

**The Benefits and Costs of the Trade
Adjustment Assistance (TAA)
Program Under the 2002
Amendments**

Final Report

Prepared as Part of the

***Evaluation of the Trade Adjustment
Assistance Program***

December 2012

Sarah Dolfin

Peter Z. Schochet

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Policy Research

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CONTENTS

	EXECUTIVE SUMMARY	i
I.	INTRODUCTION	1
	A. Overview of TAA	2
	1. Eligibility Process	3
	2. Services and Benefits Provided by TAA Under the 2002 Amendments.....	3
	B. Overview of the TAA Impact Evaluation.....	5
	1. Study Design.....	5
	2. Key Findings from the Impact Study	11
	C. Organization of the Rest of the Report.....	14
II.	OVERVIEW OF METHODOLOGY	15
	A. Benefits and Costs Included in the Analysis	15
	B. Different Perspectives on Benefits and Costs	18
	C. Approach to Measuring Benefits and Costs	19
	1. Measuring Benefits During the Study Observation Period.....	19
	2. Measuring Benefits After the Study Observation Period.....	20
	3. Measuring Costs	20
	4. Aggregating Benefits and Costs Using a Common Metric.....	21
	5. Measuring Benefits from Free Trade	21
	D. Comparing Benefits and Costs that Occur at Different Times	21
	E. Choice of a Summary Measure.....	22
	F. Samples Used for Analysis	22
	G. Sensitivity of Estimates to Alternative Assumptions	23
III.	EFFECTS FROM CHANGES IN OUTPUT	25
	A. Approach to Measurement.....	25
	B. Value of Changes in Output.....	26
	C. Value of Changes in Tax Payments	29
	D. Sensitivity to Assumptions About Labor Market Changes	31

- E. Summary of Benchmark Estimates 32
- IV. EFFECTS FROM CHANGES IN USE OF SERVICES NOT FUNDED BY TAA 37
 - A. Use of Education and Training Programs Not Funded by TAA..... 37
 - Benchmark Approach 38
 - Comparing the Benchmark and Alternative Approaches 41
 - B. Increased Use of Reemployment Services Not Funded by TAA..... 41
- V. EFFECTS FROM CHANGES IN RECEIPT OF UNEMPLOYMENT INSURANCE AND PUBLIC ASSISTANCE BENEFITS 45
 - A. Changes in Receipt of UI Benefits 45
 - B. Changes in Receipt of Public Assistance Program Benefits 48
- VI. PROGRAM COSTS 51
 - A. TRA Payments 51
 - B. TAA Training and Allowances 51
 - C. ATAA Wage Supplements..... 52
 - D. HCTC Tax Credits..... 53
 - E. Administrative Costs 54
 - F. Summary 54
- VII. AGGREGATING BENEFITS AND COSTS 57
 - A. Comparing Overall Benefits and Costs to Society: Was TAA Cost-Effective? 57
 - B. Benefits and Costs by Perspective 58
 - 1. Benefits and Costs to Participants 58
 - 2. Benefits and Costs to the Rest of Society 58
 - C. Benefits and Costs by Subgroup 59
 - 1. Benefits and Costs by Service Subgroup 59
 - 2. Benefits and Costs by Age Subgroup 59
 - D. Sensitivity Analyses 60

VIII.	BENEFITS FROM FACILITATION OF FREE TRADE.....	63
	A. The Effect of Trade on Income.....	63
	B. The Effect of TAA on Trade Policy.....	64
	C. The Effect of Trade Policy on Trade Share	67
	D. Estimation of the Benefits of TAA Due to Trade	67
IX.	CONCLUSIONS	69
	REFERENCES.....	71
	APPENDIX A	75

TABLES

II.1.	Potential Benefits and Costs of Participating in TAA, by Perspective	16
III.1:	Per Person Survey-Reported Earnings and Compensation for TAA Participants, by Quarter After Job Loss (2006 Dollars)	27
III.1a:	Per Person Compensation for TAA Participants, by Quarter After Job Loss: Estimated Impact by Subgroup (2006 Dollars).....	28
III.2:	Impacts on Taxes, by Quarter After Job Loss (2006 Dollars).....	30
III.2a:	Impacts on Taxes, by Quarter After Job Loss: Estimated Impact on Taxes Paid By Subgroup (2006 Dollars).....	31
III.3:	Sensitivity of Estimated Impacts on Compensation to Assumptions about Displacement and Replacement Effects (2006 Dollars)	32
III.4:	Benefits from Increased Output (2006 Dollars).....	33
III.4a:	Benefits from Increased Output: Discounted Impact on Compensation by Subgroup (2006 Dollars)	33
III.5:	Benefits from Increased Output, by Perspective (2006 Dollars).....	33
III.6:	Benefits from Increased Output for UI Exhaustee Sample (2006 Dollars).....	34
III.7:	Benefits from Increased Output for UI Exhaustee Sample, by Perspective (2006 Dollars)	35
IV.1:	Benefits from Decreased Attendance at Education or Training Programs Not Funded by TAA	39
IV.1a:	Benefits from Decreased Attendance at Education or Training Programs Not Funded by TAA: Discounted Benefit to Society by Subgroup (2006 Dollars).....	40
IV.1b:	Benefits from Decreased Attendance at Education or Training Programs Not Funded by TAA for UI Exhaustee Sample.....	40
IV.2:	Benefits from Decreased Use of Reemployment Services Not Funded by TAA	43
IV.2a:	Benefits from Decreased Use of Reemployment Services Not Funded by TAA: Discounted Benefit to Society by Subgroup (2006 Dollars)	43
V.1:	Impacts on the Receipt of Unemployment Insurance (2006 Dollars)	46

V.1a:	Impacts on the Receipt of Unemployment Insurance: Estimated Impact on UI Outlays by Subgroup (2006 Dollars)	47
V.2:	Benefits from Decreases in the Receipt of UI and Public Assistance Benefits (2006 Dollars)	48
V.2a:	Benefits from Decreases in the Receipt of UI and Public Assistance Benefits: Discounted Value of Change in Benefits Paid and Discounted Benefit to Society by Subgroup (2006 Dollars)	49
V.2b:	Benefits from Decreases in the Receipt of UI and Public Assistance Benefits for Exhaustee Sample (2006 Dollars)	50
VI.1:	Average Discounted Costs Per TAA Participant (2006 Dollars)	55
VII.1:	Comparing Overall Benefits and Costs of the TAA Program Per Participant (2006 Dollars)	58
VII.2:	Comparing Overall Benefits and Costs to Society of the TAA Program Per Participant Across Subgroups (2006 Dollars)	59
VII.3:	Sensitivity Analysis: Comparing Overall Benefits and Costs to Society of the TAA Program Per Participant Under Alternative Specifications (2006 Dollars)	60
VIII.1:	Minimum Effects of TAA on Trade Policy That Make the Program Cost-Effective	68
A.1.	Hourly Employer Costs for Manufacturing Workers in December 2003, by Type of Worker (In Dollars Except Where Noted)	75
A.2:	Benefits from the Increased Output of TAA Participants, by Quarter After Job Loss (2006 Dollars)	76
A.3:	Benefits from the Increased Output of TAA Participants for UI Exhaustee Sample, by Quarter After Job Loss (2006 Dollars)	77
A.4:	Impacts on Taxes for UI Exhaustee Sample, by Quarter After Job Loss (2006 Dollars)	78
A.5:	Benefits from Decreased Use of Reemployment Services Not Funded by TAA for UI Exhaustee Sample	79
A.6:	Benefits from Decreases in the Receipt of Unemployment Insurance for UI Exhaustee Sample (2006 Dollars)	80
A.7:	Costs of TRA Payments (2006 Dollars)	81
A.8:	Average Discounted Costs Per TAA Participant for UI Exhaustee Sample (2006 Dollars)	82

A.9: Average Discounted Costs Per TAA Participant Using Survey Data to Estimate Training and Allowance Costs (2006 Dollars)83

FIGURES

VIII.1. U.S. Trade Ratio (1996\$).....65

VIII.2. Frequency of Mentions of “TAA” in Major Newspapers and Transcripts66

EXECUTIVE SUMMARY

The Trade Adjustment Assistance (TAA) program has been a linchpin of Federal efforts to help America's manufacturing workers rebound from job losses experienced as a consequence of foreign competition. The program aims to help affected workers obtain reemployment at a suitable wage by providing training, wage subsidies, and temporary income support, among other services. In 2010, the program served nearly 200,000 participants.

The U.S. Department of Labor's Employment and Training Administration (ETA) funded Social Policy Research Associates (SPR) and its subcontractor, Mathematica Policy Research, to conduct a comprehensive *Evaluation of the TAA Program*. The evaluation was designed to assess the effectiveness of TAA in improving the labor market outcomes of eligible manufacturing workers following amendments to the program launched by the 2002 Trade Act. It included three parts: (a) an implementation study; (b) a quasi-experimental impact evaluation; and (c) a benefit-cost study. This report presents the findings of the benefit-cost analysis of TAA.

Our basic approach to analyzing the cost-effectiveness of the TAA program under the 2002 amendments was to estimate the program's benefits in dollar terms and compare them to the program's costs. The value of the benefits was computed by multiplying the estimated impacts of the program by their estimated dollar values. Given TAA's focus on training and reemployment, one of the most important potential benefits we measured was the increased output of participants as quantified by their total compensation (earnings and fringe benefits). We also measured the potential benefits from reduced use of training and reemployment services not funded by TAA, reduced receipt of unemployment insurance (UI) and public assistance benefits, and the facilitation of free trade—a frequently cited rationale for the program. We measured the costs of TAA as program outlays for TRA benefits, training, allowances, Health Coverage Tax Credits (HCTC), Alternative Trade Adjustment Assistance (ATAA) wage supplements, and administration. Subtracting the costs from the benefits provided a measure of the net benefits of TAA. We estimated net program benefits per participant from the perspective of society as a whole, as well as from the perspectives of TAA participants and the rest of society.

The impact estimates presented in the impact report (Schochet et al. 2012) were an important input to the benefit-cost analysis. We estimated program impacts by comparing TAA participants who filed for UI benefits to a matched comparison group of UI claimants in the manufacturing sector living in the same or similar local areas who were not eligible for the program. Nationally representative treatment samples were selected so that the estimates could be generalized to all TAA-eligible workers in firms that were certified for TAA between November 1, 2005 and October 31, 2006. Two telephone surveys of the worker samples, one conducted in 2008-2009 and a second in 2010, provided data on TAA services and benefits, employment-related outcomes, and receipt of training and reemployment services that were used in the analysis.

The most important finding of the benefit-cost analysis is that, without considering the benefits of TAA stemming from the possibility that it promotes free trade, the *net benefit to society* of the TAA program as it operated under the 2002 amendments was negative \$53,802 per participant. The main reason for the negative net benefits was that participants had lower earnings than comparison group members. Negative *net benefits to society* were smaller (-\$27,494) relative to an alternative comparison sample of only UI exhaustees, a specification representing an upper-bound estimate that assumes

TAA participants' exhaustion of UI was not influenced by the availability of training, TRA, and other TAA services. Other key results are as follows:

- The *net benefit to TAA participants* under the 2002 program was negative \$26,837, roughly 50 percent of the net benefit to society. Participants incurred costs through earnings that were lower than those of the matched comparison group (the amount participants presumably would have received in the absence of the program). Participants' reduced tax bills and higher benefits from UI and TRA were not enough to compensate for the additional earnings and fringe benefits they would have received had their paid employment been similar to that of the comparison group. Using the UI exhaustee sample, the negative net benefit per TAA participant was smaller in absolute value at -\$9,565, since the reduction in earnings of TAA participants was smaller relative to this comparison group than to the main comparison group.
- The *net benefit to the rest of society* was negative \$26,965. Just over half of this amount came from program costs, while the rest was due to negative net benefits including the cost of training and reemployment services for TAA participants.
- The net benefit of TAA was negative for all service and age subgroups. However, the net benefits in absolute value were smaller for older workers and for participants who only received TRA payments because these groups experienced a smaller earnings loss and also cost the program less in terms of their training.
- Projecting into the future, under the assumptions used in the analysis, the participants in the 2002 TAA program would have to earn at least \$2,124 per year more than the comparison group from year five (after job loss) until retirement for the program to provide positive benefits to them. Compared to just UI exhaustees, the TAA participants would have to make \$757 more per year than the comparisons over the same time period to realize benefits from the program.
- The negative net benefits were robust to a wide range of assumptions. However, these calculations do not include the potentially large benefits of the TAA program in making free trade politically feasible. Incorporating estimates of the trade-related benefit of TAA has a substantial effect on the program's net benefits, with the magnitude of the effect depending on the parameters used and, in particular, the extent to which TAA accounts for trade liberalization. However, if TAA made even a relatively modest contribution to the ease of enacting free trade policies, the program's total benefits would outweigh its costs.

There are several important caveats to these findings. First, because many TAA participants enroll in training programs for a considerable amount of time, the four-year follow-up period may not be long enough to evaluate the full returns of the 2002 TAA program on labor market activity. Furthermore, TAA trainees completed their training and re-entered the labor market when the nation's economy was mired in severe economic recession, whereas the comparison group—who spent considerably less time in training—were more likely to have returned to the labor market before economic conditions deteriorated. Thus, longer follow-up may be necessary to account for all the benefits of TAA. Finally, while costs and benefits identified here are averaged across our sample of 2002 TAA participants, by definition, some subset of participants may have experienced higher or lower benefits or engendered greater or lesser costs.

I. INTRODUCTION

The Trade Adjustment Assistance (TAA) program has been a linchpin in Federal efforts to help America's manufacturing workers rebound from job losses experienced as a consequence of foreign competition. The program aims to help affected workers obtain reemployment at a suitable wage by providing training, wage subsidies, and temporary income support, among other services. In 2010, the program served 199,238 participants.¹

The U.S. Department of Labor's Employment and Training Administration (ETA) funded Social Policy Research Associates (SPR) and its subcontractor, Mathematica Policy Research, to conduct a comprehensive *Evaluation of the TAA Program*. The evaluation was designed to assess the effectiveness of TAA in improving the labor market outcomes of eligible manufacturing workers following amendments to the program launched by the 2002 Trade Act as well as to understand implementation of the amendments, services provided, and program administration. The evaluation had three parts: (a) a process study, the results of which were presented in multiple reports, including D'Amico et al. (2009 and 2012); (b) a quasi-experimental impact evaluation whose results were presented in Schochet et al. (2012) (hereafter the impact report); and (c) a benefit-cost analysis, which is presented in this report.

Our basic approach to analyzing the cost-effectiveness of the TAA program under the 2002 amendments was to estimate program benefits in dollar terms and compare them to the program costs for the study period (four years post-unemployment insurance claim). The value of the benefits was computed by multiplying the estimated impacts of the program by their estimated dollar values. Given TAA's focus on training and reemployment, one of the most important potential benefits we measured was the increased output of participants (as proxied by earnings and fringe benefits). We also measured the potential benefits from reduced use of training and reemployment services not funded by TAA, reduced receipt of unemployment insurance (UI) and public assistance benefits. Additionally, we measured potential benefits from the facilitation of free trade, despite the difficulty of quantifying them, because TAA is sometimes thought of as a price to be paid to increase free trade legislation. We measured the costs of TAA as program outlays for TRA benefits, training, allowances, Health Coverage Tax Credits (HCTC), Alternative Trade Adjustment Assistance (ATAA) wage supplements, and administration. Subtracting the costs from the benefits provided a measure of the net benefits of TAA. We estimated net program benefits per participant from the perspective of society as a whole, as well as from the perspectives of TAA participants and the rest of society.

The estimated earning and employment impacts presented in the impact report were important inputs to the benefit-cost analysis. Estimated impacts in that report were developed by comparing TAA participants to a statistically matched group of UI claimants, who were also in the manufacturing sector but were not eligible for the TAA program. Matching was done on a large number of observable characteristics using propensity scoring. Nationally representative treatment samples ensured that the estimates can be generalized to the entire TAA participant population. Two telephone surveys of the TAA participants and their comparison group, one conducted in

¹ U.S. Department of Labor, Employment and Training Administration, *Workforce System Results: December 31, 2010* (<http://www.doleta.gov/Performance>).

2008-2009 and a second in 2010, provided much of the data on employment-related outcomes, training, reemployment services, and income support that were used in the analysis.

The rest of this chapter provides the study context for understanding the design of the benefit-cost analysis. Section A describes the TAA program, including its operational structure, recent changes to the program, and key program benefits. This background will help the reader understand how we selected the benefits and costs to include in our analysis. As the estimation of impacts is one of the most critical and complex components of our analysis, Section B summarizes the impact evaluation, including its research questions, design, and most important findings. Section C ends the chapter with a description of the organization of the rest of the report.

A. Overview of TAA

Although beneficial to the economy as a whole, the expansion of international trade exposes some U.S. firms to a level of foreign competition that can harm them financially and trigger lay-offs of significant numbers of U.S. workers (Kletzer 2001). U.S. government policy recognized such potential localized harm and incorporated escape clause provisions into U.S. trade laws in the 1940s that provided for the institution of trade barriers if trade-related injuries to U.S. producers could be clearly demonstrated. This approach protected U.S. firms and workers but meant forgoing some of the economy-wide gains that could result from trade liberalization.

TAA represents an alternative strategy. Rather than blocking or reversing trade liberalization, TAA compensates workers and firms that have suffered trade-related injuries and provides services to help them adjust to market changes, thus making free trade politically palatable. TAA's first antecedent was the Trade Expansion Act of 1962, which offered financial payments and other adjustment services to affected workers. However, strict eligibility requirements kept take-up rates low. In subsequent years, ensuing legislation and amendments, including the Trade Act of 1974, expanded eligibility guidelines (though with eligibility restricted to those affected by trade in goods-producing industries) and changed the program's orientation from financial compensation to adjustment through training and reemployment services.

The Trade Adjustment Assistance Reform Act of 2002 (referred to here as the 2002 TAA program, the Trade Act of 2002 or the 2002 amendments) represented another significant milestone in the evolution of the TAA program and constituted the programmatic environment when the evaluation was launched; details of the program as it operated under the Trade Act of 2002 are provided below. As the evaluation was nearing its end, the Trade and Globalization Adjustment Assistance Act (TGAAA), enacted in 2009 as part of the American Recovery and Reinvestment Act (ARRA), amended the TAA program yet again. Among its key provisions, TGAAA expanded eligibility (most notably to trade-affected workers in the services and public sectors), mandated that case management services be made available to TAA participants, and significantly expanded certain program benefits. These changes were continued in the Trade Adjustment Assistance Extension Act of 2011 and are due to expire in late 2013.

The following sections outline key features of the TAA program under the 2002 amendments and before ARRA, the focus of the study. We discuss the process to determine eligibility for TAA and the benefits that workers may receive. The impact report provides further details.

1. Eligibility Process

Worker eligibility for TAA was determined through a two-step process. First, groups of workers at a firm or their representatives filed a petition with the Employment and Training Administration of the U.S. Department of Labor (USDOL). A determination of eligibility was made within 40 days. If a petition was certified (that is, approved) for TAA, individual workers covered by the petition were notified by the state workforce agency of their potential eligibility to receive TAA benefits and services. Covered workers were those who are laid off or experience reductions in working hours within one year before the petition filing date and up to two years after the petition approval date (the “impact period”). These workers, however, must have then submitted individual applications to their state agency and be determined eligible for TAA services and benefits.

2. Services and Benefits Provided by TAA Under the 2002 Amendments

The main benefits provided by TAA under the 2002 amendments (and continuing today) were: subsidized training; extended income support after UI benefits have been exhausted; partial subsidies for health insurance; wage subsidies for workers over age 50; allowances for job search and relocation in another geographical area; and other services, some of which may be provided through other workforce programs. These benefits, as available in the 2002 program, are described below. As the descriptions indicate, some benefits could have been received for two years or more.

Training. TAA subsidized the cost of “training” for up to two years. Approved training options included occupational training and education programs, remedial education (such as GED or English as a Second Language courses), and on-the-job training (where the worker receives a paycheck while training and their employers receive partial federal reimbursement). Training was to be designed to provide suitable re-employment at an adequate replacement wage, defined in legislation. The 2002 Trade Act increased funding for training from \$110 million to \$220 million per year.

Trade Readjustment Allowances (TRA). Weekly TRA payments were intended to support workers enrolled in training. Following the exhaustion of UI benefits, TAA-eligible workers could receive these payments as long as they met certain other criteria. Specifically, the workers had to have had 26 weeks of work with the certified employer in the 52 weeks before job separation and must have either enrolled in training (or received a waiver from training) within the later of 8 weeks after certification or 16 weeks after job separation.² Under the 2002 program, TRA benefits included up to 52 weeks of “basic” TRA; that is, once workers exhausted UI benefits (which generally last 26 weeks), they received TRA benefits until week 52. Additional TRA was available for up to 52 weeks as long as participants were in training. TRA benefits could be extended up to 26 weeks further for participants enrolled in remedial education. Thus regular training could be supported for up to 104 weeks (26 weeks of regular UI, 26 weeks of basic TRA, and 52 weeks of

² The six conditions for which waivers could be granted by state agencies were: 1) the worker was expected to be recalled; 2) the worker was believed to have marketable skills; 3) the worker was within two years of retirement; 4) the worker had a health condition preventing participation in training; 5) suitable training was not available; or 6) the first available enrollment date for the training the worker wanted to undertake fell outside the 8/16 guidelines (but within 60 days from that cut-off date, unless there were extenuating circumstances). Most states granted waivers to TAA eligible workers to ensure their eligibility for the Health Care Tax Credit (HCTC) (D’Amico et al. 2009). Waivers of the training requirement were not permitted for additional TRA benefits.

additional TRA) and up to 130 weeks if remedial training is needed.³ Trainees could continue to receive TRA payments during breaks in training of less than 30 days (not including weekends and holidays). Training typically was long term (the impact report found a median duration of nearly 1.4 years among TAA-funded trainees) and some workers did not begin training until their UI benefits expired, the TRA payments might have ended before some workers completed training.

