The Unexpected Compression: Competition at Work in the Low Wage Economy

David Autor
MIT
with Arindrajit Dube and Annie McGrew

08. Dec. 2022
1. **Which group** has seen the **largest nominal wage gains** during the Covid recovery?
   a. Older college grads  
   b. Younger college grads  
   c. Older high school grads  
   d. Younger high school grads

2. **Inflation losses** are **not offset** by wage gains
   a. for high-wage workers  
   b. for low-wage workers  
   c. for either  
   d. fully offset for both

3. Wage growth is
   a. faster among **job-stayers**  
   b. faster among **job-changers**  
   b. comparable between these groups

4. Has the market for low-wage workers simply
   a. Labor **demand/supply** curve **shifted**
   b. More competitive -- **Elasticity of labor supply** has increased, potentially lessening scope for exercise of **monopsony power**
Skill Premium after Covid

- Different forms of compensation
  - Blue collar workers/service sector ➔ higher wages
  - White collar workers ➔ WfH, flexibility
    - Preference shift: “search for meaning”

- Long Covid esp. in service sector
  - Slow rebuilding of labor participation

- Labor shortage everywhere
Skill Premium and Inflation

- Class warfare
  - Whenever economy recovers and workers gain bargaining power
    → Central Banks lean against it with higher $i$
- Price-wage spiral
  - Constrain wage growth for workers with high MPC more
    → depress wages growth of the poor (?)
- Higher $i$ hurts growth stocks more tech sector layoffs
  → lowers skill premium
Skill Premium and Inflation: Germany 1916-1923

- Compression during high inflation, but not hyper-

"Financial Phillips’ Curve": German Hyperinflation
Brunnermeier, Correia, Luck, Werner, Zimmermann (2022)
The Unexpected Compression: 
Competition at Work in the Low Wage Economy

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Annie McGrew
UMass Amherst

Markus’ Academy
December 8, 2022
What does a competitive labor market look like?

- The textbook model of perfect competition is static
  - No unemployment, no labor shortage
  - Wages automatically adjust to the value marginal product of labor
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- Evidence on labor market competition tells us something different
  - Employers don’t face $\infty$ elastic labor supply Manning '21; Bassier et. al '19; Yeh '22
  - In such a market, similar workers are paid differently due to frictional wage inequality
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- **How does a ‘tightening’ labor market interact with state of competition?**
  - The tightening ‘post’-pandemic labor market offers an opportunity to find out
What does a competitive labor market look like?

We will distinguish between two notions of labor market tightness

1. Starting from **perfect competition**: Labor demand curve shifts out relative to labor supply curve, employment and wages rise, no change in competitive conditions

2. Starting from **imperfect competition**: Labor supply curve becomes more *elastic*—job changes more responsive to wage levels, workers reallocate from ‘bad’ to ‘good’ jobs

→ This distinction has normative implications
Plan of Attack

- Some unexpected facts: A sharp reversal in inequality, driven by rising wages among low-paid workers
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• A simple conceptual model: Changes in demand versus changes in competition
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• Evidence on changes in demand vs. changes in competition
  1. Rising job transition rates
  2. Labor market tightness and wage growth
  3. Who is quitting? The role of low pay
  4. The payoff to job change

Wage growth and price growth: What’s the connection?

Conclusions and next steps
Plan of Attack

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The State of Knowledge

• Effects of tight labor markets on earnings, job switching, job satisfaction
  • Unemployment and wage growth: Okun '73
  • Cyclicality of job switching and job satisfaction: Akerlof, Yellen, Rose '88
  • High-pressure 1990s labor market and wage growth: Katz, Krueger '99
  • Quit elasticities and job flows: Bassier, Dube, Naidu '22; Moscarini, Postel-Vinay '17

• Monopsony power and market conditions
  • Rising monopsony power: Manning '21; Yeh, Macaluso, Hershbein '22
  • Labor market pressure & employer market power: Hirsch, Jahn, Schnabel, '18; Bivens, Zipperer '18 Webber '22

• The relationship between wage pressure and price pressure
  • Katz & Krueger '99, Cerrato & Gitti '22

• Recent research on the ‘post-pandemic’ labor market
  • Rising remote work & real wage inequality: Altig, Barrero, Bloom, Davis, Meyer, Mihaylov '22
  • Post-pandemic missing workers Goda & Soltas '22
  • Post-pandemic inflation inequality Jaravel '22
Agenda

1. What does a competitive labor market look like?
2. Some unexpected facts
   - The big employment rebound
   - The unexpected wage compression
3. Distinguishing rising demand from increasing competition: Conceptual model
4. Distinguishing rising demand from increasing competition: Evidence
   - Rising job transition rates (the ‘Great Reshuffle’)
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5. How much does wage pressure contribute to inflation?
6. Conclusions
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Participation: Participation rates have largely rebounded – and Emp/Pop has risen by even more than labor force participation.
Education: Employment losses were much larger for non-college workers – but the rebound was also proportionately larger (2015-2022)
Occupations: Analogous pattern for low-, mid-, and high-wage occupations
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Substantial wage growth in bottom of wage distribution —
Inflation eats nominal gains above median (or above bottom quartile recently)
Regionally adjusted real wage growth in bottom of wage distribution
Wage inequality: Real wage trends by quantiles
P10 growth > P50 growth > P90 growth
Pre-pandemic wage compression was underway between 2015 and 2020 — But only in states that were raising their minimum wages

