# The Labor Demand and Labor Supply Channels of Monetary Policy

Sebastian Graves[1], Christopher Huckfeldt[2], and Eric Swanson[3]

[1]University of Cambridge
[2]Federal Reserve Board
[3]UC Irvine & NBER

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Midwest Macro
Cleveland

# What we do

- Study response of labor market flows to identified monetary policy shocks
  - Estimate impulse responses from proxy SVAR with HFI monetary policy shocks à la Gertler and Karadi (2015)
  - Shocks from Bauer and Swanson (2023), Swanson and Jayawickrema (2025)

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  - Quits from employment (E) to non-employment
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- Apply standard accounting framework: Response of employment twice as large holding supply-driven flows fixed

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- This paper: New evidence that decline in employment from a contractionary monetary policy shock significantly attenuated by increase in labor supply
- Potentially relevant for understanding post-Covid period: large fiscal transfers to households, quits ↑, labor force participation ↓, inflation ↑

# Data & Methodology

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- Particular focus on response of supply-driven flows to monetary policy
  - Decision to search from non-employment, e.g. U-to-N and N-to-U
  - Quits to unemployment and nonparticipation (new!)

▸ Time Series ▸ Decomposition of EN/EU Flows ▸ Cyclical Properties

# Estimating the Effects of Monetary Policy

- Begin with reduced-form VAR:

$$Y_t = \alpha + B(L)Y_{t-1} + u_t \tag{1}$$

- Seven monthly variables for baseline specification:
  - two-year Treasury yield, log CPI, log IP, corporate bond spreads
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- Assume structural shocks:

$$u_t = S\varepsilon_t \tag{2}$$

  where the first structural shock is a "monetary policy shock", $\varepsilon_t^{mp}$

- First column of $S$, denoted $s_1$, describes the impact effect of the structural monetary policy shock $\varepsilon_t^{mp}$ on $u_t$ and $Y_t$

- Use an external instrument $z_t$ to identify $s_1$

# External Instrument

- External instrument $z_t$ needs to satisfy:

$$\mathbb{E}\left\{z_t \varepsilon_t^{mp}\right\} \neq 0 \qquad \text{(Relevance)}$$

$$\mathbb{E}\left\{z_t \varepsilon_t^{-mp}\right\} = 0 \qquad \text{(Exogeneity)}$$

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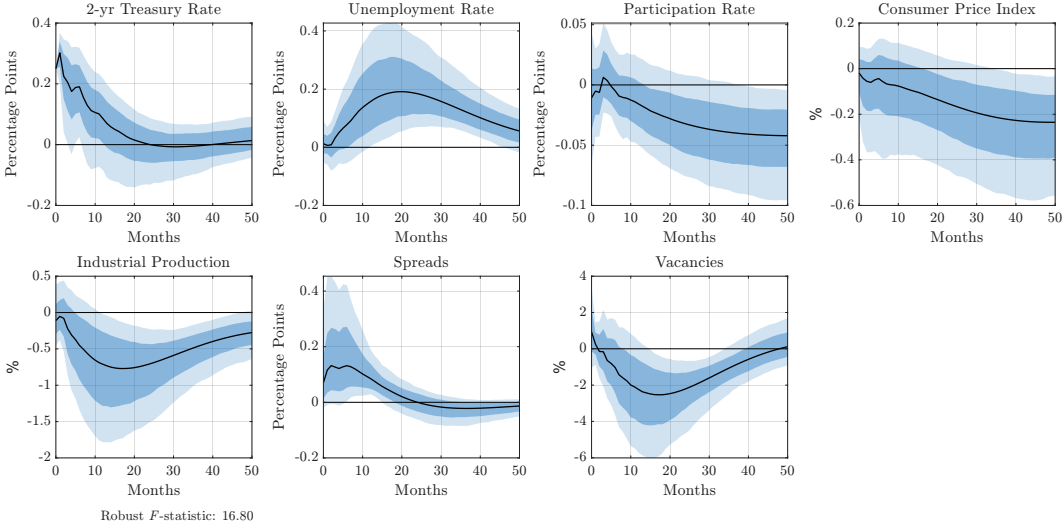
- Labor market flows added one-by-one to the main VAR
  - Similar results from large Bayesian VAR (or local projections)

# Estimates

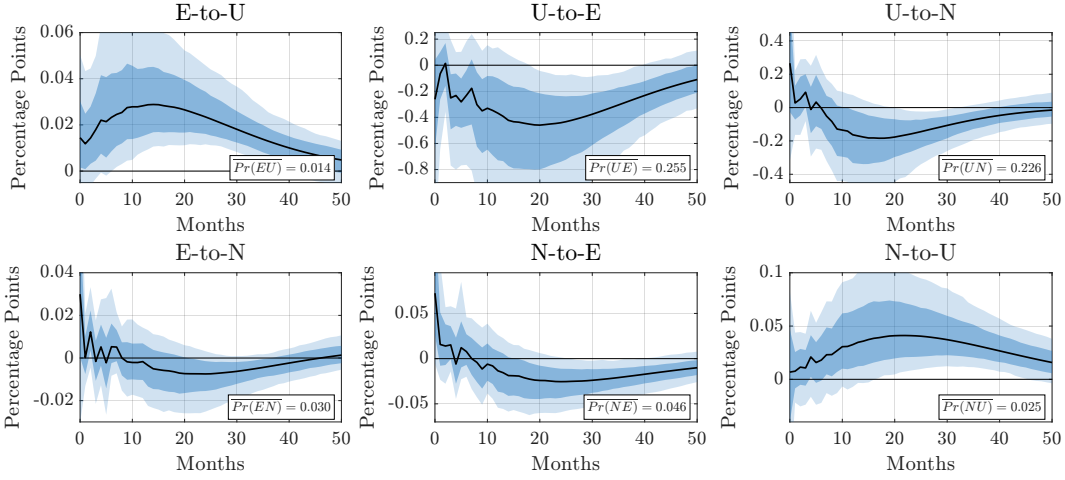
# Baseline VAR




- Monthly data, 1978:M1–2019:M12
- Dark and light shaded regions report **68%** and **90%** confidence intervals

▸ FOMC Announcements ▸ FOMC Announcements (Orthog.) ▸ Aruoba & Drechsel ▸ Local Projections ▸ Bayesian VAR

# Response of Labor Market Flows

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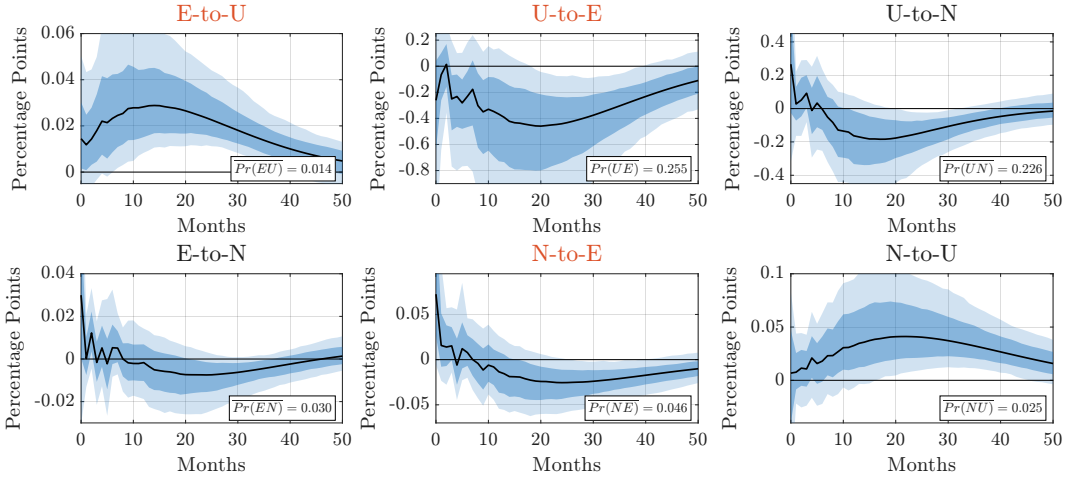


- pEU ↑, pUE ↓, & pNE ↓ ⇒ Consistent with narrative of decline in labor demand

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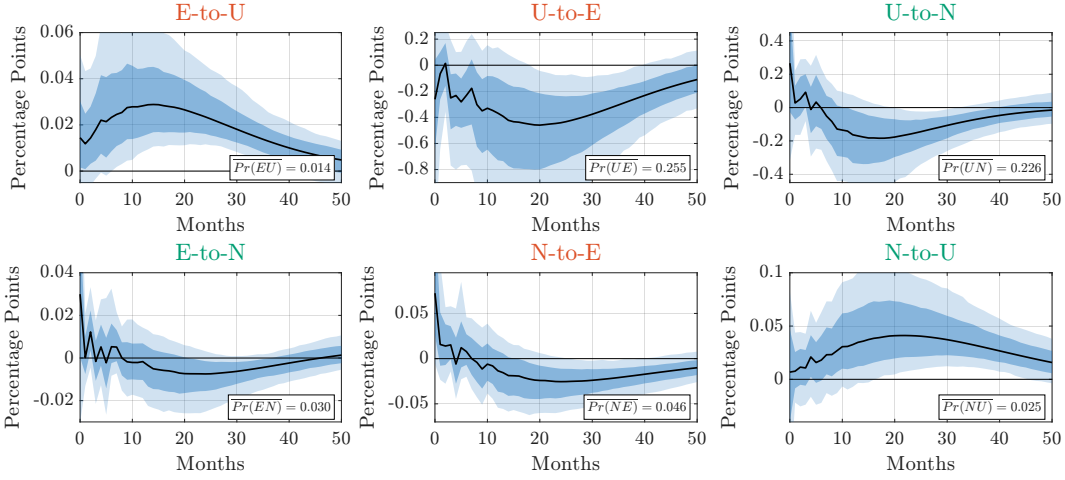


- pEU ↑, pUE ↓, & pNE ↓ ⇒ Consistent with narrative of decline in labor demand
- pNU ↑, pUN ↓, & pEN ↓ (via quits) ⇒ Consistent with increase in labor supply

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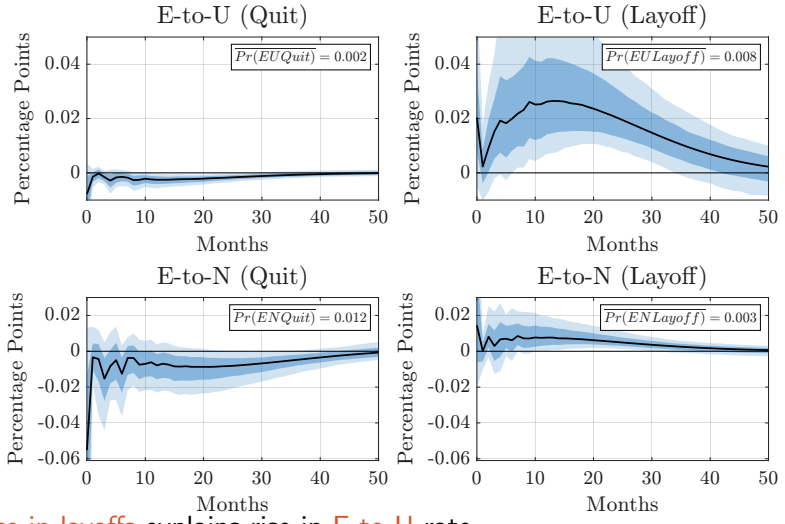
# Response of E-to-U & E-to-N Flows: Quits vs Layoffs




- Increase in layoffs explains rise in E-to-U rate
- Decline in quits explains fall in E-to-N rate

▸ Including "Other" ▸ FOMC Announcements ▸ FOMC Announcements (Orthog.) ▸ Aruoba & Drechsel ▸ LP

# Additional Results

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3. Larger response of supply-driven flows among less-educated
4. No response of job-to-job transitions
5. Nominal wages decline slowly

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3. Estimate qualitatively similar IRFs from "Main Business Cycle Shock" à la Angeletos et al (2020)

# Using Flows to Account for Dynamics of Labor Market Stocks

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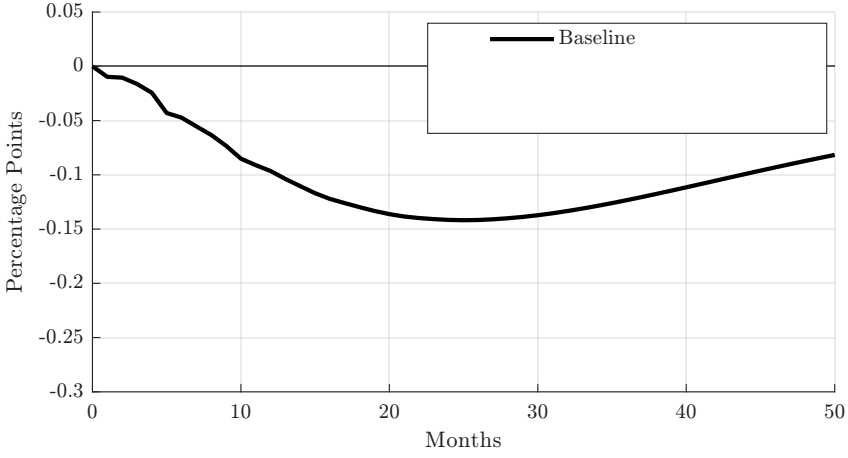
- Repeat for all supply-driven flows, in various combinations

▸ Ins and Outs of Employment ▸ Ins and Outs of Unemployment ▸ Ins and Outs of Participation

# Decomposing Employment Response to a Monetary Policy Shock




- Employment falls 0.1-0.15 percentage points when all flows respond

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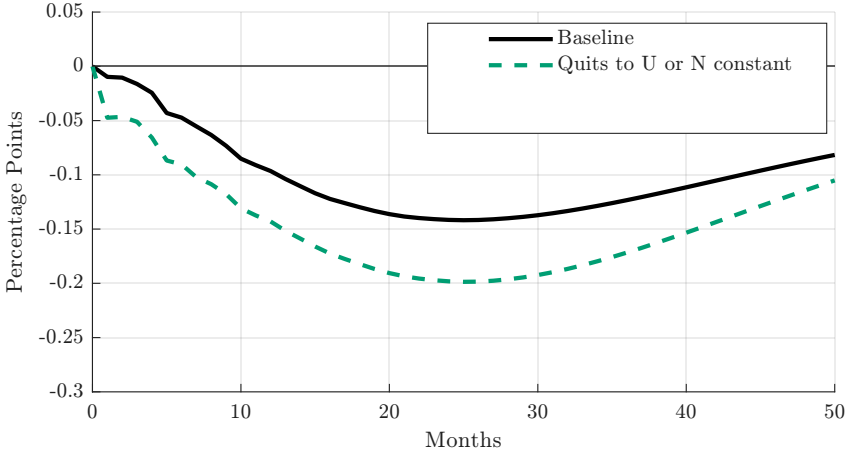


- Holding quit rate constant → employment falls 40% more

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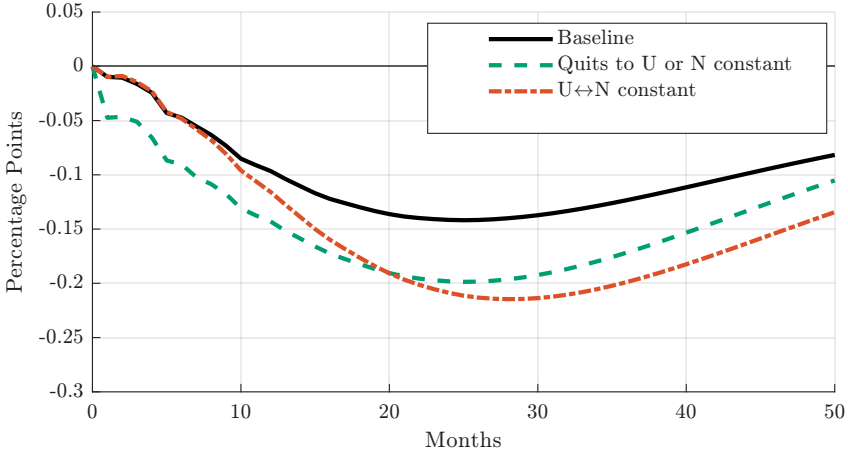


