

Chapter 3

Evaluation of Occupational Skills Training on Labor Market Outcomes

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With the onset of the Great Recession in December 2007, New Jersey experienced a significant spike in unemployment, from 4.5% in November 2007 to 9.8% in October 2009 through January 2010 (Bureau of Labor Statistics, 2015). One of the state's, and indeed the nation's, primary means of fighting unemployment is to provide job seekers with occupational training. Each year, New Jersey trains thousands of job seekers to help them upgrade their skills and return to work. From 2006 to 2013, through the largest federal workforce program, the Workforce Investment Act (WIA), and the largest state-funded training program, the Workforce Development Partnership (WDP) program, New Jersey provided nearly 40,000 New Jersey residents with individual training grants for occupational skills training.

The primary purpose of this chapter is to present the results of a quasi-experimental evaluation of the effectiveness of New Jersey's occupational skills training programs. It also addresses three related questions. First, did the recession change who sought training? Second, do individuals who participate in training at different types of training providers — a community college vs. a private training provider — achieve different labor market outcomes? Third, how do individuals trained specifically for occupations in the state's key industry sectors fare in the labor market after training?¹

Before discussing the evaluation of training, this chapter presents a brief summary of the study's principal findings, a description of the data sources used, and the results of a descriptive analysis of the changing characteristics of training participants from 2006 through 2013. The next section presents the design, methodology, and results of the Heldrich Center's evaluation of three occupational skills training programs: WIA Adult, WIA Dislocated Worker, and WDP. The chapter then compares the employment and earnings outcomes of trainees who received training at a community college to trainees who were trained at a private training provider. Next, the chapter presents the results of a labor market outcomes comparison of individuals who received training in occupational fields closely aligned with the state's key industry sectors. The final section concludes.

Summary of Principal Findings

Finding #1. After the recession began, an increasing share of training recipients in all three programs that were studied (WIA Adult, WIA Dislocated Worker, and WDP) were male, white, older, and somewhat more highly educated than pre-recession trainees. In addition, post-recession trainees also had more favorable pre-training employment histories compared with individuals who started training before the recession.

Finding #2. The quasi-experimental evaluation of the WIA Adult and WIA Dislocated Worker training programs shows that participation in training results in higher post-training employment rates and earnings relative to two matched comparison groups. There is modest evidence indicating that participation in WDP training also positively affects employment and earnings after training, but the smaller sample size available for the WDP analysis means that these results are not statistically significant, and caution should be taken in drawing conclusions about the effectiveness of WDP training.

Finding #3. Descriptive analyses of employment and earnings outcomes data for community college and private training provider exiters show that the two groups of exiters are employed in New Jersey at about the same rate following training and earn about the same amount of money.

Finding #4. A descriptive analysis of employment and earnings outcomes shows that individuals trained in the Healthcare and the Transportation, Logistics, and Distribution (TLD) fields — two of the state's "key industry sectors" — find employment in their related industries at about the same rates. TLD training exiters, however, generally earn more than the exiters of healthcare training programs.

Data Sources Used for this Report

Heldrich Center researchers used two primary data sources from the State of New Jersey to conduct the data analyses presented in this chapter: America's One-Stop Operating System (AOSOS) and Unemployment Insurance (UI) Wage Record data. AOSOS records the enrollment of customers in the workforce system, their demographic characteristics, the services they receive, and their exit from the system. AOSOS also tracks the participation of workforce system customers in the three largest welfare programs that serve working-age adults: Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), and the General Assistance (GA) program, a state-funded program that serves adults without dependent children. The UI wage data system records the wages of all employees at employers that report wages every quarter in the course of paying their UI taxes.

Training Participants Before and After the Onset of the Great Recession

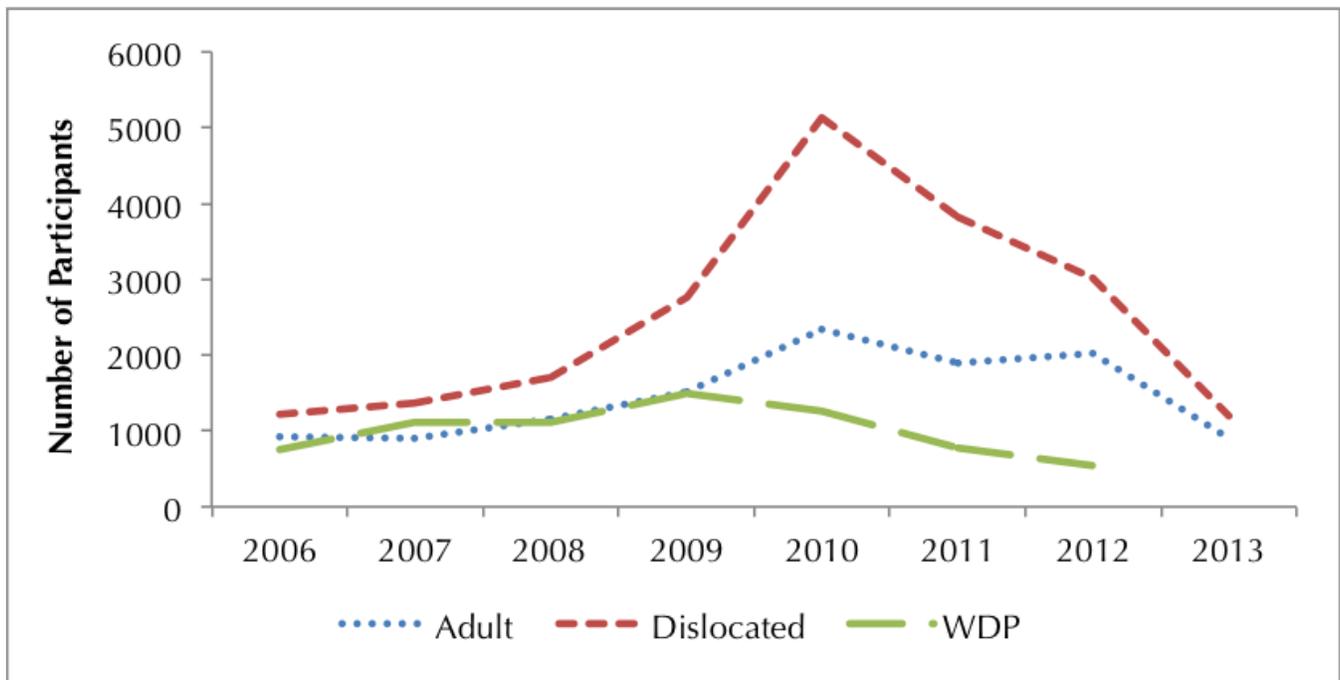
The Great Recession, which began in 2007 and officially ended in June 2009, left the nation with record levels of unemployment. In New Jersey, the seasonally adjusted unemployment rate more than doubled between November 2007 and October 2009, from 4.5% to 9.8% (Bureau of Labor Statistics, 2015). Many researchers (e.g., Elsby, Hobijn, Sahin, & Valletta, 2011; Bureau of Labor Statistics, 2012) have documented the different character of the Great Recession compared to previous recessions, including the higher spike in unemployment rates, the increased duration of unemployment, and the disproportionate effect on male workers, among others. Although the macroeconomic consequences of the Great Recession for the labor market have been well documented (e.g., Elsby et al., 2011; Bureau of Labor Statistics, 2012), less research has been devoted to the microeconomic effects of the recession on the unemployed. In the context of New Jersey's occupational skills train-

ing programs, Heldrich Center researchers asked whether the Great Recession affected who sought training through the WIA Adult, WIA Dislocated Worker, and WDP programs and studied the extent to which the characteristics of the individuals who sought occupational skills training changed from before the Great Recession to afterwards. This descriptive analysis presents interesting insights into the evolving characteristics of training recipients, which serves to place the results of the evaluation of New Jersey's training programs into context.

To examine the characteristics of training participants before and after the Great Recession, this section presents summary statistics for a number of variables for the WIA Adult, the WIA Dislocated Worker, and the state-funded WDP programs across multiple program years. These statistics are presented separately for training participants from each program, because each serves a distinct population.² In each of the charts below, Center researchers present the means for each variable for each of program years 2006-2013. Program years 2006-2008, which extend from July 2005 to June 2008, represent the pre-recession period. Although the Great Recession officially began in December 2007, the recession did not begin to have adverse effects on the labor market until the middle of 2008. Program years 2009-2013, which extend from July 2008 to June 2013, cover the recession and post-recession periods for which data are available. Thus, this chapter presents three years of pre-recession data and five years of data from the onset of the recession.

Before turning to the characteristics of the trainees, this chapter first examines how the number of training participants has changed over time. Figure 3.1 demonstrates a substantial spike in the number of individuals seeking training through the Dislocated Worker program as well as a less-pronounced but nonetheless significant increase in the number of individuals trained through the WIA Adult program. Both programs show gradual growth in training participation prior to the recession, followed by the stark increase for Dislocated Worker training and the more modest increase for WIA Adult, both of which peak in 2010 and then subside in 2011. This pattern is consistent with the large but time-limited resources that states received through the American Recovery and Reinvestment

Figure 3.1. Number of Individuals Trained through the Adult, Dislocated Worker, and WDP Programs, 2006-2013



Act (Eberts & Wandner, 2013). The other point that stands out from Figure 3.1 is that the Dislocated Worker program served a greater number of trainees than the Adult program in each of the seven program years. The state-funded WDP program actually saw reductions in the number of individuals served over this period, likely the result of lower funding levels for the program (New Jersey Department of Labor and Workforce Development, 2012).

Turning to the traits of the training participants, this section first examines their demographic characteristics, which are displayed in Figures 3.2 through 3.5. Figure 3.2 demonstrates gradual change in the proportion of female participants over time. In the Adult and Dislocated Worker programs, women represent the majority of trainees with at least 55% of participation through 2010. However, the data show a slight decline in this majority once the recession hits. After the recession hit, in almost every year, female participation in the WIA Adult, WIA Dislocated Worker, and WDP programs was lower year after year. Except for a slight uptick in female participation between 2010 and 2011, a general

decline in female participation in the three training programs begins in 2011. The decline is especially acute from 2012 to 2013 for the Adult and Dislocated Worker programs when the female participation rate declined by six and seven percentage points, respectively.

Figure 3.3 displays the changing racial composition of training participants. In both WIA programs and WDP, non-white participants represent a substantially smaller proportion of trainees once the recession hits. This drop in participation among non-white individuals is especially acute in the Dislocated Worker program, which went from 60% minority participation in 2008 to 48% in 2009. While this number rebounded to 52% in 2011, it is still much lower than its pre-recession level. The pattern of non-white participation in WDP mirrored that of the Dislocated Worker program. While not as severe, minority participation in the Adult program dropped from 74% in 2008 to 69% in 2013.

Figure 3.2. Proportion of Participants who are Female in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013

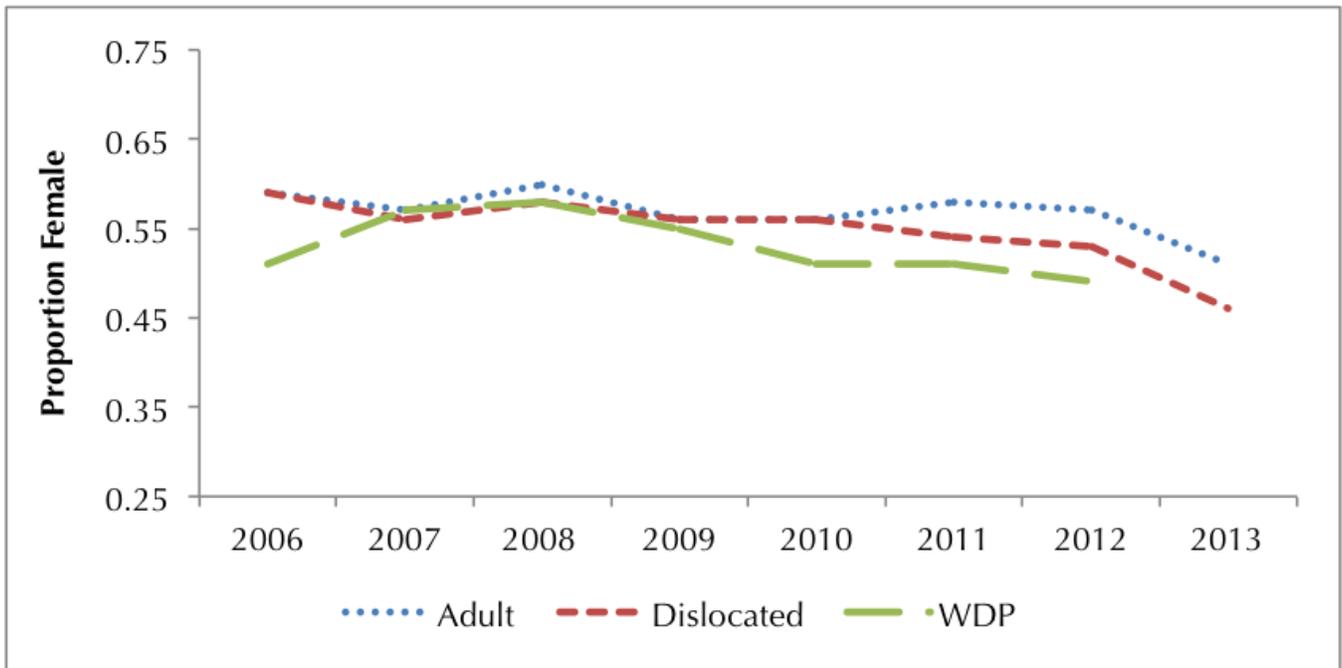
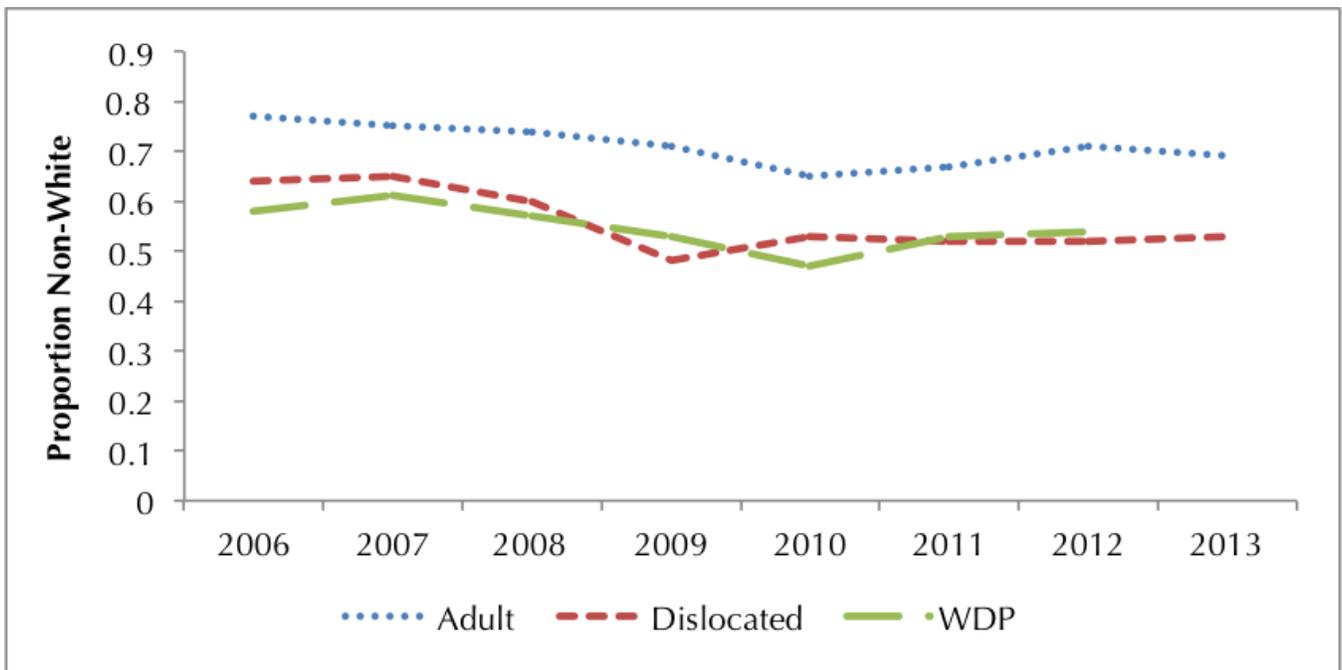


Figure 3.3. Proportion of Participants who are Non-White in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013



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Rounding out the demographic characteristics, Figures 3.4 and 3.5 demonstrate not only further differences between the WIA Adult program, on the one hand, and the WIA Dislocated Worker and WDP programs on the other, but also similar trends over time. Looking at the mean age of participants at registration and their mean years of education, it is clear that the Dislocated Worker and WDP programs serve a slightly older and more educated population than the Adult program. It is also clear that the mean age and years of education, regardless of program, increase after the onset of the recession. In summary, post-recession trainees are more likely to be male, white, older, and more highly educated than their pre-recession counterparts.

In addition to demographic traits, the pre-training employment experiences of trainees also changed from before the recession to afterward. As previous research has demonstrated, during the recession more individuals experienced significantly longer spells of unemployment. Individuals who

sought training in New Jersey were no exception to this rule. The data indicate a sharp post-recession increase in duration of unemployment of trainees. Specifically, Figure 3.6 provides a proxy for the duration of unemployment prior to WIA and WDP participation, and is arguably the most striking of all the charts in this section. Each line represents the mean number of quarters with zero wages prior to WIA registration. As with many of the demographic variables described above, Figure 3.6 provides further evidence that the WIA Adult program, on the one hand, serves a different population than the WIA Dislocated Worker and WDP programs, on the other. The Adult program trainees endure substantially longer periods without wages prior to receiving WIA assistance. Despite this difference, since the recession began, the duration of unemployment prior to training among trainees increased significantly for participants in all three programs. In fact, these durations essentially doubled between 2009 and 2011. To put these numbers in context for 2011, Dislocated Worker trainees endured, on average, at least six months

Figure 3.4. Age of Participants in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013

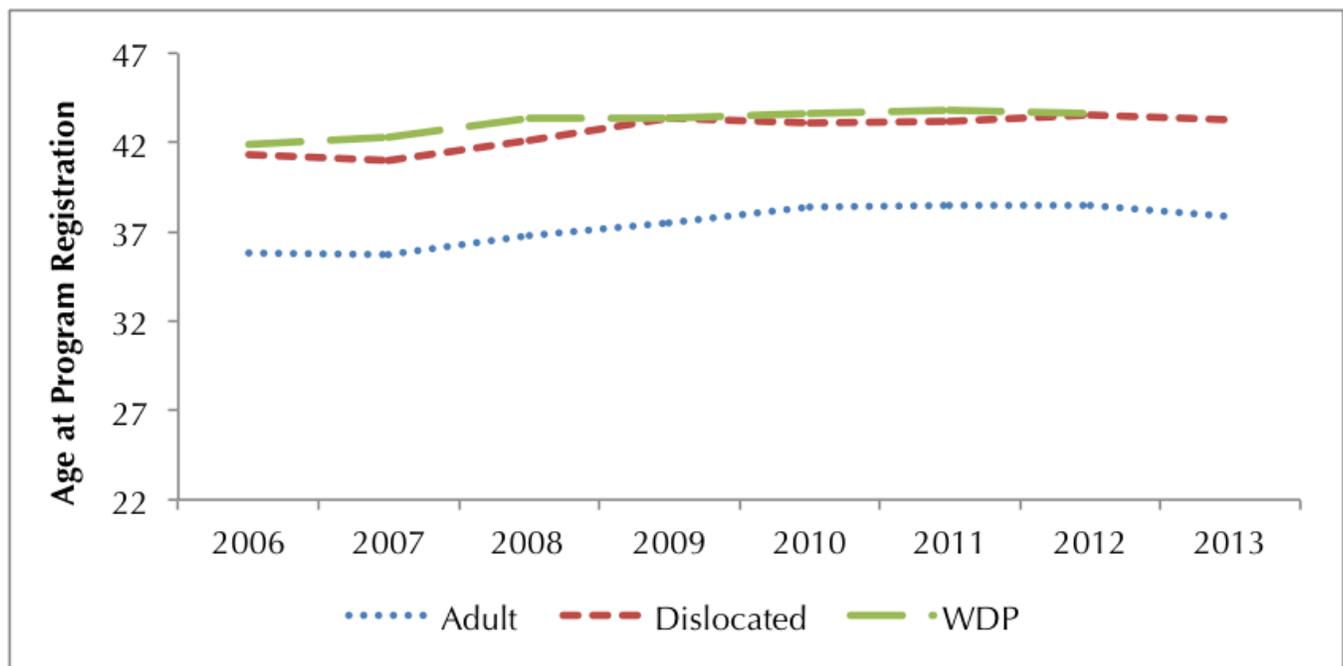


Figure 3.5. Years of Education of Participants in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013

