Does Occupational Training by the Trade Adjustment Assistance Program Really Help Reemployment?: Success Measured as Matching

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Abstract

The Trade Adjustment Assistance (TAA) Program is a dislocated worker program established by the U.S. Department of Labor to reduce the adjustment cost of workers displaced due to import competition. The program offers occupational skills training and reemployment services. This paper investigates the impacts of successful skill acquisition through occupational skills training on post-participation labor market outcomes such as wage replacement rates, post-participation earnings, and retention rates. I use matching between the occupations of training and entered employment as an indicator of successful skill acquisition through training. The data set used in this study is the Trade Act Participant Report (TAPR) and is acquired through the Freedom Of Information Act.

The data set shows a 37.53% of matching rates among occupational skills trainees. Matching is important in improving wage replacement rates. Trainees with a match display wage replacement rates that are 2 to 3 percentage points higher than trainees without a match. Trainees without a match display lower wage replacement rates than non-trainees. This is potentially due to their more limited skill sets that led them into training enrollment in the first place. Successful skill acquisition – indicated by a match – more than compensates this disadvantage of trainees. Trainees with and without a match display the same post-participation earnings. The results from wage replacement rates and post-participation earnings together suggest that although the trainees with a match displayed lower earnings prior to participation given individual characteristics, successful skill acquisition through training put these two groups of trainees on par with each other. These results suggest that the occupational choices matter and the training provision of the TAA program can be more fruitful if more resources are allocated to thorough worker assessment/counseling and good usage of local labor market information.

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I. Introduction

International trade has constantly increased throughout the second half of the 20th century, and the trend will continue well into the 21st century. International trade used to be mostly in finished goods; however, continuous technological advancement and the resulting reduction in transportation costs expanded international trade to include inputs (Yeats [1998], Hummels et al. [2001]), such as ball bearings for automobile or rubber soles for footwear. As virtually every good (and even services) becomes tradable, international trade is more active than ever.

While most economists agree on there being a net welfare gain from freer trade through an increase in economic efficiency and aggregate income, larger variety of consumer products, and lower prices, they do not deny the fact that there are winners and losers. The biggest losers from international trade are the workers displaced due to the increase in competition from imports and offshoring. The U.S. Trade Adjustment Assistance (TAA) program is specifically designed to compensate these workers.

Many studies find that TAA participants are, compared to a broader group of displaced workers such as Unemployment Insurance (UI) beneficiaries, more likely to have a harder time finding a job. Decker and Corson (1995) show that the majority (72% compared to 31% for UI exhaustees) are displaced due to plant/company closures; therefore, they are less likely to be recalled by their previous employers.[1] Finding a similar job would not be easy for these workers since these layoffs occur in the import-competing sectors, which is suffering not only locally but also nationally from massive job destruction. These facts indicate that TAA participants would benefit from finding a new occupation, but the evidence shows that they are not very likely to have marketable skills. Decker and Corson, in the same study, find that TAA participants have higher tenure with previous employers, indicating a narrow job experience. Baicker and Rehavi (2004) show that TAA participants are older, less educated, and have a higher fraction of people without a proper level of English proficiency. For this reason, it is believed that training - and income support during training to promote training enrollment - should be the major benefit of the TAA program, and it has been the case since the Trade Act of 1974.

The performance of the TAA program is officially assessed by three performance measures: wage replacement rates (which replaced by average post-participation earnings in 2007), reemployment rates, and retention rates. Many studies that evaluate the TAA program use a combination of these measures. Decker and Corson (1995) investigated the impact of the 1988 Amendment that required training

[1] While only 23% of TAA participants reported that recall is likely, 43% of UI exhaustees reported so.

enrollment in order to receive the income support. In comparison of participants who participated before and after the 1988 Amendment[2], they find that the post-participation quarterly earnings of pre-1988 trainees were $206 less than that of non-trainees, but post-1988 trainees received $353 more. They use 12th quarter from the workers' initial UI claim for the earnings estimation. Marcal (2001) uses Decker and Corson (1995) data set to find that TAA trainees earned 12% less than UI exhaustees, 7% less than TAA non-trainees. He also finds that TAA trainees were employed 12 percentage points more than TAA non-trainees, and 9 percentage points more than the UI exhaustees after 3 years from the initial UI claim.

Most evaluation studies on the TAA program as described above (for other federal training programs, see Heckman, LaLonde, and Smith [1999]) analyze whether trainees achieve better labor market outcomes after exiting the program compared to non-trainees. However, they do not directly measure the contribution of the training services provided by the program in achieving such outcomes (Barnow and Smith, 2004). An article in *The New Yorker Magazine* by Katherine Boo (2004)[3] tells a story about a woman who was laid off from the Fruit of the Loom plant located in Harlingen, TX, at the end of 2003. She received medical-assistant training, applied for twenty-nine positions, got three interviews, but ended up serving lunch at a nearby construction site. The article describes the reality of the training program in Cameron County as the following:

> *In the past five years, more than a thousand displaced manufacturing workers had been retrained as medical assistants or air-conditioning repairmen or computer-maintenance technicians. …The state workforce commission had predicted that twenty-five medical-assistant jobs would open in Cameron County in 2003, but it would be difficult to secure one. In one class of laid-off textile workers alone, eighty-five people had been trained for the profession.*

The *New Yorker* article above suggests that many participants receive training in occupations in which there are not enough job openings and end up in occupations unrelated to their training. The data on TAA participants[4] show that approximately 37.53% of participants who received occupational skills training found a job in the same occupation. This might indicate that for 62.47% of trainees, the resources put into

[2] More specifically, pre-1988 sample includes participants who participated in the program between February and July of 1988 and post-1988 sample includes participants who participated between February and July of 1989.
[3] "Letter from South Texas: The Churn," *The New Yorker Magazine*, March 29th, 2004
[4] This data set will be described in detail shortly.

their training did not achieve the goal which is providing employment opportunities by helping them acquire marketable skills. This is an inherent problem of federal training programs since the supply of trainees is only loosely linked to the demand for newly trained workers. The mismatch between supply and demand for trainees is not only a problem of the federal programs of the United States. Rasmussen and Westergaard-Nielsen (1999) found the apprenticeship systems in Germany and Denmark also have this mismatch issue.

According to the U.S. General Accounting Office (GAO), the cost of training, i.e., tuition for training classes and income support during training, accounted for more than 90% of TAA expenditures for fiscal years 1995-1999. The supply and demand mismatch issue indicates that there is significant room to improve the cost efficiency of the TAA program. One way to achieve this is to improve the rate of training success by enrolling workers in training programs that they can successfully acquire the skills and find a job using the newly acquired skills. For this purpose, we should separate the trainees who succeed in training – who find a job in their training occupation – from the trainees who do not because there are different solutions to cost-efficiency issue depending on post-participation outcomes of these two groups of trainees. If trainees who find a job in training occupation fail to achieve outcomes superior to those of non-trainees, the emphasis of the TAA program put on training provision should be redirected to other services such as job search assistance. If these successful trainees perform better than non-trainees but not the trainees who found a job in other occupation, distributing training vouchers to participants would be less costly than allocating resources in worker assessment and career counseling. If successful trainees perform better than non-trainees as well as the trainees who found a job in other occupation, more resources should be allocated to careful selection of training occupation through more thorough worker assessment and research on local labor supply and demand.

This paper separates the case of training success from the other by looking at the match between occupations of training and entered employment. The information on TAA participants, services that they received, and the outcomes are reported by the Trade Act Participant Report (TAPR). TAPR reports the 8-digit Occupational Skill Training Code (OSTC) for participants who received classroom skills training and Occupational Code of Employment (OCE) for those who found a job after exiting the program. The data set covers participants who exited the program between July, 2004 and September, 2007. I first examine whether occupation matching is a valid measure of training success by exploring the link between matching and participants' ability level. Additionally, I will discuss whether matching improves

the participants' post-participation labor market outcomes measured by wage replacement rates, post-participation earnings, retention rates, and reemployment rates by comparing these measures of three groups of TAA participants; trainees with a match, trainees without a match, and non-trainees.

First, validity of a match as a measure of successful training is examined by testing the hypothesis that a match is a preferred option for employment after training. Under the alternative hypothesis, the probability of matching shows a bell-shaped curve over the ability level. Where matching is not the most desirable option of reemployment, high ability trainees – who tend to have other marketable skills – are more likely to voluntarily withdraw from a match, inducing a low matching rate. Low ability trainees also display a low matching rate because they are less likely to succeed in training to obtain a match. In the analysis with educational attainment as a proxy for the ability level, the matching rate is generally increasing in educational attainment rather than displaying a bell-shaped link in all specifications.

With occupation matching as a measure of training success validated, I move on to investigation of the impacts of matching on post-participation outcome measures. Matching has significant impacts on the wage replacement rates, raising the rates by 2 to 3 percentage points over trainees without a match. Trainees without a match display lower rates than non-trainees. This is potentially due to the limited skill sets they possess prior to training that led them into training enrollment in the first place. Successful skill acquisition through training – indicated by a match – eliminates the disadvantage from limited skill sets by providing them marketable skills and improves wage replacement rates beyond that of non-trainees. On the other hand, matching has negligible impacts on post-participation earnings level while trainees without a match shows lower earnings level compared to non-trainees. The results from analyses of wage replacement rates and post-participation earnings together suggest that trainees with a match have lower pare-participation earnings compared to trainees without a match controlling for differences in individual characteristics; however, they display nearly the same post-participation earnings by reducing the earnings loss from the displacement. The retention rate is not influenced by matching but is influenced by receipt of various training programs. Receiving Occupational skills training or OJT improves retention rates by approximately 5 percentage points over non-trainees.

The impact of matching on reemployment rates cannot be analyzed because all trainees who have a match are necessarily employed after exiting the program. Receiving occupational skills training in general raises the chance of reemployment by 5 percentage points. Where training completion is separately included in the analysis, enrolling in skills training alone only raises the chance by 2

percentage points. Once a trainee completes the training program, the chance of reemployment rises by additional 4 percentage points, putting the rates of these trainees 6 percentage points higher than those of non-trainees. On-the-job training (OJT) has a larger impact, 11.4 to 12.6 percentage point increase in the rate. The large impact of OJT is likely to be driven by the condition that the employers need to hire the participant to receive the benefits.

The analyses of TAA participants data conducted for this paper support that occupational skills training improves the post-participation outcomes of participants. In the absence of training, participants with limited skill sets suffer from higher adjustment costs such as lower wage replacement rates. Succeeding in the training program compensates the negative impact of limited skill sets of these participants by providing the skills that generates good employment opportunities. The results from these analyses provide evidence that the focus of the TAA program on provision of training services is important and would be more fruitful if it is accompanied by emphasis on choosing the *right* occupations for participants by conducting thorough career assessment and counseling.

The rest of the paper is organized as follows: Section II describes the TAA program in more detail; Section III introduces the data set and provides various descriptive statistics; Section IV presents the analytical methodology and results; and Section V conclude.

II. Trade Adjustment Assistance

The TAA program is a dislocated worker program administered by the Employment and Training Administration (ETA) of the U.S. Department of Labor (DOL). TAA was first established in 1962, but it has only been actively implemented since the Trade Act of 1974. The North American Free Trade Agreement (NAFTA) Implementation Act of 1993 added a separate NAFTA-TAA program to help workers who are affected by the free trade agreement. The Trade Reform Act of 2002 (2002 Reform Act) integrated NAFTA-TAA into the regular TAA program.

When layoffs occur at a certain establishment, a group of three or more workers from the establishment or any entity representing them may file a petition with DOL. The petitions are filed at the plant level. The Division of Trade Adjustment Assistance investigates the case and issues a certification if they find an evidence that employment of the group of workers is adversely affected by any of the following reasons: a shift in production to a foreign country, an increase in company imports, an increase

in customer imports, or rising aggregate US imports. Once certified, all workers who are laid off from that establishment between the initial layoffs and 2 years from the certification date are entitled to the services and benefits listed in Table 1. If a worker is over age 50, he/she may apply for the Alternative TAA (ATAA)[5] program instead of TAA. ATAA is a wage insurance program that subsidizes 50% of the difference between the pre-layoff wage rate and the wage rate in the new job, up to $10,000 a year for two years, in case where the worker obtains reemployment no later than 26 weeks from the date of qualifying separation. ATAA was added by the 2002 Reform Act.

The most important benefits are training and income support. If career counseling determines that a participant does not have skills useful for reemployment, the worker may enroll in occupational skills training of up to 104 weeks. If the participant lacks basic education such as English proficiency or high school education, the participant may enroll in remedial training for additional 26 weeks in addition to the regular training. While enrolled in training, TAA participants are entitled to various types income support called Trade Readjustment Allowances (TRA) – Basic TRA, Additional TRA, and Remedial TRA. Instead of enrolling in training, participants may obtain a training requirement waiver. A training waiver is issued if a participant does not need training – if he/she has marketable skills or will soon be recalled by the previous employer – or is not able to take training – health issues or inability to find a suitable training program. Participants with a training waiver can receive Basic TRA for 26 weeks without enrolling in a training program. The Trade and Globalization Adjustment Assistance Act of 2009 (2009 Amendments) which is part of the American Recovery and Reinvestment Act of 2009 temporarily expanded the program benefits. It allowed additional 26 weeks for training and TRA payments. It also raised the cap on many adjustment allowances such as ATAA maximum benefit, Job Search Allowances, and Relocation Allowances.[6] These expanded benefits have decreased back to the normal benefits level of before 2009 Amendments in February 2011.

Choice of training occupation is made by participants with the help of local TAA staff through a proper assessment of the worker's ability. The ability assessment is measured based on an applicant's education, work history, potential barriers to employment, basic skills capabilities, aptitudes, work skills, family situation, attitudes toward work, behavioral patterns, supportive service needs, and interests for

[5] The name has changed to Reemployment Trade Adjustment Assistance (RTAA) by the Trade and Globalization Adjustment Assistance Act of 2009

[6] Job Search and Relocation Allowances were 90% of allowable costs up to $1,250 before 2009 Amendments, but they have changed to 100% of allowable costs up to $1,500. 2009 Amendments also allows part-time basis training and allows workers to begin the training program if there is a significant threat of displacement even if they are not yet laid off.

careers and training as they relate to the local labor market. Information is gathered primarily using questionnaires, individual interviews, paper and pencil tests, performance tests, behavioral observation, and career guidance instruments.

