

**Net Impact and Benefit-Cost Estimates
of the Workforce Development System
in Washington State**

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Abstract

This study estimates the net impacts and private and social benefits and costs of nine workforce development programs administered in Washington State. Five of the programs serve job-ready adults: Community and Technical College Job Preparatory Training, Private Career Schools, Apprenticeships, Job Training and Partnership Act (JTPA) Title III programs, and Community and Technical College Worker Retraining. Two of the programs serve adults with employment barriers: Community and Technical College Adult Basic Skills Education and JTPA Title II-A programs. The other two programs serve youth: JTPA Title II-C programs and Secondary Career and Technical Education.

The net impact analyses were conducted using a nonexperimental methodology. Individuals who had encountered the workforce development programs were statistically matched to individuals who had not. Administrative data with information from the universe of program participants and Employment Service registrants (who served as the comparison group pool) supported the analyses. These data included over 10 years of pre-program and outcome information including demographics, employment and earnings information from the Unemployment Insurance wage record system, and transfer income information such as Food Stamps and Temporary Assistance for Needy Families (TANF) reciprocity and benefits.

A variety of estimation techniques were used to calculate net impacts including comparison of means, regression-adjusted comparison of means, and difference-in-difference comparison of means. We estimated *short-term* net impacts that examined outcomes for individuals who exited from the education or training programs (or from the Employment Service) in the fiscal year 1999/2000 and *longer-term* impacts for individuals who exited in the fiscal year 1997/1998. Short-term employment impacts are positive for seven of the nine programs and negative for the other two. Short-term earnings impacts are insignificant for four of the programs, negative for two, and positive for the remaining three. The longer-term impacts are more sanguine. Employment impacts are positive for all nine programs, and earnings are positive for seven and insignificantly different from zero for the other two. The benefit-cost analyses show that virtually all of the programs have discounted future benefits that far exceed the costs for participants, and that society also receives a positive return on investment.

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1 OVERVIEW OF THE STUDY

The Washington State Workforce Training and Education Coordinating Board (WTECB) has a commitment to accountability and data-driven performance monitoring and management. Biennial evaluations provide the public with data about the extent to which participants in the state workforce development system (1) achieve workplace competencies, (2) find employment, (3) achieve family-wage levels of earned income, (4) are productive, (5) move out of poverty, and (6) are satisfied with program services and outcomes. The performance data for these outcomes come from administrative data or surveys of program participants (or employers of participants).

The WTECB has a seventh evaluative outcome—return on investment—that is most appropriately calculated by using data from nonparticipants as well as participants. The data burden is greatly expanded as compared to what is required for the other six criteria, and so the strategy that the State follows is to examine this outcome every four years. A net impact/return on investment study was done in 1997.¹ This report provides more recent net impact estimates of the Washington State employment preparation and training system and its economic value to the State.²

Why are Net Impact and Cost-Benefit Analyses Useful?

Washington’s systematic calculation of net impacts of its workforce development programs and their costs and benefits is rare, and indeed may be unique, among states. Why does the state insist on these analyses? Presumably, the state recognizes that investment in workforce development requires considerable public resources and needs to be accountable to the public for achieving

¹Washington State Workforce Training and Education Coordinating Board, *Workforce Training Results: An Evaluation of Washington State’s Workforce Training System, 1997*. Second Edition. Olympia, WA: 1997. Also Battelle, “Net Impact Evaluation: Appendix A, Technical Appendix,” no date.

²See Washington State Workforce Training and Education Training Board, *Workforce Training Results 2002: An Evaluation of Washington State’s Workforce Development System*. Olympia, WA: 2003.

results. But the state also seems to recognize that it is important to dissect carefully the results that are achieved in order to assure the public that its return of training investments is positive and that improvements that are warranted can be implemented.

Individuals who participate in training or educational programs may experience successful outcomes such as the six outcomes listed above. However, it is not always clear that positive outcomes for individuals are the direct result of their participation in the programs. There could have been some other intervening factor(s) such as an improving economy that cause positive results. In social science evaluation, trying to tie outcomes directly to the intervention(s) is called the attribution question. Can participants' successes be *attributed* to participation in the program or might some other factor coincidental to the program have played a role?

A net impact analysis must be conducted to answer the attribution question. Such an analysis attempts to answer the question of how do outcomes compare to what would have happened to participants if there were no program and individuals were left to their next best alternatives. To find the answer, we construct a comparison group of individuals who are very similar to the participants in each of the programs but who did not receive training or enroll in education.³ We observe both the participants and comparison group members over time. We then attribute to the program any differences in outcomes that we observe for program participants to those of comparison group members.

The net impacts of workforce development programs are likely to be positive for participants. (The programs are delivering valuable skills to individuals who will use those skills in the labor market.) However accountability generally goes beyond positive net impacts. Of interest to the public is whether the net impacts (outcomes for program participants minus outcomes for similar

³Experimental evaluation uses a randomly assigned control group.

individuals comprising a comparison group) aggregated over all participants will have exceeded the costs of the program. Thus to get a full picture of the return on investment, it is necessary to compare the programs' net benefits to their costs.⁴

Programs, Outcomes, and Time Periods

The report describes analyses (net impact and benefit-cost) of nine programs. Five of the programs serve job-ready adults: Community and Technical College Job Preparatory Training, Private Career Schools, Apprenticeships, Job Training and Partnership Act (JTPA) Title III programs, and Community and Technical College Worker Retraining. Two of the programs serve adults with employment barriers: Community and Technical College Adult Basic Education (ABE) and JTPA Title II-A programs. The other two programs serve youth: JTPA Title II-C programs and Secondary Career and Technical Education.

For the participants in each of these programs, we estimate the net impacts of participation on the following outcomes:

- employment rates
- hourly wages
- hours worked per quarter
- quarterly earnings
- receipt of UI benefits
- receipt of TANF benefits
- receipt of Food Stamps
- receipt of Medicaid benefits

The first four outcomes are derived from the quarterly wage record data generated from the Unemployment Insurance (UI) system, and thus are measured over a calendar quarter.⁵ Quarterly

⁴If we were to be able to appropriately monetize all program benefits and to accurately discount their expected future value, then return on investment would be equal to the (benefit/cost) ratio – 1.

⁵Appendix A provides details about data editing that was performed on the wage record data. In addition to the editing that is described there, we “trimmed” earnings and hours data. Specifically, we deleted from analyses observations in the top and bottom 1% of the quarterly non-zero earnings and hours distributions of the treatment and

earnings and hours worked per quarter come directly from employer wage record reports filed with quarterly UI tax payments. The state supplied these administrative data to us for this study. A processing step that the state undertook was to add together the information from multiple employers for those individuals who had more than a single employer in a quarter. Furthermore, the state personnel had gathered quarterly wage record data from surrounding states (Alaska, Idaho, Oregon, and California), and from the federal payroll. The data from the other jurisdictions contributed to quarterly earnings, but did not have hours information as is available in Washington wage record data. Throughout this study, we define employment as having at least \$100 in earnings in a quarter. Hourly wages are defined as total quarterly wages divided by hours worked in the quarter.

Unemployment Insurance benefits were gathered from the Washington UI system. UI receipt in a quarter is defined as having non-zero benefits in the calendar quarter. The last three outcomes—AFDC/TANF benefits, Food Stamp benefits, and Medicaid benefits were acquired from the Washington State Department of Human Services. For TANF and Food Stamps, data on benefit levels and receipt were used. The levels were measured as quarterly benefits received by the assistance unit that included the individual who participated in the education or training program, and receipt was defined as having non-zero benefits in the quarter. Medicaid data were limited to enrollment during the quarter; no attempt was made to assign an “insurance” value or to calculate total assistance unit medical usage in a quarter.

The next chapter of this report details the methodologies that were used to calculate net impacts. The general idea is that we constructed data bases containing longitudinal data over a fairly substantial period about individuals who had participated in the nine programs of interest or who had registered for services at the Employment Service (ES). The latter data were used to construct the

matched comparison groups in the analyses periods: i.e., quarters 3 to 6 before registration, quarter 3 after exit, and

comparison groups. We then statistically matched individuals who had participated in the programs to individuals in the comparison group, and compared outcomes. Differences in outcomes were attributed to the programs.

Two time periods were used for analysis purposes. The first period was the fiscal year running from July 1997 to June 1998 (hereafter referred to in this report as 1997/1998), and the second period was July 1999 to June 2000 (1999/2000). More specifically, an individual was considered to be a member of a “treatment” group if he or she exited from an education or training program during either of the two time periods. An individual was considered to be a member of the “comparison” group pool if they exited (last received services) from the Employment Service during either of those years.

Note that because administrative data were used, sometimes the concept of exiting from a program was ambiguous and arbitrary, especially for individuals who exited before completing. Some education or training programs result in a certificate or credential for individuals who successfully complete all of the requirements. In these cases, an individual’s exit date was set at the date when they received the credential. However, individuals who stop attending a program are unlikely to report their action to program administrators, and so there may be a lag in the data that reflects how long it takes for the program’s administrative information system to record the exit. Some programs use the rule that no contact over a 12-month period means that the individual exited the program; some programs use a six-month rule. All in all, we note that the exit date may be subject to measurement error, which therefore implies that length of time receiving treatment and initial outcome periods after treatment are somewhat subject to error.

quarters 8–11 after exit.

Summary of Results

Table 1.1 provides a summary of short-term net impacts of the nine programs on employment and earnings. The elements reported in the table show the increase (or decrease) in employment, defined as having at least \$100 in earnings in the third quarter after exiting from the program, and the increase (or decrease) in quarterly earnings, on average, for that quarter. Note that these results include all participants—those individuals who completed their training and those who left without completing. Separate net impact estimates for subgroups of participants, including completers only, are reported later in this document.

Table 1.1 Short-Term^a Net Impacts of Washington’s Education and Training System, by Program

Program	Net Employment Impact (In percentage points)	Net Quarterly Earnings Impacts (‘01 \$)
JTPA II-A	3.6	\$105 [†]
JTPA II-C	-4.0	86 [†]
JTPA III	2.2	-397
Comm. College ABE	-5.2	-613
Comm. College Job Prep	7.6	1,470
Comm. College Worker Retraining	8.0	147 [†]
Private Career Schools	2.6	10 [†]
Apprenticeships	5.4	2,030
High School Career Technical Ed.	5.5	112

NOTE: Specific estimation techniques are described in later chapters.

^aDefined as three-quarters after exit.

[†]Not statistically significant at the 0.10 level.

The employment impacts are in percentage point terms and are all statistically significant. Two of the programs have negative short-term employment programs, whereas all of the others are positive. The employment rate of the comparison group is on the order of 60 to 70 percent, so these impacts range from about 3 to 12 percent. The short-term earnings impacts are not as sanguine. With the exception of community college job preparation, apprenticeships, and high school career and

technical education, the short-term earnings impacts are negative or not statistically significantly different from zero.

Table 1.2 provides estimates of the longer-term payoffs to education and training. All of the employment impacts are positive, and for the three JTPA programs and adult basic education at community colleges, the longer-term employment impacts are much larger than the short-term impacts. The earnings picture is also far better in the longer term. Two of the programs, JTPA II-C for disadvantaged youth and adult basic education, have earning impacts that are essentially zero, but all other programs show sizeable earnings impacts that, in percentage terms, are on the order of 20 percent.

Table 1.2 Longer-Term^a Net Impacts of Washington’s Education and Training System, by Program

Program	Net Employment Impact (In percentage points)	Net Quarterly Earnings Impacts (‘01 \$)
JTPA II-A	7.4	\$543
JTPA II-C	5.3	-72 [†]
JTPA III	7.3	466
Comm. College ABE	1.6	-43 [†]
Comm. College Job Prep	7.0	1,185
Comm. College Worker Retraining	6.3	423
Apprenticeships	5.3	1,908
High School Career Technical Ed.	5.7	451

NOTE: Specific estimation techniques are described in later chapters.

^aDefined as average over quarters 8–11 after exit.

[†]Not statistically significant at the 0.10 level.

Table 1.3 summarizes the benefit-cost estimates for seven of the nine programs. Due to data limitations, no benefit-cost estimates were generated for private career schools or apprenticeship. The table presents the estimates on a per participant basis, and it shows the benefits and costs to the participant and to the public. For participants, the benefits include net earnings changes (earnings plus fringe benefits minus taxes) and transfer income changes (UI benefits plus TANF plus Food Stamps plus Medicaid). These changes may be positive, indicating that the additional earnings and

transfer income accrue to the participant, or they may be negative if earnings and/or transfers are projected to decrease. For the public, benefits include tax receipts plus reductions in transfer payments. Again, these may be positive (taxes are received and transfers are reduced) or, they may be negative. For participants, the costs are foregone earnings during the period of training and tuition/fees (for community college enrollment). For the public, costs represent the budgetary expenditures necessary to provide the training/education services. Participant costs are always positive in this study, although it is a theoretical possibility for foregone earnings to be negative. All of the benefits are discounted back to 2001 at a rate of 3.0 percent. Costs are not discounted.

Table 1.3 Discounted Benefits and Costs of Washington’s Education and Training System, by Program

Program	First 2.5 years				Lifetime			
	Participant		Public		Participant		Public	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
JTPA II-A	\$ 200	\$ 360	\$ 4,348	\$ 3,384	\$ 52,428	\$ 360	\$ 21,450	\$ 3,384
JTPA II-C	-2,500	343	1,865	2,325	29,819	343	6,793	2,325
JTPA III	4,240	12,175	960	2,575	68,485	12,175	21,867	2,575
Comm. College ABE	2,818	278	-2,026	983	5,911	278	405	983
Comm. College Job Preparation	4,179	4,493	1,885	6,916	117,849	4,493	34,891	6,916
Comm. College Worker Retraining	1,941	16,630	1,385	4,692	59,300	16,630	20,222	4,692
High School Career and Technical Education	2,747	0	902	870	60,050	0	11,186	870

NOTE: Benefits for a participant include discounted values of earnings and fringe benefits less taxes plus income transfers (TANF, Food Stamps, Medicaid, UI benefits); for the public, benefits include tax receipts minus transfer payments. Costs include direct program costs (public and participant, if tuition/fees) and foregone earnings (participant). Table entries in '01 \$.

The table shows the per participant benefits and costs that accrue over the first 10 quarters after exiting from the program and over the expected working lifetime of the participant. From the participant’s perspective, only two of the programs have discounted benefits that exceed costs over the 10-quarter time frame, while the other programs have costs that exceed benefits over the short-term period. However, all of the programs have discounted benefits that significantly exceed costs over the participants’ working lifetime. From the public’s perspective, all but one of the programs

have benefits that exceed costs in the long-run, but only JTPA II-A and secondary career and technical education have public benefits that exceed the public costs in the first 2.5 years. The benefit-cost analyses are detailed in chapter 12.

This report is organized as follows. The next chapter provides much of the technical detail underlying the net impact estimation including the statistical matching approaches and regression models used to adjust results. The following nine chapters examine the results for the nine workforce development system programs. The final chapter documents the cost-benefit analyses.

2 GENERAL METHODOLOGY FOR NET IMPACT ESTIMATION

Probably most evaluators would agree that the best way to estimate the net impacts of a program is to conduct a random assignment experiment. If it were feasible to do so, an experiment could sort individuals who apply and are eligible for services randomly into two groups—those who are allowed to receive services and those who aren't. As long as assignment into treatment or control is random, then the evaluator can have high levels of statistical confidence that the program was responsible for any differences in outcomes.⁶

The issue is moot in the present context, however, because the programs being evaluated were essentially entitlements for which anyone in the state could participate. Experiments were not feasible. Thus this study relied on a nonexperimental methodology. Individuals who encountered the workforce development programs were compared to individuals who didn't, and members of the latter group were not randomly chosen. In other words, there were systematic (nonrandom) differences between the participants and the individuals to whom they were compared. Thus the statistical estimators used to calculate the net impacts require strong assumptions and/or multivariate conditionality to control for those differences.

Four Approaches to Estimating Net Impacts

In this study, we used four general approaches to calculate net impacts. Let T_i (for treatment) denote the administrative data from individuals who exited from the i th program. And let C_i (for comparison group) denote a data set that provides information about individuals who did not

⁶Even with an experiment, there may be implementation problems or behavioral responses that threaten its external validity. For example, problems such as crossover, differential attrition, or Hawthorne effects may arise.

participate in the i th program but who are comparable to the treatment cases. We will assume that the latter is a subset⁷ of U (for universe).

We will denote the outcome(s) of interest as Y_i and we will denote by X_i the data about individuals, the services they may have received, the economic conditions in their regions of residence, and other variables that we have observed and that are believed to affect the outcome(s). Note that we have a substantial time series of outcome data. Further note that the X_i variables may be time-varying or time-invariant, but that we only observe them for one period (during program participation).

The first net impact estimator is the simple (unconditional) difference in post-program outcome means. Suppose that average quarterly earnings is one of the outcome variables of interest. Then the net impact of program i per participant could be estimated as follows:

$$(1) \quad Y_i = \sum_{j \in T_i} ET_j / nt_i - \sum_{j \in C_i} EC_j / nc_i$$

where $ET_j =$ the average quarterly earnings (adjusted to constant \$) after exiting the program⁸ for the j th individual in program i

$EC_j =$ the average quarterly earnings (adjusted to constant \$) after the appropriate program year for the individual(s) in the comparison group

$nt_i, nc_i =$ the number of individuals in the T_i and C_i , respectively

Accepting this as the program's net impact requires rather strict (unreasonable) assumptions. For (1) to hold, either enrollment into the program is totally random, or the outcome is independent of characteristics that are systematically different between the treatment and comparison group.

⁷ C_i need not be a proper subset of U ; they may be identical.

⁸“After exiting the program” is precisely defined below.

The second approach effectively recognizes the systematic differences between the treatment group and the comparison group and estimates regression-adjusted differences in means. Assuming that the relationship between the outcome variable and covariates is identical for the comparison group and for the treatment group suggests that the net impact can be estimated as in (2).

$$(2) \quad Y_i = E(ET_j | X_j; j \in T_i) - E(EC_j | X_j; j \in C_i)$$

Econometrically, we assume that the conditional dependence may be parametrically estimated through a linear regression as in the following:

$$(3) \quad ET_{ji} = a + B' X_j + c T_i + e_j$$

where $X_j =$ vector of variables describing individual j that are thought to be correlated to the outcome ET_{ji} (or EC_{ji})

$T_i =$ 1 for individuals in the participant sample and 0 for individuals in the comparison sample

$e_j =$ error term, assumed to have a mean of 0 and standard deviation of 1

The parameter estimate c would be the net impact of participation in the program.

With rich data on the outcome variables before and after program participation, it is possible to use a difference-in-differences approach to estimating the net program impact. This approach effectively allows the use of pre-program levels of the outcome variable(s) to control for the net impact effect. This third approach for net impact estimation is represented in (4):

$$(4) \quad Y_i = \frac{\sum_{j \in T_i} (ET_j - EBASE_j)}{nt_i} - \frac{\sum_{j \in C_i} (EC_j - EBASE_j)}{nc_i}$$

where $EBASE_j =$ the average quarterly earnings (adjusted to constant \$) of the j th individual for a period of time (one or more quarters) that pre-dates participation in the program of the individuals in T_i

It is easily seen that the net program impact from (4) will be identical to that from (1) if the individuals in T_i and C_i have the same average level of base earnings.

The assumptions that must hold for the net impact estimate derived from (4) to be reasonable again include an assumption that the outcomes are independent of the observed characteristics in the treatment and comparison groups (or that the groups are statistically independent of each other). To control for observed differences between the two groups, it is possible to regression-adjust the difference-in-differences. In other words, the net impact estimator becomes the difference-in-differences in conditional means as in (5).

$$(5) \quad Y_i = E(ET_j - EBASE_j | X_j; j \in T_i) - E(EC_j - EBASE_j | X_j; j \in C_i)$$

As with the net impacts estimated from outcome levels, we can econometrically estimate the regression-adjusted difference-in-differences impact by assuming that the conditional dependence may be parametrically modeled through a linear regression as in the following:

$$(6) \quad ET_{ji} - EBASE_{ji} = a + B' X_j + c T_i + e_j$$

The parameter estimate c would be the net impact of participation in the program.

Choice of Outcome and Base Periods

As mentioned in the first chapter, net impacts were calculated for each program using two different fiscal years. *Short-term* impacts were calculated by specifying the treatment group as all individuals who exited from a program in fiscal 1999/2000. *Longer-term* impacts were calculated by using individuals who exited in fiscal 1997/1998 as the treatment group. The comparison groups were drawn from administrative data for individuals who last received services from the Employment Service during those two fiscal years. (In other words, the counterfactual situation for the net impact analysis was that without the public education and training programs, the next best alternative for participants would have been registering for services with the Employment Service.)

The outcomes that we used in equations (1) through (6), i.e., the Y_i , included the following:

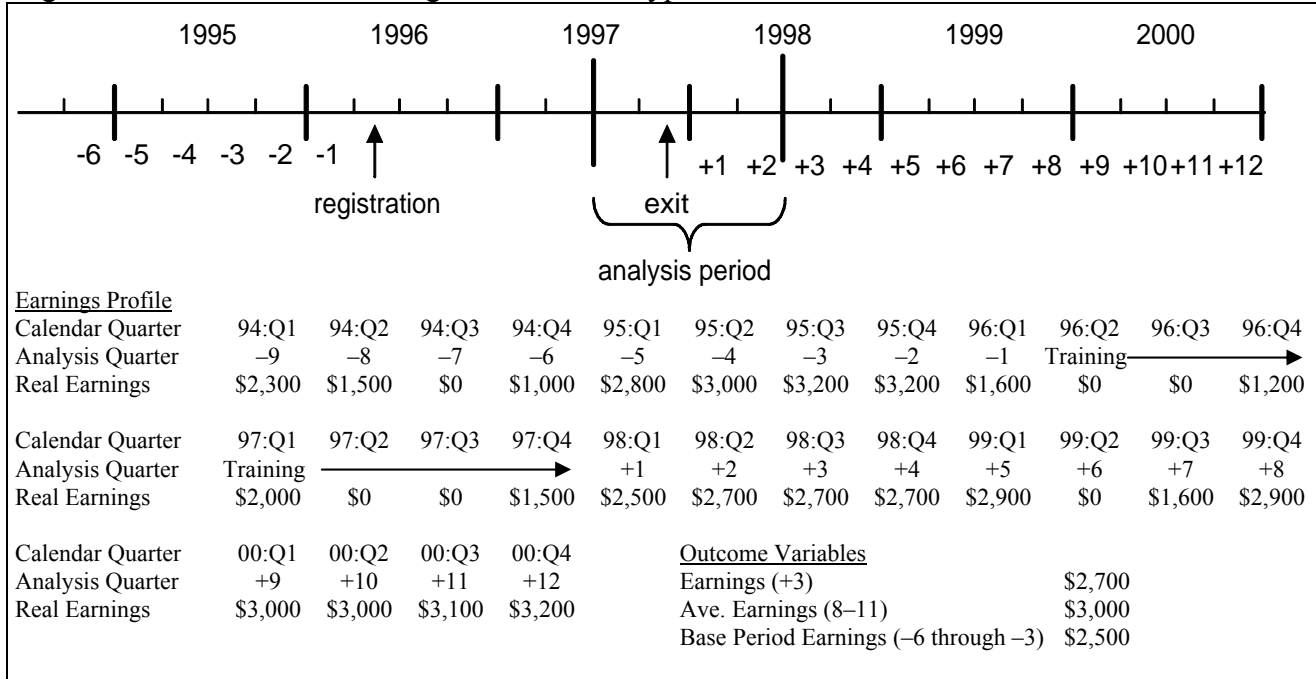
- employment rates
- hourly wages
- hours worked per quarter
- quarterly earnings
- receipt of UI benefits
- receipt of TANF benefits
- receipt of Food Stamps
- receipt of Medicaid benefits

All of these were measured on a quarterly basis. Employment was defined as having at least \$100 in earnings in a quarter; hourly wage rate was defined as quarterly earnings divided by hours worked in the quarter; and receipt of a transfer or UI benefit was defined as nonzero benefits received during the calendar quarter.

We used two different approaches for identifying the specific periods over which to measure the short-term and longer-term outcomes. The first approach was to use the outcomes three quarters after exiting from the program, and the second was the quarterly average during quarters 8–11 after exiting from the program. The latest quarter for which we had data was Quarter 1 of 2001 (2001:Q1), so we were only able to use the first approach for the 1999/2000 program exiters. For difference-in-differences estimators, we specified the pre-program base period to be the average of quarters 3–6 prior to registration.

The timeline in Figure 2.1 is intended to help explain the analyses periods. The timeline shows the registration and exit dates for a hypothetical individual who registered for JTPA Title II-A in April, 1996 (Quarter 2 of 1996) and exited from services in November, 1997 (Quarter 4 of 1997). The earnings profile shows that this person had average quarterly earnings of \$2,500 (real) in the base period (1994:Q4 to 1995:Q3), \$2,700 in the 3rd quarter after exit (1998:Q3); and \$3,000 average quarterly earnings in the 8th–11th post-exit quarters, which were 1999:Q4 to 2000:Q3. So in equations (1) and (2), the dependent variables would have been \$2,700 and \$3,000 for the short-term

Figure 2.1 Timeline and Earnings Profile for a Hypothetical JTPA Title II-A Client



and longer-term outcomes. In equations (4) and (5), the dependent variables would have been \$200 and \$500, respectively.

Subgroups

One of the advantages to relying on linked administrative data in an evaluation such as this project is that there are usually adequate sample sizes to examine the net impacts of the program interventions on subgroups of the population. Over the course of this project, we examined different subgroups for many of the programs. For example, the treatment groups usually comprised all individuals who had participated in a program and last received services during a particular fiscal year. This included individuals who “completed” the program and those who left without completing. Consequently, we examined “completers” versus “non-completers.” As would be expected, “completers” generally had more favorable outcomes.

The subgroup analyses that we performed is described in each of the chapters of this report. We limited the subgroup analyses to programmatic feature variables—such as funding streams or

particular types of interventions—such as age, sex, or minority status. Differences in outcomes by client characteristics could be identified by the coefficients in the regression adjustments.

Construction of the Comparison Group

The basic problem that had to be solved was how to choose the appropriate observations from the data sets⁹ that were used to extract the comparison samples for each of the programs being examined. The source of data that was used to construct the comparison group for most of the programs was the labor exchange (i.e., ES) registrant data system (JOBNET). The issue was which observations in the labor exchange registrant system (or high school follow-up survey) were most comparable to exiters from each of the programs.

The general situation was that we had one set of administrative data from individuals who exited from an education or training program in a year and an entirely different set of administrative data from other individuals who may or may not be reasonable matches for the program exiters.¹⁰ The solution we employed was to let C_i be comprised of the observations where the individuals were most “like” the individuals comprising T_i . Fortunately, there was substantial overlap in the variables that were in most of the data sets, such as age, race/ethnicity, education at program entry, disability status, limited English proficiency (LEP) status, gender, region of state, veteran status, prior employment and earnings history, and prior welfare/UI/Food Stamp receipt.

With a substantial number of common variables in each data set, we could have constructed the comparison group members with a “nearest neighbor” algorithm. This type of algorithm

⁹There actually were two data sets—the ES registrant data and general track students from administrative data supplied by high schools. The latter data set was used for secondary career and technical education.

¹⁰The fact that the treatment and potential comparison samples come from different administrative data eliminates some possible comparison samples. For instance, in many net impact evaluations of training programs, the comparison group that is used is comprised of program applicants who do not enroll and do not participate in the

minimizes a distance metric between observations in T_i and U . If we let X represent the vector of variables that are common to both T_i and U , and let X_j, X_k be the values of X taken on by the j th observation in T_i and k th observation in U , then C_i would be comprised of the observations in U that minimize the distance metric $|(X_j - X_k)|$.¹¹

In work concerning the evaluation of training programs, Ashenfelter¹² demonstrated that pre-program earnings usually decrease prior to enrollment in a program. This implies that a potential problem with the “nearest neighbor” approach is that individuals whose earnings have “dipped” might be matched with individuals whose earnings have not. Thus, even though earnings *levels* would be close, the individuals would not make good comparison group matches.

For this and other reasons, evaluators have used a propensity score approach to estimate the likelihood of being eligible to participate in the training.¹³ Essentially, the observations in T_i and U are pooled, and the probability of being in T_i is estimated with a limited dependent variable (logit) technique. The predicted probability, called a propensity score is calculated for each observation, and treatment observations are matched to observations in the comparison sample with the closest propensity scores. The selection of comparison sample observations can be done with or without replacement. We relied on the propensity score matching (with replacement) approach in this study.^{14, 15}

program. Such comparison samples may have an advantage over this study’s situation because the comparison group would have known about the programs and would have been motivated to apply for services.

¹¹The literature usually suggests that the distance metric be a weighted least squares distance; $(X_j - X_k)' \Sigma^{-1} (X_j - X_k)$ where Σ^{-1} is the inverse of the covariance matrix of X in the comparison sample. This is called the Mahalanobis metric. If we assume that the X_j are uncorrelated, then this metric simply becomes least squared error.

¹²Ashenfelter, O. 1978. “Estimating the Effect of Training Programs on Earnings.” *Review of Economics and Statistics* 60: 47–57.

¹³Dehejia, R. and Wahba, S. 1999. “Causal Effects in Nonexperimental Studies: Reevaluating the Evaluation of Training Programs.” *Journal of the American Statistical Association* 94(448): 1053–1062.

¹⁴Project staff actually experimented with several matching techniques. We tried propensity score matching without replacement and characteristics matching as described in footnote 11. The net impact estimates were not very different using the alternative techniques, and because the matches had higher quality, we relied on matching with replacement. WTECB staff concurred with our decision.

In other words, we estimated the following program participation model using logit:

$$(7) \quad T_{ij} = \begin{cases} 1 & \text{if } P_{ij}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

where, $P_{ij}^* = \Lambda(\beta_{ij} X_j)$

$X_j = j$ th observation's values for the vector of common variables in $T_i(U)$

$\Lambda =$ logistic cumulative distribution function

The propensity score is the predicted probability of being in T_i using the estimates from (7).

The underlying theory for this approach is that the treatment group is systematically different from the overall pool being used for selecting comparison group members, i.e. U , in observable variables. Note that if the model estimated in (7) does not fit well, then there is essentially little difference between the treatment group and the comparison pool observations in observable characteristics, and the comparison group could be chosen randomly. On the other hand, if there is some characteristic that perfectly discriminates between treatment and comparison pool, then the approach will not work because there is no statistical support in the comparison pool for the treatment observations.

In the chapters that follow, we present the results of the participation equation estimation. It has been suggested that a statistical indicator of the quality of the participation model for matching purposes is the percentile of the comparison group associated with the propensity at the 20th percentile for the treatment group (Battelle, no date, see footnote 2). If the 20th percentile for the treatment group is associated with the 20th percentile of the comparison pool (or thereabouts), then the propensity score matching approach is of little value because the observables do not distinguish

¹⁵In our matching algorithm, we actually created duplicate records in the matched comparison sample whenever a particular observation was chosen more than once. This causes the standard errors for the net impact estimates to be biased downward. Nevertheless, all of the statistical tests of significance in this report use the conventional standard

between the groups. If the 20th percentile for the treatment group is associated with the 100th percentile for the comparison pool, then the propensity score matching approach is weak because most of the distribution for the treatment group does not have comparable statistical support in the comparison group pool. It has been suggested that the 80th percentile was an optimum value for this statistic. In each chapter, we present this statistic as well as the unconditional mean propensity score for the treatment and comparison group pool.

errors calculated by the statistical packages and are unadjusted.

