Unemployment insurance generosity and labor supply - Evidence from the COVID-19 recession

Swapnil Motghare*

November 4, 2022

Abstract

I study the effect of Unemployment Insurance (UI) generosity during the COVID-19 recession using administrative data on the universe of Unemployment Insurance claims for the state of Indiana. The difference-in-difference identification strategy exploits the timing of the expiration of the Federal Pandemic Unemployment Compensation (FPUC) and the Lost Wages Assistance (LWA) programs and the eligibility rule for the LWA program, which paid eligible workers an extra $300 per week for up to 6 weeks. A change in weekly benefit amount by $300 is associated with a change in the exit rate out of unemployment by 2.1 percentage points (p.p.) in the opposite direction. This is because of both a decline in the reemployment rate (1.7 p. p.) which represents the disincentive or the moral hazard effect of UI, and a decline in labor force exits (0.4 p. p.) which suggests the ability of UI to keep workers in the labor force or the labor force participation effect. Access to six weeks of increased benefit amounts did not change workers' probability of switching employers, nor significantly affect their earnings after reemployment, suggesting worker-firm match quality was unaffected.

*University of Notre Dame. smotghare@nd.edu. I would like to thank James Sullivan, Lakshmi Iyer, Yong Suk Lee, Price Fishback, Tiemen Woutersen, Vitaliy Novik, Eduardo Montero and seminar participants at University of Notre Dame for comments and feedback. An earlier version of the paper was circulated as "Equity of COVID-19-induced job loss duration and effect of unemployment insurance generosity on labor supply"

1 Introduction

The COVID-19 pandemic caused large job losses. U.S. unemployment rose to 14.8% in April 2020, the highest rate since the great depression high of 24.9% (Margo, 1993). To address the economic impacts of the pandemic, the U.S. government passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act. It included several provisions such as establishing the Federal Pandemic Unemployment Compensation (FPUC) to increase unemployment benefits for workers who were out of work because of the COVID-19 pandemic. The FPUC paid unemployed workers an extra $600 per week in addition to the regular Unemployment Insurance (UI) benefits. After the expiration of FPUC, an additional $300 per week in benefits was provided at different points in time until September 2021.

The effects of these increased UI benefits attracted a lot of media attention (Mulligan and Moore, 2020). The argument was that the extra UI payments per week may have incentivized workers to become unemployed and stay unemployed longer. Mainly because with these enhancements, UI payments, normally around 50% of the wage, were greater than the wage earnings for many workers. This work disincentive effect, also known as the moral hazard problem of unemployment insurance, is a common argument against increasing UI benefits and was one of the reasons being proposed for businesses not being able to find enough workers in the first half of 2021 and more recently, the observed inflation (Melchior, 2021). The increased benefits may also have a labor force participation effect i.e. incentivize workers who would otherwise become "discouraged workers" and stop looking for work, to continue their job search (Solon, 1979). Lastly, increased UI benefits have the potential to improve firm-worker matching by providing workers temporary liquidity to continue searching for jobs that better match their skills.

In this paper I study these issues by answering three research questions: (i) Did the generous UI benefits during the pandemic affect labor supply by discouraging workers from returning to work? (ii) Did the benefits help to keep workers in the labor force? and (iii) Did the benefits affect firm-worker match quality? To answer these questions, I use administrative data on the universe of Unemployment Insurance claims during the pandemic for the state of Indiana. These are individual-level panel data containing UI payment information for half a million Indiana workers, about 16% of the state's labor force. The identification exploits the timing of the expiration of two UI programs: Federal Pandemic Unemployment Compensation (FPUC) and Lost Wages Assistance (LWA). The FPUC program paid all unemployed workers an extra $600 per week, while the LWA program, which went into effect immediately after FPUC, paid a smaller amount, $300 per week, but only to those whose regular UI payments were at least $100 per week. The difference-in-difference empirical strategy compares the workers just above and below this eligibility cutoff around these two benefit expirations when their benefits change by different amounts.

I first show that the generous benefits reduced rates of exiting unemployment. The change in

exit rate out of unemployment is proportional to the change in benefit amount. Around FPUC expiration, workers who lose $600 have a larger increase in the exit rates as compared to workers who lose $300 by 2.1 percentage points or 49%. After LWA expiration, workers who lose $300 have a larger increase in exit rates as compared to workers whose benefits do not change by 2.1 percentage points or 22%. Taken together, an increase in benefit amount by $300 per week is associated with a 22-49% decrease in the exit rate from unemployment. Heterogeneity analysis by gender, race, and age shows that women are more responsive and Blacks less responsive to change in benefit amount compared to men and whites respectively. Similarly, workers more than 55 years of age are more responsive to benefit expiration.

The decline in the rate of exiting unemployment does not necessarily represent the disincentive effect of UI. An exit from unemployment can result in entry into employment or exit from the labor force, and the disincentive effect is the extent to which the entry into reemployment is affected. Hence, I separate the exits from unemployment into exits into employment and exits out of the labor force by studying worker employment outcomes in the next quarter after unemployment. Around 80% of the decline in the exit rate out of unemployment is because of a decline in the reemployment rate, or exit into employment (1.7 p. p.). This represents the disincentive effect of UI. The remaining part is because of a decline in labor force exits (0.4 p.p), which suggests the ability of UI to keep workers in the labor force.[1] Thus, the generous benefits discouraged workers from returning to work but they also helped to keep workers in the labor force.

To study the effect of UI on employer match quality, I study if access to UI affected firm-worker matches and wage earnings after re-employment. Workers eligible for extra UI payments do not change employers at a different rate compared to ineligible workers. There is some evidence that these workers earn a higher wage after entering employment, especially after LWA expiration, but the effect sizes are small and statistically insignificant in one out of two cases. Thus, there is no strong evidence for the benefits improving firm-worker match quality. The depressed labor demand during the pandemic can potentially explain the null effect.

To study how the reduced reemployment rates affected aggregate unemployment, I predict counterfactual unemployment in absence of $300 LWA payments. If LWA-eligible workers would have entered employment at the same rate as ineligible workers, Indiana's unemployment rate in August 2020 would have been lower by 0.2 p.p (=6.6%) if not for the extra $300 per week LWA payments. Thus, the effect of increased UI payments had a modest effect on Indiana's unemployment rate. These estimates are a good way to understand the effects of increasing unemployment benefits by $300 in 2021 through the Continued Assistance for Unemployed Workers Act (CAUWA) and the America Rescue Plan Act (ARPA). These estimates suggest that these contributed little to the difficulty businesses faced in finding workers then.

[1] I define a labor force exit if the worker has zero earnings in the quarter after exiting unemployment. This has limitations which I discuss in the results section.

The paper is related to the stream of literature that studies the labor supply effects of UI. The literature has studied the effects of UI on several employment-related outcomes including employment, employment growth, exit from employment, duration of unemployment, and firm-worker match quality (See the excellent summaries in Krueger and Meyer, 2002 and Schmieder and Von Wachter, 2016). This literature has also studied the effect of an increase in UI duration and benefit amount and distinguished between macro or general equilibrium effects and micro or partial equilibrium effects. The macro effect includes not only the micro effect from increased moral hazard but also includes the spillover effects of unemployment insurance on non-UI-eligible workers, firms' choices to create or destroy jobs, and changes in aggregate demand associated with increased government outflows. Due to these spillover effects, the macro estimates could be smaller in magnitude than micro estimates or even positive. Consistent with this, the micro studies have found that an increase in UI duration and benefit lead to an increase in unemployment duration while the macro studies, on the other hand, have found no or small positive effect on employment. During the great recession, extension of the UI benefit period had a small effect on employment (Boone et al., 2021) and unemployment exit rate and duration (Farber and Valletta, 2015).

There is emerging literature on the effects of COVID-19-era UI programs on labor supply, driven by the observation that the statutory replacement rates (UI benefit /lost wage earnings) due to these programs were higher for a majority of workers (Ganong et al., 2020). This might lead individuals to become unemployed voluntarily or stay unemployed longer.[2] But Boar and Mongey (2020) build a simple dynamic model to understand conditions under which workers may choose to return to work even when UI pays more than their wage. This is because the expected costs of expiration of the job offers, search frictions, and wage losses out of unemployment in a recession may be enough to offset the temporary benefits. Similar evidence is presented in Petrosky-Nadeau (2020) that estimates the reservation benefit for a wide range of U.S. workers and argues that few would turn down an offer to return to work at the previous wage under the increased UI payments provided by the CARES act.

Empirical evidence has found no or small negative effects of COVID-19 era UI programs on labor supply. Using data from Homebase, a private firm that provides scheduling and time clock software to small businesses, Bartik et al. (2020) and Finamor and Scott (2021) show that the employment trends at the introduction and expiration of the FPUC benefits do not suggest large negative effects of FPUC on employment. Using data from the Household Pulse Survey, Dube (2021) finds that the probability of employment after FPUC expiration is higher but insignificant in states with higher median replacement rates. Using data from Chase bank account holders Ganong et al. (2021) find that the job-finding rate jumps up when FPUC expired in August 2020 and falls again when

[2]Individuals are typically ineligible for UI if they become unemployed voluntarily. But the terms of FPUC were very generous. For example, no documentation was required to prove COVID-19 infection nor job loss due to the infection. Hence, it was theoretically possible to become voluntarily unemployed and collect UI benefits.

new supplements begin in January 2021. Using data from a financial services company, Earnin, Coombs et al. (2021) find that ending pandemic unemployment insurance increased employment by 4.4 percentage points in 22 states that stopped the extra $300 in UI benefits in June 2021. Using Current Population Survey data, Holzer et al. (2021) show that the flow of unemployed workers into employment increased by 14 percentage points after the termination of benefits as compared to states where benefits expired in September 2021. Using similar identification and data from the Job Openings and Labor Turnover Survey (JOLTS), Albert et al. (2022) find that the elimination of enhanced UI benefits in many states in mid-2021 was associated with a small increase in hiring activity but no differences in measured unemployment. Hornstein et al. (2022) argue that the small disincentive effects of pandemic UI found in the literature are due to ignoring the labor demand effects of UI through raised disposable income of the unemployed (and thereby helping employment recovery). Focusing on the difference in employment recovery of nearby high and low-wage establishments in Homebase data, which likely face the same labor demand, the paper estimates larger disincentive effects on employment and work hours.

