

## *The Costs of Defense-Related Layoffs in New England*

Since the late 1980s, declines in defense spending have resulted in dramatic employment reductions in defense-related sectors. The costs to New England have been disproportionate, for several reasons. New England industries are relatively more dependent on defense contracts, and contracts to New England businesses have fallen at a greater rate than the national average. Furthermore, a far greater percentage of jobs have been eliminated at New England's military bases than elsewhere in the country. Finally, the downturn in defense coincided with the most severe recession the region has faced since the Great Depression.

Although considerable information exists on the fate of major defense contractors and military bases in New England, little is known about what has happened to laid-off defense workers. On the one hand, if general economic conditions are the most important determinant of job opportunities, then defense workers should have participated in the employment recovery that began in New England in 1992. On the other hand, defense workers may face particular difficulties even as the economy improves if their skills are undervalued in industries that are hiring. Specifically, since New England's recent growth has been concentrated in service-producing industries, the recovery may have left the mostly manufacturing-oriented defense workers behind. As a result, former defense workers may be experiencing disproportionately high rates of unemployment; they may have taken jobs that are significantly less attractive than their previous employment; or they may have decided to leave the New England work force by moving away or retiring.

This article starts by estimating the magnitude of defense-related employment reductions in New England since the late 1980s. It then examines the experiences of a sample of approximately 5,000 former defense workers who looked for a new job following their layoffs. The research confirms that the region's work force has suffered considerably as a result of defense cutbacks. Even though greater job opportunities exist now than at the depths of the regional recession, changes in the

*Yolanda K. Kodrzycki*

*Senior Economist, Federal Reserve Bank of Boston. Karen A. Therien provided excellent research assistance. Additional author's acknowledgments appear at the end of the article.*

region's mix of jobs and the associated skill requirements mean that former defense workers continue to have difficulties finding work and in recouping their former income even when they do find a job. Moreover, a comparison with national surveys of displaced workers in the 1980s suggests considerably greater difficulties for New England workers laid off in 1991 and 1992. The problems are most severe for older workers and those without a college degree, as well as workers located in areas that remain economically disadvantaged.

### I. Defense-Related Cutbacks in Employment

Defense-related jobs are inherently difficult to count, because they form a subset of employment in a broad array of economic sectors, and because distinguishing workers dependent on defense projects from those who are not can be a challenge.<sup>1</sup> By all accounts, however, reductions in defense spending deepened the recession job losses that started in New England in the late 1980s, and they have slowed down the pace of job gains in the subsequent economic recovery. According to the estimates presented in this section, defense cutbacks appear to account directly for a 1.7 percent drop in total New England employment since 1989. This equals almost one-third of the total net drop in New England jobs during that period.

#### Defense-Related Private Sector Employment

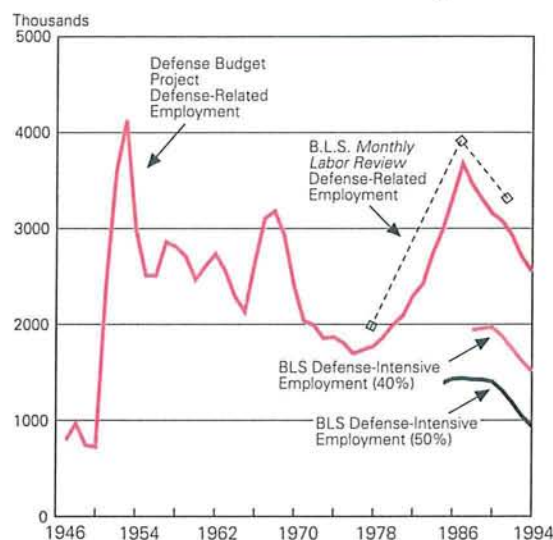
The Defense Budget Project, a private research organization, has prepared national estimates of defense-related employment in private industry (Figure 1). These figures include jobs that depend directly on Pentagon contracts, as well as jobs at subcontractors or suppliers of goods and services to support Pentagon contracts. At its 1987 peak, national defense-related employment in private industry stood at 3.665 million (3.5 percent of total private nonfarm employment). By 1992, 742,000 defense-related jobs had been eliminated, and 363,000 more positions were cut or predicted to be cut in 1993 and 1994—for a total reduction from peak of 30 percent.

For comparison, Figure 1 also displays estimates produced at the U.S. Bureau of Labor Statistics and published in the *Monthly Labor Review*. These figures

<sup>1</sup> This issue as well as other measures of New England's defense intensity and the costs of defense cutbacks are discussed in Henderson (1990).

Figure 1

### Defense-Related Employment in U.S. Private Industry



Note: Defense Budget Project data are for fiscal years; FY94 is estimated.

Source: National Defense Budget Estimates for FY 1995, March 1994, U.S. Bureau of Labor Statistics, *Monthly Labor Review*, April 1993.

show somewhat higher 1987 defense-related private sector employment, 3.939 million (3.9 percent of total private nonfarm employment), but a similar number of jobs lost through 1992.

An alternative measure of defense jobs—total employment in industries that depend heavily on defense business—is less comprehensive but easier to track over time and for subnational areas such as states. Table 1 lists the industries that, nationally, are at least 40 percent defense-dependent, as determined by the U.S. Bureau of Labor Statistics. This measure is less comprehensive than defense-related employment because it omits defense workers in industries that are not defense-intensive (Figure 1; national employment using 40-percent and 50-percent dependency is shown).<sup>2</sup> For example, the Massachusetts Institute of

<sup>2</sup> Conceptually, employment in defense-intensive industries could be more comprehensive than defense-related employment to the extent it includes all workers at a defense contractor, not only those involved in defense work. For example, defense-intensive industry employment includes employees at Connecticut defense contractor Pratt & Whitney who work on commercial aircraft projects.



Table 1  
*Defense-Intensive Industries: 40 Percent or Greater Dependency*

SIC 2892:	Explosives
SIC 348:	Ordnance and accessories <sup>a</sup>
SIC 3663:	Radio and TV communications equipment
SIC 3669:	Communications equipment, not elsewhere classified
SIC 372:	Aircraft and parts <sup>a</sup>
SIC 3731:	Shipbuilding and repairing <sup>a</sup>
SIC 376:	Guided missiles and space vehicles <sup>a</sup>
SIC 3795:	Tanks and tank components <sup>a</sup>
SIC 381:	Search and navigation equipment <sup>a</sup>
SIC 8731:	Commercial physical research
SIC 8732:	Commercial nonphysical research
SIC 8734:	Testing laboratories

<sup>a</sup>50 percent or greater dependency.

Source: U.S. Bureau of Labor Statistics, Division of Monthly Industry Employment Statistics.

Technology is a major recipient of Defense Department funding, even though the education industry (and even MIT) would not count defense as a major source of its overall revenues.<sup>3</sup>

For New England, estimates of defense-related jobs are available from the Defense Budget Project only for 1992 (Kosiak and Bitzinger 1993), but defense-intensive industry employment is available from state statistical agencies each quarter. The 1992 data indicate that the region was unusually dependent on private-sector defense jobs. While defense contracts to private industry accounted for 2.5 percent of national employment, they accounted for 4.3 percent of New England employment. Connecticut and Massachusetts ranked number one and two, respectively, among all states in terms of private-industry dependence on defense, and all the New England states except Vermont were among the top half.

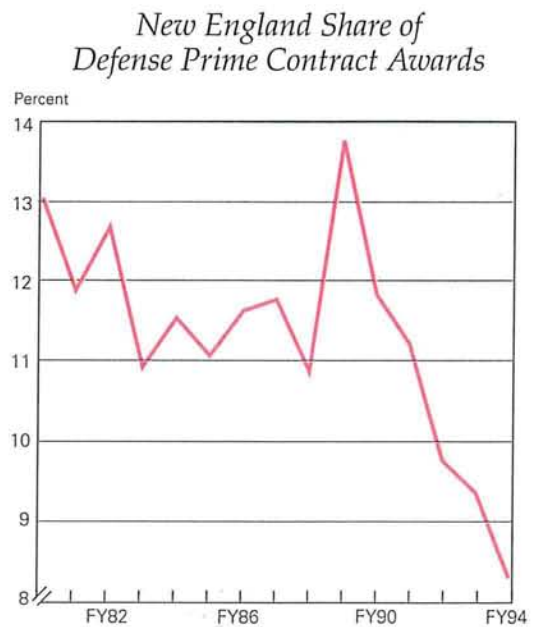
These data suggest that even if New England receives its "fair share" of cutbacks in Pentagon contracts, the proportional impact on the region's labor markets would be above-average (especially in Connecticut and Massachusetts) because of the above-

<sup>3</sup> Another example would be major computer companies that are defense prime contractors, but for which defense is a relatively small component of total business. Among the New England states, Massachusetts appears to have a particularly large share of defense-related employment outside defense-intensive sectors.

average regional significance of defense-related jobs. In fact, however, even though New England was relatively late in experiencing reductions in contracts, the region has suffered more than its "fair share" of the cutbacks to date (Table 2 and Figure 2). New England's share of national defense contracts has fallen from a range of 11 to 13 percent in the 1980s to 8.5 percent more recently. The percentage decline from peak has been substantially larger in Connecticut than in Massachusetts.

To construct a New England estimate of the number of private-sector jobs lost as a direct result of defense cutbacks, this study relies on the 1992 employment levels as measured by the Defense Budget Project combined with the trend in total employment in industries that depend heavily on defense business. Although the two measures differ in the ways discussed above, the similarity in recent national trends for defense-related private sector employment and employment in defense-intensive industries suggests some value in splicing together these two sources of

Figure 2



Source: U.S. Department of Defense, *Prime Contract Awards by State*.

