The industrial structure of job displacement, 1979–89

During the 1980's, the incidence of job displacement increased markedly in the services and retail trade sectors, in sharp contrast to earlier periods, when manufacturing industries were the primary source of this form of job loss

Michael Podgursky

Data on displaced workers show that there were major shifts among industries in the relative incidence of job loss due to displacement during the 1980's. This article examines changing industrial patterns of job displacement over the decade, with special emphasis on the behavior of levels, shares, and rates of job displacements. Most intriguing are analytical results indicating a trend in the incidence of displacement *away* from manufacturing and *toward* service-producing industries. This resulted primarily from lower relative rates of displacement in manufacturing industries, and produced a much less concentrated industrial pattern of displacements by the end of the decade.

Displaced worker surveys

The Displaced Worker Surveys are special supplements to the monthly Current Population Survey, in which workers are asked: "In the past five years has [the respondent] lost or left a job because of a plant closing, an employer going out of business, a layoff from which [the respondent] was not recalled, or other similar reasons?" Workers responding affirmatively to this initial question are then asked a series of questions about their former jobs, postdisplacement labor market experiences, and, if reemployed, current job characteristics.[1] The surveys were conducted in January of 1984, 1986, 1988, and 1990. Because each survey is retrospective over the preceding 5 years, the four surveys together cover the years 1979–89.

The sample of workers drawn from the surveys for this study was selected using criteria similar to those used by the Bureau of Labor Statistics in various articles and publications reporting data on job displacement. In particular, we include in our sample only those workers who reported job loss due to a plant shutdown or relocation, and workers who were laid off due to slack work or whose jobs were eliminated. There is, however, one major difference between our approach and that of the Bureau: Bureau tabulations *exclude* workers with less than 3 years of tenure on their former jobs, whereas we do not. Excluding workers with less than 3 years of tenure greatly reduces the sample and, hence, estimates of total displacements. Such an exclusion also affects the mix of displacements, because average tenure of displaced workers differs across industries. For example, average tenure of displaced workers is lower in

Michael Podgursky is an associate professor of economics at the University of Massachusetts at Amherst.

most retail and service industries than in manufacturing and mining. Thus, the *share* of displacements accounted for by mining and manufacturing is smaller in our sample than in samples used for earlier Bureau studies. The advantage of our approach is that it gives us a much larger sample of displaced workers that allows us to conduct our analysis at a finer level of disaggregation. However, none of the major trends identified in this article depends on this tenure criterion.

Industrial composition of displacement

The focus of our examination of the industrial composition of displacements is on the number of displacements in any industry and the percentage share of any industry or group of industries in total displacements. Table 1 presents tabulations of displacements for broad industry groups, ranked by the levels of displacements in the groups for each survey. Before examining sectoral levels and shares of displacements, however, we should note the overall decline in total displacements across the four surveys. The overall level of displacements fell from 11.4 million in the 1984 survey to 10.8 million, 9.7 million, and 9.2 million in the next three surveys.[2] Thus, aggregate displacements fell by 20 percent over the period covered by the four surveys.

This aggregate decline was not the result of a uniform decline in displacements across all sectors. The data show a clear shift in the composition of displacements *from* manufacturing to service and retail industries over the decade. While overall displacements fell by 20 percent between the 1984 and 1990 surveys, displacements in durable and nondurable manufacturing, for example, fell much faster—by 42 and 40 percent, respectively. The number of mining displacements fell by 36 percent between the same two surveys. On the other hand, retail trade had a major increase in the number and, hence, share of displacements. The share of displacements rose for all services except

Table 1. **Number and percent of displacements by industrial sector, sorted by level of displacement, 1984, 1986, 1988, and 1990 surveys**

