

## RESEARCH BRIEF No. 124

# Empirical Studies in International Trade



Export-Import Bank of India instituted the International Economic Research Annual (IERA) Award in 1989. The objective of the award is to promote research in international economics, trade, development and related financing, by Indian nationals at universities and academic institutions in India and abroad. The study titled 'Empirical Studies in International Trade' is based on the IERA Award 2020 winning thesis by Dr. Sanjana Goswami, currently Assistant Professor of Economics at the Lee Kuan Yew School of Public Policy, National University of Singapore.

Economists have long recognized that free trade has the potential to raise living standards and that both the importing and exporting countries gain by engaging in trade. The growing body of empirical evidence supports the view of most theoretical trade models that trade reallocates resources within a country, and both destroys and creates jobs, with implications for income distribution. Evidence suggests that while the countries benefit overall, there are some losers as well. Trade's adverse effects appear to be highly geographically concentrated and long-lasting in developing and developed countries alike.

This study sheds light on these distributional effects of international trade by examining the effect of two large shocks – China's rise as an export powerhouse in the 2000s, also known as the 'China Shock', and the more recent Sino-American trade war of 2018 – on labor market outcomes. In the first part, the study analyses the effect of the China Shock on occupational employment in the United States. In the second part, the study analyses the effect of tariffs imposed by the United States and China on regional employment in the United States. The China Shock captures the effect of the rise of import competition on employment, whereas the trade war tariffs capture the effect of a decline of import competition on employment. Both effects show distributional impacts of international trade.

Occupations differ along several characteristics such as their pay, degree of routineness, and required level of education. These differences should lead to heterogeneous responses of occupational employment levels to technology or international trade shocks. For

example, automation is more likely to replace highly-routine occupations, and an international offshoring relationship with an unskilled-labor abundant country is more likely to replace low-skilled occupations in the source country. For the U.S., the greatest trade shock in the last few decades comes from the rise of China as the world's largest trader. Some influential papers find a large negative impact of Chinese import competition on U.S. employment. Contributing to this literature, the goal of this study is to estimate the impact of the 'China Shock' on U.S. occupational employment from 2002 to 2014 by distinguishing occupations according to their wage, non-routineness, and education characteristics.

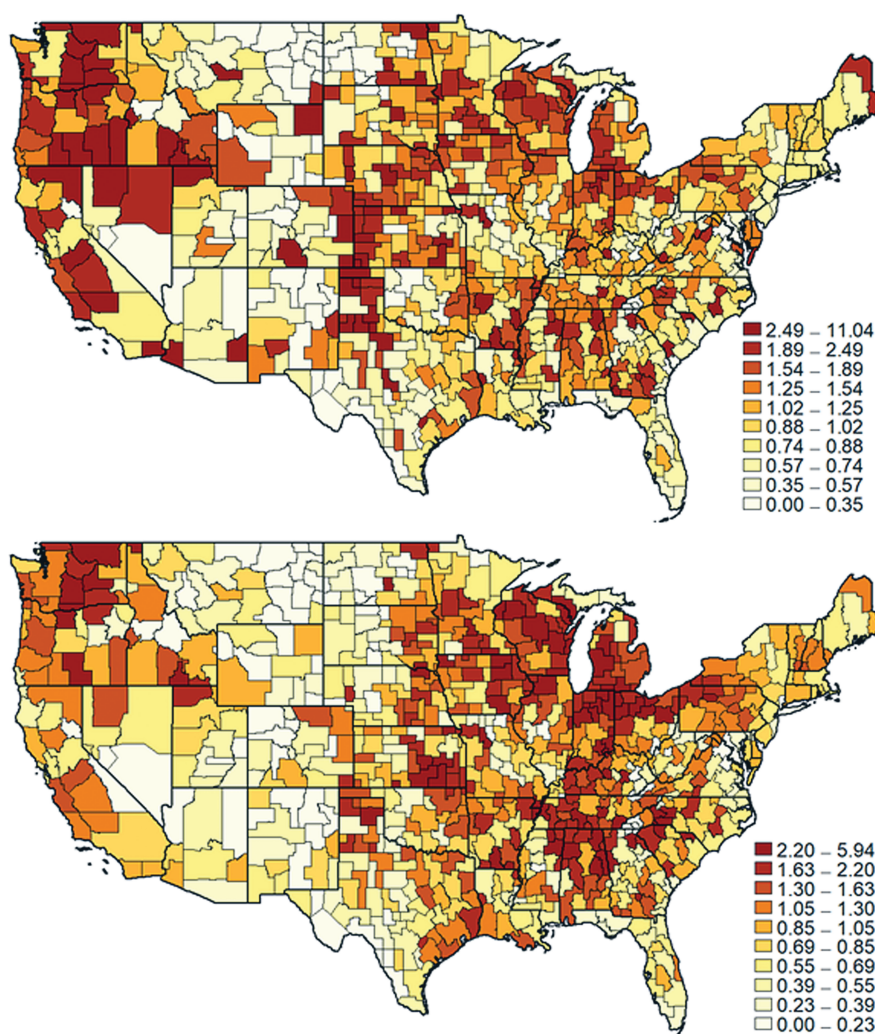
After sorting about 750 occupations from low to high wage, from routine to non-routine, and from low to high education, the first part of this study documents the decline in the share of lower-indexed occupations in total U.S. employment from 2002 to 2014, and an increase in the share of higher-indexed occupations during the same period. At the industry level, the composition of employment in the vast majority of the industries changes in favor of higher-indexed occupations. The empirical analysis confirms that Chinese import exposure is an important driver of these results, mainly through its large negative employment impact on lower-indexed occupations.

