Some Like it Hot:

A Distributional Analysis of Inclusive Monetary Policy

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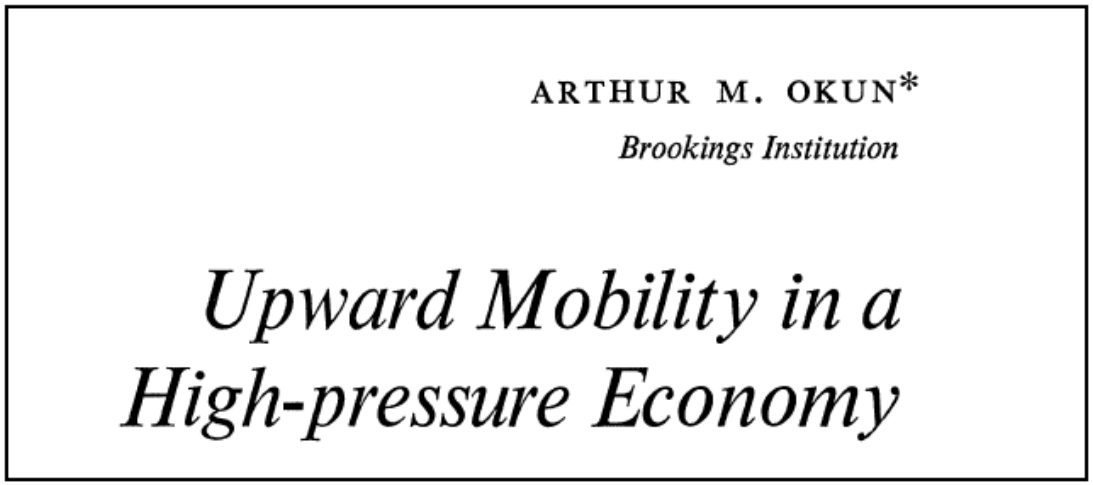
PRINCETON UNIVERSITY

Okun's hypothesis

- Okun (BPEA, 1973)



- A high-pressure economy has the potential to persistently improve the economic circumstances of less advantaged workers, allowing them to find steady employment, build their skills, and climb the job ladder

- *The sacrifice of upward mobility must be carefully reckoned as one high cost of accepting slack as an insurance policy against inflation*

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1. Maximum employment is a broad-based and inclusive goal
2. Hot economy brings benefits to low-income communities
3. Policy is informed by shortfalls of employment from maximum level

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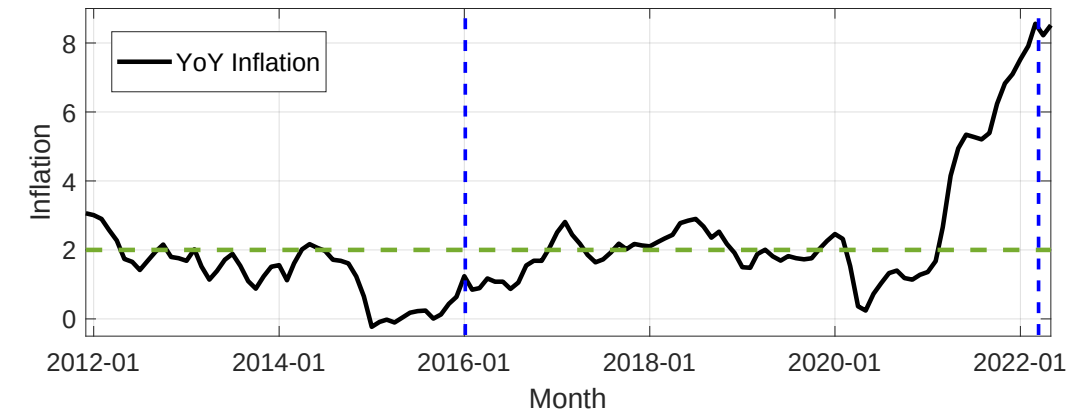

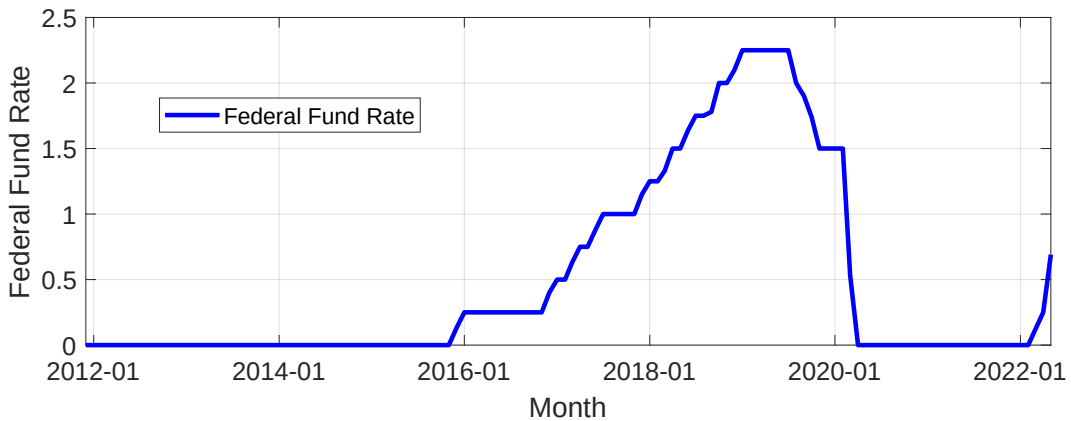

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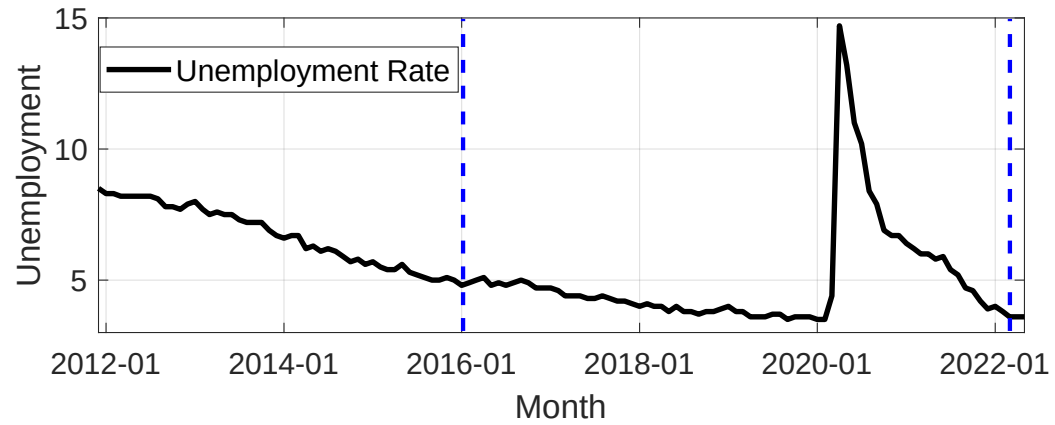

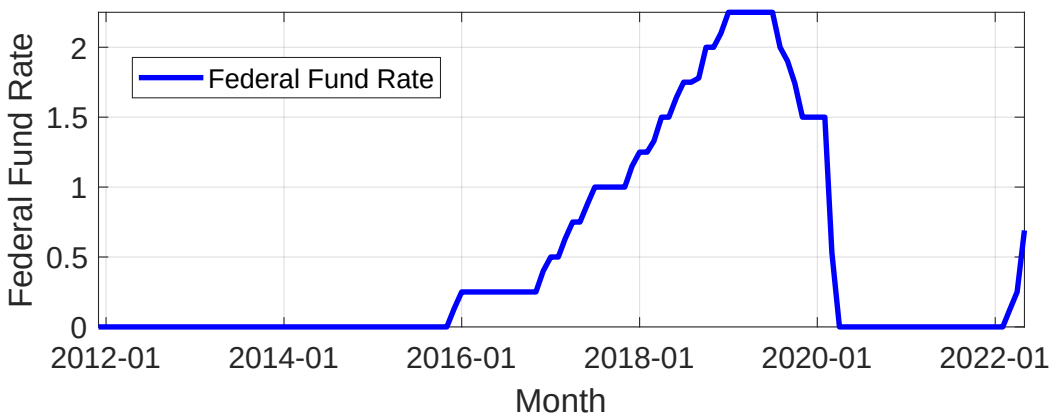

This paper

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- We build a quantitative HANK model which features
    1. Three-state model (E,U,N) of a frictional labor market
    2. Okun's hypothesis at work through several mechanisms
- Calibrate it to the US economy
- Simulate counterfactuals under more 'inclusive' monetary policy rules
- Assess distributional and macro implications of alternative rules