Year of survey and industrial sector	Displacements (thousands)	Percent of total	Employment (thousands)	Percent of total
1984 survey				
Total	11,419	100.0	98,314	100.0
Manufacturing, durables	3,179	27.8	12,973	13.2
Manufacturing, nondurables	1,784	15.6	8,486	8.6
Retail trade	1,276	11.2	16,129	16.4
Construction	1,189	10.4	5,907	6.0
Transportation, communications, and utilities	770	6.7	6,497	6.6
Business and repair services	685	6.0	4,044	4.1
Wholesale trade	585	5.1	3,920	4.0
Professional and related services	581	5.1	19,810	20.1
Mining	314	2.7	1,079	1.1
Finance, insurance, and real estate	259	2.3	5,997	6.1
Agriculture, forestry, and fishing	252	2.2	3,458	3.5
Public administration	203	1.8	5,128	5.2
Personal services	200	1.8	3,810	3.9
Entertainment and recreation services	142	1.2	1,076	1.1
1986 survey				
Total	10,835	100.0	100,835	100.0
Manufacturing, durables	3,098	28.6	11,708	11.6
Manufacturing, nondurables	1,592	14.7	8,238	8.2
Retail trade	1,045	9.6	16,832	16.7
Construction	952	8.8	6,149	6.1
Transportation, communications, and utilities	810	7.5	6,988	6.9
Business and repair services	781	7.2	4,916	4.9
Wholesale trade	585	5.4	4,314	4.3
Professional and related services	578	5.3	20,716	20.5
Mining	395	3.6	921	.9
Agriculture, forestry, and fishing	291	2.7	3,541	3.5
Finance, insurance, and real estate	270	2.5	6,510	6.5
Personal services	217	2.0	4,077	4.0
Public administration	122	1.1	4,710	4.7
Entertainment and recreation services	99	.9	1,215	1.2

Table 1. **Continued—Number and percent of displacements by industrial sector, sorted by level of displacement, 1984, 1986, 1988, and 1990 surveys**

Year of survey and industrial sector	Displacements (thousands)	Percent of total	Employment (thousands)	Percent of total
1988 survey				
Total	9,717	100.0	107,149	100.0
Manufacturing, durables	2,096	21.6	12,586	11.7
Retail trade	1,748	18.0	17,955	16.8
Construction	1,088	11.2	6,987	6.5
Manufacturing, nondurables	1,012	10.4	8,293	7.7
Professional and related services	754	7.8	21,563	20.1
Business and repair services	617	6.3	5,969	5.6
Transportation, communications, and utilities	561	5.8	7,548	7.0
Finance, insurance, and real estate	476	4.9	7,005	6.5
Wholesale trade	473	4.9	4,341	4.1
Mining	341	3.5	939	.9
Personal services	247	2.5	4,352	4.1
Agriculture, forestry, and fishing	148	1.5	3,338	3.1
Entertainment and recreation services	86	.9	1,278	1.2
Public administration	70	.7	4,995	4.7
1990 survey				
Total	8,929	100.0	112,439	100.0
Manufacturing, durables	1,857	20.8	12,478	11.1
Retail trade	1,579	17.7	18,812	16.7
Manufacturing, nondurables	1,064	11.9	8,456	7.5
Construction	968	10.8	7,456	6.6
Professional and related services	700	7.8	22,963	20.4
Business and repair services	605	6.8	6,636	5.9
Transportation, communications, and utilities	530	5.9	7,880	7.0
Finance, insurance, and real estate	472	5.3	7,763	6.9
Wholesale trade	469	5.3	4,580	4.1
Personal services	224	2.5	4,598	4.1
Mining	200	2.2	818	.7
Agriculture, forestry, and fishing	131	1.5	3,400	3.0
Entertainment and recreation services	92	1.0	1,353	1.2
Public administration	38	.4	5,246	4.7

entertainment and recreation, as did that for finance, insurance, and real estate. The share for construction fluctuated a bit over the four surveys, but ended in the 1990 survey (10.8 percent) approximately where it began in the 1984 survey (10.4 percent).

Tables 2 and 3 provide a more disaggregated look at the industrial structure of displacements.[3] In table 2, we examine the 10 industries that produced the largest numbers (and thus shares) of displaced workers in each survey. Of the top 10 industries in 1984, only 6 held that position in 1990—and all of the 1990 newcomers were service and retail industries. This pattern continues to hold even if we go further down the ranking. Of the top 20 industries in the 1984 survey, 14 are in the top 20 for 1990. Once again, all of the newcomers to the 1990 top 20 are retail and service industries.

