The Role of Firms in the Labor Market

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Econ 350, Winter 2021

Overview

Increased Inequality Between Firms Has Accompanied Major Labor Market Changes

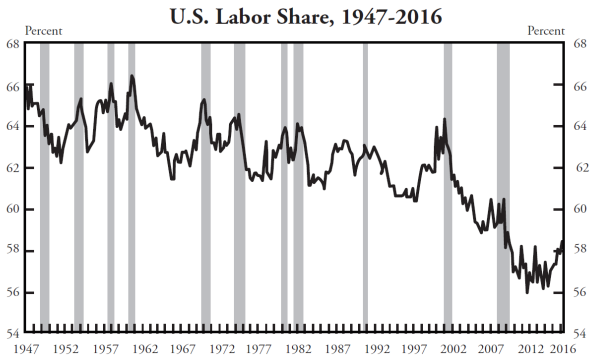

Figure 1: Share of Labor Compensation in GDP at Current National Prices for US

- Increased inequality between US firms over last 4 decades has accompanied major labor market changes
- Are these changes in the product market and labor markets connected?
- What are the mechanisms behind these trends? Globalization? Technology? Market Power?

Firm Inequality: Industrial Concentration Has Been Increasing

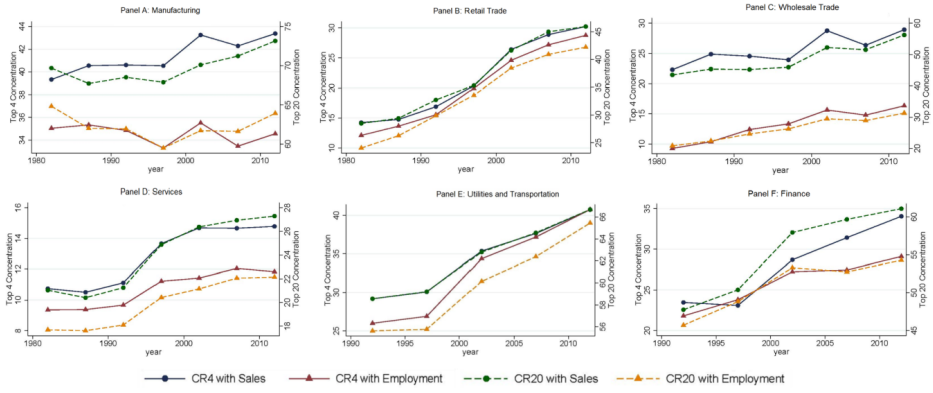

Figure 2: Average Concentration Across Four Digit Industries by Major Sector

Source: *Autor et al. (2020)*

Firm Inequality: Industrial Concentration Has Been Increasing

- Plots measure industry concentration as the fraction of total sales by the four largest firms in the industry, and the fraction of sales accrued by the 20 largest firms
- Also do this based on employment rather than sales
- Industries have been getting more concentrated over time
- Reflects both increased specialization of leading firms on their core industry and from large firms just getting bigger and expanding their scope
- The trend here does seem to be stronger when measuring concentration in sales rather than employment, suggesting that firms may attain large market shares with relatively few workers

Firm Inequality: Dispersion in Productivity

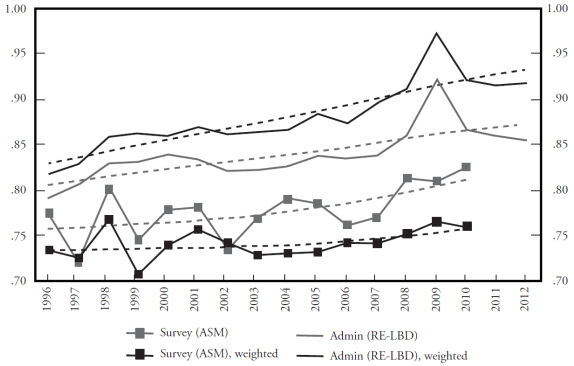

Figure 3: Rising Labor Productivity Dispersion in Survey and Administrative Data (Manufacturing)

- IO literature has documented huge cross-sectional productivity differences between firms. What about over time?

Source: *Board of Governors of the Federal Reserve System (U.S.) et al. (2018)*

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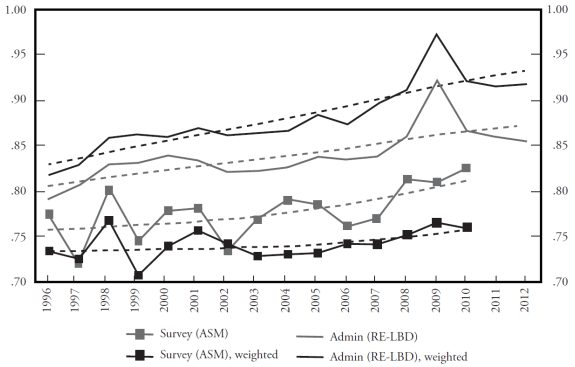

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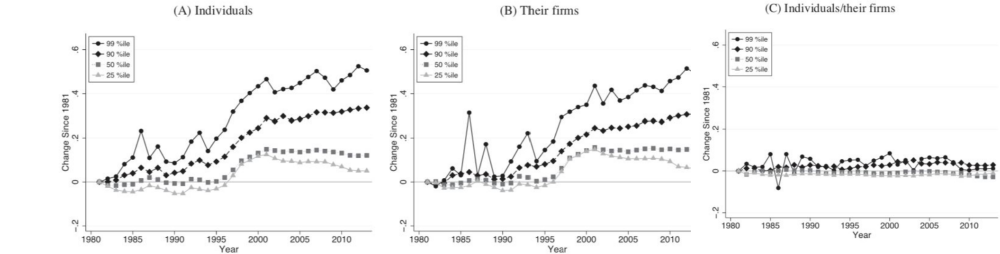
- Plot shows within-industry revenue labor productivity dispersion for manufacturing has risen. Other papers have found similar trends for TFP dispersion (see Andrews et al. 2017).
- Increase in productivity dispersion over time could signal a fall in US business dynamism

Source: *Board of Governors of the Federal Reserve System (U.S.) et al. (2018)*

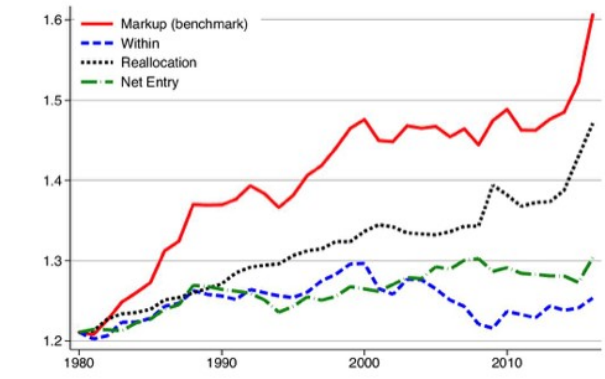
Firm Inequality: Dispersion in Firm-Level Pay



Change in Individual Earnings Inequality Mostly Between Firms - Song et al. (2019), SSA data

- Panel A: Plots selected percentiles of the overall (log) earnings distributions each year
- Panel B: Plots percentiles of the firm average earnings distribution that correspond to percentiles of the worker earnings in Panel A
- Panel C: Difference between corresponding percentile lines in A and B
- Between firm differences explain 2/3 of rise in earnings dispersion

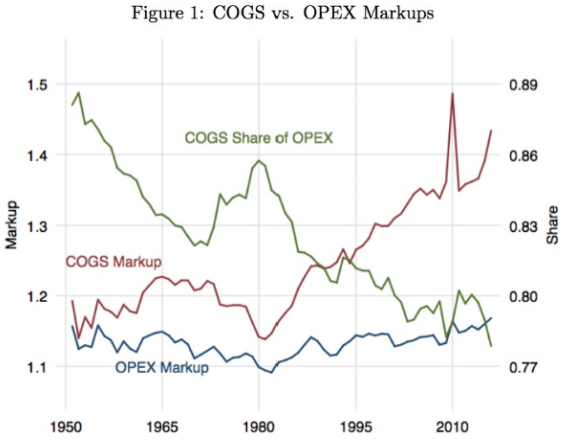
Firm Inequality: Rise in Markups and Weakening Competition?



- Rise in markups is a natural complement to the fall in labor share
- De Loecker et al. (2020) observe that In 1980, aggregate markups start to rise from 21% above marginal cost to 61% now
- Rise occurs mostly within industry

Figure 4: Average Markups Across the Economy Over Time

Firm Inequality: New Research on True Trends in Markups



Traina (2018)

- De Loecker et al. (2020) focus on COGS in estimating variable cost
- OPEX has a COGS component and a SGA component, which includes indirect costs of production such as marketing and management
- Taking this into account, public-firm markups and market power have not substantially increased in recent decades.