III. Data

Since the initiation of the TAA program, a substantial number of workers have received various benefits through the program. However, the collection of participant data became obligatory only for participants who exited the program since July 1, 1999. Through the last quarter of 2008[7], 314,964 participant cases are reported on TAPR. OSTC and OCE were reported using various classification systems until 2005 Revision which unified the occupation reporting to the O*NET code[8]. Since OSTC and OCE are the main variables of interest, only the observations collected after 2005 Revision were utilized for this study to avoid errors due to imperfect classification concordance. The data set covers information on 143,300 participants collected from the fourth quarter of 2005 to the fourth quarter of 2008.

The TAPR consists of three sections. The first section, *Identification and Participant Characteristics*, collects personal information of participants such as date of birth, gender, ethnicity, and education level. Any information regarding the qualifying separation, such as tenure with previous employer and earnings during three quarters prior to participation, is also reported here. Section II, *Activity and Service Record*, summarizes the TAA benefits a participant received. If the participant received training, it reports what type of training he/she received. For trainees who received occupational skills training, OSTCs are reported here. For all participants, receipt of financial assistance, such as Basic and Additional TRA, is reported. Finally, Section III, *Outcomes*, reports whether the participant is employed, which occupation he/she is employed in (OCE), and how much they earn during the three quarters following program exit.

Table 2 summarizes the data set. Columns 1 to 4 summarize data for different years of program exit. The last column summarizes the entire sample. Individual characteristics and service delivery of participants differ across exit years. The fraction of trainees fell noticeably in 2006 and rose back to the previous level in 2007. However, the fraction of trainees who received occupational skills training continued to decrease in 2007. One potential explanation for this is the improvement in labor market

[7] This is the reporting quarter. Each participant is monitored for three quarters from his/her date of program exit before being reported on TAPR. The last program exit date reported by the end of 2008 is 9/30/2007.
[8] The structure of O*NET code is described later in this section.

situation over time.[9] Occupation switching is less necessary for reemployment when there are more vacancies, reducing the demand for occupational skills training. This argument gains support from the rise in training waiver issuance in 2006 and 2007, which is driven by a rise in the number of workers with marketable skills. Whether the participants' existing skill sets are marketable depends on the prospect of reemployment. Another supporting evidence for this argument is the fall in Basic TRA take-up rate in 2006 and 2007. Participants with a training waiver is entitle to Basic TRA, income support up to 26 weeks from the date of UI benefit expiration. The decline in the take-up rate for Basic TRA despite of the large increase in training waiver issuance indicates that a large number of participants with a training waiver exited the program before their unemployment insurance benefit period ended. Despite of the decrease in enrollment in occupational skills training, the fraction of trainees among all participants remains high in 2007. This might be because of the trainees who received workshop-like training of very short duration. Among 90,503 trainees who reported valid dates for the first and last day of training, 6,972 received training shorter than a week.

The main variable of interest in this paper is a match between OSTC and OCE. As discussed earlier, OSTCs and OCEs are reported with 8-digit O*NET occupation codes. The first two digits of the O*NET codes represent 23 job families listed in Table 3. Table 3 shows that participants' choice of training occupations is not evenly spread. Large fraction of participants chose to receive training in office and administrative support (43) and production (51). What is more striking is that occupational trend in reemployment is vastly different from the pattern observed with their choice of training occupation. More than 30% of participants with an OCE found a job in production which implies that they returned to the manufacturing sector.

The next four digits represent different occupations within each job family. The last two digits represent any additional sub-categories for each occupation.[10] Reporting of occupation codes is far from perfect[11]. Among 143,300 total observations, 64,691 participants found a job after receiving occupational skills training; only 19,360 of them have valid 8-digit codes for both OSTC and OCE. Matching between OSTC and OCE are measured using these 19,360 observations.

[9] The national unemployment rate was 5.8-6% in 2002 and 2003. It started falling in 2004 (5.5%) and continued to decrease until the end of 2007. It was 5.1% in 2005,, 4.6% in 2006, and 4.5% in the first half of 2007.

[10] For instance, 29 is the job family of 'Healthcare Practitioners and Technical'. 29-2099.00 is the code for 'Health Technologists and Technicians, All Other' This occupation has four sub-categories: 29-2099.01 is for 'Electroneurodiagnostic Technologists,' 29-2099.02 is for 'Hearing Aid Specialists,' 29-2099.03 is for 'Ophthalmic Medical Technologists and Technicians.' For the complete list of O*Net occupation codes, visit www.onetonline.org.

[11] Reporting quality issue is discussed in more detail in Data Appendix.

Matching in this study refers to matching between training occupation and occupation of entered employment at either first- or second-degree. First-degree matching is identified by identical OSTC and OCE. Second-degree matching allows matching to a related occupation. The O*NET system specifies related occupations for each occupation based on knowledge areas, skills, abilities, work environment, and work activities.[12] It captures the idea that training in one occupation can help employment in related occupations. Table 4 summarizes these matching rates. Among 19,360 participants who have valid OSTC and OCE codes, 51.47% succeeded in getting a job in their training occupation. One can notice that second-degree matching represents a very small fraction of matches compared to first-degree matching. Only 462 have a second-degree match while 9,506 have a first-degree match. In panel (b), matching rates are reported excluding the observations from Oklahoma and Virginia. Oklahoma and Virginia show 100% and 99.97% matching rates (all at first-degree), respectively. These figures are likely to be results of miscoding. Observations from these two states account for 4.99% of the entire sample and 22.32% of the observations with valid OSTC and OCE[13]. Excluding these observations, the matching rate decreases greatly from 51.47% to 37.53%.

The outcome variables are summarized in Table 5. ETA evaluates the outcomes of the TAA program by three outcome measures; reemployment rates, wage replacement rates, and retention rates. Table 5 display these three outcomes for different groups of people. Panel (a) summarizes the outcome measures across different exit years, and Panel (b) summarizes them across different levels of educational attainment. The education level is interesting because of its linkage to the participants' potential outcomes.

Across all exit years, trainees display superior performances on all three outcomes compared to non-trainees. Such a trend is the most distinctive for reemployment rate. In 2004, trainees display reemployment rate that is 11.75 percentage points higher than non-trainees. The difference remains as around 10 percentage points for all other years. Trainees show substantially higher wage replacement rates, but the differences is very small in 2007. Though the differences between trainees and non-trainees are smaller than other outcome measures, trainees display higher retention rates for all years as well.

[12] For example, occupation code 51-4121.06 (Welders, Cutters, and Welder fitters) has ten related occupations. First six are: 51-2011.00 Aircraft Structure, Surfaces, Rigging, and Systems Assemblers, 51-4031.00 Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic, 51-4032.00 Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic, 51-4071.00 Foundry Mold and Coremakers, 51-4072.00 Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic, 51-4191.00 Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic

[13] Together they have 4,322 observations with valid OSTC and OCE. 1,444 are reported in Oklahoma and 2,878 are reported in Virginia.

Matching rates have greatly increased over time from 31.63% in 2004 to 42.89% in 2007. As mentioned earlier, labor market improves over time during this time frame. The increase in matching rates could be due to higher availability of vacancies in occupations of that participants are trained in. Occupational skills trainees with a match display higher wage replacements compared to those without a match in all years. Especially for those who exited the program in 2007, the rates are nearly 8 percentage points higher for trainees with a match compared to those without one. Matched trainees' average wage replacement rates are 3 percentage points higher than those without a match for all years combined. Retention rates are slightly higher for trainees without a match compared to those with a match. However, the difference is very small for all four years. Retention rates do not differ much across exit years and across different groups of trainees.

Looking at the outcome measures across different levels of education provides another dimension to what can be observed across exit years because different educational attainment can serve as proxy for the ability levels of participants. First of all, reemployment rates are much higher for trainees compared to non-trainees with larger differences for less educated participants. For participants who did not complete high school, the difference in reemployment rate is 14.19 percentage points. This is because less educated workers have limited sets of marketable skills; job training improves their employability more than participants with higher levels of education. Second, trainees perform better than non-trainees in wage replacement rates and retention rates as well. Third, occupational skills trainees with a match display wage replacement rates that are 3 to 6 percentage points higher than those of trainees without a match. For very highly educated participants, this pattern is reversed and trainees without a match show the rates 4 percentage points higher than those of trainees with a match. For the participants at this ability level, occupational training is less important of a determinant for the quality of post-participation reemployment. Retention rates are nearly identical for all skill trainees except for the very least educated and very highly educated.

These superior performances of trainees compared to non-trainees and of skills trainees with a match compared to those without a match could be driven by their superior pre-participation individual characteristics. Table 6 shows comparisons of various individual characteristics of different training status. First, the comparison between trainees and non-trainees do not show superiority of trainees. Trainees are generally younger and slightly more educated. While 72.17% of trainees are high-school graduates or less, 77.33% of non-trainees fit into this category. However, larger fraction of trainees claim that their

English ability is limited (6% compared to 2.59% for non-trainees). Also, trainees earned substantially less than non-trainees prior to participation. 74.81% of trainees earned less than $10,000 each quarter while only 63.74% of non-trainees earned less than that. Non-trainees earned $1,499 more each quarter on average. Pre-participation earning can serve as a predictor for the earnings potential after program exit. In this sense, trainees do not prove themselves superior to non-trainees despite their younger age and slightly better educational attainment.

Second, skills trainees with and without a match are nearly identical in their characteristics prior to participation. Their average age is almost identical and the age distribution also resembles each other very much. This is the same for educational attainment and pre-participation earnings. Trainees with a match show lower earnings prior to participation, but the difference is small. Trainees with a match also have a larger fraction of trainees with limited English, but again, the difference is small. Based on what we can observe from the data provided in TAPR, trainees with or without a match do not seem to be visibly different from each other prior to participation in the TAA program. If trainees with a match display superior post-participation outcomes to trainees without a match, it is likely the result of successful acquisition of skills provided through training program.

Given the general indication that training, especially successful training indicated by a match – is beneficial to participants, their choice of training occupation and its consequences should receive some lights. Table 7 summarizes the links between occupational choices and post-participation performances along with the matching rate for each occupation group. The matching rates vary greatly across occupation groups ranging from 15.71% for life, physical, and social science (19) to 64.17% for transportation and material moving (53). Choice of training occupation is certainly relevant to the chance of reemployment. The rates range from 73.90% for personal care and service (39) to 88.08% for protective service (33). While average wage replacement rate is only 81.12% for participants who chose training in food preparation and serving (35), it is as high as 99.30% for trainees in healthcare practitioners and technical (29). Retention rates are more associated with the occupation groups of OCE. They also vary greatly from 83.06% for Healthcare Practitioners and Technical (39) to 93.63 for Architecture and Engineering (17). Since the choice of training occupation influences the post-participation outcomes[14], the occupation groups of training are controlled in all analyses below.

[14] Whether these variations in post-participation performances are driven by selection by participants with a certain characteristics into a certain occupation group is discussed in more detail in Data Appendix.

IV. Analyses

The goal of this paper is to assess the impacts of successful training in various measures of labor market outcomes to see whether what really matters in achieving a better outcome is the skill sets acquired through the training program. Alternatively it could be merely the exposure to the intense federal assistance which involves a better access to job-related resources. In the alternative scenario, providing participants job-related services other than highly expensive training services can serve more participants without hurting the overall outcomes, improving the cost-efficiency of the program. As a measure of successful skill acquisition through training, a match between occupations of training and entered employment is used. I first verify the validity of matching as a measure of training success. Then I investigate the link between matching and post-participant labor market outcomes – reemployment rates, wage-replacement rates, post-participation earnings, and retention rates.

IV.1. Validity of Matching as a Measure of Training Success

Matching would be a direct indication of training success if the occupation of training is the most preferred occupational choice for all trainees. In this case, trainees who perform better in training are more likely to obtain a match ensuring a clear positive relationship between the probability of matching and the ability level of the trainee. However, the validity of matching as a measure of training success weakens if many trainees voluntarily choose a job in a non-match occupation despite of his/her ability to successfully acquire skills through training. This is more likely to occur to trainees with higher ability who tend to possess other marketable skills. For this reason, under the alternative hypothesis where a match is not the preferred option of reemployment, the link between matching probability and the ability level would show a bell-shaped relationship. Controlling for the occupational choices of training[15], low-ability trainees are more likely to fail in training, they tend to display low matching rates. High-ability trainees have marketable skills that are different from the training occupations, so they are more likely to choose a non-match occupation for their employment, showing low matching rates. Medium-ability trainees are more likely to succeed in training with limited outside options, they display higher matching rates.

[15] Trainees with different ability level select into different occupations with different matching rates as shown in Table A2 in Data Appendix. This creates a link between ability level and the matching rate that is not necessarily the outcome of success/fail in training.

The following regression analysis tests this hypothesis by looking at the importance of the ability level of a trainee in achieving a match. The outcome variable here is the indicator for matching with value '1.' Probit analysis is used for the following estimation:

$$\Pr(Match_i = 1) = c + \alpha Edu_i + \beta X_i + \gamma OCC_i + \delta_1 D_{5i} + \delta_2 D_{6i} + \delta_3 D_{7i} + \varepsilon_i \quad (1)$$

Education measured as degree attainment is used as a proxy for the trainee's ability level. Five dummy variables for high school degree or equivalent, some college, Associate degree, Bachelor's degree, and more than Bachelor's degree are used. Vector α will test the hypothesis whether matching is a valid measure of training success. X is a vector of individual characteristics such as gender, ethnicity, age at program exit, and completion of training. OCC_i is a vector of dummy variables for the training occupation groups listed in Table 3. As shown in Table 7, the probability of matching varies greatly across occupation groups of training; therefore, they need to be controlled to capture away the occupation-specific element of matching rates. Vector γ will capture such variations. D_{5i}, D_{6i}, and D_{7i} are dummy variables for exit years 2005, 2006, and 2007 to capture away different labor market situation as trainees initiate search. For this estimation, only the observations with both valid OSTC and OCE are used. This requires receipt of occupational skills training; therefore, investigation of the selection into a match is not biased by selection issues around training enrollment. Observations from the states of Oklahoma and Virginia are excluded for the reason discussed earlier.

Table 8 presents the results. There are four specifications. Specification I uses only the personal characteristics included in vector X. The reference group for this specification is white females with less than high school education[16] between ages 16 and 20. Specification II also includes dummy variables for years of program exit. The reference year is 2004. Specification III and IV repeat the specifications I and II with states of participants' residency controlled. California is used as reference group. In all four specifications, occupation groups of training are controlled. Group 11, Management, is used as a reference group. Occupation group 55, Military Specific, is omitted since training and hiring process for military personnel is different from other occupation groups. Group 55 only accounts for 0.07%[17] of the sample, so it is unlikely to affect the analysis in a significant manner. For each specification, I carry out

[16] Participants reported to have received no education at all are dropped from analysis due to the suspicion that no education represents not only participants with no education but also participants who have no information on their educational attainment.

