

NUMBER PB08-1

JANUARY 2008

“Fear” and Offshoring: The Scope and Potential Impact of Imports *and* Exports of Services

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While the uproar over offshoring has largely subsided since the 2004 presidential campaign, there continues to be concern and anxiety regarding the potential impact of offshoring in general and services offshoring in particular. With the economy softening and potentially headed for a recession in the midst of the current presidential campaign, worries about jobs and globalization seem likely to reemerge.

The purpose of this policy brief is to provide estimates of the scope and potential impact of imports and exports of services. The lack of detailed data covering the service sector in general and trade in services in particular makes providing an informed estimate of the potential impact difficult.¹ A number of commentators have provided forecasts of the potential impact of services offshoring.² Perhaps the most notable forecast comes from Alan Blinder in an interview that appeared on the front page of the

Wall Street Journal.³ Blinder suggests that as many as 40 million jobs could be at risk of being offshored over the next two decades. He advances the view that American workers should specialize in activities that are “personal” services (i.e., activities delivered face-to-face), because the United States is likely to lose many of the jobs that are “impersonal” (i.e., activities delivered at a distance) (Blinder 2006).

While we agree with Blinder and other commentators that the number of activities that can be provided at a distance, and are thus tradable, is large, we will argue that these other commentators miss two important pieces of the story:

1. Comparative advantage suggests about one-third of tradable service activities are at risk of being offshored to low-wage, labor-abundant countries like India and China.
2. The United States is currently a net exporter of services and likely to gain relatively high-wage, high-skill jobs through increased exports of services.

By omitting these considerations, the discussion becomes unduly alarmist, with the policy advice (e.g., specialize in “personal” services) potentially misguided.

We will present evidence that the number of jobs at risk of being offshored to low-wage, labor-abundant countries is about 15–20 million with many of these jobs (about 40 percent) in the manufacturing sector (long considered “at risk”). We will also present evidence that job “losses” will be offset by job “gains” from services exporting.⁴ Further, we show that the jobs likely to be offshored are relatively low-wage, low-skill jobs while the jobs to be gained through services exporting (and “inshoring”) are relatively high-wage, high-skill jobs.

Combined, the evidence we present suggests healthy prospects for American workers specializing in *high-skill* service activities, not nontradable “personal” services, because of their export potential and attractive wage premiums.

3. *Wall Street Journal*, “Pains from Free Trade Spur Second Thoughts,” March 28, 2007.

4. Of course the aggregate number of jobs in the economy is predominantly determined by the size of the labor force, so jobs “lost” would be jobs lost from a particular firm or sector and jobs “gained” in a different firm or sector. The important point is that trade does not affect the number of aggregate jobs in the economy but is likely to affect the sectoral composition of employment.

1. For example, in the manufacturing sector official statistical information on trade in goods is available for over 10,000 product categories by country. By comparison, unaffiliated trade in services is reported for fewer than 30 categories with limited geographical detail.

2. For examples, see McCarthy (2002), Bardhan and Kroll (2003), and Kirkegaard (2004).

The basis for our conclusion is a threshold (evident in the data) for activities that are being lost to low-wage, labor-abundant countries in manufacturing and a similar threshold for activities where US exports increase in both manufacturing and services.

This threshold is evidence that comparative advantage is indeed functioning—the United States imports low-wage, low-skill goods and services and exports high-wage, high-skill goods and services. Further, most employment in tradable service activities is above this threshold and thus most workers in tradable service activities are unlikely to face significant competition from low-wage, labor-abundant countries any time soon. Indeed, many of the firms and workers in tradable services are likely to benefit from increased services trade by exporting. This notion is critical to understand the impact of services offshoring on the US labor market and is explained in more detail below.

This policy brief reports evidence from an ongoing project at the Peterson Institute, other recent studies examining the service sector, and recent research examining the impact of globalization on the manufacturing sector⁵ to present a more comprehensive picture of the likely impact of services offshoring on US workers and firms. It reports on a novel characterization of “tradability” that can be applied to occupations, as well as to services and manufacturing industries.

This policy brief draws the following conclusions:

- Many service activities—movie and music recording production, securities and commodities trading, software, and engineering services as examples—appear to be traded within the United States and thus are at least potentially tradable internationally. Approximately 14 percent of the workforce is in service industries classified as tradable. By comparison, about 12 percent of the workforce is in manufacturing industries classified as tradable. When workers in tradable occupations (such as computer programmers in the retail banking industry or medical transcriptionists in the healthcare industry) in nontradable industries are included, the share of the workforce in tradable service activities is even higher.
- While many service activities appear tradable, we anticipate that only about one-third of the jobs in these activities will face meaningful competition from low-wage countries (or risk being offshored) in the medium term.

5. While it is difficult to forecast the future, one of the best guides to how services offshoring is likely to affect US firms and workers is the impact of imports on the manufacturing sector. This policy brief will present evidence that services and manufacturing are actually quite similar in a number of ways and, as a result, the impact of trade on the manufacturing sector is a useful guide to understanding the impact of trade on the service sector.

- Tradable service jobs, such as those at engineering or research and development (R&D) firms, are good jobs. Workers in tradable service activities have higher than average earnings. Part of this premium is due to workers in these activities having higher educational attainment than other workers, but even controlling for differences in education and other personal characteristics, workers in tradable service activities have 10 percent higher earnings. Within the set of professional service industries, a worker in a tradable industry and a tradable occupation has earnings almost 20 percent higher than a similar professional service worker in a nontradable industry and occupation.
- High earnings in tradable service activities do not mean that these jobs will be “lost” to low-wage countries. High-wage, high-skill activities are consistent with US comparative advantage. In the manufacturing sector, it is low-wage, labor-intensive industries like apparel that are most vulnerable to low-wage import competition. The United States continues to have strong export performance in high-wage, skill-intensive manufacturing industries.
- The United States currently exports high-wage, high-skill services like computer software and satellite telecommunications services. Most commentators on the offshoring issue focus on the jobs that will be “lost” to offshoring but neglect that the United States has comparative advantage in many service activities. Increased exports of services (and “inshoring”) are likely to benefit many US firms and workers.
- As many as two-thirds of tradable business service jobs are skilled enough to be consistent with US comparative advantage. US service workers and firms are likely to be beneficiaries of increased trade in services through increased export opportunities.
- To date, there is little evidence of trade in services influencing labor market outcomes. Net employment growth in the average tradable service activities is roughly the same as net employment growth in nontradable service activities. Median wage growth in tradable service occupations is nearly equal to wage growth in the average nontradable occupation. Rates of job displacement in tradable service activities are no greater than nontradable service activities.
- Many impediments exist to trade in services, ranging from language and cultural differences to regulation to technological barriers. These impediments are likely to protect US firms and workers from import competition but are also likely to impede US firms and workers from exporting. These impediments reduce the gains to the United States (and the rest of the world) from trade in services and the increased living standards that result. While potentially more difficult than reducing tariff barriers, harmonizing

regulations and expanding mutual recognition of professional standards and accreditation are important policy objectives to increase the benefits of trade in services.

WHICH SERVICE ACTIVITIES ARE TRADABLE?

This question is difficult to answer, due to a paucity of empirical work on the service sector in general and trade in services in particular. The lack of empirical work derives in part from the fact that the data infrastructure covering service activities is far less developed than that for goods. In Jensen and Kletzer (2006), we developed a novel methodology to identify services activities that are potentially tradable, using the geographic concentration of service activities within the United States as an indicator of what is traded within the United States.

The intuition for the approach relies on a long tradition among economists of using the geographic concentration of economic activity to identify a region's "export base" or "manufacturing base" (Krugman 1991, Ellison and Glaeser 1997). The thinking is that if a region specialized in a manufacturing activity—e.g., airplanes in Seattle—it is likely to export this product in which it specializes. Seattle has a disproportionate share of US aircraft manufacturing employment. This industry concentration is not because people in Seattle consume more airplanes than other parts of the country; they export the planes in exchange for other goods and services.

This same type of logic applies to services. Economists have long thought of many services as "nontradable" because (some) services seem to require face-to-face interaction. The quintessential services are personal services like haircuts or legal counseling. These service activities tend to be distributed in proportion to the population in a region (and thus we don't see high concentrations of these types of service activities in one place). But increasingly, there are services that do not appear to require face-to-face interaction and thus might be tradable (consider accounting and architectural services). We use this feature to distinguish between service activities that are tradable and those that require face-to-face interaction (and thus are far less likely to be traded).

Let's go back to Seattle. Indeed, Seattle has a disproportionate share of US aircraft manufacturing employment (about nine times Seattle's share of the population). We are accustomed to thinking of Seattle exporting aircraft. But, Seattle also has a disproportionate share of US employment in software publishing (about 18 times Seattle's share of the population). Again, this concentration is not because people in Seattle consume more software than other parts of the country; rather they export it in exchange for other goods and services. Software is a service that is traded with other regions.