Key Findings (so far)

- AIT does not look like an 'inclusive' policy rule

- A more inclusive policy rule that runs the economy hot for longer at the cost of 2 ppts of additional inflation permanently

    1. Increases average labor force participation by 1 ppt

    2. Decreases unemployment by 1 ppt

- Has larger effects at the bottom of the distribution, e.g. at the P25

    1. Participation increases by nearly 2 ppts

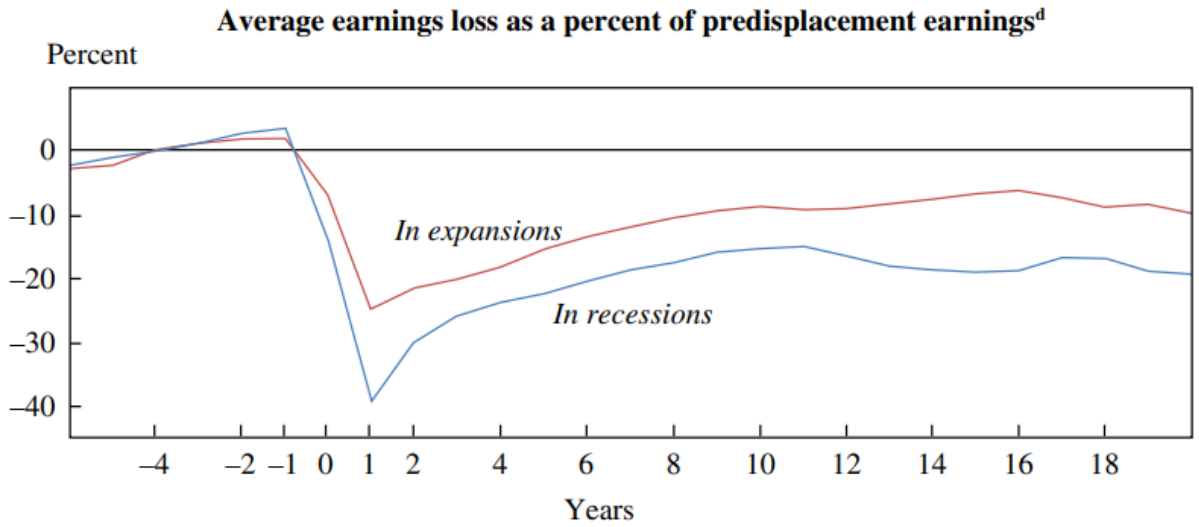
    2. Labor income and consumption increase by 12%

    3. Reduces consumption inequality (P75-P25 ratio) by 15%

The Mechanics of Okun's Hypothesis

Okun's hypothesis: Mechanism I

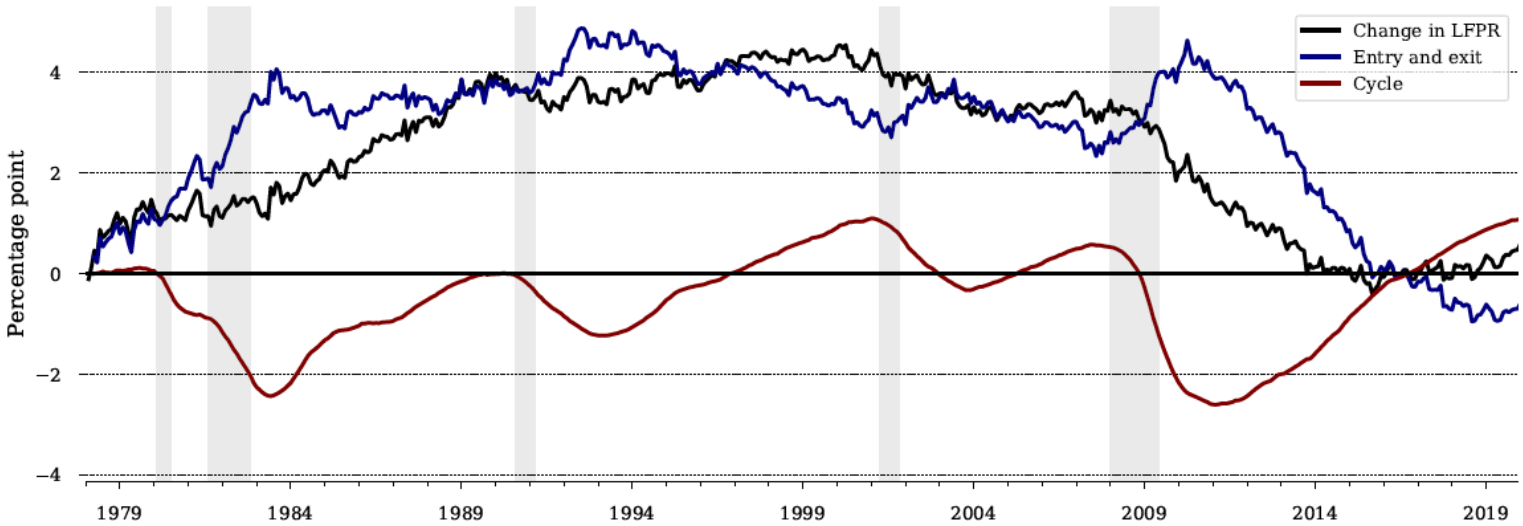
- Human capital accumulation
  - Stable employment leads to earnings growth
  - Earnings losses upon displacement are persistent
  - Recessions have scarring effects (Davis-von Wachter, 2011)



- *High-pressure economy can raise the stock of human capital*

Okun's hypothesis: Mechanism II

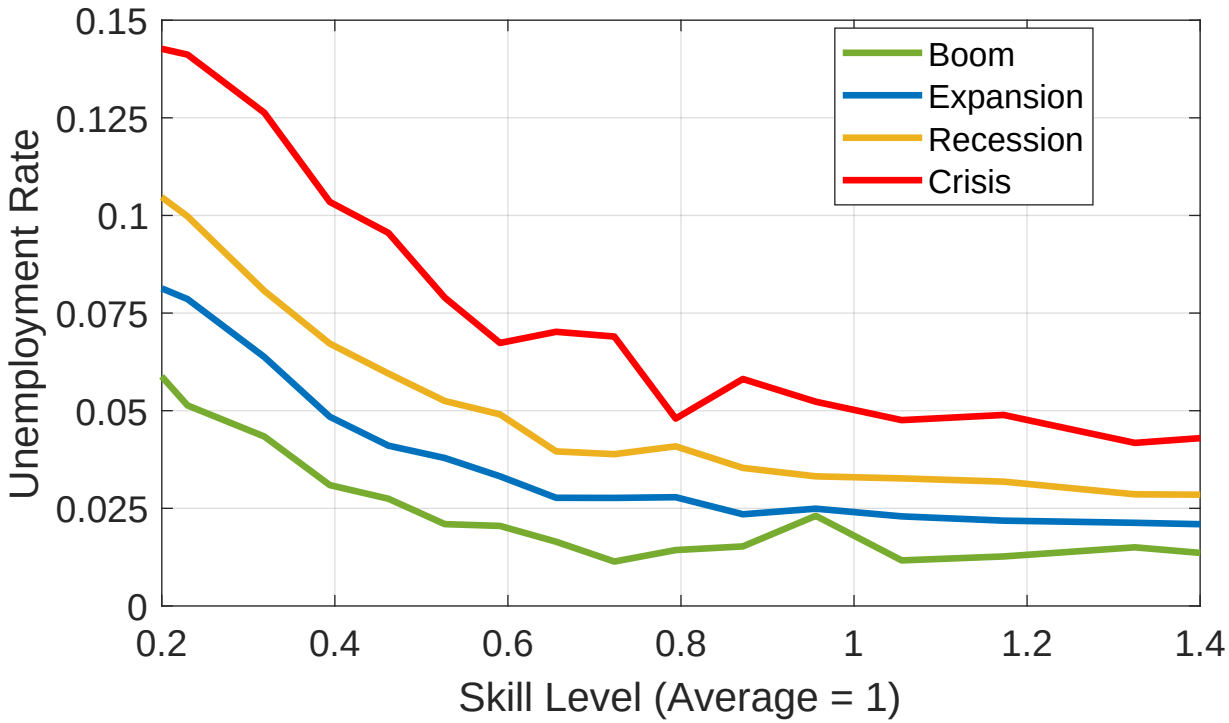
- Participation cycle (Hobijn-Sahin, 2021)
  - Participation to the labor force falls in recession
  - Unemployment is the key driver of this cyclicality



