

Measuring Tradable Services and the Task Content of Offshorable Services Jobs

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This paper borrows heavily from J. Bradford Jensen and Lori G. Kletzer. 2006. “Tradable Services: Understanding the Scope and Impact of Services Offshoring,” in Susan M. Collins and Lael Brainard, eds., *Brookings Trade Forum 2005, Offshoring White-Collar Work*. Lauren Malone provided excellent research assistance. Financial support was provided by Committee on Research, Academic Senate, UC Santa Cruz.

Introduction

Services offshoring, the migration of jobs (but not the people performing them) across national borders (mostly from rich countries to poor ones), has received considerable attention since 2000. 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 (see Jensen and Kletzer (2006) and Blinder (2006) for references). 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)).¹ Other estimates include: Deloitte Research estimates that by 2008 the world's largest financial service companies will have relocated up to two million jobs to low-cost offshore countries; Gartner Research predicts that by the end of 2004 10% of IT jobs at US IT companies and 5% 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.

Jensen and Kletzer (2006) developed a new empirical approach to identify, at a detailed level, service activities that are potentially exposed to international trade. The approach uses the geographic concentration of service activities within the U.S. to identify which service activities are traded domestically, and then classifies activities that are traded domestically as *potentially* tradable internationally. With the tradability classification, we developed estimates of the number of workers who are in tradable activities for all sectors of the economy. The paper offered comparisons of the demographic characteristics of workers in tradable and non-tradable activities and employment growth in traded and non-traded service activities. The tradability designation also allowed an examination of the risk of job loss and other employment outcomes for workers in tradable activities.

¹ The Forrester projection was updated in 2004 to 3.4 million.

This paper focuses on the task and activity content of jobs, to develop measures of the occupational job tasks, activities and characteristics associated with potential offshoring. The literature on offshoring notes that movable jobs are those with: little face-to-face customer contact; high information content, work process is internet enabled and/or telecommutable (see Bardhan and Kroll (2003); Dossani and Kenney (2003), and Blinder (2006)). More informally, it is commonly believed that if “it can be sent down a wire (or wireless),” it is offshorable. Empirically, this investigation tries to bring these basic principles of the characteristics of potentially offshorable jobs to detailed microdata on occupations. The task content investigation starts with a selection of tradable services occupations identified by Jensen and Kletzer (2006). Do the jobs identified as potentially internationally tradable, using geographic concentration, involve activities and characteristics that fit current notions of offshorability?

This paper begins with a somewhat lengthy summary of the methodology and findings in Jensen and Kletzer (2006). With the set of identified potentially tradable occupations, the next step involves an operational assessment of how the basic principles of offshorability (high information content, remote from customer, internet-enabled) match up to the characteristics of “real” jobs. Detailed information on the content and context of jobs (occupations) is available from O*Net, a U.S. Department of Labor database of 450 occupations. (O*Net is the successor to the well-known Dictionary of Occupational Titles.) For each of hundreds of occupations, O*Net contains detailed qualitative information on job tasks, work activities (interacting with computers, processing information), and work context (face-to-face discussions, work with others, work outdoors). An earlier version of this paper focused on qualitative information, available from O*Net on-line. This version develops more quantitative measures of offshorability using the information available from the (publicly available and downloadable) O*Net production dataset (version 11).

Jensen and Kletzer (2006, from here JK) reported considerable employment shares in tradable service industries and occupations. There are more workers in tradable professional and business service industries than in tradable manufacturing industries. Workers in tradable sectors have higher skills and significantly higher wages than workers in non-tradable sectors. Within specific sectors like professional services, the earnings differentials are even larger, approaching 20 percent. Job displacement rates are higher from tradable service industries than from non-tradable, and tradable white-collar occupations have higher job loss rates than non-tradable

occupations. Consistent with the characteristics of employed workers, workers displaced from tradable service activities are more educated, with higher earnings, than workers displaced from non-tradable activities. Job loss from tradable and non-tradable service activities is costly to workers in terms of earnings losses. Occupations identified as tradable in the JK methodology have, for the most part, characteristics of offshorability.

1. Geographical concentration and tradability: empirical approach

To develop a measure of tradable services, the empirical approach in JK relied on the basic economic intuition that non-traded services will not exhibit geographic concentration in production. 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. JK applied this same intuition to service production. With the identification of industries and occupations that appear to be traded within the U.S., the inference is that service activities that can be traded within the U.S. are also potentially traded internationally.

The intuition is described 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.²

Demand-induced Agglomeration and Intermediate Services

Measures of geographic concentration are a way to implement the intuition presented in the Helpman and Krugman model. Most measures of concentration use the region's share of employment in an industry relative to the region's share of total employment. One issue with measures of concentration for our purposes is that they do not differentiate between the reasons activity is concentrated. In general, the reason for the concentration does not matter to us except for one instance. If a service is non-tradable and demand for the service is concentrated (industries that use the non-traded service are geographically concentrated), the service industry will be geographically concentrated and we will infer that the service is tradable.

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

Measures

To address this issue, we modify the general measures of geographic concentration by developing an industry-region specific measure of the concentration of demand for an industry. We construct a downstream industry weighted average demand for each industry-region using the input-output tables. (More details on the construction of the weights are provided in the appendix.) The adjustment takes account of the concentration of downstream industry concentration and adjusts the "denominator" in the concentration measures accordingly.

The first measure of economic concentration, *EC*, is described in Ellison and Glaeser (1997). The measure *EC* is an index for comparing a region's share of industry employment (s_i) with the area's share of aggregate activity/employment (x_i). When an area's employment share in

² The relationship between geographical concentration of production and its relation to 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 to an "expected" baseline.

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 EC provides a national index for each industry and measures of 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 EC measure to look at the difference between the region's share of industry employment and the region's share of industry demand. We use $EC_i = \sum_p (s_{i,p} - IDS_{i,p})^2$. The new measure of 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 the index of agglomeration because we are more interested in pure geographic concentration. If economic activity is concentrated because there are significant scale economies that are captured within the firm, we do not want to discount this concentration (as opposed to agglomeration) as we are interested in a measure of tradability.

The second measure is the Gini coefficient of geographic concentration. The Gini coefficient (G) for the concentration of industry activity is given by:

$$G = | 1 - \sum_i (\sigma Y_{i-1} + \sigma Y_i) * (\sigma X_{i-1} - \sigma X_i) |$$

where i 's index regions (sorted by the region's share of industry employment), σY_i is the cumulative share of industry or occupation employment in region i , σY_{i-1} is the cumulative share of industry or occupation employment in the region ($i-1$) with the next lowest share of industry employment, σX_i is the cumulative share of total employment in region i , and σX_{i-1} is the cumulative share of total employment in region $i-1$. We modify the Gini measure to:

$$G = | 1 - \sum_i (\sigma Y_{i-1} + \sigma Y_i) * (\sigma IDS_{i-1} - \sigma IDS_i) |$$

where IDS_i is the region's share of demand for industry i .

Implementation

These measures are implemented using employment information from the 2000 Decennial Census of Population Public Use Micro Sample (PUMS) files. The geographic entity is the Consolidated Metropolitan Statistical Area or the Metropolitan Statistical Area where an individual reports working.³ The use of worker level data to investigate economic concentration is somewhat unusual. One advantage of this strategy is that it allows consideration of both industrial concentration 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. In addition, occupations have job task content and activities, while industries (often similar to products) do not.

JK reported a high correlation between the adjusted *G* and *EC* measures for both industries and occupations. The correlation between the *EC* measure and the *G* measure is quite high, .713 for industries and .732 for occupations. From here, the focus will be on the *G* results.

2. Classifying industries and occupations as tradable vs. non-tradable

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.”⁴ We started exploring where to impose the tradable/non-tradable threshold with industries because we have a much better sense of which industries are tradable – particularly for goods producing industries. We

³ For regions, we use the Place of Work Consolidated Metropolitan Area (POWCMA5) field on the Decennial PUMS. When POWCMA is coded as a non-metropolitan area or a mixed metro/non-metro area, we concatenate the Place of Work state code with the POWCMA5 code. For more information on the 5 percent sample PUMS, see: <http://www.census.gov/Press-Release/www/2003/PUMS5.html>.

⁴ Our interest is in identifying industries and occupations that are traded within the US 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 reveals 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.

initially placed industries into 3 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 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 the top two Gini classes. Only 5 of the 92 industries in these sectors are in Gini class 1: Cement and Concrete, Machine Shops, Miscellaneous Manufacturing n.e.c., Structural Metals and Tanks, and Printing and Related Activities. All of these industries seem to be either non-traded because of a high weight to value ratio (e.g., Cement and Concrete) or they are categories that include a range of potentially dissimilar activities (Miscellaneous manufacturing n.e.c.) 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 non-tradable seems appropriate for these sectors.⁵

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 non-tradable. Industries in the Transportation sector are mostly classified as tradable. For Public Administration, most activities are non-tradable except for Public Finance and the military. For the Service sector, industries are balanced between non-tradable and tradable. Table 1 provides a complete list of service industries by 2-digit NAICS sector and the industry's Gini class.⁶

⁵ 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, 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.

⁶ Higher education may appear to stand out in table 1 as a non-tradable 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.

Table 2 shows the share of employment classified in tradable industries by NAICS major 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 one of the top two Gini classes). For manufacturing, most employment is in the tradable sector.⁷ Utilities are mostly non-tradable and Construction is entirely non-traded. For the remainder of the paper, we will categorize industries with a Gini coefficient below .1 as non-tradable and industries with a Gini coefficient greater than or equal to .1 as tradable.⁸

Occupation Results

We use a similar methodology to classify occupations into tradable and non-tradable categories. We construct a demand-weighted Gini coefficient for each occupation as described above and use the same $Gini = .1$ threshold for the non-tradable/tradable categorization. Table 3 shows the share of employment by Major Standard Occupational Classification 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).⁹ The notable non-tradable occupational groups include Education and Library (99 percent non-tradable); Healthcare Practitioners (86 percent); Healthcare Support (97 percent), Food Preparation (96 percent). On the blue-collar side, 90 percent of employment in Installation, Maintenance and Repair is classified as non-tradable, as is 80 percent of Production¹⁰ and 89 percent of Transportation and Material Moving.

⁷ Alternatively, if we modify the cutoff and use .2 as the break between tradable and non-tradable, 28% of manufacturing employment would be in the non-tradable sector.

⁸ While choosing the threshold for non-tradable vs. 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.

⁹ van Welsum and Reif (2006) offer a list of U.S. occupations (at the 3-digit level) identified as “potentially affected by offshoring,” in Appendix table 2. As explained in the chapter, their method relies on occupations having “offshorability attributes,” that rely on the use of information and communication technologies, highly codifiable knowledge, and no face-to-face contact. There is overlap between the two lists of occupations, although our method identifies a larger set of tradable occupations. van Welsum and Vickery (2005a) offer a list of U.S. industries potentially affected by offshoring, in table 6. 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.

¹⁰ The geographic concentration results are at first counter-intuitive 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.

Table 4 brings together information on industries and occupations for a selection of “white-collar” occupations. In the aggregate, across occupations, the share of workers in tradable occupations and non-tradable industries is not large, about 10 percent. However, as table 4 shows, for business and professional occupations, the share of workers in tradable occupations but non-tradable industries is much larger. The typical professional occupation has about 25 percent of employment in tradable occupations but non-tradable 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.

3. 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 non-tradable industries and occupations. These characteristics are available from the 2000 Decennial Census of Population Public Use Micro Sample (PUMS) 5 percent sample.¹¹

Table 5 shows the demographic characteristics of workers in tradable industries and non-tradable industries. 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). 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 non-tradable 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.

¹¹ For more information on the 5 percent sample PUMS see: <http://www.census.gov/Press-Release/www/2003/PUMS5.html>.

Table 6 shows the results for all occupations divided into tradable and non-tradable groups. Individuals in occupations identified as tradable tend to have higher earnings, are more likely to be male and have higher educational attainment. Again, as in the industry results, workers in tradable occupations have higher earnings and have higher educational attainment than workers in non-tradable service occupations.¹²

4. Evidence on the risk of job loss and characteristics of displaced workers

The Displaced Worker Surveys (DWS) provide 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 re-employment; re-employment industry and occupation; and earnings changes. 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 and white 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 7, 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 7 includes job loss rates by industry for the period 1999-2001, from the 2002 Displaced Worker Survey. The industry classifications are different, reflecting the

¹² JK pursue the wage differential between tradable and non-tradable industries and occupations. The results reveal a wage premium for tradability, even after controlling for observable characteristics, with some independence between industry tradability and occupational tradability. Details in Jensen and Kletzer (2006).

use of 1990 Census codes for the 2002 survey. What is clear is that job loss rates increased from 1999-2001 to 2001-2003, most notably in Communications (the old sector for some of Information) and Manufacturing.

When we apply our tradable-non-tradable distinction to the overall economy, the rate of job loss is notably higher from tradable industries (.153) than from non-tradable industries (.076). Within the broad sectors of manufacturing and non-manufacturing, tradable industries also had higher rates of job loss. The tradable-non-tradable distinction is small within manufacturing, with tradable industries at a rate of job loss of .213, and non-tradable (of which there are few) at a rate of .192. Outside of manufacturing, the tradable distinction is large. Tradable non-manufacturing industries have a rate of job loss of .128, and non-tradable 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 the non-tradable job loss rate was .075.

Job loss rates by occupation are reported in Table 8. 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 2001-2003 than in 1999-2001.

Production workers faced the highest rate of job loss, at .206 (compared to 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), Architecture and Engineering (.128).

For the overall economy, tradable occupations had a higher rate of job loss than non-tradable 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 non-tradable occupations faced a rate of .065. For blue-collar workers, the tradable job loss rate was .128 and the non-tradable 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 9 reports demographic and educational characteristics for workers displaced from tradable and non-tradable non-manufacturing industries, with (tradable) manufacturing industries offered as a reference group. As noted in Kletzer (2001), workers displaced from non-manufacturing industries are slightly younger, less tenured, less likely to be male, and considerably more

educated than workers displaced from manufacturing. From tradable non-manufacturing workers, 75 percent of displaced workers had at least some college experience. That share for displaced manufacturing workers was .46.

Also evident in Table 9 is that for non-manufacturing industries, workers displaced from tradable industries were more educated, more likely to have health insurance, more likely to lose fulltime jobs, and have higher pre-displacement earnings than workers displaced from non-tradable industries. The educational attainment differences are stark: 42 percent of workers displaced from non-tradable non-manufacturing industries had a high school diploma or less, compared to 24 percent of workers displaced from tradable non-manufacturing industries. The educational differences show up in pre-displacement weekly earnings.