We generalize this approach to make up for the lack of detailed data on trade in services and identify which workers are exposed to services offshoring by looking at services that are geographically concentrated and domestically traded. These services can be classified as *potentially* tradable internationally, and estimates can be made of the number of workers in tradable activities in each sector.

Using information on service employment across metropolitan areas within the United States, we find that a significant number of service industries (and occupations) exhibit levels of geographic concentration consistent with the activity being traded within the United States.⁶ Figure 1 shows the geographic concentration of industries using Gini coefficients.

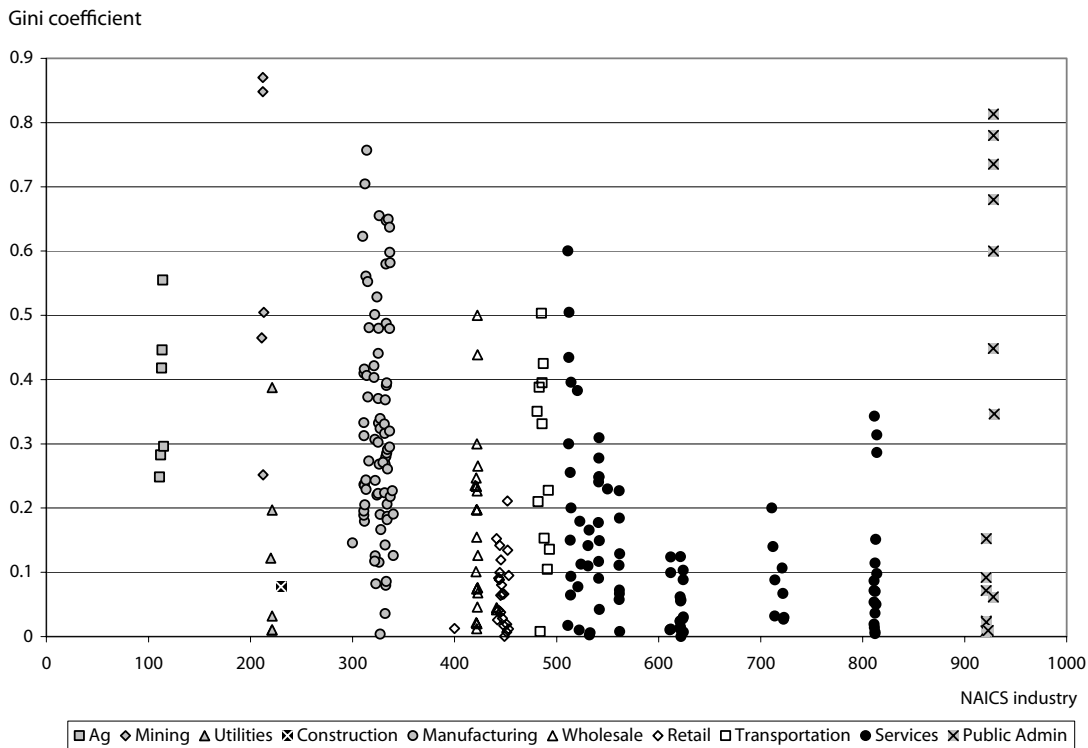
Most commentators on the offshoring issue focus on the jobs that will be "lost" to offshoring but neglect that the United States has comparative advantage in many service activities.

While industries in the manufacturing sector tend to have higher levels of geographic concentration than the service sector, many service industries exhibit levels of geographic concentration consistent with being traded within the United States. In addition, the industries that do exhibit high levels of geographic concentration conform to our prior assumptions about what service activities might be tradable. For example, software publishing, sound recording, motion picture production, and securities and commodities trading all exhibit high levels of geographic concentration. In addition, service industries identified as nontradable also conform to our notions of industries that are likely to be nontradable. For example, retail banking and video tape rental exhibit low levels of geographic concentration.

We conducted a similar analysis for occupations with results again consistent with our prior assumptions. The occupational groups with large shares of employment classified as tradable include business and financial operations; computer and mathematical occupations; architecture and engineering;

6. If a service is nontradable and demand for the service is concentrated (the industries that use the nontraded service are geographically concentrated), the service industry will be geographically concentrated, and the analysis would incorrectly infer that the service is tradable. Jensen and Kletzer adjust their measure of geographic concentration to correct for this possibility and construct region-specific measures of demand for each industry using the input-output use tables produced by the Bureau of Economic Analysis.

Figure 1 Geographic concentration of industries



NAICS = North American Industry Classification System

legal; and life, physical, and social sciences. The occupational groups with low employment shares in tradable activities require a physical presence to deliver them, and they include education and library; healthcare practitioners; healthcare support; and food preparation.

While any methodology to identify workers potentially affected by offshoring will have shortcomings, our methodology reflects facts about the actual pattern of trade in services within the United States and is not subject to as many “judgment calls” when classifying activities as offshorable or not.

HOW MANY WORKERS ARE POTENTIALLY AFFECTED BY TRADE IN SERVICES?

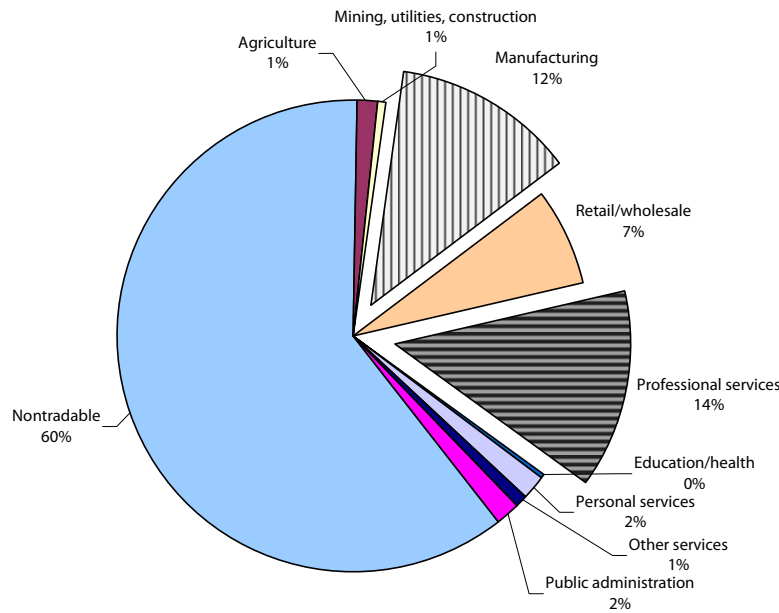
A significant share of total employment is in tradable service industries (see figure 2). For example, more workers are in tradable industries in the services sector than in manufacturing. The share of total employment in tradable professional services alone is 13.7 percent, while the share of employment in tradable manufacturing industries is 12.4 percent. Some big services sectors—education, healthcare, personal services, and public administration—do in fact have low shares of employment

in tradable industries. However, because the services sector is much larger than the manufacturing sector, the number of workers potentially exposed to international trade in services is actually larger than the number of exposed workers in manufacturing.

Moreover, we will see below that many tradable service activities are consistent with US comparative advantage and a source of high-paying jobs when foreign countries import from (or outsource to) US consulting, finance, marketing, and research activities.

Some worker inputs into service production might be tradable even though the service industry itself is not (computer programming or other back office operations for the retail banking industry). In the aggregate, the share of these sorts of workers—who hold tradable occupations in nontradable industries—is not large, at about 10 percent. However, for business and professional occupations, the share of workers in tradable occupations within nontradable industries is much larger. The typical professional occupation has about 25 percent of its employment in tradable occupations within nontradable industries. To the extent that firms can disentangle intermediate service inputs from the rest of their business, workers in

Figure 2 Tradable industries' share of employment (percent)



Source: Jensen and Kletzer (2006).

these tradable occupations are exposed to trade, even though their industry is not tradable. Thus the industry results in figure 2 understate the share of workers potentially exposed to trade; the typical white-collar occupation involves an activity that could be either imported or exported.

WHAT DO TRADABLE SERVICE WORKERS LOOK LIKE?

Workers in tradable sectors have higher education levels and significantly higher wages compared with workers in nontradable sectors and manufacturing. Across all service industries, workers in tradable service industries have annual earnings of approximately \$47,000; workers in nontradable service industries have average annual earnings of approximately \$30,000. Part of the earnings differential is due to higher education. Workers in tradable service industries are twice as likely to have a college degree and twice as likely to have an advanced degree as workers in manufacturing (see table 1).

But the higher incomes are not solely a result of higher skill levels—even controlling for differences in skills, workers in tradable service activities, like engineering, R&D labs, software publishing, and management consulting, earn incomes almost 20 percent higher than similar workers in nontradable activities in the same sector (see figure 3).

