

Mayor's Office for Economic Opportunity Independent Evaluation

Return on Investment Analysis of Industry-Focused Job Training Programs

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NYC Opportunity Response to Westat Evaluation of NYC Job Training Programs

January 2020

With low unemployment rates but growing inequality, national, state, and local policymakers are actively seeking effective strategies to help low-wage workers enter and advance in the labor market. Hard skill occupational training aligned with industry demand is an effective strategy that has increasingly been found to lead to higher job placements and better wages, as well as meet employer needs. While this strategy has growing support, it also comes with a higher cost than standard job matching programs.

This report, *Return on Investment Analysis of NYC Job Training Programs*, analyzes the economic value of investing in job training services for New Yorkers and demonstrates that the NYC Department of Small Business Services' (SBS) job training programs generate higher returns for participants, taxpayers, and society than job matching alone. Previous NYC Opportunity reports assessing innovative workforce strategies have also documented that hard skills job training has measurable impacts on participants.ⁱ

The de Blasio administration has ambitious goals to help more New Yorkers enter quality employment. In 2014, New York City's Office of Workforce Development released the *Career Pathways: One City Working Together* report, which articulates a clear vision for improving the outcomes of the City's workforce development programming and policies. Rather than focusing on immediate job placement (or "rapid attachment"), *Career Pathways* recommends investing in career advancement, high-quality employment, and economic mobility for New Yorkers. *Career Pathways* includes a commitment from the City to substantially increase the numbers of New Yorkers receiving training.

To better understand the trade-offs involved in investing in skills training, NYC Opportunity partnered with Westat to measure the effectiveness of NYC job training programs using a return on investment (ROI) analysis. Westat compared the post-training earnings of participants in six types of industry-focused training initiativesⁱⁱ to those of a matched comparison groupⁱⁱⁱ of SBS's Workforce1 Career Center (known nationally as American Job Centers) clients who did not receive training. The training participants observed in this study were active in 2014 and 2015. Westat found that training recipients earned \$1,436 to \$3,067 more than the matched comparison group members in the second quarter after program exit, resulting in large estimated differences when multiplied across a full year of earnings. Outcomes were projected to five and 10 years after program exit with similar results, demonstrating that industry-focused training has a strong, positive impact on earnings.

Westat measured ROI from the perspectives of the participants, taxpayers, and society, the last of which includes the costs and benefits from both the participant and taxpayer analyses. All six programs had positive ROIs for participants, taxpayers, and society over 10 years.^{iv} From a societal perspective, investing one dollar in job training through these programs yielded between \$2.80 and \$17.78 after five years compared to if that dollar had been invested in a standard job screening and matching program.

Additional key findings include:

- All of the job training programs led to statistically significant increases in earnings for participants compared to standard career center services.
- All trainings for which participant ROIs could be measured had positive returns in both the five- and 10-year ROI estimates.^v

ROI studies face challenges with data availability and completeness, as well as with making assumptions to estimate costs and benefits. To account for the possibility of overstating benefits, Westat made conservative assumptions and conducted sensitivity analyses to assess the study design's impact on the findings.

With limited public workforce funds and a large need for employment services to help low-wage workers obtain quality jobs, government must be strategic in investing in strategies that have proven impact. This study adds to the evidence base showing that quality employer-informed hard skill training, despite having a higher cost per person than job search and matching assistance, pays off for participants and taxpayers.

This study focuses on the economic returns of training, and provides further evidence that it is worth investing in this strategy despite its higher cost. We know there are many additional benefits to quality employment that were not factored into this analysis – the positive impacts on children and communities of having workers with better incomes, the mitigation of mental health impacts related to unemployment, and countless others. Taken together, these returns attest to the high value and impact of quality training, and that it is a cost-effective government investment.

To further enable data-driven workforce decision-making in the City, NYC Opportunity is building a new research platform that will integrate data from city and state workforce agencies to track training outcomes. This system uses state wage data and common metrics established by the City to measure workforce outcomes the same way across City programs. The platform will better equip program planners and decision makers with the tools to understand what programs work best for whom, how clients move between programs, and how clients fare after leaving programs. We look forward to sharing this information with the field as the project develops.

David Berman
Director of Programs and Evaluation

NYC Opportunity is a unit of the Mayor's Office of Operations that uses evidence and innovation to reduce poverty and increase equity. It advances research, data and design in New York City's program and policy development, service delivery, and budget decisions. Our work includes analyzing existing anti-poverty approaches, developing new interventions, facilitating the sharing of data across City agencies, and rigorously assessing the impact of key initiatives. All work is guided by our commitment to three core principles: equity, evidence, and innovation

ⁱ In 2014, NYC Opportunity, in partnership with Westat, published two evaluations of NYC job training programs: *Sector-Focused Career Centers Evaluation: Effects on Employment and Earnings After One Year* and *Evaluation of the NYC Business Solutions Customized Training Program*. Both evaluations can be found on NYC Opportunity's [website](#).

ⁱⁱ The programs included in this analysis were Individual Training Grants, Healthcare Sector Cohort Trainings, Industrial and Transportation Sector Cohort Trainings, the Tech Talent Pipeline, the Customized Training Program, and the On-the-Job Training Program.

ⁱⁱⁱ Participants were matched based on demographic characteristics and work and earnings histories using data from Small Business Services, the New York State Department of Labor, and the Human Resources Administration.

^{iv} The Tech Talent Pipeline cohort was the only program that yielded a negative return in any of the ROI analyses: a negative return of -\$0.30 to the taxpayer in the five-year projection. While it had a positive ROI for participants, the negative taxpayer ROI stemmed from the high cost of the program relative to alternatives.

^v The Customized Training and On-the-Job Training programs did not have a participant ROI because participants in these programs had no costs associated with program participation (participants received salaries while in training).

Executive Summary

While the U.S. economy recovered from the Great Recession of 2007-09, the labor market has restructured in fundamental ways. First, there is a proliferation of low-skill, low-wage jobs that offer workers little prospect for advancement. Individuals with no more than a high school education have seen their wages remain flat in real terms for decades, and their employment is often unsteady (Schmitt & Jones, 2012). Given the fact that low-skilled workers have difficulty obtaining jobs that offer higher wages, programs that train individuals in areas that match the skills demanded by employers can be highly advantageous, as they potentially benefit both workers and employers.

The City of New York's Career Pathways report, released in November 2014, calls for a major reorientation in the workforce system away from an emphasis on immediate job placement toward education and training for careers in high demand industries that offer advancement potential. As part of its effort to expand promising workforce training initiatives, the Mayor's Office for Economic Opportunity (NYC Opportunity) contracted with Westat and Metis Associates to conduct a formal return on investment (ROI) analysis of industry-focused job training initiatives managed by the NYC Department of Small Business Services (SBS). Westat conducted the data analysis, and Metis contributed to report writing. The specific training initiatives that were examined in this study included:

- Individual Training Grants (ITGs);
- Healthcare sector trainings (trainings developed after the release of the Career Pathways report were designed with NYC Alliance for Careers in Healthcare [NYACH]);
- Industrial and construction sector trainings (trainings developed after the release of the Career Pathways report

were designed with the Industrial Partnership);

- Tech sector trainings informed by the NYC Tech Talent Pipeline (TTP);
- Customized Training (CT) Program; and
- On-the-Job Training Program (OJT) (New Skills, New Jobs Program).

Training Occupations

Individual Training Grants: Bus and Truck Drivers, Commercial Drivers, Certified Nursing Assistant, Clinical Medical Assistants, Computer Support Specialists, Computer Systems Analyst, Network and Computer Systems Administrators, and Security Guards

New York Alliance for Careers in Healthcare: Dental Anesthesia, Dental Assistant, Home Health Aide, Medical Assistant, Paramedic, Patient Care Technician, Pharmacy Technician, and Registered Nurse

Industrial Partnership: Carpentry/Woodworking, Electrician/Cable Installation, Principles of Supervising, School or Intercity Bus Driver, and Welding

NYC Tech Talent Pipeline: Advanced Web Development

Job Training Programs

The study includes a diverse array of job training programs. These programs feature industry-focused training as key component in helping jobseekers address educational needs and develop high-demand skills. These programs are built on a sectoral strategy, which

leverages industry partners and aligns job training with the needs of employers.

ITGs provide qualified individuals with vouchers to pay for select occupational training programs in in-demand occupations with local colleges, public providers, and private providers of one's choice. Cohort trainings are provided through collaboration with Sector-Focused Career Centers (SFCCs), industry partnerships, and other stakeholders. Trainings are provided to a group of individuals by a single college or provider. The Workforce1 Healthcare SFCC, working with NYACH, the City's healthcare industry partnership, provides training for jobs in the healthcare field. The Workforce1 Industrial SFCC provides training for jobs in manufacturing, construction, wholesale trade, transportation and warehousing, waste management, and automotive repair and maintenance. Tech training is informed by TTP, which works with industry partners to develop and provide training in technology to low-income New Yorkers. SBS closely monitors the performance of its sectoral training programs and modifies training program offerings in favor of those that show promising results and continued alignment with industry need. CT supports low-wage incumbent workers by covering the majority of training costs for businesses that pledged to raise wages for participating workers. Finally, OJT helps employers recruit qualified candidates and provides grants to cover 70 percent of up to 280 hours of training for new employees. CT and OJT support local employers in contributing to the economic development of the City by upskilling their incumbent workforce, onboarding their new hires, and reinvesting some of their business' profits back into their own workforce.

ROI Methodology

The analysis uses data on FY 2014 and 2015 training program participants provided by SBS and linked administrative data on employment and earnings, unemployment insurance (UI), Supplemental Nutrition Assistance Program (SNAP), and Cash Assistance (CA) benefits through Q2 of 2016. Impacts were measured in the second full quarter after exit to allow time for job search. ROI estimates are based on net impacts from comparison groups derived using propensity score matching. Propensity score matching seeks to create program and comparison groups that are similar on demographic and labor market characteristics that may influence the outcomes. The differences in earnings and public assistance between the program and matched comparison groups in the second full quarter after exit from training are taken as the estimates of the benefits. Workforce1 Career Center (WF1CC) participants who did not participate in training served as the comparison group. The impacts represent the incremental impacts of training over and above receipt of job search services.

The main challenge of most ROI analyses, including the present one, is to extrapolate the returns beyond the observation period. Returns were projected for 5-year and 10-year periods. Several possible scenarios may characterize the patterns of impacts over time. First, training participants may maintain a stable advantage over the comparison group over time. Second, training participants may increase their earnings relative to the comparison group over time. Finally, the impacts of training may decay such that the comparison group eventually "catches up" to the training group. Literature on job training supports all three of these possibilities. In this study, the earnings trajectories were extrapolated using data on earlier cohorts of

training program participants.¹ Different projections were used for each training program based earnings trajectories observed in the earlier cohorts. While the earlier cohorts of participants received training in different occupations within the same industries, they were similar enough that earnings trends could reasonably expect to hold true for later cohorts. If the earnings increased in the earlier cohorts, conservative assumptions were made and earnings were projected to have no decay. If earnings decreased in the earlier cohort, earnings were projected to decay at a similar rate.

This report provides estimates of the net returns of job training to participants, taxpayers, and society.

The **participant perspective** focuses on the monetary costs and returns to participants. Costs to participants are minimal because the training is provided for free. Although for some training programs participants may reduce work hours to attend training, most trainings are relatively short, so foregone earnings is not likely to be a major cost. Foregone earnings are calculated as the difference in earnings between participants and the comparison group while participants are enrolled in training. For participants, the benefits of participation include higher earnings and fringe benefits, net of any increases in taxes reductions in public assistance. Employers also experienced benefits and costs, but this study was unable to include them due to a lack of data.

The **taxpayer perspective** measures whether the government realized a net return as a result of its investment. The costs of job training programs include the cost of providing services. Benefits include increased revenue in the form of federal, state, and local taxes and

decreased expenditures due to uptake of public assistance programs.

The **societal perspective** takes into account the costs and benefits of both participants and taxpayers. It is the sum of costs and benefits to both of these groups. The costs of job training to society include foregone earnings and program costs. The benefits of job training include participant earnings and fringe benefits. Increased tax payments and reduced public assistance are “netted out” of the societal perspective because these are transfers from one group to another.

The ROI analysis is limited to costs and benefits which could be monetized. No attempt was made to measure or assign monetary values to benefits such as quality of

$$\text{ROI (\$)} = \frac{\text{Net Program Benefits}}{\text{Program Costs}}$$

life as a result of employment or impacts on the wider economy.

The ROI is simply the net benefits divided by the cost. The net benefits are benefits minus program costs. The ROI is the expected return for every dollar invested. Thus, if a program has a ROI of \$1.50, that means the original dollar invested is paid back, plus an additional \$1.50.

Net Impacts

Table ES.1 displays the net impacts of the programs on outcomes in the 2nd full quarter after exit. The impact is the difference in the outcome between the training program participants and the matched comparison group. The impacts represent the value added of training over and above job search (as provided to the matched WF1CC participants).

¹ Earlier cohorts were available for ITG, industrial, healthcare, and CT program participants. For Tech and OJT

participants, earnings were projected to remain constant because most of the FY 2010 to 2011 impacts for the other programs were observed to be constant.

For example the value of 13.8 for employment for ITGs indicates that ITG participants were 13.8 percentage points more likely to be employed in the second quarter after exit than the matched WF1CC group.

The one exception is for CT, which represents the difference in the outcome before and after the program.

- All of the training programs had significant positive impacts on earnings, and most had positive impacts on employment.
- Three of the six programs—ITGs, Healthcare, and Tech—significantly reduced UI receipt. ITGs and Healthcare significantly reduced UI benefit amounts. OJT significantly increased both UI receipt and benefit

amounts. This suggests that OJT participants may be more likely to qualify for UI because they have more work experience.

- Only two programs—Industrial and Healthcare—had significant impacts on CA receipt. Only Industrial had a significant impact on CA benefit amount. Many of the programs were associated with reduced CA but the impacts were small and not significant.
- There were few impacts on SNAP benefits. Only Tech had a significant impact on SNAP receipt and none of the training programs had a significant impact on SNAP benefit amount. Again, many of the impacts were in the expected direction but not significant.

Table ES.1. Differences in Earnings and Public Assistance Receipt between Job Training Program Participants and Matched WF1CC Participants, 2nd Post-Exit Quarter

	ITGs	Industrial Cohort	Health-care Cohort	Tech Cohort	CT	OJT
Employment (%)	13.8*	13.2*	23.3*	-4.4	11.3	9.2*
Earnings(\$)	1,436*	3,067*	2,102*	2,931*	1,994*	2,310*
Received UI (%)	-5.9*	0.1	-7.0*	-5.1*	0.0	6.5*
Average UI benefits (\$)	-107*	8	-116*	-84	-14	103*
Received CA (%)	0.0	-4.4*	-4.0*	-1.5	0.0	-1.2
Average CA benefits (\$)	-7	-65*	-24	-7	-3	-8
Received SNAP (%)	0.0	-4.4	-4.0	-6.6*	-2.0	-3.8
Average SNAP benefits (\$)	3	15	14	-23	-17	-48

Note: Each entry represents the mean difference in the outcome between the job training program participants and the matched WF1CC participants.

* Indicates significant difference at the .05 level. Impacts are in 2016\$.

ROI Results

Table ES.2 summarizes the costs, returns, and ROI for each job training program for each of the three accounting perspectives used in the

study. ROIs are presented as dollar-per-dollar returns. A brief summary of the ROI for each job training program is provided below. ROIs give the return on top of WF1CC job matching services.

Table ES.2. Summary of Costs, Returns, and 10-Year ROI

Participant	ITG	Industrial	Healthcare	Tech	CT	OJT	All
Costs (\$)	252	1,473	324	1,615	0	-1,515	222
Returns (\$)	54,234	74,878	80,551	107,994	75,119	90,176	65,269
ROI (\$)	214.56	49.84	247.51	65.85	na	na	292.68
Taxpayer							
Costs (\$)	2,553	5,007	5,117	16,105	2,815	4,338	3,628
Returns (\$)	9,335	14,324	12,501	21,732	13,162	12,060	10,963
ROI (\$)	2.66	1.86	1.44	0.35	3.68	1.78	2.02
Society							
Costs (\$)	2,805	6,480	5,441	17,720	2,815	2,823	76,224
Returns (\$)	63,569	89,202	93,051	129,727	88,281	102,236	3,850
ROI (\$)	21.67	12.77	16.10	6.32	30.36	35.21	18.63

Note: Costs to participants include foregone earnings. Costs to taxpayers include program costs such as staffing at the training provider. Returns to participants include earnings and fringe benefits. Returns to taxpayers include increased tax payments from participants and reduced cash assistance and Supplemental Nutrition Assistance Program. Returns are in 2016 Q2 dollars. Negative costs to participants indicate that participants earn more than the comparison group while in training. The placeholder "na" indicates that participant ROI could not be calculated due to zero or negative foregone earnings. ^a Indicates significant difference at the .05 level. Impacts are in 2016\$.

**Industry-Focused Job Training Programs
Led to Increases in Earnings for
Participants and Positive Returns to
Taxpayers and Society**

All of the job training programs led to statistically significant increases in earnings for participants compared to a standard job matching program. (Table ES.1)

Averaged across all programs, the 10-year ROIs for participants, taxpayers, and society were \$292.68, \$2.02, and \$18.63, respectively. (Table ES.2)

All of the training programs produced considerable benefits for participants. Participant returns over the 10-year period ranged from \$54,234 to \$107,994. The primary sources of returns for participants are increased earnings and fringe benefits. (Table ES.2)

All but one of the programs yielded a positive ROI for taxpayers during the 5-year period and all of the programs yielded a positive ROI during the 10-year period. The 10-year taxpayer returns ranged from \$0.35 to \$3.68 for every dollar invested by taxpayers in the program. (Table ES.2)

All of the programs had a positive ROI from the societal perspective. This occurred because the earnings gains for participants exceeded the cost to taxpayers. Societal ROIs ranged from

books, and supplies are generally covered by the ITG voucher. Over the 10-year period, total returns equal \$54,234 in increased earnings and fringe benefits. Because costs to participants are so low, the participant return to ITGs is very high. Every dollar invested in ITGs is associated with returns to taxpayers of \$2.66 over 10 years – this is the marginal return on top the returns of investing in WF1CC.

Healthcare Sector Training. Healthcare training participants also have small foregone earnings of \$324. Participation increases earnings, and so, again, the ROI to participants is high. Over the 10-year period, total returns for participants in present value are \$80,551. Healthcare training costs the taxpayer an average of \$5,117 per participant. Healthcare training programs reduce UI benefits and CA and increase tax revenues to the tune of \$12,501 over the 10-year period. From the taxpayer perspective, healthcare training has a positive ROI of \$1.44 over the 10-year period over WF1CC.

Industrial Sector Training. Compared to Healthcare training participants, Industrial trainings participants have higher foregone earnings of \$1,473. However, participation also increases earnings so that the ROI to participants is positive. Total 10-year present value returns to participants is \$74,878. The cost to the taxpayer of industrial-sector training is an average of \$5,007 per participant. Participation in Industrial trainings reduces CA and increases tax payments. Total present value returns to taxpayers are \$14,324 over the 10-year period. This results in an ROI of \$1.86 to taxpayers.

Tech Sector Training. There are substantial foregone earnings for participants in Tech training in the amount of \$1,615. These trainings tend to last several months, and participants earned less than the comparison

Individual Training Grants. Participant costs are \$252, reflecting small foregone earnings as most participants had very low earnings at entry. For most recipients, there are no other costs to participants since tuition,

group during this time.² Total returns to participants over the 10-year period are \$107,994. Participation increases earnings, resulting in a positive ROI to participants. Participation in Tech training reduces UI, SNAP, and CA and increases tax payments. Total returns to the taxpayer in present value at 10-years are \$21,732. Every dollar invested by taxpayers results in a \$0.35 return over the 10-year period.

Customized Training. For participants, there are no foregone earnings associated with CT because they are incumbent workers and training is paid by employers or a third-party provider while participants are employed. Total returns to participants are \$75,119 over 10 years. CT programs reduce UI, SNAP, and CA benefits and increase tax revenues. CT programs result in a taxpayer ROI of \$3.68 over the 10-year period.

On-the-Job Training Program. OJT participants actually earn more during the program because they are working, which results in a negative cost to participant. Total returns to participants are \$90,176. OJT reduces SNAP and CA and increases tax revenue. Taxpayers receive \$1.78 for every dollar invested in OJT over the 10-year period.

All Programs. Net benefits and costs were averaged across the six job training programs to calculate an overall ROI. Because the number of participants in each training program varied considerably, a simple average was not used as this would give large and small programs equal weight. Instead, net benefits and costs for each program were weighted by the number of participants in the program. The advantage of a weighted average is that it takes into account each program's contribution to the overall net benefits and costs. The 10-year

ROIs for participants, taxpayers, and society were \$292.68, \$2.02, and \$18.63, respectively.

Sensitivity Analysis & Limitations

Due to data limitations, several assumptions had to be made in the estimates. One major assumption was the impacts on earnings beyond the period observed in the study. A sensitivity analysis forced the impacts to decay to zero by the end of year 6. While there were changes in magnitude, under the assumption of full decay by year 6, three of the six training programs maintained positive taxpayer ROIs. Taxpayer ROIs for Healthcare and Tech trainings, which have high program costs, became negative.

Because the impact estimates came from a non-experimental design, a second sensitivity analysis assumed that only 50 percent of the impacts were due to the true effect of training. In other words, the impact estimates were reduced by 50 percent to account for potential selection bias. The 10-year taxpayer ROIs for all of the programs except Tech training remained positive.

The results of this ROI study should be tempered by the limitations of the data. First, while the impacts on earnings were significant for all of the training programs, most of the impacts on UI, SNAP, and CA were not statistically significant, potentially due to small sample sizes that limited the study's power to detect differences. Second, the trajectory of impacts after the short observation period was projected using data from earlier cohorts of job training participants who were trained in different occupations within the same industry. Third, it is possible that there may have been differences between the participants and

² One of the Tech training programs included in this study provided a paid internship to students. However, this type of income is typically not subject to UI taxes and is not reported in NYSDOL wage data. Therefore, when combined with

other programs that did not pay participants, there are foregone earnings overall. We chose to include these foregone earnings so that our estimate of participant returns for Tech training would be more conservative.

matched comparison groups on factors that influence earnings, such as motivation, that could not be observed. Finally, due to the small number of participants in most of the training programs, it was impossible to examine impacts for individual occupations.

Implications

Despite these limitations, the results generally indicate that the SBS job training programs result in a positive ROI to participants and taxpayers under different assumptions. This suggests that the strategies used by the job training programs to tie training to local labor market demand—including sectoral strategies, incumbent worker training, and on-the-job training—were successful at helping low-wage

workers increase their earnings while in some reducing their utilization of public assistance.

While training is more expensive than job placement, policymakers should invest more money in training because training may produce longer-lived impacts on earnings. We recommend that a future study gather long-term follow-up data on participants to calculate ROI that is based more in observed data. That study should also assess benefits that were not included in this study, such as reduced Medicaid and criminal justice costs. ROI estimates are one piece of information that NYC Opportunity can include, along with performance metrics, in its budgetary decisions about funding levels for various job training programs.

I. Introduction

The past 40 years have seen several changes that have caused economic hardship for American workers and their families. Workers with no more than a high school diploma have seen a serious decline in earnings (Homer et al., 2008; Greenstone and Looney, 2011) along with little or no change in the probability of upward mobility: among those born in 1986, only 8 percent of those with parents in the bottom income quintile will reach the top quintile, a probability unchanged from the 1971 cohort (Chetty et al., 2014). In addition to low wages, these workers usually experience unstable employment (Mishel, Bernstein, and Shierholz, 2009; Sum and Khatiwada, 2010; Thiess, 2012) and have fewer points of entry to jobs with the potential for advancement (Osterman, 1999). At the same time, many employers are having difficulty filling so-called middle-skill jobs—those that require more than a high school diploma but less than a four year degree (Holzer and Lerman, 2007). Over the next several years, a number of industries requiring middle skills jobs are expected to grow and workers will require specific preparation and training tailored to meet the needs of employers.

Recent studies suggest that sector strategies that align job training with the needs of employers can be effective. The Sectoral Employment Impact Study (SEIS), a random assignment study of three sectoral training programs, found that in the 24 months after random assignment, trainees had significantly higher annual earnings (about \$4,500) than those in the control group (Maguire et al., 2010). The WorkAdvance study, a randomized controlled trial (RCT) of four demand-driven, sector-focused training programs, had similar results (Hendra et al., 2016). The four WorkAdvance sites helped participants earn 14 percent more in the two years after they entered the program, with larger and more

consistent impacts for programs with more experience operating sector-based training.

NYC’s Career Pathways report, released in November 2014, calls for a major reorientation in the workforce system away from an emphasis on immediate job placement toward education and training for careers in high demand industries that offer advancement potential (NYC, 2014). Specific recommendations include tripling the City’s training investments to \$100 million annually by 2020, the development of industry partnerships to focus on training New Yorkers for jobs with career potential, and bridge programs to provide jobseekers with needed skills to entry level positions or to advance to training. In response, the City formed five Industry Partnerships: the New York Alliance for Career in Healthcare (NYACH) in 2011, the NYC Tech Talent Pipeline (TTP) in 2014, the Construction Industry/Industrial Industry Partnership in 2016, and the NYC Food and Beverage Hospitality Council in 2016.

However, little is known about the return on investment (ROI) of job training for low-wage workers. For example, a recent Government-wide review of federal employment and training programs led by Vice President Joe Biden concluded that although there is little question that occupational training improves outcomes, “...quantitative estimates on the return-on-investment to firm training in the U.S. are limited, due in large part to a lack of standardized measures and publicly-available data, particularly on the direct costs of training” (U.S. Department of Labor, 2014:7).

As part of its effort to expand promising job training initiatives, NYC Opportunity contracted with Westat and Metis Associates to conduct a formal ROI evaluation of a select set of industry-focused job training initiatives managed by NYC Department of Small Business Services (SBS). This work built

directly on previous analyses Westat conducted of training provided by the Healthcare and Industrial Workforce1 Sector Focused Career Centers (SFCCs). The previous study found that participation increased earnings by more than \$5,000 in the year after exit compared to a matched comparison group (Gasper et al., 2017). The specific training initiatives that were examined in this study included:

- Individual Training Grants (ITGs);
- Healthcare sector trainings (trainings developed after the release of the Career Pathways report were designed with NYC Alliance for Careers in Healthcare [NYACH]);
- Industrial and construction sector trainings (trainings developed after the release of CP were designed with the Industrial Partnership);
- Tech sector trainings informed by the NYC Tech Talent Pipeline (TTP);
- Customized Training (CT) Program; and
- On-the-Job Training Program (OJT) (New Skills, New Jobs Program).

