Is retraining displaced workers a good investment?

Louis S. Jacobson, Robert LaLonde, and Daniel Sullivan

Introduction

Studies have found that for many workers, job loss has a major long-term adverse impact on earnings. For example, in earlier research we found the earnings losses for high-seniority workers displaced from jobs in Pennsylvania during the early 1980s amounted to approximately 25 percent of their expected earnings even five years after job loss. The losses were larger for workers displaced in the Pittsburgh area and in other labor markets with substantial employment declines, for workers with many years of service with their former employer, and for workers whose former industries were declining (Jacobson, LaLonde, and Sullivan [JLS], 1993a, b).

For such hard-hit workers, "passive" labor market policies such as unemployment insurance (UI) offset about half of their earnings losses during the typical six-month period when workers are eligible to collect benefits. However, because experienced displaced workers often face especially difficult readjustments, they are more likely than others to exhaust their unemployment insurance benefits. Moreover, a period of unemployment is not the only, or even the major, cause of financial loss suffered by displaced workers. Rather, the majority of their losses are attributable to their subsequent reemployment in lower paying jobs. The standard unemployment insurance program obviously does not address such losses.

Policymakers also provide retraining and other benefits through "active" labor market policies, such as the Workforce Investment Act (WIA) and its predecessor, Title III of the Job Training Partnership Act (JTPA), as well as the Economically Displaced Worker Adjustment Act (EDWAA). However, as we discuss, the modest resources available through such programs cannot fund large enough investments in displaced workers' skills to offset a significant portion of their long-term earnings losses.

In this paper, we examine the literature on the consequences of worker dislocation and the potential of retraining policy to ameliorate these effects. We observe that displaced workers differ from other job losers, in that temporary earnings losses associated with unemployment constitute only a small portion of the income losses associated with their layoffs. Second, retraining can be a productive investment both for displaced workers and for society. Third, incentives to acquire retraining differ in predictable ways among displaced workers. These differences influence who participates in retraining and how we interpret estimates of the impact of retraining among groups of displaced workers. Finally, current public investments in retraining are far too small to substantially mitigate the earnings losses of displaced workers. Because the long-term effects of displacement on earnings are large, policymakers would need to make comparably large investments in workers' skills to fully offset displaced workers' losses.

In the remainder of this article, we first discuss the key characteristics that set displaced workers, apart from other unemployed workers. Next, we survey the literature on the short- and long-term consequences of job loss. Then, we consider the predictions

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of human capital theory for the effects of programs and policies to retrain displaced workers. We survey the relatively limited existing empirical literature on retraining displaced workers and briefly recount the history of public-sector retraining programs. Then, we explore the costs and benefits of retraining displaced workers from the perspective of both the worker and society. Finally, we summarize our conclusions and discuss some of the policy implications of research on retraining displaced workers.

Who is a displaced worker and why should job loss be so costly?

Although there is some variation across studies, there are three common elements in most descriptions of displaced workers: 1) They have not been discharged for cause; 2) they have permanently separated from their former employer or have only a very small likelihood of being recalled to their old jobs; and 3) they have had strong prior attachment to the industry of their pre-displacement employer.

Policies and programs designed for displaced workers tend to target unemployed workers with some or all of these characteristics. In addition, some policies apply only to workers whose job loss stems from industry- or region-wide structural change, rather than from idiosyncratic shocks affecting a single firm. In our view, this additional characteristic is not an essential attribute of a displaced worker. If job loss implies the loss of specific skills or valuable seniority, workers can expect lower earnings regardless of whether others in their industry or region experience the same fate.

More essential to the notion of displacement is that workers have had strong prior attachment to their former employer or at least to their former employer's industry. Such ties make it less likely that displaced workers will be able to find new jobs that pay as well as their prior jobs. Because they recognize that job loss is more costly for workers with longer job tenure, the U.S. Bureau of Labor Statistics usually defines displaced workers as persons having at least three years of tenure when they permanently lose their jobs.

Why should job loss have long-term consequences?

There are several reasons why the loss of a job may imply long-term earnings losses for the affected workers and why earnings losses tend to increase with job tenure.

First, employees may have firm-specific skills. These skills can derive from familiarity with employers' processes, product lines, other employees, or business culture. Because such knowledge is usually less valuable to other employers, job loss can result in earnings

declines. This can be the case even when a displaced worker finds a job with another employer in the same industry (Becker, 1975). But, when job loss results in a change of industry, the value of any additional industry-specific skills may also be lost. The extent of such firm- and industry-specific skills, and thus the cost of job loss, is likely to rise with time spent with the firm or industry. Thus, the earnings losses associated with displacement should increase with these factors as well.

Long-term earnings losses for displaced workers may also result from firms' operation of what are sometimes referred to as "internal labor markets." Companies that follow such policies tend to hire new employees mainly into entry-level positions, while filling vacancies in more-responsible, higher-paying positions by promoting from within their current pool of workers. Those losing more advanced positions and needing to start over in an entry-level position with another firm will tend to suffer earnings losses. Workers displaced after several years of service are more likely to be in such a situation. More generally, any tendency for firms to pay or promote employees based in part on seniority would cause employees with more years of service to be hit harder by job loss. By contrast, those with only a short tenure at the time of their job loss would often have an easier time finding a new job at a similar rate of pay.

Evidence on the cost of displacement

Consistent with the above considerations, research on job displacement indicates that 1) job loss has long-term effects on subsequent earnings; 2) earnings losses tend to be greater for workers changing industries, and 3) these effects are larger for workers displaced after several years of service with the same employer.

Much of this research relies on the biennial *Displaced Workers Survey* (DWS). Studies based on these data indicate that displaced blue-collar workers' earnings losses rise at a rate of 1 percent to 2 percent for each year of tenure with their former employer (Topel, 1990). Therefore, workers displaced after one year on the job are predicted to be able to find jobs paying nearly the same rate of pay as their old job. By contrast, otherwise comparable workers with 20 years of tenure tend to find jobs that pay, on average, between 20 percent and 40 percent less than their old job. Other DWS studies indicate that the losses for displaced white-collar workers are approximately one-half the size of the losses for blue-collar workers. (For summaries of this literature, see JLS, 1993b, chapter 2; Fallick, 1996; Aaronson and Sullivan, 1998; and Farber, 1996 and 2005).

Supporting the notion that industry-specific skills are often important, Neal (1995) found that males who changed industries following the loss of a job experienced much greater wage losses than their counterparts who found new jobs in the same industry. In addition, in JLS (1993a, b), we found that displaced manufacturing workers' earnings losses were twice as high when they took new jobs outside manufacturing.
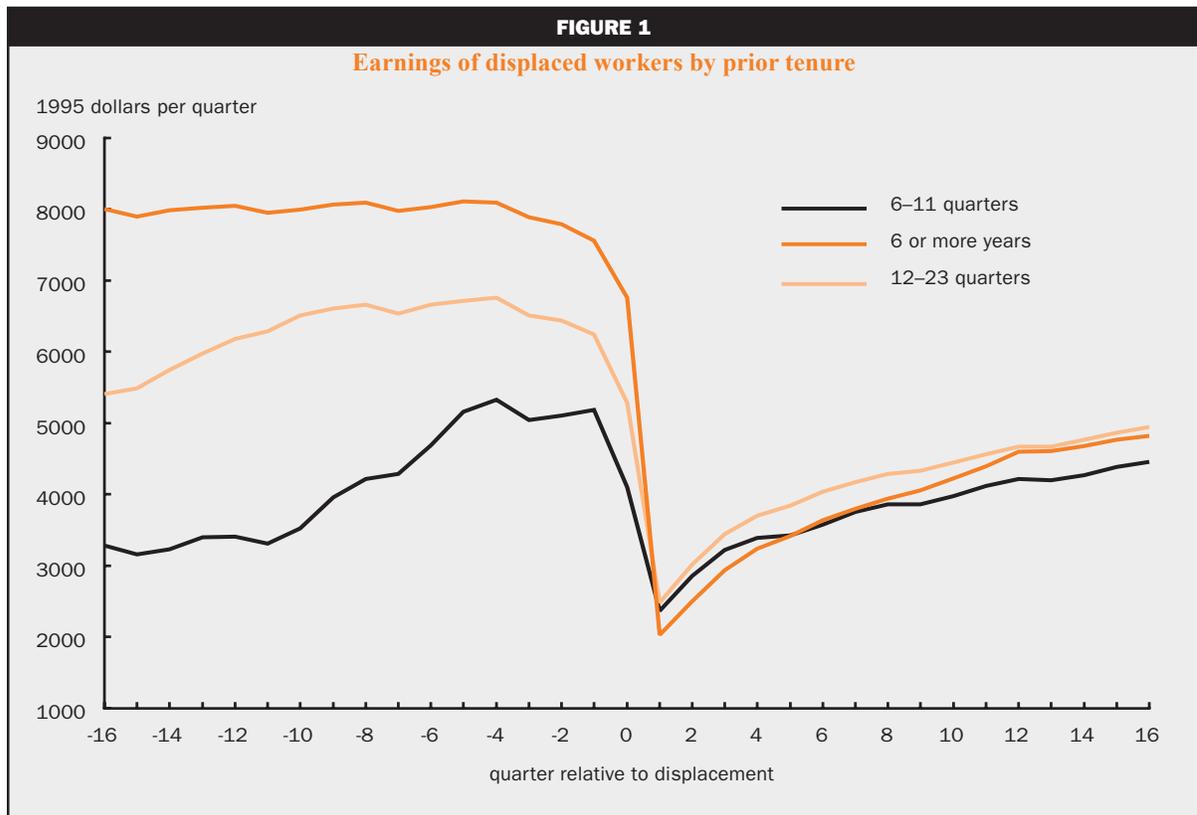
Earnings losses and prior job tenure