**State minimum wage**

**No state minimum wage**

Minimum wages & state-level wage compression
Occupational inequality: Real wage growth fastest in lowest-paid 3rd of occs

Wage trends: routine v. non-routine tasks
Racial/ethnic inequality: Sharp fall in Black/Hispanic wage penalty
Young v. old inequality: Wage growth fastest for youngest workers, <40, <25

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Educational inequality: High school workers < age 40 have steepest wage gains

Wage trends: Non-BA vs. BA, by age
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Effect of inward labor supply shift in competitive labor market

Market level impact

\[ \Delta \ln W > 0, \Delta \ln L < 0 \]
Effect of inward labor supply shift in competitive labor market

**Market level impact**

$$\Delta \ln W > 0, \Delta \ln L < 0$$

**Price taking firm response**

$$\Delta \ln W > 0, \Delta \ln L < 0$$
Subtle effects of rotation of labor supply curve in monopsonistic labor market

Low-wage monopsonistic firm

$\Delta \ln W > 0$, $\Delta \ln L < 0$
Subtle effects of rotation of labor supply curve in monopsonistic labor market

**Low-wage monopsonistic firm**

\[ \Delta \ln W > 0, \ \Delta \ln L < 0 \]

**High-wage monopsonistic firm**

\[ \Delta \ln W > 0, \ \Delta \ln L > 0 \]
Why would the labor supply curve become more elastic?

Four plausible explanations

1. Numerous involuntary separations during pandemic — Has reduced employer attachment, raised footlooseness
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Labor market tightness and voluntary job separations: Formalization

- Separations $S$ in a job ladder model: $S(w) = \delta + \rho + \lambda_e (1 - F(w))$
  - Where $\delta$ is exogenous outflow to nonemployment, $\rho$ is exogenous EE to flows (sometimes to worse jobs)
  - $F(w)$ is cumulative distribution of firm wages
  - EE separation rate to better-paying jobs: $\lambda_e (1 - F(w))$
  - Separation rate depends only on the rank of the firm $F(w)$
  - EE separation elasticity: $\epsilon^{EE} = \frac{-\lambda_e f(w)w}{\rho + \lambda_e (1 - F(w))}$

- Offer arrival rate to workers $\lambda_e = \frac{m(JS, V)}{JS} = m(1, \theta)$
  - Matching function $m(JS, V) = m(1, \theta)$ where $\theta = \frac{V}{JS}$
  - Job seekers from unemployed and employed $JS = (1 + \phi(1 - \delta))u + \phi(1 - \delta))$
  - Implication: $\theta$ is a monotonically rising in the simpler tightness measure $\tilde{\theta} = V/u$
**Labor market tightness and voluntary job separations: Formalization**

1. EE sep elasticity $\varepsilon^{EE}$ ↑ in magnitude with tightness, as measured by $\theta$ or $\tilde{\theta}$
   - Can happen either from an increase in $V$ (e.g., + demand shock), or lower $u$ (e.g., - labor force shock)

2. Key: ↑ tightness raises separations more at bottom of firm wage distribution
   - Raises overall EE separation elasticity w.r.t. firm wage

3. [Note: Endogenizing wage offer distribution $F(w)$ based on productivity distribution $H(p)$ does not affect key comparative statics]
   - EE separations: $\rho + \lambda_e(1 - F(w)) = \rho + \lambda_e(1 - H(k^{-1}(p)))$
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Overall monthly job-to-job transition rates:
Approximately 15% above pre-pandemic levels

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<td>13</td>
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Job-to-job transition rates among high school workers:

Approximately 30% higher than prior to pandemic
Rising transition rates driven by young, high school-educated workers

High School, under 40

BA+, under 40

High School, 40+

BA+, 40+
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Tightness and wage growth: Wage-Phillips curves

- Measuring labor market tightness: two ingredients
  1. Unemployment rate
  2. Job-to-job separation rate

- Tightness combines standardized EE-Sep and Unemp
  \[ \text{Tightness}_{st} = 0.5 \times \text{Std(Job-to-job separation rate)}_{st} - 0.5 \times \text{Std(Unemp)}_{st} \]

- Estimating equation: \( \Delta \ln W \) between 2021q1-q2 and 2022q2-q3
  \[ \ln W_{ist}^q = \alpha_t + \beta^q \text{Tightness}_{s,2021q3-2022q1} \times [t = 2022q2-q3] + X_i' \gamma + \delta_s + e_{ist} \]

