

Local and National Concentration Trends in Jobs and Sales: The Role of Structural Transformation

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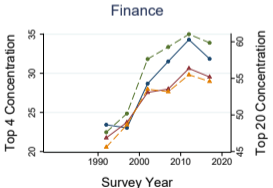
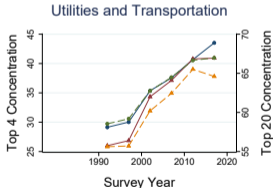
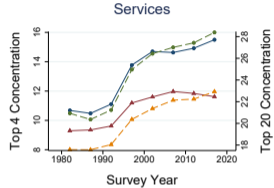
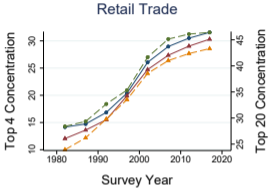
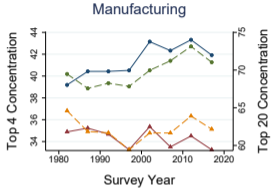
NBER Summer Institute, CRIW

July 17, 2023

- **Broad consensus that industrial concentration at national level has risen since early 1980s**
 - U.S. evidence [Autor et al. '20](#); [Kwon et al., '23](#); [Barkai '20](#); [Furman and Orszag '18](#)
 - Similar trends visible in many other countries [Bajgar et al. '19, '20](#)
 - Although controversy over exact magnitudes [Philippon '19](#)

SIC-based sectoral average concentration-ratios, 1982 – 2017

Updated from Autor et al. '20 from 2012 to 2017



● CR4 with Sales -○- CR20 with Sales
▲ CR4 with Employment -▲- CR20 with Employment

- **Less clear if comparable or opposite trends prevail at local geographic level**
 - ① **Several papers find decrease in local employment concentration**
 - Using Longitudinal Business Database (LBD) Rinz '22, but see Benmelech et al. '20

- **Less clear if comparable or opposite trends prevail at local geographic level**
 - ① **Several papers find decrease in local employment concentration**
 - Using Longitudinal Business Database (LBD) [Rinz '22](#), but see [Benmelech et al. '20](#)
 - ② **Evidence on sales concentration is more elusive**
 - LBD only has firm (not establishment) sales and even this is missing before 1998 ([Decker et al. '18](#))
 - [Rossi-Hansberg et al. '21](#) report a fall in local sales concentration using the private-sector NETS database
 - But serious concerns about NETs' representativeness, [Crane and Decker '20](#)

Why local concentration matters

- **Understanding evolution of local concentration important**
 - ① **High and rising national Hirschman-Herfindahl Index (HHI) may signal weakening product market competition**
 - But interpretation of HHI is ambiguous from IO perspective. However, also see:
 - Rising markups [De Loecker et al. '20](#)
 - Slowing productivity growth [Syverson '17](#)

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- ② **But national concentration may not be relevant**

- Many services are locally produced and sold [Benkard et al. '21](#)
- Local concentration special concern for labor markets [White House '21](#)
- Growing body of evidence of monopsony power in local markets [Lamadon et al. '22](#); [Manning '11](#); [Yeh et al. '22](#); [Kroft et al., '22](#)

This Paper

- ① **Analyze U.S. Economic Census – best extant data source for this question**
 - Sales + employment by establishment for broad firm population in covered sectors
 - Data for the 25 year interval of 1992–2017 for six large sectors: Manufacturing, Retail Trade, Wholesale Trade, Services, Utilities and Transportation, and Finance. 35 years of data, 1982 - 2017, for 4 of six sectors
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- ② **Does national concentration ↔ local concentration?**
 - Test whether local sales and employment concentration have tracked national trends
- ③ **Explore source of divergences**
 - Generally increasing concentration within sectors and industries
 - Offset by Structural Transformation: between sector reallocation to less concentrated sectors (Mnfg. to Services)

Main findings

- ① **Confirm substantial increase in national U.S. industry concentration through 2017**
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- ④ **Key source of divergence: structural transformation**
 - Shift from high concentration *manufacturing* to low concentration *services*
 - Simultaneously, sales and employment concentration *rising* within sector

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④ Key source of divergence: structural transformation

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⑤ Nuanced Implications

- Industry-area cells not necessarily markets; HHI not necessarily market power
- Average worker faces lower HHI. But low mobility incumbents face rising concentration.

