Assessing the welfare benefits of counter-cyclical unemployment insurance

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Roadmap

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Motivation

- During *each* recession in the U.S. over the last 40 years, the Congress has enacted additional extensions or supplements to the Unemployment Insurance (UI) program.
  - EUC 08: up to additional 53 weeks of benefits (min. $=$ 34 weeks)
  - CARES+: additional 53 weeks of benefits $+$ 300-600$ supplement per week

Motivation

- During *each* recession in the U.S. over the last 40 years, the Congress has enacted additional extensions or supplements to the Unemployment Insurance (UI) program.
  - EUC 08: up to additional 53 weeks of benefits (min. = 34 weeks)
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- Economists have recommended an automatic UI rule that links the generosity of UI to economic conditions (Chodorow-Reich, Ganong, and Gruber 2022)

- What's (if any) the welfare gain from automatic UI rule?

UI system in the United States

- UI $\equiv$ weekly payments to (eligible) unemployed workers for a limited duration
  - Replaces a fraction of previous earnings (with cap)
  - Two tiers: Regular benefits and Extended benefits (EB)

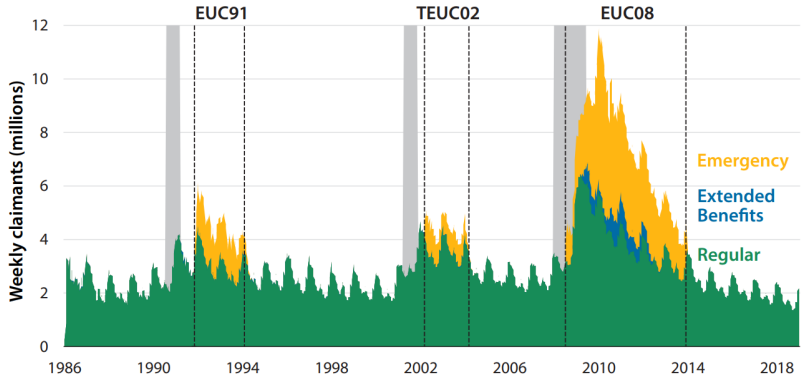
- **Regular benefits:** administrated by states, financed by payroll tax on employers
  - Maximum duration and replacement rate vary by state
  - Median duration is 26 weeks and average replacement rate is 45% (in 2018).

- **Extended benefits:** federal law, 50% financed by the federal government
  - Triggered when insured or total unemployment rate in a state exceeds legislated thresholds
  - Provide additional 13 or 20 weeks of benefits

UI system in the United States

FIGURE 2.

Number of UI Recipients, 1986–2018



Source. Chodorow-Reich and Coglianese (2019)

Literature

- **Public finance.** Abstract from aggregate uncertainty and GE. Focus on the classic dynamic contract problem in a principle-agent setting.
  - Bailey (1978), Chetty (2006), Hopenhayn and Nicolini (1997), Shimer and Werning (2008)...

- **Macro stabilization.** Focus on representative agent or zero-liquidity equilibrium
  - Mitman and Rabinovich (2015): RBC + SAM & no saving $\Rightarrow$ procyclical UI benefits
  - Mckay and Reis (2021): HANK & zero-liquidity & constant replacement rate $\Rightarrow$ presence of aggregate uncertainty implies higher replacement rate
  - Kekre (2023): HANK & realistic UI $\Rightarrow$ UI extension during GR lowers u by 0.4 pp

This paper

- Study the welfare effects of automatic UI rule in a quantitative Heterogeneous Agent New Keynesian (HANK) model
  - Who gains and who loses?
  - What's the role of UI policy if other stabilization policies prevail?
  - Does anticipation of UI extension matter? (Not today)

This paper

- Study the welfare effects of automatic UI rule in a quantitative Heterogeneous Agent New Keynesian (HANK) model
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- **Preview of results:** automatic UI rule that replicates the 2002 and 2008 UI extension leads to mild increases in average welfare
  - Large gain for unemployed, low-wage, and poor households
  - Welfare effect depends critically on monetary policy

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Overview

- HANK + Search and Matching + Endogenous search intensity
- Idiosyncratic labor productivity shock + endogenous (un)employment risk
  - Heterogeneous separation rate and search efficiency
  - Heterogeneous exposure to aggregate risk
- UI policy: constant replacement rate (with cap) + stochastic expiration (Mitman and Rabinovich 2015)
- Perfect foresight transition: 1st order approximation to RE equilibrium.

Timeline

1. At the beginning of the period, all shocks realize
   - productivity, UI expiration, aggregate shocks
2. Unemployed workers choose search effort which affects their job-finding rate.
3. After job search, workers make consumption and saving decision.
4. At the end of the period, a fraction of the employed workers is separated from their job.

Worker

Workers unemployed at the beginning of time t:

$$W_t^U(a,z,e) = \max_q \Big\{ -\varphi \frac{q^{1+\nu}}{1+\nu} + q\zeta_t(z) M_t V_t^E(a,z) + (1 - q\zeta_t(z) M_t) V_t^U(a,z,e) \Big\}$$

- a is net worth, z is productivity, and e is UI eligibility

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- $\zeta(z)$ is individual search efficiency which is productivity (z) dependent.