- Tightness is measured at the state level
- Wages from person-level microdata with SE’s clustered at state level
- Controls: Education, age group, sex, race, sector (manuf, finance, business svcs, prof svcs), union covered, state Covid death rate
Components of tightness measure: EE separations and (-) unemployment

EE Separation Rate

Negative Unemployment Rate
Sharp increase in tightness post-pandemic
State-level wage-Phillips curve

Coefficient = 0.025 (s.e. = 0.007)

Tightness (standardized EE sep rate minus unemployment), 2021q3 - 2022q1
State-level wage-Phillips curve especially steep for bottom quartile

Coefficients:
- Quartile 1: Coefficient = 0.067 (s.e. = 0.016)
- Quartiles 2-4: Coefficient = 0.011 (s.e. = 0.008)

Graph showing the relationship between Log Real Wage and Tightness (standardized EE sep rate minus unemployment), 2021q3 - 2022q1.

Table: WPC by quartiles
State-level wage-Phillips curve steeper for high school < 40 v. everyone else

**Table: WPC by age & education**

- **Coefficient=0.089 (s.e.=0.023)**
- **Coefficient=0.003 (s.e.=0.007)**

---

**Tightness (standardized EE sep rate minus unemployment), 2021q3 - 2022q1**

- **HS, under 40**
- **All other groups**
Many additional wage-Phillips results and cuts of the data

• By wage quartile
  ▶ Table: WPC by quartiles

• By age and education
  ▶ Table: WPC by age & education

• With many sets of controls
  ▶ Table: WPC - trim 15th percentile
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Wage-separation elasticity as a measure of labor market power

• Quit elasticity is a key measure of labor market power
  • Responsiveness of job-to-job (EE) separations to wages Manning 2021; Bassier et al. 2022
• Using CPS, can estimate quits in 12 months following first wage observation
• Estimating equations
  1 Using own-wage variation, $w_{i,t-1}$
    \[ EE_{sep_{it}} = a + \beta_1 \ln w_{i,t-1} + \beta_2 \ln w_{i,t-1}^2 + X_{it}' \gamma + e_{it} \]
  2 Using industry wage premiums, $\tilde{w}_{j(i),t-1}$
    \[ EE_{sep_{it}} = a + \beta_1 \ln \tilde{w}_{j(i),t-1} + \beta_2 \ln \tilde{w}_{j(i),t-1}^2 + X_{it}' \gamma + e_{it} \]
• Details
  • Own-wage controls: age, education, gender, race, ethnicity, state
  • Estimate both linear and quadratic fits, standard errors clustered at state level
  • $\ln \tilde{w}_j$: Wage regression on sex, age cubic, race, ethnicity, industry FE’s ($t = 2015 - 19$)
Aside: Measurement error correction

- Using industry and occupation $\Delta$ to proxy annual job change is noisy
- We use monthly reported job changes to implement *error correction* procedure
  - Unfortunately, reported job separations are not available at 12 month horizon
  - Instead, use monthly reported job separations in combo with ind/occ $\Delta$’s to do measurement error correction
- Naive industry-occupation $\Delta$ measures are quite unreliable
  - Only $\sim 1/2$ of EE transitions based on ind/occ $\Delta$’s are true transitions
  - Only $\sim 1/2$ of true EE transitions are captured with ind/occ $\Delta$’s
- Wage $\Delta$ gap for new hires v. stayers is **250%** larger than naive comparison
  - Commonly used Atlanta Fed Wage Tracker suffers from this problem
The aggregate wage-separation elasticity has not changed much —
Pooling all education levels
Separation elasticity
High school workers vs. everyone else

High School Only

Everyone but High School

Table: HS vs. BA
The wage-separation elasticity has gotten steeper
Among high school workers < age 40

High School, Age < 40

High School, Age 40 +

Table: Quadratic fit
Table: All vs. HS
Separation elasticity – little change for highly educated workers
Workers with a bachelor’s degree or more by age

BA+, under 40

BA+, 40 +

Table: Quadratic fit
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Why are people changing jobs so much?

Wage gains are much larger among job changers than stayers
Increased switch rate + wage growth from switching for young HS workers
Workers under 40 years old

Wage growth: switchers vs. stayers

EE transition rates
Stagnant switch rate + wage growth from switching for older workers
Workers 40 years and older

**Wage growth: switchers vs. stayers**

**EE transition rates**

![Graph showing wage growth and EE transition rates for different educational backgrounds and age groups over the years.](image-url)
More mobility out of bottom half of wage distribution among HS<40 workers

Using industry wage premia to proxy wage levels

Table: Top & bottom flows
More mobility out of bottom quartile of wage dist’n among HS<40 workers

Using industry wage premia to proxy wage levels

Using industry wage premia to proxy wage levels

Table: Bottom quartile flows
Sharp rise in net mobility out of the Hospitality sector, esp. among HS < 40

Hospitality is the canonical low-wage, low-stability job sector

Table: Hospitality flows
Industry wage premia for EE switchers—Origin vs. destination for full sample

Most wage gains are not due to moves from lower-wage to higher-wage industries.

