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Tradable Services: Understanding the Scope and Impact of Services Outsourcing

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Abstract

We develop a new empirical approach to identify tradable service activities. Contrary to conventional views of service activities as nontradable, we find a significant number of service industries and occupations that appear tradable and substantial employment in these tradable activities. Workers employed in tradable service activities differ from those employed in tradable manufacturing and nontradable services. Workers in tradable service activities have higher skill levels and are paid higher wages than manufacturing workers or workers in nontradable service activities. In general, we find little evidence that tradable service activities have lower employment growth than other service activities. However, evidence suggests lower employment growth at the lowest end of the skill distribution. There is also evidence of higher worker displacement rates in tradable services. Workers displaced from tradable service activities are different from displaced manufacturing workers: Displaced tradable service workers have higher skills and higher predisplacement earnings than displaced manufacturing workers.

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Globalization, particularly globalized production, is evolving and broadening from manufacturing into services. Service activities now account for a larger share of global trade than in the past. Services trade has almost doubled over the past decade: Over 1992–2002, exports increased from $163 billion to $279 billion and imports from $102 billion to $205 billion. These changes, and their implications for American firms and workers, have attracted widespread attention.

Coincident with the broadening of global economic integration from manufacturing to services, the face of job displacement in the United States is changing. While manufacturing workers have historically accounted for more than half of displaced workers, nonmanufacturing workers accounted for 70 percent of displaced workers over 2001–03.[1] The share of job loss accounted for by workers displaced from information, financial services, and professional and business services nearly tripled—from 15 percent during the 1979–82 recession to 43 percent over 2001–03. The industrial and occupational shift in job loss has been associated with a rise in the probability of job loss for more-educated workers.[2]

Bringing these two trends together, the changing mix of industries exposed to international trade in services may have deep implications for the structure of US industry and labor markets in the future. Currently, there is little clear understanding of the role of services globalization in domestic employment change and job loss. More fundamentally, there is little clear understanding of the size and extent of services offshoring, how large it is likely to become in the near-term future, or its impact on the US economy.

Fueled by the 2004 presidential race and continued slack in the labor market, the services offshoring debate became headline material. The literature on services offshoring is expanding rapidly. Recent contributions include Amiti and Wei (2004); Arora and Gambardella (2004); Bardhan and Kroll (2003): Bhagwati, Panagariya, and Srinivasan (2004); Brainard and Litan (2004); Bronfenbrenner and Luce (2004); Dossani and Kenney (2003, 2004); Mann (2003); Kirkegaard (2004); Samuelson (2004); and Schultze (2004). Despite the attention, relatively little is known about how many jobs may be at risk of relocation or how much job loss is associated with these business decisions.

There are a few prominent projections, advanced mostly by consulting firms. The dominant and most widely quoted projection of future job losses due to movement of jobs offshore is Forrester Research's "3.3 Million US Services Jobs To Go Offshore" (McCarthy 2002).[3] Among others, Deloitte Research estimates that by 2008 the world's largest financial services companies will have relocated up to two million jobs to low-cost offshore countries; Gartner Research predicts that by the end of 2004, 10 percent of

[1] The shift in job loss from manufacturing and production workers toward service and white-collar (nonproduction) workers has been in evidence since the recession of the early 1990s. At that time, concerns about downsizing and reengineering were coincident with a rise in the share of white-collar and service-sector job loss (see Podgursky 1992, Farber 1993, Gardner 1993, and Kletzer 1995, 1998).

[2] It is still the case that less-educated workers have the highest rates of job loss overall. Over 2001–03, the rate of job loss for workers without a high school diploma or less was .141; for workers with at least some college experience, the rate of job loss was .096 (estimates from the 2004 Displaced Worker Survey). See Farber (2005) for a more detailed examination of worker characteristics and the risk of job loss.

[3] The Forrester projection was updated in 2004 to 3.4 million.

information technology (IT) jobs at US IT companies and 5 percent of IT jobs at non-IT companies will have moved offshore; another Gartner Research survey revealed that 300 of the Fortune 500 companies today do business with Indian IT services companies. Goldman Sachs estimates 300,000 to 400,000 services jobs have moved offshore in the past three years and anticipates a monthly rate of 15,000 to 30,000 jobs, in manufacturing and services combined, to be subject to offshoring in the future.

It is clear that changes in technology are enabling more activities to be traded internationally. What is unclear is how large these trends are likely to become, the sectors and occupations affected to date and going forward, and the impact on workers of the resulting dislocations. Without understanding the nature and scope of the changes, it is difficult to formulate effective public policy to address emerging needs.

This paper develops a new empirical approach to identify, at a detailed level, service activities that are potentially exposed to international trade. We use the geographic concentration of service activities within the United States to identify which service activities are traded domestically. We classify activities that are traded domestically as *potentially* tradable internationally. Using the identified industries and occupations, we develop estimates of the number of workers who are in tradable activities for all sectors of the economy. We compare the demographic characteristics of workers in tradable and nontradable activities and employment growth in traded and nontraded service activities. We also examine the risk of job loss and other employment outcomes for workers in tradable activities.

To preview the results, we find considerable employment shares in tradable service industries and occupations. Based on our estimates, there are more workers in tradable professional and business service industries than in tradable manufacturing industries. We also examine the characteristics of workers in tradable and nontradable activities and find that workers in tradable sectors have higher skills and significantly higher wages. Within specific sectors like professional services, the earnings differentials are even larger, approaching 20 percent.

When we examine employment growth trends across traded and nontraded activities, tradable activities have lower growth rates, which is due primarily to employment losses in manufacturing. Within services, tradable and nontradable activities have similar growth rates except for at the lowest end of the skill distribution. Low-skill tradable industries and occupations have negative average employment growth compared with positive (though low) employment growth in nontraded, low-skill services.

We also examine worker displacement rates in tradable and nontradable service activities. We see some evidence that displacement rates are higher in tradable service industries than in nontradable. We also find higher displacement rates in tradable white-collar occupations than in nontradable. Consistent with the characteristics of employed workers, we find workers displaced from tradable service activities are more educated, with higher earnings, than workers displaced from nontradable activities. Job loss from tradable and nontradable service activities is costly to workers in terms of earnings losses. Taken together, the results

are consistent with the view that economic activity within the United States is moving toward US comparative advantage in services, similar to manufacturing.

In the next section we describe our empirical approach for identifying tradable activities. Section II describes the tradable and nontradable categories, for both manufacturing and services activities. Section III follows with a comparison of worker characteristics in tradable and nontradable services. Section IV explores the employment trends in tradable and nontradable services. Section V considers the most recent evidence on job displacement from tradable activities. Section VI concludes.

I. EMPIRICAL APPROACH

Historically, many services have been considered nontradable, and empirical work examining trade in services is scarce relative to empirical work on manufacturing. Because we want to examine the potential impact of trade in services on the US economy, we want to identify the size and scope of services trade at as detailed a level as possible. As many observers and researchers have noted, gathering detailed data on the extent of services offshoring is quite difficult. While the Bureau of Economic Analysis (BEA) provides data on international trade in services, these data do not provide particularly detailed industry-level data. Table 1 shows the level of industry detail available from the BEA.

Our interest in examining trade in services in more detail than what is available through the BEA services trade data necessitates an alternative empirical approach to identifying tradable service activities. Our approach to identifying service activities that are potentially tradable is novel: We use the geographic concentration of service activities within the United States to identify industries and occupations that appear to be traded within the United States. From this domestic information, we will infer that service activities that can be traded within the United States are also potentially traded internationally.

Framework

To develop our baseline measure of tradable services, we rely upon the economic intuition that nontraded services will not exhibit geographic concentration in production. We observe that goods that are traded tend to be geographically concentrated (to capitalize on increasing returns to scale, access to inputs like natural resources, etc.), while goods that are not traded tend to be more ubiquitously distributed. We will apply this same intuition to service production.

Helpman and Krugman (1985) present a model that demonstrates this intuition. They model a world with two goods, two countries, and three industries, where the first industry is assumed to be a nontradable constant-returns sector, the second industry is an industry with differentiated varieties that are assumed to be costlessly traded, and the third industry is a tradable constant-returns sector. Helpman and Krugman derive

the input vectors $\mathbf{V}(1)$, $\mathbf{V}(2)$, and $\mathbf{V}(3)$ for the integrated world equilibrium. With homothetic and identical tastes, if country *j* has a share s_j of world income, it must allocate resources $s_j\,\mathbf{V}(1)$ to the nontradable industry—that is, the production of the nontraded good must be allocated between countries in proportion to their shares of world income. Nontraded goods are distributed uniformly with population and income.

This intuition is revealed more descriptively in Krugman (1991, pg. 65), where he notes, "In the late twentieth century the great bulk of our labor force makes services rather than goods. Many of these services are nontradable and simply follow the geographical distribution of the goods-producing population—fast-food outlets, day-care providers, divorce lawyers surely have locational Ginis pretty close to zero. Some services, however, especially in the financial sector, can be traded. Hartford is an insurance city; Chicago the center of futures trading; Los Angeles the entertainment capital; and so on. …. The most spectacular examples of localization in today's world are, in fact, services rather than manufacturing. …. Transportation of goods has not gotten much cheaper in the past eighty years… But the ability to transmit *information* has grown spectacularly, with telecommunications, computers, fiber optics, etc."

The idea is that when something is traded, the production of the activity is concentrated in a particular region to take advantage of some economies in production. As a result, not all regions will support local production of the good, and some regions will devote a disproportionate share of productive activity to a good and then trade it.[4] We will use the geographic concentration of service activity within the United States as an indicator that the service is traded within the United States and thus *potentially* tradable internationally.

The reference to "locational Gini" in the quote above is one measure of geographical concentration. There are a number of ways to measure geographic concentration. The measures compare a region's share of employment in or output of an activity with the region's share of overall economic activity. We make use of two frequently used measures of geographic concentration,[5] but before turning to them we need to address one more conceptual issue.

Demand-Induced Agglomeration and Intermediate Services

Measures of geographic concentration are a way to implement the intuition presented above. Most measures of concentration use the region's share of employment in an industry relative to the region's share of total employment. The measures of concentration do not differentiate the reasons activity is concentrated. It does not matter whether production is concentrated because of the location of natural resources, increasing returns

[4] The relationship between geographical concentration of production and trade, particularly exports, has a long tradition in both economic geography (where the measure used is the location quotient) and trade analysis (where the measure used is revealed comparative advantage). The measures of economic concentration used in this paper are different from the location quotient and revealed comparative advantage measures, but all the measures have a similar flavor in that they compare the share of production (or exports) in a particular region with an "expected" baseline.

