

The Welfare Impact of Reemployment Bonuses

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September 14, 2026

Abstract

This paper investigates the welfare impact of reemployment bonuses in a dynamic job search model. Reemployment bonuses, monetary incentives offered to workers who quickly get reemployed, may mitigate the moral hazard in unemployment insurance (UI) while preserving consumption smoothing. I first derive a sufficient statistic formula for the welfare impact of reemployment bonuses. The formula combines two channels, a consumption-reallocation channel from the frontloading of income within employment and a fiscal-externality channel from the UI spending that faster reemployment saves. Evaluating the formula using U.S. data yields a positive welfare gain, driven mainly by the fiscal externality. Furthermore, an extended quantitative model suggests that (i) the optimal bonus equals about 19% of the wage and raises welfare modestly for a labor-market entrant, (ii) reemployment bonuses and UI benefits are complements, in the sense that the welfare value of adding a bonus rises with the generosity of UI, and (iii) workers no longer gain from any positive bonus once firms extract roughly one fifth of the payment through lower wages.

Keywords: Reemployment bonus; Sufficient statistic approach; Unemployment insurance; Consumption smoothing; Moral hazard

JEL classification: H20, J64, J65

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1 Introduction

Unemployment insurance (UI) is a crucial element of social insurance programs in developed countries, designed to protect workers from income loss during periods of unemployment. However, it is widely acknowledged that UI can discourage job search among the unemployed, a phenomenon often referred to as moral hazard. Prolonged unemployment spells induced by UI can impose a fiscal burden by raising government spending on benefits and lowering income tax revenues, limiting the government’s ability to provide generous support. The fiscal burden of UI is a concern not only for economists but also for policymakers. For example, improving the solvency of state UI programs was one of the goals of the proposal on UI programs made by the President back in 2016 ([White House, 2016](#)), noting that only 20 states had sufficient reserves to endure a single year of recession on their own.¹ A policy that encourages job search without impeding consumption smoothing would improve the resiliency of UI programs and ultimately the welfare of workers.

One potential way to address the issue of moral hazard is through reemployment bonuses, rewards given to unemployed workers for quickly finding a job. This policy is intended to encourage more intensive job search, potentially alleviating the burden on the UI budget. Reemployment bonuses have been tested in the U.S. and implemented in a few other countries.² Although several studies have found positive effects of these bonuses on labor supply, relatively little research has examined through which channels and to what extent reemployment bonuses affect welfare, under what conditions and for whom they raise it, or how the government should set them jointly with UI benefits.

This paper investigates the welfare impact of reemployment bonuses in a dynamic model of consumption, saving, and job search. In the first part, I derive a sufficient statistic formula that clarifies how reemployment bonuses affect worker welfare and allows for quantifying the first-order welfare impact using a few readily available reduced-form parameters. I begin with a simplified two-period setup to highlight two key channels through which reemployment bonuses affect welfare. The first channel operates through income frontloading after reemployment: balanced-budget reemployment bonuses shift a worker’s own resources from later employment periods to the periods right after reemployment. To the extent that a

¹While this refers to state-level reserves, it is worth noting that the federal government can provide loans to states and directly fund extended benefits during recessions.

²Refer to [Meyer \(1995\)](#) for the field experiments in the U.S. The actual implementation of bonus programs in South Korea and Taiwan can be found in [Ahn \(2018\)](#) and [Huang and Yang \(2021\)](#), respectively. Japan also provides reemployment bonuses to workers based on how quickly they find a job relative to the potential benefit duration.

worker is closer to a liquidity constraint right after reemployment than later in the employment spell, this intertemporal reallocation leads to a welfare gain. The second channel is a fiscal externality: if the government is currently spending heavily on UI benefits, shortening the duration of unemployment through reemployment bonuses relaxes the government budget constraint, generating a welfare gain.

I then proceed with a more general, multi-period model and find that essentially the same formula applies, retaining the key underlying intuitions. A crucial parameter in the formula is the responsiveness of unemployment duration to changes in reemployment bonuses. Rather than seeking exogenous variation in reemployment bonuses, which is not widely available, to estimate their impact on unemployment duration, I theoretically establish a link between the job search response to reemployment bonuses and the response to UI benefits. This connection allows me to draw on the extensive empirical literature on the labor supply effects of UI benefits.³

Evaluating the formula, I find that the first-order welfare gain from reemployment bonuses equal to 10% of wages is equivalent to that from a permanent 0.13% increase in wages. I also decompose the sources of this welfare gain and find that the fiscal externality induced by shorter unemployment durations accounts for 70–90% of the total while the remaining portion is attributable to the reallocation of consumption across periods after reemployment.

To compare reemployment bonuses with other government programs, I also compute the Marginal Value of Public Funds (MVPF; [Finkelstein and Hendren 2020](#), [Hendren and Sprung-Keyser 2020](#)). The MVPF of the first dollar of reemployment bonuses is about two, higher than the MVPF of most policies targeting adults documented in [Hendren and Sprung-Keyser \(2020\)](#).

The calculation above evaluates a marginal bonus under assumptions that are transparent but restrictive, and it can say neither how large a bonus should be nor under what conditions it does not raise welfare. I therefore ask what an optimally chosen bonus is worth, for whom and under what conditions it raises welfare, and how adding bonuses to the policy set changes the optimal level and duration of UI benefits. To answer these questions, I calibrate a quantitative version of the model that incorporates imperfect UI eligibility and endogenous take-up, a statutory cap on benefits, stochastic match quality with wage-dependent separations, and repeated unemployment spells. These features discipline how much the UI system actually pays out, which governs the fiscal externality at the center of the welfare evaluation. Only about one-third of the unemployed receive benefits, and the cap limits payments to

³See [Krueger and Meyer \(2002\)](#), [Schmieder and von Wachter \(2016\)](#), and [Cohen and Ganong \(2026\)](#) for surveys.

high-wage claimants. I also discipline the search cost function, a key determinant of how workers' search behavior responds to policy changes, by ensuring that the model-implied UI elasticity of unemployment duration matches its empirical counterpart.

The baseline UI structure replaces 50% of wages up to a statutory cap for up to 6 months. Given that structure, the calibrated model suggests that a reemployment bonus equal to 19% of wages maximizes welfare for a labor-market entrant, yielding a 0.06% gain in terms of consumption equivalence. The welfare gain is hump-shaped in the bonus, and negative for bonuses above roughly 37%.

I also explore for whom and under what conditions reemployment bonuses raise welfare. Four findings stand out. First, the modest size of the gain mainly reflects the limited reach of the UI system. Under full benefit eligibility and take-up, the maximum welfare gain is about seven times larger. Second, bonuses raise welfare only if workers keep most of the payment. If firms extract even a fifth of the bonus through lower wages, no positive bonus raises workers' welfare, and the gain survives only if the extracted share returns to them as profit income. Third, the gains are unevenly distributed. Eligible workers gain the most, wealthy and high-wage employed workers lose slightly, and just over a third of the current population would lose from the reform even though a labor-market entrant who expects to experience unemployment spells values it positively. Under an alternative criterion that averages welfare over the stationary population rather than discounting from entry, no positive bonus raises welfare. Fourth, the value of having bonuses available rises with the generosity of UI, both in the benefit level and in the potential duration, since generous benefits amplify the fiscal externality of faster reemployment. The optimal bonus rate itself rises with the replacement rate but falls with the potential duration, because a longer eligibility window pays the bonus for more months.

I also examine the jointly optimal design of the UI system. If the government only chooses the level of UI benefits, the optimal policy replaces 20% of wages for the average claimant, consistent with findings in, for example, [Hansen and Imrohoroglu \(1992\)](#) and [Gruber \(1997\)](#). In other words, the moral hazard effect is so strong that it is difficult to justify generous UI benefits. Adding reemployment bonuses to the set of policy instruments makes the optimal benefit slightly more generous. The jointly optimal policy pairs an effective replacement rate of 22% with a bonus of 12% of the wage, and its welfare gain is about 20% larger than that of the optimal UI alone.

Related Literature. The concept of reemployment bonuses can be traced back to the 1980s when a series of state-led field experiments revealed that offering lump-sum reemploy-

ment bonuses effectively shortened the duration of unemployment (Woodbury and Spiegelman 1987, Meyer 1995, Robins and Spiegelman 2001). More recent studies by Ahn (2018) and Huang and Yang (2021) have evaluated the impact of reemployment bonuses on unemployment duration in quasi-experimental settings, leveraging actual policy changes in South Korea and Taiwan. Their research demonstrates that reemployment bonuses significantly reduce the unemployment duration among UI recipients.

Theoretically, Hopenhayn and Nicolini (1997) study the optimal UI benefit *profile* as an optimal contract problem. They show that the optimal contract involves a UI benefit that decreases in unemployment duration and a wage tax after reemployment that increases to the extent that the worker finds a job later while ensuring that consumption is constant after reemployment. In their numerical example, they find that the optimal wage tax can be negative for a worker finding a job quickly enough, suggesting that a negative tax, which can be interpreted as a reemployment bonus, could emerge as a component of the optimal UI design. I do not solve an optimal-contract problem. Instead, I directly change a policy parameter given the current structure of the UI system and therefore restrict the set of policy instruments considered. Nonetheless, I build on their insight and derive a sufficient statistic formula that allows for more flexible modeling (e.g., borrowing and saving) and only requires well-established elasticities to quantify the welfare effect of reemployment bonuses.

Methodologically, this paper employs the sufficient statistic approach pioneered by Baily (1978) and Chetty (2006). This approach has been widely used to examine various aspects of UI. For instance, it has been used to study the optimal level of UI benefits (Gruber 1997, Chetty 2008, Landais 2015, Kroft and Notowidigdo 2016, Griffy and Rabinovich 2023), the optimal duration of UI (Ganong and Noel 2019), and the optimal trajectory of UI benefits (Kolsrud, Landais, Nilsson and Spinnewijn 2018, Lindner and Reizer 2020). This approach to welfare evaluation is useful as it requires only a subset of model parameters to be identified. But a welfare formula sometimes requires a reduced-form parameter that is difficult to obtain, and researchers establish a link between variables that are challenging to measure and those that are more straightforward. For instance, Chetty (2008) approximates the effect of UI on the utility gain from consumption smoothing, which necessitates high-frequency consumption data, by using an estimate of a labor supply response to severance payments. Following a similar logic, Landais (2015) measures a labor supply response to UI benefits that vary over time to estimate the utility gain from consumption smoothing. Griffy and Rabinovich (2023) relate the elasticities of job finding with respect to UI benefits to the elasticity of average wages with respect to UI benefits, and use this relationship to quantify the welfare impact of

UI in a model where workers’ selectiveness in job acceptance plays a crucial role. In assessing the welfare impact of reemployment bonuses, I leverage consumption information and a labor supply response to UI benefits to approximate a labor supply response to reemployment bonuses, which is then incorporated into a sufficient statistic formula.

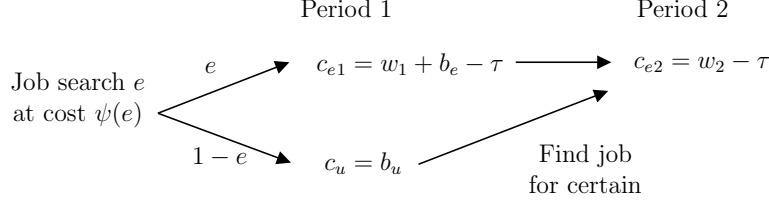
The results from the sufficient statistic approach cannot be extended to cases where policy changes are not marginal for two reasons. First, the envelope-theorem characterization is local and, by itself, does not evaluate non-marginal policy changes. Second, the formula depends on reduced-form parameters that may not be policy-invariant. Furthermore, it cannot provide direction for the joint design of multiple policy instruments. I supplement my results from the sufficient statistic approach by investigating non-marginal changes in reemployment bonuses through the full calibration of the model. In this vein, [Lentz \(2009\)](#), [Michelacci and Ruffo \(2015\)](#), [Lawson \(2017\)](#), and [Ganong and Noel \(2019\)](#) estimate a partial-equilibrium dynamic model of consumption, saving, and job search to study optimal UI benefit design.

2 Two-Period Model

2.1 Environment

I start with a two-period case under purposefully restrictive assumptions to highlight a few key intuitions that later carry over to a general case. I consider a risk-averse unemployed worker who derives utility from consumption $u(c)$ and chooses job search effort e , which entails a utility cost $\psi(e)$. The utility function u is strictly increasing and concave in c . Search effort e is normalized so that it represents the job-finding probability, and ψ is assumed to be strictly increasing and convex in e . In the event of successful job finding, the worker consumes the first-period wage w_1 plus reemployment bonuses b_e minus the tax τ . If the worker fails to find a job, they consume unemployment benefits b_u . For simplicity, I assume that the worker is employed with certainty in the second period and consumes the second-period wage $w_2 - \tau$. The tax must be set so that government spending on unemployment benefits and reemployment bonuses equals the revenue from taxes on employed workers. There is no discounting and the interest rate is zero. [Figure 1](#) illustrates the timeline of the model.

Figure 1: Timeline



Note: This figure summarizes the timing of decisions and events in the two-period model.

2.2 Welfare Impact of Reemployment Bonuses in a Two-Period Model

The welfare of the worker is given by the initial expected value

$$\mathcal{W}(\mathbf{b}) = e(\mathbf{b}) u(w_1 + b_e - \tau(\mathbf{b})) + (1 - e(\mathbf{b})) u(b_u) - \psi(e(\mathbf{b})) + u(w_2 - \tau(\mathbf{b})), \quad (1)$$

where $\mathbf{b} = (b_u, b_e)$, and $e(\mathbf{b})$ is the job search effort chosen by the worker to maximize the expected value:

$$e(\mathbf{b}) = \arg \max_{e \in [0,1]} e u(w_1 + b_e - \tau(\mathbf{b})) + (1 - e) u(b_u) - \psi(e). \quad (2)$$

The tax $\tau(\mathbf{b})$ satisfies the government budget constraint:

$$(1 + e(\mathbf{b})) \tau(\mathbf{b}) = e(\mathbf{b}) b_e + (1 - e(\mathbf{b})) b_u, \quad (3)$$

where the left-hand side is the total tax revenue, and the right-hand side is the spending on reemployment bonuses and unemployment benefits.

I examine the impact of a marginal change in the reemployment bonus b_e on the welfare $\mathcal{W}(\mathbf{b})$ by taking the derivative of the welfare with respect to b_e . Applying the envelope theorem, I obtain

$$\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e} = \mathbb{E}[u'(c_e)] \frac{\partial e(\mathbf{b})}{\partial b_e} (b_u + \tau - b_e) + e (u'(c_{e,1}) - \mathbb{E}[u'(c_e)]), \quad (4)$$

where $c_{e,1} = w_1 + b_e - \tau$ and $c_{e,2} = w_2 - \tau$ are the consumption levels of reemployed workers in periods 1 and 2, respectively, and $\mathbb{E}[u'(c_e)] = \frac{eu'(c_{e,1}) + u'(c_{e,2})}{e+1}$ is the average marginal utility of employed workers across both periods. The derivation is in Appendix A.1. To obtain a monetary measure of the welfare impact, I divide the change in welfare by the increase

in the worker's expected value that arises from a marginal increase in wages $\sum_{t=1}^2 \frac{\partial V}{\partial w_t} = eu'(c_{e,1}) + u'(c_{e,2})$ where V is the expected value of the worker. Then, the expression becomes

$$\frac{\frac{\partial W(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^2 \frac{\partial V}{\partial w_t}} = \frac{1}{1+e} \left[e \frac{u'(c_{e,1}) - \mathbb{E}[u'(c_e)]}{\mathbb{E}[u'(c_e)]} + \frac{\partial e}{\partial b_e} (b_u + \tau - b_e) \right]. \quad (5)$$

This expression shows that there are two channels through which a marginal change in reemployment bonuses affects welfare. In the quantitative exercises below, the fiscal-externality channel is the primary driver of the welfare gains from reemployment bonuses, while the consumption-reallocation channel plays a secondary role. I explain each term of this equation in the paragraphs below.

Consumption reallocation. The first channel operates through the frontloading of income and hence consumption, as suggested by the first term in the bracket of equation (5). To see this point, note that a balanced-budget increase in the reemployment bonus b_e is associated with an increase in the tax τ . Since the bonus b_e is paid to reemployed workers only in period 1, whereas the tax τ is collected from reemployed workers in both periods 1 and 2, the policy change reallocates income from period 2 to period 1. Theoretically, this term can be positive or negative depending on the path of consumption during employment. Specifically, it is positive if consumption in period 1 is smaller than that in period 2 (i.e., $w_1 + b_e - \tau < w_2 - \tau$), and this occurs if income sufficiently grows over time.⁴

Fiscal externality. Second, providing reemployment bonuses increases the job-finding probability (i.e., $\frac{\partial e}{\partial b_e} > 0$) by raising the utility of employment, which I show in detail in the next subsection. The second term in the bracket of equation (5) captures the fiscal externality that comes from shorter unemployment induced by reemployment bonuses. In particular, the term is increasing in $b_u + \tau - b_e$, indicating that, to the extent that the government is currently spending more on unemployment benefits b_u or collecting more taxes τ relative to reemployment bonuses b_e , the shorter unemployment duration induced by the bonus relaxes the government budget constraint, thereby increasing welfare. It is also worth noting that if there are no UI benefits in the economy (i.e., $b_u = b_e = \tau = 0$), then (marginally) introducing reemployment bonuses does not relax the government budget constraint, and this channel does not show up.

⁴Even if saving and borrowing are allowed, consumption tracks growing income over time when it is costly to borrow against future income. In the general model in Section 3, I allow for both borrowing and saving under a liquidity constraint.

2.3 Duration of Benefits

A key feature of the two-period model is that reemployment bonuses are paid only upon reemployment, whereas taxes are collected in subsequent periods. The presence of periods in which workers pay taxes without receiving bonuses is crucial for the welfare effects of the policy. To make this point explicit, consider an extension in which employed workers continue to pay taxes for T periods after reemployment:

$$(T + e(\mathbf{b}))\tau(\mathbf{b}) = e(\mathbf{b})b_e + (1 - e(\mathbf{b}))b_u, \quad (6)$$

where the only difference from the previous case (3) is that the tax revenue on the left-hand side depends on T . This budget constraint implies that the impact of reemployment bonuses on the budget-balancing tax is

$$\frac{\partial \tau(\mathbf{b})}{\partial b_e} = \frac{e}{T + e} - \frac{\partial e(\mathbf{b})}{\partial b_e} \frac{b_u + \tau - b_e}{T + e}, \quad (7)$$

where the first term captures the mechanical increase in the tax given job search e while the second term captures the fiscal externality through the response of job search e .

I argue below that T matters for the fiscal externality, or more specifically, the response of search effort $\frac{\partial e(\mathbf{b})}{\partial b_e}$. Recall that the first-order condition for job search is $\psi'(e) = u(w_1 + b_e - \tau(\mathbf{b})) - u(b_u)$, and differentiating both sides of the first-order condition with respect to b_e implies that

$$\begin{aligned} \frac{\partial e(\mathbf{b})}{\partial b_e} &= \frac{u'(c_e) \left(1 - \frac{\partial \tau}{\partial b_e}\right)}{\psi''(e)} \\ &= \frac{\frac{u'(c_e)}{\psi''(e)}}{1 - \frac{u'(c_e)}{\psi''(e)} \frac{b_u + \tau - b_e}{T + e}} \left(1 - \frac{e}{T + e}\right). \end{aligned} \quad (8)$$

This equation captures the impact of a marginal change in reemployment bonuses on job search.⁵ Importantly, if T is set to zero so that the workers who receive reemployment bonuses are exactly the same as those who pay taxes, then job search effort does not respond to bonuses, i.e., $\frac{\partial e}{\partial b_e} = 0$. This is simply because a budget-balancing increase in taxes exactly offsets reemployment bonuses (i.e., $\frac{\partial \tau}{\partial b_e} = 1$). As long as $T \geq 1$, the increase in taxes does not

⁵I assume that the denominator of the first factor is positive, so that the feedback through the budget-balancing tax does not overturn the direct effect of the bonus. This is the condition for a locally stable balanced-budget response, and it holds when the search cost is sufficiently convex, that is, when $\psi''(e)$ is large enough.

fully offset reemployment bonuses. At the other extreme, if $T \rightarrow \infty$, I obtain $\frac{\partial e}{\partial b_e} = \frac{u'(c_e)}{\psi''(e)} > 0$, and this also implies $\frac{\partial e}{\partial b_e} = \frac{\partial e}{\partial w_1}$; that is, the response of job search to reemployment bonuses is the same as the response to the first-period wage. As T becomes larger, the balanced budget requires a smaller increase in a per-period tax, making reemployment bonuses effectively equivalent to a wage increase.

3 General Model

In this section, I present a dynamic model of consumption, saving, and job search, building on the framework in [Chetty \(2008\)](#).

3.1 Environment

Workers in the model are initially unemployed at the beginning of the initial period $t = 1$. Upon finding a job, they remain employed until the model ends at period T , greatly simplifying the problem.⁶ Workers have preferences over consumption c and job search effort e , with a strictly increasing and concave utility function $u(c)$ and a strictly increasing and convex cost function $\psi(e)$.⁷ I normalize job search effort e so that e represents the probability of finding a job. I also assume $\psi'(0) = 0$ and $\lim_{e \rightarrow 1} \psi'(e) = \infty$ to ensure an interior solution. Workers can freely save or borrow as long as the asset a_t remains above an exogenous liquidity constraint $\underline{a}$. For expositional simplicity, I assume the interest rate is zero and there is no discounting.

Each period t , unemployed workers receive non-labor income $\bar{y}_t$. In addition, they receive UI benefits b_u if $t \leq T_B$, where T_B denotes the potential benefit duration, that is, the maximum number of periods during which unemployed workers are eligible to receive benefits, reflecting the structure of actual UI programs.⁸ In each period t , reemployed workers receive a pre-tax wage $w_{s,t}$, where $s \leq t$ denotes the time at which they found a job (capturing, for example, human capital depreciation). They also pay a tax τ . Furthermore, reemployed workers receive a reemployment bonus b_e in each period if $t \leq T_B$, meaning that the potential benefit duration applies to reemployment bonuses as well. This specification implies that finding a job earlier increases the total bonus received over the eligibility

⁶For example, [Chetty \(2008\)](#), [Landaís \(2015\)](#), and [Kolsrud et al. \(2018\)](#) adopt the same assumption to derive a welfare formula. Nonetheless, I relax this assumption in Section 5 where I numerically solve the model.

⁷An implicit assumption is that the utility function does not directly depend on employment status. I discuss this assumption in Section 4.4.

⁸Most states in the U.S. set potential benefit duration at 26 weeks.

window, strengthening incentives relative to a one-time payment.⁹ Therefore, the income processes for unemployed workers $y_{u,t}$ and for employed workers $y_{e,s,t}$ are given by

$$y_{u,t} = \begin{cases} \bar{y}_t + b_u & \text{if } t \leq T_B, \\ \bar{y}_t & \text{otherwise,} \end{cases} \quad y_{e,s,t} = \begin{cases} w_{s,t} - \tau + b_e & \text{if } t \leq T_B, \\ w_{s,t} - \tau & \text{otherwise.} \end{cases} \quad (9)$$

For example, if $T_B = 26$ weeks and a worker finds a job in the 16th week after a job loss, the worker receives UI benefits b_u for the first 15 weeks, and then receives reemployment bonuses b_e from the 16th week through week 26.

