How much did Bonus Unemployment Insurance Payments During the COVID Pandemic Depress Aggregate Employment?

Did supplemental unemployment compensation discourage a return to full-time work?

Robert Winslow

Job Market Talk

Outline

Motivation

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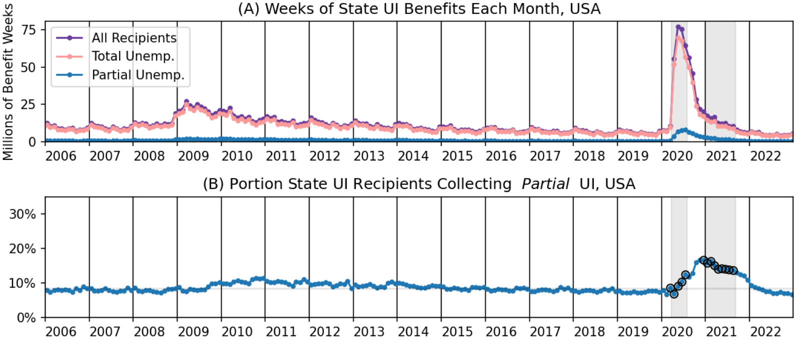
- During the Pandemic, large supplemental payments were given to anyone collecting even a dollar of Unemployment Insurance.
- These payments were made to the fully unemployed *and to those with reduced hours*.
- Other papers estimate these programs only slightly reduced the job finding rate.
- But what about the effect on the intensive margin? Did the program discourage workers from returning to *full-time* work?

Partial Unemployment Insurance in the US

Regular State UI Recipients Over Time, All US



Partial Unemployment Insurance

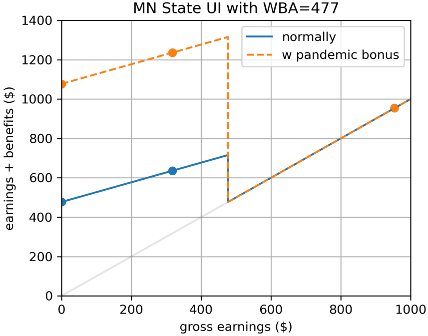
- If a person is eligible for UI, a weekly benefit amount (WBA) is determined based on employment history.
  - Except for high earners, it's about half of their typical income.
  - Constant throughout entire UI spell.
- Benefits depend both on the current week's gross earnings, and on the individual's WBA.
  - Your WBA is the amount you collect when totally unemployed.
  - As earnings increase, benefits decrease
  - Details vary by state.
- During the pandemic, the Federal Pandemic Unemployment Compensation supplement was paid out in full to anyone collecting even a single dollar of state UI.
  - 600 dollars per week April to July, 2020
  - 300 dollars per week January to September, 2021

Example: State UI Benefits in Minnesota

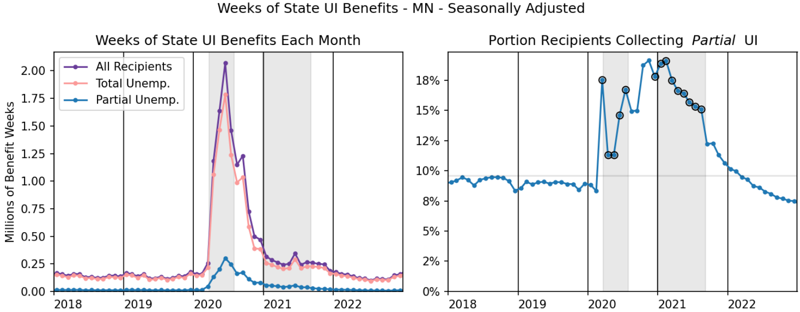
In Minnesota, the rule is that the benefits for a given week are determined by:

$$benefits = \begin{cases} WBA - \frac{earnings}{2} & \text{if } earnings < WBA \\ 0 & \text{if } earnings \geq WBA \end{cases}$$

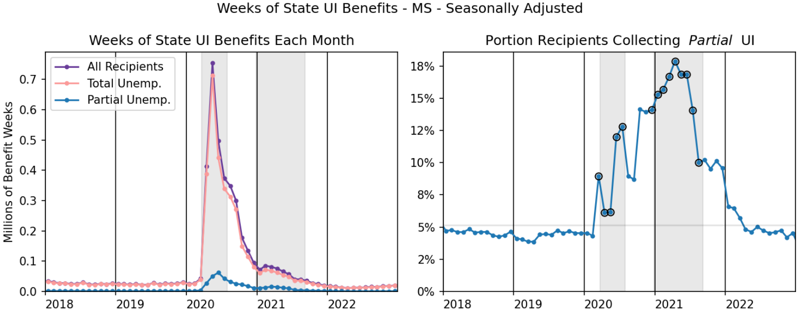
Figure on right: earnings and benefits for a hypothetical Minnesota worker with a WBA of 477 USD



Regular State UI Recipients Over Time, MN



Regular State UI Recipients Over Time, MS



Model

- Model of unemployment insurance with partial employment and moral hazard.
- Workers stochastically transition between three levels of employment opportunity.
  - Full Employment, Partial Employment, Unemployment
- Workers receive UI benefits when partially employed or unemployed.
- Workers can choose to work at a level below their employment opportunity, but only have a small chance of receiving UI benefits if they do so.

