Tradable Services:
Understanding the Scope and Impact of Services Offshoring

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

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Introduction

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

Coincident with the broadening of global economic integration from manufacturing to services, the face of job displacement in the United States is changing. While manufacturing workers have historically accounted for more than half of displaced workers, over the period 2001-2003, non-manufacturing workers accounted for 70 percent of displaced workers.[1] The share of job loss accounted for by workers displaced from Information, Financial Services, and Professional and Business Services nearly tripled, from 15 percent during the 1979-82 recession to 43 percent over the 2001-03 period. The industrial and occupational shift in job loss has been associated with a rise in the probability of job loss for more-educated workers.[2]

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

Fueled by the 2004 Presidential race and continued slack in the labor market, the services offshoring debate became headline material. The literature on services offshoring is expanding rapidly. A non-exhaustive list of recent contributions includes: Amiti and Wei (2004); Arora and Gambardella (2004); Bardhan and Kroll (2003): Bhagwati, Panagariya, and Srinivasan (2004);

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

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

Brainard and Litan (2004); Bronfenbrenner and Luce (2004); Dossani and Kenney (2003, 2004); Mann (2003); Kirkegaard (2004); Samuelson (2004); and Schultze (2004). Despite the attention, relatively little is known about how many jobs may be at risk of relocation or how much job loss is associated with these business decisions.

There are a few prominent projections, advanced mostly by consulting firms. The dominant and most widely quoted projection of future job losses due to movement of jobs off shore is Forrester Research's "3.3 Million US Services Jobs To Go Offshore" (McCarthy (2002)).[3] 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.

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

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

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

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

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

We also examine worker displacement rates in tradable and non-tradable service activities. We see some evidence that displacement rates are higher from tradable service industries than from non-tradable. We also find higher displacement rates from tradable white-collar occupations than from non-tradable. Consistent with the characteristics of employed workers, we find workers displaced from tradable service activities are more educated, with higher earnings, than workers displaced from non-tradable activities. Job loss from tradable and non-tradable service activities is costly to workers in terms of earnings losses. Taken together, the results are consistent with the view that economic activity within the U.S. is moving towards U.S. comparative advantage in services, similar to manufacturing.

In the next section we describe our empirical approach for identifying tradable activities. Section 2 describes the tradable – non-tradable categories, for both manufacturing and services activities. Section 3 follows with a comparison of worker characteristics in tradable and non-tradable services. Section 4 explores the employment trends in tradable and non-tradable services. Section 5 considers the most recent evidence on job displacement from tradable activities. Section 6 concludes.

1. Empirical Approach

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

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

Framework

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

Helpman and Krugman (1985) present a model that demonstrates this intuition. They model a world with two goods, two countries, and three industries, where the first industry is assumed to be a non-tradable constant-returns sector, the second industry is an industry with differentiated varieties that are assumed to be costlessly traded, and the third industry is a tradable constant-returns sector. Helpman and Krugman derive the input vectors $\mathbf{V}(1)$, $\mathbf{V}(2)$, and $\mathbf{V}(3)$ for the integrated world equilibrium. With homothetic and identical tastes, if country *j* has a

share s^j of world income, it must allocate resources s^j **V**(1) to the non-tradable industry, that is, the production of the non-traded good must be allocated between countries in proportion to their shares of world income. Non-traded goods are distributed uniformly with population and income.

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

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

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

[4] 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.

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

Demand-induced Agglomeration and Intermediate Services

Measures of geographic concentration are a way to implement the intuition presented described above. Most measures of concentration use the region's share of employment in an industry relative to the region's share of total employment. The measures of concentration do not differentiate the reasons activity is concentrated. It does not matter whether production is concentrated because of the location of natural resources, increasing returns in production, or spillovers due to the agglomeration of workers -- the concentration of production indicates that the good or service is produced in a location different from where it is consumed. So, in general, the reason for the concentration does not matter to us, except 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 would incorrectly infer that the service is tradable.

To incorporate this case into our approach, 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 geographical distribution of demand for that industry.

We construct region specific measures of demand for each industry using the input-output use tables produced by the Bureau of Economic Analysis.[6] This measure of industry demand share ($IDS_{i,p}$) represents how much geographic concentration there is in demand for a good or service *i* in a particular region *p*. We construct the demand for industry *i* in Place of Work Metro Area *p* by:

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

where

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

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

$InEMP_j$ = total employment in industry *j*

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

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

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

where

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

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

Measuring Geographic Concentration

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

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

The measure is an index for comparing a region's share of industry employment ($s_{i,p}$) with the area's share of aggregate activity/employment (x_p). When an area's employment share in an activity is significantly greater than the area's share of aggregate employment, this is interpreted as indicating a concentration, or specialization, in the given activity. The index ***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, as noted above:

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

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

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

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

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

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

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

Implementation

We implement these measures using employment information from the 2000 Decennial Census of Population Public Use Micro Sample (PUMS) files. We use as our geographic entity the Consolidated Metropolitan Statistical Area or the Metropolitan Statistical Area where an

individual reports working.[7] We construct the measures of geographic concentration for each industry. Industries that are geographically concentrated will be considered tradable.

