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UI Generosity and Job Acceptance: Effects of the 2020 CARES Act

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Abstract

We assess labor market effects of the CARES Act $600 UI supplement. We start with direct empirical analyses of labor force transitions using monthly CPS data and imputed UI benefits. The results show moderate disincentive effects of the supplement on job finding. We rationalize this result in a dynamic model of job acceptance decisions that yields a reservation level of UI benefits at which a recipient is indifferent between unemployment and employment at their prior wage. Calculations based on the model confirm that only a small fraction of recipients of the enhanced UI benefits were likely to reject job offers.

JEL Classification: J64, J65.

Keywords: Unemployment, unemployment insurance, job acceptance, COVID-19, CARES Act.

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1 Introduction

The Coronavirus Aid, Relief, and Economic Security (CARES) Act, through the Pandemic Unemployment Compensation (PUC) provision, provided an additional $600 per week to supplement regular unemployment insurance (UI) benefits. The supplement was available during the initial outbreak of COVID-19 from late March though the end of July 2020. This historically unprecedented increase in the level of UI benefit payments meant that most UI recipients received more weekly income via UI payments than they earned on their prior jobs–i.e., their UI replacement rates exceeded 100% (Ganong, Noel and Vavra 2020). The enhanced benefits prompted concerns that the labor market recovery from the pandemic would be delayed as many UI recipients rejected offers to return to work, reflecting the standard moral hazard effect of UI benefits on job search (Feldstein 1976, Baily 1978, Chetty 2008).

We assess the disincentive effects of expanded pandemic-era UI benefits on job search and acceptance via two complementary approaches: (i) empirical analyses of observed labor force transitions; (ii) quantitative assessment of a dynamic model of the job acceptance decision. Despite the large increase in benefits, results from both approaches suggest only moderate disincentive effects of the $600 weekly UI supplement on job search and acceptance decisions.

We first conduct direct empirical analyses of labor force transitions using monthly data from the Bureau of Labor Statistics' (BLS) Current Population Survey (CPS) combined with imputed UI benefits. Our direct empirical tests are based on a difference-in-differences regression framework. We use it to assess whether the change in job-finding rates and other labor market transitions between the pre-CARES and CARES periods is larger for individuals who have higher UI replacement rates as a result of the supplemental payments. Our value added relative to prior analyses of the potential disincentive effects of the CARES Act supplemental payments arises from two specific features of our analyses: (i) we exploit individual variation in UI replacement rates rather than geographic or solely temporal variation; (ii) we directly assess the individual labor market transitions, in particular job-finding rates (exits from unemployment to employment), that may be affected by the moral hazard effect of UI benefit generosity.

Our regression analyses rely on labor market transition data formed using data on individuals matched across consecutive monthly CPS files. We use data for early- to mid-2020 only, to focus on the impact of the extra $600/week of UI payments specified by the CARES Act. We estimate UI replacement rates for individuals in our sample by applying the calculator developed by Ganong, Noel and Vavra (2020) to annual earnings data from the CPS Annual Social and Economic Supplement (ASEC).

Our results show moderate disincentive effects on job finding from this very large increase in UI replacement rates: for the typical UI recipient, our estimates imply a 22% reduction in job-finding rates due to the $600/week supplement. As we discuss in more detail in Section 2.3.3, the resulting estimated elasticities of search duration with respect to UI replacement rates are toward the low end of the range based on earlier research using U.S. data (Schmieder and von Wachter 2016).

Our results are broadly comparable to the findings from a recent paper that examines the effects of the pandemic-period expansions using administrative micro-data from a financial services company (Coombs et al. 2022). By contrast, some other recent studies found little or no effect of the pandemic UI enhancements on labor market outcomes. Ganong et al. (2022) used administrative micro-data from a different financial services source than Coombs et al. (2022) and found only a very small impact of the increased benefit generosity on job-finding rates. Altonji et al. (2020), Bartik et al. (2020), and Finamor and Scott (2021) found that states with more generous UI systems did not experience weaker labor market rebounds during the initial phase of economic recovery from the pandemic. As we discuss in Section 2.3.3, it is likely that our larger estimates of the UI benefit effects on job search arise because we are focused on search responses at the individual level, commonly referred to as micro effects. By contrast, the studies that find smaller effects likely combine micro responses with offsetting macro effects on aggregate outcomes. The latter include the aggregate stimulus effects of UI payments, which help sustain labor demand and hence may offset the job search disincentives for individual UI recipients (Boone et al. 2021, Kekre 2021).

To complement and reinforce the regression estimates, our second approach relies on the development of a dynamic model of job acceptance decisions. We use this model to derive the level of benefits necessary for workers to be indifferent between accepting a job offer at their previous wage and rejecting it to remain unemployed, taking into account the remaining number of weeks of unemployment benefits available to them. We call this the *reservation benefit*: a job offer at the previous wage is accepted if the current level of benefits is below this level. For a given job offer, the level of the reservation benefit is determined by: (i) the expected duration of the employment spell for an accepted job – longer lasting jobs have a greater value and are rejected only for commensurately more generous unemployment insurance payments; (ii) the rate of arrival of new job offers – in a depressed labor market, when job offers are few and far between, any job offer is costly to refuse, raising the reservation benefit amount, and; (iii) the duration of benefits remaining – an additional week of benefits raises the opportunity cost of accepting an offer and lowers the reservation benefit level. In the limit of unbounded UI duration the reservation benefit converges to the prior wage. Conversely, with one week remaining of UI payments, the reservation benefit is always above the prior wage, implying that many UI recipients will accept a job even if their benefits exceed the offered wage.

We apply the reservation benefit concept to the period covered by the provisions in the CARES Act, including the extension of benefit payments for up to 52 weeks with the Pandemic Emergency Unemployment Compensation (PEUC) and state emergency extensions. We use data from the CPS and the Ganong, Noel and Vavra (2020) calculator to impute reservation benefit levels for workers in different skill (education) groups, in different occupations, and across U.S. states. Our quantitative analysis suggests that only a small fraction of UI recipients, in a narrow set of groups, would refuse an offer to return to work at their previous pay. As an example, a typical high school educated worker, with $800 in weekly earnings and UI replacement rates near 125% in early May 2020, would not have been deterred from accepting a job offer. In fact, our calculations suggest the PUC payment would need to increase by an additional $250 per week before such individuals would consider rejecting the job offer. More broadly, as of the first week of June 2020, with 8 weeks of supplementary UI payments remaining, only workers in the lowest paid occupation representing approximately 15 percent of the unemployed in that month (food services, with typical earnings of $460 per week) would be roughly indifferent between accepting a job offer at their previous wage and remaining unemployed. These findings imply that the value of a sustained job, especially in a depressed labor market, significantly outweighs the value of the temporary additional UI income.

Our findings are broadly consistent with prior research on the effects of UI enhancements during past recessions. Most notably, our finding of limited disincentive effects of enhanced UI generosity during the pandemic recession is consistent with other work that finds substantial cyclicality in such effects, with little to no impact when labor market conditions are weak (Kroft and Notowidigdo, 2016). Similarly, analyses of the impact of the historically large increase in potential UI benefit duration during the Great Recession found negligible effects on unemployment exit rates, with the main impact instead being an increase in labor force attachment. (Rothstein 2011, Farber and Valletta 2015, Chodorow-Reich, Coglianese and Karabarbounis 2019).[1]

The framework used to derive the reservation benefit statistic is similar to Mortensen (1977) in incorporating the realistic feature of UI benefits that are limited in duration. It is also broadly related to the concept of the after-tax reservation wage in Shimer and Werning (2007), which represents the take home pay required to make a worker indifferent between working and remaining unemployed.[2] Finally, Boar and Mongey (2020) derive a quantitative framework along similar lines to our reservation benefits analysis and also find a likely limited impact of temporarily increased UI payments on job acceptance decisions during the pandemic.[3] Our analysis does not address the optimality or welfare effects of the supplemental income under the CARES act. This is the focus of Mitman and Rabinovich (2021), who argue the $600 supplemental income approximated an optimal UI benefit given the large and transitory nature of the COVID-19 shock to the labor market.

The rest of this paper is organized as follows. Section 2 describes the empirical design and provides the results from regression analyses of labor market transitions using matched monthly CPS data. Section 3 describes the decision problem and derives a reservation benefit as a function of the state of the labor market, the wage offer, and the number of weeks of UI payments remaining.

[1] See Moffitt (1985) for an early empirical study of the effect of UI benefits on unemployment durations. Lalive, Landais and Zweimüller (2015) use Austrian data and find that search disincentive effects of UI benefit extensions are offset somewhat by improved search outcomes for individuals who are not eligible for the extensions. A related question not addressed here is the impact of UI provisions on the joint behavior of workers and firms, and in particular on the duration of employment spells (see, for instance, Feldstein 1976 and Baker and Rea 1998).

[2] Berg (1990) extends Mortensen's analysis to a non-stationary environment to study the dynamic evolution of a worker's reservation wage as economic conditions evolve (exogenously). Contrary to Mortensen's revervation wage our reservation benefit and the reservation wage inShimer and Werning (2007) are not choice variables affecting the arrival rate of job offers.

[3] Marinescu and Skandalis (2021), using French administrative data, find evidence of declining reservation wages (measured as a desired target wage) as exhaustion of UI benefit payments nears.

Section 3.2 adapts the reservation benefit statistic to the details of the CARES Act and uses CPS data to calculate benefit amounts for different categories of workers. Section 4 concludes.

2 CARES Act UI expansion and labor market transitions

We begin with a direct empirical assessment of the effects of the increase in UI benefit payments during the pandemic on job-finding rates and other labor market flows. We rely on a before/after regression framework to assess whether the change in job-finding rates and other labor market transitions between the pre-CARES and CARES periods is larger for individuals who receive the largest UI replacement rates due to the supplemental payments. As described in Section 1, our value added relative to prior analyses of the pandemic UI supplements arises from our reliance on individual variation in UI replacement rates and direct measurement of job-finding rates.[4]

Our regression analyses rely on labor market transition data formed using data on individuals matched across consecutive monthly CPS files. We use data for early- to mid-2020 only, to focus on the impact of the extra $600/week of UI payments specified by the CARES Act and available from late March through the end of July. We combine the monthly CPS data with estimated UI replacement rates formed using the calculator developed by Ganong, Noel and Vavra (2020). Our specific calculations rely on annual earnings data from the CPSASEC for the individuals observed in our matched monthly CPS data. We discuss these steps in detail in the next two sub-sections, including a discussion of the distribution of replacement rates in our sample.

2.1 Matched CPS data on labor market flows

We use matched monthly data on individual labor force participants from the CPS (age 16 and over).[5] Because our empirical strategy requires linking monthly CPS files to annual earnings data from the CPS ASEC (see the next sub-section), our matched observations are limited to the months of February through July of 2020. This timeframe is narrow but enables us to focus on the period when the $600 supplement was in place (and the preceding two months of 2020, which are used as a pre-treatment comparison period).[6]

[4]By comparison, Bartik et al. (2020) rely on state-level variation in median replacement rates and employment/hours, and Altonji et al. (2020) and Finamor and Scott (2021) examine labor market status but not flows between labor market states. These papers reported little or no disincentive effects of the enhanced UI payment generosity on employment status. In research conducted in parallel with ours, Coombs et al. (2022) and Ganong et al. (2022) used administrative data from financial services companies and found effects of the CARES Act UI benefit increases on job finding that are similar to or smaller than our estimates. We discuss the comparison of our results to these studies in more detail in Section 2.3.3). In addition, Marinescu, Skandalis and Zhao (2021) examined job applications in local labor markets during the pandemic and found moderate reductions in application rates in areas with greater increases in UI benefit amounts.

[5]See Valletta (2014) for more details on construction of a similar sample for an earlier timeframe (in particular, Table 2 and the associated discussion in that paper). We exclude individuals who identify as serving in the armed forces.

[6]The ASEC is administered primarily in March, although some CPS respondents receive the supplement in other months. With the 4-month rotation in the monthly CPS, this enables us to use observations with ASEC information for the months of January through July of 2020.

Due to the rotating sampling scheme used for the CPS, surveyed households and individuals are in the sample for two separate periods of 4 consecutive months (with an intervening 8-month period spent out of the sample). This enables consecutive month-to-month matching for about 70% of the sample.[7] The monthly match is based on household identifiers, which we validate by ensuring that the reported data on age, education, race, and gender do not conflict across matched observations. We identify labor market transitions by comparing an individual's labor force status in consecutive months. We focus primarily on transitions out of unemployment (U), to employment (E) or out of the labor force (N), denoting them as UE and UN transitions respectively. Given relaxed job search requirements under the CARES Act UI expansions, the behavior of individuals not actively searching for work may have been affected by the UI supplements. We therefore also examine transitions from out of the labor force to employment (NE).