- Holding U-to-N and N-to-U rates constant → employment falls 60% more

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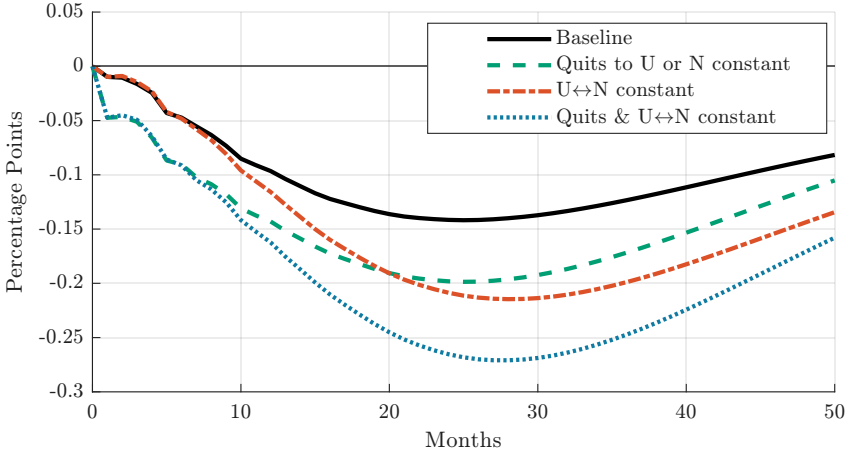


- Holding all supply-driven flows fixed ⇒ Employment falls twice as much

▸ Controls for composition ▸ Participation ▸ Unemployment ▸ Using Local Projections

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- Mechanism: Value of non-employment falls with job-finding rate
  - Consumption of non-employed falls with worsening job-finding prospects through precautionary motive + income effect
  - Fewer employed quit to non-employment, more non-employed search/accept

# Value Functions

Let $V_E(a, z)$, $V_{UI}(a, z, \kappa)$, and $V_{NoUI}(a, z, \kappa)$ represent the values of being employed, UI-eligible non-employed, and UI-ineligible non-employed:

Defined over

- $a$ = assets
- $z$ = idiosyncratic productivity: $\log z' = \rho_z \log z + \varepsilon_z$ , $\varepsilon_z \sim N(0, \sigma_z^2)$
- $\kappa$ = cost of job search, iid from logistic distribution: mean $= \mu_\kappa$, scale $= \sigma_\kappa$

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subject to

$$c + a' = Ra + (1-\tau)wz + T, \quad a' \geq 0$$

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$$\mathcal{V}^{s}_{UI}(a',z) = f_s \cdot \max\{\overbrace{\mathbb{E}\, V_E(a',z'), \mathbb{E}\, \tilde{V}_{UI}(a',z',\kappa')}^{\text{Accept or Reject Job Offer}}\} + (1-f_s)\,\mathbb{E}\, \tilde{V}_{UI}(a',z',\kappa')$$

$$\mathcal{V}^{ns}_{UI}(a',z) = f_{ns} \cdot \max\{\mathbb{E}\, V_E(a',z'), \mathbb{E}\, V_{NoUI}(a',z',\kappa')\} + (1-f_{ns})\,\mathbb{E}\, V_{NoUI}(a',z',\kappa')$$

$$\tilde{V}_{UI}(a,z,\kappa) = \delta_{UI} V_{NoUI}(a,z,\kappa) + (1-\delta_{UI}) V_{UI}(a,z,\kappa).$$

# Value Functions

Let $V_E(a,z)$, $V_{UI}(a,z,\kappa)$, and $V_{NoUI}(a,z,\kappa)$ represent the values of being employed, UI-eligible non-employed, and UI-ineligible non-employed:

$$V_{NoUI}(a,z,\kappa) = \max_{c,a'}\left\{ u(c) + \max\left\{ \underbrace{(1-\kappa)\psi + \beta \mathcal{V}^{s}_{NoUI}(a',z)}_{\text{Search}}, \underbrace{\psi + \beta \mathcal{V}^{ns}_{NoUI}(a',z)}_{\text{Do Not Search}} \right\} \right\}$$

subject to

$$c + a' = Ra + T, \quad a' \geq 0$$

where

$$\mathcal{V}^{s}_{NoUI}(a',z) = f_s \cdot \max\{\overbrace{\mathbb{E}\, V_E(a',z'), \mathbb{E}\, V_{NoUI}(a',z',\kappa')}^{\text{Accept or Reject Job Offer}}\} + (1-f_s)\,\mathbb{E}\, V_{NoUI}(a',z',\kappa')$$

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▸ Timing

# Estimation: A Monetary Policy Shock in the Model

- Feed in response of job-finding rate, layoff rate, real interest rates and wages from the data as MIT shocks
- Overall response of labor market flows also determined by endogenous changes in policy functions + distribution of households across labor market states

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- Calibrate a number of parameters, $\theta_{EXT} \equiv \{\beta, \gamma, \bar{R}, \delta_{UI}, w, \alpha, \phi, \bar{\phi}, \tau, T\}$
  - Assume $u(c) = \frac{c^{1-\gamma}-1}{1-\gamma}$, $f_{ns} = \alpha f_s$

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  - Assume $u(c) = \frac{c^{1-\gamma}-1}{1-\gamma}$, $f_{ns} = \alpha f_s$
- Estimate remaining parameters to match IRFs of labor market flows
  - À la Christiano, Eichenbaum, Evans (2005) or Auclert, Rognlie, Straub (2020)

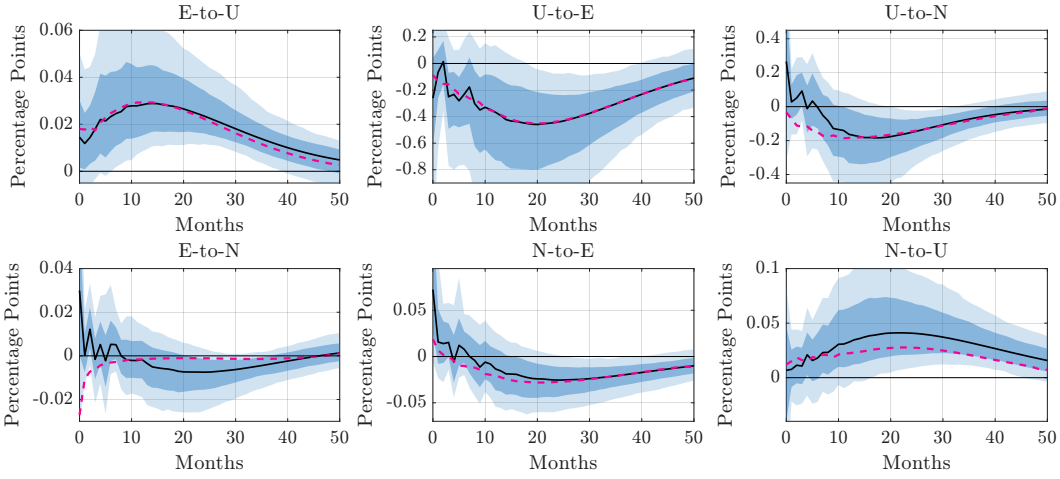
$$\theta_{EST} \equiv \{\rho_z, \sigma_z, \mu_\kappa, \sigma_\kappa, \psi, \delta_L, f_s\}$$

$$\hat{J} = \{EU_t, EN_t, UE_t, UN_t, NE_t, NU_t\}_{t=0}^{50}$$

$$\hat{\theta}_{EST} = \arg\min_{\theta_{EST}} (J(\theta_{EST}) - \hat{J})' \Sigma^{-1} (J(\theta_{EST}) - \hat{J})$$

▸ Model parameters

# Response of Labor Market Flows: Model vs Data




- Labor market flows from model (magenta lines) largely fall within 68% CI's
- Model matches EN/EU flows by quit/layoff as untargeted moments

Model steady state | Response of Quits and Layoffs | Response of Labor Market Stocks | Mechanism: What | Mechanism: Who

# Evaluating the Role of Labor Supply

- Ability of model to match response of labor market flows could reflect endogenous changes in composition or household labor supply
- For example, decrease in U-to-N flows could reflect
  - Greater mass of "likely searchers" in non-employment, or
  - Higher propensity to search for employment of all workers

# Evaluating the Role of Labor Supply

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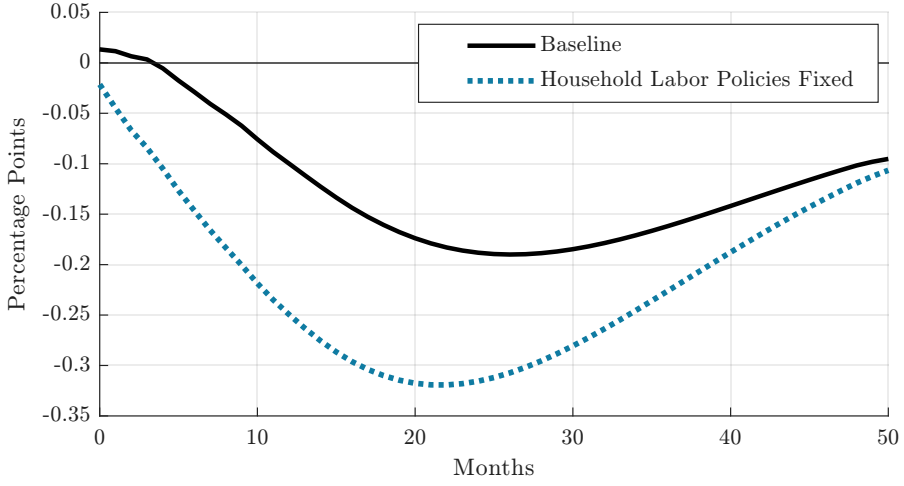
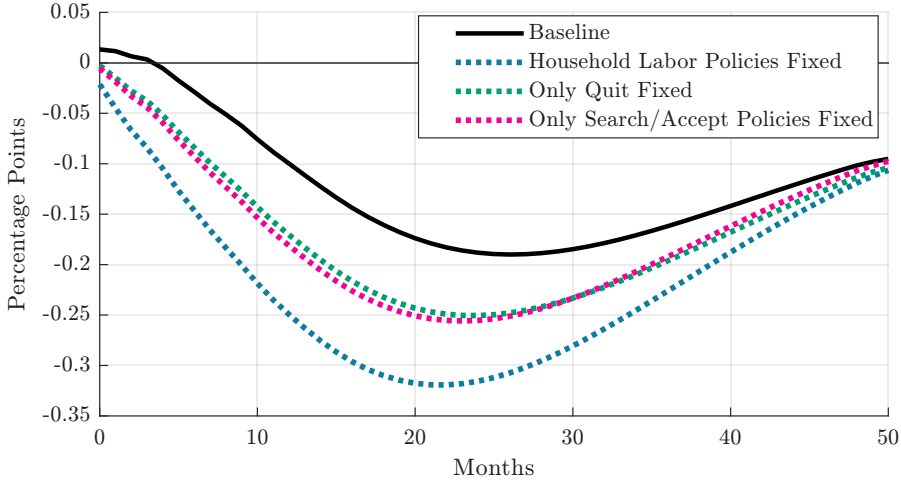
- For example, decrease in U-to-N flows could reflect
  - Greater mass of "likely searchers" in non-employment, or
  - Higher propensity to search for employment of all workers
- To assess relative importance of two channels, simulate model holding labor supply policy functions at steady state
  - If changes in labor supply do not matter, employment should be unaffected

# Evaluating the Role of Labor Supply: Employment Response




- Finding: Employment drops by additional $\approx 70\%$
  - Indicates broad-based increase in labor supply to contractionary monetary shock

# Evaluating the Role of Labor Supply: Employment Response




- Finding: Employment drops by additional $\approx 70\%$
  - Indicates broad-based increase in labor supply to contractionary monetary shock
  - Shift in labor supply for employed and non-employed is equally important

# Conclusion

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- New evidence from labor market flows consistent with substantial increase in labor supply to a contractionary monetary policy shock
  - Increase in search activity + decline in quits to non-employment
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  - Model matches response of labor flows through increase in labor supply
  - Why? Option value of employment ↑ when job finding rate falls
- Empirical evidence + model findings consistent with important role of labor supply in monetary transmission mechanism
- Future work: study labor supply response to Covid-era transfers (e.g., "Great Resignation") and evaluate role in subsequent inflation

# Appendix

# Cyclical Properties of Labor Market Stocks and Flows

Cyclicality of Labor Market Stocks

| | Employment-Population Ratio | Unemployment Rate | Participation Rate |
|---|---|---|---|
| mean($x$) | 61.14 | 6.19 | 65.16 |
| std($x$)/std($Y$) | 0.72 | 8.25 | 0.23 |
| corr($x$, $Y$) | 0.83 | −0.85 | 0.35 |

*Note:* $x$ denotes the variable in each column, $Y$ denotes HP-filtered log real GDP. Standard deviations and correlations are computed for HP-filtered quarterly averages. The sample is 1978-2019.

Cyclicality of Labor Market Flows

| | EU | EN | UE | UN | NE | NU |
|---|---|---|---|---|---|---|
| mean($x$) | 0.014 | 0.030 | 0.255 | 0.226 | 0.046 | 0.025 |
| std($x$)/std($Y$) | 5.41 | 2.40 | 5.69 | 4.13 | 2.87 | 5.22 |
| corr($x$, $Y$) | −0.81 | 0.50 | 0.77 | 0.71 | 0.67 | −0.67 |

*Note:* $x$ denotes the variable in each column, $Y$ denotes HP-filtered log real GDP. Standard deviations and correlations are computed for HP-filtered quarterly averages. The sample is 1978-2019.

