markus'academy

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

David Autor
MIT

with Arindrajit Dube and Annie McGrew

08. Dec. 2022

Poll

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
    $\Rightarrow$ higher wages
  - White collar workers
    $\Rightarrow$ WfH, flexibility
    - Preference shift: "search for meaning"
- Long Covid esp. in service sector
  - Slow rebuilding of labor participation
- Labor shortage everywhere

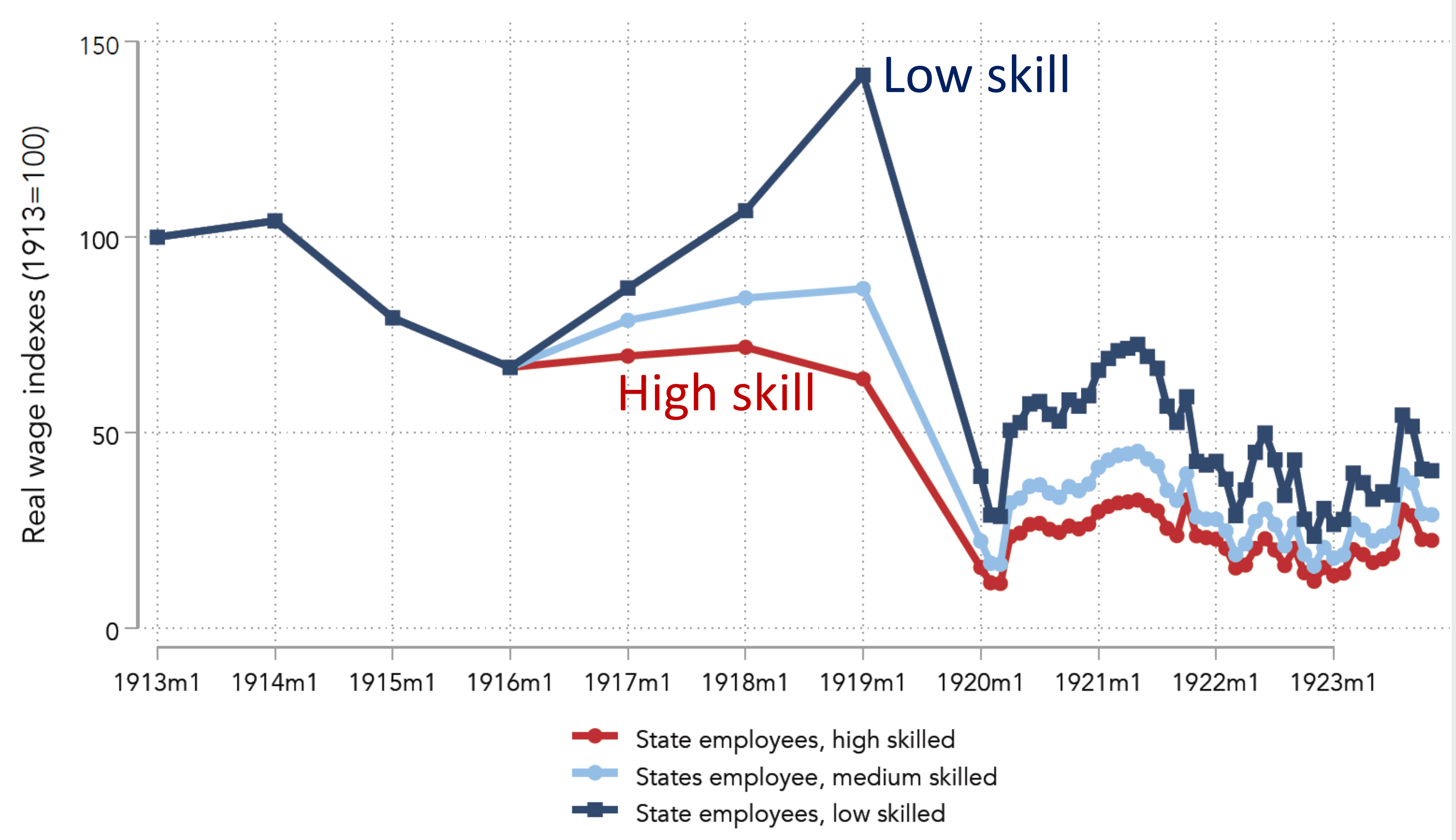
Skill Premium and Inflation

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

Skill Premium and Inflation: Germany 1916-1923

- Compression during high inflation, but not hyper-

(a) *Real wages for state employees*



- "Financial Phillips' Curve": German Hyperinflation
  Brunnermeier, Correia, Luck, Werner, Zimmermann (2022)

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

David Autor
MIT & NBER

Arin Dube
UMass Amherst & NBER

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

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
- **Evidence on labor market competition tells us something different**
  - Employers don't face ∞ 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

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
- **Evidence on labor market competition tells us something different**
  - Employers don't face ∞ 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
- **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

$\longrightarrow$ This distinction has normative implications

Plan of Attack

- Some unexpected facts: A sharp reversal in inequality, driven by rising wages among low-paid workers

Plan of Attack

- Some unexpected facts: A sharp reversal in inequality, driven by rising wages among low-paid workers
- A simple conceptual model: Changes in *demand* versus changes in *competition*

Plan of Attack

- Some unexpected facts: A sharp reversal in inequality, driven by rising wages among low-paid workers
- A simple conceptual model: Changes in *demand* versus changes in *competition*
- 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

Plan of Attack

- Some unexpected facts: A sharp reversal in inequality, driven by rising wages among low-paid workers
- A simple conceptual model: Changes in *demand* versus changes in *competition*
- 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?

Plan of Attack

- Some unexpected facts: A sharp reversal in inequality, driven by rising wages among low-paid workers
- A simple conceptual model: Changes in *demand* versus changes in *competition*
- 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

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

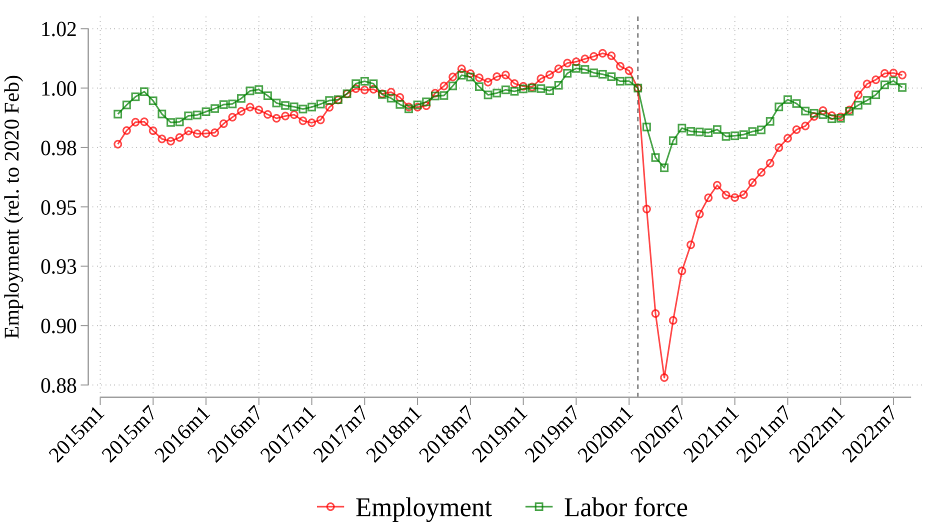
Agenda

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')
   - 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

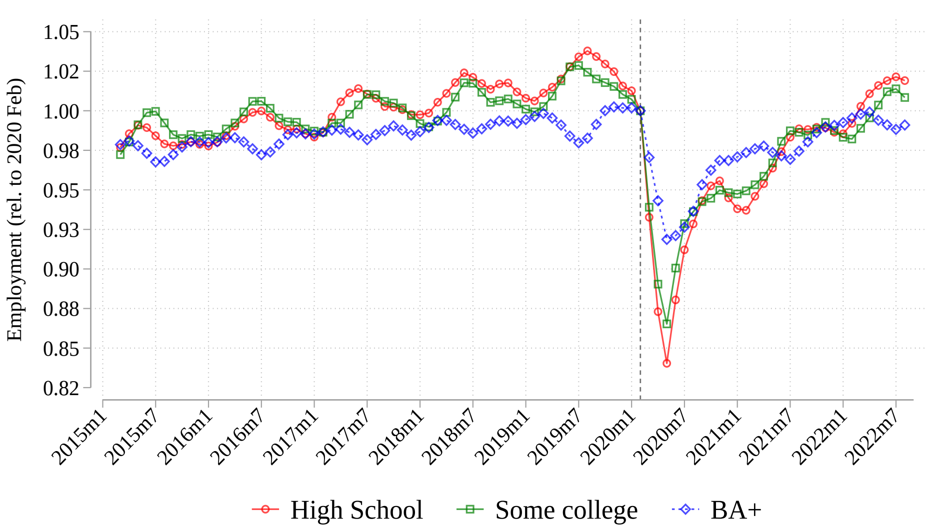
Agenda

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')
   - 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

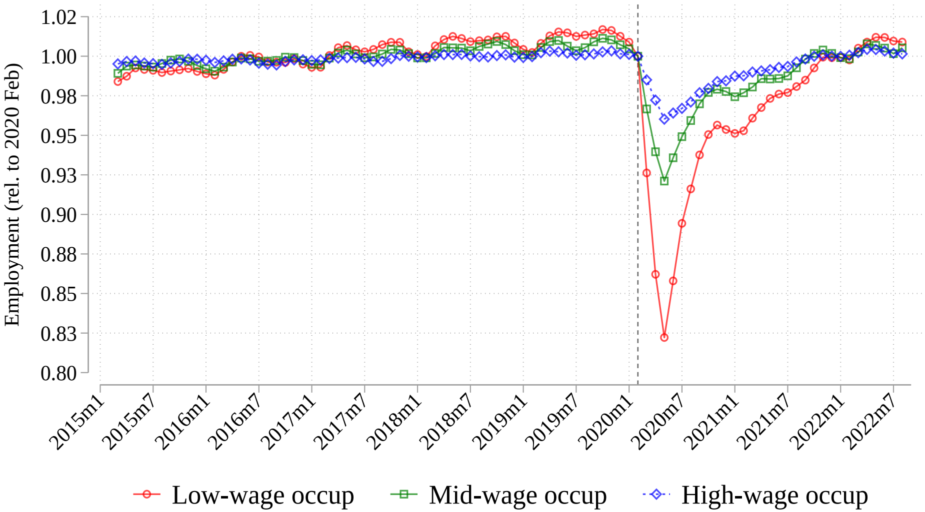
Participation: Participation rates have largely rebounded – and Emp/Pop has risen by even more than labor force participation