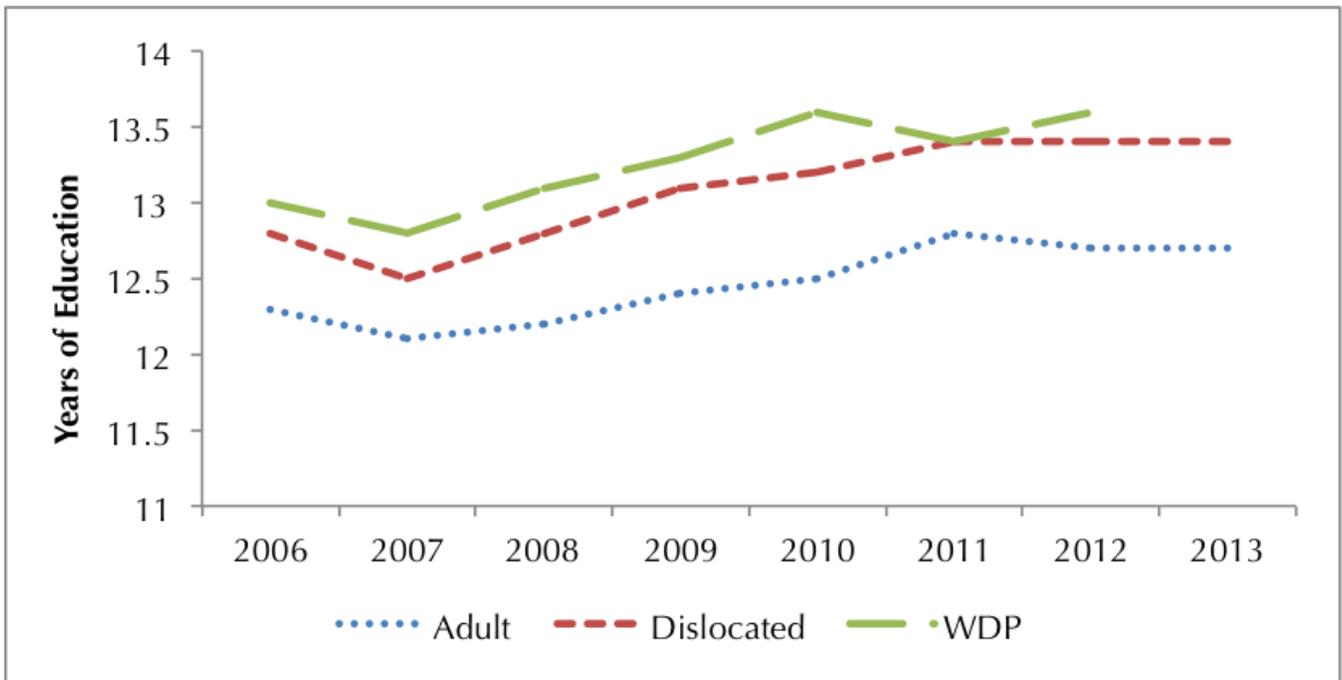
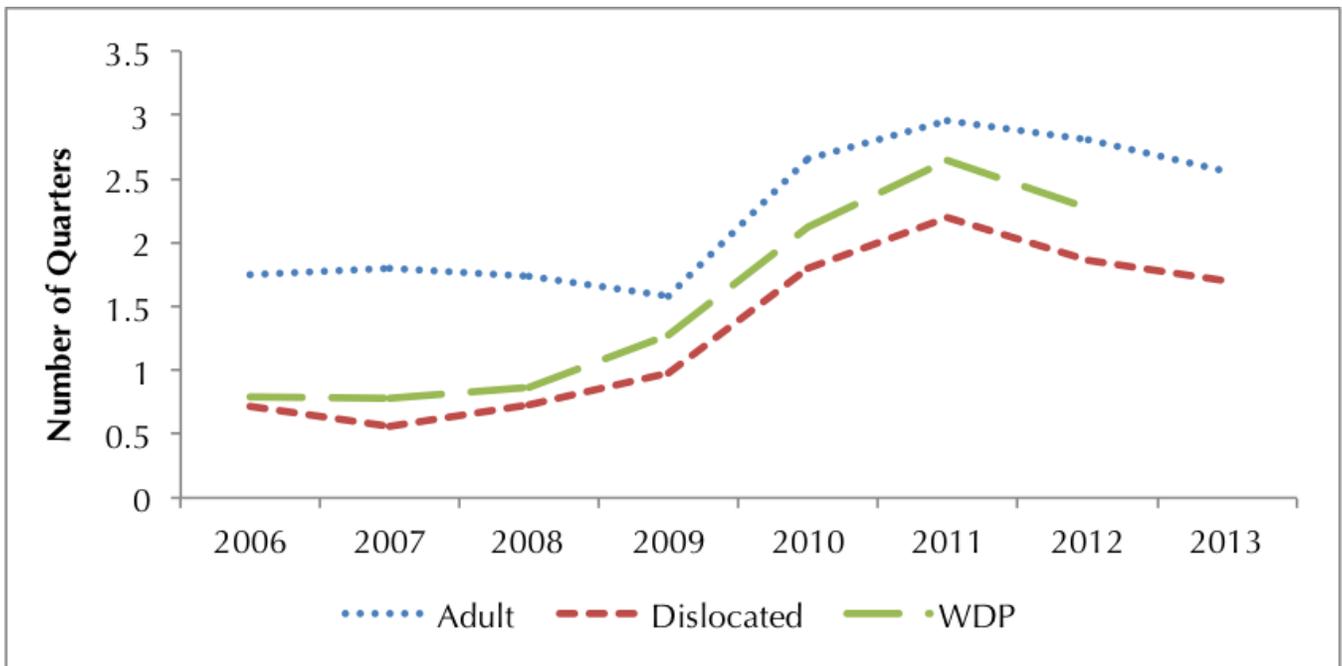


Figure 3.6. Number of Consecutive Quarters of Unemployment Before the Start of Training of Participants in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013



Evaluation of One-Stop Career Centers in New Jersey

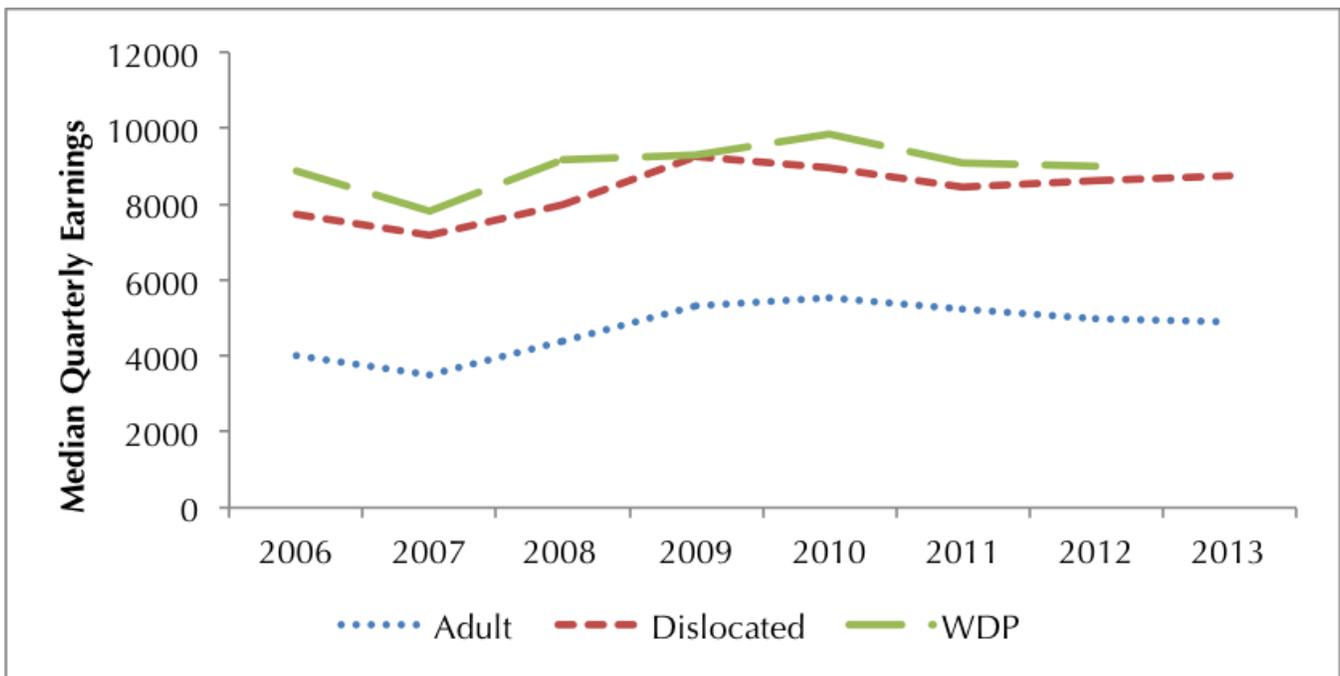
with zero wages, WDP participants endured 7.5 such months, and Adult program trainees endured nine months. These striking durations are likely a product of increasing demand for services after the recession, far exceeding the limited funding available for training programs. After 2011, the unemployment duration of participants in each of the three training programs begins to fall by roughly a month-and-a-half for participants in each of the three programs.

Heldrich Center researchers then examined whether the average pre-training earnings of trainees changed over time. In other words, did the individuals entering training in more recent years earn more or less before they started training than individuals who started training in earlier years? To estimate pre-training earnings, Heldrich Center researchers computed a quarterly, pre-training wage for all trainees, by taking the average of each trainee's earnings in the sixth quarter before training through the third quarter before training. Center researchers selected these specific pre-training quarters in order to get a more accurate sense of

each individual's true labor market value. Figure 3.7 displays the median, pre-training quarterly earnings of trainees. The data show that immediately following the onset of the recession, individuals seeking training had higher earnings than individuals who enrolled in training before the recession began. Individuals who began training in more recent years have had somewhat lower earnings than the immediate post-recession cohorts, but still higher than the pre-recession trainees.

Some of the factors that likely account for the increase in average pre-training earnings after the start of the recession are the trends shown in Figures 3.2 through 3.5. Starting in about 2009, the composition of WIA trainees begins to shift toward individuals who have a set of demographic characteristics that are associated with higher earnings. Given these demographics, it should be expected that the prior wages of trainees would be greater after the onset of the recession. This increase does occur, notably in 2009 (and 2010 for WDP). However, it remains flat through 2013, likely as a result of the increased duration of unemployment prior

Figure 3.7. Pre-Training Median Quarterly Earnings of Participants in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013



Evaluation of One-Stop Career Centers in New Jersey

to training in those years and the well-noted wage stagnation that has plagued the economy since the start of the recession (Daly & Hobijn, 2015).

To get a sense of the trainees' pre-training labor market attachment, Heldrich Center researchers calculated the proportion of the 20 quarters prior to training in which trainees were employed. The data indicate that, overall, Dislocated Worker and WDP trainees were employed in roughly 16 of the previous quarters, on average, while Adult program trainees were employed in about 13 of them. Figure 3.8 shows that over time across all three programs, there is a very slight increase in the proportion of previous quarters employed immediately after the recession starts followed by a slight, but steady decline from 2009 onward.

Concluding the labor market variables, Figure 3.9 provides the mean prior job tenure of trainees. Due to the nature of program eligibility requirements, it is not surprising that Dislocated Worker partici-

pants have longer attachments to their prior employers. WDP participants have longer job tenure, at least in part, because individuals with stronger work histories are eligible to participate in it. For the most part, tenure in the previous job is relatively stable over the entire sample period. There is, however, a modest trend among new Adult and Dislocated Worker trainees in the years after the start of the recession who show slightly higher levels of pre-training job tenure.

Finally, in addition to demographic and labor market characteristics, Figure 3.10 demonstrates an important change in the way training participants were served by One-Stop Career Centers. Each line represents the mean number of days between registering for WIA services and starting training. The most striking aspect of Figure 3.10 is that across the entire sample period, the time from registration to the start of training was far lower for WDP participants than for trainees in either of the WIA programs. This difference may be a function of

Figure 3.8. Proportion of Pre-Training Quarters Employed for Participants in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013

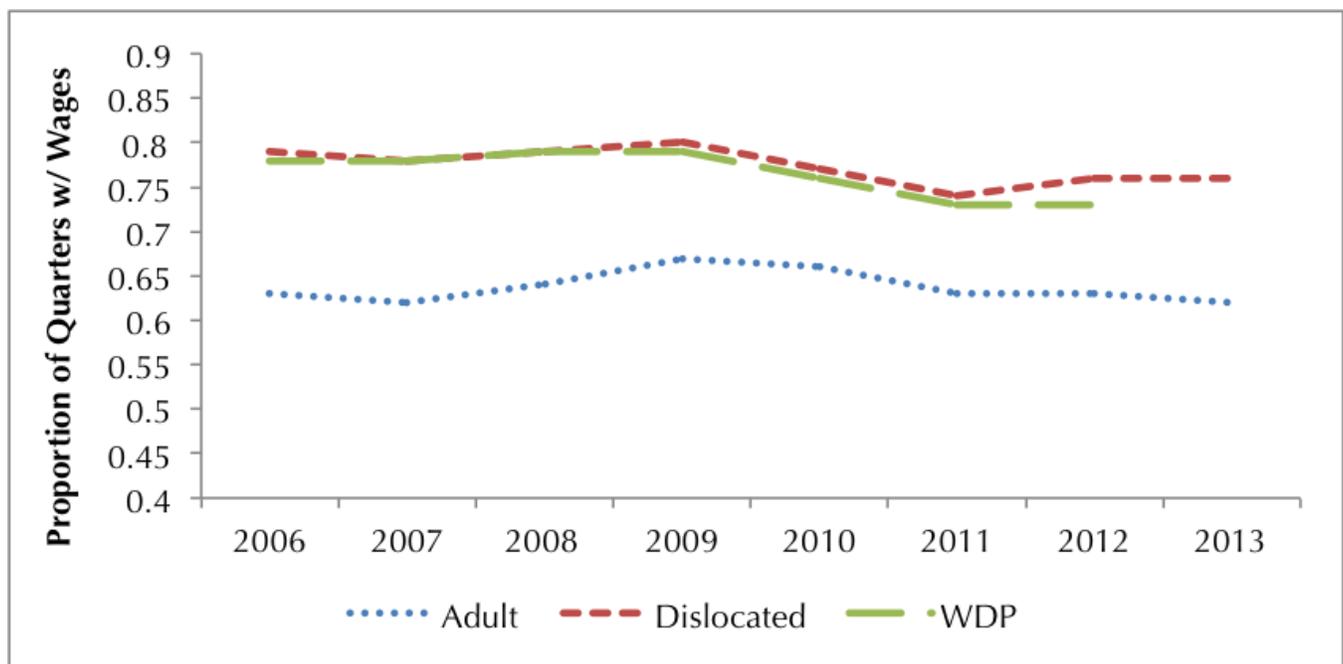


Figure 3.9. Number of Consecutive Quarters of Employment at Most Recent Employer Before Training of Participants in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013

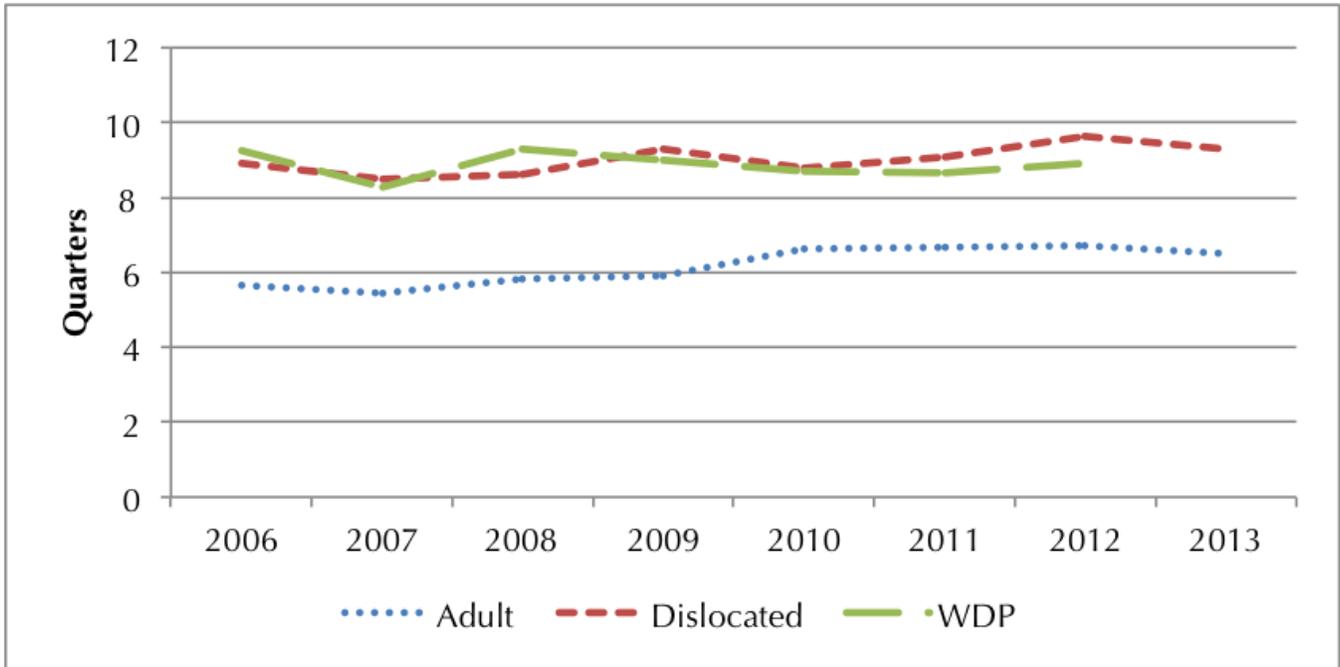
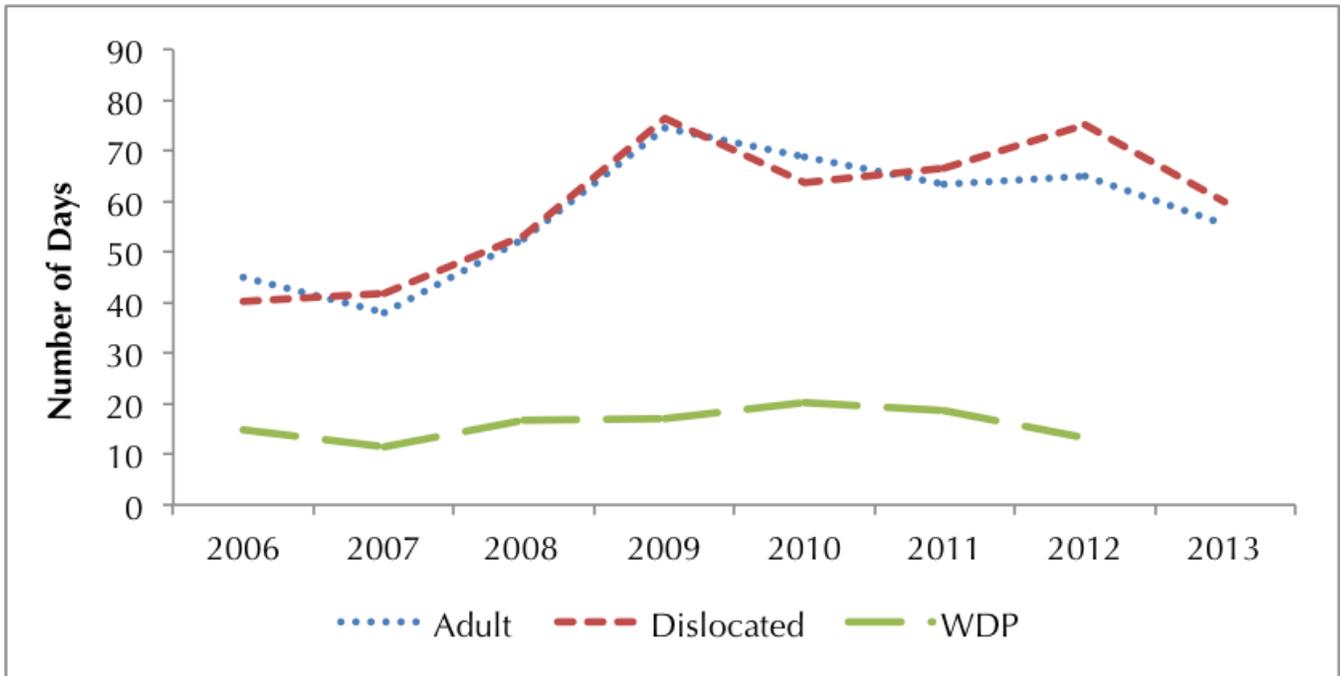


Figure 3.10. Number of Days between Registration and Start of Training for Participants in WIA Adult, WIA Dislocated Worker, and WDP Programs, 2006-2013



how WIA staff allocate individuals to these training programs or the requirements and documentation needed for participation in them. Looking only at the WIA programs, prior to the recession, training participants could expect to wait 40 to 45 days to begin a training program. This time increased dramatically in 2009, reaching over 70 days for both Adult and Dislocated Worker participants. By 2013, however, this time had dropped to around 55 to 60 days. While this post-recession trend could simply be a product of having fewer participants to serve, it could also be the result of One-Stop Career Center staff becoming more proficient at implementing assessment procedures that select individuals for training (Trutko & Barnow, 2013).

