Expanding Unemployment Insurance Coverage

Amanda M Michaud *
Federal Reserve Bank of Minneapolis

This Version (Preliminary): June 24, 2022

Abstract

Pandemic Unemployment Assistance (PUA) expanded unemployment insurance (UI) to workers with low earnings. I document that PUA claimants remained unemployed longer than regular UI claimants during the pandemic and that this gap was larger than predicted from prior recessions. Yet it is puzzling for standard models of dynamic incentives that many PUA claimants went back to work at all given the high replacement rates of UI and low quality of jobs available to this group. I construct a panel of ineligible workers, document how they are unique, and discuss how to improve models for policy analysis UI eligibility expansions. Data also reveal a large unmet insurance need for workers who don't qualify for UI, an impetus to rethink eligibility.

1 Introduction

Unemployment insurance programs in the United States do not cover all workers. Eligibility generally requires the following three criteria to be met to some degree. First, the worker has had a sufficient amount of earnings in the last few quarters subject to an employer tax paid into the unemployment system. Second, the worker has been laid off at no fault of their own. Third, the worker is actively seeking employment. The specific parameters of these criteria are set by states but commonly ineligible groups include self-employed workers, contract or gig workers, workers with low earnings, and new entrants to the labor market. The group of ineligible is important. They make up over a quarter of the labor force and their share has been growing over time.

There is a clear economic argument in favor of requiring a sufficient earnings history to qualify for unemployment insurance articulated, for example, in Hopenhayn and Nicolini (2009). If it cannot be distinguished whether a worker was laid off at no fault of their own or if they quit voluntarily then conditioning benefits on work history can limit the moral hazard incentive to quit a job in order to collect benefits.[1] While the theoretical impetus to study eligibility rules is strong, the quantitative study of the optimal work history duration and earnings level thresholds for unemployment insurance eligibility has been limited. The goal of this paper is to facilitate such research. The results of an actual UI expansion are documented and examined through the lens of a quantitative model used to study regularly eligible claimants. Rich

*E-mail: amanda.michaud@gmail.com. The views expressed are those of the individual authors and do not necessarily reflect official positions of the Federal Reserve Bank of Minneapolis, the Federal Reserve System, or the Board of Governors.

[1] Some studies such as Khoury et al. (2020) show that there is, indeed, a spike of employment separations after the threshold of work history to qualify is met. This suggests that the quit moral hazard is a relevant feature for unemployment insurance design.

microeconomic data compiled to calibrate the economic incentives for workers not normally covered by unemployment insurance show that the tradeoffs for this group differ substantially from higher earners with more stable earnings histories. Put simply: the old models don't fly for studying low earners with unstable work histories and are not suitable for predictive analysis of policies expanding UI. Additional data are used to discuss a path forward on how to improve quantitative models to appropriately capture the choices facing workers covered by potential future eligibility expansions.

The Federal Pandemic Unemployment Assistance Program (PUA) expanded unemployment insurance eligibility to virtually all workers. Newly covered workers included those not meeting the typical earnings criteria: the self employed, contract or gig workers, new labor force entrants, and low earners. It also extended benefits for individuals not meeting other criteria including workers who quit or were not looking for work due to pandemic related factors such as illness or child care needs. PUA recipients ended up comprising a significant amount of continued claims, over 40% by the end of the summer of 2021. This response has suggested an unmet need for unemployment insurance for many American workers. The impact of the PUA program has both highlighted the question of how public insurance for these workers should be designed and provided an experiment to study what happens when unemployment insurance is expanded to cover them.

Administrative claims data are used to provide real-time estimates that show the typical PUA claimant remained on the unemployment rolls for longer durations than the typical claimant covered through eligibility for regular state unemployment programs.[2] Direct classification and machine learning techniques are combined to compare PUA claimants to a pool of similar UI ineligible workers in the 2009 recession. I find that PUA claimants remain on the unemployment rolls longer than would be predicted during the pandemic for a similar group of workers based on their behavior compared to regular state claimants in the previous recession. I conclude that the presence of the PUA program likely decreased PUA claimants likelihood of returning to employment each week by over 50%.

The evidence from the PUA program shows that unemployment insurance coverage extends the unemployment duration of currently uninsured workers more than currently insured workers. Why is this and how should it be considered when designing eligibility for UI programs? To answer these questions, I quantitatively assess how the dynamic tradeoffs unemployed workers face when choosing whether to return to work differ based on their typical earnings levels and employment histories. Calibrating a standard search model to rich microeconomic data, I find that the duration of PUA claims that occurred during the pandemic is actually much shorter than would be predicted given the generosity of the program and the low dynamic value of jobs these workers were likely to receive offers for. This result is quantitatively robust. The theory not only predicts workers who were earning too little to qualify for UI would not be willing to

[2]This includes those workers entering through regular state unemployment and staying on through federal extensions either through the Extended Benefit (EB) or Pandemic Emergency Unemployment Compensation (PEUC). Including extensions implies an apples to apples comparison where total length of potential benefits was similar across both groups.

leave UI to accept their old jobs back, it predicts they were so far from the margin they would not even accept a job that doubled their old earnings. This result is robust to issues of recall during the pandemic and is only strengthened if other pandemic government transfers such as economic impact payments and expanded child tax credits are added to the analysis. To be clear, this is not an outcome of an outright bad model. This standard search model successfully replicates the duration of unemployment for those entering UI rolls through regular state UI eligibility, even given the higher UI replacement rates and duration during the pandemic. It also successfully replicates the difference in unemployment durations across groups during normal times and the Great Recession. The conclusion is that the standard model is great for standard workers but is missing economic margins that are qualitatively important for low earners and those with unstable work histories below the normal UI eligibility threshold.

What is missing from workhorse models of job search that make them ill-suited for studying expansions of the unemployment insurance system to workers with lower earnings? To address this question, I construct monthly earnings and employment data in the Panel Study of Income Dynamics and designate individuals as eligible or ineligible under typical state UI rules. Ineligible workers move into eligibility at very low rates. Their paths are mostly separate and ineligible workers are distinct from eligible workers in several ways. They are less likely to be the highly attached prime age worker at the heart of many Macro-Labor calibrations. Over a third of the ineligible are under 25 or over 65. They also work fewer hours. A model interpretation of high utility cost of work on the intensive margin would deliver lower hours and seems consistent with school demands and aging bodies. This would, however, need to be coupled with reason to work for such low earnings to begin with. It could be that the ineligible have low fixed cost of work but there are also indications that the ineligible have high marginal utility of consumption– they work for such low earnings because they really need the money. Ineligible workers have higher rates of poverty and rely more on government transfers. There is, however, substantial heterogeneity. Almost a quarter of ineligible workers are second earners in families with total household incomes over $100k per year. It may seem most ineligible workers are supported at the low end by government programs and the high end by other household members but I find this is not the case. Ineligible workers' households average a 17% decline in consumption during a year in which the worker has a non-employment spell. Furthermore, even the middle class households with family incomes from $50-$120k experience an average decline exceeding 10%.

The conclusion from coalescing data and theory is that workhorse quantitative models of claim duration are not suitable for studying extending UI coverage to lower earners. Analysis of the PUA program showed lower earners actually exhibit *lower* job search disincentives than the workhorse models would predict for regular state claimants in similar circumstances. The PSID analysis suggests two paths to improve. The first is including high marginal costs and low fixed cost of worker for workers to sort into low earnings job. The second is that the insurance need found to span across income groups in the PSID is not consistent with standard models inclusion of precautionary savings with a risk free asset. A more sophisticated model of debt and

asset liquidity is recommended but even a hand-to-mouth model without savings would provide better normative advice. For policy makers, the main take away is that extending UI has high marginal cost: current ineligible would stay on the program longer than current eligible; but high marginal gains: current ineligible tend to have higher insurance value of the program than current eligible.

Literature. There is a large literature on the work disincentive effects of unemployment benefits. The objective of this paper is to provide new information about job search tradeoffs of workers current eligible and ineligible for UI. In this review, I will focus on literature regarding either expanding coverage to new workers or pandemic insurance changes.