3 JTPA TITLE II-A (DISADVANTAGED ADULTS)

The Job Training Partnership Act (JTPA) Title II-A program was the federal program that served individuals over the age of 21 if they were economically disadvantaged (in poverty) over the period of analysis in this study.¹⁶ The services that were provided to clients included, among other things, job search assistance, job development, classroom training in basic skills, on the job training, and vocational training. Because eligibility was limited to economically disadvantaged adults, this program had many participants with spotty employment and earnings histories, and many clients on public assistance.

Participant Characteristics

Table 3.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool (exiters from the ES who were at least 22 at the time of exit). The first two columns of numbers compare the JTPA clients who exited in 1997/1998 to individuals who exited from the Employment Service in the same year (except that individuals who were served by Washington's education and training programs were removed from the data). The final two columns compare the JTPA II-A exiters in 1999/2000 to ES exiters in the same year.

The populations are quite dissimilar. In 1997/1998, almost 70 percent of the JTPA clients who had exited were females as compared to 43 percent of the JOBNET clients. Almost one-third were minorities compared to just over 20 percent. Almost 19 percent had a disability when they registered for JTPA, whereas only 3 percent of the JOBNET group had a disability. Almost half were receiving public assistance when they registered compared to just over 10 percent. Almost 13 percent of the JTPA exiters had been employed when they registered; the average quarterly earnings

Table 3.1 Descriptive Statistics for JTPA II-A Treatment Group and Comparison Group Pool

Characteristics	1997/1998		1999/2000	
	JTPA II-A	JOBNET (ES)	JTPA II-A	JOBNET (ES)
<u>Demographics and Education</u>				
Female	69.8%	42.8%	61.8%	43.1%
Minority	31.7%	21.0%	32.6%	21.2%
Age at registration	34.1	35.0	35.3	36.0
Disability	18.6%	2.9%	19.7%	2.4%
Years of education, at registration	12.0	12.3	12.1	12.2
In school at registration	6.6%	1.4%	7.6%	1.5%
Veteran	7.4%	16.6%	8.9%	13.9%
Limited English Proficiency	8.3%	6.9%	9.5%	6.9%
West WA	64.7%	68.4%	60.5%	71.4%
<u>Employment and Earnings (prior to registration)</u>				
Employed at registration	12.7%	2.8%	16.9%	2.1%
Percentage of (prior) quarters with employment	56.6%	74.2%	59.0%	76.7%
Mean, average quarterly earnings ^{a, b}	\$1,296	\$3,431	\$1,493	\$3,634
Mean, earnings trend	-\$20.6	\$65.0	-\$11.6	\$98.6
Number of quarters with job change	3.8	2.6	6.1	3.5
<u>Public Assistance (prior to registration)</u>				
On public assistance at registration	47.4%	10.6%	26.4%	11.4%
Ever received AFDC/TANF	54.8%	15.9%	45.6%	13.8%
Quarters received AFDC/TANF ^a	6.5	1.6	5.3	1.3
Ever received Food Stamps	75.1%	26.6%	69.0%	26.5%
Quarters received Food Stamps ^a	8.7	2.4	8.7	2.3
<u>Unemployment Compensation (prior to registration)</u>				
Ever received	—	—	24.4%	6.1%
Average weekly benefit ^a	—	—	\$43.7	\$13.8
Sample size	2,772	72,762	2,463	157,568

NOTE: All differences in means are statistically significant at the 0.05 level (t-test). Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

for all JTPA clients who had any earnings prior to registration was \$1,296 ('92 \$). Only about three percent of the JOBNET clients had been employed when they registered, but the average quarterly earnings prior to registration was \$3,431.

The differences in 1999/2000 were similar. Over 60 percent of the JTPA clients were females as compared to 43 percent of the JOBNET clients. Almost one-third were minorities compared to just over 20 percent. Almost 20 percent had a disability when they registered for JTPA, whereas

¹⁶JTPA was succeeded by the Workforce Investment Act (WIA) of 1998, which was not fully implemented until 2000.

only 2 percent of the JOBNET group had a disability. Over one-fourth were receiving public assistance when they registered compared to just over 10 percent. About one-sixth of the JTPA exiters had been employed when they registered; the average quarterly earnings for all JTPA clients who had any earnings prior to registration was \$1,496 ('92 \$). Only about two percent of the JOBNET clients had been employed when they registered, but the real average quarterly earnings prior to registration was \$3,634.

Participation Model

Table 3.2 provides the results from the logit estimation of participation in the JTPA II-A program. More precisely, the adults (aged 22–60) who had exited from the Employment Service (but who had not received employment and training services in Washington) were pooled with the JTPA II-A clients who had exited. A “treatment” dependent variable was created; it was a dummy variable equal to 1 for the JTPA II-A participants (and 0 for the ES group). The table provides the logit coefficient estimates and standard errors. While the magnitude of the coefficients is not easily interpreted, the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being a JTPA II-A exiter.

The logit model uses several variables to summarize the individuals’ employment and earnings histories prior to registration with JTPA (or with the Employment Service). Percent employment measures the percentage of calendar quarters prior to registration for which we had historical data (back to approximately 1990) that the individual had earnings of over \$100.¹⁷ Average quarterly earnings is the average for quarters in which the individual had any earnings.

¹⁷The numerator is the number of quarters with earnings that exceed \$100 ('92 \$) prior to registration; the denominator is potential number of quarters prior to registration that the individual could have had earnings. We started the “clock” for potential quarters in the earliest quarter in our data for which the individual had non-zero earnings.

Table 3.2 Coefficient Estimates from a Logit Model of Participation in JTPA II-A

Characteristics	1997/1998		1999/2000	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Demographics and Education</u>				
Female	0.507***	0.061	0.379***	0.058
Minority	0.589***	0.057	0.433***	0.057
Age at registration	0.012***	0.003	0.007**	0.003
Disability	2.662***	0.080	2.823***	0.074
Years of education, at registration	0.040***	0.009	0.060***	0.009
In school at registration	1.306***	0.110	1.117***	0.102
Veteran	-0.443***	0.101	-0.228***	0.094
Limited English proficiency	0.429***	0.121	0.319***	0.115
West WA	-0.141***	0.051	-0.427***	0.051
<u>Employment and Earnings (prior to registration)</u>				
Employed at registration	1.889***	0.080	2.500***	0.074
Percentage of quarters with employment	0.003**	0.001	-0.005***	0.001
Average quarterly earnings ^a	-0.021***	0.003	-0.031***	0.003
Earnings trend ^a	-0.026***	0.004	-0.043***	0.005
Earnings variance ^b	0.682***	0.092	0.019	0.015
Number of quarters with job change	0.088***	0.007	0.095***	0.006
<u>Public Assistance (prior to registration)</u>				
On public assistance at registration	1.099***	0.060	0.097	0.066
Ever received AFDC/TANF	0.277**	0.118	0.505***	0.118
Quarters received AFDC/TANF	0.003	0.008	0.032***	0.007
Average quarterly AFDC/TANF benefit ^a	-0.005	0.009	-0.022**	0.010
Ever received Food Stamps	1.135***	0.080	0.710***	0.076
Quarters received Food Stamps	0.010	0.007	0.027***	0.005
<u>Unemployment Compensation (prior to registration)</u>				
Ever received	—	—	1.183***	0.136
Average weeks on UI	—	—	0.045***	0.004
Average weekly benefit ^a	—	—	0.213***	0.062

NOTE: Model included last industry of employment prior to registration and an intercept term. Samples sizes were 45,386 and 116,933 for 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$).

^bScaled in \$10¹² ('92 \$) for 1997/1998; 10⁸ ('92 \$) for 1999/2000.

*Significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level (two-tailed test).

Earnings trend is the slope coefficient on a straight line time trend of earnings prior to registration (including 0s). Earnings variance is the statistical variance of the quarterly earnings time series prior to registration. Larger variances suggest more instability in earnings. Number of quarters with a job change is a measure of turnover. It is the number of quarters during the earnings histories prior to registration that the individual had a different employer from the previous quarter (the wage record data supplied by the state had a flag indicating different employer.)

There are also a number of variables that summarize the individual's transfer payment experience. Quarters receiving AFDC (Food Stamps) is the number of quarters prior to registration for which the individual received AFDC (Food Stamps) benefits. The AFDC (Food Stamps) recipient variable is a dummy variable equal to 1 if quarters is non-zero; 0 otherwise. The average AFDC/TANF benefit variables are the average quarterly benefit (including 0s). The 1999/2000 estimates include summary information about receipt of unemployment compensation (UI) benefits. The three variables are weeks of UI, average UI benefit, and a dummy variable indicating that UI had been received.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., a JTPA II-A exiter) in both years of data: Female, minority, age at registration, disability, years of education, being on public assistance at time of registration (not significant in 1999/2000), limited English proficiency, being enrolled in school at time of registration, being employed at registration, turnover, earnings variance (not significant in 1999/2000), and having ever received Food Stamps or AFDC/TANF. The following variables are significantly correlated with being in the Employment Service group (i.e., not being an individual who is served by JTPA II-A): Veteran, being from Western Washington, average earnings prior to registration, and trend in earnings prior to registration.

Propensity Score Statistics

The propensity score for an observation is the predicted probability using the estimated logit coefficients and the observation's actual data. If the logit model has substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be much less than the mean score for the treatment. As argued earlier, a measure of how well the logit model discriminates between comparison group members and treatment group members is the

cumulative percentile for the comparison group pool at the propensity score that is at the 20th percentile for the treatment group, and that a value of approximately 80 is “optimum.” Table 3.3 provides these data for the JTPA II-A analyses. Note that there is a considerable difference in the means and 20th percentile indicators. The mean propensity scores for the treatment groups are roughly 0.20, whereas they are 0.03 and 0.01 for the comparison pool for 1997/1998 and 1999/2000, respectively. The 20th percentile indicators are approximately 80 percent, which suggest that the participation model performed well.

Table 3.3 Indicators of Propensity Score Model Quality for JTPA II-A Analyses

Statistic	1997/1998	1999/2000
Mean p-score, JTPA II-A	0.211	0.192
Mean p-score, JOBNET	0.030	0.013
Percentile JOBNET, at 20th percentile JTPA II-A	77.16%	82.82%

Statistical Match

The statistical matching that was done used a “nearest neighbor” approach with the propensity score. For every observation j in T_i , we found the observation k in U that minimized the absolute value of the difference between the propensity score for j and k . We then added observation k to the comparison group sample, C_i . The statistical match was done with replacement, so some observations in U were the “matches” for more than one observation in the treatment group. Table 3.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group and constructed comparison group.

Table 3.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for JTPA Title II-A

Statistic/Characteristic	1997/1998		1999/2000	
	JTPA II-A	JOBNET (ES)	JTPA II-A	JOBNET (ES)
Sample size	2,772	72,762	2,463	157,568
Sample size used in match	2,239	58,221	2,175	136,307
Matched sample size	2,239	2,239	2,175	2,175
Number of observations used once	—	1,564	—	1,604
Number of observations used multiple times	—	251	—	190
Maximum number of repeats	—	13	—	37
<u>Demographics and Education</u>				
Female	68.8%**	65.0%**	61.5%	60.7%
Minority	31.4%	30.6%	32.0%	32.8%
Age at registration	33.6	33.5	34.9	35.1
Disability	19.5%	19.6%	20.5%	21.4%
Years of education, at registration	11.9	11.9	12.0	12.1
In school at registration	6.7%	7.2%	7.7%	9.1%
Veteran	8.0%**	10.0%**	9.2%	10.3%
Limited English proficiency	6.1%	5.4%	7.3%	7.7%
West WA	63.0%	63.6%	59.2%	56.5%
<u>Employment and Earnings (prior to registration)</u>				
Employed at registration	14.1%	15.9%	17.7%	18.1%
Percentage employed	55.6%	55.2%	58.4%	58.9%
Average quarterly earnings ^{a, b}	\$1,306	\$1,316	\$1,504**	\$1,630**
Earnings trend	-\$20.6**	-\$44.7**	-\$11.5**	-\$95.1**
Number of quarters with job change	3.9	3.9	6.2	6.1
<u>Public Assistance (prior to registration)</u>				
On public assistance at registration	44.8%	45.2%	25.6%**	22.9%**
Ever received AFDC/TANF	55.3%	53.9%	47.6%**	44.0%**
Quarters received AFDC/TANF ^a	6.3	6.1	5.5**	4.7**
Ever received Food Stamps	78.2%	77.9%	72.5%	70.9%
Quarters received Food Stamps ^a	9.0	8.9	9.3**	8.5**
<u>Unemployment Compensation (prior to registration)</u>				
Ever received	—	—	27.6%	27.6%
Average weekly benefit ^a	—	—	\$49.5	\$52.3
Sample size	2,239	2,239	2,175	2,175

NOTES: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

** Difference in means is statistically significant at the 0.05 level (t-test).

Sample exclusions that account for the differences between the first two rows of the table were for observations that had missing data for any of the variables used in the match.

Notice that means for the comparison group are quite close to the treatment group as would be expected. Only a handful of characteristics had differences in means that were statistically significant.

Net Impacts

One of the major purposes of the study was to estimate the net impacts of the education and training programs on clients. In particular, net impacts were estimated for the following eight outcomes:

- employment
- hourly wage
- quarterly hours of employment
- quarterly earnings
- receipt and amount of Unemployment Compensation benefits per quarter
- receipt and amount of TANF benefits per quarter
- receipt and amount of Food Stamp benefits per quarter
- enrollment in Medicaid

Tables 3.5 and 3.6 provide the estimated net impacts for JTPA II-A. The first column presents simple differences in means between the full comparison group pool (i.e., *U*) and the treatment group. The next three columns attempt to control for the systematic differences between that pool and the treatment group. The second column presents regression-adjusted estimates using the full comparison group pool. The third column presents a comparison of means between the treatment group and the matched comparison group. The fourth column presents an estimate from a regression adjustment of that mean. This column represents the preferred specification, although for some programs we use the levels of the outcome variables as the dependent variable and, for others, we use difference-in differences. The coefficient estimates that are in “boxes” represent the final, “official” estimates using the preferred specification as chosen by WTECB staff.

The results suggest that in the short term, the JTPA Title II-A clients increase their employment rate, but with very modest wage, hours, or earnings impacts. (Note, however, that the short-term impacts using the 1997/1998 cohort are much more sanguine in terms of labor market outcomes.) Furthermore, the short-term impacts suggest an increase in the take-up of public assistance and Medicaid.

Table 3.5 Net Impact Estimates for JTPA II-A Program for 1997/1998 Cohort

Outcome	Comparison Group Used				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.038***	0.105***	0.111***	0.109***	0.655	0.595
Ever employed - longer term	0.033***	0.066***	0.068***	0.065***	0.735	0.716
Employment - longer term	0.007	0.06***	0.073***	0.07***	0.634	0.577
Employment - diff-in-diff	0.140***	0.08***	0.078***	0.074***	-0.150	-0.089
Hourly wage - short term (\$)	-2.49***	0.13	0.52	0.37	11.34	8.39
Hourly wage - longer term (\$)	-2.31***	0.25	0.51**	0.55***	11.57	8.80
Hourly wage - short term diff-in-diff (\$)	0.45	0.51	0.57	0.54	1.52	1.40
Hourly wage - longer term diff-in-diff (\$)	0.39	0.31	0.31	0.48**	1.73	1.80
Hours - short term	-5.8	2.3	54.9***	9.5**	269.9	215.2
Cond. hours - short term	-32.3***	13.5***	21.7**	19.4***	410.6	357.7
Hours - short term, diff-in-diff	113.0***	33.3***	55.7***	18.6**	-46.7	11.4
Cond. hours - short term, diff-in-diff	79.3***	36.7***	34.8***	23.0**	24.4	69.8
Hours - longer term	-16.4***	24.5***	36.4***	32.1***	270.5	220.7
Cond. hours - longer term	-36.3***	6.1	19.1**	16.1***	400.7	343.1
Hours - longer term, diff-in-diff	97.7***	45.0***	41.5***	33.1***	-46.3	9.9
Cond. hours - longer term, diff-in-diff	74.1***	33.5***	31.2***	23.9***	23.2	66.1
Earnings - short term (\$)	-624***	-116**	569***	106**	2897	1764
Cond. earnings - short term (\$)	-1152***	115*	346***	229***	4408	2931
Earnings - short term, diff-in-diff (\$)	1358***	225***	600***	246***	-501	263
Cond. earnings - short term, diff-in-diff (\$)	895***	376***	463***	329***	384	821
Earnings - longer term (\$)	-797***	274***	418***	378***	3246	2073
Cond. earnings - longer term (\$)	-1283***	135*	296***	292***	4748	3167
Earnings - longer term, diff-in-diff (\$)	1135***	491***	498***	463***	-121	514
Cond. earnings - longer term, diff-in-diff (\$)	702***	425***	455***	454***	843	1087
UI receipt - short term	0.016**	0.060***	0.052***	0.056***	0.065	0.033
UI benefits - short term (\$)	4.2	52.7***	50.1***	51.4***	69.4	29.4
Cond. UI benefits - short term (\$)	-163.7***	9.6	52.1	15.2	1074.2	883.6
UI receipt - longer term	0.021**	0.057***	0.048***	0.047***	0.148	0.133
UI benefits - longer term (\$)	-12.4*	31.9***	22.5**	27.9***	114.0	85.1
Cond. UI benefits - longer term (\$)	-253.4***	-58.6	-7.8	-25.1	1453.3	1194.3
TANF receipt - short term	0.093***	-0.049***	-0.091***	-0.126***	0.065	0.245
TANF benefits - short term (\$)	106.8***	-83.1***	-109.0***	-82.3***	72.7	282.6
Cond. TANF benefits - short term (\$)	14.5	40.2	-29.0	-25.4	1119.6	1154.0
TANF benefits - short term, diff-in-diff (\$)	-133.9***	-86.2***	-120.2***	-103.7***	-15.2	-28.8
Cond. TANF benefits - short term, diff-in-diff (\$)	17.0	95.4	20.0	73.2	-127.8	-130.7
TANF receipt - longer term	0.111***	-0.018***	-0.051***	-0.067***	0.055	0.220
TANF benefits - longer term (\$)	87.0***	-19.7***	-43.2***	-47.0***	39.1	171.3
Cond. TANF benefits - longer term (\$)	28.3	37.5	-20.8	-62.5	1046.1	1102.2
TANF benefits - longer term, diff-in-diff (\$)	-158.1***	-42.7***	-61.0**	-64.5***	-34.2	-131.6
Cond. TANF benefits - longer term, diff-in-diff (\$)	-23.2	28.6	2.2	-60.4	-139.5	-165.0
FS receipt - short term	0.173***	-0.053	-0.079***	-0.100***	0.128	0.376
FS benefits - short term (\$)	96.0***	-39.0***	-54.8***	-38.4***	68.6	214.6
Cond. FS benefits - short term (\$)	11.6	-5.6	-32.2*	-17.9	535.0	570.8

Table 3.5 (Continued)

Outcome	Comparison Group Used				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
FS receipt - longer term	0.173***	-0.021*	-0.047***	-0.056***	0.127	0.353
FS benefits - longer term (\$)	75.6***	-14.3***	-31.7***	-31.6***	44.0	151.1
Cond. FS benefits - longer term (\$)	37.7***	5.1	-41.5**	-26.4*	463.7	537.5
Med. receipt - short term	0.253***	-0.043***	-0.053***	-0.084***	0.151	0.445
Med. receipt - longer term	0.224***	-0.060***	-0.073***	-0.105***	0.168	0.467

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 3.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

Table 3.6 Net Impact Estimates for JTPA II-A Program for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	-0.016*	0.014	0.035**	0.036**	0.683	0.644
Hourly wage - short term (\$)	-3.55***	-1.25***	-1.19***	-1.23***	12.37	10.00
Hourly wage - short term diff-in-diff (\$)	-0.08	-0.22	0.14	-0.02	1.28	1.06
Hours - short term	-36.7***	-12.6***	4.9	-3.0	287.7	247.7
Cond. hours - short term	-46.5***	-14.8***	-11.0	-1.2	420.6	381.0
Hours - short term, diff-in-diff	91.3***	37.5***	26.4**	20.0***	-64.2	0.2
Cond. hours - short term, diff-in-diff	63.1***	24.9***	2.8	7.6	11.1	70.8
Earnings - short term (\$)	-1172***	-423***	-129*	-195***	3431	2400
Cond. earnings - short term (\$)	-1650***	-478***	-365***	-258***	5016	3692
Earnings - short term, diff-in-diff (\$)	1225***	198***	245**	146*	-721	255
Cond. earnings - short term, diff-in-diff (\$)	711***	114	91	88	298	913
UI receipt - short term	0.015**	0.012*	0.003	0.015	0.077	0.096
UI benefits - short term (\$)	-13.8*	-15.3	-38.5**	-33.4**	106.4	136.9
Cond. UI benefits - short term (\$)	-371.6***	-258.5***	-434.3***	-378.4***	1375.5	1419.3
TANF receipt - short term	0.065***	0.017***	0.041***	0.046***	0.029	0.054
TANF benefits - short term (\$)	73.9***	29.7***	42.8***	36.6***	33.0	65.7
Cond. TANF benefits - short term (\$)	9.0	39.1	-67.7	-127.3	1130.4	1214.0
TANF benefits - short term, diff-in-diff (\$)	-82.1***	-27.6***	-47.8**	-33.5**	-8.5	-42.8
Cond. TANF benefits - short term, diff-in-diff (\$)	-7.3	-1.7	85.5	-58.9	-31.9	-124.7
FS receipt - short term	0.164***	0.035***	0.071***	0.080***	0.082	0.180
FS benefits - short term (\$)	86.9***	40.0***	45.8***	48.6***	40.9	83.4
Cond. FS benefits - short term (\$)	21.6	44.9***	50.8**	26.5	496.6	464.3
Med. receipt - short term	0.217***	0.052***	0.083***	0.093***	0.122	0.261

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 3.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

In the longer term, the training participants experience a significant earnings increase of over \$450 per quarter ('92 \$), which emanates from more employment, hours, and higher hourly wages. Furthermore, the longer-term impacts show reductions in the receipt of TANF, Food Stamps, and Medicaid. On the other hand, the receipt of unemployment compensation benefits increases, due to the increase in employment and wages.

Subgroup Analyses

Two types of subgroup analyses were performed for JTPA Title II-A. We estimated the net impact outcomes for individuals who were completers. Second, for the 1997/1998 cohort, we estimated net impacts for individuals who received “training services,” as opposed to job search assistance or other “non-training” services only. Tables 3.7 and 3.8 display the results of these analyses for the preferred estimated outcomes (those highlighted in Tables 3.5 and 3.6).

As might be expected, the completers subgroup had much better results than the full treatment group, which includes completers and individuals who left without completing the program. In both the short-term and longer-term estimates, completers have more positive labor market outcomes (employment rate, hourly wage, hours worked, and earnings) and lower take-up rates of public assistance (Food Stamps and TANF) and Medicaid. The magnitudes of the differences are quite dramatic, especially in light of the fact that almost 90 percent of the treatment sample were completers. We can infer from these results quite negative outcomes for “non-completers.”

The subgroup of persons who received training, shown in Table 3.7, have results that are nearly identical to the full treatment group results.

Table 3.7 Selected Net Impact Estimates for Subgroups of JTPA Title II-A Participants: 1997/1998 Cohort

Outcome	Subgroup			Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	Participants with Training Only	
Employment	7.4%	9.8%	7.9%	57.7%
Conditional Hourly Wage	\$0.48	\$0.78	\$0.59	\$10.52
Conditional Hours Worked	23.9	27.1	19.3	343.1
Conditional Earnings	\$543	\$652	\$500	\$3,785
UI Receipt	4.7%	5.6%	5.0%	13.3%
TANF Receipt	-6.7%	-8.1%	-6.4%	22.0%
Food Stamps Recipient	-5.6%	-8.0%	-6.3%	35.3%
Medicaid Enrollment	-10.5%	-11.1%	-10.3%	46.7%
Subgroup Sample Size	2,239	1,949	2,098	—

NOTE: Monetary data in '92 \$.

Table 3.8 Selected Short Term Net Impact Estimates for Subgroups of JTPA Title II-A Participants: 1999/2000 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	3.6%	10.6%	64.4%
Conditional Hourly Wage	-0.02 [†]	0.20 [†]	\$10.00
Conditional Hours Worked	7.6 [†]	16.2	381.0
Conditional Earnings	\$88 [†]	\$225	\$3,692
TANF Receipt	4.6%	1.7%	5.4%
Food Stamps Receipt	8.0%	3.6%	18.0%
Medicaid Enrollment	9.3%	5.1%	26.1%
Subgroup Sample Size	2,175	1,821	—

NOTE: Monetary data in '92 \$. [†]not significant at the 0.10 level (two-tailed test).

4 JTPA TITLE III (DISLOCATED WORKERS)

Over the period of analysis in this study, the Job Training Partnership Act (JTPA) Title III program was the federal program to serve individuals over the age of 18 if they were dislocated from their jobs (laid off and little prospect of being re-employed in the same occupation or industry). The services that were provided to clients were identical to those provided to Title II-A clients. That is, they included, among other things, job search assistance, job development, classroom training in basic skills, on the job training, and vocational training. The clients who participated in this program were quite different from those who participated in Title II-A, however. Title III clients tended to have had substantial labor market attachment and much higher earnings levels and skill levels prior to their participation.

Participant Characteristics

Table 4.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool. The first two columns of numbers in the table compare the JTPA dislocated worker clients who exited in 1997/1998 to individuals who exited from the Employment Service in the same year (except that individuals who were served by Washington's education and training programs were removed from the data). The final two columns compare the JTPA III exiters in 1999/2000 to ES exiters in the same year. The comparison group pool for JTPA Title III is not quite identical to the pool for Title II-A because we included individuals aged 18–21 at the time of exit in addition the observations over the age of 21.

Table 4.1 Descriptive Statistics for JTPA III Treatment Group and Comparison Group Pool

Characteristics	1997/1998		1999/2000	
	JTPA III	JOBNET (ES)	JTPA III	JOBNET (ES)
<u>Demographics and Education</u>				
Female	47.4%	43.4%	46.5%	43.6%
Minority	15.8%	21.1%	18.0%	21.3%
Age at registration	40.1	32.8	40.0	33.9
Disability	6.3%	2.6%	6.0%	2.2%
Years of education	13.0	12.1	12.9	12.1
In school at registration	10.2%	3.3%	13.5%	3.0%
Veteran	19.1%	14.5%	18.2%	12.3%
Limited English proficiency	3.1%	6.7%	4.3%	6.8%
West WA	64.9%	68.0%	71.2% ^{††}	70.9% ^{††}
<u>Employment and Earnings</u>				
Employed at registration	10.7%	2.8%	11.3%	2.2%
Percentage employed	86.4%	72.6%	85.6%	75.5%
Average quarterly earnings ^{a, b}	\$5,144	\$3,099	\$4,816	\$3,349
Earnings trend	\$7.9	\$64.9	\$61.2	\$100.3
Number of quarters with job change	2.3	2.5	4.1	3.4
<u>Public Assistance</u>				
On public assistance at registration	3.2%	10.7%	1.1%	11.9%
Ever received AFDC/TANF	6.8%	16.9%	9.7%	14.9%
Quarters received AFDC/TANF ^a	0.4	1.7	0.7	1.4
Ever received Food Stamps	16.1%	27.4%	21.4%	27.2%
Quarters received Food Stamps ^a	1.0	2.5	1.6	2.4
<u>Unemployment Compensation</u>				
Ever received	—	—	38.3%	5.5%
Average weekly benefit ^a	—	—	\$97.5	\$12.3
Sample size	4,475	84,106	3,964	179,151

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.^bObservations with no prior earnings were excluded from analyses.^{††}Differences in means are not statistically significant at 0.05 level (t-test).

The populations were similar demographically, with the exception of school enrollment status in both cohorts.¹⁸ Over 10 percent of 1997/1998 JTPA exiters were enrolled in school when they registered and only about 3 percent of JOBNET exiters were. In 1999/2000, more than 13 percent of the JTPA exiters and 3 percent of JOBNET clients were enrolled. Nevertheless, they were quite different in terms of employment and welfare experiences. In 1997/1998, only 3 percent were

¹⁸Nevertheless because of the substantial sample sizes, virtually all of the differences in mean characteristics were different with statistical significance.

receiving public assistance when they registered compared to over 10 percent of the JOBNET leavers. Over 10 percent of the JTPA exiters had been employed when they registered; the average quarterly earnings for all JTPA clients who had any earnings prior to registration was \$5,144 ('92 \$). Less than 3 percent of the JOBNET clients had been employed when they registered, while the average quarterly earnings prior to registration was \$3,099, about 40 percent lower than what JTPA Title III program participants had earned.

The differences in 1999/2000 were similar. Over one percent of the JTPA exiters were receiving public assistance when they registered compared to close to 12 percent of the comparison pool. About 11 percent of the JTPA clients had been employed when they registered; the average quarterly for all JTPA clients who had any earnings prior to registration was \$4,816. Only about 2 percent of the JOBNET clients had been employed when they registered, and the real average quarterly earnings prior to registration was about 30 percent lower, at \$3,349.

Participation Model

Table 4.2 provides the results from the logit estimation of participation. More precisely, the individuals who had exited from the Employment Service (but who had not received employment and training services in Washington) were pooled with the JTPA III clients who had exited, and participation was a dummy variable equal to 1 for the latter group (and 0 for the former). The independent variables used in the model were identical to those used in the model of AFDC Title II-A participation as described in the prior chapter. The table provides the logit coefficient estimates and standard errors. As in the prior chapter, the magnitude of the coefficients is not particularly

Table 4.2 Coefficient Estimates from a Logit Model of Participation in JTPA III

Characteristics	1997/1998		1999/2000	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Demographics and Education</u>				
Female	0.486***	0.039	0.588***	0.041
Minority	0.055	0.050	-0.016	0.051
Age at registration	0.046***	0.002	0.029***	0.002
Disability	0.913***	0.077	1.046***	0.081
Years of education	0.038***	0.007	0.059***	0.007
In school at registration	1.848***	0.064	2.249***	0.062
Veteran	0.027	0.050	0.305***	0.052
Limited English proficiency	-0.202*	0.110	-0.074	0.102
West WA	-0.386***	0.036	-0.049	0.040
<u>Employment and Earnings</u>				
Employed at registration	1.105***	0.059	1.643***	0.062
Percentage employed	0.013***	0.001	0.008***	0.001
Average quarterly earnings ^a	0.004***	0.000	0.003***	0.001
Earnings trend ^a	-0.021***	0.003	-0.014***	0.003
Earnings variance ^b	-0.169***	0.050	-0.276	0.458
Number of quarters with job change	0.033***	0.006	0.049***	0.005
<u>Public Assistance</u>				
On public assistance at registration	-0.336***	0.099	-1.618***	0.166
Ever received AFDC/TANF	0.249	0.158	0.269*	0.147
Quarters received AFDC/TANF	-0.047***	0.015	0.019	0.012
Average quarterly AFDC/TANF benefit ^a	-0.012	0.014	-0.008	0.013
Ever received Food Stamps	0.137*	0.072	0.090	0.068
Quarters received Food Stamps	-0.008	0.010	-0.001	0.008
<u>Unemployment Compensation</u>				
Ever received	—	—	1.313***	0.092
Average weeks on UI	—	—	0.020***	0.003
Average weekly benefit ^a	—	—	0.290***	0.031

NOTE: Model included last industry of employment prior to registration and an intercept term. Sample sizes were 52,913 and 129,799 for 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$).

^bScaled in \$10¹² ('92 \$) for 1997/1998 and \$10¹⁰ ('92 \$) for 1999/2000.