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- a is net worth, z is productivity, and e is UI eligibility
- q is individual search effort
- $\zeta(z)$ is individual search efficiency which is productivity (z) dependent.
- M_t is aggregate search efficiency
- V_t^E (V_t^U) is the value of being employed (unemployed) after search

Worker

Workers unemployed after search at time t:

$$V_t^U(a,z,e) = \max_{c,\,a'} \frac{c^{1-\sigma}}{1-\sigma} + \beta\left[(1-\gamma_t(e))\mathbb{E}_t W_{t+1}^U(a',z',e) + \gamma_t(e)\mathbb{E}_t W_{t+1}^U(a',z',1-e)\right]$$

$$\begin{aligned} s.t. \quad c + a' &= y_t^U(z,e) - \mathcal{T}_t(y_t^U(z,e)) + \frac{R_{t-1}^n}{\Pi_t} a \\ \log z' &= \mu^U + \rho_z \log z + \sigma_z \epsilon, \quad \epsilon \sim N(0,1) \\ a' &\geq \underline{a} \end{aligned}$$

- $\gamma_t(e) := \mathbf{1}\{e=1\} \cdot \gamma_t$ is the probability of UI expiration

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- $\mathcal{T}_t(y) := y - (1-\tau_t)y^{1-\xi}$ is HSV tax system.

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- $\mathcal{T}_t(y) := y - (1-\tau_t)y^{1-\xi}$ is HSV tax system.
- Mean growth rate of skill is state-dependent

Worker

Income during unemployment:

$$y_t^U(z,e) = \begin{cases} (1-\iota)\underbrace{\min(\lambda_t w_t z, \overline{ui})}_{\text{UI}} + \iota w_t z & \text{if } e = 1 \\ \iota w_t z & \text{if } e = 0 \end{cases}$$

- λ_t is UI replacement rate
- $\overline{ui}$ is maximum UI benefit
- $\iota w_t z$ captures other income during unemployment (e.g. spousal insurance, home production)
  - Modeled as transfer from the government

Worker

Workers employed at time t:

$$
\begin{aligned}
V_t^E(a,z) = \max_{c,\,a'} \; & \frac{c^{1-\sigma}}{1-\sigma} + \beta\big[(1-\delta_t(z))\mathbb{E}_t V_{t+1}^E(a',z') + \delta_t(z)\mathbb{E}_t W_{t+1}^U(a',z',1)\big] \\
s.t. \quad & c + a' = y_t^E(z) - \mathcal{T}_t(y_t^E(z)) + \frac{R_{t-1}^n}{\Pi_t} a \\
& y_t^E(z) = w_t z \\
& \log z' = \mu^E + \rho_z \log z + \sigma_z \epsilon, \quad \epsilon \sim N(0,1) \\
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\end{aligned}
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- $\delta_t(z)$ is separation rate

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$$

- $\delta_t(z)$ is separation rate
- Assume full UI take-up

Production

- There is a continuum of **intermediate goods firms** operating in a monopolistically competitive market, selling its goods to a representative **final goods firm**.
  - Standard Dixit-Stigiliz CES aggregation

- Intermediate goods firms rent labor service from the **HR firms** to produce goods using a CRS technology.

- Nominal rigidity: intermediate goods firms face quadratic price adjustment cost (Rotemberg 1982)

- Assume that the firms are owned by a foreigner outside the economy
  - Parsimonious way to avoid the counterfactual dividend problem

Production firm

Intermediate goods firm:

$$\max_{p_i, y_i} \ \mathbb{E}_t \sum_{k=0}^{\infty} \frac{\Pi_{t+k+1}}{R^n_{t+k}} \left(\frac{p_{it+k}}{P_{t+k}} y_{it+k} - \frac{\epsilon - 1}{\epsilon} p^N_{t+k} n_{it+k} - \frac{\epsilon - 1}{2\kappa_p} \left(\log \frac{p_{it+k}}{p_{it+k-1}} \right)^2 Y_{t+k} \right)$$

$$s.t. \quad y_{it} = \left(\frac{p_{it}}{P_t} \right)^{-\epsilon} Y_t$$

$$y_{it} = A_t n_{it}$$

NKPC

$$\log \Pi_t = \kappa_p \left(\frac{p^N_t}{A_t} - 1 \right) + \frac{\Pi_{t+1}}{R^n_t} \frac{Y_{t+1}}{Y_t} \log \Pi_{t+1}$$

HR firm

- There is a continuum of HR firms operating in a *competitive* market.
- Each HR firm has one job position which can be filled by posting a vacancy at real cost κ, taking as given the vacancy filling rate f_t.
- Real wage is determined by a wage rule every period. The HR firm sells the labor service of the worker to the intermediate goods firms at (relative) price p_t^N.