[5] There are a number of different empirical approaches to measuring geographic concentration and agglomeration. Other measures include Duranton and Overman (2004).

in production, or spillovers due to the agglomeration of workers–the concentration of production indicates that the good or service is produced in a location different from where it is consumed. So, in general, the reason for the concentration does not matter to us, except in one instance. If a service is nontradable and demand for the service is concentrated (industries that use the nontraded service are geographically concentrated), the service industry will be geographically concentrated and we would incorrectly infer that the service is tradable.

To incorporate this case into our approach, we extend the intuition from the framework. If a nontradable industry provides intermediate inputs to a downstream industry, we would expect the geographical distribution of the nontraded intermediate industry to follow the distribution of the downstream industry. Instead of being distributed with income, the nontraded good is distributed in proportion to the geographical distribution of demand for that industry.

We construct region-specific measures of demand for each industry using the BEA's Input-Output Use tables.[6] This measure of industry demand share ($IDS_{i,p}$) represents how much geographic concentration there is in demand for a good or service *i* in a particular region *p*. We construct the demand for industry *i* in Place of Work Metro Area *p* by

$$(1) \qquad IDS_{i,p} = \sum_j (Y_{i,j} / Y_i * InEMP_{j,p} / InEMP_j)$$

where

$Y_{i,j}$ = the output of industry *i* used by industry *j* (including government and private households as "industries");
Y_i = total output of industry *i;*
$InEMP_{j,p}$ = industry *j* employment in region *p;*
$InEMP_j$ = total employment in industry *j*

We include both direct use and investment in the "use" of industry *i* output by industry *j*.

To construct the occupation-region specific demand measures, we use the industry-region specific demand measures described above and weight those by the share of occupation employment in an industry.

$$(2) \qquad ODS_{o,p} = \sum_j (IDS_{j,p} * OcEMP_{o,j} / OcEMP_o)$$

where

$IDS_{j,p}$ = industry demand share for industry *j* in region *p;*
$OcEMP_{o,j}$ = occupation *o* employment in industry *j;*
$OcEMP_o$ = total employment in occupation *o*

[6] We use the 1999 Input-Output Use tables published by the BEA. (For more information, see www.bea.doc.gov/bea/dn2/i-o.htm). We aggregate some BEA Input-Output industries to a level consistent with the Census industry classification on the 2000 Decennial Population Public Use Micro Sample (PUMS).

These adjustments take account of the concentration of downstream industry concentration and adjust the "denominator" in the geographic concentration measures that follow.

Measuring Geographic Concentration

The first measure of economic concentration, as described in Ellison and Glaeser (1997) is

$$(3) \qquad \boldsymbol{EC_i} = \sum_p (s_{i,p} - x_p)^2$$

The measure is an index for comparing a region's share of industry employment ($s_{i,p}$) with the area's share of aggregate activity/employment (x_p). When an area's employment share in an activity is significantly greater than the area's share of aggregate employment, this is interpreted as indicating a concentration, or specialization, in the given activity. The index $\boldsymbol{EC}$ provides a national index for each industry, and measures of $\boldsymbol{EC}$ indicating geographic concentration will be interpreted as indicative of trade in that activity, in the sense that "local" employment exceeds "local" demand in some areas and the difference is traded outside the area. We modify the $\boldsymbol{EC}$ measure to look at the difference between the region's share of industry employment and the region's share of industry demand, as noted above:

$$(4) \qquad \boldsymbol{EC_i} = \sum_p (s_{i,p} - IDS_{i,p})^2$$

The new measure of $\boldsymbol{EC}$ is an index for comparing a region's share of an industry's employment (s_i) with the region's share of demand for that industry ($IDS_{i,p}$).

We do not make the Herfindahl adjustment that Ellison and Glaeser use in their index of agglomeration because we are not interested in agglomeration (the colocation of different firms in the same industry) but are interested in pure geographic concentration (whether the concentration is due to one firm or a number of firms). If economic activity is concentrated because there are significant scale economies that are captured within a firm, we do not want to discount this concentration (though not agglomeration) because we are interested in a measure of tradability.

The second measure of geographic concentration we use is the Gini coefficient. The Gini coefficient $\boldsymbol{G}$ for the concentration of industry activity is given by

$$(5) \qquad \boldsymbol{G_i} = \left| 1 - \sum_p (\sigma Y_{i,p-1} + \sigma Y_{i,p}) * (\sigma X_{i,p-1} - \sigma X_{i,p}) \right|$$

where *p*'s index regions (sorted by the region's share of industry employment), $\sigma Y_{i,p}$ is the cumulative share of industry *i* employment in region *p*, $\sigma Y_{i,p-1}$ is the cumulative share of industry *i* employment in the region *(p-1)* with the next lowest share of industry employment, $\sigma X_{i,p}$ is the cumulative share of total employment in region *p*, and $\sigma X_{i,p-1}$ is the cumulative share of total employment in region *(p-1)*. We modify the Gini measure to

$$(6) \qquad \boldsymbol{G_i} = \left| 1 - \sum_p (\sigma Y_{i,p-1} + \sigma Y_{i,p}) * (\sigma IDS_{i,p-1} - \sigma IDS_{i,p}) \right|$$

where $IDS_{i,p}$ is the region's share of demand for industry *i*.

Implementation

We implement these measures using employment information from the 2000 Decennial Census of Population Public Use Micro Sample (PUMS) files. We use as our geographic entity the Consolidated Metropolitan Statistical Area or the Metropolitan Statistical Area where an individual reports working.[7] We construct the measures of geographic concentration for each industry. Industries that are geographically concentrated will be considered tradable.

We recognize that the use of worker-level data to investigate economic concentration is somewhat unusual. We pursue this strategy because we are interested in both industrial and *occupational* concentration. The ability to identify both industries and occupations that are tradable is an important feature of the empirical strategy because many of the service activities that are reportedly being globally sourced are tasks within the service "production" process (for example, the banking relationship is not relocated offshore, rather the customer service/call center component is moved); occupations correspond more closely to these types of activities than do industries.

We construct the adjusted $\boldsymbol{G}$ and $\boldsymbol{EC}$ measures for both industries and occupations. The correlation between the $\boldsymbol{EC}$ and $\boldsymbol{G}$ measures is quite high, .713 for industries and .732 for occupations. For the remainder of this paper, we will focus on the $\boldsymbol{G}$ results.

[7] For regions, we use the Place of Work Consolidated Metropolitan Area (POWCMA) field on the Decennial Census PUMS. When POWCMA is coded as a nonmetropolitan area or a mixed metro/nonmetro area, we concatenate the Place of Work state code with the POWCMA5 code. For more information on the 5 percent sample PUMS, seewww.census.gov/Press-Release/www/2003/PUMS5.html.

II. CLASSIFYING INDUSTRIES AND OCCUPATIONS AS TRADABLE VERSUS NONTRADABLE

Industries

An important issue in our empirical approach is to identify the level of geographic concentration that indicates that an industry or occupation is "tradable."[8] We started exploring where to impose the tradable/nontradable threshold with industries because we have a much better sense of which industries are tradable—particularly for goods-producing industries. We initially placed industries into three roughly equal groups: Gini class 1 (least geographically concentrated) when the industry Gini was less than .1; Gini class 2 when the industry Gini was between .1 and .3; Gini class 3 (most geographically concentrated) when the Gini coefficient was greater than or equal to .3. Approximately 36 percent of industries are in Gini class 1, about 37 percent are in Gini class 2, and 27 percent are in Gini class 3.

Figure 1 plots the Gini coefficients for all industries by 2-digit North American Industrial Classification System (NAICS) code. The pattern exhibited in figure 1 is generally consistent with our priors that tradable industries will be geographically concentrated. For example, industries in the goods-producing sectors of agriculture, mining, and manufacturing are typically in Gini classes 2 and 3. Only 5 of the 92 industries in these sectors are in Gini class 1: cement and concrete, machine shops, miscellaneous manufacturing nec, structural metals and tanks, and printing and related activities. All of these industries seem to be either nontraded because of a high weight to value ratio (e.g., cement and concrete) or include a range of potentially dissimilar activities (miscellaneous manufacturing nec) that make them appear to be broadly geographically distributed. Most agriculture, mining, and manufacturing products are considered tradable; so as a first-order approximation classifying the lowest geographical concentration category (Gini class 1) as nontradable seems appropriate for these sectors.[9]

Using a Gini coefficient of .1 as the threshold for tradable seems to make sense in other sectors as well. Industries in the retail trade sector are primarily classified as nontradable. Industries in the transportation

[8] Our interest is in identifying industries and occupations that are traded within the United States and thus potentially tradable internationally. The level of geographic concentration an industry or occupation exhibits will be a function of several factors, including transportation costs (our focus here) and production economies (including access to natural resource inputs and increasing returns). We focus on a level of concentration that implies that industries or occupations are not ubiquitously distributed—indicating that they are traded. Geographic concentration above this "threshold" does not indicate higher tradability but instead reflects other factors. For example, both agricultural products and minerals are traded, but mining is much more geographically concentrated than agricultural production. The higher level of concentration does not reflect higher levels of tradability but instead features of the production process.

[9] Another check on the industry classification is to examine the correlation of geographic concentration of manufacturing industries with the level of trade intensity in those industries. The mean industry trade share [(imports+exports)/domestic production] for Gini class 1 = .40, Gini class 2 = .57, and Gini class 3 = .71. If manufacturing machinery nec is removed from Gini class 1 (by virtue of it not being a consistent industry), the mean trade share for that class falls to .35. The pattern revealed is one of a positive correlation between Gini class and mean trade share, with some notable variation within class.

sector are mostly classified as tradable. For public administration, most activities are nontradable except for public finance and the military. For the services sector, industries are balanced between nontradable and tradable. Table 2 provides a complete list of service industries by 2-digit NAICS sector and the industry's Gini class.[10]

Table 3 shows the share of employment classified in tradable industries by major NAICS group. Again, the employment shares across categories and industries conform to our priors. All of employment in the agriculture and mining sectors is classified as tradable (in either Gini class 2 or 3). For manufacturing, most employment is in the tradable sector.[11] Utilities are mostly nontradable, and construction is entirely nontraded. For the remainder of the paper, we will categorize industries with a Gini coefficient below .1 as nontradable and industries with a Gini coefficient greater than or equal to .1 as tradable.[12]

Size and Scope of Tradable Service Industries

We use the categorization of industries into tradable and nontradable to develop estimates of the employment potentially affected by trade in services. Table 4 shows the share of total employment in tradable and nontradable industries by major NAICS group. In contrast to traditional characterizations of services as being predominantly nontradable, our categorization suggests a significant share of total employment is in tradable service industries. For example, more workers are in tradable industries in the services sector than in the manufacturing sector. The sum of the share of total employment in industries that are tradable in professional services (NAICS 51-56) is 13.7 percent and larger than the share of employment in tradable manufacturing industries (12.4 percent). There are sizeable services sectors correctly characterized as having low shares of employment in tradable industries (education, health care, personal services, and public administration). 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.