The paper adds to the literature on the labor supply effects of UI by studying the effect of UI generosity using new data and a new source of identifying variation during the COVID-19 pandemic. Consistent with the literature, I find that generous UI payments during the pandemic likely increased unemployment. However, the aggregate effect on Indiana's employment rate was modest. I find evidence that increased benefits likely prevented some labor force exits and that worker-firm match quality was unaffected. The results enrich our understanding of the extent to which UI generosity influenced worker behavior in this unusual "experiment" when there was an unprecedented increase in UI benefits. This evidence should help policymakers when considering increasing UI benefits in the future.

2 Unemployment Insurance

For 85 years, Unemployment Insurance (UI) has served as the main government program designed to assist workers who lose a job through no fault of their own and stabilize the U.S. economy in times of macroeconomic contraction (Gould-Werth, 2020). UI is funded by a tax imposed on the employers and is administered by individual states who decide on eligibility criteria, benefit amount and duration. UI benefits are treated as taxable wages for federal tax purposes. Some states do not tax benefits at all, some states allow deducting some part of it, and others tax benefits as regular wage income.

In Indiana, an individual can claim UI benefits for a maximum of 26 weeks.[3] The maximum benefit amount is 0.47 times the average weekly income in the first four of the last five completed calendar

[3]Most of the information in this section is from Unemployment Insurance Claimant Handbook of Indiana Department for Workforce Development.

quarters, also known as the base period.[4] The minimum and maximum weekly UI payments are $50 and $390. Indiana taxes UI benefits but allows some amount to be deducted.

2.1 Unemployment insurance during the COVID-19 pandemic

Several provisions of the CARES Act related to unemployment insurance. This included relaxing many restrictions on receiving UI and new programs that paid the workers unemployed during the COVID-19 pandemic. These programs differed in the generosity of payments, eligibility, and time periods. Among other things the CARES Act (i) increased the maximum number of weeks the UI benefits can be paid by 13, (ii) added an extra $600 per week in addition to the amount the regular UI paid by establishing the Federal Pandemic Unemployment Compensation (FPUC), and (iii) made self-employed and contract workers (including gig-economy workers), and those who have insufficient wage history eligible for the payments. The size of the FPUC payment — $600 — was designed to replace 100% of the mean U.S. wage when combined with mean state UI benefits. The CARES Act implemented a fixed supplement to all workers in part because it was viewed as infeasible to implement policies that depended on individual earnings (American Enterprise Institute, 2021; Ganong et al., 2020). Even workers working at reduced hours were eligible to receive these extra benefits as long as they receive at least $1 in regular UI. These provisions were much more liberal as compared to those during the great recession when the federally funded benefits were extended up to 79 weeks and a supplemental weekly payment of $25 was added (American Enterprise Institute, 2021).

After the expiration of FPUC, almost all states provided an additional $300 per week for up to six weeks through Lost Wages Assistance (LWA). Fewer workers (those receiving at least $100 in regular UI and suffering job loss due to COVID-19) were eligible for LWA payments. Across states, these payments continued for 3-6 weeks. The Continued Assistance to Unemployed Workers Act of 2020 (CAUWA) (became law on December 27, 2020) extended many of the Unemployment Insurance programs from the CARES Act through the week ending March 13, 2021. CAUWA added a smaller amount, an extra $300 per week, to the regular UI benefits. These payments were further extended through the week ending September 4, 2021, by the American Rescue Plan Act of 2021 (which became law on March 11, 2021). Workers in Indiana were receiving extra UI benefits from April-September 2020 and January-September 2021.

To receive UI benefits, workers are required to be able, available, and actively seeking full-time work. During the COVID-19 pandemic, Indiana, like many other states relaxed this work search requirement for receiving UI benefits. This requirement was restored on June 1, 2021. UI benefits up to $10,200 received in 2020 were exempt for federal tax purposes. Many states, including those

[4]To meet the minimum eligibility for UI, (i) base period wages must total at least $4,200, with (ii) at least $2,500 of those wages earned in the last six (6) months of the base period, and (iii) total wages during the base period must be equal to at least one and one-half (1.5) multiplied by wages in the highest quarter of your base period. Appendix C shows an example of how benefits are calculated.

who do tax UI benefits, decided to exclude $10,200 from the taxable amount for 2020. The federal exemption for up to $10,200 of unemployment compensation received in 2020 did not apply for Indiana.

3 Empirical Strategy

To study if the extra UI benefits made individuals stay unemployed for a longer duration, I exploit the timing of the expiration of the FPUC and LWA programs and the eligibility rule for the Lost Wages Assistance (LWA) program. The FPUC program paid all unemployed workers an extra $600 per week which expired on July 25, 2020. The LWA program went into effect immediately after FPUC expiration, paid unemployed workers an extra $300 per week, and expired on September 5, 2020. The expirations were somewhat of a surprise. While both programs had a pre-determined date of expiration, it was expected that Congress would pass legislation to extend these payments further (Iacurci, 2020a). Importantly, not all workers were eligible for the $300 per week LWA payments. To be eligible, workers' regular UI payments needed to be at least $100.[5] This creates two instances when benefits for LWA-eligible and ineligible groups change by different amounts. First, after the $600 per week FPUC payments expired, the UI payments for LWA-eligible workers were reduced by $300 per week, while those for the LWA-ineligible workers were reduced by $600 per week. Second, after LWA expiration six weeks later, the UI payments for LWA eligible workers were reduced by $300 per week, while those for the LWA ineligible workers were unchanged. This motivates estimating a difference-in-difference (DID) model comparing workers just above and below the LWA eligibility cutoff separately around FPUC and LWA expiration. I estimate the following model:

$$ExitUnemployment_{i,t} = \delta_1 EligibleLWA_i + \delta_2 Post_t + \beta EligibleLWA_i * Post_t + \epsilon_{i,t} \quad (1)$$

where $ExitUnemployment_{i,t}$ is an indicator that turns one if worker i was unemployed (received UI benefit) at time $t-1$ and not unemployed (did not receive UI benefit) in period t. $EligibleLWA_i$ is an indicator that turns one if worker i is eligible for LWA, else zero. $Post_t$ is an indicator that turns one if week t is after FPUC or LWA expiration. The estimation sample is an unbalanced panel with the number of observations equal to the number of weeks unemployed.[6]

The coefficient of interest is β which indicates the difference in the probability of exiting unemployment after FPUC or LWA expiration for those eligible for LWA as compared to those ineligible for LWA. In the DID model around FPUC expiration, it will indicate the effect of receiving $300 per week, while in the DID model around LWA expiration, it will indicate the effect of losing $300 per week. Hence we should expect the estimates to have opposite signs in these models. If UI disin-

[5] Recall that the regular UI payments are proportional to past wage earnings. Thus, the rule implies that workers with annual wage earnings less than $11,000 were eligible for extra payments. The minimum wage for Indiana in 2020 was $7.25 per hour or $15,080 per year. Thus, the excluded workers are likely to be those who lost side gigs and not full-time employment, which was intentional (Iacurci, 2020b).

[6] A worker x week observation enters the estimation sample in period t if worker i was unemployed in period $t-1$

centivizes workers' return to work, we should expect the coefficient to be negative around FPUC expiration and positive around LWA expiration.

Consistent identification of β requires that in absence of benefit expiration, the probability of exiting unemployment after benefit expiration would have trended similarly as when benefits are active. To study the plausibility of parallel trends assumption, I estimate an event study model

$$ExitUnemployment_{i,t} = \delta EligibleLWA_i + \gamma_t + \sum_{t=1}^{34} \beta_t eligibleLWA_i * week_t + \epsilon_{i,t} \quad (2)$$

where γ_t is the week fixed effect and $EligibleLWA_i$ is as defined in equation 1. The coefficients of interest are β_t which indicates the difference in probability of exiting unemployment for the groups eligible and ineligible for LWA. Parallel trends assumption is likely satisfied if β_t equals zero before the benefit expiration.

4 Data

The main source of data for this study is the universe of weekly Unemployment Insurance (UI) claims in the state of Indiana between January 2020 - May 2022. These are administrative data provided by the Indiana Department of Workforce Development, the state agency that administers UI in Indiana. For each worker who received UI benefits for at least one week in this period, the individual and week-level data includes information on the amount of UI benefits paid, demographic characteristics (age, gender, race, ethnicity), industry, occupation, and geographic location of UI recipients. The data contain payments made under regular UI and some of the programs introduced through the CARES Act. I also observe if the payments were subject to any deductions made for garnishments (due to child support, taxes, etc.) or recovery of past overpayments. Additionally, I observe the quarterly earnings history and the top three employers by earnings of these workers starting 2019 Q1. The summary statistics for UI recipients in 2020, from which the estimation sample is drawn are shown in Table B.1. More than 550,000 workers received UI benefits for at least one week in this period which is around 16% of the total labor force in January 2020. The total benefit amount distributed was more than $3 billion (≈ $5,500 per worker). I discuss more details of the data in Appendix B.