HR firm

Job surplus to HR firm:

$$J_t(z) = (p_t^N - w_t)z + (1 - \delta_t(z))\frac{\Pi_{t+1}}{R_t^n}\int J_{t+1}(z')Q^E(z, z')\,dz'$$

Free entry condition:

$$\kappa = f_t \int J_t(z)\,\bar{F}_t^{Wq}(z)\,dz$$

where $\bar{F}_t^{Wq}(z) =$ probability of matching with a type-z worker

Real wage rule:

$$w_t = w_{ss}\left(\frac{p_t^N}{p_{ss}^N}\right)^{\xi_w}$$

Government

Monetary policy:

$$\frac{R_t^n}{R_{ss}} = \Pi_t^{\phi_\pi} \left(\frac{Y_t}{Y_{ss}} \right)^{\phi_y}$$

Fiscal rule:

$$B_t - \bar{B} = \rho_B (B_{t-1} - \bar{B} + UI_t - UI_{ss} + G_t - G_{ss})$$

Government budget constraint:

$$B_t + \mathcal{T}_t = \frac{R_{t-1}^n}{\Pi_t} B_{t-1} + Y_t^U + G_t$$

Aggregate equations

Matching function (Den Haan, Ramey, and Watson 2000)

$$Q_t M_t = \frac{Q_t V_t}{[Q_t^\alpha + V_t^\alpha]^{1/\alpha}}, \quad Q_t := \iiint q_t(a,z,e) F_t^W(a,z,e)\, da\, dz\, de$$

Vacancy filling rate

$$f_t = \frac{Q_t M_t}{V_t} = (1 - M_t^\alpha)^{1/\alpha}$$

Market clearing

$$Y_t - \kappa V_t - \frac{\epsilon}{2\kappa_p}(\log \Pi_t)^2 Y_t = C_t + G_t + D_t$$

Equilibrium

A **perfect foresight equilibrium** consists of path of individual decision rules $\{c_t, a_t, q_t\}$, prices $\{w_t, p_t^N\}$, labor market variable $\{J_t, M_t, V_t, Q_t\}$, real output Y_t, inflation rate Π_t, nominal rate R_t^n, fiscal policy $\{\tau_t, B_t, G_t\}$, and worker distribution $\{F_t^W, F_t^{E0}, F_t^E, F_t^U\}$ such that

1. Given aggregate variables, individual and firm optimizes
2. Monetary and fiscal policy follow their rule
3. Worker distribution satisfies the aggregate consistency condition
4. All markets clear

Main mechanisms of the model

- Unobservable endogenous search effort leads to moral hazard
  - More generous UI discourages search
  - Lower match efficiency $\Rightarrow$ inflationary pressure

- Uninsurable unemployment risk induces extra precautionary saving motive
  - Countercyclical income risk is a powerful amplification mechanism (Ravn and Sterk 2021)
  - UI can dampen this channel

Endogenous search effort

- FOC of search effort:

$$\log q_t(a,z,e) = \frac{1}{\nu}(\log \zeta_t(z) + \log M_t + \log \Delta_t(a,z,e))$$

  where $\Delta_t := V_t^E - V_t^U$.

- Search effort responds to:
  - Tightness of the labor market M_t
  - Benefits of employment $\Delta_t(a,z,e)$

- UI discourages search effort by lowering the benefits of employment (i.e. wealth effect).

Search effort and inflationary pressure

- To gain intuition, assume full separation $\delta = 1$ and homogeneous search effort.

- Log-linearize the system and we can write the NKPC as

$$\tilde{\pi}_t = \kappa_p \Gamma (\tilde{y}_t - \tilde{q}_t) + \beta \tilde{\pi}_{t+1}$$

  where $\Gamma := \left[\left(\frac{1-M^\alpha}{M^\alpha} - \frac{J}{1-J} \right) \frac{1-\xi_w w}{1-w} \right]^{-1}$, $\tilde{y}_t$ denotes log deviation of GDP, and $\tilde{q}_t$ denotes log deviation of aggregate search effort.

- More generous UI $\Rightarrow$ lower $\tilde{q}_t$ $\Rightarrow$ inflationary pressure

Unemployment risk wedge

- Euler equation for employed and UI eligible:

$$
\begin{aligned}
U'(c_t^u) &= \beta \mathbb{E}_t R_{t+1} \Big\{ (1-\gamma_t)[q_{t+1} M_{t+1} U'(c_{t+1}^e) + (1 - q_{t+1} M_{t+1}) U'(c_{t+1}^u)] \\
&\qquad + \gamma_t [\tilde{q}_{t+1} M_{t+1} U'(c_{t+1}^e) + (1 - \tilde{q}_{t+1} M_{t+1}) U'(c_{t+1}^i)] \Big\} + \chi_t^u \\
U'(c_t^e) &= \beta \mathbb{E}_t R_{t+1} \Big\{ (1-\delta_t) U'(c_{t+1}^e) + \delta_t [q_{t+1} M_{t+1} U'(c_{t+1}^e) + (1 - q_{t+1} M_{t+1}) U'(c_{t+1}^u)] \Big\} + \chi_t^e \\
&= \beta \mathbb{E}_t R_{t+1} \cdot \left(1 + \tau_{t+1}^e\right) \cdot U'(c_{t+1}^e) + \chi_t^e
\end{aligned}
$$

where

$$
\tau_{t+1}^e := \delta_t (1 - q_{t+1} M_{t+1}) \left(\frac{U'(c_{t+1}^u)}{U'(c_{t+1}^e)} - 1 \right) > 0
$$

- More generous UI $\Rightarrow$ higher c_{t+1}^u $\Rightarrow$ lower τ_{t+1}^e $\Rightarrow$ higher c_{t+1}^e

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Quantifying the model

- One period is a month

- Want the model to match:
  1. Disincentive effect of UI (Schmieder and von Wachter 2016)
  2. Consumption drop upon unemployment (Ganong and Noel 2019)
  3. Heterogeneous labor transition rates (CPS)
  4. Wealth distribution (SCF)
  5. MPC (Kekre 2023)

