Cost-Benefit Analysis for RESEA Programs: A Handbook

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About This Handbook

This handbook is a Reemployment Services and Eligibility Assessment (RESEA) Evaluation Technical Assistance product to help states and their evaluators to conduct cost-benefit analyses of their RESEA programs.

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Additional RESEA evaluation technical assistance resources are available here:
https://rc.workforcegps.org/resources/2019/07/30/17/32/RESEA_Evaluation_Evidence_Resources

Study reports, publications, and other materials are available here:
https://www.dol.gov/agencies/oasp/evaluation/completedstudies/RESEA-Evidence-Building-Implementation-Study

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1. Cost-Benefit Analyses in RESEA Evaluations

State agencies that operate **Reemployment Services and Eligibility Assessment (RESEA)** programs play a major role in developing and disseminating evidence about which activities and policies improve Unemployment Insurance (UI) claimants' economic outcomes. A wealth of evaluation technical assistance resources are available to help states understand evaluations and meet RESEA evaluation requirements.[1] Of particular note, Mills De La Rosa et al. (2021) provides a RESEA Evaluation Toolkit covering everything from the most basic level of considering what to evaluate, to more technical considerations of evaluation design, through practical tips for evaluation planning and implementation. This handbook builds on the RESEA Evaluation Toolkit by providing similar guidance to help states understand what a cost-benefit analysis (CBA) is, how states can benefit from what they learn from a CBA, and how to conduct one. The handbook covers technical considerations, practical guidance, and a general approach for CBAs that are specific to the RESEA program context.

RESEA is the latest in a series of U.S. Department of Labor (DOL)–funded state programs that verify eligibility for UI and provide reemployment services to a subset of UI claimants. Consistent with its program name, RESEA meetings involve a combination of verification of initial and ongoing eligibility and assistance with reemployment. State departments of labor have flexibility in several aspects of RESEA program design, including whether to include claimants beyond those determined most likely to exhaust benefits and whether and how to implement enhanced program components such as additional RESEA meetings.

Building evidence through evaluation is a priority for DOL. The flexibility it gives to states allows RESEA components to be tested as part of an iterative, evidence-building process where programs are adapted, the adaptations are tested, and findings are used to inform subsequent program refinements. This evidence-building process around what activities and policies improve RESEA allows states to consider important questions for the future of their programs. Should the state add or subtract a particular component of its RESEA program? Should the state focus limited resources on more cost-intensive interventions for fewer claimants? Or provide a lighter-touch intervention for as many claimants as possible?

Cost-benefit analysis (CBA) provides a framework for considering these types of questions. A leading textbook defines it as "a policy assessment method that quantifies in monetary terms the value of all consequences of a policy to all members of society… The broad purpose of CBA is to help social decision-making and to increase social value…" (Boardman et al., 2018).

A CBA aims to include all the costs and benefits experienced by participants and their communities. At a high level, a CBA adds up all monetary benefits of a policy, adds up all monetary costs of a policy, and then subtracts the total costs from the total benefits. A program, or component change to a program, should increase benefits, or decrease costs, and might do both. Usually, we want the benefits of a program to be greater than its costs.

In general, interventions are most preferred if they generate benefits that are substantially greater than costs; that is, have a high **net benefit**. Interventions with costs that are substantially greater than benefits have a negative net benefit, making policymakers or implementers likely want to consider alternative approaches to achieving policy objectives. Interventions where costs and benefits are of similar magnitude, (e.g., low-cost, low-benefit interventions or high-cost, high-benefit interventions) will have a net benefit closer to break even and could also be viable approaches to meeting policy objectives. CBAs give policymakers and implementers information about whether a program is worthwhile and a platform to consider adjustments to the program. When considering program modifications, policymakers and

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[1]   These resources are collected and available on WorkforceGPS' Reemployment Connections page (https://rc.workforcegps.org/resources/2019/07/30/17/32/RESEA_Evaluation_Evidence_Resources).

implementers can compare expected additional benefits to expected additional costs, relative to the net benefit of the existing program.

A **RESEA CBA** applies this analysis framework to enhance states' ability to use evidence from an impact evaluation of its RESEA program. Impact evaluations yield estimates of the **benefits** of a state's RESEA program or some incremental change to that program.[2] RESEA programs also have costs.[3] A RESEA CBA assesses a RESEA program by combining the monetary benefits of the program and comparing them to its monetary costs. This assessment provides one determination of whether RESEA participants, states, the federal government, and society as a whole are better off because of the program. Existing research suggests that the per-participant benefit of a program such as RESEA might be relatively modest (Klerman et al., 2019). However, if RESEA programs also have relatively small per-participant costs, the RESEA approach could represent an improvement for the government and participants in achieving workforce system objectives.

Of course, a CBA is not a magical algorithm that provides the right answer to any policy question. Rather, a rigorous RESEA CBA builds on an impact study by comparing all the benefits of a program versus all its costs, for a more complete picture. Such a picture may be broader than the interests of individual stakeholders. For example, a state department of labor manager may be interested in how a RESEA program affects the department's budget, while an individual RESEA participant may be focused on whether RESEA shortens the duration of unemployment. A CBA's main research question includes broader "social" costs and benefits. In addition to costs reflected in implementing the state department of labor's budget, a RESEA CBA includes costs of increased use of the broader workforce system that result from RESEA program referrals. Similarly, a CBA includes increased participant earnings resulting from shorter unemployment spells, but also considers how some of the earnings increase may be diverted to increase state and federal tax revenue. The intent of the CBA is to add up the effects of the program on all stakeholders, ultimately drawing conclusions about the total effect of the program on society as whole.

To arrive at this broad perspective, a RESEA CBA assesses how the differences in benefits between the treatment and comparison groups compare to the differences in costs of interventions provided to each group. Benefits considered include lower UI benefits paid, higher earnings, and follow-on social benefits like changes in tax revenues (and liabilities). Costs considered include the direct costs of running the RESEA program and follow-on social costs of increased used of workforce system services and changes in costs of UI benefit administration. The knowledge resulting from the evaluation findings can serve as a baseline for policymakers to think about how subsequent changes in a RESEA program might adjust either benefits or costs in the future. This information used together with findings from impact and implementation studies can inform decisions about future RESEA program design.

The high-level concept of cost-benefit analysis—total benefits minus total costs—is conceptually straight-forward. But the details of CBA are more subtle. Such details include what costs and benefits to include for various stakeholder perspectives. Some are straightforward to monetize (i.e., assigned a dollar value) whereas others require best-practice estimates. Also, costs and benefits can happen in multiple time periods and must be adjusted to account for time differences.

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[2] The discussion in this paragraph and much of the document refers to the costs and benefits of the "RESEA program," suggesting a comparison of the current RESEA program to no RESEA program. With minor extensions, the same ideas apply to measuring the costs and benefits of an incremental change to a RESEA program, which is the interest of many RESEA impact evaluations.

[3] For more information on state RESEA programs see Trutko, et al. (2022). For more information on evaluating state RESEA programs, see Epstein, et al. (2022).

Box 1. When is a program or component ready for a Cost-Benefit Analysis to be included in an evaluation?

Conducting a Cost-Benefit Analysis (CBA) requires evaluation resources and planning, and consideration should be given to whether a CBA is appropriate for an evaluation. The RESEA Evaluation Toolkit discusses the process of "evaluability assessment" that ensures an intervention can be tested feasibly. Such an assessment should also consider the availability of cost data and whether research questions about the intervention's net benefit to society are appropriate given the stability of the program model, likelihood of broader adoption of the model, and evaluation goals of relevant stakeholders.

A CBA is recommended for any evaluation of a mature program or component, that is, where there is some prior evidence of effectiveness and an interest in building a stronger evidence base to support expanding the reach of the intervention.

However, formative "proof-of-concept" evaluations may not be ready for a CBA, particularly if costs of developing and prototyping the intervention are difficult to separate from costs of ongoing operation of the program model. Here, the question of "could this model have positive impacts?" is most important, and it may be prudent to wait until a program model is solidified before investigating whether impacts are greater than costs.

One scenario of interest is when an impact evaluation finds that a program has no effects. A CBA of the program would then begin with a zero value of incremental benefits. Unless the intervention provides less costly services, a CBA will be documenting a negative net benefit, which may seem like unnecessary piling on to intervention developers or other stakeholders interested in the intervention's success. However, a CBA is still useful to the broader evidence-building process on how program designs, populations served, and costs combine to contribute to the magnitude of net benefits. However, in the face of a limited evaluation budget, a cost analysis only (i.e., reporting costs per participant) might be sufficient if the impact evaluation finds negligible effects. Reporting costs (e.g., in an appendix to an impact study) in this context allows other researchers to include the study in syntheses examining what contributes to interventions' cost-effectiveness.

Finally, an evaluability assessment should keep in mind that planning for a CBA early in an evaluation can reduce the evaluation resources needed to complete the CBA. Including a CBA in the design phase of an evaluation allows alignment of research questions, data collection, and analysis of benefits with the impact evaluation, which can greatly reduce the amount of extra analysis needed for a CBA. This handbook includes options for different levels of rigor that can be adjusted to fit evaluation budgets and goals.

This "handbook" aims to help a state and its evaluator to conduct a CBA for a RESEA program by presenting a template for conducting a CBA within a RESEA evaluation and providing practical recommendations and guidance for relevant CBA details.[4] Section 2 defines key concepts in Cost Benefit Analysis that will be used in the handbook. Section 3 presents the RESEA CBA Template and defines each cost and benefit for a RESEA CBA. Section 4 concludes with guidance for characterizing uncertainty in RESEA CBA estimates. Appendix A provides a stylized, hypothetical example RESEA

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[4] For a full treatment of cost-benefit analysis, the standard textbook on CBA is *Cost-Benefit Analysis: Concepts and Practice* (Boardman et al., 2018). *Economic Evaluation in Education: Cost-Effectiveness and Benefit-Cost Analysis* (Levin et al., 2018) is a standard treatment of cost analysis, with *Cost Analysis Step by Step: A How-to Guide for Planners and Providers of Welfare-to-Work and Other Employment and Training Programs* (Greenberg and Appenzeller, 1998) providing examples in an employment program context. A draft update of OMB Circular A-4 provides excellent discussion and context for many nuances of CBAs (OMB, 2023). Useful model CBAs for social programs relatively similar to RESEA include Greenberg and Appenzeller (1998), Schaberg and Greenberg (2020), and Chapter 6 of Fein et al. (2021).

CBA and Appendix B includes details of how tax rates recommended for CBA calculations were estimated.

2. Key Concepts of a CBA

We now define key concepts of a CBA, before introducing the RESEA CBA Template in Section 3.

- **Net benefit** is the main finding or result of a CBA. The net benefit is calculated as the sum of all incremental benefits less the sum of all incremental costs.

$$\text{Net Benefit} = \text{Incremental Benefits} - \text{Incremental Costs}$$

- **Incremental costs and benefits** refers to the changes in outcomes that are effects of the RESEA program, which are monetized (i.e., assigned a dollar value) whenever possible for a CBA. These make up the rows of the Template presented in Section 3.

    - **Incremental costs** are the value of resources used to provide RESEA and any resulting additional workforce system services used by treatment group members relative to comparison group members.

    - **Incremental benefits** include reduction in UI benefits paid and increased participant earnings and a variety of follow-on effects.

    - **Transfers** are benefits or costs that flow directly from one entity to another. A primary example in RESEA CBAs is UI benefits, which are paid by states to participants. Reductions in benefits paid are a positive incremental benefit (i.e., a gain) for states, but reductions in benefits paid are a negative incremental benefit (i.e., a loss) for participants. Similarly, additional taxes paid by participants (due to increased earnings) are directly offset as a benefit to federal and state governments that receive the tax payments. Even though such transfers result in no change to overall net benefit for society as a whole, transfers are important to include in a CBA because they do affect net benefit from a given perspective.

    The *incremental* concept is important. RESEA CBAs compare changes in costs and benefits for a treatment condition relative to a comparison condition.[5] This is the same concept as identifying the treatment and counterfactual in an impact study, as detailed in Section 4.1 of the *Evaluation Toolkit* (Mills De La Rosa et al., 2021). Impact estimates of changes in participant earnings and UI benefits paid are incremental benefits compared to what participant earnings and UI benefits paid would have been in a UI system experience in the comparison condition. RESEA program costs (or differential RESEA program costs for analysis of changes in program components) plus costs associated with *differential* use of workforce system services are incremental costs compared to the costs incurred in a counterfactual UI system experience by a comparison group.

    Sometimes it might not be clear whether to label an outcome as a cost or a benefit. That decision is not usually important, as long as the resulting change contributes correctly to the final net benefit calculation. In RESEA CBAs, this is the case for UI benefits. Participants expect RESEA program activities to shorten unemployment duration and decrease the total amount of UI benefit payments. This decrease in payment could be considered a cost of RESEA program participation to claimants. However, because reduction in UI benefit payments is a benefit to the state

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[5] The treatment condition is typically an additional service or services, and the comparison condition is typically the status quo. However, a CBA (or impact evaluation) could compare two alternatives, neither of which is technically the current status quo. Also, the increment need not be additional services. For example, a RESEA program status quo could include both an initial and a subsequent meeting. The treatment could be to eliminate the subsequent meeting, resulting in an increment relative to a status quo comparison condition of fewer meetings with lower (negative) incremental costs.

government and the word "benefit" is included in the name of the outcome, UI benefits seem natural to include as a benefit. As long as the reduction in benefits received is included in a way that decreases participant net benefit and increases state government net benefit, the decision of how to label changes in UI benefit payments does not alter any conclusions of a RESEA CBA.

What is the "RESEA intervention" and what is the comparison condition depends on what is being evaluated. If an evaluation is testing an incremental change to an RESEA program, such as an additional mandatory meeting, then the intervention includes the additional meeting whereas the comparison condition is the RESEA program without the additional meeting. What increment an evaluation is assessing in the CBA should be clearly and carefully documented.

- **(Non-RESEA) costs on the workforce system and (non-RESEA) costs on the UI system** reflect indirect costs brought on by changes that result from the direct costs of RESEA. Similarly, **fringe benefits, state and federal income taxes, sales taxes, and work-related expenses** reflect changes in earnings-related outcomes that result from changes in the primary earnings outcome.

- **Perspective** is the term for the various groups that have a stake in or are affected by the RESEA program. RESEA CBAs calculate incremental benefits and costs and net benefits for five perspectives: the state government, the federal government, the participants that are selected for the RESEA program, all others in society, and the "society (total)" perspective that sums across the other four perspectives.

- **Inflation adjustments** are made to monetized costs and benefits so that the monetized amounts of costs and benefits occurring in different time periods reflect the same underlying value of a dollar.

- **Discounting** is the practice of valuing benefits and costs that occur in later periods (including the future) less than those that occur in earlier periods, it is standard in CBAs and discussed in Box 4 on page 19. A **net present value** adds up a series of discounted amounts to a total value.

- **Non-monetized benefits and costs** are additional costs and benefits that can result from the RESEA program that are not captured in the net benefit calculation. These outcomes are not captured because they cannot readily be monetized (e.g., the psychological costs of unemployment) or could be measured but are likely beyond the scope of RESEA CBAs (e.g., changes in the use of means-tested benefits such as Supplemental Nutrition Assistance Program or Temporary Assistance for Needy Families). Though such possible outcomes are not monetized and included in net benefits, they should be acknowledged and discussed in a RESEA CBA.

- **Efficiency costs of government expenditures** are additional costs and benefits that reflect that "[government] expenditure has to be financed in some way." (Boardman et al., 2018). Raising government revenue, most commonly through federal and state income taxes, is associated with a reduction in overall economic output. So CBAs ideally include an estimate of this effect calculated based on net changes in government expenditures that result from the program.

