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**Hypothetical Analysis of
the Net Benefits of
Increasing Employment
of People with Disabilities
in Connecticut, 2006**

Final Report

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All statements and findings presented in this report are the sole responsibility of the authors and should not be interpreted as representing the views of any federal or state agency.

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EXECUTIVE SUMMARY

Over the past several years, the State of Connecticut has demonstrated a strong commitment to increasing the employment of people with disabilities through a variety of initiatives. In 2000, Connecticut implemented a Medicaid Buy-In program, which provides coverage to working people with disabilities who, because of their income and assets, would not otherwise qualify for Medicaid coverage. In 2006, Connecticut launched a strategic plan, called the *Connect-Ability* initiative, that seeks to remove barriers to employment for people with disabilities and focuses on five broad areas: (1) school-to-work transition; (2) stakeholder education; (3) job recruitment and retention; (4) transportation; and (5) technical assistance. In supporting the *Connect-Ability* initiative, policymakers may want to assess the effectiveness of specific program interventions and initiatives that seek to increase the employment of people with disabilities.

This report, prepared by Mathematica Policy Research (MPR) under contract to the University of Connecticut Health Center (UCHC), is a first step toward understanding the benefits and costs of increasing the employment of people with disabilities. It presents a literature review of previous cost-benefit studies and summarizes the potential costs and benefits of increasing the employment of people with disabilities from the perspectives of the individual, government, and society as a whole. Information obtained from this review was then used to develop a general framework, construct a model, and identify parameter assumptions needed for a hypothetical analysis of the net benefits of increasing the employment of people with disabilities. The report also includes preliminary estimates of the net benefits of increasing employment, using aggregate statistics and earnings data from the Connecticut Vocational Rehabilitation (VR) program in 2006 as a hypothetical example.¹ The report concludes with a summary of policy implications and next steps.

A key strength of the hypothetical analysis is the flexibility of the model to reflect parameter changes over time and to illustrate the effect of different assumptions on net benefits. Another strength is that the general framework and model can be applied to other programs or services that support the employment of people with disabilities. However, the analysis of net benefits relied on multiple assumptions because data on individual-level earnings and a comparison group were not available. Thus, the findings should be interpreted with caution. Key findings from this report are summarized below.

KEY FINDINGS

Literature Review

- *Differences in target populations contribute to variations in program impacts and net benefits.* Because SSA beneficiaries have lower average earnings than non-

¹ The VR program is a state-federal initiative to assist individuals with disabilities in achieving successful employment in integrated settings. During 2006, Connecticut's Bureau of Rehabilitation Services (BRS) had 2,049 closed cases, 1,258 of whom had a successful employment outcome (RSA 2006).

beneficiaries, program interventions with only SSA beneficiaries have had modest impacts on earnings. Earlier interventions that focus on people with disabilities before they become SSA beneficiaries are likely to yield higher net benefits.

- ***A comparison group or alternative program is an essential design feature in a rigorous cost-benefit study.*** Studies without a comparison group or alternative program incorrectly assume that any change in earnings is only attributable to the intervention itself. As a result, the absence of a comparison program results in higher, biased estimates of net benefits.
- ***Results were presented from multiple stakeholder perspectives*** – including that of society, individuals, employers, and government. However, the net benefit to society is used as the standard measure for evaluating a program’s effectiveness.²
- ***The wide range of estimated cost-benefit ratios from these studies is due to differences in key study assumptions.*** Studies with longer timeframes (10 years or more), future growth projections, and lower discount rates were likely to report very high cost-benefit ratio estimates.
- ***Some studies that examined the impact of employment support services for people with disabilities had an unfavorable (<1.0) cost-benefit ratio.*** This result was more likely to occur in studies that had shorter timeframes (two years or less) and estimated impacts that were limited in size or duration.

Target Populations and Hypothetical Analysis

- ***In 2006, there were an estimated 217,000 non-institutionalized persons with disabilities ages 21 to 64 in Connecticut.*** Within this group, an estimated 92,000 individuals (42 percent) were employed, a rate similar to the national employment rate (38 percent) of persons with disabilities.
- ***13,000 people with disabilities in Connecticut were “not working but actively seeking work,” in 2006.*** This represents a core group of people who might benefit from programs to increase employment.
- ***Policymakers can target different populations to increase the employment of people with disabilities.*** We examined net benefits in three target populations: (1) SSI recipients only, (2) SSDI recipients only, and (3) a mix of SSA and non-beneficiaries. Net benefits in the hypothetical analysis are higher when non-beneficiaries are included in the target population, but these findings might differ if actual, rather than hypothetical, impacts are used to estimate net benefits.

² While the net benefit to society is the most policy-relevant measure, it is useful to separate net benefits for individuals and the government because some elements perceived as a cost by individuals (such as more taxes paid) may represent a benefit to government (more tax revenues). Similarly, an increase in public assistance payments represents a transfer of funds from taxpayers (cost) to individual participants (benefits).

- *Medium-run impacts (Years 1 to 4) from the hypothetical analysis produced a range of cost-benefit ratios from 1.1 to 2.4, depending on the target population.* This result suggests that the VR program breaks even after about 3 years. Short-run impacts in Year 1 were less than 1.0 for all three target populations.

IMPLICATIONS AND NEXT STEPS

Employment is an important step on the pathway to self-sufficiency. As the *Connect-Ability* initiative continues to implement its strategic plan to reduce barriers to employment, the measurement of net benefits to society will be a key step in communicating the effect of increased employment to policymakers and stakeholders. We developed preliminary estimates of the net benefits of increasing the employment of people with disabilities, using the VR program as a baseline model for the hypothetical analysis. Future research using individual-level data and comparison groups designed to rigorously measure program impacts could greatly enhance the precision and reliability of estimates.

Cost-benefit analyses vary both in their study design and in the assumptions they make. Without a comparison group or alternative program, estimates of net benefits are likely to be biased upwards. Although studies with an experimental design provide the most rigorous estimates, studies with non-experimental designs provide valuable information on which aspects of program interventions, such as job placement and support services, improve the likelihood of attaining competitive employment outcomes (Bolton et al., 2000; Chan et al, 2006). Additional research on the outcomes of different program interventions can improve our understanding of how effectively programs support and increase the employment of people with disabilities.

One policy implication for the VR program and the *Connect-Ability* initiative is that targeting resources to non-beneficiaries is likely to yield a higher return with regard to increased employment and higher earnings. Similarly, early interventions that target people with disabilities before they become SSA beneficiaries are likely to yield substantial benefits. Finally, a number of studies have shown that younger people with disabilities are likely to have higher earnings than older participants, other things being equal (Gimm et al. 2008). Therefore, focusing on key sub-groups such as young adults may result in greater long-term impacts on net benefits than focusing on older adults with disabilities who are nearing retirement.

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I. INTRODUCTION

A. POLICY CONTEXT

During the past several decades, the U.S. has experienced a movement toward greater inclusion of people with disabilities in mainstream society. The 1990 Americans with Disabilities Act (ADA) was passed to help provide equal opportunity and access to employment for people with disabilities. Despite the passage of the ADA, the employment rates of working-age people with disabilities as a group have continued to decline and remain low relative to their counterparts without disabilities (Stapleton and Burkhauser, 2003).

Over the past several years, the State of Connecticut has demonstrated a strong commitment to promoting the employment and independence of people with disabilities through a variety of initiatives. The Bureau of Rehabilitation Services (BRS), which operates the public vocational rehabilitation program, leads these efforts by sponsoring research, policy discussions, and disability program development. BRS also coordinates activities related to several major federal grants and collaborates with other state agencies for which improving the employment of people with disabilities is a shared goal. These interagency efforts have improved access to personal assistance services for people with disabilities and facilitated the exchange of information on employment supports, public health insurance, and public assistance programs.

BRS has implemented several initiatives to promote the employment of people with disabilities. In 2000, Connecticut implemented a Medicaid Buy-In program, which provides coverage to working people with disabilities who, because of their income and assets, would not otherwise qualify for Medicaid coverage. To better understand the current state of employment issues facing people with disabilities, BRS conducted focus groups to identify key barriers to employment, which were inadequate transportation, access to personal assistance, and service coordination provided by state agencies. BRS is also developing a data tracking system to consolidate information from multiple sources.³ This data tracking effort will provide a useful resource for future programs to support the employment of people with disabilities. In 2006, BRS funded staff from the University of Connecticut Health Center (UCHC) to conduct a comprehensive Medicaid Infrastructure Grant (MIG) needs assessment (Robison et al., 2006). Findings from the needs assessment were used to develop a strategic plan aimed at improving the employment of Connecticut residents with disabilities.

This strategic plan, called the *Connect-Ability* initiative, seeks to remove barriers to employment for people with disabilities and focuses on five broad areas: (1) school-to-work transition; (2) stakeholder education; (3) job recruitment and retention; (4) transportation; and (5) technical assistance. The *Connect-Ability* initiative does not provide direct services to connect

³ Sources include Medicaid administrative databases, the Mental Retardation Information System, the Benefits Planning Outreach and Assistance database, the Ticket to Work database, Unemployment Insurance quarterly earnings records, BRS administrative data, and the Social Security Benefit Offset Demonstration.

individuals with jobs, as that is the function of the public vocational rehabilitation program through BRS.⁴ Instead, the initiative is focused on system change.

B. PURPOSE OF THE REPORT

In supporting the *Connect-Ability* initiative, policymakers may want to assess the effectiveness of specific program interventions and initiatives that seek to increase the employment of people with disabilities. As a first step toward understanding the costs and benefits of increasing the employment of people with disabilities, the purpose of this report is to:

- Assess the potential costs and benefits of increasing the employment of working-age people with disabilities in Connecticut,
- Provide a general framework for evaluating the costs and benefits of increasing employment and present estimates of net societal benefits, using aggregated statistics from readily available data sources, and
- Examine how differences in target populations may affect net societal benefits, using the Connecticut Vocational Rehabilitation (VR) program⁵ as a hypothetical example.