In terms of post-displacement outcomes (also reported in Table 9), reemployment rates are higher for displaced non-manufacturing workers than observed for manufacturing workers. Reemployment rates are .75 and .77 for non-tradable and tradable non-manufacturing workers, compared to .64 for manufacturing.

The earnings cost of job displacement, well established for manufacturing workers, is also in evidence for non-manufacturing workers. For the 2001-2003 period, with the weak job recovery from the recession, we see large earnings losses. Median earnings losses are smaller for non-manufacturing than for manufacturing, and a larger share of non-manufacturing workers experience no earnings loss. Consistent with lower pre-displacement earnings, workers displaced from non-tradable non-manufacturing industries experienced smaller earnings losses than workers displaced from tradable non-manufacturing industries.

Table 10 reports worker characteristics and reemployment outcomes for three services sectors: Information; Financial, 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, pre-displacement weekly earnings were higher in tradable industries than in non-tradable industries. Consistent with higher earnings, workers displaced from tradable industries reported health insurance coverage more so than workers from non-tradable industries. Reemployment outcomes (reemployment rates or average earnings losses) are similar within sector, across the tradability of the detailed industries.

Table 11 reports a similar breakdown, by occupation, for sectors: Management, Business and Financial; Professional and Related; Office and Administrative Support. Workers from tradable occupations have higher levels of education, within occupational group, than workers from non-tradable occupations. Pre-displacement 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 percent to -16 percent, with 40 to 50 percent of reemployed workers reporting no earnings loss.

5. Tradable Services Occupations – Details and Task Content

“White-collar” Tradable Occupations

Table 12 lists the “white-collar” tradable occupations, as classified by the geographic concentration methodology (these are Gini class 2 and 3). The companion non-tradable list is in table 13. The lists provide the 3-digit detail behind Table 3. At least two conclusions can be drawn from the lists: the first is that the geographic concentration method produces many “correct” classifications, in the sense of classifications that are consistent with our priors about tradability and offshoring. The second remark is that some classifications are wrong. Some commentary first on the errors.

For the management occupations, chief executives and legislators are a misfit, but one that comes straight from the geography. CEOs are likely concentrated in major cities, and legislators in the state and federal capitols. In general, though, it is not clear what to make of the management occupations.

Questions arise about several broad occupational groups. Legal, Arts Design Entertainment, Protective Service, Personal Care all seem to contain jobs that require face-to-face contact, location on-site. The misfit of Food Preparation is slight (96% non-tradable) and likely related to the concentration in major cities.

For Business and Financial Operations and Computer and Mathematical Occupations, the classifications seem consistent with priors. Within Business & Financial Occupations, face-to-face customer contact may distinguish the few non-tradable occupations from the majority that are tradable.

Architecture and Engineering gets classified as solidly tradable, consistent with current public attention to the potential relocation of (highly paid) engineering jobs. The three detailed occupations that are classified as non-tradable seem to share the need to be on-site.

The broad category of Office and Administrative Support Occupations is classified as 93% nontradable. The detailed jobs that are tradable seem to mostly make sense, with the exception of Gaming Cage Workers (concentrated in Las Vegas and Atlantic City), Cargo Agents, Couriers, and Postal Service workers.

*Task Content of Occupations – O*Net*

The literature on offshoring posits that movable jobs are those with: little face-to-face customer contact; high information content, work process is internet enabled and/or telecommutable. A great deal of attention is paid to internet-enabled: the expansion of broadband and wireless (and the broad use of “off the shelf” software programs) having greatly reduced the “transportation costs” of information. Having developed a set of tradable services occupations, the next step is to consider the detailed characteristics of these jobs and whether the characteristics fit a description of offshorability. Among the questions to be answered: Are tradable occupations more likely to be internet enabled and/or have high information content? What is the importance of face-to-face contact? Is there a difference between high-skill tradable occupations and lower-skill tradable occupations, in job task content?

Based on these offshorability characteristics, van Welsum and Vickery (2005a, b) perform a similar exercise for a selection of OECD countries. Their methodology is based on subjective judgments of the task content of jobs, not data on work activities or content. The use here of O*Net is in the spirit of Autor, Levy, and Murnane (2003), who explored the spread of computerization, using the Dictionary of Occupational Titles (DOT) to measure the routine vs. non-routine, and cognitive vs. non-cognitive aspects of occupations. O*Net is the successor to the DOT. Information is organized by detailed occupation (at the Standard Occupational Classification level), in a large number of categories (e.g., tasks, tools and technology, work activities, work context, skills, abilities). The category “Tasks” is very occupation-specific and not easily used across detailed occupations. The category Work Activities offers detailed

information for building measures of offshorability; characteristics such as no face-to-face customer contact, high information processing content, and internet-enabled.

As a first step into O*Net, I sorted the white-collar tradable occupations by employment size. That sorting raises the profile of Office and Administrative Support Occupations, a group that is 93% nontradable, but where November 2004 national employment was at 22.6 million workers (with mean annual earnings of \$29,390). Table 14 presents the O*Net “results,” a checklist of the Work Activity characteristics described above, along with some Work Context attributes, including email and telephone. A quick glance at the table reveals that the tradable occupations involve computers and work with information. Most involve telephone and email. Very few involve working directly with the public. Those that do involve face-to-face contact, such as travel agents and new account clerks, are likely misclassified.

Blinder (2006) explores an objective index based on various measures of face-to-face interaction (establishing and maintaining personal relationships; assisting and caring for others; performing for or working directly with the public; selling or influencing others; social perceptiveness), and concludes that a subjective index does poorly in assessing offshorability (as compared to his subjective assessment, based on O*Net data). His subjective index does not incorporate any attributes related to information context or internet enabling, nor does he consider the creativity or routineness of work.¹³ Objective measures may well be preferred, given the number of occupations (>450) and desire for replication. Working more broadly with the O*Net Work Activities information, eleven Work Activity measures were used to construct a measure of offshorability.

On information content:

- Getting information (+)
- Processing information (+)
- Analyzing Data or Information (+)
- Documenting/Recording Information (+)

On Internet-enabled:

- Interacting with computers (+)

On face-to-face contact:

- Assisting or Caring for Others (-)
- Performing or Working Directly with the Public (-)

¹³ The routineness of work, or the codification of tasks, is a characteristic emphasized by Autor, Levy, and Murnane (2003).

Establishing or Maintaining Interpersonal Relationships (-)

On the routine or creative nature of work:

Making Decisions and Solving Problems (-)

Thinking Creatively (-)

One additional characteristic was used to proxy for the “on-site” nature of work: Inspecting equipment, structures or material (-). The sign in parentheses [(+) or (-)] denotes a prior on whether the characteristic is positively related to offshorability or negatively related.

For each occupation, O*Net provides information on the “importance” and “level” required of each characteristic. For the attribute “Performing or Working Directly with the Public,” data entry keyers are assigned importance (I) =43, and level (L) = 33. For Security Guards, I=74 and L=62. It is not obvious how to weight importance and level. Starting (arbitrarily) with a weight of three-quarters to importance and one-quarter to level, a composite index of offshorability is the sum of the eleven components, using my priors on the sign of the attribute in regard to offshoring potential. Higher values of the index indicate more offshorability potential, yielding a ranking of all occupations for which the attributes are available.¹⁴

Results are presented in table 15. How “good” are the results? Occupations at the top of the list seem unsurprising: credit authorizers, data entry keyers, accountants, medical transcriptionists, market research analysts, bookkeeping and account clerks. One of the columns in the table indicates occupations identified by JK as “tradable;” occupations at the top of the ranking are more likely denoted “x” than those lower down, and the O*Net information corrects some obvious misfits of JK: crossing guards, massage therapists, manicurists (see the bottom of the table).

Potential offshorability and skill is of interest. The O*Net data offer information on educational attainment, based on BLS data on fractions of jobholders with varying levels of education. Table 15 offers two categories: percent with a high school diploma or less and percent with a BA degree or more. Using the BA category, the rank correlation between educational attainment and relative offshorability is +0.306 – occupations with a greater share of BA holders are more highly ranked as offshorable. The top quartile of jobs in the ranking has a mean percentage of BA+ degree holders of 61%, the second quartile, 53.7%, the third quartile 47.3%

¹⁴ The usefulness of the index is ordinal, not cardinal. Occupations are judged on their offshorability relative to each other, not compared to some absolute standard.

and the bottom quartile, 29.1% The least offshorable jobs are the least formally educated and have lower median annual earnings.

It may be premature to draw a line (literally) on jobs that are potentially offshorable and those that are not (see Blinder (2006) for an interesting discussion). Such a line needs to be drawn to estimate total number of jobs at risk.

6. Conclusions

Using a novel empirical strategy, Jensen and Kletzer (2006) find substantial employment in tradable service industries and occupations. Workers in these industries and occupations are higher skill and have higher incomes than workers in the manufacturing sector and non-tradable service activities.

There is job insecurity associated with employment in tradable activities, including services activities. We find a higher rate of job loss from tradable industries than from non-tradable industries, with the greatest difference outside of manufacturing. Compared to an overall rate of job loss of .103 for 2001-2003, tradable non-manufacturing industries have a rate of job loss of .128 and non-tradable industries .073 (though we note the possibility that these differences are driven by the tech bubble). Also within occupations, workers in tradable jobs faced a higher rate of job loss than workers in non-tradable jobs, with the greatest difference within white-collar occupations.

A selection of tradable occupations do indeed have characteristics of offshorability (internet-enabled, high information content, no face-to-face customer contact). The calculated index of offshorability offers strong potential for understanding jobs (tasks) at risk. The two measures of tradability and offshorability offer a combined potential to do the same. Future work will focus on high-skill tradable occupations and lower-skill occupations, and an understanding of the earnings implications of potential offshorability.

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Figure 1

Geographic Concentration of Industries

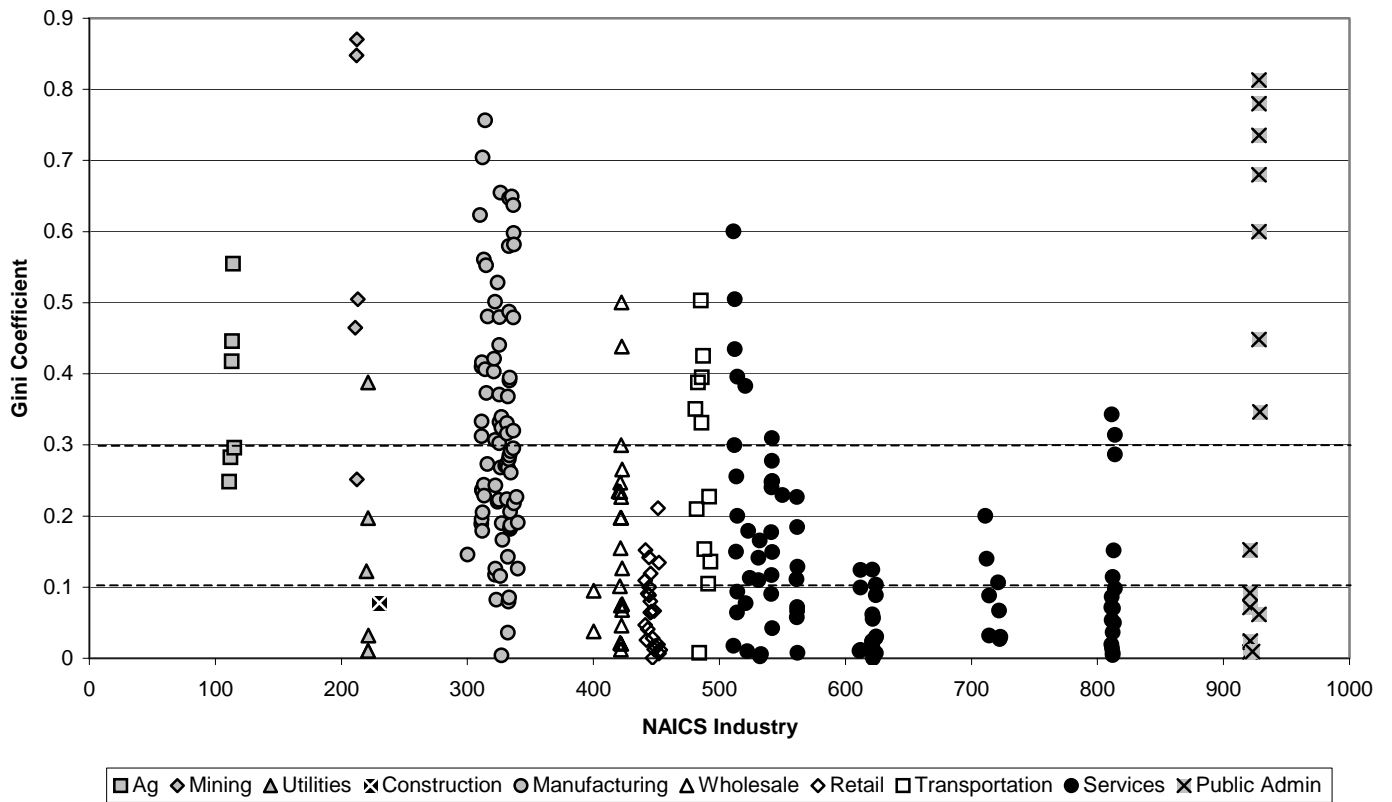


Table 1
Service Industries
Gini Coefficient Class

2-digit NAICS	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	Non-depository credit and related activities	2
52	Securities, commodities, funds, trusts, and other financial investm	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 leas	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

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 other 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
Accommodation		
72	Drinking places, alcoholic beverages	1
72	Restaurants and other food services	1
72	Recreational vehicle parks and camps, and rooming and boarding hous	1
72	Traveler accommodation	2

Other Services		
81	Beauty salons	1
81	Funeral homes, cemeteries and crematories	1
81	Personal and household goods repair and maintenance	1
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	U. S. Armed Forces, branch not specified	3
92	U. S. Coast Guard	3
92	U. S. Air Force	3
92	U. S. Army	3
92	U. S. Navy	3
92	U. S. Marines	3

Table 2
Share of Sector Employment by Gini Class Coefficient
By NAICS Sector

NAICS	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	Trans./Warehouse	42.81	22.03	35.17
49	Trans./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	Prof., Sci., Tech. Svcs.	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	97.80	2.20	0
71	Arts, Enter., 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 3
Share of Occupation Employment by Gini Class Coefficient
By Major Occupation Category