Most research on the temporary changes to unemployment benefits during the COVID-19 pandemic focus on changes to the weekly amounts paid to an unemployed worker, also referred to as a replacement rate. The Federal Pandemic Unemployment Compensation (FPUC) and other programs increased weekly payments by $300-$600. This was a subject of intrigue because some workers now received more money through unemployment benefits each week than they had earned on their previous job. Boar and Mongey (2020), Petrosky-Nadeau and Valletta (2021), and Fang et al. (2020) use structural models to assess the expected impact of increased UI replacement rates on job finding rates. These papers emphasize that the choice to take a job is a dynamic one. The value of a job relative to unemployment is generally higher than the value of a week of earnings on the job relative to a week of unemployment benefits. All three papers predict that many workers with replacement rates over 100% would still return to their old job. Petrosky-Nadeau and Valletta (2021) provide some evidence this is true using variation in replacement rates across US states. Other empirical papers generally find higher replacement rates lowered return to work but also emphasize the unique context provided by the pandemic, (Finamor and Scott (2021)). Ganong et al. (2021) find smaller disincentive effects during the early months of the pandemic. They emphasize that a scarcity of job opportunities and expected recall, both unique in scope to the pandemic, likely tempered disincentive effects relative to a normal recession. This paper focuses on newly insured PUA recipients who I show would not be predicted to return to work. My results for the increased replacement rates of workers entering through regular UI, however, are broadly consistent with these studies.

Normative research, and particularly quantitative normative research, studying expanding unemployment eligibility to workers with lower earnings or instable employment history has been rather scarce. Most studies focus on optimal benefit levels and duration for all workers and ignore eligibility. Hopenhayn and Nicolini (2009) provide a theoretical underpinning of the screening advantages of limiting eligibility using work history when quits cannot be distinguished from layoffs. Baker and Rea Jr (1998) find a substantial increase in moral hazard– that is unemployment duration– when eligibility was expanded in a natural experiment in Canada. Khoury et al. (2020) study work duration eligibility in matched French employee-employer data. They find that separations increase significantly after the eligibility threshold (indicating moral hazard concerns are real) and workers just on the other side of this threshold search

significantly longer but do not have better job quality outcomes. The analysis in this paper does not address normative issues and no welfare calculations are provided. As a consequence moral hazard and a host of issues dealing with different notions of labor market equilibrium, dynamic contracting, mechanism design, etc. are justifiably ignored. The objective is instead to provide an understanding of how job search tradeoffs change from a worker's perspective across the earnings and job stability spectrum in order to set up a quantitative environment for normative study.

2 Analysis of the Pandemic Unemployment Assistance Program

The Pandemic Unemployment Assistance Program (PUA) was a temporary Federal program that extended unemployment benefits eligibility to workers not meeting states' earnings history criteria. I perform a stock flow analysis of aggregated claims data to deduce how the claim duration of PUA recipients differed from those whose initial claims met regular state unemployment insurance eligibility. Administrative data has flaws that I attempt to accommodate but they also have advantages over survey data. Standard large surveys did not collect data on PUA claimants consistently. This stock-flow methodology uses the universe of claims and not subject to selection bias or surveying lags. The newness of the program and the decentralization of its administration across states present several hurdles to any methodology an I detail how I deal with them in the following paragraphs.

The United States Department of Labor provides data on initial and continued claims for the Pandemic Unemployment Assistance (PUA) and regular state unemployment systems, as well as continued claims for the Pandemic Emergency Unemployment Compensation (PEUC) and the Extended Benefits (EB) programs. An initial claim is a request for determination of UI eligibility from an unemployed individual who recently was separated from his or her employer. A continued claim is a claim for an additional week of unemployment from an individual who has already filed an initial claim. The former approximates a flow onto an unemployment program and the latter is the stock of individuals continuing prior claims.[3]

The PEUC and EB programs are federally funded and extend the duration of benefits for claimants in the regular state programs.[4] Moving from a regular state program to PEUC or EB constitutes a continued claim. I will define total continued claims in regular state programs as the sum of continued claims across the regular program, PEUC, and EB.[5]

[3]These are approximate measurements. For example, some initial claims are rejected and never result in payment and some programs allowed retrospective claims during the pandemic. Both of these issues will be addressed in the analysis.

[4]PEUC provided up to an additional 13 weeks of federally funded insurance due to special actions dealing with the pandemic. The EB program is automatic and provides up to 13 additional weeks if a state is experiencing high unemployment. The EB program may extend duration in eligible states after a claimant's PEUC weeks run out.

[5]This is because we are interested in the stocks of claimants by eligibility type and not the state versus federal funding distinction.

The PUA program provides up to 79 weeks of federally funded payments to workers with reduced income who are not eligible for regular state programs. The program initially provided payments through December 31, 2020 but was extended by President Trump on December 28, 2020 to last until March 14, 2021. In January 2021, it was extended again by President Biden through September 6, 2021. Additionally, the program provides retrospective payments for reduced income events beginning on or after January 27, 2020. Administration of the PUA program began at different times across different states in April-June 2020.

The retrospective payments, staggered start dates, and the requirement of some states that PUA claimants first file a regular unemployment claim all present hurdles for a stock-flow analysis. I deal with the first two issues by simply starting the analysis on July 15, 2020. The analysis is ended on May 1, 2021 which a month prior to when a subset of states withdrew from federal programs including PUA and PUEC. To deal with the second issue, I categorize states into three groups: those that require an applicant to apply for PUA through being rejected from the regular state program; those that accept PUA applications directly, and those that either changed protocol at some point or whose protocol cannot be determined.[6] The states in the third category are dropped.

For the states that take PUA applications indirectly through regular state programs, both the initial PUA and regular state claims data must be adjusted to reflect true flows onto each program. I do this by using the time series of rejection rates of initial claims due to insufficient work history which is available for each state from the Department of Labor. These are the true rejection rates for claims made to and intended for regular state UI program in the states that process PUA claims separately from regular ones. I extrapolate these rejection rates to the states that took PUA and regular claims together by assuming that the mean rejection rate due to insufficient work history of claims intended for the regular state program is the same in each set of states. I apply the mean rejection rate to regular initial claims from these states to those states that did not take PUA claims directly and assign any excess rejections as initial applications to the PUA programs.

In specific notation, let $\{a_t^{pj}, c_t^{pj}, r_t^j\}$ be the true initial claims, continued claims, and rejections to program p in state type j at time t. Let $\{\hat{a}_t^{pj}, \hat{c}_t^{pj}, \hat{r}_t^j\}$ be the same objects reported in the DOLETA data. For states that take PUA and regular claims separately, the observed objects reported by DOLETA should be the actual ones, subject perhaps to measurement error. For the states that require PUA claims to be filed first as regular claims and then rejected, the

[6] I find that roughly half of the sample, 25 states plus the District of Columbia, require PUA applicants to first file for regular benefits and be denied. We check this categorization by comparing rejection rates to regular state programs in each group. Indeed, the group that requires PUA applicants to file for regular benefits and be rejected has a 12.6 percentage point higher rejection rate of initial claims to state programs (44.3% versus 31.7%) based on insufficient work credits than those that take PUA applications directly and separately.

approximation of the true values are:

$$\begin{aligned}
\tilde{r}_t^j &= mean_{j\in\{direct\}}(\hat{r}_t^j) \\
\tilde{a}_t^{regularj} &= \hat{a}_t^{regularj} * (1 - (\hat{r}_t^j - \tilde{r}_t^j) \\
\tilde{a}_t^{PUAj} &= \hat{a}_t^{regularj} * (\hat{r}_t^j - \tilde{r}_t^j) \\
\tilde{c}_t^{pj} &= \hat{c}_t^{pj}
\end{aligned}$$

The data are cleaned in a third and final way by removing four states with swings in PUA continued claims data that exceed 200% starting in July 2020.

Results The stock-flow estimates of the weekly exit rate from unemployment programs are shown in Figure 1. The figure depicts the results for all states with rejection rates imputed as described above. I also present numbers here for only the subset of states where PUA and regular claims are taken separately. The former establishes a higher estimate of PUA duration than the latter.