In brief, the descriptive statistics show a change in the composition of individuals participating in training after the start of the Great Recession compared to before the recession began. To be more specific, after the recession began, a growing proportion of training recipients in all three programs — WIA Adult, WIA Dislocated Worker, and WDP — were male, white, older, and somewhat more highly educated. This set of characteristics has been found to be associated with more positive labor market outcomes, and the higher levels of pre-training earnings among the trainees after the start of the recession bear this out.

Quasi-Experimental Evaluation of Occupational Skills Training

Research Question and Research Design

This chapter addresses the question of whether and to what extent New Jersey's job training programs help the unemployed return to work and increase their earnings: what are the employment and earnings effects of the occupational skills training provided in New Jersey under two programs — the largest federal workforce program, WIA, and the largest state-funded training program, WDP?

Generating a valid answer to this question requires an answer to the more specific question of how the outcomes of WIA Adult, WIA Dislocated Worker, and WDP trainees would have been different had they not received training. To answer this question, ideally one would be able to compare the trainee's earnings in the world in which she participated in training with her earnings in the world in which she did not. This is, of course, impossible because we observe either the state of the world in which she participated or the state of the world in which she did not, but not both. The researcher must therefore compare individuals who participated in the program with individuals who did not participate but are otherwise as similar as possible to the participants.

In a perfect world, the only pre-program difference between the trainees and the comparison group of non-trainees would be that the former participated in the program while the latter did not. Purely from a research standpoint, the ideal way to develop such a control group would be to randomly assign a portion of those interested in training to receive training (treatment group) and a portion to receive some other service (control group), follow both groups as they enter the labor market, and then compare their earnings. With a large sample of prospective trainees, assignment at random would ensure that the only difference between two groups, on average, was participation in training. Unfortunately, such a research design was not feasible for this evaluation.

The next best alternative, and the strategy that Heldrich Center researchers followed, is to use observational data to generate a valid comparison group. The treatment and comparison group members must be as similar as possible on measurable characteristics, including their sex, race, age, education level, and wages they earned before training as well as on characteristics that are extremely difficult to measure, such as their motivation to succeed. Heldrich Center researchers constructed two separate comparison groups, one consisting of customers who have received an intensive service and another of customers who started training but did not complete it, using matching methods that selected for the comparison group individuals who are highly similar to the trainees on a number of observable characteristics. Heldrich Center re-

searchers then evaluated the effect of training by comparing the employment and earnings of trainees to the comparison group of non-trainees.

Treatment and Comparison Groups. One of the contributions of this chapter is to examine the impact of occupational training programs across multiple comparison groups. In all analyses below, the treatment group consists of all individuals who completed an occupational skills training program and who have a WIA exit date. While “training” typically refers to a wide variety of activities, including on-the-job training, occupational skills training, and alternative work experiences, the treatment group in this study consists only of individuals who started and completed an occupational skills training program that was funded by either the WIA Adult, WIA Dislocated Worker, or WDP programs.

In the first set of analyses, the comparison group consists of individuals whose “highest” level of service received in a workforce registration period was intensive services and who have a service period exit date. For a customer to have received intensive services as her highest level of services in a workforce registration period, she must have received intensive services — either one or more funded intensive services or one or more unfunded intensive services (as classified for the New Jersey Department of Labor and Workforce Development, or NJLWD) but not received any type of training — occupational skills training or any other type of training. Individuals who received intensive services and occupational skills training are included in the treatment group. Individuals who received intensive services and any type of training besides occupational skills training are excluded from this analysis. Additionally, for every individual in the treatment group, Center researchers remove all instances of that trainee’s prior participation in intensive services, in order to avoid matching a treatment group member to herself.

In the second set of analyses, researchers used individuals who started a training program but failed to complete it as the comparison group. Using WIA Intensive customers as the comparison group is a common practice in much of the training evaluation literature (Hollenbeck & Huang, 2013). Given the graduated nature of WIA services, these in-

dividuals should be more similar to training participants on unobservable characteristics than job seekers who only register for the labor exchange. However, training participants are not randomly selected from the pool of all WIA Intensive customers. On the contrary, it is highly likely that trainees are selected for and/or select into training programs based on unobservable characteristics (e.g., motivation) that correlate with employment outcomes. A more appropriate comparison group for evaluating training programs would control for these unobservable characteristics that select individuals into training programs in order to eliminate the resultant positive bias in employment outcomes. Fortunately, the administrative dataset used offers just such a comparison group by identifying those individuals who begin but fail to complete a training program. These non-completers serve as the comparison group in the second set of analyses. Because completers and non-completers alike have selected into WIA participation and specifically into starting an occupational skills training program, it is likely that they are more similar in terms of their unobservable characteristics than trainees and “intensive” services recipients. Of course, no comparison group is perfect, and there may well be systematic, unobservable differences between training program completers and non-completers. Many individuals may fail to complete, for example, because they need short-term employment and drop out of training to go to work, others because they encounter unexpected personal challenges, such as childbirth, dependent care, or serious injury, that prevent them from continuing their training.

Methodology

This section discusses the key elements of the evaluation methodology, including the unit and periods of measurement, temporal measurement, sample period, control variables, outcome variables, data limitations, and data-matching algorithms.

Unit and Periods of Analysis. The unit of analysis is the person plus workforce services registration quarter. This means that a single person can appear multiple times in the treatment group if he has multiple registration quarters in the period of study. In order to ensure at least eight quarters of wage

data on the entire sample, the analyses are limited to those individuals who registered for workforce services in program years 2009 to 2012 (July 2008 to June 2012).

Temporal Measurement. Training evaluation studies often define the temporal sequencing of an individual's path through the labor market in one of two ways. While some use a single point in time to distinguish the periods before and after participation in an employment service, others use two points in time to distinguish between the time before participation, the time spent participating in a service, and the time after the service is complete. The Heldrich Center takes the latter approach. The administrative dataset contains both a workforce services registration date and an exit date, allowing researchers to clearly identify the period in which individuals participate in the workforce system. Thus, all labor market history variables are measured backward from the registration quarter, and all outcome variables are measured forward from the exit quarter.

Sample Definition. In order to improve the validity of the results, Heldrich Center researchers remove a number of observations from the dataset. Those under 22 years of age at the time of registration are removed, as youth job seekers are a population with service challenges that are distinctly different from those of adults. Heldrich Center researchers also remove individuals with no earnings in the five years prior to registration, as well as those in the top 1% of previous earnings. Finally, researchers remove all observations that are missing a workforce services exit date.

Control Variables

Demographic Characteristics. Heldrich Center researchers created variables for the following individual-level demographic characteristics: age, sex, race/ethnicity, level of education, and disability status.

Labor Market History. Heldrich Center researchers control for the wage history of each training participant, which is defined as the individual's average earnings over the 7th through 10th quarters prior to enrollment in the workforce system. Research-

ers then created a series of additional variables, including the proportion of time that an individual was employed in the five years prior to workforce services registration, the duration of unemployment prior to registration, and job tenure at an individual's most recent place of employment.

Program History. The Heldrich Center created four separate dummy variables to indicate whether an individual had participated in WIA, TANF, SNAP, or GA at any point in the four quarters before his workforce services enrollment quarter.

Outcome Variables. Heldrich Center researchers tested the effect of training on two primary dependent variables: the earnings in each of the eight quarters following the workforce services exit quarter, and employment in each of the eight quarters following the exit quarter. Earnings were calculated only for individuals who had wages greater than zero in a particular quarter. Individuals with no earnings for a given quarter were excluded from the calculations. Earnings were adjusted for inflation to the second quarter of 2014, using the mean consumer price index values for New York, NY and Philadelphia, PA (Bureau of Labor Statistics, 2015).

Data Limitations. Finally, there are several characteristics of the data used in this study that could bias the impact estimates of the training programs evaluated. First, this study includes no UI claims data. While the New Jersey Workforce Data Quality Initiative project plans to link these UI claims data to the longitudinal data system in the near future, they are not currently linked. Consequently, Heldrich Center researchers were unable to include a number of important control variables in their analysis such as the exact duration of unemployment and the receipt of UI benefits. Second, the UI wage record only provides data for those individuals employed in New Jersey. Thus, when New Jersey job seekers find work in other states, their records show zero wages. This could bias the results of this study to the extent that individuals in treatment groups have a different likelihood of finding work outside of New Jersey than those in the corresponding comparison group.

Third and most important, Center researchers were not able to disaggregate "intensive" customers by WIA program. It was only possible to examine the

entire pool of workforce customers and identify those individuals whose highest level of service received during a workforce registration period was an “intensive” service as defined by NJLWD. Thus, in the analyses that use “intensive” customers as the comparison group, the matched comparison group customers could be from the WIA Adult, WIA Dislocated Worker, WDP, or Wagner-Peyser programs. This represents a significant departure from much of the existing evaluation literature, which often limits the comparison group only to individuals who are classified as Intensive customers in the WIA program under evaluation. Also included in the comparison pool are individuals who are TANF, SNAP, and GA customers. Heldrich Center researchers attempt to mitigate problems of comparing WIA clients to TANF, SNAP, and GA customers by including in the matching model separate dummy variables for participation in TANF, SNAP, and GA, respectively, in the past year. The limitations of using such a comparison group are discussed below.

Matching Model

Matching methods are powerful methods for identifying observations that are as similar to one another as possible in terms of their **observable** characteristics. In a perfect world, every observation in the treatment group would have a matching observation that was identical in every way except for the receipt of the treatment. Such exact matching is not feasible, so researchers developed propensity score matching (PSM), which calculates for all observations in the treatment group and the comparison pool the probability that each observation received the treatment. Each treatment group observation is then grouped with one (or more) observations from the comparison pool that has (have) the most similar propensity score(s). PSM is by far the most common method used in evaluating training programs. Recent discoveries in statistics, however, have found that PSM can lead to biased estimates that misrepresent the true impact of training programs (King, Nielsen, Coberley, Pope, & Wells, n.d.) and potentially generate worse results than not matching.

Alternative methods, such as Mahalanobis Distance Matching (MDM) and Coarsened Exact Matching, do not suffer from the deficiencies of

PSM. Heldrich Center researchers, therefore, estimate all models using MDM and evaluate the robustness of the results using PSM. Whereas propensity score matching uses a logit model to predict the probability that an individual is in the treatment group and then selects the treatment and comparison groups comprised of the individuals with the most similar propensity score, MDM measures the distance of a treatment group observation from a set of observations in the comparison pool and matches with closest comparison observation(s).

All of the models presented below use MDM with replacement, meaning that comparison group observations can be matched with more than one treatment group observation. In addition to including all variables listed above in the MDM model, Heldrich Center researchers also exact match on sex and program year. All models estimate the average effect of the treatment on the treated with Abadie-Imbens standard errors, and all estimates are regression-adjusted using all of the control variables in the matching model (Abadie & Imbens, 2011).

The limitation of any matching strategy is that, unlike an experiment, it is unable to ensure that the **only** difference between treatment and control group members is that the former received the treatment and the latter did not. In quasi-experimental designs, it is possible that individuals who have identical observable characteristics (i.e., in terms of **measurable** demographics, prior labor market, and ability variables) may differ in important ways from one another in terms of their **unobservable** traits, such as their motivation to succeed, their family connections, their social networks, etc. Although Center researchers have created two different comparison groups that seek to ensure that the treatment and control group individuals are as similar as possible to one another on both observable and unobservable characteristics, it is nonetheless likely that this model does not capture all significant variation between the treatment and comparison groups. This issue is addressed in the discussion of the results and the conclusion.

Training Completers vs. Customers who have Received an Intensive Service

Post-Match Descriptive Statistics

The goal of matching is to create a comparison group of job seekers who are as similar as possible on their observed characteristics to trainees. As described above, Heldrich Center researchers find the nearest neighbor of each training participant within the comparison group of customers who

received an intensive service using the Mahalano-bis distance. One of the benefits of using a more broadly defined comparison group is that this provided a very large pool of over 300,000 individuals for the three program years under analysis. With the comparison pool being roughly 80 times larger than the Adult program training group, 40 times larger than the Dislocated Worker training group, and 100 times larger than the WDP training group, it allowed Heldrich Center researchers to obtain strong matches on the observable characteristics used in the matching model. Table 3.1 provides post-match summary statistics for variables used in the matching model.³ As the table demonstrates,

Table 3.1. Post-Match Summary Statistics

	Adult		Dislocated Worker		WDP	
	Trainees	Intensive Clients	Trainees	Intensive Clients	Trainees	Intensive Clients
Sample Size	6,185	471,200	12,120	489,683	3,573	493,168
Matched Sample Size	6,185	6,185	12,120	12,120	3,573	3,573
Demographics						
Female	56%	56%	54%	54%	52%	52%
Age (mean)	38.0	38.0	43.0	42.9	43.5	43.4
Minority	68%	68%	52%	52%	52%	52%
Disability	1%	1%	1%	1%	1%	1%
Years of Education (mean)	12.6	12.5	13.2	13.2	13.4	13.4
Program History						
TANF	5%	5%	1%	1%	1%	1%
GA	3%	3%	1%	1%	1%	1%
SNAP	6%	6%	2%	2%	3%	3%
Workforce Services	58%	58%	60%	60%	78%	77%
Labor Market History						
Quarterly Earnings (mean)	\$5,174	\$5,152	\$9,097	\$8,953	\$9,815	\$9,599
Quarters Employed	65%	65%	76%	77%	76%	76%
Job Tenure (quarters)	6.5	6.5	9.0	9.0	8.8	8.8
Duration of Unemployment (quarters)	2.5*	2.4*	1.7*	1.6*	1.9*	1.7*

* Difference in means is statistically significant (0.05 level)

there are almost no statistically significant differences between the trainees and respective matched comparison groups in the WIA programs and the WDP program for the variables that were matched. The one exception is the duration of unemployment before workforce services registration, which is significant for all three programs. Given that the difference between the training and comparison groups is equivalent to about 10 days, however, the magnitude of this difference is quite small.

Impact Estimates

This section presents the results of the quasi-experimental evaluation graphically. For both the earnings and the employment rate outcomes, the values of the outcome variable (in dollars for earnings and in proportions for employment rates) appear on the y-axis in each figure. The x-axis indicates the quarter after training. Within each figure, the diamonds represent Heldrich Center researchers' best estimate of the earnings (or employment rate) differential between individuals who received training and similar individuals who did not receive training for each quarter after training. So, in Figure 3.11, for example, the rightmost diamond indicates that trainees earned about \$950 more in the eighth quarter after completing training than non-trainees earned in that quarter.

Extending upward from each diamond is a "T" and downward is an upside down T. These are drawn to indicate the degree of confidence (computed using a statistical formula) that Heldrich Center researchers have in the accuracy of their estimate of the effect of training. Returning to Figure 3.11, there is a high probability that the true difference in earnings between trainees and non-trainees lies between \$800 and \$1,100.⁴ In the results, Heldrich Center researchers sometimes refer to this as the "confidence band" around the estimate.

When the distance between the top of the T and the bottom of the upside down T is small, as in Figure 3.11, it indicates that researchers have a high level of confidence that the estimate is very close to the true value. When the distance is wider, as in Figure 3.19, researchers are less certain that the true value lies close to the estimate. Among the factors that significantly affect this distance are the

variability of the data and the number observations on which the statistical model is built and the estimate is made. In the results that follow, the reader will observe that the narrowest ranges around the estimates occur for the Dislocated Worker results, which have the greatest number of observations. The widest range around the diamonds occurs for the WDP results, which have the fewest observations.

Turning to the results, consistent with previous studies of WIA training programs, the Heldrich Center's models produced positive and statistically significant impact estimates for the Adult program. Figures 3.11 and 3.12 display the effect of the Adult training program on earnings and employment for the first eight quarters following program exit. In the first quarter after exiting training, participants earn about \$1,500, spiking to about \$1,600 in the second quarter after exit compared to their matched counterparts who only received one or more intensive services. In the second year after exit, however, this earning difference falls and appears to level off around a little more than \$900 per quarter. (As noted above, Heldrich Center researchers calculated earnings only for individuals who had wages greater than zero in a particular quarter. Individuals with no earnings for a given quarter were excluded from the calculations.)

The effect on employment in Figure 3.12 gives some insight into what may be driving this trend. While trainees found work at a rate about 30% higher than those in the comparison group immediately after exiting training, this advantage falls every quarter and is down to only 10% two years after exit. Consequently, one potential explanation for the decline in the effect on earnings is that it takes comparison group individuals longer to find work. Nevertheless, the impact of training on both earnings and employment is still significant and appears to stabilize by the end of the analysis period. Finally, the estimates display a very low level of uncertainty, which is evident in the small confidence bands around each point estimate.