[10] Higher education may appear to stand out in table 2 as a nontradable service industry. US colleges and universities, particularly research institutions, attract many foreign students, with acknowledged global comparative advantage. The sector also includes community colleges that are, by design, geographically dispersed. The types of specialized scientific occupations associated with research institutions (the most likely to "export" educational services) are geographically concentrated and thus considered tradable.

[11] Alternatively, if we modify the cutoff and use .2 as the break between tradable and nontradable, 28 percent of manufacturing employment would be in the nontradable sector.

[12] While choosing the threshold for nontradable versus tradable is inherently arbitrary, we ran a number of robustness checks on the results reported in the paper. With the exception of the share of employment in the tradable sector (which decreases as the threshold is increased), the results are robust to the choice of threshold.

Occupation Results

We are also interested in categorizing occupations into tradable and nontradable groups. We are interested in identifying tradable occupations because, at least based on anecdotal reports in the press, some intermediate inputs into service production might be tradable even though the service industry is not (think computer programming for the banking industry). We use a similar methodology to classify occupations into tradable and nontradable categories. We construct a demand-weighted Gini coefficient for each occupation as described above and use the same Gini = .1 threshold for the nontradable/tradable categorization. Table 5 shows the share of employment by major Standard Occupational Classification (SOC) group by Gini class. The groupings largely are consistent with our priors. The occupational groups with large shares of employment classified as tradable include business and financial operations (68 percent); computer and mathematical occupations (100 percent); architecture and engineering (63 percent); legal (96 percent); and life, physical, and social sciences (83 percent).[13] The notable nontradable occupational groups include education and library (99 percent nontradable); healthcare practitioners (86 percent); healthcare support (97 percent); and food preparation (96 percent). On the blue-collar side, 90 percent of employment in installation, maintenance, and repair is classified as nontradable, as is 80 percent of production[14] and 89 percent of transportation and material moving.

Table 6 shows for all occupations how many workers are in occupations classified as tradable but in industries classified as nontradable. In the aggregate, the share of workers in tradable occupations and nontradable industries is not large—about 10 percent. However, for business and professional occupations, the share of workers in tradable occupations but nontradable industries is much larger. Table 7 exhibits these results. The typical professional occupation has about 25 percent of employment in tradable occupations but nontradable industries. To the extent that firms can vertically "disintegrate" the provision of these intermediate service inputs, workers in these tradable occupations are potentially vulnerable to trade even though their industry is not tradable. This suggests that for service activities, the industry results on the share of workers potentially vulnerable to trade are probably understated. Outside of education and healthcare occupations, the typical "white-collar" occupation involves a potentially tradable activity.

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[13] van Welsum and Reif (2005, appendix table 2) offer a list of US occupations (at the 3-digit level) identified as "potentially affected by offshoring." As explained in their chapter, their method relies on occupations having "offshorability attributes," which rely on the use of information and communication technologies, highly codifiable knowledge, and no face-to-face contact. The two lists of occupations overlap, although our method identifies a larger set of tradable occupations. van Welsum and Vickery (2005, table 6) also offer a list of US industries potentially affected by offshoring. Our detailed industry list shares similarities with theirs, but our list excludes a number of retail industries (e.g., dairy stores, liquor stores, etc.) included in their list.

[14] The geographic concentration results are at first counterintuitive for production occupations given the manufacturing industry results. Production occupations are typically not industry-specific but instead functional activities and are thus distributed more broadly.

III. WORKER CHARACTERISTICS

Beyond mere employment counts, we also examine demographic characteristics such as education, age, gender, and earnings to identify whether there are differences between workers in tradable service activities and those in nontradable industries and occupations. These characteristics are available from the 2000 Decennial Census of Population Public Use Micro Sample (PUMS) 5 percent sample.[15]

Table 8 shows the demographic characteristics of workers in tradable and nontradable industries in aggregate. Workers in tradable industries have higher incomes, are more likely to be male, and more likely to have a college degree (though not an advanced degree). Table 9 breaks out these same characteristics for selected service industries classified as tradable and nontradable. We also present the results for the manufacturing sector as a benchmark for demographic characteristics typically associated with trade-affected workers. Workers in tradable service industries are higher paid and more skilled than workers in tradable manufacturing. Within services, the most striking feature of the service-industry results is the difference in annual earnings. Across all major service-sector groups, the differential in earnings between tradable and nontradable industries is large, with tradable services having appreciably higher wages. Service workers in tradable industries also tend to have higher educational attainment and are more likely to be male and white.

Table 10 shows the results for all occupations divided into tradable and nontradable groups. Individuals in occupations identified as tradable tend to have higher earnings, are more likely to be male, and have higher educational attainment. Table 11 shows the same characteristics for selected occupations. Again, as in the industry results, workers in tradable service occupations have higher earnings and educational attainment than workers in nontradable ones.

In tables 12 to 14, we estimate a number of regressions to examine whether the earnings differentials in the tables are the result of higher educational attainment in tradable industries and occupations. Table 12 shows regression results for all industries and NAICS 51-56 industries. Across all industries, workers in tradable industries have 6 percent higher wages controlling for observable demographic characteristics and industry (2-digit NAICS) and regional (POWCMA) fixed effects. For workers in professional and business service industries, the differential associated with being in a tradable industry is even larger. In the professional services sector, workers in tradable industries have almost 15 percent higher wages than workers in the same sector (and controlling for observable demographic characteristics) that are in nontradable industries.

Table 13 shows a similar specification for occupations. The first column reports the results for all occupations and the second column reports the results for "high-end" service occupations.[16] Across all

[15] For more information on the 5 percent sample PUMS, see www.census.gov/Press-Release/www/2003/PUMS5.html.
[16] High-end service occupations include SOC major groups 11, 13, 15, 17, 19, 23, and 29. See table 11 for the names of the SOC major groups.

occupations, workers in tradable occupations receive 9 percent higher wages than workers in nontradable occupations. For "high-end" service occupations, workers in the tradable sector receive almost 13 percent higher wages, even after controlling for demographic characteristics and occupation group (2-digit SOC) and region.

Table 14 examines whether the effects of being in a tradable industry and occupation are independent. Workers in tradable industries *and* tradable occupations are the omitted category. For all industries and occupations, workers in nontradable industries and occupations have 10 percent lower wages than workers in both tradable industries and occupations. Interestingly, the effect seems to be additive. Workers that are in either just a tradable industry or just a tradable occupation receive about 5 percent lower earnings than workers in both a tradable industry and tradable occupation. In both professional service industries and "high-end" service occupations, the effect of being in a tradable industry and tradable occupation is quite large. Workers in tradable industries and occupations in NAICS 50 sector receive 17 percent higher wages than workers in a nontradable industry and occupation *within the same sector*. For "high-end" service occupations, the differential is almost as large—workers in tradable industries and occupations make almost 16 percent more than workers in nontradable industries and occupations.

These results demonstrate that tradable industries and occupations have higher wages, even after controlling for observable characteristics. Being in a tradable industry is associated with higher wages and being in a tradable occupation is also associated with higher wages. These effects appear to be independent—being in both a tradable industry and occupation is associated with a larger (almost double) income differential than being in either a tradable industry or occupation alone.

The comparison of worker characteristics in tradable service activities suggests that tradable services are consistent with US comparative advantage—they are high-skill and high-wage activities (relative to both manufacturing and nontradable service activities).

IV. AGGREGATE EMPLOYMENT GROWTH CHANGES

Much of the recent attention to services offshoring emphasized job losses in a number of occupational categories. We examine recent employment growth trends using both aggregate industry data from the Census Bureau's County Business Patterns program and aggregate occupation data from the Bureau of Labor Statistics' Occupational Employment Statistics program.[17] We present the data broken out by tradable/nontradable and by sector. The results in the previous section indicate that tradable activities in

[17] The County Business Patterns program is an establishment-based data collection program, which uses primarily administrative data and thus has nearly universal coverage of in-scope establishments. For more information on County Business Patterns, see www.census.gov/epcd/cbp/view/cbpview.html. The Occupational Employment Statistics program is also an establishment-based program, but data are collected through a survey instrument. For more information on the Occupational Employment Statistics, seewww.bls.gov/oes/home.htm.

general and tradable services in particular are higher skill than other activities. High-skill activities are consistent with US comparative advantage, and we would expect that as trade increases, economic activity would shift to activities consistent with US comparative advantage. Thus, we would expect higher-skill industries and occupations to have higher employment growth rates. We also break out the employment growth rates by industry and occupation skill quartile.[18]

Figure 2 shows the change in log industry employment for 1998–2002 by NAICS code.[19] It shows that industries in manufacturing have employment losses in general, while service industries tend to have positive employment growth. Table 15 presents mean industry employment growth by tradable and nontradable sectors. In the aggregate, the mean tradable industry experienced an employment loss of almost 6 percent while the mean nontradable industry experienced an employment gain of 5.6 percent. The lower panels of table 15 break out industries by their sector, tradable category, and skill quartile. The lower panels of table 15 show that the employment losses are, on average, concentrated in the goods-producing sector (and in the lower portion of the skills distribution).[20] In the services sector, the average nontradable industry experienced 6.7 percent growth and the average tradable service industry experienced 7.6 percent growth. In general, lower-skill quartile industries have lower employment growth. Tradable industries do not seem to have dramatically different employment outcomes than nontradable industries, though at the low end of the skill distribution, tradable industries had on average employment losses.[21]

Table 16 shows similar employment growth rates for 1999–2003[22] for occupation categories. Similar to industries, tradable occupations in aggregate have lower employment growth rates than nontradable occupations on average. Also similar to industries, this is explained primarily by differences between production-related occupations and service activities. Tradable service occupations have, on average, higher employment growth rates than nontradable service occupations. It is interesting to note that, like in tradable industries, at the low end of the skill distribution, tradable service occupations have negative employment growth. In comparison, the highest-skill category has positive employment growth.[23]

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[18] Industry and occupation skill quartiles are created by placing industries/occupations into skill quartiles based on the share of employees within the industry with a bachelor's degree.

[19] We are constrained to use 1998 as our starting point because it is the first year that County Business Patterns was produced on an NAICS basis. 2002 is the most recent year available. Public administration is not in the scope of the County Business Patterns program, so employment change figures are not available for this sector.

[20] These results are consistent with Bernard, Jensen, and Schott (2005). They use detailed, plant-level data to examine the impact of imports from low-wage countries on US manufacturing. The results show that activity in US manufacturing is shifting to industries consistent with US comparative advantage.

[21] Using a t-test to compare the lowest skill quartile with the highest skill quartile in the tradable services industry group, we cannot reject the null hypothesis that the means are the same at the 10 percent level.

