Job Search, Wages, and Inflation

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Motivation

"Wage-price dynamics are among the myriad uncertainties in the economy that bear close watching and demand great caution from monetary policymakers as we recalibrate our policy." - Raphael Bostic, May 2022

"It's a risk that we simply can't run. We can't allow a wage–price spiral to happen. And we can't allow inflation expectations to become unanchored. It's just something that we can't allow to happen." - Jerome Powell, May 2022

Wage-Price Spirals

- Higher prices → higher wage demands → higher prices
- Getting a raise takes some action on the part of the employee.
  - Makes sense for worker to account for both inflation experience and inflation expectation.
- On-the-Job Search
  - Associated with wage growth and inflation: Faberman and Justiniano (2015), Moscarini and Postel-Vinay (2017), Karahan et al. (2017), Faccini and Melosi (2022)
  - Also particularly efficient relative to search of the unemployed: Faberman et al. (2022)

The Wage Side of the Spiral

- Expected inflation $\rightarrow$ expected decline in real wage for fixed nominal wage contract.
- Search $\rightarrow$ offers and counteroffers.
    - Suitable match could take time.

- Do higher inflation expectations lead to on-the-job search?

This Paper

- Expected Inflation and Search

  - Employed workers with higher inflation expectations are more likely to search for new work.

  - No relationship between expected inflation and search of the non-employed.

- Expected Inflation and Labor Market Outcomes

  - Higher inflation expectations correlated with subsequent job-to-job transition.

Related Literature

- Employed Search, Job-to-Job Transitions, and Inflation

  - Faberman and Justiniano (2015), Moscarini and Postel-Vinay (2017), Karahan et al. (2017), Faccini and Melosi (2022) , Faberman et al (2022), Cahuc, Postel-Vinay, and Robin (2006)

- Inflation Expectations and Consumer Spending:

  - Bachmann, Berg, and Sims (2015); Duca-Radu, Kenny, and Reuter (2019); Coibion, Georgarakos, Gorodnichenko, and van Rooij (2021), D'Acunto ,Hoang, and Weber (2016, 2018); Burke and Ozdagli (2021); Dräger and Nghiem (2021); Crump, Eusepi, Tambalotti, and Topa (2022); Ryngaert (2022)

Survey of Consumer Expectations

- Monthly survey run by the Federal Reserve Bank of New York.

  - Includes questions about macroeconomic expectations.
  - Labor Market Supplement includes questions about labor search

- Nationally representative rotating panel of households heads. ($\sim$ 1300 per month)

  - Households can stay in the survey up to 12 months.

- Sample runs from February 2014 to November 2019

  - Drop the early Covid period

Labor Search

	Employed	Not Employed
Searching (for new work)	15.3	13.0
	(0.4)	(0.3)
Not Searching	78.7	87.0
	(0.5)	(0.6)

Inflation Expectations

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% . . .

Subjective Distributions

Fitting Method

- Modification of method of Engelberg, Manski, and Williams (2009).
- Pin the mode of the distribution to the point forecast.

- Use the implied mean of this distribution as measure of expected inflation.
- Winsorize and drop observations where the point and density forecasts are inconsistent with one another.
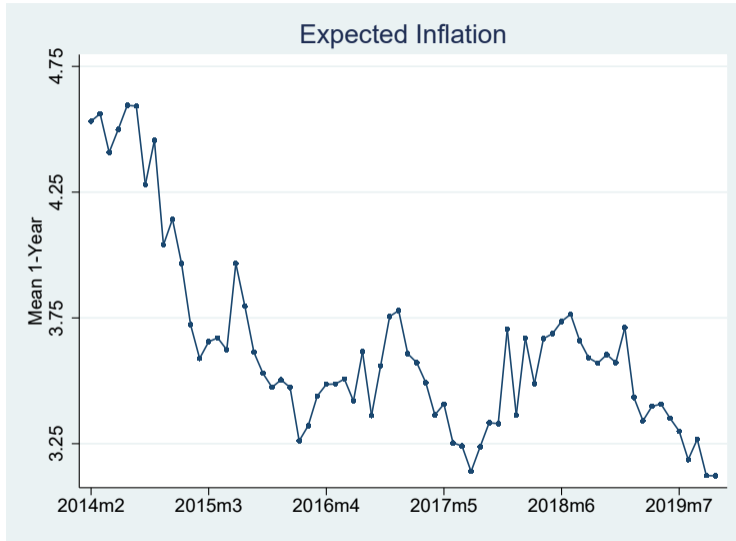
Average Inflation Expectations
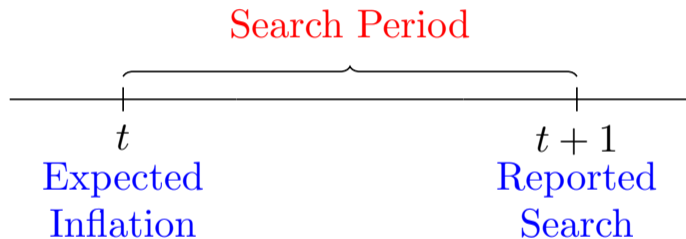
Expected Inflation

