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Abstract

This paper studies gender differences in the labor market reallocation of workers in Mexico as a response to trade liberalization with China. To measure exposure to import competition, I exploit variation in the initial industry structure of Mexican local labor markets. I show that aggregate outcomes mask heterogeneous responses based on gender. Although the employment rate drops for both men and women, the former enter into unemployment while the latter leave the labor force. The results suggest that the drop in the female labor force participation rate is driven by their exit out of formal and especially informal work.

Keywords: Trade, Gender Inequality, Labor Market, Informal Work, Mexico

JEL Codes: F16; J16; J21; J46

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This paper uses confidential data from IPUMS International (IPUMS International, 2020). The data can be obtained by filing a request directly on the IPUMS website. The author is willing to provide instructions how to download the data and provide all necessary codes for replicating results, tables, and figures in this paper.

1. Introduction

This paper studies the impact of trade liberalization on gender inequality in the labor market. With the increasing interaction of countries in the global market and persisting differences between the sexes, the question arises whether global integration and foreign competition has an equalizing effect on the position of women and men in the economy and society. From an economic perspective, promoting gender equality has a beneficial impact on economic development (Cuberes and Teignier, 2016; International Monetary Fund IMF, 2018).

In this paper, I empirically analyze the causal impact of trade liberalization on gender equality. For the identification of the effect of trade liberalization, I utilize the special case of China's integration into the world economy. The focus of this paper is the effect of China's presence in Mexico. Although scholars have studied the impact of trade liberalization on labor markets in developing countries, a clear causal effect is still ambiguous. In particularly, responses in informal employment opportunities are understudied even though these distinguish labor market responses in low- and middle-income countries to those in the developed world. Mexico has entered into various trade agreements which have fostered trade relationships among its members and has also experienced rising import competition from China (Iacovone *et al.*, 2013; Mendez, 2015). In addition, the Mexican economy is characterized by a high share of informality in the labor market (International Labour Organization, 2014). In 2016, more than half (61%) of the world's global employment was informal (Bonnet *et al.*, 2019). In the same year in Mexico, almost 50% of men and 57% of women were employed informally (OECD, 2017). Workers in these jobs which are characterized by limited social security access and worse working conditions but more flexibility could be particularly vulnerable to import competition (Goldberg and Pavcnik, 2003; Connolly, 2022). Thus, Mexico constitutes a suitable setting to shed light on labor market consequences also beyond formal employment relations.

Previous studies have also pointed to differences in the response of women and men to changes in the Mexican trade structure. The bulk of studies on trade liberalization and gender equality

focused on the period under the North American Free Trade Agreement (NAFTA). Aguayo-Tellez *et al.* (2014) report an increase in women's relative wages in Mexico driven by the expansion of female-intensive sectors and increased demand of female workers under NAFTA in the 1990s. Building on this, Juhn *et al.* (2013) and Juhn *et al.* (2014) show that technological upgrading as an answer to increased competition under NAFTA can limit the importance of workers' physical strength and ability. Indeed, this mechanism explains an increase in female blue-collar workers in Mexico. Growth in women's share of employment is also reported for the early 2000s, although this gain was associated with lower wages for women and men but more pronounced for female workers (Domínguez-Villalobos and Brown-Grossman, 2010). With a particular focus on the distinction of the formal and informal sector, Ben Yahmed and Bombarda (2020) show that increased trade liberalization in the 1990s increased the probability of working formally for both sexes in the manufacturing sector, although this effect is more pronounced for men. The probability of formal employment in services decreased for low-skilled women. A common factor of these previous studies is their focus on the manufacturing sector. In addition, the effect on informal employment is mostly neglected. The trade periods under study are also clearly related to the Mexican economy and thus cannot describe the causal effect of trade changes on the labor market. The impact of trade liberalization on gender differences in labor market outcomes has also not been assessed from 2005 onwards. Utar and Ruiz (2013) and Iacovone *et al.* (2013) report substantial reallocation across sectors and firms and deteriorating effects on employment as a response to increased imports from China. Further, Majlesi (2016) provides first evidence on deteriorating employment effects for women which result in lower relative decision making power. Despite progress in the last decades, women in Mexico are not equal to men socially, culturally and economically, with persisting differences in labor force participation and employment rates. Thus, it is of importance to assess whether increased import competition constitutes another threat to gender equality. I focus on labor market outcomes, since employment is an important indicator for economic empowerment and security as it provides women with the chance for participation in economic decision-making and economic independence. A high number of female workers can also indicate progress in gender

equality outside the labor market, especially with more social acceptance towards women in the workforce (Hiller, 2014; United Nations Women, 2019).

Several mechanisms explain why and how trade liberalization affects gender inequality. First, procompetitive effects of trade can induce progress toward gender equality. Trade liberalization increases competition, making costly discrimination of workers infeasible. Thus, employers are forced to hire from the whole pool of workers rather than discriminating against women (Becker, 1957; Ederington *et al.*, 2009). Second, more competition can also lead firms to invest in new technologies and thus induce skill-biased technological change, which can make physically demanding skills less important (Acemoglu, 2003; Juhn *et al.*, 2013; 2014). Thus, if women and men differ in their endowment of physical strength, technical change can positively affect women's employment possibilities (Galor and Weil, 1996). Third, another mechanism explaining the effect of globalization on gender inequality is the sectoral reallocation of labor. Trade liberalization shifts production factors from sectors exposed to import competition to those focused on exporting (Melitz, 2003). Gender is considered one of the main individual characteristics explaining this adjustment process (Juhn *et al.*, 2013). If female-intensive sectors are concentrated in exporting, I would observe an increase in the real earnings of women. Still, the expansion of female and capital-intensive sectors as a result of increased trade can also negatively affect women on the labor market. Sauré and Zoabi (2014) explain this possibility by the dilution of the capital-labor ratio due to the migration of male workers into initially capital-intensive sectors. Which of these mechanisms is at work and prevails depends on the initial gendered industry structure and its development as well as the the increase in competition and technological upgrading.

For the identification of the effect of trade, I rely on China's rapid and vast-reaching presence in other economies. This is convenient, since trade flows and policies are usually not exogenous and not independent from changes in behavior of trading partners. However, China's immense export growth gained momentum with domestic reforms initiating a transition from central planning towards a market-driven economy as well as its accession to the WTO in 2001. The latter granted Chinese exports most-favored nation status among the other WTO members and reduced trade

costs in China immensely. China's recent presence in foreign economics has been used as a quasi natural-experiment to get a clear causal interpretation of an import shock on changes in labor market outcomes (Autor *et al.*, 2013). To identify the import shock, I exploit variation in exposure intensity to Chinese imports based on the initial industry composition of a local labor market. To counteract possible endogeneity issues, I identify the component of Mexican import growth that is only due to China's export growth. I adjust the import exposure measure by including growth in Chinese exports to the rest of the world rather than to Mexico since other economies are not directly related to changes in the Mexican economy. This adjusted exposure measure is then used in an instrumental-variable estimation framework.

The results show that the import shock reduced employment for both female and male workers in the Mexican labor market, while I observe heterogeneity in the transition out of employment. Male workers move into unemployment whereas female workers drop out of the labor force. Results indicate that an import exposure increase of $100 per worker led to a decrease in the overall employment share of 0.12 percentage points. For a commuting zone (CZ) at the 75th percentile of exposure, this translates into declines by 0.41 percentage points for female employment rates and declines by 0.30 percentage points for male employment rates. The unemployment rate of male workers increased by 0.18 percentage points and that of female workers by 0.09 percentage points as a response to an increase of $100 in import exposure per worker. Also, my results suggest that a highly exposed commuting zone experiences a reduction of 1.09 percentage points in the female labor force participation rate whereas I do not identify an economically relevant change in the male labor force participation rate. The sharp decrease in female labor force participation can be explained by losses in informal employment rates. The informal employment rate in a highly exposed commuting zone (at the 75th percentile) declined by 0.68 percentage points for women and by 0.29 percentage points for men.

This paper provides novel evidence on labor market responses to trade liberalization of women and men in Mexico. To the best of my knowledge, this paper is the first to explicitly study differences in the labor market responses of female and male workers in Mexico to Chinese import competition.

Furthermore, I study responses beyond formal employment to emphasize a realistic response of the Mexican labor market. Hence, this paper contributes to two strands of literature. It complements the empirical literature on causal labor market effects of trade. For the particular case of Mexico, I find a decrease in the employment rate and the labor force participation rate, and an increase in the unemployment rate as an answer to increased Chinese import competition. Further, the paper contributes to the literature on heterogeneous responses to import shocks based on gender. I show that women and men react differently to an import shock. Male workers transition into unemployment, whereas female workers drop out of the labor force. This latter movement is driven by decreases in formal and especially informal employment of women.

