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?

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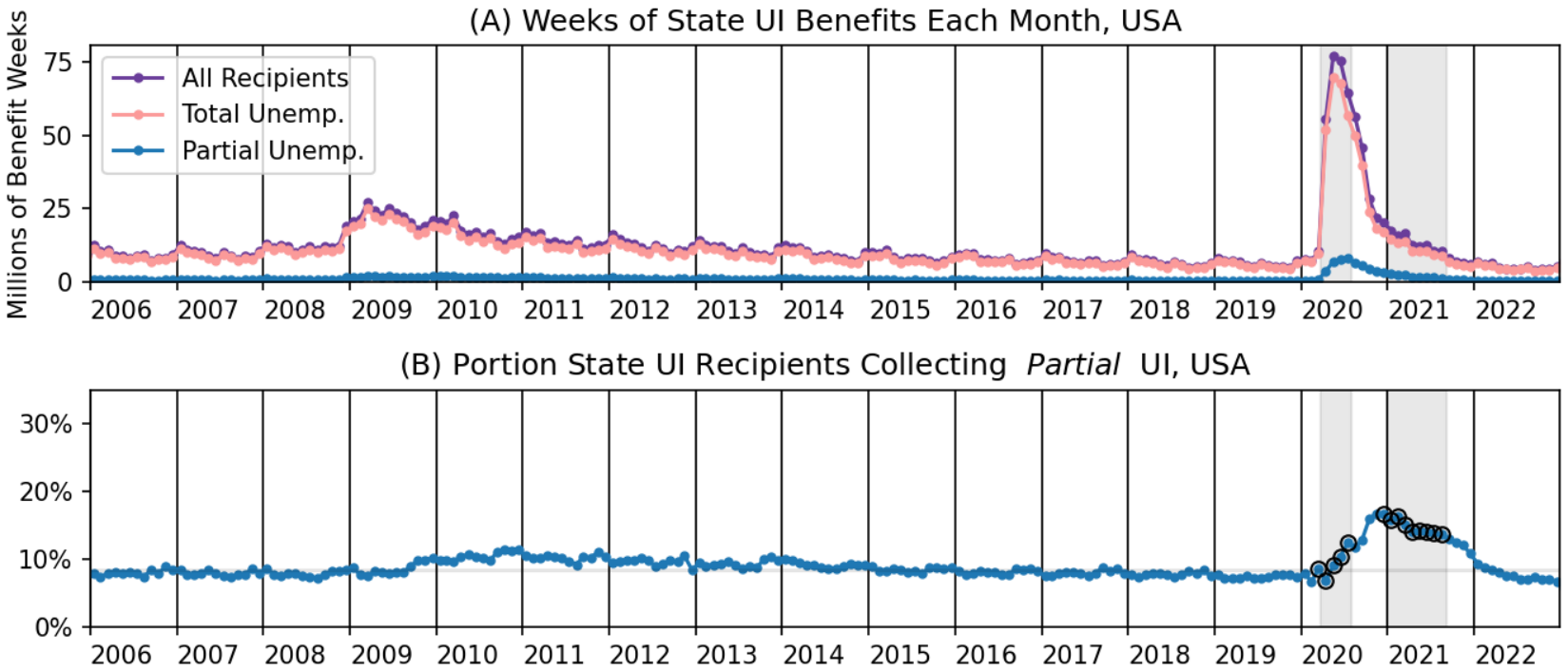
Outline

- 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?

