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UNFAIR CHINA TRADE COSTS LOCAL JOBS

2.4 Million Jobs Lost, Thousands Displaced in Every U.S. Congressional District

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Since China entered The World Trade Organization (WTO) in 2001, the extraordinary growth of U.S. trade with China has had a dramatic effect on U.S. workers and the domestic economy. The United States is piling up foreign debt, losing export capacity, and the growing trade deficit has been a prime contributor to the crisis in U.S. manufacturing employment. Between 2001 and 2008, 2.4 million jobs were lost or displaced, including 91,400 in 2008 alone, despite a dramatic decline in total and bilateral U.S.-China trade deficits that began in the second half of that year. Growing trade deficits have cost jobs in every Congressional district, including the District of Columbia and Puerto Rico (this study reports these district-level data for the first time).

The computers, electronic equipment, and parts industries experienced the largest growth in trade deficits with China, leading with 627,700 (26%) of all jobs displaced between 2001 and 2008. As a result, the hardest hit Congressional districts were located in California and Texas, where remaining jobs in those industries are concentrated, and in North Carolina, which was hard hit by job displacement in a variety of manufacturing industries.

But the jobs impact of the China trade deficit is not restricted to job loss and displacement. Competition with low-wage workers from less-developed countries has also driven down wages for other workers in manufacturing and reduced the wages and bargaining power of similar workers throughout the economy. The impact has affected essentially all production workers with less than a four-year college degree—roughly 70% of the private-sector workforce, or about 100 million workers. For a typical full-time median-wage earner in 2006, these indirect losses totaled approximately \$1,400 per worker (Bivens 2008). China is the most important source of downward pressure from trade with less-developed countries, because it pays very low wages and because it was responsible for nearly

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40% of U.S. non-oil imports from less-developed countries in 2008.

This study finds the following:

- The 2.4 million jobs lost/workers displaced nationwide since 2001 are distributed among all 50 states, the District of Columbia, and Puerto Rico, with the biggest losers, in numeric terms: California (370,000 jobs), Texas (193,700), New York (140,500), Illinois (105,500), Florida (101,600), Pennsylvania (95,700), North Carolina (95,100), Ohio (91,800), Georgia (78,100), and Massachusetts (72,800).
- The hardest-hit states, as a share of total state employment, are New Hampshire (16,300, 2.35%), North Carolina (95,100, 2.30%), Massachusetts (72,800, 2.25%), California (370,000, 2.23%), Oregon (38,600, 2.19%), Minnesota (58,800, 2.17%), Rhode Island (10,600, 2.01%), Alabama (39,300, 1.97%), Idaho (13,500, 1.97%), and South Carolina (38,400, 1.97%).
- Rapidly growing imports of computer and electronic parts (including computers, parts, semiconductors, and audio-video equipment) accounted for more than 40% of the \$186 billion increase in the U.S. trade deficit with China between 2001 and 2008. The \$73 billion deficit in advanced technology products with China in 2008 was responsible for 27% of the total U.S.-China trade deficit. The growth of this deficit contributed to the elimination of 627,700 U.S. jobs in computer and electronic products in this period. Other hard-hit industrial sectors include apparel and accessories (150,200 jobs), miscellaneous manufactured goods (136,900), and fabricated metal products (108,700); several service sectors were also hard hit by indirect job losses, including administrative support services (153,300) and professional, scientific, and technical services (139,000).
- The hardest-hit Congressional districts had large numbers of workers displaced by manufacturing trade, especially in computer and electronic parts, apparel, and durable goods manufacturing. The three hardest hit Congressional districts were all located in

Silicon Valley in California, including the 15th (Santa Clara county, 26,900 jobs, 8.3% of all jobs in the district), the 14th (Palo Alto and nearby cities, 20,300 jobs, 6.3%), and the 16th (San Jose and other parts of Santa Clara county, 18,200 jobs, 6.0%).

- The hardest hit Congressional districts were concentrated in states that were heavily exposed to growing China trade deficits in computer and electronic products and other industries such as furniture, textiles, and apparel. Of the top 20 hardest hit districts (see Table 5, below), eight were in California (in rank order, the 15th, 14th, 16th, 13th, 31st, 34th, 50th, and 47th), four were in North Carolina (10th, 6th, 4th and 5th), three were in Texas (31st, 10th and 3rd), two were in Massachusetts (5th and 3rd), and one each in Oregon (1st), Georgia (9th), and Alabama (5th). Each of these districts lost more than 8,600 jobs (2.8% of total jobs in the district).

Currency manipulation

A major cause of the rapidly growing U.S. trade deficit with China is currency manipulation. Unlike other currencies, the Chinese yuan does not fluctuate freely against the dollar. While the value of its currency should have increased as China exported more and more goods, it has instead remained artificially low, and China has aggressively acquired dollars to further depress the value of its own currency. China has tightly pegged its currency to the U.S. dollar at a rate that encourages a large bilateral surplus with the United States. China had to purchase \$453 billion in U.S. treasury bills and other securities between December 2008 and December 2009, alone, to maintain this peg.¹ China has acquired a total of \$2.4 trillion in foreign exchange reserves as of December 2009 (Chinability 2010). About 70% of these reserves are held in U.S. dollars. This intervention makes the yuan artificially cheap relative to the dollar, effectively subsidizing Chinese exports. The best estimates place this effective subsidy at roughly 40% of the U.S. dollar, even after recent appreciation in the yuan (Cline and Williamson 2010).² Currency intervention also artificially raises the cost of U.S. exports to China by a similar amount, making U.S. goods less competitive in that country.

TABLE 1

U.S. China trade and job displacement, 2001-08
U.S. trade with China (\$billions, nominal)

	2001	2007	2008	Changes in: (\$billions)			Percent change
				2001-07	2007-08	2001-08	2001-08
<i>U.S. domestic exports*</i>	\$18.0	\$61.0	\$67.2	\$43.1	\$6.2	\$49.2	274%
<i>U.S. imports for consumption</i>	102.1	323.1	337.5	221.0	14.4	235.4	231
<i>U.S. trade balance</i>	84.1	262.1	270.3	178.0	8.3	186.2	221
<i>Average annual change in the trade deficit</i>				29.7	8.3	26.6	18
U.S. trade-related jobs supported and displaced (thousands of jobs)							
	2001	2007	2008	Changes in: (thousands of jobs)			Percent change
				2001-07	2007-08	2001-08	2001-08
<i>U.S. domestic exports</i>	166.2	470.0	518.8	303.8	48.8	352.6	212%
<i>U.S. imports for consumption-jobs displaced</i>	1,188.2	3,819.3	3,959.5	2,631.1	140.3	2,771.3	233
<i>U.S. trade balance-net jobs lost</i>	1,022.0	3,349.3	3,440.7	2,327.3	91.4	2,418.8	237
<i>Average annual job displacement</i>				387.9	91.4	345.5	19

* Domestic exports are goods produced in the United States. Total exports as reported by the U.S. International Trade Commission include re-exports, i.e. goods produced in other countries and shipped through the United States. Total exports were \$71.5 billion in 2008 while U.S. re-exports to China represent 6.0% of total exports. The employment estimates shown here are based on domestic exports only.

SOURCE: EPI analysis of Census Bureau, USITC, and BLS data

Other policies by the Chinese government also encourage exports. China extensively suppresses labor rights, which lowers production costs within China. An AFL-CIO study estimated that repression of labor rights by the Chinese government has lowered manufacturing wages of Chinese workers by 47% to 86% (AFL-CIO 2006, 138). China has also been shown to provide massive direct subsidization of export production in many key industries (see, e.g., Haley 2008, 2009). Finally, it maintains strict, non-tariff barriers to imports. As a result, China's exports to the United States of \$337.5 billion in 2008 were more than five times greater than U.S. exports to China, which totaled only \$67.2 billion (Table 1). China's trade surplus was responsible for 68.5% of the U.S. total non-oil trade deficit in 2008, making the China trade relationship this country's most imbalanced by far.