A well-known concern regarding matched CPS data is the likelihood of spurious transitions in labor force status arising from inconsistent or error-ridden survey responses rather than meaningful changes (Abowd and Zellner 1985, Poterba and Summers 1986, 1995). Such spurious transitions could impart a downward bias to the estimated effects of UI payments on labor force transitions and reduce the precision of the estimates. We therefore follow past research by adjusting the data to minimize the incidence of spurious transitions (Rothstein 2011, Valletta 2014, Farber and Valletta 2015, Farber, Rothstein and Valletta 2015). In particular, for individuals identified as leaving unemployment one month, either through job finding or labor force exit, and then returning to unemployment the next month, we recode their records to show no transition (and retain the newly created observations). We refer to these as "two-month matches," although the resulting transitions are still measured on a consecutive monthly basis. This adjustment requires restriction of the final analysis sample to individuals who are observed to be in their first or second month of a consecutive four-month span in the sample, thereby reducing the matched sample count by approximately one-third and eliminating July 2020 observations from our analyses.[8]

The results for unemployment exits reported in subsequent sections generally are based on these adjusted transitions, although we also provide some comparison to specifications that do not make this adjustment. We do not apply this adjustment to our analysis of transitions from out of labor force to employed (NE), because the measurement distortion generally applies to transitions in and out of unemployment. As we will see in the results below, the adjustment for unemployment exits makes a substantial difference for the key results. This likely reflects the turbulence in labor market transitions and measurement during the time period used for our estimates, which corresponds to the early phase of the pandemic. Adjusting for short-term or spurious transitions is especially important in such circumstances.

[7] Most of the non-matched observations are from the "outgoing rotation groups" that are exiting the sample for eight months or permanently (one quarter of each monthly sample). In addition, a modest fraction of observations is lost because respondent households that move to different geographic locations are not followed.

[8] The adjustment reduces the monthly incidence of transitions out of unemployment by about 5 percentage points on average (Valletta 2014).

2.2 UI replacement rates from CPS ASEC data

Our analysis relies on UI replacement rates calculated at the individual level, defined as the ratio of weekly UI payments to weekly earnings prior to the job loss that resulted in the UI claim. As discussed in Ganong, Noel and Vavra (2020), median UI replacement rates across all eligible workers typically are slightly below 0.5 in the United States (50% of prior earnings), absent benefit supplements. They estimated that the $600 CARES Act UI supplement raised the typical replacement rate substantially, to a median value of 1.34, implying that the majority of UI recipients were eligible for UI payments that exceeded their prior weekly earnings. As part of their research, Ganong et al. constructed a calculator for replacement rates based on individuals' recent prior earnings history, which they have made publicly available.[9]

We use the Ganong et al. calculator to form estimated UI replacement rates for the individuals in our data. Precise measurement requires individual employment and earnings data from prior quarters. We therefore restrict our matched monthly CPS sample to individuals who are included in the 2020 CPS ASEC sample. As noted above, this limits the sample to the months of January through July 2020. The ASEC includes information on weeks worked, hours, and earnings in the prior calendar year (2019 in this case, which largely contains the qualifying earnings period for potential UI recipients in our sample from early 2020).[10] Because no information is provided on the timing of employment and earnings across the four quarters of the year, we spread them out evenly across all four quarters for the purposes of applying the UI benefits calculator.[11]

One notable feature of the distribution of UI replacement rates is that because normal UI payments generally are determined as a fraction of prior earnings, the uniform $600 supplement increased replacement rates more for individuals with low versus high prior earnings. To illustrate this, we divided our sample of unemployed individuals during the months when the $600 supplement was available (April-July) into quintiles based on weekly earnings. The median replacement rate ranged from about 2.5 in the lowest quintile down to about 0.6 in the highest quintile. This will also be reflected in the distribution of replacement rates across industries and occupations, given variation in typical skill levels and hence earnings across sectors.

This variation in UI replacement rates due to the $600 supplement raises potential concern about the identifying information that we use to estimate their effects on job-search behavior. In particular, job losses early in the pandemic were heavily weighted toward low-wage sectors and workers, notably individuals in high-contact services jobs concentrated in the retail, leisure and hospitality, and personal services sectors. Activity in these sectors remained disrupted well into the pandemic, curtailing job prospects for individuals laid off from these sectors. This correspondence between UI replacement rates and sectoral disruptions during the early pandemic period

[9] https://github.com/PSLmodels/ui_calculator

[10] Ganong et al. used pre-pandemic labor market data and 2018 as their base earnings year. Our use of observations on actual unemployed individuals in early 2020 combined with their 2019 earnings should yield relatively accurate measurement of UI replacement rates in our sample.

[11] The rules specifying which prior earnings quarters are used to determine UI eligibility and weekly payments vary across states.

raises potential concern that our estimates of UI effects may be contaminated by sector-specific labor market conditions.

In our subsequent empirical analysis, we address this concern about possibly confounding effects from the sectoral pattern of labor market disruptions during the early pandemic period. To preview, Figure 1 illustrates the distribution of replacement rates across our complete sample of unemployed individuals and also within major industries and occupations (calculated for the months of April-July 2020, including the $600 supplement). The median replacement rate for the full sample is 1.40, slightly higher than the estimate of 1.34 from Ganong, Noel and Vavra (2020).[12] The figures show that median and mean replacement rates vary notably across industries and occupations, with higher replacement rates evident in low-wage sectors such as the leisure and hospitality industry and also for services occupations. However, replacement rates vary more within than between sectors, as reflected in standard deviation spreads within sectors that generally extend to or beyond the range of means and medians across sectors. This suggests that variation in replacement rates is not closely related to sector-specific effects of the pandemic. We explore this issue further when we present our regression results in the next section.

2.3 Regression specification and results

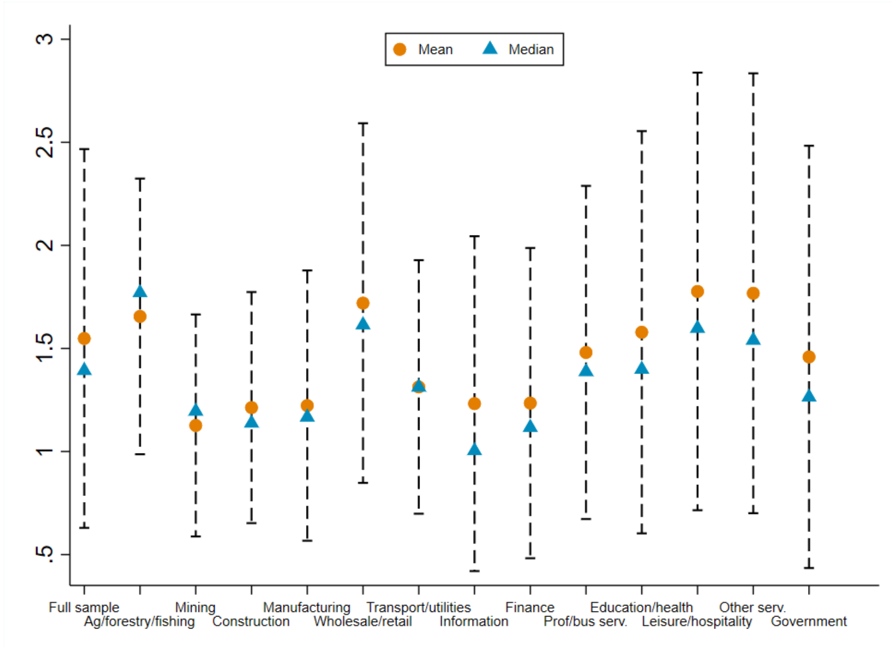
We begin our analyses with a conventional before/after regression design, essentially a differences-in-differences analysis that yields an estimate of the average treatment effect of variation in UI replacement rates. We include imputed UI replacement rates using the procedure described in the preceding section. Our specific regressions take the form:

$$Pr(Y_{it} = 1) \quad = \quad \delta R_i + (\pi \times R_i \times (Apr - July)) + \gamma_t + \phi_s + \beta X_{i,t-1} + \lambda Z_{s,t-1} \tag{1}$$

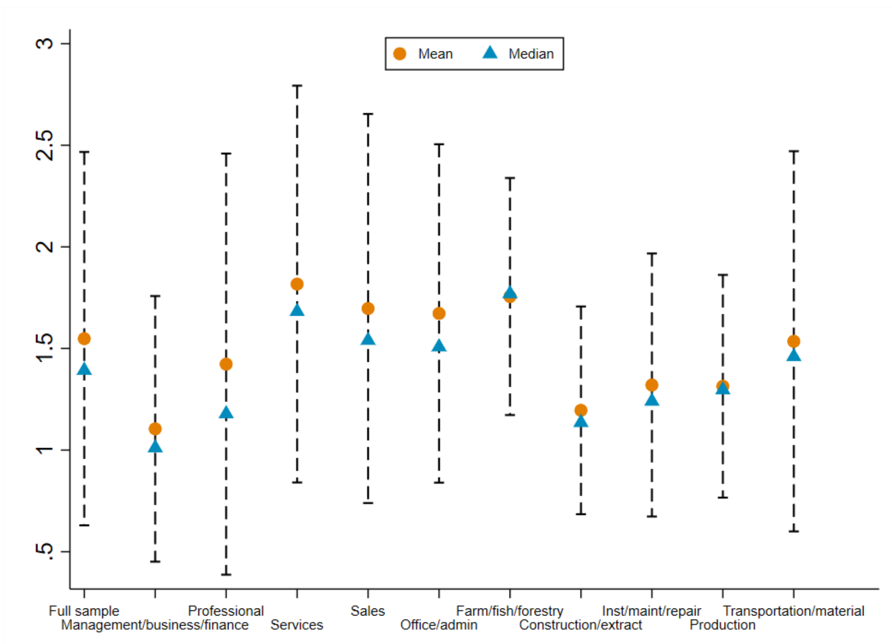
In this equation, the dependent variable Y_{it} is an indicator for whether an individual i transitions between the specified labor market states across consecutive months (observed in month t, based on status in months t and $t-1$). We focus primarily on job finding rates from unemployment (UE transitions) but also examine transitions that involve labor force exit or entry (UN and NE transitions), as discussed more below. Our preferred estimates rely on our two-month matched CPS data for the reasons described in Section 2.1, although we also examine results from the single-month matched sample. The underlying sample contains observations for transitions observed in the months of February through July of 2020, although the two-month match estimation samples end in June.

The key explanatory variables are the individual's imputed UI replacement rate (R_i) under the

[12]Our higher estimated replacement rates are as expected: Ganong, Noel and Vavra (2020) noted that replacement rates estimated from individuals unemployed during the early pandemic period are likely to exceed their estimates based on pre-pandemic data, given the tilt toward low-wage individuals among job losers during this period. Our estimates are very similar between the full sample of unemployed individuals and our restricted two-month match sample.



(a) UI replacement rate, by major industry



(b) UI replacement rate, by major occupation

Figure 1: UI replacement rates with CARES Act $600 supplement
Notes: Calculated from authors' CPS monthly-ASEC match, using the UI benefits calculator from Ganong, Noel and Vavra (2020). Vertical bars extend one standard deviation above and below the mean.

CARES Act and its interaction with an indicator for observations corresponding to the months of April through July, when the CARES Act $600 supplement was available (with estimated coefficients δ and π). The replacement rate with the $600 supplement included varies across individuals but not over time and hence is not the key source of variation in this equation. Instead, the treatment effect of the $600 CARES supplement is captured by the impact of the replacement rate after the CARES Act was implemented and the supplemental payments were available. This period began in late March 2020, between the March and April CPS reference periods. These effects are estimated by the coefficient on the interaction between the replacement rate R_i and an indicator for observations in the months of April through July (or June for the two-month matched sample). This represents a conventional before/after estimation approach with regression controls (with the months of February and March combined used as the baseline control period).

We also estimate an expanded equation that allows the effects of the CARES Act supplement to vary across the months during which it was active:

$$\begin{aligned} Pr(Y_{it} = 1) \quad = \quad & \delta_1 R_i + (\delta_2 \times R_i \times Mar) + (\pi_{1,2,3,4} \times R_i \times (Apr, May, Jun, Jul)) \\ & + \gamma_t + \phi_s + \beta X_{i,t-1} + \lambda Z_{s,t-1} \end{aligned} \tag{2}$$

In this expanded equation, we separately identify each month in the sample. This allows us to examine whether the effects of the $600 supplement varied as its expiration date at the end of July approached. The months of February and March are once again used as baseline control periods. The February control period effect is identified as the omitted category in the regression (the first term on the right-hand side), and the March control period is separately identified (via the second term on the right hand side). The effects of the UI replacement rate (R_i) for each month when the supplement was available are represented by the coefficients $\pi_{1,2,3,4}$. As above, the sample period ends in June rather than July when we use our two-month matched sample.