- **The U.S. Economic Census**
 - Conducted every five years
 - Surveys all establishments in selected sectors about their current economic activity
 - Use data from six sectors Manufacturing, Retail Trade, Wholesale Trade, Services, Utilities and Transportation, and Finance

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- **Key measures**

- Census reports each establishment's employment and sales
- Firm identifier allows us to link each establishment to parent firm
- Assign each establishment in each year to a 2017 NAICS-based, time-consistent, six-digit code (broadly equivalent to a four digit SIC code) Fort and Klimek '18

Measuring industrial concentration

- **Cell definition:**
 - NAICS-6 Industry (j) cells for national concentration.
 - NAICS-6 Industry-county (cj) cells for local concentration.
- The **Herfindahl Index** in cell m for activity $l \in \{\text{sales, employment}\}$ is:

$$HHI_{mt}^l = \sum_{i \in m} 100 \times (s_{imt}^l)^2, \quad (1)$$

where s_{ict}^l denotes firm i 's activity- l share in cell m , $m \in \{jt, cjt\}$.

Measuring industrial concentration: National level

- National industrial concentration for outcome $l \in \{\text{sales, employment}\}$:

$$HHI_t^{l,NAT} = \sum_k w_{kt}^l \sum_{j \in k} w_{jt}^l HHI_{jt}^l, \quad (2)$$

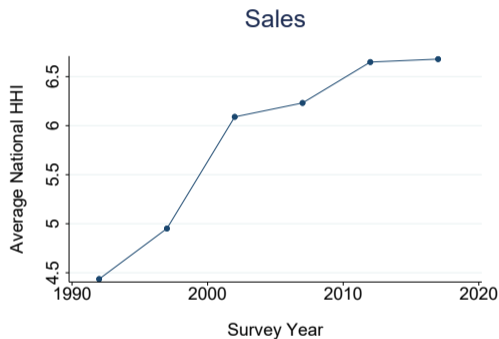
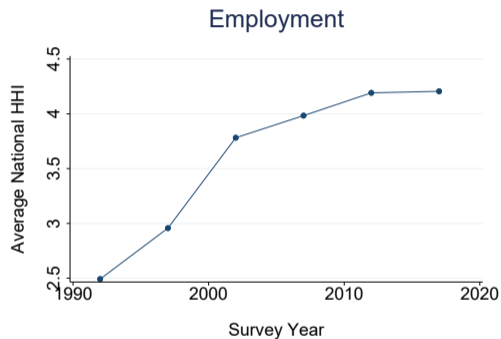
where w_{jt}^l denotes industry j 's share of activity l in Census sector k , and w_{kt}^l is sector k 's share of activity l in the economy.

- Local industrial concentration for outcome $l \in \{\text{sales, employment}\}$:

$$HHI_t^{l,LOC} = \sum_k w_{kt}^l \sum_{cj \in k} w_{cjt}^l HHI_{cjt}^l, \quad (3)$$

where w_{cjt}^l denotes the activity- l share of industry j and county c in Census sector k .