Health Care Tax Credit (HCTC). Under the 2002 program, the HCTC covered 65 percent of the cost of health insurance coverage for the individual and qualified family members (generally the spouse and dependents, for IRS purposes) as a refundable tax credit. TAA eligible workers could obtain health insurance by continuing their former coverage if available through the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA), by contributing to a spouse's plan (as long as the employer does not pay more than 50 percent of the premium), by buying coverage through state qualified health plans (usually state high-risk pool plans), or by using individually purchased coverage that the worker has had for 30 days or more prior to job separation. Workers could claim the credit when filing their tax returns; alternatively, it could be paid in advance as premiums became due. HCTC was available only to those individuals who received TRA benefits (or would have been eligible to receive them if they had exhausted UI), a waiver from training, or ATAA.

Alternative Trade Adjustment Assistance (ATAA). Since investments to retrain older workers—both the workers' time and effort and the government's expenditures—may not pay off before such workers retire, the 2002 amendments to TAA established the ATAA program, as a demonstration project, to provide a wage supplement to encourage rapid reemployment of older workers. ATAA was available to workers who were at least 50 years old, who were covered by a petition for which ATAA was certified, and who found a full-time job within 26 weeks of job separation from a new employer, at earnings that did not exceed \$50,000 a year.⁴ The wage supplement was 50 percent of the difference between the worker's pre-dislocation wage and post-dislocation wage, up to a maximum of \$10,000 over a two-year period. Workers who received ATAA could not receive TRA, training, or job search allowances, but could receive HCTC and relocation allowances. Only a very small percentage of all TAA participants and even of those participants in the eligible age range utilized ATAA, however.

Allowances. Other benefits offered by TAA included job search and relocation allowances for workers who looked for and found work in another area, and supplemental assistance payments for subsistence and transportation expenses associated with attending training in another area. Job search allowances covered 90 percent of allowable costs up to \$1,250. Relocation allowances covered 90 percent of costs up to the statutory limit for federal employees and provide a lump sum payment of up to \$1,250. Utilization of these allowances was very low, however.

³ Basic and additional TRA interact with extended benefits and the federal unemployment programs in place during ARRA. Workers are entitled to 52 weeks of basic TRA less any amount paid for regular UI and any UI extensions, so additional weeks of UI reduce weeks of basic TRA. TGAAs extended weeks of additional TRA from 52 weeks to 76 weeks.

⁴ In order for a worker group to be considered for ATAA certification, petitioners needed to check a box for ATAA on the petition form. Many states urged petitioners to do this as a matter of course. Individual workers then submitted applications for ATAA. The documentation required for states to check whether individuals met the eligibility criteria varied by state.

Other services. Helping customers develop a reemployment or training plan and providing them with follow-up services were allowable and appropriate services under TAA.⁵ However, case management services could not be funded under the 2002 TAA program. According to ETA guidance (TEGL 5-00), however, TAA was to be integrated into the broader American Job Center (formerly the One-Stop Career Center) delivery system and partner programs leveraged to provide comprehensive services to TAA participants. These services included guidance, assessment, career counseling, and staff-assisted job search, which could be funded through Wagner-Peyser or the Workforce Investment Act (WIA) Dislocated Worker Program.

B. Overview of the TAA Impact Evaluation

The impact evaluation was designed to assess the impacts of the 2002 TAA program on participants' training and labor market outcomes. Specifically, the study addressed the following research questions:

- How effective was the 2002 TAA program in improving access to reemployment services and education and training services and in leading to the attainment of educational credentials?
- How effective was the 2002 TAA program in boosting participants' employment and earnings and in improving their access to better paying jobs and ones that offered fringe benefits?
- How effective was the 2002 TAA program in promoting better health and access to health care coverage, and in reducing receipt of other forms of government assistance?
- How did the 2002 TAA program's impacts differ among participants with different demographic characteristics and among those who accessed different types of TAA services?

1. Study Design

The impact evaluation employed a comparison group design to obtain estimates of the impact of the 2002 TAA program on participants' employment-related outcomes. The ideal design—random assignment—was not feasible for the evaluation, because TAA services could not be denied to eligible workers under the law, thus making it impossible to construct a control group of TAA-eligible workers who applied for but were refused services and benefits. We defined our nationally representative treatment sample to include eligible TAA workers laid off during a certain time period when the 2002 amendments were in effect. The comparison sample of UI claimants was selected to be as similar as possible, as a group, to the treatment sample: it included dislocated manufacturing workers with similar pre-layoff earnings and living in the same or similar local areas as the TAA-

⁵ Under the 2002 amendments, Congress appropriated \$220 million each year, which states were to use primarily for funding TAA participants' training. States received an additional 15 percent of this amount for TAA administrative expenses, which included developing Individual Employment Plans or training plans. Activities such as assessment, career guidance, and case management, could not be provided using TAA funds for either training or administration. TGAAA amendments in ARRA changed these restrictions on the use of TAA funds. TGAAA: (a) required (rather than encouraged) that case management and reemployment services be made available to TAA-eligible workers, specifically including assessment, prevocational services, and career counseling; (b) more than doubled the amount of the formula allocation; (c) required that some portion of the formula funds be used for case management and reemployment services; and (d) gave each state an additional allocation of \$350,000 per year expressly to be used for case management.

eligible workers, and further matching was done on other observable variables, using propensity score matching. By definition, however, there may have been some unobservable characteristics that were not accounted for in this matching process.

Both the treatment and comparison group samples were surveyed twice to obtain information about their current and past training and employment. After the second interview, the treatment sample was rematched to a subset of the comparison sample based on the detailed background data from the survey. The goal of this design was to improve the quality of the treatment-comparison group matches.

The outcomes of the comparison sample provided the counterfactual for the evaluation—what the outcomes of treatment group members would have been in the absence of the TAA program. Thus, the impacts we used to estimate the benefits of the TAA program were based on a comparison of TAA participants with similar dislocated manufacturing workers. Below we describe the selection of the samples, collection of survey data, and analytical methods. More details may be found in the impact report and in Schochet (2012), a companion report that provides methodological notes (hereafter referred to as the “MN report”).

a. Selection of the TAA Worker Sample

A nationally representative sample of eligible TAA workers was selected in two stages:

Selection of States. In the first stage, 26 states were randomly selected and recruited for the study. We used USDOL data on petitions certified for TAA in 2005 and 2006 to select states within geographic strata with probabilities proportional to the expected number of TAA participants in the state.⁶ These 26 states contained about 90 percent of all TAA-eligible workers nationwide in the study’s certified-worker sample frame.

Selection of the Certified-Worker Sample. In the second stage, we selected a sample of TAA certified workers from each state as the primary treatment group sample for the impact analysis. The sample was obtained from lists of workers in worker groups covered by a petition certified for TAA (the “certified-worker lists”), which states are required, by law, to obtain from the workers’ employers. The evidence presented in the MN report suggested that these lists are reasonably complete. We merged these lists with UI/TRA claims data from each study state, and defined the nationally representative certified-worker sample frame to include workers meeting the following criteria (about 55,000 TAA-eligible workers nationwide):

- **Workers on the certified-worker lists who were laid off from firms that became certified for TAA between November 1, 2005 and October 31, 2006.** Even though states furnished data at different times (see below), the petition certification period for the study was the same for all states. We specified a one-year window to account for potential seasonal layoff patterns.
- **Those whose UI benefit year started between September 1, 2004 and October 31, 2008.** This window was selected because workers covered by a certification include

⁶ The selected states were New Hampshire, New Jersey, New York, Rhode Island, Maryland, Pennsylvania, Virginia, Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Texas, Arkansas, Colorado, Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, Wisconsin, California and Washington.

those laid off between one year prior to the petition filing date and two years after the petition certification date, and it typically took USDOL one to two months to make certification determinations.

States provided the UI claims data at different times throughout 2008, depending on when they agreed to participate in the study and had staff available to provide the data. We requested UI claims data for all workers who received a first UI payment of any type from the first quarter of 2004 to the most recent quarter for which UI records were available when the data were extracted. Thus, the UI data did not always cover the approximately three-year layoff window for each petition certified between November 1, 2005 and October 31, 2006. In general, however, coverage rates were high. For more than three-quarters of the petitions, the period left uncovered was 12 months or less.

The impact analysis examined several different nationally representative treatment samples of certified workers to assess the robustness of findings, including all certified workers, TAA participants, and TAA nonparticipants, as discussed in detail in the impact report. However, the main impact analysis focused on TAA participants—TAA-certified workers who received TAA program benefits like TRA, subsidized training, ATAA, or HCTC, who responded to the second survey. The benefit-cost analysis here used this same treatment sample, so we will not discuss the selection or analysis of the other treatment samples in this report.

b. Identifying the Pool of Potential Comparison Group Members

Like the treatment group, the potential comparison group consisted of displaced workers with a UI claim. We identified the pool of potential comparison group members from the UI/TRA claims data as follows:

- We aligned the treatment and comparison samples in terms of their job layoff dates by limiting the comparison group to those who started collecting regular UI benefits between September 1, 2004, and October 31, 2008.
- Using UI/TRA claim data on the industry of a worker's primary employer, we limited the comparison sample to workers in the manufacturing sector, restricting the sample to workers with North American Industry Classification System (NAICS) two-digit industry codes of 31, 32, or 33.
- We dropped workers who received TRA benefits according to the UI/TRA claims data or who were on a certified-worker list for a firm that was certified for TAA outside the date range for the study.
- We limited the potential comparison pool to workers who lived in the same local areas as the treatment group, as defined using the local area indicators discussed below, and to those between the ages of 16 and 80 who received regular UI benefits and who had non-missing values for key variables.

Under our design, treatment and matched comparison groups both consisted of new UI claimants, and the “time 0” or “trigger” date for matching was the UI claim date, which proxied for the job separation date. A disadvantage of this approach is that some in the treatment group started collecting UI benefits before their firm became certified for TAA. For instance, about 28 percent of TAA participants in the certified worker sample were separated from their jobs more than 90 days before their firm's petition was certified. Some of these participants may not yet have known about

TAA at the time of their job loss. Furthermore, some may have ultimately participated in TAA because they could not quickly find jobs (although it is also possible that these workers' job search activities were influenced by the anticipation of being eligible for TAA services). Stated differently, TAA participants who lost their jobs before petition certification may consist of a disproportionate share of workers who had initial problems becoming re-employed because of poor skills, poor economic conditions, or other reasons, and thus, decided to enroll in TAA as a result. Thus, these TAA participants may have been more likely than their matched comparisons to have unobserved characteristics that were associated with poor labor market outcomes, which could yield impact estimates that are somewhat biased downwards.

Thus, as a sensitivity analysis, we also estimated impacts using a comparison sample of those in the primary analysis sample who exhausted their UI benefits. In addition, the impact report estimated earnings impacts using samples that excluded treatments whose UI claim dates were before their firms' petition certification dates (where their matched comparisons were also excluded). The pattern of benchmark findings was robust to these sensitivity analyses.

c. Selection of the Matched Comparison Worker Sample

We used propensity score matching methods developed by Rosenbaum and Rubin (1983) to select the study comparison group from the potential comparison group. Comparison samples were selected separately by state. For each state, we matched each treatment worker to the five comparison group members with the closest propensity scores; we only planned to interview two comparison matches per treatment, but selected five comparisons in case survey nonresponse generated a need for additional sample. Matching was performed with replacement so that a comparison group member could be matched to multiple treatment group members.

The variables used in the matching process included demographic information, job characteristics, and UI claim and benefit data constructed from the UI/TRA claims data. In addition, we used zip codes from UI/TRA claims data to merge, by state, county, and year (if relevant), local area characteristics including the local annual unemployment rate in 2000 to 2006, the poverty rate in 2004, the percentage of workers in manufacturing in 2005, average earnings per job in 2005, percentage population growth between July 1, 2000 and July 1, 2005, and urban/rural status in 2003.

To assess each matching model specification, we conducted balancing tests on the categorical matching variables and the underlying continuous variables using methods found in the literature. The results suggested that the propensity score matching process identified matched comparisons from the full comparison group population whose distribution of baseline characteristics is similar to those of participants in the certified worker sample.⁷

⁷ Specifically, none of the 26 *t*-tests comparing mean propensity score values across the treatment and comparison groups in each state was statistically significant at the 5 percent level (see Chapter II Section F of the MN report). None of the 26 *F*-tests of treatment-comparison differences on the overall set of matching variables in each state was statistically significant. Only a small percentage of *t*-tests comparing the demographic and local area characteristics of treatments and their first-best matched comparisons within a given state are statistically significant. Across the 26 models, the average percentage of *t*-tests that are significant for the demographic variables is 1.4 percent and the median percentage is zero. The average percentage of *t*-tests that are significant for the local area variables is 4.0 percent. See the impact report for details.

d. Data Sources for the Impact Analysis

Outcome data for the certified worker survey sample and their matched comparisons were obtained from “baseline” and follow-up telephone interviews and administrative records (including UI wage, WIASRD, and TAPR data). “Baseline” indicates the first of the two surveys; it does not mean that it was administered at the time of the respondent’s job loss.

e. Survey Data Collection

Baseline survey. The survey questionnaire included a battery of questions about workers’ experiences with the TAA program, their labor market and training experiences, and other key study outcomes that we hypothesized could be affected by TAA participation. The survey coverage period started with the UI claim date associated with the trade-related job separation.

Baseline telephone interviewing took place between March 2008 and April 2009. The (unweighted) response rate to the baseline interview was 68.7 percent for TAA participants and 58.9 for their comparison group. Interviews were completed with 1,974 TAA participants and 3,394 matched comparisons. The average number of months between the UI claim date and the baseline interview completion date was about 29 months for each research group. We conducted baseline interviews with a comparison sample that was twice as large as the treatment sample to allow for a second stage of matching that would use the richer matching variables from the baseline survey to identify a one-to-one match for the follow-up interviews.

Follow-up survey. Follow-up telephone interviews were conducted with TAA participants in the certified-worker survey sample and their matched comparisons, but not with TAA nonparticipants and their matched comparisons. Follow-up interviews took place by telephone between June 2010 and December 2010, typically about 23 months after the baseline interviews. The follow-up survey questionnaire was nearly identical to the baseline survey questionnaire. Depending on whether the respondent had completed a baseline interview, the coverage period started at the date of the baseline survey or at the UI claim date associated with the trade-related job separation. The average number of months between the UI claim date and the follow-up interview completion date was about 51 months for each research group.

Overall, follow-up interviews were completed with 2,054 treatments and 2,026 comparisons. The (unweighted) response rate to the follow-up interview for those who completed the baseline interview was 80.9 percent for treatments and 81.7 percent for comparisons. As expected, the response rate for those who did not complete the baseline interview was considerably lower but not trivial: 32.5 percent for treatments and 26.7 percent for comparisons. The effective study survey response rate for TAA participants was 63.3 percent. This response rate pertains to the percentage of TAA participants who completed follow-up interviews among the nationally representative sample of participants who were released for baseline interviews. Using baseline data items from the UI claims data, we found some differences in the characteristics of follow-up survey respondents and nonrespondents; thus, we adjusted the follow-up weights to help account for survey nonresponse bias.

f. Sample Used in Analysis

The primary sample used for the impact analysis were members of the TAA certified-worker survey sample, and its comparison group, who completed follow-up interviews—2,054 TAA participants and 1,796 comparisons. This sample excluded 230 (crossover) comparisons who completed follow-up interviews, but who were later identified as having received a TAA service according to the TAPR or updated UI/TRA claims data. The benefit-cost analysis uses the same sample.

The baseline survey respondents in the treatment and comparison groups were similar on characteristics in the UI claims data that were used for matching. However, there were some important treatment-comparison differences in baseline survey data items that were not used for matching, especially for the pre-UI job characteristics. For example, according to baseline survey data, TAA participants were considerably more likely than their comparisons to be in a union, in larger companies, in production occupations, to have been in their jobs longer, and to have had health insurance and other fringe benefits made available. In addition, TAA participants were significantly less likely than their comparisons to report that they expected to be recalled to their job (35 percent versus 52 percent) and to have actually been recalled (7 percent versus 13 percent).

To account for these treatment-comparison baseline differences, we rematched the treatment and comparison groups in the follow-up survey sample using the full set of matching variables from the UI claims, local area, and baseline survey data. We used a “kernel” matching algorithm where each TAA participant was compared to all comparison group members in the follow-up sample, regardless of the initially-matched triads. The algorithm assigned weights to each comparison group member based on the similarity of that worker’s baseline characteristics to those of each TAA participant. Thus, a TAA participant could have many comparison group matches, each with a different weight.

This approach generated balanced treatment and matched comparison group samples on all the matching variables. None of the treatment-comparison differences was statistically significant for any of the matching variables after these adjustments. Furthermore, as shown in the impact report, based on the UI wage records, there were no statistically significant differences after the matching process, between treatments and comparisons in their quarterly employment and earnings measures covering the eight quarters prior to job loss, even though these data were not collected in time to be used for matching.

g. Analytic Methods

We estimated the average impacts of the receipt of TAA services by comparing the mean outcomes of treatment workers and their matched comparisons. The outcomes of the comparison group represent the counterfactual for the study—that is, the outcomes that the TAA participants would likely have experienced in the absence of the TAA program. This approach was used to estimate impacts for the full sample, and also for important subgroups defined by baseline worker characteristics and specific program services received by TAA participants.

We estimated impacts using regression methods, where each study outcome was regressed on a treatment status indicator variable and a fixed set of baseline covariates. Baseline covariates were used in the analysis to improve the precision of the impact estimates, and to adjust for the small pre-

existing observable differences between the treatment and comparison groups that remained after matching. All estimates were obtained using sample weights, and the standard errors of all impact estimates were inflated to account for design effects due to unequal weighting and state-level clustering.

h. Sensitivity Analyses

We conducted a series of sensitivity tests to examine the robustness of the impact findings. In one such test, we estimated impacts by limiting the treatment and matched comparison samples to UI exhaustees. We view this specification as representing an upper-bound estimate of the effects of TAA, because it assumes that exhausting UI is not influenced by the offer of training, TRA, and other TAA services. For instance, some TAA participants in our sample who exhausted their UI benefits and collected TRA might not have exhausted UI if TAA had not been an option. Instead, some of these workers might have more quickly found jobs. In fact, about 80 percent of participants in the survey sample exhausted UI, compared to only about 45 percent of matched comparisons, suggesting that TAA had a large effect on exhaustion rates and that comparison group exhaustees were possibly less “marketable” than those treatment group exhaustees induced to exhaust by the offer of TAA services. Thus, a comparison group restricted to UI exhaustees might have created a bias towards more favorable estimates for TAA, while a comparison group with both exhaustees and non-exhaustees is a more conservative approach, typical of much social science research. However, using this alternative specification, by the last quarter of the follow-up period TAA had a positive effect on employment, but no effect on earnings.

While our main impact and benefit-cost estimates are based on the comparison group with both non-exhaustees and exhaustees, we also provide estimates using a comparison group of just exhaustees. While the “true” impacts and benefit-cost results cannot be known, it is plausible that they lie somewhere between the two sets of estimates.

2. Key Findings from the Impact Study

The findings from the impact report indicate whether key potential benefits of the TAA program were realized. We summarize the main findings of the impact report below.

- ***More TAA participants received reemployment services.*** According to survey data, more than 94 percent of TAA participants received at least one reemployment service, while 77 percent of comparison group members reported doing so. Furthermore, TAA increased access to reemployment services of all types, including those designed to help workers find jobs immediately—with resume assistance or job searches, for example—and those focused on longer-term career planning. Overwhelmingly, the American Job Center system was the primary source that both TAA participants and their comparisons used to access these services, but TAA participants were much more likely to report that they found the services helpful. TAA also substantially increased the extent to which participants received staff-assisted services from programs funded through the Workforce Investment Act (WIA).
- ***Participation in TAA was associated with large increases in receipt of education and training and the attainment of educational credentials.*** Nearly 66 percent of TAA participants received training (either funded by TAA or other sources), compared

to 27 percent of comparisons. The average TAA participant spent about 8 times as many weeks in education and training as the average comparison group member (49 weeks, compared to 6 weeks). Impacts on participation in education and training programs were largest during the first two years of the follow-up period, but persisted in the third and fourth years. Furthermore, TAA increased the educational attainment of program participants—about 51 percent had received educational credentials or degrees by the end of the follow-up period while only 21 percent of comparisons did, an impact of 30 percentage points.

- ***The proportion of TAA participants engaged in productive activity (training or employment) was similar to that of comparisons.*** To a large degree, TAA participants engaged in training in the period just after job loss, in lieu of seeking and obtaining employment. Thus, impacts on being employed or in training—that is, engaging in any productive activity—were not statistically significant, except in the first year, when there were small but statistically significant negative effects).
- ***The main impact study findings show that, in the final year of the follow-up period, TAA participants earned less than those in the comparison group, but both groups worked about the same number of weeks.*** As was hypothesized, during the first two years of the observation period, when many TAA participants were in training, the labor market outcomes for participants were significantly worse than for their matched comparison group members who were not eligible for TAA. During the subsequent two years, the gap between participants and comparisons narrowed. In the final year of the follow-up period, TAA participants earned about \$3,300 less than their comparisons, but both groups worked about the same number of weeks (33 weeks for TAA participants, compared to 35 weeks for comparisons). The impact findings were very similar when we (1) used UI wage records (rather than survey data) to measure outcomes, (2) limited the sample to TAA participants who were certified for TAA prior to job loss, (3) excluded workers who were recalled to their jobs, (4) used samples of TAA participants drawn in alternative ways, and (5) used alternative statistical methods to match the TAA participants and comparisons.
- ***The impact findings on employment and earnings were somewhat more positive using the UI exhaustee sample.*** The main impact findings used treatment and matched comparison samples of UI claimants. As a sensitivity test, an alternative specification used UI exhaustees. Using this sample, results showed that TAA participants worked more than comparisons in the final year (33 weeks for TAA participants and 29 weeks for comparisons), had a higher employment rate in the final quarter (64 percent, compared to 59 percent), and earned about the same (those in each group earned about \$13,400 in the final year, on average). This specification can be thought of as representing an upper-bound estimate favorable to finding positive impacts, because it assumes that exhausting UI was not influenced by the availability of TAA services. Nonetheless, the “true” employment-related impacts likely fall between the impacts using the UI claimant and UI exhaustee samples.
- ***Impacts on employment and earnings may be more favorable for TAA participants who received training than for those who received income support without training.*** The results for the service receipt subgroups are only suggestive because of potential sample selection biases that made it difficult to identify quality

comparison group matches for each service group. The estimated impacts on average weeks worked and earnings in the fourth year of follow-up did not statistically differ for the two service groups. However, the impacts for the two groups did differ in the final quarter of the follow-up period in that the employment rate was not statistically significant for the trainees, but remained negative and significant for those who had received income support without TAA-funded training. The impact on earnings was negative and statistically significant for both service groups, but it was less negative for the trainees.