The subsequent chapters of this report are organized as follows. In Chapter II, we present key findings from our literature review of previous cost-benefit analyses that have focused on the employment of people with disabilities. The information from this review was used to develop a framework, construct a model, and identify parameters and assumptions needed to conduct the hypothetical analysis presented in subsequent chapters. A cost-benefit analysis requires identifying all possible benefits and costs of a program intervention and placing a dollar value on as many of them as possible. In this chapter, we discuss specific quantifiable benefits and costs used in previous studies as well as qualitative benefits and costs that were difficult to estimate due to data limitations.

In Chapter III, we summarize the general cost-benefit framework, methods, data sources, and model assumptions for estimating net benefits. In Chapter IV, we present our estimates of the hypothetical net benefits of increasing employment in three target populations with disabilities in Connecticut, using assumptions derived from aggregate data on VR closed cases in fiscal year 2006. We conclude in Chapter V with a summary of key findings and implications for future evaluation of program initiatives.

⁴ Connecticut Department of Social Services, "DSS Launches Groundbreaking Initiative To Link People With Disabilities, Employers," Issue Brief #2, October 2007; see (<http://www.connect-ability.com>) for more information on the Connect-Ability initiative.

⁵ The VR program is a state-federal program to assist individuals with disabilities in achieving successful employment in integrated settings. During fiscal year 2006, Connecticut's BRS had 2,049 closed cases, 1,258 of whom had a successful employment outcome (RSA 2006).

II. LITERATURE REVIEW

This chapter provides an overview of prior studies that examined the costs and benefits of increasing the employment of people with disabilities. Studies in the literature include quantitative cost-benefit analyses, qualitative articles that discuss potential costs and benefits, and methodological papers that address the steps and limitations of cost-benefit analyses. Our review included studies with the following designs: (1) experimental designs with a control group, (2) non-experimental designs with actual costs and benefits, (3) non-experimental designs with projected costs and benefits, and (4) descriptive studies. Several states, including Minnesota, New York, Illinois, Florida, Washington, and Massachusetts, have conducted quantitative cost-benefit analyses of specific programs that seek to increase the employment of people with disabilities within their borders, in each case using non-experimental designs.

After discussing the purpose of conducting a cost-benefit analysis, we summarize the main findings and different methods used in previous studies. We then discuss how different assumptions can lead to a wide variation in the range of estimates. Finally, we conclude with a summary of cross-cutting issues evident from these studies.

A. PURPOSE OF COST-BENEFIT ANALYSIS

The overall purpose of a cost-benefit analysis is to answer the question of whether funding a particular program will ultimately increase the aggregate value of social resources, as compared to using these funds for a different program or purpose (Lewis et al. 1992). A cost-benefit analysis involves identifying all possible benefits and costs of a program intervention and placing a dollar value on as many of them as possible. A standard outcome measure is the cost-benefit ratio, which is defined as the present value of quantified benefits to society divided by the present value of program costs. A cost-benefit ratio of 1.0 indicates a break-even level of cost neutrality, such that a program's benefits to society exactly offset the program's costs. A ratio greater than 1.0 indicates that a program has positive net benefits to society that exceed the program's cost. Conversely, a cost-benefit ratio less than 1.0 indicates that a program has negative net benefits, with total benefits to society falling short of program costs.

B. FINDINGS FROM PREVIOUS STUDIES

Research on the effectiveness of VR programs has traditionally not used a randomized experimental design, which is considered the gold standard for evaluations (Pruett et al, 2008). However, evidence from non-experimental studies has shown that job placement and support services significantly increase the likelihood of competitive employment (Bolton et al., 2000; Chan et al., 2006). In 2002, RSA conducted a survey, using a random sample of 8,500 VR clients nationwide, who indicated that VR services had helped them become employed (61 percent) and they obtained the job they wanted as a result of VR services (63 percent). Given the evidence of positive impacts associated with programs that increase the employment of people with disabilities, we examined the potential costs and benefits of such programs.

Our review focused on quantifiable cost-benefit analyses from the disability and vocational rehabilitation literature (see Appendix A). We identified 16 studies that focused on programs to increase the employment of people with disabilities. These studies reported a very wide range of cost-benefit ratio estimates—from a low of 0.1 to a high of 121.5. These differences are due to variations in program interventions, evaluation designs, and assumptions. A study's timeframe, growth projections, and discount rates can influence the size and duration of impacts. Longer timeframes, straight-line growth projections, and lower discount rates tend to yield higher ratios, because these factors assume a longer duration of positive benefits.

Because of the wide range of estimates resulting from variations in assumptions, Thornton (1992), Rogers (1997), and others have cautioned against directly comparing cost-benefit estimates across studies without considering the assumptions and methodology used in each study. For example, studies that rely on future projections of earnings tend to have longer timeframes and higher cost-benefit ratios than studies that use directly observable participant data. Rigorous cost-benefit studies do not rely on future projections. Despite the challenge of making cross-study comparisons, Appendix A presents a brief summary of the studies, which we reviewed and classified into four general categories:

- experimental studies with random assignment
- non-experimental studies that use actual costs and benefits
- non-experimental studies that use projected costs and benefits
- descriptive studies that explain how to conduct a cost-benefit analysis

In the four experimental studies⁶ that examined impacts on SSA beneficiaries, the range of cost-benefit ratios was narrow, from 0.1 to just above 1.0. Two of these analyses looked at the outcomes of employment support programs for young people with mental retardation, and assessed net benefits over a 22-month and 6-year period, respectively. The remaining two studies had a broad population of SSI and SSDI beneficiaries with various disabling conditions. Findings from these experimental studies indicated that overall net social benefits of two programs with intensive job training and support were positive. However, the net social benefits of the other two programs were negative due to the tapering of earning impacts in Year 3.

Studies built on experimental designs provide the most rigorous estimates of program impacts, but such studies are difficult and expensive to implement. Many researchers have therefore turned to non-experimental studies, which are less difficult to implement, but tend to produce higher, biased estimates.⁷ Among the non-experimental studies that did not rely on

⁶ For a detailed description of the SSA and DOL employment support interventions, please refer to Wittenburg et al. (forthcoming in 2008) and Rangarajan et al. (2008).

⁷ The reason for higher estimates in a non-experimental study is that the amount participants would have earned in the absence of the program is unknown. Therefore, the default assumption is that any change in earnings is attributed solely to the program intervention. Some non-experimental studies try to address this problem, however, by using a comparison group.

growth projections, the study timeframes were much shorter and sample sizes were smaller than among the group of non-experimental studies that used projections to estimate future costs and benefits. Cost-benefit ratios among the studies that did not rely on growth projections ranged from 0.6 to 4.0, and the study timeframes ranged from one year to just under eight years (94 months). Most of these studies had very specific populations, such as consumers of supported employment services, or consumers with mental retardation or severe mental illness. The sample sizes in these studies ranged from 13 to 1,250 participants.

In contrast, the timeframes of the three non-experimental studies that used growth projections to estimate costs and benefits were much longer, ranging from 27.5 to 30 years. Correspondingly, the cost-benefit ratio estimates of these studies were much higher, from 3.2 to 121.5. Each of these three studies was conducted by a specific state to evaluate its vocational programs, which included a broad population of consumers. In addition, the sample size of these studies was very large, ranging from 29,475 to 35,000 participants. These findings should be interpreted with caution and skepticism due to the very long timeframe and use of growth projection assumptions.

C. METHODS USED IN PREVIOUS STUDIES

In addition to variations in study design, the cost-benefit analyses in our literature review used a variety of methods, including target populations, comparisons to alternative programs, timeframes, discount rates, and account frameworks that are included in the study's assumptions. (However, one aspect that all studies had in common was the use of individual-level data on the earnings of people with disabilities). We briefly describe these key methodological differences and their implications for estimated benefits.

- ***Target Populations.*** The cost-benefit studies in our review included populations with a limited number of disabling conditions, such as mental retardation, and others that were broadly defined over a diverse range of conditions among SSA beneficiaries. Estimated benefits were likely to vary depending on the range of disabling conditions in the sample. Furthermore, SSA beneficiaries have lower earnings on average than non-beneficiaries within the VR program (Stapleton and Erickson 2004) and the Medicaid Buy-In program (Gimm et al. 2008). This difference suggests that program interventions that target non-SSA beneficiaries may yield higher impacts on earnings and net benefits. Similarly, early interventions that focus on people with disabilities before they become SSA beneficiaries are likely to yield higher net benefits.
- ***Comparison to Alternative Programs.*** Most non-experimental studies conducted a cost-benefit analysis of a program intervention, often a supported employment program, vocational training, or sheltered workshop,⁸ and analyzed impacts relative

⁸ Supported Employment consists of providing on-the-job supports for an extended period of time (sometimes the duration of employment) in an integrated work setting where employees without disabilities perform similar or related work. In contrast, vocational rehabilitation programs involve training the individual in preparation for work, prior to securing competitive employment.

to an alternative program. Comparing program A versus program B allows for the deduction of benefits and costs that would have occurred in the absence of the program. Studies without a comparison program used other methods, such as comparing participant earnings before and after a program intervention (a method known as “pre-post” analysis), or forming a comparison group by statistically matching program participants with non-participants. In general, the absence of a comparison group or program in a study will result in higher estimates of net benefits, due to the strong assumption that all impacts are attributable to the program itself. Consequently, experimental studies tend to have lower estimates of net benefits due to the presence of a control group.