Figure 5: COGS = Cost of Goods Sold, OPEX = COGS + Selling, General and Administrative Expenses

Explanation of Market Power: Rise of Superstar Firms

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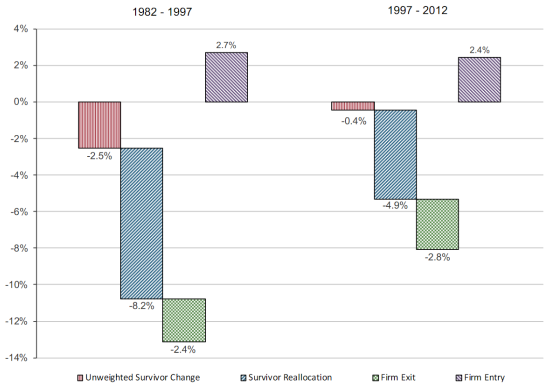

Figure 6: Decomposition of Labor Share Decrease (Manufacturing Sector)

Source: *Autor et al. (2020)*

- Increases in market toughness can actually explain trends we've seen if more productive firms gain bigger market shares

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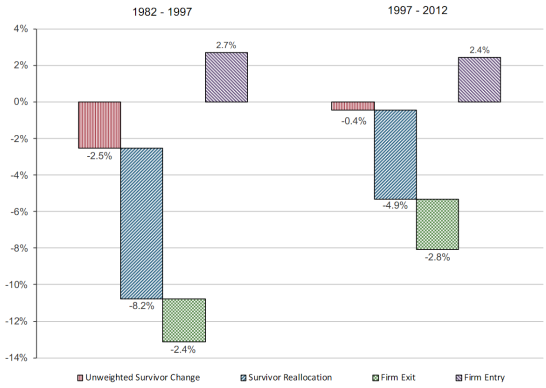

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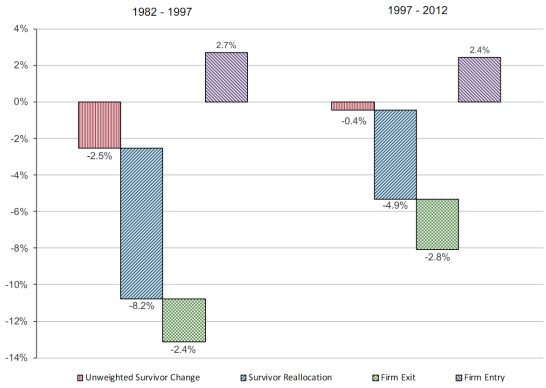
Explanation of Market Power: Rise of Superstar Firms



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- Decompose change in labor share to within firm component (red), reallocation component (blue), and entry (green)/exit (purple) decisions
- Labor share declined substantially in both periods: -10.42pp between 1982 and 1997 and -5.65pp between 1997 and 2012
- Reallocation among incumbents was the main component of the fall

But How Does Market Power Impact Wages?: Monopoly vs Monopsony

Monopoly

- Lower allocative efficiency leads to higher prices
- Inhibit productivity $\rightarrow$ upward pressure on costs and prices
- These lead to lower real wages
- Lower average wage $\rightarrow$ working is less attractive

Monopsony

- Firms face upward sloping labor supply curves $\rightarrow$ workers are paid below their marginal products
- Wage setting power due to firm specific skills, job mobility frictions, heterogeneous tastes for non-wage amenities

Market Power Beyond Concentration

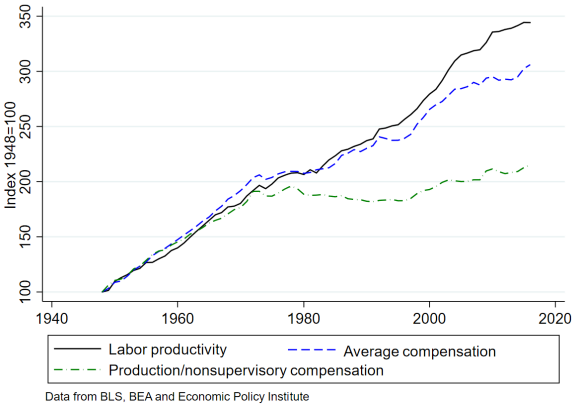

Figure 7: Stansbury and Summers (2017)

- Increasing gap between average labor productivity and the typical American worker's compensation
- Vast majority of workers were not benefiting much from productivity growth
- Literature on market concentration has not adequately explained these trends

Monopsony: Anti-Competitive Behavior

DOJ uncoverd emails in which Steve Jobs and other notable CEOS detailed plans to avoid poaching each other's engineers

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Empirical evidence from Krueger and Ashenfelter (2018)

- Find that 58% of major franchise chains include "no-poaching of workers agreements" that prevent other employers from recruiting and hiring their workers
- These no-poaching agreements are more prevalent in labor markets with high turnover

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- These no-poaching agreements are more prevalent in labor markets with high turnover
- But no concrete evidence on enforcement or geographic scope of agreements - inconclusive evidence of firm market power

Monopsony: Decline of Anti-Monoponistic Institutions

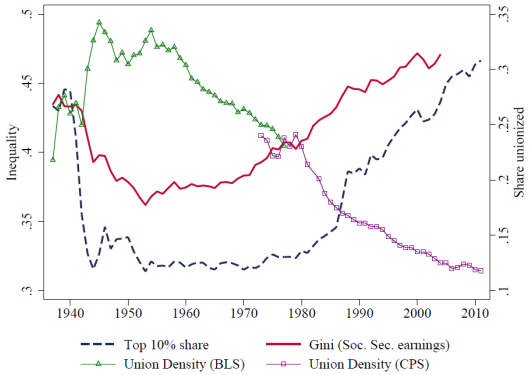

Figure 8: Union Density and Inequality Measures

Source: *Farber et al. (2018)*

- Plots union membership counts using BLS and CPS data, along with top share inequality from Piketty and Saez (2003, updated 2016)
- Observe inverse relationship beteween income inequality and union membership

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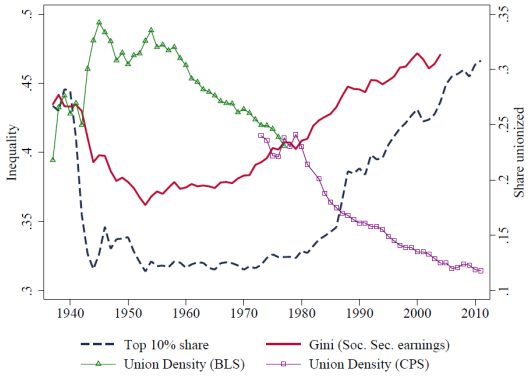

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- Paper finds that unions consistently have provided workers with a 10-20% wage boost over their non-union counterparts over the past eight decades
- Worker power determines degree to which workers receive a share of rents. If labor markets are monopsonistic, union bargaining could raise worker wages to efficient level

Monopsony: What is the Impact of the Minimum Wage?

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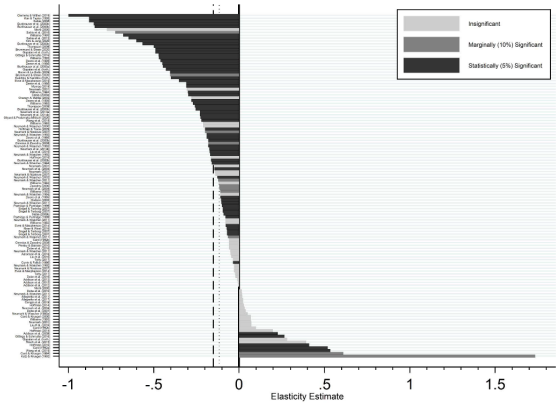


Figure 9: Neumark and Shirley (2021)

- Assemble min wage lit. since 1992
- Figure shows the distribution of preferred estimates of the percent change in employment over the percent change in the minimum wage
- 79.3% of the estimates are negative, 55.4% are negative and significant at the 10% level or less, and 47.9% are negative and significant at the 5% level or less.
- 22% are positive and significant at the 10% level, and 4.1% positive and significant at the 5% level

▸ New Min. Wage

Need for Industry and Location Specific Stories

- What is the relevant market for labor?
- How have markdowns of wages changed? How to estimate firm specific labor supply elasticity?
- Are wages the right way to measure monopsony power?

Overview

Analytic frameworks

Menu of models in which imperfect competition drives wage dispersion:

- Productivity
  - Misallocation under imperfect competition Berger et al. (2019)
- Matching and bargaining
  - The role of outside options: Schubert et al. (2020), Caldwell and Danieli (2021)
- Search frictions
  - Search frictions: Burdett and Mortensen (1998)
- Thematically will focus on how market power appears in the wage equation, and how concentration measures market power.

"Old way"

- A single employer, e.g., a company town.

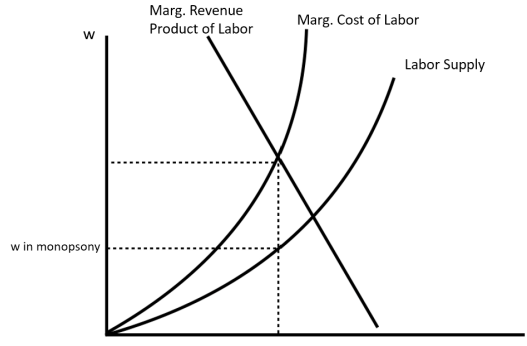
Example:

- Labor supply, $L = w^{\varepsilon}$
- Firms have technology $Y = AL$,
- Firms solve,

$$\max_{w} \quad AL - wL$$
$$\implies \max_{w} \quad Aw^{\varepsilon} - w^{\varepsilon+1}$$

- FOC on w means,

$$w^* = \underbrace{\frac{\varepsilon}{\varepsilon+1}}_{\text{wage markdown}} \underbrace{A}_{MPL}$$



Productivity

Berger, Herkenhoff, and Mongey (2019) – Labor Supply

- Study interaction between labor market collusion and productivity dispersion across firms.

Oligopsonistic model – strategic interaction between firms.
Preferences / labor supply:

- Continuum of labor markets $\ell \in [0, 1]$.
- Labor market ℓ has a fixed number of firms M_ℓ. Firms are indexed by i.
- Nested logit choice model of labor markets ℓ and then within market over firms i, with parameters θ and η controlling dispersion of random components of utility which drive choice probabilities.