[17] This is different from the figure shown in the fifth column of Table 3 because it is calculated from the observations with valid codes for both OSTC and OCE.

the estimation with or without the indicator variable for training completion. The numbers reported are the marginal effect of each variable on the chance of matching.

In all four specifications, the probability of matching does not show the bell-shaped pattern over the educational attainment. Instead, high ability trainees – trainees with a Bachelor's degree or more – display far higher matching rates than other trainees. Having a Bachelor's degree raises the probability of matching by approximately 7 percentage points and some graduate school raises the matching rates by 13 percentage points compared to trainees with less than high school education. Where states of residency are controlled, matching rates increase monotonically with the level of education. Participants with an Associate degree show the matching rates 4 to 5 percentage points higher than those with less than high school education. The rates for participants with a Bachelor's degree and some graduate studies are approximately 6.0 and 8.5 percentage points higher. The estimates support the hypothesis that matching is a preferred option for reemployment, which validates the use of matching as an indication of training success.

Some might argue that training completion is a better indicator of training success. However, the endogeneity in training completion prevents us from achieving meaningful information about selection into matching. Whether a trainee withdraws from training program because he/she considers a match as undesirable (high-ability trainees) or unattainable (low-ability trainees), early withdrawal is highly correlated with matching failure. For this reason, I use training completion as a control variable rather than an indicator for training success. In all specifications, completion of training is highly significant. Considering that the matching rate for the sample studied here is 37.53%, the fact that completion of training raises the chance of matching by 16 to 18 percentage points is substantial. Despite of such large influence of training completion on matching, its inclusion in the analysis does not affect coefficients on educational attainment. The validity of matching as a measure of training success is preserved.

Another piece of evidence that supports that matching is a valid measure of training success is the increasing coefficients on the exit years over time. Labor market was the least favorable in 2004 and gradually improved over time until the first half of 2007. Higher matching rates during favorable period imply that people take a job in the matching occupation when it is more available. This pattern is preserved with or without controlling for the states of residency.

Ethnicity is another important factor. Asians and African Americans show substantially lower matching rates – around 10 percentage points for both - than white participants. On the other hand,

Hispanic participants have the matching rates 4.4 to 5.0 percentage points higher than white participants. This pattern becomes much weaker when the states of residency are controlled indicating a high concentration of certain ethnic groups in few states as presented in table A.4 in Data Appendix. For instance, black participants account for a large fraction of participants in Georgia, North Carolina, and South Carolina. Matching rates for these states are 23.13%, 34.13%, and 13.81%, respectively, while the average rate for the entire sample is 37.53%. However, the low matching rates for Asian participants are not explained by bad local labor markets.

IV.2. Effects of Occupational Skills Training and Matching on Outcome Measures

The conventional literature on evaluation of training programs compares trainees to non-trainees. That comparison asks a simple question – Does training work? However, it does not answer why training works. If trainees' outcome measures are significantly better than those of non-trainees, it could be because what they need is successful transition away from the previous occupations for which any type of training suffices. Or it could be because they need transition into a specific occupation which is enabled by skill acquisition through training, so that which training you choose becomes very relevant for reemployment. If the outcome measures of non-trainees do not differ from those of trainees, the failure might arise from three possible reasons. First, training was not necessary and all participants generally had marketable skills already. Second, training does not work properly; that is, the training programs are poorly designed to teach the participants proper skill sets. Lastly, training works, but occupational choices are poorly made; that is, training did not help participants to earn the skills that are suitable for their ability and are in demand. It is important to figure out which is causing the failure of training program because each calls for a different solution.

All these possible scenarios can be summarized by two questions: does training work in general? and does a choice of training occupation affect the impacts of training? For the first question, instead of simply comparing trainees and non-trainees, comparison will be made between trainees without a match and non-trainees. The second question can be answered by comparing trainees with a match and trainees without a match. Using the following estimation equation, both questions can be answered.

$$Y_i = \alpha_0 + \alpha_1 M_i^{occ} + \alpha_2 TR_i^{occ} + \alpha_3 TR_i^{rmd} + \alpha_4 TR_i^{ojt} + \alpha_5 TR_i^{cst} + \beta X_i + \delta_1 D_{5i} + \delta_2 D_{6i} + \delta_3 D_{7i} + \varepsilon_i \quad (2)$$

The outcome variable, Y_i, is any one of the outcome measures – reemployment, post-participation earnings, wage replacement rate, and retention. Probit analysis is used for reemployment and retention and OLS is used for earnings and wage replacement rates. M_i^{occ} is the matching indicator – 1 if matched, 0 otherwise. *TR*'s are indicator variables for various types of training. TR_i^{occ} is 1 if participant *i* received occupational skills training. TR_i^{rmd}, TR_i^{ojt}, and TR_i^{cst} are indicator variables for remedial training, OJT, and customized training, respectively. As in the previous section, broad matching is used for all analyses. *X* is a vector of individual characteristics of participants used in the first analysis. D_{5i}, D_{6i}, and D_{7i} are dummy variables for exit years, 2005, 2006, and 2007.

α_1 captures the impact of matching on the various outcome measures. α_2, on the other hand, captures the effect of enrolling in skills training but failing to obtain a match. In the absence of a separate measure of training success (here, matching), the effect of training can only be estimated as differences between outcomes of trainees and non-trainees regardless of whether the trainees successfully acquired new skills through training or not. Matching allows us to go one step further with investigation of the efficacy of training provision.

a. Earnings-related Measures

Up to 2007 fiscal year, the ETA used wage replacement rates to measure the earnings aspect of program performance. Since then, it is using the level of earnings instead. Here, I present the impacts of occupational skills training, matching, and other types of training enrollment on both wage replacement rates and post-participation earnings.

Wage replacement rates are the ratio of post-participation earnings to pre-participation earnings. These rates are constructed using the average quarterly earnings during three quarters preceding participation and three quarters following exit reported in TAPR.[18] Post-participation earnings are logarithm of the average of three quarterly earnings following program exit. Since matching is used here, observations from Oklahoma and Virginia are omitted. Trainees who received occupational skills training but failed to report OSTC are also omitted. Training completion is dropped from analysis because training success is proxied by matching. The results are summarized in Table 9.

[18] For data issues around the earnings record collected in TAPR and detailed description of construction of wage replacement rates, refer to Data Appendix.

Matching has positive impacts on the wage replacement rates by 2 to 3 percentage points higher than trainees without a match. Where the occupation groups of training are not controlled, occupational skills trainees without a match actually show the rates lower than non-trainees. This is potentially due to the limited skill sets that led them into enrolling in training in the first place. Succeeding in training – indicated by a match – compensates the disadvantage of limited skill sets by providing the trainees new marketable skills. The impact of matching gets smaller where pre-participation earnings are controlled. Where the occupation groups of training are controlled, impact of matching remains between 1.8 and 2.6 percentage points over trainees without a match. The fact that the size of the impact of matching is not influenced by controlling for the occupation groups of training implies that the benefit of successful skill acquisition is not occupation specific. On the other hand, the negative impacts of the lack of skills decrease with OSTC group controls. The low-skilled trainees select into occupations that are suitable to their ability level, which pays less than other occupations.[19] Controlling for OSTC groups somewhat capture away the variations in skill levels and the different occupational selection by participants of different skill levels. Here, the coefficient reflects the impact of training more correctly.

In terms of earnings level, occupational skills trainees with a match do not display higher earnings after program exit compared to those without a match. Skills trainees without a match also show lower earnings level than non-trainees. Skill trainees with and without a match essentially show the same earnings level, which is still lower than that of non-trainees, where pre-participation earnings are controlled. Similar pattern is observed with and without controlling for the OSTC groups.

The lack of positive impacts of matching and occupational skills training on post-participation earnings level provides another dimension to the findings from the analyses of wage replacement rates rather than contradicting them. What is implied from these results is that skills trainees have lower earnings prior to participation compares to non-trainees and high earning people tend fo find a job with a better pay after exiting the program. However, skills training reduces the earnings loss during this process. Successful training – indicated by a match – enhances the benefit of training by further reducing the earnings loss.

OJT is proved to be largely beneficial to trainees by raising the wage replacement rates by 3.6 to 4.7 percentage points over those of non-trainees. It is also very effective in raising the post-participation earnings level, and this is not influenced where pre-participation earnings are controlled. Customized

[19] Selection issue around choice of training occupation is discussed in detail in Data Appendix.

training trainees show wage replacement rates lower than those of non-trainees where pre-participation earnings are not controlled, but rates higher than those of non-trainees where the earnings are controlled. These trainees display exceptionally high post-participation earnings, but the superiority of their earnings is very sensitive to controlling of pre-participation earnings. This indicates that the low-replacement rates for these trainees, despite of their high earnings with reemployment, is due to their high pre-participation earnings which tends to be harder to recoup. However, the skills acquired through customized training help reduce the earnings loss. Participants who received remedial training show the lowest post-participation earnings. This is still the case with pre-layoff earnings controlled. These participants represent the lower extreme of ability spectrum, hence lower earnings even with intensive training. The negative coefficients on remedial training potentially capture this selection issue that are not explained by other individual characteristics.

The coefficients on pre-participation earnings are large and negative in the analyses of wage replacement rates, and large and positive in the analyses of post-participation earnings. This implies that high-earning participants find a job with higher pay, but their pre-layoff level of earnings is simply harder to match. This indicates a convergence in earnings after participation. The standard deviation of post-participation earnings is $4,059.93, which is 21.59% smaller than that of pre-participation earnings. On the same line of logic, it is interesting to see the coefficients on educational attainment. Without controlling for pre-participation earnings, higher educational attainment has small impacts on post-participation earnings. This implies that highly educated participants – who are more likely to have earned a good pay prior to participation – still earn more after participation without any significantly larger earnings loss compared to participants with less education. Much higher wage replacement rates for higher education with pre-participation earnings control prove that higher education is beneficial in terms of securing good earnings even after traumatic displacement. The finding that wage replacement rates are not lower for highly educated participants in contrast to the finding that the rates are lower for participants with high pre-participation earnings show that the skill-level of participants – indicated by their level of education – promise them better outcomes than various aspects implied by higher-earnings such as high tenure and stronger unions. This again strengthens the argument for the importance of successful skill acquisition through training.

According to Table 6, occupational skills trainees are substantially younger than non-trainees (4.63 years on average). Also participants of age 50 or above show substantially inferior earnings

outcome compared to younger participants. I performed the same analyses of impacts of matching on earnings-related measures with only participants of age between 16 and 50 in order to see if the highly negative impacts of older age influence coefficient estimates of other variables despite of controlling for age groups. The results are generally the same without the older participants. These results are not reported here. Exit years are controlled to capture the different labor market situations over time. I carried out the same specifications presented here without exit year controls. The results are almost identical, hence, not presented.

b. Retention Rates

The indicator variable for retention is 1 if a participant is still employed during the remainder of the observation period (up to three quarters) once he/she is employed and 0 otherwise.[20] Probit analysis is used again for the analysis. Observations from Oklahoma and Virginia are omitted as well as the occupational skills trainees without OSTC and the trainees who are reemployed without OCE. Table 10 summarizes the results.

While matching has little impacts on retention rates, various training programs are largely beneficial. Occupational skills training and OJT improve the retention rates by approximately 5 percentage points. The impact of occupational skills training decreases to about 2 percentage points where OSTC groups are controlled. This implies that occupational skills trainees choose occupations with more stable employment. The impacts of OJT are robust across specifications. High retention rates for OJT trainees can be attributed to the fact that both employers and workers have a chance to evaluate the quality of the match between work and ability while in training. This reduces the likelihood of separation later once remained employed after the training is completed. Overall, the retention rates for the entire sample across specifications are quite high (around 90%) and are not influenced by differences in individual characteristics and service received compared to other outcome measures. High overall retention rate may be due to the short observation period which is only three quarters from exiting the program. Dropping the exit year controls also does not affect the analyses of retention rates. The results are not shown here.

[20] The retention variable is constructed using three employment indicator variables. The TAPR reports whether the participant is employed during each of three quarters of observation periods, providing three employment indicators. One caveat of this method of construcing the retention is that being reported as employed for two consecutive quarters does not necessarily mean that the participant is working for the same employer during the two quarters.

c. Reemployment Rate

The dependent variable is an indicator variable for employment. It takes the value 1 if a participant is employed for at least one quarter during three quarters following the program exit. The major comparison in this analysis is between trainees and non-trainees using Probit analysis. Matching is not included in this analysis because the participants with a match are necessarily all employed. Since matching variable is not used, observations from Oklahoma and Virginia are included. Table 11 summarizes the results.

First, all types of training programs influence the chance of reemployment substantially. Receiving occupational skills training improves the chance of reemployment by 5 percentage points if training completion is not separately controlled. If a participant receives occupational skills training but does not complete it, his reemployment rate is only 2 percentage points higher than that of non-trainees. Training completion adds extra 4 percentage points. Where occupation groups of training are controlled, the size of the impacts of incomplete occupational skills training decreases to 1.3 percentage points, but the additional benefit of training competition remains as 4 percentage points rise in the rate. The difference in reemployment rates for trainees who completes training and who does not implies that incompletion of training generally indicates training failure rather than voluntary exit due to a rise in other employment opportunity.

A larger impact comes from OJT as in earnings-related measures and retention rates. The probability of reemployment for OJT trainees is 11.4 to 12.6 percentage points higher than that of non-trainees. This is expected because employers can enjoy the benefit only by actually hiring the trainees. For this reason, these trainees do not need to perform job search unless they were let go immediately after the end of training period. Customized training lowers the chance by 2.7 to 3.4 percentage points. Customized training is the training program that is specially designed for skill needs of a specific firm. That is, if a trainee is not hired by the firm, the skills acquired through this training may not be applicable to other jobs making reemployment rather difficult. However this risk-taking is rewarded by higher wage replacement rates once hired.

Educational attainment, ethnicity, and, age influence the reemployment rate by similar magnitude. While having an associate degree is the most beneficial in terms of the chance of reemployment (6 percentage points higher than less than high school), all educational levels display similar reemployment

rates, 3 to 4 percentage points higher than that of trainees with less than high school education. The coefficients on age variables show a downward trend with age. Up to age 50, the negative impact of aging on reemployment rate is mild. Then, it jumps to negative 13.4 percentage points for participants of age between 16 and 20. Participants between the ages of 61 and 65 display the rate 45 percentage points lower than that of workers of age between 16 and 20. This could be caused by voluntary withdrawal from the job market by participants nearing retirement. Among 9,069 participants between 61 and 65 who obtained a training requirement waiver, 810 (8.9%) reported retirement as a reason. This is substantially higher than other age groups. Only 1.02% of training waivers issued, for all age groups, are issued for the reason of retirement. The negative impacts of age are very robust across specifications.

