The Effects of Trade-Induced Worker Displacement on Health and Mortality in Mexico

Sofía Fernández Guerrico*

Abstract

Recent research in the U.S. links trade-induced job displacement to deaths of despair. Should we expect the same mortality response in developing countries? This paper analyzes the effect of a trade-induced negative shock to manufacturing employment on leading causes of mortality in Mexico between 1998 and 2013. I exploit cross-municipality variation in trade exposure based on differences in industry specialization before China's accession to the WTO in 2001 to identify labor-demand shocks that are concentrated in manufacturing. I find trade-induced job loss increased mortality from diabetes, raised obesity rates, reduced physical activity, and lowered access to health insurance. These deaths were offset by declines in mortality from ischemic heart disease and chronic pulmonary disease. These findings highlight that negative employment shocks have heterogeneous impacts on mortality in developing countries, where falling incomes lead to less access to health care and nutritious food, but also reduce alcohol and tobacco use.

Keywords: trade competition, job displacement, chronic health conditions, adult mortality
JEL Classification: F16, I12, I15, J23, O12, R12

---

*This draft: August 2021. First draft: October 2019. Fernández Guerrico: Department of Applied Economics, Université Libre de Bruxelles. E-mail: Sofia.Fernandez.Guerrico@ulb.be. I am grateful to my advisers, Richard Akresh, Rebecca Thornton, Alex Bartik, and Mark Borgschulte for their valuable guidance and support. This paper has greatly benefited from conversations with professors and PhD students at the Department of Economics at the University of Illinois at Urbana-Champaign, as well as from comments by seminar participants at various other institutions and conferences.

1 Introduction

Over the last several decades, the relationship between trade liberalization and individuals' well-being has become a central topic of discussion for economic policy. Many developing countries experienced increased economic growth stemming from a rapid export-led industrialization and integration into the world economy. With improved living standards and access to health care, mortality from infectious diseases considerably declined, whereas mortality from chronic diseases, such as diabetes and cardiovascular disease, is increasing at alarming rates (WHO, 2018). The rise in these "lifestyle" diseases is associated with tobacco use, physical inactivity, excessive use of alcohol, and unhealthy diets. To the extent that globalization promotes economic growth, it is possible that a population's health benefits from integration. However, understanding the distributional effects of trade liberalization remains a challenge.

This paper investigates the effect of a trade-induced negative shock to manufacturing employment on leading causes of mortality—diabetes, ischemic heart disease, and alcohol-related liver disease—in Mexican municipalities between 1998 and 2013. The country experienced a rapid export-led expansion of its manufacturing sector, an important source of formal employment creation, that started with its entry into GATT in 1986 and culminated with the signing of NAFTA in 1994. China's accession to the World Trade Organization (WTO) in 2001 generates plausibly exogenous variation in international competition affecting Mexican local labor markets and allows for exploring differential mortality responses to changes in local employment opportunities and income. I exploit cross-municipality variation in trade exposure given the differences in industry specialization before China's accession to the WTO in 2001, and construct measures of exposure to both import competition in Mexico's domestic market and export competition in the U.S. market.

A priori, it is unclear how a negative economic shock may affect these "lifestyle" diseases morbidity and mortality. On the one hand, falls in income may limit households' access to nutritious food and health care (Allcott et al., 2019; Barham and Rowberry, 2013; Behrman and Parker, 2011). On the other hand, a negative income shock could improve health to the extent alcohol, tobacco, and other drugs are normal goods (Lang et al., 2018; Ruhm and Black, 2002; Ruhm, 2005). While job loss could improve the physical health of individuals employed in industries imposing strenuous physical activity or prone to work-place injuries (Hummels et al., 2019; Mcmanus and Schaur, 2016), it could also deteriorate mental health because of increased stress, anxiety levels, and overall sense of "despair" (Adda and Fawaz, 2020; Pierce and Schott, 2020; Colantone et al., 2019). Finding sources of exogenous variation in income and health behaviors is challenging. In the first part of the paper, I combine data from economic and population censuses with international trade flows to estimate the effect of trade-induced changes in local labor opportunities on mortality. I focus on three leading causes of death, which explain about one third of overall mortality in Mexico, with the aim to provide an insight into channels that affect the prevalence of chronic disease, such as the relationship between income and nutrition, access to health care, and health behaviors.

Diabetes, a chronic disease associated with high blood glucose levels, affects 14 percent of Mexican adults and is the leading cause of death over the period of my analysis (PAHO, 2012; WHO, 2015). Type 2 diabetes is the most common type and is largely the result of excess body weight and physical inactivity. I find that the trade-induced loss in manufacturing employment opportunities at the municipality level is associated with a significant increase in the type 2 diabetes age-adjusted mortality rate. This result is not driven by pre-existing trends in diabetes mortality rate, and it is robust to the inclusion of a rich set of municipality-level controls. An interquartile shift in municipalities' exposure to international competition is associated with a relative increase of 1.5 to 2 deaths per 100,000 people caused by type 2 diabetes. These changes represent a 9 to 12 percent increase on average with respect to the average age-adjusted diabetes mortality rate across municipalities at baseline. My estimates explain 14 to 19 percent of the average increase in mortality caused by type 2 diabetes over 1998-2003 (10.87 deaths per 100,000 people), and 8 to 10 percent of the average increase over 1998-2013 (20.42 deaths per 100,000).

I also examine whether two other leading causes of mortality, ischemic heart disease (i.e., heart attacks) and alcohol-related liver disease, were affected by the labor market disruption. I find that moving a municipality from the 25th to the 75th percentile of exposure to international competition is associated with a 1 to 2 percent decline (-0.6 to -0.9 deaths per 100,000 people) in ischemic heart disease age-adjusted mortality rates and a 2 to 4 percent decline (-1.02 to -1.82 deaths per 100,000 people) over 1998-2013, although these changes are somewhat imprecisely estimated. I do not find any evidence of statistically significant changes in alcohol-related liver disease mortality as a consequence of trade exposure.

I examine whether differing gender and age risk profiles explain the heterogeneous mortality response I find. While the increase in type 2 diabetes mortality associated with the negative employment shock affects both men and women, the decrease in mortality rates from ischemic heart disease is concentrated in men. I also study the effect of trade liberalization on other leading causes of mortality, some of which bear similar risk factors to type 2 diabetes and ischemic heart disease. I find declines in chronic pulmonary disease mortality and increases in hypertensive heart disease mortality in municipalities with higher exposure to the negative manufacturing shock. These results suggest that the factors driving these deaths are affected differently by the negative employment shock; my complementary evaluation of health surveys links each of the above results to specific health behaviors.

My identification strategy highlights the importance of labor market opportunities and income as determinants of health outcomes. In the second part of the paper, I provide additional supporting evidence on the relationship between income and households' investment in health inputs. First, using data from individual health surveys, I show that trade exposure is associated with a 4 percent increase in the state-level prevalence of obesity (measured using body mass index) and a decline in physical activity, which are risk factors for type 2 diabetes. Results also point to significantly less access to preventive health check-ups, which might affect information availability through delayed diagnosis of type 2 diabetes. Declines in alcohol and tobacco consumption are possible mechanisms explaining ischemic heart disease mortality declines and chronic obstructive pulmonary disease mortality declines.

Second, I provide evidence of the effect of trade exposure on the local labor market. The negative trade-induced shock to manufacturing labor demand, measured at municipality level, is associated with wage reductions and increased levels of informality at the local level. I show that differential wage reductions are concentrated in the manufacturing sector in the short term and expand to the overall economy in the long term, implying some sectoral adjustment takes place over time. Additionally, more-exposed municipalities have fewer individuals with health insurance, which is explained by a differential reduction in the share of beneficiaries enrolled in social security through formal employment. Given that I find overall declines in formal employment at the local level, this result implies the loss of access to health care was not limited to manufacturing workers.

This paper makes two main contributions. First, I identify the impact of trade liberalization on chronic disease mortality through its influence on income and employment opportunities. Thus, I provide evidence of a new dimension of the relationship between globalization and inequality in developing countries (Braga, 2018; Pavcnik, 2017; Dix-Carneiro and Kovak, 2017; Topalova, 2010). Distinct from recent work, which focuses on the trade in foods and prices (Giuntella et al., 2020; Gracner, 2017) as determinants of state-level chronic disease prevalence, my empirical strategy allows me to analyze the income effects of trade exposure as a channel affecting health outcomes. Using mortality data from national registries allows me to identify these effects at a smaller spatial unit (i.e., municipality level).[1]

Second, I take advantage of the level of disaggregation and geographical coverage of my data to explore whether the effects of trade-induced worker displacement on mortality are different depending on the source of international competition. Previous research studying the impact of Chinese international competition in Mexican labor market outcomes focuses either on the direct effect via a rise in import competition in the domestic market (Majlesi and Narciso, 2018; Blyde et al., 2017; Mendez, 2015) or the indirect effect via a reduction

[1] I provide estimates using 2,382 municipalities as opposed to 32 states. For a discussion on the implications of geographic aggregation for the analysis of health outcomes, see Lindo (2015).

of exports to the United States (Dell et al., 2019; Utar and Torres Ruiz, 2013; Gallagher and Porzecanski, 2007; Gallagher et al., 2008; Hanson and Robertson, 2008). Examining exposure to both types of international competition and using countrywide data is relevant for drawing conclusions regarding distributional implications of trade liberalization. I find that the effects of trade-induced job loss on mortality are similar using either measure of exposure to international competition. Furthermore, the results are robust to a rich set of municipality-level controls—migration pre-trends, employment pre-trends, gender composition, educational distribution, and rural/urban status.

More broadly, my analysis relates to several important literatures. An extensive literature has investigated the health and mortality consequences of unemployment. Following the seminal contribution by Ruhm (2000), which reports a pro-cyclical fluctuation of mortality in the United States, a series of influential papers study the effect of economic conditions on mortality (Sullivan and Wachter, 2009; Ruhm, 2015; Autor et al., 2019), workplace injuries (Boone et al., 2011; Mcmanus and Schaur, 2016) and self-reported health outcomes (Hummels et al., 2019; Lang et al., 2018). Additionally, a recent strand of literature focuses on the deaths of despair—drug overdoses, suicides, and alcohol-related liver mortality—as the main driver of the overall increase in all-cause mortality in the U.S. in the last two decades (Pierce and Schott, 2020; Hollingsworth et al., 2017; Case and Deaton, 2015, 2017). I exploit exogenous variation in trade exposure at the local level for identification and to shed light into the mechanisms behind this relationship in a middle-income country like Mexico.

Finally, my analysis also relates to an extensive literature examining the effect of Chinese international competition on labor market outcomes in the last two decades (Autor et al., 2013, 2014; Acemoglu et al., 2016; Pierce and Schott, 2016a; Utar, 2018), as well as an array of socio-economic outcomes such as marriage and fertility (Autor et al., 2015, 2019), internal migration (Majlesi and Narciso, 2018; Greenland et al., 2019), women's decision making power (Majlesi, 2016) and opportunity cost of criminal employment (Dell et al., 2019). Here, using a similar identification strategy, my results contribute to a better understanding of the implications of international trade exposure on mortality in a developing country.

This paper proceeds as follows. In the next section, I provide background on Mexico's leading causes of mortality and manufacturing employment trends. Section 3 describes the data. In Section 4, I describe my empirical strategy. Section 5 presents the main results. In Section 6, I discuss the key mechanisms behind the mortality response I find, and provide additional supporting evidence on the effects of international competition on health and labor market outcomes. Section 7 concludes.

2 Background

How do local changes in manufacturing employment opportunities affect mortality? The primary objective of this paper is to analyze the effects of trade-induced changes in the labor market on mortality, morbidity, and health behaviors. In this section, I provide some background Mexican population health and manufacturing employment overall trends.

Health and Mortality Trends

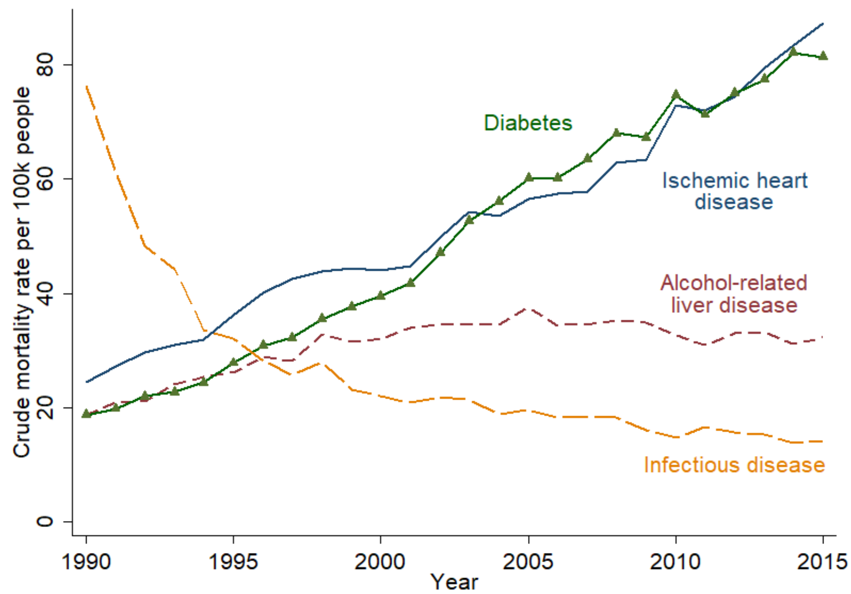
As other middle-income countries, Mexico has experienced an epidemiological transition, characterized by a decrease in mortality caused by communicable diseases (Omran, 1971). Overall mortality declined by nearly 30 percent from 1980 through 1996, associated with this epidemiological transition (Cutler et al., 2002).[2] However, the country has also experienced an alarming increase in the prevalence of chronic diseases, such as diabetes and ischemic heart disease, as shown in Figure 1.

The prevalence of these chronic diseases is a major public health problem in both developed and developing countries.[3] Each year, about 15 million adults aged 30 to 69 years old

[2]The epidemiological transition has not been homogeneous across all the country. Deaths related to undernutrition and infectious, maternal and perinatal diseases are still very relevant in the poorest regions (Gonzalez and Quast, 2010).

[3]Bommer et al. (2017) estimates that the economic burden of diabetes represents 1.8 percent of global GDP in 2015. Moreover, OECD countries spend about 8.4 percent of their total health budget on treating obesity-related diseases. This is equivalent to about USD PPP 311 billion per year (or USD PPP 209 per capita per year) (OECD, 2019).

Figure 1: Leading Causes of Mortality - Mexico 1990-2015



Notes: This figure shows the national-level crude mortality rate per 100,000 for leading causes of mortality in Mexico over my main period of analysis and the decline in communicable disease mortality in the context of the epidemiological transition in Mexico. The regression analysis uses age-adjusted mortality rates to obtain differences in mortality that are independent of age differences, particularly relevant in the context of a demographic transition characterized for aging population.

die from chronic diseases; 85 percent of these premature deaths occur in low- and middle-income countries (WHO, 2018). Over the period of 15 years analyzed in this paper, diabetes and ischemic heart disease are the leading causes of death in Mexico accounting for 15 and 13 percent of total deaths in 2013, respectively. They are followed by mortality from alcohol-related liver disease (6 percent). In this paper, I focus on these three leading causes of death, which explain about one third of overall mortality in Mexico over the period, with the aim to provide an insight into channels that affect the prevalence of chronic disease, such as the relationship between nutrition and income, access to health care, and health behaviors. Additionally, I examine the effect of trade exposure on other five leading causes of mortality in Mexico—cerebrovascular disease, chronic obstructive pulmonary disease, lower respiratory infections, hypertensive heart disease, chronic kidney disease—which account for another fifth of overall mortality (PAHO, 2012; WHO, 2015). I study the effects of the economic shock on mortality over a five-year period and over a fifteen-year period to provide evidence on fatality resulting from diseases that may develop at different pace (Ruhm, 2000; Pierce and Schott, 2020).[4]

Manufacturing Employment

The Mexican manufacturing sector experienced a rapid export-led expansion between the years 1986 and 2000, which started with the country's entry into the General Agreement on Tariffs and Trade (GATT) in 1986 and culminated with the signing of North American Free Trade Agreement (NAFTA) in 1994 and its implementation. The export to GDP ratio rose from 14 percent in 1986 to 25 percent in 2000, as Mexico became integrated into the world economy. Moreover, the relative relevance of manufacturing exports grew considerably over this period. Manufacturing exports represented 10 percent of merchandise exports over the 1980s, 43.5 percent in 1990, and 85 percent in 2000.[5]

Nearly 60 percent of Mexican workers have informal jobs (ILO, 2014). The manufacturing sector is an important source of formal and informal employment. Data from the Mexican Social Security Institute (IMSS), which covers formal private-sector sector establishments, shows that employment in export manufacturing rose from 900,000 jobs in 1986 to over 2.7 million jobs in 2000 (Atkin, 2016). The importance of manufacturing employment is even larger when including the informal sector. According to the 1998 Mexican Economic Census, 30 percent (i.e., 4.1 million) of the workers in the labor force were employed in the manufacturing sector, with an average male to female ratio of 2.[6]

Mexico provides an interesting setting to study the impact of Chinese international competition on local labor markets for several reasons. First, while other middle-income countries

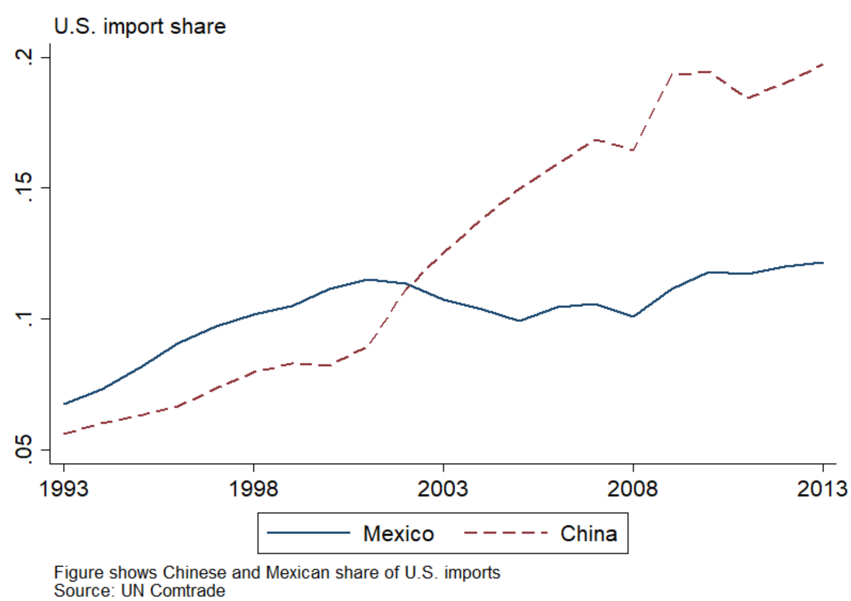
[4] Appendix A provides additional discussion on these causes of mortality in Mexico and worldwide.

[5] A cross-country comparison of the relative importance of manufacturing on merchandise exports shows the same pattern. Over 2000-2005, manufacturing accounted for 85% of exports in Mexico, but only 54% in Brazil, 24% in Colombia, 20% in Peru, and 16% in Chile (Hanson, 2010).

[6] Appendix Table C-1 presents summary statistics from the 1998 Mexican Economic Census, which includes formal and informal employment. Mexico's manufacturing share of total employment was still following an upward trend in 2001. The majority of these jobs were low skill; 78 percent of manufacturing workers had no complete high school education according to the 2000 Population Census.

benefited from China's entry to the WTO by exporting products in which China increased demand, the Mexican-Chinese trade relationship cannot be characterized as a mutual trade expansion. China's share of Mexican imports grew from 0.5 percent in 1994 to 8 percent in 2004, while Chinese imports from Mexico increased from 1.9 to 2.8 percent (Iacovone et al., 2013). Second, within NAFTA Mexico had developed a comparative advantage in the production of labor-intensive goods (Chiquiar et al., 2017; Feenstra and Kee, 2007; Gallagher et al., 2008; Hanson and Robertson, 2008). Consequently, China's sharp increase in exports to the U.S. following its accession to the WTO in 2001 is particularly relevant for Mexican manufacturing firms, given that nearly half of the manufacturing exports are produced by *maquiladoras*, or export assembly plants, with the U.S. as their export main destination (Utar and Torres Ruiz, 2013). To illustrate China's penetration in the U.S. market, Figure 2 shows that China surpasses Mexico's share of U.S. imports shortly after entering the WTO.

Figure 2: Share of China and Mexico in United States' imports



Notes: This figure shows that China surpasses Mexico's share of U.S. imports shortly after its accession to the WTO in 2001.

3 Data

This section describes the data I use to investigate the relationship between the trade-induced decline in manufacturing employment opportunities and mortality at municipality level.

3.1 Mortality Rates across Municipalities

I calculate the number of deaths by municipality using administrative registers from the Mexican National Institute of Statistics and Geography (INEGI). This data provides information from all deaths certificates filed in Mexico. Observable demographics include age, gender, education level, and place of residence. Causes of death are classified using the International Statistical Classification of Diseases (ICD-10) (NCHS, 2018). I match year by municipality by age by gender death counts to corresponding population estimates from the 1990, 2000 and 2010 Mexican Censuses of Population and Housing Units, as well as the 1995, 2005 and 2015 Intercensal Population and Housing Count collected by INEGI. I use the population estimates to compute "age-adjusted" mortality rates, expressed per 100,000 population.[7]

The age-adjusted mortality rate for a municipality is the weighted average of the crude death rate across age categories, b, within a municipality, using the Mexican population shares in those age categories in 2000 as weights, w. The difference in age-adjusted mortality rate between two relevant periods is then given by the following equation:

$$\Delta AgeAdjDeathRate_{i,t,t-1} = 100,000 * \sum_{b=1}^{16} Share_{b,w} * (\frac{Deaths_{i,t,b}}{Population_{i,t,b}} - \frac{Deaths_{i,t-1,b}}{Population_{i,t-1,b}}) \quad (1)$$

By assigning a standard age distribution to the populations being compared, I compute hypothetical summary rates indicating how the overall rates would have compared if the populations had had the same age distribution between periods. This method allows me to obtain the differences in mortality that are independent of age difference, particularly

[7] I interpolate the population (total, by gender, and by age group) for years between 1990, 1995, 2000, 2005, 2010 and 2015.

important to in the context of a demographic transition characterized for aging population (Gelman and Auerbach, 2016).[8]

3.2 Local Labor Markets and Trade

To examine the changes in manufacturing employment by industry and to measure the initial labor force size, I use the Mexican Economic Census. It was conducted in 1994, 1999, 2004, 2009 and 2014, with 1993, 1998, 2003, 2008 and 2013 reference periods. I do not use the 2008/2009 round because it was conducted during the Great Recession, period in which employment fluctuated significantly for causes other that exposure to Chinese trade competition.[9] Following Autor et al. (2013, 2019), I exploit cross-industry variation in import and export competition stemming from China's entry to the WTO to identify labor-demand shocks that are concentrated in manufacturing. I link the trade-induced decline in manufacturing to changes in mortality in the short run, 1998-2003, and in the long run, 1998-2013.

Data on international competition is from UN Comtrade. This data is matched to 4-digit time-consistent manufacturing industries in the Mexican Economic Census using the concordance in Pierce and Schott (2009, 2016a) between Comtrade 4-digit Harmonized System (HS) and 4-digit North American Industry Classification System (NAICS, or SCIAN in Spanish). I use the dataset provided by the authors to create 4-digit "industry (time-invariant) family" level dataset containing 84 constant manufacturing industries.

I use three additional sources of data to examine the main channels through which trade exposure affected mortality. First, I examine the effect on wages using data from the National Survey of Occupations and Employment (ENOE). Second, I combine data from the Economic Census and the Mexican Social Security Institute (IMSS), which covers the universe of

[8]I use the following sixteen age categories, b: 0-4 years, 5-9 years...,70-75 years, and greater than 75 years. The population weights, w, associated with these categories are provided in Appendix Table C-2.

[9]As pointed out by Dell et al. (2019), the fact that the constant reference period might not have been fully understood by respondents, significant measurement error could arise from variation in the timing of the survey. Additionally, the negative demand shock in the U.S. lead to exports from both China and Mexico to move together (decrease), weakening the negative relationship used for identification in this paper.

formal sector employment, to assess whether more-exposed municipalities exhibit increases in informal employment. Third, I use data from the Mexican National Survey on Health and Nutrition (ENSANUT) to explore differential changes in obesity prevalence and self-reported health behaviors. Each of these data sources is described in Section 6.