- Following Carroll et al. (2017), introduce discount rate heterogeneity
  - Two types with *equal* share: $\{\beta^L, \beta^H\}$

Assigned parameters

Parameter	Interpretation	Value	Source/Target
σ	Relative risk aversion	1	Standard
R	Real rate (annualized)	2%	Standard
ξ_w	Wage elasticity	0.45	Graves (2023)
f	SS vacancy-filling rate	0.7	Hagedorn and Manovskii (2008)
κ_p	Slope of NKPC	0.014	Standard
ϕ_π	Taylor rule coefficient	1.5	Standard
ϕ_y	Taylor rule coefficient	0.05	Standard
λ	SS replacement rate	0.5	BLS
$\overline{ui}$	Maximum UI benefit	$0.67w_{ss}$	BLS
γ	SS UI expiration rate	0.167	UI duration $=$ 26 weeks
ξ	Progressivity of labor tax	0.181	HSV (2017)
G_{ss}/Y_{ss}	Spending-to-GDP ratio	0.2	Mckay and Reis (2021)
ρ_b	Fiscal rule	0	Baseline

Calibrated parameters

Parameter	Interpretation	Value	Moment	Data	Model
β^L	Discount rate (low-type)	0.9930	Median liquid wealth/Avg. labor income	0.291	0.322
β^H	Discount rate (high-type)	0.9972	Mean liquid wealth/Avg. labor income	9.961	10.11
$\underline{a}$	Borrowing limit	0.195	%(liquid wealth ≤ 0)	0.272	0.275
ι	Transfer income	0.33	Consumption drop upon E-U	-8%	-7.91%
φ	Search disutility (level)	7.35	Unemployment rate	6%	6%
ν	Search disutility (curvature)	0.10	Elasticity of unemployment duration to UI duration	.15	.127
α	Matching technology	2.02	Elasticity of M to tightness	0.5	0.5
κ	Vacancy posting cost	0.165	Fraction of monthly wages to vacancy posting	15%	15.03%

NOTE. Wealth moments based on SCF 1989-2019.

Productivity process

Follow Kehoe, Midrigan, and Pastorino (2019) to assume an AR(1) process with state-dependent mean:

$$\log z' = \mu^S + \rho_z \log z + \sigma_z \epsilon, \quad \epsilon \sim N(0,1) \quad \forall S \in \{E, U\}$$

Normalize $\mu^E \equiv 0$. Use estimation result from Braxton, Herkenhoff, Rothbaum, and Schmidt (2021).

Parameter	Interpretation	Value	Source/Target
$\mu^U - \mu^E$	Persistent earnings loss	-0.0126	BHRS (2021)
ρ_z	Persistence of productivity	0.9949	BHRS (2021)
σ_z	Std. of productivity shock	0.0588	CX std. of log wage = .582

Labor transition heterogeneity

Propose the following functional form

$$\log \delta_t(z) = \log \bar{\delta}_t + \delta_z \log z + \delta_y \log \frac{Y_t}{Y_{ss}} + \delta_{zy} \left(\log z \times \log \frac{Y_t}{Y_{ss}} \right)$$

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- δ_z, ζ_z: permanent heterogeneity

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- δ_z, ζ_z: permanent heterogeneity
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- δ_z, ζ_z: permanent heterogeneity
- δ_y, ζ_y: business-cycle
- δ_{zy}, ζ_{zy}: heterogeneous exposure to business-cycle

Labor transition heterogeneity – estimation

Estimate the parameters on CPS longitudinal data (1982-2019):

$$\log x_{it} = \beta_0^x + \beta_z^x \log w_{it} + \beta_y^x \tilde{y}_t + \beta_{zy}^x \log w_{it} \times \tilde{y}_t + \alpha t + \varepsilon_{it}$$

where x_{it} is labor transition rate, w_{it} is (de-meaned) real hourly wage, $\tilde{y}_t$ is HP-filtered log real GDP, and t is linear trend. Bin the individuals into ten decile groups based on wages. Details

Labor transition heterogeneity – estimation

Estimate the parameters on CPS longitudinal data (1982-2019):

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where x_{it} is labor transition rate, w_{it} is (de-meaned) real hourly wage, $\tilde{y}_t$ is HP-filtered log real GDP, and t is linear trend. Bin the individuals into ten decile groups based on wages. Details

	β_z	β_y	β_{zy}	R^2
EU	-.675	-3.72	-2.34	0.73
	(.012)	(.561)	(1.20)	
UE	-.080	9.477	-1.98	0.12
	(.019)	(.749)	(1.70)	

- High-wage workers' separation risk is more cyclical (Mueller 2017)

Wealth distribution

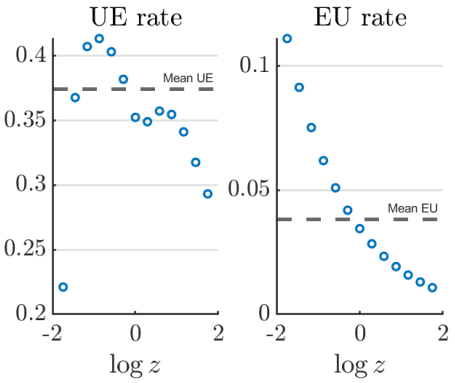
Moment	Data	Model
Wealth share by quintile (%)		
Q1	-2.16	-0.20
Q2	0.05	0.037
Q3	0.73	0.74
Q4	3.90	7.68
Q5	97.48	91.75

NOTE. Data moments based on SCF 1989-2019.

