# Reconciling Unemployment Claims with Job Losses in the First Months of the COVID-19 Crisis

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## Abstract

In the spring of 2020, many observers relied heavily on weekly initial claims for unemployment insurance benefits (UI) to estimate contemporaneous reductions in US employment induced by the COVID-19 pandemic. Though UI claims provided a timely, high-frequency window into mounting layoffs, the cumulative volume of initial claims filed through the May reference week substantially exceeded realized reductions in payroll employment and likely contributed to the historically large discrepancy between consensus expectations of further April-to-May job losses and the strong job gains reflected in the May employment report. Analyzing the relationship between UI claims and underlying employment, we argue that insured unemployment—an alternative high-frequency indicator that responds to gross job *gains* as well as gross job *losses*— offers important advantages as a barometer of labor market conditions. Adjusting for reporting artifacts and for time lags between employment flows and associated claims, we show that insured unemployment comoved strongly with payroll employment throughout the first months of the pandemic, as it did during the Great Recession.

JEL codes: E24, J65

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# 1 Introduction

The economic crisis triggered by the COVID-19 pandemic has placed tremendous financial strain on households already confronting a dire threat to public health. In the early weeks of the crisis, few indicators spoke as urgently to the mounting economic damage as the surge in weekly claims for unemployment insurance (UI). The unprecedented volume of initial UI claims—with cumulative filings reaching the tens of millions in a matter of weeks— loomed large in many observers' thinking about concurrent, but not yet reported, changes in payroll employment. But while accumulated claims broadly tracked the reduction in payrolls through late April, claims continued to accrue swiftly even as employment began to rebound. Perhaps influenced by the UI numbers, consensus forecasts of the April-to-May change in payroll employment missed by some 10 million jobs, predicting another steep decline instead of the strong gains reflected in May's Employment Situation Summary.

This paper assesses the relationship between unemployment claims and net job losses in the first months of the pandemic crisis. More so than in previous recessions, interpreting recent UI statistics is complicated by sweeping institutional changes, widespread backlogs, and irregularities in reported numbers. Though much remains unclear about even the most basic of questions—such as how many distinct individuals have applied for benefits—enough information has emerged to permit provisional conclusions about the volume of claims and their connection to underlying changes in employment. In particular, we show that weekly readings on the level of insured unemployment, once adjusted for reporting artifacts and time lags, tracked concurrent shifts in payroll employment both during the initial wave of job losses and in the rebound seen in May and June. Recent comovements in these series, which ultimately stem from their shared status as measures of *net* rather than *gross* employment losses, echo similar comovements during the Great Recession.

We begin by laying out the key institutional and data considerations needed to make sense of the UI numbers. Even for veteran observers, parsing recent UI statistics is challeng-

ing for three main reasons. First, reported claim volumes have been impacted by a host of procedural issues, ranging from overloaded application portals to fraudulent claims filed by organized networks of identity thieves. Second, the suddenness and severity of the current crisis—in which weekly *flows* of incoming claims repeatedly exceeded the pre-crisis *stock* of continuing claimants who make up the insured unemployed—have elevated the importance of subtle timing and reporting conventions that would be less consequential in more quiescent times. Third, policy changes at both the state and federal levels have reshaped many aspects of the UI system. A careful discussion of these issues is thus essential background for our subsequent analysis.

Next, we analyze the relationship between the number of new UI claims and the number of job losses from which they originate. In doing so, we first confront the threshold question of how many individuals have actually filed UI claims. We view the cumulative volume of initial claims for regular state UI benefits as a plausible upper bound on the number of benefit-seekers, at least once backlogs began to ease, whereas the cumulative growth in continued claims can be understood as a lower bound. Accounting for claimants who are determined to be ineligible for UI benefits (of whom many go on to apply for Pandemic Unemployment Assistance), and adjusting further for cross-state differences in the timing of when insured unemployment reached its peak, goes a considerable way towards narrowing the wide gap that emerged between these alternative measures over the course of the period we analyze, which stretches from mid-March through the second week of June.

We then seek to resolve the seeming tensions between UI claims and underlying job losses. Focusing first on gross employment losses, we note that each new claim could in principle reflect either *more than one* or *fewer than one* corresponding transition from employment into non-employment. A comparison of claims to weekly employment data and monthly labor force flows suggests that claims likely understated gross employment losses at first but may have overstated them later on. Next, we turn to net employment losses, the excess of gross employment losses over gross employment gains. Comparing the volume

of UI claims to realized payroll changes—as revealed both by official monthly estimates of total non-farm payroll employment and by weekly estimates of private payroll employment based on data from ADP, the largest US payroll processing company—we conclude that *initial* claims have heavily overstated net job losses but that *continued* claims, carefully interpreted and stripped of data artifacts, have more closely tracked underlying changes in employment. Central to our analysis is the fact that continued claims summarize shifts both in job separations and in hiring out of unemployment, whereas initial claims all but ignore the hiring margin. Also important is the fact that an appreciable minority of individuals seeking regular UI likely did not hold wage or salary positions on the eve of the crisis, so that their claims do not signify separations from payroll employment.

Looking ahead, we expect that both initial UI claims and the level of insured unemployment will continue to play outsized roles in policymakers' and researchers' perceptions of changes in economic conditions as the pandemic crisis plays out. To help inform future efforts to parse UI indicators, we end with a discussion of four emerging developments on the UI horizon: growing enrollment in standing and emergency extended benefit programs; the scheduled expiration of supplemental benefits that have boosted recent UI payments by $600 per week; the scope for state worksharing programs to continue expanding in the coming months; and interactions between the UI system and the Payroll Protection Program that provides loans to small businesses.

Our paper adds to the burgeoning literature on the economic impacts of the pandemic crisis, including many recent papers that analyze various aspects of unemployment and unemployment insurance (e.g., Baek et al., 2020; Bick and Blandin, 2020; Bitler et al., 2020; Chetty et al., 2020; Coibion et al., 2020; Ganong et al., 2020; Han et al., 2020; Hedin et al., 2020; Murray and Olivares, 2020; Petrosky-Nadeau and Valletta, 2020; Rinz, 2020). Relative to the existing literature, our core contribution is to provide a unified analysis of the relationship between UI claims and changes in employment. We also view our paper as a COVID-era successor to an earlier generation of papers that analyzed the relationship

between job loss and unemployment insurance during and after the Great Recession (e.g., Krueger and Mueller, 2011; Rothstein, 2011; Congressional Budget Office, 2012; Hagedorn et al., 2013; Farber and Valletta, 2015; Boone et al., 2016; Chodorow-Reich et al., 2019). Finally, we contribute to a forecasting literature that employs UI claims as one among several timely, high-frequency indicators of labor market conditions (Hobijn and Şahin, 2011; Aruoba et al., 2012; Barnichon and Nekarda, 2012).

We have based our conclusions on the information currently available about UI claims and job losses, but both sets of indicators are subject to revision and reinterpretation. Claim counts have been impacted by administrative congestion and the hurried rollout of new programs, and they include unknown numbers of fraudulent, errant, or misreported claims. Likewise, recent employment counts may be biased by low rates of survey response and heightened rates of firm exit. Economists will no doubt be poring over spring 2020 labor market data for a long time to come, and future efforts will benefit from additional data releases and revisions. But as policymakers weigh extensions of or modifications to the CARES Act stimulus programs enacted in March, and as governments, businesses, and households attempt to forecast labor market conditions, there is an urgent need to better understand the confusing signals given by UI claims in the first phase of the crisis. We hope that our paper provides useful guidance on how to read these numbers.

The rest of the paper proceeds as follows. Section 2 lays out key institutional details of the UI system and describes the process by which UI claims are filed, adjudicated, and reported. Section 3 examines new and continued claims for UI benefits and develops a refined measure of insured unemployment that reduces the impact of reporting artifacts. Section 4 compares the volume of new UI claims to contemporaneous changes in payroll and non-payroll employment. Section 5 discusses upcoming developments in the UI system related to the ramping up and phasing out of emergency UI and loan programs. Section 6 concludes.

# 2 The UI system before and during the pandemic

To provide context for what follows, we begin with a stylized account of the "life-cycle" of a claim for traditional state UI benefits. Next, we review the main changes in state and federal UI policy implemented since the onset of the crisis. We then describe how information about UI claims is collected and reported.[1]

## 2.1 The life-cycle of a UI claim

Given the swift pace of recent events, parsing COVID-era UI statistics requires attention to subtle definitional issues and time conventions. To understand these subtleties, it is helpful to trace out the typical process by which claims are filed, processed, paid out, and ultimately terminated through job-finding or benefit exhaustion.

**Filing and eligibility determination.** A worker seeking UI benefits first files an *initial claim* with the state employment office, either online, by phone, or (less commonly) in person (Wandner, 2019). The state then subjects the claim to two successive eligibility reviews:

○ *Monetary determination*: The state first determines whether the claimant satisfies the "monetary criteria" for UI eligibility, by virtue of having accrued sufficient base-period earnings in UI-covered employment in the quarters preceding job loss. The vast majority of jobs are covered by UI and count towards this calculation, but earnings from self-employment and independent contracting are excluded from consideration.

○ *Non-monetary determination*: If the claimant passes the monetary test, the state then applies the "non-monetary criteria": claimants must have become unemployed through no fault of their own, be able and available to begin work, and either engage in active job search or be on temporary furlough. As part of the review process, the claimant's

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1. Readers seeking more comprehensive introductions to the UI program as it existed on the eve of the pandemic may refer to Nunn and Ratner (2019) and O'Leary and Wandner (2020) for detailed overviews.

last employer is notified that a claim has been filed and given an opportunity to contest its validity (since, if approved, the claim may increase the employer's payroll tax rate).

Prior to the pandemic, eligibility reviews frequently took a couple of weeks, though (then as now) processing time varied across states, over time, and with claim complexity.[2] Denied claimants may appeal their denials.

**Continued claims and insured unemployment.** Each week—both while a claim is pending determination and after it is approved—a worker must file a *continued claim* spelling out his or her ongoing eligibility for benefits. Since eligibility depends on earnings and activities for the entirety of the week in question, an individual claiming benefits *for* week $t$ actually files the paperwork *in* some later week, typically week $t + 1$.[3] Such an individual is said to be "insured unemployed" in week $t$, regardless of whether the claim is pending determination or instead paying out benefits (and even if it is ultimately denied).

While most states require claimants to file every week, some states allow claimants to file once every two weeks. Biweekly filing introduces spurious sawtooth patterns into certain states' UI statistics and noticeably impacts national indicators as well. We return to this issue in Section 3.2, where we propose a simple adjustment for these data artifacts.

**Benefit receipt.** Once a claim is approved, the state begins issuing weekly payments in an amount equal to a percentage of base-period earnings (the "replacement rate"), subject to both a minimum and a maximum. Before the crisis, all but eight states imposed a one-week waiting period, with compensation commencing in the second week of eligible unemployment.

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2. In monthly filings to the Department of Labor's Employment and Training Administration (form 9050), states report breakdowns of claimants' first UI payments by days elapsed since the end of the first compensable week. In 2019, 55.4 percent of first payments were issued within 7 days, 82.3 percent were issued within 14 days, and 94.5 percent were issued within 28 days. Since all but eight states imposed a non-compensable "waiting week" during 2019, time elapsed since initial filing is somewhat longer.

3. In Department of Labor parlance, week $t$ in this example is known as the "reflected week". States establish deadlines for the filing of continued claims (e.g., within seven days of the end of the reflected week), though they sometimes excuse lateness under special circumstances.

Benefits are typically paid retroactively to the first compensable week, so that processing delays affect the timing of payments but have no mechanical effect on the amount ultimately disbursed. Like pending weeks, waiting weeks are counted as insured unemployment.[4]

Workers with significantly reduced but non-zero earnings—due to either reduced hours or the loss of a primary job—can file for *partial UI benefits*, which provide a prorated portion of the full weekly benefit amount. Likewise, a fully unemployed claimant who begins working part-time at a sufficiently low level of earnings may transition from total UI to partial UI. Some workers also receive prorated benefits through worksharing programs known as Short-Time Compensation (STC), but STC is distinct from partial UI and STC claims are omitted from the UI tabulations we use throughout the paper. We revisit worksharing in Section 5.3.

**Benefit termination.** Payment of UI benefits ceases when workers cease filing continued claims, either because they have been reemployed and are no longer eligible, because they have exhausted their UI entitlements, or because they elect to stop seeking benefits.[5] In most states, claimants can receive benefits for up to 26 weeks, though in many states benefit duration depends on base-period earnings and in some states it is capped below 26 weeks. Extra weeks of benefits are often available during recessions, both because states "trigger" onto the standing Extended Benefits program and because Congress typically enacts additional emergency legislation (Chodorow-Reich and Coglianese, 2019).

Though the above account is broadly characteristic of all state UI systems, states vary widely in program parameters and other institutional details. The Department of Labor memorandum Significant Provisions of State Unemployment Insurance Laws lists state-specific programmatic details, most recently as of January 2020.

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4. Though claimants are held harmless for processing delays, claimants who are themselves slow to file their initial claim may not get retroactive compensation for weeks of unemployment prior to the filing date.

5. Claimants can also be removed from UI mid-entitlement if, for instance, the employment office uncovers evidence of fraud, or if a former employer belatedly contests the claimant's stated reason for job separation.

## 2.2 Emergency changes in state and federal UI policy

In March 2020, both state and federal governments took numerous actions to adapt UI program rules to the special circumstances of the pandemic crisis. The combined effect of these policy changes has been to temporarily expand UI eligibility, relax job-search expectations, and increase the generosity and duration of benefits.

**State-level policy changes**

On March 18, the Families First Coronavirus Response Act authorized states to implement any of a variety of emergency modifications to their UI systems.[6] Acting on federal guidance, states swiftly announced temporary changes to their UI rules to facilitate and expedite benefit receipt for impacted workers.[7] These changes largely took the following forms:

○ *Relaxed non-monetary rules*: Many states relaxed non-monetary eligibility criteria so that otherwise-qualifying workers could receive benefits not only if they were laid off, but also if they were temporarily unable to work for certain COVID-related reasons (such as being directed to self-quarantine or caring for a school-aged child). Monetary criteria stayed in effect, and many workers remained ineligible for regular UI.

○ *Suspension of search requirements*: Recognizing that economic conditions and the need for social distancing would make job search infeasible for some time, most states waived the requirement that individuals engage in active job search while claiming UI.

○ *Suspension of waiting periods*: Most states waived their "waiting weeks", so as to provide financial relief to laid-off workers as rapidly as possible.

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6. The Act extended formal legislative backing to reinterpretations of existing UI law issued one week prior by the Department of Labor. See DOL Employment and Training Administration (2020), "Unemployment Insurance Program Letter 10-20", March 12.

7. The National Conference of State Legislatures (NCSL) details some, though not all, of these changes. NCSL (2020), "COVID-19: Unemployment Benefits," May 14, https://www.ncsl.org/research/labor-and-employment/covid-19-unemployment-benefits.aspx (accessed July 2, 2020).

- *Suspension of experience rating*: Employers in most states incur increased payroll tax liabilities when their former employees claim UI benefits. A handful of states announced that COVID-related UI claims would not be charged against individual employers' experience-rated accounts.

- *Increased processing capacity*: Struggling to keep pace with unprecedented volumes of initial claims, states responded by hiring extra staff, lengthening shifts, recalling retired claims-takers, adding server capacity, and directing claimants to file on particular days of the week on the basis of their last names.