Unlike the Adult estimates, the impact estimates for the Dislocated Worker program represent a departure from previous studies. While many scholars (Andersson et al., 2013; Heinrich et al., 2009) have found that training programs for dislocated workers

Figure 3.11. WIA Adult Quarterly Earnings Compared to Intensive Clients (Mean Difference in Levels Between Treatment and Comparison)

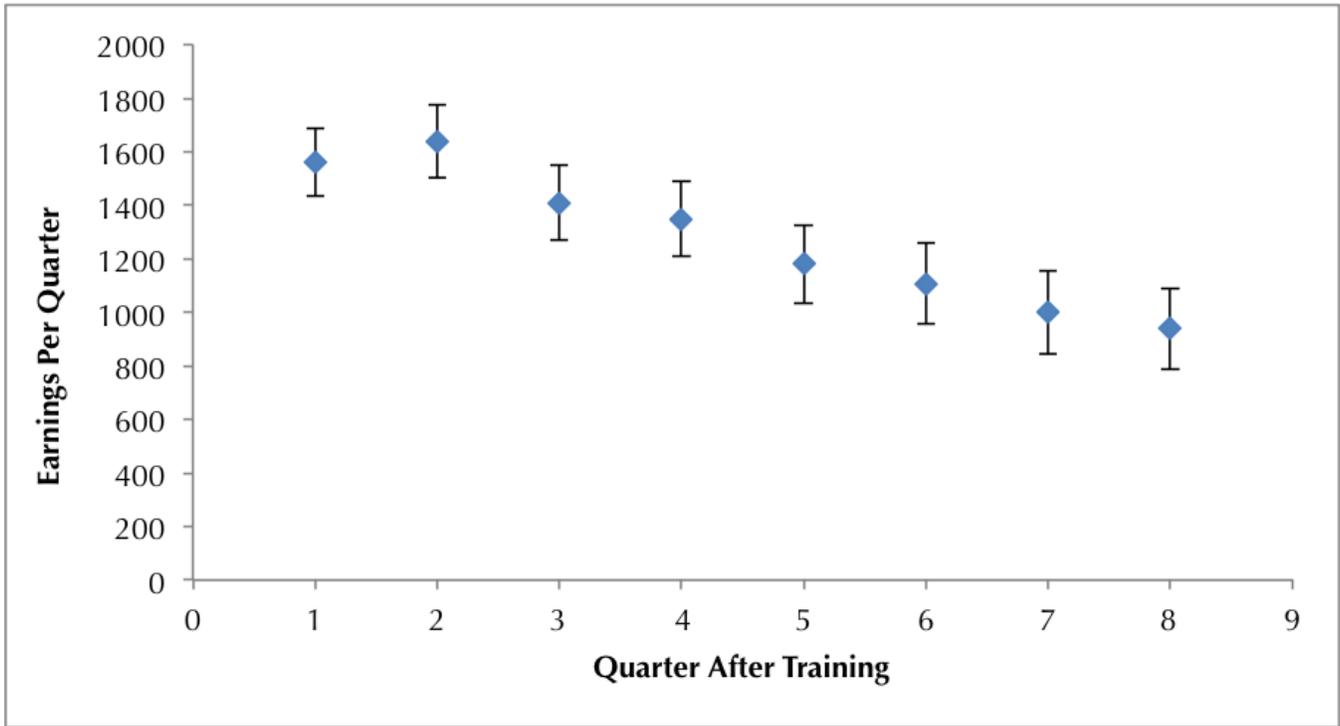
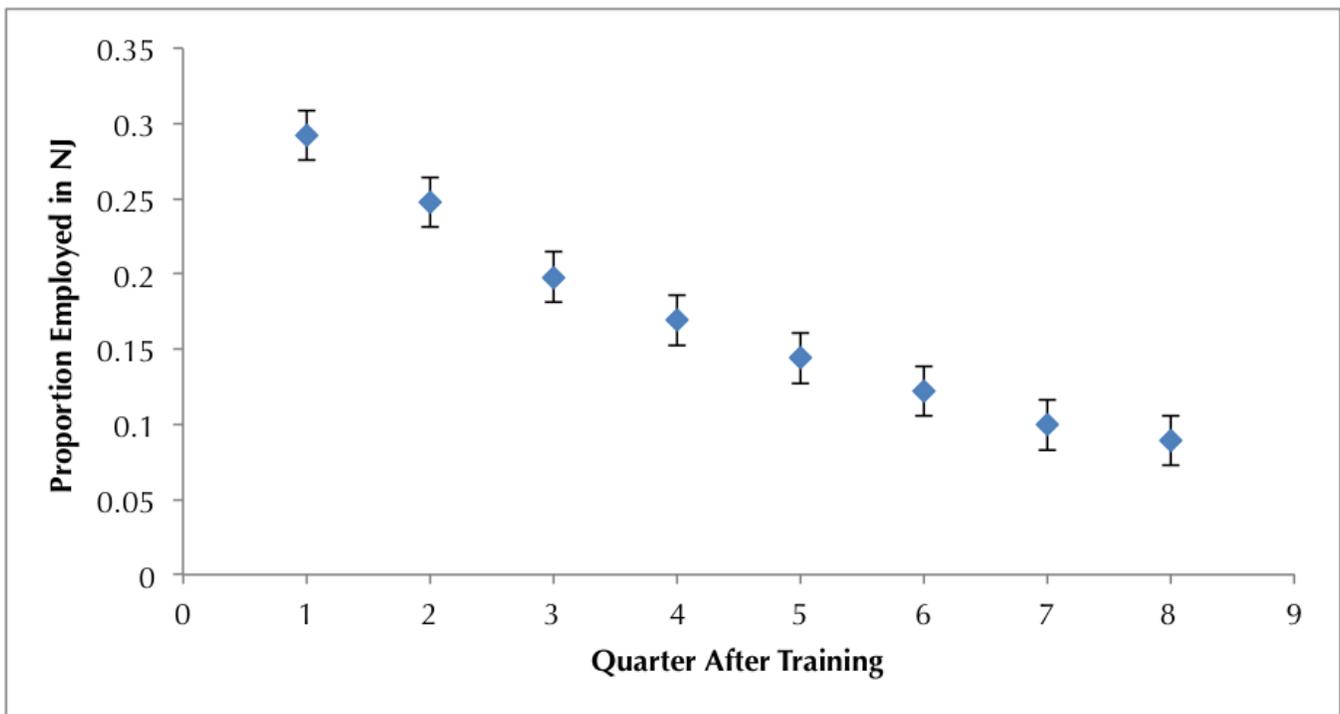


Figure 3.12. WIA Adult Employment Rates Compared to Intensive Clients (Mean Difference in Levels Between Treatment and Comparison)



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have little to no effect, Heldrich Center researchers estimate results more comparable to those of Hollenbeck and Huang (2013). As shown in Figures 3.13 and 3.14, training has a large and positive statistically significant impact on both earnings and employment, and the trends over time in the results are similar to those for the Adult program. The impact of training on earnings falls gradually from Year 1 to Year 2, and the impact on employment falls substantially from 28% in the first quarter to 11% in the eighth quarter. What stands out, however, is the magnitude of the effect on earnings. This rises to almost \$2,200 in the second quarter after training and levels off at nearly \$1,400 at the end of the analysis period.

The WDP program results mirror those of the WIA Dislocated Worker program, though the estimates fluctuate in a narrower range, albeit with a greater degree of uncertainty (wider confidence bands) than the Dislocated Worker program results. As shown in Figure 3.15, WDP trainees earn nearly \$1,900 more than the comparison group in the first quarter after training and their wages also rise relative to the comparison group in the second quarter

after exit, before falling to about \$1,300 by the eighth quarter after training. Because as explained earlier in this chapter, the WDP program serves a population that is similar to the WIA Dislocated Worker program population, it is not entirely surprising that the two programs achieve similar results. The similarity of the WDP and Dislocated Worker program results is interesting in light of the different incentives that the WIA and WDP programs may present counselors. WIA funding is contingent on having clients achieve positive outcomes and so it is possible that counselors could be selective in deciding whom they classify as a WIA client and whom they refer to training. The WDP program does not have the same incentives. The similarity in the outcomes is suggestive that the performance incentives of WIA are not exerting a significant effect on who receives training.

The WDP results also show a pattern that is similar to the Dislocated Worker pattern in terms of employment rates. The difference in employment rates is initially quite large (nearly 22%) and declines over time, falling to just a hair under 10% by the eighth quarter after exit. (See Figure 3.16.)

Figure 3.13. WIA Dislocated Worker Quarterly Earnings Compared to Intensive Clients (Mean Difference in Levels Between Treatment and Comparison)

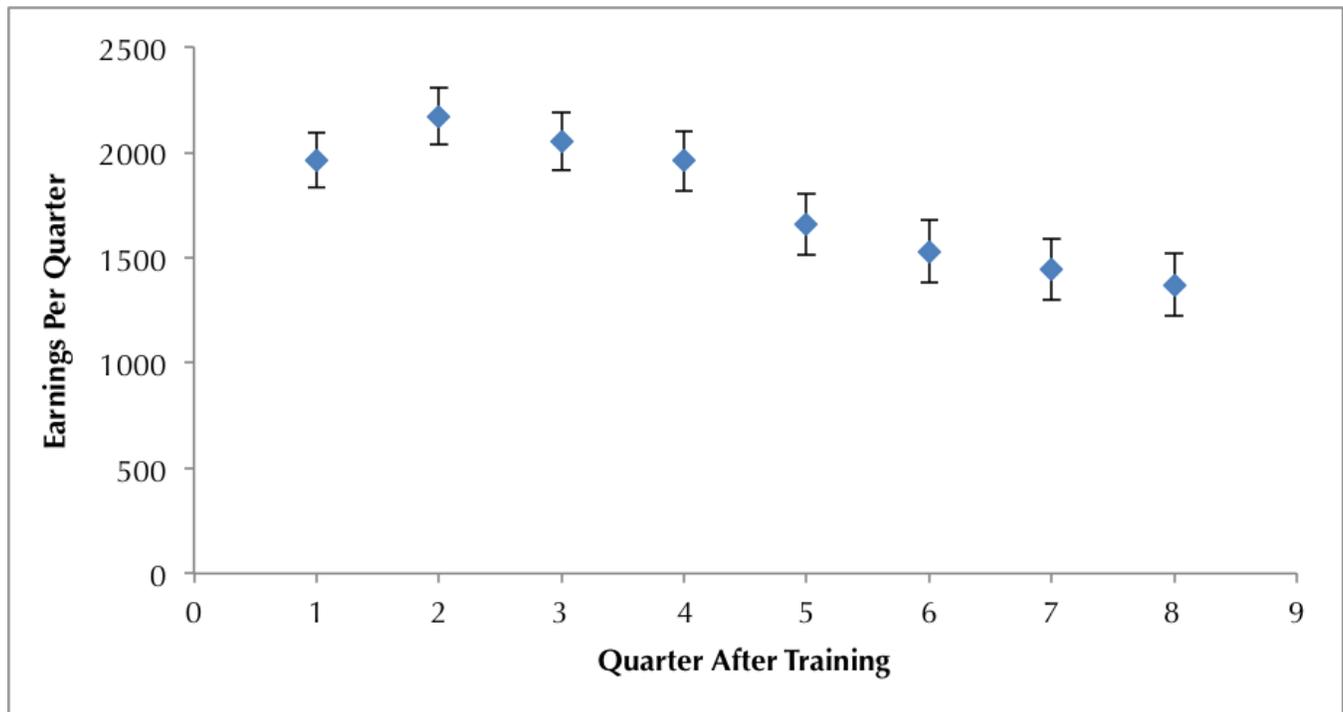


Figure 3.14. WIA Dislocated Worker Employment Rates Compared to Intensive Clients (Mean Difference in Levels Between Treatment and Comparison)

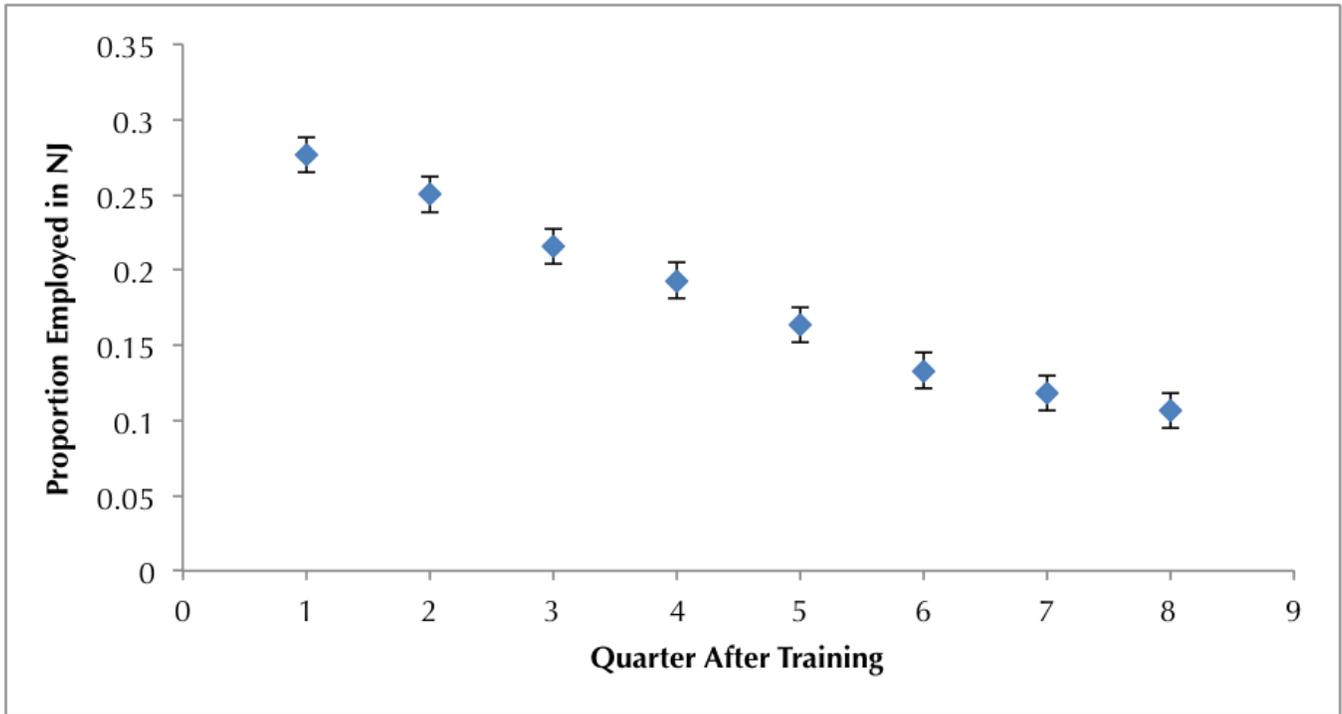


Figure 3.15. WDP Quarterly Earnings Compared to Intensive Clients (Mean Difference in Levels Between Treatment and Comparison)

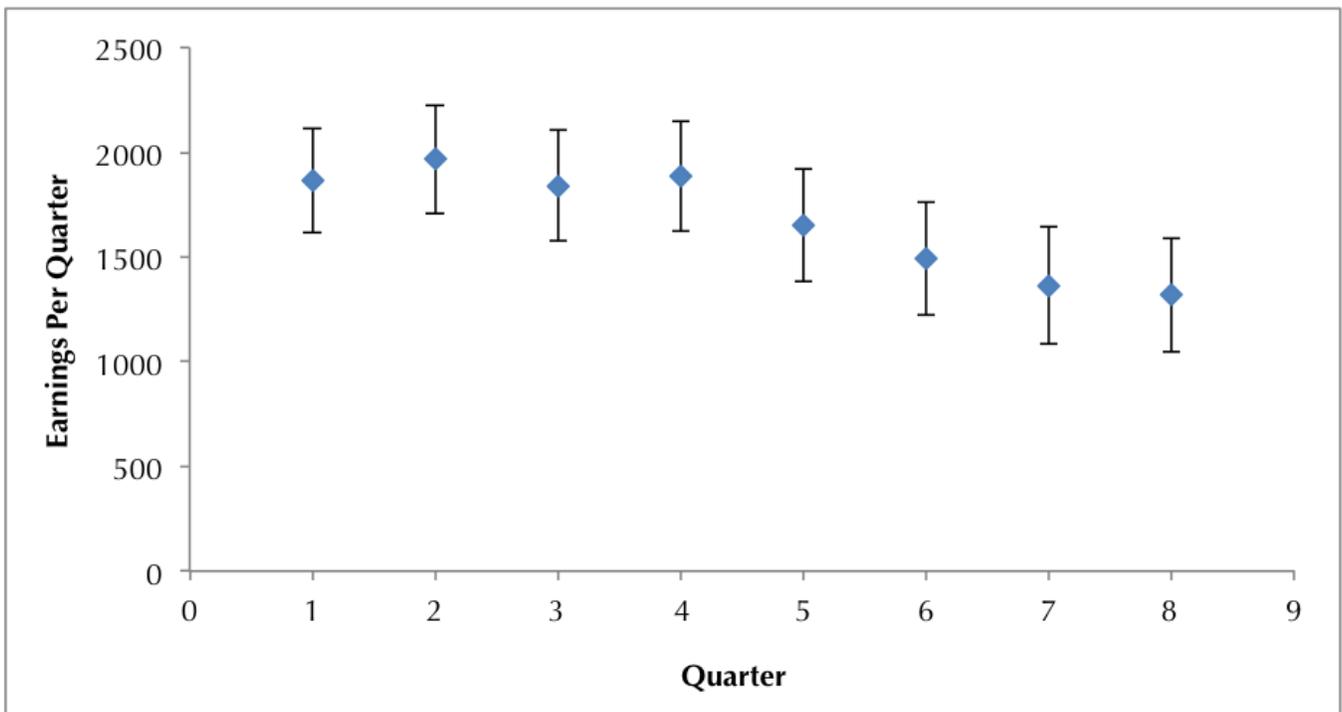
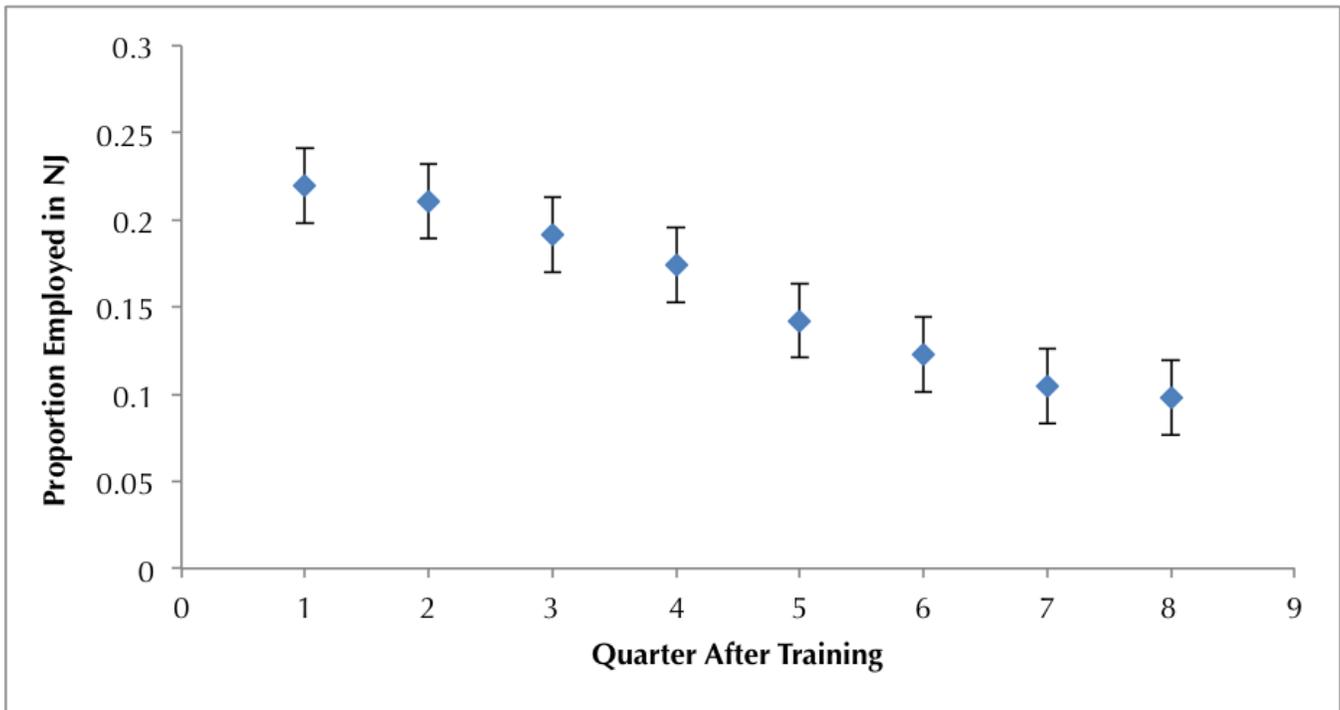


Figure 3.16. WDP Employment Rates Compared to Intensive Clients (Mean Difference in Levels Between Treatment and Comparison)



Such large effects in each of the three programs are indeed welcome signs of training program effectiveness. However, given previous studies, the evolution of the labor market since those studies were conducted, and the unique nature of the comparison group, it is likely that these findings are positively biased. As some scholars have argued, a selection process is involved in determining which job seekers are offered WIA programs just as there is a selection process to determine who is offered a training program (Andersson et al., 2013). Since Workforce Investment Boards are held most accountable for the outcomes of WIA participants, it is likely that WIA participants have unobservable characteristics that positively correlate with labor market outcomes in greater abundance than those who are not offered WIA services. Consequently, the strong results in this evaluation could be a result of the comparison group of intensive customers from all programs (not just WIA) possessing unobservable characteristics that lead to weaker labor market performance. Fortunately, the New Jersey data permitted Heldrich Center researchers to evaluate training programs using more than one comparison group.