Table 3 allows us to better identify the gainers and losers in displacement shares. To construct this table, we tabulated displacement shares for all detailed (three-digit census code) industries with at least 25 (unweighted) observations in either the 1984 or 1990 survey. This yielded 88 three-digit industries. We then ranked these 88 industries by the percentage-point change in displacement shares between the 1984 and 1990 surveys. As the table shows, all of the top 10 share-gainers are retail and service industries, while 6 of the 10 biggest share-losers are manufacturing industries.[4]

The tabulation below shows the composition of displacements for total manufacturing and separately for import- and export-sensitive manufacturing industries for each survey. The classification of import- and export-sensitive manufacturing industries was developed by economists at the Bureau of International Labor Affairs, U.S. Department of Labor. It is meant to identify manufacturing industries in markets with high or rising shares of imports or exports, in order to monitor the effect of international trade on domestic employment. (See the appendix for a fuller description of the two categories.)

Displacements	Survey year 1984	1986	1988	1990
Total:				
Number (thousands)	11,419	10,835	9,717	8,929
Percent	100.0	100.0	100.0	100.0
Manufacturing:				
Number (thousands)	4,963	4,690	3,108	2,921
Percent	43.5	43.3	32.0	32.7
Import-sensitive:				
Number (thousands)	1,338	1,215	850	735
Percent	11.6	11.2	8.7	8.0
Export-sensitive:				
Number (thousands)	1,251	1,191	827	728
Percent	10.9	11.0	8.5	7.9

These estimates provide further evidence of the declining role of manufacturing industries in total displacements. Manufacturing's share fell from 43.2 percent in the 1984 survey to 31.9 percent in the 1990 survey. Shares for both import-sensitive and export-sensitive industries fell from approximately 11 percent in the 1984 survey to around 8 percent in the 1990 survey. The mid-1980's clearly were a watershed in this shift. Percentage shares of manufacturing, import-sensitive, and export-sensitive industries were roughly constant in the 1984 and 1986 surveys, but fell sharply in the 1988 and 1990 studies.

In sum, examination of these share tabulations suggests that a change in the structure of displacements occurred in the mid-1980's (that is, between the 1986 and 1988 surveys). One summary way to gauge overall stability and change in the structure of displacements is to compute a correlation coefficient for industry displacement shares between the various surveys. The following tabulation reports correlation matrixes for the percentage

Table 2. **Top 10 industries in terms of number and percent of displacements, 1984, 1986, 1988, and 1990 surveys**

Detailed industry	Displacements (thousands)	Percent of total
1984 survey		
Construction	1,189	10.3
Motor vehicle manufacturing	339	3.0
Machinery manufacturing, except electrical, not elsewhere classified	298	2.6
Trucking	291	2.5
Apparel, excluding knitwear	285	2.5
Electrical machinery manufacturing, not elsewhere classified	279	2.4
Motor vehicle dealers	200	1.7
Printing and publishing, except newspapers	192	1.7
Blast furnaces and steelworks	173	1.5
Construction machinery manufacturing	163	1.4
Structural metal manufacturing	156	1.4
1986 survey		
Construction	952	8.8
Electrical machinery manufacturing, not elsewhere classified	355	3.3
Apparel, excluding knitwear	289	2.7
Trucking	271	2.5
Machinery manufacturing, except electrical, not elsewhere classified	257	2.4
Motor vehicle manufacturing	236	2.2
Blast furnaces and steelworks	199	1.8
Crude oil and gas extraction	195	1.8
Agriculture, crops	177	1.6
Business services, not elsewhere classified	174	1.6
1988 survey		
Construction	1,088	11.2
Eating and drinking places	523	5.4
Electrical machinery manufacturing, not elsewhere classified	237	2.4
Grocery stores	233	2.4
Apparel, excluding knitwear	212	2.2
Trucking	198	2.0
Crude oil and gas extraction	197	2.0
Machinery manufacturing, except electrical, not elsewhere classified	194	2.0
Department stores	185	1.9
Motor vehicle manufacturing	181	1.9
Machinery, wholesale	144	1.5
1990 survey		
Construction	968	10.6
Eating and drinking places	452	4.9
Electrical machinery manufacturing, not elsewhere classified	237	2.6
Apparel, excluding knitwear	212	2.3
Trucking	210	2.3
Motor vehicle manufacturing	183	2.0
Grocery stores	171	1.9
Department stores	169	1.8
Business services, not elsewhere classified	155	1.7
Printing and publishing, except newspapers	148	1.6
Machinery, wholesale	145	1.6