Back

# Decomposition of Flows From Employment to Non-Employment

- Previous work: EU flows dominated by layoffs (Elsby et al. 2009, Ahn, 2023)

| | Total | Quits | Layoffs | Other |
|---|---|---|---|---|
| mean($x$) | 0.014 | 0.002 | 0.008 | 0.004 |
| std($x$)/std($Y$) | 5.41 | 8.12 | 7.94 | 5.44 |
| corr($x$, $Y$) | −0.81 | 0.60 | −0.84 | −0.54 |

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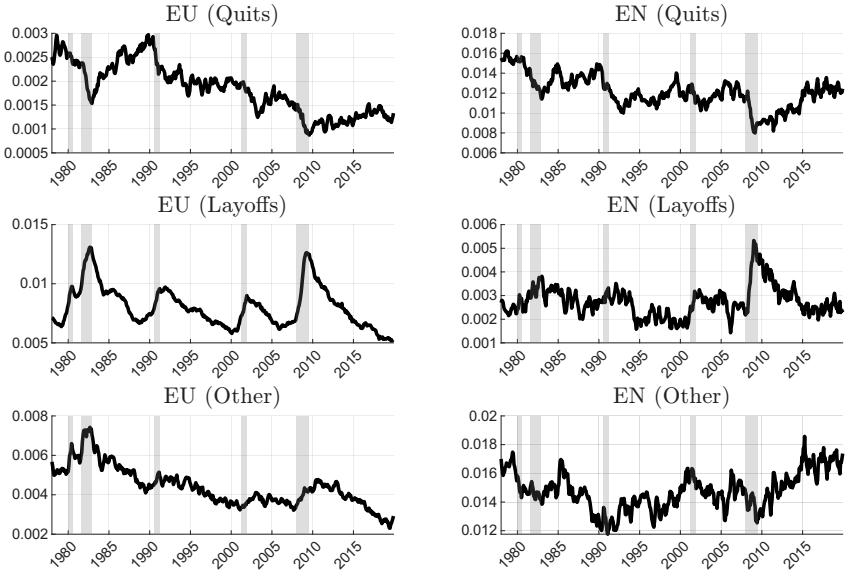
- This paper: EN flows show much larger role for quits

| | Total | Quits | Layoffs | Other |
|---|---|---|---|---|
| mean($x$) | 0.030 | 0.012 | 0.003 | 0.015 |
| std($x$)/std($Y$) | 2.40 | 5.84 | 14.39 | 4.78 |
| corr($x$, $Y$) | 0.50 | 0.53 | −0.44 | 0.25 |

▸ Times Series of Decomposed EU and EN ▸ Economic Significance of Quits and Layoffs ▸ Robustness of EU and EN Decompositions

◂ Back

# Decomposition of EU Flows




Back

# Relevance of Distinction Between Quits and Layoffs

Post-EU Transition Rates: Quits vs Layoffs

| | *To* | | |
|---|---|---|---|
| *From* | E | U | N |
| E – U(Quit) | 0.448 | 0.399 | 0.153 |
| E – U(Layoff) | 0.426 | 0.468 | 0.106 |

*Note:* Transition rates are shown for individuals that are in their first month of unemployment following an employment spell, split by reason for unemployment.

Back

# Relevance of Distinction Between Quits and Layoffs

Post-EN Report: Quits vs Layoffs

| | Average Probability |
|---|---|
| Want Job \| E-N(Quit) | 0.210 |
| Want Job \| E-N(Layoff) | 0.515 |
| NE \| Want Job | 0.145 |
| NE \| Do Not Want Job | 0.037 |
| NU \| Want Job | 0.172 |
| NU \| Do Not Want Job | 0.012 |

*Note:* The top section shows the probability that individuals want a job, split by the reason for leaving to nonparticipation. The bottom section shows the probabilities of moving to employment, split by whether or not nonparticipants report wanting a job.

Back

# Robustness of Quit/Layoff Distinction

Sequences of Reasons for U among E-U-U Individuals

| *Sample period* | P( Quit \| Layoff) | P( Layoff \| Quit) |
|---|---|---|
| pre-Redesign | 0.039 | 0.208 |
| post-Redesign | 0.007 | 0.026 |

*Note:* The first row shows the probability of individuals switching their reason for unemployment from layoff to quit (in the first column), or from quit to layoff (in the second column), prior to the 1994 CPS redesign. The second row shows the same, but for the period following the redesign.

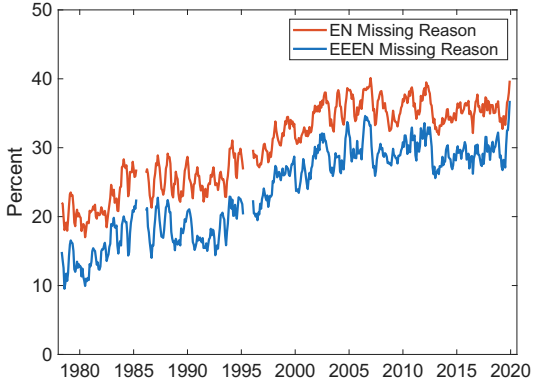
Transition Rates Across E-U-U Individuals

| | | *To* | | |
|---|---|---|---|---|
| | *From* | E | U | N |
| (*a*) | E − U(Quit) − U(Layoff) | 0.339 | 0.553 | 0.108 |
| (*b*) | E − U(Quit) − U(Quit) | 0.343 | 0.536 | 0.121 |
| (*c*) | E − U(Layoff) − U(Quit) | 0.352 | 0.557 | 0.091 |
| (*d*) | E − U(Layoff) − U(Layoff) | 0.264 | 0.667 | 0.068 |

*Note:* Transition rates are shown for individuals that are in their second month of unemployment following an employment spell, split by reason for unemployment. The rates are computed for the period prior to the 1994 CPS redesign.

Back

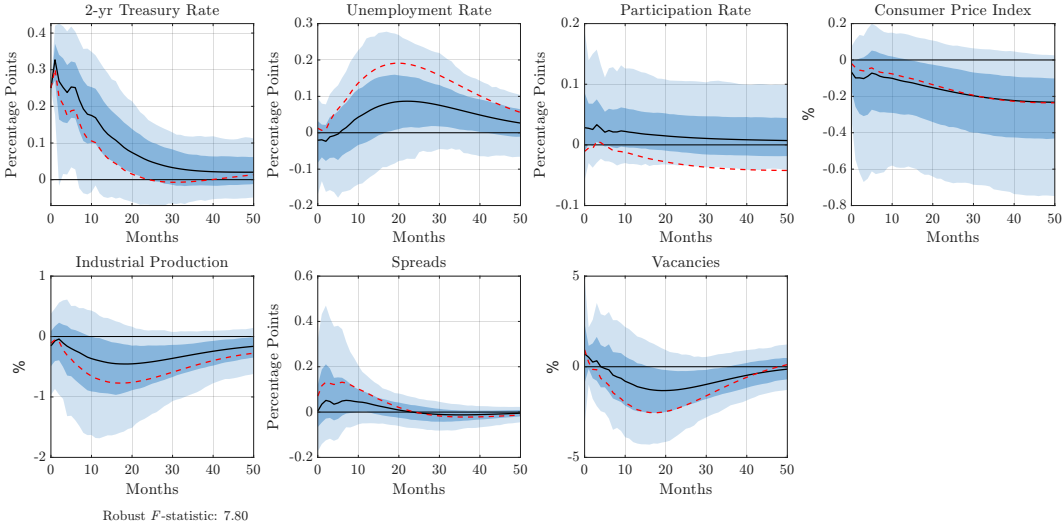
# Fraction of EN Transitions with Missing Reason




*Note:* The red line shows the proportion of individuals making an EN transition for which there is missing data on the reason for leaving the last job. The blue line shows the same calculation for individuals that were employed in each of the first three months before moving to nonparticipation. Series are smoothed using a centered 5-month moving average.

Back

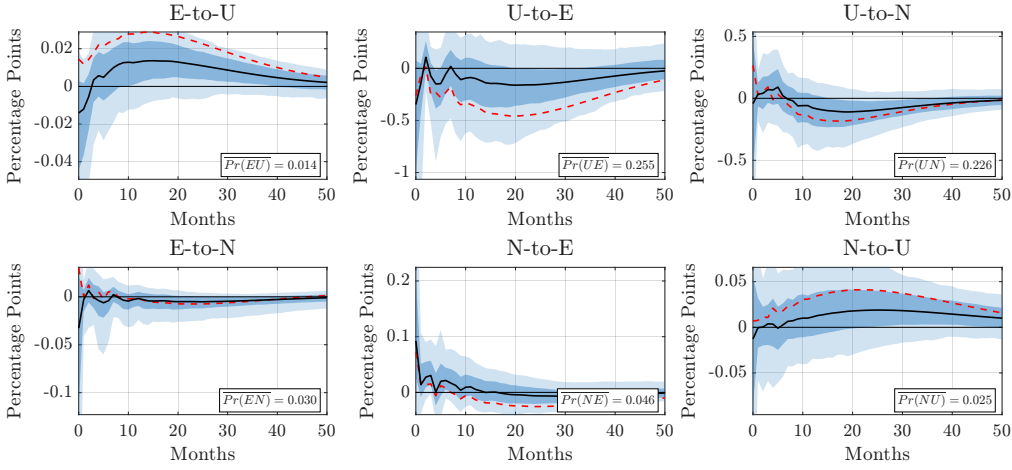
# Baseline VAR: FOMC Announcement Shocks (Not Orthogonalized)




- Baseline estimates indicated by **red** dashed lines

Back

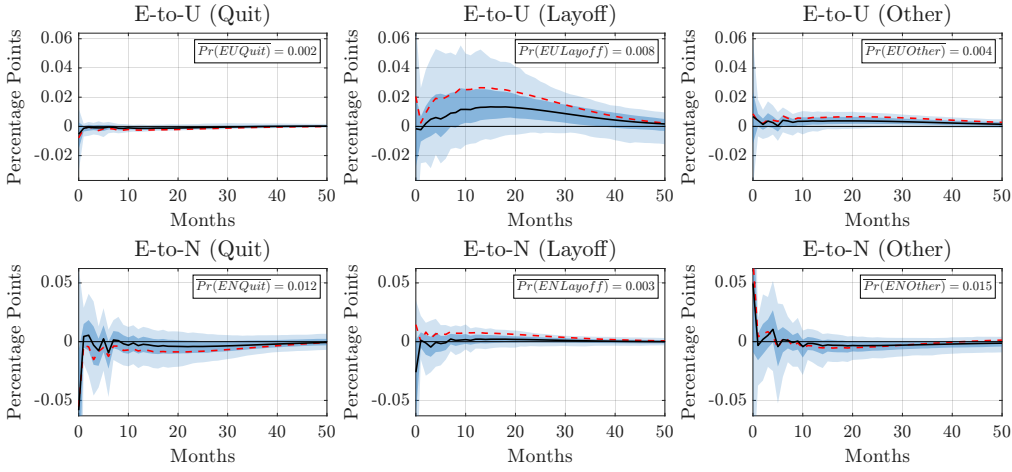
# Labor Market Flows: FOMC Announcement Shocks (Not Orthogonalized)




- Baseline estimates indicated by **red** dashed lines

Back

# Quit/Layoff Responses: FOMC Announcement Shocks (Not Orthog.)

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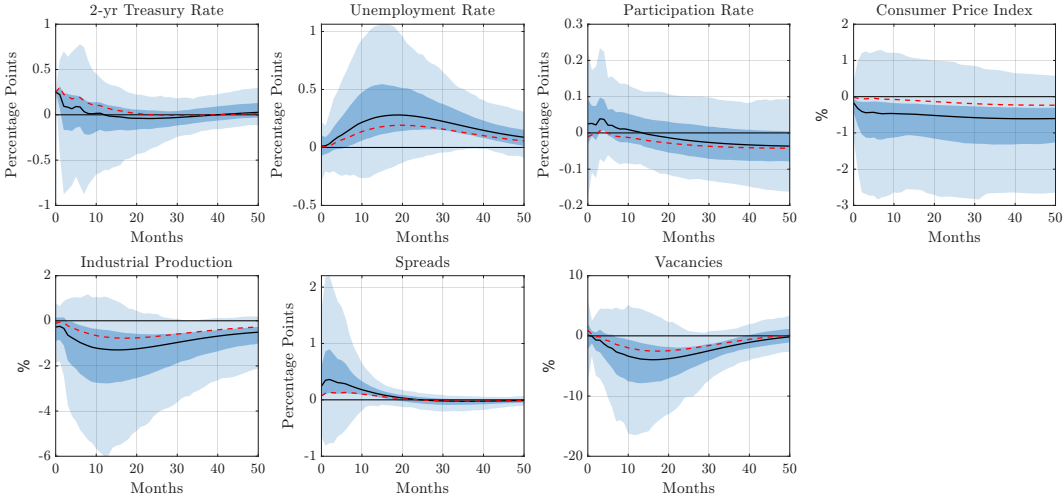
Back

# Baseline VAR: FOMC Announcement Shocks (Orthogonalized)

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Back

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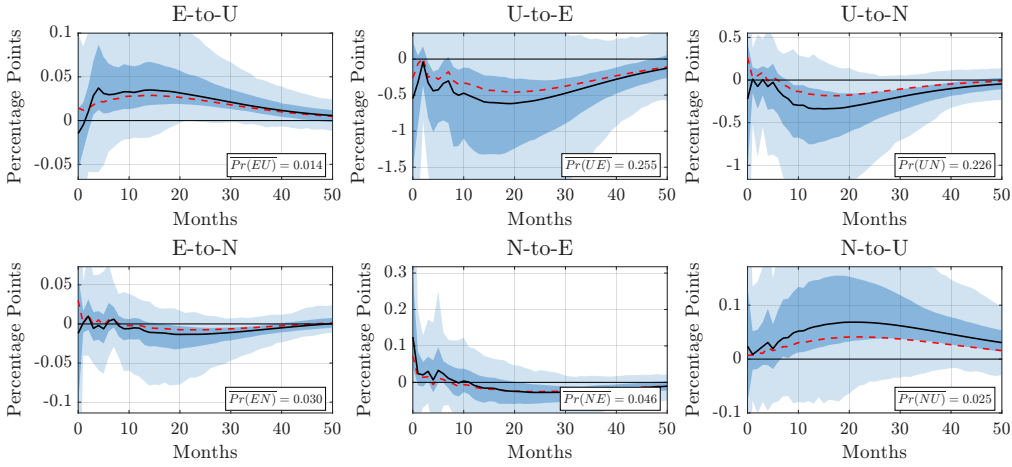


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Back

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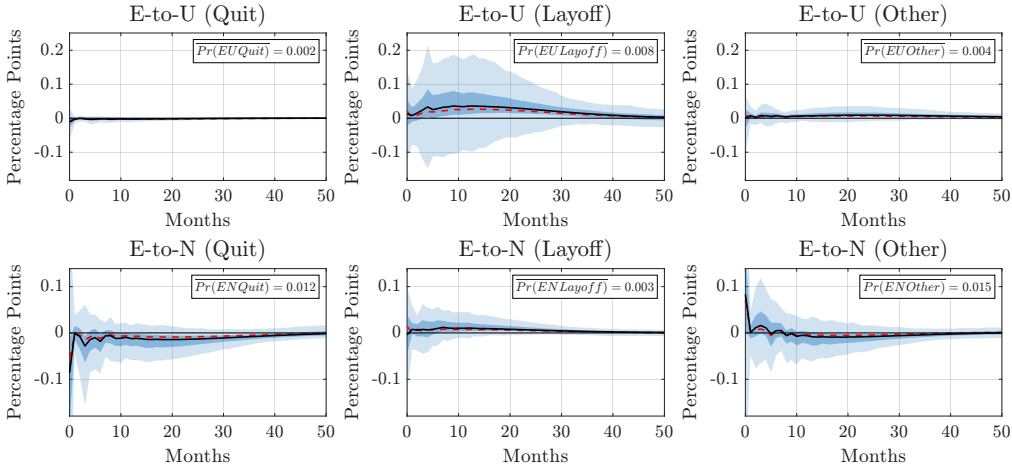
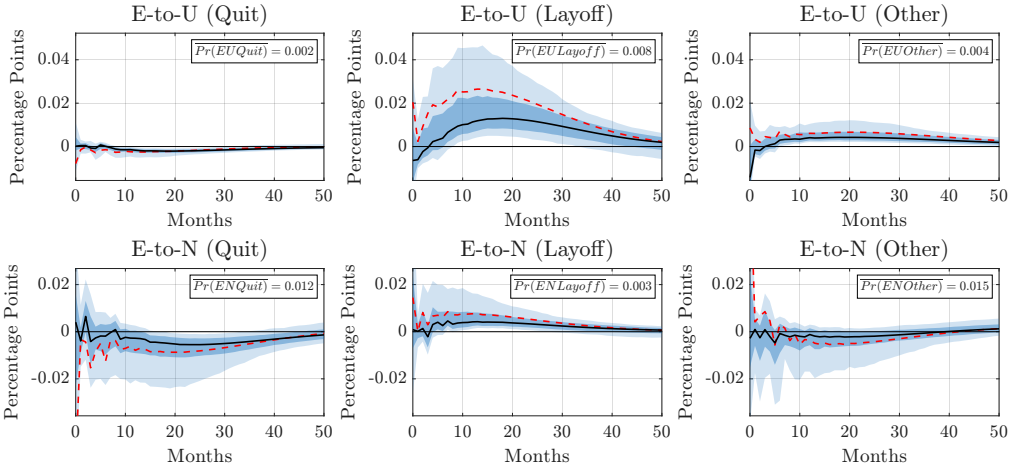