Several of these training programs were built upon the successful SFCC strategy which leverages both Workforce1 Career Center (WF1CC) and industry partners. SBS job training programs are developed in consultation with industry partners and decisions about whether to continue training programs are based on review of program performance metrics and employer demand.

The goal of the analysis was to examine the impact of job training from participant, taxpayer, and societal perspectives. The main interest was in the impact of receiving training (and possibly other services) rather than just job placement services. The analysis included participants who entered training in FY 2014 and FY 2015. The analysis used program participant data provided by SBS linked to administrative data on employment and earnings, unemployment insurance (UI), Supplemental Nutrition Assistance Program (SNAP), and Cash Assistance (CA) from 2008 Q3 to 2016 Q2. Outcome data were available for three quarters after exit from training for all participants.

2. Overview of Job Training Programs

The WF1CC system within SBS is an integrated network of 20 Career Centers whose mission is to fulfill business customers' hiring and training needs by preparing and placing the most qualified individuals in their job opportunities. "Workforce1" is the City's branding of its Workforce Investment and Opportunity Act (WIOA)-funded career centers which are known nationally as "one-stops" or American Job Centers. WF1CCs include two SFCCs, the Workforce1 Healthcare Career Center and Workforce1 Industrial Career Center. In the SFCCs, services are tailored to align with the specific needs of each targeted industry.

NYC has begun reorienting the workforce development system away from an emphasis on immediate job placement toward education and training for careers in high demand industries that offer advancement potential (NYC, 2014). With the support of NYC Opportunity and other partners, SBS has developed several programs that feature industry-specific training as a key component in helping jobseekers address educational needs and develop high-demand skills. Each of these programs incorporates one or a combination of three approaches commonly used in sector-based programs to achieve systemic changes for a large number of low-income workers and businesses in a targeted sector: 1) altering the way companies recruit, pay, and promote workers (Elliott & King, 1999); 2) providing skills training and job placement services or increasing access to better jobs (Elliott, King, Roder, & Stillman, 2001; Roder et al., 2008); and 3) encouraging local workforce providers to collaborate with businesses to develop sector-focused strategies that meet business needs while providing good jobs for workers (Conway, Blair, Dawson, & Dworak-Munoz, 2007). The nature and extent of the training opportunities offered through these programs vary widely, and range from

training for individual jobseekers, training programs tailored for a single employer, to training programs designed to meet the needs of a group of employers within an industry. Below is an overview of the SBS/NYC Opportunity initiatives that incorporate occupational training that are included in this study.

Individual Training Grants

Individual Training Grants (ITGs) help qualified jobseekers get specialized job training to find a new job or advance in their careers. ITG vouchers are issued by Workforce1 Career Centers (WF1CC) and provide funding for occupational skills training that leads to employment or advancement in NYC high demand occupations. Jobseekers are assessed at the WF1CC, and only those who are deemed likely to complete training and become employed receive ITG vouchers. Upon approval, the jobseekers choose from a list of courses found in the NYC Training Guide based on their employment goals. The trainings are typically occupational skills courses offered by local colleges, public providers, and private providers, and are closely aligned with the needs of employers. ITGs can fund course tuition, registration fees, testing fees, and books, but cannot be used to fund courses for college credit or any training that is not listed as eligible on the NYC Training Guide. Eligible occupations include but are not limited to security guards, bus and truck drivers, and certified nursing assistants. SBS identifies occupations for training that are both in demand and align with business customer needs at the WF1CC. These occupations and available voucher amounts per occupation are approved by SBS and the City's Workforce Development Board, which oversees the local area's WIOA dollars, prior to issuing ITG vouchers at the centers. The ITG program was temporarily suspended and

relaunched in FY 2013 to focus on occupations that are likely to result in a job placement in NYC.

Cohort Training

SBS works with providers to develop or revise industry-specific cohort training and career development programs to prepare workers for high-demand occupations through cohort trainings. Three **Industry Partnerships** bring together multiple stakeholders in order to address their industry's rapidly changing labor force needs.³ Together, these stakeholders analyze labor market data and employer information to identify strategic investments in training and advancement programs, and collaborate to develop workforce strategies and mobilize resources in their respective sectors. The City plans to establish a total of six Industry Partnerships in the next few years, and has already established Industry Partnerships in the healthcare, technology, industrial and manufacturing, food service and hospitality, and construction fields.

Healthcare. The New York Alliance for Careers in Healthcare (NYACH) was launched in 2011 to serve as the industry partner for the healthcare sector, which—despite its size and robust growth trajectory—has struggled to anticipate staffing needs or strategically engage with educational institutions and training providers to create a pipeline of qualified workers. Since then, NYACH has expanded employment opportunities for nurses in partnership with select hospitals and the City University of New York (CUNY), and enhanced the standard state prescribed home health aide (HHA) training program with CUNY and local employers, leading to better hiring and wage outcomes for job seekers. NYACH has expanded its focus to include

workers who lack basic education and is pursuing bridge programs to meet these needs prior to connection to training or employment.

NYACH training initiatives are offered in partnership with the Healthcare Career Center. The NYACH trainings included in this study are: Dental Anesthesia, Dental Assistant, Home Health Aide, Medical Assistant, Paramedic, Patient Care Technician, Pharmacy Technician, and Registered Nurse.

Industrial and Construction. The Industrial Partnership works with industry experts, employers, educational institutions, training providers, and other partners to design training programs that provide viable industrial and construction career opportunities. Training includes jobs in the industrial and construction fields, including: manufacturing, construction, wholesale trade, transportation and warehousing, waste management, and automotive repair and maintenance. Industrial Partnership training is provided in partnership with the Industrial Career Center.

A recent evaluation of the SFCCs provides further evidence that sector-based interventions can help prepare low-wage workers for jobs in high demand occupations that pay higher wages and offer sustainable career paths (Gasper et al., 2017). The study found that training increased earnings and employment related to a matched comparison group that did not receive training.

Tech. The NYC Tech Talent Pipeline (TTP) serves as the Industry Partnership for the technology sector. Announced by the Mayor in May 2014, the NYC Tech Talent Pipeline is a first-of-its-kind, \$10 million public-private partnership designed to support the growth of the City's growing technology sector. TTP worked together with employers to pilot and

³ Other industry partnerships focusing on food service and retail were not included in the ROI study because they were not implemented at the time of the study.

test what works for equipping New Yorkers with in-demand tech skills and delivering them for jobs at the city's leading tech employers. To address the skills gap at scale, TTP will also collaborate with local educational and training institutions to upgrade standards and educational programs in response to local employer demand.

Customized Training

Incumbent worker training—when employer-provided trainings build the skills of existing low-wage employees—has proven effective in supporting employer competitiveness and increasing worker incomes (CEO, 2014). In 2007, NYC Opportunity (formerly the Center for Economic Opportunity) partnered with SBS to launch the Customized Training program.

Customized Training is an initiative designed to upgrade the skills and earnings of low-wage incumbent workers by covering up to 70 percent of training costs for businesses that have identified training-related opportunities to increase revenue and reduce expenses. (employers typically pay 30 percent of training costs). The content and duration of training varies by employee job-specific skills and employer needs, with the length of training ranging from 12 weeks to a year. As a key component of the program, each employer commits to providing more than half of their trained incumbent workers a wage increase (CEO, 2014). A portion (20 percent) of the award is performance-based and prorated based upon the number of trainees who received a wage increase. Other significant benefits include workers being paid during training and obtaining occupational and transferable skills, including education skills such as reading, math, and English as a second language (CEO, 2014). Since the program's inception, SBS has awarded more than \$15

million in Customized Training funds to 251 companies to train over 9,300 workers.

A 2014 evaluation by Westat found that Customized Training Program participants averaged wage gains of nine percent, or approximately \$3,286 per year. Participants with relatively low starting wages (\$15 per hour or less) enjoyed even larger percentage increases. These results were broadly consistent with evaluations of similar programs across the country, such as California's Employment Training Panel Program (Westat, 2014).

On-the-Job Training

The On-the-Job Training (OJT) Program (or New Skills, New Jobs Program), launched in July 2012, helps employers recruit qualified candidates and provides grants to cover 70 percent of up to 280 hours of training for new employees. Existing employees teach new hires the skills they need to perform the job successfully. Either the trainee performs the job while the instructor watches, or the trainer performs the job while the new hire observes and learns. Eligible participants must be long-term unemployed, unemployed as a result of Hurricane Sandy, a veteran, a recent graduate, or a resident of NYC public housing. The employer commits to hiring employees as full time employees (30 hours) at \$11 hours with health benefits or \$13.40 without benefits. The OJT Program is distinct from Customized Training Program because it focuses on providing grants to cover training costs for new hires, whereas the customize training program focuses primarily on providing training to existing employees.

Table 2.1 summarizes the job training program included in this ROI study. The training programs were offered in FY 2014-2015 and are different from the training programs that were offered at the time that this report was written.

Table 2.1. Overview of SBS Job Training Programs

Program	Description
Individual Training Grants (ITGs)	ITG vouchers are issued by Workforce1 Career Centers (WF1CCs) and provide funding for occupational skills training that leads to employment or advancement in NYC high-demand occupations. Eligible ITG occupations include: Bus and Truck Drivers; Commercial Drivers; Certified Nursing Assistant; Clinical Medical Assistants; Computer Support Specialists; Computer Systems Analyst; Network and Computer Systems Administrators; and Security Guards.
Healthcare Sector Cohort Trainings	NYACH is NYC's healthcare industry partnership. NYACH trainings include Dental Anesthesia, Dental Assistant, Home Health Aide, Medical Assistant, Paramedic, Patient Care Technician, Pharmacy Technician, and Registered Nurse.
Industrial and Transportation Sector Cohort Training	The Industrial Partnership is NYC's industrial and transportation partnership. Trainings include: Carpentry/Woodworking; Electrician/Cable Installation; Principles of Supervising; School or Intercity Bus Driver; and Welding.
NYC Tech Talent Pipeline (TTP)	TTP is NYC's Industry Partnership for the tech sector. TTP trainings include trainings in advanced web development and include both classroom training and internships.
Customized Training Program	Customized Training provides grants on a competitive, cost-sharing basis to NYC businesses that employ low-skill, low-wage workers and agree to provide training and increase wages.
On-the-Job Training (OJT) Program	The OJT Program helps NYC businesses and firms to recruit qualified candidates and provides funds to cover 70 percent of the wages for the first 280 hours of training for new employees.

Return on Investment Analysis

In this era of diminished resources for public workforce programs, policy makers must make well informed decisions on the most productive use of taxpayer dollars to ensure that their investment yields a return (Harper-Anderson & Jin, 2014). Since the 1930s, economists have been evaluating public programs based on a comparison of their costs and benefits (Drummond et al., 2005; Hummel-Rossi & Ashdown, 2002; Hy, 2000; White et al., 2004, as cited in Blonigen). A benefit-cost analysis (BCA) is an analytical framework for converting the costs and benefits of a project to comparable monetary units, so they can be compared systematically and incorporated in a measure of project worth (Asian Development Bank, 2013).

The theoretical underpinning of BCA is that an investment made in the current time period is likely to yield benefits in the future (Hollenbeck, 2009a). In the case of workforce development programs, Hollenbeck explains that “the investment is the cost of providing services, and the benefits are increased tax revenues from participants’ higher levels of employment and earnings and decreased expenditures because participants have decreased take-up rates of unemployment insurance and income support programs” (Hollenbeck, 2009a). Individual participants also make investments (i.e., “their time costs, which comprise opportunity costs of foregone earnings while they are participating in the program”) and get future benefits (“greater likelihoods of employment and higher wage rates”).

The essential task of a BCA is to measure the benefits and costs of an initiative and calculate the net benefits (i.e., what remains after subtracting all of the costs) (Hollenbeck, 2012). It is also important to estimate the net impacts of an initiative (i.e., the outcomes for participants relative to the counterfactual, or what would have occurred if the program did not exist) (Hollenbeck, 2009a). The return on investment (ROI) is a measure of the gain or loss generated on an investment relative to the amount of money invested. It is essentially a restatement of the investment's benefit-cost ratio, and is often expressed as a percentage or as a gross return in dollars-per-dollar invested (i.e., "a dollar invested in an initiative today will return X dollars in the future") (Hollenbeck, 2012) or interest rate.

Several researchers have endeavored to calculate the ROI for workforce development programs with promising results. In a series of studies of workforce programs in Indiana, Virginia, and Washington (summarized in Hollenbeck, 2009b), the researchers found positive returns on investment for the majority of workforce programs studied. In a recent study of Virginia workforce development programs (Harper-Anderson & Jin, 2014), receipt of training and earning occupational skills licenses and credentials were found to vastly improve ROI, even when the ROI was negative. Other studies have yielded similar findings regarding the net impacts of training on participant outcomes. For example, a 2008 study of a state-level workforce initiative in Texas found that participants who received high-intensity job services that included hands-on training had greater annual earning impacts than participants who received low-intensity job services (King, Tang, Smith & Schroeder,

2008). A benefit-cost analysis of the Capital IDEA program—a sectoral employment program that offers occupational skills training and extensive support services to low-income Austin (TX) residents—found that taxpayers' investment in the program was fully recouped after 8.5 years. Over the first 10 years, each dollar invested in Capital IDEA training returns \$1.65 to taxpayers (an ROI of 165%); over 20 years, the return increases to 501% (or \$5.01 returned to taxpayers for every dollar invested) (Smith & King, 2011).

Despite the promising results, there are numerous challenges to conducting ROI analysis of workforce development programs. First, ROI analysis is based on numerous assumptions, such as those about tax rates, discount rates, and projection of benefits beyond the observation period. As Hollenbeck (2012) points out, ROI analyses can be strategically gamed in order to produce the desired results. Second, governments often find it difficult to collect data that is needed for ROI analysis, such as detailed data on program costs. Participant data is often not available in the format needed for analysis, and it is not unusual for data to be lacking on key participant characteristics. Third, while tempting, it is very difficult to compare ROIs across studies due to the various assumptions used by the authors, some of which are likely to have a huge effect on the ROI estimates. Finally, it is also difficult to compare ROI across training programs within the same study because the programs serve different populations, which could explain differences in ROI. Therefore, ROI analyses should be viewed with caution and used alongside other sources of data for determining the value of job training programs.

3. Methodology

This section provides a general overview of the data and methods used in the ROI analysis. The appendices referenced in this section provide further details about the data and methods.

Data Editing

Data on training program participants was provided by SBS. The data included participants who enrolled in each of the workforce programs in FY 2014 and 2015 (July 2013 to June 2015).⁴ A separate file included data on demographic characteristics. All of the available variables were the same across training programs. Data on WF1CC participants were provided in another file. This file was matched with the data on training program participants to identify training program participants who also enrolled in WF1CCs and remove them from the comparison pool.

The first step in data editing was to reconcile repeated records for participants. In some cases these represented multiple spells of enrollment in a training program but in others these appeared to be duplicate records stemming from data entry errors. Potentially out of range values for variables such as age were identified and recoded. Variables were recoded for use in the propensity score models. Data on training program participants was combined with data on WF1CC participants to create a single file for analysis. Appendix A provides detailed information on the data editing procedures.

Administrative data on employment and earnings were provided by New York State

Department of Labor (NYSDOL). The data was provided for each quarter from the 2008 Q3 to 2016 Q2 and included earnings from each employer, Federal Employer Identification Number (FIEN), and North American Industry Classification (NAICS) code for each employer. NYSDOL also provided data on UI benefits received in each quarter. The provision of data from 2008 Q3 meant that labor market history for each training participant for at least two years before program enrollment.

Data on cash assistance (CA) and Supplemental Nutrition Assistance Program (SNAP) came from NYC Human Resources Administration (HRA). CA includes Temporary Aid for Needy Families (TANF), the New York Safety Net Program, and emergency assistance (“One Shots”). The data included the amount of benefits received in each quarter. Data were provided from 2008 Q3 to 2016 Q2. All of the administrative and program data were linked using a pseudo identifier so that Westat did not have access to individual participant identities.⁵

Cohorts and Time Periods

The analysis included participants who enrolled in training programs in FY 2014 and 2015. While several of the training programs existed prior to FY 2014, the decision to focus on FY 2014 and 2015 cohorts was based on the fact that the training programs changed substantially in FY 2014. These changes included using more of a sectoral strategy to design training programs that met local labor market demands. Moreover, the Tech Training

⁴ SBS also provided data on FY 2010-2011 training program participants and WF1CC participants. While the main focus on this study was on the ROI of FY 2014-2015 training programs, earnings impact trajectories from these older cohorts were used to extrapolate earnings for FY2014-2015 cohorts, which had fewer quarters of follow-up data.

⁵ HRA also provided data on Medicaid enrollment. Unfortunately, the data was only available through 2013 Q3 and thus reduced Medicaid could not be examined as a potential taxpayer benefit.

and OJT program did not have earlier cohorts of participants.

It would have been ideal to include only the FY 2014 cohort because more quarters of post-training earnings data were available for these participants. However, the decision to combine the two cohorts was driven largely by the fact that for most of the training programs, the sample sizes for FY 2014 were too small to reliably estimate impacts. We considered 300 participants to be ideal but 100 was the minimum. The implication of including both the FY 2014 and 2015 cohorts is that data on only the short-term outcomes was available. Specifically, outcomes were examined in the second full quarter after exit from training.⁶ Small sample sizes did not permit estimation of ROI for individual training courses (e.g., Carpenter, Electrician, etc.). Appendix H provides the mean earnings before and after training by individual training courses.

Returns were projected for both 5-year and 10-year periods based on available data. The specific methods and assumptions for extrapolation are discussed later in this chapter.

Net Impact Estimation

ROI analysis requires a net impact evaluation to assess the net benefits of the program. The net impact analysis is concerned with whether the positive outcomes experienced by participants were actually due to the training program or to some other factor, such as a gradually improving economy. Net impact evaluation seeks to answer the question: How do the outcomes of participants compare to what would have happened if the training did

not exist and they were left to their next best alternative? The main concern was with the incremental impact of receiving training rather than the more general but equally important question of whether participation in a workforce program leads to positive outcomes.

To answer this question, two different approaches were used. For most of the programs, the outcomes of participants who receive training were compared to a similar group of participants in WF1CCs who did not receive training using a technique called propensity score matching. Propensity score matching has been used in previous ROI studies of workforce programs (Harper-Anderson & Jin, 2014; Hollenbeck and Huang, 2014). In this approach, the earnings and other outcome differences between the groups are used as the measure of net benefits.⁷

For one of the training initiatives, CT, a “post-minus-pre” approach was used rather than propensity score matching to estimate the net impacts. In this approach, the net impacts are calculated by examining deviations from participants’ past earnings. This approach was used because the CT program, unlike the other initiatives, provides training to all participants, so there was no internal comparison group of participants who did not receive training. Although we considered the possibility of using WF1CC participants as comparison group, we did not do so for two reasons. First, while WF1CC provides services to incumbent workers, information about employment status at the time of enrollment was not available, therefore we could not be sure that the comparison group was actually employed. Second, the appropriate comparison group CT

⁶ Even the training programs that did have sufficient numbers of FY 2014 participants to estimate impacts only had 6 quarters of post-exit data available. Only 6 quarters is still not sufficient to project the time path of future earnings impacts after the observation period. ROI was estimated for the FY 2014 cohorts for those programs and the results were similar to those for the FY 2014 and 2015 cohorts combined.

⁷ The Tech sector training programs included in this study serve individuals who are enrolled in college. Unfortunately, a comparison group of college students was not available for this study. A before-and-after comparison of earnings was not appropriate because earnings would be expected to increase significantly following completion of college, thereby leading to overestimates of the impact of the Tech sector trainings.

participants would be employees at the same employer who did not receive training. This information was not available for this study. It should be emphasized that a “post-minus-pre” approach is generally less desirable than a matched comparison group because it is impossible to determine how much of the observed earnings increase was due to training versus other factors, such as an improving economy.

Appendix B provides more details on the net impact estimation methodology.

ROI Assumptions

The ROI analysis began with a set of baseline assumptions under which costs and benefits could be measured. It then examined the net benefits under alternative assumptions through a series of sensitivity analyses. The overall approach was based on approaches developed for other ROI studies, especially Hollenbeck and Huang (2014) and Smith and King (2011).

Table 3.1 summarizes the costs and benefits included in the study and provides a conceptual framework. The primary cost is training cost, which is a cost to taxpayers. Evaluations of training programs typically include foregone earnings as a cost to participants if they are unable to work while enrolled in training.

The benefits include increased earnings of participants and associated fringe benefits.

Increased earnings are assumed to lead to increased federal, state, and local tax revenues and reduction in dependence on public assistance. These latter are benefits to taxpayers but actually a negative benefit to participants (i.e., participants must pay more taxes and receive less public assistance).⁸

The societal perspective takes into account the costs and benefits of both participants and taxpayers. In the societal perspective, taxes and reduced use of public assistance cancels out because it is simply a transfer from one group to another.

Table 3.1. Measured Costs and Benefits

Training Program	Participants	Taxpayers	Society
Costs			
Training costs	0	-	-
Foregone earnings	-	0	-
Benefits			
Increased earnings	+	0	+
Increased fringe benefits	+	0	+
Increased taxes	-	+	0
Reduced use of UI	-	+	0
Reduced use of public assistance	-	+	0

Some of the costs of CT and OJT are borne by employers, who are also participants in these job training programs. These include the costs

of recruiting workers, providing training, providing supervision, and administrative costs. (Some of these costs are paid by SBS and

⁸ Some public assistance programs have limits on the duration of assistance received. For example, eligible adults are limited

to 60 months of TANF in their lifetime. By not using public assistance use in the short-term, some participants may “save” them for future use.

are included as taxpayer costs.) Benefits to employers of these programs include reduced recruiting costs, reduced turnover, and increased production. This study did not attempt to measure employers' costs and benefits because it is extremely difficult and resources did not permit collection of data from employers. The amount of supervision and mentoring time from senior employees may vary considerably. One study found that employer costs varied from \$600 to \$52,000 for Registered Apprenticeship (Gunn and De Silva, 2008). Because the study did not include employer costs and benefits, the ROI estimates from the societal perspective may be conservative, particularly for CT and OJT programs.

All costs and benefits were converted to 2016 Q2 constant dollars.⁹

Training Costs. Program costs were obtained from cost data provided by SBS. Program costs include the cost of instructional delivery and supplies, as well as the cost of program administration and participant support, if applicable. For example, cohort-based training includes costs of participant recruitment, screening, coaching, supportive services, data collection and analysis, and training provider overhead costs. Individuals were assigned an average cost. Details on the process for estimating program costs are included in Appendix A.

Foregone Earnings. Participants in certain types of training programs may have lower earnings while they are enrolled in training if the trainings cause them to reduce or eliminate working hours. This is a potential cost to participants which must be taken into account. There is considerable variation among the

cohort trainings in terms of whether programs are offered on a full-time or part-time basis. Following Hollenbeck and Huang (2014), foregone earnings are estimated as the difference in earnings between training program participants and matched comparison group members while the training participants are enrolled in training.

For most of the training programs, foregone earnings were relatively low, indicating that most training participants have only slightly lower earnings than the comparison group while in training. The two programs with substantial foregone earnings were industrial and tech trainings. Participants in these two programs earned less than the comparison group while they were enrolled in training.¹⁰ Participants in the OJT programs had negative foregone earnings, indicating that they earned more than the comparison group while they were enrolled in training. This is expected, given that training is provided by employers. Foregone earnings for OJT were assumed to be \$0 since participants were being paid. Foregone earnings for Customized Training were similarly assumed to be \$0 since the participants were incumbent workers and no comparison group was available.

Impact Estimation for Net Benefits. As discussed above, impacts on earnings and public assistance for most of the programs were estimated using matched comparison groups of WF1CC participants. In some cases, impacts were non-significant. This was likely due to small sample sizes for some of the training programs, which gives low power for detecting impacts even with meaningful dollar values. This means that it cannot be concluded that the non-significant impacts were different

⁹ The Consumer Price Index for All Urban Consumers (CPI-U) was averaged to create a quarterly price index.

¹⁰ One of the Tech training programs included in this study provided a paid internship to students. However, this type of income is typically not subject to UI taxes and is not reported

in NYSDOL wage data. Therefore, when combined with other programs that did not pay participants, there are foregone earnings overall. We chose to include these foregone earnings so that our estimate of participant returns for Tech training would be more conservative.

than zero. All impacts, regardless of statistical significance, were included in the ROI calculations.

Fringe Benefits. Fringe benefits will accrue from additional earnings in the form of paid vacation/sick leave, paid health insurance, and retirement plan contributions. The latest data from the U.S. Bureau of Labor Statistics (BLS) was used to estimate fringe benefits. BLS indicates that for the U.S. benefits consist of 29.4 percent per hour of employee compensation. This is the ratio of paid leave, insurance, and retirement savings to wages (which includes wages and supplemental pay). This number is 28.5 for the Mid-Atlantic. A conservative assumption was used and fringe benefits were estimated at 20 percent of additional earnings.

Tax Payments. Additional earnings will result in additional federal, state, and local taxes. Taxes are applied only to the additional earnings received by participants. For federal payroll taxes, the current Federal Insurance Contributions Act (FICA) tax rate of 7.65 percent was used, which includes Social Security and Medicare taxes. For federal, state, and local income taxes marginal tax rates were used. Marginal tax rates are the highest tax rate to which an individual's income would be subjected. Marginal tax rates are appropriate because individuals will pay the highest tax rate on additional earnings from participation in training. The average marginal rate for incomes below \$40,000 was used. For federal income tax the marginal tax rate was 3.70 percent.¹¹ State and local taxes include a NYS marginal tax rate of 2.99 percent and a NYC marginal tax rate of 1.86 percent for incomes below \$40,000.¹² Therefore, total taxes were estimated at 16.2 percent of the earnings impact. For example, if the difference between the

participants and comparison groups is \$1,000, \$162 in tax revenues was imputed.