### Average Ind. Wage Premia

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### Gap in Ind. Wage Premia

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<td>2016m7</td>
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**Note:** The graphs show the trend of wage premia and gap over time, with the x-axis representing different periods from 2015m1 to 2022m7.
Industry wage premia for High School < Age 40 EE switchers

Most wage gains are not due to moves from lower-wage to higher-wage industries

**Average Ind. Wage Premia**

**Gap in Ind. Wage Premia**
Job $\Delta$’s and wage $\Delta$’s and: Summary

1. Wage growth faster among young HS graduates than others, e.g., BA+.
Wage growth faster among young HS graduates than others, e.g., BA+

2 Among job-stayers

• Young HS stayers: Wage growth keeping pace with inflation
• Young BA+ stayers: Wage growth falling short of inflation
1. Wage growth faster among young HS graduates than others, e.g., BA+

2. Among job-stayers
   - Young HS stayers: Wage growth keeping pace with inflation
   - Young BA+ stayers: Wage growth falling short of inflation

3. Among employment-to-employment job changers
   - Wage gains conditional on EE transition are always larger for BA+ than for HS workers
   - But wage gain advantage has narrowed for BA+ relative to HS workers
   - And frequency of EE transitions increased substantially for HS workers relative to BA+
   - Thus, HS workers gaining relatively more from EE transitions than pre-pandemic
Wage growth faster among young HS graduates than others, e.g., BA+

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- Thus, HS workers gaining relatively more from EE transitions than pre-pandemic

Low-education switchers not primarily moving to higher wage inds & occs
- Consistent with monopsony: workers moving to higher wage jobs doing similar work
1. What does a competitive labor market look like?

2. Some unexpected facts
   - The big employment rebound
   - The unexpected wage compression

3. Distinguishing rising demand from increasing competition: Conceptual model

4. Distinguishing rising demand from increasing competition: Evidence
   - Rising job transition rates (the ‘Great Reshuffle’)
   - Labor market tightness and wage growth: Wage-Phillips curves
   - Who is quitting? The role of low wages
   - The payoff to job change

5. How much does wage pressure contribute to inflation?

6. Conclusions
Labor market tightness, inflation, and real wages

- Key questions
  1. How much does tightness contribute to inflation?
  2. How much does inflation erode beneficial effects of tightness on wages?

- Estimating equations: $\Delta \ln W$ between 2021q1q2 and 2022q2q3

$$\ln P_{i,r(s),t} = \alpha_t + \beta_p \times \text{Tightness}_{r(s),t=2021q3-2022q1} \times [t = 2022q2q3] + \gamma_r(s) + e_{i,r(s),t}$$

$$\ln W_{i,r(s),t} = \alpha_t + \beta_w \times \text{Tightness}_{r(s),2021q3-2022q1} \times [t = 2022q2q3] + \gamma_r(s) + e_{i,r(s),t}$$

- Fit to person-level wage data with state-clustered SEs

- Form regional price indices as follows
  - For workers in 21 metro areas, use Bureau of Labor Statistics (BLS) metro price index
  - For workers in other metro areas, use average of state metros
  - For workers in states with no metro price index, use BLS regional price index
Wage Phillips Curves vs. Price Phillips Curve

Coeff=0.012 (s.e.=0.004)
Coeff=0.013 (s.e.=0.007)
Coeff=0.046 (s.e.=0.011)

-0.02 -0.01 0.00 0.01 0.02 0.03 0.04
Log Real Wage or Log CPI

-1 -0.5 0 0.5 1
Tightness (standardized EE sep rate minus unemployment), 2021q3 - 2022q1

PPC WPC, overall WPC, HS < 40
## Wage Phillips Curve (Nominal) vs. Price Phillips Curve

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<tr>
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<td>0.0246***</td>
<td>0.0230***</td>
<td>0.0149**</td>
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<td>1st Quartile</td>
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<td>High School, under 40</td>
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<td>0.0524***</td>
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**Controls:**

- Age: X X X X X
- Demographics: X X X
- Sector and Union: X X
- Covid Death Rate: X

Dependent variables are log wage and log CPI. All specifications include state and period FE. Controls include age group, sex, race, education, industry (finance, manuf, business svcs, prof svcs), and union coverage dummies, as well as state COVID death rates. Standard errors in parentheses, clustered at state level. * p < 0.10, ** p < 0.05, *** p < .01

[Table: WPC by quartiles] [Table: WPC by age & education] [Table: PPC estimates]
### Real Wage Phillips Curve – by Wage Quartile

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<td>1st Quartile</td>
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**Controls:**