The regression specifications also include indicators for calendar months (γ_t) and state of residence (ϕ_s). In addition, the vector $X_{i,t-1}$ consists of individual-level controls observed in the base (pre-transition) month: age (eight categories), education (five categories), race/ethnicity (five categories), gender by marital status, broad occupation (10 categories) and industry (13 categories) of prior employment, and duration to date of the individual's unemployment spell (10 categories, with the final category indicating duration of longer than one year).[13] The model also includes several state/month labor market controls (Z_{st}): cubics in the state unemployment rate and three-month employment growth rate.

Estimation is via a logit model, with reported parameter estimates converted into average marginal effects. All estimates are weighted by the longitudinal weights that adjust the sample for the characteristics of the sequentially matched observations.[14] The analysis is restricted to individuals with non-zero estimated UI replacement rates under the CARES Act—i.e., individuals

[13]For regressions in which the initial state is out of the labor force, the unemployment duration, industry, and occupation variables are excluded.

[14]The regression results are highly robust to use of different survey weights.

Table 1: Regression results: UI replacement rates and labor force transitions, before/after design

	(1) UE (2-month match)	(2) UE (1-month match)	(3) UN (2-month match)	(4) NE (1-month match)
UI rep rate	0.050**	0.026	0.004	-0.001
	(0.022)	(0.019)	(0.016)	(0.007)
UI rep rate*CARES months	-0.072***	-0.049**	0.013	-0.013
	(0.027)	(0.021)	(0.016)	(0.010)
Observations	2860	5449	2768	7124

*** p<0.01 ** p<0.05, * p<0.1 Notes: Logit regression model results (average marginal effects, with robust standard errors in parentheses) from matched CPS micro-data, Feb.-Jul. 2020, combined with 2020 CPS ASEC data to form individual UI replacment rates (including the $600 supplement from the CARES Act). Regression controls include: age (eight categories), education (five categories), race/ethnicity (five categories), gender by marital status, broad occupation (10 categories) and industry (13 categories) of prior employment, and duration to date of the individual's unemployment spell (10 categories, with the final category indicating duration of longer than one year); state/month economic conditions (cubics in the unemployment rate and log 3-month employment growth); and complete vectors of calendar month and state dummies. The duration, occupation, and industry controls are excluded from column 4.

who are identified as eligible to receive UI payments based on their prior earnings history. This is a direct implication of our before/after design, since individuals who are not eligible to receive UI payments do not contribute any identifying variation to the estimation.

2.3.1 Main results

The results for the before/after regression specification for unemployment exits and other labor force transitions, based on equation 1 in the preceding section, are shown in Table 1 (estimated coefficients, with robust standard errors in parentheses below them).

Results from the preferred specification for unemployment exits are reported in the first column; this specification relies on the two-month match that corrects for temporary exits from unemployment. The estimated effect of the UI replacement rate measure during the combined months of April through June when the $600 supplement was available is negative and very precise in the first column, attaining significance at better than the 1% level.

The second column of Table 1 shows results from the alternative specification for job-finding rates (UE transitions), with the two-month match restriction removed: all consecutive monthly transitions are included and no correction is made for reported temporary exits from unemployment. This enables use of observed transitions through July. As expected, the prevailing labor market turbulence during our sample frame appears to introduce noise in the measurement of monthly transition rates: the estimated interaction coefficient is reduced somewhat in size, although it remains statistically significant at nearly the 1% level.

The estimated effects of UI replacement rates during the CARES Act period in columns 1 and 2 of Table 1 are economically meaningful, implying moderate disincentive effects of the enhanced UI payments on job acceptance decisions. In particular, because they are stated as average marginal effects, the interaction coefficients imply a reduction in job-finding rates ranging from 4.9 percentage points (column 2) to 7.2 percentage points (column 1) when UI replacement rates increase from 0.5 to 1.5 (for example). We discuss interpretation of these magnitudes in more detail in in Section 2.3.3 below, where we compare our estimates to findings from the existing literature on UI benefit levels and job search.[15]

One notable element of the results is that the pre-CARES (February and March) exit rates are higher for individuals with the highest UI replacement rates under the CARES Act enhancements, with a statistically significant estimate evident for this baseline effect in the first column. This higher unemployment exit rate for individuals who will later receive high UI replacement rates suggests possible violation of the conventional parallel trends assumption for the validity of difference-in-differences estimates. While we cannot reject this interpretation, we view this baseline difference as reflecting systematic unobserved differences between individuals with high and low replacement rates–e.g., it is likely that individuals with high replacement rates under the CARES Act supplement were employed prior to the pandemic in low-wage labor markets with high turnover and job-finding rates. Moreover, this baseline difference is not evident in the second column, which is based on the full set of monthly matches.

We also examined whether UI generosity affects exits from unemployment to out of labor force (UN), with the results displayed in column 3 of the table.[16] This follows earlier empirical results suggesting that UI benefits may increase labor force attachment, because active job search generally is a requirement for UI eligibility in the United States (e.g., Farber, Rothstein and Valletta 2015, Card, Chetty and Weber 2007). The results in column 3 show no meaningful effect of UI replacement rates on reported labor force exits from unemployment. This contrasts with the earlier empirical findings of enhanced labor force attachment due to extended UI durations, likely in part because the job search requirements for UI eligibility were relaxed during the initial phase of the COVID-19 pandemic in the first half of 2020. Finally, column 4 presents results for job-finding rates from out of the labor force (NE). We include this analysis because the relaxation of job-search requirements implies that the $600 supplement may have altered the job search and acceptance decisions of individuals who self-report as not actively searching and hence out of the labor force. However, the results provide no evidence that these transition rates were affected by the increase in UI generosity due to the CARES Act.

The regression results based on equation 2 in section 2.3, which allows the effects of the UI re-

[15] The disincentive effects of UI generosity on job-finding might vary depending on the duration of unemployment. Given the massive job loss early in the pandemic, the typical duration of an in-progress unemployment spell in our sample is quite short: the mean and median duration are about 8.7 and 5 weeks, and only about 10% of the sample has been unemployed for more than 6 months (27 weeks or more). This short duration distribution precludes reliable estimation of our model for individuals with prolonged spells of unemployment. Estimates with the sample divided between those above and below the mean duration suggests somewhat larger and more consistent effects for those with shorter durations.

[16] Relative to the column 2 sample, a small number of observations are lost due to exact collinearity in the column 3 regression.

Table 2: Regression results: UI replacement rates and labor force transitions, monthly effects

	(1) UE (2-month match)	(2) UE (1-month match)	(3) UN (2-month match)	(4) NE (1-month match)
UI rep rate	0.057*	0.022	0.016	0.002
	(0.033)	(0.026)	(0.015)	(0.010)
UI rep*Mar	-0.013	0.007	-0.029	-0.005
	(0.043)	(0.037)	(0.034)	(0.013)
UI rep*Apr	-0.080*	-0.025	0.003	-0.011
	(0.043)	(0.033)	(0.018)	(0.017)
UI rep*May	-0.080**	-0.046	-0.001	-0.021
	(0.038)	(0.030)	(0.017)	(0.013)
UI rep*June	-0.069	-0.064**	0.011	-0.020
	(0.046)	(0.032)	(0.028)	(0.019)
UI rep*July	–	-0.004	–	0.008
		(0.046)		(0.037)
Observations	2860	5449	2768	7124

*** p<0.01 ** p<0.05, * p<0.1 Notes: See Table 1 notes. Pre/post-CARES period replaced by individual month indicators.

placement rates to vary across months, are displayed in Table 2. In this specification, the omitted month is February, so the UI replacement rate variable and its interaction with the month indicator for March both reflect the pre-CARES baseline comparison period. The interaction effects for subsequent months represent the impact of the higher replacement rates generated by the extra \$600/week UI benefits available through the CARES Act. The table is otherwise structured identically to Table 1, with the results for our preferred two-month match specification reported in the first column.

The results show that the estimated negative effect of UI benefit generosity from column 1 of table 1 vary somewhat across the months when the \$600 supplement was available. The estimates are the same size and attain similar statistical significance for April and May, while the estimate for June is slightly smaller and much less precise. In other words, the estimated effects are largest early in the implementation period and then decline somewhat over time, although the monthly estimates are too imprecise for the differences between them to be statistically significant. Declining effects of the \$600 supplemental payments as their expiration date approaches is one implication of our model of reservation benefits discussed subsequently, in Section 3.

Figure 2 shows the time pattern of UI generosity effects on job-finding rates based on the column 1 results from Table 2, comparing exit rates for individuals at the pre- and post-CARES Act average levels of replacement rates (holding both groups characteristics at the full sample averages). A drop in relative job-finding rates for those with higher replacement rates is evident in April. In subsequent months, job-finding rates increase for both groups, but the job-finding rates for those with higher post-CARES replacement rates remain somewhat lower than for those with lower replacement rates.

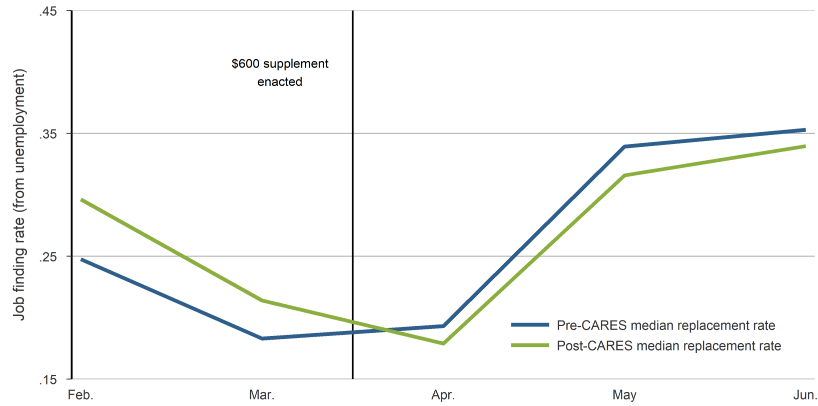


Figure 2: Job finding rates (from unemployment), by UI replacement rates (pre/post CARES Act)
Notes: Calculated from logit regression results (column 1 of Table 2).

The second column of Table 2 show results for the alternative specification for job-finding rates, similar to the same column in Table 1, with the two-month match restriction removed. As in Table 1, this reduces the magnitude and precision of the estimated coefficients. Only the June estimate is statistically significant at the conventional 5% level (despite the reduced standard errors afforded by the larger sample size compared with the first column).

Finally, results for the UN and NE transitions in columns (3) and (4) confirm no effect of UI replacement rates on these transitions during any of the months of our sample.

2.3.2 Sensitivity to industry and occupation

As noted in Section 2.2, the concentration of early pandemic job losses among low-wage services sectors raises potential concern that our estimates of UI benefit effects may be contaminated by sector-specific labor market conditions. More precisely, rather than solely reflecting effects of expanded UI generosity, our estimates may instead reflect reduced job prospects for workers previously employed in sectors in which activity was directly constrained by pandemic effects. As already illustrated in that earlier section, the wide distribution of UI replacement rates across and within occupations and industries in our sample partly alleviates this concern. This concern is also partly addressed by the inclusion of broad occupation and industry dummies in the regressions reported in the preceding section.

We further explore the sensitivity of our results to sector-specific effects by restricting the sample used for our regressions based on occupation and industry. The small sample sizes for individual industry and occupation groups preclude reliable estimation of UI replacement rate effects within those groups.[17] However, we can explore whether our key results are driven by key sectors by sequentially excluding each occupation and industry from the estimation sample.

The results are shown in panels A and B of Tables 3. For straightforward interpretation, we

[17]When estimated for subsets of grouped occupations and industries, the estimated effects of the UI replacement rate in our before/after design varied widely across sectors and generally were statistically imprecise.

once again rely on the simplified "before/after" design, as in Table 1 above. The specification is identical to that from column 1 of Table 1, but with the indicated occupations and industries sequentially excluded from the full sample. Across all columns of both panels, the estimated effect of the UI replacement rate during the CARES $600 supplement period (April-July) is tightly distributed around the full sample estimate of -0.072 (from column 1 of Table 1) and in all cases is precisely estimated. One notable and perhaps surprising exception is the leisure and hospitality industry (column 11 of Table 3, panel A). When this industry is excluded, the estimated effect of UI replacement rates under the CARES Act rises substantially, suggesting that the effect is small in this sector. Overall, these results bolster the case for interpreting our findings as reflecting variation in the UI replacement rates associated with the $600 supplement rather than sector-specific differences in job prospects for individuals who lost jobs early in the pandemic.