We illustrate the dynamics of displaced workers' earnings and show how losses are related to years of tenure with the prior employer using Washington State administrative data. The sample used in this illustration consists of all workers who filed a valid unemployment insurance claim in 1991 in Washington State and who were consistently attached to the state's UI covered labor force between 1987 and 1996.

As shown by figure 1, the inflation-adjusted earnings of displaced workers exhibit a characteristic temporal pattern. During the year prior to losing their jobs, their earnings begin to decline, likely reflecting short-term temporary layoffs or real wage cuts. Earnings drop sharply immediately following workers' job losses. Afterwards, their earnings rise, but at a decreasing rate. The long-term losses, as measured by the difference

between individuals' pre- and post-displacement earnings are especially large for high-tenure workers. This pattern also has been reported in studies using administrative data from Pennsylvania and California (JLS, 1993; Shoenei, 2000.)

The positive relationship between years of service with a displaced worker's prior employer and the long-term costs associated with job loss can be seen by comparing the earnings patterns of job losers with three different levels of prior job tenure: those with 1) six quarters to 11 quarters of prior tenure, 2) 12 quarters to 23 quarters of prior tenure, and 3) six or more years of prior tenure. In the year prior to their job losses, the earnings of workers in the group with six to 11 quarters' tenure averaged approximately $5,000 per quarter (see the black line). Four years (16 quarters) after their job losses, their post-displacement quarterly earnings were about $500 or 10 percent less than their pre-displacement levels.[1] By contrast, the pre-displacement earnings of the group with 13 to 23 quarters' tenure averaged about $6,500 per quarter prior to displacement. By the sixteenth quarter following displacement, the quarterly earnings of this group were approximately $1,500 or 23 percent less than their pre-displacement levels. Finally, the pre-displacement earnings of the group with six or more years' tenure were even

FIGURE 1

Earnings of displaced workers by prior tenure

1995 dollars per quarter

Legend:
- 6–11 quarters
- 6 or more years
- 12–23 quarters

quarter relative to displacement

greater. And their post-displacement earnings were about 30 percent less than their pre-displacement earnings.

The differences between pre- and post-displacement earnings shown in the figure indicate that workers with greater job tenure experience larger earnings losses. Prior to their job losses, the earnings of the three groups differed by $2,500 to $3,000 per quarter, but after displacement, their earnings differed by only about $1,000 per quarter. These results are consistent with the extent of firm-specific human capital increasing with years of service with an employer or with internal labor markets making high-seniority workers more likely to have to give up a valuable job for an entry-level position.

Large earnings losses from displacement are common

Studies of displaced workers, using either administrative data or the DWS, indicate that earnings losses associated with displacement are common among all groups of workers with significant prior job tenure and are not otherwise limited to specific demographic groups or to workers displaced from particular sectors of the economy. Women, minority, and less-educated workers, as well as non-manufacturing workers, all tend to experience substantial long-term earnings losses after job loss. However, the magnitude of these losses

can differ among groups. This latter finding suggests that the incentives to seek retraining after displacement also may differ among groups.

Our research using Washington State data shows that losses associated with displacement are not limited to workers displaced from particular durable goods industries, such as aircraft or wood products manufacturing. As shown by figure 2, displaced manufacturing and non-manufacturing workers from our Washington State sample with six or more years of tenure experienced substantial earnings losses. During the sixteenth quarter following their job loss, the quarterly earnings of the displaced non-manufacturing workers are still about $1,500 below their pre-displacement levels—a reduction of about 20 percent relative to their pre-displacement earnings. Manufacturing workers do tend to experience somewhat greater losses, but our analysis indicates this is primarily because the average tenure of displaced manufacturing workers is much greater than that of displaced non-manufacturing workers.

That high-tenure displaced workers outside the manufacturing sector have large earnings losses implies that policies that target displaced workers in specific manufacturing industries, such as the federal government's Trade Adjustment Assistance program, are probably not justified on equity grounds. The

FIGURE 2

Earnings of displaced workers by prior industry

1995 dollars per quarter

quarter relative to displacement
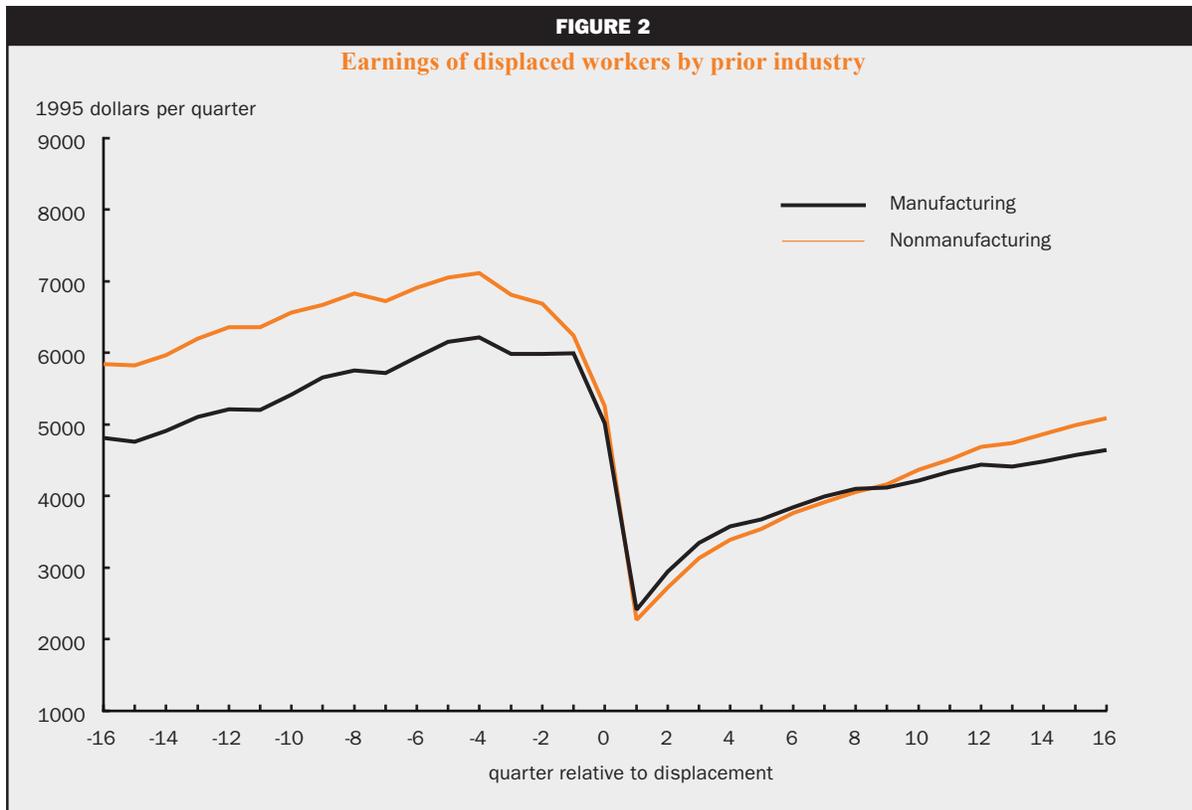
cost of displacement is closely associated with workers' attachment to a particular firm or industry, but is less affected by workers' demographic characteristics or former industry.