NOTE: The sample reflects all workers who lost a job due to a plant closing or whose job was otherwise eliminated in selected industries. A three-digit industry was included in the sample if it had at least 25 (unweighted) observations in the 1984 or 1990 survey. This criterion was met by 88 industries.

shares of our 88 three-digit industries across the four surveys. The upper matrix is for all 5 years in each survey.

Survey year	1984	1986	1988	1990
	All years			
1984	1.00	—	—	—
1986	.97	1.00	—	—
1988	.85	.83	1.00	—
1990	.85	.83	.99	1.00
	Nonoverlapping years			
1984	1.00	—	—	—
1986	.95	1.00	—	—
1988	.85	.83	1.00	—
1990	.86	.85	.97	1.00

Here we find, for example, that the correlation between 1984 and 1986 industry displacement shares is very high—0.97. Such a high correlation coefficient is perhaps not surprising, because the 5-year period covered by each survey has a 3-year overlap from one survey to the next (that is, the 1988 survey covers 1983–87 displacements while the 1990 survey covers 1985–89, so that they overlap for the years 1985–87). To test how this overlap affects interpretation of the results, the lower matrix in the above tabulation presents correlations for nonoverlapping samples. Here and elsewhere, "nonoverlapping" means displacements that occurred in the 2 years prior to each survey year: 1984 survey (1982–83); 1986 survey (1984–85); 1988 survey (1986–87); and 1990 survey (1988–89). A comparison of the overlapping and nonoverlapping share correlation matrixes shows very little difference.

These correlation coefficients indicate a highly stable structure of displacements, with a significant break in the mid-1980's. Consider the bottom nonoverlapping matrix. The correlation between percentage shares in the 1984 and 1986 surveys was 0.95. The correlation for the 1988 and 1990 surveys was a slightly higher 0.97. Contrast these with the correlation between the 1986 and 1988 surveys—just 0.83, as a sharp shift toward retail trade and services occurred in the mid-1980's.

The timing of this shift suggests that it is not cyclical in origin. Because the nonoverlapping samples include only workers displaced within 2 years of the survey date, only the 1984 survey (with 1982 and 1983 displacements) would pick up the effects of the 1981–82 recession. Hence, if this shift toward retail and service sector displacements were due to recession, the break should have occurred between the nonoverlapping 1984 survey (1982–83) and 1986 survey (1984–85) samples and not between those for the 1986 (1984–85) and 1988 (1986–87) surveys.[5]

These share changes brought about a considerable reduction in the inequality of the incidence of displacement across industries—that is, in the difference between displacement shares and employment shares. The result was a much less industrially concentrated structure of displacements by the late 1980's. If we fit Lorenz curves to the displacement and employment share data in table 1 and compute a Gini index, we find a sharp decline in inequality over the four surveys.[6] The estimated Gini coefficient falls from 0.40 and 0.42 for the 1984 and 1986 surveys, to 0.31 for the 1988 and 1990 surveys.