- **Uncertainty** is the term for analysis that acknowledges that calculated CBA benefits, costs, and net benefits are estimates, many of which require assumptions about unobserved parameters and sometimes forecasts about outcomes that have not happened yet. Uncertainty also recognizes that outcomes could have played out in multiple different ways, which could have resulted in different realizations of costs and benefits.[6] Because estimates might be sensitive to economic conditions or other factors that are unpredictable, a CBA should incorporate sensitivity analyses and other approaches to characterizing the uncertainty of estimates of incremental benefits and costs and net benefits.

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[6] For example, the net benefits of a RESEA program if a recession occurs a year after implementation will be different from the net benefits in a strong labor market.

3. The RESEA CBA Template

Standard cost-benefit analyses of employment programs follow an accounting framework that we adapt into the **RESEA CBA Template**.[7] The Template is a table with costs and benefits as rows and perspectives as columns, with the final row the combined net benefit and the final column the total societal perspective. Exhibit 1 is a version of the standard framework tailored to RESEA, with costs, benefits, and totals as rows, perspectives as columns, and symbols "+," "−," "0," and "?" entered into cells to indicate hypotheses of whether the cost or benefit is positive, negative, or uncertain from those perspectives. The symbols will be replaced with dollar-valued estimates to conduct a RESEA CBA. The next section provides a step-by-step guide to using the template accompanied by recommendations for common assumptions and practices. This section introduces the template and research hypotheses for values that will be estimated and entered into the template. The next section provides details on estimating each value.

3.1. The Columns: Five Perspectives

RESEA CBAs estimate how incremental costs and benefits accrue to different "perspectives." CBAs include perspectives for groups that have a stake in or are affected by the RESEA program— the state government (*State Gov*), the federal government (*Federal Gov*), the participant (*Participant*), and a catch-all group of "the rest of society" (*Rest of Society*). A final perspective representing society as a whole, "*Society (Total)*," sums across the other four perspectives. The various stakeholder groups are affected differently by each cost and benefit included in the CBA.

> **Box 2. Advanatages of using the Reemployment Services and Eligibility Assessment Cost-Benefit Analysis Template**
>
> Reemployment Services and Eligibility Assessment (RESEA) Cost-Benefit Analyses (CBAs) conducted using the Template with high-quality data will provide a rigorous net benefit estimate to accompany an evaluation of a RESEA program, both for society as a whole and for the state government and claimants. These estimates can both guide state decision-making and contribute to a broader understanding of the effectiveness of reemployment services. Using a standard "RESEA CBA" approach will make it more likely that findings are comparable across state evaluations, improving the quality of the joint evidence base. At a minimum, we recommend that evaluations document per-participant costs so that future syntheses of research have the information needed to incorporate costs into meta-analytic research.

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[7]   See section 14.3 of Boardman et al. (2018).

Exhibit 1: The CBA Template, with Expected Directions of Values for a RESEA Program

	Incremental Cost/Benefit	Perspective				Society (Total)
		State Gov	Federal Gov	Participant	Rest of Society	
Costs	**RESEA Program Cost**		+			+
	(Non-RESEA) Costs on Workforce System		+			+
	(Non-RESEA) Costs on UI System		?			?
Benefits	**Reductions in UI Benefits Paid**	+		−		0
	Earnings			+		+
	Fringe Benefits			+		+
	State Income Tax	+		−		0
	Federal Income Tax		+	−		0
	Sales Taxes	+		−		0
	Work-related Expenses			−	+	0
Total	**Net Benefit**	+	?	?	+	?
Additional	**Efficiency Costs of Government Expenditures**				?	?
	Non-market Time			−		−
Total + Additional	**Net Benefit Including Additional Adjustments**	+	?	?	?	?

Below we illustrate how costs and benefits differ for various perspectives using two examples: RESEA Program Costs and UI Benefits Paid:

- The direct **RESEA Program Costs** are a federal expenditure, an incremental cost indicated as a "+" symbol in the *RESEA Program Cost* row and the *Federal Gov* column. No other perspectives (stakeholder groups) incur costs associated with implementing the RESEA Program. Thus, the *Society (Total)* column in the *RESEA Program Cost* row equals the federal government cost.

- RESEA programs are expected to decrease **UI Benefits Paid**, a positive benefit from a state government perspective, indicated as a "+" symbol in the *State Gov* column in the *UI Benefits Paid* row. However, the reduction in UI benefits is a loss from the participant perspective, indicated as a "−" symbol in the *Participant* column in that row. No other perspectives are directly affected by UI Benefits Paid. The state government and participant amounts offset, resulting in a "0" symbol entry in the *Society (Total)* column. Thus, UI benefits paid is one of the "transfer" outcomes in the CBA.

Other costs and benefits (discussed in detail in the next section, 3.2) are similarly allocated to the relevant perspective(s).[8]

3.2. The Rows: Costs

This section considers each *Costs* row of the RESEA CBA Template. First, we describe each cost and hypothesize a sign (+ or −) of how the cost affects each perspective. Second, we introduce an approach to estimating or approximating the dollar amount of the cost to be entered into the Template. For some rows, estimating/approximating the dollar amount is straightforward; for other rows, a rough approximation is likely the best that can be done. For most entries, Appendix A provides a hypothetical numerical example.

RESEA Program Costs

The federal government pays for state RESEA programs through grants. Thus, implementing the RESEA program is a cost to the federal government, represented as a "+" symbol, which is carried over to the *Society (Total)* perspective.

Below, we present three alternatives for estimating *RESEA Program Costs*. The first uses expenditure reporting to estimate an average cost per participant selected. The second combines observed incremental services use with external estimates of the unit cost of incremental services use. The third uses an "ingredients method" approach, which can require more evaluation resources. The right approach for a particular evaluation will depend on available data and resource budgets. Option 1 requires the least evaluation resources, as it uses existing administrative expenditure data. But it only provides an accurate estimate if the data aligns with the incremental service(s) being evaluated. Option 2 requires an intermediate level of evaluation resources by combining estimates of incremental service receipt, ideally from the impact evaluation, with estimates of unit costs of services. Here, the precision of cost estimates will depend on the accuracy of the unit cost and incremental service receipt estimates that the approach relies on. Option 3 is the most intensive in terms of evaluation resources as it develops unit cost estimates that might require additional data collection and also requires estimates of incremental service use. However, it is expected to provide the most precise estimates of RESEA Program Costs.[9]

Option 1: Administrative data average approach to estimating RESEA Program Cost

The total cost can be computed from reported expenditure data. States report expenditures for each calendar quarter to the U.S. Department of Labor on line 10e of DOL Form ETA-9130. States also report the number of participants selected for each calendar quarter on DOL Form ETA-9128.

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[8]   As noted in Section 2, though it is conceptually helpful to identify entries in the CBA Template as either costs or benefits, some entries could be entered into either category depending on the perspective being considered. As long as the entry is treated correctly in the overall net benefit calculation, this is an issue of labeling only. For example, an alternative (and valid) approach here would be to include *UI Benefits Paid* as a cost to the state government with a separate *UI Benefits Received* row added to reflect the benefit to the RESEA participant. In the RESEA CBA Template, we keep UI benefits, paid and received, on a single *UI Benefits Paid* row to emphasize where the perspectives offset and where the entry results in a net change to the total value.

[9]   Evaluation itself is often not included as a program cost in a CBA. This is based on an idea that an evaluation is not part of the program model. However, DOL views evaluation as an ongoing effort for improving outcomes for UI benefit recipients. As such, we recommend including evaluation costs with costs of administering RESEA.

Box 3. Principles in estimating costs or benefits

Throughout this handbook, we provide alternative approaches to estimating costs or benefits. Often, an approach that likely provides a more precise or data-driven answer requires more intensive data collection and more evaluation resources. An approach that relies more on assumptions or estimates that are external to the evaluation likely uses fewer evaluation resources but might provide a less certain estimate.

We suggest a few principles to keep in mind when selecting which approach to use.

- **Leverage existing data collection efforts to reduce the burden of more intensive approaches.** For example, something similar to an *ingredients method* approach (discussed in Section 3.1.2, Option 3) might have been used to estimate Reemployment Services and Eligibility Assessment (RESEA) program costs in the state(s) being evaluated for Element 9 of the RESEA Grant State Plan. To review, update as needed, and use those estimates for the Cost-Benefit Analysis (CBA) would demand fairly minimal evaluation resources. However, if Element 9 responses in the State Plan are not relevant to the treatment-comparison contrast being assessed in the intervention and evaluation resources are limited, a cost estimate based on administrative data might be preferable.

- **Focus evaluation resources on elements that are likely to be important for calculating net benefit**, based on the program design being evaluated, claimant population, and impact study findings. For example, tax implications of earnings changes can be estimated in two ways. The first, *small group simulations*, takes more evaluation resources but gives a more precise estimate that can be used in individual-level statistical impact models. The second way applies a single average tax rate to the estimated earnings impact and requires little to no evaluation resources. If claimants have a wide range of earnings and household compositions and earnings impacts are fairly large, then simulations of changes in tax liabilities could provide critical precision and detail to estimating tax implications that will be important to the net benefit calculation. However, if claimants are similar in earnings level and household composition or earnings impacts are small, then using a single average tax rate is likely adequate.

- **Carefully document the approach selected, and any relevant motivation.** This helps users of the CBA understand the findings and it supports evidence-building efforts that compare and combine findings across evaluations.

- **Conduct sensitivity analyses** that alter estimates used or implement alternative methods (particularly when the alternative method is the low-resource option).

Cost per participant selected (*not per participant served*) can be estimated as total program expenditures divided by total participants selected:

$$\text{RESEA Program Cost per participant} = \frac{\text{Total RESEA program expenditures}}{\text{Total RESEA participants selected}}$$

If multiple quarters are observed in an evaluation, an average over observed quarters of the calculated RESEA Program Cost per participant can be used.

When using the administrative data average approach, take extra care to confirm that the estimate represents the incremental cost of interest in the evaluation. This is straightforward if the evaluation treatment group is receiving the RESEA program and the comparison group is assigned to not receive any RESEA program elements. However, many evaluations are testing the addition (or omission) of a specific component (or group of components), with the comparison group receiving the business-as-usual RESEA program, rather than no RESEA. In this setting, line 10e of DOL Form ETA-9130 will not distinguish between expenditures for the business-as-usual condition and the version being tested, and so cannot be used to directly estimate the incremental cost.

To use the administrative data average approach to estimating the RESEA Program Cost when the comparison condition includes some RESEA services, an alternative data source that has component-level expenditures would be required. Or, qualitative information from program implementers can be collected to determine a reasonable percentage of expenditures (for treatment group members) that can be allocated to the incremental program elements being assessed in the evaluation. Then the estimate to enter into the template would be the following:

$$\text{Incremental RESEA Program Cost} = \Delta_E * \text{RESEA Program Cost per participant}$$

where Δ_E is an estimate of the share of expenditures used to provide the component(s) being tested (as a share of expenditures on all services provided to treatment group members).

Option 2: External unit cost estimate approach to determining RESEA Program Cost
An alternative formulation of the cost of incremental RESEA service use leads to a second option for estimating The RESEA Program Cost. The per-participant incremental cost of a given service equals the incremental service use per participant multiplied by the cost of a unit of service use.

$$\text{Incremental RESEA Service Cost} = \text{Cost per unit of Service} * \text{Incremental Units of Service}$$

Particularly for evaluations of an additional RESEA component, this formulation provides a straight-forward approach to estimating costs. Administrative data can provide an estimate of the average incremental units of service received by RESEA participants. This value can then be multiplied by an estimate of the cost per unit of service. The result is an estimate of the incremental RESEA service cost, which can then be added to a similar estimate for any additional services that make up the incremental RESEA program being evaluated. The total sum of all such incremental RESEA service costs is an estimate of the incremental *RESEA Program Cost* to enter into the RESEA CBA Template. Sources for an estimate of the cost per unit of a service include a State Plan or a published cost analysis of a very similar service.[10]

Exhibit 2 lists unit cost estimates available in the literature for a variety of services. Before using such a cost estimate, compare the details of the resources used to provide the service in the cost estimate source versus the resources used to provide the service in the RESEA evaluation. Then make adjustments to the cost estimate as needed. In the next option, an estimate of cost per unit of service is developed as part of the evaluation.

Option 3: Ingredients method approach to estimating RESEA Program Cost
The ingredients method for estimating the incremental cost of program services tallies, input by input, the resources used to provide the program being assessed in a cost or cost-benefit analysis; monetizes the value of each resource used; and sums them together to a single dollar amount.[11]

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[10]   Attachment II of RESEA State Plans provides many estimates that could be used in Option 2.
https://www.dol.gov/sites/dolgov/files/ETA/advisories/TEGL/2022/TEGL%2008-22/Attachment%20II.pdf

[11]   Chapters 4 to 6 of Levin et al. (2018) develop the "ingredient method" for estimating costs of ongoing programs. For a detailed treatment of cost analysis in a workforce services context, see Greenberg and Appenzeller (1998). Mastri and McCutcheon (2015) apply these methods to estimating the cost of services under the Workforce Investment Act (WIA). Hendra et al. (2016) apply related methods to job training programs.

Exhibit 2: Benchmark Per-Unit Service Costs

Reference	Service	Year of $ estimate	Unit Cost Estimate[1]
Trutko, J., et al. (2022). *RESEA Program Strategies: State and Local Implementation.* Report submitted to U.S. Department of Labor, Chief Evaluation Office. Rockville, MD: Abt Associates.	Initial RESEA Meeting (Exhibit 2-3)	2021 (RESEA State Plan)	Median: $155 per initial meeting Range: $19 to over $350 Std Dev approximation: $85
	All funded RESEA activities (Exhibit 2-1) (Total RESEA Funding/Number of Claimants Scheduled for their First RESEA Session)	2015-2020	2015: $77 2016: $100 2017: $101 2018: $102 2019: $128 2020: $198 All are per RESEA claimant
Mastri, A., & McCutcheon, A. (2015). *Costs of services provided by the WIA Adult and Dislocated Worker programs.* U.S. Department of Labor. (Figure 1, Table 3)	Resource room (single visit)	2011 or 2012	Average: $16 per visit Range: $3 to $92
	Structured assessment (testing materials and scoring fees only)	2011 or 2012	Average: $13 per assessment Range: $0 to $62
	Job club (one meeting)	2011 or 2012	Average: $38 per person Range: $4 to $196
	Workshop (average duration and staffing)	2011 or 2012	Average: $54 per customer Range: $7 to $156
	One-on-one counselor meeting (one hour meeting, preparation, and follow-up)	2011 or 2012	Average: $143 per meeting Range: $70 to $355
Poe-Yamagata, et al. ((2011). *Impact of the Reemployment and Eligibility Assessment (REA) Initiative.* U.S. Department of Labor. (Exhibit 40)	Florida REA program	2009	$54 per treatment group member
	Idaho REA program (blended in person and online)	2009	$12 per treatment group member
	Illinois REA program (blended in person and online)	2009	$134 per treatment group member
	Nevada REA program (blended in person and online)	2009	$53 per treatment group member
	Nevada Reemployment Services program	2009	$148 per treatment group member

[1] Unit costs are reported in the units (per person, per customer, etc.) used in the reference publication.

A RESEA CBA determining program costs using the ingredients method would do the following.

- **Step 1:** *Determine the incremental program services* provided to the evaluation treatment group relative to the comparison group. *Unemployment Insurance Program Letter No. 02-23* (DOL, 2023) identifies services of a RESEA program to include:

    1. **Initial RESEA** — "the first meeting between a RESEA service provider and a UI claimant."

    2. **Subsequent RESEA** — any follow-on meetings required by states as part of their RESEA programs.

    3. **Reemployment Services** — referrals provided using RESEA funding or through other programs, particularly the Workforce innovation and Opportunity Act (WIOA).

    4. **Training** — through referral to available services (i.e., not funded by RESEA).