What should policymakers expect from retraining?

Ever since the passage of the Area Redevelopment Act of 1961, the Manpower Development and Training Act of 1962, and the Trade Adjustment Assistance Act of 1962, policymakers have sought to use various forms of schooling, classroom vocational training, and subsidized on-the-job training to ameliorate displaced workers' earnings losses (LaLonde, 2003). If such programs are well run, policymakers clearly have reason to expect them to raise workers' subsequent earnings. But, should policymakers expect such programs to fully offset the effects of displacement? If not, how much impact on earnings is it reasonable to expect?

A useful frame of reference is the large literature on the returns to traditional schooling. A rough summary of the findings of that literature is that an additional year of schooling raises recipients' subsequent annual earnings by approximately 10 percent; taking account of the associated costs, the inflation-adjusted internal rate of return is near 7 percent (Heckman, Lochner, and Todd, 2003). Such an investment compares favorably with returns available in financial markets. However, as we noted, the earnings losses suffered by high-tenure job losers could easily be on the order of 20 percent of their previous earnings. Thus, if the effectiveness of manpower retraining programs in raising earnings was equal to that of traditional education, it would take roughly two years of such training to fully offset the effects of displacement.

As an illustration, consider a worker for whom job displacement reduced his annual earnings from $30,000 to $25,000. That is, his previous earnings were 20 percent higher than those he could expect in the absence of retraining. What level of investment would be required to raise his annual earnings by 20 percent? Using the 7 percent return estimate from the schooling literature as our guide, we would expect that the level of investment required to increase his earnings by $5,000 would be $5,000/0.07, or somewhat in excess of $70,000. Such a program might provide 20 months of training with direct costs of $30,000 and foregone earnings of roughly $40,000.

Very few public-sector training programs come close to providing the equivalent of two years of retraining, incurring direct costs of $30,000, or making overall investments of $70,000 per participant. Indeed, the investments made by the typical program are an

order of magnitude less. Thus, unless these programs are extremely effective, it is unreasonable to expect them to fully offset displaced workers' earnings losses. As with traditional education, they may still be good investments. However, policymakers should not be disappointed if programs with direct costs of, say $3,000, increase earnings by only 2 percent or 3 percent.

The decision to obtain retraining and the interpretation of training impacts

Motives for enrolling in retraining following job loss vary. Most obviously, individuals may enroll to enhance their skills. As we discuss below, the optimal extent of investments in new skills depends on their impact on future earnings, time remaining in the trainees' work lives, and direct and indirect costs of going to school. In addition to the human capital investment motive, individuals also may enroll in training in order to facilitate job search (Heckman, LaLonde, and Smith, 1999). Exposure to new skills and new networks of contacts may allow workers to find appropriate work more quickly. Another possibility is that workers' retraining constitutes a form of consumption while unemployed. For example, displaced workers might decide to enroll in, say, a photography course, while waiting for an acceptable job offer to arrive. These varying motives have different implications for who enrolls in retraining, what effects it should have, and what these effects imply about the potential for an expansion of retraining to aid those not currently receiving services.

The human capital investment framework links displaced workers' decisions to enroll in retraining to the impact of that training on earnings (Heckman, LaLonde, and Smith, 1999). To illustrate the different incentives for participation in retraining, one can characterize the decision to enroll in retraining using equation 1:

1) $\quad \delta_i (1 - (1/1 + r)^{N_i}) / r - C_i > 0.$

In equation 1, the term δ_i denotes the annual impact of retraining on person i's post-training earnings. The subscript i indicates that the impact of schooling varies among individuals in the population.[2] The term $(1 - (1/1 + r)^{N_i}) / r$ is the present value of $1 paid to an individual annually for N_i years, where N_i denotes the number of remaining years in a trainee's work life, and r is the real interest rate. C_i denotes the costs of retraining. These costs include both the direct costs of training, such as tuition, supplies, transportation, and child care, as well as the opportunity costs of training

connected with spending less time working or searching for a new job. This formulation may be easily modified to account for the possibility that the impact of training, δ_i, depreciates or appreciates over time.

Because older workers typically will have fewer years remaining in their work lives, the term $(1 - (1/1+r)^{N_i})$ will be smaller for older workers, implying that other things being equal, they have less incentive to enroll in retraining than younger workers. Such differences in remaining working lives can substantially alter the incentives to obtain retraining. For example, suppose training raises annual earnings by $2,000 per year for the remainder of a worker's career, that the cost of retraining averages $10,000 per trainee, and that the real discount rate is 2 percent. Then the present discounted value of retraining for a 50-year-old displaced worker who expects to work an additional 15 years is $15,700. The comparable figure for a 30-year-old displaced worker who expects to work for 35 more years is $40,000. According to this framework, in order for the 50-year-old displaced worker to obtain the same (present discounted) gains from training, the annual impact on his earnings would have to increase from $2,000 to $3,900 per year. That is, a 50-year-old would need to expect nearly twice the increase in annual earnings to have the same incentives to enroll in retraining as the 30-year-old.

Although the human capital framework suggests that older workers are less likely to enroll in retraining, among those who do enroll, the annual impact of retraining is likely to be larger than it is for younger workers. Older workers are less likely to enroll in retraining because they have fewer remaining years left in their work lives and, possibly, because they face higher opportunity costs of training due to their higher foregone earnings and perhaps a higher psychological barrier associated with returning to a classroom setting. If they do enroll, it must be because the impacts on annual earnings are high enough to offset those effects. Thus, among those who enroll, the average impact of training on annual earnings is likely to be higher for the older workers.

A related point is that if we observe empirically that, among those who enroll, the impact of retraining on annual earnings is greater for older workers than it is for younger persons, it would not necessarily follow that, among the general population, older workers are more effective learners than younger workers. Nor would this finding imply that policymakers should necessarily encourage additional older workers to take up training. Instead, differences between the underlying distributions of training impacts for older

and younger workers may manifest themselves more in differences among workers' rates of participation in retraining than in differences in mean outcomes among those who participate (Heckman and Honoré, 1990).

The foregoing framework is useful for thinking about the decision to enroll in training, but it does not address the equally important decision of how much training enrollees should acquire. Indeed, because the incremental costs and benefits of additional training do not depend on the levels of training, the framework of equation 1 implies that as long as it is beneficial to enroll in one community college course, it makes sense to enroll in and complete any additional number of courses. Obviously, we do not observe this behavior in the data. Rather, we find that most displaced workers in Washington State who enrolled in community college courses around the time of their job losses completed only a few classes (JLS, 1999). To make it consistent with this pattern of behavior, one could modify the framework of equation 1 to allow for the possibility that the annual impact of training rises at a decreasing rate with the number of credits completed or that the costs are rising with the number of credits completed.[3] For example, the opportunity cost of participating in training may increase as more courses are completed, because each course raises the value of the worker's services to available jobs and, thus, the opportunity cost of turning down an available job to get more training. Alternatively, the more courses taken, the harder it is for the worker to hold a full-time or even a part-time job.

Who participates in retraining?

The foregoing discussion indicates that when assessing the impact of retraining among displaced workers, we also should examine their participation rates. To date there has been little systematic study of the determinants of participation in training generally, and especially so for displaced workers. (One exception is the study of training participation by economically disadvantaged adults in Heckman and Smith, 2004).

Here we describe participation patterns of displaced workers in community college retraining around the time of displacement. Our sample is 65,000 Washington workers who lost their jobs between 1990 and 1994. About 15 percent of these displaced workers completed at least one community college course around the time of their job loss.

These trainees differ in several ways from displaced workers in our sample who did not enroll. Among both older and younger displaced workers, community college participants are better educated, more likely to be white, and more likely to be displaced from

the aerospace industry than are the non-trainees. Among the older males, we see that community college participants also are more likely displaced from the state's wood products industries.

The higher levels of educational attainment among trainees suggest that the trainees were more skilled than the non-trainees. But, as shown near the bottom of table 1, despite their higher levels of education, we find that the average pre-displacement earnings of both the older and younger trainees are similar to those of comparably aged non-trainees. Thus, while trainees are better educated than other displaced workers, they also had lower than expected earnings relative to comparably educated non-trainees. Therefore, they are not representative of the population of displaced workers with similar levels of education.