PUA claimants had lower exit rates from unemployment insurance than those entering through regular state program eligibility. The typical PUA claimant claimed 9.5 to 11.5 more weeks of benefit payments than the typical claimant claimed through regular state UI programs. This is an additional 57 to 82 percent weeks of claims per claimant.

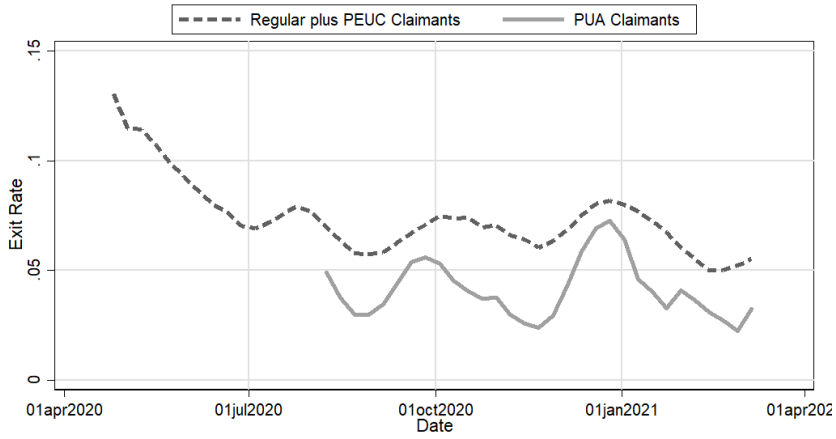
The basic accounting impact of the longer duration of PUA claimants on total claims paid is as follows. Total unemployment claims would have been 9.8 to 17.6 percent lower from May 2020 to May 2021 if PUA claimants had the same average exit rate as claimants on combined regular state and extended UI benefit programs. This difference amounts to approximately 120 to 220 million additional claim weeks. The increase in claims caused by the lower PUA exit rates grew larger in 2021 because PUA exit rates fell further behind those of regular claimants as the Pandemic recovery progressed.

Further Evidence: Anticipated Expiry in December 2020. The CARES act created the PUA program which extended UI to those previously not eligible, and the PEUC which extended the duration of claims to regular programs from 26 to 39 weeks. Both programs were temporary measures. PUA, PEUC, and also the full federal funding of Extended Benefits (EB) were originally slated to expire on December 26, 2020. As of the first week of December 2020, there were 9.7 million PUA continued claims and 5.0 million PEUC continued claims representing unemployed persons at risk of losing coverage if the programs were to have ended on December 26.[7] On December 21, 2020 the text of a bill that would extend PUA and PEUC for an additional 11 weeks was made public. The provision was signed into law by President Trump on December 27, 2020.

Economic theory, as will be made explicit in the following section, postulates that UI claimants would start looking for work in anticipation of their benefits expiring and increase

[7] All claims data published by the Department of Labor.

the rate at which they exit unemployment before they are actually terminated. This, however, is only the case if the presence of the UI program had a negative causal impact on job search behavior to begin with. The exit rate estimates shown in Figure 1 provide some suggestive evidence that the UI programs did have negative impacts on job finding rates. The exit rate of both PUA and combined regular UI and PEUC claimants rise in December 2020 before falling sharply at the end of the month when the extension is announced. There could be other factors at play such as seasonal work and so this is only suggestive evidence but the magnitude is significant and this all occurred during the largest spike in measured virus cases thus far in the pandemic.



Sample of analysis September 2020-May 2021

Figure 1: Estimated Weekly Exit Rate from Unemployment Programs.

Comparison to Prior Recessions. The fact that PUA claimants claimed unemployment insurance for longer than individuals entering through regular state programs is not alone a smoking gun that work disincentives from unemployment programs are higher for the state ineligible group compared to the eligible group. It could be that the type of workers claiming under PUA take, on average or during recessions, a longer time getting back to work than regular state claimants.

To test this hypothesis, I compare the speed at which the similar workers to the PUA eligible group returned to work in prior recessions to the findings from the stock-flow analysis above. I use data from the monthly outgoing rotational group of the Current Population Survey (CPS) to estimate monthly flow rates from unemployment to employment. I categorize workers either eligible or ineligible for regular state unemployment directly, where possible, using earnings and each worker's self report about whether they are employed in a standard employer-employee arrangement or not.[8] This method identifies only a subset of the workers who will be PUA eligible as there are not enough questions to judge all criteria. I feed this variable along with other demographic variables into a machine learning (LASSO) algorithm to predict which workers are likely to claim in all months of the CPS. The training sample is the Displaced Workers

[8]Self-employed and contractors are generally not covered by state unemployment benefits.

Supplement (DWS) which only occurs every two years. The algorithm is similar to propensity score matching but with using the LASSO algorithm to select the set of predictive variables. Note that this algorithm predicts actual claims and not just eligibility. This is the right classification for comparison to the administrative claims data which makes this approach advantageous over analysis that deduces eligibility from micro data on earnings only. With the DWS data, no assumptions on which eligible workers file claims need to be made which is important because almost half of eligible workers do not file claims and this share is not stable over time.

Flows from unemployment to either employment or non-employment will be used as the best comparison for the administrative UI claims data studied above since non-employed individuals are technically ineligible to claim unemployment insurance. Using flows from unemployment to employment only are quantitatively similar and shown in Figure 2 as well. The time series of exit rates estimated for would be PUA claimants and regular UI claimants contrast in two ways. First, the exit rate from unemployment falls more for regular UI claimants than would-be PUA claimants (non-eligible for regular programs) during the Great Recession. The estimated average rate of duration as the inverse of the exit rate for would be PUA claimants is 1.25x longer than for regular UI claimants. Second, the exit rate of each group becomes similar during the recovery and stabilizes as similar over the course of the expansion prior to the COVID pandemic in 2020.

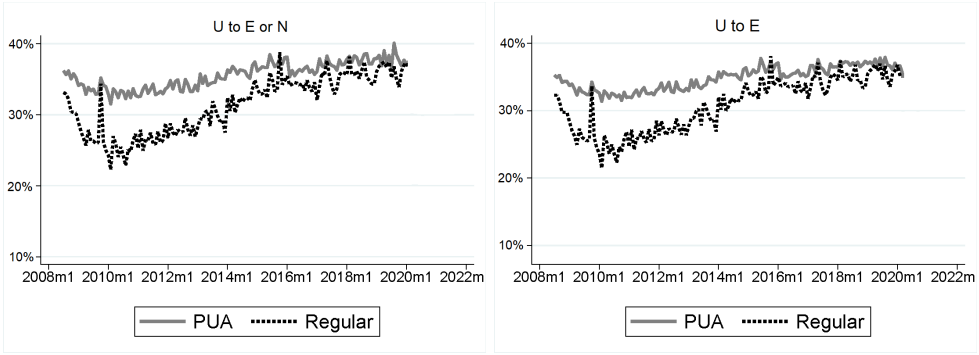


Figure 2: Estimated Monthly Exit Rate for Regular UI claimants and those who would have been eligible for a PUA-like program.

The behavior over the time series of the CPS sample is consistent with a work disincentive effect of unemployment insurance. Unemployment insurance programs were more generous and lasted longer during the Great Recession but did not cover PUA-type workers. The job finding rate of those estimated to be likely eligible for unemployment falls more than those estimated to not be eligible during this time but the rates become similar after the more generous UI programs are ended.

Comparing the CPS sample to the estimates from the pandemic also provide further interpretation of the finding that workers on PUA had longer duration of claims than those on regular UI programs during the pandemic. We see this is not likely due to fixed characteristics of each group of workers since their job finding rates were similar right before the pandemic. It is also not normal recessionary phenomenon. The duration of workers ineligible for regular UI relative to those eligible for regular state UI increased by 36% in the pandemic when they were

covered by PUA benefits than in the Great Recession when they received no unemployment benefits.