    Any service differential between the treatment group and comparison group provided as part of the RESEA program should be identified and listed in Step 1.

- **Step 2:** *Define a "unit quantity"* concept for any incremental services received in Step 1. For example, if treatment group members receive a subsequent RESEA but comparison group members do not, the unit quantity would be a single follow-on RESEA meeting.

- **Step 3:** *Determine the average incremental number of units received* by treatment group members relative to comparison group members for all incremental services identified in Step 1.[12] Ideally, this will be based on an analysis of service delivery tracking records or survey data. If necessary, qualitative interviews with program administrators can be used for this determination.

- **Step 4:** *Develop a unit cost estimate* of providing a unit quantity of the service. This requires listing all resources used to provide the services identified in Step 1. Exhibit 3 gives an example listing of resources to provide example RESEA activities. When developing this list and the ultimate cost estimates, the guiding principle is that *all* resources should be identified and included in the table *once.* Levin et al (2018) specify "three overriding considerations" when listing resources used to provide a program:

    1. Resources should be listed "in sufficient detail that their value can be ascertained in the next stage of the analysis." Detail on staffing should be adequate to match to a salary range. Characteristics of a facility (e.g., size of room needed for workshop) should be adequate to determine a reasonable rental rate for the facility.

        Description and category of resources should be clear and consistent but will differ from one program (or evaluation) to the next, depending on the specifics of the program and implementing organization. For example, some organizations develop an "overhead" rate as a percentage of staff salaries that includes insurance, facilities costs, organization-level management, and other organization-wide costs. This might be easiest to include through staffing cost line items. Other organizations separate these costs on organization-wide expenditure reports making it more straightforward to allocate the costs to the program activities based on the share of organization expenditures represented by the program.

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[12] If participant-level data on services received is available, a more precise estimate of costs is possible. To do so, the individual-level unit quantity of services received is multiplied by the unit cost for each service received and summed over services to a participant-level cost of services received. If all RESEA services are observed and costed for both treatment and comparison members, the impact on the resulting individual cost of services received can be estimated using the same statistical model used for other outcomes in the impact evaluation.

2. "The degree of specificity and accuracy" targeted when listing resources should reflect the relative importance of the ingredient to the overall cost estimate. For RESEA programs, staff time likely contributes most to the cost estimate of most services. So accurately understanding caseloads, time spent on preparation, time spent with participants, and the extent of management of service-level staff should be a higher priority than assessing the exact value of office space used to conduct a RESEA meeting.

Exhibit 3: Example Ingredients List for Example RESEA Program Services

RESEA Service	Detailed Activities	Resource(s)	Resource Cost	
			Resource	**$ per Meeting**
Initial RESEA Meeting	• Eligibility Review • Labor Market Information • Individual Reemployment Plan • Information on Other Workforce Services • Preparation and Follow-up	• RESEA staff time (e.g., 60 minutes) • Office space • Booklets/pamphlets, or other materials • Staff management	Staff (wages/salaries, benefits, employer taxes, overhead)	$ -
			Office space allocation (prorated based on staffing, square footage, or other)	$ -
			Materials	$ -
			Staff management (prorated)	$ -
			Total Unit Cost of Service:	**$ -**
Subsequent RESEA meeting	• Individual Reemployment Plan • Information on Other Workforce Services • Preparation and Follow-up	• RESEA Staff time • Office space • Booklets/pamphlets, or other materials • Staff management	Staff (wages/salaries, benefits, employer taxes, overhead)	$ -
			Office space allocation (prorated based on staffing, square footage, or other)	$ -
			Materials	$ -
			Staff management (prorated)	$ -
			Total Unit Cost of Service:	**$ -**
Referral to Reemployment Services or Training	• Review of Participant Characteristics • Referral Communication • Follow-Up	• RESEA Staff time • Staff management	Staff (wages/salaries, benefits, employer taxes, overhead)	$ -
			Staff Management (prorated)	$ -
			Total Unit Cost of Service:	**$ -**

The Step 4 detail already might have been largely compiled as part of preparing a RESEA State Plan. However, take care to align the costs calculated for a RESEA CBA with the concept of incremental service receipt. Resources for determining the monetary cost of identified resources include expenditure reports, interviews with program staff and organization financial and operations staff, and published estimates.

Step 4 should capture whether there are multiple funding sources for services provided. The expectation is that all RESEA program services are funded by the federal government. However, it is likely that state funds or partnerships with outside service providers (e.g., nonprofit organizations) also support RESEA activities—including by providing physical space and digital infrastructure for RESEA staff and meetings. If so, costs should be separated into the relevant "perspective" categories from Exhibit 1. That is, *Federal Gov*, *State Gov*, and *Rest of Society* (e.g., nonprofits) costs should be calculated separately.

Published examples of unit costs of services similar to RESEA program services are listed in Exhibit 2. These provide benchmarks and examples of how costs have been determined in prior evaluations.

- **Step 5:** Multiply the estimated unit cost(s) in Step 4 by average incremental units received for each incremental service identified in Step 1 and sum over all identified incremental services (separately for each perspective, if relevant). The resulting sum is an ingredients method **estimate of the incremental RESEA Program Cost per participant** that is entered into the RESEA CBA Template in the federal government column, with costs to other perspectives also entered as relevant. Any costs in the row are then summed and entered into the total society as a whole column.

(Non-RESEA) Costs on Workforce System

RESEA programs often refer selected participants to other non-RESEA services provided by the state's workforce system; for example, to a job search workshop or a resume writing workshop (USDOL, 2023a). These other workforce system services are usually paid for by states using federal WIOA Adult and Dislocated Worker grant funds. Thus, such non-RESEA services are also a cost to the federal government.[13] Because we expect RESEA program participation to increase participants' use of such services, we enter a "+" in the *Federal Gov* column of Exhibit 1, which then is carried over to the *Society (Total)* column.[14]

These costs are conceptualized as the sum over any relevant services of the incremental per-participant unit cost of the service multiplied by the additional units of the service used by treatment group members relative to comparison group members. For each relevant service, the incremental per-participant (non-RESEA) Workforce Service Cost is

$$(\text{Non-RESEA}) \text{ Workforce Service Cost} = \text{Unit Cost of Service} * \Delta\text{Units Received}$$

where ΔUnits Received is an estimate (or approximation) of the average incremental quantity of services received by the treatment group (relative to the comparison group). The unit cost of service is determined for each perspective that shares in the cost of providing the service, so that the cost can be allocated across perspectives as relevant. All (non-RESEA) Workforce Service Costs are then summed to an estimate of (non-RESEA) Costs on the Workforce System, and entered into the Template.

The preferred approach to estimating these costs would be, first, to estimate the RESEA program impact on the quantity of services received by participants selected receive RESEA using the same statistical model used in the impact analysis. Then, multiply that quantity impact by estimates of the unit cost of the services, ideally based on the ingredients method. In principle, it is possible to estimate the impact on the quantity of other workforce system activities (e.g., hours of group and one-on-one activities). These activities are often recorded in state workforce data systems.

However, incorporating the relevant workforce system administrative data into the impact analyses of a RESEA evaluation could be beyond the scope of a RESEA evaluation. (For example, it was not done by

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[13] Additional services are likely to be used because (1) RESEA programs often make mandatory referrals to such other workforce system services, and (2) RESEA programs often follow up on attendance at the referred services. When participation in those other activities is mandatory, failure to attend can bring UI benefit consequences (e.g., suspending benefits until attendance is completed). Limited qualitative field work suggests that follow-up by RESEA program staff is uneven and benefit consequences even less common (Trutko et al., 2022).

[14] It is possible that RESEA staff also refer participants to services wholly or partially supported by state or private funding. If this represents a non-negligible amount of services provided, cost estimates should also be developed for those columns for any such services received.

Klerman et al. (2019) in a study of REA, a precursor to RESEA, and it has not been requested by most state RESEA impact RFPs.)[15] Similarly, there might not be a standard source for estimates of the cost per hour of each activity. Unit cost information and overhead rates in a RESEA State Plan could provide a useful starting point. Additional sources of unit costs are interviews with administrative staff of the relevant service providers and published estimates. A state's process for WIOA performance reporting to the USDOL may be another source of unit cost estimates.[16] Exhibit 3 also includes example workforce service system unit costs from the available literature.

If estimating the incremental units received is beyond the scope of the RESEA evaluation, the CBA will likely need to develop an approximation for this amount. As a framework for thinking about this approximation, consider that the incremental units of services received is the difference in the average services received by treatment group members and the average services received by comparison group members:

$$\Delta\text{Units Received} = \text{Treatment Group Average Units} - \text{Comparison Group Average Units}$$

The treatment group average units received could be approximated as the share of RESEA participants referred to a particular service multiplied by an estimate of the take-up rate for those referred. Both quantities might need to be approximated by RESEA program staff. The comparison group average units could be approximated as the share of all UI recipients who access a particular service, adjusted as necessary to reflect whether RESEA-eligible UI recipients are more or less likely to access the service. Again, workforce system staff approximation might be the best available estimate for this amount.

Whatever approximations or estimation approaches are used should be carefully documented. The resulting total *(non-RESEA) Costs on Workforce System*, the sum of the cost of all identified additional services accessed, should be entered into the Template under the *Federal Gov* perspective and carried over to the *Society (Total)* perspective.

(Non-RESEA) Costs on UI System

"Eligibility assessment" in the RESEA program's name signals a second type of activity in addition to reemployment services. Attending a RESEA meeting is itself a requirement to continue receiving UI benefits. This requirement itself could alter the cost of administering UI benefits for RESEA program participants, if UI system administrative actions increase in response to missed RESEA meetings. Additionally, as detailed in Chapter 4 of Trutko et al. (2022), RESEA staff are to refer potential non-compliance issues identified during the RESEA meeting to adjudication, which can also result in the non-compliant participant losing UI benefits for a period. So, RESEA meetings represent an additional avenue for UI participants to be referred to adjudication, which can result in more UI system administrative actions per participant for RESEA participants.

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[15]   As with RESEA Program costs, either an administrative average approach or ingredients method approach could be used to estimate (non-RESEA) Workforce System costs, if evaluation resources allow.

[16]   WIOA Annual Performance Report ETA-9169 requires reports of cost per participant, but only for the broad categories of "career services" and "training services." However, WIOA implementation technical assistance providers have produced tools that allow unit costs to be estimated at a finer level. WorkforceGPS has a tool that builds up costs from spending on specific types of training and career services. Expenditures by such categories divided by the number of individuals served would provide a unit cost of each specific training or career service. See https://performancereporting.workforcegps.org/resources/2019/07/05/13/29/Cost-Per-Participant-Tool-WIOA-Annual-Performance-Report .

The RESEA program can also decrease (non-RESEA) Costs on UI System. Because UI benefits are processed each week, shortening the duration of UI benefit receipt (whether by employment or by ineligibility adjudication) will avoid some weekly administrative cost.[17]

The federal government pays for UI system administration through quarterly grants from federal appropriations.[18] Because it is not clear whether increased adjudications increase administrative costs more or less than decreases in the duration of benefit receipt decrease administrative costs, we enter a "?" symbol in the *Federal Gov* column, and carry it over to the *Society (Total)* column.

As with (non-RESEA) Costs on Workforce System, ingredients method approaches for measuring unit costs and participant-level data on UI system activities is likely beyond the scope of RESEA evaluations. So again, input from UI system staff can be important in approximating these costs. To approximate, we suggest considering the impact of RESEA on (1) the weeks of UI benefits received and (2) adjudications or other UI administrative actions during the current spell. Looking at each of these:

1) **Weeks of UI benefits received** is a standard outcome of RESEA impact evaluations. To value the cost of changes in weeks of benefits received, this impact estimate should be multiplied by an estimate of the unit cost of administering a week of UI benefits. The right concept here is a "middle" week of benefit processing, as the first week and last week of benefit administration likely have a different cost, and every spell, no matter how short, has a first and last week. So an intervention like RESEA will only affect the number of "middle" weeks. This estimate can come from UI system administrators. Another source is Resource Justification Model (RJM) data, discussed below.

2) Effects of RESEA participation on the frequency of **adjudications or other UI administrative actions** are less likely to be measured in RESEA impact evaluations. Implementation evaluations or input from UI staff are likely the best sources to estimate the share of RESEA participants referred to adjudication and the share of comparison group members that are likely referred to adjudication. The approximated difference is a unit quantity of administrative actions taken, which should be multiplied by an estimate of the unit cost of an administrative action. This cost can be approximated using input from UI administrators, or from RJM data.

RJM "is a data collection system that collects UI administrative expenditures" (USDOL 2023b). Data analysis files report annualized workloads for UI administrative tasks including initial claims, weeks claimed, non-monetary determinations, appeals, wage records, and subject employers. Total expenditures allocated to each of these task categories are also reported.[19] One estimate of per-unit administrative costs is total annual expenditure allocated to the task divided by total annualized workload of the task. For example, averaging the unit cost for weeks claimed task calculated for all states and the District of Columbia for the 2023 current fiscal year data results in an average administrative cost of about $4 per week claimed. Other costs are much larger, on average. For example, the average administrative unit cost of a non-monetary determination was $76, while an appeal unit cost was, on average $322.

For each UI activity that results in an administrative cost, multiply the average incremental unit of UI activities by an estimate of the per-unit cost of the associated administrative action. This provides a cost

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[17] There is also some evidence of potential longer-term (Year 2 after assistance) effects of RESEA type services on employment (Klerman et al., 2019). This would suggest fewer subsequent spells, which would lower UI administrative costs. However, existing estimates (0.016 quarters of additional employment) suggest the effect is likely small enough to either be ignored or discussed only as a potential, non-monetized effect.

[18] See https://bipartisanpolicy.org/explainer/funding-the-unemployment-insurance-programs-administrative-costs/ for a brief overview of UI administrative cost funding.

[19] The most recent budget year summary files of RJM for all 50 states and the District of Columbia can be downloaded from https://oui.doleta.gov/rjm/.

estimate for each incremental UI activity. The sum of all such cost estimates is the estimate of the (non-RESEA) Costs on UI System.

Because UI administration costs are paid using federal grants, the resulting cost estimate should be entered in the *Federal Gov* perspective column of the Template and carried over in the *Society (Total)* column.

3.3. The Rows: Benefits

This section considers each *benefit row* of the CBA Table. Specifically, for each row of the table, it considers (1) the sign of the impact for each perspective; and (2) how to estimate (or, where necessary, to approximate) the dollar amount. As for the cost rows, for some benefit rows, estimating/approximating the dollar amount is straightforward; for other rows, a rough approximation is likely the best that can be done.

UI Benefits Paid

As noted in Section 2, UI benefits paid are a **transfer** from the state government to participants. A decrease in UI benefits paid is a positive benefit to the state government, indicated as a "+" in the *State Gov* column in Exhibit 1. However, the same amount is no longer received by participants, resulting in a negative benefit to them, indicated as a "−" in the *Participant* column in the exhibit. There is no change in the incremental benefit to society as a whole, indicated as a "0" in the *Society (Total)* column.[20]

The impact on UI benefits paid per participant selected is a relevant outcome for a RESEA impact evaluation. That is, the impact estimate for a UI Benefits Paid outcome (estimated from individual-level participant data) should be entered into these cells, with the appropriate sign for the *State Gov* and *Participant*. If the impact analysis measures weeks of benefits received instead of amounts, an average benefit per week estimate can be used as a "unit benefit" monetized amount and multiplied by the measured weeks of benefits received.

We would expect most of the impact on benefits to occur shortly after the initial claim. For RESEA CBAs, the first two quarters after the initial claim should be included, and the first four quarters are preferred.[21] Klerman et al. (2019) provide some evidence of longer-term (into Year 2), but much smaller, impacts on benefits paid. Unless a long-term RESEA impact evaluation discovers larger longer-term impacts, differences in UI benefit receipt after the first four quarters can be included in a discussion of possible additional benefits not monetized.