LESSONS FROM MANUFACTURING...FOR SERVICES

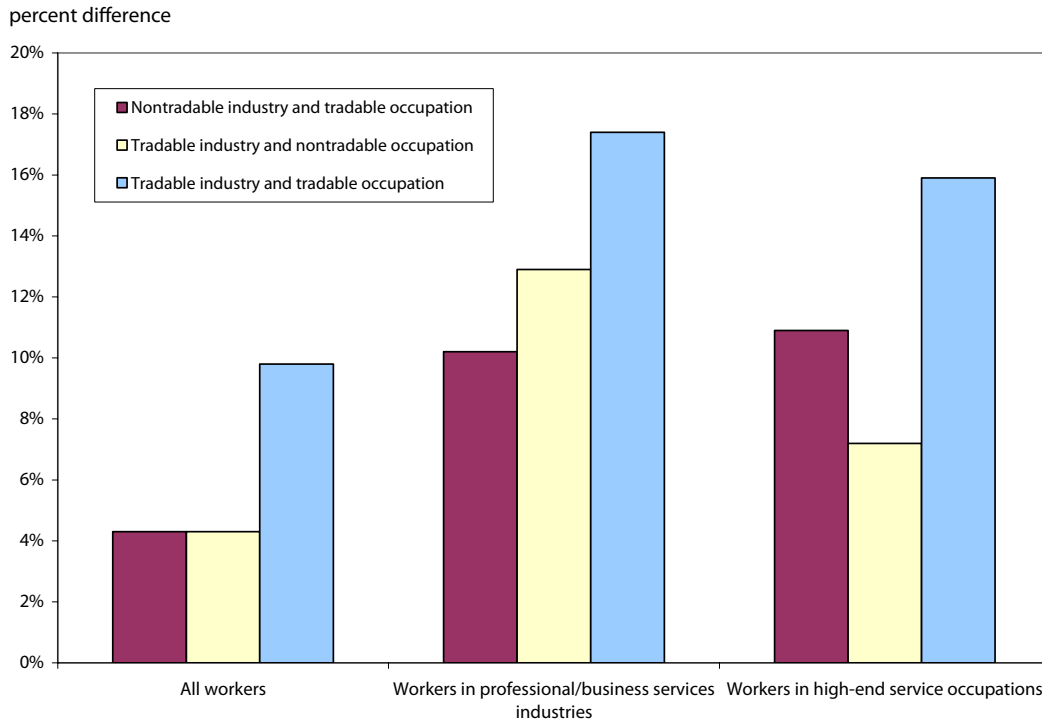
The concern about many service jobs moving overseas is driven in part by large perceived wage differentials between the United States and emerging economies like India. If software programmers in India earn a fraction of what software programmers earn in the United States, won't all the computer programming jobs move to India?

To answer this question, a comparison to manufacturing is again useful. We have learned quite a bit about how trade affects firms and workers in the manufacturing sector. In manufacturing, large wage differentials exist between the United States and emerging economies like China, suggesting that all the manufacturing jobs should move to China. But this move

Table 1 Tradable workers with college degree or higher (percent)

	College degree	Advanced degree
Tradable manufacturing	19.6	5.6
Tradable services	42.2	14.1

Figure 3 Income premia for workers in tradable industries and occupations, controlling for worker characteristics



Note: Base group is nontradable industry and nontradable occupation.

Source: Jensen and Kletzer (2006).

is simply not happening. *Comparative* advantage provides the answer. China’s exports to the United States are concentrated in low-wage, labor-intensive industries such as apparel, leather goods, and furniture.

Figure 4 shows that low-wage industries have higher shares of imports from low-wage countries as recently as 2006.⁷ This figure shows low-skill, low-wage, labor-intensive activities in the manufacturing sector face high levels of low-wage–country import competition. Industries with high low-wage import competition include apparel, leather and allied products, textile products, furniture and related products, and miscellaneous products (which include toys). High-wage, high-skill activities like transportation equipment, chemicals, and petroleum and coal products face very low levels of low-wage import competition. The only real outlier to this trend is computer and electronic equipment, which has high average wages and relatively high low-wage–country import competition. This exception is likely due to the increased fragmentation of consumer electronics production where the underlying components (like semi-

conductors) that are high-wage, high-skill activities produced in the United States and shipped to China for low-wage, labor-intensive assembly.

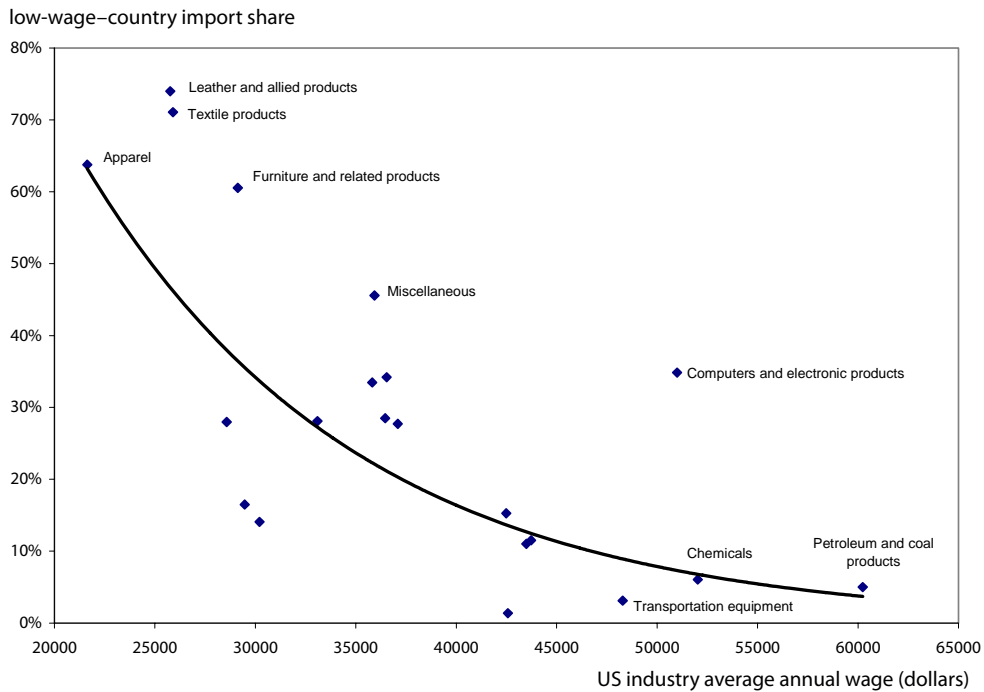
Figure 4 shows that manufacturing industries with average wages above roughly \$40,000 face very low levels of low-wage import competition. This evidence suggests that lower-paying, labor-intensive US industries face competition from low-wage, labor-abundant countries. Understanding this low-wage–high-wage distinction is important for understanding the labor market implications of manufacturing trade and increased trade in services.

From 1972 to 2001, manufacturing industries that faced low-wage–country import competition experienced lower net employment growth than other manufacturing industries. Table 2 shows the average decade-long change in employment for manufacturing industries ranked by the level of exposure to low-wage–country import competition. Manufacturing industries that faced high levels of low-wage–country import competition have experienced large net employment losses.

In a detailed study of the US manufacturing sector, Bernard, Jensen, and Schott (2006a) examine the impact of import competition from low-wage countries (such as China) on US manufacturing plants. They find that low-wage–country

7. Figure 4 shows the share of industry imports that come from countries with per capita GDP is less than 5 percent of US per capita GDP plotted against US industry average annual wages. See Bernard, Jensen, and Schott (2006a) for additional information.

Figure 4 Low-wage US industries face low-wage-country import competition, manufacturing (NAICS 31, 32, 33)



NAICS = North American Industry Classification System

Note: The trend line is an exponential regression ($y = 3.0996e-7E-05x$, $R^2 = 0.467$) of the plotted data.

Sources: Authors' calculations; 2002 Economic Census; 2006 US Imports of Merchandise data; and World Bank.

import shares and overall import penetration vary substantially across both industries and time. Both components tend to be higher and to increase more rapidly among low-wage, labor-intensive industries such as apparel (as shown in figure 4). More capital- and skill-intensive sectors experience low levels of low-wage import competition and have experienced no increase in the share of imports from low-wage countries. Manufacturing plant survival and employment growth are negatively associated with increased imports from very low-wage countries. In the low-wage, labor-intensive industries where there have been significant increases in imports from countries like China, manufacturing plants are more likely to reduce employment and close (see table 2).

In addition, even for plants in the same industry facing the same level and type of import competition, more labor-intensive plants are more likely to close and have lower employment growth. This trend suggests that trade with low-wage countries is moving US manufacturing to activities that are consistent with US comparative advantage—that is, toward capital- and skill-intensive products and production techniques. While potentially disruptive to both firms and workers, this heightened competitive pressure increases productivity—a key

contributor to higher living standards (Bernard, Jensen, and Schott 2006b). All things considered, it remains the case that the United States maintains a significant manufacturing presence in (and continues to export) skill- and capital-intensive goods like medical and scientific equipment.

