

# Job Search, Wages, and Inflation

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July 20, 2023

NBER Joint Program Macro-Micro Meeting

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- Does inflation/expected inflation prompt on-the-job search?
  - Real wages fall  $\implies$  more incentive to search
  - If consumers believe wages do not adjust with inflation (Hajdini et al. 2022), yes

- ① In pre-pandemic Survey of Consumer Expectations (SCE):
  - + correlation between inflation expectations and [on-the-job search](#) (extensive AND intensive)
  - + correlation between inflation expectations and [job-to-job transitions](#)



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  - More search when hypothetical inflation is high
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- 3 Use model to:
  - Conduct exercises for shocks to inflation and inflation expectations
  - Explore potential mechanism for “unexpected compression” (Autor et. al. (2023))

# Survey of Consumer Expectations

- Monthly rotating panel of households run by NYFed.
- Data on:
  - Inflation expectations
  - Search (intensive and extensive)
- Observe household for up to twelve months
- Sample runs October 2014 to November 2019

# Inflation Expectations - Core Survey

## Point Forecasts

What do you expect the rate of [inflation/deflation] to be **over the next 12 months**?  
Please give your best guess.

## Density Forecasts

Now we would like you to think about the different things that may happen to inflation over the **next 12 months**. We realize that this question may take a little more effort.

In your view, what would you say is the percent chance that, **over the next 12 months...**  
the rate of inflation will be 12% *or higher*, *between 8% and 12%*, *between 4% and 8%*,  
*between 2% and 4%*, *between 0% and 2%* . . .

- Use implied mean of distribution fit to density forecast using both (Ryngaert 2023)

## Extensive Margin

Have you done anything in the LAST 4 WEEKS to look for new work?

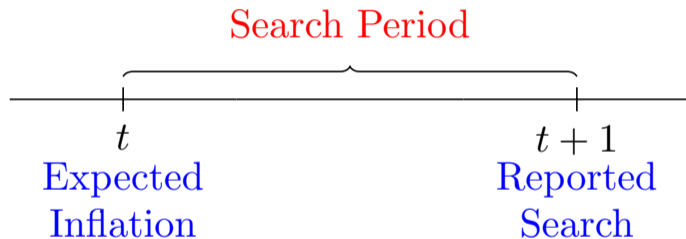
- Yes, looking to possibly leave my current job for a new job
- Yes, looking for an additional job without leaving my current job
- No

## Intensive Margin

And within the LAST 7 DAYS, about how many TOTAL hours did you spend on job search activities? Please round up to the nearest number of hours.



# Timing of Search and Expectations



# Expected Inflation by OTJ Search Status: Raw Data

Searching	Not Searching	p-value for equality of means
3.77	3.48	0.01
> Median Hours	≤ Median Hours	
4.15	3.47	0.00

Non-employed

Inflation Expectations

$$search_{i,t+1} = \beta E_{i,t}[\pi] + \delta x_{i,t} + u_t + \epsilon_{i,t}$$

## Controls

- Demographic: Education, income, age, gender, census region, numeracy, marital status, parent, race, labor force status
- Macroeconomic expectations: unemployment, interest rates, stock prices
- Individual level labor market expectations: probability of counter-offer, job-loss and -finding expectations

# Inflation Expectations and Search of the Employed, Extensive Margin: (+) Correlation

	On-the-Job Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0311*** (0.0090)	0.0056*** (0.0016)
$E_{i,t+1}[\textit{Prob. Offer}]$ , (0 - 100)	0.0128*** (0.0011)	0.0023*** (0.0002)
$E_{i,t+1}[\textit{Number of Offers}]$ ,	0.2788*** (0.0277)	0.0500*** (0.0050)
$E_{i,t+1}[\textit{Prob. Job Loss}]$ , (0 - 100)	0.0086*** (0.0012)	0.0015*** (0.0002)

Non-employed

$$hours_{i,t+1} = \beta E_{i,t}[\pi] + \delta x_{i,t} + u_t + \epsilon_{i,t}$$

## Controls

- Demographic: Education, income, age, gender, census region, numeracy, marital status, parent, race, labor force status
- Macroeconomic expectations: unemployment, interest rates, stock prices
- Labor market expectations: probability of counter offer, job loss and finding expectations

# Inflation Expectations and Search of the Employed, Intensive Margin: (+) Correlation

	Hours Searched
$E_{i,t}[\pi]$	0.41*** (0.15)
$E_{i,t+1}[\textit{Prob. Offer}]$	-0.07*** (0.02)
$E_{i,t+1}[\textit{Number of Offers}]$	0.21 (0.50)
$E_{i,t}[\textit{Prob. Job Loss}]$	0.03 (0.02)

## Result is robust to:

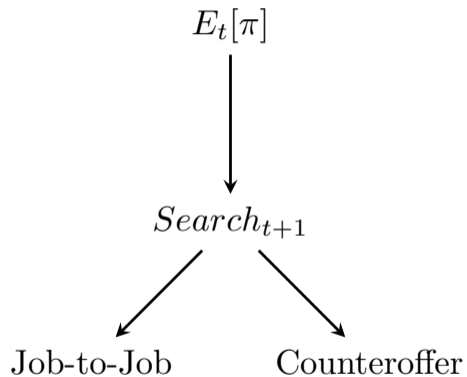
- Including various lags and leads of inflation expectations to check for possible reverse causality Lag-Lead
- Excluding some/all controls Excluding Controls
- Including searchers looking for additional work Additional Work
- Including 2020 data Including COVID Period