As in the earnings-related measures and retention rates, the same analyses were carried out without controlling for exit years. The results are almost identical and not shown here.

V. Conclusion

The TAA program offers participants various training opportunities such as occupational skills training and remedial training in order to reduce the adjustment costs of the workers adversely affected by rising import competition. This paper investigates the efficacy of occupational skills training by comparing three different groups of participants; non-trainees, trainees who succeed in skill acquisition through training, and trainees who do not. The training success is measured by a match between occupations of training and entered employment. The matching rates for the sample are 37.53% excluding observations from Oklahoma and Virginia due to data quality issue. This methodology can answer whether occupational skills training in general works regardless of participants' performance in the training program or whether successful acquisition of a specific set of skills is necessary to improve the post-participation labor market outcomes. I analyze the impacts of training success, indicated by a match, on post-participation outcome measures; reemployment, wage replacement rate, post-participation earnings, and retention.

Matching is important on outcome measures related to earnings. Trainees with a match display wage replacement rates that are 2 to 3 percentage points higher than those of trainees without a match in all specifications. Where occupation groups of training are not controlled, trainees without a match display the wage replacement rates lower than the rates of non-trainees. This is potentially due to the

limited skill sets that these trainees have other than the skills used in the previous employment that led them into training enrollment in the first place. Training success (matching) compensates the disadvantage of lack of skills by providing trainees with new sets of marketable skills raising trainees' wage replacement rates above those of non-trainees. The negative impacts of limited skills of skills trainees without a match disappear where OSTC groups are controlled. Here, trainees without a match show the rates 2 percentage points higher than non-trainees. This implies that these trainees who failed to obtain a match select into low-pay occupation groups which will be captured away by the OSTC group variables. The impacts of matching are negligible in terms of post-participation earnings. This result along with the findings from the analyses of wage replacement rates implies that trainees with a match have a lower pre-participation earnings, however, their post-participation earnings are not inferior to other participants because successful skill acquisition reduced these trainees' earnings loss.

Although retention rates are not influenced by matching and do not vary much across participants with different personal characteristics, various training programs are largely beneficial. Occupational skills training and OJT improve the retention rates by around 5 percentage points. While the impact of matching on reemployment rates cannot be analyzed due to the fact that all sample who have a match is necessarily all employed, the impacts of receiving occupational skills training is proved to improve the chance of reemployment substantially. Skills trainees display the reemployment rates 5 percentage points higher than non-trainees. Enrolling in skills training alone raises the chance of reemployment only by 2.0 percentage points above that of non-trainees but completion of the training program adds 4extra percentage points to the rates. Where OSTC groups are controlled, the impact of skills training enrollment decreases to 1.3 percentage points, but the impact of completing the training remains as highly beneficial and raises the rates by 4 percentage points.

Overall, various training provision under the TAA program is effective in reducing adjustment costs of the participants by providing better employment opportunities. Participants who choose to receive occupational skills training tend to have possessed more limited skill sets prior to participation and this is reflected in their inferior labor market outcomes compared to non-trainees in some measures. However, successful skill acquisition – indicated by a match – compensates their initial lack of marketable skills. As a result, trainees with a match do not display the labor market outcome that is inferior to non-trainees and actually superior in wage replacement rates.

This supports the importance of training provision of the TAA program in reducing the adjustment costs of the workers displaced from import competition sectors that are generally disappearing from the U.S. manufacturing sectors. The results from this study provide evidence that the TAA program's focus on training program should continue and more effort should be placed on worker assessment and counseling and good usage of the information on local labor supply and demand so that participants can choose an occupation that is suitable for their needs and abilities and are in demand which will directly lead to employment in that occupation.

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A. Data Appendix

a. Construction of Wage Variable

Under the TAPR, earnings data of each participant are collected for three quarters preceding participation and three quarters following program exit. The reported figures are quarterly earnings. The biggest problem with the earnings data collected is the fact that the three pre-participation earnings figures represent the three quarters in relation to the date of participation rather than the date of separation. Therefore, these earnings records sometimes show the temporary low-pay positions that participants held between separation and participation. Since pre-participation earnings information is used mainly to construct wage replacement rates, this will bias wage replacement rates in the analyses.

In order to improve the quality of wage replacement rates, I had to come up with a threshold of pre-participation earnings that separates the temporary low-pay positions from the earnings from the qualifying separation. I chose $2,000 for quarterly earnings. The threshold $2,000 is quarterly earning if a person works for 30 hours per week at minimum wage rate, $5.15.[21] Figures below $2,000 are likely to be indications of such temporary positions. I drop any earnings records that are less than $2,000 each quarter. I also drop earnings figures above $50,000. This amounts to an annual salary of $200,000. It is reasonably unlikely that a person with that level of earnings is trying to benefit from the training services provided by the state agency that is generally targeted for low-skilled or young workers. Table A1 presents the number of participants that fall into each earnings category for three quarters prior and following participation. There is a rapid increase in the number of people with earnings less than $2,000 including zero earnings as it gets closer to program participation. This indicates that the qualifying separation occurs not immediately before participation, it rather occurs over time prior to participation.

After dropping all records with less than $2,000 or more than $50,000 quarterly earnings, I constructed average pre-participation earnings and average post-participation earnings variable using the remaining earnings information. Using these two average earnings variable, I construct wage replacement rate for each participant. I also constructed maximum pre-participation and post-participation earning by selecting the maximum value among the remaining earnings records. I carried out the same analyses presented in Tables 9 and 10. The results are nearly identical, hence, not reported.

b. Participants' Selection of Occupations

The link between participants' choice of training occupation and post-participation labor market outcomes is discussed in Table 7. The link between matching and post-participation outcomes could be

[21] The federal minimum wage rate increased to $5.85 in 2007 (then $6.55 in 2008 and $7.25 in 2009). Most participants in the sample (whose latest exit year is in 2007), $5.15 is the relevant minimum wage rate for earnings prior to participation.

stemming from the fact that skills used in some occupation groups are more generally applicable than others. In addition to this, if there is selection into a certain occupational groups by different groups of participants, the direct relationship between matching and the outcomes could be biased. Tables A2 and A3 summarize individual characteristics of participants and the matching rate for each occupation group of training and employment respectively.

The first column in both tables shows that matching rates vary greatly across different occupation groups. Table A2 shows that the matching rates range from 15.71%[22] to 64.17% depending on participants' choice of training occupation. More interestingly, the matching rates shown in Table A3 show that the majority of employees in some occupation groups, such as legal (23) and healthcare support (31), received training specific to the occupation, while training does not seem necessary for some occupations, such as sales and related (41) and farming, fishing, and forestry (45).

Gender is very relevant for choice of training occupation according to Table A2. Male participants are heavily concentrated in construction and extraction (47) and installation, maintenance, and repair (49). Female participants are in healthcare support (31) and office and administrative support (43). This pattern is preserved for OCE groups. The importance of English proficiency also differs greatly across occupations. In their training choices, participants with limited English proficiency show high concentration in three occupation groups: food preparation and serving related (35), building and grounds cleaning and maintenance (37), and personal care and service (39). However, farming, fishing, and forestry group (45) is the major employer of these workers.

Table A2 also shows that participants with different ethnicity or different levels of educational attainment display distinctive choices of training occupation. Again, these patterns are preserved in their occupations of employment. Especially the pattern is very clear in educational attainment. More educated participants tend to seek training in management (11), business and financial operations (13), computer and mathematical (15), and architecture and engineering (17). This pattern is much stronger in the occupation groups of employment. Less educated participants tend to choose more traditionally low-skilled occupations. Participants with less than high school education mostly choose food preparation and serving (35) and building/grounds cleaning and maintenance (37) while high school graduates select into healthcare support (31), production (51), and transportation and material moving (53).

Table A4 present the link between individual characteristics and states of residency. The most noticeable thing for this table is the concentration of participants with limited English proficiency and different ethnic groups in few states. For instance, 33.3% of participants from Rhode Island claim that they have limited English proficiency. California has 23.64% and Utah has 19.96%. On the other hand,

[22] Two occupation groups with the lowest matching rates – (45) farming, fishing, and forestry (7.14% matching) and (55) military specific (0% matching) only have 13 and 2 observations respectively.

Alaska has no participants with limited English ability and Ohio and Oklahoma show less than 1%. Ethnic concentration is also strikingly visible. Georgia, Missouri, and South Carolina display more than 40% of their participants being black while black participants account for 15.5% of all sample. Hispanic participants are heavily concentrated in Idaho, New Mexico, and Texas. Hispanic participants account for more than 50% of participants from these states, but they are only 9.09% of all sample.

c. Reporting Quality

As mentioned in the text, reporting of occupational codes is far from perfect. Table A5 shows the reporting quality by states. 54.50% of all sample (78,097 participants) reported to have received occupational skills training. Only 59.22% of them (46,247 trainees) have valid a 8-digit OSTC. Out of 78,097 trainees, 18,300 have zero as their OSTC, 12,787 have 7-digits or less, and 763 have invalid first two digits that are not listed in Table 3. Among 143,300 total participants, 111,845 participants find a job within three quarters from the date of exit. This accounts for 78.05% of all observations. However, only 25.38% (28,386 participants) is reported with a valid 8-digit OCE. Among 111,845 reemployed participants, only 38,692 have non-zero entry for OCE. 8,598 of them have 7-digits or less and 1,708 of them have invalid first two digit codes for OCE.

The reporting rates for OSTCs and OCEs vary greatly across states from 0% to 100%. Most states that fail to report OSTC also fail to report OCE. For instance, North Carolina which accounts for nearly 10% of total observations during this period do not collect information on OSTCs and OCEs despite the requirement by the ETA. The reporting requirement is apparently not strictly enforced. 5 states reports OSTCs for less 10% of their occupational skills trainees and 12 states with less than 50% reporting rate. Reporting of OCEs is worse. 19 states show the reporting rate of less than 10% and 30 states with less than 50% reporting.

On top of the states with very low reporting rates, OSTCs and OCEs from Oklahoma and Virginia are questionable as well. Oklahoma shows nearly perfect reporting of OSTC and OCE. Virginia reported OSTCs for 92.52% of trainees and OCEs for 66.81% of reemployed participants. Virginia's reporting rate is still very high relative to other states. However, as mentioned earlier in the text, these two states show the matching rates of 100% and 99.97%. While I am not denying the possibility that the training program is incredibly effective in these two states, it is quite likely that this is a result of coding error. Taking these observations out of matching analyses once more reduce the sample size for the analyses in this paper.

Table 1. Benefits and Services Provided by the TAA Program

Services and Benefits	Description	
Rapid Response Assistance	Inform workers of various services available for them. Available for all displaced workers, certification not necessary	
Reemployment Services	Assist workers with reemployment by providing career counseling and assessment, job search related workshops, job search assistance and referrals. Career assessment determines whether and which training is beneficial to each participant.	
Relocation Allowance	When a participant gets a job that requires moving, the program compensates 90% of moving expenses with a stipend of three weeks' wage. Maximum of $1,250[(a)]	
Job Search Allowance	Compensates 90% of the cost of job searches outside commuting area. Maximum of $1,250[(a)]	
Training	Participants are eligible for training up to 104 weeks. To be eligible, the following criteria must be met: i) no suitable employment ii) training would be beneficial to the worker iii) training would lead to employment iv) training must be available v) the workers would be able to complete the training vi) training cost is reasonable	Training waiver may be issued to a participant if i) she will be recalled soon ii) she has marketable skills iii) she has a health problem iv) training is not available v) enrollment is not available
	Classroom Training	Targeted to obtain skill sets that are specific to an occupation of choice. Training provided by local community colleges or vocational training schools.
	Remedial Training	Eg. Literacy, English as a Second Language (ESL), and GED Can occur concurrently with other training or during additional 26 weeks from the end of regular training
	On the Job Training (OJT)	If a participant is employed under OJT, the TAA program pays 50% of the wage rate to the employer during the training
	Customized Training	The training is customized to tasks of a specific firm, but the trainees are not necessarily employed by this firm.
Trade Readjustment Allowance (TRA)	A participant is eligible to receive income support for up to 104 weeks as the following: i) 26 weeks following separation: UI ii) 26 weeks following exhaustion of UI: Basic TRA iii) 52 weeks following exhaustion of Basic TRA: Additional TRA	
	Basic TRA	During the first 26 weeks from exhaustion of UI. This requires training enrollment unless[(b)] i) the participant has obtained a training waiver ii) has completed approved training
	Additional TRA	During 52 weeks from exhaustion of Basic TRA. Training enrollment is required without exception.
	Remedial TRA	Participants who are enrolled in remedial training qualify for 26 weeks of income support in addition to 104 weeks of UI, basic TRA, and additional TRA.
Health Insurance Tax Credit (HITC)[(c)]	This is a subsidy of 65% of the qualifying health insurance premium paid. The subsidy will be paid as a Tax Credit. All TAA and NAFTA-TAA participants all are eligible.	