	Searching	Not Searching	p-value for equality of means
Employed	3.68	3.44	0.01
Not Employed	3.87	3.83	0.43

Inflation Expectations and Search

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

Controls

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

Inflation Expectations and Search of the Employed

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

Inflation Expectations and Search of the Non-Employed

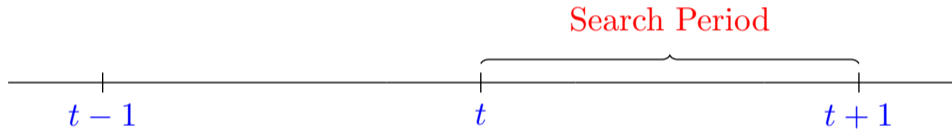|	Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0153	0.0013
	(0.0182)	(0.0015)
$E_{i,t+1}[\textit{Prob. Offer}]$,	0.0144***	0.0012***
(0 - 100)	(0.0020)	(0.0002)
$E_{i,t+1}[\textit{Number of Offers}]$,	0.1661***	0.0136***
	(0.0442)	(0.0036)

Reverse Causality Concerns

- Do higher inflation expectations cause search?
- Does search drive up inflation expectations?
- People seeing wage offers higher than their current wage may attribute to inflation rather than increased productivity.

Address Timing

- Inflation expectations are collected at beginning of the search period.
- Include lags and leads of expectations to clarify the timing of the expectations that matter for search.
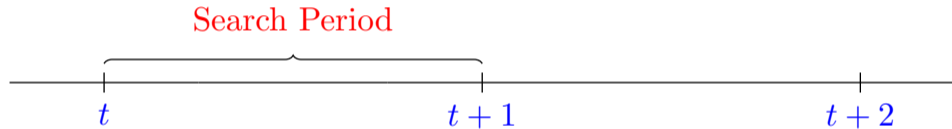
One Lag, One Lead

One Lag, One Lead

	On-the-Job Search	
	Coefficient	Marginal Effect
$E_{i,t-1}[\pi]$	-0.0162	-0.0028
	(0.0129)	(0.0023)
$E_{i,t}[\pi]$	0.0498***	0.0087***
	(0.0134)	(0.0023)
$E_{i,t+1}[\pi]$	0.0071	0.0012
	(0.0127)	(0.0022)

Search Period

$t - 2$ $\qquad$ $t - 1$ $\qquad$ t $\qquad$ $t + 1$

Two Lags

	On-the-Job Search	
	Coefficient	Marginal Effect
$E_{i,t-2}[\pi]$	0.0006	0.0001
	(0.0153)	(0.0026)
$E_{i,t-1}[\pi]$	-0.0065	-0.0011
	(0.0145)	(0.0025)
$E_{i,t}[\pi]$	0.0370**	0.0063**
	(0.0157)	(0.0027)

Two Leads

	On-the-Job Search	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0362***	0.0064***
	(0.0122)	(0.0022)
$E_{i,t+1}[\pi]$	-0.0148	-0.0026
	(0.0126)	(0.0022)
$E_{i,t+2}[\pi]$	0.0144	0.0026
	(0.0131)	(0.0023)

Labor Market Outcomes

- Expected inflation may prompt search, but does this yield changes in employment situations?
- Look at job-to-job transitions in the labor market supplement after the initial search question.

Job-to-Job Transition

- Dummy variable equal to 1 if a previously employed respondent is at a new employer ($\approx 3\%$).
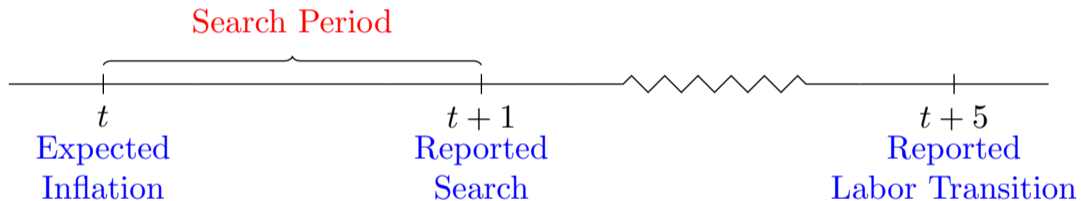
$$Transition_{i,t+5} = \beta E_{i,t}[\pi] + \delta x_{i,t} + u_t + \epsilon_{i,t}$$

