Monopsony and Concentration in the Labor Market: Evidence from Vacancy and Employment Data

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Employer Market Power

Is the U.S. labor market monopsonistic?
Is the degree of monopsony increasing over time?

- answer may affect labor market fluidity, wage growth, and inequality, as well as characteristics of jobs (wages, tasks)
- degree of monopsony affects evaluation of policies altering workers' compensation and mobility
  - minimum wage increases
  - regulations limiting growth of large firms

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Despite relevance of the monopsony question. . .

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→ **decrease in spatial dispersion of employment explains diverging local v. national concentration**

Markdowns

A measure of monopsony power: markdowns

- Monopsony: a firm's ability to compensate workers below its MRPL
- Measured through a firm's "markdown"

$$\max_{N \geq 0} Y(N) - w(N) \cdot N$$

$$Y'(N^*) = w'(N^*)N^* + w(N^*)$$

$$Y'(N^*) = \underbrace{\left[\frac{\varepsilon_S + 1}{\varepsilon_S}\right]}_{\text{markdown}} w(N^*)$$

where $\varepsilon_S = \frac{dN}{dw}\frac{w}{N}\Big|_{N=N^*}$ is a firm's labor supply elasticity.

Estimating markdowns

Markdown formula:

$$\underbrace{\frac{\varepsilon_S + 1}{\varepsilon_S}}_{\text{markdown}} = \underbrace{\mu^{-1}}_{\text{markup}} \cdot \underbrace{\theta_N}_{\substack{\text{output} \\ \text{elasticity}}} \cdot \underbrace{\alpha_N^{-1}}_{\substack{\text{labor} \\ \text{share}}}$$

A1 Firms engage in cost minimization

A2 Production function is continuous and twice differentiable

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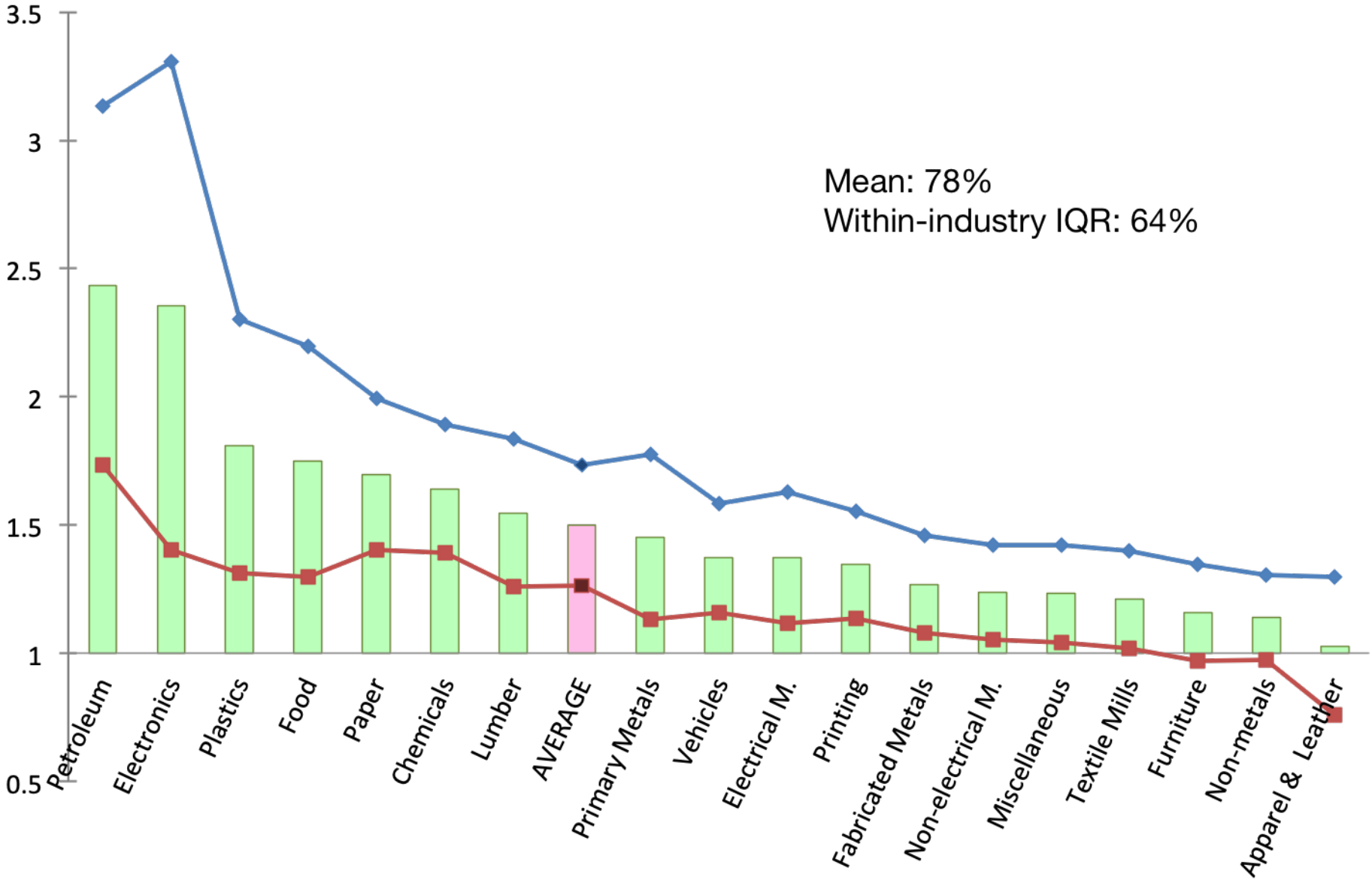
A2 Production function is continuous and twice differentiable