The foregoing evidence underscores two points: 1) Trainees are not representative of the population of displaced workers, and 2) it is particularly important to control for individuals' prior earnings power, and their potential loss of earnings power associated with job loss in assessing the impact of retraining.[4]

One explanation for the participation patterns we observe in table 1 is that those with prior schooling beyond high school are more familiar with the demands of and types of courses offered by community colleges and have had more success in learning material in a classroom setting. Consequently, they are more likely to enroll in community college retraining. The possibility that variation in knowledge about the existence of retraining opportunities might play a role in retraining decisions is also consistent with anecdotal evidence that workers displaced from aerospace and wood products industries were given information about training opportunities by their unions and former employers and that these displaced workers had higher training rates than workers from other industries during the period studied (Jacobson and Sullivan, 1999).

Some direct evidence on the impact of information on rates of enrollment in training was provided by the Lifelong Learning Demonstration, a large randomized trial conducted during 1996. Two mass mailings of information were targeted at "incumbent" workers with recent work experience. The demonstration defined such workers as those who had earned more than $1,105 in at least six of the previous eight quarters. Because of this definition, in principle, the study sample could have included some displaced workers. The results indicated that this very modest intervention had no effect on participation rates in training. (Abt Associates, 1999). This finding suggests, albeit weakly, that the higher enrollment rates that we observed for displaced workers with some prior college education were not simply due to their knowledge about the existence of such opportunities.

Another factor that may influence displaced workers' training decisions is the condition of their local labor market. Individuals whose job search prospects are poor may choose to enroll in retraining because their opportunity costs are low. As shown in table 1, our two measures of local labor market conditions, the county unemployment rate and its rate of employment growth, do not reveal any differences between trainees and comparisons. By contrast, our measure of labor market conditions in displaced workers' prior (two-digit Standard Industrial Classification) industry does differ for trainees and non-trainees. Trainees appear to be displaced from industries that have had slower employment growth.

This last difference in industry conditions suggests that displaced workers who are more likely to change industries as a result of their job loss and, as a result, expect larger earnings losses may be the ones who are most inclined to seek retraining (JLS, 1993a; Neal, 1995). This pattern is consistent with the idea that workers who expect to experience very large earnings losses from displacement, because they can not find a new job in their old industry, likely have lower opportunity costs of retraining and participate in it at higher rates. This possibility suggests that studies of the impact of retraining programs should adjust for the expected loss in earnings associated with displacement from different industries.

A final observation about table 1 is that, as implied by the human capital framework, older displaced workers in Washington State were less likely to enroll and complete community college courses than younger displaced workers. Given that displaced workers tend to be older than other unemployed workers and others seeking training, understanding the relationship between age and training participation is especially important.

To further explore this relationship among Washington State's displaced workers, we decomposed the total community college schooling that they acquired into three measures of participation: A) the probability of enrolling in community college, B) the probability of completing at least one course given enrollment, and C) the number of credits completed.[5] We consider separately the relationship between age and each of these measures of participation, using a step function for age that allows for eight separate age intervals. We also control for several individual and pre-displacement job characteristics using ordinary least squares. These characteristics are summarized in table 1 and include the three measures of labor market conditions and earnings during the year prior to job loss. Among

TABLE 1

Characteristics of displaced workers in Washington State

	Males				Females			
	Under 35		35 and over		Under 35		35 and over	
Characteristic	T[1] (1)	C[2] (2)	T[1] (3)	C[2] (4)	T[1] (5)	C[2] (6)	T[1] (7)	C[2] (8)
Age at job loss	28.70 (3.62)	29.63 (3.45)	43.06 (5.92)	43.97 (6.28)	28.92 (3.70)	28.82 (3.44)	43.62 (5.76)	44.45 (6.15)
Minority	.12	.17	.10	.13	.11	.17	.09	.14
> 6 years' tenure	.12	.13	.25	.23	.16	.15	.28	.27
Educational attainment								
< High school	.09	.18	.06	.12	.06	.12	.04	.12
> High school	.43	.28	.55	.43	.49	.38	.53	.41
Prior industry								
Aerospace	.19	.11	.18	.10	.13	.09	.11	.07
Wood products	.09	.08	.16	.07	.02	.02	.04	.02
Other manufacturing	.24	.24	.34	.23	.14	.14	.15	.15
Region of state								
Seattle–Tacoma MSA	.55	.55	.51	.57	.59	.60	.53	.58
Other counties with MSAs	.13	.12	.13	.11	.12	.11	.13	.12
Rural counties	.32	.33	.37	.31	.29	.29	.33	.30
Labor market conditions at job loss								
County U_ rate (%)	7.04	7.20	7.31	7.06	6.94	7.00	7.09	7.04
County E_growth (%)	1.50	1.54	1.13	1.47	1.44	1.45	1.45	1.48
Employment growth in 2-digit industry (%)	0.41	1.08	–0.12	1.17	1.31	1.72	1.51	2.02
Mean earnings prior to job loss								
1–4 quarters before ($000s)	26.5 (11.6)	25.7 (12.1)	34.5 (15.3)	33.3 (17.6)	21.1 (9.7)	20.5 (10.0)	24.5 (11.8)	23.4 (13.2)
5–8 quarters before ($000s)	26.7 (11.7)	26.2 (12.4)	35.8 (14.8)	34.5 (17.5)	21.1 (9.2)	20.6 (10.2)	24.7 (11.4)	23.5 (12.6)
Observations	2,936	14,560	2,371	19,342	2,291	7,462	2,809	13,552

the characteristics we control for in this analysis are a worker's prior tenure and prior industry, which are likely related to the expected long-term earnings losses associated with their displacement (JLS, 1993a). These variables, along with schooling, prior earnings, minority status, gender, and region of the state also are likely predictors of post-displacement earnings. One way to interpret these controls is that we are measuring the effects of age on the retraining participation decision, while roughly holding constant the opportunity cost of retraining.

Our findings on the determinants of age on retraining participation are shown in table 2. As shown by the first column, the number of community college credits completed by male and female displaced workers declines nearly monotonically with age. In the

second column, we see that participation, defined as completing one or more courses, also declines monotonically with age. The results in the last three columns of the table indicate that the reason older male displaced workers complete less training than younger males is that they are less likely to enroll in courses in the first place. However, once they enroll in a course, they are almost as likely to complete at least one class and, given that they complete one class, except for the very youngest and oldest age groups, on average they complete nearly the same number of credits as their younger counterparts.[6]

The results in table 2 have several possible interpretations. If we have successfully controlled for workers' expected post-training earnings, then the age–participation relationship might reflect either retraining

having a lower impact on annual earnings for older workers or older workers having shorter remaining work lives. However, another possible interpretation of the results in table 2 is that we have not completely controlled for expected post-displacement earnings and that among workers who have the same prior education and earnings, older workers differ in some unobservable dimension that makes them less productive at new jobs. Such an interpretation would explain the otherwise puzzling result that older workers with more labor market experience have the same earnings as observationally similar younger workers. To the extent that the unobserved attribute that lowers older workers' earnings also makes them less effective learners (that is, a lower value of δ_i), we expect increasing age to be associated with a lower propensity to enroll in training.

Federal retraining initiatives and the role of community colleges

The initial intent of the Manpower Development and Training Act (MDTA) was to retrain workers who had lost jobs due to technological change. But by the mid-1960s, Congress had changed the emphasis of these programs away from workers displaced from steady jobs and toward the economically disadvantaged. This emphasis was especially strong in the Job Training Partnership Act (JTPA) program, enacted in 1982 (LaLonde, 2003). However with the passage of the Economically Displaced Worker Adjustment Act (EDWAA) in 1988 and then with the mid-1990s amendments to JTPA, resources were gradually shifted back toward retraining displaced workers.

Over the years, government-sponsored retraining has taken place in a variety of settings, including technical schools and subsidized positions with private employers. However, during the last 30 years, community colleges have played an increasingly prominent role in worker retraining policy. This change coincides with the greater emphasis that these institutions have given to vocational training. Although community colleges continue to offer traditional academic courses, they also offer a wide range of vocational courses that in the past were offered mainly by proprietary schools (Freeman, 1974; Grubb, 1993b; Kane and Rouse, 1999.) Typical course offerings cover areas as diverse as computer information systems, food preparation and management, real estate, word processing, respiratory therapy, the construction trades, and automobile repair. Moreover, students who complete these kinds of courses can often obtain certification in a particular trade or take state licensing exams.