- Age: X X X X X
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- Sector and Union: X X X
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Dependent variable is log wage. Wages deflated using metro level CPI when available, census division level otherwise. All specifications include state and period FE. Controls include age group, sex, race, education, industry (finance, manuf, business svcs, prof svcs), and union coverage dummies, as well as state COVID death rates. Standard errors in parentheses, clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$
### Real Wage Phillips Curve – by Age and Education

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**Controls:**
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Dependent variable is log wage. Wages deflated using metro level CPI when available, census division level otherwise. All specifications include state and period FE. Controls include age group, sex, race, education, industry (finance, manuf, business svcs, prof svcs), and union coverage dummies, as well as state COVID death rates. Standard errors in parentheses, clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Labor market tightness, inflation, and real wages: Summary

1. Cannot reject that labor market tightness has same impact on local price level and mean local wages
   - Consistent with Katz & Krueger '99
   - Also consistent with Cerrato & Gitti '22 for local prices (they don’t examine wages)
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But tightness associated with real wage growth among bottom two quartiles of workers, young high school and some-college workers

But what about inflation inequality: Are low-wage workers subject to disproportionate inflation?

- Effective inflation rate is lower for low- and high-wage workers/ households Jaravel '22
Inflation Inequality by Income Percentile

Source: Xaravel 22
Inflation Inequality by Income Percentile: Excluding Gas & Vehicles

Source: Xaravel 22
Agenda

1. What does a competitive labor market look like?
2. Some unexpected facts
   - The big employment rebound
   - The unexpected wage compression
3. Distinguishing rising demand from increasing competition: Conceptual model
4. Distinguishing rising demand from increasing competition: Evidence
   - Rising job transition rates (the ‘Great Reshuffle’)
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Conclusions and next steps

1. For first time in four decades, wage inequality falling, due to rising lower tail
2. Despite inflation, *real wages rising* among young HS grads, 1st quartile workers
3. It’s tempting to attribute this change to ‘tight’ labor markets—but what does this mean in practice?
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   - The *simplest explanation* is that labor markets are operating on a higher point on the labor demand curve
   - Evidence indicates this explanation *too simple*: Competition has intensified
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   - Evidence indicates this explanation *too simple*: Competition has intensified.

4. Distinction is critical: Rising competition means higher wages that better reflect productivity *and* higher aggregate productivity — a *double dividend*.

5. Next: *Use worker-firm matched data to study Δ’s in labor supply elasticities*. 


Thank you
Appendix slides
Aside: Role of state minimum wage laws in wage compression, 2015–2019

- 10th Percentile:
  - Coeff = 0.43 (s.e. = 0.06)

- 50th Percentile:
  - Coeff = -0.04 (s.e. = 0.07)

- 90th Percentile:
  - Coeff = -0.02 (s.e. = 0.08)
Aside: Role of state minimum wage laws in wage compression, 2015–2019

Change in real log 50-10 ratio [2015-2019]

Coef\textsuperscript{f}=-0.47 (s.e.=0.07)

Change in real log minimum wage [2015-2019]
Remarkable overtaking of wage growth among less educated workers, 2015-2022

Hourly wage (rel. to 2020 Feb)

- No HS diploma
- HS diploma
- Some college
- BA
- MA or PhD
Remarkable overtaking of wage growth among High-school vs. college-educated workers, 2015-2022
Steepest wage gains found among non-college grads under age 40, 2015-2022

Non-BA vs. BA Under 40

Non-BA vs. BA Age 40+

Wage trends: HS vs. BA, by age
Routine v. non-routine cognitive v. non-routine manual occupations

Wage growth fastest in ‘less-skilled’ occupations (2015-2022)
Real wage trends by quantiles and metro area status

Metro Area

Non-metro Area
Job-to-job transitions: non-BA workers

**High School**

![Graph showing EE transition rates for High School from 2017-2019 and 2021-2022]

- **2017-2019**: 0.020, 0.022, 0.024, 0.026, 0.028, 0.030, 0.032, 0.034
- **2021-2022**: 0.020, 0.022, 0.024, 0.026, 0.028, 0.030, 0.032, 0.034

**Some College**

![Graph showing EE transition rates for Some College from 2017-2019 and 2021-2022]

- **2017-2019**: 0.020, 0.022, 0.024, 0.026, 0.028, 0.030, 0.032, 0.034
- **2021-2022**: 0.020, 0.022, 0.024, 0.026, 0.028, 0.030, 0.032, 0.034

Fig: HS job transitions
### Nominal Wage Phillips Curve – by Wage Quartile

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**Controls:**
- Age: X X X X
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## Nominal Wage Phillips Curve – by Age and Education