Relative to a counterfactual in which pre-pandemic rules had been left unchanged, these policy changes likely contributed to the surge of UI claims by increasing the share of COVID-affected workers who chose to submit claims.[8] Not all claimants succeeded, however: media reports make plain that UI-seekers in many states encountered harrowing delays in filing due to downed websites and busy phone lines, and some may have been deterred entirely. These delays placed significant burdens on claimants and their families and have impacted official statistics, as well.

**The federal CARES Act programs**

Enacted on March 27, the Coronavirus Aid, Relief, and Economic Security (CARES) Act complemented these state-level changes by establishing three new, federally funded programs to extend UI eligibility and augment the generosity of UI benefits.[9]

- *Extended benefit durations.* The most conventional of the new programs, Pandemic Emergency Unemployment Compensation (PEUC) resembles the similarly named EUC program enacted during the Great Recession. It extends an additional 13 weeks of UI benefits to claimants who have exhausted regular UI.

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8. Furthermore, it is possible that the suspension of experience rating may have contributed to job losses in certain states by reducing the tax penalty employers face when they conduct layoffs. Suspension of search requirements may also have reduced labor supply by depressing aggregate job search.

9. For further details on each program, see DOL UI Program Letters 15-20, 16-20, and 17-20.

- *Assistance for non-traditional claimants.* Pandemic Unemployment Assistance (PUA) provides UI-style benefits to workers who lack sufficient base-period earnings to be eligible for traditional UI, but who can demonstrate both recent attachment to the labor market and a valid COVID-related reason for being unemployed. Though PUA is often described as targeting self-employed and gig workers, the pool of potential claimants also includes some recent labor market entrants as well as wage and salary workers with sporadic work histories. Claimants can receive PUA for up to 39 weeks.[10]

- *Supplemental $600 benefits.* Federal Pandemic Unemployment Compensation (FPUC) gives $600 per week in supplemental benefits to all UI, PEUC, and PUA recipients. The uniform $600 benefit replaces a larger fraction of prior earnings for lower-paid workers, and a majority of claimants are entitled to replacement rates in excess of 100 percent while FPUC is in effect (Ganong et al., 2020). FPUC is disbursed automatically, without claimants having to file additional paperwork.

FPUC is scheduled to expire on July 31, 2020, while PUA and PEUC are scheduled to expire on December 31, though Congress may ultimately extend these programs in some form.

Beyond the statutory rules of the CARES Act programs, two aspects of their implementation are essential for making sense of UI statistics in the early weeks of the crisis. First, the pandemic programs were rolled out unevenly across US states, as it took states time to develop review protocols and set up new application portals (Garin and Koustas, 2020).[11] We discuss the slow rollout of PUA in detail in Section 3.3.

Second, it appears that many PUA applicants had previously applied for regular UI benefits and been deemed ineligible. As states relaxed non-monetary criteria in mid-March, some non-traditional UI claimants (such as self-employed workers) likely filed claims, either

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10. Since many PUA recipients lack the earnings histories that determine benefit generosity in regular state UI, the minimum weekly benefit is set to 50 percent of a state's average weekly benefit amount. Workers who exhaust both regular UI and PEUC in fewer than 39 weeks may claim PUA for the remaining weeks.

11. In an April 29 press release, DOL announced that all US states had begun paying out the $600 FPUC benefits. (Non-state US territories are also covered by the CARES Act.) See Employment and Training Administration (2020), "U.S. Department of Labor Announces That All 50 States and the District of Columbia Are Paying Federal Pandemic Unemployment Compensation Benefits", April 29.

without realizing that monetary criteria remained in effect or in the hope that states would further relax eligibility rules.[12] Once the CARES Act was passed, most states directed workers to file, and be denied, for regular benefits as a precondition for receiving PUA.[13] In assessing the total population of UI claimants, analysts must take care to avoid double counting individuals who have filed claims for both traditional and emergency benefits.

## 2.3  UI data

Every Thursday at 8:30 am Eastern, the Department of Labor's Employment and Training Administration (hereafter, DOL and ETA) posts a closely followed weekly news release with updated tabulations of the number of individuals filing for UI. Consider the release that came out on March 26.

- ○ *Initial claims for regular state UI.* Each release reports an "advance" count of initial claims filed in the seven-day period that ended on the preceding Saturday. Thus the March 26 release reported initial claims filed in the week ending Saturday, March 21.

- ○ *Insured unemployment in regular state UI.* Because continued claims filed in a given week tell us about insured unemployment in the preceding week, data on the insured unemployed lag one week behind initial claims. Thus the March 26 release gave us our first reading on insured unemployment for the week ending Saturday, March 14. It also reported that week's *insured unemployment rate*, defined as 100 times the ratio of insured unemployed individuals to UI-covered employment (updated quarterly).

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12. Workers in some states may have had reasonable grounds to nurse such hopes: in April, a news outlet reported that Texas had retroactively converted at least 70,000 ineligible claimants over to PUA. See Brian New (2020), "Coronavirus in Texas: Self-Employed Texans Eligible For Unemployment Benefits," *CBS Dallas-Fort Worth*, April 22.

13. The CARES Act stipulates that workers may only claim PUA if they are ineligible for regular state UI. Since only an official determination can formally establish ineligibility, states reportedly added this extra step to the process to ensure they only approve valid PUA claims, for which they will receive federal reimbursement. An exception is Maryland, which set up a one-stop application portal that automatically directs claimants towards either UI or PUA in response to information they provide. See Greg Iacurci (2020), "Filing for Unemployment as a Gig or Self-employed Worker? It's Complicated," *CNBC*, April 17.

○ *Other programs.* The release also reports claims filed under a variety of other state and federal programs, such as Extended Benefits, STC, and—beginning on May 7—PEUC and PUA. Importantly, claims filed under these special programs are not included in the headline series for regular state UI.

○ *Revisions.* Each release also reports revised values for statistics reported in previous releases. Revisions occur for two main reasons: reassignment of interstate claims for claimants whose state of residence differs from their state of prior employment, and correction of errors detected in the advance release. Most revisions take place in the week after a given statistic is first reported, though this is not always the case.

The above indicators are reported both nationwide and broken out separately for the 50 states, the District of Columbia, Puerto Rico, and the US Virgin Islands. For brevity, we refer to all 53 of these subnational entities as "states" throughout the paper. For national statistics, the release reports both seasonally adjusted and non-adjusted variants. For state-level statistics, the release reports only non-seasonally adjusted values.

Beyond the weekly update on initial and continued UI claims, states report a variety of monthly and quarterly updates about many aspects of their UI programs in filings submitted to ETA. In this paper, we draw on data about monetary determinations (ETA form 218), payment activities (5159), time elapsed until first payment (9050), and PUA claims (902P), available at ETA's data downloads page.

# 3 How many people have sought UI benefits?

We now turn to the surge of new UI claims that began in mid-March. While reporting issues make it difficult to determine how many unique individuals have applied for unemployment benefits, we argue that *cumulative initial claims for regular state UI* give us a plausible upper bound on the total population of new claimants, whereas *growth in insured unemployment* gives us a lower bound. We interpret the wide gap between these two series as largely driven

**Figure 1. Cumulative initial claims for regular state UI benefits.**
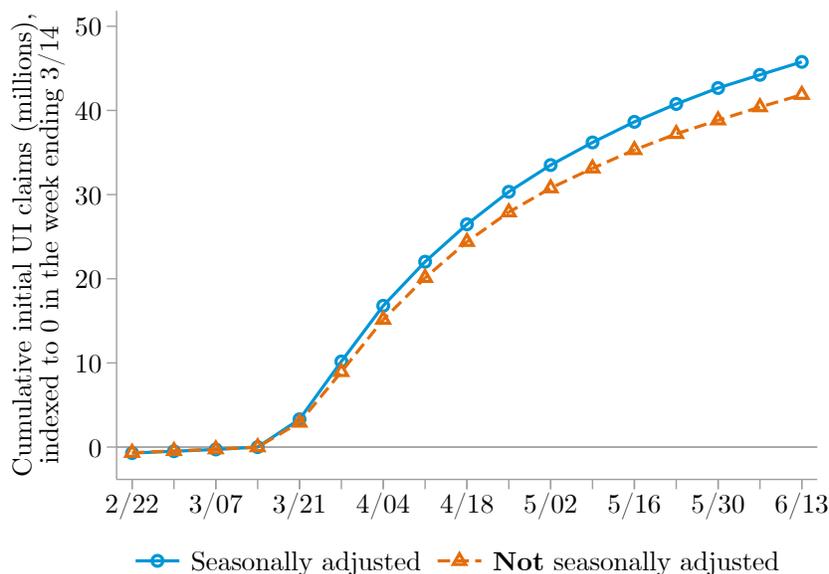


Note: Data from the Department of Labor Employment and Training Administration (hereafter, DOL and ETA), accessed via Haver Analytics and plotted at weekly frequency. Here and in subsequent figures, claims are plotted as of the end dates of the weeks to which they relate.

by denied claimants, many of whom go on to apply for Pandemic Unemployment Assistance, and by claimants transitioning from unemployment back into work.

## 3.1    Initial claims for regular state UI

Figure 1 shows the unparalleled accumulation of initial claims for regular state UI that began abruptly in March 2020. In the week ending March 21, seasonally adjusted initial claims came to 3.3 million, shattering almost fivefold the previous record of 695,000 claims set in October 1982. The following week, initial claims soared still higher, reaching a record 6.9 million in revised tabulations.[14] Though weekly initial claims declined substantially in subsequent weeks, they remained elevated far above their pre-pandemic maximum through the end of our analysis period, with 1.5 million claims filed in the week ending June 13.

Following conventional practice, many commentators have focused on seasonally ad-

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14. Throughout this paper, we cite DOL's revised claim tallies wherever possible, using unrevised "advance" tallies only where revised numbers are not yet available or where we otherwise note. For the week ending March 28, the advance tally of 6.6 million was later revised upward to the number given in the text.

justed numbers like those cited above. While there is no question that recent filings dwarf all precedent, we view these headline tallies as being meaningfully overstated by DOL's seasonal adjustment procedure, which relies on multiplicative seasonal factors that are ill-suited to the current extraordinary environment.[15] Switching to non-seasonally adjusted values (as we do from this point forward), a cumulative sum of 24.4 million initial UI claims were filed from March 15 through April 18, rising further to 35.3 million by May 16 and 41.9 million by June 13.[16] Taken at face value, these cumulated claims amounted to 28.8 percent of pre-pandemic UI-covered employment by the middle of June.

However, the official count of initial UI claims is impacted by at least three sources of measurement error. First, the timing of many claims has likely been distorted by processing delays. In the chaotic early weeks of the crisis, many applicants encountered busy phone lines and downed websites. Even once claimants succeeded in submitting the necessary paperwork, states did not always process and report their claims in a timely fashion; indeed, in statements to the media, officials from several states acknowledged large discrepancies between claims "received" (i.e., submitted by claimants) and claims "processed" (i.e., included in official DOL tallies). These backlogs appear to have at least partly abated over time as states ramped up their processing capacity.[17] We note, however, that frustration with overloaded filing systems may have caused some claimants to give up without ever successfully submitting a claim, perhaps because they returned to employment in the interim.

Second, there have been scattered reports of errant claim duplication, which can occur

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15. Appendix Figure A1 shows the pre-announced 2020 seasonal factors. As implied by Figure 1, the seasonal factors fell consistently below 100 throughout our analysis period, so that initial claims were adjusted upwards by roughly 5 to 15 percent in each week. As Bram and Karahan (2020) aptly observe, "applying this type of multiplicative seasonal adjustment now would basically imply that pandemics *typically* cause far fewer jobless claims in the spring than at other times . . . which, of course, is meaningless for a once-in-a-century type event" (emphasis and ellipsis in original). An additional reason to eschew seasonal adjustment is that the new CARES Act programs lack historical data and hence cannot be seasonally adjusted.

16. Anticipating our later discussion of employment, these dates correspond to the reference weeks for the establishment and household surveys that underlie the monthly jobs report.

17. Aside from media reports to this effect, this assertion is consistent with recent empirical analysis by Murray and Olivares (2020). Using pre-pandemic rates of UI recipiency as a proxy for states' processing capacity, they find that initial UI claims accrued more rapidly in higher-capacity states in the first few weeks of the crisis, but that lower-capacity states had begun to catch up by the end of April.

either when an overloaded website fails to confirm a claim submission (inducing the claimant to resubmit) or when employer and employee submit claims on the same worker's behalf.[18] We know of no systematic nationwide data speaking to whether claim duplication is rampant or rare, but it has likely inflated the official claim tally to some unknown extent.

Third, there have been widespread reports of a rise in fraudulent filing. In May, the *New York Times* reported that the US Secret Service had found evidence of identity thieves using previously hacked personal information to file large numbers of fraudulent claims in a number of US states.[19] Government audits indicate that roughly 3 percent of UI payments are fraudulent in a typical year, but the rate of fraud may well be higher in the current context: the severe strain on state employment offices has made them unusually vulnerable to fraudulent activity, even as the $600/week FPUC supplement has made successful UI fraud especially lucrative.[20] Recent reports suggest that fraudsters are disproportionately targeting Pandemic Unemployment Assistance, since the newness of the program, coupled with many legitimate PUA claimants' lack of third-party-reported earnings, makes it harder for states to distinguish fraudulent PUA claims from bona fide ones. As noted earlier, however, many PUA claimants are being asked to apply first for regular state UI, so fraud targeted at PUA may have pushed up initial claims for traditional UI, as well.

So, whereas backlogs have delayed initial claims (reducing the cumulative sum filed by any fixed point in time), duplicate and fraudulent filings have artificially inflated measured claims above the true number of actual, unique claimants. Importantly, however, the effect of

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18. To take one example: according to a recent article, Hawaiian officials noted that more than 10,000 out of about 161,000 UI claims filed in March 2020 were duplicates. Other states have acknowledged the existence of duplicate filings, though few appear to have released numbers. See John Burnett (2020), "Jobless Claims Soar Locally, Statewide, Nationally," *West Hawaii Today*, April 3. One might also worry that recurrent job losses would cause the same individuals to file initial claims on multiple occasions, but given the length of our analysis period such workers would typically reopen existing claims rather than starting brand-new ones.

19. See Mike Baker (2020), "Feds Suspect Vast Fraud Network Is Targeting U.S. Unemployment Systems," *The New York Times*, May 16. Much subsequent reporting has elaborated on this phenomenon.

20. In its 2019 Benefit Accuracy Measurement Annual Report, the Department of Labor concluded that fraudulent claims accounted for 3.2 percent of UI dollars disbursed in the 2018–2019 performance year. This statistic excludes instances in which fraud was detected promptly enough that a payment was never issued. See Employment and Training Administration (2020), *Benefit Accuracy Measurement State Data Summary, Improper Payment Information Act, Performance Year 2019*, March.

backlogs on claim accumulation should diminish over time, whereas spurious filings are likely to remain embedded in cumulative initial claims. For this reason, we posit that cumulative initial claims for regular state UI benefits can plausibly be interpreted as providing an *upper bound* on the number of individuals seeking UI benefits during this period.

## 3.2 Insured unemployment in regular state UI

Whereas initial claims represent the *flow* of new applications for UI benefits, continued claims capture the *stock* of individuals currently receiving benefits, inclusive of those awaiting an eligibility determination (or, in normal times, serving a waiting week prior to benefit receipt). As such, insured unemployment—the number of workers filing continued claims for a particular week—gives us another reading on the number of individuals seeking benefits.