- ***Impacts on employment and earnings became statistically insignificant by the end of the follow-up period for younger participants, but were persistently negative for older participants.*** Younger TAA participants, the group with the largest positive training impacts, had the largest negative employment and earnings impacts during the first two years of the follow-up period. However, employment results for them showed steady improvements in the last two years of follow-up, and impacts became statistically insignificant starting by the middle of the third year. By contrast, the employment and earnings impacts for the older age groups remained negative and statistically significant throughout the four-year follow-up period.
- ***When TAA participants returned to work, they had lower wages and were less likely to have access to fringe benefits than their comparisons.*** In keeping with the overall impacts on employment and earnings discussed above, the gap between the participant and comparison groups was largest early in the follow-up period. By the end of the four-year follow-up period, the gap in job quality had decreased, but had not completely closed. Trainees fared better than participants who received only income support, although trainees still earned significantly lower average hourly wages than their matched comparisons in their most recent jobs in the final follow-up year. It is possible that trainees could not take full advantage of their new skills, because many re-entered the labor market during the peak of a recession, whereas their matched comparisons (many fewer of whom undertook training) mostly re-entered the labor market earlier.
- ***Among TAA participants who received occupational skills training, 37 percent were employed in the occupations for which they trained.*** The likelihood that an occupational trainee was employed in his or her training field varied by the occupational focus of the training program. More than 50 percent of trainees in the fields of healthcare practitioner, production, or transportation and material moving were likely to be employed in those fields. By contrast, about one third of trainees who enrolled in programs for office and administrative support, healthcare support, or installation, maintenance and repair found employment in their training fields. Comparison group members were significantly more likely to return to work in production occupations than were TAA participants.
- ***Participation in TAA was associated with changes in income from sources other than the workers' own earnings.*** Participants collected more in UI payments and were more likely to have exhausted their benefits, because TAA provided additional income support while participants completed training or sought employment. However, TAA had a negative impact on total income, suggesting that these additional income payments did not fully compensate for the lower earnings that participants experienced during the follow-up period when many were in training.

- ***Participation in TAA was associated with decreased health insurance coverage in the period following job loss.*** Despite the availability of a tax credit for health insurance, the loss of employment-based health insurance coverage reduced coverage among TAA participants overall, especially for trainees. This negative impact decreased somewhat later in the study period.
- ***Participation in TAA did not impact family structure.*** Participants and their comparisons tended to retain their family structures and housing situations throughout the study period. In addition, TAA had very small effects on worker mobility.

C. Organization of the Rest of the Report

The rest of the report is organized as follows. Chapter II provides an overview of the methodology used in this benefit-cost analysis. Chapters III, IV, and V describe the estimates of certain types of benefits from TAA, respectively: changes in output; changes in the use of training and reemployment services not funded by TAA; and changes in the receipt of UI and public assistance benefits. Chapter VI presents our estimates of the costs of TAA. We aggregate the benefits and costs of TAA in Chapter VII. Chapter VIII discusses the potential benefits of TAA to free trade. Chapter IX concludes.

II. OVERVIEW OF METHODOLOGY

The 2002 TAA program had potential benefits to both society as well as to program participants. In the design of the benefit-cost analysis (SPR 2004), we hypothesized that the program might increase the productivity and earnings of participants through the training and other reemployment services offered. In addition to these benefits, the 2002 TAA program might have led to reductions in the use of other programs and services *not* funded by TAA, as well as improvements in quality of life of participants. Balanced against the benefits, however, are the significant costs of running the program. The benefit-cost analysis provides a framework for assessing whether the benefits are large enough to justify the expenditures required.

The findings in the impact report suggested that at least some of these benefits were not realized. In particular, the program did not increase participants' earnings and employment but instead had negative impacts relative to the full matched comparison group. Nonetheless, the benefit-cost analysis is important to quantify the net benefit of the 2002 TAA program, as well as to determine whether the net benefits vary among participant age and benefit receipt subgroups. Such findings may be valuable to TAA program administrators seeking to better understand or improve program operations. In this chapter, we outline the design of the benefit-cost analysis and our expectations prior to calculating impacts.

To examine the extent to which the TAA program is cost effective, we compared the actual activities of TAA program participants with what we estimated their behavior would have been in the absence of TAA. Thus, we measured the benefits and costs of the TAA program relative to the services received by the comparison group. This approach draws heavily on the framework that was developed for the benefit-cost analysis of Job Corps (McConnell et al. 2001) and has been used to assess a wide array of social programs.

This chapter is organized as follows. Section A summarizes the benefits and costs included in the analysis. Section B describes the three perspectives from which we compare benefits and costs. Section C presents our measurement approach. Section D describes how we measure benefits that may occur after the observation period, and Section E explains how we compare potential future benefits with upfront costs. Section F describes the samples used in our analysis. Section G concludes the chapter with a discussion of our sensitivity analyses that address the uncertainty associated with our estimates of the benefits and costs.

A. Benefits and Costs Included in the Analysis

The starting point for the benefit-cost analysis was a list of the potential benefits and costs resulting from the TAA program, as shown in Table II.1. This list includes benefits and costs that are measurable, as well as those that are not. It is intended as a summary; more details and complications are discussed in the relevant report chapters.

We divided the potential benefits from TAA into six categories:

1. **Increased Earnings/Output.** TAA services were expected to increase the job skills and marketability of program participants, which may, in turn, lead to increases in the

Table II.1. Potential Benefits and Costs of Participating in TAA, by Perspective

Benefits and Costs	Perspective		
	Society	Participants	Rest of Society
Benefits			
Increased Output			
Postprogram Output			
Increased earnings and fringe benefits	+	+	0
Increased tax payments	0	-	+
Opportunity Cost of In-Program Labor			
Foregone earnings and fringe benefits	-	-	0
Reduced tax payments	0	+	-
Reductions in the Use of Education and Training Programs not Funded by TAA			
Operations	+	0	+
Out-of-pocket tuition costs	0	+	-
Changes in the Use of Reemployment Services not Funded by TAA			
Operations	?	?	?
Changes in the Receipt of UI Benefits			
Administrative costs	?	0	?
Benefits	0	?	?
Reductions in the Receipt of Other Public Assistance Benefits			
Administrative Costs	+	0	+
Benefits	0	-	+
Other Benefits			
Facilitation of free trade; improved quality of life, self-esteem, and health	+	+	+
Costs			
TRA Payments			
Administrative Costs	-	0	-
Benefits	0	+	-
Training Costs			
Allowances (job search, relocation, transportation, and subsistence allowances)	0	+	-
ATAA Wage Supplements	0	+	-
HCTC Tax Credits	0	+	-
TAA Administrative Costs	-	0	-

Note: The columns indicate whether the component is a potential benefit (+), net cost (-), neither (0), or unknown (?), from the perspective of society as a whole, participants, and the rest of the society (which includes nonparticipants and the government).

output produced by participants after they exit the program (as measured by their earnings and fringe benefits). The tax payments on these increased earnings would be a benefit to the rest of the society but a cost to participants.

We also valued the lost earnings/output that could occur while participants were receiving TAA services and foregoing employment opportunities. These foregone earnings would be a cost to participants and society, although reduced tax payments on these them would be a benefit to participants.

2. Reductions in the Use of Education and Training Programs not Funded by TAA.

We expected that TAA would increase participation in education and training programs overall, because TAA offers subsidized training and TRA benefits to help support

workers while they are enrolled in a training program. However, we expected that TAA would reduce the use of education and training programs that are not subsidized by TAA, because we anticipated that most of the training program participants received would be through TAA.

3. **Changes in the Use of Reemployment Services not Funded by TAA.** Because TAA counselors typically provide some reemployment services to TAA customers, TAA might reduce the use of reemployment services that are not funded by TAA. On the other hand, several features of the 2002 TAA Reform Act might lead to increases in customers' use of non-TAA-funded reemployment services. For instance, the legislation mandated that American Job Centers be the main point of TAA participant intake and delivery of benefits and services. Furthermore, the 2002 Act required that appropriate core and intensive services be made available to TAA participants through other USDOL programs (such as WIA). Thus, we did not have a prior expectation about the direction of the change in the use of these types of reemployment services.
4. **Changes in the Receipt of UI Benefits.** TAA might reduce the receipt of UI benefits if program reemployment services are effective in helping participants find jobs quickly, and if TAA services increase long-term employment rates. On the other hand, TAA might increase UI exhaustion rates in the short term if recipients continue their training after becoming eligible for TRA services.
5. **Reductions in the Use of Other Public Assistance Programs.** We expected that TAA would reduce the receipt of public assistance benefits (such as Food Stamps, Temporary Assistance to Needy Families or TANF, and general assistance), because of participants' long-term earnings gains. Furthermore, TAA might reduce reliance on these benefits in the short term, because many participants are likely to receive TRA benefits.
6. **Other Benefits.** An important benefit of TAA is the facilitation of free trade. TAA may provide gains to society by making free trade politically feasible. Due to the challenges in measuring this benefit, however, we did not include it in our benchmark benefit-cost estimates. Instead, we estimated the benefits of TAA in terms of free trade in Chapter VIII. We hypothesized that TAA may also provide other benefits that are difficult to measure, such as improvements in participants' quality of life that may result from improvements in their employment opportunities, self-esteem, and health. However, the analysis of these benefits was beyond the scope of this study.

The costs of operating the TAA program fell into six categories:

1. **TRA Benefits.** TRA payments to program participants and the administrative costs of providing these benefits were an important cost to the TAA program.
2. **Training Costs.** TAA covers the cost of tuition payments to education and training providers that serve program participants.
3. **Allowances.** These include job search, relocation, transportation, and subsistence allowances to support participants while they look for jobs or attend training in other geographical areas.
4. **ATAA Wage Supplements.** These benefits are paid to program participants aged 50 and over with qualifying jobs.

5. **HCTC Tax Credits.** This benefit helps cover the costs of health insurance coverage for those who qualify.
6. **TAA Administrative Costs.** This covers a wide range of program-related expenses (such as staff salaries, rent, and utilities) and also includes the costs of TAA staff administering the ATAA program and furnishing the IRS with information to administer the HCTC program.

B. Different Perspectives on Benefits and Costs

The findings from the benefit-cost analysis depend on the perspective from which benefits and costs are measured. We expected that most of the benefits of TAA would accrue to program participants, while the rest of society would pay most of the costs. Hence, the benefits and costs to participants may differ from the benefits and costs to the rest of society.

We examined benefits and costs from three perspectives:

1. **Society.** The benefits and costs for society as a whole is the most relevant perspective for policymakers who are concerned about how to use resources efficiently. We devoted more evaluation resources to estimating the benefits and costs of TAA for the social perspective than from the other perspectives.
2. **Participants.** To address whether TAA is a good investment for the workers themselves, we examined the benefits and costs of TAA from the perspective of participants.
3. **The Rest of the Society.** Although participants are the main beneficiaries of TAA, nonparticipants pay for the program. Thus, we examined the extent to which TAA costs were offset by its benefits to taxpayers (such as increased tax revenue and the reduced use of other programs and services by program participants).

A positive benefit from one perspective could be a negative benefit from another one. For example, an increase in tax payments by participants is a benefit to the rest of society but a cost to participants. The benefit (or cost) to society is just the sum of the benefit (or cost) to participants and the benefit (or cost) to the rest of society. Table II.1. indicates for each benefit and cost whether it was expected to be a benefit or cost from each different perspective. A “+” indicates a benefit, a “-” indicates a cost, a “0” indicates neither a benefit nor a cost from that perspective, and a “?” indicates that we had competing theories about whether there would be a net benefit or cost.

Some potential effects of TAA lead to a benefit for one group (participants or the rest of society) but an equal cost to another. Although these effects may redistribute resources among different members of society, they do not affect the total resources in society. We refer to the benefits and cost from these impacts as transfers. Transfers can be benefits or costs from the perspective of participants and the rest of society but are neither a benefit nor a cost to society as a whole. These transfers include taxes and UI payments, public assistance payments, TRA payments, allowance payments, ATAA wage supplements, and HCTC tax credits (but not the costs of administering these programs).

C. Approach to Measuring Benefits and Costs

We measured program benefits by multiplying an estimate of the impact of the program measured over the follow-up period with an estimate of the dollar value of the impact. The impact estimates were obtained using survey and administrative UI records data. We valued program impacts at prevailing market prices on or around 2006, when most participants were receiving services. We measured the costs of TAA using states' administrative data on TAA expenditures, as well as TAPR and survey data.

1. Measuring Benefits During the Study Observation Period

Our main approach was to measure benefits starting from the UI claim date, so that both treatment and comparison group members had a common (and memorable) reference point. Because of the early intervention provisions of the 2002 Act, program benefits can start as soon as a TAA petition is filed (or before if rapid response services are delivered very soon after a WARN notice is issued).⁸ However, comparison group members were not employed in firms that file TAA petitions, and thus, a petition date is not relevant for these sample members. Consequently, the baseline and follow-up surveys collected information on respondents' experiences since they were laid off from their reference jobs.

The observation period covered by the survey data was about 51 months, the average number of months between the UI claim date and the follow-up interview completion date—just over four years. However, since sample members' UI claim dates varied within an approximately three-year window, the length of the follow-up period varied by person.

For most outcomes, we restricted our sample to respondents who shared a minimum follow-up period in order to avoid possible bias from censored data. Bias could occur if the timing of the job loss was systematically related to outcomes, as it could be if the economic conditions individuals faced at the time of their layoffs influenced their employment and training outcomes. We could have restricted the sample to workers observed for all 16 quarters following the UI claim date. Instead, following the impact report, we used the sample of workers observed for 12 follow-up quarters to estimate impacts in quarters 1 to 12, and the sample of workers observed for 16 quarters to estimate impacts in quarters 13 to 16. About 93 percent of treatments and 99 percent of comparisons in the sample had at least three years of follow-up data, and 64 percent of treatments and 69 percent of comparisons had at least 4 years of follow-up data. The exception was for outcomes measured in terms of receipt at any time during the observation period. For these outcomes, we used the full sample of follow-up interview completers. Appropriate sampling weights were used for each sample to produce nationally representative estimates.

Different impacts were measured over different periods depending on the available data items. We reported quarterly impacts on the amounts of earnings, taxes, and UI benefits received; annual impacts on total hours or weeks of education and training programs; and impacts on whether services were ever received during the observation period for reemployment services and public assistance benefits. As in the impact report, impacts were regression-adjusted. Controls included demographic characteristics, characteristics of the lost job and the associated UI claim, and local area

⁸ The Worker Adjustment and Retraining Notification (WARN) Act requires large employers to provide notice 60 days in advance of certain plant closings and mass layoffs.

characteristics. In most cases, these were the impacts presented in the impact report. However, we also defined outcomes in terms of types of education and training as well as types of reemployment services to compute impacts for this report.

We measured benefits using the relevant impact estimate even if the estimate was not significantly different from zero at conventional statistical significance levels. Because the impact estimate is an unbiased estimate of the true program impact, even when its variance is relatively large, we obtain a more accurate estimate of the benefit using an imprecise impact estimate than we would from assuming the benefit is zero.

2. Measuring Benefits After the Study Observation Period

Because TAA is designed to improve employment-related outcomes over the long run, we examined the appropriateness of extrapolating program benefits after the observation period. The extrapolation approach depended on the pattern of the impact findings as well as the nature of the benefit. We assumed that benefits that were small in absolute value and statistically insignificant by the end of the follow-up period did not persist afterwards. We also assumed that impacts on the receipt of training and reemployment services did not persist after the observation period since sample members were most likely to use these services soon after their layoff. Our treatment of impacts on earnings and output is particularly important. Impacts on earnings and output were negative and statistically significant but decreasing in absolute value over the observation period, and we assumed that these impacts did not persist in the post-observation period. This is equivalent to assuming that the treatment group's earnings caught up to the comparison group after year 4. As impacts on earnings should drive impacts on taxes paid and public assistance benefits received, we also assumed zero impacts on these outcomes after the observation period.

3. Measuring Costs

Program costs were measured using various data sources. We measured TRA benefit receipt using UI/TRA claims data collected from 25 of the 26 states included in the impact study (one state did not provide this type of data). We measured job search, relocation, transportation, and subsistence allowances paid to TAA participants as well as program training costs using survey data, TAPR data, and data from the TAA quarterly financial status reports (Standard Form 269) that states provided to USDOL. Data on ATAA wage supplements and HCTC tax credits were obtained from survey data. Administrative cost data were obtained from the quarterly TAA financial status reports. Further details of our approach for measuring specific costs will be discussed later in this section.

As we were estimating the benefits from changes in the use of TAA, we should ideally have compared them with the marginal costs of the program—the additional cost of expanding the program. Instead, because data on marginal costs are not available for TAA, we used the average cost of the program. Average costs are typically higher than marginal costs because some costs are fixed and do not vary with the number of participants in the program. However, in the long run the differences between the average and marginal costs are probably small. While some inputs into the program are fixed in the short-run, most of these inputs do vary eventually with the number of eligible workers served.

4. Aggregating Benefits and Costs Using a Common Metric

To obtain meaningful benefit-cost estimates, it is necessary to measure benefits and costs in common units. Our approach was to construct benefits and costs per TAA participant. We adopted this approach because the follow-up survey providing much of the data with which we measure program benefits was collected only from TAA participants. The potential disadvantage of this method is that some eligible nonparticipants might have benefited from the receipt of early intervention services, and may therefore incur some program administrative costs. However, these benefits and costs should be minimal compared with the TRA and training benefits and costs for participants.

5. Measuring Benefits from Free Trade

The most important of the other more indirect, hard-to-measure potential benefits of TAA is its facilitation of free trade. A historical rationale for the existence of the TAA program is to make free trade agreements politically feasible by compensating those who lose their jobs as a result. Because trade is beneficial to aggregate welfare, this benefit of TAA may be large and may affect our summary benefit-cost measures. However, it is challenging to quantify the size of the benefit of trade to society and to estimate the extent to which TAA makes trade possible. Chapter VIII discusses our analysis of the benefits of TAA due to free trade and presents our findings.

D. Comparing Benefits and Costs that Occur at Different Times

Because of inflation, a current dollar is worth more than a future dollar. To correct for inflation, we used the Gross Domestic Product (GDP) chain-price index to convert all benefits and costs occurring in later years into constant dollars. Because this index measures changes in prices of all goods and services in the U.S. economy, it is the best one for converting into constant dollars the many types of benefits and costs measured in this study. We used 2006 as the base year because most program services were received in that year.

Even after adjusting for inflation, a dollar today is still worth more than a dollar in the future, because a dollar today can be invested and earn interest. To take this value into account, we used a discount rate to convert all future benefits and costs to their present value. The formula used to compute the present value of a stream of benefits B_{ij} using the discount rate r is $\sum_{i=1}^N \left(\frac{1}{1+r} \right)^{i-1} \left(\sum_{j=1}^4 B_{ij} \right)$

where j indicates quarters and $i = 1, \dots, N$ indicates years, and outcomes are measured annually,

$$\sum_{j=1}^4 B_{ij} = B_i.$$

No consensus exists on the “correct” discount rate to use. OMB (2002) mandates that benefit-cost analyses of public investments use a 7-percent real discount rate. Its justification is that 7 percent is the approximate real pretax return on private investment and the government should not invest in a program if it could obtain a higher rate of return from the private sector. However, many view this approach as overstating the return needed for an attractive government investment. For example, Gramlich 1981 proposes the maximization of steady state consumption per worker as an alternative criterion for investment; the appropriate discount rate in this case is the growth rate of the economy.

Many researchers have instead recommended discounting using the U.S. Treasury borrowing rate (Lind 1990; Hartman 1990; Lyon 1990; GAO 1991; and CBO 2004). The advantages of using the Treasury borrowing rate are that it is easily available and can be interpreted as the opportunity cost of the government borrowing to fund a project. Previous evaluations of social programs have used this approach (McConnell et al. 2001; Thornton and Will 1988).

The most appropriate discount rate to use also depends in part on whether consumption or investment is displaced (Boardman et al. 2001). From society's perspective, resources that go to investment are worth more than those that go to consumption (Moore et al. 2003). Moore et al. (2003) discuss further complications to the choice of rate, including the view that market interest rates may not be appropriate to use for discounting both because of inconsistencies in individuals' behavior and because these rates do not reflect preferences for the time-distribution of public goods. They recommend a discount rate of 3.5 percent, within a range of discount rates for non-intergenerational projects like TAA of 1.5 to 4.5 percent. This range spans our 4 percent benchmark rate as well as the 2 percent rate we used in our sensitivity analysis.

Our analysis used a discount rate of 4 percent, in between the average real rate of return on 30-year Treasury bonds in most of 2006 (just below 5 percent) and the 3.5 percent rate suggested by Moore et al. (2003). This earlier Treasury bond rate is more relevant to the 2002 TAA program than today's lower rate since our goal is to evaluate the program as it operated at the time. In addition, it matches the rate faced by program participants making choices about job search and training investments, supporting the internal consistency of the evaluation design. We did, however, check the sensitivity of our results to the choice of discount rate by computing alternative estimates based on rates of 2 percent (also within Moore et al.'s [2003] recommended range) and 7 percent.

