The China toll deepens

Growth in the bilateral trade deficit between 2001 and 2017 cost 3.4 million U.S. jobs, with losses in every state and congressional district

Report • By Robert E. Scott and Zane Mokhiber • October 23, 2018

Summary and key findings

The United States has a massive trade deficit with China. The growth of the U.S. trade deficit with China, which has increased by more than $100 billion since the beginning of the Great Recession, almost entirely explains why manufacturing employment has not fully recovered along with the rest of the economy. And the growing trade deficit with China isn't just a post-recession phenomenon hitting manufacturing: it has cost the U.S. millions of jobs throughout the economy since China entered the World Trade Organization (WTO) in 2001, a finding validated by numerous studies.

This report underscores the ongoing trade and jobs crisis by updating EPI's research series on the jobs impact of the U.S.–China trade deficit. The most recent of these reports (Scott 2012; Kimball and Scott 2014; Scott 2017a) look at the effect of the U.S. trade deficit with China since China entered the WTO in 2001. Our model examines the job impacts of trade by subtracting the job opportunities lost to imports from those gained through exports. As with our previous analyses, we find that because imports from China have soared while exports to China have increased much less, the United States is both losing jobs in manufacturing (in electronics and high tech, apparel, textiles, and a range of heavier durable goods industries) and missing opportunities to add jobs in manufacturing (in exporting industries such as transportation equipment, agricultural products, computer and electronic parts, chemicals, machinery, and food and beverages).

The growing trade deficit with China since China entered the WTO affects different regions in different ways. Some regions are devastated by layoffs and factory closings while others are surviving but not growing the way they could be if new factories were opening and existing plants were hiring more workers. This slowdown in manufacturing job generation is also contributing to stagnating wages of typical workers and widening inequality.

Following are the key highlights of this report:

U.S. jobs lost are spread throughout the country but are concentrated in manufacturing, including in industries in which the United States has traditionally held a competitive advantage.

- **The growth of the U.S. trade deficit with China between 2001 and 2017 was responsible for the loss of 3.4 million U.S. jobs,** including 1.3 million jobs lost since 2008 (the first full year of the Great Recession, which technically began at the end of 2007). Nearly three-fourths (74.4 percent) of the jobs lost between 2001 and 2017 were in manufacturing (2.5 million manufacturing jobs lost).

- **The growing trade deficit with China has cost jobs in all 50 states and in every congressional district in the United States.** The 10 hardest-hit states, when looking at job loss as a share of total state employment, were New Hampshire, Oregon, California, Minnesota, North Carolina, Rhode Island, Massachusetts, Vermont, Wisconsin, and Texas. Job losses in these states ranged from 2.57 percent (in Texas) to 3.55 percent (in New Hampshire) of total state employment. The five hardest-hit states based on total jobs lost were California (562,500 jobs lost), Texas (314,000), New York (183,500), Illinois (148,200), and Pennsylvania (136,100).

- **The trade deficit in the computer and electronic parts industry grew the most:** 1,209,000 jobs were lost in that industry, accounting for 36.0 percent of the 2001–2017 total jobs lost. Not surprisingly, the hardest-hit congressional districts (those ranking in the top 20 districts in terms of jobs lost as a share of all jobs in the district) included districts in Arizona, California, Illinois, Massachusetts, Minnesota, New York, Oregon, and Texas, where jobs in that industry are concentrated. A district in Georgia and another in North Carolina were also especially hard hit by trade-related job displacement in a variety of manufacturing industries, including computer and electronic parts, textiles and apparel, and furniture.

- **Surging imports of steel, aluminum, and other capital-intensive products threaten hundreds of thousands of jobs** in key industries such as primary metals, machinery, and fabricated metal products as well.

- **Global trade in advanced technology products—often discussed as a source of comparative advantage for the United States—is instead dominated by China.** This broad category of high-end technology products includes the more advanced elements of the computer and electronic parts industry as well as other sectors such as biotechnology, life sciences, aerospace, and nuclear technology. In 2017, the United States had a $135.4 billion trade deficit in advanced technology products with China, and this deficit was responsible for 36.1 percent of the total U.S.–China goods trade deficit that year. In contrast, the United States had a $24.5 billion trade surplus in advanced technology products with the rest of the world in 2017.

Growing trade deficits are also associated with wage losses not just for manufacturing workers but for all workers economywide who don't have a college degree.

- **Between 2001 and 2011 alone, growing trade deficits with China reduced the incomes of directly impacted workers by $37 billion per year,** and in 2011 alone, growing competition with imports from China and other low wage-countries reduced the wages of all U.S. non–college graduates by a total of $180 billion. Most of that income was redistributed to corporations in the form of higher profits and to workers with college degrees at the very top of the income distribution through higher wages.

The U.S. trade deficit with China has increased since China entered into the WTO

U.S. proponents of admitting China into the World Trade Organization frequently claimed that letting China into the WTO would increase U.S. exports, shrink the U.S. trade deficit with China, and create jobs in the United States.[1] In 2000, President Bill Clinton claimed that the agreement then being negotiated to allow China into the WTO would create "a win-win result for both countries." Exports to China "now support hundreds of thousands of American jobs," said Clinton, and these figures "can grow substantially with the new access to the Chinese market the WTO agreement creates" (Clinton 2000, 9–10).

China's entry into the WTO in 2001 was supposed to bring it into compliance with an enforceable, rules-based regime that would require China to open its markets to imports from the United States and other nations by reducing Chinese tariffs and addressing nontariff barriers to trade. Promoters of liberalized U.S.–China trade argued that the United States would benefit because of increased exports to a large and growing consumer market in China. The United States also negotiated a series of special safeguard measures designed to limit the disruptive effects of surging imports from China on domestic producers.

However, China's trade-distorting practices, aided by China's currency manipulation and misalignment and its suppression of wages and labor rights, resulted in a flood of dumped and subsidized imports that greatly exceeded the growth of U.S. exports to China. These trade-distorting practices included extending large subsidies to industries such as steel, glass, paper, concrete, and renewable energy industries and rapidly growing its state-owned enterprises, both of which generated a massive buildup of excess capacity in a range of these sectors. This excess capacity created a supply of goods far exceeding Chinese consumer demand, and China dealt with the oversupply by dumping the exports elsewhere, primarily in the United States (Scott 2017a).

The promised surge of U.S. exports to China was also hampered by China's failure to implement certain policies to increase domestic demand for goods, including goods produced by trading partners. Specifically, for China to become a better market for U.S.

exports, it needed to stimulate the growth of domestic consumption through policies that would allow workers to organize and bargain collectively, thus raising wages. China also needed to increase domestic consumption through increased social spending and reductions to the country's massive savings rate (Scott 2017a). Such policies are all elements of a program of domestic, demand-led growth that the United States, other advanced countries, and international agencies have called on China to implement for many years. But none of these policies have been implemented at anywhere near a large enough scale, and China's national savings rate has actually increased significantly over the past 15 years (Setser 2016; IMF 2018), which has contributed to the growth of U.S. trade deficits (Bernstein 2016).

In addition, the WTO agreement spurred foreign direct investment (FDI) in Chinese enterprises and the outsourcing of U.S. manufacturing plants, which has expanded China's manufacturing sector at the expense of the United States, thereby affecting the trade balance between the two countries. Finally, the core of the agreement failed to include any protections to maintain or improve labor or environmental standards or to prohibit currency manipulation. (The descriptions in this paragraph derive from Scott 2017a.)

As a result of these forces, the U.S. trade deficit with China soared after China entered the WTO.

Table 1 displays changes in the U.S.–China goods trade deficit and job displacement from 2001 to 2017 (when the term "trade deficit" is used in this report, it always refers to the goods trade deficit). As the table shows, imports from China increased dramatically in this period, rising from $102.3 billion in 2001 to $505.6 billion in 2017.[2] U.S. exports to China rose at a rapid rate from 2001 to 2017, but from a much smaller base, from $19.2 billion in 2001 to $130.4 billion in 2017. As a result, China's exports to the United States in 2017 ("U.S. general imports") were nearly four times greater than U.S. exports to China. These trade figures make the China trade relationship the United States' most imbalanced trade relationship by far (authors' analysis of USITC 2018).

Overall, the U.S. goods trade deficit with China grew from $83.0 billion in 2001 to $375.2 billion in 2017, an increase of $292.2 billion. Put another way, since China entered the WTO in 2001, the U.S. trade deficit with China has increased annually by $18.3 billion, or 9.9 percent, on average. Although not shown in the table, we can also examine the trade deficit in another way—not by how much it grew annually, but by adding up what the total deficit was each year to produce a cumulative figure. The data reveal that the cumulative U.S. trade deficit with China over the 2002–2017 (post-WTO) era was $4.2 trillion (USITC 2018 and authors' calculations).

Between 2008 and 2017, the U.S. goods trade deficit with China increased $108.9 billion. This 40.9 percent increase occurred despite the Great Recession–induced collapse in world trade between 2008 and 2009 and the 23.4 percent decline in the U.S. trade deficit with the rest of the world between 2008 and 2017. As a result, China's share of the overall U.S. goods trade deficit increased from 32.2 percent in 2008 to 46.5 percent in 2017. (The figures in this paragraph derive from the authors' analysis of USITC 2018 and U.S. Census Bureau 2018c.)

Table 1

U.S.–China goods trade and job displacement, 2001–2017

	2001	2008	2017	Change ($billions)		Percent change	
				2001–2017	2008–2017	2001–2017	2008–2017
U.S. goods trade with China ($billions, nominal)							
U.S. total exports*	$19.2	$71.5	$130.4	$111.1	$58.9	577.8%	82.4%
U.S. general imports	$102.3	$337.8	$505.6	$403.3	$167.8	394.3%	49.7%
U.S. trade balance	-$83.0	-$266.3	-$375.2	-$292.2	-$108.9	351.8%	40.9%
Average annual change in the trade balance				-$18.26	-$15.56	9.9%	
				Change (thousands of jobs)		Percent change	
U.S. trade-related jobs supported and displaced (thousands of jobs)							
U.S. total exports—jobs supported	179.2	564.2	959.1	780.0	395.0	435.3%	70.0%
U.S. general imports—jobs displaced	1,170.7	3,616.9	5,311.3	4,140.6	1,694.4	353.7%	46.8%
U.S. trade deficit—net jobs displaced	991.5	3,052.7	4,352.2	3,360.6	1,299.4	338.9%	42.6%
Average annual change in net jobs displaced				210.0	185.6	9.7%	

* Total exports as reported by the U.S. International Trade Commission include re-exports. The employment estimates shown here are based on total exports. See note 2 for additional details.

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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The growing trade deficit with China has led to U.S. job losses

Each $1 billion in exports to another country from the United States supports some American jobs. However, each $1 billion in imports from another country leads to job loss—by eliminating existing jobs and preventing new job creation—as imports displace goods that otherwise would have been made in the United States by domestic workers.[3] The net employment effect of trade depends on the changes in the trade balance. An improving trade balance can support job creation, but a growing trade deficit usually

results in growing net U.S. job displacement. The net change in the U.S.–China trade balance between 2001 and 2017 also reflects the effect of trade in intermediate products between the two countries on net trade flows and job losses.

This is what has occurred with China since it entered the WTO; the United States' widening trade deficit with China has been costing U.S. jobs. While some imports of parts and components from China have gone into the production of final goods, some of which have then been exported to China and the rest of the world, the overall U.S. trade deficit in manufactured products with China and the rest of the world has grown substantially since China entered the WTO.

This paper describes the net effect of the growing U.S.–China goods trade deficit (hereafter referred to as the U.S.–China trade deficit) on employment as jobs "lost or displaced," with the terms "lost" and "displaced" used interchangeably.[4] The employment impacts of the growing U.S. trade deficit with China are estimated in this paper using an input-output model that estimates the direct and indirect labor requirements of producing output in a given domestic industry. The model includes 205 U.S. industries, 76 of which are in the manufacturing sector (see the box titled **"Trade and employment models,"** as well as the appendix, for details on model structure and data sources). The Bureau of Labor Statistics Employment Projections program (BLS-EP) revised and updated its labor requirements model and related data in October 2017 (BLS-EP 2017a, 2017b). Our models have been revised and updated for this report using the latest available data.[5]

Scott 2017a estimated jobs lost or displaced due to the growth in the U.S.–China trade deficit from 2001 to 2015. The total job losses reported for 2001 to 2017 in Table 1 in this report are not significantly different than the job losses for 2001 to 2015 reported in Scott 2017a, despite a small increase in the trade deficit since 2015. This is primarily caused by changes in the structure of industry-specific price deflators from the Bureau of Labor Statistics (BLS-EP 2017b). In Scott 2017a, the deflators had a base year of 2005 (the price index is set to 1,000 in the base year). However, in their latest update (BLS-EP 2017b), BLS uses a base year of 2009. There are also some minor revisions in the most recent updates to the deflators that cause the real value of imports and exports to vary from previous years.[6] Finally, deflators for 2017 have not yet been published by BLS. In the past, producer price indexes from BLS were used to extrapolate the deflators to the most recent year. In this version of the report, we use the 2026 price projections published by BLS to estimate deflators for 2017, by interpolation. Specifically, the annualized percent change between the 2016 and the 2026 price projections for each industry is applied to the deflator for 2016, to estimate price levels in 2017.

Trade and employment models

The Economic Policy Institute and other researchers have examined the job impacts of trade in recent years by subtracting the job opportunities lost to imports from those gained through exports. That general approach is used in this

report. Specifically, this report uses standard input-output models and data to estimate the jobs displaced by trade. Many economists in the public and private sectors have used this type of all-but-identical methodology to estimate jobs gained or displaced by trade, including Groshen, Hobijn, and McConnell (2005) of the Federal Reserve Bank of New York and Bailey and Lawrence (2004) in the *Brookings Papers on Economic Activity.* The U.S. Department of Commerce has published estimates of the jobs supported by U.S. exports (Tschetter 2010). That study uses input-output and "employment requirements" tables from the Bureau of Labor Statistics Employment Projections program (earlier editions of BLS-EP 2017a), the same source used to develop job displacement estimates in this report. The Tschetter report represents the work of a panel of experts from 20 federal agencies.[7]

The model estimates the amount of labor (number of jobs) required to produce a given volume of exports and the labor displaced when a given volume of imports is substituted for domestic output. The difference between these two numbers is essentially the jobs displaced by the growing trade deficit, holding all else equal.

Jobs displaced by the United States' growing trade deficit with China are a net drain on employment in trade-related industries, especially those in manufacturing. Even if increases in demand in other sectors absorb all the workers displaced by trade (which is unlikely), job quality will likely suffer because many nontraded industries such as retail trade and home health care pay lower wages and have less comprehensive benefits than traded-goods industries (Scott 2013, 2017a).

As shown in the bottom panel of Table 1, U.S. exports to China in 2001 supported 179,200 jobs, but U.S. imports displaced production that would have supported 1,170,700 jobs. Therefore, the $83.0 billion trade deficit in 2001 displaced 991,500 jobs in that year. Net job displacement rose to 3,052,700 jobs in 2008 and 4,352,200 jobs in 2017. As a result, since China's entry into the WTO in 2001 and through 2017, the increase in the U.S.–China trade deficit eliminated or displaced 3,360,600 U.S. jobs. Also shown in Table 1, the U.S. trade deficit with China increased by $108.9 billion (or 40.9 percent) between 2008 and 2017. During that period, the number of jobs displaced increased by 1,299,400 (or 42.6 percent).

For comparative purposes, the growth of the U.S.–China trade deficit between 2001 and 2017 represents a direct loss of 1.5 percent of U.S. GDP in 2017 (authors' analysis of BEA 2018). Using a macroeconomic model with standard economic multipliers (see Appendix: Methodology in Scott and Glass 2016 for further details) yields an estimate of 3.2 million jobs displaced by a trade deficit of this magnitude, providing further support for the job displacement estimates shown in Table 1.[8]

Total jobs lost or displaced between 2008 and 2017 alone amounted to 1,299,400, either by the elimination of existing jobs or by the prevention of new job creation through the displacement of domestic production by imports.

U.S. jobs displaced by the growing goods trade deficit with China since 2001 (in thousands of jobs)
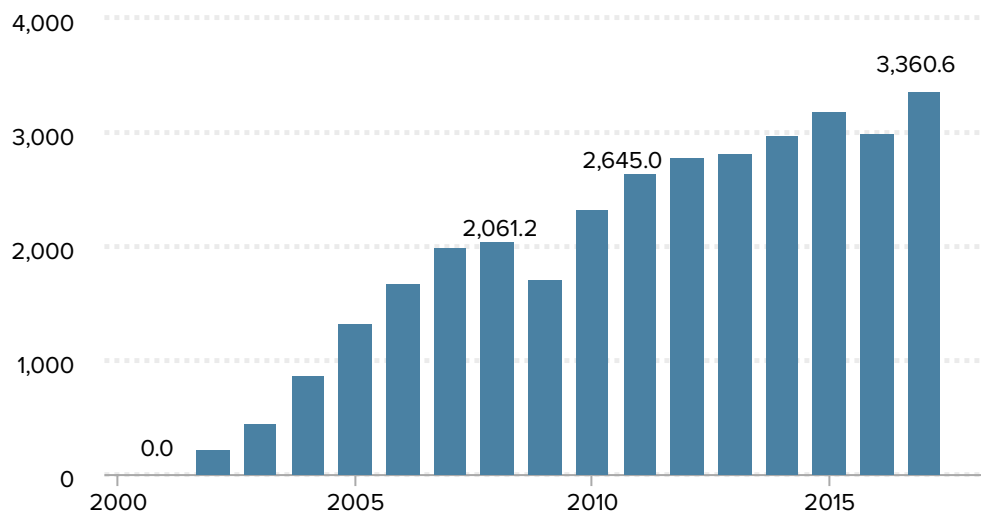
Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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The total number of jobs displaced by the growing U.S.–China trade deficit, as estimated here, is thus directly proportional to the size of the total bilateral deficit, which has increased steadily throughout the 2001–2017 period, except for a sharp decline in the recession year of 2009 and a much smaller drop in 2016. **Figure A** shows visually how rising trade deficits have displaced a growing number of jobs every year since China joined the WTO, with the exception of 2009 (during the Great Recession) and 2016 (during a brief lull in imports from China). On average, 210,000 jobs per year have been lost or displaced since China's entry into the WTO (as shown in Table 1, last row, data column four).