- *High-pressure economy sustains attachment to the labor force*

Okun's hypothesis: Mechanism III

- Uneven effects of business cycles (Aaronson et al., 2019)
  - Low-skill workers are much more sensitive to the cycle



- *High-pressure economy is especially beneficial to low-income groups*

The Model

Individual Skill and Labor Market Dynamics

- Skill level: z
- Labor market state: s

$$s = \begin{cases} e & \text{employed} \\ u_0 & \text{unemployed, ineligible for UI} \\ u_1 & \text{unemployed, eligible for UI} \\ n_0 & \text{passive non-participant} \\ n_1 & \text{active non-participant} \end{cases}$$

- Transition across labor market states:
  - Endogenous participation choices: $n_1 \to u, \quad u, e \to n_1$
  - Exogenous switch into and out of passive participation n_0
  - Exogenous $e \leftrightarrow u$ as a function of skills z

Individual Skill and Labor Market Dynamics

- State-dependent skill dynamics:

$$d \log z_t = \left\{ -\theta \log z_t + \mathbb{I}_{\{s_t = e\}} \, \delta_z^+ - \mathbb{I}_{\{s_t \neq e\}} \, \delta_z^- \right\} dt + \sigma_z dW_t$$

- Workers who do not remain employed see:

  1. their skills depreciate
  2. their job finding and separation rates deteriorate

- Slippery slope leading to long-lasting impact of job displacement

Individual Problem

- Period utility:

$$u^s(c,h) = \log c - \psi \frac{h^{1+\frac{1}{\sigma}}}{1+\frac{1}{\sigma}} - \kappa^s, \qquad s \in \{e, u_1, u_0, n_0, n_1\}$$

- Budget constraint:

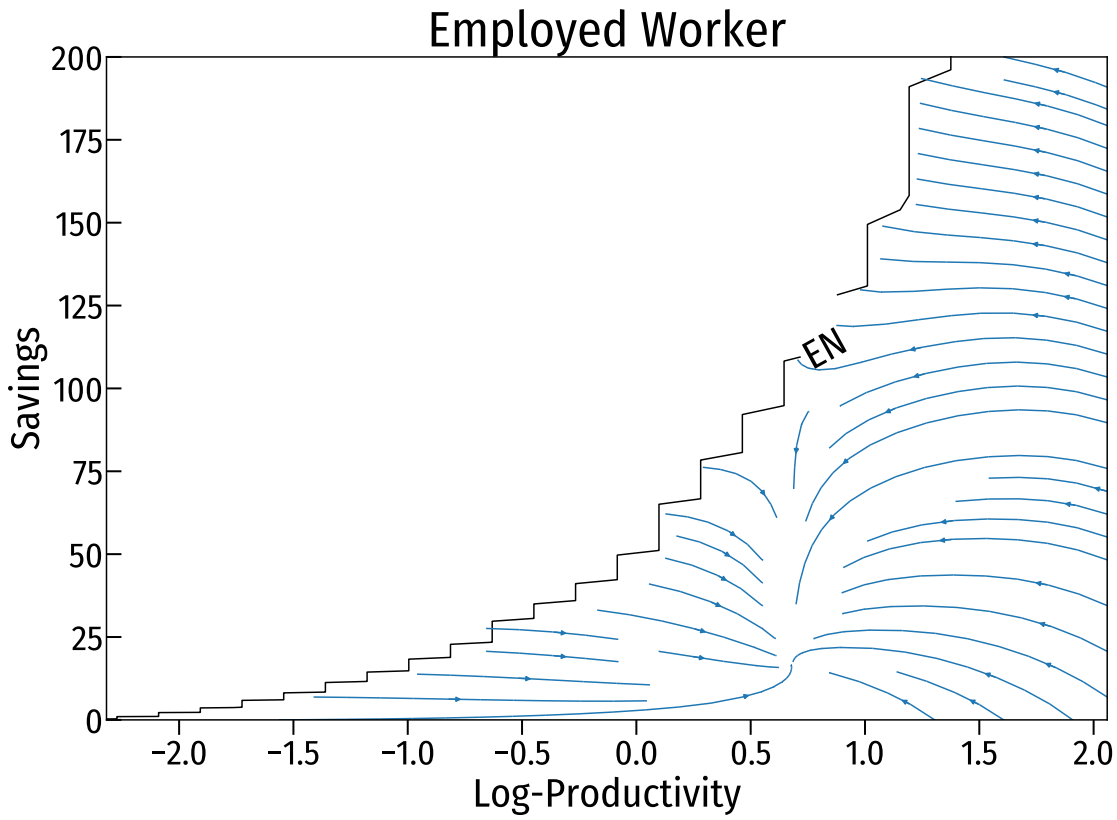
$$\begin{aligned} c_t + \dot{a}_t &= r_t a_t + \phi_t + (1-\mathfrak{t}_t) w_t z_t h_t, && \text{if } s = e \\ c_t + \dot{a}_t &= r_t a_t + \phi_t + (1-\mathfrak{t}_t) b(z_t), && \text{if } s = u_1 \\ c_t + \dot{a}_t &= r_t a_t + \phi_t, && \text{if } s \in \{u_0, n_0, n_1\} \end{aligned}$$

- Borrowing constraint: $a_t \geq 0$

- Choices:
  - consumption / saving (optimal control)
  - participation (optimal stopping)

Participation Decision over the State Space

- Optimal choice splits state space into two regions



- Participation is more likely if the worker is currently productive (substitution effect) or poor (wealth effect)

Remaining Model Ingredients

Production and wage setting

- Nominal wage rigidity (Erceg et al. 2000, Auclert et al. 2019)
- Monopolistic producers with flexible prices and linear technology $Y_t = N_t$

Mutual Fund

- Fund owns firms' equity and government bonds
- Household wealth = shares of the mutual fund

Government

- Fiscal authority issues debt, taxes, and spends on transfers
- Monetary authority sets the nominal rate based on a policy rule

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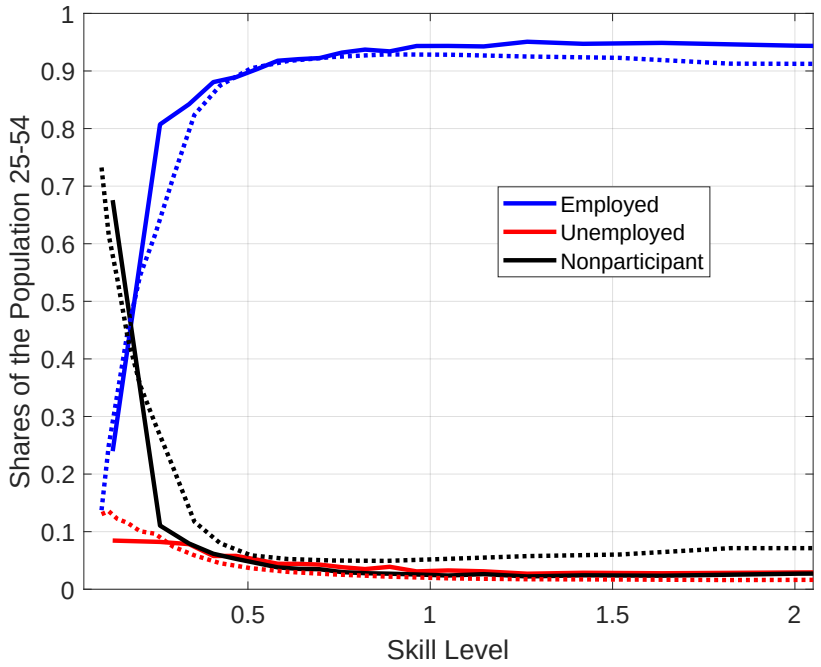
Out of steady-state: Assume frictions fluctuate proportionally to hours