Training Completers vs. Training Non-Completers

Post-Match Descriptive Statistics

The strategy of using those who begin but do not complete training as a comparison group does not suffer from the potential deficiencies of using the “intensive” group evaluated above, as all members of the comparison group have been selected into a WIA program. Moreover, these non-completers should be more similar on unobservable characteristics to those who complete training programs than those who are WIA Intensive customers (i.e., those used as a comparison group in much of the training evaluation literature). The main drawback of this comparison group is that there are a limited number of non-completers in any given program year. Indeed, they represent less than 10% of training participants. Due to the high ratio of completers to non-completers, Heldrich Center researchers use their MDM procedure to match each non-completer to a completer, essentially handling the non-completers as the “treatment” group in the matching process.⁵

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Table 3.2 presents the summary statistics for the evaluation of training programs using non-completers as the comparison group. The match quality between training completers and non-completers is relatively strong, with no statistically significant differences for either the Adult program or the WDP program, and only one variable — employment history — demonstrates a statistically significant difference for the Dislocated Worker program. It is important to note, however, that the lack of statistically significant differences in observable characteristics between the treatment and comparison groups is partly a result of having a small sample size (i.e., few non-completers). In other words, statistically significant differences between the

treatment and comparison groups may not be seen because in actuality there are no significant differences between the two groups or because there actually are significant differences between the two but not enough data are available to be able to detect the difference. As noted earlier, the advantage of using the non-completer comparison group is that it includes individuals who are far more similar to training completers in terms of unobservable characteristics, such as motivation, than the customers who populate the intensive comparison group. The disadvantage of the non-completer comparison group is that Heldrich Center researchers are unable to rule out the possibility that the treatment and comparison groups are actually dif-

Table 3.2. Post-Match Summary Statistics

	Adult		Dislocated Worker		WDP	
	Completers	Non-Completers	Completers	Non-Completers	Completers	Non-Completers
Sample Size	6,185	434	12,120	624	3,573	165
Matched Sample Size	434	434	624	624	165	165
Demographics						
Female	53%	53%	53%	53%	56%	56%
Age (mean)	37.0	37.7	42.5	42.7	41.3	41.8
Minority	69%	69%	55%	56%	44%	45%
Disability	3%	3%	1%	1%	NA	1%
Years of Education (mean)	12.3	12.3	13.0	13.1	13.1	13.1
Program History						
TANF	5%	6%	1%	1%	2%	2%
GA	4%	4%	3%	3%	5%	5%
SNAP	9%	10%	4%	4%	5%	5%
Workforce Services	60%	60%	63%	62%	81%	81%
Labor Market History						
Quarterly Earnings (mean)	\$4,094	\$4,152	\$8,489	\$8,640	\$9,016	\$8,461
Quarters Employed	61%	60%	76%*	73%*	76%	71%
Job Tenure (quarters)	5.4	5.3	8.4	7.9	8.1	7.3
Duration of Unemployment (quarters)	2.6	2.8	1.8	2.1	1.9	2.2

* Difference in means is statistically significant (0.05 level)

ferent in terms of their observable characteristics. Finally, because training completers were matched to the **non-completers**, this sample is distinctly different from the one used in the analysis above. In particular, this sample has generally poorer labor market history and greater interaction with human services programs.

Impact Estimates

Figures 3.17 and 3.18 present impact estimates for the effect of training in the WIA Adult program. As was true of the findings for the WIA Adult program using the “intensive” comparison group, training completers have both higher earnings and are more likely to find work after training than those who do not complete training. Two aspects of the WIA Adult results, however, stand out compared to the results based on the “intensive” comparison group. First, the earnings of WIA Adult program trainees rise over time relative to non-completers, whereas they fall somewhat over time compared to the individuals in the “intensive” group. In Figure 3.17,

training completers earn about \$800 more than non-completers in the first quarter after exit, but this effect quickly climbs and remains consistently between \$1,100 and \$1,300 thereafter. Second, and as expected given the smaller sample size, the confidence bands around the estimates are much wider. Whereas in Figure 3.11 (“intensive” comparison group), the range from the top of the T to the bottom of the upside down T is about \$300, the range in Figure 3.17 is about \$1,000. Nonetheless, the results using both comparison groups clearly indicate that even at the bottom of the confidence band, the WIA Adult program results in higher earnings for training completers compared to non-completers (or intensive customers).

The effect on employment displays a high value throughout the first year, with completers about 15% more likely to find work than non-completers. This number continuously declines in the second year after program exit, however, falling below 10% by the eighth quarter.

Figure 3.17. WIA Adult Quarterly Earnings Compared to Non-Completers (Mean Difference in Levels Between Treatment and Comparison)

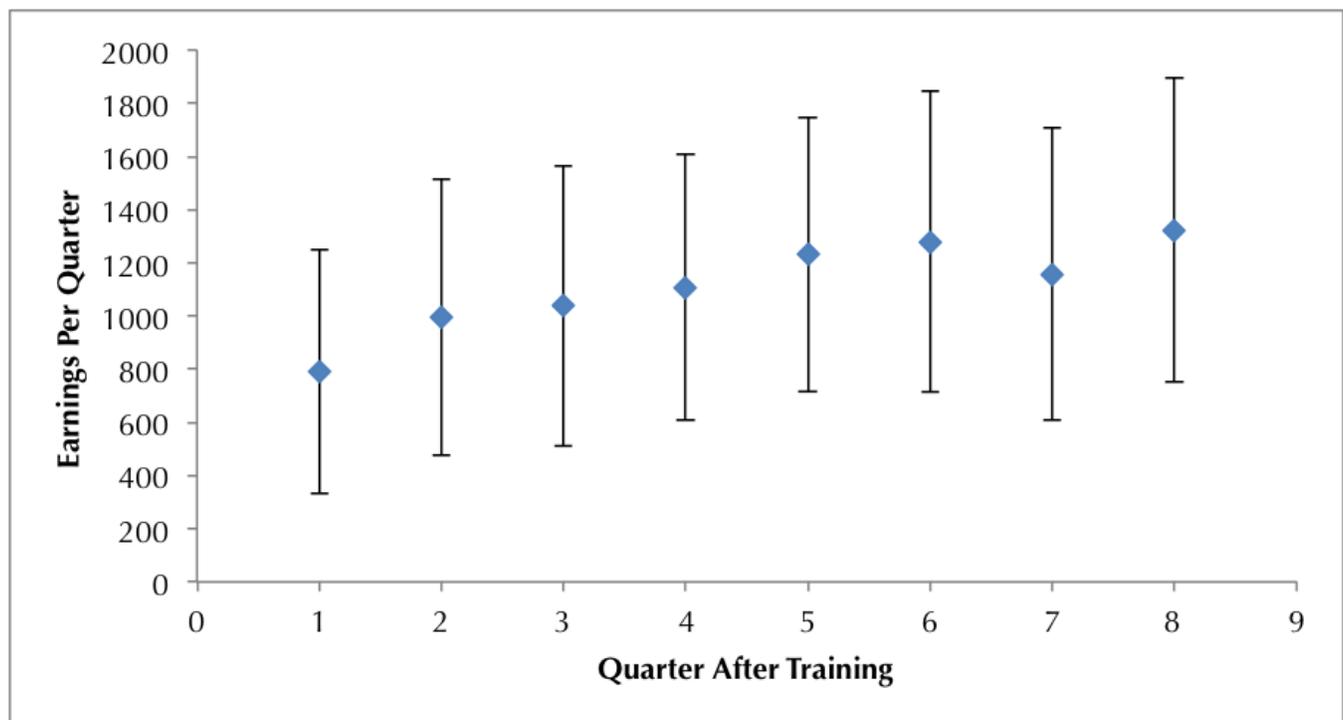
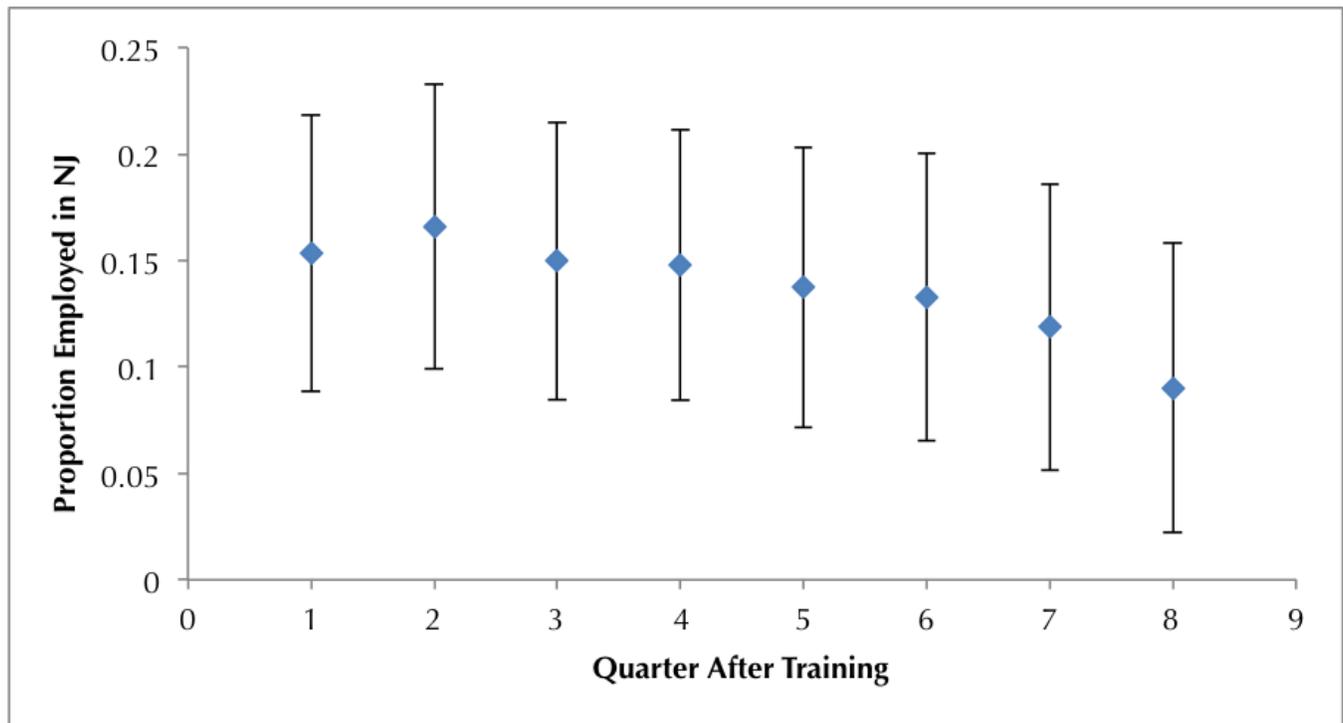


Figure 3.18. WIA Adult Quarterly Employment Rates Compared to Non-Completers (Mean Difference in Levels Between Treatment and Comparison)



Relative to the Adult program estimates that used the alternative comparison group of intensive services customers, the impact estimates have changed a fair amount. Using the eighth quarter after exit as a reference point, using non-completers as a comparison group results in the impact on earnings rising from \$939 to \$1,322, while the impact on employment is basically unchanged at 9%. The biggest difference, of course, is that the non-completer estimates have a much higher level of uncertainty due to the smaller sample size. Nevertheless, all estimates are still statistically significant at the 0.05 level.

Interestingly, the results for the Dislocated Worker program change in ways very different from the Adult program. Figures 3.19 and 3.20 demonstrate that, again, training has a positive and statistically significant impact on both earnings and employment. However, the results in Figures 3.19 and 3.20 show greater stability over time than the other analyses. While the earnings impact does rise over the period of analysis, it falls back to where it started around \$1,100 in the eighth quarter after exit.

The impact on employment also fluctuates over time, but maintains a high level. Training completers are 22% more likely to find work in the first quarter, and 14% more likely to find work by the eighth quarter.

Comparing these results for the Dislocated Worker program to those in the previous section, the change in comparison group does produce a significant change in earnings impact, especially in the first few quarters after exit, when the difference between trainees and the intensive comparison group is about \$2,000 compared to a difference of about \$1,000 for the trainees vs. the non-completers. By the eighth quarter after exit, the difference in the estimates using the different comparison groups is not as stark, though still meaningful, difference of nearly \$300 a quarter — trainees earn about \$1,372 more than the intensive comparison group and \$1,105 more than the non-completers. There is also a substantial change in the impact on employment. Whereas the employment rate difference for the intensive comparison group falls markedly from about 28% to about 11%, the employment rate difference between trainees and

Figure 3.19. WIA Dislocated Worker Quarterly Earnings Compared to Non-Completers (Mean Difference in Levels Between Treatment and Comparison)

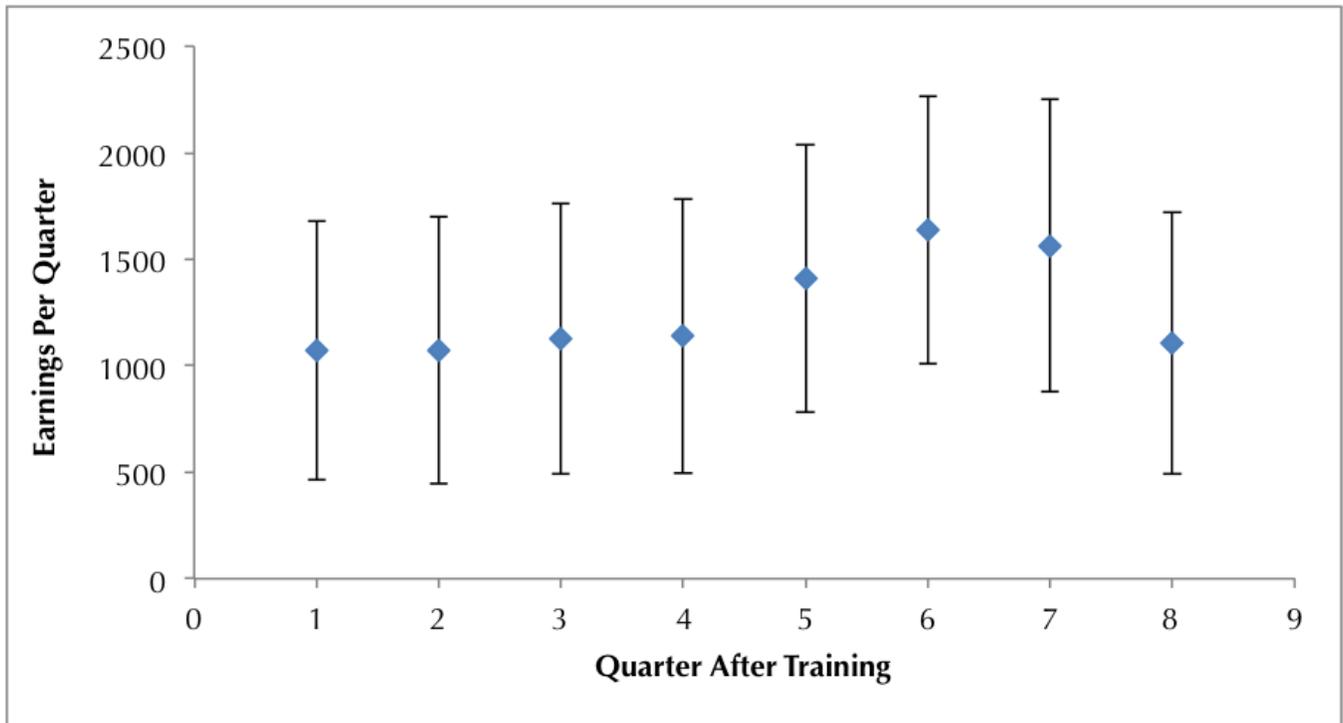
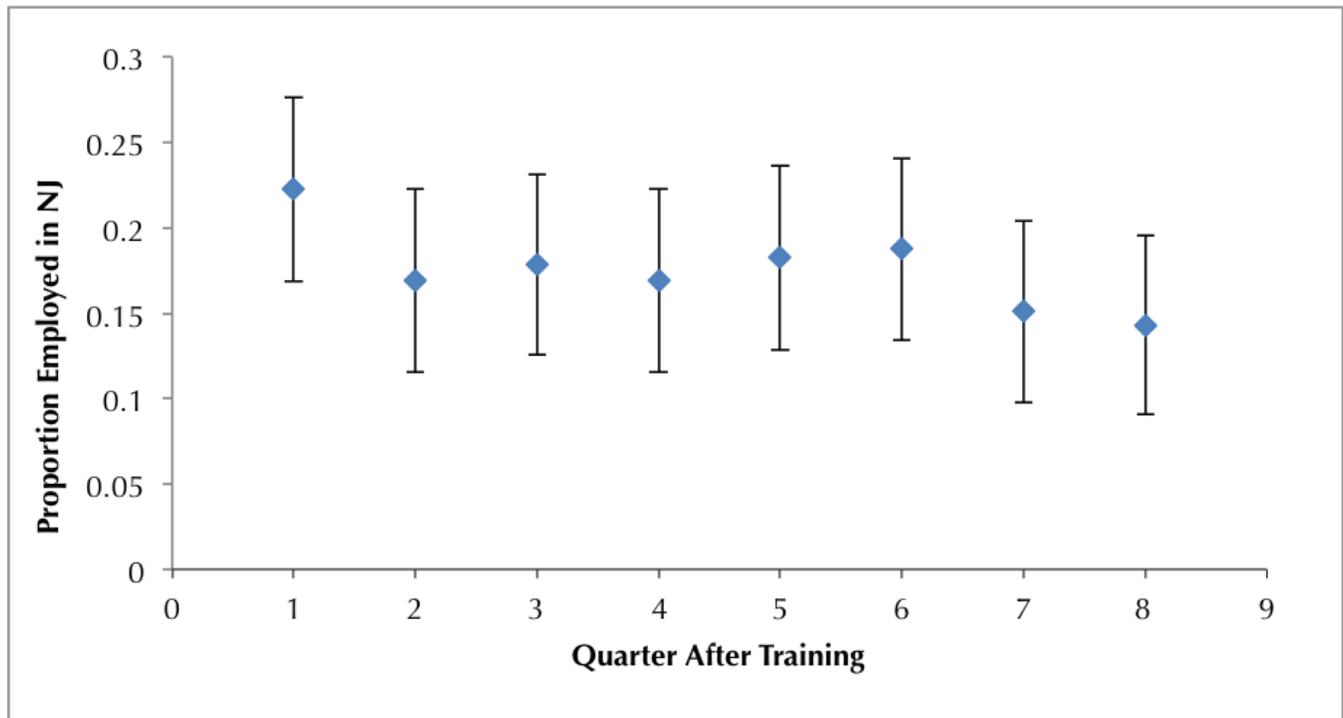


Figure 3.20. WIA Dislocated Worker Quarterly Employment Rates Compared to Non-Completers (Mean Difference in Levels Between Treatment and Comparison)



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non-completers fluctuates within a much narrower band, falling from 22% higher in the first quarter after exit to 14% higher by the eighth quarter after exit.

The WDP results for non-completers are suggestive that the program may have a positive effect on trainee earnings, but Heldrich Center researchers are unable to draw a strong conclusion because the results narrowly miss being statistically significant. In other words, as shown in Figure 3.21, the Heldrich Center is unable to rule out the possibility that the WDP training program has no effect or a slightly negative effect on the earnings of trainees. The results are likely not significant because of the small sample size of 165, compared to sample sizes of 434 and 624 for the WIA Adult and WIA Dislocated Worker programs, respectively. The wide confidence intervals in Figures 3.21 and 3.22 reflect the uncertainty of the estimates. The estimates of the magnitude of the effect of participating in WDP remain similar to the effect size estimates presented in Figure 3.19 for the WIA Dislocated Worker program.

Again, the wide confidence bands around the employment rate estimates mean that Heldrich Center researchers are unable to draw strong conclusions about the extent to which WDP completers are more likely to find work than individuals who do not complete training. Throughout the post-training period, WDP trainees are about 20% more likely to be employed than non-completers.