Certainly alternative stories besides work disincentives of unemployment insurance programs could be told to rationalize these facts. The main result of the quantitative theoretical section will be that the PUA claimants, contrary to regular UI claimants, should hardly have gone back to work at all and that their duration should have been even longer during the pandemic. Thus any criticisms that close the duration gaps shown above would strengthen the results of this paper. Further, I will show that the duration gaps would have to be increased by a like implausible magnitude in order to be consistent with basic theory of job search incentives. Thus the basic model often used for policy analysis falls short in explaining human behavior and I will explore ways to improve upon it.

3 Basic Theory of Unemployment Duration

Federal unemployment programs during the pandemic not only expanded eligibility to previously ineligible workers, they also dramatically increased how much each claiming worker received in benefits (PEUC, FPUC, PUA, etc.). Together these programs implied that some workers were receiving more money on unemployment than they earned in their previous job. And yet some workers in this situation still went back to work. The literature on job search behavior can reconcile these facts through several mechanisms that imply the value of a job is more than just the flow value of earnings received each week. A job also has an asset value that includes the empirical reality that having a job today generally increases a worker's earnings in the future compared to if that worker were unemployed today.

This section develops a structural model of the factors that determine the asset value of a job.[9] It will be calibrated to explore whether these factors can help account for the differential unemployment duration of workers who do and do not meet the earnings requirements to be eligible for unemployment insurance; as well as the increased duration of ineligible workers when covered by the PUA program during the pandemic. The model will be partial equilibrium which is suitable to explore the incentives determining past behaviour because equilibrium outcomes such as wages and job arrival rates can be asserted as they were. They do not have to be predicted by theory as would be necessary if the model were to be used to evaluate counterfactual situations such as future outcomes or policy proposals.

The model will be described for a generic job type. In the quantitative section I will explain the difference in the parameter values across ineligible and eligible jobs.

Workers. There is a continuum of ex-ante identical workers. A share d of workers die each period and are replaced by new labor market entrants. New entrants are endowed with the same initial level of earnings potential $w \in [\underline{w}, \bar{w}]$ which will evolve stochastically during periods of employment and unemployment. Workers are also distinguished by whether they currently

[9] The dynamic tradeoffs to a worker are similar to Boar and Mongey (2020)

qualify for unemployment benefits $e \in \{0, 1\}$. New entrants begin as unemployed and do not qualify for unemployment benefits at first. They become qualified stochastically if working in a job of sufficiently high earnings.

The value of a job. The value of a job to a worker with earnings potential w and unemployment qualification status e is as follows.

$$\begin{aligned} J(w,e) &= u(c) - \phi + \beta(1-\delta)\mathbf{E}_{w',e'|w,e}[J(w',e')] + \beta\delta U(w,e) \\ &st \quad c = w(1-\tau(w)) + t^g(w) \end{aligned}$$

The worker's flow utility is the sum of the value from a standard utility function $u(c)$ which is increasing and concave in consumption c and a linear disutility of work $-\phi$. The worker's consumption is equal to the sum of her after tax earnings in the period $w(1-\tau(w))$ and any government transfers she qualifies for $t^g(w)$. The baseline model abstracts from asset accumulation. This is because, as to be explained later, panel data suggest that a large fraction of households are at a negative net asset position and not able to use savings for consumption smoothing in the way that would be implied by the inclusion of a simple risk free asset to the problem. The robustness section discusses how adding a simple risk free asset would make the results of this paper even stronger.

The continuation value of a job is discounted at rate $\beta \in (0, 1)$. With probability δ, the worker loses her job and her continuation value is the value of unemployment at her current state $U(w, e)$. With probability $1 - \delta$, the worker keeps her job and her continuation value $E_{w',e'}[J(w', e')]$ includes rational expectations over her draws of w and e next period. Earnings potential w follows discrete steps up a finite ladder. Earnings potential increases to the next step with probability γ^e during each period of employment. A worker who does not qualify for UI ($e = 0$) becomes qualified with probability ρ^e during each period of employment. Once an employed worker becomes qualified she stays qualified while employed.

The value of unemployment. The value of unemployment to a worker with earnings potential w and unemployment qualification status e is as follows.

$$\begin{aligned} U(w,e) &= \max_{s\in[0,1]} u(c) - d(s) + \beta s\pi J(w,e) + \beta(1-s\pi)\mathbf{E}_{w',e'|w,e}U(w',e') \\ &s.t. \quad c = b(w,e) + t^g(w) + t^i(w) \end{aligned}$$

Unemployed workers who would like to find a job in the search market face search frictions. They must put forth an effort $s > 0$ in order to potentially receive a job offer. The flow value of unemployment includes utility from consumption $u(c)$ minus utility costs from job search $d(s)$. Consumption equals the sum of unemployment benefits $b(w, e)$; transfers from the government $t^g(w)$; and informal transfers $t^i(w)$. Unemployment benefits are equal to zero for those who do not qualify $e = 0$ and follow a concave schedule for those who do qualify. Government transfers

include things such as welfare payments and food stamps. They are a function of earnings potential. Informal transfers are thought of as those from family, savings, or charity. They are also a function of earnings potential and will be calibrated to match consumption drops during unemployment.

The asset value of unemployment includes the asset value of a job for workers who search. Workers who search for a job find one with probability $s\pi \in [0, 1)$ where s is the worker's search effort and π is an exogenous linear search efficiency. Search has a convex, non-pecuniary cost $d(s) = \chi s^{\eta}$. Workers who do not find a job or do not search remain unemployed but their state w', e' may change next period. With probability γ^u, earnings potential w' moves down one step. With probability ρ^u, a worker who qualifies for unemployment insurance benefits becomes unqualified. This reflects the finite duration of claims provided by US states.

To close the model, the unemployment insurance system is fully funded by a progressive labor tax. Let $\theta^e(w, e)$ and $\theta^u(w, e)$ be the measures of individuals of each type w, e that are employed and unemployed, respectively. Then the unemployment system is funded by $\sum_{w,e} w\tau(w)\theta^e(w, e) = \sum_{w,e} b(w, e)\theta^u(w, e)$.

Comparative Statics. The quantitative part of this paper focuses on the nuances of the asset value of jobs and unemployment; and how they may account for differing behavior of eligible and non-eligible workers. If workers were myopic $\beta = 0$ and the value of unemployment and employment were only equal to flow values of consumption, then the search choice of a worker is easy. She searches harder when her earnings potential exceeds the value of her unemployment benefits more. This comparative static is still true in the full model, but is quantitatively tempered by variation in the asset values of employment and unemployment. Generally, the asset value of employment is higher than the current flow value for three reasons: earnings are weekly increasing in tenure; UI qualification requires working several periods; and having a job today increases the chance of having a job tomorrow compared to when unemployed. Conversely, the asset value of unemployment is generally lower than the current flow value for two reasons: earnings potential weakly falls with unemployment duration; and current UI claimants lose benefits and become unqualified stochastically as unemployment continues.

These claims can be directly elucidated with some simple proofs:

Proposition 1: For all w, e such that $J(w, e) > U(w, e)$: the asset value of a job $J(w, e)$ is weakly increasing in (i) the speed and magnitude of earnings potential growth; (ii) the speed of gaining UI qualification; (iii) the expected duration of the job match.

Proposition 2: For all w, e the asset value of unemployment $U(w, e)$ is weakly decreasing in (i) the speed and magnitude of earnings potential decay; (ii) the speed of losing UI qualification.

An obvious corollary is that a comparison of period earnings on a job $w(1 - \tau(w))$ to the period unemployment benefits $b(w, e)$ is an insufficient determinant of job search intensity. Indeed, the latter can exceed the former and an unemployed worker can still want a job due to the comparison of asset values.

4 Calibration and Quantitative Analysis.

The main quantitative application of the model is to ask whether the differences in job characteristics can account for the differences in unemployment duration of eligible and non-eligible workers in three historical cases: (1) normal times (2014-2019); (2) the great recession (2008-2012); and (3) the COVID pandemic September 2020-May 2021.

The quantitative analysis includes two job types: eligible and ineligible. Eligible jobs are those with high enough earnings such that a worker will become eligible for unemployment insurance if they work for a sufficient duration. Ineligible jobs are those with earnings that are too low to qualify for unemployment insurance even if the worker is employed for the duration required to qualify. Workers will be assigned to a job type and there is no switching probability in the baseline model. This is because switches into eligible jobs are rare enough to be negligible, about 7% annually in the PSID data.