Source: Employment and Training Administration, US Department of Labor (http://www.doleta.gov/tradeact/benefits.cfm)

(a) Max $800 prior to Reform Act of 2002
(b) These exceptions do not apply to NAFTA-TAA participants. Training enrollment is required for NAFTA-TAA participants to receive basic TRA.
(c) This is added to TAA benefits by 2002 Reform Act

Table 2. Summary Statistics of TAA and NAFTA-TAA Participants across Years of Program Exit

Year of Program Exit	2004	2005	2006	2007	All
Number of Participants	27,559[ii]	45,783	43,972	25,987[ii]	143,301
Participant Characteristics[i]					
Gender					
Male	49.51	51.36	52.37	53.21	51.65
Female	50.49	48.64	47.63	46.79	48.35
Age at Participation					
Under 30	10.25	9.53	9.32	9.11	9.53
30-44	39.88	38.13	35.99	33.51	36.97
45-54	32.17	33.15	33.57	34.89	33.40
55 and more	17.70	19.20	21.12	22.50	20.10
Mean Age at Participation (years)	44.02	44.58	45.12	45.62	44.83
Ethnicity					
Hispanic/Latino	13.93	10.45	6.22	5.65	8.87
American Indian/Alaska Native	0.99	0.77	1.00	0.94	0.92
Asian	4.00	3.48	2.32	2.31	2.99
Black or African American	16.07	13.79	15.14	16.13	15.07
Hawaiian Native or Pacific Islander	0.44	0.35	0.29	0.28	0.33
White	64.57	71.16	75.04	74.69	71.82
Education					
Less than High School	19.88	18.45	20.16	20.49	19.63
High School Graduate or Eqv.[iii]	54.34	55.73	55.95	55.43	55.49
Some Post High School[vi]	19.83	19.61	17.81	17.37	18.70
College Graduate or Eqv.	5.47	5.78	5.37	5.95	5.62
Not Identified	0.48	0.43	0.71	0.76	0.56
English Proficiency					
Not Proficient	5.13	5.23	4.20	4.13	4.70
Benefits & Services Received[i]					
Received Any Training	76.12	76.61	69.76	75.44	74.20
Among Trainees					
Occupational Skill Training	70.82	71.76	66.40	54.95	66.98
On-The-Job Training	3.78	3.00	0.88	0.62	2.14
Remedial Training	14.33	14.63	16.97	16.32	15.57
Completed Training	68.90	65.82	59.12	48.96	61.39
Average Weeks of Training	57.64 wks	61.42wks	63.67wks	61.25wks	61.19wks
Rec'd Travel Allowance	11.55	14.57	17.93	13.34	14.72
Rec'd Subsistence Allowance	1.91	1.32	1.14	0.72	1.28
Training Waiver	56.07	57.21	70.48	76.73	64.60
Recall	7.03	8.50	8.98	1.84	6.98
Marketable Skills	36.93	43.77	59.76	72.45	54.16
Retirement	0.97	1.16	1.91	2.11	1.58
Health problem	1.88	0.89	0.27	0.58	0.78
Enrollment/Training Unavailable	23.68	20.39	19.30	20.30	20.55
Reason unknown	29.50	25.28	9.77	2.72	15.94
Basic TRA	61.29	63.52	61.08	56.83	61.13
Additional TRA	30.40	35.57	30.87	26.18	31.43
Job Search Allowance	1.07	1.12	1.59	1.99	1.41
Relocation Allowance	1.03	1.14	1.47	1.46	1.28

(i) Units in % unless specified otherwise.
(ii) Numbers of participants in 2004 and 2007 are smaller because the data are not collected throughout the whole year.
(iii) Attained high school diploma, attained GED or equivalent, or attained certificate of attendance/completion
(vi) 13 to 15 years of schooling, attained other post-secondary degree or certification, attained AS/AA degree or diploma

Table 3. Occupation Categories in O*NET System

Group	Occupation Group Name	Training Occupation (OSTC)		Reemployment Occupation (OCE)	
		Obs.	%	Obs.	%
11	Management	2,010	4.35	999	3.22
13	Business and Financial Operations	1,350	2.92	588	1.89
15	Computer and Mathematical	3,106	6.72	1,292	4.16
17	Architecture and Engineering	1,725	3.73	1,285	4.14
19	Life, Physical and Social Science	313	0.68	140	0.45
21	Community and Social Services	636	1.38	263	0.85
23	Legal	327	0.71	99	0.32
25	Education, Training, and Library	1,240	2.68	504	1.62
27	Arts, Design, Entertainment, Sports, and Media	497	1.07	234	0.75
29	Healthcare Practitioners and Technical	4,608	9.96	1,713	5.52
31	Healthcare support	4,601	9.95	1,641	5.29
33	Protective Service	443	0.96	294	0.95
35	Food Preparation and Serving Related	442	0.96	444	1.43
37	Building and Grounds Cleaning and Maintenance	243	0.53	672	2.16
39	Personal Care and Service	1,283	2.77	598	1.93
41	Sales and Related	251	0.54	867	2.79
43	Office and Administrative Support	6,535	14.13	3,390	10.92
45	Farming, Fishing, and Forestry	52	0.11	247	0.8
47	Construction, and Extraction	1,431	3.09	1,065	3.43
49	Installation, Maintenance, and Repair	4,607	9.96	2,297	7.4
51	Production	6,636	14.35	9,659	31.12
53	Transportation and Material Moving	3,883	8.4	2,714	8.74
55	Military Specific	28	0.06	37	0.12
all		46,247	100	31,042	100

Table 4. Matching Rates at Various Definitions of Matching

	(a) All valid observations		(b) Excluding observations from Oklahoma and Virginia	
	Total sample	Match (%)	Total Sample	Match (%)
First degree	19,360	49.10	15,038	34.48
Second degree	19,360	2.39	15,038	3.06
Matching	19,360	51.47	15,038	37.53

Table 5. Summary of the Performance Measures of the TAA Program across Exit years and Pre-participation Earnings Levels

a. Across Exit Years					Reemployment Rate (%)[(i)]		Wage Replacement Rate (%)[(v)]				Retention Rate (%)			
Exit Year	Number of Obs.	% Trainees	No of obs. with both OSTC&OCE [(ii)]	% Match[(ii)]	Non-trainees	All trainees [(iii)]	Non-trainees	All trainees	OCC skills trainees w/ match [(vi)]	OCC skills trainees w/o match	Non-trainees	All trainees	OCC skills trainees w/ match	OCC skills trainees w/o match
2004	27,559	68.69	3,522	31.63	70.90	82.65	84.48	92.11	87.33	87.00	84.85	87.47	89.55	91.03
2005	45,783	66.71	5,024	36.52	72.22	81.81	86.69	93.20	94.19	92.18	82.33	86.00	87.87	87.47
2006	43,972	57.23	4,023	40.67	71.07	81.90	87.71	92.77	94.57	92.34	84.17	87.35	89.92	91.42
2007	25,987	50.67	2,469	42.89	72.53	82.11	90.51	91.26	95.13	87.46	85.40	87.71	92.04	93.68
All	143,300	61.27	15,038	37.53	71.70	82.06	87.60	92.54	93.08	90.15	84.05	86.96	89.60	90.35

b. Across Educational Attainment					Reemployment Rate (%)[(i)]		Wage Replacement Rate (%)				Retention Rate (%)			
Education	Number of Obs.	% Trainees	No of obs. with both OSTC&OCE	% Match	Non-trainees	All trainees	Non-trainees	All trainees	OCC skills trainees w/ match	OCC skills trainees w/o match	Non-trainees	All trainees	OCC skills trainees w/ match	OCC skills trainees w/o match
Less than HS[(vi)]	19,575	59.10	1,307	39.94	61.25	75.44	90.46	93.96	96.61	93.01	80.46	84.21	83.09	88.75
HS graduate	80,318	60.71	8,031	36.61	73.40	83.40	86.42	91.56	91.70	88.33	84.24	87.56	90.62	90.57
Associate Degree	5,054	74.26	600	32.33	80.48	85.80	84.25	94.95	99.35	93.97	85.48	86.71	90.81	91.53
Some College	21,742	69.71	3,443	37.84	79.73	83.49	87.98	93.23	93.44	90.62	87.18	87.50	90.07	89.93
Bachelor's Deg	6,652	55.62	1,034	38.88	75.78	81.35	90.00	92.20	94.91	94.23	83.73	87.18	91.42	90.86
Grad School	1,408	46.02	172	43.02	76.05	80.25	89.62	94.02	85.82	89.16	84.95	83.27	85.51	92.31
All	134,749 [(vii)]	61.27	14,587	37.26	71.70	82.06	87.36	92.37	93.02	89.94	84.18	87.04	89.78	90.35

(i) Employed at any point during the three quarters of observation following program exit.

(ii) Any entry that utilizes information on OSTC and OCE is constructed excluding participants from Oklahoma and Virginia

(iii) All trainees include participants who received training of all types.

(iv) Trainees with or without a match only includes participants who received occupational skills training, excluding participants from Oklahoma and Virginia

(v) The detailed description of construction of wage replacement rates is presented in Data Appendix.

(vi) These tables are constructed excluding the observations that identified their educational attainment as no education at all. This indication seems to be inaccurate for some participants considering their high pre-participation earnings.

(vii) Total number of observation in panel (b) is smaller than that of panel (a) because participants reported to have received no education are excluded for the reason discussed above. Also some observations do not identify their educational information.

Table 6. Pre-participation Characteristics across Training Status

	Non-trainees	All Trainees	Skills trainees with a match[ii]	Skills trainees without a match[ii]	All Skills Trainees
Male (%)	59.3	46.84	55.54	53.85	47.31
Limited English (%)	2.59	6.03	6.54	5.64	4.50

Age at Participation	Non-trainees	All Trainees	Skills trainees with a match[ii]	Skills trainees without a match[ii]	All Skills Trainees
16-20	0.49	0.41	0.51	0.39	0.42
21-30	7.62	12.81	13.29	13.41	13.26
31-40	17.76	26.49	29.89	26.79	27
41-50	30.68	35.46	36.53	37.61	35.45
51-60	34.38	22.36	18.34	20.47	21.73
61-65	9.07	2.47	1.44	1.32	2.15
Average Age	47.26 yrs	42.90 yrs	41.76 yrs	42.33 yrs	42.63 yrs

Educational Attainment	Non-trainees	All Trainees	Skills trainees with a match[ii]	Skills trainees without a match[ii]	All Skills Trainees
less than HS	15.65	13.84	9.60	8.58	9.40
HS grad	61.68	58.33	54.09	55.63	60.34
Associate	2.54	4.49	3.57	4.44	4.85
Some Coll	12.87	18.13	23.97	23.38	19.81
Bachelor	5.77	4.43	7.40	6.91	4.77
Grad School	1.49	0.78	1.36	1.07	0.82
Average years of schooling	11.89 yrs	12.08 yrs	12.91 yrs	12.96 yrs	12.50 yrs

Pre-Participation Quarterly Earnings[i] ($)	Non-trainees	All Trainees	Skills trainees with a match[ii]	Skills trainees without a match[ii]	All Skills Trainees
2,000-5,000	18.01	24.61	13.65	14.39	23.2
5,000-10,000	45.73	50.21	49.73	47.81	50.26
10,000-20,000	30.27	22.52	32.94	33.66	23.72
20,000-30,000	4.92	2.28	3.29	3.57	2.43
30,000-40,000	0.89	0.29	0.33	0.48	0.31
40,000-50,000	0.18	0.09	0.06	0.1	0.09
Average	$9,694.3	$8,194.9	$9,545.9	$9,663.3	$8,364.9

Post-Participation Quarterly Earnings[i] ($)	Non-trainees	All Trainees	Skills trainees with a match[ii]	Skills trainees without a match[ii]	All Skills Trainees
2,000-5,000	32.29	38.17	24.57	28.74	37.08
5,000-10,000	46.14	48.6	55.07	48.24	49.12
10,000-20,000	19	12.39	19.06	21.3	12.95
20,000-30,000	2.11	0.76	1.22	1.6	0.77
30,000-40,000	0.36	0.07	0.06	0.1	0.07
40,000-50,000	0.09	0.02	0.02	0.01	0.02
Average	$7,633.7	$6,587.0	$7,651.9	$7,774.4	$6,667.4

(i) These tables are constructed excluding the observations that identified their educational attainment as no education at all. This indication seems to be false considering some of their high pre-participation earnings. I suspect that 'no education received' partially indicates participants with no education and participants with missing education information. Also, these observations are concentrated in non-trainee group.

(ii) Statistics on skill trainees with and without a match are derived excluding the observations from Oklahoma and Virginia

Table 7. Performance Measures for Occupation groups of Training

OCC Group	Occupation Group Name	a. For Training Occupation Groups (OSTC)			b. For Occupation Groups of Employment (OCE)		
		Match (%)	Reemployment Rate (%)	Wage Replacement rate (%)	**Match (%)**	Retention Rate (%)	Wage Replacement rate (%)
11	Management	20.08	82.22	87.64	30.33	88.95	85.71
13	Business and Financial Operations	21.23	81.87	86.63	33.68	89.22	95.62
15	Computer and Mathematical	26.99	81.47	89.08	50.51	87.95	94.63
17	Architecture and Engineering	30.43	82.66	96.30	34.44	93.63	102.60
19	Life, Physical and Social Science	15.71	80.77	89.66	25.00	91.41	92.12
21	Community and Social Services	31.33	82.14	88.13	44.97	92.65	86.78
23	Legal	42.31	83.57	91.65	79.71	89.13	87.07
25	Education, Training, and Library	36.14	79.01	83.91	41.39	91.08	76.10
27	Arts, Design, Entertainment, Sports, Media	25.24	77.06	91.62	37.06	89.05	93.19
29	Healthcare Practitioners and Technical	48.66	87.47	99.30	68.60	92.88	109.19
31	Healthcare support	51.69	86.89	83.64	71.95	91.13	81.98
33	Protective Service	16.82	88.08	95.57	21.30	93.09	87.19
35	Food Preparation and Serving Related	28.30	81.38	81.12	22.83	89.40	75.19
37	Building and Grounds Cleaning and Mtnc	47.33	78.69	91.90	19.87	88.76	86.90
39	Personal Care and Service	46.76	73.90	85.86	64.49	83.06	82.61
41	Sales and Related	31.03	75.92	83.84	7.31	87.88	78.58
43	Office and Administrative Support	26.95	80.18	85.59	26.48	90.26	82.38
45 (iii)	Farming, Fishing, and Forestry	7.14	74.55	89.05	1.92	60.99	96.19
47	Construction, and Extraction	39.96	79.97	91.07	38.45	86.09	92.56
49	Installation, Maintenance, and Repair	37.40	84.08	90.39	50.79	90.37	88.80
51	Production	30.82	80.43	95.33	11.03	89.89	95.74
53	Transportation and Material Moving	64.17	85.03	90.48	55.98	87.69	92.73
55 (iv)	Military Specific	0.00	65.52	79.34	0.00	90.32	86.22
Total		37.53	82.51	90.28	37.53	89.56	91.55

(i) For each occupation group of training.
(ii) For each occupation group of reemployment. These observations include both trainees and non-trainees as long as occupation codes for reemployment are reported.
(iii) Only 13 observations
(iv) only 2 observations

