

National Wage Setting

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National Firms and Local Labor Markets

- ▶ Local labor markets increasingly dominated by large firms operating in many regions
 - ▶ Rise of “superstar” firms and increasing national concentration
(Autor, Dorn, Katz, Patterson & Van Reenen 2020; Rossi-Hansberg, Sarte & Trachter, 2020)
 - ▶ Largest firms expand by entering into new geographic markets
(Hsieh & Rossi-Hansberg 2019)
- ▶ How firms set wages across space affects wage inequality, extent of firm power in local labor markets, and response of economy to local shocks
- ▶ *This paper: document how firms set wages across space and why*

How Do Firms Set Wages Across Space?

1. Benchmark models suggest firms vary nominal wages across space

- ▶ Adjust wages according to local productivity, local cost of living, local competition
- ▶ Leads to pay variation across region, even within a firm

2. Our finding: a large minority of firms set wages nationally and adopt geographically non-differentiated pay structures

▶ Related patterns

- ▶ Hjort, Li & Sarsons (2020); Propper & Van Reenen (2010), Boeri, Ichino, Moretti and Posch (2020), Derenoncourt, Noelke, Weil & Taska (2020)

▶ Complementary patterns document in literature for prices

- ▶ DellaVigna & Gentzkow (2019); Cavallo, Neiman, & Rigobon (2014); Nakamura (2008); Clemens & Gottlieb (2017)

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Measuring Firm Wage Setting with Job-Level Wages

- ▶ Challenging to measure national wage setting with most datasets

1. Most administrative datasets report earnings, not *wages*
2. *Job composition* varies across space
 - ▶ E.g. CVS might hire more cashiers in Houston than Bay Area

- ▶ Our Approach: posted job-level wages from Burning Glass

- ▶ From online vacancies between 2010-2019
- ▶ Posted wages with firm, county, and detailed occupation (i.e. job)

- ▶ Supplement with three additional data sources

- ▶ HR Survey: Sheds light on *why* some firms set national wages
- ▶ Payscale: Self-reported salaries/wages
- ▶ H1B visa applications: employer reported salaries/wages

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Overview of Results

1. Large amount of wage compression within firms
 - ▶ Wages within the firm vary substantially less with local conditions than wages between firms
 - ▶ Within a firm, 40-50% of posted wages for a given job are identical across locations
2. Within-firm compression reflects *national wage setting*
 - ▶ Firms with national wages pass local shocks through to other establishments
3. Firms report setting wages nationally for several reasons
 - ▶ Managerial simplicity
 - ▶ Importance of nominal comparisons to workers
4. Broader Consequences
 - ▶ National wage setting decreases nominal wage inequality and contributes to regional wage rigidity

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Outline

Simple conceptual framework

Description of wages across space within firm

- Data overview

- Four descriptive facts

Evidence for national wage setting

Why firms set wages nationally

Consequences of national wage setting

Conclusion

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Framework for wage setting across space

- ▶ Simple framework of wage setting by multi-establishment firms:
 1. Standard model of wage setting with firms (Card, Cardoso, Heining and Kline 2018)
 2. Standard model of spatial equilibrium (Rosen-Roback)
- ▶ Each firm i operates an establishment in each region j
- ▶ Households: idiosyncratic nested (logit) preferences for working at establishment ij
 - ▶ Choose region given consumer prices \tilde{P}_j , wages + amenities; choose establishment in region
 - ▶ Choose establishment with highest indirect utility \rightarrow upward-sloping labor supply curve
$$L_{ij} = w_{ij}^{\rho_j} \kappa_j(\tilde{P}_j)$$
 - ▶ w_{ij} is establishment nominal wage, L_{ij} is establishment employment
 - ▶ ρ_j : labor supply elasticity, varies exogenously by j
 - ▶ κ_j : equilibrium determinants of regional labor supply (productivity, amenities, consumer prices)

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Why would wages vary across locations in standard model?

- ▶ Firm i chooses w_{ij} to maximize profits in establishment ij , taking labor supply as given

$$\max_{w_{ij}, L_{ij}} P_j A_{ij} F(L_{ij}) - w_{ij} L_{ij}$$

$$\Rightarrow w_{ij}^* = \overbrace{\frac{\rho_j}{1 + \rho_j}}^{\text{markdown}} \underbrace{P_j A_{ij} F'(L_{ij})}_{\text{nominal marginal revenue product}}$$

- ▶ Different wages across establishments j if either:
 1. Different nominal marginal revenue product (Diamond and Moretti 2021, Kehrig and Vincent 2019)
 2. Different labor supply elasticity (Hershbein et al. 2018)

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Burning Glass Wage Data

- ▶ Dataset of wages posted on vacancies from Burning Glass Technologies
 - ▶ Source: 40,000 online job boards and company websites
 - ▶ Our subsample covers 1.2% of all vacancies
 - ▶ Vacancies contain information on firm, occupation, and county
 - ▶ Job: combination of 6-digit occupation, pay frequency (e.g. hourly) and salary type (e.g. base pay)

- ▶ Main benefit: job-level wages for different establishments + same firm

- ▶ Main limitation: posted, not realized wages ▶ Selection ▶ Strategic Posting

▶ Industry Coverage

▶ Occupation Coverage

▶ OES Wages

Survey Data

- ▶ Run with a large human resources association
- ▶ Sent to 3,000 respondents: 13% response rate
- ▶ Respondents mainly HR managers and executives [▶ Go](#)
- ▶ Designed to understand:
 - ▶ How firm sets wages across establishments
 - ▶ Why firms set national wages (or not)
- ▶ Over 65% of respondents at firms with >500 employees [▶ Go](#)
- ▶ Limit sample to respondents working at firms that operate in >1 city (lose 17% of sample) [▶ Cities](#) [▶ States](#) [▶ Sectors](#)

Payscale Data

- ▶ Compensation software and data company
- ▶ Crowdsourced data on compensation
- ▶ Employees fill out surveys to gain access to information about what individuals in similar jobs/with similar backgrounds earn
- ▶ Data:
 - ▶ Detailed job title/occupation codes
 - ▶ Self-reported salary/hourly wage
 - ▶ Hours worked
 - ▶ Additional forms of compensation (benefits, bonuses)
 - ▶ Employee ratings

Visa Application Data

- ▶ Mandatory reports from firms applying for select visas (H1-B, H1-B1, or E-3)
- ▶ Employers must legally commit to paying at least prevailing wage
- ▶ Data: All applications from 2010-2019
 - ▶ Detailed job title/occupation codes
 - ▶ Firm name
 - ▶ Worksite (city and state)
 - ▶ Wage/salary
 - ▶ Prevailing wage

▶ Occupations

▶ Geography

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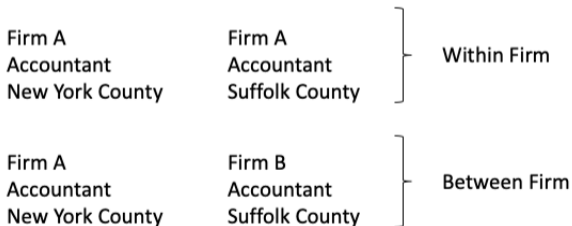
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Four Descriptive Facts on Wage Setting Across Space

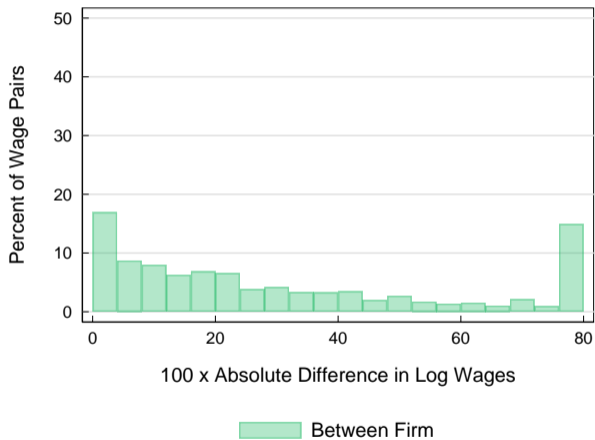
1. A large share of wages are set identically within firms across locations.
2. Identical wages are a choice made by firms separately for each occupation
3. Within firms, nominal wages are less sensitive to local prices
4. Firms setting identical wages pay a premium

Construct all possible wage pairs within firm

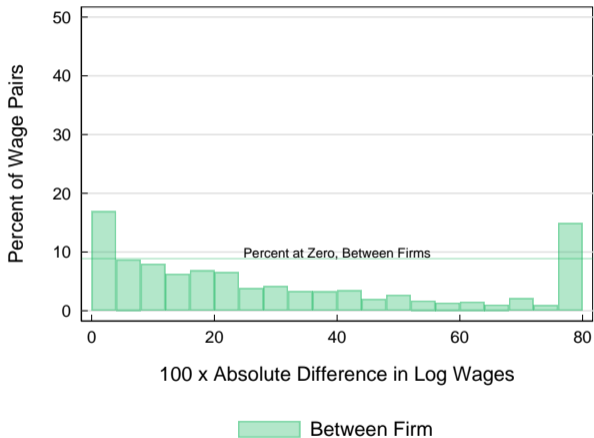
- ▶ Calculate the difference in the wage that a firm pays for the same job located in two different counties
- ▶ Create a between firm comparison group



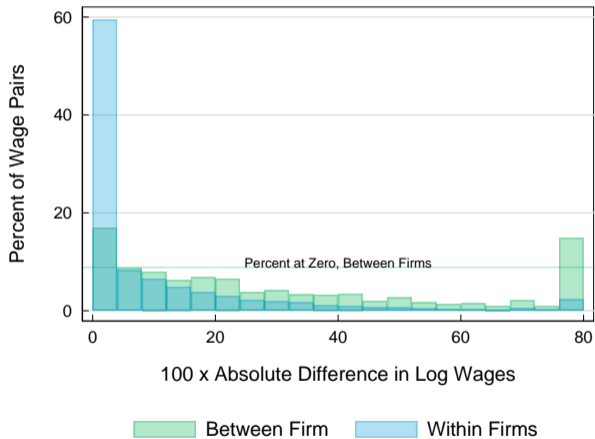
Large amount of identical wages within the firm



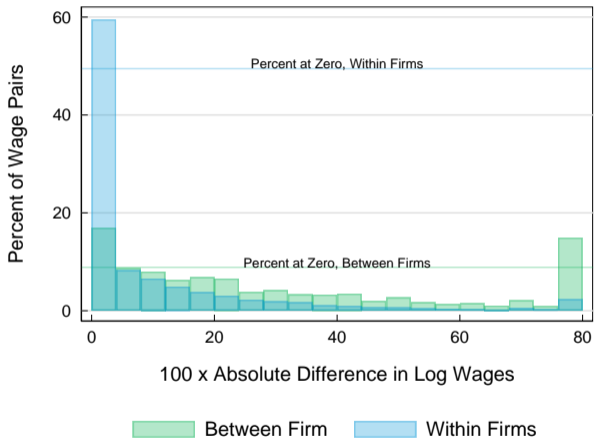
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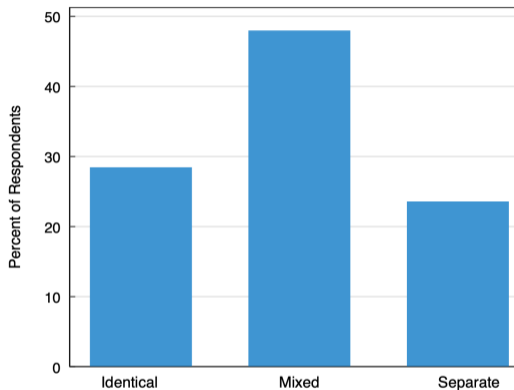
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Examples of large firms with many identical posted wages