SOC	Description	Gini Class 1	Gini Class 2	Gini Class 3
11	Management	34.48	61.15	4.37
13	Business/Fin. Oper.	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, Social Sci.	16.32	58.61	25.08
21	Community/Social Svs.	100.00	0	0
23	Legal	3.78	96.22	0
25	Education and Library	99.54	0.46	0
27	Arts, Design, Entertain.	17.13	75.02	7.85
29	Healthcare Prac./Tech	86.56	13.10	0.34
31	Healthcare Support	96.73	3.27	0
33	Protective Service	59.83	40.17	0
35	Food Prep./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/Admin. Support	93.14	6.66	0.20
45	Farm, Fish, Forestry	0	81.01	18.99
47	Construction/Extraction	61.37	36.18	2.45
49	Install., Maint., Repair	90.00	8.89	1.11
51	Production	80.30	17.15	2.55
53	Trans./Material Moving	89.20	5.86	4.95
55	Military Specific	0	0	100.00
	All Occupations	71.66	24.86	3.47

Table 4
Share of Employment in Tradable Occupations and Industries
by Major Occupation Category

Management Occupations (11)		
	Non-tradable Occupations	Tradable Occupations
Non-tradable Industries	23.97	26.58
Tradable Industries	10.51	38.94
Business and Financial Operations Occupations (13)		
	Non-tradable Occupations	Tradable Occupations
Non-tradable Industries	14.11	27.72
Tradable Industries	17.61	40.56
Computer and Mathematical Occupations (15)		
	Non-tradable Occupations	Tradable Occupations
Non-tradable Industries	0	24.22
Tradable Industries	0	75.78
Architecture and Engineering Occupations (17)		
	Non-tradable Occupations	Tradable Occupations
Non-tradable Industries	8.46	13.30
Tradable Industries	27.59	50.66
Life, Physical and Social Science Occupations (19)		
	Non-tradable Occupations	Tradable Occupations
Non-tradable Industries	7.28	36.49
Tradable Industries	9.03	47.20
Legal Occupations (23)		
	Non-tradable Occupations	Tradable Occupations
Non-tradable Industries	3.54	18.89
Tradable Industries	0.24	77.33

Table 5¹⁵
Mean Earnings and Demographic Characteristics
for Selected Industries

	Non-Tradable	Tradable
3x		
Manufacturing		
Employment Income	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 B.A.	13.8	20.4
Percent High School	85.3	82.9
Age	40.0	40.2
51		
Information		
Employment Income	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 B.A.	37.4	41.3
Percent High School	94.2	96.2
Age	38.7	37.6
52		
Finance and Insurance		
Employment Income	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 B.A.	30.5	43.8
Percent High School	97.1	97.4
Age	38.1	39.1

¹⁵ The education categories in this table are not mutually exclusive, e.g., the share with a B.A. includes those with a high school degree.

	Non-Tradable	Tradable
53	Real Estate and Rental and Leasing	
	Employment Income	23,056
	Percent Male	42,915
	Percent African-American	58.1
	Percent Hispanic	9.1
	Percent Advanced Degree	8.6
	Percent B.A.	10.8
	Percent High School	1.9
	Age	6.7
		13.3
		84.7
		31.1
		42.4
54	Prof., Sci., Tech. Svcs.	
	Employment Income	42,246
	Percent Male	57,959
	Percent African-American	35.3
	Percent Hispanic	5.1
	Percent Advanced Degree	5.0
	Percent B.A.	16.6
	Percent High School	25.7
	Age	52.5
		97.1
		39.5
		39.3
55	Management	
	Employment Income	--
	Percent Male	61,285
	Percent African-American	45.5
	Percent Hispanic	5.4
	Percent Advanced Degree	4.9
	Percent B.A.	14.3
	Percent High School	49.7
	Age	97.8
		40.5
56	Administrative Support	
	Employment Income	24,039
	Percent Male	28,742
	Percent African-American	64.1
	Percent Hispanic	11.9
	Percent Advanced Degree	17.6
	Percent B.A.	12.2
	Percent High School	2.0
	Age	5.0
		10.7
		23.4
		72.3
		37.2
		36.1

Table 6¹⁶
Mean Earnings and Demographic Characteristics
for Selected Occupations

	Non-Tradable	Tradable
11	Management	
	51,399	69,029
	56.2	67.3
	8.3	4.7
	6.8	5.0
	19.9	15.7
	46.5	49.6
	95.2	95.8
	41.8	42.6
13	Business and Financial Operations	
	42,813	51,998
	41.3	48.0
	10.3	8.3
	6.9	5.4
	10.5	16.2
	44.0	61.6
	97.6	98.6
	40.4	40.2
15	Computer and Mathematical	
	--	54,297
	--	70.3
	--	6.8
	--	4.5
	--	17.8
	--	59.9
	--	99.1
	--	37.3

¹⁶ The education categories in this table are not mutually exclusive, e.g., the share with a B.A. includes those with a high school degree.

		Non-Tradable	Tradable
17	Architecture and Engineering		
	Employment Income	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 B.A.	26.2	76.2
	Percent High School	96.2	99.9
	Age	39.4	40.6
19	Life, Physical and Social Science		
	Employment Income	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 B.A.	40.0	85.3
	Percent High School	96.4	99.2
	Age	36.0	40.3
23	Legal		
	Employment Income	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 B.A.	78.8	76.9
	Percent High School	99.2	99.3
	Age	47.7	40.9
29	Healthcare Practitioners and Technical		
	Employment Income	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 B.A.	47.3	97.8

	Percent High School	98.8	99.7
	Age	40.5	42.8
		Non-Tradable	Tradable
31	Healthcare Support		
	Employment Income	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 B.A.	7.9	30.9
	Percent High School	83.8	97.3
	Age	37.8	39.0

Table 7
Job loss rates by industry

From 2004 Displaced Worker Survey				From 2002 and 2004 Displaced Worker Surveys			
		Tradable	Not tradable		1999-2001	2001-2003	
	2001-2003						
Agriculture	0.049			Agriculture	0.042	0.065	
Mining	0.127			Mining	0.173	0.127	
Construction	0.131			Construction	0.107	0.131	
Mfg	0.209			Mfg - Durables	0.177	0.236	
WRT	0.113	0.077	0.091	Mfg - N durable	0.133	0.157	
Transport&Utilities	0.089			Transport	0.096	0.103	
Information	0.232	0.317	0.075	Communic	0.159	0.305	
Financial	0.081	0.08	0.081	Util&SanService	0.054	0.052	
Prof&BusSvc	0.144	0.158	0.113	WT	0.111	0.123	
Educ&HealthSvc	0.040	0.071	0.039	RT	0.099	0.107	
Leisure&Hospitality	0.105	0.083	0.113	FIRE	0.079	0.080	
OtherSvcs	0.051	0.03	0.057	PrivHH	0.044	0.016	
PublicAdmin	0.020			Bus&RepairSvc	0.181	0.172	
				PersonalSvc	0.080	0.057	
Total	0.103	0.153	0.076	Enter&Recreat	0.071	0.098	
				Hospitals	0.026	0.030	
Mfg. - Tradable	0.213			Other Medical	0.052	0.055	
Mfg. - Not tradable	0.192			EducSvc	0.020	0.030	
Non- Mfg. - Tradable	0.128			SocialSvc	0.033	0.060	
Non- Mfg. - Not tradable	0.073			OtherProfSvc	0.071	0.078	
				Forestry&fish	0.008	0.070	
Dropping agriculture, mining & construction:				PublicAdmin	0.017	0.020	
Mfg. - Tradable	0.213						
Mfg. - Not tradable	0.192			Total	0.090	0.106	
Non- Mfg. - Tradable	0.106						
Non- Mfg. - Not tradable	0.054						
Total		0.126	0.058				

Authors' calculations from the 2002 and 2004 Displaced Worker Surveys, using sampling weights.

Table 8
Job loss rates by occupation

From 2004 Displaced Worker Survey (a)				From the 2002 and 2004 Displaced Worker Surveys		
	2001-2003	Tradable	Not tradable		1999-2001	2001-2003
MgmtBusFin (WC)	0.089	0.077	0.091	Exec, admin, mgr	0.086	0.094
<i>BusinessOperationsSpecialists</i>	0.143	0.121	0.171	Prof. Spec	0.059	0.066
<i>Financial Specialists</i>	0.054	0.057	0.044	Technician&related	0.088	0.110
Prof&related (WC)	0.070	0.109	0.033	Sales	0.094	0.109
<i>Computer & Math</i>	0.177	0.177	N/A	AdminSupport	0.097	0.106
<i>Architecture & Engineering</i>	0.128	0.113	0.158	PrivHH	0.047	
<i>Life, Physical & Social Science</i>	0.059	0.057	0.066	ProtectSvc	0.045	0.059
Service (WC)	0.073	0.072	0.056	Food,Health,Clean,Personal	0.069	0.075
Sales (WC)	0.106	0.123	0.079	PrecProdCraftRep	0.111	0.151
Office&AdminSupport (WC)	0.109	0.067	0.092	OperAssemblnsp	0.181	0.219
FarmForestFish (BC)	0.110			TransportMMeqpt	0.103	0.112
Construct&Extract (BC)	0.149			HandlersCleanersHelpers	0.139	0.151
InstallMaintainRep (BC)	0.112	0.117	0.083	FarmForestFish	0.044	0.067
Production (BC)	0.206	0.163	0.169	ArmedForces		
Transport&MM (BC)	0.117	0.057	0.096			
Total	0.102	0.101	0.078	Total	0.090	0.103
Blue Collar - Tradable	0.128					
Blue Collar - Not tradable	0.122					
White Collar - Tradable	0.094					
White Collar - Not tradable	0.065					
Full sample:						
Blue Collar - Tradable	0.175					
Blue Collar - Not tradable	0.150					
White Collar - Tradable	0.104					
White Collar - Not tradable	0.078					
Full sample total		0.122	0.087			

(a) Agriculture, Mining, Construction omitted

Table 9
Characteristics of displaced workers, by industrial sector and tradability

	Mfg - tradable	Non-mfg - tradable	Non-mfg not tradable
Age (mean in yrs.)	41.6	39.6	38.1
Std. deviation	11.2	11.1	11.7
Job tenure (mean in yrs.)	7.11	4.4	4.26
Std. deviation	8.43	5.6	5.61
Job tenure > 10 yrs	0.23	0.12	0.14
Educational attainment:			
Share:			
HS dropout	0.14	0.05	0.11
HS grad	0.4	0.19	0.31
Some college	0.24	0.3	0.33
College +	0.22	0.45	0.25
Male	0.61	0.54	0.45
On pre-displacement job:			
Share w/ health insurance	0.75	0.66	0.47
Fulltime	0.96	0.9	0.82
If fulltime, real weekly earnings	\$342.70	\$443.18	\$294.91
Std. deviation	\$300.54	\$383.08	\$271.21
Share reemployed	0.64	0.77	0.75
Of reemployed, share fulltime	0.8	0.78	0.72
All reemployed:			
Change in ln earnings (mean)	-0.32	-0.3	-0.14
Std. deviation	0.89	0.98	1.02
Median change	-0.15	-0.11	-0.03
Share w/ no loss in earnings	0.42	0.45	0.51
Fulltime to fulltime			
Change in ln earnings (mean)	-0.21	-0.21	-0.12
Std. deviation	0.76	0.69	0.97
Median change	-0.1	-0.07	-0.03
Share w/ no loss in earnings	0.42	0.46	0.52

Source: Authors' calculations from the 2004 Displaced Worker Survey, using sampling weights. Agriculture, Mining, Construction omitted.

Table 10
Characteristics of select service sector displaced workers, by industry and tradability

	Information		Financial, Insurance, Real Estate		Professional & Business Services	
	Tradable	Not tradable	Tradable	Not tradable	Tradable	Not tradable
Job tenure (mean in yrs.)	5.8	4.51	5.82	8.28	3.55	3.24
Std. deviation	7.37	7.25	7	9.14	3.98	4.68
Job tenure > 10 yrs	0.192	0.16	0.167	0.259	0.066	0.109
Educational attainment:						
Share:						
HS dropout	0.032	0	0.04	0.046	0.047	0.173
HS grad	0.207	0.038	0.179	0.243	0.157	0.446
Some college	0.262	0.45	0.389	0.354	0.261	0.196
College +	0.499	0.512	0.392	0.357	0.535	0.186
Male	0.559	0.668	0.47	0.479	0.527	0.527
On pre-displacement job:						
Share w/ health insurance	0.82	0.62	0.62	0.73	0.66	0.36
Fulltime	0.93	0.87	0.91	0.94	0.91	0.83
If fulltime, real weekly earnings	\$530.82	\$387.98	\$409.88	\$542.51	\$504.61	\$273.95
Std. 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 fulltime	0.76	0.87	0.8	0.82	0.8	0.73
All reemployed:						
Change in ln earnings (mean)	-0.57	-0.72	-0.16	0.013	-0.34	-0.18
Std. deviation	1.07	2.97	1.09	0.499	0.96	0.93
Median change	-0.34	-0.024	-0.08	0.03	-0.08	-0.03
Share no earn loss	0.346	0.469	0.456	0.531	0.457	0.468
Fulltime to fulltime						
Change in ln earnings (mean)	-0.4	-1.003	-0.15	0.018	-0.185	-0.162
Std. deviation	0.82	3.328	0.51	0.36	0.737	0.999
Median change	-0.25	-0.07	-0.047	-0.007	-0.034	-0.029
Share no loss	0.36	0.344	0.457	0.508	0.49	0.489

Source: Authors' calculations from the 2004 Displaced Worker Survey, using sampling weights

Table 11
Characteristics of select service occupation displaced workers, by occupation and tradability