Table 3: Regression results: UI replacement rates and job finding (UE rates, two-month match), before/after design, occupations and industries eliminated

Panel A: occupations eliminated

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Manag	Prof/Tech	Services	Sales	Admin	Farm/ Fish	Const/ Extract	Inst/ Maint/Rep	Prod.	Trans/ Materials
UI rep rate	0.057**	0.040	0.049*	0.045*	0.062**	0.050**	0.045*	0.054**	0.050**	0.048**
	(0.024)	(0.025)	(0.026)	(0.024)	(0.026)	(0.023)	(0.024)	(0.023)	(0.022)	(0.023)
UI rep* CARES months	-0.074***	-0.074**	-0.073**	-0.070**	-0.076***	-0.072***	-0.062**	-0.074***	-0.068**	-0.074***
	(0.028)	(0.030)	(0.029)	(0.029)	(0.029)	(0.027)	(0.027)	(0.027)	(0.026)	(0.028)
Observations	2568	2409	2191	2547	2611	2833	2582	2774	2645	2580

Panel B: industries eliminated

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Agric	Mining	Const	Manuf	Whl/Ret	Trans/ Util	Info	Financial	Prof/ Bus	Educ/ Health
UI rep rate	0.050**	0.051**	0.043*	0.059**	0.059**	0.054**	0.051**	0.045**	0.051**	0.048*
	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)	(0.023)	(0.023)	(0.023)	(0.025)	(0.025)
UI rep* CARES months	-0.072***	-0.071***	-0.058**	-0.076***	-0.079***	-0.076***	-0.073***	-0.067**	-0.067**	-0.078**
	(0.027)	(0.027)	(0.027)	(0.028)	(0.029)	(0.027)	(0.027)	(0.027)	(0.029)	(0.031)
Observations	2825	2828	2547	2548	2487	2730	2817	2746	2567	2362

	(11)	(12)	(13)
	Leis/Hosp	Oth Serv	Gov
UI rep rate	0.046*	0.048**	0.051**
	(0.026)	(0.022)	(0.023)
UI rep* CARES months	-0.091***	-0.062**	-0.072***
	(0.029)	(0.026)	(0.027)
Observations	2336	2699	2811

Notes: *** p<0.01 ** p<0.05, * p<0.1 Notes: Occupations and industries excluded as indicated in column titles. Specification is from column 1 of Table 2.

2.3.3 Assessing the magnitude of the UI effect on job finding

We assess the magnitude of the estimated impact of the CARES supplement based on the results from the first column of Table 1, which applies the before-after design to our two-month match specification. We focus on this specification because the two-month match correction for spurious transitions bolsters the precision of the results, and the before/after framework provides a straightforward averaging of the UI replacement rate effects across the months when the $600 supplement was available.

Given the wide span of post-CARES UI replacement rates observed in our data, various metrics could be used to interpret the size of the estimated effect.[18] Interpretation of the coefficients is straightforward, however: the replacement rate is measured relative to a value of 1.0 (UI payments equal to prior earnings), and the coefficients are average marginal effects that represent the effect of an increase in the UI replacement rate of 1 (100 percentage points) on the probability of observing the relevant transition.

We conduct a straightforward calculation based on these considerations. The $600/week additional payments raised the median replacement rate from 0.5 to 1.37 in our two-month matched sample of unemployed individuals.[19] This represents an increase in the typical replacement rate of 0.87. Based on the coefficient on the UI replacement rate interaction with the CARES Act months in column 1 of Table 1, this implies that the job-finding rate for the typical recipient of enhanced UI benefits during those months was reduced by about 6.3 percentage points, or 0.063.[20] This is of moderate size relative to job-finding rates averaging about 0.29 during the months when the $600 supplement was available. Specifically, this represents a 22% reduction in job-finding rates due to the availability of the $600 weekly UI benefit supplement.

We can also translate our estimate into an elasticity of job-finding with respect to variation in UI replacement rates. This enables us to put our findings further into context and compare them directly with results from other research. We use mean rather than median differences for consistency with conventional elasticity calculations. The $600 supplement raised average UI replacement rates from 0.44 to 1.50 in our sample from Table 1 (a 240% increase). This increase of 1.06 in the average replacement rate lowers job-finding rates by 7.6 percentage points (1.06*(-0.072)=-0.076), or 26% relative to a base rate of about 0.29. The calculated job-finding elasticity is -0.11 when calculated in percentage terms and -0.25 when calculated in ln terms.[21] This elasticity range of -0.11 to -0.25 is toward the low end of the range of elasticity estimates using U.S. data summarized in Schmieder and von Wachter (2016). In particular, the low end of the range

[18] As noted earlier, the $600 supplement substantially raised the typical replacement rates. It also widened the dispersion substantially, with the standard deviation of replacement rates across UI-eligible individuals rising by nearly a factor of seven.

[19] The median replacement rate of 1.37 in this two-month matched sample is very close to the value of 1.40 for the full sample of unemployed individuals discussed in section 2.2.

[20] The specific calculation is 0.87·(-0.072)=-0.063.

[21] The exact calculations are: (i) in percentages, [(-0.076)/(0.29)]/[(1.06)/(0.44)]=-0.109; (ii) in ln terms, [ln(0.214/0.29)/ln(1.50/0.44)=-0.248. The range is uniformly lower (-0.075 to -0.16) if we instead use the estimated interaction coefficient from the full sample of one-month transitions in column 2 of Table 1

summarized in their Table 2 is -0.10 to -0.15, with about half of the reported estimates exceeding -0.5.[22] Also, our estimated range is close to but slightly wider than the reported elasticity range of -0.13 to -0.22 from Coombs et al. (2022), who examine the impact of the $600 supplement using administrative micro-data from a financial services company.

As noted in Section 1, other studies found much smaller labor market effects of the $600/week UI benefit enhancement. Most notably, Ganong et al. (2022) report an estimated benefits elasticity of about -0.02, which is nearly an order of magnitude smaller than our estimate and that from Coombs et al. (2022). Ganong et al. (2022) obtain this estimate by fitting parameters of a job-search model based on variation over time in aggregated unemployment exit rates inferred from direct bank deposits of UI benefit payments. Similarly, Bartik et al. (2020), Altonji et al. (2020), and Finamor and Scott (2021) found that states that experienced the largest increases in UI payments due to the $600/week supplement did not experience weaker labor market rebounds during the initial phase of economic recovery from the pandemic.

It is likely that our larger estimates of the pandemic UI benefit effects on job finding arise because we focus on search responses at the individual level, commonly referred to as micro effects. Our regressions rely on variation in UI replacement rates across individuals before and during the periods when the CARES Act $600 supplement was available, with no direct channel for broader macro effects to influence the estimates. Reinforcing this point, although we include measures of state labor market conditions in our regressions, our results for the UI replacement rates are invariant to their inclusion or exclusion.

By contrast, the studies that find smaller effects likely combine responses along the micro or individual margin with more general macro effects on aggregate outcomes. These macro effects can take various forms. The most important one in regard to the pandemic UI payments is their aggregate stimulus effects via consumption spending. Recent research has found these stimulus effects to be substantial during the pandemic, with a large marginal propensity to consume out of the UI benefits paid (Ganong et al. 2022). This added household spending likely helped sustain labor demand and hence offset the job search disincentives for individual UI recipients (Boone et al. 2021, Kekre 2021). Analyses that rely on outcomes aggregated above the individual level (i.e., state and local labor markets) are likely to capture a combination of the micro responses at the individual level and the offsetting stimulus effects at the macro level. Our estimates instead focus on the narrow micro or individual responses.[23]

[22] Schmieder and von Wachter (2016) focus on the elasticity of search duration, which takes on positive values, in their literature summary. Under the assumption of constant monthly exit rates from unemployment, the elasticities of search duration and job-finding probabilities are nearly identical in absolute value.

[23] Other channels for macro effects that may offset the individual search response include job rationing and spillovers to individuals not covered by the UI enhancements (Michaillat 2012, Lalive, Landais and Zweimüller 2015, Landais, Michaillat and Saez 2018). These channels may have affected recent assessments of expanded UI effects, although the unusually widespread availability of enhanced UI benefits during the pandemic likely limited the spillovers to ineligible individuals.

3 UI income and job acceptance decisions: a reservation benefits framework

Our direct assessment of individual job-finding rates in the preceding section uncovered only moderate disincentive effects of the $600 weekly UI supplement. In order to further understand this result, this section develops a dynamic framework of job acceptance decisions applied to the specific feature of the CARES act UI benefits expansions. The model sheds light why many UI recipients may accept job offers even when their benefits exceed the offered wage. Using data from the CPS and the Ganong, Noel and Vavra (2020) benefits calculator to infer CARES Act replacement rates, as in the preceding section, our quantitative analysis suggests that only a small fraction of UI recipients, in a narrow set of groups, would have refused an offer to return to work at their previous pay.

3.1 Reservation benefits

We study the problem of a risk neutral insured job seeker considering a job offer to return to work at the previous wage, w, [24] characterizing the level of UI benefits the leave a job seeker indifferent between accepting and rejecting the offer. The framework highlights the circumstances under which a job seeker may accept a job offer for a wage below the value of their current weekly UI payments. Finally, note that the reservation benefit statistic developed here does not take into account risk aversion, which would increase the value of a long stream of earned income on the job compared with temporary UI payments.

Consider a worker comparing the present value of the job, $W_E(w)$, to that of remaining unemployed with UI benefits b and t remaining weeks of eligibility, $W_U(b,t)$. The decision takes into account the likely duration of the job and that of finding an alternative offer – through the probabilities of losing and finding a job s and f, respectively – and the discounting of time at rate r:

$$W_E(w) = w + \frac{1}{1+r}\left[(1-s)\,W_E(w) + sW_U\,(b,T)\right] \quad (3)$$

$$W_U\,(b,t) = b + \frac{1}{1+r}\left[(1-f)\,W_U(b,t-1) + f\max\left[W_E(w), W_U(b,t-1)\right]\right] \text{ for } 1 < t \leq T \quad (4)$$

$$W_U\,(b,1) = b + \frac{1}{1+r}\left[(1-f)\,W_U(0) + f\max\left[W_E(w), W_U(0)\right]\right] \quad (5)$$

$$W_U(0) = 0 + \frac{1}{1+r}\left[(1-f)\,W_U(0) + f\max\left[W_E(w), W_U(0)\right]\right] \quad (6)$$

where T is the maximum duration of UI, $W_U(0)$ is the value of unemployment after exhaustion of unemployment benefits, $W_U(b,T)$ is the value of unemployment at the start of a new unemployment spell following a job loss and, for a positive wage, $\max\left[W_E(w), W_U(0)\right] = W_E(w)$.[25]

[24] Although there is little evidence of significant wage cuts during the recession triggered by the COVID-19 pandemic, the approach developed here is straightforward to adapt to any wage offer.

[25] We assume that employment immediately affords eligibility to full UI whereas state UI systems have different work

If employment if preferred to remaining unemployed at a date $t+1$ then, from the value functions above, the value of unemployment up to the maximum duration of UI of T weeks can be re-expressed as:

$$W_U(b,t) \quad = \quad B(t) + \left(\frac{f}{r+f}\right) W_E(w) \text{ for } 1 < t \leq T \tag{7}$$

which highlights that unemployment is valued for the discounted present value of expected UI payments with t weeks of eligibility remaining, $B(t) = \sum_{i=0}^{t-1} b \left(\frac{1-f}{1+r}\right)^i$, and the discounted value of finding a job and moving into employment.

Since the value of unemployment in (7) is increasing in the weekly benefit amount, there exists a reservation benefit $b^r(t,w)$ to be paid out for the remaining weeks of eligibility t such that an individual is indifferent between remaining unemployed and receiving that amount or accepting a job offering pay w. That is, a job offer with pay w will be turned down if the current level of weekly benefit payments b is greater than this reservation level $b^r(t,w)$. Formally:

Proposition 1. *The reservation benefit for an unemployed individual with t weeks of UI eligibility remaining and considering a job offer at wage w solves:*

$$W_U(b^r(t,w),t) \quad = \quad W_E(w) \tag{8}$$

Given the value functions for employment and unemployment (3) and (7) the reservation benefit is

$$b^r(t,w) \quad = \quad \frac{b^r(1,w)}{\sum_{i=0}^{t-1}\left(\frac{1-f}{1+r}\right)^i} \quad \text{for} \quad 0 < t \leq T \tag{9}$$

where

$$b^r(1,w) \quad = \quad \left(\frac{r}{r+f}\right) W_E(w) = \left(\frac{r}{r+f}\right)\left(\frac{(1+r)\,w + sW_U(b,T)}{r+s}\right) > w \tag{10}$$

Job seekers will accept an offer to return to work at their previous wage if weekly income from UI benefits is lower than their reservation level of benefits with t weeks of payments remaining, $b < b^r(t,w)$.