<i>Firm Name</i>	<i>Occupation</i>	<i>Salary</i>	<i>No. Counties (Examples)</i>
Dollartree	Cashiers	\$45,000 (2016)	35 (Fairfax VA, Laramie WY)
Speedway	Maintenance Repair	\$31,200 (2014)	23 (Detroit MI, Parkersburg WV)
Target	Lawyers	\$200,000 (2012)	63 (SF, Omaha)
Kellogg	Merchandise Displayers	\$27,040 (2016)	1559 (Denver, Decatur AL)
Deloitte	Computer Occ.	\$100,000 (2010)	44 (LA, Kansas City)
DIRECTV	Supervisors	\$50,000 (2019)	83 (Portland, Bismark ND)
Hertz	Fin. Managers	\$35,000 (2015)	398 (Miami FL, Raleigh NC)
Kaplan	Chem. Teachers	\$19,200 (2014)	80 (Seattle, Albuquerque NM)
Genesis Health	Physicians	\$103,740 (2013)	14 (Boston, Shawnee KS)
Edge Fitness	Customer Service Rep.	\$32,500 (2019)	18 (Philadelphia, Saint Ann MO)

Many HR professionals pay identical wages for at least some jobs



Notes: Figure shows the fraction of survey respondents whose firms set the same wage across establishments for a given job title (Identical), for some jobs but not all (Mix), or set separate wages across establishments (Separate).

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Identical wages are a choice made by firm for each occupation

1. Within an occupation, firms choose whether to set identical wages:

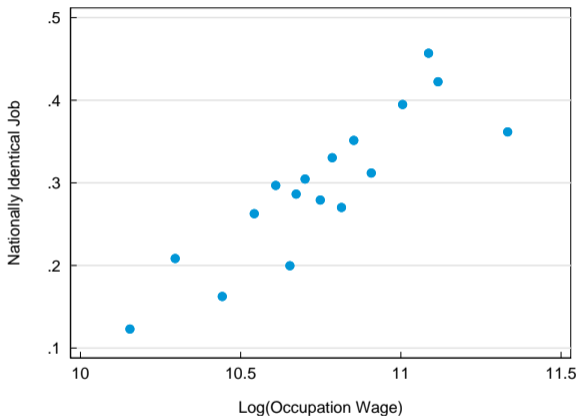
- ▶ Some firms set identical wages everywhere
- ▶ Other firms pay different wages everywhere
- ▶ Few firms pay identical wages in some locations and different wages in others [▶ Details](#)

2. Firms make a separate choice for each occupation:

- ▶ Most firms set identical wages in some occupations and different wages in others

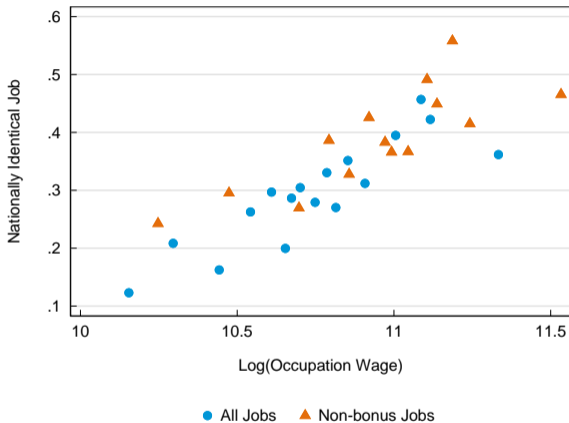
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Identical wages are more common in high-wage occupations



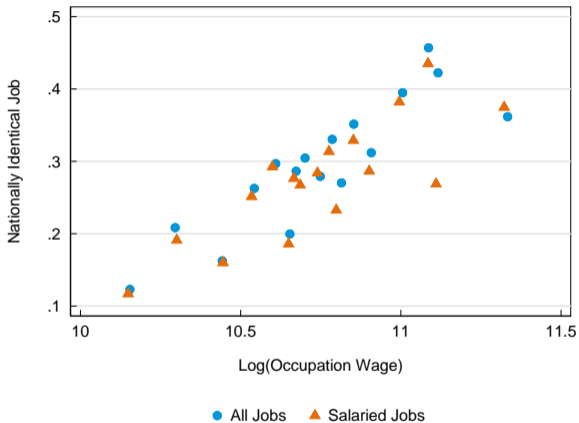
Notes: The occupation wage on the x-axis is defined using 2018 wages for employed workers from the BLS OES. Regression includes 2-digit SOC fixed effects. [▶ Other Predictors](#)

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Nominal Wages and Local Prices

- ▶ Follow DellaVigna and Gentzkow (2019) and run:
 - ▶ Within firm regression:

$$\log w_{ijot} = \beta \text{price level}_{jt} + \theta_{oi} + \theta_t + \epsilon_{ijot}$$

- ▶ For comparison, between firm (across location) regression:

$$\log w_{ijot} = \gamma \overline{\text{price level}}_{it} + \theta_o + \theta_t + \epsilon_{ijot}$$

- ▶ $\theta_o, \theta_t, \theta_{oi}$ are occupation, year, and firm by occupation fixed effects
 - ▶ $\overline{\text{price level}}_{it}$ is average price level of firm across regions
 - ▶ Measure local prices using BEA local price indices
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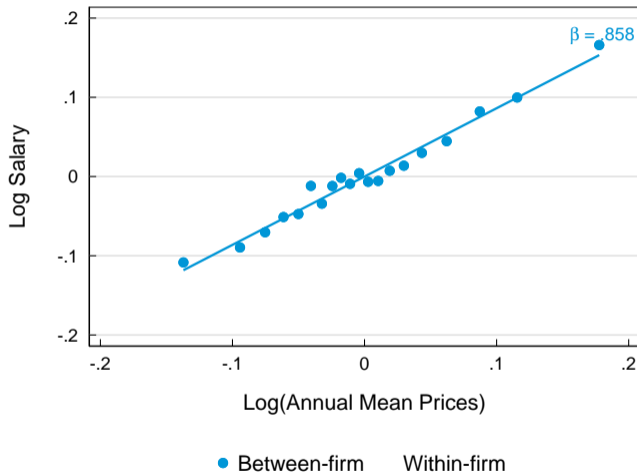
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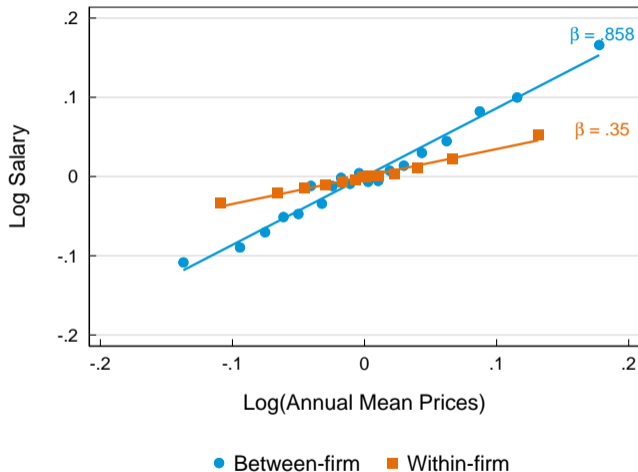
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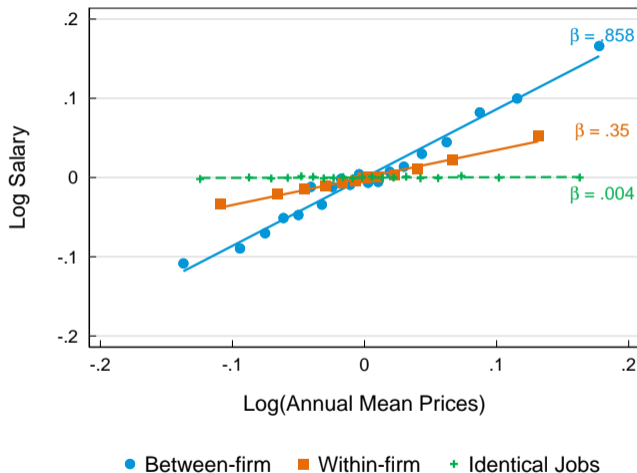
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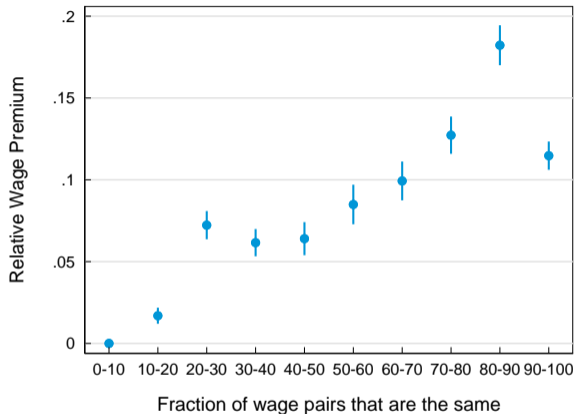
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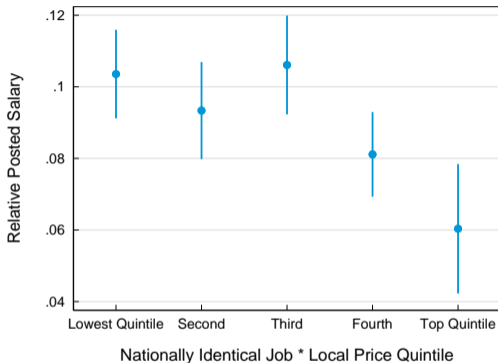
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Wage premium is increasing in extent of wage uniformity



Notes: Figure shows the relationship between the relative wage premium (y-axis) and the fraction of jobs within a firm*SOC that have the same wage. All coefficients are plotted relative to the 0-10 bin. Regression includes SOC*year*county*industry FEs and quadratic in firm and establishment size (measured by the number of vacancies).

National firms pay wage premium in all locations



Notes: Regression includes a quadratic in establishment size, a quadratic in firm size, each measured using vacancies, and fixed effects for job*county*industry*year and firm*year. Nationally identical jobs are defined as those jobs paying the modal wage in occupation*firm*year cells in which at least 80% of wage pairs are the same. Sample includes all firm-job pairs present in at least 4 establishments in that year.