Consumer's Choices

The consumer's utility function is straightforward:

$$\mathbb{E}\sum_{j}\beta^{t}U(c_t, l_t) = \mathbb{E}\sum_{t}\beta^{t}\frac{(c_t^{1-\sigma}l_t^{\sigma})^{1-\rho}-1}{1-\rho}$$

Two decisions the consumer faces:

1. How to split income between consumption and (non-interest-bearing) savings
   - budget is $a' + c = a + y_d$, where a is assets, and y_d is disposable income.
   - assets are subject to the constraint $a' \geq 0$
2. Whether and how much to work when give a job opportunity.

Timeline Within Each Period

1. Consumer receives potential job offer $s \in \{E, P, U\}$
2. Consumer chooses employment status $\eta \in \{\mathrm{E}, \mathrm{P}, \mathrm{U}\}$
3. Determine whether Consumer gets UI benefits due to imperfect monitoring.
4. Consumer chooses a' after learning whether they receive benefits

Job Search

Employment opportunity $s \in \{E, P, U\}$ represents whether the person has a job opportunity ($s = E$), a partial job opportunity ($s = P$) or no job opportunity ($s = U$). (Employment, Partial employment, full Unemployment)

- s evolves according to a 3x3 transition matrix χ

$$\chi = \begin{bmatrix} \chi(E,E) & \chi(E,P) & \chi(E,U) \\ \chi(P,E) & \chi(P,P) & \chi(P,U) \\ \chi(U,E) & \chi(U,P) & \chi(U,U) \end{bmatrix}$$

Employment status $\eta \in \{\mathrm{E}, \mathrm{P}, \mathrm{U}\}$ represents the level of work the consumer actually chooses to engage in.

- If $s = E$, consumer can choose from $\eta \in \{\mathrm{E}, \mathrm{P}, \mathrm{U}\}$
- If $s = P$, consumer can choose from $\eta \in \{\mathrm{P}, \mathrm{U}\}$
- If $s = U$, consumer can choose from $\eta = \mathrm{U}$

Unemployment Benefit Eligibility

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- If the worker otherwise *chooses* to work reduced hours, then there is some probability π that they nonetheless collect benefits due to imperfect monitoring.
- Let $\mu \in \{0, 1\}$ be a binary variable indicating whether the person receives UI benefits.
  - If $s = E$, then $\mu = 0$
  - If $(s, \eta) = (P, \mathrm{P})$ or (U, U), then $\mu = 1$
  - If $\eta = \mathrm{U}$, but $s \neq U$, then $\mu = 1$ with probability π_u, 0 otherwise
  - If $\eta = \mathrm{P}$, but $s \neq P$, then $\mu = 1$ with probability π_p, otherwise

Unemployment Benefit Payments

- Two Components to UI benefits payments:
  - Income "Replacement rate", which depends on typical and current earnings.
    - θ_p is replacement rate for partially employed (when $(\eta, \mu) = (\mathsf{P}, 1)$)
    - θ_u is replacement rate for unemployed (when $(\eta, \mu) = (\mathsf{U}, 1)$)
  - Lump sum bonus, b, which is the same for all recipients.

Utility Flows, Income, and Leisure

Utility flow is $U\Big(a - a' + (1-\tau)y(\eta,\mu),\ l(\eta)\Big)$

where $(1-\tau)y(\eta,\mu)$ is the disposable income and $l(\eta)$ is the leisure that results from the worker's decisions.

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$$y(\eta,\mu) = \begin{cases} w & \text{if } (\eta,\mu) = (\mathrm{E},0) \\ w\frac{h_p}{h_e} & \text{if } (\eta,\mu) = (\mathrm{P},0) \\ 0 & \text{if } (\eta,\mu) = (\mathrm{U},0) \\ \left(w\frac{h_p}{h_e} + w\theta_p + b\right) & \text{if } (\eta,\mu) = (\mathrm{P},1) \\ (w\theta_u + b) & \text{if } (\eta,\mu) = (\mathrm{U},1) \end{cases}$$

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$$l(\eta) = \begin{cases} 1 - h_e & \text{if } \eta = \mathrm{E} \\ 1 - h_p & \text{if } \eta = \mathrm{P} \\ 1 & \text{if } \eta = \mathrm{U} \end{cases}$$

Fixed Skill Heterogeneity

- w, which represents a worker's skill level or income when employed full time, is fixed per person.
- Introduce income/skill heterogeneity with different 'types', indexed by i, and distinguished by w_i.