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

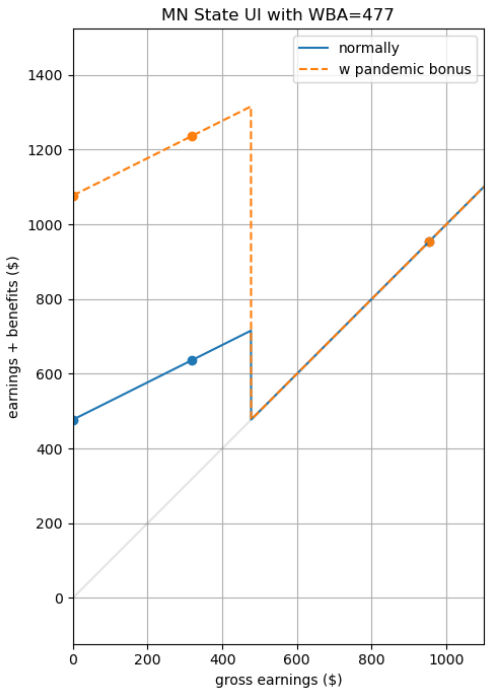
Example: State UI Benefits in Minnesota

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

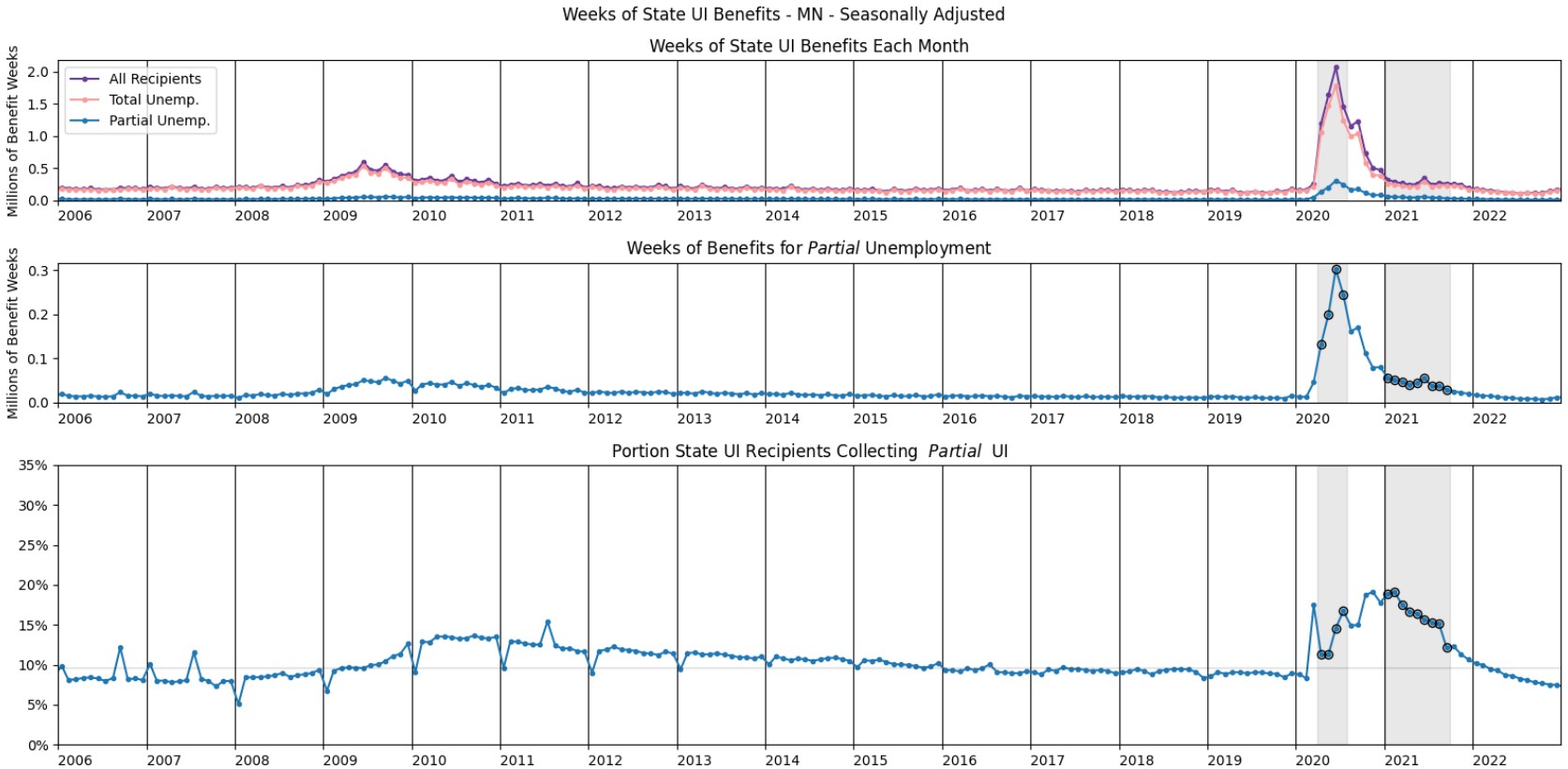
$$benefits = \begin{cases} WBA - \frac{earnings}{2} & \text{if } earnings < WBA \\ 0 & \text{if } earnings \geq WBA \end{cases}$$

where WBA is weekly benefit amount (person-specific, fixed for entire duration of benefits spell). Frame and the earnings refers to the current week's labor income before taxes and transfers.