The "official" series in Figure 2 plots the DOL's count of insured unemployed individuals seeking regular UI benefits in the early weeks of the crisis. Paralleling the surge of initial claims, insured unemployment (IU) rose rapidly through the week ending April 25, but in subsequent weeks IU rose and fell in alternating weeks before evening out in late May.

We believe this sawtooth pattern is an artifact of how IU is reported in California, Florida, Pennsylvania, Texas, and Puerto Rico, where claimants typically file continued claims once every two weeks, rather than every week as in most states. In Appendix B, we elaborate on this measurement issue and propose a simple two-week moving-average adjustment that better approximates the number of individuals seeking benefits in these states.[21] The alternate series in Figure 2 applies this refinement to the IU counts for the aforementioned states, then sums across states to reconstruct IU on a national basis. The alternate series is markedly smoother, peaking in the week ending May 2, declining rapidly in early May, and declining at a slower rate thereafter.[22]

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21. Some other states have biweekly filing, as well, but their IU series do not exhibit obvious sawtooth patterns. We adopt the minimalist approach of adjusting only the five states listed in the text.

22. As a check on our alternate series, Appendix Figure A4 shows that we obtain a similarly smooth contour for insured unemployment if we instead exclude biweekly-filing states from the calculation.

**Figure 2. Changes in insured unemployment, official series vs. alternate series that accounts for biweekly filing cycles in data from select states.**
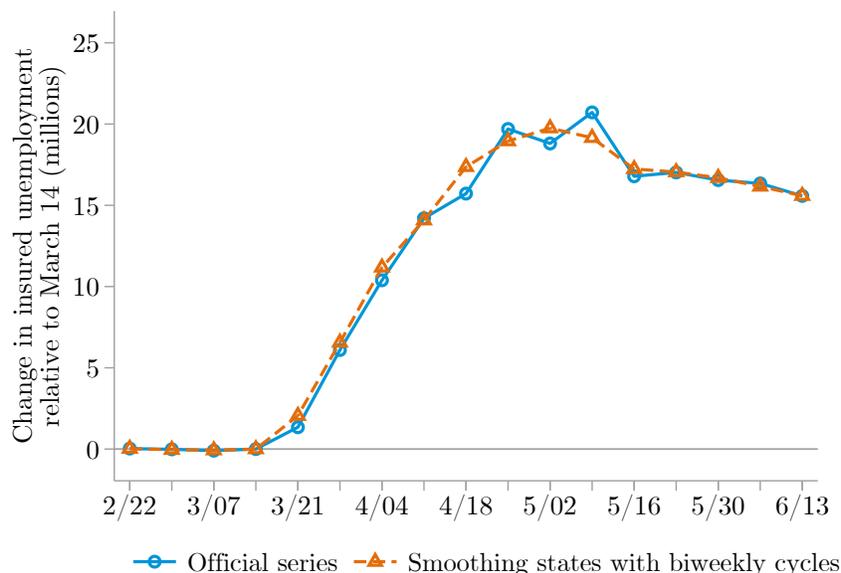


Note: Non-seasonally adjusted data from the DOL ETA, accessed via Haver Analytics. The alternate series smoothes insured unemployment in California, Florida, Pennsylvania, Texas, and Puerto Rico to remove data artifacts related to biweekly filing of claims in these states. See Appendix B for details.

Our alternate series suggests that insured unemployment grew by 19.7 million from its base of 2.1 million on March 14 to its peak of 21.8 million in the week ending May 2. Whereas we view cumulative initial claims as an *upper bound* on the number of individuals seeking UI benefits, we see growth in continued claims as providing a *lower bound* because it leaves out denied claimants as well as approved claimants who subsequently exit from UI. To the extent that denied claims reflect errant duplicates and fraudulent filings, focusing on insured unemployment may dampen the importance of spurious claims that do not represent actual unemployed workers.[23] However, some claims filed by real individuals are also denied, and benefit recipients drop out of insured unemployment upon being reemployed or otherwise ceasing to file continued claims. For these reasons, growth in the stock of continued claims almost certainly understates the number of benefit-seekers during our analysis period.

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23. For example, Washington State reported a roughly 40 percent decline in continued claims in the week ending May 16. Since media reports suggest Washington was heavily targeted by fraudsters, this unusually steep decline may indicate that the state identified and denied a large volume of fake claims. According to the *Seattle Times*, state officials attributed a concurrent 60 percent decline in *initial* claims to their anti-fraud efforts. See Paul Roberts (2020), "Washington State Claws Back $300 Million from Unemployment Fraud Scheme as Many Jobless Workers Await Benefits", *Seattle Times*, May 28.

## 3.3 Incorporating claims for Pandemic Unemployment Assistance

So far we have focused exclusively on claims for regular state UI. To round out our discussion of the number of benefit-seekers, we turn now to claims for Pandemic Unemployment Assistance (PUA). Comprehensive statistics are not yet available, initial PUA claims may include spurious filings, and continued PUA claims appear to be inflated by multiple counting of people claiming backdated benefit-weeks. With these caveats in mind, initial claims tallied by an incomplete set of reporting states suggest that at least 7.9 million individuals sought PUA benefits from program inception through June 13. After putting this number in context, we integrate it into our assessment of the overall claimant population.

**Who can claim PUA?**

As described in Section 2.2, PUA is a temporary program that extends benefits to certain classes of workers who do not usually qualify for regular state UI. Self-employed workers (including business operators and independent contractors) are a major target population, but PUA is also available to several other groups: laid-off payroll workers with inadequate base-period earnings; new entrants who had bona fide job offers cancelled due to COVID; workers employed by non-profits or religious organizations that are not covered by state UI; and payroll workers who quit their jobs for certain virus-related reasons, such as COVID-induced childcare obligations. PUA is *not* available to undocumented immigrants, nor to recent graduates unless they worked in the base period or had a job offer rescinded due to COVID.

In contrast to the regular UI system, into which employers pay taxes for each of their payroll workers, there is no exact measure of the workers entitled to PUA. While the set of potentially eligible PUA claimants is quite broad, the PUA population is sometimes characterized as being composed primarily of self-employed individuals. If this is the case, the number of continuing claims for PUA is puzzlingly high because the total—reported by an incomplete set of states thus far—already comes close to some estimates of the entire US

self-employed workforce prior to the crisis. We return to this point in Section 4.4.

## Implementation and reporting

Though PUA was designed at the federal level, implementation has been left up to individual states.[24] Program rollout varied considerably across states: Rhode Island moved first, accepting PUA claims as early as April 2, while the last state, Nevada, did not begin accepting PUA applications until May 16. Due to these cross-state differences in timing, PUA growth at the national level reflects both the extensive margin of new states accepting claims and the intensive margin of claims accumulating within participating states.

Interpretation of PUA claims is further complicated by lags in some states between program implementation and the reporting of PUA program statistics. While additional information has trickled in over time, we still observe gaps between the weeks in which some states began accepting claims and the earliest weeks for which those states have reported PUA claim volumes.[25] As of the time of writing, we still have no information on weekly PUA claims filed in Florida, Georgia, New Hampshire, West Virginia, or the US Virgin Islands at any point through June 13, the end of our analysis period. In other cases, we observe claim counts for some but not all of the weeks in which PUA programs were in place, or we observe either initial or continued claims for a given week, but not both. As such, there is still no complete national time series showing the evolution of PUA enrollment.

The left panel of Figure 3 portrays the combined effect of delays in program rollout and subsequent delays in program reporting. Only a small number of states have reported PUA claims for the first half of April, as most states had not yet launched their programs. The set of reporting states grows steadily through the end of May, with 47 states reporting

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24. The federal government will eventually reimburse states for all PUA benefit payments that are deemed valid, along with all setup and ongoing administrative costs of the new program.

25. Appendix Figure A2 plots the relationship between the date each state began accepting PUA claims—taken from press releases assembled by Murray and Olivares (2020)—and the earliest date for which it has so far reported tabulations of either initial or continued PUA claims. As of the time of writing, 11 states had a reporting lag of one or more weeks, and five had a lag of more than 30 days. These counts omit the US Virgin Islands, as we have been unable to determine when PUA claims were first accepted.

**Figure 3. Initial and continued claims for Pandemic Unemployment Assistance (reported by a growing but incomplete subset of states).**



*Number of states reporting PUA claims*

*Reported volume of PUA claims*
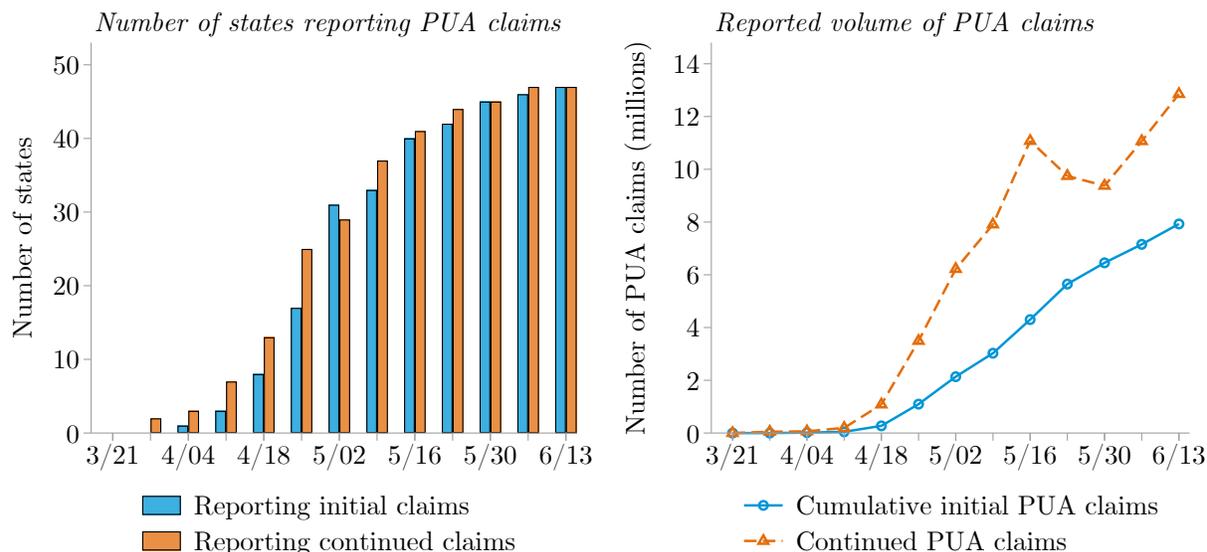
Note: Non-seasonally adjusted data from the DOL ETA, accessed via Haver Analytics. The number of reporting states is inclusive of the District of Columbia, Puerto Rico, and the US Virgin Islands in weeks for which they have reported data.

both initial and continued claims for the week ending June 13.

**The volume of PUA claims**

In a period with large job losses, we would expect the cumulative inflow of initial claims to closely track—but outpace—contemporaneous growth in the stock of continued claims. But idiosyncrasies in claim reporting and processing have resulted in a surprising anomaly: as shown in the right panel of Figure 3, continued claims for PUA have accumulated much faster than initial claims. By the week ending June 13, the cumulative total of states' reported initial claims for PUA stood at 7.9 million, whereas their reported continued claims had shot up all the way to 12.9 million.[26]

A recent news article offers a possible explanation for this puzzling pattern: the reported number of continued PUA claims is apparently overstated, perhaps severely so, because some

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26. Though these numbers partly reflect the tendency for more states to report data on continued claims than on initial claims in a given week, we observe similar patterns within individual states, with continued claims for PUA often rising faster than indicated by the number of initial PUA claims in a given week.

states (including Arkansas, Hawaii, and Pennsylvania) are counting PUA claimants multiple times when they first begin filing. This approach generates multiple entries for each person because it counts the number of *weeks* that applicants are claiming retroactively, which can reach into double digits.[27]

Given the reporting issues surrounding these continued claims, it appears that the running sum of states' initial PUA claims provides the most accurate picture of the total number of individuals applying for PUA.[28] However, this number may be a lower bound of PUA claimants because several states are not yet reporting their claims to the ETA and because several other states have not reported how many initial PUA claims were filed in the first week or two after program implementation. Tallying initial claims as of the mid-month reference weeks to which the monthly employment reports pertain, we observe *at least* 270,000 PUA claims by April 18, 4.3 million by May 16, and 7.9 million by June 13.

Importantly, because most PUA applicants have been directed to first apply and be denied for regular state UI benefits, the bulk of these nearly 8 million PUA claims are likely already embedded in our earlier tabulation of initial claims for traditional UI benefits.[29] By contrast, insured unemployment should be little affected by the swelling volume of PUA claims.[30] We return to this issue in Section 4, where we discuss how PUA claims affect the suitability of initial UI claims and insured unemployment for gauging movements in payroll employment (Section 4.3) and self-employment (Section 4.4).

27. See Katia Dmitrieva, Maeve Sheehey, and Reade Pickert (2020), "US Jobless-Claims Figures Inflated by States' Backlog-Clearing," *Bloomberg News*, June 29. In its UI press release on July 2, ETA cautioned that backdated benefit-weeks may be included in tabulations of continued claimants seeking PUA.

28. A subset of states have reported data on the monthly number of PUA applications, determinations, and first payments in their 902P filings to the Employment and Training Administration. Across states for which we can match the data, the correlations of applications/determinations/payments with states' initial claims (aggregated across weeks) are all above 0.95. These uniformly high correlations suggest that initial claims for PUA are a fairly accurate measure of the total number of PUA claimants.

29. Most states, except Maryland and perhaps a few others, require applicants to first be rejected from regular state UI before applying for PUA (although Michigan and Texas both reported converting some of their early state UI claims to PUA applications when their portals opened).

30. Individuals who go on to apply for PUA may be briefly counted towards insured unemployment if, while their prerequisite claims for regular state UI are pending determination, they file continued claims for state benefits. But they should exit from insured unemployment by the time they are applying for PUA.

**Table 1. Alternate measures of growth in the number of claimants (millions).**

|  |  | by May 2 | by June 13 |
|---|---|---|---|
| *Claim accumulation since March 14:* |  |  |  |
| (a) | Cumulative initial claims for traditional UI | 30.8 | 41.9 |
| (b) | Peak growth in insured unemployment | 19.7 | 19.7 |
| *Accounting for cross-state heterogeneity and denied claims:* |  |  |  |
| (c) | (b) summed up from state-specific peaks | 20.7 | 21.4 |
| (d) | (c) inflated to account for monetary denials | 25.9 | 26.8 |
| (e) | (c) plus cumulative initial claims for PUA | 22.9 | 29.4 |
| *Remaining gaps:* |  |  |  |
|  | (a) − (b) | 11.0 | 22.1 |
|  | (a) − (c) | 10.1 | 20.5 |
|  | (a) − (d) | 4.9 | 15.1 |
|  | (a) − (e) | 7.9 | 12.5 |

Note: Authors' calculations based on non-seasonally adjusted counts of initial and continued claims for regular state UI and for Pandemic Unemployment Assistance, as reported by the DOL ETA and accessed via Haver Analytics. Line (b) adjusts insured unemployment to account for biweekly filing cycles in select states. Line (d) draws on states' ETA 218 filings. Due to rounding, differences between indicated values do not necessarily equal the gaps reported in the bottom rows of the table.

## 3.4 Accounting for the gap between initial UI claims and insured unemployment

We now take stock of what initial and continued claims, considered jointly, tell us about the number of new claimants for unemployment benefits between March 15 and June 13.