The Labor Market Through the Lenses of the Model

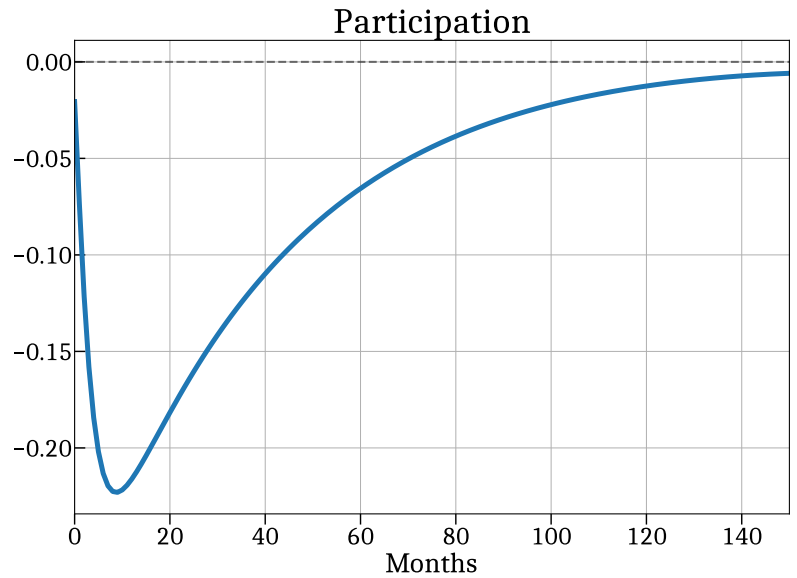
Labor Market Stocks and Flows

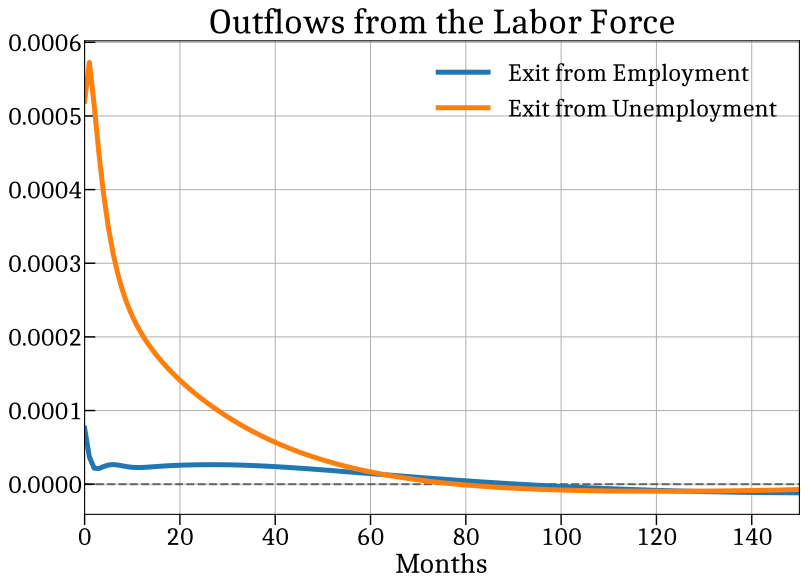
	Data	Model
EU	0.017	0.017
EN	0.011	0.011
UE	0.242	0.304
UN	0.189	0.202
NE	0.065	0.043
NU	0.064	0.077



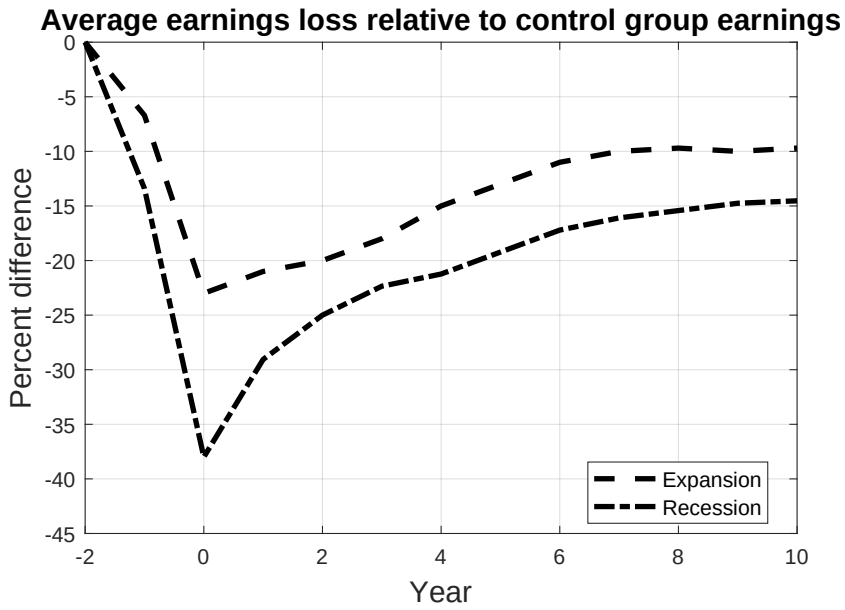
- We match both average worker flows, and stocks by skill level
- $UN >> EN$ instrumental to obtain the participation cycle