I introduce some notation as follows. The survival probability, representing the probability of remaining unemployed after searching in period t , is given by $S_t = \prod_{j=1}^t (1 - e_j)$, which is the probability of failing to find a job for t consecutive periods. The expected unemployment duration, or the expected number of periods a worker remains unemployed, is given by $D = \sum_{t=1}^T S_t$, and the expected compensated unemployment duration, or the expected number of periods a worker receives UI benefits, is given by $D_B = \sum_{t=1}^{T_B} S_t$.¹⁰ They are a function of the underlying policy parameters (b_u, b_e, τ) , and I explicitly write them as a function when it matters, but otherwise I suppress the arguments of the functions to simplify the exposition.

I focus on the case where b_u and b_e remain constant over the T_B periods, and the potential benefit duration T_B is fixed. The government finances UI benefits through taxes denoted as τ , which are collected from each employed worker.¹¹

3.2 Worker Problem

I denote by $W_{s,t}$ the value of employment at period t for a worker who found a job at $s \leq t$. I denote by U_t the value of unemployment at period t after failing to find a job in period t .

⁹This policy design is not purely theoretical. For example, Japan's reemployment allowance provides benefits that depend on the remaining days of UI eligibility at the time of reemployment. See <https://www.mhlw.go.jp/file/06-Seisakujouhou-11600000-Shokugyouanteikyoku/0000198944.pdf>.

¹⁰In general, for a nonnegative integer-valued random variable X with finite mean $\mathbb{E}[X] < \infty$, the mean can be written as $\mathbb{E}[X] = \sum_{t=0}^{\infty} \Pr(X > t)$. Let X denote the (random) unemployment duration, that is, the worker remains unemployed for X periods and finds a job in period $X + 1$. Since unemployment cannot last beyond the terminal period T in my model, we have $\Pr(X > t) = 0$ for all $t \geq T$, and therefore $\mathbb{E}[X] = \sum_{t=0}^{T-1} \Pr(X > t) = \sum_{t=1}^T \Pr(X \geq t) = \sum_{t=1}^T S_t$, where $S_t = \prod_{j=1}^t (1 - e_j) = \Pr(X \geq t)$ is the probability of remaining unemployed at the end of period t . The same derivation applies to D_B .

¹¹In practice, taxes are levied on employers, and the extent to which they are passed on to workers is an empirical question. For simplicity, I assume that employers fully pass these taxes on to wages.

These values satisfy the following Bellman equations:

$$W_{s,t}(a_t; b_e, \tau) = \max_{a_{t+1} \geq \underline{a}} u(a_t - a_{t+1} + y_{e,s,t}) + W_{s,t+1}(a_{t+1}; b_e, \tau), \quad (10)$$

$$U_t(a_t; \mathbf{b}, \tau) = \max_{a_{t+1} \geq \underline{a}} u(a_t - a_{t+1} + y_{u,t}) + V_{t+1}(a_{t+1}; \mathbf{b}, \tau), \quad (11)$$

where the first equation is for employed workers while the second equation is for unemployed workers. In the second equation, the second term $V_{t+1}(a_{t+1}; \mathbf{b}, \tau)$ is the value of unemployment in the next period *before* job search in the next period. The unemployment value at period t before the job search is given by the following equation:

$$V_t(a_t; \mathbf{b}, \tau) = \max_{e_t \in [0,1]} e_t W_{t,t}(a_t; b_e, \tau) + (1 - e_t) U_t(a_t; \mathbf{b}, \tau) - \psi(e_t), \quad (12)$$

where the worker chooses job search effort e_t , trading off the gain from employment against the cost of job search. U_t might not be concave in a_t due to the presence of V_{t+1} in the second term of equation (11). I proceed by assuming that U_t is concave in a_t under plausible parameter values, as assumed in Chetty (2008).¹²

The optimal level of search effort is determined by solving the following first-order condition for e_t :

$$\psi'(e_t(a_t; \mathbf{b}, \tau)) = W_{t,t}(a_t; b_e, \tau) - U_t(a_t; \mathbf{b}, \tau). \quad (13)$$

Given that $\psi(\cdot)$ is a convex function, the left-hand side of the equation is increasing in e_t . Workers exert greater search effort to the extent that the value of employment is higher than the value of unemployment. Consequently, an increase in UI benefits b_u makes remaining unemployed more valuable and leads to a decrease in search effort. Conversely, more generous reemployment bonuses b_e incentivize higher search effort by increasing the value of employment.¹³

3.3 Government Problem

In this subsection, I derive a formula for the welfare impact of a marginal change in b_e from the status quo of $b_e = 0$. To evaluate this impact, let $\mathcal{W}(\mathbf{b})$ represent the value of unemployed individuals at the beginning of the model as a function of UI benefits b_u and reemployment

¹²I find that the quantitative model in Section 5 does not encounter nonconcavity under a reasonable set of parameters. Also, Chetty (2008) and Lentz (2009) report that the nonconcavity does not show up in their numerical solutions for a reasonable set of parameters.

¹³In Appendix A.2, I show that job search effort is increasing in b_e .

bonuses b_e , subject to the budget constraint. The government budget constraint is given by

$$(T - D(\mathbf{b}, \tau(\mathbf{b}))) \tau(\mathbf{b}) = D_B(\mathbf{b}, \tau(\mathbf{b})) b_u + (T_B - D_B(\mathbf{b}, \tau(\mathbf{b}))) b_e. \quad (14)$$

The left-hand side is the tax revenue where $T - D$ is the expected number of periods a worker pays taxes. $\tau(\mathbf{b})$ denotes the budget-balancing level of taxes as a function of UI benefits b_u and reemployment bonuses b_e . The first term on the right-hand side is the government spending on UI benefits for which the expected compensated unemployment duration D_B matters. The second term on the right-hand side is the government spending on reemployment bonuses. Then, given the exogenous initial asset a_1 , I define the welfare function as

$$\begin{aligned} \mathcal{W}(\mathbf{b}) &= V_1(a_1; \mathbf{b}, \tau(\mathbf{b})), \\ \text{where } \tau(\mathbf{b}) &= \frac{D_B(\mathbf{b}, \tau(\mathbf{b})) b_u + (T_B - D_B(\mathbf{b}, \tau(\mathbf{b}))) b_e}{T - D(\mathbf{b}, \tau(\mathbf{b}))}. \end{aligned} \quad (15)$$

The welfare measure $\mathcal{W}(\mathbf{b})$ is the object against which I evaluate the policy. In this section, I do not solve for a globally optimal policy. Instead, I examine the welfare impact of a marginal increase in b_e from its current level, $b_e = 0$.

3.4 Welfare Impact of Reemployment Bonuses

Differentiating the welfare function $\mathcal{W}(\mathbf{b})$ with respect to b_e , I obtain the welfare impact of reemployment bonuses as

$$\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e} = \frac{\partial V_1(\mathbf{b}, \tau(\mathbf{b}))}{\partial b_e} + \frac{\partial V_1(\mathbf{b}, \tau(\mathbf{b}))}{\partial \tau} \frac{\partial \tau(\mathbf{b})}{\partial b_e}, \quad (16)$$

where I omit a_1 for notational brevity. The first term is the direct impact of reemployment bonuses while the second term captures the impact of the associated change in taxes. To express it in money-metric terms, I divide both sides by $\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}$, where $\frac{\partial V_1}{\partial w_t}$ denotes the derivative with respect to a uniform increase in the period- t wage $w_{s,t}$ across all employed states, so that the sum is the welfare gain from a marginal increase in wages in all periods. The welfare impact of reemployment bonuses is then given by

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}} = \frac{\frac{\partial V_1(\mathbf{b}, \tau(\mathbf{b}))}{\partial b_e}}{-\frac{\partial V_1(\mathbf{b}, \tau(\mathbf{b}))}{\partial \tau}} - \frac{\partial \tau(\mathbf{b})}{\partial b_e}, \quad (17)$$

where I use the relationship that $\sum_{t=1}^T \frac{\partial V_1}{\partial w_t} = -\frac{\partial V_1}{\partial \tau}$.

Exploiting the envelope theorem, I express the first term of the equation above in terms of the marginal utility of consumption. Using the government budget constraint, I relate the second term of the equation above to the response of unemployment duration to reemployment bonuses. As a result, the welfare impact of a marginal change in b_e is given by the following proposition.

Proposition 1. *The welfare impact of a marginal increase in reemployment bonuses b_e is given by*

$$\begin{aligned} \frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}} = \frac{1}{T-D} \left[(T_B - D_B) \frac{\mu_B - \mu}{\mu} \right. \\ \left. + \left(-\frac{dD_B}{db_e} \right) (b_u - b_e) + \left(-\frac{dD}{db_e} \right) \tau \right], \end{aligned} \quad (18)$$

where μ_B and μ are the average marginal utilities of reemployment consumption over T_B and T periods, respectively, given by

$$\mu_B = \sum_{t=1}^{T_B} \frac{1 - S_t}{T_B - D_B} \mathbb{E}_s[u'(c_{e,s,t})], \quad (19)$$

$$\mu = \sum_{t=1}^T \frac{1 - S_t}{T - D} \mathbb{E}_s[u'(c_{e,s,t})]. \quad (20)$$

Proof. See Appendix A.3. □

As in the simple two-period case (5), the formula here consists of the term capturing the income frontloading after reemployment and the terms representing the fiscal externality.

The first term in the bracket of equation (18), which depends on the gap in the average marginal utility of reemployment consumption over T_B periods versus the average over T periods, captures the gain or loss from reallocating consumption across periods after reemployment. The expectation is taken over time t and the timing of job finding s .¹⁴ This corresponds to the first term of equation (5). Note that μ_B represents the marginal utility of consumption immediately after reemployment while μ represents the marginal utility of consumption for employed workers overall. As a result, a welfare gain arises to the extent that consumption grows over time after reemployment.

¹⁴See Appendix A.3 for the exact expression for $\mathbb{E}_s[u'(c_{e,s,t})]$.

The last two terms in the bracket of equation (18) capture the fiscal externality, corresponding to the second term of equation (5) in the two-period case. To the extent that reemployment bonuses induce a shorter unemployment duration, government spending on unemployment benefits decreases while government tax revenue increases. This relaxes the government budget constraint, thereby contributing to a welfare gain.

4 Empirical Implementation

In this section, I use data from the U.S. labor market to evaluate the sufficient statistic formula (18) derived in the previous section.

4.1 Inferring the Response to Reemployment Bonuses

One crucial parameter in the formula is the response of unemployment duration to reemployment bonuses. Instead of attempting to directly estimate this parameter by seeking exogenous policy variations, I theoretically establish a connection between the job search response to UI benefits and the response to reemployment bonuses. This connection allows me to leverage the vast empirical literature on the response of unemployment duration to UI, as documented in [Krueger and Meyer \(2002\)](#) and [Schmieder and von Wachter \(2016\)](#).

I use the first-order condition for job search effort e_t to relate the responses to unemployment benefits and reemployment bonuses. Recall that the first-order condition (13) for search effort is given by

$$\psi'(e_t(a_t; \mathbf{b}, \tau)) = W_{t,t}(a_t; b_e, \tau) - U_t(a_t; \mathbf{b}, \tau).$$

By differentiating both sides of the equation with respect to either b_u or b_e for $t \leq T_B$, I obtain the following two equations:

$$\frac{\partial e_t(a_t; \mathbf{b}, \tau)}{\partial b_u} = \frac{-\frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_u}}{\psi''(e_t)}, \quad \frac{\partial e_t(a_t; \mathbf{b}, \tau)}{\partial b_e} = \frac{\frac{\partial W_{t,t}(a_t; b_e, \tau)}{\partial b_e} - \frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_e}}{\psi''(e_t)}. \quad (21)$$

The first equation is the response of job search effort to a marginal increase in unemployment benefits, while the second equation is the response to a marginal increase in reemployment bonuses. A key point to note here is that both of them depend on the curvature of the search

cost function $\psi''(\cdot)$. The dependence of both equations on the curvature allows me to obtain

$$\frac{\partial e_t}{\partial b_e} = \frac{\partial e_t}{\partial b_u} \frac{\frac{\partial W_{t,t}(a_t; b_e, \tau)}{\partial b_e} - \frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_e}}{-\frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_u}}. \quad (22)$$

This equation suggests that the search-effort response to reemployment bonuses shown on the left-hand side can be derived from the search-effort response to UI benefits, scaled by a correction term that reflects how an extra dollar is valued differently depending on employment status.

Equation (22) is about search effort e_t , while what I need for the formula (18) is the response of D_B and D that are functions of the profile of search effort over time. To relate the response of search effort to that of unemployment duration, I impose one assumption on consumption:

Assumption. *Consumption after reemployment does not depend on the timing of job finding s , i.e., $c_{e,s,t} = c_{e,s',t}$ for all $s, s' \leq t$ and $t = 1, \dots, T_B$.*

It is worth emphasizing that although this assumption is restrictive, it is still weaker than assuming that consumption is constant after reemployment as commonly assumed (e.g., Chetty 2008, Kroft and Notowidigdo 2016).

With the assumption above, I can now use the relationship in equation (22), which connects the response of search effort to unemployment benefits and reemployment bonuses, to establish the link between the response of unemployment duration to unemployment benefits and reemployment bonuses.

Proposition 2. *The response of the expected compensated unemployment duration D_B to a change in reemployment bonuses b_e is bounded from below by:*

$$-\frac{\partial D_B(\mathbf{b}, \tau)}{\partial b_e} \geq \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \frac{\partial D_B(\mathbf{b}, \tau)}{\partial b_u}, \quad (23)$$

where

$$c_{e,\max} = \max_{t=1,\dots,T_B} c_{e,t,t}, \quad c_{u,\min} = \min_{t=1,\dots,T_B} c_{u,t}.$$

Proof. See Appendix A.4. □

In equation (23), the left-hand side measures how much unemployment duration is shortened in response to a marginal increase in reemployment bonuses. The proposition states

that this is bounded from below by the increase in unemployment duration due to UI benefits, scaled by a correction term that captures the ratio of the marginal utility of consumption in the reemployment state to that in the unemployment state.

Partial vs. total derivatives. The bound established in Proposition 2 is derived based on partial derivatives and does not account for the feedback effects of changes in taxes associated with changes in reemployment bonuses. However, the welfare formula (18) relies on total derivatives. They are different in the following way:

$$\frac{dD_B(\mathbf{b}, \tau(\mathbf{b}))}{db_e} = \frac{\partial D_B(\mathbf{b}, \tau(\mathbf{b}))}{\partial b_e} + \left. \frac{\partial D_B(\mathbf{b}, \tau)}{\partial \tau} \right|_{\tau=\tau(\mathbf{b})} \times \frac{\partial \tau(\mathbf{b})}{\partial b_e}. \quad (24)$$

When the tax changes associated with reemployment bonuses are large, the difference between the total derivatives and the partial derivatives becomes significant. However, this term is likely to be small due to the fact that reemployment bonuses are provided to a small fraction of the overall employed population because T_B is relatively small. Following Chetty (2008) and Kolsrud et al. (2018), I ignore the difference between the partial and total impact of policy changes on expected unemployment duration. Throughout this section, I use the partial derivatives as a proxy for the total derivatives.

4.2 Evaluating the Welfare Impact

Proposition 1 in the previous section gives the first-order welfare impact of providing reemployment bonuses. I replace the job search response to reemployment bonuses with the response to UI benefits using Proposition 2, and evaluate it at the status quo $b_e = 0$. Then, I obtain a lower bound on the welfare impact of the provision of reemployment bonuses that can be evaluated by a few readily available reduced-form parameters.

Corollary 1. *The welfare impact of the marginal increase in reemployment bonuses b_e from zero satisfies*

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \frac{\partial V_t}{\partial w_t}} \geq \phi \frac{D_B}{D} \left[\frac{1}{\phi_B} \frac{\mu_B - \mu}{\mu} + \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \eta_{D_B, b_u} \right], \quad (25)$$

where $\eta_{D_B, b_u} = \frac{\partial D_B}{\partial b_u} \frac{b_u}{D_B}$ is the elasticity of UI-compensated unemployment duration D_B with respect to UI benefits b_u , $\phi = \frac{D}{T-D}$ is the unemployment-to-employment ratio, and $\phi_B = \frac{D_B}{T_B - D_B}$ is the compensated unemployment-to-employment ratio.

Proof. See Appendix A.5. □

I now calibrate the welfare formula above by combining a few different sources. I impose a parametric assumption on the shape of the utility function $u(\cdot)$. I assume it is given by the CRRA utility function $u(c) = \frac{c^{1-\gamma}}{1-\gamma}$ where γ is the relative risk aversion. I take the four reduced-form parameters (D, D_B, ϕ, ϕ_B) describing the U.S. UI environment from [Chetty \(2008\)](#). For the elasticity of compensated unemployment duration with respect to UI benefits, I use $\eta_{D_B, b_u} = 0.34$, the meta-estimate of [Cohen and Ganong \(2026\)](#), who aggregate the estimates in the literature and show that statistically significant estimates are substantially more likely to be published; correcting for this publication bias lowers the average elasticity by roughly one third. Appendix B reports results across the range of published estimates, including that value. Since the fiscal externality is proportional to η_{D_B, b_u} , the smaller corrected elasticity yields a smaller welfare gain, and the choice is therefore conservative for the welfare evaluation. The parameter values are summarized in Table 1. I explain the calibration of the remaining parameters below.

Evaluating consumption reallocation. Computing the first term of equation (25) requires comparing consumption immediately after reemployment with consumption during all employed periods. I also need the following approximation:

$$\mu = \mathbb{E}_T[u'(c)] \approx u'(\bar{c}_T), \quad (26)$$

$$\mu_B = \mathbb{E}_{T_B}[u'(c)] \approx u'(\bar{c}_{T_B}), \quad (27)$$

where in the first equation I replace the expected marginal utility over all employed workers with the marginal utility of their average consumption. In the second equation, I replace the expected marginal utility among workers reemployed before T_B with the marginal utility of their average consumption. This approximation assumes that third- and higher-order terms are sufficiently small ([Chetty, 2006](#)). Then, I obtain

$$\frac{\mu_B - \mu}{\mu} \approx \left(\frac{\bar{c}_T}{\bar{c}_{T_B}} \right)^\gamma - 1. \quad (28)$$

I compute this value using consumption information from [Ganong and Noel \(2019\)](#), who use bank account data to study consumption patterns before and after a worker receives UI benefits at the monthly level. Roughly, their Figure 1 suggests consumption among reemployed workers before T_B is about 5% lower than it was before job loss. Based on this, I obtain $\frac{\mu_B - \mu}{\mu} \approx \left(\frac{1.0}{0.95} \right)^\gamma - 1$.

Table 1: Parameters for the Welfare Evaluation of the Marginal Change in b_e

Parameter	Description	Value
D	Expected unemployment duration (weeks)	24.3
D_B	Expected UI-compensated unemployment duration (weeks)	15.8
ϕ	Unemployment-to-employment ratio	0.057
ϕ_B	Compensated unemployment-to-employment ratio	1.549
η_{D_B, b_u}	Elasticity of D_B with respect to UI benefits	0.34

Note: This table reports reduced-form parameters used for the evaluation of the welfare impact of reemployment bonuses. The durations and employment ratios are taken from or implied by [Chetty \(2008\)](#); the elasticity is the publication-bias-corrected meta-estimate of [Cohen and Ganong \(2026\)](#).

Evaluating the fiscal externality. I next evaluate the second term in equation (25), which represents the fiscal externality induced by the response of unemployment duration to the introduction of reemployment bonuses. This term can be directly evaluated using observed unemployment duration and the estimated reduced-form elasticity of unemployment duration with respect to unemployment benefits, aside from needing the marginal rate of substitution between consumption in the employment and unemployment states. Since the utility function takes the CRRA form, I have

$$\frac{u'(c_{e,\max})}{u'(c_{u,\min})} = \left(\frac{c_{u,\min}}{c_{e,\max}} \right)^\gamma. \quad (29)$$

Again, I compute this value using consumption information from [Ganong and Noel \(2019\)](#). Their Figure 1 roughly suggests that consumption among unemployed workers falls to about 89% of pre-unemployment consumption during UI-covered periods while consumption among reemployed workers recovers to about 98% of pre-unemployment consumption. I therefore use $\frac{u'(c_{e,\max})}{u'(c_{u,\min})} = \left(\frac{0.89}{0.98} \right)^\gamma \approx 0.908^\gamma$.

Total welfare impact. Table 2 reports the first-order welfare impact of introducing reemployment bonuses b_e equivalent to 10% of wages. The welfare gain in equation (25) is measured in dollars, and I report it relative to the average weekly wage from [Chetty \(2008\)](#). For reasonable values of the CRRA parameter γ , Table 2 suggests that the first-order welfare gain from this bonus is equivalent to that from a permanent 0.13% increase in wages.

I also decompose this effect into the contributions of the fiscal externality and consumption reallocation. If the relative risk aversion is $\gamma = 2$, 80% of the welfare gain comes from the fiscal externality associated with shorter unemployment duration, while the remaining

Table 2: Welfare Impact of Reemployment Bonuses $b_e = 0.1\bar{w}$

	$\gamma = 1$	$\gamma = 2$	$\gamma = 3$
Welfare gain (% increase in wage)	0.13	0.13	0.13
Contribution (%)			
Consumption reallocation	9.9	19.9	29.7
Fiscal externality	90.1	80.1	70.3

Note: This table reports the first-order welfare impact of introducing reemployment bonuses $b_e = 0.1\bar{w}$ where $\bar{w}$ is the average weekly wage. γ is the CRRA parameter. The welfare gain is $\frac{\partial \mathcal{W}(b)}{\partial b_e} / \sum_{t=1}^T \frac{\partial V_t}{\partial w_t}$ relative to the average weekly wage.

20% arises from reallocating consumption from future periods to the periods immediately after reemployment. This decomposition is useful because the consumption-reallocation term relies on additional assumptions and approximations about the post-reemployment consumption path. A conservative benchmark is to set the consumption-reallocation term to zero, in which case 80% of the welfare gain remains. As γ increases, the contribution of the fiscal externality declines, because given η_{D_B, b_u} , the bound (23) implies that reemployment bonuses have a smaller impact on unemployment duration, while the contribution from consumption reallocation increases.

4.3 Comparison to Historical Policy Changes in the U.S.

To provide a sense of the quantitative magnitude of the welfare effect obtained in this paper, I calculate the Marginal Value of Public Funds (MVPF) in Appendix B, following the approach introduced by [Hendren and Sprung-Keyser \(2020\)](#). The MVPF of a policy is defined as the aggregate willingness to pay for the policy divided by its net fiscal cost to the government. This concept offers a unified framework for evaluating the welfare impacts of government interventions across different contexts, enabling comparisons with other existing policy changes.

Table B.1 in Appendix B reports that the MVPF of reemployment bonuses is about 2.0 for a reasonable range of the risk aversion parameter γ under the baseline calibration. In contrast, [Hendren and Sprung-Keyser \(2020\)](#) report MVPFs for 133 historical policy changes in the U.S., and most policies targeting adults have MVPFs below 2.0. Reemployment bonuses therefore rank among the more cost-effective policies targeting adults. Using the elasticity of [Chetty \(2008\)](#), which is close to the uncorrected literature average, the MVPF exceeds 3.0. Furthermore, the same table provides the sensitivity of the quantitative result

to the reduced-form elasticity parameter η_{D_B, b_u} , and shows that the MVPF remains above one across the wide range of existing estimates of η_{D_B, b_u} in the literature.