Table 1 walks through five alternative estimates of this quantity. Line (a) reproduces the measure we discussed in Section 3.1: cumulated initial claims for regular state UI benefits, which came to 30.8 million as of May 2 and grew further to 41.9 million as of June 13. Line (b) shows the growth in insured unemployment (adjusted as in Section 3.2 to account for states with biweekly filing), which peaked in the week ending May 2 at a level of 19.7 million. How can we account for the huge gulf between these two indicators—a gap that reached 11.0 million in early May and widened further to 22.1 million by the middle of June?

To narrow the gap between these indicators, we first adjust our measure of the growth

in insured unemployment to account for the fact that IU peaked in different states at different times. Just as the change in national IU between March 15 and its peak on May 2 places a lower bound on the national population of new claimants, so too does the growth in each state's IU between March 15 and its state-specific peak place a lower bound on that state's claimant pool. But because state-level shifts in IU are partially offsetting at the national level, summing peak IU growth across states yields a tighter lower bound on the total claimant volume. Line (c) in the table reports this cross-state sum, which equals 20.7 million claimants when the calculation runs through May 2 and 21.4 million claimants when the calculation runs through June 13.[31] These adjusted numbers are more directly comparable—and modestly closer in magnitude—to cumulative initial claims.

Next, we scale up our estimate of peak insured unemployment to account for denied claimants. We can do this in two different ways. A direct approach is to calculate the number of claimants who receive a monetary determination but are ultimately deemed ineligible. Data from states' ETA 218 filings for the first quarter of 2020 suggest roughly 20 percent of claims that received a monetary determination lacked sufficient base-period wage credits to establish a UI entitlement.[32] If we assume that a similar denial rate applies throughout our analysis period—and if we further assume that monetary determinations are issued relatively quickly, so that by the time IU peaks in each state the large majority of claims have survived a monetary determination—we can multiply the sums listed in line (c) by five-fourths to

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31. Letting $IU_{st}$ denote insured unemployment in state $s$ in week $t$ (adjusted where necessary to account for biweekly filing), and subtracting insured unemployment as it stood pre-crisis, we compute

$$\text{cross-state sum of peak IU growth} \equiv \sum_s \max_{t \in \{3/21,\dots,T\}} (IU_{st} - IU_{s,3/14}) \qquad (1)$$

where $T$ is either May 2 or June 13. $IU_{st}$ peaks as early as the week ending April 18 (in eight states) and as late as June 13, the last week of our analysis period (in three states).

32. Appendix Figure A3 plots the percentage of monetary determinations approved each quarter from 1985Q1 through 2020Q1. Mirroring sharp declines observed during or after other recent recessions, the monetary approval rate plunged from 90.2 percent in 2019Q1 to 82.9 percent in 2020Q1. The most recent data point reflects a mix of pre-pandemic claims filed from January through early March and pandemic-era claims filed thereafter. If we use the number and disposition of 2019Q1 monetary determinations to construct a rough "no-pandemic" counterfactual for 2020Q1, we infer that approximately 80.8 percent of pandemic-induced monetary determinations concluded in 2020Q1 resulted in approvals.

account for denied claimants who have already passed out of view. This rough calculation, shown in line (d), suggests that 25.9 million [respectively, 29.4 million] sought UI benefits by May 2 [resp., June 13]. While we lack suitable data to account for claimants who are denied benefits on *non-monetary* grounds, doing so would increase these numbers still further.[33]

An alternative, indirect approach to account for denied claimants is to assume that all such individuals go on to file claims for Pandemic Unemployment Assistance. Line (e) of the table thus adds cumulative initial claims for PUA to our sum-of-state-peaks estimate of the growth in insured unemployment. The resulting total comes to 22.9 million as of May 2, then soars to 29.4 million in the week ending June 13.

Though the precise magnitudes vary across methods, these successive adjustments go a considerable way towards narrowing the original chasm between cumulative initial UI claims and growth in the level of insured unemployment. Even so, millions of individuals who filed initial claims seemingly cannot be found among the ranks of either continuing or denied claimants. A likely explanation for the remaining gap is that initial claims reflect *gross* job losses, whereas insured unemployment is better understood as a measure of *net* job losses because claimants cease filing continued claims upon returning to work. This observation turns out to be key for understanding why US employment began to rebound in mid-May, even as fresh cohorts of job losers continued to file UI claims in staggering numbers.

# 4   The relationship between UI claims and changes in employment

Because initial claims are one of the most timely labor market indicators, they have often been used to forecast other, more-comprehensive measures of labor market performance,

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33. States report non-monetary determinations in their ETA 207 filings, but not all claims raise a non-monetary issue, and claims are multiply counted if they raise multiple non-monetary issues (e.g., an alleged voluntary quit coupled with alleged refusal of suitable work). Non-monetary determinations also take longer to process, so that the currently available 2020Q1 data may not be timely enough to be informative.

such as payroll employment.[34] Before using claims for this purpose, however, it is important to recognize the differences between the two series. In this section, we first lay out the many reasons why initial claims may not relate one-for-one to changes in payroll employment. Building on the arguments developed in Section 3, we highlight the potential usefulness of insured unemployment in capturing *net* rather than *gross* changes in employment. After a brief look back at how claims compared with payroll employment during the Great Recession, we compare initial and continued claims to realized payroll changes in the current crisis. We then broaden our view to consider reductions in non-payroll employment, as well.

## 4.1 Sources of discrepancy between initial UI claims and payroll employment changes

The Bureau of Labor Statistics (BLS) publishes data for two employment concepts. Payroll employment, as measured in the Current Employment Statistics (CES), is based on the number of workers receiving wages or salaried pay from surveyed establishments during the pay period that straddles the 12th day of each month. Household employment, as measured in the Current Population Survey (CPS), is based on individual respondents' self-reported work status during the reference week that contains the 12th day of the month.[35] For the moment, we limit our analysis to the payroll concept, which, owing to the large sample size of the CES, is more actively followed in financial markets and by economic forecasters. We will, however, sometimes refer to gross labor force flows in the CPS, as these offer timely information about movements of individuals into and out of employment.

The net change in payroll employment over a given period can be thought of as the sum of wage and salary workers who started the period non-employed and ended it employed

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34. Weekly claims are deemed so important an early labor market indicator that, during the US government shutdown in November 1995, Alan Greenspan (then Chairman of the Federal Reserve) personally asked for the continuation of data collection on initial claims. This practice continues to this day, as initial UI claims are the only statistics that the federal government continues to publish in the event of a shutdown.

35. For a description of the differences between the two surveys, see Bowler and Morisi (2006). The timing of the CES and CPS reference weeks is sometimes shifted on account of holidays, but this did not occur during the months we analyze.

(gross employment gains) minus the sum of individuals who started the period employed and ended it non-employed (gross employment losses). Because initial claims are an indicator of gross employment losses, one would naturally expect them to be of greater magnitude than the net decline in employment, given that gross employment gains are always positive. Even at times when net employment is declining precipitously, as it was between March and April of this year, many individuals are still moving into employment. Since gross job gains are not perfectly correlated with gross job losses, claims would be an imperfect predictor of net changes in employment even if they were a perfect predictor of gross employment losses.

But claims are not a perfect indicator of gross employment losses. We consider in turn reasons why initial claims can, in principle, either *understate* or *overstate* gross job losses, both in general and in the special circumstances of the COVID-19 crisis.

### Reasons why initial claims can understate gross job losses

A first reason why initial claims may understate gross employment losses is that not all individuals leaving employment proceed to file for unemployment insurance. This observation applies to unemployed job losers, whose involuntary separations render them potentially eligible for UI benefits; to unemployed quitters, whose voluntary separations usually render them ineligible; and finally to job losers and quitters who have left the labor force and, as a result, are typically ineligible for lack of active job search. In most periods, many unemployed job losers choose not to apply for UI, both because some are ineligible and because take-up is far from universal even among eligible workers (e.g., Vroman, 2009). In recessions, however, there is typically a marked increase in the share of unemployed job losers filing a claim (Hobijn and Şahin, 2011). Given the added incentives to apply for UI provided by the CARES Act, in the current crisis we think it is likely that an exceptionally high share of unemployed job losers have filed initial claims.

Turning to other groups of newly jobless workers, many unemployed job quitters are also likely reflected in spring 2020 initial claim statistics because recent policy changes have

enabled individuals who quit their jobs for COVID-related reasons to receive PUA benefits (and, in some states, traditional UI). In addition, many job losers and quitters who are not searching for work—and therefore not counted as unemployed—are eligible for UI because of recent relaxations to UI search requirements.

Claim statistics may not, of course, encompass all individuals transitioning out of employment. As emphasized by Krusell et al. (2017) and others, many of the individuals moving between non-participation and employment are likely reacting to idiosyncratic exogenous shocks to labor supply. Individuals leaving employment for labor supply reasons may not think to file a claim. Even so, the fact that claims likely do not capture labor-supply-related exits from employment may not significantly degrade their ability to predict net changes in payroll employment because, at most points in time, supply-related flows out of employment seem to be roughly balanced by supply-related flows into employment. In 2019, for example, an average of 4.6 million individuals moved from employment to out of the labor force every month, while 4.7 million moved in the opposite direction. These flows also move together over time, mitigating their impact on net shifts in payrolls.

A second reason why claims may understate concurrent gross employment losses is that claims sometimes lag the separations that gave rise to them. In some cases, individuals may wait for some period of time before applying for UI due, e.g., to a lack of information about the application process or initial optimism about a quick return to work. As we noted in Section 3.1, severe congestion at state employment offices in the early weeks of the COVID-19 crisis evidently introduced additional lags between the timing of job losses and the processing of at least some associated claims. Whatever their source, delays between separation dates and filing dates can lead initial claims to first understate and later overstate contemporaneous job losses, as layoffs diminish or as backlogs ease. As we discuss below, a comparison between claims and employment changes is consistent with the assumption that claims may lag job loss by a week or so. Thus, comparing employment changes in week $t$ to claims in week $t+1$ can reduce the understatement/overstatement pattern due to waiting

and processing lags.

Finally, multiple job holding can also cause claims to understate gross job losses. For example, an individual who held two jobs before March and subsequently lost one of them may not have filed an initial claim, as earnings from the retained job might exceed allowable limits. By the same token, an individual who lost two jobs would have likely filed at most one claim, though two payroll jobs were lost. To give a sense of the potential magnitude of this factor, the number of people working multiple jobs dropped by 2.8 million between mid-February and mid-April, then rose by 0.8 million between mid-April and mid-June.[36]

### Reasons why initial claims can overstate gross job losses

Turning to reasons why initial claims may *overstate* gross employment losses, (unincorporated) self-employed and gig workers, who are eligible for PUA, are not included in firm payrolls. As a rough gauge of the importance of this factor, the mid-February to mid-April decline in unincorporated self-employment reported by the BLS was 1.2 million.[37] We discuss the employment implications of realized PUA claim volumes in detail in Section 4.4.

Another reason why the recent wave of initial claims may have overstated gross job losses is that some of the nearly 4 million individuals who, as of March, were unemployed but not receiving UI compensation have likely filed claims since then, both because the CARES Act has increased the generosity and availability of UI benefits and because job-finding prospects have worsened. It is also likely that claims have been boosted, perhaps substantially so, by fraudulent claims and by multiple claims filed per person (see discussion in Section 3.1), though it is difficult to gauge the extent of either factor.

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36. These numbers, reported in the BLS Labor Force Statistics (series LNU02044497), are non-seasonally adjusted and pertain to wage and salary workers whose primary job is not in agriculture.

37. In February 2020, there were 9.4 million unincorporated self-employed individuals and 6.5 million incorporated self-employed. Because the incorporated self-employed are required to pay themselves wages, they should theoretically be included in payroll employment. Indeed, when the BLS reconciles employment estimates from the household survey, which includes the self-employed, and the establishment survey, which is limited to wage and salary workers, it only accounts for the unincorporated self-employed as a source of discrepancy between the two series. In any case, the decline in incorporated self-employment was only 0.1 million between February and April.

Finally, claims may exceed job losses because individuals who remain employed but experience sufficiently steep reductions in hours can apply for partial UI benefits.[38] Though partial UI status is defined for benefit-weeks rather than for initial claims, available data suggest that partial payments account for a substantial minority of continued claims (perhaps around 1.8 million in May 2020).[39] We note, however, that some partial UI claims reflect instances where a worker has lost one of multiple jobs, in which case the claim would still correspond to a reduction in payroll employment.

**Summary and implications**

To recap the foregoing discussion, Table 2 summarizes the reasons claims may under- or overstate gross employment losses and, where possible, provides a gauge of the possible under- or overstatement in recent months. Table 3 compares the number of claims accumulating from the previous month's reference week through the current month's reference week to the number of workers exiting from employment over that same period, as estimated in the CPS.

We take away several lessons from the above analysis. First, one needs to account for gross employment gains before comparing claims to net employment changes. Second, in the current environment initial claims provide a quite comprehensive account of gross employment losses, as they likely include almost all job losers who do not quickly find another job, as well as many job quitters. Third, because of the recent expansion of UI coverage to the self-employed, claims for partial unemployment, claims for job loss prior to March, and the possibility of significant multiple and fraudulent claims, claims may actually

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38. Partial UI is distinct from Short-Time Compensation (STC), a worksharing program through which employees can claim prorated benefits while working reduced hours. Like partial UI recipients, STC claimants remain attached to payrolls; unlike partial UI, STC claims are not counted among regular state UI claims. Though comparatively few in number, STC claims are growing rapidly. We discuss STC further in Section 5.3.

39. According to state ETA 5159 filings, partial UI payments accounted for 6.7 percent of benefit-weeks paid in February 2020; this share then ticked up to 8.6 percent in March, reverted to 6.8 percent in April, and then jumped to 9.4 percent in May. Hedin et al. (2020) report a similar time profile in weekly California microdata. The elevated fraction of partial payments in March may reflect spikes in mid-week flows into unemployment, with workers entitled to partial compensation in their last, incomplete week of work. The reverse dynamic could be at play in May, with workers returning to payrolls mid-week; in addition, some furloughed workers may be coming back on a reduced-hours basis.

**Table 2. Reasons initial claims can diverge from gross employment losses.**

| Reason for difference | Effect on relative magnitudes | Gauge of magnitude |
| --- | --- | --- |
| Not all unemployed job losers file | Claims understate losses | Likely small now |
| Quits to out of labor force | Claims understate losses | Likely balanced by movements from out of labor force into employment |
| Claims filed with a lag | Claims initially understate and later overstate losses | Small effect except at times when processing is delayed; can be addressed by using leading values for claims |
| Multiple job holders | Claims understate losses | 2.8 million decline in multiple job holders between February and April |
| Self-employed | Claims overstate losses | 1.2 million decline in CPS unincorporated self-employment between February and April; 7.9 million initial PUA claims as of mid-June |
| Claims include job losers from prior periods | Claims overstate losses | 4 million unemployed individuals not receiving UI in February |
| Fraudulent claims and multiple claims per person | Claims overstate losses | Perhaps significant but difficult to gauge |
| Still-employed workers eligible for partial UI | Claims overstate losses | Perhaps 1.8 million partial UI claimants as of May |

**Table 3. Measures of gross employment losses and gains (millions).**

|  | March | April | May | June |
|---|---|---|---|---|
| Panel A: Gross employment losses | | | | |
| Initial claims | 0.9 | 24.4 | 10.9 | 6.6 |
| CPS short-term unemployed job losers and quitters | 2.5 | 13.4 | 3.1 | 2.3 |
| CPS gross flows from employment to unemployment | 2.6 | 17.2 | 4.6 | 3.8 |
| CPS gross flows from employment to unemployment *and also* to non-participation | 8.0 | 26.4 | 8.6 | 7.4 |
| Panel B: Gross employment gains | | | | |
| CPS gross flows from unemployment to employment | 1.4 | 1.6 | 7.6 | 7.5 |
| CPS gross flows from unemployment *and also* from non-participation to employment | 5.1 | 4.6 | 12.7 | 12.6 |

Note: Initial claims from the DOL ETA, accessed via Haver Analytics, and labor force statistics from the Current Population Survey (CPS). Claims are summed from the week after the CPS reference week of the preceding month through the CPS reference week of the current month. Data are non-seasonally adjusted.

overstate somewhat the number of gross payroll employment losses in recent months.