Value Functions

$$
\begin{aligned}
V_i(a,s) &= \max_{\eta} \left\{ \mathbb{E}\left[\max_{a'} \left\{ U\left((1-\tau)y_i(\eta,\mu) + a - a', l(\eta)\right) \right.\right.\right. \\
&\qquad \left.\left.\left. + \beta \sum_{s'} \chi(s,s') V_i(a',s') \right\} \right] \right\}
\end{aligned}
$$

s.t.

$$
\eta \in \begin{cases} \{E,P,U\} & \text{if } s = E \\ \{P,U\} & \text{if } s = P \\ \{U\} & \text{if } s = U \end{cases}
$$

$$
0 \leq a' \leq a + (1-\tau)y_i(\eta,\mu)
$$

Stationary Equilibrium

State of a person is $x = (a, s)$

Stationary equilibrium consists of :

- decision rules $c(y_d + a, s)$, $a'(y_d + a, s)$, $\eta'(a, s)$
- time-invariant measure $\lambda(x)$ of people in state x
- tax rate τ

Such that

1. Given the tax rate, the decision rules solve the worker's maximization problem.
2. The government's budget is balanced each period.
3. $\lambda(x') = \lambda(x)$

Parameterization: Transition Matrix χ

- Each period is 1 month.
- Transition matrix calculated from Current Population Survey data to match pre-pandemic economy:

$$\chi = \begin{bmatrix} \chi(E,E) & \chi(E,P) & \chi(E,U) \\ \chi(P,E) & \chi(P,P) & \chi(P,U) \\ \chi(U,E) & \chi(U,P) & \chi(U,U) \end{bmatrix} = \begin{bmatrix} 0.965 & 0.017 & 0.018 \\ 0.598 & 0.343 & 0.059 \\ 0.339 & 0.057 & 0.604 \end{bmatrix}$$

- This matrix gives a stationary distribution for E, P, and U of approximately $92.6\%, 2.8\%, 4.6\%$, which is close to the actual distribution of $92.6\%, 2.9\%, 4.5\%$

Parameterization: Working Time

- h_e is set to 0.45, representing a full work week of 45 hours out of possible 100.
- And time spent for part-time work is set to $h_p = 0.15$
- This means Part-time worker earns $1/3$ of typical income before UI benefits.

Parameterization: Skill Heterogeneity.

Quintile	1	2	3	4	5
Pre-pandemic Weekly Income	372	592	886	1280	2323
w_i	0.42	0.67	1	1.44	2.62

- Five types corresponding to income quintiles of for pre-pandemic weekly income.[1]
- Income scaled so that 886 corresponds to $w_3 = 1$

[1] From Table 1 of *US unemployment insurance replacement rates during the pandemic* (Ganong, Noel, and Vavra, 2020)

Other Parameters

- Utility parameters:
  - Discount Rate: $\beta = 0.9966$
  - Cobb-Douglass Exponent: $\sigma = 0.5$
  - Risk Aversion $\rho = 2$
- Replacement Rates:
  - $\theta_u = 1/2$
  - $\theta_p = 1/3$
- Lump sum UI bonus initially set to $b = 0$
- Chance that choice to work reduced hours is detected: calibrated for simulation to $\pi = 0.12$

Policy Experiments in the Model

- Compare stationary equilibria with different parameters.
- “Baseline” economy is stationary equilibrium with the parameters above.
- For “Unbalanced Budget” cases, some of the assumptions of the equilibrium are relaxed.

Effects of *Bonus* on Aggregates

	Tax Rate	Deficit	Cons. Equiv.	Full-Time	Part-Time	Unemployed
Pre-pandemic Baseline	3.35%	0	+0%	92.58%	2.8%	4.62%
Pandemic Bonus, Unbalanced Budget	3.35%	0.05	+5.8%	88.64%	6.74%	4.62%
Pandemic Bonus, Balanced Budget	7.61%	0	+1.5%	88.74%	6.63%	4.62%

Effects of *Higher Replacement Rate* on Aggregates

	Tax Rate	Deficit	Cons. Equiv.	Full-Time	Part-Time	Unemployed
Pre-pandemic Baseline	3.35%	0	+0%	92.58%	2.8%	4.62%
Higher RR, Unbalanced Budget	3.35%	0.02	+1.7%	92.58%	2.8%	4.62%
Higher RR, Balanced Budget	4.81%	0	+0.2%	92.58%	2.8%	4.62%

- Impose an elevated 70% replacement rate.

