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The effects of trade-induced worker displacement on health and mortality in Mexico

Policy brief written by Benjamine Dejardin based on Fernández Guerrico. S (2021), "The effects of trade-induced worker displacement on health and mortality in Mexico," Journal of Health Economics, 80, 102538.

Abstract

This policy brief focuses on a recent paper by Fernández Guerrico (2021) that analyses the impact of trade-induced changes in local manufacturing employment opportunities on leading causes of mortality in Mexico. This is done by looking at cross-municipality variation in trade exposure given differences in industry specialization before China's entry in the World Trade Organization in 2001. Fernández Guerrico finds that trade exposure leads to an increase in the type 2 diabetes age-adjusted mortality rate with respect to baseline and that exposure to international competition explains an important part of the increase in type 2 diabetes mortality in the period 1998-2013. The results show a decline in ischemic heart disease and chronic obstructive pulmonary disease, which can appear like perplexing results since the risk factors for these chronic diseases are similar. The author provides theoretical and empirical explanations for this heterogenous mortality response, for instance the reduction in alcohol and tobacco consumption are possible reasons for the decrease in ischemic heart disease and chronic pulmonary disease deaths. This paper offers evidence of demand-side factors, while most recent research focuses on supply-side analysis of the consequences of globalization on food prices and household's welfare. The author finds that the negative trade shock on manufacturing labor demand impacted chronic disease mortality in Mexico via a decline of labor market opportunities, which led to income loss because of job loss and lower wage, a decline in labor conditions (i.e., informal employment), and loss of access to health insurance. When exploring heterogeneous mortality response, the results show that the decline in ischemic heart disease deaths are concentrated among men. Furthermore, the increase in obesity prevalence linked to trade exposure supports the hypothesis of a strong relationship between income and nutrition.

Main Contributions

- Identifying the **impact of trade liberalization on chronic disease mortality** through its influence on **income** and **employment opportunities.**
- Exploring whether the effects of **trade-induced worker displacement** on mortality are different depending on the **source of international competition**
- **Trade exposure** leads to a **9 to 12 percent increase** in the **type 2 diabetes age-adjusted mortality** rate with respect to baseline municipalities at baseline in 1998.
- **Trade exposure** leads to a **decline in ischemic heart disease,** although the estimates are less precise.

Table 3
Exposure to International Competition and Leading Causes of Mortality - 2SLS.

	Dependent variable: 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	2382	2382	2382	2382	2382	2382

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Introduction

The export-led industrialization of several developing countries increased their economic growth, which lead to an improvement in living standards and a better access to health care. Mortality from infectious diseases declined. However, alarmingly, mortality from "lifestyle" diseases such as diabetes and cardiovascular disease, which are associated with tobacco use, physical inactivity, excessive use of alcohol and unhealthy diet increased. Therefore, we face a dual situation where globalization and economic growth on one hand can improve the population's health on the other hand have different distributional effects. This paper by Sofia Fernández Guerrico looks at the effect of a trade-induced negative shock to manufacturing employment on leading causes of mortality such as diabetes, ischemic heart disease and alcohol-related disease in Mexican municipalities between 1998 and 2013.

As Mexican manufacturing exports grew rapidly, after entering the GATT in 1986 and the signing of the NAFTA in 1994, the manufacturing sector became an important source of formal employment creation. China's accession to the WTO in 2001 generates plausible exogenous variation in international competition affecting local labor markets and allows for exploring differential mortality responses to changes in local employment opportunities and income. Fernández Guerrico looks at cross-municipality variation in trade exposure given the differences in industry specialization before 2001 in Mexico, and constructs measures of exposure to both import competition in Mexico's domestic market and export competition in the U.S. market.