- Baseline estimates indicated by **red** dashed lines

Back

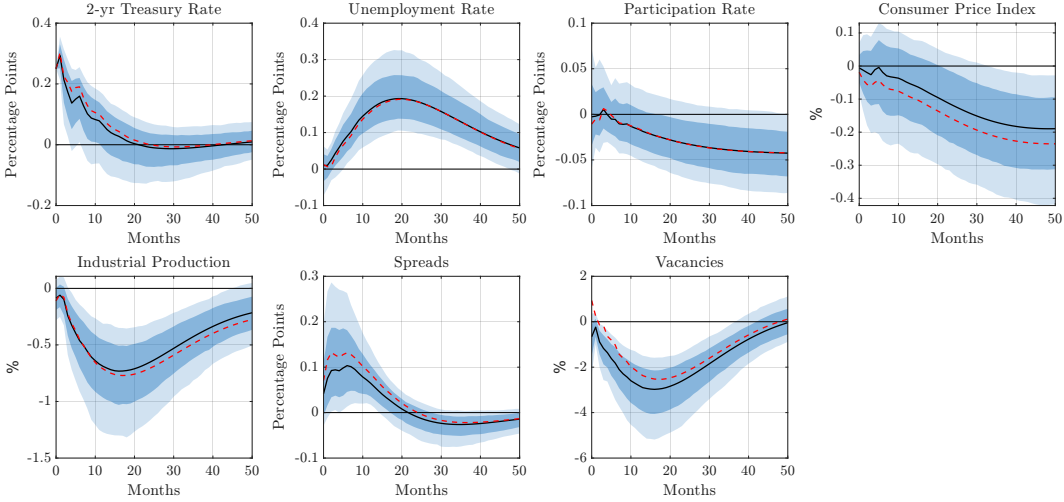
# Quit/Layoff Responses: Romer & Romer Shocks




- Baseline estimates indicated by **red** dashed lines

Back

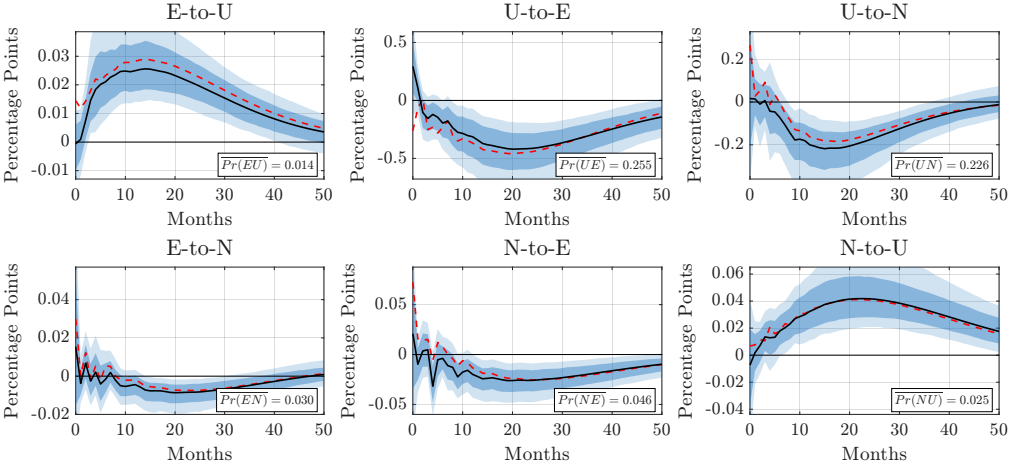
# Baseline VAR: Aruoba & Drechsel (2024) Shocks




- Baseline estimates indicated by **red** dashed lines

◂ Back (Main VAR) ◂ Back (Robustness)

# Labor Market Flows: Aruoba & Drechsel (2024) Shocks




- Baseline estimates indicated by **red** dashed lines

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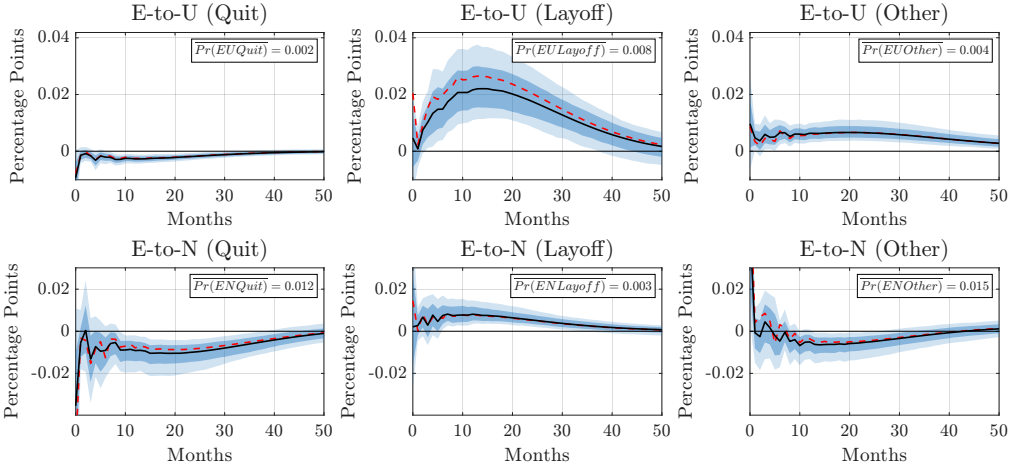
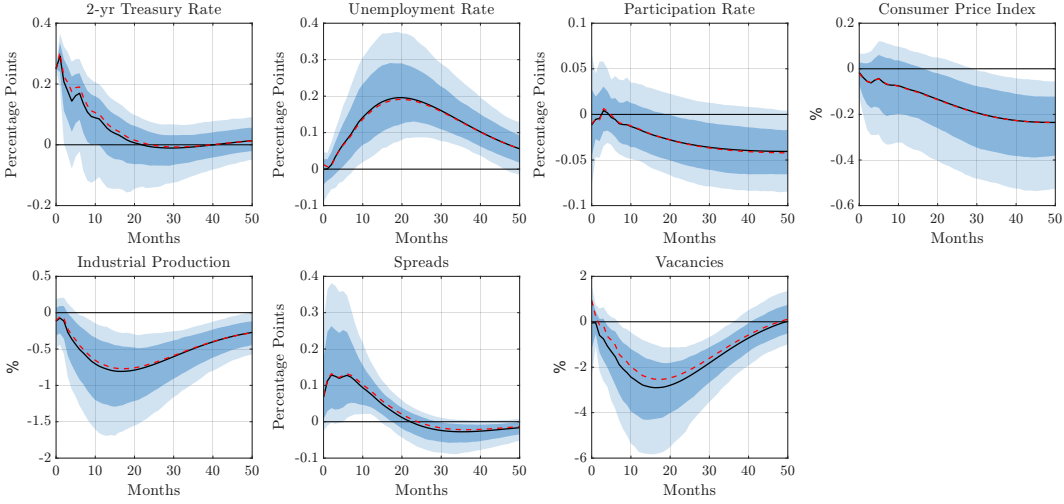
# Quit/Layoff Responses: Aruoba & Drechsel (2024) Shocks




- Baseline estimates indicated by **red** dashed lines

◂ Back (Flows Decomposition) ◂ Back (Robustness)

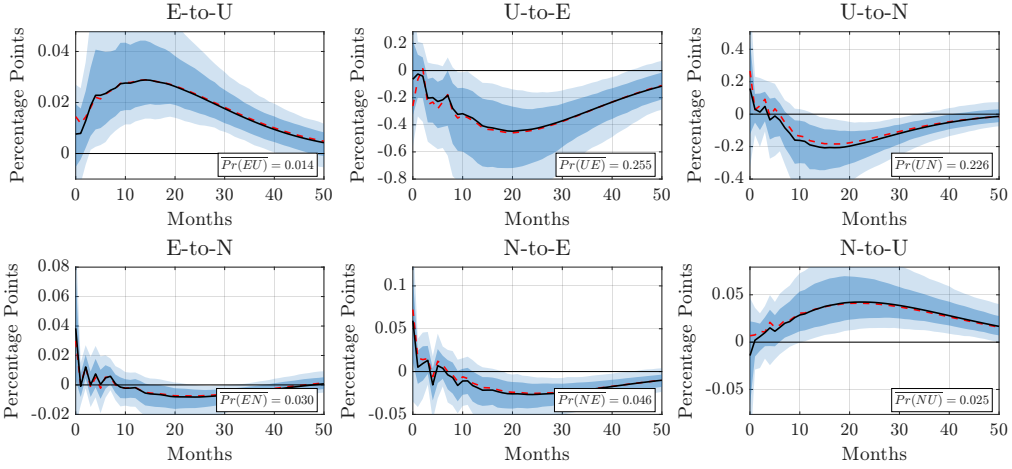
# Baseline VAR: AD (2024) and SJ (2025) Shocks




- Baseline estimates indicated by **red** dashed lines

Back

# Labor Market Flows: AD (2024) and SJ (2025) Shocks

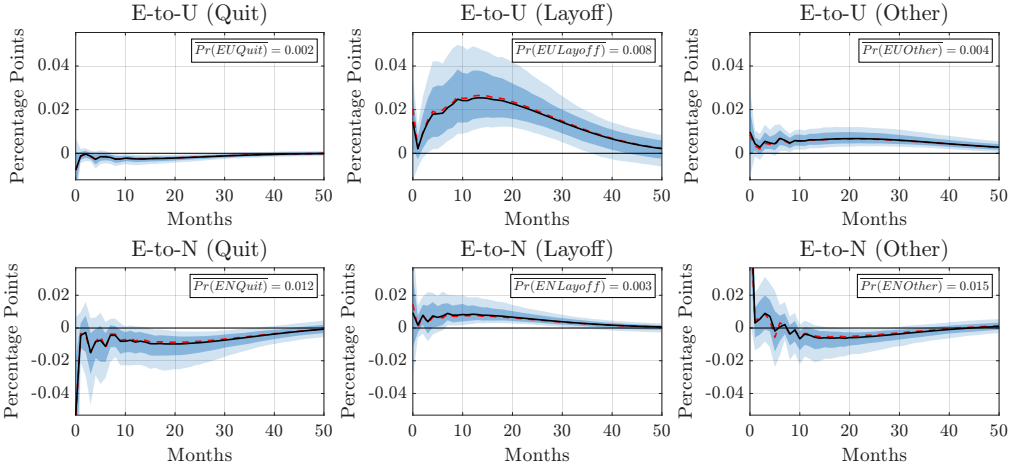



Robust $F$-statistic: 18.25

- Baseline estimates indicated by **red** dashed lines

Back

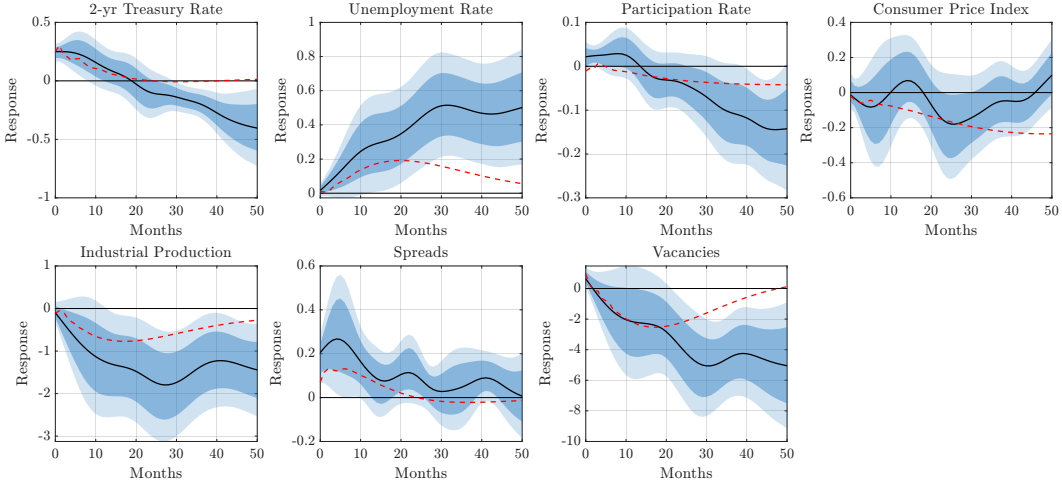
# Quit/Layoff Responses: AD (2024) and SJ (2025) Shocks




- Baseline estimates indicated by **red** dashed lines

Back

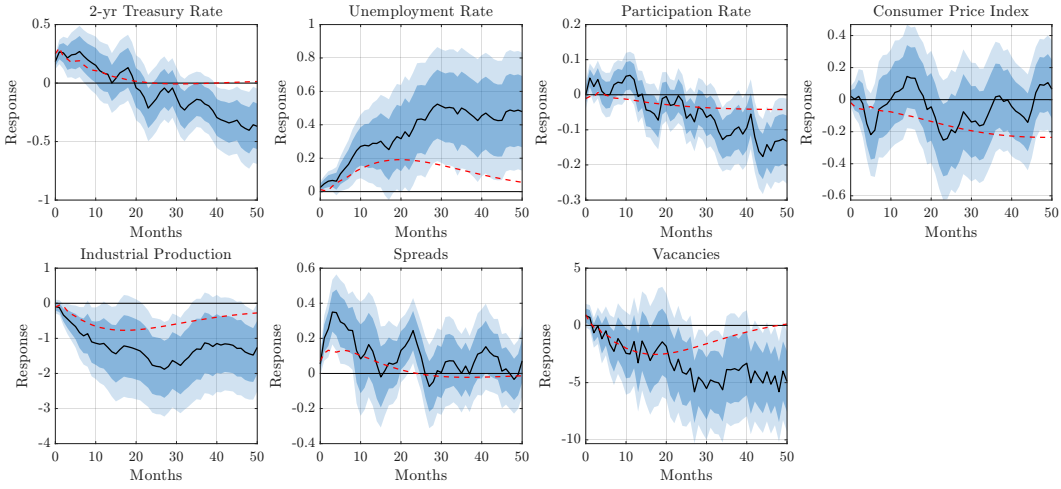
# Baseline Variables: Smooth Local Projection Estimates




- Baseline estimates indicated by **red** dashed lines

Back (Main VAR) Back (Robustness)

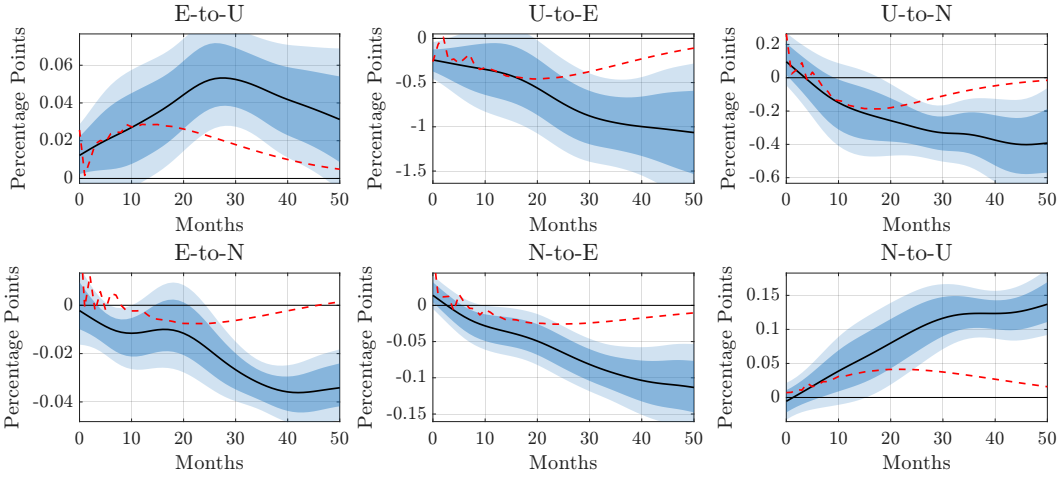
# Baseline Variables: Local Projection Estimates