We recognize that the use of worker level data to investigate economic concentration is somewhat unusual. We pursue this strategy because we are interested in both industrial 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.

We construct 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. For the remainder of this paper, we will focus 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."[8] 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 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.

[7] 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.

[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.

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. [9]

Using a Gini coefficient of .1 as the threshold for tradable seems to make sense in other sectors as well. Industries in the retail trade sector are primarily classified as 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 2 provides a complete list of service industries by 2-digit NAICS sector and the industry's Gini class.[10]

Table 3 shows the share of employment classified in tradable industries by 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.[11] Utilities are mostly non-tradable and Construction is entirely non-traded. For the remainder of the paper, we

[9] Another check on the industry classification is to examine the correlation of geographic concentration of manufacturing industries with the level of trade intensity in those industries. The mean industry trade share [(imports+exports)/domestic production] for Gini class 1 = .40, Gini class 2 = .57, 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.

[10] Higher education may appear to stand out in table 2 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.

[11] 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.

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.

Size and Scope of Tradable Service Industries

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

Occupation Results

We are also interested in categorizing occupations into tradable and non-tradable groups. We are interested in identifying tradable occupations because, at least based on anecdotal reports in the press, some intermediate inputs into service production might be tradable even though the service industry is not (think computer programming for the banking industry). We use a similar methodology to classify occupations into tradable and 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 5 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).[12] 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 Production[13] and 89 percent of Transportation and Material Moving.

Table 6 shows for all occupations how many workers are in occupations classified as tradable, but in industries classified as non-tradable. In the aggregate, the share of workers in tradable occupations and non-tradable industries is not large, about 10 percent. However, for business and professional occupations, the share of workers in tradable occupations but non-tradable industries is much larger. Table 7 exhibits these results. 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

[12] van Welsum and Reif (2005, see the chapter in this volume) 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 (2005) 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.

[13] 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.

characteristics are available from the 2000 Decennial Census of Population Public Use Micro Sample (PUMS) 5 percent sample.[14]

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

Table 10 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. Table 11 shows the same characteristics for selected occupations. 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.

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

[14] For more information on the 5 percent sample PUMS see: http://www.census.gov/Press-Release/www/2003/PUMS5.html.

sector (and controlling for observable demographic characteristics) that are in non-tradable industries.

Table 13 shows a similar specification for occupations. The first column reports the results for all occupations and the second column reports the results for "high-end" service occupations.[15] Across all occupations, workers in tradable occupations receive 9 percent higher wages than workers in non-tradable occupations. For "high-end" service occupations, workers in the tradable sector receive almost 13% higher wages, even after controlling for demographic characteristics and occupation group (2-digit SOC) and region.

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

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

[15] High-end service occupations include SOC major groups 11, 13, 15, 17, 19, 23, and 29. See Table 11 for the names of the SOC major groups.

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

4. Aggregate Employment Growth Changes

Much of the recent attention to services offshoring emphasized job losses in a number of occupational categories. We examine recent employment growth trends using both aggregate industry data from the Census Bureau's County Business Patterns program and aggregate occupation data from the Bureau of Labor Statistics' Occupational Employment Statistics program.[16] We present the data broken out by tradable/non-tradable and by sector. The results in the previous section indicate that tradable activities in general and tradable services in particular are higher skill than other activities. High skill activities are consistent with U.S. comparative advantage and we would expect that as trade increases, economic activity would shift to activities consistent with U.S. comparative advantage. Thus, we would expect higher skill industries and occupations to have higher employment growth rates. We also break out the employment growth rates by industry and occupation skill quartile.[17]

Figure 2 shows the change in log industry employment for the period 1998-2002 by NAICS code.[18] Figure 2 shows that industries in manufacturing have employment losses in general, while service industries tend to have positive employment growth. Table 15 presents mean industry employment growth by tradable and non-tradable sectors. In the aggregate, the mean tradable industry experienced an employment loss of almost 6 percent while the mean non-tradable industry experienced an employment gain of 5.6 percent. The lower panels of Table 15 break out industries by their sector, tradable category, and skill quartile. The lower panels of Table 15 show that the employment losses are, on average, concentrated in the goods producing

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

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

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

sector (and in the lower portion of the skills distribution).[19] In the service sector, the average non-tradable industry experienced 6.7 percent growth and the average tradable service industry experienced 7.6 percent growth. In general, lower skill quartile industries have lower employment growth. Tradable industries do not seem to have dramatically different employment outcomes than non-tradable industries, though at the low end of the skill distribution tradable industries had on average employment losses.[20]