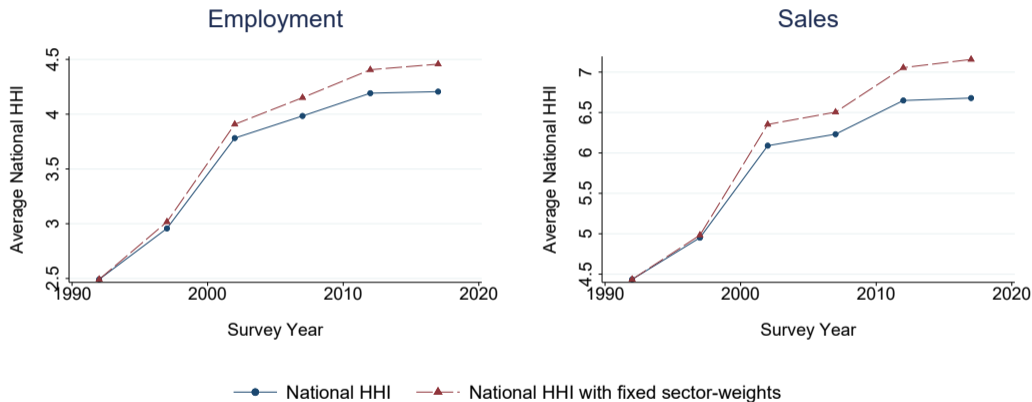
National industrial concentration



—●— National HHI

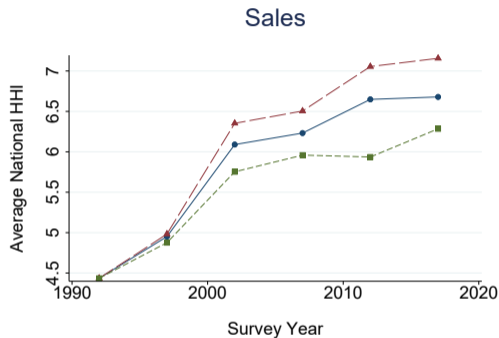
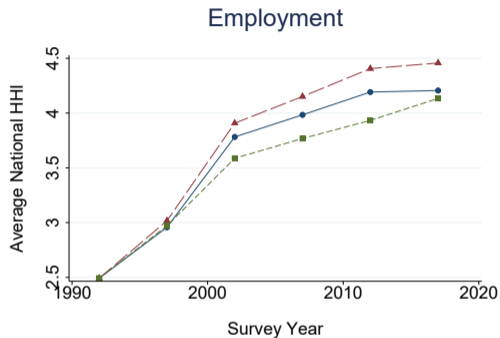
- Large proportionate Δ 's: 68% for employment HHI and 53% for sales HHI

National industrial concentration - holding sector composition fixed



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National industrial concentration - holding industry composition fixed



—●— National HHI -▲- National HHI with fixed sector-weights -■- National HHI with fixed industry-weights

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Measuring industrial concentration: Local level

- National industrial concentration for outcome $l \in \{\text{sales, employment}\}$:

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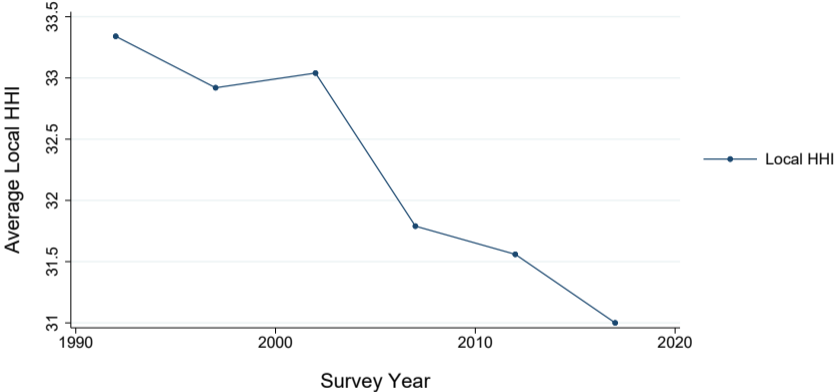
where w_{jt}^l denotes industry j 's share of activity l in Census sector k .

- Local industrial concentration for outcome $l \in \{\text{sales, employment}\}$:

$$HHI_t^{l,LOC} = \sum_k w_{kt}^l \sum_{c,j \in k} w_{cjt}^l HHI_{cjt}^l, \quad (5)$$