Table 2  
*Total Prime Contract Awards, FY 1980 to FY 1994*  
 Millions of Dollars

	United States	New England	Connecticut <sup>a</sup>	Maine	Massachusetts	New Hampshire	Rhode Island <sup>b</sup>	Vermont
FY 1980	68,070	8,775	3,879	459	3,743	306	262	125
FY 1981	87,761	10,372	4,494	476	4,605	393	236	168
FY 1982	103,858	13,037	5,905	788	5,317	539	285	202
FY 1983	118,744	12,967	5,132	405	6,328	541	381	180
FY 1984	123,995	14,249	5,459	532	7,029	663	396	170
FY 1985	140,096	15,487	5,543	957	7,714	678	431	163
FY 1986	136,026	15,748	5,441	584	8,735	471	394	124
FY 1987	133,262	15,606	5,031	830	8,685	469	478	113
FY 1988	125,767	13,673	4,911	518	7,212	481	429	122
FY 1989	119,917	16,268	6,082	370	8,757	478	417	163
FY 1990	121,254	14,271	4,241	843	8,166	391	555	75
FY 1991	124,119	13,889	4,979	1,065	6,933	427	413	71
FY 1992	112,285	11,033	3,099	1,305	5,686	424	455	63
FY 1993	114,145	10,788	2,895	1,110	5,936	396	390	63
FY 1994	110,316	9,329	2,450	925	5,106	369	422	57
Percent Change, Peak to FY94	-21.3	-42.7	-59.7	-29.1	-41.7	-45.6	-24.0	-71.8
Year of Peak	1985	1989	1989	1992	1989	1985	1990	1982

<sup>a</sup>Including Electric Boat site in Rhode Island.

<sup>b</sup>Excluding Electric Boat.

Source: U.S. Department of Defense, *Prime Contract Awards by Region and State*, selected years.

information for constructing estimates for the New England states.<sup>4</sup>

Between the 1989 peak and 1994, it is estimated that private industry defense-related employment fell from 362,500 to 269,200 (25.7 percent) in New England (Table 3). Over this five-year period, the Massachusetts figure fell from 168,900 to 127,800 (a decrease of 24.3 percent), and the Connecticut figure from 114,800 to 79,800 (30.5 percent).<sup>5</sup>

To date, the percentage reduction in defense-related employment appears to have been smaller in the region than the nation. This is probably because defense contracts to New England companies held up fairly well in the late 1980s, after the national decline had started.<sup>6</sup> Given the sharp reductions in prime contracts to New England in the early 1990s, however, regional defense-related industry employment appears likely to fall by a greater percentage than the national average in the near future.

### *Employment at Military Bases*

As a result of reductions in its budget, the U.S. Defense Department also has cut back its own employment. Total military and civilian employment

reached its recent peak at 3.292 million in 1987, but stood at only 2.555 million in 1994 (Figure 3; line labeled "total"). For analyzing regions, it is more relevant to include only those employees stationed at domestic military bases. This employment was 2.357 million in 1987, but has since dropped by 416,000 (17.6 percent) to 1.941 million in 1994.<sup>7</sup>

<sup>4</sup> At the national level, estimated defense-intensive industry employment and defense-related private employment both fell by about 23 percent from 1989 to 1994.

<sup>5</sup> State figures for employment in defense-intensive industries are shown in Appendix Table 1. Because of disclosure restrictions, Vermont data are entirely lacking and Maine data for the shipbuilding and repair industry are not available prior to 1990. This is the largest defense industry in Maine, with most of the employment at Bath Iron Works. The adjustments to correct for these omissions are described in the Appendix. For Rhode Island, the estimates incorporate results from a state survey that tracks defense-related jobs in private industry.

<sup>6</sup> Trends in employment often lag trends in contracts, as a contract awarded in a given year can result in work spanning several years.

<sup>7</sup> The Atlas/Data Abstract numbers exclude Defense Department personnel in transit or otherwise considered in a transient status (which typically number in the hundreds of thousands), as well as personnel stationed abroad or at sea. Employee counts from different sources also differ in their treatment of indirect hires. Neither data series in Chart 3 includes reservists.



Table 3

*Defense-Related Employment in the New England States*

Thousands

Year	New England Total	Connecticut	Maine	Massachusetts	New Hampshire	Rhode Island	Vermont
<b>Private Industry</b>							
1988	362.2	116.0	23.1	162.9	21.4	30.6	8.2
1989	362.5	114.8	25.2	168.9	20.8	24.6	8.2
1990	355.6	110.7	31.4	163.6	18.6	23.8	7.3
1991	333.0	105.9	28.8	152.5	16.9	22.1	6.8
1992	308.7	96.7	26.6	143.4	16.2	19.4	6.4
1993	290.1	86.4	24.1	138.9	15.6	19.0	6.1
1994	269.2	79.8	24.2	127.8	14.9	16.5	6.0
<b>Military Bases</b>							
1988	63.3	12.5	16.2	20.5	5.5	8.0	.7
1989	64.5	11.7	16.3	21.8	5.5	8.6	.7
1990	61.5	12.2	15.7	20.7	3.8	8.3	.8
1991	57.3	12.0	14.7	20.2	1.7	7.9	.8
1992	53.1	11.3	13.0	18.2	1.8	8.0	.8
1993	49.9	10.0	12.2	17.4	1.7	7.8	.8
1994	44.1	9.8	8.1	16.0	1.7	7.7	.8
<b>Total</b>							
1988	425.6	128.5	39.3	183.4	26.9	38.6	8.9
1989	427.1	126.5	41.6	190.7	26.3	33.2	8.8
1990	417.1	122.9	47.1	184.3	22.4	32.1	8.1
1991	390.3	118.0	43.5	172.7	18.6	30.0	7.6
1992	361.8	108.0	39.6	161.6	18.0	27.4	7.2
1993	340.0	96.4	36.3	156.3	17.3	26.8	6.9
1994	313.3	89.6	32.4	143.9	16.6	24.2	6.8

Source: Connecticut Department of Labor, Maine Division of Economic Analysis and Research, Massachusetts Department of Employment and Training, New Hampshire Labor Market Information Center, Rhode Island Department of Economic Development, New England Economic Project October 1994 Vermont Forecast, U.S. Department of Defense *Atlas/Data Abstract for United States and Selected Areas*, and author's calculations. 1994 Private Industry Employment data are for the first three quarters of 1994.

Although the New England states apart from Maine traditionally have been less dependent on Department of Defense jobs than the national average, downsizings and closures of military bases have had a disproportionate effect on the region. New England employment at military bases has fallen by about 20,000 (31.6 percent) since the 1980s peak, with the reductions concentrated in Maine, Massachusetts, and New Hampshire (Table 3).

### *Summary of Defense Downsizings*

In summary, counting reductions in the private and public sectors, New England defense-related employment fell by about 113,700 (26.6 percent) between 1989 and 1994. This decline amounts to 1.7 percent of total nonagricultural payroll employment in 1989. By comparison, at the national level, defense directly

accounted for only a 1.1 percent drop in total employment.

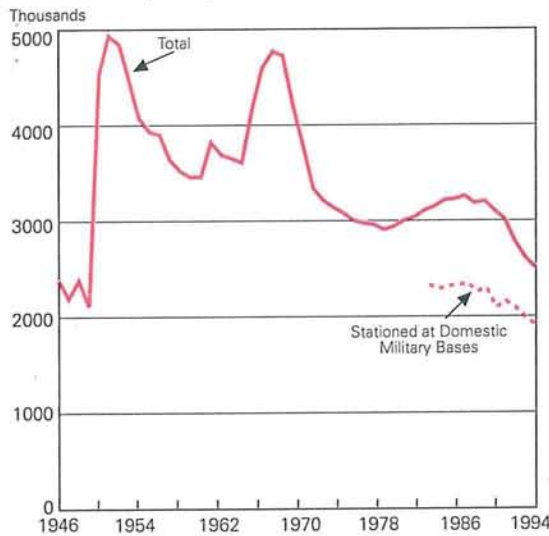
In New England, defense cutbacks were a significant contributor to the severity of the regional recession that started in 1989 and have been a factor slowing down the recovery in jobs since 1992. In 1994, total nonagricultural payroll employment in the region was 371,000 below its 1989 average. The 113,700 decline in defense-related jobs accounts for 30.6 percent of the net reduction in total employment.

## *II. Experiences of Displaced Defense Workers*

With so many workers losing their jobs during New England's severe recession, policymakers have been concerned about their reemployment prospects.

Figure 3

*Total U.S. Military and Civilian Employment of Department of Defense*



Note: 1994 Defense Budget Project data are estimates.

Source: Domestic from Dept. of Defense Atlas/Data Abstract for the United States and Selected Areas. Total from Defense Budget Project National Defense Budget Estimates for FY 1995.

States have set up centers providing job search assistance, retraining, and other forms of support to laid-off workers.<sup>8</sup> This section describes the defense workers served by assistance centers and examines their experiences in seeking reemployment. Dislocated defense workers generally have had difficulty locating new jobs, with many experiencing long unemployment spells or terminating their use of center services without finding employment. Even when they have been successful, the new jobs typically have paid substantially less than their defense jobs.

*The Dislocated Worker Sample*

The information on dislocated defense workers is both anecdotal and statistical. In the first stage of the research, on-site interviews were conducted with officials from nine worker assistance centers and summary information was obtained from two additional centers. These eleven locations encompass defense contractors and military facilities in each of the six

New England states.<sup>9</sup> In the second stage, statistical information on individual displaced workers served by assistance centers was requested from each of the New England states; Maine, Massachusetts, and Vermont were able to comply.<sup>10</sup> The resulting sample consists of about 5,000 workers laid off from military facilities and private defense contractors. The Defense Department employees are all civilian workers, as separate relocation assistance is available for military personnel. (For further information on the sample, see the Appendix.)