E. Choice of a Summary Measure

The bottom line for the benefit-cost analysis is the comparison of benefits and costs. This comparison can be summarized in three ways: (1) the difference between the present value of benefits and the present value of costs (the net present value) divided by the number of TAA participants; and (2) the net present value divided by the present value of costs, and (3) the ratio of the present value of benefits to the present value of costs. While the two benefit-cost ratio measures have the advantage of being easily understood as the net or total dollar benefits generated by each dollar invested in TAA, their magnitudes are sensitive to how benefits and costs are classified. For example, whether potential reductions in costs associated with using training programs not funded by TAA are added to program benefits or subtracted from program costs will affect the benefit-cost ratios but not the net present value. For this reason, we presented only estimates of the net present value.

F. Samples Used for Analysis

In addition to benchmark estimates for the full sample, we computed estimates for subgroups. Because the impact report showed that some key impacts vary by age and service receipt, we presented estimates for five age subgroups (where possible), the subgroup of trainees, and the subgroup of those who received TRA benefits but not training.

G. Sensitivity of Estimates to Alternative Assumptions

The estimates of benefits and costs were based on many assumptions having varying degrees of uncertainty. Major sources of uncertainty include but are not limited to (1) the impact estimates, (2) the estimated value of each benefit (shadow prices), (3) the assumption of full employment in the labor market, (4) the discount rate, (5) the procedures for extrapolating the benefits in the post-observation period, and (6) estimates of the benefits of free trade. It is important that policymakers are aware of the sensitivity of the results to changes in these assumptions. Thus, we provide benchmark estimates of benefits and costs that are based on our best assumptions and also discuss the results of our sensitivity analyses throughout the report.

As discussed, a key sensitivity test was to limit the sample to UI exhaustees. This restriction is based on the assumption that UI exhaustion is a proxy measure for workers' employability—in other words, that many TAA eligibles exhausted UI and became TAA participants when their job search efforts immediately after job loss proved unsuccessful. However, this approach assumes that TAA had no effect on UI exhaustion rates due to the offer of training, TRA, and other services. Thus, we view this specification as representing an upper-bound estimate of the effects of TAA on employment and earnings, and hence of the earnings-related benefits of the program that we measure in this report. Findings for the exhaustee sample are included throughout the report, however.

III. EFFECTS FROM CHANGES IN OUTPUT

One of the central objectives of TAA is to increase the job skills and marketability of program participants, which may lead to long-term productivity gains. Therefore, the most important program benefit is the potential increase in output (proxied by earnings and fringe benefits) for program participants. Increased productivity is clearly a benefit to participants, but it is also a benefit to the rest of society (in terms of increased tax revenue), and to society as a whole.

Our study found that TAA did not succeed in increasing participants' output during the four years following job loss. On average, the treatment group earned \$25,325 less (not shown) than the comparison group during the first two years after job loss, when many were enrolled in training, and continued to lag behind the comparison group for the next two years.⁹ Including the lower value of fringe benefits the participants received and the lower taxes that they paid on their earnings, we estimated that TAA cost society \$43,266 per participant in lost output.

The rest of this chapter is organized as follows. Section A describes our approach to measuring the output of participants. Section B discusses our strategy for valuing output produced by program participants and our results. Section C describes our methods and findings for the decrease in the value of tax payments that results from decreases in income. Section D discusses the importance to the analysis of the assumption of full employment, which means that all persons in the economy who want to work can find a job. Section E concludes the chapter with a summary of the net value of the decreased output.

A. Approach to Measurement

In our design of the benefit-cost analysis, we expected that the services and benefits available through TAA would ultimately increase the output of participants following a possible initial reduction in output while participants were receiving these benefits (in particular, training benefits). The opportunity cost of in-program labor is the value of output that participants would have produced if they had not participated in the program. These potential foregone earnings would be a cost to participants and society. The reduced taxes paid on these foregone earnings, however, would be a benefit to participants but a cost to the rest of society.

We note that the opportunity cost of in-program labor could also have been treated in the accounting framework as a program cost. However, we listed it in the benefit ledger for several reasons. First, our approaches for valuing TAA-induced changes in post-program and in-program output were identical; thus, to simplify the presentation, we listed them together. Second, in the cost ledger, we preferred to include only program operating costs so that the benefit-cost ratio can be interpreted as the return from each dollar invested in the program. Finally, it was difficult to accurately define the in-program and post-program periods due to the wide range of services offered by the TAA program and the emphasis of the 2002 Act on the provision of early intervention services. Thus, we did not produce separate estimates for the value of output produced during the in-program and post-program periods.

⁹ This figure, not shown in the tables, is the present discounted value of earnings impacts in quarters 1-8.

B. Value of Changes in Output

Because we were not able to collect detailed information about the value of output produced by sample members during their employment, we used the cost to an employer of employing a worker as a measure of the value of output. Using the standard assumptions of neoclassical economics, in competitive markets, a profit-maximizing employer will continue to hire additional workers until the value of goods and services provided by the last worker hired equals the cost of employing that worker. Therefore, the employment cost (earnings and fringe benefits) provides a good estimate of value of the employees' output.

To estimate the impact of TAA on earnings (wages and salaries), we compared the earnings of TAA and comparison group members during the follow-up period using survey data. As a sensitivity test, we also analyzed UI wage records data on earnings. Each data source has its advantages and disadvantages. The survey data cover earnings from all formal and informal jobs. As we used survey data to estimate many other benefits in this report, they also help us produce internally consistent estimates. However, earnings survey data could suffer from misreporting and survey nonresponse. The UI wage records data were available for all sample members and do not suffer from survey misreporting, but also do not reflect all types of earnings (for example, self-employment earnings) and do not cover earnings for sample members who were employed in different states than those of their initial UI claims. Furthermore, because of reporting lags in state UI wage records data systems, the UI wage records cover 12 quarters of the follow-up period rather than the full 16 quarters. For these reasons we used the survey data to compute our benchmark estimates. It is important to note that conclusions in the main report were substantively the same using either data source.

We next incorporated estimates of the value of fringe benefits to compute impacts on compensation. Fringe benefits, the other component of employment costs, include:

- **Paid Leave.** This includes paid days off work for holidays, vacations, illness, or other reasons employers pay workers when they are not working.
- **Supplemental Pay.** This includes bonuses and payments for work in addition to the regular schedule.
- **Health Insurance.** This includes health insurance and membership in a Health Maintenance Organization (HMO) or similar plan.
- **Retirement and Savings Benefits.** This includes both defined benefit and defined contribution plans.
- **Legally Required Benefits.** This includes programs an employer is legally required to provide, such as Social Security, unemployment insurance (UI), and Workers Compensation.¹⁰
- **Other Benefits.** This includes life and disability insurance, childcare assistance, employer-provided transportation, and tuition reimbursements.

We did not collect data on these costs from employers of our research sample members. Instead, we calculated estimates of these fringe benefits from published data sources. The Bureau of Labor

¹⁰ These payments, including Social Security benefits, include the employer's contribution. Individual contributions through tax payments are included in the value of tax payments estimated in section C below.

Statistics (BLS) decomposed hourly employer cost in December 2003 into wages and salaries and the six categories of fringe benefits listed above (U.S. Department of Labor 2004). Table A.1 provides information on these costs for four types of manufacturing workers—all workers, white-collar, blue-collar, and service workers. The top panel of Table A.1 presents data on average hourly wages and salaries adjusted for paid leave and supplemental pay (which best correspond to the wage measures that we construct using the survey data). The second panel of Table A.1 displays average hourly costs of other fringe benefits, and the bottom panel displays these costs as a percentage of adjusted wages and salaries.

The BLS data suggested that total employer labor costs are 27 percent higher than adjusted earnings for all manufacturing workers, although it ranges from 18 to 36 percent depending on the type of worker. For our analysis, we used the conservative 22 percent figure, which is the estimate for blue-collar manufacturing workers. By using this figure, we erred on the side of overstating TAA benefits, since TAA participants on average are less likely to receive fringe benefits in their new jobs (see Chapter VIII of the impact report).

Compensation was significantly lower among TAA participants than among the comparison group, as Table III.1 shows. The difference was greatest early in the follow-up period, reaching a peak of -\$4,902 in the fourth quarter after the UI claim date. This figure is consistent with the higher rate of enrollment in training among TAA participants shortly after the UI claim date. As participants finished

Table III.1: Per Person Survey- Reported Earnings and Compensation for TAA Participants, by Quarter After Job Loss (2006 Dollars)

Quarter After Job Loss	Average Earnings of TAA Participants	Average Earnings of Comparison Group	Estimated Impact on Earnings	Estimated Impact on Compensation
1	348	1,964	-1,616***	-1,972***
2	549	3,838	-3,289***	-4,013***
3	848	4,732	-3,885***	-4,740***
4	1,335	5,353	-4,018***	-4,902***
5	1,855	5,589	-3,734***	-4,555***
6	2,325	5,730	-3,406***	-4,155***
7	2,615	5,712	-3,097***	-3,778***
8	2,876	5,657	-2,781***	-3,393***
9	3,147	5,586	-2,439***	-2,976***
10	3,335	5,371	-2,036***	-2,484***
11	3,523	5,306	-1,783***	-2,175***
12	3,685	5,173	-1,489***	-1,817***
13	3,902	4,866	-964***	-1,176***
14	3,980	4,821	-841***	-1,026***
15	4,070	4,852	-782***	-954***
16	4,077	4,839	-761***	-928***

Source: Data on earnings were obtained from the Mathematica TAA Baseline and Follow-up Surveys. Data on the availability of fringe benefits for U.S. blue collar manufacturing workers were obtained from Bureau of Labor Statistics (2004).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

*/**/*** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

training and returned to work, the gap in compensation between the participants and the comparisons decreased. However, TAA participants still earned about \$3,300 less on average than comparisons in the final follow-up year, a statistically significant difference (not shown).¹¹ Sensitivity analyses using UI wage data showed the same pattern of statistically significant but decreasing impacts (see Table A.2).

Subgroup analyses showed the influence of training on patterns of compensation. The overall finding of large negative impacts followed by a closing of the gap was particularly strong for younger TAA participants, the group with the most positive training impacts (Table III.1a). These younger workers had the largest negative impacts on compensation during the first two years of the follow-up period among all the age groups, but their impacts became statistically insignificant starting in quarter 10. In contrast, the compensation impacts for the older age groups remained negative and significant throughout the follow-up period, especially for those 60 and older. Results for the service receipt subgroups showed that impacts on compensation were more favorable for the trainees than TRA-only participants. The impact on year 4 compensation was less negative for the trainees, although still statistically significant.

Table III.1a: Per Person Compensation for TAA Participants, by Quarter After Job Loss: Estimated Impact by Subgroup (2006 Dollars)

Quarter After Job Loss	Age Subgroups					Trainees	TRA Only
	16-29	30-39	40-49	50-59	60+		
1	-2,064***	-3,387***	-1,635***	-1,699***	-1,333***	-1,975***	-1,703***
2	-4,420***	-5,590***	-3,776***	-3,383***	-1,983***	-4,020***	-3,478***
3	-5,447***	-6,218***	-4,673***	-4,019***	-2,623***	-5,053***	-4,006***
4	-6,220***	-5,921***	-4,736***	-4,078***	-2,716***	-5,353***	-3,881***
5	-7,708***	-4,874***	-4,615***	-3,643***	-2,594***	-5,123***	-3,362***
6	-7,592***	-4,630***	-4,016***	-3,229***	-2,349***	-4,724***	-2,971***
7	-6,743***	-4,197***	-3,720***	-2,950***	-2,136***	-4,296***	-2,695***
8	-4,979***	-3,605***	-3,528***	-2,752***	-1,847***	-3,843***	-2,458***
9	-4,485***	-2,899***	-3,049***	-2,438***	-1,912***	-3,254***	-2,302***
10	-1,481	-2,208***	-2,860***	-1,821***	-1,690***	-2,791***	-2,040***
11	-181	-1,681***	-2,843***	-1,615***	-1,443***	-2,364***	-2,014***
12	967	-906**	-2,549***	-1,477***	-1,490***	-1,898***	-1,939***
13	-526	-2,335***	-1,497***	-988**	-2,087***	-1,297***	-1,679***
14	-255	-1,917***	-1,332***	-826**	-1,968***	-1,179***	-1,645***
15	-22	-1,900***	-1,092***	-719*	-1,763**	-921***	-1,609***
16	-322	-1,670***	-1,142***	-755*	-1,643**	-694**	-1,554***

Source: Data on earnings were obtained from the Mathematica TAA Baseline and Follow-up Surveys. Data on the availability of fringe benefits for U.S. blue collar manufacturing workers were obtained from Bureau of Labor Statistics (2004).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

¹¹ This amount is the undiscounted sum of the earnings impacts in quarters 13-16.

Although impacts on compensation were generally negative and significant through the end of the follow-up period, we did not make ad hoc assumptions about how long the negative impacts may persist. Instead, we assumed the impacts are zero in the future. This approach is equivalent to assuming that the earnings gap closes in quarter 17 after job loss.

C. Value of Changes in Tax Payments

Any changes in participants' income resulting from the TAA program would also change the amount of taxes they pay. We treated the change in tax payments as a pure transfer. Decreased tax payments are a benefit to participants but are an offsetting cost to the rest of society.

We measured four categories of taxes paid by TAA and comparison group members in each quarter during the follow-up period:

- **Payroll Taxes.** This includes the Social Security tax paid by the employer and employee (each 7.65 percent of earnings up to a maximum). It also includes a federal unemployment tax of 0.8 percent of the first \$7,000 of earnings paid to an employee and a state unemployment tax that varies by state, but on average it is another 0.65 percent of earnings. We calculated payroll taxes by applying the appropriate tax rate to earnings.
- **Federal Excise Taxes.** This includes federal taxes on items such as tobacco and gasoline. We simulated the amount of federal excise taxes paid by each sample member using CBO (2004) estimates of the amount of federal excise taxes paid as a percentage of income. In 2001, the CBO estimated that the effective excise tax rate for all households was about 0.9 percent of household income.
- **State and Local Taxes.** This includes all state and local sales and excise taxes, property taxes, and income taxes net of any state Earned Income Tax Credit (EITC). To calculate the amount of these taxes paid by our sample members, we assumed that all sample members paid 10 percent of their earnings on state and local taxes. This estimate is a U.S. average that comes from a 2004 study by the Tax Foundation. This average is appropriate to our nationally representative sample, even though the distribution of the TAA population may not exactly match that of the entire U.S. population.
- **Federal Income Taxes.** We calculated the federal income tax liability of each sample member based on respondents' own reported earnings and UI payments and the tax parameters effective in each year. The survey data do not report spousal income in each year, so this important source of income was omitted from the taxable income of married respondents. However, the impact report showed that TAA did not have an impact on spouses' earnings. This finding suggests that our estimates of total taxes paid should be accurate except for the potential downward bias due to the lower marginal tax rate that may apply to the lower estimated taxable income. As part of this analysis, we calculated the amount of Earned Income Tax Credits (EITC) received by eligible sample members. All persons who were eligible to receive the EITC were assumed to receive it. (Dickert 1995 estimated that about 86 percent of families eligible for the EITC receive the credit.) We did not have data to estimate itemized deductions.

We simulated the taxes paid by sample members by applying the rates and eligibility criteria described above. The components of income used in this process included earnings and UI/TRA payments. We used the same samples and weights as in the earnings and compensation analysis.

We extrapolated the impact on taxes after the observation period in the same way we extrapolated compensation, by assuming the impacts are zero in the future.

Table III.2 shows the average impacts of TAA on total tax payments during each quarter following job loss. The net discounted impact over the entire observations period was -\$7,136 (not shown). Overall and subgroup impacts (Table III.2a) were negative in each quarter, consistent with the negative impacts on earnings. Tax impacts were larger in quarters with larger earnings impacts.

Table III.2: Impacts on Taxes, by Quarter After Job Loss (2006 Dollars)

Quarter After Job Loss	Taxes Paid by Treatment Group	Taxes Paid by Comparison Group	Estimated Impact on Taxes Paid
1	159	514	-355***
2	77	647	-570***
3	138	649	-511***
4	204	720	-517***
5	213	772	-559***
6	254	774	-520***
7	282	774	-492***
8	272	774	-502***
9	250	796	-546***
10	266	811	-545***
11	287	778	-491***
12	334	833	-498***
13	477	842	-366***
14	513	855	-342***
15	606	1021	-415***
16	436	738	-302***

Source: Data on earnings were obtained from the Mathematica TAA Baseline and Follow-up Surveys. Data on UI receipt were obtained from state UI Administrative Data. Taxes paid were simulated.

Notes: The taxes computed included payroll taxes, federal excise taxes, state and local taxes, and federal income taxes. Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

*/**/*** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

Table III.2a: Impacts on Taxes, by Quarter After Job Loss: Estimated Impact on Taxes Paid By Subgroup (2006 Dollars)

Quarter After Job Loss	Age Subgroups					Trainees	TRA Only
	16-29	30-39	40-49	50-59	60+		
1	-337	-465	-347	-313	-129	-354***	-296***
2	-393	-679	-724	-416	-205	-561***	-509***
3	-478	-589	-679	-342	-135	-527***	-398***
4	-441	-663	-658	-304	-158	-522***	-423***
5	-442	-691	-726	-284	-265	-547***	-496***
6	-549	-418	-702	-306	-245	-513***	-486***
7	-330	-335	-708	-332	-214	-478***	-508***
8	-347	-325	-706	-334	-204	-501***	-473***
9	-385	-346	-723	-333	-295	-571***	-550***
10	-340	-439	-733	-328	-281	-569***	-541***
11	-191	-396	-755	-331	-299	-503***	-500***
12	-158	-373	-782	-286	-367	-501***	-507***
13	-101	-450	-677	-49	-406	-463***	-463***
14	176	-403	-758	81	-508	-419***	-435***
15	344	-535	-842	14	-741	-478***	-394***
16	96	-445	-628	50	-623	-363***	-262**

Source: Data on earnings were obtained from the Mathematica TAA Baseline and Follow-up Surveys. Data on UI receipt were obtained from state UI Administrative Data. Taxes paid were simulated.

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design. Estimates for age subgroups are differences in weighted means.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

D. Sensitivity to Assumptions About Labor Market Changes

Our benchmark estimates of benefits and costs due to increased output were calculated under the assumption of full employment in the labor market. Full employment refers to an economic condition in which all persons who want to work at the prevailing wage are able to find a job. This assumption plays a critical role in estimating the impact of TAA on output that was produced while TAA customers are receiving program services and afterwards.

With full employment, an increase in the probability of a participant finding a job after leaving the program represents a net increase in total employment. However, with unemployment, the job the participant takes after leaving TAA may, in the absence of the program, have been taken by another unemployed worker. This phenomenon is referred to as the *displacement effect*—participants displace other workers in the job market. In our analysis, however, we did not find that TAA participants displace other workers on average. Instead, since they were less likely to find employment, they made jobs available for other workers. In the extreme example, in which every job not taken by a TAA participant is taken by another worker, the net benefit of the employment shift to society is zero. Although the displacement effect did not affect our estimates of program benefits

from the perspective of program participants, our estimates based on the assumption of full employment may understate the benefits of TAA to society as a whole.

A similar effect can occur while TAA participants are enrolled in the program. Under the assumption of full employment, the value of output that participants would have produced if they had been employed instead of participating in TAA is a cost to society, because the foregone jobs are not filled by unemployed workers. However, in the presence of unemployment, any jobs forgone by participants while participating in TAA may be filled by otherwise unemployed workers. This phenomenon is referred to as the *replacement effect*. Thus, our estimates, based on the assumption of full employment, may understate the benefits of TAA to society by not taking into account these possible benefits to nonparticipants.

The assumption of full employment in the labor market for the population of trade-affected workers who participated in TAA is probably unrealistic. Most of our sample had already been laid off and was potentially searching for employment during the economic recession that began in December 2007. Thus, we explored the sensitivity of our estimates to differing assumptions about the size of displacement and replacement effects. Since both displacement and replacement effects worked in the same direction in our analysis, and since our findings did not distinguish between periods during and after enrollment in TAA, we combined them. We estimated benefits from increased output—earnings, compensation, and taxes—from three perspectives under the assumptions of a 25 percent, 50 percent, 75 percent, and 100 percent displacement/replacement effect. Table III.3 shows our benchmark cost to society of \$43,266 (presented in the next section) can become a cost of \$0 under the extreme assumption of a 100 percent displacement/replacement effect.

Table III.3: Sensitivity of Estimated Impacts on Compensation to Assumptions about Displacement and Replacement Effects (2006 Dollars)

Assumptions Total Displacement= Replacement Effect (Percent)	Total Discounted Four-Year Benefit to:		
	Society	TAA Participants	Rest of Society
0 ^a	-43,266	-43,266	0
25	-32,450	-43,266	10,817
50	-21,633	-43,266	21,633
75	-10,817	-43,266	32,450
100	0	-43,266	43,266

Source: Table III.1 and Table III.2.

^aThe assumption of no displacement/replacement effect is equivalent to the benchmark assumption of full employment.

TAA = Trade Adjustment Assistance.

E. Summary of Benchmark Estimates

We subtracted the impacts on taxes paid from the impacts on compensation to calculate impacts on the output of TAA participants in Table III.4. Subgroup findings are shown in Table III.4a. The net benefits from three perspectives—society, TAA participants, and the rest of society—are shown in Table III.5. All the benefits that accrue after the first year are discounted.

Table III.4: Benefits from Increased Output (2006 Dollars)

Year After Job Loss	Discounted Impact on Compensation	Discounted Impact on Taxes Paid	Net Discounted Impact on Output
1	-15,626	-1,953	-13,673
2	-15,271	-1,993	-13,278
3	-8,738	-1,923	-6,815
4	-3,631	-1,267	-2,364
5+	0	0	0
Discounted Total	- 43,266	- 7,136	- 36,130

Source: Tables III.1 and III.2.

TAA = Trade Adjustment Assistance.