*Significant at the 0.10 level; **significant at the 0.5 level; ***significant at the 0.01 level (two-tailed test).

meaningful, but the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being a JTPA Title III participant.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., a JTPA III participant) in both years of data: Female, age at registration, disability, years of education, being enrolled in school at time of registration, veteran (not significant in 1997/1998), being employed at registration, percent

employed, average earnings prior to registration, turnover, ever received AFDC/TANF (not significant in 1997/1998), and having received Food Stamps (not significant in 1999/2000). The following variables are significantly correlated with being in the Employment Service group: limited English proficiency (not significant in 1999/2000), being from Western Washington (not significant in 1999/2000), trend in earnings prior to registration, earnings variance (not significant in 1999/2000), and being on public assistance at time of registration.

Propensity Score Statistics

The propensity score for an observation is the predicted probability using the estimated coefficients and the observation's actual data. If the logit model has substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be much less than the mean score for the treatment. As argued earlier, a measure of how well the logit model discriminates between comparison group members and treatment group members is the cumulative percentile for the comparison group at the propensity score that is the 20th percentile; a value of approximately 80 indicates a "good model." Table 4.3 provides these indicators for the JTPA III analyses. There is a considerable difference in the means. The mean propensity scores for the treatment groups are approximately 0.15, whereas they are 0.06 and 0.02 for the comparison pool in 1997/1998 and 1999/2000, respectively. The 20th percentile indicators are less than 80 percent—only 64 percent in 1997/1998 and 71 percent in 1999/2000. These statistics suggest that the participation model does not discriminate as well as the model for JTPA Title II-A.

Table 4.3 Indicators of Propensity Score Model Quality for JTPA III Analyses

Statistic	1997/1998	1999/2000
Mean p-score, JTPA III	0.159	0.156
Mean p-score, JOBNET	0.055	0.022
Percentile JOBNET, at 20th percentile JTPA III	64.09%	71.49%

Statistical Match

The statistical matching that was done used a “nearest neighbor” approach with the propensity score. For every observation j in T_i , we found the observation k in U that minimized the absolute value of the difference between the propensity score for j and k . We then added k to the comparison group sample. The statistical match was done with replacement, so some observations in U were the “matches” for more than one observation in the treatment group and were duplicated in the match comparison set. Table 4.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group and constructed comparison group. Notice that means for the comparison group are quite close to the treatment group as would be expected. No variables have differences in means that are significant. Sample exclusions that account for the differences between the first two rows of the table were for observations that had missing data for any of the variables used in the participation model.

Net Impacts

One of the major purposes of the study was to estimate the net impacts of the education and training programs on clients. Tables 4.5 and 4.6 provide the estimated net impacts for JTPA III. The first column presents simple differences in means between the full comparison group pool (i.e., U)

Table 4.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for JTPA III

Statistic/Characteristic	1997/1998		1999/2000	
	JTPA III	JOBNET (ES)	JTPA III	JOBNET (ES)
Sample size	4,475	84,106	3,964	179,151
Sample size used in match	4,333	66,414	3,890	152,567
Matched sample size	4,333	4,333	3,890	3,890
Number of observations used once	—	3,346	—	3,054
Number of observations used multiple times	—	423	—	326
Maximum number of repeats	—	9	—	20
<u>Demographics and Education</u>				
Female	47.4%	47.0%	46.5%	45.0%
Minority	15.6%	15.7%	18.1%	19.2%
Age at registration	40.1	40.2	40.0	40.2
Disability	6.2%	5.7%	6.0%	5.5%
Years of education	13.0	13.1	12.9	12.9
In school at registration	10.3%	9.6%	13.7%	13.0%
Veteran	18.9%	18.5%	18.2%	19.3%
Limited English proficiency	3.1%	3.0%	4.3%	4.4%
West Washington	64.6%	64.1%	71.2%	70.9%
<u>Employment and Earnings</u>				
Employed at registration	10.9%	10.6%	11.5%	12.8%
Percentage employed	86.4%	86.4%	85.5%	85.3%
Average quarterly earnings ^{a, b}	\$5,156	\$5,344	\$4,819	\$4,774
Earnings trend	\$7.9	-\$19.5	\$61.2	\$58.5
Number of quarters with job change	2.3	2.4	4.1	4.1
<u>Public Assistance</u>				
On public assistance at registration	3.1%	3.2%	1.0%	0.8%
Ever received AFDC/TANF	6.9%	7.3%	9.8%	10.1%
Quarters received AFDC/TANF ^a	0.4	0.4	0.7	0.8
Ever received Food Stamps	16.3%	17.0%	21.6%	21.8%
Quarters received Food Stamps ^a	1.0	1.0	1.6	1.7
<u>Unemployment Compensation</u>				
Ever received	—	—	39.0%	39.4%
Average weekly benefit ^a	—	—	\$99.3	\$98.1
Sample size	4,333	4,333	3,890	3,890

NOTE: None of the differences in means were statistically significant at the 0.05 level (t-test). Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

and the treatment group. The next three columns attempt to control for the systematic differences between that pool and the treatment group. The second column presents regression adjusted estimates using the full comparison group pool. The third column presents a comparison of means between the treatment group and the matched comparison group. The fourth column presents an estimate from a regression adjustment of that mean. This column represents the preferred specification, and for this program we used the levels of the outcome variables as the preferred

Table 4.5 Net Impact Estimates for the JTPA III Program for 1997/1998 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.126***	0.099***	0.075***	0.075***	0.651	0.708
Ever employed - longer term	0.082***	0.078***	0.064***	0.066***	0.741	0.768
Employment - longer term	0.123***	0.080***	0.078***	0.073***	0.633	0.685
Employment - diff-in-diff	-0.026***	0.034***	0.049***	0.042***	-0.127	-0.202
Hourly wage - short term (\$)	1.60***	-0.40*	-0.71*	-0.39	10.85	13.18
Hourly wage - longer term (\$)	2.37***	0.11	-0.27	-0.07	11.07	13.72
Hourly wage - short term diff-in-diff (\$)	-2.10***	-0.78***	-1.45**	-0.89**	1.62	0.98
Hourly wage - longer term diff-in-diff (\$)	-1.45***	-0.31*	-0.81**	-0.57*	1.90	1.27
Hours - short term	89.6***	15.0***	51.4***	14.5***	260.9	302.5
Cond. hours - short term	52.9***	18.1***	24.8***	19.6***	398.7	427.4
Hours - short term, diff-in-diff	-38.6***	-18.0***	14.6**	-11.9***	-30.7	-84.0
Cond. hours - short term, diff-in-diff	-37.8***	-5.4	-1.7	0.7	36.5	0.5
Hours - longer term	89.0***	54.4***	52.6***	47.7***	264.8	304.9
Cond. hours - longer term	63.2***	30.3***	30.1***	26.6***	390.9	424.3
Hours - longer term, diff-in-diff	-38.5***	13.8***	18.7***	20.2***	-27.5	-84.9
Cond. hours - longer term, diff-in-diff	-38.6***	2.0	3.2	10.2**	39.2	-2.9
Earnings - short term (\$)	1553***	188***	583***	195***	2702	3715
Cond. earnings - short term (\$)	1353***	115**	244**	196***	4129	5249
Earnings - short term, diff-in-diff (\$)	-943***	-275***	290**	-170***	-316	-1550
Cond. earnings - short term, diff-in-diff (\$)	-889***	-214***	-140	-95	505	-242
Earnings - longer term (\$)	1698***	761***	659***	710***	3068	4155
Cond. earnings - longer term (\$)	1622***	412***	351***	390***	4466	5734
Earnings - longer term, diff-in-diff (\$)	-809***	226***	447***	337***	80	-1181
Cond. earnings - longer term, diff-in-diff (\$)	-799***	-1	17	109	986	166
UI receipt - short term	0.038***	0.020***	0.022***	0.024***	0.058	0.075
UI benefits - short term (\$)	81.1***	58.3***	52.1***	61.4***	61.6	92.1
Cond. UI benefits - short term (\$)	431.4***	322.7***	261.4**	236.1***	1057.7	1227.1
UI receipt - longer term	0.024***	0.012**	0.004	0.002	0.139	0.161
UI benefits - longer term (\$)	47.8***	26.0***	22.3**	19.7*	103.9	132.1
Cond. UI benefits - longer term (\$)	290.6***	131.8***	146.3**	99.0	1418.1	1569.0
TANF receipt - short term	-0.054***	-0.012	-0.007**	-0.007**	0.066	0.019
TANF benefits - short term (\$)	-60.4***	3.0	-6.2**	-4.0	72.8	18.8
Cond. TANF benefits - short term (\$)	-61.5	157.0*	35.5	145.8	1106.3	1010.5
TANF benefits - short term, diff-in-diff (\$)	18.8***	7.7*	1.4	6.5*	-17.5	-0.1
Cond. TANF benefits - short term, diff-in-diff (\$)	-194.4	-19.5	-319.2	810.7	-114.6	10.1
TANF receipt - longer term	-0.047***	-0.013*	-0.006**	-0.004	0.059	0.017
TANF benefits - longer term (\$)	-34.4***	0.2	-4.5**	-3.3	41.0	11.1
Cond. TANF benefits - longer term (\$)	-52.4	2.2	-93.9	-8.9	1028.5	1041.1
TANF benefits - longer term, diff-in-diff (\$)	31.7***	4.9	2.8	5.8**	-36.4	-7.2
Cond. TANF benefits - longer term, diff-in-diff (\$)	-330.6	-258.0	-494.9	-363.2	-133.6	30.8

Table 4.5 (Continued)

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
FS receipt - short term	-0.086***	-0.031***	-0.015***	-0.016***	0.126	0.055
FS benefits - short term (\$)	-48.3***	-1.0	-6.5**	-4.2*	67.1	25.3
Cond. FS benefits - short term (\$)	-56.7**	43.6*	16.1	20.9	533.7	460.7
FS receipt - longer term	-0.088***	-0.028***	-0.015**	-0.016***	0.129	0.057
FS benefits - longer term (\$)	-31.7***	-0.3	-2.0	-2.1	44.2	14.6
Cond. FS benefits - longer term (\$)	-32.5	50.9**	59.0**	50.9*	462.5	370.2
Med. receipt - short term	-0.110***	-0.039***	-0.022***	-0.022***	0.156	0.068
Med. receipt - longer term	-0.122***	-0.051***	-0.026***	-0.025***	0.175	0.079

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 4.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

Table 4.6 Net Impact Estimates for the JTPA III Program for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.069***	0.028***	0.019*	0.022**	0.682	0.737
Hourly wage - short term (\$)	0.45**	-1.34***	-1.33***	-1.09***	11.89	13.66
Hourly wage - short term diff-in-diff (\$)	-1.59***	-0.54**	-0.85**	-0.41	1.41	0.68
Hours - short term	55.1***	14.1***	17.6**	12.7***	280.9	320.4
Cond. hours - short term	36.7***	17.8***	12.6**	17.0***	410.7	435.0
Hours - short term, diff-in-diff	-51.8***	-42.7***	-31.0***	-31.2***	-49.7	-70.4
Cond. hours - short term, diff-in-diff	-40.6***	-28.1***	-24.5***	-17.1***	22.0	5.9
Earnings - short term (\$)	783***	-226***	-182**	-195***	3235	4225
Cond. earnings - short term (\$)	620***	-387***	-383***	-332***	4731	5736
Earnings - short term, diff-in-diff (\$)	-1031***	-652***	-565***	-526***	-539	-1003
Cond. earnings - short term, diff-in-diff (\$)	-958***	-629***	-656***	-480***	416	116
UI receipt - short term	0.020***	-0.029***	-0.046***	-0.041***	0.071	0.138
UI benefits - short term (\$)	51.3***	-42.4***	-43.6**	-41.5***	96.3	192.4
Cond. UI benefits - short term (\$)	271.3***	114.0*	224.5**	137	1354.3	1398.0
TANF receipt - short term	-0.020***	0.032***	0.009***	0.012***	0.032	0.003
TANF benefits - short term (\$)	-21.1***	14.0***	11.6***	12.3***	35.6	3.2
Cond. TANF benefits - short term (\$)	58.9	241.2**	189.1	106.4	1112.4	998.1
TANF benefits - short term, diff-in-diff (\$)	10.1***	10.8***	5.0	6.4*	-7.9	-2.8
Cond. TANF benefits - short term, diff-in-diff (\$)	87.3	194.9	—	—	-30.4	—
FS receipt - short term	-0.040***	0.020***	0.013**	0.016***	0.083	0.029
FS benefits - short term (\$)	-21.0***	8.1***	9.0***	9.1***	41.4	11.2
Cond. FS benefits - short term (\$)	-20.7	59.0**	88.5**	80.3*	496.4	388.2
Med. receipt - short term	-0.069***	0.026***	0.016**	0.022***	0.131	0.046

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 4.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

dependent variable. The coefficient estimates that are in “boxes” represent the final, “official” estimates used by WTECB.

The results in Table 4.6 show that in the short term, the JTPA Title III clients increase their employment rates and hours of work, but have reduced quarterly earnings because of a substantial decrease in hourly wages. Furthermore, the short-term impacts suggest an increase in the take-up of public assistance benefits and Medicaid enrollment.

The longer-term impacts displayed in Table 4.5 show an even stronger increase in employment rates, a modest decrease in wage rates, and a substantial increase in hours. All together, these effects result in a substantial increase in quarterly earnings of about \$400 ('92 \$), which is around 7 percent. Furthermore, the longer-term estimates show reductions in TANF and Food Stamp reciprocity and in Medicaid enrollment. There is an insignificant increase (point estimate of 0.7 percentage points) in receipt of UI.

Subgroup Analyses

Around 75 to 80 percent of the JTPA Title III participants were coded in the administrative data as program completers. Tables 4.7 and 4.8 display the net impact estimates for that subgroup. As with our analysis of JTPA Title II-A, we also estimated net impacts for individuals who were coded as receiving training in the 1997/1998 cohort (about 70 percent of the treatment group). Completers have much more positive outcomes than the full treatment sample—higher levels of employment, hourly wages, hours, and quarterly earnings, and lower levels of public assistance and Medicaid receipt. The short-term net impact estimate for employment is dramatically greater for completers than for the full treatment group—15 percent compared to 2 percent.

As with the JTPA Title II-A subgroup analyses, the net impacts for the 1997/1998 participants who received training are very similar to the full treatment group.

Table 4.7 Selected Longer-Term Net Impact Estimates for Subgroups of JTPA Title III Participants: 1997/1998 Cohort

Outcome	Subgroup			Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	Participant w/Training	
Employment	7.3%	12.6%	6.7%	68.5%
Conditional hourly wage	-\$0.07 [†]	\$0.16 [†]	-\$0.11 [†]	\$13.72
Conditional hours	26.6	34.6	19.4	424.3
Conditional earnings	\$390	\$530	\$231	\$5,734
UI receipt	0.2% [†]	1.0% [†]	0.2% [†]	16.9% [†]
TANF receipt	-0.4% [†]	-0.9%	-0.3% [†]	1.4%
Food Stamps receipt	-1/6%	-2.6%	-1.8%	3.9%
Medicaid enrollment	-2.5%	-3.3%	-2.0%	5.9%
Subgroup sample size	4,337	3,442	2,885	—

NOTE: Monetary data in '92 \$. [†]not significant at the 0.10 level (two-tailed test).

Table 4.8 Selected Short-Term Net Impact Estimates for Subgroups of JTPA Title III Participants: 1999/2000 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	2.2%	15.2%	73.7%
Conditional hourly wage	-\$1.09	-\$0.79	\$13.66
Conditional hours	17.0	35.9	435.0
Conditional earnings	-\$332	-\$24 [†]	\$5,736
TANF receipt	1.2%	0.4%	0.3%
Food Stamps receipt	1.6%	-0.3% [†]	2.9%
Medicaid enrollment	2.2%	-0.2%	4.6%
Subgroup sample size	3,890	2,984	—

Note: Monetary data in '92 \$. [†]not significant at the 0.10 level (two-tailed test).

5 JTPA TITLE II-C (DISADVANTAGED YOUTH)

The Job Training Partnership Act (JTPA) Title II-C (youth) program was the federal program in existence during the period of analysis to serve individuals from 16 to 21 years of age if they were economically disadvantaged or otherwise at risk. The services that were provided to in-school and out-of-school clients included, among other things, job search assistance, job development, classroom training in basic skills, on the job training, and vocational training.

Participant Characteristics

Table 5.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool. The first two columns of numbers compare the JTPA clients who exited in 1997/1998 to individuals under 22 who exited from the Employment Service in the same year (except that individuals who were served by Washington's education and training programs were removed from the data). The final two columns compare the JTPA II-C exiters in 1999/2000 to ES exiters in the same year.

The populations were quite dissimilar. In 1997/1998, about 60 percent of the JTPA exiters were females as compared to 47 percent of the JOBNET leavers. Almost 45 percent were minorities compared to slightly over one-fifth. Almost 14 percent had a disability when they registered for JTPA, whereas merely 0.7 percent of the JOBNET group did. Nearly half of the JTPA youth were in school when they registered, while only 15 percent of JOBNET youth were. Almost one-third were receiving public assistance when they registered compared to just over 11 percent. While the percent of exiters who were employed at registration were just modestly different: 8 and 3 percent for JTPA

Table 5.1 Descriptive Statistics for JTPA II-C Treatment Group and Comparison Group Pool

Characteristics	1997/1998		1999/2000	
	JTPA II-C	JOBNET (ES)	JTPA II-C	JOBNET (ES)
<u>Demographics and Education</u>				
Female	60.0%	46.7%	56.7%	46.7%
Minority	44.8%	22.1%	44.9%	21.8%
Age at registration	17.8	18.6	17.8	18.6
Disability	13.9%	0.7%	16.3%	0.5%
Years of education	10.2	11.1	10.1	11.1
In school at registration	45.2%	15.5%	42.9%	14.6%
Veteran	0.2%	1.1%	0.1%	0.8%
Limited English proficiency	6.4%	5.1%	7.9%	6.4%
West WA	58.1%	66.1%	57.4%	67.6%
<u>Employment and Earnings</u>				
Employed at registration	8.4%	3.3%	8.8%	2.9%
Percentage employed	49.0%	61.0%	48.4%	65.7%
Average quarterly earnings ^{a, b}	\$430	\$799	\$468	\$1,027
Earnings trend	-\$13.9	\$63.5	-\$20.0	\$114.5
Number of quarters with job change	1.5	2.0	1.8	2.2
<u>Public Assistance</u>				
On public assistance at registration	31.7%	11.3%	25.7%	14.8%
Ever received AFDC/TANF	56.5%	23.5%	59.5%	22.6%
Quarters received AFDC/TANF ^a	6.6	2.3	8.5	2.5
Ever received Food Stamps	70.4%	32.0%	71.9%	32.3%
Quarters received Food Stamps ^a	8.4	3.0	10.8	3.4
<u>Unemployment Compensation</u>				
Ever received	—	—	1.7%	1.0%
Average weekly benefit ^a	—	—	\$1.9 ^{††}	\$1.3 ^{††}
Sample size	2,077	11,631	1,676	21,691

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

^{††}Differences in means are not statistically significant at 0.05 level (t-test).

and JOBNET respectively, the difference in average quarterly earnings is quite large, with JOBNET clients earning \$799 ('92 \$), almost double of the \$430 ('92 \$) that JTPA youth earned.

The differences in 1999/2000 were similar. Over 55 percent of the JTPA exiters were females as compared to 47 percent of the JOBNET leavers. Almost 45 percent were minorities compared to just over one-fifth. Over 16 percent had a disability when they registered for JTPA, whereas only five-tenths of one percent of the JOBNET group had a disability. Over one-fourth were receiving public assistance when they registered compared to 15 percent. While the percentages of

exiters who were employed at registration were similar to that of 1997/1998: 8 and 3 percent for JTPA and JOBNET respectively, the difference in average quarterly earnings is even bigger, with JOBNET clients earning an average of \$1,027, more than double the \$468 that JTPA youth earned.

Participation Model

Table 5.2 provides the results from the logit estimation of participation. Again, the individuals who had exited from the Employment Service (but who had not received employment and training services in Washington) were pooled with the JTPA II-C clients who had exited and participation was a dummy variable equal to 1 for the latter group (and 0 for the former). The table provides the logit coefficient estimates and standard errors. The magnitudes of the coefficients are not particularly meaningful, but the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being a JTPA II-C participant.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., a JTPA II-C participant) in both years of data: Female, minority, disability, being enrolled in school when registered, being employed at registration, having received AFDC/TANF, number of quarters received AFDC/TANF (not significant in 1997/1998), having received Food Stamps, and number of quarters receiving Food Stamps. The following variables are significantly correlated with being in the Employment Service group: age at registration (not significant in 1999/2000), years of education, veteran (not significant in 1997/1998), average earnings prior to registration, trend in earnings prior to registration, and average quarterly AFDC/TANF benefit amount prior to registration.

Table 5.2 Coefficient Estimates from a Logit Model of Participation in JTPA II-C

Characteristics	1997/1998		1999/2000	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Demographics and Education</u>				
Female	0.386***	0.080	0.344***	0.079
Minority	0.999***	0.080	1.014***	0.080
Age at registration	-0.080***	0.029	-0.035	0.030
Disability	3.397***	0.196	3.920***	0.185
Years of education	-0.079***	0.015	-0.088***	0.014
In school at registration	1.179***	0.088	1.243***	0.089
Veteran	-0.401	0.720	-2.003**	0.900
Limited English proficiency	-0.022	0.184	0.103	0.170
West WA	-0.121	0.077	-0.116	0.080
<u>Employment and Earnings</u>				
Employed at registration	1.132***	0.138	1.614***	0.132
Percentage employed	0.001	0.002	-0.001	0.002
Average quarterly earnings ^a	-0.065***	0.012	-0.079***	0.014
Earnings trend ^a	-0.048***	0.015	-0.084***	0.015
Earnings variance ^b	2.123	1.773	-0.733	3.288
Number of quarters with job change	-0.013	0.020	0.035*	0.020
<u>Public Assistance</u>				
On public assistance at registration	0.680***	0.097	-0.142	0.104
Ever received AFDC/TANF	0.312*	0.162	0.758***	0.161
Quarters received AFDC/TANF	0.001	0.011	0.028***	0.009
Average quarterly AFDC/TANF benefit ^a	-0.025**	0.012	-0.027**	0.011
Ever received Food Stamps	1.211***	0.121	0.900***	0.127
Quarters received Food Stamps	0.020**	0.010	0.022***	0.008
<u>Unemployment Compensation</u>				
Ever received	—	—	0.585	0.810
Average weeks on UI	—	—	0.058*	0.031
Average weekly benefit ^a	—	—	0.270	0.627

NOTE: Model included industry and an intercept term. Sample sizes were 5,146 and 11,199 for 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$).

^bScaled in \$10⁸ ('92 \$).

*Significant at the 0.10 level; **significant at the 0.5 level; ***significant at the 0.01 level (two-tailed test).

Propensity Score Statistics

The propensity score for an observation is the predicted probability using the estimated coefficients and the observation's actual data. If the logit model has substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be much less than the mean score for the treatment. The mean p-score for the treatment group is 0.36 in 1997/1998, which is four times larger than the mean for the comparison pool—0.09. For the

1999/2000 data, the difference is even greater, 0.32 to 0.04. As argued earlier, a measure of how well the logit model discriminates between comparison group members and treatment group members is the cumulative percentile for the comparison group at the propensity score that is the 20th percentile. Table 5.3 provides these data for the JTPA II-C analyses. These indicators are reasonably close to 80 percent suggesting a good model; it discriminates well between treatment and control.

Table 5.3 Indicators of Propensity Score Model Quality for JTPA II-C Analyses

Statistic	1997/1998	1999/2000
Mean p-score, JTPA II-C	0.362	0.315
Mean p-score, JOBNET	0.091	0.044
Percentile JOBNET, at 20th percentile JTPA II-C	71.17%	77.48%

Statistical Match

The statistical matching algorithm used a nearest neighbor approach with the propensity score. For every observation j in T_i , we found the observation k in U that minimized the absolute value of the difference between the propensity score for j and k . We then added k to the comparison group sample. The statistical match was done with replacement, so some observations in U were the “matches” for more than one observation in the treatment group and were duplicated. Table 5.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group and constructed comparison group. Notice that means for the comparison group are quite close to the treatment group as would be expected. Again, missing data caused the sample size used for matching purposes to be slightly smaller than the overall sample size.

Table 5.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for JTPA II-C

Statistic/Characteristic	1997/1998		1999/2000	
	JTPA II-C	JOBNET (ES)	JTPA II-C	JOBNET (ES)
Sample size	2,077	11,631	1,676	21,691
Sample size used in match	1,174	8,253	1,047	16,236
Matched sample size	1,174	1,174	1,047	1,047
Number of observations used once	—	637	—	604
Number of observations used multiple times	—	162	—	132
Maximum number of repeats	—	25	—	52
<u>Demographics and Education</u>				
Female	60.4%	60.1%	57.4%	54.3%
Minority	44.3%**	49.1%**	46.7%	47.7%
Age at registration	18.3	18.3	18.2	18.3
Disability	12.8%	11.8%	14.2%	16.4%
Years of education	10.5	10.3	10.3	10.2
In school at registration	36.1%	33.4%	36.0%	31.7%
Veteran	0.3%**	1.4%**	0.2%	0.2%
Limited English proficiency	5.1%	4.6%	6.1%	4.4%
West Washington	58.6%**	63.7%**	59.1%	58.7%
<u>Employment and Earnings</u>				
Employed at registration	10.4%**	13.8%**	11.9%	10.2%
Percentage employed	46.3%**	49.1%**	46.6%	46.0%
Average quarterly earnings ^{a, b}	\$416	\$450	\$463	\$445
Earnings trend	-\$13.9	-\$10.7	-\$20.0	-8.0
Number of quarters with job change	1.6	1.7	1.9	2.0
<u>Public Assistance</u>				
On public assistance at registration	30.4%	29.8%	22.3%	20.6%
Ever received AFDC/TANF	56.9%	58.6%	60.1%	58.0%
Quarters received AFDC/TANF ^a	6.4	6.5	8.1**	6.8**
Ever received Food Stamps	72.0%	70.6%	72.9%	70.8%
Quarters received Food Stamps ^a	8.4	8.3	10.7**	9.3**
<u>Unemployment Compensation</u>				
Ever received	—	—	2.8%	2.7%
Average weekly benefit ^a	—	—	\$3.0	\$3.1
Sample size	1,174	1,174	1,047	1,047

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.^bObservations with no prior earnings were excluded from analyses.

**Differences in means are statistically significant of 0.05 level (t-test).

Net Impacts

Tables 5.5 and 5.6 provide the estimated net impacts of the Title II-C programs on clients. The first column presents simple differences in means between the full comparison group pool (i.e., *U*) and the treatment group. The next three columns attempt to control for the systematic differences

Table 5.5 Net Impact Estimates for JTPA II-C Program for 1997/1998 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	-0.093***	0.025	0.018	0.061***	0.611	0.589
Ever employed - longer term	-0.019*	0.047***	0.072***	0.073***	0.779	0.763
Employment - longer term	-0.036***	0.037***	0.039**	0.057***	0.626	0.616
Employment - diff-in-diff	0.135***	0.052***	0.057**	0.053**	0.032	0.111
Hourly wage - short term (\$)	-1.05***	-0.34	-0.30	-0.22	7.58	6.96
Hourly wage - longer term (\$)	-1.13***	-0.44***	-0.85**	-0.55	8.18	8.07
Hourly wage - short term diff-in-diff (\$)	-0.56*	-0.30	-0.22	-0.33	2.13	1.79
Hourly wage - longer term diff-in-diff (\$)	-0.76***	-0.39*	-0.92**	-0.5	2.93	3.10
Hours - short term	-59.7***	-9.9*	-7.6	-11.2*	200.2	181.7
Cond. hours - short term	-63.9***	-14.5*	-34.8***	-15.3	320.4	305.7
Hours - short term, diff-in-diff	17.3**	-2.2	-0.1	-4.5	73.5	92.5
Cond. hours - short term, diff-in-diff	8.9	-7.3	-20.1*	-3.6	118.4	149.7
Hours - longer term	-32.3***	8.7	6.7	16.7*	226.5	214.1
Cond. hours - longer term	-35.3***	-7.6	-9.9	-3.1	328.7	312.1
Hours - longer term, diff-in-diff	40.5***	15.6*	12.4	17.5*	96.5	125.1
Cond. hours - longer term, diff-in-diff	24.8***	0.6	-7.4	2.3	140.2	173.0
Earnings - short term (\$)	-579***	-115**	-148**	-155***	1473	1276
Cond. earnings - short term (\$)	-723***	-157**	-389***	-214***	2358	2146
Earnings - short term, diff-in-diff (\$)	-97*	-81	-116	-123**	816	846
Cond. earnings - short term, diff-in-diff (\$)	-217***	-103	-282**	-124	1267	1348
Earnings - longer term (\$)	-524***	22	-62	54	1963	1739
Cond. earnings - longer term (\$)	-665***	-119*	-248***	-119	2798	2506
Earnings - longer term, diff-in-diff (\$)	-59	70	-26	82	1343	1322
Cond. earnings - longer term, diff-in-diff (\$)	-260***	-57	-231**	-60	1857	1843
UI receipt - short term	0.006*	0.018***	0.022***	0.027***	0.018	0.012
UI benefits - short term (\$)	5.8*	12.6**	16.1**	11.7*	12.0	9.7
Cond. UI benefits - short term (\$)	60.6	240.4	-36.7	-75.8	683.5	798.8
UI receipt - longer term	-0.004*	0.015	0.024**	0.035***	0.081	0.068
UI benefits - longer term (\$)	-7.1*	11.2	12.3*	21.1***	40.7	29.1
Cond. UI benefits - longer term (\$)	-146.6**	45.5	-60.5	73.9	1045.7	983.3
TANF receipt - short term	0.097***	-0.027***	-0.029*	-0.069***	0.071	0.185
TANF benefits - short term (\$)	114.0***	-30.1***	-46.5**	-67.2***	74.3	207.8
Cond. TANF benefits - short term (\$)	80.9**	12.5	-92.0*	20.8	1040.8	1125.8
TANF benefits - short term, diff-in-diff (\$)	-116.1***	-58.2***	-112.0***	-93.7***	-30.8	-35.3
Cond. TANF benefits - short term, diff-in-diff (\$)	-156.9	-16.2	-166.7	-135.4	-39.6	-36.5
TANF receipt - longer term	0.113***	0.010	0.012	-0.007	0.083	0.185
TANF benefits - longer term (\$)	85.1***	-1.6	-8.7	-50.2***	53.6	144.2
Cond. TANF benefits - longer term (\$)	39.9	4.7	-103.5**	-68.4	959.3	1095.9
TANF benefits - longer term, diff-in-diff (\$)	-100.2***	-16.6	-45.2*	-79.3***	-48.2	-103.5
Cond. TANF benefits - longer term, diff-in-diff (\$)	-61.6	18.0	-151.7	-75.6	-89.0	-0.2
FS receipt - short-term	0.202***	0.037***	0.049**	0.052**	0.109	0.251
FS benefits - short term (\$)	112.1***	13.6**	3.4	-1.0	57.9	150.0
Cond. FS benefits - short term (\$)	14.8	-47.7**	-85.1**	-111.5***	532.3	596.9

Table 5.5 (Continued)

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
FS receipt – longer term	0.175***	0.27**	0.047**	0.050**	0.141	0.268
FS benefits – longer term (\$)	60.9***	4.3	8.2	-10.9	45.9	99.8
Cond. FS benefits – longer term (\$)	2.7	13.9	-19.4	-7.1	460.8	492.1
Med. receipt – short term	0.260***	0.015	0.029	-0.006	0.188	0.386
Med. receipt – longer term	0.213***	0.012	0.024	0.029	0.220	0.401

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 5.4.

*significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level (two-tailed test).