Mechanism: We hypothesize that we will see weakened or no relationship between expected inflation and search among:

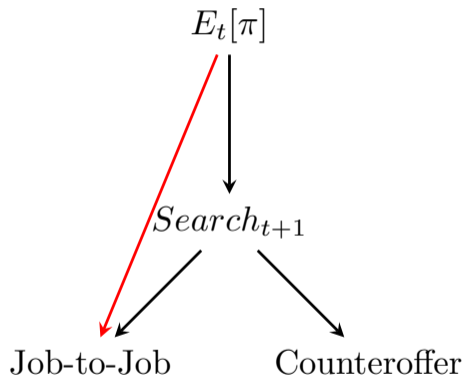
- Workers covered by collective bargaining agreements Unionization
- Workers with tenure-linked benefits Pensions
- Workers highly satisfied with benefits/opportunities at job Satisfaction
- Workers less financially constrained Financial Constraints



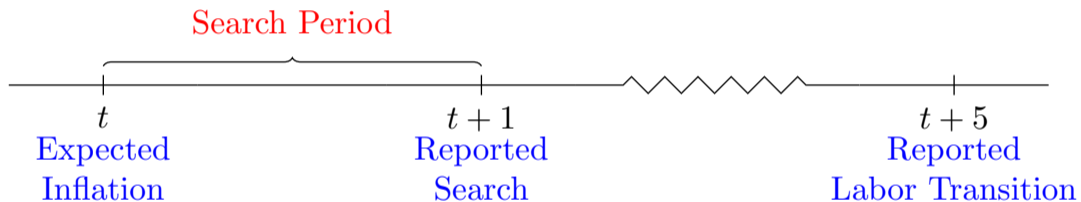
# Labor Market Outcomes



# Labor Market Outcomes



# Job-to-Job Transition



$$\text{Transition}_{i,t+5} = \beta E_{i,t}[\pi] + \delta x_{i,t} + u_t + \epsilon_{i,t}$$

## Controls

- Demographic: Education, income, age, gender, census region, numeracy, marital status, parent, race, labor force status
- Macroeconomic expectations: unemployment, interest rates, stock prices
- Labor market expectations: probability of counter offer, job loss and finding expectations

# Inflation Expectations and Job-to-Job Transitions

	Transition - Not Controlling for Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0352** (0.0155)	0.0025** (0.0011)

# Inflation Expectations and Job-to-Job Transition

	Transition - Not Controlling for Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0352** (0.0155)	0.0025** (0.0011)
	Transition - Controlling for Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0240 (0.0163)	0.0016 (0.0011)
$search_{i,t+1}[\pi]$	0.8678*** (0.1293)	0.0457*** (0.0079)

# New Survey Evidence Using RTP

- Surveyed households w/ Real-Time Population (RTP) Survey (Bick and Blandin (2021))
  - Fielded in October 2022 w/ Qualtrics (5% annualized inflation, 5.9% expected annualized)
- We asked for:
  - Current expected inflation (SCE wording)
  - Various expectations under hypothetical values of inflation: 2 % and 10 %
    - Earnings growth (remaining with current employer)
    - Labor market actions



## Earnings Growth

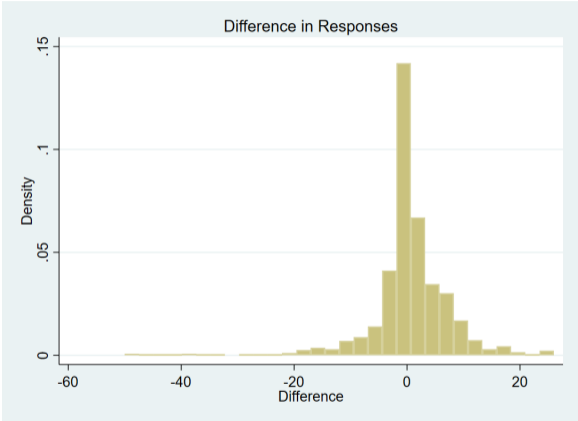
Suppose prices in the overall economy will increase by  $X$  % over the next 12 months.

If you were to remain at your current main job, by what percent would your employer increase your usual earnings before taxes and other deductions?

Please provide your best guess.

All respondents answered for  $X = 2$  and  $X = 10$ .

# Difference in Individual Responses: Nominal Earnings Growth



levels

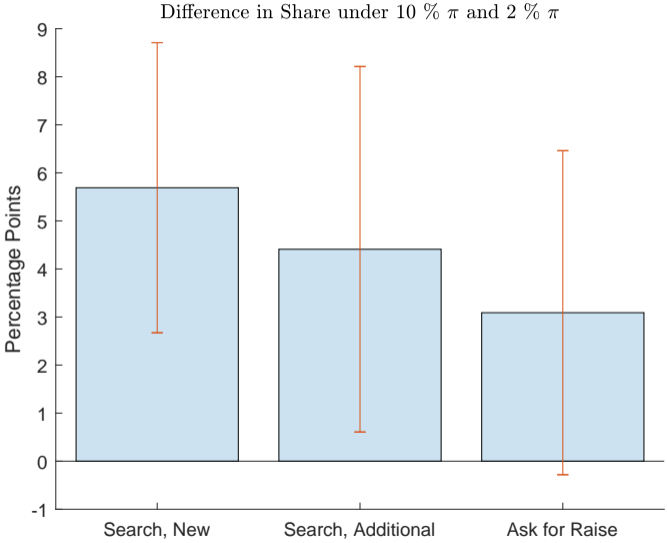
## Actions

Suppose prices in the overall economy will increase by  $X\%$  over the next 12 months. Which of the following actions would you take. Please check all that apply.