Robustness of descriptive findings

1. Descriptive facts likely not due to difference between posted and realized wages

- ▶ In survey: choice of whether to post wages uncorrelated with identical wages [▶ Go](#)
- ▶ Posted wages in Burning Glass track realized wages closely [▶ Go](#)
- ▶ Similar results for realized wages in Payscale
- ▶ Similar results for reported wages from H1B Visa filings

2. Other forms of compensation

- ▶ Payscale: large amounts of uniformity when accounting for bonuses
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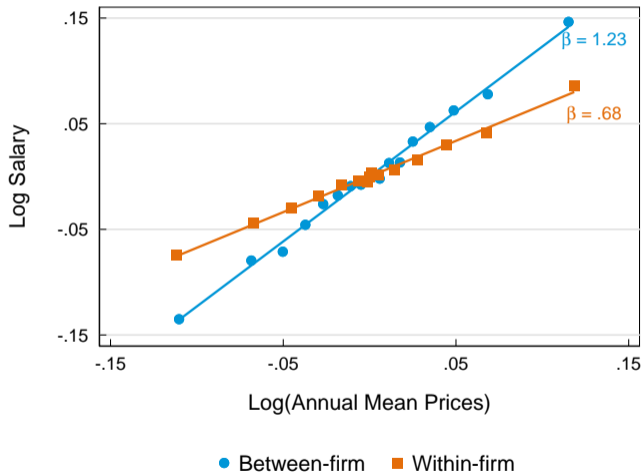
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Realized wages from Payscale show similar patterns



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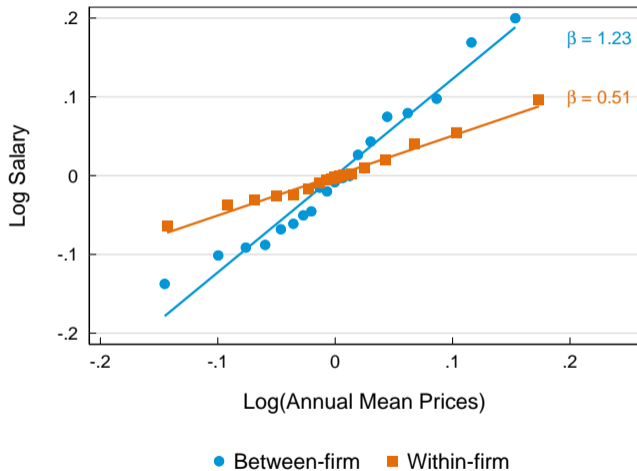
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Visa application data for reported wages show similar patterns



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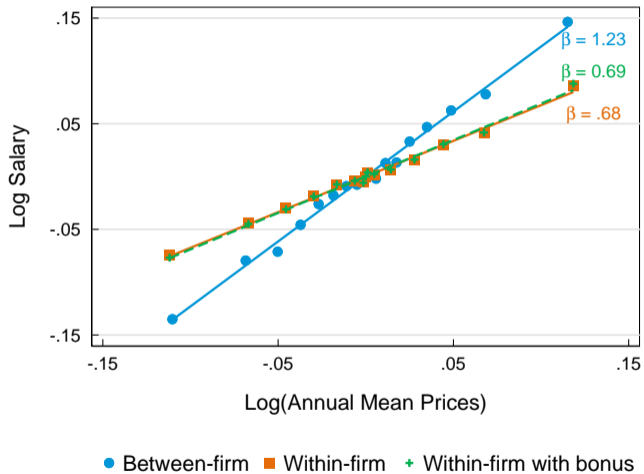
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Bonuses do not affect with-firm patterns in Payscale



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► Two possibilities for within-firm wage compression:

1. **Benchmark model:** pay the same nominal wage because local markets are similar

$$w_{ij}^* = \frac{\rho_j}{1 + \rho_j} P_j A_{ij} F'(L_{ij})$$

2. National wage setters: *constrained to set same wage everywhere* → weighted average of w_{ij}^*

$$\bar{w}_i = \sum_{j \in N} \omega_{ij} w_{ij}^*$$

→ Differentiate between types of firms using changes in wages

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► Two possibilities for within-firm wage compression:

1. **Benchmark model:** pay the same nominal wage because local markets are similar

$$w_{ij}^* = \frac{\rho_j}{1 + \rho_j} P_j A_{ij} F'(L_{ij})$$

2. **National wage setters:** *constrained to set same wage everywhere* → weighted average of w_{ij}^*

$$\bar{w}_i = \sum_{j \in N} \omega_{ij} w_{ij}^*$$

→ Differentiate between types of firms using changes in wages

Initially identical wages move together over time

$$\Delta \log w_{oijt} = \beta_1(\Delta \log w_{oij't} \times \text{Equal}_{oij,t-1}) + \beta_2(\Delta \log w_{oij't} \times \text{Diff}_{oij,t-1}) + \beta_3 \text{Equal}_{oij,t-1} + \theta_o + \theta_t + \varepsilon_{oijt}$$

- ▶ $\log w_{oijt}$: log wage for firm i in occupation o for workers in county j in year t
- ▶ $\log w_{oij't}$: log wage for firm i in occupation o for workers in county j' in year t
- ▶ $\text{Equal}_{oij,t-1}$: Indicator for 2 establishments having identical wages in $t - 1$

Initially identical wages move together over time

$$\Delta \log w_{oijt} = \beta_1(\Delta \log w_{oij't} \times \text{Equal}_{oij,t-1}) + \beta_2(\Delta \log w_{oij't} \times \text{Diff}_{oij,t-1}) + \beta_3 \text{Equal}_{oij,t-1} + \theta_o + \theta_t + \varepsilon_{oijt}$$

	Baseline
$\Delta \log w_{oij't} \times \text{Equal}_{oij,t-1}$	0.634 (0.071)
$\Delta \log w_{oij't} \times \text{Diff}_{oij,t-1}$	0.155 (0.038)
Observations	6,506,438
<i>Fixed Effects:</i>	
Occupation	✓
Year	✓
County Pair \times Year	

Initially identical wages move together over time

$$\Delta \log w_{oijt} = \beta_1(\Delta \log w_{oij't} \times \text{Equal}_{oij,t-1}) + \beta_2(\Delta \log w_{oij't} \times \text{Diff}_{oij,t-1}) + \beta_3 \text{Equal}_{oij,t-1} + \theta_o + \theta_t + \varepsilon_{oijt}$$

	Baseline	County Pair
$\Delta \log w_{oij't} \times \text{Equal}_{oij,t-1}$	0.634 (0.071)	0.628 (0.058)
$\Delta \log w_{oij't} \times \text{Diff}_{oij,t-1}$	0.155 (0.038)	0.173 (0.029)
Observations	6,506,438	4,583,928
<i>Fixed Effects:</i>		
Occupation	✓	✓
Year	✓	
County Pair × Year		✓

Initially identical wages move together over time

$$\Delta \log w_{oijt} = \beta_1(\Delta \log w_{oij't} \times \text{Equal}_{oij,t-1}) + \beta_2(\Delta \log w_{oij't} \times \text{Diff}_{oij,t-1}) + \beta_3 \text{Equal}_{oij,t-1} + \theta_o + \theta_t + \varepsilon_{oijt}$$

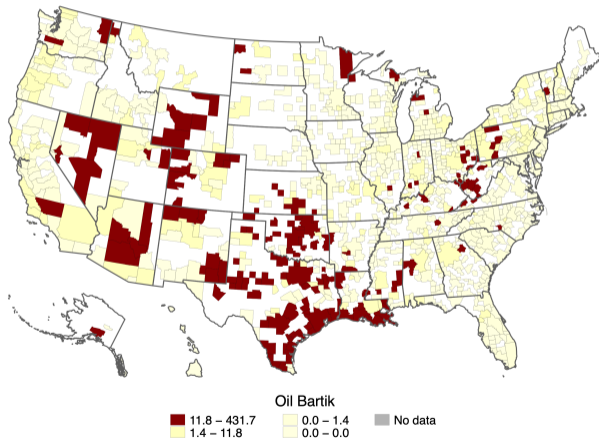
	Baseline	County Pair	Excluding Tradable Industries	Nontradable Occupations
$\Delta \log w_{oij't} \times \text{Equal}_{oij,t-1}$	0.634 (0.071)	0.628 (0.058)	0.626 (0.079)	0.625 (0.083)
$\Delta \log w_{oij't} \times \text{Diff}_{oij,t-1}$	0.155 (0.038)	0.173 (0.029)	0.151 (0.043)	0.152 (0.039)
Observations	6,506,438	4,583,928	4,317,084	5,753,522
<i>Fixed Effects:</i>				
Occupation	✓	✓	✓	✓
Year	✓		✓	✓
County Pair \times Year		✓		

Evidence for national wage setting: local shock pass-through

- ▶ Instrument for $\Delta \log w_{oij't}$ with natural resources Bartik shock ▶ Equation

Evidence for national wage setting: local shock pass-through

- ▶ Instrument for $\Delta \log w_{oij}t$ with natural resources Bartik shock ▶ Equation



Pass Through of Shock to Wages in other Establishments

$$\Delta \log w_{ojt} = \beta_1 \Delta \log w_{ojj't} + \theta_{ojt} + \varepsilon_{ojt}$$

	First Stage		Reduced Form	IV
$\Delta \text{Shock}_{j,t}$	0.80 (0.17)	1.28 (0.66)		
$\Delta \log w_{ojj't}$				
Observations	448,045	1,958,034		
First-Stage F-stat				
Included Sample	Same	Different		

Pass Through of Shock to Wages in other Establishments

$$\Delta \log w_{ojt} = \beta_1 \Delta \log w_{oj't} + \theta_{ojt} + \varepsilon_{ojt}$$

	First Stage		Reduced Form		IV
$\Delta \text{Shock}_{j,t}$	0.80 (0.17)	1.28 (0.66)	0.66 (0.12)	-0.24 (0.13)	
$\Delta \log w_{oj't}$					
Observations	448,045	1,958,034	458,228	2,110,997	
First-Stage F-stat					
Included Sample	Same	Different	Same	Different	

Pass Through of Shock to Wages in other Establishments

$$\Delta \log w_{oijt} = \beta_1 \Delta \log w_{oij't} + \theta_{ojt} + \varepsilon_{oijt}$$

	First Stage		Reduced Form		IV	
$\Delta \text{Shock}_{j,t}$	0.80 (0.17)	1.28 (0.66)	0.66 (0.12)	-0.24 (0.13)		
$\Delta \log w_{oij't}$					0.83 (0.12)	-0.20 (0.12)
Observations	448,045	1,958,034	458,228	2,110,997	448,045	1,958,034
First-Stage F-stat					22.85	3.77
Included Sample	Same	Different	Same	Different	Same	Different

▶ Survey Evidence

▶ Robustness

Outline

Simple conceptual framework

Description of wages across space within firm

- Data overview

- Four descriptive facts

Evidence for national wage setting

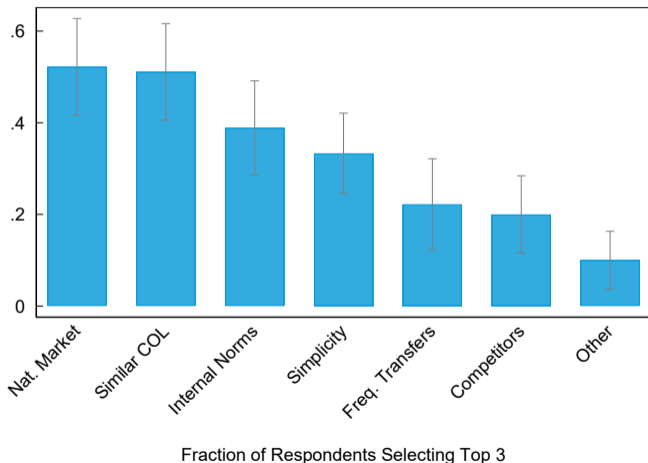
Why firms set wages nationally

Consequences of national wage setting

Conclusion

Many drivers of identical wage setting among survey respondents

- ▶ Direct question in HR survey: 6 categories for respondents



Summing up: Many reasons for national wage setting

- ▶ Several patterns emerge from responses
 1. Firms set national wages to simplify management
 2. Fairness norms constrain nominal wages
 3. National wages are more common for mobile workers
- ▶ Some explanations make more sense at firm level, others at the occupation level
- ▶ Some explanations are notably absent (e.g. minimum wages)

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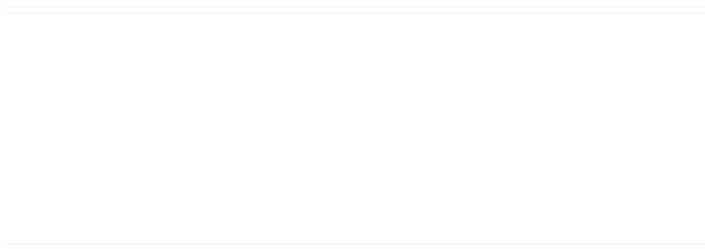
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Benchmarking effects of on wages and profits

- ▶ How much is at stake by setting national wage \bar{w}_i vs. unconstrained optimal wage w_{ij}^* ?