These points suggest using insured unemployment (IU), rather than initial claims, as a proxy for net employment changes. Because insured unemployment declines when a UI claimant becomes reemployed and ceases to file continued claims for benefits, it accounts for gross employment gains as well as losses. To a greater degree than initial claims, IU also filters out multiple and fraudulent claims, and it excludes the self-employed, who are accounted for separately under PUA claims. Less helpfully, IU does not include individuals who lose a job but lack sufficient previous earnings to quality for regular state UI. Such individuals are also included under PUA, but they are not identified separately from the self-employed or from those quitting their jobs because of COVID.[40]

Insured unemployment is not a perfect indicator: it does not capture all gross employment gains, and it inherits some of the wedges between initial claims and gross employment losses. Initial claims are reported on a more timely basis than continued claims and may be

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40. As noted in Section 3.4, the ETA publishes data on the share of claims denied because they do not meet the monetary criteria for eligibility; however, we lack data indicating what share of claims so denied originate from job losers as opposed to other individuals with insufficient base-period earnings.

particularly useful in detecting the beginnings of a recession—the very reasons why newly filed claims have received so much attention in this as in previous downturns. Nonetheless, insured unemployment has conceptual appeal as a complementary, omnibus measure that captures flows out of as well as into unemployment. We turn now to the question of how this indicator has performed empirically, in recent memory and today.

## 4.2 Comparing continued claims with payroll employment during the Great Recession and its aftermath

Before returning to the present crisis, we briefly examine the relationship between insured unemployment and total non-farm CES payroll employment during and after the Great Recession, from the official start of the recession in December 2007 through December 2013.[41] For consistency with our analysis of the current epoch, we use non-seasonally adjusted data.

Figure 4 shows that through the end of 2008, continuing claims and payroll employment moved largely in tandem, with both changing by about 3.5 million. The pace of decline in payroll employment exceeded the increase in IU through much of the rest of the recession and recovery; IU increased by about three-quarters of the decline in payrolls, which is consistent with findings about UI recipiency during recessionary periods.[42] As discussed above, while UI recipiency was likely quite high among the eligible unemployed, not all payroll declines trigger UI eligibility, including quits out of the labor force, job losers not eligible for UI due to earnings thresholds, and loss of secondary jobs. Additionally, the protracted recovery from the Great Recession meant that a substantial number of workers exhausted their UI benefits, notwithstanding programs that extended the potential duration of benefits. Such exhaustions would serve to lower IU relative to payroll employment.

Despite differences in the level of the two series, their close comovement during the previous recession highlights the potential usefulness of insured unemployment in assessing

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41. We end the comparison in 2013 because the 2008 Extended Unemployment Compensation (EUC) program expired at the end of 2013. The insured unemployment series plotted in Figure 4 is inclusive of claimants receiving EUC as well as claimants receiving Extended Benefits.

42. See Nunn and Ratner (2019) for a discussion of UI recipiency rates.

**Figure 4. The relationship between insured unemployment and payroll employment during the Great Recession and its aftermath.**
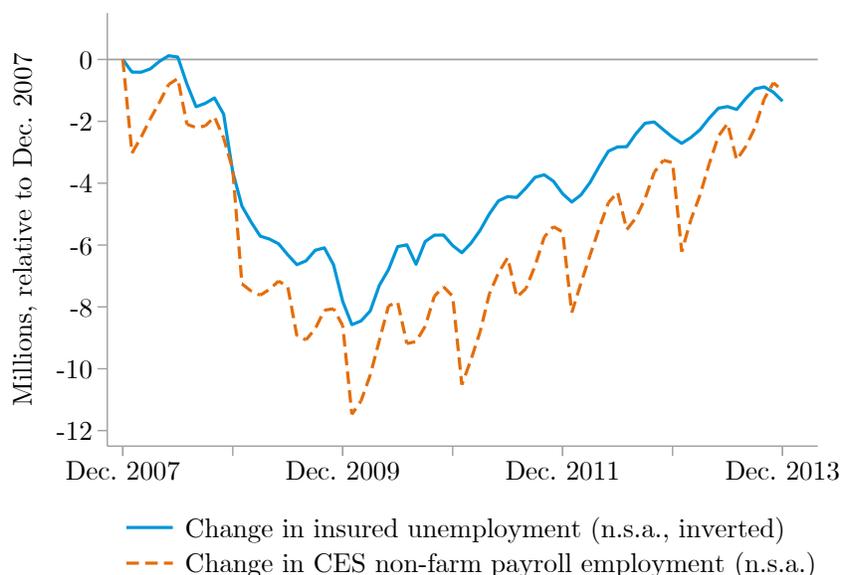


Note: Insured unemployment from the DOL ETA and Current Employment Statistics (CES) payroll employment from the Bureau of Labor Statistics (BLS), both accessed via Haver Analytics. Both series are at monthly frequency and are not seasonally adjusted. Insured unemployment is defined here as the sum of regular state, Emergency Unemployment Compensation, and Extended Benefit continuing claims and is multiplied by −1 to facilitate visual comparisons.

shifts in underlying payroll employment.

## 4.3 Comparing UI indicators with payroll employment during the COVID-19 crisis

Of course, the fact that insured unemployment closely tracked employment during the Great Recession—which played out over years—does not necessarily imply that it would do so again under the very different circumstances of the pandemic. Thus far, however, it has.

Figure 5 compares cumulative changes since February 15, 2020 in initial claims, insured unemployment, and two measures of payroll employment: the monthly CES series we have already seen, which captures total non-farm payrolls, and a weekly "ADP-FRB" measure of private payroll employment developed by Federal Reserve Board staff based on microdata provided by the firm ADP.[43] Initial claims and insured unemployment are multiplied by −1

43. ADP processes payrolls for clients accounting for roughly one-fifth of US private-sector employment.

**Figure 5. The relationship between UI claims and payroll employment during the COVID-19 crisis.**
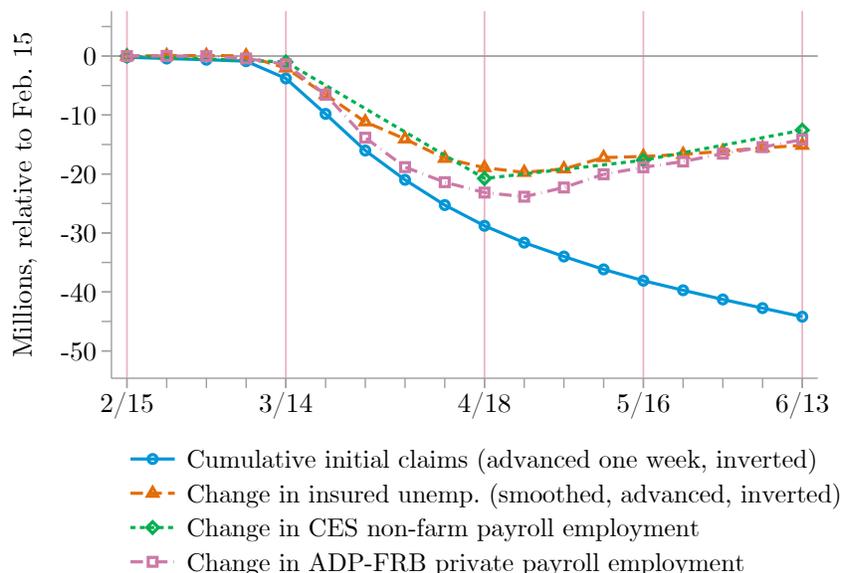


Note: Claim volumes from the DOL ETA via Haver Analytics, Current Employment Statistics (CES) payroll employment from the BLS via Haver Analytics, and ADP-FRB payroll employment based on microdata provided by the payroll provider ADP. All series are non-seasonally adjusted. Initial claims pertain to regular state UI only (but see Section 3.3 for a discussion of why claimants seeking Pandemic Unemployment Assistance may be showing up in this series). Insured unemployment is adjusted for biweekly reporting as described in Section 3.2 and Appendix B. Initial claims and insured unemployment are multiplied by −1 to facilitate visual comparisons. Vertical rules indicate the reference weeks for which employment is measured in the CES (those containing the 12th day of each month).

and shown advanced by one week to account for the time gap between true employment changes and initial/continuing UI claims.

Cumulative initial claims tracked payroll employment changes relatively well through the beginning of April. During that period, gross employment gains appear to have been little changed from previous months, as shown in Table 3. Thus, the close comovement of initial claims and payroll employment through the beginning of April suggests that initial claims

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The ADP-FRB employment measure uses anonymized payroll records from client firms to construct representative estimates of private payroll employment in the United States as a whole. For details about the ADP-FRB series, see Cajner et al. (2020b). While for the CES we present the broader measure of total non-farm payrolls, our conclusions are unchanged if we look instead at private CES payrolls, which accounted for the vast majority of the net change in total CES employment during this period. The IU series plotted here, in contrast to its analogue in Figure 4, omits individuals receiving (Pandemic) Emergency Unemployment Compensation or Extended Benefits (EB) because, over the period shown, relatively few claimants exhausted benefits and because shifts in the number of PEUC and EB recipients are heavily impacted by changes in the set of states in which these benefit extensions were available.

were a good proxy for gross employment losses—implying, in turn, that the effects listed in Table 2 roughly offset each other during that period. Consistent with this interpretation, the accumulation of initial claims between the March and April reference weeks exceeded gross flows of individuals from employment to unemployment but fell short of gross flows of individuals from employment to non-employment more broadly. This is as one would expect, given the presence of some flows to non-participation due to idiosyncratic changes in labor supply that would be unlikely to generate an initial claim.

As shown in Figure 5, however, from mid-April onwards initial claims started to diverge appreciably from changes in payroll employment. Table 3 indicates that between the April and May reference weeks initial claims overstated gross employment losses by a few million, with PUA likely playing an important role. Even more importantly, gross employment gains shot up dramatically during that period, as CPS gross flows from non-employment to employment reached almost 13 million and thus more than doubled their typical monthly level (Table 3). These developments in large part reflected the recalling of previously furloughed workers as several states started lifting their pandemic-related lockdown restrictions and consumers began resuming commercial activities from which they had previously refrained (Bartik et al., 2020; Cajner et al., 2020a).

As argued previously, insured unemployment should exclude the mounting volume of PUA claims, and it should reflect changes in gross employment gains as well as gross employment losses. Consistent with these features, the rise and subsequent fall in insured unemployment has mirrored opposing movements in payroll employment: after tracking net job losses between February and April, between the April and May CES reference weeks insured unemployment moved down 1.9 million, while total non-farm CES employment rebounded by 3.1 million and ADP-FRB private payrolls jumped up by 4.3 million. Both insured unemployment and payroll employment exhibited further signs of improvement from May to June, though the decline in insured unemployment decelerated somewhat even as

payrolls continued to recover at headlong speed.[44]

Strikingly, on the eve of the May Employment Situation Summary—the closely watched "jobs report" in which statistics from the establishment and household surveys are first published—the Bloomberg consensus forecast predicted a decline in non-farm payroll employment of 7.5 million for the month of May, resulting in an unparalleled forecast miss of about 10 million jobs.[45] Presumably, private forecasters took greater cues for the payroll forecast from the mounting millions of initial claims than from the signs of an incipient recovery implicit in the level of insured unemployment.

As our analysis in Section 3 makes clear, however, these signs were not easy to discern in real time. Indeed, three factors we have discussed—seasonal adjustment, the time lag between employment changes and continued claims, and the reporting artifacts stemming from biweekly filing—combined to make the headline insured unemployment tally a misleading indicator of how labor market conditions had changed over the period in question. Based on information available on the date of the May jobs report, a straight read of seasonally adjusted insured unemployment would have shown an *increase* from 18.0 million to 20.8 million between the April and May reference weeks.[46] Insured unemployment's apparent signaling of further labor market deterioration through the middle of May 2020 highlights the need for scrupulous attention to the timing and reporting of this high-frequency indicator, especially when events are moving at the breakneck pace of the COVID-19 crisis.

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44. Payroll growth may have outstripped reductions in insured unemployment in part because some furloughed workers are being recalled at reduced hours and thus eligible to receive partial UI benefits. As we noted in Section 4.1, available data suggest a recent uptick in the share of UI claimants who are receiving only a portion of their full weekly benefit amounts by virtue of having positive earnings. In addition, estimates of payroll employment for recessionary periods tend to revise downward as more comprehensive statistics become available, reflecting perhaps the difficulty of adjusting real-time payroll data for establishment births and deaths (Cajner et al., 2020b). If June 2020 employment is revised downward, it might ultimately show the same deceleration seen in concurrent shifts in insured unemployment.

45. See Katia Dmitrieva (2020), "US Hiring Rebounds, Defying Forecasts for Surge in Joblessness," *Bloomberg*, June 5.

46. The IU level for the week ending April 18 was last reported in ETA's May 14 press release. The IU level for the week ending May 16 was reprinted in ETA's June 4 press release, which came out the day before the May Employment Situation Summary.

## 4.4  Reconciling PUA claims with self-employment and job loss

By the middle of June, the 7.9 million initial PUA claims filed by that point already far exceeded the number originally anticipated; for instance, the Congressional Budget Office expected only five million people to claim PUA.[47] Although PUA claims contain potentially important information about the magnitude of COVID-related job loss, at this point we do not have enough credible intelligence about the types of individuals filing PUA claims to use it for these purposes. Below we describe three types of PUA claimants: (1) the self employed, including gig workers; (2) wage and salary workers not qualifying for regular UI; and (3) fraudulent claimants. Claimants in category (2) include payroll workers with limited attachment to the labor force, a subset of those who recently joined the labor force, and some payroll workers who cannot work on account of childcare obligations. Each group of PUA claimants has different implications for the employment effects of COVID but, while we can estimate the size of the eligible groups in categories (1) and (2), we have limited reliable information about the distribution of actual PUA claims.

The pool of primarily self-employed individuals can be estimated from tax data or from labor force survey responses. Drawing on their analysis of annual IRS income tax data, Garin and Koustas (2020) estimated that 20 million workers had recent 1099 self-employment income but that nearly half of those workers could be covered by state UI programs because they also earned wage and salary income. The authors identify 11 million individuals as primarily self-employed and suggest that at least half could be experiencing income losses from social distancing because they serve individual customers directly; the authors estimate that 1.5 million self-employed individuals would be entirely out of work due to COVID. Similarly, the CPS reported nearly 10 million unincorporated self-employed in February 2020 and showed a peak-to-trough decline of 1.2 million between February and April.[48] It is likely that, in addition to these 1.2 million individuals, many more self-employed

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47. See Phillip L. Swagel (2020), "Preliminary Estimate of the Effects of H.R. 748, the CARES Act, Public Law 116-136, Revised," letter to Mike Enzi, April 27.

48. We focus on the unincorporated self-employed because the incorporated self-employed are considered

workers would qualify for PUA because they lost some or all of their income due to COVID.