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



Regular State UI Recipients Over Time, MN



- 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 optimand 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. (See next slide.)

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

Unemployment Benefits

- $\mu \in \{0, 1\}$ is a binary variable indicating whether the person collects unemployment 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
- If Consumer collects benefits, the benefits adjust their disposable income to some fraction of employed disposable income, called the "replacement rate".
  - θ_p is replacement rate for partially employed (when $(\eta, \mu) = (\mathrm{P}, 1)$)
  - θ_u is replacement rate for unemployed (when $(\eta, \mu) = (\mathrm{U}, 1)$)

Utility Flows, Income, and Leisure

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

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

$$y_d(\eta,\mu) = \begin{cases} (1-\tau)w & \text{if } (\eta,\mu) = (\mathrm{E},0) \\ (1-\tau)w\frac{\hat{h}_p}{\hat{h}_e} & \text{if } (\eta,\mu) = (\mathrm{P},0) \\ 0 & \text{if } (\eta,\mu) = (\mathrm{U},0) \\ (1-\tau)(w\theta_p + b) & \text{if } (\eta,\mu) = (\mathrm{P},1) \\ (1-\tau)(w\theta_u + b) & \text{if } (\eta,\mu) = (\mathrm{U},1) \end{cases}$$

$$l(\eta) = \begin{cases} 1-\hat{h}_e & \text{if } \eta = \mathrm{E} \\ 1-\hat{h}_p & \text{if } \eta = \mathrm{P} \\ 1 & \text{if } \eta = \mathrm{U} \end{cases}$$

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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. Draw $\mu \in \{0, 1\}$: does the Consumer get unemployment benefits?
4. Consumer chooses a' after seeing μ

Value Functions

$$V(a,s) = \max_{\eta} \left\{ \mathbb{E} \left[\max_{a'} \left\{ U\left(y^d(\eta,\mu) + a - a', l(\eta)\right) + \beta \sum_{s'} \chi(s,s') V(a',s') \right\} \right] \right\}$$

s.t.

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

$$0 \leq a' \leq a + y^d(\eta,\mu)$$

Market Clearing and Equilibrium

State of a person is $x = (a, s, \eta, \mu)$
Stationary equilibrium consists of

- decision rules $c(x)$, $a'(x)$, $\eta'(a, s)$
- 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 goods market clears.
3. The government's budget constraint is balanced each period.
4. $\lambda(x') = \lambda(x)$

Adding heterogeneity to the model.

In *US unemployment insurance replacement rates during the pandemic* (Ganong, Noel, and Vavra, 2020), the authors use CPS data to estimate the income distribution of workers benefitting from the Pandemic Unemployment Compensation.

Quintile	**1**	**2**	**3**	**4**	**5**
Pre-pandemic Weekly Income	372	592	886	1280	2323

From Table 1 from (Ganong, Noel, and Vavra, 2020)

Adding this to model:

- 5 'types' of people corresponding to these income quintiles.
- Income scaled so that 886 corresponds to $y = 1$

The 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 $92.6\%, 2.9\%, 4.5\%$

Working Time

- $\hat{h}_e$ 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 $\hat{h}_p = 0.15$

Other Parameters

- Utility parameters:
  - $\beta = 0.9966$
  - $\sigma = 0.5$
  - $\rho = 2$
- UI parameters:
  - $\theta_u = 0.5$
  - $\theta_p = 0.\bar{6}$
- π calibrated for simulation:
  - $\pi = 0.12$

Effects of *Bonus* on Aggregates

- Compare stationary equilibriums with different parameters.
- "Baseline" economy is stationary equilibrium with the parameters above.
- Compare to economy with the equivalent of a permanent 600 dollar UI bonus.
- For the "Unbalanced Budget" case, some of the assumptions of the equilibrium are relaxed.

	Tax Rate	Deficit	Cons. Equiv.	Full-Time	Part-Time	Unemployed
Pre-pandemic Baseline	3.35%	-0.0	+0.0%	92.58%	2.8%	4.62%
Pandemic Bonus, Unbalanced Budget	3.35%	0.052	+5.8%	88.91%	6.46%	4.62%
Pandemic Bonus, Balanced Budget	7.6%	-0.0	+1.5%	88.88%	6.49%	4.62%

Effects of *Higher Replacement Rate* on Aggregates

- Impose an elevated 70% replacement rate.