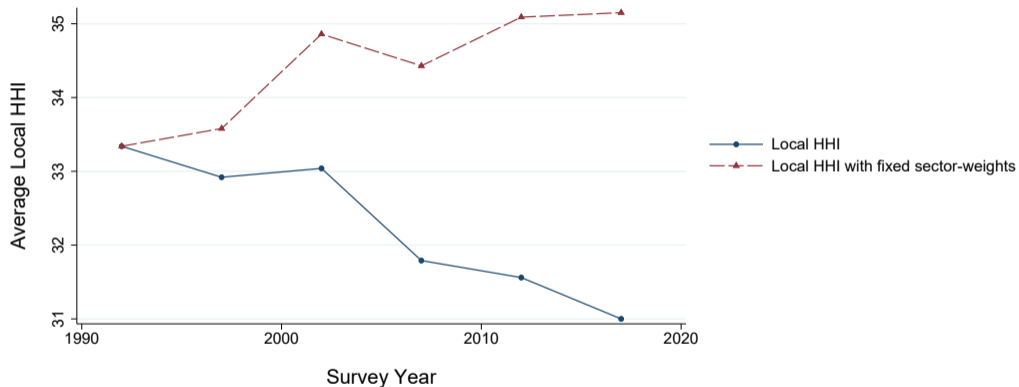
where w_{cjt}^l denotes the activity- l share of industry j and county c in Census sector k .

Local industrial concentration: Employment



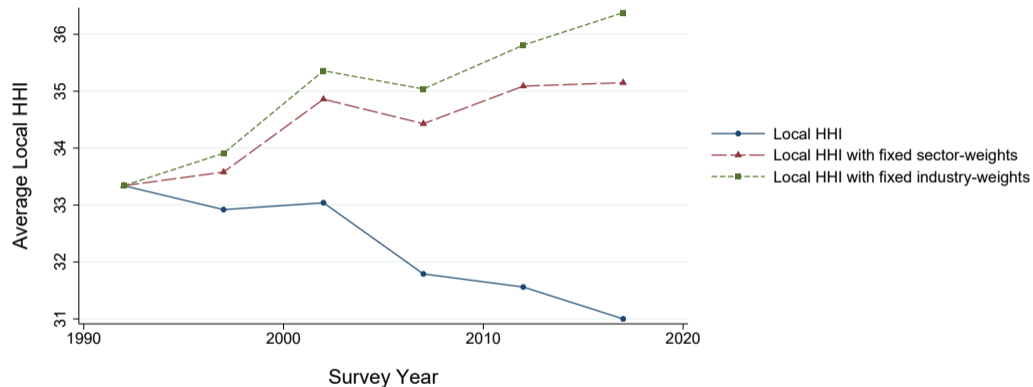
- Local employment HHI fell by 2.3 points between 1992 and 2017

Local industrial concentration: Employment, holding sector fixed



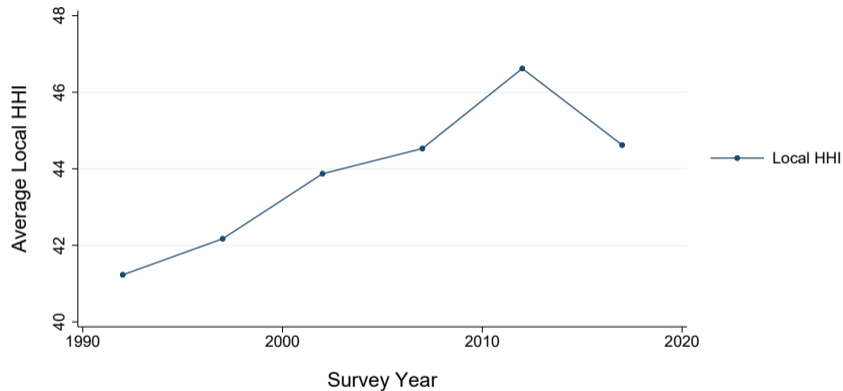
- If sector employment weights fixed in 1992, HHI would have risen 1.9 points to 35.1