Berger, Herkenhoff, and Mongey (2019) – Labor Supply

Nested logit choice model equivalent to a representative agent with nested CES preferences:

$$N = \left(\int_0^1 n_\ell^{\frac{\theta+1}{\theta}} \mathrm{d}\ell \right)^{\frac{\theta}{\theta+1}}$$
$$n_\ell = \left(\sum_{i=1}^{M_\ell} n_{i\ell}^{\frac{\eta+1}{\eta}} \right)^{\frac{\eta}{\eta+1}} \tag{1}$$

Their interpretation:

- θ = dispersion of individual market-specific utility shock $\implies$ elasticity of substitution of aggregate labor across labor markets
- η = dispersion of individual firm-specific utility shock $\implies$ aggregate within-market cross-firm mobility (capturing e.g., job search / skill transferability)

Berger, Herkenhoff, and Mongey (2019) – Firms

Cournot competition in the labor market:

$$\max_{n_{i\ell}} \; z_{i\ell} F(n_{i,\ell}) - \underbrace{w\left(n_{i\ell}, n^*_{-i,\ell}, N\right)}_{\text{residual supply}} n_{i\ell}$$

First order condition on wages,

$$w_{i\ell} = \mu_{i\ell} MRPL_{i\ell}$$

where $\mu_{i\ell}$ is the wage markdown,

$$\mu_{i\ell} = \frac{\varepsilon_{i\ell}}{1+\varepsilon_{i\ell}}, \quad \varepsilon_{i\ell}\Big|_{n^*_{-i,\ell}} = \left(s_{i\ell}\theta^{-1} + (1-s_{i\ell})\eta^{-1}\right)^{-1}$$

and $s_{i\ell}$ is the payroll market share. Large firms face upward slope driven by θ, smaller firms from η.

Berger, Herkenhoff, and Mongey (2019) – Estimates

Estimates of labor supply elasticities and markdowns,

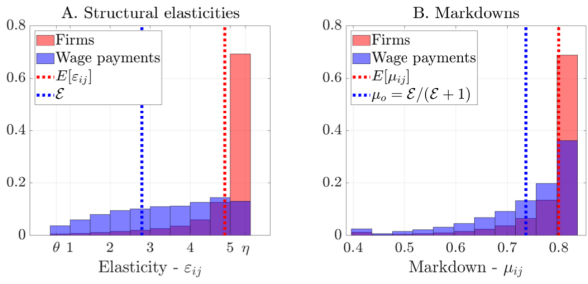


Figure 10: Results from calibrated macro model. Red = unweighted, blue = weighted by individuals.

- Local labor markets ℓ discretized: commuting zone $\times$ 3-digit NAICS
- Firm definition i is collection of establishments owned by the same firm in each local labor market ℓ.
- Avg firm faces fairly elastic supply, but most workers work at firms facing relatively inelastic labor supply.
- Wage markdowns on the order of 20% to 30%

Berger, Herkenhoff, and Mongey (2019) – Misallocation

Employment reallocates to more productive firms under perfect competition:

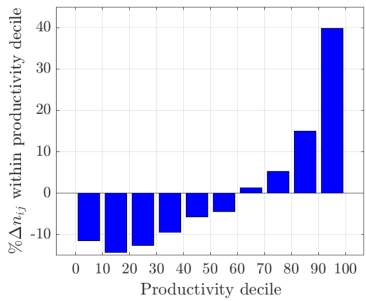


Figure 11: "Percent change in total employment within productivity decile bin. Change measured between benchmark oligopsony equilibrium and competitive equilibrium."

- Absent imperfect competition and mobility frictions, workers work at highest wage firm $\implies$ wage equalization across firms; highest productivity firm employs the greatest share of labor.
- "Frictions" give rise to wage differences across firms; workers maxing utility may choose to work at a low productivity-firm because of idiosyncratic shock.
- Cournot competition $\implies$ quantities distorted downwards, pushing workers to low-productivity firms.

Berger, Herkenhoff, and Mongey (2019) – Minimum wages

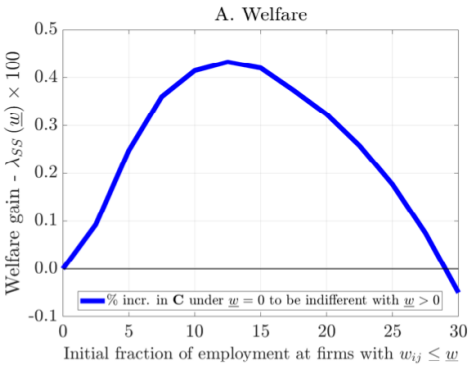


Figure 12: Model-based measure of welfare (worker + firm) vs. size of minimum wage

- Best minimum wage can do is implement the competitive allocation
- Minimum wage increases beyond the competitive level induce "classical" distortions.
- Productivity differences across regions $\Longrightarrow$ regional minimum wages optimal.
- Minimum wage: narrower markups at small firms, but more market power at large firms; min wage increases labor market concentration.

Berger, Herkenhoff, and Mongey (2019) – Minimum wages

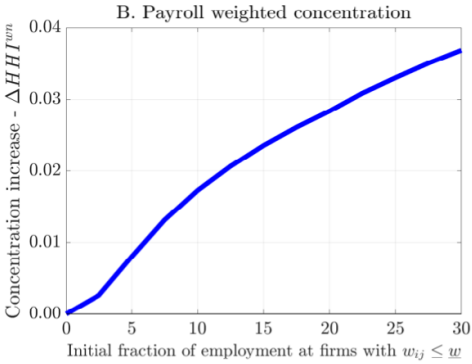


Figure 13: Labor market concentration vs. size of minimum wage

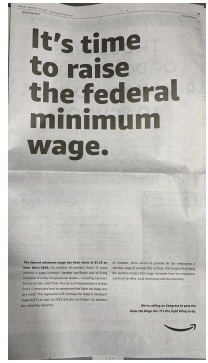


Figure 14: A recent ad taken out by Amazon in the Jeff Bezos Washington Post. Min wage increases shift employment to most productive firms, which has (unmodeled) product market effects.

How concentrated are local labor markets?

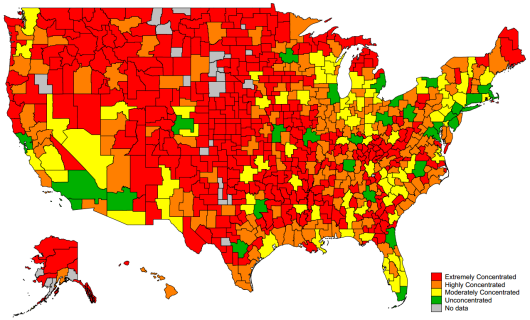


Figure 15: Average HHI Using CareerBuilder Job Postings; color indicates FTC product market concentration cutoffs. Red = more concentrated.

Source: *Azar et al. (2017)*

- Standard measure of concentration: *HHI* in market m and year-quarter t as the market share of firm j in market m,

$$HHI_{m,t} = \sum_{j=1}^{J} s_{j,m,t}^2$$

$$s_{j,m,t} = \frac{(\text{sum of vacancies posted})_{j,m,t}}{(\text{Total vacancies})_{m,t}}$$

- "Firm" defined by SOC 6-digit occupation.
- Does not account for firm age – younger firms may have more vacancies.
- **Does not account for worker mobility across firms within markets!**

Bargaining, Search & Matching

Schubert, Stansbury, and Taska (2020) – Bargaining and wages

- Nash bargaining; oo_i = worker i's outside option.

$$w_i = \text{argmax}_w(\underbrace{w - oo_i}_{\text{worker surplus}})^{\beta}(\underbrace{p_i - w}_{\text{firm surplus}})^{1-\beta}$$

- This gives a wage equation,

$$w_i = \beta p_i + (1-\beta) oo_i$$

- This type of wage equation appears across models, where the weights correspond to the source of firm market power.

Schubert, Stansbury, and Taska (2020) – Concentration and wages

- Outside options,

$$oo_i = \sum_{j \neq i} \underbrace{\alpha_j}_{\text{match prob}} w_j + \left(1 - \sum_{j \neq i} \alpha_j\right) \underbrace{b}_{\text{unemp. benefit}}$$

- Solving for average wages,

$$\bar{w} = \bar{p} + (1 - \beta) HHI (b - \bar{p}) + \beta (1 - \beta) \sum_i \alpha_i^2 (p_i - \bar{p})$$

- *Negative relationship* between *HHI* and wages, coefficient reflects firm bargaining power.
- *Concentration* measuring outside options common across models

Schubert, Stansbury, and Taska (2020) – Concentration and wages

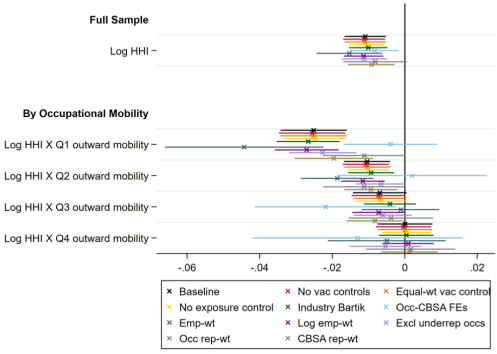


Figure 16: Coefficient on log *HHI* (defined by SOC 6-digit concentration at MSA level) in regression of log wages on concentration. Job mobility defined by Burning Glass job-to-job transition data.

- Fairly small effects of concentration on wages driven by those in the lowest-mobility occupations.
- IV estimates suggest fall of 2.6 log points from 5th to 95th percentile of concentration.

Caldwell and Danieli (2021)

- Schubert, Stansbury, and Taska (2020) specify workers option sets: only jobs within their MSA. Can we measure the breadth of workers' choices in the labor market?
- Outside options heterogeneous, depend on preferences for commuting and firm-specific amenities.
- Capture this in a matching model where workers of type x have preferences over firm types z, firms likewise have preferences over workers.
- Use Shapley and Shubik (1971) two-sided matching game with transfers to develop **empirical procedure for measuring individuals' option sets**.
- Estimate model on German matched employer-employee data.

Caldwell and Danieli (2021) – Setup

- Reinvention of Tinbergen (1956) where firm and worker characteristics are matched in equilibrium.
- Workers i and firms j meet and divide match surplus τ_{ij} with a transfer w_{ij}
- Division:

$$\tau_{ij} = \underbrace{\pi_{ij}}_{\text{profits}} + \underbrace{\omega_{ij}}_{\text{compensation}} = \underbrace{y_{ij}}_{\text{output}} + \underbrace{a_{ij}}_{\text{amenities}}$$

$$\pi_{ij} = y_{ij} - w_{ij}. \qquad \omega_{ij} = a_{ij} + w_{ij}$$

- Equilibrium is an allocation $m(\cdot)$ that maps workers to firms, and a transfer, w_{ij} that satisfy a no profitable deviation condition:

$$\forall i, j, \quad \omega_{i,m(i)} + \pi_{m^{-1}(j),j} \geq \tau_{ij}$$

- Output is net all costs (including amenities) except the transfer.