	Tax Rate	Deficit	Cons. Equiv.	Full-Time	Part-Time	Unemployed
Pre-pandemic Baseline	3.35%	0.0	+0.0%	92.58%	2.8%	4.62%
Higher RR, Unbalanced Budget	3.35%	0.018	+1.7%	92.58%	2.8%	4.62%
Higher RR, Balanced Budget	4.81%	-0.0	+0.2%	92.58%	2.8%	4.62%

Effects of *Transfers* on Aggregates

- 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.

	Tax Rate	Deficit	Cons. Equiv.	Full-Time	Part-Time	Unemployed
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Pandemic Bonus, Balanced Budget	7.6%	-0.0	+1.5%	88.88%	6.49%	4.62%
Transfer to Everyone	7.39%	-0.0	+1.8%	92.58%	2.8%	4.62%
Transfer to Bottom Two Quintiles	7.39%	0.0	+4.2%	92.58%	2.8%	4.62%

Consumption Equivalent of Each Quintile

	Consumption Equivalent to Welfare Change					
Quintile	1	2	3	4	5	all
Pre-pandemic Baseline	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
Pandemic Bonus, Unbalanced Budget	+10.9%	+7.2%	+5.1%	+3.7%	+2.1%	+5.8%
Pandemic Bonus, Balanced Budget	+6.9%	+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%

Average Asset Holdings of Each Quintile

	Average Asset Holdings					
Quintile	1	2	3	4	5	all
Pre-pandemic Baseline	0.223	0.363	0.539	0.785	1.422	0.666
Pandemic Bonus, Unbalanced Budget	0.378	0.431	0.265	0.124	0.014	0.242
Pandemic Bonus, Balanced Budget	0.369	0.416	0.254	0.118	0.015	0.234
Higher RR, Unbalanced Budget	0.01	0.019	0.026	0.042	0.076	0.034
Higher RR, Balanced Budget	0.01	0.019	0.023	0.042	0.072	0.033
Transfer to Everyone	0.158	0.286	0.451	0.688	1.3	0.577
Transfer to Bottom Two Quintiles	0.093	0.216	0.517	0.745	1.359	0.586