Several federal programs have funded community college services for displaced workers. These programs include those funded under the Trade Adjustment Assistance Act (TAA), EDWAA, which is now Title I of the Workforce Investment Act (WIA), and the 1972 Higher Education Amendments (Pell Grants).

The TAA program was first established by Congress in 1962 and has been amended several times since then. TAA currently provides extended unemployment insurance benefits to unemployed former manufacturing workers who participate in retraining and who the Secretary of Labor determines to have lost jobs in trade-impacted plants and industries. About 40 percent of those receiving TAA-sponsored job-skill training and 73 percent of those receiving TAA-sponsored general education received these services at community or four-year colleges (Corson, Decker, Gleason, and Nicholson, 1993).

There also is a similar program for workers displaced because of the effects of the North American Free Trade Agreement (NAFTA). NAFTA Transitional Adjustment Assistance was established in 1993 to provide assistance to displaced workers and to workers who retained jobs but had their hours or wages cut as result of increased trade between the U.S. and Mexico and Canada. Applicants who the Secretary of Labor determines meet these criteria are eligible to receive a variety of services, including training with long-term income support. Since the passage of the Trade Act of 2002, this program has been merged with the TAA program.

In 1988, Congress established EDWAA as an amendment to Title III of JTPA. EDWAA provides displaced workers with retraining and other services, but does not extend unemployment benefits. One important change from previous legislation was to require that at least one-half of EDWAA funds be spent on retraining as opposed to job search and other reemployment services. Eligibility for EDWAA services extends to all permanently displaced workers. Initially, funding levels limited annual participation in EDWAA programs to about 120,000 workers at a cost of approximately $200 million. However since fiscal year 1994, expenditures have exceeded $1 billion annually. Also, compared with JTPA, proportionally more Title I WIA funds have gone to displaced adults than to economically disadvantaged adults.

EDWAA defined displaced worker eligibility more broadly than we did earlier in this article. EDWAA funds could be used to train applicants who program operators determined would likely benefit from the services and who lost jobs because of plant closures or mass layoffs, or were long-term unemployed persons with

Adjusted participation in community college by age of displaced workers

	Credits completed	Probability of completing one or more credits	Probability of enrolling in credit course	Probability of earning credits given enrollment	Credits earned given at least one credit
Males					
20–24	6.77	0.191	0.229	0.023	10.65
	(0.53)	(0.011)	(0.013)	(0.035)	(3.63)
25–29	3.61	0.107	0.130	0.027	7.90
	(0.45)	(0.010)	(0.011)	(0.033)	(3.44)
30–34	2.47	0.070	0.090	–0.005	7.36
	(0.44)	(0.010)	(0.010)	(0.033)	(3.42)
35–39	1.95	0.046	0.061	0.002	8.48
	(0.44)	(0.010)	(0.010)	(0.033)	(3.44)
40–44	0.98	0.027	0.042	–0.017	5.07
	(0.42)	(0.010)	(0.010)	(0.034)	(3.50)
45–49	1.15	0.024	0.032	0.006	5.71
	(0.47)	(0.010)	(0.010)	(0.035)	(3.60)
50–54	0.79	0.021	0.030	–0.035	3.78
	(0.50)	(0.011)	(0.011)	(0.037)	(3.83)
55–60	0.0	0.0	0.0	0.0	0.0
Observations	39,208	39,208	39,208	6,568	5,306
Females					
20–24	10.30	0.225	0.258	0.050	21.15
	(0.72)	(0.017)	(0.018)	(0.032)	(3.17)
25–29	4.55	0.121	0.147	0.028	12.00
	(0.59)	(0.014)	(0.015)	(0.030)	(2.95)
30–34	2.92	0.073	0.094	0.013	10.18
	(0.58)	(0.013)	(0.014)	(0.030)	(2.92)
35–39	2.72	0.059	0.079	0.009	11.20
	(0.57)	(0.013)	(0.014)	(0.030)	(2.92)
40–44	2.32	0.048	0.067	–0.004	9.94
	(0.57)	(0.013)	(0.014)	(0.030)	(2.93)
45–49	1.72	0.032	0.483	–0.010	8.57
	(0.59)	(0.014)	(0.015)	(0.031)	(3.01)
50–54	0.80	0.023	0.029	–0.005	4.50
	(0.62)	(0.015)	(0.016)	(0.032)	(3.22)
55–60	0.0	0.0	0.0	0.0	0.0
Observations	26,113	26,113	26,113	6,156	5,099

Notes: Figures in columns 1 and 5 are from a regression with the indicated column heading as the dependent variable and with an intercept and indicators for the age ranges shown. Figures in columns 2 through 4 are coefficients from a linear probability model with an intercept and indicators for the age ranges shown. No other controls are included in the regressions. Information on the sample is given in the text. The figures in the table are coefficients for the indicators of the age ranges shown in the table. All models include controls for prior schooling, prior industry, earnings in year prior to displacement, tenure on pre-displacement job, minority status, region of state, county unemployment and employment growth rates, the statewide employment growth rate in the individual's prior two-digit industry, and quarter and year of job loss. Numbers in parentheses are standard errors (under the incorrect assumption of homoscedasticity).

limited job prospects, farmers, ranchers, and other self-employed persons who become unemployed due to general economic conditions, and, if states so desired, spouses of displaced workers.

Although it was not designed specifically for displaced workers, the Pell Grant program has provided low-income displaced workers with grants to cover the cost of retraining. Current regulations base eligibility on prior year income, allowing relatively few displaced workers to participate. However, the program once allowed administrators to waive the normal limit on an applicant's assets and base their eligibility on current instead of the previous year's income. As a result, displaced workers were eligible to receive grants to cover the tuition costs of retraining and schooling. Many displaced workers have taken advantage of this provision. During the 1990–91 academic year, more than 75,000 displaced workers received Pell Grants. Approximately 30 percent of displaced Pell grantees attended proprietary schools, another 10 percent

attended four-year colleges, and the remaining 60 percent enrolled in community colleges.

Today, most displaced workers who receive federally sponsored retraining services participate in programs authorized under WIA. These programs provide clients with a diverse set of services that may include job search assistance, on-the-job training, or classroom instruction in vocational, remedial, or college-level skills. Currently, most federal training is funded through locally provided Individual Training Accounts (ITAs), which are flexible vouchers that can be used at certified institutions, such as community colleges and proprietary schools. In the past, local Private Industry Councils assigned clients to training provided by their own operating organizations or through subcontracts to a variety of educational institutions.

In practice under both WIA and JTPA, most of the training that displaced workers receive is relatively low intensity and low cost. For example, below, we discuss the Texas Worker Readjustment Demonstration, in which participants received on average 20 weeks of either job search assistance alone or job search assistance combined with vocational classroom training or on-the-job training. The costs for this program ranged from $1,300 to $3,000 per participant, which is fairly typical of the training that historically has been available to displaced workers.

In practice, two-year community colleges are one of the most common providers of government-sponsored training services. Although community colleges that receive WIA funds frequently place displaced workers into specially designed noncredit courses, they also enroll WIA participants into regular community college programs. In these mainstream programs, displaced workers take classes with non-displaced workers and full-time students. State and local governments typically subsidize 80 percent of the cost of community college schooling (Kane and Rouse, 1999). For more technical lines of retraining, such as nursing programs, the subsidies tend to be even larger. Displaced workers likely account for a significant part of community college enrollments. About one-third of community college students in the United States are over 30, and the vast majority work at least part-time (Kane and Rouse, 1999).

Impact of retraining on displaced workers' earnings

There have been relatively few evaluations of the impact of training on the employment outcomes of displaced workers according to our definition. Instead, there has been greater interest in assessing the effect of job training on economically disadvantaged youth and adults. One study that is relevant is Ashenfelter's classic early study of the 1964 Manpower Training Development Act (MDTA) cohort, who received training just prior to the shift of federal funding toward the economically disadvantaged. His impact estimates for the second year following training indicate that the vocational classroom training provided under MTDA raised the earnings (in 2002 dollars) of white and minority males by $830 and $2,065, respectively; impacts for white and minority females were $2,020 and $2,870, respectively.[7] These impressive earnings gains amount to about 4 percent and 12 percent of post-training earnings for the white and minority men, respectively, and 18 percent and 29 percent of post-training earnings for the women. Ashenfelter estimates that in subsequent years these gains declined significantly for males, but remained relatively stable for females, persisting for at least five years after training. Though one could question the current relevance of a study of training that took place 40 years ago, Ashenfelter's study did show that vocational retraining programs can significantly increase participants' earnings and possibly by more than what one would expect from completing one year of traditional schooling.