Caldwell and Danieli (2021) – Assumptions

- Workers and firms defined by characteristics x_i and z_j with densities d and g in the population.
- Workers make (continuous) logit choices over firms that offer $\omega(x_i, z_j) + \varepsilon_{i,z_j}$
- Firms choose over workers that produce $\pi(x_i, z_j) + \varepsilon_{j,x_i}$.
- $\varepsilon_{j,x_i} \perp \varepsilon_{i,z_j}$, both with continuous Logit distributions.
- Workers' expected compensation is,

$$\mathbb{E}[\omega_{ij} \mid x_i] = \mathbb{E}[\omega(x_i, z_{m(i)}) \mid x_i] + \mathbb{E}[\varepsilon_{i,z_{m(i)}} \mid x_i]$$

- $\mathbb{E}[\varepsilon_{i,z_{m(i)}} \mid x_i]$ is the *Outside options index* (OOI) – workers have more outside options when there are more jobs that offer similar compensation.
- This is similar to the pricing of worker attributes in Tinbergen, which is shaped by worker and firm heterogeneity.

Caldwell and Danieli (2021) – Outside options index

- Can solve in closed form for $E[\varepsilon_{i,z_{m(i)}} \mid x_i]$ under the logit error assumptions.
- In particular,

$$E[\varepsilon_{i,z_{m(i)}} \mid x_i] = -\int f(z_j \mid x_i) \log \frac{f(z_j \mid x_i)}{g(z_j)} \mathrm{d}z_j$$

- Notice this is the Shanon entropy index, which measures the **concentration** of job types z_j that type x_i workers are matched with in equilibrium.
  - Recurring theme: wage equation balances productivity and outside options; outside options measured with an index of concentration.
- Can estimate $f(z_j \mid x_i)$ by logistic regression, in particular, they assume a linear structure, $\log \frac{f(z|x)}{g(z)} = xAz + x\beta_x + z\beta_z$
- xs and zs include age and gender for workers, e.g., and firm size and job task content for firms. Interaction term on distance.

Caldwell and Danieli (2021) – Mass layoffs

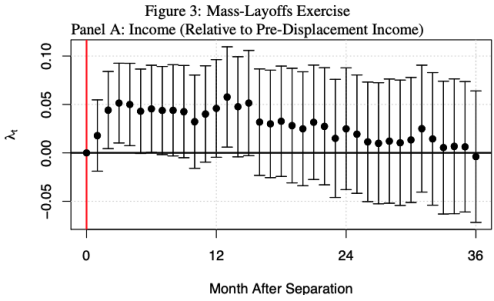


Figure 17: Effect on % change in wages. Plotted: coefficients on OOI interacted with months-since-layoff dummies.

- They estimate the OOI for every worker in their the data
- x includes gender, education, age, and citizenship, and apprenticeship history.
- z includes establishment survey data on size, share of females in management, working hours, vocational training, contract structure, task type, physical conditions.
- Mass layoff events: plants whose workforce has declined by at least thirty percent relative to the previous year. Layoff cohort fixed effects included.
- Relative to same-layoff peers, 1 s.d. increase in OOI $\implies$ 5% higher earnings in first year after separation.

Caldwell and Danieli (2021) – Mass layoffs

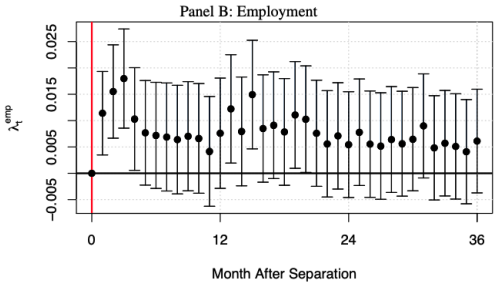


Figure 18: Effect on employment probability. Plotted: coefficients on OOI interacted with months-since-layoff dummies.

- They estimate the OOI for every worker in their the data
- x includes gender, education, age, and citizenship, and apprenticeship history.
- z includes establishment survey data on size, share of females in management, working hours, vocational training, contract structure, task type, physical conditions.
- Mass layoff events: plants whose workforce has declined by at least thirty percent relative to the previous year.
- 1 s.d. increase in OOI $\implies$ 1% more likely to be employed relative to same-layoff peers. Layoff cohort fixed effects included

Caldwell and Danieli (2021) – Map

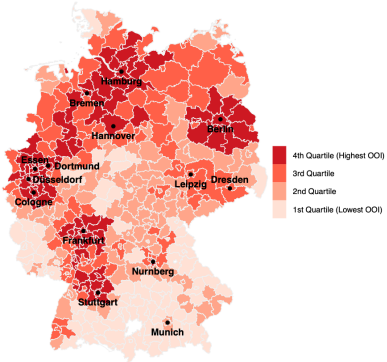


Figure 19: Reproduced from Caldwell and Danieli (2021): "This figure plots the distribution of the outside options index by district (kreis) as calculated for the population of German workers as of June 30th, 2014."

- They estimate the OOI for every worker in their the data
- x includes gender, education, age, and citizenship, and apprenticeship history.
- z includes establishment survey data on size, share of females in management, working hours, vocational training, contract structure, task type, physical conditions.
- Geographic distance between worker and firm included as well.
- Urban areas and their suburbs have greater outside options: divide seems less pronounced in fmr. East Germany.

- Looks broadly similar for the U.S., urban rural divide less pronounced except for the Great Plains.

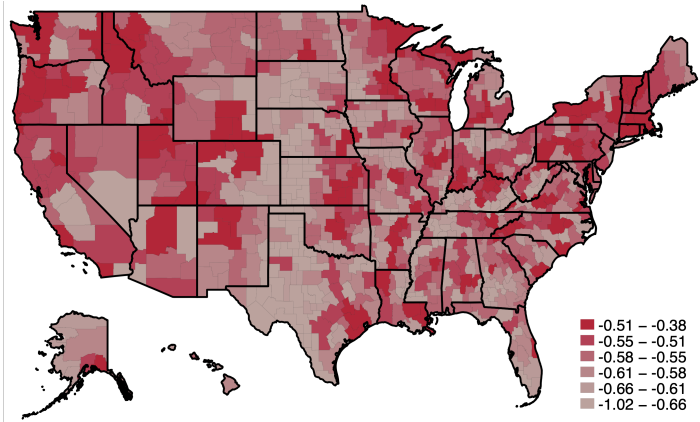


Figure 20: OOI index averaged across commuting zones (CZs) using SOC 3-digit job-to-job transitions data from Burning Glass and local employment shares from the ACS 2015-2018. Jordan's calculations.

Search models and labor market imperfections

"New" models of monopsony

- Firm monopsony power derived from search frictions.
- Firms maybe be as small as one worker per firm and still face upward sloping labor supply curves.

Will present Burdett and Mortensen (1998) following presentation in Manning (2003),

- Key model feature: firms *post* a distribution of wages.

Search models – posting vs. surplus splitting

Discussion follows Manning (2011).

- Bargaining models, wages maximize a Nash bargain

$$w^* = \text{argmax}_w (p - w)^{1-\beta}(w - b)^{\beta} \implies w^* = \beta p + (1 - \beta) b$$

  where β= worker bargaining power.

- if labor supply facing monopsonist $L(w) = (w - b)^{\varepsilon}$, then,

$$w^* = \frac{\varepsilon}{1 + \varepsilon} p + \frac{1}{1 + \varepsilon} b$$

- So there's a rough isomorphism between models, worker power $\approx$ monopsonist markdown. Similar to the Hosios condition.
- Survey evidence: in the low-skills labor market, posting is more prevalent (Hall and Krueger, 2012).

Hall and Krueger (2012) – Posting vs. bargaining

TABLE 2—TABULATIONS AND CROSS-TABULATIONS OF SURVEY RESPONSES

Questions included

Bargain?	Knew pay exactly?	Keep previous job?	Employer learned pay?	Responses	Fraction	Weighted fraction	Total responses
N				925	0.645	0.631	1,435
Y				510	0.355	0.369	
	N			980	0.683	0.685	1,435
	Y			455	0.317	0.315	
		N		860	0.601	0.585	1,432
		Y		572	0.399	0.415	
			N	726	0.542	0.527	1,340
			Y	614	0.458	0.473	

Figure 21: Survey responses Questions.

- Random digit dialing in 2008, weights match the CPS of recent hires.
- On-the-job-search: about 40% of recent hires could have kept their last job.
- Only $\approx$ 15% of union and public sector employees report bargaining over pay and often know the wage exactly.
- 86% of 'Knowledge workers' bargain over pay, while only 6% of 'blue-collar' workers report bargaining.

Burdett & Mortensen (1998) – Setup

- Unit mass of identical workers and identical firms.
- Workers can be employed at a wage w or unemployed.
- Continuous time: firms post wages and workers choose whether to accept job offers as they arrive.
- On-the-job-search (OTJS): job offers arrive at rate λ
- Job destruction at rate δ
- Firms *post* wages, a distribution $F(w)$
- Workers take offers better than their current wage, and thus separate at rate,

$$s(w) = \underbrace{\delta}_{\text{job destruction}} + \underbrace{\lambda(1 - F(w))}_{\text{OTJS}}$$

- Recruits occur at rate,

$$r(w) = u + (1 - u)G(w)$$

where G is employment CDF.

▸ Bellmans?

Burdett & Mortensen (1998) – Equilibrium

- Labor supply facing the firm in equilibrium,

$$N(w) = (1 - s(w))N(w) + r(w) \implies N(w) = r(w)/s(w)$$

  is upward sloping, and has elasticity, $\varepsilon_{rw} - \varepsilon_{sw}$.
- Unemployment u and employment CDF $G(w)$ stationary.
- Existence of continuous wage offer distribution, $F(w)$, despite homogeneity of worker / firm types.
- Main equilibrium concept: employers indifferent across wage offers, $\pi(w) = \pi(b)$, where π represents steady-state profit function.