[22] We are constrained to use 1999 as our starting year because it is the first year the Occupational Employment Statistics were published on an SOC basis. We use 2003 as the end point to have a four-year period consistent with the industry data.

[23] Using a t-test to compare the lowest-skill quartile with the highest-skill quartile in the tradable services occupation group, we can reject the null hypothesis that the means are the same.

The employment growth results are consistent with the comparative advantage framework. Employment is shifting toward activities that are consistent with US comparative advantage. High-skill industries and occupations are growing relative to low-skill industries and occupations. In both tradable service industries and occupations, the lowest-skill classes experience negative employment growth on average.

V. EVIDENCE ON THE RISK OF JOB LOSS AND CHARACTERISTICS OF DISPLACED WORKERS

The Displaced Worker Surveys provide basic information on the scope and cost of involuntary job loss. They 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.[24] These surveys have been used extensively to study manufacturing job loss (see Kletzer 2001).

Only the 2000 Census industry and occupational classifications allow study of the services and white-collar jobs of primary interest. This need for updated detail on industry and occupation (currently) limits our use of the Displaced Worker Surveys to the most recent administration—in January 2004. Although we lose the ability to observe services job loss over time, we gain the industry and occupational detail necessary for studying services offshoring.

Job Displacement from Services

Job loss rates by industry are reported in table 17, focusing on the 2001–03 period covered by the January 2004 Displaced Worker Survey. Remembering that this time period covered the dot-com bust and the most recent recession, the information sector (NAICS 51) had a notably high rate of job loss (.232). Overall, the risk of job loss was lower in services than in manufacturing.

As a reference point, table 17 includes job loss rates by industry for 1999–2001, from the 2002 Displaced Worker Survey. The industry classifications are different, reflecting the use of 1990 Census codes for the 2002 survey. What is clear is that job loss rates increased from 1999–2001 to 2001–03, most notably in communications (the old sector for some of the information sector) and manufacturing.

When we apply our tradable-nontradable distinction to the overall economy, the rate of job loss is notably higher from tradable industries (.153) than from nontradable industries (.076). Within the broad sectors of manufacturing and nonmanufacturing, tradable industries also had higher rates of job loss. The tradable-nontradable distinction is small within manufacturing, with the rate of job loss from tradable

[24] See the appendix for more information on the Displaced Worker Surveys.

industries being .213, and from nontradable (of which there are few), .192. Outside of manufacturing, the tradable distinction is large. Tradable nonmanufacturing industries have a rate of job loss of .128 and nontradable industries, .073. This difference is most notable in the information sector, where the rate of job loss from tradable (3-digit) industries was .317 and from nontradable, .075.

Job loss rates by occupation are reported in table 18. The blue-collar occupations faced a higher rate of job loss (about .12) than the white-collar occupations (about .09). Workers in all occupational categories faced a higher rate of job loss in 2001–03 than in 1999–2001.

Production workers faced the highest rate of job loss, at .206 (compared with the across-occupation average of .106). Some of the white-collar occupational categories forecasted to be at risk of services offshoring had high job loss rates (but lower than production workers), including business operations specialists (.143), computer and math (.177), and architecture and engineering (.128).

For the overall economy, tradable occupations had a higher rate of job loss than nontradable occupations, with the greatest difference in white-collar occupations. White-collar workers in tradable occupations faced a job loss rate of .094, and workers in nontradable occupations faced a rate of .065. For blue-collar workers, the tradable job loss rate was .128 and the nontradable rate was .122. There is no clear pattern of exposure to the risk of job loss by tradability within detailed occupations.

Parallel to our discussion of worker characteristics from the 2000 PUMS, table 19 reports demographic and educational characteristics of workers displaced from tradable and nontradable nonmanufacturing industries, with (tradable) manufacturing industries offered as a reference group. As noted in Kletzer (2001), workers displaced from nonmanufacturing industries are slightly younger, less tenured, less likely to be male, and considerably more educated than workers displaced from manufacturing. Among tradable nonmanufacturing workers, 75 percent of displaced workers had at least some college experience; for displaced manufacturing workers, that share was .46.

Also evident in table 19 is that for nonmanufacturing industries, workers displaced from tradable industries were more educated, more likely to have health insurance, more likely to lose full-time jobs, and have higher predisplacement earnings than workers displaced from nontradable industries. The educational attainment differences are stark: 42 percent of workers displaced from nontradable nonmanufacturing industries had a high school diploma or less, compared with 24 percent of workers displaced from tradable nonmanufacturing industries. The educational differences show up in predisplacement weekly earnings.

In terms of postdisplacement outcomes (also reported in table 19), reemployment rates are higher for displaced nonmanufacturing workers than observed for manufacturing workers. Reemployment rates are .75 and .77 for nontradable and tradable nonmanufacturing workers, respectively, compared with .64 for manufacturing.

The earnings cost of job displacement, well established for manufacturing workers, is also in evidence for nonmanufacturing workers. For the 2001–03 period, with the weak job recovery from the

recession, we see large earnings losses. 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.

Table 20 reports worker characteristics and reemployment outcomes for three services sectors: information; finance, insurance, and real estate; and professional and business services. For the most part, workers in tradable industries in these sectors have higher levels of educational attainment. In information and professional and business services, predisplacement weekly earnings were higher in tradable than in nontradable industries. Consistent with higher earnings, workers displaced from tradable industries reported health insurance coverage more so than workers from nontradable industries. Reemployment outcomes (reemployment rates or average earnings losses) are similar within sector, across the tradability of the detailed industries.

Table 21 reports a similar breakdown, by occupation, for sectors: management, business, and financial; professional and related; and office and administrative support. Workers from tradable occupations have higher levels of education, within occupational group, than workers from nontradable occupations. Predisplacement earnings were higher, as was the availability of health insurance coverage. Men are more highly represented in the tradable occupations. Again, there is no clear pattern of reemployment outcomes, by tradability. Earnings losses range from –3 to –16 percent, with 40 to 50 percent of reemployed workers reporting no earnings loss.

VI. CONCLUSIONS

This paper develops a new empirical approach to identify, at a detailed level for the entire economy, industries and occupations that are tradable. Using the methodology, we find substantial employment in tradable service industries and occupations. Workers in these industries and occupations are higher-skilled and have higher incomes than workers in the manufacturing sector and nontradable service activities. The higher incomes are not solely a result of higher skill levels—in regressions controlling for observable characteristics, workers in select tradable service activities earn 16 to 17 percent higher incomes than similar workers in nontradable activities in the same sector.

Examining employment growth across industries and occupations, there is little evidence that tradable service industries or occupations have lower employment growth than nontradable industries or occupations overall, though at the low end of the skill distribution, employment growth is negative for tradable services. High-skill service activities have the highest employment growth rates.

There is job insecurity associated with employment in tradable activities, including service activities. We find a higher rate of job loss from tradable industries than from nontradable industries, with the greatest

difference outside of manufacturing. Compared with an overall rate of job loss of .103 for 2001–03, tradable nonmanufacturing industries have a rate of job loss of .128 and nontradable industries, .073 (though we note the possibility that these differences are driven by the technology bubble). Also within occupations, workers in tradable jobs faced a higher rate of job loss than workers in nontradable jobs, with the greatest difference within white-collar occupations.

These results have several implications. First, it seems inappropriate to consider all service activities as inherently nontradable. The geographical concentration of some service activities within the United States is as great as in manufacturing and is consistent with the view that a number of service industries and occupations are tradable. The share of employment in tradable services is large enough that a better understanding of the forces shaping trade in services warrants our attention. At a minimum, more resources should be devoted to collecting and publishing considerably more detail on international service flows. Continuing to increase the amount of information collected on the use of intermediate service inputs within the United States would also increase our ability to track and understand developments in this large and growing sector.

While the share of employment in tradable services is large, this does not suggest that all or even most of these jobs are likely to move offshore. Just because an activity is tradable does not necessarily mean that the job will move to a lower-cost location. Indeed, the results presented in this paper suggest that tradable services are largely consistent with US comparative advantage. While professional and business services are higher skilled and higher paying than manufacturing in general, tradable services within these sectors are even higher skilled and higher paying than nontradable service activities. We would expect that as technological and organizational change increases the potential for trade in services, economic activity within the United States will shift to activities consistent with US comparative advantage. Because these activities are consistent with US comparative advantage,[25] it is possible that further liberalization in international services trade would directly benefit workers and firms in the United States. The policy community should devote more attention to understanding the impediments to services trade.

Third, while the employment growth results indicate that tradable services have relatively high employment growth rates overall, at the low end of the skill distribution, tradable service activities have negative employment growth. The potential for reallocation across activities in response to shifting trade patterns in services is real. Policymakers should prepare for additional reallocation among this group of workers.

The process of adjustment to job displacement might be eased by service worker characteristics. For the most part, workers displaced from tradable services are different, in terms of job tenure and educational attainment, from workers displaced from (tradable) manufacturing industries. Generalizing from what we

[25] The United States maintains a positive trade balance in service activities; see table 1.

know from studies of manufacturing worker job loss, lower levels of job tenure and higher levels of educational attainment may be advantageous in regard to reemployment outcomes. Given current data availability, it is too early to tell. We need data beyond the time period of the "jobless recovery." We also need more information to discern whether workers in tradable activities face different reemployment outcomes than workers in nontradable activities. The evidence we do have tells us that service worker job loss is costly. These costs underscore the need for a less-porous safety net (e.g., extending Trade Adjustment Assistance (TAA) to services workers, extending wage insurance beyond TAA). Lower levels of employment growth at the lower end of the skill distribution within tradable service activities may have implications for retraining strategies and opportunities for displaced low-skill workers from both manufacturing and services.

APPENDIX

Displaced Worker Survey

The Displaced Worker Survey is administered biennially as a supplement to the Current Population Survey (CPS). The first survey was administered in January 1984 and the most recent in January 2004. In each survey, adults (aged 20 years and older) in the regular monthly CPS were asked if they had lost a job in the preceding three- or five-year period due to "a plant closing, an employer going out of business, a layoff from which he/she was not recalled, or other similar reasons."[26] If the answer was yes, a series of questions followed concerning the old job and period of joblessness. Other causes of job loss, such as quits or firings, are not considered displacements.[27] This categorization is consistent with our common understanding of job displacement: It occurs without personal prejudice, in that terminations are related to the operating decisions of the employer and are independent of individual job performance.[28] This operational definition is not without ambiguity: The displacements are "job" displacements, in the sense that an individual displaced from a job and rehired into a different job with the same employer is considered displaced.