Discount Rate. Investments in job training programs produce benefits that occur in the future. In ROI analysis, it is necessary to discount future benefits to their present value using a discount rate so that they can be compared with investments (e.g., costs) incurred today. For example, \$1,000 realized 5 or 10 years from now is not worth as much as a \$1,000 available today because the money could have been alternatively invested and earned interest. The discount rate should reflect the opportunity cost or the amount of interest that could be earned if the money was invested in an alternative investment. However, there is little consensus on how to choose an appropriate discount rate. The Office of Management and Budget (OMB) recommends a nominal discount rate of between of .6 for 5-year time horizon and 1.0 for 10-year time horizons. A 1.5 percent discount rate was chosen for both analyses to be conservative. This is likely to generate lower present values, which will make the estimates of present values conservative.

Extrapolation of Benefits and Decay Rates. Impacts were measured in the second full quarter after exit from training to allow participants time for job search. Because some participants may take longer to find a job, the impacts may be conservative. Returns had to be projected for 5-year and 10-year periods. The main challenge of most ROI analyses, including the present one, is to extrapolate the returns beyond the observation period. There are several possible scenarios that may characterize the patterns of impacts over time. First, training participants may maintain a stable advantage over the comparison group over time. This would be expected if, for

¹¹<https://www.census.gov/library/publications/2011/compendia/statab/131ed/federal-govt-finances-employment.html>

¹²<http://www.ibo.nyc.ny.us/RevenueSpending/pitoverview.pdf>

example, job training results in a real increase in human capital, such as would be expected for an associate's or bachelor's degree. Second, training participants may increase their earnings relative to the comparison group over time. This would happen if job training resulted in careers where participants increased their job responsibilities over time or had opportunities for further training, such as through their employers. Finally, the impacts of training may decay such that the comparison group eventually "catches up" to the training group. There are many reasons why job training effects would decay. Some job training efforts may simply represent "one shot" efforts to get participants back into the labor market. Low-wage workers likely need basic skills instruction and supportive services to continue to be successful in the labor market.

Unfortunately, the literature on job training programs generally includes only short-follow up periods, so little is known about whether the effects of job training programs are short-term or long-term (D'Amico, 2006). Generally, the literature only looks broadly – not specifically at trainings using SBS's sectoral strategy – and does not support the first view that job training programs increase benefits over time. Most studies indicate that the benefits of job training programs remain constant or decay. One study found that the effects of training for women who received welfare were fully decayed by year 6 (Hamilton, 2002). However, two evaluations found persistent impacts for women through 7 to 9 years. A recent study suggested that impacts of job training programs may not decay at all and that cost-benefit analyses should consider this possibility (Greenberg et al., 2004). It is likely that the decay rates vary by type of training and target population.

To project future benefits, data on FY 2010-2011 cohorts of training participants was used to determine decay or growth rates. For each earlier cohort, the pattern of impacts over time

was examined. If earnings increased during the follow-up period, a conservative approach was taken and it was assumed that a constant differential was maintained between the program and comparison groups and the impact for future quarters was assumed to be equal to the impact in the second quarter after exit. If, on the other hand, earnings impacts were observed to decrease over time, a decay factor was applied at the same rate to future quarters. In some cases, there was no clear pattern and the future impacts were assumed to equal those in the second quarter after exit. Earnings were never projected to be negative (e.g., they were stopped at zero). A similar approach was followed for UI benefits, welfare and food stamps. Projections were stopped at zero such that training participants were never projected to receive more public assistance than the comparison group. In most cases, earnings impacts were constant for the earlier cohorts, whereas UI, SNAP, and CA impacts tended to decrease over time. Earlier cohorts were not available for Tech and OJT, so earnings impacts were projected to be constant since this was the pattern most often observed across the training programs. Appendix C provides further details on the projections for each training program.

Sensitivity Analyses

Several sensitivity analyses were conducted to examine how the ROI estimates change in response to changes in assumptions. Because the impact estimates were derived from non-experimental estimators, there is some possibility that they may be biased upward to the extent that unobservable variables (such as motivation or personal or family circumstances) are associated with selection into the training programs. There is really no way to judge the extent of this bias. On the one hand, the comparison group was matched on important variables including earnings and public assistance, and balance was achieved on

most of these variables for the training programs. On the other hand, the impact estimates for most of the training programs were considerably larger than those obtained in randomized studies of job training (D'Amico, 2006). The first sensitivity analysis examined this uncertainty by decreasing all of the impacts by 50 percent.

The second sensitivity analysis imposed a rapid decay rate on all of the impacts. It was assumed that all impacts decay to 0 (100% decay rate) by the end of year seven. This is a conservative assumption for training programs aligned with a “career pathway” model within a growing sector which may produce long-term impacts. These programs are designed to allow jobseekers to enter an industry with long-term growth potential and deliver skills which serve as a foundation for more advanced roles within the industry. However, this assumption is consistent with those studies that showed that impacts of training programs do not last long, though “career pathway” models are relatively new.

A third sensitivity analysis included impacts only for the FY 2014 cohort. The purpose the analysis was to illuminate whether including the FY 2015 cohort changed the results due to differences in outcomes across cohorts. Using the FY 2014 cohort was only possible for training programs which had at least 100 participants in FY 2014, which included ITGs, Customized Training, Healthcare, and OJT. Industrial, Tech, and OJT did not have sufficient participants to be included in this sensitivity analysis.

A fourth sensitivity analysis excluded non-significant impacts from the ROI estimates, and a final analysis tested the sensitivity to the choice of discount rate.

Limitations

This analysis is best thought of as exploratory for several reasons. First, the impact estimates are based on propensity score matching and post minus pre comparisons. Propensity score matching is widely used to estimate impacts of employment and training programs but hinges on the assumption that unobservable characteristics do not determine program participation. If there are unobservable characteristics, such as motivation, that lead people to select into training, this could lead to upward bias in the impact estimates.

Second, the training programs included in this study are relatively new. Some of the programs used a sectoral strategy that involved collaboration with employers whereas others did not. In addition, a limited number of quarters of follow-up data that are available. ROI analysis typically requires at least five years of data to generate viable benefit streams that outweigh costs. Several prior ROI studies have included at least two or three years of follow-up data. Most of the ROI estimates are based on extrapolations outside of the observation period informed by earlier cohorts of participants in similar training programs. The actual outcomes of trainees over time are unknown. Moreover, the outcomes of trainees may vary for each of the examined training programs, making comparisons across programs very difficult. More follow-on research is needed in the future that collects longer follow-up data for these more recent training cohorts.

It is impossible to take into account all factors that may influence the ROI of job training programs. To account for this, a conservative approach to assumptions has deliberately been adopted.

4. Net Impact Analysis

This chapter presents the results from the net impact analyses of job training programs. It begins with a summary of the demographic characteristics of training program and WF1CC participants. Demographic characteristics of participants are likely to affect labor market outcomes and hence the ROI of training programs.

Table 4.1 shows that, with the exception of healthcare, the training programs analyzed are predominantly male. Tech training participants are younger than those in other training programs. CT participants are more likely to have a college degree than those in other training programs. Tech and CT were less likely to be non-white. ITG participants were most likely to be Veterans, and healthcare participants were most likely to be single parents.

There were large differences in earnings among participants in the various training programs. Mean earnings are mean quarterly earnings for the eight quarters before training entry. Participants in the Industrial training and CT had notably higher earnings before training entry than those in other training programs.¹³ The higher earnings of CT participants may be explained by the fact that they are incumbent workers. Healthcare training participants had the lowest earnings before training of any of the programs.

With respect to UI benefits, ITG participants were more likely than participants in any of the training programs to have received UI benefits in the two years before training enrollment, followed by Industrial training participants. Tech and CT participants were least likely to have received UI before training.

With respect to public assistance benefits, the pattern fit what was observed for earnings.

ITG and healthcare participants were more likely than participants in the other training programs to have received cash assistance in the two years before training. Tech and CT participants were least likely to have received cash assistance prior to training. A similar pattern was observed for SNAP benefits.

There were marked differences between training program participants and full set of WF1CC participants. The training programs served fewer females than the WF1CCs. There were large differences in education level between training program participants and WF1CC participants. Training program participants had higher levels of education than WF1CC participants.

There were not consistent differences in prior earnings between training program participants and WF1CC participants. ITG, Industrial, and CT participants had higher prior earnings than WF1CC participants, whereas healthcare and OJT participants had lower earnings compared to WF1CC participants. This difference could be explained by the fact that, with the exception of CT and OJT, training participants may need some savings or family support to cover their expenses during the programs.

Receipt of CA and SNAP were notably lower among CT and Tech participants than among participants in the other training programs. For CT participants, the lower rate of CA and SNAP is likely explained by the fact that they are incumbent workers and their higher earnings may make them eligible for fewer benefits. For Tech participants, the lower CA and SNAP likely reflects the fact that the participants are college students and may have other forms of support, such as parents.

¹³Among Industrial participants, those in supervisor training had the higher pre-training earnings than those in other

Industrial trainings. When supervisor training participants are excluded, Industrial training participants have lower pre-training earnings than the other training programs.

Table 4.1. Demographic Characteristics of Participants in Each Job Training Program and Workforce I Career Centers (WFICCs) at Entry

Characteristic	ITGs	Industrial Cohort	Healthcare Cohort	Tech Cohort	Customized Training	OJT	WFICC
Participants	2,727	159	781	137	428	262	162,429
Female (%)	42.1	17.0	88.2	45.3	55.6	37.4	51.9
Non-white (%)	81.6	83.0	81.7	57.7	62.9	76.7	79.5
Age at enrollment	34.8	34.1	33.1	25.5	33.2	33.8	33.6
Education level (%)							
Less than high school	1.4	9.4	12.8	0.0	2.6	6.1	12.4
High school diploma or GED	38.9	39.6	30.6	16.1	19.6	27.5	35.8
Some college or vocational training	41.5	42.8	39.1	44.5	18.2	46.9	36.2
Bachelor degree or higher	18.1	8.2	17.5	39.4	59.6	19.5	15.5
Veteran (%)	11.7	4.4	2.6	2.2	1.4	1.8	4.4
Borough of residence (%)							
Bronx	30.7	19.5	30.6	8.0	7.2	15.6	24.7
Brooklyn	26.7	47.8	24.6	50.4	27.5	43.1	27.4
Manhattan	13.6	7.5	9.9	12.4	11.9	13.4	14.7
Queens	16.6	22.0	27.0	25.5	36.2	18.3	18.7
Staten Island	9.1	1.8	5.2	2.9	2.6	6.9	10.6
Mean quarterly earnings (\$) ^a	3,102	3,986	1,893	2,772	6,053	2,580	2,738
Received UI in past two years (%)	39.1	34.0	22.0	11.7	7.9	33.2	26.6
Received cash assistance in past two years (%)	23.1	9.4	21.8	3.6	2.1	14.9	19.2
Received SNAP in past two years (%)	52.5	32.1	46.7	11.7	10.7	34.7	46.1

SOURCES: SBS program data, NYSDOL UI wage and benefit records, and HRA administrative data.

^a Includes quarters with 0 earnings.

Net Impact Estimates

Table 4.2 displays the results of the net impact estimation. Note that the table displays the impacts employment, earnings, UI benefits, CA, and SNAP. Outcomes are measured in the 2nd full quarter after exit. Employment is specifically defined as having any quarterly earnings. The impact is the difference in the outcome between the training program participants and the matched comparison group. The one exception is for Customized Training, which represents the difference in the outcome before and after the program. The impacts in Table 4.2 were used in the ROI calculations in the next chapter.

The first row shows the impact on employment. The first entry for ITGs of 13.8 means that in the 2nd quarter after exiting the program, participants had an employment rate that was 13.8 percentage points higher than the individuals in the matched comparison group who received WF1CC services without training. Roughly, 76 percent of ITG participants were employed (had earnings in the quarter) and only 62 percent of the matched comparison group individuals were employed, a 22 percent increase. Industrial, Healthcare, and OJT also had positive and significant impacts on employment. CT also had a positive impact but it was not significant.

All of the programs had positive and statistically significant earnings impacts in the 2nd quarter after exit relative to the matched WF1CC group. The largest impacts were for Industrial Cohort and Tech Cohort—about \$3,000 and \$2,900, respectively. Earnings impacts for OJT, Healthcare Cohort, and Customized training were between about \$1,900 and \$2,300. Earnings impacts for ITGs were the smallest at \$1,436.

The second panel shows the estimates on UI receipt and benefits. Impacts on UI were

mixed. Three of the programs—Healthcare Cohort, ITGs, and Tech Cohort—had statistically significant impacts on receipt of UI benefits, with training program participants being less likely to receive these benefits in the 2nd quarter after exit. OJT had a positive impact on UI, suggesting that participation increases UI benefits. The result is consistent with the fact that OJT participants are employed during their training period and may be more likely to qualify for UI benefits. Two of the programs had significant impacts on average UI benefit amounts. The impact for ITGs was -\$107, indicating that ITG participants received \$107 fewer in UI benefits in the 2nd quarter after exit than the matched comparison group. Healthcare cohort training also reduced UI benefits by about \$116 in the 2nd quarter after exit. Tech Cohort also had reduced UI benefits but the impact was not significant.

The training programs had few impacts on CA or SNAP. Participants in the Industrial cohort and Healthcare cohort trainings were about 4 percentage points less likely to receive CA in the 2nd quarter after exit than the matched comparison group who did not receive training. Industrial cohort training was the only program that had a significant impact on CA benefit amount, reducing it by about \$65 in the 2nd quarter after exit. The impact for ITGs, Healthcare, and Tech were in the expected direction but not statistically significant.

Looking at the results for SNAP benefits, Tech cohort participants were about 7 percentage points less likely than the matched comparison group to receive SNAP benefits in the 2nd post-exit quarter. Interestingly, this is the training program whose participants have the lowest SNAP take-up rates before entry. This may be explained by the fact that while the sample sizes are small, it is easier to detect impacts when the base percentage is very low. None of the training programs had significant impacts on SNAP benefit amounts. Tech cohort, CT,

and OJT participants received less SNAP benefits that the matched comparison group but the impacts were not significant. Appendix

E provides further details on the impact estimates.

Table 4.2. Differences in Earnings and Public Assistance Receipt between Job Training Program Participants and Matched WFICC Participants, 2nd Post-Exit Quarter

	ITGs	Industrial Cohort	Health-care Cohort	Tech Cohort	CT	OJT
Employment (%)	13.8*	13.2*	23.3*	-4.4	11.3	9.2*
Earnings(\$)	1,436*	3,067*	2,102*	2,931*	1,994*	2,310*
Received UI (%)	-5.9*	0.1	-7.0*	-5.1*	0.0	6.5*
Average UI benefits (\$)	-107*	8	-116*	-84	-14	103*
Received CA (%)	0.0	-4.4*	-4.0*	-1.5	0.0	-1.2
Average CA benefits (\$)	-7	-65*	-24	-7	-3	-8
Received SNAP (%)	0.0	-4.4	-4.0	-6.6*	-2.0	-3.8
Average SNAP benefits (\$)	3	15	14	-23	-17	-48

Note: Each entry represents the mean difference in the outcome between the job training program participants and the matched WFICC participants.

* Indicates significant difference at the .05 level. Impacts are in 2016\$.

5. ROI Estimates

The sections that follow present the results from the ROI analyses of job training programs. ROI is the ratio of the net benefit of an investment in present value relative to the investment cost. ROI is expressed as a return in gross dollars per dollar invested as well as an annual percentage since ROIs are earned over a several year period. For this study, ROIs have been calculated for 5- and 10-year periods. Furthermore, ROIs were calculated for three groups—participants, taxpayers (federal, state, and City government), and society as a whole. The societal perspective sums the benefits to participants and taxpayers.

Individual Training Grants

Participant Perspective. Table 5.1 presents expenditures, returns, and returns on investment for ITGs from the participant perspective. Foregone earnings for ITG participants are \$252. Foregone earnings are low because the average participant is earning little before training. Total returns for participants are \$27,840 over the 5-year period. The returns include participant earnings and fringe benefits. Participants receive fewer UI, SNAP, and CA benefits and pay more taxes, which are subtracted from the total returns. Participants earn \$109.65 for every dollar invested in the program. This is a 156 percent annual ROI. Total returns over the 10-year period are \$54,234 in present value terms.¹⁴

Table 5.1. ROI from ITG FY 2014 and 2015 Cohorts, Participant Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$0	\$0
Foregone Earnings	\$252	\$252
Total Costs	\$252	\$252
Returns		
Earnings	\$28,721	\$57,442
Fringe Benefits	\$5,744	\$11,488
Cash assistance	-\$132	-\$265
SNAP	\$52	\$105
UI Benefits	-\$615	-\$621
Taxes	-\$4,653	-\$9,306
<i>Total Returns</i>	<i>\$29,118</i>	<i>\$58,844</i>
Present Value of Total Returns	\$27,840	\$54,234
Returns on Investment		
Net Present Values of Returns	\$27,588	\$53,982
Percent Return	10,965%	21,456%
Return in Dollars	\$109.65	\$214.56
Annual ROI	156%	71%

¹⁴The estimated 10-year returns are not necessarily twice the 5-year returns due to the application of decay rates to the

impacts based on FY 2010-2011 cohorts. For example, an impact that is greater than 0 in Year 5 may decay to 0 by Year 10.

Taxpayer Perspective. Table 5.2 presents expenditures, returns, and returns on investment from the taxpayer perspective. From the taxpayer perspective, program costs are the primary expenditure and returns include increased taxes and reduced UI, SNAP, and CA benefits. Participant earnings and fringe benefits are not included in the taxpayer perspective. Average program costs are \$2,553 per participant. The taxpayer returns over the

5-year period is \$5,127 in present value terms. This return is largely due to increased taxes but also includes reductions in UI and CA benefits. The total returns over the 5-year period are estimated at 101 percent for taxpayers, with an annualized ROI of 15 percent. Therefore, each dollar invested in ITGs is associated with returns to taxpayers of \$1.01 over the 5-year period. The 10-year ROI is \$2.66 or 14 percent on an annual basis.

Table 5.2. ROI from ITG FY 2014 and 2015 Cohorts, Taxpayer Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$2,553	\$2,553
Foregone Earnings	\$0	\$0
Total Costs	\$2,553	\$2,553
Returns		
Earnings	\$0	\$0
Fringe Benefits	\$0	\$0
Cash assistance	\$132	\$265
SNAP	-\$52	-\$105
UI Benefits	\$615	\$621
Taxes	\$4,653	\$9,306
<i>Total Returns</i>	<i>\$5,348</i>	<i>\$10,087</i>
Present Value of Total Returns	\$5,127	\$9,335
Returns on Investment		
Net Present Values of Returns	\$2,574	\$6,782
Percent Return	101%	266%
Return in Dollars	\$1.01	\$2.66
Annual ROI	15%	14%

Societal Perspective. The societal perspective combines the participant and taxpayer perspectives. Expenditures include program costs and foregone earnings and benefits include increased participant earnings and fringe benefits. Since taxes, UI, SNAP, and CA benefits are transfers from taxpayers to participants, they are costs to participants and benefits to taxpayers. Therefore, they are not included in the societal perspective. Table 5.3 presents expenditures, returns, and returns on

investment from the societal perspective. The total expenditures including foregone earnings and program costs were \$2,805. The total returns to society were \$32,967 over a 5-year period. Each dollar invested in ITGs is associated with returns to society of \$10.75 over the 5-year period. This represents an annualized ROI of 64 percent over the 5-year period. The 10-year ROI is \$21.67 or 37 percent on an annual basis.

Table 5.3. ROI from ITG FY 2014 and 2015 Cohorts, Societal Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$2,553	\$2,553
Foregone Earnings	\$252	\$252
Total Costs	\$2,805	\$2,805
Returns		
Earnings	\$28,721	\$57,442
Fringe Benefits	\$5,744	\$11,488
Cash assistance	\$0	\$0
SNAP	\$0	\$0
UI Benefits	\$0	\$0
Taxes	\$0	\$0
<i>Total Returns</i>	<i>\$34,465</i>	<i>\$68,931</i>
Present Value of Total Returns	\$32,967	\$63,569
Returns on Investment		
Net Present Values of Returns	\$30,163	\$60,765
Percent Return	1,075%	2,167%
Return in Dollars	\$10.75	\$21.67
Annual ROI	64%	37%

Figures 5.1 and 5.2 summarize the costs and returns of ITGs from the participant, taxpayer,

and societal perspectives for the 5-year and 10-year periods, respectively.

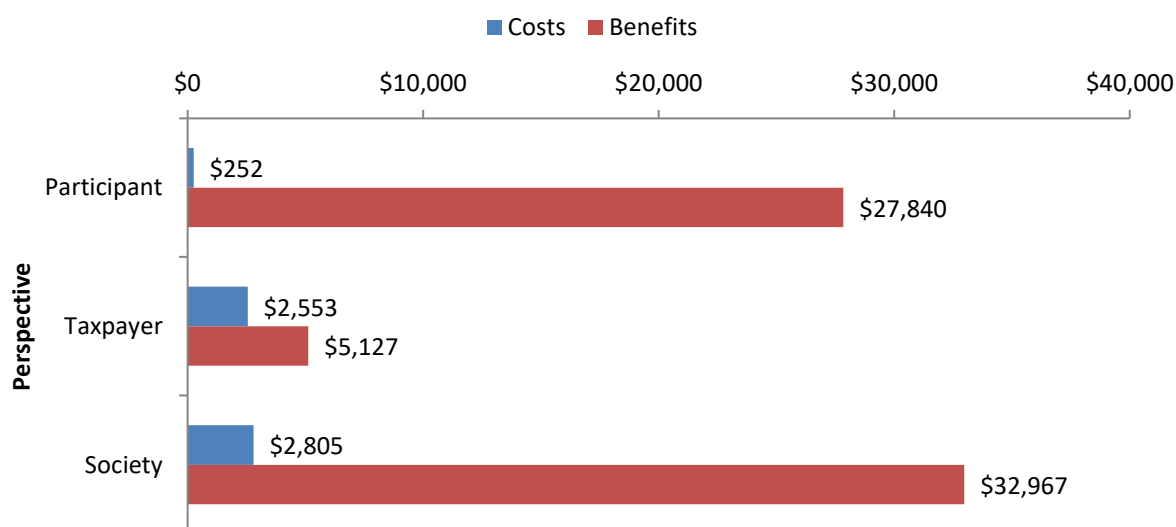
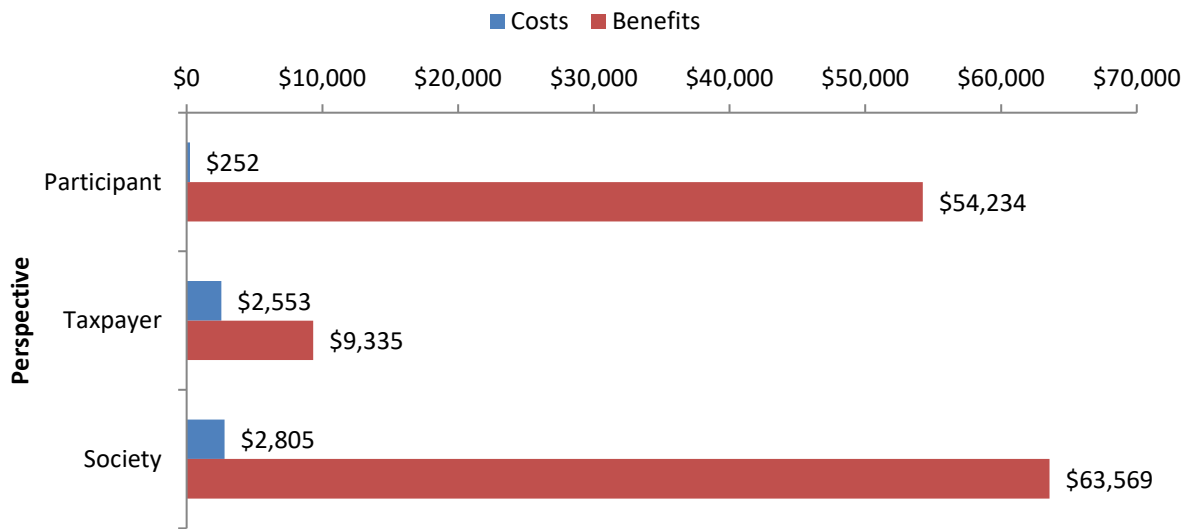
Figure 5.1. Costs and Returns from ITG FY 2014 and 2015 Cohorts, 5-Year Period

Figure 5.2. Costs and Returns from ITG FY 2014 and 2015 Cohorts, 10-Year Period

Industrial Cohort Training

Participant Perspective. Table 5.4 presents expenditures, returns, and returns on investment for the Industrial Cohort Trainings from the participant perspective. Industrial cohort training participants had \$1,473 in foregone earnings. However, they received positive returns over the 5-year period,

primarily due to increased earnings. The present value of returns for industrial cohort training participants is \$48,450 over 5 years and \$74,848 over 10 years. Participants earn \$31.90 for every dollar invested in the program over 5 years and \$49.84 over 10 years. These represent 101 percent and 48 percent annual ROIs, respectively.

Table 5.4. ROI from Industrial FY 2014 and 2015 Cohorts, Participant Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$0	\$0
Foregone Earnings	\$1,473	\$1,473
Total Costs	\$1,473	\$1,473
Returns		
Earnings	\$49,780	\$79,621
Fringe Benefits	\$9,956	\$15,924
Cash assistance	-\$1,307	-\$2,614
SNAP	\$102	\$105
UI Benefits	\$27	\$27
Taxes	-\$8,064	-\$12,899
<i>Total Returns</i>	<i>\$50,494</i>	<i>\$80,164</i>
Present Value of Total Returns	\$48,450	\$74,878
Returns on Investment		
Net Present Values of Returns	\$46,977	\$73,405
Percent Return	3,190%	4,984%
Return in Dollars	\$31.90	\$49.84
Annual ROI	101%	48%

Taxpayer Perspective. Table 5.5 presents expenditures, returns, and returns on investment from the taxpayer perspective. Program costs paid by the taxpayer equal \$5,007. From the taxpayer perspective, increased tax revenue and decreased spending

on CA resulted in positive returns of \$8,861 over 5 years and \$14,324 over 10 years. For every dollar invested, taxpayers receive \$0.77 over the 5-year period and \$1.86 over the 10-year period. These are annual ROIs of 12 percent and 11 percent, respectively.

