Impact Evaluation of New England Institute of Technology's Shipbuilding/Marine Advanced Manufacturing Institute (SAMI) Program

TAACCCT II Grant

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Evaluator:
Center for Labor Markets and Policy
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A Word of Thanks

This report could not have been produced without the professionalism, cooperation, and goodwill of the Rhode Island Department of Labor and Training (RI DLT). The evaluation methods mandated for the TAACCCT-II program under which SAMI was funded are quite rigorous and data intensive. The propensity score matching method that we have employed for this net impact study requires that a comparison group be drawn from a population that is similar in many key respects to those who enroll in the SAMI program. The staff at RI DLT were generous with their time and expertise in providing us with appropriate data that we needed to develop a matched comparison group of unemployment insurance claimants. RI DLT staff also provided us with longitudinal data that were essential to measure the net impact of the SAMI program on the employment and earnings of SAMI program participants.

We especially want to acknowledge Donna Murray, Assistant Director, and Kathleen Greenwell, Administrator of the Labor Market Information unit at the RI DLT. We have had the privilege of working with Ms. Murray and Ms. Greenwell and the LMI unit of the RI DLT for a number of years. The insight and expertise of these two researchers were essential to the completion of this study and are reflective of an LMI unit that justifiably prides itself on providing top quality research and analysis. Donna and Kate continue the tradition of their predecessors in the LMI unit at RI DLT: serving as impartial observers and interpreters of important developments in the Rhode Island economy.

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Summary of Findings

The SAMI program was organized by New England Institute of Technology to provide education and training services to unemployed workers in industries and occupations hardest hit with job losses from international trade and the Great Recession. Using funds from the U.S. Department of Labor, the SAMI program was created to provide training in welding and machine trades that was focused on meeting the hiring requirements in the Rhode Island shipbuilding, marine and advanced manufacturing industries.

Over a two year period, the SAMI program enrolled about 300 unemployed workers who had previously worked in blue-collar and lower skill service occupations. The training was focused on developing abilities and knowledge of enrollees in welding and machine trades and providing training-related employment opportunities with good pay and a chance for advancement.

The program was organized during late 2013, at a time when the state, regional and national labor markets were slowly recovering from job losses associated with the Great Recession. At that time the unemployment rate in Rhode Island remained above 9 percent and the unemployment rate in blue-collar and lower skill service occupations was substantially higher. Over the next few years, an intensive effort to build relationships with local employers by SAMI staff combined with modest improvements in the state's job market created the outcomes described in this net impact evaluation study.

The net impact evaluation is based on a statistically rigorous and data-intensive quasi-experimental evaluation method using the propensity score matching technique. This method used a counterfactual consisting of a matched comparison group of unemployed workers with characteristics much like those of SAMI enrollees. The findings presented in this study represent the net impact of participating in the SAMI program on post-program employment and earnings.

The primary finding from the evaluation is that SAMI participants were substantially more likely to be employed and that their earnings were sharply higher relative to the matched comparison group. Specifically:

- In 2016-Q2, the quarter after the SAMI program ended, SAMI participants had an employment rate that was 1.17 times that of the matched comparison group.

- SAMI participants were about 1.09 times more likely to be employed over the potential number of quarters of employment after SAMI participation relative to the matched comparison group.
- In 2016-Q2, the quarter after the SAMI program ended, the quarterly earnings of SAMI participants were 1.19 times higher than the matched comparison group.

These outcomes are partially the product of an exceptionally high completion rate of SAMI enrollees and very clear pathways to employment that were well understood by SAMI students. Strong positive impacts of the SAMI program were also the result of SAMI faculty and staff efforts to build relationships with a large number of Rhode Island manufacturers who were involved not simply in the hiring process, but also in creating the program structure and curriculum that increased the chance of employment for SAMI students.

Introduction

The Employment and Training Administration (ETA) of the U.S. Department of Labor organized the Trade Adjustment Assistance Community College and Career Training (TAACCCT) grants program to provide services to individuals who were displaced from their long-tenured employment as a result of foreign competition, technological obsolescence, or other factors that shift the (ability, knowledge, skills and behavioral) requirements for employment and induce worker dislocation.

The ETA targeted TAACCCT funds to institutions that primarily provide higher education services to a student body seeking education and training programs that can be completed in two years or less. These institutions were to focus TAACCCT-financed education and training activities towards industries and occupations that provided students with the best chance of post-program success. These funds were to simultaneously assist institutions of higher learning to create model training programs and to help shift their overall program-mix toward segments of the state and local labor market with substantial employment opportunities. A fundamental objective of all programs operated by ETA is to improve the employment and earnings experiences of individuals who participate in federally-funded education and training initiatives. While building capacity to provide model educational and training programs that can help program participants succeed in acquiring skills and credentials (certificates/degrees) needed in the local labor market and creating innovative methods of instruction are some of the activities encouraged by the program, the primary outcome for the TAACCCT initiative is labor market success of dislocated workers.

This paper presents findings from the evaluation of the net impact on employment and earnings outcomes of enrollees in New England Institute of Technology's Shipbuilding/Marine Advanced Manufacturing Institute (SAMI) program funded with the second round of the national TAACCCT initiative. This evaluation study uses a large scale data base of unemployment insurance claimants to identify a matched comparison group of dislocated and jobless workers along with unemployment insurance tax reports of state employers (UI wage records data base) to measure the post-program employment and earnings experiences of SAMI program enrollees and the matched comparison group. Using these data and a quasi-experimental evaluation

method, the study finds that the net impact of SAMI training programs on the employment and earnings of program participants are positive, substantial and statistically significant.

The paper begins with a discussion of some of the most important elements of the SAMI program and places SAMI in the context of a turbulent labor market environment that has characterized Rhode Island for the last ten years. This discussion is followed with a description of the post-graduation employment and earnings outcomes of SAMI participants. The second part of this paper focuses on the evaluation of the net impact beginning with a discussion of the propensity score matching method that is used for the selection of a comparison group that is closely matched with SAMI participants on a number of key characteristics. The matched comparison group serves as a counterfactual against which the impact of SAMI participation is measured. The final section presents estimates of the net impact of SAMI training programs on three outcomes measuring post-program employment and earnings of participants.

SAMI and the Rhode Island Labor Market

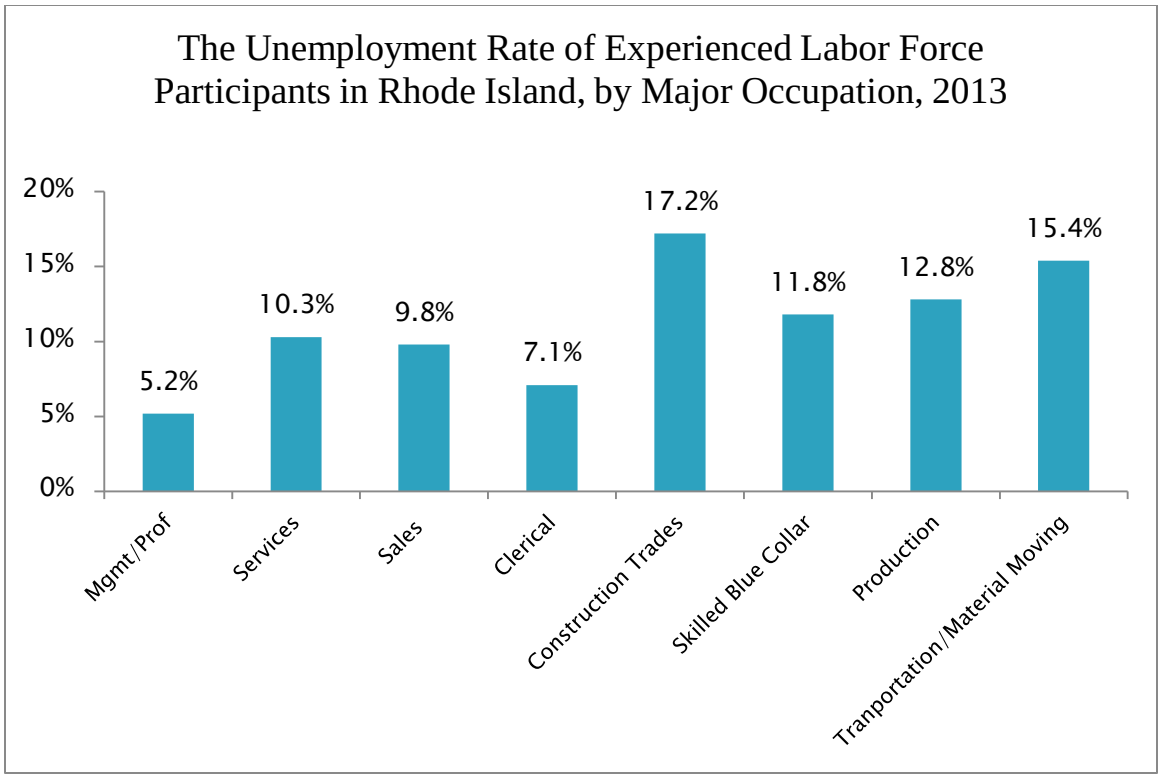
New England Institute of Technology's Shipbuilding/Marine and Advanced Manufacturing Institute (SAMI) was created with TAACCCT Round II funding to develop the physical infrastructure, educational curricula, and employer relationships required to provide education and training services to unemployed Rhode Island residents. The program was designed to prepare students for employment in welding and machine trade related occupations through both classroom education and hands-on training by master welder and machinist instructional faculty. The program primarily focused on enrolling jobless Rhode Island residents previously employed in blue-collar and service occupations from across the state. Student characteristics presented in the next section of this paper reveals that student enrollees were typically male adults in their thirties with a high school diploma.