The continuing growth of job displacement between 2008 and 2017 slightly outpaced the increase in the bilateral trade deficit in this period because of the relatively rapid growth of U.S. imports of computer and electronic parts from China, discussed below, and the fact that the price index for most of these products fell continuously throughout the study period. The share of U.S. imports from China accounted for by computer and electronic parts (in current, nominal dollars) increased from 32.0 percent in 2008 to 36.5 percent in 2017 (according to the authors' analysis of USITC 2018).

Unfortunately, growing job losses due to outsourcing and growing trade deficits with China are only part of the story.

Next we turn to analysis of direct China trade and job loss in more detail.

The trade deficit and job losses, by industry

The composition of imports from China is changing in fundamental ways, with significant, negative implications for certain kinds of high-skill, high-wage jobs once thought to be the hallmark of the U.S. economy. Since it entered the WTO in 2001, China has moved rapidly "upscale," from low-tech, low-skill, labor-intensive industries such as apparel, footwear, and basic electronics to more capital- and skills-intensive industries such as computers, electrical machinery, and motor vehicle parts. It has developed a rapidly growing trade surplus in these specific industries and in high-technology products in general.

Table 2 provides a snapshot of the changes in U.S.–China goods trade flows between 2001 and 2017, by industry, for imports, exports, and the trade balance. The rapid growth of the bilateral trade deficit in computer and electronic parts (including computer and peripheral equipment, semiconductors, and audio and video equipment) accounted for 50.7 percent of the $292.1 billion increase in the U.S. trade deficit with China between 2001 and 2017. In 2017, the total U.S. trade deficit with China was $375.2 billion—$167.3 billion of which was in computer and electronic parts (trade flows by industry in 2001 and 2017 are shown in **Supplemental Table 1**, available at the end of this document).

As evident in the increasing trade deficit and also shown in Table 2, imports from China far exceeded exports to China between 2001 and 2017. Table 2 further shows that the growth in manufactured goods imports explained virtually all (99.4 percent) of total growth in imports from China between 2001 and 2017 and included a wide array of products. Computer and electronic parts were responsible for 39.7 percent of the growth in imports in this period, including computer equipment ($50.4 billion, or 12.5 percent of the overall growth in imports) and communications, audio, and video equipment ($81.3 billion, or 20.2 percent). Other major importing sectors included electrical equipment ($34.2 billion, or 8.5 percent), machinery ($30.5 billion, or 7.6 percent), apparel ($20.7 billion, or 5.1 percent) and miscellaneous manufactured commodities ($29.3 billion, or 7.3 percent).

As Table 2 shows, manufacturing was also the top sector exporting to China—72.0 percent of the growth in exports to China between 2001 and 2017 was in manufactured goods, totaling $80.0 billion. Within manufacturing, key export-growth industries included chemicals ($12.9 billion, or 11.7 percent of the growth in exports), aerospace products and parts ($13.7 billion, or 12.3 percent), motor vehicles and parts ($12.9 billion, or 11.6 percent), computer and electronic parts ($11.8 billion, or 10.6 percent), and machinery ($6.8 billion, or 6.1 percent). Scrap and secondhand goods industries—which support no jobs, according to the models used in this report (BLS-EP 2017a)[9]—accounted for 4.8 percent ($5.3 billion) of the growth in exports.

Agricultural exports—which were dominated by corn, soybeans, and other cash grains—grew faster than any individual manufacturing industry except for transportation equipment, increasing $17.3 billion (15.6 percent of the total increase) between 2001 and 2017. Nonetheless, the overall scale of U.S. total exports to China in 2017 was dwarfed by imports from China in that year, which exceeded the value of exports by nearly 4 to 1, as

Table 2

Change in U.S. goods trade with China, by industry, 2001–2017

Industry*	U.S. imports		U.S. exports		Trade balance	
	Change ($billions, nominal)	Share of total change	Change ($billions, nominal)	Share of total change	Change ($billions, nominal)	Share of total change
Total change	$403.2	100.0%	$111.1	100.0%	$-292.1	100.0%
Agriculture, forestry, fishing, and hunting	2.3	0.6%	17.3	15.6%	15.0	-5.1%
Mining	-0.1	0.0%	8.5	7.7%	8.6	-3.0%
Oil and gas	0.1	0.0%	6.8	6.2%	6.8	-2.3%
Minerals and ores	0.1	0.0%	1.7	1.5%	1.6	-0.5%
Manufacturing	400.8	99.4%	80.0	72.0%	-320.8	109.8%
Nondurable goods	44.1	10.9%	3.5	3.2%	-40.6	13.9%
Food	3.2	0.8%	2.5	2.3%	-0.6	0.2%
Beverage and tobacco products	0.1	0.0%	0.2	0.2%	0.1	0.0%
Textile mills and textile product mills	11.8	2.9%	0.4	0.4%	-11.4	3.9%
Apparel	20.7	5.1%	0.1	0.1%	-20.7	7.1%
Leather and allied products	8.3	2.0%	0.3	0.3%	-7.9	2.7%
Industrial supplies	44.5	11.0%	20.3	18.3%	-24.2	8.3%
Wood products	3.1	0.8%	1.8	1.6%	-1.3	0.4%
Paper	2.6	0.6%	2.2	2.0%	-0.4	0.1%
Printed matter and related products	2.1	0.5%	0.1	0.1%	-2.0	0.7%
Petroleum and coal products	0.5	0.1%	1.1	1.0%	0.7	-0.2%
Chemicals	16.4	4.1%	12.9	11.7%	-3.4	1.2%
Plastics and rubber products	14.6	3.6%	1.5	1.3%	-13.1	4.5%
Nonmetallic mineral products	5.4	1.3%	0.7	0.6%	-4.7	1.6%
Durable goods	312.2	77.4%	56.2	50.6%	-230.5	78.9%
Primary metals	3.6	0.9%	2.0	1.8%	-1.6	0.5%
Fabricated metal products	18.8	4.7%	2.1	1.9%	-16.8	5.7%
Machinery	30.5	7.6%	6.8	6.1%	-23.7	8.1%
Computer and electronic parts	160.0	39.7%	11.8	10.6%	-148.2	50.7%
Computer and peripheral equipment	50.4	12.5%	0.7	0.7%	-49.7	17.0%
Communications, audio, and video equipment	81.3	20.2%	1.1	0.9%	-80.3	27.5%
Navigational, measuring, electromedical, and control instruments	6.1	1.5%	4.6	4.1%	-1.5	0.5%
Semiconductor and other electronic components, and reproducing magnetic and optical media	22.2	5.5%	5.4	4.9%	-16.8	5.7%
Electrical equipment, appliances, and components	34.2	8.5%	2.8	2.5%	-31.4	10.8%

Table 2
(cont.)

Industry*	U.S. imports		U.S. exports		Trade balance	
	Change ($billions, nominal)	Share of total change	Change ($billions, nominal)	Share of total change	Change ($billions, nominal)	Share of total change
Transportation equipment	17.2	4.3%	26.6	24.0%	9.4	-3.2%
Motor vehicles and motor vehicle parts	14.8	3.7%	12.9	11.6%	-1.9	0.6%
Aerospace products and parts	0.9	0.2%	13.7	12.3%	12.8	-4.4%
Railroad, ship, and other transportation equipment	1.6	0.4%	0.1	0.1%	-1.5	0.5%
Furniture and related products	18.6	4.6%	0.2	0.1%	-18.4	6.3%
Miscellaneous manufactured commodities	29.3	7.3%	3.9	3.5%	-21.0	7.2%
Scrap and secondhand goods	0.2	0.1%	5.3	4.8%	5.1	-1.7%

* Excludes utilities, construction, and service sectors, which reported no goods trade in this period, and information, which reported negligible goods trade in this period.

Source: Authors' analysis of U.S. International Trade Commission 2018. For a more detailed explanation of the data sources and computations, see the appendix.

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shown in Table 1.

The import data in Table 2 reflect China's rapid expansion into higher-value-added commodities once considered strengths of the United States, such as computer and electronic parts, which accounted for 36.5 percent ($184.4 billion) of U.S. imports from China in 2017 (as shown in Supplemental Table 1). This growth is apparent in the shifting trade balance in advanced technology products (ATP), a broad category of high-end technology goods trade tracked by the U.S. Census Bureau (but not broken out in Table 2, which uses U.S. International Trade Commission data).[10] ATP includes the more advanced elements of the computer and electronic parts industry as well as other sectors such as biotechnology, life sciences, aerospace, nuclear technology, and flexible manufacturing. The ATP sector includes some auto parts; China is one of the top suppliers of auto parts to the United States, having surpassed Germany (Scott and Wething 2012).

In 2017, the United States had a $135.4 billion trade deficit with China in ATP, reflecting a tenfold increase from $11.8 billion in 2002.[11] This ATP deficit was responsible for 36.1 percent of the total U.S.–China trade deficit in 2017. It dwarfs the $25.0 billion surplus in ATP that the United States had with the rest of the world in 2017. As a result of the U.S. ATP deficit with China, the United States ran an overall deficit in ATP products in 2017 (of $110.4 billion), as it has in every year since 2002 (U.S. Census Bureau 2018b).

Job loss or displacement by industry is directly related to trade flows by industry, as shown in **Table 3**.[12] The growing trade deficit with China eliminated 2,500,500 manufacturing jobs between 2001 and 2017, nearly three-fourths (74.4 percent) of the total. By far the largest job displacements occurred in the computer and electronic parts industry, which lost 1,209,900 jobs (36.0 percent of the 3.4 million jobs displaced overall). This industry includes computer and peripheral equipment (661,300 jobs lost, or 19.7 percent of the overall jobs displaced), semiconductors and components (284,200 jobs, or 8.5 percent),

and communications, audio, and video equipment (247,800 jobs, or 7.4 percent).

Other hard-hit industries include apparel (169,000 jobs displaced, equal to 5.0 percent of the total), electrical equipment, appliances, and components (145,300 jobs, or 4.3 percent), fabricated metal products (144,100 jobs, or 4.3 percent), furniture and related products (135,200 jobs, or 4.0 percent), miscellaneous manufactured commodities (126,600 jobs, or 3.8 percent), textile mills and textile product mills (119,100 jobs, or 3.5 percent), plastics and rubber products (78,700 jobs, or 2.3 percent), and motor vehicles and motor vehicle parts (44,700 jobs, or 1.3 percent). In addition, surging imports of steel, aluminum, and other capital-intensive products threaten hundreds of thousands of jobs in key metal-using industries such as primary metals, machinery, and fabricated metal products.

Several service industries, which provide key inputs to traded-goods production, experienced significant job displacement, including administrative and support and waste management and remediation services (161,700 jobs, or 4.8 percent of overall jobs displaced) and professional, scientific, and technical services (104,400 jobs, or 3.1 percent).

These job displacement estimates are based on changes in the real value of exports and imports. For example, while the share of U.S. imports accounted for by computer and electronic parts from China rose from 23.8 percent in 2001 to 36.5 percent in 2017 (to $184.4 billion, as shown in Supplemental Table 1), the average price indexes (deflators) for most of these products fell sharply between 2001 and 2017—47.4 percent on a trade-weighted basis. Thus, the real value of computer and electronic parts imports increased more than twelvefold in this period, rising from $16.3 billion in 2001 to $208.7 billion in 2017 in constant 2009 dollars (authors' analysis of real trade flows; see the methodology appendix for data sources and computational details).[13]

Missed opportunities to create more jobs through fair trade with China

The trade and jobs analysis in this report is focused on the actual jobs gained and lost due to increased trade with China over the past 16 years. This raises the question of what trade and employment could have looked like but for the massive growth of the U.S. trade deficit with China between 2001 and 2017. A full analysis of such scenarios at the level of employment impacts by industry and geographic area is beyond the scope of this report. It will be the subject of future research. But the broad outlines of one such scenario can be quickly sketched from the trade data in Table 2.

To have maintained a stable trade balance with China between 2001 and 2017, imports would have had to grow less rapidly or exports would have had to grow more rapidly—or some combination of the two. For example, had U.S. export growth to China matched the growth of China's exports to the United States dollar for dollar between 2001 and 2017, balanced trade would have required roughly a fourfold increase in U.S. exports to China in 2017.[14] If actual 2017 exports in each industry (shown in Supplemental Table 1) had increased by this ratio (the specific ratio is 3.88-to-1), then the largest growth in exports would have occurred in transportation equipment ($111.7 billion), agricultural products

Table 3

Net U.S. jobs created or displaced by goods trade with China, by industry, 2001–2017

	Total	Share of total jobs displaced
*Total**	-3,360,600	
Subtotal, nonmanufacturing	-860,100	25.6%
Subtotal, manufacturing	-2,500,500	74.4%
Agriculture, forestry, fishing, and hunting	76,500	-2.3%
Mining	1,300	0.0%
Oil and gas	4,400	-0.1%
Minerals and ores	-3,000	0.1%
Utilities	-9,500	0.3%
Construction	-13,500	0.4%
Manufacturing	-2,500,500	74.4%
Nondurable goods	-332,900	9.9%
Food	-6,400	0.2%
Beverage and tobacco products	0	0.0%
Textile mills and textile product mills	-119,100	3.5%
Apparel	-169,000	5.0%
Leather and allied products	-38,500	1.1%
Industrial supplies	-226,700	6.7%
Wood products	-29,600	0.9%
Paper	-24,000	0.7%
Printed matter and related products	-28,400	0.8%
Petroleum and coal products	-900	0.0%
Chemicals	-32,400	1.0%
Plastics and rubber products	-78,700	2.3%
Nonmetallic mineral products	-32,800	1.0%
Durable goods	-1,940,800	57.8%
Primary metals	-53,200	1.6%
Fabricated metal products	-144,100	4.3%
Machinery	-108,700	3.2%
Computer and electronic parts	-1,209,900	36.0%
Computer and peripheral equipment	-661,300	19.7%
Communications, audio, and video equipment	-247,800	7.4%

Table 3
(cont.)

	Total	Share of total jobs displaced
Navigational, measuring, electromedical, and control instruments	-16,600	0.5%
Semiconductors and other electronic components, and reproducing magnetic and optical media	-284,200	8.5%
Electrical equipment, appliances, and components	-145,300	4.3%
Transportation equipment	-17,800	0.5%
Motor vehicles and motor vehicle parts	-44,700	1.3%
Aerospace products and parts	32,500	-1.0%
Railroad, ship, and other transportation equipment	-5,700	0.2%
Furniture and related products	-135,200	4.0%
Miscellaneous manufactured commodities	-126,600	3.8%
Wholesale trade	-184,000	5.5%
Retail trade	-43,200	1.3%
Transportation and warehousing	-92,700	2.8%
Information	-43,100	1.3%
Finance and insurance	-62,600	1.9%
Real estate and rental and leasing	-12,300	0.4%
Professional, scientific, and technical services	-104,400	3.1%
Management of companies and enterprises	-122,900	3.7%
Administrative and support and waste management and remediation services	-161,700	4.8%
Education services	-1,800	0.1%
Healthcare and social assistance	-1,600	0.0%
Arts, entertainment, and recreation	-10,100	0.3%
Accommodation and food services	-34,400	1.0%
Other services (except public administration)	-26,700	0.8%
Public administration	-13,600	0.4%

* Subcategory and overall totals may vary slightly due to rounding.

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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($71.0 billion), computer and electronic parts ($61.0 billion), chemicals ($56.6 billion), machinery ($33.6 billion), and food and beverage products ($12.8 billion). In total, U.S. exports to China would have increased by $486.4 billion, $375.2 billion more than they actually did.[15]

If exports to China had increased at this pace, it would have supported the creation of

millions of U.S. manufacturing jobs and prevented much of the collapse of overall U.S. manufacturing employment between December 2001 and December 2017, when 3.2 million U.S. manufacturing jobs were lost (BLS 2018b). This level of growth in U.S. exports to China could not have taken place without major structural changes in China's trade, industrial, macroeconomic, and labor policies. This analysis does illustrate the potential gains had China trade delivered on the promises made by China trade proponents when China entered the WTO in 2001.

Job losses by state

Growing U.S. trade deficits with China have reduced demand for goods produced in every region of the United States and have led to job displacement in all 50 states and the District of Columbia, as shown in **Table 4** and **Figure B**. (**Supplemental Table 2** ranks the states by the number of net jobs displaced, while **Supplemental Table 3** ranks the states by jobs displaced as a share of total state jobs and presents the states alphabetically.) Table 4 shows that jobs displaced from 2001 to 2017 due to the growing goods trade deficit with China ranged from 0.29 percent to 3.59 percent of total state employment. The 10 hardest-hit states ranked by job shares displaced were New Hampshire, Oregon, California, Minnesota, North Carolina, Rhode Island, Massachusetts, Vermont, Wisconsin, and Texas. This list includes states with high-tech industries (California, Massachusetts, Minnesota, Oregon, and Texas) and manufacturing states (New Hampshire, North Carolina, Rhode Island, Vermont, and Wisconsin). Job losses in these states ranged from 2.57 percent to 3.55 percent of total state employment. Other traditional manufacturing powers—such as Georgia, Kentucky, Indiana, Illinois, South Carolina, and Tennessee—are among the top 20 hardest-hit states, as is Idaho, also a high-tech hub.

As shown in Supplemental Table 2, the top 10 states in terms of total jobs lost were California (562,500 jobs), Texas (314,000), New York (183,500), Illinois (148,200), Pennsylvania (136,100), North Carolina (130,800), Florida (125,500), Ohio (121,400), Georgia (103,100), and Massachusetts (99,100).

The map in Figure B shows the broad impact of the growing trade deficit with China across the United States, with no areas exempt from job displacement. The 3.4 million U.S. jobs displaced due to the growing trade deficit with China between 2001 and 2017 represented 2.29 percent of total U.S. employment.