Table III.4a: Benefits from Increased Output: Discounted Impact on Compensation by Subgroup (2006 Dollars)

Year After Job Loss	Age Subgroups					Trainees	TRA Only
	16-29	30-39	40-49	50-59	60+		
1	-18,151	-21,116	-14,819	-13,180	-8,655	-16,402	-13,069
2	-25,982	-16,640	-15,269	-12,091	-8,582	-17,294	-11,045
3	-4,788	-7,114	-10,447	-6,797	-6,041	-9,530	-7,669
4	-1,000	-6,953	-4,501	-2,923	-6,633	-3,637	-5,767
5+	0	0	0	0	0	0	0
Discounted Total	- 49,922	- 51,823	- 45,036	- 34,991	- 29,912	- 46,862	- 37,549

Source: Tables III.1a and III.2a.

TAA = Trade Adjustment Assistance.

Table III.5: Benefits from Increased Output, by Perspective (2006 Dollars)

Benefit	Perspective		
	Society	TAA Participants	Rest of Society
Increased Earnings and Fringe Benefits	-43,266	-43,266	0
Increased Taxes	0	7,136	-7,136
Discounted Total	- 43,266	- 36,130	- 7,136

Source: Tables III.1 and III.2.

TAA = Trade Adjustment Assistance.

Overall, impacts on output were negative in total and in each year of the follow-up period, as shown in Table III.4. The loss accrued largely in the first two years following job loss, when many participants were enrolled in training. Especially during this period, they produced relatively little output (had low earnings) and paid relatively little in taxes.

Table III.5 shows that the negative impacts on output led to a net loss to society of \$43,266 per participant, reflecting participants' relatively low earnings. This negative net benefit to society is equal to the impact on compensation (column 1 of Table III.4) because the reduced taxes paid by

TAA participants represent a transfer payment and did not impose a cost on society as a whole. These lower taxes represented a \$7,136 benefit to participants and an equal cost to the rest of society.

The impacts on compensation for age and service subgroups shown in Table III.4a represent the net benefits of changes in their output to society. (Thus this table shows the equivalent of column 1 in Table III.4 but computed by subgroup.) The net loss in output to society was smallest in absolute value for the subgroups of older workers 50 and over and for TAA participants receiving only TRA benefits. These individuals did not lose as much in earnings relative to the comparison group as did other TAA participants.

As a sensitivity analysis, we used UI wage data on earnings in place of survey data. Impacts on earnings, fringe benefits, and taxes paid were calculated following the same methods (Table A.2). Results indicated a smaller net discounted impact on output of -\$31,258 (not shown).

We also examined the sensitivity of our benchmark estimates to the choice of discount rate. In our benchmark analysis, we used a discount rate of 4 percent, approximately the real rate of return on 30-year Treasury bonds. We also calculated the overall net discounted impact on compensation, the largest component of program benefits, using discount rates of 2 percent and 7 percent. Results indicated that the net impact on output (earnings and fringe benefits minus taxes) varied between -\$36,802 (2 percent) and -\$35,188 (7 percent) around the benchmark estimate of -\$36,130. This difference is small, roughly 2 to 3 percent.

Finally, we computed benefits from increased output for the UI exhaustee sample to check the robustness of our findings. Benefits were calculated in the same way as for the benchmark estimates by subtracting the impacts on taxes paid (see Table A.3 from the impacts on compensation (see Table A.4) to calculate impacts on output. Table III.6 shows that while impacts on output were negative in total and in each year of the follow-up period, they were smaller than the benchmark estimates. This reflects the somewhat more positive impacts on earnings found for this sample, which was expected because comparisons in the UI exhaustee sample likely had more difficulty finding jobs than comparisons in the UI claimant sample. Table III.7 shows that these smaller negative impacts on output led to a net loss to society of \$17,435 per participant.

Table III.6: Benefits from Increased Output for UI Exhaustee Sample (2006 Dollars)

Year After Job Loss	Discounted Impact on Compensation	Discounted Impact on Taxes Paid	Net Discounted Impact on Output
1	-7,891	-885	-7,005
2	-7,033	-641	-6,391
3	-2,638	-914	-1,724
4	126	-880	1,006
5+	0	0	0
Discounted Total	-17,435	-3,320	-14,115

Source: Tables A.3 and A.4.

TAA = Trade Adjustment Assistance.

Table III.7: Benefits from Increased Output for UI Exhaustee Sample, by Perspective (2006 Dollars)

Benefit	Perspective		
	Society	TAA Participants	Rest of Society
Increased Earnings and Fringe Benefits	-17,435	-17,435	0
Increased Taxes	0	3,320	-3,320
Discounted Total	- 17,435	- 14,115	- 3,320

Source: Tables A.3 and A.4.

TAA = Trade Adjustment Assistance.

IV. EFFECTS FROM CHANGES IN USE OF SERVICES NOT FUNDED BY TAA

TAA encourages the receipt of training and reemployment services. Since available services are funded through multiple entities in addition to the TAA program, an increase in the overall receipt of services could affect the resources spent by these entities depending on the mix of services that are used. This impact represents a direct benefit or cost to society.

This chapter presents our estimates of the costs from, first, potential increases in the use of education and training programs not funded by TAA, and second, potential increases in the use of reemployment services not funded by TAA. We estimated the cost to society to be \$2,137 per participant, mostly from the increased use of education and training programs not funded by TAA (a cost of \$1,290).

A. Use of Education and Training Programs Not Funded by TAA

We expected that TAA would increase participation in education and training programs overall, because TAA offers subsidized training to program participants and TRA benefits to help support workers while they are enrolled in training. This would represent a cost to society. The value of this cost can be computed by multiplying the impact on training receipt by a measure of the cost of training—for example, the additional number of training hours received by TAA participants relative to comparisons multiplied by the cost per hour of providing training.

A key challenge in estimating this cost is the lack of detailed and accurate data on the cost of training provision. To address this issue, we considered two approaches to estimating the social cost of training. The benchmark approach, described in this section, involved decomposing training receipt by funding source based on survey information. Thus, we estimated the value to society of impacts on training funded by TAA separately from impacts on the receipt of training funded by other sources. We expected that TAA would reduce the use of education and training programs that are *not* subsidized by TAA, because we anticipated that most of the training received by program participants would be through TAA, whereas all the training received by comparison group members would be funded from other sources. Reductions in the use of non-TAA-funded training programs would represent a benefit to society in the form of reduced program operating costs. Impacts on non-TAA-funded training were easily estimated because this type of training was received by both the treatment and comparison groups. Estimates of operating costs were obtained from external sources of data on appropriations and expenditures for different types of training and education programs, as we describe below. Training provided by TAA was treated as a component of program costs (as discussed below in Chapter VI).

The alternative approach does not distinguish between the sources of funding for each training program. Instead, we used the overall impact estimates on training receipt from the impact report. We estimated the costs of providing this training based on TAA training expenditures. Using TAA administrative data, we divided total training expenditures by reported hours of TAA-funded training to obtain the cost of training per hour. The advantages of this approach are that (1) we did not need to rely as heavily on individual recall of the funding source for training and (2) the aggregate TAA administrative training cost data are accurate. A disadvantage is that we must assume that the mix of training programs is the same for treatment and comparison workers, since the measure of costs is based on the programs that TAA participants chose. This assumption is reasonable based on the impact findings on the types of programs attended by participants and their comparisons (see Schochet et al. 2012). The alternative approach included all potential costs of training on the cost side of the ledger. We describe this

estimation procedure in more detail and compare the findings of the alternative and benchmark approaches at the end of this section.

Benchmark Approach

The benefits resulting from potential reductions in the use of education and training programs not funded by TAA were valued by multiplying impact estimates on participation in each of the programs (using survey data) by estimates of the average costs of these programs.¹² Table IV.1 displays estimates of average costs (which include both program operating as well as central administration costs) of the following alternative education and training programs that sample members attended:

- **Vocational Education.** Our estimate of the average annual costs of attendance at vocational education programs was based on appropriations for Vocational Education State Grants, Tech-Prep Education Programs, and Registered Apprenticeship Training Programs for fiscal year 2002, divided by the number of participants who attended these programs (U.S. General Accounting Office, Multiple Employment and Training Programs, Funding and Performance Measures for Major Programs, April 2003). Because most programs reported using 75 percent or more of their appropriations, we assumed that 75 percent of appropriations were used. We converted annual costs to hourly costs by dividing the annual costs by 35 hours.
- **Adult Basic Education (ABE).** We used a similar approach for estimating the average annual costs of attending ABE programs as for attending vocational education programs. Specifically, we divided appropriations for the Adult Education State Grant Program for fiscal year 2002 by the number of participants to this program (U.S. General Accounting Office, Multiple Employment and Training Programs, Funding and Performance Measures for Major Programs, April 2003). Because most programs reported using 75 percent or more of their appropriations, we assumed that only 75 percent of appropriations were used. We converted these annual costs to hourly costs by dividing by 35, which is the median number of hours of instruction based on a national evaluation of adult education programs funded under the Economic Opportunity Act of 1964 (National Evaluation of Adult Education Programs, U.S. Department of Education, December 1994).
- **Two- and Four-Year Colleges.** Our estimates of the annual cost of college were based on the annual expenditures per full-time-equivalent student in two- and four-year public institutions of higher education (U.S. Department of Education, National Center for Education Statistics, 2002). We converted these annual costs to weekly costs by dividing by 39 weeks.

Impact estimates, shown in Table IV.1, present effects on education and training services *not* funded by TAA that were received since job loss using survey data. We used a sample of workers we observed for 16 quarters. Hours of training not funded by TAA were identified using workers' survey reports of the sources of funding for each training program they enrolled in. We measured impacts on hours of vocational education and adult basic education received, and on weeks of two- and four-year

¹² Out-of-pocket training costs are a transfer payment from participants to the rest of society.

Table IV.1: Benefits from Decreased Attendance at Education or Training Programs Not Funded by TAA

Program	Impact on Total Hours/Weeks Attended	Social Cost (2006 Dollars) ^a	Discounted Benefit to Society (2006 Dollars) ^b
Vocational Education	124 hours ^{***}	9.94 per hour	-956
Adult Basic Education (ABE)	38 hours ^{***}	5.57 per hour	-166
Two-Year College	-0.008 weeks	250.35 per week	1
Four-Year College	0.4 weeks [*]	499.32 per week	-169
Total			- 1,290

Source: Mathematica TAA Baseline and Follow-up Surveys. Cost estimates are from U.S. General Accounting Office, Multiple Employment and Training Programs, Funding and Performance Measures for Major Programs, April 2003. National Evaluation of Adult Education Programs, U.S. Department of Education, December 1994. U.S. Department of Education, National Center for Education Statistics, 2002.

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

^aDeflated costs are used for training received in each calendar year.

^bThe discounted benefit is equal to the sum of the benefit in each year. As the benefits in after year 1 are discounted, this cost is not identical to the total impact times the social cost of the program.

^{*}/^{**}/^{***} Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

college education received. We classified the other types of education and training that participants and comparison group members reported into the most similar of these categories. Training for a specific skill or occupation and computer classes were included in the vocational education category; GED classes, non-credit adult education, ESL, regular high school, and unspecified courses/sessions were classified with ABE; and graduate or professional programs were included in the four-year college category. We assumed that impacts on education and training were zero after the observation period since few participants and comparison group workers were still enrolled at the end of the period. In quarter 16, 8 percent of participants were enrolled versus 3 percent of the comparison group. Costs were deflated and discounted based on the average period in which trainees were enrolled in their programs.

The impact report showed that TAA increased the receipt of education and training overall (see Chapter VI). Results shown here in Table IV.1 indicate that this finding was due in part to increases in the receipt of education and training not funded by TAA. Overall, this increase represented a negative net benefit—that is, a cost—of \$1,290 per participant to society. Roughly three-quarters of this cost was due to the large increase in the number of hours in vocational education.

The cost per participant was greater among younger (though not the youngest) workers, who were more likely to enroll in training funded by any source. The cost per participant was \$1,606 among participants aged 30-39 (Table IV.1a). The cost per trainee was \$2,090.

Table IV.1a: Benefits from Decreased Attendance at Education or Training Programs Not Funded by TAA: Discounted Benefit to Society by Subgroup (2006 Dollars)

Quarter After Job Loss	Age Subgroups				Trainees
	16-29	30-39	40-49	50-60+	
Vocational Education	491	-1,422	-1,151	-585	-1,473
Adult Basic Education (ABE)	93	-50	-243	-169	-270
Two-Year College	-1,068	-93	-32	38	-57
Four-Year College	-360	-41	53	-263	-290
Total	- 844	- 1,606	- 1,373	- 979	- 2,090

Source: Mathematica TAA Baseline and Follow-up Surveys. Cost estimates are from U.S. General Accounting Office, Multiple Employment and Training Programs, Funding and Performance Measures for Major Programs, April 2003. National Evaluation of Adult Education Programs, U.S. Department of Education, December 1994. U.S. Department of Education, National Center for Education Statistics, 2002.

TAA = Trade Adjustment Assistance.

We conducted several sensitivity analyses. First, the benefits from decreased attendance at education or training programs are very similar using the UI exhaustee and UI claimant samples (-\$1,202 compared to -\$1,290). This occurred because impacts on the receipt of training not funded by TAA were similar for the two samples (Table IV.1b). Next, we also examined the sensitivity of our findings to the choice of discount rate. The benefits varied between -\$1,328 (using a 2 percent discount rate) and -\$1,236 (using a 7 percent discount rate), a difference of 3 to 4 percent on either side of the benchmark estimate.

Table IV.1b: Benefits from Decreased Attendance at Education or Training Programs Not Funded by TAA for UI Exhaustee Sample

Program	Impact on Total Hours/Weeks Attended	Social Cost (2006 Dollars) ^a	Discounted Benefit to Society (2006 Dollars) ^b
Vocational Education	113 hours***	9.94 per hour	-882
Adult Basic Education (ABE)	41 hours***	5.57 per hour	-182
Two-Year College	-0.18 weeks	250.35 per week	37
Four-Year College	0.4 weeks*	499.32 per week	-175
Total			- 1,202

Source: Mathematica TAA Baseline and Follow-up Surveys. Cost estimates are from U.S. General Accounting Office, Multiple Employment and Training Programs, Funding and Performance Measures for Major Programs, April 2003. National Evaluation of Adult Education Programs, U.S. Department of Education, December 1994. U.S. Department of Education, National Center for Education Statistics, 2002.

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

^aDeflated costs are used for training received in each calendar year.

^bThe discounted benefit is equal to the sum of the benefit in each year. As the benefits in after year 1 are discounted, this cost is not identical to the total impact times the social cost of the program.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

Comparing the Benchmark and Alternative Approaches

Using the benchmark approach, the total cost to society of changes in training enrollment induced by TAA can be computed as the sum of the average (negative) net benefit of changes in the use of non-TAA-funded training and the average cost of providing TAA-funded training. Chapter VI shows the benchmark estimate of this cost to be \$5,786. The benchmark total cost to society of TAA-induced changes in training was thus \$7,076 (\$1,290 + \$5,786).

Using the alternative approach, we computed the total cost to society of changes in training enrollment by valuing TAA's impact on hours of training (regardless of funding source) at the TAA program's hourly cost of providing training. The hourly costs were estimated by dividing average total training costs per participant by average total hours of training per participant. Chapter VI includes a detailed discussion of how we estimate training costs per participant using administrative data from the TAA program. Estimates of the impact on hours of training and of average hours spent in training were obtained from the impact report. We combined these estimates to find a total cost to society of TAA-induced changes in training of \$5,210.

B. Increased Use of Reemployment Services Not Funded by TAA

Customers in the 2002 TAA program were likely to receive some reemployment services from TAA counselors. In addition, as discussed, the 2002 Trade Act might have led some TAA customers to receive core and intensive services from other programs, such as WIA, that are not funded by TAA. We expected that many comparison group members also used these same core and intensive services. Consequently, it was uncertain whether impacts on the use of non-TAA-funded reemployment services would be positive or negative.

The costs of reemployment services provided by TAA were a component of the program and administrative costs that states reported to USDOL in their TAA financial status reports. Thus, these services were accounted for when we calculated program costs (see Chapter VI below). Changes in the receipt of non-TAA-funded reemployment services, however, were treated in our accounting framework as a potential program benefit. We placed a dollar value on this potential benefit by multiplying impacts on the receipt of various reemployment services with estimates of the cost of providing these services.

To estimate program impacts on reemployment services ever received since job loss, we used survey information on core and intensive services received by our sample members. Core services included the seven key areas we asked about: assistance in searching for work, referrals to jobs and employers, help with your resume, information on how to change careers, tests to see what jobs you are qualified or suited for, labor market information about what occupations are in demand in your local area, and information on education or job training programs. Intensive services included counseling to help you determine whether training is appropriate and counseling to help you select a training program or provider. To the extent that some of the services we classified as "core" services were part of an intensive in-depth evaluation, we may overstate the receipt of core services and understate the receipt of intensive services. We used the full follow-up survey sample to compute the estimates.

Reemployment services are funded by a number of programs, including WIA, Employment Services (ES), Welfare-to-Work, and TANF (Borden 2002). The surveys, however, did not collect

information on sources of funding for the specific services participants received, because we expected that customers would not know these details. Consequently, the survey data alone could not be used to determine which services received by the treatment group were provided by TAA and which were not. Moreover, the survey data did not contain information on the costs of providing these services.

To address these problems, we combined estimates from a number of sources to compute the non-TAA cost per participant. Using Borden (2002), we gathered estimates of the average cost to WIA of providing core and intensive reemployment services to a participant and divided by WIA's share of the total costs of providing these services to inflate up to the total cost of providing services to a participant.¹³ We assumed that none of the cost per participant was covered by TAA. The reason was that, although One-Stop cost-sharing arrangements vary both by state and, within state, by LWIA, the cost of reemployment services for TAA participants are typically borne by WIA and ES (D'Amico 2007). WIA and ES together pay these costs for TAA participants co-enrolled in WIA, while ES normally pays for TAA participants not co-enrolled in WIA (since nearly all are co-enrolled in ES). We deflated and discounted the cost estimates based on the average period over which services could have been received (from the UI claim date up to the survey interview date). We assumed there were no differences between participants and comparison group members in the use of reemployment services after the observation period.

Results shown in Table IV.2 indicate that TAA participants were more likely to receive reemployment services, especially the more expensive intensive services. This finding led to an overall cost to society of \$847 per participant, about one-quarter due to the cost of increased use of core services and three-quarters due to increased cost of intensive services. Costs were higher for younger participants who make more use of these services, as shown in Table IV.2a. For those aged 16-29, costs per participant were \$1,645, compared with \$423 for participants over age 60. Impacts on the use of reemployment services tended to be larger for trainees, whose per-participant cost was larger than average (\$1,124). Findings for the exhaustee sample were very similar (Table A.5). Using alternative discount rates changed discounted costs to \$873 (using a 2 percent discount rate) and \$811 (using a 7 percent discount rate), a difference of 3 to 4 percent on either side of the benchmark estimate.

¹³ Borden's estimate of the fraction of resource room funding that comes from WIA proxies for WIA's cost share of all One-Stop operations, including core and intensive services.

Table IV.2: Benefits from Decreased Use of Reemployment Services Not Funded by TAA

Type of Service	Impact on Receipt of Service Funded by Any Source (Percentage)	Social Cost (2006 Dollars) ^a	Discounted Benefit to Society (2006 Dollars)
Core Services	12***	1,829	-208
Intensive Services	27***	2,560	-639
Total			- 847

Source: Mathematica TAA Baseline and Follow-up Surveys. Cost estimates are from Borden (2002).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

^aCosts are deflated based on the average period of participation in TAA among sample members.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

Table IV.2a: Benefits from Decreased Use of Reemployment Services Not Funded by TAA: Discounted Benefit to Society by Subgroup (2006 Dollars)

Type of Service	Age Subgroups					Trainees	TRA Only
	16-29	30-39	40-49	50-59	60+		
Core Services	-515	-331	-302	-122	-144	-250	-144
Intensive Services	-1,130	-783	-759	-649	-278	-873	-216
Total	- 1,645	- 1,114	- 1,062	- 771	- 423	- 1,124	- 361

Source: Mathematica TAA Baseline and Follow-up Surveys. Cost estimates are from Borden (2002).

^aCosts are deflated based on the average period of participation in TAA among sample members.

TAA = Trade Adjustment Assistance.

V. EFFECTS FROM CHANGES IN RECEIPT OF UNEMPLOYMENT INSURANCE AND PUBLIC ASSISTANCE BENEFITS

When designing the benefit-cost study, it was difficult to predict whether treatment or comparison group members would receive more UI payments during the follow-up period. On the one hand, TAA might reduce the receipt of UI benefits if program reemployment services are effective in helping participants find jobs quickly, and if TAA increases long-term employment rates (and hence, reduces the need for UI benefits in the future). On the other hand, TAA might increase UI exhaustion rates in the short term if many TAA customers continue training after becoming eligible for TRA services.

More definitively, we expected that treatment group members would receive fewer public assistance benefits (such as food stamps, TANF, SSI/SSA, and general assistance) than comparison group members because TAA was expected to increase the long-term earnings of program participants. Furthermore, the receipt of TRA benefits might reduce the need for public assistance benefits in the short term.

Potential changes in the receipt of these transfer payments would represent a benefit or cost to participants (who receive the payments) and an offsetting benefit or cost to the rest of society (who pay for the transfers). Although changes in the value of the transfer payments do not represent a net benefit or cost to society, changes in administrative costs do.

This chapter presents our estimates of the benefits from changes in the receipt of UI and public assistance payments by TAA participants. (TRA payments are not included here; we discuss receipt of TRA separately in our analysis of the costs of TAA.) Participants collected more in UI payments and food stamp benefits than comparison group members but less in cash assistance. We estimated the net cost to society (in terms of increased administrative costs) to be \$313 per participant.