The labor market context in which the SAMI program has operated has been generally unfavorable over the life of the program. Rhode Island was among the first states in the nation to feel the job market effects as the Great Recession gripped the nation. Payroll employment levels in the Ocean State began to decline a full year before job losses began to mount in most other states. Rhode Island posted double-digit rates of job losses between 2006 and 2010 and experienced more months of continuous job losses during the economic downturn than any other state in the nation.

Even after the national jobs recovery started in the beginning of 2010, labor market conditions in Rhode Island had not improved much. When the SAMI program was implemented towards the end of 2013 (three years into the national jobs recovery) the employment situation in Rhode Island remained quite poor. The Rhode Island unemployment rate averaged 9.2 percent during 2013. Among the state's experienced construction and manufacturing industry workers, a major target population of the SAMI program, the 2013 unemployment rates were 16.6 percent and 10.6 percent, respectively.

The likelihood of experiencing a spell of unemployment in Rhode Island during 2013 was closely associated with the level of educational attainment. Among individuals aged 25 and older who were actively engaged in the labor market, the unemployment rate of high school dropouts was 19.3 percent, while high school graduates, with no college education had an unemployment rate of 9.8 percent. Unemployment rates were also quite high among persons with some post-secondary education below the bachelor's degree level. The unemployment rate for those aged 25+ with some college but no degree award was 8.6 percent during 2013. Adult college graduates had an unemployment rate in Rhode Island of 4.3 percent at that time; a rate of unemployment that was low compared to that of individuals with fewer years of schooling, but still about twice as high as its pre-recession level.

Unemployment rates in Rhode Island were especially high in blue-collar occupations that were heavily concentrated among goods-producing firms in the state. Those employed in the construction trades were especially likely to be unemployed with an annual average unemployment rate over 17 percent during 2013. Skilled blue-collar workers in installation, maintenance and repair occupations had an unemployment rate of 11.8 percent, while blue-collar production workers had an unemployment rate of 12.8 percent. The unemployment rate among transportation and material moving workers including warehouse workers, baggage handlers and truck drivers was 15.4 percent.



Source: U.S. Bureau of Labor Statistics, *Geographic Profiles of Employment and Unemployment, 2013*, BLS Bulletin 2780, October, 2014.

The jobs recovery in Rhode Island up through the end of 2013 had been quite weak. Between the trough of the jobs recession in February 2010 and the end of 2013, Rhode Island employers added only 16,000 jobs, representing a recovery of only about 40 percent of the total jobs lost in the state during the Great Recession. The pace of job growth in the state has remained relatively weak; indeed as of August 2016, Rhode Island remains one of a handful of states that has yet to reach its pre-recession employment level.

The SAMI program targeted its services to long-term unemployed adults primarily dislocated from blue-collar occupations concentrated in the construction and manufacturing industries and with most lacking a college degree. Many of the applicants to the SAMI program were referred by Rhode Island DLT's network of Career Centers that provide a variety of education, training and job search assistance services to Rhode Island residents. SAMI enrollees were largely unemployed workers who had been laid off from labor market segments characterized by extraordinarily high levels of excess labor supply.

The SAMI program has operated in a weak overall labor market environment, characterized by slow job growth and compounded by competition from a very large number of unemployed experienced workers seeking employment in manufacturing firms and other organizations where they could best utilize their prior work experiences.

Characteristics of SAMI Participants

The SAMI program was designed to create new capabilities at New England Institute of Technology by developing facilities, equipment, faculty and curriculum for new certificate programs in welding and machine trades. The program enrolled a total of 298 students over its three-year cycle through the end of 2015. Students enrolled in the SAMI program were overwhelmingly men, with women accounting for just 6.4 percent of total enrollment.

The race-ethnicity characteristics of students enrolled in the SAMI program largely mirrored the characteristics of the unemployed residents of Rhode Island at the time the program was implemented. Table 1 presents a comparison of the distribution of the 298 SAMI students across four race-ethnicity categories and the distribution of unemployed Rhode Island residents during 2013 by their race and ethnicity.

It is important to note that the SAMI race-ethnicity categories differ from those adopted by the BLS to classify the race-ethnicity of unemployed residents. The BLS unemployment measure is derived from the Census Bureau's Current Population Survey (CPS). The CPS race-ethnicity data are generally reported separately for racial categories and for ethnicity categories. The result is that Census-based tabulations frequently double count respondents when both race and ethnicity are included. In contrast, the SAMI application form uses a much simpler classification method that simply requests students to self-identify their race-ethnicity essentially into one of four mutually exclusive categories: White, Black, Hispanic and Asian; so no double counting occurred with SAMI data on race-ethnicity.

The findings provided in Table 1 compare the race-ethnicity characteristics of SAMI participants with those of the all unemployed Rhode Island residents in 2013. The double counting problem with BLS based race-ethnicity data is clear. Our comparison found that about 64 percent of all SAMI students identified themselves as non-Hispanic White and about 11 percent as Hispanic. Together, White and Hispanic students accounted for 75 percent of total SAMI enrollment.

The BLS distribution of unemployed persons by race-ethnicity found that 82 percent of all unemployed Rhode Island residents were White, while 27 percent were classified as Hispanic. Because of the double counting described above, combining the share of BLS-based White and Hispanic unemployed individuals suggests that 109 percent of all unemployment individuals in the state are White or Hispanic; an obvious impossibility and a clear exposition of the double counting problem.

While BLS race categories are mutually exclusive, the ethnicity category, Hispanic origin, is determined by survey respondents independently from race. For example, respondents who identify themselves as Hispanic also identify their race (in response to separate question on the survey) as one of the following racial categories: White, Black, Asian, or Other. The majority of those of Hispanic ethnicity in Rhode Island classify themselves as White on the CPS household survey. Therefore the sum of White and Hispanic unemployed persons in the state exceeds 100 percent.

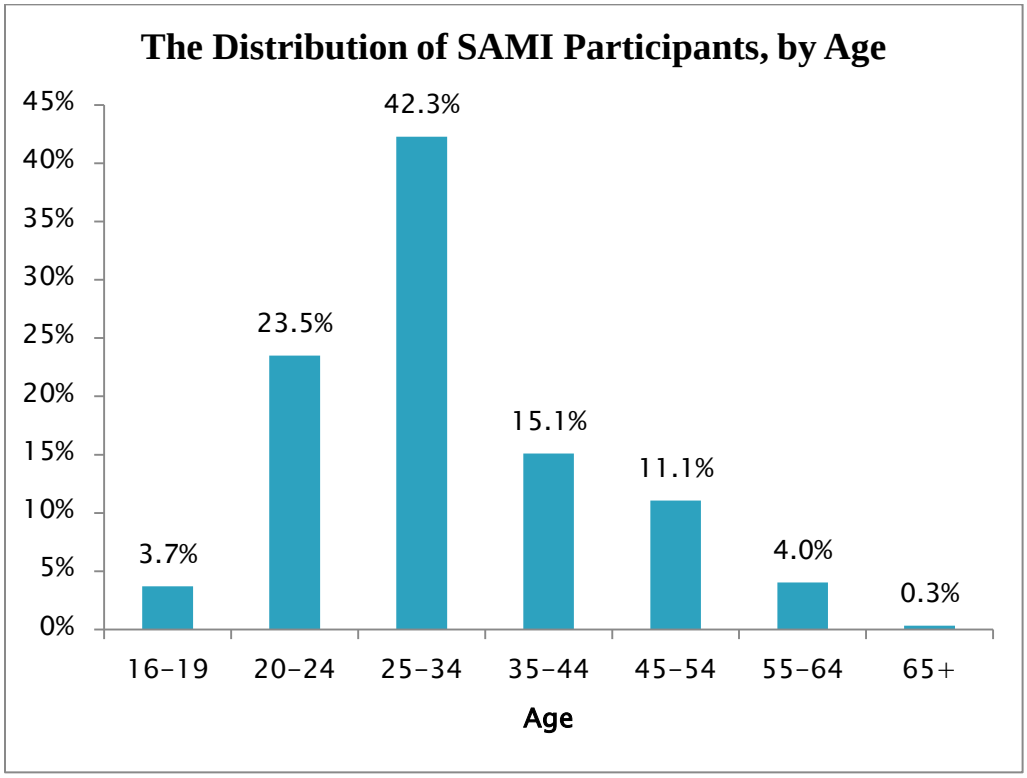
Considering these differences in the race-ethnicity classification, the findings in Table 1 suggest an approximate proportionality between the race-ethnicity composition of SAMI participants and that of Rhode Island job market participants officially classified as unemployed by the CPS survey.