Table 15 shows similar employment growth rates for 1999-2003[21] for occupation categories. Similar to industries, tradable occupations in aggregate have lower employment growth rates than non-tradable industries on average. Also similar to industries, this is explained primarily by differences between production-related occupations and service activities. Tradable service occupations have, on average, higher employment growth rates than non-tradable service occupations. It is interesting to note that, like in tradable industries, at the low end of the skill distribution tradable service occupations have negative employment growth. In comparison, the highest skill category has positive employment growth.[22]

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

5. 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

[19] These results are consistent with Bernard, Jensen, and Schott (2005). Bernard, Jensen and Schott use detailed, plant level data to examine the impact of imports from low-wage countries on U.S. manufacturing. The results show that activity in U.S. manufacturing is shifting to industries consistent with U.S. comparative advantage.
[20] Using a t-test to compare the lowest skill quartile to the highest skill quartile in the tradable services industry group, we cannot reject the null hypothesis that the means are the same at the 10 percent level.
[21] We are constrained to use 1999 as our starting year because it is the first year the Occupational Employment Survey was published on a Standard Occupational Classification basis. We use 2003 as the end point to have a four-year period consistent with the industry data.
[22] Using a t-test to compare the lowest skill quartile to the highest skill quartile in the tradable services occupation group, we can reject the null hypothesis that the means are the same.

characteristics of workers affected; likelihood of re-employment; re-employment industry and occupation; and earnings changes.[23] 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 17, focusing on the 2001-03 period covered by the January 2004 Displaced Worker Survey. Remembering that this time period covered the dot-com bust and the most recent recession, the Information sector (NAICS 51) had a notably high rate of job loss (.232). Overall, the risk of job loss was lower in services than in manufacturing.

As a reference point, Table 17 includes job loss rates by industry for the period 1999-2001, from the 2002 Displaced Worker Survey. The industry classifications are different, reflecting the use of 1990 Census codes for the 2002 survey. What is clear is that job loss rates increased from 1999-2001 to 2001-2003, 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

[23] See the Data Appendix for more information on the Displaced Worker Surveys.

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 18. The "blue-collar" occupations faced a higher rate of job loss (about .12) than the "white-collar" occupations (about .09). Workers in all occupational categories faced a higher rate of job loss in 2001-2003 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 19 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 19 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 19), 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 20 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 21 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.

6. Conclusions

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

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

There is job insecurity associated with employment in tradable activities, including 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.

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

increase our ability to track and understand developments in this large and growing sector.

Second, the results presented in this paper suggest that tradable services are consistent with U.S. comparative advantage. While professional and business services are more skilled and higher paying than manufacturing in general, tradable services within these sectors are even higher skill and higher paid than non-tradable service activities. We would expect that as technological and organizational change increases the potential for trade in services, economic activity within the U.S. will shift to activities consistent with U.S. comparative advantage. Because these activities are consistent with U.S. comparative advantage,[24] it is possible that further liberalization in international services trade would directly benefit workers and firms in the U.S.. The policy community should devote more attention to understanding the impediments to services trade.

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

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

[24] The U.S. maintains a positive trade balance in service activities, see Table 1.

Data Appendix

Displaced Worker Survey

The Displaced Worker Survey is administered biennially as a supplement to the Current Population Survey (CPS). The first survey was administered in January 1984 and the most recent in January 2004. In each survey, adults (aged 20 years and older) in the regular monthly CPS were asked if they had lost a job in the preceding three or five year period due to "a plant closing, an employer going out of business, a layoff from which he/she was not recalled, or other similar reasons."[25] If the answer was yes, a series of questions followed concerning the old job and period of joblessness. Other causes of job loss, such as quits or firings are not considered displacements.[26] This categorization is consistent with our common understanding of job displacement: it occurs without personal prejudice in that terminations are related to the operating decisions of the employer and are independent of individual job performance.[27] This operational definition is not without ambiguity: the displacements are "job" displacements, in the sense that an individual displaced from a job and rehired into a different job with the same employer is considered displaced.