These data are ideal for studying the effect of UI on labor supply. First, these are panel data at the weekly level, which allows for exploiting the timing of the expiration of benefits. Second, the accurate data for wage and UI benefits paid allows for exploiting the benefit eligibility for identification. Third, I observe actual payments and not only eligibility for UI. Lastly, the large sample size and lower measurement error help with the precision of estimates.

The estimation sample includes workers just above and below the LWA eligibility cutoff where eligibility is inferred using observed UI payments in August 2020. A worker is considered eligible if the UI payments in August 2020 were in the range [$125, $175] and ineligible if UI payments

were in the range [$50, $75]. Since the payments are rounded to the nearest $25, I exclude workers receiving $100 as they can be on either side of the cutoff. Table 1 compares these workers. The annual wage of workers eligible for LWA is $20,351, around two times of those ineligible. These workers have similar characteristics but there also exist notable differences in some characteristics including industry and occupation.

Table 1: Summary statistics for estimation sample

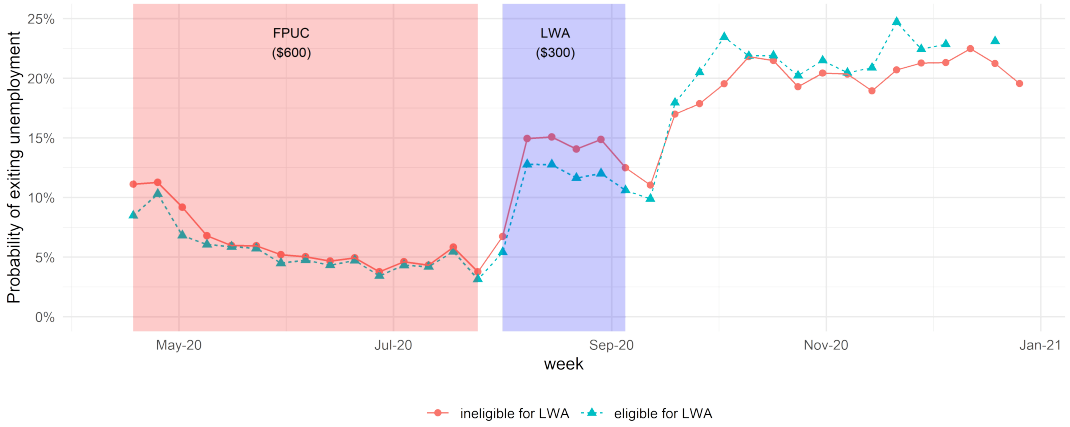
	LWA eligible	LWA ineligible
Annual wage (2019)	20,250	10,500
Gender		
Women	.59	.62
Race		
White	.67	.66
Black	.23	.25
Other	.095	.09
Ethnicity		
Hispanic	.056	.051
UI receipt weeks (2020)	19	17
Industry		
Manufacturing	.14	.078
Accommodation and Food Services	.23	.29
Health Care and Social Services	.11	.088
Retail Trade	.1	.13
Admin./ Support / Waste Mgt. / Rem. Services	.14	.15
All other	.28	.26
Occupation		
Production Occupations	.11	.065
Office and Administrative Support Occupations	.18	.16
Management Occupations	.1	.086
Food Preparation and Serving Related Occupations	.18	.22
Sales and Related Occupations	.069	.11
Construction and Extraction Occupations	.047	.034
All other	.32	.32
Age group		
16-24	.16	.27
25-34	.31	.27
35-44	.22	.19
45-54	.15	.12
55-64	.11	.088
Region		
Region 1 (North)	.12	.13
Region 3 (North)	.1	.1
Region 5 (Central)	.33	.32
N	44,205	35,867

4.1 Examining parallel trends assumption

Figure 1 shows the variation in the outcome variable, the raw exit rates out of unemployment, for workers eligible and ineligible for LWA. The exit rate is similar during FPUC which suggests parallel trends assumption is likely satisfied. It increases for both groups after the expiration of FPUC but they increase more for the group ineligible for LWA (that loses $600 per week in benefits) as compared to the group eligible for LWA (that loses $300 per week in benefits). After the expiration of LWA the exit rate increases more for the group eligible for LWA (that loses $300 per week in benefits) as compared to the group ineligible for LWA (whose benefits do not change). Thus, around both expirations, the change in exit rates is proportional to the change in benefit amount. Simple difference-in-difference estimates of the effect of these payments are 1.7 and 2.7 percentage points

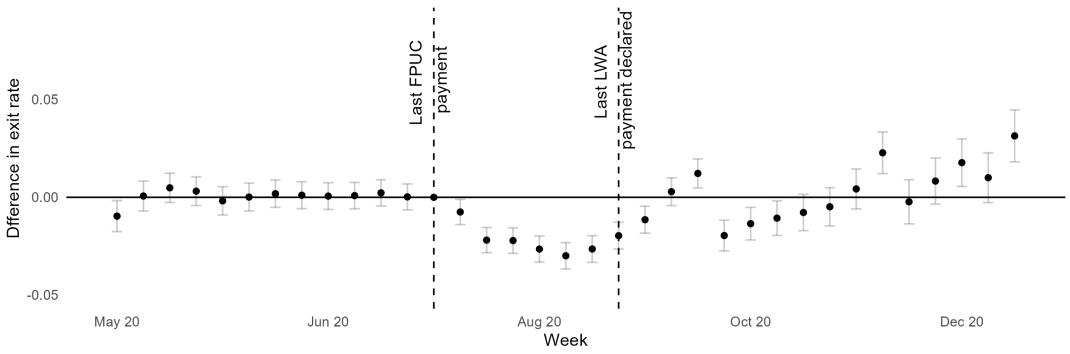
(Table B.3). A more robust comparison of pre-trends is shown in Figure 2 which shows the estimate

Figure 1: Exit rate out of unemployment by LWA eligibility



of β_t from equation 2 treating the last week before FPUC expiration as the reference week. There is no statistically significant difference in the probability of exiting unemployment for those eligible and ineligible for LWA until the last week of FPUC. After FPUC expiration, the probability of exiting unemployment for those eligible for LWA is lower than for those ineligible for payments. After LWA expiration, the probability of exiting unemployment for the eligible group is similar for most periods. Although the probability is higher immediately after LWA expiration. Thus, the timings and directions of the change in exit probability are consistent with payments affecting exit rates. The absence of differential pre-trends suggests the parallel trends assumption is likely to be satisfied.[7]

Figure 2: Event-study estimates



Estimates for β_t in equation 2. Probability of exiting from unemployment for LWA eligible group relative to the ineligible group. The reference week is the last week before FPUC expiration.

[7]It is not clear why the exit rate for ineligible group increases sharply after LWA expiration when their benefits do not change. This could be because of demand-side conditions such as school reopenings. Another reason could be that on September 26, 2020, the final stage of Indiana's re-opening post-COVID went into effect. The identification assumption is that these changes affect both groups similarly. Additionally, after LWA, the high-wage group appears to have higher exit rates than the low-wage group which could be because of the differential recovery of jobs for these groups.

5 Results

I first study the effect of FPUC and LWA expiration on the exit rate out of unemployment. In Table 2, models 1-5 study changes around FPUC expiration when benefits for LWA eligible group reduce by $300 and that for ineligible group reduce by $600. Estimate from model 1 indicates that after FPUC expiration, the average exit rate out of unemployment increase by 6.1 percentage points (p.p.). Estimates from model 2 indicate that this increase was different for LWA ineligible and eligible groups. For the ineligible group, the increase was 7.1 p.p. while for the ineligible group the increase was smaller by 1.7 p.p.. This difference in exit rates for the groups is similar after successively adding controls for observable characteristics (Model 3), individual fixed effects (Model 4), and week fixed effects (Model 5). The negative estimate for the interaction coefficient implies that a smaller reduction in benefit is associated with a smaller increase in exit rates.

Table 2: Effect of LWA eligibility on exit rates out of unemployment

	post FPUC					post LWA				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
eligibleLWA*post		-0.017***	-0.018***	-0.020***	-0.021***		0.028***	0.027***	0.018***	0.021***
		(0.001)	(0.001)	(0.001)	(0.001)		(0.002)	(0.002)	(0.002)	(0.002)
eligible LWA		-0.003***	-0.011***				-0.021***	-0.029***		
		(0.001)	(0.001)				(0.001)	(0.001)		
post	0.061***	0.071***	0.072***	0.078***		0.082***	0.067***	0.071***	0.163***	
	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	
Observations	1,010,781	1,010,781	1,008,233	1,005,127	1,005,127	748,373	748,373	746,672	743,754	743,754
R-sq	0.01	0.01	0.02	0.20	0.20	0.01	0.01	0.02	0.20	0.22
Controls			X	X	X			X	X	X
Individual FE				X	X				X	X
Week FE					X					X

(i) Estimates for coefficients of equation 1 based on 48,303 LWA eligible and 34,434 ineligible workers. (ii) Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. (iii) Pre and post periods for models 1-5: May 2 - July 25 2020 (Pre), Aug 1 - Sept 12, 2020 (Post). Models 6-10: Aug 1, 2020 - Sep 12, 2020 (Pre), Sep 19 - Dec 26, 2020 (Post) (iv) Controls include age, gender, race, ethnicity, industry, occupation, place of residence, and wage quartile.