Tariffs on imports reduce import competition for domestic firms and in turn encourages more firms to enter the market or expand, therefore generating new jobs. On the other hand, retaliatory tariffs on exports hurt domestic firms and they may shrink or even exit and may therefore displace workers. Moreover, tariffs on imports of intermediate products make

inputs more expensive and hurt domestic firms and may displace workers. A trade war imposes tariffs or quotas on imports and foreign countries retaliate with similar forms of trade protectionism. As it escalates, a trade war reduces international trade, and in turn has distributional effects on the labor market. The recent trade escalation prompted by the U.S. administration under President Donald Trump since January 2018 is an unprecedented move, incomparable to any previous episodes of trade disputes since the Great Depression. The second part of this paper explores these distributional impacts by studying the short-run and long-run employment consequences of the U.S-China trade war. **Figure 1** shows the exposure to

Chinese import and export tariffs in by region. The regions in the map are commuting zones, which are geographic units of analysis intended to closely reflect the local economy where people live and work. County boundaries are not always adequate confines for a local economy and often reflect political boundaries rather than an area's local economy. Exposure here is defined as the change in a commuting zone's tariff between December 2017 and December 2018. Import tariffs seem to be more concentrated in the Rust Belt around the Great Lakes region, whereas retaliatory tariffs seem to be concentrated in the Corn Belt of the Mid-West, which is dominated by farming and agriculture and the North-West part of the country.

**Figure 1: Chinese Retaliatory Export Tariff Exposure (Top) and U.S. Import Tariff Exposure (Bottom) by Commuting Zone**



Although the legal justifications for these trade wars range from national security (in the case of steel) to protection of intellectual property (in the case of China), the justification that President Trump put forward when talking to his political base was the protection of the American worker and American jobs. This study presents evidence that such a claim may have been credible prior to the events of the global financial crisis, but it does not hold in today's environment.

The short-term approach estimates the effects of changes in U. S. import tariffs, U. S. import tariffs that propagate downstream to buyers of intermediate inputs, and Chinese retaliatory tariffs on commuting zone-level employment growth. Using monthly data on employment, U. S. - China trade and tariffs from January 2017 to March 2019, this study finds that Chinese retaliatory tariffs have had a statistically significant and negative effect on commuting zone-level employment growth, whereas U.S. import tariffs have had no effect. This suggests that commuting zones that are relatively more exposed to the export

tariffs are disproportionately hurt, whereas commuting zones that are relatively more exposed to the import tariffs are not growing any differently than they were before the trade war.