These results are reason for cautious optimism regarding the impact of the WIA and WDP training programs in New Jersey. There are, however, still multiple reasons that these results could be positively biased, and many of these can be seen in Table 3.2. Due to a low number of non-completers, the match quality was not as high as in the analysis of trainees and intensive services customers. Moreover, the differences in the means of the matching variables, while not statistically significant, were all biased in the direction to produce positive results in this analysis. Finally, while this is unlikely to explain all or even the majority of non-completers, extenuating circumstances and life events (e.g., childbirth, illness, etc.) could explain

Figure 3.21. WDP Quarterly Earnings Compared to Non-Completers (Mean Difference in Levels Between Treatment and Comparison)

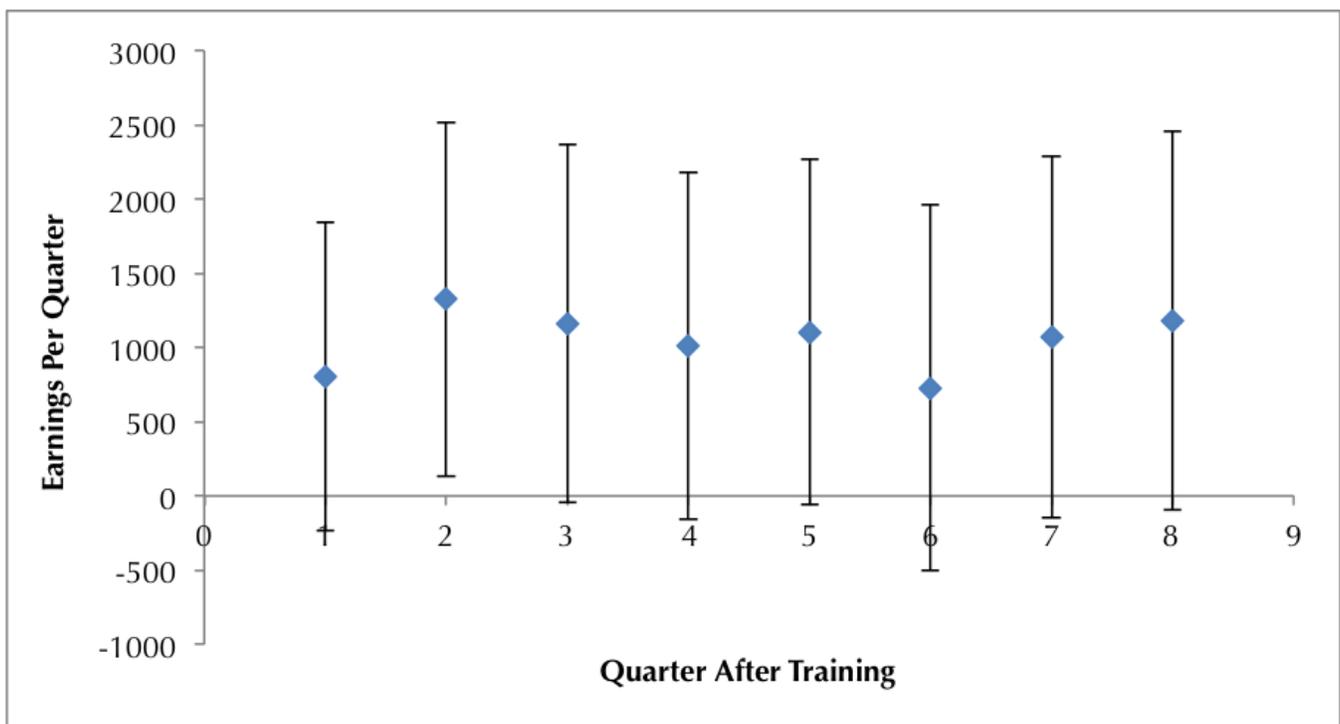
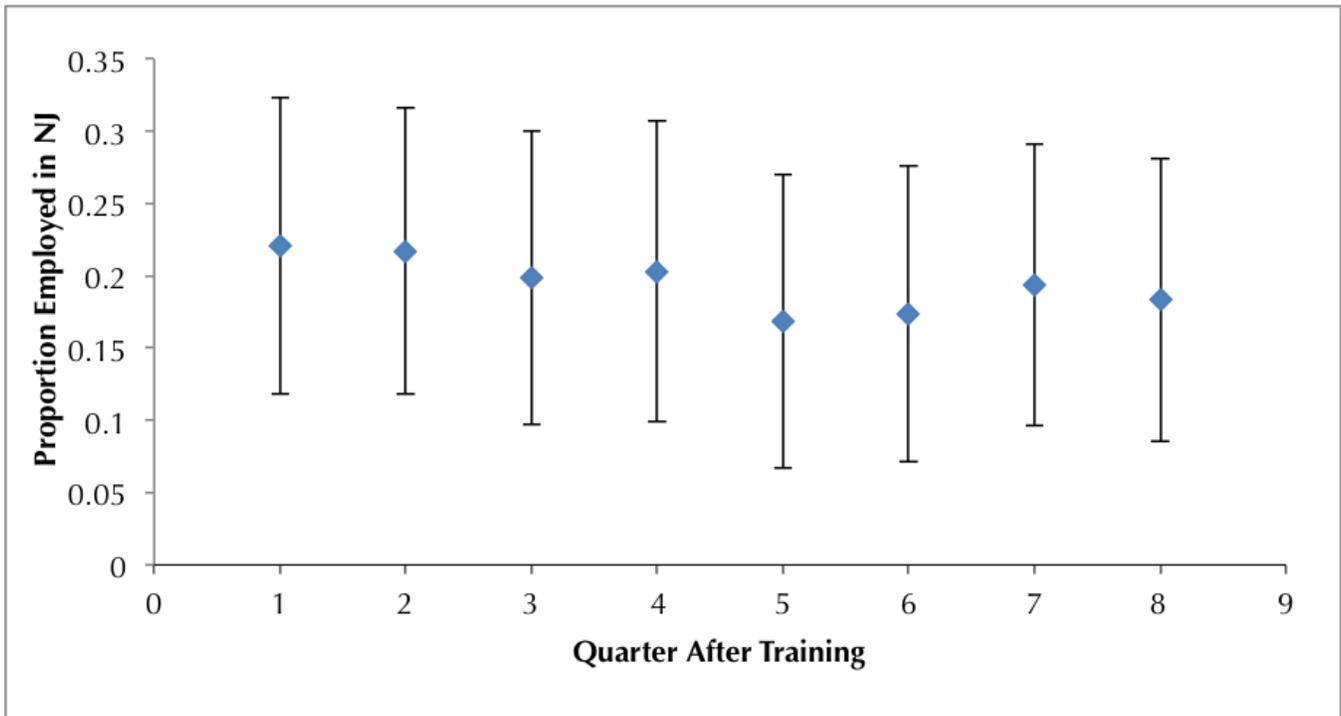


Figure 3.22. WDP Quarterly Employment Rates Compared to Non-Completers (Mean Difference in Levels Between Treatment and Comparison)



why individuals do not complete training. This is of note because Heldrich Center researchers cannot control for these instances in the analysis, and most likely have a negative effect on employment and earnings and would therefore contribute to the positive result found.

Provider Type: Community College vs. Private Training Provider

Heldrich Center researchers also studied the question of whether individuals who participate in occupational skills training at a community college realize different employment outcomes than individuals who obtain training from a private training provider. This section compares the outcomes of individuals who attended a community college and individuals who attended a private training provider in terms both of their second and fourth quarter post-training employment rates and earnings and of changes in earnings between a year before the start of training and two and four quarters after exit.

The AOSOS data include an indicator for the type of provider that a trainee attended. The two most common types of providers, for which there are sufficient data for analysis, are community colleges and private training providers. Table 3.3 shows the number of trainees who received training from a community college and the number who received training from a private training provider between program year 2006 and program year 2013.

The comparisons presented in this section are raw, unadjusted comparisons. Sample size limitations prevented Heldrich Center researchers from using a quasi-experimental methodology to evaluate the effect of training provider type on employment outcomes. The available sample sizes for a more sophisticated provider type analysis were limited for two reasons. First, provider type is missing for many records in the AOSOS data. Second, using a quasi-experimental design would have required cutting the treatment group sample in half (or actually less than half, as some trainees either did not have a provider type or attended a provider that was not a private training provider or a community college), resulting in an under-powered sample from which it would have been impossible to estimate an effect size.

Table 3.3. Number of Individuals Receiving Training from Community Colleges and Private Training Providers, 2006-2013

Provider Type	Number of Training Participants	Percent
Community College	6,824	15.9%
Private Training Provider	29,825	69.4%
Total Number of Training Participants with Provider Type Value	43,004	100.00%

The rates of employment in New Jersey after exit from training are almost identical for community college exiters and private training provider exiters across all seven years of sample data. Figures 3.23 and 3.24 show the second and fourth quarter, respectively, post-training employment rates for the two types of providers.

The employment rates track very closely year to year, with the significant expected dips during the recession and gradual recovery thereafter.

Throughout the sample period, with respect to earnings after completion, the differences between community college exiters and private training provider exiters are minor in the second and fourth quarters after exit. (See Figures 3.25 and 3.26.)

The exception is 2013, the final year for which these outcomes can be calculated. Although the chart shows a divergence in earnings in the fourth quarter after exit, because of the small number of individuals who had completed their training programs in time to have wage data for the fourth quarter after exit, the difference is not statistically significant.

Heldrich Center researchers also compared the trainees' (mean) quarterly earnings in quarters three through six before training to their second quarter after training and fourth quarter after training earnings. These charts were created by calculating how much more or how much less money each individual who attended a community college and each individual who attended a private training provider was earning after completing training relative to what they were earning beforehand. These calculations provide some insight into the extent to

Figure 3.23. Proportion of Exiters Employed in New Jersey in the Second Quarter after Training, 2006-2013

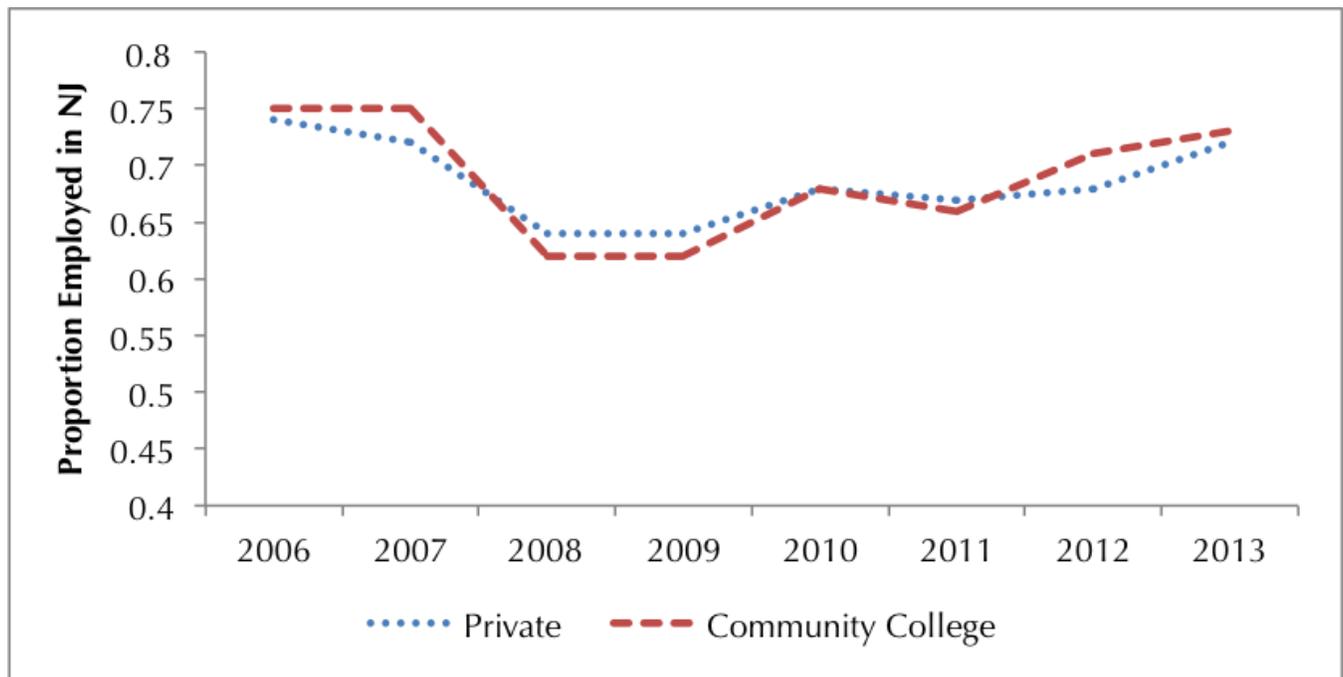


Figure 3.24. Proportion of Exitors Employed in New Jersey in the Fourth Quarter after Training, 2006-2013

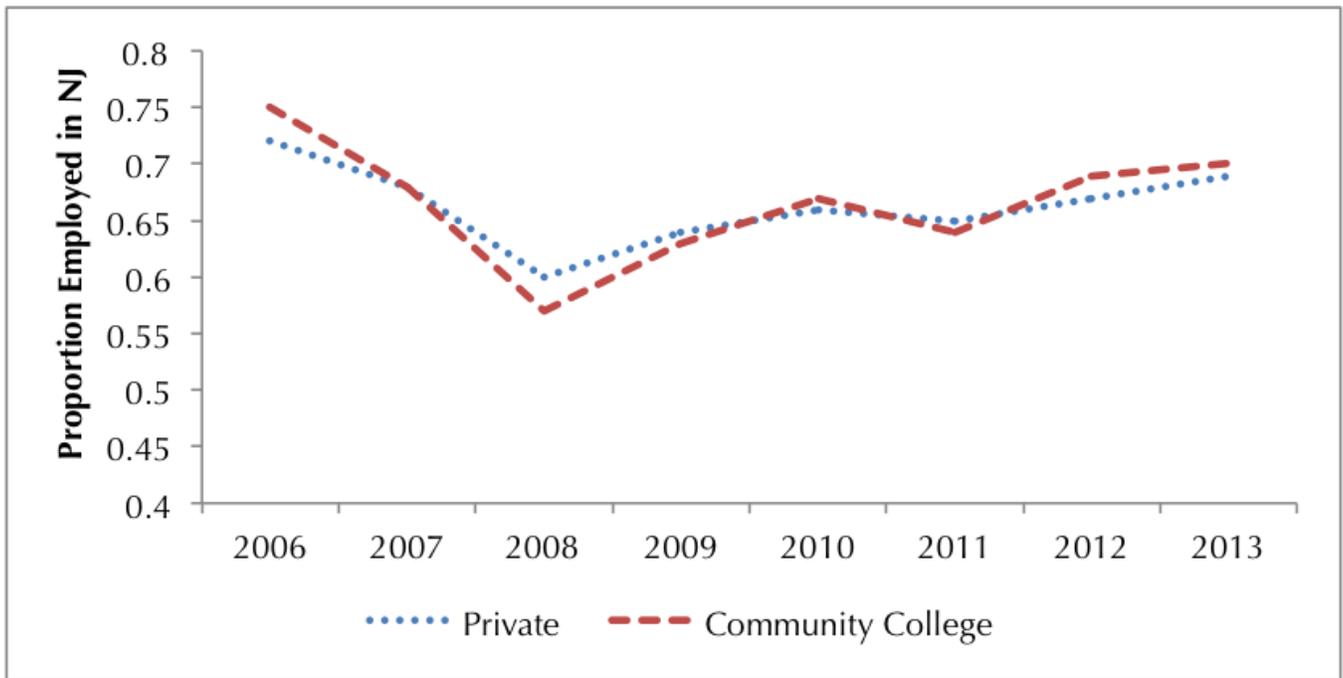


Figure 3.25. Median Earnings of Training Program Exitors in New Jersey in the Second Quarter after Training, 2006-2013

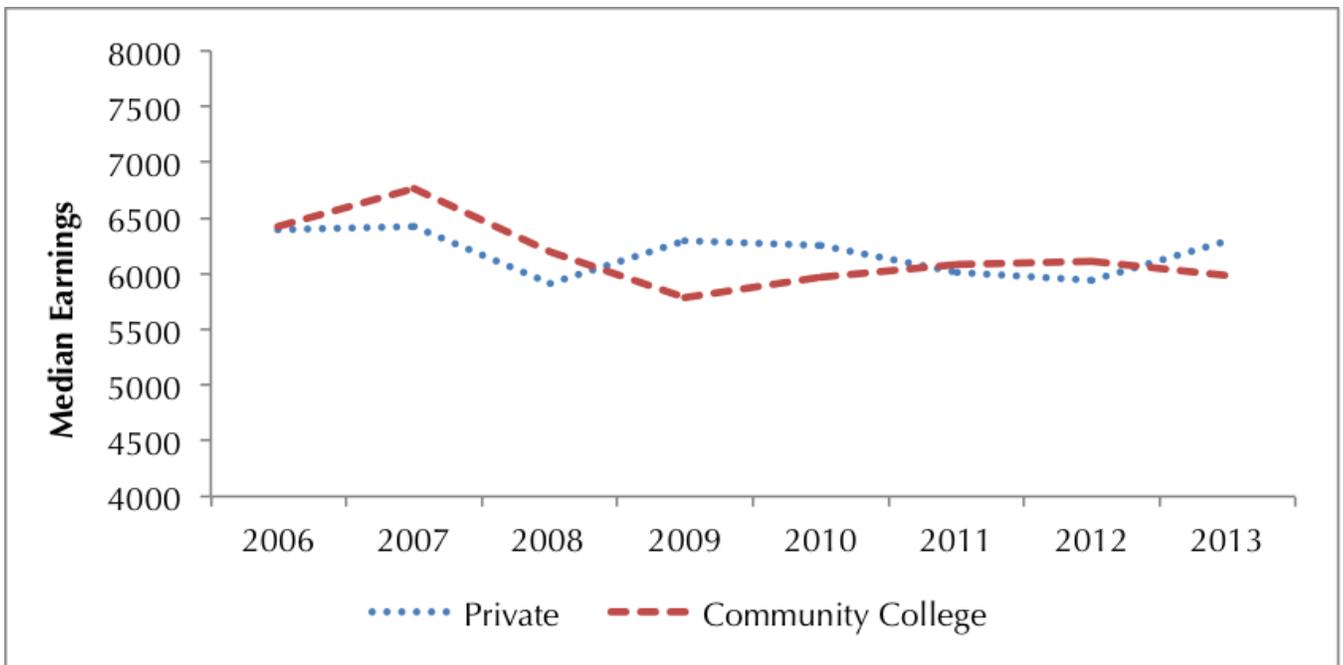
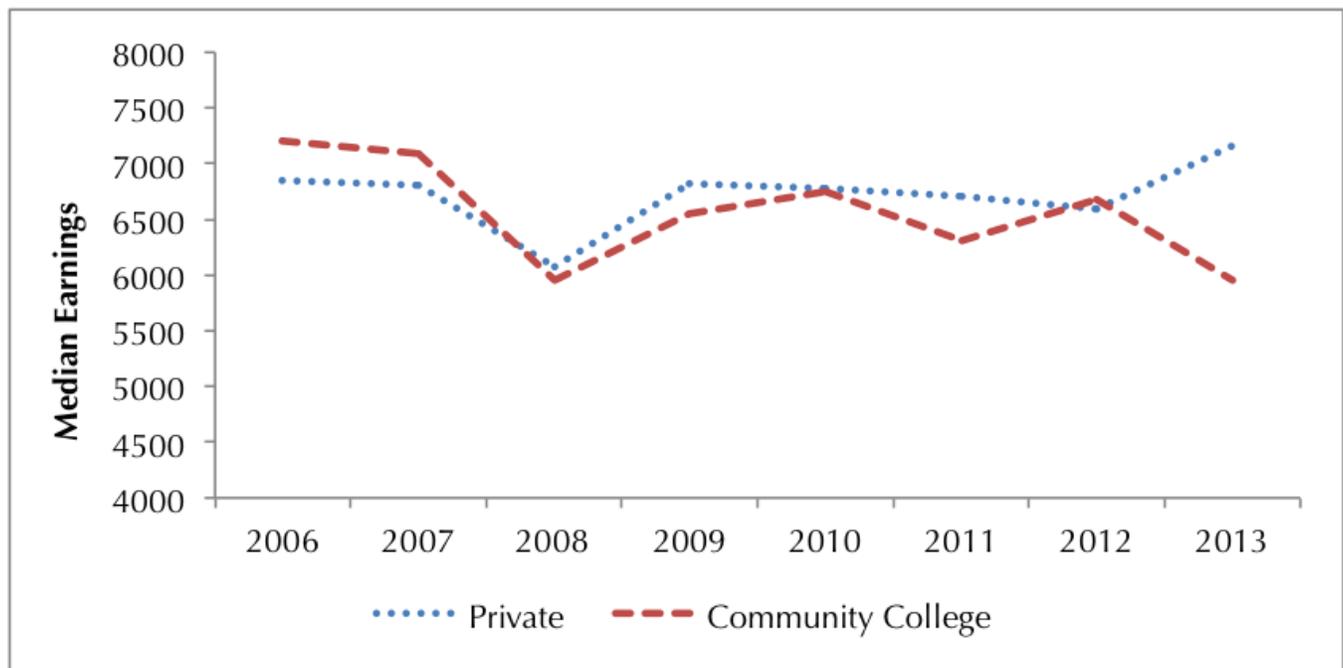


Figure 3.26. Median Earnings of Training Program Exiters in New Jersey in the Fourth Quarter after Training, 2006-2013



which trainees are able to recover their pre-training wages. Figures 3.27 and 3.28 present these data. The first thing that stands out is that regardless of the type of training provider that an individual attended, he is not able to return to his prior earnings level within either two or four quarters after the exit from training. (This, of course, is not surprising, given the severity of the recession. While the restoration of lost wages is important, for the purpose of evaluating training, the question asked in the quasi-experimental evaluation section was not whether training completers were able to return to their previous income level as a result of training, but whether they were better off after completing training than they likely would have been if they had not participated in training.)