Table 5.6 Net Impact Estimates for JTPA II-C Program for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	-0.147***	-0.040**	-0.047**	-0.040	0.669	0.630
Hourly wage - short term (\$)	-1.39***	0.08	-0.11	0.35	8.32	7.36
Hourly wage - short term diff-in-diff (\$)	-0.48	0.12	0.07	0.80	2.40	1.85
Hours - short term	-86.6***	-15.2***	-38.9***	-13.6*	230.3	207.7
Cond. hours - short term	-72.6***	-26.0***	-40.2***	-14.8	338.2	320.7
Hours - short term, diff-in-diff	7.4	-4.6	-26.1**	-1.3	68.8	102.2
Cond. hours - short term, diff-in-diff	15.0*	-5.8	-23.1*	10.4	111.4	148.8
Earnings - short term (\$)	-860***	-114**	-337***	-125**	1852	1540
Cond. earnings - short term (\$)	-887***	-202***	-379***	-122	2720	2378
Earnings - short term, diff-in-diff (\$)	-181**	-45	-240**	-18	889	946
Cond. earnings - short term, diff-in-diff (\$)	-179**	-73	-262**	72	1346	1425
UI receipt - short term	-0.007*	0.005	0.001	-0.009	0.025	0.026
UI benefits - short term (\$)	-8.1**	9.5	5.8	-0.03	22.3	15.2
Cond. UI benefits - short term (\$)	-121.2	237.2	190.8	449.4	878.3	578.5
TANF receipt - short term	0.094***	0.044***	0.060***	0.079***	0.052	0.080
TANF benefits - short term (\$)	115.7***	60.9***	71.7***	46.3**	54.5	86.1
Cond. TANF benefits - short term (\$)	122.0**	91.2	52.0	60.3	1046.4	1081.3
TANF benefits - short term, diff-in-diff (\$)	-109.5***	-31.7***	-16.8	-43.6	-0.7	-93.3
Cond. TANF benefits - short term, diff-in-diff (\$)	-50.2	-261.9	-396.2*	-179.7	50.5	396.6
FS receipt - short term	0.163***	0.051***	0.075***	0.084***	0.089	0.156
FS benefits - short term (\$)	104.2***	54.3***	53.0***	32.9**	44.9	85.6
Cond. FS benefits - short term (\$)	89.5**	23.3	50.6	-63.4	502.0	547.7
Med. receipt - short term	0.269***	0.119***	0.148***	0.163***	0.192	0.285

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 5.4.

* significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level (two-tailed test).

between that pool and the treatment group, and the third column presents a comparison of means between the treatment group and the matched comparison group. The fourth column presents an estimate from a regression adjustment of that mean. This column represents the preferred specification. We use difference-in-differences net impact estimates, in “boxes,” for the final, “official” estimates used by WTECB.

The employment and earnings impacts of JTPA Title II-C programs in the short term given in Table 5.6 are slight—none are statistically significant. The point estimates suggest a decrease in employment and an increase in hourly wage rates and hours. In combination, these net impact estimates yield a slight increase in quarterly earnings. Title II-C participants are estimated to significantly increase their usage of TANF, Food Stamps, and Medicaid, however.

The longer-term impacts in Table 5.5 differ somewhat. There are significant increases in employment (and unemployment compensation); however the impacts on the earnings of those working is zero. The take-up of TANF decreases, but the receipt of Food Stamps increases.

Subgroup Analyses

Tables 5.7 and 5.8 display selected longer-term and short-term net impact estimates for the JTPA Title II-C program participants and one subgroup—program completers. The completers comprised almost 90 percent of the treatment population, so the estimates of net impacts are not too different. However, as with the other workforce programs, completers have more positive outcomes. Employment rates and quarterly hours worked are higher for completers than for the full treatment group, and therefore average quarterly earnings are higher. However, the longer-term estimates are not significant. The conditional hourly wage estimate for the short term in Table 5.8 seems anomalous for completers, however, as it shows a decrease relative to the entire group.

Table 5.7 Selected Longer-Term Net Impact Estimates for Subgroups of JTPA Title II-C Participation: 1997/1998 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	5.3%	6.1%	61.6%
Conditional hourly rate	-\$0.59 [†]	\$0.37 [†]	\$8.07
Conditional hours	2.3 [†]	11.8 [†]	312.1
Conditional earnings	-\$60 [†]	\$77 [†]	\$2,506
UI receipt	3.5%	4.7%	6.8%
TANF receipt	-0.7% [†]	-4.0% [†]	18.5%
Food Stamps receipt	5.0%	-0.3% [†]	26.8%
Medicaid enrollment	2.9% [†]	-1.9%	40.1%
Subgroup sample size	1,174	962	—

NOTE: Monetary data in '92 \$. [†] means not significant at the 0.10 level (two-tailed test).

Table 5.8 Selected Short-Term Net Impact Estimates for Subgroups of JTPA Title II-C Participation: 1999/2000 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	-4.0% [†]	-0.9%	63.0%
Conditional hourly rate	\$0.80	-\$0.09 [†]	\$7.36
Conditional hours	10.4 [†]	26.1	320.7
Conditional earnings	\$72	\$196	\$2,378
TANF receipt	7.9%	3.9%	8.0%
Food Stamps receipt	8.4%	6.6%	15.6%
Medicaid enrollment	16.3%	11.4%	43.2%
Subgroup sample size	1,047	900	—

NOTE: Monetary data in '92 \$. [†] means not significant at the 0.10 level (two-tailed test).

Both tables show a smaller take-up rate for public assistance and Medicaid for completers, but a higher reciprocity rate for unemployment compensation. The latter is likely due to the increased employment rate.

6 COMMUNITY COLLEGE JOB PREPARATORY TRAINING

Job preparation programs represent the applied (non-transfer) training mission of community colleges. For the most part, they provide technical training for individuals to enter sub-baccalaureate occupations. The fields that individuals who complete these programs enter are varied, but generally might be referred to as technicians.

Participant Characteristics

Table 6.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool. The comparison group consists of Employment Service clients who were 16 to 60 at the time of registration. The individuals who had participated in the workforce development programs were removed from the data. The first two columns of numbers compare the community college job preparatory training students who exited in 1997/1998 to individuals in the comparison group. The final two columns compare the community college job preparation students in 1999/2000 to ES exiters in the same year.

The populations were quite dissimilar. In 1997/1998, almost 60 percent of the community college job preparation clients were females as compared to 43 percent of the JOBNET leavers. In general, the job preparation clients are better educated:¹⁹ Whereas they had a slightly lower percentage of individuals who had gotten a bachelor or higher degree prior to registering for the job preparatory training, they had higher percentages of individuals with a high school degree, with some college, and who had obtained a certificate or associate degree. Furthermore, they had a much lower percentage of individuals who had not completed high school: 6 percent compared to almost 22 percent for Employment Service registrants. Almost 50 percent of the community college job

¹⁹The community college and ES administrative data contain information on degrees and certifications,

Table 6.1 Descriptive Statistics for Community College Job Preparatory Training Treatment Group and Comparison Group Pool

Characteristics	1997/1998		1999/2000	
	Job Prep	JOBNET (ES)	Job Prep	JOBNET (ES)
<u>Demographics and Education</u>				
Female	59.1%	43.4%	55.2%	43.6%
Minority	20.8% ^{††}	21.1% ^{††}	21.8% ^{††}	21.3% ^{††}
Age at registration	31.7	32.8	32.8	33.9
Disability	7.6%	2.6%	7.1%	2.2%
High school dropout	6.2%	21.6%	7.2%	20.9%
High school graduate	48.3%	41.5%	45.1%	42.6%
Some college, no degree	25.3%	23.0%	25.7%	23.8%
College certificate or associate degree	12.4%	4.7%	13.8%	4.1%
Bachelor degree or higher	7.7%	9.2%	8.2% ^{††}	8.6% ^{††}
In school at registration	99.5%	3.3%	98.3%	3.0%
Limited English proficiency	2.0%	6.7%	2.8%	6.8%
West WA	77.4%	68.0%	77.3%	70.9%
<u>Employment and Earnings</u>				
Employed at registration	47.2%	2.8%	48.9%	2.2%
Percentage employed	70.5%	72.6%	72.7%	75.5%
Average quarterly earnings ^{a, b}	\$2,087	\$2,948	\$2,452	\$3,347
Earnings trend	\$29.6	\$67.9	\$60.5	\$100.0
Number of quarters with job change	2.3	2.5	2.7	3.4
<u>Public Assistance</u>				
Ever received AFDC/TANF	20.3%	16.9%	18.3%	14.9%
Quarters received AFDC/TANF ^a	1.8	1.7	1.7	1.4
Ever received Food Stamps	29.2%	27.4%	27.6% ^{††}	27.2% ^{††}
Quarters received Food Stamps ^a	2.5 ^{††}	2.5 ^{††}	2.6	2.4
<u>Unemployment Compensation</u>				
Ever received	—	—	5.4% ^{††}	5.5% ^{††}
Average weekly benefit ^a	—	—	\$12.4 ^{††}	\$12.3 ^{††}
Sample size	17,019	84,104	16,471	179,149

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

^{††}Differences in means are not statistically significant at 0.05 level (t-test).

preparation participants had been employed when they entered; but the average quarterly earnings for all community college job preparation clients who had any earnings prior to registration was only \$2,087—about two-thirds of their ES counterparts. Only about three percent of the JOBNET clients had been employed when they registered, but the average quarterly earnings prior to registration was \$2,948.

which was absent from the JTPA administrative data.

The differences in 1999/2000 were similar. Over 55 percent of the community college job preparatory students were females as compared to 44 percent of the JOBNET registrants. The job preparation clients were better educated: again, a slightly lower percentage with a bachelor or higher degree, but higher percentages with high school graduation, having some college, and obtaining certificates or associate degrees. They have a much lower percentage without a high school diploma: 7 percent compared to about 21 percent for Employment Service clients. About half of the community college job preparation participants had been employed when they registered; the average quarterly for all community college job preparation clients who had any earnings prior to registration, however was \$2,452. Only about two percent of the JOBNET clients were employed when they registered, but the real average quarterly earnings of clients prior to registration was \$3,347.

Participation Model

Table 6.2 provides the results from the logit estimation of participation in job preparatory training. The dependent variable in this econometric model, which was estimated with a sample that pooled the individuals who had exited from the Employment Service (but who had not received employment and training services in Washington) with the community college job preparation students who had exited, was a dummy variable equal to 1 for the students (and 0 for the ES clients). The table provides the logit coefficient estimates and standard errors. While the magnitude of the coefficients is not particularly meaningful, the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being a community college job preparation student.

Table 6.2 Coefficient Estimates from a Logit Model of Participation in Community College Job Preparatory Training

Characteristics	1997/1998		1999/2000	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Demographics and Education</u>				
Female	0.492***	0.028	0.332***	0.027
Minority	0.280***	0.033	0.296***	0.031
Age at registration	-0.003**	0.001	0.001	0.001
Disability	1.598***	0.052	1.574***	0.051
High school graduate	1.327***	0.050	0.969***	0.046
Some college, no degree	1.229***	0.054	1.030***	0.049
College certificate or associate degree	1.993***	0.062	2.008***	0.057
Bachelor degree or higher	1.093***	0.067	1.003***	0.062
Limited English proficiency	-0.191**	0.094	0.136*	0.080
West WA	0.408***	0.030	0.368***	0.029
<u>Employment and Earnings</u>				
Employed at registration	3.757***	0.032	4.152***	0.029
Percentage employed	-0.002***	0.001	-0.001	0.001
Average quarterly earnings ^a	-0.014***	0.001	-0.017***	0.001
Earnings trend ^a	-0.030***	0.003	-0.034***	0.003
Earnings variance ^b	-0.045	0.040	-0.076	0.123
Number of quarters with job change	-0.047***	0.005	-0.078***	0.004
<u>Public Assistance</u>				
Ever received AFDC/TANF	0.224***	0.085	0.348***	0.083
Quarters received AFDC/TANF	-0.014**	0.006	0.010*	0.006
Average quarterly AFDC/TANF benefit ^a	0.035***	0.007	0.004	0.007
Ever received Food Stamps	0.116**	0.049	-0.056	0.044
Quarters received Food Stamps	-0.028***	0.006	-0.003	0.005
<u>Unemployment Compensation</u>				
Ever received	—	—	0.145	0.119
Average weeks on UI	—	—	0.027***	0.004
Average weekly benefit ^a	—	—	0.224***	0.044

NOTE: Model included industry and an intercept term. Sample sizes were 57,249 and 134,146 for 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$).

^bScaled in \$10⁸ ('92 \$).

*Significant at the 0.10 level; **significant at the 0.5 level; ***significant at the 0.01 level (two-tailed test).

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., a community college job preparation participant) in both years of data: Female, minority, disability, all the education attainment variables (with high school dropout as the omitted category), being from Western Washington, being employed at registration, having received TANF, average quarterly TANF benefits (not significant for 1999/2000), average weeks on UI benefits, and average weekly UI benefit amount. The following

variables are significantly correlated with being in the Employment Service group: age at registration (not significant for 1999/2000), percent of quarters employed (not significant for 1999/2000), average earnings prior to registration, trend in earnings prior to registration, turnover, and number of quarters having received Food Stamps (not significant for 1999/2000). The results are consistent with the story that prior education is strongly positively correlated with being a community college student, and prior labor market success is negatively correlated.

Propensity Score Statistics

The propensity score for an observation is the predicted probability using the estimated coefficients and the observation’s actual data. If the logit model has substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be much less than the mean score for the treatment. As argued earlier, a measure of how well the logit model discriminates between comparison group members and treatment group members is the cumulative percentile for the comparison group at the propensity score that is the 20th percentile. Table 6.3 provides these data for the community college job preparation analyses. The mean propensity scores for the treatment groups are roughly 0.5 and 0.43 whereas they are about 0.10 and 0.05 for the comparison group for 1997/1998 and 1999/2000 respectively. The 20th percentile indicators are approximately 80 percent, which suggest that the participation model is “good;” it discriminated well between students and non-students.

Table 6.3 Indicators of Propensity Score Model Quality for Community College Job Prep Analyses

Statistic	1997/1998	1999/2000
Mean p-score, Job Preparation	0.497	0.430
Mean p-score, JOBNET	0.097	0.046
Percentile JOBNET, at 20th percentile Job Prep	76.53%	81.15%

Statistical Match

The statistical matching used a nearest neighbor approach with the propensity score. For every observation j in T_i , we found the observation k in U that minimized the absolute value of the difference between the propensity score for j and k . We then added k to the comparison group sample. The statistical match was done with replacement, so some observations in U were the “matches” for more than one observation in the treatment group. Table 6.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group, comparison group, and pool of observations from which the comparison group was chosen. As would be expected, the differences between the treatment group and the match comparison group means are much smaller than in Table 6.1. However, a number of mean differences are significant, which is different from the comparable table in the JTPA chapters. The explanation is that prior education and prior earnings experience were so different using the full comparison group pool that the matching was not able to get any closer along these dimensions.

Net Impacts

The major purpose of the study was to estimate the net impacts of the education and training programs on clients. Tables 6.5 and 6.6 provide the estimated net impacts for community college job preparatory training. The first column presents simple differences in means between the full comparison group pool (i.e., U) and the treatment group. The next three columns attempt to control for the systematic differences between that full pool and the treatment group. The second column presents regression adjusted estimates using the full comparison group sample. The third column presents a comparison of means between the treatment group and the matched comparison group

Table 6.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for Community College Job Preparatory Training

Statistic/Characteristic	1997/1998		1999/2000	
	Job Prep	JOBNET (ES)	Job Prep	JOBNET (ES)
Sample size	17,019	84,104	16,471	179,149
Sample size used in match	12,767	66,419	12,307	152,576
Matched sample size	12,767	12,767	12,307	12,307
Number of observations used once	—	4,827	—	5,511
Number of observations used multiple times	—	1,926	—	1,898
Maximum number of repeats	—	30	—	32
<u>Demographics and Education</u>				
Female	59.1%**	57.6%**	55.8%	55.3%
Minority	19.8%	19.8%	20.9%	21.3%
Age at registration	31.2	31.3	32.3**	32.7**
Disability	7.4%	8.0%	7.1%**	8.6%**
High school dropout	5.5%	5.6%	6.7%	7.0%
High school grad	48.2%	48.8%	45.0%	44.2%
Some college, no degree	25.9%**	28.0%**	26.3%	27.3%
Certificate/Associate degree	12.6%**	9.8%**	13.8%	13.3%
Bachelor degree or higher	7.8%	7.8%	8.1%	8.2%
In school at registration	99.6%**	11.0%**	98.6%**	11.7%**
Limited English proficiency	1.8%	1.9%	2.4%	2.2%
West Washington	76.8%	75.2%	76.4%**	72.0%**
<u>Employment and Earnings</u>				
Employed at registration	54.1%	53.9%	56.8%	56.1%
Percentage employed	69.6%**	66.2%**	71.5%**	68.3%**
Average quarterly earnings ^{a, b}	\$2,080**	\$1,993**	\$2,327**	\$2,264**
Earnings trend	\$30.2**	\$6.0**	\$54.7**	\$20.6**
Number of quarters with job change	2.3	2.4	2.7	2.7
<u>Public Assistance</u>				
Ever received AFDC/TANF	19.4%**	22.6%**	17.5%**	20.3%**
Quarters received AFDC/TANF ^a	1.7**	1.9**	1.7**	1.9**
Ever received Food Stamps	28.9%**	33.9%**	27.6%**	30.9%**
Quarters received Food Stamps ^a	2.4**	2.9**	2.6**	3.0**
<u>Unemployment Compensation</u>				
Ever received	—	—	6.0%	5.7%
Average weekly benefit ^a	—	—	\$13.3	\$12.8
Sample size	12,767	12,767	12,307	12,307

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

**Differences in means are statistically significant of 0.05 level (t-test).

sample. The fourth column presents an estimate from a regression adjustment of that mean. This column represents the preferred specification and we used difference-in differences. The coefficient estimates that are in “boxes” represent the final, “official” estimates used by WTECB.

Table 6.5 Net Impact Estimates for Job Preparatory Training for 1997/1998 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.079***	0.052***	0.051***	0.045***	0.651	0.710
Ever employed - longer term	0.060***	0.041***	0.038***	0.032***	0.741	0.787
Employment - longer term	0.091***	0.056***	0.065***	0.052***	0.633	0.684
Employment - diff-in-diff	0.129***	-0.083***	0.066***	0.070***	-0.127	-0.060
Hourly wage - short term (\$)	0.36**	1.31***	1.64***	1.51***	10.85	9.67
Hourly wage - longer term (\$)	1.04***	1.12***	1.53***	1.47***	11.07	10.66
Hourly wage - short term diff-in-diff (\$)	1.51***	1.14***	1.56***	1.47***	1.62	1.60
Hourly wage - longer term diff-in-diff (\$)	2.38***	1.13***	1.52***	1.42***	1.90	2.78
Hours - short term	38.8***	8.4***	29.1***	9.5***	260.9	287.2
Cond. hours - short term	12.0***	12.0***	13.4***	13.2***	398.7	402.1
Hours - short term, diff-in-diff	99.8***	43.1***	46.8***	36.2***	-30.7	24.4
Cond. hours - short term, diff-in-diff	68.4***	43.8***	40.1***	38.6***	36.5	67.0
Hours - longer term	52.8***	34.6***	41.0***	32.8***	264.8	289.1
Cond. hours - longer term	28.8***	19.2***	24.4***	18.9***	390.9	398.0
Hours - longer term, diff-in-diff	107.8***	66.1***	59.2***	54.9***	-27.5	23.7
Cond. hours - longer term, diff-in-diff	81.1***	52.4***	49.7***	44.8***	39.2	72.6
Earnings - short term (\$)	550***	363***	719***	446***	2702	2726
Cond. earnings - short term (\$)	327***	548***	709***	602***	4129	3816
Earnings - short term, diff-in-diff (\$)	1575***	646***	827***	645***	-316	451
Cond. earnings - short term, diff-in-diff (\$)	1294***	769***	892***	779***	505	925
Earnings - longer term (\$)	887***	757***	992***	833***	3068	3134
Cond. earnings - longer term (\$)	708***	710***	962***	825***	4466	4265
Earnings - longer term, diff-in-diff (\$)	1861***	1025***	1104***	986***	80	857
Cond. earnings - longer term, diff-in-diff (\$)	1629***	992***	1145***	992***	986	1486
UI receipt - short term	-0.031***	-0.008**	-0.003	0.001	0.058	0.032
UI benefits - short term (\$)	-30.2***	4.4	2.6	6.7**	61.6	30.6
Cond. UI benefits - short term (\$)	89.3*	195.1***	172.9**	228.2***	1057.7	948.6
UI receipt - longer term	-0.053***	-0.008*	-0.013***	-0.007*	0.139	0.106
UI benefits - longer term (\$)	-40.1***	-7.4*	-15.7***	-12.7***	103.9	83.8
Cond. UI benefits - longer term (\$)	30.3	4.5	-35.1	-41.4	1418.1	1474.5

Short-term and longer-term impacts for the job preparatory training students are quite positive. In the short term, average quarterly earnings increased by over \$1,200, or almost 30

Table 6.5 (Continued)

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
TANF receipt - short term	-0.008***	-0.000	-0.008**	-0.006*	0.066	0.061
TANF benefits - short term (\$)	-11.7***	1.7	-12.8***	-1.5	72.8	65.4
Cond. TANF benefits - short term (\$)	-57.9**	-32.2	-78.2**	-47.9	1106.3	1074.4
TANF benefits - short term, diff-in-diff (\$)	-31.4***	-17.2***	-13.9**	-19.7***	-17.5	-34.4
Cond. TANF benefits - short term, diff-in-diff (\$)	-101.0**	-42.0	-113.4**	-148.6***	-114.6	-102.8
TANF receipt - longer term	-0.015***	-0.003	-0.008**	-0.004	0.059	0.052
TANF benefits - longer term (\$)	-12.3***	-1.6	-5.8**	-1.0	41.0	33.0
Cond. TANF benefits - longer term(\$)	-8.1	41.6	40.4	44.2	1028.5	964.7
TANF benefits - longer term, diff-in-diff (\$)	-29.8***	-18.7***	-5.1	-16.0***	-36.4	-61.3
Cond. TANF benefits - longer term, diff-in-diff (\$)	32.3	52.3	78.8	-38.1	-133.6	-180.6
FS receipt - short term	-0.023***	-0.010***	-0.013***	-0.009**	0.126	0.109
FS benefits - short term (\$)	-15.9***	-2.9	-11.6***	-3.0	67.1	57.2
Cond. FS benefits - short term (\$)	-36.8***	-23.4**	-50.5***	-28.9**	533.7	527.0
FS receipt - longer term	-0.040***	-0.016***	-0.017***	-0.014***	0.129	0.105
FS benefits - longer term (\$)	-13.4***	-1.4	-4.7**	0.3	44.2	33.9
Cond. FS benefits - longer term (\$)	-0.24	23.4**	18.8*	36.0***	462.5	434.8
Med. receipt - short term	0.005	0.014***	-0.001	0.008	0.156	0.152
Med. receipt - longer term	-0.026***	-0.017***	-0.023***	-0.018***	0.175	0.167

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 6.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

percent. These earnings gains came from increased employment impacts of 7.6 percentage points, hourly wage increases of \$2.17, and increased hours per quarter of over 40 hours. The increased earnings gains contrasted sharply with a very slight increase in TANF receipt (0.5%) and decreases (not significant) in Food Stamps and Medicaid.

The longer-term earnings impacts were somewhat dampened, but still quite strong. The students earned, on average, almost \$1,000 per quarter more than their comparison group counterparts. Furthermore, the students reduced their usage of public assistance, Medicaid, and unemployment compensation.

Table 6.6 Net Impact Estimates for Job Preparatory Training for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.096***	0.084***	0.079***	0.076***	0.682	0.725
Hourly wage - short term (\$)	1.12***	1.78***	2.28***	2.06***	11.89	10.71
Hourly wage - short term diff-in-diff (\$)	2.83***	2.08***	2.52***	2.17***	1.41	1.84
Hours - short term	56.2***	11.0***	43.0***	11.9***	280.9	306.2
Cond. hours - short term	22.5***	14.4***	12.5***	15.1***	410.7	422.1
Hours - short term, diff-in-diff	122.3***	46.6***	62.1***	33.8***	-49.7	15.6
Cond. hours - short term, diff-in-diff	78.1***	50.8***	43.8***	40.4***	22.0	62.2
Earnings - short term (\$)	1079***	633***	1201***	751***	3235	3245
Cond. earnings - short term (\$)	813***	884***	1058***	968***	4731	4475
Earnings - short term, diff-in-diff (\$)	2398***	1049***	1456***	1012***	-539	481
Cond. earnings - short term, diff-in-diff (\$)	1992***	1281***	1410***	1230***	416	1080
UI receipt - short term	-0.031***	-0.006	-0.002	-0.001	0.071	0.045
UI benefits - short term (\$)	-40.9***	-5.6	-2.9	-2.9	96.3	59.8
Cond. UI benefits - short term (\$)	24.9	50.4	-18.0	124.4*	1354.3	1328.8
TANF receipt - short term	0.003*	0.007***	0.003	0.005**	0.032	0.027
TANF benefits - short term (\$)	3.6*	13.0***	3.9	11.9***	35.6	30.3
Cond. TANF benefits - short term (\$)	17.1	41.0	13.9	68.8	1112.4	1108.8
TANF benefits - short term, diff-in-diff (\$)	-33.0***	-18.6***	-10.6**	-12.9***	-7.9	-30.9
Cond. TANF benefits - short term, diff-in-diff (\$)	-0.3	60.1	104.6	100.6	-30.4	-128.4
FS receipt - short term	-0.012***	0.001	-0.008**	-0.004	0.083	0.074
FS benefits - short term (\$)	-4.0**	6.5***	-3.0	5.6***	41.4	36.1
Cond. FS benefits - short term (\$)	26.2**	30.4**	12.6	19.3	496.4	486.3
Med. receipt - short term	-0.004	0.003	-0.012**	-0.007	0.131	0.130

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 6.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

Subgroup Analyses

We examined several subgroups of the community college job preparatory training students. First, as with most of the other treatment groups, we examined completers versus all students. The results shown in Tables 6.7 and 6.8 exhibit an interesting pattern. The short-term net impacts for completers are actually *smaller* than for all program participants for hourly wage, hours worked, and quarterly earnings. On the other hand, the longer-term net impacts are larger for completers than for

Table 6.7 Selected Longer-Term Net Impact Estimates for Subgroups of Community College Job Prep Training: 1997/1998 Cohort

Outcome	Subgroup				Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	Prior ABE	Tech Prep	
Employment	7.0%	10.1%	4.5%	12.5%	68.4%
Conditional hourly wage	\$1.42	\$2.11	\$0.43	-\$0.93 [†]	\$10.66
Conditional hours	44.8	47.1	25.5	68.8	398.0
Conditional earnings	\$992	\$1,272	\$446	\$50 [†]	\$4,265
UI receipt	-0.7% [†]	-1.8%	0.1% [†]	-1.6% [†]	10.6%
TANF receipt	-0.4% [†]	-2.4% [†]	-0.0% [†]	1.9% [†]	5.2%
Food Stamps receipt	-1.4%	-5.4%	0.4% [†]	1.2% [†]	10.5%
Medicaid enrollment	-1.8%	-5.1%	1.5% [†]	1.7% [†]	16.7%
Subgroup sample size	12,764	5,832	1,353	141	—

NOTE: Monetary data in '92 \$. [†]means not significant at the 0.10 level (two-tailed test).

the entire treatment group. These results are consistent with the notion that one of the reasons for non-completion at the community college level is the economic opportunities that are available. However, the longer-term estimates suggest that the community college completers eventually surpass the non-completers in labor market outcomes.

Table 6.8 Selected Short-Term Net Impact Estimates for Subgroups of Community College Job Prep Training: 1999/2000 Cohort

Outcome	Subgroup				Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	Prior ABE	Tech Prep	
Employment	7.6%	8.6%	5.3%	14.6%	72.5%
Conditional hourly wage	\$2.17	\$1.76	\$0.24 [†]	\$1.51 [†]	\$10.71
Conditional hours	40.4	31.5	23.6	46.8 [†]	422.1
Conditional earnings	\$1,230	\$1,072	\$454	\$1,071	\$4,475
TANF receipt	0.5%	0.7%	1.2%	-1.6% [†]	2.7%
Food Stamps receipt	-0.4% [†]	-2.5% [†]	1.4%	2.1% [†]	7.4%
Medicaid enrollment	-0.7% [†]	-4.5% [†]	3.2%	-4.8% [†]	13.0%
Subgroup sample size	12,315	8,854	1,587	62	—

NOTE: Monetary data in '92 \$. [†]means not significant at the 0.10 level (two-tailed test).

A second subgroup that was examined was individuals who had participated in adult basic education at a community college prior to entering a job preparatory program. The reason for looking at this group was to investigate the hypothesis that one of the major payoffs to investing in an ABE program was the opportunity to pursue occupational training at the community college level. If this hypothesis were true, then the economic payoffs to the ABE training may be modest, but those payoffs would be understated for the individuals who followed-up with job preparatory training. Indeed, the estimates suggest that there is merit to this hypothesis. Whereas the net impact estimates suggest that the individuals in this subgroup have lower labor market returns than the treatment group as a whole, and they have higher public assistance reciprocity rates, the average quarterly earnings for this subgroup is still 10 percent higher than matched comparison group means. Employment rates are almost five percentage points higher. In short, there does seem to be a substantial labor market payoff for ABE participants who enter job preparatory occupational training.

The final group examined was Tech Prep students. This group had quite large labor market net impact gains in the short term, and modest gains in the longer term (moderated by a decrease in hourly wages relative to the comparison group). However, the sample sizes for this subgroup were extremely small causing virtually every estimate to be imprecise.

7 COMMUNITY COLLEGE WORKER RETRAINING PROGRAM

The Worker Retraining (WR) program provided long-term unemployed and dislocated workers with skill training at community colleges.²⁰ The training programs were similar to community college job preparation, i.e., technical training geared to sub-baccalaureate occupations. The trainees were similar in economic circumstances to individuals served by the JTPA Title III program. In fact, Worker Retraining was a state-funded program that supplemented the federal dislocated worker retraining.

Participant Characteristics

Table 7.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool. The comparison group consists of Employment Service clients who were 16 to 60 at the time of registration and last received services in 1997/1998 or 1999/2000. The individuals who were served by Washington's workforce development programs were removed from the comparison group pool data. The first two columns of numbers compare the community college Worker Retraining clients who exited in 1997/1998 to individuals in the comparison group. The final two columns compare the community college Worker Retraining exiters in 1999/2000 to ES exiters in the same year.