Unless China raises the real value of the yuan by at least 40% and eliminates these other trade distortions, the U.S. trade deficit and job losses will continue to grow rapidly in the future. While the overall U.S. trade deficit

improved slightly in 2008—largely as a result of collapse in world trade associated with the onset of the great recession of 2008-09—the U.S. deficit with China increased \$8.3 billion, mostly because China engaged in currency manipulation designed to suppress the value of the yuan. The increase in the U.S.-China trade deficit declined from \$26.6 billion in 2007 to \$8.3 billion in 2008, reflecting the collapse in demand in the United States.

Beginning in 2002, the dollar declined more than 30% against several major currencies such as the Euro and the Canadian dollar. However, yuan appreciation was largely delayed until late 2007 and 2008—too little and too late to be of any help in slowing the current U.S.-China trade gap to date.³ Furthermore, the appreciation of the yuan has had little effect on the prices of U.S. imports from China, which rose only 2.5% between July 2005 (when the yuan was first adjusted) and May 2008, much less than the 19% appreciation of the yuan in that period (Congressional Budget Office 2008, 2). While Chinese exporters were able to absorb the impact of a higher yuan

by lowering profit margins, at least through mid-2008, further appreciation is likely to be reflected in higher prices.⁴

China's currency manipulation has compelled other countries to follow similar policies in order to protect their relative competitiveness and to promote their own exports. Widespread currency manipulation has also contributed to the growth of very large, global current account imbalances. Cline and Williamson (2010) call for a substantial realignment of the dollar against currencies from five Asian countries that are undervalued relative to the dollar, in order to rebalance global current account flows: China, Hong Kong, Malaysia, Taiwan, and Singapore. They call for reducing the U.S. current account deficit to 2.8% of GDP in 2012 (from a projected 5.6% if currencies are not realigned). They estimate that the yuan needs to rise 41% against the U.S. dollar, and the other countries listed by 25% to 32%. Cline and Williamson project that global currency realignment would result in a 5.6% fall in the trade-weighted value of the U.S. dollar across all currencies. Reducing the U.S. current account to a lower level, such as 1% of GDP, would require proportionately greater rebalancing of currencies, especially those of Asian countries.

Undervaluation of the yuan has forced other countries to bear the burden of global current account realignment pressures. As a result, the currencies of many other countries, including Australia, New Zealand, South Africa, and Brazil, as well as the United States, have become overvalued on a trade-weighted basis.

As a result of China's currency manipulation and other trade distorting practices, including extensive subsidies, legal and illegal barriers to imports, dumping and suppression of wages and labor rights, China's share of the U.S. trade surplus has soared, especially in 2009. Between 2008 and 2009, the U.S. goods trade deficit declined 38.5%, while the U.S.-China trade deficit fell only 15.4%. China's share of the total, U.S. non-oil trade deficit jumped from 68.6% in 2008 to 80.2% in 2009 (Scott 2010).

China's entry into the WTO was supposed to bring it into compliance with an enforceable, rules-based regime that would require that it open its markets to imports from the United States and other nations. The United States also negotiated a series of special safeguard measures designed to limit the disruptive effects of surging Chinese

imports on domestic producers. However, the core of the agreement failed to include any protections to maintain or improve labor or environmental standards and, prior to 2007, the administration rejected all requests for special safeguards protection. In September 2009, the Obama administration announced that it would take action to restrict imports of Chinese tires for three years under the special safeguard measures, the first time since 2001 that these measures had been utilized.

China's entry into the WTO has further tilted the international economic playing field against domestic workers and firms and in favor of multinational companies from the United States and other countries as well as state- and privately owned exporters in China. This shift has increased the global "race to the bottom" in wages and environmental quality and closed thousands of U.S. factories, decimating employment in a wide range of communities, states, and entire regions of the United States. U.S. national interests have suffered while U.S. multinationals have enjoyed record profits on their foreign direct investments (Scott 2008).

Failed expectations

Proponents of China's entry into the WTO frequently claimed that it would create jobs in the United States, increase U.S. exports, and improve the trade deficit with China. President Clinton claimed that the agreement allowing China into the WTO, which was negotiated during his administration, "creates a win-win result for both countries" (Clinton 2000, 9). He argued that exports to China "now support hundreds of thousands of American jobs" and that "these figures can grow substantially with the new access to the Chinese market the WTO agreement creates" (Clinton 2000, 10). Others in the White House, such as Kenneth Libberthal, the special advisor to the president and senior director for Asia affairs at the National Security Council, echoed Clinton's assessment:

Let's be clear as to why a trade deficit might decrease in the short term. China exports far more to the U.S. than it imports [from] the U.S....It will not grow as much as it would have grown without this agreement and over time clearly it will shrink with this agreement.⁵

Promises about jobs and exports misrepresented the real effects of trade on the U.S. economy: trade both creates and destroys jobs. Increases in U.S. exports tend to create jobs in the United States, but increases in imports will lead to job loss—by destroying existing jobs and preventing new job creation—as imports displace goods that otherwise would have been made in the United States by domestic workers.

The impact of trade changes on employment is estimated here by calculating the labor content of changes in the trade balance—the difference between exports and imports. Each \$1 billion in computer exports to China from the United States supports American jobs. However, each \$1 billion in computer imports *from* China displaces the American workers who would have been employed making them in the United States. On balance, the net employment effect of trade flows depends on the growth in the trade *deficit*, not just exports.

Another critically important promise made by the promoters of liberalized U.S.-China trade was that the United States would benefit because of increased exports to a large and growing consumer market in China. However, despite widespread reports of the rapid growth of the Chinese middle class, this growth has not resulted in a significant increase in U.S. consumer exports to China. The most rapidly growing exports to China are bulk commodities such as grains, scrap, and chemicals; intermediate products such as semiconductors; and producer durables such as aircraft (see Table 3 below). Furthermore, the increase in U.S. exports to China since 2001 has been overwhelmed by the growth of U.S. imports, as shown below.

Growing trade deficits and job losses

The U.S. trade deficit with China has risen from \$84 billion in 2001 to \$270 billion in 2008, an increase of \$186 billion, as shown in Table 1. Since China entered the WTO in 2001, this deficit has increased by \$26.6 billion per year, on average, or 18% per year.

While it is true that exports support jobs in the United States, it is equally true that imports displace them. The net effect of trade flows on employment is determined by changes in the *trade balance*.⁶ The employment impacts of

growing trade deficits 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 201 U.S. industries, 84 of which are in the manufacturing sector.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.⁸ The net of these two numbers is essentially the jobs displaced by growing trade deficits, holding all else equal.

Jobs displaced by the growing China trade deficit are a net drain on employment in trade-related industries, especially those in the manufacturing sector. Even if increases in demand in other sectors absorb all the workers displaced by trade (an unlikely event), it is likely that job quality will suffer, as many non-traded industries such as retail trade and home health care pay lower wages and have less-comprehensive benefits than traded-goods industries.

U.S. exports to China in 2001 supported 166,200 jobs, but U.S. imports displaced production that would have supported 1,188,200 jobs, as shown in the bottom half of Table 1. Therefore, the \$84 billion trade deficit in 2001 displaced 1,022,000 jobs in that year. Job displacement rose to 3,349,300 jobs in 2007 and 3,440,700 jobs in 2008.

Since China's entry into the WTO in 2001 through 2008, the increase in U.S.-China trade deficits eliminated or displaced 2,418,800 U.S. jobs, as shown in the bottom half of Table 1. In 2008 alone 91,400 jobs were lost, either by the elimination of existing jobs or by the prevention of new job creation. On average, 345,500 jobs per year have been lost or displaced since China's entry into the WTO.