▸ Equilibrium

Burdett & Mortensen (1998) – Equilibrium wage distribution

- Employer profits $\pi(w) = (p - w)N(w)$
- In eq, $\dot{N} = 0$, and,

$$N(w) = \frac{\lambda\delta}{(\delta + \lambda(1 - F(w)))^2}$$

▸ Equilibrium

- Can solve indifference across wage distribution, $\pi(w) = \pi(b)$,

$$F(w) = \frac{\delta + \lambda}{\lambda}\left(1 - \sqrt{\frac{p - w}{p - b}}\right)$$

and,

$$\mathbb{E}[w] = \frac{\lambda}{\delta + \lambda}p + \frac{\delta}{\lambda + \delta}b$$

Standard wage equation with $\varepsilon = \lambda/\delta$.

Burdett & Mortensen (1998) – Measuring labor supply

Recall,

$$s(w) = \delta + \lambda[1 - F(w)]$$
$$r(w) = \lambda u + \lambda \int_b^w f(\tilde{w}) N(\tilde{w}) \mathrm{d}\tilde{w}$$

Then, differentiating and using $N(w) = r(w)/s(w)$,

$$\begin{aligned} \varepsilon_{s,w} &= -\frac{\lambda w f(w)}{s(w)} \\ &= -\frac{\lambda w f(w) N(w)}{r(w)} \\ &= -\varepsilon_{r,w} \end{aligned}$$

So the labor supply elasticity facing the firm is $-2 \times \varepsilon_{s,w}$.

Manning (2003) – Measuring the separation elasticity

The Sensitivity of the Separation Elasticity to Specification

	PSID (US)	*NLSY (US)*	*BHPS (UK)*	*LFS (UK)*
All separations				
Mean separation rate	0.21	0.55	0.19	0.058
No controls	−0.944 (0.030)	−0.515 (0.019)	−0.798 (0.032)	−0.646 (0.021)
With controls	−0.973 (0.041)	−0.536 (0.032)	−0.720 (0.041)	−0.500 (0.028)
Tenure controls	−0.575 (0.037)	−0.340 (0.026)	−0.503 (0.064)	−0.343 (0.032)
Separations to employment				
Mean separation rate	0.12	0.43	0.12	0.032
No controls	−0.759 (0.050)	−0.307 (0.018)	−0.631 (0.038)	−0.529 (0.030)
With controls	−0.867 (0.038)	−0.359 (0.032)	−0.688 (0.049)	−0.425 (0.039)
Tenure controls	−0.450 (0.042)	−0.156 (0.027)	−0.429 (0.050)	−0.207 (0.044)
Separations to non-employment				
Mean separation rate	0.08	0.12	0.07	0.025
No controls	−1.010 (0.067)	−0.750 (0.028)	−0.916 (0.048)	−0.748 (0.029)
With controls	−0.892 (0.087)	−0.850 (0.055)	−0.632 (0.066)	−0.578 (0.041)
Tenure controls	−0.569 (0.068)	−0.713 (0.056)	−0.493 (0.071)	−0.477 (0.045)

Figure 22: Maximum likelihood estimation of the separation elasticity: suppose instantaneous rate of separations is $s(w) = \exp(\varepsilon \ln w + \beta x)$. Then, $Pr(ee \mid x, \tau) = 1 - \exp(-s(w)\tau)$. The above estimates different *ee* (employment→employment) and *en* (emp→ non-emp) elasticities and takes the weighted average.

Source: *Manning (2003)*

Overview

Empirical Evidence

1. Estimating labor supply elasticity to an individual firm
   - Using AKM
   - How much monopsony is there?
   - (Quasi-)Experimental evidence
2. Gender wage gaps
3. Policy implications

Estimating labor supply elasticity to an individual firm

- Firm-level labor supply elasticity provides important insight into degree of monopsony power in labor market
- Following Manning (2003), researchers have typically estimated separations and recruitment elasticities with respect to individual earnings, conditional on observable control variables
  - Recruitment elasticities: Falch (2017), Dal Bo et al. (2013), Dube et al. (2020)
  - Separation elasticities: Booth and Katic (2011), Ransom and Sims (2010), Depew and Sorensen (2013)

Estimating labor supply elasticity to an individual firm

- Recent survey of the literature in Sokolova and Sorensen (2021) collects 801 estimates of labor supply elasticity to the firm from published studies
- Mean elasticity among studies is 3.75 but estimates
  1. Depend on methodologies
  2. Vary with underlying data and labor market setting

Endogeneity concerns

- Wage differences across workers reflect permanent differences in skills and other characteristics, or transitory shocks to the job prospects of workers

Using AKM

- Bassier et al. (2020) propose an alternative approach to calculating separation and recruitment elasticities
- They calculate AKM firm effects, and use these to estimate the impact of the firm component of wage variation on separations and recruitment

Overview of AKM

- AKM framework from Abowd et al. (1999):

$$\underbrace{Y_{it}}_{\text{log-earnings}} = \underbrace{\alpha_i}_{\text{worker}} + \underbrace{\psi_{j(i,t)}}_{\text{firm}} + \underbrace{\varepsilon_{it}}_{\text{error}}.$$

- Used to examine how wages are determined by worker and firm heterogeneity
- Uses least-squares fixed-effects estimator for $\alpha_1, \ldots, \alpha_N$ and $\psi_1, \ldots \psi_J$
- Effects only separately identiifed with a connected set of firms that are linked by worker mobility

The model

- We can also include covariates in AKM:

$$Y_{it} = X_{it}'\beta + \alpha_i + \psi_{j(i,t)} + \varepsilon_{it}$$

  assuming:

$$\mathbb{E}\left(\varepsilon_{it} \mid X, j, \alpha, \psi\right) = 0$$

- Additive form rules out interactions between worker and firm fixed effects
- Assumptions/restrictions might not be realistic in dynamic models of worker-firm interactions such as wage posting or sequential bargaining

Bassier, Dube and Naidu (2020)

- Use matched employer-employee data from Oregon 2000-2017 ▸ Data ▸ Transitions
- Propose two strategies to isolate the component of individual wages determined by firm wage policies:
  1. Calculate AKM firm effects using a split sample approach and then use these to estimate the impact of the firm component of wage variation on separations ▸ AKM ▸ Details

$$s_{ijt} = \sum_j \eta \hat{\phi}_j f^i_{jt} + X_{it}\Gamma + v_{ijt}$$

  2. Look at how separations respond for otherwise similar workers who happen to start new jobs at firms paying different wages

Bassier, Dube and Naidu (2020)

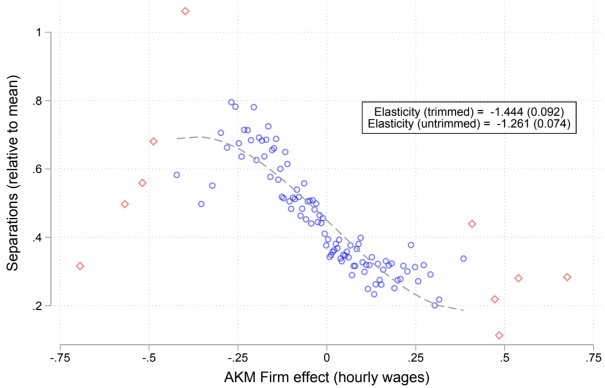


Figure 23: Separations and firm wage effects ▸ Details

- Binned scatterplot
- Negative relationship between separation rates and firm effects
- Average separation elasticity: -1.4

Bassier, Dube and Naidu (2020)

- **Concern:** identication strategy of estimating elasticities using AKM firm effects is unlikely to be valid with non-causal sorting
  - If workers with high α_i sort to firms with high ϕ_j, and those workers have different exogenous separation rates, it will be difficult to tease out firm and worker components of separations
  - If workers at higher wage firms are on average more connected to other firms (and hence have greater rates of separations) this could also confound the relationship between the firm effects and separation rates

Bassier, Dube and Naidu (2020)

- **Solution:** Look at how separations respond for otherwise similar workers who happen to start new jobs at firms paying different wages to coworkers
  - Regress separation rate on wage change associated with move; instrument wage change of mover with change in mean wage of the firm and control for past worker history
  - Approach does not nest AKM because it excludes worker fixed effects $\rightarrow$ allows worker separation propensities to be correlated with firm wages through channels that are not elasticity of labor supply to the firm
  - Separations elasticity: -2.1 $\rightarrow$ Labor supply elasticity: 4.2

How much monopsony is there?