	Management, Business & Financial		Professional & Related		Office & Administrative Support	
	Tradable	Not tradable	Tradable	Not tradable	Tradable	Not tradable
Job tenure (mean in yrs.)	6.72	5.03	4.82	4.3	5.31	4.57
Std. deviation	8.04	4.99	6.09	5.25	6.69	5.74
Job tenure > 10 yrs	0.204	0.143	0.111	0.109	0.176	0.136
Educational attainment:						
Share:						
HS dropout	0.008	0.012	0.003	0.026	0.051	0.05
HS grad	0.132	0.272	0.092	0.115	0.331	0.339
Some college	0.269	0.28	0.198	0.328	0.438	0.406
College +	0.591	0.436	0.708	0.53	0.18	0.204
Male	0.466	0.633	0.717	0.248	0.306	0.241
On pre-displacement job:						
Share w/ health insurance	0.775	0.588	0.794	0.632	0.616	0.577
Fulltime	0.965	0.927	0.93	0.791	0.896	0.865
If fulltime, real weekly earnings	\$554.78	\$426.02	\$523.24	\$323.60	\$299.45	\$261.96
Std. deviation	\$434.23	\$336.05	\$369.44	\$226.58	\$254.48	\$198.07
Share reemployed	0.786	0.72	0.8	0.801	0.691	0.755
Of reemployed, share fulltime	0.791	0.726	0.805	0.707	0.758	0.763
All reemployed:						
Change in ln earnings (mean)	-0.374	-0.364	-0.34	-0.14	-0.227	-0.093
Std. deviation	1.08	1.144	1.155	0.811	0.677	1.063
Median change	-0.127	-0.165	-0.084	-0.037	-0.15	-0.045
Share no earn loss	0.492	0.389	0.455	0.507	0.443	0.512
Fulltime to fulltime						
Change in ln earnings (mean)	-0.205	-0.357	-0.318	-0.128	-0.113	0.012
Std. deviation	0.852	1.165	1.176	0.343	0.455	0.704
Median change	-0.045	-0.109	-0.068	-0.029	-0.068	-0.025
Share no loss	0.528	0.351	0.462	0.515	0.471	0.542

Source: Authors' calculations from the 2004 Displaced Worker Survey, using sampling weights

Table 12

"White-Collar" Tradable Occupations

Management occupations (65% tradable)

Chief Executives 11-1011
Legislators 11-1031
Advertising and Promotions Managers 11-2011
Marketing and Sales Managers 11-2020
Public Relations Managers 11-2031
Administrative Services Managers 11-3011
Computer and Information Systems Managers 11-3021
Financial Managers 11-3031
Human Resources Managers 11-3040
Purchasing Managers 11-3061
Farm, Ranch, and Other Agricultural Managers 11-9011
Farmers and Ranchers 11-9012
Engineering Managers 11-9041
Gaming Managers 11-9071
Natural Sciences Managers 11-9121
Postmasters and Mail Superintendents 11-9131
Property, Real Estate, and Community Association Managers 11-9141
Social and Community Service Managers 11-9151
Managers, All Other 11-9199

Business & Financial Operations Occupations (68% tradable)

Agents and Business Managers of Artists, Performers, and Athletes 13-1011
Purchasing Agents and Buyers, Farm Products 13-1021
Wholesale and Retail Buyers, Except Farm Products 13-1022
Claims Adjusters, Appraisers, Examiners, and Investigators 13-1030
Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transpo 13-1041
Cost Estimators 13-1051
Human Resources, Training, and Labor Relations Specialists 13-1070
Logisticians 13-1081
Management Analysts 13-1111
Meeting and Convention Planners 13-1121
Other Business Operations Specialists 13-1061, 13-1199
Accountants and Auditors 13-2011
Budget Analysts 13-2031
Credit Analysts 13-2041
Financial Analysts 13-2051
Personal Financial Advisors 13-2052
Insurance Underwriters 13-2053
Financial Examiners 13-2061
Tax Examiners, Collectors, and Revenue Agents 13-2081
Financial Specialists, All Other 13-2099

Computer & Mathematical Occupations (100% tradable)

Computer Scientists and Systems Analysts 15-1011, 15-1051, 15-1099

Computer Programmers 15-1021
Computer Software Engineers 15-1030
Computer Support Specialists 15-1041
Database Administrators 15-1061
Network and Computer Systems Administrators 15-1071
Network Systems and Data Communications Analysts 15-1081
Actuaries 15-2011
Operations Research Analysts 15-2031
Miscellaneous Mathematical Science Occupations 15-2090

Architecture and Engineering Occupations (64% tradable)

Architects, Except Naval 17-1010
Surveyors, Cartographers, and Photogrammetrists 17-1020
Aerospace Engineers 17-2011
Chemical Engineers 17-2041
Civil Engineers 17-2051
Computer Hardware Engineers 17-2061
Electrical and Electronics Engineers 17-2070
Environmental Engineers 17-2081
Industrial Engineers, Including Health and Safety 17-2110
Marine Engineers and Naval Architects 17-2121
Materials Engineers 17-2131
Mechanical Engineers 17-2141
Nuclear Engineers 17-2161
Petroleum Engineers 17-2171
Engineers, All Other 17-2199

Life, Physical, and Social Science Occupations (83% tradable)

Biological Scientists 19-1020
Conservation Scientists and Foresters 19-1030
Medical Scientists 19-1040
Astronomers and Physicists 19-2010
Atmospheric and Space Scientists 19-2021
Chemists and Materials Scientists 19-2030
Environmental Scientists and Geoscientists 19-2040
Physical Scientists, All Other 19-2099
Economists 19-3011
Market and Survey Researchers 19-3020
Psychologists 19-3030
Urban and Regional Planners 19-3051
Miscellaneous Social Scientists and Related Workers 19-3090
Agricultural and Food Science Technicians 19-4011
Biological Technicians 19-4021
Chemical Technicians 19-4031
Geological and Petroleum Technicians 19-4041
Other Life, Physical, and Social Science Technicians 19-4061, 19-4090

Legal Occupations (96% tradable)

Lawyers 23-1011
Judges, Magistrates, and Other Judicial Workers 23-1020

Paralegals and Legal Assistants 23-2011
Miscellaneous Legal Support Workers 23-2090

Arts, Design, Entertainment, Sports, and Media Occupations (82% tradable)

Artists and Related Workers 27-1010
Designers 27-1020
Actors 27-2011
Producers and Directors 27-2012
Dancers and Choreographers 27-2030
Musicians, Singers, and Related Workers 27-2040
Entertainers and Performers, Sports and Related Workers, All Other 27-2099
News Analysts, Reporters and Correspondents 27-3020
Public Relations Specialists 27-3031
Editors 27-3041
Technical Writers 27-3042
Writers and Authors 27-3043
Miscellaneous Media and Communication Workers 27-3090
Broadcast and Sound Engineering Technicians and Radio Operators 27-4010
Photographers 27-4021
Television, Video, and Motion Picture Camera Operators and Editors 27-4030

Healthcare Practitioners and Technical Occupations (13% tradable)

Chiropractors 29-1011
Dentists 29-1020
Optometrists 29-1041
Physicians and Surgeons 29-1060
Podiatrists 29-1081
Audiologists 29-1121
Occupational Therapists 29-1122
Radiation Therapists 29-1124
Recreational Therapists 29-1125
Therapists, All Other 29-1129
Health Diagnosing and Treating Practitioners, All Other 29-1199

Protective Service Occupations (40% tradable)

First-Line Supervisors/Managers of Correctional Officers 33-1011
First-Line Supervisors/Managers of Police and Detectives 33-1012
First-Line Supervisors/Managers of Fire Fighting and Prevention Workers 33-1021
Supervisors, Protective Service Workers, All Other 33-1099
Fire Fighters 33-2011
Fire Inspectors 33-2020
Bailiffs, Correctional Officers, and Jailers 33-3010
Detectives and Criminal Investigators 33-3021
Parking Enforcement Workers 33-3041
Animal Control Workers 33-9011
Private Detectives and Investigators 33-9021
Security Guards and Gaming Surveillance Officers 33-9030
Crossing Guards 33-9091
Lifeguards and Other Protective Service Workers 33-9092, 33-9099

Food Preparation and Serving Related Occupations (4% tradable)

Chefs and Head Cooks 35-1011
First-Line Supervisors/Managers of Food Preparation and Serving Workers 35-1012
Cooks 35-2010
Dining Room and Cafeteria Attendants and Bartender Helpers 35-9011

Personal Care and Service Occupations (17% tradable)

First-Line Supervisors/Managers of Gaming Workers 39-1010
Gaming Services Workers 39-3010
Motion Picture Projectionists 39-3021
Ushers, Lobby Attendants, and Ticket Takers 39-3031
Miscellaneous Entertainment Attendants and Related Workers 39-3090
Funeral Service Workers 39-4000
Miscellaneous Personal Appearance Workers 39-5090
Baggage Porters, Bellhops, and Concierges 39-6010
Tour and Travel Guides 39-6020
Transportation Attendants 39-6030
Personal and Home Care Aides 39-9021
Residential Advisors 39-9041
Personal Care and Service Workers, All Other 39-9099

Sales and Related Occupations (24% tradable)

First-Line Supervisors/Managers of Non-Retail Sales Workers 41-1012
Parts Salespersons 41-2022
Advertising Sales Agents 41-3011
Securities, Commodities, and Financial Services Sales Agents 41-3031
Travel Agents 41-3041
Sales Representatives, Services, All Other 41-3099
Sales Representatives, Wholesale and Manufacturing 41-4010
Models, Demonstrators, and Product Promoters 41-9010
Real Estate Brokers and Sales Agents 41-9020
Sales Engineers 41-9031
Telemarketers 41-9041
Sales and Related Workers, All Other 41-9099

Office and Administrative Support Occupations (7% tradable)

Telephone Operators 43-2021
Communications Equipment Operators, All Other 43-2099
Bill and Account Collectors 43-3011
Billing and Posting Clerks and Machine Operators 43-3021
Gaming Cage Workers 43-3041
Procurement Clerks 43-3061
Brokerage Clerks 43-4011
Credit Authorizers, Checkers, and Clerks 43-4041
Customer Service Representatives 43-4051
Eligibility Interviewers, Government Programs 43-4061
Loan Interviewers and Clerks 43-4131
New Accounts Clerks 43-4141
Order Clerks 43-4151
Human Resources Assistants, Except Payroll and Timekeeping 43-4161

Reservation and Transportation Ticket Agents and Travel Clerks 43-4181
Cargo and Freight Agents 43-5011
Couriers and Messengers 43-5021
Postal Service Clerks 43-5051
Postal Service Mail Sorters, Processors, and Processing Machine Operators 43-5053
Computer Operators 43-9011
Data Entry Keyers 43-9021
Word Processors and Typists 43-9022
Desktop Publishers 43-9031
Mail Clerks and Mail Machine Operators, Except Postal Service 43-9051
Office Machine Operators, Except Computer 43-9071
Proofreaders and Copy Markers 43-9081
Statistical Assistants 43-9111

Table 13

"White-Collar" Nontradable Occupations

Management occupations

General and Operations Managers 11-1021
Industrial Production Managers 11-3051
Transportation, Storage, and Distribution Managers 11-3071
Construction Managers 11-9021
Education Administrators 11-9030
Food Service Managers 11-9051
Funeral Directors 11-9061
Lodging Managers 11-9081
Medical and Health Services Managers 11-9111

Business & Financial Operations Occupations

Purchasing Agents, Except Wholesale, Retail, and Farm Products 13-1023
Appraisers and Assessors of Real Estate 13-2021
Loan Counselors and Officers 13-2070
Tax Preparers 13-2082

Architecture and Engineering Occupations

Drafters 17-3010
Engineering Technicians, Except Drafters 17-3020
Surveying and Mapping Technicians 17-3031

Life, Physical, and Social Science Occupations

Agricultural and Food Scientists 19-1010

Community and Social Services Occupations

Counselors 21-1010
Social Workers 21-1020
Miscellaneous Community and Social Service Specialists 21-1090
Directors, Religious Activities and Education 21-2021

Education, Training, and Library Occupations

Postsecondary Teachers 25-1000
Preschool and Kindergarten Teachers 25-2010
Elementary and Middle School Teachers 25-2020
Secondary School Teachers 25-2030
Other Teachers and Instructors 25-3000
Librarians 25-4021
Teacher Assistants 25-9041
Other Education, Training, and Library Workers 25-9011, 25-9021, 25-9031, 25-9099

Arts, Design, Entertainment, Sports, and Media Occupations

Athletes, Coaches, Umpires, and Related Workers 27-2020
Announcers 27-3010

Healthcare Practitioners and Technical Occupations

Dietitians and Nutritionists 29-1031
Pharmacists 29-1051
Physician Assistants 29-1071
Registered Nurses 29-1111
Physical Therapists 29-1123
Respiratory Therapists 29-1126
Speech-Language Pathologists 29-1127
Veterinarians 29-1131
Clinical Laboratory Technologists and Technicians 29-2010
Dental Hygienists 29-2021
Diagnostic Related Technologists and Technicians 29-2030
Emergency Medical Technicians and Paramedics 29-2041
Health Diagnosing and Treating Practitioner Support Technicians 29-2050
Licensed Practical and Licensed Vocational Nurses 29-2061
Medical Records and Health Information Technicians 29-2071
Opticians, Dispensing 29-2081
Miscellaneous Health Technologists and Technicians 29-2090
Other Healthcare Practitioners and Technical Occupations 29-9000

Healthcare Support Occupations

Nursing, Psychiatric, and Home Health Aides 31-1010
Physical Therapist Assistants and Aides 31-2020
Dental Assistants 31-9091
Medical Assistants and Other Healthcare Support Occupations 31-9092, 31-9093, 31-9094, 31-9095, 31-9

Protective Service Occupations

Police and Sheriff's Patrol Officers 33-3051

Food Preparation and Serving Related Occupations

Food Preparation Workers 35-2021
Bartenders 35-3011
Combined Food Preparation and Serving Workers, Including Fast Food 35-3021
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop 35-3022
Waiters and Waitresses 35-3031
Food Servers, Nonrestaurant 35-3041
Dishwashers 35-9021
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop 35-9031

Building and Grounds Cleaning and Maintenance Occupations

First-Line Supervisors/Managers of Housekeeping and Janitorial Workers 37-1011
First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Work 37-1012
Janitors and Building Cleaners 37-2011, 37-2019
Maids and Housekeeping Cleaners 37-2012
Grounds Maintenance Workers 37-3010

Personal Care and Service Occupations

First-Line Supervisors/Managers of Personal Service Workers 39-1021
Animal Trainers 39-2011
Nonfarm Animal Caretakers 39-2021
Barbers 39-5011

Hairdressers, Hairstylists, and Cosmetologists 39-5012
Child Care Workers 39-9011
Recreation and Fitness Workers 39-9030

Sales and Related Occupations

First-Line Supervisors/Managers of Retail Sales Workers 41-1011
Cashiers 41-2010
Counter and Rental Clerks 41-2021
Retail Salespersons 41-2031
Insurance Sales Agents 41-3021
Door-To-Door Sales Workers, News and Street Vendors, and Related Workers 41-9091