Table 5.5. ROI from Industrial FY 2014 and 2015 Cohorts, Taxpayer Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$5,007	\$5,007
Foregone Earnings	\$0	\$0
Total Costs	\$5,007	\$5,007
Returns		
Earnings	\$0	\$0
Fringe Benefits	\$0	\$0
Cash assistance	\$1,307	\$2,614
SNAP	-\$102	-\$105
UI Benefits	-\$27	-\$27
Taxes	\$8,064	\$12,899
<i>Total Returns</i>	\$9,242	\$15,380
Present Value of Total Returns	\$8,861	\$14,324
Returns on Investment		
Net Present Values of Returns	\$3,854	\$9,317
Percent Return	77%	186%
Return in Dollars	\$0.77	\$1.86
Annual ROI	12%	11%

Societal Perspective Table 5.6 presents expenditures, returns, and returns on investment from the societal perspective. Societal expenditures were \$6,480, which includes program costs paid by the taxpayer and participant foregone earnings. Due to increased wages and fringe benefits, the

present value of returns is \$57,311 over 5 years and \$101,245 over 10 years. Society receives \$7.84 for every dollar invested in the program over the 5-year period and \$12.77 over the 10-year period. The annual ROIs are 55 percent and 30 percent for the 5-year and 10-year periods, respectively.

Table 5.6. ROI from Industrial FY 2014 and 2015 Cohorts, Societal Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$5,007	\$5,007
Foregone Earnings	\$1,473	\$1,473
Total Costs	\$6,480	\$6,480
Returns		
Earnings	\$49,780	\$79,621
Fringe Benefits	\$9,956	\$15,924
Cash assistance	\$0	\$0
SNAP	\$0	\$0
UI Benefits	\$0	\$0
Taxes	\$0	\$0
<i>Total Returns</i>	<i>\$59,736</i>	<i>\$95,545</i>
Present Value of Total Returns	\$57,311	\$89,202
Returns on Investment		
Net Present Values of Returns	\$50,831	\$82,723
Percent Return	784%	1,277%
Return in Dollars	\$7.84	\$12.77
Annual ROI	55%	30%

Figures 5.3 and 5.4 summarize the costs and returns of Industrial training from the

participant, taxpayer, and societal perspectives for the 5-year and 10-year periods, respectively.

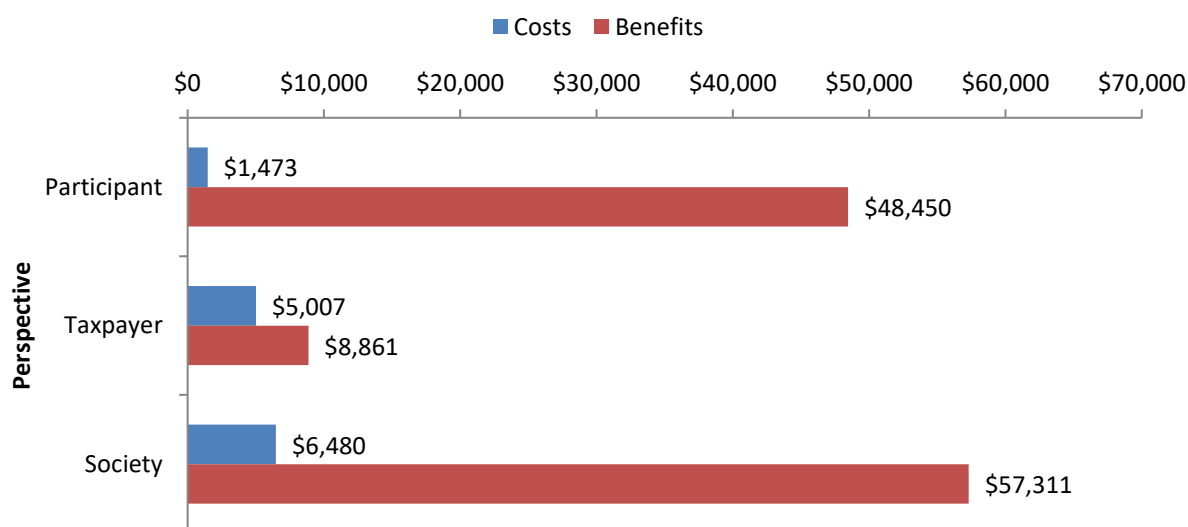
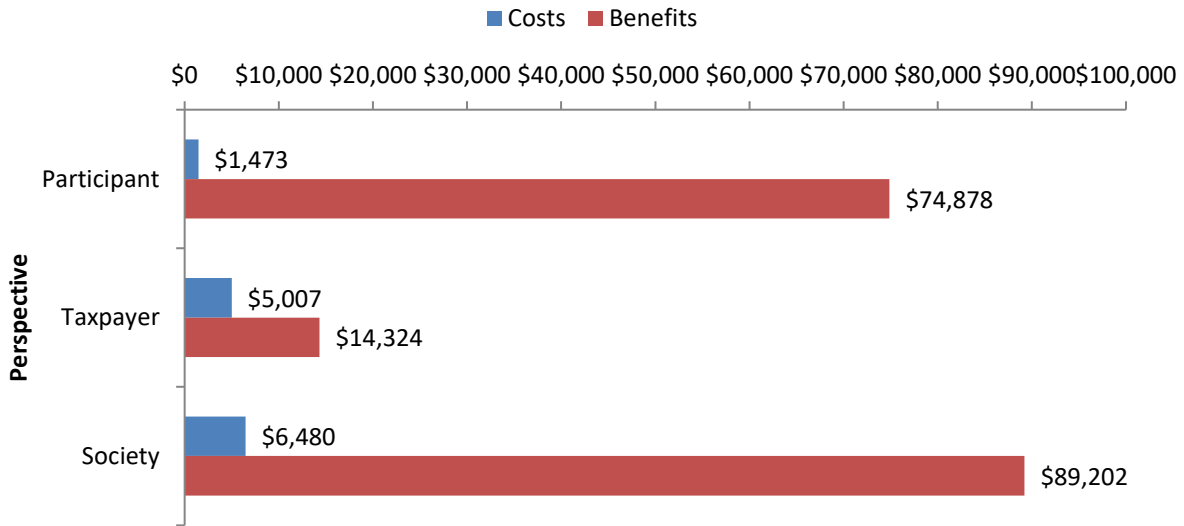
Figure 5.3. Costs and Returns from Industrial FY 2014 and 2015 Cohorts, 5-Year Period

Figure 5.4. Costs and Returns from Industrial FY 2014 and 2015 Cohorts, 10-Year Period

Healthcare Cohort Training

Participant Perspective. Table 5.7 presents expenditures, returns, and returns on investment for Health Cohort Trainings from the participant perspective. Health Cohort Training participants had \$324 in foregone

earnings while participating in training. However, present value returns for participants were \$41,558 over 5 years and \$80,551 over 10 years. These returns are primarily a result of increased earnings and fringe benefits. This suggests an ROI of \$127.21 over 5 years and \$247.51 over 10 years.

Table 5.7. ROI from Healthcare FY 2014 and 2015 Cohorts, Participant Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$0	\$0
Foregone Earnings	\$324	\$324
Total Costs	\$324	\$324
Returns		
Earnings	\$42,041	\$84,083
Fringe Benefits	\$8,408	\$16,817
Cash assistance	-\$84	-\$84
SNAP	\$276	\$276
UI Benefits	-\$372	-\$372
Taxes	-\$6,811	-\$13,621
<i>Total Returns</i>	<i>\$43,459</i>	<i>\$87,375</i>
Present Value of Total Returns	\$41,558	\$80,551
Returns on Investment		
Net Present Values of Returns	\$41,234	\$80,226
Percent Return	12,721%	24,751%
Return in Dollars	\$127.21	\$247.51
Annual ROI	164%	74%

Taxpayer Perspective. Table 5.8 presents expenditures, returns, and returns on investment from the taxpayer perspective. The taxpayer perspective includes the program cost of \$5,117. The increased taxes and decreased payments of UI and CA benefits result in returns of \$6,699 over 5 years and \$12,501 over 10 years. The total returns over the 5-year

period are estimated at 31 percent for taxpayers, with an annualized ROI of 6 percent. Therefore, each dollar invested is associated with returns to taxpayers of \$0.31 over the 5-year period. The 10-year ROI is \$1.44 or 5 percent on an annual basis.

Table 5.8. ROI from Healthcare FY 2014 and 2015 Cohorts, Taxpayer Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$5,117	\$5,117
Foregone Earnings	\$0	\$0
Total Costs	\$5,117	\$5,117
Returns		
Earnings	\$0	\$0
Fringe Benefits	\$0	\$0
Cash assistance	\$84	\$84
SNAP	-\$276	-\$276
UI Benefits	\$372	\$372
Taxes	\$6,811	\$13,621
<i>Total Returns</i>	<i>\$6,991</i>	<i>\$13,525</i>
Present Value of Total Returns	\$6,699	\$12,501
Returns on Investment		
Net Present Values of Returns	\$1,582	\$7,384
Percent Return	31%	144%
Return in Dollars	\$0.31	\$1.44
Annual ROI	6%	5%

Societal Perspective. Table 5.9 presents expenditures, returns, and returns on investment from the societal perspective. The societal expenditures include the program costs of \$5,117 and participant's foregone earnings of \$524. Societal returns include increased earnings for participants. From the societal perspective, the present value of

returns for the Healthcare Cohort Trainings is \$48,257 over 5-years and \$93,051 over 10-years. Society receives \$7.87 for every dollar invested in the program over the 5-year period and \$6.10 over the 10-year period. The annual ROIs are 55 percent and 16 percent for the 5-year and 10-year periods.

Table 5.9. ROI from Healthcare FY 2014 and 2015 Cohorts, Societal Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$5,117	\$5,117
Foregone Earnings	\$324	\$324
Total Costs	\$5,441	\$5,441
Returns		
Earnings	\$42,041	\$84,083
Fringe Benefits	\$8,408	\$16,817
Cash assistance	\$0	\$0
SNAP	\$0	\$0
UI Benefits	\$0	\$0
Taxes	\$0	\$0
<i>Total Returns</i>	<i>\$50,450</i>	<i>\$100,899</i>
Present Value of Total Returns	\$48,257	\$93,051
Returns on Investment		
Net Present Values of Returns	\$42,815	\$87,610
Percent Return	787%	1,610%
Return in Dollars	\$7.87	\$16.10
Annual ROI	55%	16%

Figures 5.5 and 5.6 summarize the costs and returns of healthcare training from the

participant, taxpayer, and societal perspectives for the 5-year and 10-year periods, respectively.

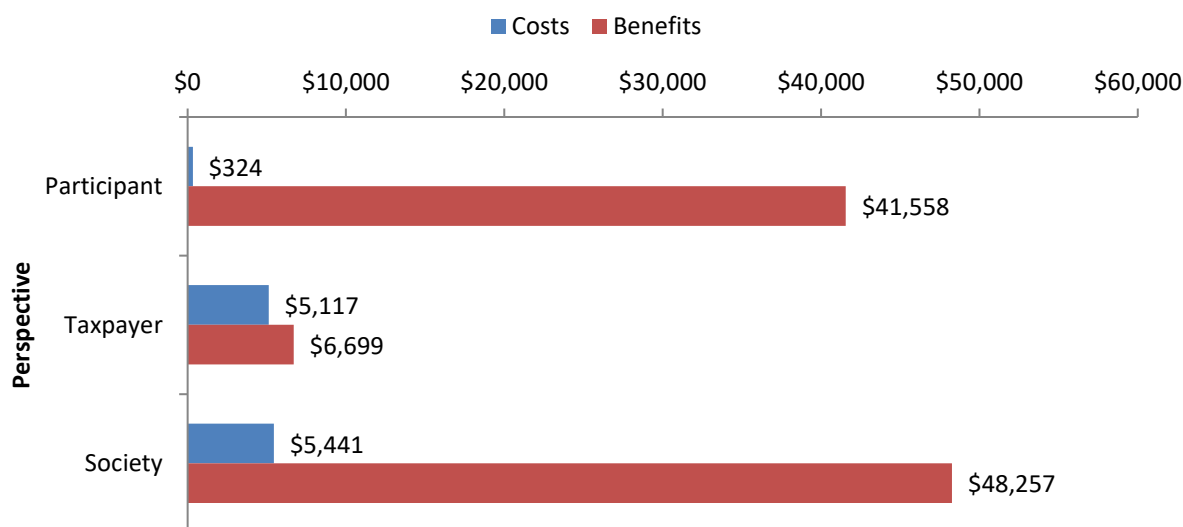
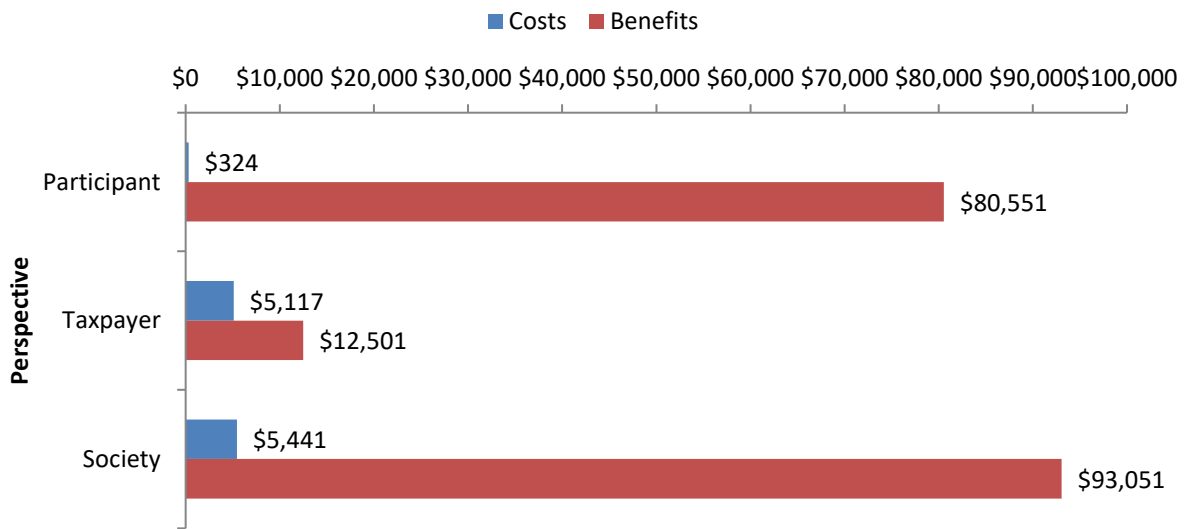
Figure 5.5. Costs and Returns from Healthcare FY 2014 and 2015 Cohorts, 5-Year Period

Figure 5.6. Costs and Returns from Healthcare FY 2014 and 2015 Cohorts, 10-Year Period

Tech Cohort Training

Participant Perspective. Table 5.10 presents expenditures, returns, and returns on investment of Tech Cohort Training from the participant perspective. Participant expenditures include \$1,615 of foregone earnings during their participation in the

program. Participant returns include increased earnings and fringe benefits. After accounting for the reduced income from cash assistance, SNAP, and UI benefits, the present value of total returns over a 5-year period are \$56,006 and \$107,995 over 10-years. This indicates an ROI of \$33.67 over 5-years and \$65.85 over 10-years.

Table 5.10. ROI from Tech Cohort FY 2014 and 2015 Cohorts, Participant Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$0	\$0
Foregone Earnings	\$1,615	\$1,615
Total Costs	\$1,615	\$1,615
Returns		
Earnings	\$58,612	\$117,223
Fringe Benefits	\$11,722	\$23,445
Cash assistance	-\$143	-\$286
SNAP	-\$466	-\$932
UI Benefits	-\$1,679	-\$3,358
Taxes	-\$9,495	-\$18,990
<i>Total Returns</i>	\$58,551	\$117,103
Present Value of Total Returns	\$56,006	\$107,994
Returns on Investment		
Net Present Values of Returns	\$54,391	\$106,379
Percent Return	3,367%	6,585%
Return in Dollars	\$33.67	\$65.85
Annual ROI	103%	52%

Taxpayer Perspective. Table 5.11 presents expenditures, returns, and returns on investment from the taxpayer perspective. Taxpayer expenditures include the \$16,105 program costs per participant. Taxpayer returns include decreased payments of cash assistance, SNAP, and UI benefits along with increased tax revenue. Over 5-years, the

present value of total returns is \$11,270, which does not cover the program costs and results in a negative ROI. However, over 10-years, returns are greater than expenditures, which results in an ROI of \$0.35. This is a 35% return for taxpayers over 10-years, or 3 percent on an annual basis.

Table 5.11. ROI from Tech Cohort FY 2014 and 2015 Cohorts, Taxpayer Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$16,105	\$16,105
Foregone Earnings	\$0	\$0
Total Costs	\$16,105	\$16,105
Returns		
Earnings	\$0	\$0
Fringe Benefits	\$0	\$0
Cash assistance	\$143	\$286
SNAP	\$466	\$932
UI Benefits	\$1,679	\$3,358
Taxes	\$9,495	\$18,990
<i>Total Returns</i>	<i>\$11,783</i>	<i>\$23,565</i>
Present Value of Total Returns	\$11,270	\$21,732
Returns on Investment		
Net Present Values of Returns	-\$4,835	\$5,627
Percent Return	-30%	35%
Return in Dollars	-\$0.30	\$0.35
Annual ROI	-7%	3%

Societal Perspective. Table 5.12 presents expenditures, returns, and returns on investment from the societal perspective. The expenditures associated with the societal perspective include \$16,105 program costs paid by the taxpayer and the participant foregone earnings of \$1,615. Returns to society

include increased earnings and fringe benefits of \$67,277 over 5-years and \$129,727 over 10-years. This is an ROI of \$2.80 over 5-years and \$6.32 over 10-years. This is a 632% return over 10 years for society. The annual ROIs are 31 percent and 22 percent, respectively.

Table 5.12. ROI from Tech Cohort FY 2014 and 2015 Cohorts, Societal Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$16,105	\$16,105
Foregone Earnings	\$1,615	\$1,615
Total Costs	\$17,720	\$17,720
Returns		
Earnings	\$58,612	\$117,223
Fringe Benefits	\$11,722	\$23,445
Cash assistance	\$0	\$0
SNAP	\$0	\$0
UI Benefits	\$0	\$0
Taxes	\$0	\$0
<i>Total Returns</i>	<i>\$70,334</i>	<i>\$140,668</i>
Present Value of Total Returns	\$67,277	\$129,727
Returns on Investment		
Net Present Values of Returns	\$49,556	\$112,006
Percent Return	280%	632%
Return in Dollars	\$2.80	\$6.32
Annual ROI	31%	22%

Figures 5.7 and 5.8 summarize the costs and returns of tech training from the participant,

taxpayer, and societal perspectives for the 5-year and 10-year periods, respectively.

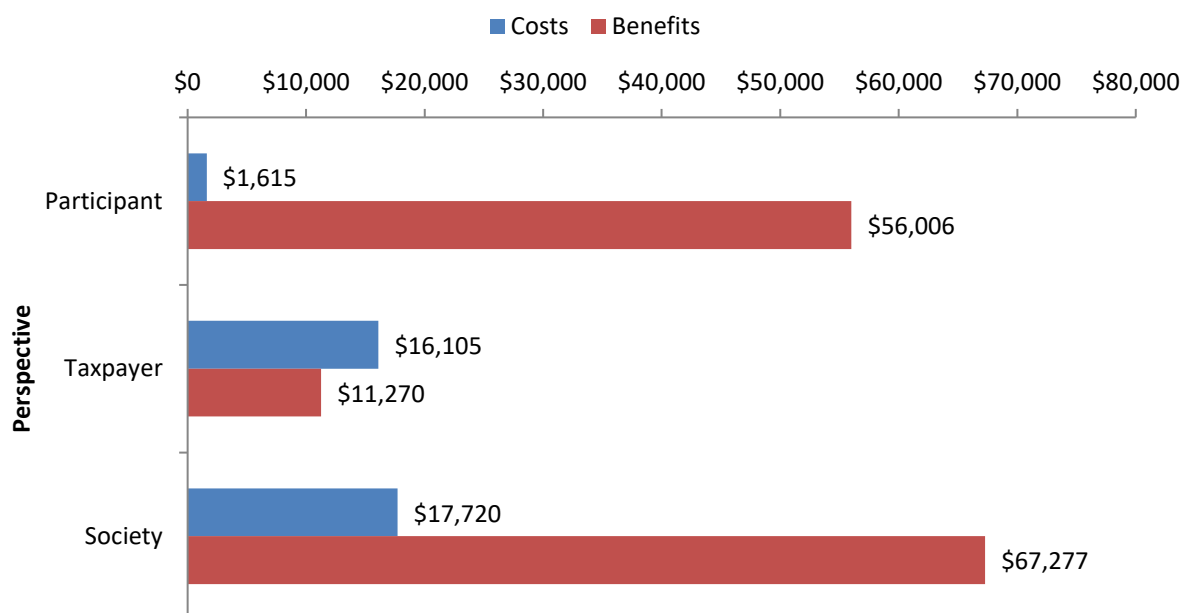
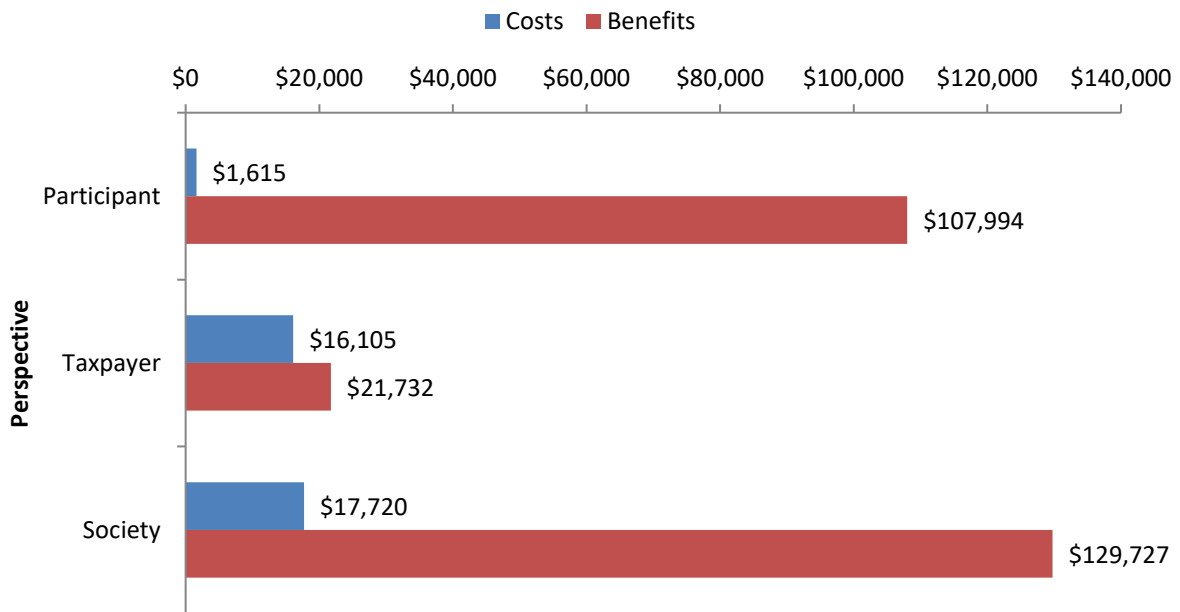
Figure 5.7. Costs and Returns from Tech FY 2014 and 2015 Cohorts, 5-Year Period

Figure 5.8. Costs and Returns from Tech FY 2014 and 2015 Cohorts, 10-Year Period



Customized Training

Participant Perspective. Table 5.13 presents expenditures, returns, and returns on investment for CT from the participant perspective. CT participants did not pay program costs or have any foregone in earnings due to program participation. Participant

earnings over a 5-year period equal \$39,886 and \$79,772 over a 10-year period. After reductions in UI, SNAP, and CA benefits, the present value of returns for program participants was \$38,957 over 5 years and \$75,119 over 10 years. Participant ROI was not calculated because participant costs were \$0.

Table 5.13. ROI from Customized Training FY 2014 and 2015 Cohorts, Participant Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$0	\$0
Foregone Earnings	\$0	\$0
Total Costs	\$0	\$0
Returns		
Earnings	\$39,886	\$79,772
Fringe Benefits	\$7,977	\$15,954
Cash assistance	-\$53	-\$105
SNAP	-\$349	-\$698
UI Benefits	-\$273	-\$546
Taxes	-\$6,462	-\$12,923
<i>Total Returns</i>	<i>\$40,727</i>	<i>\$81,454</i>
Present Value of Total Returns	\$38,957	\$75,119
Returns on Investment		
Net Present Values of Returns	\$38,957	\$75,119
Percent Return	--	--
Return Ratio	--	--
Annual ROI	--	--

Taxpayer Perspective. Table 5.14 presents expenditures, returns, and returns on investment from the taxpayer perspective. The taxpayer perspective includes program costs of \$2,815 per participant. Taxpayers received returns due to increased tax revenue and decreased payments of UI, SNAP, and CA benefits. The present value of taxpayer returns

are \$6,826 over the 5-year period and \$13,162 over the 10-year period. Therefore, each dollar invested in CT is associated with returns to taxpayers of \$1.42 over the 5-year period or 19 percent on an annual basis. The 10-year ROI is \$3.68 or 17 percent on an annual basis.

Table 5.14. ROI from Customized Training FY 2014 and 2015 Cohorts, Taxpayer Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$2,815	\$2,815
Foregone Earnings	\$0	\$0
Total Costs	\$2,815	\$2,815
Returns		
Earnings	\$0	\$0
Fringe Benefits	\$0	\$0
Cash assistance	\$53	\$105
SNAP	\$349	\$698
UI Benefits	\$273	\$546
Taxes	\$6,462	\$12,923
<i>Total Returns</i>	<i>\$7,136</i>	<i>\$14,272</i>
Present Value of Total Returns	\$6,826	\$13,162
Returns on Investment		
Net Present Values of Returns	\$4,011	\$10,347
Percent Return	142%	368%
Return in Dollars	\$1.42	\$3.68
Annual ROI	19%	17%

Societal Perspective. Table 5.15 presents expenditures, returns, and returns on investment from the taxpayer perspective. The societal perspective includes program costs of \$2,815. The present value of total returns is

\$45,783 over 5 years and \$88,466 over 10 years. This return includes increased earnings and fringe benefits for participants.. This results in ROIs of \$15.26 over 5 years and \$30.36 over 10 years.