- Use of firm component of wages implies moderate amount of monopsony power in Oregon labor market **but** much less than very high degree suggested using any wage variation
- Some evidence of variation by sector, high-wage or low-wage, level of labor market concentration
- Traditional approach suggests markdowns of 50% whereas their approach suggests 20%, (consistent with Berger, Herkenhoff, and Mongey (2019)) where markdown is

$$1 - \frac{\epsilon}{1+\epsilon} = 1 - \frac{4.2}{1+4.2} \approx 0.2$$

Experimental evidence

- Experimental or quasi-experimental estimates can help us identify and discern between the mechanisms at work in a specific industry or labor market
  1. Labor market concentration: Staiger and Phibbs (2010)
  2. Outside options: Dal Bó et al. (2013); Naidu et al. (2016); Mendez-Chacon and Patten (2020)
  3. Search frictions: Dube et al. (2020)

Migrant labor markets

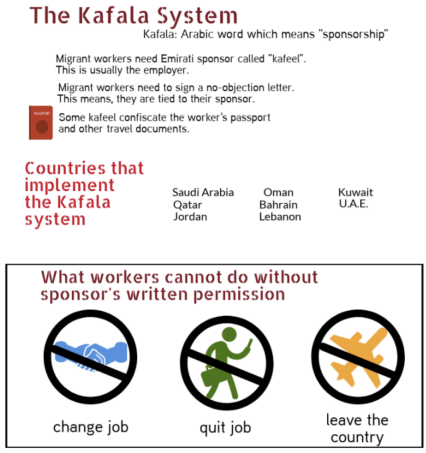


Figure 24: Description of Kafala System

- Monopsony may be particularly important in migrant labor markets which feature institutionalized limits on workers' outside options

Naidu, Nyarko and Wang (2016)

- **Question**: What is effect of allowing migrant workers to switch employers upon visa expiration?
- **Setting**:
  - 89% of population of UAE are migrants
  - Migrant workers in the UAE were under a labor system (*Kafala system*) based on sponsorship by firms, where they were tied to one employer for the duration of their multiyear contracts
  - In January 2011, the UAE government implemented a policy reform that allowed migrant workers to transition to new employers without approval from their previous employer

Naidu, Nyarko and Wang (2016)

- **Data:**
  - Monthly administrative payroll data from January 2009 - October 2012
  - Firm implements payments for 10-15% of UAE migrant workforce
  - Match with government database that registers contract term and hours worked

Naidu, Nyarko and Wang (2016)

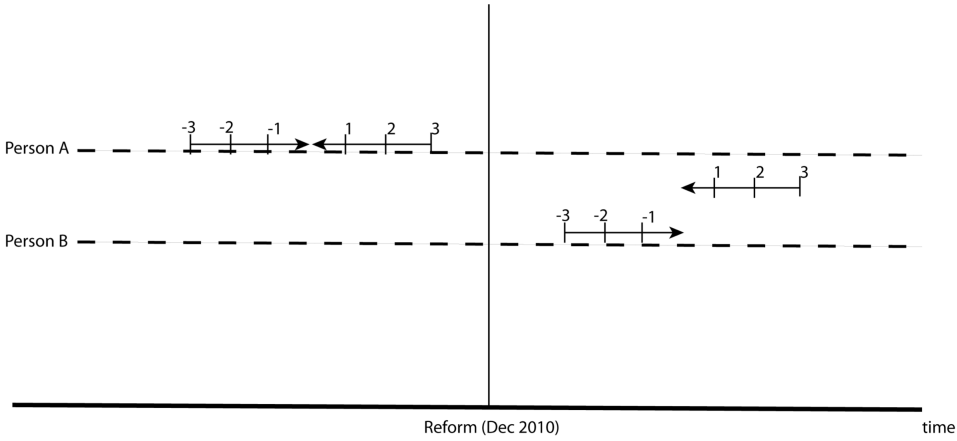


Figure 25: Identification strategy compares impact of contract expiration on outcomes before/after reform ▸ DiD

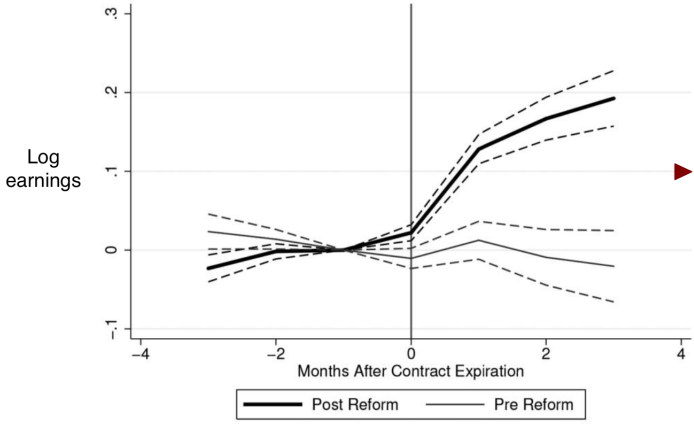
Naidu, Nyarko and Wang (2016)

- Estimation strategy is analogous to a differences-in-differences framework

$$y_{it} = \sum_{k=0}^{3} \gamma_k^{\text{Post 2011}} D_{it+k}^{\text{Post}} + \sum_{k=0}^{3} \gamma_k^{\text{Pre2011}} D_{it+k}^{\text{Pre}} + \delta_i + \delta_t + \epsilon_{it}$$

  where k is the year relative to the contract expiration
- Key: Contracts are signed 3 years in advance and have fixed durations
  - Timing of individual contract expiration is exogenous to the reform and to transitory worker and firm shocks

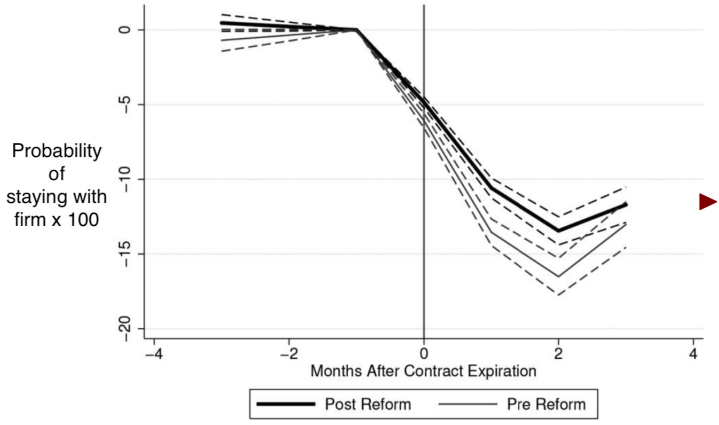
Naidu, Nyarko and Wang (2016)



- Effect of reform: Monthly earnings grow 11 percent in 3 months following incumbents' contract expiration

Figure 26: Impact of a contract expiration on log earnings

Naidu, Nyarko and Wang (2016)



- Effect of reform: Probability of staying at firm increases by 3.8 percentage points

Figure 27: Impact of a contract expiration on retention

▸ Table

Naidu, Nyarko and Wang (2016)

- Authors approximate labor supply elasticity to the monopsonistic firm using changes in incumbent wages and labor supply, $\epsilon^l = 1.05$
- Lerner condition implies workers were paid 51 percent of their marginal product prior to the reform
- Unlikely that improved matches between workers and firms explain results (aggregate rates of employer transitions are low even after the reform; earnings effects are largest for lower end of earnings distribution) Details

Naidu, Nyarko and Wang (2016)

- **Key takeaways:**
  1. International mobility is not enough to allow workers to capture full marginal productivity
  2. Restrictions on mobility within the destination country play an important role in depressing wages $\rightarrow$ increased competition increases incumbent bargaining power
  3. Offers insight into channels of wage setting power that can be applied to many other types of labor markets in which workers sign contracts that tie them to employers

Gender wage gaps

"Perfect discrimination is probably rare in buying labor but imperfect discrimination may often be found. For instance there may be two types of workers (for example, men and women or men and boys) whose efficiencies are equal but whose conditions of [labor] supply are different. It may be necessary to pay the same wage within each group, but the wages of the two groups (say of men and of women) may differ." Shove (1933) — Joan Robinson

Gender wage gaps

- Women may earn less than men if search varies due to between-group differences in outside options or bargaining power
  - Manning (2003); Le Barbanchon et al. (2020); Caldwell and Danieli (2021); Caldwell and Oehlsen; Ransom and Lambson (2011); Ransom and Lambson (2011)

Barbanchon, Rathelot, and Roulet (2020)

- Some suggestive evidence of this in Barbanchon et al. (2021), who document that unemployed women have a lower reservation wage and a shorter maximum acceptable commute than their male counterparts
- They plot the evolution of the unconditional and conditional difference between women's and men's outcomes over time using
  - French unemployment insurance data (2006-12) - asks claimants about their reservation wage and maximum acceptable commute time
  - Firm fiscal declarations from French Institute of Statistics (Insee) - have data on wages and earnings in random sample of French population

Barbanchon, Rathelot, and Roulet (2021)

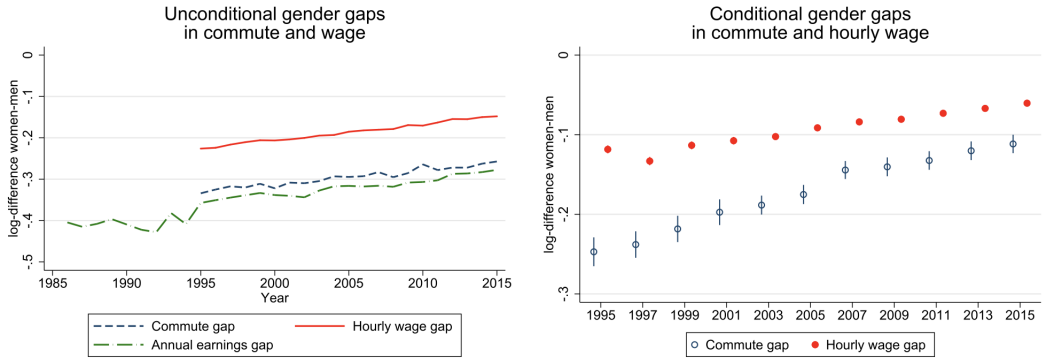


Figure 28: Gender gaps in wages and commuting distances over time

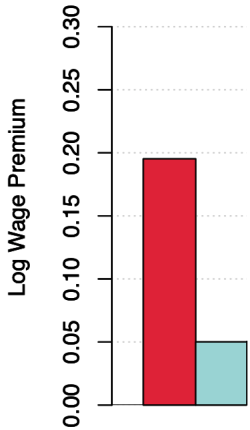
Caldwell and Danieli (2021)

- Examine whether differences in outside options faced by men and women face can explain some part of the observed gender wage gap in German data
- They use their underlying matching model with two-sided heterogeneity to create a counterfactual distribution of OOI if workers have the same implicit commuting costs

Caldwell and Danieli (2021)

1. Estimate a standard Mincer regression of log wages on demographic characteristics (gender)
$$\log w_i = \beta_0 X_i + \epsilon_i$$
2. Coefficients on gender are presented in red
3. Next estimate regression of log wages on OOI of individual i and demographic characteristics (gender)
$$\log w_i = \underbrace{\widehat{\alpha}}_{.19} OOI_i + \beta_1 X_i + \nu_i$$
4. $\hat{\beta}_0$ captures overall gap in wages between groups, $\hat{\beta}_1$ captures gaps in factors other than OOI
5. The difference $\widehat{\beta}_0 - \widehat{\beta}_1$ is the part that can be attributed to the differences in OOI

Caldwell and Danieli (2021)



- Gender wage gap is 20% (red)
- $\widehat{\beta}_0 - \widehat{\beta}_1 = 0.05$
- $\Rightarrow$ Differences in OOI would imply gender wage gap of 5% (light blue)

Figure 29: Gender wage gap

Policy implications

1. Antitrust regulation
2. Eliminating search frictions
3. Increasing employee bargaining power
   - Card, Riddell and Lemieux (2018) Details
4. Minimum wage legislation
   - Derononcourt and Montialoux (2021)

Other frictions?