	All	Employed	UI eligible	UI ineligible
MPC	0.090	0.076	0.300	0.500

- Avg. consumption drop upon UI expiration: -15.11%
  - Ganong and Noel (2019): -12%
- MPC of unemployed is higher

Labor transition in the SS



Unemployment duration	≤ 1 month	$2-5$ months	≥ 6 months
Fraction of unemployed	0.393	0.527	0.080
Data (1982-2019)	0.353	0.438	0.209

- UE rate slightly decreasing
  - Wealth effect vs. substitution effect
- Not enough long-term unemployed
  - Need duration-dependent UE rate

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Experiment

- Consider a monetary policy shock of -1 pp. (annualized) with persistence 0.9

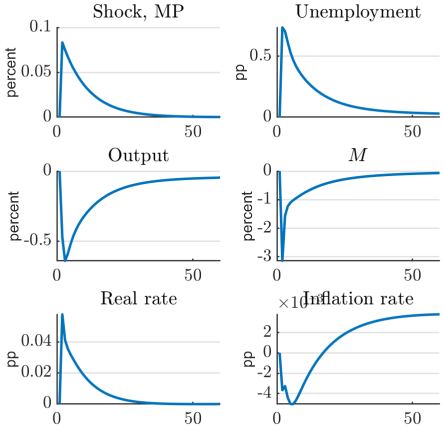
- Evaluate welfare under two cases:
  1. No UI response
  2. Automatic UI extension rule:

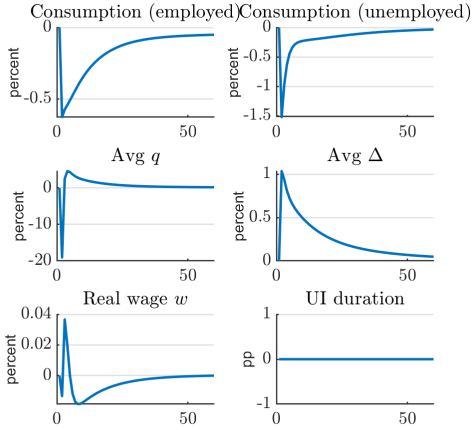
$$\log \gamma_t = \phi^{ui} \log \left(\frac{U_{t-1}}{U_{ss}} \right)$$

  Estimate the rule in the data $\Rightarrow \phi^{ui} = -2.05$ $(R^2 = 0.84)$ Details

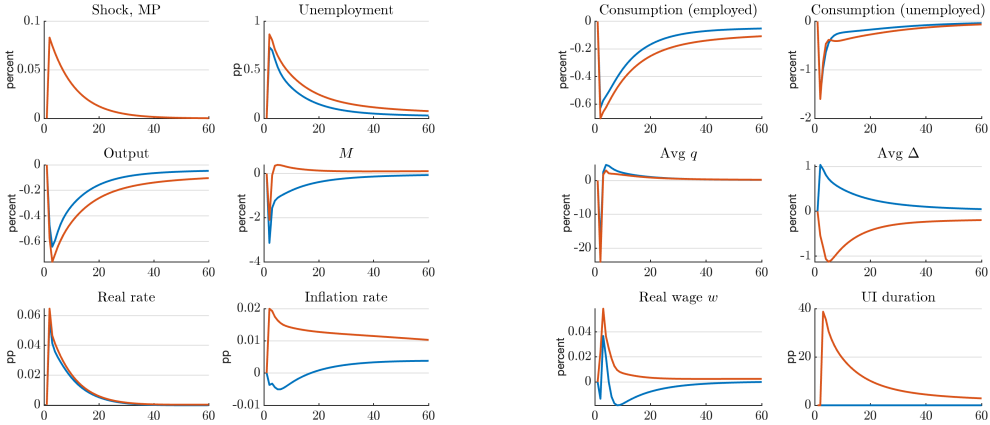
- Taylor rule $(\phi_\pi = 1.5, \phi_y = 0.05)$ and no deficit $(\rho_B = 0)$

IRF – baseline





IRF – UI rule



- Blue line is without UI, orange line is with automatic UI extension

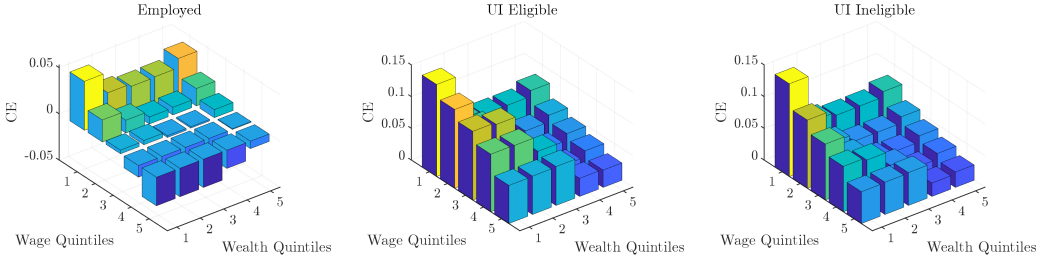
Consumption-equivalent welfare change

Group	No rule	UI rule
All		
Population	-0.15%	-0.14%
Employed	-0.14%	-0.14%
Unemployed	-0.24%	-0.15%
UI eligible	-0.24%	-0.14%
UI ineligible	-0.27%	-0.19%
Below median wealth-to-income		
Employed	-0.20%	-0.18%
Unemployed	-0.31%	-0.19%
UI eligible	-0.30%	-0.18%
UI ineligible	-0.37%	-0.26%

