Labor Market Concentration

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Introduction

- Growing concern about increasing product market concentration:
  - increases in markups (De Loecker and Eeckhout, 2017)
  - decline in the labor share (Barkai, 2016; Karabarbounis and Neiman 2018).
- Inter-firm earnings inequality: Song et al 2016; Card, Cardoso, Heining, and Kline 2016. What's supposed to equalize earnings across firms is competition for workers.
- Lack of formal competition in the labor market: Starr, Prescott, and Bishara 2017; Ashenfelter and Krueger 2018.
- Growing evidence for monopsony: Dube, Jacobs, Naidu, and Suri 2018; Webber 2016; Benmelech, Bergman, and Kim 2018; Dube, Giuliano, and Leonard 2015.
- Could monopsony depress wages?
- If so, is there a role for policy?

Antitrust and the Consumer Welfare Standard

- In theory, antitrust authorities can block mergers based on effects on consumer prices or input prices (including labor).
- In practice, enforcement focused on consumer outcomes (primarily prices) due to "consumer welfare standard": we don't care about allocation of surplus among upstream competitors (including labor).
- Existing evidence for monopsony generally focused on particular labor markets $\Rightarrow$ not clear how widespread labor market power is, and how much it affects wages.

This Paper

- Data from the largest US employment website, CareerBuilder.com, covering about a third of US vacancies.
- Quarterly panel data from 2010 to 2013.
- Measure competition using the Herfindahl-Hirschman Index (HHI) based on vacancies for most common occupations and almost all US commuting zones.
- HHI is policy-relevant: threshold for high concentration (2,500) in the antitrust agencies' horizontal merger guidelines (Department of Justice / Federal Trade Commission, 2010). The same HHI threshold applies to seller and buyer power, hence relevant for the labor market.
- Assess impact on posted wages using panel regression and IV.

Findings

- HHIs for over 8,000 labor markets, defined by a combination of occupation at the SOC-6 level and commuting zone.
- Average HHI is 3,157: above the 2,500 threshold for high concentration according to the Department of Justice / Federal Trade Commission horizontal merger guidelines
- Larger cities are less concentrated.
- OLS panel regression: elasticity of the real wage with respect to the HHI is -0.038, robust to controlling for tightness.
- IV: HHI instrumented by average concentration in other geographic markets for the same occupation in a given quarter.
- IV panel regression: elasticity of the real wage with respect to the HHI is -0.127. Going from the 25th to the 75th level of concentration decreases posted wages by 17%, and effect larger in smaller commuting zones.

Outline

Data: overview

- Total number of vacancies on CareerBuilder.com represents 35% of the total number of vacancies in the US in January 2011 as counted in the Job Openings and Labor Turnover Survey
- Broadly representative of jobs and job seekers in the US (Marinescu and Rathelot, 2018)
- Occupations were selected based on counts of jobs posted between 2009 and 2012 on CareerBuilder: at the broad SOC level, i.e. SOC-5 digits, the 13 most frequent occupations were selected.
- We also added the three most frequent occupations in manufacturing and construction (17-2110, 47-1010, 51-1010).
- Davis and Marinescu (2017) also use this data to measure impact of tightness on posted wages.

The Herfindahl-Hirschman Index (HHI)

- HHI calculated at the quarterly level, because this is the average duration of unemployment in the US.
- FTC/DOJ: an HHI above 1500 is "moderately concentrated", and above 2500 is "highly concentrated".
- A merger that increases the HHI by more than 200 points, leading to a highly concentrated market is "presumed likely to increase market power".

The formula for the HHI in market m and year-quarter t is

$$\text{HHI}_{m,t} = \sum_{j=1}^{J} s_{j,m,t}^2 \qquad (1)$$

where $s_{j,m}$ is the market share of firm j's vacancies in market m.

The Hypothetical Monopolist Test

- Hypothetical monopolist test used in merger reviews: the relevant antitrust market is the smallest market for which a hypothetical monopolist that controlled that market would find it profitable to implement a "small significant non-transitory increase in price" (SSNIP). In practice, small price increase = 5%.
- Critical Loss Analysis (Harris, 1991): method to determine SSNIP based on a critical price elasticity of demand. If the elasticity is below critical, then the market is well defined. If it is larger than critical, the market is too broad.
- Can apply same method for a hypothetical monopsonist test.