Office and Administrative Support Occupations

First-Line Supervisors/Managers of Office and Administrative Support Workers 43-1011
Switchboard Operators, Including Answering Service 43-2011
Bookkeeping, Accounting, and Auditing Clerks 43-3031
Payroll and Timekeeping Clerks 43-3051
Tellers 43-3071
Court, Municipal, and License Clerks 43-4031
File Clerks 43-4071
Hotel, Motel, and Resort Desk Clerks 43-4081
Interviewers, Except Eligibility and Loan 43-4111
Library Assistants, Clerical 43-4121
Receptionists and Information Clerks 43-4171
Information and Record Clerks, All Other 43-4199
Dispatchers 43-5030
Meter Readers, Utilities 43-5041
Postal Service Mail Carriers 43-5052
Production, Planning, and Expediting Clerks 43-5061
Shipping, Receiving, and Traffic Clerks 43-5071
Stock Clerks and Order Fillers 43-5081
Weighers, Measurers, Checkers, and Samplers, Recordkeeping 43-5111
Secretaries and Administrative Assistants 43-6010
Insurance Claims and Policy Processing Clerks 43-9041
Office Clerks, General 43-9061
Office and Administrative Support Workers, All Other 43-9199

Table 14
Task Content of Select Tradable Occupations

Census code	Occupation	National employment Nov. 2004	Mean annual earnings Nov. 2004	interacting w/ computers	getting information	documenting/ recording information	processing information	analyzing data & information	telephone
524	Customer Service Representatives 43-4051	2,036,090	29350	x	x	x	x		x
80	Accountants and Auditors 13-2011	1,007,760	57160	x	x	x	x	x	x
102	Computer Software Engineers 15-1030	760,840	\$81,295	No O*Net information available					
511	Billing and Posting Clerks and Machine Operators 43-3021	506720	28460	x	x		x		x
104	Computer Support Specialists 15-1041	491680	43660	x	x				x
510	Bill and Account Collectors 43-3011	444790	29460	x	x		x		x
71	Management Analysts 13-1111	424740	73460						
494	Telemarketers 41-9041	407650	23520	x					x
101	Computer Programmers 15-1021	396100	66480	x	x			x	x
484	Sales Representatives, Services, All Other 41-3099	383680	54060						
581	Data Entry Keyers 43-9021	307400	24560	x					
141	Electrical and Electronics Engineers 17-2070	280,530	\$77,000	No O*Net information available					
535	Order Clerks 43-4151	276160	27030	x	x				
110	Network and Computer Systems Administrators 15-1071	262930	62300						
482	Securities, Commodities, and Financial Services Sales Agents 41-3031	249170	87520	x	x			x	x
136	Civil Engineers 17-2051	226100	68280	x		x			x
533	Loan Interviewers and Clerks 43-4131	223870	31100		x	x	x		
146	Mechanical Engineers 17-2141	219040	69480	x	x				x
84	Financial Analysts 13-2051	181340	71280	x	x	x	x	x	x
111	Network Systems and Data Communications Analysts 15-1081	176840	64080	x	x				x
536	Human Resources Assistants, Except Payroll and Timekeeping 43-4161	163920	33250	x					x
582	Word Processors and Typists 43-9022	161730	29800	x	x				
541	Reservation and Transportation Ticket Agents and Travel Clerks 43-4181	159510	30240	x	x				
580	Computer Operators 43-9011	133230	33140	x	x		x		
85	Personal Financial Advisors 13-2052	102120	83060		x	x	x	x	
106	Database Administrators 15-1061	100420	64380	x	x		x	x	x

Census code	Occupation	National employment Nov. 2004	Mean annual earnings Nov. 2004	interacting w/ computers	getting information	documenting/ recording information	processing information	analyzing data & information	telephone
86	Insurance Underwriters 13-2053 Office Machine Operators, Except Computer 43-9071	96200	54870	x	x		x	x	x
590	43-9071	88540	24870						
483	Travel Agents 41-3041	88480	30010	x	x				x
534	New Accounts Clerks 43-4141	85120	28370		x				x
132	Aerospace Engineers 17-2011	79730	83620	x	x			x	x
140	Computer Hardware Engineers 17-2061	79670	85540	x	x				x
515	Procurement Clerks 43-3061	71150	31890	x	x		x		x
520	Brokerage Clerks 43-4011	70580	37700	x			x		x
493	Sales Engineers 41-9031	70300	77290						
523	Credit Authorizers, Checkers, and Clerks 43- 4041	67110	31020	x	x	x	x	x	x
83	Credit Analysts 13-2041	64630	57560	x	x				x
82	Budget Analysts 13-2031	54940	60290	x	x			x	x
122	Operations Research Analysts 15-2031	53580	63760	x	x		x	x	x
70	Logisticians 13-1081	52210	62570						
142	Environmental Engineers 17-2081	50120	69200	x	x				x
502	Telephone Operators 43-2021	36760	29980	x	x				x
583	Desktop Publishers 43-9031	30340	34210						
135	Chemical Engineers 17-2041	28590	78030	x	x		x	x	x
90	Financial Examiners 13-2061	22610	65600	x	x		x	x	x
145	Materials Engineers 17-2131	20940	70700		x		x	x	
591	Proofreaders and Copy Markers 43-9081	20190	27080						
592	Statistical Assistants 43-9111	18370	31390						
151	Nuclear Engineers 17-2161	15870	89320	x	x	x		x	x
120	Actuaries 15-2011	15710	89230	x	x	x	x	x	x
152	Petroleum Engineers 17-2171	14790	92840		x		x	x	x
144	Marine Engineers and Naval Architects 17- 2121	6250	73410	x	x			x	x
		4,085,220							
130	Architects, Except Naval 17-1010			No O*Net information available					
153	Engineers, All Other 17-2199			No O*Net information available					
	Surveyors, Cartographers, and								
131	Photogrammetrists 17-1020			No O*Net information available					
	Industrial Engineers, Including Health and								
143	Safety 17-2110			No O*Net information available					

Source: O*Net on-line

Table 14
Task Content of Select Tradable Occupations

Census code	Occupation	e-mail	Performing for or Working Directly with the Public	Assisting and Caring for Others	Establishing and Maintaining Interpersonal Relationships	Communicating with Supervisors, Peers, or Subordinates	Structured versus Unstructured Work	Freedom to Make Decisions	Making Decisions and Solving Problems	Thinking Creatively
524	Customer Service Representatives 43-4051	x								
80	Accountants and Auditors 13-2011	x							x	
102	Computer Software Engineers 15-1030									
511	Billing and Posting Clerks and Machine Operators 43-3021									
104	Computer Support Specialists 15-1041	x							x	
510	Bill and Account Collectors 43-3011									
71	Management Analysts 13-1111									
494	Telemarketers 41-9041									
101	Computer Programmers 15-1021	x							x	
484	Sales Representatives, Services, All Other 41-3099									
581	Data Entry Keyers 43-9021									
141	Electrical and Electronics Engineers 17-2070									
535	Order Clerks 43-4151									
110	Network and Computer Systems Administrators 15-1071									
482	Securities, Commodities, and Financial Services Sales Agents 41-3031	x	x						x	
136	Civil Engineers 17-2051						x	x	x	x
533	Loan Interviewers and Clerks 43-4131									
146	Mechanical Engineers 17-2141	x					x	x	x	
84	Financial Analysts 13-2051	x							x	x
111	Network Systems and Data Communications Analysts 15-1081	x							x	x
536	Human Resources Assistants, Except Payroll and Timekeeping 43-4161	x								
582	Word Processors and Typists 43-9022									
541	Reservation and Transportation Ticket Agents and Travel Clerks 43-4181		x	x						
580	Computer Operators 43-9011								x	
85	Personal Financial Advisors 13-2052									
106	Database Administrators 15-1061	x						x	x	x

Census code	Occupation	e-mail	Performing for or Working Directly with the Public	Assisting and Caring for Others	Establishing and Maintaining Interpersonal Relationships	Communicating with Supervisors, Peers, or Subordinates	Structured versus Unstructured Work	Freedom to Make Decisions	Making Decisions and Solving Problems	Thinking Creatively
86	Insurance Underwriters 13-2053						x	x		
590	Office Machine Operators, Except Computer 43-9071									
483	Travel Agents 41-3041	x	x					x		
534	New Accounts Clerks 43-4141		x				x	x		
132	Aerospace Engineers 17-2011	x					x	x	x	x
140	Computer Hardware Engineers 17-2061	x							x	
515	Procurement Clerks 43-3061	x					x	x		
520	Brokerage Clerks 43-4011	x								
493	Sales Engineers 41-9031									
523	Credit Authorizers, Checkers, and Clerks 43-4041	x					x	x		
83	Credit Analysts 13-2041	x								
82	Budget Analysts 13-2031	x							x	
122	Operations Research Analysts 15-2031	x					x	x	x	x
70	Logisticians 13-1081									
142	Environmental Engineers 17-2081	x					x	x	x	
502	Telephone Operators 43-2021									
583	Desktop Publishers 43-9031									
135	Chemical Engineers 17-2041	x					x	x	x	
90	Financial Examiners 13-2061	x								
145	Materials Engineers 17-2131								x	
591	Proofreaders and Copy Markers 43-9081									
592	Statistical Assistants 43-9111									
151	Nuclear Engineers 17-2161	x					x	x		
120	Actuaries 15-2011	x							x	
152	Petroleum Engineers 17-2171	x					x		x	
144	Marine Engineers and Naval Architects 17-2121	x					x	x	x	x
130	Architects, Except Naval 17-1010									
153	Engineers, All Other 17-2199									
131	Surveyors, Cartographers, and Photogrammetrists 17-1020									
143	Industrial Engineers, Including Health and Safety 17-2110									

Source: O*Net on-line

Table 15. Ranking of occupations by offshorability index

SOC code	Offshoring index ranking	Title	Employment (May2005)	Median annual earnings (May 2005)	Percent w/ HS diploma or less	Percent w/ BA or as more	identified tradable	index1
15209100	1	Mathematical Technicians	1,430	\$36,470			x	1.777
19102100	2	Biochemists and Biophysicists	17,690	\$71,000			x	1.510429
15204100	3	Statisticians	17,480	\$62,450	0.0	100.0		1.308857
23209300	4	Title Examiners, Abstractors, and Searchers	64,580	\$35,120	57.4	2.1	x	1.304
43404100	5	Credit Authorizers, Checkers, and Clerks Weighers, Measurers, Checkers, and Samplers,	65,410	\$29,330	44.1	34.5		1.03
43511100	6	Recordkeeping	79,050	\$25,310	61.0	0.0		1.025786
43902100	7	Data Entry Keyers	296,700	\$23,810	77.7	0.7	x	1.015929
13201100	8	Accountants and Auditors	1,051,220	\$52,210	2.0	92.2	x	1.01
31909400	9	Medical Transcriptionists	90,380	\$29,080	34.3	0.4		0.998786
15201100	10	Actuaries	15,770	\$81,640	0.0	100.0	x	0.981357
19302100	11	Market Research Analysts	195,710	\$57,300	0.0	60.5	x	0.9275
19201100	12	Astronomers	970	\$104,670	0.0	100.0		0.923286
43303100	13	Bookkeeping, Accounting, and Auditing Clerks	1,815,340	\$29,490	21.5	18.0		0.914857
17301300	14	Mechanical Drafters	74,650	\$43,350	0.0	0.0		0.908857
19301100	15	Economists	12,470	\$73,690	0.0	100.0	x	0.905214
15202100	16	Mathematicians	2,930	\$80,920	0.0	100.0		0.905143
19304100	17	Sociologists	3,500	\$52,760	0.0	100.0		0.904857
15203100	18	Operations Research Analysts	52,530	\$62,180	0.0	100.0	x	0.885786
19302200	19	Survey Researchers	21,650	\$31,140			x	0.882786
13204100	20	Credit Analysts	61,500	\$50,370	29.3	56.9	x	0.881143
43305100	21	Payroll and Timekeeping Clerks	205,600	\$31,360	42.3	8.4	x	0.872857
17102100	22	Cartographers and Photogrammetrists	11,260	\$48,250	14.9	29.5	x	0.839714
43911100	23	Statistical Assistants	18,700	\$28,950	2.2	62.0	x	0.828429
23201100	24	Paralegals and Legal Assistants	217,700	\$41,170	11.0	29.1	x	0.808572
19309200	25	Geographers	810	\$63,550	0.0	100.0		0.8015
15105100	26	Computer Systems Analysts	492,120	\$68,300	1.2	64.1	x	0.772857
13206100	27	Financial Examiners	22,160	\$63,090	2.2	94.9	x	0.754857
17217100	28	Petroleum Engineers	14,860	\$93,000	0.0	100.0	x	0.752714
13203100	29	Budget Analysts	53,510	\$58,910	0.0	96.4	x	0.741929
23209100	30	Court Reporters	17,130	\$41,640	0.8	4.1	x	0.734143
13205100	31	Financial Analysts	180,910	\$63,860	0.0	100.0	x	0.731857
19102001	32	Biologists	77,000	\$51,150			x	0.718643
19309400	33	Political Scientists	5,010	\$84,100	0.0	100.0		0.709786

SOC code	Offshoring index ranking	Title	Employment (May2005)	Median annual earnings (May 2005)	Percent w/ HS diploma or less	Percent w/ BA or more	identified as tradable	index1
43302100	34	Billing and Posting Clerks and Machine Operators	513,020	\$27,780	50.6	6.9	x	0.7
19309300	35	Historians	2,850	\$44,400	0.0	82.0		0.693214
27304200	36	Technical Writers	46,250	\$55,160	1.6	93.2	x	0.677643
15106100	37	Database Administrators	99,380	\$63,250	3.4	52.0	x	0.660357
19402100	38	Biological Technicians	67,080	\$34,270	14.3	78.9	x	0.649071
19203100	39	Chemists	76,540	\$57,890	0.0	84.8	x	0.641357
15103100	40	Computer Software Engineers, Applications	455,980	\$77,090	0.0	67.7	x	0.633214
17216100	41	Nuclear Engineers	14,290	\$88,290	0.0	92.3	x	0.631357
11303101	42	Financial Managers	471,950	\$86,280	0.5	65.7	x	0.621357
17201100	43	Aerospace Engineers	81,100	\$84,090	0.0	93.9	x	0.606357
17301200	44	Electrical and Electronics Drafters	30,270	\$45,550	8.4	16.4		0.6
17302400	45	Electro-Mechanical Technicians	15,130	\$43,880	26.0	0.0		0.585
		Atmospheric, Earth, Marine, and Space Sciences						
25105100	46	Teachers, Postsecondary	8,810	\$65,720	0.0	100.0		0.582571
17207200	47	Electronics Engineers, Except Computer Administrative Law Judges, Adjudicators, and	130,050	\$78,030	0.0	84.1	x	0.574857
23102100	48	Hearing Officers	15,350	\$70,680	17.1	66.4	x	0.574286
27401300	49	Radio Operators	1,190	\$36,230			x	0.5705
19403100	50	Chemical Technicians	59,790	\$38,500	22.8	33.3	x	0.5685
19104100	51	Epidemiologists	3,630	\$52,170	0.0	94.2	x	0.554214
13208100	52	Tax Examiners, Collectors, and Revenue Agents	72,290	\$44,210	28.3	41.0	x	0.544214
19309100	53	Anthropologists and Archeologists	4,790	\$45,910	0.0	100.0		0.51
13107200	54	Compensation, Benefits, and Job Analysis Specialists	97,740	\$48,870	0.4	61.3		0.489714
19204200	55	Geoscientists, Except Hydrologists and Geographers	27,430	\$71,640	0.0	99.9	x	0.4895
15102100	56	Computer Programmers	389,090	\$63,420	3.4	81.5	x	0.484214
43415100	57	Order Clerks	259,760	\$25,570	90.2	0.0	x	0.482929
19203200	58	Materials Scientists	7,880	\$71,450	0.2	99.6	x	0.482786
15103200	59	Computer Software Engineers, Systems Software	320,720	\$82,120	11.7	57.4	x	0.473428
17302200	60	Civil Engineering Technicians	90,390	\$39,210	32.9	19.0		0.464714
25106100	61	Anthropology and Archeology Teachers, Postsecondary	5,320	\$60,710	0.0	100.0		0.454071
19401100	62	Agricultural and Food Science Technicians	19,340	\$31,360	38.1	37.7	x	0.45