A key advantage of the Displaced Worker Survey is its large-scale, representative nature. As part of the CPS, it draws upon a random sample of 60,000 households, which is weighted to be representative of the US work force. As a result, the surveys yield large numbers of displaced workers, from a wide set of industries. In exchange for breadth of coverage, the Displaced Worker Surveys suffer two weaknesses relevant to any study of the costs of job loss. The first is the relatively short-term horizon. Individuals are surveyed just once, providing information on one postdisplacement point in time, rather than about their experiences over time. The second weakness is the lack of a readily available comparison group of nondisplaced workers. Without such a comparison group, we cannot investigate what would have happened to these workers if they had not been displaced. The lack of a comparison group leads to some unavoidable errors in measuring outcomes such as postdisplacement reemployment and earnings losses. The rate of job loss reported in the tables is calculated as in Farber (1993, 2003, 2005): It is the ratio of the (weighted) number of reported displacements divided by the (weighted) number of workers who were either employed at the survey date or reported a job loss but were not employed at the survey date. See Kletzer (2001) for more discussion of the issues that arise when using the Displaced Worker Surveys to measure the incidence of job loss.

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[26] For the 1984–92 surveys, the recall period was five years. Starting in 1994, the recall period was shortened to three years.

[27] Individuals who respond that their job loss was due to the end of a seasonal job or the failure of a self-employed business are also not included.

[28] There is some ambiguity: The displacements are "job" displacements, in the sense that an individual displaced from a job and rehired into a different job with the same employer is considered displaced.

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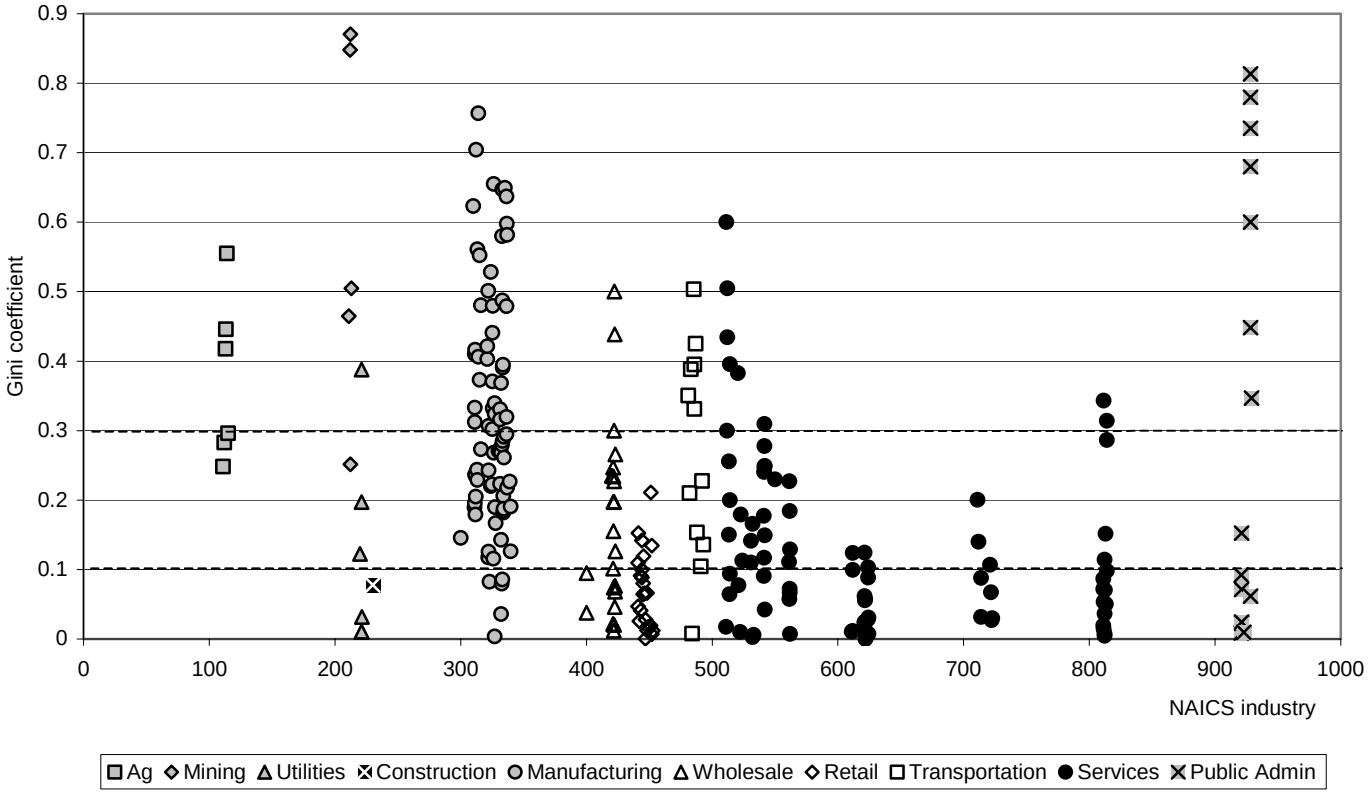
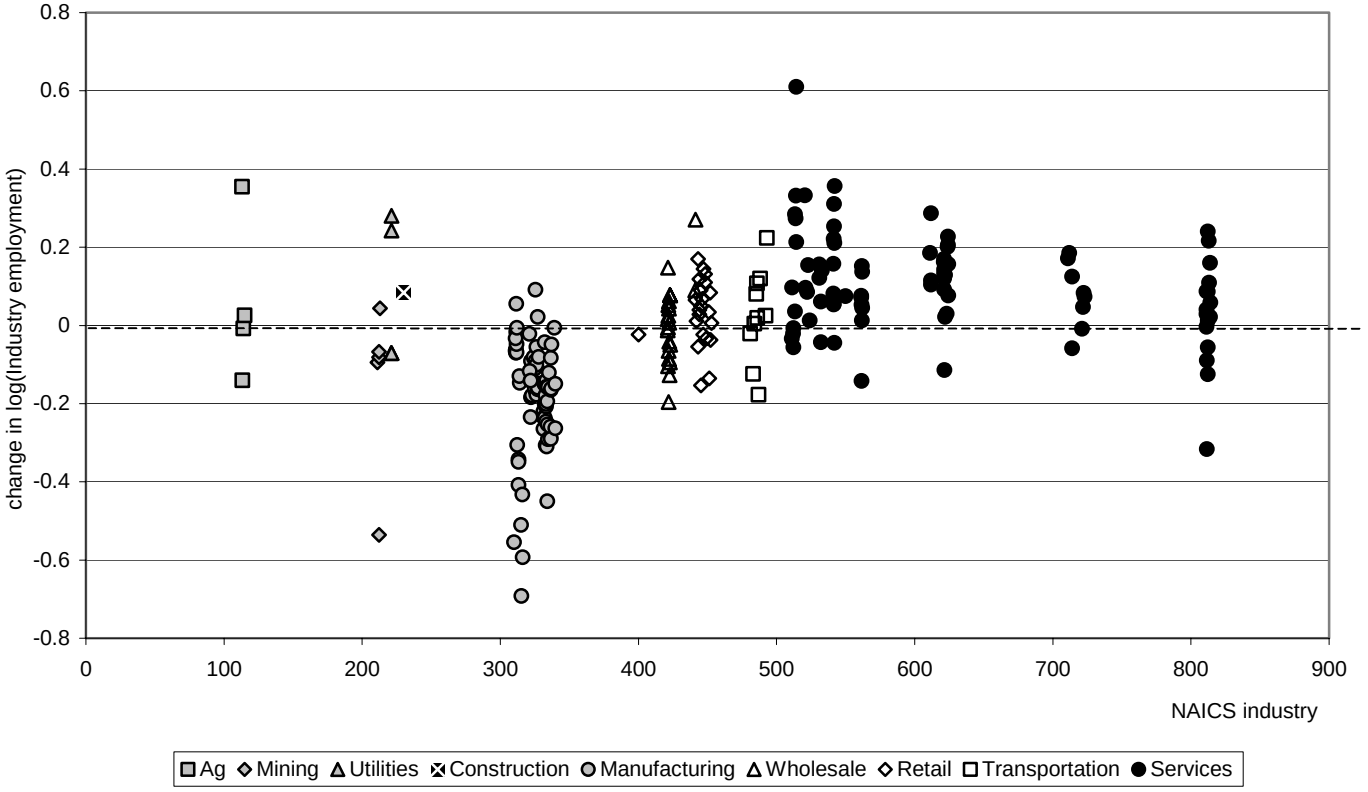
Figure 1 Geographic concentration of industries



NAICS = North American Industry Classification System

Figure 2 Industry employment growth, 1998–2002



NAICS = North American Industry Classification System

Table 1 Private services trade by type, 2002 (millions of dollars)

Type of service	Exports	Imports
Total private services	**279,495**	**205,234**
Travel	**66,547**	**58,044**
Overseas	54,772	44,494
Canada	6,268	6,489
Mexico	5,507	7,061
Passenger fares	**17,046**	**19,969**
Other transportation	**29,166**	**38,527**
Freight	12,330	25,973
Port services	16,836	12,554
Royalties and license fees	**44,142**	**19,258**
Affiliated	32,218	15,132
US parents' transactions	29,066	2,958
US affiliates' transactions	3,152	12,174
Unaffiliated	11,924	4,126
Industrial processes	3,900	1,935
Other	8,024	2,192
Other private services	**122,594**	**69,436**
Affiliated services	43,500	32,367
US parents' transactions	25,194	17,529
US affiliates' transactions	18,306	14,838
Unaffiliated services	79,094	37,069
Education	12,759	2,466
Financial services	15,859	3,665
Insurance services	2,839	15,348
Telecommunications	4,137	4,180
Business, professional, and technical service	28,799	10,732
Accounting, auditing, and bookkeeping services	360	716
Advertising	633	1,360
Agricultural, mining, and on-site processing services	366	273
Agricultural and mining services	346	259
Waste treatment and depollution services	20	14
Architectural, engineering, and other technical services	1,916	312
Computer and data processing services.	3,004	1,057
Construction, architectural, engineering, and mining services	n.a.	n.a.
Construction	654	226
Database and other information services	2,426	236
Industrial engineering	749	185
Installation, maintenance, and repair of equipment	4,992	812
Legal services	3,270	768
Management, consulting, and public relations services	1,696	1,188
Medical services	1,901	n.a.
Miscellaneous disbursements	623	1,522
Operational leasing	3,573	190
Research, development, and testing services	1,086	1,040
Sports and performing arts	175	110
Trade-related services	353	95
Training services	591	361
Other business, professional and technical services	430	283
Other unaffiliated services	14,700	679

n.a. = not available *Source:* Bureau of Economic Analysis.