The Hypothetical Monopsonist Test for Occupations

- Most estimates of the elasticity of labor supply to the *individual* firm are below critical elasticity of 2 (see e.g. Manning, 2011).
- The firm is already a plausible market.
- Estimated impact of posted wages on applications on CareerBuilder.com is *negative* within a 6-digit SOC code (Marinescu and Wolthoff, 2018).
- This is because much heterogeneity with a 6-digit SOC: senior accountant jobs pay more and receive fewer applicants than junior accountant jobs.
- The impact of posted wages on applications is only positive with a *job title* (Marinescu and Wolthoff, 2018).
- SOC-6 is a conservative definition of a market: likely to be too broad, and therefore underestimate HHI.

Summary Statistics

Table: **Summary statistics.**

	Mean	Std. Dev.	Min	Max	Obs.
Real Wage	41547.36	36216.76	4.71	5504385	61017
Vacancies	82.95	224.39	1	17928	61017
Applications	3612.96	14416.02	0	528289	61017
Searches	441156.09	1385720.05	0	78808601	61017
Log Tightness	-2.9	1.36	-7.64	4.48	60200
Number of Firms	20.03	35.78	1	571	61017

Figure: HHI by CZ, average over SOC

HHI Concentration Category
- Very High (5000-10000)
- High (2500-5000)
- Moderate (1500-2500)
- Low (0-1500)
- No data
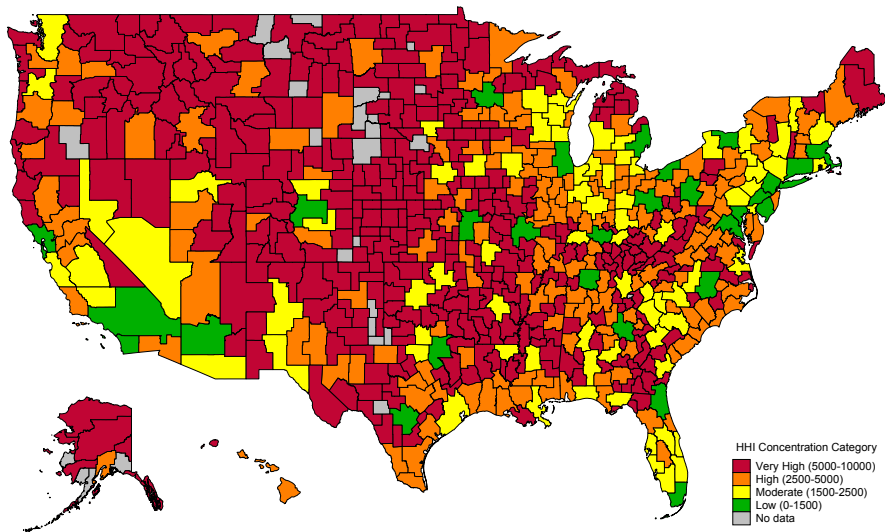
Table: **HHI at the CZ level: different time aggregations**

	Mean	Std. Dev.	Min	Max	Obs.
HHI (Vacancies, CZ Quarterly)	3157.02	2923.92	66.04	10000	61017
HHI (Applications, CZ Quarterly)	3480.17	3061.03	0	10000	61017
HHI (Vacancies, CZ Monthly)	3251.69	3004.4	74.23	10000	132461
HHI (Vacancies, CZ Semesterly)	3090.29	2872.86	58.57	10000	38503
HHI (Vacancies, CZ Yearly)	2970.47	2780.11	51.91	10000	24060
HHI (Vacancies, CZ Whole Period)	2541.6	2498.51	54.76	10000	8979
HHI (Applications, CZ Monthly)	3790.37	3132.18	0	10000	132461
HHI (Applications, CZ Semesterly)	3315.38	3017.08	0	10000	38503
HHI (Applications, CZ Yearly)	3120	2900.47	0	10000	24060
HHI (Applications, CZ Whole Period)	2722.97	2653.19	0	10000	8979