4 Empirical Strategy

The basis of my empirical strategy is to examine whether changes in local labor market opportunities have an effect on the population health over time. I use an instrumental variable approach following Autor et al. (2013). I start by assuming that:

$$Y_{i,t} = \alpha_i + \delta_t + \beta Z_{i,t} + t.X_i\gamma + \mu_{i,t} \tag{2}$$

where $Y_{i,t}$ is the age-adjusted mortality rate at municipality level. $Z_{i,t}$ is a measure of local labor market conditions. α_i and δ_t are unobserved municipality and time effects, respectively, X_i is a trend for municipality i, and $u_{i,t}$ is the error term.

Municipalities more- or less-exposed to international competition differ in level and trend before the trade-shock, meaning that any direct comparison of exposed and non-exposed municipalities could be biased. To address pre-existing differences and to be able to explore the within-municipality variation in mortality, I take first differences of the equation above and obtain the regression model I will use throughout the analysis:

$$\Delta Y_{i,t} = \beta_0 + \beta_1 \Delta Z_{i,t} + X_i'\gamma + \Delta u_{i,t} \tag{3}$$

where $\Delta Y_{i,t}$ is the change in age-adjusted mortality rates between the initial year and year t in municipality i. $\Delta Z_{i,t}$ is the change in municipality i's labor market conditions between the initial year and year t. My measure of the local labor market shock is the average change in Chinese international competition per worker (ICW); estimates of β then represent the effect of exposure to Chinese trade competition for municipalities. X_i' includes baseline municipality-level controls and state fixed effects.

I examine changes in exposure to international trade for Mexican municipalities associated with the growth in Mexican imports from China, and the growth in U.S. imports from China. I estimate the causal effect of $Z_{i,t}$ under the assumption that individuals in different municipalities exposed and not exposed to trade with China would have had common changes in health and labor market outcomes in the absence of the trade shock.

Using a 2SLS specification, I examine whether municipalities with higher exposure to international competition per worker experience differential changes in mortality as a consequence of the negative shock to manufacturing employment. In Section 4.1, I discuss how I construct the measures of municipality exposure to international competition to account for the potential endogeneity of Mexican trade exposure stemming from both direct and indirect Chinese competition. Section 4.2 discusses the 2SLS estimation.

4.1 Measures of Exposure to International Competition

China's accession to the WTO affected Mexico both directly via import competition in its domestic market an indirectly via export competition in the U.S. market. The increase in Chinese exports was not uniform across industries, allowing me to exploit cross-municipality variation in exposure to international competition depending on municipalities initial sector of specialization. Following Autor et al. (2013), I construct the following measure of municipality exposure to trade:

$$\Delta ICW_{it}^{D} = \sum_{j} \frac{L_{ij,0}}{L_{j,0}} \frac{\Delta CE_{jt}^{D}}{L_{i,0}} \tag{4}$$

where ΔICW_{it}^{D} is the changed in international competition per worker faced by Mexican municipality i between the initial year and year t. $L_{ij,0}$ is the manufacturing employment of industry j in municipality i in the initial year, $L_{j,0}$ is the total manufacturing employment for industry j, $L_{i,0}$ is the initial size of the labor force in municipality i. ΔCE_{jt}^{D} is the observed change in Chinese manufacturing exports in industry j to destination D between the initial year and year t. Different Chinese export destinations, D, allow me to construct two measures that capture exposure to direct and indirect international competition.

I use an instrumental variable strategy to account for the potential endogeneity of Mexican trade exposure stemming from both direct and indirect Chinese competition.

4.1.1 Import competition

First, I examine the changes in exposure to international trade for Mexico associated with the growth in Mexican imports from China (Majlesi and Narciso, 2018; Blyde et al., 2017; Mendez, 2015). My measure of local labor market shock is the average change in Chinese import penetration in a municipality's industries weighted by each industry's share in initial municipality level employment. Setting Mexico as Chinese export destination D in Equation 4 above I obtain ΔICW_{it}^{MEX}, where ΔCE_{jt}^{MEX} is the change in Chinese manufacturing exports to Mexico in industry j between the initial year and year t.

The concern here is that Mexican imports from China may be correlated with industry import demand shocks. The OLS estimation of how increased imports from China affect Mexican labor and health outcomes may understate the true impact, as both Mexican employment and imports may be correlated with unobserved shocks to Mexican product demand.

To identify the supply-driven component of Mexican imports from China, I instrument the growth of Chinese exports to Mexico using the growth of Chinese exports to a group of middle-income countries. Specifically, I instrument the measured import exposure ΔICW_{it}^{MEX} with a non-Mexico exposure variable ΔICW_{it}^{MIDDLE} constructed using trade data on industry-level growth of Chinese exports to other middle-income markets:

$$\Delta ICW_{it}^{MIDDLE} = \sum_{j} \frac{L_{ij,0}}{L_{j,0}} \frac{\Delta CE_{jt}^{MIDDLE}}{L_{i,0}} \tag{5}$$

Table 1: Summary Statistics - International Competition per Worker (ICW) and the Manufacturing Employment Rate

	Mean	Std. Dev.	25th pctile	75th pctile
Changes in exposure to import competition (1,000 USD)				
$\Delta ICW^{Middle}_{1998-2003}$	0.1754	0.2086	0.0243	0.2393
$\Delta ICW^{Middle}_{1998-2013}$	3.8889	3.8322	0.8288	5.6581
$\Delta ICW^{Mexico}_{1998-2003}$	0.1358	0.1590	0.0219	0.1854
$\Delta ICW^{Mexico}_{1998-2013}$	1.1509	1.2481	0.2018	1.5850
Changes in exposure to export competition (1,000 USD)				
$\Delta ICW^{High-income}_{1998-2003}$	2.1508	2.2744	0.5273	2.9335
$\Delta ICW^{High-income}_{1998-2013}$	11.883	10.868	3.086	17.373
$\Delta ICW^{US}_{1998-2003}$	2.3401	2.7188	0.5460	3.0653
$\Delta ICW^{US}_{1998-2013}$	14.152	13.944	3.205	19.761
Changes in the manufacturing employment rate (L)				
All				
$\Delta L^{All}_{1998-2003}$	-0.048	0.079	-0.085	-0.014
$\Delta L^{All}_{1998-2013}$	-0.073	0.100	-0.118	-0.017
Men				
$\Delta L^{Men}_{1998-2003}$	-0.035	0.078	-0.072	-0.004
$\Delta L^{Men}_{1998-2013}$	-0.049	0.100	-0.096	-0.002
Women				
$\Delta L^{Women}_{1998-2003}$	-0.033	0.085	-0.063	-0.002
$\Delta L^{Women}_{1998-2013}$	-0.062	0.104	-0.110	-0.005

Notes: This table reports summary statistics of the measures of exposure to export and import competition for 1998-2003 and 1998-2013. $\Delta ICW^{D}_{i,t}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries, ΔICW^{MIDDLE}. ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries ΔICW^{HIGH}. ΔL is the change in the manufacturing employment rate.

where ΔCE_{jt}^{MIDDLE} is the observed change in Chinese manufacturing exports (CE) to a group of middle-income countries similar to Mexico. The idea is that because of similarities in the economic structure and income, this group of countries and Mexico are similarly exposed to increased import penetration from China.[10] Using ΔICW_{it}^{MIDDLE} to instrument for changes in import exposure allows me to identify the causal effect of rising Chinese import exposure on Mexican health and labor market outcomes.

4.1.2 Export competition

Second, I examine the changes in exposure to international trade for Mexico associated with the growth in U.S. imports from China. I analyze the competition between two South locations in a third, Northern, market (Dell et al., 2019; Utar and Torres Ruiz, 2013; Gallagher and Porzecanski, 2007; Gallagher et al., 2008; Hanson and Robertson, 2008).

My measure of local labor market shock is the average change in Chinese import penetration in the U.S. weighted by each industry's share in initial municipality level employment. Mexican municipalities with a larger initial share of employment in industries where Chinese exports to the U.S. increased after China joined the WTO, have higher exposure to trade competition. Setting the U.S. as Chinese export destination D in Equation 4 above I obtain $\Delta ICW_{it}^{U.S.}$, where $\Delta CE_{jt}^{U.S.}$ is the change in Chinese manufacturing exports to the U.S. in industry j between the initial year and year t.

The concern here is that a negative labor productivity shock in Mexico could affect manufacturing employment, mortality, and U.S. imports from China since those imports compete with imports from Mexico. In this case, the OLS estimates of the effect of ΔICW_{it}^{US} on health and labor market outcomes would be biased.

To identify the supply-driven component of U.S. imports from China, I instrument the growth of Chinese exports to U.S. using the growth of Chinese exports to a group of high-income countries. Specifically, I instrument the measured U.S. import exposure ΔICW_{it}^{US}

[10] The eight middle-income countries are those used by Mendez (2015): Argentina, Brazil, Chile, Colombia, Costa Rica, Greece, Panama, and Portugal.

with a non-U.S. exposure variable ΔICW_{it}^{HIGH} constructed using trade data on industry-level growth of Chinese export to other high-income markets:

$$\Delta ICW_{it}^{HIGH} = \sum_{j} \frac{L_{ij,0}}{L_{j,0}} \frac{\Delta CE_{jt}^{HIGH}}{L_{i,0}} \tag{6}$$

where ΔCE_{jt}^{HIGH} is the observed change in Chinese manufacturing exports to a group of high-income countries similar to the U.S.. The idea is that because of similarities in the economic structure and income, these group of countries and the U.S. are similarly exposed to increased import penetration from China.[11] Using ΔICW_{it}^{HIGH} to instrument for changes in trade exposure allows me to identify the causal effect of rising Chinese competition in the U.S. market on Mexican health and labor market outcomes.

Table 1 presents summary statistics of the measures of exposure and the change in the manufacturing employment rate over the period of analysis.[12] Figure 3 shows two maps of Mexico's cross-municipality exposure to Chinese export competition in the U.S. market (top) and to Chinese import competition in the domestic market (bottom).

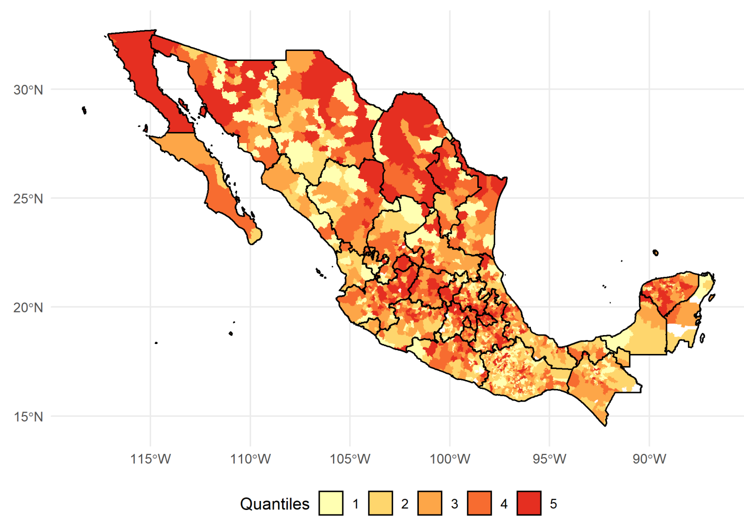
4.2 2SLS Estimation

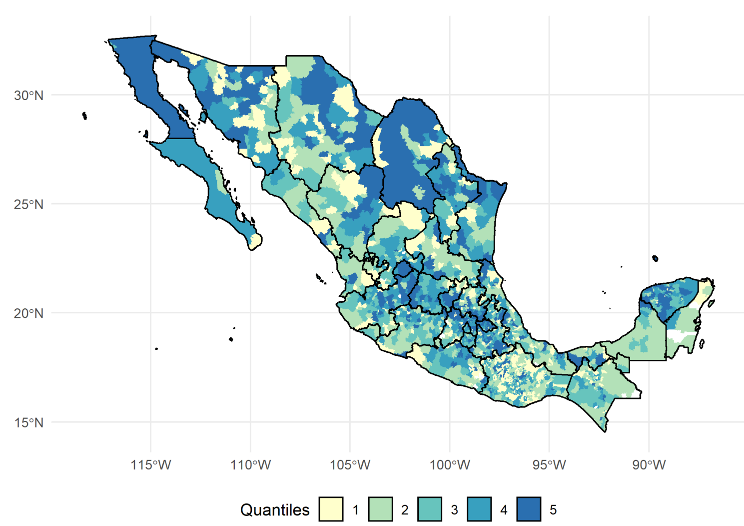
My identification strategy aims at investigating the relationship between trade exposure and mortality. Following Autor et al. (2013), I exploit cross-industry and cross-local-labor-market (i.e., municipality) variation in trade competition stemming from China's entry to the WTO in 2001 to identify the effect of labor-demand shocks that are concentrated in manufacturing. Chinese exports to middle-income countries (i.e., source of plausibly exogenous variation for Mexican import competition) and to high-income countries (i.e., source of plausibly exogenous variation for Mexican export competition in the U.S.) are reasonably independent of unobserved shocks to Mexican municipality-level health outcomes.

[11] The eight high-income countries are those used by Autor et al. (2013): Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain, and Switzerland.

[12] Figures D-3 and D-4 show histograms of the distribution of the measures of exposure to import and export competition, respectively.

Figure 3: Cross-municipality Exposure to International Competition per Worker - Mexico





Notes: These maps of Mexico show the cross-municipality exposure to international competition per worker (ICW) between 1998-2013. The map on top shows exposure to Chinese export competition in the U.S. market and the bottom map shows Chinese import competition in the domestic market.

China's integration into the world economy may have affected the demand of commodities increasing their relative price. It is also possible that areas with increased exposure to import competition have different supply of healthful or unhealthful products. My identification strategy leverages exogenous variation driven by the municipalities' initial industrial composition, hence predicted exposure to non-manufacturing imports is not captured by the instruments. Another concern is that Chinese competition may have affected migration flows between the Mexico and the U.S., and internal migration in Mexico. Selective migration could bias my results upwards or downwards depending on the characteristics of the population moving.[13] Finally, municipalities with higher exposure to international competition could have been already experiencing differential trends in mortality, but I will show using pre-period data that this is not the case.

4.2.1 First Stage

First, I estimate the first stage using Chinese exports to middle-income countries similar to Mexico to instrument Mexican exposure to import competition:

$$\Delta ICW_{i,t}^{MEX} = \beta_0 + \beta_1 \Delta ICW_{i,t}^{MIDDLE} + X_i'\gamma + \epsilon_{i,t} \tag{7}$$

Second, I estimate the first stage using Chinese exports to high-income countries to instrument for my measure of Mexican export competition in the U.S. market:

$$\Delta ICW_{i,t}^{US} = \beta_0 + \beta_1 \Delta ICW_{i,t}^{HIGH} + X_i'\gamma + \epsilon_{i,t} \tag{8}$$

where $\Delta ICW_{i,t}^{D}$ is divided by 1,000 to be in units of 1,000 USD. The sample includes 2,383 Mexican municipalities. The regressions are weighted by the initial working-age population size. In my baseline results, X_i' only include state fixed effects. I show that the results are

[13] In related work, I find international competition is associated with increased population growth in the early 2000s and decreased population growth in the late 2000s, mostly driven by changes in internal migration (Fernández Guerrico, 2020).

robust to a rich set of baseline controls and pre-trends. Given the municipality-industry level data on manufacturing employment available in the Mexican Economic Census, I look at the relationship between changes in manufacturing employment and mortality over a 5-year period, 1998-2003, and over a 15-year period, 1998-2013. The initial period is always 1998, which is the latest year with available industry-municipality level data in Mexico before China's entry to the WTO in 2001.

Table 2: Exposure to International Competition - First Stage Estimates

	(1) **1998-2003**	(2) **1998-2013**
Panel A: Import competition		
	ΔICW^{MEX}	
ΔICW^{MIDDLE}	0.637***	0.239***
	(0.0290)	(0.00950)
Rescaled 25th-75th pctile	0.1370***	1.1540***
	(0.0062)	(0.0459)
First Stage F-stat	113.01	181.72
Panel B: Export competition		
	ΔICW^{US}	
ΔICW^{HIGH}	1.013***	1.162***
	(0.0323)	(0.0151)
Rescaled 25th-75th pctile	2.4367***	16.6034***
	(0.0777)	(0.2159)
First Stage F-stat	338.89	2029.53
Observations	2,382	2,382

Notes: This table shows first stage estimates of Equation 7 in Panel A and Equation 8 in Panel B. Observations are municipalities weighted by the start-of-period working-age population. $\Delta ICW_{i,t}^{D}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries, ΔICW^{MIDDLE}. ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries, ΔICW^{HIGH}. Summary statistics of the instrumental variables are reported in Table 1. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

I start by presenting the first stage estimates in Table 2. Column 1 shows the first stage estimates for the period 1998-2003, while Column 2 presents the estimates for the period 1998-2013. The point estimates reported in Panel A show that the effect of a 1,000 USD predicted increase in import exposure per worker corresponds to a 637 USD increase in measured import exposure per worker between 1998-2003 and 237 USD between 1998-2013. To make these estimates more interpretable, I also report the effect of going from the 25th to the 75th percentile of municipality exposure in the second two rows of Panel A. The interquartile range of predicted import exposure is 0.215 over 1998-2003 and 4.82 between 1998-2013. The point estimates reported in Panel B show that the effect of a 1,000 USD predicted increase in export exposure per worker corresponds to a 1,013 USD increase in measured export exposure per worker between 1998-2003, and 1,162 USD between 1998-2013. To make these estimates more interpretable, I also report the effect of going from the 25th to the 75th percentile of municipality exposure in the second two rows of Panel B. The interquartile range of predicted import exposure is 2.41 over 1998-2003 and 14.28 between 1998-2013. The main takeaway from Table 2 is that both measures of exposure to international competition generate a strong first stage.

5 The Effects of Trade Exposure on Mortality

This section examines whether changes in exposure to international competition influence changes in leading causes of mortality in Mexico during two periods: 1998-2003 and 1998-2013.

I start by showing the 2SLS estimation results of the change in exposure to international competition per worker on Mexico's leading causes of mortality —type 2 diabetes, ischemic heart disease and alcohol-related liver disease—in Table 3.[14] Panel A presents the estimation

[14] OLS estimation results are reported in Table C-3. The sign of all the coefficients is the same in both tables, while the magnitudes are marginally smaller in the OLS estimation. The effect of exposure to trade competition on mortality is statistically significant at 1 percent in the case of type 2 diabetes. The rest of the OLS estimates are not statistically significant at conventional levels with the exception of a decrease in

results of the effect of the change in Mexico's exposure to import competition from China, instrumented by realized imports from China by other middle-income countries. Panel B presents the estimation results of the effect of the change in Mexico's exposure to export competition from China, instrumented by realized imports from China by other high-income countries. In each panel, the first two rows report the point estimates for a 1,000 USD increase in international competition per worker, while the second two rows rescale these point estimates to reflect the change in trade exposure for a municipality at the 75th percentile compared to the 25th percentile of exposure.

Coefficient estimates in Columns 1 and 4 imply that an interquartile shift in municipalities' exposure to international competition is associated with a relative increase of 1.5 to 2 deaths per 100,000 people caused by type 2 diabetes. These changes represent a 9 to 12 percent increase on average with respect to the average age-adjusted diabetes mortality rate across municipalities in the year 1998, which is 17.47, as reported in the third to last row of the table. These estimates explain 14 to 19 percent of the average increase in mortality caused by type 2 diabetes over 1998-2003 (10.87 deaths per 100,000 people), and 8 to 10 percent of the average increase over 1998-2013 (20.42 deaths per 100,000).[15]

Coefficients in Columns 2 and 5 imply that moving a municipality from the 25th to the 75th percentile of exposure to international competition is associated with a relative 1 to 2 percent decline in the ischemic heart disease mortality rate over 1998-2003 (-0.6 to -0.9 deaths per 100,000 people) and a 2 to 4 percent decline over 1998-2013 (-1.02 to -1.82 deaths per 100,000 people), relative to the baseline mortality rate of 47.35 deaths per 100,000 people. These estimates are only marginally significant for import competition over the long term (Panel A, Column 5) and for export competition in the short term (Panel B, Column 2).

alcohol-related liver disease in the short term, which is statistically significant at 10 percent.

[15] My results do not imply that the onset of the disease and the death occur within a 5-year period. In the short term, the negative income shock plausibly affects households' access nutritious food and medicine to properly manage an existing chronic disease such as type 2 diabetes. There is previous evidence of the effect of income shocks and changes in policy that affect access to treatment on chronic disease mortality in the short term that help place my results within the related literature, which I discuss in Section 6. See for instance, Barham and Rowberry (2013); Cutler et al. (2002); Américo and Rocha (2020); Huh and Reif (2017).

Table 3: International Competition and Leading Causes of Mortality - 2SLS

	Δ Age-adjusted Mortality Rate					
	1998-2003			1998-2013		
	Type 2 Diabetes	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**	**Type 2 Diabetes**	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	12.40***	-3.556	-2.883	1.238***	-1.317*	0.120
	(2.758)	(3.495)	(2.257)	(0.454)	(0.707)	(0.398)
Rescaled 25th-75th pctile	2.0271***	-0.5814	-0.4713	1.7119***	-1.8220*	0.1664
	(0.4510)	(0.5714)	(0.3690)	(0.6279)	(0.9776)	(0.5499)
p-values	0.000	0.309	0.201	0.006	0.062	0.762
q-values	0.001	0.228	0.179	0.017	0.091	0.434
Panel B: Export Competition						
ΔICW^{US}	0.607***	-0.366*	-0.116	0.124***	-0.0617	-0.0199
	(0.155)	(0.207)	(0.130)	(0.0379)	(0.0470)	(0.0311)
Rescaled 25th-75th pctile	1.5291***	-0.9220*	-0.2924	2.0524***	-1.0220	-0.3287
	(0.3910)	(0.5216)	(0.3278)	(0.6274)	(0.7777)	(0.5148)
p-values	0.000	0.077	0.372	0.001	0.189	0.523
q-values	0.001	0.115	0.288	0.003	0.183	0.355
Baseline mortality rate	17.47	47.35	17.24	17.47	47.35	17.24
Average change mortality	10.87	-0.32	-2.17	20.42	2.33	-5.02
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on the three leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Observations are municipalities weighted by the start-of-period working-age population. $\Delta ICW_{i,t}^{D}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the age-adjusted mortality rate associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in the age-adjusted mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The third two rows in each panel present the p-values and the corresponding sharpened q-values to control for multiple hypothesis testing. The two bottom rows in the table show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Coefficient estimates for alcohol-related liver disease mortality presented in Columns 3 and 6 are not statistically significant at conventional levels.

Although there are theoretical reasons to explore these outcomes separately, given that these are the leading causes of mortality in Mexico over this period, I also correct for the potential issue of simultaneous inference using multiple hypothesis testing. To control for multiple hypothesis testing when examining multiple outcomes, I construct sharpened q-values following (Anderson, 2008; Benjamini et al., 2006). This process uses a two-stage procedure to control the false discovery rate when reporting results for specific outcomes. In each panel, the third two rows present the p-values and the corresponding sharpened q-values. The effect of international exposure on type 2 diabetes mortality is statistically significant after the corrections in every specification (sometimes at 5 percent instead of 1 percent). However, the effects of the trade-induced economic shock on ischemic disease mortality is no longer significant. This is not surprising given that the evidence on ischemic heart disease and alcohol-related mortality is weaker before the p-value correction.

The results in Table 3 imply that trade exposure is associated with an increase in mortality from type 2 diabetes but a decrease in mortality from ischemic heart disease. This finding is a priori puzzling given that, broadly speaking, the risk factors for these chronic diseases are similar (i.e., diet, physical activity, tobacco and alcohol consumption). Even though the evidence for the reduction of ischemic heart disease is weaker than that of the increase in type 2 diabetes mortality, exploring potential mechanisms to explain the difference in the sign of the mortality response is worthwhile. In remainder of the paper, I provide complementary theoretical and empirical explanations for this heterogenous mortality response.

While it is true that, broadly speaking, risk factors for these two chronic diseases are similar, the prevalence of risk factors varies between countries' income groups, age groups, and gender. For instance, some risk factors are high or becoming more prevalent in middle-income countries; these include tobacco use among men and higher rates of physical inactivity among women. Regarding the prevalence of high body mass index (BMI), in middle-income countries the prevalence of obesity among women is double that among men (WHO, 2011). Moreover, ischemic heart disease death rates are much higher for men than for women in all OECD countries. Since 1980 ischemic heart disease mortality rates have declined in nearly all OECD countries; a number of factors are responsible, with declining tobacco consumption contributing to reducing its incidence and consequently the ischemic heart disease mortality rates (OECD, 2009).

In the next two subsections, first, I analyze whether differing gender and age risk profiles explain the mortality response I find. Second, I examine the effect of trade liberalization on other leading causes of mortality, some of which bear similar risk factors to type 2 diabetes and ischemic heart disease.