Benchmarking effects of on wages and profits

- ▶ How much is at stake by setting national wage \bar{w}_i vs. unconstrained optimal wage w_{ij}^* ?
 1. **Wages:** Use percent difference *within firm* between j and j' for non-identical firms to construct w_{ij}^*

	25th	Median	75th
Percent difference in wages: $\frac{w_{ij}^* - \bar{w}_i}{w_{ij}^*}$	2.2	6.1	13

Benchmarking effects of on wages and profits

- How much is at stake by setting national wage \bar{w}_i vs. unconstrained optimal wage w_{ij}^* ?
1. **Wages:** Use percent difference *within firm* between j and j' for non-identical firms to construct w_{ij}^*
 2. **Profits:** Return to simple model to translate wage difference to effects on profits (assume $\rho_j = \rho = 4$)

$$\frac{\pi_{ij}^* - \bar{\pi}_{ij}}{\pi_{ij}^*} = G\left(\rho, \frac{\bar{w}_i}{w_{ij}^*}\right)$$

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Percent difference in wages: $\frac{w_{ij}^* - \bar{w}_i}{w_{ij}^*}$	2.2	6.1	13

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	25th	Median	75th
Percent difference in wages: $\frac{w_{ij}^* - \bar{w}_i}{w_{ij}^*}$	2.2	6.1	13
Percent different in profits: $\frac{\pi_{ij}^* - \bar{\pi}_{ij}}{\pi_{ij}^*}$.46	3.6	17

Broader Implications of National Wage Setting

1. Regional wage rigidity

- ▶ National wage setting increases regional wage rigidity [▶ Go](#)

2. Geographic distribution of employment

- ▶ National wage setters are relatively large in low-price area [▶ Go](#)

3. Nominal wage inequality

- ▶ National wage setters decrease nominal wage inequality by approximately 5% [▶ Go](#)

Outline

Simple conceptual framework

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Evidence for national wage setting

Why firms set wages nationally

Consequences of national wage setting

Conclusion

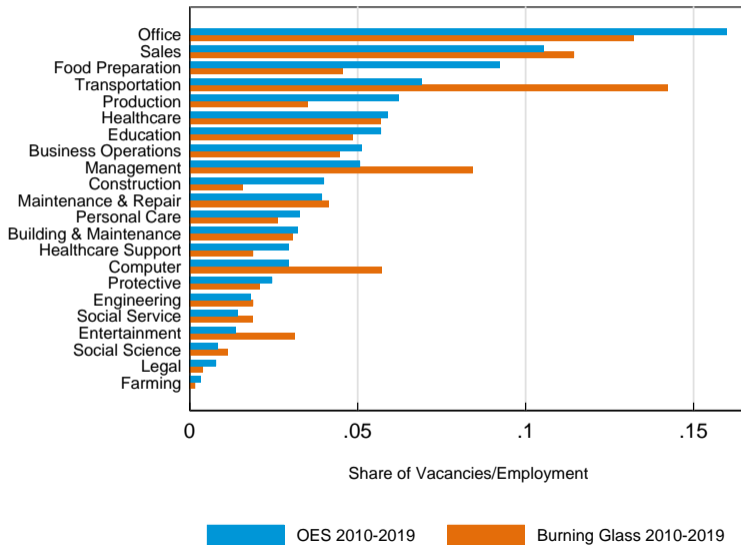
Conclusion

- ▶ Substantial compression of wages across locations within firm
- ▶ Pass-through results suggest compression consistent with national wage setting
- ▶ Future work looking at consequences of national wage setting:
 - ▶ Workers' welfare
 - ▶ Contribution to within and across-firm inequality
 - ▶ Implications for monopsony power
 - ▶ Implications for nominal wage rigidities over business cycles

Appendix

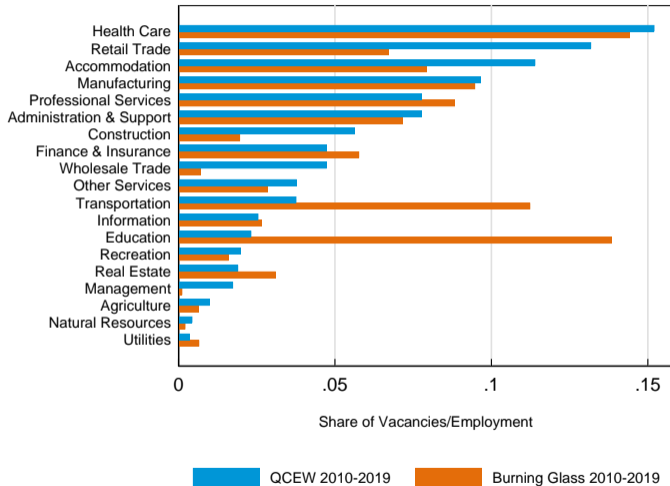
Occupation Coverage of Burning Glass

[Return](#)



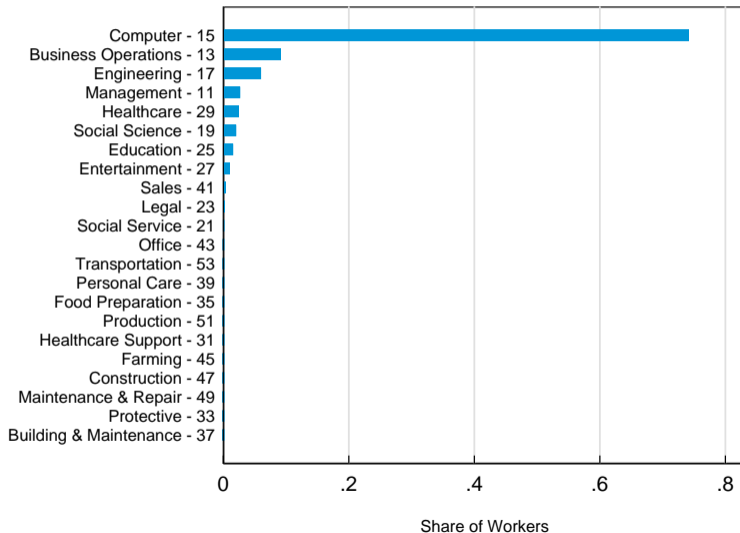
Industry Sector Shares in Burning Glass and QCEW

[Return](#)



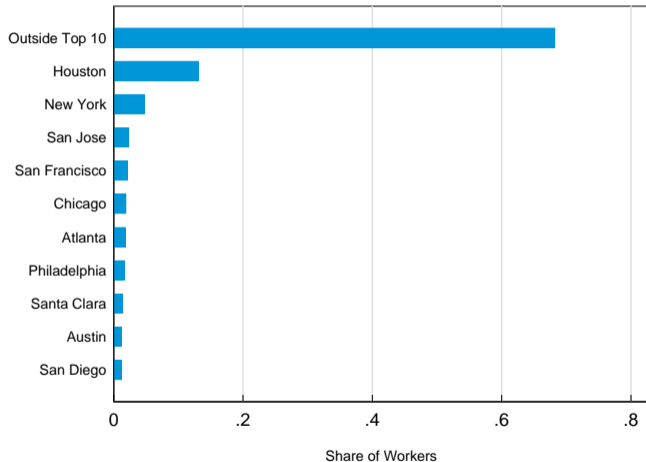
Visa Application Data: Occupation Distribution

[Return](#)



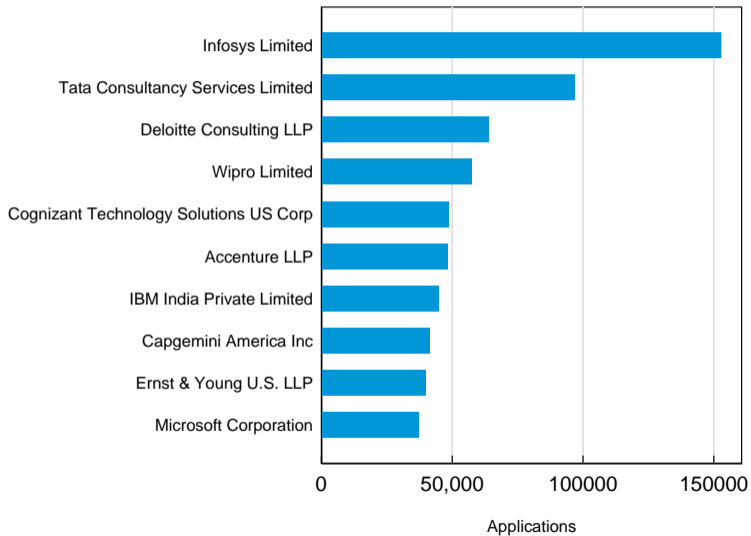
Visa Application Data: Geographic Distribution

[▶ Return](#)

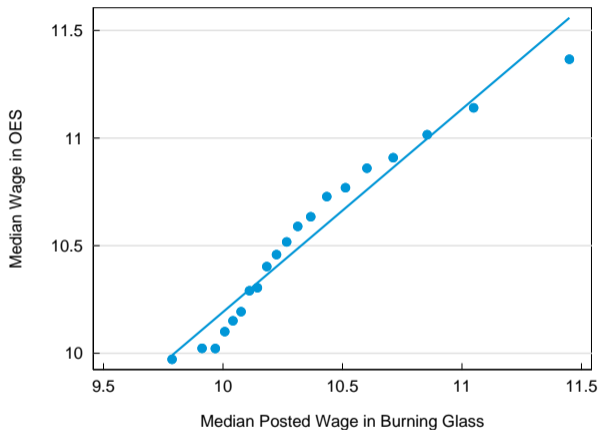


Visa Application Data: Firm Distribution

[Return](#)



Posted Wages Closely Match MSA by Occupation Data



The coefficient is 0.934, SE: 0.007

What Jobs Have Posted Wages?