Table 5.15. ROI from Customized Training FY 2014 and 2015 Cohorts, Societal Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$2,815	\$2,815
Foregone Earnings	\$0	\$0
Total Costs	\$2,815	\$2,815
Returns		
Earnings	\$39,886	\$79,772
Fringe Benefits	\$7,977	\$15,954
Cash assistance	\$0	\$0
SNAP	\$0	\$0
UI Benefits	\$0	\$0
Taxes	\$0	\$0
<i>Total Returns</i>	<i>\$47,863</i>	<i>\$95,726</i>
Present Value of Total Returns	\$45,783	\$88,281
Returns on Investment		
Net Present Values of Returns	\$42,968	\$85,466
Percent Return	1,526%	3,036%
Return in Dollars	\$15.26	\$30.36
Annual ROI	75%	41%

Figures 5.9 and 5.10 summarize the costs and returns of CT from the participant, taxpayer,

and societal perspectives for the 5-year and 10-year periods, respectively.

Figure 5.9. Costs and Returns from Customized Training FY 2014 and 2015 Cohorts, 5-Year Period

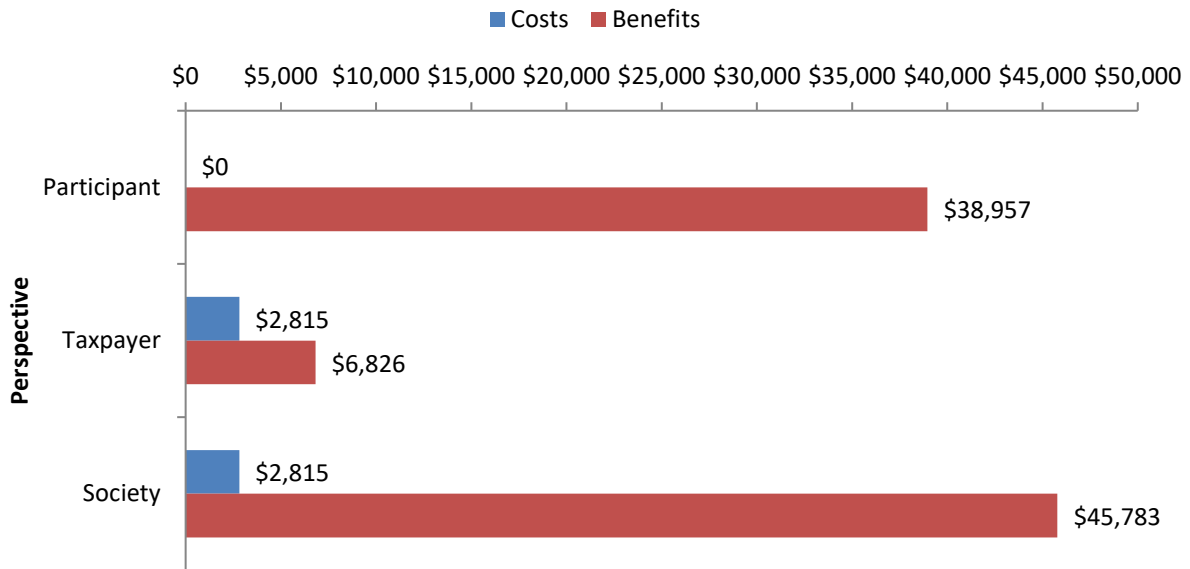
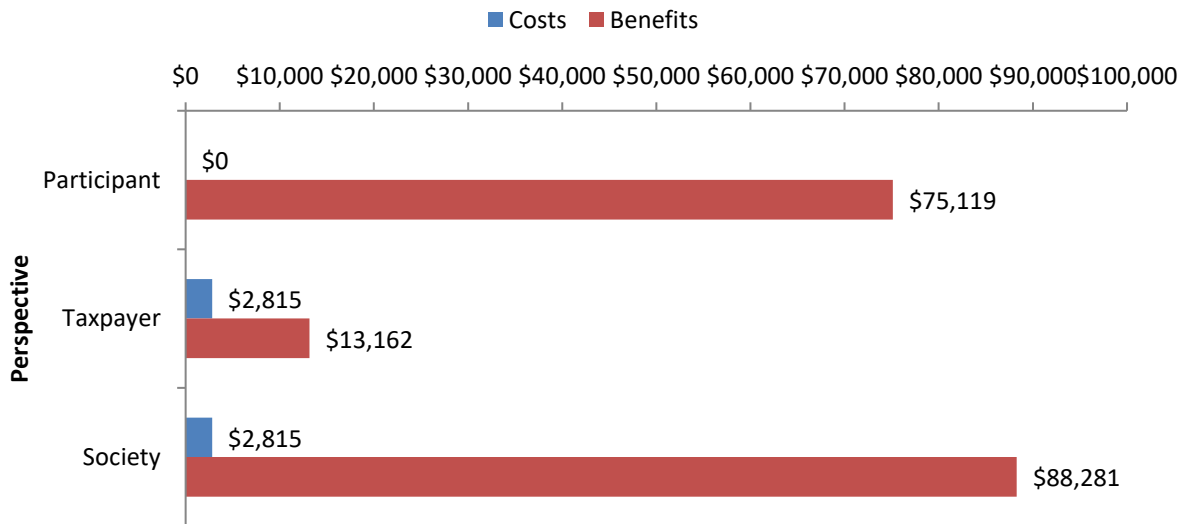


Figure 5.10. Costs and Returns from Customized Training FY 2014 and 2015 Cohorts, 10-Year Period



On-the-Job Training

Participant Perspective. Table 5.16 presents expenditures, returns, and returns on investment for OJT from the participant perspective. Participant foregone earnings are negative for OJT participants. Negative foregone earnings indicate the OJT participants actually earned more than the comparison group since the former work while

participating in training. The present value of total returns for participants is \$46,766 over the 5-year period. These returns are from an increase in earnings, after deducting increased taxes and lower receipt of CA and SNAP Combined, this indicates a net present value of returns of \$48,281 over 5-years and \$91,691 over 10 years. Participant ROI was not calculated because participant costs were negative.

Table 5.16. ROI from On-the-Job Training FY 2014 and 2015 Cohorts, Participant Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$0	\$0
Foregone Earnings	-\$1,515	-\$1,515
Total Costs	-\$1,515	-\$1,515
Returns		
Earnings	\$46,191	\$92,382
Fringe Benefits	\$9,238	\$18,476
Cash assistance	-\$163	-\$325
SNAP	-\$951	-\$1,902
UI Benefits	\$2,058	\$4,116
Taxes	-\$7,483	-\$14,966
<i>Total Returns</i>	<i>\$48,891</i>	<i>\$97,782</i>
Present Value of Total Returns	\$46,766	\$90,176
Returns on Investment		
Net Present Values of Returns	\$48,281	\$91,691
Percent Return	--	--
Return in Dollars	--	--
Annual ROI	--	--

Taxpayer Perspective. Table 5.17 presents expenditures, returns, and returns on investment from the taxpayer perspective. Taxpayer expenditures include the \$4,338 per participant program cost. The total returns include increased tax revenue and decreased payment of CA and SNAP, which lead to a total return of \$6,254 over 5 years and \$12,060

over 10 years. Taxpayers actually pay increased UI benefits, which likely reflects the fact that participants are more likely to be eligible for UI due to OJT. The ROI from the taxpayer perspective is \$0.44 over 5 years and \$1.78 over 10 years. The annual ROIs are 8 percent and 11 percent, respectively.

Table 5.17. ROI from On-the-Job Training FY 2014 and 2015 Cohorts, Taxpayer Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$4,338	\$4,338
Foregone Earnings	\$0	\$0
Total Costs	\$4,338	\$4,338
Returns		
Earnings	\$0	\$0
Fringe Benefits	\$0	\$0
Cash assistance	\$163	\$325
SNAP	\$951	\$1,902
UI Benefits	-\$2,058	-\$4,116
Taxes	\$7,483	\$14,966
<i>Total Returns</i>	<i>\$6,538</i>	<i>\$13,077</i>
Present Value of Total Returns	\$6,254	\$12,060
Returns on Investment		
Net Present Values of Returns	\$1,916	\$7,722
Percent Return	44%	178%
Return in Dollars	\$0.44	\$1.78
Annual ROI	8%	11%

Societal Perspective. Table 5.18 presents expenditures, returns, and returns on investment from the societal perspective. The societal perspective expenditures include the \$4,338 program cost paid by the taxpayer and the -\$1,515 in foregone earnings that represent

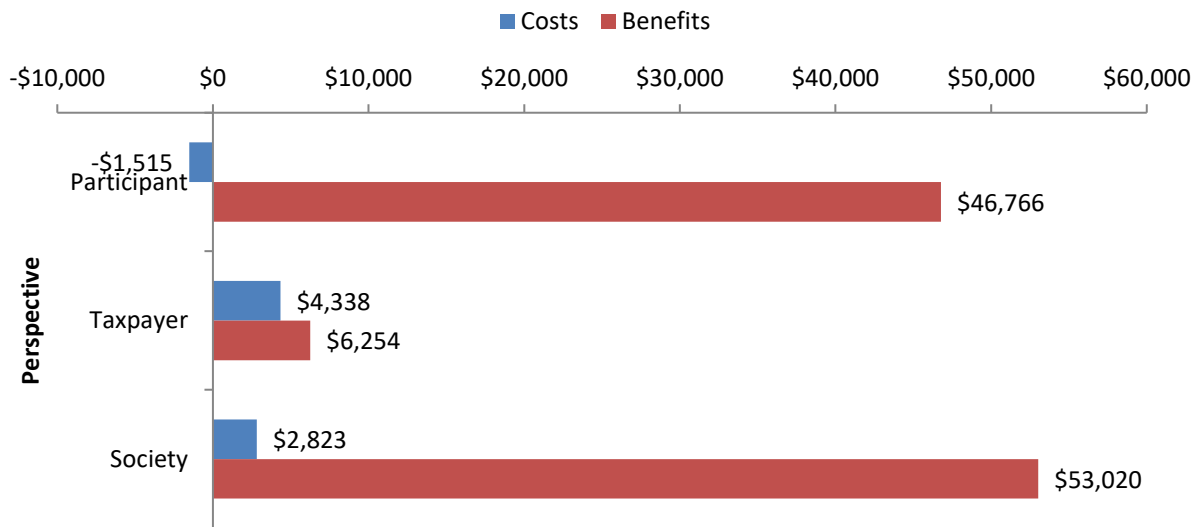
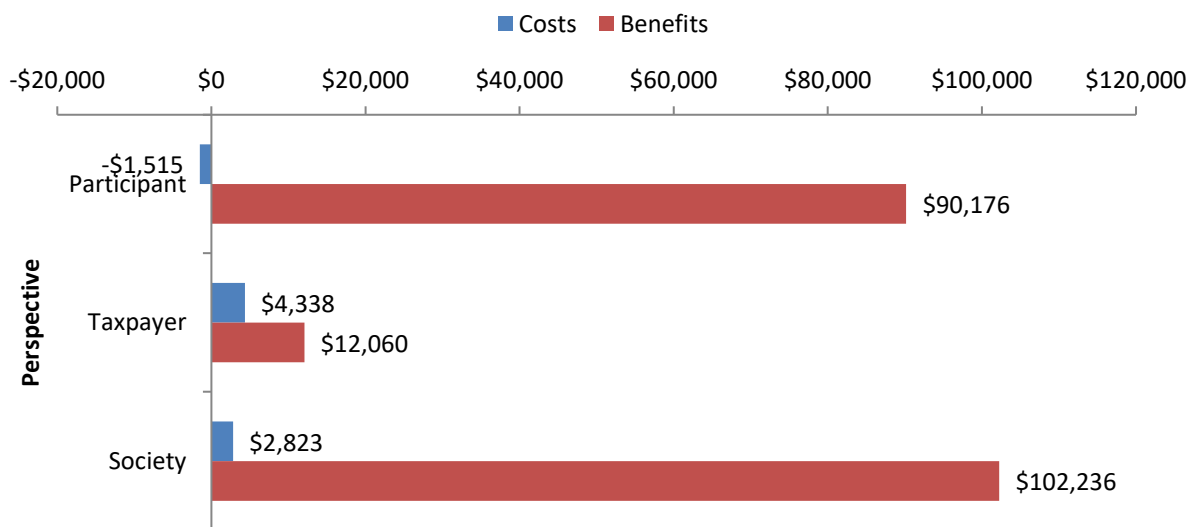
the increased earnings of participants during training. Returns include increased earnings and fringe benefits for participants. Societal returns are \$53,020 over 5 years and \$102,236 over 10 years. This results in ROIs of \$17.78 over 5 years and \$35.21 over 10 years.

Table 5.18. ROI from On-the-Job Training FY 2014 and 2015 Cohorts, Societal Perspective

	5-Year Period	10-Year Period
Expenditures		
Program Costs	\$4,338	\$4,338
Foregone Earnings	-\$1,515	-\$1,515
Total Costs	\$2,823	\$2,823
Returns		
Earnings	\$46,191	\$92,382
Fringe Benefits	\$9,238	\$18,476
Cash assistance	\$0	\$0
SNAP	\$0	\$0
UI Benefits	\$0	\$0
Taxes	\$0	\$0
<i>Total Returns</i>	\$55,429	\$110,859
Present Value of Total Returns	\$53,020	\$102,236
Returns on Investment		
Net Present Values of Returns	\$50,197	\$99,413
Percent Return	1,778%	3,521%
Return in Dollars	\$17.78	\$35.21
Annual ROI	80%	43%

Figures 5.11 and 5.12 summarize the costs and returns of OJT from the participant, taxpayer,

and societal perspectives for the 5-year and 10-year periods, respectively.

Figure 5.11. Costs and Returns from On-the-Job Training FY 2014 and 2015 Cohorts, 5-Year Period**Figure 5.12. Costs and Returns from On-the-Job Training FY 2014 and 2015 Cohorts, 10-Year Period**

Sensitivity Analysis

Like most ROI analyses, the current analysis was based on several major assumptions. To test the sensitivity of these ROI results, several assumptions used to calculate the 10-year ROI were varied and the results were compared to the “benchmark” ROI estimates in this section.

These included changes in the discount rate, assumptions about decay of impacts, assumptions about the size of impacts, and excluding non-significant impacts. These analyses are displayed in Appendix G.

The benchmark estimates assumed a discount rate of 1.5 percent. Using discount rates of 0

percent and 3 percent did not substantially change the ROI estimates.

The benchmark estimates use decay rates for the impacts based on data from earlier cohorts of training program participants. As a sensitivity analysis, a more conservative approach was taken and it was assumed that the impacts decayed to 0 (100% decay) by the end of year 6, which has been observed in evaluations of welfare-to-work programs. From the participant and societal perspectives, all training programs maintained positive returns on investment. From the taxpayer perspective, ROIs for Health Cohort Training, Tech Cohort Training, and OJT became negative when the impacts were fully decayed by the end of year 6.

The impacts used to calculate ROI are based on a non-experimental design. For this reason, it is possible that some of the impact may not be causal but rather due to selection bias owing to differences in unobserved preexisting factors (e.g., motivation) between training participants and WF1CC participants. This would likely cause the impact estimates to be higher. As another sensitivity analysis, it was assumed that 50 percent of the impact estimates were non-causal. In other words, all of the impact estimates were reduced by 50 percent. The participant and societal ROIs

were reduced but remained positive for all of the training programs when the impacts were reduced by 50 percent. However, the taxpayer ROI for Tech Cohort Training became negative after reducing impacts by 50 percent.

Third, as discussed, some of the impacts were not statistically significant owing to the small sizes for some of the analyses. The benchmark estimates included all of the impacts. An additional sensitivity analysis excluded non-significant impacts from the ROI calculations. The ROI estimates were reduced but all of the trainings programs sustained a positive ROI after removing non-significant impacts.

A final sensitivity analysis included FY 2014 job training program participants only for the programs that had sufficient sample sizes to estimate impacts. These include ITGs, Healthcare, Customized Training, OJT, and Tech. The ROIs for ITGs and Healthcare were unchanged compared to when both FY 2014 and 2015 cohorts were included. However, taxpayer and societal ROIs for both CT and OJT were substantially reduced. This was due to the fact that FY 2014 participants in these two programs had lower earnings impacts compared to when both cohorts were pooled in the analysis.

6. Conclusions and Policy Implications

This study represents a first attempt to calculate ROI estimates for industry-focused job training programs managed by SBS. Overall the findings found that investing in job training yielded between \$6.32 and \$35.21 for every dollar invested over and above what might have otherwise been achieved in a standard job screening and matching program, from a societal perspective.

The analysis is limited in several ways. Most importantly, sample sizes were quite small and many of the impacts were not significant. In addition, several major assumptions were involved in extrapolating benefits from the relatively short follow-up period to estimate returns several years in the future. This makes it problematic to compare ROI across training programs because the impacts of some of the programs may continue to grow over time whereas others may decrease. While the projections were based on observed data from earlier cohorts of program participants, it is impossible to know the course of future impacts with any certainty.

It is important to note that several potential benefits of job training were not included in this study, including:

1. Decreased Medicaid utilization;
2. Decreased criminal justice system costs;
3. Increases in property and sales taxes;
4. Increases in employer output;
5. Multiplier effects on the economy; and
6. Increases in quality of life for participants and families due to employment and other services provided.

Overall, the results generally indicate that the job training programs included result in a positive ROI to participants, taxpayers, and society. Participant returns are extremely generous

because most participants are earning very little when they begin job training.

Taking these additional benefits into account may potentially increase the societal ROI of the job training programs. This study included taxpayer costs but did not include employer costs and benefits for Customized Training and OJT. Future research should seek to examine these additional benefits and costs.

In terms of recommendations, there are several. First, we recommend that the NYC include ROI estimates in their budgetary decisions about funding levels for various job training programs. ROI estimates should not be the only piece of information taken into consideration, but it should be used in conjunction with other data to make decisions about which job training programs are most likely to yield high taxpayer returns. ROI should be used alongside other metrics, such as performance metrics, to better gauge the effectiveness of programs. ROI is likely to vary based on the population served and costs of programs.

Second, the results of ROI studies could be used to advertise the program to participants. Participants often do not have access to information about employment outcomes as a result of program participation. Information gleaned from rigorous ROI studies could be communicated to participants (such as through social media) to help inform their decisions about training participation. People have inadequate labor market information about the types of outcomes that are likely to result from these programs.

Finally, NYC should make ROI analysis a regular part of its program performance metrics. The results of this analysis should be considered a first exploration and indicate that it is possible to access administrative data and calculate ROI. Future analysis should draw on extended follow-up data for the cohorts

included in this study to calculate ROIs that are based on at least 12 quarters of data to avoid extrapolation of benefits into the future.

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Appendix A. Data Editing

SBS provided several files containing data on participants in each of the job training programs as well as participants in the WF1CCs to serve as the comparison pool. Data on ITG participants were in one file and data on participants in the other trainings (non-ITG) were included in several additional files. Additional files contained data on participant demographic characteristics, pre-training work

history and job placement outcomes, and services received. Records from provided from FY 2011 (July 1, 2010) through January 2016 but the specific dates available varied by training program. Table A.1 below shows the number of records and unique individuals in each of the programs based on the original files provided by SBS.

Table A.1. Records in Original Files and Analysis File, FY 2014-15

Program	Number of Records	Unique Individuals	Excluded for no SSN	Excluded for missing sex	Number of unique individuals remaining
ITG	2,776	2,767	10	30	2,727
Industrial	128	128	2	0	126
Healthcare	834	820	29	10	781
Tech	146	146	9	0	137
Customized Training	544	438	10	0	428
OJT	269	269	1	6	262

Creation of a combined analysis file required several steps. The first step involved understanding the reasons for multiple records. Some individuals had more than one record in each of the training programs or WF1CC. In some cases these records were found to be exact duplicates (i.e., all of the information was the same). Exact duplicates were only found in the WF1CC file. These cases were excluded and only one record was kept. In the training program files, multiple records for the same individual were usually due to the person having enrolled in the training more than once. In these instances, only the record associated with the first enrollment in the period of interest was retained. An alternative would have been to retain the records, but the occurrence was so rare that the method of handling them in the analysis would make no difference in the results. It was deemed

preferable to exclude them to avoid complications associated with estimating standard errors due to clustering. Another reason for repeated records was that the records represented administrative actions rather than multiple training enrollments. For example, in the ITG file training courses and associated exam fees were sometimes listed as separate records even though both pertain to the same training encounter. Still, in some instances, there was no clear reason for the multiple records. However, training program participants could have been enrolled in one or more of the other training programs included in the analysis.

Individuals served by WF1CC who were also enrolled in one of the training programs during the time period for which we had data were excluded from the comparison pool.

Records with missing Social Security Number (SSN) had to be excluded. This is the unique identifier used to link records and if it was missing we were unable to access administrative data on outcomes from NYSDOL or HRA.

Demographic variables were examined for missing data. Every effort was made to avoid excluding training program participants with missing data. Individuals who were missing data on gender or who had missing or implausible values of age were excluded. The reason for excluding participants who were missing gender was because exact matching was performed on this variable. The number excluded for missing gender or age varied across programs was just about 1 percent of participants.

The distribution of quarterly earnings was examined for each program and top coded at \$50,000. For a small number of participants who had very high earnings (some showing earnings in the millions per quarter), that data were clearly in error. The distribution of UI benefits, CA, and SNAP were also examined and found to be reasonable, so no top-coding was performed for these variables.

Several records with missing enrollment dates had to be excluded from the ITG file. Exit dates that were missing for some of the training

programs and had to be imputed. For the Customized Training program, the exit dates that were provided were examined and found to be implausible when they were compared to the enrollment dates. The exit date was set to be six months from the date that the participant began training. This decision was based on the fact that employers have one year to conduct training, so 6 months is a reasonable mid-point imputation. For the OJT program, the exit dates provided were in many cases one or more years from the enrollment date. The OJT program provides training during the first 3 months of employment, so these values were deemed implausible and imputed. All OJT program exit dates were imputed to be 3 months from the enrollment date.

Finally, some recoding of missing values had to be done for the propensity score models. Every effort was made to retain job training participants in the analysis rather than exclude them due to missing data. A few participants had ambiguous values of education of education (e.g., “High School or Above”). These individuals were assumed to be high school graduates, since this was the most common category. In all other cases, missing data on covariates was set to the reference category for use in the propensity score models.

Appendix B. Impact Estimation Methodology

Propensity score matching was used to estimate the effects of participation in most of the job training programs. Propensity score matching has become a popular tool in program evaluation (Rosenbaum and Rubin 1983) when random assignment is impossible or unethical. Propensity score matching enables evaluators to compare the outcomes of two groups (program and “business as usual”) who are similar on observable characteristics. The main problem of observation studies such as this is whether the observed outcomes of training participants would have occurred even if they had not participated in training. Simple comparisons of training program participants and WF1CC participants can lead to biased estimates because individuals self-select into training based on their individual characteristics, interests, and work history. Each individual has two sets of potential outcomes, those that occur under participation in a training program and those that occur in the absence of participation. For participants in a training program, we can only observe the outcomes that occur under participation. The outcomes that would have occurred if they had not participated are unobserved and must be inferred (the counterfactual). To do this, we formed another group to represent what the training participants’ outcomes would have been had they not participated. Because they are similar, the outcomes of the comparison group should represent what the participants’ outcomes would have been if they had not participated in the program, with some important caveats discussed below.

For ITG, healthcare, industrial, tech, and OJT, the comparison pool was drawn from WF1CC participants who did not enroll in training. While a prior evaluation used Healthcare Career Center and Industrial Career Center participants as the comparison pool for healthcare and industrial trainings, this study used WF1CC participants because the former

were found not to be suitable comparison groups. The main reason is that some of the trainings were targeted toward low-income individuals who were more similar to WF1CC participants than SFCC participants. The impact estimates in this report do not represent the impact of receiving training compared to no services at all but rather the incremental or value added impact of training versus participation in a workforce development program without training. The outcomes examined included earnings, UI benefit payment, CA, and SNAP after exit from training.

The use of WF1CC participants as a comparison group for tech training participants was somewhat problematic because some of the training participants are students enrolled in college degree programs. Reliable information about school enrollment was not provided in the Worksource1 data for the comparison group. Moreover, the use of pre/post methodology for tech trainings was explored would have been even more inappropriate because college students do not have pre-earnings. The tech training participants experienced a large gain in earnings, part of which is due to simply completing a degree rather than to training. To examine the sensitivity of the findings, we limited the comparison group to WF1CC participants who had a bachelor’s degree or higher. While these participants would not be expected to see the same increase in earnings post-exit as those who earned a degree, their post-exit earnings would be expected to be higher. This analysis did not lead to substantially different results. However, the impact estimates for tech training should be interpreted with caution given the fact that the comparison group’s college enrollment status could not be determined.

Prior to propensity score matching, individuals who did not meet the basic training program eligibility criteria (e.g., at least 18 years of age, resident of NYC), were removed from the WF1CC comparison pool. Some of the training programs had specific eligibility criteria that could not be determined for the comparison pool. For example, tech training participants must have not worked previously as a web developer. We do not think that the inability to exclude comparison pool individuals based on such criteria is a major limitation.

Propensity score matching entails several steps. The first step is to estimate the propensity scores. For each training program, we constructed a data set that included both the training program participants and comparison pool. A variable was coded 1 if the record was from the training group and 0 if it was from the comparison pool. The propensity score is the conditional probability of receiving treatment, which is, in this case, participation in a job training program. The propensity score is estimated with a logistic regression model:

$$Y_i = \beta_1 T_i + \beta_2 X_i,$$

where $T_i = 1$ if individual i participated in a job training program, X_i is a vector of covariates for individual i that predict participation in a job training program and potential confounding variables of the association between the decision to participate and employment and earnings, and β is a vector of parameter estimates for a set of covariates X_i . Separate propensity score models were estimated for the probability of participation in each training program as opposed to a WF1CC. Table B.1 describes the variables included in the propensity score model and their source. The model was built upon and extended the model used by Hollenbeck and Huang (2014).