Trade and jobs, industry details

The composition of imports from China is changing in fundamental ways, with serious implications for certain kinds of high-skill, high-wage jobs once thought to be the hallmark of the U.S. economy. China is moving rapidly “upscale,” from low-tech, low-skilled, labor-intensive industries such as apparel, footwear, and basic electronics to more capital- and skills- intensive sectors such as computers, electrical machinery, and motor vehicles; it has

TABLE 2

Trade with China by industry, 2001-08 (millions of dollars)*

	2001			2008			Change in trade, 2001-08		
	Imports	Exports	Net exports	Imports	Exports	Net exports	Imports	Exports	Net exports
Agriculture, forestry, fisheries	\$749	\$1,345	\$596	\$2,411	\$10,222	\$7,811	\$1,662	\$8,877	\$7,215
Mining	250	80	-171	694	848	154	444	769	325
<i>Oil and gas</i>	89	8	-81	387	2	-385	298	-6	-304
<i>Minerals and ores</i>	161	71	-90	307	846	539	146	775	629
Manufacturing	100,866	15,383	-85,483	333,879	48,300	-285,579	233,014	32,918	-200,096
Non-durable goods	23,412	975	-22,436	58,214	3,323	-54,891	34,802	2,348	-32,454
<i>Food and kindred products</i>	591	763	173	3,000	2,616	-384	2,410	1,853	-557
<i>Beverage and tobacco products</i>	30	4	-26	30	36	5	0	31	31
<i>Textiles and fabrics</i>	328	74	-254	1,301	382	-920	973	307	-666
<i>Textile mill products</i>	1,854	13	-1,840	7,297	62	-7,235	5,443	49	-5,394
<i>Apparel and accessories</i>	8,597	30	-8,567	26,153	27	-26,126	17,556	-3	-17,559
<i>Leather and allied products</i>	12,012	90	-11,922	20,431	200	-20,231	8,419	110	-8,309
Industrial supplies	9,571	3,239	-6,332	33,071	11,775	-21,295	23,500	8,537	-14,963
<i>Wood products</i>	887	25	-862	2,765	69	-2,696	1,878	44	-1,834
<i>Paper</i>	706	501	-205	2,813	1,355	-1,459	2,107	854	-1,253
<i>Printed matter and related products</i>	730	44	-686	2,295	155	-2,139	1,564	111	-1,453
<i>Petroleum and coal products</i>	237	88	-149	393	375	-18	156	287	131
<i>Chemicals</i>	1,810	2,180	369	9,697	8,566	-1,130	7,886	6,387	-1,500
<i>Plastics and rubber products</i>	2,707	201	-2,506	10,011	752	-9,259	7,304	551	-6,752
<i>Nonmetallic mineral products</i>	2,493	201	-2,292	5,097	503	-4,594	2,604	302	-2,302
Durable goods	67,883	11,169	-56,714	242,595	33,202	-209,393	174,712	22,033	-152,678
<i>Primary metal</i>	794	236	-558	10,601	2,925	-7,675	9,807	2,690	-7,117
<i>Fabricated metal products</i>	3,862	291	-3,571	14,838	1,304	-13,534	10,976	1,013	-9,962
<i>Not specified metal industries</i>			0			0	0	0	0
<i>Machinery, except electrical</i>	4,518	2,430	-2,088	17,569	7,218	-10,352	13,052	4,788	-8,264
<i>Computer and electronic parts</i>	24,304	4,446	-19,858	110,991	11,074	-99,917	86,687	6,628	-80,059
<i>Computer and peripheral equipment</i>	8,174	1,182	-6,991	46,035	1,321	-44,714	37,862	139	-37,723
<i>Communications, audio and video equipment</i>	9,395	836	-8,559	46,798	908	-45,890	37,403	72	-37,331
<i>Navigational, measuring, electromedical, and control instruments</i>	1,237	822	-415	4,402	2,703	-1,699	3,165	1,881	-1,284
<i>Semiconductor and other electronic components & magnetic and optical media production</i>	5,499	1,606	-3,893	13,755	6,141	-7,614	8,256	4,535	-3,721
<i>Electrical equipment, appliances, and component</i>	8,997	457	-8,540	22,156	1,648	-20,508	13,159	1,191	-11,968

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TABLE 2 (CONT.)

Trade with China by industry, 2001-08 (millions of dollars)*

	2001			2008			Change in trade, 2001-08		
	Imports	Exports	Net exports	Imports	Exports	Net exports	Imports	Exports	Net exports
<i>Transportation equipment</i>	1,816	2,837	1,020	8,066	7,478	-588	6,250	4,642	-1,608
<i>Motor vehicles and parts</i>	1,046	264	-782	6,039	1,815	-4,224	4,993	1,551	-3,443
<i>Aerospace product and parts</i>	88	2,555	2,467	387	5,429	5,042	299	2,874	2,575
<i>Railroad, ship, and other transportation equipment</i>	682	17	-665	1,639	234	-1,405	957	217	-740
<i>Furniture and fixtures</i>	4,942	20	-4,922	14,520	91	-14,429	9,579	72	-9,507
<i>Miscellaneous manufactured commodities</i>	18,650	453	-18,197	43,854	1,464	-42,390	25,204	1,011	-24,193
Information	6	0	-6	2	23	21	-4	23	28
Scrap and non-comparable imports	194	1,079	884	449	7,541	7,092	255	6,462	6,208
TOTAL	102,066	17,886	-84,180	337,435	66,935	-270,500	235,369	49,049	-186,320

* Totals vary slightly due to rounding.

SOURCE: EPI analysis of Census Bureau, ITC, and BLS data.

also developed a rapidly growing trade surplus in high technology products.

U.S. trade with China in 2001 and 2008 is summarized in **Table 2**. Trade flows increased dramatically in this period, especially imports, which rose from \$102 billion in 2001 to \$337 billion in 2008.⁹ Manufactured goods were 99% of total imports and included a wide array of commodities. Computer and electronic products were responsible for one-third of total imports, including computer equipment (\$46 billion, or 13.6%) and communications, audio, and video equipment (\$47 billion, 13.9%). Other major importing sectors included apparel (\$26 billion, 7.8%) and miscellaneous manufactured products (\$44 billion, 13.0%).

U.S. exports rose rapidly in this period, but from a much smaller base, from \$18 billion in 2001 to \$67 billion in 2008. Manufacturing was the top industry exporting to China—72% of exports to China in 2008 were manufactured goods. Scrap and second-hand goods industries (that support no jobs in the BLS models) made up 11.3% (\$7.5 billion) of the total. Within manufacturing, key export sectors included chemicals (\$8.6 billion, or 12.8% of total exports), aerospace products and parts (\$5.4

billion, 8.1%), machinery (\$7.2 billion, 10.8%), and semiconductors and components (\$6.1 billion, 9.2%). However, the scale of U.S. exports is dwarfed by imports, which exceeded the value of exports by more than 5 to 1.

The data in Table 2 show that China is rapidly diversifying its export base and expanding into higher value-added commodities such as computer and electronic products, aircraft, and auto parts and machinery. The United States has had a trade deficit with China in advanced technology products (ATP) throughout this period, but it increased more than six-fold, from \$11.8 billion in 2002 to \$74.0 billion in 2008.

The United States had a deficit in its ATP trade with the rest of the world in 2002. However, rapid growth of U.S. ATP exports to the rest of the world, which increased 7.1% per year between 2002 and 2008, generated a \$13 billion surplus in 2008. This sector is enjoying some trade success at the moment. However, this small surplus was completely overwhelmed by the U.S. ATP deficit with China in 2008. As a result, the United States ran an overall deficit in ATP products in 2008, as is has in every year since 2002. The U.S. global ATP trade deficit was \$61.1 billion in 2008.