Earnings

The RESEA program is expected to increase earnings because participants are working instead of being unemployed. Earnings also could increase because workforce system assistance can result in better employment matches that lead to fewer subsequent unemployment spells and higher earnings. Higher earnings are a benefit to the participant (and to society as a whole), as they represent increased economic

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[20] The administrative cost savings could be included in the *UI Benefits Paid* row, resulting in an additional savings to the federal government. However, we choose to conceptually address this savings, together with the possibility of increased adjudications, as a cost in the *(Non-RESEA) Cost on UI System* row of the exhibit. Either approach is valid, as long as the administrative cost effect is capture in the resulting net benefit.

[21] If data on only the first two quarters are available, results reported by Klerman et al. (2019) suggest that using half of the amount of UI benefits paid in the first two quarters as an estimate of benefits paid in quarters three and four would be an appropriate approximation.

activity. This is again represented as a "+" symbol in the *Participant* column (and carried over to the *Society (Total) column)* in Exhibit 1.[22]

The impact on earnings per participant selected is a standard outcome in an impact evaluation of a RESEA program. Most of the impact on benefits is likely to occur shortly after the initial claim. Ideally, impacts on total earnings over the follow-up period, adjusted for inflation and discounting if the follow-up is longer than one year (see text box on page 19), are estimated using the same statistical model used in the impact analysis. For RESEA CBAs, the first two quarters of earnings after the initial claim should be included (i.e., the quarter of the initial claim plus two additional quarters), and the first four quarters are preferred.[23] To do so, the total impact on earnings should be summed, adjusting for the time value of money for earnings that occur a year or more after the program costs are incurred. Klerman et al. (2019) provides some evidence of earnings gains persisting into the second year after an initial claim.

We recommend not imputing additional years of earnings in the main RESEA CBA Template findings if follow-up data are not available to the evaluation. Rather, a sensitivity analysis should include imputed earnings for two to three additional years. For such an analysis, consider imputing that Year 2 earnings impacts are half of the impacts observed in Year 1, that Year 3 impacts are half again those imputed for Year 2, and that there are no additional impacts after Year 3.

The resulting incremental earnings estimate for the entire follow-up period is entered in the *Participant* column and carried over to the *Society (Total)* column in the CBA Template.

Fringe Benefits

Most workers get fringe benefits in addition to earnings and those fringe benefits are a sizable fraction of compensation. Like earnings, this compensation is a benefit to the participant (and to society) as it reflects increased economic activity. A "+" is hypothesized in the *Participant* column of Exhibit 1 (and carried over to the *Society (Total)* column) to reflect this compensation that accompanies higher earnings.

The Bureau of Labor Statistics (BLS) publishes quarterly estimates of "the average employer cost for wages and salaries as well as benefits per hour worked" (https://www.bls.gov/news.release/ecec.htm). Estimates for March 2023 indicate that the median hourly wage (or salary) for civilian workers was $22.23, with total benefits providing an additional $10.57 of hourly compensation, a number that includes paid leave, overtime pay, insurance, retirement and savings, and some additional legally required benefits.[24] Based on this estimate, RESEA CBAs can use 48 percent, (10.57/22.23) as an estimate of the value of fringe benefits based on earnings impacts.

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[22] See Section 14.4.2 of Boardman et al, (2018) for a discussion of the full-employment assumption required for increased participant earnings to represent a one-to-one increase in societal net benefit. See Crépon et al. (2013) and Lise, Seitz, and Smith (2004) for work describing settings where this assumption might not hold. Nevertheless, we recommend RESEA CBAs make this standard assumption.

[23] If only the first two quarters of data are available, we recommend, based on Klerman et al. (2019), that the total Q3 + Q4 impact be imputed as 75 percent of what was observed in Q1 + Q2.

[24] From https://www.bls.gov/news.release/ecec.t08.htm and https://www.bls.gov/news.release/ecec.nr0.htm .

Box 4. Adjusting for inflation and the time value of money

In a Cost-Benefit Analysis (CBA), costs and benefits are compared as if they were in the same year—in our case, usually the year in which the claimant was selected for Reemployment Services and Eligibility Assessment (RESEA). For most costs and benefits related to RESEA, this is not a major issue—the overwhelming share of earnings impacts is expected to occur within a year of when the claimant was selected. For some parts of the CBA, however, this can be an issue. For example, a cost estimate (e.g., the cost per hour of group sessions) could be drawn from an earlier period. Or impacts on earnings could extend into a second or third year after RESEA participation.

Two adjustments are required when monetary values from different time periods are compared or combined. These are referred to as inflation and discounting.

Inflation. When summing or comparing dollar values across time periods, the values must be adjusted for **inflation,** which is prices in general rising over time. Because of inflation, dollars at future dates buy less than dollars in the year of selection for RESEA. An adjustment is required because we want dollars to have common buying power.

CBAs and other analyses adjust for inflation using the Consumer Price Index (CPI). Annual CPI values can be found at https://data.bls.gov/timeseries/CUSR0000SA0 (select the "include annual averages" box for annual averages). For example, to convert $100 in 2022 to its value in a 2021 base year, multiply the $100 by the ratio of 2021 to 2022 CPI, or $100*(270.97/292.66)=$92.59. Any two years can be compared using a calculator found at https://data.bls.gov/cgi-bin/cpicalc.pl.

If a unit cost (or benefit) parameter needs to be adjusted because it is an estimate from a different calendar time period, an inflation adjustment is applied so that the unit cost is denominated in the same year that the estimated incremental unit quantity occurs.

Discounting. The second adjustment CBAs make to account for monetary values from different time periods is referred to as **discounting.** Having something today is preferred to getting it tomorrow. This is why it costs interest to borrow money. In a CBA, the rate at which money next year is valued relative to money today is known as the *discount rate*. What discount rate to use in a CBA is the subject of a large literature and can depend on the nature of the policies being informed by the CBA, the type of investment (i.e., program) being considered, and the characteristics of the population affected. Boardman et al. (2018) devotes Chapter 10 to discussing various approaches to discounting.

For RESEA CBAs, we recommend using a Social Time Preference Method, and following the guidance of Boardman et al. to **use a discount rate of 3.5 percent**, with sensitivity analysis conducted at higher and lower alternatives. Because recent draft federal Circular A-4 (OMB, 2023) suggests a 1.7 percent discount rate, RESEA CBAs should conduct sensitivity analyses using this lower rate and a higher 5.5 percent rate. However, given that most costs and benefits of a RESEA program are expected to occur in the year of the initial claim, or shortly thereafter, CBAs for RESEA are unlikely to be sensitive to the choice of discount rate.

A monetary amount is discounted by multiplying it by a discount factor, which equals

$$1 / (1 + discount\ rate)^{\text{Years}}$$

where Years is the number of years between the baseline year and the value that should be discounted. So, $100 observed in 2023 is valued as $93 dollars in 2021:

$$\$100 * \frac{1}{(1 + 0.035)^2} = \$100 * 0.93 = \$93$$

Both inflation adjustments and discount rates should be applied to claimant-level data prior to estimating impact models wherever possible. Otherwise, inflation adjustments and discount rates should be applied to incremental cost and benefit estimates that occur later than the baseline year, which is typically the year when most study participants were randomly assigned. Notes on tables presenting CBA findings should indicate the base year and how inflation and discounting were conducted.

However, there is significant variation in what portion of compensation is composed of fringe benefits across wage levels, industries, and geography. For example, at the 10th percentile of wages nationally, fringe benefits are just 25 percent of wages. Unemployment and RESEA participation are more likely for workers who return to employment at lower than median wages. There are a variety of reasonable approaches to adjusting to an estimate that is more applicable to the RESEA-eligible population being evaluated. These range from taking a simple average of 25 and 48, (or about 37 percent) to researching BLS figures for the geography and average sample characteristics relevant to the evaluation.[25]

An evaluation that used a 37 percent approximation for the value of fringe benefits resulting from increased earnings would multiply the incremental earnings estimate from the *Earnings* row by 0.37 and enter that amount in the *Participant* row and carried over to the *Society (Total)* row in the CBA Template.

State and Federal Income Taxes

Increased earnings typically induce higher state and federal income taxes paid. Changes in taxes are a transfer from participants, indicated as a "−" in the *Participant* column in Exhibit 1, to the state government and to the federal government, indicated as a "+" in those columns. Taxes are thus neutral for society as a whole, indicated as a "0" in the *Society (Total)* column.

Below we present two options for estimating the state and federal income tax implications of a change in earnings. The first is to use approximations based on marginal tax rates computed for a representative household. The second is to estimate taxes for a RESEA evaluation's sample.

Option 1: Approximate tax rates
Appendix Exhibit B-1 provides approximate tax rates (calculated for this handbook) that can be applied to incremental earnings estimates in RESEA CBAs. The approximations are generated using the National Bureau of Economic Research's TAXSIM, a computer program that "[calculates] liabilities under US Federal and State income tax laws from individual data" (Feenberg & Coutts, 1993). The tax liabilities are estimated using characteristics of a represented household experiencing unemployment, with the characteristics estimated using the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC). Additional details are provided in Appendix B.

To calculate incremental state and federal income tax effects due to RESEA participation using this first option, multiply incremental earnings by the relevant percentage listed in Exhibit B-1. Enter the amounts as a negative value for participants and a positive value for the state and federal government, respectively.[26]

Option 2: Estimate individual tax liabilities using evaluation sample characteristics
If an evaluation has information about marital status, the number of household members (preferably by age), and household income for a sample of households in a RESEA evaluation, the TAXSIM software

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[25] Note that this percentage includes "legally required benefits" of the employer's contribution to Social Security, Medicare, federal and state UI, and Workers' Compensation. Social Security and Medicare represent public retirement programs that participants will ultimately receive benefits from. Unemployment Insurance and Workers' Compensation are insurance against risk of job loss or injury, which are also benefits to the participant. The government is an intermediary for these benefits, but ultimately the benefit is directed to the participant.

[26] Note that some tax rates are negative. This is because, on average, households experiencing unemployment in these states are predicted to have larger refundable tax credits (e.g., earned income tax credit and child tax credit) as income increases. In these cases, the *Participant* perspective will show a positive benefit, and the *Federal Gov* and *State Gov* perspectives will show a negative benefit in the Template.

can be used to estimate individual tax rates.[27] This approach is often complicated because data privacy restrictions limit the amount of information about participants that can be combined with earnings data that is most commonly used for RESEA impacts evaluations, such as the National Directory of New Hires (NDNH).

As an example of how these challenges might be overcome, Fein, Dastrup, and Burnett (2021) conducted a CBA that created small groups of study participants based on earnings (observed in the NDNH), and marital status and the presence of children from surveys conducted for the evaluation.[28] Average earnings for each small group were calculated in the NDNH data.

The CBA then created a lookup file of tax rates by using TAXSIM to generate estimates of tax liabilities for all combinations of household compositions and average earnings that could be observed in the evaluation data. That is, it estimates a tax liability profile for each permutation of household composition variables (e.g., single individual or two individuals with zero, one, two, three, four, or five dependents of various ages) and each average earnings amount for the NDNH study groups (with adjustments made based on survey data to account for dual-income households). Note that no individual-level data was submitted to TAXSIM.

Finally, each small study group was assigned the tax liability profile that matched its characteristics, and treatment effects were estimated using a similar impact model to that used to estimate earnings impacts. RESEA CBAs that take this approach would enter the impact on federal and state tax liabilities into the RESEA CBA Template in the respective cells for *Federal Gov*, and *Participant* perspectives.[29]

Sales Taxes

Increased participant earnings result in increased consumer spending. In most states, some of this spending will be taxed as sales tax. This would decrease the *Participant* earnings benefit, a "−" in Exhibit 1, and directly increase the *State Gov* benefit, shown as a "+". This transfer offsets from the *Society (Total)* perspective.[30] Exhibit B-1 provides estimated effective sales taxes for each state. Details on how these rates are estimated are provided in Appendix C. RESEA CBAs can choose to adjust assumed effective sales tax rates based on the characteristics of their sample.[31]

To estimate incremental sales taxes, multiply incremental earnings estimates by the effective sales tax rate for the state (from Exhibit B-1). Enter this amount as a negative value for participants and a positive value for the state.

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[27] Given individual-level information on income and family structure, TAXSIM computes a variety of information about federal and state taxes due for a given state and year, including marginal state and federal tax rates. A marginal tax rate is the tax rate that applies to an additional (or the last) dollar of income. This is the appropriate tax rate for a CBA because incremental earnings align with this concept of marginal income. More information on TAXSIM is provided in Appendix B.2.

[28] Because of data privacy restrictions, each group had at least 10 participants.

[29] Note that the TAXSIM output includes the employer portion of payroll (FICA) taxes. If an evaluation includes these taxes here, it will result in an amount for the federal government that is larger than participant liabilities. If these are included here, they should *not* be included as "legal required benefits" with other participant fringe benefits.

[30] A scan of Exhibit B-1 reveals why sales taxes are important to include alongside state income taxes. Some states have relatively low state income tax rates and higher sales tax rates (e.g., Florida), whereas others rely more on income taxes.

[31] These estimates incorporate (1) estimates of a household's likelihood of spending each additional dollar of earnings, (2) the extent to which this spending is likely subject to sales taxes based on consumer spending patterns, and (3) the nominal sales tax rates on various categories of consumer goods in each state.

Work-Related Expenses

Most workers have work-related expenses (e.g., child care, commuting, uniforms, higher food costs). To the extent that increased earnings are a result of increased hours (or weeks) worked, work-related expenses are expected to increase. An estimate of these expenses can be included in the CBA, indicated as a "−" in the *Participant* column in Exhibit 1. Because these expenses represent increased economic activity (similarly to the increased earnings), the same amount is indicated as a "+" transfer amount in the *Rest of Society* column.[32]

We refer to Schaberg and Greenberg, (2020), who rely on estimates of average transportation and other expenses (excluding childcare) published by Census Bureau researchers (see Edwards, 2016; Mohanty, Edwards, and Fox, 2017) to develop an estimate of work-related expenses as a percentage of earnings.[33] We expand this approach to include childcare which is likely a relevant expense for RESEA program participants and use statistics reported in Knop and Mohanty (2018) to develop an estimate. Together, we recommend RESEA CBAs use a 9.7 percent estimate for work-related expenses.[34] If evaluators are aware that their population has relatively higher (or lower) commuting or childcare costs (e.g., employment rates are higher among single parents than the population at large), a higher estimate could be appropriate.

To estimate incremental work-related expenses, multiply incremental earnings estimates by 9.7 percent. Enter this amount as a negative value in the *Participant* column and a positive value in the *Rest of Society* column, resulting in no change for the *Society (Total)* perspective.

3.4. Total Net Benefit

The net benefit of a RESEA CBA is calculated as the sum of all incremental benefits (row *UI Benefits Paid* through *Work-Related Expenses*) less all incremental costs (row *RESEA Program Cost* through *(Non-RESEA) Costs on UI System*). That is

$$
\begin{aligned}
\text{Net Benefit} = &[\text{UI Benefits Paid} + \text{Earnings} + \text{Fringe Benefits} + \text{State Income Tax} \\
&+ \text{Federal Income Tax} + \text{Sales Taxes} + \text{Work-Related Expenses}] \\
&- [\text{RESEA Program Cost} + \text{(Non-RESEA) Costs on Workforce System} \\
&+ \text{(Non-RESEA) Costs on UI System}]
\end{aligned}
$$

The calculation is done for each perspective (column):

- Because the *State Gov* perspective has no costs and all positive benefits, it is expected to have a positive net benefit.