There are numerous ways to use propensity scores in an analysis, including stratification,

matching, weighting, and covariate adjustment (Stuart, 2010). In this study, we chose matching. The second step in propensity score matching is to use the predicted probabilities or “propensities” from the logistic regression to match individuals in the treated group to control individuals with similar propensities for treatment but who did not receive treatment. In this case this meant matching training program participants to WF1CC participants who were similar on the observed characteristics included in the logistic regressions but who did not participate in a training program. While there are many methods for matching, we used a common method known as one-to-one nearest neighbor matching (Rubin 1973). In nearest neighbor matching, the data are randomly sorted and a “greedy” algorithm is used to find the closest match for a treated (training participant) individual from the comparison group (WF1CC participant) that meets the matching criteria. A match is chosen for each treated individual one at a time. To ensure close matches, we required matches to have propensity scores within .10 (or 10%) of the propensity score of the treatment case to which it was matched. Matching was done without replacement, meaning that once a comparison individual had been chosen as a match, they could not be chosen again as a match for another treated individual. Matching was performed separately for males and females.

The goal of propensity score matching is to achieve “balance”—that is, to ensure a similar distribution of measured background characteristics between the treated and control groups. The extent to which matching achieves balance can be assessed by comparing the distribution of the matching covariates before and after matching. Checking balance is the third step. To assess balance, we used t-tests and a measure of standardized bias, as recommended by Rosenbaum and Rubin (1985). The standardized bias is a measure of the standardized difference between the

treatment and control group means. Covariates with standardized bias less than .20 are considered to be balanced. Propensity score matching was able to achieve acceptable balance on most of the covariates, arguably the most important of which is prior earnings.

The fourth and final step in propensity score matching is to estimate the program effects. If propensity score matching was successful in forming similar comparison groups, then program effects can be obtained by simply comparing the average outcomes of the training participants and matched WF1CC participants. Another approach is to use regression analysis on the matched data. The regression analysis would include all of the covariates included in matching. Such “doubly robust” estimation (Bang and Robins, 2005) controls for any residual differences that may remain after matching and can improve the precision of the estimates, which was a

particular concern given the small number of participants in some of the training programs. For each outcome, we estimated a regression model that included a treatment indicator for training participation as well as all of the covariates included in the propensity score models.

It is important to note that while propensity score matching is an improvement over standard regression adjustment for estimating program impacts, it does have its limitations. Specifically, propensity score matching addresses only selection on observed characteristics that are available to evaluators are included in the matching process. Unlike a randomized experiment, propensity score matching does not guard against selection on unobserved characteristics. If participants and non-participants differ in ways that are unobserved, the treatment impact estimates may be biased.

Table B.1. Baseline Variables for Matching and Statistical Adjustment of Impact Estimates

Variable	Description of Coding
Female	Binary based on SBS data: 1=female, 0=male
Non-white	Binary based on SBS data: 1=non-white, 0=white
Age	Based on SBS data
Disabled	Binary based on SBS data: 1=yes, 0=no
Veteran	Binary based on SBS data: 1=yes, 0=no
Less than high school graduate	(Reference category) Dummy based on SBS data: 1=less than high school graduate or GED, 0=otherwise
High school graduate	Dummy based on SBS data: 1= high school graduate or GED, 0=otherwise
Some college or vocational	Dummy based on SBS data: 1= some college/no degree, Associate's degree, or vocational, 0=otherwise
Bachelor's degree	Dummy based on SBS data: 1=Bachelor's degree or higher, 0=otherwise
Bronx	(Reference category) Dummy based on SBS data: 1=Bronx, 0=otherwise
Brooklyn	Dummy based on SBS data: 1=Brooklyn, 0=otherwise
Manhattan	Dummy based on SBS data: 1=Manhattan, 0=otherwise
Queens	Dummy based on SBS data: 1=Queens, 0=otherwise
Staten Island	Dummy based on SBS data: 1=Staten Island, 0=otherwise
Single parent	Binary based on SBS data: 1= yes, 0=no
Percent of quarters employed	Based on NYSDOL data: Percent of quarters employed of quarters 1 to 8 before enrollment
Quarterly earnings	Based on NYSDOL data: Average earnings in quarters 1 to 8 before employment
Earnings trend	Based on NYSDOL data: Slope of earnings in pre-enrollment quarters 1 to 8
Earnings variation	Based on NYSDOL data: Coefficient of variation in earnings in pre-enrollment quarters 1 to 8

Table B.1. Baseline Variables for Matching and Statistical Adjustment of Impact Estimates (continued)

Variable	Description of Coding
Turnover	Based on NYSDOL data: Number of job changes per quarter in pre-enrollment quarters 1 to 8
Earnings dip	Based on NYSDOL data: 1 = Earnings decline of 20 percent or more in pre-enrollment quarters 1 to 8, 0 = otherwise
Percent earnings dip	Based on NYSDOL data: Percent of previous earnings that the dip represents, 0 = no dip or dip less than 20 percent
Time since earnings dip	Based on NYSDOL data: Number of quarters before enrollment dip occurred, 0 = no dip or dip less than 20 percent
Received UI benefits in past 2 years	Based on NYSDOL data: 1 = Yes, 0 = No
Percent of quarters received UI	Based on NYSDOL data: Average number of quarters received UI benefits in pre-enrollment quarters 1 to 8
Average UI benefit	Based on NYSDOL data: Average quarterly UI payment in pre-enrollment quarters 1 to 8
Received CA in past 2 years	Based on HRA data: 1 = Received cash assistance in pre-enrollment quarters 1 to 8, 0 = otherwise
Percent of quarters received CA	Based on HRA data: Percent of quarters received cash assistance in pre-enrollment quarters 1 to 8
Average CA benefit	Based on HRA data: Average quarterly cash assistant amount in pre-enrollment quarters 1 to 8
Received SNAP in past 2 years	Based on HRA data: 1 = Received SNAP in pre-enrollment quarters 1 to 8, 0 = otherwise
Percent of quarters received SNAP	Based on HRA data: Percent of quarters received SNAP in pre-enrollment quarters 1 to 8
Average SNAP benefit	Based on HRA data: Average quarterly SNAP payment in pre-enrollment quarters 1 to 8
Industry	Based on NYSDOL data: Two-digit NAICS code of most recent employer before enrollment

We used a “post-minus-pre” approach to estimate the impacts for the Customized Training program. In this approach, the treatment impact is estimated as a deviation from past earnings. This approach is generally considered weaker than the propensity score matching for evaluation of employment and training programs because participants’ earnings are likely to increase to some extent in the absence of the training. For this reason, the pre-post approach likely overestimates impacts. One important consideration is which

pre-enrollment period to use as the “pre” measure of earnings. Hollenbeck (2008) used pre-enrollment quarters 2 to 8 to avoid the period of the “Aschenfelter dip,” a well-documented drop in earnings in the period just before program entry due to the fact that individuals seek training during periods of labor market distress (Aschenfelter & Card, 1985). The Virginia ROI study used the first quarter before enrollment (Harper-Anderson & Jin, 2014). The authors’ justification was that workforce programs should be expected to

bring earnings back to where they were upon enrollment. Still another study used the symmetric pre-enrollment quarter (Andersson et al., 2013). For the Customized Training program, earnings in each quarter after enrollment were compared to average earnings in the first two quarters before enrollment. The first two quarters quarter before enrollment were chosen because Customized Training participants showed an increase in earnings prior to enrollment, and the first and second

quarters had the highest earnings of all quarters before enrollment. An alternative strategy would have been to use the average earnings from all quarters before enrollment. However, this would have overstated the earnings gain since earnings increased prior to participation. One limitation of the pre-post design is that we do not know whether the gains would have occurred in the absence of training, so the impacts are likely overestimated to some degree.

Appendix C. Further Details on ROI Assumptions

This appendix describes the background and assumptions used to calculate the ROI estimates in greater detail.

Program Cost Data

Program cost data was provided by Leigh Shapiro of SBS for most of the training programs. For ITGs, direct training cost data came from the cost of vouchers in each participants' electronic records. ITGs can be used for tuition, books, and supplies but there is a cap on the voucher amount. Participants whose training costs exceed the voucher amount would have to pay the difference out of pocket. While SBS did not have data on how often this occurs, they believed it was rare. For healthcare, industrial, and tech trainings, SBS provided data on cost of each training course. The costs include the direct costs as well as administrative costs associated with recruitment and screening of trainees. To

calculate an average cost per trainee, the cost of each course was multiplied by the number of trainees and aggregated to obtain a total program cost weighted by the number of trainees. This was then divided by the total number of trainees to obtain an average cost per participant across training programs for different occupations. Customized Training expenditure data only included data on direct costs associated with employers and not administrative costs. Therefore, this information had to be obtained from the Customized Training budget, which was made available to the authors by NYC Opportunity. Finally, data on OJT costs were available in the form of total expenditures, which again included a percentage of direct wage costs. Table C.1 shows the costs used in the ROI analysis. All program costs were inflated to 2016 dollars. The cost used in the ROI analysis was the average of FY 2014-15 costs.

Table C.1. Training Costs per Participant, by Program and Year

Program	FY 2014			FY 2015			Cost Used in ROI
	Total	Number Served	Cost (2016\$)	Total	Number Served	Cost (2016\$)	
ITGs	\$2,375,694	1,458	\$1,644	\$1,919,863	1,322	\$1,463	\$1,553
Healthcare	\$1,931,642	357	\$5,458	\$2,261,812	477	\$4,777	\$5,117
Industrial	\$409,202	98	\$4,212	\$226,482	30	\$7,606	\$5,909
Tech	\$1,252,231	114	\$11,079	\$671,211	32	\$21,132	\$16,105
CT	\$598,111	187	\$3,226	\$598,995	251	\$2,404	\$2,815
OJT	\$265,208	163	\$1,641	\$479,101	85	\$5,678	\$4,338

Projecting Future Benefits

Returns were projected for 5-year and 10-year periods. Too few quarters of follow-up data were available for the training programs to make projections based on the observed quarterly trends in impacts. To project future

benefits, data on early cohorts training program participants was used to determine decay or growth rates. SBS made available data on FY 2012-13 ITG, Customized Training, healthcare training, and industrial training participants. Data was available for up to three years after exit (12 quarters) for these training

participants. For each program, quarterly impacts were calculated using the impact estimation methodology described above. The comparison pool was drawn from WF1CC participants served during the same period. Impacts over up to 12 quarters after exit were then examined. If earnings impacts increased during the follow-up period, a conservative approach was taken and it was assumed that a constant differential was maintained between the program and comparison groups and the impact for future quarters was assumed to be equal to the impact in the last quarter observed. If, on the other hand, earnings impacts were observed to decrease over time, a decay factor was applied at the same rate to future quarters. In some cases, there was no clear pattern and the future benefits were assumed to be equal to the benefit in the second quarter after exit.

A similar approach was followed for UI benefits, SNAP, and CA. In cases where a decay rate was applied to public assistance benefits, the impacts were never projected to be positive. In other words, it was never assumed that training program participants were receiving more public assistance benefits than the matched comparison group. The projection simply stopped at zero impact.

Data on early cohorts of tech and OJT participants were not available to be used in the

projection since these programs are relatively new. Given that most of the other training programs exhibited growth or constant impacts over the follow-up period, for these two programs, impacts were held constant at the level of the second quarter after exit.

Table C.2 shows the projection assumptions based on the data observed for the earlier cohorts through 12 quarters.

For ITGs, earnings impacts were observed to increase and so were held constant to be conservative. SNAP and CA impacts were observed to decrease (training participants received fewer benefits over time) and were held constant to be conservative. UI benefits were assumed to decay at a rate of .7928 per quarter.

For healthcare training, earnings were observed to increase and were held constant. SNAP benefits were relatively constant over time and held constant in the analysis. CA benefits were observed to decrease and were decayed at a rate of .5927 per quarter. UI benefits were assumed to decay at a rate of .5472 per quarter. For industrial training, UI benefits were assumed to decay at a rate of .5754 per quarter.

Table C.2. Decay Rate Assumptions

Training Program	Earnings	CA	SNAP	UI
ITG	0	0	0	.7928
Healthcare	0	.5927	0	.5472
Industrial	0	0	.8347	.5754
Tech	0	0	0	0
Customized Training	0	0	0	0
OJT	0	0	0	0

Appendix D. Balance on Baseline Characteristics Before and After Matching

Table D.1. Variable Means of the ITG Study Sample before and after Matching

Variable	Before Matching				After Matching			
	ITG	WFICC	P-value	Std. Bias	ITG	WFICC	P-value	Std. Bias
Female (%)	44.2	52.2	<.0001	0.1596	42.2	42.2	1.0000	0.0000
Non-white (%)	81.6	80.7	0.3884	0.0234	81.6	82.7	0.2734	0.0297
Age at enrollment	34.6	33.6	0.0049	0.0787	34.8	35.1	0.3997	0.0228
Veteran (%)	11.5	4.4	<.0001	0.2658	11.7	12.5	0.3394	0.0259
Education level (%)								
Less than high school	1.0	12.8	<.0001	0.4772	1.4	1.4	1.0000	0.0000
High school diploma/GED	37.8	35.6	0.0935	0.0449	38.9	40.5	0.2566	0.0307
Some college	43.2	36.5	<.0001	0.1371	41.5	41.0	0.7002	0.0104
Bachelor degree or higher	18.1	15.2	0.0029	0.0775	18.1	17.1	0.3373	0.0260
Borough (%)								
Bronx	33.3	26.0	<.0001	0.1610	30.7	30.7	0.9532	0.0016
Brooklyn	25.9	27.0	0.3518	0.0253	26.7	25.7	0.3888	0.0233
Manhattan	12.4	15.1	0.0043	0.0799	13.6	14.0	0.6656	0.0117
Queens	14.8	18.5	0.0003	0.1014	16.6	17.5	0.3876	0.0234
Staten Island	10.2	9.9	0.7060	0.0101	9.1	8.4	0.3635	0.0246
Single parent (%)	7.0	8.0	0.1716	0.0379	9.2	8.4	0.3161	0.0272
Percent of quarters employed (%)	51.1	49.2	0.0585	0.0516	52.8	53.3	0.6040	0.0140
Average earnings (\$)	3,889.64	3,466.22	0.0012	0.0877	3,998.11	4,118.69	0.3857	0.0235
Earnings trend (\$)	-151.14	-27.53	<.0001	0.1740	-98.11	-96.76	0.9466	0.0018
Earnings variance (\$)	0.97	0.92	0.0765	0.0483	0.93	0.94	0.8106	0.0065
Had an earnings dip (%)	69.4	63.7	<.0001	0.1221	68.7	69.3	0.6189	0.0135
Percent dip (%)	2.4	2.3	0.1128	0.0429	2.4	2.5	0.2996	0.0281
Time since dip (quarters)	60.2	53.7	<.0001	0.1438	58.3	58.6	0.7925	0.0071
Turnover	0.61	0.59	0.2167	0.0356	0.64	0.64	0.8128	0.0064
Received UI, past 2 years	43.5	29.2	<.0001	0.2996	39.1	38.9	0.8460	0.0053
Percent of quarters received UI (%)	18.9	13.1	<.0001	0.2264	15.0	14.8	0.7649	0.0081
Average UI payment (\$)	1,097.97	662.61	<.0001	0.3033	976.37	957.36	0.6440	0.0125
Received CA, past 2 years	23.1	20.1	0.0063	0.0718	23.1	22.2	0.4002	0.0228

Table D.1. Variable Means of the ITG Study Sample before and after Matching (continued)

Variable	Before Matching				After Matching			
	ITG	WFICC	P-value	Std. Bias	ITG	WFICC	P-value	Std. Bias
Percent of quarters received CA (%)	11.5	10.8	0.3347	0.0261	11.6	11.2	0.5650	0.0156
Average CA payment (\$)	264.13	242.32	0.2213	0.0326	263.51	246.07	0.3278	0.0265
Received SNAP, past 2 years	52.9	47.9	0.0002	0.1014	52.5	51.1	0.3161	0.0272
Percent of quarters received SNAP (%)	36.0	33.3	0.0133	0.0663	35.1	34.8	0.7458	0.0088
Average SNAP payment (\$)	429.50	395.16	0.0201	0.0627	416.61	393.74	0.1151	0.0427

Table D.2. Variable Means of the Industrial Cohort Training Study Sample before and after Matching

Variable	Before Matching				After Matching			
	Industrial cohort	WFICC	P-value	Std. Bias	Industrial cohort	WFICC	P-value	Std. Bias
Female (%)	17.0	52.0	<.0001	0.7903	17.0	17.0	1.0000	0.0000
Non-white (%)	83.0	79.5	0.2762	0.0893	83.0	86.2	0.4390	0.0869
Age at enrollment	34.1	33.6	0.6156	0.0444	34.1	34.3	0.9218	0.0110
Veteran (%)	4.4	4.4	0.9829	0.0017	4.4	3.1	0.5576	0.0658
Education level (%)								
Less than high school	9.4	12.5	0.2501	0.0965	9.4	10.1	0.8506	0.0211
High school diploma/GED	39.6	35.8	0.3169	0.0785	39.6	41.5	0.7329	0.0383
Some college	42.8	36.2	0.0852	0.1344	42.8	40.9	0.7341	0.0381
Bachelor degree or higher	8.2	15.5	0.0104	0.2289	8.2	7.6	0.8356	0.0233
Borough (%)								
Bronx	19.5	24.7	0.1298	0.1250	19.5	22.6	0.4933	0.0769
Brooklyn	47.8	27.4	<.0001	0.4295	47.8	42.1	0.3118	0.1136
Manhattan	7.6	14.7	0.0110	0.2283	7.6	4.4	0.2382	0.1326
Queens	22.0	18.7	0.2782	0.0832	22.0	22.0	1.0000	0.0000
Staten Island	1.9	10.6	0.0004	0.3662	1.9	2.5	0.7034	0.0427
Single parent (%)	5.0	8.7	0.0987	0.1463	5.0	3.1	0.3971	0.0951
Percent of quarters employed (%)	59.2	48.9	0.0008	0.2640	59.2	58.6	0.8843	0.0163

Table D.2. Variable Means of the Industrial Cohort Training Study Sample before and after Matching (continued)

Variable	Before Matching				After Matching			
	Industrial cohort	WFICC	P-value	Std. Bias	Industrial cohort	WFICC	P-value	Std. Bias
Average earnings (\$)	4,649.19	3,475.62	0.0028	0.2370	4,649.19	4,448.62	0.7451	0.0365
Earnings trend (\$)	-37.00	-12.14	0.6302	0.0376	-37.00	-82.53	0.5766	0.0627
Earnings variance (\$)	0.76	0.90	0.0441	0.1686	0.76	0.76	0.9813	0.0026
Had an earnings dip (%)	67.3	62.3	0.1977	0.1037	67.3	66.7	0.9055	0.0133
Percent dip (%)	2.5	2.3	0.1435	0.1129	2.5	2.6	0.8590	0.0199
Time since dip (quarters)	52.6	52.1	0.9077	0.0094	52.6	53.0	0.9371	0.0089
Turnover	0.76	0.59	0.0003	0.2485	0.76	0.71	0.5386	0.0690
Received UI, past 2 years	34.0	26.6	0.0355	0.1607	34.0	32.1	0.7216	0.0400
Percent of quarters received UI (%)	11.6	11.2	0.7961	0.0215	11.6	11.6	1.0000	0.0000
Average UI payment (\$)	904.84	588.02	0.0010	0.2264	904.84	786.72	0.4755	0.0801
Received CA, past 2 years	9.4	19.3	0.0017	0.2825	9.4	8.2	0.6934	0.0443
Percent of quarters received CA (%)	3.5	10.3	0.0006	0.3448	3.5	3.1	0.7893	0.0300
Average CA payment (\$)	94.43	235.76	0.0069	0.2574	94.43	79.30	0.7226	0.0399
Received SNAP, past 2 years	32.1	46.1	0.0004	0.2898	32.1	30.2	0.7174	0.0406
Percent of quarters received SNAP (%)	18.1	31.9	<.0001	0.3819	18.1	17.3	0.8227	0.0252
Average SNAP payment (\$)	211.47	377.19	0.0001	0.3494	211.47	210.51	0.9831	0.0024

Table D.3. Variable Means of the Healthcare Cohort Training Study Sample before and after Matching

Variable	Before Matching				After Matching			
	Healthcare Cohort	WFICC	P-value	Std. Bias	Healthcare Cohort	WFICC	P-value	Std. Bias
Female (%)	88.2	52.0	<.0001	0.8626	88.2	88.2	1.0000	0.0000
Non-white (%)	81.7	79.5	0.1360	0.0546	81.7	81.8	0.9478	0.0033
Age at enrollment	33.1	33.6	0.2818	0.0406	33.1	33.5	0.5000	0.0341
Veteran (%)	2.6	4.4	0.0110	0.1022	2.6	1.8	0.2985	0.0526

Table D.3. Variable Means of the Healthcare Cohort Training Study Sample before and after Matching (continued)

Variable	Before Matching				After Matching			
	Healthcare Cohort	WFICC	P-value	Std. Bias	Healthcare Cohort	WFICC	P-value	Std. Bias
Education level (%)								
Less than high school	12.8	12.5	0.7624	0.0108	12.8	13.3	0.7641	0.0152
High school diploma/GED	30.6	35.8	0.0024	0.1108	30.6	31.2	0.7845	0.0138
Some college	39.1	36.2	0.0984	0.0588	39.1	38.7	0.8763	0.0079
Bachelor degree or higher	17.5	15.5	0.1227	0.0540	17.5	16.8	0.6874	0.0204
Borough (%)								
Bronx	30.6	24.7	0.0001	0.1327	30.6	28.8	0.4385	0.0392
Brooklyn	24.6	27.4	0.0760	0.0647	24.6	25.4	0.7260	0.0177
Manhattan	9.9	14.7	0.0001	0.1474	9.9	9.1	0.6045	0.0262
Queens	27.0	18.7	<.0001	0.2000	27.0	26.5	0.8193	0.0116
Staten Island	5.3	10.6	<.0001	0.1993	5.3	6.9	0.1689	0.0696
Single parent (%)	13.6	8.7	<.0001	0.1543	13.6	15.5	0.2818	0.0545
Percent of quarters employed (%)	45.5	48.9	0.0134	0.0892	45.5	45.3	0.9071	0.0059
Average earnings (\$)	2,612.33	3,475.62	<.0001	0.2009	2,612.33	2,491.18	0.5004	0.0341
Earnings trend (\$)	7.47	-12.14	0.4007	0.0340	7.47	-15.28	0.3616	0.0462
Earnings variance (\$)	0.93	0.90	0.4354	0.0277	0.93	0.91	0.6392	0.0237
Had an earnings dip (%)	60.1	62.3	0.1872	0.0470	60.1	60.6	0.8362	0.0105
Percent dip (%)	2.1	2.3	0.1493	0.0527	2.1	2.2	0.7126	0.0186
Time since dip (quarters)	50.8	52.1	0.4245	0.0285	50.8	51.8	0.6802	0.0209
Turnover	0.56	0.59	0.2523	0.0427	0.56	0.53	0.2373	0.0598
Received UI, past 2 years	22.0	26.6	0.0039	0.1066	22.0	21.9	0.9513	0.0031
Percent of quarters received UI (%)	9.0	11.2	0.0060	0.1047	9.0	9.3	0.7634	0.0152
Average UI payment (\$)	459.88	588.02	0.0032	0.1126	459.88	443.69	0.7612	0.0154
Received CA, past 2 years	21.8	19.3	0.0749	0.0624	21.8	23.8	0.3348	0.0488
Percent of quarters received CA (%)	11.5	10.3	0.2083	0.0444	11.5	13.7	0.1057	0.0819
Average CA payment (\$)	242.18	235.76	0.7859	0.0101	242.18	290.95	0.1301	0.0766

Table D.3. Variable Means of the Healthcare Cohort Training Study Sample before and after Matching (continued)

Variable	Before Matching				After Matching			
	Healthcare Cohort	WFICC	P-value	Std. Bias	Healthcare Cohort	WFICC	P-value	Std. Bias
Received SNAP, past 2 years	46.7	46.1	0.7177	0.0130	46.7	48.7	0.4477	0.0384
Percent of quarters received SNAP (%)	32.9	31.9	0.4844	0.0249	32.9	37.1	0.0505	0.0990
Average SNAP payment (\$)	397.10	377.19	0.3024	0.0368	397.10	448.00	0.0722	0.0910

Table D.4. Variable Means of the Tech Cohort Training Study Sample before and after Matching

Variable	Before Matching				After Matching			
	Tech Cohort	WFICC	P-value	Std. Bias	Tech Cohort	WFICC	P-value	Std. Bias
Female (%)	45.3	52.0	0.1171	0.1340	45.3	45.3	1.0000	0.0000
Non-white (%)	57.7	79.5	<.0001	0.4838	57.7	59.1	0.8072	0.0295
Age at enrollment	25.5	33.6	<.0001	0.8248	25.5	25.4	0.8937	0.0162
Veteran (%)	2.2	4.4	0.2015	0.1257	2.2	3.7	0.4748	0.0865
Education level (%)								
Less than high school	0.0	12.5	<.0001	0.5332	0.0	3.7	0.0240	0.2742
High school diploma/GED	16.1	35.8	<.0001	0.4621	16.1	9.5	0.1041	0.1970
Some college	44.5	36.2	0.0428	0.1699	44.5	52.6	0.1849	0.1606
Bachelor degree or higher	39.4	15.5	<.0001	0.5539	39.4	34.3	0.3826	0.1057
Borough (%)								
Bronx	8.0	24.7	<.0001	0.4615	8.0	7.3	0.8211	0.0273
Brooklyn	50.4	27.4	<.0001	0.4832	50.4	41.6	0.1469	0.1758
Manhattan	12.4	14.7	0.4520	0.0664	12.4	12.4	1.0000	0.0000
Queens	25.6	18.7	0.0386	0.1662	25.6	21.9	0.4795	0.0856
Staten Island	2.9	10.6	0.0035	0.3096	2.9	4.4	0.5211	0.0776
Single parent (%)	4.4	8.7	0.0714	0.1762	4.4	4.4	1.0000	0.0000
Percent of quarters employed (%)	50.9	48.9	0.5424	0.0524	50.9	50.4	0.9050	0.0144
Average earnings (\$)	3,584.38	3,475.62	0.7970	0.0239	3,584.38	3,582.99	0.9982	0.0003

Table D.4. Variable Means of the Tech Cohort Training Study Sample before and after Matching (continued)