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

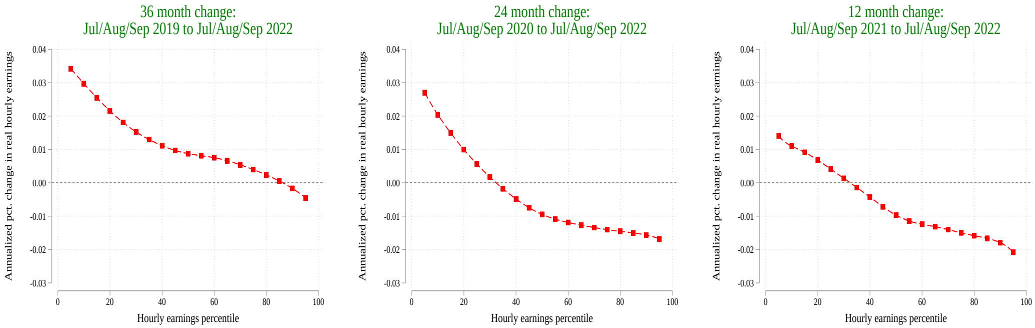


Agenda

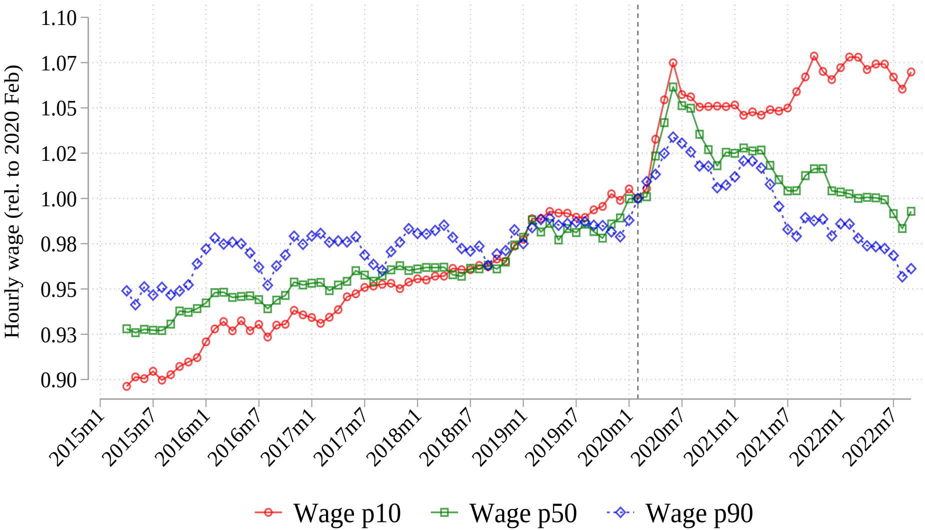
1. What does a competitive labor market look like?
2. Some unexpected facts
   - The big employment rebound
   - The unexpected wage compression
3. Distinguishing rising demand from increasing competition: Conceptual model
4. Distinguishing rising demand from increasing competition: Evidence
   - Rising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

Substantial wage growth in bottom of wage distribution —
Inflation eats nominal gains above median (or above bottom quartile recently)

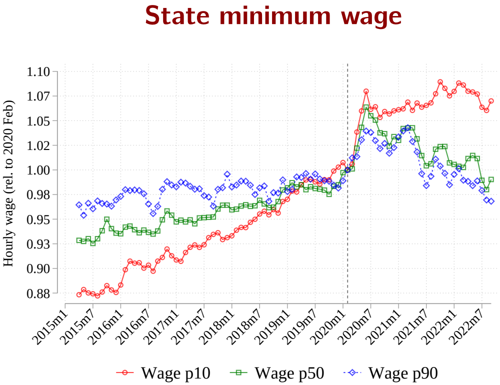
Regionally adjusted real wage growth in bottom of wage distribution

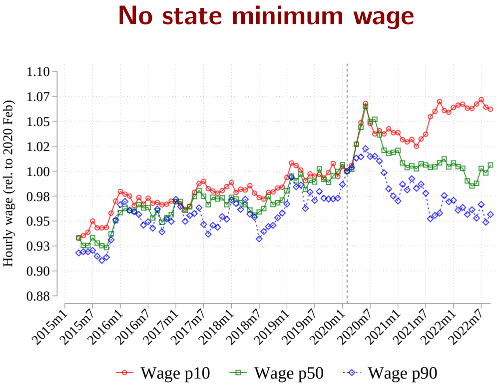


Wage inequality: Real wage trends by quantiles
P10 growth > P50 growth > P90 growth



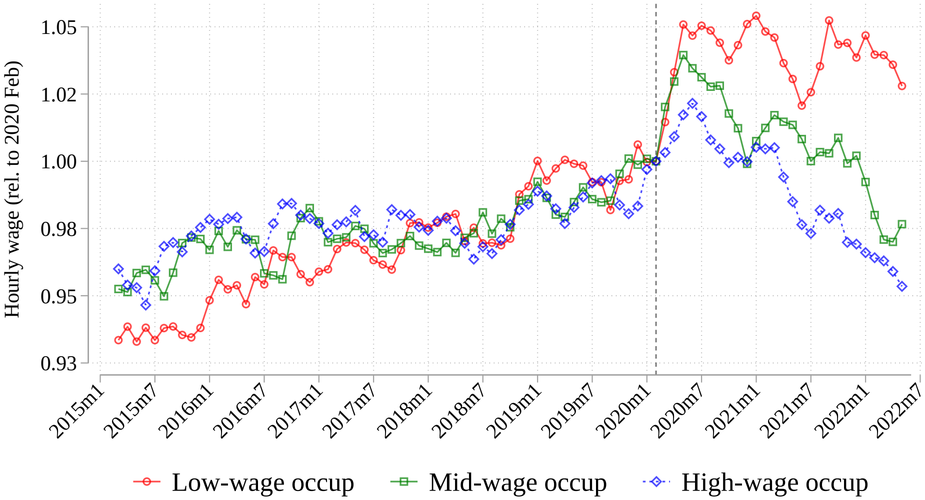
Pre-pandemic wage compression was underway between 2015 and 2020 — But only in states that were raising their minimum wages





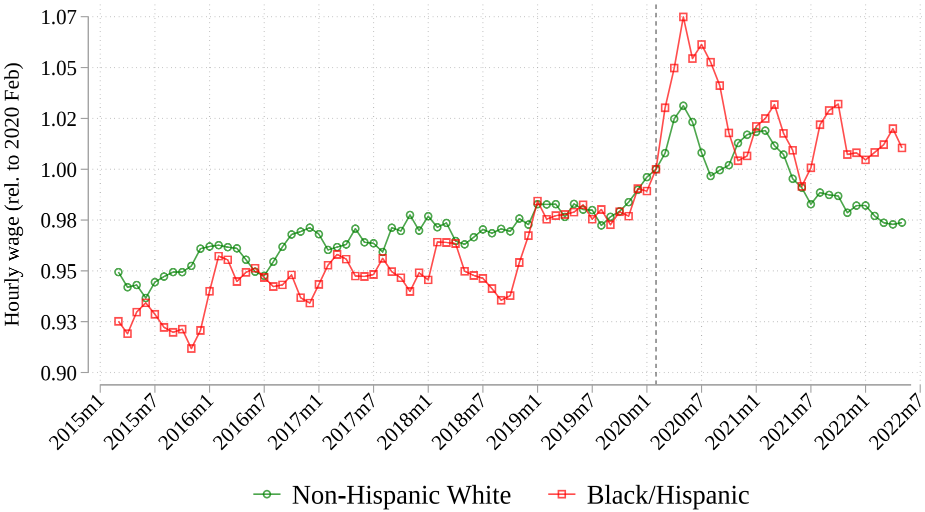
▸ Minimum wages & state-level wage compression

Occupational inequality: Real wage growth fastest in lowest-paid 3^{rd} of occs

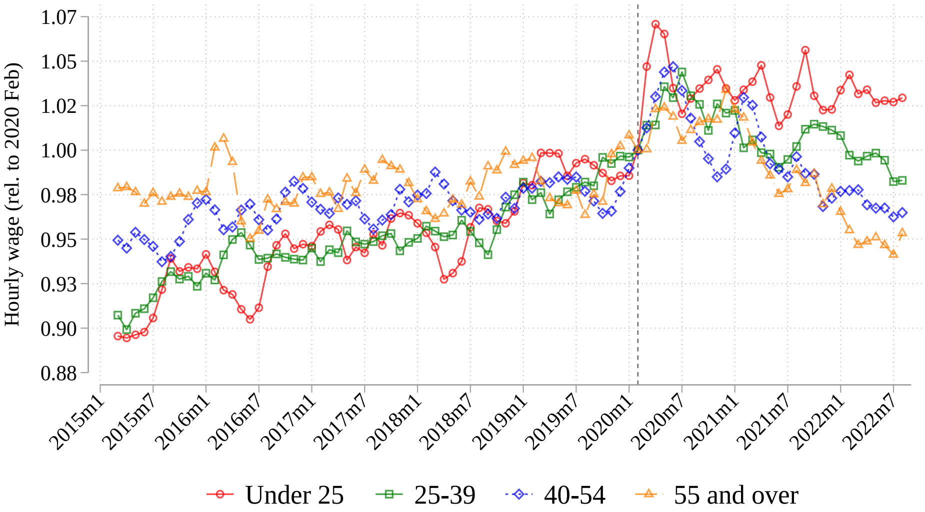


▸ Wage trends: routine v. non-routine tasks

Racial/ethnic inequality: Sharp fall in Black/Hispanic wage penalty

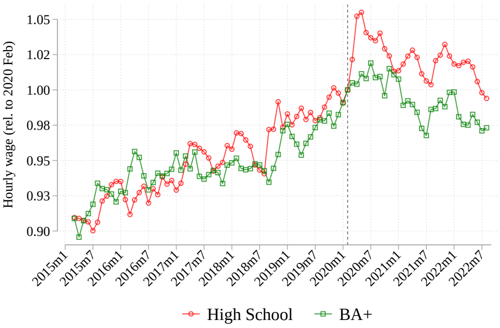


Young v. old inequality: Wage growth fastest for youngest workers, <40, <25

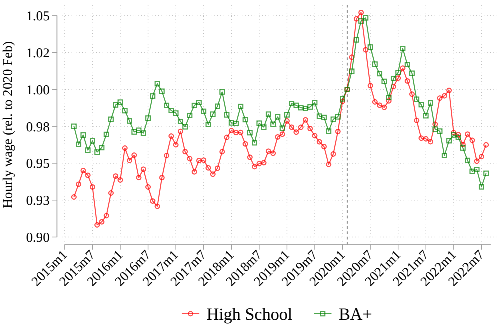


Educational inequality: High school workers < age 40 have steepest wage gains

HS vs. BA+ Under 40



HS vs. BA+ Age 40+



▸ Wage trends: Non-BA vs. BA, by age

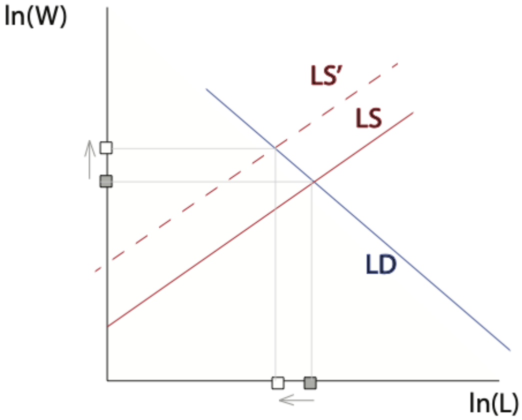
Agenda

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')
   - 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