In the 1980s the large structural changes that hit the manufacturing sector led to at least the perception of a surge in the number of displaced workers. In response, the Department of Labor sponsored seven demonstration programs to assess the effectiveness of displaced worker programs. During fiscal year 1983, these demonstrations served approximately 10,000 displaced workers. Participants received a range of services, including job search assistance, classroom training, and on-the-job training (Corson, Long, and Maynard, 1985).

In the Buffalo Dislocated Worker Program, officials assigned some applicants to program slots using a lottery. The follow-up survey indicated that the opportunity to receive the program's employment and training services increased average earnings during the first six post-program months by about $179 per week (in 2002 dollars) or by 65 percent of post-displacement earnings.[8] However, only 18 percent of participants received classroom training as their major activity, with the rest mainly receiving job search assistance. No separate estimate of the impact of the program on those who did receive training was produced (Corson, Long, and Maynard, 1985).

The Texas Worker Readjustment Demonstration, which operated during 1984 and 1985, also targeted displaced workers (Bloom, 1990). In this study, roughly one-half of the training participants were between the ages of 35 and 54 and, on average, had held their

prior jobs for more than four years. This demonstration used randomized trials to study the effects of job search assistance combined with vocational classroom training in Houston and subsidized on-the-job training in El Paso.

Overall, in this study received relatively little training. On average, participants received 20 weeks of services, but 62 percent of male participants and 50 percent of the female participants received only job search assistance while enrolled in this program. For males, who were more likely to have participated at the Houston site, with its more expensive classroom training, the direct cost of these services averaged approximately $3,000 per participant. For females, who were more likely to have participated at the El Paso site, with its less expensive on-the-job training, the direct cost averaged approximately $1,300 per participant. The figure for females was fairly typical of JTPA expenditures at the time.

The experimental evaluation of the Texas program indicated that the opportunity to participate in training raised participants' earnings. Men's earnings rose by about 8 percent and women's earnings rose by nearly 34 percent (Bloom, 1990, p. 163). (The increase in women's earnings was statistically significant at conventional levels.) The more impressive impacts for female participants in the Texas program are consistent with findings from the literature on training for the economically disadvantaged. Such studies typically report larger training impacts for women than for men. If the gains in the Texas study persisted, the social internal rate of return for this training intervention would be very impressive. But without longer follow-up data, it is impossible to determine whether the Texas program was successful.

The Buffalo and Texas evaluations indicate that Job Search Assistance (JSA) could be a highly cost-effective service for displaced workers. Duane Leigh (1990) summarized the random assignment demonstrations as showing that, on average, job search assistance is about as effective as retraining, but much less expensive. However, more recent evidence is mixed. In the Job Search Assistance Demonstration, the earnings of Washington, DC, participants who received JSA were about 10 percent above those of a control group. But a similar treatment that operated contemporaneously in Florida showed no effect on participants' earnings (Decker et al., 2000). When job search assistance is effective, studies indicate that it is associated with about a 3 percent to 5 percent increase in short-term earnings.

The impacts of JSA for displaced workers are similar to the earnings impacts reported in the Unemployment Insurance Bonus experiments conducted in New Jersey, Washington State, Pennsylvania, and Illinois (Woodbury and Spiegelman, 1987; O'Leary, Spiegelman, and Kline, 1995; Corson and Haimson, 1995). In these studies, the only treatment received by unemployment insurance claimants was a cash bonus for returning to work early in their unemployment spell. As with JSA, there were significant differences in the impacts across states, a finding that should make policymakers cautious about generalizing from these studies. Differences in how policies and services are implemented in different locations and differences in local labor market conditions appear to have major effects on the results.

Another study that evaluated the impact of retraining for displaced workers is the Evaluation of the TAA Program (Corson, Decker, Gleason, and Nicholson, 1993). Here, access to training and job search assistance among workers who lost jobs for reasons related to international trade was estimated to have raised participants' quarterly earnings by about $1,176 on an annual basis. Given that the program cost averaged $2,350 per participant, this program would pay for itself in less than three years if the impact persisted.

But this careful study of TAA has three shortcomings commonly associated with evaluations of retraining programs. First, the follow-up period was too short. Human capital theory predicts that investments in skills should generate returns over a long period through higher worker productivity (Ashenfelter, 1978). The benefits of retraining should therefore be measured over a long period. In practice, a one- or two-year follow-up period is likely to be inadequate, especially when one effect of retraining is to enable participants to get jobs that offer the possibility of career advancement.

A second shortcoming of the TAA study was that the sample size was too small. The estimated impact is large relative to the cost of the program. But, given the standard error associated with the impact estimate, one cannot be confident that the program impact is significantly different from $0 per year or from $3,000 per year. When evaluating programs like the TAA retraining program, evaluators must ensure that the sizes of their samples are large enough to detect an impact on annual earnings of about $500. This is necessary because given the typical cost of these programs, if such an impact persisted, it would still imply very respectable rates of return. In the case of the TAA study, the required sample size is about 16 times greater than the sample actually used. Such requirements for the sample size make relying on survey data to evaluate training programs very expensive.

Third, the study used a single yes/no variable to describe the training offered, while there was actually enormous variation in the rigor and length of the programs. Had more information about the characteristics of training been used in producing the estimates, it is possible that the confidence interval surrounding the point estimate could have been substantially reduced. Moreover, factors associated with high and low returns might have been identified. Controlling for variation in training characteristics was especially important with respect to the TAA program because entering training, or receiving a waiver, was necessary to qualify for six months or more of additional UI benefits. Thus, there were unusually strong incentives for program participants to enter training programs simply to qualify for the extended benefits, even if the training was unlikely to raise their long-term earnings.

Effects of community college retraining

As noted above, it may be inappropriate to use the findings of several of the studies described above to assess the effect of training, because the major activity that program participants received was job search assistance. In the Buffalo, NY, Texas, and New Jersey demonstrations, only small percentages of participants received vocational classroom training or on-the-job training. To remedy this shortcoming, we recently have examined the effects of training on the earnings of a large number of displaced workers from Washington State who completed regular community college courses during the early 1990s.[9] Approximately 15 percent of displaced workers in our sample completed at least one course around the time of their job loss and, on average, earned about 0.6 academic years of community college credits. Very few such workers completed enough retraining to earn a degree or certificate. Nonetheless, the incidence and intensity of classroom training received by the displaced workers studied here is greater than that usually received by participants in studies of public-sector-sponsored retraining.

Our analysis indicates that on average the impact of this community college retraining for displaced workers is somewhat larger, but still consistent, with the impacts reported by Kane and Rouse (1995) and Leigh and Gill (1997), who studied younger community college participants rather than displaced workers per se. We estimate that the equivalent of a year of community college credits raises displaced workers' earnings by about 9 percent for men and by about 13 percent for women. Further, like Kane and Rouse, we also find that workers appear to benefit even if they complete only a few courses. Indeed, for males we found no evidence of a "sheepskin" effect—an increase in

earnings associated with degree completion greater than what would be predicted on the basis of the individual courses completed. In fact, we found evidence that males who take a very large number of community college courses may do worse than their counterparts who complete somewhat fewer classes.

The average results just discussed mask considerable differences in impacts among individuals taking different types of courses. One academic year of courses in more quantitative subject matter raised individuals' subsequent earnings by about 14 percent for males and by about 29 percent for females. These gains are large by the standards of the schooling literature and suggest that by completing a large number of such courses, displaced workers can offset a substantial portion of the earnings losses associated with their job loss.

By contrast, the effects of other community college courses are much smaller than conventional estimates of the return to formal schooling. We find little evidence that displaced workers benefit financially from completing less quantitative vocational or academic courses. Our estimated impacts for some workers could even be negative. An implication of our results is that public subsides of community college schooling for displaced workers will not pay off unless displaced workers enroll in appropriate courses.

Our results indicate that the impact of community college retraining on annual earnings is similar for older and younger displaced workers. More specifically, one academic year of community college retraining raises older males' earnings—those 35 or older—by about 7 percent and older females' earnings by about 10 percent. These impacts are consistent with conventional estimates of the return to formal schooling. The fact that older displaced workers' annual earnings are not raised by more than those of younger workers is somewhat surprising in light of our argument earlier that a shorter pay-back period for human capital investments should lead to older workers enrolling in training only when the expected increases in their annual earning are especially high.