Table 3. **Top 10 industry gainers and losers in share of displacements between the 1984 and 1990 displaced worker surveys**

Industry	1990 share (percent)	1984 share (percent)	Percentage-point change in share, 1984–90
Top 10 gainers			
Eating and drinking places	4.81	0.73	4.08
Grocery stores	1.82	.15	1.67
Department stores	1.80	.21	1.59
Hospitals	1.47	.12	1.35
Insurance	1.33	.27	1.06
Banking	.99	.02	.97
Elementary and secondary schools	.83	.11	.73
Business services, not elsewhere classified	1.64	1.04	61
Colleges and universities	.50	.02	.48
Hotels and motels	1.16	.71	.45
Top 10 losers			
Machinery manufacturing except electrical, not elsewhere classified	1.33	2.66	–1.33
Motor vehicle manufacturing	1.95	3.03	–1.07
Blast furnaces and steelworks	.61	1.54	–.93
Construction machinery manufacturing	.59	1.46	–.86
Motor vehicle dealers	1.04	1.79	–.75
Newspapers publishing and printing	.26	.93	–.67
Agriculture, crops	.44	1.06	–.63
Railroad transportation	.33	.89	–.56
Auto repair shops	.77	1.31	–.54
Farm machinery manufacturing	.16	.65	–.48

NOTE: Due to rounding, sums of columns 2 and 3 may not equal column 1.

Displacement rates by industry

An industry may generate a high level of displacements because it has a high rate of displacement or because it employs a large number of workers. Thus, it is useful to examine trends in rates of displacement by industry. For this analysis, the 5-year flow of displacements in any industry is divided by a measure of average employment over the 5-year interval covered by the displaced worker survey. Examination of the resulting rates allows us to identify industries with high rates of job instability.

Rates of displacement by broad industrial sector are reported in table 4. The rate of displacement is computed by dividing the 5-year flow of displacements by average monthly Current Population Survey employment in the industry for the middle year of the 5-year panel (for example, 1987 for the 1990 survey, 1985 for the 1988 survey, and so forth) as reported in the BLS publication *Employment and Earnings*.[7] In all four surveys of displaced workers, the highest rates are found in mining, durable manufacturing, and nondurable manufacturing, in that order. These are followed by construction, then retail trade and service industries.

Table 5 presents the top 10 industries in terms of displacement rates for 87 of the 88 three-digit industries with 25 or more (unweighted) displacements in the 1984 or 1990 survey. An examination of the data shows that mining and several manufacturing industries had very high rates of displacement. Metal mining, for example, had a 5-year flow of displacements that equaled 77 percent of average monthly employment. Industries that, directly or indirectly, face international trade pressures tend persistently to occupy top rank: metal mining, coal mining, leather footwear, construction machinery, and blast furnaces and steelworks.

Table 4. **Percentage rates of displacement by industrial sector, 1984, 1986, 1988, and 1990 surveys**

Industry sector	Survey year			
	1984	1986	1988	1990
Agriculture, forestry, and fishing	7.3	6.2	4.4	3.9
Mining	29.1	42.9	36.3	24.4
Construction	20.1	15.5	15.6	13.0
Manufacturing, nondurables	21.0	19.3	12.2	12.6
Manufacturing, durables	24.5	26.4	16.7	14.9
Transportation, communications, and utilities	11.9	11.6	7.4	6.7
Wholesale trade	14.9	13.6	10.9	10.2
Retail trade	7.9	6.2	9.7	8.4
Finance, insurance, and real estate	4.3	4.1	6.8	6.1
Business and repair services	16.9	15.9	10.3	9.1
Personal services	5.2	5.3	5.7	4.9
Entertainment and recreation	13.2	8.1	6.7	6.8
Professional and related services	2.9	2.6	3.5	3.0
Public administration	4.0	3.0	1.4	.7

How stable are these rate estimates from survey to survey? The upper correlation matrixes below show that there was considerable change in rates of displacement from one survey to the next.[8]

Survey year	*Rates, all years*			
	1984 survey	*1986 survey*	*1988 survey*	*1990 survey*
1984	1.00	—	—	—
1986	.92	1.00	—	—
1988	.82	.87	1.00	—
1990	.75	.75	.85	1.00

	Rates, nonoverlapping years			
	1984 survey	*1986 survey*	*1988 survey*	*1990 survey*
1984	1.00	—	—	—
1986	.84	1.00	—	—
1988	.60	.60	1.00	—
1990	.61	.60	.65	1.00