- ***Timeframe and Duration of Impact.*** Another key assumption is the timeframe or number of years for the study. About two-thirds of the studies in our review examined program costs and benefits only within the timeframe for which data was available, most often one to four years. Other studies assumed that costs and/or benefits would continue to have long-term impacts in the future. Generally, these latter studies had higher cost-benefit ratios than studies with observable program costs and benefits over a shorter period of time. Studies with longer timeframes (more than 10 years) tend to yield higher cost-benefit ratios than other studies, since most program costs (such as the cost of a vocational training program) are realized early in the process, whereas benefits (such as participant earnings) tend to increase over time.
- ***Discount Rate Used to Compute Present Value.*** Another key assumption is the method used to determine the present value of future benefits or costs. The discount rate is the rate at which future dollars are translated into current dollars to allow for an “apples to apples” comparison of dollars across different years. Future dollars must be ‘discounted’ because a dollar today is worth more than a dollar in the future. Most studies use a 3 percent, 5 percent, or 10 percent discount rate. The most common assumption in the studies we reviewed was a 5 percent discount rate. Several analyses used inflation factors based on the consumer price index to convert future dollars into present values.
- ***Allocation of Costs.*** Studies also varied in the method of allocating program costs to individual participants. Most studies used a “resource component approach” (described in Lewis et al. 1992) for evenly allocating overhead costs to participants, but allocated direct program costs and services more heavily to those who used more of the services or employment supports. Calculating program benefits using individual-level data was more straightforward. Participant earnings could be observed, and taxes paid or fringe benefits were estimated as a percent of earnings.⁹

⁹ Most studies used estimates based on U.S. Department of Labor publications showing the average effective tax rate of low-wage earners, as well as the average value of fringe benefits received by these workers. Studies in our review estimated fringe benefits to be 9 to 23 percent of gross income (with 15 percent being the most commonly-used figure). Similarly, the effective tax rate was estimated to be 14 to 25 percent of gross income, with 23 percent as the most prevalent rate.

D. POTENTIAL COSTS AND BENEFITS

Using an accounting framework, we present a list of potential costs and benefits of increasing the employment of people with disabilities for society as a whole and for various stakeholders (Table II.1). From the individual's perspective, benefits include increased earnings and access to employer-sponsored benefits; costs may include taxes on earnings, reduced eligibility for public benefits such as SSDI or SSI, and other work-related expenses such as commuting and child care provision.

From the government's perspective, costs may include higher expenditures related to policies and vocational training programs for people with disabilities, while benefits include higher tax revenues and reduced public assistance payments (Table II.1). Net benefits to society are equivalent to the sum of net benefits across all stakeholders, including the government and individuals. While some costs and benefits (such as earnings) are quantifiable using individual-level data, others are more difficult to quantify because of data limitations or the absence of objective measures. We also identify specific costs and benefits that were quantified in previous studies, and other costs and benefits that could not be easily quantified due to data limitations.

Another potential stakeholder perspective associated with the valuation of efforts to increase the employment of people with disabilities is that of the employer. None of the studies in our review quantified costs and benefits from the employer's perspective. This may be because net benefits to the employer are considered too small, are difficult to measure due to data limitations, or are already included within the societal perspective. Nevertheless, some studies did suggest particular elements that might be included in a cost-benefit analysis from the employer perspective (Needles and Schmitz 2006). Potential costs for an employer include additional resources spent on modifying the workplace and future litigation associated with the ADA. On the other hand, a key benefit to employers might be reduced staff turnover due to an inclusive workplace environment and greater morale. Furthermore, hiring people with disabilities may enhance a company's reputation within the community. Finally, some employers may receive tax credits for hiring persons with disabilities; however, evidence to date has shown that the use of employer tax credits has been limited (GAO 2002).¹⁰

Most studies in our review included a similar set of quantifiable costs and benefits, such as earnings, fringe benefits, and taxes paid. Some intangible costs and benefits were excluded, however, because they were too difficult to quantify due to data limitations or a lack of objective measures (Table II.1). Intangible benefits from the individual participant's perspective include enhanced job skills (human capital) for the participant, while intangible costs might include a reduction in the amount of leisure time available. Intangible benefits from the employer's perspective include access to a broader pool of qualified job applicants and a more diverse workplace environment (Needles and Schmitz 2006).

¹⁰ For example, the Work Opportunity Tax Credit (WOTC) is a federal tax credit for employers who hire targeted low-income groups, including workers with disabilities. In 2007, the WOTC provided a tax credit of 40 percent of the first \$6,000 paid to each eligible worker (U.S. Department of Labor, 2008). Two other federal provisions (The Small Business Tax Credit (IRC Section 44) and the Architectural and Transportation Tax Deduction (IRC Section 190)) provide tax credits or deductions to employers for the cost of modifying the workplace to make it accessible to employees with disabilities (Connecticut Department of Labor, 2008).

TABLE II.1

POTENTIAL COSTS AND BENEFITS OF EMPLOYMENT OF PEOPLE WITH DISABILITIES

Potential Costs	Potential Benefits
Individuals	
<ul style="list-style-type: none"> • Taxes on earnings • Reduced eligibility for public benefit programs • Foregone income during job training program • Work-related expenses (e.g., commuting, child care) • Work-related stress and negative impacts on physical and mental health • Reduced time available for leisure, health maintenance, dependent care, and household production 	<ul style="list-style-type: none"> • Increased earnings and income • Access to employer-sponsored benefits • Higher future Social Security benefits • Increased human capital (job-related and interpersonal experience, skills, and knowledge) • Increased self-esteem from greater independence, self-sufficiency, and social participation • Increased material well-being
Employers	
<ul style="list-style-type: none"> • Costs to accommodate persons with disabilities and fear of potential litigation associated with ADA • Higher premiums for employer-sponsored health insurance and disability benefits 	<ul style="list-style-type: none"> • Reduced search cost of filling vacancies due to access to a larger pool of qualified labor • Reduced employee turnover and higher morale due to a workplace culture of inclusion and accommodation
Government / Taxpayers	
<ul style="list-style-type: none"> • Increased costs of education and employment-related programs for people with disabilities • Increased costs of ADA enforcement as more people with disabilities experience workplace conflicts • Costs of reducing environmental and attitudinal barriers to participation by people with disabilities 	<ul style="list-style-type: none"> • Increased tax revenues • Reduced administrative and program expenditures related to SSDI and SSI payments • Reduced administrative and program expenditures related to other public programs (e.g., Medicaid)
Society	
<ul style="list-style-type: none"> • Net costs from above (not including transfers) 	<ul style="list-style-type: none"> • Net benefits from above (not including transfers) • Increased productivity and aggregate welfare

Note: None of the studies in our review explicitly specified costs and benefits from the employer's perspective. Costs and benefits appearing in boldface text were quantified and included in at least one of the studies in our review. Other costs and benefits were not quantified in the studies due to limitations in data availability or objective measures.

E. CROSS-CUTTING THEMES

Conducting a cost-benefit analysis requires the selection of an analytic design, comparison group or program, and multiple assumptions. Due to variations in these factors and program interventions, the range of cost-benefit estimates in the literature is broad, from moderately unfavorable (0.3) to favorable (121.5). However, any cost-benefit ratio that is greater than 1.0 indicates that a program intervention is effective from a societal perspective. Several themes emerged in our review that were consistent across studies:

- ***Differences in target populations contribute to variations in program impacts and net benefits.*** Because SSA beneficiaries have lower average earnings than non-beneficiaries, program interventions with only SSA beneficiaries have had modest impacts on earnings. Earlier interventions that focus on people with disabilities before they become SSA beneficiaries have not been rigorously tested, but are likely to yield higher net benefits.
- ***A comparison group or alternative program is an essential design feature in a rigorous cost-benefit study.*** Studies without a comparison group or alternative program incorrectly assume that any change in earnings is only attributable to the intervention itself. As a result, the absence of a comparison program results in higher, biased estimates of net benefits.
- ***Results were presented from multiple stakeholder perspectives—including that of society, individuals, employers, and government.*** However, the net benefit to society is used as the standard measure for evaluating a program's effectiveness¹¹
- ***The wide range of estimated cost-benefit ratios from these studies is due to differences in key study assumptions.*** Studies with longer timeframes (10 years or more), future growth projections, and lower discount rates were likely to report very high cost-benefit ratio estimates.
- ***Some studies that examined the impact of employment support services for people with disabilities had an unfavorable (<1.0) cost-benefit ratio.*** This result was more likely to occur in studies that had shorter timeframes (two years or less) and estimated impacts that were limited in size or duration.

While all potential costs and benefits are important to consider in an evaluation of a program's effectiveness, only quantifiable costs and benefits can be included in a cost-benefit ratio. Thus, in our model, which we describe in the next section, we only included quantifiable costs and benefits that could be estimated using aggregate data and available statistics. Furthermore, we included all quantifiable costs and benefits from three stakeholder perspectives:

¹¹ While the net benefit to society is the most policy-relevant measure, it is useful to separate net benefits for individuals and the government because some elements perceived as a cost by individuals (such as more taxes paid) may represent a benefit to government (more tax revenues). Similarly, an increase in public assistance payments represents a transfer of funds from taxpayers (cost) to individual participants (benefits).

the individual participant, the government, and society at large. Because of data limitations, we excluded monetary benefits and costs from the employer's perspective. This approach is consistent with previous studies.

III. METHODS AND DATA SOURCES

In this chapter, we describe the methods, data sources, and key assumptions used to derive our estimates of the net benefits of increasing the employment of people with disabilities in Connecticut. We used aggregate data from the VR program administered by Connecticut's BRS to estimate benefits and identify total program costs in fiscal year 2006. The VR program is a state-federal initiative to assist individuals with disabilities in achieving successful employment in integrated settings, through counseling, vocational training, personal assistance services, and job placement services. In FY 2006, the VR program nationwide assisted 205,796 persons with disabilities in achieving employment (RSA 2006).

Although VR clients represent a small subgroup of all persons with disabilities in the state of Connecticut, these participants include a mix of SSA beneficiaries (SSI or SSDI recipients) and non-beneficiaries (having neither SSI nor SSDI) at the time of application. Also, the VR program provides a baseline example for estimating potential net benefits, especially if VR clients have more severe mental or physical impairments, compared with the broader population of working-age people with disabilities in the state of Connecticut.

Our hypothetical analysis is based on a simulation model of Connecticut's VR program outcomes in FY2006, using assumptions based on the parameters we identified in our literature review. We did not include a comparison group or program alternative in our analysis because these data were not available. Therefore, our model assumes that people with closed cases would not have achieved competitive employment in the absence of the VR program. As noted in Chapter II, this strong assumption produces higher estimates of net benefits.