4.4 Discussion

The baseline model analyzed so far is highly stylized, and I acknowledge that the model may not capture some important realistic features. In this subsection, I provide a comprehensive discussion on the robustness of the analysis as well as its limitations.

State-dependent marginal utility of consumption. In Proposition 2, the marginal utilities $u'(c_{u,t})$ and $u'(c_{e,t,t})$ play a crucial role in connecting the estimable quantity $\frac{\partial D_B}{\partial b_u}$ to what needs to be obtained, $\frac{\partial D_B}{\partial b_e}$. So far, I have assumed that the marginal utilities of consumption do not directly depend on employment status, as is commonly assumed. However, they might depend on employment status for a few reasons. For instance, if consumption and leisure are not separable, the true marginal rate of substitution should deviate from what I have used in Proposition 2. Let $u_u(c)$ denote utility from consumption while unemployed and $u_e(c)$ denote utility from consumption while employed. Ziliak and Kniesner (2005) estimate a utility function in which consumption and leisure are not separable, and find that consumption and leisure are direct substitutes. This implies that the marginal utility of consumption evaluated at the same level of consumption is higher during periods of employment, i.e., $u'_u(c) < u'_e(c)$. Importantly, under this condition, Proposition 2 provides a conservative estimate of the lower bound since I have $u'_u(c_{e,t,t})/u'_u(c_{u,t}) < u'_e(c_{e,t,t})/u'_u(c_{u,t})$, which in turn leads to a conservative estimate of the welfare impact of reemployment bonuses.

Another possible source of the state-dependent marginal utility is that unemployed individuals have more time to devote to shopping and home production, allowing them to achieve the same level of utility with a lower level of *expenditure*, as discussed by Aguiar and Hurst (2007).¹⁵ For example, suppose a person is busy while employed and often dines out to save time. If this person becomes unemployed, they have more free time and can spend it on cooking to save money. Let c represent expenditure and $\tilde{c}$ represent consumption (as the output of time and expenditure). The example above suggests that it is likely that $\frac{c_e}{c_u} > \frac{\tilde{c}_e}{\tilde{c}_u}$. This implies that the marginal rate of substitution between *consumption* while employed and while unemployed would be greater than the marginal rate of substitution between *expenditure* while employed and while unemployed, which is used in the proposition. Once

¹⁵Here, consumption and expenditure are distinct concepts. Consumption is considered to be the output produced by utilizing time and market goods (expenditure) as inputs. See Becker (1965) and Aguiar and Hurst (2005).

again, this leads to a conservative estimate of the lower bound for the response of unemployment duration, which in turn leads to a conservative estimate of the welfare impact of reemployment bonuses.

Heterogeneity. While the model presented in this section does not assume heterogeneity among unemployed individuals, unemployed people in reality would exhibit heterogeneity in various primitives (e.g., wealth at the time of job loss, liquidity constraint) as discussed by Chetty (2008). However, incorporating heterogeneity preserves the form of the formula under the aggregation and orthogonality conditions stated in Appendix C.1. To see this, let θ capture heterogeneity among individuals. By redefining welfare as $\mathcal{W}(\mathbf{b}) = \int V_1(a_1(\theta), \theta; b, \tau(\mathbf{b})) dF(\theta)$, where $V_1(a_1(\theta), \theta; \mathbf{b}, \tau(\mathbf{b}))$ represents the value of an individual θ and $F(\theta)$ denotes the distribution of individuals, the resulting formula takes the same form as equation (18), with the marginal utilities and the durations replaced by their exposure-weighted averages across workers. The bound of Proposition 2 continues to hold worker by worker. Writing the aggregate in the same compact form additionally requires that the ratio of marginal utilities be uncorrelated with the individual duration response, since the empirical counterpart is a ratio of averages rather than an average of ratios. A detailed derivation of the formula in the presence of heterogeneity and the conditions it uses are in Appendix C.1.

Uncertainty in wage offers. Many studies that analyze the job search behavior of unemployed individuals commonly assume that workers stochastically draw wage offers from a distribution (McCall, 1970). While incorporating this assumption introduces a reservation wage (R_t) as an additional choice variable in the model, the envelope theorem suggests that the response of reservation wages to reemployment bonuses has a first-order impact on welfare only through the government budget constraint because the reservation wage R_t is chosen by workers to maximize their expected value.¹⁶ Furthermore, the impact of the response of reservation wages on the government budget through a change in unemployment duration is embedded in $\frac{dD_B}{db_e}$ in equation (18). Consequently, the presence of uncertainty in wage offers does not alter the welfare formula. A more rigorous treatment of this issue is in Appendix C.2.

¹⁶A key factor here is that wages (w) and taxes (τ) are separable in my specification. If taxes are levied in proportion to wages, a higher reservation wage creates a positive fiscal externality (Griffy and Rabinovich, 2023). In reality, proportional taxes are applied only to a taxable wage base; taxes are therefore proportional to wages for low-wage workers but not for high-wage workers.

Ex-ante savings response. The preceding analysis has focused on the problem that arises after individuals experience a job loss, disregarding the possibility that individuals may respond to policy changes even before losing their jobs. For instance, a more generous UI policy could lead to reduced precautionary savings, as discussed by [Engen and Gruber \(2001\)](#). However, given that the policy change is marginal, the ex-ante response does not have an impact on the analysis presented in this section due to the envelope condition. Although changes in reemployment bonuses (b_e) may influence pre-job loss asset choices, what is crucial for the welfare calculation is the direct impact of reemployment bonuses (b_e) on utility and the externality through the government budget constraint. Other effects resulting from individual choices cancel out due to the first-order conditions of the agent’s optimization problem.

Still, when considering non-marginal policy changes, the response of savings becomes important for the welfare impact. The quantitative model in [Section 5](#) incorporates stochastic job loss after reemployment to capture this savings response in evaluating the welfare effects of reemployment bonuses.

Endogenous separations. Since reemployment bonuses increase the value of unemployment, there could be a concern that they could also raise the flow into unemployment by making unemployment more attractive. Although those who quit their jobs are not eligible for UI in the U.S., a better unemployment value might improve the outside option of employed workers and induce more breakups of matches. To address this concern, I consider endogenous separation as follows. Suppose that a match between a worker and a firm generates a joint surplus of

$$S = \underbrace{W - U}_{\text{Worker surplus}} + \underbrace{J - O}_{\text{Firm surplus}} ,$$

where W and U denote the value of employment and unemployment for the worker, respectively, while J is the value of the job to the firm and O is the value of the firm’s outside option. In a standard search and matching model with endogenous separation (e.g., [Mortensen and Pissarides 1994](#)), a match between a worker and a firm dissolves endogenously and the worker moves to unemployment if the joint surplus S becomes negative. Reemployment bonuses, like UI benefits, put downward pressure on the joint surplus S by increasing the value of the worker’s outside option U . The extent to which UI and reemployment bonuses affect the inflow into unemployment depends on how much they raise the value of U . With the

envelope theorem, the model in the previous section implies that

$$\frac{\partial U}{\partial b_u} = D_B u'(c_u), \quad \frac{\partial U}{\partial b_e} = (T_B - D_B) u'(c_e),$$

where I assume, for expositional simplicity, that consumption during unemployment is constant at c_u , and consumption after reemployment is constant at c_e . The parameter values in Table 1 indicate that $T_B - D_B < D_B$, and the concavity of the utility function $u(\cdot)$ implies that $u'(c_u) > u'(c_e)$ for $c_u < c_e$. This implies that a marginal increase in reemployment bonuses increases the value of the worker’s outside option *less than* a marginal increase in UI benefits does. Therefore, although reemployment bonuses may contribute to additional unemployment inflow, their impact should be *smaller* than that of UI benefits.

Given these observations, a natural question is how much UI benefits increase the flow into unemployment, which would provide a rough upper bound on the impact of reemployment bonuses on unemployment inflow. Although empirical evidence on the effect of changes in UI benefit levels on unemployment inflow is scarce, especially in the U.S., Jäger, Schoefer, Young and Zweimüller (2020) use Austrian administrative data and find that the UI replacement rate has almost no effect on the job separation rate. Moreover, the UI programs in the U.S. include experience rating, which discourages firms from laying off workers. Therefore, I believe it is unlikely that reemployment bonuses would strongly induce additional unemployment inflow. One specific inflow margin, temporary layoffs followed by recalls, deserves separate treatment and is discussed next.

Seasonal and recall unemployment. The model treats reemployment as the outcome of the worker’s own search, and seasonal or temporary-layoff unemployment raises two distinct concerns about this scope. On the outflow side, for a worker whose reemployment date is set by an employer’s recall decision, a bonus would be an inframarginal transfer that generates no fiscal externality. On the inflow side, a bonus payable upon recall would reward short and predictable spells, and could induce temporary layoffs timed around the eligibility window, the concern that Feldstein (1976) raised for UI benefits, in which case the fiscal externality turns negative. A single design feature answers both: restricting eligibility to reemployment at a new job removes the payment to recalled workers and the incentive to time layoffs to collect the bonus.¹⁷ I therefore interpret the analysis, here and in the quantitative model of

¹⁷In the Washington Reemployment Bonus Experiment, recalls to the previous job and union hiring hall placements did not qualify for the bonus, and eligibility was verified through a notice of hire filed upon reemployment (Robins and Spiegelman, 2001). Reemployment at a different employer on a schedule set outside the worker’s own search would still qualify, and the residual heterogeneity in responsiveness is

Section 5, as applying to search-driven claimants.

Additional fiscal externalities. In the context of UI, fiscal externalities arise from increased spending on UI benefits and reduced tax revenue due to prolonged unemployment durations caused by worker moral hazard. The model assumes all taxes collected from employed workers are used to fund UI benefits for unemployed individuals or reemployment bonuses. In reality, however, when unemployed workers become employed, the government collects additional taxes from them, including contributions to Social Security and Medicare. As a result, the reduction in tax revenue caused by UI-induced extended unemployment leads to additional welfare costs (Lawson, 2017). By the same logic, accounting for these broader fiscal externalities suggests that reemployment bonuses could generate greater welfare gains by enabling the government to collect more tax revenue for other programs.

Take-up rate. Another concern about reemployment bonuses is that they might induce more workers to take up UI benefits in order to receive them (Meyer, 1995). A marginal increase in the bonus would then generate a negative fiscal externality without improving the value of the marginal claimants, who are indifferent between taking up and not. Appendix C.3 extends the welfare formula to endogenous take-up based on random filing costs, relates the take-up response to reemployment bonuses to its response to UI benefits, and calibrates the additional term with the estimate of Anderson and Meyer (1997). The welfare impact becomes smaller but remains positive. The quantitative model in Section 5 incorporates the take-up decision directly, estimated to match the take-up rate and its response to benefit generosity. Both treatments are conservative, since increased take-up can also generate positive externalities by lowering stigma or informational barriers for other eligible individuals (Kroft, 2008).

5 Optimal Policy in the Quantitative Model

Based on the sufficient statistic approach, the previous section clarifies the main channels through which reemployment bonuses affect welfare and demonstrates that modest welfare improvements are available within the current UI system. In this section, I quantify the welfare impact of an optimally chosen level of reemployment bonuses, ask under what conditions and for whom the welfare gain survives, and then examine how incorporating such bonuses affects the optimal level and duration of UI benefits.

absorbed into the average duration elasticity that the analysis targets.

5.1 Extended Model

Relative to the baseline, I enrich the framework along four dimensions to assess the robustness of the welfare conclusions: (i) stochastic match quality with an acceptance margin; (ii) imperfect UI eligibility and an endogenous take-up decision; (iii) a realistic benefit schedule and the withdrawal of other means-tested transfers upon reemployment; and (iv) reduced-form wedges for the labor-demand side, covering payroll-tax incidence, extraction of the bonus by firms, and matching congestion. I describe each in turn.

Job matches and match quality. Instead of a constant wage offer, an unemployed worker draws a match-specific wage w from a distribution F and decides whether to accept the match. A match with wage w is destroyed each period with probability $\delta(w)$, decreasing in w , so that lower-quality matches are also shorter-lived. Wage-dependent separation implies that workers in low-wage matches separate more often and account for a disproportionate share of UI claims, and benefit recipients are selected toward lower earnings.

Eligibility and take-up of unemployment insurance. There are three labor-market states: employed (W), unemployed and eligible for UI (B), and unemployed but ineligible (N). The duration of eligibility is governed by a clock k , which is set to the potential benefit duration T_B at each job loss and decreases by one each period. UI benefits and reemployment bonuses are available only while $k > 0$, and an eligible worker whose clock reaches $k = 0$ becomes ineligible.

Whether a worker qualifies for benefits in the first place is determined as follows. Upon a job loss, a worker immediately becomes ineligible with probability χ . This captures, for example, ineligibility because of a disqualifying separation. An eligible worker draws a stochastic filing cost ε from a distribution G and takes up benefits only if the value of claiming, net of the cost, exceeds the value of not claiming; otherwise the worker forgoes benefits and enters state N .

Together, exogenous ineligibility χ and the filing-cost distribution G generate a UI reciprocity rate below one, consistent with the evidence that not all of the unemployed receive benefits. Since reemployment bonuses raise the value of being an eligible claimant, the model also captures the concern that bonuses may induce additional take-up, which raises UI spending and thereby generates a negative fiscal externality. Since the marginal claimant is indifferent between claiming and not, the additional spending is not offset by a first-order gain to the induced claimants.

Benefits, bonuses, and the income process. An eligible claimant with base wage w receives UI benefits $b_u(w) = \min\{\phi_u w, \bar{b}\}$, where ϕ_u is the statutory replacement rate and $\bar{b}$ is a benefit cap that makes the effective replacement rate decline with previous earnings. A reemployed worker still within the eligibility window ($k > 0$) receives a per-period reemployment bonus $b_e(w) = \phi_e w$.

In addition, workers receive a means-tested transfer, capturing programs such as SNAP and Medicaid, that is withdrawn as labor income rises: a worker with labor income y receives $m(y) = \max\{\bar{m} - \phi_m y, 0\}$, where ϕ_m is the phase-out rate and $\bar{m}$ the maximal transfer. An unemployed worker has no labor income and receives the full transfer $\bar{m}$, whereas a reemployed worker's transfer is withdrawn at rate ϕ_m as earnings rise. Since the reemployment bonus adds to labor income, it accelerates this withdrawal, so that part of the bonus is clawed back through lost transfers, and the withdrawal is steepest for low earners, who are most likely to remain in the phase-out range.

Firms may also respond to reemployment bonuses by reducing wages offered to or negotiated with workers. To capture this force in a reduced-form way, I let workers retain a fraction $1 - \rho_e$ of each bonus payment while the government still pays the full $b_e(w)$, so that ρ_e is the share of the bonus that never reaches the worker. The extracted share does not enter workers' welfare, and it is not returned to them as profit income. UI and bonuses are financed by a proportional payroll tax τ , of which workers bear a fraction λ and firms the remainder, so that $\lambda < 1$ captures incomplete pass-through. The resulting flow incomes are

$$y_W(w, k) = \underbrace{(1 - \lambda\tau) w}_{\text{post-tax earnings}} + \underbrace{(1 - \rho_e) b_e(w) \mathbb{1}_{\{k > 0\}}}_{\text{bonus retained}} + \underbrace{m(w + (1 - \rho_e) b_e(w) \mathbb{1}_{\{k > 0\}})}_{\text{other transfers}}, \quad (30)$$

$$y_B(w) = \bar{y} + b_u(w) + \bar{m}, \quad (31)$$

$$y_N = \bar{y} + \bar{m}, \quad (32)$$

for employed, eligible-unemployed, and ineligible-unemployed workers, respectively, where $\bar{y}$ is non-labor income while unemployed.

Matching congestion. The baseline takes the job-finding technology facing each worker as invariant to the aggregate volume of search. To allow for crowding out, in which a worker who leaves unemployment sooner does so partly at the expense of another searcher, I let aggregate search effort congest the matching process. A congestion index $\xi = (E/E_0)^{-(1-\eta)}$

scales the matching efficiency parameter of the offer probability, which becomes $p(e) = 1 - \exp(-\kappa \xi e)$, where E is aggregate search effort, E_0 its value in the same economy without bonuses, and η is the matching elasticity.¹⁸ Following the terminology of [Lalive, Landais and Zweimüller \(2015\)](#), the change in ξ is a market externality of the policy, and its sign is governed by what [Landais, Michailat and Saez \(2018\)](#) call the rat race effect. Two extreme cases cover the range of assumptions about labor demand. The baseline, $\xi = 1$, corresponds to a perfectly elastic labor demand, under which tightness is determined by job creation and the contact rate per unit of effort does not respond to the size of the search pool. The congestion rows of Section 5.4 take the other extreme and hold vacancies fixed, in which case the rat race effect is not offset by vacancy creation. Wages do not respond to the bonus in either case, and the wage effect of the same framework is therefore absent.

Value functions. I suppress the dependence on policy parameters for brevity throughout. Let $W_t(a, w, k)$ be the value of employment, and let $U_t^B(a, w, k)$ and $U_t^N(a)$ be the values of eligible and ineligible unemployment once the job search outcome is realized. The corresponding values at the search stage are V_t^B and V_t^N . Denoting $(k - 1)_+ = \max\{0, k - 1\}$, the employed worker solves

$$W_t(a, w, k) = \max_{a' \geq a} u((1 + r)a - a' + y_W(w, k)) + \beta \left[(1 - \delta(w)) W_{t+1}(a', w, (k - 1)_+) + \delta(w) \bar{V}_{t+1}(a', w) \right], \quad (33)$$

where the continuation value upon job loss involves the eligibility lottery and the take-up decision and sends the worker directly to the search stage,

$$\bar{V}_{t+1}(a', w) = (1 - \chi) \int \max \{ V_{t+1}^B(a', w, T_B) - \varepsilon, V_{t+1}^N(a') \} dG(\varepsilon) + \chi V_{t+1}^N(a'). \quad (34)$$

Since a job loser proceeds directly to the search stage rather than to a period of mechanical unemployment, a worker who loses a job can search and get reemployed immediately in the first month of the unemployment spell. The filing decision is accordingly made before

¹⁸The index is a reduced-form specification. Its elasticity with respect to aggregate effort, $-(1 - \eta)$, is that of the match rate per unit of effort in a Cobb-Douglas matching function with vacancies held fixed, and the matching function is used only to set that value. Each searcher receives at most one offer per month in the model, whose wage is a single draw from F whatever the level of effort, and the offer probability is therefore not an aggregation of contacts. The acceptance decision that turns an offer into a match is a separate margin. Aggregate effort E integrates individual search effort over the stationary population and is computed at the solution, which makes ξ a fixed point of each policy experiment. In the experiments of Section 5.4, ξ rises by less than one percent.

the first search outcome is known: a claimant who regains employment immediately never collects UI benefits, yet is entitled to the reemployment bonus for the remaining eligibility window. The unemployed obtain their respective incomes and proceed to the next period's search stage,

$$U_t^B(a, w, k) = \max_{a' \geq \underline{a}} u((1+r)a - a' + y_B(w)) + \beta \tilde{V}_{t+1}(a', w, k), \quad (35)$$

$$U_t^N(a) = \max_{a' \geq \underline{a}} u((1+r)a - a' + y_N) + \beta V_{t+1}^N(a'), \quad (36)$$

where $\tilde{V}_{t+1}(a', w, k) = V_{t+1}^B(a', w, (k-1)_+)$ if $(k-1)_+ > 0$ and $V_{t+1}^N(a')$ otherwise, so that benefits expire when the clock runs out. At the search stage, the worker chooses search effort e , finds a job with probability $p(e)$, draws an offer $w' \sim F$, and accepts it if employment is better than continued search:

$$V_t^B(a, w, k) = \max_e p(e) \int \max \{W_t(a, w', k), U_t^B(a, w, k)\} dF(w') \\ + (1 - p(e)) U_t^B(a, w, k) - \psi(e) \quad (37)$$

$$V_t^N(a) = \max_e p(e) \int \max \{W_t(a, w', 0), U_t^N(a)\} dF(w') \\ + (1 - p(e)) U_t^N(a) - \psi(e). \quad (38)$$

The inner maximization captures the acceptance decision. Reemployed eligible workers ($k > 0$) collect the bonus, whereas a worker reemployed from ineligibility (N) starts with $k = 0$ and receives no bonus until eligibility is re-established after a subsequent job loss. Terminal values $W_{T+1} = U_{T+1}^B = U_{T+1}^N = 0$ close the model, and I solve the value functions by backward induction from T .

Government and welfare. Let $s = (a, w, k, \ell)$ denote a worker's individual state, with $\ell \in \{W, B, N\}$ the labor-market state, and let Γ_t denote the cross-sectional distribution of states at age t that the policy generates. The government chooses the UI policy instruments (ϕ_u, ϕ_e, T_B) subject to the budget constraint

$$\sum_{t=1}^T \left(\frac{1}{1+r} \right)^{t-1} \int \left[\tau w \mathbb{1}_{\{\ell=W\}} - b_e(w) \mathbb{1}_{\{\ell=W, k>0\}} - b_u(w) \mathbb{1}_{\{\ell=B\}} \right] d\Gamma_t(s) = 0, \quad (39)$$

where the three terms are payroll-tax revenue, bonus payments to reemployed workers still within the eligibility window, and UI benefits to claimants. The government collects the full

payroll tax τw , while workers' budgets reflect only the borne share $\lambda\tau$. The distributions Γ_t are computed by iterating the cross-sectional measure forward over the life cycle. The constraint balances in present value over the working life of a single cohort. Equivalently, it balances period by period in a population in which a new cohort enters each period and cohort size grows at rate r (Michelacci and Ruffo, 2015).

Workers enter the labor market with no wealth, unemployed and ineligible, and the baseline welfare criterion is therefore the value of a newborn, $V_1^N(0)$. This evaluates welfare for the same cohort that the budget constraint balances over. The members of a cohort are identical at entry, which makes $V_1^N(0)$ the utilitarian average of lifetime utility within it and leaves no distributional weights to choose. At entry, UI benefits and reemployment bonuses are mainly insurance. A worker at entry faces every unemployment spell, wage draw, and separation still ahead, and the criterion values reemployment bonuses as insurance against risks not yet realized. Workers already in the labor market retain an insurance motive against the spells still ahead of them, but an evaluation at a later state adds to that insurance value a redistributive component across workers whose outcomes have already differed. Section 5.5 examines how the gains are distributed across the current population, and Appendix C.5 evaluates the same policies under the stationary population distribution instead.

I take the transfer schedule $m(\cdot)$ as a fixed feature of the environment that workers face, financed outside the UI budget by a separate levy that is held constant across all policy experiments. The transfer therefore enters the analysis only through workers' incentives. Importantly, since the financing of $m(\cdot)$ is held fixed, I do not return to workers the savings in transfer spending that arise when reemployment bonuses move workers from unemployment into employment. In other words, the model incorporates the cost that benefit cliffs impose on the job-finding incentives generated by reemployment bonuses, while abstracting from the offsetting fiscal savings those same cliffs generate. This treatment works against reemployment bonuses in this one respect: as with the additional revenue from Social Security and Medicare contributions discussed in Section 4.4, internalizing the reduction in transfer spending from faster reemployment would only raise the welfare gains.