	Rank-order, nonoverlapping years			
	1984 survey	*1986 survey*	*1988 survey*	*1990 survey*
1984	1.00	—	—	—
1986	.90	1.00	—	—
1988	.80	.82	1.00	—
1990	.79	.80	.83	1.00

Focusing on the nonoverlapping rates in the lower matrix, we find that the correlation in rates between the 1984 and 1986 surveys was 0.84. This drops to 0.60 between the 1986 and 1988 surveys and to 0.65 between the 1988 and 1990 surveys. However, the rank-order correlation matrix at the bottom of the tabulation shows that, while the relative rate of displacement computed for any industry varies considerably from survey to survey, the *rank* of an industry tends to be more stable. Note, for example, the lower left entry: the correlation between ranks in the nonoverlapping years of the 1984 survey (1982 and 1983) and the 1990 survey (1988 and 1989) was 0.79, indicating that industries with high rates of job instability tended to be relatively unstable both at the beginning and at the end of the 1980's.

Finally, we examine the effect of changing displacement rates on the *composition* of displacements. As noted at the beginning of this section, an industry may account for a large share of overall displacements either because it has a relatively high rate of displacements or because it

Table 5. **Top 10 industries in terms of rates of displacement, 1984, 1986, 1988, and 1990 surveys**

Detailed industry	Displacement rate (percent)
1984 survey	
Metal mining	77.4
Construction machinery manufacturing	70.3
Iron and steel foundries	59.3
Farm machinery manufacturing	56.2
Leather footwear manufacturing	52.7
Coal mining	49.0
Blast furnaces and steelworks	47.7
Canning fruit and vegetables	36.4
Structural metal manufacturing	35.9
Motor vehicle manufacturing	34.0
1986 survey	
Metal mining	70.7
Coal mining	66.9
Construction machinery manufacturing	63.7
Blast furnaces and steelworks	54.9
Farm machinery manufacturing	47.3
Iron and steel foundries	43.9
Household appliance manufacturing	42.9
Leather footwear manufacturing	41.1
Other primary metal manufacturing	34.8
Yarn and fabric mills	34.6
1988 survey	
Coal mining	50.3
Metal mining	47.7
Leather footwear manufacturing	41.3
Construction machinery manufacturing	40.0
Crude oil and gas extraction	33.2
Structural metal manufacturing	29.3
Blast furnaces and steelworks	27.4
Farm machinery manufacturing	22.9
Shipbuilding and repair	21.6
Miscellaneous food preparation	21.5
1990 survey	
Leather footwear manufacturing	56.6
Metal mining	35.3
Coal mining	29.4
Construction machinery manufacturing	27.5
Household appliance manufacturing	26.3
Crude oil and gas extraction	25.0
Shipbuilding and repair	24.9
Structural metal manufacturing	24.2
Apparel, except knitwear	21.5
Miscellaneous food preparation	18.7

Table 6. **Shift-share analysis of changes in industry displacement shares between the 1984 and 1990 surveys**

Residual	Percentage-point change in displacement share, 1984-90	Change due to—		
		Displacement rate	Industry employment	Residual
Durable manufacturing	–7.04	–3.11	–4.43	0.49
Nondurable manufacturing	–3.71	–1.95	–2.01	.25
Retail trade	6.51	6.17	.22	.12
Construction	.43	–.59	1.08	–.06
Transportation, communications, and utilities	–.81	–1.15	.41	–.07
Business and repair services	.78	–1.28	2.61	–.56
Wholesale trade	.13	.02	.11	.00
Professional and related services	2.75	2.65	.07	.04
Mining	–.51	.63	–.93	–.21
Finance, insurance, and real estate	3.01	2.40	.30	.32
Agriculture, forestry, and fishing	–.74	–.50	–.31	.07
Public administration	–1.35	–1.30	–.19	.14
Personal services	.76	.63	.10	.03
Entertainment and recreational services	–.21	–.31	.12	–.03

accounts for a large share of employment. This simple idea may be formalized as:

$$(D_i / D) = \frac{D_i / D}{D / N} \quad (N_i / N)$$

where D_i and N_i are the levels of displacements and employment in the ith industry, and D and N are the economy-wide totals for the same variables. Then, the change in the share of displacements between any two periods may be decomposed using a familiar "shift-share" formula:

$$\Delta (D_i / D) = \left[\Delta \frac{D_i / N_i}{D / N} (N_i / N) \right] + \left[\Delta (N_i / N) \frac{D_i / N_i}{D / N} \right] + \left[\Delta \frac{D_i / N_i}{D / N} \Delta (N_i / N) \right]$$

Such a decomposition is reported in table 6.