We excluded those qualitative benefits (such as increased self-esteem) and costs (such as work-related stress) noted in prior studies that could not be quantified using readily available data. Unlike a formal cost-benefit analysis, our hypothetical analysis does not use individual-level data, which would provide a more rigorous estimation than is possible with aggregate data. Since our analysis must therefore rely on strong assumptions and projections, these estimates of hypothetical net benefits should be interpreted with caution.

A. GENERAL FRAMEWORK

Our proposed framework includes potential benefits and costs from three key stakeholder perspectives: the individual participant, government, and society as a whole. As noted previously, other cost-benefit studies did not include an employer perspective because of data limitations, challenges with finding objective measures (for example, the value of workplace diversity), and because net benefits to employers are reflected within the societal perspective.

To illustrate the framework, we provide an example with fictional numbers (Table III.1). Society gains from the increased output in goods and services produced by workers with disabilities, as reflected in the earnings and fringe benefits of individuals. The Year 1 benefit to society from this increased output is measured by the sum of increased earnings and fringe benefits (\$1,150 per person). Taxes paid on earnings (\$250 per person) and the reduced use of

public assistance programs such as reduced SSDI or SSI benefits (\$750 per person across all years) constitute net transfers from individuals to the government. Because transfer payments shift funds from one stakeholder to another, they do not represent a net gain to society as a whole. However, reduced reliance on SSA payments is an important benefit to the government because individuals tend to remain on the SSDI or SSI rolls for many years once they become eligible.

TABLE III.1
GENERAL FRAMEWORK FOR THE ANALYSIS USING HYPOTHETICAL
VALUES FOR ILLUSTRATION PURPOSES

Benefits or Costs	Stakeholder Perspective		
	Society	Individual Participants	Other Taxpayers
Benefits From Increased Output (per person)			
Year 1			
Increased Earnings	\$1,000	\$1,000	\$0
Increased Fringe Benefits (15%)	150	150	0
Increased Taxes Paid (25%)	0	(250)	250
Years 2 to 4			
Increased Earnings	1,500	1,500	0
Increased Fringe Benefits (15%)	225	225	0
Increased Taxes Paid (25%)	0	(375)	375
Years 5 to 10			
Increased Earnings	2,500	2,500	0
Increased Fringe Benefits (15%)	375	375	0
Increased Taxes Paid (25%)	0	(625)	625
Total Benefits from Reduced Use of Programs and Services			
Reduced Use of SSDI/SSI public assistance	0	(750)	750
Reduced Use of All Other Services (Medicaid)	0	(300)	300
<i>Total Quantifiable Benefits</i>	\$5,750	\$3,450	\$2,300
Program Costs (per person)			
Direct Program Operating Costs	(4,000)	0	(4,000)
All Other Operating Costs	(500)	0	(500)
<i>Net Benefits</i>	\$1,250	\$3,450	(\$2,200)

This process of estimating benefits may be replicated into the future for Years 2 to 4 and Years 5 to 10. The sum of quantifiable benefits from a societal perspective is \$5,750 per person, which represents the break-even cost for a program. With an average program cost of \$4,500 per person, therefore, the program intervention would yield positive net social benefits of \$1,250 over a ten-year period.

B. DATA SOURCES

The first step in developing the model was to estimate the number of people with disabilities who might benefit from a program to improve employment. We identified a list of data sources that provide aggregated data and statistics on the number of working-age people with disabilities in Connecticut, the mean or median earnings among those who are employed, average SSI/SSDI transfer payments, and VR program expenditures (Appendix B). Information from these aggregate data sources was used to develop parameters for the model and assumptions for the simulation analysis.

We selected 2006 as the reference year for the simulation analysis because it provided the most recent data available across multiple data sources. To estimate the number of people who might benefit from future initiatives, we used data from the American Community Survey (ACS) to estimate the total number of people with disabilities in Connecticut. The ACS, a national survey administered by the Census Bureau, includes a broad definition of a disability based on six categories embedded within three survey questions.¹² If a person responds affirmatively to any of the six categories, that person is coded as having a disability (RRTC 2007).

We also obtained the number of SSI and SSDI beneficiaries in Connecticut, which allowed us to account for differences in earning growth rates and estimate the benefits of reducing public assistance payments for people who exit from the SSDI or SSI programs. The *Annual Statistical Report on the SSDI Program* in 2006 includes tables on the number of beneficiaries and average monthly payments by state. We used the *FY2006 Annual Review Report for Connecticut's Department of Social Services: Bureau of Rehabilitation Services*, produced by the Rehabilitation Services Administration (RSA), to obtain aggregate statistics on the number of VR cases closed with and without employment, average weekly hours worked, average hourly wage, total program costs, and data on SSA beneficiaries and non-beneficiaries. (RSA 2006).

The range and types of disabilities among individuals receiving VR services can vary widely and therefore result in different employment and earnings outcomes. For example, studies have found that SSA beneficiaries attain lower employment and earnings outcomes than other VR clients. This is likely due to a number of factors, including more severe disabilities, lower levels of education, and less work experience among SSA beneficiaries compared to non-beneficiaries.¹³ Individuals who qualify for SSA benefits have, on average, more severe conditions than non-beneficiaries because of the criteria SSA uses to determine disability status.

¹² Specifically, the survey contains these questions: “Q1) Does this person have any of the following long-lasting conditions: (a) blindness, deafness, or a severe vision or hearing impairment?; (b) a condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?; Q2) Because of a physical, mental, or emotional condition lasting six months or more, does this person have any difficulty with: (a) learning, remembering, or concentrating?; (b) dressing, bathing, or getting around inside the home?; Q3) Does this person have any difficulty with (a) going outside the home alone to shop or visit a doctor’s office?; (b) working at a job or business?”

¹³ Stapleton and Erickson (2004) found that SSA beneficiaries in the VR program had a lower employment rate (58.2 percent) at closure than non-beneficiaries (70.4 percent).

SSA defines a disability as the inability to engage in “substantial gainful activity” (SGA)¹⁴ by reason of a medically determinable physical or mental impairment that is expected to result in death or last for at least 12 months. Furthermore, SSA beneficiaries may face a work disincentive. SSDI beneficiaries can retain their income benefits indefinitely, as long as their monthly earnings remain below the SGA level and they continue to meet SSA’s medical eligibility criteria. But they lose their benefits if their monthly earnings exceed SGA levels after a nine-month trial work period. Another disincentive to earning above the SGA level is the possible loss of health insurance coverage for SSDI beneficiaries who are eligible for Medicare after a 24-month waiting period (Stapleton and Erickson 2004).

The distinction between a broad and a narrow definition of a disability is relevant since impacts on earnings may vary by subgroup. The ACS captures a broad count of people with disabilities (compared with data on SSA beneficiaries), because it asks individuals to self-report whether they have a disability, which is broadly defined as a physical, mental, or emotional condition lasting six months or more that could make it difficult to engage in activities such as walking, climbing stairs, dressing, bathing, learning, going outside the home alone, or working. By contrast, the SSA definition is based on a physical or mental impairment that impedes substantial gainful activity for at least 12 months. Since the ACS definition of a disability is broader than the SSA definition, the ACS data reports more people with a disability nationwide than SSA data.

C. TARGET POPULATIONS IN CONNECTICUT

Table III.2 presents a summary in 2006 of the statewide count of people with disabilities, closed cases in the VR program, and the effect of increasing the employment rate. First, the 2006 ACS estimated that Connecticut had 217,000 non-institutionalized working-age persons with disabilities. Within this group, an estimated 92,000 individuals (42 percent) were employed, which was similar to the nationwide employment rate (38 percent) among working-age people with disabilities (RRTC 2007). Among the 125,000 persons who were not employed, 13,000 were “not working but actively seeking work,” representing a core group that might benefit from a program to improve employment.¹⁵

We then used aggregate data from RSA’s annual report on Connecticut’s VR program to estimate the net benefits of increasing the employment of 2,049 people with closed cases. Of the 2,049 closed cases, there were 1,258 successful employment outcomes during fiscal year 2006, which represent one-fourth of all VR clients receiving services and 61 percent of all closed cases. The estimated effect of increasing the employment rate is based on 217,000 people with disabilities. A one-percentage-point rise in the employment rate (from 42 to 43 percent) would result in 2,170 additional people with disabilities achieving competitive employment. Using the VR program as an example, we project that 3,534 closed cases would be needed to yield 2,170

¹⁴ In 2006, the SGA level was \$860 per month for a non-blind individual, or \$10,320 when annualized. The SGA amount is indexed to inflation and is currently \$940 per month as of 2008 (Gimm et al. 2008).

¹⁵ It is also possible that some of the 92,000 employed persons with disabilities might benefit from increased earnings if a program supports an increase in hours worked for those who would like to work more.

people with employment. Similarly, a two-percentage point rise and five-percentage point rise would mean 4,340 and 10,850 additional people, respectively. The latter goal would include a majority (83 percent) of 13,000 persons with disabilities, who are actively seeking work.

TABLE III.2

TARGET POPULATIONS WITH DISABILITIES IN CONNECTICUT, 2006

	Number of People With Disabilities	Percent of Total
Number of persons with disabilities in Connecticut in 2006	217,000	100.0
Employed Persons With Disabilities	92,000	42.4
Not Employed	125,000	57.6
Not Working but Actively Seeking Work	13,000	6.0
Not Working and Not Seeking Work	112,000	51.6
VR Clients Receiving Services in FY 2006 (BRS)	5,045	100.0
Open Cases in FY 2006	2,996	59.4
Closed Cases in FY 2006	2,049	40.6
With a Successful Employment Outcome	1,258	24.9
Without Employment	791	15.7
	Number of People Employed	VR Closed Cases Estimated
Estimated Effect of Increasing Employment Rate		
1 percentage point increase	2,170	3,534
2 percentage point increase	4,340	7,069
5 percentage point increase	10,850	17,672

Sources: 2006 ACS data; RSA 2006.

Notes: The number of VR clients receiving services in fiscal year 2006 excludes 3,891 applicants. The average time between application and closure (in months) for individuals with successful employment outcomes was 18 months (RSA 2006).