First, the author estimates the effect of trade-induced changes in local labor opportunities on mortality by merging data from economic and population censuses with international trade flows. This paper looks at three leading causes of death: type 2 diabetes, ischemic heart disease and alcohol-related liver disease, which represented about one third of causes of death in Mexico. Then, the author looks at whether there are heterogeneous results depending on age and gender, and looks at the link between income and nutrition, access to health care and health behavior to better understand the channels through which trade exposure affects prevalence of chronic disease. Fernández Guerrico finally looks at the effect of international competition on risk factors for these chronic diseases.

Empirical Strategy

The number of deaths by municipality are calculated using administrative registers from the Mexican National Institute of Statistics and Geography (INEGI). The Mexican Economic Census was used to examine the changes in manufacturing employment by industry and to measure the initial labor force size. The age-adjusted mortality rate is the dependent variable, and the main independent variable is the measure of local labor market conditions. To take into account the pre-existing differences in exposure to international competition across municipalities and avoid bias when exploring the within-municipality variation in mortality, the author looks at the change in age-adjusted mortality rates between the initial year and year *t* in municipality *i* as the dependent variable and the independent variable is the change in municipality *i*'s labor market conditions between the initial year and year *t.*

The main objective is to analyze the effects of trade-induced changes in the labor market on mortality, morbidity, and health behaviors. For this, we have that the local labor market shock is the average change in Chinese international competition per worker. The regression includes municipality-level controls and state fixed effects. To assess the variation in exposure to international trade for Mexican municipalities, the authors look at the growth in Mexican imports from China, and the growth in U.S. imports from China. The causal effect of the main independent variable, the measure of local labor market conditions, is examined under the assumption that people living in municipalities exposed to trade with China and people living in municipalities not exposed to trade with China will have common changes in health and labor market outcomes in the absence of trade shock.

The author uses an instrumental variable approach following Autor et al. (2013). With a 2SLS specification, the paper looks at whether municipalities that are more exposed to international competition per worker have relatively different changes in mortality because of the negative shock to manufacturing employment. The first stage uses Chinese exports to middle-income countries like Mexico to instrument Mexican exposure to import competition and uses Chinese exports to high-income countries to instrument for the measure of Mexican export competition in the U.S. market.

Results

Table 3 shows the 2SLS results of the effect of change in exposure to international competition per worker on leading causes of mortality in Mexico, namely type 2 diabetes, ischemic heart disease and alcohol-related liver disease, during two periods: 1998-2003 and 1998-2013. Panel A shows the results when we look at the effect of the change in exposure to import competition from China, which is instrumented by realized imports from China by other middle-income countries. Panel B shows the results when looking at the effect of the change in exposure to export competition from China, which is instrumented by realized imports from China by other high-income countries. The first row of each panel represents the point estimates for a 1000 USD increase in international competition per worker and the second row shows the change in trade exposure for a municipality at the 75th percentile compared to the 25th percentile of exposure.

We can see in table 3 that a change in trade exposure for a municipality at the 75th percentile compared to the 25th percentile of exposure leads to an increase of 1.5 to 2 deaths per 100 000 people caused by type 2 diabetes, and those are significant results. The baseline mortality rate is 17.47, so 1.5 to 2 deaths per 100 000 represent a 9 to 12% increase on average with respect to the average age-adjusted diabetes mortality rate across municipalities in the year 1998. Average change in mortality for type 2 diabetes is 10.87 deaths per 100 000 people from 1998 to 2003 and 20.42 deaths per 100 000 people from 1998 to 2013, so the estimates explain respectively 14 to 19 % of the average increase in mortality caused by type 2 diabetes from 1998 to 2003 and 8 to 10 % from 1998 to 2013. A change in trade exposure for a municipality at the 75th percentile compared to the 25th percentile of exposure leads to a decrease of 0.6 to 1 death per 100 000 people caused by ischemic heart disease from 1998 to 2003, and 1 to 1.8 deaths from 1998 to 2003. Those changes are somewhat imprecisely estimated though. The baseline ischemic heart disease mortality rate is 47.35, so 0.6 to 1 death per 100 000 represent a 1 to 2% decrease on average with respect to the average age-adjusted diabetes mortality rate across municipalities from 1998 to 2003 and 1 to 1.8 deaths represents a 2 to 4% decline from 1998 to 2013.