Controls

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

Inflation Expectations and Job-to-Job Transition

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

▸ Appendix

Search with Nominal Wage Contracts - In Progress

- Model on-the-job search with wages bargained in nominal terms.
  - Employees match to outside offers with some probability (exogenous, for now).
  - Nominal wages can be re-bargained *only with a credible threat.* (two-sided limited comittment)

- Wages depend on:
  - Current: firm productivity, price level, aggregate productivity.
  - Negotiation Benchmark:
    - Firm productivity of last credible offer.
    - Aggregate price level at time of last credible offer.
    - Aggregate productivity at time of last credible offer.

The Mechanism: Example

- Start a job with firm y, joint surplus is $S(y, z)$ where z is aggregate productivity.

- Worker gets wage which gives zero initial surplus share, $\sigma_0(y, w)$.

- Price level rises and nothing happens to productivity $\longrightarrow$ At former nominal wage, effective surplus share has fallen for the worker, $\sigma_1(y, w) < \sigma_0(y, w)$

- Worker gets outside offer from y' such that $S(y, z) \geq S(y', z) > \sigma_1(y, w) S(y, z)$

- Since $\sigma_1(y, w) < \sigma_0(y, w)$, more likely to extract a raise with outside offer

- With endogenous search, lower effective share raises incentive to search

- Inflation expectations positively linked with the search and job-to-job transitions of employed workers.

- Does it matter?

Conclusion

- Inflation expectations positively linked with the search and job-to-job transitions of employed workers.

- Does it matter?

- Maybe

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  - As average inflation expectation goes up, will we see an uptick in number of searchers?

  - Do matches with higher nominal wages result in higher productivity as well as wages?

  - Is some part of these raises inflationary?

Conclusion

- Inflation expectations positively linked with the search and job-to-job transitions of employed workers.

- Does it matter?

- Maybe
  - As average inflation expectation goes up, will we see an uptick in number of searchers?
  - Do matches with higher nominal wages result in higher productivity as well as wages?
  - Is some part of these raises inflationary?

- In progress: Model with endogenous search in which inflation incentivizes search.

Unionization

	Top 10 Most Unionized States	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0021	0.0004
	(0.0159)	(0.0030)

	Rest of States	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0411***	0.0070***
	(0.0103)	(0.0018)

Satisfaction

	Highly Satisfied with Opportunities	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0066	0.0009
	(0.0144)	(0.0025)

	Less Satisfied	
	Coefficient	Marginal Effect
$E_{i,t}[\pi]$	0.0389***	0.0077***
	(0.0115)	(0.0023)

Model

- Homogeneous, infinitely lived, measure one workers, linear preferences over final consumption good $u(c) = c$ w/ price p_t (exogenous)

- Unit mass of potential firms indexed by their productivity y, output $F(y, z)$

- Aggregate productivity z evolves according to $T_z(z'|z)$

- Aggregate price p evolves according to $T_p(p'|p)$

- Vacancy distribution exogenous, $v(y, z)$

- Exogenous contact rate $\lambda(z)$ for unemployed and $s(z)\lambda(z)$ for employed

Meeting Technology

- At any date t, u_t unemployed and $h_t(y)$ employed at firm type y

- Separations/ meetings btwn. searching workers and vacant jobs occur sequentially after change in aggregate state: separations, then searching workers may draw a new offer.

- Letting u_{t+} and $h_{t+}(y)$ be stock of unemployed and employed at firms y right after both the state changes and separations occur. Then number of effective searchers L_t is then:

$$L_t = u_{t+} + s \int h_{t+}(y) \, dy,$$

- Meeting probabilities:

$$\underline{(z_t) u_{t+}}$$

Value of Unemployment

$$U(z) = b(z) + \beta E_{\Omega'|\Omega}\left[(1 - \lambda(p', z')) U(z') + \lambda(p', z') \int U(z') v(y, z') \, dy\right]$$
$$= b(z) + \beta E_{\Omega'|\Omega}\left[U(z')\right] \tag{1}$$

where $\Omega = \{z, p\}$.

$$P\left(y,z\right) = zy + \beta E_{\Omega'|\Omega}\left[U\left(z'\right) + \left(1-\delta\right)\mathbf{1}\left\{P\left(y,z'\right) \geq U\left(z'\right)\right\}\left[P\left(y,z'\right) - U\left(z'\right)\right]\right] \quad (2)$$