The combined data base provides considerable information on demographic and job characteristics of former defense workers in New England. For those workers who found new employment through a center, information is available on the duration of unemployment and the characteristics of the new job. Thus, the statistical data can be used to measure the economic costs of job loss and the influences of factors such as the worker's age, occupation, pay and length of experience at the defense employer, and geographic location, as well as the general condition of the local

<sup>8</sup> These programs were established under Title III of the federal Job Training Partnership Act (JTPA), as amended by the Economic Dislocation and Worker Assistance Act (EDWAA) of 1988. More recently, funding for some centers has come from federal monies specifically dedicated to defense conversion. States apply for worker assistance grants under the auspices of these federal programs and design services within the guidelines set by the federal government. Displaced workers' former employers also may play a role in developing services provided by assistance centers.

<sup>9</sup> State officials were instrumental in arranging visits to worker assistance centers. The following locations were visited: Bath, ME (serving employees of Bath Iron Works); Bridgeport, CT (Textron Lycoming); Hartford, CT (the Pratt & Whitney and Hamilton Standard divisions of United Technologies); Kittery, ME (Portsmouth, NH Naval Shipyard); Loring Air Force Base, ME; New London, CT (Electric Boat); Pittsfield, MA (Martin Marietta; formerly General Electric Company); Quonset Point, RI (Electric Boat); Wilmington, MA (Martin Marietta; formerly General Electric Company). Additional information was obtained concerning former employees of General Electric facilities in Lynn, MA and Burlington, VT. In the case of Lynn, the information came in the form of unpublished statistical data and an interview with a labor leader familiar with the plant; for Burlington, the source is Kessel and Maher (1991).

<sup>10</sup> Statistical information was requested from individual states rather than the federal government, for two reasons. First, states have been required to share standardized records on assisted displaced workers with the federal government only since the year that began July 1993, and data processing problems in some states reportedly caused delays in meeting the first of these deadlines (in the summer of 1994). Thus, at best only one year of information would have been available from the federal government. Second, information from the federal government would not have permitted the identification of defense-related layoffs. The data include a broad array of displaced workers served by JTPA programs, and states are not required to report the industry of the former employer.



economy at the time. Officials at worker assistance centers were able to provide additional information not encompassed in the statistical data bases. These interviews also served as an indication of experiences in states for which statistical data were not available.

The information has several notable limitations, however. The statistics cover only what is included in states' data bases. In general, data on layoffs in more recent years are more complete than for earlier layoffs, in part because of the introduction of federal reporting

---

*Dislocated defense workers generally have had difficulty locating new jobs, with many experiencing long unemployment spells.*

---

requirements since 1993. The more recent the layoff, however, the less is likely to be known about the eventual duration of unemployment or the characteristics of any new job. Second, this study's sample is limited to individuals who were working at recognized defense facilities and does not include individuals laid off from jobs at vendors or suppliers with less obvious ties to defense.<sup>11</sup>

A final limitation is that the information pertains only to dislocated workers who chose to seek government assistance in finding a new job. Because of a lack of advance notice concerning layoffs and/or funding delays, some worker assistance centers opened after layoffs had already occurred; center officials noted that a smaller fraction of eligible workers tended to register when services were delayed. In other cases, workers' decisions not to seek help were more idiosyncratic. For example, some officials noted that blue-collar workers have become accustomed to "self-help" in the aftermath of previous layoffs, in contrast with white-collar workers, who were more likely to be losing a job for the first time. In other cases, individuals may have had other resources on which to draw, such as a company severance package or income from a working spouse; this might have caused them to drop out of the work force without registering at an assistance center. Furthermore, even among those who did seek help at a worker assistance center, a sizable fraction eventually

stopped using services without locating a job; comparatively little is known about their eventual labor market experiences.

These various limitations mean that the sample cannot be used to form a precise "statistical profile" of all dislocated defense workers in New England (or even in the three states that provided detailed data). Also, because some workers have not been tracked "long enough" after being laid off (because either the sample period or use of center services ended), questions about their subsequent successes and failures cannot be fully resolved with these data. Nevertheless, the sample does provide considerable information about a large group of dislocated defense workers in New England who were motivated to seek new employment and who took advantage of government support programs. In this respect, it far surpasses other potential sources of information.<sup>12</sup>

#### *Characteristics of Displaced Defense Workers in New England*

Table 4 provides basic summary information about sampled defense workers at the time they lost their job. As a benchmark for comparison, the last column indicates national statistics on all civilian workers.

Dislocated defense workers were concentrated in prime working ages and had considerable experience in their last job. Close to 60 percent were in the 35- to 54-year-old age group, compared to about 45 percent in this age range among all workers. Eighty percent of the defense workers had been with their previous employer for at least five years, and 45 percent for at least ten years. Almost three out of four dislocated defense workers had finished high school but did not

---

<sup>11</sup> It also excludes some displaced defense workers who found temporary employment outside of defense. A study in Rhode Island found that some defense workers were able to obtain nondefense jobs for a short time before being laid off for a second time. Specifically, 15.6 percent of Rhode Islanders who filed for unemployment benefits in 1991 had been laid off from a defense-dependent job. The fraction increased to 21.8 percent if all jobs during the previous year were counted. The author is grateful to Diane Disney, formerly of the University of Rhode Island and now with the Department of Defense, for sharing these unpublished findings.

<sup>12</sup> A number of other studies of labor markets have used the biennial national survey of dislocated workers (see, for example, U.S. Congressional Budget Office 1993). The advantage of these surveys is that they are based on a representative sample of households across the nation. The disadvantage is that recent samples average about 3,800 workers a year. This is too small to permit analysis of specific categories of workers in selected regions of the country.



Table 4  
*Characteristics of Displaced Defense  
 Worker Sample for New England*

Percent	N.E. Defense Worker Sample	Memo: All U.S. Civilian Workers <sup>a</sup>
<b>Age</b>		
Less than 35 Years	29	43
35 to 44 Years	33	27
45 to 54 Years	25	18
55 Years and Over	12	12
<b>Job Tenure<sup>b</sup></b>		
Less than 5 Years	20	50
5 to 9 Years	35	19
10 to 19 Years	27	} 30
20 Years or More	18	
<b>Education</b>		
Less than High School	6	13
High School	46	33
Some College	26	29
College Degree	19	17
More than College	4	8
<b>Gender</b>		
Male	66	54
Female	34	46
<b>Race</b>		
White	92	86
Nonwhite	8	14
<b>Occupation<sup>c</sup></b>		
Professional, Technical, and Managerial Occupations	41	30
Architecture, Engineering, and Surveying	18	n.a.
Computer-Related	3	n.a.
Admin. Specializations, Managers and Officials		
Not Elsewhere Classified, and All Other	15	n.a.
Clerical and Sales	14	28
Service	3	14
Production <sup>d</sup>	41	29
<b>Hourly Wage</b>		
Below \$10.00	14	n.a.
\$10.00 to 11.99	14	n.a.
\$12.00 to 14.99	34	n.a.
\$15.00 to 17.99	15	n.a.
\$18.00 and above	23	n.a.
<b>Industry</b>		
Durables Manufacturing	75	9
Other Private Industry	4	73
Government	21	17 <sup>e</sup>

n.a. = not available. <sup>a</sup>National data circa 1992. <sup>b</sup>Job tenure not available for defense workers from Maine and approximately one-third of defense workers from Vermont. <sup>c</sup>Occupation not available for defense workers from Maine and Vermont. <sup>d</sup>Includes operators, fabricators, laborers, precision production, craft, repair, farming, forestry and fishing occupations. <sup>e</sup>Includes military employment.

Source: Author's calculations using sample of 5,001 defense workers (see Appendix). Data for defense worker sample refer to worker and job characteristics at the time of layoff. National statistics on job tenure from U.S. Congressional Budget Office (1993). National statistics on age, gender, race, occupation, and industry from *Employment and Earnings* (1993). National statistics on education from U.S. Bureau of Labor Statistics calculations using *Current Population Survey* (1994).

have a college degree. Twenty-three percent had graduated from college, including 4 percent with post-college coursework. In the population as a whole, relatively more workers lack a high school diploma. Laid-off defense workers were disproportionately male; 92 percent were white.

Three-quarters of the defense workers had been employed in durables manufacturing industries—far above the 9 percent overall share of national employment for this industry. The remainder mostly had been employed at military bases. Occupational data, available only for the Massachusetts sample, indicate that 40 percent had been in professional, technical, and managerial jobs; close to half of these were in engineering and related fields. Only small numbers held clerical and sales positions or service jobs. The remaining 41 percent were production workers. Representative production worker occupations included machinist, mechanic, materials handler, welder, pipefitter, electrician, assembler, and inspector, according to interviews at worker assistance sites.

The median dislocated defense worker in the sample earned \$13.77 per hour at the time of layoff. The top quartile earned \$17.46 or more. In Massachusetts, the average wage among displaced defense workers not classified as professional, technical, or managerial was \$13.90—more than 30 percent above national average hourly earnings and 15 percent above the Massachusetts average for manufacturing production workers—and professional salaries averaged close to \$20 an hour.<sup>13</sup>

Laid-off workers across the New England states were similar in many respects, but a relatively greater fraction of Massachusetts workers had been highly paid. Close to half the Massachusetts sample had been earning \$15 or more per hour, compared to only 11 and 17 percent, respectively, in Maine and Vermont. Conversely, 37 percent of the Maine workers and 21 percent of the Vermont workers had earned less than \$10 per hour; in Massachusetts, only 8 percent of the sample had such low wages.<sup>14</sup> Another difference was

<sup>13</sup> National hourly earnings averaged \$10.58 in the 1991–93 period. This figure relates to production workers in mining and manufacturing; construction workers in construction; and non-supervisory workers in transportation and public utilities; wholesale and retail trade; finance, insurance, and real estate; and services. Average hourly earnings for Massachusetts production workers were \$12.11; state data for broader categories of workers are not available. See U.S. Bureau of Labor Statistics, January and May 1994.