[▶ Return](#)

Outcome: Percentage Chance of Posting a Wage

Regressor:	Median Hourly Occupation Wage (1)	Posted Education (2)	Posted Experience (3)	Firm # of Establishments (4)
No Controls	-1.62 (0.36)	-2.36 (0.44)	-1.15 (0.22)	-0.22 (0.65)
Firm x Year Fixed Effects	-1.25 (0.10)	-1.09 (0.12)	-0.56 (0.05)	
Observations	145891980	102505082	74181070	148211982

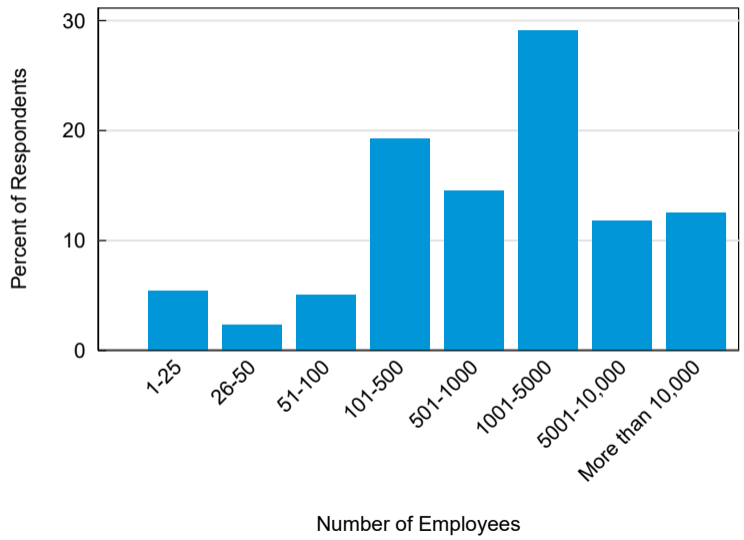
Little Evidence for Strategic Wage Posting Across Regions

[▶ Return](#)

	<i>Outcome: Percentage Chance of Posting a Wage</i>		
Regressor:	Consumer Prices (1)	House Prices (2)	Superstar City (3)
No Controls	-0.51 (0.07)	-0.12 (0.11)	-1.12 (0.41)
Firm x Year x SOC Fixed Effects	-0.03 (0.01)	0.13 (0.01)	-0.05 (0.03)
Observations	112194747	147356941	148211982

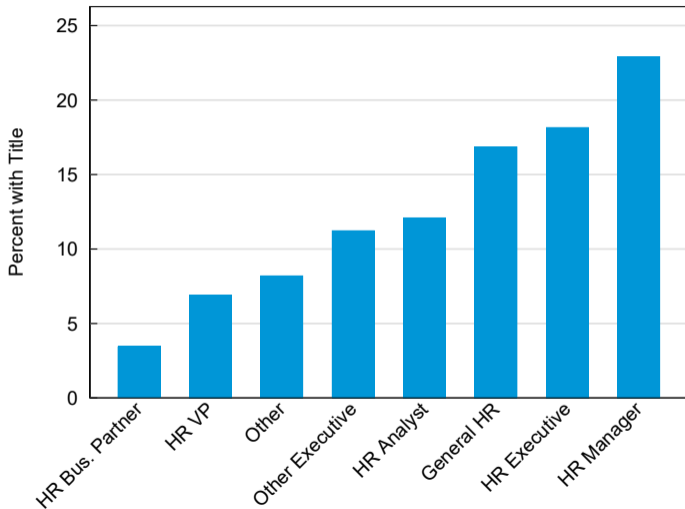
Survey Sample: Number of Employees in Firm

[Return](#)



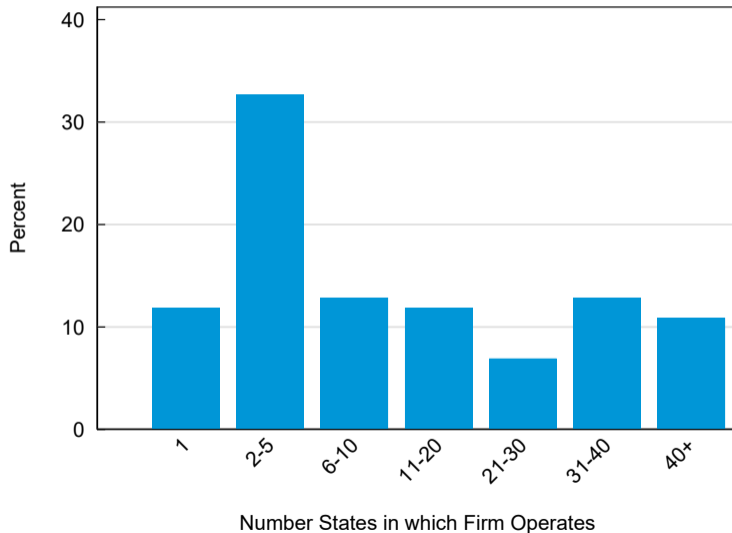
Survey Sample: Respondent Job Titles

[Return](#)



Survey Sample: Number of States in which Firms Operate

[▶ Return](#)



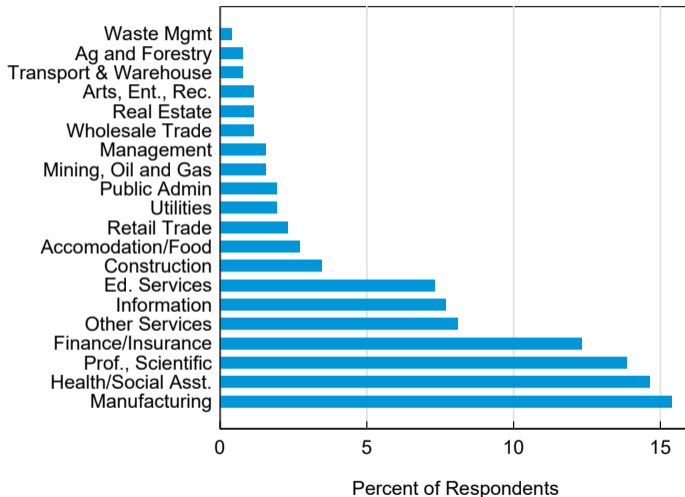
Survey Sample: Number of Cities in which Firms Operate

[Return](#)



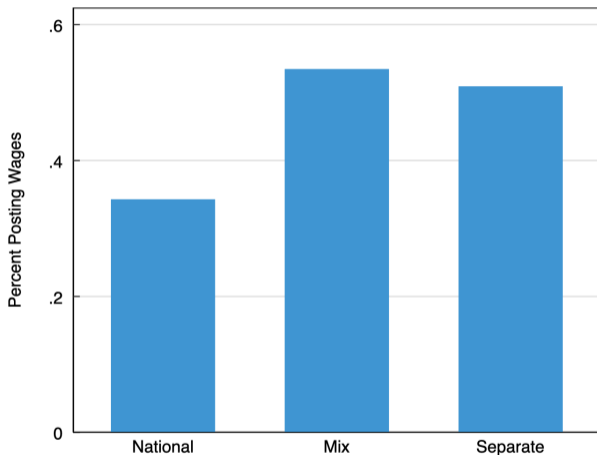
Survey Respondents: Sector Representation

[Return](#)



Identical wage setters are less likely to post wages

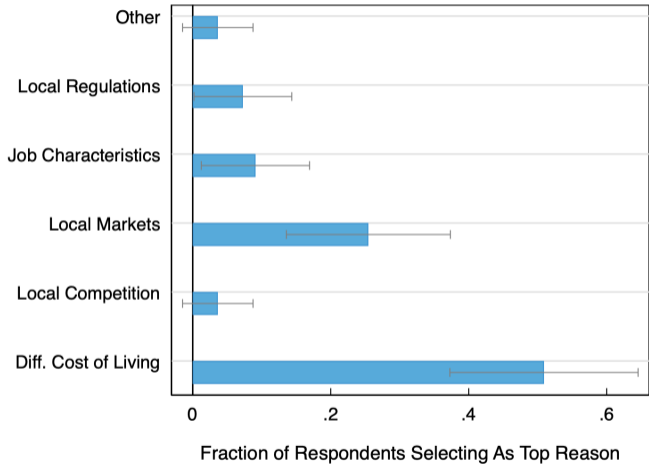
▶ Return



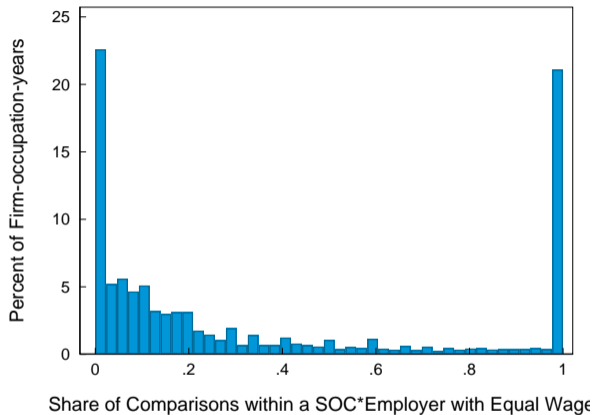
Notes: This figure shows the fraction of respondents who state that their firm posts wages or pay bands on their job ads, for the majority of their jobs.

Reasons firms set different wages across locations

[Return](#)

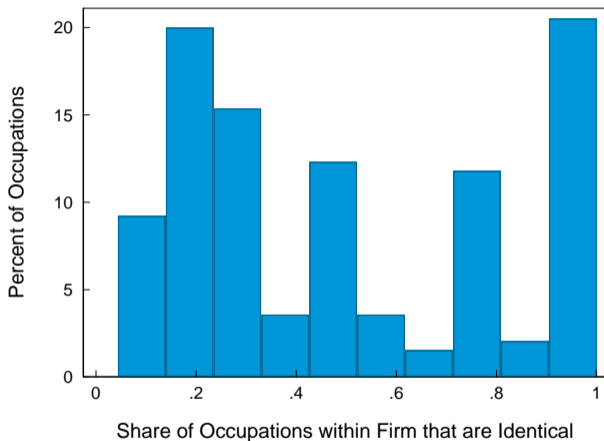


Fraction of Establishments with Identical Wage Pairs [Return](#)



Notes: This figure plots the share of within-firm pairs in a given job \times year that are identical. The sample excludes job cells where there are fewer than 5 within-firm pairs.

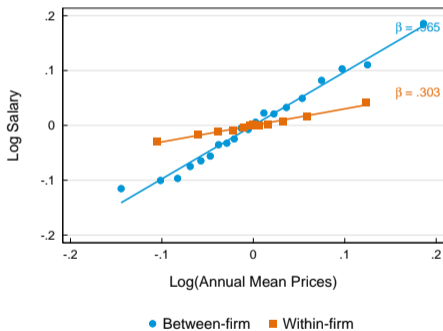
Fraction of Occupations that Firm Sets Identically [Return](#)



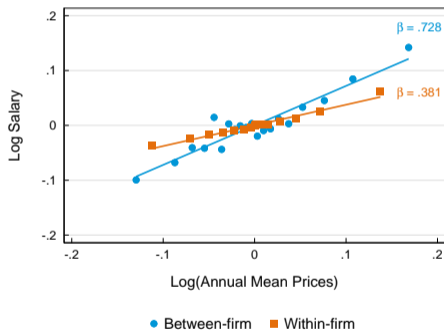
Notes: This figure shows the percent of firms (y-axis) that have X share of occupations with identically set wages. An occupation has identically set wages if at least 80% of the job pairs within that firm \times occupation are identical. The sample includes the set of firms with at least 3 occupations. This results in 663 firms.