5.2 Quantitative Specification

I set each period to one month, and workers are in the labor market for 40 years, or 480 months. I specify the utility from consumption and the disutility from search as $u(c) = c^{1-\gamma_c}/(1-\gamma_c)$ and $\psi(e) = \theta e^{1+\gamma_e}/(1+\gamma_e)$, and let the job-finding probability be $p(e) = 1 - \exp(-\kappa e)$ following Lentz (2009). I specify the separation probability as

Table 3: List of Parameters

Parameter	Description	Source/Target	Value	Data	Model
A. Externally set					
r	Interest rate	Annual rate of 5 percent	0.004		
β	Discount factor	$1/(1+r)$	0.996		
γ_c	Relative risk aversion	Michelacci and Ruffo (2015)	2.000		
$\underline{a}$	Borrowing limit		0.000		
$\mathbb{E}[w]$	Mean wage offer	Normalization	1.000		
λ	Payroll-tax pass-through	Full pass-through	1.000		
ρ_e	Extraction of the bonus by firms	Workers retain the full bonus	0.000		
$\bar{m}$	Means-tested transfer	No transfer	0.000		
ϕ_u	UI replacement rate	Current U.S. system	0.500		
ϕ_e	Reemployment-bonus rate	No bonus	0.000		
T_B	Potential benefit duration	Current U.S. system	6		
B. Internally estimated					
θ	Search disutility: scale	Avg. compensated duration	2.977	3.646	3.788
γ_e	Search disutility: curvature	UI duration elasticity	0.084	0.340	0.350
σ_w	Wage-offer dispersion	Mean-min wage ratio	0.201	1.500	1.521
δ_1	Separation gradient	Separation ratio (Q1/Q5)	3.375	5.510	5.516
$\bar{\delta}$	Separation: level	Avg. separation rate	0.043	0.034	0.034
μ_ε	Filing cost: location	UI take-up rate	-0.403	0.768	0.766
σ_ε	Filing cost: scale	Take-up semi-elasticity	2.750	0.180	0.176
$\bar{y}$	Non-labor income	Job-loser replacement rate	0.387	0.830	0.806
χ	Ineligibility probability	UI eligibility rate	0.592	0.459	0.459
$\bar{b}$	UI benefit cap	Benefit cap / avg. wage	0.459	0.402	0.399

Note: This table reports the parameter values for the calibrated model. The last two columns report the targeted moment values and the model-implied moment values. Durations are in months, and the compensated-duration target of 15.8 weeks equals 3.646 months. The compensated duration counts the months of UI receipt among completed recipient spells, whereas the unemployment durations reported later in this section average the length of every completed spell, including the spells of workers who never claim. The two statistics therefore have different conditioning sets, and the compensated duration is the larger of the two.

$\delta(w) = \bar{\delta} \exp\{-\delta_1(\log w - \log \bar{w})\}$, so that δ_1 is the elasticity of the separation rate with respect to the match wage and the separation rate equals $\bar{\delta}$ at the mean offer wage $\bar{w}$. The wage-offer distribution F is lognormal with dispersion σ_w , normalized so that the mean offer equals one, and the filing cost ε follows a logistic distribution with location μ_ε and scale σ_ε . The parameters fall into two groups: those set externally and those estimated internally to match data moments, both summarized in Table 3.

Externally calibrated parameters. I set the following parameters externally. The interest rate is $r = (1.05)^{1/12} - 1$, reflecting an annual rate of 5 percent, and $\beta = 1/(1+r)$. The coefficient of relative risk aversion is $\gamma_c = 2$ (Michelacci and Ruffo, 2015), and the borrowing limit is $\underline{a} = 0$. As in Lentz (2009), κ and θ are difficult to separately identify using

unemployment duration. I therefore normalize $\kappa = 1$.

In the baseline UI system, the statutory replacement rate is $\phi_u = 0.50$ and the potential benefit duration is $T_B = 6$ months, with $\phi_e = 0$. The benefit cap $\bar{b}$ makes the 50 percent statutory rate apply only up to a wage of $\bar{b}/\phi_u$, with the effective replacement rate declining thereafter. What the data pin down is a ratio rather than a level, and the wage against which that ratio is measured is itself an endogenous object; therefore the cap cannot be fixed before the model is solved. I therefore pin down $\bar{b}$ internally, together with the parameters described below.

In the baseline, the remaining wedges are set to neutral values. Workers bear the full payroll tax ($\lambda = 1$), as is common in the literature, there is no means-tested transfer ($\bar{m} = 0$), workers retain the full bonus ($\rho_e = 0$), and aggregate search effort does not congest the matching process ($\xi = 1$). Section 5.4 examines how the conclusions change when each of these mechanisms is switched on. One implementation detail deserves emphasis. Whenever I vary the generosity of UI benefits, I scale the statutory rate ϕ_u and the cap $\bar{b}$ proportionally, so that the experiment changes benefit levels for all claimants. This mirrors the variation behind the empirical elasticity estimates, much of which comes from changes in statutory maximum benefits. Under a fixed cap, a change in ϕ_u alone would leave capped claimants' benefits unchanged.

Internally calibrated parameters. The remaining ten parameters ($\theta, \gamma_e, \sigma_w, \delta_1, \bar{\delta}, \mu_e, \sigma_e, \bar{y}, \chi, \bar{b}$) are estimated jointly to fit ten data moments. Although the estimation is joint, each parameter is informed mainly by one moment, and I pair them in turn.

The scale of the search cost θ governs the level of search effort, and I target the average compensated unemployment duration of 15.8 weeks, or 3.646 months, among workers who collect benefits (Chetty, 2008). The curvature γ_e dictates how search effort responds to a change in the incentive to search, and is informed by the elasticity of compensated unemployment duration with respect to UI benefits of 0.34, the publication-bias-corrected meta-estimate of Cohen and Ganong (2026). The wage-offer dispersion σ_w controls the spread of the offers workers draw, and I match a mean-min wage ratio of 1.50, the lower end of the range of 1.5 to 2 that Hornstein, Krusell and Violante (2011) recover from residual wage dispersion. The separation gradient δ_1 determines how much job stability improves with the match wage, and is disciplined by the ratio of separation rates between the bottom and top quintiles of the earnings distribution of 5.51 (Birinci and See, 2023). The separation level $\bar{\delta}$ anchors how often employed workers lose their jobs, and I target the average monthly separation rate among the employed of 0.034 (Shimer, 2005).

The location of the filing cost μ_ε governs how many eligible workers find claiming worthwhile, and I target the UI take-up rate among the eligible of 0.768 (Auray, Fuller and Lkhagvasuren, 2019). The scale σ_ε drives how far take-up moves when claiming becomes more attractive, and is informed by the semi-elasticity of the take-up rate with respect to benefit generosity of 0.18 (Anderson and Meyer, 1997). Non-labor income $\bar{y}$ determines consumption while unemployed, and I match the job-loser income replacement rate of 0.83 (Ganong and Noel, 2019). The ineligibility probability χ sets how many job losers qualify for benefits at all, and is disciplined by the share of the unemployed who are eligible for benefits of 0.459 (Auray et al., 2019). The benefit cap $\bar{b}$ fixes the earnings level beyond which the effective replacement rate declines, and I target the average across states of the maximum weekly benefit amount relative to the average weekly wage, which is 0.402.¹⁹

Table 3 shows the calibrated parameters. Four parameters are worth noting. First, the estimated search cost is close to linear ($\gamma_e = 0.084$), in line with the estimates in, for example, Lise (2013) and Ganong and Noel (2019). Second, the estimated separation level is $\bar{\delta} = 0.043$, above the average separation rate of 0.034 it targets, because employed workers are selected toward high-wage matches with low separation rates. Third, imperfect eligibility and endogenous take-up together imply that only about one-third of the unemployed receive benefits. Fourth, the estimated cap of $\bar{b} = 0.459$ delivers a cap-to-wage ratio of 0.399 against the target of 0.402, and it binds for a large share of claimants. The average effective replacement rate among claimants is 0.44, well below the 50 percent directly implied by $\phi_u = 0.5$.

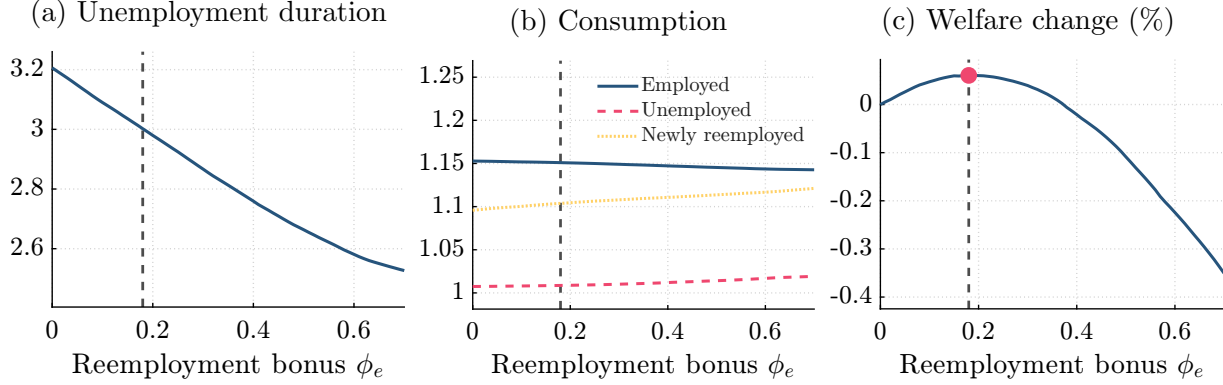
5.3 Welfare Impact of Reemployment Bonuses

I first study the impact of reemployment bonuses on welfare. Since workers who enter the labor market are initially unemployed without assets and not eligible for UI, the objective function of the government is the value of a newborn $V_1^N(0)$. I measure the change in welfare from the baseline economy to a counterfactual one in terms of consumption equivalence, the percentage change in consumption at every state and time in the baseline economy that makes a newborn worker indifferent between the two.

This criterion already compares economies across their policy-specific distributions. Because all workers enter in the same state, a law of large numbers implies that the cross-sectional distribution Γ_t introduced with the budget constraint coincides with the distribu-

¹⁹State maximum weekly benefit amounts average \$584 per week (U.S. Department of Labor, Employment and Training Administration, 2026). The average weekly wage over all covered employment is \$1,454, from the annual averages of the BLS Quarterly Census of Employment and Wages for 2024.

Figure 2: Impact of Reemployment Bonuses



Note: Panel (a) displays average unemployment duration in months as a function of reemployment bonuses. Panel (b) displays average consumption of employed workers (solid line), unemployed workers (dashed line), and newly reemployed workers who are still eligible for bonuses (dotted line). The objects in panels (a) and (b) are averages over the model-implied cross-sectional distributions, taken across workers and time. Panel (c) shows the welfare change of a newborn in terms of consumption equivalence from the baseline of no reemployment bonuses. The vertical dashed lines represent the optimal level of reemployment bonuses.

tion of an individual worker's state at that age. Letting (c_t, e_t) denote the policies chosen at each state, the value of a newborn can be written as

$$V_1^N(0) = \sum_{t=1}^T \beta^{t-1} \int v_t(s) d\Gamma_t(s), \quad v_t(s) = u(c_t(s)) - \psi(e_t(s)) - \varepsilon_t(s), \quad (40)$$

where $\varepsilon_t(s)$ is the expected filing cost paid at s , nonzero only at take-up decisions. The criterion is therefore an average of flow utility over the distribution that the policy itself generates, discounted and summed over the life cycle. Each policy is evaluated under its own Γ_t , and the effect of the policy on how often workers find themselves unemployed, on what wages they hold, and on how much they have saved is already embedded in those distributions. Comparing $V_1^N(0)$ across policies is thus a comparison of two economies over the whole working life.²⁰

Figure 2 displays the impact of reemployment bonuses on average unemployment dura-

²⁰Appendix C.5 evaluates the same policies under an alternative criterion, the average of value functions over the stationary distribution of a population of overlapping cohorts, with a payroll tax that balances that population's budget period by period. Holding an economy fixed, the two criteria are weighted sums of the same flow utilities in equation (40) and differ only in the age weights. The newborn criterion discounts, whereas the population average weights the end of the working life about two hundred times as heavily as the start, and under that weighting no positive bonus raises welfare. The appendix also re-solves the payroll tax under the population's own budget, and Table C.2 there shows that the budget moves the level of the gain while the weights alone reverse its sign. The appendix reports the disagreement and its source in full.

tion, average consumption, and welfare. The durations and consumption levels in the figure are averages over the model-implied cross-sectional distributions, taken across workers and time. Panel (a) shows that reemployment bonuses reduce unemployment duration, averaged over all completed spells, from 3.2 months in the baseline to 3.0 months at the optimal level of reemployment bonuses, which replaces 19% of the wage per month during the remaining eligibility period. In the benchmark logic of Section 2, as long as reemployment bonuses are smaller than UI benefits, the reduced unemployment duration contributes to welfare through a positive fiscal externality.

Panel (b) shows the response of consumption. Each line represents the average consumption of employed workers (solid line), unemployed workers (dashed line), and newly reemployed workers receiving reemployment bonuses (dotted line). The average consumption of newly reemployed workers lies below that of all employed workers throughout the range of bonuses considered, for two reasons. They have depleted their assets during unemployment and reduce consumption to rebuild savings, and, because high-wage matches last longer and therefore accumulate among the employed, the newly hired are drawn disproportionately from lower-wage matches. Frontloading income toward the periods right after reemployment therefore remains welfare-improving on the consumption-smoothing margin even for generous bonuses. The consumption of unemployed workers also rises slightly with the bonus, reflecting both shorter unemployment duration and the anticipated future income from reemployment bonuses.

Panel (c) displays the welfare change relative to the baseline economy. The welfare gain is hump-shaped in the bonus. It reaches 0.06% in consumption-equivalent terms at the optimal bonus of 19% of the wage, and turns negative for bonuses above roughly 37% of the wage. Two aspects of this result deserve emphasis. First, the welfare gain from the optimally chosen bonus is positive but modest. As Section 5.4 shows, the same experiment yields a gain about seven times larger under full eligibility and take-up, and noticeably larger without the benefit cap. Second, sufficiently generous bonuses reduce welfare. As the bonus approaches the level of UI benefits, the fiscal saving from shorter unemployment shrinks, while the government keeps paying bonuses to workers who would have found jobs quickly anyway.

Table 4: Optimal Reemployment Bonuses under Alternative Mechanisms

	Optimal ϕ_e	Peak gain (%)	Δ duration (months)	Breakeven ϕ_e
Baseline	0.19	0.06	-0.21	0.37
<i>A. Baseline mechanisms switched off</i>				
No benefit cap	0.23	0.09	-0.28	0.46
No separation gradient	0.19	0.10	-0.17	0.39
Full eligibility and take-up	0.28	0.45	-1.00	0.60
<i>B. Contested mechanisms switched on</i>				
Tax incidence ($\lambda = 0.10$)	0.21	0.07	-0.24	0.43
Tax incidence ($\lambda = 0.20$)	0.21	0.07	-0.24	0.42
Bonus extracted by firms ($\rho_e = 0.10$)	0.11	0.02	-0.12	0.22
extracted share rebated to workers	0.20	0.06	-0.20	0.40
Bonus extracted by firms ($\rho_e = 0.20$)	0.00	0.00	0.00	0.00
extracted share rebated to workers	0.22	0.05	-0.20	0.43
Transfer cliff ($\bar{m} = 0.10$)	0.21	0.07	-0.28	0.40
Transfer cliff ($\bar{m} = 0.20$)	0.19	0.08	-0.28	0.45
Endogenous congestion ($\eta = 0.5$)	0.33	0.14	-0.37	0.57
Endogenous congestion ($\eta = 0.7$)	0.23	0.09	-0.26	0.47

Note: Welfare is the consumption-equivalent gain for a newborn relative to the same row’s economy without bonuses, “ Δ duration” the change in average unemployment duration (months) at the row’s optimal bonus, and “Breakeven ϕ_e ” the bonus at which the gain turns negative. The rows marked as rebated return the extracted share to workers as profit income, the convention of the tax-incidence rows. The transfer rows use the SNAP phase-out rate $\phi_m = 0.30$ (Kosar and Moffitt, 2017). The congestion rows scale matching efficiency by $\xi = (E/E_0)^{-(1-\eta)}$ with vacancies held fixed, where E is aggregate search effort and E_0 its baseline value. The breakeven extraction rate of about 20% is interpolated over a finer grid of ρ_e . Section 5.4 describes each mechanism.

5.4 Under What Conditions Do Reemployment Bonuses Raise Welfare?

The welfare gains documented above rest on a particular set of mechanisms, and a natural question is which of them drive the results and which could overturn them. To answer it, I re-run the optimal-bonus experiment of Section 5.3 while focusing on one mechanism at a time, holding all estimated parameters at their baseline values. Panel A of Table 4 switches *off* features of the baseline model, and Panel B switches *on* mechanisms that the baseline keeps neutral because their magnitudes are difficult to pin down.

Panel A shows that the modest size of the baseline gains mainly reflects the imperfect eligibility and take-up decisions. Assuming full eligibility and take-up raises the maximum welfare gain about sevenfold, from 0.06% to 0.45%, and increases the optimal bonus to 28% of the wage. Removing the benefit cap raises the peak gain by about half, to 0.09%. Both

features operate through the UI spending that is saved by faster reemployment, which is precisely the channel through which reemployment bonuses raise welfare. Shutting down the wage gradient of separations raises the peak gain from 0.06% to 0.10%, so that the concern that bonuses allocate workers toward low-quality, short-lived matches is visible in the model, comparable in size to the benefit cap effect but an order of magnitude smaller than the reciprocity channel. The margin itself moves little. At the optimal bonus, the probability of accepting an offer within a month of search rises by 6.5%, the mean accepted wage falls by 0.7%, and the monthly separation rate of newly formed matches rises from 0.0475 to 0.0492.

Panel B shows the conditions under which reemployment bonuses no longer raise welfare. If firms extract a share ρ_e of the bonus through lower negotiated wages, the reduced-form wedge of Section 5.1, the welfare gain from bonuses falls quickly, and once the extraction rate reaches about a fifth, no positive bonus raises workers' welfare. The extracted share is not a loss to the economy as a whole, and the rows marked as rebated return it to workers as profit income. In that case, the gain stays positive at every extraction rate considered. The only cost that extraction then leaves is a weaker search incentive, since the worker receives a smaller payment upon reemployment. The extraction rate at which bonuses no longer raise welfare, about a fifth, therefore applies to workers as job seekers. It does not apply once workers also receive the extracted share as owners of firms. For the bonus to work as an incentive, workers must keep most of the payment.

The other contested mechanisms do not change the conclusion. Crowding out is evaluated by activating the congestion index of Section 5.1, with the matching elasticity η set to 0.5 and 0.7 (Petrongolo and Pissarides, 2001). With vacancies held fixed, the optimal bonus rises to 33% and 23% of the wage, the peak gain to 0.14% and 0.09% of consumption, and the breakeven bonus to 57% and 47% of the wage. The gain rises rather than falls because aggregate search effort falls slightly, by 1.4% at a bonus of 34%, even though effort per unemployed worker rises by 12.6%. The bonus raises the effort of claimants, who account for a fifth of aggregate effort, and reduces the number of non-claimants, who account for the remaining four fifths, and the second effect is slightly larger. The smaller pool raises the contact rate per unit of effort for every searcher, and most of the gain in the congestion rows is this market externality rather than the micro effect of the bonus (Lalive et al., 2015).²¹

²¹At $\eta = 0.5$ and a bonus of 34%, aggregate effort falls by 1.4% and the contact rate per unit of effort rises by 0.7%. Solving the same economy with ξ held at one leaves a gain of 0.02% of consumption, and the improvement in matching efficiency alone, without any bonus, is worth 0.12%. A change in matching efficiency of under one percent is worth this much because the newborn criterion weights the entry spell heavily, when workers hold no assets and job finding matters most.

The rows therefore represent an extreme case rather than a prediction. With free entry, vacancy creation responds to the size of the pool and offsets part or all of the change in the contact rate, and the outcome lies between the fixed-vacancy rows and the baseline row. In a one-group steady state a bonus raises aggregate effort and the externality is negative, and with the pool of searchers held fixed, as it is in the short run before the stock of unemployed workers adjusts, the same effort response gives $\xi = 0.94$ and a loss of about one percent of consumption. In the steady state with vacancies held fixed, congestion therefore does not overturn the gain.

The withdrawal of means-tested transfers upon reemployment does weaken the job-finding response to the bonus, and yet the net effect strengthens rather than weakens the case. Longer unemployment durations raise the UI spending that bonuses can save, while the clawback of the bonus itself is small because the phase-out region ends below the wages that workers accept, and reemployment therefore withdraws the transfer in full. This last point limits what the exercise can show. At $\bar{m} = 0.20$ the phase-out ends at two-thirds of the mean offer wage, and about 98% of accepted wages lie above that point, in the baseline and at the optimal bonus alike. The transfer rows therefore measure the reemployment wedge that withdrawal creates rather than a threshold that the bonus alone pushes workers across, which this calibration cannot produce. A program with an eligibility cutoff near accepted wages, such as an income limit for Medicaid, could place workers on such a cliff, and evaluating it would require that program's schedule rather than the linear phase-out used here.

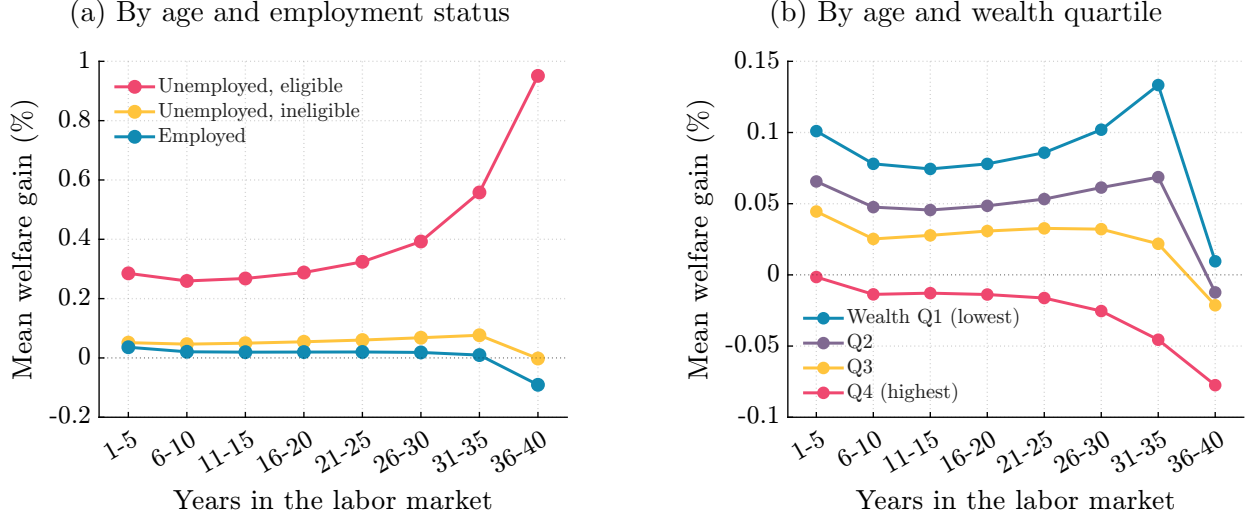
Shifting the payroll tax onto firms also raises the welfare gain slightly, since workers then perceive a smaller marginal tax and financing the bonus distorts search by less.²²

5.5 For Whom Do Reemployment Bonuses Raise Welfare?

The welfare gains reported so far accrue to a labor-market entrant, and this subsection asks how the reform affects the workers who are in the economy when it is introduced. For a worker at state s and age t in the baseline cross-section, I define the welfare impact $\pi_t(s)$ of introducing the optimal bonus as the uniform percentage change in the worker's remaining

²²Because a reform that raises the tax lowers profits, I charge workers the profit change that financing the bonus causes, on the view that workers ultimately own the firms. Without that adjustment the measured gain would rise mechanically with the share of the tax shifted onto firms. The adjustment enters when welfare is evaluated rather than inside workers' budgets, and search and saving respond to the perceived wedge $\lambda\tau$ rather than to the profit income itself. Since the payroll tax is about one percent of the wage, the omitted wealth effect is small.