Effect of inward labor supply shift in competitive labor market

Market level impact

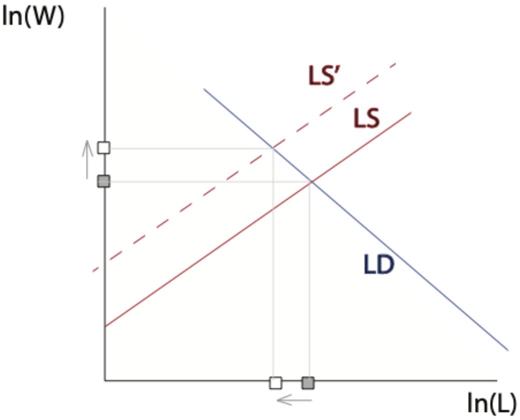
$$\Delta \ln W > 0, \ \Delta \ln L < 0$$



Effect of inward labor supply shift in competitive labor market

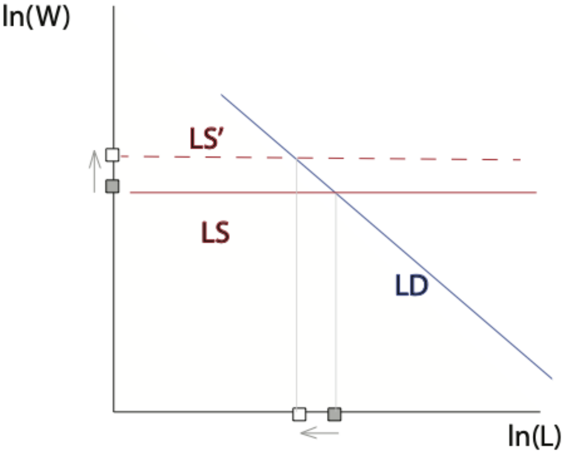
Market level impact

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



Price taking firm response

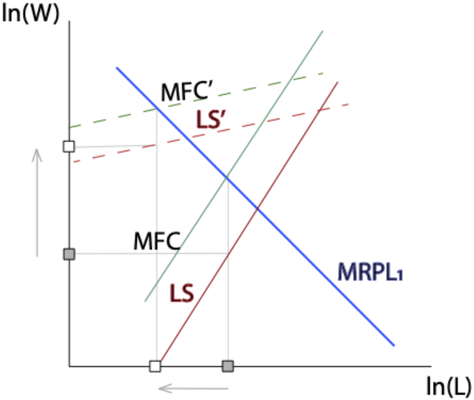
$\Delta \ln W > 0, \; \Delta \ln L < 0$



Subtle effects of rotation of labor supply curve in monopsonistic labor market

Low-wage monopsonistic firm

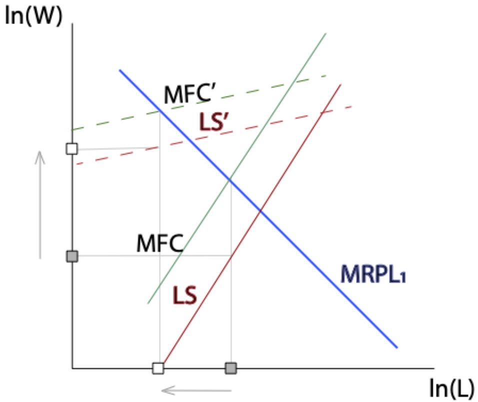
$\Delta \ln W > 0, \ \Delta \ln L < 0$



Subtle effects of rotation of labor supply curve in monopsonistic labor market

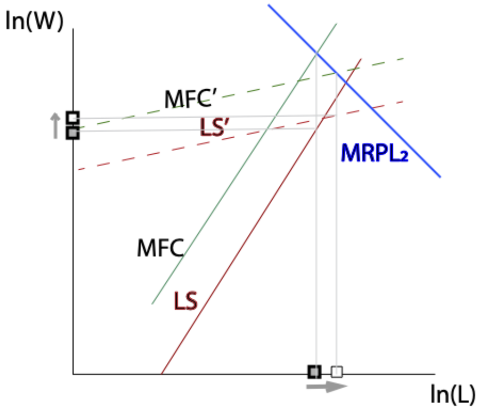
Low-wage monopsonistic firm

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



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

Why would the labor supply curve become more elastic?

Four plausible explanations

1. Numerous involuntary separations during pandemic — Has reduced employer attachment, raised footlooseness
2. Liquidity — Pandemic savings are not yet exhausted

Why would the labor supply curve become more elastic?

Four plausible explanations

1. Numerous involuntary separations during pandemic — Has reduced employer attachment, raised footlooseness

2. Liquidity — Pandemic savings are not yet exhausted

3. Word of mouth — Everyone knows that everyone else is moving to a better job

Why would the labor supply curve become more elastic?

Four plausible explanations

1. Numerous involuntary separations during pandemic — Has reduced employer attachment, raised footlooseness
2. Liquidity — Pandemic savings are not yet exhausted
3. Word of mouth — Everyone knows that everyone else is moving to a better job
4. Formal theory — Drops out of canonical job ladder model Burdett, Mortensen '98

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 δ is exogenous outflow to nonemployment, ρ 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: θ 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 ϵ^{EE} $\uparrow$ in magnitude with tightness, as measured by θ 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: $\uparrow$ 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: $\rho + \lambda_e(1 - F(w)) = \rho + \lambda_e(1 - H(k^{-1}(p)))$

Agenda

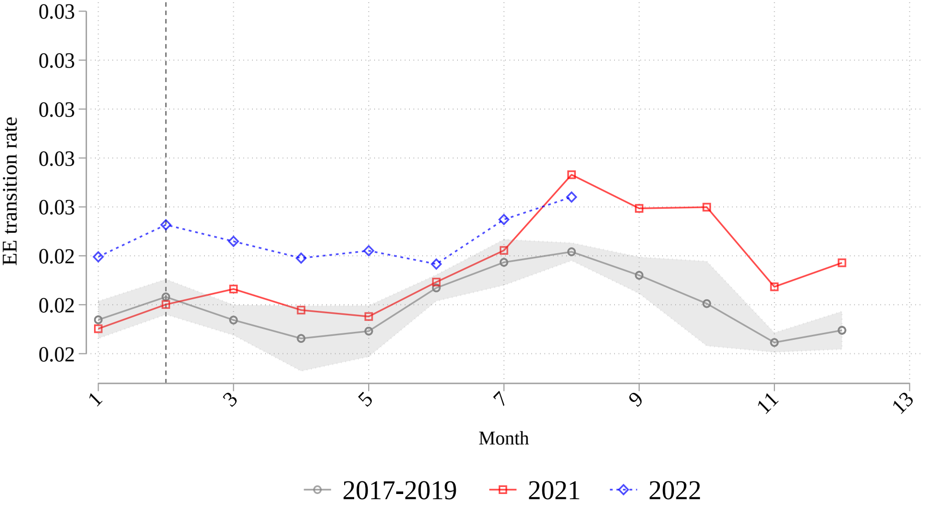
1. What does a competitive labor market look like?
2. Some unexpected facts
   - The big employment rebound
   - The unexpected wage compression
3. Distinguishing rising demand from increasing competition: Conceptual model
4. Distinguishing rising demand from increasing competition: Evidence
   - Rising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

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')
   - 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

Overall monthly job-to-job transition rates:

Approximately 15% above pre-pandemic levels



Job-to-job transition rates among high school workers:

Approximately 30% higher than prior to pandemic

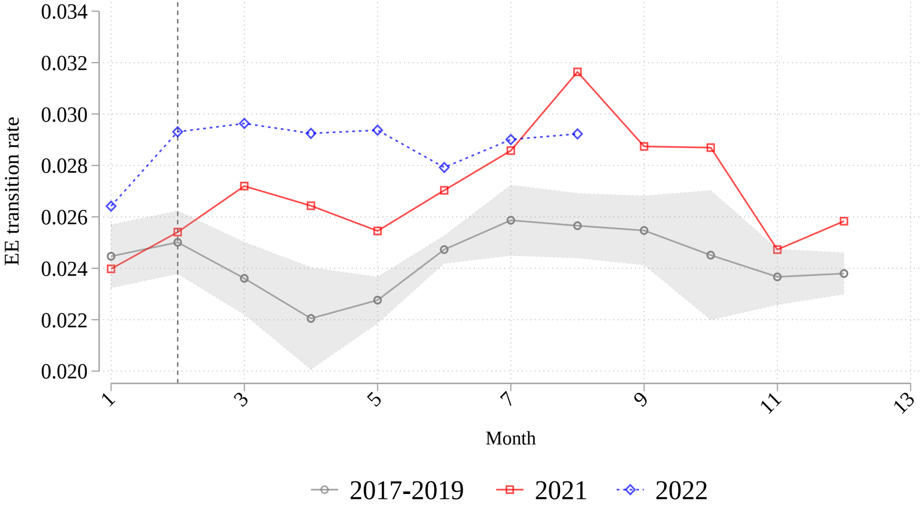
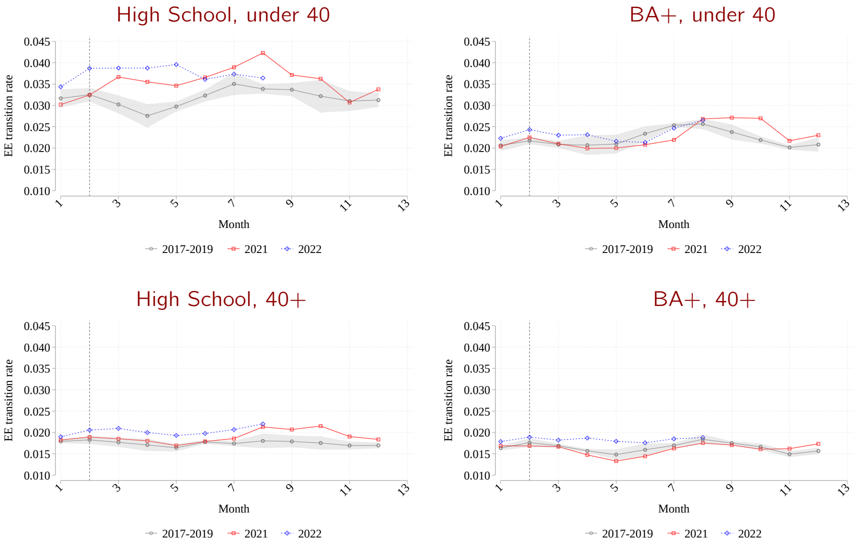


Fig: HS vs. SC job transitions

Rising transition rates driven by young, high school-educated workers



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')
   - 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