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[32] We note that Boardman et al. (2018) instructs that in a CBA involving employment, "effects in undistorted secondary markets should be ignored if program benefits in primary markets are measured in terms of changes in surplus." Rather than attempt a labor supply adjustment, we include (secondary market) work-related expenses as a transfer from participants to the rest of society to adjust for this component of RESEA participants' opportunity cost of employment.

[33] RESEA participants are likely to find employment in jobs with wages that are below the economy-wide average (because unemployment rates are higher for younger and lower-wage workers). Because of this we base recommended multipliers on medians rather than means.

[34] We update Schaberg and Greenberg's estimate based on Mohanty, et al. (2017), who document variability in mean and median weekly work expenses across various waves of the Census Bureau's Survey of Income and Program Participation. We approximate work expenses as a percentage of income using the average of the last two waves of (1) average expenses and earnings and (2) median expenses and earnings. The midpoint of these two estimates is 7.6. For childcare expenses, Knop and Mohanty (2018) imply that about 31 percent of households have childcare expenses, and for those households 6.7 is the median percentage of household income spent on childcare. The approximate share of earnings spent on childcare is then $0.31 * 0.067 = 0.021$. So the final recommended approximation of work-related expenses is $7.6 + 2.1 = 9.7$.

- The *Federal Gov* perspective has positive benefits, but also has positive costs. We do not have a clear hypothesis on the resulting direction of net benefit.

- The *Participant* perspective has no costs. Together earnings plus fringe benefits is expected to be greater than increased taxes and work-related expenses. However, decreases in *UI Benefits Paid* reduce net benefit from the *Participant* perspective. So the hypothesis for net benefit for *Participant* is ambiguous.

- The *Rest of Society* perspective is expected to have a (small) net benefit.

The direction of the total net benefit depends on whether earnings and fringe benefit gains are greater than increased direct and indirect costs of the RESEA program. We indicate the ambiguity of this hypothesis by a "?" in the *Society (Total)* column of Exhibit 1 for the *Net Benefit* row.

Our primary net benefit calculation does not include two technical adjustments that are implied by economic theory but are not uniformly included in CBAs for various reasons. These are adjustments for the efficiency costs of government expenditures and the value of participants non-market time. We recommend that RESEA CBAs report estimates for these additional incremental adjustments and report the net benefit including them.[35]

Efficiency Costs of Governmental Expenditures

Government expenditures are financed by taxation – either in the present or in the future (through increasing government debt). This finance comes with at least two types of costs. First, taxes and expenditures involve administrative costs, such as the costs of collecting taxes and accounting and auditing expenditures. Second, taxes and expenditures change behaviors. For example, economic theory predicts that income taxes result in people working less and sales taxes result in people purchasing less. We call the difference between the hypothetical level of economic activity without these costs and what actually happens the "efficiency costs of government expenditures."[36]

We follow Boardman et al. (2018) and recommend using a 23 percent estimate for this cost. To apply this adjustment, sum the net benefits for the *State Gov* and *Federal Gov* perspectives and multiply by −0.23. The resulting value is entered into the *Rest of Society* column of the template and repeated in the *Society (Total)* column. A hypothesis for the direction of the efficiency cost is ambiguous. While the *State Gov* net benefit is expected to be positive, indicating a *reduction* in state expenditures, the *Federal Gov* net benefit could be a negative value, indicating an *increase* in federal expenditures.

Non-Market Time

Faster reemployment implies more time working. This time has an economic value. Some of the time that comparison group members (those not selected for RESEA) are not employed while treatment group members (those selected for RESEA) are employed is spent on activities of value besides time spent searching for employment, participating in RESEA-related activities, and certifying for UI benefits.[37] Giving up these activities of value to work represents a loss to the participant. We refer to this loss as

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[35]   This approach follows Schaberg and Greenberg (2020).

[36]   Other technical verbiage for this concept includes "deadweight loss", "excess tax burden", "marginal cost of public funds", and even "leakage".

[37]   Krueger and Mueller (2010) suggest that for most UI recipients, only a few hours per week are spent on job search. Aguiar, Hurst, and Karabarbounis (2013) show that the few hours per week are somewhat less for younger workers and somewhat more for older workers.

"non-market time" and enter it as a negative value in the *Participant* column, which carries over to the *Society (Total)* column.[38]

In theory, only the portion of incremental earnings that results from increased time at work relative to time spent seeking employment—as opposed to a higher wage—should be included when calculating the value of forgone non-market time.[39] In practice, a RESEA impact study will likely observe only earnings and weeks receiving UI benefits and weeks receiving any earnings.

We suggest that evaluators use qualitative information available from implementation evaluations to refine an estimate that 80 percent of incremental earnings in the first quarter after employment are due to additional time spent working and that 50 percent of incremental earnings in subsequent quarters are due to additional time spent working. We then suggest an additional adjustment that the value of *Non-Market Time* be assigned as 40 percent of this portion of incremental earnings. So, if first-quarter incremental earnings are $100, and total incremental earnings in the second quarter and beyond are $75, an estimate for the value of incremental non-market time would be:

$$0.40 * (0.8 * 100 + 0.5 * 75) = \$47$$

This amount would be entered as a negative value for the *Participant* and *Society (Total)* of the RESEA CBA Template.[40]

Net Benefit Including Additional Adjustments

The last row of the RESEA CBA template recalculates net benefits including the additional rows of *Efficiency Costs of Government Expenditures* and *Non-Market Time*. These should be added to the values from the *Net Benefit* row. The resulting *Net Benefit Including Additional Adjustments* will be a smaller number than *Net Benefit* for the *Participant*, the *Rest of Society*, and *Society (Total)* perspectives.

Discussion of Non-Monetized Benefits and Costs

RESEA CBAs will include as many benefits and costs as possible. However, some will be beyond the scope of the evaluation, either because they are difficult to monetize or because they could be measured but evaluation resources will not be available to do so. Examples that could be relevant to the population being studied include psychological costs of unemployment or changes in use of Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF), or other means-tested benefits. Such effects can extend beyond those experiencing unemployment. Such "spill-over effects"

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[38] The technical economic term for time not spent working is "leisure", which does not necessarily imply leisurely activities are done during this time, but rather that the activities are not remunerated. The value of this leisure time plus the work-related expenses addressed above represent a person's "reservation wage" threshold for how much they must be paid to be willing to work. See Haveman and Weimer (2015) for an in-depth discussion of reservation wages in CBAs involving unemployment and hiring.

[39] On the relation between potential UI duration and subsequent earnings in the United States: Card et al. (2007) find no impact. Schmieder, von Wachter, and Bender (2016) find a negative effect for Germany. In the non-U.S. literature, there are several studies of "natural experiments" (i.e., changes in policy). Nekoei and Weber (2017) find a positive effect for Austria; van Ours and Vodopivec (2008) find no effect for Slovenia; Lalive (2007) finds no effect for Austria; and Lindner and Reizer (2020) find no effect for Hungary.

[40] Unfortunately, these values are recommended rough approximations. We base them on the literature in the prior footnote that suggests the extent of wage effects of longer unemployment duration is variable and depends on economic conditions; on theoretical discussions in Boardman et al. (2018); and on Schaberg and Greenberg's (2020) discussions of approximations for the analysis of their sectoral training samples. Also, Haveman and Weimer (2015) suggest 50 percent of earnings as an adjustment to account for the value of non-market time. We decrease this to 40 percent since we deal with work-related expenses separately.

include negative outcomes among children of those experiencing unemployment, empathy felt by family and friends, and increases in crime (Haveman and Weimer, 2015).

These additional outcomes may be of interest to policymakers and are important context to interpreting the calculated net benefits. The possibility of such costs and benefits should be discussed in the narrative of a RESEA CBA with a clarification that a full social accounting of the costs and benefits of the RESEA Program would include such factors. Such a discussion should reference any information or evidence available about such costs and benefits, for example from findings of a companion implementation evaluation.

Additionally, this CBA handbook treats dollars as equivalent regardless of whose dollars they are. An equity perspective might argue that UI beneficiaries are, on average, situated worse than the general population. That perspective might argue that benefits to participants should be valued more highly than benefits to the rest of society and to government.[41] Chapter 3 of Boardman et al. (2018) describes how a CBA analysis could be weighted to account for equity considerations.

4. Characterizing Uncertainty in RESEA CBAs

In a CBA, calculated incremental benefits, incremental costs, and net benefits are best estimates. Many of the benefits and costs require assumptions about unobserved parameters and sometimes forecasts about outcomes that have not been observed yet. Additionally, the CBA outcomes could have played out in multiple unusual ways, which would have resulted in different estimates of incremental costs and benefits, and a resulting net benefit. For example, the net benefits of RESEA if a recession occurs a year from now will be different from the net benefits if the labor market is strong. Because estimates are sensitive to economic conditions or other factors that are unpredictable, and because we cannot be certain that our parameter assumptions are correct, a RESEA CBA should incorporate sensitivity analyses that characterize the uncertainty of CBA estimates.

In this section we present best practices for characterizing uncertainty, including how to conduct sensitivity analyses. The best practices include reporting statistical characterizations of uncertainty where possible, focus on uncertainty in parameters that are most relevant to the overall net benefit estimate, and conduct sensitivity analyses for these parameters.

4.1. Statistical Characterizations of Uncertainty

The two main benefits in a RESEA CBA, UI benefits paid and earnings, can typically be estimated using individual-level data.[42] The same statistical models used in RESEA impact evaluations can be applied to outcomes needed for the CBA. These outcomes are the net present value of UI benefits paid and the net present value of earnings impacts for the period for which data is available to the evaluation.[43]

Using individual-level data allows statistical characterizations of uncertainty due to sampling variability and individual-level variability in how inherent uncertainty around UI benefit receipt and earnings resolved. RESEA CBAs should report conventional measures of uncertainty in parameter estimates for these outcomes: standard errors, statistical significance, and confidence intervals.

Additionally, any incremental costs and benefits observable for individuals can be summed at the individual level and characterized using the evaluation's statistical impact model. This allows correlations

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[41]   Note that this argument assumes that means-tested benefits, UI benefits, and progressive tax initiatives (such as the Earned Income Tax Credit) do not combine to achieve society's equity goals.

[42]   Where possible, adjustments for inflation should be made prior to estimating a statistical impact model. Discounting adjustments can also be made prior to estimating a statistical model.

[43]   Similarly, if tax estimates are made for individuals (or small groups of individuals), incremental state and federal income taxes can be estimated using statistical models.

between the various incremental costs and benefits to be accounted for in characterizing the uncertainty of the combined contribution of these outcomes to net benefit.

Note that it is typically not appropriate to calculate and generate statistical uncertainty estimates for an individual net benefit outcome that includes incremental costs and benefits that are not measured at the individual level. For example, adding the same estimate of RESEA Program Cost to individual-level UI benefits paid and earnings estimates before conducting a statistical analysis of treatment and comparison differences would not reflect uncertainty associated with RESEA Program Costs. The resulting characterization of uncertainty would then understate the true uncertainty.

4.2. Uncertainty in RESEA CBA Incremental Costs and Benefits

In general, our approach to characterizing uncertainty in RESEA CBAs is to examine how using plausible alternative values for incremental costs and benefits would change the net benefit calculation. Specifically, for each incremental cost and benefit, the net benefit is recalculated based on a plausible low or plausible high value for this estimate. In this section, we discuss how to determine the plausible alternative values.

RESEA Program Costs

RESEA program Cost might be the most challenging incremental cost or benefit for which to assess uncertainty. This is because average RESEA program costs per participant are typically calculated for an entire state based on actual expenditures or a single estimate of the ingredients needed to provide the intervention. One source of variation in costs that could be considered is the individual-level variation in the extent of services received. So, if information on the standard deviation of quantities of services received is available, this can be used to develop low and high cost estimates based on scenarios were service use was one standard deviation below and above the average observed. But this does not account for uncertainty in a per-unit cost estimate of services.

Our recommendations for lower and upper uncertainty estimates depends on how costs are estimated. If program costs are based on a unit quantity multiplied by unit cost, and unit quantity standard deviations are available, we recommend using a per-unit cost estimate that is 25 percent lower (higher) than the cost used in the primary analysis multiplied by a unit quantity that is one standard deviation below (above) the average used in the primary analysis for the lower (higher) uncertainty estimate. Otherwise, we recommend using an average incremental cost estimate that is 50 percent lower (higher) than that used in the primary analysis for the lower (higher) uncertainty estimate.

> **Box 5. Concepts for characterizing uncertainty**
>
> A *break-even analysis* reports the value of an incremental cost or benefit that would result in a zero net benefit, and discusses the plausibility of this value.
>
> *Worst- and best-case scenario analyses* combine multiple incremental cost or benefit estimates that result in lower (worst) or higher (best) net benefit estimates.

These approximations for plausibly low and high values can be adjusted based on qualitative input from the evaluation's implementation study. The intent is to use values that are plausible, but different enough from the value used to calculate *Net Benefit* to capture a meaningfully large range of possible values. *RESEA Program Cost* is an outcome for which reporting a break-even scenario is often useful.

RESEA CBAs need not conduct an uncertainty analysis for each incremental cost and benefit. Rather, uncertainty analyses should focus on the incremental costs and benefits that represent the largest contributions to *Net Benefit* to society as a whole—to the *Society (Total)* perspective—or to the perspective(s) of particular interest.

(Non-RESEA) Costs on Workforce System

(Non-RESEA) Costs on Workforce System face similar challenges in characterizing uncertainty as does *RESEA Program Cost*. We recommend the same approach to determining low and high plausible values as is used for that above. *(non-RESEA) Costs on Workforce System* is not a good candidate for break-even analysis alone, but a break-even analysis for *RESEA Program Costs* can consider increases in *(non-RESEA) Costs on Workforce System* that are related to higher or lower costs of the *RESEA Program*.

(Non-RESEA) Costs on UI System

Again, *(non-RESEA) Costs on UI System* faces similar challenges in characterizing uncertainty as for *RESEA Program Cost*. And again, we recommend the same approach to determining low and high plausible values as is used above. *(non-RESEA) Costs on UI System* is not a good candidate for break-even analysis alone, but a break-even analysis for *RESEA Program Cost* can consider increases in *(non-RESEA) Costs on UI System* that are related to higher or lower costs of the RESEA Program.

UI Benefits Paid

RESEA CBAs should have individual-level data on UI benefits paid and thus should have a standard error accompanying the estimate of incremental UI benefits. The 90 percent confidence interval of the estimate provides plausible low and high values for the incremental benefit. An uncertainty analysis should report how the *State Gov* and *Participant* perspectives would change using incremental *UI Benefits Paid* at the lower and upper ends of the interval. Because *UI Benefits Paid* is a transfer, a break-even analysis is not relevant for this incremental benefit from the society perspective but can be done for the *State Gov* and *Participant* perspectives.

Earnings

RESEA CBAs should have individual-level data on participant earnings and thus should have a standard error accompanying the estimate of incremental earnings. The 90 percent confidence interval of the estimate provides plausible low and high values for incremental earnings. An uncertainty analysis should include recalculating *Net Benefit* at the lower and higher value of the interval. The recalculation should include the downstream changes in fringe benefits, taxes, and work-related expenses that are based on earnings. For earnings, a break-even analysis often can be interpreted as how much future earnings would need to increase in order to have the RESEA Program produce positive net benefits.

RESEA CBAs may have follow-up data for a limited period after RESEA participation. If the final period (e.g., quarter) for which data is available includes positive impacts, RESEA CBAs should consider a sensitivity analysis that projects earnings impacts into the future, as discussed in Section 4.3. We recommend that such a sensitivity analysis consider at least two scenarios in addition to the baseline of no additional impacts conducted for the RESEA CBA: (1) a conservative scenario where impacts decline over two to three additional years and (2) an optimistic scenario, where earnings impacts decline more gradually. An example is provided in Box 6.

