Tradable Services:
Understanding the Size and Scope of Services Outsourcing and Its Impact on American Workers

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Introduction

Globalization, particularly in the guise of globalized production, is evolving and broadening from a manufacturing base into services. These changes, and their implications for American workers, have attracted widespread attention. Services activities now account for a larger share of global trade than they have 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.

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, in the most recent downturn non-manufacturing workers accounted for 70 percent of displaced workers.[1] 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] One example is the share accounted for by Finance, Insurance, Real Estate, Business Services, and Professional Services, all relatively high-skill industries, more than doubled from 15% during the 1979-82 recession to 34% during the 2000-01 period. The changing mix of industries exposed to international trade in services may have deep implications for the structure of US industry and skill needs 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 global outsourcing, the vulnerabilities of American workers, and how large this phenomenon is likely to become in the near-term future.[3]

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[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. In the 2000-01 downturn, workers with a high school diploma or less accounted for 38 percent of non-manufacturing job loss. On average, these low-skill workers earned under $20,000 per year in their pre-displacement jobs (estimates from the Displaced Worker Surveys, 1984-2002).

[3] The literature on services outsourcing is expanding rapidly. Recent contributions include: Amiti and Wei (2004); Arora and Gambardella (2004); Bardhan and Kroll (2003): Bhagwati, Panagariya, and Srinivasan (2004); Brainard and Litan (2004); Bronfenbrenner and Luce (2004); Samuelson (2004); and Schultze (2004).

There is considerable hype on this issue in the press. 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)). 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 of offshoring in the future.

While the size and scope of this activity is not clear, it seems plausible to expect an impact on the structure of American industry. The economic forces driving the changing location of production, support, and even research and design activities is likely to affect the range of activities undertaken in the US and may have implications for the long-term competitiveness of US industries – both for better and worse. Beyond the impact on firms, the changing location of service activities is likely to affect labor market outcomes of US service sector workers as well.

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.

The most immediate goal of this paper is the development of defensible estimates of the size and scope of global trade in services and an identification of the impact on worker labor market outcomes. This paper is part of a larger project to address the gap in knowledge regarding the nature and scope of outsourcing of services activities and the related impact on workers, with a focus on developing appropriate policy prescriptions to address emerging labor market needs.

1. Empirical Approach

Our interest is to identify the size and scope of services trade at as detailed a level as possible. As many observers and researchers have noted, gathering accurate detailed data on the extent of services global outsourcing is quite difficult. While the Bureau of Economic Analysis provides data on international trade in services, the data on international services that BEA publishes do not provide particularly detailed industry level data and contain no information on occupations. Table 1 shows the level of industry detail available from BEA.

We seek to examine changes in services trade at the detailed industry level and the detailed occupational level. 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 industries and occupations.

Framework

To develop a better understanding of the detailed industries and occupations that might be susceptible to offshoring, we will first use domestic microdata to identify the service industries and occupations with characteristics of tradability. Identifying these dimensions of tradable services will allow us to then identify the number and characteristics of workers vulnerable to global outsourcing.[4]

The economic intuition we rely upon to develop our baseline empirical measure of tradability of services is that non-traded goods will not exhibit geographic concentration in production. Goods that are traded will tend to be geographically concentrated (to capitalize on increasing returns to scale, access to markets, natural resources, etc), while goods that are not traded will tend to be more ubiquitously distributed. As Helpman and Krugman (1985) demonstrate in a model 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

[4] To aid our understanding of this complex activity, we will also eventually incorporate industry- and occupation-specific information to examine how and what kind of technological and business environmental changes may increase the tradability of services.

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.

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."

Measures

Krugman's "locational Gini" in the quote above is a statistical measure of geographical agglomeration or concentration. The 1990s saw a surge of research investigating a striking feature of the economic landscape – the geographic agglomeration of firms in a single industry.[5] Many explanations of agglomeration/spatial clustering rely on some form of increasing returns. Following this central thread of increasing returns, the literature on agglomeration has expanded beyond economic geography and urban economics to include research in international trade, growth, and industrial organization.[6] The literature has (at least) three strands: understanding the reasons behind pervasive agglomeration (theoretical concerns), understanding the economic development implications (policy) and understanding the stylized facts (measurement).

Our interest in measures of agglomeration derives from our interest in measures of "tradability" – whether or not an industry/occupation produces a good or service that is

[5] Alfred Marshall (1920) presented the first analysis of industry localization.
[6] Key papers include Ellison and Glaeser (1997), Krugman (1991).

tradable and therefore potentially vulnerable to global outsourcing.[7] We make use of two frequently used measures of geographic concentration. Both measures capture the notion of the extent that local production exceeds local demand. [8]

The first is a measure of economic concentration described in Ellison and Glaeser (1997), $\boldsymbol{EC} = \sum_i (s_i - x_i)^2$. The measure ***EC*** is an index for comparing an area's share of a particular activity/employment (s_i) with the area's share of aggregate activity/employment (x_i). 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 occupation 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 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 a Gini coefficient of geographic concentration. We construct the Gini coefficient (***G***) for industries and occupations using:

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

where i's index regions (sorted by the region's share of industry or occupation 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

[7] Beyond measurement issues, our research is informed by recent work in industrial organization that considers the distribution of economic activity across space (see Holmes and Stevens (2003)) and the importance of specialization (concentration) and scale economies in knowledge-intensive sectors (see Garicano and Hubbard (2003)).