- Baseline estimates indicated by **red** dashed lines

◂ Back (Main VAR) ◂ Back (Robustness)

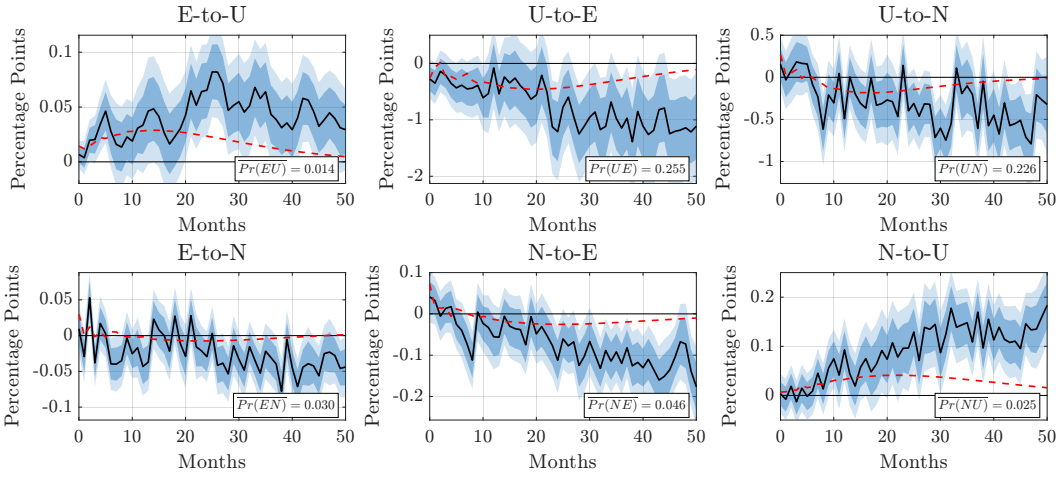
# Labor Market Flows: Smooth Local Projection Estimates




- Baseline estimates indicated by **red** dashed lines

Back (Flows) Back (Robustness)

# Labor Market Flows: Local Projection Estimates

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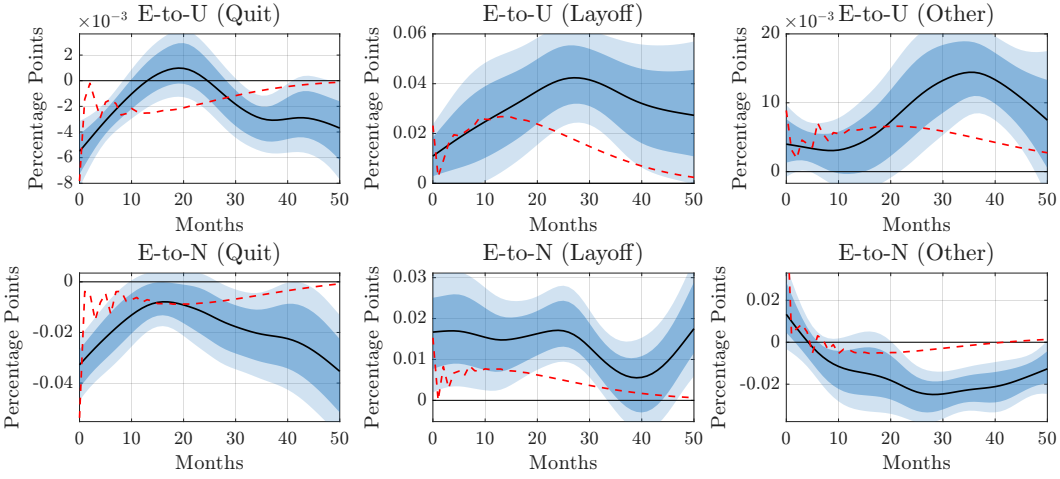
# Quit/Layoff Responses: Smooth Local Projection Estimates

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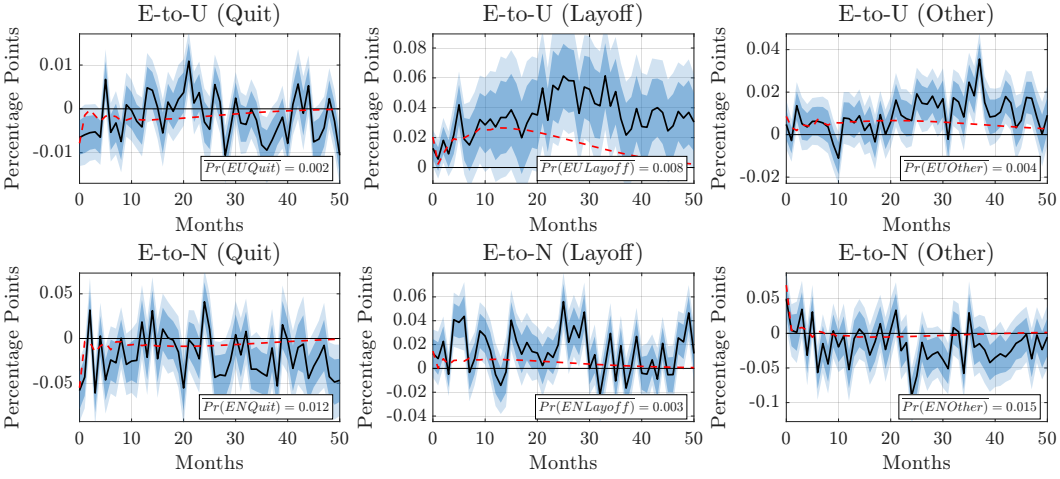
◂ Back (Flows Decomposition) ◂ Back (Robustness)

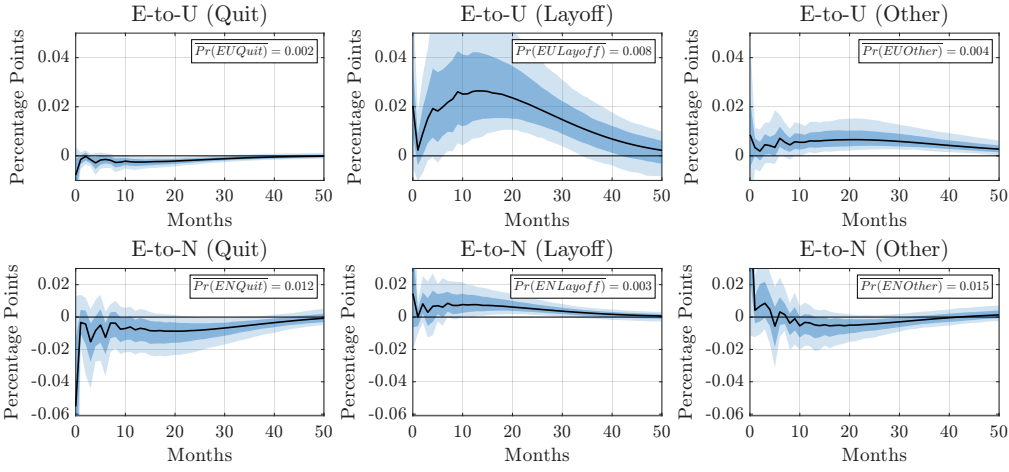
# Quit/Layoff Responses: Local Projection Estimates




- Baseline estimates indicated by **red** dashed lines

Back

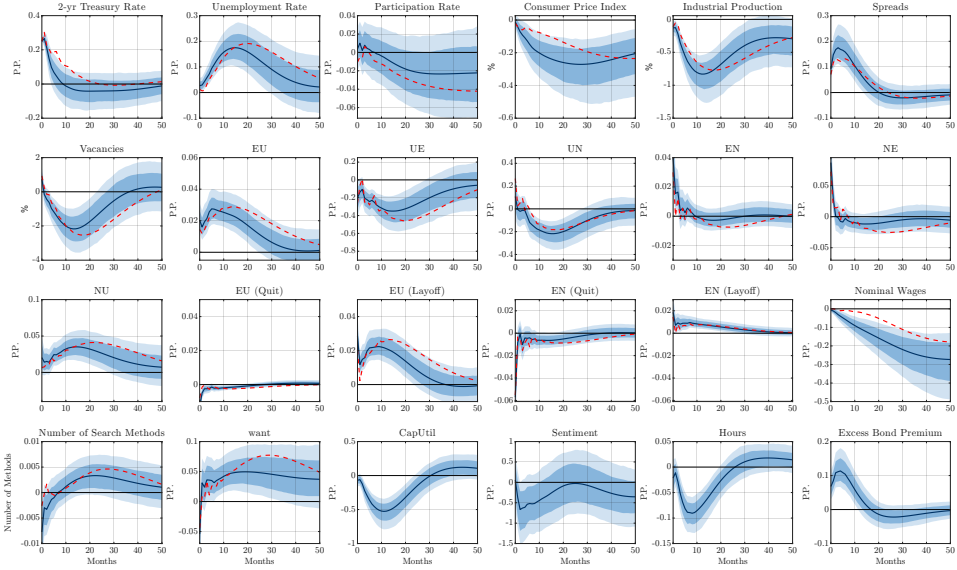
# Quit/Layoff Responses: Including Other Separations




- "Other separations" not a key driver of EU or EN responses

◂ Back (Flows Decomposition) ◂ Back (Robustness)

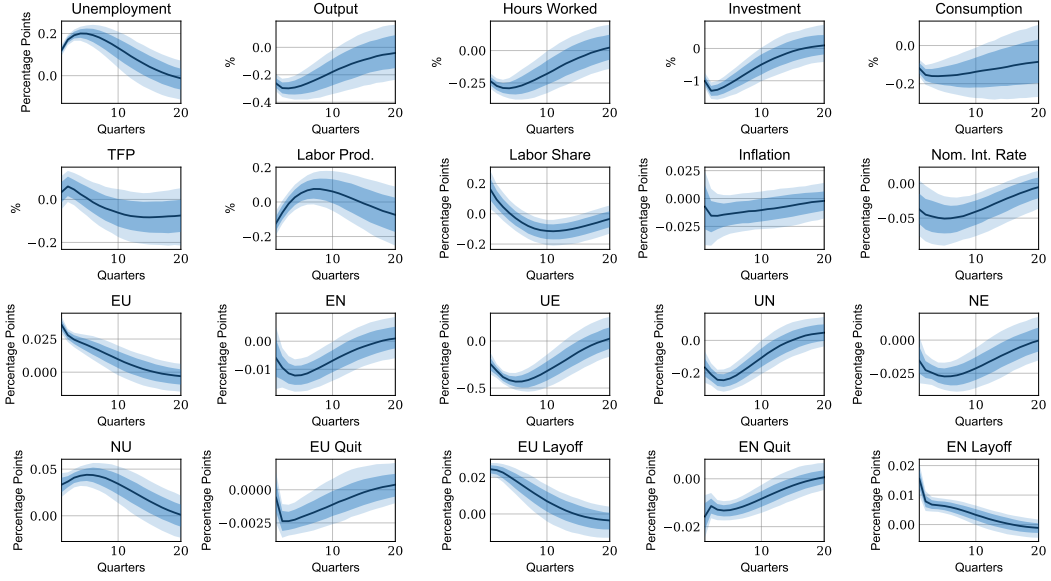
# Large Scale Bayesian VAR




- Baseline estimates indicated by **red** dashed lines

◂ Back (Main VAR) ◂ Back (Robustness)

# Main Business Cycle Shock + Flows (Angeletos et al. (2020))

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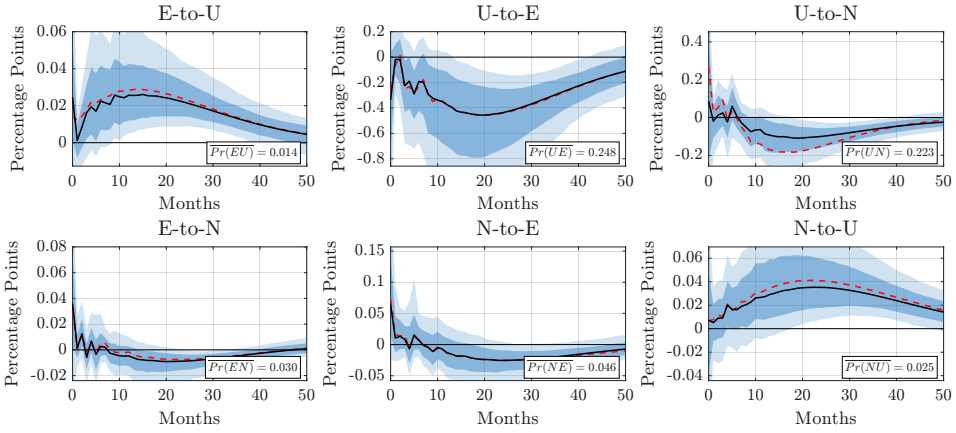
# Labor Market Flows: Holding Composition Fixed




- Composition-adjusted flows by ex-ante characteristics, à la Elsby et al. (2015)
- Fix shares using bins for age × gender × education × reason for unemployment
- Baseline estimates indicated by **red** dashed lines

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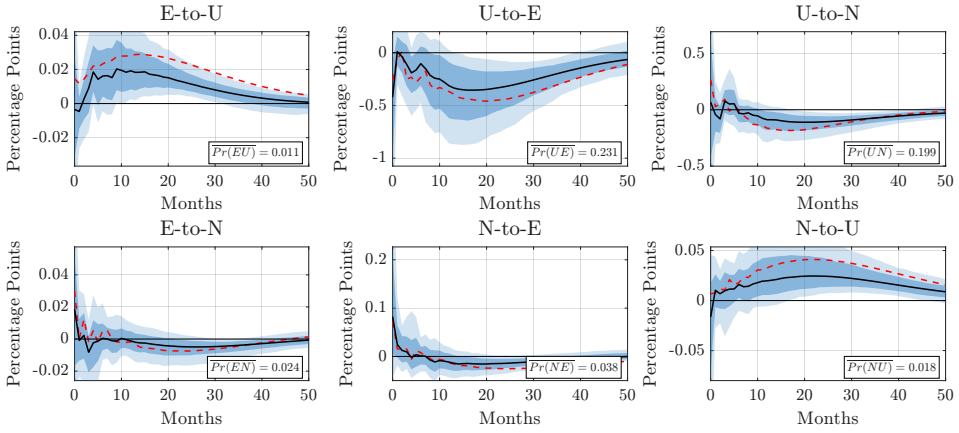
# Labor Market Flows: Holding Composition Fixed (Full Controls)




- Fix shares using bins for age × gender × education × reason for unemployment × labor market status one year ago
- Baseline estimates for alternative sample indicated by **red** dashed lines