The remainder of the paper proceeds as follows. In Section 2, I start with a discussion on previous literature on trade liberalization and gendered labor market outcomes and how my work adds to these streams of literature. In the next section, Section 3, the measurement for the exposure to foreign competition is introduced. In Section 4, I first start with the empirical strategy and then move on to presenting the results. Here, I show the overall impact of an import shock on employment rates, unemployment rates, and labor force participation rates. Further, I present evidence for the effect of increased import exposure on formal and informal employment rates and also show heterogeneous responses by industry. Section 5 provides robustness for the results. Finally, Section 6 concludes.

2. Related Literature

This paper makes use of the Chinese import shock and thus adds to the understanding of the economic impact of China's growth. Overall, there is a rich literature highlighting adverse (labor market) effects in the US. Starting with the seminal contribution of Autor *et al.* (2013), scholars made use of China's entry into the world economy to measure the extent of exposure to international competition. Autor *et al.* (2013) introduce an estimation strategy based on initial industry structures in local labor markets and explain the Chinese import penetration as one major cause of the stark decrease of manufacturing employment in the US. These findings are supported by Pierce and

Schott (2016) who rely on the abolishment of uncertainty in tariffs for Chinese exports due to its accession to the WTO for their identification. Autor *et al.* (2021) also highlight the persistence of the negative employment responses of the China trade shock. [1] Negative employment effects as a response to increased import competition from China are also reported for other highly developed economies. Balsvik *et al.* (2015) find that low-skilled workers in Norway exit the labor force or employment due to the import shock. Beyond adverse employment effects, Malgouyres (2017) also report decreases in wages of manufacturing workers and wage polarization in the nontraded sector in France. For developing countries, the evidence is more ambiguous and not as extensive. Costa *et al.* (2016) explicitly also account for the increase in demand in commodities in China together with the increase in its supply. They show that growth of manufacturing wages slowed down in local labor markets that faced more import exposure compared to faster wage growth in regions with increased exports to China. The impact of the expansion of the Chinese economy has also been studied for Mexico. Iacovone *et al.* (2013) show that small firms and marginal products are negatively affected, whereas larger firms actually benefit from cheaper Chinese intermediary inputs. The paper most directly related to mine is Mendez (2015) that also relies on the exposure to Chinese import competition of Mexican regions to study the response in labor market outcomes. The study finds that manufacturing employment in Mexico declined due to foreign competition and that this decrease is more pronounced for regions indirectly affected as well through exposure in the US market. Exploiting the same identification strategy, my findings are in line with this study. Additionally, I enrich the analysis by additionally incorporating industries beyond the manufacturing sector and focusing on heterogeneous reactions based on gender.

Since I am focusing on the gendered labor market outcomes, my paper complements works on the relationship between gender inequality and trade liberalization which is an important issue in the literature on economics and gender. Previous papers have also focused on industry variation in trade exposure for developing countries. Ederington *et al.* (2009) find that firms in previously less

[1] Beyond labor market effects, China's growth in the world economy led to a reduction of sales, R&D expenditure, and patent production for US firms. Further, increased import competition is also linked to polarization in US politics (Autor *et al.*, 2020). The deteriorating employment effects have further been linked to a decrease in marriage and fertility (Dorn *et al.*, 2019).

competitive environments in Columbia hire more female workers as a response to trade induced competition. For the trade liberalization period in the 90s, Gaddis and Pieters (2017) report a decline in labor force participation and employment rates for both sexes in Brazil which is more pronounced for men. Focusing on the informal sector, Goldberg and Pavcnik (2003) cannot identify a link between trade liberalization and informal employment for Brazil and Colombia in the 1980s and 90s. Brussevich (2018) add to the results of Autor *et al.* (2013) that the negative shock to US employment and wages as a result of an import shock from China is for the most part borne by male workers due to the male-intensity of the manufacturing sector. This reduction of male workers in the US, especially low educated men, is also reported by Besedeš *et al.* (2021). Their empirical findings show an increase in women's labor force participation rate which is more pronounced for educated women but also an increase in part-time work for women. In line with findings for the US, Benguria and Ederington (2017) find evidence that import competition from China reduced the gender wage gap in Brazil. The reduction can be explained by a decrease in wages of male workers and an increasing share of female workers in higher paying occupations. Connolly (2022) builds upon work of Costa *et al.* (2016) and considers the immense increase of exports from Brazil to China as well. Higher import exposure induces slower wage growth which is more pronounced for male workers whereas higher exports are associated with faster wage growth. However, increased imports also increase female employment and decrease unemployment for both women and men. These employment opportunities are concentrated in the formal sector which also highlights the transition of women into formal working conditions. For Peruvian workers, Mansour *et al.* (2022) find contrary results. They indicate a negative initial employment effect for both men and women. Due to non-perfect labor mobility across tradable and non-tradable sectors, the effects are persistent only for women. The literature has thus highlighted the importance of studying heterogeneous responses to trade based on gender. Overall, scholars emphasize positive effects of China's global integration on gender equality in labor markets which is mostly driven by a relative worsening of the labor market situation of men.

3. Local Exposure to Chinese Import Competition

In this section, I set the stage for the identification strategy. The analysis is performed at a local labor market level. I first introduce the regional exposure measure. Then, I discuss the data sources and the definition of the local labor market level as well as presenting summary statistics.

Measurement and Data Sources

The effect of increased import competition is measured by comparing local labor markets along their exposure to competition from China. Since I do not have information on trade flows at a regional level, I have to map changes in national imports to the regional level by using the initial regional industry composition. This measure of regional exposure is a Bartik-style instrument (Bartik, 1991), similarly used by Autor *et al.* (2013). The measure is defined as follows

$$\Delta EXP_{rt}^{mx} = \sum_{i} \frac{L_{irt_0}}{L_{rt_0}} \times \frac{\Delta IM_{it}^{mx}}{L_{it_0}}, \tag{1}$$

where L_{irt_0} is the number of employed people in industry i, region r, and the baseline year t_0. The normalization with L_{rt_0} leads to the industry-employment share for region r in the baseline year t_0. ΔIM_{it}^{mx} is the growth in imports from China to Mexico for each industry i for period t, which is normalized by national industry employment in the baseline year L_{it_0}. The exposure measure shows the import change in US dollars in region r and period t per worker.

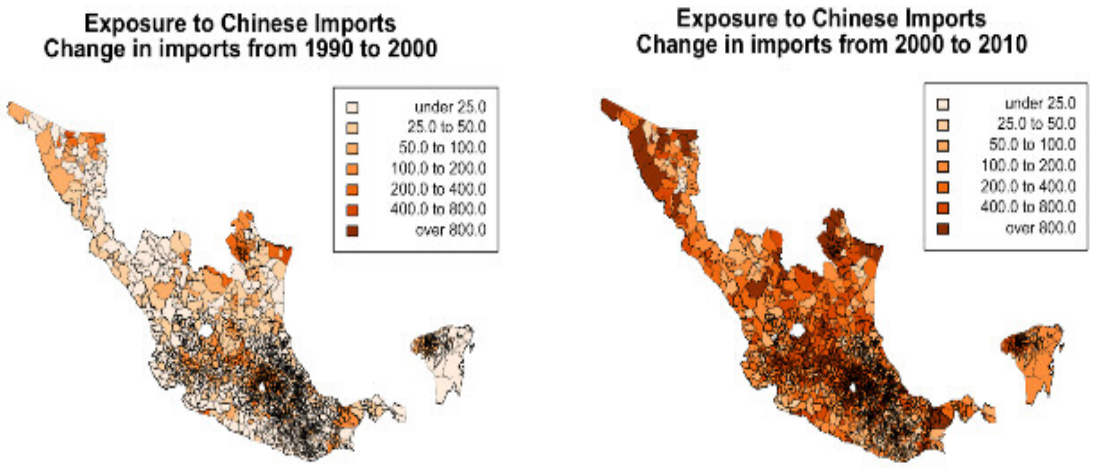
The analysis is performed at a regional level. The idea of using initial regional industry composition to relate trade shocks to labor market outcomes goes back to early work by Borjas and Ramey (1995) and was applied in the context of Mexico to study wages in the 1990s under NAFTA by Chiquiar (2008). This regional approach does not appropriately measure labor market outcomes if labor is highly mobile across regions but usually regional adjustments are sluggish. This has been shown for the US (Topel, 1986), and holds especially for developing countries (Pavcnik, 2017). Hanson (2003) points to little interregional mobility in Mexico. For the specific context of the Chinese import shock however, Majlesi and Narciso (2018) show that increased import competition leads to increased internal migration (at a municipality level) in Mexico. If as a result of increased

competition with China individuals loose their job and thus migrate to other municipalities, I would underestimate any negative employment effects. However, most important for the gendered responses, Majlesi and Narciso (2018) do not identify differences in international migration for women and men. I define a local labor market as an aggregation of municipalities that exhibit high degrees of socioeconomic integration within the cluster but not across clusters and thus accounts for imperfect mobility of workers across space (Mendez, 2015; Autor *et al.*, 2013). Following Faber (2020), these clusters are defined as 1,806 commuting zones (CZs) in Mexico (from 2,438 municipalities).