It is important to distinguish that the job type of a worker is distinct from their UI qualification status. An eligible worker is only qualified if they work for a sufficient duration. An ineligible worker can never be qualified. This distinction will be very important later on when discussing the impact of the PUA program because PUA claims include all workers in ineligible jobs and also workers in eligible jobs who are not yet qualified. Thus the discussion of workers will include both their job types and qualification statuses.

4.1 Calibration.

Technological parameters of the two job types differ but workers have the same preferences except for the flow cost of work. The model period is one week and the discount factor is set to $\beta = 0.999$.

Preferences over consumption are $u(c) = ln(c)$.[10] The utility cost of job search takes a common form in the literature: $d(s) = \chi s^{\eta}$. Studies using microeconomic time use data provide a range of estimates of η and I choose a central value $\eta = 3.0$.[11] The cost parameter χ is calibrated such that endogenous job search effort of unqualified workers matches the average search time of unqualified workers estimated in time use data by Krueger and Mueller (2010): 47 minutes out of a potential 4 hours for job search in a day.[12] The flow utility cost of work is normalized to zero for ineligible jobs and, for eligible jobs, is calibrated to match the average search time of UI recipients in Krueger and Mueller (2010): 33 minutes a day.[13] The calibration implies that worker's endogenous search decision provides a consumption equivalent flow utility cost ranging from 0.4-3.3% of their flow earnings. The flow cost of work for eligible jobs is equivalent to 0.28% of median eligible earnings, or $12 per week.

[10] Alternative calibrations with a higher concavity of CES utility or a lower value of β have been shown to strengthen the main result in the paper.

[11] Gomme and Lkhagvasuren (2015); Faberman et al. (2017).

[12] Potential hours are set at 4 because job search of more than 20 hours per week is rare in ATUS studies.

[13] The higher utility cost of work for eligible jobs is necessary because the other job-specific parameters of the model do not provide the difference in job search intensity seen in the data. A higher cost, however, is not unreasonable since eligible jobs have higher hours than ineligible jobs in the PSID data.

The remaining parameters are chosen to match estimates from the Panel Study of Income Dynamics (of Income Dynamics (2021)).[14] These data were used to construct a panel on monthly earnings and labor force status matched with annual data on individual demographics and household composition, income, and consumption. Employment data and earnings are used to construct whether a worker is in an eligible job and if she or he has worked long enough to qualify for UI coverage. All statistics for unemployment include those reporting non-participation as well but they must have worked within the past 12 months and have non-employment durations of less than six months.

Earnings for each type of job are estimated from the PSID data for eligible and ineligible workers. The earnings ladder for each job is chosen to match the median life-cycle income profile for each. Individuals also receive government transfers which are calibrated to be equal to the median EITC and food stamp values in the PSID data for their earnings level. This accounts for elaborate benefit formulas and also claiming behavior and household composition which are not included in this model. The stochastic arrival rate of qualification for UI for workers in eligible jobs is chosen to provide a mean arrival rate of 6 months in concordance to typical state rules.

Workers in each job become unemployed with a weekly probability that replicates, on average, the monthly separation rate for each type of job in the PSID data. Unemployed workers who have qualified for unemployment benefits receive a government transfer equal to the formula provided for New York State. This formula roughly replaces half of lost income up to a threshold of $500 per week. Workers who qualify for UI loose their qualification status with a probability that replicates the average duration of benefits of 26 weeks during the baseline of non-recessionary times. Unemployed workers continue to receive government transfers equal to those estimated in the PSID data for their income group. Additional family income and/or informal transfers are chosen to replicate a drop in consumption equal to the estimated fall in household food consumption during a year in which unemployment occurs.[15]

Target	Covered	Uncovered
Annual earnings growth in E	2.6%	1.8%
Annual earnings loss in U	3.4%	5.7%
Median annual earnings	$48k	$8.6k
Search time	33 min	47 min
Monthly U to E	30%	35%
Monthly E to U	0.5%	2.5%
Consumption drop in U	5.7%	17%

Table 1: Calibration Target Highlights

The model is exactly identified and targets can be matched, sequentially, one for one by choosing the relevant parameter. This implies that the calibration, through the algorithm described, is both unique and that all of the targets are exactly replicated in the model.

[14] Analysis used the package Kohler (2015).

[15] Food consumption declines are estimated in a regression controlling for age, family composition, inflation, and individual family fixed effects.

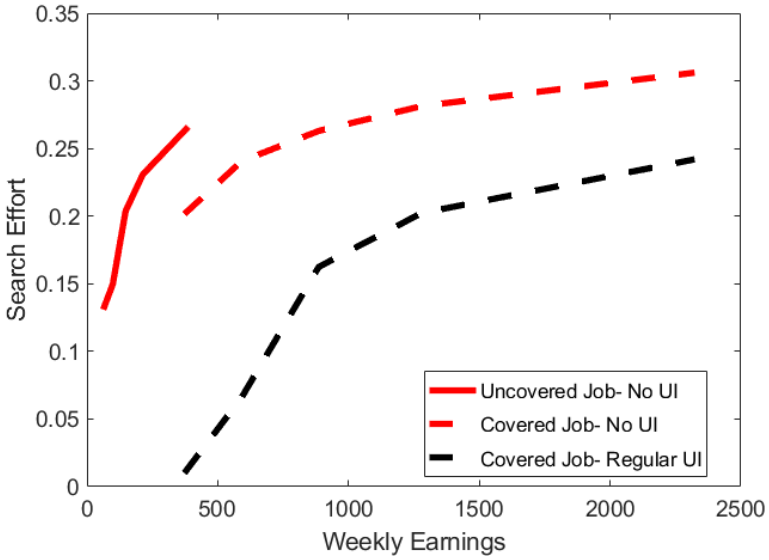


Figure 3: Search policy functions from the baseline non-recessionary calibration

Mechanics of the Baseline Model. Figure 3 shows the policy functions for workers in uncovered (ineligible) jobs and for workers in covered (eligible) jobs by whether they currently do not qualify for or qualify for and receive UI. The search effort is generally higher for workers who do not receive UI. This depicts the job search disincentives of UI when comparing those in covered jobs who receive UI to those in covered jobs who don't. The search disincentives for lower earners are larger than for higher earners with the same job type because the UI system replaces a greater share of potential earnings for lower income workers and other government transfer programs are more generous as well.

The search intensity for covered workers not on UI relative to uncovered workers not on UI depends on the characteristics of these jobs and the progressivity of both UI an other transfers. For example, the search policy of uncovered workers increases more steeply in potential earnings not only because food stamps and other government transfers fall off sharply when increasing income from low levels, but also because informal insurance declines are estimated to be larger for higher earners within the uncovered group. This makes sense given the empirical finding that the majority of earners in uncovered jobs are teenagers, retirees, or secondary earners who have additional family income.

Table 2 shows how the difference in job characteristics across job types impacts search intensity with and without UI coverage. The top portion shows that workers in ineligible jobs would choose a significantly lower search intensity if they received UI than eligible workers who do receive UI. What drives the generally lower search effort of workers in ineligible jobs? This question is addressed under the heading "Counterfactual for Ineligible" by assigning, one at a time in isolation, the characteristics of eligible jobs to workers ineligible jobs. We see that the estimated lower efficiency of search χ and lower earnings levels are key factors lowering job search effort of ineligible workers. This is interesting because earnings in eligible jobs are six times larger than ineligible while the search efficiency in eligible jobs is only 10% larger than in

Baseline		
	w/ UI	w/out UI
Eligible	**35.0**	48.0
Ineligible	28.7	**35.0**
Counterfactual for Ineligible		
If had covered...	w/ UI	w/out UI
Job finding efficiency	32.3	37.7
Job loss rate	29.3	35.4
Job ladder	28.7	35.0
Earnings levels	37.4	38.5
Disutility of work	22.0	28.8

*** Matched data values in baseline calibration**

Table 2: Counterfactual decomposition of determinants of search intensity across job type

ineligible. Yet, the response to each of these counterfactuals is not much different in magnitude. Neither the difference in job loss rate nor the difference in earnings growth on the job have a significant impact on differences in job search. The difference in the estimated utility cost of work across jobs is the strongest driver increasing the relative search effort of workers in ineligible jobs. This cost was calibrated to match the job search intensity of workers in eligible jobs given all other parameters of the model. The value is approximately \$12/week. This is relatively small at the median value of weekly earnings of \$923 dollars for eligible jobs but is higher at the median value for ineligible jobs with median weekly earnings of \$165. This is not an implausible result given that workers in ineligible jobs work on average 12 hours per week compared to 36 on eligible jobs.