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

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

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

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

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Figure 1

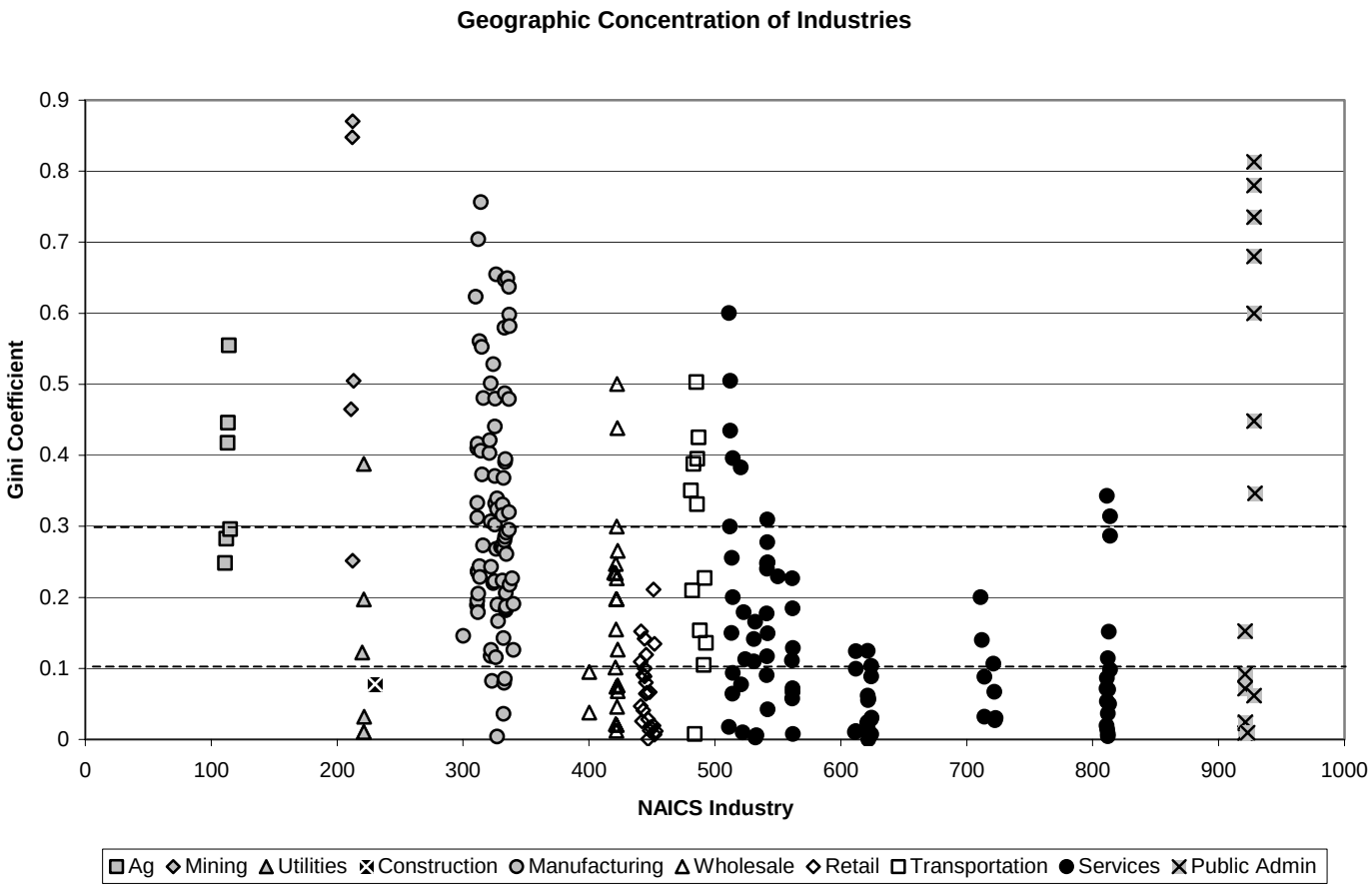
Geographic Concentration of Industries
Gini Coefficient
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
100
200
300
400
500
600
700
800
900
1000
NAICS Industry
Ag
Mining
Utilities
Construction
Manufacturing
Wholesale
Retail
Transportation
Services
Public Admin