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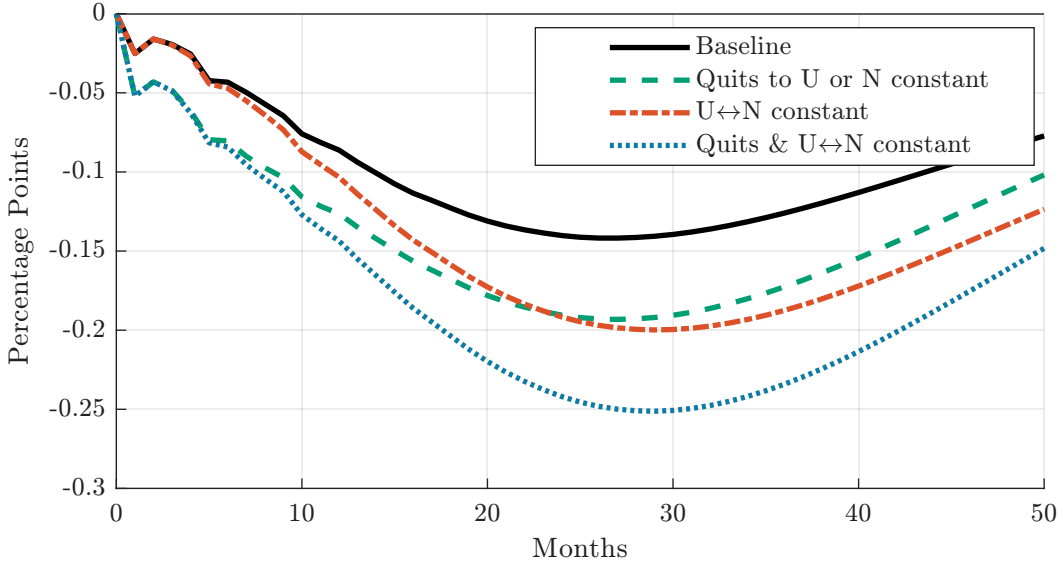
# Decomposing Employment Response: Holding Composition Fixed

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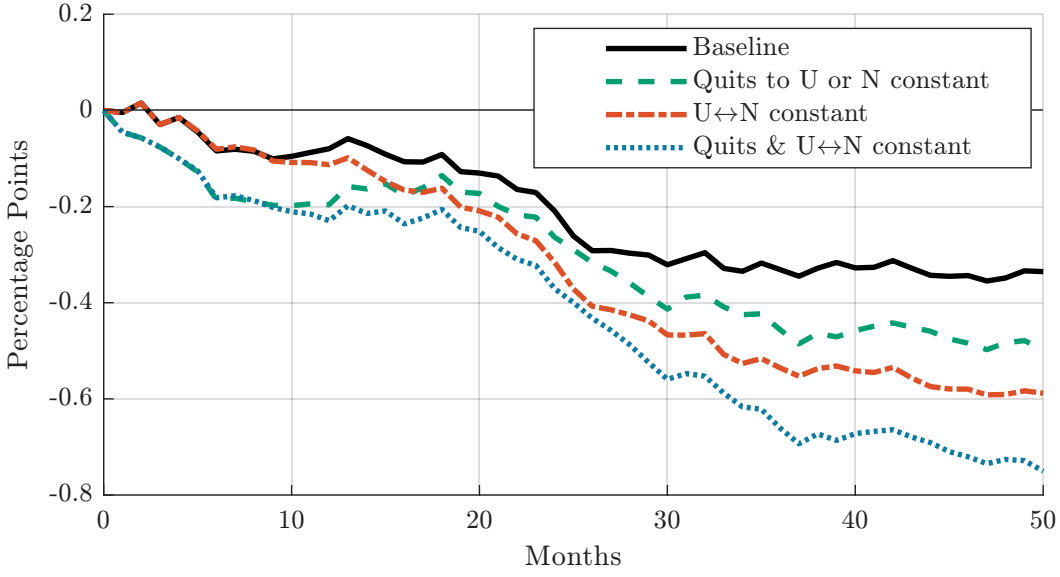
# Decomposing Employment Response: Using Local Projections

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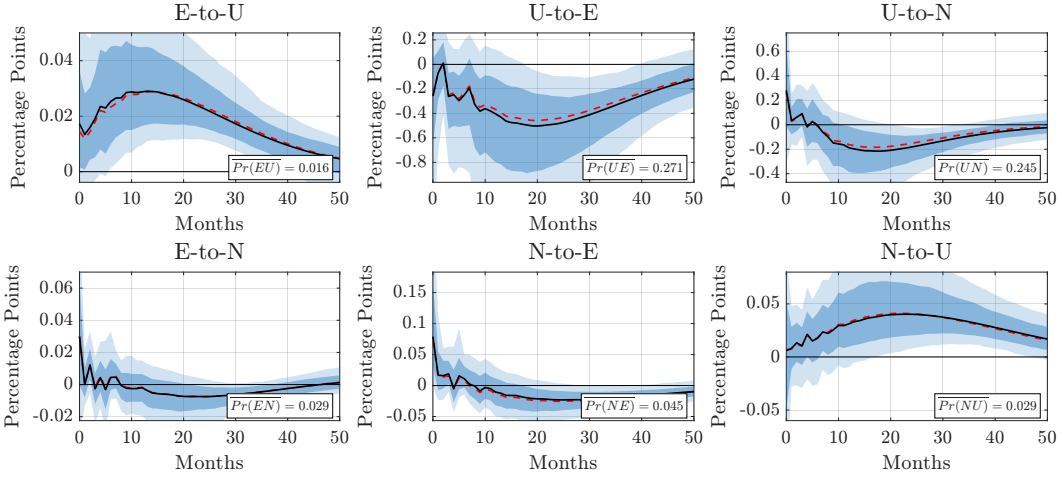
# Labor Market Flows: Corrected for Time-Aggregation




- Baseline estimates indicated by **red** dashed lines

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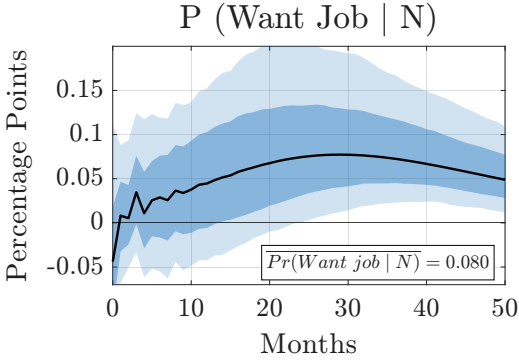
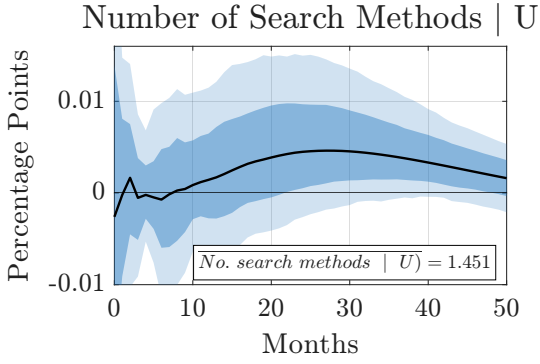
# Intensive Margins of Labor Supply

Intensive margins of job search consistent with behavior of NU/UN flows:

- For N: share that want a job
- For U: number of search methods

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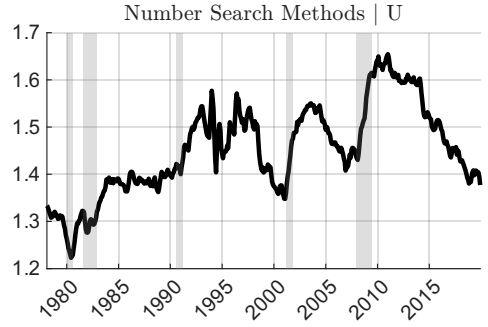
# Intensive Margins: Time-Series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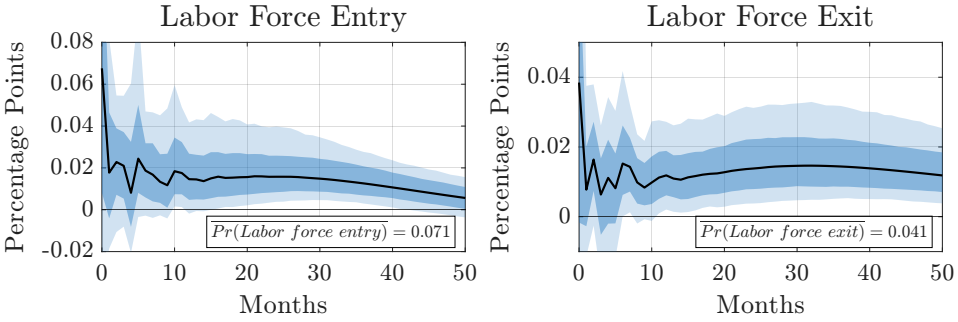
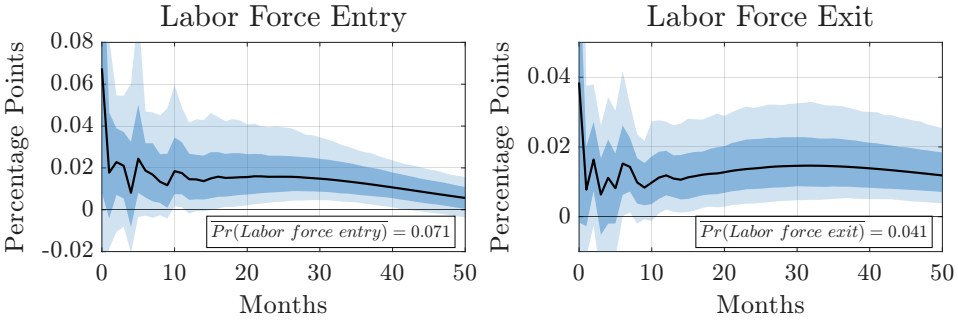
# Participation: Response of Labor Force Entry and Exit




- Participation falls due to higher exit rate, offset by rise in entry

# Participation: Response of Labor Force Entry and Exit




- Participation falls due to higher exit rate, offset by rise in entry
- Increase in exits driven by $u_{t-1}$, attenuated by $UN_t$ and $EN_t$

$$\left(\text{Labor Force Entry Rate}\right)_t = NU_t + NE_t,$$

$$\left(\text{Labor Force Exit Rate}\right)_t = u_{t-1} \cdot UN_t + (1 - u_{t-1}) \cdot EN_t,$$

where $u_{t-1}$ denotes the unemployment rate (and $\overline{UN} >> \overline{EN}$)

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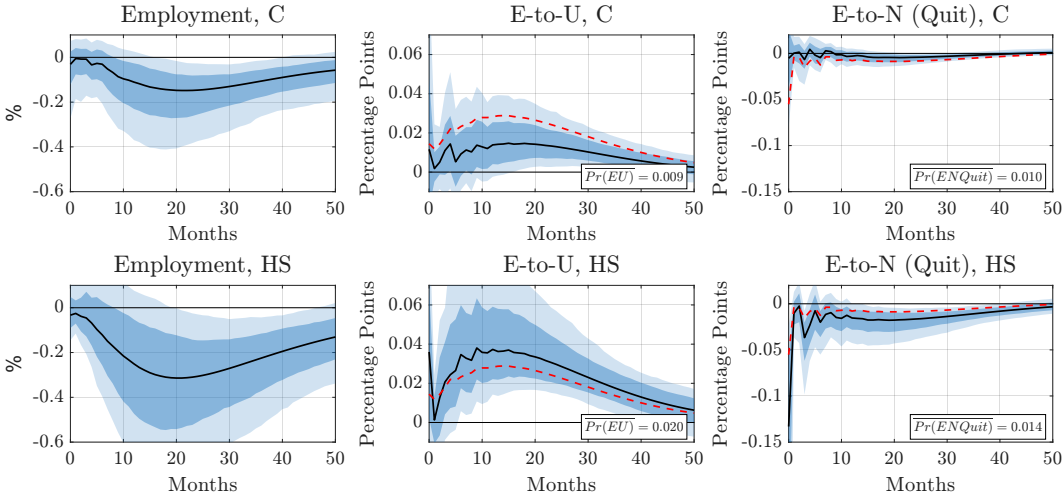
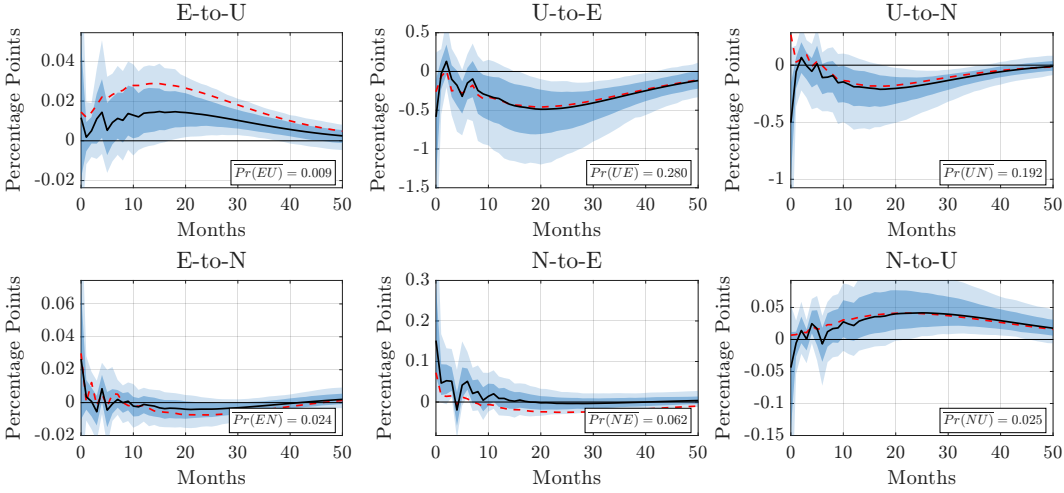
# Heterogeneity in Labor Market Responses: Education




- Decline in E-to-N concentrated among less educated
- Baseline estimates indicated by **red** dashed lines

Flows: Coll+ | Flows: HS+ | Back

# Labor Market Flows: Higher-Educated




- Baseline estimates indicated by **red** dashed lines

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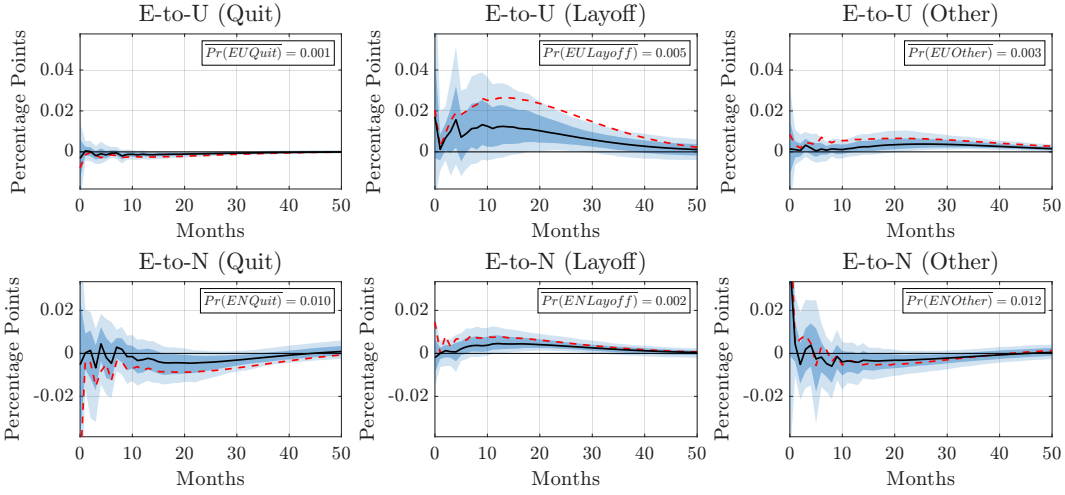
# Quit/Layoff Responses: Higher-Educated