Dampened within-firm slope similar for high/low wage jobs [Return](#)

a) Higher Wage

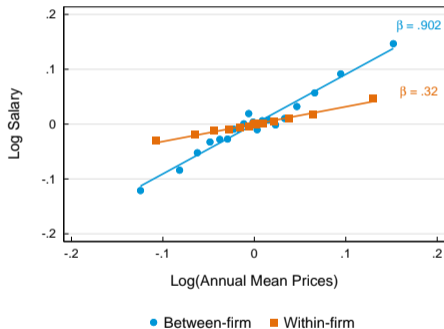


b) Lower Wage

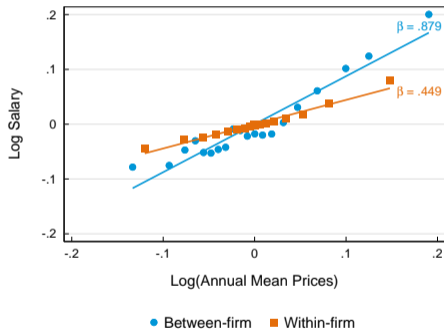


Level of aggregation does not play a key role [Return](#)

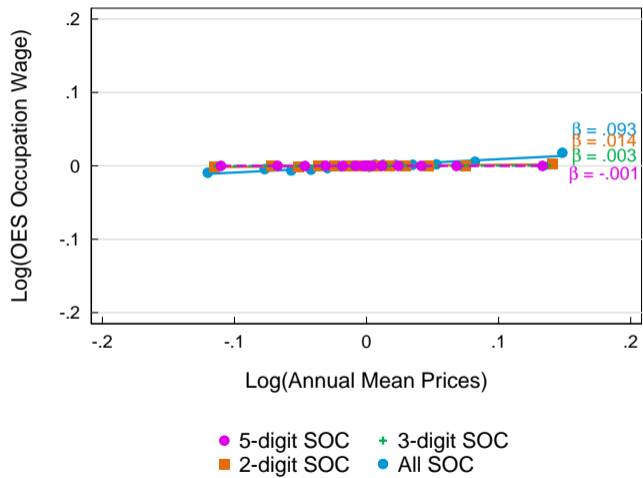
a) Within jobtitle



b) Across all occupations

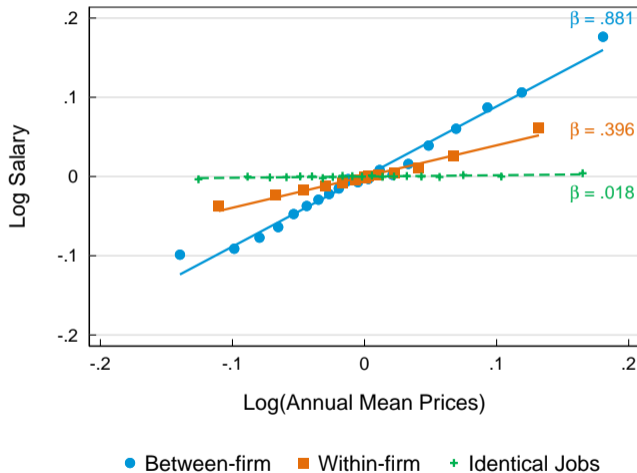


Occupation shifting does not play important role [▶ Return](#)



Patterns look similar including jobs that post wage ranges

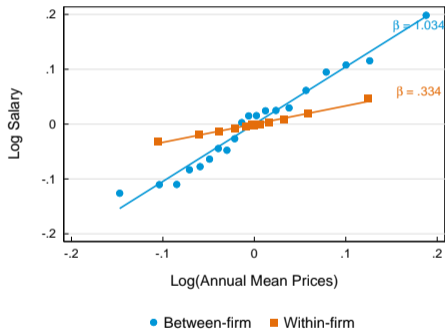
[Return](#)



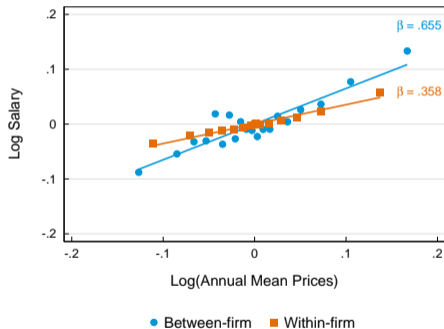
Similar patterns in tradable and nontradable occupations

▶ Return

a) Tradable Occupations

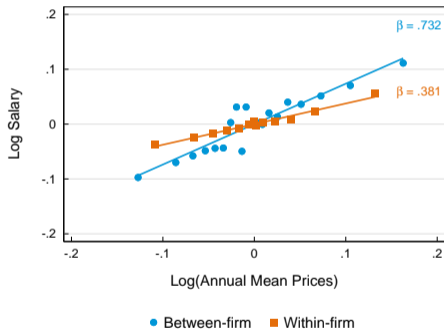


b) Nontradable Occupations

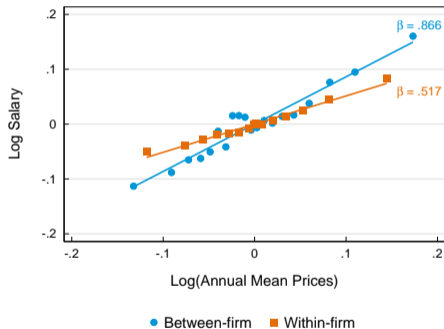


Similar patterns in tradable and nontradable industries [Return](#)

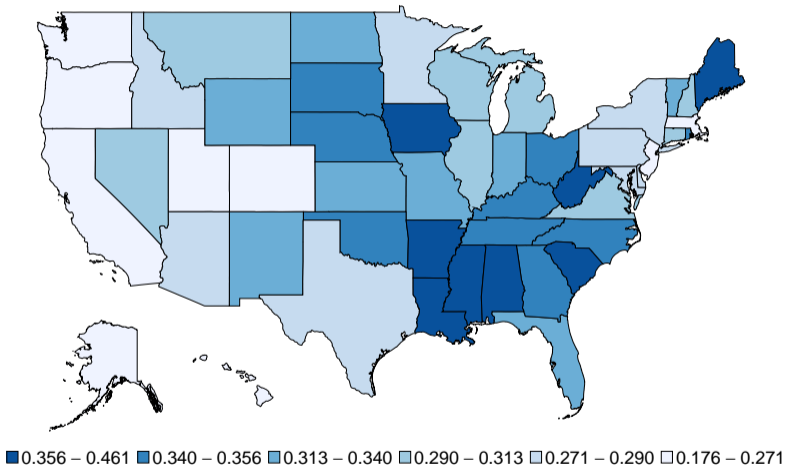
a) Tradable Industries



b) Nontradable Industries



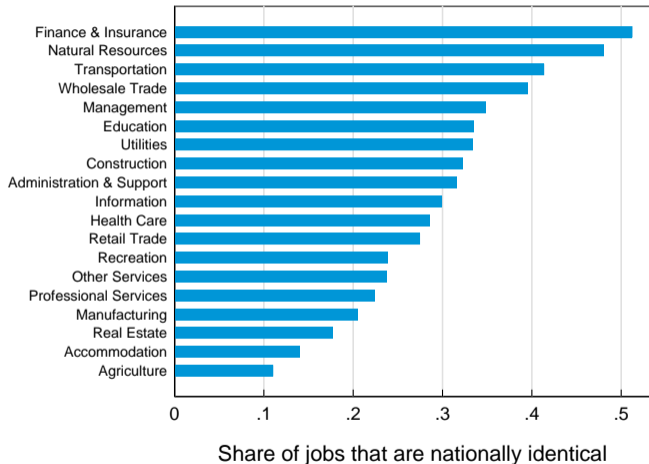
Geography of Identical Wage Setting [Return](#)



Notes: National jobs are defined as those jobs paying the modal wage in occupation*firm*year cells in which at least 80% of wage pairs are the same. Sample includes all firm-job pairs present in at least 2 establishments in that year.

Identical wages are widespread across industries

▶ Return



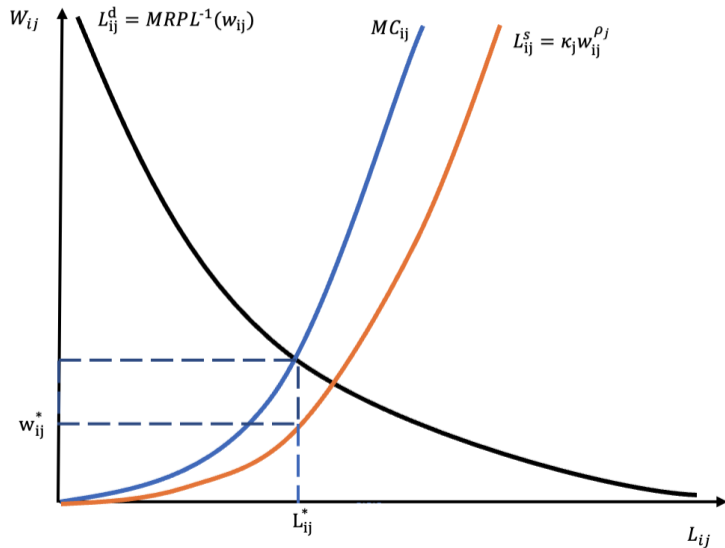
Identical wages more likely in tradeable occupations/industries

▶ Return



Labor Supply vs. Labor Demand

Return



Theoretical Framework: Household Labor Supply

▶ Return

- ▶ Agents maximize indirect utility V_{ijk} from working in establishment ij

$$\max_{ij} V_{ijk} = \max_{C_{ijk}} [\log C_{ijk} + \varepsilon_{ijk}]$$

- ▶ **Assumption:** distribution of idiosyncratic preferences is nested logit, i.e.

$$F\left(\{\varepsilon_{ij}\}_{i \in M, j \in N}\right) = e^{-\sum_{j \in N} \left(\sum_{i \in M} e^{-\rho_j \varepsilon_{ij}}\right)^{\frac{\eta}{\rho_j}}} \quad \rho_j \geq \eta,$$

- ▶ η : mobility across markets
- ▶ ρ_j : mobility within markets across establishments

$$L_{ij} = W_{ij}^{\rho_j} P_j^{-\eta} \underbrace{\left(\sum_{k \in M} W_{kj}^{\rho_j}\right)^{\frac{\eta - \rho_j}{\rho_j}}}_{=\kappa_j} \kappa$$

Why would wages depend on local prices?