Note that the importance of conducting these analyses depends on the findings of the baseline RESEA CBA. For example, if the net benefit of the baseline CBA (without projected earnings) is positive, the conservative scenario alone may be adequate to communicate that future earnings impacts would result in an even larger net benefit.

Box 6. Projecting earnings in an uncertainty analysis

Increased future earnings may be an important consideration in a RESEA CBA, but evaluation timelines often preclude waiting for long-term data to be available. Because of inherent uncertainty in how the future will unfold, evaluations can consider multiple scenarios—both optimistic and conservative—when extrapolating possible future earnings impacts.

For example, suppose a RESEA impact evaluation has four quarters of follow-up earnings data and finds a $50 impact in quarter 1 and positive impacts in quarters two, three, and four that average $100 per quarter. For the conservative sensitivity analysis scenario, assume year two earnings impacts are $175 (half of year one), and year three impacts are $87.50 (half again). Then, using a discount rate of 3.5 percent, the net present value of earnings impacts is then

$$\$601 = \$350 + \frac{\$175}{1.035} + \frac{\$87.50}{1.035^2}$$

For an optimistic scenario, the sensitivity analysis could assume that annualized impacts decline by $50 per year. So, year two impacts would be projected at $350, year four, at $300, and so on through $50 in year eight. Applying a discount rate of 3.5 percent, the net present value of total earnings is then $1,615.

$$\$1,615 = \$350 + \frac{\$350}{1.035} + \frac{\$300}{1.035^2} + \frac{\$250}{1.035^3} + \cdots + \frac{\$50}{1.035^7}$$

Note: Because we project first year earnings forward in first year dollars, we do not make an inflation adjustment for the projected earnings.

State Income Tax

For state income taxes we recommend tax rates 50 percent lower and 50 percent higher as a plausible range. Evaluators might want to use local information of possible variability in state tax rates to adjust the high and low plausible value for this. If small-group tax liabilities are calculated using participant characteristics and incremental taxes are estimated using a statistical model, a standard error can be used to develop plausible values at the ends of a 90 percent confidence interval.

State income taxes typically represent a small contribution to *Net Benefits* for the *State Gov* and *Participant* perspectives; and as a transfer, they do not affect *Net Benefit* for the *Society (Total)* perspective. So, state income taxes are less important for uncertainty analysis, but should be included (along with federal income taxes) in assessing earnings uncertainty.

Federal Income Tax

For federal income taxes, we recommend tax rates 50 percent lower and 50 percent higher as a plausible range for recalculating *Net Benefits* if using the lookup table in Exhibit B-1. If small-group tax liabilities are calculated using participant characteristics and incremental taxes are estimated using a statistical model, a standard error can be used to develop plausible values at the ends of a 90 percent confidence interval. An uncertainty analysis for tax rates should likely include both federal and state income taxes.

Sales Taxes

For sales taxes, we recommend tax rates 50 percent lower and 50 percent higher than those used in the main analysis as plausible values for an uncertainty analysis. However, sales taxes are unlikely to be a main contributor to net benefit and are unlikely to be an important candidate for uncertainty analysis alone. Rather, sales taxes should be considered when sensitivity analyses for earnings are conducted.

Efficiency Costs of Government Expenditures

Uncertainty analyses for RESEA CBAs that include Efficiency Costs of Government Expenditures should use a lower bound estimate of 18 percent and an upper bound estimate of 25 percent. See Boardman et al. (2018) for a discussion of the range of rates that are appropriate for this adjustment.

Non-Market Time

Uncertainty analyses for RESEA CBAs that include the value of participants' *Non-Market Time* should vary the assumptions about the amount of earnings increases that are due to increased work hours and the value of non-market time. For a lower plausible value, we recommend using 60 percent of incremental earnings due to increased hours in the first quarter and 25 percent due to additional time spent working in subsequent quarters together with a 25 percent valuation of earnings. For an upper plausible value, we recommend 90 percent of incremental earnings due to increased hours in the first quarter and 60 percent in subsequent quarters, with a 50 percent value of non-market time for this portion of earnings.

4.3. Sensitivity Analyses

To conduct a sensitivity analysis, begin by considering high and low plausible values for the most important incremental benefits and costs in *Net Benefit* one at a time. Recalculate the RESEA CBA Template using each of these values and report the resulting *Net Benefit*.

Exhibit 4 provides an example for a sensitivity analysis of earnings. The example has written out the recalculation that would be conducted for each net benefit based on a high value of earnings (e.g., the upper end of a 90 percent confidence interval on an incremental earnings estimate), a low value of earnings, and the base case. The resulting calculated values would be included in a sensitivity analysis for an earnings estimate uncertainty table for a RESEA CBA report.[44]

Exhibit 4: Example Sensitivity Analysis Table Shell (Earnings)

Net Benefit Type	Perspective				Society (Total)
	State Gov	Federal Gov	Participant	Rest of Society	
Net Benefit (High)	$UI + %StTax*$High	%FedTax*$High – $Cost	$High + (%Fringe – %FedTax – %WorkExp)*$High – $UI	%WorkExp*$High	Net Benefit of $High
Net Benefit (Low)	$UI + %StTax*$Low	%FedTax*$Low – $Cost	$Low + (%Fringe – %FedTax – %WorkExp)*$Low – $UI	%WorkExp*$Low	Net Benefit of $Low
Net Benefit (Base)	$UI + %StTax*$Base	%FedTax*$Base – $Cost	$Base + (%Fringe – %FedTax – %WorkExp)*$Base – $UI	%WorkExp*$Base	Net Benefit of $Base

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[44] Sophisticated evaluators could want to conduct a Monte Carlo analysis where all uncertain estimates and parameters are allowed to vary. The 90 percent interval of calculated values can then be reported as a likely range of overall uncertainty.

5. Key Takeaways

Hopefully this handbook encourages state agencies that operate RESEA programs and the evaluators they engage to build evidence about their programs using CBAs. Much of the information needed to support a CBA is likely already available to evaluators conducting a rigorous impact study. We conclude this Handbook by reiterating some key takeaways and highlighting important resources for evaluators conducting CBAs.

Cost-Benefit Analysis provides a framework for considering questions that face RESEA program designers and implementers. A CBA includes and monetizes, to the extent possible, all costs and benefits experienced by RESEA participants, the state and federal governments, and the rest of society. Together, an analysis articulating the incremental costs, incremental benefits, and resulting net benefit of a RESEA program or component provides a platform from which policymakers can think about how subsequent changes in a RESEA program might change either benefits or costs in the future.

The bottom-line result of a RESEA CBA, calculated for each perspective considered and for society as a whole, is the *net benefit*. It is the difference between the sum of the RESEA program's *incremental benefits* and its' *incremental costs*. The incremental outcomes are calculated as the average differences between treatment group RESEA program participants' outcomes and those experienced by the comparison group of UI claimants. RESEA CBA incremental benefits include reductions in UI benefits paid and increases in earnings (with related fringe benefits, taxes, and other adjustments based on earnings changes). Incremental costs result from direct RESEA program costs, increased use of workforce system services and changes in UI system actions and related administrative costs.

Rigorous RESEA CBAs will include an *uncertainty analysis* that considers how different values for approximations, assumptions, or realizations of outcomes that could have played out differently alter the CBA's conclusions. A discussion of *non-monetized benefits and costs* acknowledges limitations of social science research in the form of outcomes that are beyond the scope of the evaluation at hand.

Much of the information needed for the key outcomes in RESEA CBAs will be included in (or a straightforward extension of) information that is normally in a RESEA impact evaluation. Specifically, UI benefits received and participant earnings are standard impact evaluation outcomes. Information needed to estimate costs may have already been estimated or approximated in developing state plans for RESEA grant applications or can be gleaned from existing expenditure reports. For parameters that will likely require approximation, this handbook provides suggested base values and alternatives for checking the robustness of the approximation. Most of these suggestions are drawn from existing literature that evaluators can reference for additional guidance and encouragement in conducting CBAs. Examples from the References section below include the Boardman et al. (2018) textbook, a Greenberg and Appenzeller (1998) how-to guide, and current discussion around the future of conducting CBAs for federal regulatory analysis (OMB, 2023).

If RESEA evaluations are not currently planning a full CBA, it may be nonetheless possible to report data needed to estimate costs that, together with findings from impact evaluations, can be used in future research to build evidence around RESEA programs using a CBA approach.

Appendix A: Example Hypothetical RESEA CBA

This appendix walks through an example of a hypothetical RESEA CBA. In this example, the RESEA evaluation compares an enhanced version of RESEA to the version the state has been implementing previously. The Enhanced RESEA group receives up to two additional 15-minute check-in calls after the initial RESEA meeting. Otherwise, the state's normal and enhanced programs are identical. The intent of the reminder calls is to encourage follow-through with job search activities, to check for current needs, and to recommend any additional services that might help with the participant's job search.

Given this design, impact estimates capture the effect of the additional 15-minute check-in calls. Similarly, incremental cost estimates capture the cost of adding 15-minute check-in calls to an existing RESEA program.

A.1. Incremental Cost

The exhibit below shows the incremental cost of enhancing the RESEA program. Below, the text walks through the calculation of the RESEA Program Cost, the (non-RESEA) Costs on the Workforce System, and the (non-RESEA) Costs on the UI System.

Exhibit A-1: Hypothetical Enhanced RESEA Costs

Incremental Cost	Perspective				Society (Total)
	State Gov	Federal Gov	Participant	Rest of Society	
RESEA Program Cost		$ 48			$ 48
(non-RESEA) Costs on Workforce System		$ 20			$ 20
(non-RESEA) Costs on UI System		$ 8			$ 8

RESEA Program Cost
To build up the incremental RESEA program cost, we consider each element of the RESEA program, calculate the difference in service receipt between the groups and then apply a unit cost estimate to those differences. Then, we sum the costs for all elements to an estimate of the incremental cost of the enhanced RESEA program.

Reminder calls
The evaluation is designed to test the effect of calls to check in on participants' job search progress, to assess current needs, and to recommend additional services. For the RESEA impact study, RESEA participants that have completed an initial meeting are randomly assigned to receive either Enhanced RESEA, with up to two additional reminder calls, or continue as Regular RESEA participants. Only Enhanced RESEA participants are scheduled for check-in calls.

For illustrative purposes, we consider each of the three options for estimating costs of the Enhanced RESEA program costs.

- *Option 1—Administrative data average approach:* For this hypothetical Enhanced RESEA program, expenditure data reported on DOL Form ETA-9130 does not distinguish between enhanced RESEA services and regular RESEA activities. So, this data is not useful for estimating incremental costs.
- *Option 2—External unit cost estimate approach:* For this approach, the evaluation will need to estimate incremental units of services and multiply this estimate by an external unit cost estimate.
  1. *Incremental units of service:* RESEA program records track each program activity. The program generates regular monthly reports that include the number of initial RESEA meetings, the number of additional check-in calls, and the number of RESEA participants assigned to the Enhanced RESEA programs and to the Regular RESEA program. All RESEA participants are in one of the two groups, and no regular participants receive additional calls. The incremental units of service for each month should be estimated as the number of

additional calls made that month divided by the number of enhanced RESEA program participants assigned that month. The average of this monthly number over all evaluation months can then be used as an estimate of the average incremental units of service for the incremental cost estimate. In our hypothetical example, on average, Enhanced RESEA group members received 0.72 reminder calls (some participants exited RESEA participation through reemployment before receiving a call, while others did not respond to automated outreach to schedule the call).[45]

2. **External unit cost estimate:** The State Plan that proposed this Enhanced RESEA program developed cost estimates for additional calls based on planned staff caseloads and standard organizational operational overhead multipliers. The estimated cost in the plan was $48 per additional reminder call.[46]

3. **Enhanced RESEA Program cost estimate:** The resulting cost per participant estimate using option 2 is thus $0.72 * \$47 = \$34$

- **Option 3: Ingredients method approach:** This approach shares the requirements of needing an estimate of incremental units of services received with option 2. Additionally, it develops an estimate of unit costs of a service.

  1. **Incremental units of service:** Following the option 2 method, incremental units of service are 0.72 reminder calls.

  2. **Unit cost estimate:** The evaluation team conducts an interview with the RESEA staff member that completed the unit cost section of the State Plan. The RESEA staff member described a process that was analogous to the "ingredients" method—staff time was estimated for preparation, completion, and documentation of each reminder call at a total of 15 minutes. The staff cost allocated for this amount of time included both direct labor costs and organizational overhead (e.g., cost of office space and staff management). However, during the interview, the RESEA staff member indicated that a software system update had included a tool that automated aspects of call scheduling and documentation that were previously done by hand. As a result, staff were completing an average of five calls per hour (that is, calls were taking on average a total of 12 minutes each). The evaluation team and RESEA staff member agreed that $(12/15)*\$48 = \$38$ would be a more accurate estimate of the actual cost per reminder call.

  3. **Enhanced RESEA Program cost estimate:** The resulting cost per participant estimate using option 2 is thus $0.72 * \$38 = \$27$

We proceed with the Option 3 estimate of an average Enhanced RESEA Program Cost of $27 per participant.

RESEA Orientation Workshop

All UI participants selected for RESEA are required to complete the orientation workshop. There is no mechanism through which reminder calls, which happen after the orientation, can increase completion of the orientation. So RESEA CBAs would not include any analysis of costs of orientation workshops.[47]

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[45]   The hypothetical RESEA program could have allowed RESEA staff to suggest a reminder call in initial meetings for regular RESEA participants that the staff member felt would benefit from a reminder call, while requiring reminder calls for participants assigned to enhanced RESEA. In this case the incremental unit quantity would have been the difference between calls per enhanced RESEA participant and calls per normal RESEA participant.

[46]   For the 2012 program year, the average cost of a one-hour, one-on-one counseling session provided by WIA Adult and Dislocated Worker Programs was $143, when you include staff time for preparation, holding the meeting, and follow-up (Mastri & McCutcheon, 2015). Adjusting for inflation, a one-hour, one-on-one counseling session would cost $189 in today's dollars. We divide this by four to get the hypothetical cost for a 15-minute reminder call.

[47]   Suppose, however, that Standard RESEA group members happen to complete the orientation workshop at a slightly higher rate—2 percentage points more often—than Enhanced RESEA group members, though the difference is not statistically significant. It would be valid to include this difference in the incremental cost calculation. The per person cost for the orientation is the same for both groups: $72. (For the 2012 program year, the average cost of a 2-hour workshop provided by WIA Adult and Dislocated Worker Programs was $54 (Mastri & McCutcheon, 2015). Adjusting for inflation, a two-hour workshop would cost $72 in today's dollars.) The incremental cost would then be $\$72 * 0.02 = \$1.44$, which could be subtracted from the Enhanced Program cost.

Required One-on-One Services

After completing orientation, RESEA participants are required to complete a series of one-on-one services. While these are typically completed in a single meeting, the "initial RESEA meeting," some states include subsequent RESEA meetings as part of the program. A two-week check-in call could increase participation in subsequent RESEA meetings and completion of any other follow-up tasks identified in the initial RESEA meeting. In our hypothetical example, 40 percent of Enhanced RESEA participants complete a subsequent RESEA meeting, while 30 percent of Regular RESEA participants do so. A reasonable hypothetical subsequent RESEA meeting cost is $100. So, the incremental cost of additional subsequent RESEA meetings is $100 * 0.01 = $10.

Required Workshops

Both the Enhanced and Standard RESEA groups are required to complete a Career Planning Workshop and a Job Search Workshop. Check-in calls should increase workshop completion. The impact study includes workshop completion as a short-term outcome, and finds that, on average Enhanced RESEA participants complete 0.15 more required workshops than Regular RESEA participants.[48] At $72 per person for a two-hour workshop, the per person program cost for an additional 0.15 workshops completed is $11.

Total Incremental RESEA Program Costs

The enhancement increased RESEA program costs in three ways. The incremental cost of the reminder calls, $27, is the direct cost of the enhancement. The incremental cost of required one-on-one services is $10 for additional subsequent RESEA meetings. Increased attendance at required workshops results in an incremental cost of $11.