Models 6-10 study changes around LWA expiration when benefits for LWA eligible group reduce by $300 and that for the ineligible group remain unchanged.[8] Estimate from model 6 indicates that after LWA expiration, the average exit rate out of unemployment increase by 8.2 p.p.. Estimates from model 7 indicate that this increase was different for LWA ineligible and eligible groups. For the ineligible group, the increase was 6.7 p.p. while for the ineligible group the increase was higher by 2.8 p.p.. This difference in exit rates for the groups is similar after successively adding controls for observable characteristics (Model 8), individual fixed effects (Model 9), and week fixed effects (Model 10). The positive estimate for the interaction coefficient implies that a larger reduction in benefit is associated with a larger increase in exit rates. Taken together, the change in the exit rate out of unemployment is proportional to the change in the benefit amount, consistent with benefits amounts affecting exit rates.

[8]The LWA payments were effective for the period Aug 1 - Sept 5, 2020, recipients received them starting Sept 21, 2020, around 1.5 months later than they were due. I assume that since the benefits and eligibility were announced in early August, workers responded *as if* they are receiving benefits when they were due. Similar to what I have assumed during FPUC payment delays.

Around FPUC expiration, the estimate indicates the differential response of losing $300 vs losing $600, or a relative gain of $300 per week. Thus, a gain of $300 is associated with a decrease in exit rate by 2.1 p.p. or 49% of the pre-period rate of 4.3%. Around LWA expiration the estimate indicates the effect of losing $300. This loss of $300 is associated with an increase in the exit rate by 2.1 p.p. or 22% of the pre-period rate of 9.6%. Thus a change in benefit amount by $300 per week is associated with a change in exit rate out of unemployment by 22-49% in the opposite direction. Alternatively, the $300 benefits depressed exit rates by around one-fourth to one-half.

5.1 Effect on reemployment and labor force exits

An exit from unemployment can result in entry into employment or exit from the labor force. If UI disincentivizes employment, we must observe that after exiting unemployment, workers go back to being employed (Solon, 1979). If workers exit the labor force after exiting unemployment, this is not disincentivizing employment rather may imply that UI encouraged workers to stay in the labor force and search for jobs. These workers in absence of UI may have exited the labor force and hence they must be excluded when considering the true disincentive effect of UI.

To separate the work disincentive effect from the labor force participation effect, I estimate the effect of LWA eligibility on reemployment and exit from the labor force. I classify each exit from unemployment as either exit into employment or exit from the labor force. Using data on quarterly wages earned, a worker's exit from unemployment in quarter q is considered as an exit into employment if the worker earns a non-zero wage in quarter $q + 1$. If not, the exit is considered an exit from labor force.[9] These variables are then used as outcome variables in equation 1 If the disincentive effect of UI exists, change in reemployment rate should be negatively correlated with LWA eligibility. If UI affects labor force participation, we expect a relationship between labor force exits and LWA eligibility.

Table 3 shows the effect of LWA eligibility on reemployment and labor force exits.[10] Models 1 and 2 study changes around FPUC expiration when benefits for LWA eligible group increase by $300 in relative terms. Estimate from model 1 indicates that after FPUC expiration, the LWA eligible group was 1.7 p.p. less likely to exit into employment. This negative effect on reemployment corresponds to the disincentive effect of UI. Estimate from model 2 indicates that after FPUC

[9]9Notice that this definition assumes that a non-earning quarter is an exit from the labor force. There are at least three cases in which this will not be correct. First, if the worker has stopped receiving benefits while still looking for a job and hence in the labor force. This is unlikely as there is little reason a worker may stop receiving benefits while still looking for a job, especially given that workers were not required to provide proof of applying for jobs during this period. So, the costs of applying for benefits were small. Second, there is a possibility that a worker is still collecting benefits through other programs which I do not observe. I argue that this effect is small as only a small proportion of workers exhaust 26 weeks of regular UI only after which they can apply for other programs (2719 in the ineligible and 5976 in the eligible group). Third, with this definition, a worker will be considered exited from the labor force if he is working out of state or is self-employed. I still use the term "exit from the labor force" to convey the worker is non-employed in the next quarter.

[10]The event study plots shown in Figure F.1 suggest that the parallel trends assumption is likely satisfied for each of the models.

Table 3: Effect of LWA eligibility on reemployment and labor force exits

	post FPUC exit		post LWA exit	
	(1) into employment	(2) from labor force	(3) into employment	(4) from labor force
eligibleLWA * post	-0.017***	-0.004***	0.015***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	1,005,127	1,005,127	743,754	743,754
R-sq	0.22	0.18	0.26	0.19

(i) Estimates for coefficients of equation 1. The dependent variables are indicator variables that turn one if the worker exited unemployment in quarter t and in the next quarter earned a non-zero wage (Models 1 and 3) or earned zero wage (Models 2 and 4). All models control for observables (gender, race, ethnicity, industry, occupation, place of residence, and wage quartile), individual fixed effect, and week fixed effect. (ii) Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, ***

expiration, the LWA eligible group is 0.4 p.p. less likely to exit the labor force. This is the labor force participation effect and suggests that LWA was able to prevent labor force exits. Models 3 and 4 study changes around LWA expiration when benefits for eligible group reduce by $300. The positive estimates indicate that after LWA expiration, the LWA eligible group was 1.5 p.p. more likely to exit employment (model 3) and 0.6 p.p. more likely to exit the labor force. Thus, a large part of the decline in the exit rate out of unemployment (2.1 p.p.) is because of a decline in the reemployment rate (1.7 p. p.) while the remaining is because of a decline in labor force exits (0.4 p.p).

5.2 Effect on firm-worker match quality

Access to UI may allow credit-constrained workers to search longer for a better job match. The existence of this effect has been documented in the literature (Farooq et al., 2020; Nekoei and Weber, 2017) and is consistent with the "liquidity effect" of UI (Card et al., 2007; Chetty, 2008). To study the effects on firm-worker match quality, I estimate the effect of LWA eligibility on workers' probability of changing employers and wages after re-employment. Each exit into employment is further classified as either exit to the same or a different employer. An exit into employment in quarter q is considered as an exit to the same employer if at least one of the employers in quarter $q + 1$ is the same as the beginning of the pandemic (Q1 of 2020). Additionally, I assign "exit earnings" to each exit into employment in quarter q, which are the wage earnings in quarter $q + 1$. These variables are then used as outcome variables in equation 1. If access to extra weeks of benefits improved firm-worker match quality we expect workers eligible for LWA to change employers or experience an increase in wage earnings.

Table 4 shows the effect of LWA eligibility on the type of employer and wage earnings following an unemployment spell.[11] Estimate from model 1 indicates that after FPUC expiration, workers eligible for LWA were 1.6 p.p less likely to be employed by the same employer. Estimate from model 2 indicates that after FPUC expiration, workers eligible for LWA were equally likely to be employed

[11]The event study plots shown in Figure F.1 suggest that the parallel trends assumption is likely satisfied for each of the models.

Table 4: Effect of LWA eligibility on firm-worker match quality

	post FPUC exit			post LWA exit		
	(1) same employer	(2) different employer	(3) quarterly earnings	(4) same employer	(5) different employer	(6) quarterly earnings
eligibleLWA * post	-0.016***	-0.000*	10.643*	0.015***	0.000	169.014***
	(0.001)	(0.000)	(5.056)	(0.001)	(0.000)	(7.686)
Observations	1,005,127	1,005,127	1,005,127	743,754	743,754	743,754
R-sq	0.22	0.21	0.26	0.26	0.25	0.32

(i) Estimates for coefficients of equation 1. (ii) Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. (iii) The dependent variables are indicator variables that turn one if the worker exited unemployment in quarter t and was employed by the same employer as Q1 of 2020 (Model 1), was not employed by the same employer as in Q1 of 2020 (Model 2). In Model 3, the dependent variable is the quarterly earnings of the worker in the quarter after entering employment. (iv) All models control for observables (gender, race, ethnicity, industry, occupation, place of residence, and wage quartile), individual fixed effect, and week fixed effect.

by a different employer. Comparing the estimates in models 3 and 4 suggests that all the decline in the exit into employment (1.7 p.p.) is because of a decline in exit to the same employer and not because of an exit to a different employer. Alternatively, the LWA-eligible and ineligible groups continue to exit to different employers at similar rates but the eligible workers, now exit to the same employer at a lower rate. In model 3, I explore the effect on earnings after exiting unemployment. The estimate on the interaction term suggests there is no significant effect of LWA eligibility on wage earnings after entering employment for both groups.

Models 4-6 study changes around LWA expiration when benefits for eligible group reduce by $300. After LWA expiration, workers eligible for LWA were 1.5 p.p more likely to be employed by the same employer (model 4) and equally likely to be employed by a different employer (model 5). The positive estimate on the interaction term in model 6 indicates that LWA-eligible workers had higher wage earnings by $169. This is about 3% of the average quarterly wage in Q1 of 2020 for the LWA-eligible group. Thus, there is no evidence that extra UI allowed workers to switch employers. There is some evidence that it increased the wage earnings after re-employment. This suggests that LWA eligibility likely did not affect the worker-firm match quality.

5.3 Robustness checks

I study the robustness of estimates in Table 2. In the data, I do not observe LWA eligibility and I infer this from the observed UI payments. In Tables E.1 and E.2 I use alternate ways to identify the LWA eligible and ineligible groups based on observed UI payments and estimated payments based on wage earnings in 2019. The effect of LWA eligibility on the exit rate out of unemployment is robust to different definitions of treatment using observed payments. Although there is some variation in the estimates when using wage earnings in 2019.

One threat to identification, especially relevant when treatment is based on eligibility cutoff, is that of workers manipulating to get into the treatment group to become eligible for payments. I argue this is unlikely since the eligibility was determined by past wages when workers did not know of the eligibility rule. To support this argument, in Figure B.4 I show that there is no visible discontinuity

in wage earnings around the LWA eligibility cutoff.