TABLE 3

Change in net jobs created or displaced by industry, 2001-08

	Industry total*	Share of total
<i>Agriculture, forestry, fisheries</i>	27,300	-1.1%
<i>Mining</i>	-5,300	0.2
<i>Oil and gas</i>	-1,300	0.1
<i>Minerals and ores</i>	-4,000	0.2
<i>Utilities</i>	-6,800	0.3
<i>Construction</i>	-13,700	0.6
<i>Manufacturing</i>	-1,616,300	66.9
<i>Non-durable goods</i>	-301,000	12.5
<i>Food and kindred products</i>	-7,900	0.3
<i>Beverage and tobacco products</i>	-200	0.0
<i>Textiles and fabrics</i>	-55,100	2.3
<i>Textile mill products</i>	-33,100	1.4
<i>Apparel and accessories</i>	-150,200	6.2
<i>Leather and allied products</i>	-54,400	2.3
<i>Industrial supplies</i>	-177,600	7.4
<i>Wood products</i>	-20,900	0.9
<i>Paper</i>	-23,100	1.0
<i>Printed matter and related products</i>	-31,100	1.3
<i>Petroleum and coal products</i>	-1,400	0.1
<i>Chemicals</i>	-21,900	0.9
<i>Plastics and rubber products</i>	-59,200	2.4
<i>Nonmetallic mineral products</i>	-20,100	0.8
<i>Durable goods</i>	-1,137,700	47.1
<i>Primary metal</i>	-40,000	1.7
<i>Fabricated metal products</i>	-108,700	4.5
<i>Not specified metal industries</i>	0	0.0
<i>Machinery, except electrical</i>	-54,200	2.2
<i>Computer and electronic parts</i>	-627,700	26.0
<i>Computer and peripheral equipment</i>	-330,200	13.7
<i>Communications, audio and video equipment</i>	-148,600	6.2
<i>Navigational, measuring, electromedical, and control instruments</i>	-11,500	0.5
<i>Semiconductor and other electronic components & magnetic and optical media production</i>	-137,400	5.7
<i>Electrical equipment, appliances, and component</i>	-63,900	2.6
<i>Transportation equipment</i>	-22,100	0.9
<i>Motor vehicles and parts</i>	-25,100	1.0
<i>Aerospace product and parts</i>	6,000	-0.2
<i>Railroad, ship, and other transportation equipment</i>	-2,900	0.1

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TABLE 3 (CONT.)

Change in net jobs created or displaced by industry, 2001-08

	Industry total*	Share of total
<i>Furniture and fixtures</i>	-84,300	3.5 %
<i>Miscellaneous manufactured commodities</i>	-136,900	5.7
<i>Other not specified</i>	0	0.0
<i>Wholesale trade</i>	0	0.0
<i>Retail trade</i>	0	0.0
<i>Transportation</i>	-103,000	4.3
<i>Information</i>	-98,100	4.1
<i>Finance and insurance</i>	-52,500	2.2
<i>Real estate and rental and leasing</i>	-22,900	0.9
<i>Professional, scientific, and technical services</i>	-139,000	5.8
<i>Management of companies and enterprises</i>	-72,700	3.0
<i>Administrative and support and waste mgmt. and remediation svcs.</i>	-153,300	6.3
<i>Education services</i>	-5,600	0.2
<i>Health care and social assistance</i>	-900	0.0
<i>Arts, entertainment and recreation</i>	-14,300	0.6
<i>Accommodation and food services</i>	-52,300	2.2
<i>Other services</i>	-26,700	1.1
<i>Government</i>	-58,600	2.4
<i>Scrap and non-comparable imports</i>	0	0.0
Total jobs created or displaced	-2,414,900	100.0

* Totals vary slightly due to rounding.

SOURCE: EPI analysis of Census Bureau, ITC, and BLS data.

Trade deficits are highly correlated with job losses by industry, as shown in **Table 3**. Growing trade deficits with China eliminated 1,616,300 manufacturing jobs between 2001 and 2008, more than two-thirds (66.9%) of the total. By far the largest job losses occurred in the computer and electronic products sectors, which lost nearly 627,700 jobs (26.0% of the 2.4 million jobs lost overall). This sector included computer and peripheral equipment (330,200 jobs, 13.7%) and semiconductors and components (137,400 jobs, 5.7%). Other hard-hit sectors included apparel and accessories (150,200 jobs, 6.2%), fabricated metal products (108,700 jobs, 4.5%), and miscellaneous manufacturing (136,900 jobs, 5.7%). Several service industries, which provide key inputs to

traded-goods production, experienced large job losses, including administrative and support services (153,300 jobs, 6.3%) and professional, scientific, and technical services (139,000 jobs, 5.8%).

Trade, jobs, and the states

Growth in trade deficits with China has reduced demand for goods produced in every region of the United States and has led to job displacement in all 50 states and the District of Columbia, as shown in **Table 4a**. Jobs displaced due to growing deficits with China exceeded 1.95% of total employment in states such as New Hampshire, North Carolina, Massachusetts, California, Oregon, Minnesota, Rhode Island, Alabama, Idaho, and South Carolina, as

TABLE 4 A

**Net job loss due to growing trade deficits with China 2001-08,
ranked by share of state employment**

	Net jobs lost	Total employment*	Share of total state employment
<i>New Hampshire</i>	16,300	694,200	2.35%
<i>North Carolina</i>	95,100	4,133,000	2.30
<i>Massachusetts</i>	72,800	3,241,300	2.25
<i>California</i>	370,000	16,565,000	2.23
<i>Oregon</i>	38,600	1,764,400	2.19
<i>Minnesota</i>	58,800	2,713,700	2.17
<i>Rhode Island</i>	10,600	526,500	2.01
<i>Alabama</i>	39,300	1,995,900	1.97
<i>Idaho</i>	13,500	685,800	1.97
<i>South Carolina</i>	38,400	1,950,800	1.97
<i>Vermont</i>	6,200	329,700	1.88
<i>Colorado</i>	45,200	2,424,500	1.86
<i>Tennessee</i>	51,400	2,778,500	1.85
<i>Wisconsin</i>	52,300	2,849,100	1.84
<i>Indiana</i>	54,900	3,000,700	1.83
<i>Texas</i>	193,700	10,602,400	1.83
<i>Georgia</i>	78,100	4,310,000	1.81
<i>Illinois</i>	105,500	6,087,800	1.73
<i>Kentucky</i>	32,200	1,863,500	1.73
<i>Ohio</i>	91,800	5,412,100	1.70
<i>Puerto Rico</i>	20,000	1,199,900	1.67
<i>Pennsylvania</i>	95,700	5,825,400	1.64
<i>New Jersey</i>	69,100	4,212,200	1.64
<i>Mississippi</i>	19,400	1,201,700	1.61
<i>Arkansas</i>	19,800	1,237,400	1.60
<i>New York</i>	140,500	8,954,600	1.57
<i>Connecticut</i>	27,300	1,742,300	1.57
<i>Utah</i>	19,200	1,228,900	1.56
<i>Michigan</i>	68,300	4,552,700	1.50
<i>Arizona</i>	40,200	2,756,400	1.46
<i>Washington</i>	44,300	3,051,500	1.45
<i>Maine</i>	9,400	656,400	1.43
<i>Missouri</i>	38,700	2,774,000	1.40
<i>Virginia</i>	51,700	3,739,700	1.38
<i>Iowa</i>	20,900	1,530,400	1.37
<i>Maryland</i>	36,600	2,827,400	1.29

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TABLE 4A (CONT.)