Table III.3 provides a breakout of persons with disabilities by SSA beneficiary status. Within the group of 217,000 persons with disabilities in Connecticut, 11 percent were SSI recipients in December 2006, and 34 percent were SSDI beneficiaries. These proportions are similar to the distribution of VR closed cases in fiscal year 2006. About 15 percent of closed cases were SSI recipients and 33 percent were SSDI beneficiaries. However, among closed cases with a successful employment outcome, non-beneficiaries represented the majority of cases due to a much higher employment rate (79 percent) than either SSI recipients (32 percent) or SSDI beneficiaries (46 percent).

D. ASSUMPTIONS FOR HYPOTHETICAL ANALYSIS

As discussed earlier, prior studies have shown a wide range of cost-benefit ratios associated with employment-related interventions for people with disabilities because of stark differences in earnings projections, timeframes, and discount rates. In general, studies with longer timeframes,

a straight-line earnings growth assumption, and lower discount rates were likely to report very high cost-benefit ratios.

TABLE III.3
TARGET POPULATIONS WITH DISABILITIES, BY SSA BENEFICIARY STATUS

	Number of People With Disabilities	Percent of Total
Number of Persons With Disabilities in Connecticut in 2006	217,000	100.0
SSI recipients	24,586	11.3
SSDI beneficiaries	74,652	34.4
Neither SSI nor SSDI	117,762	54.3
Closed Cases among VR Clients in FY2006	2,049	100.0
SSI recipients	292	14.3
SSDI beneficiaries	669	32.7
Neither SSI nor SSDI	1,088	53.1
	Number of People Employed	Employment Rate
Closed Cases with Successful Employment in FY2006	1,258	61.4
SSI recipients	94	32.2
SSDI beneficiaries	307	45.9
Neither SSI nor SSDI	857	78.8

Sources: 2006 ACS data; SSA (2007); RSA 2006.

We tested the sensitivity of our hypothetical estimates to different parameter assumptions. First, we tested several discount rates, but present our results with a standard 5 percent discount rate, which is consistent with the approach taken in prior studies. Second, our timeframe is made explicit by separating short-term effects (Year 1) from medium-term effects (Years 2-4) in the framework. Third, we explored the impact of using different earnings projections. For example, we initially assumed a straight-line earnings growth rate that remained constant in future years. For people with disabilities who receive SSDI cash benefits, a straight-line earnings trend that far exceeds the inflation-adjusted SGA level may not be a reasonable assumption.¹⁶ Therefore, we applied a more conservative assumption with an earnings decay rate.¹⁷ The earnings decay rate is a factor less than 1.0 by which future year earnings are multiplied to allow for a gradual reduction in earnings over time.

Increases in participant earnings are the largest component of benefits in all studies, and provide the basis for estimating fringe benefits (non-wage compensation) and taxes. All studies

¹⁶ To remain eligible for disability benefits, a person must be unable to engage in SGA. As of January 2008, the Social Security Administration (SSA) defines a non-blind person earning more than \$940 per month (\$11,280 per year) to be engaging in SGA. The level of SGA is based on changes in the national average wage index.

¹⁷ Higher decay rates reduce future earnings more quickly. A visual illustration of how varying decay rates affect earnings over time is provided in Figure IV.2.

assume that fringe benefits represent a fixed percentage of earnings. Most studies use a 15 percent benchmark, which is appropriate for lower-wage jobs, where fringe benefits tend to be less generous than for the average U.S. worker (23 percent). We therefore use a 15 percent fringe benefit rate. The effective tax rate used in prior studies depends on statutory rates for payroll tax as well as state and federal income tax. We assume a 27 percent rate, which reflects Connecticut's income tax rate of 5 percent.

Several additional assumptions were needed to specify parameters, as indicated below:

- ***Size of Impact.*** Using data from a national survey of VR clients, including both SSA beneficiaries and non-beneficiaries, we assume that 17 percent of SSA beneficiaries were working at the time of entering the VR program (at application), with 32 percent of non-beneficiaries having a prior job (Exhibit 3.4 in Stapleton and Erickson, 2004). The model assumes that participants without a prior job and without a future job have zero earnings during the entire period. The absence of a control group or comparison program implies a very strong assumption that participants would not have achieved employment without the VR program.
- ***Timing of Impact.*** The model assumes that employment is staggered during the receipt of VR services for participants without a pre-VR job, but with a post-VR job. Since the average duration of VR services is 18 months, we divide the incidence of employment into 6-month intervals for participants who do not have a prior job but obtain a future job. Therefore, one-third of VR clients are placed in a job after 6 months, two-thirds after 12 months, and everyone after 18 months.
- ***Duration of Impact.*** The model optimistically assumes that all individuals who achieve employment *after* receiving VR services remain employed in all future years. Levels and changes in earnings are analyzed separately for SSA beneficiaries and non-beneficiaries. For the estimated benefits associated with reductions in public assistance payments, we assume that SSI recipients are subject to a reduction of \$1 in SSI benefits for every \$2 in earnings above \$65 per month. For SSDI beneficiaries, we assume monthly SSDI payments would continue for at least twelve months due to a trial work period (TWP) of at least nine months and a three-month grace period. Based on a review of annual VR reimbursement claims indicating the number of closed cases where earnings were at or above SGA levels for at least nine months, our model assumes that 25 percent of SSDI beneficiaries had earnings above SGA.

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IV. RESULTS

A. HYPOTHETICAL ANALYSIS OF NET BENEFITS

Using the VR program in fiscal year 2006 as a model for increasing the employment of people with disabilities, we analyzed three hypothetical strategies based on different target populations: (1) SSI recipients only, (2) SSDI recipients only, and (3) a mix of SSA beneficiaries and non-beneficiaries similar to the actual mix of closed cases in 2006. First, the hypothetical net benefits to society were positive over a four-year period when all three strategies were applied (see Table IV.1). However, the magnitude of net benefits varied greatly, from \$647 to \$3,982 to \$17,277, respectively. This difference reflects the fact that SSI beneficiaries tend to have lower average earnings than SSDI recipients, and their earnings, in turn, are lower than those of non-beneficiaries.

TABLE IV.1

HYPOTHETICAL ANALYSIS OF NET SOCIETAL BENEFITS WITH THREE TARGET POPULATIONS

	Target Population		
	SSI Recipients Only (\$)	SSDI Recipients Only (\$)	Mix of SSA and Non- Beneficiaries (\$)
Benefits from Increased Output (per person)			
Year 1			
Increased Earnings	702	886	1,604
Increased Fringe Benefits (15%)	105	133	241
Years 2 to 4			
Increased Earnings	10,343	13,058	23,902
Increased Fringe Benefits (15%)	1,551	1,959	3,585
Years 5 to 10			
Increased Earnings	19,849	25,059	46,446
Increased Fringe Benefits (15%)	2,977	3,759	6,967
Total Quantifiable Benefits (Years 1-4)	12,702	16,036	29,331
Average Program Cost (in FY 2006)	12,055	12,055	12,055
Net Societal Benefits (Years 1-4)	647	3,982	17,277
Hypothetical Cost-Benefit Ratios			
Short-Term Impact (Year 1)	0.1	0.1	0.2
Medium-Term Impact (Years 1-4)	1.1	1.3	2.4

Source: MPR analysis of aggregate data in RSA 2006.

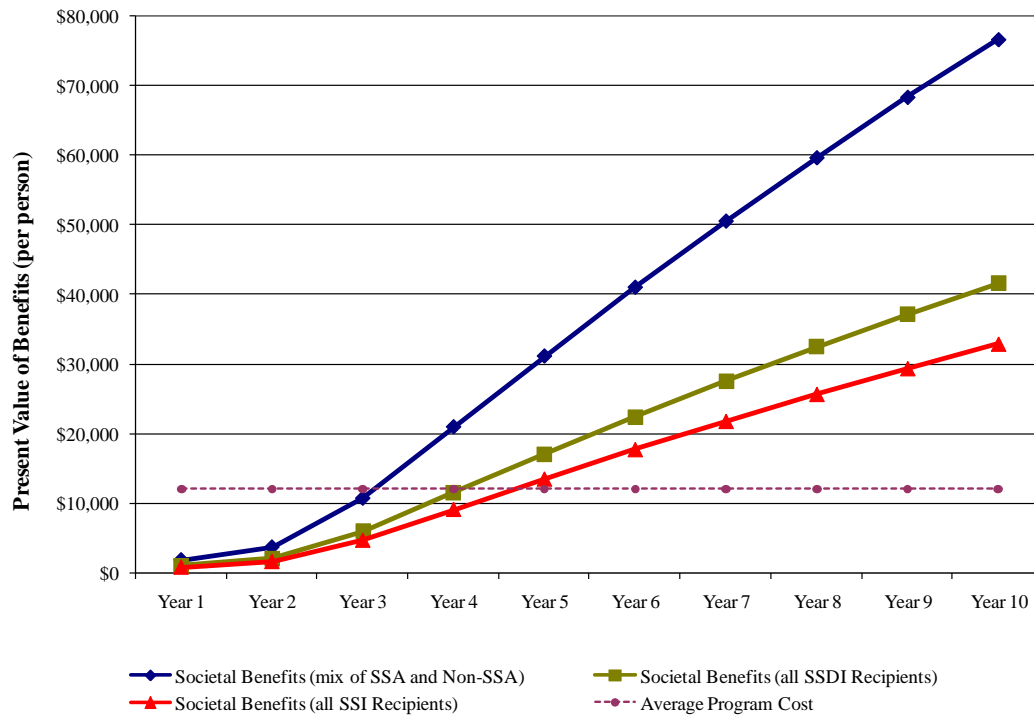
Note: These hypothetical estimates assume a 5% discount rate with a conservative assumption of an initial 5% earnings growth rate and decay rate of 50% in each subsequent year. Average program cost is defined as total VR program costs in FY 2006 divided by the number of closed cases in that year.