SOC code	Offshoring index ranking	Title	Employment (May2005)	Median annual earnings (May 2005)	Percent w/ HS diploma or less	Percent w/ BA or more	identified as tradable	index1
43901100	63	Computer Operators	129,160	\$32,070	15.7	34.3	x	0.446429
19101200	64	Food Scientists and Technologists	7,570	\$51,440	7.1	90.5		0.430715
17204100	65	Chemical Engineers	27,550	\$77,140	0.0	100.0	x	0.424143
17207100	66	Electrical Engineers	144,920	\$73,510	0.0	62.7	x	0.4225
43301100	67	Bill and Account Collectors	431,280	\$28,160	30.6	0.1	x	0.414072
13205200	68	Personal Financial Advisors	108,640	\$63,500			x	0.405714
13202100	69	Appraisers and Assessors of Real Estate	63,800	\$43,440	18.3	37.3		0.4
11912100	70	Natural Sciences Managers	40,400	\$93,090	0.0	100.0	x	0.396572
19404100	71	Geological and Petroleum Technicians	11,130	\$43,750	9.7	46.2	x	0.39
19202100	72	Atmospheric and Space Scientists	7,050	\$73,940	0.0	100.0	x	0.372286
13208200	73	Tax Preparers	58,850	\$25,700	39.0	41.1		0.352
17302300	74	Electrical and Electronic Engineering Technicians	165,850	\$48,040	4.6	13.3		0.35
43904100	75	Insurance Claims and Policy Processing Clerks	239,120	\$30,130	57.6	1.4		0.35
25108200	76	Library Science Teachers, Postsecondary	3,960	\$53,810	0.0	100.0		0.337214
19303200	77	Industrial-Organizational Psychologists	1,070	\$84,690	0.0	100.0		0.321286
17302600	78	Industrial Engineering Technicians	73,310	\$45,280	19.6	51.8		0.321143
17211200	79	Industrial Engineers	191,640	\$66,670	0.0	86.8	x	0.315786
19409200	80	Forensic Science Technicians	11,030	\$44,590	12.3	74.8		0.313786
43503200	81	Dispatchers, Except Police, Fire, and Ambulance	172,550	\$31,390	77.2	0.8		0.299357
29207100	82	Medical Records and Health Information Technicians	160,450	\$26,690	10.3	43.1		0.2975
13111100	83	Management Analysts	441,000	\$66,380	8.6	75.8	x	0.290071
19102200	84	Microbiologists	15,250	\$56,870	0.0	96.4		0.287929
13205300	85	Insurance Underwriters	98,970	\$51,270	33.1	17.2	x	0.287357
43601200	86	Legal Secretaries	265,000	\$37,750	15.5	0.0		0.281143
17213100	87	Materials Engineers	20,950	\$69,660	0.0	100.0	x	0.278429
25106300	88	Economics Teachers, Postsecondary	12,670	\$68,910	0.0	100.0		0.261286
43306100	89	Procurement Clerks	71,390	\$32,210	33.1	12.8	x	0.248
25105300	90	Environmental Science Teachers, Postsecondary	4,340	\$60,880	0.0	100.0		0.232857
19204300	91	Hydrologists	8,360	\$63,820	0.0	100.0	x	0.231286
19201200	92	Physicists	15,160	\$89,810	1.7	93.6		0.225714
43905100	93	Postal Service	148,330	\$22,870			x	0.215214
17214100	94	Mechanical Engineers	220,750	\$67,590	11.7	81.7	x	0.212357
19405100	95	Nuclear Technicians	6,050	\$61,120				0.2

SOC code	Offshoring index ranking	Title	Employment (May2005)	Median annual earnings (May 2005)	Percent w/ HS diploma or less	Percent w/ BA or more	identified as tradable	index1
17206100	96	Computer Hardware Engineers	78,580	\$84,420	4.2	93.8	x	0.199714
19101100	97	Animal Scientists	3,000	\$43,170	0.0	96.3		0.198571
43506100	98	Production, Planning, and Expediting Clerks	287,980	\$37,590	44.0	17.2		0.195929
19101300	99	Soil and Plant Scientists	10,100	\$54,530	0.0	100.0		0.192071
13108100	100	Logisticians	52,220	\$60,110	0.0	89.1	x	0.19
43405100	101	Customer Service Representatives	2,067,700	\$27,490	57.8	10.6	x	0.188571
25106500	102	Political Science Teachers, Postsecondary	13,710	\$59,850	0.0	100.0		0.187143
		Mining and Geological Engineers, Including Mining						
17215100	103	Safety Engineers	5,680	\$70,070	0.0	92.4		0.184143
25105400	104	Physics Teachers, Postsecondary	13,310	\$65,880	0.0	100.0		0.183429
13207200	105	Loan Officers	332,690	\$49,440	74.9	22.0		0.182786
17212100	106	Marine Engineers and Naval Architects	6,550	\$72,920	0.0	92.3	x	0.18
43407100	107	File Clerks	229,830	\$21,430	48.5	0.0		0.178643
43501100	108	Cargo and Freight Agents	78,730	\$35,860	58.0	36.6	x	0.174643
17302100	109	Aerospace Engineering and Operations Technicians	9,950	\$52,450	27.1	56.7		0.165143
17302500	110	Environmental Engineering Technicians	19,900	\$39,810	28.6	40.6		0.162643
11304100	111	Compensation and Benefits Managers	51,470	\$69,130	0.3	48.3		0.157571
17102200	112	Surveyors	54,220	\$45,860	41.2	6.9	x	0.154929
41904100	113	Telemarketers	400,860	\$20,360	88.9	0.0	x	0.151072
25101100	114	Business Teachers, Postsecondary	67,420	\$59,210	0.0	100.0		0.148857
43903100	115	Desktop Publishers	29,910	\$32,800	51.7	4.8	x	0.1475
43401100	116	Brokerage Clerks	70,110	\$35,450	22.5	32.5	x	0.143929
27102100	117	Commercial and Industrial Designers	31,650	\$52,200	2.1	69.7		0.143857
43402100	118	Correspondence Clerks	17,990	\$28,420	90.4	1.4		0.142
15107100	119	Network and Computer Systems Administrators	270,330	\$59,930	1.0	57.1	x	0.141857
		First-Line Supervisors/Managers of Non-Retail Sales						
41101200	120	Workers	294,010	\$61,970	23.9	67.4	x	0.137857
11913100	121	Postmasters and Mail Superintendents	26,120	\$52,710	62.9	7.5	x	0.136143
43601400	122	Secretaries, Except Legal, Medical, and Executive	1,744,380	\$26,670	39.6	3.8		0.126072
		Forestry and Conservation Science Teachers,						
25104300	123	Postsecondary	2,990	\$64,870	0.0	98.3		0.116643
		Environmental Science and Protection Technicians,						
19409100	124	Including Health	32,460	\$36,260	13.2	75.3		0.106

SOC code	Offshoring index ranking	Title	Employment (May2005)	Median annual earnings (May 2005)	Percent w/ HS diploma or less	Percent w/ BA or more	identified as tradable	index1
25401100	125	Archivists	5,410	\$37,420	23.9	43.0	x	0.098643
13104100	126	Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation	161,810	\$49,360	19.0	67.5	x	0.098
23209200	127	Law Clerks	40,620	\$35,620	0.0	58.7	x	0.0975
33902100	128	Private Detectives and Investigators	33,720	\$32,650			x	0.096429
25106200	129	Area, Ethnic, and Cultural Studies Teachers, Postsecondary	7,970	\$55,610	0.0	100.0		0.095286
43406100	130	Eligibility Interviewers, Government Programs	85,550	\$33,740	52.6	10.0	x	0.091214
11302100	131	Computer and Information Systems Managers	259,330	\$96,520	15.7	61.8	x	0.089643
43413100	132	Loan Interviewers and Clerks	231,700	\$30,200	28.1	3.9	x	0.077143
27302200	133	Reporters and Correspondents	52,920	\$32,270	2.2	86.4		0.077071
43202100	134	Telephone Operators	29,290	\$31,380			x	0.076
15104100	135	Computer Support Specialists	499,860	\$40,610	0.0	24.0	x	0.075929
13102300	136	Purchasing Agents, Except Wholesale, Retail, and Farm Products	267,410	\$49,030	11.2	36.6		0.066714
25103200	137	Engineering Teachers, Postsecondary	34,500	\$74,540	0.0	99.7		0.064072
25112500	138	History Teachers, Postsecondary	20,520	\$54,780	0.0	100.0		0.063786
33903100	139	Gaming Surveillance Officers and Gaming Investigators	8,730	\$25,870	94.7	0.0		0.063286
17208100	140	Environmental Engineers	50,140	\$68,090	0.4	82.5	x	0.059215
25104200	141	Biological Science Teachers, Postsecondary	59,540	\$63,570	0.0	100.0		0.052286
27304100	142	Editors	96,270	\$45,510	1.6	88.0	x	0.0475
43906100	143	Office Clerks, General	2,997,370	\$23,070	52.2	0.0		0.042857
17301100	144	Architectural and Civil Drafters	101,040	\$40,390	14.0	23.8		0.04
17211100	145	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	25,330	\$65,210	0.0	100.0	x	0.03
43403100	146	Court, Municipal, and License Clerks	102,060	\$29,320	62.4	14.3		0.03
19102300	147	Zoologists and Wildlife Biologists	16,440	\$52,050	26.4	73.6		0.029357
17303100	148	Surveying and Mapping Technicians	63,910	\$31,290	9.7	15.6		0.02
43601100	149	Executive Secretaries and Administrative Assistants	1,442,040	\$35,960	44.6	9.7		0.019
29103100	150	Dietitians and Nutritionists	48,850	\$44,940	2.8	88.7		0.010786
43416100	151	Human Resources Assistants, Except Payroll and Timekeeping	161,870	\$32,730	32.7	30.9	x	0.008429

SOC code	Offshoring index ranking	Title	Employment (May2005)	Median annual earnings (May 2005)	Percent w/ HS diploma or less	Percent w/ BA or more	identified as tradable	index1
19204100	152	Environmental Scientists and Specialists, Including Health	72,000	\$52,630	2.7	86.6	x	0.004429
25106700	153	Sociology Teachers, Postsecondary	14,980	\$54,320	0.0	100.0		0.004143
13102100	154	Purchasing Agents and Buyers, Farm Products Securities, Commodities, and Financial Services	12,970	\$46,680			x	1.19E-07
41303100	155	Sales Agents	251,710	\$67,130	0.6	86.4	x	-0.01
25106400	156	Geography Teachers, Postsecondary	4,250	\$57,870	0.0	100.0		-0.013286
19104200	157	Medical Scientists, Except Epidemiologists	73,670	\$61,730	0.0	99.2	x	-0.014072
13103200	158	Insurance Appraisers, Auto Damage	12,900	\$48,090	30.9	32.0		-0.043786
25104100	159	Agricultural Sciences Teachers, Postsecondary	11,460	\$71,330	1.1	98.4		-0.049
25111100	160	Criminal Justice and Law Enforcement Teachers, Postsecondary	9,880	\$49,240	0.0	100.0		-0.051357
43503100	161	Police, Fire, and Ambulance Dispatchers	94,060	\$30,060	58.1	0.3		-0.051857
17302700	162	Mechanical Engineering Technicians	46,580	\$44,830	17.0	44.6		-0.063571
43907100	163	Office Machine Operators, Except Computer	87,900	\$23,990			x	-0.064286
27401200	164	Broadcast Technicians	30,730	\$30,410	27.1	17.0	x	-0.064857
25102100	165	Computer Science Teachers, Postsecondary	38,520	\$54,270	0.9	98.2		-0.066071
13207100	166	Loan Counselors	28,030	\$35,680	35.8	58.3		-0.073214
23102300	167	Judges, Magistrate Judges, and Magistrates	25,330	\$97,570	5.9	92.6	x	-0.078214
11911100	168	Medical and Health Services Managers	230,130	\$69,700	5.2	62.8		-0.080857
19103200	169	Foresters	10,750	\$48,670	0.0	100.0	x	-0.086214
15108100	170	Network Systems and Data Communications Analysts	185,190	\$61,750	0.0	34.4	x	-0.087643
25106600	171	Psychology Teachers, Postsecondary	30,240	\$56,370	0.0	99.6		-0.092714
43507100	172	Shipping, Receiving, and Traffic Clerks	759,910	\$25,180	55.7	0.0		-0.100214
41401100	173	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	379,890	\$60,760	10.6	53.3	x	-0.101929
11904100	174	Engineering Managers	187,410	\$100,760	0.0	82.5	x	-0.110429
43417100	175	Receptionists and Information Clerks	1,088,400	\$22,150	68.8	0.8		-0.118714
43908100	176	Proofreaders and Copy Markers	18,070	\$25,590	5.1	88.0	x	-0.120357
17202100	177	Agricultural Engineers	3,170	\$64,890	0.0	100.0		-0.126928
43902200	178	Word Processors and Typists	153,580	\$29,020	70.3	0.0	x	-0.1285
43307100	179	Tellers	599,220	\$21,300	66.7	0.0		-0.129286
13103100	180	Claims Adjusters, Examiners, and Investigators	234,030	\$46,190	22.7	30.5		-0.13
25111200	181	Law Teachers, Postsecondary	13,560	\$89,790	0.0	100.0		-0.134429