Figure 3: Welfare Gains across the Current Population



Note: Both panels show the average welfare impact $\pi_t(s)$ of introducing the optimal reemployment bonus, by five-year groups of years in the labor market, from snapshots covering the full working life. Panel (a) splits workers by employment status and, among the unemployed, by benefit eligibility. In panel (b), wealth quartiles are computed within each age group, pooling employed and unemployed workers. Gains late in the working life are measured against a short remaining horizon, as equation (41) makes explicit.

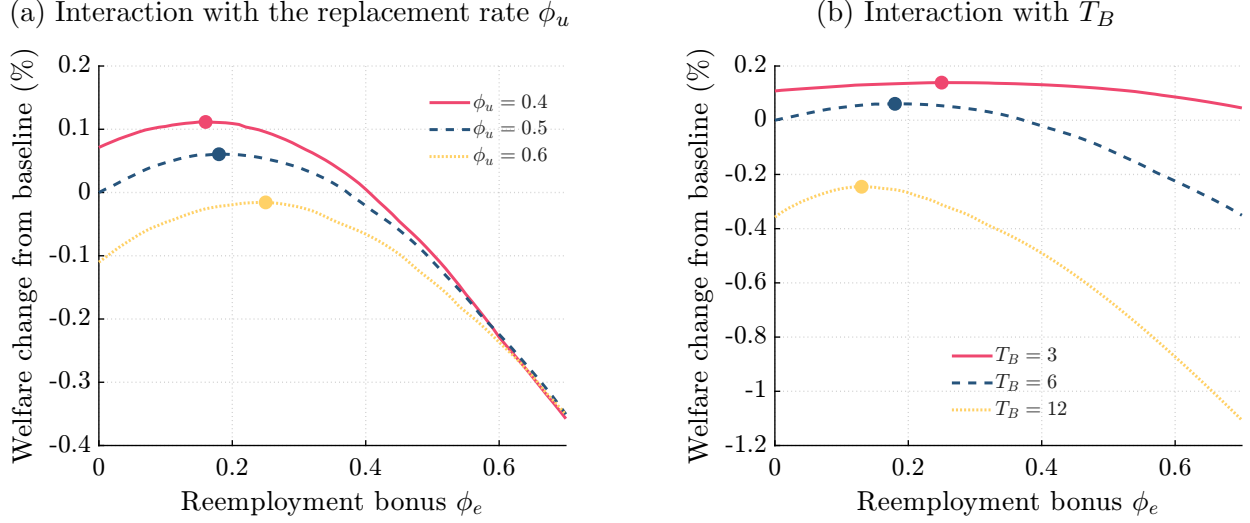
baseline consumption that makes the worker indifferent to the reform,

$$\mathbb{E} \left[\sum_{j=t}^T \beta^{j-t} \left\{ u((1 + \pi_t(s)) c_j) - \psi(e_j) - \varepsilon_j \right\} \middle| s \right] = V_t^{\text{cf}}(s), \quad (41)$$

where the expectation and the consumption, effort, and filing choices on the left are those of the baseline economy, and $V_t^{\text{cf}}(s)$ is the value of the same state under the reform at its budget-balancing tax. A positive $\pi_t(s)$ identifies a winner. Because the horizon is finite, $\pi_t(s)$ is expressed relative to the consumption the worker has left, and gains and losses late in the working life are therefore measured against a short remaining horizon.

Figure 3 displays the average of $\pi_t(s)$ across the baseline cross-section, by five-year groups of years in the labor market. Panel (a) splits workers by employment status and, among the unemployed, by benefit eligibility. Eligible unemployed workers are the group that gains most. Their gains average 0.42% of consumption, rise with age, and reach about 1% near the end of the working life, where a claimant collects the bonus soon and bears the higher tax for only a few remaining years. Ineligible unemployed workers gain almost nothing, since the bonus never reaches them directly. Employed workers roughly break even on average, with modest gains early in the working life and losses concentrated at its end, where little of

Figure 4: Welfare Impact of Reemployment Bonuses: Interactions



Note: This figure shows the welfare change from the baseline economy ($\phi_u = 0.5$, $\phi_e = 0$, $T_B = 6$) as a function of the reemployment bonus. In panel (a), each line corresponds to a different statutory replacement rate ($\phi_u = 0.4, 0.5, 0.6$), scaling the statutory rate and the benefit cap together as described in Section 5.2. In panel (b), each line corresponds to a different potential benefit duration ($T_B = 3, 6, 12$). The circles mark the optimal bonus and the corresponding welfare change under each policy. The incremental value of the bonus under a given policy, quoted in the text, is the vertical distance between the circle and the same line's value at $\phi_e = 0$, not the circle's height relative to the baseline.

the insurance value remains while the financing still applies. Panel (b) splits the same gains by wealth, with quartiles computed within each age group. Within every age group, gains decline monotonically from the lowest to the highest wealth quartile.

Table D.1 in Appendix D tabulates the group averages together with the share of workers who lose in each group. Within the employed, the bottom wage quintile, whose jobs are the least stable, gains 0.10% of consumption while the top quintile loses 0.10% with virtually all of its members losing. In short, reemployment bonuses redistribute from wealthy workers in stable jobs toward the currently unemployed and toward low-wage workers with high separation risk, and just over a third of the current population would lose slightly from their introduction.

5.6 Interactions with the Design of UI

I next examine how the welfare impact of reemployment bonuses varies with the two main parameters of the UI system.

Panel (a) of Figure 4 shows the welfare change from the baseline economy as a function

of the reemployment bonus, evaluated at statutory replacement rates of 40%, 50%, and 60%, with 50% the baseline, scaling the statutory rate and the benefit cap together as described in Section 5.2. The optimal bonus increases with the replacement rate, from 16% of the wage at a 40% replacement rate to 25% at 60%. This pattern reflects the fiscal externality. Abstracting from taxation, a worker who leaves unemployment one month earlier saves the government the gap between the UI benefit and the bonus, and a higher replacement rate widens that gap at any given bonus. The incremental value of introducing the optimal bonus also rises steeply with the replacement rate, from 0.04% of consumption at 40% to 0.09% at 60%. Indeed, at a 60% replacement rate the optimal bonus offsets most of the welfare cost of the higher replacement rate, which is 0.11% of consumption in isolation. Section 5.7 returns to why this complementarity raises the jointly optimal benefit level only slightly.

Panel (b) repeats the exercise for the potential benefit duration. The optimal bonus falls with the potential benefit duration, from 25% of the wage at $T_B = 3$ to 13% at $T_B = 12$. The bonus is paid over the remaining eligibility window, and a longer potential benefit duration therefore raises the fiscal cost of any given bonus rate. The value of the bonus, however, again rises with the length of the potential benefit duration. The optimally chosen bonus adds 0.03% of consumption at $T_B = 3$, 0.06% at the baseline duration, and 0.11% at $T_B = 12$. With a twelve-month potential benefit duration, the bonus recovers about 30 percent of the welfare cost of the longer duration, although it cannot restore the baseline level of welfare.

Additional results on unemployment durations and the consumption of the newly reemployed across these experiments are in Appendix D.

5.7 Optimal Joint Design

Finally, I examine how the optimal design of the UI system changes when reemployment bonuses are added to the policy instruments. Specifically, I solve for the combination of the UI replacement rate ϕ_u and the reemployment bonus ϕ_e that maximizes the expected value of a newborn subject to the budget constraint, holding the potential benefit duration at its baseline value of six months. The choice of the duration is considered at the end of this section and in Appendix C.6. As in the comparative-statics exercises above, a change in the statutory rate is accompanied by a proportional change in the cap, so that the government varies the level of the benefit schedule while holding its shape fixed. Because the cap binds for most claimants, the statutory rate overstates the benefits actually paid, and the table therefore also reports the average effective replacement rate among claimants. Appendix C.4 reports the same exercise with the cap held at its statutory level and shows that the

Table 5: Optimal UI Policy

	(1)	(2)	(3)	(4)
		Optimal		
	Baseline	UI	RB	Joint
<i>Policy Parameters:</i>				
UI replacement rate ϕ_u	0.50	0.23	0.50	0.25
Reemployment bonus ϕ_e	0.00	0.00	0.19	0.12
Potential benefit duration (months)	6	6	6	6
<i>Outcomes:</i>				
Effective replacement rate	0.44	0.20	0.44	0.22
Welfare gain (%)	0.00	0.11	0.06	0.14
Unemployment duration (months)	3.21	2.99	3.00	2.89
Average consumption	1.14	1.15	1.14	1.15

Note: Columns (2) to (4) report the welfare-maximizing policy when the chosen instruments are, respectively, ϕ_u alone, ϕ_e alone, and ϕ_u and ϕ_e jointly. The effective replacement rate is the average of $\min\{\phi_u w, \bar{b}\}/w$ among claimants. Welfare gains are consumption-equivalent changes for a newborn relative to the baseline economy. The potential benefit duration is not reported as a chosen instrument because welfare identifies it only weakly; Table C.3 in Appendix C.6 reports the flat profile.

welfare conclusions and the effective replacement rates are essentially unchanged, although the statutory parameters are only weakly identified once most claimants are capped.

Before doing so, I first compute the optimal level of UI benefits given the baseline potential benefit duration $T_B = 6$ months and no reemployment bonuses. This serves as a benchmark to assess whether the optimal UI benefit level in the current model is consistent with the literature. Column (2) of Table 5 shows that the optimal statutory rate is 23%, which delivers an effective replacement rate of 20% among claimants. This is much lower than the current replacement rate but within the range reported in the literature. For example, Hansen and Imrohoroglu (1992) find an optimal replacement rate of 15% in the presence of moral hazard, and the elasticity estimates in Cohen and Ganong (2026) imply an optimal replacement rate of 28%. Column (3) reproduces the optimal-bonus result from Section 5.3 for comparison.

Column (4) shows the result of optimally choosing both the UI replacement rate and the reemployment bonus, given the potential benefit duration fixed at the baseline. The jointly optimal policy features a statutory rate of 25% and a bonus of 12% of the wage. Two points are worth noting.

First, the availability of bonuses makes the optimal UI benefit slightly more generous, since the bonus offsets part of the search distortion that a higher benefit creates. The optimal

effective replacement rate is 22% when the two instruments are chosen together against 20% when the benefit level is chosen alone. The shift is smaller than the strong complementarity documented in Section 5.6 might suggest, and the reason is as follows. The gap that faster reemployment returns to the government is large at the replacement rates of Figure 4, but small at the low benefit levels where the optimal policies sit. What remains of it is offset by a counteracting force. A larger bonus raises the value of claiming and draws more eligible workers into take-up, which raises the fiscal cost of benefit generosity, the negative fiscal externality generated by the take-up margin of Section 5.1. The two forces roughly cancel at the low benefit levels where the optima sit, and the jointly optimal benefit therefore rises only slightly.

Second, the welfare differences across columns (2) through (4) are small, and therefore the analysis is more informative about the direction of reform than about the precise mix of instruments. Reemployment bonuses clearly raise welfare within the existing UI system. Taking the current replacement rate and duration as given, introducing the optimal bonus delivers a welfare gain of 0.06% (column (3)) without requiring a cut in benefit levels. Column (2) provides the natural comparison for that number. Cutting the statutory replacement rate from 50% to 23%, which is the best the model can do by choosing the benefit level alone, is worth 0.11% of consumption. The bonus delivers about half of that gain without changing benefits.

Finally, I ask whether the potential benefit duration should be chosen alongside the two rates, and the answer is that welfare identifies it only weakly. When I re-solve the joint problem at each duration from one to eight months, the highest welfare varies by less than a hundredth of a percentage point of consumption between two and eight months. The criterion does have a numerical maximum inside that range, but the differences are too small to support a policy recommendation. Table C.3 in Appendix C.6 reports the full profile. What the exercise does identify is the trade-off along that flat range. A shorter potential benefit duration is compensated by a more generous benefit and a larger bonus, with the optimal pair moving from a statutory rate of 25% and a bonus of 12% of the wage at six months to 42% and 26% at three months. Frontloading is thus close to welfare-neutral over a wide set of re-optimized designs, and the government has many equivalent ways to combine duration, generosity, and bonuses.

Together with Sections 5.4 and 5.6, these results point in the same direction. Reemployment bonuses are most valuable precisely where UI is most generous, because that is where the fiscal externality of faster reemployment is largest. They are an addition to the

existing UI system, not a substitute for redesigning it. The results are likely to apply beyond the United States as well. The modest gains reported here reflect a UI system that reaches about a third of the unemployed and caps the benefits it pays, and where coverage is broader and benefits are less tightly capped, the welfare gain from reemployment bonuses would be larger.

6 Conclusion

This paper studies the welfare impact of reemployment bonuses as a way to address the moral hazard inherent in the UI system. Using a dynamic model of consumption, saving, and job search, I derive a formula that quantifies the welfare impact of a marginal change in reemployment bonuses. By leveraging existing estimates of the response of unemployment duration to changes in UI benefits, I evaluate the welfare formula and find that the first-order welfare gain from reemployment bonuses equal to 10 percent of wages is equivalent to that of a 0.13% permanent increase in wages. Evaluating the welfare impact using the Marginal Value of Public Funds (MVPF), I find that the MVPF of reemployment bonuses is higher than that of most policies targeting adults documented in [Hendren and Sprung-Keyser \(2020\)](#).

I then calibrate a quantitative model that incorporates imperfect UI eligibility and take-up, a statutory benefit cap, stochastic match quality, and repeated unemployment spells, and I characterize for whom and under what conditions reemployment bonuses raise welfare. Under the current UI system, a moderate bonus of about 19% of wages raises welfare modestly for a labor-market entrant, while generous bonuses reduce it. Under an alternative criterion that averages welfare over the stationary population rather than discounting from entry, no positive bonus raises welfare, and [Appendix C.5](#) shows that the disagreement comes from how heavily each age is weighted. The gains available anywhere in this policy space are modest, and reforming the benefit level itself is worth about twice as much as adding the bonus. What matters about the policy is therefore not the size of the gain but the conditions under which the gain exists. The gains are largest where UI benefits are generous in level or in duration, and they accrue mainly to unemployed benefit-eligible workers and to low-wage workers with unstable jobs. The gains also require that workers keep most of the payment. If firms extract even a fifth of the bonus through lower wages, no positive bonus raises workers' welfare, and the gain survives only if the extracted share returns to them as profit income. The optimal UI replacement rate is low with or without bonuses. Reemployment bonuses

are therefore best understood as an addition to the existing UI system, not as a substitute for redesigning it.

Acknowledgements

I would like to thank Naoki Aizawa, Jesse Gregory, Emanuel Hansen, John Kennan, Rasmus Lentz, Corina Mommaerts, Shuhei Otani, Jeffery Smith, Christopher Taber, Matthew Wiswall, Hoyoung Yoo, as well as seminar participants at UW-Madison, Econometric Society World Congress 2020, National Tax Association 113th Annual Conference, 15th Trans Pacific Labor Seminar, and Osaka University for helpful comments and suggestions.

Funding: This work was supported by the Japan Society for the Promotion of Science KAKENHI [grant number 25K16596] and the Joint Usage/Research Centers at the Kyoto Institute of Economic Research, Kyoto University.

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Online Appendix (Not for Publication)

A Proofs

A.1 Derivation of Equation (4)

I define the welfare of the worker as

$$\mathcal{W}(\mathbf{b}) = e(\mathbf{b})u(w_1 + b_e - \tau(\mathbf{b})) + (1 - e(\mathbf{b}))u(b_u) - \psi(e(\mathbf{b})) + u(w_2 - \tau(\mathbf{b})) \quad (\text{A.1})$$

where $e(\mathbf{b})$ is the job search effort chosen by the worker to maximize the expected value:

$$e(\mathbf{b}) = \arg \max_{e \in [0,1]} eu(w_1 + b_e - \tau(\mathbf{b})) + (1 - e)u(b_u) - \psi(e) \quad (\text{A.2})$$

and $\tau(\mathbf{b})$ satisfies the government budget constraint:

$$(e(\mathbf{b}) + 1)\tau(\mathbf{b}) = e(\mathbf{b})b_e + (1 - e(\mathbf{b}))b_u \quad (\text{A.3})$$

where the left-hand side is the tax revenue while the right-hand side is the spending on reemployment bonuses and unemployment benefits.

First, differentiating both sides of the government budget constraint yields

$$\begin{aligned} \frac{\partial e}{\partial b_e} \tau + (e + 1) \frac{\partial \tau}{\partial b_e} &= e + (b_e - b_u) \frac{\partial e}{\partial b_e} \\ \iff \frac{\partial \tau}{\partial b_e} &= \frac{e}{1 + e} - \frac{1}{1 + e} \frac{\partial e}{\partial b_e} (b_u + \tau - b_e) \end{aligned}$$

Applying the envelope theorem, I have

$$\begin{aligned} \frac{\partial W}{\partial b_e} &= eu'(c_{e,1}) \left(1 - \frac{\partial \tau}{\partial b_e} \right) - u'(c_{e,2}) \frac{\partial \tau}{\partial b_e} \\ &= eu'(c_{e,1}) - [eu'(c_{e,1}) + u'(c_{e,2})] \frac{\partial \tau}{\partial b_e} \\ &= eu'(c_{e,1}) - [eu'(c_{e,1}) + u'(c_{e,2})] \frac{1}{1 + e} \left(e - \frac{\partial e}{\partial b_e} (b_u + \tau - b_e) \right) \\ &= e\{u'(c_{e,1}) - \mathbb{E}[u'(c_e)]\} + \mathbb{E}[u'(c_e)] \frac{\partial e}{\partial b_e} (b_u + \tau - b_e) \end{aligned}$$

A.2 Properties of Job Search Effort

In this subsection, I discuss how unemployed workers respond to a change in UI benefits or reemployment bonuses through their search effort. The first-order condition (13) for job search effort in period t is given by

$$\psi'(e_t(a_t; \mathbf{b}, \tau)) = W_{t,t}(a_t; b_e, \tau) - U_t(a_t; \mathbf{b}, \tau),$$

where the left-hand side is the marginal cost of job search and the right-hand side is the marginal gain. For periods $t = 1, \dots, T_B$, the responses of job search effort to UI benefits b_u and reemployment bonuses b_e are obtained by taking derivatives of both sides of the first-order condition above

with respect to b_u and b_e , i.e.,

$$\frac{\partial e_t}{\partial b_u} = \frac{-\frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_u}}{\psi''(e_t)}, \quad t = 1, \dots, T_B, \quad (\text{A.4})$$

$$\frac{\partial e_t}{\partial b_e} = \frac{\frac{\partial W_{t,t}(a_t; b_e, \tau)}{\partial b_e} - \frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_e}}{\psi''(e_t)}, \quad t = 1, \dots, T_B. \quad (\text{A.5})$$

These two equations (A.4) and (A.5) depend on the partial derivatives of the value functions. Exploiting the envelope theorem, I obtain the derivatives of the value functions as follows. The derivative of the unemployment value with respect to b_u is given by

$$\frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_u} = \begin{cases} u'(c_{u,t}) + \sum_{k=t+1}^{T_B} S_{k|t+1} u'(c_{u,k}) & t = 1, \dots, T_B, \\ 0 & t = T_B + 1, \dots, T, \end{cases} \quad (\text{A.6})$$

where $c_{u,k}$ represents the consumption of unemployed individuals in period k . The term $S_{k|t+1} = \prod_{j=t+1}^k (1 - e_j)$ denotes the probability of remaining unemployed at the end of period k conditional on being unemployed at the beginning of period $t + 1$. The derivative of the employment value with respect to b_e is given by

$$\frac{\partial W_{t,t}(a_t; b_e, \tau)}{\partial b_e} = \begin{cases} \sum_{k=t}^{T_B} u'(c_{e,t,k}) & t = 1, \dots, T_B, \\ 0 & t = T_B + 1, \dots, T \end{cases} \quad (\text{A.7})$$

where $c_{e,t,k}$ represents the consumption of employed individuals in period k who find a job in period t . Finally, the derivative of the unemployment value with respect to b_e is given by

$$\frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_e} = \begin{cases} e_{t+1} \frac{\partial W_{t+1,t+1}}{\partial b_e} + (1 - e_{t+1}) \frac{\partial U_{t+1}}{\partial b_e} & t = 1, \dots, T_B - 1, \\ 0 & t = T_B, \dots, T \end{cases} \quad (\text{A.8})$$

Equation (A.6) suggests that $\frac{\partial U_t}{\partial b_u}$ is positive for $t \leq T_B$, suggesting that search effort is decreasing in UI benefits b_u . For search effort to be increasing in reemployment bonuses, I need to show $\frac{\partial W_{t,t}(a_t; b_e, \tau)}{\partial b_e} - \frac{\partial U_t(a_t; \mathbf{b}, \tau)}{\partial b_e} > 0$. For notational brevity, I suppress the dependence of the value functions on their arguments. Equations (A.7) and (A.8) imply

$$\begin{aligned} \frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial U_t}{\partial b_e} &= \frac{\partial W_{t,t}}{\partial b_e} - \left[e_{t+1} \frac{\partial W_{t+1,t+1}}{\partial b_e} + (1 - e_{t+1}) \frac{\partial U_{t+1}}{\partial b_e} \right] \\ &= \frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial W_{t+1,t+1}}{\partial b_e} + (1 - e_{t+1}) \left[\frac{\partial W_{t+1,t+1}}{\partial b_e} - \frac{\partial U_{t+1}}{\partial b_e} \right] \\ &= \frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial W_{t+1,t+1}}{\partial b_e} + \sum_{k=t+1}^{T_B} S_{k|t+1} \left[\frac{\partial W_{k,k}}{\partial b_e} - \frac{\partial W_{k+1,k+1}}{\partial b_e} \right]. \end{aligned} \quad (\text{A.9})$$

To proceed, I make an assumption about the evolution of consumption:

Assumption. For $t = 1, \dots, T_B$, consumption for the employed does not depend on the timing of job finding, i.e., $c_{e,s,t} = c_{e,s',t}$ for $s, s' \leq t$.

Although this assumption is restrictive, it is still weaker than the constant consumption $c_{e,s,t} =$

c_e commonly assumed in the literature (e.g., [Chetty 2008](#)). This assumption implies that

$$\begin{aligned}\frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial W_{t+1,t+1}}{\partial b_e} &= u'(c_{e,t,t}) + \sum_{j=t+1}^{T_B} [u'(c_{e,t,j}) - u'(c_{e,t+1,j})] \\ &= u'(c_{e,t,t})\end{aligned}\tag{A.10}$$

where the second term on the right-hand side of the first line disappears because of the assumption made above. Now, going back to equation (A.9), I obtain

$$\begin{aligned}\frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial U_t}{\partial b_e} &= u'(c_{e,t,t}) + (1 - e_{t+1}) \left[\frac{\partial W_{t+1,t+1}}{\partial b_e} - \frac{\partial U_{t+1}}{\partial b_e} \right] \\ &= u'(c_{e,t,t}) + \sum_{k=t+1}^{T_B} S_{k|t+1} u'(c_{e,k,k}),\end{aligned}\tag{A.11}$$

which is positive since the marginal utility is always positive. Then, equation (A.5) implies that job search effort is increasing in b_e .