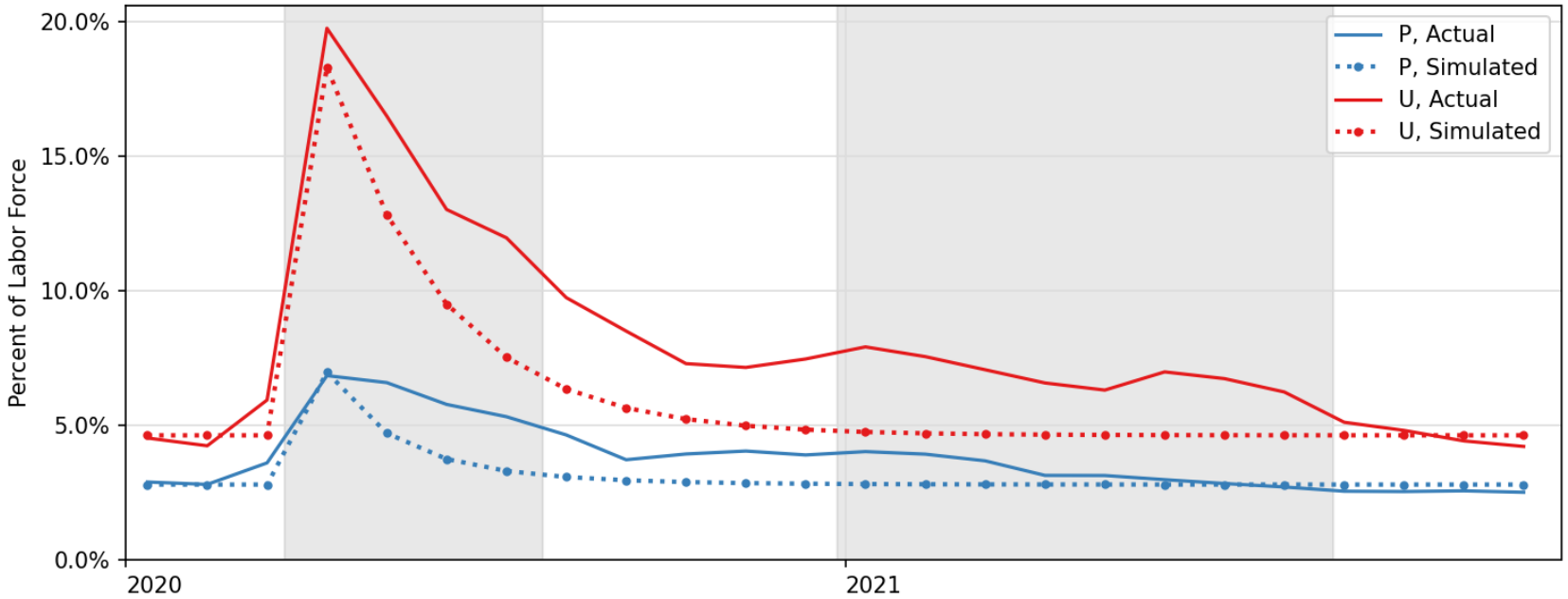
Simulation of Pandemic Timeline

- 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:

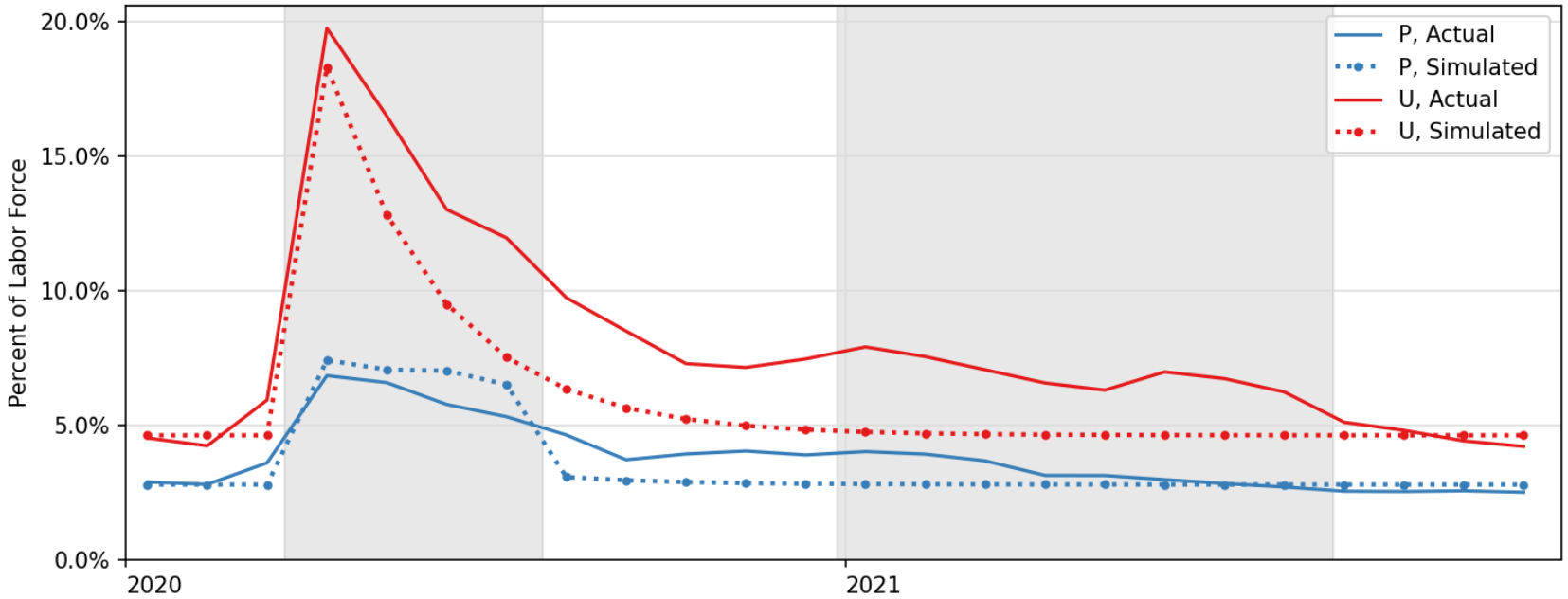
$$\chi_{shock} = \begin{bmatrix} 0.783 & 0.065 & 0.152 \\ 0.360 & 0.252 & 0.388 \\ 0.268 & 0.053 & 0.679 \end{bmatrix}$$

- 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



Simulation with bonus UI payments



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)