The second thing that stands out from both Figures 3.27 and 3.28 is that for most of the sample period, exiters from private training providers are earning, on average, about \$500 more per quarter than the community college exiters. (Again, the divergence in 2013 is probably best considered anomalous because of the small sample size for that program year.) As explained at the outset of this section, however, the reader is urged caution in drawing strong conclusions from these results.

Employment Outcomes by Key Industry Sector

In order to streamline its investments in workforce development, New Jersey identified seven key industry sectors: advanced manufacturing; health-care; technology and entrepreneurship; financial services; life sciences; transportation, logistics, and distribution (TLD); and retail, hospitality, and tourism. NJLWD has targeted its reemployment efforts to these industries. To get a sense of how individuals trained to enter a key industry sector fared after completing training, Heldrich Center researchers studied the outcomes of trainees who received training in an occupational field closely associated with a New Jersey key industry sector.

Only two key industry sector-related occupational fields had enough trainees to be able to generate meaningful estimates of employment outcomes: healthcare (Classification of Instructional Program [CIP] code 51) and TLD (CIP code 49). Heldrich Center researchers used the North American Industry Classification System industry codes in the UI wage record data to identify the industries in which trainees obtained employment after they

Figure 3.27. Change in Median Earnings of Training Program Exiters in New Jersey in the Second Quarter after Training, 2006-2013

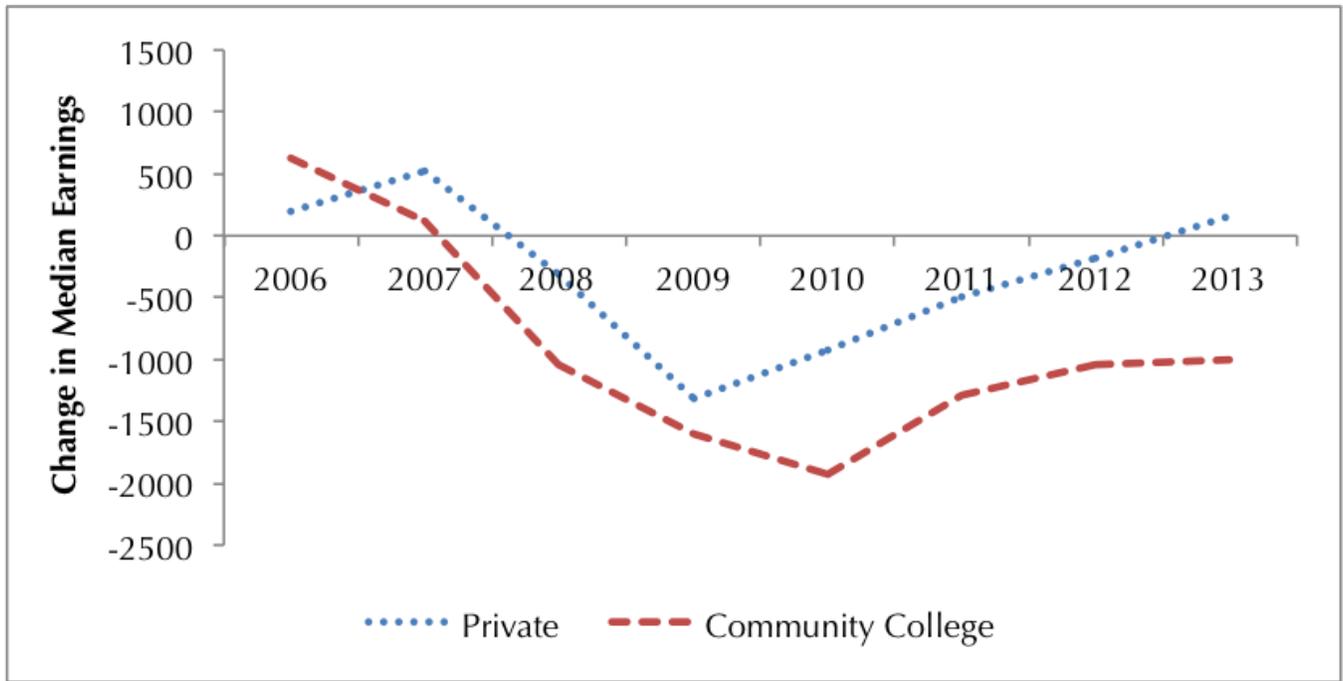
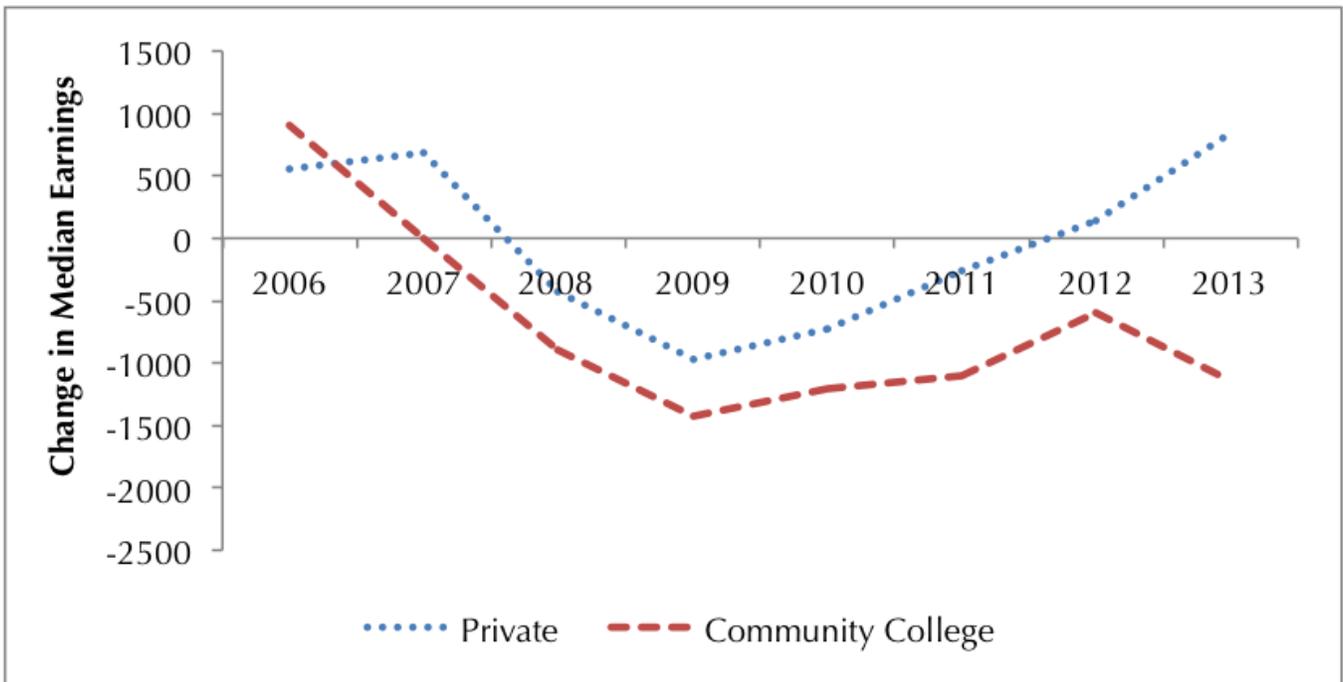


Figure 3.28. Change in Median Earnings of Training Program Exiters in New Jersey in the Fourth Quarter after Training, 2006-2013



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completed training. Table 3.4 shows the number of individuals exiting healthcare and TLD training programs in program years 2006 through 2013.

Table 3.4. Number of Exiters of Healthcare and Transportation, Logistics, and Distribution Training Programs, 2006-2013

Provider Type	Number of Training Participants	Percent
Healthcare	11,322	27.2%
Transportation	9,270	22.2%
Total Number of Training Participants with CIP Code Values	41,701	100.00%

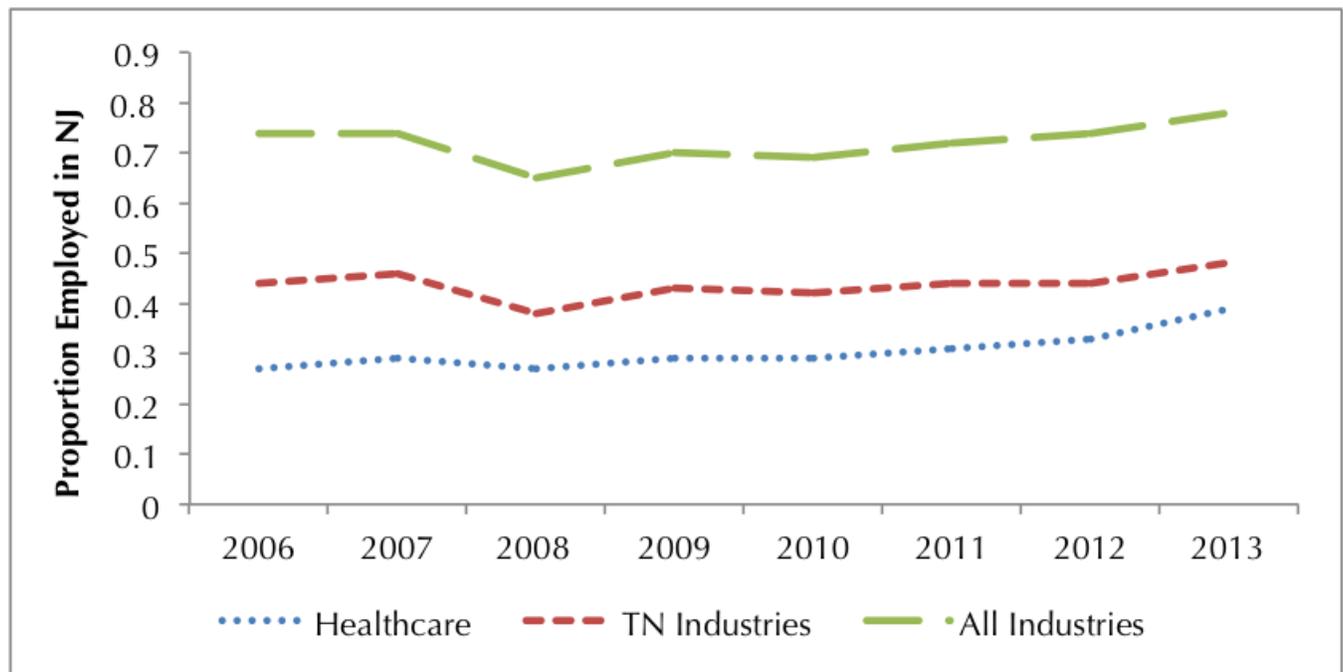
Heldrich Center researchers began by looking at the outcomes for trainees who completed training in healthcare. Figure 3.29 displays the percent of exiters who were trained in a healthcare field and were either employed in the healthcare industry (blue-dotted line), in any of the seven key industry sectors (red, short-dashed line), or in any industry

(green, longer-dashed line) in the fourth quarter after exit from training. These data show a secular upward trend that is hardly disrupted by the recession in the rate at which healthcare program graduates are finding employment in the healthcare industry. Whereas 27% of healthcare program completers from program year 2006 were employed in the healthcare industry in the fourth quarter after exit, by 2013, 39% of healthcare program exiters were working in the healthcare industry.

Nonetheless, many individuals trained for a healthcare field did not enter the healthcare industry. During the sample period, about two-thirds of the employed healthcare program training completers were employed in a non-healthcare industry in the fourth quarter after completion. Many ended up working in one of the other key industry sectors.

Because the UI wage data do not contain occupational information, it is impossible to infer the type of job that healthcare trainees employed in any industry are doing after completion of training. Although there is a relatively close linkage between healthcare occupations and the healthcare industry

Figure 3.29. Proportion of Exiters from Healthcare Programs Employed in the Fourth Quarter after Exit, by Industry



Evaluation of One-Stop Career Centers in New Jersey

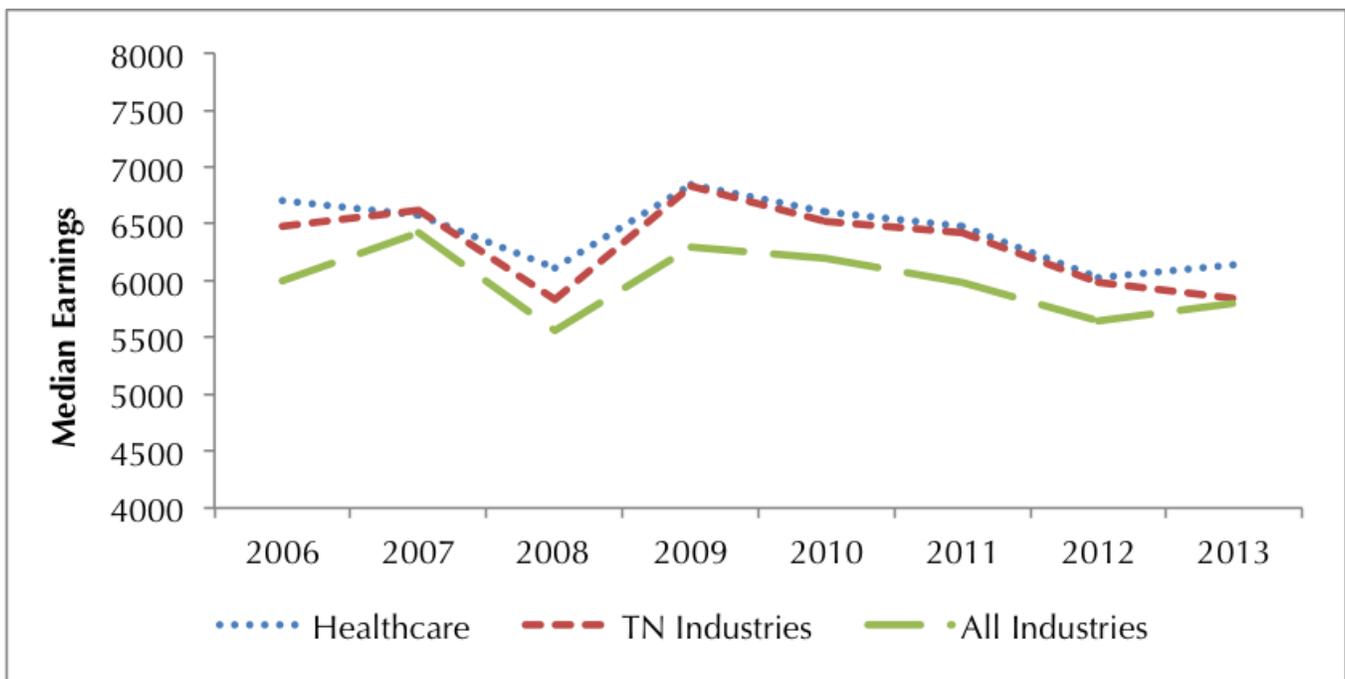
(i.e., nurses typically work for healthcare industry employers such as hospitals and nursing homes), there are many healthcare occupations outside of the healthcare industry. For example, both schools and prisons employ nurses. By the same token, even if a trainee is trained for a specific healthcare occupation and is employed by a healthcare firm, it is impossible to know whether that person is working in a healthcare occupation or is instead working in the healthcare industry in a non-healthcare job, such as accounting, computers, or custodial services.

Heldrich Center researchers also examined the earnings of healthcare program completers by industry. Figure 3.30 shows the median earnings of healthcare program completers who were employed in the healthcare industry (blue-dotted line), in any of the seven key industry sectors

(red, short-dashed line), or in any industry (green, longer-dashed line) in the fourth quarter after exit from training.

These individuals clearly earn more if they find work in a key industry sector than if they get a job in a non-key industry sector, but their earnings are about the same throughout the sample period whether they are working in a healthcare industry or in one of the other key industry sectors. Interestingly, the earnings of healthcare program completers dip significantly for those individuals who exited during the recession and then recover quickly in 2009, only for graduates in each successive year to see lower fourth quarter earnings. In fact, healthcare program completers in 2013 are earning about the same, on an inflation-adjusted basis, as the individuals who exited these programs during the recession. Although Heldrich Center

Figure 3.30. Median Earnings of Exiters from Healthcare Programs Employed in the Fourth Quarter after Exit, by Industry



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researchers lack the data to be able to explain this downward earnings trend, it is possible that this wage decline is reflective of the trend in the broader economy of wage stagnation. It is also possible that the emphasis on training healthcare workers has resulted in an oversupply of such workers, putting downward pressure on wages, but the increase in the rate at which more recent healthcare program completers have been able to find work in the healthcare sector contradicts this explanation somewhat.

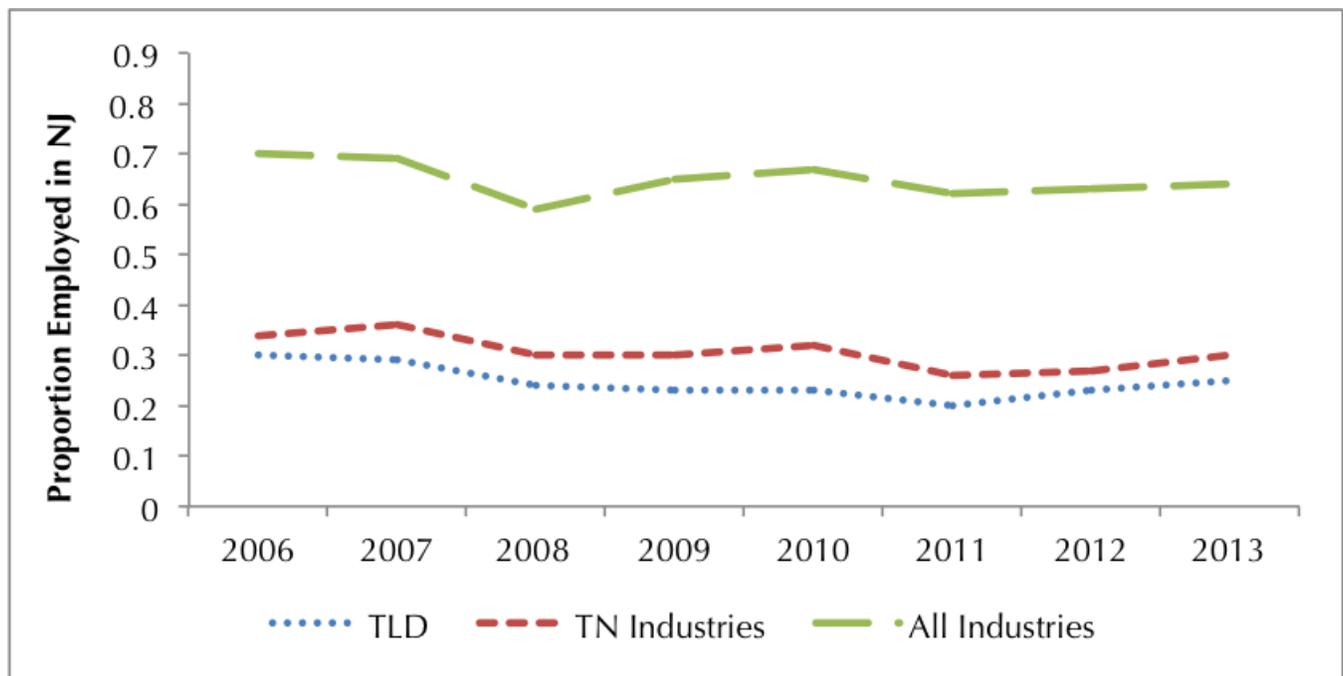
Heldrich Center researchers conducted the same analyses for the completers of TLD programs. In Figure 3.31, the employment rates in the fourth quarter after training are presented for individuals who exited in each program year from 2006 through 2013. The blue-dotted line shows the proportion of TLD trainees who find employment in a TLD industry. The graph shows a steady decline from the high point of 30% of 2006 exiters employed in a TLD industry in the fourth quarter after

exit to 20% of 2011 exiters employed in TLD in the fourth quarter after exit. This proportion rebounds somewhat between 2011 and 2013, to 25%. The trends for employment in any key industry sector (the red, short-dashed line) and in any industry at all (the longer-dashed, green line) are similar.