**Net job loss due to growing trade deficits with China 2001-08,
ranked by share of state employment**

	Net jobs lost	Total employment*	Share of total state employment
<i>South Dakota</i>	5,200	407,600	1.28%
<i>Oklahoma</i>	20,700	1,626,900	1.27
<i>Kansas</i>	17,400	1,380,000	1.26
<i>Florida</i>	101,600	8,204,700	1.24
<i>Delaware</i>	5,000	407,900	1.23
<i>New Mexico</i>	10,600	868,100	1.22
<i>Nebraska</i>	10,800	916,600	1.18
<i>Nevada</i>	13,400	1,206,800	1.11
<i>District of Columbia</i>	3,100	286,400	1.08
<i>West Virginia</i>	8,000	753,200	1.06
<i>Louisiana</i>	17,400	1,872,100	0.93
<i>North Dakota</i>	3,100	336,900	0.92
<i>Hawaii</i>	5,000	605,800	0.83
<i>Montana</i>	3,600	464,900	0.77
<i>Alaska</i>	2,400	322,300	0.74
<i>Wyoming</i>	2,000	268,800	0.74
National plus Puerto Rico total**	2,414,900	141,348,700	

* Average employment in 2005-07.

** Totals vary slightly due to rounding.

SOURCE: EPI analysis of Census Bureau, ITC, and BLS data.

shown in Table 4a and **Figure A**. More than 300,000 jobs were lost in California and more than 100,000 each in Texas, New York, Illinois, and Florida, as shown in **Table 4b**. An alphabetical list of job losses by state is shown in **Table 4c**.

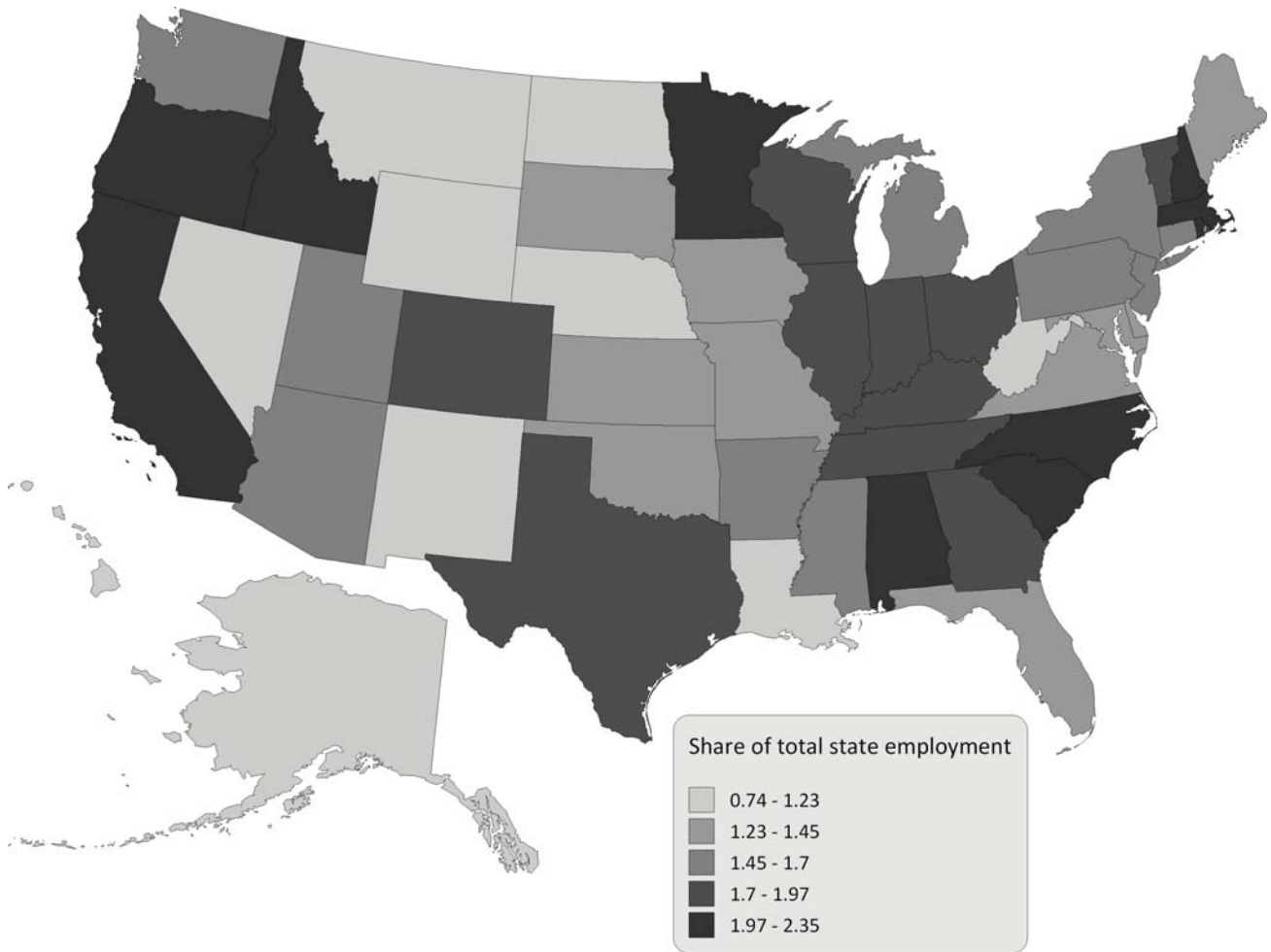
The state job loss map shows that the effects of growing trade deficits with China have been felt widely across the United States and that no area has been exempt from their impact. Job losses have been concentrated in states, with high-tech industries such as Massachusetts, California, and Oregon, and in a variety of manufacturing states, including New Hampshire, North Carolina, Minnesota, Alabama, and Rhode Island. Traditional manufacturing states, such as Wisconsin, Tennessee, Indiana, Illinois, and the Carolinas, were also hard hit.

Growing trade deficits with China have clearly reduced domestic employment in traded goods industries, especially in the manufacturing sector, which has been hard hit by plant closings and job losses. Workers displaced by trade from the manufacturing sector have had particular difficulty in securing comparable employment elsewhere in the economy. More than one-third of workers displaced from manufacturing dropped out of the labor force (Kletzer 2001, 101, Table D2), and average wages of those who found new jobs fell 11% to 13%.

Some economists 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. However, while the trade balance is but

FIGURE A

Job loss as share of total state employment, 2001-08



SOURCE: EPI analysis of Census Bureau, ITC, and BLS data.

one of many variables affecting aggregate job creation, 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 loss 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.

Further, even in the best-case scenario in which other jobs rise up one-for-one to replace those displaced by trade flows, the job numbers in this paper are a (conservative)

measure of the *involuntary* job displacement caused by growing trade deficits and a potent indicator of imbalance in the U.S. labor market and wider economy. Economists may label it a wash when the loss of a hundred manufacturing jobs in Ohio or Pennsylvania is offset by the hiring of a hundred construction workers in Phoenix, but in the real world these displacements often result in large income losses and even permanent damage to workers’ earning power (Bivens 2008b).

Lastly, many of the mechanisms that help push back against employment losses from growing trade deficits are not operating in the current recession (or jobless

TABLE 4B**Net job loss due to growing trade deficits with China 2001-08,
ranked by number of jobs displaced**

	Net jobs lost
<i>California</i>	370,000
<i>Texas</i>	193,700
<i>New York</i>	140,500
<i>Illinois</i>	105,500
<i>Florida</i>	101,600
<i>Pennsylvania</i>	95,700
<i>North Carolina</i>	95,100
<i>Ohio</i>	91,800
<i>Georgia</i>	78,100
<i>Massachusetts</i>	72,800
<i>New Jersey</i>	69,100
<i>Michigan</i>	68,300
<i>Minnesota</i>	58,800
<i>Indiana</i>	54,900
<i>Wisconsin</i>	52,300
<i>Virginia</i>	51,700
<i>Tennessee</i>	51,400
<i>Colorado</i>	45,200
<i>Washington</i>	44,300
<i>Arizona</i>	40,200
<i>Alabama</i>	39,300
<i>Missouri</i>	38,700
<i>Oregon</i>	38,600
<i>South Carolina</i>	38,400
<i>Maryland</i>	36,600
<i>Kentucky</i>	32,200
<i>Connecticut</i>	27,300
<i>Iowa</i>	20,900
<i>Oklahoma</i>	20,700
<i>Puerto Rico</i>	20,000
<i>Arkansas</i>	19,800
<i>Mississippi</i>	19,400
<i>Utah</i>	19,200
<i>Kansas</i>	17,400
<i>Louisiana</i>	17,400
<i>New Hampshire</i>	16,300

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TABLE 4B (CONT.)