Figure 2

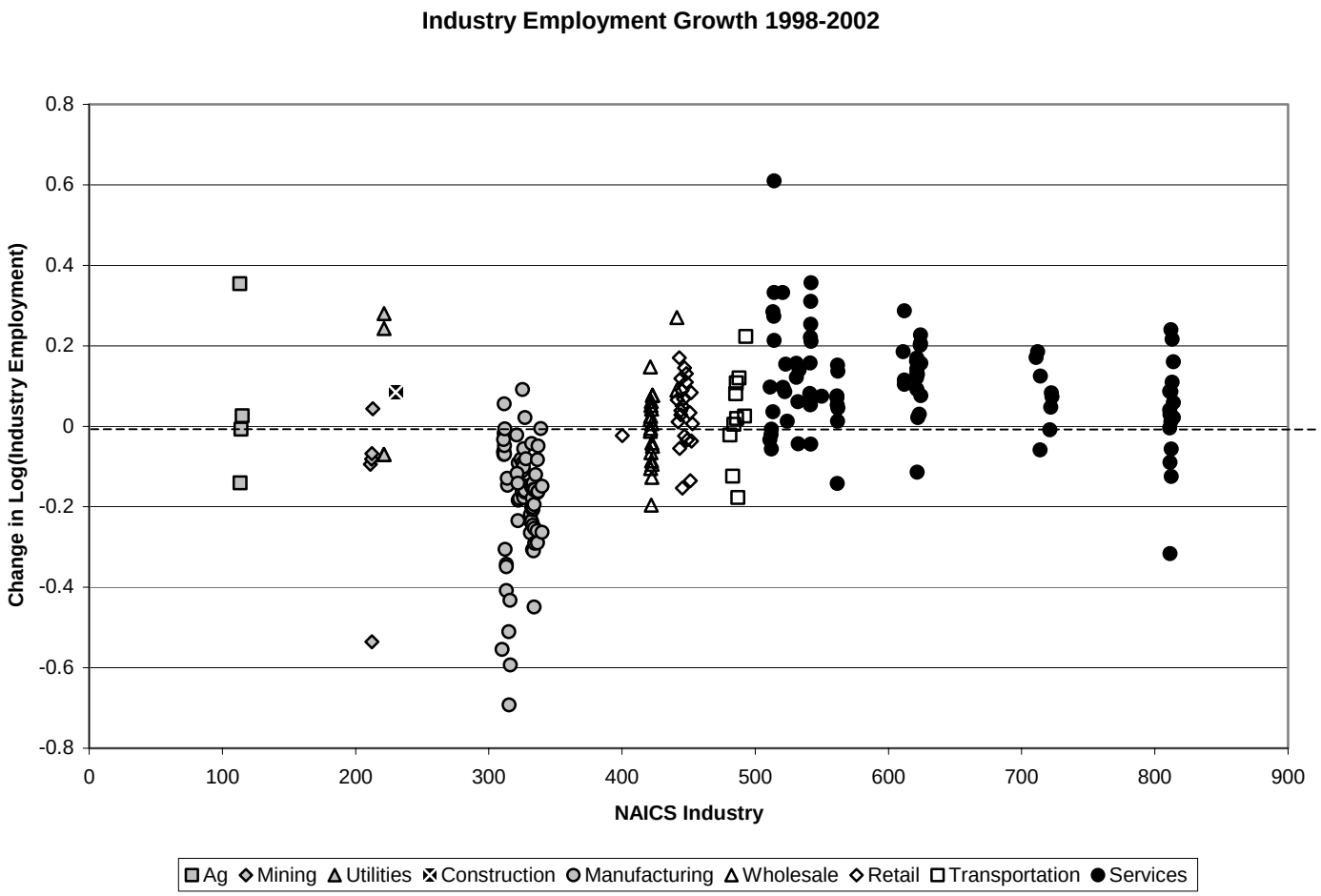
Industry Employment Growth 1998-2002
Change in Log(Industry Employment)
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
0
100
200
300
400
500
600
700
800
900
NAICS Industry
Ag
Mining
Utilities
Construction
Manufacturing
Wholesale
Retail
Transportation
Services

Table 1

Table 1.--Private Services Trade by Type, 1992-2002
[Millions of dollars]

	Exports	Imports
	2002	2002
Total private services	**279,495**	**205,234**
Travel	**66,547**	**58,044**
Overseas	54,772	44,494
Canada	6,268	6,489
Mexico	5,507	7,061
Passenger fares	**17,046**	**19,969**
Other transportation	**29,166**	**38,527**
Freight	12,330	25,973
Port services	16,836	12,554
Royalties and license fees	**44,142**	**19,258**
Affiliated	32,218	15,132
U.S. parents' transactions	29,066	2,958
U.S. affiliates' transactions	3,152	12,174
Unaffiliated	11,924	4,126
Industrial processes	3,900	1,935
Other	8,024	2,192
Other private services	**122,594**	**69,436**
Affiliated services	43,500	32,367
U.S. parents' transactions	25,194	17,529
U.S. affiliates' transactions	18,306	14,838
Unaffiliated services	79,094	37,069
Education	12,759	2,466
Financial services	15,859	3,665
Insurance services	2,839	15,348
Telecommunications	4,137	4,180
Business, professional, and technical services	28,799	10,732
Accounting, auditing, and bookkeeping services	360	716
Advertising	633	1,360
Agricultural, mining, and on-site processing services	366	273
Agricultural and mining services/1/	346	259
Waste treatment and depollution services	20	14
Architectural, engineering, and other technical services	1,916	312
Computer and data processing services	3,004	1,057
Construction, architectural, engineering, and mining services/2/	n.a.	n.a.
Construction	654	226
Data base and other information services	2,426	236
Industrial engineering	749	185
Installation, maintenance, and repair of equipment	4,992	812
Legal services	3,270	768
Management, consulting, and public relations services	1,696	1,188
Medical services	1,901	n.a.
Miscellaneous disbursements/3/	623	1,522
Operational leasing	3,573	190
Research, development, and testing services	1,086	1,040
Sports and performing arts	175	110
Trade-related services/4/	353	95
Training services	591	361
Other business, professional and technical services/5/	430	283
Other unaffiliated services/6/	14,700	679

Source: Bureau of Economic Analysis.