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

lowest share of industry or occupation 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.

Implementation

We recognize that the use of worker level data to investigate economic concentration is somewhat unusual. We pursue this strategy because of an important feature of our research design. We want to develop measures 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 outsourced are tasks within the service "production" process (for example, the banking relationship is not outsourced, rather the call center piece of the service is); occupations correspond more closely to these types of activities than do industries.

We implement the intuition by constructing the geographic concentration measures (***EC*** and ***G***) using employment information from the 2000 Decennial Census Public Use Micro Sample (PUMS) files. We use as our geographic entity the individual's Consolidated Metropolitan Statistical Area or the individual's Metropolitan Statistical Area where the individual reports working.[9] We construct the measures of geographic concentration for each metropolitan area for each industry and occupation. Industries and occupations that are geographically concentrated will be considered tradable.

The correlation between the ***EC*** measure and the ***G*** measure is quite high, .75 for industries and .77 for occupations. For the remainder of this paper, we will focus on the ***G*** results.[10]

An important issue in our empirical approach is to identify the level of geographic concentration that indicates that an industry or occupation is "tradable." To begin to identify the level of geographic concentration that indicates tradable, we group industries and occupations into three equally sized groups based on their Gini coefficient. The top third of

[9] We use the field on the Decennial PUMS POWCMA5. 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. The Census Bureau defines Metropolitan statistical areas (MSAs) as metropolitan areas (MAs) that are not closely associated with other MAs. If an area that qualifies as a metropolitan area (MA) has 1 million people or more, two or more primary metropolitan statistical areas (PMSAs) may be defined within it. When PMSAs are established, the larger MA of which they are component parts is designated a consolidated metropolitan statistical area (CMSA).

[10] We expect that additional information might be available by exploiting the differences between the EC and G measures. We leave this for future versions of the paper.

industries (occupations), ranked in Gini coefficient descending order, are in class "3", the middle third in class "2", and the lowest third in class "1." The most concentrated, or tradable, activities are therefore in class "3" and the least concentrated are in class "1." In the next section we will present preliminary evidence on the reasonableness of the use of geographic concentration as an indicator of whether an industry or occupation is tradable. Table 3 lists service industries (by NAICS major group) and the Gini class.[11]

2. Preliminary Results on Industries and Occupations

Industry Results

To begin to identify the relevant level of geographic concentration to indicate tradability, we compare the classification of manufacturing industries with service industries. Figure 1 displays the industry data, with the horizontal lines separating class "3" at the top, class "2" in the middle between the two lines, and class "1" at the bottom. Agriculture, Mining and Manufacturing are CIC codes 0 to 399, with Trade, Transportation, and Services with codes greater than 400.

The pattern conforms to our priors – most industries in the Agriculture, Mining, Construction, and Manufacturing sectors are in the upper two Gini classes. Only 8 of 99 Agriculture, Mining, and Manufacturing industries are in the lowest Gini class. Construction, power generation and transmission, water and sewage treatment, cement and concrete manufacturing, structural metal tank manufacturing, and not elsewhere classified machinery are the industries in these sectors that are in the lowest Gini class. These seem to be non-tradable or traded at low levels. Most of manufacturing, agriculture, and mining are considered tradable, so for a first-order approximation classifying the lowest Gini class as non-tradable seems appropriate for these sectors.

If we use this categorization (classifying the lowest Gini class as non-tradable and the others as tradable) for Trade, Transportation, and Services, the number of industries in the top two Gini Classes is much lower. About half, 82 of 165, of the industries in these sectors

[11] A full listing of industries and occupations and their associated Gini coefficients and EC measures is available from the authors upon request.

are in the non-tradable category. The general pattern in these sectors also conforms to our priors. The vast majority of wholesale and retail trade industries are in the non-traded category. Transportation industries are mostly classified as tradable. For services, industries are balanced between traded and non-traded (see table 2).

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). Utilities are mostly non-tradable and Construction is entirely non-traded.

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 correlation of manufacturing industry geographic concentration and industry trade intensity is not strong. There are a number of industries that have high concentration, yet have low trade intensities (examples include aerospace products (not aircraft), bakery, and dairy products). Most of these appear to be explained by various forms of trade barriers, either tariffs or non-tariff barriers. On the other end, there are a number of "n.e.c." industries that have low geographical concentration and high trade shares. In future research, we will expand the set of factors used to identify industries and occupations as tradable.