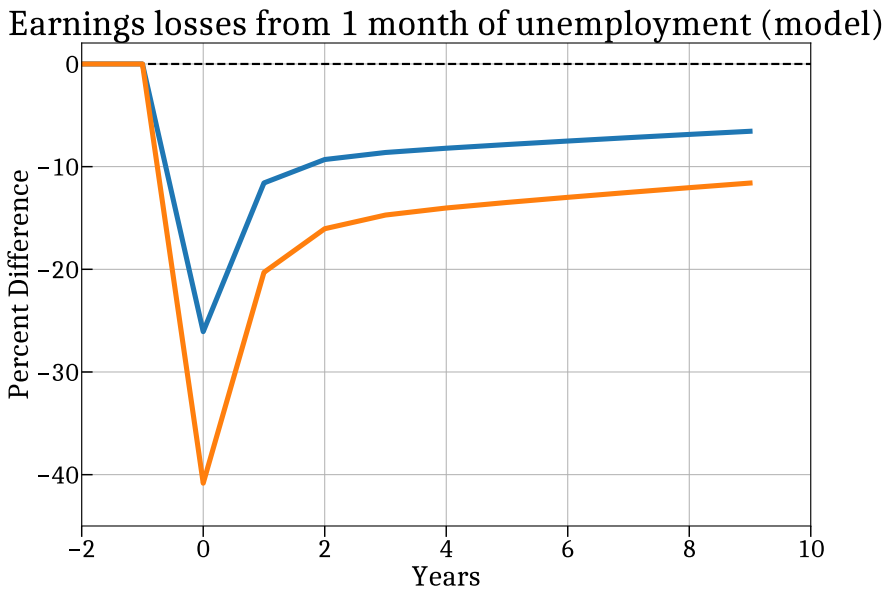
Participation Cycle



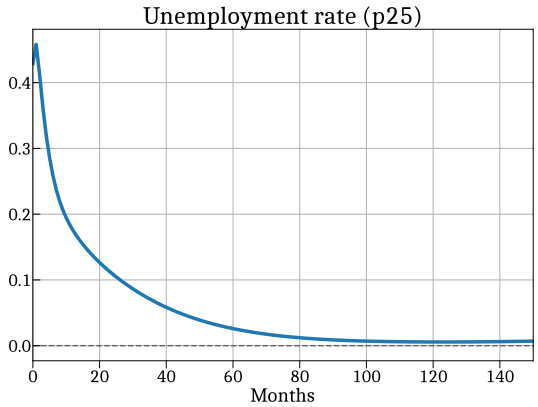


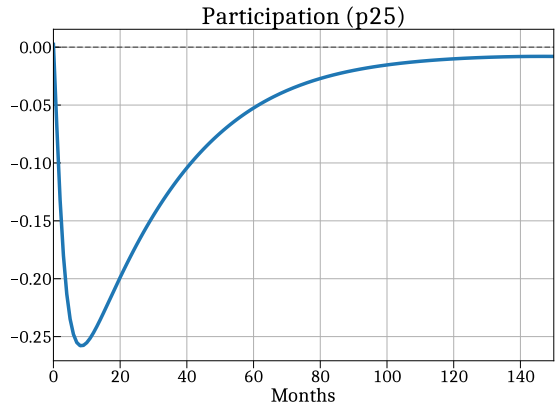
Earnings Losses from Job Displacement

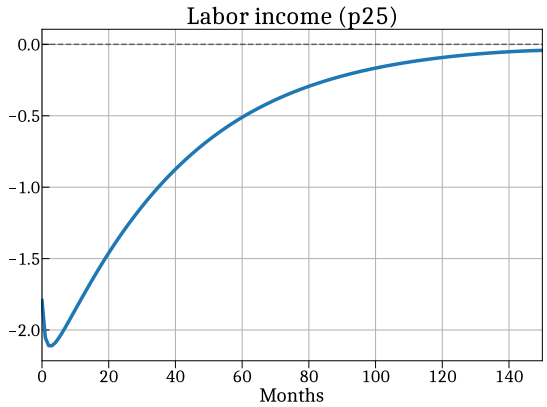


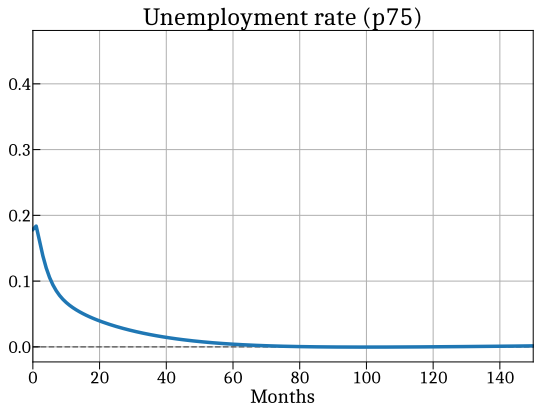


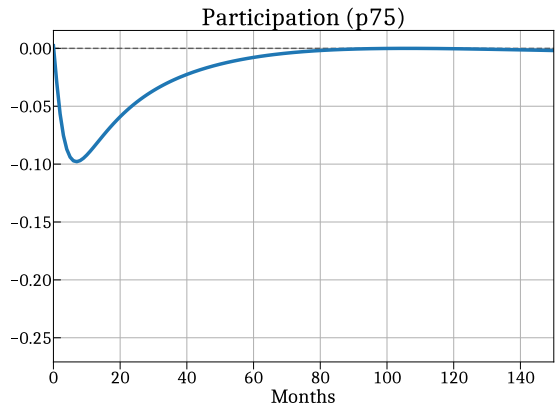
Uneven Incidence of Recessions

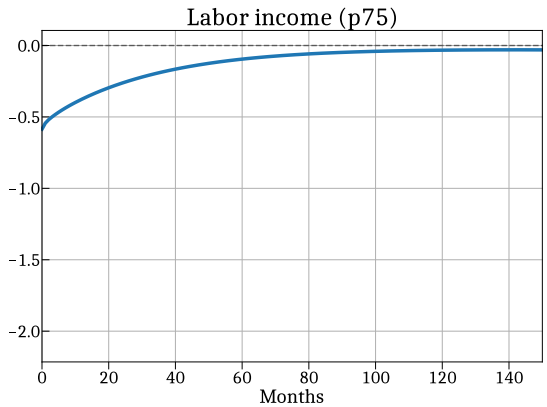












- Fluctuations at P25 of the skill distribution much stronger than at P75

Counterfactual Policy Experiments

Baseline Model Simulation

- Assume the Fed follows a standard Inflation Targeting (IT) rule

$$r_t = i^* + \phi_Y (Y_t - \bar{Y})$$

- Invert model to estimate demand shocks that match U rate (1990-2019)

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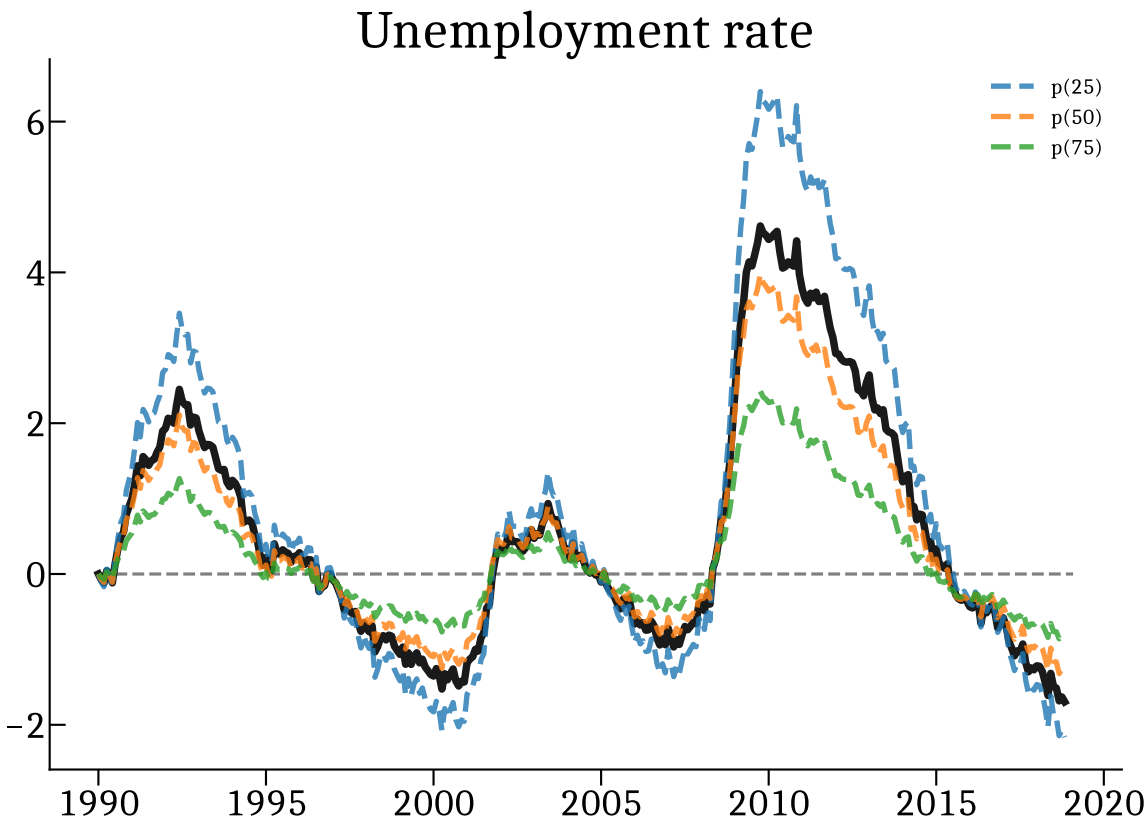


Design of Counterfactual Experiments

- Simulate economy s.t. same shocks under more 'inclusive' policy rules

1. Average Inflation Targeting (AIT)

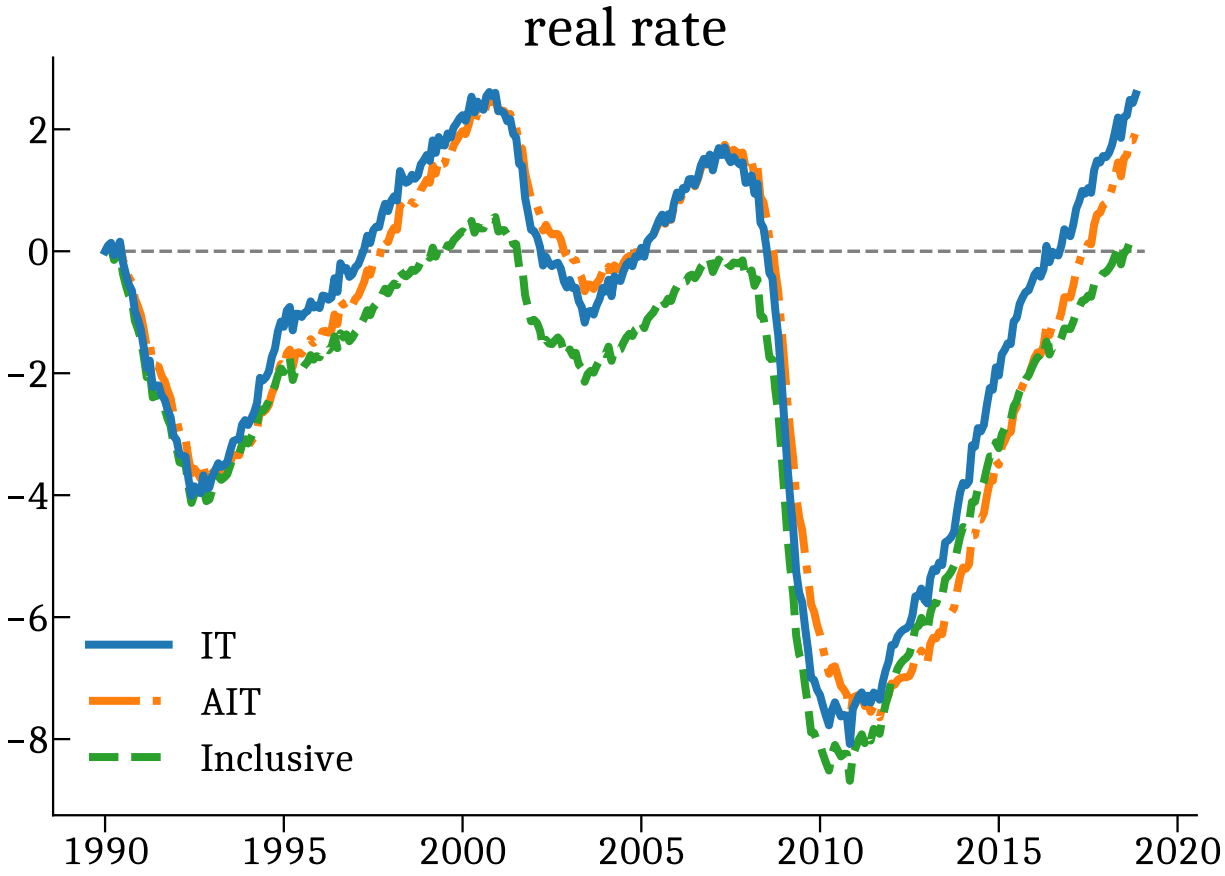
$$r_t = i^* + \phi_Y(Y_t - \bar{Y}) + \phi_{ait}\Gamma_t^\pi, \quad \Gamma_t^\pi = (1-\rho)\pi_t + \rho\Gamma_{t-1}^\pi$$