A3 Production function is $Y(N, K, M, E)$ and translog

A4 Material inputs M are free of adjustment costs and monopsony power

More

Markdown distribution



Markdowns increase with employment share

Dependent variable: plant-level (log) markdowns		
	Cobb-Douglas	*Translog*
log share	**0.0292**	**0.0251**
	(0.0140)	(0.0052)
Observations (in millions)	1.449	1.449

Source: ASM data on U.S. manufacturing plants 1976-2014. All regression specifications include **industry, state, and year** fixed effects, and **age** controls. Standard errors are clustered at the industry (3-digit NAICS) level.

→ 1 SD ↑ in a plant's share is associated with a 3.7% ↑ in the plant's markdown rate

→ indexes based on employment shares (e.g., HHI) capture concentration as well as monopsony power

Concentration

HHI at the market- and aggregate level

Concentration: $\text{HHI}_{mt} = \sum_{f \in F(m)} \left(\frac{x_{mft}}{X_{mt}} \right)^2$

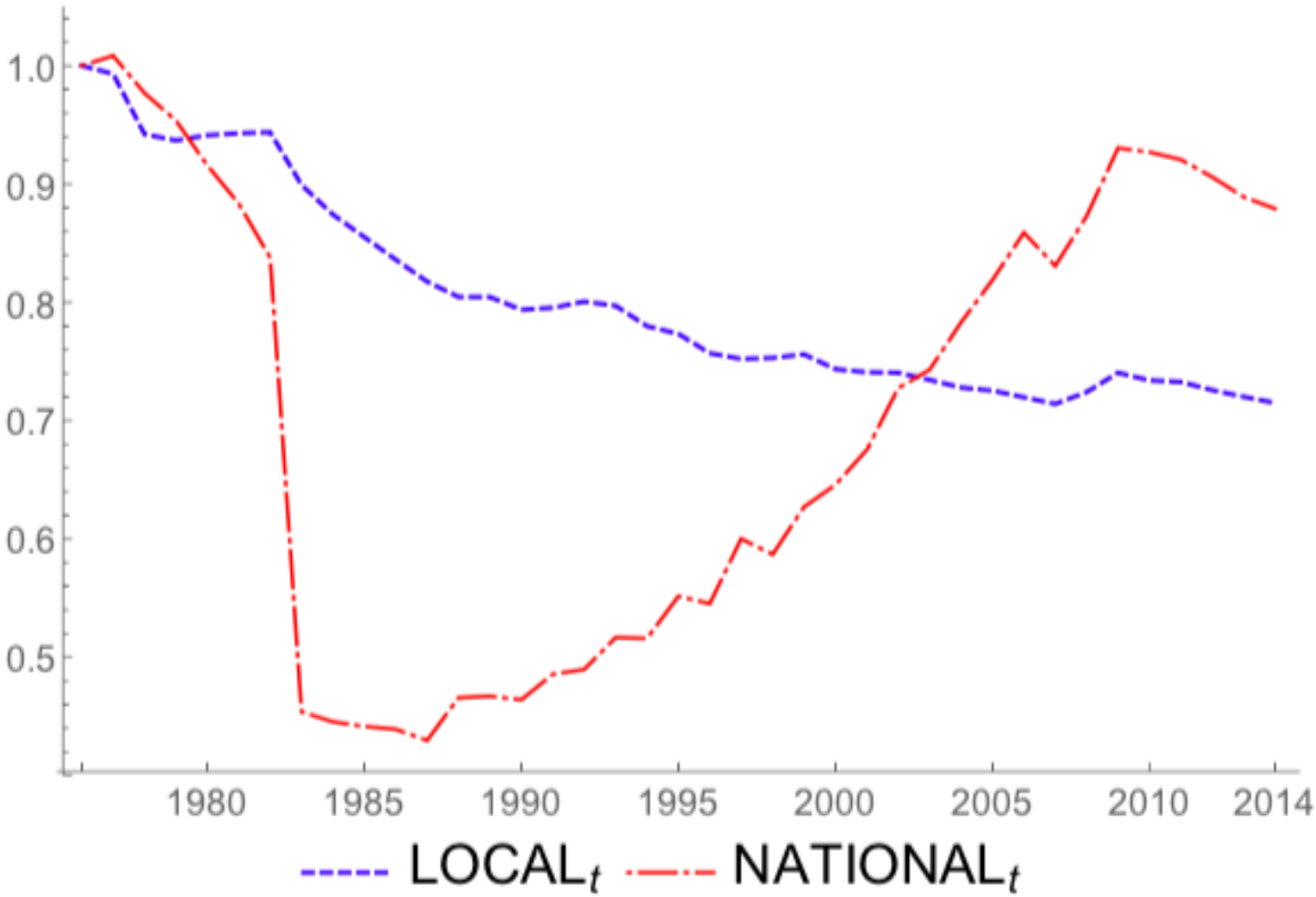
Two aggregates:

$$\text{NATIONAL}_t \equiv \sum_{j \in J} \omega_{jt} HHI_{jt}$$

$$\text{LOCAL}_t \equiv \sum_{j \in J} \sum_{\ell \in L} \omega_{j\ell t} HHI_{j\ell t}$$

where ω_{mt} is employment/vacancies share of market m for $m \in \{j, (j, \ell)\}$.

Local v. national (LBD 1976-2014)



BGT

National versus local

Statistical decomposition of local concentration:

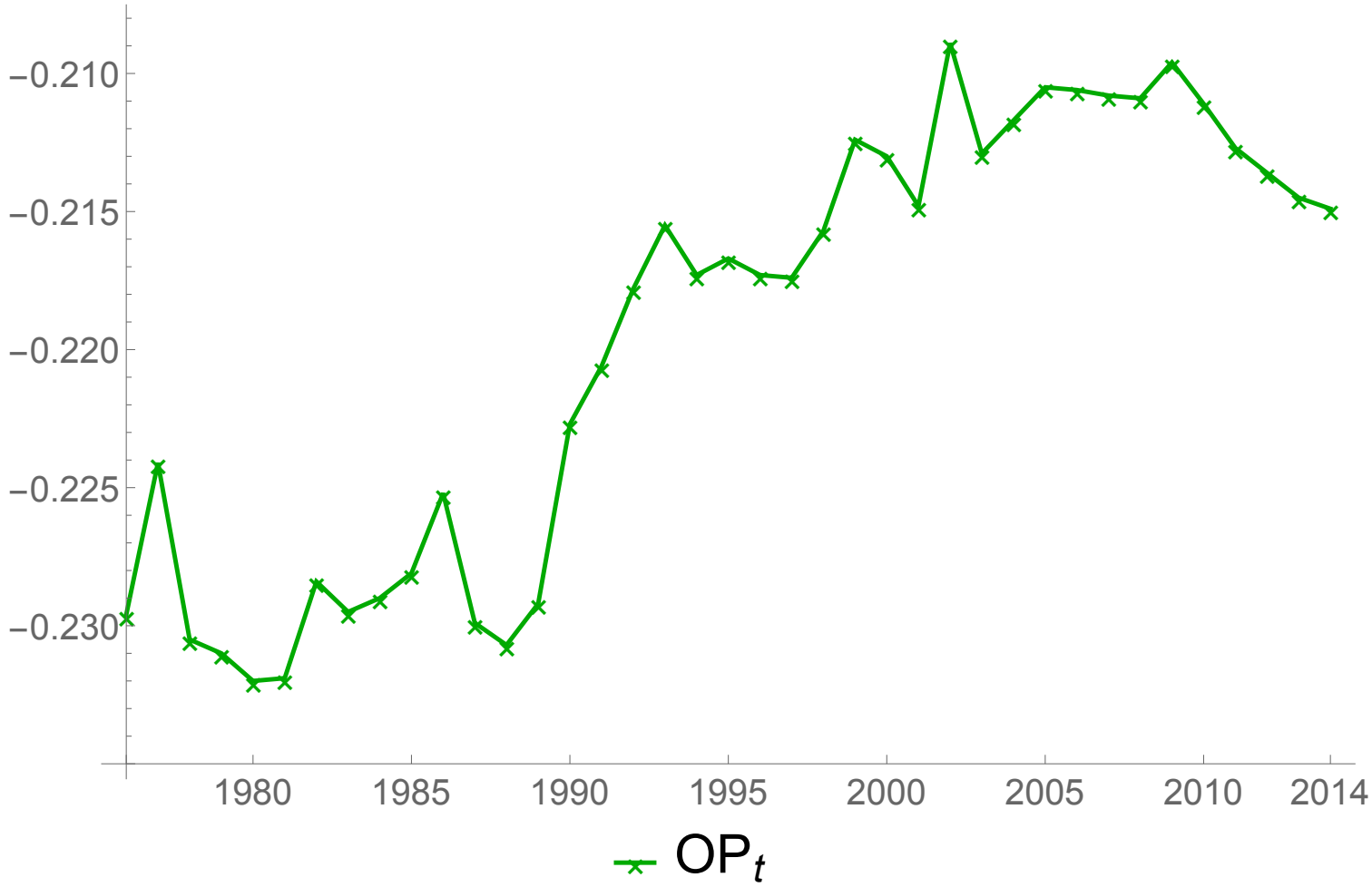
$$\begin{aligned}
\sum_{j\in J}\sum_{\ell\in L}\omega_{j\ell t}HHI_{j\ell t} &= \sum_{j\in J}\omega_{jt}\left[\sum_{\ell\in L}s^{j}_{\ell t}HHI_{j\ell t}\right] \\
&= \sum_{j\in J}\omega_{jt}\left[\overline{HHI}_{jt} + cov(s^{j}_{\ell t}, HHI_{j\ell t})\right] \\
&= \sum_{j\in J}\omega_{jt}HHI_{jt} + \sum_{j\in J}\omega_{jt}cov(s^{j}_{\ell t}, HHI_{j\ell t}) - \sum_{j\in J}\omega_{jt}(HHI_{jt} - \overline{HHI}_{jt}) \\
\text{LOCAL}_t &= \text{NATIONAL}_t + \text{OP}_t - \text{SPATIAL}_t
\end{aligned}$$

where:

- $s^{j}_{\ell t} = \frac{\omega_{j\ell t}}{\omega_{jt}}$
- $\overline{HHI}_{jt} \equiv \frac{1}{|L|}\sum_{\ell\in L} HHI_{j\ell t}$