For the analysis, I need information on labor market outcomes and demographic characteristics of the Mexican population as well as on trade flows from China to Mexico. With respect to the latter, I use trade data at the 4-digit industry level from China to Mexico as well as to other countries from the UN Comtrade Database. The trade flows from China to Mexico are on an annual basis where I use the years 1990, 2000, and 2010. The baseline year consists of data from the year 1990. Since a bulk of countries only have trade data available from 1992 onwards, I employ annual data for 1992, 2000, and 2010 for the IV measure. For the outcome of interest, labor market outcomes of men and women, I rely on Mexican Census data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI). This census is conducted every ten years starting in 1960, as well as an intercensal survey in 2015. In order to capture the effects of China's export growth, I focus on cross-sections of the years 1990, 2000, and 2010. The data includes rich information on labor force participation, the employment status, as well as other individual characteristics. Further, there is detailed information on the specific form of employment, which allows me to distinguish formal and informal workers. Another feature is the indication of the municipality of the residence as well as the workplace. This makes it possible to perform the analysis at a local labor market level. IPUMS International (IPUMS International, 2020) provides data samples of 10% of the population as well as person weights of the Census. I restrict the sample to people between 15 and 64 years old. My broad measure of employment is defined as private employment and includes wage or salary workers and excludes self-employment and public sector workers. The outcome variables

Figure 1: Exposure Measure per Worker

(a) 1990-2000 **(b)** 2000-2010



Notes: Import exposure per worker for each commuting zone for two consecutive periods (1990-2000, 2000-2010).

are defined as follows: The labor force participation rate is the labor force as a percentage of the working age population. The employment rate is the number of employed people as a percentage of the working age population. The unemployment rate is the number of unemployed people as a percentage of the labor force. In order to link the industry codes from the census data with the trade data, I employ the crosswalk provided by Faber (2020).

Summary Statistics and Descriptives

After defining the exposure measure as well as the geographical level of the analysis, I now take a glance at the data. Figure 1 presents a map of Mexican commuting zones and their corresponding exposure to Chinese import competition based on the initial industry structure, as defined in Eq. (1). Panel (a) shows the change in exposure per worker for the first period 1990 to 2000 and panel (b) for the second period 2000 to 2010. For all local labor markets, trade flows from China to Mexico have increased from period 1 to period 2. Still, due to differences in the industry structure of the commuting zones in the initial period, there is variation in the intensity of the import shock across space also for both periods.

Table 1: Commuting Zone Characteristics

	CZ characteristics		
	Mean	Median	IQR
Δ EXP$_{90-00}$	52.0	25.6	39.0
Δ EXP$_{00-10}$	580.1	187.5	406.9
	Wgt. Mean	Wgt. Median	Wgt. IQR
Female LFP rate, 1990	0.23	0.26	0.15
Female LFP rate, 2010	0.41	0.44	0.10
Male LFP rate, 1990	0.81	0.80	0.05
Male LFP rate, 2010	0.85	0.84	0.03
Female employment rate, 1990	0.18	0.21	0.14
Female employment rate, 2010	0.27	0.31	0.09
Male employment rate, 1990	0.50	0.55	0.11
Male employment rate, 2010	0.52	0.54	0.06
Female unemployment rate, 1990	0.02	0.02	0.01
Female unemployment rate, 2010	0.03	0.03	0.01
Male unemployment rate, 1990	0.03	0.03	0.01
Male unemployment rate, 2010	0.05	0.06	0.02
Observations	1,806	1,806	1,806

Notes: For the labor market outcomes, the summary statistics are weighted (wgt.) by the CZ's working age population. IQR indicates the interquartile range.

Table 1 presents commuting zone characteristics. The immense growth in Chinese imports is again visible. The median CZ experienced an increase in import exposure from $25 to $187 when comparing period 1 to period 2. The interquartile range indicates a wide variation across commuting zones for both periods, which was also emphasized in Figure 1. Turning to labor market outcomes at a commuting zone level, Table 1 also presents summary statistics for the labor market outcomes of interest. While the male labor force participation was already rather high in 1990 and virtually remained at this high level, the average female labor force participation denotes an increase of 18 percentage points over the two periods. However, with 41% the average labor force participation rate of women remained about half that of men with 85% in 2010. Similarly, male employment

rates stayed persistently stable around 50% on average in both periods. Again, female employment rates experience a stark surge over the period studied, increasing from 18% on average in 1990 to 27% in 2010. Female unemployment rates hardly changed from 1990 to 2010 from on average 2% to about 3%. In contrast, the male unemployment rate is slightly higher and experienced an increase from on average 3% in 1990 to 5% in 2010.

4. Local Labor Market Effects of an Import Shock

In this section, I use the specification of the import exposure measure and specify my model. Then, I discuss potential problems with this approach and how I tackle them. I present results for my main outcomes before moving on to further analysis. These extensions cover formal and informal employment, heterogeneity by industry, and indirect competition.

Empirical Strategy

The estimation strategy relies on the variation in the initial industry structure across commuting zones. The analysis is performed at the local labor market level by aggregating the individual-level data for two periods, 1990 to 2000 and 2000 to 2010. I estimate the following first-difference equation

$$\Delta Y_{rt} = \alpha_r + \beta \Delta EXP_{rt}^{mx} + \boldsymbol{\delta} \boldsymbol{X}_{rt_0} + \varepsilon_{rt}, \quad \varepsilon_{rt} \sim \mathcal{N}(0, \sigma_r^2) \tag{2}$$

where time is denoted by $t = \{1, 2\}$ and the commuting zones are denoted by $r = 1, ..., 1806$. ΔY_{rt} denotes changes in employment, unemployment or labor force participation as a percentage of the working age population for each period t. The definition of these variables of interest is $\Delta Y_{rt} = Y_{rt} - Y_{r(t-1)}$. This leaves me with two time periods in the analysis. For the gender-specific analysis, I study these labor market outcomes separately for women and men. Further, I add to this specification demographic characteristics X_{rt_0} in the baseline year t_0 as controls. These are the share of the working age population, the share of men, the logarithm of the population size, the

share of people with children under five years old, and the shares of people with primary, secondary and tertiary education as their highest level, all for the baseline year 1990.

This estimation strategy faces potential endogeneity issues. If Mexico has experienced a positive industry productivity shock throughout 1990 to 2010, I would observe changes in labor market outcomes. Thus, the OLS estimates from Eq. (2) would underestimate the effect of Chinese import competition on the Mexican labor market. In that case, trade flows from China to Mexico would represent an endogenous answer to domestic market conditions rather than a supply-driven nature of the import shock. To address these potential endogeneity issues, I adjust the import exposure measure to depict the exogenous rise in China's productivity. I instrument trade flows from China to Mexico with trade flows from China to the rest of the world (excluding Mexico and the US). The adjusted exposure measure is similar to Eq. (1):

$$\Delta EXP_{rt}^{other} = \sum_{i} \frac{L_{irt_0}}{L_{rt_0}} \times \frac{\Delta IM_{it}^{other}}{L_{it_0}} \tag{3}$$

where the only difference is that ΔIM_{it}^{other} is now the growth in imports from China for each industry i and period t to the rest of the world rather than to Mexico. The preferred equation looks as follows

$$\Delta Y_{rt} = \alpha_r + \beta_1 \Delta \widehat{EXP_{rt}^{other}} + \boldsymbol{\delta} \boldsymbol{X}_{rt} + \varepsilon_{rt}, \quad \varepsilon_{rt} \sim \mathcal{N}(0, \sigma_r^2) \tag{4}$$

where $\Delta \widehat{EXP_{rt}^{other}}$ are the predicted values from a first stage, where I regressed ΔEXP_{rt}^{mx} on ΔEXP_{rt}^{other} and the controls used in the second stage. This instrumental variable approach has also been used widely in the literature (see e.g., Autor *et al.*, 2013; Malgouyres, 2017). The required exclusion restriction for this instrument is that import growth in Mexico is only driven by supply-related factors specific to China (Dorn *et al.*, 2019; Mansour *et al.*, 2022). Thus, this specification identifies the component of Mexican import growth that is due to China's rising comparative advantage and falling trade costs. Table A1 presents the first stage. The outcomes suggest a positive and significant relationship between ΔEXP_{rt} constructed with Mexican and rest-of-the-world data.

The predictive power of the instrument is also confirmed with test statistics and I do not face a weak instrument problem.