2. Asymmetric Targeting (Inclusive)

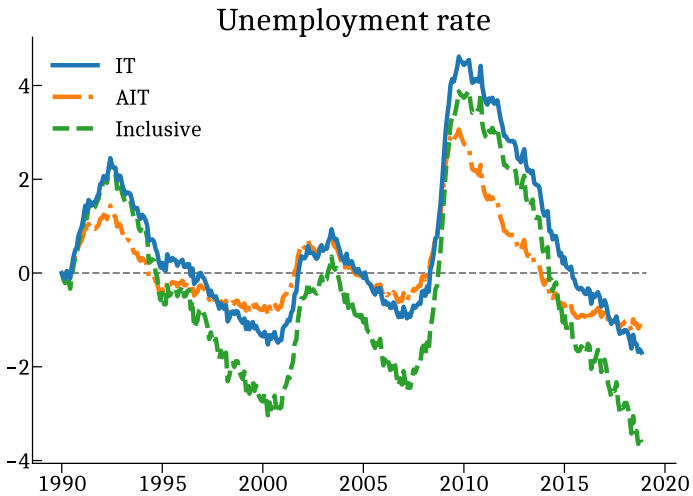
$$r_t = i^* + \phi_Y^+(Y_t - \bar{Y})^+ + \phi_Y^-(Y_t - \bar{Y})^-, \quad \phi_Y^- > \phi_Y^+$$

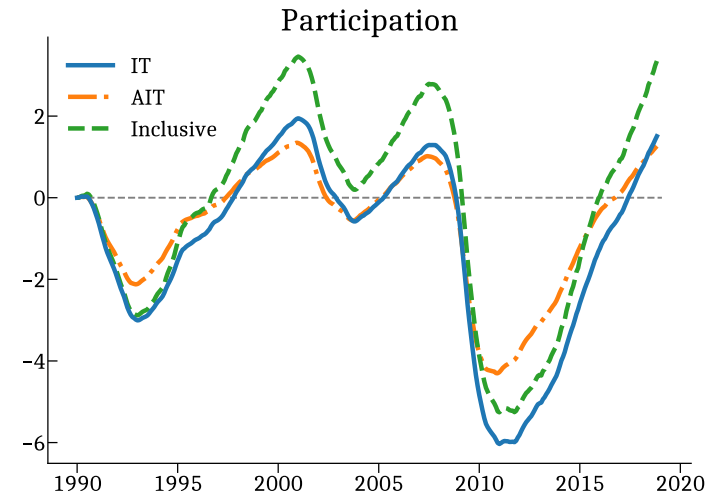
- Quantify aggregate and distributional implications