- Baseline estimates indicated by **red** dashed lines

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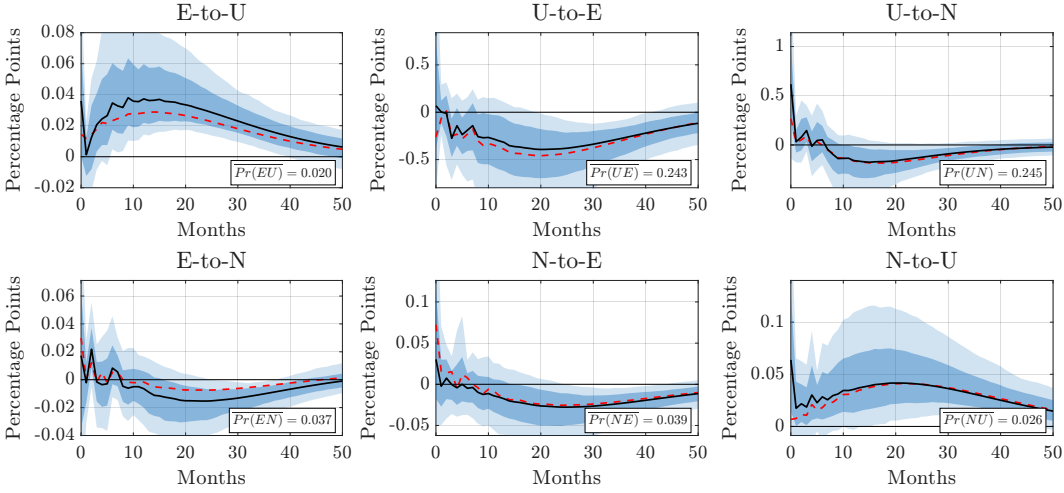
# Labor Market Flows: Lower-Educated




- Baseline estimates indicated by **red** dashed lines

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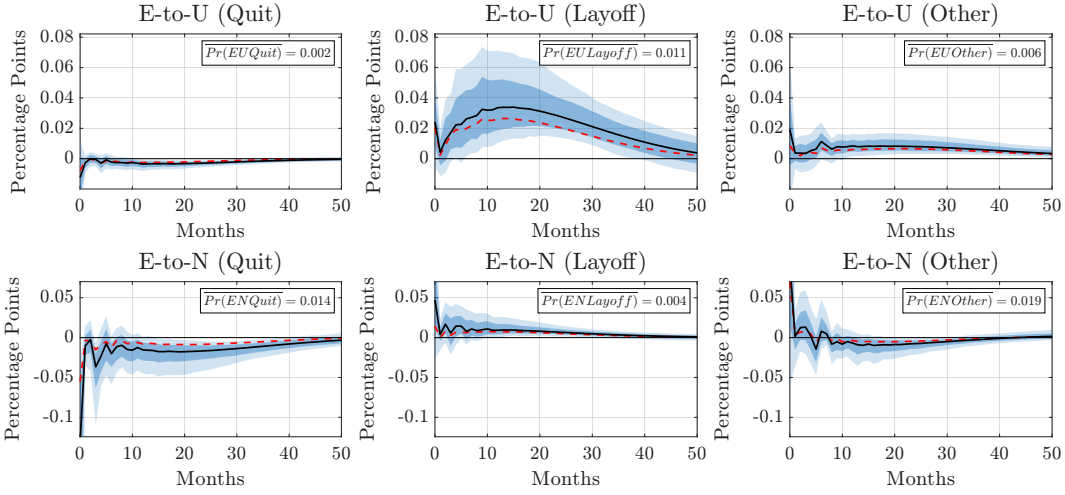
# Quit/Layoff Responses: Lower-Educated




- Baseline estimates indicated by **red** dashed lines

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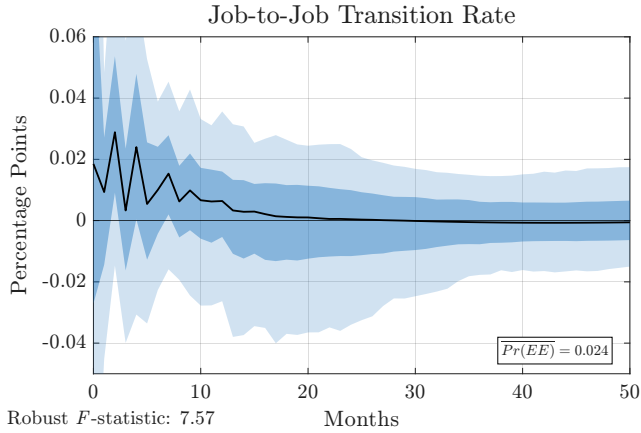
# Response of Job-to-Job Flows (1994-2019)




- Recent literature posits important role of job-to-job transitions for inflation
  - e.g. Faccini & Melosi (2023), Moscarini & Postel-Vinay (2025), Birinci et al (2025)
- Our estimates show no response of EE rate to contractionary MPS

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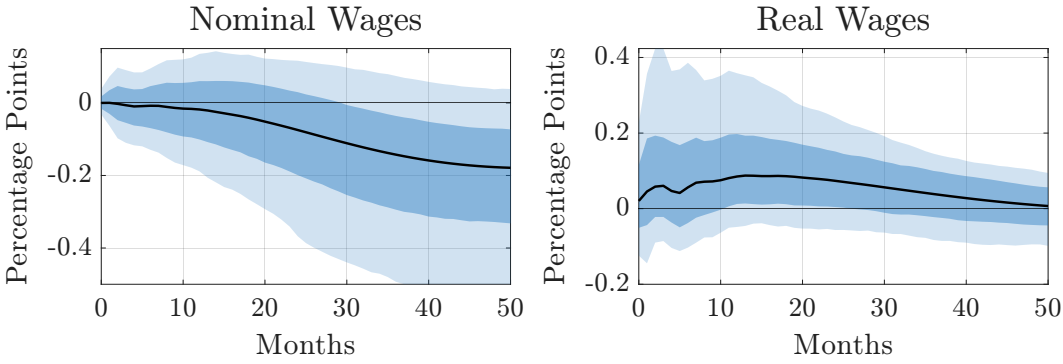
# Response of Wages




- Nominal wages decline more slowly than CPI

  $\Rightarrow$ real wages rise very slightly in the short-run

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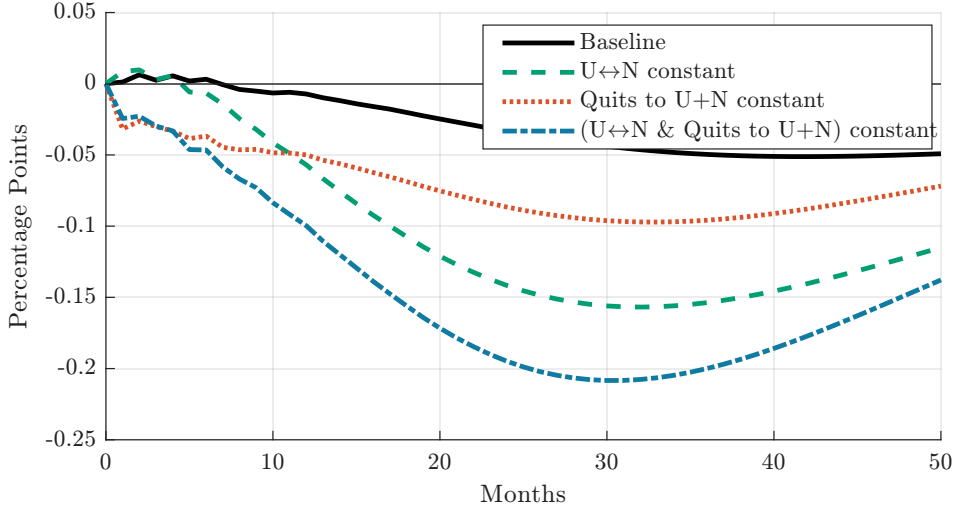
# Participation Response to a Monetary Policy Shock




- With response of supply-driven flows fixed ⇒ Participation far more procyclical

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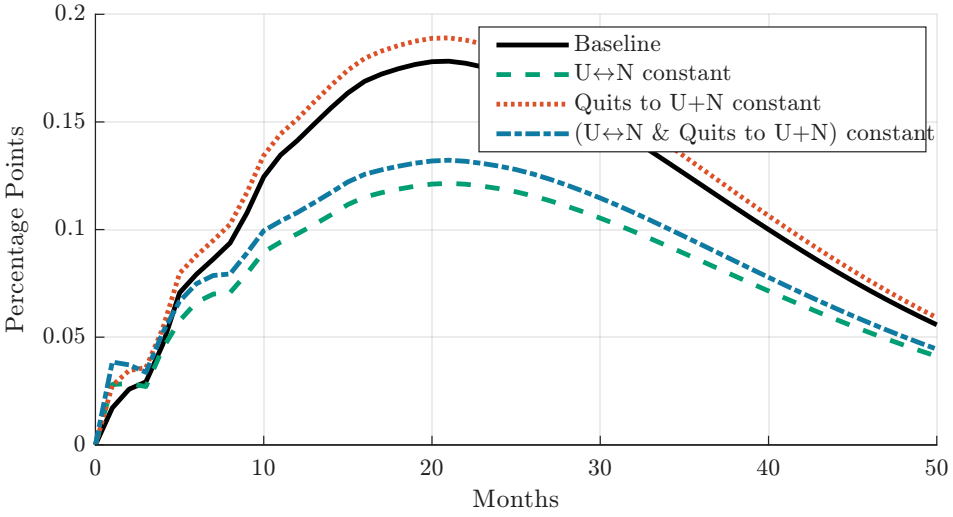
# Unemployment Response to a Monetary Policy Shock




- Response of quits not important for unemployment dynamics

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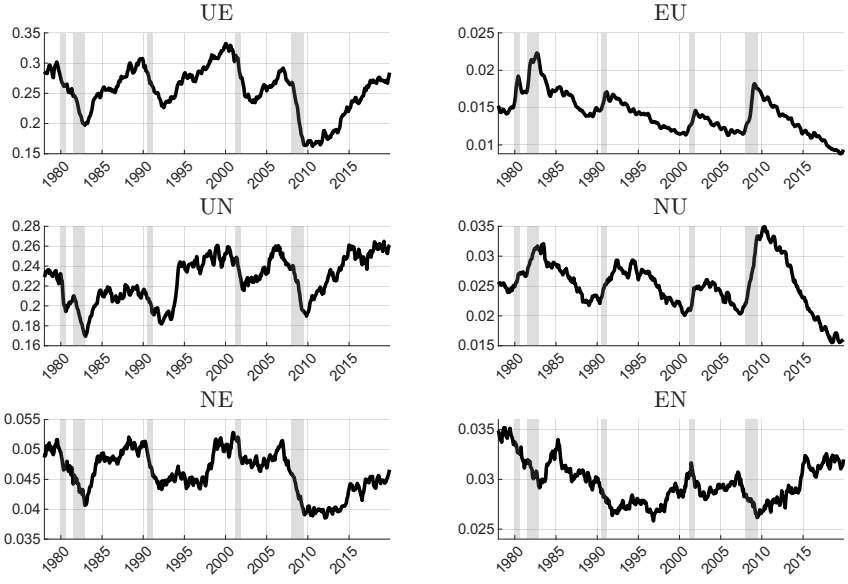
# Time Series of Labor Market Flows

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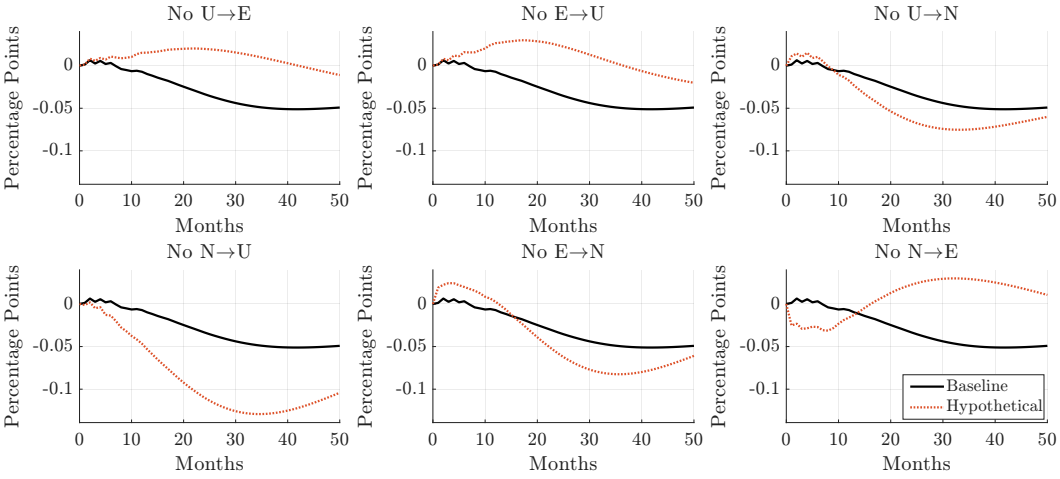
# The Ins and Outs of Participation




- E→U and U→E are important for participation cycle

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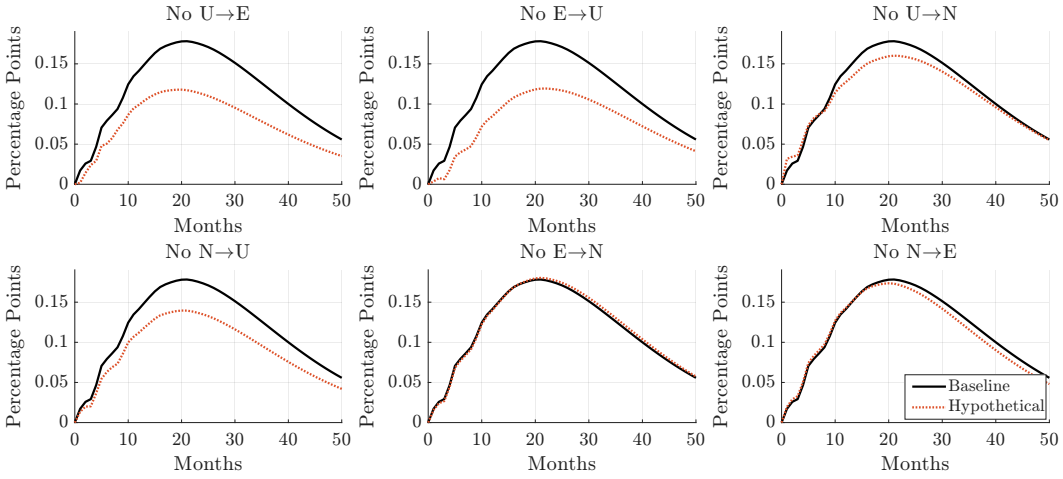
# The Ins and Outs of Unemployment




- E→U and U→E roughly equally responsible for rise in unemployment

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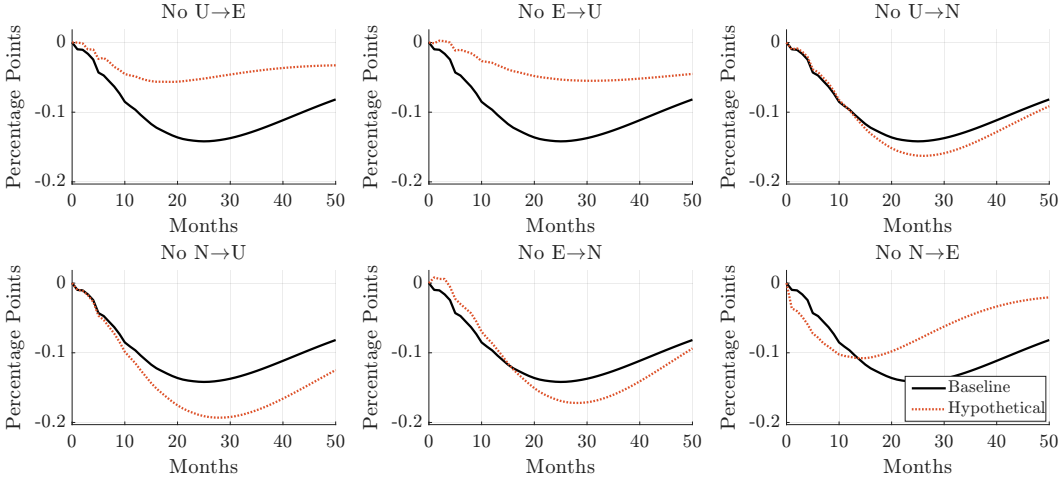
# The Ins and Outs of Employment




- N→U more important than U→N for supporting employment

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# Timing within a Model Period

1. All individuals draw a new value of productivity, $z$. Non-employed individuals draw an i.i.d. search cost, $\kappa$.
2. Employed individuals make consumption/saving decisions and choose whether or not to quit their job. Non-employed individuals make consumption/saving decisions and choose whether or not to search for a job.
3. Employed individuals who do not quit are exogenously laid off with probability $\delta$. Non-employed individuals receive job offers with probabilities $f_s$ of $f_{ns}$, depending on whether or not they actively search.
4. Non-employed individuals who receive job offers decide whether or not to accept such offers.
5. UI-eligible non-employed individuals who search and either do not receive a job offer or do not accept an offer are subject to UI expiry with probability $\delta_{UI}$.