Job losses by congressional district

This study also reports the employment impacts of the growing U.S. goods trade deficit with China in every congressional district and in the District of Columbia. **Table 5** lists the top 20 hardest-hit congressional districts (those with the largest job losses as a share of overall district employment). **Figure C** shows job displacement as a share of total district employment in all 435 congressional districts plus the District of Columbia. (**Supplemental Table 4** shows the same data, but ranked by net jobs displaced, and **Supplemental Table**

Table 4 | **Net U.S. jobs displaced due to goods trade deficit with China, by state, 2001–2017 (ranked by jobs displaced as a share of total state employment)**

Rank	State	Net jobs displaced	State employment	Jobs displaced as share of state employment
1	New Hampshire	24,000	675,500	3.55%
2	Oregon	62,900	1,873,900	3.36%
3	California	562,500	16,818,700	3.34%
4	Minnesota	88,300	2,932,100	3.01%
5	North Carolina	130,800	4,415,800	2.96%
6	Rhode Island	14,100	494,500	2.84%
7	Massachusetts	99,100	3,609,500	2.75%
8	Vermont	8,600	314,200	2.74%
9	Wisconsin	78,700	2,945,200	2.67%
10	Texas	314,000	12,224,200	2.57%
11	Indiana	77,900	3,105,300	2.51%
12	Idaho	17,600	716,600	2.46%
13	Illinois	148,200	6,062,400	2.45%
14	South Carolina	50,800	2,091,500	2.43%
15	Kentucky	45,400	1,921,200	2.36%
16	New Jersey	96,700	4,129,100	2.34%
17	Alabama	46,900	2,015,400	2.33%
18	Georgia	103,100	4,453,400	2.32%
19	Tennessee	69,300	3,011,200	2.30%
20	Pennsylvania	136,100	5,948,000	2.29%
21	Arizona	63,400	2,774,000	2.29%
22	Connecticut	38,400	1,681,600	2.28%
23	Colorado	59,500	2,658,700	2.24%
24	Mississippi	25,300	1,152,200	2.20%
25	Ohio	121,400	5,528,600	2.20%
26	Arkansas	26,800	1,239,600	2.16%
27	Michigan	92,400	4,372,500	2.11%
28	Utah	29,100	1,468,700	1.98%
29	New York	183,500	9,523,300	1.93%
30	Oklahoma	31,900	1,662,600	1.92%

Table 4
(cont.)

Rank	State	Net jobs displaced	State employment	Jobs displaced as share of state employment
31	Maine	11,900	622,800	1.91%
32	Iowa	29,900	1,573,200	1.90%
33	Washington	58,100	3,326,100	1.75%
34	Missouri	49,800	2,868,400	1.74%
35	Virginia	66,200	3,952,100	1.68%
36	Maryland	43,000	2,723,700	1.58%
37	New Mexico	12,800	830,800	1.54%
38	Kansas	21,700	1,403,900	1.54%
39	Florida	125,500	8,569,600	1.46%
40	South Dakota	6,300	434,900	1.44%
41	West Virginia	10,600	745,400	1.42%
42	Nebraska	14,200	1,018,000	1.40%
43	Delaware	6,000	456,200	1.32%
44	Nevada	15,900	1,341,400	1.18%
45	Louisiana	21,200	1,970,800	1.08%
46	Hawaii	6,200	652,800	0.95%
47	Montana	4,200	472,700	0.89%
48	Alaska	2,700	329,100	0.83%
49	North Dakota	3,400	430,700	0.78%
50	Wyoming	2,000	281,700	0.72%
51	District of Columbia	2,300	790,500	0.29%
Total*		3,360,600	146,614,300	2.29%

* Totals may vary slightly due to rounding.

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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5 provides the data sorted alphabetically by state.) Because the largest growth in the goods trade deficits with China from 2001 to 2017 occurred in the computer and electronic parts industry, 18 of the 20 hardest-hit districts were in Arizona, California, Illinois, Massachusetts, Minnesota, New York, Oregon, and Texas, where remaining jobs in that industry are concentrated. Georgia and North Carolina, which suffered considerable job displacement in a variety of manufacturing industries, also each have one district in the top 20 hardest-hit districts.[16]

Specifically, of the 20 hardest-hit districts, eight were in California (in rank order, the 17th,

Net U.S. jobs displaced due to the goods trade deficit with China as a share of total state employment, 2001–2017

| 0.29% to 1.42%* | 1.44% to 1.91%** | 1.92% to 2.29%*** | 2.29% to 2.51%**** | 2.57% to 3.55%***** |
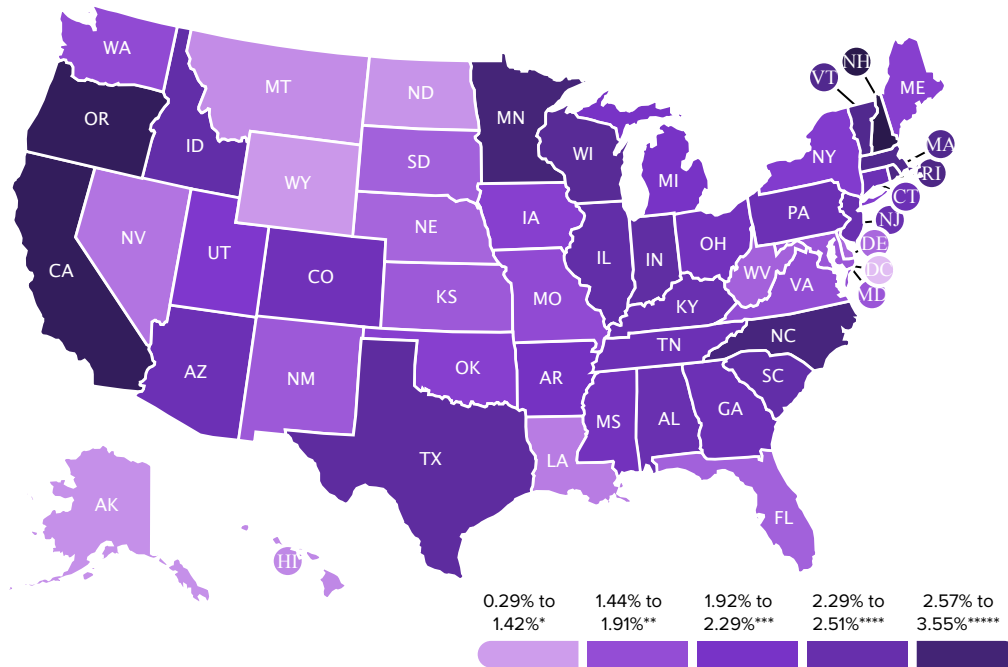
* 10 least-affected states, plus D.C.
** 10 next-least-affected states
*** 10 middle affected states
**** 10 next-most-affected states
***** 10 most-affected states

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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18th, 19th, 15th, 40th, 52nd, 34th, and 45th), four were in Texas (31st, 3rd, 10th, and 18th), and one each were in Oregon (1st), Georgia (14th), Massachusetts (3rd), Illinois (6th), Minnesota (1st), New York (18th), Arizona (5th), and North Carolina (2nd). Job losses in these districts ranged from 12,900 jobs to 59,500 jobs, and from 4.25 percent to 17.19 percent of total district jobs. These distributions reflect both the size of some states (e.g., California and Texas) and the concentration of the industries hardest hit by the growing U.S.–China trade deficit. We have already mentioned the prevalence of the computer and electronic parts industry in certain states; other industries with a presence in these districts include furniture, textiles, apparel, and other manufactured products.

The three hardest-hit congressional districts were all located in Silicon Valley (South Bay Area) in California, including the 17th Congressional District (encompassing Sunnyvale, Cupertino, Santa Clara, Fremont, Newark, North San Jose, and Milpitas), which lost 59,500 jobs, equal to 17.19 percent of all jobs in the district; the 18th Congressional District (including parts of San Jose, Palo Alto, Redwood City, Menlo Park, Stanford, Los Altos,

Table 5

Twenty congressional districts hardest hit by U.S. goods trade deficit with China, 2001–2017 (ranked by jobs displaced as a share of district employment)

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of district employment
1	California	17	59,500	346,100	17.19%
2	California	18	48,300	344,500	14.02%
3	California	19	38,600	324,000	11.91%
4	Texas	31	34,400	323,000	10.65%
5	Oregon	1	31,600	377,200	8.38%
6	California	15	26,900	336,400	8.00%
7	Georgia	14	17,600	290,700	6.05%
8	Texas	3	21,100	371,200	5.68%
9	Massachusetts	3	20,000	355,400	5.63%
10	California	40	14,800	280,500	5.28%
11	Texas	10	16,900	342,600	4.93%
12	California	52	16,900	350,100	4.83%
13	Illinois	6	17,000	355,600	4.78%
14	California	34	14,600	309,400	4.72%
15	Minnesota	1	16,400	348,200	4.71%
16	California	45	16,100	354,400	4.54%
17	Texas	18	13,700	306,400	4.47%
18	New York	18	14,800	332,100	4.46%
19	Arizona	5	13,500	317,900	4.25%
20	North Carolina	2	12,900	303,800	4.25%

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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Campbell, Saratoga, Mountain View, and Los Gatos), which lost 48,300 jobs, or 14.02 percent; and the 19th Congressional District (most of San Jose and other parts of Santa Clara County), which lost 38,600 jobs, or 11.91 percent.[17]

Although the San Francisco Bay Area has experienced rapid growth over the past decade in software and related industries, this growth has come at the expense of direct employment in the production of computer and electronic parts. The computer and electronic parts manufacturing sector has experienced more actual job losses than any other major manufacturing industry has since China joined the WTO.[18] There are

Figure C

Net U.S. jobs displaced due to the goods trade deficit with China as a share of total congressional district employment, 2001–2017
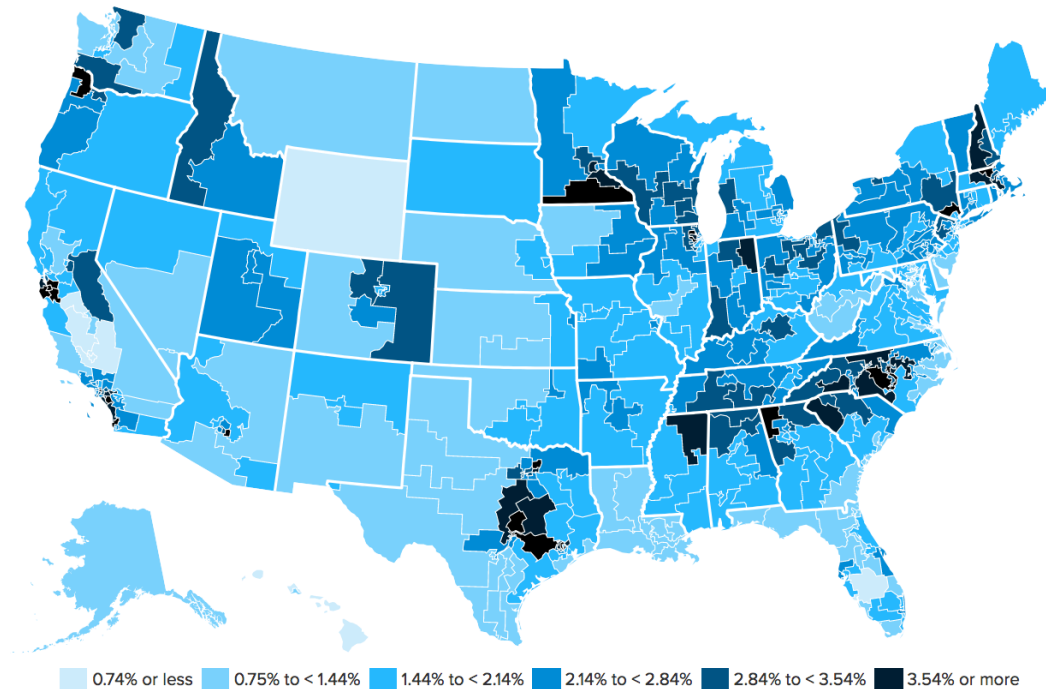
0.74% or less   0.75% to < 1.44%   1.44% to < 2.14%   2.14% to < 2.84%   2.84% to < 3.54%   3.54% or more

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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substantial questions about the long-run ability of firms in the high-tech sectors to continue to innovate while offshoring most or all of the production in their industries (Shi 2010).

Other research confirms job losses from U.S.–China trade

Recent academic research has confirmed findings in this and earlier EPI research (e.g., Kimball and Scott 2014) that the growing U.S.–China trade deficit has caused significant loss of U.S. jobs, especially in manufacturing.

For example, Acemoglu et al. (2014) find that import competition with China from 1999 to 2011 was responsible for up to 2.4 million net job losses (including direct, indirect, and respending effects).[19] This result compares with the finding in this paper that 2.6 million jobs were lost due to growing trade deficits with China between 2001 and 2011, as shown in Figure A. Thus, over a roughly comparable period, Acemoglu et al. estimate an

employment impact that is roughly 90 percent as large as the estimate found in this study.[20]

Further academic confirmation of the impacts of China trade on manufacturing employment is provided by Pierce and Schott (2016). Pierce and Schott use an entirely different estimation technique based on differences in the pre- and post-China WTO entry maximum tariff rates, with and without permanent normal trade relations (PNTR) status, which the United States granted to China in the China–WTO implementing legislation. Pierce and Schott estimate the impacts of changes in U.S. international transactions between 1992 and 2008. They find that the grant of PNTR status to China "reduced relative employment growth of the average industry by 3.4 percentage points…after one year [and] 15.6 percentage points after 6 years" (following the grant of PNTR status to China in 2001). They do not translate percentage-point changes in employment into total jobs displaced, but data on changes in total manufacturing employment in this period provide a base of comparison.

The research in this paper looks at the total loss or displacement of jobs due to the growing trade deficit with China and the number of those lost jobs that are manufacturing jobs. We can check the consistency of this finding with a different approach—looking at the total loss of manufacturing jobs and estimating the number of those job losses that are due to growing trade deficits with China. The United States lost 3.2 million manufacturing jobs between December 2001 and December 2017, a decline of 20.0 percent in total manufacturing employment (BLS 2018b). Drawing from Pierce and Schott 2016 above, if 15.6 percentage points of this 20.0 percent decline can be attributed to the growth of the U.S. trade deficit with China, this implies that about 77.7 percent (or 2.5 million) of the manufacturing jobs lost in this period were lost due to the growing trade deficit with China. This estimate is identical to this study's estimated total manufacturing jobs displaced by the growing U.S.–China trade deficit (2.5 million net jobs displaced). Thus, two other recent academic studies have concluded that the growing U.S.–China trade deficit is responsible for the displacement of at least 2 million U.S. manufacturing jobs since 1990, with most jobs lost since China entered the WTO in 2001.

Lost wages from the increasing trade deficit with China

Growing trade-related job displacement has several direct and indirect effects on workers' wages. The direct wage effects are a function of the wages forgone in jobs displaced by growing U.S. imports from China minus wage gains from both jobs added in export-producing industries, versus the (lower) wages paid in alternative jobs in nontraded industries (U.S. workers displaced from traded-goods production in manufacturing industries who find jobs in nontraded goods industries experience permanent wage losses, as discussed below). Standard trade theory assumes that economic integration leads to "gains from trade" as workers move from low-productivity jobs in import-competing industries into higher-productivity jobs in export-competing industries. However, this assumption is proven incorrect in Scott 2013, which shows that import-

competing jobs pay better than alternative jobs in export-producing industries. Specifically, Scott examines the gains and losses associated with direct changes in employment caused by growing U.S.–China trade deficits between 2001 and 2011, and finds that jobs displaced by imports from China actually paid 17.0 percent more than jobs exporting to China: $1,021.66 per week in import-competing industries versus $872.89 per week in exporting industries (Scott 2013, 24, Table 9a).[21] Therefore, simple trade expansion that increases total trade with no underlying change in the trade balance will result in a *net loss* to workers as they move from higher-paying jobs in import-competing industries to lower-paying jobs in exporting industries.

Furthermore, jobs in both import-competing and exporting industries paid substantially more than jobs in nontraded industries, which pay $791.14 per week (Scott 2013, Table 9a, 24). Between 2001 and 2011, growing exports to China supported 538,000 U.S. jobs, but growing imports displaced 3,280,200 jobs, for a net loss of 2.7 million U.S. jobs (Scott 2013, Table 5, 13). Thus, not only did workers lose wages moving from import-competing to exporting industries, but 2.7 million workers were displaced from jobs where they earned $1,021.66 per week on average and (if they were lucky enough to find jobs) were mostly pushed into jobs in nontraded industries paying an average of only $791.14 per week (a decline of 22.6 percent). In total, U.S. workers suffered a direct net wage loss of $37 billion per year (Scott 2013, 26, Table 9b) due to trade with China. But the direct wage losses are just the tip of the iceberg.

As shown by Josh Bivens in *Everybody Wins, Except for Most of Us* (Bivens 2008a, with results updated in Bivens 2013), growing trade with China and other low-wage exporters essentially puts all American workers without a college degree (roughly 100 million workers) in direct competition with workers in China (and elsewhere) making much less. He shows that trade with low-wage countries was responsible for 90 percent of the growth in the college wage premium since 1995 (the college wage premium is the percent by which wages of college graduates exceed those of otherwise-equivalent high school graduates), relative to the wages earned by the 100 million non-college-educated workers. The growth of China trade alone was responsible for more than half of the growth in the college wage premium in that period, Bivens finds. To put these estimates in macroeconomic terms, in 2011, trade with low-wage countries lowered annual wages by 5.5 percent—roughly $1,800 per worker for all full-time, full-year workers without a college degree. To provide comparable economywide impact estimates, assume that 100 million workers without a college degree suffered average losses of $1,800 per year, which yields a total national loss of $180 billion (Scott 2017b). Therefore, the indirect, macroeconomic losses to U.S. workers without college degrees caused by growing trade with low-wage nations were about five times as large as the $37 billion in direct wage losses in 2011 from trade with China, and about 40 times as many workers were affected indirectly due to globalization's wage-lowering effect (100 million) as were displaced by trade with China (2.7 million).[22] And China trade alone was responsible for about 56.8 percent of the increase in the overall college/noncollege wage gap between 1995 and 2011.[23]

Additionally, Autor, Dorn, and Hanson estimate that rising exposure to low-cost Chinese imports lowers labor force participation and reduces wages in local labor markets; in particular, they find that increased import competition has a statistically significant

depressing effect on nonmanufacturing wages (Autor, Dorn, and Hanson 2012, abstract). This confirms the findings of Bivens (2008a, 2013). They also find that "transfer benefits payments for unemployment, disability, retirement, and healthcare also rise sharply in exposed labor markets" and that "for the oldest group (50–64), fully 84% of the decline in [manufacturing] employment is accounted for by the rise in nonparticipation, relative to 71% among the prime-age group and 68% among the younger group" (Autor, Dorn, and Hanson 2012, abstract, 25). Thus, Autor, Dorn, and Hanson find that more than two-thirds of all workers displaced by growing competition with Chinese imports dropped out of the labor force. These results are explained, in part, by the finding that "9.9%...of those who lose employment following an import shock obtain federal disability insurance benefits [Social Security Disability Insurance (SSDI) benefits]." Additionally, "rising import exposure spurs a substantial increase in government transfer payments to citizens in the form of increased disability, medical, income assistance and unemployment benefits." Moreover, "these transfer payments vastly exceed the expenses of the TAA [Trade Adjustment Assistance] program, which specifically targets workers who lose employment due to import competition" (Autor, Dorn, and Hanson 2012, 25, 30). In Autor and Hanson 2014, the effects are totaled, and they find that "for regions affected by Chinese imports, the estimated dollar increase in per capita SSDI payments is more than 30 times as large as the estimated dollar increases in TAA payments."