<sup>14</sup> In Maine, the lower wages can be explained partly by the relatively large share of young workers who were laid off (37 percent were under age 35), as well as the relative paucity of college degree recipients (only 14 percent). In Vermont, over 70 percent of



in industry composition. While manufacturing layoffs accounted for most of the displaced workers, three-quarters of the Maine sample were former employees of Loring Air Force Base.

### Overview of Worker Experiences after Layoff

The post-layoff experiences of former defense workers varied considerably. While virtually all who registered at a worker assistance center experienced some unemployment while they searched for new jobs, the duration of unemployment ranged widely among individuals. Furthermore, some enrolled in job training or more general education classes in the course of seeking a new job. While a sizable fraction eventually found another job, some stopped searching and left the local labor force, either retiring, giving up, or migrating elsewhere; others were still looking when the data were collected. Among those who did find jobs, some were quite successful in recapturing their previous occupation or pay level, but most experienced a drop in pay. The sampled defense workers thus faced a series of adjustment costs after losing their defense-related jobs, and the difficulty of adjustment can be assessed in several ways: how long they were unemployed, what fraction eventually found another job, how their new job differed from their old job, and how much lower their earnings were in the new job.

Table 5 reports employment status 12, 18, 24, and 30 months after the date of layoff. Results are shown for workers laid off in three time periods, in part because more recent cohorts are not observed as long as those laid off in earlier years, but also to highlight possible influences of changing economic conditions. In general, the results indicate that defense workers have had considerable difficulty finding new employment.

For defense workers who lost their job in 1991 or earlier, only 22 percent were known to be reemployed 12 months later, while 70 percent were still looking for a job or preparing for a new job through enrollment in vocational or general education classes.<sup>15</sup> After 12

the displaced workers had no formal education beyond high school, and only 10 percent had a college degree. Interviews in Connecticut indicate that defense workers there were, on average, relatively highly educated and highly paid. For example, 23 percent of the displaced workers from Pratt & Whitney and Hamilton Standard had a college degree, according to data provided by the Career Transition Center in East Hartford. Both that center and the one serving Textron Lycoming workers in Bridgeport cited relatively high average hourly pay among those who had been laid off.

<sup>15</sup> The reemployment rate for this cohort is probably understated because of selection bias (and the subsequently discussed

Table 5  
*Employment Status of Displaced Defense Workers after 12, 18, 24, and 30 Months, by Year of Layoff*  
Percent

Subgroup and Number of Months	Reemployed	No Longer Enrolled	Unemployed or In Training	Memo: Sample Size
Laid Off in 1991 or Earlier				1,018
12	22	8	70	
18	36	16	48	
24	48	28	25	
30	51	37	11	
Laid Off in 1992				1,098
12	43	14	44	
18	59	24	17	
24	63	28	10	
Laid Off in 1993				2,071
12	35	13	52	

Note: An additional 814 workers in the sample were laid off in 1994.  
Source: Author's calculations based on sample of displaced defense workers from Maine, Massachusetts, and Vermont.

months, 8 percent had stopped using the services of the center. Although a few of these workers dropped out of the labor force for a specified reason (such as to retire or care for a sick family member), nothing is known about the subsequent employment histories for most of the dropouts. Some of them may have found a job on their own after terminating their search through the assistance center, while others were unemployed or no longer actively looking. After 24 months, the percentage known to be reemployed had increased to 48 percent, and the percentage that had stopped using worker assistance services had increased to 28 percent. Twenty-five percent remained unemployed or in training.<sup>16</sup>

increase in the speed of reemployment for the 1992 cohort is correspondingly overstated). The Maine data base includes enrollees starting in July 1991 and ending in September 1994. The Massachusetts data base counts those receiving services as of July 1992. As a result, the sample underrepresents laid-off defense workers from these states who lost their job prior to the starting date for the statistical data but who found a job or stopped attending the worker assistance center after a relatively short period of time.

<sup>16</sup> The reemployment rates cited in this article are computed as the number reemployed as a percent of the total number of workers who were laid off and used the services of an assistance center. By contrast, placement rates as computed for JTPA purposes are based on the number reemployed as a percent of the total number of workers who terminate their enrollment at an assistance center. That is, they do not take into account workers still registered who are actively seeking a job or preparing to seek a job. For the example



Total New England employment began to rise gradually in 1992, following three years of decline. Thus, to the extent that defense workers' fortunes depend on the general economic climate, those who lost their job during the recovery should have fared better than those who lost their job in the recession. Table 5 confirms this hypothesis. Workers laid off in 1992 had a reemployment rate of 43 percent after 12 months (compared to only 22 percent for the 1991 and

---

*Although some workers undoubtedly found better jobs by searching or training longer, this was found not to be the general case.*

---

earlier cohort) and 63 percent after 24 months (compared to 48 percent), and the fraction known to lack a job at any given interval is substantially lower. Nevertheless, even these improved results for the 1992 cohort suggest that displaced defense workers face significant barriers in finding reemployment.

The final portion of the table raises some doubt about whether defense workers' job prospects have shown additional improvement as the New England economy continues to recover. Twelve months following the date of displacement, the reemployment rate for those laid off in 1993 was not higher than that of the 1992 group.<sup>17</sup> One reason may be the changing characteristics of the unemployed. Several worker assistance officials indicated that, even though economic opportunities were better in 1994 than a year or two earlier, defense-related layoffs increasingly are

---

just cited in the text, the JTPA-computed placement rate would be 63 percent (48 as a percent of 48 plus 28). The 25 percent noted as "unemployed or in training" are not taken into account. If, however, all of these workers found jobs through the center, the ultimate JTPA-computed placement rate for those laid off in 1991 would be 73 percent (48 plus 25 as a percent of 100). Another difference is that the reemployment rates in this article include workers recalled by their former employer, while statistics for JTPA purposes omit recalls from both the numerator and the denominator. The numerical significance of this definitional difference is small, however.

<sup>17</sup>The reemployment share for 1993 is probably biased downward a little, as data for workers laid off after September were available for less than 12 months.

affecting older and more specialized workers. This is particularly the case for blue-collar jobs, where layoffs frequently are determined by seniority.<sup>18</sup>

A question arises as to how to interpret the column headed "unemployed or in training." The percentages shown in this category are far higher than the prevailing jobless rates for the New England region (which averaged 8.0 percent in 1991 and 1992, and 6.2 percent in 1993). On the other hand, some displaced workers were availing themselves of educational opportunities and other resources in order to find a better job. In this sense, high fractions in this category may not be a totally bad sign. This issue is addressed below, in the section on earnings gains and losses. Although some workers undoubtedly found better jobs by searching or training longer, this was found not to be the general case. Therefore, the fraction without a job is a legitimate indicator of the difficulty of making the transition from defense to nondefense work.

Table 6 examines employment status for different types of workers at 18 months (for all displaced defense workers observed for at least 18 months, regardless of the year of layoff). In total, 49 percent found reemployment through the worker assistance centers within 18 months of losing their job. The most striking result is that reemployment rates decline with age (confirming the interview reports). Over half of all workers under age 45 were reemployed after 18 months, but less than one-third of those 55 years and older had found a job. The oldest group was also much more likely to stop using the services of an assistance center, which suggests some discouragement about the likelihood of finding a job. Those who had been with their defense-sector employer for 20 years or more were also relatively unlikely to find work. Long-term employees may have handicaps such as overly specialized skills or a lack of ability to adjust to changing circumstances; many also were older.

The table indicates that former manufacturing workers had somewhat better success than nonmanufacturing workers in finding new work. This is surprising, given declining employment opportunities in New England manufacturing during this period. The explanation probably is found in the identity of the nonmanufacturing workers. Many had been employed at Loring Air Force Base, which is located in a remote northern section of Maine that has had unem-

---

<sup>18</sup>In the sample, the median age at time of layoff increased from 39 years in 1992 to 41 in 1993.



Table 6  
*Employment Status and Unemployment Spells for  
 Displaced Defense Workers, by Worker and  
 Job Characteristics*

Subgroup	Employment Status after 18 Months (Percentages)			Median Unemployment Spell for Reemployed Workers (Months)
	Reemployed	No Longer Enrolled	Unemployed or In Training	
All Workers	49	21	30	11
Age				
Less than 35 Years	56	16	28	11
35 to 44 Years	52	20	29	11
45 to 54 Years	48	19	32	12
55 Years and Over	31	35	34	13
Job Tenure				
Less than 5 Years	51	18	31	11
5 to 9 Years	54	18	28	11
10 to 19 Years	52	18	29	11
20 Years or More	37	35	28	12
Education				
Less than High School	43	24	33	12
High School	52	22	26	11
Some College	48	19	33	12.5
College Degree	44	19	38	13
More than College	56	17	28	10
Gender				
Male	50	21	29	11
Female	46	21	32	13
Race				
White	49	21	30	11
Nonwhite	45	22	33	13
Industry				
Manufacturing	50	21	29	11
Nonmanufacturing	44	19	36	12
Occupation				
Professional, Technical, and Managerial	46	17	37	13
Clerical and Sales	42	28	31	14
Service	52	19	29	11
Production	48	22	30	11

Note: Employment status for 2,444 workers laid off at least 18 months prior to September 1994. Unemployment spells for 1,258 workers laid off prior to 1993 and subsequently reemployed. Source: Author's calculations based on sample of displaced defense workers from Maine, Massachusetts, and Vermont.

ployment rates in the vicinity of 9 to 11 percent in recent years.<sup>19</sup>

Additional differences show up between men and women, and between whites and nonwhites. Differences by education and occupation show mixed patterns.

## Unemployment and Training

The foregoing data on employment status after various amounts of time have elapsed following a defense layoff suggest that one indicator of adjustment difficulty might be the duration of unemployment. For those workers who eventually found a job, and who were observed for 18 months or more, the median spell of unemployment was 11 months (Table 6).<sup>20</sup> One-fourth of reemployed workers took at least 17 months to find a job, while another one-fourth took 7 months or less.