As we found with our full sample of displaced workers, we find larger impacts for older trainees when they complete courses in quantitative vocational or academic subject areas. Completing one academic year of such retraining increased the long-term quarterly earnings of older male displaced workers by about 10 percent. Among women, the gains were larger. The effect of completing one academic year of all other community college courses was positive, but generally small at about 3 percent to 5 percent of post-displacement earnings. Therefore, it is reasonable to conclude that, at least among those who participate in retraining,

older workers in Washington State effectively increased their earnings power.

Worker training is an investment in which upfront costs are incurred to obtain future benefits. An important component of those upfront costs may be reduced earnings while workers are in training. Training takes time and that time may come at the expense of working or searching for work. Thus, in our Washington State study we attempted to measure these opportunity costs by assessing how much lower trainees' earnings were than similar workers who did not enroll in community college courses. We found that being in school approximately full time was associated with earnings reductions of 60 percent for younger workers and 75 percent for older workers. We also find that the more courses that displaced workers enroll in, the lower their earnings.

In estimating the foregone earnings associated with retraining, we attempted to control as much as possible for factors that make community college enrollees different from other displaced workers. However, we recognize that estimating foregone earnings is an especially difficult problem. Displaced workers must, practically by definition, engage in a difficult search for new employment. The length of time spent in that job search is best thought of as random. It is possible that workers whose job search turned out to be especially long and difficult made the best of a bad situation by enrolling in community college while they continued to search for new jobs with little or no reduction in intensity. If this is the case, then a portion of the reduced earnings we associate with enrollment in community college does not actually correspond to foregone earnings. Thus, our estimates should be considered upper bounds on the magnitude of the opportunity costs associated with community college retraining.

Should we teach old dogs new tricks?

The above results clearly indicate that at least among those displaced workers who choose to enroll in community college retraining, old dogs can be taught new tricks. But is having displaced workers return to school to obtain new skills a good investment? Given that state and local governments subsidize many of the costs of community college retraining, how does the answer to this question depend on whether the investment is viewed from the point of view of the individual or society as a whole? In this section, we explore the answers to these questions by putting our estimates of the effects of community college on earnings together with some figures on its costs and assumptions on the workings of the tax system.

In deciding whether to continue supporting community college education for displaced workers or possibly to expand its scope, policymakers need to know the net social benefits and rates of return from investments in classroom training. Individual displaced workers and those who counsel them need comparable information. In terms of the human capital framework we outlined earlier, displaced workers tend to be 1) older and thus to have shorter remaining work lives, and 2) more skilled and thus to have higher opportunity costs of schooling and training. So, the rate of return from retraining displaced adults in community college could be lower than for training economically disadvantaged individuals and low-tenure job losers. Thus, policymakers may wish to compare our analysis of the cost and benefits of community college training for displaced workers with similar analyses of other human capital investments.

Here, we present alternative estimates of the private and social net benefits and the internal rate of return (IRR) from investments in community college retraining based on our study of displaced workers in Washington State. We assume that trainees complete one academic year of the same mix of courses as the individuals in our Washington State sample. We also assume that individuals pay one-fourth of their increased earnings in taxes and that the welfare cost of the taxes raised to subsidize community college schooling amounts to $3,250 per academic year of schooling. This figure assumes that the "deadweight loss" associated with raising $1 in taxes is $0.50 (Browning, 1987; Heckman, LaLonde, and Smith, 1999).

In table 3, panel A, we present estimates of the net benefit of retraining from the perspective of the trainee and of society. These calculations assume that our estimates of forgone earnings discussed in the last section are a true, opportunity cost of retraining. The table shows both the present value of net benefits in 2004 dollars, assuming a 4 percent real interest rate, and the ratio of benefits to costs, again in present value terms.

As the table shows, our calculations indicate that Washington State's displaced workers experienced substantial net benefits from their investments in community college schooling.[10] As expected, the private net benefits of retraining are larger for younger displaced workers (those under 35 years of age) than for older displaced workers. The benefit–cost ratios indicate that for every dollar invested in retraining by younger male displaced workers, they got $3.88 back, in present value terms.[11] For younger female workers, the figure is $4.52. By contrast, the corresponding ratios for older male and female displaced workers are $2.27 and

TABLE 3

Net benefit and internal rates of return from year of community college for displaced workers

A. Cost–benefit analysis of investments in retraining

	Include "just showing up" effect			
	Males		**Females**	
	Young (1)	Old (2)	Young (3)	Old (4)
Perspective of participants				
Net benefit ($000s)	18.2	9.8	17.5	11.6
Benefit to cost ratio	3.88	2.27	4.52	3.05
Perspective of society				
Net benefit ($000s)	16.6	5.9	15.5	7.6
Benefit to cost ratio	2.04	1.34	2.04	1.49

B. Alternative social internal rates of return calculations

	Include "just showing up" effect Opportunity costs (%)		
	No (1)	1/2 (2)	Yes (3)
Younger men	12.6	9.2	7.1
Older men	10.8	6.5	3.9
Younger women	12.0	9.4	7.6
Older women	11.0	7.8	5.5

Notes: Calculations based on estimates in Jacobson, LaLonde, and Sullivan (2004), column 6 of table 3a for males and column 6 of table 3b for females. We assume that the average remaining work lives of older displaced workers is 22 years and for younger displaced workers is 36 years. This assumption likely overstates the numbers of years that these individuals will work before retirement. In panel A, we discount future per period earnings impacts using a real rate of 4 percent. We also assume that individuals pay 25 percent of these gains to government in the form of various taxes. To measure the cost of schooling, we follow Kane and Rouse (1999) and assume the direct costs equal $8,000 per academic year. This figure includes tuition paid by the students plus the subsidies from state and local governments. We assume that students pay about 20 percent or $1,500 of this direct cost through their tuition, with taxpayers paying the remaining amount. For the calculations in panel A, we estimate the opportunity cost of schooling to equal one-half of the costs implied by the "in-school" estimates reported in tables 3a and 3b in Jacobson, LaLonde, and Sullivan (2004). In panel B, we make the indicated alternative assumptions about the opportunity cost of retraining. All figures in panel B are the social internal rates of return. All private internal rates of return are larger than those shown in columns 1 and 3. Finally, we assume that the welfare cost associated with the taxes raised to subsidized community college schooling equals 50 percent of the subsidy or $3,250.

$3.05, respectively. These lower figures reflect primarily their shorter remaining work lives. Of course, even the figures for older workers suggest that training was a good investment from the perspective of the worker.

The results of our cost–benefit analysis are less impressive from the perspective of society. The difference between the two sets of results in panel A come about because community college schooling is heavily subsidized by taxpayers and because the welfare costs of taxation incorporated in our calculations are large. Taking account of the costs and benefits to society lowers our estimates of the net benefits of retraining. For older male workers, total societal benefits are only about one-third greater than costs. For older female workers, benefits are nearly 50 percent greater than costs.[12] By contrast, our calculations indicate that the social benefit–cost ratios are substantially

larger when younger displaced workers acquire retraining, especially younger females.

As discussed above, there is uncertainty about the true extent to which displaced workers forego earnings to attend community college. Thus, we present evidence under three alternative scenarios. These are that true opportunity costs are zero, that they are equal to 50 percent of what we estimated, and that they are equal to what we estimated. As table 3 shows, our estimates of the net benefits and the IRR of retraining are quite sensitive to these assumptions.

Finally, we observe that our conclusions about the returns to retraining also are sensitive to the type of courses completed by displaced workers. So far, we have based our net benefit and IRR calculations on the assumption that displaced workers complete the same mix of more quantitative and less quantitative courses observed in our Washington State sample.