The job and wage losses stemming from the growing U.S.–China trade deficit are real—and also increase demands on the social safety net

Some economists and others in the trade debate have argued that job loss numbers extrapolated from trade flows are uninformative because aggregate employment levels in the United States are set by a broad range of macroeconomic influences, not just by trade flows.[24] However, while the trade balance is but one of many variables affecting aggregate job creation, it plays a large role in explaining structural change in employment, especially in the manufacturing sector. As noted earlier, between December 2001 and December 2017, 3.2 million U.S. manufacturing jobs were lost (BLS 2018b). The growth of the U.S. trade deficit with China was responsible for the displacement of 2.5 million manufacturing jobs in this period, or about 78.1 percent of manufacturing jobs lost. Thus, manufacturing job loss due to the growing trade deficit with China accounts for roughly four out of five U.S. manufacturing jobs lost or displaced in this period.

The employment impacts of trade identified in this paper can be interpreted as the "all else equal" effect of trade on domestic employment. The Federal Reserve, for example, may decide to cut interest rates to make up for job losses stemming from deteriorating trade balances (or any other economic influence), leaving net employment unchanged. This, however, does not change the fact that trade deficits by themselves are a net drain on employment. Even if macroeconomic policy is adjusted to offset the negative impact of

the growing trade deficit with China on total employment, the structure of production and employment in the United States has been negatively affected (Scott 2017a).

The growing trade deficit with China has clearly reduced domestic employment in traded-goods industries, especially in the manufacturing sector, which has been pummeled by plant closings and job losses. Workers from the manufacturing sector displaced by trade have had particular difficulty securing comparable employment elsewhere in the economy. According to the most recent Bureau of Labor Statistics survey covering displaced workers (BLS 2018a, Table 4), more than one-third (35.3 percent) of long-tenured (employed more than three years) manufacturing workers displaced from January 2015 to December 2017 were not working in January 2018, including 21.7 percent who were not in the labor force, i.e., no longer even looking for work, and 13.7 percent who were unemployed.

As noted above, U.S. workers who were directly displaced by trade with China between 2001 and 2011 lost a collective $37.0 billion in wages as a result of accepting lower-paying jobs in nontraded industries or industries that export to China assuming, conservatively, that those workers are reemployed in nontraded goods industries (Scott 2013).[25] Worse yet, growing competition with workers in China and other low-wage countries reduced the wages of all 100 million U.S. workers without a college degree, leading to cumulative losses of approximately $180 billion per year in 2011 (Bivens 2013; Scott 2017b). The lost output of unemployed workers, especially that of labor force dropouts, can never be regained and is one of the larger costs of trade-related job displacement to the economy as a whole.[26]

Trade Adjustment Assistance (TAA) program is a Department of Labor program to provide retraining and unemployment benefits to certain workers who have been displaced by growing imports. However, new research suggests that significant shares of displaced workers are signing up for disability and retirement benefits, other government income assistance, and government medical benefits, in addition to temporary trade adjustment assistance. Many of these workers, such as those on disability and retirement, are permanently dropping out of the labor force, resulting in permanent income losses to themselves and the economy. TAA benefits represent only a tiny share of the costs of adjustment. Examining only those costs for which workers actually qualify for government benefits, Autor, Dorn, and Hanson (2012, Figure 7 at 32) find that unemployment and TAA benefits represent only 6.3 percent of the total benefit costs associated with a $1,000 increase in imports per worker in "commuting zones" over the 1990–2007 period.[27] Given the low level of coverage of social safety net programs in the United States versus other developed countries (such as those in the EU), actual adjustment costs for displaced workers are likely substantially larger than the actual U.S. benefits estimated by Autor, Dorn, and Hanson.

Conclusion

The growing U.S. goods trade deficit with China has displaced millions of jobs in the United States and has contributed heavily to the crisis in U.S. manufacturing employment, which has heightened over the last decade largely due to trade with China. Moreover, the United States is piling up foreign debt, losing export capacity, and facing a more fragile macroeconomic environment.

China and America are locked in destructive, interdependent economic cycles, and both can gain from rebalancing trade and capital flows. Although economic growth in China has been rapid, it is unbalanced and unsustainable. Growth in China slowed to 6.9 percent in 2017, and it is projected to fall to 5.5 percent in 2023 (IMF 2018). China's economy is teetering on the edge between inflation and a growth slump, and a soft landing is nowhere in sight. China needs to rebalance its economy by becoming less dependent on exports and more dependent on domestic demand led by higher wages and infrastructure spending. It also needs to reduce excessive levels of domestic savings to better align savings levels with domestic investment and government borrowing. The best ways to do this are to raise wages and to increase public spending on pensions, health care, and other aspects of the safety net. This will reduce private saving and increase Chinese domestic demand for both domestic and imported goods, reducing China's trade surplus (Scott 2017a).

The effects on the United States of China's destructive, rapidly growing trade surplus are outlined in this report. To summarize, the growing U.S. trade deficit with China has eliminated 3.4 million U.S. jobs between 2001 and 2017, including 1.3 million jobs lost since 2008 (the first full year of the Great Recession). Nearly three-fourths of the jobs lost were in manufacturing. These losses were responsible for a substantial share of the 3.2 million U.S. manufacturing jobs lost between December 2001 and December 2017. The growing trade deficit with China has reduced wages of those directly displaced by $37 billion through 2011 alone, and it is largely responsible for the loss of nearly $2,000 per worker per year, due to wage suppression, for all non-college-educated workers in the United States. These losses have been extremely costly for the workers and communities affected, as shown in this report.

The U.S.–China trade relationship needs to undergo a fundamental change. Addressing unfair trade, weak labor, and environmental standards in China, and ending currency manipulation and misalignment, should be our top trade and economic priorities with China (Scott 2017a).

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Acknowledgments

Appendix: Methodology

The trade and employment analyses in this report are based on a detailed, industry-based study of the relationships between changes in trade flows and employment for each of approximately 205 individual industries of the U.S. economy, specially grouped into 45 custom sectors,[28] and using the North American Industry Classification System (NAICS) with data obtained from the U.S. Census Bureau (2013) and the U.S. International Trade Commission (USITC 2018).

The number of jobs supported by $1 million of exports or imports for each of 205 different U.S. industries is estimated using a labor requirements model derived from an input-output table developed by the BLS-EP (2017a).[29] This model includes both the direct effects of changes in output (for example, the number of jobs supported by $1 million in auto assembly) and the indirect effects on industries that supply goods (for example, goods used in the manufacture of cars). So, in the auto industry for example, the indirect impacts include jobs in auto parts, steel, and rubber, as well as service industries such as accounting, finance, and computer programming that provide inputs to the motor vehicle manufacturing companies. This model estimates the labor content of trade using empirical estimates of labor content and goods flows between U.S. industries in a given base year (an input-output table for the year 2001 was used in this study) that were developed by the U.S. Department of Commerce and the BLS-EP. It is not a statistical survey of actual jobs gained or lost in individual companies, or the opening or closing of particular production facilities (Bronfenbrenner and Luce 2004 is one of the few studies based on news reports of individual plant closings).

Nominal trade data are used in this analysis are converted to constant 2009 dollars using industry-specific deflators (see below for further details). This is necessary because the labor requirements table is estimated using price levels in that year. Data on real trade flows are converted to constant 2009 dollars using industry-specific price deflators from the BLS-EP (2017b). Use of constant 2009 dollars is required for consistency with the other BLS models used in this study.

Estimation and data sources

Data requirements

Step 1. U.S.–China trade data are obtained from the U.S. International Trade Commission DataWeb (USITC 2018) in four-digit, three-digit, and two-digit NAICS formats. General imports and total exports are downloaded for each year.

Step 2. To conform to the BLS Employment Requirements tables (BLS-EP 2017a), trade data must be converted into the BLS industry classifications system. For NAICS-based data, there are 205 BLS industries. The data are then mapped from NAICS industries onto their respective BLS sectors.

The trade data, which are in current dollars, are deflated into real 2009 dollars using published price deflators from the BLS-EP (2017b). As noted above, deflators for 2017 have not yet been published by the BLS. In this version of the report, we use the 2026 price projections published by BLS to estimate deflators for 2017, by interpolation. Specifically, the annualized percent change between the 2016 and the 2026 price projection for each sector is applied to the deflator for 2016, to estimate price levels in 2017.

Step 3. Real domestic employment requirements tables are downloaded from the BLS-EP (2017a). These matrices are input-output industry-by-industry tables that show the employment requirements for $1 million in outputs in 2009 dollars. So, for industry i the a_{ij} entry is the employment indirectly supported in industry i by final sales in industry j and, where $i=j$, the employment directly supported.

Analysis

Step 1. Job equivalents. BLS trade data are compiled into matrices. Let $[T_{2001}]$ be the 205×2 matrix made up of a column of imports and a column of exports for 2001. $[T_{2017}]$ is defined as the 205×2 matrix of 2017 trade data. Finally, $[T_{2008}]$ is defined as the 205×2 matrix of 2008 trade data. Define $[E_{2001}]$ as the 205×205 matrix consisting of the real 2001 domestic employment requirements tables. To estimate the jobs displaced by trade, perform the following matrix operations:

$[J_{2001}] = [T_{2001}] \times [E_{2001}]$

$[J_{2008}] = [T_{2008}] \times [E_{2001}]$

$[J_{2017}] = [T_{2017}] \times [E_{2001}]$

$[J_{2001}]$ is a 205×2 matrix of job displacement by imports and jobs supported by exports for each of 205 industries in 2001. Similarly, $[J_{2008}]$ and $[J_{2017}]$ are 205×2 matrices of jobs displaced or supported by imports and exports (respectively) for each of 205 industries in 2008 and 2017, respectively.

To estimate jobs created/lost over certain time periods, we perform the following operations:

$[J_{nx01\text{-}17}] = [J_{2017}] - [J_{2001}]$

$[J_{nx01\text{-}08}] = [J_{2008}] - [J_{2001}]$

$[J_{nx08\text{-}17}] = [J_{2017}] - [J_{2008}]$

Step 2. State-by-state analysis. For states, employment-by-industry data are obtained from the Census Bureau's American Community Survey (ACS) data for 2011 (U.S. Census Bureau 2013) and are mapped into 45 unique census industries and eight aggregated total and subtotals, for a total of 53 sectors.[30] We look at job displacement from 2001 to 2017 so from this point, we use $[J_{nx01\text{-}17}]$. In order to work with 45 sectors, we group the 205 BLS industries into a new matrix, defined as $[Jnew_{01\text{-}17}]$, a 45×2 matrix of job displacement numbers.[31] We define $[St_{2011}]$ as the 45×51 matrix of state employment shares (with the

addition of the District of Columbia) of employment in each industry. We calculate:

$$[Stj_{nx01\text{-}17}] = [St_{2011}]_T [Jnew_{01\text{-}17}]$$

where $[Stj_{nx01\text{-}17}]$ is the 45×51 matrix of job displacement/support by state and by industry. To get state total job displacement, we add up the subsectors in each state.

Step 3. Congressional district analysis. Employment by congressional district, by industry, and by state is obtained from the ACS data from 2011, which use geographic codings that match the district boundaries of the 113th, 114th, and 115th Congresses. In order to calculate job displacement in each congressional district, we use the columns in $[Stj_{nx01\text{-}17}]$, which represent individual state job-displacement-by-industry estimates, and define them as $[Stj_{01}]$, $[Stj_{02}]$, $[Stj_i]$…$[Stj_{51}]$, with *i* representing the state number and each matrix being 45×1.

Each state has *Y* congressional districts, so $[Cd_i]$ is defined as the 45×*Y* matrix of congressional district employment shares for each state. Congressional district shares are calculated thus:

$$[Cdj_{01}] = [Stj_{01}]_T [Cd_{01}]$$

$$[Cdj_i] = [Stj_i]_T [Cd_i]$$

$$[Cdj_{51}] = [Stj_{51}]_T [Cd_{51}]$$

where $[Cdj_i]$ is defined as the 45x*Y* job displacement in state *i* by congressional district by industry.

To get total job displacement by congressional district, we add up the subsectors in each congressional district in each state.

Endnotes

1. The World Trade Organization, which was created in 1994, was empowered to engage in dispute resolution and to authorize imposition of offsetting duties if its decisions were ignored or rejected by member governments. It expanded the General Agreement on Tariffs and Trade (GATT) trading system's coverage to include a huge array of subjects never before included in trade agreements, such as food safety standards, environmental laws, social service policies, intellectual property standards, government procurement rules, and more (Wallach and Woodall 2004).

2. Tables 1 and 2 report U.S. general imports from China as measured by "customs value" (the value of imports as appraised by the U.S. Customs Service) and total exports to China as measured by "free alongside" or FAS value (the value of exports at the U.S. port, including the transaction price, inland freight, insurance, and other charges) to China. News releases from the U.S. Census Bureau and the Commerce Department usually emphasize general imports and total exports. The U.S. Internal Trade Commission (USITC) often refers to this netting out of general imports and total exports as the "broad" measure of the trade balance, as opposed to the "narrow" measure, which relies on imports for consumption and domestic exports. (For an example, see USITC 2014. For an explanation of the difference between general imports and imports for consumption, see the U.S. Census Bureau's online trade glossary [2018e].) The key difference between these two measures

is that total exports, as reported by the U.S. Census Bureau, include foreign exports (re-exports), i.e., goods produced in other countries and shipped through the United States, while domestic exports, as implied by the name, do not include re-exports. While a previous version of this report (Kimball and Scott 2014) relied on the narrow definition, using imports for consumption and domestic exports for the analysis, the broad measure was used in Scott 2017a. For 2017, imports for consumption were $504.0 billion, domestic exports were $120.0 billion, and the reported (narrow) trade balance was $384.0 billion. When we compare the trade deficit and job displacement estimates we obtained using the broad measure with the estimates we would have obtained using the narrow measure, we find the difference to be insignificant. The broad measure delivers an estimate of 3.36 million net jobs displaced in 2017, whereas the narrow measure delivers an estimate of 3.44 million net jobs displaced in 2017 (USITC 2018). In this report, all estimates for trade and jobs gained and lost for prior years are based on the broad measure of the trade balance. Data for individual years, and for the change in net jobs displaced, are reported in Table 1, in Figure A, and in other exhibits in this report.

3. While some small proportion of goods imported from China represent a category of goods that may not be produced in the United States, and thus would be "noncompeting" goods, the model used in this report produces an overall estimate of the net jobs displaced by the growing trade deficit. It is, in essence, an estimate of the jobs displaced by the growth of imports in excess of the growth of exports. Since virtually all U.S. imports from China are manufactured goods, as shown in Table 2 in this report, nearly all *could* be produced in the United States but for China's unfair trade and currency policies and its domestic "savings glut" (Setser 2016).

4. The term "displaced" would be appropriate to an economy that was at true full employment, where any displaced worker would immediately take a job in another sector of the economy. However, the workers displaced by goods trade are almost exclusively manufacturing workers, and these workers have not been successfully moving into different parts of the economy in recent years: more than one-third of manufacturing workers who were displaced between 2015 and 2017 and who had previously been employed for at least three years were either unemployed or out of the labor force in January 2018 (BLS 2018a). Thus, trade-related job displacement does result in at least some workers moving to a nonworking status, thus "lost" jobs, even if other workers are reemployed elsewhere in the economy (reemployment would result in a change in the composition, rather than the level, of employment).

5. The BLS updated its Employment Requirements Matrix in October 2017 (BLS-EP 2017a), as it normally does every two years. Those revisions have been taken into account in this update. There are 205 NAICS-based BLS industries in the 2017 BLS update (NAICS stands for North American Industry Classification System). The underlying population data from the American Community Survey used to analyze the geographic impacts of trade-related job loss was last updated in Kimball and Scott 2014, with data from the American Community Survey for the 113th Congress census boundaries, which were redrawn after the 2010 census (U.S. Census Bureau 2013).

6. The shift in the deflator base year from 2005 in the previous report to 2009 in this report significantly reduced our estimates of jobs displaced in the computer and electronic parts industry, because large price declines in this industry and its sectors result in outsized impacts on changes in estimated real trade flows (compared with industries that have experienced lower levels of inflation, such as steel or automobile parts), and those price declines were smaller in 2017 than in 2015 (estimated using a 2005 deflator), due to the use of a 2009 base year for deflators in this report (see also note 13, below). Thus, in Scott 2017a, Table 3, we estimate that 1,238,300 direct jobs were displaced in this sector in the 2001–2015 period, a number greater than the 1,209,900 jobs displaced from 2001 to 2017, as shown in Table 3 of this report. The previous report has a

greater job displacement estimate in computer and electronic parts despite the fact that the nominal trade deficit in this sector grew less in the 2001–2015 period (by $140.2 billion, as shown in Scott 2017a, Table 2) than it did in the 2001–2017 period (by $148.2 billion, Table 2 in this report).

7. Updated in Rasmussen 2017. Employment requirements tables in that report are derived from BEA input-output data, which are the primary source of data used to estimate BLS employment requirement tables (BLS-EP 2017a).

8. The macroeconomic model developed in Scott and Glass 2016 assumes that a 1.5 percent decrease in GDP would reduce total direct and indirect U.S. employment by roughly 1.3 percent. There were, on average, 153.3 million people employed in the United States in 2017 (BLS 2018c), thus yielding 2.0 million direct and indirect jobs displaced. The macroeconomic model also assumes a respending multiplier of 0.6 and yields a total of 3.2 million direct and indirect and respending jobs displaced by a trade deficit of this magnitude.