Table 2
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 mainte	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 3
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. Srvs.	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 4
Share of Total Employment by Tradable/Non-Tradable
By NAICS Sector

NAICS	Description	Non-Tradable	Tradable
11	Agriculture	0	1.36
21	Mining	0	0.39
22	Utilities	0.76	0.18
23	Construction	6.86	0
31	Manufacturing	0	2.17
32	Manufacturing	0.81	2.86
33	Manufacturing	1.16	6.86
3M	Manufacturing	0	0.53
42	Wholesale Trade	1.66	1.96
44	Retail Trade	5.90	1.32
45	Retail Trade	2.91	0.37
4M	Retail Trade	0.62	0
48	Trans./Warehouse	1.32	1.76
49	Trans./Warehouse	0	1.27
51	Information	1.04	2.08
52	Finance and Insurance	1.64	3.47
53	Real Estate and Rental	0.16	1.63
54	Prof., Sci., Tech. Srvs.	0.82	5.08
55	Management	0	0.06
56	Administrative Support	1.99	1.35
61	Education	8.75	0.10
62	Health Care/Social	10.90	0.25
71	Arts, Enter., Recreation	1.12	0.54
72	Accommodation	4.52	1.00
81	Other Services	3.76	0.95
92	Public Administration	4.14	1.63
	All Industries	**60.82**	**39.18**

Table 5
Share of Occupation Employment by Gini 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 6
Share of Total Employment in Tradable Occupations and Industries

	Non-tradable Occupations	Tradable Occupations
Non-tradable Industries	50.03	10.79
Tradable Industries	21.64	17.54

Table 7
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 8
Mean Earnings and Demographic Characteristics for Industries

	Non-Tradable	Tradable
All Industries		
Employment Income	30,966	41,836
Percent Male	49.6	60.1
Percent African-American	10.2	9.9
Percent Hispanic	10.4	10.3
Percent Advanced Degree	10.2	9.2
Percent B.A.	26.6	30.2
Percent High School	87.0	88.7
Age	38.8	39.4

Table 9
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

		Non-Tradable	Tradable
53	**Real Estate and Rental and Leasing**		
	Employment Income	23,056	42,915
	Percent Male	58.1	51.1
	Percent African-American	9.1	8.6
	Percent Hispanic	10.8	9.7
	Percent Advanced Degree	1.9	6.7
	Percent B.A.	13.3	29.7
	Percent High School	84.7	90.6
	Age	31.1	42.4
54	**Prof., Sci., Tech. Srvs.**		
	Employment Income	42,246	57,959
	Percent Male	35.3	57.1
	Percent African-American	5.1	5.5
	Percent Hispanic	5.0	5.6
	Percent Advanced Degree	16.6	25.7
	Percent B.A.	52.5	59.5
	Percent High School	97.1	97.8
	Age	39.5	39.3
55	**Management**		
	Employment Income	--	61,285
	Percent Male	--	45.5
	Percent African-American	--	5.4
	Percent Hispanic	--	4.9
	Percent Advanced Degree	--	14.3
	Percent B.A.	--	49.7
	Percent High School	--	97.8
	Age	--	40.5
56	**Administrative Support**		
	Employment Income	24,039	28,742
	Percent Male	64.1	48.5
	Percent African-American	11.9	17.6
	Percent Hispanic	22.2	12.2
	Percent Advanced Degree	2.0	5.0
	Percent B.A.	10.7	23.4
	Percent High School	72.3	88.0
	Age	37.2	36.1

Table 10
Mean Earnings and Demographic Characteristics for Occupations

	Non-Tradable	Tradable
All Occupations		
Employment Income	28,789	51,503
Percent Male	48.5	66.7
Percent African-American	11.1	7.5
Percent Hispanic	10.9	8.8
Percent Advanced Degree	7.4	16.1
Percent B.A.	21.8	43.9
Percent High School	86.3	91.0
Age	38.8	39.9

Table 11
Mean Earnings and Demographic Characteristics for Selected Occupations

		Non-Tradable	Tradable
11	**Management**		
	Employment Income	51,399	69,029
	Percent Male	56.2	67.3
	Percent African-American	8.3	4.7
	Percent Hispanic	6.8	5.0
	Percent Advanced Degree	19.9	15.7
	Percent B.A.	46.5	49.6
	Percent High School	95.2	95.8
	Age	41.8	42.6
13	**Business and Financial Operations**		
	Employment Income	42,813	51,998
	Percent Male	41.3	48.0
	Percent African-American	10.3	8.3
	Percent Hispanic	6.9	5.4
	Percent Advanced Degree	10.5	16.2
	Percent B.A.	44.0	61.6
	Percent High School	97.6	98.6
	Age	40.4	40.2
15	**Computer and Mathematical**		
	Employment Income	--	54,297
	Percent Male	--	70.3
	Percent African-American	--	6.8
	Percent Hispanic	--	4.5
	Percent Advanced Degree	--	17.8
	Percent B.A.	--	59.9
	Percent High School	--	99.1
	Age	--	37.3