The populations were somewhat different. In 1997/1998, almost 48 percent of the Worker Retraining clients were females as compared to 43 percent of the JOBNET leavers. Just as was the case with Job Preparatory training, the Worker Retraining clients were better educated: a much lower percentage of individuals without a high school diploma (5 percent as compared to almost 22

7.1 Descriptive Statistics for Worker Retraining Treatment Group and Comparison Group Pool

Characteristics	1997/1998		1999/2000	
	Worker Retraining	JOBNET (ES)	Worker Retraining	JOBNET (ES)
<u>Demographics and Education</u>				
Female	47.7%	43.4%	46.1%	43.6%
Minority	16.7%	21.1%	24.7%	21.3%
Age at registration	39.4	32.8	39.3	33.9
Disability	7.8%	2.6%	9.6%	2.2%
High school dropout	5.4%	21.6%	9.6%	20.9%
High school graduate	42.5% ^{††}	41.5% ^{††}	43.3% ^{††}	42.6% ^{††}
Some college, no degree	28.9%	23.0%	25.0% ^{††}	23.8% ^{††}
College certificate or associate degree	15.1%	4.7%	13.2%	4.1%
Bachelor degree or higher	8.1%	9.2%	8.8% ^{††}	8.6% ^{††}
In school at registration	99.9%	3.3%	98.6%	3.0%
Limited English proficiency	2.5%	6.7%	6.8% ^{††}	6.8% ^{††}
West WA	81.1%	68.0%	75.9%	70.9%
<u>Employment and Earnings</u>				
Employed at registration	2.6% ^{††}	2.8% ^{††}	1.6%	2.2%
Percentage employed	82.1%	72.6%	81.8%	75.5%
Average quarterly earnings ^{a, b}	\$4,039	\$2,948	\$4,073	\$3,347
Earnings trend	-\$42.6	\$67.9	\$15.2	\$100.0
Number of quarters with job change	2.8	2.5	3.9	3.4
<u>Public Assistance</u>				
Ever received AFDC/TANF	11.2%	16.9%	13.5%	14.9%
Quarters received AFDC/TANF ^a	0.7	1.7	1.1	1.4
Ever received Food Stamps	26.2% ^{††}	27.4% ^{††}	29.3%	27.2%
Quarters received Food Stamps ^a	1.6	2.5	2.4 ^{††}	2.4 ^{††}
<u>Unemployment Compensation</u>				
Ever received	—	—	59.2%	5.5%
Average weekly benefit ^a	—	—	\$159.8	\$12.3
Sample size	2,905	84,104	5,041	179,149

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

^{††}Differences in means are not statistically significant at 0.05 level (t-test).

percent for ES registrants) and higher percentage of individuals with some college and with certificates or associate degrees. Interestingly, the percentage of individuals with at least a bachelor's degree is somewhat lower. Since the Worker Retraining program served unemployed and dislocated workers, the percentage of participants employed at registration is very slight and is about the same as that of the JOBNET population. However, the Worker Retraining exiters' work histories

²⁰A small percentage of Worker Retraining participants attended private career schools, but this project excluded

were more stable (percentage of quarters worked was 82 versus 73 for the Worker Retraining and JOBNET clients, respectively) and had higher quarterly earning (\$4,039 for WR participants and \$2,948 for JOBNET exiters). Both dollar amounts are in 1992 dollars. The Worker Retraining participants were less likely to receive AFDC/TANF, 11 percent compared to 17 percent for JOBNET, although just as likely to receive Food Stamps.

The differences in 1999/2000 were similar—again not all that dramatic. Over 46 percent of the community college Working Retraining exiters were females as compared to 44 percent of the JOBNET leavers. They had a lower percentage of individuals with less than a high school degree, about the same percentage with just a high school diploma, and higher percentages with some college or more. A slightly lower percentage of Worker Retraining participants had been employed when they registered (1.6 versus 2.2 percent), but again a more stable earnings history at higher levels of earnings (employed 82 percent of all prior quarters as compared to 76 percent for Employment Service exiters; average earnings of \$4,073 versus \$3,347). The table shows that a much higher percentage of the Worker Retraining clients had received UI (almost 60 percent compared to 5 percent).

Participation Model

Table 7.2 provides the results from the logit estimation of participation. The individuals who had exited from the Employment Service were pooled with the community college Worker Retraining clients, and the dependent variable, participation, was a dummy variable equal to 1 for the latter group (and 0 for the former). The independent variables in the participation model were identical to those used in the Job Preparatory Training participation model documented in Chapter 6.

those individuals from the analyses and focused on community college students only.

Table 7.2 Coefficient Estimates from a Logit Model of Participation in the Worker Retraining Program at Community Colleges

Characteristics	1997/1998		1999/2000	
	Coefficient	Standard Error	Coefficient	Standard Error
<u>Demographics and Education</u>				
Female	0.313***	0.045	0.368***	0.039
Minority	0.069	0.059	0.306***	0.045
Age at registration	0.044***	0.002	0.014***	0.002
Disability	1.018***	0.082	1.805***	0.066
High school graduate	1.142***	0.097	0.890***	0.066
Some college, no degree	1.204***	0.102	0.964***	0.071
College certificate or associate degree	2.225***	0.109	2.179***	0.082
Bachelor degree or higher	0.791***	0.120	1.039***	0.087
Limited English proficiency	-0.039	0.148	0.484***	0.085
West WA	0.488***	0.052	0.289***	0.042
<u>Employment and Earnings</u>				
Employed at registration	-0.230*	0.130	0.013	0.132
Percentage employed	0.011***	0.001	0.008***	0.001
Average quarterly earnings ^a	-0.001	0.001	-0.008***	0.001
Earnings trend ^a	-0.036***	0.004	-0.033***	0.004
Earnings variance ^b	-0.177***	0.060	-0.060	0.101
Number of quarters with job change	0.057***	0.007	-0.026***	0.005
<u>Public Assistance</u>				
Ever received AFDC/TANF	0.187	0.166	0.312**	0.127
Quarters received AFDC/TANF	-0.068***	0.015	0.005	0.009
Average quarterly AFDC/TANF benefit ^a	-0.005	0.015	-0.030**	0.012
Ever received Food Stamps	0.445***	0.075	0.261***	0.059
Quarters received Food Stamps	0.003	0.010	0.013**	0.006
<u>Unemployment Compensation</u>				
Ever received	—	—	1.436***	0.0821
Average weeks on UI	—	—	0.044***	0.002
Average weekly benefit ^a	—	—	0.531***	0.027

NOTE: Model included industry and an intercept term. Sample sizes were 51,059 and 129,772 for 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$)

^bScaled in \$10⁸ ('92 \$)

*Significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.1 level (two-tailed test).

The table provides the logit coefficient estimates and standard errors. While the magnitude of the coefficients is not particularly meaningful, the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being a community college Worker Retraining client.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., a community college Worker Retraining client) in

both years of data: Female, minority (not significant in 1997/1998), disability, age at registration, all the education attainment variables relative to being a high school dropout, being from Western Washington, percentage of quarters employed, having received TANF (not significant in 1997/1998), having received Food Stamps, quarters received Food Stamps (not significant for 1997/1998), having received UI benefits, average weeks on UI benefits, and average weekly UI benefit amount. The following variables are significantly correlated with being in treatment group: average earnings prior to registration (not significant in 1997/1998), trend in earnings prior to registration, and variance in earnings prior to registration (not significant in 1999/2000).

Propensity Score Statistics

If the participation model had substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be much less than the mean score for the treatment. As argued earlier, a measure of how well the logit model discriminates between comparison group members and treatment group members is the cumulative percentile for the comparison group at the propensity score that is the 20th percentile. Table 7.3 provides these data for the community college Worker Retraining analyses. The mean propensity scores for the treatment groups are roughly 0.08 and 0.25, whereas they are 0.04 and 0.02 for the comparison group for 1997/1998 and 1999/2000 respectively. The 20th percentile indicator is approximately 60 percent for 1997/1998 and 73 percent for 1999/2000. The relatively small difference in means and 20th percentile indicator in 1997/1998 suggested that the match in that year was not as good as in 1999/2000.

Table 7.3 Indicators of Propensity Score Model Quality for Worker Retraining at Community Colleges

Statistic	1997/1998	1999/2000
Mean p-score, WR	0.083	0.245
Mean p-score, JOBNET	0.036	0.022
Percentile JOBNET, at 20th percentile WR	57.88%	73.14%

Statistical Match

Table 7.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group, comparison group, and pool of observations from which the comparison group was chosen. Notice that means for the comparison group are quite close to the treatment group, except for the education variables. Relative to the community college Job Preparatory training, the statistical match for Worker Retraining did much better on the previous earnings and employment and approximately as well on the educational attainment variables.

Net Impacts

Tables 7.5 and 7.6 provide the estimated net impacts for Worker Retraining. The preferred specification, used the levels of the outcome variables as the dependent variable and not difference-in-differences. The coefficient estimates that are in “boxes” represent the final, “official” estimates used by WTECB.

Short-term impacts for the Worker Retraining students reflect a very strong positive, employment rate gain of 8.0 percentage points, but very weak and insignificant gains in hourly wages, hours, and earnings. The point estimate for the average gain in quarterly earnings of \$123 is on the order of two to three percent. In the short term, the Worker Retraining students had reductions in public assistance and Medicaid, although these were not statistically significant.

Table 7.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for Worker Retraining at Community Colleges

Statistic/Characteristic	1997/1998		1999/2000	
	Worker Retraining	JOBNET (ES)	Worker Retraining	JOBNET (ES)
Sample Size	2,905	84,104	5,041	179,149
Sample size used in match	2,615	66,419	4,405	132,576
Matched sample size	2,615	2,615	4,405	4,405
Number of observations used once	—	2,291	—	2,928
Number of observations used multiple times	—	151	—	482
Maximum number of repeats	—	5	—	21
<u>Demographics and Education</u>				
Female	47.3%	48.0%	46.1%**	42.5%**
Minority	16.3%	16.8%	25.1%**	27.1%**
Age at registration	39.4	39.5	39.1	39.1
Disability	7.9%	7.7%	9.7%	9.4%
High school dropout	5.4%	5.2%	9.5%	9.9%
High school graduate	42.4%	42.3%*	43.5%	45.6%**
Some college, no degree	28.8%	29.5%	25.0%	25.2%
College certificate or associate degree	15.2%	14.6%	13.3%	12.5%
Bachelor degree or higher	8.1%	8.4%	8.8%**	6.8%**
In school at registration	100.0%**	1.4%**	98.4%**	1.2%**
Limited English proficiency	2.5%	2.7%	7.0%**	9.1%**
West WA	80.3%	80.2%	76.1%	75.7%
<u>Employment and Earnings</u>				
Employed at registration	2.5%	2.6%	1.6%	1.6%
Percentage employed	82.1%	82.3%	81.8%	81.9%
Average quarterly earnings ^{a, b}	\$4,023	\$3,935	\$4,049	\$4,142
Earnings trend	-\$43.1	\$14.1	\$13.6	-\$122.7
Number of quarters with job change	2.8	2.9	3.9	4.0
<u>Public Assistance</u>				
Ever received AFDC/TANF	11.1%	10.5%	13.7%	14.3%
Quarters received AFDC/TANF ^a	0.7	0.6	1.1	1.1
Ever received Food Stamps	26.1%	26.0%	29.7%	31.0%
Quarters received Food Stamps ^a	1.6	1.5	2.4	2.5
<u>Unemployment Compensation</u>				
Ever received	—	—	59.9%	58.5%
Average weekly benefit ^a	—	—	\$160.5	\$156.4
Sample size	2,615	2,615	4,405	4,405

NOTE: Monetary data are in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

**Differences in means are statistically significant at 0.05 level (t-test).

The longer-term earnings impacts were somewhat larger, and were statistically significant. The employment rate impact was 6.3 percentage points and the hours worked impact was about 35 hours per quarter. Hourly wages were estimated to fall slightly, and all together quarterly earnings

Table 7.5 Net Impact Estimates for Worker Retraining Program for 1997/1998 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.078***	0.059***	0.044***	0.054***	0.651	0.690
Ever employed - longer term	0.053***	0.052***	0.037**	0.044***	0.741	0.762
Employment - longer term	0.091***	0.068***	0.054***	0.063***	0.633	0.675
Employment - diff-in-diff	-0.021**	0.039***	0.047***	0.037***	-0.127	-0.192
Hourly wage - short term (\$)	0.26	-1.007**	-0.85	-0.84	10.85	11.90
Hourly wage - longer term (\$)	1.27***	-0.171	-0.21	-0.37	11.07	12.50
Hourly wage - short term diff-in-diff (\$)	-1.78***	-1.14**	-1.22*	-0.66	1.62	1.07
Hourly wage - longer term diff-in-diff (\$)	-0.82***	-0.15	-0.49	-0.41	1.90	1.58
Hours - short term	51.3***	9.9***	28.8***	13.7***	260.9	286.2
Cond. hours - short term	29.6***	13.4***	14.1**	18.9***	398.7	414.6
Hours - short term, diff-in-diff	-27.9***	-6.0	13.3*	-10.1*	-30.7	-71.9
Cond. hours - short term, diff-in-diff	-21.7***	2.8	5.9	4.1	36.5	8.3
Hours - longer term	67.9***	49.2***	44.8***	49.8***	264.8	291.1
Cond. hours - longer term	52.3***	33.3***	32.3***	35.1***	390.9	411.9
Hours - longer term, diff-in-diff	-8.9*	32.1***	34.5***	28.8***	-27.5	-70.2
Cond. hours - longer term, diff-in-diff	-6.2	21.7***	24.0***	19.4***	39.2	9.0
Earnings - short term (\$)	730***	-18	230**	58	2702	3202
Cond. earnings - short term (\$)	579***	-43	32	46	4129	4640
Earnings - short term, diff-in-diff (\$)	-539***	-118**	70	-139*	-316	-935
Cond. earnings - short term, diff-in-diff (\$)	-511***	-85	-95	-52	505	62.5
Earnings - longer term (\$)	1131***	574***	530***	588***	3068	3677
Cond. earnings - longer term (\$)	1070***	344***	351***	354***	4466	5155
Earnings - longer term, diff-in-diff (\$)	-124	494***	431***	444***	80	-485
Cond. earnings - longer term, diff-in-diff (\$)	-128*	337***	247**	281***	986	588
UI receipt - short term	-0.003	-0.020***	-0.017**	-0.018***	0.058	0.072
UI benefits - short term (\$)	7.8	-15.3**	-14.9	-15.7	61.6	84.4
Cond. UI benefits - short term (\$)	203.3**	82.0	85.9	213.0	1057.7	1172.9
UI receipt - longer term	0.002	-0.009	-0.016	-0.015	0.139	0.160
UI benefits - longer term (\$)	5.3	-19.6**	-31.6**	-32.2***	103.9	141.4
Cond. UI benefits - longer term (\$)	153.1**	12.8	-56.4	-50.1	1418.1	1616.2
TANF receipt - short term	-0.040***	-0.009	-0.005	-0.005	0.066	0.027
TANF benefits - short term (\$)	-46.5***	-6.2	-7.0	-6.4	72.8	28.5
Cond. TANF benefits - short term (\$)	-83.0	-65.5	-92.5	-46.5	1106.3	1042.9
TANF benefits - short term, diff-in-diff (\$)	13.8***	-4.9	-13.8**	-7.2	-17.5	6.5
Cond. TANF benefits - short term, diff-in-diff (\$)	226.6	38.2	-175.9	-24.9	-114.6	131.1
TANF receipt - longer term	-0.038***	-0.010	-0.009**	-0.009*	0.059	0.029
TANF benefits - longer term (\$)	-27.1***	-2.7	-2.8	-3.5	41.0	15.9
Cond. TANF benefits - longer term (\$)	-50.2	-47.0	56.2	-1.4	1028.5	901.9
TANF benefits - longer term, diff-in-diff (\$)	23.8***	-0.7	-8.4*	-3.5	-36.4	-5.9
Cond. TANF benefits - longer term, diff-in-diff (\$)	450.8**	312.4**	339.6*	156.2	-133.6	-60.1

Table 7.5 (Continued)

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
FS receipt - short term	-0.052***	-0.012	-0.011	-0.014*	0.126	0.083
FS benefits - short term (\$)	-33.2***	-4.5	-4.1	-4.8	67.1	35.8
Cond. FS benefits - short term (\$)	-73.8***	-18.8	10.5	11.2	533.7	434.1
FS receipt - longer term	-0.066***	-0.028***	-0.033	-0.033***	0.129	0.095
FS benefits - longer term (\$)	-25.6***	-5.0*	-6.7**	-7.2***	44.2	24.1
Cond. FS benefits - longer term (\$)	-43.7*	20.5	48.5*	32.5	462.5	361.8
Med. receipt - short term	-0.073***	-0.022**	-0.012	-0.013	0.156	0.091
Med. receipt - longer term	-0.084***	-0.035***	-0.023**	-0.024**	0.175	0.110

NOTE: See Appendix B for explanatory notes. Samples sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 7.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

Table 7.6 Net Impact Estimates for Worker Retraining Program for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.067***	0.057***	0.035***	0.080***	0.682	0.715
Hourly wage - short term (\$)	0.65***	-0.57	-0.77**	0.45	11.89	13.14
Hourly wage - short term diff-in-diff (\$)	-1.02***	-0.26	-0.45	0.53	1.41	0.76
Hours - short term	43.2***	7.5***	21.8***	9.4*	280.9	302.4
Cond. hours - short term	21.7***	8.3**	9.2**	9.1	410.7	422.7
Hours - short term, diff-in-diff	-20.9***	-38.1***	-25.0***	-37.0***	-49.7	-48.4
Cond. hours - short term, diff-in-diff	-25.2***	-22.6***	-24.3***	-18.9**	22.0	19.9
Earnings - short term (\$)	703***	-70*	-4	149*	3235	3877
Cond. earnings - short term (\$)	524***	-115**	-260**	123	4731	5420
Earnings - short term, diff-in-diff (\$)	-474***	-603***	-554***	-438***	-539	-524
Cond. earnings - short term, diff-in-diff (\$)	-580***	-456***	-596***	-282**	416	373
UI receipt - short term	0.024***	-0.033***	-0.058***	-0.040***	0.071	0.152
UI benefits - short term (\$)	56.0***	-76.4***	-81.0***	-29.8	96.3	229.5
Cond. UI benefits - short term (\$)	241.1***	69.4	66.7	117.7	1354.3	1515.3
TANF receipt - short term	-0.017***	0.005	0.004	-0.0004	0.032	0.013
TANF benefits - short term (\$)	-19.6***	-4.0	3.8	-4.3	35.6	14.1
Cond. TANF benefits - short term (\$)	-77.3	-17.3	-32.6	61.7	1112	1083.5
TANF benefits - short term, diff-in-diff (\$)	-0.13	-3.6	-4.4	-9.9	-7.9	-3.6
Cond. TANF benefits - short term, diff-in-diff (\$)	286**	100.0	539.4*	-191.8	-30.4	-258.9
FS receipt - short term	-0.025***	-0.002	0.002	-0.005	0.083	0.056
FS benefits - short term (\$)	-14.3***	1.2	2.9	-2.1	41.4	25.2
Cond. FS benefits - short term (\$)	-30.1	26.1	33.7	-52.2	496.4	446.5
Med. receipt - short term	-0.045***	-0.007	-0.001	-0.011	0.131	0.088

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 7.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

increased by about \$3350, which is about 7 percent. The Worker Retraining participants reduced their take-up of unemployment compensation, TANF, Food Stamps, and Medicaid also.

Subgroup Analyses

About half of the 1997/1998 treatment group and about 40 percent of the 1999/2000 treatment group actually completed their community college course of study. Selected net impact estimates for these subgroups are provided in Tables 7.7 and 7.8. The differences are not dramatic, but in both the short term and longer term, the completers have more positive outcomes. The second table shows that the estimated net impact for average quarterly earnings for those who work was about \$435 for completers, but only \$123 for the entire treatment group. The larger earnings came from increased employment, hourly wages, and hours per quarter. The earnings impact for the longer term for completers was similar to the short term—\$403 versus \$435—but it was not so different from the full treatment group—\$403 versus \$354.

Table 7.7 Selected Longer-Term Net Impact Estimates for Subgroups of Community College Worker Retraining: 1997/1998 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	6.3%	11.2%	67.5%
Conditional hourly wage	-\$0.37 [†]	\$0.24 [†]	\$12.50
Conditional hours	35.1	34.4	411.9
Conditional earnings	\$354	\$463	\$5,155
UI receipt	-1.5% [†]	-1.4% [†]	16.0%
TANF receipt	-0.9%	-2.0%	2.9%
Food Stamps receipt	-3.3%	-5.2%	9.5%
Medicaid enrollment	-2.4%	-4.2%	11.0%
Subgroup sample size	2,617	1,277	—

NOTE: Monetary data in '92 \$. [†]means not significant at the 0.10 level (two-tailed test).

Table 7.8 Selected Short-Term Net Impact Estimates for Subgroups of Community College Worker Retraining: 1999/2000 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	8.0%	9.2%	71.5%
Conditional hourly wage	\$0.45 [†]	\$0.91 [†]	\$13.14
Conditional hours	9.1 [†]	11.2	422.7
Conditional earnings	\$123	\$435	\$5,419
TANF receipt	-0.0% [†]	-0.5% [†]	1.3%
Food Stamps receipt	-0.5% [†]	-1.5%	5.6%
Medicaid enrollment	-1.1% [†]	-2.1% [†]	8.8%
Subgroup sample size	4,401	1,602	—

NOTE: Monetary data in '92 \$. [†] means not significant at the 0.10 level (two-tailed test).

8 ADULT BASIC EDUCATION PROGRAMS ON COMMUNITY COLLEGE CAMPUSES

Adults with deficits in basic academic skills were supported in adult basic skills education (ABE) across the state. The skills deficit(s) could be in one or more of the core disciplines such as reading or math (arithmetic). Individuals with limited English proficiency participated in English as Second Language (ESL) programs. Programs were offered at various venues, but the analyses in this study were limited to programs delivered at community colleges because of the availability of administrative data and the interest in the part of the State Board of Community and Technical Colleges (SBCTC) in program effectiveness.

Participant Characteristics

Table 8.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool. As with the other community college programs, the comparison group consists of Employment Service clients who were 16 to 60 at the time of ES registration and individuals who were served by Washington's education and training programs were removed from the data. The first two columns of numbers compare the community college ABE participants who exited in 1997/1998 to individuals in the comparison group. The final two columns compare the exiters in 1999/2000 to ES exiters in the same year.

The populations were quite different. In 1997/1998, over 60 percent of the community college ABE clients were minorities as compared to just over 20 percent of the JOBNET leavers. In 1999/2000, the differential was about 55 percent to 20 percent. As would be expected, the ABE clients have far lower educational attainment: Over half of them did not have high school diplomas, about one-third had just a high school education, and under 15 percent had some college or more (likely to have been the ESL students). In contrast, about 20 percent of the ES registrants had less

8.1 Descriptive Statistics for ABE Treatment Group and Comparison Group Pool

Characteristics	1997/1998		1999/2000	
	ABE	JOBNET (ES)	ABE	JOBNET (ES)
<u>Demographics and Education</u>				
Female	41.5%	43.4%	53.3%	43.6%
Minority	60.7%	21.1%	54.7%	21.3%
Age at registration	29.8	32.8	30.1	33.9
Disability	3.2%	2.6%	4.0%	2.2%
High school dropout	56.9%	21.6%	52.8%	20.9%
High school graduate	29.3%	41.5%	32.3%	42.6%
Some college, no degree	7.1%	23.0%	6.2%	23.8%
College certificate or associate degree	4.2%	4.7%	5.3%	4.1%
Bachelor degree or higher	2.6%	9.2%	3.3%	8.6%
In school at registration	100.0%	3.3%	62.4%	3.0%
Limited English proficiency	53.0%	6.7%	54.7%	6.8%
West WA	63.6%	68.0%	67.8%	70.9%
<u>Employment and Earnings</u>				
Employed at registration	0.0%	2.8%	35.4%	2.2%
Percentage employed	70.1%	72.6%	69.1%	75.5%
Average quarterly earnings ^{a, b}	\$1,869	\$2,948	\$1,858	\$3,347
Earnings trend	\$101.3	\$67.9	\$138.9	\$100.0
Number of quarters with job change	3.2	2.5	3.4 ^{††}	3.4 ^{††}
<u>Public Assistance</u>				
Ever received AFDC/TANF	21.2%	16.9%	33.0%	14.9%
Quarters received AFDC/TANF ^a	1.6	1.7	3.8	1.4
Ever received Food Stamps	39.9%	27.4%	47.0%	27.2%
Quarters received Food Stamps ^a	3.0	2.5	5.4	2.4
<u>Unemployment Compensation</u>				
Ever received	—	—	11.8%	5.5%
Average weekly benefit ^a	—	—	\$21.3	\$12.3
Sample size	11,417	84,104	12,227	179,149

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

^{††}Differences in means are not statistically significant at 0.05 level (t-test).

than a high school diploma, over 40 percent had just a high school education, and over one-third had some college or more. Over half of the ABE participants had limited English proficiency compared to less than seven percent of the ES registrants. These percentages hold for both cohorts.

The pre-program labor market experiences of the ABE students was similar to the ES registrants, although the earnings levels were significantly lower. Both groups had prior employment percentages of about 70 percent. However the average quarterly earnings for the ABE population was only about \$1,850; whereas it was just under \$3,000 in 1997/1998 and almost \$3,350 in

1999/2000 for the ES registrants. The ABE participants had higher incidences of being on AFDC/TANF and Food Stamps prior to registration.

Participation Model

Table 8.2 provides the results from the logit estimation of participation in ABE. The independent variables in the participation model were exactly the same as those used in the other community college programs as documented in the two previous chapters. The table provides the logit coefficient estimates and standard errors. While the magnitude of the coefficients is not particularly meaningful, the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being a community college ABE exiter.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., ABE participant) in both years of data: minority, disability, limited English proficiency, being from Western Washington, earnings trend, having received TANF (not significant in 1997/1998), having received Food Stamps, quarters received Food Stamps, having received UI benefits, average weeks on UI benefits, and average weekly UI benefit amount. The following variables are significantly correlated with being in the comparison group (ES registrants): age at registration, all the education attainment variables relative to not completing high school, employed at time of registration (not significant in 1997/1998), percentage of quarters employed, and variance in earnings.

Table 8.2 Coefficient Estimates from a Logit Model of Participation in an ABE Program

Characteristics	1997/1998		1999/2000	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Demographics and Education</u>				
Female	-0.060*	0.032	0.227***	0.034
Minority	0.961***	0.033	0.341***	0.038
Age at registration	-0.030***	0.002	-0.031***	0.002
Disability	1.017***	0.082	1.778***	0.078
High school graduate	-1.156***	0.034	-0.932***	0.037
Some college, no degree	-1.637***	0.052	-1.638***	0.061
College certificate or associate degree	-0.796***	0.073	-0.551***	0.078
Bachelor degree or higher	-1.981***	0.097	-1.548***	0.102
Limited English proficiency	2.432***	0.042	2.952***	0.456
West WA	0.321***	0.034	0.326***	0.036
<u>Employment and Earnings</u>				
Employed at registration	-14.789	106.100	3.848***	0.041
Percentage employed	-0.001**	0.001	-0.006***	0.001
Average quarterly earnings ^a	-0.000	0.001	-0.009***	0.002
Earnings trend ^a	0.012***	0.003	0.021***	0.004
Earnings variance ^b	-1.040***	0.317	-1.660***	0.472
Number of quarters with job change	0.047***	0.004	-0.003	0.004
<u>Public Assistance</u>				
Ever received AFDC/TANF	0.131	0.086	0.429***	0.084
Quarters received AFDC/TANF	-0.051***	0.006	0.219***	0.005
Average quarterly AFDC/TANF benefit ^a	-0.019*	0.007	-0.010	0.006
Ever received Food Stamps	0.360***	0.044	0.128***	0.051
Quarters received Food Stamps	0.031***	0.005	0.037***	0.004
<u>Unemployment Compensation</u>				
Ever received	—	—	0.172	0.115
Average weeks on UI	—	—	0.054***	0.004
Average weekly benefit ^a	—	—	0.357***	0.049

NOTE: Model included industry and an intercept term. Sample sizes were 52,823 and 128,870 for 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$)

^bScaled in \$10⁸ ('92 \$)

*Significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.1 level (two-tailed test).

Propensity Score Statistics

Table 8.3 provides the mean propensity scores and 20th percentile indicator for the community college ABE analyses. The mean propensity scores for the treatment groups are roughly 0.35 and 0.44 whereas they are 0.08 and 0.03 for the comparison group for 1997/1998 and 1999/2000 respectively. The 20th percentile indicator is approximately 79 percent for 1997/1998 and 90 percent for 1999/2000. These statistics indicate that the logit model of participation discriminated

Table 8.3 Indicators of Propensity Score Model Quality for Community College ABE Participants

Statistic	1997/1998	1999/2000
Mean p-score, ABE	0.350	0.440
Mean p-score, JOBNET	0.076	0.028
Percentile JOBNET, at 20th percentile ABE	78.28%	90.28%

well between treatment and comparison group observations. The limited English proficiency variable was particularly strong in this model.

Statistical Match

Table 8.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group, comparison group, and pool of observations from which the comparison group was chosen. Notice that a number of the differences in means are still significant, although the magnitudes of the differences are considerably smaller than in Table 8.1. Our hypothesis is that the strength of the LEP variable in the participation model caused the matches to overemphasize that characteristic relative to all of the other variables.

Net Impacts

The major purpose of the study was to estimate the net impacts of the education and training programs on clients and Tables 8.5 and 8.6 provide the estimated net impacts for ABE programs. The first column presents simple differences in means between the full comparison group pool and the treatment group. The second column presents regression adjusted estimates using the full pool. The regressors that were used were the same variables as in the propensity score model, except that

Table 8.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for Community College ABE Programs

Statistic/Characteristic	1997/1998		1999/2000	
	ABE	JOBNET (ES)	ABE	JOBNET (ES)
Sample size	11,417	84,104	12,227	179,149
Sample size used in match	7,753	66,419	7,547	152,576
Matched sample size	7,753	7,753	7,547	7,547
Number of observations used once	—	4,025	—	3,439
Number of observations used multiple times	—	1,270	—	909
Maximum number of repeats	—	16	—	157
<u>Demographics and Education</u>				
Female	39.1%	39.3%	53.4%**	55.2%**
Minority	59.0%**	63.7%**	53.3%**	57.7%**
Age at registration	29.6	29.7	29.9**	29.6**
Disability	3.1%	3.0%	5.0%	5.2%
High school dropout	61.7%**	64.8%**	56.2%**	61.0%**
High school grad	26.0%	25.0%	30.7%**	26.6%**
Some college, no degree	7.1%**	6.2%**	6.4%	4.3%
Certificate/Associate degree	3.5%**	2.8%**	4.5%	6.5%
Bachelor degree or higher	1.7%**	1.3%**	2.2%**	1.7%**
In school at registration	100.0%**	3.2%**	63.6%**	7.7%**
Limited English proficiency	46.0%	44.6%	48.0%	48.0%
West Washington	61.2%**	54.9%**	65.7%*	64.7%
<u>Employment and Earnings</u>				
Employed at registration	0.0%	0.0%	43.5%**	36.3%**
Percentage employed	68.6%**	67.5%**	67.0%**	61.9%**
Average quarterly earnings ^{a, b}	\$1,879**	\$1,800**	\$1,817**	\$1,611**
Earnings trend	\$97.8**	\$81.2**	\$127.5**	\$102.3**
Number of quarters with job change	3.4	3.5	3.6**	3.4**
<u>Public Assistance</u>				
Ever received AFDC/TANF	22.1%	22.7%	35.6%**	44.5%**
Quarters received AFDC/TANF ^a	1.8	1.8	4.4**	5.3**
Ever received Food Stamps	44.4%**	47.1%**	51.1%**	59.9%**
Quarters received Food Stamps ^a	3.6*	3.8	6.5**	8.0**
<u>Unemployment Compensation</u>				
Ever received	—	—	16.5%	17.2%
Average weekly benefit ^a	—	—	\$185.6**	\$218.5**
Sample size	7,753	7,753	7,547	7,547

NOTE: Monetary data are in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

**Differences in means are statistically significant at 0.05 level (t-test).

they do not include the summary variables for employment and earnings, UI receipt, and other transfer program receipt.