NOTE. CE-equivalent welfare compared to SS

- Overall, 52% of households gain from the UI rule
  - 51.5% of them are borrowing
- Avg. welfare of the employed roughly the same
  - Mask within-group dispersion

Within-group dispersion of welfare effects



- Low-wage, low-wealth households gains the most
- High-wealth households also gain because of higher real rate

Decomposing the channels

	UI	Real rate	Job-finding (M)	Tax	Wage	Separation	All
Population	0.0117	0.0021	0.0623	-0.0324	0.0026	-0.0345	0.0114
Employed	0.0105	0.0021	0.0555	-0.0323	0.0026	-0.0345	0.0035
Unemployed	0.0241	0.0017	0.1306	-0.0332	0.0026	-0.0342	0.0905
UI eligible	0.0259	0.0016	0.1304	-0.0333	0.0026	-0.0342	0.0916
UI ineligible	0.0146	0.0026	0.1320	-0.0328	0.0026	-0.0340	0.0844

- Each column is the CE welfare *change* (%) when only one "price" changes, holding other "prices" fixed at the No-UI value.

Other groups

Decomposing the channels

	UI	Real rate	Job-finding (M)	Tax	Wage	Separation	All
Population	0.0117	0.0021	0.0623	-0.0324	0.0026	-0.0345	0.0114
Employed	0.0105	0.0021	0.0555	-0.0323	0.0026	-0.0345	0.0035
Unemployed	0.0241	0.0017	0.1306	-0.0332	0.0026	-0.0342	0.0905
UI eligible	0.0259	0.0016	0.1304	-0.0333	0.0026	-0.0342	0.0916
UI ineligible	0.0146	0.0026	0.1320	-0.0328	0.0026	-0.0340	0.0844

- Each column is the CE welfare *change* (%) when only one "price" changes, holding other "prices" fixed at the No-UI value.
- Effect of UI net of fiscal cost is negative

Other groups

Decomposing the channels

	UI	Real rate	Job-finding (M)	Tax	Wage	Separation	All
Population	0.0117	0.0021	0.0623	-0.0324	0.0026	-0.0345	0.0114
Employed	0.0105	0.0021	0.0555	-0.0323	0.0026	-0.0345	0.0035
Unemployed	0.0241	0.0017	0.1306	-0.0332	0.0026	-0.0342	0.0905
UI eligible	0.0259	0.0016	0.1304	-0.0333	0.0026	-0.0342	0.0916
UI ineligible	0.0146	0.0026	0.1320	-0.0328	0.0026	-0.0340	0.0844

- Each column is the CE welfare *change* (%) when only one "price" changes, holding other "prices" fixed at the No-UI value.
- Effect of UI net of fiscal cost is negative
- Most gains come from higher job-finding rate
  - Lower $q \Rightarrow$ higher M if consumption does not drop enough

Other groups

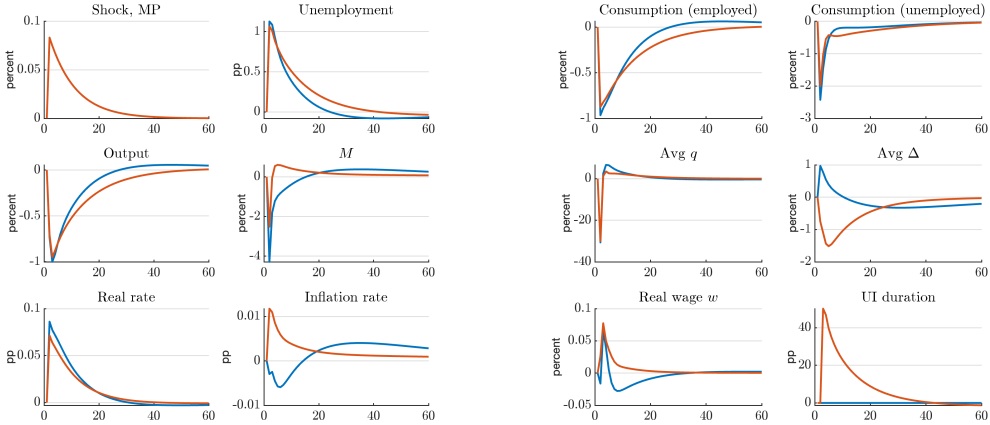
Role of monetary policy

With regard to the employment side of our mandate, our revised statement emphasizes that maximum employment is a broad-based and inclusive goal. This change reflects our appreciation for the benefits of a strong labor market, particularly for many in low- and moderate-income communities.