▶ Return

$$w_{ij} = \frac{\rho_j}{1 + \rho_j} P_j A_i A_j (1 - \alpha) L_{ij}^{-\alpha} \quad , \quad L_{ij} = w_{ij}^{\rho_j} P_j^{-\eta} \tilde{\kappa}_j$$

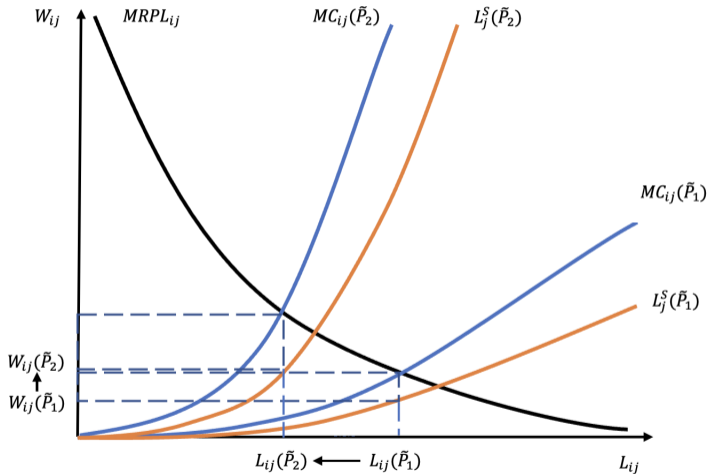
- ▶ Consider partial equilibrium exercise: response of w_{ij} to change in P_j , holding other variables fixed

$$\implies \frac{\partial \log W_{ij}}{\partial \log P_j} = \frac{\alpha \eta}{1 + \alpha \rho_j} \geq 0$$

- ▶ Wages are not a function of prices only in two cases:
 - ▶ $\alpha = 0$: constant returns to scale, horizontal labor demand
 - ▶ η : no mobility across regions

▶ Figure

Wages and local prices: graphical representation ▶ Return



Deriving Estimating Equation [▶ Return](#)

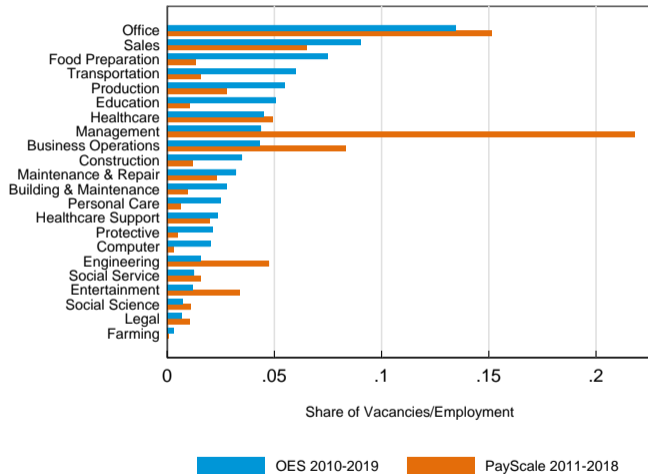
- ▶ Differencing firm first order conditions and taking expectations yields

$$E[\Delta \log w_{ij} | \Delta \log w_{ij'}] = \mathcal{N} \Delta \log w_{ij'} + \gamma_j + (1 - \mathcal{N}) \mu_j E[\Delta \log A_{ij} | \Delta \log w_{ij'}]$$

- ▶ For fraction \mathcal{N} , wages move 1-for-1 across establishments
- ▶ For fraction $1 - \mathcal{N}$, wage growth depends on:
 - ▶ $\Delta \log A_{ij}$: productivity movements in each establishment
 - ▶ ν_j : pass-through from productivity to wages
- ▶ γ_j : market-level effects for all firms in j

Occupation Distribution in Payscale

[Return](#)



Industry Distribution in Payscale

[Return](#)

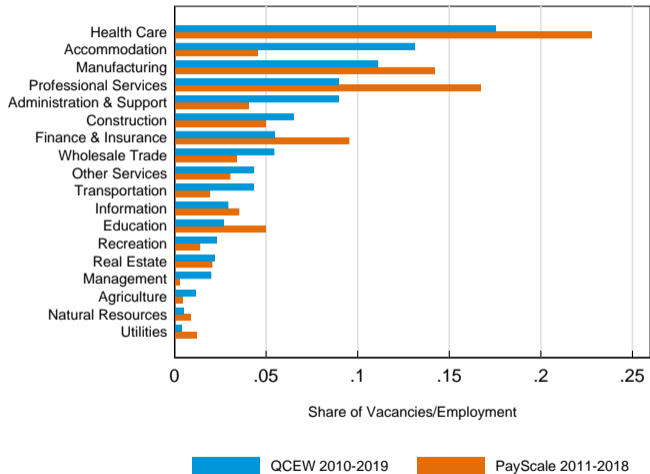


Table: Comparing OES and Burning Glass Wages Across the Distribution

	10th (1)	25th (2)	Median (3)	75th (4)	90th (5)
Posted Wages	0.792 (0.00571)	0.924 (0.00569)	0.998 (0.00610)	0.975 0.00687)	0.867 (0.00625)
Observations	100,789	100,741	100,503	100,021	99,359

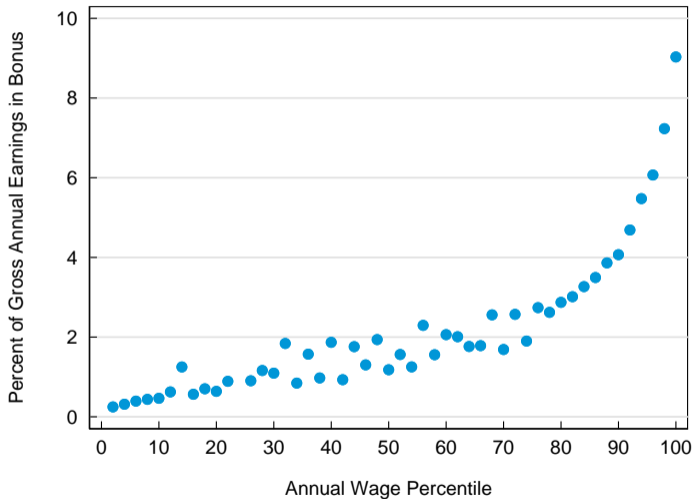
Notes: The dependent variable is the specified moment of the occupation by MSA hourly wages from the Occupational Employment Statistics. The independent variable is the same moment of the posted wage distribution in the Burning glass data. In both cases, we take logs and study the wage averaged over 2010-2019. In both datasets, occupations are at the 6 digit level. In all columns, the Burning Glass wage is annual base pay. The observations are weighted by occupation by MSA employment over 2010-2019. Robust standard errors are reported in parentheses.

Table: Comparing Median Wages in OES and Burning Glass

	Annual Basepay (1)	Hourly Basepay (2)	Annual Total (3)	Hourly Total (4)
Posted Wages	0.911 (0.0155)	0.998 (0.00610)	0.732 (0.0112)	0.906 (0.00842)
Observations	90,155	100,503	88,044	85,586

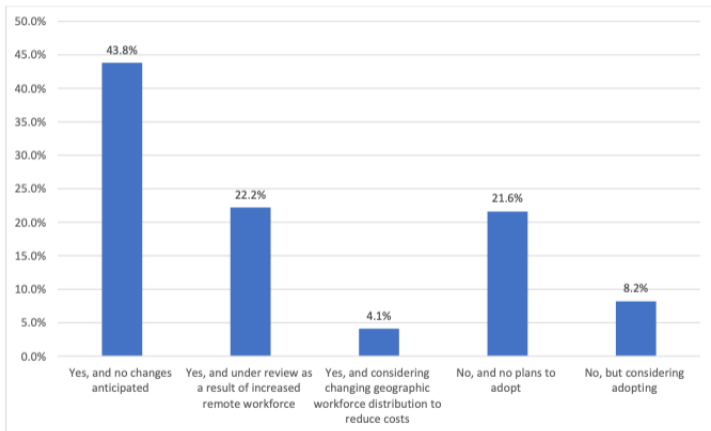
Notes: We regress occupation by MSA log median hourly wages from the Occupational Employment Statistics, on occupation by MSA log median wages from Burning Glass. In both cases, we study the wage averaged over 2010-2019. In both datasets, occupations are at the 6 digit level. In the first column, the Burning Glass wage is annual base pay. In the second column the wage is hourly base pay; in the third, annual total pay; and in the fourth column, hourly total pay. The observations are weighted by occupation by MSA employment over 2010-2019. Robust standard errors are reported in parentheses.

Bonuses in payscale are substantial [Return](#)

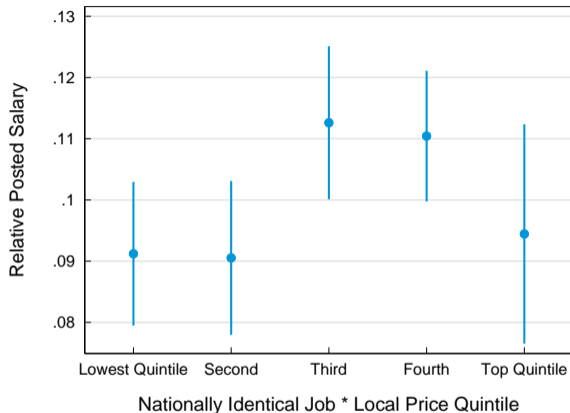


Use of Geographic Differentials

Participants were asked whether their organizations currently have, or are considering adopting, a geographic differentiated compensation policy. 194 organizations responded to this question. 70.1% indicated they have geographic differentiated compensation policy and another 8.2% are considering adopting one. 22.2% indicated their current policy is under review because of an increased remote workforce. 21.6% said they have no plans to adopt a geographically differentiated compensation policy.

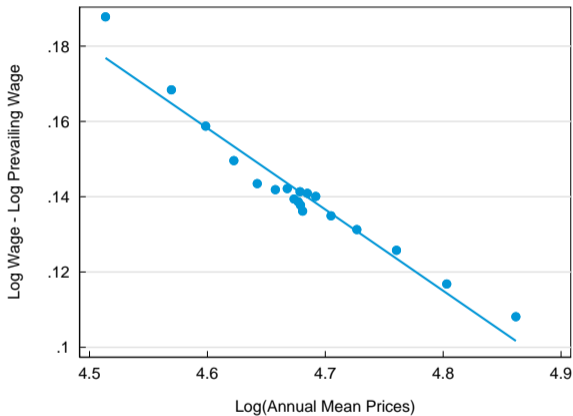


National firms pay wage premium in all locations [Return](#)



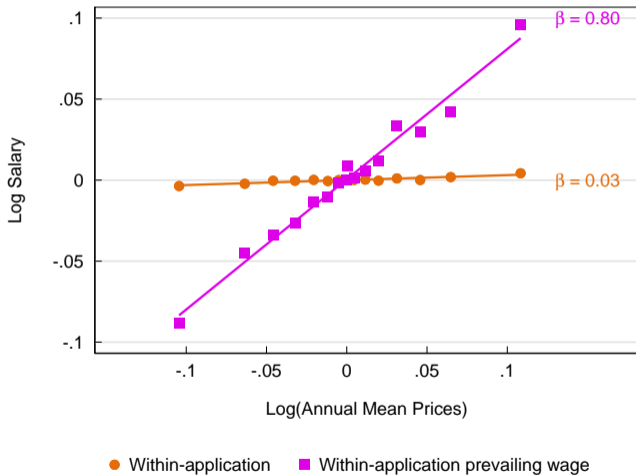
Notes: Regression includes a quadratic in establishment size, a quadratic in firm size, each measured using vacancies, and fixed effects for job*county*industry*year. Nationally identical jobs are defined as those jobs paying the modal wage in occupation*firm*year cells in which at least 80% of wage pairs are the same. Sample includes all firm-job pairs present in at least 2 establishments in that year.