**Net job loss due to growing trade deficits with China 2001-08,
ranked by number of jobs displaced**

	Net jobs lost
<i>Idaho</i>	13,500
<i>Nevada</i>	13,400
<i>Nebraska</i>	10,800
<i>Rhode Island</i>	10,600
<i>New Mexico</i>	10,600
<i>Maine</i>	9,400
<i>West Virginia</i>	8,000
<i>Vermont</i>	6,200
<i>South Dakota</i>	5,200
<i>Delaware</i>	5,000
<i>Hawaii</i>	5,000
<i>Montana</i>	3,600
<i>District of Columbia</i>	3,100
<i>North Dakota</i>	3,100
<i>Alaska</i>	2,400
<i>Wyoming</i>	2,000
National plus Puerto Rico total*	2,414,900

* Totals vary slightly due to rounding.

SOURCE: EPI analysis of Census Bureau, ITC, and BLS data.

recovery). The Federal Reserve cannot cut interest rates any lower than it already has, and interest-sensitive industries like residential construction are not seeing employment gains from lower rates. In short, in today's economy with high rates of unemployment, jobs displaced due to trade deficits with China are much more likely to be actual net, economy-wide losses, not just job reallocations.

Job loss by Congressional district

This study also reports, for the first time, on results of a new model which shows that growing trade deficits cost jobs in every Congressional district, including the District of Columbia and Puerto Rico.¹⁰ Because the computer, electronic equipment, and parts industries experienced the largest growth in trade deficits with China, the hardest-

hit Congressional districts were located in California and Texas, where remaining jobs in that industry are concentrated, and also in North Carolina, which was hard hit by job displacement in a variety of manufacturing industries.

The top 50 hardest-hit Congressional districts are shown in **Table 5**. The greatest concentrations of these districts are in California (15), Texas (5), North Carolina (5), Massachusetts (4), Minnesota (3), South Carolina (3), Colorado (2), and Illinois (2). These distributions reflect both the size of some states (e.g., California and Texas) and also the concentration of the industries hardest hit such as electronics, furniture, and other manufactured products.

The Congressional district job model is based on new data from the Census Bureau's American Community Survey (ACS). Prior studies in this series (such as Scott 2008) used state and demographic data drawn from the

TABLE 4 C**Net job loss due to growing trade deficits with China 2001-08,
alphabetically sorted**

	Net jobs lost
<i>Alabama</i>	39,300
<i>Alaska</i>	2,400
<i>Arizona</i>	40,200
<i>Arkansas</i>	19,800
<i>California</i>	370,000
<i>Colorado</i>	45,200
<i>Connecticut</i>	27,300
<i>Delaware</i>	5,000
<i>District of Columbia</i>	3,100
<i>Florida</i>	101,600
<i>Georgia</i>	78,100
<i>Hawaii</i>	5,000
<i>Idaho</i>	13,500
<i>Illinois</i>	105,500
<i>Indiana</i>	54,900
<i>Iowa</i>	20,900
<i>Kansas</i>	17,400
<i>Kentucky</i>	32,200
<i>Louisiana</i>	17,400
<i>Maine</i>	9,400
<i>Maryland</i>	36,600
<i>Massachusetts</i>	72,800
<i>Michigan</i>	68,300
<i>Minnesota</i>	58,800
<i>Mississippi</i>	19,400
<i>Missouri</i>	38,700
<i>Montana</i>	3,600
<i>Nebraska</i>	10,800
<i>Nevada</i>	13,400
<i>New Hampshire</i>	16,300
<i>New Jersey</i>	69,100
<i>New Mexico</i>	10,600
<i>New York</i>	140,500
<i>North Carolina</i>	95,100
<i>North Dakota</i>	3,100
<i>Ohio</i>	91,800

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TABLE 4C (CONT.)

**Net job loss due to growing trade deficits with China 2001-08,
alphabetically sorted**

	Net jobs lost
<i>Oklahoma</i>	20,700
<i>Oregon</i>	38,600
<i>Pennsylvania</i>	95,700
<i>Puerto Rico</i>	20,000
<i>Rhode Island</i>	10,600
<i>South Carolina</i>	38,400
<i>South Dakota</i>	5,200
<i>Tennessee</i>	51,400
<i>Texas</i>	193,700
<i>Utah</i>	19,200
<i>Vermont</i>	6,200
<i>Virginia</i>	51,700
<i>Washington</i>	44,300
<i>West Virginia</i>	8,000
<i>Wisconsin</i>	52,300
<i>Wyoming</i>	2,000
National plus Puerto Rico total*	2,414,900

* Totals vary slightly due to rounding.

SOURCE: EPI analysis of Census Bureau, ITC, and BLS data.

Census Bureau's Current Population Survey (CPS). The Current Population Survey (CPS) provides labor force estimates for various demographic groups at the national and state levels. It is a monthly survey of about 50,000 housing units that is conducted by the U.S. Bureau of Census (BOC) for the U.S. Bureau of Labor Statistics (BLS). According to the Census Bureau,

The American Community Survey (ACS) is a new program that is meant to collect census "long form" type data giving basic population characteristics continuously throughout the decade. Starting in 2003, the ACS will use a rolling sample of about 250,000 different housing units per month, spread evenly throughout the country, based on a continuously updated address list.

Both the regular availability of "census" type data and the updated address list provide opportunities and additional flexibility for the CPS design and estimates.

The greatest potential benefit to BLS from the ACS, because of its large sample size of 3,000,000 addresses per year, lies in enhancements of the models for labor force estimates at the state and sub-state levels.¹¹

The ACS thus provides a much richer dataset for analyzing the effects of trade on employment in the states and, for the first time, provides information that was used to estimate the distribution of employment by industry at the Congressional district level.

TABLE 5

**Net job loss due to growing trade deficits with China, 2001-08:
Top 50 Congressional districts**

State	Congressional district	Net jobs lost	Total employment*	Share of total employment
<i>California</i>	15	26,900	324,600	8.29%
<i>California</i>	14	20,300	320,700	6.33
<i>California</i>	16	18,200	303,700	5.99
<i>Texas</i>	31	14,900	338,200	4.41
<i>California</i>	13	13,400	313,900	4.27
<i>California</i>	31	11,400	291,600	3.91
<i>Massachusetts</i>	5	12,200	317,400	3.84
<i>Texas</i>	10	16,500	436,900	3.78
<i>Oregon</i>	1	14,600	388,100	3.76
<i>California</i>	34	9,600	262,800	3.65
<i>North Carolina</i>	10	10,700	301,100	3.55
<i>Massachusetts</i>	3	10,800	322,800	3.35
<i>North Carolina</i>	6	10,700	332,100	3.22
<i>Georgia</i>	9	11,100	352,100	3.15
<i>North Carolina</i>	4	11,700	384,800	3.04
<i>California</i>	50	10,100	344,500	2.93
<i>California</i>	47	8,300	285,900	2.90
<i>North Carolina</i>	5	9,300	321,700	2.89
<i>Texas</i>	3	12,000	418,300	2.87
<i>Alabama</i>	5	8,600	302,400	2.84
<i>California</i>	35	7,900	281,600	2.81
<i>Minnesota</i>	2	10,900	389,200	2.80
<i>California</i>	32	7,800	281,600	2.77
<i>California</i>	38	7,700	282,400	2.73
<i>Texas</i>	25	10,300	377,800	2.73
<i>Minnesota</i>	1	9,000	334,100	2.69
<i>Illinois</i>	8	10,200	379,000	2.69
<i>Colorado</i>	4	9,300	352,500	2.64
<i>South Carolina</i>	5	8,200	311,100	2.64
<i>Mississippi</i>	1	8,500	325,000	2.62
<i>Minnesota</i>	3	9,100	350,300	2.60
<i>California</i>	39	7,500	289,300	2.59
<i>Alabama</i>	4	7,000	274,300	2.55
<i>North Carolina</i>	13	8,800	344,900	2.55
<i>Massachusetts</i>	2	8,100	318,600	2.54
<i>South Carolina</i>	4	8,500	336,400	2.53

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TABLE 5 (CONT.)