Given that total VR program costs in fiscal year 2006 were \$12,055 per closed case, we can generate a hypothetical cost-benefit ratio. Using these preliminary estimates, we estimated that targeting a population of only SSI or SSDI recipients would yield a cost-benefit ratio of 0.1 in the short run (after one year), and a cost-benefit ratio of 1.1 and 1.3, respectively, in the medium run (after four years). These estimates are roughly similar to findings from the experimental studies we reviewed. However, when the target population includes non-SSA beneficiaries, the cost-benefit ratio is considerably higher at 0.2 in the short run (after one year), and 2.4 in the medium run (after four years), which reflects a higher level of earnings among non-beneficiaries. We used a standard 5 percent discount rate with a conservative assumption of an initial 5 percent earnings growth rate with a decay rate of 50 percent in each subsequent year.

The quantifiable benefits for Year 1, ranging from \$807 to \$1,845 per person, indicate that the VR program does not “break-even” within a short timeframe, since program costs per person are \$12,055 and the cost-benefit ratio is less than 1.0. Year 1 benefits are the sum of increased earnings and fringe benefits. Note that any increase in taxes paid due to higher earnings is not considered a net benefit to society, but represents a transfer of funds from individual participants to the government. Similarly, a reduction in SSA benefits would constitute a transfer from the individual to the government. However, the VR program generates positive net benefits between Years 2-4. In fact, the break-even level occurs in Year 3 or Year 4. In Figure IV.1, the break-even level occurs when the trend line for estimated societal benefits per person intersects with the average program cost per person trend line.

FIGURE IV.1

BREAKEVEN LEVEL OF NET SOCIETAL BENEFITS



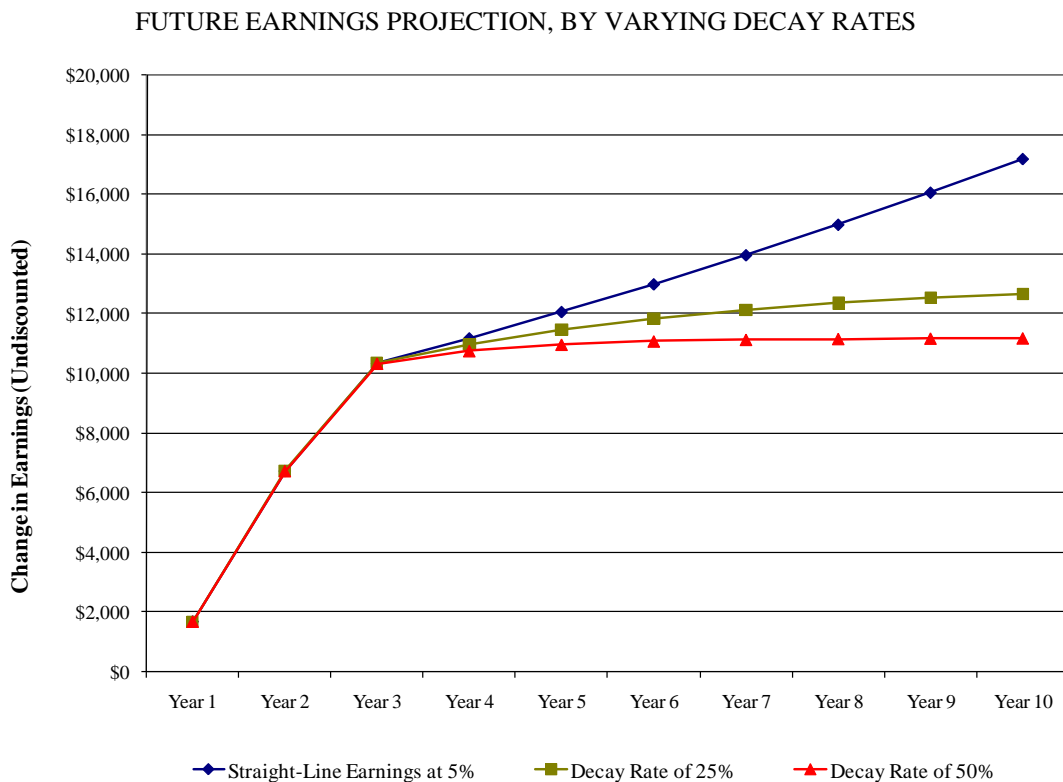
Source: MPR analysis of aggregate data from the FY 2006 Annual Review Report of the BRS.

In presenting these preliminary results, we note that the hypothetical analysis relied on multiple assumptions, including the future projection of earnings. Furthermore, the absence of a valid comparison group or alternative program suggests that the estimates are biased upwards. In the next section, we discuss the findings of a sensitivity analysis that varied this earnings projection and the discount rate to assess the impact these parameter modifications would have on net benefits. Although the magnitude of quantifiable benefits does change as the assumptions change, the overall conclusion that the VR program generates positive net benefits to society after a three-to-four-year period remains constant.

B. SENSITIVITY ANALYSIS

Two specific parameters that we tested in our model assumptions were the future projection of earnings and the discount rate. A straight-line earnings projection assumes a constant growth rate for earnings, but this may not be realistic for SSI and SSDI beneficiaries, who may have medical conditions that limit the number of hours they are available for work. In addition, SSA beneficiaries have a disincentive to work above the SGA level because of the loss of cash benefits. If we include a more optimistic assumption of straight-line earnings growth in our model, the amount of net societal benefits increases to \$86,871 per person. The cost-benefit ratio exceeds 8.0, which suggests positive net benefits. Figure IV.2 illustrates how varying the rate of decay affects the profile of earnings over time. Specifically, higher rates of decay lead to a diminishing rate of growth after Year 4, which will affect the long term estimates of net benefits.

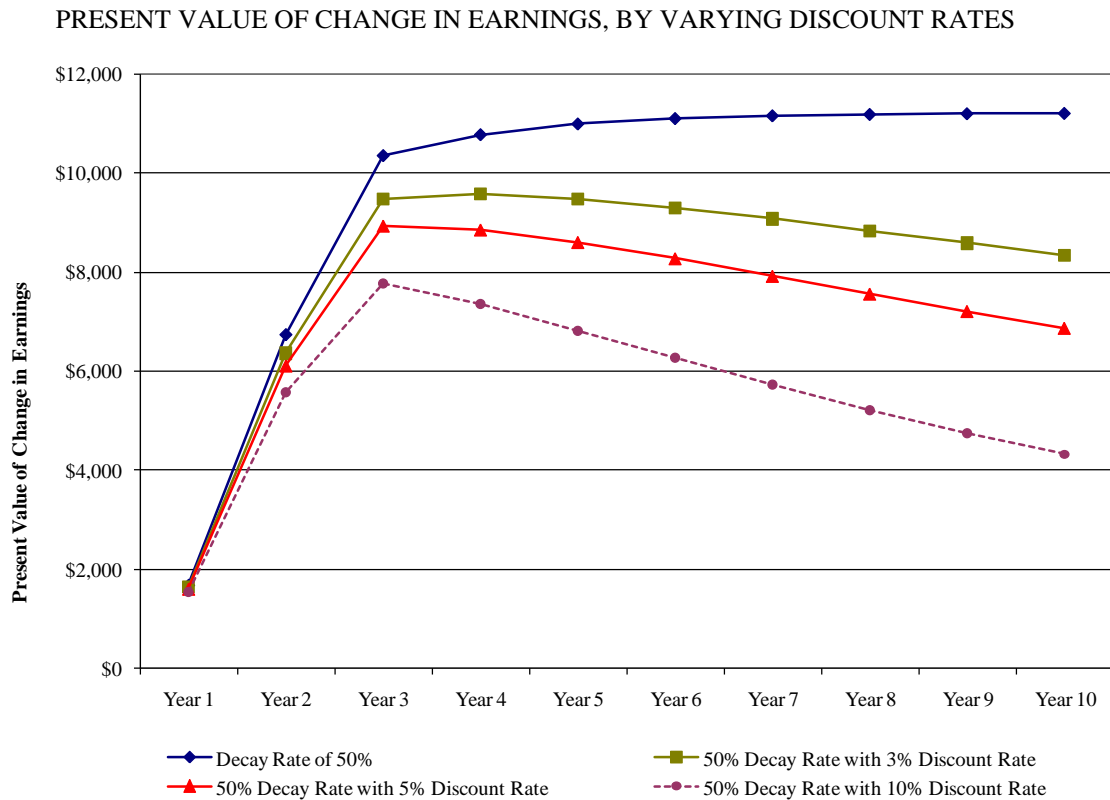
FIGURE IV.2



Source: MPR analysis of aggregate data from the FY 2006 Annual Review Report of the BRS.

We also conducted a sensitivity analysis to compare discount rates at 3 percent, 5 percent, and 10 percent to see whether this resulted in a change in estimated net benefits. Figure IV.3 illustrates how the present value of incremental earnings in Years 1 to 10 is affected as the discount rate increases. Higher discount rates generate a lower present value of incremental earnings beginning in Year 3. The figure shows that the range of present values widens in the long term (after Year 4). However, the discount rate is not as important a factor as the size and duration of impacts on earnings. Variations in target populations and the intensity of a program intervention are likely to yield substantial differences in the size of impacts. Furthermore, cost-benefit ratios are highly sensitive to the timeframe or number of years included in the analysis. Studies that consider impacts over 10 or more years are very sensitive to the discount rate and the earnings decay rate.

FIGURE IV.3



Source: MPR analysis of aggregate data from the FY 2006 Annual Review Report of the BRS.

These descriptive analyses show that variations in the earnings decay rate and discount rate assumptions have the greatest impact on long-term estimates of net benefits. In addition, studies that use longer timeframes (up to 10 years or more) generally produce higher estimates of net benefits, which are sensitive to changes in parameter assumptions. However, short-term (Year 1) and medium-term (Years 1-4) impacts are less sensitive to changes in parameter assumptions. Other things being equal, shorter timeframes produce a more conservative estimate of the net

benefits of a program intervention. Table IV.2 provides a summary of hypothetical cost-benefit ratios estimated under different parameter assumptions.