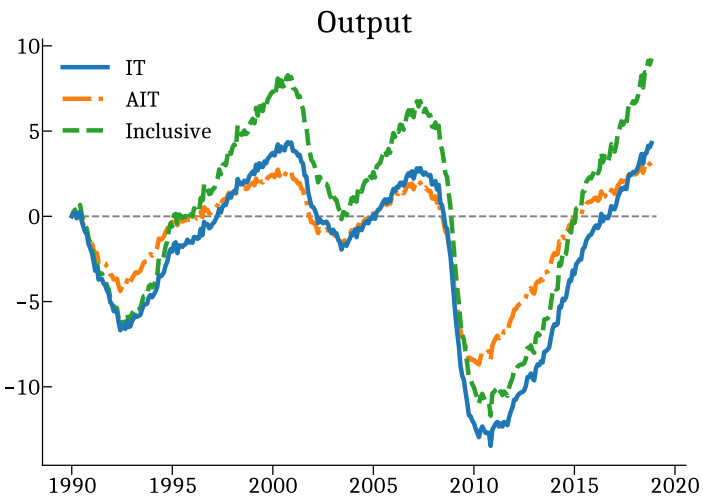
Real Rate Implied by Different Rules

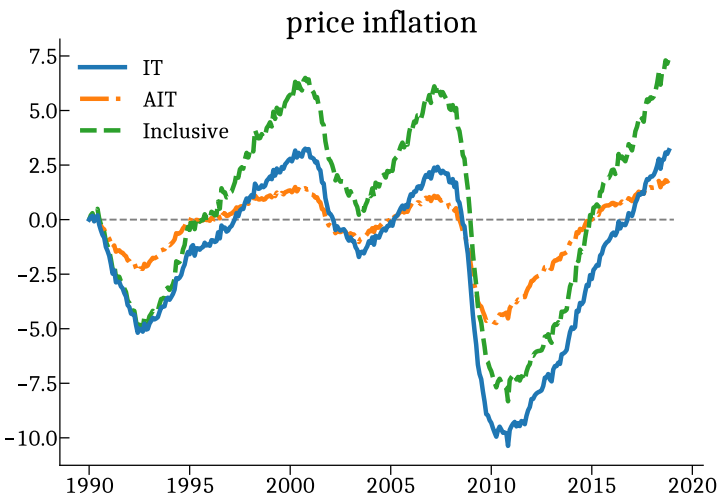


Aggregate Implications of Different Rules

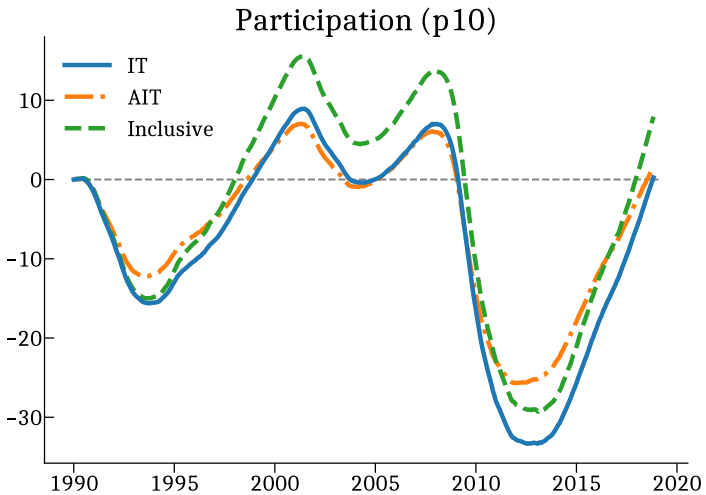


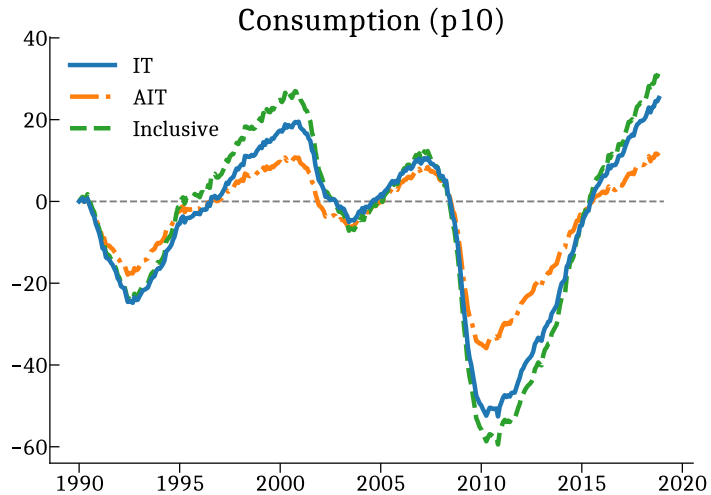


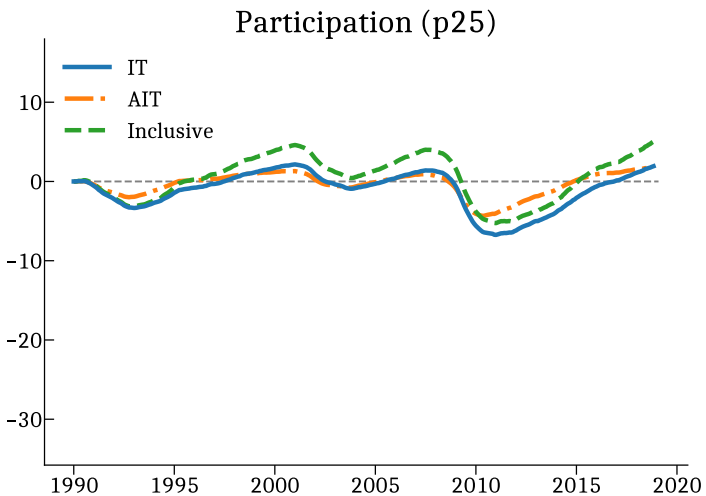


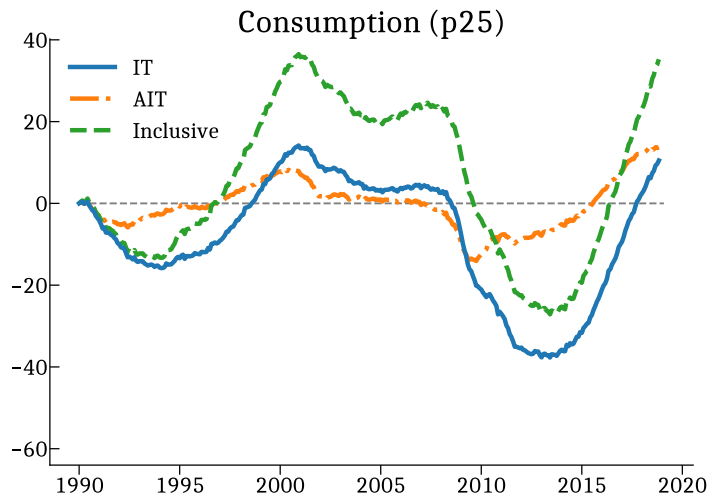


Distributional Implications of Different Rules

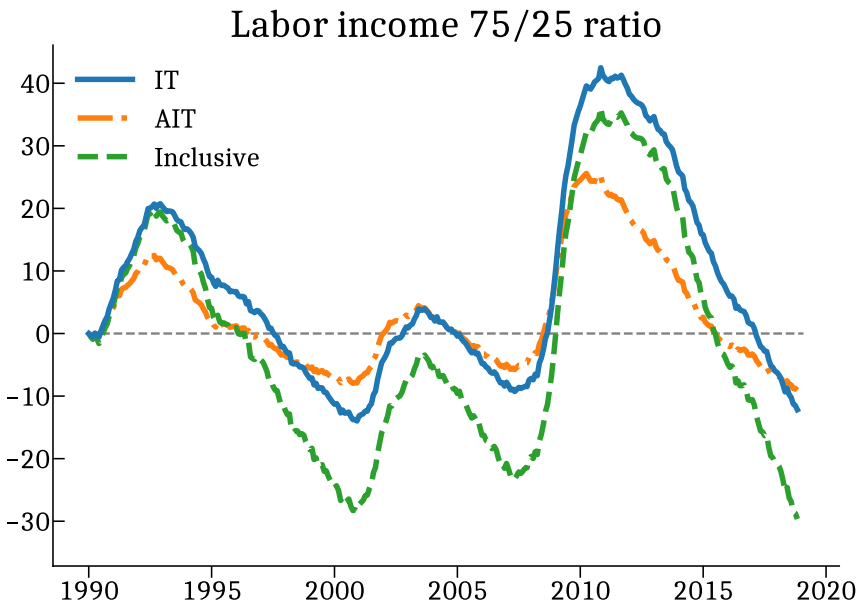


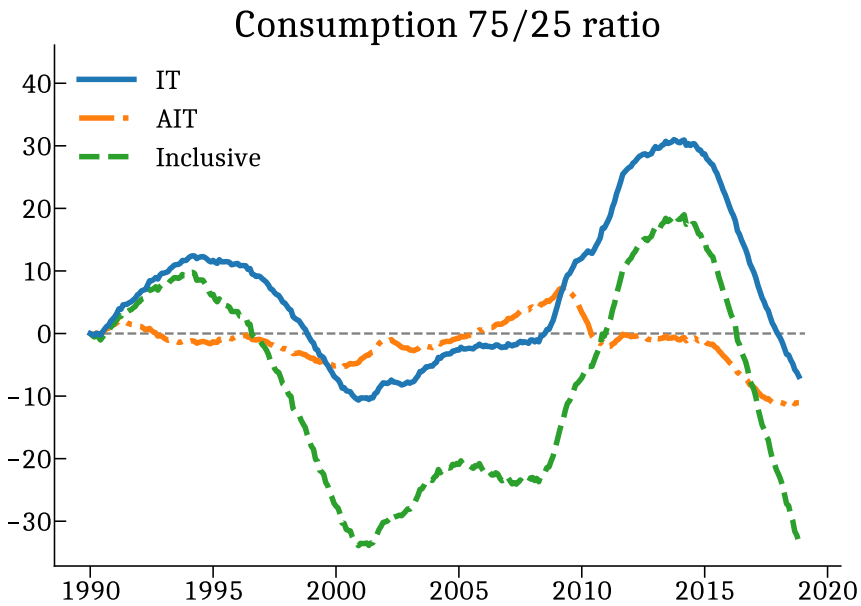






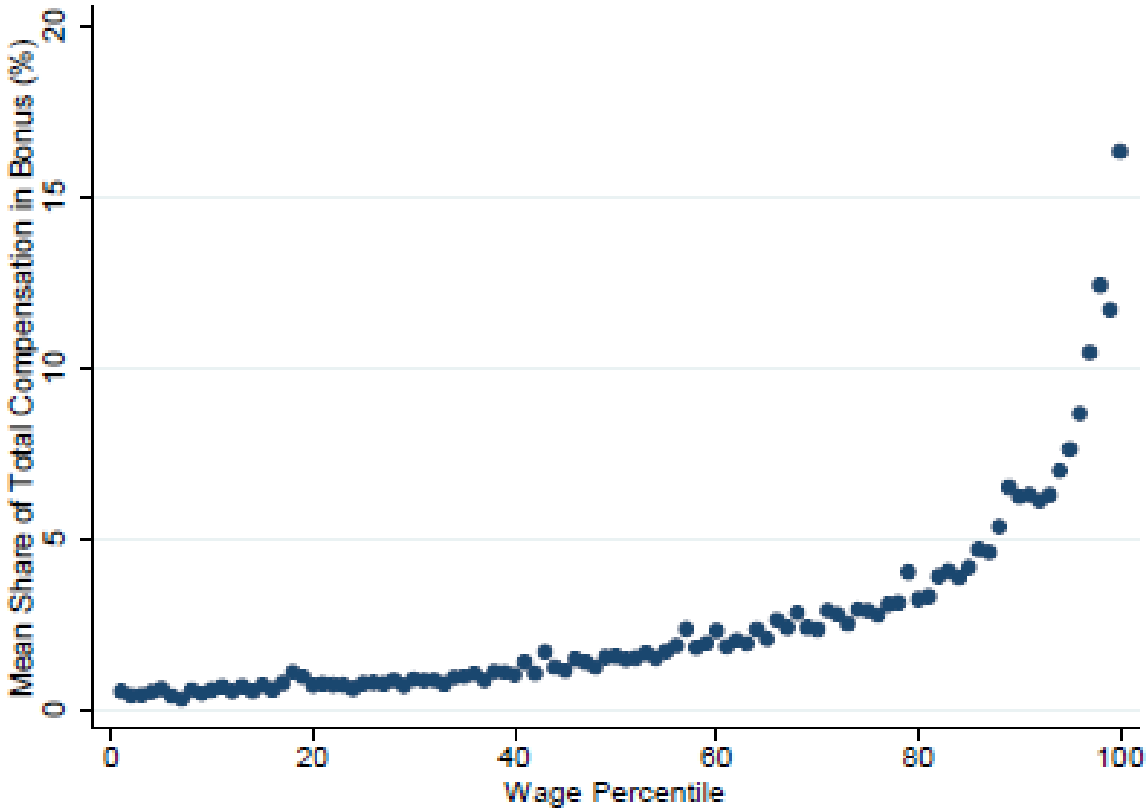
Distributional Implications of Different Rules