Jobs increasingly emphasize services skills and, in many cases, use of modern information technologies. Accordingly, most training courses for former defense workers reflected these new workplace demands. White-collar workers often were enrolled in computer classes, especially data base management, spreadsheet software, and networks. In addition, some former blue-collar workers were trained in computer repair. Other popular training courses have prepared displaced defense workers for jobs in accounting, health care (including jobs as medical technicians or nurses), law (as paralegals), heating and air

<sup>19</sup> Another explanation is that the average length of job search is overstated for some former employees of Fort Devens Army Base. Many Fort Devens employees registered for assistance services before they actually lost their job. In those cases where the date of layoff was not recorded, this study uses the date of registration to calculate the length of unemployment. A similar issue arises with respect to some additional

workers, not from Fort Devens. These cases tend to be scattered across a variety of work sites, and therefore they do not result in any obvious bias in comparing different groups of workers.

<sup>20</sup> Limiting the subsample to displaced workers who were observed for a longer period of time would lengthen the estimated typical spell of unemployment, as more long-term unemployed would be included. Conversely, shortening the time frame would make the typical unemployment spell appear to be shorter.



conditioning maintenance, truckdriving, automotive repair, and culinary arts.

Although some centers offered classes in entrepreneurship, relatively few laid-off defense workers have ended up starting their own business. In some cases, however, professionals have started consulting practices, usually to tide themselves through until they found full-time employment or qualified for full retirement benefits. For engineers and software specialists, contract work has been quite common—either through an agency or, in some cases, with their former employer. In addition, some former blue-collar employees have become independent contractors, particularly for general maintenance work (such as snow removal or lawn care).

Most centers indicated that local community colleges, specialized training schools, and universities offered an ample selection of courses of study for displaced defense workers. The exception was the center in Pittsfield, Massachusetts, which reportedly had a relatively small selection of classes in the immediate area.

Nevertheless, several serious barriers to effective retraining were said to exist. First, limited or uncertain budgets constrained what could be offered to any individual worker. Officials noted the frequently large differences in the skill set required for the "new good jobs" as compared to defense work. As a result, retraining for positions that would allow defense workers to recoup their former pay would require considerably greater per-worker funding than has been available. Second, officials asked the question "retraining for what?" Given projections of a slow rate of growth in New England employment, with no obvious sizable high-growth segments and expected declines in manufacturing, heavy investments in retraining were risky. Some interviewees noted that even what seemed to be attractive service sectors in the recent past, such as health care and the law, might not be significant generators of jobs in the future because of market changes. Finally, some former defense workers have been reluctant to invest in retraining or otherwise to adapt to changing circumstances. Craft workers have been bitter and frustrated over the lack of jobs in their area of specialization. Engineers have felt that they would waste their talents by moving into more commercially oriented work with less exact standards.

While statistics to measure the extent of migration are lacking, assistance center officials indicated that laid-off defense workers with whom they have had contact have tended to limit their job search to the

local area—even though attractive opportunities existed elsewhere (and were publicized at the center) and relocation assistance was available. The reluctance to migrate has been greatest for those with strong ties to a community, either through a long family tradition of living in the same area, having children in local schools, or homeownership (especially for those threatened with capital losses upon sale of their home). Indeed, the only location where strong outmigration was cited is Loring Air Force Base, where many ex-civilian employees were married to military personnel who were being transferred to other installations. Officials estimated that about one-fifth of laid-off workers had moved out of Aroostook County. In Pittsfield, Massachusetts, mention was made of professionals moving away, as very few opportunities remained locally following their layoff from General Electric (later Martin Marietta).

### *Probability of Reemployment*

To explore further the factors that make reemployment more difficult, regressions were run to explain the likelihood of finding work. These regressions take into account information on employment outcomes at all intervals, instead of looking at progress after an arbitrary number of months, as did Tables 5 and 6. They simultaneously examine hypotheses about economic conditions, characteristics of workers and their jobs, and selected additional determinants not mentioned above. The Cox proportional hazards model was used to estimate the coefficients in Table 7, which represent the relative likelihood of finding employment in any given time period, for a unit increase in the value of the explanatory variable (Cox and Oakes 1992).<sup>21</sup>

<sup>21</sup> For each individual in the sample, define  $h(t)$  as (the probability of becoming reemployed between times  $t$  and  $\Delta t$ )/[( $\Delta t$ )  $\times$  (the probability of becoming reemployed after time  $t$ )]. In the Cox model,  $h(t) = h_0(t)e^{b_1x_1 + \dots + b_nx_n}$ , where  $x_1 \dots x_n$  are the explanatory variables and  $h_0(t)$  is the so-called baseline hazard function—that is, the value of  $h(t)$  if all the explanatory variables equal zero. The parameters  $b_1 \dots b_n$  are estimated using maximum likelihood. Note that the change in the relative likelihood of becoming reemployed if the value of variable  $x_k$  changes by one unit equals  $(e^{b_1x_1 + \dots + b_k(x_k+1) + \dots + b_nx_n}) / (e^{b_1x_1 + \dots + b_kx_k + \dots + b_nx_n}) = e^{b_k}$ . These are the values reported in Table 7 under the heading "Hazard Ratio."

The model takes into account time censoring—that is, some workers sever their relationship with the assistance center prior to finding a job, while in other cases, the sample period ends before an employment outcome can be observed. The Cox technique is efficient, in that the lack of employment for such workers during the time period in which they were observed is taken into account in estimating parameters. The term "hazard" indicates that the Cox technique was used originally to analyze the probability of failure;



Table 7  
*Reemployment Probabilities—Estimates  
 Using Cox Proportional Hazards Model*

Independent Variable	Hazard Ratio	Standard Error
Age <sup>a</sup>		
Less than 25 Years	1.00	.13
25 to 34 Years	1.02	.06
45 to 54 Years	.88*	.05
55 Years and Over	.61**	.05
Education <sup>a</sup>		
Less than High School	1.29*	.13
High School	1.05	.06
College	1.06	.07
More than College	1.17	.15
Male	1.15**	.06
White	1.11	.09
Number of Dependents	1.09**	.02
Recalled	3.75**	.33
Dummy for Proxied Layoff Date	.52**	.05
County Unemployment Rate at Time of Layoff		
Level	.80**	.02
12-Month Change	.79**	.03
Difference between State and County Unemployment Rates at Time of Layoff		
Level	.73**	.03
12-Month Change	.79**	.03
Loring Dummy	.38**	.05
Year of Layoff <sup>a</sup>		
1992	1.79**	.13
1993	1.69**	.14
1994	2.00**	.25

Pseudo R<sup>2</sup> = .02

Number of Observations = 4,743

\*Significantly different from one at 5 percent level.

\*\*Significantly different from one at 1 percent level.

<sup>a</sup>The omitted categories are as follows: age, 35 to 44 years; education, some college; year of layoff, 1991 and earlier.

Source: Author's calculations based on sample of displaced defense workers from Maine, Massachusetts, and Vermont.

*As a group, the oldest workers had great difficulty in finding a new job, regardless of their qualifications or when they lost their defense-related job. All else equal, a person 55 years of age and older was only about 60 percent as*

however, the technique is equally applicable to analyzing the probability of success. Standard errors may be used to determine whether the hazard ratio is significantly different from one.

likely to be reemployed after any given time interval as someone under age 45. It appears that workers begin to experience difficulties starting in their mid-forties.<sup>22</sup>

Workers with less than a high school diploma were more likely to be hired than those who had completed more years of schooling.<sup>23</sup> (But, as will be shown below, they suffered relatively greater income losses upon reemployment.) Men had a greater chance of finding work than similarly qualified women.

*Greater family responsibilities increased the probability of reemployment, which suggests that worker motivations play some role even when economic conditions and other worker qualifications are considered.* Each added dependent raised the likelihood of employment by about 9 percent.

*Those who were offered and accepted reemployment with their previous employer found work much more quickly than those who searched elsewhere.* This finding is evidenced by the high and statistically significant coefficient for the recall dummy.<sup>24</sup>

*Economic conditions are very important in determining reemployment for all workers.* Defense workers laid off when the prevailing unemployment rate in their county was, say, 8 percent were only 80 percent as likely to find a job as those laid off when the unemployment rate was 7 percent. (For an unemployment rate of 9 percent, the relative likelihood drops to 64 percent.)<sup>25</sup> For each percentage point by which the state unemployment rate at the time of layoff exceeded the county unemployment rate, the likelihood of reemployment was only 73 percent as great as if the two were identical. Increases in either the county or state unemployment rate in the 12-month period following layoff also reduced the chances of finding work. A

<sup>22</sup> Job tenure was always insignificant when age was included. This variable is not available for the Maine sample and about one-third of the Vermont sample; hence its inclusion required using a smaller number of observations.

<sup>23</sup> Those who had gone beyond college also had higher than average reemployment probabilities, but the deviation was not statistically significant. Previous occupation was not significant in the presence of the other variables.

<sup>24</sup> A total of 158 workers were recalled. An additional variable, the "dummy for proxied layoff date," equals one if the registration date was used in place of the layoff date (because the layoff date was unknown). This was the case for some workers who registered for services before they were laid off. Because the length of unemployment was overstated for these workers, the hazard ratio is below one. Finally, an additional specification included previous industry as an explanatory variable; this coefficient was not significantly different from one.

<sup>25</sup> The estimate of 64 percent comes from squaring the hazard ratio reported in the table—to obtain the effect of a two-unit change in the value of the explanatory variable.



1-point increase lowered the likelihood of reemployment to about 79 percent of what it would have been had the unemployment rate remained constant. Because Aroostook County had by far the worst unemployment rates and the most remote location of all the areas studied, the regression includes a separate dummy variable for former Loring workers; as expected, their reemployment chances were far below those of other workers.