- These policies may address various forms of employer wage setting power (generated by labor market frictions) with varying levels of effectiveness
- However, there may be other frictions that don't come from firms which these policies cannot address and which are becoming increasingly important over time
- E.g. social skills prevent task trade and cause a wedge-like trade friction that causes tasks to be duplicated and lowers wages Deming (2017)

Deming (2017)

- Consider a model with two workers and symmetric cost of trading tasks
- Workers produce tasks in which they have a comparative advantage and then trade for mutual benefit
- Social skills are valuable because they reduce the cost of trading tasks with other workers

Deming (2017)

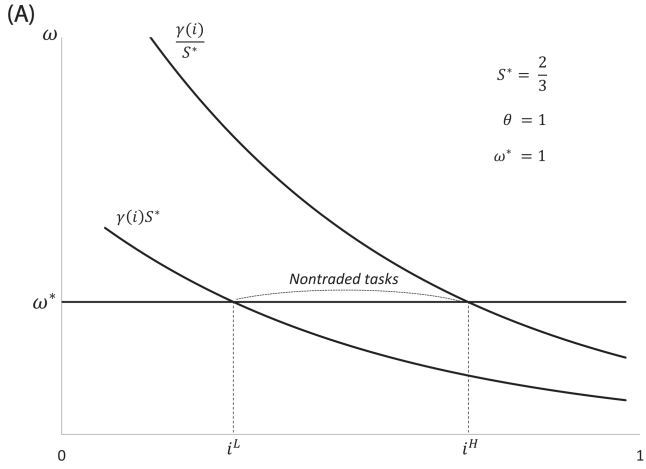


Figure 30: Equilibrium Task Thresholds with $\theta = 2$

Deming (2017)

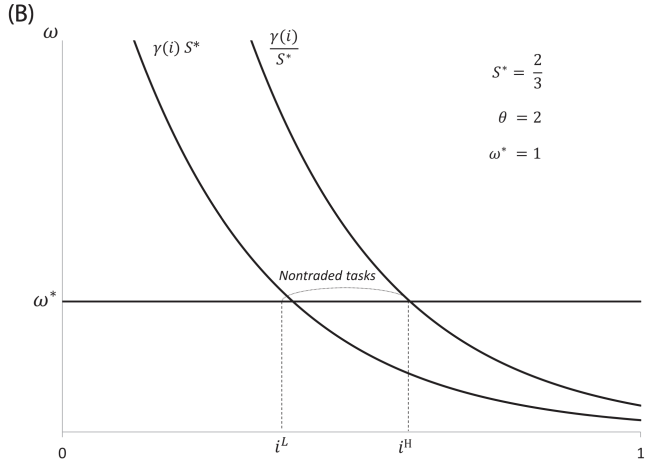


Figure 31: Equilibrium Task Thresholds with $\theta = 1$

Deming (2017)

- Tasks in the interval $[0, i^L]$ will be produced exclusively by worker 1, tasks in the interval $[i^H, 1]$ will be produced exclusively by worker 2, and tasks in the interval $[i^L, i^H]$ will be nontraded
- The size of the non-traded zone $[i^L, i^H]$ is decreasing in θ, which indexes the variance of task productivities and the steepness of the comparative advantage schedule
- One interpretation of θ is that it indexes the share of tasks for which there is no single best approach
- As θ increases, a lower share of tasks are routine $\rightarrow$ return to social skills should be decreasing in the routineness of an occupation

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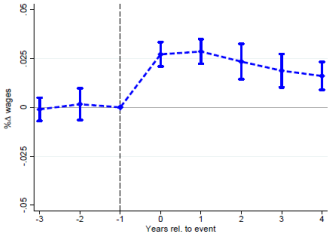
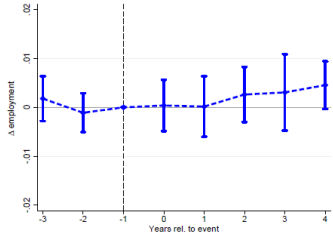
Appendix

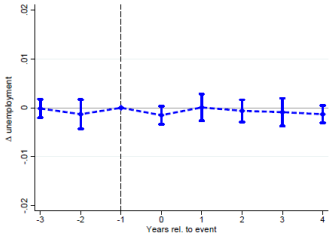
Monopsony: Further Evidence on Minimum Wage



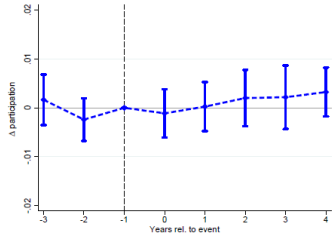
(a) Wage



(b) Employment



(c) Unemployment



(d) Participation

Monopsony: Further Evidence on Minimum Wage

Cengiz, Dube, Lindner, and Zentler-Munro (2021)

- Use ML methods to predict which individuals were likely to be impacted by minimum wage policy. Then runs event study analysis that looks at 172 prominent state-level minimum wage increases between 1979 and 2019
- Plot is event study of the impact of minimum wage on the "high-probability" group, aka 10% of the population with the highest likelihood of being affected by the policy
- Observe increase in wages, which attenuates with time. No pre-existing trends
- No significant break in trends in other indicators $\rightarrow$ indicates minimum wage is unlikely to have a negative impact on workers

Back

Hall and Krueger (2008)

- *Bargain?* When you were offered your (current/previous job), did your employer make a "take-it-or leave-it" offer or was there some bargaining that took place over the pay?
- *Knew pay exactly?* At the time that you were first interviewed for your job, did you already know exactly how much it would pay, have a pretty good idea of how much it would pay, or have very little idea of how much it would pay if you got it? We consider the probability of the answer that the respondent knew exactly how much it would pay. We do not show the results for the group who responded that they knew exactly or had a pretty good idea because the responses for all groups were high—uniformly above 80 percent.
- *Keep previous job?* Think back to the time when you were offered your (current/most recent) job. When you were offered this job, was it possible for you to keep your previous job instead if you wanted to?
- *Employer learned pay?* Did your (current/most recent) employer learn how much you were making in your previous job before making you your job offer?

Back

Burdett & Mortensen (1998) – Bellmans

Employment,

$$\rho V^e(w) = w + \delta(V^u - V^e(w)) + \lambda \int (\max\{V^e(w), V^e(\tilde{w})\} - V^e(w)) \, \mathrm{d}F(\tilde{w})$$

and unemployment,

$$\rho V^u = b + \lambda \int (\max\{V^e(\tilde{w}), V^u\} - V^u) \, \mathrm{d}F(\tilde{w})$$

In eq, no firm posts $w < b$.

Back

Burdett & Mortensen (1998) – Equilibrium

- Unemployment stationary, $\dot{u}$=0,

$$\delta(1-u) = \lambda u \implies u = \frac{\delta}{\delta+\lambda}$$

- Employment CDF stationary,

$$(\delta + \lambda(1-F(w)))(1-u)G(w) = u\lambda F(w) \implies G(w) = \frac{u}{1-u}\frac{\lambda F(w)}{\delta+\lambda(1-F(w))}$$

- Employment, $\dot{N}(w) = 0$, where,

$$\dot{N}(w) = \lambda(u + (1-u)G(w)) - (\delta + \lambda(1-F(w))N(w)$$

Back

Bassier, Dube and Naidu (2020)

- As part of Oregon's unemployment insurance (UI) payroll tax requirements, all employers required to report quarterly earnings and quarterly hours worked for all employees
- Hourly wage information from matched employer-employee data from Oregon from 2000-2017
- Drop the following obserations:
  - Employment spells with less than 100 hours per quarter
  - Any wage less than $2/hour
  - Spells that are less than 3 quarters in length
  - Any firms with less than 20 employees, similar to Song et al. (2018)
- Final dataset consists of 87.6 million observations and contains information on 3.4 million workers and 55,000 firms
- Note: separations to firms outside of of Oregon are counted as job-to-non-employment (3% of workers moved out of Oregon in 2016 based on the ACS)

Back

Bassier, Dube and Naidu (2020)

- Replicate event study illustrating interquartile transitions from Card et al. (2013)
- Augment the graph with size of flows between quartiles
- Takeaways from graph
  1. Lack of wage changes prior to move (flat pre trends)
  2. Effects firms have on wages (magnitude of an individual wage change after a move)
  3. Volume of flows vary across firm quartiles

Back

Bassier, Dube and Naidu (2020)

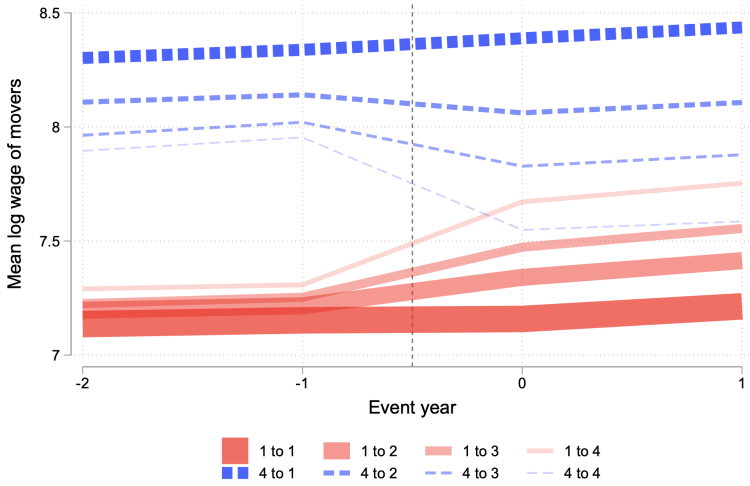


Figure 33: Separations and firm wage effects

Bassier, Dube and Naidu (2020)