- Search for a new job.
- Search for additional work.
- Ask for a raise at my current job.

All respondents answered for  $X = 2$  and  $X = 10$ .

# Hypothetical Labor Market Behavior under Higher Inflation



# Empirical Results Summary

- Higher inflation expectations predict:
  - On-the-job search
  - Job-to-job transitions
- Respondents in recent survey do not believe that on-the-job wage changes will scale with inflation.
- Workers more likely to search under hypothetical 10 % inflation than hypothetical 2 % inflation.

# Model: the Gist

- Christensen et. al (2005) + nominal frictions
- Key assumption: new hire wages relatively more flexible (upward) than stayer wages (Hurst, Grigsby, Yildirim (2020), Hazell and Taska (2020))

- Christensen et. al (2005) + nominal frictions
- Key assumption: new hire wages relatively more flexible (upward) than stayer wages (Hurst, Grigsby, Yildirim (2020), Hazell and Taska (2020))
- Real earnings fall at current job, expected rate of decline depends on inflation expectations
  - higher expected inflation  $\implies$  lower expected real earnings
  - searching perceived more beneficial when inflation expectations are higher
- Searching is more beneficial when *actual* inflation is higher and workers are at lower real wages (Christensen et. al (2005), Faberman, Mueller, Sahin, Topa (2022))

# Model: Labor Market

- Exogenous job offer distribution  $F(w)$ ,  $w$  is *real wage*
- Employed  $e_t$  and non-employed  $n_t$  sample offers from  $F(w)$  at rates which depend on their search effort,  $\bar{\lambda}_e(s)$ ,  $\bar{\lambda}_n(s)$ ,  $s \in (0, 1)$ , both linear in search
- Search is costly, with  $c_e(s)$ ,  $c_n(s)$ , both increasing and convex
- Non-employed earn  $b$  (in real terms)
- Employed earn  $w$  (real) today
  - real earnings tomorrow  $\frac{w}{1+\pi}$  depend on actual inflation  $\pi$
  - expected real earnings tomorrow  $\frac{w}{1+\tilde{\pi}}$  depend on expected inflation  $\tilde{\pi}$



# Model: Inflation and Inflation Expectations

- Actual inflation is  $\pi$
- Individuals' inflation *expectations* at date  $t$  about  $\pi$  are given by:

$$E_{it}(\pi) = \tilde{\pi}_{it} = \bar{\pi} + \pi + \varepsilon_{it}$$

- $\varepsilon_{it} \sim N(0, \sigma_\varepsilon^2)$
  - $\bar{\pi}$  is “mean bias” from truth  $\pi$  (D’Acunto, Malmendier, Weber (2023))
- Note: Assume  $\tilde{\pi}_{t+1} = \pi + \bar{\pi}$

# Model: Real Wage Dynamics for Stayers

- Stayers' wages are nominally sticky (Grigsby, Hurst, Yildirmaz (2020)); nominal wages do not adjust unless they are “re-indexed”
- Nominal wage adjustments as Calvo (1983)
  - With probability  $0 \leq \gamma_1 < 1$  wage readjusted
  - Wages adjusted to  $0 < \gamma_2 \leq 1$  fraction of initial real wage  $w^0$ 
    - Example: Starting real wage is 1, after depreciation with inflation, a reset brings the worker to  $\gamma_2 \cdot 1$
- Offer distribution  $F(\cdot)$  tracks inflation, fixed in real terms

# Perceived Value of Employment

- The value of employment to a worker with current real wage  $w$ , initial real wage  $w^0$ , and inflation expectation  $\tilde{\pi}_t$  can be written as:

$$\begin{aligned} W(w, w^0, \tilde{\pi}_t) &= w + \max_{s \in (0,1)} -c(s) \\ &+ \beta(1-\delta) \bar{\lambda}_e(s) E_{\pi_{t+1}} \int_x \max \left\{ W(x, x, \pi_{t+1}), \max \left\{ \bar{W}(w, w^0, \pi_{t+1}), N(\pi_{t+1}) \right\} \right\} dF \\ &+ \beta(1-\delta) (1 - \bar{\lambda}_e(s)) E_{\pi_{t+1}} \max \left\{ \bar{W}(w, w^0, \pi_{t+1}), N(\pi_{t+1}) \right\} \\ &+ \beta \delta E_{\pi_{t+1}} N(\pi_{t+1}) \end{aligned}$$

where

$$\bar{W}(w, w^0, \pi_{t+1}) = (1 - \gamma_1) W\left(\frac{w}{1 + \tilde{\pi}_t}, w^0, \pi_{t+1}\right) + \gamma_1 W\left(\gamma_2(\tilde{\pi}_t) w^0, w^0, \pi_{t+1}\right)$$

- $\tilde{\gamma}_2(\tilde{\pi}_t) \neq \gamma_2$ : do not expect wage adjustments to keep up with inflation
- “If I stay, my wage moves to  $\frac{w}{1 + \tilde{\pi}_t}$  next period; if I get a new offer, it is in real terms”