Physical activity, tobacco and alcohol consumption are risk factors of type 2 diabetes and ischemic heart disease, so it might appear puzzling as to why the estimates are of different signs. The author conducts an analysis on whether there is heterogeneous mortality response by gender and by age group. Fernández Guerrico's main result from this analysis is that the decrease in ischemic heart decease is driven by man. The author explains that the prevalence of risk factors varies between countries' income groups, age groups, and gender. In middle-income countries, for example, tobacco use among man and physical inactivity for women are more prevalent risk relative to higher-income countries. The decline in tobacco use contributed to reducing ischemic heart disease mortality.

The author then analyses the link between income and nutrition, access to health care and health behavior to better understand the channels through which trade exposure affects prevalence of chronic diseases. Table 6 shows the effect of a higher exposure to international competition on manufacturing employment, and the estimates are significant and display a negative relationship. Based on those results, it can be stated that half of the decline in manufacturing employment rate is caused by Chinese trade competition. This highlights the channel through which exposure to international competition could have affected chronic disease mortality in Mexico. Indeed, a deterioration of labor market opportunities could lead to income loss, worsened labor conditions and a loss of access to health insurance. The author shows in table 7 (not shown in this policy brief) that there is a significant negative link between international competition and the change in log of wages of full-time workers in the manufacturing sector in the short-run and overall wage decrease in the long-run. This income loss might worsen consumption habits, by limiting

Table 6
Exposure to International Competition and Manufacturing Employment - 2SLS.

	Dependent variable: Δ Log Manufacturing Employment					
	1998–2003			1998–2013		
	Total (1)	Men (2)	Women (3)	Total (4)	Men (5)	Women (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	2382	2382	2382	2382	2382	2382

access to food quality and variety for individuals who are financially constrained, and thus increase the prevalence of type 2 diabetes. The author also shows that there was a decline in formal employment at the local level which resulted to a decline in access to health care.

The author finally looks at the effect of international competition on the risk factors for the chronic diseases analysed. The Mexican National Health and Nutrition Survey is then used to explore how regions with higher exposure to international competition differ in terms of the share of population self-reporting healthy habits or unhealthy habits. The main results are that import competition explains about 40 percent of overall increase in obesity, that respondents living in states that are more exposed to international competition report doing less physical activity (however most of the coefficients are imprecisely estimated) and that reports of smoking and heavy drinking daily habits are negatively linked to exposure to international competition for low-income households and positively linked for high income households. Obesity and lack of physical activity are risk factors for type 2 diabetes, and the increase in those risk factors linked to trade exposure supports the hypothesis of a strong relationship between income and nutrition.

Policy implications

Hoddinott et al. (2000) find that a conditional cash transfer called Progresa/Opportunidades, that started in the late 1900's, significantly improved the dietary's quality of beneficiary households. Barham and Rowberry (2013) find that this conditional cash transfer decreased elderly municipal-level mortality from diabetes by 12 percent over 1997–2000. Progresa/Opportunidades's target were households with children in school age, increasing income at household level improves the household's members access to diverse and better-quality food and other health input. This highlights that implementing welfare programs for financially constrained households has multiple benefits. We saw that a decline of labor market opportunities because of a negative trade shock could lead to income loss because of job loss and lower wage, which could lead to a decline in labor conditions like informal employment and to loss of access to health insurance. This could deteriorate standards of living and negatively affect household's dietary quality and physical activity, which ultimately leads to a higher prevalence of diseases such as type 2 diabetes and higher mortality rates for those "lifestyle" diseases. Increasing income to relax financial constraints allows households to have a better quality of life and could prevent increases of mortality rate for chronic diseases such as type 2 diabetes due for example to a negative trade shock.

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