Wage premium in visa application data is largest in low-cost areas



Visa Application data: within-worker cross-worksite patterns

Return



Self-reported satisfaction falls within firm with prices

[▶ Return](#)

<i>Outcome:</i>	Worker Satisfaction		Fair Pay	
	(1)	(2)	(3)	(4)
Average Local Price for Firm		-0.121 (0.358)		-0.590 (0.518)
Local Price	-0.555 (0.215)		-0.036 (0.298)	
Observations	8862	8862	5176	5176
Firms	2659	2659	1702	1702
<i>Fixed-effects</i>				
Year	✓	✓	✓	✓
Job		✓		✓
Job×Employer	✓		✓	
<i>Fixed-effects</i>				
Year	✓	✓	✓	✓
Job		✓		✓
Job×Employer	✓		✓	

Natural Resource Shock: Shift-share instrument [▶ Return](#)

$$B_{j,t} = 100 \times \sum_j \frac{\text{NR empl}_{j,2009}}{\text{total empl}_{j,2009}} \times \Delta \log(\text{NR empl}_{-j,t})$$

- $\text{NR empl}_{j,2009}$: natural resource employment in county j in 2009
- $\text{NR empl}_{-j,t}$: natural resource empl in year t in all counties excluding j

Correlates of National Wage Setting [Return](#)

	(1) More than 500 Employees	(2) More than 50% Empl. Salaried	(3) Pay Determined Centrally	(4) Centralized Hiring
Identical Pay Firm	0.064 (0.079)	0.020 (0.081)	0.306 (0.069)	0.072 (0.074)
Mixed Pay Firm	0.139 (0.072)	-0.032 (0.074)	0.096 (0.072)	0.083 (0.068)
Observations	298	298	298	297
Mean of Y-Var for Firms w/ No National Pay	0.574	0.485	0.574	0.279

Notes: The dependent variable in column 1 is an indicator that more than the respondent works at a firm employing more than 500 workers; in column 2 it is an indicator that more than 50% of the firm's employees are salaried (as opposed to hourly) employees; in column 3 it is an indicator that the firm's pay structure is determined by central management; and in column 4 it is an indicator that hiring is done by centralized management.

Benchmarking effects on profits: Alternate values for ρ [Return](#)

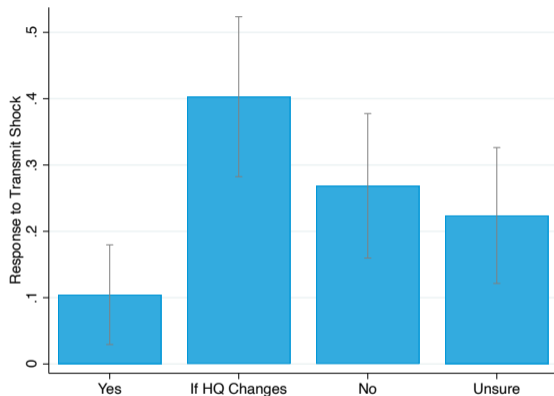
	25th	Median	75th
Between-Firm Benchmark			
$\rho = 2$	3.1	16	73
$\rho = 4$	9.9	45	227
$\rho = 6$	20	75	744
Within-Firm Benchmark			
$\rho = 2$.14	1.1	5.2
$\rho = 4$.46	3.6	17
$\rho = 6$.96	7.4	33

Benchmarking effects on profits: Alternate models [Return](#)

	25th	Median	75th
Between-Firm Benchmark			
Constant returns to scale	9.9	45	227
Decreasing returns to scale	6.8	32	133
Rationing	6.8	24	59
Within-Firm Benchmark			
Constant returns to scale	9.9	45	227
Decreasing returns to scale	.31	2.4	11
Rationing	.31	2.4	10

Would a wage change in one establishment impact others?

▶ Return



Notes: Figure shows survey responses to the question: “If wages for a given in one of your firm’s establishments had to change due to an increase in local competitors’ wages, would the wages for that same job in your firm’s other establishments also change?” Sample restricted to respondents whose firms set identical wages for some or all jobs.

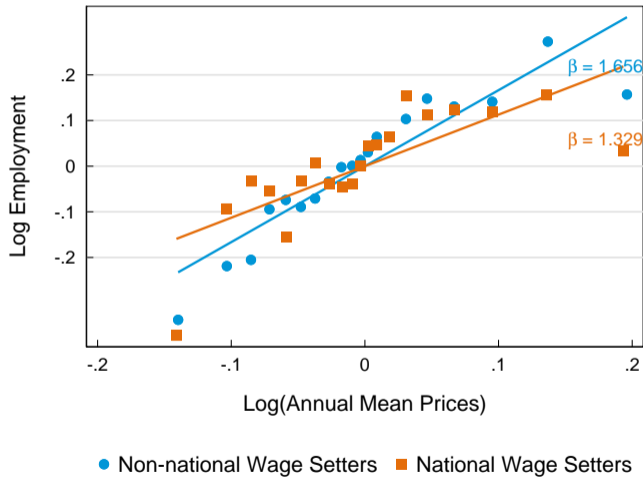
National wage setters adjust wages less frequently [Return](#)

	(1)	(2)	(3)	(4)	(5)	(6)
Nationally Wage Set Job	-48.917 (0.203)	-48.178 (0.207)	-34.606 (0.303)	-48.639 (0.294)	-47.907 (0.299)	-34.644 (0.424)
Shock x Non-nationally wage set job				0.234 (0.039)	0.230 (0.039)	0.161 (0.031)
Shock x Nationally wage set job				0.032 (0.028)	0.051 (0.028)	0.077 (0.025)
Observations	583,367	583,367	555,384	575,300	575,300	547,442
<i>Fixed Effects:</i>						
Occupation x Year	✓	✓	✓	✓	✓	✓
Industry x Year		✓	✓		✓	✓
Firm			✓			✓

Notes: The dependent variable is an indicator for whether the wage changes between $t - 1$ and t and includes all job postings that are posted with wages in consecutive years. The dependent variable is multiplied by 100. The shock is the change in the average change in log wages for jobs posted in the county by other firms and that are outside the 2-digit occupation.

National wage setters are relatively large in low-price areas

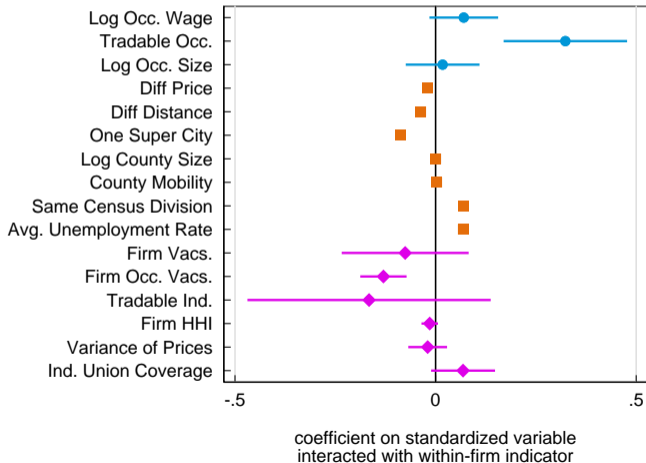
[Return](#)



Predictors of National Wage Setting

[Return](#)

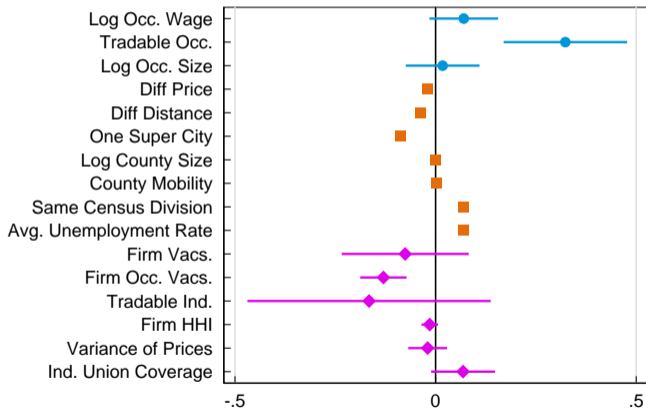
$$\text{Same}_{i',jj',ot} = \beta 1_{i=i'} + \alpha 1_{i=i'} \times X_{o,t} + \omega X_{ot} + \gamma_{j,-j} + \gamma_i + \gamma_t + \epsilon_{ijot}$$



Predictors of National Wage Setting

[Return](#)

$$\text{Same}_{i',jj',ot} = \beta 1_{i=i'} + \alpha 1_{i=i'} \times X_{o,t} + \omega X_{ot} + \gamma_{j,-j} + \gamma_i + \gamma_t + \epsilon_{ijot}$$



Robustness of Pass Through of Natural Resource Shock

[Return](#)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Primary	Estab. Sample	Strict	Unexposed	Nontradable	Occ.	Excluding	Tradable Ind.
Δ Natural Resources	0.73	-0.32	0.47	-0.95	0.93	-0.29	0.24	-0.60
	(0.19)	(0.25)	(0.24)	(0.22)	(0.25)	(0.14)	(0.13)	(0.14)
Observations	196458	883500	305199	1439505	265353	1930300	408332	1542219
Included Sample	Identical	Different	Identical	Different	Identical	Different	Identical	Different

Effect of National Wage Setting on Nominal Wage Inequality

▶ Return

$$\text{Var} [w_{ioj}] = \underbrace{\text{Var} [w_{ioj} - \bar{w}_{io}]}_{\text{within firm, across region}} + \underbrace{\text{Var} [\bar{w}_{io}]}_{\text{between firms and occs.}}$$

$$\text{Var} [w_{ioj}] = N \underbrace{\text{Var} [w_{ioj}^{nat} - \bar{w}_{io}]}_{\text{National} = 0} + (1 - N) \underbrace{\text{Var} [w_{ioj}^{local} - \bar{w}_{io}]}_{\text{Local}} + \underbrace{\text{Var} [\bar{w}_{io}]}_{\text{between firms and occs.}}$$

$$\text{Var}^{CF} [w_{ioj}] = N \underbrace{\text{Var} [w_{ioj}^{local} - \bar{w}_{io}]}_{\text{National} = \text{Local}} + (1 - N) \underbrace{\text{Var} [w_{ioj}^{local} - \bar{w}_{io}]}_{\text{Local}} + \underbrace{\text{Var} [\bar{w}_{io}]}_{\text{between firms and occs.}}$$

▶ We find that:

- ▶ Within-firm, across region component is 8 percent of overall variance
- ▶ $\text{Var}^{CF} [w_{ioj}]$ is 4.3 percent higher than $\text{Var} [w_{ioj}]$

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