In theory, there is a large set of individuals who could receive PUA for reasons other than self-employment—for instance, Dingel et al. (2020) estimate that more than 10 percent of the workforce (17.5 million adults) could be unable to return to work due to daycare and school closures. Many of these workers would not qualify for PUA because they can telework or use paid sick time, but some fraction could be eligible for PUA by virtue of COVID-induced childcare closures.

Data on PUA filings by claim type are inconclusive thus far because only half of states reported such data as of early July and because some of the reported data seem unreliable: for instance, six states do not appear to have distinguished between self-employed and other applicants for PUA.[49] Excluding these six extreme outliers, claimant composition appears to vary substantially across states: while the median state has roughly half of PUA claimants coming from outside the self-employed population, some states report a third or less while others report two-thirds or more. In California—a state for which we have more information—it appears that the vast majority of PUA claims are from self-employed individuals and not from those described in category (2) above.[50]

Official testimony and media reports suggest that the number of PUA claims may also be vastly inflated by fraudulent claims filed by organized criminal networks. Some sources say that fraudsters specifically targeted PUA to exploit its easier self-certification process; therefore, it is difficult to relate PUA claims to job losses without greater insight into the extent of organized fraud.[51] A number of states have recently shown discrete, large drops

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payroll workers and may also find it more advantageous to apply for the Paycheck Protection Program instead of UI. See Section 4.1 for more details.

49. In their filings to the ETA (form 902P), three states (Colorado, North Dakota, and New Mexico) indicated that all PUA claimants were self-employed, while another three states (North Carolina, Rhode Island, and South Dakota) reported that none were self-employed.

50. Hedin et al. (2020) find that "...over 95% of PUA claims [in California] were from previously self-employed individuals, with the remainder from individuals that had not qualified for regular UI for other reasons." California's ETA 902P filings corroborate this statistic.

51. See Scott B. Sanders (2020), "Unemployment Insurance During COVID-19: The CARES Act and the Role of Unemployment Insurance during the Pandemic", statement before the Committee on Finance, US Senate, June 9.

in continued PUA claims, which may suggest that states are purging millions of active or pending fraudulent claims.[52]

Initial claims for PUA may overstate the number of jobs lost due to COVID both because of the large number of fraudulent claims and because some valid claims by individuals who were previously marginally attached to the labor force might not represent true COVID-related job losses if some of these individuals had not been planning to work in the short run. Nonetheless, the large numbers of PUA applications thus far suggest that the earnings of self-employed workers have been hit hard by COVID-related factors, and perhaps there are more workers who qualify for PUA (either for self-employment or COVID-related payroll reasons) than previously thought.

Going forward, it is unclear how quickly the pace of newly filed PUA claims will decelerate in response to amelioration in labor market conditions. First, there is potentially a large pool of individuals—described in category (2) above—who may yet file claims for PUA. Second, recalled wage and salary workers who were receiving state UI but cannot return to work for COVID-related health or childcare reasons, together with claimants who exhaust state UI and PEUC benefits before 39 weeks, may be able to convert their claims to PUA.[53] And third, reporting by additional states that were thus far missing from the ETA's tabulations will eventually boost national totals. In addition, job market improvements may be less evident in PUA continuing claims than in insured unemployment because PUA recipients who are self-employed face little pressure to voluntarily decertify themselves as their earnings recover. However, continued claims for PUA may decline as states work through their backlogs of pending claims, since the inclusion of backdated benefit-weeks should become less consequential for future cohorts of PUA claims and since states will deny ineligible individuals and work to weed out fraud.

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52. For example, Massachusetts and Michigan's continued PUA claims each fell by more than 1 million in the second half of May.

53. See evidence for Iowa in Beth Townsend (2020), statement before the Committee on Finance, US Senate, June 9, https://www.finance.senate.gov/imo/media/doc/09JUN2020TOWNSENDSTMNT.pdf.

# 5 Upcoming developments in the UI system

The CARES Act made unprecedented temporary changes to the UI landscape. In the coming months, scheduled modifications to income-support and loan programs will interact in complex ways with evolving economic conditions. To chart the road ahead, we discuss upcoming developments in four government programs: statutory and emergency extended benefit programs, which are poised to expand as workers exhaust regular UI; the $600/week supplemental benefits scheduled to expire in July 2020; potential growth in state worksharing programs that may encourage employers to recall a larger share of their workers, albeit at reduced hours; and the Payroll Protection Program, in which conditions on the use and timing of small-business loans may have important ramifications for the UI system.

## 5.1 Potential growth in extended benefit programs

By the week ending May 30, the ETA reported over 1 million continued claims for Pandemic Emergency Unemployment Compensation (PEUC), which provides 13 weeks of additional benefits after regular UI runs out.[54] Though the number of PEUC claims declined over the ensuing two weeks, PEUC is primed to expand as more workers run out of UI benefits in the coming weeks and months. Because most workers are entitled to up to 26 weeks of regular benefits, the majority of those laid off in March or later are not at risk of exhausting their entitlements until this fall. However, workers who were already unemployed prior to the crisis have undoubtedly seen their unemployment spells prolonged due to the recent collapse in hiring. In addition, data from ETA 218 filings show that one-third of new UI claimants are eligible for 20 or fewer weeks, either due to limited work histories or because they live in states that cut maximum benefit durations after the last recession.

To illustrate the scope for PEUC enrollment to ramp up in the months ahead, we next conduct a back-of-the-envelope calculation for the path of potential exhaustions of regular

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54. In its UI release on July 9, the ETA added a cautionary note indicating that the PEUC count may be inflated by the inclusion of backdated benefit-weeks. See Section 3.3 for related discussion about PUA.

**Figure 6. Cumulative potential exhaustions of regular state UI benefits, assuming all claimants remain on UI until the point of exhaustion.**
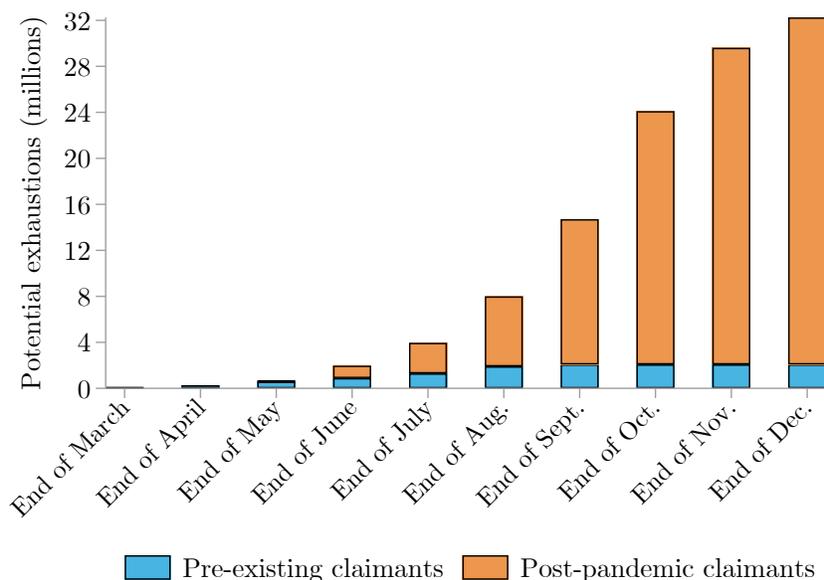


Note: Authors' calculations using data from the CPS and from the DOL ETA (form 218 as well as claim counts accessed via Haver Analytics). Pre-existing claimants comprise the insured unemployed as of March 14; post-pandemic claimants are calculated as two-thirds of subsequent initial claimants through the week ending July 4. See Appendix C for details.

state UI entitlements through December 2020, *provided that UI recipients remain unemployed until the date of exhaustion.* While this is obviously an extreme assumption, our calculation is merely intended to highlight when potential exhaustions would be scheduled to occur absent changes in claimants' labor force status. Doing so requires us to assign potential benefit durations to two groups: (1) the existing stock of insured unemployed at the onset of the crisis, a group of about 2 million individuals, and (2) subsequent new filers. Appendix C describes the details of our calculation, which leverages data on the potential duration of new benefit entitlements, the pre-pandemic distribution of unemployment durations, and flows of initial claims from March 15 through the week ending July 4.[55]

Figure 6 shows the cumulative number of UI claimants slated to exhaust benefits by month from the end of March through the end of December, broken into each group. While this very simple calculation appears to understate PEUC take-up through the end of May

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55. For this particular analysis, we incorporate data beyond June 13 (the end of our analysis period elsewhere in the paper) so as to better project developments through the end of the year.

(perhaps owing to suspected reporting issues in PEUC statistics to date), it suggests that by the end of July nearly 4 million workers will potentially be eligible, of whom around 1.3 million come from the pool of the unemployed prior to the crisis. By the end of September, about 12.5 million who filed initial claims during the COVID crisis could end up exhausting benefits, with that figure shooting up to roughly 30 million by the end of the year.

These projections will surely be a vast overstatement of realized PEUC enrollment between now and the end of the year, since many unemployed workers will return to work prior to exhausting benefits (though, in the opposing direction, our calculation omits any workers laid off beyond July 4 who later transition into PEUC). It seems clear, however, that PEUC will play an increasingly key role in supporting incomes later in the year, just as the rising incidence of long-term unemployment boosted the scale of the analogous 2008 EUC program during the Great Recession (Chodorow-Reich and Coglianese, 2019).

Along similar lines, the Extended Benefit (EB) program—which has been activated in all but one state by the time we write—will provide between 13 and 20 weeks of additional benefits to workers who use up their regular UI and PEUC allotments. The Extended Benefits program may assume greater significance once the PEUC program expires at the end of 2020, but how long EB remains available to workers will depend on the evolution of states' total and insured unemployment rates and on whether they have adopted the optional alternative trigger criteria allowed under federal rules.

## 5.2  Phase-out of the $600/week supplemental benefits

Whereas UI normally replaces less than 50 percent of previous earnings for the average worker, the extra $600 in weekly benefits under FPUC has pushed most claimants' replacement rates above 100 percent through the end of July (Ganong et al., 2020). Some observers have cautioned that these unusually high replacement rates have dampened labor supply as UI has been temporarily more remunerative than working. This concern is especially acute for lower-paid workers, for whom $600 per week is a larger proportional increase in income.

Research on the disincentive effects of UI benefits has long stressed that more generous benefits—either in the form of higher replacement rates or longer durations—can reduce incentives to work (either through lower job search or reluctance to accept job offers).[56] However, FPUC supplements are slated to expire on July 31, which (in a present-discounted-value sense) presumably makes the outside option of UI receipt only modestly more attractive as compared with the stability and the longer-term income prospects offered by an employment relationship.[57] In addition, augmented UI benefits have boosted consumption among lower-wage workers and thereby stimulated economic activity (Cox et al., 2020).[58] In fact, in the view of the Congressional Budget Office, this aggregate demand effect will likely dominate, so that—despite some reduction in labor supply—FPUC's overall effect on output and employment may well turn out to be positive.[59] Indeed, while it is still extremely early to evaluate the causal effects of FPUC on labor market outcomes, a comparison of states with higher vs. lower replacement rates by Bartik et al. (2020) yields no evidence that the provision of FPUC substantially slowed the recovery in hiring.

Whatever effects FPUC has had on labor supply and aggregate demand in the late spring and early summer, its immediate effects will presumably dissipate if the program expires as originally planned, though these short-lived payments could have longer-lasting effects through a variety of hysteresis effects, such as keeping job losers attached to the labor force, averting foreclosures and evictions that can disrupt family and career planning, or spurring purchases from small businesses that would otherwise have had to shutter for good.

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56. In the United States, the main lever of UI policy has traditionally been extended benefit durations rather than increased replacement rates. For discussions of the effect of replacement rates on labor market incentives and outcomes largely in the European context, see Nickell and Layard (1999) and Nickell et al. (2005).

57. Of course, any pecuniary disincentives for job search stemming from FPUC are layered atop the risks and anxieties of returning to places of employment for jobs that cannot be performed at home.

58. See Chodorow-Reich et al. (2019) for a summary of estimates of the aggregate demand effects of increases in UI generosity.

59. See Phillip L. Swagel (2020), "Economic Effects of Additional Unemployment Benefits of $600 per Week," letter to Charles Grassley, June 4.

## 5.3  Worksharing programs in the recession and recovery

Many UI experts have advocated use of worksharing programs as a means for American firms to weather pandemic-induced shortfalls in demand without laying off large numbers of workers (Abraham and Houseman, 2020; Gilarsky et al., 2020; von Wachter, 2020). In brief, worksharing encourages qualifying employers to lower their payroll costs by cutting hours rather than by conducting layoffs, with government funds replenishing a portion of workers' reduced earnings. Worksharing is sometimes billed as a "win-win-win" arrangement that simultaneously shields workers from outright unemployment, spares firms the expense of recruiting new workers when conditions improve, and reduces fiscal costs relative to full UI payments. Worksharing programs were heavily used in Europe and Japan during the Global Financial Crisis (Cahuc, 2019), and they are playing a key role in several countries' responses to the current episode (Adams-Prassl et al., 2020; Giupponi and Landais, 2020).[60]

In the United States, the oldest state worksharing programs—formally called "Short-Time Compensation" (STC)—date to the 1970s and 1980s, but usage was limited until the Great Recession, when continued claims for prorated STC benefits peaked at 141,000 in June 2009. With federal encouragement, additional states introduced STC programs in the 2010s, and 26 US states had programs up and running on the eve of the pandemic. Aided in part by the CARES Act, participation in STC programs has grown rapidly since early March, and by early May the stock of STC claimants exceeded the 2009 record.[61] To date, however, STC enrollment remains relatively modest in comparison with traditional UI, with over 50 continued claims for regular state UI for every STC claimant.

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60. A nascent literature has evaluated the employment effects of worksharing programs during the Global Financial Crisis (Abraham and Houseman, 2014; Cahuc et al., 2018; Giupponi and Landais, 2018; Kopp and Siegenthaler, 2020). Researchers have generally found that worksharing increases headcount employment at treated firms, at least while subsidies remain in effect, but some also caution that worksharing may impede labor reallocation from failing firms to viable ones. Germany's *Kurzarbeit* program has been widely credited with mitigating job losses during the financial crisis (Cooper et al., 2017), though Burda and Hunt (2011) contend that so-called working-time accounts played a larger role in preserving employment.

61. The CARES Act incentivized states to encourage STC participation by offering full federal funding for the prorated UI benefits paid to workers with reduced hours. On April 4, the Department of Labor's UI Program Letter No. 15-20 clarified that workers receiving prorated STC benefits would be eligible to receive the full $600 per week supplement under FPUC.