Variable	Before Matching				After Matching			
	Tech Cohort	WFICC	P-value	Std. Bias	Tech Cohort	WFICC	P-value	Std. Bias
Earnings trend (\$)	115.61	-12.14	0.0217	0.2024	115.61	76.08	0.6787	0.0501
Earnings variance (\$)	0.88	0.90	0.7217	0.0316	0.88	0.81	0.4935	0.0828
Had an earnings dip (%)	66.4	62.3	0.3245	0.0851	66.4	69.3	0.6063	0.0623
Percent dip (%)	2.3	2.3	0.8816	0.0129	2.3	2.5	0.5128	0.0792
Time since dip (quarters)	50.8	52.1	0.7213	0.0311	50.8	53.1	0.6606	0.0531
Turnover	0.60	0.59	0.8166	0.0217	0.60	0.57	0.6630	0.0527
Received UI, past 2 years	11.7	26.6	<.0001	0.3856	11.7	11.7	1.0000	0.0000
Percent of quarters received UI (%)	4.1	11.2	0.0002	0.3839	4.1	4.0	0.9551	0.0068
Average UI payment (\$)	318.86	588.02	0.0094	0.2427	318.86	298.08	0.8609	0.0212
Received CA, past 2 years	3.7	19.3	<.0001	0.5049	3.7	2.9	0.7358	0.0408
Percent of quarters received CA (%)	1.6	10.3	<.0001	0.4574	1.6	0.7	0.3810	0.1060
Average CA payment (\$)	36.53	235.76	0.0004	0.3987	36.53	21.62	0.5648	0.0697
Received SNAP, past 2 years	11.7	46.1	<.0001	0.8198	11.7	11.7	1.0000	0.0000
Percent of quarters received SNAP (%)	7.2	31.9	<.0001	0.7561	7.2	6.8	0.8643	0.0207
Average SNAP payment (\$)	95.51	377.19	<.0001	0.6418	95.51	90.57	0.8972	0.0156

Table D.5. Variable Means of the OJT Study Sample before and after Matching

Variable	Before Matching				After Matching			
	OJT	WFICC	P-value	Std. Bias	OJT	WFICC	P-value	Std. Bias
Female (%)	37.4	52.2	<.0001	0.2996	37.4	37.4	1.0000	0.0000
Non-white (%)	76.7	79.1	0.3522	0.0564	76.7	74.1	0.4787	0.0619
Age at enrollment	33.8	34.0	0.7740	0.0196	33.8	34.8	0.3355	0.0842
Veteran (%)	17.6	4.0	<.0001	0.4463	17.6	6.1	<.0001	0.3595
Education level (%)								
Less than high school	6.1	12.9	0.0010	0.2343	6.1	7.3	0.6005	0.0458
High school diploma/GED	27.5	35.5	0.0069	0.1725	27.5	22.1	0.1574	0.1237

Table D.5. Variable Means of the OJT Study Sample before and after Matching (continued)

Variable	Before Matching				After Matching			
	OJT	WFICC	P-value	Std. Bias	OJT	WFICC	P-value	Std. Bias
Some college	47.0	35.8	0.0002	0.2267	47.0	48.9	0.6627	0.0381
Bachelor degree or higher	19.5	15.7	0.0983	0.0977	19.5	21.8	0.5179	0.0565
Borough (%)								
Bronx	15.7	24.3	0.0011	0.2174	15.7	17.2	0.6379	0.0412
Brooklyn	43.1	27.7	<.0001	0.3264	43.1	34.7	0.0488	0.1725
Manhattan	13.4	14.4	0.6196	0.0312	13.4	14.9	0.6166	0.0438
Queens	18.3	19.7	0.5887	0.0338	18.3	17.9	0.9099	0.0099
Staten Island	6.9	10.0	0.0915	0.1127	6.9	9.2	0.3353	0.0843
Single parent (%)	6.9	6.7	0.8951	0.0081	6.9	6.5	0.8614	0.0153
Percent of quarters employed (%)	40.3	48.0	0.0013	0.2050	40.3	41.5	0.7065	0.0329
Average earnings (\$)	3,805.75	3,501.12	0.3235	0.0615	3,805.75	3,877.66	0.8835	0.0128
Earnings trend (\$)	-216.52	-36.67	<.0001	0.2371	-216.52	-249.96	0.6711	0.0371
Earnings variance (\$)	0.93	0.89	0.4336	0.0473	0.93	0.99	0.5026	0.0586
Had an earnings dip (%)	59.5	61.3	0.5575	0.0361	59.5	62.2	0.5318	0.0547
Percent dip (%)	2.2	2.2	0.7125	0.0227	2.2	2.2	0.7856	0.0238
Time since dip (quarters)	55.1	51.3	0.1813	0.0804	55.1	58.1	0.4662	0.0637
Turnover	0.47	0.57	0.0047	0.1936	0.47	0.48	0.8661	0.0147
Received UI, past 2 years	33.2	26.9	0.0209	0.1382	33.2	35.5	0.5818	0.0482
Percent of quarters received UI (%)	15.1	12.0	0.0343	0.1262	15.1	15.6	0.8474	0.0168
Average UI payment (\$)	1,029.23	624.58	<.0001	0.2749	1,029.23	1,059.77	0.8336	0.0184
Received CA, past 2 years	14.9	18.6	0.1251	0.0988	14.9	11.5	0.2458	0.1015
Percent of quarters received CA (%)	6.4	9.8	0.0246	0.1534	6.4	5.7	0.6749	0.0367
Average CA payment (\$)	172.92	226.36	0.1807	0.0903	172.92	152.35	0.6916	0.0347
Received SNAP, past 2 years	34.7	45.3	0.0006	0.2173	34.7	30.5	0.3063	0.0895
Percent of quarters received SNAP (%)	18.8	31.3	<.0001	0.3467	18.8	15.6	0.2473	0.1012
Average SNAP payment (\$)	235.75	377.09	<.0001	0.2927	235.75	208.45	0.4394	0.0676

Appendix E. Detailed Impact Estimates

Tables E.1 to E.6 present the percentage change in earnings and public assistance receipt for job training program participants. The percentage change is calculated by dividing the estimated impact on the outcome by the comparison group mean earnings or public assistance receipt in the 2nd post-exit quarter. Since the comparison group is created using propensity score matching, the comparison group mean 2nd quarter post exit earnings is considered the best available estimate of what participants would have earned without the program.

Table E.1. Comparison Group Mean, Impact, and Percent Change, 2nd Quarter after Exit, ITGs

	Comparison Group Mean	Impact	Percent Change
Employment (%)	61.8	13.8*	22.3%
Earnings(\$)	3,114	1,436*	46.1%
Received UI (%)	10.4	-5.9*	-56.7%
Average UI benefits (\$)	173	-107*	-61.8%
Received CA (%)	13.4	0.0	0.0%
Average CA benefits (\$)	173	-7	-4.0%
Received SNAP (%)	37.6	0.0	0.0%
Average SNAP benefits (\$)	286	3	1.1%

*Indicates significant difference at the .05 level. Impacts are in 2016\$.

Table E.2. Comparison Group Mean, Impact, and Percent Change, 2nd Quarter after Exit, Industrial Cohort

	Comparison Group Mean	Impact	Percent Change
Employment (%)	62.9	13.2*	21.0%
Earnings(\$)	3,127	3,067*	98.1%
Received UI (%)	9.4	0.1	1.1%
Average UI benefits (\$)	115	8	7.0%
Received CA (%)	5.6	-4.4*	-78.6%
Average CA benefits (\$)	87	-65*	-75.0%
Received SNAP (%)	25.1	-4.4	-17.5%
Average SNAP benefits (\$)	127	15	11.8%

*Indicates significant difference at the .05 level. Impacts are in 2016\$.

Table E.3. Comparison Group Mean, Impact, and Percent Change, 2nd Quarter after Exit, Healthcare Cohort

	Comparison Group Mean	Impact	Percent Change
Employment (%)	58.0	23.3*	40.2%
Earnings(\$)	2,244	2,102*	93.7%
Received UI (%)	8.0	-7.0*	-87.5%
Average UI benefits (\$)	134	-116*	-86.5%
Received CA (%)	17.3	-4.0*	-23.1%
Average CA benefits (\$)	227	-24	-10.6%
Received SNAP (%)	40.1	-4.0	-10.0%
Average SNAP benefits (\$)	344	14	4.1%

* Indicates significant difference at the .05 level. Impacts are in 2016\$.

Table E.4. Comparison Group Mean, Impact, and Percent Change, 2nd Quarter after Exit, Tech Cohort

	Comparison Group Mean	Impact	Percent Change
Employment (%)	68.6	-4.4	-6.4%
Earnings(\$)	7,374	2,931*	39.7%
Received UI (%)	6.6	-5.1*	-77.3%
Average UI benefits (\$)	119	-84	-70.5%
Received CA (%)	1.5	-1.5	-100.0%
Average CA benefits (\$)	10	-7	-73.7%
Received SNAP (%)	10.2	-6.6*	-64.7%
Average SNAP benefits (\$)	72	-23	-32.2%

* Indicates significant difference at the .05 level. Impacts are in 2016\$.

Table E.5. Comparison Group Mean, Impact, and Percent Change, 2nd Quarter after Exit, Customized Training

	Comparison Group Mean	Impact	Percent Change
Employment (%)	87.6	11.3	12.9%
Earnings(\$)	8,892	1,994*	22.4%
Received UI (%)	1.9	0.0	0.0%
Average UI benefits (\$)	46	-14	-30.7%
Received CA (%)	10.8	0.0	0.0%
Average CA benefits (\$)	289	-3	-1.0%
Received SNAP (%)	20.6	-2.0	-9.7%
Average SNAP benefits (\$)	38	-17	-44.9%

* Indicates significant difference at the .05 level. Impacts are in 2016\$.

Table E.6. Comparison Group Mean, Impact, and Percent Change, 2nd Quarter after Exit, OJT

	Comparison Group Mean	Impact	Percent Change
Employment (%)	54.1	9.2*	17.0%
Earnings(\$)	2,750	2,310*	84.0%
Received UI (%)	9.5	6.5*	68.4%
Average UI benefits (\$)	229	103*	45.1%
Received CA (%)	6.9	-1.2	-17.4%
Average CA benefits (\$)	73	-8	-11.0%
Received SNAP (%)	22.9	-3.8	-16.6%
Average SNAP benefits (\$)	173	-48	-27.8%

* Indicates significant difference at the .05 level. Impacts are in 2016\$.

Appendix F. Detailed ROI Calculations

Table F.1. 5-Year ROI of Individual Training Grants, Participant Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$252						
<i>Total Expenditures</i>	\$252						
PV of Total Expenditures							\$252
Returns/Participant							
Earnings		\$5,744	\$5,744	\$5,744	\$5,744	\$5,744	
Fringe Benefits		\$1,149	\$1,149	\$1,149	\$1,149	\$1,149	
Welfare		-\$26	-\$26	-\$26	-\$26	-\$26	
Food Stamps		\$10	\$10	\$10	\$10	\$10	
UI Benefits		-\$365	-\$155	-\$61	-\$24	-\$10	
Taxes		-\$931	-\$931	-\$931	-\$931	-\$931	
<i>Total Returns</i>		\$5,582	\$5,791	\$5,885	\$5,922	\$5,937	
PV of Total Returns		\$5,499	\$5,622	\$5,628	\$5,580	\$5,511	\$27,840
				Net PV of Returns			\$27,588
				5-Year Returns			10,965%
				Return in Dollars			\$109.65
				5-Year ROI			156%

Table F.2. 10-Year ROI of Individual Training Grants, Participant Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$252						
<i>Total Expenditures</i>	\$252						
PV of Total Expenditures							\$252
Returns/Participant							
Earnings	\$28,721	\$5,744	\$5,744	\$5,744	\$5,744	\$5,744	
Fringe Benefits	\$5,744	\$1,149	\$1,149	\$1,149	\$1,149	\$1,149	
Welfare	-\$132	-\$26	-\$26	-\$26	-\$26	-\$26	
Food Stamps	\$52	\$10	\$10	\$10	\$10	\$10	
UI Benefits	-\$615	-\$4	-\$1	-\$1	\$0	\$0	
Taxes	-\$4,653	-\$931	-\$931	-\$931	-\$931	-\$931	
<i>Total Returns</i>	\$29,118	\$5,943	\$5,945	\$5,946	\$5,946	\$5,946	
PV of Total Returns	\$27,840	\$5,435	\$5,357	\$5,278	\$5,201	\$5,124	\$54,234
				Net PV of Returns			\$53,982
				10-Year Returns			21,456%
				Return in Dollars			\$214.56
				10-Year ROI			71%

Table F.3. 5-Year ROI of Individual Training Grants, Taxpayer Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$2,553						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$2,553						
PV of Total Expenditures							\$2,553
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare		\$26	\$26	\$26	\$26	\$26	
Food Stamps		-\$10	-\$10	-\$10	-\$10	-\$10	
UI Benefits		\$365	\$155	\$61	\$24	\$10	
Taxes		\$931	\$931	\$931	\$931	\$931	
<i>Total Returns</i>		\$1,311	\$1,102	\$1,008	\$971	\$956	
PV of Total Returns		\$1,292	\$1,069	\$964	\$915	\$888	\$5,127
				Net PV of Returns			\$2,574
				5-Year Returns			101%
				Return in Dollars			\$1.01
				5-Year ROI			15%

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$2,553						
Foregone earnings	\$0						
Total Expenditures	\$2,553						
PV of Total Expenditures							\$2,553
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare	\$132	\$26	\$26	\$26	\$26	\$26	\$265
Food Stamps	-\$52	-\$10	-\$10	-\$10	-\$10	-\$10	-\$105
UI Benefits	\$615	\$4	\$1	\$1	\$0	\$0	\$621
Taxes	\$4,653	\$931	\$931	\$931	\$931	\$931	\$9,306
Total Returns	\$5,348	\$950	\$948	\$947	\$947	\$947	\$10,087
PV of Total Returns	\$5,127	\$869	\$854	\$841	\$828	\$816	\$9,335
				Net PV of Returns			\$6,782
				10-Year Returns			266%
				Return in Dollars			\$2.66
				10-Year ROI			14%

Table F.5. 5-Year ROI of Individual Training Grants, Societal Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$2,553						
Foregone earnings	\$252						
<i>Total Expenditures</i>	\$2,805						
PV of Total Expenditures							\$2,805
Returns/Participant							
Earnings		\$5,744	\$5,744	\$5,744	\$5,744	\$5,744	
Fringe Benefits		\$1,149	\$1,149	\$1,149	\$1,149	\$1,149	
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>		\$6,893	\$6,893	\$6,893	\$6,893	\$6,893	
PV of Total Returns		\$6,791	\$6,691	\$6,592	\$6,495	\$6,399	\$32,967
				Net PV of Returns			\$30,163
				5-Year Returns			1,075%
				Return in Dollars			\$10.75
							64%
				5-Year ROI			

Table F.6. 10-Year ROI of Individual Training Grants, Societal Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$2,553						
Foregone earnings	\$252						
<i>Total Expenditures</i>	\$2,805						
PV of Total Expenditures							\$2,805
Returns/Participant							
Earnings	\$28,721	\$5,744	\$5,744	\$5,744	\$5,744	\$5,744	\$57,442
Fringe Benefits	\$5,744	\$1,149	\$1,149	\$1,149	\$1,149	\$1,149	\$11,488
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>	34,465	\$6,893	\$6,893	\$6,893	\$6,893	\$6,893	\$68,931
PV of Total Returns	32,967	\$6,304	\$6,211	\$6,119	\$6,029	\$5,940	\$63,569
				Net PV of Returns			\$60,765
				10-Year Returns			2,167%
				Return in Dollars			\$21.67
							37%
				10-Year ROI			

Table F.7. 5-Year ROI of Industrial Cohort Training, Participant Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$1,473						
<i>Total Expenditures</i>	\$1,473						
PV of Total Expenditures							\$1,473
Returns/Participant							
Earnings		\$12,037	\$10,935	\$9,868	\$8,905	\$8,036	
Fringe Benefits		\$2,407	\$2,187	\$1,974	\$1,781	\$1,607	
Welfare		-\$261	-\$261	-\$261	-\$261	-\$261	
Food Stamps		\$53	\$27	\$13	\$6	\$3	
UI Benefits		\$24	\$3	\$0	\$0	\$0	
Taxes		-\$1,950	-\$1,771	-\$1,599	-\$1,443	-\$1,302	
<i>Total Returns</i>		\$12,309	\$11,119	\$9,995	\$8,988	\$8,083	
PV of Total Returns		\$12,127	\$10,793	\$9,558	\$8,468	\$7,503	\$48,450
				Net PV of Returns			\$46,977
				5-Year Returns			3,190%
				Return in Dollars			\$31.90
				5-Year ROI			101%

Table F.8. 10-Year ROI of Industrial Cohort Training, Participant Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$1,473						
<i>Total Expenditures</i>	\$1,473						
PV of Total Expenditures							\$1,473
Returns/Participant							
Earnings	\$49,780	\$7,252	\$6,544	\$5,906	\$5,329	\$4,809	
Fringe Benefits	\$9,956	\$1,450	\$1,309	\$1,181	\$1,066	\$962	
Welfare	-\$1,307	-\$261	-\$261	-\$261	-\$261	-\$261	
Food Stamps	\$102	\$1	\$1	\$0	\$0	\$0	
UI Benefits	\$27	\$0	\$0	\$0	\$0	\$0	
Taxes	-\$8,064	-\$1,175	-\$1,060	-\$957	-\$863	-\$779	
<i>Total Returns</i>	\$50,494	\$7,268	\$6,532	\$5,869	\$5,271	\$4,731	
PV of Total Returns	\$48,450	\$6,646	\$5,886	\$5,210	\$4,610	\$4,076	\$74,878
				Net PV of Returns			\$73,405
				10-Year Returns			4,984%
				Return in Dollars			\$49.84
				10-Year ROI			48%

Table F.9. 5-Year ROI of Industrial Cohort Training, Taxpayer Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$5,007						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$5,007						
PV of Total Expenditures							\$5,007
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare		\$261	\$261	\$261	\$261	\$261	
Food Stamps		-\$53	-\$27	-\$13	-\$6	-\$3	
UI Benefits		-\$24	-\$3	\$0	\$0	\$0	
Taxes		\$1,950	\$1,771	\$1,599	\$1,443	\$1,302	
<i>Total Returns</i>		\$2,135	\$2,003	\$1,847	\$1,698	\$1,560	
PV of Total Returns		\$2,104	\$1,944	\$1,766	\$1,599	\$1,448	\$8,861
				Net PV of Returns			\$3,854
				5-Year Returns			77%
				Return in Dollars			\$0.77
				5-Year ROI			12%

Table F.10. 10-Year ROI of Industrial Cohort Training, Taxpayer Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$5,007						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$5,007						
PV of Total Expenditures							\$5,007
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare	\$1,307	\$261	\$261	\$261	\$261	\$261	\$2,614
Food Stamps	-\$102	-\$1	-\$1	\$0	\$0	\$0	-\$105
UI Benefits	-\$27	\$0	\$0	\$0	\$0	\$0	-\$27
Taxes	\$8,064	\$1,175	\$1,060	\$957	\$863	\$779	\$12,899
<i>Total Returns</i>	\$9,242	\$1,435	\$1,321	\$1,218	\$1,125	\$1,040	\$15,380
PV of Total Returns	\$8,861	\$1,312	\$1,190	\$1,081	\$984	\$897	\$14,324
				Net PV of Returns			\$9,317
				10-Year Returns			186%
				Return in Dollars			\$1.86
				10-Year ROI			11%

Table F.11. 5-Year ROI of Industrial Cohort Training, Societal Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$5,007						
Foregone earnings	\$1,473						
<i>Total Expenditures</i>	\$6,480						
PV of Total Expenditures							\$6,480
Returns/Participant							
Earnings		\$12,037	\$10,935	\$9,868	\$8,905	\$8,036	
Fringe Benefits		\$2,407	\$2,187	\$1,974	\$1,781	\$1,607	
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>		\$14,444	\$13,121	\$11,841	\$10,686	\$9,643	
PV of Total Returns		\$14,231	\$12,736	\$11,324	\$10,068	\$8,951	\$57,311
				Net PV of Returns			\$50,831
				5-Year Returns			784%
				Return in Dollars			\$7.84
				5-Year ROI			55%

Table F.12. 10-Year ROI of Industrial Cohort Training, Societal Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$5,007						
Foregone earnings	\$1,473						
<i>Total Expenditures</i>	\$6,480						
PV of Total Expenditures							\$6,480
Returns/Participant							
Earnings	\$49,780	\$7,252	\$6,544	\$5,906	\$5,329	\$4,809	\$79,621
Fringe Benefits	\$9,956	\$1,450	\$1,309	\$1,181	\$1,066	\$962	\$15,924
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>	59,736	\$8,702	\$7,853	\$7,087	\$6,395	\$5,771	\$95,545
PV of Total Returns	57,311	\$7,959	\$7,076	\$6,291	\$5,593	\$4,973	\$89,202
							Net PV of Returns
							\$82,723
							10-Year Returns
							1,277%
							Return in Dollars
							\$12.77
							30%
							10-Year ROI

Table F.13. 5-Year ROI of Healthcare Cohort Training, Participant Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$324						
<i>Total Expenditures</i>	\$324						
PV of Total Expenditures							\$324
Returns/Participant							
Earnings		\$8,408	\$8,408	\$8,408	\$8,408	\$8,408	
Fringe Benefits		\$1,682	\$1,682	\$1,682	\$1,682	\$1,682	
Welfare		-\$72	-\$11	-\$1	\$0	\$0	
Food Stamps		\$55	\$55	\$55	\$55	\$55	
UI Benefits		-\$330	-\$38	-\$3	\$0	\$0	
Taxes		-\$1,362	-\$1,362	-\$1,362	-\$1,362	-\$1,362	
<i>Total Returns</i>		\$8,381	\$8,734	\$8,778	\$8,783	\$8,783	
PV of Total Returns		\$8,257	\$8,478	\$8,395	\$8,275	\$8,153	\$41,558
				Net PV of Returns			\$41,234
				5-Year Returns			12,721%
				Return in Dollars			\$127.21
				5-Year ROI			164%

Table F.14. 10-Year ROI of Healthcare Cohort Training, Participant Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$324						
<i>Total Expenditures</i>	\$324						
PV of Total Expenditures							\$324
Returns/Participant							
Earnings	\$42,041	\$8,408	\$8,408	\$8,408	\$8,408	\$8,408	
Fringe Benefits	\$8,408	\$1,682	\$1,682	\$1,682	\$1,682	\$1,682	
Welfare	-\$84	\$0	\$0	\$0	\$0	\$0	
Food Stamps	\$276	\$55	\$55	\$55	\$55	\$55	
UI Benefits	-\$372	\$0	\$0	\$0	\$0	\$0	
Taxes	-\$6,811	-\$1,362	-\$1,362	-\$1,362	-\$1,362	-\$1,362	
<i>Total Returns</i>	\$43,459	\$8,783	\$8,783	\$8,783	\$8,783	\$8,783	
PV of Total Returns	\$41,558	\$8,033	\$7,914	\$7,797	\$7,682	\$7,568	\$80,551
				Net PV of Returns			\$80,226
				10-Year Returns			24,751%
				Return in Dollars			\$247.51
				10-Year ROI			74%

Table F.15. 5-Year ROI of Healthcare Cohort Training, Taxpayer Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$5,117						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$5,117						
PV of Total Expenditures							\$5,117
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare		\$72	\$11	\$1	\$0	\$0	
Food Stamps		-\$55	-\$55	-\$55	-\$55	-\$55	
UI Benefits		\$330	\$38	\$3	\$0	\$0	
Taxes		\$1,362	\$1,362	\$1,362	\$1,362	\$1,362	
<i>Total Returns</i>		\$1,709	\$1,356	\$1,312	\$1,307	\$1,307	
PV of Total Returns		\$1,684	\$1,316	\$1,254	\$1,232	\$1,213	\$6,699
				Net PV of Returns			\$1,582
				5-Year Returns			31%
				Return in Dollars			\$0.31
				5-Year ROI			6%

Table F.16. 10-Year ROI of Healthcare Cohort Training, Taxpayer Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$5,117						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$5,117						
PV of Total Expenditures							\$5,117
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare	\$84	\$0	\$0	\$0	\$0	\$0	\$84
Food Stamps	-\$276	-\$55	-\$55	-\$55	-\$55	-\$55	-\$553
UI Benefits	\$372	\$0	\$0	\$0	\$0	\$0	\$372
Taxes	\$6,811	\$1,362	\$1,362	\$1,362	\$1,362	\$1,362	\$13,621
<i>Total Returns</i>	\$6,991	\$1,307	\$1,307	\$1,307	\$1,307	\$1,307	\$13,525
PV of Total Returns	\$6,699	\$1,195	\$1,178	\$1,160	\$1,143	\$1,126	\$12,501
				Net PV of Returns			\$7,384
				10-Year Returns			144%
				Return in Dollars			\$1.44
				10-Year ROI			5%

Table F.17. 5-Year ROI of Healthcare Cohort Training, Societal Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$5,117						
Foregone earnings	\$324						
<i>Total Expenditures</i>	\$5,441						
PV of Total Expenditures							\$5,441
Returns/Participant							
Earnings		\$8,408	\$8,408	\$8,408	\$8,408	\$8,408	
Fringe Benefits		\$1,682	\$1,682	\$1,682	\$1,682	\$1,682	
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>		\$10,090	\$10,090	\$10,090	\$10,090	\$10,090	
PV of Total Returns		\$9,941	\$9,794	\$9,649	\$9,507	\$9,366	\$48,257
				Net PV of Returns			\$42,815
				5-Year Returns			787%
				Return in Dollars			\$7.87
							55%
				5-Year ROI			

Table F.18. 10-Year ROI of Healthcare Cohort Training, Societal Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$5,117						
Foregone earnings	\$324						
<i>Total Expenditures</i>	\$5,441						
PV of Total Expenditures							\$5,441
Returns/Participant							
Earnings	\$42,041	\$8,408	\$8,408	\$8,408	\$8,408	\$8,408	\$84,083
Fringe Benefits	\$8,408	\$1,682	\$1,682	\$1,682	\$1,682	\$1,682	\$16,817
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>	50,450	\$10,090	\$10,090	\$10,090	\$10,090	\$10,090	\$100,899
PV of Total Returns	48,257	\$9,228	\$9,091	\$8,957	\$8,825	\$8,694	\$93,051
				Net PV of Returns			\$87,610
				10-Year Returns			1,610%
				Return in Dollars			\$16.10
							16%
				10-Year ROI			