9. Scrap and used or secondhand goods are industries 203 and 204, respectively, in the BLS model, and there are no jobs supported or displaced by the production of or trade in goods in these sectors, according to the BLS model. (The jobs supported or displaced by trade are counted in the year these goods are originally manufactured—that is, when they are new—not when they are traded in the secondhand market.)

10. ATPs are an amalgamation of products from a variety of industries and subsectors within the broad NAICS-based categories shown in Table 2. They consist of 10 categories of products including biotechnology, life science, opto-electronics, information and communications, electronics, flexible manufacturing, advanced materials, aerospace, weapons, and nuclear technology (U.S. Census Bureau 2018a). In total ATP trade with the world in 2017, the United States had exports of $353.9 billion, imports of $464.3 billion, and a trade deficit of $110.4 billion. In total ATP trade with China in 2017, the United States had exports of $35.7 billion, imports of $171.1 billion, and a trade deficit of $135.4 billion. This exceeded the overall U.S. ATP deficit of $110.4 billion. Thus, the United States had an ATP trade surplus with the rest of the world in 2015 of $25.0 billion ($135.4 billion − $110.4 billion) (U.S. Census Bureau 2018b).

11. Data for trade in advanced technology products (ATP) by country are not available before 2002.

12. These results are derived from the trade and employment model described in the appendix to this report.

13. Deflators for many sectors in the computer and electronics parts industry fell sharply between 2001 and 2017 due to rapid productivity growth in those sectors. For example, the price index for computer and peripheral equipment fell from 2,666.4 in 2001 to 760.1 in 2017, a decline of 71.5 percent (the price index is set at 1,000 in 2009, the base year). In order to convert exports or imports of computers and peripheral equipment from nominal to real values for 2017, the nominal value is multiplied by 1,000/760.1 (the price index in year 2017 = 1.32). Thus, the real value of computers and peripheral products, a subset of the computer and electronic parts industry, is 32 percent larger than the nominal value in 2017 (in constant 2009 dollars). Overall, the real value of all computer and electronic parts imports in 2017 exceeded nominal values in that year by 11.2 percent. See the appendix for source notes and deflation procedures used.

14. Total imports from China in 2017 exceeded exports by a factor of 3.88-to-1 (505.6/130.4, as shown in Table 1). Thus, exports to China would have had to be roughly four times larger than they actually were in 2017 to achieve balanced trade with China.

15. Data not shown in Table 2. Authors' analysis based on the change in exports shown, by industry, and the multiplier referred to in the previous note (3.88), based on analysis of data shown in Supplemental Table 1.

16. The computer and electronic parts industry's share of all jobs lost due to the growth in the U.S.–China trade deficit from 2001 to 2017 ranged from 54.7 percent in Illinois's 6th District to 92.3 percent in California's 17th District (authors' analysis of U.S. Census Bureau 2013; USITC 2018; BLS-EP 2017a, 2017b), compared with the national average of 36.0 percent of jobs (Table 3). In these states the only exceptions—that is, districts where job losses were concentrated in industries other than computer and electronic parts—were California's 34th and 40th districts, where jobs losses in the apparel industry were 65.3 percent and 56.3 percent, respectively, of jobs lost in each district (compared with the national average of apparel industry job losses accounting for 5.0 percent of jobs lost due to U.S.–China trade, as shown in Table 3). Georgia is also one of the states that are host to one of the 20 hardest-hit congressional districts; Georgia's 14th Congressional District's job losses due to the trade deficit include a very large share of jobs in manufacturing, overall, 88.9 percent of all jobs lost, according to unpublished data available upon request. Nationally, manufacturing accounted for a smaller, 74.4 percent share, of all jobs lost (Table 3). Overall, nearly two-thirds (65.4 percent) of jobs lost in Georgia's 14th district were in textile mills and textile product mills alone. North Carolina's 2nd district also suffered a large number of job losses in a wide range of manufacturing industries, totaling 88.9 percent of job losses in that district. These losses were spread over a large number of industries, including computer and peripheral equipment, apparel, textiles, and furniture manufacturing.

17. California's 17th Congressional District is home to Santa Clara University and corporate offices for Apple, Intel, Yahoo, and eBay (Wikipedia 2018). The 18th Congressional District is home to the headquarters of Google, Netflix, and HP, among others (Eshoo 2018).

18. The term "major manufacturing sector" refers here to employment by three-digit NAICS manufacturing industries. The computer and electronic parts industry lost 1,209,900 of the 3,360,600 U.S. manufacturing jobs lost between December 2001 and December 2017 (Table 3), more than six times as many jobs as were lost as in apparel, the next largest of the hardest-hit three-digit manufacturing industries. Trade-related job losses in these industries, shown in Table 3, reflect both potential jobs displaced by the growth of imports (which represents domestic consumption that could have been supplied by domestically produced goods) and by the failure of exports to grow, resulting in large trade deficits in these products.

19. In earlier research, Autor, Dorn, and Hanson "conservatively estimate" that growing "Chinese import competition…imply a supply-shock driven net reduction in U.S. manufacturing employment of 548 thousand workers between 1990 and 2000, and a further reduction of 982 thousand workers between 2000 and 2007." They note further that these results are based on microeconomic research "exploiting cross-market variation in import exposure" (Autor, Dorn, and Hanson 2012, 19–20, abstract). These estimates are conservative, for several reasons, as noted by the authors. They fail to account for the overall macroeconomic impacts of growing U.S. trade deficits with China, including the direct and indirect effects of growing China trade deficits on U.S. employment, as noted by Acemoglu et al. (2014). As shown in Table 3, the growing U.S. goods trade deficit with China displaced 2.5 million total manufacturing jobs between 2001 and 2017, and an additional 860,100 nonmanufacturing jobs. Thus, approximately 0.34 nonmanufacturing jobs were displaced for each manufacturing job displaced. Differences in parameter estimates notwithstanding, it is important to note that Autor, Dorn, and Hanson (2012) confirm that growing Chinese import competition is responsible for the displacement of approximately 1.5 million U.S. manufacturing jobs from 1990 to 2007, generally confirming the results of current and earlier EPI research.

20. Acemoglu et al. (2014) examine the impacts of U.S.–China trade from 1999 to 2011. The U.S. trade deficit with China increased from $68.7 billion in 1999 to $83.1 billion in 2001 to $295.2 billion in 2011 (U.S. Census Bureau 2018d). Thus, 93.6 percent of the growth of the U.S. trade deficits with China in the 1999–2011 period occurred after China entered the WTO in 2001.

21. Scott's 2013 estimates are based on average wages from a three-year pooled sample of workers by industry from 2009–2011. These estimates are not updated in this report.

22. The $180 billion in income is redistributed to college-educated workers in the top third of the labor force and to owners of capital. Bivens and Mishel (2015, Figure C) find that for the period of 1973–2014, the loss in the labor share of income was responsible for 8.9 percentage points of the gap between net productivity and real median hourly compensation (a measure of the growth in inequality in this period).

23. Between 1995 and 2011, growing trade with China was responsible for 51.6 percent of the increase in the college/noncollege wage gap in the United States in this period (Bivens 2013, Table 1), 57.1 percent of this wage gap. Thus, China is responsible for a sizeable majority (56.8 percent) of the overall impact of least-developed-countries (LDC) trade on the noncollege wage gap in this period. This analysis decomposes the overall increase in the wage gap (4.8 percentage points), the share attributable to LDC trade, and the share of LDC trade accounted for by China.

24. One frequent criticism of trade and employment studies is that the growth of imports does not displace domestic production, and thus the claim is that such imports do not actually cost jobs. In addition, some assert that if imports from China fell, they would be replaced by imports from some other low-wage country (see, for example, U.S.–China Business Council 2014). However, important empirical research by Autor, Dorn, and Hanson (2012, 4) has shown that "increased exposure to low-income country imports is associated with rising unemployment, decreased labor-force participation, and increased use of disability and other transfer benefits, as well as with lower wages." The bottom line is that "trade creates new jobs in exporting industries and destroys jobs when imports replace the output of domestic firms. Because *trade deficits* have risen over the past decade, more jobs have been displaced by imports than created by exports" (Bivens 2008b, 1).

25. This analysis refers to the wage impacts of net jobs lost due to the growth of the U.S.–China trade deficit between 2001 and 2011. It includes net wage gains in the 538,000 jobs supported by increased employment in export industries, less net wage losses in the 3.2 million jobs displaced by increased imports, assuming that all of the 2.7 million net displaced workers are rehired and receive average earnings in jobs in nontraded goods industries (Scott 2013, Table 9a). It is conservative in the sense that it assumes that all of the net displaced workers are rehired in jobs in nontraded goods industries; it excludes the wage losses absorbed by those displaced workers who are not reemployed (for example, the 35.3 percent of long-tenured workers in manufacturing who had been displaced between January 2015 and December 2017 and were not employed in January 2018, as estimated in the BLS Displaced Worker Survey [BLS 2018a]).

26. These losses can never be regained in that the hours unemployed are a permanent loss to the economy, even if an individual worker later finds employment at wages equal to or higher than predisplacement wages. Unemployment costs are a dead-weight loss to the economy, in the same way that unemployment during a recession generates a permanent loss in national economic output.

27. Autor, Dorn, and Hanson (2012) use an analytic technique that compares employment in import-sensitive industries in various geographic areas at a fairly disaggregated level (roughly, cities or counties), referred to in their research as "commuting zones." They use these zones and data on

imports in each region over the study period to do their statistical analysis.

28. A previous edition of this research used data for 56 industries provided by the ACS (Scott 2012). The BLS-EP consolidated several industries, including textiles and apparel, which required us to consolidate data for these industries in our ACS state and congressional district models. Other "not elsewhere classified" industries were consolidated with other industries (e.g., "miscellaneous manufacturing") or deleted (e.g., in the case of "not specified metal industries") to update and refine the crosswalk from BLS-EP to ACS industries. As a result of these consolidations, there are 45 industries in the ACS data set used for this study. The current (BLS-EP 2017a) iteration of the employment requirements tables used in this study breaks the economy down into 205 industries, including 76 manufacturing industries. The previous iteration of employment requirements tables, used in Scott 2017a, broke the economy down into 195 industries, including 77 manufacturing industries. The apparel industry and the leather and allied products industry—NAICS 315 and 316—were consolidated into one sector in the BLS-EP 2017a model. We disaggregated job losses in these two sectors in this report using the results from Scott 2017a.

29. The model includes 205 NAICS industries. The trade data include only goods trade. Goods trade data are available for 85 commodity-based industries, plus information (publishing and software, NAICS industry 51), waste and scrap, used or secondhand merchandise, and goods traded under special classification provisions (e.g., goods imported from and returned to Canada; small, unclassified shipments). Trade in scrap, used, and secondhand goods has no impact on employment in the BLS model. Some special classification provision goods are assigned to miscellaneous manufacturing.

30. The U.S. Census Bureau uses its own table of definitions of industries. These are similar to NAICS-based industry definitions, but at a somewhat higher level of aggregation. For this study, we develop a crosswalk from NAICS to Census industries, and we use population estimates from the ACS for each cell in this matrix.

31. The switch from the 195-45 industry crosswalk to the 205-45 industry crosswalk created one inconsistency. The apparel manufacturing and leather and allied products manufacturing industries were separate in the previous (2013, referenced in Scott 2017a) version of the BLS-EP (2017a) model and were combined into one category in the 205 industry table. However, in the 45 industry table, there are two separate categories for these industries. In order to accurately assign jobs displaced to both industries, we apply the ratio of jobs displaced in these two industries in 2015, from the previous version of this report, to the number of jobs displaced in the (now combined) apparel and leather products industry as specified in the current 205 industry table. These inconsistencies will be addressed in the next revision of this trade and employment model.

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U.S. goods trade with China, by industry, 2001–2017 (in billions of nominal dollars)

Industry*	2001			2017			Change 2001–2017			Percent change 2001–2017		
	U.S. imports	U.S. exports	Trade balance	U.S. imports	U.S. exports	Trade balance	Change in imports	Change in exports	Change in trade balance	Change in imports	Change in exports	Change in trade balance
Agriculture, forestry, fishing, and hunting	$0.8	$1.4	$0.6	$3.0	$18.7	$15.6	$2.3	$17.3	$15.0	306%	NA	NA
Mining	$0.3	$0.1	-$0.2	$0.2	$8.6	$8.4	$0.0	$8.5	$8.6	-16%	NA	NA
Oil and gas	$0.1	$0.0	-$0.1	$0.0	$6.9	$6.9	-$0.1	$6.8	$7.0	-99%	NA	NA
Minerals and ores	$0.2	$0.1	-$0.1	$0.2	$1.8	$1.5	$0.1	$1.7	$1.6	47%	NA	NA
Manufacturing	$101.1	$16.7	-$84.4	$501.9	$96.7	-$405.2	$400.8	$80.0	-$320.8	397%	480%	380%
Nondurable goods	$23.4	$1.0	-$22.4	$67.4	$4.5	-$62.9	$44.1	$3.5	-$40.6	188%	350%	181%
Food	$0.6	$0.8	$0.2	$3.8	$3.3	-$0.5	$3.2	$2.5	-$0.6	538%	328%	-354%
Beverage and tobacco products	$0.0	$0.0	$0.0	$0.1	$0.2	$0.1	$0.1	$0.2	$0.1	188%	NA	-362%
Textile mills and textile product mills	$2.2	$0.1	-$2.1	$14.0	$0.5	-$13.5	$11.8	$0.4	-$11.4	540%	439%	544%
Apparel	$8.6	$0.0	-$8.6	$29.3	$0.1	-$29.3	$20.7	$0.1	-$20.7	241%	185%	241%
Leather and allied products	$12.0	$0.1	-$11.9	$20.2	$0.4	-$19.8	$8.3	$0.3	-$7.9	69%	342%	67%
Industrial supplies	$9.6	$3.4	-$6.1	$54.1	$23.7	-$30.4	$44.5	$20.3	-$24.2	466%	596%	394%
Wood products	$0.9	$0.1	-$0.8	$4.0	$1.9	-$2.1	$3.1	$1.8	-$1.3	347%	NA	164%
Paper	$0.7	$0.5	-$0.2	$3.3	$2.7	-$0.6	$2.6	$2.2	-$0.4	364%	420%	207%
Printed matter and related products	$0.7	$0.1	-$0.7	$2.8	$0.2	-$2.6	$2.1	$0.1	-$2.0	287%	124%	306%
Petroleum and coal products	$0.2	$0.1	-$0.1	$0.7	$1.2	$0.6	$0.5	$1.1	$0.7	227%	NA	-602%
Chemicals	$1.8	$2.2	$0.4	$18.2	$15.2	-$3.0	$16.4	$12.9	-$3.4	898%	586%	-880%
Plastics and rubber products	$2.7	$0.2	-$2.5	$17.3	$1.7	-$15.6	$14.6	$1.5	-$13.1	538%	700%	524%
Nonmetallic mineral products	$2.5	$0.2	-$2.3	$7.9	$0.9	-$7.0	$5.4	$0.7	-$4.7	216%	347%	205%
Durable goods	$68.1	$12.3	-$55.9	$380.4	$68.5	-$311.9	$312.2	$56.2	-$256.0	458%	458%	458%
Primary metals	$0.9	$0.2	-$0.6	$4.5	$2.3	-$2.2	$3.6	$2.0	-$1.6	422%	846%	256%
Fabricated metal products	$3.9	$0.3	-$3.6	$22.7	$2.4	-$20.3	$18.8	$2.1	-$16.8	484%	687%	467%
Machinery	$4.5	$2.5	-$2.0	$35.0	$9.3	-$25.7	$30.5	$6.8	-$23.7	671%	270%	NA
Computer and electronic parts	$24.4	$5.3	-$19.1	$184.4	$17.1	-$167.3	$160.0	$11.8	-$148.2	657%	223%	778%
Computer and peripheral equipment	$8.2	$1.6	-$6.6	$58.6	$2.3	-$56.3	$50.4	$0.7	-$49.7	617%	47%	753%
Communications, audio, and video equipment	$9.4	$0.9	-$8.5	$90.7	$2.0	-$88.8	$81.3	$1.1	-$80.3	862%	114%	943%
Navigational, measuring, electromedical, and control	$1.2	$1.0	-$0.3	$7.4	$5.6	-$1.8	$6.1	$4.6	-$1.5	490%	460%	608%

Industry*	2001			2017			Change 2001–2017			Percent change 2001–2017		
	U.S. imports	U.S. exports	Trade balance	U.S. imports	U.S. exports	Trade balance	Change in imports	Change in exports	Change in trade balance	Change in imports	Change in exports	Change in trade balance
instruments												
Semiconductor and other electronic components, and reproducing magnetic and optical media	$5.5	$1.8	-$3.7	$27.7	$7.2	-$20.5	$22.2	$5.4	-$16.8	404%	300%	455%
Electrical equipment, appliances, and components	$9.1	$0.5	-$8.6	$43.3	$3.3	-$40.0	$34.2	$2.8	-$31.4	377%	573%	366%
Transportation equipment	$1.8	$2.9	$1.1	$19.1	$29.5	$10.5	$17.2	$26.6	$9.4	951%	918%	863%
Motor vehicles and motor vehicle parts	$1.0	$0.3	-$0.8	$15.8	$13.2	-$2.6	$14.8	$12.9	-$1.9	NA	NA	243%
Aerospace products and parts	$0.1	$2.6	$2.5	$1.0	$16.3	$15.3	$0.9	$13.7	$12.8	982%	524%	508%
Railroad, ship, and other transportation equipment	$0.7	$0.0	-$0.7	$2.3	$0.1	-$2.2	$1.6	$0.1	-$1.5	234%	363%	230%
Furniture and related products	$4.9	$0.0	-$4.9	$23.5	$0.2	-$23.4	$18.6	$0.2	-$18.4	376%	678%	375%
Miscellaneous manufactured commodities	$18.7	$0.5	-$18.2	$47.9	$4.4	-$43.5	$29.3	$3.9	-$25.3	157%	805%	139%
Scrap and secondhand goods	$0.2	$1.1	$0.9	$0.4	$6.4	$6.0	$0.2	$5.3	$5.1	122%	473%	547%
Total	$102.28	$19.23	-$83.0	$505.6	$130.4	-$375.2	$403.3	$111.1	-$292.2	394%	578%	352%

* Excludes utilities, construction, and service sectors, which reported no goods trade in this period, and information, which reported negligible goods trade in this period.