HOW WILL INCREASED SERVICE IMPORTS (AKA OFFSHORING) AFFECT THE UNITED STATES?

Based on the way low-wage-country imports have affected the manufacturing sector, we can expect that some share of tradable service activities will move to other countries with workforces that currently have lower wages than those paid in the United States. Yet, we expect the activities that move to developing countries to be relatively lower-wage, lower-skilled activities (albeit sometimes in higher-end service industries, like business services). Higher-wage, higher-skilled service activities will remain and provide a source of potential exports (as we discuss in the next section).

Figure 4 suggests that low-wage, labor-abundant countries have comparative advantage in low-wage, labor-intensive

Table 2 Low-wage–country imports associated with lower employment growth in manufacturing

Initial exposure to low-wage–country imports	Average decade-long change, 1972–2001 (percent)	
	In employment	In real output
Low	2.3	38.7
Middle	–4.4	32.4
High	–12.8	15.0

Source: Bernard, Jensen, and Schott (2005).

manufacturing. Conversely the United States still has comparative advantage in high-wage, capital- and technology-intensive manufacturing. Figure 7 (page 11) bears this out. Figure 8 (page 12) shows an intriguingly similar picture for service exports—the United States has comparative advantage in high-wage service activities and exports relatively more high-wage services.

Furthermore, we will see that all of the figures suggest that a notional dividing line between activities where the United States has comparative advantage and where low-wage, labor-abundant countries have comparative advantage is somewhere around \$40,000.⁸ Service activities that have average wages below \$40,000 are likely to face competitive pressure from service imports (or offshoring) from low-wage, labor-abundant countries. (As we argue in the next section, service activities that pay wages above \$40,000 are likely to expand with increased trade in services.) We expect that relatively low-wage service activities will experience increased levels of dislocation. However, we do not think that the alarmist picture painted by some is likely to play out.

One dimension on which services differ from manufacturing is the share of employment that is likely to face import competition from low-wage countries. An important difference between tradable services and manufacturing is the share of employment in each sector that is in industries above and below that \$40,000 threshold. Figure 5 shows the cumulative distribution of employment in tradable manufacturing (NAICS 31, 32, 33) and tradable business services (NAICS 51, 54, 55, 56).

8. Of course there is not an absolute threshold. Instead, the risk of facing import competition from low-wage, labor-abundant countries is stochastic and decreases with the skill of the firm's workforce (which can be proxied by wages). Similarly, there is not a firm threshold for exporting but instead the probability of exporting increases with skills and wages. The notion of an earnings threshold is a useful simplification for the purposes of this policy brief.

The key point from figure 5 is that the share of manufacturing employment in industries below the \$40,000 threshold is almost two-thirds (about 60 percent of 13 million workers in manufacturing). In contrast, the share of tradable business service employment that is in industries with average wages below the \$40,000 threshold is only about one-third (of about 15 million workers in tradable business services). These numbers suggest that only about one-third of tradable business services are likely to face meaningful competition from low-wage countries (or offshoring) in the medium term.

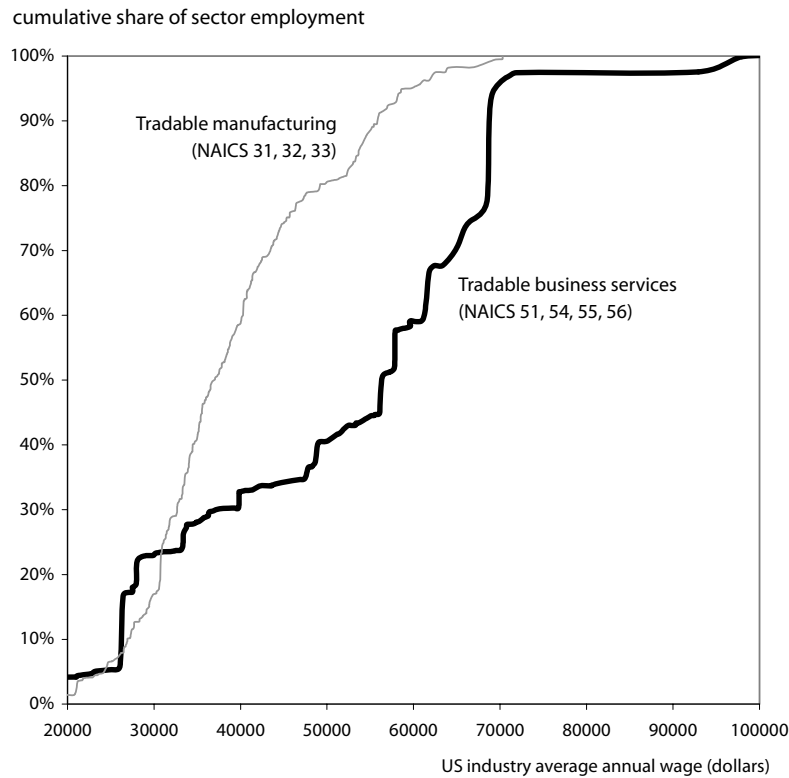
The supply of educated workers with the appropriate productivity—even in large countries like India—is not limitless, further evidence that is consistent with the notion that relatively high-wage service activities will stay in the United States. The McKinsey Global Institute suggests that the number of engineers and computer programmers in the developing world that are “multinational company ready” is a fraction (under 20 percent) of the total number of these workers and that other factors, like accessibility and domestic competition for this talent, will further reduce the pool available for offshoring (McKinsey Global Institute 2005). Indeed, as reported in the *Wall Street Journal*, salaries for highly skilled computer programmers in India are now approaching those in the United States to the extent that some firms are closing their Bangalore offices and bringing the work back to the United States.⁹

Our methodology reflects facts about the actual pattern of trade in services within the United States and is not subject to as many “judgment calls” when classifying activities as offshorable or not.

Similar to manufacturing, it is highly unlikely that a significant share of high-wage, skill-intensive service activities will move to emerging markets in the short term and even in the long term. The skill-intensive, high-wage jobs in services are likely to stay in the United States and even grow as other countries open to our service exports, as we will discuss in the next section. Indeed, the United States is a net exporter of services (unlike manufactured goods) and increased trade in services is likely to benefit US service firms and workers.

9. *Wall Street Journal*, “Second Thoughts: Some in Silicon Valley begin to sour on India, A few bring jobs back as pay of top engineers in Bangalore skyrockets,” July 3, 2007.

Figure 5 More high-wage employment in tradable business services than tradable manufacturing



NAICS = North American Industry Classification System
 Sources: Authors' calculations; 2002 Economic Census.

**WHAT ROLE FOR EXPORTS?
 UNDERSTANDING BUSINESS SERVICE
 EXPORTS AND EXPORTERS**

The United States is well-positioned to export services—a fact typically missing in the public discussion of offshoring. The public conversation has gone from treating services as nontradable to treating services as very tradable and primarily *importable*. What is often missing from the public discussion is that the United States has a large positive trade balance in services, and many tradable service activities seem consistent with US comparative advantage, suggesting that the United States is likely to benefit from increased trade in services.

Part of the difficulty with any discussion of the service sector is its large size and diversity. To make the discussion manageable, we will focus on a subset of the service sector where direct evidence of exports is collected. The US Census Bureau collects information on exporting in select service industries, including information industries (NAICS 51), professional, scientific, and technical industries (NAICS 54), and administrative support and waste remediation industries (NAICS 56).

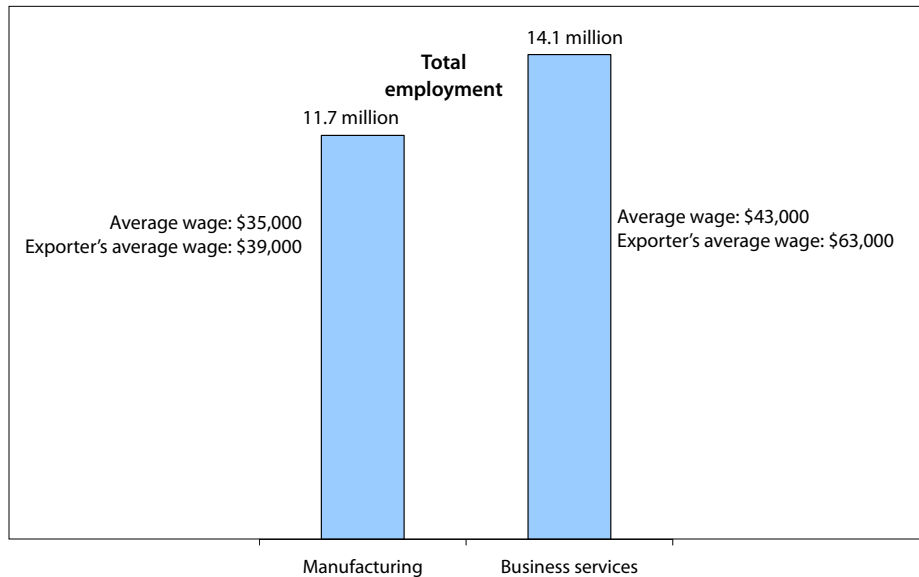
Figure 6 presents summary statistics on the manufacturing sector and this “business services” sector. While these industries are a small subset of what many people consider the service sector, it is noteworthy that employment in these three NAICS sectors is larger than the entire manufacturing sector.