Validity of the Research Design

The measure introduced in Section 3 relies on mapping national changes in imports to the regional level (Bartik, 1991). The identification relies on the exogeneity of the initial industry shares where the import shocks act as weights on the shares as proposed in Goldsmith-Pinkham *et al.* (2020). Following their suggestion, I estimate the Rotemberg weight for each industry. Appendix Table A2 Panel B lists the top 5 industries with the highest weights. Their sum makes up almost 86% (=0.95/1.106) of the absolute weight in the estimator. The five main industries include agriculture and four manufacturing industries (Computers & Electronics, Other Manufacturing, Rubber & Plastic Products, and Electrical Equipment & Machinery). This is reassuring for the validity of the research design, because particularly manufacturing industries experience the largest exposure to Chinese import competition. Next, I test the plausibility of the identifying assumption by investigating the relationship of local labor market characteristics (that I also include as controls in Eq. (4)) and the formerly mentioned industry shares. Table A3 shows the correlations. Almost all of these industries are concentrated in higher educated local labor markets. However, the industry shares are not correlated with other commuting zone characteristics which provides support that the import exposure measure is exogenous. This does not hold for the agriculture industry which is correlated with all commuting zone characteristics. To provide support that this does not interfere with the identification, Table A4 shows results excluding the agriculture industry. The results are in line with my main findings from Table 2 and thus I argue that including agriculture does not bias my results.

Main Results

I begin the analysis by discussing results from estimation Eq. (4) in Table 2 and Figure 2. These are outcomes from using the IV approach. The OLS estimates are presented in Table A5. I

show my three main outcome variables overall as well as for women and men separately. The outcome variables are the change in the employment rate, the unemployment rate, and the labor force participation rate. The size of the effect in Table 2 is the change in labor market outcomes to a $100 increase in exposure to Chinese import competition. Figure 2 shows changes in the outcome variables for a highly exposed commuting zone (at the 75th percentile). Here, the local labor market experiences an increase in import exposure of $302 per worker. This specification provides a deeper understanding of the magnitude of the effects. For Table 2, Column 1, 3, and 5 show the results without any baseline controls, whereas Column 2, 4, and 6 include baseline demographic controls at the CZ level as well as CZ fixed effects and clustered standard errors at the CZ level. The latter specification is also used for the outcomes in Figure 2. The control variables used are the share of the working age population, the share of men, the logarithm of the population size, the share of people with children under five years old, and the shares of people with primary, secondary and tertiary education as their highest level, all for the baseline year 1990.

The results in Panel A of Table 2 indicate that the import shock had an overall negative effect on the employment rate. If I focus on the preferred specification (Column (2)), the results imply that an import exposure increase of $100 per worker led to a decrease in the overall employment share of 0.12 percentage points. This negative impact of increased import exposure on employment is confirmed for both genders alike. Figure 2 shows that a highly exposed commuting zone (at the 75th percentile) experiences a reduction of 0.41 percentage points in the female employment rate and a reduction of 0.30 percentage points in the male employment rate. Next, I analyze how this reduction in employment translated to unemployment and the labor force participation overall. The results from Table 2 suggest a surge in unemployment as a response to an import shock. This change in unemployment is more pronounced for men. More specifically, the overall unemployment rate reacts with an increase of 0.16 percentage points to a $100 change per worker in import exposure. A highly exposed CZ shows a positive change in the unemployment rate of 0.47 percentage points. Men's unemployment rate experiences an increase of 0.54 percentage points in a highly exposed commuting zone, compared to an increase of 0.27 percentage points for women. When I move

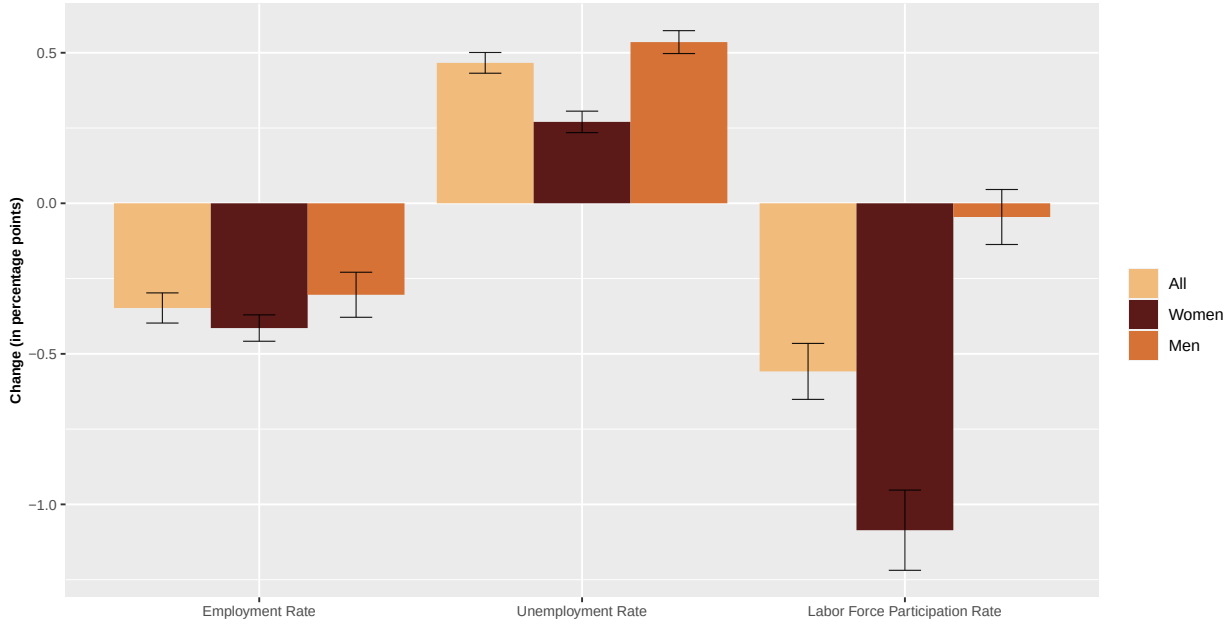
Table 2: IV regressions: Effect of Trade Shock on Labor Market Outcomes

	Panel A: Employment Rate					
	W&M		Women		Men	
Δ EXP	−0.042	−0.115	−0.043	−0.137	−0.048	−0.101
	(0.010)	(0.033)	(0.008)	(0.041)	(0.015)	(0.030)
	Panel B: Unemployment Rate					
	W&M		Women		Men	
Δ EXP	0.074	0.155	0.050	0.090	0.086	0.178
	(0.007)	(0.043)	(0.008)	(0.025)	(0.008)	(0.049)
	Panel C: Labor Force Participation Rate					
	W&M		Women		Men	
Δ EXP	−0.060	−0.185	−0.150	−0.360	0.021	−0.015
	(0.017)	(0.055)	(0.024)	(0.109)	(0.019)	(0.015)
Observations	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls		✓		✓		✓
CZ FE		✓		✓		✓
Clustered SE		✓		✓		✓

Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. Number in parenthesis indicates standard errors. The outcome variables are the change in employment rate (Panel A), the unemployment rate (Panel B), and the labor force participation rate (Panel C). Column (1) shows results from a regression without any controls. Column (2) includes controls, CZ fixed effects, and clustered standard errors at the CZ level.

to the labor force participation rate, the results reveal a contrary finding. Overall, exposure to Chinese import competition reduces the labor force participation rate. This reduction amounts to 0.19 percentage points as a response to a $100 increase in import exposure. However, this decline is entirely borne by female workers who experience a decrease of almost 1.09 percentage points in a highly exposed CZ. If I compare this to the median female labor force participation rate in 2010, which is 44%, a decline of 2.00 percentage points indicates a 2.5 % decrease in the female labor force participation rate. Contrary to the findings on the unemployment rate, I do not identify an economically relevant change in the male labor force. Thus, my results suggest that an import shock leads to adverse labor market outcomes for both women and men.

Figure 2: Changes in Labor Market Outcomes



Notes: Results from a regression for a highly exposed commuting zone (at the 75th percentile). This figure plots the point estimates (thick bars) and standard errors (thin bars) of the exposure to Chinese import competition for different outcomes. The outcome variables are the change in employment rate, the unemployment rate, and the labor force participation rate. This specification includes controls, CZ fixed effects and clustered standard errors at the CZ level. The control variables used are the share of the working age population, the share of men, the logarithm of the population size, the share of people with children under five years old, and the shares of people with primary, secondary and tertiary education as their highest level, all for the baseline year 1990.

The reported outcomes emphasize the difference in the transition process. My findings suggest an overall negative effect on the Mexican labor market as a response to increased import competition from China. Men and women react differently in the transition process: Male workers transition into unemployment but stay within the active labor force, women experience a smaller increase in unemployment and further actually drop out of the labor force. Thus, I highlight that total effects can mask underlying heterogeneity. The overall decline in employment rates is in line with general findings on the effects of the Chinese import shock (Autor *et al.*, 2013; Mansour *et al.*, 2022), as well as evidence for Mexico (Mendez, 2015). My results suggest a prominent decrease in women's labor force participation but no significant change for men. For the US, Brussevich (2018) and Besedeš *et al.* (2021) show exactly the opposite, namely negative effects on men's labor force participation. Similar to my findings, Mansour *et al.* (2022) also indicate a reduction in the

labor force participation for women in Peru which they explain by the lack of job opportunities in the non-tradable sector.