		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 12
OLS Regression Results
Tradable Industry Wage Differentials

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

Table 13
OLS Regression Results
Tradable Occupation Wage Differentials

	All Occupations	**"High-End" Service Occupations**
Dependent Variable: Log(Employment Income)		
Tradable Occupation	0.091	0.127
	(0.0008)	(0.0014)
Male	0.215	0.245
	(0.0006)	(0.0013)
African American	-0.061	-0.112
	(0.0010)	(0.0023)
Hispanic	-0.187	-0.168
	(0.0010)	(0.0027)
Hours	0.026	0.020
	(0.0000)	(0.0001)
Weeks	0.039	0.038
	(0.0000)	(0.0001)
Advanced Degree	0.216	0.227
	(0.0011)	(0.0016)
BA	0.303	0.297
	(0.0008)	(0.0013)
Occupation Controls (2-digit SOC)	Yes	Yes
POW MSA Controls	Yes	Yes
N	5,836,630	1,446,158
Weighted N	122,155,903	30,803,183
R-Squared	0.545	0.396

Note: "High-End Service Occupations" are occupations in SOC major groups 11, 13, 15, 17, 19, 23, and 29.

Table 14
OLS Regression Results
Tradable Industry and Occupation Wage Differentials

	All Industries and Occupations	NAICS 50s	"High-End" Service Occupations
Dependent Variable: Log(Employment Income)			
Non-Tradable Industry and Non-Tradable Occupation	-0.098	-0.174	-0.159
	(0.0011)	(0.0026)	(0.0022)
Non-Tradable Industry and Tradable Occupation	-0.055	-0.072	-0.050
	(0.0012)	(0.0026)	(0.0019)
Tradable Industry and Non-Tradable Occupation	-0.055	-0.045	-0.087
	(0.0010)	(0.0022)	(0.0021)
Tradable Industry and Tradable Occupation	--- Omitted category ---		
Male	0.205	0.205	0.244
	(0.0007)	(0.0015)	(0.0013)
African American	-0.064	-0.111	-0.111
	(0.0010)	(0.0024)	(0.0022)
Hispanic	-0.173	-0.169	-0.158
	(0.0010)	(0.0026)	(0.0026)
Hours	0.025	0.027	0.020
	(0.0000)	(0.0001)	(0.0001)
Weeks	0.039	0.038	0.036
	(0.0000)	(0.0001)	(0.0001)
Advanced Degree	0.223	0.197	0.232
	(0.0011)	(0.0024)	(0.0016)
BA	0.279	0.245	0.276
	(0.0008)	(0.0017)	(0.0013)
Industry Controls (2-digit NAICS)	Yes	Yes	Yes
Occupation Controls (2-digit SOC)	Yes	Yes	Yes
POW MSA Controls	Yes	Yes	Yes
N	5,836,630	1,074,271	1,446,158
Weighted N	122,155,903	23,609,616	30,803,183
R-Squared	0.545	0.540	0.419

Note: "High-End Service Occupations" are occupations in SOC major groups 11, 13, 15, 17, 19, 23, and 29.

Table 15
Industry Level Employment Change 1998-2002
by Industry Characteristics

Industry Classification			Number of Industries	Mean	Std. Dev.
Non-Tradable			88	0.056	0.114
Tradable			149	-0.059	0.198
Ag, Min, Mfg	Non-Tradable		5	-0.116	0.099
	Tradable		83	-0.173	0.161
Services	Non-Tradable		91	0.067	0.107
	Tradable		85	0.076	0.145
Ag, Min, Mfg	Non-Tradable	Skill Q1	3	-0.067	0.102
		Skill Q2	2	-0.190	0.015
	Tradable	Skill Q1	32	-0.191	0.169
		Skill Q2	24	-0.203	0.148
		Skill Q3	16	-0.114	0.103
		Skill Q4	11	-0.147	0.216
Services	Non-Tradable	Skill Q1	24	0.016	0.080
		Skill Q2	23	0.084	0.098
		Skill Q3	20	0.015	0.106
		Skill Q4	24	0.156	0.088
	Tradable	Skill Q1	7	-0.006	0.233
		Skill Q2	16	0.112	0.104
		Skill Q3	31	-0.007	0.095
		Skill Q4	31	0.139	0.148

Table 16
Occupation Level Employment Change 1999-2003
by Occupation Characteristics