For a given wage offered, the level of reservation benefit leading to a job offer being rejected is determined by: (i) the duration of benefits remaining (t); (ii) the expected duration of the employment spell ($\approx 1/s$), and; (iii) the rate of arrival of new job offers (f). With an unbounded duration of UI payments ($T \to \infty$) the reservation benefit is equal to the wage, $b^r(\infty) = w$. In this limit, a replacement rate above 100% will induce workers to reject a job offer at their previous wage rate. With one week remaining, the reservation benefit $b^r(1,w)$ is the annuity value of the present discounted value of the job offered. It is always the case that, with a week remaining, the reservation benefit is greater than the wage offer ($b^r(1,w) > w$). In other words, replacement ratios above

and earnings requirements to establish UI eligibility. Detailed derivations for all results are provided in the appendix.

100% do not necessarily lower job offer acceptance rates. More generally, for UI benefit payments of finite duration, the reservation benefit $b^r(t)$ is declining with weeks remaining of UI benefits, trading off an additional week of benefits at the reservation level against the forgone employment value.

The level of the reservation benefit depends crucially on the expected duration of the employment spell and the rate of arrival of new job offers, over and above the considerations from the duration of remaining weeks of UI eligibility. Longer lasting employment spells (lower s) are of greater value and rejected only for commensurately generous unemployment insurance payments. In a depressed labor market, when job offers are few and far between (low f), any job offer is costly to refuse as new offers are hard to find. This can be seen in the discounting terms in equations (9) and (10).

3.2 Reservation benefits during the pandemic

This section provides estimates of reservation benefits for different categories of workers during the COVID-19 recession. We adapt the general problem to reflect institutional details from the CARES Act and then use micro data from the CPS to obtain the relevant moments entering the definition of a reservation benefit level. The main set of results are based on the experience during the recovery out of the Great Recession of 2007-09, especially with respect to the expected hazard rates out of unemployment. Additional results, obtained by varying the assumptions on the expected durations of unemployment and employment spells, are provided and are meant to capture bounds on reservation benefit levels at different horizons of remaining UI eligibility and alternative labor market states.

3.2.1 CARES Act specific formulation

The temporary nature of the supplemental PUC income relative to the duration of payments of baseline UI requires a small modification to the unemployment Bellman equations above. Let t_c denote the weeks of expanded UI eligibility, and t_p the weeks of supplemental UI income under the PUC remaining for a given unemployment spell. For simplicity it is assumed that $t_p < t_c$ for all unemployed. In addition, let $\bar{b}$ denote baseline UI payments and the additional income provided through the PUC by b_p. The value of unemployment under the CARES Act is:

$$\begin{aligned} W_U\left(\bar{b}, t_c, b_p, t_p\right) &= \bar{b} + b_p + \frac{1}{1+r}\left[(1-f)\, W_U(\bar{b}, t_c - 1, b_p, t_p - 1)\right. \\ &\quad \left. + f \max\left[W_E(w), W_U(\bar{b}, t_c - 1, b_p, t_p - 1)\right]\right] \text{ for } t_c, t_p > 1 \qquad (11) \\ W_E(w) &= w + \frac{1}{1+r}\left[(1-s)\, W_E(w) + s W_U\left(\bar{b}, T_c\right)\right] \qquad (12) \end{aligned}$$

Following similar steps as in the previous section, the value of unemployment under the CARES Act with t_c weeks of regular UI payments and t_p weeks of PUC payments may be expressed as:

$$W_U\left(\bar{b}, t_c, b_p, t_p\right) \quad = \quad \overline{B}(t_c) + B_p(t_p) + \frac{f}{r+f} W_E(w)$$

where $\overline{B}(t) = \sum_{i=0}^{t-1} \bar{b} \left(\frac{1-f}{1+r}\right)^i$ is the present discounted value of expected baseline UI payments and $B_p(t) = \sum_{i=0}^{t-1} b_p \left(\frac{1-f}{1+r}\right)^i$ the present discounted value of expected supplemental UI payments.

We focus on the the level of *supplemental* UI payments leading to indifference to job offers at the previous wage w, denoted $b_p^r(t, t_c, w)$. The reservation benefit for a job seeker during the period of the CARES act is the sum of regular benefit payments $\bar{b}$ and this supplemental reservation benefit payments: $b^r(t, t_c, w) = \bar{b} + b_p^r(t, t_c, w)$. This level of reservation for the supplemental benefit depends on the number of weeks of regular benefit payments remaining, t_c, and, for 1 or t weeks remaining in PUC payments, is given by:

$$b_p^r(1, t_c, w) \quad = \quad \frac{r}{r+f} W_E(w) - \overline{B}(t_c) \tag{13}$$

$$b_p^r(t, t_c, w) \quad = \quad \frac{b_p^r(1, t_c, w)}{\sum_{i=0}^{t-1} \left(\frac{1-f}{1+r}\right)^i} \tag{14}$$

3.2.2 Calculating reservation benefits during the pandemic

As previously mentioned, the reservation benefits during the pandemic calculated below is the sum of regular and supplemental reservation benefit payments, $b^r(t, t_c, w) = \bar{b} + b_p^r(t, t_c, w)$. We specify the baseline UI program as a weekly payment $\bar{b} = \min\left[\bar{\tau} \times w, b_{cap}\right]$ for a maximum duration of $\bar{T} = 26$ weeks, where $\bar{\tau} \in (0, 1)$ is a replacement rate set to 50 percent and b_{cap} a cap on weekly payments of \$500.[26] The PEUC extended the duration of UI payments an additional 13 weeks for a total of 39 weeks, but in some states emergency extensions provide an additional 13 weeks for a maximum of 52 weeks. We set T^c to 52 weeks. The additional income provided through the PUC is denoted by $b_p = \$600$ per week. Payments first began the week ending April 4, 2020 and the last week ending July 25, 2020, for a total of $T_p = 17$ weeks. Finally, the CARES Act provision of additional UI income is assumed to no longer be available at the end of the employment spell of any job offer under consideration.[27]

The remaining moments for weekly earnings, and job finding and job separation rates required to calculate reservation benefits are obtained from the monthly CPS. These are reported for the overall population, prime aged workers, by level of education, and by occupation in Table 4 as

[26] This assumption for regular UI compensation is slightly more generous than the typical U.S. state program. See Department of Labor (2019) for a review of the heterogeneity in eligibility requirements and benefit levels and duration across US states. Note also the discount rate r is set to an annualized rate of 5%.

[27] Allowing for the additional UI income to be available upon reemployment, at least partially, would increase the value of a job offer. The levels of the reservation benefit would be somewhat higher due to strong discounting over the duration of a typical employment spell.

median weekly earnings, and measures of expected unemployment and employment spell duration implied by job arrival and separation rates (f and s). Weekly earnings are based on the full calendar year 2019 as the most likely compensation to be offered to workers during the period of the CARES Act provisions. Our baseline calculations turn instead to period of the early recovery phase following the Great Recession (the full calendar year 2010) for measure of expected durations of unemployment and employment spells. This period is chosen as a reasonable reference point for a job seeker's expectation of job offer arrival rates coming out of the initial phase of the COVID-19 recession. In addition we present a series of results under alternative assumptions regarding job offer arrival rates for robustness. The job offer arrival rate $f_t = UE_t/U_{t-1}$ is the sum of transitions from unemployment to employment over the previous period's stock of unemployed individuals. The separation rate out of employment $s_t = (EU_t + EN_t)/E_{t-1}$ is the sum of transitions out of employment into either unemployment or non-employment over the preceding period's stock of employed individuals. It is worth noting that durations of unemployment spells based on outflow rates are significantly shorter than the average durations reported by CPS respondents. In other words, our chosen measure of job offer arrival rates will imply lower levels of reservation benefits compared to using self-reported durations of unemployment spells. [28]

Transition rates into employment in a specific occupation are not easily defined due to the ambiguity of identifying the pool of potential job seekers within each occupation. Our solution to this measurement challenge follows Hall and Schulhofer-Wohl (2018). We estimate a logit on the outcome of a transition from unemployment into employment into a specific occupation, $f = \exp(\beta_f X)/\left[1+\exp(\beta_f X)\right]$, based on a set of demographic characteristics in the vector X that includes age, education, race/ethnicity, sex and marital status. The regressions, using all months of 2010, are then used to predict the average transition rate by occupation (see appendix B for further details).

3.2.3 Results: Overall, by education, and by occupation

The PUC benefit expired July 31st 2020. As such, we focus on reservation benefit levels, and the corresponding replacements rates, for individuals considering an offer to return to work at the previous wage in the first weeks of May and June 2020 with either 12 or 8 weeks of UI eligibility remaining, respectively. This timeframe corresponds to the period studied in the analysis of individual transition rates in the preceding section.

A typical worker earning about $1000 per week in their previous job received $1100 per week in UI payments under the CARES act, or 110% of prior earnings. Considering an offer at the previous wage takes into account that the proposed employment spell is expected to last just under two years and, if rejected, unemployment can be expected to last 22 weeks (see the first row of Table 4). We calculate that an offer during the first week of May 2020 would be accepted as long

[28] Table A1 provides durations of unemployment spells as self-reported in the CPS for comparison to the durations implied by the finding rate f. In particular, it reports the average duration of the unemployment spell preceding a transition into employment, which can be compared to the imputed finding rate based on durations by occupation. Table A3 of the appendix reports the equivalent moments for 2019. See also the discussion in Farber and Valletta (2015).

as this worker's current benefit payment was below $b^r(12) = \$1,550$, a reservation benefit level that is 155% of the previous wage. This is $450 above weekly UI payments under the CARES Act. An offer during the first week of June, with 8 weeks of PUC payments remaining, is all the more attractive, raising the reservation benefit further. These conclusions are similar when the analysis is restricted to the prime age workforce, aged 25 to 54 years old (see the second row of Table 4).

The next three rows of Table 4 present the results for imputed reservation benefit levels and ratios for workers with three levels of education (less than high school, high school, and college and above). College educated workers were not likely to turn down a job offer at the previous wage during the period of supplemental payments under the CARES Act: their employment spells have long durations (3 years) with weekly earnings well above augmented UI payments. High school educated workers, earning $800 per week and expected durations of employment and job-finding rates close to the overall average, were equally unlikely to be deterred by a 124% replacement rate under the CARES Act in May and June 2020. Overall, based on the quantitative elements we used to calculate reservation benefit levels, only individuals with less than a high school education were likely to decline job offers due to enhanced UI payments when considering whether to accept a job offer in May 2020: this group's reservation benefit level of $708 is below their expanded weekly UI payments of $856 in that month. However, even for this group, a job offer in June 2020, when many states were moving to reopen their economies, would have been preferable to remaining unemployed.

The last rows of Table 4 present reservation benefit calculations for 10 major occupations. Weekly earnings in 2019 for this set of occupations range from under $500 a week (Food services) to over $1550 a week (Managers), with average durations of employment spells from under a year (janitors and construction) to over three years (managers, nurses and therapists). The reservation benefits levels with 12 and 8 weeks remaining in PUC payments for each occupation are summarized in Figure 3, which plots an occupation's weekly earnings against reservation benefits. A 100% replacement rate (black line) separates the graph in two regions, shaded in blue for replacement rates below 100%. Regular UI payment rates are represented by the bottom line (red), increasing at a rate of 50% of the prior wage until hitting a cap at $1000 in weekly earnings for a maximum benefit payment of $500 per week. The UI payment schedule under the CARES Act is shifted up by $600 (green line), and any individual with earnings below $1100 per week receives more on UI with the PUC payments than on the previous job. Each occupation's weekly earnings and reservation benefit level with 12 and 8 weeks of PUC supplemental payments remaining are plotted as yellow and blue dots, respectively. At the time several states moved to reopen their economies, only insured unemployed workers who had been in food services were close to indifferent toward returning to work at their previous wage.[29]

[29] Appendix section C.1 performs the same analysis at the state level, taking into account the substantial cross-state variation in regular UI benefit payments.