Heterogeneous mortality response by gender and by age groups

In Table 4, I explore whether the effect of trade competition on mortality differs by gender. The statistically significant increase in type 2 diabetes associated with increased trade exposure affects both men (Panels A and B) and women (Panels C and D), while the decrease in mortality rates caused by ischemic heart disease is driven by men. The estimates in Column 1 imply that an interquartile shift in exposure to international competition between 1998 and 2003 is associated with a 10 percent increase in type 2 diabetes mortality among men, with respect to the male baseline mortality rate of 15.84 deaths per 100,000 people, and a 12 percent increase among women, with respect to the female baseline mortality rate of 19.10 deaths per 100,000 people. Column 4 estimates imply that, over 1998-2013, type 2 diabetes mortality increased by 12 and 10 percent among men and women with respect to the baseline rate, respectively. These estimates are statistically significant at 1 percent and remain significant after correcting for multiple hypothesis testing as shown by the sharpened q-values reported in the third two rows in each panel.

The estimates in Columns 2 and 5 imply that male deaths caused by ischemic heart disease decreased by 2 to 3 percent over 1998-2003 and by 3 to 4 percent over 1998-2013, with respect to a baseline mortality rate of 54 deaths per 100,000 men, in more-exposed

Table 4: International Competition and Leading Causes of Mortality by Gender- 2SLS

	Δ Age-adjusted Mortality Rate					
	1998-2003			1998-2013		
	Type 2 Diabetes	Ischemic Heart Disease	Alcohol Related Liver Disease	Type 2 Diabetes	Ischemic Heart Disease	Alcohol Related Liver
	(1)	(2)	(3)	(4)	(5)	(6)
	MEN					
Panel A: Import Competition						
ΔICW_{MEX}	9.721***	-7.420	-5.518	1.389***	-1.701*	-0.0237
	(3.564)	(5.788)	(4.003)	(0.513)	(0.905)	(0.608)
Rescaled 25th-75th pctile	1.5894***	-1.2132	-0.9022	1.9209***	-2.3534*	-0.0327
	(0.5827)	(0.9464)	(0.6544)	(0.7095)	(1.2524)	(0.8410)
p-values	0.006	0.200	0.168	0.007	0.06	0.969
q-values	0.026	0.212	0.212	0.026	0.122	0.478
Panel B: Export Competition						
ΔICW_{US}	0.305	-0.627*	-0.0888	0.116***	-0.107*	-0.0484
	(0.189)	(0.352)	(0.222)	(0.0418)	(0.0648)	(0.0487)
Rescaled 25th-75th pctile	0.7684	-1.5797*	-0.2238	1.9252***	-1.7734*	-0.8012
	(0.4772)	(0.8863)	(0.5605)	(0.6925)	(1.0727)	(0.8065)
p-values	0.107	0.075	0.690	0.005	0.098	0.321
q-values	0.193	0.193	0.503	0.021	0.193	0.304
	WOMEN					
Panel C: Import Competition						
ΔICW_{MEX}	14.93***	0.973	-0.451	1.045*	-0.870	0.255
	(3.856)	(5.253)	(1.533)	(0.551)	(0.674)	(0.293)
Rescaled 25th-75th pctile	2.3546***	0.1535	-0.0712	1.4455*	-1.2039	0.3525
	(0.6081)	(0.8284)	(0.2417)	(0.7619)	(0.9324)	(0.4055)
p-values	0.000	0.853	0.768	0.058	0.197	0.385
q-values	0.002	0.450	0.444	0.122	0.212	0.427
Panel D: Export Competition						
ΔICW_{US}	0.901***	-0.0591	-0.135	0.127***	-0.0152	0.0102
	(0.207)	(0.244)	(0.0903)	(0.0443)	(0.0450)	(0.0225)
Rescaled 25th-75th pctile	2.2691***	-0.1490	-0.3390	2.1095***	-0.2508	0.1687
	(0.5214)	(0.6157)	(0.2274)	(0.7327)	(0.7447)	(0.3717)
p-values	0.000	0.809	0.136	0.004	0.736	0.650
q-values	0.001	0.509	0.212	0.021	0.503	0.503
Baseline male mortality rate	15.84	53.98	29.66	15.84	53.98	29.66
Average male change mortality	10.77	0.05	-3.59	22.61	4.44	-8.77
Baseline female mortality rate	19.10	41.26	5.47	19.10	41.26	5.47
Average female change mortality	11.03	-0.70	-0.66	18.58	0.59	-1.21
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on the three leading causes of mortality in Mexico by gender (Panels A and B men; Panels C and D women) for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Observations are municipalities weighted by the start-of-period working-age population. $\Delta ICW^{D}_{i,t}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} and ΔICW^{US} are defined in Table 3. In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the age-adjusted mortality rate associated with an increase of 1,000 USD in $ICW^{D}_{i,t}$, while in the second two rows present rescaled estimates to reflect the change in the age-adjusted mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The third two rows in each panel present the p-values and the corresponding sharpened q-values to control for multiple hypothesis testing. The two bottom rows in the table show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

municipalities. These estimates are significant at 10 percent, and no longer statistically significant at conventional levels after correcting for multiple hypothesis testing. Among women the coefficients are noisily estimated and the magnitudes are smaller compared to changes in the male ischemic heart disease mortality rate.

Although I find no statistically significant evidence of changes in alcohol-related liver disease mortality across more- and less-exposed municipalities in Columns 3 and 6, breaking down the mortality rate by gender shows that the baseline mortality rate for men is 6 times higher than the female mortality rate (29.66 and 5.47 deaths per 100,000 people, respectively). The cross-municipality average alcohol-related liver disease mortality rate declines by 8.77 deaths per 100,000 men and 1.21 deaths per 100,000 women over 1998-2013.

Table 5 shows second stage estimates for the three leading causes of mortality for three age groups: 0-29, 30-59, and 60 and over years old. As expected, the negative effect of trade exposure on chronic disease mortality is concentrated in the latter age group. Column 3 estimates imply that moving a municipality from the 25th to the 75th percentile of exposure to international competition is associated to a statistically significant increase in mortality from type 2 diabetes of 1.3 to 1.8 deaths per 100,000 people aged 60 and over, which implies a 10 to 14 percent increase with respect to the baseline rate of 12.79 for this age group. The estimates in Column 2, for the 30-60 age group, imply a 5 percent relative increase in type 2 diabetes mortality with respect to the baseline mortality rate of 4.63 for this age group; however, most of the estimates for this age group are not statistically significant.

Columns 4-6 show the change in ischemic heart disease mortality rates associated with international competition. The signs in the three columns indicate a relative decline in deaths caused by this type of heart disease in the three groups. Although imprecisely estimated in most cases, the magnitudes of the coefficients imply similar decreases in the 30-60 and 60 and over age groups. Estimates in Column 5 imply a decline of about 3 percent (-0.18 to -0.31 deaths per 100,000 people) with respect to the baseline mortality rate of 8 in the 30-60 age group, while estimates in Column 6 imply a decline that ranges from 1 to 4 percent with respect to the baseline mortality rate of 39 deaths per 100,000 people aged 60 and over.

As for the changes in the mortality rate cause by alcohol-related liver disease, Columns 7-9 do not show statistically significant differences between age groups. In line with national statistics (PAHO, 2012) previously discussed, the estimates magnitudes confirm that the age group with a higher mortality rate is 30-60 years old, with a baseline mortality rate of 10.3 compared to the 6.3 baseline mortality rate of people aged 60 and over.

Evidence on overall mortality and other causes of mortality

The increase in deaths caused by type 2 diabetes is offset to some extent by declines in deaths caused by ischemic heart disease, two chronic diseases with broadly similar risk factors. This heterogeneous mortality response maybe partially explained by some differing risk factors and disease prevalence across gender. In this subsection, I explore the effect of international exposure on other chronic diseases with similar risk factors, bearing in mind the trade-off between expanding the number outcomes examined to learn more about the mortality response to the trade shock and the potential issue arising form testing multiple hypothesis. I describe the results of tables presented in Appendix A.

In Table A-1, I show estimates of the effect of increased international competition on other five leading causes of mortality in Mexico over the 1998-2013 period (PAHO, 2012; WHO, 2015). These five causes of mortality represent about a fifth of Mexican overall mortality: cerebrovascular diseases (5%), chronic obstructive pulmonary disease (4%), lower respiratory infections (3.4%), hypertensive heart disease (3.4%), chronic kidney disease (2.3%).[16] Most estimates are not statistically significant at conventional levels, even before correcting by multiple hypothesis testing, with the exception of hypertensive disease in the short term and chronic obstructive pulmonary disease in the long term. Nevertheless, exploring the direction and magnitude of the effect is relevant for having a better understanding of the net effect of the trade shock. An interquartile shift in exposure to international competition

[16] As mentioned above, type 2 diabetes (14%), ischemic heart disease (13%) and alcohol-related liver disease (6%) represent about a third of overall mortality in Mexico over the period. Therefore, the eight leading internal causes of mortality account for about half of the deaths in Mexico over the period.

Table 5: Exposure to International Competition and Leading Causes of Mortality by Age - 2SLS

	Δ Age-Adjusted Mortality Rate								
	Type 2 diabetes			**Ischemic heart disease**			**Alcohol-related liver disease**		
	0-29yr	**30-60yr**	**60yr+**	**0-29yr**	**30-60yr**	**60yr+**	**0-29yr**	**30-60yr**	**60yr+**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PERIOD: 1998-2003									
Panel A: Import Competition									
ΔICW^{MEX}	0.0507	1.729	10.62***	-0.0867	-1.601	-1.868	0.0781	-0.992	-1.969
	(0.0999)	(1.063)	(2.448)	(0.242)	(1.518)	(3.190)	(0.351)	(1.553)	(1.441)
Rescaled 25th-75th pctile	0.0083	0.2826	1.7362***	-0.0142	-0.2617	-0.3055	0.0128	-0.1622	-0.3219
	(0.0163)	(0.1738)	(0.4003)	(0.0396)	(0.2483)	(0.5216)	(0.0575)	(0.2539)	(0.2356)
Panel B: Export Competition									
ΔICW^{US}	0.00424	0.100*	0.502***	-0.00225	-0.0896	-0.274	0.00569	-0.0825	-0.0393
	(0.00617)	(0.0550)	(0.139)	(0.0134)	(0.0828)	(0.182)	(0.0195)	(0.0896)	(0.0678)
Rescaled 25th-75th pctile	0.0107	0.2529*	1.2655***	-0.0057	-0.2257	-0.6907	0.0143	-0.2077	-0.0990
	(0.0155)	(0.1384)	(0.3497)	(0.0338)	(0.2087)	(0.4586)	(0.0491)	(0.2257)	(0.1708)
PERIOD: 1998-2013									
Panel C: Import Competition									
ΔICW^{MEX}	0.000148	0.0860	1.152***	-0.0313	-0.132	-1.154*	0.0590	0.159	-0.0977
	(0.0163)	(0.145)	(0.379)	(0.0418)	(0.161)	(0.634)	(0.0477)	(0.296)	(0.153)
Rescaled 25th-75th pctile	0.0002	0.1189	1.5928***	-0.0433	-0.1824	-1.5963*	0.0815	0.2200	-0.1351
	(0.0226)	(0.1999)	(0.5240)	(0.0578)	(0.2229)	(0.8769)	(0.0660)	(0.4096)	(0.2121)
Panel D: Export Competition									
ΔICW^{US}	-0.000536	0.0149	0.110***	-0.000144	-0.0190	-0.0426	0.00325	-0.0208	-0.00227
	(0.00117)	(0.0114)	(0.0318)	(0.00283)	(0.0131)	(0.0403)	(0.00360)	(0.0230)	(0.0120)
Rescaled 25th-75th pctile	-0.0089	0.2462	1.8150***	-0.0024	-0.3139	-0.7057	0.0539	-0.3451	-0.0375
	(0.0194)	(0.1885)	(0.5267)	(0.0468)	(0.2166)	(0.6670)	(0.0595)	(0.3801)	(0.1979)
Baseline mortality rate	0.06	4.63	12.79	0.38	7.99	38.97	0.61	10.33	6.30
Average change mortality 98-03	0.05	2.47	8.35	0.06	-0.14	-0.24	-0.04	-1.55	-0.58
Average change mortality 98-13	0.09	4.83	15.51	0.28	0.05	2.01	-0.12	-3.60	-1.29
Observations	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on the three leading causes of mortality in Mexico for three age groups and two time periods: 1998-2003 and 1998-2013. Observations are municipalities weighted by the start-of-period working-age population. $\Delta ICW^{D}_{i,t}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panels A and C). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panels B and D). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the age-adjusted mortality rate associated with an increase of 1,000 USD in $ICW^{D}_{mi,t}$, while in the second two rows present rescaled estimates to reflect the change in the age-adjusted mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The bottom rows in the table show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

is associated with about 5 percent increase in deaths from hypertensive disease and chronic kidney disease, and less than a 1 percent change in mortality caused by cerebrovascular disease (i.e., strokes).

Regarding the two respiratory diseases that are in the top ten of leading causes of mortality in Mexico, acute lower respiratory infections (e.g., influenza and pneumonia) do not present any statistically significantly different evolution in more- or less-exposed municipalities. However, an interquartile shift in exposure to international competition is associated with an statistically significant decrease in chronic obstructive pulmonary disease (COPD) of about 1 death per 100,000 people (i.e., a 9 percent decline) over 1998-2013. Tobacco smoke is a key factor in the development and progression of this disease, followed by home and workplace air pollutants (CDC, 2021).

The eight leading causes of mortality examined above explain about half of the Mexican mortality over this period. Although focusing on specific causes of mortality helps when attempting to determine the channels behind the mortality response to the economic shock, there is also value in exploring the effect of trade liberalization on overall of mortality. Table A-2 shows the net effect of exposure to trade on aggregated measures of the leading causes of mortality. Table A-3 shows the effect of trade exposure on the overall Mexican mortality due to internal causes of death. Most of the coefficients are not statistically significant at conventional levels with a few exceptions, as described in more detail in Appendix A.

The main takeaway from the evidence presented in this section is that trade-induced negative income shock explains between 14 and 19 percent of the increase in type 2 diabetes mortality over 5 years, and 9 to 11 percent of the increase over 15 years. These magnitudes are economically relevant and the results on type 2 diabetes mortality are robust to multiple hypothesis testing correction. Some evidence points to a relative decline in ischemic heart disease, although somewhat noisily estimated in some of the specifications. Even though the evidence for the relative reduction of ischemic heart disease is weaker, the estimates suggest that these two leading causes of mortality might have offset each other to a certain extent.

To explore potential explanations behind this heterogeneous mortality response, I started by showing results by gender and age groups. I also explored net effects of the trade-induced employment shock on aggregate measures of the leading causes of mortality and overall mortality. In the next subsection, I show that my results are robust to a series of sensitivity checks. In Section 6, I provide evidence on the effect of international exposure on health and labor market outcomes that help highlight income as the main mechanism behind the mortality response to the trade shock.

5.1 Robustness Checks

In this section I show that my results are robust to a series of sensitivity checks. I describe results presented in Appendix B.

Potential cross-sectional correlation in residuals

Recent work shows that estimations using the shift-share instrumental variables proposed by Autor et al. (2013) might suffer an overrejection problem affecting robust standard errors. This issue is caused by cross-regional correlation in residuals across observations with very similar shares (Adão et al., 2019). However, the inclusion of controls improves the performance of these specifications because they absorb most of the cross-regional correlation in the residuals.[17] My first stage is robust to the inclusion of a rich set of baseline controls, which allays concerns about cross-regional correlation in residuals. Results are reported in Table B-1. Column 1 presents the baseline specification, which only includes state fixed effects. Column 2 includes geographic controls for urban/rural municipalities and the log distance to U.S. that absorb region-specific trends in manufacturing employment. Column 3 additionally controls for the share of population older than 15 years old with no primary education and the share of working-age men. Column 4 controls for pre-period working-age population growth (1990-1998) to account for the possibility of differential working-age population

[17] Adão et al. (2019) show that accounting for controls used by Autor et al. (2013) in the first-stage regression of reduces the overrejection rate by about 20% with respect to their placebo exercise with no controls.

growth between areas more- and less-exposed to trade international competition (Greenland et al., 2019).[18] In the same spirit, I add controls for the pre-period change in manufacturing employment (1993-1998) in Column 5, and the pre-period interstate and returned migration rates (1995-2000) in Columnn 6.[19] Table B-2 shows the second stage results corresponding to Column 6. Overall, the estimates remain statistically significant and the magnitudes are similar.

Identifying assumptions and shift-share instruments

Goldsmith-Pinkham et al. (2020) also discuss Autor et al. (2013)'s identifying assumptions in terms of shift-shares, and argue that weighting the shares by growth rates in Chinese exports is an imperfect way of isolating the variation in industries where China experienced rapid productivity gains (low-skill and labor-intensive). However, this does not imply that the identification assumption is implausible in terms of shares. For example, the authors mention Pierce and Schott (2016a) measure industry-level of exposure to China receiving Permanent Normal Trade Relations (PNTR) as a case in which the argument is not that a trade policy is random, but that the change in a trade policy is not correlated with pre-existing trends in outcomes at the local level.[20]

Following Pierce and Schott (2020), I construct a measure of Mexican municipalities (indirect) exposure to the PNTR as the employment-share weighted average of NTR gaps across manufacturing industries that are subject to tariffs. The intuition behind using this alternative instrument is that Mexican municipalities with industries that benefited from

[18] Greenland et al. (2019) find that local labor markets in the U.S. with higher exposure to Chinese import competition (using the PNTR agreement with China as policy change as Pierce and Schott (2016a)) experienced a relative reduction in population growth, driven by young, males and low-educated groups. Contrary to Autor et al. (2013), the authors find evidence of population adjustments. The key difference in their results lies upon controlling for pre-existing trends in population growth at the local level.

[19] Return migrants are individuals living in Mexico in 2000, but who lived in another country (or state) five years before. The return migration rate is the number of returned migrants divided by the source's population in year 1995.

[20] In October 2000, the United States Congress passed a bill granting PNTR to China. Pierce and Schott (2016a) measure the impact of NTR as the rise in US tariffs on Chinese goods that would have occurred in the event of a failed annual renewal of China's NTR status. They refer to this difference as the NTR gap. Pierce and Schott (2020) compute county-level exposure to the PNTR as the employment-share-weighted-average of NTR gap across the 4-digit SIC industries active in the county.

NAFTA, developing a comparative advantage and increasing exports to U.S. over 1994-2000, were more negatively affected by the trade agreement between China and the United States. The change in trade policy between China and the U.S. was not correlated with Mexican pre-existing outcomes at the local level, while the industry-municipality shares predict changes in employment through the changes in the trade policy between third countries.

My results are robust to using Pierce and Schott (2016a) measure of exposure to trade competition as reduced-form evidence in Table B-3 shows. Panel A shows that an interquartile shift in exposure to the PNTR increased type 2 diabetes mortality by 0.66 deaths per 100,000 people over 1998-2003 and by 1.1 deaths per 100,000 people over 1998-2013.[21] Panel B estimates imply that moving a Mexican municipality from the 25th to the 75th percentile of exposure to PNTR, decreased the manufacturing employment rate by 2.4 percentage points over 1998-2003 and by 3.7 percentage points over 1998-2013. These effects of exposure to the PNTR on manufacturing employment are very similar to the effect implied by my 2SLS estimates, which I discuss in Section 6 below.[22]

Other sensitivity and robustness checks

Another concern is that municipalities with higher exposure to international competition were already experiencing differential trends in mortality. To address this concern, in Table B-4, I show that municipalities more exposed to international competition were not experiencing differential trends in these causes of mortality, using data extending eight years prior to my sample period. The dependent variable in the second stage is the change in age-adjusted mortality rates between 1990 and 1997, while the changes in the measures of exposure to international competition remain between 1998-2003 and 1998-2013. All the coefficients are statistically insignificant, alleviating concerns over the identification assump-

[21] The reduced-form estimates are smaller and not as precisely estimated; the signs are as expected.

[22] I also report the effect of export exposure on the change in the log manufacturing employment rate. The estimates imply a decline in overall manufacturing employment of -0.08 log points over 1998-2003 and of -0.17 log points over 1998-2013. These effects of exposure to the PNTR on manufacturing employment are very similar to the effect implied by my 2SLS estimates, presented in Table 6 and in Table C-5.

tions.[23] Finally, I also show that my mortality results are not sensitive to either dropping border states (Tables B-5 and B-6), varying regression weights (Table B-7), accounting for the expansion of a free health insurance program that was rolled-out by the Mexican government during my period of analysis (Table B-8), or using an alternative identification strategy proposed by Dell et al. (2019) (Tables B-9 and B-10).[24]

6 Discussion and Additional Supporting Evidence

My results thus far imply that exposure to international trade competition is associated with increases in age-adjusted mortality from type 2 diabetes. However, some evidence also points to declines in age-adjusted mortality from ischemic heart disease. To explore potential explanations behind this heterogeneous mortality response, I started by showing results by gender and age groups. While I observe relative increases of type 2 diabetes deaths across both genders, the declines in ischemic heart disease deaths are concentrated among men. This evidence is in line with the existence of different risk profiles by gender observed globally: women are more likely to be obese than men, while tobacco use and alcohol consumption is more prevalent among men (WHO, 2011; OECD, 2009). Furthermore, it implies that the drivers of chronic disease might be different or differently affected by a trade-induced negative employment shock. In this section, I further examine the channels that affect the prevalence of chronic disease, such as the relationship between income and nutrition, access to health care, and health behaviors.

[23] The caveat of using pre-period mortality data is that the International Classification of Deaths (ICD) changed in 1998. In the main analysis, causes of death are classify using ICD-10, which has been used in Mexican mortality records since 1998. In order to conduct the placebo exercise to check for differential pre-trends in the years previous to my analysis, I have to classify deaths using ICD-9. There are some comparability issues between the two. For example, diabetes is only reported at aggregate level in ICD-9, so I cannot calculate the pre-trend for type 2 diabetes. This results in a baseline rate for 1990 that is higher than the baseline rate reported in the main analysis. Other causes of death have similar issues.

[24] Dell et al. (2019) use the change in the manufacturing employment rate as endogenous variable, instrumented with a measure of exposure to trade competition in the U.S. market, and interpret the second stage results on mortality rates as the effect of a one standard deviation change in manufacturing employment.

6.1 International Competition and Income

One of the primary ways that trade liberalization might lead to changes in health and mortality rates is through its effects on labor market outcomes (Adda and Fawaz, 2020; Pierce and Schott, 2020; Autor et al., 2019; Colantone et al., 2019; Hummels et al., 2019; Mcmanus and Schaur, 2016). In this section, I examine the relationship between international competition and several labor market outcomes.

International Competition and Manufacturing Employment

The primary mechanism through which trade competition might lead to these mortality outcomes is via a deterioration in employment opportunities in the manufacturing sector. Table 6 shows that manufacturing employment exhibits a negative and statistically significant relationship with municipality exposure to import competition (Panel A) and export competition (Panel B). Column 1 estimates imply that overall manufacturing employment in a municipality at the 75th percentile of trade exposure declined by -0.08 log points more than in a municipality at the 25th percentile over 1998-2003, and by -0.15 log points more over 1998-2013. Columns 2 and 3 show the trade-induced decline in manufacturing employment for men (-0.05 log points) and women (-0.05 to -0.10 log points), respectively.[25]

My estimates indicate that more than half of the decline in the manufacturing employment rate can be attributed to Chinese trade competition.[26] The economic relevance of my estimates is in line with Utar and Torres Ruiz (2013) results, which indicate that about half

[25]The mean changes in the manufacturing employment rate by gender are reported in Table 1. In 1998, there were about 1.4 million women and 2.6 million men working in the manufacturing sector. Although the percentage decline for women is larger than for men, the employment ratio of men to women in the manufacturing sector at baseline is 2 to 1 (see Table C-1). Autor et al. (2019) find that while trade shocks reduce employment and earnings of both genders, losses are larger for males.

[26]These estimates imply a loss of 600,000 jobs in the manufacturing sector due to trade exposure over the 15-year period. Table C-5 shows results using the change in the manufacturing employment rate as an outcome (instead of the log change in manufacturing workers). Columns (1) and (3) show that the manufacturing employment rate in a municipality at the 75th percentile of exposure decreased 3 and 6 percentage points more than in a municipality at the 25th percentile over 1998-2003 and 1998-2013, respectively. Table 1 shows that the overall decline in the manufacturing employment rate over was 0.05 percentage points over 1998-2003 and 0.07 percentage points over 1998-2013. The results by gender in the remaining columns imply declines of about 1-3 percentage points for men and 2-5 percentage points for women. According to the economic census data, the baseline manufacturing employment was 0.25 for women and 0.30 for men.