However, as we noted, the more quantitative courses had per-period impacts that were two to five times larger than the per-period impacts of the less quantitative courses. For older male workers, this difference in per-period impacts implies that the social IRR from one academic year of more quantitative courses equals about 8 percent. This figure compares favorably with conventional estimates of the internal rates of return to schooling.[13]

By contrast, the IRR from a similar investment in less quantitative courses is negative. This finding suggests that policymakers might consider shifting resources from supporting less quantitative to more quantitative courses of study. It also suggests that providing appropriate oversight and counseling to displaced workers considering retraining may be very valuable. In Washington State during the early 1990s, about one-half of the credits completed by male displaced workers and nearly two-thirds of the credits completed by female displaced workers were in courses teaching less quantitative subject matter. This raises the question of whether community colleges should steer older displaced workers toward more quantitative vocational and academic subject areas. Similarly, would WIA or TAA programs, which rely on community college retaining, be more productive if participants were given better information about the likely earnings effects of the more and less quantitative courses?[14]

Conclusion

The previous literature on assistance for displaced workers indicates that they can benefit from a variety of employment and training services, and our research on Washington State workers indicates that, on average, those who complete community college courses around the time of their job loss derive significant net benefits. These gains are especially large for displaced workers who are able to focus their retraining on quantitative vocational and academic subject matter.

Policymakers should, however, be cautious in drawing lessons from this research. Other things being equal, displaced workers who make the effort to acquire training are likely to be those who expect the largest impact from training. For most of these displaced workers, the research we surveyed strongly suggests that both the private and social benefits of retraining are likely to exceed the costs. However, if policymakers were to substantially increase the subsidy for community college retraining, they would tend to induce participation disproportionately by individuals who expect less dramatic impacts from retraining.

The net gains from training such individuals would, therefore, be smaller and possibly even negative.

Even if it were the case that individuals induced to participate in retraining by increased public subsidies experienced the same gains as those who already participate, it is not clear that increasing subsidies is the best policy. If an investment in retraining is optimal from the point of view of society, it is very likely also optimal from the point of view of the individual considering retraining.[15] Why then should such investments require subsidies? There are two arguments. First, displaced workers may be liquidity constrained. That is, it may be optimal in the long run for workers to invest in retraining, but in the short run they may be unable to pay for training either from their own funds or by securing a loan. The second is that publicly subsidized retraining is a form of insurance against the risk of job loss, given that private markets do not allow workers to insure against this risk.

If the rationale for subsidized retraining is that displaced workers are liquidity constrained, an obvious alternative to straight subsidies would be to provide them with publicly guaranteed loans. Such an alternative would likely serve to finance the same investments with less public expenditure. Eliminating some of the subsidy would also lessen the possible inefficiency of workers' electing training when it is a positive net benefit from their perspective only with subsidies. Policymakers might also use WIA funds to selectively award income stipends (as loans or grants) to displaced workers who show promise in completing course work in high-return fields.

Many displaced workers experience long-term earnings losses that far exceed the losses due to the initial period of unemployment and that in total amount to a significant portion of their lifetime earnings. Because benefits are paid only while workers are unemployed, the current unemployment insurance is not designed to insure against this type of risk. Moreover, because it is difficult to verify that job loss is unavoidable, private markets cannot provide insurance against such risk, and given the magnitude of the shock in many cases, it is unreasonable to expect workers to accumulate large enough buffer-stock savings to reduce the welfare cost of the lack of job loss insurance. Thus, there may be a role for publicly provided insurance against job loss.

While the provision of publicly provided retraining may be one legitimate form of insurance payout, it may not always be the optimal one. Indeed, for workers late in their careers and with still substantial marketable skills, it is very unlikely to be the optimal form of assistance. Cash compensation is likely more

efficient in many, perhaps most cases. In our 1993 book, *The Cost of Worker Dislocation*, we discussed how the unemployment insurance system might be improved by the addition of a system of wage insurance for experienced workers. Under such a system, worker and firm contributions to UI trust funds would be used to replace a portion of the difference between earnings on pre- and post-displacement jobs, as well as paying benefits during periods of joblessness as they currently do. We argue that wage insurance is attractive because relatively small sums would be required to be put aside each year while workers are employed and the cost would be widely distributed across high-tenure workers whose probability of displacement is very low in any given year, but would cover an event, should it occur, that is very costly per person. Litan and Kletzer (2001) have also proposed such programs. The 2002 amendments to the TAA include wage insurance provisions for older workers.

However, TAA benefits are limited to manufacturing workers displaced due to trade. Moreover, this provision of TAA has so far rarely been used, possibly because its existence is not widely known. In our view, a generally applicable program of wage insurance deserves serious consideration.

The pace of technological change shows no signs of slowing. And we have seen indications that broader segments of the work force may be subject to periodic major career interruptions. Therefore, issues of worker displacement are likely to continue to grow in public policy importance. Researchers and policymakers need to continue to search for innovative and cost-effective ways to return displaced workers to gainful employment, while ensuring that important developments (for example, in trade or technological innovation) that benefit the economy overall do not create undo hardships for those who may be adversely affected.

NOTES

[1]The actual cost of job loss to the workers is likely larger than 10 percent because previous studies indicated that had these workers not been displaced, their earnings would likely have grown modestly.

[2]We assume that these impacts are drawn from a probability distribution $F(\delta_i)$.

[3]The possibility that there are fixed costs associated with attending school during any given quarter also does not address the foregoing shortcoming of equation 1. Indeed, such costs make it more likely that trainees who enroll in one class will enroll in many classes. Suppose that older workers face higher fixed costs associated with going to school. In this case, we expect that among those who enroll, older workers complete more classes than their younger counterparts. However as we show below, this prediction is inconsistent with the participation patterns we observe in our data. Our data suggest that, all other things being equal, the fixed costs associated with acquiring retraining are relatively small and similar for older and younger displaced workers (JLS, 2003).

[4]This issue is different from the problem of Ashenfelter's dip in evaluations of training for economically disadvantaged persons (Ashenfelter, 1978; Heckman and Smith, 2004). In this case the commonly observed decline in earnings prior to training participation is thought to be transitory. In the case of displaced workers a significant and unknown fraction of the decline in earnings prior to entering training is permanent.

[5]Heckman and Smith (2004) use a similar decomposition to examine the determinants of training participation in programs operated under the Job Training Partnership Act.

[6]As shown by the bottom half of table 2, these patterns also hold for female displaced workers. But there are some modest differences in the results. First, among enrollees, older women are somewhat less likely to complete courses. Second, among those who complete at least one class, women 50 and over complete one to two fewer courses (or five to ten credits) than women under 50.

[7]See Ashenfelter (1978), pp. 54 and 56, tables 4 and 6. The base year for these estimates is 1961. The Consumer Price Index adjustment is taken from the 2004 *Economic Report of the President*, p. 353, table B-60.

[8]Not everyone offered the opportunity for services accepted the offer.

[9]A more detailed presentation of this analysis can be found in Jacobson, LaLonde, and Sullivan (2005).

[10]As noted above in the text, we have standardized these calculations to one academic year of schooling. As shown in table 1, the trainees in our sample acquired a little less than two-thirds of a year of schooling. Recall that earlier we found no evidence of diminishing impacts of community college credits for any of the four demographic groups. Thus, the average net benefit of retraining for our sample of displaced workers is approximately one-third less than the figures in table 3.

[11]The private IRR are larger for younger than for older displaced workers. Assuming the opportunity cost of retraining equals one-half the amount implied by the estimated "in-college" effects, we estimate that the private IRR for younger trainees ranges from 13.1 percent for younger men to 21.2 percent for younger women. For older trainees, our private IRR estimates range from 11.4 percent for older men to 15.7 percent for older women. If we alternatively assume that our "in-college" estimates reflect the opportunity cost of retraining, then our estimates range from 5.4 percent for older males to 9.4 percent for older females.

[12]The benefit–cost ratios that include the "just showing up" effect are somewhat larger: 1.34 for older males and 1.49 for older females.

[13]The 8.1 percent figure assumes the "just showing up" effect is not part of the per-period impact of community college schooling. When we include it in our calculation for older males, the IRR of more quantitative courses rises to 10.3 percent. We computed

these percentages under the assumption that the opportunity cost of retraining equaled one-half the cost implied by the "in-college" effects. Our social IRR figures for Group 1 courses are comparable to those reported for individuals in the population who complete between 12 and 14 years of schooling. See Heckman, Lochner, and Todd (2003), table 4. Their calculations also include consideration of tuition and tax payments.

[14]Unlike community colleges, WIA and, to a lesser extent, TAA programs require participants to assess the expected value of alternative training programs. These assessments are reviewed by case-management staff prior to issuing what amounts to training vouchers. This screening may be helpful in ensuring that participants obtain training relevant to entering fields with solid job opportunities.

[15]The only exception would be if retraining workers generates positive externalities for others. This might be the case if employers capture some of the gains from workers' higher productivity or if retrained workers are less likely to draw on other publicly provided social services.

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