- Start with AKM decomoposition

$$w_{ijt} = \sum_j \phi_j f_{ijt} + \alpha_i + \alpha_t + \epsilon_{ijt}$$

- Following CHK, the sufficient condition for identification is that the probability of a worker being employed by a particular firm is a function only of firm wage effects and worker fixed effects

$$f_{ijt} = E\left(\mathrm{J_{it}} = j\right) = E\left(\mathrm{J_{it}} = j \mid \epsilon\right) = G_{jt}\left(\phi_1, \ldots, \phi_J, \alpha_i\right)$$

- This is consistent with assignment rules that include both sorting of high ability workers to high-wage employers as well as high productivity employers paying higher wages for identical workers

Bassier, Dube and Naidu (2020)

- **But** to interpret a regression of firm separations on firm wage effects as representing a causal separations elasticity, we need to impose some further assumptions on G
  - f_{ijt} must be monotonic and increasing function of ϕ_j
  - f_{ijt} independent of worker's type and wage policies of other firms
- Then we can decompose the assignment function into a monopsonistically competitive labor supply component that only depends on firm effects and a non-monopsony component that includes sorting and strategic interactions that depend on α_i
- A regression of separations s_j on ϕ_j does not recover the causal effect of ϕ_j on f_{ijt} if there is sorting that induces a correlation between separation and firm fixed effects that does not operate through labor supply elasticity

Bassier, Dube and Naidu (2020)

- Following Manning, we have the separation elasticity:

$$s(w) = s^{EU}(w) + s^{EE}(w)$$

- Recruitment elasticity:

$$R(w) = R^{UE}(w) + R^{EE}(w)$$

- And the overall labor supply elasticity is estimated is:

$$\begin{aligned}\epsilon &= -\left(\theta_R + \theta_S\right)\eta^{EE} - \left(1 - \theta_S\right)\eta^{EU} + \left(1 - \theta_R\right)\gamma^{UE} \\ &= -\left(1 + \theta_R\right)\eta^{EE} - \left(1 - \theta_R\right)\eta^{EU} - \gamma_\theta^{EE}\end{aligned}$$

where θ_S and θ_R give the proportion of separations and recruits from employment and $\gamma_\theta^{EE} = \left(1 - \theta_R\right)\left(\gamma^{EE} - \gamma^{UE}\right)$ is the elasticity of share of recruits out of employment Back

Bassier, Dube and Naidu (2020)

- AKM firm effects are weighted averages of wage changes among movers between firms, and weights depend on separation probabilities Hull (2018)
- Concern: when the independent variable is a function of the dependent variable this may induce a mechanical bias
- Solution: randomly split the workers (in each 5-year period) into two groups A and B, stratified on moving; generate two sets of AKM firm effects, μ^A and μ^B and regress y_{it} on μ^A while instrumenting with μ^B
- This ensures that a worker's separation indicator is not entering both sides of the regression equation, and eliminates any mechanical correlation induced by an individual's separation influencing ϕ_j
- If estimation errors is each sample are uncorrelated, this will also alleviate some of the attenuation bias that stems from using a generated regressor

Back

Bassier, Dube and Naidu (2020)

- Figure 23 shows binned scatterplot of full range of employment to employment separations (divided by average separations rate) plotted against AKM firm fixed effects, controlling for first stage residuals
- AKM model is estimated using stacked 6-year samples (stacked panel)

Back

Bassier, Dube and Naidu (2020)

- Split sample approach is achieved through control function approach
- Residuals are calculated from a regression of own-sample firm effects on the complement-sample firm effects, and used as a control in a regression of E-E separations on own-sample firm effects
- Plotted points show the residualized points of this latter regression, re-centred around the original mean values
- Blue points represent quantiles of the trimmed sample, which excludes the top and bottom 2.5 percent of the firm effects distribution

Back

Bassier, Dube and Naidu (2020)

	Wage			Firm FE	
	(1)	(2)	(3)	(4)	(5)
All separations	-0.282	-0.51	-0.622	-1.342	-1.448
	(0.005)	(0.01)	(0.015)	(0.085)	(0.095)
E-E separations	-0.317	-0.533	-0.753	-1.677	-1.811
	(0.007)	(0.013)	(0.023)	(0.127)	(0.141)
E-N separations	-0.291	-0.422	-0.578	-1.209	-1.303
	(0.005)	(0.01)	(0.014)	(0.075)	(0.085)
E-E recruits	0.266	0.127	0.067	0.413	0.438
	(0.022)	(0.031)	(0.017)	(0.059)	(0.064)
Pct. EE-recruits	0.47	0.47	0.464	0.464	0.465
Labor Supply Elasticity	0.355	0.879	1.345	2.69	2.912
	(0.024)	(0.037)	(0.039)	(0.199)	(0.221)
Obs (millions)	7.348	7.348	69.072	69.072	68.553
Log hourly wage		Y	Y	Y	Y
Hazard spec.	Y	Y			
Firm FE				Y	Y
Split-sample					Y
F-stat					9792

Figure 34: Separations and recruits elasticities to firm component of wage using AKM

Back

Bassier, Dube and Naidu (2020)

- Figure 33 shows the results from regression of a variety of outcome variables on wages and firm fixed effects
- Estimates reported using any separation as an outcome variable, as well as employment-to-employment separations (E-E), employment to non-employment (N-E), employment-to-employment recruits (E-E recruits), share of recruits from employment
- All regressions are run at the individual level, clustered by firm and control for firm size and quarterly fixed effects

Back

Bassier, Dube and Naidu (2020)

- Limited mobility bias not a major concern given relatively long (6-year) and higher frequency sample
- Sample splitting means that the connected sets used to estimate ϕ_j vary in samples A and B, but there is a high degree of overlap - 99.9% of firms in pooled connected set are in A-connected set and 99.8% are in B-connected set
- Correlation coefficient between firm fixed effects in each sample is 0.965

Back

Naidu, Nyarko and Wang (2016)

- Compare (1) wages, (2) firm stays, (3) country exits, (4) firm-to-firm transitions around a contract expiration, before and after the reform (January 2011) using a difference-in-difference design
- Controls: Quartic polynomials in time between contract issue date and the reform, separately before and after the reform; quarter-specific worker characteristics (education, Indian, age, construction); lags of earnings interacted with post 2011
- Robustness: Workers with earnings observed before the reform; exclude first and last calendar quarters of the sample and within 1 quarter of the reform

Back

Naidu, Nyarko and Wang (2016)

	Full Sample			Both Sides	Trimmed
	(1)	(2)	(3)	(4)	(5)
	A. Log Earnings				
Postreform × post–contract expire	.113***	.110***	.109***	.091***	.139***
	(.009)	(.009)	(.011)	(.010)	(.012)
Postreform × period contract expire	.015***	.013**	.016**	.049***	.017***
	(.005)	(.005)	(.006)	(.005)	(.006)
Observations	529,502	529,502	342,555	463,312	447,394
Number of clusters	111,006	111,006	69,239	88,290	105,606
R^2	.017	.017	.023	.010	.019
	B. Staying with Firm				
Postreform × post–contract expire	3.832***	4.333***	6.387***	3.106***	4.270***
	(.304)	(.321)	(.405)	(.282)	(.393)
Postreform × period contract expire	1.642***	1.881***	2.743***	.223**	1.759***
	(.205)	(.224)	(.242)	(.114)	(.266)
Observations	525,737	525,737	343,503	466,806	445,200
Number of clusters	110,120	110,120	68,931	88,293	105,448
R^2	.082	.082	.370	.093	.081
Polynomials in time to reform	No	Yes	Yes	No	No
Worker characteristics	No	No	Yes	No	No

Figure 35: Effect of reform on log earnings and retention

▸ Back

Naidu, Nyarko and Wang (2016)

- Model of international labor market: incumbent workers and new recruits who may be hired from source countries
- They model the reform as an increase in the labor market competition that firms face, which moves firms from having monopsony power to an ologopsonistic Cournot equilibrium where labor is free to move across firms
- **But** in their model all firms are identical so workers enjoy wage gains associated with increased labor mobility without moving

Naidu, Nyarko and Wang (2016)

- Another way to think about this is the authors' model of monopsony captures the reform as a reduction in the influence any single employer's choice of employment has on the wage that employer pays, but the overall labor supply curve (or quit function) stays the same
- Given the upward-sloping labor supply curve, the increase in the wage is purely driven by an increase in employment
- A local approximation of ϵ^l is recovered from the change in w^l relative to the change in l^l , holding l_i^{t-1} fixed

Naidu, Nyarko and Wang (2016)

- Then they can estimate the incumbent labor supply elasticity facing the monopsonistic firm, ϵ^I as:

$$\epsilon^I = \frac{\Delta s\left(w^I\right)/s\left(w^I_{\text{pre}}\right)}{\Delta \log w^I} = \frac{3.8 \times 3}{95} = \frac{0.12}{0.11} = 1.05$$

  where the numerator is the change in percentage probability of staying with the firm and the denominator is the change in wage for a worker experiencing a contract expiration

- 3 is the number of months after expiration and 95 percent is the average rate of staying in the prereform period

Back

Card, Riddell and Lemieux (2018)

- Unions reduce economy-wide wage inequality by less than 10% (Card, Ridell, Lemieux (2018)
- Early studies found that unions reduced wages for men rather than women (DiNardo et al., 1996, Card et al., 2004)
- Union impacts on wage inequality are much larger in the public sector than the private sector, once effects are disaggregated by sector, gender differences disappear

Back