Another concern for identification is the measurement error in the outcome variable, exit from unemployment. This variable turns 1 if the worker stops receiving regular UI. It is possible that after this, the worker may have continued to receive benefits (through PEUC) leading to measurement error in the outcome variable. Moreover, the error is likely higher for the eligible group since they are more likely to exhaust regular UI and go on PEUC as they stay unemployed longer because of LWA payments. Thus the measurement error is "non-random" and hence the standard result of imprecision of estimates does not apply. I argue that the effect of measurement error is small since only a small proportion of workers exhaust 26 weeks of regular UI only after which they can apply for PEUC (2719 in the ineligible and 5976 in the eligible group).

Another concern for identification is the confusion about the LWA eligibility rule among workers. It is possible that despite being declared in early August, the LWA eligibility rule wasn't clear to non-eligible groups, and hence the ineligible group was expecting to receive benefits. This is consistent with the increase in the exit rate of the ineligible group after LWA expiration (Figure 1). If a fraction of the ineligible group behaves as if they were eligible, this would bias the estimates toward zero.

6 Effect on aggregate unemployment

How much did the increased UI benefits contribute to increasing unemployment? To study this, I calculate the effect of LWA benefits on increasing Indiana's unemployment in August 2020. The negative effect of LWA eligibility on reemployment indicates that LWA-eligible workers in July 2020 who may have entered employment in August 2020 remained unemployed. I can calculate the number of such workers using the estimate for the effect of LWA on reemployment and the total unemployed workers in July 2020 eligible for LWA. In calculating counterfactual unemployment, I "move" these workers from unemployed to employed and hence subtract these from actual unemployed in August 2020.

Let U^*_{aug}= counterfactual unemployment in August 2020, U_{aug}= Actual unemployed in August, and U_{jul} = actual unemployed in July 2020. We can estimate U^*_{aug} as follows

$$U^*_{aug} = U_{aug} - |\beta| * U_{jul} \tag{3}$$

There were 6488 extra unemployed workers in August 2020 because of LWA. Adjusting for these translates to an unemployment rate of 6.6%, smaller than the actual value of 6.8%. Thus, the unemployment rate in August 2020 would have been smaller by 0.2 percentage points if not for LWA.[12]

[12]This is a partial equilibrium effect that avoids considering spillover effects on workers ineligible for LWA, whose job-finding rates are likely to be lower in absence of LWA.

6.1 Discussion

In appendix G, I study the heterogeneity in the effect on exiting unemployment by gender, race, and age show. The estimates for women are larger in magnitude while those for Blacks are smaller. Thus women are more responsive and blacks less responsive to change in benefit amount compared to men and whites respectively. Similarly, workers more than 55 years of age are more responsive to benefit expiration.

The estimates are comparable to those of Ganong et al. (2021) who find that the expiration of FPUC benefits increases the exit rate from unemployment. One percent larger reduction is associated with a 1.4 - 1.7 p.p. increase in exit rates into a new job. Holzer et al. (2021) show that states that ended benefits early in 2021 had an increased exit rate by 13 p.p., or around 66%. This is significantly bigger than those in this paper. The different time period examined by Holzer et al. (2021) might be responsible for the different responses.

This estimate using low-wage workers is likely an overestimate of the response of the average worker. This is because an average worker is likely to be less responsive to benefit changes since they will be a smaller share of wage earnings. The estimate is likely generalizable to other states. The median statutory replacement rate (UI benefit/wage) for Indiana during FPUC was 143%, which is similar to that for the US of 145% (Ganong et al., 2020). Unless the demand-side factors such as recovery from the pandemic were drastically different in Indiana, we can expect the estimate to be generalizable to other states. The estimates are likely not generalizable to non-pandemic periods because the labor demand conditions are likely going to be different during non-pandemic periods. However, the response to UI benefit means that UI can stabilize markets during downturns.

The estimate indicates the immediate response to benefit expiration. This is likely smaller than the true response if there is a delay in responding to benefit expiration for reasons including worker inattention, the expectation of a continuation of benefits, or savings. Hence, it is likely that the estimates are smaller than the true "long-run" response.

7 Conclusion

I study the effects of increasing UI benefits during the COVID-19 pandemic on labor supply. The probability of exiting unemployment is lower for workers receiving an extra $300 weekly UI benefits. This is because of a decrease in the reemployment rate and the rate of exiting the labor force. The decrease in the reemployment rate indicates that UI benefits disincentivized workers from returning to employment. However, the effect on Indiana's overall employment is modest. After reemployment, workers do not change employers or earn a higher wage suggesting that UI did not affect the firm-worker match quality which could be because of depressed labor demand during the pandemic. The decline in exit from the labor force indicates that UI incentivized workers stay in the labor force.

References

Albert, S., Lofton, O., Petrosky-Nadeau, N., and Valletta, R. G. (2022). Unemployment Insurance Withdrawal. *Economic Letters*.

American Enterprise Institute (2021). Unemployment Insurance at a Crossroads: Tracing Program Design During and beyond COVID-19. Technical report.

Bartik, A. W., Bertrand, M., Lin, F., Rothstein, J., and Unrath, M. (2020). Measuring the labor market at the onset of the COVID-19 crisis. Working Paper 27613, National Bureau of Economic Research.

Boar, C. and Mongey, S. (2020). Dynamic Trade-offs and Labor Supply Under the CARES Act. Working Paper 27727, National Bureau of Economic Research.

Boone, C., Dube, A., Goodman, L., and Kaplan, E. (2021). Unemployment Insurance Generosity and Aggregate Employment. *American Economic Journal: Economic Policy*, 13(2):58–99.

Card, D., Chetty, R., and Weber, A. (2007). Cash-on-Hand and Competing Models of Intertemporal Behavior: New Evidence from the Labor Market*. *The Quarterly Journal of Economics*, 122(4):1511–1560.

Chetty, R. (2008). Moral Hazard versus Liquidity and Optimal Unemployment Insurance. *Journal of Political Economy*, 116(2):173–234.

Coombs, K., Dube, A., Jahnke, C., Kluender, R., Naidu, S., and Stepner, M. (2021). Early Withdrawal of Pandemic Unemployment Insurance: Effects on Earnings, Employment and Consumption.

Dube, A. (2021). Aggregate Employment Effects of Unemployment Benefits During Deep Downturns: Evidence from the Expiration of the Federal Pandemic Unemployment Compensation. Working Paper 28470, National Bureau of Economic Research.

Farber, H. S. and Valletta, R. G. (2015). Do extended unemployment benefits lengthen unemployment spells?: Evidence from recent cycles in the u.s. labor market. *Journal of Human Resources*, 50(4):873–909.

Farooq, A., Kugler, A. D., and Muratori, U. (2020). Do unemployment insurance benefits improve match and employer quality? evidence from recent u.s. recessions. Working Paper 27574, National Bureau of Economic Research.

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

Ganong, P., Greig, F., Noel, P., Sullivan, D. M., and Vavra, J. (2021). Micro and Macro Disincentive Effects of Expanded Unemployment Benefits.

Ganong, P., Noel, P., and Vavra, J. (2020). US unemployment insurance replacement rates during the pandemic. *Journal of Public Economics*, 191:104273.

Gould-Werth, M. (2020). Fool Me Once: Investing in Unemployment Insurance systems to avoid the mistakes of the Great Recession during COVID-19. https://equitablegrowth.org/fool-me-once-investing-in-unemployment-insurance-systems-to-avoid-the-mistakes-of-the-great-recession-during-covid-19/. Retrieved on July 24, 2021.

Holzer, H. J., Hubbard, R. G., and Strain, M. R. (2021). Did pandemic unemployment benefits reduce employment? evidence from early state-level expirations in june 2021. Working Paper 29575, National Bureau of Economic Research.

Hornstein, A., Karabarbounis, M., Kurmann, A., Lalé, E., and Ta, L. (2022). Disincentive effects of pandemic unemployment benefits. Working paper.

Iacurci, G. (2020a). $600 unemployment benefit will likely end July 31. https://www.cnbc.com/2020/05/04/unemployment-benefits-will-be-reduced-after-july-31.html. Retrieved on April 27, 2022.

Iacurci, G. (2020b). These people won't get Trump's $300 unemployment benefit. https://www.cnbc.com/2020/09/15/these-people-wont-get-trumps-300-unemployment-benefit.html. Retrieved on November 07, 2021.

Indiana Nonprofits Project (2007). Economic Growth Regions.

Institute for Women's Policy Research (2018). The Economic Status of Women in Indiana. Technical report.

Krueger, A. B. and Meyer, B. D. (2002). Labor supply effects of social insurance. *Handbook of public economics*, 4:2327–2392.

Margo, R. A. (1993). Employment and unemployment in the 1930s. *Journal of Economic Perspectives*, 7(2):41–59.

Melchior, J. K. (2021). Covid Unemployment Relief Makes Help Impossible to Find. https://www.wsj.com/articles/covid-relief-makes-help-impossible-to-find-11619208369?mod=searchresults_pos5&page=1.

Mulligan, C. and Moore, S. (2020). Unemployment Bonus Proves Its Harm. https://www.wsj.com/articles/unemployment-bonus-proves-its-harm-11607037230?mod=searchresults_pos4&page=1.

Nekoei, A. and Weber, A. (2017). Does extending unemployment benefits improve job quality? *American Economic Review*, 107(2):527–61.

Petrosky-Nadeau, N. (2020). Reservation Benefits: Assessing job acceptance impacts of increased UI payments. Federal Reserve Bank of San Francisco.

Schmieder, J. F. and Von Wachter, T. (2016). The effects of unemployment insurance benefits: New evidence and interpretation. *Annual Review of Economics*, 8:547–581.