The year of layoff remained highly significant, with workers losing their job after 1991 almost twice as likely to find new employment as those losing their job in 1991 or earlier. The year dummies pick up other aspects of the local economy (such as the rate of employment growth) that are not captured in the unemployment rate, as well as economic conditions outside the state that may affect reemployment.<sup>26</sup>

### New Jobs

New jobs entailed considerable changes. Fewer than half the workers remained in manufacturing and government (Table 8). Sectors such as services and trade, which are important in the economy at large, became major sources of jobs for former defense workers. According to the data for Massachusetts, the percentage working in professional, technical, and managerial jobs remained almost the same, but a net shift occurred out of production jobs and into services and clerical and sales positions, which are much more prevalent outside of defense sectors (Table 9). Most

Table 8

#### *Percentage Distribution of Previous and New Industries for Reemployed Defense Workers from Massachusetts and Vermont*

	Previous	New
Construction	.2	1.7
Manufacturing	92.9	41.0
Transportation	.2	2.3
Trade	.6	7.0
Finance, Insurance, and Real Estate	.1	1.8
Services	1.6	19.8
Government	4.0	2.3
Other and Unknown	.4	24.1
Total	100.0	100.0

Note: Based on 1,877 observations for which previous industry was known. New industry was not available for Maine. Other includes agriculture, mining, and nonclassified industries.

Source: Author's calculations based on sample of displaced defense workers from Massachusetts and Vermont.

Table 9

#### *Percentage Distribution of Previous and New Occupations for Reemployed Defense Workers from Massachusetts*

	Previous	New
Professional, Technical, and Managerial	37.4	36.5
Clerical and Sales	12.4	16.9
Services	2.2	4.0
Production	48.0	42.5
Total	100.0	100.0

Note: Based on 1,237 observations for which previous and new occupations were available. Previous occupation was not available for Maine or Vermont. Numbers may not add to totals because of rounding.

Source: Author's calculations based on sample of displaced defense workers from Massachusetts.

defense workers who became reemployed earned less in their new job.<sup>27</sup> New jobs paid a median hourly wage of \$10.90, and half of all new positions paid in the range of \$8.00 to \$14.87. The median earnings replacement rate was 82 percent. Twenty percent of the sample had hourly earnings that were roughly the same as at their defense employer (that is, between 95 and 104 percent of their former wage), and only 16 percent earned more (Table 10, first column). The remaining 64 percent had noticeably lower hourly earnings. Indeed, for over one in five workers who found a new job, the new wage rate represented a pay cut of 40 percent or more.<sup>28</sup>

<sup>26</sup> Interviewees in Connecticut, in particular, indicated that the low state unemployment rate (measured at around 5 percent in 1994) gave much too positive an impression of labor market conditions. Declining unemployment in other areas also has reflected reductions in the size of the labor force as some workers choose not to look for a job and others move away, in addition to added employment. According to the National Bureau of Economic Research, the national recession ended in March 1991. However, employment remained quite sluggish for another year or so. This may help to account for more positive placement outcomes starting in 1992. A final explanation for the significance of the year dummies is that they reflect selection bias, as discussed in footnote 15.

<sup>27</sup> The data include only the wage at placement, thereby ignoring any subsequent increases that might have occurred following a probationary period at the new job. This fact may cause an overstatement of earnings losses. On the other hand, Jacobson, LaLonde, and Sullivan (1993) show that the pay of displaced workers begins to fall behind the pay of other workers prior to the time of layoff. By ignoring pre-layoff trends, this study may be understating earnings losses.

<sup>28</sup> Information from Connecticut is consistent with these estimates. One center there cited a 72 percent replacement rate for hourly workers and an 80 percent replacement rate for salaried



Table 10  
*Current Earnings as a Percent of Previous Earnings  
 for Reemployed Defense Workers*  
 Percent

Replacement Rate	All Workers, Hourly Earnings	Former Full-Time Workers	
		Hourly Earnings	Weekly Earnings
Under 60 Percent	23	18	21
60 to 79 Percent	25	26	26
80 to 94 Percent	16	17	17
95 to 104 Percent	20	23	22
105 to 120 Percent	9	9	8
Over 120 Percent	7	6	6
Memo: Number of Observations	1,850	1,492	1,442

Source: Author's calculations based on sample of displaced defense workers from Maine, Massachusetts, and Vermont.

Given inflation, which averaged about 3 percent a year in New England during the early 1990s, real purchasing power dropped more than wages. Other ways in which workers can be made worse off include involuntary cuts in hours worked and cuts in employment-related benefits. It does not appear that many former defense workers shifted from full-time to part-time work. The distribution of weekly earnings for those who formerly worked full-time look very similar to the distribution of their hourly pay (last two columns of Table 10). As for benefits, the picture is less clear. Three-quarters of the new jobs for defense workers did come with some form of employer-sponsored health and/or pension benefit. However, worker assistance officials noted that in many cases, contributions on the part of the new employer were not as generous as those of the defense employer. They also indicated that contract work typically did not pay benefits.

### *Determinants of Earnings Losses*

Earnings losses varied with characteristics of workers and jobs (Table 11). Although the median hourly earnings replacement rate was 82 percent,

workers. Officials at a second center indicated that a 50 percent replacement rate was typical for hourly workers, but that salaried workers did better on average than hourly workers. At the third Connecticut center, it was estimated that the replacement rate was 87.5 percent (for all workers combined).

reemployed workers 55 years of age and older replaced only 69 percent of their former wage, while those under age 35 replaced 89 percent. More highly educated workers generally suffered lower wage losses. For those with college degrees, the median replacement rate was 90 percent or more, compared with less than 80 percent for those who never attended college. Although former manufacturing workers typically had wage losses of 20 percent, the median nonmanufacturing worker who found a new job had no loss in earnings. The nature of the new job also mattered, with those finding work in manufacturing replacing more of their previous wage than those who did not. Also, there were relatively small earnings losses for

those who found work in a professional, technical, or managerial position, and relatively large earnings losses for those who went into clerical, sales, or service jobs.<sup>29</sup>

Regressions were used to measure the effects of individual factors on earnings replacement rates, and to test some additional hypotheses. In contrast to the information in Table 11, the regressions identify the independent effect of each variable, holding all other variables constant. The results are shown in Table 12. The columns labeled "Without New Industry" show the most comprehensive set of results.

*All else equal, the older the worker, the greater the earnings loss upon reemployment.* Compared to the typical worker aged 35 to 44, 45- to 54-year-olds suffered a wage loss that was 3 percentage points greater, and those 55 years and older suffered a 5 point greater loss.

*More highly educated workers fared much better than less educated workers.* Compared to a reference group who had attended college but did not graduate, the

<sup>29</sup> Professionals who remained in professional jobs upon reemployment had average hourly earnings equal to 96 percent of what they had earned at their defense job, and 78 percent of the professional jobs were filled by former professionals. The typical person who had held a service job at the defense employer earned about the same amount at his or her new job; earnings losses in service jobs therefore were concentrated among those who switched into service work from a more highly compensated occupation. For example, professionals and production workers who found a service job on average replaced only 62 percent of their former wage. A similar trend, though not as pronounced, occurred for clerical and sales jobs.



Table 11  
*Hourly Earnings Replacement Rates for  
 Reemployed Defense Workers, by Worker  
 and Job Characteristic*  
 Percent

Subgroup	Median Replacement Rate
All Workers	82
Age	
Less than 35 Years	89
35 to 44 Years	83
45 to 54 Years	75
55 Years and Over	69
Job Tenure	
Less than 5 Years	86
5 to 9 Years	77
10 to 19 Years	79
20 Years or More	86
Education	
Less than High School	73
High School	77
Some College	82
College Degree	93
More than College	90
Gender	
Male	85
Female	78
Race	
White	82
Nonwhite	82
Previous Industry	
Manufacturing	80
Nonmanufacturing	100
New Industry	
Manufacturing	89
Nonmanufacturing	72
Previous Occupation	
Professional, Technical, and Managerial	90
Clerical and Sales	79
Service	100
Production	82
New Occupation	
Professional, Technical, and Managerial	91
Clerical and Sales	71
Service	62
Production	82

Memo: Number of Observations = 1,850

Source: Author's calculations based on sample of displaced defense workers from Maine, Massachusetts, and Vermont.

higher for those with a degree from a four-year college or a postgraduate education. The sharp earnings losses for high school dropouts, combined with the earlier results indicating they were faster in finding a new job, suggest that they could not afford to search as long to find a comparable job as more highly educated workers. Given a worker's age and education, other characteristics of his or her previous job (except the wage level, discussed below) generally were insignificant in explaining earnings losses. The only exception was that former professional, technical, and managerial workers tended to do better than production workers.<sup>30</sup>

*New employers tended to discount the skills and experience of former defense workers.* Those who were recalled to their former job had a wage replacement rate about 21 percentage points higher than those who accepted a job with a new employer. Also, defense-related layoffs have apparently resulted in some leveling of wages for workers with similar backgrounds. Consider, for example, a defense worker who had been earning \$12 an hour, and who earned \$9.60 an hour upon reemployment (for a replacement rate of 80 percent). According to the regression, a "similar" person (on the basis of age, education, race, and gender) who had been earning \$13 an hour would be expected to earn a new wage just under \$10.<sup>31</sup> In other words, the marketplace is willing to pay only 40 cents of this worker's previous dollar wage premium. The remaining 60 cents could have been due to a variety of factors. The more highly paid worker might be capable of performing a specialized task (such as a particular kind of welding or pipefitting work) that was not applicable in the new job. Or the worker might have benefited from higher wages resulting from unionization, seniority, or an exceptionally generous employer. Although this particular numerical example is illustrative only of how much a new employer might discount the skills and experience of a former defense worker, the negative coefficient on the previous wage (combined with the very low positive coefficient on

<sup>30</sup> Results are not shown in the table; regressions using data on the previous occupation were possible only for the Massachusetts sample. Additional alternative regressions examined the effects of the worker's job tenure. These specifications require dropping observations for Maine and about one-third of the Vermont sample. Job tenure had a statistically insignificant effect on wage replacement rates.