A. Changes in Receipt of UI Benefits

We estimated impacts on the amount of UI benefits received per quarter using UI claims data. Quarters were defined differently here than when analyzing outcomes related to earnings. Earnings quarters were constructed to start the week after the UI claim date, while the UI claims database reports payments by calendar quarters. Thus, we measured UI benefits received starting with the calendar quarter in which the UI claim date fell, referred to as the “trigger quarter.” We incorporated the value of benefits resulting from administrative cost savings to obtain the total value of changes in UI receipt. To perform this calculation, we inflated the impact estimates by 16 percent, the average administrative cost as a percentage of benefits received (U.S. House of Representatives 2000).

Impacts on the receipt of UI benefits were initially positive (and statistically significant through the sixth quarter), becoming negative and smaller by quarter 11 after job loss, as shown in Table V.1. This finding is consistent with the pattern of earnings and training impacts shown above. After job loss, TAA participants were more likely to be enrolled in training and less likely to be employed, as the impact report showed, so they collected more UI benefits than comparison group members. As they returned to work following training, UI receipt fell, although impacts were small and statistically insignificant for most quarters after quarter 6. We assumed that impacts were zero after the

Table V.1: Impacts on the Receipt of Unemployment Insurance (2006 Dollars)

Quarter After Job Loss	UI Received by TAA Participants	UI Received by Comparison Group	Estimated Impact on UI Receipt	Estimated Impact on UI Outlays
Trigger quarter	1,867	1,597	270**	313**
1	2,786	2,286	500***	580***
2	1,920	1,403	517***	600***
3	554	334	221***	256***
4	677	135	542***	628***
5	926	305	621***	721***
6	550	262	287***	333***
7	277	299	-22	-25
8	280	231	49	57
9	322	312	10	12
10	356	343	14	16
11	325	362	-37	-43
12	314	352	-38	-44
13	275	525	-250**	-290**
14	285	423	-139**	-161**
15	347	415	-68	-79
16	291	321	-30	-35

Source: Data on UI receipt were obtained from state UI Administrative Data. Data on UI administrative costs as a percentage of benefits received were obtained from U.S. House of Representatives (2000).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design. The sample is restricted to individuals who completed the second follow-up survey for whom UI administrative data provide complete information for all quarters.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

observation period, an assumption that is in line with the assumptions made for earnings and training receipt.

Among age and service subgroups, we found roughly the same pattern of positive, statistically significant impacts on UI receipt for the first six quarters after job loss, followed by smaller, statistically insignificant and often positive impacts (Table V.1a). The signs on the impact estimates, indicating a benefit (positive) or cost (negative) to participants, were quite variable across subgroups in the later quarters.

Table V.1a: Impacts on the Receipt of Unemployment Insurance: Estimated Impact on UI Outlays by Subgroup (2006 Dollars)

Quarter After Job Loss	Age Subgroups					Trainees	TRA Only
	16-29	30-39	40-49	50-59	60+		
Trigger quarter	260	767**	576**	150	256	364**	293
1	126	605***	758***	466***	452*	561***	582***
2	99	267	896***	425***	517**	581***	565***
3	221*	106	402***	134*	524***	276***	186***
4	880***	418***	866***	537***	344**	755***	428***
5	1,282***	545***	795***	528***	490**	809***	574***
6	542***	329***	507***	348***	234	380***	252***
7	-97	113	59	-228	371***	5	-128*
8	-146	27	44	124*	198*	94	-38
9	29	69	-40	-21	134	65	-81
10	-358***	51	73	-134	42	90	-71
11	-546***	-61	70	-101	36	18	-112*
12	-687***	23	74	-66	135	-19	-90
13	269	20	-182	-150	150	-307*	-160
14	341	-138	-100	-312***	92	-116	-201***
15	192	-357*	79	-241**	-29	-25	-161**
16	-65	-252	109	-181	-96	-34	-25

Source: Data on UI receipt were obtained from state UI Administrative Data. Data on UI administrative costs as a percentage of benefits received were obtained from U.S. House of Representatives (2000).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design. The sample is restricted to individuals who completed the second follow-up survey for whom UI administrative data provide complete information for all quarters.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

The total discounted value of the increase in benefits paid, including both UI payments and administrative costs, was \$2,841 (top panel of Table V.2). Of this amount, the total discounted payment of \$2,449 represented a transfer payment from the rest of society to TAA participants, and did not impose a cost on society as a whole. The total administrative cost of \$392, however, was a net cost to society. This cost was not affected by the use of alternative discount rates of 2 percent and 7 percent. Transfer payments and administrative costs were relatively high for older workers (particularly those aged 40-49) and trainees (Table V.2a).

Among the UI exhaustee sample, in contrast, there was a negative impact on the amount of UI received (Table A.7). Thus, society received a discounted net benefit of \$133 due to administrative cost savings (Table V.2b). These findings are not surprising because less than half of comparison group members in the UI claimant sample exhausted UI, compared to all comparisons in the UI exhaustee sample.

B. Changes in Receipt of Public Assistance Program Benefits

Cash assistance and Food Stamp (SNAP) benefits are available to families with limited income and assets and who meet other requirements. Although job loss is not a prerequisite to receiving these means-tested benefits, displaced workers may find that their loss of income makes them eligible for these benefits. Some cash assistance benefits, such as Social Security Retirement, are eligible only to individuals who are no longer working and meet age requirements. We expected that TAA could affect participation in these programs because of program effects on earnings and total income.

We estimated impacts on the amount of cash assistance (TANF, welfare, Social Security Retirement, Supplementary Security Income, and General Assistance) and food stamp benefits received since the UI claim date using survey data. We then inflated the impact on cash assistance receipt by 11.5 percent and the impact on Food Stamps receipt by 16 percent to incorporate the value of administrative cost savings (U.S. House of Representatives 2001). Dollar amounts were deflated and discounted based on the average period of participation in TAA.

Impacts on the receipt of cash assistance were negative and statistically insignificant, while the (smaller) impacts on the receipt of food stamp benefits were positive and statistically significant, as shown in the bottom panel of Table V.2. We assumed that impacts on receipt of these benefits were zero after the observation period. The combined impact on both types of public assistance was \$728 (undiscounted), indicating that TAA participants collected less on net than comparison group members.

The total discounted value of the decrease in benefits paid, including both payments to recipients and administrative costs, was \$843. Of this amount, \$764 represents a transfer payment from TAA participants to the rest of society, while \$79 represents a benefit to society as a whole.

Table V.2: Benefits from Decreases in the Receipt of UI and Public Assistance Benefits (2006 Dollars)

Benefit	Undiscounted Impact on Amount Received	Administrative Cost as a Percentage of Benefit Received	Discounted Value of Change in Benefits Paid	Discounted Benefit to Society
Unemployment Insurance	2,447	16	2,841	-392
Public Assistance Benefits	-728		-843	79
Cash Assistance	-929	11.5	-1,077	111
Food Stamp (SNAP) Benefits	201**	16	234	-32
Total	1,719		1,998	- 313

Source: Data on UI receipt were obtained from state UI Administrative Data. Data on UI administrative costs as a percentage of benefits received were obtained from U.S. House of Representatives (2000). Data on cash assistance and Food Stamp (SNAP) benefits were obtained from Mathematica TAA Baseline and Follow-Up Surveys.

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design. The sample is restricted to individuals who completed the second follow-up survey for whom UI administrative data provide complete information for all quarters.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

Results varied across subgroups, but there were few clear patterns or statistically significant impact estimates. Among younger workers aged 16-29, impacts on food stamp benefits were positive, leading to relatively high administrative costs (Table V.2a). Impacts on cash assistance benefits were negative for older workers aged 50-59, leading to negative administrative costs. Trainees had negative impacts on cash assistance benefits that were only partially offset by positive impacts on food stamp benefits.

Table V.2a: Benefits from Decreases in the Receipt of UI and Public Assistance Benefits: Discounted Value of Change in Benefits Paid and Discounted Benefit to Society by Subgroup (2006 Dollars)

Benefit	Age Subgroups						
	16-29	30-39	40-49	50-59	60+	Trainees	TRA Only
Discounted Value of Change in Benefits Paid							
Unemployment Insurance	1,319	2,082	4,810	2,002	3,234	3,459	1,864
Public Assistance Benefits	1,508	1,184	-751	-3,844	1,753	-1,053	-275
Cash Assistance	-465	622	-1,014*	-3,950***	1,770	-1,396*	-378
Food Stamps	1,973***	562*	263	106	-17	343**	103
Total	2,827	3,266	4,059	- 1,842	4,987	2,406	1,589
Discounted Benefit to Society							
Unemployment Insurance	-182	-287	-663	-276	-446	-477	-257
Public Assistance Benefits	-224	-142	68	393	-180	97	25
Cash Assistance	48	-64	105	407	-183	144	39
Food Stamps	-272	-78	-36	-15	2	-47	-14
Total	- 406	- 429	- 595	117	- 626	- 380	- 232

Source: Data on UI receipt were obtained from state UI Administrative Data. Data on UI administrative costs as a percentage of benefits received were obtained from U.S. House of Representatives (2000). Data on cash assistance and Food Stamp (SNAP) benefits were obtained from Mathematica TAA Baseline and Follow-Up Surveys.

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design. The sample is restricted to individuals who completed the second follow-up survey for whom UI administrative data provide complete information for all quarters.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

Among the UI exhaustee sample, TAA participants collected significantly less in cash assistance than their comparisons, leading to a negative impact on public assistance benefits received (Table V.2b). The savings in administrative costs leads to a \$254 benefit to society, larger than the benchmark estimate. This result is not surprising because comparisons in the UI exhaustee sample were more likely to be in need of cash assistance than comparisons in the primary sample.

It is important to note that cash assistance includes social security retirement benefits. These benefits differ from other types of cash assistance because the total amount ultimately received is not a function of contemporaneous income. The value of the benefit amount per year, and hence

the present value of the total amount ultimately received, depends on both the recipient's earnings before retirement and his retirement age. Both factors were affected by the TAA program. TAA had a negative impact on earnings, reducing the present value of total lifetime retirement benefits. It also led workers to retire earlier than usual, as shown in the impact report, which had two opposing effects on the present value of total lifetime retirement benefits: it reduced the annual benefit amount (which decreased the present value) but also shifted benefit payments from the future to the study period (which increased the present value). In principle, the total net effect of TAA on the present value of social security retirement benefits is unclear. However, the negative estimated impacts on the amount of cash assistance received indicate that this effect may be dominated by decreases in other forms of cash assistance among TAA participants. Thus, we did not consider alternative assumptions about the future net benefits of social security retirement benefits.

Table V.2b: Benefits from Decreases in the Receipt of UI and Public Assistance Benefits for Exhaustee Sample (2006 Dollars)

Benefit	Undiscounted Impact on Amount Received	Administrative Cost as a Percentage of Benefit Received	Discounted Value of Change in Benefits Paid	Discounted Benefit to Society
Unemployment Insurance	-878	16	-961	133
Public Assistance Benefits	-2,265		-2,518	254
Cash Assistance	-2,399**	11.5	-2,674**	276
Food Stamp (SNAP) Benefits	134	16	156	-22
Total	- 3,143		- 3,479	387

Source: Data on UI receipt were obtained from state UI Administrative Data. Data on UI administrative costs as a percentage of benefits received were obtained from U.S. House of Representatives (2000). Data on cash assistance and Food Stamp (SNAP) benefits were obtained from Mathematica TAA Baseline and Follow-Up Surveys.

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design. The sample is restricted to individuals who completed the second follow-up survey for whom UI administrative data provide complete information for all quarters.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance. UI = Unemployment Insurance.

VI. PROGRAM COSTS

TAA provides many services and benefits to its participants and as a result uses considerable resources. Whether TAA is a cost-effective investment of society's resources depends on whether the benefits discussed in the previous chapters exceeded the value of the resources used by the program: its social costs. The costs of TAA fall into six categories:

1. TRA payments
2. Training
3. Allowances (including job search, relocation, transportation, and subsistence allowances)
4. ATAA wage supplements
5. HCTC tax credits
6. TAA administrative costs

TRA payments, allowances, ATAA wage supplements, and HCTC tax credits are transfers that benefit participants directly, rather than indirectly. These transfers are a benefit to participants, and an offsetting cost to the rest of society. Thus, these payments do not represent a net social cost. In contrast, training-related and administrative costs represent a net social cost.

The remainder of this chapter discusses our measurement and analysis of average program costs per TAA participant. We describe each component separately. Our benchmark estimates assumed that there are no additional costs in the future. We estimated that the cost of the 2002 TAA program is \$8,086 per participant.

A. TRA Payments

We used UI/TRA claims data obtained from 25 states included in the evaluation to determine the amount of TRA benefits received in each quarter since the UI claim date. Table A.7 shows the average amount of TRA payments received by participants each quarter. TRA payments peaked at \$1,828 in quarter 4 after the trigger quarter, and fell to \$6 in quarter 16 after the trigger quarter. To these impacts we added an additional 16 percent to account for the costs of administering this program (U.S. House of Representatives 2001).

B. TAA Training and Allowances

Our primary approach to estimate job search, relocation, transportation, and subsistence allowances paid to TAA participants and the value of education and training costs covered by the TAA program was to use quarterly administrative data. Program outlays for allowances and training paid to recipients per calendar quarter were computed from quarterly financial status reports that state TAA programs provide to USDOL using Standard Form 269 (Form 269 data). These financial reports combine expenditures on allowances and education and training, so we reported these costs together.

We estimated average allowances and education and training costs per TAA participant using the following steps:

1. We computed quarterly training and allowance expenditures per recipient by dividing total national program expenditures by the total number of TAA participants receiving training or allowances. (Program funds can be used to cover only training and allowance costs.) The national estimate of the number of participants was based on TAPR data. The analysis included data from quarters 2004:2-2007:2; since the TAPR data includes program exiters, later quarters may undercount the number of participants. These quarterly amounts were discounted based on the average dates of training receipt in our follow-up survey sample, and then averaged over calendar quarters based on the proportion of the sample enrolled in training in each quarter.
2. We calculated the average number of quarters of receipt of training or allowances among recipients using TAPR data. The TAPR did not indicate quarters of receipt of allowances, so we assumed that allowances are received during the entire follow-up period.
3. We computed the average training and allowance cost per TAA participant by multiplying the average expenditure measure from Step 1 by the average number of quarters of receipt from Step 2 and the percentage of all TAA participants who ever received training or allowances.

In sum, we used the following mathematical formula to calculate average allowance and training costs per TAA participant C_p :

$$C_p = \frac{A_Q}{R_Q} \cdot P \cdot \frac{R_T}{N_T}$$

where A_Q is the total quarterly training and allowance cost, R_Q is the number of recipients who received training or allowances in the quarter, P is the average number of quarters of receipt of allowances or training among recipients, R_T is the number of recipients among the TAA participants, and N_T is the number of TAA participants in the follow-up survey sample.

Training and allowance costs should ideally be treated separately, since they impose their costs on different segments of society. Allowance payments represent a transfer from the rest of society to TAA participants and did not impose a cost on society as a whole. In contrast, training costs did impose a cost on society but not on TAA participants. As a sensitivity analysis, we computed average training and allowance costs per TAA participant separately using survey data on the costs of training paid by the TAA program and the value of allowance payments received.

C. ATAA Wage Supplements

The ATAA program paid a wage supplement to older workers who take a new job at a lower salary than the job they lost. The wage supplement was 50 percent of the difference between their pre-TAA wage and the post-TAA wage, up to a maximum of \$10,000 over a two-year period. In addition, they must have found a full-time job from a new employer within 26 weeks of job separation that did not exceed \$50,000 a year. ATAA participants could not receive TRA payments,

TAA training services, or job search allowances (although they may have been eligible for other allowances and HCTC tax credits).

We obtained information on whether a participant received ATAA payments and the total amount of payments received from the baseline and follow-up surveys. The surveys provided information on the total amount received but not the dates or time period of receipt. To deflate and discount the dollar amounts, we assumed that the total payment was spread evenly over the 2.5 years following between the UI claim date and the interview date, in accordance with the 2 year time limit on ATAA payments and the requirement to find employment within 26 weeks.

While administrative data on ATAA payments was available, it was not appropriate for use in our analysis. States have been required to submit quarterly reports on ATAA expenditures beginning in FY 2006. These reports include information on payments and number of recipients. However, as we did not have information on the number of quarters in which ATAA recipients collected these benefits from survey, TAPR, or administrative data, the reports were not used here.

D. HCTC Tax Credits

Under the HCTC program, an eligible TAA customer could claim a tax credit equal to 65 percent of the premiums paid by the customer for qualified health coverage. Customers could obtain health coverage by continuing their former coverage if available through the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA), by contributing to a spouse's plan as long as the employer does not pay more than 50 percent of the premium, by buying coverage through state qualified health plans, or by using individually purchased coverage that the worker had for 30 days or more prior to job separation.

To measure the value of HCTC tax credits that sample members receive, we used survey information on whether the TAA participant received the tax credit and the amount that was received. For those who could not provide information on the amount received, we estimated the tax credit as 65 percent of the cost of buying coverage through COBRA.¹⁴ We estimated the cost of buying coverage through COBRA by using the state of residence, the number of dependents, and the age of the participant and the participant's spouse (when applicable). In 2004, the average monthly payment for COBRA coverage in the District of Columbia for a family with two children was \$227 dollars. Estimated amounts collected were deflated and discounted based on the average period of participation in TAA.

The HCTC program had the potential to generate benefits to society that partially offset these costs. In theory, it could have increased the likelihood that individuals have health insurance coverage and thus reduced the costs to doctors and hospitals of providing care for the uninsured. However, the impact report showed that TAA actually led to reduced incidence of health insurance coverage through negative impacts on employment. Thus, if anything, we may have understated the

¹⁴ Source: http://www.cobrainsurance.com/COBRA_Insurance/COBRA_Insurance_temporary_Health_plan.htm. To generate an estimate of health plan cost, we entered information about the participant and selected the least expensive of the permanent plans. We used number of dependents under age 18 reported on the survey, and since the average age of respondents and spouses in this group was 56, we assumed all dependents were age 18. We assumed spouse's age was equal to participant's age. We took the average of plan costs for 5 ZIP codes randomly selected from among this group. We assumed this group received HCTC credits for 7 months since they collected TRA for 6.05 months on average.

costs of HCTC. However, our survey data did not include the detailed health and health care questions necessary to assess the value of this effect, so it was not accounted for in our analysis.

Finally, the HCTC program is administered by the IRS (although TAA staff provide the IRS with information that is used to determine customer eligibility for HCTC benefits). We did not collect HCTC-related administrative records data from the IRS, because collecting this confidential information is beyond the scope of the study.

E. Administrative Costs

Administrative costs included a wide range of costs associated with running the program. Program rules mandated that of the total amount that states receive in TAA funding, a maximum of 15 percent can be used for administrative purposes, including all non-training services. Most states included in the Initial Implementation Study reported that they use 15 percent of their funds for administrative purposes (D'Amico et al. 2009). Thus, a simple approach for estimating administrative costs per eligible TAA worker would be to multiply the total training and allowance cost estimate discussed above by 0.1765 (which is equal to $0.15/0.85$).

A more direct approach is to use administrative costs provided in the TAA quarterly financial status reports and the method described in the previous section on allowances and training costs. A complication with this approach, however, is that, unlike other sources of costs, administrative costs were incurred for program participants as well as for eligible program nonparticipants (who might receive early intervention services funded by TAA).

To account for this complication, we first calculated average quarterly administrative costs per participant using the procedures described above. Second, we calculated the average number of quarters that participants participated in TAA (that is, the period during which administrative costs could have been incurred). This participation period was measured from the date of the first service received to the date of the last service received, as reported in the TAPR data. Finally, we estimated administrative costs per TAA participant by multiplying average quarterly administrative costs per participant by the average number of quarters of participation.

F. Summary

We estimated that the 2002 TAA program cost society \$8,086 per participant (Table VI.1). It cost the rest of society \$15,694 per participant. The difference between the cost to society and the cost to the rest of society, \$7,608, is an estimate of the benefit to TAA participants of transfer payments: TRA payments, ATAA wage supplements, and HCTC tax credits. These transfers were worth almost 50 percent of the total costs of the program to the rest of society ($7,608/15,694$). (Allowances are a transfer payment as well, but because the value of allowances is combined with the much greater value of training costs, we could not include them with the other transfer payments.)

Using the UI exhaustee sample, we obtained a similar cost to society of \$8,368 rather than \$8,086 (Table A.8). The slightly larger amount for the UI exhaustee sample reflects somewhat higher costs of TRA payments and TAA training and allowances for the TAA participants who exhausted their UI benefits relative to all participants.

The findings were fairly robust to sensitivity analyses. First, computing separate training and allowance costs per TAA participant using survey data yielded lower costs to society as a whole. Table A.9 shows that TAA cost society \$6,999 per participant using this approach, while transfers were worth 52 percent of the total costs of the program to the rest of society. Second, estimating administrative costs to be 17.65 percent of the estimated cost of training and allowances (\$5,786 in Table VI.1) yielded a very similar administrative cost estimate of \$1,021 per TAA participant. This value led to a slightly lower overall cost to society of \$56,754 per participant (not shown).

Table VI.1: Average Discounted Costs Per TAA Participant (2006 Dollars)

Component	Perspective		
	Society	TAA Participants	Rest of Society
TRA Payments	1,195	-7,472	8,667
TAA Training and Allowances	5,786	0	5,786
ATAA Wage Supplement	0	-103	103
HCTC Tax Credits	0	-33	33
Administrative Costs	1,105	0	1,105
Total	8,086	- 7,608	15,694

Source: Data on TRA payments were obtained from TRA Administrative Data. Data on training and allowance payments and administrative costs were obtained from state Standard Form 269 data. Data on ATAA and HCTC payments were obtained from Mathematica TAA Baseline and Follow-Up Surveys. HCTC payments were simulated for HCTC recipients who did not report payment amounts.

TAA = Trade Adjustment Assistance.