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27302100	182	Broadcast News Analysts	6,680	\$42,810	6.9	78.2		-0.143429
27201200	183	Producers and Directors	59,070	\$53,860	10.9	50.5		-0.15
29901100	184	Occupational Health and Safety Specialists	35,460	\$53,710	0.0	90.3		-0.151071
25105200	185	Chemistry Teachers, Postsecondary	19,520	\$58,060	0.0	100.0		-0.158429
21101500	186	Rehabilitation Counselors	117,230	\$28,330	54.5	43.5		-0.189357
33302100	187	Detectives and Criminal Investigators	85,270	\$55,790	19.4	42.2	x	-0.2
27101400	188	Multi-Media Artists and Animators	23,790	\$50,290	14.7	56.9		-0.200286
17205100	189	Civil Engineers	229,700	\$66,190	0.0	93.6	x	-0.211929
17203100	190	Biomedical Engineers	11,660	\$71,840	0.0	48.3		-0.214286
37301300	191	Tree Trimmers and Pruners	29,790	\$27,920				-0.222214
25402100	192	Librarians	146,740	\$47,400	0.1	95.3		-0.226
11202100	193	Marketing Managers	166,470	\$92,680	6.4	75.7		-0.226143
19103100	194	Conservation Scientists	15,540	\$53,350	5.8	78.1	x	-0.23
25102200	195	Mathematical Science Teachers, Postsecondary	44,660	\$53,820	0.0	100.0		-0.240857
29201100	196	Medical and Clinical Laboratory Technologists	155,250	\$47,710	6.1	72.0		-0.242214
43504100	197	Meter Readers, Utilities	46,920	\$29,310	99.0	0.0		-0.256286
43505100	198	Postal Service Clerks	78,710	\$48,310	87.5	0.0	x	-0.264572
43414100	199	New Accounts Clerks	82,450	\$27,420	72.4	0.1	x	-0.264714
25119100	200	Graduate Teaching Assistants	117,970	\$27,340	0.9	99.1		-0.266214
25401300	201	Museum Technicians and Conservators	9,370	\$34,090	18.7	46.0	x	-0.266714
25108100	202	Education Teachers, Postsecondary	51,320	\$50,380	0.0	100.0		-0.268286
43601300	203	Medical Secretaries	381,020	\$27,320	73.1	0.0		-0.270643
25403100	204	Library Technicians	115,770	\$25,650	16.2	19.5	x	-0.272786
11305100	205	Industrial Production Managers	153,950	\$75,580	20.6	24.6		-0.278072
25112200	206	Communications Teachers, Postsecondary	22,320	\$50,890	0.0	98.6		-0.286643
27301100	207	Radio and Television Announcers	41,090	\$24,120	32.4	37.9		-0.291929
23101100	208	Lawyers	529,190	\$98,930	0.0	100.0	x	-0.293214
13107100	209	Employment, Recruitment, and Placement Specialists	181,260	\$41,780	26.2	45.0		-0.3
43505300	210	Postal Service Mail Sorters, Processors, and Processing Machine Operators	208,600	\$43,420	94.1	0.8	x	-0.302
17101100	211	Architects, Except Landscape and Naval	96,740	\$62,850	0.0	97.9	x	-0.303214
11307101	212	Transportation, Storage, and Distribution Managers	84,870	\$69,120	46.3	29.7		-0.305429
25111300	213	Social Work Teachers, Postsecondary	7,440	\$52,660	0.0	100.0		-0.307214

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41903100	214	Sales Engineers	69,790	\$74,200	0.0	62.7	x	-0.309071
43101100	215	First-Line Supervisors/Managers of Office and Administrative Support Workers	1,352,130	\$42,400	27.9	39.9		-0.316215
43418100	216	Reservation and Transportation Ticket Agents and Travel Clerks	160,120	\$28,120	87.3	0.0	x	-0.318429
41302100	217	Insurance Sales Agents	299,470	\$42,340	35.5	5.8		-0.319857
29205200	218	Pharmacy Technicians	266,790	\$24,390	66.0	0.3		-0.320714
19305100	219	Urban and Regional Planners	31,650	\$55,170	0.0	63.6	x	-0.325286
25903100	220	Instructional Coordinators	112,880	\$50,430	0.0	100.0		-0.325929
33101100	221	First-Line Supervisors/Managers of Correctional Officers	37,530	\$48,570	71.6	0.8	x	-0.327071
43411100	222	Interviewers, Except Eligibility and Loan	201,790	\$25,110	21.5	25.8		-0.332572
27309100	223	Interpreters and Translators	29,240	\$34,800	12.0	55.3		-0.336857
11901200	224	Farmers and Ranchers	350	\$34,140			x	-0.339786
43304100	225	Gaming Cage Workers	18,730	\$22,380	90.0	0.0		-0.339929
27401100	226	Audio and Video Equipment Technicians	40,390	\$32,940	10.5	25.0	x	-0.344357
41401200	227	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,436,800	\$47,380	28.2	25.2		-0.348857
27304300	228	Writers and Authors	43,020	\$46,420	28.9	60.9	x	-0.35
33304100	229	Parking Enforcement Workers	10,140	\$29,070	46.6	13.5	x	-0.356571
27303100	230	Public Relations Specialists	191,430	\$45,020	0.0	79.6	x	-0.362357
25119200	231	Home Economics Teachers, Postsecondary	4,010	\$48,720	0.0	98.0		-0.374429
33202200	232	Forest Fire Inspectors and Prevention Specialists	1,720	\$34,270	3.3	90.1		-0.374786
41202200	233	Parts Salespersons	235,190	\$26,450	76.1	0.0	x	-0.380143
25107100	234	Health Specialties Teachers, Postsecondary	108,680	\$70,890	0.0	100.0		-0.382429
27101100	235	Art Directors	29,350	\$63,950	0.0	23.6	x	-0.384929
41902100	236	Real Estate Brokers	41,760	\$57,190	17.2	32.4		-0.385357
29901200	237	Occupational Health and Safety Technicians	9,510	\$43,150				-0.387428
43408100	238	Hotel, Motel, and Resort Desk Clerks	207,190	\$17,810	79.7	0.0		-0.390786
43412100	239	Library Assistants, Clerical	104,650	\$21,140	52.8	19.3		-0.402286
43201100	240	Switchboard Operators, Including Answering Service	194,980	\$22,060	66.1	6.6		-0.403786
29112700	241	Speech-Language Pathologists	94,660	\$54,880	0.0	100.0		-0.405
41304100	242	Travel Agents	88,590	\$28,670	49.4	2.2	x	-0.410857

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29105100	243	Pharmacists	229,740	\$89,820	0.0	100.0		-0.416214
11903300	244	Education Administrators, Postsecondary	105,360	\$70,350	0.7	98.0		-0.4315
25112300	245	English Language and Literature Teachers, Postsecondary	58,710	\$49,480	0.4	99.3		-0.432429
31909500	246	Pharmacy Aides	46,610	\$18,900	57.0	0.0		-0.4455
29205300	247	Psychiatric Technicians	62,040	\$26,770	39.2	0.5		-0.447286
39301200	248	Gaming and Sports Book Writers and Runners	19,290	\$18,440	79.8	9.0	x	-0.467
11304000	249	Human Resources Managers	157,000	\$75,960	19.7	59.8	x	-0.469357
27403200	250	Film and Video Editors	15,200	\$46,930	4.8	47.5	x	-0.472929
27401400	251	Sound Engineering Technicians	12,680	\$38,390	17.2	15.1		-0.482643
19409300	252	Forest and Conservation Technicians	29,940	\$28,540	33.6	36.1		-0.490143
43502100	253	Couriers and Messengers	106,520	\$20,870	88.1	0.9	x	-0.491071
11908100	254	Lodging Managers	31,040	\$40,610	19.9	14.8		-0.4925
25112600	255	Philosophy and Religion Teachers, Postsecondary	18,340	\$53,210	0.0	100.0		-0.493357
27204100	256	Music Directors and Composers	8,610	\$34,810				-0.5
25204100	257	Special Education Teachers, Preschool, Kindergarten, and Elementary School	214,060	\$44,630	0.2	99.5	x	-0.503214
25112400	258	Foreign Language and Literature Teachers, Postsecondary	23,830	\$49,570	4.3	95.7		-0.511143
11102100	259	General and Operations Managers	1,663,810	\$81,480	18.1	47.6		-0.514214
29106600	260	Psychiatrists	23,450 #		0.0	100.0		-0.516928
29112400	261	Radiation Therapists	14,120	\$62,340	0.0	40.2	x	-0.520214
25902100	262	Farm and Home Management Advisors	12,620	\$41,890	0.0	100.0		-0.521429
13107300	263	Training and Development Specialists	206,860	\$45,870	12.9	45.1		-0.530714
11101100	264	Chief Executives	321,300	\$142,440	0.0	96.6	x	-0.532643
41301100	265	Advertising Sales Agents	153,890	\$41,770	50.5	8.1	x	-0.538357
11203100	266	Public Relations Managers	43,770	\$76,450	59.7	35.9	x	-0.539
11901100	267	Farm, Ranch, and Other Agricultural Managers	4,070	\$51,160	1.6	93.6	x	-0.55
25119300	268	Recreation and Fitness Studies Teachers, Postsecondary	16,530	\$45,890	0.0	96.9		-0.554571
25107200	269	Nursing Instructors and Teachers, Postsecondary	37,020	\$53,160	0.0	100.0		-0.556143
27202100	270	Athletes and Sports Competitors	12,230	\$39,930				-0.571429
29106400	271	Obstetricians and Gynecologists	21,910 #		0.0	100.0		-0.572643
27102500	272	Interior Designers	50,020	\$41,350	31.3	29.4		-0.576643

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11306100	273	Purchasing Managers	69,300	\$76,270	0.0	47.2	x	-0.588786
11301100	274	Administrative Services Managers	239,410	\$64,020	24.3	25.7	x	-0.5915
11202200	275	Sales Managers	317,970	\$87,580	19.0	23.4		-0.616714
21101200	276	Educational, Vocational, and School Counselors	214,160	\$46,440	0.0	97.1		-0.617357
25204200	277	Special Education Teachers, Middle School	103,480	\$45,490	0.0	100.0		-0.618929
43508100	278	Stock Clerks and Order Fillers	1,625,430	\$20,100	87.2	0.5		-0.62
41201100	279	Cashiers	3,481,420	\$16,260	99.2	0.0		-0.629929
21102100	280	Child, Family, and School Social Workers	256,430	\$35,350	2.6	93.2		-0.632357
37301200	281	Pesticide Handlers, Sprayers, and Applicators, Vegetation	25,770	\$26,120	49.1	7.4		-0.6365
31909300	282	Medical Equipment Preparers	41,790	\$24,880	78.6	7.5		-0.6425
29205600	283	Veterinary Technologists and Technicians	63,860	\$25,670	31.9	0.0		-0.647643
11903200	284	Education Administrators, Elementary and Secondary School	213,250	\$75,400	0.0	99.1		-0.652
41909100	285	Door-To-Door Sales Workers, News and Street Vendors, and Related Workers	10,970	\$20,450				-0.655714
25202100	286	Elementary School Teachers, Except Special Education	1,486,650	\$44,040	4.0	91.9		-0.661786
21101400	287	Mental Health Counselors	87,220	\$34,010	16.7	75.9		-0.663357
25901100	288	Audio-Visual Collections Specialists	6,910	\$40,260	0.0	75.4		-0.6665
33301100	289	Bailiffs	17,160	\$33,800	60.4	0.3	x	-0.669714
13112100	290	Meeting and Convention Planners	40,040	\$41,280	23.1	35.2	x	-0.679143
29112600	291	Respiratory Therapists	95,320	\$45,140	0.0	14.4		-0.6815
25204300	292	Special Education Teachers, Secondary School	136,290	\$46,820	0.0	100.0		-0.688857
29203200	293	Diagnostic Medical Sonographers	43,590	\$54,370	0.0	2.8		-0.689
25203200	294	Vocational Education Teachers, Secondary School	96,600	\$47,090	2.5	72.0		-0.691
11914100	295	Property, Real Estate, and Community Association Managers	154,230	\$41,900	0.0	4.9	x	-0.692143
25202200	296	Middle School Teachers, Except Special and Vocational Education	637,340	\$44,640	1.7	98.3		-0.699214
27102400	297	Graphic Designers	178,530	\$38,390	22.1	33.1		-0.699572
13106100	298	Emergency Management Specialists	11,240	\$45,980	10.9	52.7		-0.704
39101200	299	Slot Key Persons	14,700	\$22,120	85.2	4.5		-0.7075
11304200	300	Training and Development Managers	28,720	\$74,180	50.7	17.0		-0.711429

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35201400	301	Cooks, Restaurant	791,450	\$19,840	79.6	0.2	x	-0.7115
27102700	302	Set and Exhibit Designers	8,380	\$37,390	0.0	74.7		-0.715786
21109200	303	Probation Officers and Correctional Treatment Specialists	90,600	\$40,210	1.3	63.3		-0.717071
21102200	304	Medical and Public Health Social Workers	112,220	\$41,120	0.0	100.0		-0.728143
29106500	305	Pediatricians, General	26,400	\$136,600	0.0	99.4		-0.729857
33303100	306	Fish and Game Wardens	6,300	\$42,850	8.6	74.3		-0.729929
21109100	307	Health Educators	51,970	\$39,730	26.9	73.0		-0.736143
33305200	308	Transit and Railroad Police	5,090	\$48,850	5.7	4.5		-0.737357
25203100	309	Secondary School Teachers, Except Special and Vocational Education	1,015,740	\$46,060	0.0	100.0		-0.738857
31909600	310	Veterinary Assistants and Laboratory Animal Caretakers	69,890	\$19,610	67.1	4.4		-0.741714
13101100	311	Agents and Business Managers of Artists, Performers, and Athletes	10,640	\$53,800			x	-0.742857
43505200	312	Postal Service Mail Carriers	347,180	\$46,330	91.8	0.0		-0.747286
41902200	313	Real Estate Sales Agents	150,200	\$39,240	45.2	2.7	x	-0.750929
25904100	314	Teacher Assistants	1,260,400	\$20,090	40.6	6.4		-0.761429
33301200	315	Correctional Officers and Jailers	411,080	\$34,090	49.5	0.2	x	-0.764
35902100	316	Dishwashers	498,620	\$15,490	98.0	2.0		-0.768357
33202100	317	Fire Inspectors and Investigators	12,820	\$47,090	10.8	27.4		-0.77
27202300	318	Umpires, Referees, and Other Sports Officials	12,800	\$21,610	71.2	21.2		-0.774143
29203100	319	Cardiovascular Technologists and Technicians	43,560	\$40,420	1.1	20.8		-0.774571
25202300	320	Vocational Education Teachers, Middle School	15,380	\$43,820	0.0	98.0		-0.784714
33101200	321	First-Line Supervisors/Managers of Police and Detectives	91,320	\$65,570	57.9	12.9	x	-0.790357
31909100	322	Dental Assistants	270,720	\$29,520	35.5	0.0		-0.795357
29206100	323	Licensed Practical and Licensed Vocational Nurses	710,020	\$35,230	0.0	0.0		-0.798571
11201100	324	Advertising and Promotions Managers	41,710	\$68,860	1.9	71.7	x	-0.798857
21101100	325	Substance Abuse and Behavioral Disorder Counselors	72,210	\$32,580	1.3	80.1		-0.801071
21202100	326	Directors, Religious Activities and Education	13,610	\$32,540				-0.801429
29203300	327	Nuclear Medicine Technologists	18,280	\$59,670	0.0	28.0		-0.812143
39302100	328	Motion Picture Projectionists	10,230	\$16,780	96.8	3.2	x	-0.812929