**Net job loss due to growing trade deficits with China, 2001-08:
Top 50 Congressional districts**

State	Congressional district	Net jobs lost	Total Employment*	Share of total employment
California	11	8,800	349,500	2.52%
California	48	8,800	351,200	2.51
Indiana	3	8,600	346,800	2.48
Alabama	3	6,800	274,800	2.47
Colorado	2	9,400	380,500	2.47
Idaho	1	8,800	359,700	2.45
New Hampshire	2	8,300	344,100	2.41
South Carolina	3	7,300	305,200	2.39
Massachusetts	4	7,700	326,500	2.36
Kentucky	6	8,400	357,200	2.35
California	40	7,500	320,600	2.34
New Hampshire	1	8,000	350,100	2.29
Illinois	6	7,900	346,100	2.28
Texas	16	6,000	262,900	2.28

* Average employment in 2005-07.

SOURCE: EPI analysis of Census Bureau, ITC, and BLS data.

The CPS data suffered from small sample sizes in some smaller states with lower industrial densities, which may have resulted in some underestimates of employment by state. More important, the ACS sample used for this survey contained pooled data for the 2005-07 period. The large number (approximately 9 million) of observations in this dataset allowed for the generation of reliable estimates of job displacement by Congressional district.

Conclusion

The growing U.S. trade deficit with China has displaced huge numbers of jobs in the United States and has been a prime contributor to the crisis in manufacturing employment over the past seven years. Moreover, the United States is piling up foreign debt, losing export capacity, and facing a more fragile macroeconomic environment.

Is America's loss China's gain? The answer is most certainly no. China has become dependent on the U.S. consumer market for employment generation, suppressed

the purchasing power of its own middle class with a weak currency, and, most important, held trillions of dollars in hard currency reserves instead of investing them in public goods that could benefit Chinese households. Its vast purchases of foreign exchange reserves have stimulated the overheating of its domestic economy, and inflation in China has accelerated rapidly in the past year. Its repression of labor rights has suppressed wages, thereby artificially subsidizing exports.

The U.S-China trade relationship needs a fundamental change. Addressing the exchange rate policies and labor standards issues in the Chinese economy are important first steps.

—The author thanks Algernon Austin, Josh Bivens, and John Irons for comments.

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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 201 individual industries of the U.S. economy, specially grouped into 56 custom sectors and using North American Industry Classification System (NAICS) data obtained from the U.S. International Trade Commission (USITC).

This study separates exports produced domestically from foreign exports—which are goods produced in other countries, exported to the United States, and then re-exported from the United States. However, because only domestically produced exports generate jobs in the United States, employment calculations here are based only on domestic exports. The measure of the net impact of trade used here to calculate the employment content of trade is the difference between domestic exports and consumption imports. This measure is referred to in this report as “net exports,” to distinguish it from the more commonly reported gross trade balance. Both concepts are measures of net trade flows.

The number of jobs supported by \$1 million of exports or imports for each of 201 different U.S. industries is estimated using a labor requirements model derived from an input-output table developed by the U.S. Bureau of Labor Statistics. This model includes both the direct effects of changes in output (for example, the number of jobs supported by \$1 million of auto assembly) and the indirect effects on industries that supply goods used in the manufacture of cars. The indirect impacts include jobs in auto parts, steel, and rubber, as well as service industries such as accounting, finance, and computer programming. This model estimates the labor content of trade using empirical estimates of labor content and trade flows between U.S. industries in a given base year (an input-output table for the year 2006 was used in this study) that were developed by the U.S. Department of Commerce and

the Bureau of Labor Statistics. 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 used in this analysis were converted to constant 2000 dollars using industry-specific deflators (see next section for further details). This was necessary because the labor requirements table was estimated using price levels in that year. Data on real trade flows were converted to constant 2000 dollars using export and import price deflators from the Bureau of Labor Statistics (2009a). Use of constant 2000 dollars was 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 were obtained from the USITC DataWeb (2009) in four-digit, three-digit, and two-digit NAICS format. Consumption imports and domestic exports are downloaded for each year.

Step 2. To conform to the BLS Employment Requirements tables (BLS 2009b), trade data must be converted into the BLS industry classifications system. For NAICS-based data, there are 201 BLS industries. The data are then mapped from NAICS classifications onto their respective BLS classification.

The trade data, which are in current dollars, are deflated into real 2000 dollars using published price deflators from the Bureau of Labor Statistics (2009a).

Step 3. BLS real domestic employment requirements tables are downloaded from the BLS. These matrices are input-output tables industry by industry that show the employment requirements for \$1,000,000 in outputs in 2000 dollars. So, for the i -th industry, 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 is compiled into matrices. Let $[T_{2001}]$ be the 201x2 matrix made up of a column of imports and a column of exports. $[T_{2007}]$ is defined as the 201x2 matrix of 2007 trade data. Finally, $[T_{2008}]$ is defined as the 201x2 matrix of 2008 trade data. Define $[E_{2001}]$ as the 201x201 matrix consisting of the real 2006 domestic employment requirements tables. To estimate the jobs displaced by trade, perform the following matrix operations.

$$[J_{2001}] = [T_{2001}] \times [E_{2006}]$$

$$[J_{2007}] = [T_{2007}] \times [E_{2007}]$$

$$[J_{2008}] = [T_{2008}] \times [E_{2006}]$$

$[J_{2001}]$ is a 201x201 matrix of job displacement by imports and jobs supported by exports for each of 201 industries. Similarly, $[J_{2007}]$ and $[J_{2008}]$ are 201x201 matrices of job displaced or supported by imports and exports (respectively) for each of 201 industries.

The employment estimates for retail trade, wholesale trade, and advertising were set to zero for this analysis. We assume that goods must be sold and advertised whether they are produced in the United States or imported for consumption.

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

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

$$[J_{nx01-07}] = [J_{2007}] - [J_{2001}]$$

$$[J_{nx07-08}] = [J_{2008}] - [J_{2007}]$$

Step 2. State-by-state analysis

For states, employment by industry data is obtained for the ACS data from 2005-07 and is mapped into 56 custom sectors. We look at job displacement from 2001 to 2008, so from this point, we use $[J_{nx01-08}]$. In order to work with 56 sectors, we group the 201 BLS industries into a new matrix, defined as $[Jnew_{01-08}]$, a 56x201 matrix of

job displacement numbers. Define $[St_{05-07}]$ as the 56x52 matrix of state employment shares (with the addition of the District of Columbia and Puerto Rico) of employment in each industry. Calculate:

$$[Stj_{nx01-08}] = [St_{05-07}]^T [Jnew_{01-08}]$$

Where $[Stj_{nx01-08}]$ is the 56x52 matrix of job displacement/support by state 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 by state is obtained from the ACS data from 2005-2007. In order to calculate job displacement in each Congressional district, we use each column in $[Stj_{nx01-08}]$ which represent individual state job displacement by industry numbers, and define them as $[Stj_{01}]$, $[Stj_{02}]$, $[Stj_i] \dots [Stj_{52}]$, with i representing the state number and each matrix being 56x1.