Formal and Informal Employment

The analysis until now has focused on my main labor market outcomes for all industries. In the following, I will take a more precise look at formal and informal employment in explaining differences in the responses of men and women to increased import exposure.

So far, I have presented results based on a broad measure of private employment. However, the Mexican economy features high rates of informal employment (OECD, 2017). In order to understand the effect of an import shock on the labor market, I have to further differentiate between formal and informal employment. Based on the classification of INEGI and the ILO International Labour Organization (2013), informal employment includes own account workers, day laborers, and unpaid family workers who work outside their home. Formal employment covers employers (business owners with employees) and blue- and white-collar wage workers (Schmieder, 2021).[2] As a comparison, recall that private employment includes wage and salary workers. This group consists of blue and white collar employees (formal) and day laborers (informal), thus providing an overall measure of employment including formal and informal workers. Own account workers (informal) and business owners (formal) are considered as self-employed and were excluded from the former employment measure.

Table 3 presents summary statistics of formal and informal employment rates from the data. Since these are measured at a commuting zone level, the numbers are weighted by the commuting zone's working age population to account for different population sizes. A similar picture as reported for employment in Table 1 arises. Male formal employment stagnates at a rather high value, whereas average female formal employment rates have increased from 18% in 1990 to 27% in 2010. For

[2] INEGI defines informal employment according to international standards (International Labour Organization, 2013). This includes own-account workers and employers employed in their own informal sector enterprises, contributing family workers, employees holding informal jobs, whether employed by formal sector enterprises, by informal sector enterprises, or as domestic workers employed by households, members of informal producers' cooperatives, and own-account workers engaged in the production of goods exclusively for own final use by their household (International Labour Organization, 2013).

the male informal employment rate, the data suggest a slight decrease on average from 1990 to 2010 (from 34% to 28% on average). Again, female informal employment rates experience a surge over the period studied, from 4% in 1990 to 11% in 2010 on average. However, these informal employment rates are much lower than those reported in the literature. Schmieder (2021) shows that this definition of informal employment identifies about two-thirds of informal employment in younger women based on the International Labour Organization (2013) definition with data from the National Survey of Occupation and Employment (ENOE). I want to emphasize that while I am not able to capture the whole universe of informal employment in Mexico, I offer a glimpse into adjustment horizons beyond formal employment.

Table 3: Commuting Zone Characteristics, Formal and Informal Employment

	CZ characteristics		
	Wgt. Mean	Wgt. Median	Wgt. IQR
Female formal employment rate, 1990	0.18	0.21	0.15
Female formal employment rate, 2010	0.27	0.31	0.10
Male formal employment rate, 1990	0.42	0.49	0.264
Male formal employment rate, 2010	0.50	0.56	0.12
Female informal employment rate, 1990	0.04	0.04	0.01
Female informal employment rate, 2010	0.11	0.11	0.04
Male informal employment rate, 1990	0.34	0.26	0.27
Male informal employment rate, 2010	0.28	0.21	0.13
Observations	1,806	1,806	1,806

Notes: The summary statistics are weighted (wgt.) by the CZ's working age population. IQR indicates the interquartile range.

Table A6 and Figure 3 show IV estimates for the impact of the Chinese import shock on formal and informal employment. Overall, employment declines as a response to an import shock but informal employment is affected with a larger magnitude. Female workers also face a stronger reduction in formal as well as informal employment compared to male workers. Men in formal employment experience a reduction of 0.10 percentage points in employment. The change is statistically significant but arguably lacks economic importance. As a response to a $100 increase

Table 4: Top 5 Industries with largest growth in imports from China to Mexico (ΔIM^{mx}_{90-10})

	Mean share of workers (t_0)
	Female
Computers & Electronics	0.326
Industrial Machinery	0.115
Other Manufacturing	0.244
Electrical Equipment & Machinery	0.408
Rubber & Plastic Products	0.197
Overall Mean Female Share for all Industries	0.218

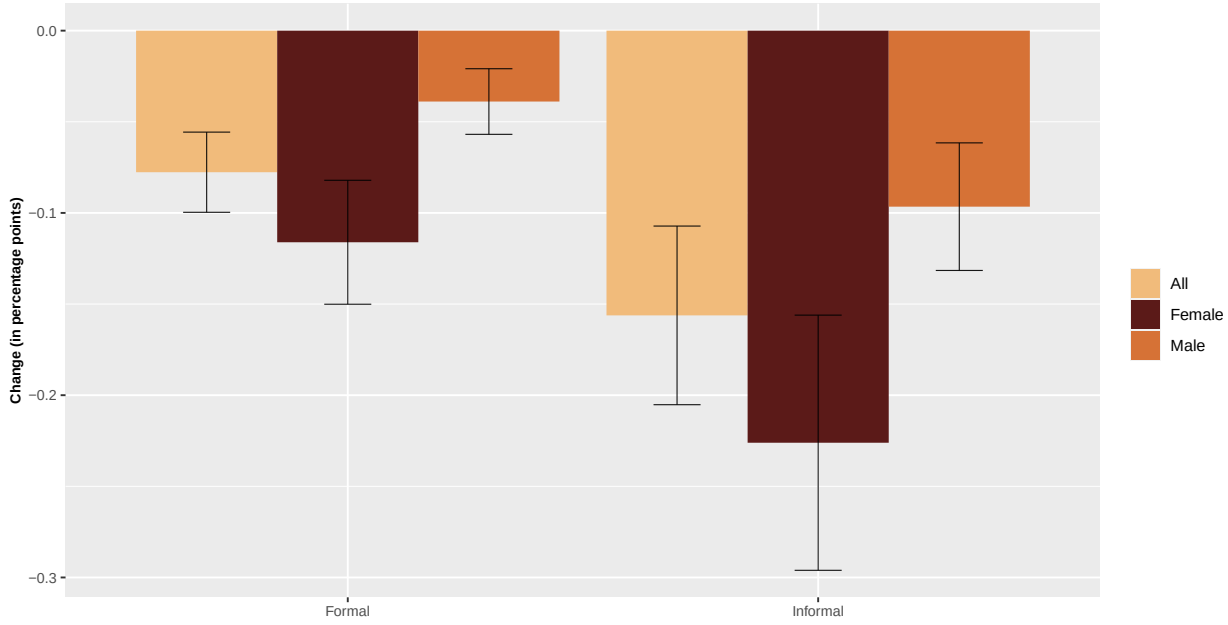
Notes: The summary statistics are weighted by the CZ's population size.

in exposure to Chinese import competition informal employment of women declines by 0.23 percentage points. For a highly exposed commuting zone (at the 75th percentile) this indicates a decrease in female informal employment of 0.68 percentage points. Male informal employment in a highly exposed commuting zone declines by 0.29 percentage points. The more pronounced response of informal work can be explained by the lower job security and generally more precarious employment conditions in these jobs. Also, the sharp decline of female formal and especially informal employment can explain the decrease in women's labor force participation rates, as I discussed in Table 2. Because informal jobs offer more flexibility on which female workers depend, this can explain them rather dropping out of the labor force than transitioning into formal employment relations (Schmieder, 2021). The OECD (2017) notes that especially Mexican parents deal with an "all or nothing" choice in the labor market – if flexibility and less working hours are not possible, then not working at all is the only choice to take care of the family.

Industry-Level Heterogeneity

Now that I have presented the response of different labor market outcomes also beyond formal employment, in this next section I shed light on heterogeneity by industry.