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27102200	329	Fashion Designers	12,980	\$60,860				-0.813929
29106300	330	Internists, General	48,210 #		0.0	90.6		-0.819357
33305100	331	Police and Sheriff's Patrol Officers	624,130	\$46,290	41.0	2.0		-0.82
25201200	332	Kindergarten Teachers, Except Special Education	171,290	\$42,230	0.0	100.0		-0.840715
39303100	333	Ushers, Lobby Attendants, and Ticket Takers First-Line Supervisors/Managers of Housekeeping and Janitorial Workers	102,330	\$15,400	74.7	0.1	x	-0.846357
37101100	334	Dental Hygienists	186,870	\$30,330	52.6	16.9		-0.846429
29202100	335	Retail Salespersons	161,140	\$60,890	0.0	23.0		-0.846571
41203100	336	Registered Nurses	4,344,770	\$19,140	73.0	14.8		-0.850072
29111100	337	First-Line Supervisors/Managers of Personal Service Workers	2,368,070	\$54,670	0.0	23.3		-0.850786
39102100	338	Chiropractors	125,760	\$31,390				-0.854286
29101100	339	Audiologists	24,290	\$67,200	3.1	93.1	x	-0.857357
29112100	340	Adult Literacy, Remedial Education, and GED Teachers and Instructors	10,330	\$53,490	0.0	98.2	x	-0.860786
25301100	341	Cost Estimators	66,070	\$41,270	2.6	97.4		-0.865643
13105100	342	Physician Assistants	204,330	\$52,020	40.9	31.9	x	-0.867714
29107100	343	Medical Assistants	63,350	\$72,030	0.0	100.0		-0.867857
31909200	344	Opticians, Dispensing	382,720	\$25,350	6.4	0.8		-0.868714
29208100	345	Nursing Aides, Orderlies, and Attendants	70,090	\$29,000	52.5	0.0		-0.870643
31101200	346	Gaming Supervisors	1,391,430	\$21,440	70.2	0.0		-0.870643
39101100	347	Veterinarians	24,180	\$40,300			x	-0.886643
29113100	348	Demonstrators and Product Promoters	47,870	\$68,910	0.0	100.0		-0.887643
41901100	349	Social and Community Service Managers	86,050	\$20,730				-0.889429
11915100	350	Baggage Porters and Bellhops	112,910	\$49,500	0.0	67.8	x	-0.890643
39601100	351	Cooks, Institution and Cafeteria	51,300	\$17,590	94.8	0.4	x	-0.896857
35201200	352	Physical Therapists	393,500	\$19,640	81.4	0.0	x	-0.905
29112300	353	Orthodontists	151,280	\$63,080	0.0	100.0		-0.907929
29102300	354	Camera Operators, Television, Video, and Motion Picture	4,820 #		0.0	100.0		-0.911071
27403100	355	Recreational Therapists	22,530	\$41,610	40.1	29.7	x	-0.913572
29112500	356	Oral and Maxillofacial Surgeons	23,260	\$33,480	26.8	66.1	x	-0.916643
29102200	357		5,120 #		0.0	100.0		-0.919929

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		First-Line Supervisors/Managers of Food						
35101200	358	Preparation and Serving Workers	748,550	\$26,050	78.3	6.5	x	-0.924
39401100	359	Embalmers	9,840	\$36,960	2.7	29.5	x	-0.931429
11907100	360	Gaming Managers	3,310	\$59,940	56.5	19.2	x	-0.933
31101300	361	Psychiatric Aides	56,150	\$22,920	52.8	21.2		-0.933857
35202100	362	Food Preparation Workers	880,360	\$17,040	93.4	2.6		-0.934357
35201300	363	Cooks, Private Household	830	\$20,820	32.1	3.6	x	-0.935643
21101300	364	Marriage and Family Therapists	18,500	\$42,300	0.0	100.0		-0.939643
39904100	365	Residential Advisors	50,490	\$21,850	0.7	61.1	x	-0.946143
29104100	366	Optometrists	23,720	\$88,040	0.0	92.9	x	-0.949286
29106200	367	Family and General Practitioners	112,150	\$140,400	0.0	100.0		-0.952643
11902100	368	Construction Managers	192,610	\$72,260	4.8	21.6		-0.957143
17101200	369	Landscape Architects	20,220	\$54,220	0.0	44.5		-0.959857
41201200	370	Gaming Change Persons and Booth Cashiers	28,590	\$20,050	92.9	0.0		-0.970571
31202200	371	Physical Therapist Aides	41,930	\$21,510	51.3	2.0		-0.976071
27102600	372	Merchandise Displayers and Window Trimmers	64,320	\$22,590	81.3	2.9		-0.978286
35304100	373	Food Servers, Nonrestaurant	188,750	\$17,210	71.4	0.0		-0.9835
35903100	374	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop Locker Room, Coatroom, and Dressing Room	328,930	\$15,840	98.5	0.0		-0.985143
39309300	375	Attendants	20,340	\$17,940	99.8	0.0		-0.992357
25401200	376	Curators	8,790	\$45,240	0.0	57.3	x	-0.995214
39601200	377	Concierges	16,810	\$23,510				-0.997143
29106700	378	Surgeons	52,930	#	0.0	100.0		-1.013714
33903200	379	Security Guards	994,220	\$20,760	76.3	0.1		-1.024214
37201200	380	Maids and Housekeeping Cleaners	893,820	\$17,080	81.7	3.0		-1.027214
29204100	381	Emergency Medical Technicians and Paramedics	196,880	\$26,080	30.6	0.0		-1.028714
33901100	382	Animal Control Workers	13,940	\$26,780	46.4	0.0	x	-1.03
37202100	383	Pest Control Workers	62,400	\$27,170	93.9	0.2		-1.033143
35201100	384	Cooks, Fast Food Combined Food Preparation and Serving Workers, Including Fast Food	631,190	\$15,080	82.4	17.6	x	-1.0355
35302100	385	Art, Drama, and Music Teachers, Postsecondary	2,298,010	\$14,790	91.9	0.3		-1.036214
25112100	386		69,260	\$51,240	5.9	94.1		-1.036786
21102300	387	Mental Health and Substance Abuse Social Workers	120,140	\$34,410	0.0	99.1		-1.043786

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39509100	388	Makeup Artists, Theatrical and Performance	1,070	\$23,480			x	-1.045714
29203400	389	Radiologic Technologists and Technicians	184,580	\$45,950	0.0	8.8		-1.05
11906100	390	Funeral Directors	21,960	\$47,630	11.0	26.0		-1.053571
31202100	391	Physical Therapist Assistants	58,670	\$39,490	0.0	2.3		-1.060429
39309200	392	Costume Attendants	3,900	\$25,360	69.6	22.0		-1.062286
29108100	393	Podiatrists	8,290	\$100,550	0.0	100.0	x	-1.067857
31201100	394	Occupational Therapist Assistants	22,160	\$39,750	13.7	22.6	x	-1.076286
19303100	395	Clinical, Counseling, and School Psychologists	98,820	\$57,170	0.0	94.7	x	-1.08
31201200	396	Occupational Therapist Aides	6,220	\$24,310	31.2	19.5	x	-1.100071
37101200	397	First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers	106,280	\$36,320	55.3	1.4		-1.110714
29102400	398	Prosthodontists	560 #		0.0	95.5		-1.121071
29909100	399	Athletic Trainers	15,110	\$34,260	0.0	100.0		-1.121357
27102300	400	Floral Designers	63,920	\$21,060	69.7	22.0		-1.124071
39202100	401	Nonfarm Animal Caretakers	100,550	\$17,720	95.1	0.0		-1.139357
35303100	402	Waiters and Waitresses	2,274,770	\$14,200	85.8	0.1		-1.156714
11903100	403	Education Administrators, Preschool and Child Care Center/Program	47,670	\$37,010	8.8	78.9		-1.159928
41202100	404	Counter and Rental Clerks	473,090	\$18,970	100.0	0.0		-1.162214
39602200	405	Travel Guides	3,120	\$29,240				-1.165714
11905100	406	Food Service Managers	191,420	\$41,340	63.3	10.6		-1.167929
21201100	407	Clergy	36,590	\$38,540	14.1	60.0	x	-1.1805
37301100	408	Landscaping and Groundskeeping Workers	896,690	\$20,670	78.2	4.4		-1.192071
29102100	409	Dentists, General	86,270	\$125,300	7.6	85.2	x	-1.203214
35901100	410	Dining Room and Cafeteria Attendants and Bartender Helpers	391,320	\$15,040	92.8	3.7	x	-1.213214
35302200	411	Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	501,390	\$15,820	99.6	0.0		-1.240429
29209100	412	Orthotists and Prosthetists	5,190	\$53,760	0.0	87.1		-1.242357
29205100	413	Dietetic Technicians	23,780	\$23,470	85.6	2.7		-1.242571
29106100	414	Anesthesiologists	27,970 #		0.0	100.0		-1.247
33201100	415	Fire Fighters	282,180	\$39,090	47.8	0.0	x	-1.26
29112200	416	Occupational Therapists	87,430	\$56,860	0.0	82.7	x	-1.267643
31101100	417	Home Health Aides	663,280	\$18,800	93.0	0.0		-1.278214

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27101300	418	Fine Artists, Including Painters, Sculptors, and Illustrators	10,390	\$41,280	38.1	32.6		-1.279143
21109300	419	Social and Human Service Assistants	313,210	\$25,030	24.0	38.1		-1.281214
27402100	420	Photographers	58,260	\$26,100	64.0	3.8	x	-1.295928
39903200	421	Recreation Workers	264,840	\$20,110	30.8	48.1		-1.3315
39509400	422	Skin Care Specialists	22,740	\$23,340				-1.332572
37201100	423	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	2,107,360	\$19,390	89.5	6.5		-1.345357
39402100	424	Funeral Attendants	30,220	\$19,720	66.0	3.6	x	-1.353214
39902100	425	Personal and Home Care Aides	566,860	\$17,340	85.7	0.0	x	-1.354
39602100	426	Tour Guides and Escorts	28,320	\$19,990	40.9	18.9	x	-1.359786
27301200	427	Public Address System and Other Announcers	8,150	\$23,290	86.7	2.7		-1.387714
33102100	428	First-Line Supervisors/Managers of Fire Fighting and Prevention Workers	53,490	\$60,840	55.5	4.7	x	-1.39
41101100	429	First-Line Supervisors/Managers of Retail Sales Workers	1,083,890	\$32,840	93.1	2.7		-1.411714
39309100	430	Amusement and Recreation Attendants	232,030	\$15,920	97.9	1.9	x	-1.420928
35201500	431	Cooks, Short Order	203,350	\$17,230	99.9	0.0	x	-1.448571
13102200	432	Wholesale and Retail Buyers, Except Farm Products	132,900	\$42,870	63.0	15.4	x	-1.475286
27202200	433	Coaches and Scouts	145,440	\$25,990	0.7	91.1		-1.478714
29205400	434	Respiratory Therapy Technicians	22,060	\$38,200				-1.4935
27204200	435	Musicians and Singers	50,410 *		26.3	41.4	x	-1.5
35101100	436	Chefs and Head Cooks	115,850	\$32,330	58.5	4.7	x	-1.501928
39603200	437	Transportation Attendants, Except Flight Attendants and Baggage Porters	24,810	\$19,290			x	-1.505714
35301100	438	Bartenders	480,010	\$15,850	74.6	0.4		-1.508357
27101200	439	Craft Artists	4,300	\$22,430	51.5	18.2		-1.527929
33909200	440	Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	107,620	\$16,910	94.1	0.6	x	-1.544072
27203100	441	Dancers	16,240 *		81.5	15.5	x	-1.577929
27203200	442	Choreographers	16,150	\$32,950	40.0	40.0	x	-1.585214
39201100	443	Animal Trainers	8,320	\$24,800	65.1	5.3		-1.585429
25302100	444	Self-Enrichment Education Teachers	141,650	\$32,360	31.7	38.4		-1.606714
39901100	445	Child Care Workers	557,680	\$17,050	62.9	15.0		-1.617357

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41901200	446	Models	1,430	\$22,700				-1.619643
25201100	447	Preschool Teachers, Except Special Education	348,690	\$21,990	43.1	16.9		-1.625857
39903100	448	Fitness Trainers and Aerobics Instructors	189,220	\$25,840	59.1	22.6		-1.645643
29205500	449	Surgical Technologists	83,680	\$34,830	15.3	9.0		-1.681072
33909100	450	Crossing Guards	69,390	\$20,050	96.4	0.0	x	-1.7085
31901100	451	Massage Therapists	37,670	\$32,890	10.2	24.7	x	-1.7195
39301100	452	Gaming Dealers	82,320	\$14,260	87.5	0.0	x	-1.752571
27201100	453	Actors	59,590 *		60.2	12.0		-1.889643
39509200	454	Manicurists and Pedicurists	42,960	\$18,280	57.1	0.0	x	-1.961571
39501200	455	Hairdressers, Hairstylists, and Cosmetologists	338,910	\$20,610	6.0	0.0		-1.981286
39603100	456	Flight Attendants	99,590	\$46,680	48.2	16.8		-2.064714
39501100	457	Barbers	13,630	\$21,760	27.1	0.0		-2.21

Source: O*Net data