For manufacturing industries, roughly one-half of the decline in displacement shares between the 1984 and 1990 surveys is accounted for by a decline in the relative rate of displacement, and the other half by a decline in relative employment in the industry. However, for industries with growing shares of total displacement, such as retail trade, professional and related services, and finance, insurance, and real estate, most of the rise is due to higher relative rates of displacement. These results are consistent with the behavior of Gini coefficients noted in an earlier section: industries with rising employment shares, such as retail trade and services, typically had even faster increases in displacement shares over the study period.

ALTHOUGH THE INCIDENCE of job displacement still is heavily concentrated in manufacturing, and in goods-producing industries generally, this concentration declined during the 1980's as displacements shifted toward service and retail sectors. This shift was, for the most part, not due to faster employment growth in the latter sectors. Instead, it derives primarily from a higher relative rate of displacement in retail trade and services, as compared to manufacturing industries. □

Footnotes

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[1] For further details on the Displaced Worker Survey, see *Displaced Workers, 1979–1983*, Bulletin 2240 (Bureau of Labor Statistics, July 1985); *Displaced Workers, 1981–85*, Bulletin 2289 (Bureau of Labor Statistics, September 1987); and Diane E. Herz, "Worker displacement still common in the late 1980's," *Monthly Labor Review*, May 1991, pp. 3–9.

[2] Total displacements may differ slightly from survey to survey due to missing values for the variables under consideration. There were relatively few missing values for former industry in the first three Displaced Worker Surveys. The 1990 survey, however, had an unusually large number of missing values for this question. If these cases are included, the total level of displacements is 9.2 million; if they are excluded, displacements total 9.0 million.

[3] In examining more disaggregated data, a caveat is in order. It is important to keep in mind that changes in the level and share of displacements between surveys may result not from changing economic conditions but from sampling error. Hence, we must be careful in interpreting these disaggregated data, particularly for industries that have fewer than 100,000 displacements. For example, an industry with 100,000 displacements has an estimated standard deviation of 15,249. (This is computed using the procedure described in *Displaced Workers, 1981–85*, appendix A). Thus, a 95-percent confidence interval for the true level of displacements is 100,000 ± 1.96 (15,249) = [70,112 to 129,888]. For an industry showing 50,000 displacements, the estimated standard error is 10,785 and the corresponding confidence interval is [28,861 to 71,139]. *Differences* in the level or share of displacements between surveys will be even less reliable because the variance of the estimated difference will equal the *sum* of the variances from each survey.

[4] One industry in particular stands out in table 3. "Eating and drinking places" (Industry 641) rose from 39th to 2nd place between the two surveys, and is by far the largest share-gainer in table 3. Total displacements in this industry rose from 81,864 and 57,377 in the 1984 and 1986 surveys to 523,260 and 452,259 in the 1988 and 1990 studies. Such a sharp increase between the latter and former surveys seems implausibly large. Even if the true level of restaurant displacements had doubled from the early to latter 1980's, sampling error could not explain such an increase. I have discussed this finding with a number of individuals at the Bureau of Labor Statistics who are familiar with the Displaced Worker Surveys. None could explain a change of this magnitude. I also examined the interviewer instruction manuals for the four surveys but could find no clues. I have computed a number of cross-tabulations of displaced workers in this industry in order to shed light on the veracity of this finding. The results of these cross-tabulations do not point to any obvious coding errors and seem reasonable. For example, the occupations of most of these restaurant workers were waiters, waitresses, bartenders, cashiers, and "managers, not elsewhere classified." These displacements also are dispersed over many States and all the census regions. In the absence of a good explanation for the increase in displacements of the magnitude observed for "Eating and drinking places," this finding should be treated with caution. None of the major findings in this article, however, hinges on the peculiar behavior of data for restaurants and eating places.