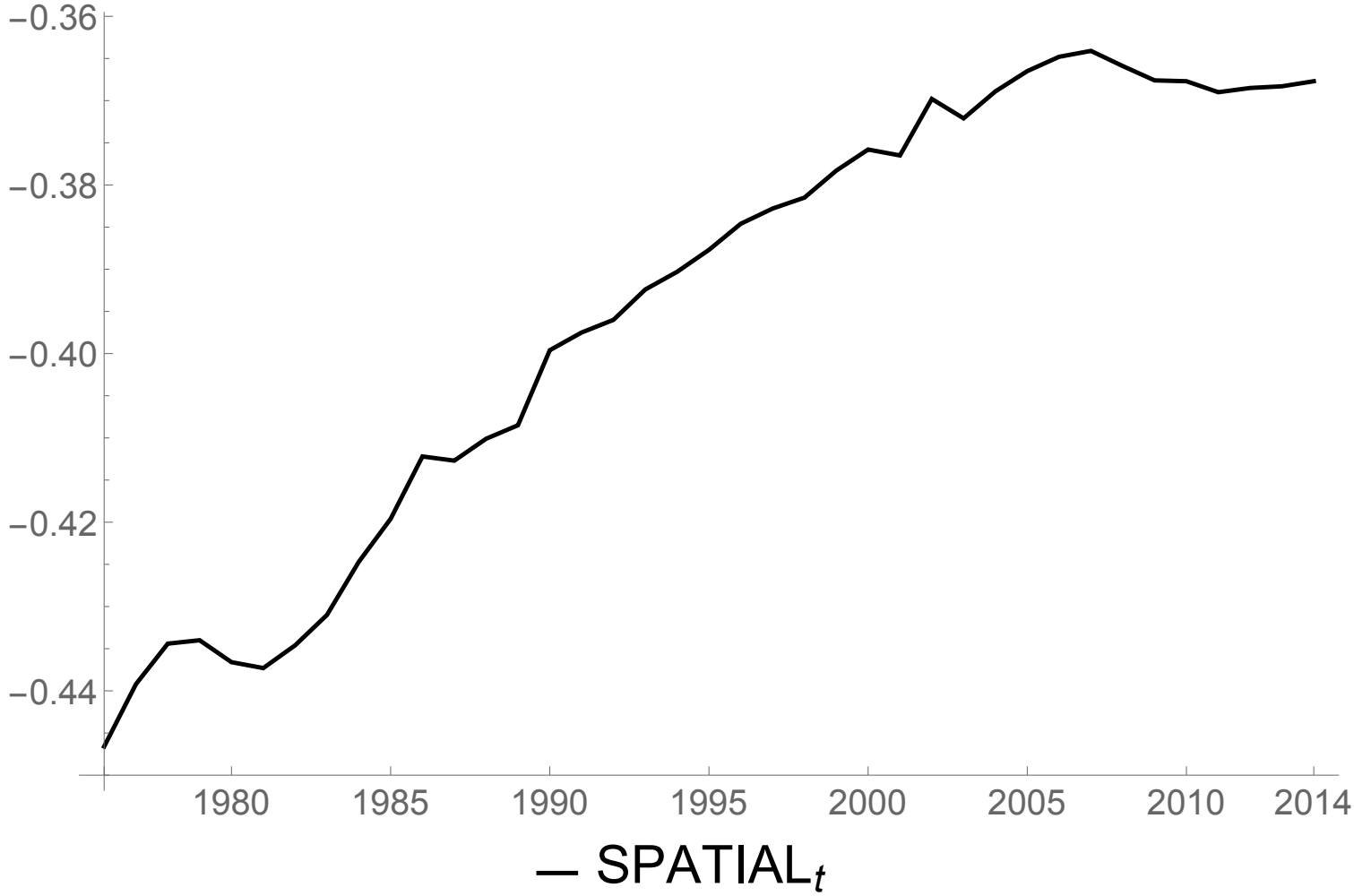
Trend in $OP_t = \sum_{j \in J} \omega_{jt} cov(s^j_{\ell t}, HHI_{j\ell t})$

Figure 1: The OP covariance term has been increasing over time, so it cannot account for the divergence.



Trend in $SPATIAL_t = \sum_{j \in J} \omega_{jt} (HHI_{jt} - \overline{HHI}_{jt})$

Figure 2: A pronounced decrease in spatial dispersion can account for the divergence between NATIONAL and LOCAL.



SPATIAL_t for an industry j

Interpretation of $\text{SPATIAL}_t \uparrow$:

		firm		
region		x	y	z
	A	9	0	0
	B	0	9	0
	C	0	0	9

Table 1: "small" local monopsonies

		firm		
region		x	y	z
	A	3	3	3
	B	3	3	3
	C	3	3	3

Table 2: equally spaced economy

- $HHI_j = 3 \cdot (\frac{1}{3})^2 = \frac{1}{3}$
- $\overline{HHI}_j = \frac{1+1+1}{3} = 1$
- $\text{SPATIAL}_t = \frac{1}{3} - 1$
- as $N_f \to \infty$, $\mathbf{SPATIAL_t} \to \mathbf{-1}$

- $HHI_j = 3 \cdot (\frac{1}{3})^2 = \frac{1}{3}$
- $\overline{HHI}_j = \frac{3 \cdot \frac{1}{3}}{3} = \frac{1}{3}$
- $\mathbf{SPATIAL_t = 0}$

To sum up: what we do

1. **Estimate plant-level markdown rates**
   - Average 78%, average within-industry IQR 64%

2. **Markdowns increase with size**

3. **Local v. national labor market concentration**
   - statistical decomposition to interpret divergence over time
   - drop in spatial dispersion of employment across U.S. local labor markets

4. Negative time trend and limited cross-sectional incidence of local concentration in both employment and vacancies Histograms

5. Wage compression + upskilling

Thank you!