Each state has Y congressional districts, so $[Cd_i]$ is defined as the 56x Y matrix of Congressional district employment shares for each state. Congressional district shares are calculated thus:

$$[Cdj_{01}] = [Stj_{01}]^T [Cd_{01}]$$

$$[Cdj_i] = [Stj_i]^T [Cd_i]$$

$$[Cdj_{52}] = [Stj_{52}]^T [Cd_{52}]$$

Where $[Cdj_i]$ is defined as the 56x Y job displacement in state i by congressional district by industry.

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

Endnotes

1. These purchases were sufficient to finance the entire U.S. current account deficit in 2009 (the broadest measure of all U.S. trade and income flows) of \$420 billion. Without these purchases, the reduced demand would have put significant downward pressure on the U.S. dollar. A substantial depreciation in the dollar would begin to improve the U.S. trade deficit within a few years.
2. The official name of the Chinese currency is the renminbi (RMB). The RMB is convertible for current account transactions but not for capital account flows. “Unlike the United States and many other countries, China uses a different word—yuan—for the unit in which product prices, exchange rates, and other such values are denominated from the word used for its currency” (Congressional Budget Office 2008, note 3). Here after, the word yuan will be used when referring to the Chinese exchange rate.
3. The trade balance usually responds to a fall in the dollar with a substantial lag of at least one to two years, due to “J-curve” effects. The major initial impact of a depreciation is usually to raise the price and total value of imports, and hence the trade deficit. In the medium- and long-term, the trade flows usually respond to the increase in the relative competitiveness of domestic products as the rate of growth of imports slows or imports decrease, and the rate of growth of exports accelerates, ultimately leading to an improvement in the trade balance for large currency adjustments. Most of the dollar adjustment against major currencies occurred between February 2002 and December 2004. For example, the dollar fell 36.4% against the euro in this period, and then fell only 4.0% between December 2004 and December 2007.
4. If maintained, price suppression (in response to recent appreciation of the yuan) is likely to result in an increase in unfair trade complaints. In fact, a number of successful anti-dumping cases were filed against Chinese makers of steel pipe in 2008 and 2009, including Oil Country Tubular Goods.
5. *NewsHour with Jim Lehrer* transcript. 1999. “Online NewsHour: Opening Trade - November 15, 1999.” <http://www.pbs.org/newshour/bb/asia/july-dec99/wto_11-15.html >
6. Output (gross domestic product or GDP) is the sum of consumption, investment, government spending, and the trade balance. The trade balance is the sum of exports less imports. A declining trade balance lowers GDP. The growth of the U.S. trade deficit with China has therefore reduced U.S. GDP and the demand for labor. Holding all other sources of demand constant, growing trade deficits therefore reduce the demand for labor in the United States.
7. See the Appendix for a technical presentation and details on data sources used. This model has been completely updated and expanded for this study using new data on employment by state, industry, and Congressional District from the American Community Survey, and employment requirements tables for 2006 and related economic data from the Bureau of Labor Statistics (2009a, 2009b). Trade data collected by the U.S. Census Bureau were downloaded from the U.S. International Trade Commission (2009).
8. For the purposes of this report it is necessary to distinguish between exports produced domestically and re-exports—which are goods produced in other countries, imported into the United States, and then re-exported to other countries, in this case to China. Since re-exports are not produced domestically, their production does not support domestic employment and they are excluded from the model used here. See Table 1 for information about the levels of U.S. re-exports to China in 2008.

9. Table 2 reports U.S. imports for consumption and domestic exports to China. These flows were chosen to emphasize goods produced and consumed in the United States. News reports from the Census Bureau and Commerce Department usually emphasize general imports and total exports. Total exports as reported by the Census Bureau include re-exports, i.e., goods produced in other countries and shipped through the United States. For 2007, the Census Bureau reported general imports from China of \$337.8 billion, total exports of \$71.5 billion, and a trade balance of -\$266.3 billion.
10. Data for 437 districts total are shown in companion tables available with the posting of this report at www.EPI.org.
11. <http://www.fcs.m.gov/99papers/acsasa.html>

References

- AFL-CIO, U.S. Representative Benjamin L. Cardin, and U.S. Representative Christopher H. Smith (AFL-CIO et al). 2006. “Section 301 Petition [on China’s repression of workers’ rights].” June 8.
- Bivens, L. Josh. 2008a. *Everybody Wins, Except for Most of Us: What Economics Teaches (But Economists Generally Don’t) About Globalization*. Washington, D.C.: Economic Policy Institute.
- Bivens, L. Josh. 2008b. “Trade, Jobs, and Wages: Are the Public’s Worries about Globalization Justified?” Issue Brief No. 244. Washington, D.C.: Economic Policy Institute. <http://www.epi-net.org>.
- Bronfenbrenner, Kate, and Stephanie Luce. 2004. “The Changing Nature of Corporate Global Restructuring: The Impact of Production Shifts on Jobs in the U.S., China, and Around the Globe.” Commissioned research paper for the U.S. Trade Deficit Review Commission. http://www.uscc.gov/researchpapers/2004/cornell_u_mass_report.pdf.
- Bureau of Labor Statistics, Office of Employment Projections. 2009a. *Special Purpose Files—Industry Output and Employment*. Washington, D.C.: U.S. Department of Labor. <http://www.bls.gov/emp/empind2.htm>.
- Bureau of Labor Statistics, Office of Employment Projections. 2009b. *Special Purpose Files—Employment Requirements*. Washington, D.C.: U.S. Department of Labor. <http://stats.bls.gov/emp/empind4.htm>.
- Chinability. 2010. China’s foreign exchange reserves, 1977-2009. <http://www.chinability.com/Reserves.htm>
- Cline, William R., and John Williamson. 2010. “Notes on Equilibrium Exchange Rates: January 2010.” Washington, D.C.: Peterson Institute for International Economics. Policy Brief 10-2. <http://iie.com/publications/interstitial.cfm?ResearchIDs=1472>

Clinton, Bill. 2000. Expanding trade, protecting values: Why I'll fight to make China's trade status permanent. *New Democrat*, Vol. 12, No. 1, pp. 9-11.

Congressional Budget Office. 2008. "How Changes in the Value of the Chinese Currency Affect U.S. Imports." Washington, D.C.: Congress of the United States, Congressional Budget Office.

Haley, Usha C.V. 2008. "Shedding Light on Energy Subsidies in China: An Analysis of China's Steel Industry from 2000-2007." Washington, D.C.: Alliance for American Manufacturing. <http://www.americanmanufacturing.org/wordpress/wp-content/uploads/2008/01/energy-subsidies-in-china-jan-8-08.pdf>

Haley, Usha C.V. 2009. "Through China's Looking Glass—Subsidies to the Chinese Glass Industry from 2004-08." Briefing Paper No. 242. Washington, D.C.: Economic Policy Institute. October 8. <http://www.epi.org/publications/entry/bp242/>

Kletzer, Lori G. 2001. *Job Loss from Imports: Measuring the Costs*. Washington, D.C.: Institute for International Economics.

Scott, Robert E. 2008. "International Picture: Increase in oil prices, fall in investment income exacerbates current account deficit woes." June 18. Washington, D.C.: Economic Policy Institute. <http://www.epinet.org>.

Scott, Robert E. 2010. "International Picture: U.S. Trade Deficit Falls in 2009, but Larger Share Goes to China." Washington, D.C.: Economic Policy Institute. February 11. http://www.epi.org/publications/entry/international_picture_20100211/

U.S. International Trade Commission. 2009. USITC Interactive Tariff and Trade DataWeb. http://dataweb.usitc.gov/scripts/user_set.asp