Table 8. Validity of Matching as a Measure of Training Success

	I				II				III				VI			
ind. Variable	Coeff	Std. Err	Coeff	Std. Err	Coeff	Std. Err	Coeff	Std. Err	Coeff	Std. Err	Coeff	Std. Err	Coeff	Std. Err	Coeff	Std. Err
Male	0.026**	(0.011)	0.021**	(0.011)	0.028**	(0.011)	0.022**	(0.011)	0.004	(0.011)	-0.003	(0.011)	0.005	(0.011)	-0.002	(0.011)
Limited Engl Proficic.	0.018*	(0.021)	0.020*	(0.020)	0.020*	(0.021)	0.021*	(0.020)	-0.023*	(0.020)	-0.024*	(0.020)	-0.023*	(0.020)	-0.024*	(0.020)
Eth: Hispanic	0.044**	(0.015)	0.050**	(0.015)	0.044**	(0.015)	0.050**	(0.015)	0.005	(0.016)	0.006	(0.016)	0.004	(0.016)	0.005	(0.016)
Eth: Asian	-0.107**	(0.020)	-0.116**	(0.020)	-0.097**	(0.021)	-0.106**	(0.020)	-0.094**	(0.022)	-0.100**	(0.021)	-0.090**	(0.022)	-0.096**	(0.021)
Eth: Black	-0.102**	(0.017)	-0.112**	(0.017)	-0.099**	(0.017)	-0.109**	(0.017)	-0.033*	(0.020)	-0.039**	(0.020)	-0.035**	(0.020)	-0.041**	(0.020)
Eth: Others	0.035*	(0.037)	0.022	(0.036)	0.034*	(0.037)	0.021	(0.037)	0.024	(0.037)	0.011	(0.037)	0.021	(0.037)	0.009	(0.037)
Edu: High School	-0.025**	(0.015)	-0.028**	(0.015)	-0.020*	(0.015)	-0.024**	(0.015)	-0.001	(0.015)	-0.002	(0.015)	0.001	(0.015)	-0.001	(0.015)
Edu: Some College	0.022*	(0.016)	0.022*	(0.016)	0.031**	(0.016)	0.030**	(0.016)	0.019*	(0.017)	0.021*	(0.017)	0.022*	(0.017)	0.023*	(0.017)
Edu: Associate	-0.007	(0.025)	-0.009	(0.025)	0.002	(0.025)	0.000	(0.025)	0.042*	(0.028)	0.048**	(0.028)	0.041*	(0.028)	0.046**	(0.028)
Edu: Bachelor's	0.068**	(0.022)	0.069**	(0.022)	0.071**	(0.022)	0.073**	(0.022)	0.060**	(0.023)	0.063**	(0.023)	0.061**	(0.023)	0.063**	(0.023)
Edu: More than B	0.131**	(0.044)	0.132**	(0.043)	0.133**	(0.044)	0.134**	(0.043)	0.085**	(0.044)	0.084**	(0.044)	0.087**	(0.044)	0.085**	(0.044)
Age: 21_30	-0.009	(0.107)	-0.017	(0.106)	-0.006	(0.107)	-0.013	(0.106)	-0.018	(0.108)	-0.019	(0.107)	-0.012	(0.109)	-0.014	(0.108)
Age: 31_40	-0.024	(0.106)	-0.032	(0.105)	-0.022	(0.106)	-0.029	(0.105)	-0.023	(0.108)	-0.024	(0.107)	-0.019	(0.108)	-0.020	(0.107)
Age: 41_50	-0.044	(0.106)	-0.052	(0.105)	-0.040	(0.106)	-0.048	(0.105)	-0.043	(0.108)	-0.045	(0.107)	-0.039	(0.108)	-0.042	(0.107)
Age: 51_60	-0.084*	(0.102)	-0.091*	(0.101)	-0.082*	(0.102)	-0.088*	(0.101)	-0.086*	(0.103)	-0.087*	(0.103)	-0.085*	(0.103)	-0.085*	(0.103)
Age: 61_65	-0.049	(0.105)	-0.056	(0.103)	-0.050	(0.105)	-0.056	(0.103)	-0.048	(0.107)	-0.049	(0.106)	-0.049	(0.106)	-0.051	(0.105)
Training Completed	0.177**	(0.010)			0.179**	(0.010)			0.157**	(0.010)			0.161**	(0.010)		
Exit Year 2005					0.040**	(0.011)	0.049**	(0.011)					0.026**	(0.012)	0.033**	(0.012)
Exit Year 2006					0.079**	(0.012)	0.079**	(0.012)					0.064**	(0.013)	0.060**	(0.013)
Exit Year 2007					0.091**	(0.014)	0.087**	(0.014)					0.106**	(0.016)	0.098**	(0.016)
State									YES		YES		YES		YES	
Occ group	YES		YES		YES		YES		YES		YES		YES		YES	
No of Obs.	14,220		14,220		14,420		14,420		14,417		14,417		14,417		14,417	
LR Chi2	1,491.9		1,195.7		1,553.0		1,252.9		2,450.5		2,237.7		2,503.0		2,280.8	
Prob>Chi2	0.000		0.000		0		0		0.000		0.000		0.000		0.000	
Pseudo R2	0.078		0.063		0.0814		0.0657		0.129		0.117		0.131		0.120	

• * and ** indicate significance at the 95% and 99% level, respectively. Numbers in the parentheses are standard errors.

Table 9. Earnings-related Measures

	Wage Replacement Rates								Post-Participation Earnings							
ind. Variable	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Male	0.015**	(0.005)	0.156**	(0.004)	0.009**	(0.005)	0.149**	(0.004)	0.259**	(0.004)	0.161**	(0.004)	0.249**	(0.005)	0.152**	(0.005)
Limited Engl Proficic.	0.023**	(0.012)	-0.029**	(0.010)	0.025**	(0.012)	-0.025**	(0.010)	-0.059**	(0.011)	-0.032**	(0.010)	-0.051**	(0.011)	-0.026**	(0.010)
Eth: Hispanic	0.044**	(0.009)	-0.035**	(0.008)	0.043**	(0.009)	-0.036**	(0.008)	-0.080**	(0.008)	-0.023**	(0.008)	-0.081**	(0.008)	-0.025**	(0.008)
Eth: Asian	0.024**	(0.013)	0.026**	(0.011)	0.024**	(0.013)	0.028**	(0.011)	0.046**	(0.012)	0.047**	(0.011)	0.047**	(0.012)	0.048**	(0.011)
Eth: Black	0.029**	(0.008)	-0.013**	(0.007)	0.029**	(0.008)	-0.012**	(0.007)	-0.057**	(0.007)	-0.026**	(0.007)	-0.056**	(0.007)	-0.025**	(0.007)
Eth: Others	0.001	(0.022)	-0.019*	(0.019)	0.002	(0.022)	-0.018*	(0.019)	-0.059**	(0.020)	-0.033**	(0.019)	-0.059**	(0.020)	-0.032**	(0.019)
Edu: High School	-0.034**	(0.007)	0.041**	(0.006)	-0.034**	(0.007)	0.041**	(0.006)	0.095**	(0.007)	0.038**	(0.006)	0.094**	(0.007)	0.038**	(0.006)
Edu: Some College	-0.012*	(0.009)	0.133**	(0.008)	-0.014*	(0.009)	0.129**	(0.008)	0.238**	(0.008)	0.135**	(0.008)	0.233**	(0.008)	0.131**	(0.008)
Edu: Associate	0.005	(0.014)	0.181**	(0.013)	0.003	(0.014)	0.178**	(0.013)	0.314**	(0.013)	0.191**	(0.013)	0.307**	(0.013)	0.187**	(0.013)
Edu: Bachelor's	0.019*	(0.012)	0.264**	(0.010)	0.019*	(0.012)	0.262**	(0.010)	0.444**	(0.011)	0.270**	(0.010)	0.439**	(0.011)	0.268**	(0.010)
Edu: More than B	0.032*	(0.021)	0.356**	(0.018)	0.030*	(0.021)	0.353**	(0.018)	0.605**	(0.019)	0.377**	(0.018)	0.600**	(0.019)	0.374**	(0.018)
Age: 21_30	-0.144**	(0.045)	0.046*	(0.039)	-0.142**	(0.045)	0.049*	(0.039)	0.210**	(0.040)	0.073**	(0.040)	0.211**	(0.040)	0.075**	(0.040)
Age: 31_40	-0.209**	(0.045)	0.080**	(0.039)	-0.207**	(0.045)	0.082**	(0.039)	0.323**	(0.040)	0.119**	(0.040)	0.324**	(0.040)	0.120**	(0.040)
Age: 41_50	-0.276**	(0.045)	0.061*	(0.039)	-0.275**	(0.045)	0.063*	(0.039)	0.334**	(0.040)	0.096**	(0.040)	0.335**	(0.039)	0.098**	(0.040)
Age: 51_60	-0.359**	(0.045)	-0.002	(0.039)	-0.357**	(0.045)	0.001	(0.039)	0.251**	(0.040)	-0.001	(0.040)	0.255**	(0.039)	0.003	(0.040)
Age: 61_65	-0.440**	(0.046)	-0.117**	(0.040)	-0.438**	(0.046)	-0.112**	(0.040)	0.048*	(0.041)	-0.179**	(0.041)	0.052**	(0.041)	-0.175**	(0.041)
MATCH	0.030**	(0.010)	0.019**	(0.008)	0.026**	(0.010)	0.018**	(0.009)	-0.011*	(0.009)	-0.003	(0.009)	-0.008**	(0.009)	-0.002	(0.009)
Train: Occupational	-0.006*	(0.008)	-0.015**	(0.007)	0.020*	(0.012)	-0.004	(0.011)	-0.034**	(0.007)	-0.030**	(0.007)	-0.041**	(0.011)	-0.030**	(0.011)
Train: OJT	0.036**	(0.016)	0.044**	(0.014)	0.041**	(0.016)	0.047**	(0.014)	0.068**	(0.014)	0.064**	(0.014)	0.066**	(0.014)	0.063**	(0.014)
Train: Remedial	0.012*	(0.010)	-0.054**	(0.009)	0.016*	(0.010)	-0.048**	(0.009)	-0.104**	(0.009)	-0.059**	(0.009)	-0.096**	(0.009)	-0.053**	(0.009)
Train: Customized	-0.061**	(0.021)	0.038**	(0.018)	-0.066**	(0.021)	0.032**	(0.018)	0.115**	(0.019)	0.042**	(0.018)	0.108**	(0.019)	0.036**	(0.018)
Marketable Skills	-0.022**	(0.006)	-0.001	(0.005)	-0.021**	(0.006)	0.000	(0.005)	0.022**	(0.006)	0.009**	(0.005)	0.023**	(0.006)	0.010**	(0.005)
Pre-Particip Earnings			-0.547**	(0.004)			-0.548**	(0.004)			0.385**	(0.005)			0.383**	(0.005)
Exit Year 2005	0.033**	(0.007)	0.023**	(0.006)	0.032**	(0.007)	0.023**	(0.006)	0.017**	(0.006)	0.025**	(0.006)	0.018**	(0.006)	0.025**	(0.006)
Exit Year 2006	0.032**	(0.007)	0.022**	(0.006)	0.030**	(0.007)	0.021**	(0.006)	0.020**	(0.007)	0.027**	(0.007)	0.021**	(0.007)	0.028**	(0.007)
Exit Year 2007	0.046**	(0.008)	0.040**	(0.007)	0.044**	(0.008)	0.040**	(0.007)	0.044**	(0.007)	0.049**	(0.007)	0.045**	(0.007)	0.050**	(0.007)
Const.	1.152**	(0.048)	5.663**	(0.055)	1.164**	(0.048)	5.684**	(0.055)	8.322**	(0.042)	5.162**	(0.056)	8.340**	(0.042)	5.187**	(0.056)
State	YES		YES		YES		YES		YES		YES		YES		YES	
OSTC group					YES		YES						YES		YES	
No of Obs.	46,097		46,097		46,097		46,097		49,586		49,586		49,586		46,097	
F	33.2		258.2		27.3		200.8		238.0		354.4		185.7		274.6	
R-sq	0.048		0.285		0.052		0.289		0.2517		0.354		0.257		0.357	
Adj R-sq	0.047		0.2837		0.050		0.287		0.2507		0.353		0.255		0.3557	

• * and ** indicate significance at the 95% and 99% level, respectively.

Table 10. Retention Rates

ind. Variable	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Male	0.004*	(0.003)	-0.002	(0.003)	0.005*	(0.003)	0.000	(0.003)
Limited Engl Proficic.	-0.014**	(0.008)	-0.014**	(0.008)	-0.011*	(0.008)	-0.011*	(0.008)
Eth: Hispanic	-0.012**	(0.006)	-0.006*	(0.006)	-0.012**	(0.006)	-0.007*	(0.006)
Eth: Asian	0.005	(0.008)	0.008*	(0.008)	0.006*	(0.008)	0.007*	(0.009)
Eth: Black	-0.007*	(0.005)	-0.006*	(0.005)	-0.007*	(0.005)	-0.006*	(0.005)
Eth: Others	-0.014*	(0.015)	-0.005	(0.015)	-0.016*	(0.015)	-0.007	(0.015)
Edu: High School	0.023**	(0.004)	0.020**	(0.004)	0.023**	(0.004)	0.019**	(0.004)
Edu: Some College	0.031**	(0.005)	0.026**	(0.005)	0.029**	(0.005)	0.024**	(0.005)
Edu: Associate	0.024**	(0.008)	0.017**	(0.009)	0.023**	(0.008)	0.016**	(0.009)
Edu: Bachelor's	0.019**	(0.007)	0.008*	(0.007)	0.018**	(0.007)	0.008*	(0.007)
Edu: More than B	0.027**	(0.011)	0.012*	(0.013)	0.026**	(0.011)	0.012*	(0.013)
Age: 21_30	0.028*	(0.021)	0.016	(0.025)	0.026*	(0.021)	0.015	(0.025)
Age: 31_40	0.041**	(0.021)	0.026*	(0.024)	0.040**	(0.021)	0.026*	(0.024)
Age: 41_50	0.038**	(0.022)	0.021*	(0.025)	0.037**	(0.022)	0.021*	(0.025)
Age: 51_60	0.022*	(0.023)	0.002	(0.026)	0.022*	(0.023)	0.002	(0.026)
Age: 61_65	-0.065**	(0.031)	-0.091**	(0.037)	-0.066**	(0.031)	-0.090**	(0.037)
MATCH	-0.004	(0.007)	-0.005	(0.007)	-0.005	(0.007)	-0.005*	(0.008)
Train: Occupational	0.050**	(0.005)	0.048**	(0.005)	0.023**	(0.008)	0.018**	(0.009)
Train: OJT	0.053**	(0.008)	0.050**	(0.008)	0.049**	(0.008)	0.046**	(0.009)
Train: Remedial	0.003	(0.006)	0.006*	(0.006)	0.002	(0.006)	0.003	(0.007)
Train: Customized	-0.012*	(0.015)	-0.017*	(0.015)	-0.008	(0.014)	-0.011*	(0.015)
Marketable Skills	0.003*	(0.004)	0.002	(0.004)	0.003*	(0.004)	0.002	(0.004)
Pre-Particip Earnings			0.021**	(0.003)			0.021**	(0.003)
Exit Year 2005	-0.012**	(0.005)	-0.013**	(0.005)	-0.012**	(0.005)	-0.012**	(0.005)
Exit Year 2006	0.009**	(0.005)	0.005*	(0.005)	0.011**	(0.005)	0.007*	(0.005)
Exit Year 2007	0.022**	(0.005)	0.018**	(0.005)	0.024**	(0.005)	0.020**	(0.005)
State	Yes		Yes		Yes		Yes	
OCC Countrol					Yes		Yes	
No of Obs.	57,204		52,781		57,204		52,781	
LR Chi2	1,165.2		1,108.1		1,238.6		1,170.2	
Prob>Chi2	0.000		0.000		0.000		0.000	
Pseudo R2	0.025		0.026		0.027		0.028	

• * and ** indicate significance at the 95% and 99% level, respectively.