VII. AGGREGATING BENEFITS AND COSTS

We combined our estimates of program benefits and costs to measure the cost-effectiveness of TAA in several ways. The results indicated that TAA is not a good investment either for society as a whole or for participants. Our best estimate was that the 2002 TAA program imposed net costs of \$53,802 per participant to society as a whole and net costs of \$26,837 to each participant. Using the UI exhaustee sample, we estimated net costs of \$27,494 per participant to society as a whole. From society's perspective, the program is not cost-effective for any of the age or service subgroups we examined.

To reach these conclusions, we had to make assumptions. To convey the degree of confidence that can be placed in our best estimate of net benefits, we examined the sensitivity of the findings to alternative assumptions. This sensitivity analysis, which dealt with various sources of uncertainty, plays the role normally taken by statistical hypothesis testing or confidence interval estimation. We concluded that, despite many unknowns, the net benefits of TAA are negative under a wide range of plausible assumptions.

The rest of this chapter is organized as follows. Section A compares the overall costs and benefits of TAA to society. Section B compares costs and benefits from the perspectives of participants and the rest of society. Section C summarizes the findings for service and age subgroups. Section D summarizes the results of sensitivity analyses.

A. Comparing Overall Benefits and Costs to Society: Was TAA Cost-Effective?

Our analysis found that the costs of the 2002 TAA program exceed its benefits, as shown in Table VII.1. While both TAA participants and the rest of society incurred net costs, roughly 50 percent of the net cost to society was borne by the participants (-\$26,837 net present value of benefits to participants divided by -\$53,802 net present value of benefits to society).

Nearly all potential benefits of the TAA program were found to be negative. The TAA program's emphasis on the use of appropriate training and reemployment services to help participants find jobs led TAA participants to use more training and reemployment services not funded by TAA. This trend created a cost to the rest of society, which paid for the provision of these services. However, the investment did not pay off either for society or for participants during the 4-year observation period, throughout which the participants had lower average compensation than the comparison group. The \$43,266 net loss in compensation per participant accounted for almost 95 percent of TAA's negative net benefit to society of -\$45,716 per participant (Table VII.1). Lower earnings meant a decrease in taxes paid, a benefit to participants that was offset by an equal cost to the rest of society. The TRA benefits paid to participants represented a cost to the rest of society, although society as a whole incurred only the additional administrative costs this created. The only benefit to society arose from a decrease in administrative costs associated with TAA participants collecting less in public assistance benefits than the comparison group. The rest of society benefited from both the lower administrative costs and the lower payments themselves.

The program costs reflect the fact that TAA was moderately expensive to operate. Society paid \$8,086 per participant. Taking the negative benefits and high cost of TAA together, the net present value of the benefits to society based on our best assumptions was large at -\$53,802 per participant (Table VII.1).

Table VII.1: Comparing Overall Benefits and Costs of the TAA Program Per Participant (2006 Dollars)

Benefit	Perspective		
	Society	TAA Participants	Rest of Society
Increase in Earnings and Fringe Benefits	-43,266	-43,266	0
Increase in Taxes Paid	0	7,136	-7,136
Decrease in Attendance at Education and Training Programs Not Funded by TAA	-1,290	0	-1,290
Decrease in the Use of Reemployment Services Not Funded by TAA	-847	0	-847
Decrease in the Receipt of UI Benefits	-392	2,449	-2,841
Decrease in the Receipt of Other Public Assistance Benefits	79	-764	843
Total Benefit of TAA Program	- 45,716	- 34,445	- 11,271
Total Average Cost of TAA Program	- 8,086	7,608	- 15,694
Net Present Value of Benefits	- 53,802	- 26,837	- 26,965

Source: Tables III.4, IV.1, IV.2, V.2, and VI.1.

TAA = Trade Adjustment Assistance.

Using the UI exhaustee sample, the net present value of the benefits to society was calculated to be -\$27,494 (Table VII.3). The negative net benefits of the program for this sample were smaller in absolute value than the benchmark estimates, primarily due to the smaller negative impacts on earnings among this sample.

B. Benefits and Costs by Perspective

In addition to calculating overall benefits and costs to society, we compared benefits and costs from the perspectives of TAA participants and the rest of society.

1. Benefits and Costs to Participants

The 2002 TAA program was not a good investment for participants. They incurred a cost through earnings that were lower than they would have received in the absence of the program (i.e., relative to the matched comparison groups). This reduction in earnings was accompanied by some benefits: a reduced tax bill and an increase in the receipt of UI. However, this benefit was not enough to exceed the costs of lower earnings. The net benefit to TAA participants was -\$26,837 (Table VII.1). Using the UI exhaustee sample, the negative net benefit to TAA participants was smaller in absolute value at -\$9,565. This is not surprising since the reduction in earnings of TAA participants was smaller relative to the UI exhaustee comparison group than for the benchmark comparison group.

2. Benefits and Costs to the Rest of Society

Excluding TAA participants, the rest of society also incurred a net cost of TAA. This cost had three parts: reduced taxes paid by participants; increased spending on training and reemployment programs as well as UI; and program administrative costs and payments for training, TRA, ATAA and HCTC. The net benefit to the rest of society was -\$26,965 (Table VII.1).

C. Benefits and Costs by Subgroup

Since TAA service receipt and labor market outcomes varied across participant subgroups, program benefits and costs differed by subgroup as well. Thus, we aggregated TAA benefits and costs separately by age and service subgroups to determine whether the TAA program was relatively more cost-effective for some subgroups than for others. Estimates of program benefits for each subgroup were presented above. Estimates of program costs for each subgroup were estimated by multiplying the average cost to TAA of providing each service to a participant by the proportion of each subgroup that received the service. Costs varied across subgroups depending on their extent of TRA, training, and allowance receipt, since administrative costs per participant did not differ by subgroup and HCTC and ATAA costs are transfer payments that did not affect overall program costs to society as a whole.

1. Benefits and Costs by Service Subgroup

We found that the net present value of benefits of TAA was negative for all service subgroups, as shown in Table VII.2. The net present value of benefits of TAA was higher than average for trainees (-\$58,542), but was substantially lower for TRA-only recipients (-\$40,522) since they typically did not enroll in training.

2. Benefits and Costs by Age Subgroup

We found that the net present value of benefits of TAA was negative for all age subgroups, as Table VII.2 shows. However, benefits were less negative for older workers. The net present value of benefits was -\$35,667 for TAA participants age 60 and older, compared with -\$59,835 for participants aged 29 and younger. This result was driven by older workers' lower use of reemployment services and training.

Table VII.2: Comparing Overall Benefits and Costs to Society of the TAA Program Per Participant Across Subgroups (2006 Dollars)

	Age Subgroups					Trainees	TRA Only
	16-29	30-39	40-49	50-59	60+		
Benefits							
Increase in Earnings and Fringe Benefits	-49,922	-51,823	-45,036	-34,991	-29,912	-46,862	-37,549
Decrease in Attendance at Education and Training Programs Not Funded by TAA	-844	-1,606	-1,373	-979	-979	-2,090	0
Decrease in the Use of Reemployment Services Not Funded by TAA	-1,645	-1,114	-1,062	-771	-423	-1,124	-361
Decreases in the Receipt of UI and Public Assistance Benefits	-406	-429	-595	117	-626	-380	-232
Total Benefit of TAA Program	- 52,817	- 54,972	- 48,066	- 36,624	- 31,940	- 50,456	- 38,142
Total Average Cost of TAA Program	- 7,018	- 6,445	- 5,971	- 5,260	- 3,727	- 8,086	- 2,410
Net Present Value of Benefits	- 59,835	- 61,417	- 54,037	- 41,883	- 35,667	- 58,542	- 40,552

Source: Tables III.4a, IV.1a, IV.2a, V.2a, and VI.1.

TAA = Trade Adjustment Assistance.

D. Sensitivity Analyses

Throughout the report, we discussed the findings from analyses to assess the sensitivity of various benchmark estimates to the assumptions or data sources used. In general, our estimates did not change substantially, and in no case were the estimated net benefits of the 2002 TAA program positive. Table VII.3 summarizes the benefits and costs to society found for each sensitivity analysis.

Table VII.3: Sensitivity Analysis: Comparing Overall Benefits and Costs to Society of the TAA Program Per Participant Under Alternative Specifications (2006 Dollars)

Benefit	Use UI exhaustee sample	Use UI wage records to estimate impacts on output	Assume total displacement= replacement effect is 100%	Assume discount rate of 2%	Assume discount rate of 7%	Use TAA administrative data to measure the costs of providing training	Use survey data to estimate program costs of training and allowances
Increase in Earnings and Fringe Benefits	-17,435	-33,614	0	-40,358	-38,504	-43,266	-43,266
Increase in Taxes Paid	0	0	0	0	0	0	0
Decrease in Attendance at Education and Training Programs Not Funded by TAA	-1,202	-1,290	-1,290	-1,328	-1,236	0	-1,290
Decrease in the Use of Reemployment Services Not Funded by TAA	-875	-847	-847	-873	-811	-847	-847
Decrease in the Receipt of UI Benefits	133	-392	-392	-392	-392	-392	-392
Decrease in the Receipt of Other Public Assistance Benefits	254	79	79	79	79	79	79
Total Benefit of TAA Program	- 19,126	- 36,064	- 2,450	- 42,872	- 40,864	- 44,426	- 45,716
Total Average Cost of TAA Program	- 8,368	- 8,086	- 8,086	- 8,224	- 7,892	- 7,510	- 6,999
Net Present Value of Benefits	- 27,494	- 44,150	- 10,536	- 51,096	- 48,756	- 36,916	- 52,715

Source: Tables III.3, III.4, IV.1, IV.1b, IV.2, V.2, V.2b, VI.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, and A.9.

TAA = Trade Adjustment Assistance.

- At -\$27,494, the negative net benefits of the program calculated for the sample of treatments and comparisons who exhausted their UI benefits were smaller in absolute value than our benchmark estimates. This was primarily due to the smaller negative impacts on earnings among this sample.
- Using UI wage records to analyze net benefits on output yielded negative net benefits of -\$44,150, smaller in absolute value than our benchmark estimates.
- It is likely that some degree of displacement and replacement existed in the labor market at the time of the study. Changing our assumption of full employment to allow for displacement and replacement effects in the labor market led to a net benefit on earnings/output of zero, but only when making the extreme assumption that all decreases in employment among TAA participants led to a corresponding increase in employment (at the same wage) among the comparison group. Even in this extreme case, the net benefit of the TAA program was still negative at -\$10,536, due primarily to the cost of the program services.
- The net benefits on earnings/output changed by only 5 or 9 percent when we assumed alternative reasonable discount rates of 2 percent and 7 percent.
- An alternative approach to estimating the costs to society of increased use of training and education programs is to value the total impact on hours of training at the TAA program's cost of providing training. This led to a net benefit of the TAA program of -\$36,916, smaller than our benchmark estimate.
- We estimated TAA program costs of training and allowances using survey data on participant-reported costs. They yielded a net benefit of the TAA program of -\$52,715.

It is important to note that the impact estimates themselves were robust to a wide variety of modeling assumptions; see the impact report for details.

Another way to think about the sensitivity of these findings is to consider what future impacts on earnings would make TAA cost-effective from society's perspective, keeping all other benefits and costs constant. The 2002 TAA program would realize net benefits to society if the present discounted value of future earnings impacts exceeded \$53,802. This value would be equivalent to an average annual earnings impact of \$4,257 over the rest of a participant's working life (that is, starting from year 5 until retirement sixteen years later at the Social Security full retirement age of 66, given our sample's average age of 46 at the time of the UI claim). Using the UI exhaustee sample, a smaller annual earnings impact of \$2,176 would make the TAA program cost effective.

Similarly, we computed the present discounted value of future earnings impacts that would make the TAA program a good investment from the perspective of TAA participants. Participants would have to earn at least \$2,124 per year more than the comparison group from year 5 until retirement. For the UI exhaustee sample, the analogous annual earnings impact would be \$757.

The overall finding that the 2002 TAA program is not cost-effective was robust to a variety of sensitivity analyses. The costs to society exceeded the benefits, even when we considered alternative assumptions in sensitivity analyses. However, because many TAA participants enrolled in training programs for a considerable amount of time, the four-year follow-up period may not be long

enough to evaluate the full returns of the TAA program on labor market activity. Longer follow-up may be necessary to account for all the benefits and costs of TAA.

VIII. BENEFITS FROM FACILITATION OF FREE TRADE

The overall benefits of free trade to aggregate welfare are well known. To the extent that the TAA program makes free trade politically feasible, the gains from such trade constitute another set of benefits to the TAA program (Magee 2001).

To account for these additional benefits of the 2002 TAA program in our analysis, we required both an estimate of the value of free trade and some assumption about the extent to which the TAA program is responsible for free trade. We decomposed the total benefit in terms of income per capita into specific links: the effect of TAA on income per capita equals the effect of TAA on trade share times the effect of trade share on income per capita, where trade share is defined as the ratio of imports plus exports to gross domestic product (GDP). The effect of TAA on the trade share may be further decomposed: the effect of TAA on trade share equals the effect of TAA on trade policy times the effect of trade policy on trade share.

Overall, we could not determine with certainty whether the benefits to free trade make the TAA program cost-effective. Cost-effectiveness depends critically on the extent to which trade liberalization may be attributed to TAA. It appears that if TAA makes a relatively modest contribution to the ease of enacting free trade policies, the program's total benefits could outweigh its costs. However, given the empirical and conceptual difficulties in measuring the benefits of trade, we caution readers about placing too much weight on these findings.

We discuss estimation of the components above in Sections A through C below, and then combine estimates of each component to arrive at a value of the benefits of the TAA program on free trade in Section D. We conclude this section by presenting estimates of the net present value of the TAA program that incorporate benefits due to free trade.

A. The Effect of Trade on Income

Quantifying the broad range of gains associated with economic openness is challenging. The primary benefit cited by economists is the increase in real income due to the higher productivity and lower prices resulting from improved economic efficiency (Kletzer 2001). Other more indirect benefits are difficult to measure, and may be infeasible to incorporate in our analysis. These include, for example, gains in consumer well-being due to expanded product choice and the availability of new goods; and overall improvements in health due to greater access to and advancements in medical products and services. We followed the trade literature and restricted our attention to gains in the standard of living, measured as real income per capita.¹⁵ However, as the full range of potential indirect benefits may be extensive, our estimate of the benefits of open trade may understate the total benefits.

Results from the trade literature indicate that trade has a substantial effect on a country's income. In a recent study, Frankel and Rose (2002) estimate a regression of real income per capita on the trade share using macroeconomic data from a sample of 100 countries in 1990. An important complication is that wealthy countries may be more likely to adopt free trade policies if they tend to have some unobserved characteristics correlated with both income and trade share,

¹⁵ Real income adjusts for inflation. It is a more useful measure than nominal income since consumers' purchasing power increases when prices are lower due to trade.

such as free-market domestic policies. They address this potential “simultaneity” bias by employing an instrumental variables estimation strategy. Their estimation uses only the variation in the trade share that can be explained by geographic characteristics that affect a country’s trade patterns directly but not its wealth. Specifically, they construct an instrument by taking the sum of each country’s predicted bilateral trade with all other countries, based on size, proximity, shared borders, and an indicator for being landlocked. Our analysis used their finding, similar to others in the literature, that a one percentage point increase in the trade share increases per-capita income by about 0.3 to 0.4 percent.

It is important to note that the effect of trade share on income need not be the same as the effect of trade policy on income (Winters 2004); changes in trade due to changes in trade policy may affect income differently than changes arising for other reasons. For this reason, Rodriguez and Rodrik (1999) advocate analyzing the latter relationship directly. However, this approach is difficult for two reasons. First, TAA may lead to specific types of trade policies that may differ from those analyzed in a given study, making the results inappropriate for use. Second, the measure of trade policy openness used in a given study may not be readily available for us to use to determine how it is affected by TAA. Thus, we also explored an alternative strategy, in keeping with their recommendation, that considers the intermediate link between trade policy and trade share, as we discuss below.

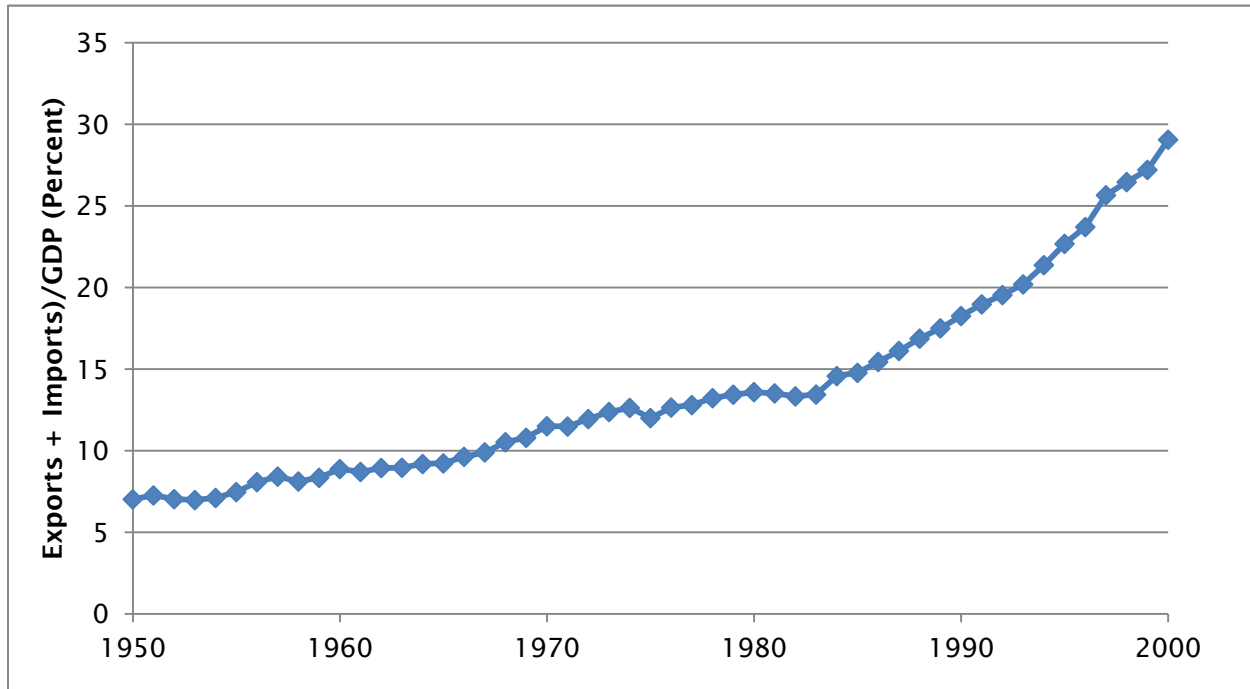
B. The Effect of TAA on Trade Policy

The extension of our benefit-cost analysis to include the benefits of trade openness hinged on the assumption that the TAA program helps reduce political opposition to more open trade policies by appeasing labor unions and other critics concerned about the impact of foreign competition on domestic employment (Magee 2003). Thus, to obtain an estimate of the trade-related benefits of TAA, the impact of trade share on income must be weighted by the contribution of TAA to the trade share.

There are two ways to evaluate whether TAA makes trade possible. The first is to investigate whether TAA affects trade directly, by examining a time series of trade share data. Since its inception in 1962, the U.S. trade share has increased from about 9 percent to 29 percent in 2000, or about 0.5 percentage points per year (see Figure VIII.1). We considered this crude estimate as one possibility in our analysis. A crucial drawback to this method, however, is that simple correlations between the timing of TAA rule changes and trade data do not indicate causality. For instance, if the TAA program expands at the same time as the trade share, it is impossible to determine whether the expanded program helps to increase trade, whether increasing trade leads to moves to expand TAA, or whether the two are simply growing independently and the correlation is spurious.

A second, two-part strategy is to examine whether TAA affected the ease of passing more liberal trade legislation, and whether that legislation in turn led to increased trade. A casual reading of the history of the TAA program shows that program expansions frequently accompanied the

Figure VIII.1. U.S. Trade Ratio (1996\$)



Source: Congressional Budget Office (2003).

passage of major trade legislation. For instance, Trade Adjustment Assistance was created partly through the influence of organized labor as part of the 1962 Trade Expansion Act, which ceded greater trade negotiation power to the Executive branch and resulted in tariff cuts during the greater trade negotiation power to the Executive branch during the Kennedy Round of GATT talks (Kapstein 1998). Similarly, the 1974 Trade Reform Act and the 1994 North American Free Trade Agreement (NAFTA) expanded eligibility and benefits of the TAA program while reducing tariff and nontariff barriers to trade.