Figure 3: Changes in Formal and Informal Employment Rates

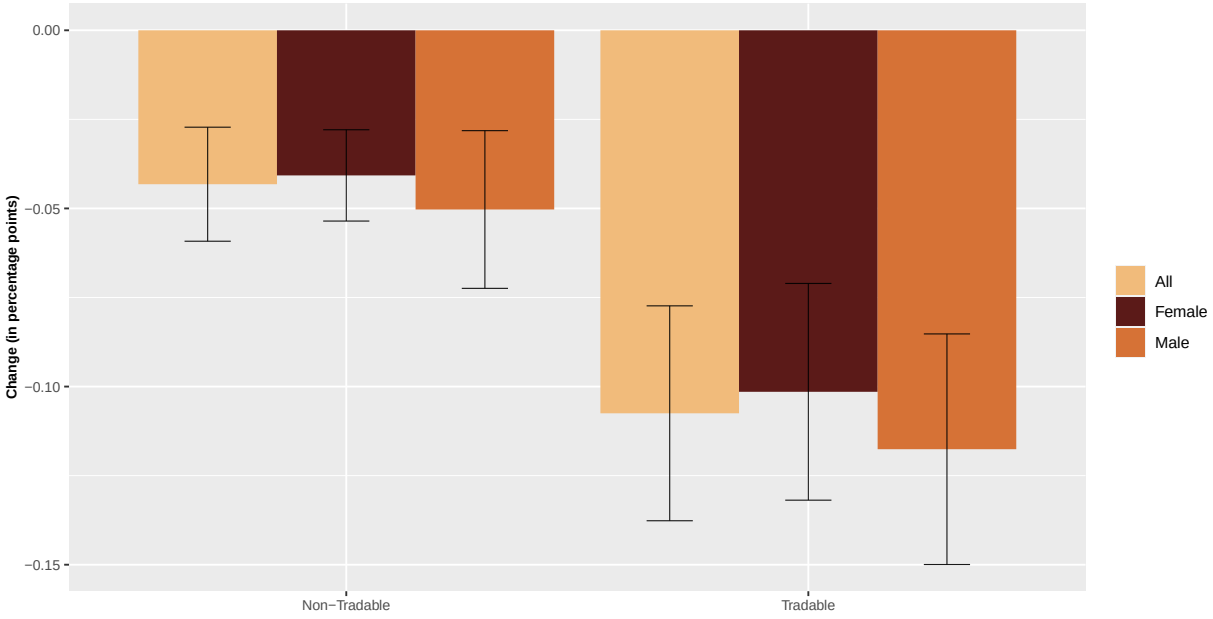


Notes: Results from a regression for indicating a $100 increase in exposure to Chinese import competition. This figure plots the point estimates (thick bars) and standard errors (thin bars) of the exposure to Chinese import competition for different outcomes. The outcome variables are the change in the formal employment rate and the informal employment rate. This specification includes controls, CZ fixed effects and clustered standard errors at the CZ level. The control variables used are the share of the working age population, the share of men, the logarithm of the population size, the share of people with children under five years old, and the shares of people with primary, secondary and tertiary education as their highest level, all for the baseline year 1990.

In a first step, I look at employment responses separately for tradable and non-tradable industries. I define tradable industries as all industries which received imports from China.[3] The results are presented in Figure 4. Again, I rely on the same specification as for the main results in Table 2. The outcome variables are the change in the employment rate in tradable and non-tradable industries. Overall, the employment rate decreases in both industry groups as a response to increased import exposure. The results suggest a similar response of women and men. The negative change in employment is of a larger magnitude in tradable industries compared to non-tradable industries. In a next step, Figure 5 shows the industry-specific employment-to-population changes due to the Chinese import shock. In agriculture, I observe an overall decline of employment which is

[3] Tradable industries are agriculture, automotives, computers, electricals, food, industrial machinery, metal products, metals, minerals, other manufacturing, paper, pharmaceuticals, rubber, textiles, and wood.

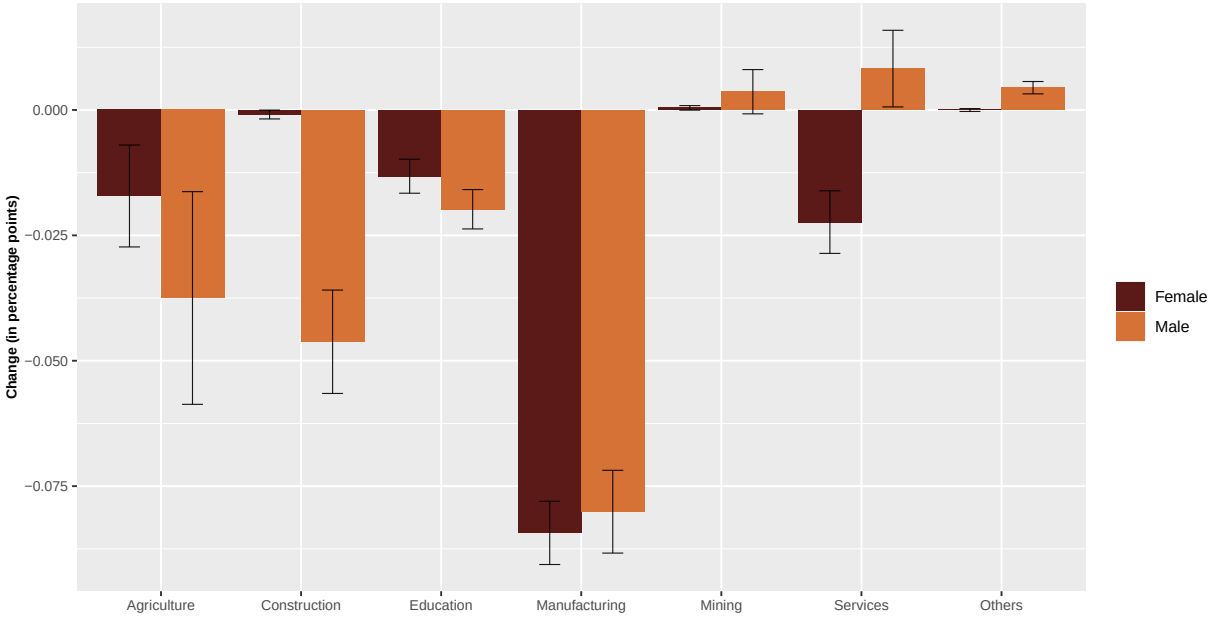
Figure 4: Changes in Employment Rate by Tradable and Non-Tradable Industries



Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. This figure plots the point estimates (thick bars) and standard errors (thin bars) of the exposure to Chinese import competition for tradable and non-tradable employment-to-population ratios. This specification includes controls, CZ fixed effects and clustered standard errors at the CZ level. The control variables used are the share of the working age population, the share of men, the logarithm of the population size, the share of people with children under five years old, and the shares of people with primary, secondary and tertiary education as their highest level, all for the baseline year 1990.

more pronounced for men. In construction, only male workers were affected by the decrease in employment. Of course, this can be explained by the low female intensity of the industry (see Table A7). The manufacturing sector, which comprises the most exposed industries (see Table 4), saw the largest adverse effects in employment for both sexes alike. The non-tradable industry mining does not experience significant changes in the male or female employment rate. For the services industry, again a non-tradable industry, I report two counteracting effects. While women's employment declines, male's employment even increases with a small magnitude to an import shock. The stark difference in the gendered-responses in industries can also be explained by differences in the initial female-intensity of the industry. Table 4 shows the female-intensity of the top five industries that experienced the largest growth in imports from China to Mexico (ΔIM^{mx}_{90-10}). Compared to the average female share over all industries, most of these industries actually exhibit

Figure 5: Changes in Employment Rate by Industry



Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. This figure plots the point estimates (thick bars) and standard errors (thin bars) of the exposure to Chinese import competition for different industry-employment-to-population ratios. This specification includes controls, CZ fixed effects and clustered standard errors at the CZ level. The control variables used are the share of the working age population, the share of men, the logarithm of the population size, the share of people with children under five years old, and the shares of people with primary, secondary and tertiary education as their highest level, all for the baseline year 1990.

rather high participation of women. Thus, the differences in women's and men's response in each industry are interlinked with their initial female and male share.

5. Sensitivity Analysis

In this section, I perform robustness checks by discussing different specifications for my model and also alternative measures for the import shock. Further, I discuss the role of exports and indirect competition.

Robustness of Main Specification

My main results from Table 2 show labor market responses of women and men to an import shock. Overall, these results from Table 2 and Figure 2 show that the estimates are robust to the inclusion

of demographic controls, and to using the Two-Stage Least Squares specification. In addition, Table A8 shows results from a specification without CZ fixed effects. However, here I again include control variables for the baseline year 1990, namely the share of the working age population, the logarithm of the population size, the share of low, medium, and high education, and the share of people with children under five years old. Overall, the outcomes do not change qualitatively. I still report a reduction in the employment rate for both sexes, and an increase in the unemployment rate of men and women as well as a decrease in the labor force participation of women. The effects are of smaller magnitude compared to the specification with CZ fixed effects (Table 2). This can be explained by more weight given to commuting zones with zero or lower exposure in the specification without fixed effects. To still control for similarities in geographical clusters, I also present results using fixed effects and clustered standard errors at the state level in Table A9. Compared to 1806 commuting zones, this specification controls for 31 states, thus at a more aggregated level. Again, the results suggest the familiar pattern, a decrease in the employment rate where men and women transition into unemployment and women also out of the labor force. Similar to the setting without CZ fixed effects, I also observe effects of a smaller magnitude. Table A10 shows results with the same specification as those in Table 2 but the models are weighted with the commuting zone's working age population. Again, the results are in line with my main results and are similar in significance and in some cases also in magnitude. The weighted results also show the negative effects on the employment rate, increases in the unemployment rate and a drop in the labor force participation rate that is for the most part borne by women. Thus, the robustness of my results are once again confirmed in this specification.