4.2 Analysis of the Great Recession.

The model is applied to analyze whether the theory can replicate behavior across job types that I previously estimated for the Great Recession. The unemployment insurance program is adjusted to include the 20 week increase in the duration of benefits that was enacted during this time. Next, the efficiency of search technology, χ is adjusted downwards for the workers in eligible jobs such that the endogenous job search response to both changes replicates their lower job finding rate estimated in the CPS data of 26%. The search efficiency for ineligible jobs is then adjusted downwards by the same proportion. The implicit assumption here is that eligible and ineligible jobs became equally more difficult to find during the Great Recession.

This model does a decent job in matching the gap in job finding rates across job types during the Great Recession. During normal times workers in both job types find new jobs at a similar rate. During the Great Recession, workers estimated to not be collecting unemployment found jobs at a 25% higher rate than those estimated to be collecting unemployment in the CPS data. The model predicted a 23% higher rate. Thus, the benchmark calibration does a decent job at replicating the search incentives for both groups tied to search efficiency and the incentives tied to UI for the eligible group, at least in these smaller deviations.

The model can also be used to asses what would have happened if a PUA like program extending coverage to workers not qualifying for regular state UI had been put in place during

the Great Recession. This counterfactual predicts a job finding rates for the PUA covered workers would have been 53% lower than what they were if they could have had the same UI benefits as workers covered by regular UI during the Great Recession.

4.3 Analysis of the COVID-19 Pandemic Recession.

The model is applied similarly to analyze the Pandemic Recession. First, the unemployment insurance program is adjusted to look like enacted measures. The duration of benefits for regular UI workers and coverage for PUA workers are each extended to match, probabilistically, coverage from March 2020 until July 2021.[16] To be clear, regular UI workers in the model are workers who earned qualification for UI in eligible jobs. PUA workers in the model are those in ineligible jobs and those in eligible jobs that did not yet work long enough to earn qualification for regular UI. The level of benefits is also increased by $400 per worker. This roughly replicates the average increase due to FPUC programs. Second, the efficiency of search technology, χ is adjusted downwards by 22% for the workers in eligible jobs such that the endogenous job search response to both changes replicates their lower job finding rate of 5.5% estimated in the DOLETA administrative data for the sample period of September 2020-May 2021. This sample period avoids the higher incidence of recall early in the recession. The χ is adjusted downwards by the same ratio for uncovered jobs. The assumption that the fall in efficiency is the same across job types serves as a baseline and was also shown to be a good assumption for the Great Recession.

The results for the COVID-19 Pandemic are shown in Figure 4. The results are striking. The model predicts that the value of unemployment benefits were so high to workers in ineligible jobs that they would not want to search at all. The graph of the latent net value of employment shows the gap between the value of work and unemployment is large. Through the lens of this model the PUA claimants in ineligible jobs would not be even close to the margin of job search. By contrast, the workers in eligible jobs that did not qualify for regular UI and were on PUA continue to show positive job search effort that is even above the values for eligible workers covered by regular UI. This is because these workers have lower additional resources available to them as estimated in the PSID consumption data. They tend to be younger single earners who are starting their careers.

[16] PEUC and PUA were terminated early in a subset of states and, without a doubt, there was uncertainty all along about coverage duration. These choices serve as a benchmark. Adding greater uncertainty or changing the expected length of coverage does not greatly change the duration of PUA workers *relative* to regular UI workers in the model which is the primary focus here. It would change the duration for both groups.

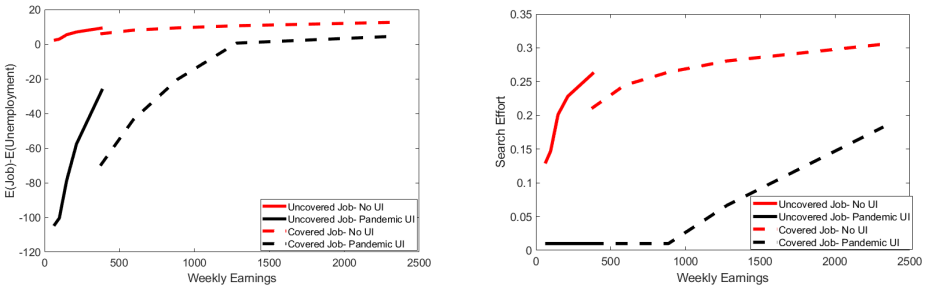


Figure 4: Latent net value of a job (left) and search policy (right) during the COVID-19 pandemic recession.

The model results provide an unusual interpretation of the results of the stock-flow analysis of the PUA claims data. The empirical results showed that exit rate from unemployment of PUA claimants fell much more than for regular UI claimants during the pandemic than compared to prior recessions. This might have been interpreted as suggesting the search disincentives of UI are much stronger for PUA claimants. The model, however, adds the caveat that the exit rates were 2.5x higher than predicted by theory relying on the dynamic values of these jobs. The story the model tells is that these jobs have such low earnings and dynamic asset values that rational workers were much better off on unemployment. So, while disincentives may have been larger for the PUA group, they are much smaller than would have been predicted for regular UI claimants facing similar tradeoffs. In this sense, the moral hazard component can be thought of as smaller for the PUA group given the job opportunities available to them.

This result is extremely robust. No difference in the job finding efficiency can reconcile these facts. All workers from ineligible jobs reject job offers and so the finding rate hinges solely on workers in eligible jobs covered by PUA. Even if we give these workers a 100% job finding rate, we can not close the gap between model and theory. It is possible that wages increased in ineligible jobs. However, they would have had to increase by almost 4-fold to close the gap between model and data. More stories can be told. Perhaps ineligible workers jumped on the chance to look for eligible jobs which is not allowed in the model. It would be required that they all have access to the 50th percentile of eligible jobs to close this gap. Although analysis may show the pandemic was a special case where this was possible, the PSID data show that the flow into an eligible job from a non-eligible is only 11% per year. This is concentrated mostly among the workers in eligible jobs gaining concentration and cannot close the gap.

4.4 Robustness.

This section discusses three features absent to the baseline calculations. All three features would exacerbate the inability of the baseline model to explain the unemployment duration of PUA claimants and thus strengthen the results of this paper. They are: asset accumulation including other cyclical government transfers such as economic impact payments and child tax credits; recall; and duration dependence.

Assets accumulation and expanded government transfers. Prior literature has presented mixed results on whether work disincentive effects of UI are stronger for households with higher or lower access to liquid assets.[17] In a later section I will document in the PSID that household income is a poor indicator of which households suffer a larger consumption loss associated with unemployment, suggesting that modelling asset accumulation is not a first order issue. None-the-less I discuss the implications.

Both asset accumulation and increased government transfers would have strengthened the results of this paper by increasing the unemployment duration of unqualified workers. Workers who are unqualified because they were working ineligible jobs already would reject any job offer. The unqualified workers who search for jobs are those in eligible jobs that have not accrued enough earnings history to qualify for UI. Increasing the flow value of unemployment through previously accrued assets or extra government transfers would reduce their job search effort. Both also increase the asset value of unemployment by increasing the flow value of consumption after expanded UI or extra government transfers end and this also decreases job search. For both of these reasons, the results of the model are amplified.

An alternative exercise would be to recalibrate the model with the inclusion of a risk free asset. This calibration would require an interest rate low enough such that ineligible workers do not accumulate assets in order to match the consumption drops associated with unemployment that we see for them in the PSID. This essentially puts us back to the same state as in the baseline calibration and the logic from the prior paragraph can be applied: the results would only be strengthened.