Table: **Quarterly HHI for different geographies**

|	Mean	Std. Dev.	Min	Max	Obs.
HHI (Vacancies, CZ Quarterly)	3157.02	2923.92	66.04	10000	61017
HHI (Vacancies, CZ Quarterly Population-Weighted)	1690.74	1942.09	66.04	10000	61013
HHI (Applications, CZ Quarterly Population-Weighted)	1848.51	2127.09	0	10000	61013
HHI (Vacancies, County Quarterly)	4222.52	3331.36	76.09	10000	111109
HHI (Applications, County Quarterly)	4563.85	3369.67	0	10000	111109
HHI (Vacancies, State Quarterly)	1358.48	1634.58	64.01	10000	15124
HHI (Applications, State Quarterly)	1458.09	1781.24	0	10000	15124

Outline

1. Measuring labor market concentration

2. **Labor Market Concentration and Wages**

3. Discussion

Figure: Binned scatter of log HHI based on vacancies and log real wage
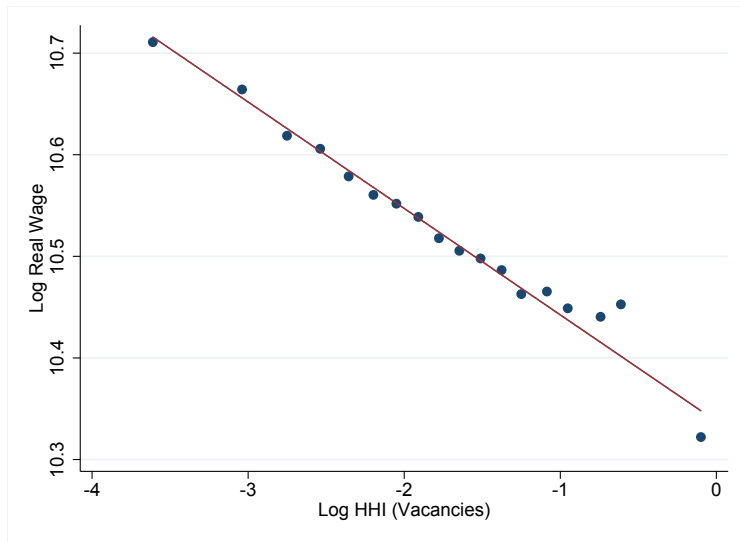
Econometric specification: OLS panel regression

Our baseline specification is:

$$\log(w_{m,t}) = \beta \cdot \text{HHI}_{m,t} + \gamma \cdot X_{m,t} + \alpha_t + \nu_m + \varepsilon_{m,t}, \qquad (2)$$

where $\log(w)$ is the log real wage in market m in year-quarter t, $\text{HHI}_{m,t}$ is the corresponding log HHI, $X_{m,t}$ is a set of controls, and α_t and δ_m are year-quarter and market (commuting zone-occupation) fixed effects, and $\varepsilon_{m,t}$ is an error term.

- Key threat to identification: market-specific changes in labor demand or labor supply could influence both posted wages and HHI. A decrease in labor demand can lower wages and the number of firms hiring in the market, leading to higher concentration; a decrease in labor supply can increase wages, and lower the number of firms hiring, also leading to higher concentration
- Can control for labor market tightness, which is a time-varying measure of labor demand & supply at the market level

Econometric specification: IV panel regression

- Instrument the HHI with the average of $\log(1/N)$ in other commuting zones for the same occupation and time period (where N refers to the number of firms in the market).
- Use $\log(1/N)$ instead of *HHI* as the instrument because it is less likely to be endogenous, as it does not depend on market shares.
- This provides us with variation in market concentration that is driven by national-level changes in occupational concentration, and not by changes in the occupation in that particular local market.
- Such IV commonly used in industrial organization to address the endogeneity of prices in a local product market, e.g. Nevo (2001). In labor, see Autor, Dorn and Hanson (2013).
- Main threat to identification: labor demand (or supply) shocks could be correlated across areas. Instrument protects us against a spurious correlation between concentration and outcomes that is due to local changes in labor demand, but not against national-level changes in labor demand that influence both concentration and other outcomes.