Occupation Results

Occupations are more difficult to assess, in part due to the relatively novelty of considering occupations as "tradable." Table 4 shows the share of employment in for each Gini class for major occupational categories. While we have weaker priors regarding which occupations should be tradable (as opposed to industries), the employment shares across occupational categories do not seem unreasonable.

As a preliminary means of checking the reasonableness of the categorization, we turn to the newly emerging literature on services outsourcing. Recent discussions of services offshoring (see Bardhan and Kroll (2003) and Dossani and Kenney (2004)) offer examples of occupations considered to be "at-risk" of offshoring. Researchers admit these judgments to be subjective, based on anecdotal discussions in the business press, and we do not quarrel

with these first efforts. Our current effort is to present an approach that is motivated by economic theory and generalizable across a broad range of industries and occupations. We compare our results with those from Dossani and Kenney (2004) as a rough check on the reasonableness of our estimates. Table 5 shows the list of "at-risk" occupations and the Gini class category we derive for each occupation.

Discussion of Results

Preliminary analysis indicates that geographical concentration of industries and occupations can be a useful indicator of whether an activity is tradable. Classifying industries and occupations into tradable and non-tradable groups based on the degree of geographic concentration seems to provide reasonable results relative to priors and other research. While geographic concentration is clearly not the single necessary and sufficient indicator of whether an activity is tradable, it seems to provide a useful first-order approximation.

3. Preliminary Results on Workers in Service Industries and Occupations

We are interested in the impact of international trade in services on workers. One issue regarding the impact of global outsourcing is how many workers are potentially affected. There is a tradition in economics of treating services as non-tradable and there is a sense among some economists that because services tend to be non-traded, the risks of global outsourcing are overblown.

One potential reason for the mindset that services are not tradable is the level of service trade relative to merchandise trade. Service exports are less than half the value of goods exports and service imports are about one-fifth the value of goods imports. However, because value of output per worker is higher on average in goods producing industries than service producing industries, it is possible that even a lower value level of services trade will have a larger impact on labor market outcomes than higher value levels of goods trade.

One objective of this paper is to develop credible estimates of the employment potentially affected by trade in services. The classification of industries and occupations in tradable and non-tradable categories allows us to develop employment counts in tradable and

non-tradable industries and occupations. In contrast to traditional characterizations of services as being predominantly non-tradable, our categorization suggests that more workers are in tradable industries in the services sector than in the manufacturing sector. Table 6 shows the share of total employment in tradable and non-tradable industries by major NAICS group. The sum of the share of total employment in industries that are traded in professional services (NAICS 51-56) is larger than the share of employment in tradable manufacturing industries. While services more broadly, including education, health care, other services and public administration, are correctly characterized as having low shares of employment in tradable industries, because the service sector is much larger than the manufacturing sector, the number of workers exposed to international trade in services is actually larger than the number of exposed workers in manufacturing.

Beyond mere employment counts, we also examine the demographic characteristics such as education, age, gender and earnings, to identify whether there are differences in the profile of service workers in the industries and occupations identified as tradable and those in industries and occupations identified as non-tradable. These characteristics are available from the 2000 Decennial PUMS.

Table 7 shows the demographic characteristics of workers in 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. 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 is large, with tradable services having higher wages. Service workers in tradable industries also tend to have higher educational attainment and are more likely to be male and white.

Table 8 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.

Workers in tradable service industries and in tradable occupations have different characteristics, on average, than workers in non-traded industries and occupations. In the next section, we examine the labor market outcomes in service industries.

Job displacement from services

The Displaced Worker Surveys (DWS) provide basic information on the scope and cost of involuntary job loss. These surveys contain information on job losses over the period 1979 to 2003, and have been used extensively to study manufacturing 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; durations of joblessness; likelihood of re-employment; re-employment industry and occupation; and earnings changes.[12] For these key outcomes and characteristics, the service worker analysis parallels the approach for manufacturing workers used in Kletzer (2001).

Preliminary comparisons between services and manufacturing job displacement are reported in tables 9-11. Services are the focus of these descriptive statistics, with selective manufacturing industries represented for comparison purposes. The incidence of job displacement is notably lower in services than in manufacturing (see Table 9). Where the risk of job loss can average 6-7 percent (annual averages) in manufacturing, for the three services industries profiled in Table 7, incidence averages around 2-3 percent. The risk of job loss is trending upward over the period for services, starting from a relatively low level. As we noted in the introduction, the share of displaced workers accounted for by services has increased over time, as has the share of employment.

In terms of outcomes, reemployment rates are higher for displaced services workers than observed for manufacturing workers. Reemployment rates average about 70-75 percent for services workers, compared to 65 percent average in manufacturing. We note that reemployment rates fell considerably from the late 1990s to the 2000-01 recession, in both services and manufacturing.