A.3 Proof of Proposition 1

Proof. Remember that the welfare function $\mathcal{W}(\mathbf{b})$ is defined as $\mathcal{W}(\mathbf{b}) = V_1(a_1; b, \tau(\mathbf{b}))$ given the initial asset a_1 where $\tau(\mathbf{b})$ is the budget-balancing tax. Differentiating the welfare function with respect to reemployment bonuses b_e yields

$$\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e} = \frac{\partial V_1}{\partial b_e} + \frac{\partial V_1}{\partial \tau} \frac{\partial \tau(\mathbf{b})}{\partial b_e}.\tag{A.12}$$

Exploiting the envelope conditions from the individual's optimization problem, I have

$$\begin{aligned}\frac{\partial V_1}{\partial b_e} &= e_1 \frac{\partial W_1}{\partial b_e} + (1 - e_1) \frac{\partial U_1}{\partial b_e} \\ &= e_1 \sum_{t=1}^{T_B} u'(c_{e,1,t}) + S_1 e_2 \sum_{t=2}^{T_B} u'(c_{e,2,t}) + \cdots + S_{T_B-1} e_{T_B} u'(c_{e,T_B,T_B}) \\ &= e_1 u'(c_{e,1,1}) + \sum_{s=1}^2 S_{s-1} e_s u'(c_{e,s,2}) + \cdots + \sum_{s=1}^{T_B} S_{s-1} e_s u'(c_{e,s,T_B}) \\ &= \sum_{t=1}^{T_B} \left(\sum_{s=1}^t S_{s-1} e_s u'(c_{e,s,t}) \right)\end{aligned}\tag{A.13}$$

where $S_0 = 1$. For notational brevity, I rewrite this as

$$\frac{\partial V_1}{\partial b_e} = \sum_{t=1}^{T_B} (1 - S_t) \mathbb{E}_s[u'(c_{e,s,t})], \quad \text{where} \quad \mathbb{E}_s[u'(c_{e,s,t})] = \sum_{s=1}^t \frac{S_{s-1} e_s}{1 - S_t} u'(c_{e,s,t}).\tag{A.14}$$

Here, $1 - S_t$ is the probability of being employed in period t , and $\mathbb{E}_s$ is the expectation over the distribution of the timing of job finding s conditional on being employed in period t . Similarly, the

response of the value to a change in τ is given by

$$\frac{\partial V_1}{\partial \tau} = - \sum_{t=1}^T (1 - S_t) \mathbb{E}_s[u'(c_{e,s,t})].$$

To further simplify the exposition and make equations easier to interpret, I introduce the following notation:

$$\mu_B = \sum_{t=1}^{T_B} \frac{1 - S_t}{T_B - D_B} \mathbb{E}_s[u'(c_{e,s,t})], \quad (\text{A.15})$$

$$\mu = \sum_{t=1}^T \frac{1 - S_t}{T - D} \mathbb{E}_s[u'(c_{e,s,t})]. \quad (\text{A.16})$$

μ_B and μ are the average marginal utilities over $t = 1, \dots, T_B$ and $t = 1, \dots, T$, respectively, where the weights are the relative probabilities of reaching each state (combination of t and s). With this notation, I have

$$\frac{\partial V_1}{\partial b_e} = (T_B - D_B) \mu_B, \quad \frac{\partial V_1}{\partial \tau} = -(T - D) \mu.$$

The first equation states that the marginal effect of reemployment bonuses is the expected number of periods for which workers receive reemployment bonuses multiplied by the average marginal utility over these periods. A similar interpretation applies to the marginal effect of a tax.

Now, I move on to the evaluation of the impact on the tax τ through the government budget constraint. Recall that the government budget constraint is given by

$$(T - D) \tau(\mathbf{b}) = D_B b_u + (T_B - D_B) b_e. \quad (\text{A.17})$$

Differentiating this with respect to b_e yields

$$(T - D) \frac{\partial \tau(\mathbf{b})}{\partial b_e} - \frac{dD(\mathbf{b}, \tau(\mathbf{b}))}{db_e} \tau(\mathbf{b}) = T_B - D_B + \frac{dD_B(\mathbf{b}, \tau(\mathbf{b}))}{db_e} (b_u - b_e). \quad (\text{A.18})$$

Arranging terms, I obtain

$$\frac{\partial \tau(\mathbf{b})}{\partial b_e} = \frac{1}{T - D} \left[(T_B - D_B) + \frac{dD_B}{db_e} (b_u - b_e) + \frac{dD}{db_e} \tau(\mathbf{b}) \right]. \quad (\text{A.19})$$

To get a money metric of the welfare impact of reemployment bonuses, I normalize $\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}$ by the welfare gain from a marginal increase in wages, i.e., $\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}$. Note that $\sum_{t=1}^T \frac{\partial V_1}{\partial w_t} = -\frac{\partial V_1}{\partial \tau}$. Then, I obtain

$$\begin{aligned} \frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e} / \sum_{t=1}^T \frac{\partial V_1}{\partial w_t} &= \frac{\frac{\partial V_1}{\partial b_e}}{-\frac{\partial V_1}{\partial \tau}} - \frac{\partial \tau(\mathbf{b})}{\partial b_e} \\ &= \frac{1}{T - D} \left[(T_B - D_B) \frac{\mu_B - \mu}{\mu} - \frac{dD_B}{db_e} (b_u - b_e) - \frac{dD}{db_e} \tau(\mathbf{b}) \right]. \end{aligned} \quad (\text{A.20})$$

This is the expression in Proposition 1. □

A.4 Proof of Proposition 2

Proof. Let $t \leq T_B$. In Appendix A.2, I differentiated the first-order condition for job search with respect to UI benefits b_u and reemployment bonuses b_e to obtain the following search responses to b_u and b_e , respectively.

$$\begin{aligned}\frac{\partial e_t}{\partial b_u} &= \frac{-\frac{\partial U_t}{\partial b_u}}{\psi''(e_t)}, \\ \frac{\partial e_t}{\partial b_e} &= \frac{\frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial U_t}{\partial b_e}}{\psi''(e_t)}.\end{aligned}$$

Also, Appendix A.2 provides the numerator of each of the two expressions above, in equations (A.6) and (A.11):

$$\begin{aligned}\frac{\partial U_t}{\partial b_u} &= u'(c_{u,t}) + \sum_{k=t+1}^{T_B} S_{k|t+1} u'(c_{u,k}), \\ \frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial U_t}{\partial b_e} &= u'(c_{e,t,t}) + \sum_{k=t+1}^{T_B} S_{k|t+1} u'(c_{e,k,k}).\end{aligned}$$

I define $\Delta_{u,t} = \frac{\partial U_t}{\partial b_u}$ and $\Delta_{e,t} = \frac{\partial W_{t,t}}{\partial b_e} - \frac{\partial U_t}{\partial b_e}$ so that $\frac{\partial e_t}{\partial b_u} = \frac{-\Delta_{u,t}}{\psi''(e_t)}$ and $\frac{\partial e_t}{\partial b_e} = \frac{\Delta_{e,t}}{\psi''(e_t)}$. Then, combining these two expressions provides

$$\frac{\partial e_t}{\partial b_e} = -\frac{\Delta_{e,t}}{\Delta_{u,t}} \frac{\partial e_t}{\partial b_u}. \quad (\text{A.21})$$

Now, I connect the response of job search effort e_t to the response of the survival probability $S_t = \prod_{j=1}^t (1 - e_j)$. For $t \leq T_B$, I have

$$\begin{aligned}\frac{\partial S_t}{\partial b_e} &= \frac{\partial}{\partial b_e} \prod_{j=1}^t (1 - e_j) \\ &= \sum_{k=1}^t \frac{\partial(1 - e_k)}{\partial b_e} \prod_{j \neq k} (1 - e_j) \\ &= -\sum_{k=1}^t \frac{\Delta_{e,k}}{\Delta_{u,k}} \frac{\partial(1 - e_k)}{\partial b_u} \prod_{j \neq k} (1 - e_j),\end{aligned} \quad (\text{A.22})$$

where I use equation (A.21) in the last line. Recall that the compensated unemployment duration D_B is defined as $D_B = \sum_{t=1}^{T_B} S_t$. Using the expression obtained just above, I have

$$\begin{aligned}-\frac{\partial D_B(\mathbf{b}, \tau)}{\partial b_e} &= -\sum_{t=1}^{T_B} \frac{\partial S_t}{\partial b_e} \\ &= \sum_{t=1}^{T_B} \left[\sum_{k=1}^t \frac{\Delta_{e,k}}{\Delta_{u,k}} \frac{\partial(1 - e_k)}{\partial b_u} \prod_{j \neq k} (1 - e_j) \right].\end{aligned} \quad (\text{A.23})$$

To derive a bound on $\frac{\partial D_B}{\partial b_e}$, I compute a bound on $\frac{\Delta_{e,t}}{\Delta_{u,t}}$. First, note that

$$\begin{aligned}\frac{\Delta_{e,t}}{\Delta_{u,t}} &= \frac{u'(c_{e,t,t}) + \sum_{k=t+1}^{T_B} S_{k|t+1} u'(c_{e,k,k})}{u'(c_{u,t}) + \sum_{k=t+1}^{T_B} S_{k|t+1} u'(c_{u,k})} \\ &\geq \frac{[1 + \sum_{k=t+1}^{T_B} S_{k|t+1}] u'(c_{e,\max})}{[1 + \sum_{k=t+1}^{T_B} S_{k|t+1}] u'(c_{u,\min})} \\ &= \frac{u'(c_{e,\max})}{u'(c_{u,\min})},\end{aligned}\tag{A.24}$$

where $c_{e,\max} = \max_{t=1,\dots,T_B} c_{e,t,t}$ and $c_{u,\min} = \min_{t=1,\dots,T_B} c_{u,t}$. Since this bound on $\frac{\Delta_{e,k}}{\Delta_{u,k}}$ does not depend on k , I obtain

$$\begin{aligned}-\frac{\partial D_B(\mathbf{b}, \tau)}{\partial b_e} &= \sum_{t=1}^{T_B} \left[\sum_{k=1}^t \frac{\Delta_{e,k}}{\Delta_{u,k}} \frac{\partial(1-e_k)}{\partial b_u} \prod_{j \neq k} (1-e_j) \right] \\ &\geq \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \sum_{t=1}^{T_B} \left[\sum_{k=1}^t \frac{\partial(1-e_k)}{\partial b_u} \prod_{j \neq k} (1-e_j) \right] \\ &= \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \frac{\partial D_B(\mathbf{b}, \tau)}{\partial b_u}.\end{aligned}\tag{A.25}$$

This is the inequality (23) in Proposition 2. □

A.5 Proof of Corollary 1

Proof. From Appendix A.3, remember that

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}} = \frac{1}{T-D} \left[(T_B - D_B) \frac{\mu_B - \mu}{\mu} - \frac{dD_B}{db_e} (b_u - b_e) - \frac{dD}{db_e} \tau(\mathbf{b}) \right].\tag{A.26}$$

Evaluating this at $b_e = 0$ yields

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}} = \frac{1}{T-D} \left[(T_B - D_B) \frac{\mu_B - \mu}{\mu} - \frac{dD_B}{db_e} b_u - \frac{dD}{db_e} \frac{D_B}{T-D} b_u \right].\tag{A.27}$$

Using Proposition 2, I obtain

$$\begin{aligned}\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}} &= \frac{1}{T-D} \left[(T_B - D_B) \frac{\mu_B - \mu}{\mu} - \frac{dD_B}{db_e} b_u - \frac{dD}{db_e} \tau \right] \\ &\geq \frac{1}{T-D} \left[(T_B - D_B) \frac{\mu_B - \mu}{\mu} - \frac{dD_B}{db_e} b_u \right] \\ &\geq \frac{1}{T-D} \left[(T_B - D_B) \frac{\mu_B - \mu}{\mu} + \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \frac{dD_B}{db_e} \frac{b_u}{D_B} D_B \right] \\ &= \frac{D}{T-D} \frac{D_B}{D} \left[\frac{T_B - D_B}{D_B} \frac{\mu_B - \mu}{\mu} + \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \eta_{D_B, b_u} \right]\end{aligned}\tag{A.28}$$

Table B.1: MVPF of Reemployment Bonus and Its Sensitivity to η_{D_B, b_u}

Source of Elasticity η_{D_B, b_u}	η_{D_B, b_u}	MVPF		
		$\gamma = 1$	$\gamma = 2$	$\gamma = 3$
Panel A. Baseline:				
Cohen and Ganong (2026)	0.34	2.02	1.96	1.93
Panel B. Sensitivity:				
Chetty (2008)	0.53	4.14	3.43	3.03
Moffitt (1985)	0.36	2.13	2.05	2.00
Solon (1985)	0.10	1.22	1.27	1.32
Katz and Meyer (1990)	0.80	∞	∞	16.24
Meyer and Mok (2007)	0.12 - 0.60	1.27 - 6.75	1.31 - 4.75	1.36 - 3.84
Landais (2015)	0.29	1.78	1.76	1.76
Kroft and Notowidigdo (2016)	0.63	9.25	5.68	4.34
Card, Johnston, Leung, Mas and Pei (2015)	0.38 - 1.21	2.26 - ∞	2.15 - ∞	2.09 - ∞

Note: Panel A of this table reports the MVPF of a marginal change in reemployment bonuses in the baseline calibration, which uses the publication-bias-corrected meta-estimate of η_{D_B, b_u} from [Cohen and Ganong \(2026\)](#). Panel B reports the MVPF under single-study estimates of η_{D_B, b_u} reviewed in [Schmieder and von Wachter \(2016\)](#).

where the second line drops the term $\left(-\frac{dD}{db_e}\right)\tau$, which is nonnegative because search effort is increasing in b_e (Appendix A.2) so that $-\frac{dD}{db_e} \geq 0$, and $\tau \geq 0$; the third line uses the bound (23); and the last line factors out D_B . Finally, letting $\phi = \frac{D}{T-D}$ be the unemployment-to-employment ratio and $\phi_B = \frac{D_B}{T_B-D_B}$ be the corresponding ratio in UI-covered periods, I obtain

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \frac{\partial V_1}{\partial w_t}} \geq \phi \frac{D_B}{D} \left[\frac{1}{\phi_B} \frac{\mu_B - \mu}{\mu} + \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \eta_{D_B, b_u} \right]. \quad (\text{A.29})$$

□

B Marginal Value of Public Funds

To provide a sense of the quantitative magnitude of the welfare effect obtained in this paper, I calculate the Marginal Value of Public Funds (MVPF), following the approach introduced by [Hendren and Sprung-Keyser \(2020\)](#). The MVPF of a policy is defined as the aggregate willingness to pay for the policy divided by its net fiscal cost to the government. This concept offers a unified framework for evaluating the welfare impacts of government interventions across different contexts, enabling comparisons with other existing policy changes.

The first component of the MVPF is the willingness to pay for a \$1 increase in reemployment bonuses b_e , which is given by

$$WTP = \frac{1}{\mu} \cdot \frac{\partial V_1}{\partial b_e} = (T_B - D_B) \cdot \frac{\mu_B}{\mu} \quad (\text{B.1})$$

where the willingness to pay is measured in terms of consumption during employment.²³

²³In Appendix D.IV, [Hendren and Sprung-Keyser \(2020\)](#) compute the willingness to pay for unemployment

The second component of the MVPF is the net cost of the policy change. Let $R = D_B b_u + (T_B - D_B)b_e - (T - D)\tau$ be the pre-financing net program cost, that is, the net spending on the UI program evaluated at a given tax τ . In computing the net cost, I hold the tax fixed at its baseline level rather than imposing budget balance, since the MVPF framework measures the willingness to pay per dollar of net government cost (Hendren and Sprung-Keyser, 2020). Every derivative in this subsection is therefore a partial derivative at the baseline tax, written $(\partial \cdot / \partial b_e)_\tau$, and both the willingness to pay and the behavioral responses are evaluated at that tax. This is why R is not zero here, whereas the government budget constraint in the main text holds with equality once the tax adjusts. The net cost of the policy change is then given by

$$\text{Net Cost} = \left(\frac{\partial R}{\partial b_e} \right)_\tau = (T_B - D_B) \cdot (1 + FE), \quad (\text{B.2})$$

where FE is the fiscal externality given by

$$FE = \frac{1}{T_B - D_B} \cdot \left[\left(\frac{\partial D_B}{\partial b_e} \right)_\tau \cdot (b_u - b_e) + \left(\frac{\partial D}{\partial b_e} \right)_\tau \cdot \tau \right] \quad (\text{B.3})$$

As in the previous subsection, I evaluate this at the current policy $b_e = 0$ and use the bound to obtain

$$FE \leq -\phi_B \cdot \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \cdot \eta_{D_B, b_u} \quad (\text{B.4})$$

Combining the expressions above, I obtain

$$\text{MVPF} = \frac{WTP}{\text{Net Cost}} \geq \frac{\mu_B / \mu}{1 - \phi_B \cdot \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \cdot \eta_{D_B, b_u}}. \quad (\text{B.5})$$

Panel A of Table B.1 reports the MVPF of a marginal change in reemployment bonuses, which is about 2.0 across plausible values of γ . Hendren and Sprung-Keyser (2020) report MVPFs for 133 historical policy changes in the U.S., and most policies targeting adults have MVPFs below 2.0; reemployment bonuses therefore rank among the more cost-effective policies targeting adults. With the elasticity of Chetty (2008), which is close to the uncorrected literature average, the MVPF exceeds 3.0 (Panel B).

It is worth discussing why this policy is quantitatively cost-effective. As noted in the previous subsection, the welfare gain stems primarily from the fiscal externality rather than from the reallocation of consumption among reemployed workers. The magnitude of the fiscal externality critically depends on how unemployment duration responds to reemployment bonuses. A key insight is that the lower bound of this response is directly linked to the responsiveness of unemployment duration to UI benefits. Thus, the strong moral hazard that limits the optimal generosity of UI benefits directly leads to the welfare gains from reemployment bonuses.

Sensitivity to the reduced-form elasticity parameter. One advantage of the approach taken in this paper, which connects the response of unemployment duration to reemployment bonuses and the response to UI benefits, is that I can utilize the extensive research on labor supply responses to UI benefits to easily check the sensitivity of the result to other estimates of the response of unemployment duration to UI benefits.

Panel B of Table B.1 outlines the estimated elasticities from a collection of studies using U.S. insurance in a static environment by the marginal utility of consumption in case of employment.

data, reviewed in [Schmieder and von Wachter \(2016\)](#). It also shows the MVPFs of reemployment bonuses determined using these elasticities. For studies like [Solon \(1985\)](#) with smaller estimated elasticities, the MVPF ranges from 1.22 to 1.32 depending on the risk aversion parameter γ . While this is significantly smaller than the figures discussed earlier in this section, it still exceeds 1, suggesting that the policy provides welfare benefits greater than one dollar for each dollar of government expenditure. Conversely, for studies with larger estimated elasticities, the MVPF's denominator turns negative. In these cases, I define the MVPF as infinity, following [Hendren and Sprung-Keyser \(2020\)](#). An infinite MVPF indicates that the job search response to reemployment bonuses is so large that the significant reduction in UI benefit spending allows the reemployment bonus policy to pay for itself. The lower-bound inequality in equation (B.5) applies only where the net cost is positive, and a nonpositive bound on the net cost instead indicates a self-financing policy.

C Extensions

C.1 Heterogeneity

The model in the main text assumes that workers are homogeneous. In this subsection, I assume that individuals are heterogeneous in model primitives including utility functions, income processes, initial assets, and liquidity constraints. I show that the welfare formula is almost unchanged in the presence of heterogeneity although additional conditions are required.

I begin by rewriting individual problems that account for individual heterogeneity. I assume that individuals are heterogeneous and each individual is indexed by $\theta \in \Theta$. The distribution of θ is given by $F(\theta)$. If individual θ is employed in period t with asset a_t , the value function is given by

$$W_{s,t}(a_t, \theta) = \max_{a_{t+1} \geq \underline{a}(\theta)} u(a_t - a_{t+1} + y_{e,s,t}(\theta); \theta) + W_{s,t+1}(a_{t+1}, \theta), \quad (\text{C.1})$$

where the utility function u directly depends on θ . The liquidity constraint $\underline{a}$ and income y also depend on θ . More precisely, income is given by

$$y_{e,s,t}(\theta) = \begin{cases} w_{e,s,t}(\theta) - \tau + b_e & \text{if } t \leq T_B, \\ w_{e,s,t}(\theta) - \tau & \text{if } t > T_B, \end{cases} \quad (\text{C.2})$$

where $w_{e,s,t}(\theta)$ is non-stochastic earnings for individual θ .

If individual θ with asset a_t does not find a job at the beginning of period t , the value function is given by

$$U_t(a_t, \theta) = \max_{a_{t+1} \geq \underline{a}(\theta)} u(a_t - a_{t+1} + y_{u,t}(\theta); \theta) + V_{t+1}(a_{t+1}, \theta), \quad (\text{C.3})$$

where income is given by

$$y_{u,t}(\theta) = \begin{cases} \bar{y}_{u,t}(\theta) + b_u & \text{if } t \leq T_B, \\ \bar{y}_{u,t}(\theta) & \text{if } t > T_B, \end{cases} \quad (\text{C.4})$$

where $\bar{y}_{u,t}(\theta)$ is non-stochastic non-labor income for individual θ . The value function of an unemployed individual θ with asset a_t at the beginning of each period before searching for a job is given by

$$V_t(a_t, \theta) = \max_{e_t \in [0,1]} e_t W_{t,t}(a_t, \theta) + (1 - e_t) U_t(a_t, \theta) - \psi(e_t; \theta), \quad (\text{C.5})$$

where the disutility of job search ψ directly depends on θ . Let $e_t(\theta)$ be the search effort of individual

θ at time t . I define an individual-specific survival probability $S_t(\theta)$, expected unemployment duration $D(\theta)$, and expected compensated duration $D_B(\theta)$ as follows: $S_t(\theta) = \prod_{s=1}^t (1 - e_s(\theta))$, $D(\theta) = \sum_{t=1}^T S_t(\theta)$, and $D_B(\theta) = \sum_{t=1}^{T_B} S_t(\theta)$.

The government budget constraint is given by

$$(T - \bar{D})\tau = \bar{D}_B b_u + (T_B - \bar{D}_B) b_e, \quad (\text{C.6})$$

where $\bar{D} = \int_{\theta \in \Theta} D(\theta) dF(\theta)$ and $\bar{D}_B = \int_{\theta \in \Theta} D_B(\theta) dF(\theta)$ are the averages among heterogeneous workers.

Let $\tau(\mathbf{b})$ be the tax as a function of UI benefits b_u and reemployment bonuses b_e implied by the budget constraint above. I define the welfare function $\mathcal{W}(\mathbf{b})$ as

$$\mathcal{W}(\mathbf{b}) = \int_{\theta \in \Theta} V_1(a_1(\theta), \theta; \mathbf{b}, \tau(\mathbf{b})) dF(\theta), \quad (\text{C.7})$$

where $\mathcal{W}(\mathbf{b})$ captures the initial expected value averaged over the distribution of workers. Here I make the value function explicitly depend on the government policy $(\mathbf{b}, \tau(\mathbf{b}))$.