# Perceived Value of Non-employment

- The value of non-employment to a worker with current inflation expectation  $\tilde{\pi}_t$  can be written as:

$$\begin{aligned} N(\tilde{\pi}_t) = & b + \max_{s \in (0,1)} -c(s) \\ & + \beta \bar{\lambda}_n(s) E_{\pi_{t+1}} \left[ \int \max \{ W(x, x, \pi_{t+1}), N(\pi_{t+1}) \} dF(x) \right] \\ & + \beta (1 - \bar{\lambda}_n(s)) E_{\pi_{t+1}} N(\pi_{t+1}) \end{aligned}$$

- $b$  is real, non-employed search and reservation wage policies flat in  $\tilde{\pi}_t$

- Model period = 1 SCE Labor Ad Hoc period = 4 months
- Assume steady state, inflows = outflows for every state
- $\beta$  to match 5% annual interest rate
- Parametric assumptions:
  - Wage offer distribution:  $\log(w) \sim N(\mu_w, \sigma_w^2)$ ,  $\mu_w$  normalized to 1
  - Search cost function:  $c_e(s) = c_u(s) = \bar{c}s^\kappa$
  - Returns to search:  $\bar{\lambda}_j(s) = \lambda_j + \lambda_j^s \cdot s, j \in \{e, n\}$
  - Expectations about indexing:  $\gamma_2(\tilde{\pi}) = \min\left\{\left[\frac{1+\pi_t}{1+\tilde{\pi}}\right]^{\frac{1}{\gamma_1}}, 1\right\}$   $\gamma_2(\tilde{\pi})$

## Model Calibration (cont.)

- Take  $\delta, \lambda_e, \lambda_n, \lambda_n^s$  from SCE
- Set  $\pi = 1.65$  annual,  $\bar{\pi} = 1.02$  annual,  $\sigma_\varepsilon = 1.03$  annual, SCE
- Choose  $\bar{c}, \kappa, \lambda_e^s, b, \sigma_w^2$  to match the following moments:
  - elasticity of search with respect to inflation expectations (5%)
  - job-finding rate for the unemployed (21%)
  - 50-10 ratio of residualized wages (1.69)
  - the offer arrival probability for active searchers (34.7%)
  - job-to-job transition probability (3.2%)

Moment	Model	Target	Source
Monthly UN rate, non-employed	26.70%	21.00%	SCE
Search-inflation expectation elasticity, employed searchers	3.15%	5.00%	SCE
4-month job-to-job transition probability	4.16%	3.20%	SCE
4-month offer arrival probability, employed searchers	38.71%	34.7%	SCE
50-10 ratio in residualized log wages	2.02	1.69	SCE

# Calibrated Parameters

Parameter	Value
Value of leisure $b$	2.77
Return to search for employed, $\lambda_e^s$	0.48
Search cost convexity, $\kappa$	1.21
Cost of search $\bar{c}$	0.95
Variance of log wages $\sigma_w^2$	0.50