Somewhat parallel to the characteristics reported in Table 7, Table 10 reports educational and demographic characteristics for workers displaced from the services and manufacturing industries profiled in Table 9. These two tables offer a comparison between the characteristics of workers employed in services (as measured in the 2000 PUMS), and the characteristics of workers displaced from services. In terms of educational attainment and percent female, the two groups of workers look similar.

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

Workers displaced from services are more highly educated than workers displaced from manufacturing, with key differences at the lowest and highest ends of the educational attainment distribution. Relatively few services displaced workers are high school dropouts (ranging from 3 to 10 percent), while 30 to 40 percent of manufacturing displaced workers are high school dropouts (depending a bit on industry). For workers displaced in 2000-01, pre-displacement earnings were higher for services than for manufacturing.

Averaging over the years 1979-2001, Table 11 reports earnings losses and reemployment rates. The reemployment advantages experienced by college graduates, relative to those without a college degree, are clear. From both services and manufacturing, college graduates are more likely to be reemployed than the sectoral average. Focused solely on manufacturing, Kletzer (2001) reported a 10 to 12 percentage point difference in the likelihood of reemployment between a high school dropout and a high school graduate.

Mean earnings losses are somewhat smaller from services than from manufacturing, and a larger share of displaced services workers experience no earnings loss (or a gain) than we observe from manufacturing. The shares of workers experiencing losses in excess of 15% are smaller for services, but still notable, in the range of 25-30 percent.

4. Conclusions

This paper reports on our first efforts to develop theoretically and empirically sound estimates of the size and scope of global trade in services, with an eye toward identifying the activities potentially vulnerable to services global outsourcing. One novelty of our approach is the use of worker-level data to broadly, and at the same time with more detail, consider the wide range of services activities that are potentially tradable. With worker-level employment and job loss data we also investigate the potential impact of services outsourcing on worker labor market outcomes.

At the industry level, our empirical measures of geographic concentration produce estimates of "tradability" that are consistent with more traditional measures (import share). The preliminary results suggest that a significant number of workers in service industries are potentially affected by international trade in services. Preliminary results also suggest that the

workers in tradable service industries have different demographic characteristics and earnings than workers in non-tradable industries. Last, displacements rates in service industries are lower than in manufacturing, but on the rise. Reemployment rates are higher and earnings losses are lower for displaced service workers than for displaced manufacturing workers.

In future and ongoing work, we plan to pursue the important distinction between imported and exported services. At the occupational level, where our analysis is particularly novel, our estimates both confirm other researchers more subjective judgments and call those judgments into question. We consider the occupational work very preliminary. One way we plan to gain additional insight into occupation is to study the combined classification of occupations by industry. While preliminary, the approach presented in this paper offers promise to identify the labor market impact of global trade in services, both to identify the risks of increased trade in services and the opportunities afforded by increased liberalization in global services trade.

Data Appendix

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 February 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."[13] 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.[14] 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.[15]

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.

A common understanding of job displacement is that it occurs without personal prejudice; terminations are related to the operating decisions of the employer and are independent of individual job performance. In the DWSs, this definition can be implemented by drawing the sample of displaced from individuals who respond that their job loss was due to the reasons noted above. Other causes of job loss, such as quits or firings are not considered displacements.[16] 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.

See Kletzer (2001) for more discussion of the issues that arise when using the DWSs to measure the incidence of job loss.

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

[14]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.

[15]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.

[16]Individuals may also respond that their job loss was due to the end of a seasonal job or the failure of a self-employed business. These individuals are not considered displaced in this study. For a discussion of these reasons, see Farber (2003).

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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.