Market level regressions

	Dependent Variable: Log(Real Wage)			
		OLS		IV
	(1)	(2)	(3)	(4)
Log HHI (Vacancies)	-0.0347***	-0.0399***	-0.0378***	-0.127***
	(0.00377)	(0.00392)	(0.00406)	(0.0176)
Log Tightness		0.0113***	0.0132***	0.0305***
		(0.00320)	(0.00357)	(0.00479)
CZ × SOC FE	✓	✓	✓	✓
Year-q FE	✓	✓		
Year-q FE × CZ FE			✓	✓
Observations	59,485	58,642	56,679	56,679
R-squared	0.674	0.672	0.715	0.711
Kleibergen-Paap F				996.7

Vacancy level regressions

| | Dependent Variable: Log(Real Wage) | | | | |
| | OLS | | | | IV |
	(1)	(2)	(3)	(4)	(5)
Log HHI (Vacancies)	-0.0327***	-0.0331***	-0.0314***	-0.0154***	-0.116***
	(0.00453)	(0.00476)	(0.00500)	(0.00377)	(0.0184)
Log Tightness		0.000665	0.00429	0.00818***	0.0315***
		(0.00342)	(0.00462)	(0.00297)	(0.00601)
CZ × SOC FE	✓	✓	✓		
Year-q FE	✓	✓		✓	✓
Year-q FE × CZ FE			✓		
CZ × Job-Title FE				✓	✓
Observations	1,023,295	1,021,185	1,020,510	955,641	955,641
R-squared	0.533	0.533	0.541	0.849	0.847
Kleibergen-Paap F-stat					150.1

*** p<0.01, ** p<0.05, * p<0.1

Wage Effect as a Function of Population

Figure: Effect of Log HHI (Vacancies) on Log Real Wage by Commuting Zone Population Percentile (IV)
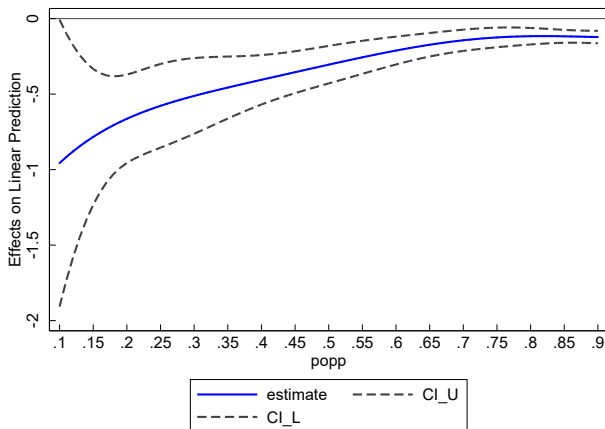
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Monopsony

- "New Monopsony" literature on firm-level heterogeneity in labor supply elasticity as a source of wage-setting power is motivated by monopsony power even when labor markets are unconcentrated.
- In that framework, firms trade off higher wages for lower quit rates. $w < MPL$ to the extent workers are unwilling to quit.
- In our (older) framework, $w < MPL$ to the extent workers have few other potential outside job offers.
- Also potentially relevant to the "skills gap": queueing in the labor market would give employers leverage to demand more credentials for a given job. (Hershbein and Macaluso 2018)

Conclusion

- Using the HHI, we show that US labor markets are highly concentrated on average.
- A 10% increase in concentration leads to a 0.38% (OLS) to a 1.3% (IV) decline in posted wages.
- Smaller commuting zones have higher HHI and a larger impact of HHI on posted wages.
- Our findings imply that mergers have the potential to significantly increase employers' *labor* market power.
- This type of analysis could be used by antitrust agencies to assess whether mergers can create anti-competitive effects in labor markets. Marinescu & Hovenkamp (2018).
- Increasing monopsony power may play a role in explaining the slow growth of real wages in the US since 1980: Benmelech, Bergman, and Kim (2018).