<sup>31</sup> Using the reported coefficients for the previous wage and the square of the previous wage, and the assumption of an 80 percent replacement rate for the less highly paid worker, the more highly paid worker's replacement rate is calculated at 76.7 percent, for an hourly earnings rate of \$9.96.

wage replacement rate was about 7 percentage points lower for high school dropouts, 4 points lower for those with only a high school education, and 11 points



Table 12

*Hourly Wage Replacement Rates: Regression Results*

Dependent Variable = New Wage as Percent of Previous Wage

Independent Variable	Without New Industry		With New Industry	
	Coefficient	Standard Error	Coefficient	Standard Error
Age <sup>a</sup>				
Less than 25 Years	3.31	3.22	-.82	4.51
25 to 34 Years	1.21	1.45	.04	1.56
45 to 54 Years	-3.36*	1.51	-1.42	1.63
55 Years and Over	-5.02*	2.23	-4.47	2.31
Education <sup>a</sup>				
Less than High School	-6.80*	2.78	-5.75	3.02
High School	-4.46**	1.43	-5.57**	1.61
College Degree	10.83**	1.99	10.59**	2.24
More than College	10.94**	3.45	7.36*	3.66
Male	1.72	1.33	1.97	1.46
White	-1.65	2.28	-1.61	2.25
Recalled	21.38**	2.23	17.04**	2.57
Previous Wage	-6.10**	.45	-4.50**	.50
Previous Wage Squared	.11**	.01	.08**	.01
New Occupation <sup>a</sup>				
Professional, Technical, and Managerial	14.33**	1.57	15.62**	1.84
Clerical	-8.03**	1.71	-2.15	1.94
Service	-13.43**	2.51	-9.85**	3.00
New Industry = Manufacturing			7.71**	1.38
Duration of Unemployment	-.29**	.06	-.50**	.08
Constant	146.98**	5.09	127.27**	5.70
Adjusted R <sup>2</sup>		.24		.24
Number of Observations		1,823		1,310

Note: Observations with replacement rates over 200 percent were omitted.

\*Significantly different from zero at 5 percent level.

\*\*Significantly different from zero at 1 percent level.

<sup>a</sup>The omitted categories are as follows: age, 35 to 44 years; education, some college; new occupation, production.

Source: Author's calculations based on sample of displaced defense workers from Maine, Massachusetts, and Vermont.

the previous wage squared) indicates that a convergence in wages has been a general consequence of defense-related layoffs.

*Those who managed to find professional or technical work, or a job in manufacturing, fared better than others.* All else equal, the wage replacement rate for white-collar jobs was about 14 points higher than for those whose new occupation was production work. Workers finding service jobs had replacement rates about 13 points lower than production workers, and workers finding sales and clerical jobs about 8 points lower. Information on the industry of the new employer was not available for defense workers from Maine (nor for some workers from Massachusetts and Vermont). For

the subset of reemployed workers for which industry data were available, a manufacturing job raised the wage replacement rate by almost 8 percentage points, holding other factors constant (see columns labeled "With New Industry").<sup>32</sup>

*The longer they searched for a job, the more likely unemployed defense workers were to accept pay cuts.* The coefficient on the duration of unemployment indicates that, for each additional year of looking for a job, the replacement rate falls by 3.5 points.

<sup>32</sup> Given the included explanatory variables, previous industry was not significant in explaining wage replacement rates.



### *Comparisons with Other Displaced Workers*

The research reported here indicates that defense workers in New England have suffered large costs upon displacement; have they experienced more serious losses than other types of workers who were laid off? Some partial conclusions emerge from comparing the current findings with those from national studies of displaced workers (U.S. Congressional Budget Office 1993).<sup>33</sup>

---

*Comparisons with national studies suggest that laid-off New England defense workers experienced greater difficulty in finding employment.*

---

Defense workers were definitely at a disadvantage in terms of replacing their former earnings. In the national surveys, 45 percent of displaced workers recovered less than 95 percent of their former hourly pay upon finding a new job; for 32 percent the replacement rate was less than 80 percent. In the New England defense worker sample, 64 percent replaced less than 95 percent of their former hourly pay and 48 percent replaced less than 80 percent.

With respect to the likelihood of finding employment, the comparisons suggest some greater difficulty for defense workers in the recent New England experience. In the national surveys of workers displaced during the 1980s, 27 percent were not employed one to three years after losing their job. By comparison, between 25 and 54 percent of sampled defense workers laid off in 1991 or earlier, and between 10 and 38 percent of those laid off in 1992, were not employed after two years. The lower bound in these statistics represents only those unemployed or in training, while the upper bound also includes those no longer using worker assistance services. However, it is likely that the New England figures generally underestimate the fraction who were not working, as the sample excludes those who decided not to seek reemployment assistance. Presumably, many of these workers dropped out of the labor force. As for those who searched on their own, it is hard to make a convincing argument that they would have done better than the sampled workers, who had access to organized career counseling and job retraining.<sup>34</sup>

### *III. Summary and Conclusions*

Defense cutbacks appear to have resulted directly in the loss of almost 114,000 jobs in New England between 1989 and 1994. This article has examined the implications of these layoffs for a sample of about 5,000 former defense workers who tried to find a new job.

Improving regional economic conditions over the past couple of years have helped to speed up job searches for laid-off defense workers. Nevertheless, their employment rates remain disappointing. Among the sampled workers who lost their job in 1992, 63 percent had found reemployment through a worker assistance center two years later, and 10 percent were still enrolled in training or were looking for a job through a center. The remaining 28 percent had stopped attending an assistance center, presumably having decided either to drop out of the labor force or to look for work on their own.

In some parts of New England, economic recovery has remained slow or nonexistent, further limiting defense workers' prospects. In Aroostook County, Maine, where Loring Air Force Base recently closed, the unemployment rate exceeds 11 percent. Employment has been recovering slowly in Connecticut and Rhode Island, and some areas in southeastern Massachusetts continue to have unemployment rates that are substantially above the statewide average.

The transition to a less defense-dependent economy has entailed substantial losses of income. Among all sampled defense workers who found a job, the median loss in hourly earnings was 18 percent. Twenty-three percent faced declines of 40 percent or more. Clearly, defense workers had amassed specific experience at their old jobs that was not fully valued at their new jobs. On average, retraining programs did not provide enough new skills to offset the obsolescence of old skills.

Income losses were severe for older workers in the sample. Their probability of finding a job was below average, and for those 55 years of age and older who did, the median hourly earnings decline was 31 percent. For displaced defense workers aged 45 to 54

---

<sup>33</sup> In subsequent research, the author plans to study the experiences of different types of displaced workers in New England.

<sup>34</sup> Somewhat surprisingly, the median duration of unemployment among those who found a job is 18 months in the national displaced worker surveys, but only 11 months in the New England defense sample. This disparity may be due to the fact that the national survey polls workers one to three years following their layoff, and therefore is likely to include more completed long-term unemployment spells.



years, the median wage drop upon reemployment was 25 percent. Income losses also varied inversely with education: median hourly wages declined 23 percent for high school graduates but only 7 percent for college graduates. Given decreasing opportunities in manufacturing, many former defense workers took jobs in other sectors or other occupations that resulted in large reductions in pay.

This study did not specifically analyze the efficacy of general support services and training programs for laid-off defense workers. The findings suggest, however, that achieving better reemployment and income results would require significantly higher investments on the part of both government and workers, as the experiences of displaced defense workers reflect broad

structural changes occurring in U.S. labor markets.<sup>35</sup> Manufacturing traditionally has provided high-wage opportunities for workers with a variety of educational backgrounds, but has been shrinking. Meanwhile, highly paid services sector jobs require new skills that many former manufacturing workers lack. These structural issues continue to confront displaced defense workers, even as the overall economic environment improves and even if they are served by well-run assistance centers.

<sup>35</sup> For further discussion of general trends, see, for example, Freeman and Katz (1994), Levy and Murnane (1992), and U.S. Congressional Budget Office (1993, 1994).

The author gratefully acknowledges the assistance provided by the following individuals: Les Abramowitz, Christa Baade, Margaret Bean, John Beauregard, Michael Bourret, Rick Bruce, Rita Carey, Joseph Caissey, Carla Erb, Tim Griffin, Ruth Johnson, Ted Kinerson, Kevin Mahar, Theresa Mangiante, Carl Mautner, Janet Poncelet, Mark Roos, Nanda Salvitti, Cheryl Sanborn, John Saunders, Horace Scharges, Suzanne Teegarden, Diane Uttaro, Gene White. Federal Reserve Bank of Boston colleagues Katharine Bradbury and Christopher Mayer provided useful suggestions.

## Appendix by Karen A. Therien

### Measuring Defense Employment

The extent of defense downsizing in New England since 1988 is indicated in Appendix Table 1. Employment in Connecticut, Maine, Massachusetts, and New Hampshire is estimated using ES-202 data for the following defense-dependent SIC codes: 2892, 348, 3663, 3669, 372, 3731, 376, 3795, 381, 8731, 8732, and 8734. These industries, described in Table 1, were used to calculate defense-intensive employ-

ment because at least 40 percent of the industry's national product is for defense purposes. Disclosure restrictions prevented the state of Maine from releasing employment estimates for the shipbuilding and repair industry (SIC 3731) prior to 1990.