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

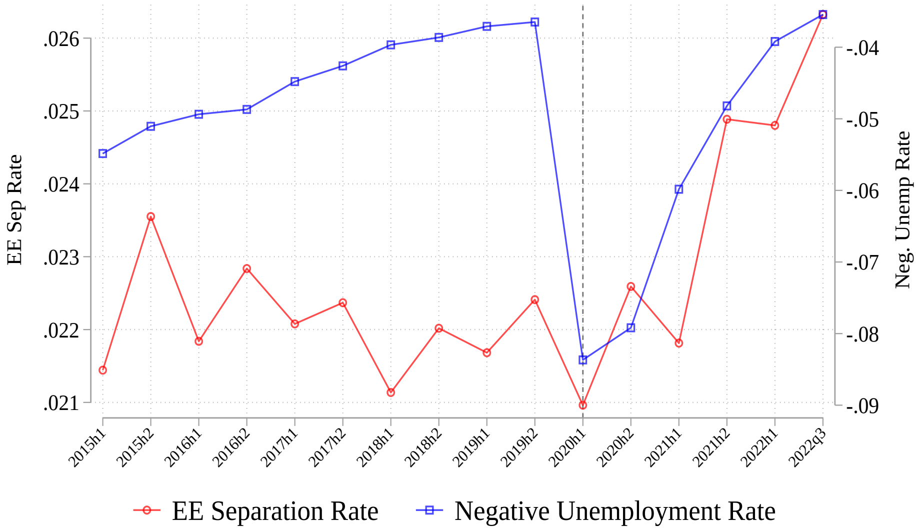
$$\text{Tightness}_{st} = 0.5 \times \text{Std}(\text{Job-to-job separation rate}_{st}) - 0.5 \times \text{Std}(\text{Unemp}_{st})$$

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

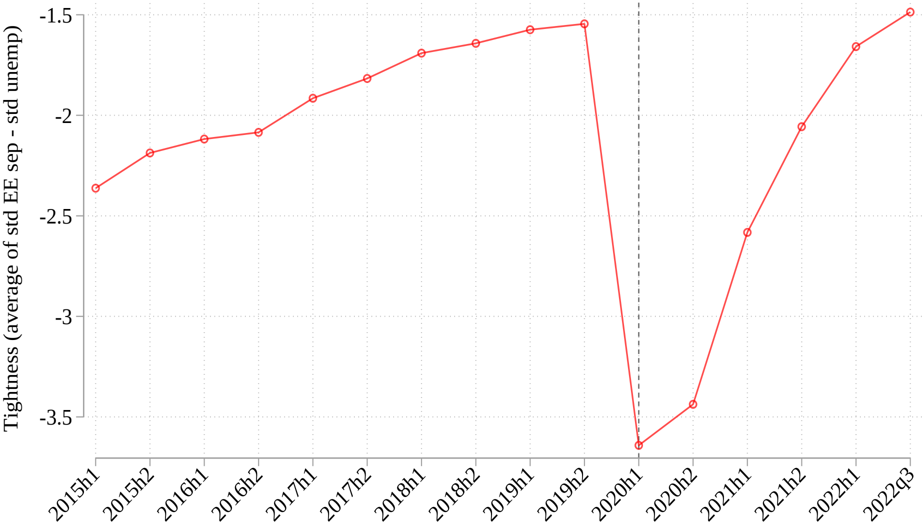
$$\ln W^{q}_{ist} = \alpha_t + \beta^q \text{Tightness}_{s,2021q3-2022q1} \times [t = 2022q2q3] + X_i' \gamma + \delta_s + e_{ist}$$

  - 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

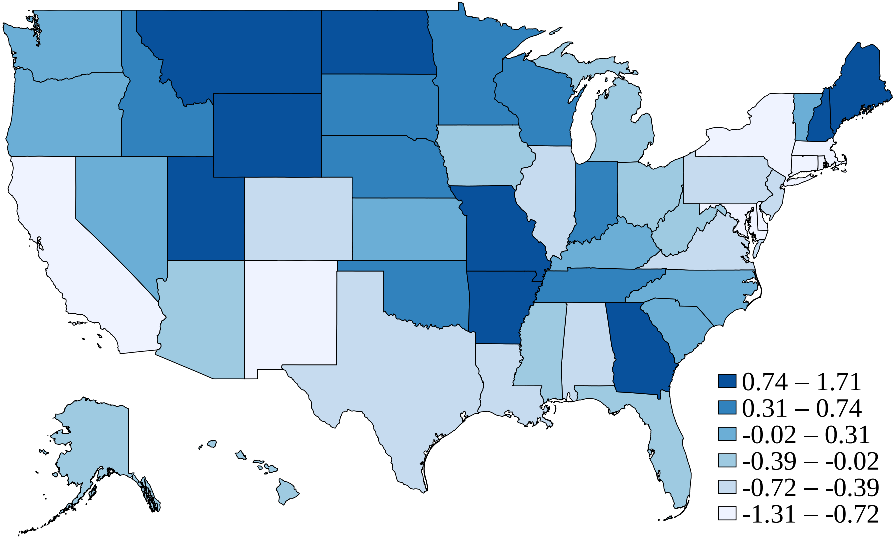
Components of tightness measure: EE separations and (-) unemployment



Sharp increase in tightness post-pandemic

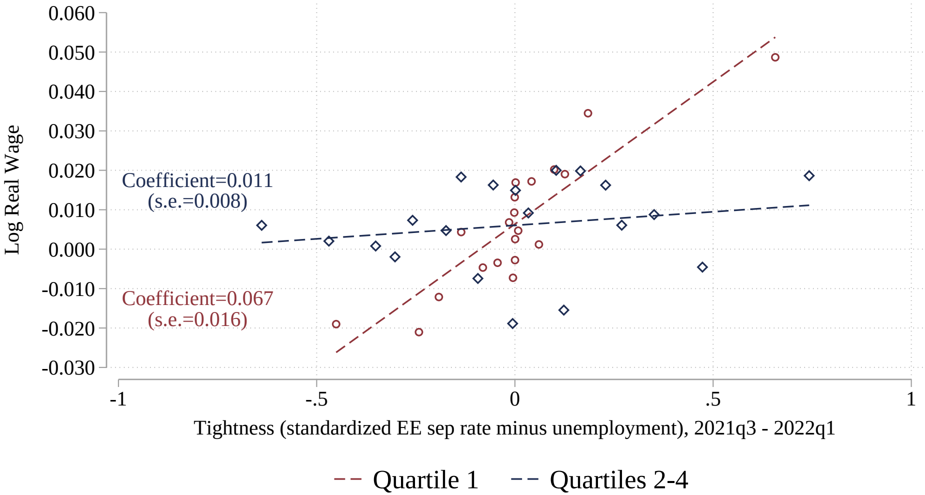


Cross-state variation in tightness (2021q3 - 2022q1)



State-level wage-Phillips curve

State-level wage-Phillips curve especially steep for bottom quartile



▸ Table: WPC by quartiles

State-level wage-Phillips curve steeper for high school < 40 v. everyone else

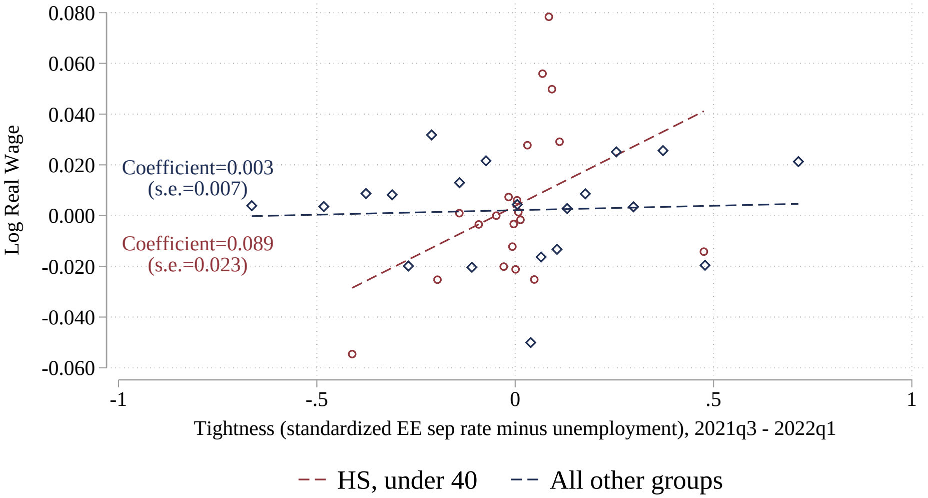


Table: WPC by age & education

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 15^{th} percentile

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')
   - 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

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, $w_{i,t-1}$

$$\text{EEsep}_{it} = a + \beta_1 \ln w_{i,t-1} + \beta_2 \ln w^2_{i,t-1} + X'_{it}\gamma + e_{it}$$

2. Using industry wage premiums, $\tilde{w}_{j(i),t-1}$

$$\text{EEsep}_{it} = a + \beta_1 \ln \tilde{w}_{j(i),t-1} + \beta_2 \ln \tilde{w}^2_{j(i),t-1} + X'_{it}\gamma + e_{it}$$

- 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 Δ 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 Δ 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 Δ 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

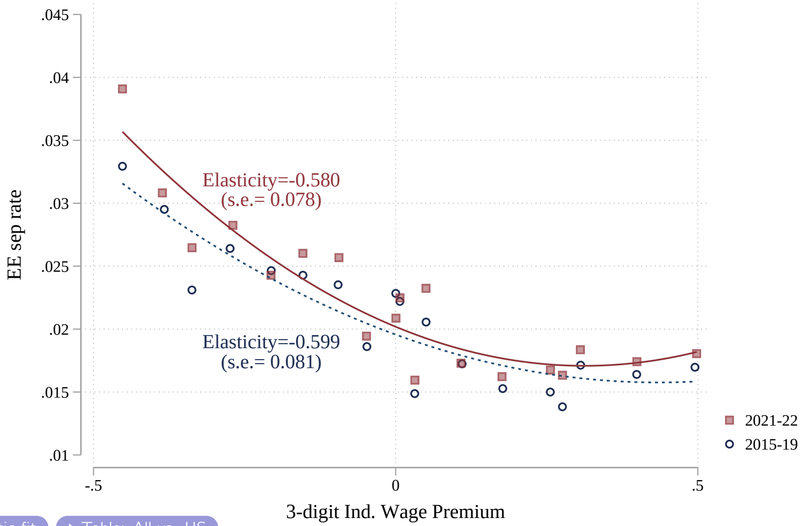
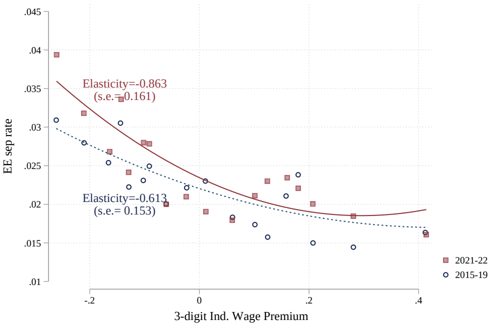