Altogether, the incremental RESEA Program cost is $27 + $11 + $10 = $48. All costs are paid using federal RESEA funding, so the costs are borne by the Federal government.

(Non-RESEA) Costs on Workforce System

RESEA customers are referred to workforce services, in our hypothetical example these are funded by WIOA at American Job Centers (AJCs). Check-in calls are intended to increase RESEA customers' participation in workforce services, both by encouraging participants to attend services to which they were referred at initial meetings, and to increase referrals through increased subsequent meetings or because of the check-in calls themselves.

There are a wide range of services to which RESEA customers might be referred, including staff-assisted services (which look similar to the one-on-one services listed above), training services and supports (e.g. adult basic education, occupational skills and/or on-the-job training, short-term pre-vocational services), workshops, and self-service/facilitated self-help. For this hypothetical example, suppose that the only services to which RESEA participants are systematically referred are Workshops and a weekly Job Club.

The table below shows the calculation of incremental costs for AJC services. Here, the Enhancement increases the average number of workshops from 0.68 to 0.86, a difference of .18 workshops. At $72 per workshop, this difference yields an incremental cost of $13. Similarly, the enhancement increases the average number of job club meetings attended from 0.42 to 0.52, a difference of 0.13 meetings. At $51

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[48] The average Enhanced group member completes 1.11 required workshops and the average Standard group member completes 0.96 required workshops. These numbers include UI claimants who did not engage with RESEA. Among the 60% of Enhanced group members who complete the RESEA orientation workshop, the average number of required workshops completed is 1.85. Among the 60% of Standard group members who complete the RESEA orientation workshop, the average number of required workshops completed is 1.60. These are high completion rates for each workshop—92.5% for the Enhanced and 80% for the Standard group.

per meeting, the incremental cost is $7. The total incremental cost of $20 is borne by the Federal Government.

Exhibit A-2: Calculation of Incremental (Non-RESEA) Costs on Workforce System

JC Services	Cost ($)	Enhanced RESEA (#)	Standard RESEA (#)	Difference (#)	Incremental Cost ($)
Workshops	72	0.86	0.68	0.18	13
Job Club	51	0.55	0.42	0.13	7
Total					20

(Non-RESEA) Costs on UI System

Non-RESEA Costs on the UI System can result from increased UI system actions or from decreased administrative costs because of shorter unemployment spells.

As an example of increased *UI system actions*, requiring participation in check-in calls could increase the proportion of UI participants who do not meet requirements and are referred to adjudication. This could, in turn, increase enforcement costs of the UI system. The administrative cost of processing a single UI participant through the enforcement process would need to be calculated to accurately measure this cost. Suppose that this calculation is not straightforward, but we have data on the number of UI participants who were referred to the UI system for non-compliance by RESEA. We can use that data to obtain benchmark costs.

Suppose that the RESEA program refers 11.6 percent of the Enhanced Group and 11.9 percent of the Standard Group back to the UI system for non-compliance with RESEA. Given a difference of -0.03 percentage points, the incremental cost will be less than $1 if the cost of processing one participant through enforcement is less than $333.[49] Another way to conceptualize this is that if the cost of processing one participant through enforcement is less than $1,000, the incremental cost with a 0.03 difference in enforcement actions will be less than $3. Based on the nation-wide average costs for UI Administrative actions from the RJM reported in Section 3.2, we assume that the per person cost of UI enforcement for the Regular RESEA participants is less than $333 and omit it from the CBA table. If the difference between the non-compliance referrals were greater, the cost could be estimated using the state's RJM data and would be borne by the federal government, which supports UI administrative costs through grants to states.

Costs of *administering UI benefits* will decrease if Enhanced RESEA reduces the number of weeks for which the participant receives UI benefits. As detailed in the next section, suppose the RESEA impact evaluation shows that Enhanced RESEA participants average 0.5 fewer weeks of UI benefit receipt.

Suppose that, on average, the enhanced group receives 20.8 weeks of unemployment benefits and the standard group receives 20.3 weeks of unemployment benefits. The impact of 0.5 weeks would be produced by the RESEA impact evaluation. Suppose that RJM data for the state implies that processing a week of UI has an average cost of $16. A decrease of 0.5 weeks of unemployment benefit reduces costs by $8. As detailed in Section 3.2, this cost is borne by the federal government. Because there is not a meaningful change in UI System activities in our hypothetical example, this is the cost for this item that we enter into the RESEA CBA Template.

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[49] We can calculate the unit cost that yields an incremental cost of $1 by dividing 1 by the difference, that is, $\frac{\$1}{.03} = \$333$.

A.2.   Incremental Benefits

We now consider the incremental benefits of the enhanced RESEA program.

Exhibit A-3: Hypothetical Enhanced RESEA Benefits

Incremental Benefit	Perspective				Society (Total)
	State Gov	Federal Gov	Participant	Rest of Society	
Reductions in UI Benefits Paid	$140		− $140		$0
Earnings			$330		$330
Fringe Benefits			$83		$83
State Income and Sales Taxes	$ 17		− $17		$0
Federal Income Tax		$20	− $20		$0
Work-related Expenses			− $32	$32	$0

Reduction in UI Benefits Paid

The impact evaluation for our hypothetical Enhanced RESEA program estimates that the 0.5 week reduction in UI benefit receipt for Enhanced RESEA participants was accompanied by a $140 decrease in UI benefits paid. The impact analysis includes eight quarters of UI benefit data, and a quarter-by-quarter analysis indicates that the benefit reductions occurred in the first three quarters after random assignment. So, no inflation or discounting adjustment is needed. The $140 is entered as a positive benefit for the state government and a negative benefit for participants in the RESEA CBA Template. The benefits portion of the template for our example is shown in Exhibit A-3.

Earnings

The impact evaluation for our hypothetical Enhanced RESEA program estimates that earnings are $185 higher in the first year of follow-up, and $150 in the second year (after adjusting for inflation). Using a 3.5 discount rate, this results in a net present value of incremental earnings of $330. This amount is entered in the *Participant* and *Society (Total)* columns of Exhibit A-3.

Fringe Benefits

RESEA participants both enter unemployment and are reemployed at jobs with earnings below the median for the metropolitan area. Qualitative interviews in an accompanying RESEA implementation evaluation confirm that the jobs frequently have fringe benefits, but are in industries with relatively less-generous time off, retirement contributions, etc. In this scenario, a 25 percent of incremental earnings assumption for benefits is appropriate. So, $83 is entered in this row for the *Participant* and *Society (Total)* columns.

State Income and Sales Taxes

State income tax rates in our hypothetical Enhanced RESEA program do not vary significantly for the range of earnings experienced by RESEA participants. We use a hypothetical marginal state income tax rate of 2.2 percent for example. Similarly, we use a 3.0 percent estimate for hypothetical sales tax effects of the incremental earnings increase.[50] Together, this results in a transfer of $17 from *Participant* to *State Gov* in Exhibit A-3.

Federal Income Tax

Because federal marginal income taxes vary with earnings, and our hypothetical RESEA participants have below-median earnings in a (hypothetical) state where earnings are lower than national averages, we

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[50]   This is the simple average of the marginal state income tax rates in Exhibit B-1 in Appendix B.

assume a hypothetical marginal federal income tax rate of 6% (on the low end of Exhibit B-1). This results in a transfer of $20 from *Participant* to *Federal Gov* in Exhibit A-3.

Work-related Expenses

For our hypothetical example, we follow the recommendation from Section 3.3 and apply a 9.7 percent of incremental earnings estimate for work-related expenses. To do so, we enter a transfer of $32 from the *Participant* to the *Rest of Society* column.

A.3.   Additional Adjustments

Before we calculate net benefits for our hypothetical example, we consider the two recommended RESEA CBA additional adjustments.

Efficiency Costs of Government Expenditures

Following the guidance in Section 3.4, we sum the net benefits for the *State Gov* and *Federal Gov* perspectives and multiply by −0.23. The total net change in government expenditures in our hypothetical example is given by the combined *State Gov* and *Federal Gov* Net Benefit. As noted below and in Exhibit A-4, this is $101 = $157 − $56 in our hypothetical example, indicating a *decrease* in government expenditure of $101. The associated efficiency costs of government expenditure would be a savings to the *Rest of Society* perspective of $23.

Non-market Time

The hypothetical example RESEA impact evaluation found earnings impacts of $35 in the first quarter, followed by an average of $50 in each of the following three quarters. Following the guidance in Section 3.4., this implies an approximation of the value of lost Non-Market Time of $41 = 0.40 ∗ (0.8 ∗ $35 + 0.5 ∗ $150). This is entered as a negative value in the *Participant* column and carried over to the *Society (Total)* perspective.

A.4.   Net Benefit of Hypothetical Enhanced RESEA Program

Exhibit A-4 uses the RESEA CBA Template to report all the estimates and approximations of the RESEA CBA for the hypothetical Enhanced RESEA Program.

Because the program, the (non-RESEA) workforce system, and UI system administrative costs are all funded by the federal government, but the reduction in UI Benefits Paid accrues to the state government, net benefit to the *State Gov* perspective are $157, while net benefit to the *Fed Gov* perspective is −$56. Note that this does *not* imply that the Enhanced RESEA program is not worthwhile to federal government decision-makers. This is because the federal government's objective is not to maximize government net benefit. Rather, −$56 indicates that net government expenditures increased by $56 to achieve a gain to society as a whole, the *Society (Total)* perspective, of more than five times that amount.

The net benefit calculations indicate that hypothetical Enhanced RESEA program participants are better off because of the program by $204. This is because earnings plus fringe benefit gains outweigh the reduction in UI benefits received, even after accounting for the tax and work-related expenses increases that accompany increased earnings.

The *Rest of Society* perspective is better off by $32 due to economic efficiency gains from a net decrease in government expenditures.

Exhibit A-4: RESEA CBA Template Completed with Hypothetical Example

	Incremental Cost/Benefit	Perspective				Society (Total)
		State Gov	**Federal Gov**	**Participant**	**Rest of Society**	
Costs	**RESEA Program Cost**		$48			$48
	(non-RESEA) Costs on Workforce System		$20			$20
	(non-RESEA) Costs on UI System		$8			$8
Benefits	**Reductions in UI Benefits Paid**	$140		− $140		$0
	Earnings			$330		$330
	Fringe Benefits			$83		$83
	State Income and Sales Taxes	$17		− $17		$0
	Federal Income Tax		$20	− $20		$0
	Work-related Expenses			− $32	$32	$0
Total	**Net Benefit**	$157	− $56	$204	$32	$ 37
Additional	**Efficiency Costs of Government Expenditures**				$23	$23
	Non-market Time			− $41		− $41
Total + Additional	**Net Benefit Including Additional Adjustments**	$157	− $56	$163	$55	$319

Net Benefit Including Additional Adjustments
In our hypothetical example, the overall story is not meaningfully changed by including additional adjustments. This is because, in our example, the adjustments are partially offsetting. This is an artifact of our hypothetical values, and will not be the case in every CBA.

A.5.   Uncertainty Analysis

The net benefit calculation for our hypothetical Enhanced RESEA program is built on a variety of estimates and approximations. It is important to acknowledge and provide some characterization of the uncertainty in the final estimate.

The most important items determining net benefit in this hypothetical RESEA CBA are *RESEA Program Costs*, *Reductions in UI Benefits Paid*, and *Earnings*. So, we present a series of sensitivity analyses that consider how net benefits would differ if these items had different estimates.

Higher RESEA Program Cost
First, we develop a plausible range of uncertainty for the *RESEA Program Cost* estimate. Enhanced RESEA participants averaged 0.72 reminder calls. Because the program has a positive net benefit, the interesting case for uncertainty is where *RESEA Program Cost* is higher than estimated. So, we consider a case where there are twice as many calls per participant, or 1.44 calls.[51] Similarly, suppose our unit costs

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[51]   This would be approximately one standard deviation higher if the number of calls follows a Poisson distribution with a mean of 0.72.

estimate is 25 percent higher than estimated, or $48. Under these assumptions, the incremental cost of enhanced calls would be $69.

Conceptually, we consider three possibilities for how this example of higher RESEA program costs could affect other values in the CBA. First, the realization of the number of check-in calls may not have a meaningful effect on either additional RESEA activities, workforce system service participation, or UI system activities. Second, additional check-in calls may increase both other RESEA activities, workforce system participation, and UI system actions. We consider this case in the uncertainty analysis since it would result in the greatest increase in incremental costs. Third, additional check-in calls may result in larger impacts on UI benefits paid and earnings. We assume this is not the case for this sensitivity analysis; instead, we think of the case where more program activities resulted in the same benefit impacts.

Our sensitivity analysis should consider how the increase in calls would flow through to other RESEA activities. It is plausible that doubling the number of per-participant calls would increase subsequent RESEA meetings, but the number of incremental meetings would likely not also double. An increase from a 10 percentage point effect on subsequent meetings to a 15 percentage point impact is plausible for a sensitivity analysis. This would increase the incremental cost of subsequent RESEA meetings to $15. Similarly, it is plausible that doubling the number of calls increases the incremental cost of required workshop attendance to $17.

Altogether, this would result in an incremental *RESEA Program Cost* of $69 + $15 + $17 = $101.

Similarly, a 1.5 multiplier as the resulting increase in (non-RESEA) costs on both workforce and UI systems is a plausible high-end sensitivity estimate. This would result in incremental cost estimates of $30 and $12 for these systems, respectively. The new summed value of RESEA Program Cost is entered into Exhibit A-5 in the combined *RESEA Program Cost + (non-RESEA) Costs* row.

For this sensitivity analysis of higher realized Enhanced RESEA program activities, net benefit remains positive at $270.

Smaller Reductions in UI Benefits Paid
For a second sensitivity analysis, we consider how smaller reductions in UI Benefits paid would affect the CBA. UI Benefits paid are a transfer, and so only affect net benefit through associated reductions in administrative costs. Still, it can be helpful to consider how sensitive the net benefit for various perspectives is to a change in an important benefit.

Suppose that the impact estimate for UI Benefits Paid to participants had a 90 percent confidence interval that spanned from $60 to $220. Because the *State Gov* perspective net benefit is almost entirely determined by *Reduction in UI Benefits Paid,* the more interesting perspective for a sensitivity analysis is *Participant.* So, we consider the case where *Reduction in UI Benefits Paid* is realized at the upper end of a 90 percent confidence interval and is −$220 from the *Participant* perspective. As shown in the middle panel of Exhibit A-5, this sensitivity analysis results in a higher *State Gov* net benefit, a lower but still positive *Participant* net benefit, and a slightly larger *Federal Gov* net benefit (due to reduced administrative costs to the UI system).