Table 1:
The Distribution of SAMI Participants and
Unemployed Adults (25+) in Rhode Island in 2013,
by Race-Ethnicity

Race-Ethnicity	SAMI Students	Rhode Island Unemployed Adults (25+)
White*	64%	82%
Black	9%	10%
Hispanic	11%	27%
Asian	3%	2%
Other/Missing	12%	None
Total	100%	122%

Sources: SAMI Administrative Data and U.S. Bureau of Labor Statistics, *Geographic Profiles of Employment and Unemployment, 2013*, BLS Bulletin 2780, October, 2014
*Note: The White race group excludes Hispanics among SAMI participants and includes White Hispanics among unemployed adults (25+) in Rhode Island.

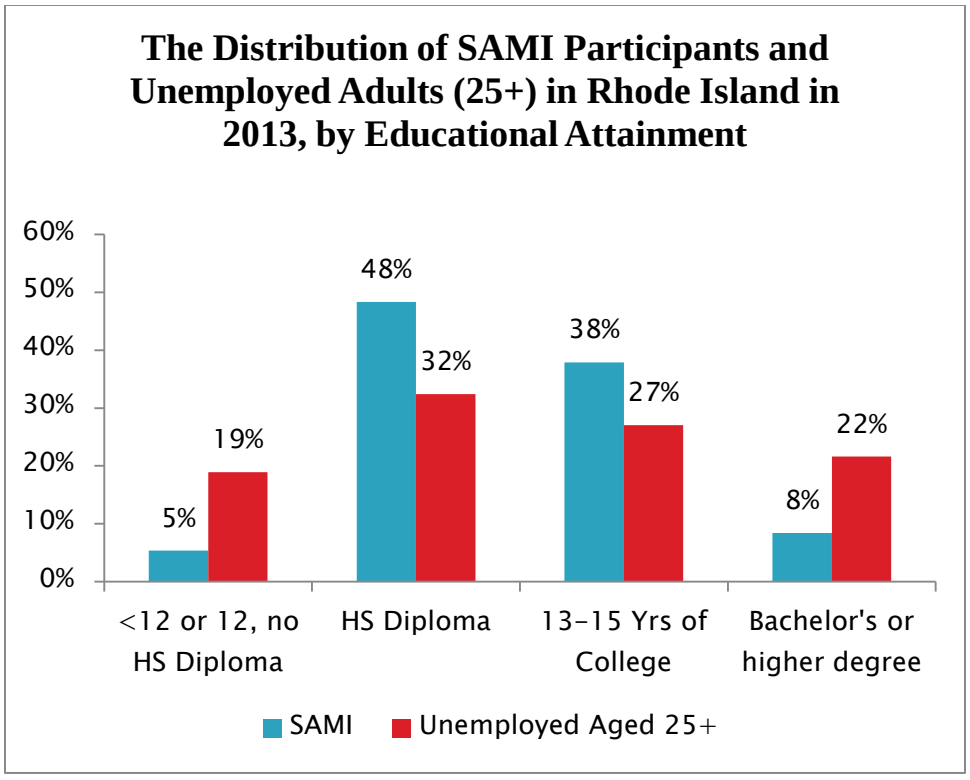
SAMI participants were relatively young, with a median age of 30. Just 3 percent of all participants were teens (16-19) while young adults aged 20 to 24 accounted for nearly one-quarter of all SAMI students. The largest group consisted of students aged 25 to 34, with 42 percent of all SAMI enrollees in this age group. Persons 35 to 54 accounted for an additional quarter of SAMI enrollees. Persons aged 55 and older rarely participated in the SAMI program, accounting for just over 4 percent of all students enrolled in the program.



Source: SAMI Administrative Data

The SAMI program, in large part, enrolled students who had not earned a college degree. While about 22 percent of all unemployed Rhode Island residents aged 25 and older had a college degree, fewer than one in ten SAMI participants were college graduates. Nearly half of all SAMI students were high school graduates with no post-secondary schooling. An additional quarter of SAMI students had completed some college, but few of these participants had earned an associate's degree award, although a substantial number of these students (with some college) had earned some kind of certification and all had earned some college credits. Just five percent of all students enrolled in the SAMI program had not earned a high school diploma.

The level of educational attainment of SAMI students differed considerably from that of all unemployed adults in Rhode Island. Our comparison of the educational attainment of SAMI students with unemployed adults in the state found that high school graduates accounted for about one-third of all adult unemployment in the state and nearly one-half of SAMI enrollees. Thus, SAMI participants were 1.5 times more likely to be high school graduates with no college experience, compared to all unemployed adults in the state.



Source: SAMI Administrative Data

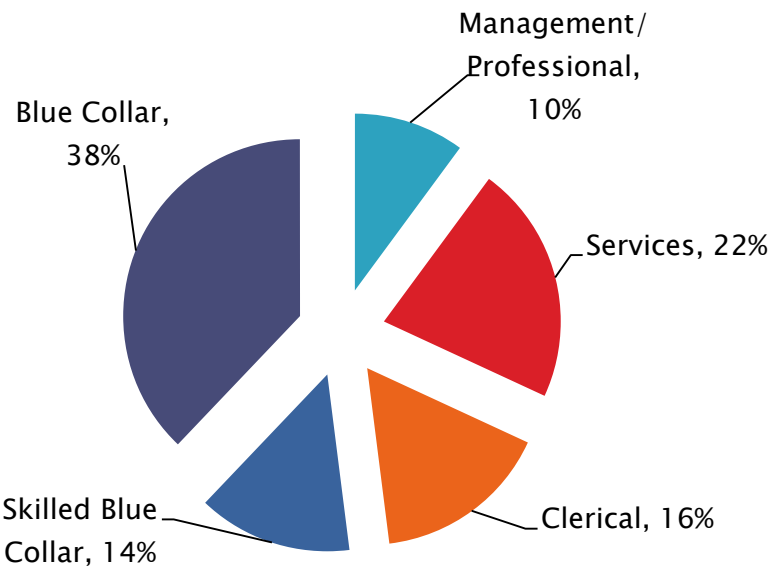
About 38 percent of SAMI enrollees had some college education below a bachelor's degree, compared to 28 percent of all unemployed adult Rhode Islanders. Relatively small shares of SAMI participants were high school dropouts, but dropouts and college graduates accounted for a much larger share of overall adult unemployment in the state. We suspect that the nature of work, proficiency requirements, and earning potential expected after completing SAMI training were much less attractive to either adult dropouts or college graduates compared to those with a high school diploma or some college, but no degree.

The high share of SAMI students who were high school graduates with no college as well as the substantial share with some college, but no degree is not surprising. SAMI was designed to

target dislocated workers in Rhode Island with substantial need for re-training to rapidly become re-employed in welding and machine trade occupations. Given this objective, large numbers of dislocated workers from blue-collar and low-level service occupations, who for the most part were not college graduates, were referred to the SAMI program by the state's system of career centers as well as other sources of student applicants including some community-based organizations.

More than one-half of SAMI students had previously worked in a blue-collar occupation, ranging from construction trades and maintenance and repair occupations to material moving and transportation positions. About 22 percent of SAMI students had previously worked in service occupations including cafeteria workers, dishwashers and cooks, security workers, baristas and bar tenders. About one in six SAMI students had worked in administrative support and clerical positions prior to dislocation that included stock clerks, cashiers, shipping and receiving clerks and customer service workers. Just 10 percent of all enrollees were previously employed in college labor market occupations prior to participating in SAMI.

The Distribution of SAMI Participants by Prior Occupational Employment Experience



Source: SAMI Administrative Data

Outcomes of SAMI Participants

A major problem among post-secondary institutions, especially among two-year institutions, is that of retaining students after initial enrollment. Indeed, in recent years, poor student retention has been voiced as a key concern in higher education. Poor student retention has raised doubts about the effectiveness of key elements of the post-secondary system in the U.S.[1]

A fundamental feature of a successful education and training program is its ability to retain students who initially enroll in the program. The retention of students enrolled in the SAMI program was quite high. A total of 298 individuals enrolled in the program beginning in late 2013 until the end of 2015. Out of these 298 student enrollees, 288 completed the course of study and earned a certificate, representing a completion rate of nearly 97 percent. The high student completion rate is in part the product of a very effective screening program to identify motivated enrollees, a teaching faculty that was highly regarded by students, and a strong job development and placement program. Perhaps the most important characteristic of SAMI in supporting student retention was the program's explicit pathways for participants to find work after completion. Students highlighted that a clear pathway to a job was important in motivating their persistence in the program.

In the following section we examine the post exit employment and earning experiences of SAMI students using three different employment outcome measures and two different earnings measures.

Employment

We determined the employment status of each student using unemployment insurance tax reports that are submitted to the Rhode Island Department of Labor and Training by business establishments covered by the state's unemployment insurance compensation statute. These tax reports cover most of the wage and salary employment among private for-profit firms, not-for-profit organizations and charities, and government agencies in Rhode Island; however they do not include unincorporated self-employed persons.

[1] Linda Wild and Larry Ebbers, "Rethinking Student Retention in Community Colleges," *Community College Journal of Research and Practice,* vol. 26, 2002.