<table>
<thead>
<tr>
<th>Age/Grammar, Under 40</th>
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<td>0.0468*** (0.0102)</td>
<td>0.0463*** (0.0111)</td>
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<tr>
<td>High School, 40+</td>
<td>0.0477** (0.0189)</td>
<td>0.0463*** (0.0179)</td>
<td>0.0433** (0.0185)</td>
<td>0.0379** (0.0166)</td>
<td>0.0374** (0.0158)</td>
</tr>
<tr>
<td>Some College, Under 40</td>
<td>0.0491*** (0.0107)</td>
<td>0.0424*** (0.0106)</td>
<td>0.0407*** (0.0103)</td>
<td>0.0362*** (0.0099)</td>
<td>0.0356*** (0.0107)</td>
</tr>
<tr>
<td>Some College, 40+</td>
<td>0.0161 (0.0122)</td>
<td>0.0144 (0.0120)</td>
<td>0.0124 (0.0124)</td>
<td>0.0139 (0.0114)</td>
<td>0.0136 (0.0116)</td>
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<tr>
<td>BA+, Under 40</td>
<td>-0.0246* (0.0140)</td>
<td>-0.0232* (0.0136)</td>
<td>-0.0200 (0.0140)</td>
<td>-0.0191 (0.0133)</td>
<td>-0.0194 (0.0130)</td>
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<tr>
<td>BA+, 40+</td>
<td>-0.0207 (0.0143)</td>
<td>-0.0224 (0.0151)</td>
<td>-0.0194 (0.0148)</td>
<td>-0.0191 (0.0148)</td>
<td>-0.0194 (0.0153)</td>
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**Controls:**
- Age
- Demographics
- Sector and Union
- Covid Death Rate

Dependent variable is log wage. All specifications include state and period FE. Controls include age group, sex, race, education, industry (finance, manuf, business svcs, prof svcs), and union coverage dummies, as well as state COVID death rates. Standard errors in parentheses, clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
## Nominal Wage Phillips Curve – trimming bottom 15th percentile

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<tr>
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<tbody>
<tr>
<td>Overall</td>
<td>0.0220***</td>
<td>0.0220***</td>
<td>0.0152***</td>
<td>0.0134**</td>
<td>0.0128**</td>
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<td></td>
<td>(0.0073)</td>
<td>(0.0072)</td>
<td>(0.0054)</td>
<td>(0.0055)</td>
<td>(0.0061)</td>
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<tr>
<td>1st Quartile</td>
<td>0.0880***</td>
<td>0.0881***</td>
<td>0.0846***</td>
<td>0.0839***</td>
<td>0.0835***</td>
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<tr>
<td></td>
<td>(0.0118)</td>
<td>(0.0117)</td>
<td>(0.0111)</td>
<td>(0.0111)</td>
<td>(0.0115)</td>
</tr>
<tr>
<td>High School, under 40</td>
<td>0.0584***</td>
<td>0.0604***</td>
<td>0.0593***</td>
<td>0.0547***</td>
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<td>(0.0116)</td>
<td>(0.0116)</td>
<td>(0.0115)</td>
<td>(0.0107)</td>
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**Controls:**

- Age: X X X X X
- Demographics: X X X X
- Sector and Union: X X X
- Covid Death Rate: X

Dependent variable is log wage. Observations trimmed to those above the 15th wage percentile at the state, period level. All specifications include state and period FE. Controls include age group, sex, race, education, industry (finance, manuf, business svcs, prof svcs), and union coverage dummies, as well as state COVID death rates. Standard errors in parentheses, clustered at state level. * p < 0.10, ** p < 0.05, *** p < .01
## Employment-to-Employment Separation Elasticity Estimates

<table>
<thead>
<tr>
<th></th>
<th>Individual-level Wage</th>
<th>Industry Wage Premium</th>
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<tr>
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</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015-2019</td>
<td>-0.2014***</td>
<td>-0.2810***</td>
</tr>
<tr>
<td></td>
<td>(0.0392)</td>
<td>(0.0286)</td>
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<tr>
<td>2021-2022</td>
<td>-0.1209</td>
<td>-0.2986***</td>
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<tr>
<td></td>
<td>(0.0971)</td>
<td>(0.0753)</td>
</tr>
<tr>
<td>High School Educated, Under 40 Years Old</td>
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<tr>
<td>2015-2019</td>
<td>-0.1482</td>
<td>-0.0622</td>
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<tr>
<td></td>
<td>(0.1218)</td>
<td>(0.0788)</td>
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<tr>
<td>2021-2022</td>
<td>-0.5859**</td>
<td>-0.4321**</td>
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<td>(0.2746)</td>
<td>(0.1933)</td>
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### Aggregation Level
<table>
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<tr>
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<th>Individual</th>
<th>Individual</th>
<th>3-digit Ind.</th>
<th>3-digit Ind.</th>
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<tbody>
<tr>
<td>Time Interval</td>
<td>3-month</td>
<td>Annual (adjusted)</td>
<td>Monthly</td>
<td>Monthly</td>
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<td>Controls</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
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</table>

* p < 0.10, ** p < 0.05, ***p < .01. Standard errors in parentheses.
### Employment-to-Employment Separation Elasticity Estimates