Figure 1

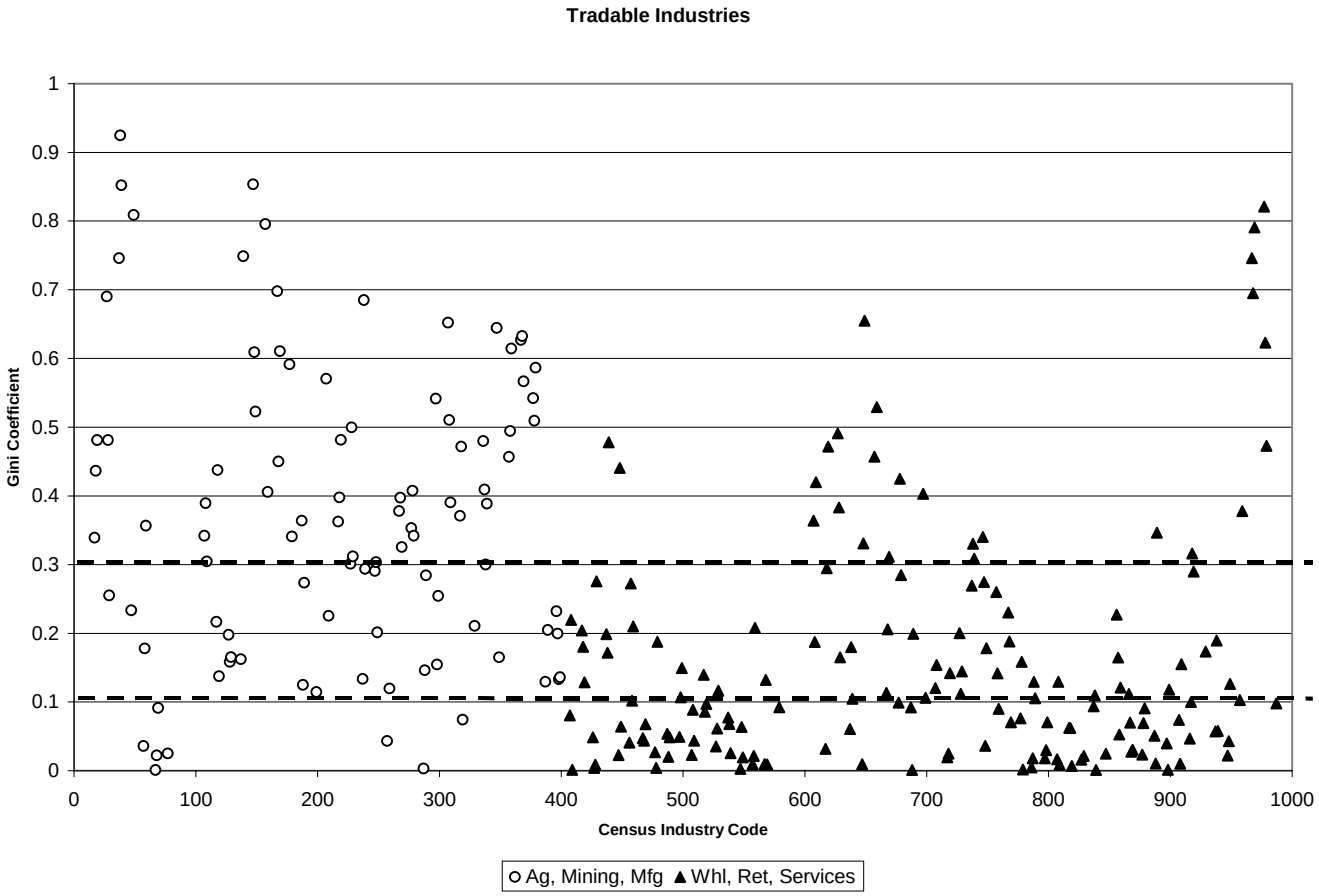
Tradable Industries
Gini Coefficient
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
100
200
300
400
500
600
700
800
900
1000
Census Industry Code
Ag, Mining, Mfg
Whl, Ret, Services

Table 2
Service Industries
Gini Coefficient Class

2-digit NAICS	Industry Description	Gini Coefficient Class
51	Newspaper publishers	1
51	Libraries and archives	1
51	Radio and television broadcasting and cable	2
51	Wired telecommunications carriers	2
51	Data processing services	2
51	Publishing except newspapers and software	3
51	Software publishing	3
51	Motion pictures and video industries	3
51	Sound recording industries	3
51	Other telecommunication services	3
51	Other information services	3
52	Banking and related activities	1
52	Savings institutions, including credit unions	1
52	Non-depository credit and related activities	2
52	Insurance carriers and related activities	2
52	Securities, commodities, funds, trusts, and other financial investments	3
53	Video tape and disk rental	1
53	Other consumer goods rental	1
53	Real estate	2
53	Automotive equipment rental and leasing	2
53	Commercial, industrial, and other intangible assets rental and leas	2
54	Veterinary services	1
54	Legal services	2
54	Accounting, tax preparation, bookkeeping and payroll services	2
54	Architectural, engineering, and related services	2
54	Specialized design services	2
54	Advertising and related services	2
54	Other professional, scientific and technical services	2
54	Computer systems design and related services	3
54	Management, scientific and technical consulting services	3
54	Scientific research and development services	3
55	Management of companies and enterprises	2
56	Business support services	1
56	Services to buildings and dwellings	1
56	Landscaping services	1
56	Waste management and remediation services	1
56	Employment services	2
56	Travel arrangement and reservation services	2