Table 8.5 Net Impact Estimates for the ABE Program for 1997/1998 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	-0.052***	0.013**	0.026***	0.020**	0.651	0.651
Ever employed - longer term	-0.084***	-0.012**	-0.016**	-0.010	0.741	0.753
Employment - longer term	-0.079***	-0.010*	-0.005	0.004	0.633	0.629
Employment - diff-in-diff	0.049***	0.020***	0.001	0.016*	-0.127	-0.077
Hourly wage - short term (\$)	-1.79***	0.13	0.56**	0.13	10.85	8.75
Hourly wage - longer term (\$)	-2.02***	-0.41***	-0.05	-0.47***	11.07	9.24
Hourly wage - short term diff-in-diff (\$)	0.21	0.32	0.47**	0.26	1.62	1.39
Hourly wage - longer term diff-in-diff (\$)	-0.00	-0.19	-0.13	0.18*	1.90	2.02
Hours - short term	-17.5***	-2.5	12.9**	0.3	260.9	259.1
Cond. hours - short term	5.3**	-6.0**	3.1	-3.4	398.7	396.7
Hours - short term, diff-in-diff	53.3***	-0.5	10.8**	-4.5	-30.7	11.4
Cond. hours - short term, diff-in-diff	20.8***	-4.2	-7.3	-7.5*	36.5	64.3
Hours - longer term	-27.1***	-0.8	3.5	4.6	264.8	261.2
Cond. hours - longer term	4.4**	-2.0	6.8**	1.7	390.9	384.3
Hours - longer term, diff-in-diff	39.3***	7.6**	-1.6	3.0	-27.5	14.2
Cond. hours - longer term, diff-in-diff	23.5***	-1.1	-8.5**	4.9	39.2	71.4
Earnings - short term (\$)	-580***	-16	213***	36	2702	2216
Cond. earnings - short term (\$)	-606***	-35	178***	13	4129	3393
Earnings - short term, diff-in-diff (\$)	824***	48	203***	68*	-316	305
Cond. earnings - short term, diff-in-diff (\$)	402***	67	80*	64	505	832
Earnings - longer term (\$)	-820***	-88**	73*	-25	3068	2476
Cond. earnings - longer term (\$)	-775***	-127***	125**	-85**	4466	3592
Earnings - longer term, diff-in-diff (\$)	545***	62	34	47	80	595
Cond. earnings - longer term, diff-in-diff (\$)	224***	-24	-19	37	986	1227
UI receipt - short term	0.013***	0.006*	0.008*	0.023***	0.058	0.084
UI benefits - short term (\$)	1.2	5.7	10.4*	17.5***	61.6	71.1
Cond. UI benefits - short term (\$)	-176.9***	48.8	37.1	98.7**	1057.7	846.0
UI receipt - longer term	-0.004	-0.025***	-0.031***	0.021***	0.139	0.199
UI benefits - longer term (\$)	-24.1***	-24.8***	-18.6***	-19.3***	103.9	116.1
Cond. UI benefits - longer term (\$)	-305.9***	-44.6	9.5	-27.7	1418.1	1076.2
TANF receipt - short term	0.010***	0.120***	0.004	0.134***	0.066	0.062
TANF benefits - short term (\$)	15.9***	61.9***	6.6	57.7***	72.8	65.0
Cond. TANF benefits - short term (\$)	56.4**	241.6***	35.8	361.1***	1106.3	1040.6
TANF benefits - short term, diff-in-diff (\$)	-3.1	43.2***	13.0**	38.8***	-17.5	-33.9
Cond. TANF benefits - short term, diff-in-diff (\$)	30.0	399.4***	2.7	900.7***	-114.6	-75.9
TANF receipt - longer term	0.014***	0.075***	0.006	0.076***	0.059	0.067
TANF benefits - longer term (\$)	13.8***	38.8***	6.6*	35.9***	41.0	44.6
Cond. TANF benefits - longer term(\$)	12.4	130.9***	15.8	124.9**	1028.5	1002.8
TANF benefits - longer term, diff-in-diff (\$)	5.2	26.9***	15.0**	24.5***	-36.4	-46.0
Cond. TANF benefits - longer term, diff-in-diff (\$)	33.6	207.8**	-20.4	282.7	133.6	-65.4

Table 8.5 (Continued)

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
FS receipt - short term	0.027***	0.069***	0.005	0.077***	0.126	0.142
FS benefits - short term (\$)	13.5***	34.1***	1.8	33.5***	67.1	68.6
Cond. FS benefits - short term (\$)	-6.3	55.3***	-5.3	55.3***	533.7	484.8
FS receipt - longer term	0.031***	0.063***	0.010*	0.067***	0.129	0.157
FS benefits - longer term (\$)	13.8***	26.3***	3.9	24.7***	44.2	49.4
Cond. FS benefits - longer term (\$)	14.4*	48.1***	-1.7	46.9***	462.5	439.7
Med. receipt - short term	0.044***	0.067***	0.002	0.071***	0.156	0.183
Med. receipt - longer term	0.050***	0.078***	0.013**	0.084***	0.175	0.211

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 8.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

Table 8.6 Net Impact Estimates for the ABE Program for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	-0.091***	-0.068***	-0.037***	-0.052***	0.682	0.697
Hourly wage - short term (\$)	-2.89***	-0.53*	-0.08	-0.26	11.89	8.95
Hourly wage - short term diff-in-diff (\$)	0.10	-0.23	-0.13	0.24	1.41	1.54
Hours - short term	-45.9***	-23.5***	-25.4***	-29.3***	280.9	283.8
Cond. hours - short term	-17.0***	-39.8***	-18.3***	-47.0***	410.7	405.9
Hours - short term, diff-in-diff	58.8***	-0.7	-26.3***	-24.5***	-49.7	32.7
Cond. hours - short term, diff-in-diff	27.0***	-18.2***	-36.9***	-48.8***	22.0	84.0
Earnings - short term (\$)	-1188***	-324***	-297***	-373***	3235	2557
Cond. earnings - short term (\$)	-1300***	-614***	-268***	-605***	4731	3657
Earnings - short term, diff-in-diff (\$)	822***	-220***	-311***	-298***	-539	553
Cond. earnings - short term, diff-in-diff (\$)	319***	-427***	-437***	-513***	416	1126
UI receipt - short term	-0.022***	-0.026***	-0.027***	-0.023***	0.071	0.094
UI benefits - short term (\$)	-29.0***	-4.8	-4.7	4.0	96.3	96.8
Cond. UI benefits - short term (\$)	10.8	244.5***	352.2***	215.2***	1354.3	1032.4
TANF receipt - short term	0.071***	0.080***	0.028***	0.209***	0.032	0.075
TANF benefits - short term (\$)	91.6***	77.1***	17.1**	74.8***	35.6	103.1
Cond. TANF benefits - short term (\$)	122.7***	5.9	-211.2***	10.2	1112.4	1368.9
TANF benefits - short term, diff-in-diff (\$)	-36.5***	38.6***	23.4**	-0.1	-7.9	-65.7
Cond. TANF benefits - short term, diff-in-diff (\$)	-24.5	298.2**	-112.0**	499.4	-30.4	59.0
FS receipt - short term	0.100***	0.088***	0.025***	0.182***	0.083	0.158
FS benefits - short term (\$)	72.2***	62.8***	12.2**	60.3***	41.4	92.9
Cond. FS benefits - short term (\$)	124.6***	78.4***	-13.7	24.6	496.4	588.0
Med. receipt - short term	0.143***	0.114***	0.029***	0.194***	0.131	0.247

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 8.4.

*significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

The third column presents a comparison of means between the treatment group and the matched comparison group. The fourth column presents an estimate from a regression adjustment of that mean. This column represents the preferred specification using difference-in differences. The coefficient estimates that are in “boxes” represent the final, “official” estimates used by WTECB.

The short-term net impacts for the community college Adult Basic Education participants are not positive from a societal viewpoint. The employment rate and hours of work per quarter are both significantly negative (–5.2 percentage points and –48.8 hours, respectively). The hourly wage impact has a positive point estimate, but it is not significant. Combined, these impacts result in a significant decrease in average quarterly earnings of over \$500, about 12–13 percent. Furthermore, bringing the ABE participants into training apparently introduces them to public assistance, because the net impacts on participation in TANF, Food Stamps, and Medicaid are all in the 20 percentage point range.

The longer-term net impacts suggest that these individuals recover the earnings losses that they apparently suffered in the short term. The net impacts show a small, but significant, increase in the employment rate, and a small, but significant decrease in the hourly wage rate. All together, there is virtually no net impact on quarterly earnings. The longer-term estimates of the receipt of TANF and Food Stamps, and the enrollment in Medicaid were much smaller than the short-run estimates, but they are still fairly sizeable—about 8 percentage points. In the longer-term estimates, the ABE participants display a net decrease in unemployment compensation.

No separate subgroup analyses was conducted with this treatment group. The reader would be referred to the subgroup analyses in chapter 6 that suggested that a positive outcome for community college ABE training occurs for that share of students who go on to pursue occupational training.

9 APPRENTICESHIP PROGRAMS

The workforce development program that is the “treatment” in this chapter is apprenticeship programs. Apprenticeships are formal arrangements between employed individuals, employers, and the state in which classroom instruction and formal on-the-job training are combined. They are typically multi-year efforts, and are supervised by journey-level craftspersons or other trade professionals. Apprenticeships are administered in Washington by the Department of Labor and Industries.

Participant Characteristics

Table 9.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool. As with the community college programs, the comparison group consists of Employment Service clients who were 16 to 60 at the time of ES registration. The individuals who were served by Washington’s education and training programs were removed from the data. The first two columns of numbers compare the apprenticeship participants who exited in 1997/1998 to individuals in the comparison group. The final two columns compare the exiters in 1999/2000 to ES exiters in the same year.

One major data limitation in our analyses of apprenticeship programs is the paucity of information about the individuals’ characteristics. The only administrative data available were gender, age, and minority status. We had no data on education background, disability, limited English proficiency status, or employment or public assistance status at the time of registration for the apprenticeship. This data deficiency limited severely the quality of the participation model estimation and the statistical match as documented below.

Table 9.1 Descriptive Statistics for the Apprenticeship Treatment Group and Comparison Group Pool

Characteristics	1997/1998		1999/2000	
	Apprentice.	JOBNET (ES)	Apprentice.	JOBNET (ES)
<u>Demographics</u>				
Female	12.9%	43.4%	10.8%	43.6%
Minority	24.4%	21.1%	26.8%	21.3%
Age at registration	28.5	32.8	28.2	33.9
West WA	72.4%	68.0%	81.6%	70.9%
<u>Employment and Earnings (prior to registration)</u>				
Percentage of (prior) quarters with employment	73.6% ^{††}	72.6% ^{††}	73.4%	75.5%
Mean, average quarterly earnings ^a	\$2,630	\$2,951	\$2,578	\$3,349
Mean, earnings trend	\$61.7 ^{††}	\$68.0 ^{††}	\$99.4 ^{††}	\$100.1 ^{††}
Number of quarters with job change	3.6	2.5	4.5	3.4
<u>Public Assistance (prior to registration)</u>				
Ever received AFDC/TANF	9.7%	16.9%	13.4%	14.8%
Quarters received AFDC/TANF ^a	0.7	1.7	1.1	1.4
Ever received Food Stamps	21.7%	27.3%	26.9% ^{††}	27.1% ^{††}
Quarters received Food Stamps ^a	1.4	2.5	2.1	2.4
<u>Unemployment Compensation (prior to registration)</u>				
Ever received	—	—	10.9%	5.4%
Average weekly benefit ^a	—	—	\$24.0	\$12.2
Sample size	3,201	83,848	3,195	178,546

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

^{††}Differences in means are not statistically significant at 0.05 level (t-test).

Even with the few characteristics that were available, we see that the populations were different. In 1997/1998, only about 10 percent of apprenticeship participants were females compared to over 40 percent of the ES registrants. Concomitantly, they were less likely to have received TANF or Food Stamps prior to registration, although the differences between the two populations in these characteristics are much smaller than the differences in gender. The apprentices were slightly younger at registration than the comparison group, and had lower prior earnings and more job turnover. The share of the populations that were minorities were similar for the two groups.

Participation Model

Table 9.2 provides the results from the logit estimation of apprenticeship participation. The independent variables included the few demographic variables available plus prior earnings and public assistance. The table provides the logit coefficient estimates and standard errors. While the magnitude of the coefficients is not particularly meaningful, the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being an apprentice.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., apprenticeship participant) in both years of data: Being a minority, being from Western Washington, percentage of quarters employed, turnover (labor force stability), average quarterly AFDC/TANF benefit (not significant in 1999/2000), and having received UI benefits, and average weeks on UI benefits. The following variables are significantly correlated with being in treatment group: Female, age at registration, average earnings prior to registration, variance in earnings prior to registration (not significant in 1997/1998), trend in earnings prior to registration, having received TANF (not significant in 1999/2000), and average weekly UI benefit (in 1999/2000 model).

Propensity Score Statistics

The propensity score for an observation is the predicted probability using the estimated coefficients and the observation's actual data. If the logit model has substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be much less than the mean score for the treatment. As argued earlier, a measure of how well the logit model discriminates between comparison group members and treatment group members is the

Table 9.2 Coefficient Estimates from a Logit Model of Participation in Apprenticeship

Characteristics	1997/1998		1999/2000	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Demographics</u>				
Female	-1.167***	0.062	-1.588***	0.064
Minority	0.489***	0.051	0.503***	0.046
Age at registration	-0.054***	0.003	-0.062***	0.003
West WA	0.515***	0.051	0.720***	0.051
<u>Employment and Earnings (prior to registration)</u>				
Percentage of quarters with employment	0.004***	0.001	0.003***	0.001
Average quarterly earnings ^a	-0.003**	0.001	-0.006***	0.001
Earnings trend ^a	-0.011***	0.004	-0.010**	0.005
Earnings variance ^b	-0.061	0.143	-0.700**	0.341
Number of quarters with job change	0.063***	0.001	0.038***	0.005
<u>Public Assistance (prior to registration)</u>				
Ever received AFDC/TANF	-0.416**	0.172	0.062	0.140
Quarters received AFDC/TANF	-0.018	0.015	0.017	0.010
Average quarterly AFDC/TANF benefit ^a	0.029**	0.014	0.003	0.116
Ever received Food Stamps	0.024	0.076	-0.023	0.067
Quarters received Food Stamps	-0.012	0.011	-0.008	0.008
<u>Unemployment Compensation (prior to registration)</u>				
Ever received	—	—	0.791***	0.152
Average weeks on UI	—	—	0.022***	0.006
Average weekly benefit ^a	—	—	-0.226***	0.060

NOTE: Model included industry and an intercept term. Sample sizes were 52,455 and 129,739 in 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$)

^bScaled in \$10⁸ ('92 \$)

*Significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.1 level (two-tailed test).

cumulative percentile for the comparison group at the propensity score that is the 20th percentile.

Table 9.3 provides these data for the apprenticeship group. The mean propensity scores for the treatment groups are roughly 0.11 and 0.06 whereas they are 0.03 and 0.02 for the comparison group for 1997/1998 and 1999/2000 respectively. The 20th percentile indicator is approximately 62 percent for 1997/1998 and 68 percent for 1999/2000. The means and the 20th percentile statistics indicate that the logit model of participation did not discriminate all that well between treatment and comparison group observations. This is likely because of the lack of personal characteristics data in the administrative database.

Table 9.3 Indicators of Propensity Score Model Quality for Apprenticeships

Statistic	1997/1998	1999/2000
Mean p-score, apprenticeship	0.110	0.062
Mean p-score, JOBNET	0.035	0.018
Percentile JOBNET, at 20th percentile apprenticeship	61.62%	67.76%

Statistical Match

Table 9.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group, comparison group, and pool of observations from which the comparison group was chosen. Notice that means for the comparison group are quite close to the treatment group as would be expected. None of the differences in means are statistically significant.

Net Impacts

Tables 9.5 and 9.6 provide the estimated net impacts of participating in apprenticeships. Short-term and longer-term impacts for apprenticeship participants are quite positive. In the short term, average quarterly earnings increased by almost \$1,700, which is over 30 percent. These earnings gains came from increased employment impacts of 5.4 percentage points, hourly wage increases of \$4.21, and increased hours per quarter of about 12 hours. The increased earnings gains were complemented with the slight, but significant, decreases in Medicaid and Food Stamps. There is an estimated decrease in TANF reciprocity as well, but it is not statistically significant.

The longer-term earnings impacts were only slightly smaller. The employment rate and hours per quarter net impacts were virtually identical to the short term estimates. The hourly wage increase was quite substantial, \$3.11 per hour, but it was still less than the increase estimated for the short term. The longer-term impacts for public assistance and Medicaid were virtually identical to the

Table 9.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for Apprenticeships

Statistic/Characteristic	1997/1998		1999/2000	
	Apprentice.	JOBNET (ES)	Apprentice.	JOBNET (ES)
Sample size	3,201	83,848	3,195	178,546
Sample size used in match	2,613	67,139	2,885	152,855
Matched sample size	2,613	2,613	2,885	2,885
Number of observations used once	—	2,369	—	2,740
Number of observations used multiple times	—	202	—	136
Maximum number of repeats	—	6	—	4
<u>Demographics and Education</u>				
Female	13.5%	14.3%	10.8%	11.4%
Minority	23.8%	22.8%	25.6%	25.9%
Age at registration	28.6	28.6	28.2	28.1
West WA	77.6%	77.3%	82.3%	81.9%
<u>Employment and Earnings (prior to registration)</u>				
Percentage employed	73.0%	72.8%	72.9%	73.2%
Average quarterly earnings ^{a, b}	\$2,671	\$2,627	\$2,605	\$2,588
Earnings trend	\$61.7	\$63.6	\$99.4	103.3
Number of quarters with job change	3.7	3.7	4.6	4.6
<u>Public Assistance (prior to registration)</u>				
Ever received AFDC/TANF	10.8%	10.7%	14.0%	13.6%
Quarters received AFDC/TANF ^a	0.8	0.7	1.2	1.1
Ever received Food Stamps	25.0%	24.9%	28.7%	28.2%
Quarters received Food Stamps ^a	1.6	1.5	2.2	2.2
<u>Unemployment Compensation (prior to registration)</u>				
Ever received	—	—	12.0%	12.1%
Average weekly benefit ^a	—	—	\$26.6	\$27.4
Sample size	2,613	2,613	2,885	2,885

NOTE: Monetary data are in '92 \$. None of the differences in means are statistically significant.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

short-term ones. On the other hand, apprentices are projected to increase their usage of unemployment compensation in the longer term.

Subgroup Analyses

About one-third of the apprenticeship treatment group were completers, which is comparable to historical, national data. Tables 9.7 and 9.8 display selected net impact estimates for the completers and for the full treatment group. The estimates are extremely positive and statistically

Table 9.5 Net Impact Estimates for Apprenticeship for 1997/1998 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.044***	0.023**	0.001	0.025*	0.651	0.693
Ever employed - longer term	0.054***	0.045***	0.011	0.040***	0.741	0.784
Employment - longer term	0.070***	0.051***	0.028**	0.052***	0.633	0.674
Employment - diff-in-diff	0.076***	0.056***	0.050***	0.053***	-0.127	-0.100
Hourly wage - short term (\$)	6.92***	3.91***	5.59***	3.89***	10.85	12.18
Hourly wage - longer term (\$)	5.00***	3.41***	3.49***	2.93***	11.07	12.58
Hourly wage - short term diff-in-diff (\$)	5.63***	4.43***	5.19***	4.38***	1.62	2.06
Hourly wage - longer term diff-in-diff (\$)	4.33***	3.35***	3.22**	3.11***	1.90	3.01
Hours - short term	19.8***	1.5	-2.2	-1.2	260.9	282.9
Cond. hours - short term	5.2	2.0	-2.6	-3.1	398.7	406.6
Hours - short term, diff-in-diff	40.1***	11.2***	14.5*	4.3	-30.7	-5.1
Cond. hours - short term, diff-in-diff	19.9***	11.0**	1.4	5.5	36.5	55.0
Hours - longer term	34.3***	19.4***	14.2**	23.6***	264.8	284.9
Cond. hours - longer term	15.2***	0.7	9.9**	5.9	391.0	396.3
Hours - longer term, diff-in-diff	53.9***	33.2***	28.6***	29.1***	-27.5	-2.1
Cond. hours - longer term, diff-in-diff	27.8***	14.1***	11.6*	11.6*	39.2	55.4
Earnings - short term (\$)	1812***	941***	1289***	873***	2702	3225
Cond. earnings - short term (\$)	2366***	1353***	1860***	1189***	4130	4635
Earnings - short term, diff-in-diff (\$)	2106***	1182***	1527***	1083***	-317	261
Cond. earnings - short term, diff-in-diff (\$)	2306***	1574***	1734***	1373***	505	1077
Earnings - longer term (\$)	2022***	1499***	1399***	1474***	3068	3692
Cond. earnings - longer term (\$)	2329***	1558***	1729***	1481***	4467	5067
Earnings - longer term, diff-in-diff (\$)	2335***	1714***	1652***	1642***	80	763
Cond. earnings - longer term, diff-in-diff (\$)	2336***	1747***	1678***	1597***	986	1645
UI receipt - short term	0.074***	0.068***	0.045***	0.089***	0.058	0.088
UI benefits - short term (\$)	140.4***	122.7***	101.1***	140.2***	61.6	100.9
Cond. UI benefits - short term (\$)	465.9***	395.7***	372.6***	483.4***	1057.7	1150.9
UI receipt - longer term	0.065***	0.075***	0.003	0.053***	0.139	0.202
UI benefits - longer term (\$)	81.4***	93.1***	24.3*	70.8***	103.9	161.0
Cond. UI benefits - longer term (\$)	282.1***	195.7***	183.0**	207.7***	1418.5	1517.6
TANF receipt - short term	-0.045***	-0.015**	-0.001	-0.000	0.066	0.021
TANF benefits - short term (\$)	-49.8***	-12.2**	0.9	1.8	72.9	22.2
Cond. TANF benefits - short term (\$)	22.7	6.0	81.4	166.8	1106.3	1047.6
TANF benefits - short term, diff-in-diff (\$)	2.2	-8.7	-2.6	-3.2	-17.5	-12.7
Cond. TANF benefits - short term, diff-in-diff (\$)	-77.4	68.9	108.6	-11.1	-114.5	-300.6
TANF receipt - longer term	-0.039***	-0.016**	-0.004	-0.001	0.059	0.024
TANF benefits - longer term (\$)	-27.0***	-6.0	-1.3	-0.3	41.0	15.4
Cond. TANF benefits - longer term(\$)	43.2	36.3	-3.7	37.2	1028.4	1075.3
TANF benefits - longer term, diff-in-diff (\$)	12.2**	-6.4	-7.5	-6.0	-36.4	-16.8
Cond. TANF benefits - longer term, diff-in-diff (\$)	68.9	102.1	-103.4	239.2	-133.5	38.8

Table 9.5 (Continued)

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
FS receipt - short term	-0.074***	-0.032***	-0.014**	-0.012	0.126	0.066
FS benefits - short term (\$)	-41.0***	-9.6***	-3.8	-1.1	67.1	29.9
Cond. FS benefits - short term (\$)	-32.7	-21.9	46.4	25.1	533.8	454.7
FS receipt - longer term	-0.072***	-0.037***	-0.019**	-0.016*	0.129	0.076
FS benefits - longer term (\$)	-28.5***	-7.4***	-5.1*	-3.4	44.2	20.7
Cond. FS benefits - longer term (\$)	-62.4**	-16.9	-19.7	-26.8	462.6	419.8
Med. receipt - short term	-0.103***	-0.060***	-0.031***	-0.033***	0.156	0.084
Med. receipt - longer term	-0.108***	-0.062***	-0.033***	-0.031***	0.175	0.100

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 9.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

Table 9.6 Net Impact Estimates for Apprenticeship for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.058***	0.057***	0.053***	0.054***	0.692	0.719
Hourly wage - short term (\$)	4.97***	3.82***	4.89***	3.00***	12.37	12.60
Hourly wage - short term diff-in-diff (\$)	6.18***	4.63***	5.33***	4.21***	1.40	2.23
Hours - short term	22.0***	4.7*	26.1***	8.1**	289.2	293.5
Cond. hours - short term	-2.1	5.9	6.7	8.0	417.2	407.3
Hours - short term, diff-in-diff	82.4***	23.8***	35.1***	19.0***	-58.4	-11.9
Cond. hours - short term, diff-in-diff	37.0***	15.9***	8.1	11.7*	16.4	44.4
Earnings - short term (\$)	1854***	1169***	1897***	1052***	3449	3597
Cond. earnings - short term (\$)	2098***	1600***	2125***	1329***	4976	4992
Earnings - short term, diff-in-diff (\$)	3137***	1616***	2158***	1458***	-674	295
Cond. earnings - short term, diff-in-diff (\$)	2999***	1993***	2236***	1699***	355	1105
UI receipt - short term	0.056***	0.054**	0.044***	0.060***	0.077	0.092
UI benefits - short term (\$)	108.7***	54.5***	74.3***	62.8***	105.6	144.9
Cond. UI benefits - short term (\$)	244.7***	235.1***	34.2	187.6*	1372.2	1579.9
TANF receipt - short term	0.013***	-0.002	-0.002	-0.002	0.003	0.018
TANF benefits - short term (\$)	18.0***	-2.2	2.3	2.6	2.3	19.4
Cond. TANF benefits - short term (\$)	418.1***	202.5**	247.7*	361.8**	904.2	1055.6
TANF benefits - short term, diff-in-diff (\$)	-21.2***	-18.3**	-20.5**	-15.4**	-7.5	-8.3
Cond. TANF benefits - short term, diff-in-diff (\$)	413.1*	189.2	616.8	608.5	-333.8	-537.6
FS receipt - short term	0.005	-0.024***	-0.011*	-0.013**	0.036	0.052
FS benefits - short term (\$)	6.0**	-6.9**	-7.5**	-4.6	12.4	26.4
Cond. FS benefits - short term (\$)	104.2**	-5.4	-51.1	-35.2	349.8	503.5
Med. receipt - short term	0.002	-0.039***	-0.022**	-0.024***	0.058	0.085

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 9.4.

* significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

Table 9.7 Selected Longer-Term Net Impact Estimates for Subgroups of Apprenticeships: 1997/1998 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	5.3%	20.9%	67.4%
Conditional hourly wage	\$3.11	\$6.54	\$12.58
Conditional hours	11.6	31.8	396.3
Conditional earnings	\$1,597	\$3,569	\$5,067
UI receipt	5.3%	13.9%	20.1%
TANF receipt	-0.1% [†]	-1.3% [†]	2.4%
Food Stamps receipt	-1.6%	-8.5%	7.6%
Medicaid enrollment	-3.1%	-6.7%	10.0%
Subgroup sample size	2,610	903	—

NOTE: Monetary data in '92 \$. [†] means not significant at the 0.10 level (two-tailed test).

Table 9.8 Selected Short-Term Net Impact Estimates for Subgroups of Apprenticeships: 1999/2000 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	5.4%	33.3%	71.9%
Conditional hourly wage	\$4.21	\$8.69	\$12.60
Conditional hours	11.7	39.4	407.3
Conditional earnings	\$1,699	\$4,197	\$4,992
TANF receipt	-0.2% [†]	-23.4%	1.8%
Food Stamps receipt	-1.3%	-16.0%	5.2%
Medicaid enrollment	-2.4%	-12.2%	8.5%
Subgroup sample size	2,883	1,035	—

NOTE: Monetary data in '92 \$. [†] means not significant at the 0.10 level (two-tailed test).

significant. The positive net impacts for the entire treatment group may emanate just from the completers. In the short term, relative to the comparison group and the non-completers, the employment rates rise by 32.3 percentage points, wage rates by \$8.69, hours by 39 hours, and quarterly earnings by \$4,200. Furthermore, there are huge reductions in public assistance receipt.

The longer-term net impact estimates are attenuated somewhat relative to the short-term estimates, but only slightly. The average quarterly earnings of apprenticeship completers rise by \$3,500.

10 PRIVATE CAREER SCHOOL PROGRAMS

A difference between this project and the prior study done to estimate net impacts is estimation of the impact of attending private career (proprietary) school programs. These programs train individuals who have completed high school or its equivalency for specific occupations. The institutions are privately operated, but they are monitored by the WTECB staff. The occupations that are being trained run the gamut from cosmetology to truck driving to computer programming and many others. The administrative data come from a voluntary data collection effort administered by the WTECB. Because of its voluntary nature, the representativeness or generalizability of the data is uncertain. Furthermore, this administrative data collection has only recently been instituted, so we were only able to analyze a 1999/2000 cohort of students.

Participant Characteristics

Table 10.1 provides descriptive data that compare the individuals in the treatment group to those in the comparison group pool. As with many of the other programs including those at community colleges, the comparison group consists of Employment Service clients who were 16 to 60 at the time of registration and exited from the ES in 1999/2000. The entries in the two columns of numbers in the table compare the private career school students in 1999/2000 to ES exiters in the same year.

The populations were somewhat different. Almost 60 percent of the private career school participants were females compared to over 40 percent of the ES registrants. Also a larger share of the students was minorities—almost 40 percent compared to just over 20 percent—and they were

Table 10.1 Descriptive Statistics for the Private Career School Treatment Group and Comparison Group Pool

Characteristics	Private Career School	JOBNET (ES)
<u>Demographics and Education</u>		
Female	59.2%	43.6%
Minority	37.4%	21.3%
Age at registration	29.9	33.9
Disability	1.6%	2.2%
High school dropout	6.7%	20.9%
High school graduate	71.1%	42.6%
Some college	18.8%	20.4%
Coll. grad. or more	3.5%	16.1%
West WA	56.9%	70.9%
<u>Employment and Earnings (prior to registration)</u>		
Percentage of (prior) quarters with employment	72.6%	77.0%
Mean, average quarterly earnings ^{a, b}	\$2,418	\$3,391
Mean, earnings trend	\$72.7	\$97.4
Number of quarters with job change	3.8	3.4
<u>Public Assistance (prior to registration)</u>		
Ever received AFDC/TANF	19.8%	14.9%
Quarters received AFDC/TANF ^a	1.9	1.4
Ever received Food Stamps	30.7%	27.2%
Quarters received Food Stamps ^a	3.2	2.4
<u>Unemployment Compensation (prior to registration)</u>		
Ever received	13.6%	5.5%
Average weekly benefit ^a	\$31.9	\$12.3
Sample size	8,429	179,152

NOTE: All differences in means are statistically significant at the 0.05 level (t-test). Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

slightly younger. The educational background of the private career school students was considerably different from the ES registrants. Almost 80 percent of the students had at most a high school diploma; most of those with a diploma or its equivalent. Just over 60 percent of the ES registrants had this level of education, but one-third of them had less than a high school diploma. Less than five percent of the private vocational school students indicated that they had a college degree or more, whereas over 15 percent of the ES registrants were bachelor degree holders.

In terms of labor market experience prior to schooling, the students had lower levels of average quarterly earnings—about \$2,400 compared to about \$3,400—but prior employment rates and turnover were comparable. The lower earnings may be explained by younger ages, lower

incidence of college education, and a higher percentage of females. The students at the private career schools were slightly more likely to have received public assistance benefits and unemployment compensation prior to registering for their schooling. However, the differences between the students and the ES registrants in public assistance reciprocity was not large.

Participation Model

Table 10.2 provides the results from the logit estimation of participation in private career schools. The table provides the logit coefficient estimates and standard errors. While the magnitude of the coefficients is not particularly meaningful, the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being an exiter from a private career school.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., student at a private career school): Female, minority, disability, high school graduate, having some college, prior job turnover, having received TANF, quarters received Food Stamps, having received UI benefits, average weeks on UI benefits, and average weekly UI benefit amount. The following variables are significantly correlated with being in treatment group: Age at registration, having a college degree, percent employment prior to registration, average earnings prior to registration, variance in earnings prior to registration, average quarterly AFDC/TANF benefit, and ever received Food Stamps.