Table 4: Reservation benefits and replacement rates

	Earnings	Duration of:		Weekly UI compensation				Replacement rates (%)			
	w (wkly)	U (wks)	E (yrs)	$\bar{b}$	b^C	$b^r(12)$	$b^r(8)$	$\bar{\tau}$	τ^C	$\tau^r(12)$	$\tau^r(8)$
Overall	1007	22	1.7	500	1100	1553	1995	50	109	154	198
Age 25 to 54 years	1087	21	2.3	500	1100	1732	2234	46	101	159	206
Education:											
Less then HS	513	23	0.74	256	856	708	907	50	167	138	177
High School	807	22	1.6	403	1003	1246	1602	50	124	155	199
College and above	1389	19	2.8	500	1100	2226	2884	36	79	160	208
Occupation:											
Food Service	464	21	1.1	232	832	670	856	50	179	144	184
Janitors	549	22	0.9	274	874	780	999	50	159	142	182
Medical Assi.	709	23	1.9	354	954	1139	1474	50	135	161	208
Sales and Retail	873	21	1.6	436	1036	1313	1679	50	119	150	192
Transportation	887	21	1.6	444	1044	1354	1737	50	118	153	196
Construction	1000	20	0.9	500	1100	1339	1668	50	110	134	169
Teachers	1090	19	1.9	500	1100	1632	2083	46	101	150	191
Nurses and therap.	1203	21	3.4	500	1100	2010	2614	42	91	167	217
IT	1466	19	4.5	500	1100	2404	3116	34	75	164	213
Managers	1554	20	3.2	500	1100	2589	3381	32	71	166	218

Notes: Earnings data calculated using the Dec. 2018 to Dec. 2019 CPS. Durations of unemployment and employment in columns 2 and 3 are calculated using the Dec. 2009 to Dec. 2010 CPS. w: weekly earnings; Weekly job finding and separation rates entering the resevation benefits are obtained by converting the monthly flow rates to a weekly frequency (see appendix for details); $\bar{b}$: regular weekly unempmloyment benefits; b^C: weekly benefits under CARES act, $\bar{b} + 600$$.

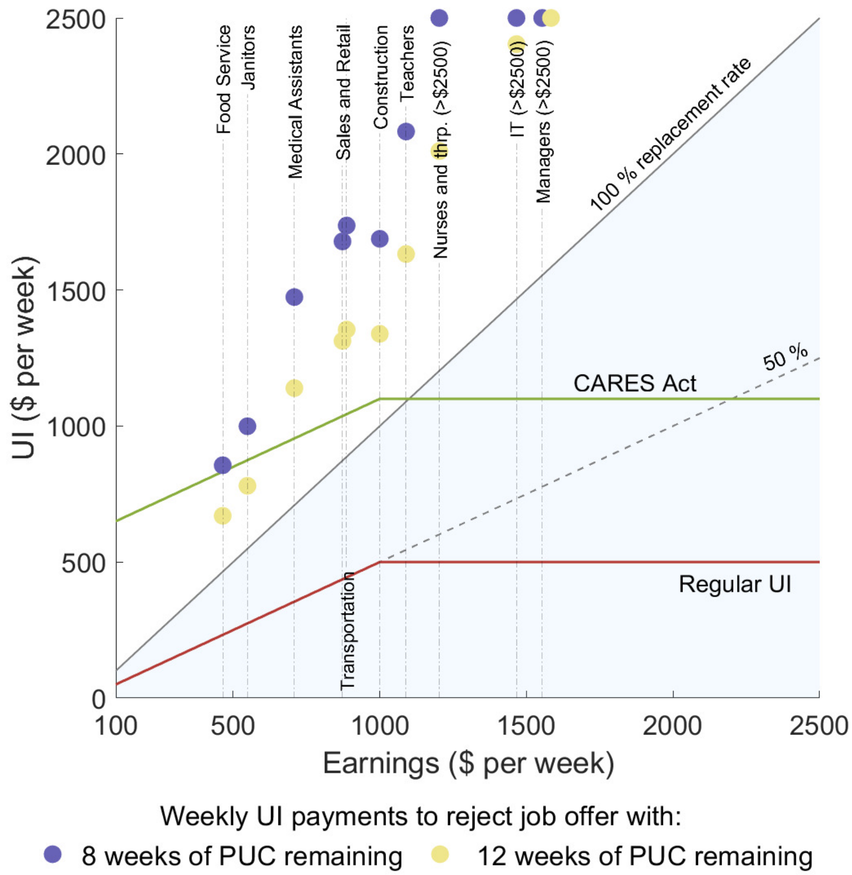


Figure 3: Regular, CARES Act and reservation level UI benefit payments

Notes: Each dot corresponds to the reservation benefit for an average worker within each occupation calculated according to (14) with 12 (first week of May 2020) or 8 (first week of June 2020) weeks of PUC payments remaining.

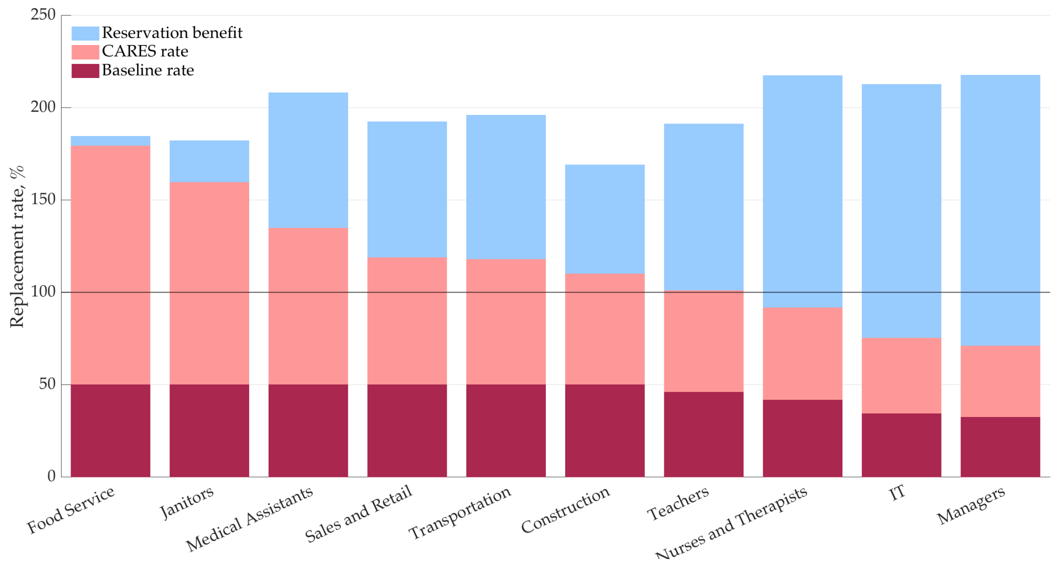


Figure 4: Regular, CARES Act and reservation level UI benefit replacement rates
Notes: The figures reports reservation benefit replacement rates with 8 weeks (first week of June 2020) remaining to the PUC program.

Figure 4 reports the same information but focuses on replacement rates explicitly. Under the CARES Act, all but three occupations out of ten have a replacement rate above 100%. From the perspective of the first week of June, the vast majority of occupations show sizable gaps between their replacement rates with PUC payments and replacement rates that would cause UI recipients to be indifferent to a job offer at the previous wage. The exceptions are individuals employed in food services and janitors. For these two occupations, which comprised about 15% of the unemployed in May and June of 2020, UI payments under the CARES Act are close to their respective reservation benefit levels.[30]

In order to provide bounds for the values of reservation benefits under varying expectations for labor market conditions, the same calculations are performed under an alternative assumption for job offer arrival rates and durations of employment spells. This alternative uses the data from 2019 to obtain transition rates and would represent a situation in which the unemployed, when considering a job offer, expect a strong labor market rebound with far less difficulty finding a job. The result of increasing the arrival rate of job offers by about 50%, as reported in Table A3, is to lower the level of reservation benefits in all occupations such that two of them, food services and janitors, would prefer remaining unemployed and receiving enhanced UI benefits to accepting a job at their previous wage during the first week of June 2020. This example is based on a scenario for the labor market that was not likely to be in the modal expectation of unemployed individuals and is meant to provide bounds on possible levels of reservation benefits during the period of increased UI payments under the CARES Act.

[30]We calculate the occupation shares among the unemployed restricting the population to individuals in the CPS aged 25 to 54 years old who report a prior occupation, excluding both job leavers and new entrants who would not be eligible for UI.

4 Conclusion

This paper examines the impacts of the $600 weekly UI benefits supplement provided by the CARES Act on job search and acceptance behavior in early 2020. We first conduct direct empirical analyses of labor force transitions using matched CPS data, linked to annual earning records from the CPS income supplement to form UI replacement rates. The results show moderate disincentive effects of the UI supplemental payments on job finding rates. Our estimated elasticities of job-finding rates with respect to UI replacement rates are at the low end of the range of prior estimates using U.S. data, and they are comparable to results from a different paper that uses alternative micro-data to assess the impacts of the pandemic UI supplements (Schmieder and von Wachter 2016, Coombs et al. 2022). Our estimates are aimed at identifying the micro effects of the UI benefit expansions on job search, whereas other recent analyses of the pandemic UI expansions likely combine micro effects at the individual level with more general macro effects that alter aggregate labor market conditions (Ganong et al. 2022, Altonji et al. 2020, Bartik et al. 2020, Finamor and Scott 2021).

In the second part of our analysis, we derive a level of UI benefit payments over the duration of remaining UI eligibility at which unemployed individuals are indifferent between accepting a job paying their previous wage and remaining unemployed. With finite UI benefit duration, this reservation benefit is always above the previous wage. In a depressed labor market with lower job offer arrival rates, the gap between the previous wage and the reservation benefit widens, leaving room for replacement ratios above 100% without negative effects on job acceptance rates and the speed of the labor market recovery. Our analyses using CPS micro data on weekly earnings, average durations of employment spells, and job finding rates show that limited types and shares of workers would refuse an offer to return to work at their previous pay even if they could receive three months of the additional $600/week of UI benefits under the CARES Act. These calculations are consistent with our direct estimates of small reductions in job-finding rates due to the $600 supplement in the earlier section of the paper.

It is worth noting a few considerations that may have a meaningful impact on an individual's job acceptance decision in the context of our job-search model. First, our analysis does not take explicit account of health and safety risks on the job during the pandemic which would reduce the value of a job offer and the level of the reservation benefit commensurately. Our exclusion is based on the argument of separating out the financial disincentive of the supplemental UI income from the job acceptance decision, and the calculations based on the micro data suggest that the additional income alone was not likely to have deterred workers from returning to a previous job. Second, our model does not incorporate human capital depreciation or other factors that would result in a declining job arrival rate over the duration of the unemployment spell. This consideration would act to increase the reservation benefit level, especially as individuals experience longer unemployment spells during a protracted slowdown. Finally, these are partial equilibrium exercises, which do not take into account general equilibrium effects of expanding UI policies on job offer arrival and separation rates, and are meant to be the model counterparts of the individual level estimates uncovered in the first part of the analysis. Consideration of such general equilibrium effects is left to future work.

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Online appendix

A Detailed derivations

A.1 Main derivations

Recall the Bellman equations:

$$W_E = w + \frac{1}{1+r}\left[(1-s)W_E + sW_U(b,T)\right] \tag{A.1}$$

$$W_U(b,t) = b + \frac{1}{1+r}\left[(1-f)W_U(b,t-1) + fW_E\right] \text{ for } T \geq t > 1 \tag{A.2}$$

$$W_U(b,1) = b + \frac{1}{1+r}\left[(1-f)W_U(0) + fW_E\right] \tag{A.3}$$

$$W_U(0) = 0 + \frac{1}{1+r}\left[(1-f)W_U(0) + fW_E\right] \tag{A.4}$$

From the last line we have $W_U(0) = \frac{f}{r+f}W_E$, then:

$$\begin{aligned}
W_U(b,1) &= b + \frac{1}{1+r}\left[(1-f)\frac{f}{r+f}W_E + fW_E\right] = b + \frac{f}{r+f}W_E \\
W_U(b,2) &= b + \frac{1}{1+r}\left[(1-f)W_U(b,1) + fW_E\right] \\
&= b + b\left(\frac{1-f}{1+r}\right) + \frac{1}{1+r}\left[(1-f)\frac{f}{r+f} + f\right]W_E \\
&= b + b\left(\frac{1-f}{1+r}\right) + \frac{f}{r+f}W_E
\end{aligned}$$

and finally:

$$W_U(b,t) = \sum_{i=0}^{t-1} b\left(\frac{1-f}{1+r}\right)^i + \left(\frac{f}{r+f}\right)W_E$$

Let $b^r(t,w)$ denote the value of unemployment benefit with t weeks of eligibility remaining such that an individual is just indifferent between a job offer and remaining unemployed. With one week of benefits remaining:

$$\begin{aligned}
W_U(b^r(1,w),1) &= W_E \\
b^r(1,w) + \frac{f}{r+f}W_E &= W_E \\
b^r(1,w) &= \left(\frac{r}{r+f}\right)W_E
\end{aligned}$$