Recall. The COVID pandemic was unique in that recall of unemployed workers to their former employer was much higher than in both normal times and during previous recessions. Hall and Kudlyak (2021) show that temporary unemployment accounted for more than three-quarters of all unemployment in early 2021 but declined to 26 percent by November 2020. The November statistic is close to normal times if compared with the finding of Fujita and Moscarini (2017) that 30% of unemployed workers return to a previous employer. Given these facts, I consider that my stock-flow analysis partially addresses this concern by focusing on the period from September 2020-May 2021. Further, the estimates in 1 show that the exit rate of regular claimants plus PEUC had stabilized from the initial burst of recall before the time period of analysis in this paper starting in September 2020.

Including recall in the model would only weaken my results if recall were more common for workers who don't qualify for UI than for those who do. This is because the puzzle is why workers who don't qualify go back to work so quickly when the model is calibrated to match the finding rate of workers who do qualify. Indeed, there is no recall rate that can rationalize the return to work of unqualified since no ineligible workers would accept a job offer while the PUA program is in place in the model. The value of the benefits is just far too high. The only

[17] Meyer and Mok (2014) present evidence that disincentive effects are not dependent on liquid assets. Chetty (2008) find the opposite.

unqualified workers who return to work are those in eligible jobs that have not accrued enough tenure. They are about 15% of all unqualified workers and so would have needed a monthly recall rate of 100% to replicate the 15% job finding rate in the data.

Duration Dependence. The model implicitly includes duration dependance through the earnings potential process. Duration dependence is an empirical phenomenon whereby workers who have been unemployed for a longer duration have a lower monthly probability of returning to employment. The model generates this through both a composition effect and a causal duration effect. The composition effect is that lower wage workers choose lower job search effort and so make up a larger portion of long-term unemployed. This mechanically lowers the average job finding rate of long-term unemployed workers. The causal duration effect is that, if we construct panel data on model workers, workers who are unemployed longer are more likely to have moved down the earnings potential ladder relative to where they were before. This reduces their job search effort relative to where it was in the beginning of their unemployment spell.

Increasing the impact of duration dependence through either the selection or causal channels strengthens the results of this paper by increasing the difference in unemployment duration between eligible and ineligible workers.[18] This is because the sharp progressivity of unemployment benefits and the greater variance in earnings potential (longer job ladder) of the eligible workers implies a job search policy with more variance than for the ineligible workers. In other words, eligible workers change their search effort more at different points of the job ladder than ineligible workers. As a result, there is more quantitative room for duration dependence than for ineligible workers who choose more similar search efforts since the net value of a job versus unemployment does not change much for them along their job ladder.

Match Quality. There is no match quality in this analysis. Studies considering match quality conjecture that the longer unemployment durations accompanying more generous UI policies yield better matches through longer and pickier search. Multiple studies refute this conjecture and find the opposite: workers take worse jobs after longer unemployment spells induced by more generous UI (Schmieder et al. (2013), Schmieder et al. (2012)).[19] Studies that do find better match quality after longer unemployment spells induced by more generous UI find this effect to be quantitatively small (Griffy and Rabinovich (2022)). The omission of match quality is, therefore, unlikely to account for the large quantitative gap between the value of a job an unemployment documented in this paper for PUA recipients.

[18] Two exercises are done to confirm this claim. One is ρ^u is increased uniformly for each job type. The second is an extreme version of selection that asserts only the lowest 40% of each job type face job loss risk.

[19] Similarly, Rebollo-Sanz and Rodríguez-Planas (2020) finds no decline match quality when benefits are made less generous.

5 Additional Evidence from the Panel Study of Income Dynamics.

The inability of the quantitative model to come close to rationalizing the duration of PUA claims suggests that something is missing from the analysis. A promising avenue to extend the model would be to add permanent or persistent differences across workers. In this section, I discuss which differences are good candidates to rationalize the claim duration facts from the pandemic. They are also good candidates to rationalize the sorting across jobs to begin with. The eligible jobs provide higher utility in the model equal in value to 6.6 times the flow consumption of ineligible jobs. Yet almost a quarter of the workforce works in ineligible jobs and few of these workers move from ineligible to eligible jobs in a given year. Modelling the persistant differences across workers that drive this sorting will also inform the heterogeneity in how much workers value unemployment insurance and improve normative policy guidance from our structural models.

Table 3 provides a list of differences in workers across job types. Covered workers generally work more than uncovered workers. This is true both on the intensive and extensive margins. A first candidate for sorting is that workers who choose ineligible jobs have a higher marginal utility cost for work and/or they have a low fixed cost of going to work. This would rationalize taking a job with low earnings or a preferences for part time or part year jobs. The demographic evidence suggests the differences in preferences are unrelated to child care. The presence of young children is statistically insignificant across workers in covered and uncovered jobs. There is, however, a significantly different share of workers in uncovered jobs that are outside of the prime-age working years: 35.6% versus 8.9%. Both older and younger workers could have higher marginal cost of work. Many younger workers have less time available for work due to school and it is not uncommon for older workers to have poorer health that makes high work loads extra costly. The difference in female shares could also reflect higher marginal cost of work due to less time available since time use data show that women spend more time on home production than men. A lower fixed cost of work could also be characteristic to these workers but it could also be a characteristic of the job. The differences in college shares suggest that uncovered work requires less education and potentially specific training.

Another candidate for sorting is constraints. It is simply more difficult for some workers to find a covered job than others. The difference in education across job types could bolster this story. There may simply be fewer covered jobs available for workers without a college degree. Interestingly enough the difference in the racial composition of workers in each type of job is not statistically significant. This suggests that racial discrimination may not play a large role in sorting. Of course, further analysis is needed to definitively accept or reject the implications of these mean differences.

A third candidate to account for the sorting is that workers in uncovered jobs have higher marginal utility of additional income than workers in covered jobs. This difference could rationalize the willingness of uncovered workers to pay utility costs of work for low paying, unstable

mean or % of Group	Covered	UnCovered
Months Employed	11.8	9.3*
Child age 0-6	16.1	13.4
Under age 25	2.3	10.7*
Over age 65	6.6	24.9*
White	88.7	86.6
Black	11.3	13.4
Female	49.7	62.6*
College	72.3	59.3*
% of Workers	74.0	26.0
% of Workers not working	31.0	69.0

Statistically different at 95% CI.

Table 3: Characteristic of workers in the PSID by regular state unemployment coverage status.

% of Group	Covered	UnCovered
Poverty	0.8	13.0*
Food Insecurity	9.3	24.0*
Gov Transfers> $1k	21.1	45.5*
Fam Income > $100k	55.5	22.1*
Av. Fall in Food if Unemployed	5.7%	17.0%

Statistically different at 95% CI.

Table 4: Characteristic of households in the PSID by workers' regular state unemployment coverage status.

jobs. Table 4 suggests that uncovered workers' households show higher consumption needs than covered workers. They are significantly more likely to be in poverty, have food insecurity, and receive government transfers over $1,000 per year. There is, however, significant heterogeneity in the socioeconomic status of workers in covered job. A share of 22.1% of workers in uncovered jobs have a total family income over $100k per year. Not only are some uncovered workers reasonably well off, they are also not the sole earner in the household which provides some additional insurance in the case of job loss. Still, the average fall in spending on annual food consumption in a year of an unemployment spell is three times larger for uncovered workers' households. Their food spending, including the value of food stamps, falls 17%. A fall of this magnitude is likely significant in utility value and a signal of serious economic hardship if a job is lost. This decline is predicted by a regression controlling for household composition, age, and household fixed effects. Unfortunately for policy makers, food consumption declines associated with unemployment are over 10% for households earning $50-$120k as well.[20] This implies that income based welfare programs such as food stamps do not adequately insure the majority of uncovered households who do not qualify for them but show a need for such insurance.