It is also interesting to note that the “business services” sector presented here has average wages that are equivalent to the manufacturing sector.¹⁰ This subset of the service sector employs more people than the manufacturing sector with similar wage levels.

The figure also reports the average wage of exporters in each sector. It is now well-established that manufacturing sector

10. The calculations reported here are based on access to respondent level microdata at the Center for Economic Studies at the US Census Bureau. The data exclude establishments (respondents) that are not mailed a form and thus do not report information (so-called administrative records). Nonmail cases tend to be much smaller than the average establishment. Nonmail cases are more prevalent in the “business services” sector than in the manufacturing sector. This exclusion does bias the results obtained from these data as a larger share of the “business services” sector’s very small establishments are excluded from the analysis than in the manufacturing sector. Average establishment wages calculated from published aggregates in the manufacturing sector are about \$39,000 and in the “business service” sector they are \$40,000. We use the microdata results throughout this section for consistency.

Figure 6 Employment and wages in business services compare favorably with manufacturing



Sources: Authors' calculations using 2002 Economic Census data; Manufacturing (NAICS 31–33), Business Services (NAICS 51, 54, 56).

plants that export pay higher wages (and have other desirable characteristics, too, such as higher productivity and greater survival probabilities). Figure 6 reports that this phenomenon is not restricted to the manufacturing sector. Business services exporters pay significantly higher wages than nonexporters and higher wages than both exporters and nonexporters in the manufacturing sector. This evidence again points to a role for comparative advantage in shaping services trade. The next two sections present more detailed evidence on the relationship between services, skills, and exports.

COMPARATIVE ADVANTAGE AND EXPORTS ACROSS INDUSTRIES: MANUFACTURING-SERVICES PARALLELS

In this section, we'll start again by looking at manufacturing, only this time focusing on exports. In manufacturing, we know there is considerable variation across industries in average wages, capital intensity, and productivity. Apparel production tends to be labor-intensive and relatively low-wage, while chemicals and transportation equipment production tends to be capital-intensive and high-wage. Apparel producers face high levels of low-wage import competition and are less likely to export than higher-skill, higher-wage industries, while skill-intensive and capital-intensive industries like aircraft tend to have higher exports. Figure 7 shows the relationship between industry aver-

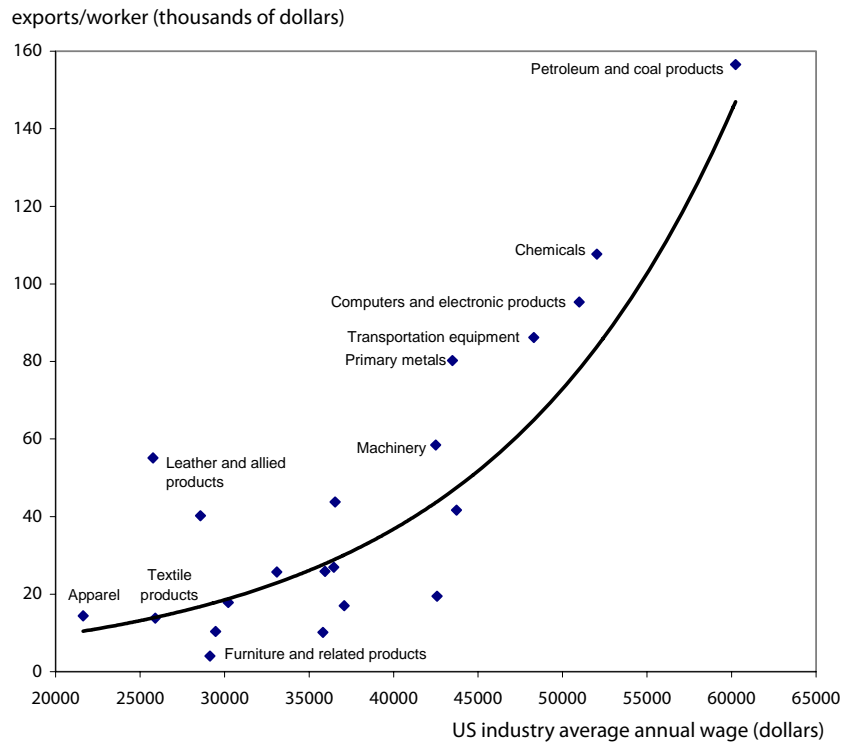
age wages and exporting (specifically exports/worker); there is a strong positive relationship between industry average wages and exports per worker. This relationship is well-established and well-known for manufacturing. The results demonstrate that the United States exports manufactured goods from industries that are consistent with US comparative advantage—high-wage and high-skill industries.

While data covering the service sector are not as comprehensive as those for manufacturing, for the service industries where there is data, the same patterns hold. Figure 8 shows the relationship between industry average wages and exports per worker for select service industries.

Figure 8 shows that services industries with higher wages have higher exports per worker. Again, note that at about \$40,000 service industries have much higher levels of exports per worker. This suggests that across service industries, business service industries that use more skilled workers are more consistent with US comparative advantage and more likely to export.

These results demonstrate that the United States exports services from industries that are consistent with US comparative advantage—high-wage and high-skill industries. Results discussed above suggest that “tradable” service activities in general are high-skill, high-earning activities. The direct evidence from select service industries suggests that high-wage services are more likely to be exported. Taken together, these results suggest that the United States can benefit from expanded services trade.

Figure 7 Exports per worker in manufacturing rise with industry wages, manufacturing (NAICS 31, 32, 33)



NAICS = North American Industry Classification System

Note: The trend line is an exponential regression ($y = 2.3723e-7E-05x$, $R^2 = 0.5364$) of the plotted data.

Sources: Authors' calculations; 2002 Economic Census.

COMPARATIVE ADVANTAGE AND EXPORTS WITHIN INDUSTRIES: MANUFACTURING-SERVICES PARALLELS

The cross-industry evidence that high-skill, high-wage service industries have higher export participation is not the only evidence consistent with the United States having comparative advantage in high-skill, high-wage service activities. There is strong within-industry evidence as well.

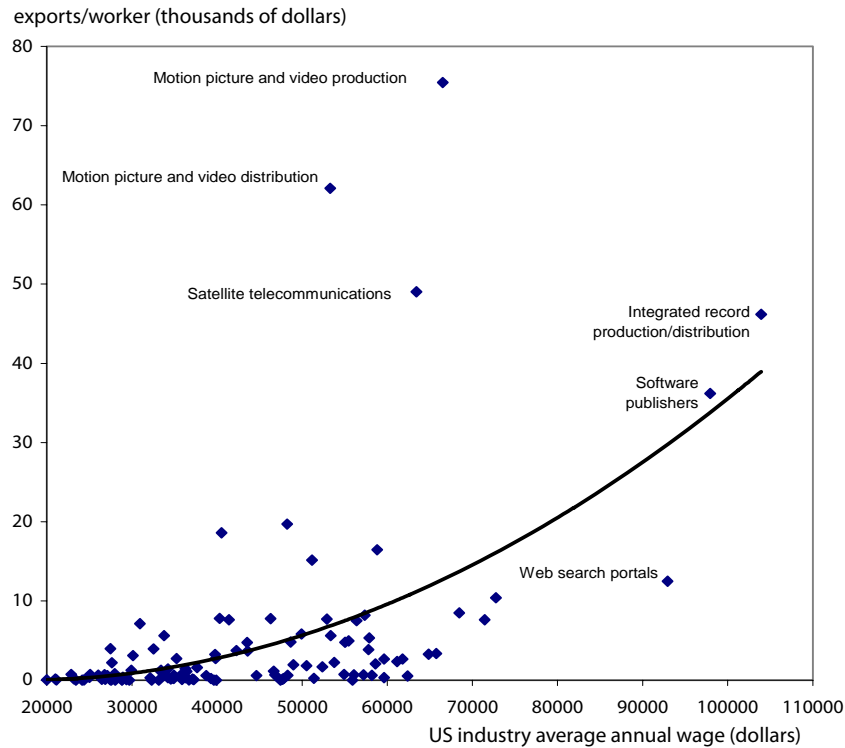
The desirable characteristics of exporting plants and firms in the manufacturing sector are now well-known. US manufacturing exporters pay significantly higher wages, are more productive, more skill-intensive, and more likely to survive and grow than nonexporters in the same industry (Bernard and Jensen 1995, 1999, 2007, and Bernard, Jensen, Redding, and Schott 2007). In addition, because exporters have higher growth and survival rates, the growth of exporters is associated with a reallocation of economic activity that improves aggregate productivity (Bernard and Jensen 2004). Figure 9 reports

results from the 2002 Census of Manufactures on the desirable characteristics of exporters in the manufacturing sector.