The long-run approach imposes a hypothetical trade war on a well-studied phenomenon in the empirical international trade literature: the large job-reducing effects of surging imports from China, or the 'China Shock', on the U. S. labor market in addition to the job-creating effect of exports, which are also substantially large enough to almost offset the losses created by Chinese imports. Using an industry-level specification that estimates the effect of the change in Chinese import competition, non-Chinese import competition, and U. S. export expansion on the change in manufacturing employment, counterfactual employment levels are calculated under three different scenarios of retaliation by China: (i) simple retaliation, which imposes identical restrictions on U.S. exports across all industries, (ii) political retaliation, which targets in particular those industries that

**Table 1: Predicted Changes in Manufacturing Employment (in thousands)  
due to a Balanced Trade War between U. S. and China (1991-2007)**

All U. S. Trade					U. S. - China Trade			
	No Trade War	Simple Retaliation	Political Retaliation	Responsible Retaliation	No Trade War	Simple Retaliation	Political Retaliation	Responsible Retaliation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>1991-1999</b>								
Imports	-124	-76	-106	-118	-281	-231	-262	-274
Exports	735	710	730	734	39	9	34	38
Net	613	633	625	618	-240	-222	-227	-236
<b>1999-2007</b>								
Imports	-547	-450	-509	-534	-631	-534	-593	-619
Exports	463	418	455	458	75	31	66	70
Net	-71	-21	-42	-63	-553	-502	-525	-545
<b>1991-2007</b>								
Total imports	-671	-526	-615	-653	-912	-764	-855	-893
Total exports	1,198	1,128	1,185	1,193	114	39	99	108
<b>Total Net</b>	<b>542</b>	<b>612</b>	<b>583</b>	<b>555</b>	<b>-794</b>	<b>-724</b>	<b>-752</b>	<b>-781</b>

have a large proportion of Trump supporters, and (iii) responsible retaliation, which minimizes the impact of retaliation on global supply chains. This exercise is conducted for two time periods: 1991-2007, where the China Shock had a large negative impact on manufacturing employment, and the post-recession period of 2010-2016, where the China Shock no longer has an effect on manufacturing employment. A trade war in this empirical model simultaneously reduces both import and export exposure, based on the type of retaliation, thereby bringing back some jobs lost due to Chinese imports while killing some jobs gained due to U.S. export expansion.

To guide this empirical exercise, this study closely follows Acemoglu, Autor, Dorn, Hanson, and Price (2016a) and Feenstra, Ma, and Xu (2019). Using an instrumental variables approach, the former estimates the effects of Chinese import penetration on U. S. employment at both the industry and commuting-zone levels, while the latter expands the approach to consider also the employment effects of U. S. exports. While both papers find that Chinese import exposure is associated with employment losses in the U. S., Feenstra, Ma, and Xu (2019) find that “export exposure” has a countervailing effect that makes up for the Chinese-induced job losses during the 1991-2007 period. The counterfactual exercise for the 1991-2007 period finds that a uniform tariff by the U.S. along with no retaliation by China would bring back enough manufacturing jobs to almost reverse the effects of the China Shock. No matter the type of retaliation

strategy by China, had the U. S. taken a protectionist approach during this period by imposing import tariffs, manufacturing employment would have increased. **Table 1** shows calculations for a trade war between U.S. and China under three different retaliation scenarios.

However, these results would no longer be true if the focus is on only the post-recession period of 2010-2016. In this case, the job-reducing effect of the China Shock no longer exists. In fact, Chinese import penetration has a positive and insignificant effect on U.S. manufacturing employment. The counterfactual analysis for this period indicates that the trade war would lead to a net destruction of jobs.

These results combined suggest that the employment consequences of the U. S. - China trade wars are negative in the short-run and are unlikely to be largely positive in the long-run either because of the shift in the nature of manufacturing production towards automation and offshoring in the past decade.

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