[5] This sharp break occurs even if we exclude eating and drinking places and recompute the correlation coefficient using just 87 industries, although it is reduced in magnitude. Excluding industry 641 yields the following nonoverlapping correlations: 0.95 (1984 to 1986 surveys); 0.89 (1986 to 1988 surveys); and 0.97 (1988 to 1990 surveys).

[6] Lorenz curves were fit to the data in table 1 using the method described in Nanak C. Kakwani, "On the Estimation of Lorenz Curves from Grouped Observations," *International Economic Review*, June 1973, p. 281. The Gini index was computed by numerical integration of the resulting curve.

[7] Unfortunately, the published data for years prior to 1983 could not be matched to our 88 detailed industries. Thus, it was necessary to compute displacement rates for the 1984 survey differently from those for the other surveys. For the 1984 survey, displacement levels are divided by 1983 employment levels. Annual average monthly employment data are from table 28 of the January 1988, 1986, and 1984 issues of *Employment and Earnings*. In addition, published average monthly employment levels were not available for one of the 88 industries: "Health services, not elsewhere classified."

[8] Because the overall level of displacements was falling over the four surveys and average employment was rising, the average rate of displacement was falling as well. This source of change, however, cannot account for the low correlation coefficients observed in the following tabulation. If the rate of displacement fell by the same proportion for all industries from one survey to another, the correlation coefficient would be unity.

APPENDIX: Trade-sensitive manufacturing industries

Manufacturing industries are classified as export- or import-sensitive based on trade data covering the period 1982–87. Specifically, an *import-sensitive* industry is defined as one in which the ratio of imports to new supply (imports + industry shipments): a) exceeded 30 percent; or b) grew at an average annual rate of 2 percent or more. The following industries, with their Current Population Survey industry codes, were thus classified as import-sensitive: apparel and accessories, except knitting (151); rubber products, except tires and plastic footwear and belting (211); footwear, except rubber and plastic (221); leather products, except footwear (222); miscellaneous nonmetallic mineral and stone products (262); other primary metals industries (280); construction and material handling machines (312); office and accounting machines (321); machinery, except electrical, not elsewhere classified (331); radio, TV, and communications equipment (341); railroad locomotives and equipment (361); cycles and miscellaneous transportation equipment (370); scientific and controlling equipment (371); optical and health services supplies (372); photographic equipment and supplies (380); watches, clocks, and clockwork-operated devices (381); and miscellaneous manufacturing industries (391).

An *export-sensitive* industry is defined as an industry in which the ratio of exports to industry shipments: a) exceeded 20 percent; or b) grew at an average annual rate of 1 percent or more. The following industries, with their Current Population Survey industry codes, were deemed export-sensitive: tobacco manufactures (130); pulp, paper, and paperboard mills (160); agricultural chemicals (191); industrial and miscellaneous chemicals (192); miscellaneous petroleum and coal products (201); rubber products, except tires and inner tubes (211); other primary metals industries (280); engines and turbines (310); construction and material handling machines (312); office and accounting machines (321); machinery, except electrical, not elsewhere classified (331); electrical machinery and equipment, not elsewhere classified (342); aircraft and parts (352); cycles and miscellaneous transportation equipment (370); scientific and controlling equipment (371); and miscellaneous manufacturing industries (391).

For details on this methodology see, Gregory K. Schoepfle, "Imports and domestic employment: identifying affected industries," *Monthly Labor Review*, August 1982, pp. 13–26; and Robert W. Bednarzik, "Trade-Sensitive U.S. Industries: Employment Trends and Worker Characteristics," Economic Discussion Paper, 36 (U.S. Department of Labor, Bureau of International Labor Affairs, July 1991). The above classification is from Bednarzik, "Trade-Sensitive U.S. Industries," table 4.