TABLE IV.2

SENSITIVITY ANALYSIS OF HYPOTHETICAL COST-BENEFIT RATIOS UNDER VARYING EARNINGS DECAY AND DISCOUNT RATE ASSUMPTIONS

	Discount Rate Assumption		
	3% Discount Rate	5% (Standard) Discount Rate	10% Discount Rate
0% Decay Rate (Straight-Line Earnings Growth)			
Short Term Impact (Year 1 only)	0.2	0.2	0.1
Medium Term Impact (Years 1-4)	2.6	2.5	2.1
Longer Term Impact (Years 1-10)	9.3	8.2	6.2
25% Decay Rate			
Short Term Impact (Year 1 only)	0.2	0.2	0.1
Medium Term Impact (Years 1-4)	2.6	2.4	2.1
Longer Term Impact (Years 1-10)	8.2	7.3	5.6
50% Decay Rate			
Short Term Impact (Year 1 only)	0.2	0.2	0.1
Medium Term Impact (Years 1-4)	2.6	2.4	2.1
Longer Term Impact (Years 1-10)	7.7	6.9	5.3

Source: MPR analysis of aggregate data in RSA 2006.

Note: A hypothetical cost-benefit ratio is defined as total quantifiable benefits per person (across one or multiple years) divided by average program cost in FY 2006 (defined as total VR program costs in FY 2006 divided by the number of closed cases in that year). Estimates assume an initial 5 percent earnings growth rate with varying discount and earnings decay rates applied in future years. The model assumes that all persons with disabilities continue working in all years after competitive employment is attained.

In Table IV.2, the middle column reflects a standard discount rate of 5 percent. The top series of rows assume a straight-line earnings growth rate with no decay. Both the short-term estimate (0.2) and medium-term estimate (2.4) of the hypothetical cost-benefit ratio are similar under varying decay rate assumptions because differences in earnings begin to take effect in Year 4. Longer-term estimates range from 6.9 to 8.2 depending on the decay rate. Because of the wider range of estimates when looking beyond Year 4, the results presented in this report include short-term (Year 1) and medium-term (Years 1 to 4) net benefit estimates using a 5 percent standard discount rate assumption and a 50 percent rate of earnings decay. For all estimates, the model assumes an initial earnings growth rate of 5 percent.

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V. CONCLUSIONS AND IMPLICATIONS

As part of the *Connect-Ability* initiative, policymakers may be interested in assessing the effectiveness of specific initiatives that seek to increase the employment rate of people with disabilities in Connecticut. Overcoming barriers to employment for people with disabilities requires a multifaceted approach, including partnerships with public and private employers to address litigation fears associated with hiring people with disabilities, issues stemming from transportation, housing, and income support, and guidance for participants interested in working or increasing their earnings. This study used aggregate data to estimate net benefits to society with the VR program as a hypothetical example. Key findings from our hypothetical analysis and cross-cutting themes from our review of previous cost-benefit studies are summarized below.

A. SUMMARY OF FINDINGS

1. Literature Review

- Differences in target populations contribute to variations in program impacts and net benefits. Because SSA beneficiaries have lower average earnings than non-beneficiaries, program interventions with only SSA beneficiaries have had modest impacts on earnings. Earlier interventions that focus on people with disabilities before they become SSA beneficiaries have not been rigorously tested, but are likely to yield higher net benefits.
- A comparison group or alternative program is an essential design feature in a rigorous cost-benefit study. Studies without a comparison group or alternative program incorrectly assume that any change in earnings is only attributable to the intervention itself. As a result, the absence of a comparison program results in higher, biased estimates of net benefits.
- Results were presented from multiple stakeholder perspectives—including that of society, individuals, employers, and government. However, the net benefit to society is used as the standard measure for evaluating a program's effectiveness.
- The wide range of estimated cost-benefit ratios from these studies is due to differences in key study assumptions. Studies with longer timeframes (10 years or more) and lower discount rates were likely to report very high cost-benefit ratio estimates.
- Some studies that examined the impact of employment support services for people with disabilities had an unfavorable (<1.0) cost-benefit ratio. This result was more likely to occur in studies that had shorter timeframes (two years or less) and estimated impacts that were limited in size or duration.

2. Target Population and Hypothetical Analysis

- In 2006, there were an estimated 217,000 non-institutionalized persons with disabilities ages 21 to 64 in Connecticut. Within this group, an estimated 92,000 individuals (42 percent) were employed, a rate similar to the national employment rate (38 percent) of persons with disabilities.
- 13,000 people with disabilities in Connecticut were “not working but actively seeking work,” in 2006. This represents a core group of people who might benefit from programs to increase employment.
- Policymakers can target different populations to increase the employment of people with disabilities. We examined net benefits with three hypothetical groups: (1) SSI recipients only, (2) SSDI recipients only, and (3) a mix of SSA and non-beneficiaries. Net benefits in the hypothetical analysis are higher when non-beneficiaries are included in the target population, but these findings might differ if actual, rather than hypothetical, impacts are used to estimate net benefits.
- Medium-run impacts (Years 1 to 4) from the hypothetical analysis produced a range of cost-benefit ratios from 1.1 to 2.4, depending on the target population. This result suggests that the VR program breaks even after about 3 years. Short-run impacts in Year 1 were less than 1.0 for all three target populations.

B. MODEL STRENGTHS AND LIMITATIONS

A key strength of the hypothetical analysis is the flexibility of the model to reflect parameter changes over time and to illustrate the effect of different assumptions on net benefits. For example, inflation and economic conditions can influence both the size and duration of benefits for people with disabilities. The model allows for such adjustments over time. Given the wide range of estimates in the disability and rehabilitation literature, the model also specifies the timeframe and assumptions that affect the estimation of net benefits.

Another strength is that the general framework and model can be applied to other programs or services that support the employment of people with disabilities. One example is the Medicaid Buy-In program, which had more SSDI beneficiaries (69 percent) than the VR program (33 percent of closed cases) in 2006. Connecticut had a total of 5,512 participants who were enrolled in the Medicaid Buy-In program at some point during 2006 (Gimm et al. 2008).

One limitation in the study was the use of aggregate data, which made it necessary to rely heavily on assumptions. Data on average weekly hours worked and hourly wages from the RSA’s Annual Review Report (RSA, 2006) were used to generate annualized earnings, separately for SSA beneficiaries and non-beneficiaries. However, the dispersion of actual earnings varies tremendously around these mean values. Therefore, the precision of estimates would greatly increase if individual-level earnings data were used to calculate the incremental change in earnings after VR services are received.

Second, the model examined a single year of data (fiscal year 2006) to generate estimates for 2,049 closed cases. However, the employment of people with disabilities is a dynamic, long-

term process that spans multiple years. We did not have information on cases that did not close in fiscal year 2006, and it was not possible to use fiscal year 2007 data because the “carryover” cases from fiscal year 2006 were blended with new applicants who started to receive VR services in fiscal year 2007. Furthermore, we relied on a strong assumption that a VR client would remain employed indefinitely after receiving VR services. However, evidence suggests that SSA beneficiaries are less likely to remain continuously employed after receiving VR services compared with non-beneficiaries. Because this information was missing from the RSA report, it could not be incorporated into the model.

Finally, the model implicitly assumes that participants would not have attained employment in the absence of the VR program, even though this cannot be observed as a counterfactual in the design of the analysis. Using aggregate data on VR clients precluded the analysis of people with disabilities who did not receive VR services. Understanding how people with disabilities enter the labor market in the absence of the VR program is essential to developing a robust estimate of the net benefit of increasing employment relative to the “status quo.” If people with disabilities find it relatively easy to enter the labor market on their own or through alternative channels, then our estimation method would overstate the magnitude of net benefits. However, even if the true impact was only half of what we have assumed, the VR program would still demonstrate positive net benefits within four years under most parameter assumptions because the cost-benefit ratio in the medium term (Years 1-4) is greater than 2.0.

C. IMPLICATIONS FOR FUTURE RESEARCH

Employment is an important step on the pathway to self-sufficiency. As the *Connect-Ability* initiative continues to implement its strategic plan to reduce barriers to employment, the measurement of net benefits to society will be a key step in communicating the effect of increased employment to policymakers and stakeholders. We developed preliminary estimates of the net benefits of increasing the employment of people with disabilities, using the VR program as a baseline model for the hypothetical analysis. Future research using individual-level data and comparison groups designed to rigorously measure program impacts could greatly enhance the precision and reliability of estimates.

Cost-benefit analyses vary both in their study design and in the assumptions they make. Without a comparison group or alternative program, estimates of net benefits are likely to be biased upwards. Although studies with an experimental design provide the most rigorous estimates, studies with non-experimental designs provide valuable information on which aspects of program interventions, such as job placement and support services, improve the likelihood of attaining competitive employment outcomes (Bolton et al., 2000; Chan et al, 2006). Additional research on the outcomes of different program interventions can improve our understanding of how effectively programs support and increase the employment of people with disabilities.

One policy implication for the VR program and the *Connect-Ability* initiative is that targeting resources to non-beneficiaries is likely to yield a higher return with regard to increased employment and higher earnings. Similarly, early interventions that target people with disabilities before they become SSA beneficiaries are likely to yield substantial benefits. Finally, a number of studies have shown that younger people with disabilities are likely to have higher earnings than older participants, other things being equal (Gimm et al. 2008). Therefore,

focusing on key sub-groups such as young adults may result in greater long-term impacts on net benefits than focusing on older adults with disabilities who are nearing retirement.