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# Estimation: A Monetary Policy Shock in the Model

- Feed in response of job-finding rate, layoff rate, real interest rates and wages from the data
- Overall response of labor market flows also determined by endogenous changes in policy functions + distribution of households across labor market states

# Estimation: A Monetary Policy Shock in the Model

- Feed in response of job-finding rate, layoff rate, real interest rates and wages from the data
- Overall response of labor market flows also determined by endogenous changes in policy functions + distribution of households across labor market states
- Calibrate a number of parameters, $\theta_{EXT} \equiv \{\beta, \gamma, \bar{R}, \delta_{UI}, w, \alpha, \phi, \bar{\phi}, \tau, T\}$
  - Assume $u(c) = \frac{c^{1-\gamma}-1}{1-\gamma}$, $f_{ns} = \alpha f_s$

# Estimation: A Monetary Policy Shock in the Model

- Feed in response of job-finding rate, layoff rate, real interest rates and wages from the data
- Overall response of labor market flows also determined by endogenous changes in policy functions + distribution of households across labor market states
- Calibrate a number of parameters, $\theta_{EXT} \equiv \{\beta, \gamma, \bar{R}, \delta_{UI}, w, \alpha, \phi, \bar{\phi}, \tau, T\}$
- Estimate remaining parameters to match IRFs of labor market flows
  - À la Christiano, Eichenbaum, Evans (2005) or Auclert, Rognlie, Straub (2020)

$$\theta_{EST} \equiv \{\rho_z, \sigma_z, \mu_\kappa, \sigma_\kappa, \psi, \delta_L, f_s\}$$

$$\hat{J} = \{EU_t, EN_t, UE_t, UN_t, NE_t, NU_t\}_{t=0}^{50}$$

$$\hat{\theta}_{EST} = \arg\min_{\theta_{EST}} (J(\theta_{EST}) - \hat{J})' \Sigma^{-1} (J(\theta_{EST}) - \hat{J})$$

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# Model Parameters

**Calibrated**

| Parameter | Description | Value | Source/Target |
|---|---|---|---|
| $\beta$ | Discount Factor | 0.988 | Quarterly MPC of 7-8% |
| $R$ | Steady-State Real Interest Rate | 1.001 | 1% Annual |
| $\gamma$ | Risk Aversion Coefficient | 2 | Standard value |
| $\delta^{UI}$ | Benefit Exhaustion Probability | 0.167 | Expected duration of UI |
| $w$ | Steady-State Wage | 1 | Normalization |
| $\alpha$ | Efficiency of Passive Search | 0.6 | Job-finding rate from N |
| $\phi$ | UI Replacement Rate | 0.50 | Graves (2023) |
| $\bar{\phi}$ | Maximum UI Payments | 1.85 | Graves (2023) |
| $\tau$ | Labor Income Tax Rate | 0.33 | Auclert et al. (2021) |
| $T$ | Lump-sum Transfer | 0.24 | Auclert et al. (2021) |

**Estimated**

| Parameter | Description | Value | Standard Error |
|---|---|---|---|
| $\rho_z$ | Persistence of Labor Productivity | 0.960 | (0.004) |
| $\sigma_z$ | Standard Deviation of Labor Productivity | 0.362 | (0.023) |
| $\mu_\kappa$ | Mean Value of Search Cost | 0.783 | (0.105) |
| $\sigma_\kappa$ | Dispersion of Search Cost | 0.167 | (0.022) |
| $\psi$ | Value of Leisure | 0.421 | (0.107) |
| $\delta$ | Steady-State Layoff Rate | 0.019 | (0.002) |
| $f_s$ | Steady-State Job-Finding Rate | 0.273 | (0.028) |

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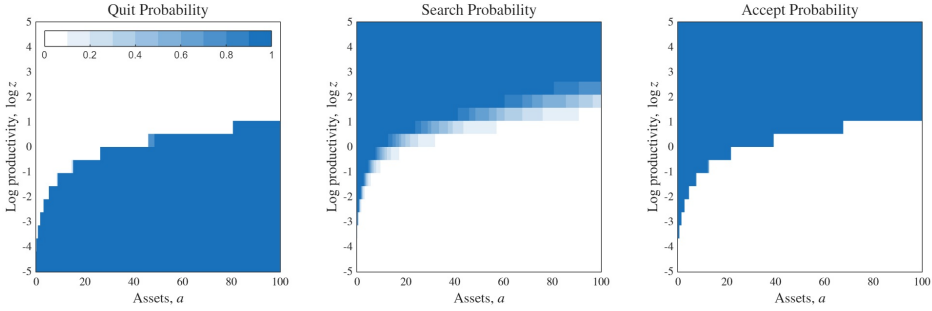
# Results: Steady State




1. Model almost exactly fits steady-state transition rates between E, U and N
2. Model produces quarterly MPC of 7-8%, annual MPE of 5%
   In line with Orchard et al. (2023), Boehm et al. (2024), Golosov et al. (2023)

# Steady-State Labor Market Flows

| Flow | Model | Data |
|---|---|---|
| EU | 0.0143 | 0.0142 |
| EN | 0.0296 | 0.0296 |
| UE | 0.2548 | 0.2547 |
| UN | 0.2263 | 0.2262 |
| NE | 0.0461 | 0.0461 |
| NU | 0.0253 | 0.0252 |

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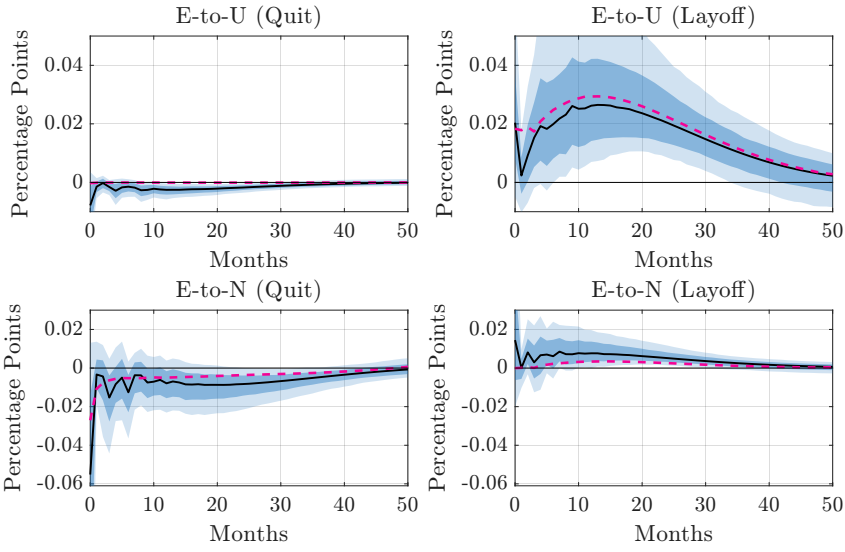
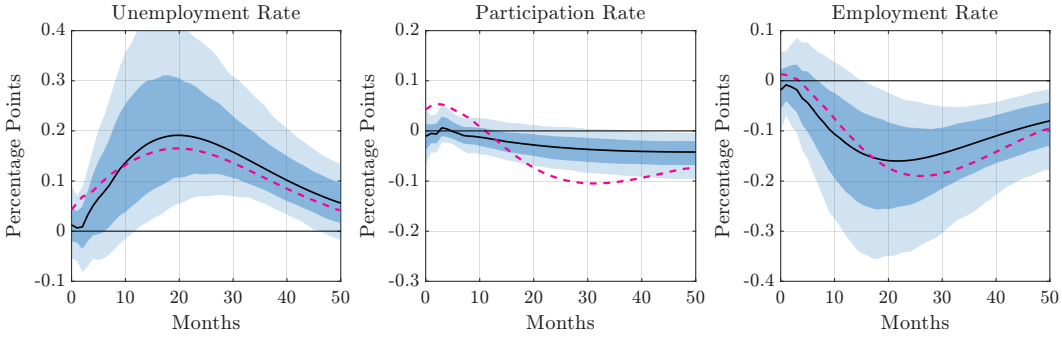
# Response of Quits and Layoffs: Model vs Data




- Model closely matches response of EN/EU flows by reason (quit or layoff)

# Response of Labor Market Stocks: Model vs Data

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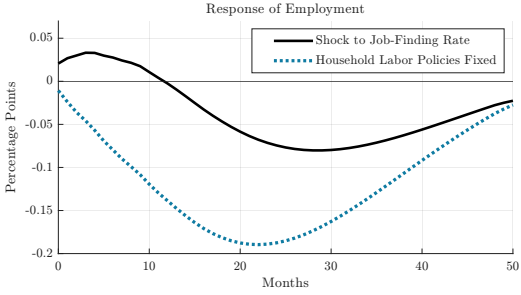
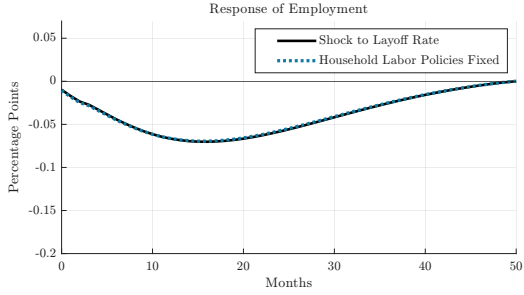
# Mechanism: What is labor supply responding to?

- Our "monetary policy shock" consists of paths for job-finding rate, layoff rate, real interest rates and wages
- Feed in paths of job-finding rate and layoff rate one by one:



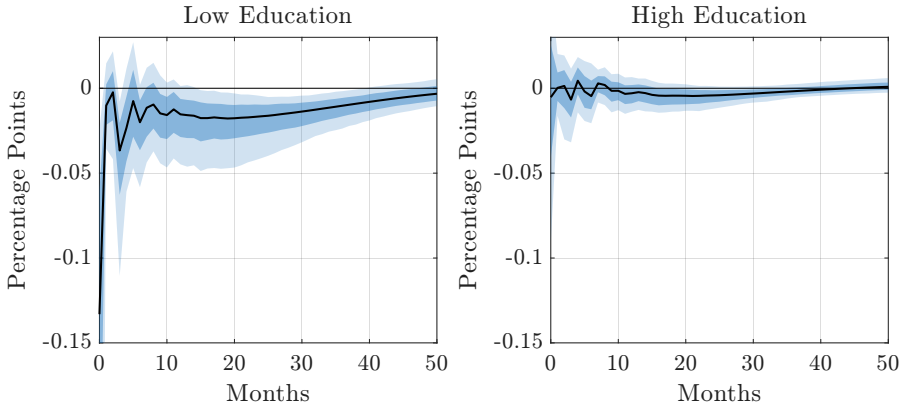




- Labor supply increase is entirely due to fall in job-finding rate
- Households less likely to quit/more likely to accept if jobs are harder to find

Decomposed response of flows

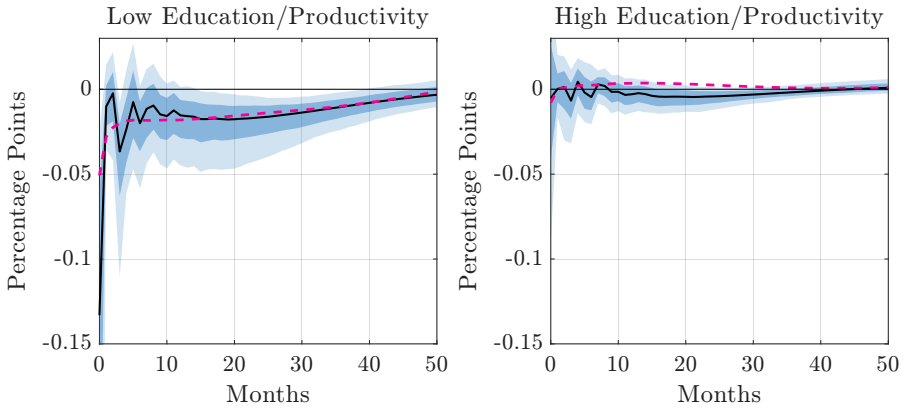
# Mechanism: Whose labor supply is responding?

- Data: Decline in quits to N is concentrated among less educated

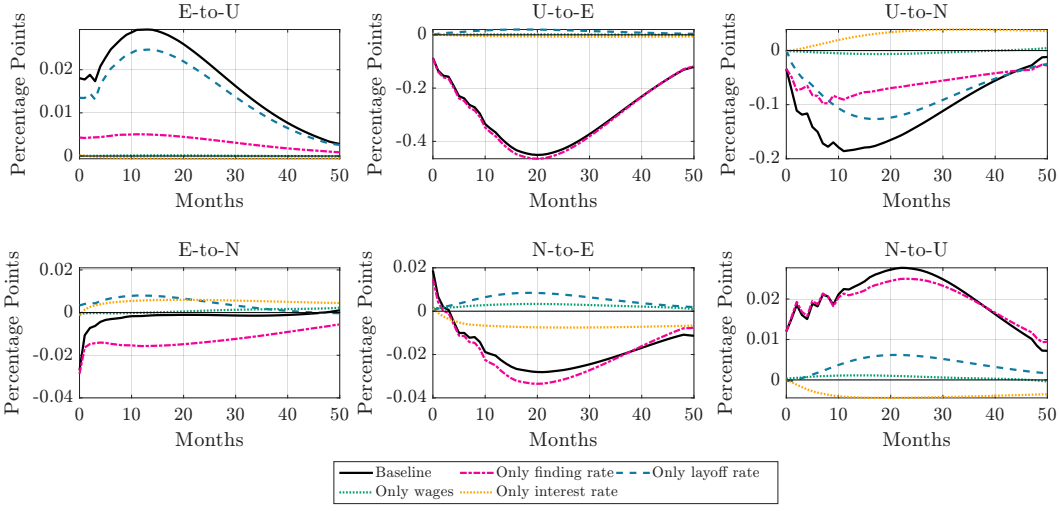


# Mechanism: Whose labor supply is responding?

- Data: Decline in quits to N is concentrated among less educated
- Model: Decline in quits to N is concentrated among less productive



# Decomposed Response of Labor Market Flows




- Drop in quits due to drop in job-finding rate
- Increase in layoffs reduces U-to-N flows through composition effect

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