Note: NA denotes "not applicable" because growth rates in excess of 1,000% were calculated but these rates were generally due to small trade flows in the base year.

Source: Authors' analysis of U.S. International Trade Commission 2018. For a more detailed explanation of the data sources and computations, see the appendix.

Economic Policy Institute

Net U.S. jobs displaced due to the goods trade deficit with China, by state, 2001–2017 (ranked by net jobs displaced)

Rank	State	Net jobs displaced	State employment	Jobs displaced as share of state employment
1	California	562,500	16,818,700	3.34%
2	Texas	314,000	12,224,200	2.57%
3	New York	183,500	9,523,300	1.93%
4	Illinois	148,200	6,062,400	2.45%
5	Pennsylvania	136,100	5,948,000	2.29%
6	North Carolina	130,800	4,415,800	2.96%
7	Florida	125,500	8,569,600	1.46%
8	Ohio	121,400	5,528,600	2.20%
9	Georgia	103,100	4,453,400	2.32%
10	Massachusetts	99,100	3,609,500	2.75%
11	New Jersey	96,700	4,129,100	2.34%
12	Michigan	92,400	4,372,500	2.11%
13	Minnesota	88,300	2,932,100	3.01%
14	Wisconsin	78,700	2,945,200	2.67%
15	Indiana	77,900	3,105,300	2.51%
16	Tennessee	69,300	3,011,200	2.30%
17	Virginia	66,200	3,952,100	1.68%
18	Arizona	63,400	2,774,000	2.29%
19	Oregon	62,900	1,873,900	3.36%
20	Colorado	59,500	2,658,700	2.24%
21	Washington	58,100	3,326,100	1.75%
22	South Carolina	50,800	2,091,500	2.43%
23	Missouri	49,800	2,868,400	1.74%
24	Alabama	46,900	2,015,400	2.33%
25	Kentucky	45,400	1,921,200	2.36%
26	Maryland	43,000	2,723,700	1.58%
27	Connecticut	38,400	1,681,600	2.28%
28	Oklahoma	31,900	1,662,600	1.92%
29	Iowa	29,900	1,573,200	1.90%
30	Utah	29,100	1,468,700	1.98%

Rank	State	Net jobs displaced	State employment	Jobs displaced as share of state employment
31	*Arkansas*	26,800	1,239,600	2.16%
32	*Mississippi*	25,300	1,152,200	2.20%
33	*New Hampshire*	24,000	675,500	3.55%
34	*Kansas*	21,700	1,403,900	1.54%
35	*Louisiana*	21,200	1,970,800	1.08%
36	*Idaho*	17,600	716,600	2.46%
37	*Nevada*	15,900	1,341,400	1.18%
38	*Nebraska*	14,200	1,018,000	1.40%
39	*Rhode Island*	14,100	494,500	2.84%
40	*New Mexico*	12,800	830,800	1.54%
41	*Maine*	11,900	622,800	1.91%
42	*West Virginia*	10,600	745,400	1.42%
43	*Vermont*	8,600	314,200	2.74%
44	*South Dakota*	6,300	434,900	1.44%
45	*Hawaii*	6,200	652,800	0.95%
46	*Delaware*	6,000	456,200	1.32%
47	*Montana*	4,200	472,700	0.89%
48	*North Dakota*	3,400	430,700	0.78%
49	*Alaska*	2,700	329,100	0.83%
50	*District of Columbia*	2,300	790,500	0.29%
51	*Wyoming*	2,000	281,700	0.72%
Total*		3,360,600	146,614,300	2.29%

* Totals may vary slightly due to rounding.

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program BLS-EP 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

Economic Policy Institute

Net U.S. jobs displaced due to the goods trade deficit with China, by state, 2001–2017 (sorted alphabetically)

Rank (by jobs displaced as a share of total)	State	Net jobs displaced	State employment	Jobs displaced as share of state employment
24	Alabama	46,900	2,015,400	2.33%
49	Alaska	2,700	329,100	0.83%
18	Arizona	63,400	2,774,000	2.29%
31	Arkansas	26,800	1,239,600	2.16%
1	California	562,500	16,818,700	3.34%
20	Colorado	59,500	2,658,700	2.24%
27	Connecticut	38,400	1,681,600	2.28%
46	Delaware	6,000	456,200	1.32%
50	District of Columbia	2,300	790,500	0.29%
7	Florida	125,500	8,569,600	1.46%
9	Georgia	103,100	4,453,400	2.32%
45	Hawaii	6,200	652,800	0.95%
36	Idaho	17,600	716,600	2.46%
4	Illinois	148,200	6,062,400	2.45%
15	Indiana	77,900	3,105,300	2.51%
29	Iowa	29,900	1,573,200	1.90%
34	Kansas	21,700	1,403,900	1.54%
25	Kentucky	45,400	1,921,200	2.36%
35	Louisiana	21,200	1,970,800	1.08%
41	Maine	11,900	622,800	1.91%
26	Maryland	43,000	2,723,700	1.58%
10	Massachusetts	99,100	3,609,500	2.75%
12	Michigan	92,400	4,372,500	2.11%
13	Minnesota	88,300	2,932,100	3.01%
32	Mississippi	25,300	1,152,200	2.20%
23	Missouri	49,800	2,868,400	1.74%
47	Montana	4,200	472,700	0.89%
38	Nebraska	14,200	1,018,000	1.40%
37	Nevada	15,900	1,341,400	1.18%

Rank (by jobs displaced as a share of total)	State	Net jobs displaced	State employment	Jobs displaced as share of state employment
33	New Hampshire	24,000	675,500	3.55%
11	New Jersey	96,700	4,129,100	2.34%
40	New Mexico	12,800	830,800	1.54%
3	New York	183,500	9,523,300	1.93%
6	North Carolina	130,800	4,415,800	2.96%
48	North Dakota	3,400	430,700	0.78%
8	Ohio	121,400	5,528,600	2.20%
28	Oklahoma	31,900	1,662,600	1.92%
19	Oregon	62,900	1,873,900	3.36%
5	Pennsylvania	136,100	5,948,000	2.29%
39	Rhode Island	14,100	494,500	2.84%
22	South Carolina	50,800	2,091,500	2.43%
44	South Dakota	6,300	434,900	1.44%
16	Tennessee	69,300	3,011,200	2.30%
2	Texas	314,000	12,224,200	2.57%
30	Utah	29,100	1,468,700	1.98%
43	Vermont	8,600	314,200	2.74%
17	Virginia	66,200	3,952,100	1.68%
21	Washington	58,100	3,326,100	1.75%
42	West Virginia	10,600	745,400	1.42%
14	Wisconsin	78,700	2,945,200	2.67%
51	Wyoming	2,000	281,700	0.72%
Total*		3,360,600	146,614,300	2.29%

* Totals may vary slightly due to rounding.

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program BLS-EP 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

Economic Policy Institute

Net U.S. jobs displaced due to the goods trade deficit with China, by congressional district, 2001–2017 (ranked by net jobs displaced)

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
1	California	17	59,500	346,100	17.19%
2	California	18	48,300	344,500	14.02%
3	California	19	38,600	324,000	11.91%
4	Texas	31	34,400	323,000	10.65%
5	Oregon	1	31,600	377,200	8.38%
6	California	15	26,900	336,400	8.00%
7	Georgia	14	17,600	290,700	6.05%
8	Texas	3	21,100	371,200	5.68%
9	Massachusetts	3	20,000	355,400	5.63%
10	California	40	14,800	280,500	5.28%
11	Texas	10	16,900	342,600	4.93%
12	California	52	16,900	350,100	4.83%
13	Illinois	6	17,000	355,600	4.78%
14	California	34	14,600	309,400	4.72%
15	Minnesota	1	16,400	348,200	4.71%
16	California	45	16,100	354,400	4.54%
17	Texas	18	13,700	306,400	4.47%
18	New York	18	14,800	332,100	4.46%
19	Arizona	5	13,500	317,900	4.25%
20	North Carolina	2	12,900	303,800	4.25%
21	Minnesota	3	15,000	353,800	4.24%
22	Texas	2	15,400	364,600	4.22%
23	North Carolina	10	13,600	324,000	4.20%
24	Minnesota	2	15,000	358,300	4.19%
25	Massachusetts	2	14,800	356,500	4.15%
26	Texas	17	13,600	329,300	4.13%
27	North Carolina	8	12,400	301,700	4.11%
28	California	14	14,600	364,000	4.01%
29	California	48	14,100	352,600	4.00%
30	California	49	11,900	299,700	3.97%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
31	California	35	11,300	284,800	3.97%
32	North Carolina	13	13,600	349,900	3.89%
33	New Hampshire	2	12,800	332,200	3.85%
34	Texas	25	11,600	302,200	3.84%
35	North Carolina	6	13,100	341,800	3.83%
36	South Carolina	3	10,100	264,500	3.82%
37	California	39	12,600	332,000	3.80%
38	Texas	32	13,600	360,900	3.77%
39	Massachusetts	4	14,000	374,800	3.74%
40	California	46	11,700	314,400	3.72%
41	Illinois	8	13,100	366,300	3.58%
42	Mississippi	1	10,900	305,600	3.57%
43	Indiana	3	11,600	327,000	3.55%
44	North Carolina	5	11,500	324,500	3.54%
45	Alabama	5	10,900	311,900	3.49%
46	Texas	33	9,900	283,900	3.49%
47	Colorado	2	13,400	384,600	3.48%
48	Colorado	4	11,800	344,100	3.43%
49	New Jersey	7	12,900	377,100	3.42%
50	Kentucky	6	11,400	335,400	3.40%
51	Georgia	7	10,600	312,500	3.39%
52	Illinois	10	11,000	324,800	3.39%
53	California	7	10,600	313,200	3.38%
54	Texas	24	13,100	388,600	3.37%
55	Massachusetts	5	12,900	387,400	3.33%
56	California	44	9,000	270,600	3.33%
57	Wisconsin	5	12,300	370,600	3.32%
58	South Carolina	5	9,100	275,200	3.31%
59	Arizona	9	11,800	360,300	3.28%
60	Indiana	8	10,700	329,300	3.25%
61	Alabama	4	8,500	262,900	3.23%
62	Indiana	2	10,200	317,800	3.21%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
63	South Carolina	4	9,600	301,000	3.19%
64	Minnesota	6	11,100	348,700	3.18%
65	New Hampshire	1	11,200	352,600	3.18%
66	Illinois	11	11,000	347,300	3.17%
67	Illinois	14	11,100	351,000	3.16%
68	California	13	10,700	340,200	3.15%
69	Wisconsin	6	11,100	353,600	3.14%
70	Washington	3	8,900	284,500	3.13%
71	California	38	9,800	313,300	3.13%
72	Texas	7	11,600	376,300	3.08%
73	New York	25	10,300	335,400	3.07%
74	Michigan	2	9,700	315,900	3.07%
75	Wisconsin	1	10,500	342,500	3.07%
76	North Carolina	12	9,800	319,800	3.06%
77	Wisconsin	3	10,700	353,500	3.03%
78	California	4	8,900	294,200	3.03%
79	Tennessee	7	8,600	285,800	3.01%
80	Ohio	14	10,500	349,700	3.00%
81	Georgia	9	8,500	284,600	2.99%
82	Washington	1	9,900	332,300	2.98%
83	Idaho	1	9,800	329,900	2.97%
84	New York	19	9,700	327,300	2.96%
85	Texas	12	10,000	337,500	2.96%
86	California	32	8,700	293,800	2.96%
87	Oregon	3	11,300	383,300	2.95%
88	North Carolina	11	8,700	295,400	2.95%
89	Georgia	3	8,400	285,800	2.94%
90	Ohio	7	9,600	326,800	2.94%
91	Ohio	4	9,300	317,900	2.93%
92	Tennessee	4	9,200	314,500	2.93%
93	New Jersey	5	10,400	356,100	2.92%
94	Pennsylvania	3	9,100	317,700	2.86%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
95	North Carolina	4	10,000	350,900	2.85%
96	Indiana	6	8,800	311,900	2.82%
97	Illinois	4	9,200	326,600	2.82%
98	California	42	8,600	307,000	2.80%
99	Pennsylvania	15	9,600	343,800	2.79%
100	Florida	8	7,900	283,400	2.79%
101	Rhode Island	2	7,200	260,300	2.77%
102	Virginia	9	8,200	298,400	2.75%
103	Tennessee	5	9,700	353,400	2.74%
104	New Jersey	11	9,800	358,800	2.73%
105	Ohio	5	9,100	334,200	2.72%
106	Rhode Island	1	6,800	250,900	2.71%
107	Ohio	13	8,600	320,400	2.68%
108	California	37	9,000	335,600	2.68%
109	Kentucky	2	8,500	317,100	2.68%
110	Illinois	9	9,300	347,200	2.68%
111	North Carolina	9	9,900	371,400	2.67%
112	California	12	10,600	399,400	2.65%
113	Minnesota	5	9,300	352,000	2.64%
114	Kentucky	3	8,800	333,300	2.64%
115	Arkansas	3	8,600	327,000	2.63%
116	Vermont	Statewide	8,600	327,300	2.63%
117	Tennessee	3	7,800	297,000	2.63%
118	Wisconsin	8	9,500	362,800	2.62%
119	Ohio	8	8,600	328,800	2.62%
120	New Jersey	8	9,700	371,000	2.61%
121	Michigan	3	8,200	315,300	2.60%
122	Pennsylvania	8	9,300	357,800	2.60%
123	Pennsylvania	6	9,400	362,300	2.59%
124	Michigan	10	8,000	308,700	2.59%
125	Tennessee	1	7,700	297,600	2.59%
126	Alabama	3	7,100	274,600	2.59%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
127	Massachusetts	6	9,600	372,000	2.58%
128	California	43	7,800	302,800	2.58%
129	Georgia	6	9,300	361,200	2.57%
130	Oklahoma	1	9,300	361,900	2.57%
131	New York	22	8,200	320,200	2.56%
132	California	27	8,500	332,200	2.56%
133	Texas	26	9,400	368,300	2.55%
134	Wisconsin	7	8,600	338,400	2.54%
135	California	30	9,100	358,200	2.54%
136	Utah	3	7,900	311,200	2.54%
137	Ohio	16	9,000	355,600	2.53%
138	Iowa	1	9,900	392,300	2.52%
139	New York	2	9,000	357,800	2.52%
140	New Jersey	9	8,500	338,500	2.51%
141	New York	1	8,600	343,300	2.51%
142	Pennsylvania	12	8,300	331,900	2.50%
143	Wisconsin	4	7,700	308,000	2.50%
144	California	50	7,400	296,200	2.50%
145	Connecticut	5	8,700	348,300	2.50%
146	Pennsylvania	10	7,800	312,500	2.50%
147	Pennsylvania	17	7,800	312,600	2.50%
148	Pennsylvania	18	8,600	345,000	2.49%
149	Michigan	11	8,500	342,100	2.48%
150	Michigan	6	7,700	310,400	2.48%
151	California	25	7,500	302,700	2.48%
152	Arizona	6	9,000	366,000	2.46%
153	Arizona	7	6,900	282,300	2.44%
154	California	47	8,000	327,600	2.44%
155	Minnesota	4	8,200	336,000	2.44%
156	California	29	7,400	303,700	2.44%
157	New Jersey	6	8,600	353,600	2.43%
158	Tennessee	6	7,400	304,500	2.43%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
159	New York	7	7,800	322,200	2.42%
160	Texas	6	8,400	348,800	2.41%
161	Pennsylvania	16	7,800	327,700	2.38%
162	Pennsylvania	5	7,500	316,800	2.37%
163	Pennsylvania	4	8,100	342,900	2.36%
164	Oregon	5	7,700	326,700	2.36%
165	Utah	4	7,800	331,500	2.35%
166	New York	24	7,700	327,300	2.35%
167	Georgia	11	8,000	340,900	2.35%
168	Indiana	4	7,700	328,500	2.34%
169	Illinois	17	7,300	311,700	2.34%
170	South Carolina	7	6,300	269,400	2.34%
171	Indiana	7	7,300	312,200	2.34%
172	Connecticut	4	8,000	343,000	2.33%
173	Connecticut	3	8,200	352,700	2.32%
174	Kentucky	1	6,600	284,800	2.32%
175	Illinois	5	9,200	397,600	2.31%
176	Colorado	5	7,300	315,900	2.31%
177	Tennessee	8	6,900	299,200	2.31%
178	California	26	7,500	325,900	2.30%
179	Oregon	4	7,100	309,000	2.30%
180	Florida	13	7,100	309,200	2.30%
181	Kansas	3	8,500	370,300	2.30%
182	New York	23	7,400	324,600	2.28%
183	Iowa	2	8,500	373,400	2.28%
184	California	53	7,800	342,700	2.28%
185	Indiana	9	7,700	339,400	2.27%
186	North Carolina	1	6,600	291,800	2.26%
187	California	33	8,200	364,200	2.25%
188	Massachusetts	9	7,900	352,300	2.24%
189	Utah	2	6,800	305,700	2.22%
190	Ohio	6	6,500	292,300	2.22%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
191	Colorado	6	8,200	369,600	2.22%
192	Texas	21	8,000	361,200	2.21%
193	Michigan	9	7,200	326,100	2.21%
194	Pennsylvania	7	7,500	339,700	2.21%
195	Michigan	8	7,300	330,800	2.21%
196	Texas	9	7,200	326,400	2.21%
197	Idaho	2	7,800	355,000	2.20%
198	Missouri	2	8,300	378,600	2.19%
199	New York	27	7,400	337,800	2.19%
200	Texas	30	6,400	292,300	2.19%
201	Florida	12	6,200	283,200	2.19%
202	Massachusetts	8	8,200	375,600	2.18%
203	Virginia	10	8,200	376,400	2.18%
204	Florida	23	7,400	339,900	2.18%
205	Illinois	16	7,200	330,800	2.18%
206	Ohio	10	6,800	312,800	2.17%
207	Florida	22	7,200	332,000	2.17%
208	Missouri	7	7,300	337,400	2.16%
209	Minnesota	7	7,100	328,700	2.16%
210	Wisconsin	2	8,400	390,000	2.15%
211	Arkansas	2	7,200	336,300	2.14%
212	Texas	4	6,400	299,300	2.14%
213	Texas	35	6,800	318,200	2.14%
214	California	41	5,800	271,900	2.13%
215	Pennsylvania	9	6,500	304,800	2.13%
216	Michigan	4	6,100	286,300	2.13%
217	Pennsylvania	11	7,000	329,300	2.13%
218	Virginia	5	6,700	316,100	2.12%
219	Texas	29	6,200	292,900	2.12%
220	Utah	1	6,600	312,400	2.11%
221	California	5	6,900	326,800	2.11%
222	Missouri	8	6,300	298,500	2.11%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
223	Oklahoma	4	7,400	350,900	2.11%
224	Ohio	9	6,600	315,000	2.10%
225	Pennsylvania	13	7,100	339,000	2.09%
226	Indiana	1	6,500	310,600	2.09%
227	Arizona	8	6,300	301,700	2.09%
228	Georgia	10	6,000	287,400	2.09%
229	Illinois	3	6,600	319,500	2.07%
230	South Carolina	2	6,300	305,600	2.06%
231	Washington	10	6,000	291,300	2.06%
232	Alabama	2	5,700	276,900	2.06%
233	Washington	7	7,800	380,000	2.05%
234	New Mexico	1	6,400	311,900	2.05%
235	Indiana	5	7,300	357,700	2.04%
236	Arkansas	4	6,000	295,100	2.03%
237	California	28	7,300	359,900	2.03%
238	Texas	5	6,100	300,800	2.03%
239	New Jersey	4	6,600	326,400	2.02%
240	California	31	5,900	292,200	2.02%
241	California	20	6,100	302,500	2.02%
242	New Jersey	12	7,100	352,400	2.01%
243	Colorado	7	7,300	362,500	2.01%
244	Minnesota	8	6,100	303,400	2.01%
245	Alabama	6	6,400	318,400	2.01%
246	Kentucky	4	6,700	333,500	2.01%
247	Michigan	7	6,000	299,100	2.01%
248	Tennessee	9	6,100	305,300	2.00%
249	New York	17	6,800	341,400	1.99%
250	Texas	16	5,600	281,300	1.99%
251	Texas	22	7,000	352,500	1.99%
252	California	10	5,500	277,200	1.98%
253	South Carolina	6	5,000	253,500	1.97%
254	Pennsylvania	14	6,300	323,200	1.95%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
255	Ohio	12	7,000	359,500	1.95%
256	New Jersey	1	6,600	339,200	1.95%
257	California	6	5,600	288,300	1.94%
258	Georgia	12	5,400	278,200	1.94%
259	Illinois	2	5,400	278,200	1.94%
260	Texas	8	6,000	309,200	1.94%
261	Ohio	1	6,400	332,300	1.93%
262	Illinois	18	6,500	337,500	1.93%
263	Colorado	1	7,400	384,400	1.93%
264	Connecticut	2	6,700	348,600	1.92%
265	California	1	5,000	260,300	1.92%
266	Connecticut	1	6,700	349,800	1.92%
267	Georgia	2	4,800	251,200	1.91%
268	Washington	9	6,500	341,400	1.90%
269	Georgia	4	5,900	311,700	1.89%
270	Maine	2	5,700	302,700	1.88%
271	Virginia	6	6,400	339,900	1.88%
272	New York	21	5,800	309,200	1.88%
273	New York	3	6,300	336,700	1.87%
274	New Jersey	10	5,800	310,700	1.87%
275	Virginia	7	6,800	364,600	1.87%
276	Illinois	15	5,900	316,500	1.86%
277	Michigan	13	4,300	230,700	1.86%
278	Ohio	3	6,200	333,000	1.86%
279	Georgia	5	5,900	318,100	1.85%
280	Ohio	2	6,000	323,600	1.85%
281	California	11	6,000	324,200	1.85%
282	Michigan	5	4,900	264,800	1.85%
283	Ohio	15	6,200	336,400	1.84%
284	Nevada	2	5,700	309,400	1.84%
285	Tennessee	2	6,000	327,200	1.83%
286	Michigan	14	4,700	257,700	1.82%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
287	Maine	1	6,200	340,400	1.82%
288	Maryland	6	6,600	363,200	1.82%
289	Ohio	11	5,000	275,200	1.82%
290	New York	12	7,600	418,800	1.81%
291	Arkansas	1	5,000	277,400	1.80%
292	New Jersey	3	6,200	344,200	1.80%
293	Nebraska	2	5,600	316,300	1.77%
294	New York	26	5,800	327,700	1.77%
295	Virginia	4	5,800	327,900	1.77%
296	New York	20	6,300	357,600	1.76%
297	Massachusetts	1	6,000	341,000	1.76%
298	Georgia	13	5,500	312,800	1.76%
299	Pennsylvania	1	4,800	273,300	1.76%
300	Florida	25	5,700	326,000	1.75%
301	California	51	4,500	258,600	1.74%
302	Arizona	2	5,200	299,200	1.74%
303	Missouri	5	6,000	345,300	1.74%
304	Oklahoma	2	5,000	290,300	1.72%
305	New York	6	5,600	327,000	1.71%
306	Mississippi	3	5,200	303,900	1.71%
307	Nebraska	1	5,500	321,700	1.71%
308	Florida	7	5,500	322,500	1.71%
309	Missouri	3	6,300	370,000	1.70%
310	West Virginia	1	4,400	258,700	1.70%
311	Maryland	8	6,800	400,100	1.70%
312	Florida	27	5,300	313,600	1.69%
313	Texas	1	5,000	297,700	1.68%
314	Mississippi	4	5,100	304,900	1.67%
315	New York	5	5,600	336,200	1.67%
316	Alabama	7	4,200	253,500	1.66%
317	Oregon	2	5,200	314,200	1.65%
318	Illinois	7	4,900	298,500	1.64%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
319	Oklahoma	5	5,700	348,800	1.63%
320	Florida	16	4,500	276,100	1.63%
321	Missouri	6	5,800	355,900	1.63%
322	Michigan	1	4,700	290,200	1.62%
323	Kansas	2	5,500	339,900	1.62%
324	North Carolina	7	5,100	315,400	1.62%
325	Washington	5	4,700	291,500	1.61%
326	New York	16	5,200	323,600	1.61%
327	Michigan	12	5,000	313,800	1.59%
328	Illinois	1	4,600	290,200	1.59%
329	Mississippi	2	4,200	266,900	1.57%
330	Texas	27	4,800	305,600	1.57%
331	Illinois	12	4,700	301,000	1.56%
332	Florida	14	5,000	320,700	1.56%
333	Maryland	1	5,300	342,300	1.55%
334	Massachusetts	7	5,700	369,800	1.54%
335	Iowa	3	6,000	390,800	1.54%
336	California	9	4,200	275,300	1.53%
337	New York	14	5,200	341,800	1.52%
338	Florida	6	4,300	283,200	1.52%
339	South Dakota	1	6,300	415,600	1.52%
340	Florida	21	4,800	316,800	1.52%
341	Florida	15	4,600	304,200	1.51%
342	New Mexico	3	4,300	284,800	1.51%
343	Texas	36	4,400	291,900	1.51%
344	Virginia	1	5,300	352,400	1.50%
345	Georgia	8	4,100	272,700	1.50%
346	New York	8	4,400	292,700	1.50%
347	New York	10	5,400	360,300	1.50%
348	Florida	20	4,500	302,100	1.49%
349	Alabama	1	4,200	283,000	1.48%
350	New York	13	4,700	317,200	1.48%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
351	New York	11	4,700	317,500	1.48%
352	Missouri	1	4,900	331,500	1.48%
353	Missouri	4	4,800	324,900	1.48%
354	Maryland	4	5,600	384,100	1.46%
355	Arizona	4	3,400	233,500	1.46%
356	California	2	4,700	323,100	1.45%
357	Kentucky	5	3,400	234,300	1.45%
358	New York	15	3,700	255,900	1.45%
359	Florida	5	4,100	284,000	1.44%
360	Iowa	4	5,500	382,300	1.44%
361	South Carolina	1	4,300	299,800	1.43%
362	Florida	24	4,200	293,400	1.43%
363	Delaware	Statewide	6,000	420,400	1.43%
364	Florida	4	4,700	329,900	1.42%
365	Virginia	11	5,700	400,900	1.42%
366	New York	9	4,600	324,900	1.42%
367	Florida	18	4,000	284,000	1.41%
368	New Jersey	2	4,500	324,400	1.39%
369	Washington	8	4,400	318,000	1.38%
370	Virginia	2	4,700	339,800	1.38%
371	Maryland	3	5,100	369,500	1.38%
372	Florida	11	3,000	217,400	1.38%
373	Arizona	3	3,600	262,200	1.37%
374	New York	4	4,700	342,500	1.37%
375	Maryland	7	4,300	315,700	1.36%
376	Arizona	1	3,600	264,900	1.36%
377	West Virginia	2	3,600	266,900	1.35%
378	Oklahoma	3	4,400	329,900	1.33%
379	Pennsylvania	2	3,600	273,100	1.32%
380	Illinois	13	4,300	326,600	1.32%
381	California	8	3,100	235,500	1.32%
382	Virginia	3	4,200	320,100	1.31%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
383	Florida	26	4,400	335,600	1.31%
384	Maryland	2	4,600	351,700	1.31%
385	Florida	10	4,300	331,500	1.30%
386	Texas	14	3,900	303,300	1.29%
387	Washington	2	4,100	318,900	1.29%
388	Texas	20	4,000	311,400	1.28%
389	Texas	13	3,900	309,000	1.26%
390	Maryland	5	4,600	368,200	1.25%
391	Texas	23	3,600	289,700	1.24%
392	Washington	6	3,400	275,500	1.23%
393	Louisiana	4	3,800	311,100	1.22%
394	Hawaii	1	4,000	330,100	1.21%
395	Colorado	3	4,000	331,400	1.21%
396	Nevada	4	3,300	274,300	1.20%
397	Florida	2	3,600	301,500	1.19%
398	North Carolina	3	3,600	305,600	1.18%
399	Texas	15	3,300	280,900	1.17%
400	California	24	3,800	323,500	1.17%
401	West Virginia	3	2,600	223,000	1.17%
402	Nevada	3	3,900	336,500	1.16%
403	Georgia	1	3,300	286,100	1.15%
404	Kansas	4	3,800	332,900	1.14%
405	Kansas	1	3,900	345,900	1.13%
406	Texas	28	3,000	266,300	1.13%
407	Texas	19	3,500	310,700	1.13%
408	Louisiana	6	4,100	367,800	1.11%
409	Louisiana	1	3,900	354,000	1.10%
410	Texas	11	3,400	308,800	1.10%
411	Louisiana	3	3,600	328,100	1.10%
412	Texas	34	2,600	242,200	1.07%
413	Florida	9	3,400	317,200	1.07%
414	Florida	19	2,800	265,200	1.06%