Table 2 Service industries (Gini coefficient class)

2-digit NAICS code	Industry description	Gini coefficient class
	Information	
51	Newspaper publishers	1
51	Radio and television broadcasting and cable	1
51	Libraries and archives	1
51	Wired telecommunications carriers	2
51	Data processing services	2
51	Other telecommunication services	2
51	Publishing except newspapers and software	2
51	Other information services	3
51	Motion pictures and video industries	3
51	Sound recording industries	3
51	Software publishing	3
	Finance and insurance	
52	Savings institutions, including credit unions	1
52	Banking and related activities	1
52	Insurance carriers and related activities	2
52	Nondepository credit and related activities	2
52	Securities, commodities, funds, trusts, and other financial investment	3
	Real estate and rental	
53	Video tape and disk rental	1
53	Other consumer goods rental	1
53	Commercial, industrial, and other intangible assets rental and leasing	2
53	Real estate	2
53	Automotive equipment rental and leasing	2
	Professional, scientific, and technical services	
54	Veterinary services	1
54	Accounting, tax preparation, bookkeeping, and payroll services	1
54	Architectural, engineering, and related services	2
54	Other professional, scientific, and technical services	2
54	Legal services	2
54	Specialized design services	2
54	Computer systems design and related services	2
54	Advertising and related services	2
54	Management, scientific, and technical consulting services	2
54	Scientific research and development services	3
	Management	
55	Management of companies and enterprises	2

Table 2 *(continued)*

2-digit NAICS code	Industry description	Gini coefficient class
	Administrative support	
56	Waste management and remediation services	1
56	Business support services	1
56	Services to buildings and dwellings	1
56	Landscaping services	1
56	Employment services	2
56	Other administrative and support services	2
56	Investigation and security services	2
56	Travel arrangement and reservation services	2
	Education	
61	Elementary and secondary schools	1
61	Colleges and universities, including junior colleges	1
61	Other schools, instruction, and educational services	1
61	Business, technical, and trade schools and training	2
	Health care and social services	
62	Hospitals	1
62	Nursing care facilities	1
62	Vocational rehabilitation services	1
62	Offices of physicians	1
62	Outpatient care centers	1
62	Offices of dentists	1
62	Offices of optometrists	1
62	Residential care facilities, without nursing	1
62	Child day care services	1
62	Home health care services	1
62	Other health care services	1
62	Office of chiropractors	1
62	Individual and family services	1
62	Community food and housing, and emergency services	2
62	Offices of other health practitioners	2
	Arts, entertainment, and recreation	
71	Bowling centers	1
71	Other amusement, gambling, and recreation industries	1
71	Museums, art galleries, historical sites, and similar institutions	2
71	Independent artists, performing arts, spectator sports, and related	2

Table 2 *(continued)*

2-digit NAICS code	Industry description	Gini coefficient class
	Accommodation	
72	Drinking places, alcoholic beverages	1
72	Restaurants and other food services	1
72	Recreational vehicle parks and camps, and rooming and boarding houses	1
72	Traveler accommodation	2
	Other services	
81	Automotive repair and maintenance	1
81	Barber shops	1
81	Religious organizations	1
81	Commercial and industrial machinery and equipment repair and maintenance	1
81	Drycleaning and laundry services	1
81	Car washes	1
81	Electronic and precision equipment repair and maintenance	1
81	Civic, social, advocacy organizations, and grantmaking and giving	1
81	Nail salons and other personal care services	2
81	Other personal services	2
81	Business, professional, political, and similar organizations	2
81	Labor unions	3
81	Footwear and leather goods repair	3
	Public administration	
92	Justice, public order, and safety activities	1
92	Administration of human resource programs	1
92	Other general government and support	1
92	Executive offices and legislative bodies	1
92	Military Reserves or National Guard	1
92	Administration of economic programs and space research	1
92	Administration of environmental quality and housing programs	1
92	Public finance activities	2
92	National security and international affairs	3
92	US Armed Forces, branch not specified	3
92	US Coast Guard	3
92	US Air Force	3
92	US Army	3
92	US Navy	3
92	US Marines	3

Table 3 Share of sector employment by Gini coefficient class, by NAICS sector

NAICS code	Description	Gini class 1	Gini class 2	Gini class 3
11	Agriculture	0	87.95	12.05
21	Mining	0	24.24	75.76
22	Utilities	80.89	15.31	3.80
23	Construction	100.00	0	0
31	Manufacturing	0	40.39	59.61
32	Manufacturing	21.99	44.88	33.13
33	Manufacturing	14.44	65.36	20.21
3M	Manufacturing	0	100.00	0
42	Wholesale trade	45.82	50.62	3.57
44	Retail trade	81.72	18.28	0
45	Retail trade	88.65	11.35	0
4M	Retail trade	100.00	0	0
48	Transportation/warehouse	42.81	22.03	35.17
49	Transportation/warehouse	0	100.00	0
51	Information	33.25	50.37	16.38
52	Finance and insurance	32.05	50.98	16.97
53	Real estate and rental	9.06	90.94	0
54	Professional, scientific, and technical services	13.95	79.87	6.18
55	Management	0	100.00	0
56	Administrative support	59.53	40.47	0
61	Education	98.89	1.11	0
62	Health care/social services	97.80	2.20	0
71	Arts, entertainment, and recreation	67.35	32.65	0
72	Accommodation	81.92	18.08	0
81	Other services	79.77	9.86	10.37
92	Public administration	71.68	4.63	23.69
	All industries	**60.82**	**29.75**	**9.43**

Table 4 Share of total employment by tradable/nontradable, by NAICS sector

NAICS code	Description	Nontradable	Tradable
11	Agriculture	0	1.36
21	Mining	0	0.39
22	Utilities	0.76	0.18
23	Construction	6.86	0
31	Manufacturing	0	2.17
32	Manufacturing	0.81	2.86
33	Manufacturing	1.16	6.86
3M	Manufacturing	0	0.53
42	Wholesale trade	1.66	1.96
44	Retail trade	5.90	1.32
45	Retail trade	2.91	0.37
4M	Retail trade	0.62	0
48	Transportation/warehouse	1.32	1.76
49	Transportation/warehouse	0	1.27
51	Information	1.04	2.08
52	Finance and insurance	1.64	3.47
53	Real estate and rental	0.16	1.63
54	Professional, scientific, and technical services	0.82	5.08
55	Management	0	0.06
56	Administrative support	1.99	1.35
61	Education	8.75	0.10
62	Health care/social services	10.90	0.25
71	Arts, entertainment, and recreation	1.12	0.54
72	Accommodation	4.52	1.00
81	Other services	3.76	0.95
92	Public administration	4.14	1.63
	All industries	**60.82**	**39.18**

Table 5 Share of occupation employment by Gini coefficient class, by major SOC

SOC code	Description	Gini class 1	Gini class 2	Gini class 3
11	Management	34.48	61.15	4.37
13	Business/financial operations	31.73	65.96	2.32
15	Computer/mathematical	0	73.07	26.93
17	Architecture/engineering	36.04	58.31	5.65
19	Life, physical, and social sciences	16.32	58.61	25.08
21	Community/social services	100.00	0	0
23	Legal	3.78	96.22	0
25	Education and library	99.54	0.46	0
27	Arts, design, entertainment	17.13	75.02	7.85
29	Healthcare practitioners/technical	86.56	13.10	0.34
31	Healthcare support	96.73	3.27	0
33	Protection services	59.83	40.17	0
35	Food preparation/serving	95.68	4.32	0
37	Building maintenance	98.54	1.46	0
39	Personal care service	82.64	7.22	10.13
41	Sales and related	75.41	21.82	2.77
43	Office/administrative support	93.14	6.66	0.20
45	Farming, fishing, and forestry	0	81.01	18.99
47	Construction/extraction	61.37	36.18	2.45
49	Installation, maintenance, and repair	90.00	8.89	1.11
51	Production	80.30	17.15	2.55
53	Transportation/material moving	89.20	5.86	4.95
55	Military specific	0	0	100.00
	All occupations	**71.66**	**24.86**	**3.47**

SOC = Standard Occupational Classification

Table 6 Share of total employment in tradable occupations and industries

	Nontradable occupations	Tradable occupations
Nontradable industries	50.03	10.79
Tradable industries	21.64	17.54

Table 7 Share of employment in tradable occupations and industries, by major SOC

	Nontradable occupations	Tradable occupations
Management occupations (11)		
Nontradable industries	23.97	26.58
Tradable industries	10.51	38.94
Business and financial operations occupations (13)		
Nontradable industries	14.11	27.72
Tradable industries	17.61	40.56
Computer and mathematical occupations (15)		
Nontradable industries	0	24.22
Tradable industries	0	75.78
Architecture and engineering occupations (17)		
Nontradable industries	8.46	13.30
Tradable industries	27.59	50.66
Life, physical, and social science occupations (19)		
Nontradable industries	7.28	36.49
Tradable industries	9.03	47.20
Legal occupations (23)		
Nontradable industries	3.54	18.89
Tradable industries	0.24	77.33

SOC = Standard Occupational Classification

Table 8 Mean earnings and demographic characteristics for all industries

Characteristic	Nontradable	Tradable
Employment income (dollars per year)	30,966	41,836
Percent male	49.6	60.1
Percent African-American	10.2	9.9
Percent Hispanic	10.4	10.3
Percent advanced degree	10.2	9.2
Percent BA	26.6	30.2
Percent high school	87.0	88.7
Age	38.8	39.4

Note: The education categories in this table are not mutually exclusive (e.g., the share with a BA includes those with a high school degree).

Table 9 Mean earnings and demographic characteristics for selected industries

	Industry/characteristic	Nontradable	Tradable
3x	**Manufacturing**		
	Employment income (dollars per year)	36,974	39,901
	Percent male	75.1	67.8
	Percent African-American	6.1	9.7
	Percent Hispanic	9.7	11.7
	Percent advanced degree	2.6	6.0
	Percent BA	13.8	20.4
	Percent high school	85.3	82.9
	Age	40.0	40.2
51	**Information**		
	Employment income (dollars per year)	35,472	49,510
	Percent male	50.9	55.9
	Percent African-American	10.4	11.5
	Percent Hispanic	7.8	7.3
	Percent advanced degree	9.4	10.6
	Percent BA	37.4	41.3
	Percent high school	94.2	96.2
	Age	38.7	37.6
52	**Finance and insurance**		
	Employment income (dollars per year)	38,170	54,460
	Percent male	29.0	42.7
	Percent African-American	11.5	9.2
	Percent Hispanic	7.8	6.4
	Percent advanced degree	7.1	10.2
	Percent BA	30.5	43.8
	Percent high school	97.1	97.4
	Age	38.1	39.1
53	**Real estate and rental and leasing**		
	Employment income (dollars per year)	23,056	42,915
	Percent male	58.1	51.1
	Percent African-American	9.1	8.6
	Percent Hispanic	10.8	9.7
	Percent advanced degree	1.9	6.7
	Percent BA	13.3	29.7
	Percent high school	84.7	90.6
	Age	31.1	42.4
54	**Professional, scientific, and technical services**		
	Employment income (dollars per year)	42,246	57,959
	Percent male	35.3	57.1
	Percent African-American	5.1	5.5
	Percent Hispanic	5.0	5.6
	Percent advanced degree	16.6	25.7
	Percent BA	52.5	59.5
	Percent high school	97.1	97.8
	Age	39.5	39.3

(table continues next page)

Table 9 *(continued)*

	Industry/characteristic	Nontradable	Tradable
55	**Management**		
	Employment income (dollars per year)	—	61,285
	Percent male	—	45.5
	Percent African-American	—	5.4
	Percent Hispanic	—	4.9
	Percent advanced degree	—	14.3
	Percent BA	—	49.7
	Percent high school	—	97.8
	Age	—	40.5
56	**Administrative support**		
	Employment income (dollars per year)	24,039	28,742
	Percent male	64.1	48.5
	Percent African-American	11.9	17.6
	Percent Hispanic	22.2	12.2
	Percent advanced degree	2.0	5.0
	Percent BA	10.7	23.4
	Percent high school	72.3	88.0
	Age	37.2	36.1

Notes: The education categories in this table are not mutually exclusive (e.g., the share with a BA includes those with a high school degree). No management industries are classified as nontradable.