Table: Quadratic fit
Table: All vs. HS

Separation elasticity

High school workers vs. everyone else

High School Only



Everyone but High School

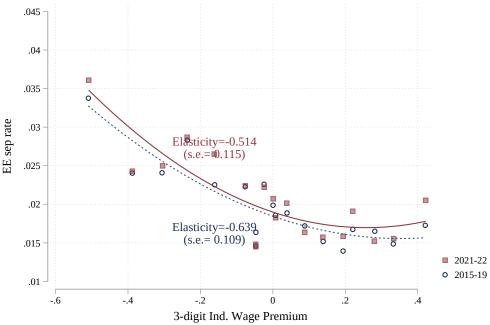
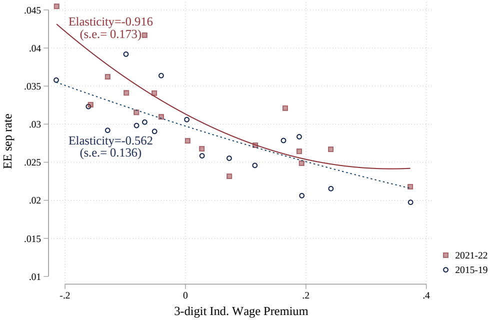


Table: HS vs. BA

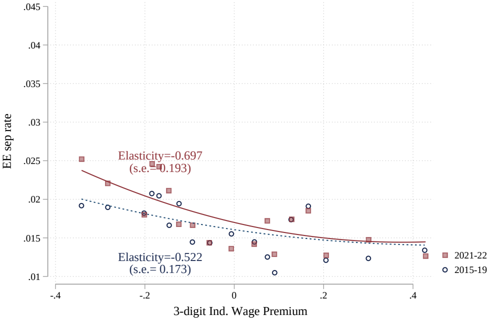
The wage-separation elasticity has gotten steeper

Among high school workers < age 40

High School, Age < 40



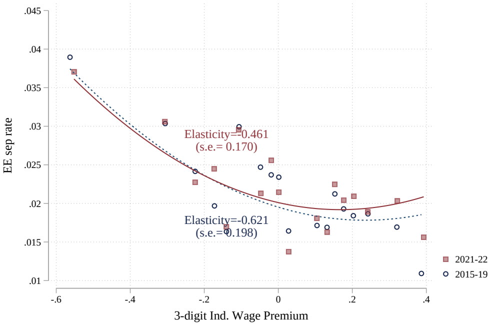
High School, Age 40 +



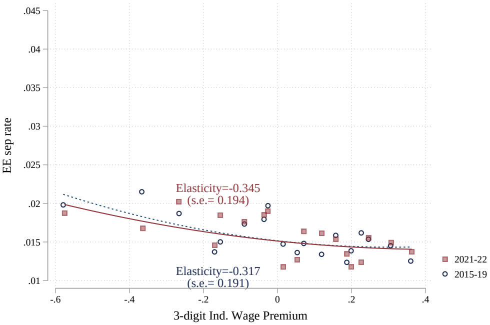
▸ Table: Quadratic fit ▸ Table: All vs. HS

Separation elasticity – little change for highly educated workers
Workers with a bachelor's degree or more by age

BA+, under 40



BA+, 40 +



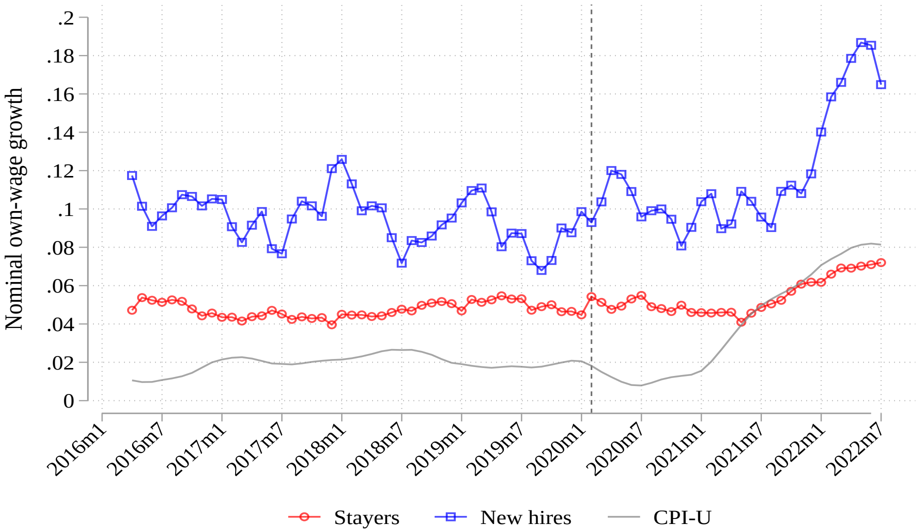
▸ Table: Quadratic fit

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')
   - 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

Why are people changing jobs so much?

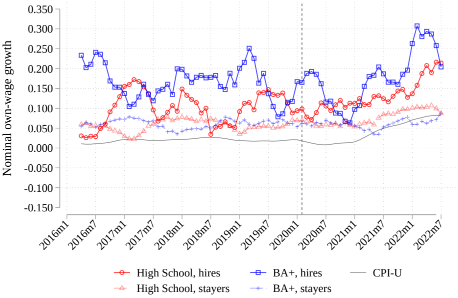
Wage gains are much larger among job changers than stayers



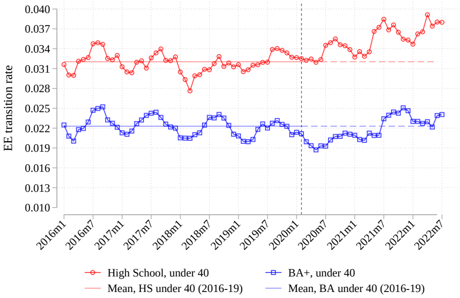
Increased switch rate + wage growth from switching for young HS workers

Workers under 40 years old

Wage growth: switchers vs. stayers



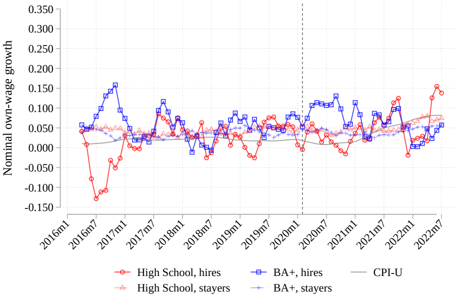
EE transition rates



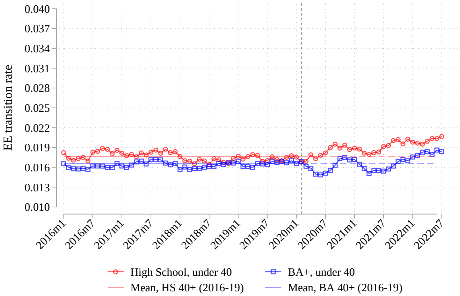
Stagnant switch rate + wage growth from switching for older workers

Workers 40 years and older

Wage growth: switchers vs. stayers

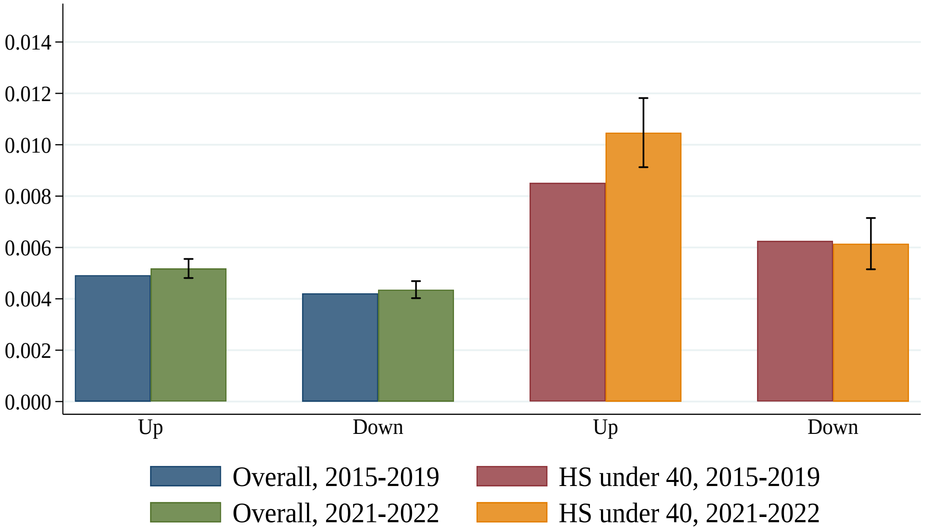


EE transition rates



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

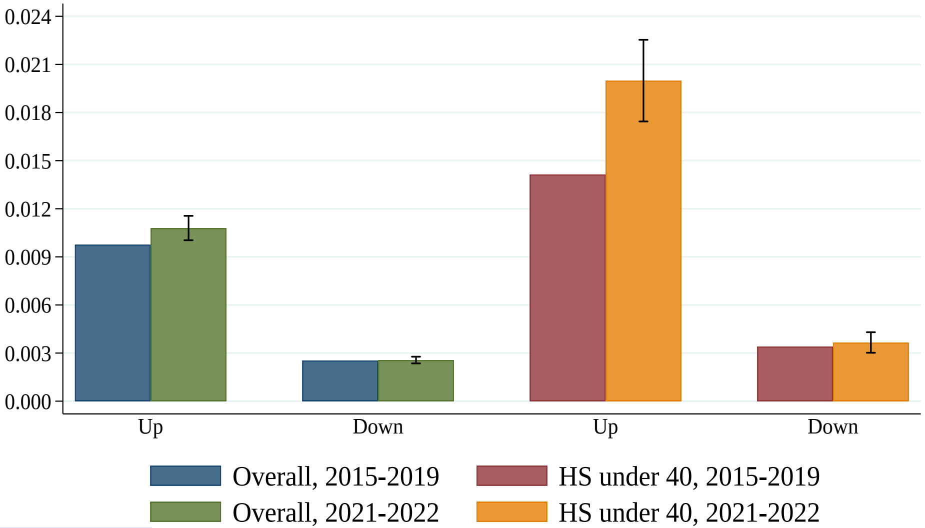


Table: Bottom quartile flows

Sharp rise in net mobility out of the Hospitality sector, esp. among HS < 40

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

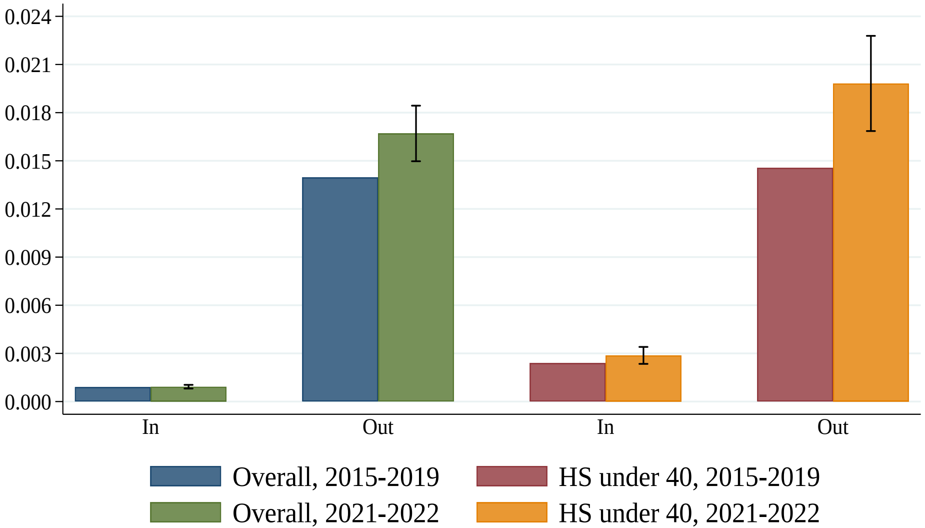
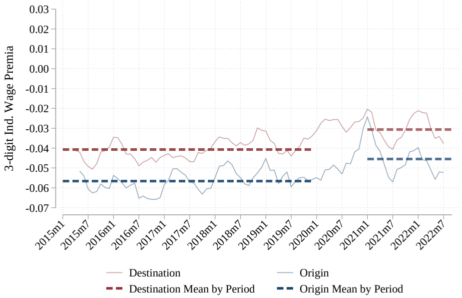