Solon, G. (1979). Labor supply effects of extended unemployment benefits. *The Journal of Human Resources*, 14(2):247–255.

U.S. Census Bureau (2019). QuickFacts: Indiana. `https://www.census.gov/quickfacts/IN`.

U.S. Department of Labor. Questions and Answers: Federal Pandemic Unemployment Compensation (FPUC) Program. `https://wdr.doleta.gov/directives/attach/UIPL/UIPL_15-20_Change_1_Attachment_1.pdf`.

Appendix A Abbreviations

- CARES: Coronavirus Aid, Relief, and Economic Security Act. The CARES Act, signed into law in March 2020, provided over $2 trillion of economic relief to workers, families, small businesses, industry sectors, and other levels of government hit hard by the public health crisis created by the Coronavirus Disease 2019 (COVID-19). Three important provisions created by the act were
  1. PUA: Pandemic Unemployment Assistance. The PUA created a federal unemployment insurance program for individuals not otherwise eligible for UI benefits, including the self-employed, independent contractors, gig economy workers, those seeking part-time employment, and individuals lacking sufficient work history.[13]
  2. FPUC: Federal Pandemic Unemployment Assistance. The FPUC provided $600 per week to those eligible for regular UI or Pandemic Unemployment Insurance (PUA).
  3. PEUC: Pandemic Emergency Unemployment Compensation. This extended unemployment benefits by an additional 13 weeks (up to 39 weeks for Indiana).
- EB: Extended Benefits. The EB program triggers on during periods of high unemployment. In Indiana, EB was available after regular UI and PEUC was exhausted, during the following period: June 7 – November 14, 2020.
- LWA: The Lost Wages Assistance. The LWA program provided benefits of $300 per week after the expiration of FPUC to unemployed workers impacted by the COVID-19 pandemic.
- CAUWA: Continued Assistance for Unemployed Workers Act. The CAUWA legislation was designed to continue unemployment insurance benefits for those who were receiving relief from the CARES Act and continued many of the same or similar programs. It restarted FPUC @ $300 per week and extended PEUC by 11 more weeks.
  - MEUC: Mixed Earner Unemployment Compensation. The MEUC program introduced by CAUWA was designed to cover workers with both earned wages and self employment income, such as part-time musicians and performing arts professionals. They often qualified for regular UI but received disproportionately low benefits due to their previous wage history. The MEUC program provided these workers an additional federally funded $100 weekly benefit.
- ARPA: America Rescue Plan Act. ARPA, enacted in March 2021, extended PUA, expanded PEUC eligibility for up to 53 weeks, and continued the $300 FPUC through early September 2021.

[13]The benefit amount was decided based on tax filing status. If the applicant filed as single tax filer, income from 2019 was to be used, If the individual did not file taxes or filed as married filing jointly, the individual will receive a minimum benefit amount. The minimum benefit amount varied for states and was $149 per week for Indiana.

Appendix B Data

I describe the data files shared by Indiana Department of Workforce Development.

- the benefits file, that contains the weekly benefit amounts. This also contains the industry and location of the employer, and the occupation of the employee before getting unemployed. The geographic location is available at the Economic Growth Region (EGR) level. All the 92 counties in Indiana are grouped into 11 Economic growth regions (EGR) based on economic and social ties, specifically commuting patterns, demographics, and other quantifiable factors (Indiana Nonprofits Project, 2007).
- the wages file, that contains the quarterly wages earned
- the employer file, that contains the top 3 employers from whom the employer earned the most in the quarter.
- the deductions file, that contains the deductions that were made before the payments

In the Unemployment Insurance raw benefits file, a row represents recipients (Universal_ID) and columns the weeks. The values are the amounts received in respective weeks. The benefit amounts are rounded to the nearest \$25. Weeks in which no benefits were paid to a recipient are marked as NA. The benefit amount for a particular week is the amount that was due for that week. It is possible that actual payment may ave happened at a later week. For example, if there are delays in the application review, in which case, the actual payment will include all the due payments. The annual wage earnings are rounded to the nearest \$50.

B.1 Summary statistics - All recipients

The demographic, industry and occupational characteristics for all UI recipients in 2020 are shown in Table B.1. Women constitute 48% of recipients, Whites constitute 77% while Blacks constitute 13%. The largest proportion of recipients are from manufacturing industry (32%), followed by Accommodation and Food Services (13%), Health Care and Social Services (11%), and Retail Trade (9%). Largest proportion of recipients are from production occupations (18%), followed by Office and Administrative Support Occupations (13%), Management Occupation (12%), and Food Preparation and Serving Related Occupations (10%). Age group 25-34 and 35-44 constitute 46% of recipients. The largest share of recipients, 26%, are from the region 5, that also contains the state capital. The average annual earnings is \$39,876 and the average weekly benefit amount is \$562. For comparison, the median household income in Indiana in 2019 was \$56,303 and the per capita income was \$29,777 (U.S. Census Bureau, 2019). The average annual wage and hence benefit amounts are smaller for women and Blacks as compared to men and whites respectively (Appendix B).

Table B.1: Recipient characteristics

	Count	Proportion
Gender		
Women	262,946	0.48
Race		
White	427,292	0.77
Black	74,576	0.13
Asian	15,981	0.03
American Indian or Alaska Native	2,170	0.00
Hawaiian Native or Pacific Islander	798	0.00
Other	33,179	0.06
Ethnicity		
Hispanic	27,777	0.05
Industry		
Manufacturing	171,910	0.32
Accommodation and Food Services	65,922	0.12
Health Care and Social Services	55,822	0.10
Retail Trade	45,981	0.09
Admin./ Support / Waste Mgt. / Rem. Services	43,033	0.08
All other	155,942	0.29
Occupation		
Production Occupations	99,147	0.18
Office and Administrative Support Occupations	73,456	0.13
Management Occupations	66,040	0.12
Food Preparation and Serving Related Occupations	53,169	0.10
Sales and Related Occupations	34,900	0.06
Construction and Extraction Occupations	37,302	0.07
All other	189,934	0.34
Age group		
16-24	70,998	0.13
25-34	139,973	0.25
35-44	118,428	0.21
45-54	108,501	0.20
55-64	90,561	0.16
Region		
Region 1 (North)	61,514	0.11
Region 2 (North)	66,034	0.12
Region 3 (North)	71,285	0.13
Region 4 (North)	44,432	0.08
Region 5 (Central)	144,839	0.26
Region 6 (East)	23,906	0.04
Region 7 (West)	13,892	0.03
Region 8 (South)	17,677	0.03
Region 9 (South)	28,191	0.05
Region 10 (South)	19,762	0.04
Region 11 (South)	34,090	0.06

Summary statistics of workers who received UI for at least one week in 2020.

B.2 Limitations of the data

The data contains initial and continued claims and I cannot separate the two. I cannot identify workers working part-time. The UI data from DWD are different from the initial weekly UI claims data released by the Department of Labor (DOL).[14] The DOL data contains all claims made in the week regardless of whether the claims were paid or denied. The DWD data contains only those claims that were paid. I observe FPUC (extra $600 between May 2020 - July 2020) and CAUWA (extra $300 between January 2021 - March 2021) payments but not LWA (extra $300 in September 2020) payments. I also do not observe payments made under PEUC (extension of 13 weeks) or PUA (payments made to self employed and others not typically covered in UI). I also cannot identify if the payments were paid through PEUC or EB extensions.

B.3 Recipients by time

Figure B.1: Number of recipients

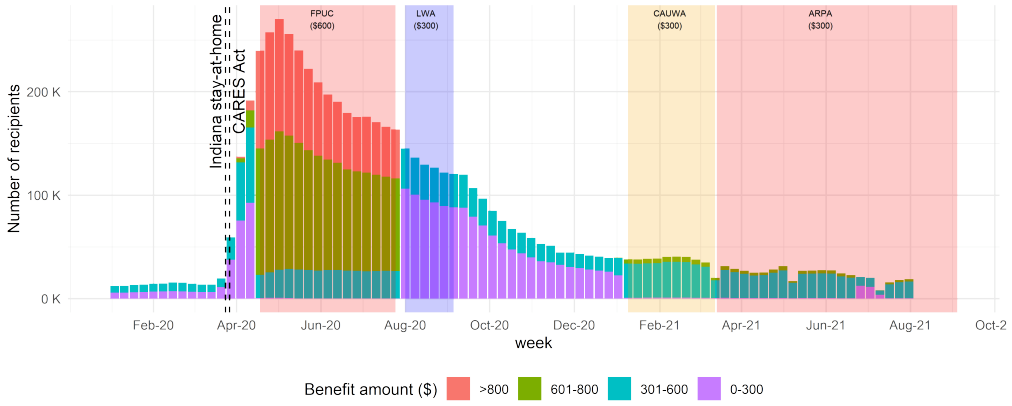


Figure B.1 shows the total recipients broken down into amount received. There is a steep increase in the number of recipients in the weeks of April following the introduction of Indiana's Stay-at-Home order and passage of the CARES Act. There is a lag of two weeks after the extra $600 benefits was signed in law (March 27, 2020) and when the payments started (April 18, 2020). The increase continues until mid-May and then starts to decline. The UI benefit amount increases in the months of April until July due to the extra $600 FPUC benefit. The payments <$600 are likely because of deductions made for garnishments (due to child support, taxes, etc.) or recovery of past overpayments. Not more than 50% of FPUC payments could be deducted for such purposes (U.S. Department of Labor).