With two weeks remaining:

$$W_U\left(b^r(2,w),2\right) = W_E$$
$$b^r(2,w)\left[1+\left(\frac{1-f}{1+r}\right)\right]+\frac{f}{r+f}W_E = W_E$$
$$b^r(2,w) = \frac{\left(\frac{r}{r+f}\right)W_E}{\left[1+\left(\frac{1-f}{1+r}\right)\right]} = \frac{b^r(1,w)}{\left[1+\left(\frac{1-f}{1+r}\right)\right]}$$

such that $b^r(2,w) < b^r(1,w)$. More generally: for $T > t > 1$

$$b^r(t,w) = \frac{b^r(1,w)}{\sum_{i=0}^{t-1}(\frac{1-f}{1+r})^i}$$

Finally, we can re-express the value of employment as:

$$W_E = \frac{w+\frac{s}{1+r}W_U(b,T)}{1-(\frac{1-s}{1+r})}$$
$$W_E = \left(\frac{1+r}{r+s}\right)w+\left(\frac{s}{r+s}\right)W_U(b,T) = \left(\frac{1+r}{r+s}\right)w+\left(\frac{s}{r+s}\right)B(T)+\left(\frac{s}{r+s}\right)\left(\frac{f}{r+f}\right)W_E$$
$$rW_E = \frac{r+f}{r+f+s}\left[(1+r)w+sB(T)\right]$$

such that

$$b^r(1,w) = \frac{(1+r)\,w+sB(T)}{r+s+f}$$

A.2 Application to the 2020 CARES Act

The value of unemployment under the CARES Act is:

$$W_U\left(\bar{b},t_c,b_p,t_p\right) = \bar{b}+b_p+\frac{1}{1+r}\left[(1-f)\,W_U(\bar{b},t_c-1,b_p,t_p-1)\right.$$
$$\left.+f\max\left[W_E(w),W_U(\bar{b},t_c-1,b_p,t_p-1)\right]\right] \text{ for } t_c,t_p>1$$
$$W_U\left(\bar{b},t_c,b_p,1\right) = \bar{b}+b_p+\frac{1}{1+r}\left[(1-f)\,W_U(\bar{b},t_c-1,0,0)+f\max\left[W_E(w),W_U(\bar{b},t_c-1,0,0)\right]\right]$$
$$W_U\left(\bar{b},t_c,0,0\right) = \bar{b}+\frac{1}{1+r}\left[(1-f)\,W_U(\bar{b},t_c-1,0,0)+f\max\left[W_E(w),W_U(\bar{b},t_c-1,0,0)\right]\right]$$
$$W_U\left(\bar{b},1,0,0\right) = \bar{b}+\frac{1}{1+r}\left[(1-f)\,W_U(0)+f\max\left[W_E(w),W_U(0)\right]\right]$$
$$W_U(0) = \frac{f}{r+f}W_E(w)$$
$$W_E(w) = w+\frac{1}{1+r}\left[(1-s)\,W_E(w)+sW_U\left(\bar{b},T_c\right)\right]$$

With one week and t_c weeks of regular UI remaining and exhaustion of PUC benefits:

$$\begin{aligned}
W_U\left(\bar{b},1,0,0\right) &= \bar{b}+\frac{f}{r+r}W_E(w) \\
W_U\left(\bar{b},t_c,0,0\right) &= \bar{b}\sum_{i=0}^{t-1}\left(\frac{1-f}{1+r}\right)^i+\frac{f}{r+r}W_E(w)=\overline{B}(t_c)+\frac{f}{r+r}W_E(w)
\end{aligned}$$

With t_c weeks of regular UI payments and one week of PUC payments:

$$\begin{aligned}
W_U\left(\bar{b},t_c,b_p,1\right) &= \bar{b}+b_p+\frac{1}{1+r}\left[(1-f)\,W_U(\bar{b},t_c-1,0,0)+fW_E(w)\right] \\
W_U\left(\bar{b},t_c,b_p,1\right) &= \overline{B}(t_c)+b_p+\frac{f}{r+r}W_E(w)
\end{aligned}$$

With t_c weeks of regular UI payments and t_p weeks of PUC payments:

$$W_U\left(\bar{b},t_c,b_p,t_p\right) = \overline{B}(t_c)+B_p(t_p)+\frac{f}{r+r}W_E(w)$$

Reservation supplemental benefit with one week of PUC remaining $b^r(t_c,t_p=1,w)$:

$$\begin{aligned}
W_U(\bar{b},t_c,b_p^r(1),1) &= W_E(w) \\
\overline{B}(t_c)+b_p^r(1,t_c)+\frac{f}{r+r}W_E(w) &= W_E(w) \\
b_p^r(1,t_c) &= \frac{r}{r+f}W_E(w)-\overline{B}(t_c)
\end{aligned}$$

Reservation supplemental benefit with two weeks of PUC remaining $b^r(t_c,t_p=2,w)$:

$$\begin{aligned}
W_U(\bar{b},t_c,b_p^r(2),2) &= W_E(w) \\
\overline{B}(t_c)+B_p(2)+\frac{f}{r+r}W_E(w) &= W_E(w) \\
b_p^r(2,t_c) &= \frac{\frac{r}{r+f}W_E(w)-\overline{B}(t_c)}{\sum_{i=0}^{1}\left(\frac{1-f}{1+r}\right)^i}
\end{aligned}$$

Reservation supplemental benefit with t weeks of PUC remaining $b^r(t_c,t_p=t,w)$:

$$\begin{aligned}
W_U(\bar{b},t_c,b_p^r(t),t) &= W_E(w) \\
\overline{B}(t_c)+B_p(t)+\frac{f}{r+r}W_E(w) &= W_E(w) \\
b_p^r(t,t_c) &= \frac{\frac{r}{r+f}W_E(w)-\overline{B}(t_c)}{\sum_{i=0}^{t-1}\left(\frac{1-f}{1+r}\right)^i}
\end{aligned}$$

B Data

Unemployment duration is the inverse of the weekly job finding rate calculated by converting the monthly flow rate $f_m = UE_t/U_{t-1}$, to a weekly frequency as $f_w = 1 - (1 - f_m)^{1/4}$; The duration of an employment spell is the inverse of the weekly job separation rate calculated from the monthly flow rate $s_m = (EU_t + EN_t)/E_{t-1}$, converted to a weekly rate by solving
$s = s_w \left\{[(1 - f_w) + (1 - s_w)] \left(2s_w f_w + (1 - f_w)^2 + (1 - s_w)^2\right)\right\}$.

Table A1: Measures of weekly earnings, unemployment and employment duration

	Weekly earnings		Duration of: unemployment[a]			employment[b]
				Reported	Flow	Flow
	mean	median	mean	cond. on U-E	$1/f_w$	$1/s_w$
Overall	807	641	31.74	20.53	21.84	1.82
Age 25 to 54 years	875	720	33.73	22.12	21.31	2.52
Education:						
Less then HS	397	350	28.56	18.37	23.19	0.80
High School	659	560	32.46	21.06	22.09	1.76
College and above	1174	1000	32.80	21.10	19.97	3.08
Occupation:						
Construction	800	692	–	18.91	22.09	0.94
Food Service	352	300	–	16.91	21.21	1.19
Information Technology	1374	1185	–	20.64	19.82	5.09
Janitors	438	388	–	22.85	22.77	1.01
Managers	1340	1154	–	23.90	21.00	3.51
Medical Assistants	548	449	–	16.70	21.31	2.09
Nurses and Therapists	884	788	–	16.37	20.33	3.87
Sales and Retail	671	480	–	21.09	21.25	1.69
Teachers	936	865	–	17.85	19.63	2.34
Transportation	735	615	–	20.33	22.81	1.79

Notes: (a) weeks; (b) years. Earnings data calculated using the Dec. 2018 to Dec. 2019 CPS. Durations calculated using Dec. 2009 to Dec. 2010 CPS. w: weekly earnings; Weekly job finding f_w and separation s_w rates calculated by converting the monthly flow rates to a weekly frequency.

Job finding rates by major occupation are obtain from a logit on the outcome of a transition from unemployment into employment, $f = \exp(\beta_f X)/\left[1 + \exp(\beta_f X)\right]$, based on a set of demographic characteristics in the vector X that includes age, education, race/ethnicity, sex and marital status. The regression results are reported in Table A2.

Table A2: Predicting Finding and Separation Rates for 2010

	UE		*EU + EN*	
Age				
25-34	0.0128	-0.0539	-0.953	-0.833
	(0.0341)	(0.0362)	(0.0215)	(0.0227)
35-44	-0.0316	-0.135	-1.166	-0.976
	(0.0356)	(0.0408)	(0.0222)	(0.0257)
45-54	-0.195	-0.310	-1.274	-1.070
	(0.0363)	(0.0430)	(0.0220)	(0.0263)
55-64	-0.333	-0.460	-0.970	-0.757
	(0.0437)	(0.0504)	(0.0230)	(0.0275)
65-79	-0.468	-0.604	-0.0557	0.159
	(0.0759)	(0.0812)	(0.0268)	(0.0315)
Education				
H.S. Diploma	0.0721	0.0755	-0.536	-0.529
	(0.0336)	(0.0336)	(0.0211)	(0.0211)
Some College	0.149	0.170	-0.672	-0.672
	(0.0355)	(0.0356)	(0.0214)	(0.0215)
College Degree & Above	0.287	0.309	-1.020	-1.014
	(0.0408)	(0.0410)	(0.0236)	(0.0236)
Race/Ethnicity				
Black	-0.373	-0.343	0.408	0.356
	(0.0353)	(0.0357)	(0.0221)	(0.0224)
Hispanic	0.147	0.137	0.269	0.268
	(0.0322)	(0.0323)	(0.0209)	(0.0209)
Asian/Pacific Islander	-0.248	-0.260	0.147	0.141
	(0.0635)	(0.0637)	(0.0338)	(0.0338)
Other	-0.0771	-0.0627	0.291	0.267
	(0.0623)	(0.0624)	(0.0403)	(0.0404)
Sex				
Female		-0.169		0.0984
		(0.0238)		(0.0141)
Marital Status				
Married (Spouse Absent)		0.243		0.221
		(0.0866)		(0.0572)
Widowed		-0.0420		0.109
		(0.0962)		(0.0465)
Divorced		-0.133		0.0810
		(0.0393)		(0.0254)
Separated		0.00183		0.213
		(0.0669)		(0.0477)
Never Married		-0.185		0.291
		(0.0323)		(0.0195)
Constant	-1.540	-1.314	-1.761	-2.070
	(0.0323)	(0.0450)	(0.0210)	(0.0277)
Observations	52442	52442	536849	536849

Note: Groups “16-24”, “Less than H.S. Diploma”, “White”, “Male”, and “Married (Spouse Present)” are included as reference categories, respectively.

C Additional tables and figures

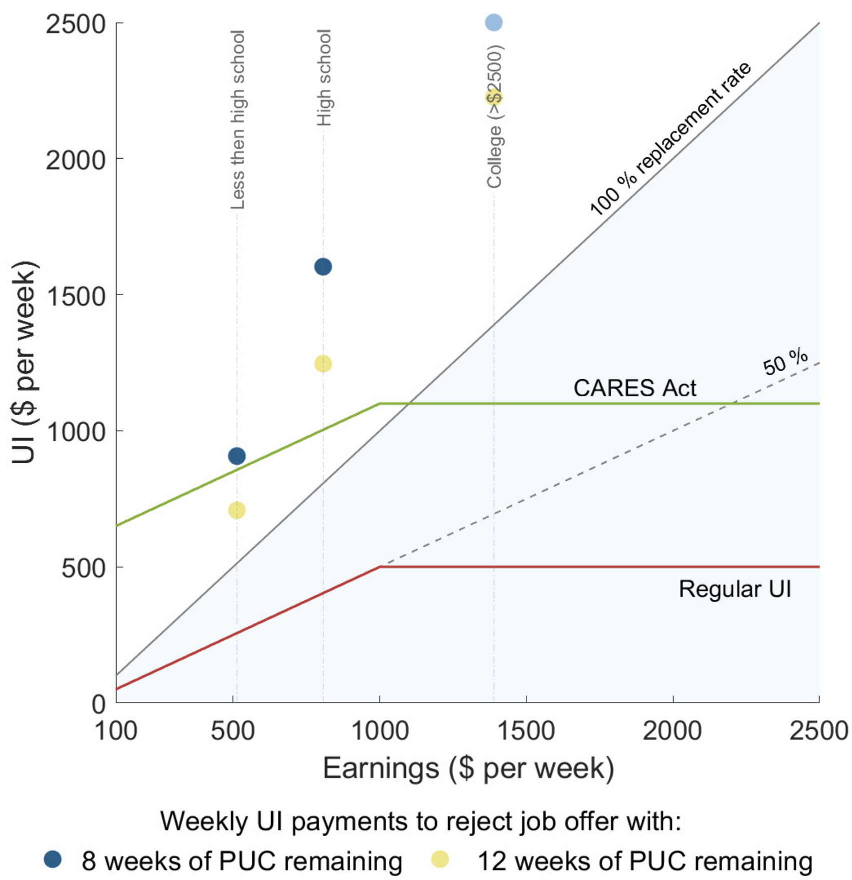


Figure A1: Regular, CARES Act and reservation level UI benefit payments - baseline

Notes: Each dot corresponds to the reservation benefit for an average worker of a particular level of educational attainment calculated according to (14) with 12 (first week of May 2020) or 8 (first week of June 2020) weeks of PUC payments remaining.