Table 6: International Competition and Manufacturing Employment

	Dependent variable: Δ Log Manufacturing Employment					
	1998-2003			**1998-2013**		
	Total	**Men**	**Women**	**Total**	**Men**	**Women**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	-0.466***	-0.354***	-0.332**	-0.116***	-0.0996***	-0.121***
	(0.114)	(0.120)	(0.143)	(0.0210)	(0.0209)	(0.0246)
Rescaled 25th-75th pctile	-0.0762***	-0.0579***	-0.0543**	-0.1598***	-0.1378***	-0.1672***
	(0.0187)	(0.0196)	(0.0233)	(0.0290)	(0.0289)	(0.0341)
Panel B: Export Competition						
ΔICW^{US}	-0.0332***	-0.0199***	-0.0410***	-0.00928***	-0.00666***	-0.0127***
	(0.00684)	(0.00616)	(0.00850)	(0.00176)	(0.00172)	(0.00203)
Rescaled 25th-75th pctile	-0.0838***	-0.0502***	-0.1032***	-0.1536***	-0.1103***	-0.2103***
	(0.0172)	(0.0155)	(0.0214)	(0.0291)	(0.0284)	(0.0337)
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on the log change in manufacturing employment for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Columns 1 and 4 report the overall effect, Columns 2 and 5 report the effect for male workers, and Columns 3 and 6 report the effects for female workers. $\Delta ICW_{i,t}^{D}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in log manufacturing employment associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in log manufacturing employment for a Mexican municipality at the 75th compared to the 25th percentile of exposure. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1) of the -1.2 percent decline in *maquiladoras* (i.e., Mexican export processing plants) between 2001 and 2006 can be attributed to Chinese competition.[27]

The negative trade shock on manufacturing labor demand highlights the main mechanisms through which trade liberalization affected chronic disease mortality in Mexico: deterioration of labor market opportunities, which plausibly lead to income loss (due to job loss or lower wages), worsening labor conditions (i.e. informal employment), and loss of access to health insurance. To further check on falling incomes as the main mechanism linking trade exposure to mortality, I present additional evidence on the relationship between international competition wages next.

International competition and wages

The Mexican Economic Census, which I use as main source of employment data, only has data on the annual wage bill and the annual number of paid employees by industry and municipality. However, it does not have information on individual wages and hours worked. Consequently, it does not allow me to observe whether the changes in wages are due to changes for individual workers or the result of changes in the composition of workers. Therefore, I complement this part of the analysis using data from the National Employment Survey (Encuesta Nacional de Empleo, ENE) and the National Survey of Occupations and Employment (Encuesta Nacional de Ocupaciones y Empleo, ENOE) to examine the effect of trade exposure on wages. This survey tracks the Mexican labor force and provides information on characteristics of employment, but it is only available for a subsample of municipalities.

Table 7 shows 2SLS estimates of the effect of international competition on the change in log of wages of full-time workers (i.e., individuals who report working at least 30 hours). The results suggest that higher exposure to international competition was associated with

[27] Autor et al. (2013) find that Chinese import penetration explains 25 to 66 percent of the overall decline in US manufacturing employment from 2000 to 2007, or -5 to -11 percentage points of the overall -20 percent decline. Pierce and Schott (2016a) find a relative decline in manufacturing employment of -0.15 log points as a consequence of exposure to the PNTR.

Table 7: Exposure to International Competition and Wages - 2SLS

	Dependent variable: Δ Log Wages					
		1998-2003			**1998-2013**	
	Total	**Manufacturing**	**Non-Manuf.**	**Total**	**Manufacturing**	**Non-Manuf.**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	-0.171	-0.340**	-0.143	-0.0474***	-0.0347	-0.0483***
	(0.106)	(0.142)	(0.110)	(0.0175)	(0.0227)	(0.0178)
Rescaled 25th-75th pctile	-0.0292	-0.0582**	-0.0245	-0.0625***	-0.0464	-0.0638***
	(0.0181)	(0.0243)	(0.0188)	(0.0231)	(0.0303)	(0.0235)
Panel B: Export Competition						
ΔICW^{US}	-0.00413	-0.0164***	-0.000443	-0.00347**	-0.00338**	-0.00329**
	(0.00534)	(0.00616)	(0.00590)	(0.00144)	(0.00167)	(0.00148)
Rescaled 25th-75th pctile	-0.0108	-0.0433***	-0.0012	-0.0584**	-0.0563**	-0.0552**
	(0.0139)	(0.0163)	(0.0154)	(0.0242)	(0.0279)	(0.0249)
Observations	403	403	403	403	403	403

Notes: This table shows second stage estimates of the effect of international competition on the log change of wages of full-time workers (i.e., individuals that report working at least 30 hours) for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Observations are municipalities covered in Employment and Occupation Survey (ENE-ENOE) weighted by the initial working age-population. The overall change in wages is presented in columns 1 and 4. Columns 2 and 5 show the change in wages in the manufacturing sector, while columns 3 and 6 show the change in wages in the non-manufacturing sectors. $\Delta ICW^{D}_{i,t}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the log change in wages associated with an increase of 1,000 USD in ICW, while in the second two rows present rescaled estimates to reflect the change in log wages for a Mexican municipality at the 75th compared to the 25th percentile of exposure. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1) a statistically significant decrease in wages in the manufacturing sector in the short run and overall decreases in wages in the long run. Moving a municipality from the 25th to the 75th percentile of exposure to international competition decreased average wages in the manufacturing sector by 4-6 percent between 1998-2003 and by around 5 percent between 1998-2013. The point estimates in the non-manufacturing sector are negative in both periods, but statistically significant in the long term, implying certain sectoral adjustment takes place over time. The magnitude of my estimates is in line with Chiquiar et al. (2017) who find a 7 percent decline in wages over 2000-2008 in 59 Mexican metropolizan zones (which group about 300 municipalities) more exposed to Chinese competition.[28]

Thus far, my analysis on labor market outcomes provides evidence of falling incomes as the main mechanism linking trade exposure to mortality. Changes in income may affect chronic disease prevalence and mortality by affecting consumption patterns of food, cigarettes, alcohol, and medicine. For example, Jofre-Bonet et al. (2018) find that the 2008 Great Recession had a damaging effect for some health indicators (i.e., diabetes, fruit consumption, and obesity), while being protective for others (i.e., smoking and drinking) in England.[29]

The prevalence of type 2 diabetes is associated with poor nutrition and lack of physical activity. Therefore, the increase in type 2 diabetes mortality might be linked to limited access to food variety and quality in financially constrained households. Although I do not have measures of dietary quality as an outcome, related work documents a meaningful nutrition-income relationship in both developed and developing countries. In the United States, Allcott et al. (2019) find that households in the top income quartile buy groceries that are 0.56 standard deviations more healthful than the bottom quartile. This 0.56 standard

[28]On the contrary, Mendez (2015) does not find a negative effect on wages within formal private-sector employment during the period 2000-2010. However, examining the effects on wages within the formal sector does not allow to capture changes in earning due to transitions from formal to informal employment. The results in the next section show that there were significant changes in the levels of informality at the local level. Therefore, changes in the composition of informal and formal workers are a relevant dimension to consider when analyzing local level changes in wages.

[29]The authors also argue that the documented decreases in heavy smoking and heavy, moderate, and light drinking are possibly associated with reduced affordability of cigarettes and alcohol.

deviation difference associated with a 0.67 difference in body mass index (0.09 standard deviations) and a 1.9 percentage point difference in diabetes prevalence.

In Mexico, Hoddinott et al. (2000) find that Progresa/Oportunidades, a conditional cash transfer program that started in the late 1990s, significantly improved beneficiary household's dietary quality, as measured by the number of different foods consumed, and a 20 percent increase in the value of consumption of fruits and vegetables.[30] Similarly, Barham and Rowberry (2013) find that Progresa significantly reduced elderly municipal-level mortality from diabetes by 12 percent over 1997-2000. Progresa's main target were households with children in school age; hence, these studies suggest that increased income at household level improves the members access to nutritious food and other health inputs.[31]

In addition to income losses, due to job loss or lower wages, a trade-induced shock to manufacturing labor demand may have an effect on mortality through changes in access to health insurance. In the next subsection, I explore the relationship between trade exposure and access to health insurance through formal employment.

6.2 International competition, informal employment, and access to health insurance

In Mexico, formal sector workers (and their families) have health insurance through employment, provided by the Mexican Social Security Institute (Instituto Mexicano de Seguro Social or IMSS) and the Institute of Social Security and Services for Civil Servants (Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado or ISSSTE). In 2000, around 40 percent of the population was covered by the IMSS, 7 percent was covered by the

[30] The cash transfer amount represented about 25 percent of these households' monthly income (Hoddinott et al., 2000). Gertler et al. (2012) find a 5.6 percent increase in consumption and a 10 percent increase in agricultural income after 18 months of benefits.

[31] The authors also find that the program reduced mortality cause by infectious disease, but it had little effect on mortality caused by respiratory infections or heart disease, stroke and hypertension. Behrman and Parker (2011) find self-reported reductions in the overall prevalence of diabetes among the elderly members in households that were beneficiaries of Progresa. For an comprehensive literature review of the research on the effects of Progresa, see Parker and Todd (2017).

ISSSTE, 3 percent was covered by private insurance, while the rest was uninsured.[32]

Mexican workers are allowed to continue with Social Security benefits for two months if they become unemployed potentially affecting the continuity of care of non-communicable diseases (OECD, 2017). Consequently, job loss or transitions from formal to informal employment may have a negative effect on health coverage.

First, I examine whether municipalities with higher exposure to international competition experienced differential adjustments in their share of formal employment. I calculate this share by combining data from the IMSS and the Mexican Economic Census. While employment data from the IMSS covers the universe of formal private-sector establishments (and all employees must enroll), the Economic Census counts both the formal and informal labor force. I take this difference as a proxy of the gap between formal and informal employment.[33] Table 8 shows that moving a municipality from the 25th to the 75th percentile in international competition decreased the share of formal jobs in the manufacturing sector by 2 to 3.5 percentage points. Furthermore, the overall share of formal employment (i.e., the ratio IMSS to Economic Census number of total workers) decreases by 2 percentage points over 1998-2003, and by about 4 to 5 percentage points over 1998-2013. This implies an increase in informality of about 16 to 25 percent in the manufacturing sector and 4 to 10 percent in all sectors.[34] These results indicate that displaced workers and their families may

[32]Regarding the population employed in the manufacturing sector in particular, according to the 2000 Population Census, 53 percent of manufacturing workers report affiliation to IMSS while 1 percent were affiliated to ISSSTE, and 45 percent were uninsured. This data comes from 10.6 percent subsample of the 2000 Mexican census collected by INEGI and available from IPUMSI (Minnesota Population Center). The 10.1 million records cover 2,443 municipalities. The data available from the IMSS covers 1,439 municipalities.

[33]The initial ratio of workers enrolled in the IMSS to workers' counts form the Economic Census is 0.124 in the manufacturing sector and 0.47 in all sectors.

[34]In Appendix C, I also examine whether there was a change in the composition of workers within the manufacturing sector using data from the Mexican Economic Census for the full sample of municipalities. I divide the manufacturing labor force in paid employees and contract workers. The distinction is relevant because paid employees have more rights in terms of severance payments, social security contributions, minimum salary and unionizing than contract workers, who are paid by the hour and are not covered by labor regulations. In line with Blyde et al. (2017), I find that exposure to international competition is associated with an overall decrease in manufacturing employment as well as a change in the composition of workers within the sector. Table C-6 shows that higher trade exposure is associated with a 8 percent decrease in paid manufacturing employees paired with a 3 percent increase in contract workers between 1998-2003 (Columns 2 and 3), and a 16 to 18 percent decrease in paid employees between 1998-2013 paired with a 3.5 percent increase in contract workers in the manufacturing sector.

Table 8: Exposure to International Competition and Formal Jobs -2SLS

Dependent variable: Change in Share of Formal Jobs (ratio IMSS to Economic Census)				
	1998-2003		**1998-2013**	
	Manufacturing	**Total**	**Manufacturing**	**Total**
	(1)	(2)	(3)	(4)
Panel A: Import Competition				
ΔICW^{MEX}	-0.188***	-0.114***	-0.0240***	-0.0285***
	(0.0577)	(0.0354)	(0.00831)	(0.00708)
Rescaled 25th-75th pctile	-0.0358***	-0.0217***	-0.0347***	-0.0411***
	(0.0110)	(0.0068)	(0.0120)	(0.0102)
Panel B: Export Competition				
ΔICW^{US}	-0.00611**	-0.00924***	-0.00162**	-0.00310***
	(0.00275)	(0.00241)	(0.000663)	(0.000552)
Rescaled 25th-75th pctile	-0.0163**	-0.0243***	-0.0292**	-0.0558***
	(0.0073)	(0.0063)	(0.0119)	(0.0099)
Observations	1,439	1,439	1,439	1,439

Notes: This table shows second stage estimates of the effect of international competition on on the change in the share of formal employment for two periods: 1998-2003 (columns 1-2) and 1998-2013 (columns 3-4). Observations are municipalities weighted by the initial working age-population. Employment data from the Mexican Social Security Institute (IMSS) covers the universe of formal private-sector establishments, and all employees must enroll (available for 1,439 municipalities). The dependent variable represents the gap between formal an informal employment in each municipality. Columns 1 and 3 present results for the manufacturing sector, while columns 2 and 4 show results for all sectors. $\Delta ICW_{i,t}^{D}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the share of formal workers (i.e., the ratio IMSS to Economic Census number of workers) associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in the share of formal workers for a Mexican municipality at the 75th compared to the 25th percentile of exposure. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1) have lost access to health insurance through formal employment.

Second, I examine whether municipalities with higher exposure to international competition experienced a differential decrease in the share of population with access to health care. Table 9 presents 2SLS estimates on the relationship between trade exposure and access to health insurance. Moving a municipality from the 25th to the 75th percentile of international competition is associated with a reduction in the share of the population with access to any type of health insurance of 2 percentage points over 2000-2005 (Column 1) and 5 to 7 percentage points over 2000-2010 (Column 3). This decrease is partially explained by the decrease in the share of beneficiaries enrolled in the IMSS (Columns 2 and 4). The estimates are negative for both periods, but statistically significant only over 2000-2010; an interquartile shift in exposure to international competition decreased the share of population with access to health insurance through the IMSS by 0.5 percentage points.

Loss of health insurance paired with falls in income may link trade exposure to mortality, even in the short term, via declines in treatment of chronic diseases. For instance, Huh and Reif (2017) estimate that the implementation of Medicare Part D reduced elderly mortality by 2.2 percent annually between 2004 and 2007.[35] Also in the context of changes in policy that affect access to treatment on chronic disease mortality, Américo and Rocha (2020) find that a large-scale subsidizing program of prescription drugs in Brazil reduced diabetes mortality by 1 percent annually between 2006 and 2012.[36] In the context of the health toll of trade exposure, Adda and Fawaz (2020) show that import exposure in the U.S. is associated with significant declines in health care access and utilization. Their results imply that one of the mechanisms explaining health deterioration was delayed diagnosis of new conditions,

[35] This result is driven primarily by a reduction of 4.4 percent in cardiovascular mortality, leading cause of death for the American elderly. The authors find that individuals who lack drug insurance consume fewer drugs and spend less on them. The largest categories in terms of either utilization or expenditures are treatments for heart disease, diabetes, lipid metabolism disorders, and digestive disorders.

[36] Aqui Tem Farmacia Popular (ATFP) was launched by the Brazilian government in 2006. An additional ATPF pharmacy per 100,000 inhabitants is associated with a decrease of 0.625 in the annual municipality number of deaths by diabetes and a decrease in the hospitalization rate due to diabetes of 8.2 per 100,000 individuals aged 40 years or more. These declines correspond to a 1 and 3.6 percent decline with respect to the baseline 65 deaths and 226 hospitalizations per 100,000 inhabitants, respectively.

Table 9: Exposure to International Competition and Health Insurance - 2SLS

Dependent variable: Change in Share of population covered by health insurance				
	2000-2005		**2000-2010**	
	Any insurance	**IMSS**	**Any insurance**	**IMSS**
	(1)	(2)	(3)	(4)
Panel A: Import Competition				
ΔICW^{MEX}	-0.151***	0.00320	-0.0517***	-0.00369**
	(0.0236)	(0.0100)	(0.00578)	(0.00171)
Rescaled 25th-75th pctile	-0.0246***	0.0005	-0.0706***	-0.0050**
	(0.0039)	(0.0016)	(0.0079)	(0.0023)
Panel B: Export Competition				
ΔICW^{US}	-0.00777***	3.27e-05	-0.00317***	-0.000348**
	(0.00119)	(0.000606)	(0.000431)	(0.000143)
Rescaled 25th-75th pctile	-0.0194***	0.0001	-0.0519***	-0.0057**
	(0.0030)	(0.0015)	(0.0071)	(0.0023)
Observations	1,850	1,850	1,850	1,850

Notes: This table shows second stage estimates of the effect of international competition on the change in the share the population that has health insurance for two periods: 2000-2005 (columns 1-2) and 2000-2010 (columns 3-4). Data is from the Mexican Population Census (2000, 2010) and Mexican Population Counts (2005). Observations are municipalities with information on insured population weighted by the initial working age-population. Columns 1 and 3 present results for the share of population with any type of health insurance (IMSS, ISSSTE, Seguro Popular, other), while columns 2 and 4 show the change in the share of population with access to health insurance through formal employment (IMSS). $\Delta ICW_{i,t}^{D}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese export penetration to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the share of population with health insurance associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in the share of insured population for a Mexican municipality at the 75th compared to the 25th percentile of exposure. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1) and delayed or discontinued treatment for pre-existing conditions.

Trade exposure potentially decreased access to preventive medicine, diagnosis, and treatment of chronic conditions, such as type 2 diabetes and hypertensive disease. However, the relative decline in ischemic heart disease is harder to explain with regards to access to health care. I explore two potential explanations: first, the expansion of a free health insurance program in Mexico might have contributed to improving emergency medical procedures and therapies for coronary conditions.[37] Second, the declines in ischemic heart disease might be explained by the relationship between trade exposure and specific risk factors (e.g., alcohol and tobacco consumption) together with the gender risk profiles discussed above.

In 2002, the Mexican government launched a free health insurance program known as *Seguro Popular* (SP) to extend health coverage and financial protection to around 50 million uninsured people (around 50 percent of the population). Initially, SP operated as a pilot, enrolling 641 thousand families in 26 municipalities across 5 states, until it was formally introduced in 2004, and it was extended to every municipality country-wide by 2007 (Frenk et al., 2009; Bosch and Campos-Vazquez, 2014; Parker et al., 2018). The main objective of SP was to cover the population with no access to health care through work, i.e., informal workers and their families.

The expansion of "universal" health care might have mitigated the negative effects on health outcomes if displaced workers did not lose health care access, instead switching to SP. However, given that the SP expansion was non-random, I cannot draw casual conclusions regarding the effect of the program because its roll-out is potentially endogenous.[38] With this caveat in mind, Table B-8 shows that my main mortality results are not sensitive to controlling for varying SP coverage and the exclusion of municipalities that first received such coverage.

[37] Approximately half the decline in U.S. deaths from coronary heart disease from 1980 through 2000 may be attributable to reductions in major risk factors and approximately half to evidence-based medical therapies (Ford and al., 2007).

[38] The expansion prioritized states with low social security coverage, large number of uninsured in the first six deciles of income, ability to provide the services covered by the program, potential demand for enrollment, explicit request of the state, and existence of sufficient budget for the program (Conti and Ginja, 2020).

The lack of sensitivity of my mortality results to the expansion of SP is in line with studies that examine the effect of the free health insurance program expansion on health outcomes in Mexico over my period of analysis.[39] Several studies have documented an increase in the use of health services (Barros, 2008; Harris and Sosa-Rubi, 2009; Sosa-Rubí et al., 2009a) and a reduction in the probability of catastrophic health expenditures (Barros, 2008; Galárraga et al., 2010). From 2004 to 2012 the number of interventions covered in the universal health services catalog (Catálogo Universal de Servicios de Salud, CAUSES) increased gradually, going from 90 to 284. However, costly interventions for non-communicable health conditions, such as cardiovascular diseases, adult cancers and the complications of diabetes were not yet covered by the Fund for Protection against Catastrophic Expenditures (Fondo de Protección contra Gastos Catastróficos) by year 2009 (Frenk et al., 2009).[40] Preventive treatment for dietary related diseases and treatment for elderly people with diabetes were added only in 2012 to the CAUSES (SPSS, 2013). Finally, heart attacks in those aged over 60, strokes, dialysis after renal failure, multiple sclerosis, and lung cancer were not covered by SP by year 2016 (OECD, 2017).

The results presented in this section indicate that the negative trade shock on manufacturing labor demand affects chronic disease mortality in Mexico via a deterioration of labor market opportunities, which leads to income loss (due to job loss and lower wages), worsening labor conditions (i.e., informal employment), and loss of access to health insurance. In the next section, I examine the relationship between trade exposure and risk factors for chronic disease.

[39] Conti and Ginja (2020) show that SP reduced infant mortality by 10 percent in poor municipalities, but do not find any significant program impacts on mortality for children ages 1-4, adults, or elderly. Parker et al. (2018) findings suggest positive effects on the usage of health care services and on receiving diagnostic tests, but limited effects on treatment, conditional on being ill. Regarding diabetes treatment, in particular, Rivera-Hernandez et al. (2016) find very limited effects of the SP on diverse treatment indicators for both hypertensive and diabetic patients. Sosa-Rubí et al. (2009b) find that those enrolled in SP were more likely to report having had regular blood glucose control tests, but no significant difference in the probability of reporting that diabetes was controlled.

[40] While pooling of funds across health insurance sub-systems exists for this Fund, there is no national pool to pay for rate high-cost diseases or specialized medicines. Moreover, there are no agreements across sub-systems to guarantee the continuity of care for chronic disease such as diabetes in the event of changes in employment status (OECD, 2017).

Table 10: Exposure to Import Competition and Health Outcomes - 2SLS

	All	**Household income**		**Gender**	
		Low	**High**	**Men**	**Women**
	(1)	(2)	(3)	(4)	(5)
Prevalence					
Obesity (BMI>30)	0.0273**	0.0197*	0.0332	0.0428**	0.0213
	(0.0129)	(0.0102)	(0.0263)	(0.0178)	(0.0160)
Physical Activity					
Intense exercise last week	-0.0183	-0.0523*	0.0107	-0.0211	-0.0363
	(0.0306)	(0.0277)	(0.0492)	(0.0320)	(0.0400)
Moderate Exercise last week	-0.0109	-0.00602	-0.0116	-0.0732**	0.00971
	(0.0407)	(0.0392)	(0.0442)	(0.0350)	(0.0605)
Walk 10 min last 10 days	-0.0383	-0.0612*	-0.0245	-0.0559	-0.0322
	(0.0350)	(0.0369)	(0.0342)	(0.0423)	(0.0368)
Risk factors					
Currently smokes	0.00349	-0.0181**	0.0268	0.0107	-0.00777
	(0.00899)	(0.00865)	(0.0167)	(0.0151)	(0.00580)
Drinks daily	0.00324	0.00163	0.00386	0.00471	0.00208**
	(0.00244)	(0.00177)	(0.00350)	(0.00505)	(0.000890)
Got drunk last month	0.00851	-0.00386	0.0216	0.0295	-0.00804
(heavy drinking)	(0.0125)	(0.0171)	(0.0181)	(0.0223)	(0.00971)
Access to health care					
Health insurance	-0.120*	-0.106	-0.0988*	-0.118*	-0.119*
	(0.0669)	(0.0723)	(0.0566)	(0.0707)	(0.0636)
Preventive medicine in the last year	-0.0477*	-0.0201	-0.0669**	-0.0480	-0.0340
	(0.0289)	(0.0301)	(0.0317)	(0.0481)	(0.0281)
Self-reported physical and mental health					
Bad health in last 2 weeks	0.00366	0.0124	-0.0102	0.00740	0.00134
	(0.0188)	(0.0242)	(0.0140)	(0.0222)	(0.0187)
Any depression symptoms	0.0494	0.0321	0.0511	0.0510	0.0489
	(0.0530)	(0.0520)	(0.0539)	(0.0608)	(0.0483)
Poor mental health	0.0345	0.0193	0.0461	0.0271	0.0323
	(0.0441)	(0.0383)	(0.0521)	(0.0329)	(0.0519)
States	32	32	32	32	32

Notes: This table shows state-level second stage results of the effect of international competition on the change in health outcomes over 2006-2012. Data is from the Mexican National Health and Nutrition Survey (ENSANUT), which is representative at state level for 2006 and 2012. Each coefficient results from a different regression on the outcome variables in the table rows on a state-level measure of exposure to import competition. Table C-7 presents equivalent results for exposure to export competition. $\Delta ICW^{D}_{i,t}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries. I calculated the measures of exposure to import competition at state level for 2006-2012, with the industry pre-shock industry shares from 1998. To reflect the change in health outcomes for a Mexican municipality at the 75th compared to the 25th percentile of exposure to trade competition, point estimates need to be multiply by 0.4681, the interquartile range of $\Delta ICW^{MEX}_{2006-2012}$ (Mean 0.44, 25th pctile 0.1749, 75th pctile 0.6430, IR 0.4681). Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

6.3 International Competition and Risk Factors

In this section, I explore risk factors driving the mortality response to the negative economic shock described in the main part of the analysis. I use the Mexican National Health and Nutrition Survey to explore whether regions with higher exposure to international competition exhibit differential change in the shares of population self-reporting healthy behaviors (e.g., exercising) or unhealthy behaviors (e.g., drinking or smoking), and the change in the share of population with obesity. Table 10 shows second stage estimates of the relationship between trade exposure and several drivers of chronic disease for the 2006-2012 period at state level. Each coefficient results from a different regression of the outcome variables in the table rows on a state-level measure of exposure to import competition. The point estimates show the effect of a 1,000 USD increase in import competition.[41]

Column 1 presents overall shares, Columns 2 and 3 split the sample in low- and high-income households. The survey has information on households' income that allows me to explore changes in health behaviors along the income distribution. However, mortality data used in the main part of the analysis is not available by income level. Consequently, I cannot draw conclusions on mortality outcomes based on the differences by income level found in this section.[42]

First, areas most-exposed to international competition have higher overall obesity rates, especially among low-income households. Increased obesity rates in most exposed areas supports the hypothesis of a strong income-nutrition relationship explaining the increase in

[41] To interpret this estimates as the interquartile shift from a state at the 25th to the 75th percentile of exposure to international competition, the point estimates have to be multiplied by the interquartile range as in previous tables. The summary statistics for the exposure measures at state level are: $\Delta ICW^{MEX}_{2006-2012}$ (Mean 0.44, 25th pctile 0.1749, 75th pctile 0.6430, IR 0.4681); $\Delta ICW^{US}_{2006-2012}$ (Mean 4.97, 25th pctile 2.7557, 75th pctile 6.0649, IR 3.3092). I do not report the rescaled coefficients in the table for lack of space. The second stage estimates of the effect of export exposure on the same health outcomes are presented in Table C-7. The results are similar unless specified. I take the results in these tables as suggestive evidence given the large number of outcomes tested.