Next, I turn to discussing the robustness of the exposure measure. In my main specification, I rely on the adjusted exposure measure in Eq. (3). This makes use of the change in imports from China to the rest of the world but excluding Mexico and the US. Thus, to test the robustness, Table A11 presents results using different countries for the IV specification. Panel A uses changes in imports from China to the rest of the world excluding only Mexico. Panel B excludes Mexico, the US, and European Union countries. Lastly, Panel C only uses trade flows from China to other Latin

American countries and excluding Mexico. All of theses results confirm my main specification and show changes in labor market outcomes of a really similar magnitude.

Exports

The main analysis focuses on imports from China to Mexico but does not mention any changes in exports from Mexico to China in the same period. Scholars have shown that accounting for increased demand in China and thus increased exports has labor market implications as well (Connolly, 2022). However, this may only be of importance if changes in exports are of a similar magnitude compared to imports, which is not the case for Mexico. Still, I construct a net exports measure to also account for changes in exports form Mexico to China:

$$\Delta NET.EXP_{rt}^{mx} = \sum_i \frac{L_{irt_0}}{L_{rt_0}} \times \frac{\Delta IM_{it}^{mx}}{L_{it_0}} - \sum_i \frac{L_{irt_0}}{L_{rt_0}} \times \frac{\Delta X_{it}^{mx}}{L_{it_0}}, \tag{5}$$

where ΔX_{it}^{mx} are exports from Mexico to China in industry i in the period t (Autor *et al.*, 2013).

Table A12 presents outcomes using the net exposure measure ($\Delta NET.EXP_{rt}^{mx}$). The outcomes match the results with the original exposure measure (Eq. (1)) in Table A5 regarding sign and also size. Thus, I conclude that changes in exports from Mexico to China do not affect my results.

Indirect Competition

Until now, I have discussed the direct import exposure from China to Mexico. Since Mexico's primary export destination is the US, a legitimate concern is the indirect influence of increased import competition from China via the US. There is a rich literature on the adverse labor market effects of Chinese import competition in the US (Autor *et al.*, 2013; Pierce and Schott, 2016). The increased exposure to Chinese imports in the US markets has also reduced the demand for exports from Mexico (Shafaeddin, 2004; Gallagher *et al.*, 2008), also for the special case of China's integration into the world economy as shown by Utar and Ruiz (2013) for the maquiladora

sector (export assembly and processing plants). Thus, I further account for the indirect import shock by building a separate measure of changes in international competition in the US. The detailed specification can be found in Appendix 1. Similarly build to the exposure measure to Chinese import competition (Eq. (1)), the international competition measure (Eq. (A.1)) relies on the industry composition of the commuting zone to map changes in exports from Mexico to the US to the local labor market level. The measure is then included in the main specification as an explanatory variable. The results are presented in Table A13 and again suggest the known outcomes. I observe a decrease in employment for both women and men. The unemployment rate increases and even more so for male workers. As a response to an increase in import exposure, women's labor force participation decreases, whereas men's does not change significantly. The effects sizes are also in line with the main specification although of a slightly larger magnitude. The coefficient of the exposure to international competition indicates that an increase in international competition (i.e., decrease in exports leads to a decrease in the exposure measure ΔI_{rt}^{mx-us}) is associated with a positive effect on the employment rate, a negative effect on unemployment rates and a positive effect on the labor force participation rate. This would suggest that increased indirect competition does not influence the labor market negatively as opposed to direct increased import competition.

6. Concluding Remarks

This paper examines the impact of trade liberalization on gender inequality in the workforce. This paper adds to the literature by providing further causal evidence on the impact of increased globalization on gender equality. More specifically, I investigate labor market effects of trade shocks, with a focus on heterogeneous responses based on gender. To do so, I make use of China's integration into the world economy. I construct an import exposure measure which indicates the change in imports for a local labor market over the periods 1990 to 2000 and 2000 to 2010. My results indicate an overall reduction in employment as a result of increased import exposure. I highlight heterogeneity in the transition process and also in the magnitude of the response. Unemployment rates of both male and female workers increase but only women's labor force participation decreases.

I further suggest that this latter and most pronounced effect is driven by decreases in female formal and especially informal employment rates.

This differential response of women and men could be explained by the presence of traditional gender roles that drive women out of the labor force. The World Value Surveys suggest that Mexico still is characterized by rather non-egalitarian gender norms. A fourth of the Mexican population agrees if jobs are scarce, men should be prioritized compared to women (wave for 2005-2009, Inglehart *et al.* (2014)).[4] Especially for mothers, flexibility and shorter working hours are often the only possible form of employment (OECD, 2017). If informal employment opportunities are reduced due to increased import exposure, these women are forced to leave the labor force. To sum up, my paper highlights the importance of understanding heterogeneous responses of women and men also based on the structure of the labor market.

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[4] For comparison, not even 7% of the US population agreed to this statement (Inglehart *et al.*, 2014).

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A. Appendix

Table A1: First Stage Estimates for Instrumental Variable

	$\Delta\, EXP_{rt}^{mx}$
$\Delta\, EXP_{rt}^{other}$	0.054
	(0.003)
Observations	3,536
F-Statistic	17.54
Baseline Controls	✓
CZ FE	✓
Clustered SE	✓

Notes: First stage results from a regression of the original exposure measure on the instrument. Number in parenthesis indicates clustered standard errors at the CZ level. This specification includes controls and CZ fixed effects. The control variables used are the share of the working age population, the share of men, the logarithm of the population size, the share of people with children under five years old, and the shares of people with primary, secondary and tertiary education as their highest level, all for the baseline year 1990.

Table A2: Summary of Rotemberg Weights

Panel A: Total, Negative and Positive Weights

	Sum	Mean
Total	1.000	0.033
Negative	−0.106	−0.007
Positive	1.106	0.079

Panel B: Top 5 Rotemberg Weight Industries

	$\hat{\alpha}_i$	$\hat{\beta}_i$	$IndShare$
Computers	0.452	−0.025	0.001
Other Manufacturing	0.208	−0.015	0.014
Agriculture	0.143	−0.037	0.410
Rubber	0.083	−0.028	0.001
Electricals	0.064	−0.029	0.002

Notes: This table reports statistics on the Rotemberg weights as discussed by (Goldsmith-Pinkham *et al.*, 2020). Panel A shows the sum, mean, and share of total, positive, and negative weights. Panel B reports the top 5 industries that received the highest Rotemberg weights. $\hat{\alpha}_i$ is the weight for each industry i, $\hat{\beta}_i$ is the coefficient from the just-identified regression, and $IndShare$ is the industry share.

Table A3: Relationship between Industry Share and Labor Market Characteristics

	Computers	Other Manufacturing	Agriculture	Rubber	Electricals
Share Female	− 0.011	0.014	−1.191	0.019	− 0.017
	(0.007)	(0.025)	(0.228)	(0.001)	(0.014)
Share Tradable	0.001	−0.002	−0.013	−0.000	0.004
	(0.001)	(0.003)	(0.025)	(0.000)	(0.002)
Share w/ Children	− 0.010	−0.013	−0.799	−0.011	0.005
	(0.006)	(0.022)	(0.201)	(0.005)	(0.012)
Share High Education	0.190	0.594	−8.016	−0.015	0.144
	(0.019)	(0.071)	(0.645)	(0.016)	(0.039)
Observations	1,806	1,806	1,806	1,806	1,806

Notes: Each column reports results of a single regression of industry share on local labor market characteristics at the baseline year 1990.

Table A4: IV regressions: Excluding Agriculture

	A1: Employment Rate			*A2: Unemployment Rate*			*A3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.106	−0.123	−0.096	0.143	0.082	0.165	−0.161	−0.312	−0.014
	(0.031)	(0.037)	(0.029)	(0.041)	(0.023)	(0.046)	(0.048)	(0.095)	(0.015)
Observations	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZ FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition, excluding the industry Agriculture. Number in parenthesis indicates clustered standard errors. All columns include controls. The control variables used are the share of the working age population,the logarithm of the population size, share of low/med/high education, and share of people with children under 5 years old all in the baseline year 1990. All columns include fixed effects at the commuting zone level and standard errors are clustered at the commuting zone level.

Table A5: OLS regressions: Effect of Trade Shock on Labor Market Outcomes

	Panel A: Employment Rate					
	W&M		Women		Men	
Δ EXP	−0.037	−0.090	−0.035	−0.100	−0.043	−0.086
	(0.009)	(0.027)	(0.008)	(0.032)	(0.014)	(0.026)
	Panel B: Unemployment Rate					
	W&M		Women		Men	
Δ EXP	0.058	0.110	0.038	0.062	0.068	0.127
	(0.006)	(0.033)	(0.007)	(0.019)	(0.007)	(0.038)
	Panel C: Labor Force Participation Rate					
	W&M		Women		Men	
Δ EXP	−0.043	−0.115	−0.103	−0.221	0.012	−0.013
	(0.016)	(0.035)	(0.022)	(0.071)	(0.017)	(0.011)
Observations	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls		✓		✓		✓
CZ FE		✓		✓		✓
Clustered SE		✓		✓		✓

Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. Number in parenthesis indicates clustered standard errors. The outcome variables are the change in employment rate (Panel A), the unemployment rate (Panel B), and the labor force participation rate (Panel C). Column (1) shows results from a regression without any controls. Column (2) includes controls, CZ fixed effects, and clustered standard errors at the CZ level.