# Search Effort and Real Wages

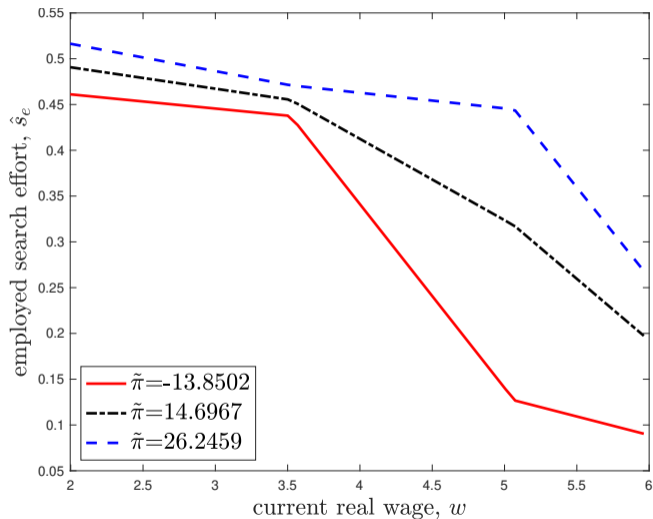


Figure: Search Policy, Employed Workers

# Search Effort and Inflation Expectations

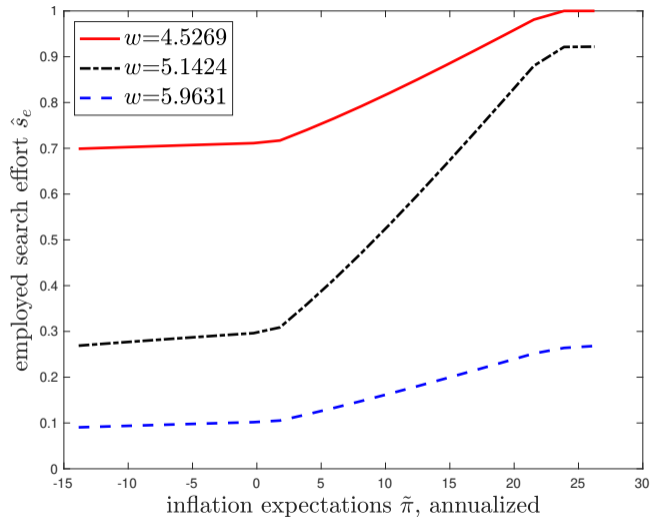
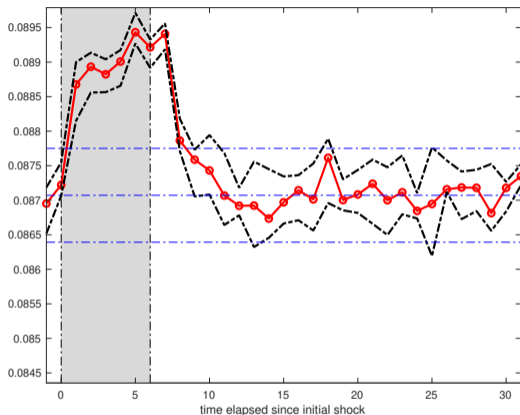
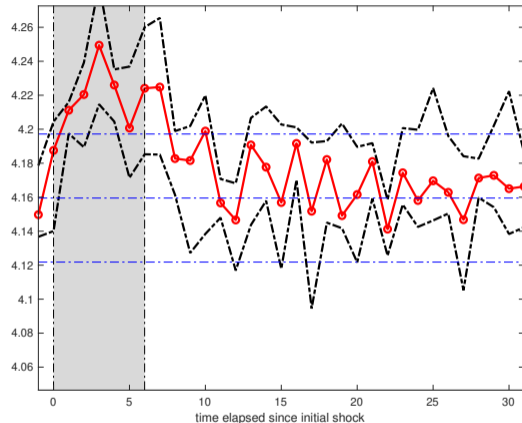


Figure: Search Policy, Employed Workers

# 1 PP Shift in Annualized Inflation $\pi$ and Inflation Expectations $\tilde{\pi}$



(a) mean search effort, employed



(b) job-to-job transition probability

details  $\tilde{\pi}$  shock only

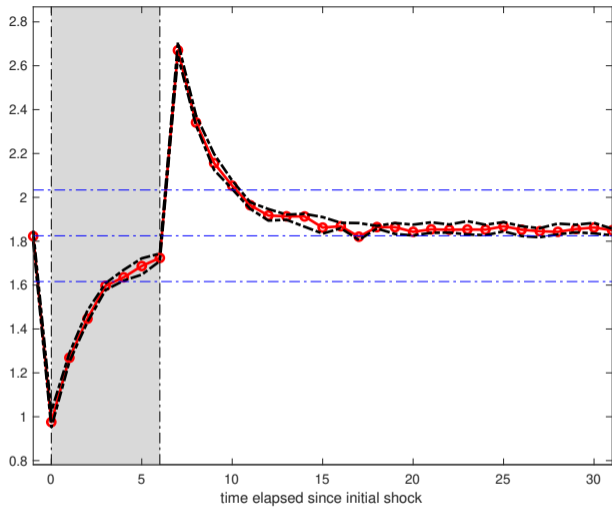
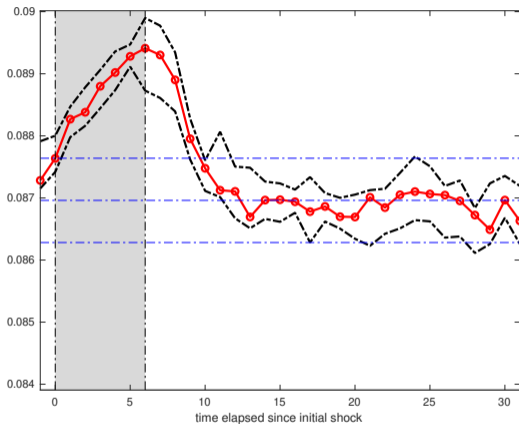
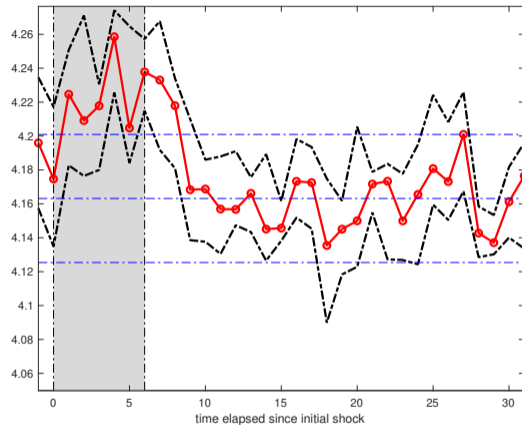