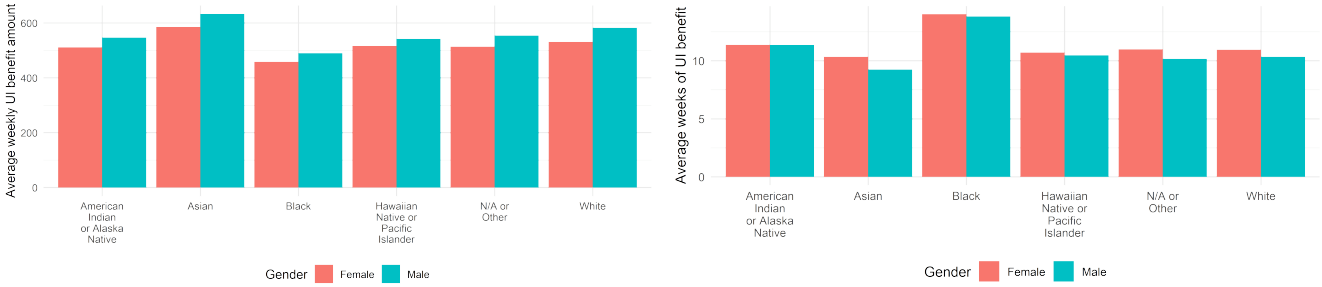
Table B.2 shows the difference in weekly wage and benefit amounts by gender and race. The average annual wage and hence benefit amounts are smaller for women and Blacks as compared to men and whites respectively. Thus women earn 0.63 times the wage of men which is comparable to what was found in Institute for Women's Policy Research (2018). Figure B.2 shows that the gender gaps in average weekly benefit amounts and unemployment duration are observed in all races.

[14] `https://oui.doleta.gov/unemploy/claims.asp`

Table B.2: Weekly wage and benefit amount

	Men	Women	White	Blacks
Weekly wage ($)	917	582	787	531
Average UI amount ($)	590	532	576	478
N	270,993	251,009	400,906	70,096

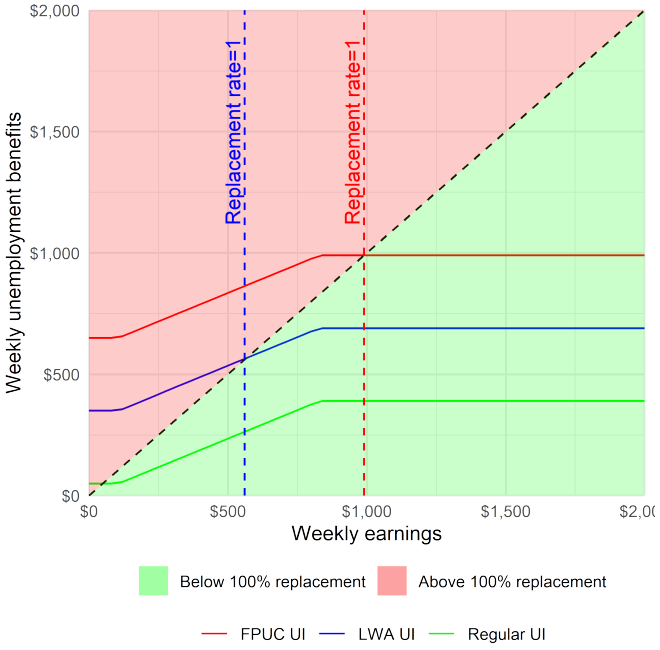
Figure B.2: Average weekly benefit amounts and duration by race and gender



B.4 Effect of the extra $600 and extra $300

Figure B.3 shows the effect of the extra $600 and extra $300. With regular UI, the benefits are always below the weekly earnings for any level of earnings. With the extra $600, the UI benefits are higher than the earnings for weekly earnings <$990 (equivalent to $24.75 per hour or $51,480 annual wage) which is true for around 78% of UI claimants.[15] With the extra $300, the UI benefits are higher than the earnings for weekly earnings <$560 (equivalent to $14 per hour or $29,120 annual wage) which is true for around 45% of UI claimants.

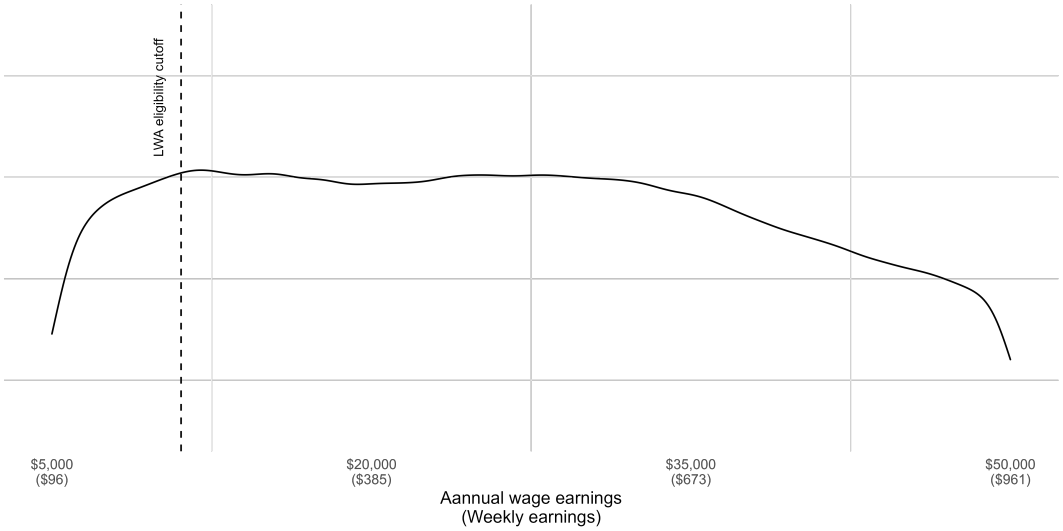
Figure B.3: UI benefit vs weekly earnings



[15]This is comparable to the number in Ganong et al. (2020) who find that at the national-level 76% of unemployed workers have a statutory replacement rate above 100%.

B.5 Wage earnings distribution

Figure B.4: Annual wage earnings density



Workers whose wages are higher than LWA eligibility cutoff are eligible for $300 per week LWA payments.

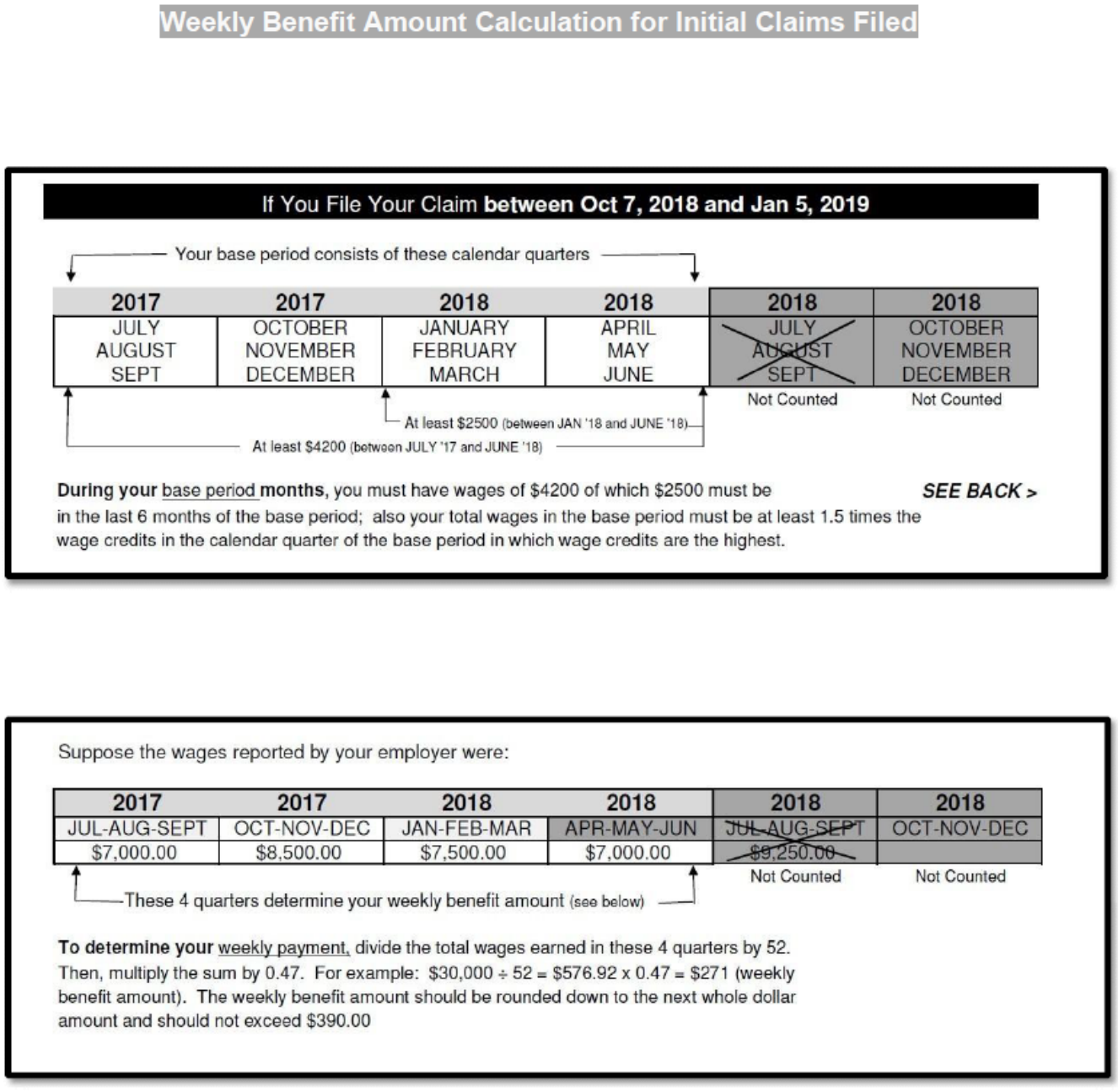
Table B.3 shows the average exit rates around FPUC and LWA expiration. The increase in exit rate for LWA eligible is smaller by 1.7 percentage points (0.071-0.054) after expiration of FPUC and larger by 2.7 percentage points (0.094-0.067) after expiration of LWA.