Differentiating the welfare function with respect to b_e yields

$$\begin{aligned} \frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e} &= \int_{\theta \in \Theta} \left[\frac{\partial V_1(a_1(\theta), \theta; b, \tau)}{\partial b_e} + \frac{\partial V_1(a_1(\theta), \theta; b, \tau)}{\partial \tau} \frac{\partial \tau(\mathbf{b})}{\partial b_e} \right] dF(\theta) \\ &= \int_{\theta \in \Theta} \frac{\partial V_1(a_1(\theta), \theta; b, \tau)}{\partial b_e} dF(\theta) + \int_{\theta \in \Theta} \frac{\partial V_1(a_1(\theta), \theta; b, \tau)}{\partial \tau} dF(\theta) \frac{\partial \tau(\mathbf{b})}{\partial b_e}. \end{aligned} \quad (\text{C.8})$$

As in the homogeneous case, I normalize the welfare impact of reemployment bonuses by the impact of a marginal change in wages on the expected value.

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \int \frac{\partial V_1}{\partial w_t} dF(\theta)} = \frac{\int_{\theta \in \Theta} \frac{\partial V_1(a_1(\theta), \theta; b, \tau)}{\partial b_e} dF(\theta)}{- \int_{\theta \in \Theta} \frac{\partial V_1(a_1(\theta), \theta; b, \tau)}{\partial \tau} dF(\theta)} - \frac{\partial \tau(\mathbf{b})}{\partial b_e}. \quad (\text{C.9})$$

The same calculation as in the proof of Proposition 1 implies that the equation above reduces down to

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \int \frac{\partial V_1}{\partial w_t} dF(\theta)} = \frac{1}{T - \bar{D}} \left[(T_B - \bar{D}_B) \frac{\bar{\mu}_B - \bar{\mu}}{\bar{\mu}} - \frac{d\bar{D}_B}{db_e} (b_u - b_e) - \frac{d\bar{D}}{db_e} \tau(\mathbf{b}) \right] \quad (\text{C.10})$$

where $\bar{\mu}_B$ and $\bar{\mu}$ are the same as in the homogeneous case, except that these terms are now averaged over the distribution of workers, with the normalization by the aggregate exposures $T_B - \bar{D}_B$ and $T - \bar{D}$ rather than by each worker's own:

$$\bar{\mu}_B = \int_{\theta \in \Theta} \sum_{t=1}^{T_B} \frac{1 - S_t(\theta)}{T_B - \bar{D}_B} \mathbb{E}_s[u'(c_{e,s,t}(\theta))] dF(\theta), \quad (\text{C.11})$$

$$\bar{\mu} = \int_{\theta \in \Theta} \sum_{t=1}^T \frac{1 - S_t(\theta)}{T - \bar{D}} \mathbb{E}_s[u'(c_{e,s,t}(\theta))] dF(\theta). \quad (\text{C.12})$$

This exposure weighting makes the aggregation exact: integrating the individual envelope conditions gives $\int \frac{\partial V_1}{\partial b_e} dF(\theta) = (T_B - \bar{D}_B) \bar{\mu}_B$ and $\int \frac{\partial V_1}{\partial \tau} dF(\theta) = -(T - \bar{D}) \bar{\mu}$, which are the objects the formula requires.

There are mainly two differences between the formula above and the one in the case of ho-

homogeneous workers in the main text. First, the average marginal utilities μ and μ_B in equation (18) are now replaced by $\bar{\mu}$ and $\bar{\mu}_B$, which are the exposure-weighted averages over heterogeneous workers. The other difference is that the expected unemployment duration D and the expected insured duration D_B in the main text are also replaced by the ones averaged over workers $\bar{D}$ and $\bar{D}_B$.

The bound in Proposition 2 cannot be directly applied to $\bar{D}_B$. Instead, I have

$$\frac{\partial \bar{D}_B}{\partial b_e} = \int_{\theta \in \Theta} \frac{\partial D_B(\theta)}{\partial b_e} dF(\theta), \quad (\text{C.13})$$

which implies

$$-\frac{\partial \bar{D}_B}{\partial b_e} \geq \int_{\theta \in \Theta} \frac{u'(c_{e,\max}(\theta); \theta)}{u'(c_{u,\min}(\theta); \theta)} \frac{\partial D_B(\theta)}{\partial b_u} dF(\theta), \quad (\text{C.14})$$

where $c_{e,\max}(\theta) = \max_{t=1,\dots,T_B} c_{e,t,t}(\theta)$ and $c_{u,\min}(\theta) = \min_{t=1,\dots,T_B} c_{u,t}(\theta)$.

If the heterogeneity in the population is such that $\frac{u'(c_{e,\max}(\theta); \theta)}{u'(c_{u,\min}(\theta); \theta)}$ is orthogonal to $\frac{\partial D_B(\theta)}{\partial b_u}$, then the inequality simplifies to

$$-\frac{\partial \bar{D}_B}{\partial b_e} \geq \int_{\theta \in \Theta} \frac{u'(c_{e,\max}(\theta); \theta)}{u'(c_{u,\min}(\theta); \theta)} dF(\theta) \frac{\partial \bar{D}_B}{\partial b_u}. \quad (\text{C.15})$$

As in Corollary 1, arranging terms yields

$$\frac{\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e}}{\sum_{t=1}^T \int \frac{\partial V_t}{\partial w_t} dF(\theta)} \geq \bar{\phi} \cdot \frac{\bar{D}_B}{\bar{D}} \cdot \left[\frac{1}{\bar{\phi}_B} \cdot \frac{\bar{\mu}_B - \bar{\mu}}{\bar{\mu}} + \int_{\theta} \frac{u'(c_{e,\max}(\theta); \theta)}{u'(c_{u,\min}(\theta); \theta)} dF(\theta) \cdot \eta_{\bar{D}_B, b_u} \right], \quad (\text{C.16})$$

where $\bar{\phi} = \frac{\bar{D}}{T - \bar{D}}$, $\bar{\phi}_B = \frac{\bar{D}_B}{T_B - \bar{D}_B}$, and $\eta_{\bar{D}_B, b_u} = \frac{\partial \bar{D}_B}{\partial b_u} \frac{b_u}{\bar{D}_B}$, matching the definition used in the main text. The same set of reduced-form parameters in Table 1 in the main text can be used to evaluate the formula. The remaining thing to be determined is $\int_{\theta \in \Theta} \frac{u'(c_{e,\max}(\theta); \theta)}{u'(c_{u,\min}(\theta); \theta)} dF(\theta)$. If the utility for consumption is homogeneous (i.e., $u(c; \theta) = u(c)$) and is given by a CRRA function, then

$$\int_{\theta \in \Theta} \frac{u'(c_{e,\max}(\theta))}{u'(c_{u,\min}(\theta))} dF(\theta) = \int_{\theta \in \Theta} \left(\frac{c_{u,\min}(\theta)}{c_{e,\max}(\theta)} \right)^{\gamma} dF(\theta). \quad (\text{C.17})$$

If the CRRA parameter is $\gamma \geq 1$, which is a standard assumption, then Jensen's inequality implies

$$\begin{aligned} \int_{\theta \in \Theta} \frac{u'(c_{e,\max}(\theta))}{u'(c_{u,\min}(\theta))} dF(\theta) &\geq \left[\int_{\theta \in \Theta} \frac{c_{u,\min}(\theta)}{c_{e,\max}(\theta)} dF(\theta) \right]^{\gamma} \\ &\approx \left[\frac{\int_{\theta \in \Theta} c_{u,\min}(\theta) dF(\theta)}{\int_{\theta \in \Theta} c_{e,\max}(\theta) dF(\theta)} \right]^{\gamma} \end{aligned} \quad (\text{C.18})$$

where the second line is based on the first-order approximation around the averages.

C.2 Stochastic Wage Offers

The discussion here mostly follows Chetty (2008) except that I differentiate the welfare function with respect to reemployment bonuses instead of UI benefits. As before, workers exert search effort e_t , but this time I assume that e_t represents the probability of getting an offer, and conditional

on getting a job offer, the wage offer is drawn from a distribution F_w . If a worker is employed in period t with asset a_t and wage w , their value function is given by

$$W_{s,t}(a_t, w) = \max_{a_{t+1} \geq a} u(a_t - a_{t+1} + y_{e,t}(w)) + W_{s,t+1}(a_{t+1}, w), \quad (\text{C.19})$$

where income is given by $y_{e,t}(w) = w - \tau + b_e \mathbb{1}_{\{t \leq T_B\}}$.

If a worker with asset a_t does not find a job at the beginning of period t , the value function is given by

$$U_t(a_t) = \max_{a_{t+1} \geq a} u(a_t - a_{t+1} + y_{u,t}) + V_{t+1}(a_{t+1}), \quad (\text{C.20})$$

where $y_{u,t} = \bar{y}_t + b_u \mathbb{1}_{\{t \leq T_B\}}$.

Now I consider the search decision of a worker. Letting R_t be the reservation wage at t , the value function of unemployed people with asset a_t at the beginning of each period before searching for a job is given by

$$\begin{aligned} V_t(a_t) = & \max_{e_t \in [0,1], R_t} e_t \Pr(w \geq R_t) \mathbb{E}[W_t(a_t, w) | w \geq R_t] \\ & + (1 - e_t \Pr(w \geq R_t)) U_t(a_t) - \psi(e_t). \end{aligned} \quad (\text{C.21})$$

This optimization problem is different from the one in the main text in that the worker now chooses the reservation wage R_t in addition to the search effort e_t .

As in the main text, I define the welfare function as $\mathcal{W}(\mathbf{b}) = V_1(a_1; \mathbf{b}, \tau(\mathbf{b}))$ given a_1 . Differentiating this with respect to reemployment bonuses b_e yields

$$\frac{\partial \mathcal{W}(\mathbf{b})}{\partial b_e} = \frac{\partial V_1}{\partial b_e} + \frac{\partial V_1}{\partial \tau} \frac{\partial \tau(\mathbf{b})}{\partial b_e}. \quad (\text{C.22})$$

Exploiting the envelope conditions from the individual's optimization problem, I have

$$\frac{\partial V_1}{\partial b_e} = e_1 \Pr(w \geq R_1) \frac{\partial \mathbb{E} W_1}{\partial b_e} + (1 - e_1 \Pr(w \geq R_1)) \frac{\partial U_1}{\partial b_e}. \quad (\text{C.23})$$

Defining a survival probability as $S_t = \prod_{j=1}^t [1 - e_j \Pr(w \geq R_j)]$, I apply the same calculation as in Appendix A.3 and obtain

$$\frac{\partial V_1}{\partial b_e} = \sum_{t=1}^{T_B} (1 - S_t) \mathbb{E}_s[u'(c_{e,s,t})], \quad \frac{\partial V_1}{\partial \tau} = - \sum_{t=1}^T (1 - S_t) \mathbb{E}_s[u'(c_{e,s,t})]. \quad (\text{C.24})$$

This is exactly the same as the case where wage offers are not stochastic, except that the survival probability is now redefined so that it reflects the probability that an offered wage is above the reservation wage. Introducing stochastic wage offers into the model does not change the welfare formula because the additional variable R_t shows up in the formula only through the survival probability S_t . Since the government budget constraint is not affected by the introduction of stochastic wage offers once the survival probability S_t is redefined to capture the acceptance probability, the formula for the welfare impact of the marginal change in b_e in the presence of stochastic wage offers is the same as the one in the main text.

C.3 Imperfect Take-up

In this subsection, I introduce a take-up decision by workers. I assume that, upon job loss, workers draw a take-up cost $\epsilon \geq 0$ from a distribution H that is differentiable. For simplicity, I assume that the take-up decision is made only at the beginning of the model, and once a worker takes UI benefits or reemployment bonuses, the worker keeps taking them as long as the worker is eligible. A worker with ϵ takes up UI or reemployment bonuses in the initial period if

$$V_1(a_1) - \epsilon \geq V_1^N(a_1) \quad (\text{C.25})$$

where $V_1(a_1)$ is the value of take-up and hence the same as in the baseline model while $V_1^N(a_1)$ is the value of a worker who does not file for UI. Let $\Delta = V_1(a_1) - V_1^N(a_1)$ be the difference in these values. I define the welfare function as

$$\mathcal{W} = p \cdot \left[V_1(a_1) - \mathbb{E}[\epsilon | \epsilon \leq \Delta] \right] + (1 - p) \cdot V_1^N(a_1), \quad (\text{C.26})$$

where $p = H(\Delta)$ is the probability of take-up. I refer to workers who take up UI or reemployment bonuses as *takers* and workers who do not as *non-takers*.

The government budget constraint is now given by

$$(T - \bar{D})\tau = p \cdot [D_B b_u + (T_B - D_B)b_e], \quad (\text{C.27})$$

where $\bar{D}$ is the average unemployment duration

$$\bar{D} = pD + (1 - p)D^N, \quad (\text{C.28})$$

and D^N is the expected unemployment duration of non-takers.

Noting that the response of p has no first-order effect on the expected value through the envelope theorem, I differentiate the welfare function with respect to reemployment bonuses b_e to obtain

$$\frac{\partial \mathcal{W}}{\partial b_e} = p \cdot \frac{\partial V_1}{\partial b_e} + \frac{\partial \bar{V}_1}{\partial \tau} \cdot \frac{\partial \tau(\mathbf{b})}{\partial b_e}, \quad (\text{C.29})$$

where $\bar{V}_1$ is the average initial value given by $\bar{V}_1 = pV_1 + (1 - p)V_1^N$, and $\frac{\partial \tau(\mathbf{b})}{\partial b_e}$ is now different from the main text and given by

$$\begin{aligned} \frac{\partial \tau(\mathbf{b})}{\partial b_e} = \frac{1}{T - \bar{D}} & \left[p \cdot \left\{ (T_B - D_B) + \frac{dD_B}{db_e}(b_u - b_e) \right\} + \frac{d\bar{D}}{db_e}\tau \right. \\ & \left. + \frac{dp}{db_e} \{ D_B b_u + (T_B - D_B)b_e \} \right]. \end{aligned} \quad (\text{C.30})$$

Note that $\frac{d\bar{D}}{db_e}$ can be written as

$$\begin{aligned} \frac{d\bar{D}(\mathbf{b}, \tau(\mathbf{b}))}{db_e} &= \frac{dp(\mathbf{b}, \tau(\mathbf{b}))}{db_e}(D - D^N) + p \frac{dD(\mathbf{b}, \tau(\mathbf{b}))}{db_e} + (1 - p) \frac{dD^N(\mathbf{b}, \tau(\mathbf{b}))}{db_e} \\ &= \frac{dp(\mathbf{b}, \tau(\mathbf{b}))}{db_e}(D - D^N) + p \frac{dD(\mathbf{b}, \tau(\mathbf{b}))}{db_e} + (1 - p) \frac{\partial D^N(\mathbf{b}, \tau(\mathbf{b}))}{\partial \tau} \frac{\partial \tau(\mathbf{b})}{\partial b_e}, \end{aligned}$$

where I use the fact that the unemployment duration of non-takers does not directly depend on reemployment bonuses. As discussed in Section 4.1, I assume as an approximation that the feedback effect through taxes is negligible, $\frac{\partial D^N}{\partial \tau} \frac{\partial \tau}{\partial b_e} = 0$. Then, equation (C.30) simplifies to

$$\begin{aligned} \frac{\partial \tau(\mathbf{b})}{\partial b_e} = \frac{1}{T - \bar{D}} & \left[p \cdot \left\{ (T_B - D_B) + \frac{dD_B}{db_e} (b_u - b_e) + \frac{dD}{db_e} \tau \right\} \right. \\ & \left. + \frac{dp}{db_e} \{ D_B b_u + (T_B - D_B) b_e + (D - D^N) \tau \} \right]. \end{aligned} \quad (\text{C.31})$$

Taken together, the welfare impact is

$$\frac{\frac{\partial \mathcal{W}}{\partial b_e}}{\sum_{t=1}^T \frac{\partial \bar{V}_1}{\partial w_t}} = p \cdot \Psi - \Omega, \quad (\text{C.32})$$

where Ψ is almost the same expression as the welfare impact in the baseline model:

$$\Psi = \frac{1}{T - \bar{D}} \left[(T_B - D_B) \frac{\mu_B - \bar{\mu}}{\bar{\mu}} + \left(-\frac{dD_B}{db_e} \right) (b_u - b_e) + \left(-\frac{dD}{db_e} \right) \tau \right]. \quad (\text{C.33})$$

The differences between this equation and the formula in the baseline model are that (i) I have $\bar{D} = pD + (1 - p)D^N$ in the denominator in front of the bracket instead of having just D , and (ii) the average marginal utility $\bar{\mu}$ here is based on the average among non-takers and reemployed workers among takers.

The term Ω captures the fiscal externality induced by the take-up decision and is given by

$$\Omega = \frac{1}{T - \bar{D}} \frac{dp}{db_e} \left\{ D_B b_u + (T_B - D_B) b_e + (D - D^N) \tau \right\}. \quad (\text{C.34})$$

This fiscal externality is increasing in the response of the take-up and in the government's net spending on takers relative to non-takers.

Again, I assume that the feedback effect through taxes is small enough that $\frac{dp}{db_e} \approx \frac{\partial p}{\partial b_e}$ and I use the model to relate the take-up response to reemployment bonuses to the take-up response to UI benefits.

Take-up response. In the main analysis, I used the first-order condition to derive a lower bound on the response of unemployment duration to reemployment bonuses. I take the same approach to relate the response of take-up to reemployment bonuses to the response of take-up to UI benefits. In doing so, I impose the same restriction as in Section 4 that $c_{e,s,t}$ does not depend on s and denote it by $c_{e,t}$. First, note that

$$\begin{aligned} \frac{\partial p(b_u, b_e, \tau)}{\partial b_u} &= H'(\Delta) \frac{\partial V_1(a_1)}{\partial b_u} \\ &= H'(\Delta) \sum_{t=1}^{T_B} S_t u'(c_{u,t}), \end{aligned} \quad (\text{C.35})$$

where the envelope theorem implies the response of search effort has no first-order impact. Second, note that

$$\begin{aligned}\frac{\partial p(b_u, b_e, \tau)}{\partial b_e} &= H'(\Delta) \frac{\partial V_1(a_1)}{\partial b_e} \\ &= H'(\Delta) \sum_{t=1}^{T_B} (1 - S_t) u'(c_{e,t}).\end{aligned}\tag{C.36}$$

These two equations imply that

$$\begin{aligned}\frac{\partial p(b_u, b_e, \tau)}{\partial b_e} &= \frac{\sum_{t=1}^{T_B} (1 - S_t) u'(c_{e,t})}{\sum_{t=1}^{T_B} S_t u'(c_{u,t})} \frac{\partial p(b_u, b_e, \tau)}{\partial b_u} \\ &= \frac{T_B - D_B}{D_B} \frac{\sum_{t=1}^{T_B} \frac{1 - S_t}{T_B - D_B} u'(c_{e,t})}{\sum_{t=1}^{T_B} \frac{S_t}{D_B} u'(c_{u,t})} \frac{\partial p(b_u, b_e, \tau)}{\partial b_u} \\ &= \frac{1}{\phi_B} \frac{\mu_B}{\mu_B^u} \frac{\partial p(b_u, b_e, \tau)}{\partial b_u}\end{aligned}\tag{C.37}$$

where $\phi_B = \frac{D_B}{T_B - D_B}$ is the compensated unemployment-to-employment ratio, μ_B is the average marginal utility of reemployed workers over $t = 1, \dots, T_B$, and μ_B^u is the average marginal utility of unemployed workers over $t = 1, \dots, T_B$. As in the bound for the response of unemployment duration in the main text, the relative marginal utility adjusts for how an extra dollar is valued differently in employment versus unemployment. The compensated unemployment-to-employment ratio ϕ_B appears here because the extent to which an additional per-period dollar of UI benefits or reemployment bonuses improves the initial expected value depends on the expected number of periods during which a worker receives each type of benefit.

Evaluating the adjusted welfare formula. Evaluating the fiscal externality induced by the take-up response Ω at $b_e = 0$, I obtain

$$\begin{aligned}\Omega &= \frac{1}{T - \bar{D}} \frac{\partial p}{\partial b_e} \{D_B b_u + (D - D^N) \tau\} \\ &= \frac{1}{T - \bar{D}} \frac{1}{\phi_B} \frac{\mu_B}{\mu_B^u} \frac{\partial p}{\partial b_u} b_u \left\{ D_B + (D - D^N) \frac{\tau}{b_u} \right\} \\ &= \frac{1}{T - \bar{D}} \frac{1}{\phi_B} \frac{\mu_B}{\mu_B^u} \frac{\partial p}{\partial \log b_u} \left\{ D_B + (D - D^N) \frac{p D_B}{T - \bar{D}} \right\},\end{aligned}\tag{C.38}$$

where the last line uses the budget constraint at $b_e = 0$, which implies $\tau/b_u = p D_B / (T - \bar{D})$. For expositional purposes, I introduce a variable λ such that $D^N = \lambda D$ where λ denotes the unemployment duration of non-takers relative to takers. In addition, I denote the take-up semi-elasticity by $\kappa_{p, b_u} = \frac{\partial p}{\partial \log b_u}$. Then, I obtain

$$\Omega = \frac{\bar{\phi}}{\phi_B} \cdot \frac{D_B}{\bar{D}} \cdot \frac{\mu_B}{\mu_B^u} \cdot \kappa_{p, b_u} \cdot \left[1 + \bar{\phi} \frac{(1 - \lambda)p}{p + (1 - p)\lambda} \right],\tag{C.39}$$

where $\bar{\phi} = \frac{\bar{D}}{T - \bar{D}}$ is the unemployment-to-employment ratio among all workers.

Finally, I use the lower bound for Ψ in the main text and obtain

$$\begin{aligned} \frac{\partial \mathcal{W}}{\partial b_e} \frac{\partial \bar{V}_1}{\partial w_t} \geq p \cdot \underbrace{\bar{\phi} \cdot \frac{D_B}{\bar{D}} \cdot \left[\frac{1}{\phi_B} \cdot \frac{\mu_B - \bar{\mu}}{\bar{\mu}} + \frac{u'(c_{e,\max})}{u'(c_{u,\min})} \cdot \eta_{D_B, b_u} \right]}_{\text{(Nearly) welfare impact in baseline}} \\ - \underbrace{\frac{\bar{\phi}}{\phi_B} \cdot \frac{D_B}{\bar{D}} \cdot \frac{\mu_B}{\mu_B^u} \cdot \kappa_{p, b_u} \cdot \left[1 + \bar{\phi} \frac{(1-\lambda)p}{p + (1-p)\lambda} \right]}_{\text{Fiscal externality due to take-up response}}. \end{aligned} \quad (\text{C.40})$$

I evaluate this formula by combining the reduced-form parameters from several sources. In addition to the parameters used in the baseline model, I need the take-up rate p , the relative unemployment duration of non-takers to takers λ , the marginal utility of consumption of unemployed takers μ_B^u , and the response of the take-up rate to log UI benefits κ_{p, b_u} .