Table 11. Reemployment Rates

ind. Variable	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std. Err
Male	0.000	(0.002)	0.000	(0.002)	0.000	(0.002)	0.001	(0.002)
Limited Engl Proficic.	-0.014**	(0.006)	-0.016**	(0.006)	-0.014**	(0.006)	-0.016**	(0.006)
Eth: Hispanic	0.011**	(0.005)	0.010**	(0.005)	0.010**	(0.005)	0.009**	(0.005)
Eth: Asian	-0.039**	(0.008)	-0.039**	(0.008)	-0.037**	(0.008)	-0.037**	(0.008)
Eth: Black	0.016**	(0.003)	0.017**	(0.003)	0.016**	(0.003)	0.017**	(0.003)
Eth: Others	-0.036**	(0.012)	-0.036**	(0.012)	-0.038**	(0.012)	-0.037**	(0.012)
Edu: High School	0.040**	(0.003)	0.040**	(0.003)	0.040**	(0.003)	0.040**	(0.003)
Edu: Some College	0.043**	(0.004)	0.043**	(0.004)	0.045**	(0.004)	0.045**	(0.004)
Edu: Associate	0.059**	(0.006)	0.055**	(0.006)	0.061**	(0.006)	0.057**	(0.006)
Edu: Bachelor's	0.029**	(0.005)	0.028**	(0.005)	0.033**	(0.005)	0.032**	(0.005)
Edu: More than B	0.038**	(0.010)	0.038**	(0.010)	0.041**	(0.010)	0.041**	(0.010)
Age: 21_30	0.011	(0.026)	0.009	(0.026)	0.011	(0.026)	0.010	(0.026)
Age: 31_40	-0.004	(0.027)	-0.007	(0.027)	-0.005	(0.026)	-0.007	(0.027)
Age: 41_50	-0.033*	(0.027)	-0.036*	(0.027)	-0.033*	(0.027)	-0.035*	(0.027)
Age: 51_60	-0.134**	(0.030)	-0.137**	(0.030)	-0.134**	(0.030)	-0.136**	(0.030)
Age: 61_65	-0.447**	(0.036)	-0.449**	(0.036)	-0.445**	(0.036)	-0.448**	(0.036)
Train: Occupational	0.050**	(0.003)	0.021**	(0.004)	0.038**	(0.004)	0.014**	(0.004)
Train: OJT	0.126**	(0.007)	0.114**	(0.008)	0.124**	(0.007)	0.114**	(0.008)
Train: Remedial	-0.010**	(0.004)	-0.017**	(0.004)	-0.012**	(0.004)	-0.018**	(0.004)
Train: Customized	-0.027*	(0.016)	-0.034**	(0.017)	-0.025*	(0.016)	-0.032**	(0.017)
Marketable Skills	0.009**	(0.003)	0.010**	(0.003)	0.009**	(0.003)	0.010**	(0.003)
Training Completed			0.042**	(0.003)			0.040**	(0.003)
Exit Year 2005	-0.001	(0.003)	-0.001	(0.003)	-0.001	(0.003)	-0.001	(0.003)
Exit Year 2006	-0.002	(0.004)	-0.001	(0.004)	-0.001	(0.004)	-0.001	(0.004)
Exit Year 2007	0.010**	(0.004)	0.010**	(0.004)	0.010**	(0.004)	0.011**	(0.004)
State	YES		YES		YES		YES	
Occ group					YES		YES	
No of Obs.	128,327		128,327		128,327		128,327	
LR Chi2	11,540.3		11,700.5		11,806.5		11,950.8	
Prob>Chi2	0		0		0.000		0.000	
Pseudo R2	0.0878		0.089		0.090		0.091	

• * and ** indicate significance at the 95% and 99% level, respectively.

Table A1. Quality of Earnings records

a. Pre-participation quarterly earnings ($)	Number of Observations for each earnings level		
	Three quarters prior to participation	Two quarters prior to participation	One quarter prior to participation
0	17,508	24,100	45,358
1 – 2,000	5,910	8,922	11,609
2,001 – 10,000	84,632	78,156	58,287
10,001 – 20,000	30,759	29,952	21,969
20,001 – 30,000	3,214	4,698	3,318
30,001 – 40,000	572	1,508	1,017
40,001 – 50,000	205	827	573
50,001 or above	561	837	1155
Mean	9,759.02	9,09.22	9,479.27

b. Post-participation quarterly earnings ($)	Number of Observations for each earnings level		
	Three quarters after program exit	Two quarters after program exit	One quarter after program exit
0	42,198	42,262	44,014
1 – 2,000	10,059	11,104	13,291
2,001 – 10,000	73,600	73,823	71,644
10,001 – 20,000	15,747	14,485	12,836
20,001 – 30,000	1,407	1,349	1,195
30,001 – 40,000	181	190	209
40,001 – 50,000	68	54	74
50,001 or above	41	34	38
Mean	4,765.02	4,614.63	4,308.292

Table A2. Participant Characteristics and Matching Rates for Occupation groups of Training

OSTC Group	Occupation Group Name	% Match[(i)]	% Male	% Limited English	Ethnicity (%)					Education (%)					
					White	Asian	Black	Hisp	Other	Less than HS	High Schl	Some Coll	Assoc	Bach	More than Bach
11	Management	20.08	53.54	1.83	77.02	2.56	12.13	6.40	1.89	2.67	44.43	33.00	5.62	11.52	2.76
13	Business and Financial Operations	21.23	41.42	2.09	76.12	3.45	13.02	6.38	1.03	2.37	47.53	30.82	5.23	11.90	2.15
15	Computer and Mathematical	26.99	66.45	2.85	69.97	6.59	10.80	9.87	2.77	4.90	45.78	29.09	5.66	12.29	2.27
17	Architecture and Engineering	30.43	84.40	2.70	76.00	6.67	7.19	8.52	1.63	2.99	42.61	34.46	6.52	11.90	1.52
19	Life, Physical and Social Science	15.71	58.33	2.66	79.18	2.45	8.57	5.71	4.08	2.08	41.96	35.42	4.17	13.69	2.68
21	Community and Social Services	31.33	34.33	2.23	61.97	2.29	24.30	9.51	1.94	4.18	47.99	34.52	4.49	7.43	1.39
23	Legal	42.31	23.74	1.11	71.98	1.95	14.40	7.78	3.89	2.84	51.42	28.98	4.83	9.94	1.99
25	Education, Training, and Library	36.14	40.15	9.60	62.47	3.75	16.34	16.26	1.17	15.99	40.63	21.49	3.87	15.40	2.62
27	Arts, Design, Entertainment, Sports, and Media	25.24	53.92	4.48	71.76	7.89	9.41	8.40	2.54	3.33	43.89	33.33	7.04	10.74	1.67
29	Healthcare Practitioners and Technical	48.66	30.23	2.33	69.54	3.68	14.21	10.45	2.12	4.80	57.02	26.84	4.38	5.78	1.17
31	Healthcare support	51.69	13.22	10.16	57.34	3.12	16.49	21.64	1.41	16.05	64.45	14.51	2.73	2.01	0.26
33	Protective Service	16.82	67.09	1.88	71.89	1.35	14.05	9.19	3.51	3.29	66.01	25.22	2.63	2.19	0.66
35	Food Preparation and Serving Related	28.30	37.73	20.24	56.91	9.00	13.18	17.68	3.22	27.04	49.69	18.24	1.89	2.94	0.21
37	Building and Grounds Cleaning and Maintnc.	47.33	45.90	26.23	54.05	22.70	10.81	9.19	3.24	37.50	43.75	13.89	1.04	3.47	0.35
39	Personal Care and Service	46.76	16.98	22.56	34.61	18.18	16.53	29.34	1.34	27.36	52.19	14.57	4.09	1.78	0.00
41	Sales and Related	31.03	50.84	4.68	72.81	3.07	13.16	9.65	1.32	8.83	44.88	31.80	4.95	8.83	0.71
43	Office and Administrative Support	26.95	15.79	9.00	60.94	2.64	15.35	20.06	1.02	15.41	60.02	17.54	3.56	3.02	0.45
45	Farming, Fishing, and Forestry	7.14 [(ii)]	36.36	5.45	75.00	4.55	11.36	9.09	0.00	16.98	43.40	24.53	1.89	11.32	1.89
47	Construction, and Extraction	39.96	94.99	4.78	71.55	2.14	9.67	14.82	1.82	9.42	62.86	19.96	3.91	3.45	0.40
49	Installation, Maintenance, and Repair	37.40	94.31	4.00	69.91	4.63	10.67	12.97	1.81	9.82	61.67	21.23	4.16	2.73	0.39
51	Production	30.82	47.08	3.86	70.27	2.04	20.79	6.07	0.83	14.77	63.58	17.88	1.28	2.19	0.31
53	Transportation and Material Moving	64.17	82.81	4.94	65.50	0.69	18.69	13.93	1.19	18.20	63.62	12.53	2.97	2.28	0.41
55	Military Specific	0.00 [(iii)]	20.69	0.00	96.43	0.00	3.57	0.00	0.00	3.45	79.31	10.34	0.00	6.90	0.00
	All	37.53	48.86	5.84	66.57	3.65	15.16	13.08	1.54	11.60	56.79	21.61	3.76	5.33	0.91

(i) Excluding observations from Virginia and Oklahoma
(ii) Only 13 observations with both OSTC and OCE
(iii) Only 2 observations with both OSTC and OCE

Table A3. Participant Characteristics and Matching Rates for Occupation groups of Employment

OCE Group	Occupation Group Name	% Match[(i)]	% Male	% Limited English	Ethnicity (%)					Education (%)					
					White	Asian	Black	Hisp	Other	Less than HS	High Schl	Some Coll	Assoc	Bach	More than Bach
11	Management	30.33	60.79	1.20	86.54	2.35	4.71	4.05	2.35	1.58	36.42	7.26	25.68	21.89	7.16
13	Business and Financial Operations	33.68	43.32	2.04	80.94	2.97	6.19	6.93	2.97	1.58	33.27	10.74	26.94	22.01	5.46
15	Computer and Mathematical	50.51	66.61	2.17	74.15	6.32	7.49	5.61	6.43	4.24	36.00	5.96	30.43	19.84	3.53
17	Architecture and Engineering	34.44	83.88	2.41	70.90	13.06	6.09	6.97	2.99	1.75	28.21	10.52	32.67	23.27	3.59
19	Life, Physical and Social Science	25.00	67.14	2.14	83.52	1.10	6.59	4.40	4.40	2.17	34.78	7.25	31.16	18.84	5.80
21	Community and Social Services	44.97	40.30	3.80	79.28	0.45	12.61	5.86	1.80	4.76	51.19	3.57	28.57	9.92	1.98
23	Legal	79.71	22.45	0.00	73.33	1.67	11.67	8.33	5.00	3.16	47.37	3.16	31.58	12.63	2.11
25	Education, Training, and Library	41.39	44.82	1.98	83.75	1.65	6.06	7.71	0.83	2.68	31.75	5.57	25.98	28.87	5.15
27	Arts, Design, Entertainment, Sports, and Media	37.06	66.81	1.28	77.18	8.72	2.01	8.72	3.36	2.16	35.50	11.69	30.30	16.88	3.46
29	Healthcare Practitioners and Technical	68.60	33.98	1.93	81.54	3.17	5.78	6.66	2.85	2.75	53.71	3.59	30.48	7.72	1.74
31	Healthcare support	71.95	12.62	7.56	74.30	3.33	7.86	12.40	2.12	12.02	65.77	2.38	16.96	2.44	0.44
33	Protective Service	21.30	73.29	1.02	80.09	0.45	10.41	6.79	2.26	4.91	61.75	2.81	23.86	6.32	0.35
35	Food Preparation and Serving Related	22.83	31.59	15.32	69.53	8.28	10.06	10.06	2.07	22.48	56.67	2.34	15.69	2.81	0.00
37	Building and Grounds Cleaning and Maintnc.	19.87	51.64	19.20	70.21	4.06	8.90	14.70	2.13	30.56	53.76	1.72	10.82	2.82	0.31
39	Personal Care and Service	64.49	19.45	18.90	58.56	13.40	7.94	18.86	1.24	23.92	54.91	2.24	15.49	2.75	0.69
41	Sales and Related	7.31	41.23	2.77	80.52	2.76	8.74	6.75	1.23	9.70	56.05	4.67	19.64	8.74	1.20
43	Office and Administrative Support	26.48	23.73	4.28	76.96	3.17	8.01	10.24	1.62	7.13	59.20	4.49	23.01	5.62	0.55
45	Farming, Fishing, and Forestry	1.92	43.32	52.63	33.03	1.36	0.45	63.80	1.36	57.64	31.44	2.18	7.42	0.87	0.44
47	Construction, and Extraction	38.45	93.99	4.04	78.81	3.29	3.17	12.30	2.44	7.44	60.39	3.57	22.71	5.12	0.77
49	Installation, Maintenance, and Repair	50.79	93.59	3.13	75.83	4.81	6.03	10.49	2.84	7.81	59.10	4.22	24.88	3.50	0.50
51	Production	11.03	51.91	7.65	67.82	6.17	14.26	10.69	1.06	15.91	60.46	2.76	17.45	2.84	0.59
53	Transportation and Material Moving	55.98	76.93	5.16	73.21	1.68	12.89	10.63	1.59	16.27	62.22	2.16	15.91	3.04	0.40
55	Military Specific	0.00 [(ii)]	50.00	2.70	77.42	0.00	3.23	16.13	3.23	8.33	61.11	0.00	16.67	11.11	2.78
	All	37.82	53.38	6.03	72.99	4.76	9.92	10.42	1.92	11.27	54.91	4.00	21.38	7.09	1.34