The quarterly tax reports filed by covered business establishments include the quarterly employment status and quarterly earnings of persons employed in wage and salary jobs in a given calendar quarter. It is important to recognize that these data exclude information about the employment status of Rhode Island residents working out of state and include only workers employed by business establishments located in Rhode Island. Rhode Island residents employed in business establishments located in another state such as Massachusetts or Connecticut are excluded from these data and therefore also from our study. The employment and earnings status in these quarterly tax reports are reported in the state where the employee works, not where they reside.

The employment measure we use indicates only that a person was employed at some point during the calendar quarter of the report. Thus, we do not provide information about the weeks of employment over the quarter or information about the weekly hours of work for the employed individual.[2] Using identification information supplied by the SAMI program, Rhode Island DLT staff identified all SAMI participants who were employed at any time between their exit from the program and 2016-Q2. Identification information was submitted to RI DLT on all 298 students, including both SAMI program completers and dropouts.

SAMI students who dropped out of the program are included in our evaluation since SAMI resources were devoted to provide these non-completers with education, training and placement services regardless of whether they fully utilized those resources.[3] Enrollees' failure to complete the program of study comes at a price of another student who could have completed the SAMI program and so the outcome measures we employ reflect the opportunity cost of those resources. SAMI is held accountable for the failure of a student to complete the course of study, regardless of their reason for exiting the program before completion.

[2] Rhode Island DLT does request that employers voluntarily provide this information, but unlike employment and earnings it is not a required part of the business establishment's quarterly filing. Our review of these data on weeks and weekly hours of employment found that the actual reporting was spotty and the data reported are not edited or checked for any reporting errors. The DLT LMI unit advised great care in using these data for our purpose and so after our review we opted not to employ these limited reports in our analysis.

[3] Most college and university studies of post-college outcomes focus exclusively on graduates and exclude persons who exit before a degree award.

The findings provided in Table 2 report the entered employment rate for all SAMI students. The immediate entered employment rate is provided for the first calendar quarter following the quarter of program exit. This entered employment rate is different from that reported from program administrative records since it measures only employment in the quarter following completion, thus excluding students who may have had a post program job search that exceeded three months after the quarter of completion. Also these data exclude any employment in out-of-state positions, including jobs at the Electric Boat submarine manufacturing facility in Groton Connecticut, that are captured by SAMI administrative data but not in the quarterly tax reports data.

The findings reveal some variability in immediate employment rates over the life of the SAMI program. The SAMI immediate post-program employment rate varied from a low of 60 percent for students who exited in 2014-Q2 to a high of 94 percent for those who exited from SAMI during 2015-Q2. The simple unweighted mean immediate entered employment rate for the SAMI program was 81 percent over the life of the program.

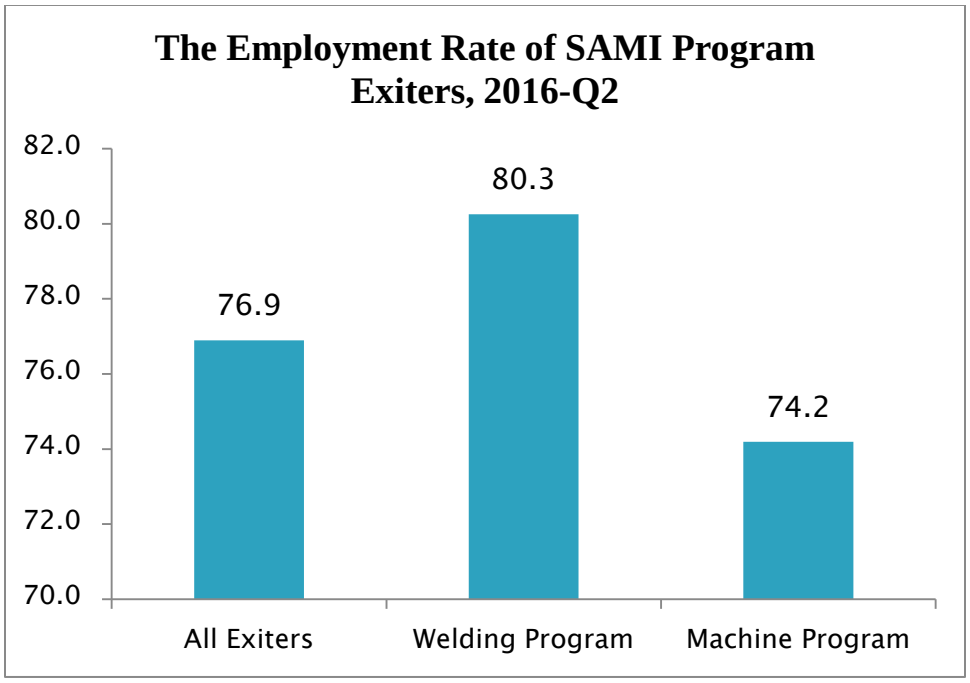
Table 2:
Immediate Entered Employment Rate of SAMI Program Exiters,
2014-Q2 to 2016-Q2

Exit Quarter	Employment Quarter	Immediate Entered Employment Rate
2014-Q1	2014-Q2	86%
2014-Q2	2014-Q3	60%
2014-Q3	2014-Q4	75%
2014-Q4	2015-Q1	88%
2015-Q1	2015-Q2	82%
2015-Q2	2015-Q3	94%
2015-Q3	2015-Q4	89%
2015-Q4	2016-Q1	74%
2016-Q1	2016-Q2	83%

Source: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

A second measure of employment examines the employment status of all program completers during 2016-Q2. The program has continuously exited students each quarter since its beginning up until 2016-Q1. Our second employment measure gives us a snapshot of the current

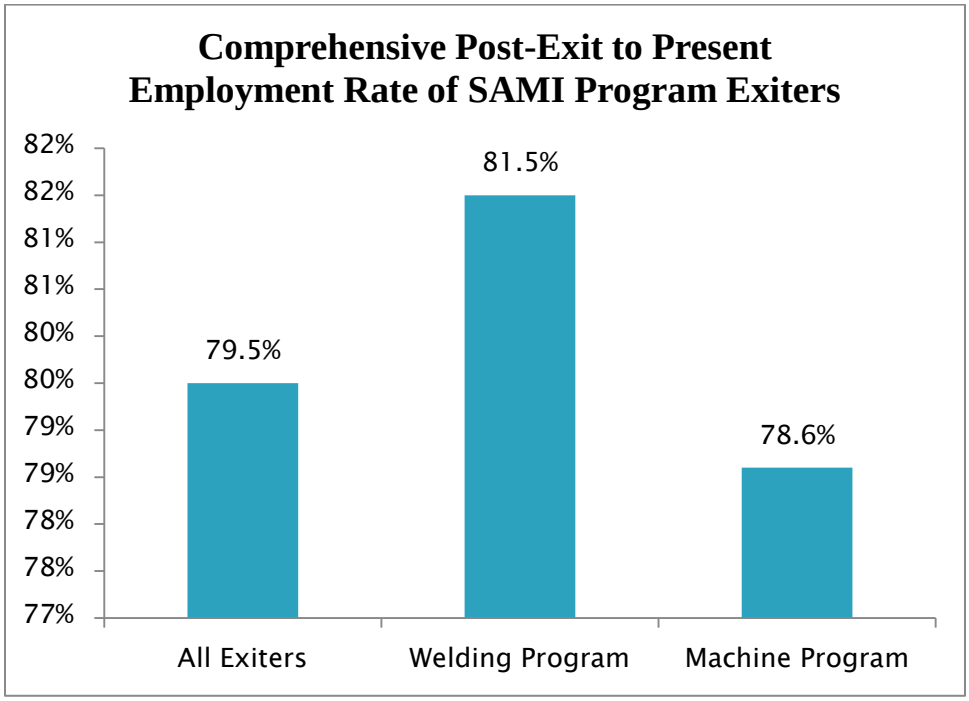
post-program employment status of all SAMI program exiters during the most recent quarter (2016-Q2). This employment rate is a measure of the current employment status of SAMI exiters regardless of when they participated in the program. The overall 2016-Q2 employment rate for SAMI exiters was 76.9 percent. About 80 percent of students who had completed the welding program had a job during 2016-Q2 while among machine program graduates we found that 74 percent were employed at that time.



Source: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

A third more comprehensive measure of employment is designed to examine the number of actual quarters of employment between the time of program exit and 2016-Q2, relative to the potential number of quarters of employment that a SAMI student could have worked had they been employed in all quarters since the quarter after their exit through the second quarter of 2016. Our third employment outcome measure simply determines the actual number of quarters that a SAMI student was employed after their exit from the program and takes that number as a ratio of the potential number of quarters that the student could have worked through 2016-Q2. For example, SAMI completers who exited the program during 2014-Q1 could have worked up to 9 additional calendar quarters between the quarter after their exit and 2016-Q2. If we found

that a student was employed in 7 of the 9 quarters between 2014-Q2 and 2016-Q2, then this would yield an employment rate of (7/9*100) or 77.8 percent. This measure provides insight into the likelihood that SAMI completers had a job over the entire period from time of program exit to the current period.



Source: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

This 'comprehensive employment rate' of SAMI students averaged about 79.5 percent for all program exiters. Welding students had a mean comprehensive employment rate of 81.5 percent while those exiting the machine program had a comprehensive employment rate of 78.6 percent.