Figure 9 shows that exporters in the manufacturing sector are larger in terms of employment and sales and have higher wages and higher sales per employee (i.e., labor productivity). The left bar for each characteristic shows the mean difference between exporters and nonexporters across the same sector. Comparing the average exporter to the average nonexporter across all manufacturing, exporters are over 100 percent larger in size than nonexporters.¹¹ Exporters also pay about 20 percent higher wages. Comparing the results without industry controls and with industry controls, we see that some of the effect is due to variation across industries. Comparing exporters to nonexporters that produce in the same 6-digit NAICS

11. The coefficients reported in figure 9 are mean log differences and can be interpreted as the percentage difference between exporters and nonexporters, i.e., exporters are on average 108 percent larger in terms of employment than nonexporters. Within the same industry, exporters are 80 percent larger in terms of employment.

Figure 8 Exports per worker in business services rise with industry wages, business services (NAICS 51, 54, 56)



NAICS = North American Industry Classification System

Note: The trend line is a polynomial regression ($y = 5E-09x^2 - 0.0002x + 1.3732$, $R^2 = 0.2946$) of the plotted data.

Sources: Authors' calculations; 2002 Economic Census.

industry, exporters are still larger, pay higher wages, and have more sales per employee.

Figure 10 presents the first evidence on remarkably comparable exporter “premia” in the service sector. Like manufacturing exporters, business service exporters tend to be larger in both sales and employment, have higher average wages, and have higher sales per worker than nonexporters. Comparing the results with and without industry controls, we see that much of the effect is variation across industries. Exporters tend to be in business service industries characterized by high average wages and high labor productivity.

Comparing exporters to nonexporters in the same industry, business services exporters are almost 70 percent larger in employment and 100 percent larger in sales. Exporters are more skill-intensive, paying average wages almost 20 percent higher than nonexporters in the same industry.

Establishment size is correlated with these other measures. Comparing establishments in the same 6-digit NAICS industry, in the same state, of the same size, business service exporters are still significantly different than nonexporters (the same is true of manufacturers). Exporters have higher sales, pay higher

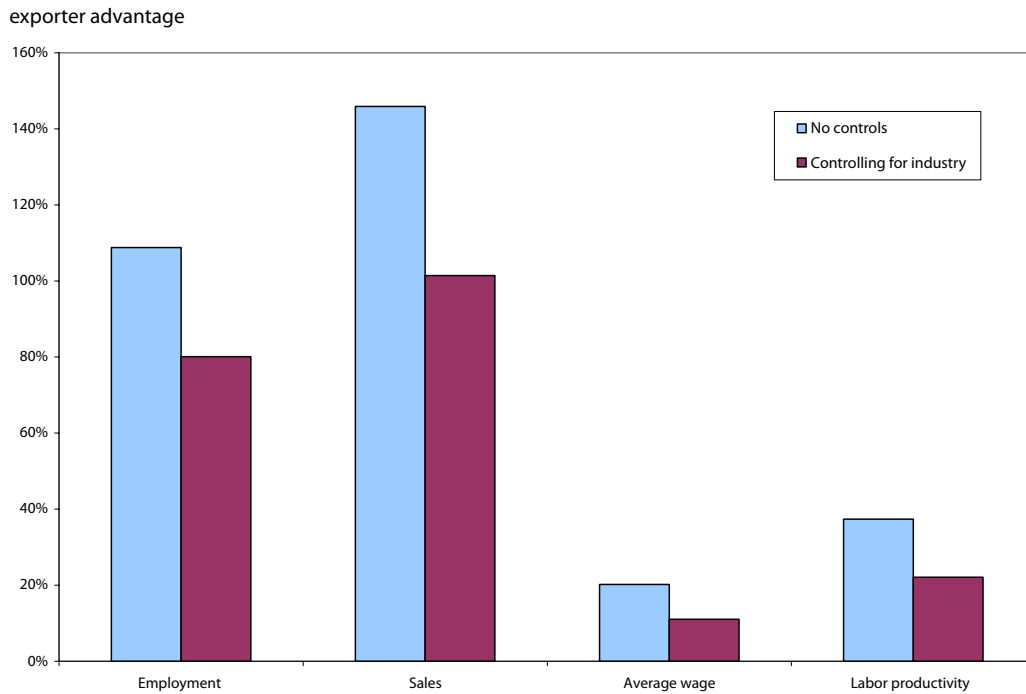
average wages, and are more productive than nonexporters. As seen by comparing figures 9 and 10, the business service exporters are different from business service nonexporters in many of the same ways that exporters differ from nonexporters in the manufacturing sector.

Similar to the worker characteristics discussed above, the service establishment results discussed in this section suggest US business service export activity tends to be concentrated in high-wage, high-productivity industries. Within these industries, the establishments that export tend to be larger, pay higher wages, and are more productive than nonexporters. These results suggest that tradable business services are consistent with US comparative advantage and, as a result, less likely to be vulnerable to low-wage foreign competition. On the contrary, they are likely to make global rivals feel vulnerable!

REMOVING IMPEDIMENTS TO TRADE

There is a growing sense that services are becoming more tradable, as tradable perhaps as manufactures. The data on service exporters do not yet support this impression. In fact, service

Figure 9 Manufacturing exporters' advantage (NAICS 31, 32, 33)

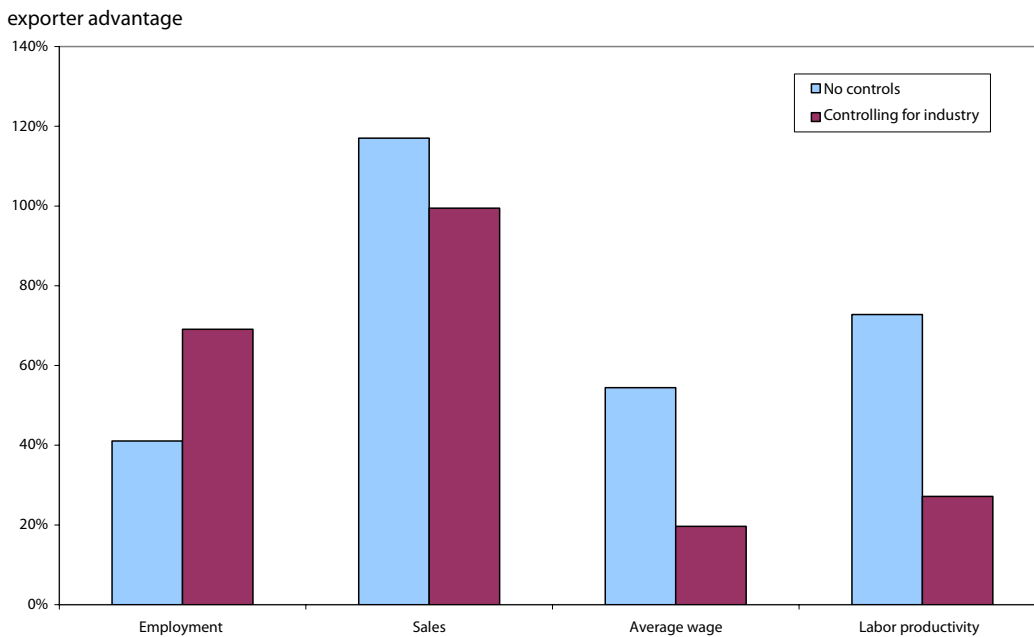


NAICS = North American Industry Classification System

Note: The bars in the chart represent regression coefficients from a regression on manufacturing-sector data of the form $\log(y)$ on a dummy variable identifying whether the establishment exports and the controls listed.

Sources: Authors' calculations; 2002 Economic Census microdata.

Figure 10 Business service exporters' advantage (NAICS 51, 54, 56)



NAICS = North American Industry Classification System

Note: The bars in the chart represent regression coefficients from a regression on business service-sector data of the form $\log(y)$ on a dummy variable identifying whether the establishment exports and the controls listed.

Sources: Authors' calculations; 2002 Economic Census microdata.

establishments are less likely than manufacturing plants to export; while about 1 in 4 manufacturing plants export, only 1 in 20 service establishments export. Even if we control for the tradability measure previously discussed, service establishments are still about half as likely as manufacturing plants to export. In addition, exports to sales ratios are lower in business services than manufacturing. These statistics suggest that there continues to be significant impediments to trade in services, possibly including culture and language differences, technological barriers, or policy impediments.