Exhibit A-5: Uncertainty Analysis

Sensitivity Check Scenario	Incremental Value	Perspective				Society (Total)
		State Gov	Federal Gov	Participant	Rest of Society	
Net Benefit of Hypothetical Enhanced RESEA Program (No changes)	RESEA Program Cost + (non-RESEA) Costs		$76			$76
	Reduction in UI Benefits Paid	$140		-$140		$0
	Earnings + Fringe + Tax + Expenses	$17	$20	$344	$32	$413
	Net Benefit	**$157**	**-$56**	**$204**	**$32**	**$337**
Higher Enhanced RESEA Cost: 2x check-in calls, 20% higher unit cost	**RESEA Program Cost + (non-RESEA) Costs**		**$143**			**$143**
	Reduction in UI Benefits Paid	$140	$0	-$140	$0	$0
	Earnings + Fringe + Tax + Expenses	$17	$20	$344	$32	$413
	Net Benefit	**$157**	**− $123**	**$204**	**$32**	**$270**
Higher Reductions in UI Benefits Paid: upper end of 90% CI	RESEA Program Cost + (non-RESEA) Costs	$0	$76	$0	$0	$76
	Reduction in UI Benefits Paid	**$220**		**− $220**		**$0**
	Earnings + Fringe + Tax + Expenses	$17	$20	$344	$32	$413
	Net Benefit	**$237**	**− $54**	**$124**	**$32**	**$337**
Lower Earnings gain: Lower end of 90% CI	RESEA Program Cost + (non-RESEA) Costs		$76			$76
	Reduction in UI Benefits Paid	$140		-$140		$0
	Earnings			**$50**		**$50**
	Fringe Benefits			**$13**		**$13**
	State Income and Sales Taxes	**$ 3**		**− $3**		**$0**
	Federal Income Tax		**$5**	**− $5**		**$0**
	Work-related Expenses			**− $5**	**$5**	**$0**
	Net Benefit	**$143**	**− $64**	**− $90**	**$5**	**− $13**

Lower Earnings Gain

As a last sensitivity analysis, we consider a lower estimate for *Earnings*. For our hypothetical example, the impact evaluation's estimate on the net present value of earnings was $330. Suppose the estimate had a 90 percent confidence interval of $50 to $610. The upper end of the confidence interval would clearly increase the net benefit estimates from the base case, but what about the lower end?

The bottom panel of Exhibit A-5 reports estimates that result from this scenario. We enter the lower *Earnings* estimate for the *Participant* perspective and apply the same assumptions used earlier for the rows that follow from *Earnings*. We see that a lackluster, but still possible, earnings estimate dramatically changes the net benefit findings. Now, only the *State Gov* perspective has a meaningfully positive net benefit estimate. The *Participant* perspective now has a −$90 net benefit, as reductions in UI benefits now outweigh earnings gains. And now, the federal government is increasing expenditures by a net of $64 for a program that essentially does not improve society overall. With a *Society (Total)* net benefit of −$90, this scenario effectively provides a break-even analysis; earnings at the lower end of the 90 percent

confidence interval of the impact estimates would result in the Enhanced RESEA program essentially breaking even from an overall societal perspective.

Discussion of Non-Monetized Benefits and Costs

Our hypothetical RESEA CBA would also include a discussion of non-monetized benefits and costs that are relevant for the RESEA participants in our state. Suppose that, as part of qualitative interviews conducted for an implementation study of the Enhanced RESEA program, participants and RESEA program staff both mentioned that check-in calls helped participants feel greater confidence in a plan to obtain employment and, as a result, to feel less anxiety and fewer depression symptoms during their unemployment spell. This is a benefit to participants and likely provides a positive spill-over benefit of confidence and less worry to the participants' families and support networks. While monetizing this benefit is beyond the scope of a RESEA CBA, our hypothetical RESEA CBA would include quotes from participants describing these benefits.

Appendix B: Federal and State Tax Rates

This appendix provides technical details to this *Handbook*'s approach to estimates of marginal federal and state income tax rates and state sales tax rates for households receiving Unemployment Insurance (UI) benefits. Exhibit B-1 provides those estimates for the 2022 tax year (the latest year for which tax rates are available).

Exhibit B-1: Tax Rates by State, for 2022

IRS Code	USPS Code	State Name	Tax Rates %		
			Federal Income	State Income	State Sales
1	AL	Alabama	-1.5%	2.95%	4.60%
2	AK	Alaska	9.4%	0.00%	1.52%
3	AZ	Arizona	8.0%	0.96%	3.35%
4	AR	Arkansas	7.2%	2.18%	4.67%
5	CA	California	10.7%	1.20%	3.92%
6	CO	Colorado	10.8%	3.64%	3.06%
7	CT	Connecticut	10.8%	2.27%	3.11%
8	DE	Delaware	8.8%	2.77%	0.31%
9	DC	District of Columbia	8.2%	-0.17%	3.46%
10	FL	Florida	6.8%	0.00%	3.67%
11	GA	Georgia	9.2%	3.08%	3.88%
12	HI	Hawaii	10.7%	5.51%	2.87%
13	ID	Idaho	9.8%	1.97%	3.36%
14	IL	Illinois	9.5%	4.56%	3.86%
15	IN	Indiana	9.8%	3.18%	3.12%
16	IA	Iowa	10.7%	3.27%	3.26%
17	KS	Kansas	10.0%	2.80%	4.38%
18	KY	Kentucky	10.6%	4.54%	2.65%
19	LA	Louisiana	6.1%	1.81%	4.11%
20	ME	Maine	10.5%	3.26%	2.56%
21	MD	Maryland	10.1%	2.14%	2.66%
22	MA	Massachusetts	11.9%	2.74%	2.86%
23	MI	Michigan	8.7%	4.31%	1.04%
24	MN	Minnesota	11.9%	2.75%	3.66%
25	MS	Mississippi	2.1%	1.34%	3.92%
26	MO	Missouri	9.7%	3.51%	3.81%
27	MT	Montana	9.7%	3.01%	0.46%
28	NE	Nebraska	8.8%	2.34%	3.00%
29	NV	Nevada	8.2%	0.00%	3.46%
30	NH	New Hampshire	13.9%	0.00%	0.61%
31	NJ	New Jersey	11.3%	0.78%	2.68%
32	NM	New Mexico	6.0%	2.63%	3.33%
33	NY	New York	9.7%	1.74%	3.17%
34	NC	North Carolina	7.1%	2.52%	3.39%
35	ND	North Dakota	13.0%	0.10%	2.61%
36	OH	Ohio	10.4%	0.92%	3.04%
37	OK	Oklahoma	7.4%	2.15%	5.17%
38	OR	Oregon	9.1%	5.68%	0.50%
39	PA	Pennsylvania	11.2%	2.92%	2.53%
40	RI	Rhode Island	9.4%	1.98%	3.37%
41	SC	South Carolina	5.1%	2.78%	1.44%
42	SD	South Dakota	10.0%	0.00%	3.56%
43	TN	Tennessee	7.8%	0.00%	4.60%

IRS Code	USPS Code	State Name	Tax Rates %		
			Federal Income	State Income	State Sales
44	TX	Texas	9.2%	0.00%	3.31%
45	UT	Utah	9.2%	4.35%	3.94%
46	VT	Vermont	11.6%	2.48%	2.59%
47	VA	Virginia	9.8%	2.24%	2.23%
48	WA	Washington	12.0%	0.00%	4.63%
49	WV	West Virginia	7.6%	3.35%	2.72%
50	WI	Wisconsin	11.5%	2.86%	2.71%
51	WY	Wyoming	12.0%	0.00%	2.43%

Source: Project computations, drawing on NBER TAXSIM, published sales tax rates and coverage, tabulations of Current Population Survey microdata, published Consumer Expenditure Survey tabulations. See text for details.

Estimation of tax rates proceeds in three steps. First, as detailed in Section B.1, a Current Population Survey (CPS) database is used to estimate average income and other characteristics that determine income tax liabilities for households receiving UI in each state. Second, detailed in Section B.3, the household characteristics are used to estimate marginal federal and state income tax rates. Third, Section B.3 provides details on how state sales taxes are estimated.

B.1 Household Characteristics from the Current Population Survey

The first step in estimating tax rates is to determine the average tax-relevant characteristics of households receiving UI.[52] These characteristics include marital status, age, number of dependents of various ages, and income amounts for various types of income. The UI data that RESEA CBAs use to estimate earnings and UI receipt outcomes do not include information on household income, marital status, number and age of dependents, and other characteristics that determine tax rates.

Because of this, we develop estimates using publicly available survey data. The March Current Population Survey Annual Social and Economic Supplement (CPS-ASEC) includes the most relevant characteristics that determine tax rates—in the tax-relevant characteristics listed above.[53] Characteristics of the population experiencing unemployment differ by state and state income tax rates differ by state. Because the CPS-ASEC includes respondents in all 50 states and the District of Columbia, it allows for state-specific estimates. The CPS-ASEC also includes receipt of UI, allowing estimates for this population that are likely more relevant to RESEA participants.

We highlight three challenges to using the CPS-ASEC to determine average tax-relevant characteristics for households experiencing unemployment.

1. **Sample Size**. The CPS-ASEC is among the largest national surveys. Still, because unemployment affects only a fraction of workers each year, for smaller states, the sample has relatively few households receiving UI in a given year. Given the variance in earnings across households, this is too small to generate reliable estimates.

2. **Release Lag**. CPS-ASEC data refer to the previous calendar year and is released with a lag of about six months. Thus, data for calendar year 2022 will not be released until mid-September 2023.

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[52] Of course, claimants selected to participate in RESEA may have different characteristics in terms of household composition, income, and other elements that affect tax rates. An evaluator may wish to adjust the approach detailed in this appendix to reflect the characteristics of RESEA participants.

[53] The CPS-ASEC is administered by the Census Bureau and co-sponsored by the U.S. Bureau of Labor Statistics. The dataset uses a represented sample of about 60,000 households each year. See https://www.census.gov/programs-surveys/cps/technical-documentation/methodology.html for more information about the survey.

3. **Unusual Years**. Recent years have included the Great Recession (2007-2009) and the COVID-19 pandemic (2020 and 2021). Those years are unlikely to be representative of the years of the RESEA program being assessed.

To address these challenges, we pool all CPS-ASEC interviews in the data release years 2011 to 2020. These interviews refer to calendar years 2010 to 2019. This results in a roughly ten times larger sample and, by combining, averages the post-recession expansion years with years just prior to the pandemic. We constructed this pooled dataset using IPUMS-CPS (Flood, et al., 2022). To account for the release lag, all dollar amounts are adjusted for inflation to 2022 dollars using the CPI-U (see Box 4 on page 19).[54]

Using the pooled data, we construct a tax unit.[55] Tax units are assumed to be equivalent to CPS-ASEC "families." Thus, each individual in a CPS-ASEC family or sub-family is assumed to file taxes with everyone else in that family, but not with anyone else in the CPS-ASEC household. What the CPS-ASEC calls "nonfamily householders" and "secondary" families are assumed to file as individuals. Each family in each state with an amount of UI received greater than zero is retained in the data, with tax-related characteristics defined from relevant CPS-ASEC fields.

B.2 Average Marginal Federal and State Income Sales Tax Rates

We approximate marginal tax rates by applying NBER's TAXSIM program (Feenberg and Coutts, 1993) to the tax units with UI receipts from our CPS-ASEC sample. Information on TAXSIM can be found at: http://users.nber.org/~taxsim/. Given individual-level information on income and family structure, TAXSIM computes a variety of information about federal and state taxes due for a given state and year, including marginal state and federal tax rates. A marginal tax rate is the tax rate that applies to an additional (or the last) dollar of income. This is the appropriate tax rate for a CBA because incremental earnings align with this concept of marginal income.

TAXSIM returns federal and state marginal tax rates for each year for each household receiving UI in the database. The average marginal tax rates reported in Exhibit B-1 are the weighted averages of the tax units' state and federal marginal income tax rates, where the weights are given by the CPS-ASEC sampling weights.

B.3 Average State Sales Tax Rates

Some states rely more on income taxes to raise revenue, while others rely more on sales taxes.[56] A large fraction of incremental earnings due to RESEA participation will be spent on goods and services which are taxed. So, it is important to also include an estimate of state sales taxes in RESEA CBAs.[57]

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[54] This implicitly assumes that, after adjusting for inflation, characteristics of individuals' experiencing unemployment in 2010 through 2019 waves are informative of individuals in 2022. This approach ignores economic growth and shifting demographics, which is a reasonable approach for estimating tax rates.

[55] As is discussed in some detail on the NBER TAXSIM website and in the references and sample programs stored there (see Feenberg and Coutts, 1993 and https://www.nber.org/research/data/taxsim), there is some ambiguity about how to create tax units from the CPS-ASEC (https://users.nber.org/~taxsim/to-taxsim/cps27/cps-uchicago/). The challenges arise for what the Census Bureau refers to as "related subfamilies" and "unrelated subfamilies." These challenging households are not a focus of this study and they represent less than 5 percent of all individuals in the full database (i.e., not restricted to those receiving UI income).

[56] Of course, property taxes are an additional main source of state and local revenues. However, changes in earnings due to reemployment are unlikely to affect property tax liabilities, at least over the time horizons that RESEA CBAs will include. So, property taxes do not need to be included in RESEA CBAs.

[57] Federal excise taxes are similar to sales taxes but are mostly restricted to "motor fuel [gasoline], airline tickets, tobacco, alcohol, and health-related goods and services" (https://www.taxpolicycenter.org/briefing-book/what-are-major-federal-excise-taxes-and-how-much-money-do-they-raise). However, excise taxes make up a very

The right sales tax to apply to incremental earnings in a RESEA CBA is the "effective" sales tax. Theoretically, the effective sales tax rate is the share of incremental earnings that is paid as sales taxes. Incremental earnings are either spent or saved, and the portion of earnings that are spent is subject to whatever sales tax applies to the class of goods purchased (since sales tax rates vary by type of goods sold in many states and most states exempt at least some expenditures from sales taxes).[58]

That appropriate effective average sales tax rate is a weighted average of the nominal sales tax rate for each class of expenditures; where the weights are given by the share of incremental earnings RESEA participants spent on goods in each class. Of course, RESEA CBAs will not observe RESEA participant (or comparison group members') spending patterns. So, following Fein, Dastrup, and Burnett (2021), we approximate budget shares based on average consumer expenditure shares based on the Consumer Expenditure Survey (CEX). The CEX publishes budget shares for broad categories of expenditures by income quintiles.[59] To approximate RESEA participant expenditure shares, we weight the CEX expenditure quartiles to match income quarters observed in the pooled CPS-ASEC data described in Section B.1.

We recover state sales tax rates and exclusions from state tax web sites in 2022.[60] Thus, even states with zero nominal sales taxes sometimes have positive sales tax rates according to the concept used here.[61]

Putting the pieces together, the average effective state sales tax for state s is approximated by:

$$r_s = \sum_{q=1}^{5} p_{s,q} \left\{ \sum_c b_{q,c} r_{s,c} \right\}$$

Where r_s is the approximated effective sales tax rate in state s. Income quintiles are indicated by $q = 1, ..., 5$. The share of the CPS-ASEC sample in each state with earnings in the CEX quintile is $p_{s,q}$. the classes of expenditure are indexed by c. The share of total expenditures for the class c for the income quintile q is $b_{q,c}$, and the class-specific sales tax rate in the state is $r_{s,c}$.

In words, the first (outer) summation is over the five earnings' quintiles, q. The weights for each quintile are given by the state-specific share of each income quintile—as given by the pooled CPS data, for state s.

For each quintile, the second (inner) summation computes the average effective tax rate as the weighted average of tax rates for different classes of expenditures, c. The tax rates, r, are drawn from state tax agency websites and other published information; the budget shares are drawn from the CEX for that income quintile.[62]

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small portion of federal revenues and would likely only result in trivial adjustments were they to be included in RESEA CBAs.

[58]   Examples of frequently excluded expenditures include property taxes, rent, and groceries.

[59]   The relevant CEX tables can be found here: https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income.

[60]   The "state sales tax rates" include other taxes computed as a percent of the sale (e.g., taxes on medical services).

[61]   A spreadsheet with the exact sales tax rates by category and the sources for those rates is available on request. Our mapping is admittedly imperfect. Additional effort, especially by someone with detailed knowledge of a given state's tax policy, would likely improve on our estimates. However, differences are likely to have relatively small implications for net benefit calculations.

[62]   This approach embeds an assumption that all incremental earnings are spent. In fact, incremental earnings and consumer expenditure shares diverge because lower income quintiles have expenditures above reported income (presumably because of some combination of under-reported transfer income and running down savings) and higher income quintiles have expenditures below reported income (presumably because of savings). We anticipate that further refinement of the approximation to account for savings is beyond the scope of RESEA CBAs.

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