Figure: Mean Real Wage Growth

# COVID Shift in Annualized Inflation $\pi$ and Inflation Expectations $\tilde{\pi}$



(a) mean search effort, employed



(b) job-to-job transition probability

details

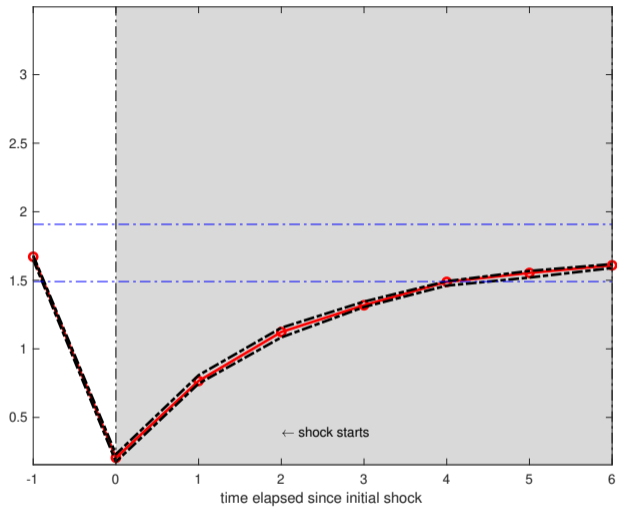


Figure: Mean Real Wage Growth

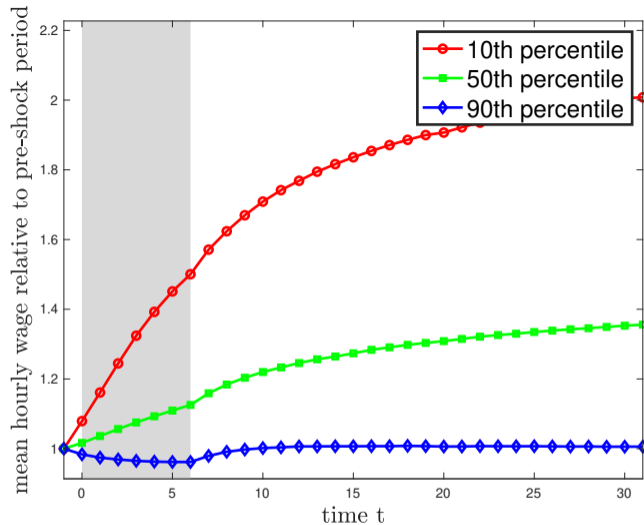


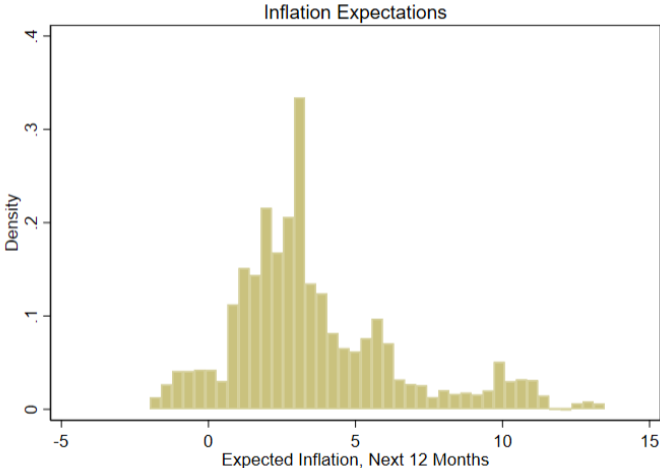
Figure: Real Wages by Quantile Relative to Pre-Shock Period

# Conclusion

- Empirical evidence showing inflation expectations positively linked with the search and job-to-job transitions of employed workers
- Model with endogenous search in which inflation/expected inflation incentivizes search
- Mechanism natural explanation for some of wage dynamics post-Covid
- One small peice of how inflation and the labor market interact

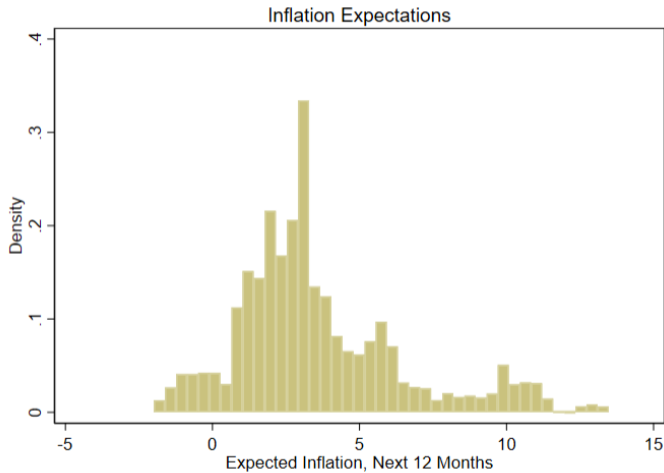


# SCE: Inflation Expectations



[back](#)

# SCE: Inflation Expectations



[back](#)

# Expected Inflation by Search Status

	Searching	Not Searching	p-value for equality of means
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*Not Employed*

4.03

3.83

0.24

[back](#)

# Inflation Expectations and Search of the Non-Employed : 0

## Correlation

	Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0153 (0.0182)	0.0013 (0.0015)
$E_{i,t+1}[\textit{Prob. Offer}]$ , (0 - 100)	0.0144*** (0.0020)	0.0012*** (0.0002)
$E_{i,t+1}[\textit{Number of Offers}]$ ,	0.1661*** (0.0442)	0.0136*** (0.0036)

# Lag-Lead Coefficients

	Two Lags		One Lag, One Lead		Two Leads	
	Coeff.	ME	Coeff.	ME	Coeff.	ME
$E_{i,t-2}[\pi]$	0.0111 (0.0158)	0.0019 (0.0027)				
$E_{i,t-1}[\pi]$	-0.0121 (0.0152)	-0.0020 (0.0026)	-0.0149 (0.0132)	-0.0026 (0.0023)		
$E_{i,t}[\pi]$	0.0405** (0.0164)	0.0068** (0.0028)	0.0531*** (0.0138)	0.0092*** (0.0024)	0.0330*** (0.0123)	0.0058*** (0.0022)
$E_{i,t+1}[\pi]$			0.0095 (0.0129)	0.0016 (0.0022)	-0.0080 (0.0126)	-0.0014 (0.0022)
$E_{i,t+2}[\pi]$					0.0169 (0.0129)	0.0030 (0.0023)

[back](#)