Table: Hospitality flows

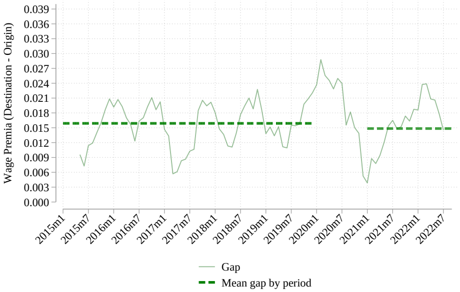
Industry wage premia for EE switchers—Origin vs. destination for full sample

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

Average Ind. Wage Premia



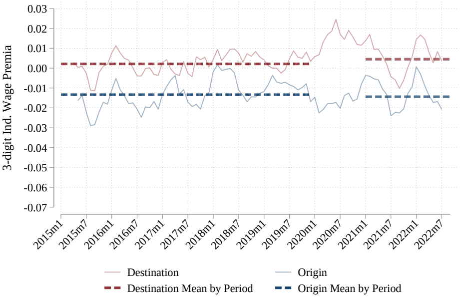
Gap in Ind. Wage Premia



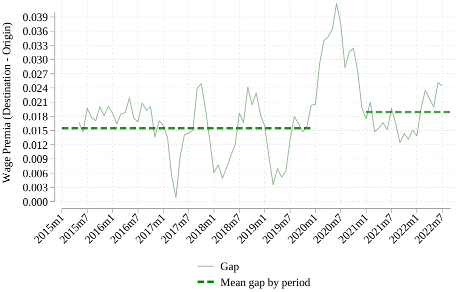
Industry wage premia for High School < Age 40 EE switchers

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+

Job $\Delta' s$ and wage $\Delta' s$ and: Summary

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

Job $\Delta's$ and wage $\Delta's$ and: Summary

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

Job $\Delta's$ and wage $\Delta's$ and: Summary

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
4. Low-education switchers not primarily moving to higher wage inds & occs
   - Consistent with monopsony: *workers moving to higher wage jobs doing similar work*

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')
   - 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

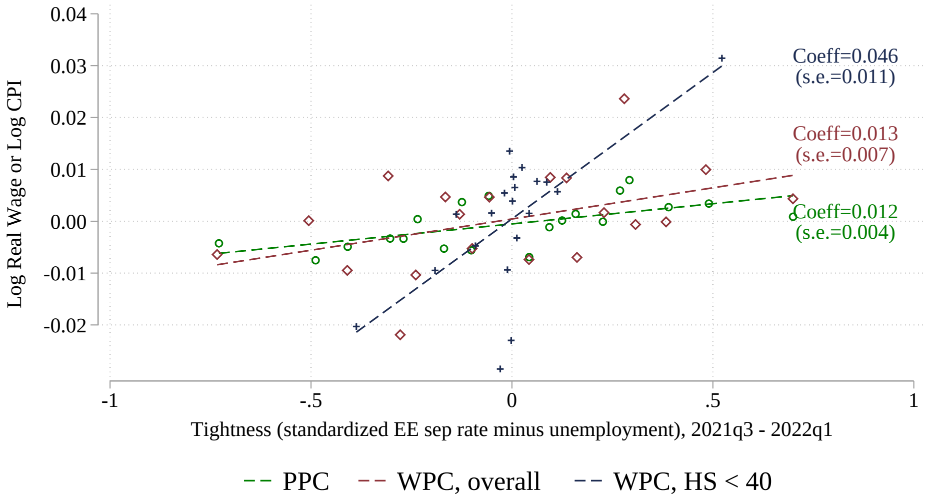
$$\ln P_{i,r(s),t} = \alpha_t + \beta_p \times \text{Tightness}_{r(s),t=2021q3-2022q1} \times [t = 2022q2q3] + \gamma_{r(s)} + e_{i,r(s),t}$$

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

  - 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



Wage Phillips Curve (Nominal) vs. Price Phillips Curve

	(1)	(2)	(3)	(4)	(5)
A. Wage Phillips Curve - Coefficient on Tightness					
Overall	0.0246***	0.0230***	0.0149**	0.0130**	0.0125*
	(0.0068)	(0.0067)	(0.0060)	(0.0060)	(0.0065)
1st Quartile	0.0668***	0.0670***	0.0647***	0.0644***	0.0641***
	(0.0160)	(0.0158)	(0.0154)	(0.0155)	(0.0162)
High School, under 40	0.0479***	0.0526***	0.0524***	0.0468***	0.0463***
	(0.0093)	(0.0102)	(0.0103)	(0.0102)	(0.0111)
B. Price Phillips Curve - Coefficient on Tightness					
Overall	0.0116***	0.0115***	0.0113***	0.0122***	0.0120***
	(0.0039)	(0.0039)	(0.0040)	(0.0040)	(0.0041)
Controls:					
Age		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

	(1)	(2)	(3)	(4)	(5)
Overall	0.0151**	0.0136**	0.0055	0.0036	0.0032
	(0.0066)	(0.0058)	(0.0047)	(0.0048)	(0.0052)
Within wage quantiles					
1st Quartile	0.0573***	0.0576***	0.0553***	0.0550***	0.0549***
	(0.0178)	(0.0176)	(0.0172)	(0.0173)	(0.0175)
2nd Quartile	0.0428***	0.0425***	0.0410***	0.0407***	0.0406***
	(0.0095)	(0.0096)	(0.0094)	(0.0093)	(0.0093)
3rd Quartile	-0.0184***	-0.0180***	-0.0172***	-0.0179***	-0.0180***
	(0.0067)	(0.0067)	(0.0065)	(0.0066)	(0.0068)
4th Quartile	-0.0197	-0.0203	-0.0205	-0.0201	-0.0202
	(0.0133)	(0.0133)	(0.0126)	(0.0125)	(0.0126)
Controls:					
Age		X	X	X	X
Demographics			X	X	X
Sector and Union				X	X
Covid Death Rate					X

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

	(1)	(2)	(3)	(4)	(5)
High School, under 40	0.0388***	0.0435***	0.0433***	0.0377***	0.0373***
	(0.0100)	(0.0112)	(0.0112)	(0.0113)	(0.0119)
High School, 40+	0.0380*	0.0366*	0.0336*	0.0282	0.0278
	(0.0199)	(0.0189)	(0.0193)	(0.0175)	(0.0169)
Some College, under 40	0.0399***	0.0333***	0.0316***	0.0270***	0.0266***
	(0.0111)	(0.0102)	(0.0094)	(0.0092)	(0.0099)
Some College, 40+	0.0071	0.0054	0.0035	0.0050	0.0047
	(0.0117)	(0.0114)	(0.0114)	(0.0104)	(0.0106)
BA+, under 40	-0.0344***	-0.0331***	-0.0299**	-0.0289**	-0.0292**
	(0.0130)	(0.0126)	(0.0129)	(0.0122)	(0.0119)
BA+, 40+	-0.0300**	-0.0317**	-0.0288**	-0.0284**	-0.0287**
	(0.0121)	(0.0129)	(0.0128)	(0.0127)	(0.0131)
Controls:					
Age		X	X	X	X
Demographics			X	X	X
Sector and Union				X	X
Covid Death Rate					X

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. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Labor market tightness, inflation, and real wages: Summary

1. Cannot reject that labor market tightness has same impact on local price level and <u>mean</u> local wages
   - Consistent with Katz & Krueger ’99
   - Also consistent with Cerrato & Gitti ’22 for local prices (they don’t examine wages)

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)
2. Estimates imply that labor market tightness contributes about 1 pct point to post-pandemic inflation (small part of total)

Labor market tightness, inflation, and real wages: Summary

1. Cannot reject that labor market tightness has same impact on local price level and <u>mean</u> local wages
   - Consistent with Katz & Krueger '99
   - Also consistent with Cerrato & Gitti '22 for local prices (they don't examine wages)

2. Estimates imply that labor market tightness contributes about 1 pct point to post-pandemic inflation (small part of total)

3. But tightness associated with **real wage growth** among bottom two quartiles of workers, young high school and some-college workers

Labor market tightness, inflation, and real wages: Summary

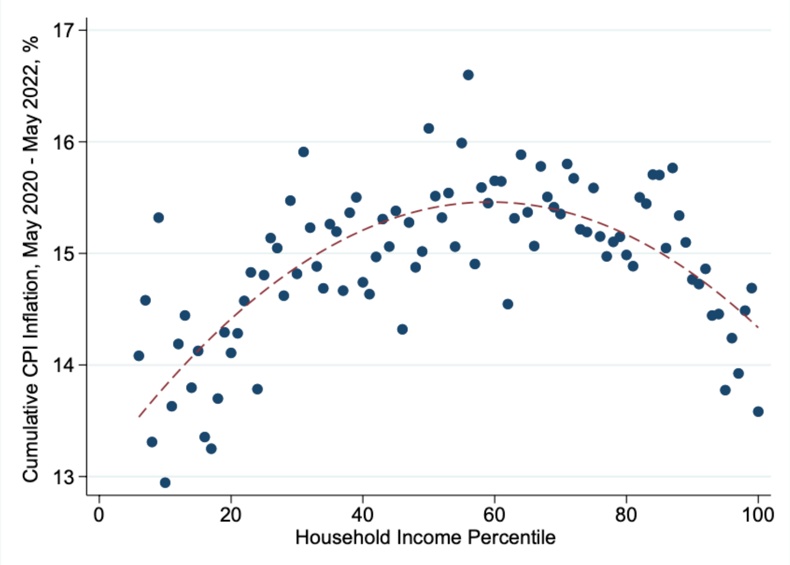
1. Cannot reject that labor market tightness has same impact on local price level and mean local wages
   - Consistent with Katz & Krueger '99
   - Also consistent with Cerrato & Gitti '22 for local prices (they don't examine wages)