Going Forward: Unequal Costs of Inflation

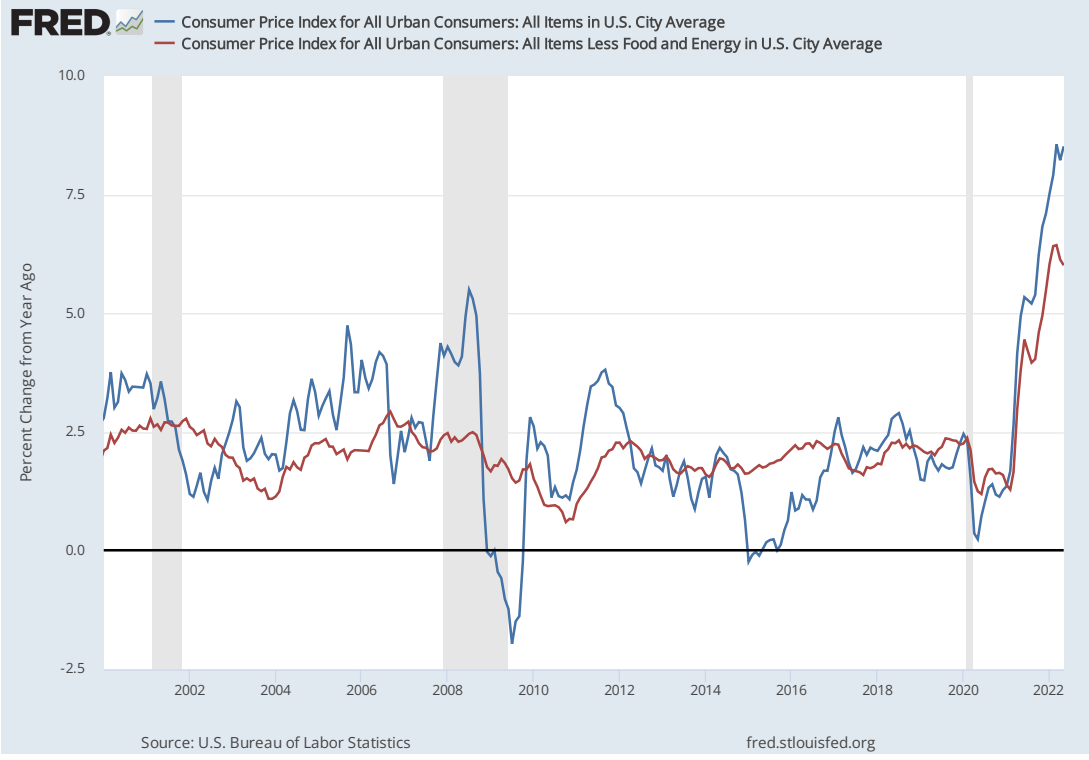
Heterogeneous Nominal Wage Rigidity



PANEL A: SHARE IN BONUS OUT OF TOTAL EARNINGS

Source: Grisby-Hurst-Yildirmaz (2021)

Heterogeneous Expenditure Bundles



	Bottom 10%	Middle 10%	Top 10%
Exp. Share Food	59	12	5
Exp. Share Energy	16	3	1

Thanks!

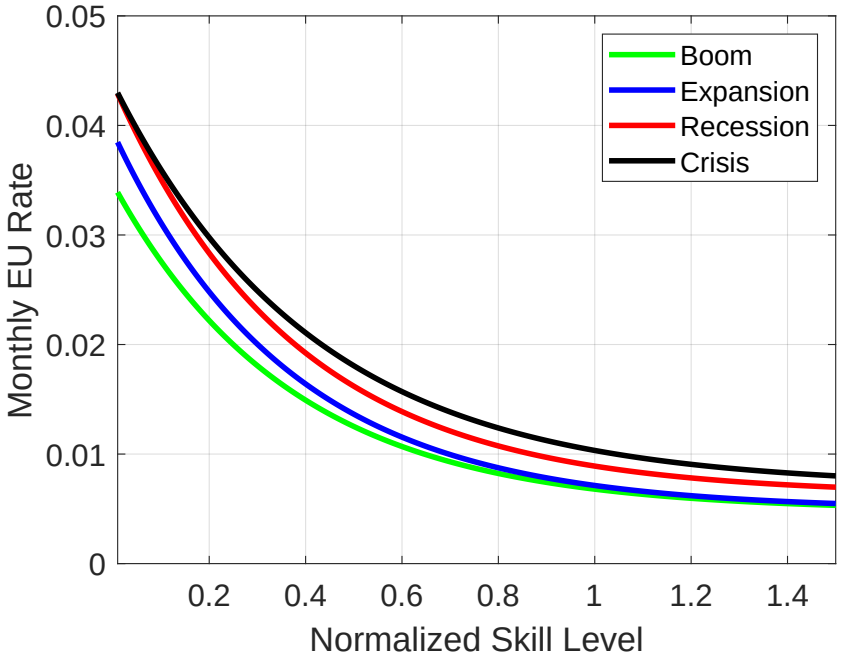
Example: Problem of the Employed Worker

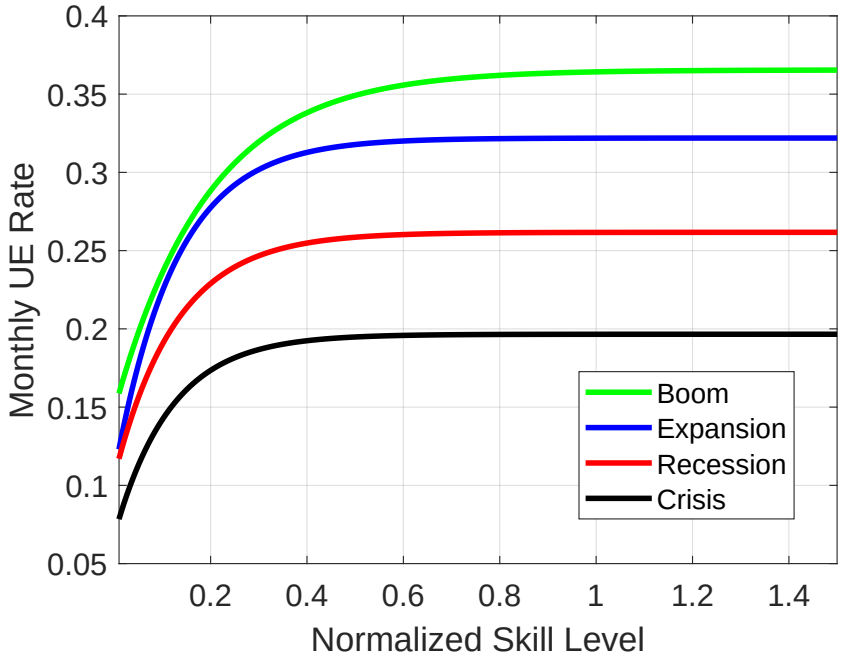
$$
\begin{aligned}
v_0^e(a,z) = \max_{\{c_t\}_{t\geq 0},\tau^*} \quad & \mathbb{E}_0\left[\int_0^{\tau^{\min}} e^{-\rho t}\mathfrak{u}^e(c_t,h_t)\,dt\right. \\
& +\mathbb{I}_{\{\tau^{\min}=\tau^u\}} e^{-\rho\tau^u} v_{\tau^u}^{u_1}\left(a_{\tau^u},z_{\tau^u}\right) \\
& +\mathbb{I}_{\{\tau^{\min}=\tau^{n_0}\}} e^{-\rho\tau^{n_0}} v_{\tau^{n_0}}^{n_0}\left(a_{\tau^{n_0}},z_{\tau^{n_0}}\right) \\
& \left.+\mathbb{I}_{\{\tau^{\min}=\tau^*\}} e^{-\rho\tau^*} v_{\tau^*}^{n_1}\left(a_{\tau^*},z_{\tau^*}\right)\right]
\end{aligned}
$$

$$
\begin{aligned}
& s.t. \\
c_t + \dot{a}_t &= r_t a_t + \phi_t + (1-\mathfrak{t}_t) w_t z_t h_t \\
a_t &\geq 0
\end{aligned}
$$

- τ^u: suffers job displacement at Poisson rate λ_{zt}^{eu}
- τ^{n_0}: exogenous switch to passive non-participant at Poisson rate η_0
- τ^*: chooses to leave labor force

Uneven Incidence of Business Cycles





	Boom			Crisis			
	EU	UE	U	EU	UE	U	ΔU
Low-skilled (0.1)	0.026	0.23	0.10	0.037	0.13	0.22	0.12
High-skilled (1.0)	0.005	0.37	0.01	0.008	0.20	0.04	0.03