Earnings

In order to measure the earnings outcome of SAMI students after program exit we use the median quarterly earnings measure. There is a very wide distribution around the mean of earnings in general and in small scale studies one or two very high or very low earnings reports can exert a very strong and disproportionate influence on the mean earnings level. Therefore we have opted to measure earnings outcomes by calculating the median value of earnings, which, in

this instance is a better indicator of the central tendency of earnings than the mean. Median earnings refer to the midpoint of an earnings distribution that ranks quarterly earnings from the highest to lowest value. Median earnings are the earnings of workers at the 50th percentile of the earnings distribution.

The median immediate post-program earnings experiences of employed SAMI students are summarized in Table 3. These data measure the earnings during the calendar quarter immediately following the quarter of exit of students who worked and were paid at any time by a covered Rhode Island employer during that calendar quarter. These individuals may have worked for different employers sequentially over the quarter but the earnings paid by each employer are included in the earnings measure for that quarter. Additionally, all of the earnings of workers who held multiple jobs simultaneously during a quarter or any part of a quarter (although this 'moonlighting' employment occurred only in a few instances) are also included in the earnings for that quarter.

Table 3:
Median Immediate Quarterly Earnings of Employed SAMI
Program Exiters (in the First Quarter after Exit), 2014-Q2 to 2016-Q2

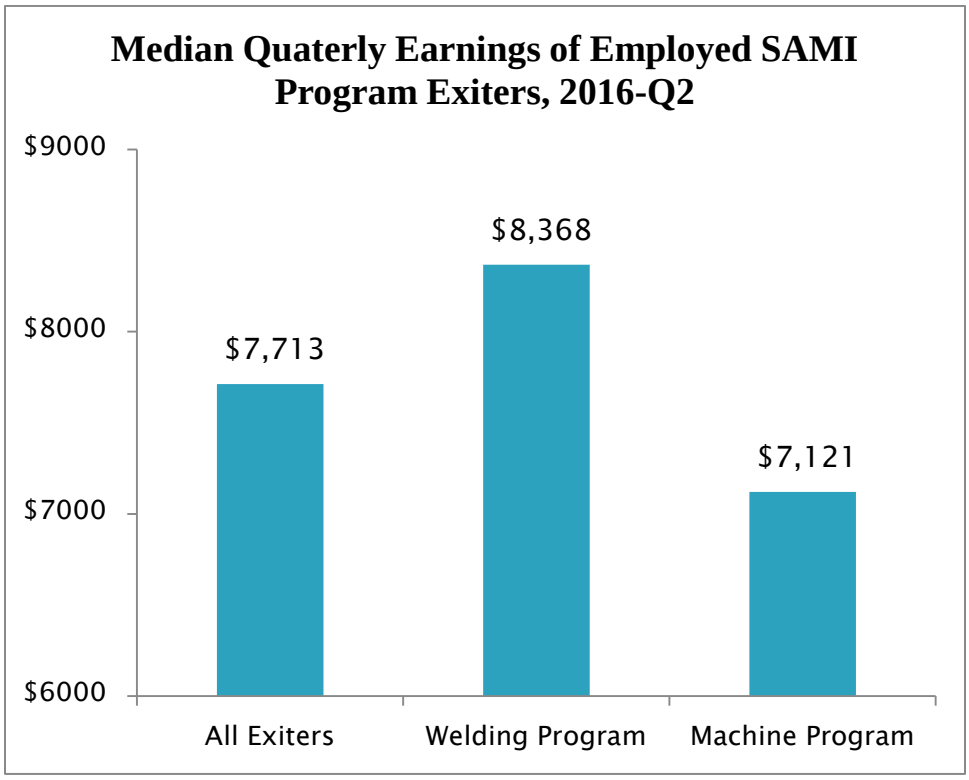
Exit Quarter	Earnings Quarter	Median Immediate Quarterly Earnings
2014-Q1	2014-Q2	$5,076
2014-Q2	2014-Q3	$3,598
2014-Q3	2014-Q4	$4,174
2014-Q4	2015-Q1	$7,299
2015-Q1	2015-Q2	$5,797
2015-Q2	2015-Q3	$7,380
2015-Q3	2015-Q4	$7,360
2015-Q4	2016-Q1	$2,922
2016-Q1	2016-Q2	$5,783

Source: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

The median first post-exit quarterly wages of employed SAMI exiters varied considerably by their exit quarter. Students who exited during 2015-Q4 had median first post-exit quarterly earnings of just $2,922; the lowest level of quarterly earnings compared to all exit cohorts. In contrast the median quarterly wage of those who exited during 2015-Q2 was $7,380;

2.5 times higher than the median wage of those who exited during 2015-Q4. The large variation in entering quarterly wage rates is likely associated with differences in the duration of job search of SAMI students as well as differences in industries and occupations of initial placement. Industry and occupation strongly influence the hourly wage rate and the number of weeks of employment and hours of employment available from the employers. The overall unweighted first post-exit quarterly median earnings for employed SAMI exiters averaged $5,446 over the life of the program.

Our second measure of earnings examines the median earnings of all SAMI exiters during 2016 Q2, the quarter after the end of the SAMI program and the most recent quarter for which data are available. This measure presents a snapshot of the median quarterly earnings of all SAMI students after the end of the program.



Source: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

Overall median earnings for SAMI students were $7,713. This earnings level is well above the average median earnings level of about $5,500 among those employed in the first

quarter after exiting the program. The data revealed that median earnings among SAMI welding graduates of $8,368 were about $1,200 greater than the median earnings of SAMI machine program graduates.

Part of the reason that the most recent quarter wages are much greater than the entry quarter wages of SAMI participants is likely the extended job search among some participants that reduces the number of weeks of work available to them in the quarter after exit. A second factor may be that improving labor market conditions in Rhode Island since 2013 (the state's unemployment rate currently stands at 5.3 percent-a sharp decline from 2013 levels) that may have contributed to increased weeks and hours of work available to SAMI exiters. Finally, it is likely that the additional post-program quarters of work experience have led to hourly wage increases and in some instances promotions for SAMI participants. Such wage gains (from additional work experience) are associated with increased worker productivity from further development of occupational proficiencies through on-the-job training activities, both formal and informal, that are provided by many employers of SAMI program graduates.

Impact Evaluation Design and Method

The evaluation findings provided in this section of the paper examine the *impact* of SAMI program participation on post-graduation employment and earnings of SAMI enrollees. Using statistical methods discussed in greater detail below, we constructed a comparison group of persons with key characteristics that are similar to those of students enrolled in the SAMI training program. This comparison group serves as a point of contrast (counterfactual) that we use to compare the post-program employment and earnings experiences of SAMI participants with those of jobseekers in the matched comparison group who did not participate in the SAMI program.[4]

The impact evaluation uses the propensity score matching (PSM) impact evaluation method—a highly regarded non-experimental evaluation research design—to estimate the impact on post-exit employment and earnings of 298 SAMI participants who had enrolled in either the

[4] It is helpful to note that some of those selected as part of the matched comparison group may have received other kinds of educational, employment, training or job placement services offered by DLT or other organizations during the evaluation period. However, no information is available about that training so we are not able to account for workforce development services received by those selected for the comparison group.

welding or machine trades training program through the end of 2015. We used the PSM method to select a group of 298 unemployed job seekers in Rhode Island who did not participate in the SAMI training program for the comparison group. The comparison group was matched with SAMI participants based on key traits that are closely related to employment and wage outcomes.

The PSM method requires that the matched comparison group (the counterfactual) should be selected from a comparison population universe consisting of persons in similar circumstances as those receiving the treatment. The most convenient comparison population universe would have been students enrolled at NEIT who did not participate in the SAMI program. However, NEIT enrolls very young, traditionally college aged (18 to 22 year old) students, most of whom are unlikely to have been dislocated from a job, be on lay-off or even be looking for full-time work.

The SAMI program is a job market intervention designed to provide education and training services primarily to adult dislocated workers who, for the most part, were unemployed job seekers. This meant that the matched comparison group would be best drawn from a similar population of adult unemployed residents of the state. The largest and most comprehensive data on individuals experiencing a spell of unemployment in Rhode Island is DLT's unemployment insurance (UI) claimant data base. We determined that the best data source that was potentially available to construct a matched comparison group was the highly confidential UI claimant data base. We worked with senior staff at DLT and NEIT to develop a data sharing and confidentiality agreement that enabled us to access a de-identified unit record UI claimant data file to select the matched comparison group for the impact study.

The second major task involved in measuring the net impact of SAMI program participation is that of finding comparable information about post-program employment and earnings outcomes of both participant and matched comparison group members. One option is to employ a follow-up contact program with participants and comparison group members using a questionnaire that collects information from respondents about labor force status and earnings at a point in time. These surveys, when properly financed and conducted by an experienced survey research organization, can potentially provide valuable information on post-program labor market experiences of SAMI program participants and the comparison group.

Our experience with third-party survey research organizations in conducting postsecondary follow-up studies suggests that achieving high response rates at the post-secondary level has become increasingly difficult in recent years. Further, we suspect that achieving high response rates for a comparison group may prove even more daunting. We determined that the resources required to produce a high response survey-based set of findings of high quality were simply prohibitive.