56	Investigation and security services	2
56	Other administrative and other support services	2
61	Elementary and secondary schools	1
61	Colleges and universities, including junior colleges	1
61	Business, technical, and trade schools and training	2
61	Other schools, instruction, and educational services	2
62	Offices of physicians	1
62	Offices of dentists	1
62	Office of chiropractors	1
62	Offices of optometrists	1
62	Outpatient care centers	1
62	Home health care services	1
62	Other health care services	1
62	Hospitals	1
62	Nursing care facilities	1
62	Residential care facilities, without nursing	1
62	Individual and family services	1
62	Vocational rehabilitation services	1
62	Child day care services	1
62	Offices of other health practitioners	2
62	Community food and housing, and emergency services	2
71	Bowling centers	1
71	Independent artists, performing arts, spectator sports, and related	2
71	Museums, art galleries, historical sites, and similar institutions	2
71	Other amusement, gambling, and recreation industries	2
72	Recreational vehicle parks and camps, and rooming and boarding houses	1
72	Restaurants and other food services	1
72	Drinking places, alcoholic beverages	1
72	Traveler accommodation	2
81	Automotive repair and maintenance	1
81	Car washes	1
81	Electronic and precision equipment repair and maintenance	1
81	Commercial and industrial machinery and equipment repair and maintenance	1
81	Personal and household goods repair and maintenance	1
81	Barber shops	1
81	Beauty salons	1
81	Dry cleaning and laundry services	1
81	Funeral homes, cemeteries and crematories	1
81	Religious organizations	1
81	Nail salons and other personal care services	2
81	Other personal services	2
81	Civic, social, advocacy organizations, and grant-making	2
81	Business, professional, political, and similar organizations	2
81	Private households	2
81	Footwear and leather goods repair	3

81	Labor unions	3
92	Executive offices and legislative bodies	1
92	Other general government and support	1
92	Justice, public order, and safety activities	1
92	Administration of human resource programs	1
92	Military Reserves or National Guard	1
92	Public finance activities	2
92	Administration of environmental quality and housing programs	2
92	Administration of economic programs and space research	2
92	National security and international affairs	3
92	U. S. Army	3
92	U. S. Air Force	3
92	U. S. Navy	3
92	U. S. Marines	3
92	U. S. Coast Guard	3
92	U. S. Armed Forces, branch not specified	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	6.08	93.92
21	Mining	0	24.24	75.76
22	Utilities	84.77	11.43	3.80
23	Construction	100.00	0	0
31	Manufacturing	0	29.51	70.49
32	Manufacturing	3.73	53.70	42.57
33	Manufacturing	10.56	32.38	57.06
3M	Manufacturing	0	100.00	0
42	Wholesale Trade	51.26	45.17	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	33.03	24.17
49	Trans./Warehouse	56.11	43.89	0
51	Information	18.23	44.30	37.47
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.	2.74	61.37	35.89
55	Management	0	100.00	0
56	Administrative Support	59.53	40.47	0
61	Education	96.14	3.86	0
62	Health Care/Social	97.80	2.20	0
71	Arts, Enter., Recreation	2.38	97.62	0
72	Accommodation	81.92	18.08	0
81	Other Services	69.18	29.29	1.53
92	Public Administration	60.40	15.91	23.69
	All Industries	**57.18**	**27.08**	**15.74**

Table 4
Share of Employment by Gini Class Coefficient
By Major Occupation Category

SOC	Description	Gini Class 1	Gini Class 2	Gini Class 3
11	Management	33.97	44.93	21.10
13	Business/Fin. Oper.	13.74	64.05	22.20
15	Computer/Mathematical	0	12.39	87.61
17	Architecture/Engineering	27.62	19.81	52.57
19	Life, Physical, Social Sci.	2.33	28.08	69.59
21	Community/Social Svs.	77.99	22.01	0
23	Legal	0	39.22	60.78
25	Education and Library	96.54	3.00	0.46
27	Arts, Design, Entertain.	8.78	52.71	38.51
29	Healthcare Prac./Tech	81.26	17.92	0.82
31	Healthcare Support	96.73	2.84	0.43
33	Protective Service	24.86	70.88	4.26
35	Food Prep./Serving	55.26	40.42	4.32
37	Building Maintenance	98.54	1.46	0
39	Personal Care Service	71.40	13.19	15.42
41	Sales and Related	64.67	31.33	4.00
43	Office/Admin. Support	73.85	24.57	1.58
45	Farm, Fish, Forestry	0	0	100.00
47	Construction/Extraction	89.05	7.82	3.14
49	Install., Maint., Repair	69.53	22.45	8.02
51	Production	58.43	26.78	14.79
53	Trans./Material Moving	83.02	8.88	8.10
55	Military Specific	0	0	100.00
	All Industries	**61.14**	**25.77**	**13.09**

Table 5
List of "Employment in At-Risk Occupations, 2002"
Dossani and Kenney (2004)

Occupations	2002 Employment	Gini (Gini Class) (Jensen and Kletzer)
Bill & Account Collectors	407,280	.13(2)
Billing & Posting Clerks & Machine Operators	491,000	.07(2)
Bookkeeping, Accounting, & Auditing Clerks	1,728,730	0(1)
Customer Service Reps	1,854,750	.08(2)
Shipping, Receiving, & Traffic Clerks	792,470	.03(1)
Office Clerks, General	2,857,300	.04(1)
Claims Adjusters, Examiners, & Investigators	211,960	.13(2)
Accountants & Auditors	888,690	.14(2)
Fin., Budget, Management & Credit Analysts	677,190	.42(3); .3(3); .28(3); .31(3)
Loan Officers	218,470	.04(1)
Telemarketers	419,740	.06(2)
Drafters	209,940	.02(1)
Surveying & Mapping Technicians	55,670	.02(1)
Paralegals & Legal Assistants	193,300	.18(2)
Computer & Mathematical Science	2,772,620	
Actuaries		.49(3)
Computer Science Engineers		.38(3)
Operations Research Analysts		.33(3)
Database Administrators		.28(3)
Network Systems Administrators		.27(3)
Computer Control Programmers		.25(3)
Network & Computer Systems Analysts		.20(3)
Computer Support Specialists		.18(2)