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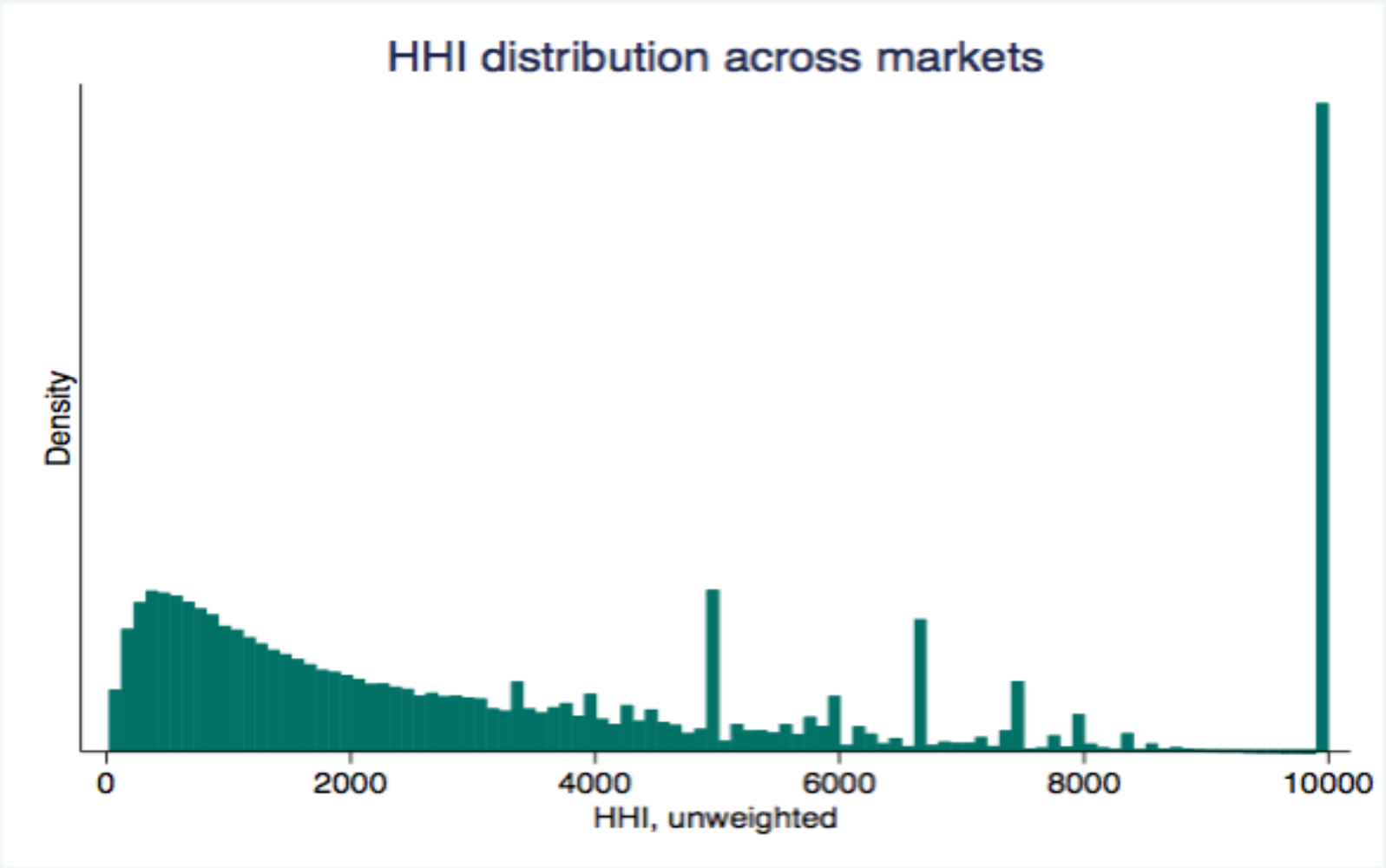