**Figure 7. Historical and recent enrollment in Short-Time Compensation.**



*Number of continued claims for STC*      *Ratio of STC to UI continued claims*
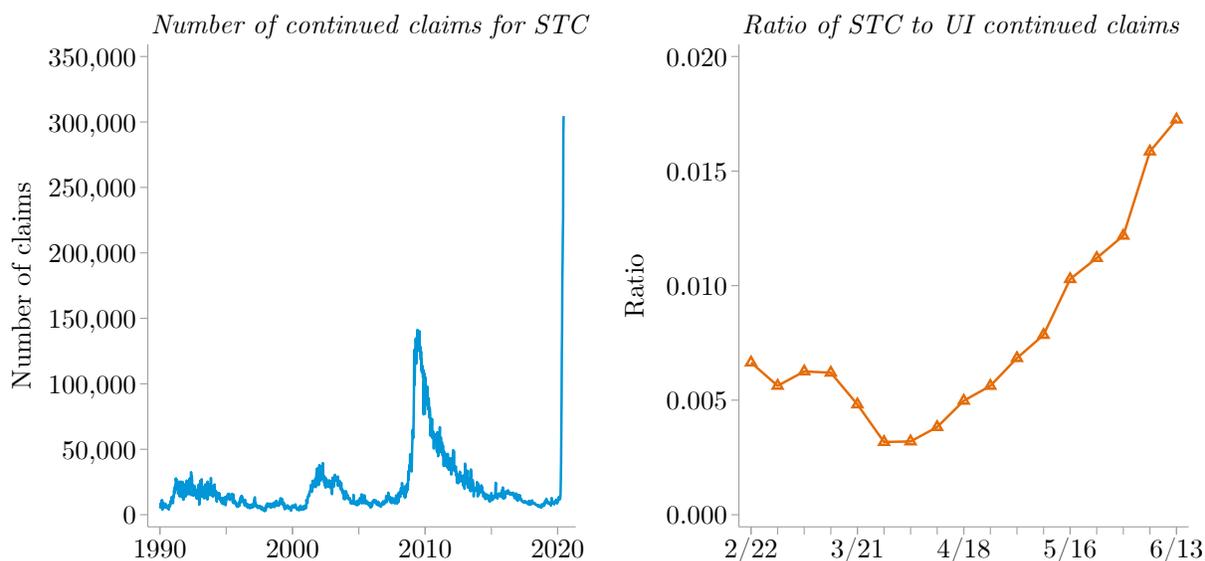
Note: Continued claims for Short-Time Compensation (STC) from the DOL ETA (form 539); continued claims for regular state UI from DOL, accessed via Haver Analytics. Data are not seasonally adjusted. Both series are plotted through the week ending June 13, 2020.

Despite its comparatively limited role in spring 2020, worksharing may loom larger in the months ahead. Layoffs typically remain elevated well into a labor market recovery, and to the extent that STC participation has been impeded by limited awareness, participation may grow through word-of-mouth and through outreach efforts by state employment offices. If STC claims continue to accumulate rapidly even as continuing claims for regular state UI and for PUA begin to decline, STC may come to account for an appreciable share of the total pool of workers drawing unemployment benefits. Moreover, beyond worksharing's traditional role as an alternative to layoffs, the Department of Labor has stressed that

> In the context of re-opening businesses closed temporarily by a pandemic, STC can also serve as a means of bringing most or all of a temporarily laid-off workforce back to the job, even if social-distancing measures, a decline in business, or other factors prevent operating at full staffing levels full time. Specifically, this benefit may be made available to individuals returning to work with reduced hours who worked for the employer prior to the temporary lay-off due to COVID-19.[62]

Worksharing may yet prove especially well-suited to this particular crisis.

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62. John Pallasch (2020), "CARES Act of 2020—Short-Time Compensation (STC) Program Provisions and Guidance Regarding 100 Percent Federal Reimbursement of Certain State STC Payments," letter to State Workforce Agencies, May 3.

## 5.4 Interactions between UI and the Payroll Protection Program

The Paycheck Protection Program (PPP) created by the CARES Act provides up to $670 billion in loans to small businesses, self-employed business owners, and independent contractors. Generally speaking, businesses with fewer than 500 employees prior to the crisis were eligible for loans. The loans convert to grants if businesses restore employment and maintain pay rates similar to those prior to the crisis. At the time of writing, about $520 billion in loans had been approved, less than the total amount appropriated, but the program has been extended from its original June 30 expiration through August 8. Many of the loans are small enough to suggest that there may have been substantial take-up among the self-employed.[63]

The PPP competes with the unemployment insurance system in the sense that workers receive government transfers via their employers rather than receiving benefits through UI. However, because of the increased generosity of UI benefits, some workers may have preferred receiving UI over continuing to be employed by their companies through PPP.[64] Thus, PPP may have dampened both the decrease in payroll employment and the increase in UI claims, although it is still too early to know the effect of the program on either.

Moving forward, many firms will exhaust their PPP loans in the coming months. This may lead to another round of layoffs, boosting initial claims and reducing payroll employment again.[65] However, if economic conditions have improved to a sufficient extent, firms may be in a position to keep those workers on payrolls instead.

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63. For the number of loans under $50,000, see US Small Business Administration (2020), "Paycheck Protection Program (PPP) Report: Approvals through 06/20/2020", June.

64. There have been many news reports to this effect, for example, Sarah Hansen (2020), "Another Small Business Headache: Some Employees Are Asking to be Laid Off Thanks to Higher Unemployment Benefits," *Forbes*, April 22.

65. At the beginning of June, Congress extended the window from eight weeks to 24 weeks in which firms can use their loans to pay workers and other expenses. This additional flexibility may extend the effectiveness of PPP and keep workers on payrolls rather than filing claims for UI benefits.

# 6 Conclusion

The suddenness and severity of the COVID-19 crisis have underscored the need for timely, high-frequency, reliable indicators of economic conditions. As a powerful early indicator of emergent recessions, initial claims for unemployment insurance played a key role in alerting policymakers, researchers, and the public at large to the breadth, scale, and astonishing swiftness of labor market deterioration in March of 2020.

This paper has analyzed the relationship between initial and continued UI claims and contemporaneous changes in payroll and non-payroll employment during the critical first months of the pandemic. We argue that cumulative initial claims have offered only an upper bound on underlying changes in payroll employment, and a loose upper bound at that. In part this is because initial claims may be inflated by spurious or multiply counted filings. More fundamentally, however, initial claims speak only to the magnitude of gross employment losses and are largely silent as to the scale of hiring activity. By contrast, insured unemployment—a measure of the stock of continued claimants for UI benefits— reacts to shifts in employment along both the separation and hiring margins.

Between early March and early May, both initial claims and insured unemployment tightly tracked the abrupt fall in employment, owing to the fact that gross job losses far exceeded gross job gains during this period. But whereas initial claims kept amassing rapidly through May and June, insured unemployment, once adjusted to remove spurious fluctuations stemming from biweekly filing in certain large states, began to decline in early May just as payroll employment started to rebound. The recent usefulness of insured unemployment as an economic indicator echoes its performance during the Great Recession, when the rise and fall of continued UI claims coincided with opposing movements in payroll employment.

Many questions remain about the role UI has played, and will play going forward, in the COVID-19 crisis. Looking back, there is a clear need for additional detective work to piece together the relationship among job losses, claim filing, and UI reporting in the tumultuous

spring of 2020. Policy changes, claim backlogs, and fraudulent activity by opportunistic identity thieves all impacted official statistics, and rapid changes in employment elevated the importance of subtle timing conventions and reporting practices that would matter less in ordinary times. Only by disentangling economic fundamentals from numerous sources of measurement error can researchers and policymakers hope to understand the role that government policies—ranging from the timing and scope of lockdown restrictions, to stimulus checks, to state- and federal-level expansions of UI eligibility and generosity, to loan facilities for small businesses and large financial institutions alike—played in shaping the course of events during this seminal moment in economic history. The insights we offer as to the signals and noises hidden in headline claims should aid the many active research projects using UI claims as proxies for labor market conditions in evaluations of available policies.

Looking ahead, unemployment insurance will surely remain a cornerstone of the policy response to the pandemic, both directly—as a vital source of income support for jobless workers and their families—and indirectly, as a sensitive barometer of labor market conditions. Though our analysis has centered on the first months of the crisis, we hope it will prove useful to policymakers and researchers attempting to keep up with the rapidly evolving economic picture. Lastly, while we have focused on the relationship between claims and employment in the aggregate, there is no doubt tremendous heterogeneity in that relationship across demographic groups, geographic areas, and industries and occupations. Exploring that heterogeneity would be a fruitful direction for future research, both to ascertain in what circumstances claims are most predictive of shifts in employment and to gauge how effectively UI benefits are reaching the groups hardest hit by job losses.

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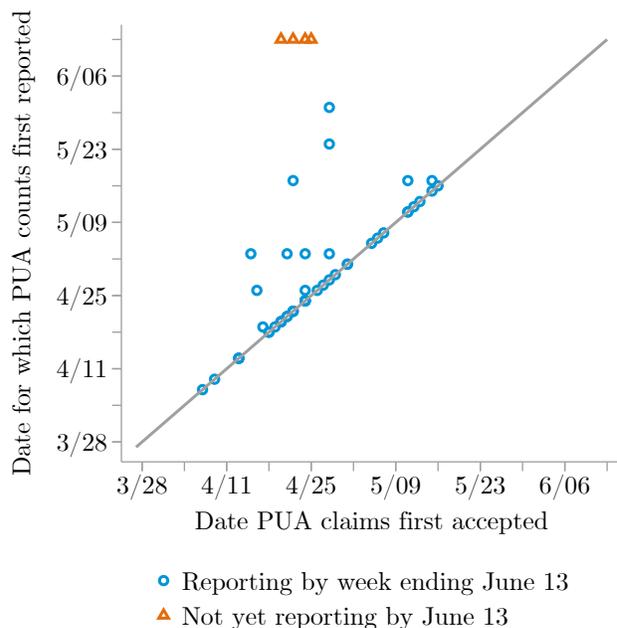
# Appendix A    Additional figures

**Figure A1. 2020 seasonal adjustment factors for initial UI claims.**
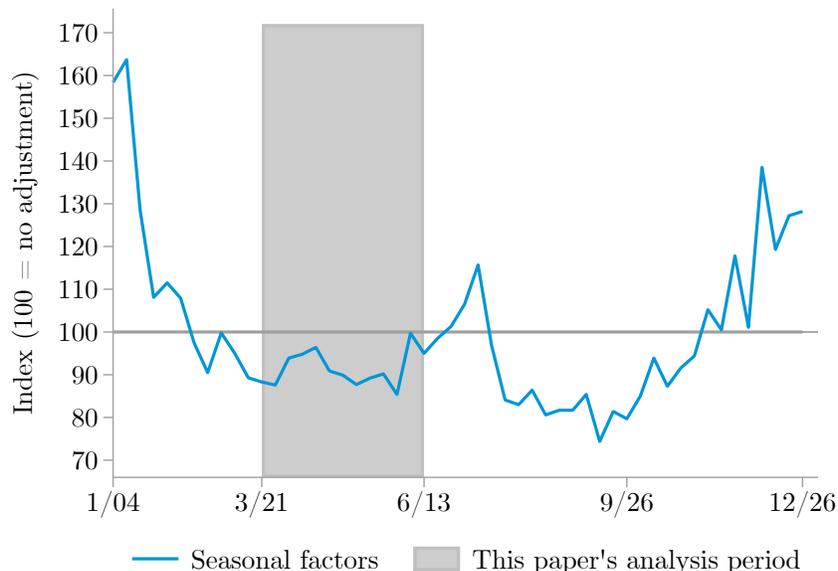


Note: Data from the DOL ETA, accessed via Haver Analytics.

**Figure A2. Dates when each state started accepting and started reporting claims for Pandemic Unemployment Assistance.**



Note: Dates when states began accepting PUA claims assembled by Murray and Olivares (2020) on the basis of state press releases. Dates when states began reporting PUA statistics from the DOL ETA, accessed via Haver Analytics. If the state has reported either initial or continued PUA claims (or both) for the reference week containing the program launch date, we set the reporting date equal to the date when claims were first accepted. If not, we set the reporting date equal to the Sunday of the first week for which PUA statistics have been provided. Four states (Florida, Georgia, New Hampshire, and West Virginia) were not yet reporting any PUA statistics as of the week ending June 13. We were unable to determine when the US Virgin Islands began to accept PUA claims.

**Figure A3.** Percentage of monetary determinations with sufficient wage credits to establish a UI entitlement.
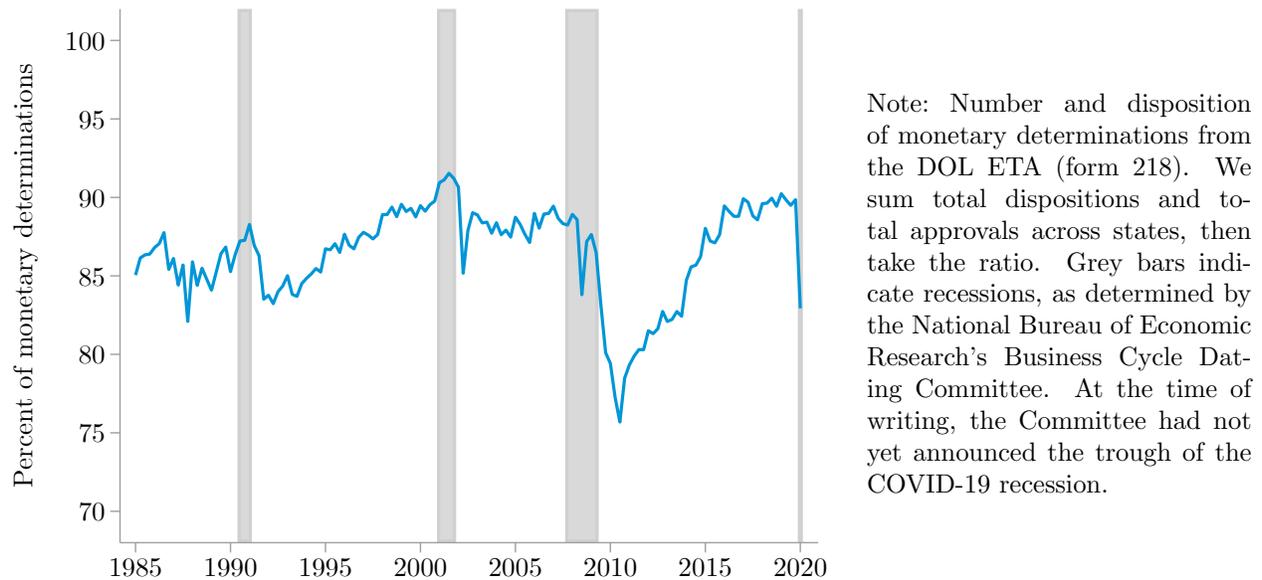


Note: Number and disposition of monetary determinations from the DOL ETA (form 218). We sum total dispositions and total approvals across states, then take the ratio. Grey bars indicate recessions, as determined by the National Bureau of Economic Research's Business Cycle Dating Committee. At the time of writing, the Committee had not yet announced the trough of the COVID-19 recession.
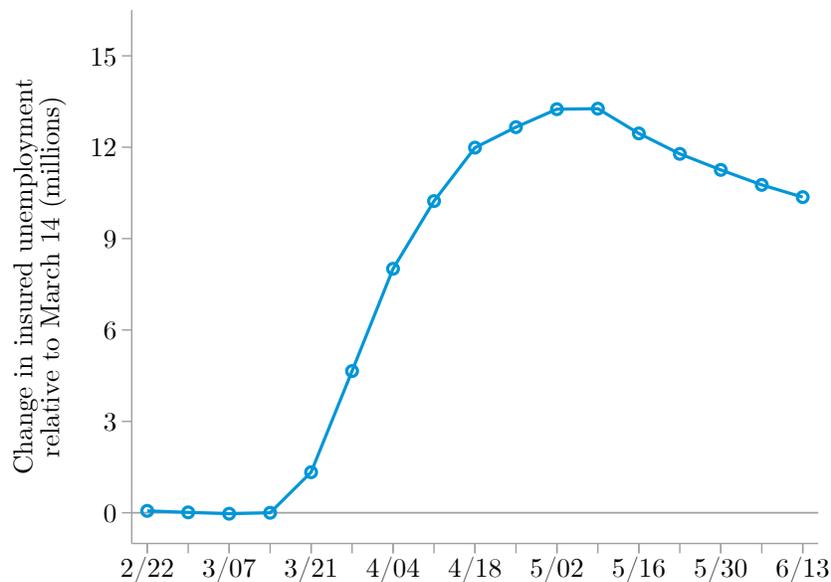
**Figure A4.** Insured unemployment, excluding states that exhibit reporting artifacts stemming from the processing of biweekly claims.