2. Estimates imply that labor market tightness contributes about 1 pct point to post-pandemic inflation (small part of total)

3. But tightness associated with **real wage growth** among bottom two quartiles of workers, young high school and some-college workers

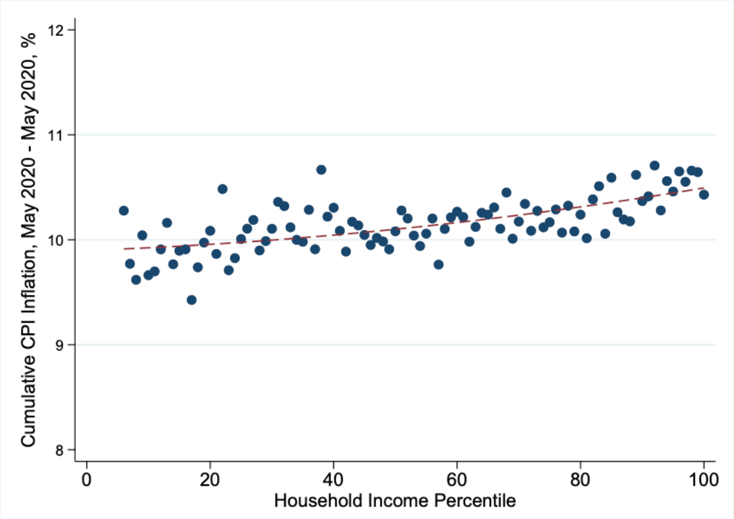
4. But what about *inflation inequality: Are low-wage workers subject to disproportionate inflation?*
   - Effective inflation rate is **lower** for low- and high-wage workers/ households Jaravel '22

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')
   - 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

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?

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?
   - 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

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?
    - 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
4. Distinction is critical: Rising competition means higher wages that better reflect productivity *and* higher aggregate productivity — a <u>double dividend</u>

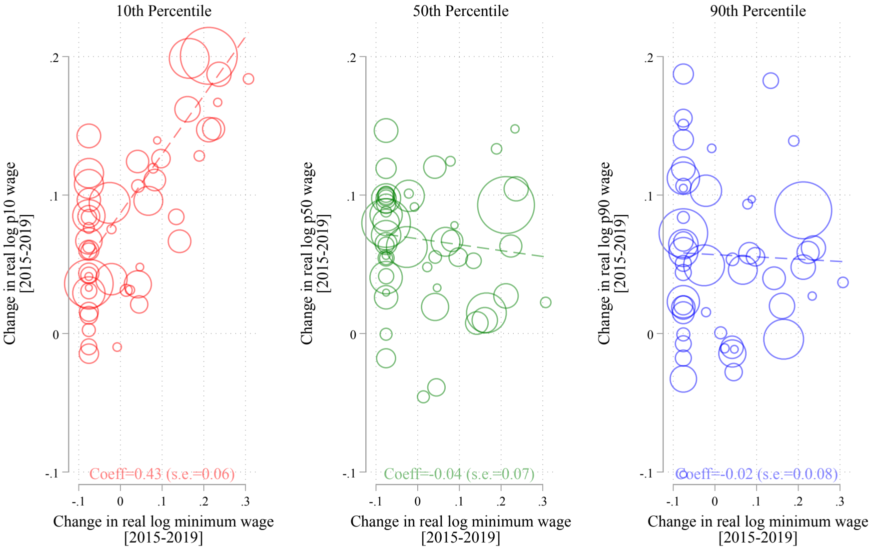
Conclusions and next steps

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?
    - 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
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

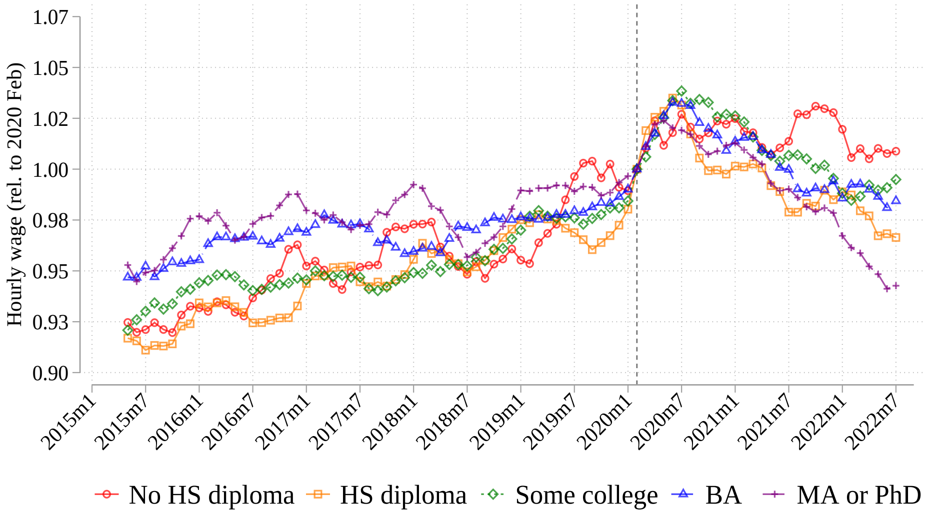


Back

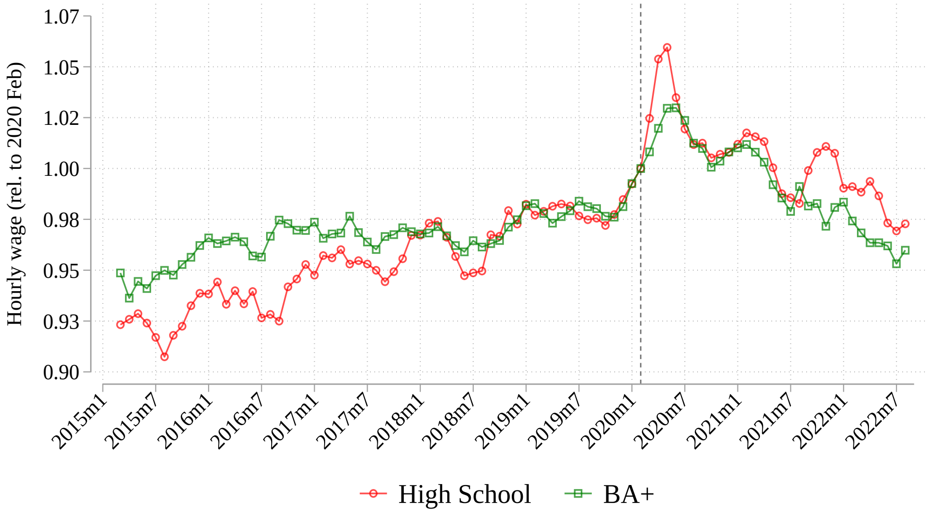
Aside: Role of state minimum wage laws in wage compression, 2015–2019

Back

Remarkable overtaking of wage growth among less educated workers, 2015-2022



Remarkable overtaking of wage growth among High-school vs. college-educated workers, 2015-2022



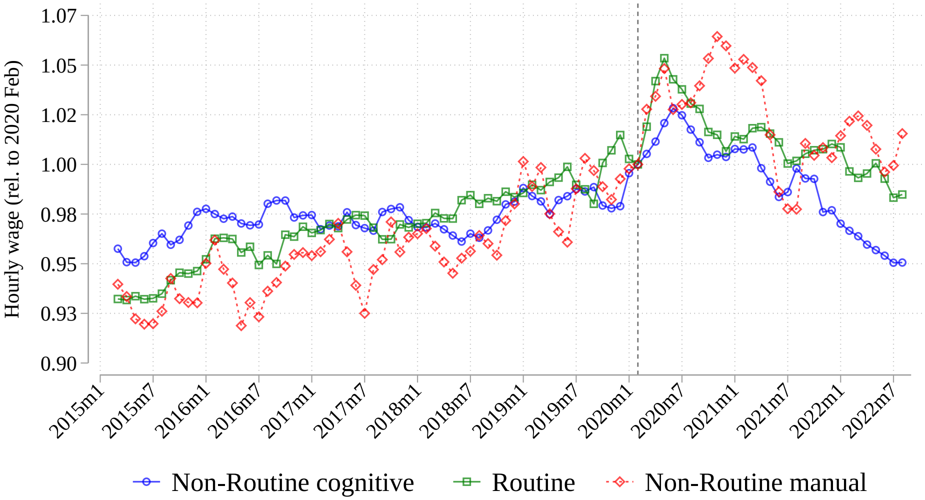
Steepest wage gains found among non-college grads under age 40, 2015-2022

Non-BA vs. BA Under 40

Non-BA vs. BA Age 40+

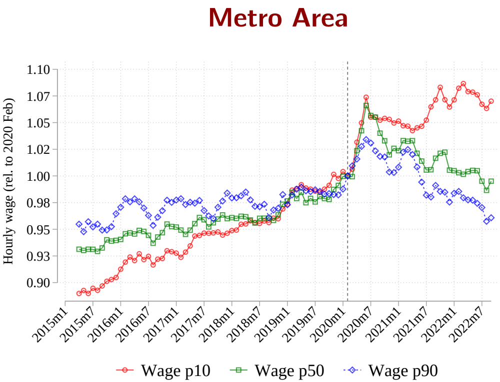
◀ Wage trends: HS vs. BA, by age

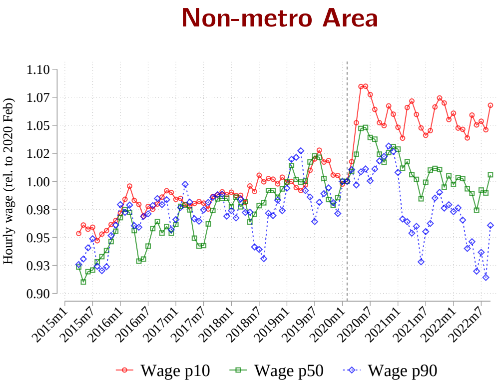
Routine v. non-routine cognitive v. non-routine manual occupations
Wage growth fastest in ‘less-skilled’ occupations (2015-2022)



◂ Trends: Occupational Terciles

Real wage trends by quantiles and metro area status

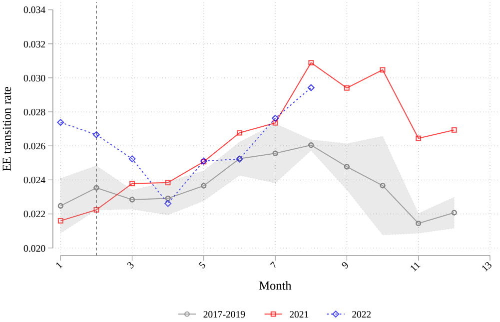




Job-to-job transitions: non-BA workers

High School

Some College



◂ Fig: HS job transitions

Nominal Wage Phillips Curve – by Wage Quartile

	(1)	(2)	(3)	(4)	(5)
Overall	0.0246***	0.0230***	0.0149**	0.0130**	0.0125*
	(0.0068)	(0.0067)	(0.0060)	(0.0060)	(0.0065)
Within wage quantiles					
1st Quartile	0.0668***	0.0670***	0.0647***	0.0644***	0.0641***
	(0.0160)	(0.0158)	(0.0154)	(0.0155)	(0.0162)
2nd Quartile	0.0521***	0.0519***	0.0504***	0.0500***	0.0497***
	(0.0107)	(0.0108)	(0.0107)	(0.0107)	(0.0106)
3rd Quartile	-0.0090	-0.0087	-0.0078	-0.0085	-0.0088
	(0.0082)	(0.0082)	(0.0082)	(0.0083)	(0.0087)
4th Quartile	-0.0108	-0.0114	-0.0116	-0.0112	-0.0115
	(0.0145)	(0.0145)	(0.0138)	(0.0137)	(0.0139)
Controls:					
Age		X	X	X	X
Demographics			X	X	X
Sector and Union				X	X
Covid Death Rate					X