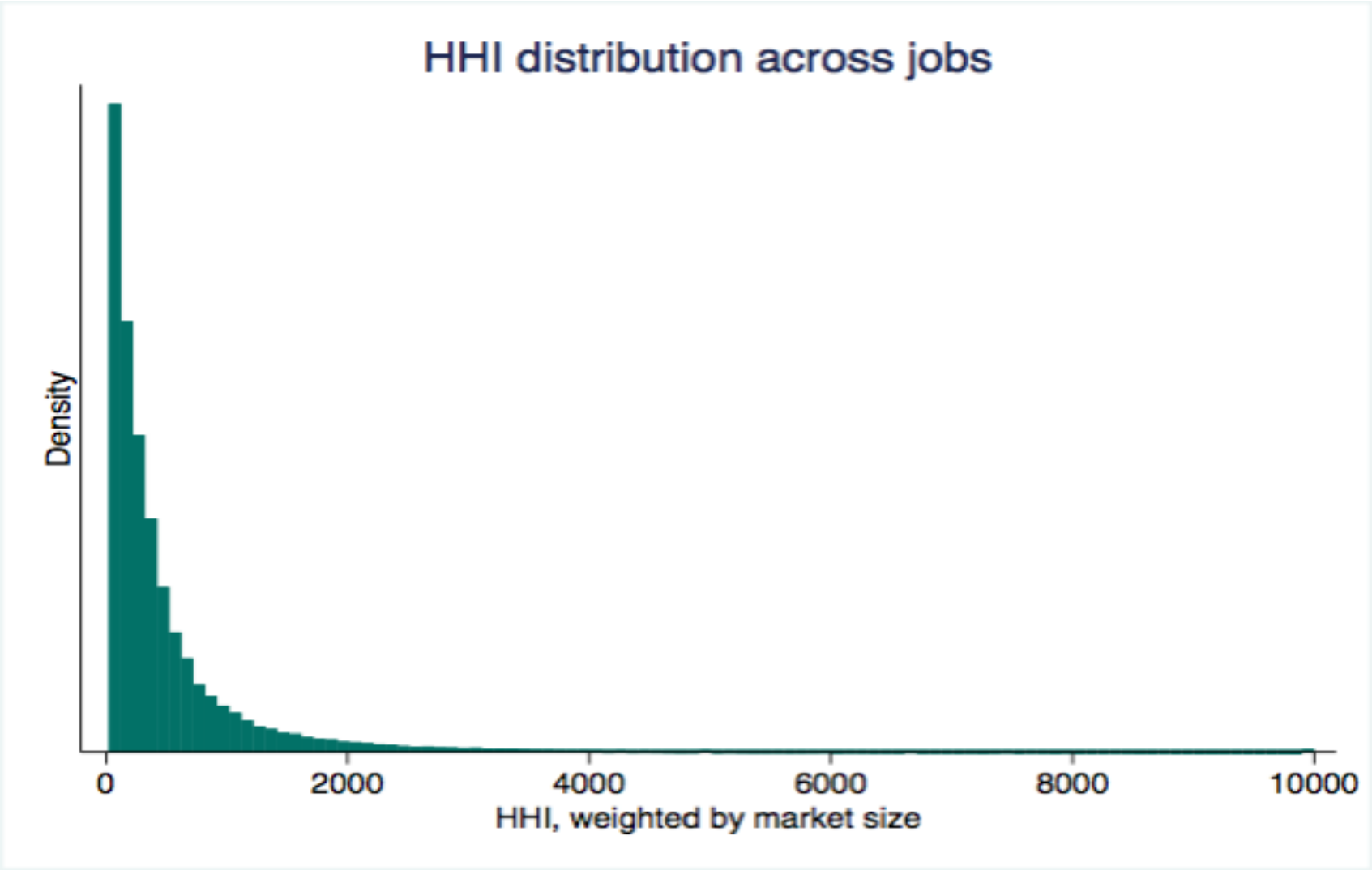
Unweighted HHI distribution