In summary, this PSID analysis presents two main suggestions for how to improve models for policy analysis. First, the willingness of PUA claimants to go back to work is still a bit puzzling. It could be that higher marginal value of income for this group implied that they

[20] A candidate explanation for these facts is differential access to credit markets as studied in Braxton et al. (2020) and Herkenhoff (2019).

wanted to have a job as soon as their benefits ended and took jobs early as a precautionary measures against being able to find a job later. They could have also been more eager to lock in higher pay as wages in the lower end of the earnings distribution rose faster than those in the rest of the income distribution. Again, they would have been giving up flow consumption value since the replacement rate was over 100% for most PUA claimants, but this is consistent with precautionary forward looking behavior. Finally, it could have been that PUA claimants had additional value of work not modelled here. This could be building a resume for the young PUA claimants or the older PUA claimants retiring and ending their claim as they exited the labor force and claimed retirement.

Second, this analysis identifies a substantial hole in the social safety net. The data show that even upper middle class households are not well insured in the case an uncovered secondary earner loses a job loss. They will not receive unemployment benefits, do not qualify for need-based welfare programs, and do not appear to be well insured by the earnings of other household members. This is consistent with the evidence of "wealthy hand-to-mouth" households that have higher income but also high debt obligations that limit their liquid savings for discretionary spending in times of need. From a policy perspective, this means that income or asset based programs leave a large gap of unmet needs. From a modelling perspective, this means that workhorse models used for normative analysis require replicating either consumption data or data on liquid assets versus liabilities. Throwing in savings in the form of a risk-free asset is standard but yields counterfactual results. It implies that middle class households establish a precautionary buffer against income risk that would imply lower formal insurance needs than the data reveal. Ideally debt, liquid assets, and non-liquid assets should be introduced. If too cumbersome, then a hand-to-mouth model such as the one presented here may yield better policy advice than one with a risk free asset that replicates the asset distribution of households but not their liquid net asset position.

6 Conclusion.

The almost universal expansion of unemployment benefits during the COVID-19 pandemic provides a great setting to learn about how workers presently uncovered by regular state programs would respond to coverage. Any lessons learned, however, must account for the context of the expansion. The expansion also included increase in the level of UI payments to historically high replacement rates; many other government transfers reached historic levels as well; and there was a once in a lifetime (hopefully) global pandemic. All of these factors make the episode hard to compare to the past and difficult to extrapolate lessons to future candidate extensions.

The first step in using the COVID-19 pandemic to advance our understanding of unemployment insurance expansions was to simply document facts about claiming behavior. I provided estimates of how unemployment durations differed for the universe of claimants across the PUA versus extended regular programs using administrative data. I then compared these differences in durations to both normal times and prior recessions by estimating the pools of would-be

PUA and regular UI claimants using machine learning techniques. The finding was that PUA claimants claimed almost 4 months longer than claims through regular state eligibility standards and this difference was not typical to prior normal or recessionary times.

The second step is to use economic theory to interpret the facts surrounding claiming behavior. Analysis of a quantitative workhorse model of job search showed that dynamic considerations around the value of a job could easily rationalize the claim durations of claimants entering through regular state UI eligibility. These same incentives could not rationalize PUA claim durations. PUA claims were actually almost two-thirds shorter than what would be predicted. Through the lens of the model a surprising puzzle emerges of "why were PUA claims *so short*"?

A take away for future economic research is that workhorse quantitative models of claim duration are not suitable for studying extending UI coverage to lower earners. These lower earners actually show *lower* job search disincentives than the workhorse models would predict for regular state claimants in similar circumstances. While the short duration of PUA claimants remains a puzzle, microeconomic data provide some clues as to how this group of workers could fundamentally differ in preferences or constraints from the rest of the labor force. The data also show a high insurance need for workers not currently eligible for state UI systems. Their household consumption expenditures fall, on average, 17% in a year of an unemployment spell and middle-class households earning $50-120k still see drops over 10%. This suggests that modelers need to be mindful that many low earners live in high income households, but that the roles of precautionary savings or household insurance in standard models needs to be tempered by the reality of consumption dynamics.

For policy makers, the main take away is that extending UI has high marginal cost: current ineligible would stay on the program longer than current eligible; but high marginal gains: current ineligible tend to have higher insurance value of the program than current eligible. Further analysis is needed to pin down specific parameters of an improved system. A complete analysis should include an equilibrium context that is consistent with empirical findings on how labor markets as a whole respond to changes in UI policy.

References

Baker, M. and S. A. Rea Jr (1998): "Employment spells and unemployment insurance eligibility requirements," *Review of Economics and Statistics*, 80, 80–94.

Boar, C. and S. Mongey (2020): "Dynamic trade-offs and labor supply under the CARES Act," Tech. rep., National Bureau of Economic Research.

Braxton, J. C., K. F. Herkenhoff, and G. M. Phillips (2020): "Can the unemployed borrow? implications for public insurance," Tech. rep., National Bureau of Economic Research.

Chetty, R. (2008): "Moral hazard versus liquidity and optimal unemployment insurance," *Journal of political Economy*, 116, 173–234.

Faberman, R. J., A. I. Mueller, A. Şahin, and G. Topa (2017): "Job search behavior among the employed and non-employed," Tech. rep., National Bureau of Economic Research.

Fang, L., J. Nie, and Z. Xie (2020): "Unemployment insurance during a pandemic," *Federal Reserve Bank of Kansas City Working Paper*.

Finamor, L. and D. Scott (2021): "Labor market trends and unemployment insurance generosity during the pandemic," *Economics Letters*, 199, 109722.

Fujita, S. and G. Moscarini (2017): "Recall and unemployment," *American Economic Review*, 107, 3875–3916.

Ganong, P., F. Greig, M. Liebeskind, P. Noel, D. M. Sullivan, and J. Vavra (2021): "Spending and job search impacts of expanded unemployment benefits: Evidence from administrative micro data," *University of Chicago, Becker Friedman Institute for Economics Working Paper*.

Gomme, P. and D. Lkhagvasuren (2015): "Worker search effort as an amplification mechanism," *Journal of Monetary Economics*, 75, 106–122.

Griffy, B. and S. Rabinovich (2022): "Worker Selectivity and Fiscal Externalities from Unemployment Insurance," *Available at SSRN*.

Hall, R. E. and M. Kudlyak (2021): "The Unemployed with Jobs and without Jobs," Tech. rep., Federal Reserve Bank of San Francisco Working Paper 2021-17.

Herkenhoff, K. F. (2019): "The impact of consumer credit access on unemployment," *The Review of Economic Studies*, 86, 2605–2642.

Hopenhayn, H. A. and J. P. Nicolini (2009): "Optimal unemployment insurance and employment history," *The Review of Economic Studies*, 76, 1049–1070.

Khoury, L., C. Brébion, and S. Briole (2020): "Entitled to Leave: the Impact of Unemployment Insurance Eligibility on Employment Duration and Job Quality," *NHH Dept. of Economics Discussion Paper*.

Kohler, U. (2015): "PSIDTOOLS: Stata module to facilitate access to Panel Study of Income Dynamics (PSID)," Statistical Software Components, Boston College Department of Economics.

Krueger, A. B. and A. Mueller (2010): "Job search and unemployment insurance: New evidence from time use data," *Journal of Public Economics*, 94, 298–307.

Meyer, B. D. and W. K. Mok (2014): "A short review of recent evidence on the disincentive effects of unemployment insurance and new evidence from New York State," *National Tax Journal*, 67, 219–251.

of Income Dynamics, P. S. (2021): "PSID," Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.

Petrosky-Nadeau, N. and R. G. Valletta (2021): "UI Generosity and Job Acceptance: Effects of the 2020 CARES Act," .

Rebollo-Sanz, Y. F. and N. Rodríguez-Planas (2020): "When the Going Gets Tough... Financial Incentives, Duration of Unemployment, and Job-Match Quality," *Journal of Human Resources*, 55, 119–163.

Schmieder, J. F., T. Von Wachter, and S. Bender (2012): "The long-term effects of UI extensions on employment," *American Economic Review*, 102, 514–19.

——— (2013): "The causal effect of unemployment duration on wages: Evidence from unemployment insurance extensions," Tech. rep., National Bureau of Economic Research.