I set the take-up rate to $p = 0.768$, taken from [Auray et al. \(2019\)](#), who combine data from the BLS with the methodology of [Blank and Card \(1991\)](#) to estimate the take-up rate over 1989–2012. For the unemployment duration of non-takers relative to takers λ , the extrapolation based on the UI elasticity $\eta_{D_B, b_u} = 0.34$ implies that a 100% reduction in UI benefits reduces unemployment duration by about 34%. Therefore, I set $\lambda = 1 - 0.34 = 0.66$. For the marginal utility of consumption of unemployed workers receiving UI benefits, as in Section 4, I assume a CRRA utility function and use consumption data displayed in Figure 1 of [Ganong and Noel \(2019\)](#), which shows that the consumption of unemployed UI takers hovers slightly above 0.9 relative to pre-unemployment wages. Therefore, I use $\mu_B^u = u'(0.92)$. Finally, for the response of the take-up rate to the log of UI benefits, I set $\kappa_{p, b_u} = 0.18$ based on the estimate reported by [Anderson and Meyer \(1997\)](#) in their Table V, column (3).²⁴

I also need to slightly adjust the first term of the welfare formula since it now involves $\bar{\phi}$, $\bar{D}$, and $\bar{\mu}$ that reflect non-takers. For $\bar{\phi}$ and $\bar{D}$, I make an adjustment based on the relative unemployment duration λ set above. As for $\bar{\mu}$, I use the same μ as in the baseline, since data on the consumption of non-takers are not available.

Based on this calibration, I find that the first-order welfare impact of providing reemployment bonuses equal to 10% of previous wages is equivalent to the welfare gain of permanently increasing wages by 0.059%. Although this is about 45% of the welfare gain in the baseline formula in the main text, it still yields a positive welfare gain.

C.4 Optimal Policy with the Benefit Cap Held Fixed

The optimal-policy exercise in Section 5 lets the benefit cap move proportionally with the statutory replacement rate, so that the government varies the level of the benefit schedule while holding its shape fixed. An alternative convention holds the cap at its statutory level, so that raising the statutory rate pulls additional claimants onto the cap. Table C.1 repeats the exercise under this alternative.

The two conventions deliver almost the same policy in economic terms. The optimal effective replacement rate among claimants is 18% here against 20% in the main text when only UI is chosen,

²⁴ [Anderson and Meyer \(1997\)](#) report several estimates of the response of the take-up rate across specifications and subsamples. Column (3) removes separations likely to be quits or spurious transitions and further restricts the sample to separations from firms losing at least five percent of employment and at least five employees. I choose it because separations of this kind are closest to the involuntary job loss that makes a worker eligible in the model. The estimate also falls near the middle of their reported range.

Table C.1: Optimal UI Policy with the Benefit Cap Held Fixed

	(1)	(2)	(3)	(4)
		Optimal		
	Baseline	UI	RB	Joint
<i>Policy Parameters:</i>				
UI replacement rate ϕ_u	0.50	0.18	0.50	0.21
Reemployment bonus ϕ_e	0.00	0.00	0.19	0.13
Potential benefit duration (months)	6	6	6	6
<i>Outcomes:</i>				
Effective replacement rate	0.44	0.18	0.44	0.21
Welfare gain (%)	0.00	0.11	0.06	0.13
Unemployment duration (months)	3.21	2.99	3.00	2.89
Average consumption	1.14	1.15	1.14	1.15

Note: This table repeats Table 5 holding the benefit cap $\bar{b}$ at its statutory level rather than scaling it with the statutory replacement rate. Welfare gains are consumption-equivalent changes for a newborn relative to the baseline economy.

and 21% here against 22% when UI and bonuses are chosen jointly, with the joint optimum more generous than the UI-only optimum in both cases. The optimal stand-alone bonus is identical across the conventions, and the welfare gains agree to within about 0.01 percentage points in every column. The conventions differ in how the optimum is expressed rather than in what it achieves. With the cap fixed, the optimum happens to lie where the cap is slack, and the statutory and effective replacement rates therefore coincide. Once most claimants are capped, however, raising the statutory rate further leaves the allocation nearly unchanged, and under a fixed cap the statutory rate is therefore only weakly identified at high replacement rates. This is the reason the main text adopts the proportional convention.

C.5 Welfare under the Stationary Population Distribution

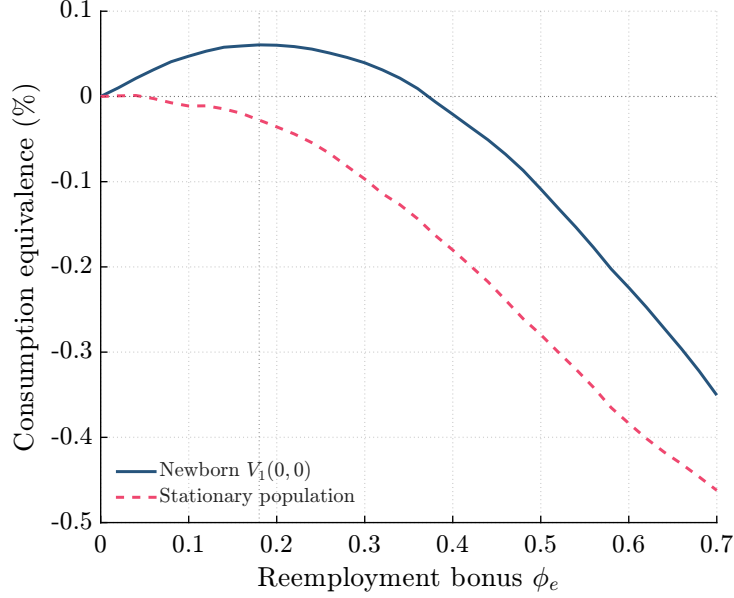
The welfare criterion in the main text is the value of a newborn, $V_1^N(0)$. Another commonly used criterion is to average welfare over a stationary distribution, evaluating each policy under the distribution that the policy generates. This appendix implements that alternative and shows why the two criteria differ.

The model in Section 5.1 does not have a stationary distribution of workers over individual states. The model is finite-horizon, and the transition operator over individual states $s = (a, w, k, \text{employment})$ depends on age and terminates at T . The distribution Γ_t of individual states therefore never settles, and no fixed point exists to integrate over. Every worker enters at $t = 1$ in the same state, which makes Γ_1 a point mass rather than a distribution.

Nevertheless, the stationary object exists once the model is embedded in a population of overlapping cohorts. Let a cohort of measure $1/T$ enter each period and live for T periods. The population distribution over the extended state (t, s) ,

$$\Gamma^{\text{pop}}(t, s) = \frac{1}{T} \Gamma_t(s), \quad t = 1, \dots, T, \quad (\text{C.41})$$

Figure C.1: Welfare Impact under Alternative Welfare Criteria



Note: Each line shows the consumption-equivalent welfare change relative to the corresponding economy without bonuses, as a function of the reemployment bonus ϕ_e . The solid line is the value of a newborn, as in Figure 2. The dashed line averages value functions over the stationary distribution of the population in equation (C.41), computed by exact forward iteration, with the payroll tax balancing the population's budget period by period. The vertical dotted line marks the optimal bonus under the newborn criterion.

is a fixed point of the population transition operator, under which age increases by one period and workers who reach T are replaced by entrants. It is invariant in calendar time and is the steady state of the corresponding overlapping-generations economy. The uniform mixture over ages in equation (C.41) is thus the object that a stationary criterion should average over, and I refer to it throughout as the stationary population distribution to distinguish it from a distribution over individual states alone.

The stationary population also carries its own budget constraint. The constraint in the main text balances in present value over a single cohort's working life, which is period-by-period balance in a population growing at rate r . In the stationary population of equation (C.41), every age is instead present in equal number, and the government's net spending gets balanced period by period when the undiscounted average of net spending over ages is zero. I therefore re-solve the payroll tax under that constraint for every policy, and the criterion and the budget then describe the same economy.

Figure C.1 reports the two criteria. The newborn criterion is largest at a bonus of 19% of the wage and turns negative above roughly 37%. The stationary population criterion never rises above zero, and declines essentially monotonically from the start. A planner using the population criterion would adopt no reemployment bonus, and the two criteria therefore disagree about whether the case for bonuses survives at all, not merely about its size.

Two things change between the criteria as Figure C.1 draws them, the age weights and the government budget, and Table C.2 separates them. Within each column the budget is held fixed, and the two rows then evaluate the same economy and differ only in the weights. With the budget held fixed, the weights alone flip the sign. At the newborn-optimal bonus the newborn value rises

Table C.2: Welfare Criterion and Fiscal Constraint

Budget:	Bonus of 19% (newborn optimum)		Bonus of 70%	
	Cohort	Population	Cohort	Population
Newborn value $V_1^N(0)$	+0.06	+0.09	-0.35	-0.17
Population average of V	-0.06	-0.03	-0.64	-0.46

Note: Consumption-equivalent welfare gains (%) relative to the economy without bonuses. The cohort budget balances in present value over a cohort's working life, as in the main text. The population budget balances period by period for the stationary population of equation (C.41), with the payroll tax re-solved for each policy. Within a column the two criteria evaluate the same economy and differ only in the age weights of equation (C.43).

by 0.06% while the population average falls by 0.06% under the cohort budget of the main text, and the same pattern holds under the population budget. With the criterion held fixed, the choice of budget moves the level but never the sign. The disagreement is therefore a disagreement about the weights.

The gap between the criteria is mainly a difference in how flow utility at different ages is weighted, and the difference can be written down in closed form. Write the population average of value functions as

$$\mathcal{V} = \frac{1}{T} \sum_{t=1}^T \int V_t(s) d\Gamma_t(s), \quad (\text{C.42})$$

and let $v_j = u(c_j) - \psi(e_j) - \varepsilon_j$ denote flow utility as in equation (40), including the expected filing cost paid at take-up decisions, with $\mathbb{E}[v_j] = \int v_j(s) d\Gamma_j(s)$. Substituting $V_t(s) = \mathbb{E}[\sum_{j=t}^T \beta^{j-t} v_j \mid s]$ and exchanging the order of summation gives

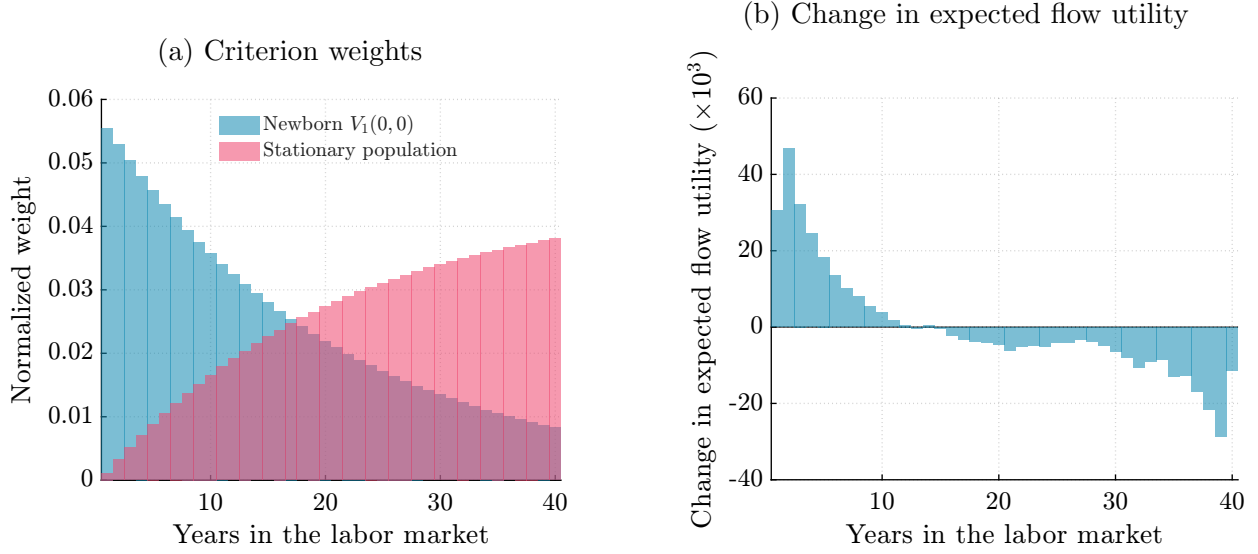
$$\mathcal{V} = \frac{1}{T} \sum_{j=1}^T \frac{1 - \beta^j}{1 - \beta} \mathbb{E}[v_j], \quad \text{and} \quad V_1^N(0) = \sum_{j=1}^T \beta^{j-1} \mathbb{E}[v_j]. \quad (\text{C.43})$$

The two criteria are weighted sums of the same $\mathbb{E}[v_j]$. Every effect of the policy, including its effect on the distribution of states at each age, is already contained in those flow utilities. What differs is the weight, and the two profiles run in opposite directions. At the monthly discount factor used here, the newborn weight falls from 1.00 at entry to 0.14 at the end of the working life, while the weight in the population average rises from 1.00 to about 211. Panel (a) of Figure C.2 displays the two profiles, aggregated to years and normalized to sum to one over the working life. The newborn criterion concentrates its weight in the early part of the working life, whereas the population average concentrates it toward the end.

The rising profile comes from the construction of the average. In a stationary population the same life is present at every stage through which it passes, and flow utility at age j therefore enters the value function of every worker younger than j . The population average remains a well-defined object, namely the expected remaining lifetime utility of a worker drawn at random from the living population, but it is not a utilitarian sum over lives.

The reweighting reverses the sign of the welfare impact because the reform's flow effects have a steep age profile. Panel (b) of Figure C.2 shows that, at the optimal bonus, the change in expected flow utility $\mathbb{E}[v_j]$ relative to the no-bonus economy is positive over roughly the first dozen years of the working life and negative thereafter, and increasingly so toward the end. Two features of

Figure C.2: Age Weights and the Reform's Flow Effects



Note: In panel (a), each bar is the weight that a criterion places on average flow utility received in a given year of the working life, from equation (C.43) aggregated to years and normalized so that the bars sum to one. The newborn criterion weights month j by β^{j-1} , and the stationary population average weights it by $(1 - \beta^j)/(1 - \beta)$. Panel (b) shows the change in expected flow utility $\mathbb{E}[v]$ by year of the working life when the optimal bonus is introduced, relative to the no-bonus economy, with each economy at its budget-balancing tax.

the model produce this profile. The first is financing. The payroll tax is proportional to earnings, and earnings rise over the life cycle as workers are selected into high-wage, stable matches, whereas benefit and bonus receipts are roughly flat across ages. The reform's net fiscal flow to a worker, the benefits and bonuses received minus the additional taxes paid, where the tax is already net of the UI spending that the bonus saves, is therefore positive over the first several years of the working life and negative from then on. The second is insurance and saving. The utility gain from the bonus is concentrated at entry, when workers are unemployed with no wealth and marginal utility is at its highest, and the improved public insurance weakens the precautionary motive, leaving workers with less wealth and lower consumption late in the working life. The newborn criterion discounts the late-life losses and gives full weight to the early insurance gains. The population average weights the losses up to two hundred times as heavily as the gains, and the sign reverses.

The small fluctuations in the middle of the profile in panel (b) are numerical. Search effort responds to the value gap between employment and unemployment, that gap moves node by node on the discrete wage-offer grid, and the nodes do not switch at the same ages in the two economies. Refining the offer grid shrinks the fluctuations and leaves the shape of the profile unchanged. The peak in the second year reflects the timing of eligibility. Entrants are ineligible, and the first-year gain is only the consumption and search-effort relaxation that the improved insurance allows, before any benefits or bonuses flow. The first separations and the first eligibility decisions arrive toward the end of the first year and into the second, and the gain peaks when the first group of eligible unemployed workers begins to collect benefits and reemployment bonuses, at ages when wealth is still low and marginal utility is high. The additional filing costs and search effort that the bonus induces arrive at the same time but are outweighed by the receipts, and the profile then declines

Table C.3: Jointly Optimal Policy at Each Potential Benefit Duration

T_B (months)	ϕ_u	ϕ_e	Effective repl.	Welfare gain (%)
1	0.86	0.38	0.76	0.132
2	0.62	0.39	0.55	0.141
3	0.42	0.26	0.38	0.141
4	0.34	0.19	0.30	0.140
5	0.29	0.15	0.26	0.139
6	0.25	0.12	0.22	0.137
7	0.23	0.10	0.20	0.135
8	0.21	0.08	0.19	0.133

Note: For each potential benefit duration T_B , the table reports the welfare-maximizing pair (ϕ_u, ϕ_e) with the benefit cap scaled proportionally, the effective replacement rate among claimants, and the consumption-equivalent welfare gain for a newborn relative to the baseline economy. The welfare column keeps three decimals to display the flatness of the profile.

for the reasons above.

I close this section by summarizing the main points about the disagreement between the criteria. Reemployment bonuses are valuable as insurance against risks that are concentrated at the start of the working life, and the two criteria value that insurance at different points in the life cycle. For a worker who has yet to enter the labor market, with every spell still ahead and each life counted once, the policy raises welfare. The insurance arrives when wealth has yet to accumulate, and the fiscal externality of faster reemployment returns part of the cost through a lower tax. For the workers already in the labor market, the largest of those risks have already passed while the net financing falls on their rising earnings, and the policy does not raise their welfare. The fiscal externality itself enters both criteria, since each economy is evaluated at its own budget-balancing tax. The criteria disagree only about when the insurance and the net burden arrive in a life, and about how heavily each age counts. The stationary population average states this for the long run, and the interim incidence in Section 5.5 points the same way for the population in place when the reform arrives: just over a third of the current population loses, and the average gain across it is near zero. Which criterion to adopt is therefore a question of whose welfare the government aims to maximize, and the main text answers it with the entrant, for whom UI is insurance against risks that have not yet occurred.

C.6 The Potential Benefit Duration

Table C.3 reports, for each potential benefit duration from one to eight months, the jointly optimal replacement rate and bonus and the associated welfare gain, under the proportional-cap convention of the main text. Welfare is flat: between two and eight months the highest gain varies by less than a hundredth of a percentage point of consumption, and only the one-month duration is clearly lower. Along the flat range, a shorter duration is compensated by a more generous benefit and a larger bonus. The welfare criterion therefore identifies the potential benefit duration only weakly, and Section 5.7 reports the trade-off along the flat range rather than an optimal duration.

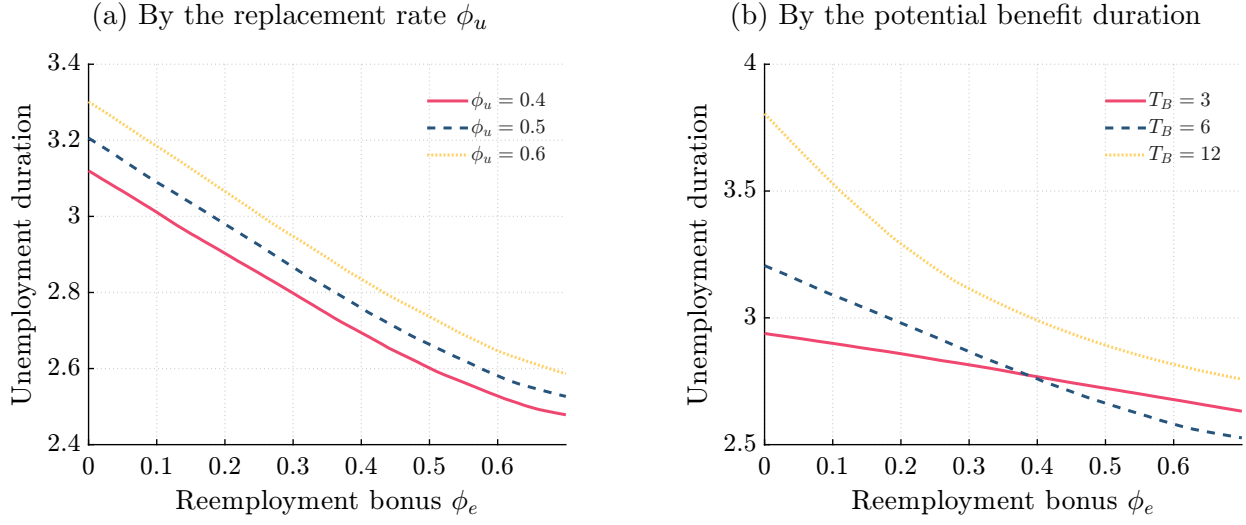
D Additional Figures and Tables

Table D.1: Distribution of the Welfare Gains across Workers

	Mean gain (%)	Share losing (%)
All workers	0.03	36.9
Employed	0.01	40.7
Unemployed, eligible	0.42	0.8
Unemployed, ineligible	0.05	6.7
Employed, bottom wage quintile	0.10	4.7
Employed, top wage quintile	-0.10	99.1

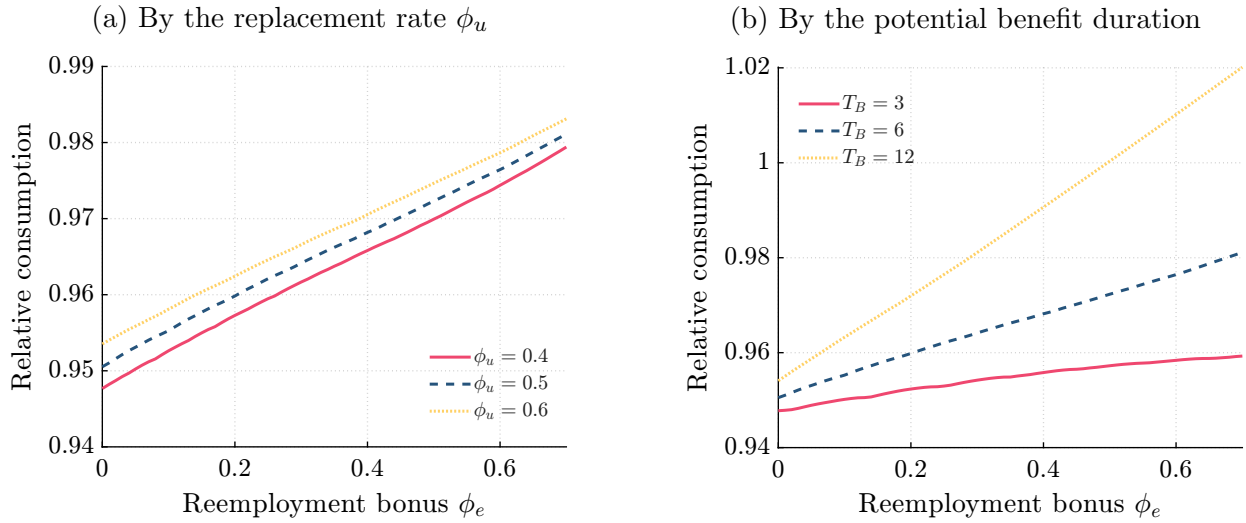
Note: This table reports the incidence of introducing the optimal reemployment bonus on the current population, from the same full-working-life sample as Figure 3. Each worker is evaluated at the state that worker occupies in the baseline cross-section, and the welfare impact is $\pi_t(s)$ of equation (41). “Share losing” is the fraction of the group whose gain is negative. Wage quintiles are computed among the employed. The entries are interim incidence numbers evaluated at workers’ baseline states; they are distinct from the long-run stationary-population criterion of Appendix C.5.

Figure D.1: Unemployment Duration across Policy Experiments



Note: This figure shows average unemployment duration in months as a function of the reemployment bonus for the policy experiments of Section 5.6. In panel (a), each line corresponds to a different statutory replacement rate, scaling the statutory rate and the benefit cap together. In panel (b), each line corresponds to a different potential benefit duration.

Figure D.2: Consumption of the Newly Reemployed Relative to All Employed



Note: This figure shows the ratio of the average consumption of newly reemployed workers receiving bonuses to the average consumption of all employed workers, as a function of the reemployment bonus, for the policy experiments of Section 5.6.