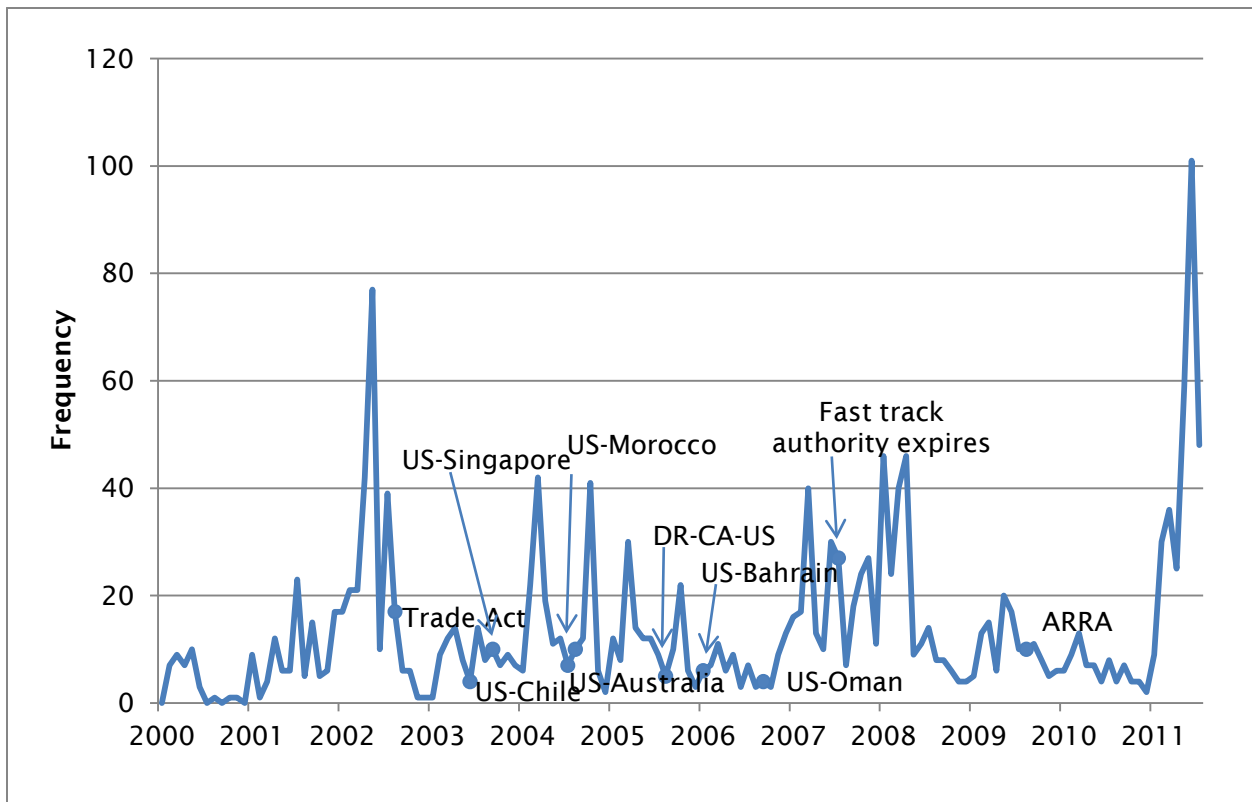
More careful inspection, however, casts doubt on the necessity of TAA for trade progress. It was not until seven years after the creation of TAA that the first workers were certified (Baicker and Rehavi 2004), suggesting that the actual demand for TAA compensation may have been low. Further weakening this relationship is the fact that not only were numerous trade policies introduced prior to TAA (such as the 1934 Reciprocal Trade Agreements Act), but that subsequent trade policy sometimes liberalized while the TAA program became more restricted (as in the 1988 Omnibus Trade and Competitiveness Act, which introduced a training requirement for receipt of TAA benefits).

Another way to consider the importance of TAA for trade is by examining the time pattern of discussions of TAA in the press. If the compensation TAA provides is an important component of trade agreements, we would expect heightened discussion and testimony about TAA while these agreements are being drafted. Figure VIII.2 shows monthly frequency of mentions of “Trade Adjustment Assistance” in major U.S. newspapers and transcripts between January 1, 2000 and July 19, 2011 according to a Nexis search. This period covers the passage of the two most recent changes to the TAA program: the 2002 Trade Act and 2009 ARRA.

The figure shows an upswing in mentions of TAA during the three months prior to the passage of the 2002 Trade Act, which restored the president’s fast track negotiating authority. This power to negotiate trade agreements that Congress cannot amend or filibuster is considered to promote trade openness. In fact, a number of free trade agreements were signed into law between mid-2003 and the expiration of fast track authority in July 2007; others, discussed with important trading partners, have not yet come before Congress. Consistent with this finding, Figure VIII.2 shows several spikes in mentions of TAA during this period. Mentions jump again in the middle of 2011, coincident with Congressional discussions of free trade pacts with Colombia, South Korea, and Panama. At the time of this report, debate continues about whether the renewal of the TAA program will be packaged with the trade agreement legislation.

The correlation implied by Figure VIII.2 is rough and only suggestive. Even a strong correlation would not constitute proof that the TAA program made free trade possible. More generally, the counterfactual case of how trade policy would have evolved without TAA is unknown. Thus, this critical part of our calculations must be based on speculation. Our analysis considered a variety of assumptions about TAA’s contributions.

Figure VIII.2. Frequency of Mentions of “TAA” in Major Newspapers and Transcripts



Source: Nexis database search.

Notes: Data labels show dates when free trade agreements between the nations shown, and other legislation, were signed into law. DR-CA-US refers to the Dominican Republic—Central America—U.S. free trade agreement. ARRA is the American Reinvestment and Recovery Act.

C. The Effect of Trade Policy on Trade Share

To determine how these policies actually affected the volume of trade, we would ideally wish to know how a given type of liberalization—say, a reduction in tariffs—affects the overall U.S. trade share. One such investigation by the Congressional Budget Office (2003) examines the effect of NAFTA on the U.S. trade share with Mexico in each year from 1993 to 2001, using macroeconomic data to model annual imports to and exports from the U.S. The effects range from 3 percent in 1993 to 23 percent in 2001, similar in size to the effects found in other studies.

Using these estimates in our analysis has three drawbacks. First, the estimates do not refer to the overall trade share but to the share of trade with Mexico. Second, the estimates relate to the particular set of liberalization policies embodied by NAFTA, which may not be comparable to other types of trade policy changes. However, these drawbacks are not as serious as they may seem for a rough estimate. Mexico is one of the United States' largest trading partners; at the start of NAFTA, it was the third largest market for U.S. exports (8.8 percent of all U.S. exports) and the third largest supplier of U.S. imports. Furthermore, since we are interested in the effect of TAA on all subsequent trade liberalization, which involves changes in many types of policy instruments, we do not necessarily want a measure based on a specific type of instrument. A third important drawback is that since the period post-NAFTA was one of unusual growth in trade, these estimates are both likely to overstate the impact of typical trade policies on trade share. However, we used both the lower and upper bound of the range of estimates found to construct high and low estimates of the trade-related benefits of TAA.

D. Estimation of the Benefits of TAA Due to Trade

We applied these results to our estimate of the benefits of the 2002 TAA program through more open trade using the formula described above, which decomposes the total effect of TAA on income per capita into its effect on trade share and the effect of trade share on income. This expression gives the benefit of TAA in a given year. To measure the total benefit of TAA analogously to the other benefits and costs in our analysis, we considered the benefit to society per TAA participant. Thus, we summed the effect above over the entire U.S. population and divide by the number of TAA participants. A complication is that if some of these benefits of trade persist into the following year, even if the TAA program is repealed, then the overall benefit of TAA should be calculated as the present value of the stream of benefits accruing in all future years. The net benefits of the TAA program would be considerably higher if we allowed TAA's effects on the benefits of trade to accrue over time. If we assumed the entire benefit persists into infinity, it is clear that this benefit would overwhelm any costs of the TAA program in a given year. We made the conservative assumption that the entire benefit was realized in the given year, although we also discuss alternative scenarios.

We estimated this benefit using the two methods described above. First, we computed the effect of TAA on income per capita as the product of three components: the effect of TAA on trade policy, the effect of trade policy on trade share, and the effect of trade share on income per capita. Using the following additional assumptions, we estimated the upper and lower bounds of the gain from trade due to TAA:

- **High estimate.** TAA is necessary for trade liberalization that will occur in a given year (effect of TAA on trade policy=1), liberalizing a given trade policy increases trade share by 23 percent, and a one percentage point increase in trade share increases income per capita by

0.4 percent. This estimate is included for comparative purposes but is not seriously plausible.

- **Low estimate.** TAA accounts for 1 percent of any trade liberalization, liberalizing a given trade policy increases trade share by 3 percent, and a one percentage point increase in trade share increases income per capita by 0.3 percent.

Second, we estimated the benefit by computing the effect of TAA on income per capita as the product of two components: the effect of TAA on the trade share and the effect of the trade share on income per capita. This estimate falls between those above:

- **Moderate estimate.** TAA increases the trade share by 0.5 percentage points, and a one percentage point increase in trade share increases income per capita by 0.4 percent.

With a U.S. population of 275,423,000, income per capita of about \$33,000, trade share of 29 percent (from the Penn World Table), and 60,000 TAA participants in 2000, the high, moderate, and low estimates of the trade-related benefit of TAA in 2000 were about \$4,042,000, \$303,000, and \$4,000 per participant. The high and moderate estimates led to positive net present values of benefits of TAA (\$3,988,198 and \$249,198, respectively). However, since TAA program costs were high and other net benefits are negative, the low estimate did not (the net present value of benefits is -\$49,802 under this scenario, or -\$23,494 using the exhaustee sample). In fact, assuming the low estimate of gains from trade, the TAA program would have to realize the \$4,000 gain per participant annually for between 17 and 18 years to break even (between 6 and 7 years using the exhaustee sample). Thus, whether the benefits of free trade make the 2002 TAA program cost-effective depends on the key parameters above; in particular, the extent to which TAA accounts for any trade liberalization.

Another way to think about this is to determine the effect of TAA on trade liberalization that would make the 2002 TAA program break even and then consider its plausibility. Table VIII.1 shows the size of these effects using various combinations of assumptions about the other parameter values in the first method above. The table indicates that if TAA accounted for 1 to 15 percent of any trade liberalization, the program’s benefits would offset its costs. In other words, TAA would need to make 1 to 15 percent of the value of free trade agreements possible.

Thus, while our analysis cannot say definitively whether the benefits of free trade make the 2002 TAA program cost-effective, it appears that if TAA made a relatively modest contribution to the ease of enacting free trade policies, the program’s total benefits could outweigh its costs. However, given the empirical and conceptual difficulties in measuring the benefits of trade, we caution readers about placing too much weight on these findings.

Table VIII.1: Minimum Effects of TAA on Trade Policy That Make the Program Cost- Effective

Effect of Trade Policy on Trade Share	Effect of Trade Share on Income per Capita	
	0.3%	0.4%
3%	15%	11%
23%	2%	1%

Source: Author’s calculations.

Notes: The table shows the percentage of trade liberalization that can be attributed to TAA.

TAA = Trade Adjustment Assistance.

IX. CONCLUSIONS

The most important finding of the benefit-cost analysis is that without considering the benefits of TAA stemming from the possibility that it promotes free trade, the *net benefit to society* of the TAA program as it operated under the 2002 amendments was negative \$53,802 per participant. The main reason for the negative net benefits was that participants had lower earnings than comparison group members. Our other key results are as follows:

- The *net benefit to TAA participants* was negative \$26,837, roughly 50 percent of the net benefit to society. Participants incurred costs through earnings that were lower than they would have been in the absence of the program. On average, for the primary analysis sample of UI claimants, TAA participants earned \$25,325 less than the comparison group during the first two years after job loss, when many were enrolled in training, and continued to lag behind the comparison group for the next two years. Their benefits of reduced tax bills and increases in their receipt of UI and TRA were not enough to exceed the costs of their lower earnings.
- The *net benefit to the rest of society* was negative \$26,965. Just over half of this amount came from program costs, while the rest was due to negative net benefits including the cost of training and reemployment services for TAA participants.
- The negative *net benefits to society* were smaller (-\$27,494) when we used an alternative sample—the “UI exhaustee” sample—that compared the benefits and costs of TAA participants with comparison group members who exhausted their UI benefits. We view this specification as representing an upper-bound estimate of the effects of TAA on employment and earnings, and hence of the net benefits to society from the change in output, because it assumes that the decision to exhaust UI is not influenced by the availability of training, TRA, and other TAA services.
- The net benefit of TAA was negative for all service and age subgroups. However, the net benefits in absolute value were smaller for older workers and for participants who only received TRA payments because these groups experienced a smaller earnings loss and also cost the program less in terms of their training.
- Projecting into the future, under the assumptions used in the analysis, the 2002 TAA participants would have to earn at least \$2,124 per year more than the comparison group from year five (after job loss) until retirement for the program to provide positive benefits to them. Compared to just UI exhaustees, the TAA participants would have to make \$757 more per year for the same time period to realize benefits from the program.
- The negative net benefits were robust to a wide range of assumptions. However, these calculations do not include the potentially large benefits of the TAA program in making free trade politically feasible. Incorporating estimates of the trade-related benefit of TAA has a substantial effect on the program’s net benefits, with the magnitude of the effect depending on the parameters used and, in particular, the extent to which TAA accounts for trade liberalization. However, if TAA made even a relatively modest contribution to the ease of enacting free trade policies, the program’s total benefits would outweigh its costs.

There are several important caveats to these findings. First, because many TAA participants enroll in training programs for a considerable amount of time, the four-year follow-up period may not be long enough to evaluate the full returns of the TAA program on labor market activity. Furthermore, TAA trainees completed their training and re-entered the labor market when the nation's economy was mired in severe economic recession, whereas the comparison group—who spent considerably less time in training—were more likely to have returned to the labor market before economic conditions deteriorated. Thus, longer follow-up may be necessary to account for all the benefits of TAA.

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APPENDIX A

Table A.1. Hourly Employer Costs for Manufacturing Workers in December 2003, by Type of Worker (In Dollars Except Where Noted)

	Type of Manufacturing Worker			
	All Workers	White Collar	Blue Collar	Service
Adjusted Wages and Salaries^a	20.92	29.05	17.24	13.59
Wages and Salaries	17.73	24.73	14.56	11.89
Paid Leave	2.00	3.05	1.52	1.09
Supplemental Pay	1.19	1.27	1.16	0.61
Cost of Other Fringe Benefits				
Health Insurance	2.37	2.78	2.19	1.91
Retirement and Savings	0.96	1.35	0.78	0.59
Legally Required Benefits	2.24	2.56	2.10	1.47
Other Benefits	0.10	0.15	0.07	0.07
Total	5.67	6.84	5.14	4.04
Percentage of Adjusted Wages and Salaries				
Health Insurance	11.3	9.6	12.7	14.1
Retirement and Savings	4.6	4.6	4.5	4.3
Legally Required Benefits	10.7	8.8	12.2	10.8
Other Benefits	0.5	0.5	0.4	29.7
Total Percentage	26.6	35.9	22.4	17.6

Source: U.S. Department of Labor, Bureau of Labor Statistics. (Last modified February 2004). <http://www.bls.gov/news.release/ecec.t12.htm>.

^aAdjusted for paid leave and overtime, shift pay, bonuses, and lump-sum payments.

Table A.2: Benefits from the Increased Output of TAA Participants, by Quarter After Job Loss (2006 Dollars)

Quarter After Job Loss	Average Earnings of TAA Participants	Average Earnings of Comparison Group	Estimated Impact on Earnings	Estimated Impact on Compensation	Estimated Impact on Taxes	Net Impact on Output
1	2,694	3,542	-849***	-1,036***	-115***	-921
2	1,670	3,626	-1,956***	-2,386***	-156***	-2,230
3	1,409	4,831	-3,422***	-4,175***	-233***	-3,942
4	1,814	4,708	-2,894***	-3,531***	-304***	-3,227
5	1,828	4,751	-2,923***	-3,566***	-376***	-3,190
6	2,009	4,614	-2,606***	-3,179***	-398***	-2,781
7	2,271	4,837	-2,566***	-3,131***	-390***	-2,741
8	2,605	4,708	-2,102***	-2,564***	-374***	-2,190
9	2,710	4,412	-1,702***	-2,076***	-410***	-1,666
10	2,933	4,485	-1,552***	-1,893***	-397***	-1,496
11	2,996	4,734	-1,738***	-2,120***	-386***	-1,734
12	3,229	4,578	-1,349***	-1,646***	-394***	-1,252
13	3,391	4,522	-1,131***	-1,380***	-376***	-1,004
14	3,333	4,475	-1,142***	-1,393***	-376***	-1,017
15	3,405	4,856	-1,450***	-1,769***	-432***	-1,337
16	3,382	5,361	-1,979***	-2,414***	-406***	-2,008

Source: Data on earnings were obtained from Mathematica Baseline and Follow-up Surveys and UI Wage Records. Data on the availability of fringe benefits for U.S. blue collar manufacturing workers were obtained from Bureau of Labor Statistics (2004).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

Table A.3: Benefits from the Increased Output of TAA Participants for UI Exhaustee Sample, by Quarter After Job Loss (2006 Dollars)

Quarter After Job Loss	Average Earnings of TAA Participants	Average Earnings of Comparison Group	Estimated Impact on Earnings	Estimated Impact on Compensation
1	237	841	-604***	-736***
2	335	1,804	-1,469***	-1,792***
3	604	2,725	-2,121***	-2,588***
4	1,161	3,435	-2,274***	-2,774***
5	1,756	3,767	-2,011***	-2,454***
6	2,307	3,925	-1,618***	-1,973***
7	2,649	3,935	-1,287***	-1,570***
8	2,903	3,982	-1,080***	-1,317***
9	3,149	4,012	-863***	-1,053***
10	3,316	4,091	-775*	-9468
11	3,515	4,011	-496	-605
12	3,684	3,888	-204	-249
13	3,812	3,835	-23	-28
14	3,809	3,842	-33	-40
15	3,859	3,763	95	116
16	3,896	3,820	77	93

Source: Data on earnings were obtained from the Mathematica TAA Baseline and Follow-up Surveys. Data on the availability of fringe benefits for U.S. blue collar manufacturing workers were obtained from Bureau of Labor Statistics (2004).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance. UI = Unemployment Insurance.

Table A.4: Impacts on Taxes for UI Exhaustee Sample, by Quarter After Job Loss (2006 Dollars)

Quarter After Job Loss	Taxes Paid by Treatment Group	Taxes Paid by Comparison Group	Estimated Impact on Taxes Paid
1	154	432	-277***
2	66	397	-331***
3	124	259	-136**
4	194	335	-142**
5	198	357	-160**
6	229	378	-150**
7	264	445	-181***
8	256	432	-176***
9	238	499	-261***
10	244	518	-273***
11	275	509	-234***
12	340	560	-220***
13	440	675	-235***
14	466	804	-339***
15	596	856	-260***
16	407	563	-157*

Source: Data on earnings were obtained from the Mathematica TAA Baseline and Follow-up Surveys. Data on UI receipt were obtained from state UI Administrative Data. Taxes paid were simulated.

Notes: The taxes computed included payroll taxes, federal excise taxes, state and local taxes, and federal income taxes. Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance. UI = Unemployment Insurance.

Table A.5: Benefits from Decreased Use of Reemployment Services Not Funded by TAA for UI Exhaustee Sample

Type of Service	Impact on Receipt of Service Funded by Any Source (Percentage)	Social Cost (2006 Dollars) ^a	Discounted Benefit to Society (2006 Dollars)
Core Services	7***	1,829	-214
Intensive Services	28***	2,560	-661
Total			-875

Source: Mathematica TAA Baseline and Follow-up Surveys. Cost estimates are from Borden (2002).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design.

^aCosts are deflated based on the average period of participation in TAA among sample members.

*/**/*** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance. UI = Unemployment Insurance.

Table A.6: Benefits from Decreases in the Receipt of Unemployment Insurance for UI Exhaustee Sample (2006 Dollars)

Quarter After Job Loss	UI Received by TAA Participants	UI Received by Comparison Group	Estimated Impact on UI Receipt	Estimated Impact on UI Outlays
Trigger quarter	1,835	2,217	-382	-443
1	3,140	3,509	-369*	-428*
2	2,156	2,394	-238	-276
3	548	508	40	46
4	583	178	406***	471***
5	831	436	395***	458***
6	446	262	184**	214**
7	244	304	-60	-69
8	271	257	14	17
9	305	365	-60	-70
10	347	445	-98	-113
11	322	454	-131	-152
12	311	406	-95	-110
13	282	648	-365	-424
14	295	367	-72	-84
15	317	354	-37	-43
16	284	293	-9	-10

Source: Data on UI receipt were obtained from state UI Administrative Data. Data on UI administrative costs as a percentage of benefits received were obtained from U.S. House of Representatives (2000).

Notes: Treatment group weights account for sample design and nonresponse, and comparison group weights are constructed using a kernel matching algorithm. Comparison group means and impacts are regression adjusted. Standard errors account for the two-stage sampling design. The sample is restricted to individuals who completed the second follow-up survey for whom UI administrative data provide complete information for all quarters.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance. UI = Unemployment Insurance.

Table A.7: Costs of TRA Payments (2006 Dollars)

Quarter After Job Loss	TRA Payments Received by TAA Participants
Trigger quarter	35
1	111
2	759
3	1,828
4	1,522
5	831
6	705
7	685
8	502
9	270
10	183
11	132
12	77
13	34
14	24
15	13
16	6

Source: TRA Administrative Data.

Notes: Treatment group weights account for sample design and nonresponse. The sample is restricted to individuals who completed the second follow-up survey for whom TRA administrative data provide complete information for all quarters.

*/**/** Impact of TAA is significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

TAA = Trade Adjustment Assistance.

Table A.8: Average Discounted Costs Per TAA Participant for UI Exhaustee Sample (2006 Dollars)

Component	Perspective		
	Society	TAA Participants	Rest of Society
TRA Payments	1,210	-7,562	8,772
TAA Training and Allowances	6,050	0	6,050
ATAA Wage Supplement	0	-24	24
HCTC Tax Credits	0	-56	56
Administrative Costs	1,108	0	1,108
Total	8,368	- 7,642	16,010

Source: Data on TRA payments were obtained from TRA Administrative Data. Data on training and allowance payments and administrative costs were obtained from state Standard Form 269 data. Data on ATAA and HCTC payments were obtained from Mathematica TAA Baseline and Follow-Up Surveys. HCTC payments were simulated for HCTC recipients who did not report payment amounts.

TAA = Trade Adjustment Assistance. UI = Unemployment Insurance.

Table A.9: Average Discounted Costs Per TAA Participant Using Survey Data to Estimate Training and Allowance Costs (2006 Dollars)

Component	Perspective		
	Society	TAA Participants	Rest of Society
TRA Payments	1,195	-7,472	8,667
TAA Training	4,699	0	4,699
Allowances	0	-86	86
ATAA Wage Supplement	0	-103	103
HCTC Tax Credits	0	-33	33
Administrative Costs	1,105	0	1,105
Total	6,999	- 7,694	14,693

Source: Data on TRA payments were obtained from TRA Administrative Data. Data on training, allowance, ATAA, and HCTC payments were obtained from Mathematica TAA Baseline and Follow-Up Surveys. HCTC payments were simulated for HCTC recipients who did not report payment amounts.

TAA = Trade Adjustment Assistance.

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