Table 10 Mean earnings and demographic characteristics for all occupations

Industry/characteristic	Nontradable	Tradable
Employment income	28,789	51,503
Percent male	48.5	66.7
Percent African-American	11.1	7.5
Percent Hispanic	10.9	8.8
Percent advanced degree	7.4	16.1
Percent BA	21.8	43.9
Percent high school	86.3	91.0
Age	38.8	39.9

Note: The education categories in this table are not mutually exclusive (e.g., the share with a BA includes those with a high school degree).

Table 11 Mean earnings and demographic characteristics for selected occupations

	Occupation/characteristic	Nontradable	Tradable
11	**Management**		
	Employment income (dollars per year)	51,399	69,029
	Percent male	56.2	67.3
	Percent African-American	8.3	4.7
	Percent Hispanic	6.8	5.0
	Percent advanced degree	19.9	15.7
	Percent BA	46.5	49.6
	Percent high school	95.2	95.8
	Age	41.8	42.6
13	**Business and financial operations**		
	Employment income (dollars per year)	42,813	51,998
	Percent male	41.3	48.0
	Percent African-American	10.3	8.3
	Percent Hispanic	6.9	5.4
	Percent advanced degree	10.5	16.2
	Percent BA	44.0	61.6
	Percent high school	97.6	98.6
	Age	40.4	40.2
15	**Computer and mathematical**		
	Employment income (dollars per year)	—	54,297
	Percent male	—	70.3
	Percent African-American	—	6.8
	Percent Hispanic	—	4.5
	Percent advanced degree	—	17.8
	Percent BA	—	59.9
	Percent high school	—	99.1
	Age	—	37.3
17	**Architecture and engineering**		
	Employment income (dollars per year)	40,505	62,115
	Percent male	82.5	89.0
	Percent African-American	5.7	3.9
	Percent Hispanic	6.4	4.1
	Percent advanced degree	5.3	25.5
	Percent BA	26.2	76.2
	Percent high school	96.2	99.9
	Age	39.4	40.6
19	**Life, physical, and social science**		
	Employment income (dollars per year)	29,339	50,000
	Percent male	57.4	59.2
	Percent African-American	7.0	4.6
	Percent Hispanic	7.2	4.0
	Percent advanced degree	11.6	54.4
	Percent BA	40.0	85.3
	Percent high school	96.4	99.2
	Age	36.0	40.3

(table continues next page)

Table 11 *(continued)*

		Nontradable	Tradable
23	**Legal**		
	Employment income (dollars per year)	71,304	80,265
	Percent male	60.6	51.4
	Percent African-American	9.1	5.6
	Percent Hispanic	4.5	5.1
	Percent advanced degree	58.2	64.1
	Percent BA	78.8	76.9
	Percent high school	99.2	99.3
	Age	47.7	40.9
29	**Healthcare practitioners and technical**		
	Employment income (dollars per year)	39,922	139,375
	Percent male	19.5	70.6
	Percent African-American	9.8	4.6
	Percent Hispanic	4.5	4.8
	Percent advanced degree	17.8	93.4
	Percent BA	47.3	97.8
	Percent high school	98.8	99.7
	Age	40.5	42.8
31	**Healthcare support**		
	Employment income (dollars per year)	18,423	18,751
	Percent male	11.9	17.6
	Percent African-American	24.0	3.7
	Percent Hispanic	10.6	5.6
	Percent advanced degree	2.2	9.9
	Percent BA	7.9	30.9
	Percent high school	83.8	97.3
	Age	37.8	39.0

Notes: The education categories in this table are not mutually exclusive (e.g., the share with a BA includes those with a high school degree). No computer and mathematical occupations are classified as nontradable.

Table 12 OLS regression results, tradable industry wage differentials

	All industries	NAICS 50s
Dependent variable: Log(employment income)		
Tradable industry	0.060	0.147
	(0.0008)	(0.0016)
Male	0.214	0.225
	(0.0006)	(0.0014)
African-American	-0.096	-0.145
	(0.0010)	(0.0024)
Hispanic	-0.215	-0.218
	(0.0010)	(0.0026)
Hours	0.026	0.029
	(0.0000)	(0.0001)
Weeks	0.040	0.039
	(0.0000)	(0.0001)
Advanced degree	0.262	0.224
	(0.0011)	(0.0023)
BA	0.380	0.325
	(0.0008)	(0.0017)
Industry controls (2-digit NAICS)	Yes	Yes
POW MSA controls	Yes	Yes
N	5,836,360	1,074,271
Weighted N	122,155,903	23,609,616
R-squared	0.538	0.519

OLS = ordinary least squares
POW MSA = Place of Work Metropolitan Statistical Area

Note: The education categories in this table are not mutually exclusive (e.g., the share with a BA includes those with a high school degree).

Table 13 OLS regression results, tradable occupation wage differentials

	All occupations	"High-end" service occupations
Dependent variable: Log(employment income)		
Tradable occupation	0.091	0.127
	(0.0008)	(0.0014)
Male	0.215	0.245
	(0.0006)	(0.0013)
African-American	-0.061	-0.112
	(0.0010)	(0.0023)
Hispanic	-0.187	-0.168
	(0.0010)	(0.0027)
Hours	0.026	0.020
	(0.0000)	(0.0001)
Weeks	0.039	0.038
	(0.0000)	(0.0001)
Advanced degree	0.216	0.227
	(0.0011)	(0.0016)
BA	0.303	0.297
	(0.0008)	(0.0013)
Occupation controls (2-digit SOC)	Yes	Yes
POW MSA controls	Yes	Yes
N	5,836,630	1,446,158
Weighted N	122,155,903	30,803,183
R-Squared	0.545	0.396

Notes: "High-end service occupations" are occupations in SOC major groups 11, 13, 15, 17, 19, 23, and 29.
The education categories in this table are not mutually exclusive (e.g., the share with a BA includes those with a high school degree).

Table 14 OLS regression results, tradable industry and occupation wage differentials

	All industries and occupations	NAICS 50s	"High-end" service occupations
Dependent variable: Log(employment income)			
Nontradable industry and nontradable occupation	-0.098	-0.174	-0.159
	(0.0011)	(0.0026)	(0.0022)
Nontradable industry and tradable occupation	-0.055	-0.072	-0.050
	(0.0012)	(0.0026)	(0.0019)
Tradable industry and nontradable occupation	-0.055	-0.045	-0.087
	(0.0010)	(0.0022)	(0.0021)
Tradable industry and tradable occupation	--- Omitted category ---		
Male	0.205	0.205	0.244
	(0.0007)	(0.0015)	(0.0013)
African-American	-0.064	-0.111	-0.111
	(0.0010)	(0.0024)	(0.0022)
Hispanic	-0.173	-0.169	-0.158
	(0.0010)	(0.0026)	(0.0026)
Hours	0.025	0.027	0.020
	(0.0000)	(0.0001)	(0.0001)
Weeks	0.039	0.038	0.036
	(0.0000)	(0.0001)	(0.0001)
Advanced degree	0.223	0.197	0.232
	(0.0011)	(0.0024)	(0.0016)
BA	0.279	0.245	0.276
	(0.0008)	(0.0017)	(0.0013)
Industry controls (2-digit NAICS)	Yes	Yes	Yes
Occupation controls (2-digit SOC)	Yes	Yes	Yes
POW MSA controls	Yes	Yes	Yes
N	5,836,630	1,074,271	1,446,158
Weighted N	122,155,903	23,609,616	30,803,183
R-squared	0.545	0.540	0.419

Notes: "High-end service occupations" are occupations in SOC major groups 11, 13, 15, 17, 19, 23, and 29.
The education categories in this table are not mutually exclusive (e.g., the share with a BA includes those with a high school degree).

Table 15 Industry-level employment change, 1998–2002, by industry characteristics

Industry classification			Number of industries	Mean	Standard deviation
Nontradable			88	0.056	0.114
Tradable			149	-0.059	0.198
Agriculture, mining, and manufacturing	Nontradable		5	-0.116	0.099
	Tradable		83	-0.173	0.161
Services	Nontradable		91	0.067	0.107
	Tradable		85	0.076	0.145
Agriculture, mining, and manufacturing	Nontradable	Skill Q1	3	-0.067	0.102
		Skill Q2	2	-0.190	0.015
	Tradable	Skill Q1	32	-0.191	0.169
		Skill Q2	24	-0.203	0.148
		Skill Q3	16	-0.114	0.103
		Skill Q4	11	-0.147	0.216
Services	Nontradable	Skill Q1	24	0.016	0.080
		Skill Q2	23	0.084	0.098
		Skill Q3	20	0.015	0.106
		Skill Q4	24	0.156	0.088
	Tradable	Skill Q1	7	-0.006	0.233
		Skill Q2	16	0.112	0.104
		Skill Q3	31	-0.007	0.095
		Skill Q4	31	0.139	0.148

Table 16 Occupation-level employment change, 1999–2003, by occupation characteristics