# Excluding Controls

	$E_{i,t}[\pi]$	
	Coefficient	Marginal Effect
All Controls Included	0.0312*** (0.0090)	0.0056*** (0.0016)
Exclude Macro Expectations	0.0315*** (0.0090)	0.0057*** (0.0016)
Exclude LM Expectations	0.0227*** (0.0073)	0.0042*** (0.0017)
Exclude Demographic	0.0245*** (0.0086)	0.0046*** (0.0016)
Exclude All	0.0173*** (0.0066)	0.0042*** (0.0016)

# Including Search for Additional Work

	Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0206** (0.0090)	0.0044** (0.0016)

[back](#)

	Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0253*** (0.0082)	0.0045*** (0.0015)

back



# Union Representation

## *Top 10 Most Unionized States*

	Top 10		Out of Top 10	
	Coeff.	ME	Coeff.	ME
$E_{i,t}[\pi]$	0.0021 (0.0159)	0.0004 (0.0030)	0.0411*** (0.0103)	0.0070*** (0.0018)

## *Union Workers at Current Job*

	Yes		No	
	Coeff.	ME	Coeff.	ME
$E_{i,t}[\pi]$	0.0327 (0.0393)	0.0037 (0.0045)	0.0462** (0.0194)	0.0073** (0.0031)

back

# Pension Benefits

	<u>Has Pension Benefit</u>		<u>No Pension Benefit</u>	
	Coeff.	ME	Coeff.	ME
$E_{i,t}[\pi]$	0.0139 (0.0174)	0.0022 (0.0028)	0.0354*** (0.0101)	0.0065*** (0.0019)

[back](#)

## *Benefits and Flexibility*

	Highly Satisfied		Less Satisfied	
	Coeff.	ME	Coeff.	ME
$E_{i,t}[\pi]$	0.0243 (0.0210)	0.0029 (0.0025)	0.0346*** (0.0098)	0.0068*** (0.0019)

## *Opportunities at Current Job*

	Yes		No	
	Coeff.	ME	Coeff.	ME
$E_{i,t}[\pi]$	0.0066 (0.0144)	0.0009 (0.0019)	0.0389*** (0.0115)	0.0077*** (0.0023)

# Financial Constraints

## *Less Constrained*

	Could Come up with \$2000		No Chance of Default	
	Coeff.	ME	Coeff.	ME
$E_{i,t}[\pi]$	0.0344* (0.0031)	0.0056* (0.0106)	0.0254 (0.0244)	0.0036 (0.0035)

## *More Constrained*

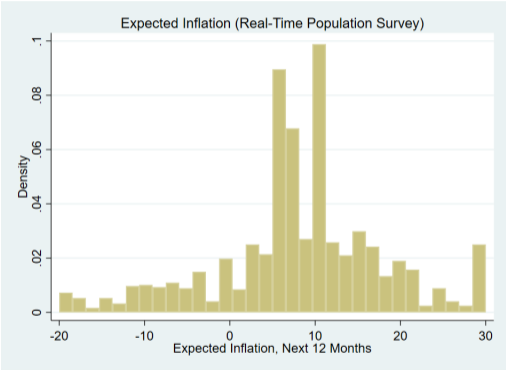
	Might Not Come up with \$2000		Positive Prob. of Default	
	Coeff.	ME	Coeff.	ME
$E_{i,t}[\pi]$	0.0390*** (0.0117)	0.0071*** (0.0022)	0.0409*** (0.0244)	0.0076*** (0.0035)

back

# Inflation Expectations and Promotions

	Promotion - Not Controlling for Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	-0.0005 (0.0136)	-0.0001 (0.0016)
	Promotion- Controlling for Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	-0.0041 (0.0137)	-0.0005 (0.0016)
$search_{i,t}[\pi]$	0.2192** (0.0987)	0.0253** (0.0115)

# RPS: Inflation Expectations

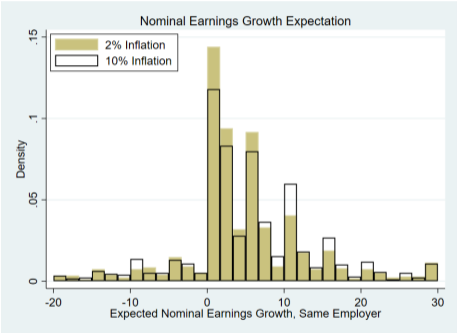


$\Delta$  earnings in pp.

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$E_{i,t}[\pi]$	-0.04 (0.13)	-0.04 (0.13)	-0.05 (0.13)
$Search_{i,t+1}$		1.40 (0.90)	0.72 (0.96)
$Promote_{i,t+5}$			2.54** (1.27)
$Transition_{i,t+5}$			7.19** (2.87)

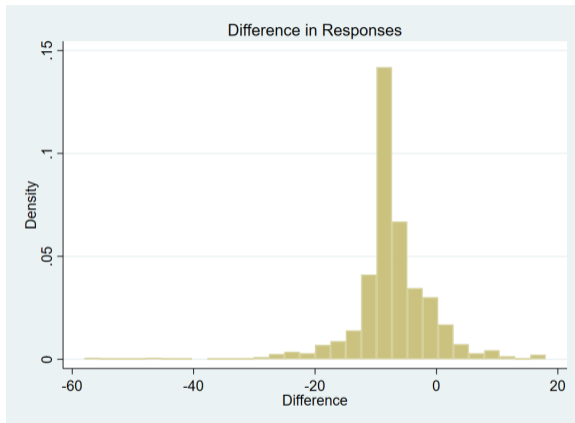
# Expected Earnings Growth is Similar Across Hypothetical Inflation Scenarios