We estimate the number of jobs at risk to offshoring to low-wage, labor-abundant countries is about 15–20 million with many (40–50 percent) of these jobs in the manufacturing sector (long considered “at risk”).

While significant impediments to trade in services still seem to exist, it seems likely they will continue to diminish over time. The history of trade in the manufacturing sector provides a good indicator of how the process is likely to play out in services.

Using very detailed plant-level data, Bernard, Jensen, and Schott (2006b) examine the impact of falling trade costs (both tariffs and transportation costs) on US manufacturers. To no great surprise, they find that when trade costs in an industry fall, plants within that industry are more likely to close. Imports increase and plants close. This is an implication of trade that creates great discomfort. It is a fact. But the story does not end there.

The researchers also find that when trade costs fall, industry productivity growth increases. This finding is important because productivity growth drives increased living standards.

There are a number of channels by which reduced trade barriers increase productivity. As mentioned above, the first channel is plant closures. When trade costs fall and imports increase, plants close. But random plants do not close; lower productivity plants close. Falling trade costs and increased trade tend to reduce the amount of economic activity at the low end of the productivity distribution. These closures raise aggregate productivity by decreasing the market shares of the lower end of the productivity distribution.

In addition, relatively highly productive nonexporters in industries with falling trade costs are more likely to start

exporting. Again, this will have favorable distributional and aggregate productivity implications. Because relatively higher productivity plants are expanding, aggregate productivity will tend to rise.

Furthermore, existing exporters increase their shipments abroad as trade costs fall. Exporters are high-productivity plants, and again this expansion of the high end of the productivity distribution will tend to raise aggregate productivity.

Further, there is evidence of productivity growth within plants in response to decreases in industry-level trade costs. All of the previous channels would have increased aggregate productivity without any plant-level productivity growth, merely by increasing the share of economic activity at more productive producers. Bernard, Jensen, and Schott also find that decreases in trade costs, and the increased competitive pressure associated with it, increase productivity at the plant level. Plants seem to respond to increased import competition by increasing their productivity.

Not surprisingly, given the number of channels by which falling trade costs shift the distribution of economic activity toward more productive plants and the plant-level productivity improvements associated with falling trade costs, entire industries experiencing relatively large declines in trade costs exhibit relatively strong productivity growth compared with other industries.

There is little reason to expect decreasing impediments to trade to play out any differently in the service sector. Increased trade in services should foster the same type of reallocation across industries and within industries as it has in manufacturing. Low-productivity service producers will be more likely to close; high-productivity nonexporters will be more likely to start exporting (and grow); and existing exporters are likely to increase their exports (and grow). The reallocation associated with these changes will tend to increase productivity in the tradable service sector. In addition, the increased competitive pressure will likely foster productivity growth within service producers. All of these responses to increased trade will have the positive impact of increasing productivity growth—and raising living standards—in the United States (see Mann 2003).

TRADE, EMPLOYMENT GROWTH, AND JOBS: WHAT IS THE LABOR MARKET IMPACT TO DATE?

In earlier work, we reported net employment growth differences between tradable and nontradable service activities and found little difference in net employment growth rates between tradable and nontradable services (see Jensen and Kletzer 2006).

Here we update our 2006 analysis with the most recently available data and also examine differences in occupational median wage growth rates for tradable and nontradable occupations.¹² It appears that tradable and nontradable service activities (both industries and occupations) have similar net employment growth rates and similar median wage growth rates, suggesting that neither offshoring nor exporting has yet had a significant impact on the US labor market.

Figure 11a shows the average net change in industry employment for 1998–2004, broken out by sector and tradable/nontradable classifications.¹³ We see that tradable manufacturing industries experienced job losses on average, but tradable service industries had employment increases similar to nontradable service industries.

Figure 11b shows similar employment growth rates for 1999–2006¹⁴ for occupation categories. Similar to industries, tradable production occupations experienced employment losses, but tradable service occupations had similar employment growth to nontradable service occupations. These statistics are consistent with trade in services not having had a significant impact on net employment growth to date.

We also examine average changes in median wages in tradable and nontradable occupations. Figure 11c shows that tradable service occupations have similar average median wage outcomes to nontradable services. These results also seem to suggest that trade in services has not yet had an impact on labor market outcomes in the United States.

TRADE IN SERVICES AND JOB DISPLACEMENT

Mirroring, again, the debate about manufacturing job loss and trade, there is considerable current interest in potential job loss resulting from increasing trade in services. In our 2006 paper, we also reported on the incidence, scope, and characteristics of

job displacement associated with potential services tradability. Very briefly here we report an update, using the 2006 Displaced Worker Survey (DWS).¹⁵

Table 3 reports job loss rates by industry for 2003–05. The table reports the share of workers in a sector who were involuntarily displaced from their jobs over the three-year period. Overall, about 4 percent of workers were displaced from their jobs over the period, with the risk of job loss lower in services than in manufacturing. Tradable industries overall had a somewhat higher risk of job loss than nontradable

We expect low-wage, low-skill job “losses” to be offset by high-wage, high-skill job “gains” from services exporting.

industries (5 percent compared with 3 percent). In manufacturing, nontradable industries had a higher rate of job loss (17 percent), compared with a tradable job loss rate of about 12 percent.¹⁶ Outside of the manufacturing sector, the nontradable job loss rate was slightly higher than the tradable rate. Three sectors account for business services as defined above: information services, financial services, and professional and business services. In information and financial services, the nontradable job loss rate was notably higher than the tradable job loss rate. In professional and business services, the reverse held. What is most notable about this sector is its overall low rate of job loss compared with manufacturing—even in tradable activities.

Parallel to our discussion of worker characteristics above, table 4 reports select demographic and educational characteristics for workers displaced from tradable and nontradable nonmanufacturing industries for 2003–05, with (tradable) manufacturing industries offered as a reference group. Kletzer (2001) noted that workers displaced from nonmanufacturing industries are slightly younger, less tenured, less likely to be male, and considerably more educated than workers displaced from manufacturing. These patterns still hold. For tradable

12. The County Business Patterns program is an establishment-based data collection program that uses primarily administrative data and thus has nearly universal coverage of in-scope establishments. For more information on County Business Patterns, see the US Census Bureau’s website, <http://www.census.gov/epcd/cbp/view/cbpview.html>. The Occupational Employment Statistics program is also an establishment-based program but is collected through a survey instrument. For more information on the Occupational Employment Statistics, see the US Bureau of Labor Statistics’ website, www.bls.gov/oes/home.htm.

13. We are constrained to use 1998 as our starting point, because it is the first year that County Business Patterns was produced on a NAICS basis. The most recent year available is 2004.

14. We are constrained to use 1999 as our starting year because it is the first year the Occupational Employment Survey was published on a Standard Occupational Classification basis.

15. The Current Population Survey–based Displaced Worker Survey (DWS) provides basic information on the scope and cost of involuntary job loss. The DWSs offer large sample sizes, are nationally representative, and allow several key elements to be investigated, including the incidence of job loss; the characteristics of workers affected; likelihood of reemployment; reemployment industry and occupation; and earnings changes. These surveys have been used extensively to study manufacturing job loss (see Kletzer 2001).

16. Analysis of the earlier three-year period, 2001–03, revealed a much larger tradable-nontradable job loss difference (15 percent for tradables compared with about 8 percent for nontradables).

Figure 11a Industry average net employment change, 1998–2004 (percent)

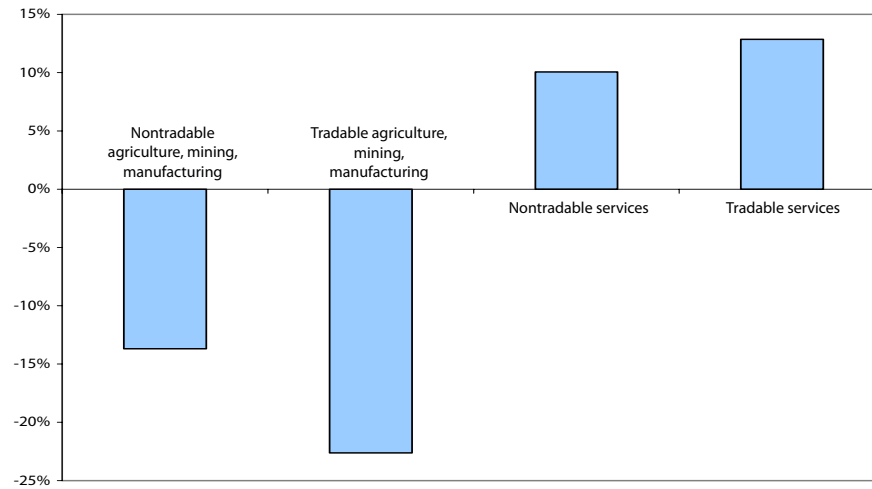


Figure 11b Occupation average net employment change, 1999–2006 (percent)