— Jerome Powell, 2020 Jackson Hole Economic Policy Symposium

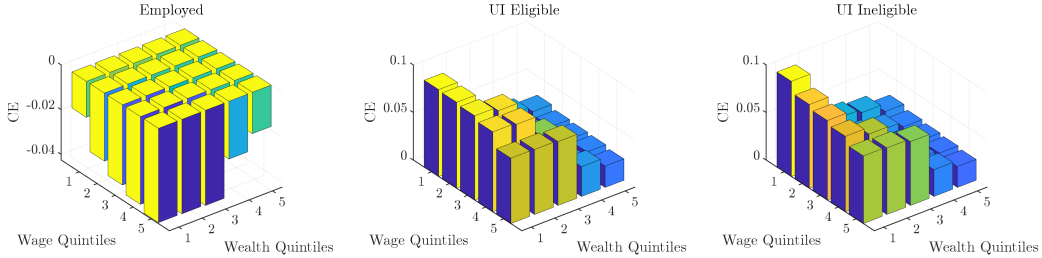
- Given the automatic UI rule, how should monetary policy be conducted to achieve broad-based welfare gain?
- **Exercise.** Compare welfare under *inactive* MP and *accommodative* MP.

IRF – Inactive MP



- Inactive MP: $\phi_y = \phi_\pi = 0$

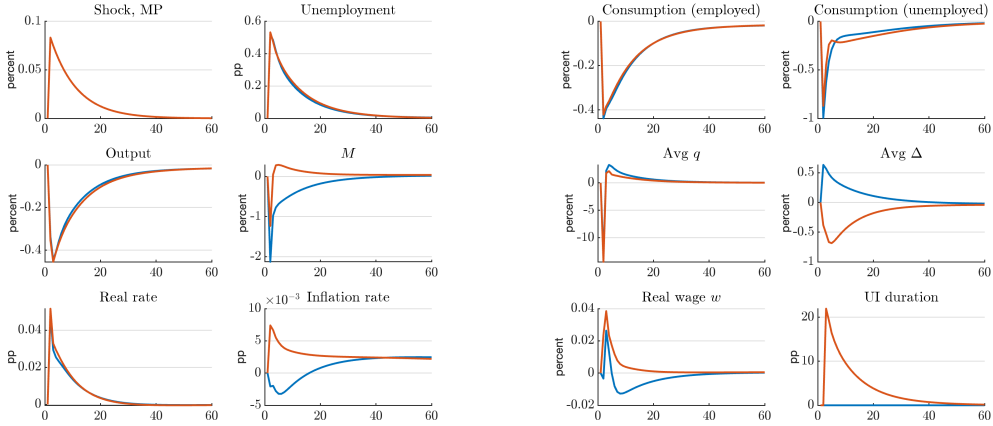
Welfare effects – Inactive MP



- Average welfare decreases, only 10% of households gain from the rule.
- Pure redistribution from employed to unemployed
  - Also, from high wage to low wage

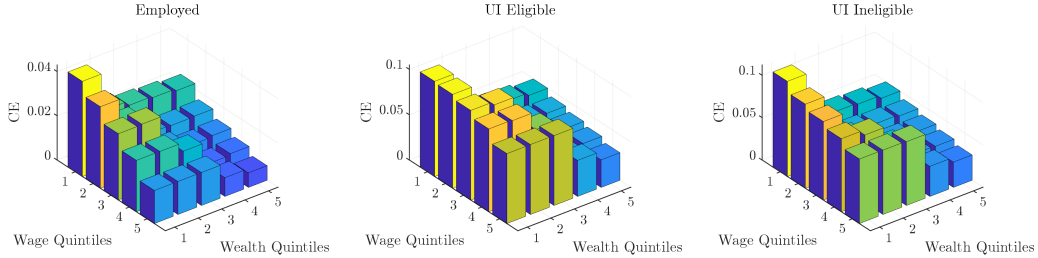
Decomposition

IRF – Accomodative MP



- Accommodative MP: $\phi_y = 0.1$

Welfare effects – Accommodative MP



- Everyone gains!
- MP accommodates the destabilization effect of UI extension, reaping the benefits from insurance.

Decomposition

Roadmap

Introduction

Model

Quantification

Transition dynamics

Conclusion

Conclusion

- In response to a demand shock, automatic UI rule generates significant welfare gain for poor households
  - Cost: persistent inflation and unemployment
- Accommodative monetary policy helps eliminate the destabilization cost of UI rule, leading to broad-based welfare gains.
- Relationship between inflation, labor market tightness, and wealth effect on labor supply is important.

Labor transition heterogeneity – estimation details

- Sample: 1982-2019 CPS-ORG, age $\in [25, 60]$, exclude self-employed, veteren, and unpaid family worker
- Bin the workers based on hourly wage reported in the 4th interview
  - Decile group, year by year
- Compute the transition rate for each group in each period
  - Only consider the labor transitions in the 5th-8th interview (8 months after the 4th interview).

Labor transition heterogeneity – estimation details

	(1) $\log(EU)$	(2) $\log(EU)$	(3) $\log(EU)$	(4) $\log(UE)$	(5) $\log(UE)$	(6) $\log(UE)$
$\log w_{it}$	-0.676***	-0.675***	-0.675***	-0.081***	-0.081***	-0.081***
	(0.012)	(0.012)	(0.012)	(0.018)	(0.018)	(0.019)
$\tilde{y}_t$			-3.717***			9.477***
			(0.561)			(0.749)
$\log w_{it} \times \tilde{y}_t$		-2.343**	-2.343*		-1.980	-1.980
		(1.128)	(1.200)		(1.569)	(1.700)
Observations	1,410	1,410	1,410	1,410	1,410	1,410
Time-FE	YES	YES	NO	YES	YES	NO
Linear trend	YES	YES	YES	YES	YES	YES
R-squared	0.788	0.789	0.730	0.334	0.335	0.116

NOTE. Robust standard errors are reported. EU/UE rates are quarterly average. $\tilde{y}_t$ is HP-filtered log real GDP with smoothing parameter = 1600.