Examining Figures 3.29 and 3.31 together shows a number of similarities between the post-training employment experiences of healthcare trainees, on the one hand, and TLD trainees, on the other, namely that both sets of trainees have similar probabilities of finding employment in the industry related to training, finding employment in any key industry sector, and finding employment in any industry.

Heldrich Center researchers also examined the earnings of TLD trainees by industry in the fourth quarter after exit from training. Generally, individuals who received training in a TLD field had higher earnings throughout the sample period than indi-

Figure 3.31. Proportion of Exiters from Transportation, Logistics, and Distribution Programs Employed in the Fourth Quarter after Exit, by Industry



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viduals who were not employed in a key industry sector. Throughout the period from 2006 through 2013, earnings exhibit sharp fluctuations, with significant declines during the recession, followed by some growth afterwards, stagnation and slight decline from 2009 through 2011, and noticeable wage growth in 2012 and 2013. (See Figure 3.32.)

Comparing Figures 3.30 and 3.32, the most pronounced differences between healthcare trainees and TLD trainees lies in their earnings. TLD trainees consistently earn more than healthcare trainees. Whether employed in the industry related to their training, in any key industry sector, or in any industry at all, TLD trainees earn anywhere from \$500 to \$2,000 more in the fourth quarter after training than healthcare trainees. Although it is possible that these wage differentials are a product of the male-female wage gap, as TLD trainees are far more likely to be male and healthcare trainees are far more likely to be female, or skills differences among those entering the different training programs, the available data do not allow for a

rigorous analysis to explain the differences. Heldrich Center researchers also examined the proportion of all trainees, regardless of occupational field, who were employed in New Jersey in the fourth quarter after training in a key industry sector and the proportion that were employed in any other industry. Figure 3.33 presents these data. A greater proportion of trainees were working in a key industry sector, though many found employment outside the key industry sectors.

In addition to being more likely to be working in key industry sector, trainees who work in key industry sectors also earn in the fourth quarter after exit more than trainees employed in other industries. Figure 3.34 shows that trainees working in a key industry sector earn about \$500 more in the fourth quarter after exit relative to trainees employed in other industries. This differential may be a product of simply being employed in a key industry sector. Alternatively, it may be that the strongest exiters of training programs are the ones most likely to find work in an industry closely

Figure 3.32. Earnings of Exiters from Transportation, Logistics, and Distribution Programs Employed in the Fourth Quarter after Exit, by Industry

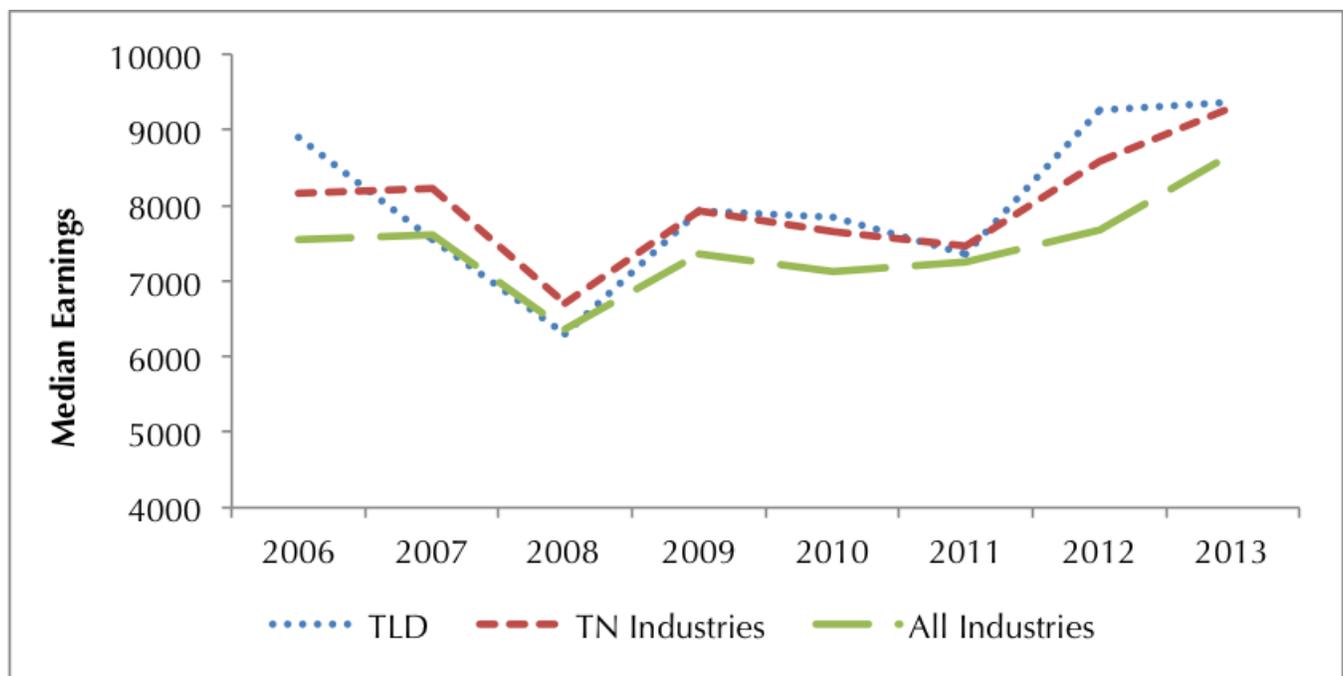


Figure 4.33. Proportion of Training Exiters Employed in Key and Other Industries in the Fourth Quarter after Exit

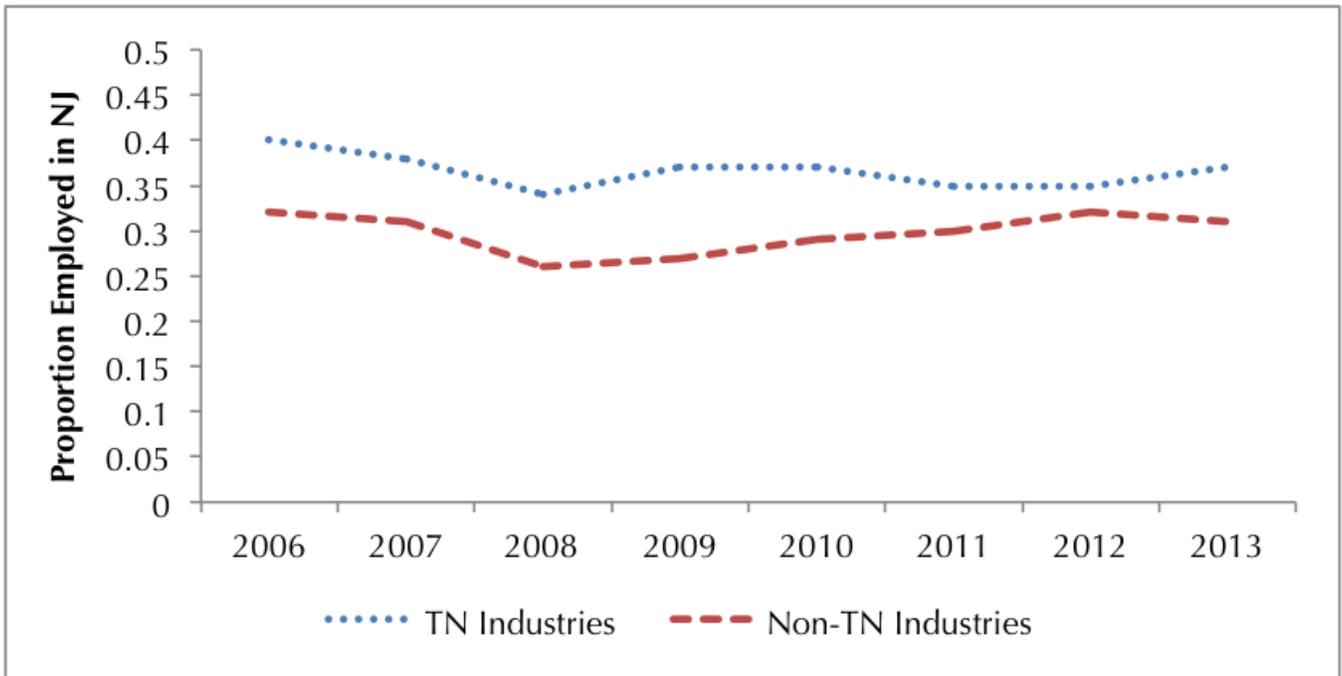
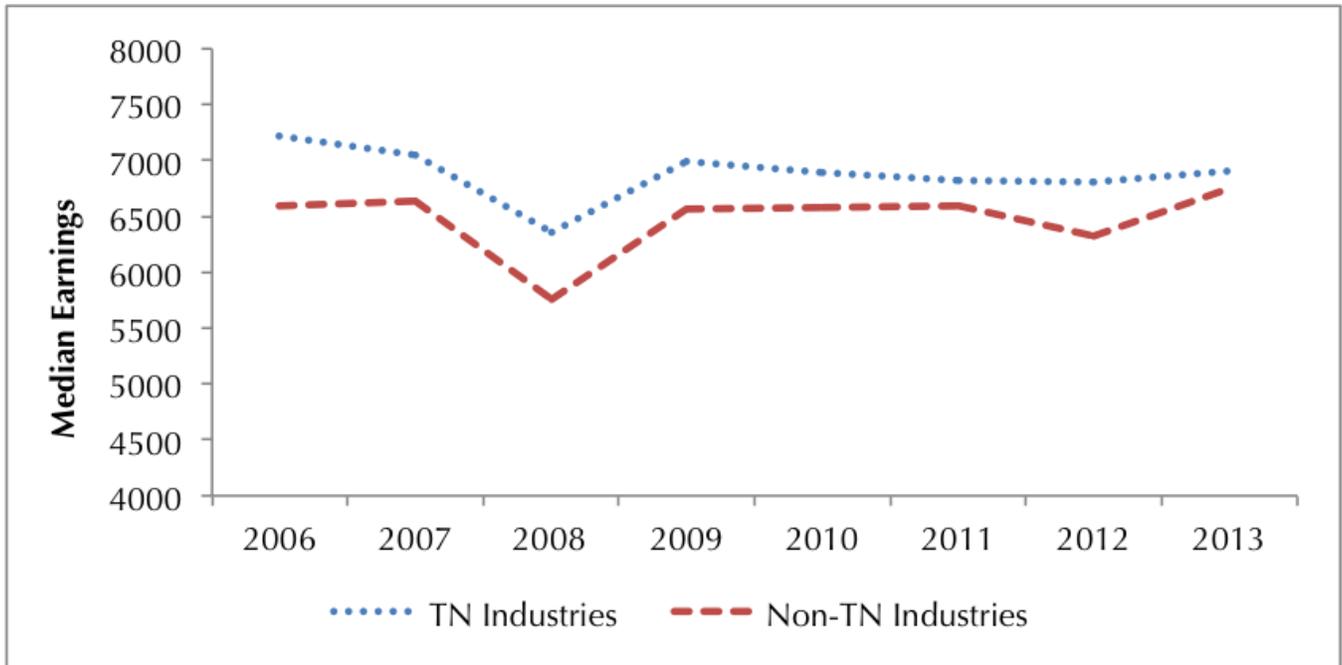


Figure 4.34. Earnings of Training Exiters Employed in Key and Other Industries in the Fourth Quarter after Exit



related to their occupation, and it may therefore be the skill level of the exiter rather than the fact of employment in a key industry sector that explains this differential. The data do not permit Heldrich Center researchers to conduct a rigorous causal analysis.

Conclusion

This chapter presented descriptive information on the trends from before the Great Recession to afterwards in the composition of those individuals who received training. The data showed that the demographic characteristics of the individuals receiving training changed over the time period of the study. Specifically, after the recession began, an increasing share of training recipients in all three programs studied (WIA Adult, WIA Dislocated Worker, and WDP) were male, white, older, and somewhat more highly educated. This set of characteristics has been found to be associated with more positive labor market outcomes, and the higher levels of pre-training earnings among the trainees after the start of the recession bear this out.

In this context, Heldrich Center researchers created two separate comparison groups to evaluate the effect of occupational skills training on the labor market outcomes of individuals who exited training after the recession began. The first comparison group included workforce system customers who had received one or more intensive services as their highest level of service. Heldrich Center researchers then used MDM to create a comparison group that was as similar as possible to the treatment group of trainees on a series of observable characteristics. The results showed that for the WIA Adult, WIA Dislocated Worker, and WDP programs, training had a very positive effect on employment and earnings. These findings must, however, be tempered, perhaps significantly, by the fact that the treatment group was created through non-random selection on unobservable (to Heldrich Center researchers) factors that may inflate the estimates of the effects of training.

In an attempt to mitigate the selection on unobservables problem, Heldrich Center researchers created a second comparison group consisting of

individuals who started training but never finished. This second comparison group should substantially mitigate the selection on unobservables problem, because not only have both groups been selected by counselors to participate in WIA, they have also been selected to participate in occupational skills training. The results obtained using this second comparison group are roughly similar to the results from the analysis that used customers who had received an intensive service as the comparison group: WIA Adult and WIA Dislocated Worker training both had positive and statistically significant effects on employment and earnings, while the WDP program showed positive but not statistically significant effects on employment and earnings.

Based on the site visits that Heldrich Center researchers conducted in which they conducted focus groups and interviews of job seekers and One-Stop staff, it is clear that there is a significant amount of selection that goes into who enrolls in a training program. Counselors, however, do not appear to be cherry picking individuals who are more or less likely to succeed in training to participate. This is borne out in part by the positive and nearly statistically significant result on the WDP program as well the very similar characteristics of the individuals that counselors are assigning to that program, which does not offer any performance-based incentive for cream skimming, and the Dislocated Worker program, which does present performance-based incentive for cream skimming. The fact that the individuals enrolling in the WDP and WIA Dislocated Worker programs are similar and that they realize similar outcomes after exit suggests that counselors are not cherry picking WIA Dislocated Worker clients. Without conducting an experiment, it is, of course, impossible to rule out this selection effect, but based on the available evidence, Heldrich Center researchers think it is unlikely to be operating.

There is, however, an important job seeker, self-selection effect. In order to participate in a training program, the job seeker must complete a number of steps, including meeting with a counselor (perhaps multiple times) conducting research on training providers, and filling out necessary paperwork. As result, individuals who enroll in training (that is, the individuals who end up in the treat-

ment group) are likely more motivated than comparison group members. That said, however, this self-selection largely affects the first comparison group methodology, differentiating trainees from individuals who received an intensive service but who never participated in training. It is less true of the non-completer comparison group, who had to go through all of the same processes as the treatment group in order to start their training programs. In all, the design employed in this study mitigates the possibility of selection bias as well as any non-experimental study can.

The final two sections of this chapter presented descriptive outcome data on the employment rates and earnings by provider type and key industry sector. These data show roughly similar post-training employment and earnings for community college exiters and private training provider exiters. The data did indicate smaller post-training earnings declines relative to pre-training earnings for private training provider exiters than for community college exiters. The key industry analysis shows that healthcare and TLD trainees found employment in their related industries, in key industry sectors in general, and in any industry at all, at about the same rates, but that TLD exiters generally earned more than the exiters of healthcare training programs.

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Endnotes

1. Heldrich Center researchers were not able to answer the related question of which trainees benefited the most from training because the data did not contain enough observations to permit researchers to detect statistically meaningful effects for different subgroups.
2. The WIA Adult program serves all individuals 18 years and older seeking employment services. The WIA Dislocated Worker program serves a more targeted population of adults that have demonstrated previous attachment to the labor market.
3. Tables 3.1 and 3.2 do not present summary statistics for all dummy variables used in the matching model to control for race and education. However, none of the omitted variables display statistically significant differences in their means.
4. The range between the top of the T and the bottom of the upside down T is the 95% confidence interval.
5. The drawback of matching in this fashion is that the individuals selected for inclusion in the treatment group are only those people who are similar to the non-completers on their observable characteristics and are therefore not representative of all trainees. The implications of this matching strategy is discussed in Appendix 3.1 to this chapter.

Appendix 3.1

This chapter analyzed the effect of occupational skills training on the earnings of trainees using a comparison group of individuals who started training but did not complete. Since there were very few individuals who started training but failed to complete it, Heldrich Center researchers were forced to conduct the matching in a different fashion than is typical.

Ordinarily, individuals who receive the treatment — in this study, occupational skills training — are matched against a comparison pool, which is a much larger set of individuals from which a comparison group is drawn. The matching algorithm selects all or nearly all of the individuals who receive the treatment (the treatment group) and a subset of individuals from the comparison pool who are as similar (the comparison group). The selected comparison group typically includes at least as many, and oftentimes more, observations than the treatment group.

In this case, because there were so few non-completers, the comparison pool was far smaller than the number of training completers. In order for the matching to work, researchers had to think of the **non-completers** as the treated group and the training completers as the comparison pool. Heldrich Center researchers then used the matching algorithm to identify the training completers who were as similar as possible to the individuals who did not complete training.

The implications of this matching strategy are as follows. First, what Heldrich Center researchers have measured in their comparison between training completers and non-completers is not the effect of completing training on the employment and earnings of the training completers, but rather the **effect of NOT completing training on the employment and earnings of non-trainees**. This is a perfectly valid analysis, but it is not the same as estimating the effect of training. This means that technically the results in the figures should be presented as the difference that not completing a training program has on an individual's earnings compared to individuals who completed training.

Presented this way, the results would be identical, except that the signs of the estimates and the confidence bands would be flipped.

Although this analysis is not the same as examining the effect of training completion on training completers, Heldrich Center researchers presented the data in this manner because the trainees included in the non-completer analysis are highly similar to the trainees included in the intensives analysis, as indicated in Table 3A1. It should, however, be noted that because researchers only selected into the analysis the subset of trainees who were the most similar to the non-completers, the results are not representative of the effect of training on all trainees and are only representative of the effect of training on trainees who are similar to those included in the treatment group for the non-completer analysis. Since the trainees included in the non-completer analysis are roughly similar to the larger group of trainees in the intensives analysis, the Heldrich Center thinks its presentation of the results is reasonable.

Table 3A1. Comparison of Treatment Groups

	Adult		Dislocated Worker		WDP	
	Trainees Matched w/ Intensives	Trainees Matched w/ Non-Completers	Trainees Matched w/ Intensives	Trainees Matched w/ Non-Completers	Trainees Matched w/ Intensives	Trainees Matched w/ Non-Completers
Sample Size	6,185	6,185	12,120	12,120	3,573	3,573
Matched Sample Size	6,185	434	12,120	624	3,573	165
Demographics						
Female	56%	53%	54%	53%	52%	56%
Age (mean)	38	37	43	42.5	43.5	41.3
Minority	68%	69%	52%	55%	52%	44%
Disability	1%	3%	1%	1%	1%	NA
Years of Education (mean)	12.6	12.3	13.2	13	13.4	13.1
Program History						
TANF	5%	5%	1%	1%	1%	2%
GA	3%	4%	1%	3%	1%	5%
SNAP	6%	9%	2%	4%	3%	5%
Workforce Services	58%	60%	60%	63%	78%	81%
Labor Market History						
Quarterly Earnings (mean)	\$5,174	\$4,094	\$9,097	\$8,489	\$9,815	\$9,016
Quarters Employed	65%	61%	76%	76%	76%	76%
Job Tenure (quarters)	6.5	5.4	9	8.4	8.8	8.1
Duration of Unemployment (quarters)	2.5*	2.6	1.7*	1.8	1.9*	1.9

* Difference in means is statistically significant (0.05 level)