Table 6
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	0.79	0.14
23	Construction	6.86	0
31	Manufacturing	0	2.17
32	Manufacturing	0.14	3.53
33	Manufacturing	0.85	7.17
3M	Manufacturing	0	0.53
42	Wholesale Trade	1.86	1.77
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	0.71	0.56
51	Information	0.57	2.55
52	Finance and Insurance	1.64	3.47
53	Real Estate and Rental	0.16	1.63
54	Prof., Sci., Tech. Srvs.	0.16	5.75
55	Management	0	0.06
56	Administrative Support	1.99	1.35
61	Education	8.50	0.34
62	Health Care/Social	10.90	0.25
71	Arts, Enter., Recreation	0.04	1.62
72	Accommodation	4.52	1.00
81	Other Services	3.26	1.45
92	Public Administration	3.49	2.28
	All Industries	**57.18**	**42.82**

Table 7
Mean Earnings and Demographic Characteristics
for Selected Industries

		Non-Tradable	Tradable
3x	**Manufacturing**		
	Employment Income	37,764	39,629
	Percent Male	79.7	68.0
	Percent African-American	6.6	9.4
	Percent Hispanic	9.7	11.6
	Percent Advanced Degree	3.0	5.7
	Percent B.A.	14.0	19.9
	Percent High School	84.0	83.2
	Age	40	40
51	**Information**		
	Employment Income	28,369	48,515
	Percent Male	42.2	56.9
	Percent African-American	9.4	11.5
	Percent Hispanic	6.8	7.7
	Percent Advanced Degree	11.9	9.9
	Percent B.A.	36.6	40.8
	Percent High School	93.0	96.1
	Age	40	37
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	97.5
	Age	38	39

		Non-Tradable	Tradable
53	**Real Estate and Rental and Leasing**		
	Employment Income	23,056	42,915
	Percent Male	58.1	51.2
	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	42
54	**Prof., Sci., Tech. Srvs.**		
	Employment Income	33,544	56,393
	Percent Male	25.1	54.9
	Percent African-American	1.6	5.5
	Percent Hispanic	4.1	5.5
	Percent Advanced Degree	27.5	24.4
	Percent B.A.	39.4	59.1
	Percent High School	94.0	97.8
	Age	35	39
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
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	38

Table 8
Mean Earnings and Demographic Characteristics for Occupations

	Non-Tradable	Tradable
All Occupations		
Employment Income	28,445	45,892
Percent Male	49.3	60.5
Percent African-American	10.8	9.1
Percent Hispanic	11.2	9.0
Percent Advanced Degree	7.3	13.9
Percent B.A.	21.3	38.5
Percent High School	85.7	90.7
Age	39	39

Table 9. Job loss by sector, with reemployment

Sector	1979-82	1983-87	1988-92	1993-99	2000-01
Finance, Insurance & Real Estate					
Number displaced	239,100	956,797	1,183,906	1,886,093	384,395
Share of displaced	0.03	0.05	0.08	0.08	0.06
Displacement rate	0.01	0.01	0.02	0.03	0.03
Share reemployed	0.80	0.76	0.74	0.78	0.71
Business Services					
Number displaced	608,908	1,575,729	1,294,465	2,223,273	1,063,744
Share of displaced	0.07	0.08	0.09	0.09	0.17
Displacement rate	0.04	0.05	0.04	0.03	0.05
Share reemployed	0.75	0.67	0.67	0.71	0.63
Professional Services					
Number displaced	515,472	1,567,380	1,591,517	3,655,487	742,126
Share of displaced	0.059	0.082	0.106	0.155	0.117
Displacement rate	0.011	0.017	0.018	0.026	0.022
Share reemployed	0.659	0.700	0.664	0.792	0.693
Selective manufacturing industries:					
Apparel					
Displacement rate	0.037	0.057	0.071	0.071	0.082
Share reemployed	0.581	0.560	0.595	0.577	0.509
Textiles					
Displacement rate	0.029	0.045	0.028	0.032	0.074
Share reemployed	0.695	0.666	0.675	0.663	0.492
Footwear/Leather Products					
Displacement rate	0.074	0.094	0.082	0.070	0.082
Share reemployed	0.374	0.590	0.555	0.672	0.649
Furniture					
Displacement rate	0.039	0.059	0.067	0.040	0.040
Share reemployed	0.621	0.660	0.598	0.713	0.605
All high import-competing manufacturing					
Displacement rate	0.038	0.044	0.032	0.033	0.061
Share reemployed	0.681	0.640	0.638	0.716	0.540
Total					
Number displaced	8,669,846	19,209,600	15,021,001	23,549,971	6,352,431
Displacement rate	0.018	0.022	0.020	0.021	0.026
Share reemployed	0.692	0.658	0.657	0.739	0.616