Effects of *Transfers* on Aggregates

	Tax Rate	Deficit	Cons. Equiv.	Full-Time	Part-Time	Unemployed
Pre-pandemic Baseline	3.35%	0	+0%	92.58%	2.8%	4.62%
Pandemic Bonus, Balanced Budget	7.61%	0	+1.5%	88.74%	6.63%	4.62%
Transfer to Everyone	7.4%	0	+1.8%	92.58%	2.8%	4.62%
Transfer to Bottom Two Quintiles	7.4%	0	+4.2%	92.58%	2.8%	4.62%

- Calculate the amount of increased spending in the case with a permanent 600 dollar bonus.
- Spend the same amount of money on a lump-sum bonus to everyone, regardless of employment status.
- Do the same, but transfer only to the bottom two quintiles.

Who Wins? Who Loses?

	% Consumption Equivalent to Welfare Change					
Quintile	1	2	3	4	5	all
Pre-pandemic Baseline	0	0	0	0	0	0
Pandemic Bonus, Unbalanced Budget	11.1	7.2	5.1	3.7	2.1	5.8
Pandemic Bonus, Balanced Budget	7.0	2.9	0.7	-0.8	-2.4	1.5
Higher RR, Unbalanced Budget	1.7	1.7	1.7	1.7	1.7	1.7
Higher RR, Balanced Budget	0.2	0.2	0.2	0.2	0.2	0.2
Transfer to Everyone	7.5	3.4	1.0	-0.6	-2.3	1.8
Transfer to Bottom Two Quintiles	21.0	13.2	-4.4	-4.4	-4.4	4.2

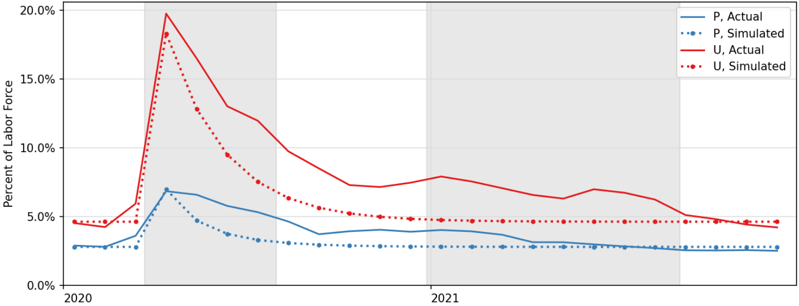
Simulation of Pandemic Timeline

- Start in pre-pandemic stationary equilibrium.
- Iterate measure month by month. 24 periods representing 2020 and 2021.
- Represent the direct effect of the pandemic as one time shock, where transition between months 3 and 4 is:

$$\chi_{shock} = \begin{bmatrix} 0.783 & 0.065 & 0.152 \\ 0.360 & 0.252 & 0.388 \\ 0.268 & 0.053 & 0.679 \end{bmatrix}$$

- Then transition process reverts to normal thereafter.
- Simulate lump sum UI bonus by updating b each period.
- Both the arrival and cessation of elevated benefits are unexpected.

Simulation without bonus UI payments



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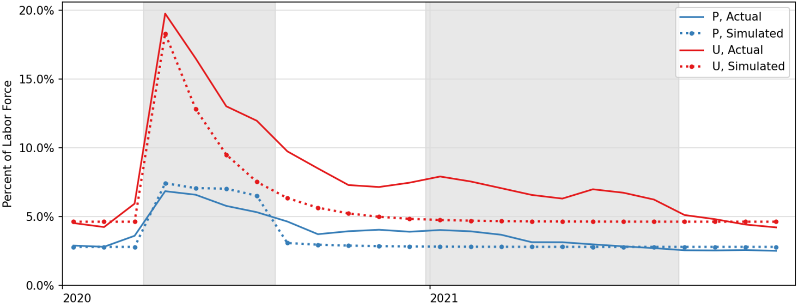

Key Takeaways:

- The relative spike in Partial Unemployment was large.
- But if people could freely respond, it should have been much larger.
  - Suggests that for the most part, workers were unable to freely maximize their income in this way.
- Nonetheless, alternate programs could have spent the money more effectively.

Appendix

Lit Review

- Similar models without partial employment:
  (Hansen and Imrohoroğlu, 1992)(Abdulkadiroğlu et al., 2002)
- UI Replacement rates were effectively above 100%:
  (Ganong et al., 2020)
- Effects of expanded UI on job finding rate were small:
  (Ganong et al., 2022)(Dube, 2021)(Coombs et al., 2022)