<table>
<thead>
<tr>
<th></th>
<th>Individual-level Wage</th>
<th>Industry Wage Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>High School Educated</td>
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<td></td>
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<tr>
<td>2015-2019</td>
<td>-0.2131***</td>
<td>-0.1444**</td>
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<td>(0.0807)</td>
<td>(0.0603)</td>
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<tr>
<td>2021-2022</td>
<td>-0.3081*</td>
<td>-0.2472</td>
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<tr>
<td></td>
<td>(0.1866)</td>
<td>(0.1555)</td>
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<tr>
<td>Bachelor’s Degree or Higher</td>
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<td></td>
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<tr>
<td>2015-2019</td>
<td>-0.1964***</td>
<td>-0.3503***</td>
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<tr>
<td></td>
<td>(0.0593)</td>
<td>(0.0463)</td>
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<tr>
<td>2021-2022</td>
<td>-0.0900</td>
<td>-0.3654***</td>
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<tr>
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<td>(0.1505)</td>
<td>(0.1188)</td>
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<tr>
<td>Aggregation Level</td>
<td>Individual</td>
<td>Individual</td>
</tr>
<tr>
<td>Time Interval</td>
<td>3-month</td>
<td>Annual (adjusted)</td>
</tr>
<tr>
<td>Controls</td>
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<td>Y</td>
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* $p < 0.10$, ** $p < 0.05$, ***$p < .01$. Standard errors in parentheses.
# Employment-to-Employment Separation Elasticity Estimates
## Linear and Quadratic Fit

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>HS, under 40</th>
<th>HS, 40+</th>
<th>BA+, under 40</th>
<th>BA+, 40+</th>
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<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>2015-2019</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ind. Wage Premium</td>
<td>-0.5980***</td>
<td>-0.5986***</td>
<td>-0.5773***</td>
<td>-0.5618***</td>
<td>-0.4913***</td>
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<tr>
<td></td>
<td>(0.0958)</td>
<td>(0.0807)</td>
<td>(0.1346)</td>
<td>(0.1364)</td>
<td>(0.1552)</td>
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<tr>
<td>Ind. Wage Premium²</td>
<td>0.5168</td>
<td>-0.1662</td>
<td>0.5821</td>
<td>1.3931***</td>
<td>0.5855</td>
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<td></td>
<td>(0.3151)</td>
<td>(0.3867)</td>
<td>(0.4500)</td>
<td>(0.4692)</td>
<td>(0.4644)</td>
</tr>
<tr>
<td>2021-2022</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ind. Wage Premium</td>
<td>-0.5568***</td>
<td>-0.5799***</td>
<td>-0.7819***</td>
<td>-0.9163***</td>
<td>-0.6498***</td>
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<td>(0.1267)</td>
<td>(0.0777)</td>
<td>(0.1861)</td>
<td>(0.1730)</td>
<td>(0.2052)</td>
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<tr>
<td>Ind. Wage Premium²</td>
<td>0.9674***</td>
<td>1.4079*</td>
<td>0.9815*</td>
<td>1.3510***</td>
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<tr>
<td></td>
<td>(0.2864)</td>
<td>(0.7243)</td>
<td>(0.5856)</td>
<td>(0.3945)</td>
<td>(0.5287)</td>
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* p < 0.10, ** p < 0.05, *** p < .01

Standard errors in parentheses
## Movement between top half and bottom half of the 3-digit industry wage premia distribution

<table>
<thead>
<tr>
<th></th>
<th>(1) 2015-2019</th>
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<th>(3) Difference</th>
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<tbody>
<tr>
<td>Switching up: bottom half of IWP to top half</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Overall</td>
<td>0.00492***</td>
<td>0.00518***</td>
<td>0.00026</td>
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<tr>
<td></td>
<td>(0.00009)</td>
<td>(0.00017)</td>
<td>(0.00019)</td>
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<tr>
<td>HS, under 40</td>
<td>0.00852***</td>
<td>0.01047***</td>
<td>0.00196***</td>
</tr>
<tr>
<td></td>
<td>(0.00031)</td>
<td>(0.00061)</td>
<td>(0.00069)</td>
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<tr>
<td>Switching down: top half of IWP to bottom half</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>0.00421***</td>
<td>0.00436***</td>
<td>0.00014</td>
</tr>
<tr>
<td></td>
<td>(0.00008)</td>
<td>(0.00015)</td>
<td>(0.00017)</td>
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<tr>
<td>HS, under 40</td>
<td>0.00626***</td>
<td>0.00615***</td>
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<tr>
<td></td>
<td>(0.00026)</td>
<td>(0.00044)</td>
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Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$
Movement in and out of the bottom quartile of the 3-digit industry wage premia distribution