[42] These cross-sectional surveys provide information about around 40,000 adults (20-70 years old) in each round (i.e., ENSA 2000, ENSANUT 2006, and 2012). Because the survey is representative at state level only for years 2006 and 2012 (ENSANUT, 2012), I constructed the exposure measures for this period at state level, but I kept the industry pre-shock employment shares.

type 2 diabetes mortality. Moving a state from the 25th to the 75th percentile of exposure to import competition is associated with an increase of 1.3 (=2.73 x 0.4681) percentage points for the overall population (Column 1) and 1 (=1.97 x 0.4681) percentage point for low-income households (Column 2).[43] These coefficient magnitudes represent an increase of 4 percent overall and of 3 percent in low-income households with respect to the baseline share of obese people of 0.32.[44] Moreover, import competition explains about 40 percent of overall increase in obesity (3.2 percentage points) and a 29 percent of the mean increase in obesity in low-income households (3.1 percentage points) over this period. The estimates in Columns 4 and 5 imply that the effect of the interquartile shift in import exposure is associated with a 2 percentage point increase in the prevalence of obesity among men (i.e., a 60 percent increase relative to the sample mean increase of 3 percentage points), and a 1 percentage point increase in the share of women with obesity (i.e., a 25 percent increase relative to the sample mean increase of 4 percentage points). To compare these magnitudes with the related literature Giuntella et al. (2020) find that the impact of food imports from the U.S. may account for up to 22 percent of the observed increase in obesity prevalence in adult Mexican women over 1988-2012.

Second, respondents living in more-exposed states also report doing less physical activity (either intense, moderate or walking at least 10 minutes) in previous weeks, although most of the coefficients are imprecisely estimated. Across all groups at baseline, 40 percent report doing intensive exercise, 70 percent report doing moderate exercise, and 90 percent report walking at least 10 minutes. Over this period, on average intense exercise drops 5 percentage points, while moderate exercise and walking fall by 40 percentage points. Relative to these sample means, the interquartile shift in import competition is associated with a 2.5-3 percentage point relative decrease if physical activity in low-income households (i.e., implying a

[43] Increased exposure to export competition is associated with a 1 percentage point increase in the overall obesity rate (though imprecisely estimated). See Table C-7.

[44] The estimates for lowest quintile of the income distribution imply that increase import competition is associated with a 9.2 percent increase in obesity prevalence with respect to the baseline rate, which accounts for a striking 90 percent of the change in obesity prevalence over the period for the bottom quintile of the income distribution. This result (available upon request) is statistically significant at 1%.

marginally significant 2-5 percent decline with respect to baseline), and a 0.5-1.1 percentage point relative decrease in high-income households (although imprecisely estimated). Among both genders, physical activity relatively declines by 1.5 percentage points; the only statistically significant effect is a 5 percent decline in moderate physical activity for men with respect to the baseline, which accounts for 14 percent of the decline in moderate physical activity over the period.[45] On the one hand, declines in physical activity are associated for overweight and obesity. On the other hand, previous literature links job loss among individuals employed in industries imposing strenuous physical activity with improvements in the general health production function. Pierce and Schott (2016b) and Ruhm (2000) find a negative association between economic shocks and heart attacks.[46] Unfortunately, the survey does not provide enough details on the type of activity.

Third, the share of individuals that report smoking and heavy drinking daily is negatively associated with exposure to international competition for low-income households and positively associated for high income households. At baseline, 20 percent of respondents reported smoking overall (30 percent of men and 10 percent of women, 21 percent of high-income households and 18 percent of low income households). The interquartile shift in state-level exposure to import competition is associated with a statistically significant 2 percentage point decrease in the share of low-income households that smoke (i.e., a 11 percent decline with respect to baseline), and a 2 percent increase in the share of high-income households to smoke (imprecisely estimated). Although there are not statistically significant differences between genders, the sign of the coefficients on smoking (Column 2) and heavy drinking (Column 4) are negative for women and positive for men. Estimates in Column (3) show no evidence of statistically significant effects of import competition on regular drinking, with

[45] Previous work on the health consequences of unemployment find mix evidence on this channel. While individuals might have more time to do physical activity during recessions (Ruhm, 2005), bad economic conditions could also force less healthy individuals to enter the labor force or primary caregivers to join the workforce (Cutler et al., 2016).

[46] Hummels et al. (2019) report that increased effort in manufacturing jobs resulting from positive export shocks is associated with increased rates of hospitalizations due to heart attacks. Mcmanus and Schaur (2016) find increased injury rates in industries with higher exposure to import competition in the U.S.; Boone et al. (2011) find workers are less likely to report accidents during recessions.

the exception of the share women in high-exposure states which increase by a modest 0.1 percentage point. To the extent we consider cigarettes, alcohol, and other drugs as normal goods, falls in income will tend to improve health by reducing their consumption.

Previous evidence on this mechanism is mixed. Lang et al. (2018) do not find significant differences in smoking and drinking in CZ with higher exposure to import competition in the United States. Ruhm and Black (2002) report a procyclical variation in overall drinking using aggregate U.S. sales data from 1987 to 1999, and Ruhm (2005) also finds a procyclical variation in tobacco use over the same period. However, Ruhm (2019) finds that U.S. counties experiencing economic decline over 1999-2015 had larger increases in alcohol mortality. Finally, I find self-reported declines in access to preventive medicine and health insurance that reinforce the aggregate results presented in the previous section. However, I do not find statistically significant differences in self-reported mental and physical health.

All in all, the findings presented in this section suggest that negative employment shocks may have heterogeneous effects in middle-income countries, where falling incomes lead to less access to health care and nutritious food, but also reduce alcohol and tobacco consumption.

7 Conclusion

This paper investigates the extent to which trade-induced changes in local manufacturing employment opportunities affected leading causes of mortality in Mexico. I exploit cross-municipality variation in trade exposure given differences in industry specialization before China's accession to the WTO in 2001, and construct measures of exposure to both import competition in Mexico's domestic market and export competition in the U.S. market.

I show that trade exposure led to a 9 to 12 percent increase in the type 2 diabetes age-adjusted mortality rate with respect to baseline. Moreover, my results indicate that exposure to international competition explains between 14 and 19 percent of the increase in type 2 diabetes mortality over 1998-2003 and 8 to 10 percent of the average increase over

1998-2013. These magnitudes are economically relevant and the results on type 2 diabetes mortality rates are robust to a series of sensitivity checks and multiple hypothesis testing correction. Additionally, some evidence points to declines in ischemic heart disease and chronic obstructive pulmonary disease, although somewhat noisily estimated in some of the specifications.

This finding is a priori puzzling given that, broadly speaking, the risk factors for these chronic diseases are similar (i.e., diet, physical activity, tobacco and alcohol consumption). Even though the evidence for the reduction of ischemic heart disease is weaker than that of the increase in type 2 diabetes mortality, exploring potential mechanisms to explain the difference in the sign of the mortality response is worthwhile. In the rest of the paper, I provide theoretical and empirical explanations for this heterogenous mortality response.

While recent research focuses on supply-side analysis of the consequences of globalization on food prices and households' welfare, this paper provides evidence on demand-side factors that are central to the health-income relationship. My results indicate that the negative trade shock on manufacturing labor demand affected chronic disease mortality in Mexico via a deterioration of labor market opportunities, which led to income loss (due to job loss and lower wages), worsening labor conditions (i.e., informal employment), and loss of access to health insurance.

I also explore whether differing gender and age risk profiles explain the heterogeneous mortality response. While I observe relative increases of type 2 diabetes deaths across both genders, the declines in ischemic heart disease deaths are concentrated among men. This evidence is in line with the existence of different risk profiles by gender observed globally. Finally, I provide suggestive evidence of the relationship between trade exposure and chronic disease risk factors. The relative reduction in alcohol and tobacco consumption are plausible channels for the decline in ischemic heart disease and chronic pulmonary disease deaths. The 4 percent increase in obesity prevalence associated to trade exposure supports the hypothesis of a strong income-nutrition relationship explaining the increase in type 2 diabetes mortality.

References

Acemoglu, D., Autor, D., Dorn, D., Hanson, G. H., and Price, B. (2016). Import Competition and the Great US Employment Sag of the 2000s. *Journal of Labor Economics*, 34(S1):141–198.

Acosta Cázares, B. and Escobedo De La Peña, J. (2010). High burden of cardiovascular disease risk factors in Mexico: An epidemic of ischemic heart disease that may be on its way? *American Heart Journal*, 160(2):230–236.

Adão, R., Kolesár, M., and Morales, E. (2019). Shift-Share Designs : Theory and Inference. *Quarterly Journal of Economics*, 134(4):1949–2010.

Adda, J. and Fawaz, Y. (2020). The health toll of import competition. *Economic Journal*, 130(630):1501–1540.

Allcott, H., Diamond, R., Dube, J., Hanbury, J., Rahkovsky, I., and Schnell, M. (2019). Food Deserts and the Causes of Nutritional Inequality. *Quarterly Journal of Economics*, 134(4):1793–1844.

Américo, P. and Rocha, R. (2020). Subsidizing access to prescription drugs and health outcomes: The case of diabetes. *Journal of Health Economics*, 72.

Anderson, M. L. (2008). Multiple inference and gender differences in the effects of early intervention: A reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects. *Journal of the American Statistical Association*, 103(484):1481–1495.

Atkin, D. (2016). Endogenous Skill Acquisition and Export Manufacturing in Mexico. *American Economic Review*, 106(8):2046–85.

Autor, D., Dorn, D., and Hanson, G. (2013). The China Syndrome: Local Labor Market Effects of Import Competition in the United States. *American Economic Review*, 103(6):2121–2168.

Autor, D., Dorn, D., and Hanson, G. (2015). The Labor Market and the Marriage Market: How Adverse Employment Shocks Affect Marriage, Fertility, and Children's Living Circumstances.

Autor, D., Dorn, D., and Hanson, G. (2019). When Work Disappears: Manufacturing Decline and the Falling Marriage Market Value of Young Men. *American Economic Review: Insights*, 1(2):161–178.

Autor, D., Dorn, D., Hanson, G., and Song, J. (2014). Trade Adjustment: Worker-level Evidence. *Quarterly Journal of Economics*, 129(4):1799–1860.

Barham, T. and Rowberry, J. (2013). Living longer: The effect of the Mexican conditional cash transfer program on elderly mortality. *Journal of Development Economics*, 105:226–236.

Barquera, S., Campos-Nonato, I., Hernandez-Barrera, L., Pedroza, A., and Rivera-Dommarco, J. (2013). Prevalencia de Obesidad en Adultos Mexicanos, 2000-2012. *Salud Publica Mexico*, 55(2):151–159.

Barros, R. (2008). Wealthier but not much Healthier: Effects of a Health Insurance Program for the Poor in Mexico.

Basu, S. and Pearlman, S. (2017). Violence and migration: evidence from Mexico's drug war. *IZA Journal of Development and Migration*, 7(18).

Behrman, J. R. and Parker, S. W. (2011). The Impact of the PROGRESA/Oportunidades Conditional Cash Transfer Program on Health and Related Outcomes for the Aging in Mexico.

Benjamini, Y., Krieger, A. M., and Yekutieli, D. (2006). Adaptive linear step-up procedures that control the false discovery rate. *Biometrika*, 93(3):491–507.

Blyde, J., Busso, M., Faggioni, V., and Romero, D. (2017). The Impact of Chinese Competition on Mexican Labor Outcomes.

Bommer, C., Heesemann, E., Sagalova, V., Manne-Goehler, J., Atun, R., Bärnighausen, T., and Vollmer, S. (2017). The global economic burden of diabetes in adults aged 20-79 years: a cost-of-illness study. *The Lancet Diabetes Endocrinology*, 5(6):423–453.

Boone, J., Van Ours, J. C., Wuellrich, J.-P., and Zweimüller, J. (2011). Recessions are bad for workplace safety. *Journal of Health Economics*, 30:764–773.

Bosch, M. and Campos-Vazquez, R. M. (2014). The Trade-Offs of Welfare Policies in Labor Markets with Informal Jobs: The Case of the "Seguro Popular" Progran in Mexico. *American Economic Journal: Economic Policy*, 6(4):71–99.

Braga, B. (2018). The Effects of Trade Exposure on Marriage and Fertility Choices: Evidence from Brazil. *IZA DP No. 11875*.

Case, A. and Deaton, A. (2015). Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. In *Proceedings of the National Academy of Sciences*, pages 15078–15083.

Case, A. and Deaton, A. (2017). Mortality and Morbidity in the 21st Century. In *Brookings Papers on Economic Activity*.

CDC (2021). Chronic Obstructive Pulmonary Disease.

Chiquiar, D., Covarrubias, E., and Salcedo, A. (2017). Labor market consequences of trade openness and competition in foreign markets. *Banco de Mexico WP 2017-01*.

Colantone, I., Crinò, R., and Ogliari, L. (2019). Globalization and mental distress. *Journal of International Economics*, 119:181–207.

Conti, G. and Ginja, R. (2020). Who Benefits From Free Health Insurance: Evidence from Mexico. *Journal of Human Resources*, pages 1117–9157R2.

Cutler, D., Knaul, F., Lozano, R., Mendez, O., and Zurita, B. (2002). Financial crisis, health outcomes and ageing: Mexico in the 1980s and 1990s. *Journal of Public Economics*, 84:279–303.

Cutler, D. M., Huang, W., and Lleras-Muney, A. (2016). Economic Conditions and Mortality: Evidence from 200 years of data. *NBER WP No 22690*.

Dell, M. (2015). Trafficking Networks and the Mexican Drug War. *American Economic Review*, 105(6):1738–1779.

Dell, M., Feigenberg, B., and Teshima, K. (2019). The Violent Consequences of Trade-Induced Worker Displacement in Mexico. *American Economic Review: Insights*, 1(1):43–58.

Dix-Carneiro, R. and Kovak, B. K. (2017). Trade Liberalization and Regional Dynamics. *American Economic Review*, 107(10):2908–2946.

Dow, W. H., Godøy, A., Lowenstein, C. A., and Reich, M. (2019). Can Economic Policies Reduce Deaths of Despair? *NBER Working Paper No 25787*.

ENSANUT (2012). Encuesta National de Nutricion 2012. Technical report, Instituto Nacional de Salud Publica de Mexico.

Feenstra, R. C. and Kee, H. L. (2007). Trade Liberalisation and Export Variety: A Comparison of Mexico and China. *World Development*.

Fernández Guerrico, S. (2020). Trade Shocks, Population Growth, and Migration: Implications for Mortality Rate Calculations.

Ford, E. and al., E. (2007). Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. *The New England Journal of Medicine*, 62(10):664–665.

Frenk, J., Gómez-Dantés, O., and Knaul, F. M. (2009). The democratization of health in Mexico: Financial innovations for universal coverage. *Bulletin of the World Health Organization*, 87(7):542–548.

Galárraga, O., Sosa-Rubí, S. G., Salinas-Rodríguez, A., and Sesma-Vázquez, S. (2010). Health insurance for the poor: Impact on catastrophic and out-of-pocket health expenditures in Mexico. *European Journal of Health Economics*, 11(5):437–447.

Gallagher, K. P., Moreno-Brid, J. C., and Porzecanski, R. (2008). The Dynamism of Mexican Exports: Lost in (Chinese) Translation? *World Development*, 36(8):1365–1380.

Gallagher, K. P. and Porzecanski, R. (2007). What a Difference a Few Years Makes: China and the Competitiveness of Mexican Exports. *Oxford Development Studies*, 35(2).

Gelman, A. and Auerbach, J. (2016). Age-aggregation bias in mortality trends. *Proceedings of the National Academy of Sciences*, 113(7):816–817.

Gertler, P. J., Martinez, S. W., and Rubio-Codina, M. (2012). Investing Cash Transfers to Raise Long-Term Living Standards. *American Economic Journal: Applied Economics*, 4(1):164–192.

Giuntella, O., Rieger, M., and Rotunno, L. (2020). Weight Gains from Trade in Foods: Evidence from Mexico. *Journal of International Economics*, 122(January):103277.

Goldsmith-Pinkham, P., Sorkin, I., and Swift, H. (2020). Bartik Instruments : What, When, Why, and How. *American Economic Review*, 110(8):2586–2624.

Gonzalez, F. and Quast, T. (2010). Mortality and business cycles by level of development: Evidence from Mexico. *Social Science and Medicine*, 71(12):2066–2073.

Gracner, T. (2017). Bittersweet: How Prices of Sugar-Rich Foods Contribute to the Diet-Related Disease Epidemic in Mexico.

Greenland, A., Lopresti, J., and Mchenry, P. (2019). Import Competition and Internal Migration. *Review of Economics and Statistics*, 101(1):55–59.

Hanson, G. (2010). Why isn't Mexico Rich? *Journal of Economic Literature*, 48(4):987–1004.

Hanson, G. H. and Robertson, R. (2008). China and the Manufacturing Exports of Other Developing Countries. *NBER WP No 14497*.

Harris, J. and Sosa-Rubi, S. (2009). Impact of "Seguro Popular" on Prenatal Visits in Mexico, 2002-2005: Latent Class Model of Count Data with a Discrete Endogenous Variable. *NBER WP 14995*.

Hoddinott, J., Skoufias, E., and Washburn, R. (2000). The impact of PROGRESA on consumption. *International Food Policy Research Institute (IFPRI)*, (September).

Hollingsworth, A., Ruhm, C. J., and Simon, K. (2017). Macroeconomic conditions and opioid abuse. *Journal of Health Economics*, 56:222–233.

Huh, J. and Reif, J. (2017). Did Medicare Part D reduce mortality? *Journal of Health Economics*, 53:17–37.

Hummels, D., Munch, J., and Xiang, C. (2019). No Pain, No Gain: The Effects of Exports on Effort, Injury, and Ilness. *NBER WP No 22365*.

Iacovone, L., Rauch, F., and Winters, L. A. (2013). Trade as an engine of creative destruction: Mexican experience with Chinese competition. *Journal of International Economics*, 89:379–392.

ILO (2014). Informal employment in Mexico: Current situation, policies and challenges. Technical report, International Labour Force Organization.

Jofre-Bonet, M., Serra-Sastre, V., and Vandoros, S. (2018). The impact of the Great Recession on health-related risk factors, behaviour and outcomes in England. *Social Science and Medicine*, 197(November 2016):213–225.

Lang, M., McManus, T. C., and Schaur, G. (2018). The effects of import competition on health in the local economy. *Health Economics*, (December 2017):44–56.

Lindo, J. M. (2015). Aggregation and the estimated effects of economic conditions on health. *Journal of Health Economics*, 40:83–96.

Majlesi, K. (2016). Labor market opportunities and women's decision making power within households. *Journal of Development Economics*, 119(2016):34–47.

Majlesi, K. and Narciso, G. (2018). International import competition and the decision to migrate: Evidence from Mexico. *Journal of Development Economics*, 132:75–87.

Mcmanus, T. C. and Schaur, G. (2016). The effects of import competition on worker health. *Journal of International Economics*, 102:160–172.

Mendez, O. (2015). The effect of Chinese import competition on Mexican local labor markets. *North American Journal of Economics and Finance*, 34:364–380.

NCHS (2018). Underlying and Multiple Cause of Death Codes - Years 1979-2015. Technical report, National Center for Health Statistics.

OECD (2009). Mortality from heart disease and stroke. Technical report, Paris.

OECD (2017). *OECD Reviews of Health Systems: Mexico 2016*.

OECD (2019). Heavy Burden of Obesity : The Economics of Prevention. *OECD Health Policy Studies*.

Omran, A. (1971). The Epidemiologic Transition: A Theory of the Epidemiology of Population Change. *The Milbank Memorial Fund Quarterly*, 49(1):509–538.

PAHO (2012). Health in the Americas. Mexico: Diabetes. Technical report, Pan American Health Organization.

Parker, S., Saenz, J., and Wong, R. (2018). Health Insurance and the Agin: Evidence From Seguro Popular Program in Mexico. *Demography*, 55(1):361–386.

Parker, S. W. and Todd, P. E. (2017). Conditional Cash Transfers: The Case of Progresa/Oportunidades. *Journal of Economic Literature*, 55(3):866–915.

Pavcnik, N. (2017). The Impact of Trade on Inequality in Developing Coutnries. *NBER WP No. 23878*.

Pierce, B. J. R. and Schott, P. K. (2020). Trade Liberalization and Mortality: Evidence from US Counties. *American Economic Review: Insights*, 2(1):47–64.

Pierce, J. R. and Schott, P. K. (2009). A concordance between ten-digit U.S. harmonized system codes and SIC/NAICS product classes and industries.

Pierce, J. R. and Schott, P. K. (2016a). The Surprisingly Swift Decline of US Manufacturing Employment †. *American Economic Review*, 106(7):1632–1662.

Pierce, J. R. and Schott, P. K. (2016b). Trade Liberalization and Mortality: Evidence from U.S. counties. NBER Working Paper 22849.

Rivera-Hernandez, M., Rahman, M., Mor, V., and Galarraga, O. (2016). The Impact of Social Health Insurance on Diabetes and Hypertension Process Indicators among Older Adults in Mexico. *Health Services Research*, 51(4):1323–1346.

Ruhm, C. J. (2000). Are Recessions Good for your Health? *Quarterly Journal of Economics*, 115(2):617–650.

Ruhm, C. J. (2005). Healthy living in hard times. *Journal of Health Economics*, 24:341–363.

Ruhm, C. J. (2015). Recessions, healthy no more? *Journal of Health Economics*, 42:17–28.

Ruhm, C. J. (2019). Drivers of the Fatal Drug Epidemic. *Journal of Health Economics*, 64:25–42.

Ruhm, C. J. and Black, W. E. (2002). Does drinking really decrease in bad times? *Journal of Health Economics*, 21(2002):659–678.

Sosa-Rubí, S. G., Galárraga, O., and Harris, J. E. (2009a). Heterogeneous impact of the "Seguro Popular" program on the utilization of obstetrical services in Mexico, 2001-2006: A multinomial probit model with a discrete endogenous variable. *Journal of Health Economics*, 28(1):20–34.

Sosa-Rubí, S. G., Galárraga, O., and López-Ridaura, R. (2009b). Diabetes treatment and control: The effect of public health insurance for the poor in Mexico. *Bulletin of the World Health Organization*, 87(7):512–519.

SPSS (2013). Sistema de Proteccion Social en Salud: Informe de Resultados. Technical report.