The second alternative to producing the employment and earnings information needed for the net impact evaluation is data derived from quarterly tax filings from business establishments located in Rhode Island. As noted in a previous section of this paper, these tax filings provide a nearly complete accounting of all wage and salary employment in Rhode Island on a quarterly basis, Indeed, these filings are used by the RI DLT's LMI unit to prepare and publish employment and wage reports as part of its Quarterly Census of Employment and Wages statistical program that it operates in cooperation with the BLS.

Once again we worked with senior officials at DLT and NEIT to develop data sharing and confidentiality arrangements that gave us access to a de-identified employment and wage records data file for both the SAMI participant group as well as the matched comparison group of UI claimants. This meant that we were able to utilize comparable employment and earnings measures derived from the same data base for the same time period for both the participant and the comparison group to undertake the net impact evaluation.

With the de-identified data files made available by the RI DLT we used three post-program outcomes measures to judge the impact of the SAMI program including:

- Stock employment measure: the share of participants and comparison group members employed in the post-program period (2016-Q2),
- Flow employment measure: The proportion of quarters actually employed relative to the potential share of quarters employed over the life of the program, and
- Wage measure: median wage in the post-program period (2016-Q2).

De-identified unit record employment and wage data for SAMI participants and the matched comparison group from the Rhode Island Unemployment Insurance (UI) wage records data base were then secured from the RI DLT. Using the de-identified UI wage records data file, post-program employment and earnings outcomes were computed for SAMI participants and the

comparison group. We then measured differences between the employment and earnings outcomes of SAMI participants and the comparison group and estimated the statistical significance of these differences to determine whether the size of these differences were sufficiently large and based on a sufficient number of observations to be more than simply the product of chance.

Selection of the Comparison Group

Since the SAMI program is designed to serve unemployed residents of Rhode Island, we designed the evaluation to select the comparison group from Rhode Island unemployment insurance claimants. The comparison group was selected from UI claimants who were active claimants over the same time when unemployed SAMI participants were enrolling in the SAMI training program. The target group of our evaluation is SAMI participants who had enrolled in the program during 2014 and 2015. Therefore the comparison group universe (from which a matched comparison group was selected) consists of UI claimants who had an active claim in 2014 or 2015. Since many SAMI participants were UI claimants at the time of their enrollment in the program, SAMI participants were excluded from the comparison universe before propensity score matching was conducted to select a comparison group that was closely matched with key traits of SAMI participants.[5]

The comparison universe consisted of 61,441 UI claimants with active claims in 2014 or 2015. The de-identified unit record data for these UI claimants included information about the gender, age, race-ethnicity, educational attainment, and occupation on their last job for each of the 61,441 claimants. These variables represent the covariates that we used in the selection of the matched comparison group. Data on these same background traits of SAMI participants were secured from the SAMI internal data base. The comparison universe consisted of 61,441 claimants from which just 298 claimants were selected to serve as a matched comparison group to 298 SAMI participants. The size of the comparison universe provided a large pool of claimants while yielding the selection of a very closely matched comparison group.

[5] Along with the request for data on initial UI claimants, DLT was provided a list of the 298 SAMI participants with a request to flag them in the de-identified unit record UI claimant data file so that we could exclude SAMI participants from the comparison universe before the selection of the comparison group.

Propensity Score Matching

The selection of the matched comparison group was based on the propensity score matching (PSM) method. The first step in the PSM method entails estimating propensity scores for all individuals in the study—both those who received the treatment and the comparison universe consisting of those who did not receive the treatment. For this study, propensity scores were estimated for the 298 SAMI participants and the 61,441 UI claimants who did not participate in the SAMI program. The propensity score measures the probability of being in the treatment group. The PSM method uses logistic regression models to predict the probability that an individual will be in the treatment group, based on characteristics that are likely to affect outcomes. We have included the following variables in our propensity score regression models: gender, age, race-ethnicity, educational attainment, and the occupation of their previous job.[6]

After estimating propensity scores for each SAMI participant and all UI claimants in the comparison group universe, we estimated the Mahalanobis distance metric using multivariate analysis that included the same predictor variables (gender, age, race-ethnicity, educational attainment, and the occupation of their previous job) and the propensity score. The propensity score was included in estimating the Mahalanobis distance metric as its inclusion is found to yield better matches.[7] SAMI participants were then matched with UI claimants in the comparison universe based on the 'nearest neighbor' matching estimator using the Mahalanobis distance nearest-neighbor matching technique.[8] The matching was performed on a 1:1 basis without replacement using a caliper[9] width of .1 that is recommended by researchers.[10]

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[6] The characteristics used to select the matched comparison group were based on traits that are known to be closely related to employment and wage outcomes and the data available on the Rhode Island UI claimant database. A detailed list of the variables used in the selection of the comparison group is presented in Appendix Table A-1.

[7] Rubin, Donald B. and Neal Thomas, "Combining Propensity Score Matching with Additional Adjustments for Prognostic Covariates," *Journal of the American Statistical Association*, Vol. 95, No. 450 (June 2000), pp. 573- 585; Rubin, Donald B. and Paul R. Rosenbaum, "Constructing a Control Group Using Multivariate Matched Sampling Methods that Incorporate the Propensity," *The American Statistician*, Vol. 39, No. 1, February 1985, pp. 33-38.

[8] See: Rubin, Donald B. "Bias Reduction Using Mahalanobis-Metric Matching," *Biometrics*, Vol. 36, No. 2, June 1980, pp. 293-298.

[9] Caliper is a maximum standard deviation of the distance measure permitted between matched groups.

[10] Austin, Peter C., "Optimal caliper widths for propensity-score matching when estimating differences in means and differences in proportions in observational studies." *Pharmaceutical Statistics*, vol. 10, no. 2, March/April 2011, pp. 150-161

The matching process produced a very closely matched comparison group. On each of the matching criteria there were wide differences between SAMI participants and the comparison universe before matching. For example, SAMI participants had a much higher share of males, were more likely to be younger, have lower levels of education, and more likely to have worked in blue-collar occupations than the 61,441 UI claimants in the comparison universe. The PSM matching method produced a matched comparison group of 298 UI claimants that was almost perfectly matched with SAMI participants. The gender, race, and age composition, educational attainment and occupational composition of the last job of the 298 UI claimants in the matched comparison group was almost the same as that of 298 participants in the SAMI program (Table 4).[11]

Table 4:
A Comparison of the Traits of SAMI Participants and the Comparison Universe, Before and After Propensity Score Matching

Characteristics	SAMI Participants	Comparison Universe		Difference (SAMI Minus Comparison)	
		Before Matching	After Matching	Before Matching	After Matching
All	298	61441	298	na	na
Gender					
Female	6.4	47.8	6.0	-41.4	0.3
Male	93.6	52.2	94.0	41.4	-0.3
Race-Ethnicity					
White	64.4	61.1	64.4	3.4	0.0
Non-White	24.5	24.6	24.5	-0.1	0.0
Missing race-ethnicity	11.1	14.3	11.1	-3.2	0.0
Age					
16-24	27.2	10.1	27.2	17.1	0.0
25-34	42.3	25.4	42.3	16.8	0.0
35-44	15.1	19.7	15.1	-4.6	0.0
45-54	11.1	21.6	11.1	-10.6	0.0
55-64	4.0	17.2	4.0	-13.2	0.0
65 or more	0.3	5.9	0.3	-5.6	0.0

[11] A comparison of the pre- and post-matching traits of the UI claimant comparison universe with those of SAMI participants is presented in Appendix Table A-2.

Characteristics	SAMI Participants	Comparison Universe		Difference (SAMI Minus Comparison)	
		Before Matching	After Matching	Before Matching	After Matching
Educational Attainment					
No High School Diploma	5.4	13.3	5.4	-7.9	0.0
High School Diploma/GED	48.3	42.2	48.3	6.2	0.0
13-15 Years of College	37.9	23.7	37.9	14.2	0.0
Bachelor's or higher degree	8.4	20.9	8.4	-12.5	0.0
Major Occupation on Last Job					
Management, Professional, Technical, Healthcare, High Level Sales	10.1	24.0	10.1	-13.9	0.0
Health Support, Protective Service, Food Preparation, Building and Ground Cleaning, and Personal Services	21.8	22.2	21.8	-0.4	0.0
Office and Admin. Support and Low-Level Sales	16.1	16.9	16.1	-0.8	0.0
Construction, Extraction, Installation, Maintenance, and Repair	14.1	8.5	14.1	5.6	0.0
Production	14.4	11.1	14.4	3.3	0.0
Transportation and Material Moving	12.8	9.0	12.8	3.8	0.0
Farming, Fishing, and Forestry , Military, Missing Occupations	10.7	8.3	10.7	2.4	0.0

Sources: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Claimant Data Files and SAMI Administrative Data; tabulations by the Center for Labor Markets and Policy, Drexel University.

Employment and Earnings Outcomes Included in the Evaluation

The net impact component of our evaluation is designed to measure the independent effect of SAMI program enrollment on the following three outcomes: 1) Stock employment rate or current employment rate, 2) current median wage, 3) percent of potential quarters employed (or flow employment rate). Among SAMI participants the three outcomes are measured for those participants who had exited the program at any time from 2014-Q1 to 2016-Q1. There were a total of 290 SAMI program exiters over this two year period.[12] For the comparison group these outcomes were measured for all 298 individuals selected in the matched comparison group.