<table>
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<tr>
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<th>(2) 2021-2022</th>
<th>Difference</th>
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<tr>
<td><strong>Switching up: switching out of bottom quartile of IWP</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>0.00977***</td>
<td>0.01080***</td>
<td>0.00103***</td>
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<tr>
<td></td>
<td>(0.00018)</td>
<td>(0.00034)</td>
<td>(0.00039)</td>
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<tr>
<td>HS, under 40</td>
<td>0.01414***</td>
<td>0.01999***</td>
<td>0.00585***</td>
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<tr>
<td></td>
<td>(0.00055)</td>
<td>(0.00118)</td>
<td>(0.00130)</td>
</tr>
<tr>
<td><strong>Switching down: switching into bottom quartile of IWP</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Overall</td>
<td>0.00254***</td>
<td>0.00257***</td>
<td>0.00002</td>
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<tr>
<td></td>
<td>(0.00005)</td>
<td>(0.00009)</td>
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<tr>
<td>HS, under 40</td>
<td>0.00341***</td>
<td>0.00366***</td>
<td>0.00025</td>
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<td>(0.00016)</td>
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Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < .01$
## Movement in and out of hospitality industry

<table>
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<th>(3) Difference</th>
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<tr>
<td><strong>Switching into Hospitality</strong></td>
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<td></td>
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<tr>
<td>Overall</td>
<td>0.00090***</td>
<td>0.00092***</td>
<td>0.00002</td>
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<td>(0.00005)</td>
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<tr>
<td>HS, under 40</td>
<td>0.00239***</td>
<td>0.00288***</td>
<td>0.00048*</td>
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<td></td>
<td>(0.00013)</td>
<td>(0.00024)</td>
<td>(0.00027)</td>
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<tr>
<td><strong>Switching out of Hospitality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>0.01396***</td>
<td>0.01670***</td>
<td>0.00274***</td>
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<td>(0.00039)</td>
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<td>(0.00088)</td>
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<tr>
<td>HS, under 40</td>
<td>0.01456***</td>
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Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$
Price Phillips Curve

Various Specifications of Regression of Log CPI on Measures of Tightness

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<td><strong>A. Independent var:</strong></td>
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<td></td>
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<tr>
<td>Tightness</td>
<td>0.0116***</td>
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<tr>
<td></td>
<td>(0.0039)</td>
<td>(0.0039)</td>
<td>(0.0040)</td>
<td>(0.0040)</td>
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<tr>
<td>1-Unemp</td>
<td>0.6808***</td>
<td>0.6771***</td>
<td>0.6754***</td>
<td>0.7282***</td>
<td>0.7060***</td>
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<td>(0.1979)</td>
<td>(0.1975)</td>
<td>(0.2040)</td>
<td>(0.2064)</td>
<td>(0.2008)</td>
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<td><strong>C. Independent var:</strong></td>
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<td>EE Sep</td>
<td>0.8329</td>
<td>0.8220</td>
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**Controls:**
- Age: X X X X X
- Demographics: X X X X
- Sector and Union: X X
- Covid Death Rate: X

Dependent variable is Log CPI. All specifications include state and period FE. Controls include age group, sex, race, education, industry (finance, manuf, business svcs, prof svcs), and union coverage dummies, as well as state COVID death rates. Standard errors in parentheses, clustered at state level. * p < 0.10, ** p < 0.05, *** p < 0.01
## Price Phillips Curve - benchmarked specifications

### Various Specifications of Price Phillips Curve

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<th>(6)</th>
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<tr>
<td><strong>Dep Var:</strong></td>
<td><strong>∆Inflation</strong></td>
<td><strong>∆LogCPI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>∆Unemp</td>
<td>-0.7924*</td>
<td>-0.7290*</td>
<td>-1.4588**</td>
<td>-0.9821</td>
<td>-0.9578</td>
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</tr>
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<td></td>
<td>(0.3897)</td>
<td>(0.3682)</td>
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<td>Unemp</td>
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<td>-1.1913***</td>
<td>-0.8132**</td>
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<td>(0.5421)</td>
<td>(0.4667)</td>
<td>(0.4609)</td>
<td>(0.3580)</td>
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<tr>
<td><strong>Pre-period</strong></td>
<td>Jan/Feb ’20</td>
<td>Jan/Feb ’20</td>
<td>Jan-Jun ’19</td>
<td>Sep ’19-Feb ’20</td>
<td>Jan/Feb ’20</td>
<td>Jan-Jun ’21</td>
</tr>
<tr>
<td><strong>Post-period</strong></td>
<td>Mar/Apr ’22</td>
<td>Mar/Apr ’22</td>
<td>Apr-Sep ’22</td>
<td>Apr-Sep ’22</td>
<td>Apr-Sep ’22</td>
<td>Apr-Sep ’22</td>
</tr>
<tr>
<td>LAUS adjustment</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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Sample includes 21 main metropolitan areas for which CPI is reported at the metro level. Column 1 replicates Figure 2 in Cerrato & Gitti (2022). LAUS adjustment indicates seasonally adjusted unemployment rates from BLS LAUS. CPI is reported bimonthly. Cols 3-6 impute for missing monthly CPI assuming constant growth such that $CPI_t = e^{0.5[ln(CPI_{t-1}) + ln(CPI_{t+1})]}$. Standard errors in parentheses, clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$