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APPENDIX A

**COST-BENEFIT ANALYSES OF PROGRAMS THAT INCREASE
EMPLOYMENT OF PEOPLE WITH DISABILITIES**

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TABLE A.1

COST-BENEFIT ANALYSES OF PROGRAMS THAT INCREASE EMPLOYMENT OF PEOPLE WITH DISABILITIES

Authors	Study Description	Data and Sample Size	Timeframe Assumption	Stakeholder Perspectives	Comparison Program or Group	Key Findings (All cost-benefit ratios are from a societal perspective, unless otherwise noted)
TYPE 1: EXPERIMENTAL STUDIES OF SSA BENEFICIARIES¹⁸						
Kerachsky and Thornton (1987)	Impact of the Structured Training and Employment Transitional Services (STETS); Random assignment of 18-24 year-olds with mental retardation.	Individual-level data, with 22 month followup (n=467) in 5 cities	Assessment at 6, 15, and 22 months following enrollment.	Society Government Participants SSA	Control group	Estimated net benefits of \$4,300 per participant over the 22-month observation period. Average program cost estimated to be \$19,568 per participant. Cost-Benefit Ratio >1.0
Decker and Thornton (1995)	Impact of the Transitional Employment Training Demonstration (TETD); Random assignment of 18-40 year-old SSI beneficiaries with mental retardation	Individual-level data, with 6 year followup (n=745) in 13 demo sites in 8 states	Impacts over 6 year period	Society Government Participants SSA	Control group	Total impact on earnings was \$8,100 per participant across all years (1-6); reduced SSI benefit of \$1,645. Estimated total benefit of \$9,745, not including other quality-of-life benefits. Average program cost estimated to be \$10,594 per participant. Cost-Benefit Ratio > 1.0 with quality-of-life benefits included.
Kornfeld and Rupp (2000)	Impact of four models of case management services provided by SSA staff, VR counselor, private contractor, and referral staff; random assignment of SSI/SSDI beneficiaries 15-65 years old.	Individual-level data, with 6 year followup (n=8,428) in 8 selected sites	Impacts over 6 year period	Society Government Participants SSA	Control group	Earnings impacts about \$320 in Year 1 and \$321 in Year 2 with no impact in Year 3 and afterwards; no reduced SSI or SSDI benefits. Estimated total benefit of \$641. Average program cost estimated to be \$5,165 per participant. Cost-Benefit Ratio = 0.12

¹⁸ Experimental studies use random assignment to evaluate the impact of a program relative to a control group that does not receive the program intervention.

Authors	Study Description	Data and Sample Size	Timeframe Assumption	Stakeholder Perspectives	Comparison Program or Group	Key Findings (All cost-benefit ratios are from a societal perspective, unless otherwise noted)
Peikes et al. (2005)	Evaluation of State Partnership Initiative (SPI) with benefits counseling, case management, and better access to vocational supports.	Individual-level data, with 2 year followup (n=3,366) in 4 sites.	Impacts over a 2 year period	Society Government Participants	Control group	No impacts in year after enrollment except for reduced SSDI benefits in New Hampshire (\$1,840). Average program cost estimates range from \$400 to \$13,000 per participant. Cost-Benefit Ratio <1.0
TYPE 2: NON-EXPERIMENTAL STUDIES¹⁹ THAT DO NOT PROJECT FUTURE COSTS AND BENEFITS						
Lee et al. (2003)	Estimates CBR of supported employment (Korea)	Individual-level program and earnings data (n=66)	3 years	Society Taxpayer Participant	Sheltered Workshop	1.39 (0.77 in year 1; 1.59 in year 2; 1.84 in year 3)
Rogers et al. (1995)	Estimates the CBR of a program for persons with severe mental illness (Massachusetts)	Individual-level participant survey (n=19)	2 years	Society Taxpayer Participant	Surveyed participants on alternative programs actually used.	0.89
Lewis et al. (1992)	41 types of vocational programs (Minnesota)	Individual earnings with aggregate program data (n=1,892; across 13 service sites)	1 year; Discount rate not applicable (since study does not project future costs and benefits.)	Society Taxpayer Participant	Specified the alternative program as the next most restrictive program from the client was in at the time of study.	Supported Employment (SE) compared to rehabilitation training: 2.0 Supported Employment (SE) compared to sheltered workshops: 1.3 to 4.0
Noble et al. (1991)	Estimates the CBR of the Job Coach Model, which is part of VR services (New York)	Individual-level administrative data (N=1250)	2 years	Societal, Taxpayer	Alternative vocational programs (included estimated foregone earnings).	0.67 to 0.69

¹⁹ Non-experimental studies use a “pre/post intervention” design to estimate the benefits of a program, but do not use random assignment.

Authors	Study Description	Data and Sample Size	Timeframe Assumption	Stakeholder Perspectives	Comparison Program or Group	Key Findings (All cost-benefit ratios are from a societal perspective, unless otherwise noted)
Rusch et al. (1993)	Benefit Ratio (CBR) of supported employment programs (Illinois)	(N=729)	3 years, 4 years	Society Taxpayer Participant	9 programs (adult day care, vocational development)	0.75 in first year; 0.91 in third year; 1.09 over four years.
Sav (1989)	CBA of “Project Employability” and “Structure Training and Employment Transitional Services” (STETS)	Project Employability : N=90 STETS: N=284	Project Employability: 47 months STETS: 1 year	Society Taxpayer Participant	Earnings before the program are subtracted from earnings after program	Project Employability: 1.68 STETS: 0.83
Hill et al. (1987)	CBA of a supported employment program for persons with mental retardation (Virginia)	N=214	94 months; 5% discount rate	Taxpayer Participant	Sheltered Workshops and Day Activity Centers	Taxpayer: 1.87 Participant: 1.97
TYPE 3: EMPIRICAL STUDIES THAT PROJECT FUTURE COSTS AND BENEFITS						
Hollenbeck and Huang (2006)	CBA of 11 Workforce Development Programs (Washington)	Individual earnings data	2.5 years, lifetime = (27.2 years); 3% discount rate.	Society Taxpayer Participant	Comparison group of statistically matched non-participants	0.3 to 19.2 after 2.5 years (based on actual data); 3.2 to 121.5 lifetime (using growth projections)
Uvin et al. (2004)	CBA of VR program (Massachusetts)	Individual earnings data (N=16,599)	30 years; 5% discount rate	Society Participant	Participant earnings before vs. after program	14.0 to 18.0.
Hemenway and Rohani (1999)	CBA of VR Services (Florida)	Individual VR, SSA, and Medicaid data (N=29,475)	30 years; 5% discount rate	Society Taxpayer Participant	Participant earnings before vs. after program	16.0

Authors	Study Description	Data and Sample Size	Timeframe Assumption	Stakeholder Perspectives	Comparison Program or Group	Key Findings (All cost-benefit ratios are from a societal perspective, unless otherwise noted)
TYPE 4: DESCRIPTIVE STUDIES²⁰						
Rogers (1997)	Lays out the 5 steps for conducting a cost-benefit analysis of supported employment programs. Includes literature review of such studies.	N/A	N/A	N/A	N/A	Assumptions have a big impact on Cost-Benefit Ratio (CBR), including discount rate, timeframe, perspective, and what the comparison point is. Also, program size affects the depth of data (smaller program has the advantage) vs. the robustness of estimates (larger program has the advantage). Thus, hard to compare CBRs across studies w/o considering the assumptions and depth/scope of data. Should always include alternative program(s) for comparison (if available).
Thornton (1992)	Theoretical article highlighting an important aspect of the benefit-cost analysis: An assessment of the uncertainty in the analysis.	N/A	N/A	N/A	N/A	Cost-benefit analyses of transitional and supported employment programs have yielded a wide range of results. This is due to a level of uncertainty inherent in program evaluation, which arises from variation in the methodology used to estimate effects, assumptions, characteristics of the persons served, and program implementation. Highlights the importance of sensitivity analysis by varying the parameters used, estimating a range of cost-benefit ratios. Also encourages measures or description of intangible benefits, such as increases in community integration or quality of life, even if these cannot be quantified and incorporated into the cost-benefit ratio.

²⁰ Descriptive studies provide an explanation of how to conduct a cost-benefit analysis with examples of different program interventions.

APPENDIX B

LIST OF DATA SOURCES WITH DISABILITY STATISTICS

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LIST OF DATA SOURCES WITH DISABILITY STATISTICS

Data Source / Notes	Variables or Measures
Target Population	
<ul style="list-style-type: none"> • The American Community Survey (ACS) provides state-level disability statistics for 2006 and is available at Cornell's RRTC (www.disabilitystatistics.org). • SSA's Annual Statistical Report on the SSDI Program in 2006 includes aggregate data tables on the number of SSDI beneficiaries, by state, and is available at (www.ssa.gov/policy/docs/statcomps/). • RSA's Annual Review Report for the Connecticut Bureau of Rehabilitation Services (BRS) includes aggregate tables on VR client characteristics in FY2006, persons served, cases closed, and employment outcomes. The report is publicly available at (http://rsamis.ed.gov). 	<p>(1) the number of non-institutionalized people with disabilities in CT, age 21-64, as of 2006; (2) number above who are employed; (3) those not working but actively seeking work (pp.12, 22, 24)</p> <p>(1) total number of SSDI and SSI beneficiaries in CT, age 18-64, as of December 2006 (Tables 65, 66)</p> <p>(1) number of VR clients receiving services; (2) cases closed; (3) cases closed with successful employment; (4) average weekly hours worked; and (5) average hourly wage, by SSA beneficiary status (Tables 1, 2, 5)</p>
Earnings	
<ul style="list-style-type: none"> • The American Community Survey (ACS) provides aggregate statistics on median labor earnings. • RSA's Annual Review Report for the Connecticut Bureau of Rehabilitative Services (BRS) includes aggregate data tables related to earnings, for closed cases, and by SSA beneficiary status in FY2006. 	<p>(1) median labor earnings of working disabled population in 2006 (p. 28)</p> <p>(1) average number of hours worked per week; (2) average hourly wage, by SSA beneficiary status for Connecticut and nationwide (Tables 1, 7, 16, 18)</p>
Transfer Payments and Program Costs	
<ul style="list-style-type: none"> • SSA's Annual Statistical Report on the SSDI Program in 2006 includes aggregate data tables on SSDI and SSI beneficiary payments, by state. • RSA's Annual Review Report for the Connecticut Bureau of Rehabilitation Services (BRS) includes aggregate statistics on total program costs. 	<p>(1) average monthly SSDI payment in 2006, by state; (2) average monthly SSI payment in 2006, by state; (3) percent of SSDI beneficiaries in 2006 with terminated benefits (earnings > substantial gainful activity level) (Tables 15, 56, 65)</p> <p>(1) total program expenditures; (2) administrative costs; (3) service-related expenditures (assessment, counseling, training/education, and placement) (Tables 1, 21, 22)</p>