Estimates for Vermont and Rhode Island use different industry definitions. Vermont employment in its two large defense-intensive industries (SIC 348 and 372) is not disclosed. Instead, total defense-related employment in Vermont in Table 3 was constructed using New England Economic Project data for the 2-digit SIC codes 34 and 37

Appendix Table 1

### *New England Employment in Defense-Intensive Industries*

Thousands

Year	Connecticut	Maine	Massachusetts	New Hampshire	Rhode Island <sup>a</sup>
1988	96.2	n.a. <sup>b</sup>	67.7	13.0	17.4
1989	95.2	n.a. <sup>b</sup>	70.2	12.6	14.0
1990	91.8	13.6	68.0	11.3	13.5
1991	87.8	12.4	63.4	10.2	12.5
1992	80.2	11.5	59.6	9.8	11.0
1993	71.6	10.4	57.7	9.5	10.8
1994 <sup>c</sup>	66.2	10.5	53.1	9.0	9.4

<sup>a</sup>Defense-related employment in all industries, as described in the Appendix text.

<sup>b</sup>Prior to 1990, employment in the shipbuilding and repair industry was not disclosed.

<sup>c</sup>1994 data are an average of the first three quarters.

Source: Estimates based on unpublished data supplied by the Connecticut Department of Labor; the Maine Department of Labor, Division of Economic Analysis and Research; the Massachusetts Department of Employment and Training; the New Hampshire Department of Employment Security; and the Rhode Island Department of Employment Security.



(along with Defense Budget Project fiscal year 1992 estimates of defense-related employment).

The Rhode Island Department of Economic Development uses a company survey to estimate defense-related employment in all industries for firms reporting 10 percent or more defense sales. The figures in Appendix Table 1 equal total employment at these Rhode Island establishments times the fraction of sales reportedly related to defense. Conceptually, these employment numbers are comparable to the Defense Budget Project estimates, but a substantial difference exists in practice. For example, the Rhode Island Department of Economic Development survey estimates defense employment of 10,995 in 1992, while the Defense Budget Project estimates that Rhode Island's defense-related employment was 19,400 in fiscal year 1992. The estimates in Table 3 use the trends from the Rhode Island survey, benchmarked to the employment level estimated by the Defense Budget Project.

#### Displaced Defense Worker Sample

Appendix Table 2 lists the former employers of the 5,001 individuals in the dislocated defense worker sample. The Massachusetts Industrial Services Program provided a data base of approximately 21,000 displaced workers. Individuals who were formerly employed by a defense prime contractor or who were civilian employees at a military facility in Massachusetts were included in the displaced defense worker sample. In addition, the Massachusetts sample includes individuals who were formerly employed at the Connecticut facilities of Pratt & Whitney and Hamilton Standard, but who resided in Massachusetts, for a total of 3,619 observations. The Bureau of Employment and Training Programs in Maine provided data for 878 individuals formerly employed at Loring Air Force Base and Bath Iron Works. Until its closure, Loring was the largest military facility in Maine. Bath Iron Works is the largest private employer in the state and accounts for most of the defense prime contracts awarded. The Vermont Department of Employment and Training furnished data for 504 individuals formerly employed by General Electric and Simmonds Precision, the predominant defense prime contractors in that state.

Appendix Table 3 provides statistics for the displaced defense worker sample. The job tenure variable, measuring the years of employment at the former defense employer, is the length of time between the start date and the end date at the former employer. The hourly replacement wage was constructed as a ratio of the hourly wage on the new job to the hourly wage on the former job. The weekly replacement wage is the ratio of the weekly wage on the new job to the weekly wage on the old job. Weekly wages were determined by multiplying the hourly wage and the hours worked per week. The observed length of unemployment was calculated as the number of months between the date of layoff and the date of termination from the center. The date of layoff was taken as the ending date of work at the former employer. The date of application at the worker assistance center was used as the layoff date if the end date was unknown. In cases where the date of termination was not available because the sample period ended, the observed unemployment spell was calculated as the number of months between the layoff

and the end of the sample (September 1994 for Maine and Massachusetts and October 1994 for Vermont).

County unemployment rates were assigned based on the location of the former employer. If the former employer had locations in more than one county (such as General Electric), and the particular location was unknown, the county unemployment rates for all of the possible locations in that state were averaged. Observations that do not have county unemployment data represent individuals formerly employed at a military facility with an unknown location or individuals displaced before 1988.

#### Adjustment of State Data

*Vermont.* The first day of the month was filled in as the day of birth because the date of birth contained only the year and month. The number of dependents was not included in the Vermont data base, but was constructed using family size. An SIC code was assigned according to the primary

Appendix Table 2  
*Corporations and Military Facilities  
Represented in the Sample*

Name	Number of Employees
<b>Maine</b>	
Loring Air Force Base	586
Bath Iron Works	292
	<hr/> 878
<b>Massachusetts</b>	
General Electric <sup>a</sup>	980
Raytheon Company	959
Fort Devens	431
Martin Marietta	252
Textron	151
Hamilton Standard	132
Northrop	100
GTE	89
Kollmorgen	59
Craig Systems	58
Varian	58
MA/Com	54
U.S. Armed Forces	45
Computervision	42
Loral	39
Nuclear Metals	31
Chamberlain Manufacturing	30
All Other	109
	<hr/> 3,619
<b>Vermont</b>	
General Electric Company	474
Simmonds Precision	30
	<hr/> 504
<b>Total</b>	<hr/> 5,001

<sup>a</sup>Includes facilities purchased by Ametek from General Electric.  
Source: See Appendix text.



Appendix Table 3

*Displaced Defense Worker Sample Variables*

Variable	Mean	Standard Deviation	Number of Observations
<b>Worker</b>			
Age (years)	41.3	10.3	5,001
Education (years)	13.3	2.1	4,967
Number of Dependents	.9	1.2	4,765
<b>Former Job</b>			
Hourly Wage (dollars)	15.1	5.7	4,891
Hours per Week	40.1	5.5	4,093
Job Tenure (years)	11.7	8.4	3,350
<b>New Job</b>			
Hourly Wage (dollars)	12.3	6.1	1,966
Hours per Week	38.7	5.2	1,837
<b>Comparison between Old and New Job</b>			
Hourly Replacement Wage (percent)	83.6	31.7	1,850
Weekly Replacement Wage (percent)	82.8	30.6	1,450
<b>Unemployment</b>			
Observed Length of Unemployment (months) <sup>a</sup>	11.7	18.6	4,924
County Unemployment Rate at Time of Displacement (percent)	7.3	2.3	4,979
12-month Change in County Unemployment Rate (percentage points)	-.7	1.1	4,979
Difference between State and County Unemployment Rates at Time of Displacement (percentage points)	.0	1.8	4,979
Difference between 12-month Change in State and County Unemployment Rates (percentage points)	.1	.9	4,979

<sup>a</sup>See description in the Appendix text.

Source: See Appendix text.

industry of the defense employer. Comparing the new weekly wage to the former weekly wage was not possible, because the number of hours worked per week at the former employer was not available.

*Maine.* The number of hours worked per week at the former employer was not provided, but was assumed to be 40 if the individual's working status had been full-time. Because of this, the former weekly wage could be calculated only for those individuals who had been displaced from full-time jobs. The start date at the former job was not provided, making it impossible to calculate tenure at the former job. Appropriate SIC codes were assigned for the two Maine employers. Dates containing 00 or 32 for the day of the month were changed to 01 and 31, respectively.

*Massachusetts.* Unlike the data for Maine and Vermont, SIC codes for the former employers were included in the state's data base, but they were in the form of 2-digit, 3-digit, and 4-digit codes. 2- and 3-digit SIC codes were changed into 4-digit codes by adding zeros. Observations that did not have an SIC code for the former employer were supplied with one if it could be determined from the name of the employer. SIC codes for the new employer in the form of 2-digit and 3-digit codes were also changed into 4-digit codes by adding zeros.

## References

- Cox, D.R. and D. Oakes. 1992. *Analysis of Survival Data*. Monographs on Statistics and Applied Probability 21. London: Chapman & Hall.
- Freeman, Richard B. and Lawrence F. Katz. 1994. "Rising Wage Inequality: The United States vs. Other Advanced Countries." In Richard B. Freeman, ed., *Working Under Different Rules*. New York: Russell Sage Foundation.
- Henderson, Yolanda K[odrzycki]. 1990. "Defense Cutbacks and the New England Economy." *New England Economic Review*, July/August, pp. 3-24.
- Jacobson, Louis S., Robert J. LaLonde, and Daniel G. Sullivan. 1993. "Earnings Losses of Displaced Workers." *The American Economic Review*, vol. 83, no. 4 (September), pp. 685-709.
- Kessel, Herbert and Frederick Maher. 1991. "Worker Adjustment to G.E. Layoffs." Prepared for Vermont Department of Employment and Training, Fall.
- Kosiak, Steven, and Richard A. Bitzinger. 1993. *Potential Impact of Defense Spending Reductions on the Defense Related Labor Force by State*. May. Washington, D.C.: Defense Budget Project.
- Levy, Frank and Richard J. Murnane. 1992. "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations." *Journal of Economic Literature*, vol. 30, no. 3 (September), pp. 1333-81.
- Saunders, Norman C. 1993. "Employment Effects of the Rise and Fall in Defense Spending." *Monthly Labor Review*, April, pp. 3-10.
- U.S. Bureau of Labor Statistics. *Employment and Earnings*. January 1993, and January and May 1994. Washington: U.S. Government Printing Office.
- U.S. Congressional Budget Office. 1993. *Displaced Workers: Trends in the 1980s and Implications for the Future*. February. Washington, D.C.
- \_\_\_\_\_. 1994. *An Analysis of the Administration's Proposed Program for Displaced Workers*. December. Washington, D.C.
- U.S. Department of Commerce. 1993. *Department of Defense Prime Contractor Plants with Awards Totaling \$5 Million or More During FY 1992 By Location*. Washington Headquarters Services: Directorate for Information Operations and Reports.
- U.S. Department of Defense. *Atlas/Data Abstract*. Various years.
- \_\_\_\_\_. *Prime Contract Awards by Region and State*. Various years.
- \_\_\_\_\_. 1994. *National Defense Budget Estimates for FY 1995*. Office of the Comptroller of the Department of Defense. March.