[back](#)

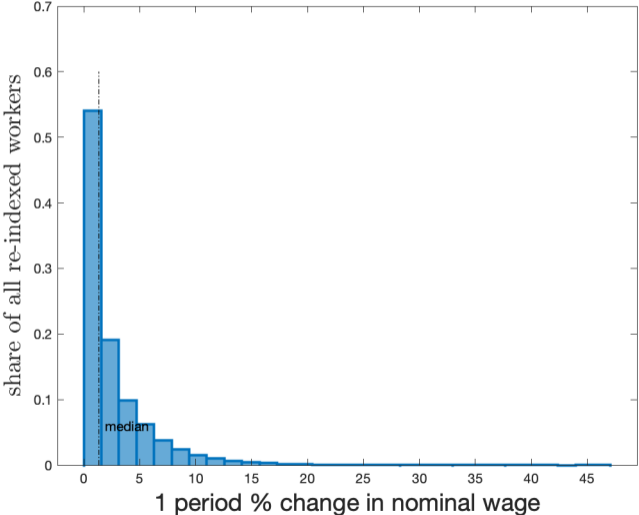


# Difference in Individual Responses: Expected Real Earnings Growth



[back](#)

# Nominal Wage Changes



# Expectations About Indexing

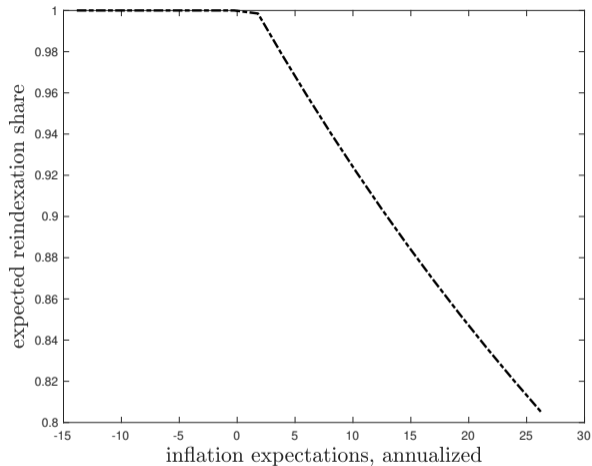


Figure: Expectations about Wage Indexation

[back](#)

Figure 8: Real Hourly Wages by Quantile, Relative to January 2020



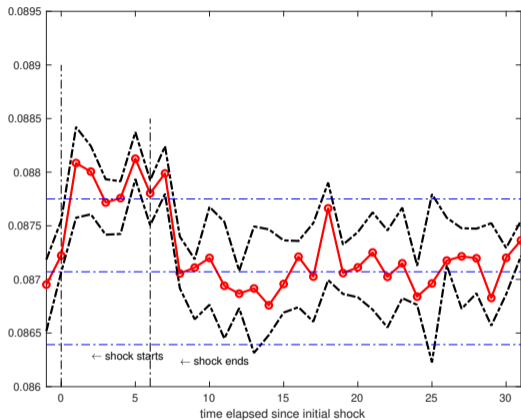
Note: CPS monthly data. Adjusted to maintain demographic composition in January–March 2020 using inverse probability weighting based on age, education, race/ethnicity, gender, citizenship, country of birth, and region. Wages are real (2022<sub>Q3</sub> USD). Wage percentiles smoothed with lowess and 3-month moving average.

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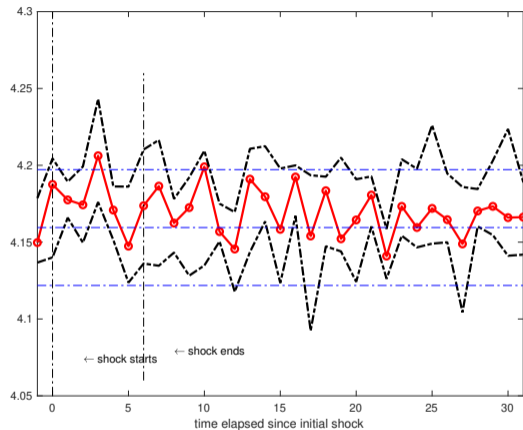
Figure: Compression in the Wage Distribution

back

# 1 PP Shift in Inflation Expectations Only $\tilde{\pi}$



(a) mean search effort, employed



(b) job-to-job transition probability

- Annualized inflation moves from  $\pi = 1.65$  to  $\hat{\pi} = 2.65$
- Inflation expectations also move by 1 PP, but in unanticipated way (shift in mean of  $\varepsilon_{it}$ , not in  $\bar{\pi}$ )
- $\gamma_2$  moves to  $\hat{\gamma} = \left(\frac{1+\pi}{1+\hat{\pi}}\right)^3 < 1$

back

- Annualized inflation moves from  $\pi = 1.65$  to  $\hat{\pi} = 4.74$  (average post-COVID)
- Inflation expectations also move by same amount, but in unanticipated way (shift in mean of  $\varepsilon_{it}$ , not in  $\bar{\pi}$ )
- $\gamma_2$  moves to  $\hat{\gamma} = \left(\frac{1+\pi}{1+\hat{\pi}}\right)^3 < 1$

back

# References I