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Labor transition heterogeneity – estimation details

	(1) $\log(EU)$	(2) $\log(EU)$	(3) $\log(EU)$	(4) $\log(UE)$	(5) $\log(UE)$	(6) $\log(UE)$
$\log w_{it}$	-0.698***	-0.698***	-0.698***	-0.100***	-0.100***	-0.100***
	(0.010)	(0.010)	(0.011)	(0.015)	(0.015)	(0.015)
$\log(UR_t)$			0.237***			-0.840***
			(0.037)			(0.052)
$\log w_{it} \times \log(UR_t)$		0.183***	0.183**		-0.110	-0.110
		(0.068)	(0.073)		(0.095)	(0.099)
Observations	4,200	4,200	4,200	4,167	4,167	4,167
Time-FE	YES	YES	NO	YES	YES	NO
Linear trend	YES	YES	YES	YES	YES	YES
R-squared	0.634	0.634	0.528	0.244	0.244	0.071

NOTE. Robust standard errors are reported. Observations in monthly frequency. $\log(UR_t)$ is HP-filtered log unemployment rate with smoothing parameter = 900000.

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UI extension rule – estimation

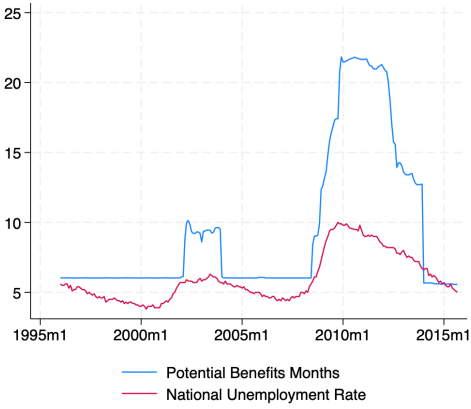
- Data from Chodorow-Reich, Coglianese, and Karabarbounis (2019).
  - Potential UI duration (regular + extension) for each state during 1996m1-2015m9
  - Aggregate to national level using labor force as weights.

- Estimate the following specification with OLS

$$\log \gamma_t = \alpha + \phi^{ui} \log(UR_t) + \beta t + \varepsilon_t$$

- Focus on the two extension periods
  1. 2002-March to 2003-Dec
  2. 2008-July to 2013-Dec

UI extension rule – estimation results



	(1)	(2)	(3)
ϕ^{ui}	-3.85***	-2.05***	-2.05***
	(0.963)	(0.139)	(0.156)
Observations	28	65	93
Period	2003	2008	2002 & 2008
R-squared	0.377	0.793	0.835

NOTE. Robust standard errors are reported.

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Decomposing the channels – wealth and wage quintiles

	UI	Real rate	Job-finding (M)	Tax	Wage	Separation	All
Wage quintile							
Q1	0.0226	0.0003	0.1118	-0.0329	0.0026	-0.0320	0.0715
Q2	0.0141	0.0007	0.0790	-0.0324	0.0026	-0.0371	0.0263
Q3	0.0122	0.0012	0.0632	-0.0321	0.0025	-0.0369	0.0097
Q4	0.0100	0.0021	0.0506	-0.0321	0.0025	-0.0355	-0.0026
Q5	0.0056	0.0046	0.0357	-0.0326	0.0026	-0.0315	-0.0158
Wealth quintile							
Q1	0.0244	-0.0001	0.1119	-0.0397	0.0032	-0.0403	0.0583
Q2	0.0172	0.0000	0.0775	-0.0401	0.0032	-0.0434	0.0138
Q3	0.0087	0.0002	0.0530	-0.0365	0.0029	-0.0383	-0.0101
Q4	0.0039	0.0013	0.0385	-0.0265	0.0021	-0.0280	-0.0088
Q5	0.0039	0.0113	0.0286	-0.0183	0.0014	-0.0216	0.0052

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Decomposing the channels – alternative MP

	UI	Real rate	Job-finding (M)	Tax	Wage	Separation	All
Inactive MP							
Population	0.0078	-0.0002	0.0105	-0.0155	0.0018	-0.0213	-0.0176
Employed	0.0063	-0.0002	0.0029	-0.0154	0.0018	-0.0212	-0.0264
Unemployed	0.0224	-0.0003	0.0837	-0.0163	0.0019	-0.0220	0.0671
UI eligible	0.0250	-0.0002	0.0816	-0.0163	0.0019	-0.0221	0.0670
UI ineligible	0.0086	-0.0004	0.0954	-0.0159	0.0019	-0.0213	0.0676
Accommodative MP							
Population	0.0041	0.0002	0.0241	-0.0021	0.0012	-0.0012	0.0260
Employed	0.0035	0.0002	0.0194	-0.0021	0.0012	-0.0012	0.0208
Unemployed	0.0101	0.0002	0.0697	-0.0022	0.0012	-0.0012	0.0773
UI eligible	0.0111	0.0002	0.0690	-0.0022	0.0012	-0.0012	0.0775
UI ineligible	0.0048	0.0003	0.0736	-0.0022	0.0012	-0.0012	0.0764

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