Table 10.2 Coefficient Estimates from a Logit Model of Being a Private Career School Student

Characteristics	Coefficient	Std. Error
<u>Demographics and Education</u>		
Female	0.677***	0.032
Minority	0.491***	0.033
Age at registration	-0.034***	0.002
Disability	0.373***	0.102
High school graduate	1.663***	0.055
Some college	1.076***	0.063
College plus	-0.209**	0.093
<u>Employment and Earnings (prior to registration)</u>		
Percentage of quarters with employment	-0.002***	0.001
Average quarterly earnings ^a	-0.006***	0.001
Earnings trend ^a	-0.003	0.004
Earnings variance ^b	-0.804***	0.292
Number of quarters with job change	0.027***	0.004
<u>Public Assistance (prior to registration)</u>		
Ever received AFDC/TANF	0.411***	0.087
Quarters received AFDC/TANF	0.003	0.006
Average quarterly AFDC/TANF benefit ^a	-0.025***	0.008
Ever received Food Stamps	-0.208***	0.049
Quarters received Food Stamps	0.025***	0.004
<u>Unemployment Compensation (prior to registration)</u>		
Ever received	0.538***	0.101
Average weeks on UI	0.027***	0.004
Average weekly benefit ^a	0.337***	0.039

NOTE: Model included industry and an intercept term. Sample size was 127,855.

^aScaled in \$100 ('92 \$)

^bScaled in \$10⁸ ('92 \$)

*Significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.1 level (two-tailed test).

Propensity Score Statistics

The propensity score for an observation is the predicted probability using the estimated coefficients and the observation's actual data. If the logit model has substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be much less than the mean score for the treatment. Table 10.3 provides these means as well as the 20th percentile indicator for the apprenticeship group. The mean propensity scores for the treatment group is roughly 0.09; whereas it is 0.03 for the comparison group. The 20th percentile indicator is

Table 10.3 Indicators of Propensity Score Model Quality for Private Career Schools

Statistic	1999/2000
Mean p-score, private career school	0.091
Mean p-score, JOBNET	0.033
Percentile JOBNET, at 20th percentile of private career school	60.91%

approximately 61 percent. The means and the 20th percentile statistic indicate that the logit model of participation did not discriminate all that well between treatment and comparison group observations. This may be because a limited number of personal characteristics data were available in the administrative database.

Statistical Match

The statistical matching that was done was to use a nearest neighbor approach with the propensity score. For every observation j in T_i , we found the observation k in U that minimized the absolute value of the difference between the propensity score for j and k . We then added k to the comparison group sample. The statistical match was done with replacement, so some observations in U were the “matches” for more than one observation in the treatment group and were duplicated in the comparison sample. Table 10.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group, comparison group, and pool of observations from which the comparison group was chosen. Notice that means for the comparison group are quite close to the treatment group as would be expected. None of the differences in means were statistically significant.

Table 10.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for Private Career Schools

Statistic/Characteristic	1999/2000	
	Private Career School	JOBNET (ES)
Sample size	8,429	179,152
Sample size used in match	5,591	151,992
Matched sample size	5,591	5,591
Number of observations used once	—	4,832
Number of observations used multiple times	—	346
Maximum number of repeats	—	7
<u>Demographics and Education</u>		
Female	62.3%	63.2%
Minority	27.0%	27.9%
Age at registration	29.9	29.8
Disability	2.0%	2.0%
Less than high school	7.1%	7.5%
High school graduate	72.2%	72.1%
Some college	17.5%	16.8%
College plus	3.2%	3.6%
West WA	58.9%	72.8%
<u>Employment and Earnings (prior to registration)</u>		
Percentage employed	71.2%	70.7%
Average quarterly earnings ^{a, b}	\$2,206	\$2,209
Earnings trend	\$66.5	\$63.4
Number of quarters with job change	4.0	3.9
<u>Public Assistance (prior to registration)</u>		
Ever received AFDC/TANF	24.9%	25.2%
Quarters received AFDC/TANF ^a	2.5	2.6
Ever received Food Stamps	37.8%	37.8%
Quarters received Food Stamps ^a	4.0	4.2
<u>Unemployment Compensation (prior to registration)</u>		
Ever received	16.0%	15.8%
Average weekly benefit ^a	\$36.0	\$35.4
Sample size	5,591	5,591

NOTE: None of the differences in means are statistically significant at the 0.05 level (t-test). Monetary data are in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

Net Impacts

Table 10.5 provides the estimated net impacts of attending private career schools on clients. The first column presents simple differences in means between the full comparison group pool (i.e., *U*) and the treatment group. The second column presents regression adjusted estimates using the full pool. The third column presents a comparison of means between the treatment group and the

Table 10.5 Net Impact Estimates for Private Career School Program for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	-0.003	0.035***	0.017**	0.026**	0.682	0.705
Hourly wage - short term (\$)	-0.89***	-0.60*	-0.29	-0.25	11.89	10.49
Hourly wage - short term diff-in-diff (\$)	0.54*	-0.21	-0.12	0.21	1.41	1.65
Hours - short term	-10.8***	-0.6	7.6*	-5.3	280.9	279.3
Cond. hours - short term	-14.4***	-0.3	1.0	-10.1**	410.7	393.7
Hours - short term, diff-in-diff	51.4***	11.1***	17.4**	3.7	-49.7	-10.8
Cond. hours - short term, diff-in-diff	25.5***	7.0*	5.4	-4.9	22.0	45.8
Earnings - short term (\$)	-362***	-168***	70	-76	3235	2815
Cond. earnings - short term (\$)	-514***	-162***	2	-149**	4731	3968
Earnings - short term, diff-in-diff (\$)	779***	30	204***	69	-539	67
Cond. earnings - short term, diff-in-diff (\$)	400***	18	120**	8	416	695
UI receipt - short term	-0.031***	-0.044***	-0.023***	-0.025***	0.071	0.066
UI benefits - short term (\$)	-37.8***	-40.9***	-34.4***	-28.3***	96.3	93.7
Cond. UI benefits - short term (\$)	115.9	48.8	-50.9	115.7	1354.6	1422.2
TANF receipt - short term	0.016***	0.016***	0.007*	0.027***	0.032	0.049
TANF benefits - short term (\$)	17.3***	28.9***	7.5	35.5***	35.6	56.8
Cond. TANF benefits - short term (\$)	-2.9	85.7**	-14.5	19.6	1112.4	1163.1
TANF benefits - short term, diff-in-diff (\$)	-1.9	19.8***	-2.9	29.1***	-7.9	-8.4
Cond. TANF benefits - short term, diff-in-diff (\$)	92.9	36.1	31.1	-54.3	-30.4	74.1
FS receipt - short term	0.007**	0.020***	-0.001	0.029***	0.083	0.110
FS benefits - short term (\$)	3.2*	11.2***	0.5	15.5***	41.4	53.4
Cond. FS benefits - short term (\$)	-3.7	9.8	8.2	13.9	496.5	484.6
Med. receipt - short term	0.027***	0.037***	0.005	0.038***	0.131	0.184

NOTE: See Appendix B for explanatory notes. Samples sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 10.4.

*significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

matched comparison group. The fourth column presents an estimate from a regression adjustment of that mean.

The short-term net impacts of attending private career schools include an increased employment rate (2.6 percentage points) and increase in the take-up of public assistance and Medicaid—on the order of 3 percentage points. There is a reduction in UI reciprocity and virtually no change in quarterly earnings.

Subgroup Analysis

Table 10.6 provides net impact estimates for the subgroup of the private career school participants who were reported to complete their programs. The results are much stronger than for the whole treatment group. The short-term employment rate impact was 8.2 percentage points and the hourly wage went up by \$0.61 for those working. Similarly, hours worked for those employed went up by 15 hours and overall earnings increased by about \$310, or about 7.5 to 8 percent. Furthermore, instead of increases in public assistance and Medicaid receipt, the completers were estimated to reduce their reciprocity, although the TANF and Medicaid estimates were not significant.

Table 10.6 Selected Short-Term Net Impact Estimates for Subgroups of Private Career Schools: 1999/2000 Cohort

Outcome	Subgroup		Matched Comparison Group Mean
	Full Treatment Sample	Completers Only	
Employment	2.6%	8.2%	70.5%
Conditional hourly wage	\$0.21 [†]	\$0.61	\$10.49
Conditional hours	-4.9 [†]	15.1	393.7
Conditional earnings	\$8 [†]	\$312	\$3,968
TANF receipt	2.7%	-0.9% [†]	4.9%
Food Stamps receipt	2.9%	-2.6%	11.0%
Medicaid enrollment	3.8%	-0.7% [†]	18.4%
Subgroup sample size	5,590	3,902	—

NOTE: Monetary data in '92 \$. [†] means not significant at the 0.10 level (two-tailed test).

11 HIGH SCHOOL CAREER AND TECHNICAL EDUCATION PROGRAMS

Secondary career and technical education (vocational education) provides general workplace and, to some extent, specific occupational skills instruction to high school students. In all of the other programs analyzed in this project, the participating population included completers as well as “non-completers.” However, with the high school career and technical education students, the “treatment” is full-time equivalent vocational completers only, defined as completing 360 hours of sequenced vocational classes. The Office of the Superintendent of Public Instruction (OSPI) provided the WTECB with individual-level data from general administrative information provided by public high schools in the state about their student enrollment (Form SPIP-210). The intent of the data collection was to have universal coverage, but some high schools did not provide the data. So the representativeness and generalizability of the data are not known. A significant advantage to our analyses, however, was the ability to use the same data set for the comparison group pool as the treatment. That is, the observations in the high school data that were not classified as vocational completers (by the high school) comprised the comparison group pool.

Participant Characteristics

Table 11.1 provides descriptive data that compare the students in the treatment group to those in the comparison group pool. The first two columns of numbers compare the high school career and technical education completers who graduated in 1997/1998 to the remaining students in the sample. The final two columns compare the 1999/2000 career and technical education graduates to other graduates.²¹

²¹We also matched the career and technical students from high schools to individuals on the ES file who were 16–19 years old. However, the participation model and the quality of the matches were not as believable or as statistically

Table 11.1 Descriptive Statistics for the High School Career and Technical Education Graduates and Comparison Group Pool Comprised of All Other High School Graduates

Characteristics	1997/1998		1999/2000	
	Career and Tech. Ed Graduates	Other HS Graduates	Career and Tech. Ed Graduates	Other HS Graduates
<u>Demographics and Education</u>				
Female	50.1%	51.6%	50.5%	51.9%
Minority	16.1%	17.7%	18.3%	19.8%
Disability	4.1% ^{††}	4.6% ^{††}	5.2%	5.1%
GPA	2.81	2.88	2.90	2.70
Free or reduced price lunch eligibility	5.7% ^{††}	5.9% ^{††}	7.9% ^{††}	7.4% ^{††}
Graduated	84.8%	80.5%	93.3%	79.2%
West WA	67.5%	72.7%	75.4%	75.9%
Urban	24.6%	20.4%	23.9% ^{††}	24.1% ^{††}
Suburban	51.5%	56.5%	51.4%	56.2%
Rural	24.0% ^{††}	23.1% ^{††}	24.7%	19.7%
<u>Employment and Earnings (prior to graduation)</u>				
Employed, prior to graduation	84.7%	78.7%	82.6%	80.0%
Mean, average quarterly earnings ^{a, b}	\$851	\$717	\$857	\$833
Number of quarters with earnings	4.9	4.0	4.5	4.1
<u>Public Assistance (family circumstances)</u>				
Ever received AFDC/TANF	10.3% ^{††}	15.5% ^{††}	11.7%	15.0%
Quarters received AFDC/TANF ^a	1.1 ^{††}	1.0 ^{††}	1.4	1.9
Average quarterly AFDC/TANF grant	\$137.3	\$124.0	\$152.5	\$192.4
Ever received Food Stamps	6.0% ^{††}	6.4% ^{††}	8.7%	12.3%
Quarters received Food Stamps ^a	0.2 ^{††}	0.2 ^{††}	0.5	0.7
Sample size	6,212	33,424	10,030	32,759

NOTE: Monetary data in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

^{††}Differences in means are not statistically significant at 0.05 level (t-test).

The two populations of high school graduates are virtually indistinguishable from each other. Many of the differences in characteristics are not statistically significant. There appear to be slightly fewer females and minority students in the career and technical education programs. Also there are more students from urban and rural high schools, and much fewer from suburban high schools. Prior to graduation, a higher percentage of career and technical education students had been employed, and their average quarterly earnings were higher. Finally, the share of students whose families had

robust as the models using the high school data.

been on AFDC/TANF or on Food Stamps was considerably lower. Interestingly, the GPA of the vocational students is lower in 1997/1998, but it is higher in 1999/2000.

Participation Model

Table 11.2 provides the results from the logit estimation of participation. Using the high school data base, we estimated a model of being a vocational completer. That was the dependent variable, which took on a value of 1 for the treatment group, and 0 for the other graduates. The table provides the logit coefficient estimates and standard errors. While the magnitude of the coefficients is not particularly meaningful, the sign and statistical significance are. If the coefficient is negative, then a (positive) change in that variable will decrease the likelihood of being a career and technical education completer.

The coefficient estimates seem quite reasonable. The following variables are significantly correlated with being in the treatment group (i.e., career and technical education student) in both years of data: actually graduating, average earnings (not significant in 1997/1998), and number of quarters employed. The following variables are significantly correlated with being in treatment group: GPA, suburban school, and having received TANF (not significant in 1999/2000) or food stamps.

Propensity Score Statistics

The propensity score for an observation is the predicted probability using the estimated coefficients and the observation's actual data. If the logit model has substantial predictive capability, then the mean propensity score for the comparison group should be small (near zero) and should be

Table 11.2 Coefficient Estimates from a Logit Model of Participation in High School Career and Technical Education

Characteristics	1997/1998		1999/2000	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Demographics and Education</u>				
Female	0.024	0.030	-0.110***	0.024
Minority	-0.072*	0.041	0.007	0.031
Disability	-0.093	0.074	0.082	0.054
GPA	-0.266***	0.021	0.028*	0.015
Free or reduced price lunch eligibility	0.023	0.066	0.195***	0.048
Graduated	0.845***	0.050	1.262***	0.048
West WA	-0.111***	0.037	0.116***	0.029
Urban	0.019	0.046	-0.332***	0.035
Suburban	-0.012	0.040	-0.450***	0.031
<u>Employment and Earnings (prior to graduation)</u>				
Employed, prior to graduation	-0.034	0.055	-0.033	0.041
Mean, average quarterly earnings ^{a, b}	0.006***	0.002	0.001	0.001
Number of quarters with earnings	0.037***	0.006	0.034***	0.005
<u>Public Assistance (prior to graduation)</u>				
Ever received AFDC/TANF	-0.306**	0.125	-0.117	0.093
Quarters received AFDC/TANF	0.067***	0.007	-0.002	0.004
Average quarterly AFDC/TANF grant ^a	0.028***	0.009	0.009	0.007
Ever received Food Stamps	-0.574***	0.168	-0.204**	0.084
Quarters received Food Stamps	0.0123**	0.059	0.017	0.013

NOTES: Model included industry and an intercept term. Sample sizes were 26,194 and 41,591 for 1997/1998 and 1999/2000, respectively.

^aScaled in \$100 ('92 \$)

^bScaled in \$10⁸ ('92 \$)

*Significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.1 level (two-tailed test).

much less than the mean score for the treatment. As argued earlier, a measure of how well the logit model discriminates between comparison group members and treatment group members is the cumulative percentile for the comparison group at the propensity score that is the 20th percentile. Table 11.3 provides these data for the apprenticeship group. The mean propensity scores for the treatment groups are roughly 0.19 and 0.26 whereas they are 0.17 and 0.23 for the comparison group for 1997/1998 and 1999/2000 respectively. The 20th percentile indicator is approximately 33 percent for 1997/1998 and 35 percent for 1999/2000. The means and the 20th percentile statistics indicate that the logit model of participation did not discriminate well between treatment and comparison group observations. We could have used the entire comparison group pool for the analyses.

Table 11.3 Indicators of Propensity Score Model Quality for High School Career and Technical Education

Statistic	1997/1998	1999/2000
Mean p-score, high school career-tech. ed.	0.185	0.262
Mean p-score, other high school graduates	0.165	0.229
Percentile other high school grads, at 20th percentile career-technical education	32.90%	34.98%

Statistical Match

Nevertheless, we performed a match. For every observation j in T_i , we found the observation k in U that minimized the absolute value of the difference between the propensity score for j and k . We then added k to the comparison group sample. The statistical match was done with replacement, so some observations in U were the “matches” for more than one observation in the treatment group. Table 11.4 provides data about the sample sizes, number of matched observations that were duplicates, and a comparison of descriptive statistics between the treatment group, comparison group, and pool of observations from which the comparison group was chosen. Notice that means for the comparison group are quite close to the treatment group, but this is an artifact of the original distribution rather than the matching process.

Net Impacts

The major purpose of the study was to estimate the net impacts of the education and training programs on clients. Tables 11.5 and 11.6 provide the estimated net impacts for secondary career and technical education. The first column presents simple differences in means between the full comparison group pool (i.e., U) and the treatment group. The next three columns attempt to control for the systematic differences between that full pool and the treatment group. The second column presents regression adjusted estimates using the full pool. The third column presents a comparison of

Table 11.4 Matching Algorithm Statistics and Post-Match Comparison of Characteristics for High School Career and Technical Education

Statistic/Characteristic	1997/1998		1999/2000	
	Career and Tech. Ed Graduates	Other HS Graduates	Career and Tech. Ed Graduates	Other HS Graduates
Sample size	6,212	33,424	10,030	32,759
Sample size used in match	5,586	27,554	9,995	32,195
Matched sample size	5,586	5,586	9,995	9,995
Number of observations used once	—	4,633	—	6,047
Number of observations used multiple times	—	736	—	1,743
Maximum number of repeats	—	12	—	8
<u>Demographics and Education</u>				
Female	51.1%	51.0%	50.6%	50.9%
Minority	16.7%	15.5%	18.3%	17.9%
Disability	4.3%	4.6%	5.2%	5.4%
GPA	2.83	2.83	2.90	2.89
Free or reduced price lunch eligibility	5.8%	5.2%	7.8%	8.0%
Graduated	88.1%	87.9%	93.4%	93.3%
West WA	72.7%	73.0%	75.4%	75.5%
Urban	21.8%	22.7%	24.0%	23.5%
Suburban	54.8%	54.6%	51.5%	51.5%
Rural	23.4%	22.7%	24.5%	25.0%
<u>Employment and Earnings (prior to graduation)</u>				
Employed, prior to graduation	85.1%	84.2%	82.7%	82.3%
Mean, average quarterly earnings ^{a, b}	\$852	\$829	\$858**	\$831**
Number of quarters with earnings	4.9	4.9	4.5	4.4
<u>Public Assistance (prior to registration)</u>				
Ever received AFDC/TANF	9.8%	10.0%	11.6%	11.0%
Quarters received AFDC/TANF ^a	1.1	1.1	1.4	1.3
Ever received Food Stamps	5.5%	5.3%	8.7%	8.4%
Quarters received Food Stamps ^a	0.1	0.1	0.5	0.5
Sample size	5,586	5,586	9,995	9,995

NOTE: Monetary data are in '92 \$.

^aAverages include observations with values of zero.

^bObservations with no prior earnings were excluded from analyses.

**Differences in means are statistically significant of 0.05 level (t-test).

means between the treatment group and the matched comparison group, and the fourth column presents an estimate from a regression adjustment of that mean.

Career and technical education pays off for secondary school students economically. The short-term impacts include increases in employment (5.5 percentage points), hours for those working (11.4 hours in a quarter), and quarterly earnings (\$94). The earnings impact is on the order of 10 percent. The economic advantages persist, and even grow, in the longer term. The employment net

Table 11.5 Net Impact Estimates for Secondary Career and Technical Education for 1997/1998 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.110***	0.071***	0.052***	0.059***	0.500	0.562
Ever employed - longer term	0.051***	0.040***	0.040***	0.041***	0.759	0.779
Employment - longer term	0.080***	0.054***	0.056***	0.057***	0.592	0.624
Hourly wage - short term	0.30	0.26	0.69**	0.56***	7.45	7.24
Hourly wage - longer term	0.41***	0.32***	0.39***	0.42***	8.04	8.12
Hours - short term	52.4***	22.9***	34.7***	23.5***	118.5	137.0
Cond. hours - short term	47.2***	37.6***	37.9***	39.3***	225.9	234.5
Hours - longer term	51.2***	36.1***	36.1***	36.3***	188.6	205.3
Cond. hours - longer term	41.5***	30.2***	26.3***	27.1***	288.7	302.6
Earnings - short term	409***	186***	274***	192***	816	963
Cond. earnings - short term	404***	308***	316***	325***	1562	1655
Earnings - longer term	548***	405***	406***	415***	1548	1717
Cond. earnings - longer term	518***	395***	361***	377***	2341	2503
UI receipt - short term	0.003**	0.001	0.000	0.000	0.009	0.012
UI benefits - short term	1.7	-2.5*	-1.2	-2.5	6.9	9.4
Cond. UI benefits - short term	-49.9	-23.6	-103.6	-22.8	726.8	808.4
UI receipt - longer term	0.020***	0.014***	0.010**	0.010**	0.34	0.043
UI benefits - longer term	8.5***	5.7***	7.5**	6.3***	14.1	15.5
Cond. UI benefits - longer term	52.2	75.8	119.6*	159.0**	912.2	867.2
TANF receipt - short term	-0.004**	-0.003	0.001	0.002	0.017	0.010
TANF benefits - short term	-5.1**	-5.1**	-0.1	0.2	17.3	11.3
Cond. TANF benefits - short term	-45.0	4.5	-83.8	-93.8	1026.2	1082.6
TANF receipt - longer term	-0.003	-0.000	-0.002	0.001	0.025	0.023
TANF benefits - longer term	-0.3	-1.3	1.5	1.2	13.4	10.3
Cond. TANF benefits - longer term	28.8	45.9	100.2*	105.0*	843.4	759.9
FS receipt - short term	-0.008***	-0.007**	-0.003	-0.001	0.031	0.023
FS benefits - short term	-5.5***	-5.9***	-1.9	-2.1	16.4	11.5
Cond. FS benefits - short term	-61.6*	-64.8*	-24.4	-38.4	522.3	497.6
FS receipt - longer term	-0.005**	-0.003	-0.003	0.001	0.044	0.037
FS benefits - longer term	-1.7*	-1.8*	-0.5	-0.8	11.6	9.9
Cond. FS benefits - longer term	-3.8	2.2	11.0	17.1	393.4	385.1
Med. receipt - short term	-0.009**	-0.010*	-0.002	0.001	0.098	0.085
Med. receipt - longer term	-0.007*	-0.007	-0.005	-0.003	0.099	0.092

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 11.4.

*significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

impact estimate is 5.7 percentage points; the hourly wage increases by \$0.42 per hour; the hours worked increase by 27.1 hours per quarter; and earnings increase by about \$375 or about 25 percent.

There is little effect of high school career and technical education on public assistance or UI.

Table 11.6 Net Impact Estimates for Secondary Career and Technical Education Program for 1999/2000 Cohort

Outcome	Comparison Group				Comparison Group Means	
	Full Sample		Matched Sample		Full	Matched
	Diff. in Means	Regr. Adj.	Diff. in Means	Regr. Adj.		
Employment - short term	0.068***	0.066***	0.052***	0.055***	0.491	0.507
Hourly wage - short term	0.09	0.12	-0.23	0.23	7.82	8.15
Hours - short term	23.9***	8.2***	19.0***	5.7***	129.2	134.3
Cond. hours - short term	13.3***	11.3***	13.1***	11.4***	252.5	252.7
Earnings - short term	167***	57***	144***	46***	923	948
Cond. earnings - short term	88***	118***	105***	94***	1810	1793
UI receipt - short term	0.001	0.003**	0.001	0.001	0.010	0.010
UI benefits - short term	-1.1	-0.7	-0.3	-0.8	8.7	7.9
Cond. UI benefits - short term	-197.1	-134.6*	-79.5	-0.8	871.1	753.4
TANF receipt - short term	-0.012***	-0.005**	-0.001	0.000	0.021	0.010
TANF benefits - short term	-13.3***	-5.9***	-2.3	-2.6*	21.7	10.5
Cond. TANF benefits - short term	-154.1**	-162.3**	-146.6*	-141.7*	1021.0	1007.8
FS receipt - short term	-0.020***	-0.010***	-0.006**	-0.004*	0.040	0.026
FS benefits - short term	-11.9***	-6.3***	-4.6***	-5.0***	20.4	13.1
Cond. FS benefits - short term	-85.3***	-75.1***	-83.0**	-100.8***	505.8	501.9
Med. receipt - short term	-0.028***	-0.010**	-0.006	-0.006	0.116	0.094

NOTE: See Appendix B for explanatory notes. Sample sizes differ for virtually every entry in the table because of observations with missing data. If there were no missing data, the sample sizes would be those displayed in rows 2 and 3 of Table 11.4. *significant at the 0.10 level; ** significant at the 0.5 level; *** significant at the 0.01 level (two-tailed test).

12 BENEFIT-COST ANALYSES

In addition to the net impact analyses, we conducted benefit-cost analyses for seven of the nine workforce development programs—all but apprenticeship and private career schools.²² This chapter documents the methodology that we used and the results of these analyses.

The essential task of a benefit-cost analysis (BCA) is to measure the benefits and costs of a program, place weights on each, and arrive at a conclusion as to the net benefits of the program. To conduct a BCA, it is necessary to measure the benefits and costs in a common unit, usually dollars. Note that the benefits and costs may differ depending on the decisionmaking groups whose interests are affected by the action. For example, increased earnings are a benefit for individuals, but a cost for employers (who get the benefits of increased production of goods or services). In considering whether the workforce programs that are administered in Washington had net benefits, we explicitly estimated benefits and costs for two groups: (1) the program participants and (2) the rest of society (i.e., taxpayers).

For this project, the benefits that were calculated included the following:

- Increased lifetime earnings (discounted)
- Fringe benefits
- Taxes on earnings (negative benefit to participants)
- Reductions in UI benefits
- Reductions in TANF benefits
- Reductions in Food Stamp benefits
- Reductions in Medicaid benefits

The costs included the following:

- Foregone earnings (reduced earnings during the period of training)
- Tuition payments
- Program costs (marginal)

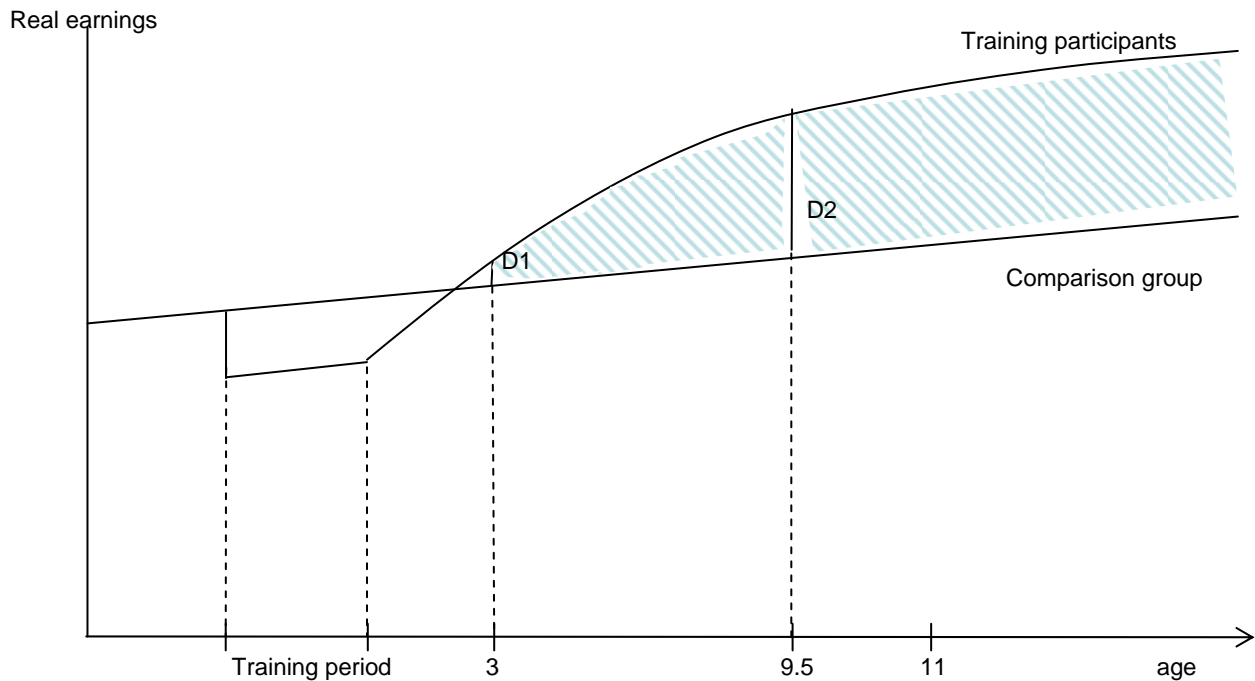
²²We omitted private career schools because we did not have 1997/1998 net impact estimates which, as described in this chapter, are used to estimate key parameters. Furthermore, there is little public subsidy of these programs. We omitted apprenticeships for the latter reason—little public subsidy involved.

Most of these costs and benefits were derived from the net impact estimates presented in prior chapters or by calculating some simple descriptive statistics from the underlying data. The next sections of the chapter document the assumptions and data that we used to calculate each of those benefits and costs. The final part of the chapter presents the results and discussion.

Lifetime Earnings

Figure 12.1 shows the earnings profiles for the average individual in the treatment group and in the comparison group. The hypothesis used to construct these profiles is that encountering a workforce development program enhances an individual's skills and productivity (thus increasing wage rates) and increases the likelihood of employment. Thus, after the training period, the treatment earnings profile is above the comparison earnings profile (both hourly wage and employment net impacts are positive.) During the training period, the treatment earnings will be

Figure 12.1 Hypothetical Earnings Profiles of Training Participants and Comparison Group Members



below the comparison earnings, on average. These are the foregone costs of training in the form of wages that are given up by the participant while he or she is receiving training.

The theoretical lifetime earnings benefit would be the shaded area in the graph. The average comparison group member's real earnings grow at some fairly constant rate (increase in productivity), and the average treatment group member's earnings eventually become higher after training and likely grow faster as they accumulate additional human capital in the form of work experience.

The problem that needed to be solved in this project was how to estimate the shaded area. The two lines D1 and D2 represent the difference in average earnings at three quarters after exiting from the training program and at 9.5 quarters after exit. These are essentially the short-run and longer run net impact estimates that have been documented in the prior chapters. (Note that 9.5 is the midpoint of quarters 8–11). Because the profiles represent the *average* individual, we use the *unconditional* net earnings impacts to calculate these benefits. (They automatically control for employment, hourly wage, and hours worked impacts.)

What is unknown (and unknowable) is the shape of the earnings profiles into the future after the D2 point. The profiles could continue to move apart from each other if the training participants continue to be more and more productive relative to the comparison group member, or the profiles eventually may converge over time if the training effect depreciates. Alternatively, the profiles may become parallel to reflect a scenario in which the training participants gain a permanent advantage, but then their productivity growth eventually matches the comparison group members. Since the earnings benefits are received by the participants in future periods, they need to be discounted. We used a 3 percent real discount rate.

The empirical strategy that we followed was to use the short-term and longer-term net impact estimates for unconditional earnings from the 1997/1998 data to “fit” a log earnings function.²³ That is, we assumed the following functional forms:

$$(1) \quad Y_C(q) = \log(a + b \cdot q); \quad Y_T(q) = \log(c + d \cdot q)$$

where $Y_C(q), Y_T(q)$ = average earnings of individuals in the comparison group, treatment group in quarter q

and solved for $a, b, c,$ and d using mean earnings for the comparison group at $q = 3$ (short-run) and $q = 9.5$ (longer-run) and those means plus the treatment net impact estimate for the treatment group.

Table 12.1 presents the lifetime earnings parameters.