Occupation Classification			Number of Industries	Mean	Std. Dev.
Non-Tradable			197	0.022	0.160
Tradable			228	-0.004	0.247
Ag, Prod, Ext, Con	Non-Tradable		38	-0.044	0.143
	Tradable		77	-0.141	0.228
Services	Non-Tradable		180	0.036	0.161
	Tradable		180	0.059	0.230
Ag, Prod, Ext, Con	Non-Tradable	Skill Q1	23	-0.070	0.145
		Skill Q2	12	-0.026	0.140
		Skill Q3	3	0.056	0.125
	Tradable	Skill Q1	56	-0.148	0.235
		Skill Q2	18	-0.150	0.196
		Skill Q3	3	0.014	0.272
Services	Non-Tradable	Skill Q1	30	0.005	0.114
		Skill Q2	57	0.037	0.173
		Skill Q3	54	0.021	0.165
		Skill Q4	39	0.078	0.164
	Tradable	Skill Q1	10	-0.065	0.111
		Skill Q2	32	0.086	0.210
		Skill Q3	59	0.032	0.181
		Skill Q4	79	0.083	0.269

Table 17
Job loss rates by industry

From 2004 Displaced Worker Survey

	2001-2003	Tradable	Not tradable
Agriculture	0.049		
Mining	0.127		
Construction	0.131		
Mfg	0.209		
WRT	0.113	0.077	0.091
Transport&Utilities	0.089		
Information	0.232	0.317	0.075
Financial	0.081	0.08	0.081
Prof&BusSvc	0.144	0.158	0.113
Educ&HealthSvc	0.040	0.071	0.039
Leisure&Hospitality	0.105	0.083	0.113
OtherSvcs	0.051	0.03	0.057
PublicAdmin	0.020		
Total	0.103	0.153	0.076
Mfg. - Tradable	0.213		
Mfg. - Not tradable	0.192		
Non- Mfg. - Tradable	0.128		
Non- Mfg. - Not tradable	0.073		

Dropping agriculture, mining & construction:

Mfg. - Tradable	0.213		
Mfg. - Not tradable	0.192		
Non- Mfg. - Tradable	0.106		
Non- Mfg. - Not tradable	0.054		
Total		0.126	0.058

From 2002 and 2004 Displaced Worker Surveys

	1999-2001	2001-2003
Agriculture	0.042	0.065
Mining	0.173	0.127
Construction	0.107	0.131
Mfg - Durables	0.177	0.236
Mfg - Ndurable	0.133	0.157
Transport	0.096	0.103
Communic	0.159	0.305
Util&SanService	0.054	0.052
WT	0.111	0.123
RT	0.099	0.107
FIRE	0.079	0.080
PrivHH	0.044	0.016
Bus&RepairSvc	0.181	0.172
PersonalSvc	0.080	0.057
Enter&Recreat	0.071	0.098
Hospitals	0.026	0.030
Other Medical	0.052	0.055
EducSvc	0.020	0.030
SocialSvc	0.033	0.060
OtherProfSvc	0.071	0.078
Forestry&fish	0.008	0.070
PublicAdmin	0.017	0.020
Total	0.090	0.106

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

Table 18
Job loss rates by occupation

From 2004 Displaced Worker Survey (a)

	2001-2003	Tradable	Not tradable
MgmtBusFin (WC)	0.089	0.077	0.091
BusinessOperationsSpecialists	0.143	0.121	0.171
Financial Specialists	0.054	0.057	0.044
Prof&related (WC)	0.070	0.109	0.033
Computer & Math	0.177	0.177	N/A
Architecture & Engineering	0.128	0.113	0.158
Life, Physical & Social Science	0.059	0.057	0.066
Service (WC)	0.073	0.072	0.056
Sales (WC)	0.106	0.123	0.079
Office&AdminSupport (WC)	0.109	0.067	0.092
FarmForestFish (BC)	0.110		
Construct&Extract (BC)	0.149		
InstallMaintainRep (BC)	0.112	0.117	0.083
Production (BC)	0.206	0.163	0.169
Transport&MM (BC)	0.117	0.057	0.096
Total	0.102	0.101	0.078

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

From the 2002 and 2004 Displaced Worker Surveys

	1999-2001	2001-2003
Exec, admin, mgr	0.086	0.094
Prof. Spec	0.059	0.066
Technician&related	0.088	0.110
Sales	0.094	0.109
AdminSupport	0.097	0.106
PrivHH	0.047	
ProtectSvc	0.045	0.059
Food,Health,Clean,Personal	0.069	0.075
PrecProdCraftRep	0.111	0.151
OperAssembInsp	0.181	0.219
TransportMMeqpt	0.103	0.112
HandlersCleanersHelpers	0.139	0.151
FarmForestFish	0.044	0.067
ArmedForces		
Total	0.090	0.103

(a) Agriculture, Mining, Construction omitted

Table 19
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 20
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 21
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