Sullivan, D. and Wachter, V. (2009). Job Displacement and Mortality: An Analysis using Administrative Data. *Quarterly Journal of Economics*, 124(3):1265–1306.

Topalova, P. (2010). Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India. *American Economic Journal: Applied Economics*, 2(4):1–41.

Utar, H. (2018). Workers Beneath the Floogates: Low-wage Import Competition and Workers' Adjustment. *Review of Economics and Statistics*, 100(4):631–647.

Utar, H. and Torres Ruiz, L. B. (2013). International competition and industrial evolution: Evidence from the impact of Chinese competition on Mexican maquiladoras. *Journal of Development Economics*, 105:267–287.

Velásquez, A. (2019). The Economic Burden of Crime: Evidence from Mexico. *Journal of Human Resources*, (February):0716–8072r2.

WHO (2011). Burden: mortality, morbidity and risk factors. In *Global Status Report on noncommunicable diseases 2010*, chapter 1.

WHO (2015). Mexico: WHO statistical profile. *Country statistics and global health estimates by WHO and UN partners.*, pages 1–3.

WHO (2018). Noncommunicable Diseases. Global Action Plan for the Prevention and Control of NCDs 2013-2020. Technical report, World Health Organization.

Appendix

A Leading Causes and Overall Mortality in Mexico

The leading causes of mortality in Mexico over the period of my analysis are associated with changes in lifestyle patterns including changes in food consumption, decline in physical activity, and health behaviors (such as alcohol and tobacco use). This section provides some more details regarding the prevalence of these causes of mortality in Mexico and worldwide.

Type 2 diabetes, which accounts for 90 percent of all diabetes cases, is a preventable disease but approaching levels of a global epidemic. The worldwide prevalence of diabetes among adults over 18 years of age rose from 4.7 percent (108 million people) in 1980 to 8.5 percent in 2014 (422 million people) (WHO, 2018). The key factors driving this alarming rise are overweight and obesity. In 34 out of 36 OECD member countries, more than half of the population is now overweight (OECD, 2019). In Mexico, the prevalence of overweight and obesity increased 15.4 percent between the years 2000 and 2012 (Barquera et al., 2013). Figure D-1 shows the body mass index (BMI) distribution of a national representative sample of adults from the Mexican National Survey on Health and Nutrition (ENSANUT).[47] The prevalence of obesity rose from 27 to 35 percent of the adult population between years 2000 and 2012, while the share of adults with overweight is about 38 percent for both years.

[47] I use objective measures of height and weight to calculate individuals' BMI, which is a person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness. If a person's BMI is 25.0 to <30, it falls within the overweight range; if the BMI is 30.0 or higher, it falls within the obese range.

Cardiovascular diseases are the main cause of death globally, accounting for 31 percent of deaths (17.9 million people) per year. Over three quarters of these deaths occur in low- and middle-income countries. In Mexico, smoking is the main risk factor for cardiovascular disease (Acosta Cázares and Escobedo De La Peña, 2010). According to the ENSANUT, nearly 18 percent of Mexican adults smoke. The main causes of smoking-related cardiovascular mortality are ischemic heart disease (i.e., heart attacks) and cerebrovascular disease (i.e., strokes).

Alcohol-related liver disease is the leading cause of death in young people and the third cause of overall mortality in Mexico. It is estimated that nearly 27 million Mexicans drink infrequently, but in excessive quantities (PAHO, 2012). Alcohol-related liver disease is usually referred to as one of the contributors of "deaths of despair" (together with overdose and suicide), which have been extensively discussed in the U.S. in the recent years (Case and Deaton, 2015, 2017; Pierce and Schott, 2020; Ruhm, 2019; Dow et al., 2019). Unlike the U.S., where deaths of despair are driven by mortality from overdose in the context of the opioid epidemic taking place in the country, alcohol-related liver disease mortality is the main driver in Mexico.

While the main focus of the paper is on the relationship between trade exposure and the three leading causes of mortality mentioned above, in this section I also present evidence of the effect of international competition on other five leading causes of mortality (Table A-1), aggregated measures of these eight leading causes of mortality (Table A-2), overall mortality (Table A-3), and major internal causes of mortality (Table A-4).[48]

The five causes of death shown in Table A-1 are ranked in the top ten of internal causes of mortality in Mexico and represent about a fifth of overall mortality: cerebrovascular diseases (5%), chronic obstructive pulmonary disease (4%), lower respiratory infections (3.4%),

[48] Regarding external causes of death, homicides and road accidents explained about 3-4 percent each of total mortality in 2013. The increase in the homicide rate has been documented in the recent literature (Velásquez, 2019; Dell et al., 2019; Basu and Pearlman, 2017; Dell, 2015). However, it is worth noting that even over the worst years on the homicide spike (2006-2010), homicides represented about a fourth of the number of deaths that diabetes caused.

hypertensive heart disease (3.4%), chronic kidney disease (2.3%) (PAHO, 2012; WHO, 2015).

Although focusing on specific causes of mortality helps when attempting to determine the channels behind the mortality response to the economic shock, there is also value in exploring the effect of trade liberalization on aggregated measures of mortality.

Table A-2 shows the net effect of exposure to trade on aggregated measures of the leading causes of mortality. The outcome variable in Column 1 is the aggregated mortality rate of the three leading causes of mortality presented in Table 3. Similarly, Column 2 aggregates the five leading causes of mortality presented in Table A-1, and Column 3 aggregates those eight leading causes of mortality as ranked in PAHO (2012) and WHO (2015). It is not surprising, given the mixed signs when studying the effect on these specific causes of death separately, that the coefficients on the aggregated measures of these leading causes of mortality are not statistically significant at conventional levels, with a few exceptions. For example, the estimates in Column 3 (only marginally significant at 10 percent) imply that moving a municipality from the 25th to the 75th percentile of exposure to import competition is associated with an increase of 2 deaths per 100,000 people, which implies a 1 percent increase in the net causes of mortality with respect to the baseline mortality rate of 154 deaths per 100,000 people.

The eight leading causes of mortality examined above explain about half of the Mexican mortality over this period. Nonetheless, exploring the effect of the trade-induced negative shock to manufacturing employment on all-cause mortality might also provide information of the extent to which specific causes of death might be offsetting each other depending on whether we observe statistically significant differences on overall mortality between more- and less-exposed municipalities. Table A-3 shows second stage estimates of trade exposure on the overall Mexican mortality due to internal causes of death. The top panel shows the results for all and by gender, while the bottom panel shows the results for the same three age groups as before: 0-29, 30-59, and 60 and over years old. Most of the coefficients are not statistically significant at conventional levels with a few exceptions.

Table A-4 shows results for 13 major causes of internal mortality using the major categories defined by the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).[49] Looking at these major categories, trade exposure is associated with an increase in infectious disease mortality, an increase in endocrine and metabolic conditions (includes type 2 diabetes), a decrease in diseases of the respiratory system (includes chronic obstructive pulmonary disease and lower respiratory infections), an increase in diseases of the genitourinary system (includes chronic kidney disease), and a decline in neoplasms. However, given the large number of outcomes none of these estimates is significant after correcting for multiple hypothesis testing as shown by the p-values and sharpened q-values in the third two rows in each panel.

[49] As classified by the ICD-10 the major internal causes of mortality are: I. Infectious disease, II. Neoplasms, III. Disease of the blood, IV. Endocrine, nutritional and metabolic diseases (includes type 2 diabetes), V. Mental and behavioral disorders, VI. Diseases of the nervous system, VII. Diseases of the eye*, VIII. Diseases of the ear*, IX. Diseases of the circulatory system (includes ischemic heart disease, cerebrovascular disease, and hypertensive disease), X. Diseases of the respiratory system (includes acute lower respiratory infections and chronic obstructive pulmonary disease), XI. Diseases of the digestive system (includes alcohol-related liver disease), XII. Diseases of the skin*, XIII. Diseases of the musculoskeletal system*, XIV. Diseases of the genitourinary system (includes chronic kidney disease), XV. Pregnancy and childbirth*, XVI. Perinatal, XVII. Congenital. Where [*] Indicates that cause of death is included in column 13 “Other”, which are causes that have a baseline mortality rate lower than 4 deaths per 100,000 and causes not elsewhere classified.

Table A-1: Exposure to International Competition and Other Leading Causes of Mortality - 2SLS

	Δ Age-adjusted Mortality Rate									
	1998-2003					1998-2013				
	Cerebro-vascular Disease	Hyper-tensive Disease	Acute Lower Respiratory Infections	Chronic Obstructive Pulmonary Disease	Chronic Kidney Disease	Cerebro-vascular Disease	Hyper-tensive Disease	Acute Lower Respiratory Infections	Chronic Obstructive Pulmonary Disease	Chronic Kidney Disease
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Import Competition										
ΔICW^{MEX}	-0.476	4.029*	-0.862	1.942	2.122	0.0114	0.352	0.467	-0.795***	0.115
	(2.443)	(2.063)	(2.039)	(1.528)	(1.349)	(0.329)	(0.279)	(0.333)	(0.247)	(0.156)
Rescaled 25th-75th pctile	-0.0778	0.6587*	-0.1409	0.3176	0.3469	0.0158	0.4864	0.6456	-1.0998***	0.1587
	(0.3995)	(0.3373)	(0.3334)	(0.2499)	(0.2206)	(0.4551)	(0.3857)	(0.4606)	(0.3410)	(0.2162)
p-values	0.846	0.051	0.673	0.204	0.116	0.972	0.207	0.161	0.001	0.463
q-values	0.603	0.297	0.528	0.383	0.383	0.637	0.383	0.383	0.013	0.528
Panel B: Export Competition										
ΔICW^{US}	0.119	0.204*	-0.00911	0.0915	0.0946	0.00830	0.0205	-0.00328	-0.0438***	0.0170
	(0.124)	(0.109)	(0.118)	(0.0978)	(0.0636)	(0.0211)	(0.0175)	(0.0259)	(0.0166)	(0.0104)
Rescaled 25th-75th pctile	0.2991	0.5144*	-0.0230	0.2305	0.2382	0.1375	0.3391	-0.0542	-0.7252***	0.2821
	(0.3126)	(0.2751)	(0.2984)	(0.2463)	(0.1603)	(0.3486)	(0.2897)	(0.4283)	(0.2752)	(0.1715)
p-values	0.339	0.062	0.939	0.349	0.137	0.693	0.242	0.899	0.008	0.100
q-values	0.523	0.384	0.937	0.523	0.445	0.937	0.512	0.937	0.092	0.429
Baseline mortality rate	27.41	10.08	17.79	11.49	5.44	27.41	10.08	17.79	11.49	5.44
Average change mortality	-2.78	0.39	-4.99	0.53	0.52	-6.93	2.31	-4.79	0.80	-0.31
Observations	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on other leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-5) and 1998-2013 (columns 6-10). $\Delta ICW^{D}_{i,t}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in age-adjusted mortality rate (number of deaths per 100,000 people) associated with an increase of 1,000 USD in $ICW^{D}_{i,t}$, while in the second two rows present rescaled estimates to reflect the change in the mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The third two rows in each panel present the p-values and the corresponding sharpened q-values to control for multiple hypothesis testing. The two bottom rows in the table show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$)

Table A-2: International Competition and Aggregated Leading Causes of Mortality - 2SLS

	Δ Age-adjusted Mortality Rate					
	1998-2003			**1998-2013**		
	Three leading causes	**Five leading causes**	**Eight leading causes**	**Three leading causes**	**Five leading causes**	**Eight leading causes**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	5.960	6.755	12.72*	0.0407	0.149	0.190
	(4.815)	(5.035)	(6.704)	(0.890)	(0.625)	(1.146)
Rescaled 25th-75th pctile	0.9745	1.1045	2.0789*	0.0564	0.2067	0.2630
	(0.7873)	(0.8232)	(1.0961)	(1.2316)	(0.8648)	(1.5845)
Panel B: Export Competition						
ΔICW^{US}	0.125	0.500*	0.625*	0.0424	-0.00126	0.0411
	(0.296)	(0.276)	(0.373)	(0.0728)	(0.0412)	(0.0856)
Rescaled 25th-75th pctile	0.3147	1.2593*	1.5739*	0.7016	-0.0208	0.6808
	(0.7454)	(0.6946)	(0.9393)	(1.2055)	(0.6827)	(1.4171)
Baseline mortality rate	82.06	72.21	154.26	82.06	72.21	154.26
Average change mortality	8.39	-6.33	2.06	17.74	-8.93	8.81
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on aggregated measures of leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). The number of leading causes aggregated is indicated in the name of the outcome variable: "Three" aggregates causes of mortality in Table 3, "Five" aggregates those in Table A-1, and "Eight" aggregates both. Observations are municipalities weighted by the start-of-period working-age population. $\Delta ICW_{i,t}^{D}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the age-adjusted mortality rate associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in the age-adjusted mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The two bottom rows in the table show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table A-3: Exposure to International Competition and Overall Mortality - 2SLS

Δ Overall Age-adjusted Mortality Rate by gender						
	1998-2003			**1998-2013**		
	All	**Men**	**Women**	**Overall**	**Men**	**Women**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	25.96*	30.98*	21.17	1.401	1.366	1.461
	(14.69)	(17.86)	(16.53)	(2.400)	(2.949)	(2.351)
Rescaled 25th-75th pctile	4.2443*	5.0650*	3.4608	1.9380	1.8891	2.0202
	(2.4023)	(2.9205)	(2.7024)	(3.3193)	(4.0793)	(3.2514)
Panel B: Export Competition						
ΔICW^{US}	0.535	0.743	0.401	-0.106	-0.182	-0.0379
	(0.825)	(1.078)	(0.871)	(0.159)	(0.207)	(0.158)
Rescaled 25th-75th pctile	1.3488	1.8731	1.0110	-1.7608	-3.0152	-0.6283
	(2.0784)	(2.7153)	(2.1945)	(2.6287)	(3.4250)	(2.6155)
Baseline mortality rate	419.90	451.86	390.87	419.90	451.86	390.87
Average change mortality	-27.82	-24.87	-30.31	-54.35	-48.96	-58.53

Δ Overall Age-adjusted Mortality Rate by age groups						
	1998-2003			**1998-2013**		
	0-29yr	**30-59yr**	**60+yr**	**0-29yr**	**30-59yr**	**60+yr**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel C: Import Competition						
ΔICW^{MEX}	6.105	1.795	18.06	1.091	0.847	-0.537
	(5.022)	(4.641)	(11.62)	(0.811)	(0.816)	(1.599)
Rescaled 25th-75th pctile	0.9982	0.2935	2.9526	1.5091	1.1717	-0.7428
	(0.8211)	(0.7588)	(1.9004)	(1.1220)	(1.1290)	(2.2122)
Panel D: Export Competition						
ΔICW^{US}	0.0466	-0.159	0.648	-0.0226	-0.0658	-0.0179
	(0.289)	(0.237)	(0.613)	(0.0617)	(0.0560)	(0.103)
Rescaled 25th-75th pctile	0.1174	-0.4013	1.6327	-0.3746	-1.0891	-0.2971
	(0.7271)	(0.5977)	(1.5449)	(1.0211)	(0.9267)	(1.7052)
Baseline mortality rate	65.74	92.32	261.83	65.74	92.32	261.83
Average change mortality	-9.83	-6.03	-11.97	-16.88	-12.70	-24.77
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on overall of mortality in Mexico for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Panels A and B show the results for all, men, and women. Panels C and D show the results for three age groups: 0-29, 30-59 and 60+ years old. $\Delta ICW_{i,t}^{D}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panels A and C). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panels B and D). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in age-adjusted mortality rate (number of deaths per 100,000 people) associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in the mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The bottom rows show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table A-4: Exposure to International Competition and Major Internal Causes of Death - 2SLS

	Δ Age-Adjusted Mortality Rate												
	Infectious	**Neoplasms**	**Blood**	**Endocrine Metabolic**	**Mental**	**Nervous System**	**Circulatory System**	**Respiratory System**	**Digestive System**	**Genito-Urinary**	**Perinatal**	**Congenital**	**Other**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
PERIOD: 1998-2003													
Panel A: Import Competition													
ΔICW^{MEX}	5.944**	-5.449	0.665	14.55***	0.543	-0.583	4.072	1.202	-0.568	3.303	1.336	0.911	0.0339
	(2.665)	(4.552)	(1.062)	(4.701)	(1.164)	(1.215)	(5.612)	(3.781)	(3.506)	(2.049)	(2.864)	(1.444)	(2.232)
Rescaled 25th-75th pctile	0.9719**	-0.8909	0.1087	2.3786***	0.0888	-0.0953	0.6658	0.1965	-0.0928	0.5400	0.2184	0.1490	0.0055
	(0.4357)	(0.7443)	(0.1736)	(0.7686)	(0.1903)	(0.1987)	(0.9175)	(0.6183)	(0.5732)	(0.3349)	(0.4683)	(0.2360)	(0.3649)
p-values	0.026	0.231	0.531	0.002	0.641	0.631	0.468	0.751	0.871	0.107	0.641	0.528	0.988
q-values	0.259	0.637	1.000	0.054	1.000	1.000	1.000	1.000	1.000	0.491	1.000	1.000	1.000
Panel B: Export Competition													
ΔICW^{US}	0.209*	-0.488***	0.0178	0.606**	-0.0356	0.0282	0.0856	0.0422	-0.183	0.193*	0.103	-0.0615	0.0192
	(0.126)	(0.188)	(0.0638)	(0.304)	(0.0675)	(0.0704)	(0.268)	(0.193)	(0.199)	(0.110)	(0.168)	(0.0749)	(0.139)
Rescaled 25th-75th pctile	0.5262*	-1.2293***	0.0448	1.5258**	-0.0897	0.0710	0.2156	0.1063	-0.4603	0.4854*	0.2598	-0.1550	0.0483
	(0.3185)	(0.4728)	(0.1608)	(0.7670)	(0.1699)	(0.1773)	(0.6755)	(0.4871)	(0.5005)	(0.2769)	(0.4220)	(0.1887)	(0.3502)
p-values	0.099	0.009	0.781	0.047	0.598	0.689	0.75	0.827	0.358	0.08	0.538	0.411	0.890
q-values	0.420	0.313	1.000	0.313	1.000	1.000	1.000	1.000	1.000	0.387	1.000	1.000	1.000
PERIOD: 1998-2013													
Panel C: Import Competition													
ΔICW^{MEX}	0.795***	-0.589	0.203	-0.109	0.279	0.225	-0.342	-0.214	0.242	0.452*	-0.120	-0.115	0.697**
	(0.308)	(0.492)	(0.126)	(0.610)	(0.179)	(0.153)	(0.781)	(0.509)	(0.559)	(0.256)	(0.403)	(0.195)	(0.346)
Rescaled 25th-75th pctile	1.0996***	-0.8154	0.2805	-0.1512	0.3852	0.3118	-0.4733	-0.2966	0.3350	0.6247*	-0.1663	-0.1595	0.9634**
	(0.4264)	(0.6812)	(0.1738)	(0.8437)	(0.2476)	(0.2116)	(1.0801)	(0.7045)	(0.7727)	(0.3536)	(0.5577)	(0.2694)	(0.4791)
p-values	0.01	0.231	0.107	0.858	0.120	0.141	0.661	0.674	0.665	0.077	0.766	0.554	0.044
q-values	0.142	0.637	0.491	1.000	0.491	0.524	1.000	1.000	1.000	0.491	1.000	1.000	0.343
Panel D: Export Competition													
ΔICW^{US}	0.0262	-0.0649**	0.00474	0.0119	-0.00465	0.00234	-0.00994	-0.0786**	-0.0189	0.0416**	-0.0314	-0.0145	0.0297
	(0.0206)	(0.0317)	(0.00989)	(0.0458)	(0.0136)	(0.0114)	(0.0549)	(0.0357)	(0.0432)	(0.0187)	(0.0338)	(0.0165)	(0.0286)
Rescaled 25th-75th pctile	0.4345	-1.0739**	0.0784	0.1975	-0.0770	0.0388	-0.1646	-1.3015**	-0.3130	0.6882**	-0.5191	-0.2400	0.4910
	(0.3418)	(0.5244)	(0.1637)	(0.7587)	(0.2250)	(0.1883)	(0.9084)	(0.5903)	(0.7149)	(0.3088)	(0.5603)	(0.2731)	(0.4736)
p-values	0.204	0.041	0.632	0.795	0.732	0.837	0.856	0.027	0.662	0.026	0.354	0.379	0.300
q-values	0.937	0.313	1.000	1.000	1.000	1.000	1.000	0.313	1.000	0.313	1.000	1.000	1.000
Baseline mortality rate	21.62	60.29	4.69	63.06	5.99	8.05	108.79	44.40	45.72	12.63	20.79	10.67	13.19
Average Δ rate 98-03	-4.25	-1.53	-0.93	5.89	-1.70	-0.13	-9.80	-7.11	-3.37	-0.71	-2.52	-1.19	-0.47
Average Δ rate 98-13	-8.15	-7.81	-1.53	4.58	-3.11	-0.15	-12.92	-9.82	-6.68	0.98	-6.91	-1.15	-1.68
Observations	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on changes in the age-adjusted mortality rate from major internal causes of mortality (ICD-10) for two time periods: 1998-2003 (Panels A and B) and 1998-2013 (Panels C and D). Column 13 "other" includes causes for which the baseline mortality rate is less than 4 deaths per 100,000 people: eyes, ears, skin, skeletal, pregnancy-related, and not elsewhere classified. $\Delta ICW_{i,t}^{D}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panels A and C). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panels B and D). In each sub-panel, the first two rows present point estimates, which should be interpreted as the associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change for a Mexican municipality at the 75th compared to the 25th percentile of exposure. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

B Robustness Checks

Table B-1: Varying Controls: First Stage

	Δ International Competition per Worker (ICW)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A			**1998-2003**			
$\Delta ICW^{MIDDLE}_{1998-2003}$	0.637***	0.623***	0.625***	0.621***	0.612***	0.611***
	(0.0290)	(0.0289)	(0.0289)	(0.0291)	(0.0292)	(0.0293)
Rescaled 25th-75th pctile	0.1370***	0.1340***	0.1343***	0.1334***	0.1316***	0.1314***
	(0.0062)	(0.0062)	(0.0062)	(0.0063)	(0.0063)	(0.0063)
First Stage F-stat	113.01	138.86	147.53	139.38	137.06	137.70
$\Delta ICW^{HIGH}_{1998-2003}$	1.013***	1.002***	1.001***	1.001***	1.016***	1.015***
	(0.0323)	(0.0337)	(0.0336)	(0.0340)	(0.0335)	(0.0335)
Rescaled 25th-75th pctile	2.4367***	2.4121***	2.4091***	2.4081***	2.4452***	2.4431***
	(0.0777)	(0.0812)	(0.0808)	(0.0818)	(0.0805)	(0.0807)
First Stage F-stat	338.89	256.90	248.78	238.18	260.25	255.94
Panel B			**1998-2013**			
$\Delta ICW^{MIDDLE}_{1998-2013}$	0.239***	0.235***	0.235***	0.234***	0.234***	0.233***
	(0.00950)	(0.00964)	(0.00966)	(0.00981)	(0.00981)	(0.00983)
Rescaled 25th-75th pctile	1.1540***	1.1341***	1.1326***	1.1287***	1.1289***	1.1240***
	(0.0459)	(0.0466)	(0.0467)	(0.0474)	(0.0474)	(0.0475)
First Stage F-stat	181.72	192.30	184.74	170.64	175.03	169.72
$\Delta ICW^{HIGH}_{1998-2013}$	1.162***	1.158***	1.158***	1.158***	1.167***	1.166***
	(0.0151)	(0.0152)	(0.0152)	(0.0155)	(0.0157)	(0.0157)
Rescaled 25th-75th pctile	16.6034***	16.5441***	16.5475***	16.5450***	16.6720***	16.6608***
	(0.2159)	(0.2171)	(0.2177)	(0.2216)	(0.2241)	(0.2250)
First Stage F-stat	2029.53	2162.08	2163.87	1999.11	1946.33	1866.80
Observations	2,382	2,382	2,382	2,382	2,382	2,382
Log(distance to U.S.); Rural dummy		Y	Y	Y	Y	Y
% Male in working age population			Y	Y	Y	Y
% Adult population with no primary education			Y	Y	Y	Y
Δ Log(population) 1990-1998				Y	Y	Y
Δ Log(manufacturing employment) 1993-1998					Y	Y
Δ Log (migration) 1995-2000						Y

Notes: This table shows that the first stage is robust to adding a rich set of municipality level controls. Column 1 is the baseline specification, which only includes state fixed effects. Columns 2 adds geographic controls for urban/rural municipalities and Log(distance to the U.S). Column 3 adds the percentage of population older than 15 years old with no primary education and the percentage of the municipality working age population that is male. Columns 4-6 add (log differences) for pre-period working-age population growth (1990-1998), pre-period change in manufacturing employment (1993-1998), the pre-period interstate and returned migration rates (1995-2000). The instruments and dependent variable are described in Table 2 notes.