Table F.19. 5-Year ROI of Tech Cohort Training, Participant Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$1,615						
<i>Total Expenditures</i>	\$1,615						
PV of Total Expenditures							\$1,615
Returns/Participant							
Earnings		\$11,722	\$11,722	\$11,722	\$11,722	\$11,722	
Fringe Benefits		\$2,344	\$2,344	\$2,344	\$2,344	\$2,344	
Welfare		-\$29	-\$29	-\$29	-\$29	-\$29	
Food Stamps		-\$93	-\$93	-\$93	-\$93	-\$93	
UI Benefits		-\$336	-\$336	-\$336	-\$336	-\$336	
Taxes		-\$1,899	-\$1,899	-\$1,899	-\$1,899	-\$1,899	
<i>Total Returns</i>		\$11,710	\$11,710	\$11,710	\$11,710	\$11,710	
PV of Total Returns		\$11,537	\$11,367	\$11,199	\$11,033	\$10,870	\$56,006
				Net PV of Returns			\$54,391
				5-Year Returns			3,367%
				Return in Dollars			\$33.67
				5-Year ROI			103%

Table F.20. 10-Year ROI of Tech Cohort Training, Participant Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$1,615						
<i>Total Expenditures</i>	\$1,615						
PV of Total Expenditures							\$1,615
Returns/Participant							
Earnings	\$58,612	\$11,722	\$11,722	\$11,722	\$11,722	\$11,722	
Fringe Benefits	\$11,722	\$2,344	\$2,344	\$2,344	\$2,344	\$2,344	
Welfare	-\$143	-\$29	-\$29	-\$29	-\$29	-\$29	
Food Stamps	-\$466	-\$93	-\$93	-\$93	-\$93	-\$93	
UI Benefits	-\$1,679	-\$336	-\$336	-\$336	-\$336	-\$336	
Taxes	-\$9,495	-\$1,899	-\$1,899	-\$1,899	-\$1,899	-\$1,899	
<i>Total Returns</i>	\$58,551	\$11,710	\$11,710	\$11,710	\$11,710	\$11,710	
PV of Total Returns	\$56,006	\$10,710	\$10,551	\$10,395	\$10,242	\$10,090	\$107,994
				Net PV of Returns			\$106,379
				10-Year Returns			6,585%
				Return in Dollars			\$65.85
				10-Year ROI			52%

Table F.21. 5-Year ROI of Tech Cohort Training, Taxpayer Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$16,105						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$16,105						
PV of Total Expenditures							\$16,105
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare		\$29	\$29	\$29	\$29	\$29	
Food Stamps		\$93	\$93	\$93	\$93	\$93	
UI Benefits		\$336	\$336	\$336	\$336	\$336	
Taxes		\$1,899	\$1,899	\$1,899	\$1,899	\$1,899	
<i>Total Returns</i>		\$2,357	\$2,357	\$2,357	\$2,357	\$2,357	
PV of Total Returns		\$2,322	\$2,287	\$2,254	\$2,220	\$2,187	\$11,270
				Net PV of Returns			-\$4,835
				5-Year Returns			-30%
				Return in Dollars			-\$0.30
				5-Year ROI			-7%

Table F.22. 10-Year ROI of Tech Cohort Training, Taxpayer Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$16,105						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$16,105						
PV of Total Expenditures							\$16,105
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare	\$143	\$29	\$29	\$29	\$29	\$29	\$286
Food Stamps	\$466	\$93	\$93	\$93	\$93	\$93	\$932
UI Benefits	\$1,679	\$336	\$336	\$336	\$336	\$336	\$3,358
Taxes	\$9,495	\$1,899	\$1,899	\$1,899	\$1,899	\$1,899	\$18,990
<i>Total Returns</i>	\$11,783	\$2,357	\$2,357	\$2,357	\$2,357	\$2,357	\$23,565
PV of Total Returns	\$11,270	\$2,155	\$2,123	\$2,092	\$2,061	\$2,031	\$21,732
				Net PV of Returns			\$5,627
				10-Year Returns			35%
				Return in Dollars			\$0.35
				10-Year ROI			3%

Table F.23. 5-Year ROI of Tech Cohort Training, Societal Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$16,105						
Foregone earnings	\$1,615						
<i>Total Expenditures</i>	\$17,720						
PV of Total Expenditures							\$17,720
Returns/Participant							
Earnings		\$11,722	\$11,722	\$11,722	\$11,722	\$11,722	
Fringe Benefits		\$2,344	\$2,344	\$2,344	\$2,344	\$2,344	
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>		\$14,067	\$14,067	\$14,067	\$14,067	\$14,067	
PV of Total Returns		\$13,859	\$13,654	\$13,452	\$13,254	\$13,058	\$67,277
				Net PV of Returns			\$49,556
				5-Year Returns			280%
				Return in Dollars			\$2.80
							31%
				5-Year ROI			

Table F.24. 10-Year ROI of Tech Cohort Training, Societal Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$16,105						
Foregone earnings	\$1,615						
<i>Total Expenditures</i>	\$17,720						
PV of Total Expenditures							\$17,720
Returns/Participant							
Earnings	\$58,612	\$11,722	\$11,722	\$11,722	\$11,722	\$11,722	\$117,223
Fringe Benefits	\$11,722	\$2,344	\$2,344	\$2,344	\$2,344	\$2,344	\$23,445
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>	70,334	\$14,067	\$14,067	\$14,067	\$14,067	\$14,067	\$140,668
PV of Total Returns	67,277	\$12,865	\$12,675	\$12,487	\$12,303	\$12,121	\$129,727
							Net PV of Returns
							\$112,006
							10-Year Returns
							632%
							Return in Dollars
							\$6.32
							22%
							10-Year ROI

Table F.25. 5-Year ROI of Customized Training, Participant Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$0						
PV of Total Expenditures							\$0
Returns/Participant							
Earnings		\$7,977	\$7,977	\$7,977	\$7,977	\$7,977	
Fringe Benefits		\$1,595	\$1,595	\$1,595	\$1,595	\$1,595	
Welfare		-\$11	-\$11	-\$11	-\$11	-\$11	
Food Stamps		-\$70	-\$70	-\$70	-\$70	-\$70	
UI Benefits		-\$55	-\$55	-\$55	-\$55	-\$55	
Taxes		-\$1,292	-\$1,292	-\$1,292	-\$1,292	-\$1,292	
<i>Total Returns</i>		\$8,145	\$8,145	\$8,145	\$8,145	\$8,145	
PV of Total Returns		\$8,025	\$7,906	\$7,790	\$7,674	\$7,561	\$38,957
				Net PV of Returns			\$38,957
				5-Year Returns			--
				Return in Dollars			--
				5-Year ROI			--

Table F.26. 10-Year ROI of Customized Training, Participant Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$0						
PV of Total Expenditures							\$0
Returns/Participant							
Earnings	\$39,886	\$7,977	\$7,977	\$7,977	\$7,977	\$7,977	
Fringe Benefits	\$7,977	\$1,595	\$1,595	\$1,595	\$1,595	\$1,595	
Welfare	-\$53	-\$11	-\$11	-\$11	-\$11	-\$11	
Food Stamps	-\$349	-\$70	-\$70	-\$70	-\$70	-\$70	
UI Benefits	-\$273	-\$55	-\$55	-\$55	-\$55	-\$55	
Taxes	-\$6,462	-\$1,292	-\$1,292	-\$1,292	-\$1,292	-\$1,292	
<i>Total Returns</i>	\$40,727	\$8,145	\$8,145	\$8,145	\$8,145	\$8,145	
PV of Total Returns	\$38,957	\$7,449	\$7,339	\$7,231	\$7,124	\$7,019	\$75,119
				Net PV of Returns			\$75,119
				10-Year Returns			--
				Return in Dollars			--
				10-Year ROI			--

Table F.27. 5-Year ROI of Customized Training, Taxpayer Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$2,815						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$2,815						
PV of Total Expenditures							\$2,815
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare		\$11	\$11	\$11	\$11	\$11	
Food Stamps		\$70	\$70	\$70	\$70	\$70	
UI Benefits		\$55	\$55	\$55	\$55	\$55	
Taxes		\$1,292	\$1,292	\$1,292	\$1,292	\$1,292	
<i>Total Returns</i>		\$1,427	\$1,427	\$1,427	\$1,427	\$1,427	
PV of Total Returns		\$1,406	\$1,385	\$1,365	\$1,345	\$1,325	\$6,826
				Net PV of Returns			\$4,011
				5-Year Returns			142%
				Return in Dollars			\$1.42
				5-Year ROI			19%

Table F.28. 10-Year ROI of Customized Training, Taxpayer Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$2,815						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$2,815						
PV of Total Expenditures							\$2,815
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare	\$53	\$11	\$11	\$11	\$11	\$11	\$105
Food Stamps	\$349	\$70	\$70	\$70	\$70	\$70	\$698
UI Benefits	\$273	\$55	\$55	\$55	\$55	\$55	\$546
Taxes	\$6,462	\$1,292	\$1,292	\$1,292	\$1,292	\$1,292	\$12,923
<i>Total Returns</i>	\$7,136	\$1,427	\$1,427	\$1,427	\$1,427	\$1,427	\$14,272
PV of Total Returns	\$6,826	\$1,305	\$1,286	\$1,267	\$1,248	\$1,230	\$13,162
				Net PV of Returns			\$10,347
				10-Year Returns			368%
				Return in Dollars			\$3.68
				10-Year ROI			17%

Table F.29. 5-Year ROI of Customized Training, Societal Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$2,815						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$2,815						
PV of Total Expenditures							\$2,815
Returns/Participant							
Earnings		\$7,977	\$7,977	\$7,977	\$7,977	\$7,977	
Fringe Benefits		\$1,595	\$1,595	\$1,595	\$1,595	\$1,595	
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>		\$9,573	\$9,573	\$9,573	\$9,573	\$9,573	
PV of Total Returns		\$9,431	\$9,292	\$9,154	\$9,019	\$8,886	\$45,783
				Net PV of Returns			\$42,968
				5-Year Returns			1,526%
				Return in Dollars			\$15.26
							75%
				5-Year ROI			

Table F.30. 10-Year ROI of Customized Training, Societal Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$2,815						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$2,815						
PV of Total Expenditures							\$2,815
Returns/Participant							
Earnings	\$39,886	\$7,977	\$7,977	\$7,977	\$7,977	\$7,977	\$79,772
Fringe Benefits	\$7,977	\$1,595	\$1,595	\$1,595	\$1,595	\$1,595	\$15,954
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>	47,863	\$9,573	\$9,573	\$9,573	\$9,573	\$9,573	\$95,726
PV of Total Returns	45,783	\$8,755	\$8,625	\$8,498	\$8,372	\$8,248	\$88,281
				Net PV of Returns			\$85,466
				10-Year Returns			3,036%
				Return in Dollars			\$30.36
							41%
				10-Year ROI			

Table F.31. 5-Year ROI of On the Job Training, Participant Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	-\$1,515						
<i>Total Expenditures</i>	-\$1,515						
PV of Total Expenditures							-\$1,515
Returns/Participant							
Earnings		\$9,238	\$9,238	\$9,238	\$9,238	\$9,238	
Fringe Benefits		\$1,848	\$1,848	\$1,848	\$1,848	\$1,848	
Welfare		-\$33	-\$33	-\$33	-\$33	-\$33	
Food Stamps		-\$190	-\$190	-\$190	-\$190	-\$190	
UI Benefits		\$412	\$412	\$412	\$412	\$412	
Taxes		-\$1,497	-\$1,497	-\$1,497	-\$1,497	-\$1,497	
<i>Total Returns</i>		\$9,778	\$9,778	\$9,778	\$9,778	\$9,778	
PV of Total Returns		\$9,634	\$9,491	\$9,351	\$9,213	\$9,077	\$46,766
				Net PV of Returns			\$48,281
				5-Year Returns			--
				Return in Dollars			--
				5-Year ROI			--

Table F.32. 10-Year ROI of On the Job Training, Participant Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$0						
Foregone earnings	-\$1,515						
<i>Total Expenditures</i>	-\$1,515						
PV of Total Expenditures							-\$1,515
Returns/Participant							
Earnings	\$46,191	\$9,238	\$9,238	\$9,238	\$9,238	\$9,238	
Fringe Benefits	\$9,238	\$1,848	\$1,848	\$1,848	\$1,848	\$1,848	
Welfare	-\$163	-\$33	-\$33	-\$33	-\$33	-\$33	
Food Stamps	-\$951	-\$190	-\$190	-\$190	-\$190	-\$190	
UI Benefits	\$2,058	\$412	\$412	\$412	\$412	\$412	
Taxes	-\$7,483	-\$1,497	-\$1,497	-\$1,497	-\$1,497	-\$1,497	
<i>Total Returns</i>	\$48,891	\$9,778	\$9,778	\$9,778	\$9,778	\$9,778	
PV of Total Returns	\$46,766	\$8,943	\$8,810	\$8,680	\$8,552	\$8,426	\$90,176
				Net PV of Returns			\$91,691
				10-Year Returns			--
				Return in Dollars			--
				10-Year ROI			

Table F.33. 5-Year ROI of On the Job Training, Taxpayer Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$4,338						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$4,338						
PV of Total Expenditures							\$4,338
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare		\$33	\$33	\$33	\$33	\$33	
Food Stamps		\$190	\$190	\$190	\$190	\$190	
UI Benefits		-\$412	-\$412	-\$412	-\$412	-\$412	
Taxes		\$1,497	\$1,497	\$1,497	\$1,497	\$1,497	
<i>Total Returns</i>		\$1,308	\$1,308	\$1,308	\$1,308	\$1,308	
PV of Total Returns		\$1,288	\$1,269	\$1,251	\$1,232	\$1,214	\$6,254
				Net PV of Returns			\$1,916
				5-Year Returns			44%
				Return in Dollars			\$0.44
				5-Year ROI			8%

Table F.34. 10-Year ROI of On-the-Job Training, Taxpayer Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$4,338						
Foregone earnings	\$0						
<i>Total Expenditures</i>	\$4,338						
PV of Total Expenditures							\$4,338
Returns/Participant							
Earnings							
Fringe Benefits							
Welfare	\$163	\$33	\$33	\$33	\$33	\$33	\$325
Food Stamps	\$951	\$190	\$190	\$190	\$190	\$190	\$1,902
UI Benefits	-\$2,058	-\$412	-\$412	-\$412	-\$412	-\$412	-\$4,116
Taxes	\$7,483	\$1,497	\$1,497	\$1,497	\$1,497	\$1,497	\$14,966
<i>Total Returns</i>	\$6,538	\$1,308	\$1,308	\$1,308	\$1,308	\$1,308	\$13,077
PV of Total Returns	\$6254	\$1,196	\$1,178	\$1,161	\$1,144	\$1,127	\$12,060
				Net PV of Returns			\$7,722
				10-Year Returns			178%
				Return in Dollars			\$1.78
				10-Year ROI			11%

Table F.35. 5-Year ROI of On-the-Job Training, Societal Perspective

	Program Year	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Expenditures/Participant							
Program	\$4,338						
Foregone earnings	-\$1,515						
<i>Total Expenditures</i>	\$2,823						
PV of Total Expenditures							\$2,823
Returns/Participant							
Earnings		\$9,238	\$9,238	\$9,238	\$9,238	\$9,238	
Fringe Benefits		\$1,848	\$1,848	\$1,848	\$1,848	\$1,848	
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>		\$11,086	\$11,086	\$11,086	\$11,086	\$11,086	
PV of Total Returns		\$10,922	\$10,761	\$10,602	\$10,445	\$10,291	\$53,020
				Net PV of Returns			\$50,197
				5-Year Returns			1,778%
				Return in Dollars			\$17.78
							80%
				5-Year ROI			

Table F.36. 10-Year ROI of On-the-Job Training, Societal Perspective

	Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	10-Year Total
Expenditures/Participant							
Program	\$4,338						
Foregone earnings	-\$1,515						
<i>Total Expenditures</i>	\$2,823						
PV of Total Expenditures							\$2,823
Returns/Participant							
Earnings	\$46,191	\$9,238	\$9,238	\$9,238	\$9,238	\$9,238	\$92,382
Fringe Benefits	\$9,238	\$1,848	\$1,848	\$1,848	\$1,848	\$1,848	\$18,476
Welfare							
Food Stamps							
UI Benefits							
Taxes							
<i>Total Returns</i>	55,429	\$11,086	\$11,086	\$11,086	\$11,086	\$11,086	\$110,859
PV of Total Returns	53,020	\$10,139	\$9,989	\$9,841	\$9,696	\$9,552	\$102,236
				Net PV of Returns			\$99,413
				10-Year Returns			3,521%
				Return in Dollars			\$35.21
							43%
				10-Year ROI			

Appendix G. Sensitivity Analysis Results

Table G.1. Sensitivity Analysis Results, ITGs

	Participant	Taxpayer	Society
Benchmark			
<ul style="list-style-type: none"> Discount rate 1.5% No decay All impacts included Impacts not adjusted FY 2014 and 2015 cohorts 	\$214.56	\$2.66	\$21.67
Discount rate			
<ul style="list-style-type: none"> 0% 3% 	\$232.88	\$2.56	\$23.58
	\$198.26	\$2.39	\$19.97
Decay			
<ul style="list-style-type: none"> Impacts decay to 0 by end of Year 6 	\$71.11	\$0.41	\$6.75
Impacts			
<ul style="list-style-type: none"> Only statistically significant impacts included 	\$215.53	\$2.56	\$21.67
Impact adjustment			
<ul style="list-style-type: none"> Impacts reduced by 50% 	\$106.78	\$0.83	\$10.33
Cohort			
<ul style="list-style-type: none"> FY 2014 cohort only 	\$203.62	\$2.70	\$20.73

Table G.2. Sensitivity Analysis Results, Industrial Cohort

	Participant	Taxpayer	Society
Benchmark			
<ul style="list-style-type: none"> Discount rate 1.5% No decay All impacts included Impacts not adjusted FY 2014 and 2015 cohorts 	\$49.84	\$1.86	\$12.77
Discount rate			
<ul style="list-style-type: none"> 0% 	\$53.43	\$2.07	\$13.75
<ul style="list-style-type: none"> 3% 	\$46.62	\$1.67	\$11.89
Decay			
<ul style="list-style-type: none"> Impacts decay to 0 by end of Year 6 	\$22.50	\$0.26	\$5.30
Impacts			
<ul style="list-style-type: none"> Only statistically significant impacts included 	\$49.76	\$1.89	\$12.77
Impact adjustment			
<ul style="list-style-type: none"> Impacts reduced by 50% 	\$24.42	\$0.43	\$5.88

Table G.3. Sensitivity Analysis Results, Healthcare Cohort

	Participant	Taxpayer	Society
Benchmark			
<ul style="list-style-type: none"> Discount rate 1.5% No decay All impacts included Impacts not adjusted FY 2014 and 2015 cohorts 	\$247.51	\$1.44	\$16.10
Discount rate			
<ul style="list-style-type: none"> 0% 	\$266.25	\$1.64	\$17.54
<ul style="list-style-type: none"> 3% 	\$230.87	\$1.26	\$14.82
Decay			
<ul style="list-style-type: none"> Impacts decay to 0 by end of Year 6 	\$82.76	-\$0.11	\$4.82
Impacts			
<ul style="list-style-type: none"> Only statistically significant impacts included 	\$246.20	\$1.53	\$16.10
Impact adjustment			
<ul style="list-style-type: none"> Impacts reduced by 50% 	\$123.26	\$0.22	\$7.55
Cohort			
<ul style="list-style-type: none"> FY 2014 cohort only 	\$246.29	\$1.63	\$16.21

Table G.4. Sensitivity Analysis Results, Tech Cohort

	Participant	Taxpayer	Society
Benchmark			
<ul style="list-style-type: none"> Discount rate 1.5% No decay All impacts included Impacts not adjusted FY 2014 and 2015 cohorts 	\$65.85	\$0.35	\$6.32
Discount rate			
<ul style="list-style-type: none"> 0% 	\$71.49	\$0.46	\$6.94
<ul style="list-style-type: none"> 3% 	\$60.84	\$0.25	\$5.77
Decay			
<ul style="list-style-type: none"> Impacts decay to 0 by end of Year 6 	\$21.59	-\$0.54	\$1.48
Impacts			
<ul style="list-style-type: none"> Only statistically significant impacts included 	\$66.55	\$0.28	\$6.32
Impact adjustment			
<ul style="list-style-type: none"> Impacts reduced by 50% 	\$32.43	-\$0.33	\$2.66

Table G.5. Sensitivity Analysis Results, Customized Training

	Participant	Taxpayer	Society
Benchmark			
<ul style="list-style-type: none"> Discount rate 1.5% No decay All impacts included Impacts not adjusted FY 2014 and 2015 cohorts 	na	\$3.68	\$30.36
Discount rate			
<ul style="list-style-type: none"> 0% 	na	\$4.07	\$33.01
<ul style="list-style-type: none"> 3% 	na	\$3.32	\$28.01
Decay			
<ul style="list-style-type: none"> Impacts decay to 0 by end of Year 6 	na	\$0.62	\$9.68
Impacts			
<ul style="list-style-type: none"> Only statistically significant impacts included 	na	\$3.46	\$30.36
Impact adjustment			
<ul style="list-style-type: none"> Impacts reduced by 50% 	na	\$1.34	\$14.68
Cohorts			
<ul style="list-style-type: none"> FY 2014 cohort only 	na	\$1.73	\$14.02

Table G.6. Sensitivity Analysis Results, On-the-Job Training

	Participant	Taxpayer	Society
Benchmark			
<ul style="list-style-type: none"> Discount rate 1.5% No decay All impacts included Impacts not adjusted FY 2014 and 2015 cohorts 	na	\$1.78	\$35.21
Discount rate			
<ul style="list-style-type: none"> 0% 	na	\$2.01	\$38.27
<ul style="list-style-type: none"> 3% 	na	\$1.57	\$32.50
Decay			
<ul style="list-style-type: none"> Impacts decay to 0 by end of Year 6 	na	-\$0.06	\$11.31
Impacts			
<ul style="list-style-type: none"> Only statistically significant impacts included 	na	\$2.59	\$35.21
Impact adjustment			
<ul style="list-style-type: none"> Impacts reduced by 50% 	na	\$0.39	\$17.11
Cohorts			
<ul style="list-style-type: none"> FY 2014 cohort only 	na	-\$0.57	\$7.26

Appendix H. Earnings by Occupation

The small number of participants enrolled in the training programs did not permit calculation of ROI by occupation. This appendix presents pre/post earnings by occupation for ITGs, NYACH, and Industrial Partnerships. There are two important limitations to keep in mind. First, pre/post earnings gains are not a good measure of program impacts because earnings are likely to increase for most participants even in the absence of training. Without a comparison group it is impossible to separate the inevitable earnings gain from the gain that resulted from training. Therefore, pre/post earnings gains are likely to overestimate the true earnings gain from training. Second, the post-training earnings include only one or two quarters of data for some of the participants. Because participants may need time to find a job after finishing training, the level of post-training earnings may be lower than expected.

The appendix shows the pre/post earnings by occupation. Within each training program, the data are sorted by the percentage gain in earnings. Looking at NYACH, there is

considerable variation in earnings gains, ranging from \$966 for Dental Hygienist to 14,654 for Transition to Practice for Registered Nurses. Earnings gains are inversely related to the pre-training earnings. The average earnings gains for the two occupations with the highest earnings is lower than the average pre-earnings for the three occupations with the lowest earnings gains. Participants with lower pre-training earnings gain more than those with higher pre-training earnings. This finding suggests that the earnings gains associated with training depend not only on the training itself but also on the labor market characteristics of trainees. Therefore, it is important to keep in mind that differences in earnings gains across occupations reflect not only the true effect of the training but also differences in the characteristics of trainees.

Similar patterns of relationship between starting earnings and earnings gains were observed for the other training programs.

Table H.1. Pre- and Post-Training Earnings by Occupation

Program	Frequency	Average wages prior to entry (\$)	Wages second quarter after exit (\$)	Difference (\$)	Percent change (%)	Rank by starting wage	Rank by percent change
NYACH							
Transition to Practice for US Registered Nurse	20	3,737	18,391	14,654	392.1	7	1
ESL Bridge to Home Health Aide	11	591	2,443	1,852	313.5	10	2
Paramedic	31	3,329	9,997	6,667	200.3	6	3
Dental Anesthesia	15	4,275	11,583	7,308	171.0	9	4
Home Health Aide	513	1,168	3,071	1,903	162.9	1	5
Registered Nurse	80	2,496	5,854	3,359	134.6	2	6
Pharmacy Technician	19	1,908	3,123	1,215	63.7	8	7
Medical Assistant	69	2,835	4,459	1,625	57.3	3	8
Dental Assistant	41	1,995	2,961	966	48.4	4	9
Patient Care Technician	35	5,018	6,582	1,564	31.2	5	10
Industrial Partnerships							
Electrician/Cable Installation	28	1,803	5,337	3,534	196.0	3	1
Welding	12	2,228	3,959	1,731	77.7	5	2
School/Intercity Bus Driver	73	4,068	7,062	2,994	73.6	1	3
Carpentry/Woodworking	30	2,784	4,172	1,387	49.8	2	4
Principles of Supervision	18	10,641	10,425	-216	-2.0	4	5
ITGs							
Security Guards	1,432	1,680	3,459	1,779	105.8	1	1
Truck Drivers, Light or Delivery Services	42	2,988	5,775	2,787	93.3	10	2
Truck Drivers, Heavy and Tractor-Trailer	58	5,185	7,697	2,512	48.5	8	3
Bus Drivers, School	299	4,242	6,241	1,999	47.1	3	4

Table H.1. Pre- and Post-Training Earnings by Occupation (continued)

Program	Frequency	Average wages prior to entry (\$)	Wages second quarter after exit (\$)	Difference (\$)	Percent change (%)	Rank by starting wage	Rank by percent change
Nursing Aides, Orderlies, and Attendants	438	2,746	3,703	957	34.8	2	5
Medical Assistants	165	3,608	4,751	1,143	31.7	4	6
Network and Computer Systems Administrators	97	8,882	9,834	952	10.7	6	7
Computer Specialists, All Other	50	9,375	9,309	-66	-0.7	9	8
Computer Support Specialists	111	7,769	6,882	-887	-11.4	5	9
Bookkeeping, Accounting, and Auditing Clerks	84	5,775	4,560	-1,215	-21.0	7	10