Table A6: IV regressions: Effect of Trade Shock on Formal and Informal Employment

	Panel A: Formal Employment Rate		
	W&M	Women	Men
Δ EXP	−0.078	−0.116	−0.039
	(0.022)	(0.034)	(0.018)
	Panel B: Informal Employment Rate		
	W&M	Women	Men
Δ EXP	−0.156	−0.226	−0.097
	(0.049)	(0.070)	(0.035)
Observations	3,534	3,534	3,534
Baseline Controls	✓	✓	✓
CZ FE	✓	✓	✓
Clustered SE	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. Number in parenthesis indicates clustered standard errors. The outcome variables are the change in employment rate (Panel A), the unemployment rate (Panel B), and the labor force participation rate (Panel C). This specification includes controls, CZ fixed effects, and clustered standard errors at the CZ level.

Table A7: Mean Female Share of Workers per Industry

	Mean female share of workers	
	1990	2010
Agriculture	0.042	0.077
Automotive	0.195	0.334
Computers	0.326	0.490
Construction	0.031	0.043
Education	0.575	0.621
Electricals	0.408	0.391
Food	0.204	0.324
Industrial machinery	0.115	0.230
Metal products	0.091	0.097
Metals	0.077	0.108
Minerals	0.094	0.126
Mining	0.102	0.091
Other manufacturing	0.244	0.385
Other Services	0.364	0.426
Paper	0.215	0.287
Pharmaceuticals	0.219	0.323
Rubber	0.197	0.338
Textiles	0.422	0.504
Unspecified	0.360	0.453
Utilities	0.120	0.171
Wood	0.058	0.112
Overall Mean Share	0.218	0.292

Notes: The summary statistics are weighted by the CZ's population.

Table A8: IV regressions: Effect of Trade Shock on Labor Market Outcomes, without Commuting Zone Fixed Effects

	A1: Employment Rate			*A2: Unemployment Rate*			*A3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.056	−0.067	−0.051	0.074	0.048	0.085	−0.081	−0.170	−0.001
	(0.015)	(0.020)	(0.015)	(0.021)	(0.015)	(0.024)	(0.024)	(0.051)	(0.011)
Observations	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZ FE									
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. Number in parenthesis indicates clustered standard errors. All columns include controls and clustered standard errors at the CZ level. The control variables used are the share of the working age population,the logarithm of the population size, share of low/med/high education, and share of people with children under 5 years old all in the baseline year 1990.

Table A9: IV regressions: Effect of Trade Shock on Labor Market Outcomes, with state fixed effects and clustered standard errors at the state level

	A1: Employment Rate			*A2: Unemployment Rate*			*A3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.060	−0.076	−0.050	0.077	0.049	0.088	−0.088	−0.185	−0.000
	(0.022)	(0.023)	(0.023)	(0.025)	(0.017)	(0.028)	(0.033)	(0.066)	(0.012)
Observations	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE (state)	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. Number in parenthesis indicates clustered standard errors. All columns include controls. The control variables used are the share of the working age population,the logarithm of the population size, share of low/med/high education, and share of people with children under 5 years old all in the baseline year 1990. All columns include fixed effects at the state level and standard errors are clustered at the state level.

Table A10: IV regressions: Effect of Trade Shock on Labor Market Outcomes, weighted with working age population

	A1: Employment Rate			*A2: Unemployment Rate*			*A3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.125	−0.122	−0.133	0.104	0.068	0.123	−0.137	−0.188	−0.090
	(0.016)	(0.016)	(0.017)	(0.012)	(0.008)	(0.014)	(0.019)	(0.024)	(0.018)
Observations	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZ FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in net exposure ($\Delta\ NET.EXP_{rt}^{mx}$) to Chinese import competition. Number in parenthesis indicates clustered standard errors. All columns include controls and clustered standard errors at the CZ level. The control variables used are the share of the working age population,the logarithm of the population size, share of low/med/high education, and share of people with children under 5 years old all in the baseline year 1990. Models are weighted by the working age population of the CZ in the baseline year.

Table A11: IV regressions: Effect of Trade Shock on Labor Market Outcomes, other countries

	A1: Employment Rate			*A2: Unemployment Rate*			*A3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.113	−0.135	−0.098	0.152	0.088	0.174	−0.182	−0.355	−0.015
(excl. Mexico)	(0.034)	(0.042)	(0.031)	(0.045)	(0.026)	(0.051)	(0.056)	(0.113)	(0.015)
	B1: Employment Rate			*B2: Unemployment Rate*			*B3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.113	−0.132	−0.101	0.149	0.086	0.171	−0.176	−0.342	−0.014
(excl. MX, US, EU)	(0.033)	(0.041)	(0.031)	(0.044)	(0.026)	(0.050)	(0.055)	(0.110)	(0.014)
	C1: Employment Rate			*C2: Unemployment Rate*			*C3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.118	−0.140	−0.103	0.156	0.090	0.179	−0.186	−0.360	−0.015
(other LA countries)	(0.030)	(0.036)	(0.028)	(0.037)	(0.022)	(0.043)	(0.047)	(0.094)	(0.016)
Observations	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZ FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in net exposure ($\Delta\, NET.EXP_{rt}^{mx}$) to Chinese import competition. Number in parenthesis indicates clustered standard errors. All columns include controls and clustered standard errors at the CZ level. The control variables used are the share of the working age population,the logarithm of the population size, share of low/med/high education, and share of people with children under 5 years old all in the baseline year 1990. Models are weighted by the working age population of the CZ in the baseline year.

Table A12: OLS regressions: Effect of Trade Shock on Labor Market Outcomes, NetImports

	A1: Employment Rate			*A2: Unemployment Rate*			*A3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.082	−0.093	−0.078	0.098	0.057	0.114	−0.103	−0.197	−0.012
	(0.026)	(0.031)	(0.025)	(0.030)	(0.018)	(0.034)	(0.032)	(0.065)	(0.011)
Observations	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZ FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in net exposure ($\Delta\, NET.EXP_{rt}^{mx}$) to Chinese import competition. Number in parenthesis indicates clustered standard errors. All columns include controls and clustered standard errors at the CZ level. The control variables used are the share of the working age population,the logarithm of the population size, share of low/med/high education, and share of people with children under 5 years old all in the baseline year 1990.

A1. Indirect import shock via the US

The measure accounting for changes in the international competition in the US for a Mexican local labor market is defined as (Majlesi and Narciso, 2018):

$$\Delta I_{rt}^{mx-us} = \sum_{i} \frac{L_{irt_0}}{L_{rt_0}} \times \frac{\Delta X_{it}^{mx-us}}{L_{it_0}}, \tag{A.1}$$

where X_{it}^{mx-us} is the change in exports from Mexico to the US in industry i in the period t.
The international competition measure (ΔI_{rt}^{mx-us}) is included in the specification from Eq. (4):

$$\Delta Y_{rt} = \alpha_r + \beta_1 \Delta \widehat{EXP_{rt}^{other}} + \beta_2 \Delta I_{rt}^{mx-us} + \boldsymbol{\delta} \boldsymbol{X}_{rt} + \varepsilon_{rt}, \quad \varepsilon_{rt} \sim \mathcal{N}(0, \sigma_r^2) \tag{A.2}$$

Table A13: IV regressions: Effect of Trade Shock (Direct and Indirect) on Labor Market Outcomes

	A1: Employment Rate			*A2: Unemployment Rate*			*A3: Labor Force Participation Rate*		
	W&M	Women	Men	W&M	Women	Men	W&M	Women	Men
Δ EXP	−0.130	−0.152	−0.120	0.175	0.105	0.200	−0.214	−0.423	−0.018
	(0.041)	(0.050)	(0.038)	(0.056)	(0.034)	(0.063)	(0.071)	(0.144)	(0.016)
Δ I	−0.036	−0.035	−0.045	0.049	0.036	0.054	−0.070	−0.150	−0.007
	(0.017)	(0.016)	(0.021)	(0.014)	(0.010)	(0.016)	(0.022)	(0.041)	(0.017)
Observations	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534	3,534
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZ FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Results from a regression indicating a $100 increase in exposure to Chinese import competition. Number in parenthesis indicates clustered standard errors. All columns include controls and clustered standard errors at the CZ level. The control variables used are the share of the working age population,the logarithm of the population size, share of low/med/high education, and share of people with children under 5 years old all in the baseline year 1990.