Business Services: Business & Repair (advertising, personnel supply, automotive repair, electrical repair, janitorial, computer & data processing)
Professional Services: Health care practitioners, libraries, schools, colleges and universities, legal, accounting
Author calculations from Displaced Worker Surveys (1984-2002) and CES

Table 10. Educational attainment of displaced workers, by sector of displacement

Sector	1979-82	1983-87	1988-92	1993-99	2000-01	1979-2001
Finance, Insurance & Real Estate						
Share <12 yrs	0.048	0.066	0.02	0.036	0.014	0.037
Share HS grad	0.441	0.384	0.305	0.254	0.302	0.308
Share some college	0.232	0.29	0.312	0.365	0.351	0.328
Share college or more	0.28	0.26	0.363	0.345	0.333	0.328
Share female	0.624	0.645	0.592	0.663	0.608	0.635
Predisplacement annual earnings ($2000)					$32,300	
Business Services						
Share <12 yrs	0.159	0.156	0.124	0.105	0.096	0.124
Share HS grad	0.395	0.398	0.355	0.282	0.234	0.326
Share some college	0.227	0.247	0.277	0.342	0.286	0.288
Share college or more	0.219	0.198	0.245	0.271	0.384	0.262
Share female	0.354	0.394	0.411	0.418	0.451	0.41
Predisplacement annual earnings ($2000)					$34,120	
Professional Services						
Share <12 yrs	0.096	0.077	0.054	0.048	0.055	0.058
Share HS grad	0.341	0.325	0.226	0.19	0.183	0.232
Share some college	0.241	0.266	0.293	0.335	0.329	0.307
Share college or more	0.322	0.333	0.426	0.428	0.434	0.403
Share female	0.655	0.626	0.648	0.693	0.756	0.675
Predisplacement annual earnings ($2000)					$25,109	
Selective manufacturing industries:						
Apparel						
Share <12 yrs	0.419	0.34	0.376	0.34	0.316	0.356
Share HS grad	0.449	0.501	0.478	0.393	0.407	0.453
Share some college	0.11	0.12	0.132	0.215	0.189	0.153
Share college or more	0.022	0.039	0.014	0.052	0.089	0.038
Share female	0.843	0.799	0.785	0.751	0.737	0.785
Predisplacement annual earnings ($2000)					$13,700	
Textiles						
Share <12 yrs	0.405	0.404	0.246	0.221	0.24	0.324
Share HS grad	0.486	0.461	0.526	0.419	0.357	0.458
Share some college	0.109	0.091	0.171	0.26	0.402	0.17
Share college or more	0	0.045	0.057	0.1	0	0.048
Share female	0.598	0.524	0.669	0.523	0.602	0.567
Predisplacement annual earnings ($2000)					$21,760	
Footwear/Leather Products						
Share <12 yrs	0.351	0.499	0.373	0.23	0.061	0.398
Share HS grad	0.589	0.377	0.319	0.484	0.7	0.438

Share some college	0.06	0.075	0.199	0.262	0.115	0.117
Share college or more	0	0.049	0.109	0.024	0.124	0.047
Share female	0.753	0.617	0.675	0.658	0.576	0.664
Predisplacement annual earnings ($2000)					$20,630	
Total						
Share <12 yrs	0.19	0.18	0.142	0.107	0.104	0.143
Share HS grad	0.464	0.442	0.382	0.328	0.314	0.384
Share some college	0.2	0.224	0.276	0.326	0.319	0.273
Share college or more	0.146	0.154	0.2	0.238	0.263	0.199
Share female	0.393	0.432	0.458	0.494	0.473	0.456
Predisplacement annual earnings ($2000)					$26,800	

Table 11. - Earnings losses following job displacement, by sector of job loss, 1979-2001

Sector	Mean reemployment rate	Mean earnings loss	Share w/ no loss (or with a gain)	Share w/ loss > 15%
Mfg. - nondurables	0.643	-0.125	0.526	0.337
College graduates	0.79	-0.116	0.611	0.271
Mfg. - durables	0.668	-0.168	0.513	0.358
College graduates	0.792	-0.107	0.57	0.272
Finance, Insurance, Real Estate	0.762	-0.104	0.577	0.305
College graduates	0.812	-0.122	0.597	0.289
Business Services	0.684	-0.066	0.624	0.261
College graduates	0.773	-0.085	0.643	0.241
Professional Services	0.731	-0.054	0.594	0.288
College graduates	0.829	0.006	0.621	0.249

Source: Displaced Worker Surveys, 1984-2002