Note: Non-seasonally adjusted data from the DOL ETA, accessed via Haver Analytics. The plotted series sums insured unemployment across all US states other than California, Florida, Pennsylvania, Texas, and Puerto Rico (in which reporting artifacts related to the processing of biweekly claims introduce sawtooth patterns into the official series). See Appendix B for details.

# Appendix B   Details on our adjustment to insured unemployment to account for states with biweekly filing

As noted in Section 3.2, the official tabulation of insured unemployment (IU) exhibits an artifactual sawtooth pattern stemming from the way continued claims are tabulated and reported in certain states where claimants file them only once every two weeks. This appendix lays out the issue and explains the construction of our alternate IU series. The same procedure can be used to remove similar artifacts from the insured unemployment *rate* (IUR), by simply dividing our alternate IU series by the level of UI-covered employment.

In most states, people seeking UI benefits must file a continued claim every week, describing their activities and earnings during the preceding week. In such states, insured unemployment in week $t$ equals the number of continued claims filed in week $t + 1$. But in some states—including California, Florida, Pennsylvania, and Texas, as well as Puerto Rico—claimants are instructed to file continued claims every other week, with each claim describing activities over the preceding two weeks. Because states with biweekly filing receive roughly half as many claims as they otherwise would (each pertaining to two person-weeks), they appear to calculate IU in week $t$ as *twice* the number of continued claims filed in week $t + 1$, so that the level is correct on average.[1]

The Department of Labor (DOL) reports insured unemployment in week $t$, both nationwide and separately by state, in its press release on Thursday of week $t + 2$. For reasons given in the main text, we focus on non-seasonally adjusted IU.

## B.1   The problem

Insured unemployment can be interpreted as a count of the number of workers who are seeking benefits for a given week (inclusive of pending claims and people serving waiting weeks). Given this interpretation, it would seemingly be more appropriate for states with biweekly filing to define IU in week $t$ as the sum of continued claims filed in weeks $t + 1$ and $t + 2$, since all such claimants are potentially requesting benefits in week $t$.[2] However, doing so would require an extra week of data beyond what is available at the time of the

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1. Biweekly filing was once common. According to Blaustein (1980), "In the majority of states, claimants are scheduled to file on a biweekly basis and can claim 2 weeks of unemployment when they file. Both weeks claimed are counted for the preceding week even though only one actually refers to that week. As only half the claimants file each week, the counts of weeks claimed generally even out properly from week to week, but there could be some distortion of the count for a local office in a particular week because of some major event such as a large layoff or recall. An administrative adjustment is made in the count to correct for the effects of such an event." The sawtooth patterns we observe in the data are net of any adjustments states may be making to try to neutralize distortions resulting from biweekly filing.

2. This discussion, and the refinement proposed below, presume that every claimant seeks benefits in both of the preceding two weeks whenever he or she files a continued claim. In practice, some continued claimants may seek benefits only for one of the two weeks, e.g., a worker might file her first continued claim in the week immediately following job loss and hence claim only for that single week. Consistent with the timing assumed here, the website for Pennsylvania's Office of Unemployment Compensation speaks of "the date you will file your first biweekly claim, which is generally the *second* Sunday after completing your initial application for benefits" (emphasis added).

DOL release. By simply double-counting the latest batch of continued claims, states with biweekly filing are able to report IU on the normal schedule. Double-counting can thus be rationalized as an administrative expedient to meet DOL's reporting timetable.

But this procedure can induce large, artifactual oscillations in states' insured unemployment series. To understand why, it is useful to think of claimants in biweekly states as filing claims in either "even weeks" or "odd weeks". In normal times, "even" and "odd" claimants are roughly balanced in number, and the double-counting approach may yield a smoothly evolving IU series. In the current crisis, however, the enormous week-to-week variability in the number of new claimants—e.g., owing to the exact timing of a state's lockdown order—may lead to large imbalances between even and odd claimants.

To see whether this concern arises in practice, the blue series in Appendix Figure B1 plot official IU in three states we know to use biweekly filing—California, Florida, and Pennsylvania—alongside New York, where claimants file every week.[3] Whereas insured unemployment has evolved smoothly in New York, the other states have exhibited telltale up-down oscillations over the period we study. Among US states, California, Florida, Pennsylvania, Texas, and Puerto Rico appear to be unique in having generated this pattern during the time period we analyze (at least to such a visually apparent degree).[4]

## B.2  Our proposed refinement

For states that define IU as $2 \times$ continued claims filed in the subsequent week, we can back out an estimate of the true number of people claiming benefits for a given week, as follows.

Let $IU_{st}$ be DOL's official count of insured unemployment in biweekly-filing state $s$ in week $t$. Under the above assumption, a total of $\frac{1}{2}IU_{st}$ continued claims were filed in week $t+1$. Similarly, a total of $\frac{1}{2}IU_{s,t+1}$ continued claims were filed in week $t+2$. Assuming that all individuals claim benefits for both possible weeks whenever they file a continued claim, all claims filed in either $t+1$ or $t+2$ represent people seeking benefits for week $t$. Therefore, we can estimate the "true" value of insured unemployment (denoted with an asterisk) as

$$IU_{st}^{*} \equiv \frac{1}{2}IU_{st} + \frac{1}{2}IU_{s,t+1} \tag{2}$$

In other words, we account for biweekly filing by taking a 2-week moving average of official IU, putting equal weight on the observed values for the week in question and for the week

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3. It is possible that there are other states with biweekly filing in which IU has evolved smoothly (e.g., because the number of "even" and "odd" claimants has just so happened to be similar). The same modification should potentially be applied to other such states, though applying it would likely have a more modest impact on these states' estimated IU (and hence on the national series). It is also possible that other biweekly states somehow adjust their reported values of IU to remove unevenness caused by biweekly filing, in which case it may be appropriate to make no further adjustment.

4. Florida's IU is especially difficult to interpret, as the state suspended its continued filing requirement in mid-April but reinstated biweekly filing effective May 9—see Jillian Olsen (2020), "Unemployed Floridians Required to Resume Making Biweekly Benefits Requests", *10TampaBay*, May 8. This temporary policy change may account for the spike in the week ending May 9, which departed from the sawtooth pattern evident in earlier weeks.

**Figure B1. Official and alternate insured unemployment series (select states).**
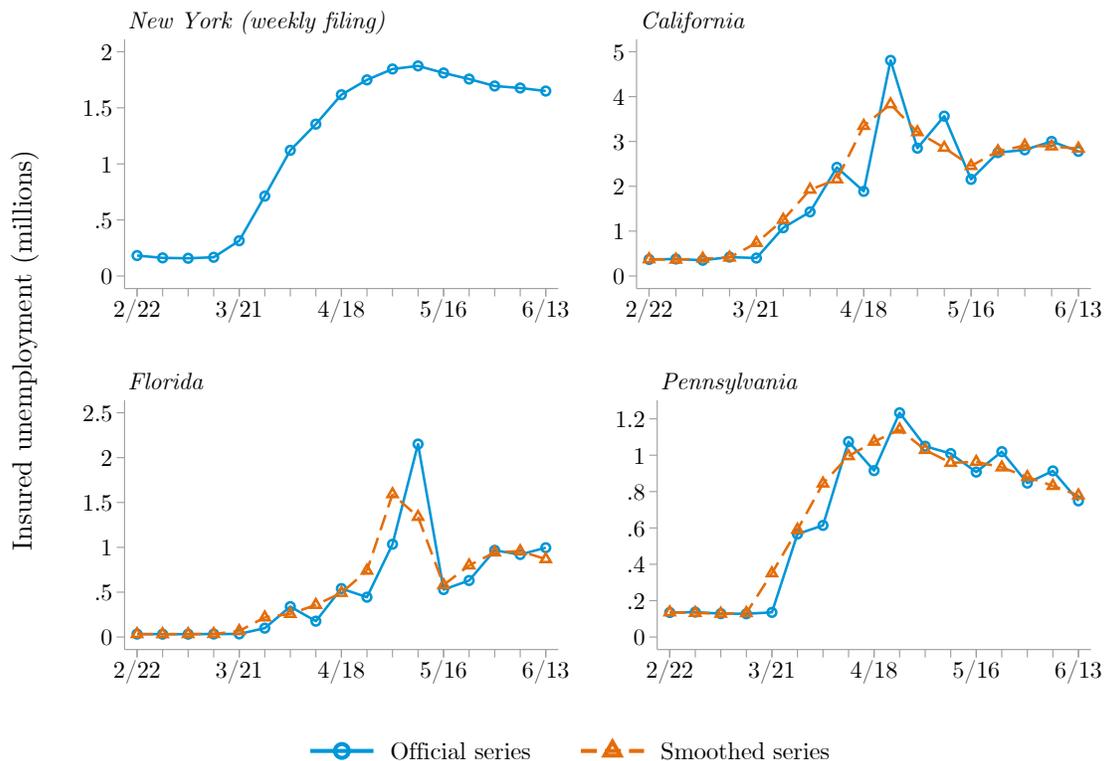


Note: Non-seasonally adjusted data from the DOL ETA, accessed via Haver Analytics. In New York, claimants file continued claims every week, so no smoothing is needed. Though not shown here, we also adjust Puerto Rico and Texas data to account for biweekly filing in the same fashion.

that follows.[5]

## B.3 Extrapolation to the latest IU release

A final difficulty remains: because adjusting IU for week $t$ requires knowing IU for week $t + 1$, our proposed refinement can never be applied to the most recent data point released by DOL.[6] When analysts are using IU for historical purposes (e.g., gauging what share of initial claims are passing through to continued claims), this is no hindrance: indeed, we

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5. If we take first differences in Equation 2, we find that week-to-week changes in our alternate IU series are proportional to changes between official IU observations spaced two weeks apart:

$$\Delta IU^*_{st} = \frac{1}{2} \left( IU_{s,t+1} - IU_{s,t-1} \right) \tag{3}$$

(and likewise for the IUR). Thus the adjustment gleans each biweekly state's trend by chaining together comparisons among "even week" filers and comparisons among "odd week" filers, whereas the official series also incorporates (potentially misleading) differences between the size of each of these groups.

6. While this may appear to be a defect of the present approach, it simply reflects an institutional reality: in biweekly states, true IU for week $t$ depends partly on paperwork submitted in week $t + 2$, which is still in progress on the release date.

ourselves are able to report our adjusted IU series for the full analysis period considered in this paper. But if our method is to be used in forecasting, by analysts wishing to read IU as a near-real-time measure of labor market conditions, it may be necessary to extrapolate the adjusted series to include an estimated value for week $t$ itself.

A simple approach is to extrapolate linearly from week $t - 1$, setting

$$\widehat{IU}^*_{st} \equiv IU^*_{s,t-1} + \Delta IU^*_{s,t-1} \tag{4}$$

The proposed extrapolation can be usefully expressed in two other algebraically equivalent forms:

1. Per Footnote 5, the extrapolation extends $IU^*$ using the latest available comparison between IU and its value two weeks prior, thereby avoiding comparisons between "even" and "odd" weeks:
$$\widehat{IU}^*_{st} \equiv IU^*_{s,t-1} + \frac{1}{2}\left(IU_{st} - IU_{s,t-2}\right) \tag{5}$$

2. Like the adjusted values for earlier weeks, the extrapolated adjustment for the final week can be calculated directly from a state's official IU series:

$$\widehat{IU}^*_{st} \equiv IU_{st} + \frac{1}{2}\left(IU_{s,t-1} - IU_{s,t-2}\right) \tag{6}$$

Whichever of these equivalent formulations is used, we can replace $\widehat{IU}^*_{st}$ with $IU^*_{st}$ once another week of data comes in, then extrapolate out again to get $\widehat{IU}^*_{s,t+1}$.

## B.4   Applying this refinement to recent data

The green series in Appendix Figure B1 apply this procedure to adjust, and then extrapolate, the level of IU in California, Florida, and Pennsylvania. In each case, the adjusted (moving-average) series is substantially smoother than the raw official series. Moreover, the series that result more closely resemble the dynamics exhibited by weekly-filing states like New York, and they can be more fruitfully compared with cumulative initial claims filed by a given date to draw inferences about benefit receipt.

With the adjusted series in hand, we can sum IU across states—using official values $IU_{st}$ for weekly states and adjusted values $\{\ldots, IU^*_{s,t-2}, IU^*_{s,t-1}, \widehat{IU}^*_{st}\}$ for biweekly states— to obtain an adjusted IU series at the national level. Figure 2 in the main text of this paper presents our alternate series alongside the official level of IU. Whereas official IU seesawed during the period we study—rising in the week ending April 25, falling through May 2, rising through May 9, and so on—the adjusted series is single-peaked, rising through May 2 and declining thereafter. The adjusted series seems like a more plausible indication of how the claimant pool has evolved throughout the crisis.

# Appendix C  Calculating potential benefit exhaustions

This section describes the calculations underlying potential benefit exhaustion in Figure 6. We assign potential benefit durations to two groups: the existing insured unemployed at the onset of the crisis, who numbered about 2 million as of March 14, 2020, as well as the new cohorts of initial UI claimants.

We rely on the estimate of potential benefit duration in ETA 218 reports. The potential benefit distribution gives the probability, $p_d$, that a newly insured claimant is entitled to $d$ weeks of benefits. For the existing unemployed, we use the distribution for 2019Q4, the last quarter of complete data, and truncate that distribution at 30 weeks.[7] The potential benefit distribution is given in discrete bins, so we have to choose durations to assign. We assign 9 weeks to the 0–9 bin, 12 weeks to the 10–14 bin, 17 weeks to the 15–19 bin, and the lower support of each of the remaining bins up to 30.

We assume that the distribution of actual unemployment durations among the existing unemployed is the same as that of job losers in the Current Population Survey. We estimate that duration distribution by pooling data over the year ending in February 2020 to obtain reasonable sample sizes. Let $d_i$ denote the mass of unemployed job losers at a given duration $i$. Thus, the mass of workers with duration $d$ and remaining weeks of benefits $d - i$ is $p_d \times d_i$, conditional on $d > i$.[8] We can then sum over the mass of job losers whose UI entitlements would expire by the end of March, April, and so on.

Turning to the flow of newly unemployed, we assign potential benefit durations to the successive cohorts of initial UI claimants each week, starting with those filing on March 21 and running through claims filed in the week ending July 4. Since on average roughly one-third of initial UI claims do not translate into continuing claims, we scale initial claims down by that amount. We then assign claimants to a potential duration $d$. From that potential benefit duration, we can calculate the number of new claimants who will exhaust benefits by the end of the months shown in Figure 6.

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7. As regards the data extract we use, the distribution in 2020Q1 from available states is very similar to that in 2019Q4. As regards our truncation step, we observe a small mass of potential benefits in excess of 30 weeks, which is the statutory maximum benefit duration. Some workers may be entitled to longer durations due to previous claims that were not exhausted, for example.

8. We scale the mass of job losers to sum to one by appropriately conditioning on $d > i$.