Occupation classification			Number of industries	Mean	Standard deviation
Nontradable			197	0.022	0.160
Tradable			228	-0.004	0.247
Agriculture, production, extraction, and construction	Nontradable		38	-0.044	0.143
	Tradable		77	-0.141	0.228
Services	Nontradable		180	0.036	0.161
	Tradable		180	0.059	0.230
Agriculture, production, extraction, and construction	Nontradable	Skill Q1	23	-0.070	0.145
		Skill Q2	12	-0.026	0.140
		Skill Q3	3	0.056	0.125
	Tradable	Skill Q1	56	-0.148	0.235
		Skill Q2	18	-0.150	0.196
		Skill Q3	3	0.014	0.272
Services	Nontradable	Skill Q1	30	0.005	0.114
		Skill Q2	57	0.037	0.173
		Skill Q3	54	0.021	0.165
		Skill Q4	39	0.078	0.164
	Tradable	Skill Q1	10	-0.065	0.111
		Skill Q2	32	0.086	0.210
		Skill Q3	59	0.032	0.181
		Skill Q4	79	0.083	0.269

Table 17 Job loss rates by industry

From 2004 Displaced Worker Survey				From 2002 and 2004 Displaced Worker Surveys		
		Tradable	Non-tradable			
	2001–03				1999–2001	2001–03
Agriculture	0.049			Agriculture	0.042	0.065
Mining	0.127			Mining	0.173	0.127
Construction	0.131			Construction	0.107	0.131
Manufacturing	0.209			Manufacturing - Durables	0.177	0.236
Wholesale and retail trade	0.113	0.077	0.091	Manufacturing - Nondurables	0.133	0.157
Transportation/utilities	0.089			Transportation	0.096	0.103
Information	0.232	0.317	0.075	Communication	0.159	0.305
Financial	0.081	0.080	0.081	Utilities/sanitation service	0.054	0.052
Professional and business services	0.144	0.158	0.113	Wholesale trade	0.111	0.123
Education/health services	0.040	0.071	0.039	Retail trade	0.099	0.107
Leisure and hospitality	0.105	0.083	0.113	Finance, insurance, and		
Other services	0.051	0.030	0.057	real estate	0.079	0.080
Public administration	0.020			Maintenance and repair services	0.181	0.172
				Personal services	0.080	0.057
Total	0.103	0.153	0.076	Entertainment and recreation	0.071	0.098
				Hospitals	0.026	0.030
Manufacturing - Tradable	0.213			Other medical	0.052	0.055
Manufacturing - Nontradable	0.192			Educational services	0.020	0.030
Nonmanufacturing - Tradable	0.128			Social services	0.033	0.060
Nonmanufacturing - Nontradable	0.073			Other professional services	0.071	0.078
				Forestry and fishing	0.008	0.070
Dropping agriculture, mining, and construction:				Public administration	0.017	0.020
Manufacturing - Tradable	0.213					
Manufacturing - Not tradable	0.192			Total	0.090	0.106
Nonmanufacturing - Tradable	0.106					
Nonmanufacturing - Not tradable	0.054					
Total		0.126	0.058			

Source: Author's calculations from the 2002 and 2004 Displaced Worker Surveys, using sampling weights.

Table 18 Job loss rates by occupation

From 2004 Displaced Worker Survey[a]				From the 2002 and 2004 Displaced Worker Surveys		
	2001–03	**Tradable**	**Nontradable**		**1999–2001**	**2001–03**
Management, business, and finance (WC)	0.089	0.077	0.091	Executive, administrative, managerial	0.086	0.094
Business operations specialists	0.143	0.121	0.171	Professional specialist	0.059	0.066
Financial specialists	0.054	0.057	0.044	Technician and related	0.088	0.110
Professional related (WC)	0.070	0.109	0.033	Sales	0.094	0.109
Computer and math	0.177	0.177	n.a.	Administrative support	0.097	0.106
Architecture and engineering	0.128	0.113	0.158	Protective services	0.045	0.059
Life, physical, and social science	0.059	0.057	0.066	Food, health, cleaning, personal services	0.069	0.075
Service (WC)	0.073	0.072	0.056	Precision production craft, repair	0.111	0.151
Sales (WC)	0.106	0.123	0.079	Operators, assemblers, specialists	0.181	0.219
Office and administrative support (WC)	0.109	0.067	0.092	Transportation/material moving equipment	0.103	0.112
Farming, forestry, and fishing (BC)	0.110			Handlers, cleaners, and helpers	0.139	0.151
Construction and extraction (BC)	0.149			Farming, forestry, and fishing	0.044	0.067
Installation, maintenance, and repair (BC)	0.112	0.117	0.083			
Production (BC)	0.206	0.163	0.169	**Total**	**0.090**	**0.103**
Transportation and material moving (BC)	0.117	0.057	0.096			
Total	**0.102**	**0.101**	**0.078**			

Blue collar - Tradable	0.128
Blue collar - Nontradable	0.122
White collar - Tradable	0.094
White collar - Nontradable	0.065
Full sample:	
Blue collar - Tradable	0.175
Blue collar - Nontradable	0.150
White collar - Tradable	0.104
White collar - Nontradable	0.078
Full sample total	0.122 0.087

BC = blue collar

WC = white collar

a. Agriculture, mining, and construction are omitted.

Table 19 Characteristics of displaced workers, by industrial sector and tradability

		Nonmanufacturing	
	Manufacturing: Tradable	Tradable	Nontradable
Age (mean in years)	41.6	39.6	38.1
Standard deviation	11.2	11.1	11.7
Job tenure (mean in years)	7.11	4.4	4.26
Standard deviation	8.43	5.6	5.61
Job tenure > 10 years	0.23	0.12	0.14
Educational attainment:			
Share:			
High school dropout	0.14	0.05	0.11
High school graduate	0.40	0.19	0.31
Some college	0.24	0.30	0.33
College +	0.22	0.45	0.25
Male	0.61	0.54	0.45
On predisplacement job:			
Share with health insurance	0.75	0.66	0.47
Full-time	0.96	0.90	0.82
If full-time, real weekly earnings	$342.70	$443.18	$294.91
Standard deviation	$300.54	$383.08	$271.21
Share reemployed	0.64	0.77	0.75
Of reemployed, share full-time	0.80	0.78	0.72
All reemployed:			
Change in ln earnings (mean)	-0.32	-0.3	-0.14
Standard deviation	0.89	0.98	1.02
Median change	-0.15	-0.11	-0.03
Share with no loss in earnings	0.42	0.45	0.51
Full-time to full-time			
Change in ln earnings (mean)	-0.21	-0.21	-0.12
Standard deviation	0.76	0.69	0.97
Median change	-0.1	-0.07	-0.03
Share with no loss in earnings	0.42	0.46	0.52

Note: Agriculture, mining, and construction omitted.

Source: Author's calculations from the 2004 Displaced Worker Survey, using sampling weights.

Table 20 Characteristics of select service-sector displaced workers, by industry and tradability

	Information		Financial, insurance, real estate		Professional and business services	
	Tradable	Nontrad-able	Tradable	Nontradable	Tradable	Nontradable
Job tenure (mean in years)	5.80	4.51	5.82	8.28	3.55	3.24
Standard deviation	7.37	7.25	7.00	9.14	3.98	4.68
Job tenure > 10 years	0.19	0.16	0.17	0.26	0.10	0.12
Educational attainment:						
Share:						
High school dropout	0.03	0	0.04	0.05	0.05	0.17
High school graduate	0.21	0.04	0.18	0.24	0.16	0.45
Some college	0.26	0.45	0.39	0.35	0.26	0.20
College +	0.50	0.51	0.39	0.38	0.54	0.19
Male	0.56	0.668	0.47	0.48	0.53	0.53
On predisplacement job:						
Share with health insurance	0.82	0.62	0.62	0.73	0.66	0.36
Full-time	0.93	0.87	0.91	0.94	0.91	0.83
If full-time, real weekly earnings	$530.82	$387.98	$409.88	$542.51	$504.61	$273.95
Standard deviation	$409.45	$350.69	$380.43	$454.14	$415.82	$251.57
Share reemployed	0.72	0.81	0.61	0.68	0.71	0.62
Of reemployed, share full-time	0.76	0.87	0.8	0.82	0.80	0.73
All reemployed:						
Change in ln earnings (mean)	-0.57	-0.72	-0.16	0.01-	-0.34	-0.18
Standard deviation	1.07	2.97	1.09	0.50	0.96	0.93
Median change	-0.34	-0.02	-0.08	0.03	-0.08	-0.03
Share no earn loss	0.35	0.47	0.46	0.531	0.46	0.47
Full-time to full-time						
Change in ln earnings (mean)	-0.4	-1.00	-0.15	0.02	-0.19	-0.16
Standard deviation	0.82	3.33	0.51	0.36	0.74	1.00
Median change	-0.25	-0.07	-0.05	-0.01	-0.03	-0.03
Share no loss	0.36	0.34	0.46	0.51	0.49	0.49

Source: Author's calculations from the 2004 Displaced Worker Survey, using sampling weights.

Table 21 Characteristics of select service occupation displaced workers, by occupation and tradability

	Management, business, and financial		Professional and related		Office and administrative support	
	Tradable	Nontradable	Tradable	Nontradable	Tradable	Nontradable
Job tenure (mean in years)	6.72	5.03	4.82	4.3	5.31	4.57
Standard deviation	8.04	4.99	6.09	5.25	6.69	5.74
Job tenure > 10 years	0.20	0.14	0.11	0.11	0.18	0.14
Educational attainment:						
Share:						
High school dropout	0.01	0.01	0.00	0.026	0.05	0.05
High school graduate	0.13	0.27	0.09	0.12	0.33	0.34
Some college	0.27	0.28	0.20	0.33	0.44	0.41
College +	0.59	0.44	0.71	0.53	0.18	0.20
Male	0.47	0.63	0.72	0.25	0.31	0.24
On predisplacement job:						
Share with health insurance	0.78	0.59	0.79	0.63	0.62	0.58
Full-time	0.97	0.93	0.93	0.79	0.90	0.87
If full-time, real weekly earnings	$554.78	$426.02	$523.24	$323.60	$299.45	$261.96
Standard deviation	$434.23	$336.05	$369.44	$226.58	$254.48	$198.07
Share reemployed	0.79	0.72	0.80	0.80	0.69	0.76
Of reemployed, share full-time	0.79	0.726	0.81	0.71	0.76	0.76
All reemployed:						
Change in ln earnings (mean)	-0.37	-0.36	-0.34	-0.14	-0.28	-0.09
Standard deviation	1.08	1.14	1.16	0.81	0.68	1.06
Median change	-0.13	-0.17	-0.08	-0.04	-0.15	-0.05
Share no earn loss	0.49	0.39	0.46	0.51	0.44	0.51
Full-time to full-time						
Change in ln earnings (mean)	-0.21	-0.36	-0.32	-0.13	-0.11	0.01
Standard deviation	0.85	1.17	1.18	0.34	0.46	0.70
Median change	-0.05	-0.11	-0.07	-0.03	-0.07	-0.03
Share no loss	0.53	0.35	0.462	0.52	0.47	0.54

Source: Author's calculations from the 2004 Displaced Worker Survey, using sampling weights.