Table B.3: Average exit rates around FPUC and LWA expiration

LWA eligibility	FPUC	post FPUC	Difference	LWA	post LWA	Difference
Eligible	0.043	0.096	0.054	0.096	0.191	0.094
Ineligible	0.046	0.117	0.071	0.117	0.184	0.067

Appendix C Benefit calculation example

Figure C.1: Benefit calculation example



Appendix D Important dates

- 2020
  - Mar 6 - Public health emergency declared in Indiana
  - Mar 19 - Public schools closed in Indiana
  - Mar 23 - Indiana issues stay-at-home (SAH) orders
  - Mar 26 - CARES Act signed into law
  - May 1 - Indiana starts to re-open
  - Aug 08 - Up to $44 billion made available from Federal Emergency Management Agency's (FEMA) Disaster Relief Fund to provide financial assistance to Americans who have lost wages due to the COVID-19 pandemic. The cutoff of $100 is declared.
  - Aug 22: Indiana approved for a FEMA grant under the Lost Wages Assistance program.
  - Sept 10 - Indiana declares to start disbursing $300 LWA payments for
  - Sept 21 - Indiana starts disbursing $300 LWA payments retrospectively
  - Sept 26 - Final opening stage for Indiana businesses
- 2021
  - May 17 - Indiana announced that the extended unemployment would end by June 19.
  - Jul 13 - Indiana was advised to continue benefits while the court considered the lawsuit against the state. The benefits continued until September 2021.

Appendix E Robustness checks

Tables E.1 and E.2 show the effect of LWA eligibility on exit rate out of unemployment using alternate ways to identify the LWA eligible and ineligible groups. Estimates in models 1-3 are based on observed UI payments and those in models 4-6 are based on estimated payments based on wage earnings in 2019. The effect on LWA eligibility on exit rate out of unemployment is robust to different definitions of treatment using observed payments. Although when using wage earnings in 2019, the magnitude of estimates is larger. Models 4-6 assume the base period used to calculate eligibility is Q1-Q4 of 2019, which may not be true.

Table E.1: Effect of LWA eligibility on exit rate out of unemployment - Around FPUC expiration

	post FPUC					
	(1)	(2)	(3)	(4)	(5)	(6)
eligibleLWA * post	-0.018***	-0.021***	-0.019***	-0.008***	-0.010***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Observations	1,085,757	984,701	944,848	1,446,198	976,144	760,509
R-sq	0.20	0.20	0.20	0.22	0.22	0.22

Estimates for coefficients of equation 1. All models include individual fixed effect, week fixed effect and controls for age, gender, race, ethnicity, industry, occupation, place of residence, and wage quartile.

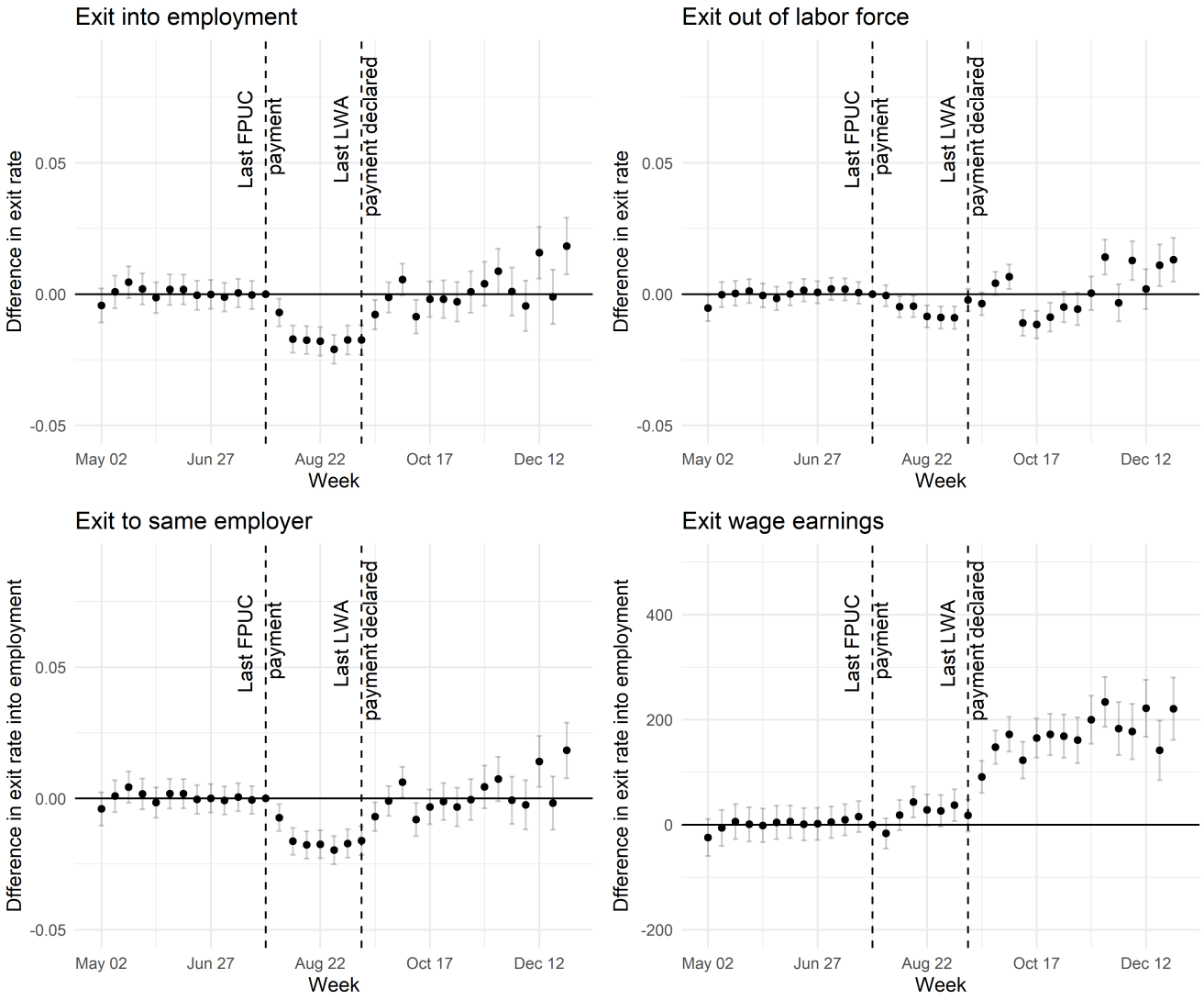
Table E.2: Effect of LWA eligibility on exit rate out of unemployment - Around LWA expiration

	post FPUC					
	(1)	(2)	(3)	(4)	(5)	(6)
eligibleLWA * post	0.011***	0.024***	0.022***	0.033***	0.053***	0.055***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	840,030	709,071	726,014	883,782	609,803	492,769
R-sq	0.22	0.21	0.21	0.22	0.22	0.22

Estimates for coefficients of equation 1. All models include individual fixed effect, week fixed effect and controls for age, gender, race, ethnicity, industry, occupation, place of residence, and wage quartile.

Appendix F Event-study plots

Figure F.1: Event-study plots



Estimates for β_t in equation 2.

Appendix G Heterogeneity

Table G.1 show the heterogeneity in response to FPUC and LWA expiration by gender and race. Each model uses a subset of data and the dependent variable turns one if worker exits unemployment and zero if stays unemployed. In model 1 the estimates indicate the difference in the probability of exiting unemployment after FPUC or LWA expiration for those *males* eligible for LWA as compared to those *males* ineligible for LWA, which seems the most obvious comparable group. Similar interpretations are in Table G.2. Interpretation of estimates in Table **??** is different. Here, the difference is in the outcome variable used in each model. In model 1, the estimates indicate the difference in probability of exiting unemployment to *same employer* after FPUC or LWA expiration for those eligible for LWA as compared to those ineligible for LWA.

Table G.1: Effect of FPUC and LWA expiration - Gender and Race

	post FPUC				post LWA			
	(1) Men	(2) Women	(3) White	(4) Black	(5) Men	(6) Women	(7) White	(8) Black
eligibleLWA * post	-0.015***	-0.019***	-0.023***	-0.007***	0.025***	0.033***	0.033***	0.022***
	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
eligible LWA	-0.008***	-0.012***	-0.011***	-0.010***	-0.023***	-0.026***	-0.029***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
post	0.068***	0.073***	0.081***	0.043***	0.071***	0.070***	0.071***	0.069***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	371,471	579,758	650,150	209,617	286,609	423,656	456,207	186,734
R-sq	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Estimates for coefficients of equation 1.

Table G.2: Effect of FPUC and LWA expiration - Age

	post FPUC			post LWA		
	(1) 16-24	(2) 25-54	(3) 55+	(4) 16-24	(5) 25-54	(6) 55+
eligibleLWA * post	-0.015***	-0.012***	-0.021***	0.023***	0.031***	0.027***
	(0.003)	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)
eligible LWA	-0.003	-0.013***	-0.015***	-0.020***	-0.025***	-0.032***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.003)
post	0.090***	0.064***	0.066***	0.065***	0.069***	0.084***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.003)
Observations	183,550	601,972	165,689	129,273	461,250	119,728
R-sq	0.03	0.02	0.02	0.01	0.02	0.03

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Estimates for coefficients of equation 1.