Source: BGT 2010-17

Weighted HHI distribution



Source: BGT/OES 2010-17

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Estimating markdowns (1)

- How to estimate markdowns?
- Plant's cost minimization problem:

$$\min_{N \geq 0} w(N) \cdot N \quad \text{s.t.} \quad Y(N) \geq Y$$

- Optimality condition can be written as:

$$\frac{w'(N) \cdot N}{w(N)} + 1 = \lambda \frac{Y'(N)}{w(N)}$$

$$\underbrace{\frac{\varepsilon_S + 1}{\varepsilon_S}}_{\text{markdown}} = \underbrace{\mu^{-1}}_{\text{markup}} \cdot \underbrace{\theta_N}_{\substack{\text{output} \\ \text{elasticity}}} \cdot \underbrace{\alpha_N^{-1}}_{\substack{\text{labor} \\ \text{share}}}$$

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Estimating markdowns (2)

- We obtain:

$$\frac{\varepsilon_S + 1}{\varepsilon_S} = \mu^{-1} \cdot \theta_N \cdot \alpha_N^{-1}$$

  - $\mu = \frac{P}{\lambda}$ is the price-cost markup
  - $\theta_N = \frac{Y'(N) \cdot N}{Y(N)}$ is the output elasticity with respect to labor
  - $\alpha_N = \frac{w(N) \cdot N}{P \cdot Y(N)}$ is the revenue share of labor

- Intuition as in Hall (1988)
- Procedure from de Loecker and Warzynski (2012) on material inputs: markups
- Production function estimation: output elasticities
- Revenue shares are directly observable

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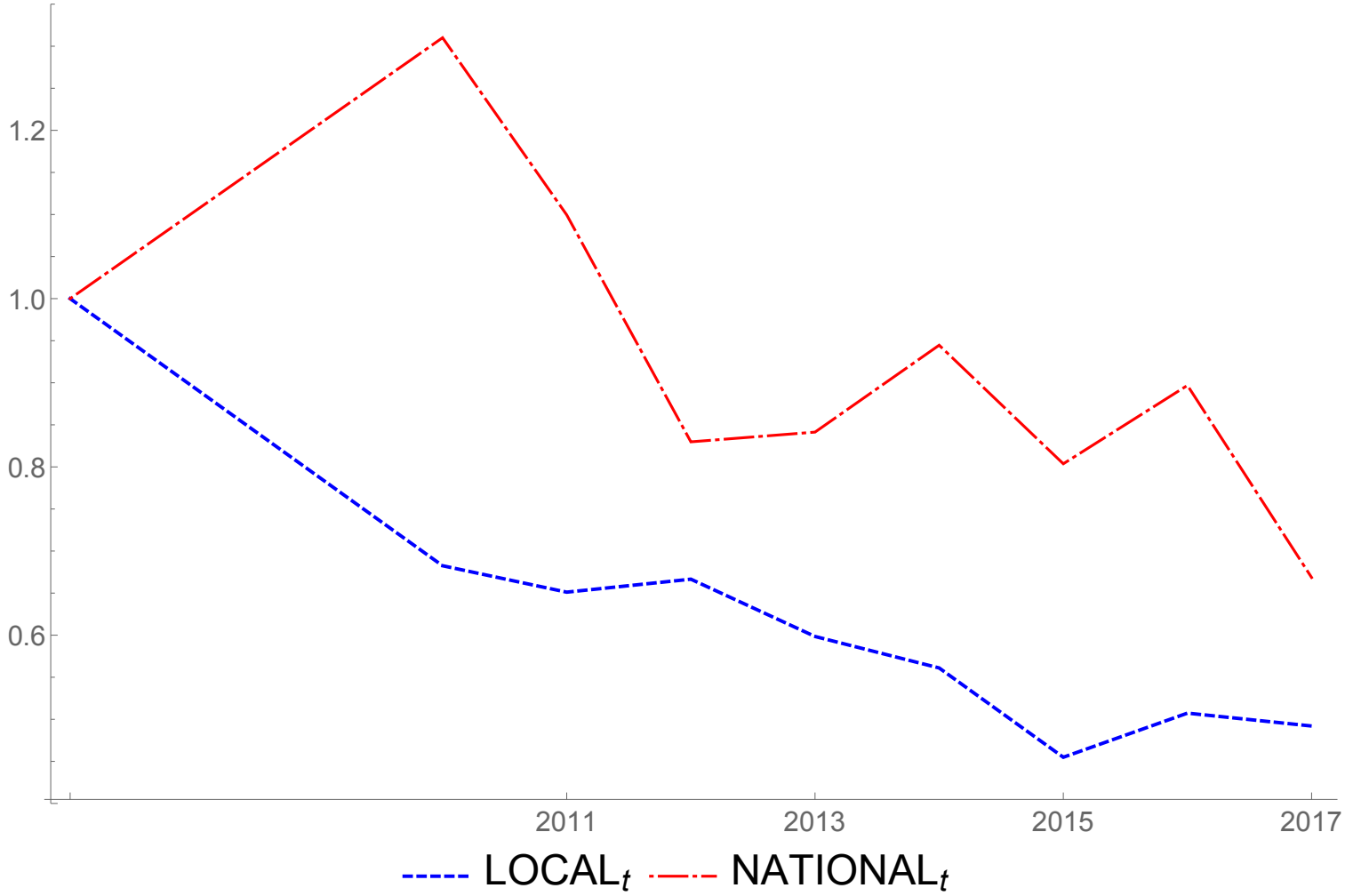
Local labor market concentration across time (BGT)



Concentration based on vacancies in BGT ($LOCAL_{2007} = 1$)

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