[12] Eight early enrollees were excluded from the evaluation since they did not participate in the fully developed SAMI model. These individuals were enrolled from a much different population than most SAMI participants received substantially different treatments than all other SAMI participants, although we note that all of these excluded enrollees were employed at the end of their program.

The outcome “current employment rate” was measured from the employment status in the most recent quarter. At the time of this evaluation, the most recent quarter for which UI wage records data were available was the second quarter of 2016 (2016-Q2). The outcome “current median wage” was also based on the median wage for those employed in the most recent quarter. This outcome measures the median wage of SAMI participants and the comparison group in the second quarter of 2016.

The third outcome measure, “percent of potential quarters employed” provides a measure of actual quarters of employment relative to total potential quarters of employment. The definition of potential quarters of employment is different for the comparison group and SAMI participants. For the comparison group the potential quarters of employment is 10 quarters, from 2014-Q1 to 2016-Q2. So if a member of the comparison group was employed for 7 quarters between 2014-Q1 and 2016-Q2, the percent of potential quarters employed for this person would be 7/10=70%. The percent of potential quarters employed for the entire comparison group is the mean of the individual measures of the percent of potential quarters employed.

For SAMI participants, the potential quarters of employment vary by the quarter during which the participant exited the program. The potential quarters of employment is measured as the sum of quarters from the quarter after their program exit to the second quarter of 2016. For example, for a 2014-Q2 SAMI program exiter, the potential quarters of employment would be 2014-Q3 to 2016-Q2 = 8 quarters. If this exiter was employed for 4 quarters then the ‘percent of potential quarters employed’ would be 4/8=50%. We used this method to compute a ‘percent of potential quarters employed’ measure for each SAMI program exiter. The mean of these individual measures of the percent of potential quarters employed of all SAMI program exiters represent the ‘percent of potential quarters employed’ for the entire group of SAMI participants.

Estimates of Impact

Once the matched comparison group of 298 non-SAMI-participating UI claimants was selected, the matched comparison group and the entire list of SAMI participants were submitted to the RI DLT with a request for de-identified unit records data from the UI wage records

database.[13] The RI DLT provided us with de-identified unit records from the UI wage records data base for all quarters between the first quarter of 2014 and the second quarter of 2016 (the most recent quarter of data available).

The unit record UI wage records data base for SAMI participants and the comparison group was used to compute each of the three outcome measures for all SAMI participants who had exited the SAMI training program between 2014-Q1 and 2016-Q1 and for all 298 UI claimants in the matched comparison group. Among SAMI exiters we have provided separate measures of the three outcomes for: all exiters (including program completers and quitters - those who exited the program without completing), all program completers, and for welding program completers and machine program completers.

The three outcomes are presented for each of these subgroups of SAMI participants and the comparison group in Tables 5 through 10. These tables present each outcome separately for SAMI participants and the comparison group, the difference in the outcome between SAMI participants and the comparison group, and the statistical significance of this difference in the outcome. Since the comparison group was closely matched with SAMI participants, a statistically significant difference between the outcome of SAMI participants and the comparison group is attributable to the SAMI training program— it is the measure of the net impact of the SAMI program intervention.

Current Employment Rate

As noted above, the employment impact of the SAMI program was estimated by comparing the current employment rate of SAMI program exiters with that of the comparison group. The current employment rate was based upon their employment status in the most recent quarter—the second quarter of 2016.

All Exiters: Program Completers and Quitters

A total of 290 SAMI participants had exited the program between the first quarter of 2014 and the first quarter of 2016. During the second quarter of 2016, 223 out of these 290

[13] The de-identified unit record for each of the 61,441 UI claimants in was assigned a random ID by the RI DLT to allow RI DLT to identify these UI claimants in the UI wage records database. We provided the RI DLT with random IDs of the 298 UI claimants selected in the matched comparison group to identify these claimants in the UI wage records data base.

exiters were employed, yielding an employment rate of 76.9 percent. In contrast, only 196 members of the matched comparison group were employed in 2016-Q2, yielding an employment rate of just 65.8 percent. SAMI participants enjoyed an employment advantage of 11.1 percentage points during the current quarter (2016-Q2); this difference was statistically significant at the .01 level (Table 5).

All Program Completers

Out of 290 total exits that occurred over the life of the SAMI program, 281 had exited the program after completing the training while the remaining 9 had quit the program before completing the training. The 2016-Q2 employment rate of these 281 SAMI participants who had completed the training was slightly higher than the current employment rate of all SAMI exiters (including quitters). The 77.6 percent current employment rate of SAMI program completers was 11.8 percent points higher than that of the comparison group; the difference was statistically significant at the .01 level (Table 5).

Table 5:
Percent of SAMI Participants and the Comparison Group that were Employed in the Second Quarter of 2016

	Total Number	Number Employed in 2016-Q2	Percent Employed in 2016-Q2
SAMI Participants (Including all Exits—program completers and quitters)	290	223	76.9
Matched Comparison Group	298	196	65.8
Difference (percentage points)			**+11.1*** **
SAMI Participants (Including only program completers)	281	218	77.6
Matched Comparison Group	298	196	65.8
Difference (percentage points)			**+11.8*** **

*** sig. at .01 level, ** sig. at .05 level, * sig. at .10 level
Sources: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

The likelihood of being currently employed (2016-Q2) is considerably higher among SAMI program exiters than the matched comparison group. The employment impact of the

SAMI program for all exiters (including quitters) is estimated to be over 11.1 percentage points or nearly 17 percent higher than the comparison group, and 11.8 percentage points or nearly 18 percent higher than the comparison group among participants who had completed the training program (Table 5).

Welding and Machine Program Completers

We have estimated separate employment rate measures for SAMI participants in the machine and welding programs. The findings reveal a much higher rate of employment among participants in the welding program than the employment rate of their counterparts in the machine program. Out of 157 SAMI participants who completed the welding program, 126 or 80.3 percent were employed in 2016-Q2. The employment rate of welding program completers was 14.5 percentage points higher than that of the comparison group (80.3% versus 65.8%) (Table 6). In relative terms, this 14.5 percentage point impact represents an employment advantage of 22 percent (relative to 65.8 percent employment of the comparison group).

Table 6:
Percent of SAMI Participants and the Comparison Group that were Employed in the Second Quarter of 2016, by SAMI Training Program

	Total Number	Number Employed in 2016-Q2	Percent Employed in 2016-Q2
SAMI Welding Program Completers	157	126	80.3
Matched Comparison Group	298	196	65.8
Difference (SAMI minus matched comparison, percentage points)			**+14.5*** **
SAMI Machine program completers)	124	92	74.2
Matched Comparison Group	298	196	65.8
Difference (SAMI minus matched comparison, percentage points)			**+11.8*** **

*** sig. at .01 level, ** sig. at .05 level, * sig. at .10 level

Sources: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

Among the 124 participants who had completed training in the machine trades program, 92 were employed during the second quarter of 2016, representing an employment rate of 74.2 percent (Table 6). Although still considerably higher than the employment rate of the comparison group (65.8%), the employment advantage of SAMI participants who completed training in the machine program over the comparison group (8.4 percentage points or 12.7%) was smaller than that of their counterparts who had completed training in the welding program (14.5 percentage points or 22%). These measures of the employment rate impact for both groups (welding and machine program completers) were statistically significant at the .01 level (Table 6).

Current Median Wage

The impact of the SAMI program on earnings was estimated by comparing the current wages of SAMI program participants with that of the comparison group. The current wage measure is based on the 2016-Q2 earnings of SAMI participants and comparison group members who were employed during 2016-Q2. As noted in the previous section, the existence of a few outliers that can sway mean values for small numbers of observations led us to use the median wage to measure the earnings impact of the SAMI program. The median wage is the wage of the individual at the mid-point of the wage distribution whereas the mean wage is the arithmetic average of the all wages. Outliers have a much larger effect on the mean wage than the median wage.

All Exiters: Program Completers and Quitters

The median wage of the 223 SAMI program exiters who were employed in the second quarter of 2016 was $7,713. The comparison group had a median wage of $6,500 during the same quarter. The difference between the median wages of the two groups was $1,213. The difference was statistically significant at the .05 level. The earnings of SAMI participants were 18.6 percent higher than the earnings of the comparison group; representing a strong positive impact of the SAMI program on participant earnings.

All Program Completers

Excluding SAMI program exiters who had quit the program before completing, yields a slightly higher earnings impact. The median wage in 2016-Q2 of the 218 employed SAMI

participants who had completed the training program in which they had enrolled was $7,760; representing a median wage advantage of $1,260 over the comparison group. This represents a wage advantage of SAMI participants over the comparison group of 19.3 percent. This earnings impact was statistically significant at the .01 level (Table 7).