Table A3: Reservation benefits and replacement rates - quicker re-opening

	Earnings	Duration of:		Weekly UI compensation				Replacement rates (%)			
	w (wkly)	U (wks)	E (yrs)	$\bar{b}$	b^C	$b^r(12)$	$b^r(8)$	$\bar{\tau}$	τ^C	$\tau^r(12)$	$\tau^r(8)$
Overall	1007	13	1.7	500	1100	1238	1481	50	109	123	147
Age 25 to 54 years	1087	13	2.5	500	1100	1369	1645	46	101	126	151
Education:											
Less then HS	513	14	0.8	265	856	602	725	50	167	117	141
High School	807	13	1.5	403	1003	982	1171	50	124	122	145
College and above	1389	13	2.5	500	1100	1798	2199	36	79	129	158
Occupation:											
Construction	1000	12	1.4	500	832	1168	1374	50	110	117	137
Food Service	464	13	1.0	232	874	541	642	50	179	116	138
IT	1466	12	3.4	500	954	1871	2271	34	75	128	155
Janitors	549	13	1.0	274	1036	643	765	50	159	117	139
Managers	1554	12	2.4	500	1044	1961	2388	32	71	126	154
Medical Assi.	709	13	1.7	354	1100	862	1026	50	135	122	145
Nurses and Thrp.	1203	12	2.9	500	1100	1509	1813	42	91	125	151
Sales and Retail	873	12	1.5	436	1100	1038	1227	50	119	119	141
Teachers	1090	12	1.5	500	1100	1295	1536	46	101	119	141
Transportation	887	12	1.4	444	1100	1061	1258	50	118	120	142

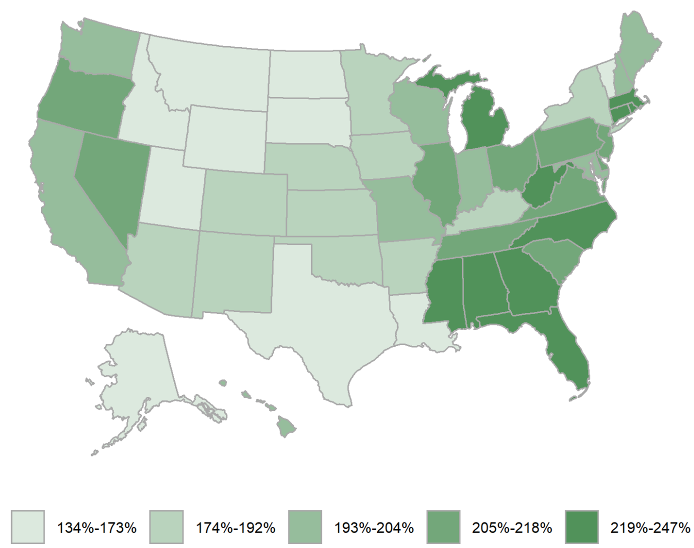
Notes: Earnings and duration data calculated using the Dec. 2018 to Dec. 2019 CPS. w: weekly earnings; Weekly job finding f_w and separation s_w rates calculated by converting the monthly flow rates to a weekly frequency (see appendix for details); $\bar{b}$: regular weekly unempmloyment benefits; b^C: weekly benefits under CARES Act, $\bar{b} + 600$\$.

C.1 State level estimates

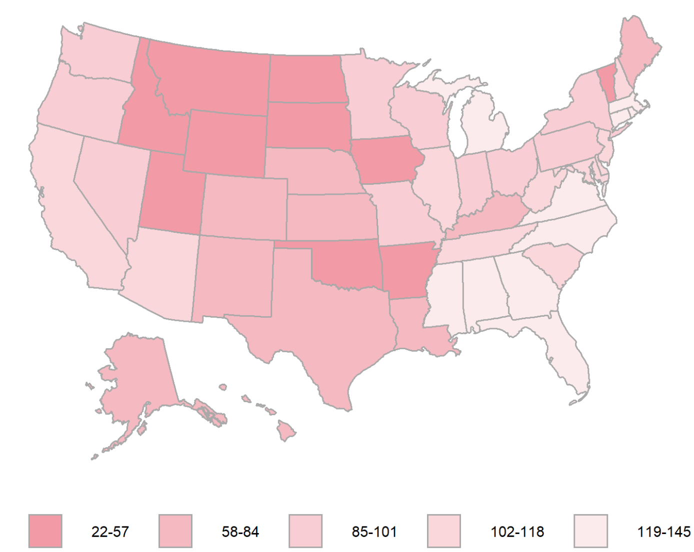
Regular UI benefit payments vary substantially across states, and by extension with the supplemental PUC payments. Regular weekly UI payments in Alabama were capped at $275 compared with $790 in Washington State in 2019, for example (Department of Labor 2019). This section calculates reservation benefits and replacement rates with 8 weeks of PUC payments remaining for all 50 states following the same approach as earlier and mapped in Figure A2a.[31] The map separates states into reservation replacement rate quintiles, ranging from 134% of the previous wage in North Dakota to 247% in Massachusetts. North Dakota's lower reservation replacement rate is a result of the state's dynamic labor market with very short durations of unemployment spells. The typical unemployment spell in North Dakota in 2010 was expected to last 10 weeks. The elevated reservation replacement rate in Massachusetts is largely explained by significantly longer expected durations of job search, around 28 weeks.

This contrasts with actual replacement rates under the CARES Act for the average earner in the two states that are relatively similar: 111% in North Dakota and 102% in Massachusetts (weekly state UI benefits were calculated adapting Ganong, Noel and Vavra (2020)'s UI calculator). The gap between CARES replacement and reservation replacement rates in North Dakota is relatively small but not negligible: 22 percentage points. The margin in Massachusetts, 145 percentage points, is quite wide. The large difference in reservation replacement rates and gaps with state UI under the CARES Act across the two states suggests the potential impacts of the supplemental PUC payments on job acceptance decisions should differ significantly. Figure A2b maps quintiles of the percentage point gaps between CARES replacement rates and reservation replacements rates for all 50 states. Bartik et al. (2020) find that the pick up in the labor market during the initial attempts at reopening was strongest among the states with the highest UI benefit replacement rates. The analysis here shows these states also tended to have the largest gaps between the reservation benefit replacement rates and UI replacement rates under the CARES Act (light pink states in Figure A2b). These are states where the generous supplemental PUC payments would have been the least likely to distort job acceptance decisions (see, for example, Florida, Georgia, and North Carolina).

[31] The full set of state average earnings, job finding and separation rates, and results are available in appendix Table A4.



(a) Reservation replacement rates



(b) Percent point gap between CARES and reservation replacement rates

Figure A2: State level CARES and reservation replacement rates with 8 weeks of PUC payments remaining

Notes: weekly earnings calculated from the monthly CPS, weekly state UI benefits calculated adapting Ganong, Noel and Vavra (2020)'s UI calculator. See appendix B for further details.

Table A4: UI payments and reservation benefits: State average worker

State	U (wks)	E (yrs)	Earnings	UI payments CARES	UI payments Reservation	Replacement rates CARES	Replacement rates Reservation
Alabama	25.97	2.08	944.84	875.00	2180.19	92.61	230.75
Alaska	13.93	1.42	1039.19	970.00	1573.04	93.34	151.37
Arizona	20.87	1.57	966.28	840.00	1858.37	86.93	192.32
Arkansas	18.11	1.47	885.76	1042.88	1548.43	117.74	174.81
California	22.80	1.36	1104.16	1050.00	2240.94	95.09	202.95
Colorado	19.81	1.57	1089.39	1161.00	2064.46	106.57	189.51
Connecticut	25.02	2.13	1105.53	1152.77	2545.33	104.27	230.24
Delaware	24.41	1.64	983.48	1000.00	2106.64	101.68	214.20
Florida	27.66	1.70	945.51	875.00	2212.75	92.54	234.03
Georgia	25.85	1.55	991.11	965.00	2186.48	97.37	220.61
Hawaii	20.74	1.78	1000.42	1219.31	1947.56	121.88	194.67
Idaho	15.72	1.55	877.42	1038.71	1419.68	118.38	161.80
Illinois	24.04	1.70	1058.60	1084.00	2282.95	102.40	215.66
Indiana	22.02	1.72	927.93	990.00	1869.44	106.69	201.46
Iowa	17.40	1.94	909.00	1081.00	1596.55	118.92	175.64
Kansas	17.43	1.88	936.40	1088.00	1641.58	116.19	175.31
Kentucky	20.95	1.47	904.17	1122.00	1728.68	124.09	191.19
Louisiana	17.56	1.49	935.23	847.00	1607.74	90.57	171.91
Maine	20.97	1.77	914.90	1045.00	1792.67	114.22	195.94
Maryland	20.13	1.78	1186.25	1030.00	2344.59	86.83	197.65
Massachusetts	28.25	1.84	1154.46	1177.23	2846.98	101.97	246.61
Michigan	28.24	1.71	988.07	962.00	2347.61	97.36	237.60
Minnesota	19.65	2.03	1041.75	1120.87	2004.20	107.60	192.39
Mississippi	25.39	1.59	846.83	835.00	1853.06	98.60	218.82
Missouri	21.46	1.61	957.18	920.00	1880.86	96.12	196.50
Montana	16.34	1.44	886.34	1060.90	1455.23	119.69	164.18
Nebraska	17.07	2.05	916.36	1040.00	1598.51	113.49	174.44
Nevada	24.77	1.35	941.18	1069.00	1973.61	113.58	209.69
New Hampshire	20.21	2.03	1080.92	1027.00	2135.58	95.01	197.57
New Jersey	24.42	1.52	1153.97	1292.38	2509.16	111.99	217.44
New Mexico	21.88	1.26	883.68	1061.00	1697.00	120.07	192.04
New York	20.51	1.45	1093.88	1104.00	2096.51	100.93	191.66
North Carolina	24.90	1.80	967.19	950.00	2127.43	98.22	219.96
North Dakota	10.38	2.09	976.31	1088.16	1307.54	111.46	133.93
Ohio	23.02	1.79	968.19	1080.00	2018.68	111.55	208.50
Oklahoma	17.83	1.63	912.10	1115.53	1597.44	122.30	175.14
Oregon	23.31	1.77	1017.07	1248.00	2143.49	122.70	210.75
Pennsylvania	22.92	1.78	1013.57	1118.47	2111.67	110.35	208.34
Rhode Island	27.77	1.90	1050.95	1126.00	2532.72	107.14	240.99
South Carolina	23.29	1.48	930.02	926.00	1904.25	99.57	204.75
South Dakota	14.32	1.75	920.61	1014.00	1430.07	110.14	155.34
Tennessee	23.34	1.81	929.56	875.00	1959.49	94.13	210.80
Texas	17.55	1.52	981.26	1110.26	1689.79	113.15	172.21
Utah	16.13	1.55	919.75	1054.87	1510.50	114.69	164.23
Vermont	15.24	1.71	1000.23	1113.00	1605.14	111.27	160.48
Virginia	22.43	2.38	1138.18	978.00	2476.84	85.93	217.61
Washington	20.84	1.69	1111.50	1156.31	2202.80	104.03	198.18
West Virginia	25.80	1.79	867.80	1024.00	1953.24	118.00	225.08
Wisconsin	19.96	2.07	958.91	970.00	1850.30	101.16	192.96
Wyoming	13.85	1.65	938.23	1087.88	1423.91	115.95	151.76

Notes: Notes: Earnings data calculated using the Dec. 2018 to Dec. 2019 CPS. Durations calculated using Dec. 2009 to Dec. 2010 CPS. w: weekly earnings; Weekly job finding and separation rates entering the resevation benefits are obtained by converting the monthly flow rates to a weekly frequency ; regular weekly unempmloyment benefits calculated with the Ganong et al (2020) UI calculator; reservation benefits reported for 8 weeks of PUC payments remaining.