Table 12.1 Estimates of the Logarithmic Earnings Profile Parameters

Program	Comparison Group				Participants (Treatment)			
	Mean, quarterly earnings (includes 0; '92 \$)		Parameters ^a		Net impact estimates ^b		Parameters ^a	
	$q = 3$	$q = 9.5$	a	b	$q = 3$	$q = 9.5$	c	d
JTPA II-A	\$1,764	\$2,073	4.860	0.325	+ \$246	+ \$463	5.078	0.795
JTPA II-C	1,275	1,739	2.604	0.325	-123	+82	1.773	0.464
JTPA III	3,714	4,155	30.520	3.500	+195	+710	13.010	12.280
Comm. Coll. ABE ^c	2,216	2,476	7.9136	0.419	+68	+47	8.4563	0.419
Comm. Coll. Job Prep	2,726	3,134	11.720	1.184	+645	+986	-1.3782	6.625
Comm. Coll. Worker Ret.	3,202	3,677	17.690	2.300	+58	+588	5.230	6.940
High School CTE	963	1,717	1.2575	0.454	+192	+415	0.744	0.810

NOTES: Means and net impact estimates displayed in net impact tables in Chapters 3–11.

^aTo estimate the parameters, Y_C and Y_T are scaled in \$thousands.

^bRegression-adjusted diff-in-diff estimators for JTPA II-A, II-C, Comm. Coll. Job Prep, and Comm. College ABE; all others were regression-adjusted levels of unconditional earnings impacts.

^cThe net impact estimates were assumed to be constant at 57.5.

²³We actually calculated four alternative lifetime earnings benefits for each of the programs. We did two types of interpolation—logarithmic and linear, and we made two assumptions about depreciation—(1) no depreciation over the participant’s lifetime, and (2) the profiles become parallel after 10 quarters. The preferred specification was a logarithmic interpolation—with parallel profiles after 10 quarters.

Equation (1) was used to generate the average comparison group member's and participant's quarterly earnings until age 65. The earnings benefit per quarter was simply $Y_T - Y_C$. The average age of the participants at exit are given in table 12.2.

Table 12.2 Average Age of Participants at Exit, by Program (Used to Determine Quarters Until Retirement)

Program	Mean, Age at Exit	Quarters Until Age 65
JTPA II-A	34.8	121
JTPA II-C	19.0	184
JTPA III	41.1	96
CC ABE	30.7	138
CC Job Prep	34.3	123
CC Worker Retraining	40.8	97

The high school data did not have age, so the assumption was made that these individuals were 18.0.

We extrapolated earnings for 188 quarters.

Fringe Benefits

With additional earnings, workers will also accrue additional fringe benefits in the form of paid leave, paid insurances, retirement/savings plan contributions, and other non-cash benefits. We relied on two sources of data that provided estimates of the ratio of fringe benefits (defined as paid leave plus paid insurances plus retirement plan contributions plus other) to gross wages and salaries (including supplemental pay such as overtime) that were in the 20 to 25 percent range. Specifically, the U.S. Department of Labor Bureau of Labor Statistics, *News*, No. 02-346, June 19, 2002, report this ratio to be 23.3 percent for "All U.S." and 20.4 percent for the "West Census Region." The U.S. Chamber of Commerce report, *The 2001 Employee Benefits Study*, 2001, reports a ratio of 24.3 percent for the Pacific region (Table 5 of that report). Under the assumption that workforce

development program participants are less likely to get fringe benefit coverages than the average worker, and to be conservative in our benefit estimation, we used the assumption that this ratio would be 20 percent (applied to the discounted annual earnings increments).

Employee Tax Liabilities

Higher earnings will lead to payment of increased payroll, sales/excise, and federal income taxes.²⁴ The increased taxes are a cost to participants and a benefit to the public. We used average (marginal) tax rates for each of the three types of taxes and applied these rates to the annual earnings changes.

Payroll Taxes

Payroll taxes include social security and Medicare tax rates. The current rate of 7.65 percent was used to estimate the future liabilities. This requires three assumptions: this rate would not increase in future years, all participants would be employed in covered employment (not self-employed), and that none of the participants would exceed the maximum earnings levels against which this payroll tax is applied. The assumption that the rate will remain fixed at its current rate seemed like a reasonable compromise since it is likely that the rate will continue to increase somewhat over time as it has in the past, but it is also likely that some participants will work in non-covered employment (such as agriculture) and that a few participants will exceed the taxable earnings maximums. Thus we may be underestimating future tax rates, but overestimating the taxable base.

²⁴Washington does not have state income taxes.

Note that, under FICA, employers also pay additional payroll taxes. However, these taxes do not need to be factored into the benefit-cost analysis since they are a transfer from employers to the public. Similarly, the document W. Vroman, *Tax Equity Study*, 1999, showed that employers bore, on average, a payroll tax rate of 2.13 percent for unemployment insurance taxes. But, these also represent a transfer from employers to the public that do not affect participants.

Sales/Excise Taxes

We used a methodology similar to the payroll tax estimation to calculate these tax liabilities, but in this case used a rate of 7.5 percent. This number was derived from Table 7 of the document, R. Peterson, *Washington Excise Tax Simulation Model*, 2002, unpublished, May 6, 2002. Table 12.3 reproduces a portion of that table along with a calculation of marginal tax rates.

Table 12.3 Marginal Sales/Excise Tax Rates

Total Outlays (1)	Total Excise Taxes (2)	Marginal Tax Rate (3)
\$0–\$15,000	\$842	0.0454
\$15–\$20,000	1,296	0.0760
\$20–\$25,000	1,676	0.0934
\$25–\$30,000	2,143	0.0762
\$30–\$35,000	2,524	0.0766
\$35–\$40,000	2,907	

NOTE: Marginal tax rate calculated as the (Δ excise taxes) / (Δ midpoint of outlays).

SOURCE: R. Peterson, *Washington Excise Tax Simulation Model*, 2002, Table 7 for columns (1) and (2).

The marginal tax rates range from 4.54 percent to 9.34 percent over this range of outlays, but three of the five rates were approximately 7.6 percent. So a rate of 7.5 percent seemed reasonable.

Federal Income Tax

We again used a simple average (marginal) tax rate, which is applied to the change in earnings. The source used was the U.S. Department of Commerce, *2001 U.S. Statistical Abstract*, Table 474. This table showed marginal rates in 1998 that were approximately 0.10 (10.0 percent) for adjusted gross income levels up to \$30,000.²⁵ The tax liabilities given in that table showed much lower average tax rates, since many taxpayers at those levels of income received earned income tax credits.

Unemployment Compensation

Unemployment compensation benefits in the future may increase for participants if programs increase employment (and therefore the probability of receiving UI) or increase earnings (and therefore benefits) or they may decrease if programs decrease the likelihood of unemployment or decrease duration of unemployment spells. Increased UI benefits in the future would be a discounted benefit to participants and cost to the public.

We used a similar empirical strategy as we did for lifetime earnings to interpolate and extrapolate. We have two estimates of unconditional UI benefits (at quarters 3 and 8–11 after exit) using the 1997/1998 cohort. As described earlier in the report, we did not have sufficient pre-program data to use a difference-in-differences estimation approach, so estimates in Table 12.4 are regression-adjusted net impacts on the UI benefit levels (including observations with 0s and in ‘92\$). Note that these estimates suggest that the adult programs have decreasing reliance on UI, whereas the two youth programs, JTPA II-C and high school CTE, have increased benefits.

²⁵The average tax for a return with \$8,000 in adjusted gross income (AGI) was \$300 according to the *Statistical Abstract* table. For an AGI of \$18,000, the average return had a tax liability of \$1,300; and for an AGI of \$28,000, the average tax was \$2,300.

Table 12.4 Estimated Net Impacts on Unemployment Compensation Benefits, by Program

	Uncond. UI benefits, 3rd quarter 1997/1998	Uncond. UI benefits, 8–11 quarters, 1997/1998 (assumed to be quarter 9.5)
JTPA II-A	51.4	27.9
JTPA II-C	11.7	21.1
JTPA III	61.4	19.7
CC ABE	17.5	-19.3
CC Job Prep	6.7	-12.7
CC WR	-15.7	-32.2
HS CTE	-2.5	6.3

In this case we did a linear interpolation/extrapolation function for the difference in UI between treatment and comparison group cases to get the estimates in Table 12.5. In terms of duration, we assumed that the interpolation/extrapolation function would hold for 40 quarters (10 years) for adult programs and 80 quarters (20 years) for the two youth programs. The increases (or decreases) in unemployment compensation benefits for the average participant were exactly offset by decreases (or increases) in public costs.

Table 12.5 Linear Function to Estimate Net Impacts of UI Over Time, by Program

Program	$\Delta \text{UI} = a + bq$
JTPA II-A	$62.5 - 3.7q$
JTPA II-C	$7.1 + 1.5q$
JTPA III	$80.6 - 6.4q$
CC ABE	$34.6 - 5.7q$
CC Job Prep	$15.7 - 3q$
CC WR	$-8.2 - 2.5q$
HS CTE	$-6.7 + 1.4q$

Income-Related Transfer Payments

The maintained hypothesis was that participation in the workforce development programs would decrease the probability of receiving TANF and Food Stamps, and the probability of enrolling

in Medicaid. In addition, increased earnings may have resulted in reductions in benefit levels for TANF and Food Stamps. Finally, if individuals no longer receive TANF or Food Stamps, they would not receive any support services such as child care or other referrals.

TANF/Food Stamps

We followed a similar empirical strategy as we did for unemployment compensation. We had two estimates of unconditional TANF benefits (at quarters 3 and 8–11 after exit) using the 1997/1998 cohort shown in Table 12.6 (in '92 \$).

Table 12.6 Net Impact Estimates of Unconditional TANF Benefits

	Uncond. TANF benefits, 3rd quarter 97/98	Uncond. TANF benefits, 8–11 quarters, 97/98 (assumed to be quarter 9.5)
JTPA II-A ^a	-103.7	-64.5
JTPA II-C ^a	-93.7	-79.3
JTPA III	-4.0	-3.3
CC ABE ^a	38.8	24.5
CC Job Prep ^a	-19.7	-16.0
CC WR	-6.4	-3.5
HS CTE	0.2	1.4

^aNet impact estimates from regression-adjusted difference-in-differences model.

Note that these estimates, for the most part, exhibit a reduction in the magnitudes of the net impact estimates between the two time periods. Furthermore, most of the estimates are negative as hypothesized.

The linear interpolation/extrapolation function for each of the programs yields the following time path for TANF benefits given in Table 12.7. In terms of duration, we assumed that the interpolation/extrapolation function would hold for 40 quarters (10 years) for adult programs and 80 quarters (20 years) for the two youth programs.

Table 12.7 Linear Function to Estimate Net Impacts of TANF Over Time, by Program

Program	$\Delta \text{TANF} = a + bq$
JTPA II-A	$-121.7 + 6.0q$
JTPA II-C	$-100.9 + 2.4q$
JTPA III	$-4.3 + 0.1q$
CC ABE	$45.4 - 2.2q$
CC Job Prep	$-21.5 + 0.6q$
CC WR	$-7.75 + 0.45q$
HS CTE	$-6.7 + 0.23q$

Support costs in TANF were estimated by WTECB personnel to be 124.26 percent of each case's cash benefits. (Personal communication from J. Bauer, dated August 14, 2002). This estimate was derived from a document referred to as the ESA Briefing Book. Data in that source were used to estimate an average monthly cash benefit per case of \$441. Child care expenditures per case were \$356 and client support expenditures (such as transportation) averaged \$192.²⁶

Thus the quarterly increases or decreases in TANF benefits from the interpolation/extrapolation functions were inflated by 124.26 percent to reflect total programmatic costs per participant. The increases (or decreases) in TANF benefits for the average participant were exactly offset by decreases (or increases) in public costs.

We followed a similar empirical strategy—linear interpolation—for Food Stamps as we did for TANF, except that we did not have sufficient data to support difference-in-differences estimation nor did we estimate any support costs above and beyond the cash value of the Food Stamps. Thus, we had two estimates of unconditional Food Stamp benefits (at quarters 3 and 8–11 after exit) using the 1997/1998 cohort that are shown in Table 12.8 (in '92 \$). As with TANF, these estimates, for the

²⁶ Note that support expenditures ($\$356 + \$192 = \$548$) divided by cash benefit ($\$441$) = 1.2426 or 124.26 percent.

most part, exhibit a reduction in the magnitudes of the net impact estimates between the two time periods. Furthermore, more of the estimates are negative as hypothesized.

Table 12.8 Estimated Net Impacts of Food Stamp Benefits, by Program

	Uncond. FS benefits, 3rd quarter 1997/1998	Uncond. FS benefits, 8–11 quarters, 1997/1998 (assumed to be quarter 9.5)
JTPA II-A	-38.4	-32.6
JTPA II-C	-1.0	-10.9
JTPA III	-4.2	-2.1
CC ABE	33.5	24.7
CC Job Prep	-3.0	0.3
CC WR	-4.8	-7.2
HS CTE	-2.1	-0.8

The linear interpolation/extrapolation function for each of the programs yields the following time path for Food Stamp (FS) benefits given in Table 12.9. In terms of duration, we assumed that the interpolation/extrapolation function would hold for 40 quarters (10 years) for adult programs and 80 quarters (20 years) for the two youth programs.

Table 12.9 Linear Function to Estimate Net Impacts of Food Stamps Benefits Over Time, by Program

Program	$\Delta FS = a + bq$
JTPA II-A	$-41.4 + 1.0q$
JTPA II-C	$3.5 - 1.5q$
JTPA III	$-5.16 + 0.32q$
CC ABE	$37.5 - 1.35q$
CC Job Prep	$-4.5 + 0.5q$
CC WR	$-3.77 - 0.37q$
HS CTE	$-2.7 + 0.2q$

Medicaid

Our data did not have any benefit/usage information for Medicaid, so we only estimated net impacts of actually being enrolled in Medicaid. The working hypothesis was that training participants will tend to decrease their enrollment rates as they become better attached to the labor force over time. The average state share of Medicaid expenditures per enrollee was estimated to be \$195 per month (\$585 per quarter in 2001\$) (personal communication from J. Bauer, dated August 14, 2002, who cited Laura Piliairis of the Washington State Medical Assistance Administration). So the decrease (increase) in per participant Medicaid expenditures per quarter was estimated to be the net impact estimate for Medicaid enrollment times \$585 (three months at \$195 per month). This was a benefit to the participant and a cost to the public. The estimated changes in enrollment were assumed to equal approximately the arithmetic average of the short-term and longer-term estimates, and that change was assumed to last indefinitely. The estimates are given in Table 12.10.

Table 12.10 Estimated Net Impacts on Medicaid Enrollment, by Program

Program	Medicaid enrollment, 3rd quarter 1997/1998	Medicaid enrollment, 8–11 quarters, 1997/1998	Estimate used in BCA
JTPA II-A	-0.084	-0.105	-0.100
JTPA II-C	-0.006	0.029	0.012
JTPA III	-0.022	-0.025	-0.022
CC ABE	0.071	0.084	0.080
CC Job Prep	0.008	-0.018	-0.010
CC WR	-0.013	-0.024	-0.020
HS CTE	0.001	-0.003	-0.001

NOTE: Table entries are changes in rates of enrollment.

Costs

Two types of costs were estimated for each of the programs. The first was foregone earnings, which would be reduced earnings while the participants were actually engaged in the training

programs. The second type of cost was the actual direct costs of the training. In some cases this involved tuition or fee payments by the participants, and in all cases it involved state subsidies for delivering the training. Each of these types of costs are considered in turn.

Foregone Earnings

Foregone earnings represent the difference between what workforce development program participants would have earned if they had not participated in a program (which is unobservable) and what they earned while they did participate. The natural estimate for the former is the earnings of the matched comparison group members during the length of training. Specifically, we used (3) to estimate mechanistically the foregone earnings. Note that we did not discount foregone earnings, but did calculate them in real \$. Specifically, we calculated $Foregone_i$ for both 1997/1998 and 1999/2000 exiters and averaged them. Table 12.11 displays the data as tabulated from administrative records. Table 12.12 displays the estimated foregone earnings.

$$(3) \quad Foregone_i = \left[0.5 \times (\hat{E}_{-1_i} + \bar{E}_{-1_i}) - \bar{E}_{0_i} \right] \times d_i \quad ,$$

where, \bar{E}_{-1}, \bar{E}_0 = avg. quarterly earnings (uncond.) for treatment group in quarter -1 and during training period, respectively.

\hat{E}_1 = avg. quarterly earnings in 1st post-exit period for matched comparison group

d = avg. training duration

i = indexes program

Table 12. 11 Average Quarterly Earnings and Average Training Duration, by Program

Program	\bar{E}_{-1}		\bar{E}_0		\hat{E}_1		d	
	1997/1998	1999/2000	1997/1998	1999/2000	1997/1998	1999/2000	1997/1998	1999/2000
JTPA II-A	\$729	\$905	\$1,194	\$1,521	\$1,802	\$2,490	2.5	2.4
JTPA II-C	424	521	692	880	1,244	1,469	2.1	2.4
JTPA III	4,499	5,272	2,241	2,178	3,801	4,457	4.2	4.6
CC ABE	2,087	2,113	2,140	2,164	2,280	2,650	5.7	1.6
CC Job Prep	2,034	2,509	2,166	2,884	2,762	3,302	9.4	5.6
CC WR	2,159	2,747	1,145	2,084	3,266	4,165	6.2	10.6
HS Voc.	537	532	764	739	1,238	1,129	3.0 ^a	3.0 ^a

NOTE: Average quarterly earnings data in columns (1)–(6) are in '92 \$. Duration data in columns (7) and (8) are in months.

^a By assumption.

Table 12.12 Estimated Foregone Earnings, by Program

Program	<i>Foregone</i>		
	1997/1998 (1)	1999/2000 (2)	Average (3)
JTPA II-A	\$ 179	\$ 424	\$ 360
JTPA II-C	298	276	343
JTPA III	8,018	12,358	12,175
CC ABE	248	218	278
CC Job Prep	2,181	120	1,375
CC WR	9,719	14,543	14,497
HS Voc.	371	275	386

NOTE: Columns (1) and (2) in '92 \$. Column (3) in '01 \$.

Foregone Earnings for Secondary Career and Technical Education. In the benefit-cost analyses, the WTECB chose to assume that the foregone earnings for high school students was \$0 since both career and technical education students and the students in the comparison group were attending high school during the training period. Under this assumption, the estimated foregone earnings would simply be an artifact of the types of (part-time) employment held by students. However, it is possible that secondary career and technical education students would bear a cost of foregone earnings if it were the case that some of the students pursued unpaid work-site training

opportunities in conjunction with their class work (such as co-operative education placements) and these limited the amount of paid employment that they pursued.

Program Costs

For the most part, the program costs were supplied to us by the State. The JTPA costs were calculated from administrative microdata on days in the program and cost data from the program (personal communication from C. Wolfhagen, August 6, 2002). Specifically, we used the arithmetic average of what was spent per participant in 1997/1998 and 1999/2000. The data that were supplied to us are given in Table 12.13. These costs were assigned to the public. There were no programmatic costs to participants.

Table 12.13 JTPA Costs Per Participant, by Program

Program	Dollars per person ('92\$), 1997/1998 participants	Dollars per person ('92\$), 1999/2000 participants	Average ('01\$)
JTPA II-A	\$2,946	\$3,526	\$3,384
JTPA II-C	2,375	2,062	2,325
JTPA III	3,319	1,571	2,575

Community/Technical College Costs. Staff from the State Board for Community and Technical Colleges (SBCTC) supplied the cost data for the ABE, Job Preparation, and Worker Retraining programs. In the case of ABE, there are no tuition or supply costs to participants. SBCTC supplied a state cost per participant figure of \$945 (1997/1998 \$) (personal communication from D. Whittaker, August 15, 2002). For Job Preparation and Worker Retraining, public costs were supplied on a per FTE student basis by C. Reykdal at SBCTC. In FY 2000, the Washington general fund expenditures per FTE were \$3,640. The average FTE's for job preparation students were 1.9 and for worker retraining, were 1.3. Therefore the public costs per participant for these two programs were

\$6,916 and \$4,732 ('01 \$). Tuition and operating fee costs for an FTE was \$1,641, so the per participant cost for job preparation and worker retraining, were \$3,118 and \$2,133 ('01\$), respectively. Note that books and supply costs were not estimated for training participants, and that tuition subsidies for worker retraining were not shifted to the public column of the BCA.

Secondary Career and Technical Education. The Office of the Superintendent of Public Instruction provided a state and federal cost per FTE student of \$870 ('01 \$). Rather than trying to determine what share of students completed partial FTE's, we were advised to assume that all of the students accounted for a single FTE. Thus, we used a public cost of \$870 for this program.

Results

Tables 12.14–12.20 provide the benefit-cost analyses for the seven programs. Each table has an estimate for the first ten quarters after exiting the program and an estimated lifetime benefits and costs. In all cases, the benefits were discounted to 2001 using a 3.0 percent annual rate.

Table 12.14 Participant and Public Benefits and Costs Per Participant in JTPA Title II-A Programs

Benefit/Cost	First 2.5 years		Lifetime (until 65)	
	Participant	Public	Participant	Public
<u>Benefit</u>				
Earnings	\$ 3,773	–	\$ 65,337	–
Fringe Benefits	775	–	13,067	–
Taxes	–949	\$ 949	–16,432	\$ 16,432
<u>Transfers</u>				
UI	486	–486	–400	400
TANF	–2,292	2,292	–425	425
FS	–413	413	–902	902
Medicaid	–393	393	–1,413	1,413
<u>Costs</u>				
Foregone earnings	\$ 360	–	\$ 360	–
Program costs	–	\$ 3,384	–	\$ 3,384

NOTE: '01 \$.

Table 12.15 Participant and Public Benefits and Costs per Participant in JTPA Title II-C Programs

Benefit/Cost	First 2.5 years		Lifetime (until 65)	
	Participant	Public	Participant	Public
<u>Benefit</u>				
Earnings	\$ -1,326	–	\$ 27,527	–
Fringe Benefits	-265	–	5,505	–
Taxes	334	\$ -334	-6,923	\$ 6,923
<u>Transfers</u>				
UI	175	-175	4,456	-4,456
TANF	-2,261	2,261	-942	942
FS	-54	54	-3,694	3,694
Medicaid	47	-47	353	-353
<u>Costs</u>				
Foregone earnings	\$ 343	–	\$ 343	–
Program costs	–	\$ 2,325	–	\$ 2,325

NOTE: '01\$.

Table 12.16 Participant and Public Benefits and Costs Per Participant in JTPA Title III Programs

Benefit/Cost	First 2.5 years		Lifetime (until 65)	
	Participant	Public	Participant	Public
<u>Benefit</u>				
Earnings	\$ 4,333	–	\$ 79,626	–
Fringe Benefits	867	–	15,925	–
Taxes	-1,090	\$ 1,090	-20,026	\$ 20,026
<u>Transfers</u>				
UI	526	-526	-1,827	1,827
TANF	-97	97	-217	217
FS	-39	39	45	-45
Medicaid	-86	86	-311	311
<u>Costs</u>				
Foregone earnings	\$ 12,175	–	\$ 12,175	–
Program costs	–	\$ 2,575	–	\$ 2,575

NOTE: '01 \$.

Table 12.17 Participant and Public Benefits and Costs Per Participant in Community College Job Preparatory Training

Benefit/Cost	First 2.5 years		Lifetime (until 65)	
	Participant	Public	Participant	Public
Benefit				
Earnings	\$ 4,275	–	\$ 100,539	–
Fringe Benefits	855	–	20,108	–
Taxes	–1,075	\$ 1,075	–25,285	\$ 25,285
Transfers				
UI	–7	7	–1,767	1,767
TANF	–469	469	–905	905
FS	–20	20	217	–217
Medicaid	–39	39	–141	141
Costs				
Foregone earns.	\$ 1,375	–	\$ 1,375	–
Program costs	3,118	\$ 6,916	3,118	\$ 6,916

NOTE: '01 \$.

Table 12.18 Participant and Public Benefits and Costs Per Participant in Community College ABE Programs

Benefit/Cost	First 2.5 years		Lifetime (until 65)	
	Participant	Public	Participant	Public
Benefits				
Earnings	\$ 660	–	\$ 5,923	–
Fringe Benefits	132	–	1,185	–
Taxes	–166	\$ 166	–1,490	\$ 1,490
Transfers				
UI	41	–41	–3,160	3,160
TANF	861	–861	228	–228
FS	346	–346	460	–460
Medicaid	315	–315	1,131	–1,131
Costs				
Foregone earns.	\$ 278	–	\$ 278	–
Program costs	–	\$ 983	–	\$ 983

NOTE: '01 \$.

Table 12.19 Participant and Public Benefits and Costs Per Participant in Community College Worker Retraining Programs

Benefit/Cost	First 2.5 years		Lifetime (until 65)	
	Participant	Public	Participant	Public
Benefit				
Earnings	\$ 2,772	–	\$ 69,040	–
Fringe Benefits	554	–	13,808	–
Taxes	–697	\$ 697	–17,363	\$ 17,363
Transfers				
UI	–250	250	–2,350	2,350
TANF	–136	136	95	–95
FS	–66	66	–453	453
Medicaid	–79	79	–283	283
Costs				
Foregone earnings	\$ 14,497	–	\$ 14,497	–
Program costs	2,133	\$ 4,692	2,133	\$ 4,692

NOTE: '01 \$

Table 12.20 Participant and Public Benefits and Costs Pr Participant in Secondary Career and Technical Education Programs

Benefit/Cost	First 2.5 years		Lifetime (until 65)	
	Participant	Public	Participant	Public
Benefit				
Earnings	\$ 3,041	–	\$ 62,404	–
Fringe Benefits	608	–	12,481	–
Taxes	–765	\$ 765	–15,695	\$ 15,695
Transfers				
UI	10	–10	3,201	–3,201
TANF	–140	140	123	–123
FS	–19	19	332	–332
Medicaid	4	–4	29	–29
Costs				
Foregone earnings	\$ 0	–	\$ 0	–
Program costs	–	\$ 870	–	\$ 870

NOTE: '01 \$.

Appendix A

Longitudinal Data File Editing

1. Multiple participant records for a education or training program. The State supplied us with individual-level data for each of the nine programs. In some of the program files, we found duplicate records, despite the fact that the file specifications indicated that each individual would have a single record. For example, in JTPA Title III, there were multiple records because of multiple funding streams—special state grants in addition to the general title funding. In all cases where there were multiple records, we used the record with the latest exit date.
2. Missing or “out of bounds” quarterly hours data in earnings records. Records that had missing hours, zero hours (despite having reported earnings), and hours greater than 990 in the employment records had hours imputed. The imputation was done in three steps. The first step was to impute the hours using reported (non-imputed) information from adjacent quarters. The same rule was applied as was used by the State contractor, which was basically an interpolation of data from adjacent records. For records that still had missing or zero hours, the next step in the algorithm was to assign the median working hours by the individual’s industry and earnings class. If the industry was not available, the last step was to assign the population median working hours by earnings class. When hours exceeded 990, they were truncated to 990. Table A.1 shows the percentage of records for which hours were imputed. The State had imputed data on about 3 percent of the records; we imputed data for about 5 percent of the records; which means that about 92 percent of the records did not have imputed hours.
3. Comparison group records that have received prior intervention. The State decided that the analyses were to reflect the impact and economic benefit of the entire system of education and training programs in the state. So, comparison group records were deleted for individuals who had

been served by any of the education or training programs (except for secondary vocational/technical education) in recent years. This was a controversial decision because it meant, for example, that individuals who had recently attended community colleges were systematically excluded from the comparison group for the JTPA programs or apprenticeships.

Table A.1 Percentage of Records with Imputed Hours

Program	1997/1998	1999/2000
JTPA II-A	7.3%	7.4%
JTPA II-C	7.9	8.3
JTPA III	6.5	7.0
Community College ABE	5.9	6.7
Community College Job Prep	7.5	7.4
Community College Worker Retraining	8.0	7.4
Private Career Schools	—	7.8
Apprenticeships	7.4	7.1
High School Career Technical Ed.	5.1	2.7
Employment Service (JOBNET)	7.7	7.5

Appendix B

Explanatory Notes for Net Impact Estimate Tables

Outcomes

Table entries in first four columns give net impact estimates for each outcome calculated four different ways. The columns labeled, “Diff. in Means,” are unadjusted differences in means calculated as treatment group minus comparison group. Column (1) uses the full sample for the comparison group and column (3) uses the matched sample. The columns labeled, “Regr. Adj.,” are coefficients on the treatment dummy in an OLS-estimated model of the outcomes (for continuous variables). The entries in the row for outcomes that are binary are logit coefficients transformed to be marginal effects.

Two types of outcomes measured at two time periods, are displayed in the tables. The two time periods are three quarters after program exit (short term) and average of quarters 8–11 or reciprocity during one of the quarters (longer term). The two types of outcomes are levels and difference-in-differences. Levels measure the outcomes at the particular time period. “Diff-in-diff” differences the levels at the post-training period minus a base-period measure. In particular, quarters 3–6 before entry were used as the base period.

“Employment” means having earnings in the quarter \geq \$100. “Ever employed” means being employed in at least one quarter of the time period. “Employment – longer term” means arithmetic average of employment during quarters 8–11 after exit. “Employment – diff-in-diff” means (employment – longer term) minus (employment – base period).

Receipt means non-zero quarterly benefits for UI, TANF, and food stamps. Receipt means enrollment for Medicaid.

Outcomes modified by the phrase “Cond.” do not include 0s in the calculation of the means. Otherwise 0s are included. Hourly wage outcomes do not include 0s.

Monetary outcomes measured in '92 \$.

Regression Adjustment

Independent variables used in regression adjustments for JTPA programs include years of education, high school graduate, experience as of 3rd quarter after exit, experience squared, sex, disability status, ethnic minority status, limited English proficiency status, veteran status, age at registration, employment status at registration, enrollment at registration, county unemployment rate, western WA residence, industry of employment at time of outcome (dummies at one-digit level), percentage employment prior to registration, prior earnings trend, average prior quarterly earnings, variance of prior quarterly earnings, number of quarters with job changes prior to registration, public assistance recipient at time of registration, prior AFDC/TANF recipient, prior food stamps recipient, number of quarters on AFDC/TANF prior to registration, number of quarters on food stamps, average quarterly AFDC/TANF grant prior to registration, treatment group dummy, and (in 1999/2000) prior UI recipient and prior average weekly benefit.

Independent variables used in regression adjustments for community college and private career school programs are similar to those listed above. They do not include experience, experience squared, veteran status, or years of education; however they do include educational attainment measured as less than high school, high school diploma only, some college w/no degree, a less than 4-year certificate or Associate's degree, and bachelor degree or higher.

Independent variables used in regression adjustments for apprenticeship programs are a subset of those used for JTPA programs. The variables that were missing included years of

education, high school graduate, disability status, limited English proficiency status, veteran status, employment status at registration, enrollment status at registration, and public assistance status at registration.

Independent variables used in regression adjustments for high school are similar to those used for JTPA programs. Not available or not meaningful were years of education, limited English proficiency, veteran status, age, or employment status at registration, enrollment status at registration, and public assistance status at registration. Other variables that were available and were used included grade point average, free or reduced-price lunch eligibility, and school located in urban, suburban, or rural location. The prior employment and earnings variables were measured relative to high school graduation (not program registration). Prior percentage employed was replaced with ever employed and number of quarters employed prior to graduation. Prior earnings trend and variance were not used. Prior public assistance was also measured relative to graduation and pertained to the students' family, specifically was the student on record as being in a public assistance case.

Comparison Group Means

The last two columns of the tables present the means for the comparison groups for the outcome variable measurement periods (post-training). They are given so that impacts can be gauged on a percentage basis.