Table B-2: Varying controls - 2SLS

	Δ Age-adjusted Mortality Rate					
	1998-2003			**1998-2013**		
	Type 2 Diabetes	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**	**Type 2 Diabetes**	**Ischemic Heart Disease**	**Alcohol Related Liver**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	9.600***	-3.659	-2.236	0.930**	-1.203	0.155
	(2.720)	(4.094)	(2.535)	(0.446)	(0.807)	(0.385)
Rescaled 25th-75th pctile	1.5696***	-0.5982	-0.3656	1.2860**	-1.6645	0.2146
	(0.4447)	(0.6694)	(0.4144)	(0.6168)	(1.1169)	(0.5328)
Panel B: Export Competition						
ΔICW^{US}	0.467***	-0.561**	-0.130	0.0827***	-0.0904*	-0.00202
	(0.157)	(0.267)	(0.167)	(0.0317)	(0.0477)	(0.0336)
Rescaled 25th-75th pctile	1.1754***	-1.4136**	-0.3268	1.3692***	-1.4964*	-0.0334
	(0.3954)	(0.6738)	(0.4212)	(0.5250)	(0.7899)	(0.5560)
Baseline mortality rate	17.47	47.35	17.24	17.47	47.35	17.24
Average change mortality	10.87	-0.32	-2.17	20.42	2.33	-5.02
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows the second stage results corresponding to Column 6 of Table B-1; the second stage is robust to adding a rich set of municipality level controls. See Table 3 notes for variables descriptions.

Table B-3: Alternative Instrument for Export Competition - Reduced-form Results

	(1)	(2)	(3)	(4)	(5)	(6)
		1998-2003			**1998-2013**	
Panel A: Reduced-from estimates - Exposure to PNTR and Δ Age-adjusted Mortality Rate						
	Type 2 Diabetes	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**	**Type 2 Diabetes**	**Ischemic Heart Disease**	**Alcohol Related Liver**
$NTRGap_i$	7.822*	-2.746	-3.093	12.92*	-3.037	-6.728
	(4.352)	(8.559)	(4.980)	(7.125)	(8.379)	(5.941)
Rescaled 25th-75th pctile	0.6665*	-0.2339	-0.2635	1.1011*	-0.2587	-0.5732
	(0.3708)	(0.7292)	(0.4243)	(0.6071)	(0.7139)	(0.5061)
Baseline mortality rate	17.47	47.35	17.24	17.47	47.35	17.24
Average change mortality	10.87	-0.32	-2.17	20.42	2.33	-5.02
Panel B: Reduced-from estimates - Exposure to PNTR and Δ Manufacturing Employment						
Δ Manufacturing Employment Rate						
	All	Men	Women	All	Men	Women
$NTRGap_i$	-0.288***	-0.105***	-0.386***	-0.443***	-0.245***	-0.659***
	(0.0389)	(0.0370)	(0.0420)	(0.0542)	(0.0557)	(0.0551)
Rescaled 25th-75th pctile	-0.0246***	-0.0090***	-0.0329***	-0.0377***	-0.0209***	-0.0562***
	0.0033	0.0032	0.0036	0.0046	0.0047	0.0047
Δ Log manufacturing employment						
	All	Men	Women	All	Men	Women
$NTRGap_i$	-1.018***	-0.345*	-1.755***	-2.067***	-1.307***	-3.442***
	(0.191)	(0.185)	(0.234)	(0.281)	(0.289)	(0.306)
Rescaled 25th-75th pctile	-0.0867***	-0.0294*	-0.1495***	-0.1761***	-0.1114***	-0.2933***
	(0.0163)	(0.0158)	(0.0199)	(0.0240)	(0.0246)	(0.0261)
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows reduced-form results using an alternative measure of exposure to Chinese competition in the U.S. market (i.e., "export" competition). I follow (Pierce and Schott, 2016a, 2020) in measuring the impact of Permanent Normal Trade Relations (PNTR) as the rise in US tariffs on Chinese goods that would have occurred in the event of failed annual renewal of China's NTR status prior to PNTR (i.e., NTR gap), and compute it for each industry j using ad valorem equivalent tariff rates provided by Feenstra et al. (2002) for 1999. Chinese exports to the U.S. increased in industries with higher NTR Gaps. Due to NAFTA, Mexico had increase its exports to the U.S., and developed a comparative advantage in some of the sectors in which China increased it exports to the U.S after 2000 (Hanson and Robertson, 2008). The PNTR provides exogenous variation to Mexico's export demand from the U.S. The first stage is: $\Delta Y_{i,t} = \beta_0 + \beta_1 NTRGap_i + X_i'\gamma + \epsilon_{i,t}$. Where $NTRGap_i$ is the Mexican i municipalities (indirect) exposure to PNTR is the employment-share weighted average NTR gaps across industries j in which they are active: $NTRGap_i = \sum_j \frac{L_{ji,1998}}{L_{i,1998}} NTRGap_j$. Panel A shows the effect of exposure to the PNTR on leading causes of mortality. Panel B shows that municipalities with greater exposure to PNTR exhibit a decrease in the manufacturing employment rate over 1998-2003 and 1998-2013.

Table B-4: Placebo - Pre-Trends Analysis - 2SLS

	Δ Age-adjusted Mortality Rate 1990-1997					
	1998-2003			**1998-2013**		
	Diabetes Total*	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**	**Diabetes Total***	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	-1.215	-8.956	-4.248	0.0934	-0.546	-0.382
	(3.473)	(5.654)	(3.227)	(0.450)	(0.623)	(0.388)
Rescaled 25th-75th pctile	-0.1948	-1.4357	-0.6809	0.1306	-0.7646	-0.5338
	(0.5568)	(0.9063)	(0.5173)	(0.6303)	(0.8715)	(0.5434)
Panel B: Export Competition						
ΔICW^{US}	-0.0778	-0.0456	-0.0790	0.000308	-0.00871	-0.0304
	(0.189)	(0.347)	(0.156)	(0.0329)	(0.0549)	(0.0288)
Rescaled 25th-75th pctile	-0.1983	-0.1163	-0.2015	0.0051	-0.1449	-0.5055
	(0.4822)	(0.8846)	(0.3972)	(0.5468)	(0.9136)	(0.4785)
Baseline rate 1990	18.89	23.24	19.97	18.89	23.24	19.97
Average change 1990-1997	10.02	12.24	7.95	10.02	12.24	7.95
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table conducts a placebo exercise where the dependent variable is the change in age-adjusted mortality rate between 1990 and 1997. Table reports 2SLS estimates of Equation 3. The instrumented variable remains the change in the change in international competition over 1998-2003 and 1998-2013. The 2SLS estimates show the effect of an 1,000 USD increase in import (Panel A) and export (Panel B) competition per worker on the change in age-adjusted mortality rate (number of deaths per 100,000 people). The bottom rows show the sample mean change in mortality rate and baseline mortality rate by cause. *The caveat of using pre-period mortality data is that the International Classification of Deaths (ICD) changed in 1998. The main analysis uses ICD-10, while for this table requires using ICD-9. There are some comparability issues between the two. For example, diabetes is only reported at aggregate level in ICD-9 so I cannot calculate the pre-trend for type 2 diabetes. This results in a baseline rate for 1990 that is higher than the baseline rate reported in the main analysis. Observations are municipalities weighted by the initial working age-population. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table B-5: International Competition and Leading Causes of Mortality - 2SLS - Dropping border states

	Δ Age-adjusted Mortality Rate					
	1998-2003			**1998-2013**		
	Type 2 Diabetes	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**	**Type 2 Diabetes**	**Ischemic Heart Disease**	**Alcohol Related Liver**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	11.67***	2.033	-2.386	0.609	-0.771	0.334
	(3.086)	(3.725)	(3.056)	(0.451)	(0.684)	(0.545)
Rescaled 25th-75th pctile	1.7302***	0.3014	-0.3538	0.7289	-0.9226	0.4000
	(0.4577)	(0.5524)	(0.4531)	(0.5391)	(0.8178)	(0.6516)
p-values	0.000	0.585	0.435	0.176	0.259	0.539
q-values	0.001	0.953	0.953	0.761	0.761	0.953
Panel B: Export Competition						
ΔICW_{US}	0.572***	-0.0592	-0.0500	0.0771**	-0.0446	-0.0201
	(0.188)	(0.261)	(0.206)	(0.0322)	(0.0522)	(0.0435)
Rescaled 25th-75th pctile	1.3346***	-0.1381	-0.1167	1.1538**	-0.6679	-0.3004
	(0.4385)	(0.6084)	(0.4798)	(0.4824)	(0.7816)	(0.6512)
p-values	0.002	0.820	0.808	0.017	0.393	0.645
q-values	0.015	1.00	1.00	0.044	1.00	1.00
Baseline mortality rate	17.67	42.46	19.37	17.67	42.46	19.37
Average change mortality	11.40	0.13	-2.46	21.84	3.98	-5.72
Observations	2,108	2,108	2,108	2,108	2,108	2,108

Notes: This table shows second stage estimates of the effect of international competition on the three leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Table shows results after dropping the six Mexican states bordering the U.S. (i.e., Baja California, Coahuila de Zaragoza, Chihuahua, Nuevo Leon, Sonora, Tamaulipas). Observations are municipalities weighted by the start-of-period working-age population. $\Delta ICW^{D}_{i,t}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the age-adjusted mortality rate associated with an increase of 1,000 USD in $ICW^{D}_{i,t}$, while in the second two rows present rescaled estimates to reflect the change in the age-adjusted mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The third two rows in each panel present the p-values and the corresponding sharpened q-values to control for multiple hypothesis testing. The bottom rows in the table show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table B-6: First Stage - Dropping border states

	(1) $\Delta ICW^{MEX}_{1998-2003}$	(2) $\Delta ICW^{MEX}_{1998-2013}$	(3) $\Delta ICW^{US}_{1998-2003}$	(4) $\Delta ICW^{US}_{1998-2013}$
$\Delta ICW^{MIDDLE}_{1998-2003}$	0.641***			
	(0.0341)			
$\Delta ICW^{MIDDLE}_{1998-2013}$		0.238***		
		(0.0102)		
$\Delta ICW^{HIGH}_{1998-2003}$			1.017***	
			(0.0376)	
$\Delta ICW^{HIGH}_{1998-2013}$				1.156***
				(0.0162)
Rescaled 25th-75th pctile	0.1253***	1.0061***	1.9086***	14.8447***
	(0.0067)	(0.0432)	(0.0706)	(0.2076)
First Stage F-stat	80.93	191.60	140.22	1448.12
IR	0.1955	4.2339	1.8774	12.8439
25th pctile	0.0215	0.6724	0.4365	2.8017
75th pctile	0.2170	4.9063	2.3139	15.6456
Observations	2,108	2,108	2,108	2,108

Notes: This table shows first stage results after dropping the six Mexican states bordering the U.S. (i.e., Baja California, Coahuila de Zaragoza, Chihuahua, Nuevo Leon, Sonora, Tamaulipas). All the variables are described in Table 2.

Table B-7: International Competition and Leading Causes of Mortality - 2SLS Alternative Regression Weights

	Δ Age-adjusted Mortality Rate					
	1998-2003			1998-2013		
	Type 2 Diabetes	Ischemic Heart Disease	Alcohol Related Liver Disease	Type 2 Diabetes	Ischemic Heart Disease	Alcohol Related Liver Disease
	(1)	(2)	(3)	(4)	(5)	(6)
I. Weight: Total population						
Panel A: Import Competition						
ΔICW^{MEX}	12.42***	-2.795	-2.989	1.222***	-1.306*	0.124
	(2.713)	(3.423)	(2.283)	(0.445)	(0.694)	(0.410)
Rescaled 25th-75th pctile	1.9901***	-0.4477	-0.4788	1.7081***	-1.8251*	0.1727
	(0.4347)	(0.5484)	(0.3658)	(0.6221)	(0.9703)	(0.5731)
Panel B: Export Competition						
ΔICW^{US}	0.599***	-0.318	-0.110	0.122***	-0.0612	-0.0211
	(0.152)	(0.202)	(0.135)	(0.0369)	(0.0462)	(0.0320)
Rescaled 25th-75th pctile	1.5194***	-0.8058	-0.2801	2.0211***	-1.0180	-0.3517
	(0.3859)	(0.5134)	(0.3420)	(0.6141)	(0.7687)	(0.5322)
Baseline mortality rate	17.18	46.63	17.53	17.18	46.63	17.53
Average change mortality	10.79	-0.23	-2.16	20.61	2.68	-5.10
II. Weight: non-agricultural labor force size						
Panel C: Import Competition						
ΔICW^{MEX}	9.533***	-7.206*	-3.616*	1.648***	-0.379	0.233
	(3.247)	(4.021)	(2.110)	(0.513)	(0.720)	(0.358)
Rescaled 25th-75th pctile	1.7379***	-1.3136*	-0.6592*	2.6895***	-0.6178	0.3795
	(0.5919)	(0.7330)	(0.3847)	(0.8379)	(1.1756)	(0.5841)
Panel D: Export Competition						
ΔICW^{US}	0.527***	-0.434*	-0.218	0.153***	-0.00468	-0.0122
	(0.179)	(0.236)	(0.133)	(0.0463)	(0.0559)	(0.0316)
Rescaled 25th-75th pctile	1.4634***	-1.2041*	-0.6054	2.7750***	-0.0847	-0.2212
	(0.4980)	(0.6556)	(0.3692)	(0.8394)	(1.0133)	(0.5733)
Baseline mortality rate	18.92	54.54	15.42	18.92	54.54	15.42
Average change mortality	11.55	-1.26	-2.21	19.20	-1.06	-4.77
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on the three leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Observations are municipalities weighted by the start-of-period total population in Panels A and B, and weighted by start-of-period non-agricultural labor force in Panels C and D. $\Delta ICW^{D}_{i,t}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries, ΔICW^{MIDDLE} (Panels A and C). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries ΔICW^{HIGH} (Panels B and D). All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table B-8: International Competition and Leading Causes of Mortality - 2SLS Accounting for Seguro Popular

	Δ Age-adjusted Mortality Rate					
	1998-2003			1998-2013		
	Type 2 Diabetes	Ischemic Heart Disease	Alcohol Related Liver Disease	Type 2 Diabetes	Ischemic Heart Disease	Alcohol Related Liver Disease
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Dropping municipalities with coverage >20% in 2005						
ΔICW^{MEX}	11.16***	-4.264	-2.890	1.263***	-1.169	-0.0355
	(2.865)	(3.654)	(2.314)	(0.474)	(0.741)	(0.362)
Rescaled 25th-75th pctile	1.8536***	-0.7083	-0.4800	1.7832***	-1.6507	-0.0501
	(0.4758)	(0.6069)	(0.3843)	(0.6690)	(1.0470)	(0.5108)
ΔICW^{US}	0.562***	-0.430**	-0.128	0.123***	-0.0473	-0.0275
	(0.162)	(0.218)	(0.133)	(0.0398)	(0.0489)	(0.0291)
Rescaled 25th-75th pctile	1.4205***	-1.0860**	-0.3238	2.0087***	-0.7705	-0.4483
	(0.4103)	(0.5517)	(0.3362)	(0.6483)	(0.7967)	(0.4741)
Observations	2,009	2,009	2,009	2,009	2,009	2,009
Baseline mortality rate	17.93	47.93	16.94	17.93	47.93	16.94
Average change mortality	11.03	-0.31	-2.15	20.10	2.03	-4.88
Panel B: Adding Δ share population with SP between 2000-2010						
ΔICW^{MEX}	10.70***	-2.171	-2.683	1.622***	-0.338	-0.267
	(2.685)	(3.464)	(2.282)	(0.474)	(0.736)	(0.392)
Rescaled 25th-75th pctile	1.7446***	-0.3538	-0.4374	2.2167***	-0.4615	-0.3647
	(0.4376)	(0.5646)	(0.3719)	(0.6485)	(1.0053)	(0.5353)
ΔICW^{US}	0.484***	-0.336	-0.106	0.143***	-0.00660	-0.0432
	(0.151)	(0.211)	(0.136)	(0.0392)	(0.0478)	(0.0307)
Rescaled 25th-75th pctile	1.2095***	-0.8387	-0.2658	2.3468***	-0.1081	-0.7073
	(0.3767)	(0.5262)	(0.3401)	(0.6430)	(0.7827)	(0.5027)
Observations	1,850	1,850	1,850	1,850	1,850	1,850
Baseline mortality rate	17.71	47.97	17.04	17.71	47.97	17.04
Average change mortality	10.88	-0.26	-2.19	20.34	2.31	-5.01
Panel C: Dropping states with SP coverage >20% in 2005						
ΔICW^{MEX}	11.15***	-1.968	-2.273	1.290***	-1.062	0.253
	(3.044)	(3.865)	(2.592)	(0.492)	(0.758)	(0.444)
Rescaled 25th-75th pctile	1.9952***	-0.3523	-0.4069	1.8544***	-1.5265	0.3635
	(0.5449)	(0.6918)	(0.4640)	(0.7075)	(1.0901)	(0.6384)
ΔICW^{US}	0.561***	-0.324	-0.0847	0.123***	-0.0468	-0.0136
	(0.176)	(0.241)	(0.157)	(0.0444)	(0.0505)	(0.0367)
Rescaled 25th-75th pctile	1.3820***	-0.7982	-0.2087	1.9827***	-0.7515	-0.2188
	(0.4336)	(0.5940)	(0.3879)	(0.7142)	(0.8122)	(0.5900)
Observations	2,208	2,208	2,208	2,208	2,208	2,208
Baseline mortality rate	17.46	47.02	18.39	17.46	47.02	18.39
Average change mortality	10.96	-0.29	-2.22	20.43	2.47	-5.40

Notes: This table shows second stage estimates of the effect of international competition on the three leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Panel A shows results of dropping municipalities with at least 20 percent of the population covered by SP in 2005. Panel B shows results of adding as control variable the change in coverage between 2000-2010 at municipality level for the subset of 1,850 for which I have that information on insurance coverage. Panel C shows results of dropping states that had achieved at least 20 percent of coverage in 2005. See Table 3 notes for variables definitions.

Table B-9: Manufacturing Employment and Leading Causes of Mortality - 2SLS Alternative Identification Strategy (Dell et al., 2019)

	Δ Age-adjusted Mortality Rate					
	1998-2003			**1998-2013**		
	Type 2 Diabetes	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**	**Type 2 Diabetes**	**Ischemic Heart Disease**	**Alcohol Related Liver**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import and Export Competition						
Δ Manuf. Employment	-2.367***	0.534	1.119**	-2.183***	2.018*	0.915
	(0.634)	(0.930)	(0.568)	(0.707)	(1.215)	(0.622)
Panel B: Export Competition						
Δ Manuf. Employment	-2.163***	-0.108	1.575***	-2.424***	1.429	1.037
	(0.670)	(0.778)	(0.578)	(0.856)	(1.221)	(0.664)
Panel C: Import Competition						
Δ Manuf. Employment	-2.575***	1.191	0.652	-2.065***	2.304*	0.857
	(0.656)	(1.359)	(0.601)	(0.688)	(1.366)	(0.628)
Mean of Dep. Var.	10.87	-0.32	-2.17	20.42	2.33	-5.02
Baseline rate	17.47	47.35	17.24	17.47	47.35	17.24
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This Table shows 2SLS estimates using an alternative identification strategy (Dell et al., 2019), which instruments changes in local manufacturing employment with measures of predicted changes international competition per worker. Coefficients are obtained estimating the following equation: $\Delta Y_{i,t} = \beta_0 + \beta_1 \Delta L^m_{i,t} + X_i'\gamma + \Delta u_{i,t}$ for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Observations are municipalities weighted by the initial working age-population. The instrumented variable is the change in the manufacturing employment rate, $\Delta L^m_{i,t}$, which is standardized to facilitate the interpretation of the second stage. The 2SLS estimates show the effect of a standard deviation *change* in the manufacturing employment rate on the change in age-adjusted mortality rate (number of deaths per 100,000 people). Given that the First Stage coefficients reported in Table B-10 are negative, in order to interpret the 2SLS estimates in this table as the effect of a standard deviation *decrease* in manufacturing employment on age-adjusted mortality rates, *the sign of the coefficient in this table needs to be reversed.* Panel A instruments the change in the manufacturing employment rate using both import and export competition, while panels B and C use only export exposure and import exposure, respectively. The bottom rows show the sample mean change in mortality rate (mean dep. var.) and baseline mortality rate by cause. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table B-10: International Competition and Manufacturing Employment - First Stage Alternative Identification Strategy (Dell et al., 2019)

	Δ Manufacturing Employment Rate (standardized)					
	1998-2003			**1998-2013**		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Effect of a \$1,000 increase in predicted ICW (point estimates)						
ΔICW^{US}	-0.157***		-0.0872***	-0.0299***		-0.0116**
	(0.0178)		(0.0271)	(0.00319)		(0.00506)
ΔICW^{MEX}		-2.126***	-1.158***		-0.113***	-0.0793***
		(0.210)	(0.318)		(0.0104)	(0.0178)
Panel B: Effect of moving a municipality from 25th-75th percentile of exposure						
ΔICW^{US}	-0.2815***		-0.1564***	-0.3068***		-0.1188**
	(0.0319)		(0.0485)	(0.0328)		(0.0520)
ΔICW^{MEX}		-0.2937***	-0.1599***		-0.3417***	-0.2402***
		(0.0290)	(0.0439)		(0.0315)	(0.0539)
First Stage F-stat	**77.88**	**102.53**	**64.65**	**87.61**	**117.85**	**76.76**
International Competition	Export	Import	Both	Export	Import	Both
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This Table shows first stage estimates using an alternative identification strategy (Dell et al., 2019), which instruments changes in local manufacturing employment with measures of predicted changes international competition per worker. The first stage coefficients result from estimating the following equation: $\Delta L^m_{it} = \beta_0 + \beta_1 \Delta ICW^{US}_{it} + \beta_2 \Delta ICW^{MEX}_{it} + X_i'\gamma + \epsilon_{it}$ for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). The dependent variable, $\Delta L^m_{i,t}$, is the change in the manufacturing employment rate (i.e., the change in the number of workers in the manufacturing sector normalized by the labor force size in municipality i); it is standardized to facilitate the interpretation of the second stage. $\Delta ICW^D_{i,t}$ is the change in predicted international competition per worker in 1,000 USD. Columns 1 and 4 present estimates of the equation above using municipality level exposure to Chinese competition in the U.S. market, ΔICW^{US}, as instrument. Columns 2 and 5 use municipality level exposure to import competition, ΔICW^{MEX}. Columns 3 and 6 estimate show results using both instruments in the same specification. Panel A presents point estimates, which should be interpreted as the standard deviation change in the manufacturing employment rate associated with an increase of 1,000 USD in ICW^D. In Panel B, I rescale these point estimates to reflect the change in trade exposure for a Mexican municipality at the 75th percentile compared to the 25th percentile of exposure. Observations are municipalities weighted by the initial working age-population. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

C Additional Tables

Table C-1: Descriptive Statistics - Mexican Labor Force 1998

Industry (2-digits)	**Male-to-Female Ratio**	**Number of Workers**	**Share in Labor Force**
Agriculture, fishing, and forestry	15.6	174127	1%
Mining	11.1	113189	1%
Electric, water and gas supply	5.6	190033	1%
Construction	17.3	651411	5%
Manufacturing	**2.0**	**4175400**	**30%**
Wholesale Trade	3.2	851935	6%
Retail Trade	1.0	2940531	21%
Transportation and warehousing	6.9	596773	4%
Information	1.5	194116	1%
Financial services and insurance	1.3	241918	2%
Estate and rental services	1.8	113738	1%
Professional and business services	1.6	379021	3%
Management of companies	1.8	52010	0%
Administrative and support and waste management and remediation services	2.0	611097	4%
Educational Services	0.6	362015	3%
Leisure and hospitality	0.9	285326	2%
Arts, Entertainment and Recreation	2.1	107188	1%
Accommodation and food	1.0	940894	7%
Other services	3.6	846303	6%

Notes: This table shows descriptive statistics of the Mexican labor force from year 1998. Source: Mexican Economic Census 1998 - INEGI

Table C-2: Distribution of Mexican Population Across Age Categories in 2000

	Total	Women	Men
Ages 0-4	0.109	0.105	0.113
Ages 5-9	0.115	0.111	0.119
Ages 10-14	0.110	0.106	0.114
Ages 15-19	0.103	0.102	0.103
Ages 20-24	0.093	0.096	0.090
Ages 25-29	0.084	0.086	0.081
Ages 30-34	0.073	0.075	0.071
Ages 35-39	0.065	0.067	0.064
Ages 40-44	0.053	0.054	0.052
Ages 45-49	0.042	0.042	0.041
Ages 50-54	0.034	0.035	0.034
Ages 55-59	0.026	0.027	0.026
Ages 60-64	0.023	0.023	0.022
Ages 65-69	0.017	0.018	0.016
Ages 70-74	0.013	0.013	0.012
Ages 75 +	0.019	0.020	0.018

Note: Table reports the overall Mexican population weights used to construct the age-adjusted mortality rates. Data is from the 2000 Mexican Population Census. I follow the same approach as Pierce and Schott (2020) to calculate age-adjusted mortality rates. In the U.S., age-adjusted death rates calculated by National Vital Statistics Reports are based on the 2000 U.S. standard population. This population standard was adopted by the National Center of Health Statistics (NCHS) in 1999, and replaced the 1940 standard population that had been used for more than 50 years. To the best of my knowledge, Mexico has not designated any particular year as population standard. Gelman and Auerbach (2016) show that age-adjusted mortality trends are not sensitive to the age distribution used to normalize the mortality rates.