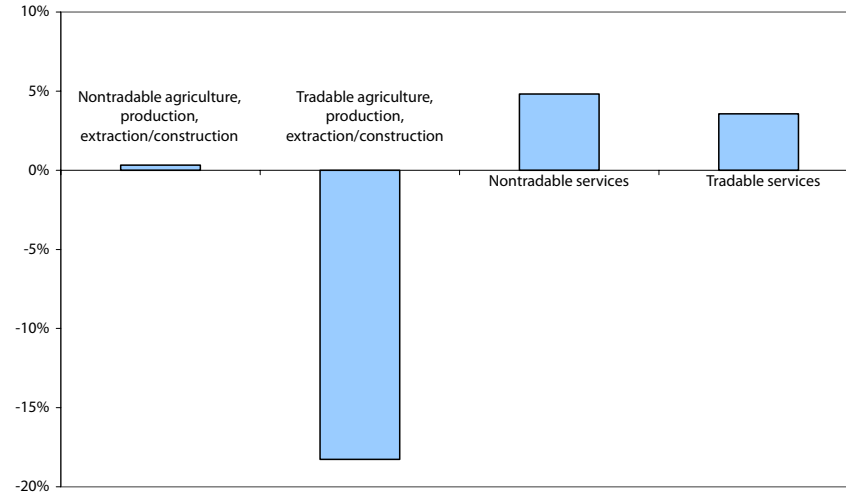
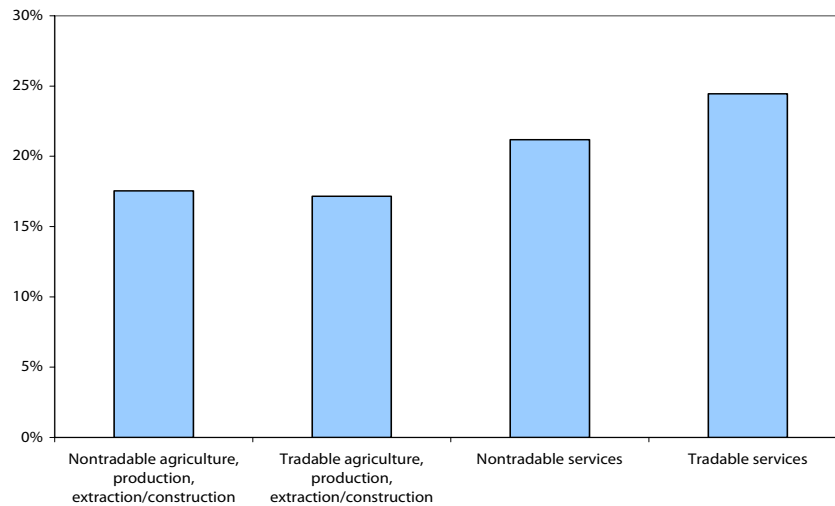


Figure 11c Occupation average median wage change, 1999–2006 (percent)



Sources: Authors' calculations; 1998–2004 County Business Patterns data; 1999–2006 Occupational Employment Statistics data.

Table 3 Job loss rates by industry, 2003–05 (percent)

Industry	Overall	Tradable	Not tradable
Manufacturing	12	12	17
Information	4	4	15
Financial services	4	3	12
Professional and business services	4	5	2
Total	4	6	3

Source: Authors' calculations from the 2006 Displaced Worker Survey, using sample weights.

Table 4 Characteristics of displaced workers by industrial sector and tradability, 2003–05

Characteristic	Manufacturing, tradable	Nonmanufacturing	
		Tradable	Not tradable
Educational attainment share (percent)			
High school drop out	15	4	10
High school graduate	40	22	31
Some college	25	35	34
College +	21	38	25
On predisplacement job			
Share with health insurance (percent)			
Full-time (percent)	69	58	42
If full-time, real weekly earnings	\$723.21	\$855.38	\$605.10
Standard deviation	\$520.50	\$573.17	\$465.65
Share reemployed (percent)			
Of reemployed, share full-time (percent)	67	74	66
Of reemployed, share full-time (percent)	85	67	66
All reemployed			
Change in ln earnings (mean)	-0.17	-0.082	-0.073
Standard deviation	0.51	0.61	0.68
Median change	-0.054	-0.028	0
Share with no earnings loss (percent)	37	43	48

Note: Agriculture, mining, forestry, and construction omitted.

Source: Authors' calculations from the 2006 Displaced Worker Survey, using sampling weights.

nonmanufacturing workers, just under 75 percent of displaced workers had at least some college experience compared with 46 percent of displaced manufacturing workers.

Also evident in table 4 is that for nonmanufacturing industries, workers displaced from tradable industries were more educated, more likely to have health insurance, more likely to lose fulltime jobs, and have higher predisplacement earnings than workers displaced from nontradable industries. The educational attainment differences are stark: Forty-one percent of workers displaced from nontradable nonmanufacturing industries had a high school diploma or less compared with 26 percent of workers displaced from tradable nonmanufacturing industries. The educational differences show up in predisplacement weekly earnings and are consistent with the comparative advantage characteristics noted above.

In terms of postdisplacement outcomes, reemployment rates were higher for tradable nonmanufacturing than for nontradable nonmanufacturing. The median change in weekly earnings for manufacturing workers was a loss of about 5 percent for 2003–05 (compared with a loss of 15 percent in 2001–03). Median earnings losses are smaller for nonmanufacturing than for manufacturing, and a larger share of nonmanufacturing workers experience no earnings loss. Consistent with lower predisplacement earnings, workers displaced from nontradable nonmanufacturing industries experienced smaller earnings losses than workers displaced from tradable nonmanufacturing industries.

CONCLUDING REMARKS

We have argued in this policy brief that the public discussion of offshoring would benefit substantially from additional facts and analysis. We have reported results from a number of studies and ongoing research that provide a useful framework for understanding how offshoring and service exports are likely to affect the US labor market going forward.

Workers in tradable service activities are better educated and have higher earnings than workers in similar, nontradable activities. Tradable services are higher skill and higher wage than nontradable activities, which suggests that they are consistent with US comparative advantage. Indeed, US service establishments that export tend to be in high-wage industries and within those industries pay higher wages on average, again consistent with the notion that the United States has comparative advantage in tradable services production.

Because the United States has comparative advantage in high-skill, high-wage production, the United States is likely to retain and indeed increase these activities in both the manufacturing and tradable services sectors as trade barriers diminish.

The evidence suggests that the dividing line between activities where low-wage, labor-abundant countries have comparative advantage and high-wage, high-skill countries have comparative advantage is at industries that have average wages in the United States of about \$40,000. While this threshold is not a precise estimate, all of the evidence suggests that this threshold is a useful way to think about the implications of trade in services.

So, while we agree with many commentators that a significant share of employment in the United States is in activities that can be provided at a distance—and are thus tradable—we differ from other commentators in our estimate of how many of the tradable jobs are likely to move offshore. We estimate the number of jobs at risk to offshoring to low-wage, labor-abundant countries is about 15–20 million with many (40–50 percent) of these jobs in the manufacturing sector (long considered “at risk”). We expect low-wage, low-skill job “losses” to be offset by high-wage, high-skill job “gains” from services exporting. A fear of rapid revolutionary change resulting from services offshoring and encouraging US workers to train for nontradable, “personal” service activities seems inappropriate.

Potential notwithstanding, the evidence to date suggests there has been little net employment or median earnings impact of offshoring on US service industries and occupations. For services, there is no discernibly higher risk of job loss in tradable service activities than in nontradable service activities. Given the share of employment in relatively low-wage industries in manufacturing (60 percent) and business services (33 percent), we can anticipate that the risk of manufacturing job loss will remain higher than the risk of service sector job loss.

It seems reasonable to expect that the process of globalization in services will proceed much as it has in manufacturing; relatively low-wage, labor-intensive activities will be the most likely to move offshore. This increased competitive pressure will cause dislocation to workers and firms. But higher-wage, skill-, capital-, and technology-intensive activities will grow through exports to foreign markets. Through both dislocation of import competing industries and exports, the globalization of services production is likely to have productivity-enhancing (and standard of living-increasing) effects similar to the impact of globalization in the manufacturing sector.

Our analysis here acknowledges that services offshoring has potential to cause dislocation in the labor market (as it did in manufacturing), and we do not minimize the individual costs of job dislocation. Our intention is to provide a fuller picture of services trade that underscores how exports of services have the potential to expand high-quality services employment. Trade in services has the potential to contribute significantly to productivity growth within the service sector in the United States (as increased trade contributed to productivity growth in

the manufacturing sector). In addition to raising productivity in the United States, trade in services has probably even more potential to improve productivity in developing countries' services sector, where service sector productivity is not as high as in developed countries. Increased trade in services offers significant potential to improve living standards in the United States and around the world.

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