(i) Excluding observations from Virginia and Oklahoma
(ii) Only 11 observations

Table A4. Participant Characteristics and Matching Rates for Various States

State	No of obs.	% of sample	% Match	% Male	% Lmtd English Profic	Ethnicity (%)					Education (%)					
						White	Asian	Black	Hisp	Other	Less than HS	High Schl	Some Colleg	Assoc	Bachel	More than B
AK	174	0.12	43.69	77.01	0.57	75.29	5.17	2.30	2.30	14.94	7.56	40.12	31.98	0.00	18.60	1.74
AL	1,175	0.82	0.00	41.28	0.00	70.23	1.47	25.28	1.81	1.21	7.04	56.69	29.31	0.00	5.63	1.32
AR	1,711	1.19	0.00	45.06	1.29	74.23	0.64	23.44	0.88	0.82	6.14	86.32	6.78	0.00	0.70	0.06
AZ	1,220	0.85	0.00	56.23	0.74	54.92	4.18	4.02	34.67	2.21	18.02	46.74	26.24	0.00	6.79	2.22
CA	3,295	2.3	48.03	47.95	23.64	0.00	0.00	0.00	100.0	0.00	34.45	26.81	29.00	0.00	7.96	1.78
CO	1,447	1.01	37.14	58.33	6.70	70.47	8.76	2.78	16.26	1.74	4.84	35.29	34.95	0.00	17.23	7.68
CT	1,652	1.15	0.00	48.01	8.23	61.88	5.59	11.71	20.43	0.40	45.98	31.14	18.33	0.08	4.47	0.00
DE	115	0.08	0.00	60.00	6.09	68.42	6.14	21.05	2.63	1.75	13.91	69.57	6.09	6.09	4.35	0.00
FL	934	0.65	0.00	36.62	11.46	37.37	3.10	14.45	40.47	4.60	14.22	66.92	12.50	0.65	4.63	1.08
GA	3,653	2.55	25.60	34.55	1.18	47.78	1.46	46.67	3.87	0.22	19.03	59.08	18.98	1.48	1.21	0.22
IA	1,151	0.8	21.43	48.39	2.26	95.53	0.96	0.79	0.96	1.75	2.19	58.65	31.73	0.26	5.68	1.49
ID	1,304	0.91	32.43	54.91	6.52	29.41	0.78	0.39	68.82	0.59	24.08	41.41	21.24	5.83	7.44	0.00
IL	4,594	3.21	23.98	52.47	4.55	76.37	2.77	8.99	10.86	1.01	11.97	64.98	16.04	0.15	5.70	1.16
IN	8,007	5.59	31.25	64.27	1.20	88.69	0.76	8.02	1.88	0.65	8.34	69.37	16.64	0.73	4.11	0.81
KS	1,164	0.81	27.57	59.62	1.12	78.77	3.81	10.92	4.59	1.91	6.87	52.41	27.23	3.61	7.82	2.06
KY	3,222	2.25	13.58	43.89	1.49	93.03	0.26	5.84	0.55	0.32	10.83	69.49	11.83	5.13	2.50	0.22
LA	116	0.08	57.14	39.66	0.00	59.65	1.75	33.33	1.75	3.51	11.30	69.57	10.43	0.00	7.83	0.87
MA	3,704	2.58	30.79	55.26	15.12	76.56	8.43	5.23	9.17	0.61	22.96	51.28	6.27	7.47	8.59	3.44
MD	960	0.67	0.00	42.81	1.67	64.24	1.28	30.94	2.14	1.39	13.76	71.43	11.68	0.94	1.88	0.31
ME	3,295	2.3	36.69	62.43	2.70	94.73	1.83	1.99	0.62	0.84	11.50	62.98	15.58	2.20	5.72	2.02
MI	10,123	7.06	44.78	60.75	3.90	82.43	1.94	10.01	4.60	1.03	9.50	67.46	11.02	1.02	8.83	2.17
MN	1,570	1.1	39.58	59.32	19.49	77.65	6.68	3.11	6.08	6.48	3.89	69.18	20.93	0.00	5.42	0.57
MO	1,750	1.22	28.31	42.29	0.17	88.21	0.61	9.11	1.09	0.97	12.86	69.89	14.17	1.26	1.54	0.29
MS	2,892	2.02	21.43	41.15	1.45	56.38	0.38	42.28	0.10	0.86	14.42	42.67	16.53	22.54	3.39	0.45
MT	454	0.32	44.30	74.86	0.88	94.92	0.22	0.00	0.88	3.97	6.09	67.95	22.57	0.00	2.71	0.68
NC	13,917	9.71	0.00	39.36	4.44	62.69	2.45	31.51	2.04	1.32	13.95	56.80	13.44	12.07	3.37	0.37
ND	66	0.05	0.00	43.94	0.00	98.46	0.00	0.00	1.54	0.00	1.52	43.94	21.21	27.27	6.06	0.00
NE	249	0.17	47.92	37.75	0.80	93.50	1.63	0.81	2.44	1.63	2.42	72.18	21.77	0.00	3.63	0.00
NH	810	0.57	34.88	60.37	13.21	69.89	6.69	1.41	21.30	0.70	2.89	71.82	11.85	0.43	10.55	2.46
NJ	1,776	1.24	8.53	50.80	16.39	38.57	4.97	16.71	38.94	0.81	16.00	65.74	9.78	3.28	4.07	1.13
NM	235	0.16	54.62	67.23	0.85	38.30	2.13	1.70	54.47	3.40	0.00	61.28	32.34	0.00	4.68	1.70
NV	49	0.03	73.33	77.55	4.08	70.83	0.00	10.42	16.67	2.08	8.16	36.73	26.53	2.04	18.37	8.16
NY	8,398	5.86	22.22	62.22	1.55	79.41	3.38	6.41	9.97	0.82	9.91	66.95	11.54	6.71	3.97	0.92
OH	8,258	5.76	50.00	59.93	0.02	84.32	0.54	12.07	2.27	0.81	8.67	68.19	18.16	0.00	3.11	1.87
OK	1,452	1.01	100.00	43.32	0.90	69.08	3.39	12.53	0.18	14.82	7.92	50.76	30.10	0.00	9.57	1.65
OR	1,886	1.32	70.94	62.46	10.13	71.33	9.86	1.24	15.74	1.82	10.13	51.33	20.47	6.68	8.38	3.02
RI	1,042	0.73	59.57	45.39	33.30	74.49	5.12	6.18	13.82	0.39	32.88	49.85	10.40	0.79	5.40	0.69
SC	7,526	5.25	13.56	44.80	0.85	54.25	1.45	42.82	0.86	0.62	18.82	62.11	15.17	0.00	3.36	0.54
SD	543	0.38	29.18	44.20	2.21	94.48	1.29	2.03	1.47	0.74	1.29	66.11	7.73	12.15	10.87	1.84
TN	11,099	7.75	0.00	45.54	0.97	89.44	0.41	9.33	0.72	0.10	30.89	62.93	3.32	1.40	1.11	0.35
TX	5,742	4.01	0.00	51.01	15.88	25.40	5.43	8.06	60.49	0.62	33.38	44.32	15.02	2.06	4.81	0.42
UT	461	0.32	45.38	53.15	19.96	70.18	13.82	0.66	13.60	1.75	17.21	46.41	27.67	0.22	7.41	1.09
VA	5,709	3.98	99.97	36.93	0.00	68.43	0.41	30.32	0.44	0.41	12.13	61.23	22.57	0.30	3.47	0.30
VT	232	0.16	29.17	50.00	1.29	94.40	0.86	0.43	1.72	2.59	11.79	53.71	21.83	0.00	11.35	1.31
WA	6,333	4.42	32.84	64.16	7.86	23.25	38.93	11.05	20.04	6.73	5.36	44.61	30.34	10.59	9.01	0.08
WI	6,095	4.25	33.56	53.52	3.94	87.69	1.16	5.58	4.34	1.22	9.39	65.61	18.81	0.31	5.05	0.82
WV	1,725	1.2	0.00	72.29	0.06	94.87	0.13	3.97	0.51	0.51	5.15	67.59	17.56	4.55	4.36	0.79
WY	16	0.01	75.00	81.25	0.00	100.0	0.00	0.00	0.00	0.00	0.00	31.25	50.00	12.50	6.25	0.00
Total	143,300	100.00	51.47[(i)]	51.65	4.70	71.57	2.91	15.25	9.09	1.17	14.53	59.61	16.14	3.75	4.94	1.04

(i) This matching rate is different from 37.53% used throughout the paper because this table includes observations from Oklahoma and Virginia. These two states show 100% and 99.97% matching rate, and whether these were real matching rates or coding errors is not verifiable. For this reason, I excluded observations from these two states in all analyses.

Table A5. Reporting Quality by States

States	Number of Obs.	% of all sample	Match (%)	OCC skills trainees		With valid OSTC		Reemployed participants		With valid OCE	
				Count	As % of state obs	Count	As % of skills trainees	Count	As % of state obs	Count	As % of reempd
AK	174	0.12	43.69	168	96.55	168	100.00	116	66.67	97	83.62
AL	1,175	0.82	0.00	1,092	92.94	6	0.55	923	78.55	0	0.00
AR	1,711	1.19	0.00	1,691	98.83	0	0.00	1,328	77.62	0	0.00
AZ	1,220	0.85	0.00	519	42.54	0	0.00	953	78.11	0	0.00
CA	3,295	2.3	48.03	3,018	91.59	3,018	100.00	2,554	77.51	2,006	78.54
CO	1,447	1.01	37.14	780	53.90	693	88.85	1,164	80.44	726	62.37
CT	1,652	1.15	0.00	756	45.76	707	93.52	1,166	70.58	0	0.00
DE	115	0.08	0.00	79	68.70	17	21.52	92	80.00	28	30.43
FL	934	0.65	0.00	868	92.93	632	72.81	563	60.28	0	0.00
GA	3,653	2.55	25.60	2,759	75.53	1,645	59.62	2,888	79.06	316	10.94
IA	1,151	0.8	21.43	1,002	87.05	926	92.42	991	86.10	13	1.31
ID	1,304	0.91	32.43	640	49.08	557	87.03	1,172	89.88	969	82.68
IL	4,594	3.21	23.98	3,207	69.81	558	17.40	3,726	81.11	1,196	32.10
IN	8,007	5.59	31.25	3,103	38.75	900	29.00	6,461	80.69	441	6.83
KS	1,164	0.81	27.57	810	69.59	674	83.21	994	85.40	514	51.71
KY	3,222	2.25	13.58	1,672	51.89	1,575	94.20	2,454	76.16	961	39.16
LA	116	0.08	57.14	89	76.72	84	94.38	51	43.97	6	11.76
MA	3,704	2.58	30.79	2,397	64.71	1,026	42.80	3,167	85.50	1,799	56.80
MD	960	0.67	0.00	591	61.56	119	20.14	819	85.31	4	0.49
ME	3,295	2.3	36.69	1,770	53.72	1,737	98.14	2,601	78.94	2,311	88.85
MI	10,123	7.06	44.78	3,263	32.23	3,262	99.97	7,808	77.13	2,735	35.03
MN	1,570	1.1	39.58	1,146	72.99	106	9.25	1,244	79.24	111	8.92
MO	1,750	1.22	28.31	1,216	69.49	964	79.28	1,381	78.91	502	36.35
MS	2,892	2.02	21.43	1,472	50.90	1,472	100.00	1,972	68.19	129	6.54
MT	454	0.32	44.30	175	38.55	103	58.86	285	62.78	238	83.51
NC	13,917	9.71	0.00	12,251	88.03	0	0.00	11,592	83.29	0	0.00
ND	66	0.05	0.00	41	62.12	41	100.00	57	86.36	0	0.00
NE	249	0.17	47.92	187	75.10	181	96.79	237	95.18	204	86.08
NH	809	0.56	34.88	283	34.94	188	66.43	561	69.26	181	32.26
NJ	1,776	1.24	8.53	1,089	61.32	975	89.53	1,293	72.80	352	27.22
NM	235	0.16	54.62	204	86.81	196	96.08	192	81.70	141	73.44
NV	49	0.03	73.33	44	89.80	42	95.45	37	75.51	18	48.65
NY	8,398	5.86	22.22	2,372	28.24	623	26.26	6,521	77.65	534	8.19
OH	8,258	5.76	50.00	3,390	41.05	3,365	99.26	6,521	78.97	273	4.19
OK	1,452	1.01	100.00	1,452	100.00	1,444	99.45	1,278	88.02	1,271	99.45
OR	1,886	1.32	70.94	1,319	69.94	1,289	97.73	1,595	84.57	923	57.87
RI	1,042	0.73	59.57	410	39.35	406	99.02	842	80.81	362	42.99
SC	7,526	5.25	13.56	3,877	51.51	3,333	85.97	5,778	76.77	275	4.76
SD	543	0.38	29.18	419	77.16	419	100.00	470	86.56	444	94.47
TN	11,099	7.75	0.00	1,347	12.14	783	58.13	6,935	62.48	0	0.00
TX	5,742	4.01	0.00	2,616	45.56	2,615	99.96	4,733	82.43	0	0.00
UT	461	0.32	45.38	363	78.74	363	100.00	366	79.39	296	80.87
VA	5,709	3.98	99.97	4,356	76.30	4,030	92.52	4,245	74.36	2,836	66.81
VT	232	0.16	29.17	177	76.29	177	100.00	175	75.43	126	72.00
WA	6,333	4.42	32.84	3,357	53.01	3,337	99.40	5,331	84.18	4,760	89.29
WI	6,095	4.25	33.56	3,755	61.61	1,152	30.68	4,851	79.59	276	5.69
WV	1,725	1.2	0.00	490	28.41	325	66.33	1,353	78.43	4	0.30
WY	16	0.01	75.00	15	93.75	14	93.33	9	56.25	8	88.89
Total	143,300	100	51.47[(i)]	78,097	54.50	46,247	59.22	111,845	78.05	28,386	25.38

(i) This matching rate is different from 37.53% used throughout the paper because this table includes observations from Oklahoma and Virginia. These two states show 100% and 99.97% matching rate, and whether these were real matching rates or coding errors is not verifiable. For this reason, I excluded observations from these two states in all analyses.