Table C-3: International Competition and Leading Causes of Mortality - OLS

	Δ Age-adjusted Mortality Rate					
	1998-2003			**1998-2013**		
	Type 2 Diabetes	**Ischemic Heart Disease**	**Alcohol Related Liver Disease**	**Type 2 Diabetes**	**Ischemic Heart Disease**	**Alcohol Related Liver**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	9.275***	-0.960	-0.276	1.191**	-0.782	0.152
	(2.161)	(2.615)	(1.880)	(0.488)	(0.555)	(0.334)
Rescaled 25th-75th pctile	1.5165***	-0.1570	-0.0452	1.6479**	-1.0820	0.2103
	(0.3533)	(0.4275)	(0.3073)	(0.6746)	(0.7682)	(0.4623)
Panel B: Export Competition						
ΔICW^{US}	0.466***	-0.119	-0.224*	0.124***	-0.0531	-0.0288
	(0.140)	(0.168)	(0.115)	(0.0406)	(0.0460)	(0.0285)
Rescaled 25th-75th pctile	1.1746***	-0.3000	-0.5635*	2.0519	-0.8797	-0.4765
	(0.3526)	(0.4232)	(0.2898)	(0.6720)	(0.7612)	(0.4714)
Baseline mortality rate	17.47	47.35	17.24	17.47	47.35	17.24
Average change mortality	10.87	-0.32	-2.17	20.42	2.33	-5.02
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows OLS estimates of the effect of international competition on the three leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Observations are municipalities weighted by the start-of-period working-age population. $\Delta ICW_{i,t}^{D}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S. (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in the age-adjusted mortality rate associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in the age-adjusted mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The bottom rows in the table show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table C-4: Exposure to International Competition and Other Leading Causes of Mortality - OLS

	Δ Age-adjusted Mortality Rate									
	1998-2003					1998-2013				
	Cerebro-vascular Disease	**Hyper-tensive Disease**	**Acute Lower Respiratory Infections**	**Chronic Obstructive Pulmonary Disease**	**Chronic Kidney Disease**	**Cerebro-vascular Disease**	**Hyper-tensive Disease**	**Acute Lower Respiratory Infections**	**Chronic Obstructive Pulmonary Disease**	**Chronic Kidney Disease**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Import Competition										
ΔICW^{MEX}	0.215	1.280	-0.330	1.464	1.181	-0.204	0.147	0.337	-0.782***	0.196*
	(1.745)	(1.474)	(1.517)	(1.237)	(0.903)	(0.223)	(0.213)	(0.293)	(0.193)	(0.118)
Rescaled 25th-75th pctile	0.0352	0.2093	-0.0540	0.2393	0.1931	-0.2826	0.2033	0.4659	-1.0812***	0.2705*
	(0.2853)	(0.2410)	(0.2480)	(0.2023)	(0.1476)	(0.3089)	(0.2944)	(0.4049)	(0.2667)	(0.1631)
Panel B: Export Competition										
ΔICW^{US}	0.0827	0.113	-0.0740	0.140	0.0947*	0.00978	0.0175	-0.00277	-0.0372**	0.0168*
	(0.109)	(0.0920)	(0.100)	(0.0873)	(0.0562)	(0.0200)	(0.0183)	(0.0258)	(0.0155)	(0.0101)
Rescaled 25th-75th pctile	0.2083	0.2844	-0.1863	0.3530	0.2385*	0.1619	0.2893	-0.0459	-0.6162**	0.2776*
	(0.2758)	(0.2318)	(0.2522)	(0.2200)	(0.1417)	(0.3316)	(0.3026)	(0.4276)	(0.2563)	(0.1675)
Baseline mortality rate	27.41	10.08	17.79	11.49	5.44	27.41	10.08	17.79	11.49	5.44
Average change mortality	-2.78	0.39	-4.99	0.53	0.52	-6.93	2.31	-4.79	0.80	-0.31
Observations	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows OLS estimates of the effect of international competition on other leading causes of mortality in Mexico for two time periods: 1998-2003 (columns 1-5) and 1998-2013 (columns 6-10). $\Delta ICW_{i,t}^{D}$ is the change in international competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S. (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in age-adjusted mortality rate (number of deaths per 100,000 people) associated with an increase of 1,000 USD in $ICW_{i,t}^{D}$, while in the second two rows present rescaled estimates to reflect the change in the mortality rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. The bottom rows show the baseline mortality rate and the sample mean change in mortality rate over the period. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table C-5: International Competition and Manufacturing Employment

	Dependent variable: Δ Manufacturing Employment Rate					
		1998-2003			1998-2013	
	Total	**Men**	**Women**	**Total**	**Men**	**Women**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	-0.188***	-0.0680***	-0.0808***	-0.0434***	-0.0243***	-0.0330***
	(0.0253)	(0.0222)	(0.0291)	(0.00451)	(0.00422)	(0.00426)
Rescaled 25th-75th pctile	-0.0308***	-0.0111***	-0.0132***	-0.0600***	-0.0336***	-0.0457***
	(0.0041)	(0.0036)	(0.0048)	(0.0062)	(0.0058)	(0.0059)
Panel B: Export Competition						
ΔICW^{US}	-0.0133***	-0.00532***	-0.00929***	-0.00378***	-0.00202***	-0.00348***
	(0.00179)	(0.00140)	(0.00207)	(0.000387)	(0.000351)	(0.000391)
Rescaled 25th-75th pctile	-0.0335***	-0.0134***	-0.0234***	-0.0626***	-0.0334***	-0.0576***
	(0.0045)	(0.0035)	(0.0052)	(0.0064)	(0.0058)	(0.0065)
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on the change in the manufacturing employment rate for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Columns 1 and 4 report the overall effect, Columns 2 and 5 report the effect for male workers, and Columns 3 and 6 report the effects for female workers. $\Delta ICW^{D}_{i,t}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the change in log manufacturing employment associated with an increase of 1,000 USD in $ICW^{D}_{i,t}$, while in the second two rows present rescaled estimates to reflect the change in the manufacturing employment rate for a Mexican municipality at the 75th compared to the 25th percentile of exposure. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table C-6: Exposure to International Competition and Formal Manufacturing Employment - 2SLS

	1998-2003			1998-2013		
	All Employees	Paid Employees	Contract Workers	All Employees	Paid Employees	Contract Workers
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Import Competition						
ΔICW^{MEX}	-0.466***	-0.490***	2.132***	-0.116***	-0.134***	0.245***
	(0.114)	(0.146)	(0.630)	(0.0210)	(0.0252)	(0.0664)
Rescaled 25th-75th pctile	-0.0762***	-0.0801***	0.3485***	-0.1598***	-0.1849***	0.3387***
	(0.0187)	(0.0239)	(0.1030)	(0.0290)	(0.0348)	(0.0919)
Panel B: Export Competition						
ΔICW^{US}	-0.0332***	-0.0325***	0.132***	-0.00928***	-0.00980***	0.0208***
	(0.00684)	(0.00726)	(0.0342)	(0.00176)	(0.00193)	(0.00539)
Rescaled 25th-75th pctile	-0.0838***	-0.0819***	0.3316***	-0.1536***	-0.1622***	0.3451***
	(0.0172)	(0.0183)	(0.0862)	(0.0291)	(0.0320)	(0.0893)
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Notes: This table shows second stage estimates of the effect of international competition on the change in log number of workers within the manufacturing sector for two time periods: 1998-2003 (columns 1-3) and 1998-2013 (columns 4-6). Columns 1 and 4 show the overall change in log employment in the manufacturing sector, while the rest of the columns show changes in the composition of workers. Paid Employees (columns 2 and 5) have more rights in terms severance payment, social security contributions, minimum salary, and unionizing than contract workers (columns 3 and 6), who work by the hour and are not covered by labor regulations. Observations are municipalities weighted by the initial working age-population. The dependent variable is the difference in log number of workers between two periods (not normalized by the total labor force size). $\Delta ICW^D_{i,t}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{MEX} is a measure of the change in Chinese import penetration in Mexico, instrumented with the observed growth of Chinese exports to a group of middle-income countries (Panel A). ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries (Panel B). In each sub-panel, the first two rows present point estimates, which should be interpreted as the log change in workers associated with an increase of 1,000 USD in $ICW^D_{i,t}$, while in the second two rows present rescaled estimates to reflect the change in log workers for a Mexican municipality at the 75th compared to the 25th percentile of exposure. All regressions include state fixed effects. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

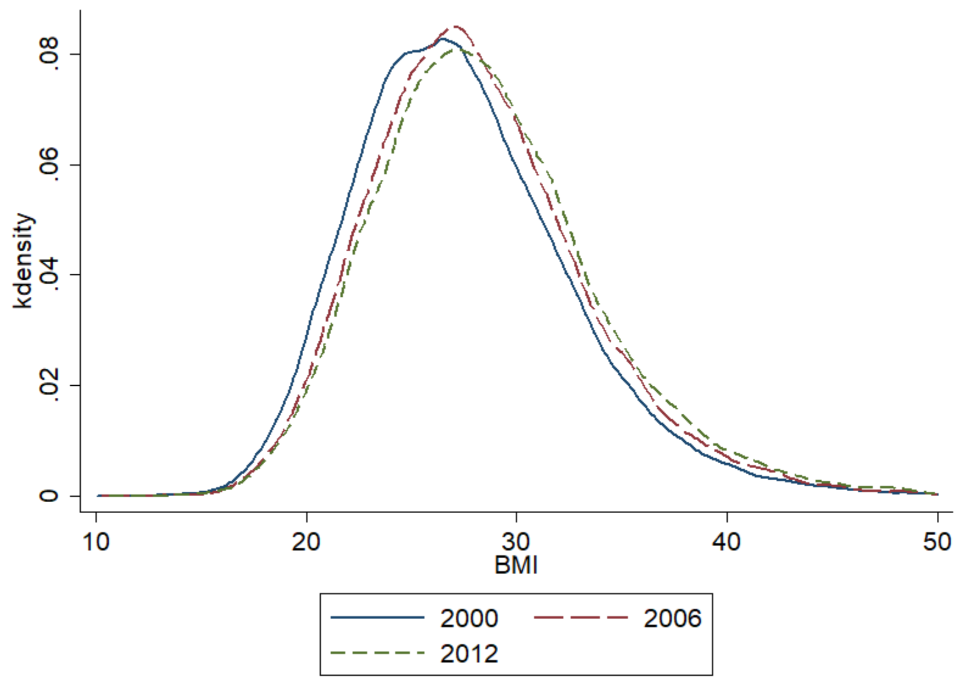
Table C-7: Exposure to Export Competition and Health Outcomes

	All	Household income		Gender	
		Low	High	Men	Women
	(1)	(2)	(3)	(4)	(5)
Prevalence					
Obesity (BMI>30)	0.00277	0.00219*	0.00319	0.00491*	0.00185
	(0.00197)	(0.00130)	(0.00362)	(0.00271)	(0.00206)
Physical Activity					
Intense exercise last week	-0.00239	-0.00603**	0.000759	-0.00216	-0.00495
	(0.00389)	(0.00307)	(0.00566)	(0.00366)	(0.00503)
Moderate Exercise last week	-0.000547	0.000381	-0.000953	-0.00789**	0.00216
	(0.00532)	(0.00511)	(0.00568)	(0.00360)	(0.00780)
Walk 10 min last 10 days	-0.00518	-0.00758*	-0.00400	-0.00679	-0.00488
	(0.00411)	(0.00419)	(0.00419)	(0.00450)	(0.00439)
Risk factors					
Currently smokes	0.000731	-0.00189	0.00354**	0.00182	-0.000825
	(0.00111)	(0.00116)	(0.00179)	(0.00189)	(0.000701)
Drinks	0.000324	0.000166	0.000397	0.000446	0.000209**
	(0.000214)	(0.000195)	(0.000320)	(0.000476)	(8.71e-05)
Got drunk last month	0.00112	-5.55e-05	0.00243	0.00360	-0.00105
(heavy drinking)	(0.00154)	(0.00190)	(0.00199)	(0.00265)	(0.00119)
Access to health care					
Health insurance	-0.0126**	-0.0107	-0.0107**	-0.0118*	-0.0129**
	(0.00581)	(0.00685)	(0.00486)	(0.00624)	(0.00553)
Preventive Medicine in the last year	-0.00497	-0.00162	-0.00725*	-0.00414	-0.00374
	(0.00319)	(0.00328)	(0.00371)	(0.00477)	(0.00348)
Self-reported physical and mental health					
Bad health last 2 weeks	0.00115	0.00225	-0.000574	0.00161	0.000886
	(0.00241)	(0.00312)	(0.00171)	(0.00297)	(0.00223)
Any depression symptoms	0.00648	0.00501	0.00617	0.00682	0.00642
	(0.00583)	(0.00613)	(0.00572)	(0.00686)	(0.00522)
Poor mental health	0.00480	0.00348	0.00591	0.00406	0.00451
	(0.00486)	(0.00438)	(0.00566)	(0.00365)	(0.00586)
States	32	32	32	32	32

Notes: This table shows state-level second stage results of the effect of international competition on the change in health outcomes over 2006-2012. Data is from the Mexican National Health and Nutrition Survey (ENSANUT), which is representative at state level for 2006 and 2012. Each coefficient results from a different regression on the outcome variables in the table rows on a state-level measure of exposure to export competition. Table 10 presents equivalent results for exposure to import competition. $\Delta ICW_{i,t}^{D}$ is the change in International Competition reported in units of 1,000 USD per worker, defined in Eq. 4. ΔICW^{US} is the municipality level exposure to Chinese export competition in the U.S., instrumented using the change in Chinese exports to other high-income countries. I calculated the measures of exposure to export competition at state level for 2006-2012, with the industry pre-shock industry shares from 1998. To reflect the change in health outcomes for a Mexican municipality at the 75th compared to the 25th percentile of exposure to trade competition, point estimates need to be multiply by 3.3092, the interquartile range of $\Delta ICW^{US}_{2006-2012}$ (Mean 4.97, 25th pctile 2.7557, 75th pctile 6.0649, IR 3.3092). Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

D Appendix Figures

Figure D-1: Body Mass Index (BMI)



Notes: This Figure shows the body mass index (BMI) distribution of adults surveyed in the Mexican National Survey of Health and Nutrition (ENSA 2000; ENASUT 2006, 2012). I calculate individuals' BMI, which is a person's weight in kilograms divided by the square of height in meters. If a person's BMI is 25.0 to < 30, it falls within the overweight range; if the BMI is 30.0 or higher, it falls within the obese range.

Figure D-2: Mexican and Chinese Exports to the U.S. (millions USD, 2-digit industries)

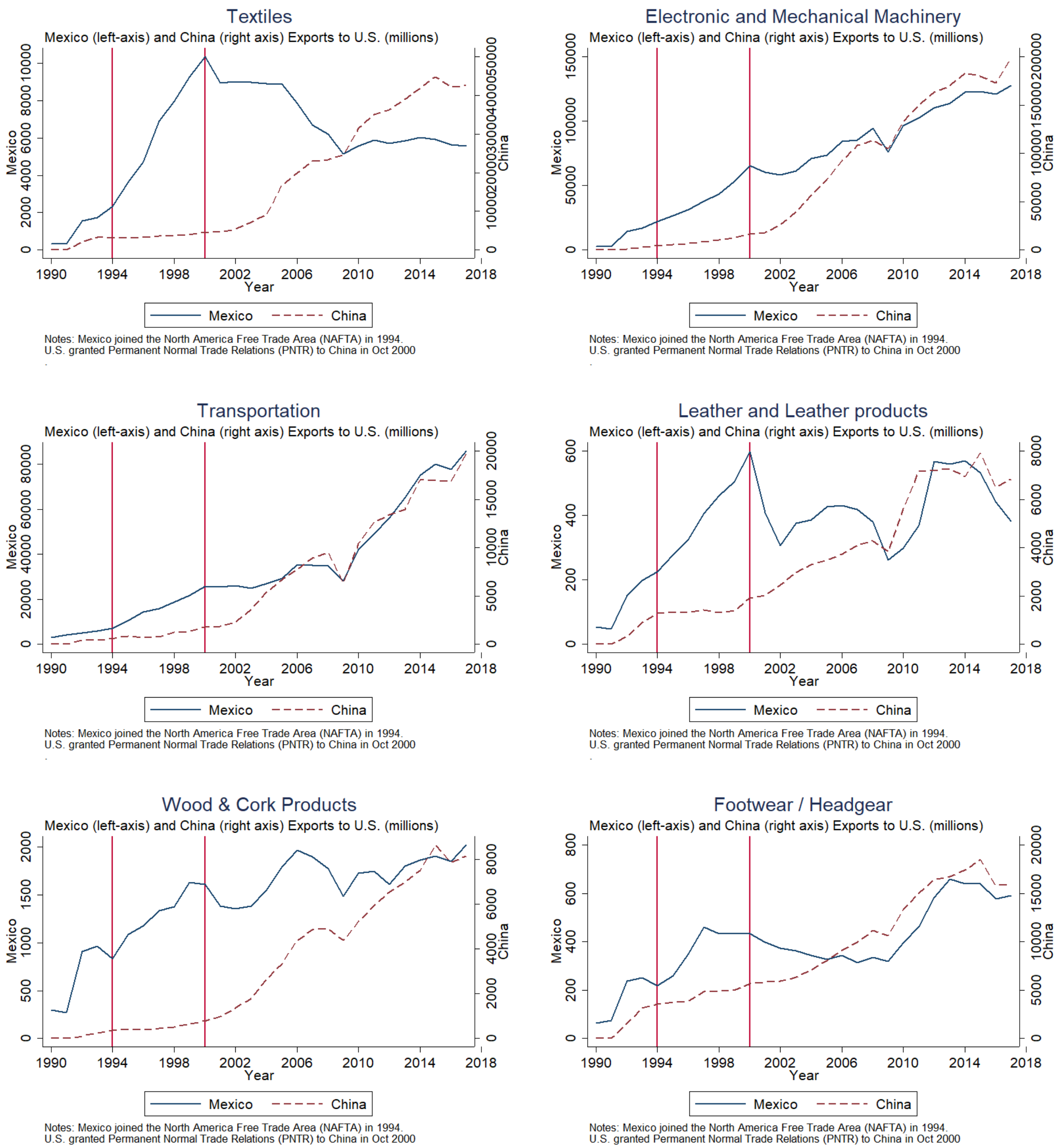
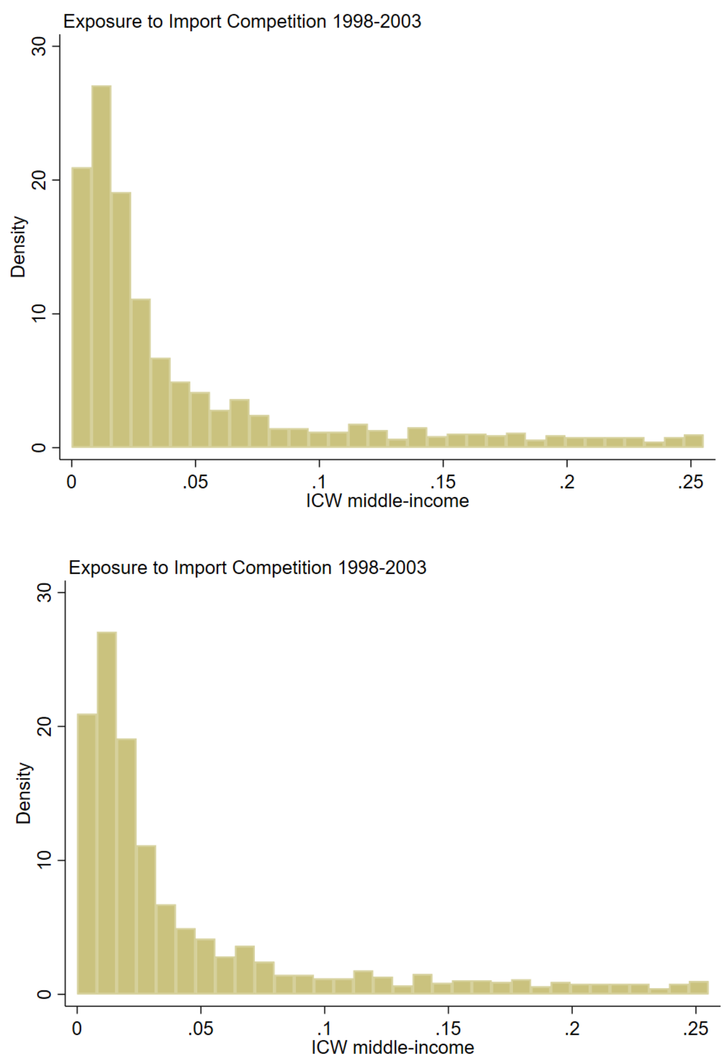
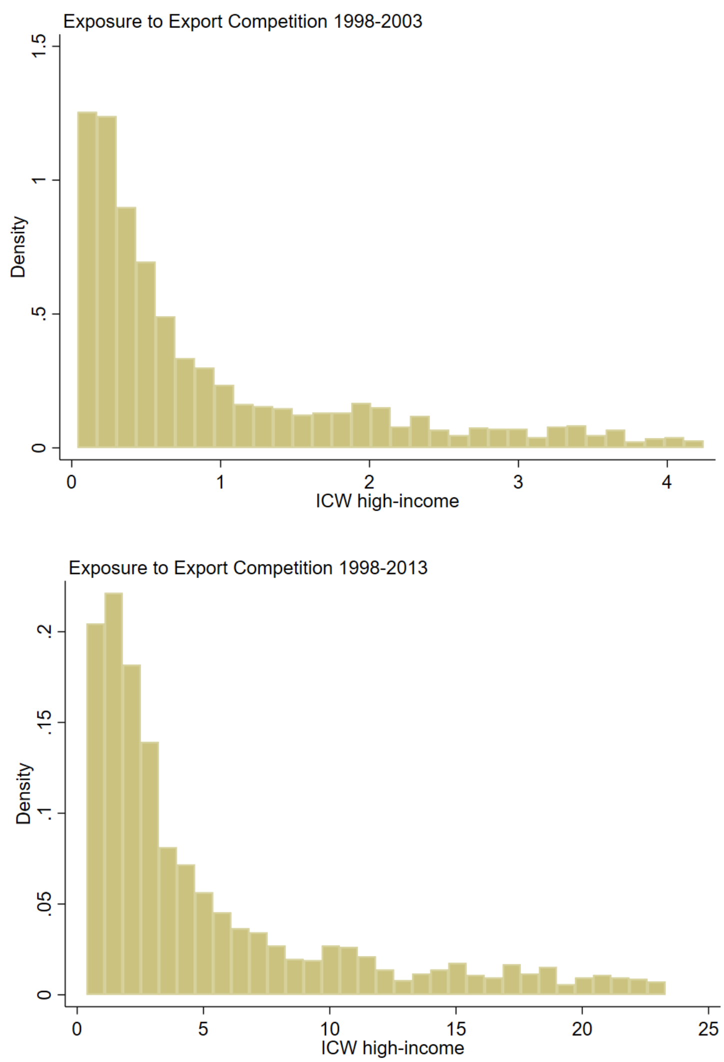


Figure D-3: Histogram - ICW Import Competition



Notes: Figure shows the distribution of the measure of exposure to import competition across Mexican municipalities for two periods: 1998-2003 (top) and 1998-2013 (bottom). Summary statistics are presented in Table 1.

Figure D-4: Histogram - ICW Export Competition



Notes: Figure shows the distribution of the measure of exposure to export competition across Mexican municipalities for two periods: 1998-2003 (top) and 1998-2013 (bottom). Summary statistics are presented in Table 1.

Figure D-5: Histogram - Pierce and Schott (2016) measure of exposure