Rank	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
415	Nevada	1	3,000	284,700	1.05%
416	Nebraska	3	3,100	305,600	1.01%
417	Virginia	8	4,200	423,700	0.99%
418	Florida	1	3,000	303,900	0.99%
419	Louisiana	5	2,800	283,900	0.99%
420	Florida	3	2,700	277,000	0.97%
421	Louisiana	2	3,200	329,000	0.97%
422	California	36	2,400	251,900	0.95%
423	California	22	2,700	289,600	0.93%
424	North Dakota	Statewide	3,400	370,800	0.92%
425	California	3	2,600	286,600	0.91%
426	Montana	Statewide	4,200	480,000	0.88%
427	Washington	4	2,300	284,500	0.81%
428	Alaska	Statewide	2,700	344,300	0.78%
429	New Mexico	2	2,100	273,100	0.77%
430	District of Columbia	Districtwide	2,300	310,600	0.74%
431	Hawaii	2	2,200	299,400	0.73%
432	California	23	2,000	274,100	0.73%
433	California	16	1,700	244,900	0.69%
434	Wyoming	Statewide	2,000	290,000	0.69%
435	Florida	17	1,500	248,700	0.60%
436	California	21	200	243,800	0.08%
Total*			3,360,600	140,400,900	2.39%

* Totals may vary slightly due to rounding.

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, and Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

Economic Policy Institute

Net U.S. jobs displaced due to the goods trade deficit with China, by congressional district, 2001–2017 (sorted alphabetically by state)

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
349	Alabama	1	4,200	283,000	1.48%
232	Alabama	2	5,700	276,900	2.06%
126	Alabama	3	7,100	274,600	2.59%
61	Alabama	4	8,500	262,900	3.23%
45	Alabama	5	10,900	311,900	3.49%
245	Alabama	6	6,400	318,400	2.01%
316	Alabama	7	4,200	253,500	1.66%
428	Alaska	Statewide	2,700	344,300	0.78%
376	Arizona	1	3,600	264,900	1.36%
302	Arizona	2	5,200	299,200	1.74%
373	Arizona	3	3,600	262,200	1.37%
355	Arizona	4	3,400	233,500	1.46%
19	Arizona	5	13,500	317,900	4.25%
152	Arizona	6	9,000	366,000	2.46%
153	Arizona	7	6,900	282,300	2.44%
227	Arizona	8	6,300	301,700	2.09%
59	Arizona	9	11,800	360,300	3.28%
291	Arkansas	1	5,000	277,400	1.80%
211	Arkansas	2	7,200	336,300	2.14%
115	Arkansas	3	8,600	327,000	2.63%
236	Arkansas	4	6,000	295,100	2.03%
265	California	1	5,000	260,300	1.92%
356	California	2	4,700	323,100	1.45%
425	California	3	2,600	286,600	0.91%
78	California	4	8,900	294,200	3.03%
221	California	5	6,900	326,800	2.11%
257	California	6	5,600	288,300	1.94%
53	California	7	10,600	313,200	3.38%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
381	California	8	3,100	235,500	1.32%
336	California	9	4,200	275,300	1.53%
252	California	10	5,500	277,200	1.98%
281	California	11	6,000	324,200	1.85%
112	California	12	10,600	399,400	2.65%
68	California	13	10,700	340,200	3.15%
28	California	14	14,600	364,000	4.01%
6	California	15	26,900	336,400	8.00%
433	California	16	1,700	244,900	0.69%
1	California	17	59,500	346,100	17.19%
2	California	18	48,300	344,500	14.02%
3	California	19	38,600	324,000	11.91%
241	California	20	6,100	302,500	2.02%
436	California	21	200	243,800	0.08%
423	California	22	2,700	289,600	0.93%
432	California	23	2,000	274,100	0.73%
400	California	24	3,800	323,500	1.17%
151	California	25	7,500	302,700	2.48%
178	California	26	7,500	325,900	2.30%
132	California	27	8,500	332,200	2.56%
237	California	28	7,300	359,900	2.03%
156	California	29	7,400	303,700	2.44%
135	California	30	9,100	358,200	2.54%
240	California	31	5,900	292,200	2.02%
86	California	32	8,700	293,800	2.96%
187	California	33	8,200	364,200	2.25%
14	California	34	14,600	309,400	4.72%
31	California	35	11,300	284,800	3.97%
422	California	36	2,400	251,900	0.95%
108	California	37	9,000	335,600	2.68%
71	California	38	9,800	313,300	3.13%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
37	*California*	39	12,600	332,000	3.80%
10	*California*	40	14,800	280,500	5.28%
214	*California*	41	5,800	271,900	2.13%
98	*California*	42	8,600	307,000	2.80%
128	*California*	43	7,800	302,800	2.58%
56	*California*	44	9,000	270,600	3.33%
16	*California*	45	16,100	354,400	4.54%
40	*California*	46	11,700	314,400	3.72%
154	*California*	47	8,000	327,600	2.44%
29	*California*	48	14,100	352,600	4.00%
30	*California*	49	11,900	299,700	3.97%
144	*California*	50	7,400	296,200	2.50%
301	*California*	51	4,500	258,600	1.74%
12	*California*	52	16,900	350,100	4.83%
184	*California*	53	7,800	342,700	2.28%
263	*Colorado*	1	7,400	384,400	1.93%
47	*Colorado*	2	13,400	384,600	3.48%
395	*Colorado*	3	4,000	331,400	1.21%
48	*Colorado*	4	11,800	344,100	3.43%
176	*Colorado*	5	7,300	315,900	2.31%
191	*Colorado*	6	8,200	369,600	2.22%
243	*Colorado*	7	7,300	362,500	2.01%
266	*Connecticut*	1	6,700	349,800	1.92%
264	*Connecticut*	2	6,700	348,600	1.92%
173	*Connecticut*	3	8,200	352,700	2.32%
172	*Connecticut*	4	8,000	343,000	2.33%
145	*Connecticut*	5	8,700	348,300	2.50%
363	*Delaware*	Statewide	6,000	420,400	1.43%
430	*District of Columbia*	Districtwide	2,300	310,600	0.74%
418	*Florida*	1	3,000	303,900	0.99%
397	*Florida*	2	3,600	301,500	1.19%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
420	Florida	3	2,700	277,000	0.97%
364	Florida	4	4,700	329,900	1.42%
359	Florida	5	4,100	284,000	1.44%
338	Florida	6	4,300	283,200	1.52%
308	Florida	7	5,500	322,500	1.71%
100	Florida	8	7,900	283,400	2.79%
413	Florida	9	3,400	317,200	1.07%
385	Florida	10	4,300	331,500	1.30%
372	Florida	11	3,000	217,400	1.38%
201	Florida	12	6,200	283,200	2.19%
180	Florida	13	7,100	309,200	2.30%
332	Florida	14	5,000	320,700	1.56%
341	Florida	15	4,600	304,200	1.51%
320	Florida	16	4,500	276,100	1.63%
435	Florida	17	1,500	248,700	0.60%
367	Florida	18	4,000	284,000	1.41%
414	Florida	19	2,800	265,200	1.06%
348	Florida	20	4,500	302,100	1.49%
340	Florida	21	4,800	316,800	1.52%
207	Florida	22	7,200	332,000	2.17%
204	Florida	23	7,400	339,900	2.18%
362	Florida	24	4,200	293,400	1.43%
300	Florida	25	5,700	326,000	1.75%
383	Florida	26	4,400	335,600	1.31%
312	Florida	27	5,300	313,600	1.69%
403	Georgia	1	3,300	286,100	1.15%
267	Georgia	2	4,800	251,200	1.91%
89	Georgia	3	8,400	285,800	2.94%
269	Georgia	4	5,900	311,700	1.89%
279	Georgia	5	5,900	318,100	1.85%
129	Georgia	6	9,300	361,200	2.57%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
51	Georgia	7	10,600	312,500	3.39%
345	Georgia	8	4,100	272,700	1.50%
81	Georgia	9	8,500	284,600	2.99%
228	Georgia	10	6,000	287,400	2.09%
167	Georgia	11	8,000	340,900	2.35%
258	Georgia	12	5,400	278,200	1.94%
298	Georgia	13	5,500	312,800	1.76%
7	Georgia	14	17,600	290,700	6.05%
394	Hawaii	1	4,000	330,100	1.21%
431	Hawaii	2	2,200	299,400	0.73%
83	Idaho	1	9,800	329,900	2.97%
197	Idaho	2	7,800	355,000	2.20%
328	Illinois	1	4,600	290,200	1.59%
259	Illinois	2	5,400	278,200	1.94%
229	Illinois	3	6,600	319,500	2.07%
97	Illinois	4	9,200	326,600	2.82%
175	Illinois	5	9,200	397,600	2.31%
13	Illinois	6	17,000	355,600	4.78%
318	Illinois	7	4,900	298,500	1.64%
41	Illinois	8	13,100	366,300	3.58%
110	Illinois	9	9,300	347,200	2.68%
52	Illinois	10	11,000	324,800	3.39%
66	Illinois	11	11,000	347,300	3.17%
331	Illinois	12	4,700	301,000	1.56%
380	Illinois	13	4,300	326,600	1.32%
67	Illinois	14	11,100	351,000	3.16%
276	Illinois	15	5,900	316,500	1.86%
205	Illinois	16	7,200	330,800	2.18%
169	Illinois	17	7,300	311,700	2.34%
262	Illinois	18	6,500	337,500	1.93%
226	Indiana	1	6,500	310,600	2.09%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
62	Indiana	2	10,200	317,800	3.21%
43	Indiana	3	11,600	327,000	3.55%
168	Indiana	4	7,700	328,500	2.34%
235	Indiana	5	7,300	357,700	2.04%
96	Indiana	6	8,800	311,900	2.82%
171	Indiana	7	7,300	312,200	2.34%
60	Indiana	8	10,700	329,300	3.25%
185	Indiana	9	7,700	339,400	2.27%
138	Iowa	1	9,900	392,300	2.52%
183	Iowa	2	8,500	373,400	2.28%
335	Iowa	3	6,000	390,800	1.54%
360	Iowa	4	5,500	382,300	1.44%
405	Kansas	1	3,900	345,900	1.13%
323	Kansas	2	5,500	339,900	1.62%
181	Kansas	3	8,500	370,300	2.30%
404	Kansas	4	3,800	332,900	1.14%
174	Kentucky	1	6,600	284,800	2.32%
109	Kentucky	2	8,500	317,100	2.68%
114	Kentucky	3	8,800	333,300	2.64%
246	Kentucky	4	6,700	333,500	2.01%
357	Kentucky	5	3,400	234,300	1.45%
50	Kentucky	6	11,400	335,400	3.40%
409	Louisiana	1	3,900	354,000	1.10%
421	Louisiana	2	3,200	329,000	0.97%
411	Louisiana	3	3,600	328,100	1.10%
393	Louisiana	4	3,800	311,100	1.22%
419	Louisiana	5	2,800	283,900	0.99%
408	Louisiana	6	4,100	367,800	1.11%
287	Maine	1	6,200	340,400	1.82%
270	Maine	2	5,700	302,700	1.88%
333	Maryland	1	5,300	342,300	1.55%

	Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
Supplemental Table 5 (cont.)	384	*Maryland*	2	4,600	351,700	1.31%
	371	*Maryland*	3	5,100	369,500	1.38%
	354	*Maryland*	4	5,600	384,100	1.46%
	390	*Maryland*	5	4,600	368,200	1.25%
	288	*Maryland*	6	6,600	363,200	1.82%
	375	*Maryland*	7	4,300	315,700	1.36%
	311	*Maryland*	8	6,800	400,100	1.70%
	297	*Massachusetts*	1	6,000	341,000	1.76%
	25	*Massachusetts*	2	14,800	356,500	4.15%
	9	*Massachusetts*	3	20,000	355,400	5.63%
	39	*Massachusetts*	4	14,000	374,800	3.74%
	55	*Massachusetts*	5	12,900	387,400	3.33%
	127	*Massachusetts*	6	9,600	372,000	2.58%
	334	*Massachusetts*	7	5,700	369,800	1.54%
	202	*Massachusetts*	8	8,200	375,600	2.18%
	188	*Massachusetts*	9	7,900	352,300	2.24%
	322	*Michigan*	1	4,700	290,200	1.62%
	74	*Michigan*	2	9,700	315,900	3.07%
	121	*Michigan*	3	8,200	315,300	2.60%
	216	*Michigan*	4	6,100	286,300	2.13%
	282	*Michigan*	5	4,900	264,800	1.85%
	150	*Michigan*	6	7,700	310,400	2.48%
	247	*Michigan*	7	6,000	299,100	2.01%
	195	*Michigan*	8	7,300	330,800	2.21%
	193	*Michigan*	9	7,200	326,100	2.21%
	124	*Michigan*	10	8,000	308,700	2.59%
	149	*Michigan*	11	8,500	342,100	2.48%
	327	*Michigan*	12	5,000	313,800	1.59%
	277	*Michigan*	13	4,300	230,700	1.86%
	286	*Michigan*	14	4,700	257,700	1.82%
	15	*Minnesota*	1	16,400	348,200	4.71%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
24	*Minnesota*	2	15,000	358,300	4.19%
21	*Minnesota*	3	15,000	353,800	4.24%
155	*Minnesota*	4	8,200	336,000	2.44%
113	*Minnesota*	5	9,300	352,000	2.64%
64	*Minnesota*	6	11,100	348,700	3.18%
209	*Minnesota*	7	7,100	328,700	2.16%
244	*Minnesota*	8	6,100	303,400	2.01%
42	*Mississippi*	1	10,900	305,600	3.57%
329	*Mississippi*	2	4,200	266,900	1.57%
306	*Mississippi*	3	5,200	303,900	1.71%
314	*Mississippi*	4	5,100	304,900	1.67%
352	*Missouri*	1	4,900	331,500	1.48%
198	*Missouri*	2	8,300	378,600	2.19%
309	*Missouri*	3	6,300	370,000	1.70%
353	*Missouri*	4	4,800	324,900	1.48%
303	*Missouri*	5	6,000	345,300	1.74%
321	*Missouri*	6	5,800	355,900	1.63%
208	*Missouri*	7	7,300	337,400	2.16%
222	*Missouri*	8	6,300	298,500	2.11%
426	*Montana*	Statewide	4,200	480,000	0.88%
307	*Nebraska*	1	5,500	321,700	1.71%
293	*Nebraska*	2	5,600	316,300	1.77%
416	*Nebraska*	3	3,100	305,600	1.01%
415	*Nevada*	1	3,000	284,700	1.05%
284	*Nevada*	2	5,700	309,400	1.84%
402	*Nevada*	3	3,900	336,500	1.16%
396	*Nevada*	4	3,300	274,300	1.20%
65	*New Hampshire*	1	11,200	352,600	3.18%
33	*New Hampshire*	2	12,800	332,200	3.85%
256	*New Jersey*	1	6,600	339,200	1.95%
368	*New Jersey*	2	4,500	324,400	1.39%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
292	New Jersey	3	6,200	344,200	1.80%
239	New Jersey	4	6,600	326,400	2.02%
93	New Jersey	5	10,400	356,100	2.92%
157	New Jersey	6	8,600	353,600	2.43%
49	New Jersey	7	12,900	377,100	3.42%
120	New Jersey	8	9,700	371,000	2.61%
140	New Jersey	9	8,500	338,500	2.51%
274	New Jersey	10	5,800	310,700	1.87%
104	New Jersey	11	9,800	358,800	2.73%
242	New Jersey	12	7,100	352,400	2.01%
234	New Mexico	1	6,400	311,900	2.05%
429	New Mexico	2	2,100	273,100	0.77%
342	New Mexico	3	4,300	284,800	1.51%
141	New York	1	8,600	343,300	2.51%
139	New York	2	9,000	357,800	2.52%
273	New York	3	6,300	336,700	1.87%
374	New York	4	4,700	342,500	1.37%
315	New York	5	5,600	336,200	1.67%
305	New York	6	5,600	327,000	1.71%
159	New York	7	7,800	322,200	2.42%
346	New York	8	4,400	292,700	1.50%
366	New York	9	4,600	324,900	1.42%
347	New York	10	5,400	360,300	1.50%
351	New York	11	4,700	317,500	1.48%
290	New York	12	7,600	418,800	1.81%
350	New York	13	4,700	317,200	1.48%
337	New York	14	5,200	341,800	1.52%
358	New York	15	3,700	255,900	1.45%
326	New York	16	5,200	323,600	1.61%
249	New York	17	6,800	341,400	1.99%
18	New York	18	14,800	332,100	4.46%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
84	New York	19	9,700	327,300	2.96%
296	New York	20	6,300	357,600	1.76%
272	New York	21	5,800	309,200	1.88%
131	New York	22	8,200	320,200	2.56%
182	New York	23	7,400	324,600	2.28%
166	New York	24	7,700	327,300	2.35%
73	New York	25	10,300	335,400	3.07%
294	New York	26	5,800	327,700	1.77%
199	New York	27	7,400	337,800	2.19%
186	North Carolina	1	6,600	291,800	2.26%
20	North Carolina	2	12,900	303,800	4.25%
398	North Carolina	3	3,600	305,600	1.18%
95	North Carolina	4	10,000	350,900	2.85%
44	North Carolina	5	11,500	324,500	3.54%
35	North Carolina	6	13,100	341,800	3.83%
324	North Carolina	7	5,100	315,400	1.62%
27	North Carolina	8	12,400	301,700	4.11%
111	North Carolina	9	9,900	371,400	2.67%
23	North Carolina	10	13,600	324,000	4.20%
88	North Carolina	11	8,700	295,400	2.95%
76	North Carolina	12	9,800	319,800	3.06%
32	North Carolina	13	13,600	349,900	3.89%
424	North Dakota	Statewide	3,400	370,800	0.92%
261	Ohio	1	6,400	332,300	1.93%
280	Ohio	2	6,000	323,600	1.85%
278	Ohio	3	6,200	333,000	1.86%
91	Ohio	4	9,300	317,900	2.93%
105	Ohio	5	9,100	334,200	2.72%
190	Ohio	6	6,500	292,300	2.22%
90	Ohio	7	9,600	326,800	2.94%
119	Ohio	8	8,600	328,800	2.62%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
224	Ohio	9	6,600	315,000	2.10%
206	Ohio	10	6,800	312,800	2.17%
289	Ohio	11	5,000	275,200	1.82%
255	Ohio	12	7,000	359,500	1.95%
107	Ohio	13	8,600	320,400	2.68%
80	Ohio	14	10,500	349,700	3.00%
283	Ohio	15	6,200	336,400	1.84%
137	Ohio	16	9,000	355,600	2.53%
130	Oklahoma	1	9,300	361,900	2.57%
304	Oklahoma	2	5,000	290,300	1.72%
378	Oklahoma	3	4,400	329,900	1.33%
223	Oklahoma	4	7,400	350,900	2.11%
319	Oklahoma	5	5,700	348,800	1.63%
5	Oregon	1	31,600	377,200	8.38%
317	Oregon	2	5,200	314,200	1.65%
87	Oregon	3	11,300	383,300	2.95%
179	Oregon	4	7,100	309,000	2.30%
164	Oregon	5	7,700	326,700	2.36%
299	Pennsylvania	1	4,800	273,300	1.76%
379	Pennsylvania	2	3,600	273,100	1.32%
94	Pennsylvania	3	9,100	317,700	2.86%
163	Pennsylvania	4	8,100	342,900	2.36%
162	Pennsylvania	5	7,500	316,800	2.37%
123	Pennsylvania	6	9,400	362,300	2.59%
194	Pennsylvania	7	7,500	339,700	2.21%
122	Pennsylvania	8	9,300	357,800	2.60%
215	Pennsylvania	9	6,500	304,800	2.13%
146	Pennsylvania	10	7,800	312,500	2.50%
217	Pennsylvania	11	7,000	329,300	2.13%
142	Pennsylvania	12	8,300	331,900	2.50%
225	Pennsylvania	13	7,100	339,000	2.09%

Supple- mental Table 5 (cont.)	Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
	254	Pennsylvania	14	6,300	323,200	1.95%
	99	Pennsylvania	15	9,600	343,800	2.79%
	161	Pennsylvania	16	7,800	327,700	2.38%
	147	Pennsylvania	17	7,800	312,600	2.50%
	148	Pennsylvania	18	8,600	345,000	2.49%
	106	Rhode Island	1	6,800	250,900	2.71%
	101	Rhode Island	2	7,200	260,300	2.77%
	361	South Carolina	1	4,300	299,800	1.43%
	230	South Carolina	2	6,300	305,600	2.06%
	36	South Carolina	3	10,100	264,500	3.82%
	63	South Carolina	4	9,600	301,000	3.19%
	58	South Carolina	5	9,100	275,200	3.31%
	253	South Carolina	6	5,000	253,500	1.97%
	170	South Carolina	7	6,300	269,400	2.34%
	339	South Dakota	1	6,300	415,600	1.52%
	125	Tennessee	1	7,700	297,600	2.59%
	285	Tennessee	2	6,000	327,200	1.83%
	117	Tennessee	3	7,800	297,000	2.63%
	92	Tennessee	4	9,200	314,500	2.93%
	103	Tennessee	5	9,700	353,400	2.74%
	158	Tennessee	6	7,400	304,500	2.43%
	79	Tennessee	7	8,600	285,800	3.01%
	177	Tennessee	8	6,900	299,200	2.31%
	248	Tennessee	9	6,100	305,300	2.00%
	313	Texas	1	5,000	297,700	1.68%
	22	Texas	2	15,400	364,600	4.22%
	8	Texas	3	21,100	371,200	5.68%
	212	Texas	4	6,400	299,300	2.14%
	238	Texas	5	6,100	300,800	2.03%
	160	Texas	6	8,400	348,800	2.41%
	72	Texas	7	11,600	376,300	3.08%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
260	Texas	8	6,000	309,200	1.94%
196	Texas	9	7,200	326,400	2.21%
11	Texas	10	16,900	342,600	4.93%
410	Texas	11	3,400	308,800	1.10%
85	Texas	12	10,000	337,500	2.96%
389	Texas	13	3,900	309,000	1.26%
386	Texas	14	3,900	303,300	1.29%
399	Texas	15	3,300	280,900	1.17%
250	Texas	16	5,600	281,300	1.99%
26	Texas	17	13,600	329,300	4.13%
17	Texas	18	13,700	306,400	4.47%
407	Texas	19	3,500	310,700	1.13%
388	Texas	20	4,000	311,400	1.28%
192	Texas	21	8,000	361,200	2.21%
251	Texas	22	7,000	352,500	1.99%
391	Texas	23	3,600	289,700	1.24%
54	Texas	24	13,100	388,600	3.37%
34	Texas	25	11,600	302,200	3.84%
133	Texas	26	9,400	368,300	2.55%
330	Texas	27	4,800	305,600	1.57%
406	Texas	28	3,000	266,300	1.13%
219	Texas	29	6,200	292,900	2.12%
200	Texas	30	6,400	292,300	2.19%
4	Texas	31	34,400	323,000	10.65%
38	Texas	32	13,600	360,900	3.77%
46	Texas	33	9,900	283,900	3.49%
412	Texas	34	2,600	242,200	1.07%
213	Texas	35	6,800	318,200	2.14%
343	Texas	36	4,400	291,900	1.51%
220	Utah	1	6,600	312,400	2.11%
189	Utah	2	6,800	305,700	2.22%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
136	Utah	3	7,900	311,200	2.54%
165	Utah	4	7,800	331,500	2.35%
116	Vermont	Statewide	8,600	327,300	2.63%
344	Virginia	1	5,300	352,400	1.50%
370	Virginia	2	4,700	339,800	1.38%
382	Virginia	3	4,200	320,100	1.31%
295	Virginia	4	5,800	327,900	1.77%
218	Virginia	5	6,700	316,100	2.12%
271	Virginia	6	6,400	339,900	1.88%
275	Virginia	7	6,800	364,600	1.87%
417	Virginia	8	4,200	423,700	0.99%
102	Virginia	9	8,200	298,400	2.75%
203	Virginia	10	8,200	376,400	2.18%
365	Virginia	11	5,700	400,900	1.42%
82	Washington	1	9,900	332,300	2.98%
387	Washington	2	4,100	318,900	1.29%
70	Washington	3	8,900	284,500	3.13%
427	Washington	4	2,300	284,500	0.81%
325	Washington	5	4,700	291,500	1.61%
392	Washington	6	3,400	275,500	1.23%
233	Washington	7	7,800	380,000	2.05%
369	Washington	8	4,400	318,000	1.38%
268	Washington	9	6,500	341,400	1.90%
231	Washington	10	6,000	291,300	2.06%
310	West Virginia	1	4,400	258,700	1.70%
377	West Virginia	2	3,600	266,900	1.35%
401	West Virginia	3	2,600	223,000	1.17%
75	Wisconsin	1	10,500	342,500	3.07%
210	Wisconsin	2	8,400	390,000	2.15%
77	Wisconsin	3	10,700	353,500	3.03%
143	Wisconsin	4	7,700	308,000	2.50%

Rank (by jobs displaced as a share of total)	State	District	Net jobs displaced	District employment (in 2011)	Jobs displaced as a share of employment
57	*Wisconsin*	5	12,300	370,600	3.32%
69	*Wisconsin*	6	11,100	353,600	3.14%
134	*Wisconsin*	7	8,600	338,400	2.54%
118	*Wisconsin*	8	9,500	362,800	2.62%
434	*Wyoming*	Statewide	2,000	290,000	0.69%
Total*			3,360,600	140,400,900	2.39%

* Totals may vary slightly due to rounding.

Source: Authors' analysis of U.S. Census Bureau 2013, U.S. International Trade Commission 2018, Bureau of Labor Statistics Employment Projections program 2017a and 2017b. For a more detailed explanation of data sources and computations, see the appendix.

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