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. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

◂ Fig: WPC Quartile 1 ◂ Slide: additional WPC findings ◂ Table: WPC v. PPC comparison

Nominal Wage Phillips Curve – by Age and Education

	(1)	(2)	(3)	(4)	(5)
High School, under 40	0.0479***	0.0526***	0.0524***	0.0468***	0.0463***
	(0.0093)	(0.0102)	(0.0103)	(0.0102)	(0.0111)
High School, 40+	0.0477**	0.0463***	0.0433**	0.0379**	0.0374**
	(0.0189)	(0.0179)	(0.0185)	(0.0166)	(0.0158)
Some College, under 40	0.0491***	0.0424***	0.0407***	0.0362***	0.0356***
	(0.0107)	(0.0106)	(0.0103)	(0.0099)	(0.0107)
Some College, 40+	0.0161	0.0144	0.0124	0.0139	0.0136
	(0.0122)	(0.0120)	(0.0124)	(0.0114)	(0.0116)
BA+, under 40	-0.0246*	-0.0232*	-0.0200	-0.0191	-0.0194
	(0.0140)	(0.0136)	(0.0140)	(0.0133)	(0.0130)
BA+, 40+	-0.0207	-0.0224	-0.0194	-0.0191	-0.0194
	(0.0143)	(0.0151)	(0.0148)	(0.0148)	(0.0153)
Controls:					
Age		X	X	X	X
Demographics			X	X	X
Sector and Union				X	X
Covid Death Rate					X

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. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

◂ Fig: WPC HS under 40 vs. everyone ◂ Slide: additional WPC findings ◂ Table: WPC v. PPC comparison

Nominal Wage Phillips Curve – trimming bottom 15^{th} percentile

	(1)	(2)	(3)	(4)	(5)
Overall	0.0220***	0.0220***	0.0152***	0.0134**	0.0128**
	(0.0073)	(0.0072)	(0.0054)	(0.0055)	(0.0061)
1st Quartile	0.0880***	0.0881***	0.0846***	0.0839***	0.0835***
	(0.0118)	(0.0117)	(0.0111)	(0.0111)	(0.0115)
High School, under 40	0.0584***	0.0604***	0.0593***	0.0547***	0.0540***
	(0.0116)	(0.0116)	(0.0115)	(0.0107)	(0.0107)
Controls:					
Age		X	X	X	X
Demographics			X	X	X
Sector and Union				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. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Slide: additional WPC findings

Employment-to-Employment Separation Elasticity Estimates

	Individual-level Wage		Industry Wage Premium	
	(1)	(2)	(3)	(4)
Overall				
2015-2019	-0.2014***	-0.2810***	-0.8400***	-0.5980***
	(0.0392)	(0.0286)	(0.1278)	(0.0958)
2021-2022	-0.1209	-0.2986***	-0.8725***	-0.5568***
	(0.0971)	(0.0753)	(0.1887)	(0.1267)
High School Educated, Under 40 Years Old				
2015-2019	-0.1482	-0.0622	-0.8163***	-0.5773***
	(0.1218)	(0.0788)	(0.1403)	(0.1346)
2021-2022	-0.5859**	-0.4321**	-1.1241***	-0.7819***
	(0.2746)	(0.1933)	(0.2169)	(0.1861)
Aggregation Level	Individual	Individual	3-digit Ind.	3-digit Ind.
Time Interval	3-month	Annual (adjusted)	Monthly	Monthly
Controls	Y	Y	N	Y

* $p < 0.10$, ** $p < 0.05$, ***$p < .01$. Standard errors in parentheses

Overall fig HS figs

Employment-to-Employment Separation Elasticity Estimates

	Individual-level Wage		Industry Wage Premium	
	(1)	(2)	(3)	(4)
High School Educated				
2015-2019	-0.2131***	-0.1444**	-0.9187***	-0.5817***
	(0.0807)	(0.0603)	(0.1930)	(0.1348)
2021-2022	-0.3081*	-0.2472	-1.1550***	-0.7424***
	(0.1866)	(0.1555)	(0.2663)	(0.1736)
Bachelor's Degree or Higher				
2015-2019	-0.1964***	-0.3503***	-0.7248***	-0.6793***
	(0.0593)	(0.0463)	(0.1994)	(0.1750)
2021-2022	-0.0900	-0.3654***	-0.5449***	-0.5231***
	(0.1505)	(0.1188)	(0.2020)	(0.1622)
Aggregation Level	Individual	Individual	3-digit Ind.	3-digit Ind.
Time Interval	3-month	Annual (adjusted)	Monthly	Monthly
Controls	Y	Y	N	Y

* $p < 0.10$, ** $p < 0.05$, ***$p < .01$. Standard errors in parentheses

◂ HS vs. everyone else fig

Employment-to-Employment Separation Elasticity Estimates

Linear and Quadratic Fit

	Overall		HS, under 40		HS, 40 +		BA+, under 40		BA+, 40+	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2015-2019										
Ind. Wage Premium	-0.5980***	-0.5986***	-0.5773***	-0.5618***	-0.4913***	-0.5224***	-0.8572***	-0.6214***	-0.4353***	-0.3165*
	(0.0958)	(0.0807)	(0.1346)	(0.1364)	(0.1552)	(0.1732)	(0.2153)	(0.1979)	(0.1430)	(0.1909)
Ind. Wage Premium^2		0.5168		-0.1662		0.5821		1.3931***		0.5855
		(0.3151)		(0.3867)		(0.4500)		(0.4692)		(0.4644)
2021-2022										
Ind. Wage Premium	-0.5568***	-0.5799***	-0.7819***	-0.9163***	-0.6498***	-0.6967***	-0.6473***	-0.4612***	-0.4099***	-0.3454*
	(0.1267)	(0.0777)	(0.1861)	(0.1730)	(0.2052)	(0.1934)	(0.2038)	(0.1696)	(0.1496)	(0.1944)
Ind. Wage Premium^2		0.9674***		1.4079*		0.9815*		1.3510***		0.3465
		(0.2864)		(0.7243)		(0.5856)		(0.3945)		(0.5287)

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$
Standard errors in parentheses

◂ Overall Fig ◂ HS Fig ◂ BA Fig

Movement between top half and bottom half of the 3-digit industry wage premia distribution

	(1) 2015-2019	(2) 2021-2022	(3) Difference
Switching up: bottom half of IWP to top half			
Overall	0.00492***	0.00518***	0.00026
	(0.00009)	(0.00017)	(0.00019)
HS, under 40	0.00852***	0.01047***	0.00196***
	(0.00031)	(0.00061)	(0.00069)
Switching down: top half of IWP to bottom half			
Overall	0.00421***	0.00436***	0.00014
	(0.00008)	(0.00015)	(0.00017)
HS, under 40	0.00626***	0.00615***	-0.00011
	(0.00026)	(0.00044)	(0.00051)

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Fig: Top & Bottom Flows

Movement in and out of the bottom quartile of the 3-digit industry wage premia distribution

	(1) 2015-2019	(2) 2021-2022	(3) Difference
Switching up: switching out of bottom quartile of IWP			
Overall	0.00977***	0.01080***	0.00103***
	(0.00018)	(0.00034)	(0.00039)
HS, under 40	0.01414***	0.01999***	0.00585***
	(0.00055)	(0.00118)	(0.00130)
Switching down: switching into bottom quarter of IWP			
Overall	0.00254***	0.00257***	0.00002
	(0.00005)	(0.00009)	(0.00011)
HS, under 40	0.00341***	0.00366***	0.00025
	(0.00016)	(0.00029)	(0.00033)

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Fig: Bottom quartile Flows

Movement in and out of hospitality industry

	(1) 2015-2019	(2) 2021-2022	(3) Difference
	Switching into Hospitality		
Overall	0.00090***	0.00092***	0.00002
	(0.00003)	(0.00005)	(0.00006)
HS, under 40	0.00239***	0.00288***	0.00048*
	(0.00013)	(0.00024)	(0.00027)
	Switching out of Hospitality		
Overall	0.01396***	0.01670***	0.00274***
	(0.00039)	(0.00079)	(0.00088)
HS, under 40	0.01456***	0.01982***	0.00526***
	(0.00064)	(0.00137)	(0.00151)

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

◂ Fig: Hospitality Flows

Price Phillips Curve

Various Specifications of Regression of Log CPI on Measures of Tightness

	(1)	(2)	(3)	(4)	(5)
A. Independent var : Tightness					
Tightness	0.0116***	0.0115***	0.0113***	0.0122***	0.0120***
	(0.0039)	(0.0039)	(0.0040)	(0.0040)	(0.0041)
B. Independent var: 1 - Unemployment					
1-Unemp	0.6808***	0.6771***	0.6754***	0.7282***	0.7060***
	(0.1979)	(0.1975)	(0.2040)	(0.2064)	(0.2008)
C. Independent var: EE Separation Rate					
EE Sep	0.8329	0.8220	0.7648	0.8251	0.8762
	(0.8911)	(0.8869)	(0.9104)	(0.9255)	(0.9437)
Controls:					
Age		X	X	X	X
Demographics			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. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

◂ Table: WPC v. PPC ▸ Table: PPC benchmark estimates

Price Phillips Curve - benchmarked specifications

Various Specifications of Price Phillips Curve

	(1)	(2)	(3)	(4)	(5)	(6)
				Dep Var: ΔInflation		
$\Delta Unemp$	-0.7924*	-0.7290*	-1.4588**	-0.9821	-0.9578	
	(0.3897)	(0.3682)	(0.6607)	(0.6375)	(0.6196)	
				Dep var: ΔLogCPI		
$Unemp$			-1.2120**	-1.1523**	-1.1913***	-0.8132**
			(0.5421)	(0.4667)	(0.4609)	(0.3580)
Pre-period	Jan/Feb '20	Jan/Feb '20	Jan-Jun '19	Sep '19-Feb '20	Jan/Feb '20	Jan-Jun '21
Post-period	Mar/Apr '22	Mar/Apr '22	Apr-Sep '22	Apr-Sep '22	Apr-Sep '22	Apr-Sep '22
LAUS adjustment		X	X	X	X	X
Imputed CPI			X	X	X	X

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. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Table: PPC estimates