Table 7:
Median Wage of Employed SAMI Participants and the
Comparison Group in the Second Quarter of 2016

	Number Employed in 2016-Q2	Median Wage in 2016-Q2
SAMI Participants (Including all Exits—program completers and quitters)	223	$7,713
Matched Comparison Group	196	$6,500
Absolute Difference (SAMI minus matched comparison)		**+$1,213****
Relative difference		**+18.7%**
SAMI Participants (Including just program completers)	218	$7,760
Matched Comparison Group	196	$6,500
Absolute Difference (SAMI minus matched comparison)		**+$1,260*****
Relative difference		**19.4%**

*** sig. at .01 level, ** sig. at .05 level, * sig. at .10 level
Sources: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

Welding and Machine Program Completers

SAMI participants who had completed training in the welding program had a median wage of $8,368 during the second quarter of 2016. This median wage of the 126 welding program completers was $1,868 higher than the 2016-Q2 median wage of the comparison group; representing a relative median wage advantage of nearly 29 percent. This median wage advantage of SAMI welding program completers was statistically significant at the .01 level (Table 8).

Participants who had completed the machine training program also had a modest median wage advantage over the comparison group ($7,121 versus $6,500) that did not meet the standard

of statistical significance. In other words, we found no statistical difference between the median wage of machine program completers and the comparison group (Table 8).

Table 8:
The Median Wage of Employed SAMI Participants and the Comparison Group in the Second Quarter of 2016, by Training Program

	Number Employed in 2016-Q2	Median Wage in 2016-Q2
SAMI Welding program completers	126	$8,368
Matched Comparison Group	196	$6,500
Absolute Difference (SAMI minus matched comparison)		**+$1,868*** **
Relative difference		**+28.7%**
SAMI Machine program completers	92	$7,121
Matched Comparison Group	196	$6,500
Absolute Difference (SAMI minus matched comparison)		**+$621**
Relative difference		**9.6%**

*** sig. at .01 level, ** sig. at .05 level, * sig. at .10 level

Sources: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

Percent of Potential Quarters Employed

As noted in a previous section, we have developed a third outcome measure that takes into account the employment status of SAMI participants and the comparison group over a longer time period—over ten quarters (2014-Q1 to 2016-Q2) for the comparison group and over all quarters after program exit to 2016-Q2 for SAMI program participants. Among SAMI participants this measure is a gauge of their employment over a range of 1 to 9 quarters depending on when they exited the SAMI training program. The percent of potential quarters employed is computed for each participant and comparison group member and the mean of the individual values of the percent of potential quarters employed represents the percent of potential quarters employed for the entire group.

All Exiters: Program Completers and Quitters

On average, SAMI participants were employed for nearly 80 percent of all quarters after their exit from the training program. The average percent of potential quarters employed among the matched comparison group was 72.9 percent. This means that on average members of the comparison group were employed for less than three-quarters of their potential employment during the 10 quarters between 2014-Q1 and 2016-Q2. Not only were SAMI participants more likely than the comparison group to be employed at a given point in time (during the most recent quarter, 2016-Q2) but they were also employed during more of their potential quarters of employment than the comparison group. The difference of 6.6 percentage points represents an advantage of 9 percent relative to the comparison group that was statistically significant at the .01 level (Table 9).

Table 9:
Percent of Potential Quarters Employed among
SAMI Participants and the Comparison Group

	Total Number	Percent of Potential Quarters Employed
SAMI Participants (Including all Exits—program completers and quitters)	290	79.5%
Matched Comparison Group	298	72.9%
Difference (percentage points)		**+6.6*** **
SAMI Participants (Including only program completers)	281	80.2%
Matched Comparison Group	298	72.9%
Difference (percentage points)		**+7.3*** **

*** sig. at .01 level, ** sig. at .05 level, * sig. at .10 level
Sources: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

All Program Completers

The percent of potential quarters employed among SAMI participants who had completed their training program was slightly higher, 80.2 percent representing an advantage of 7.3 percentage points over the comparison group that was statistically significant at the .01 level (Table 9). Program completers had better employment and wage outcomes that those who had

quit the SAMI training program without completing. Most program exiters (281 out of 290) had completed the program in which they were enrolled. Only 9 exiters had quit the training program before completion (Table 9).

Welding and Machine Program Completers

As with the previous two outcomes, SAMI participants who had completed the welding training program outperformed their machine program counterparts on the outcome measure of percent of potential quarters employed (81.5% versus 78.6%). Relative to the comparison group, the percent of potential quarters employed among welding program completers was 8.6 percentage points or nearly 12 percent higher (81.5% versus 72.9%) (Table 10).

Machine program completers also outperformed the comparison group on this measure. Machine program completers were employed for 78.6% of all potential employment (post-exit) quarters; these completers outperformed the comparison group by nearly 6 percentage points or nearly 8 percent. The difference in the percent of potential quarters employed between the comparison group and SAMI machine program completers was statistically significant at the .10 level (Table 10).

Table 10:
Percent of Potential Quarters Employed among SAMI Participants and the Comparison Group, by SAMI Training Program

	Total Number	Percent of Potential Quarters Employed
SAMI Welding Program Completers	157	81.5%
Matched Comparison Group	298	72.9%
Difference (SAMI minus matched comparison, percentage points)		**+8.6*** **
SAMI Machine program completers	124	78.6%
Matched Comparison Group	298	72.9%
Difference (SAMI minus matched comparison, percentage points)		**+5.7***

*** sig. at .01 level, ** sig. at .05 level, * sig. at .10 level
Sources: Labor Market Information Unit, Rhode Island Department of Labor and Training, derived from Unemployment Insurance Taxable Wage Record Data Files, September, 2016; tabulations by the Center for Labor Markets and Policy, Drexel University.

Summary of Net Impact Findings

SAMI program participants outperformed the comparison group on all three measures of labor market outcomes. The 2016-Q2 employment rate of SAMI exiters was 11.1 percentage points or nearly 17 percent higher than that of the comparison group (76.9% vs 65.8%). The 2016-Q2 median wage of employed SAMI exiters was $1,213 or nearly 19 percent higher than the median wage of employed members of the comparison group during the same quarter. And SAMI participants were employed for 79.5 percent of the total potential quarters of employment after program exit; nearly 7 percentage points or 9 percent higher than the 72.9 percent of potential quarters employed among the comparison group.

All three measures of impact were sizable and statistically significant. The size of the impact on each of the three outcome measures was slightly higher among exiters who had completed the SAMI program than the outcomes for all program enrollees including those who had quit the SAMI training program before completion. The small difference between the outcomes of all exiters and exiters who had completed the program is the product of a very high program completion rate so that

Estimates of impact were higher among those who had completed training in the welding program than their machine program counterparts. The 2016-Q2 employment rate of welding program completers was 14.5 percentage points higher than that of the comparison group. Machine program completers outperformed the comparison group on the 2016-Q2 employment rate by 11.8 percentage points. The 2016-Q2 median wages of employed welding program completers exceeded the median wages of the comparison group by $1,868 or nearly 29 percent, whereas employed SAMI machine program completers earned slightly higher wages than the comparison group during 2016-Q2 but the difference was not statistically significant. And, on the measure of the percent of potential quarters employed, SAMI welding program completers outperformed the comparison group by 8.6 percentage points while graduates of the SAMI machine program outperformed the comparison group by 5.7 percentage points.

Appendix A

Appendix Table A-1: Variables Used in Propensity Score Matching

(1) Gender
Male
Female

(2) Race
White, non-Hispanic
Non-White:
  Black, non-Hispanic
  Asian, non-Hispanic
  All other races
Missing races

(3) Age
16-24
25-34
35-44
45-54
55-64
65+

(4) Educational Attainment Level
< 12 or 12, no high school diploma
High school diploma/GED
13-15 years of college, including vocational certifications and Associate's degree
Bachelors or higher degree

(5) Occupation
For SAMI participants, 8-digit SOC codes were used to identify participants' job titles. In Rhode Island's UI claimant comparison group file, 8-digit SOC codes were available for UI claimants. The occupations codes were missing for nearly 11 percent of UI claimants and 8 percent of SAMI participants. The seven aggregated occupational classifications that were used in performing propensity score matching and the detailed occupations that comprise each of these aggregates are presented below.

Group/SOC (2-Digit)	Major Occupation Title
(a) Management, Professional, Technical, Healthcare, High Level Sales	
11	Management
13	Business and Financial Operations
15	Computer and Mathematical
17	Architecture and Engineering
19	Life, Physical, and Social Science

21 Community and Social Services
23 Legal
25 Education, Training, and Library
27 Arts, Design, Entertainment, Sports, and Media
29 Healthcare Practitioner and Technical
41 High-Level Sales Occupations

(b) Health Support, Protective Service, Food Preparation, Building and Ground Cleaning, and Personal Services

31 Healthcare Support
33 Protective Service
35 Food Preparation and Serving
37 Building and Grounds Cleaning
39 Personal Care and Service

(c) Office and Admin. Support and Low-Level Sales

41 Low-Level Sales
43 Office and Administrative Support

(d) Construction, Extraction, Installation, Maintenance, and Repair

47 Construction and Extraction
49 Installations, Maintenance, and Repair

(e) Production

51 Production Occupations

(f) Transportation and Material Moving

53 Transportation and Material Moving

(g) Farming, Fishing, and Forestry , Military, Missing Occupations

45 Farming, Fishing, and Forestry
55 Military
Missing Occupations