Local industrial concentration: Employment, holding industry fixed



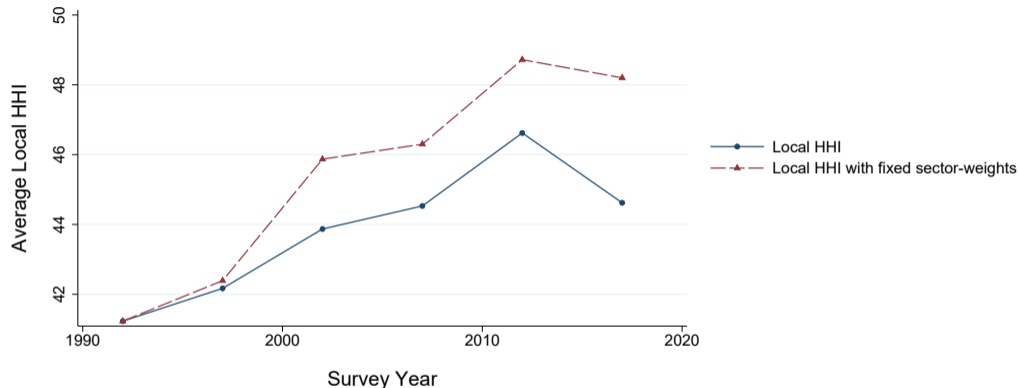
- If industry employment weights fixed in 1992, HHI would have risen 3.1 points to 36.4

Local industrial concentration: Sales



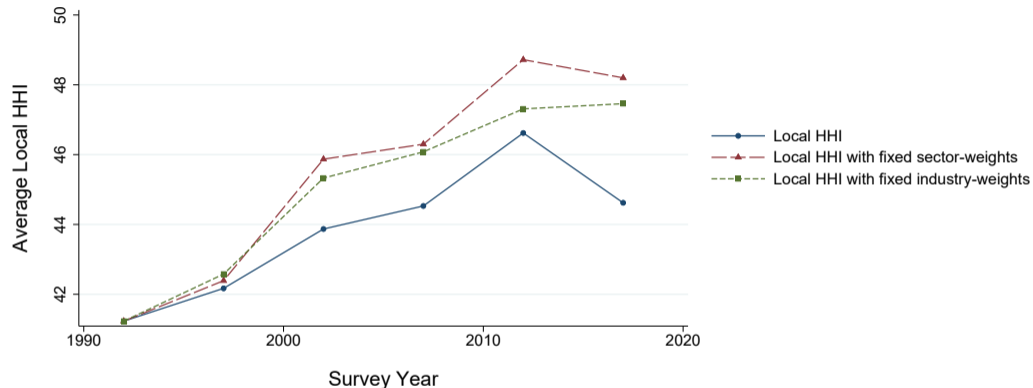
- Sales HHIs rose by 3.2 points between 1992 and 2017

Local industrial concentration: Sales



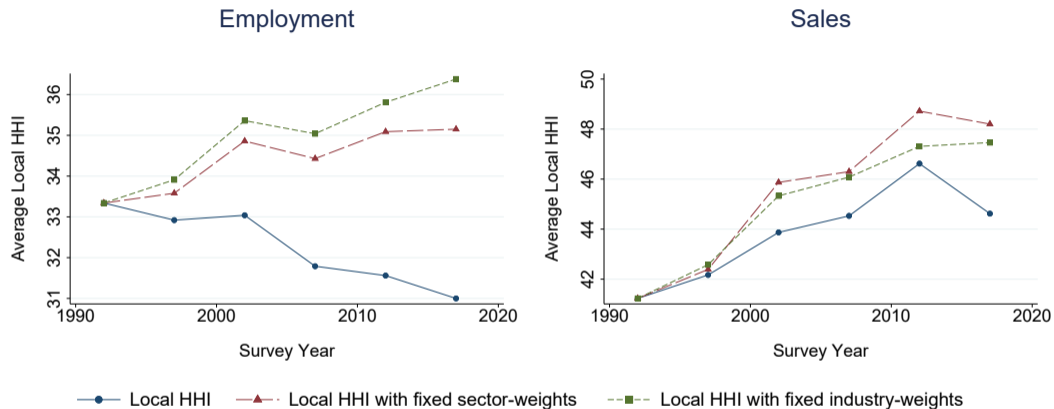
- Sales HHIs rose by 3.2 points between 1992 and 2017
- Holding sectors fixed, sales HHI would have risen by another 6.2 points (7.0 if holding industries fixed)

Local industrial concentration: Sales



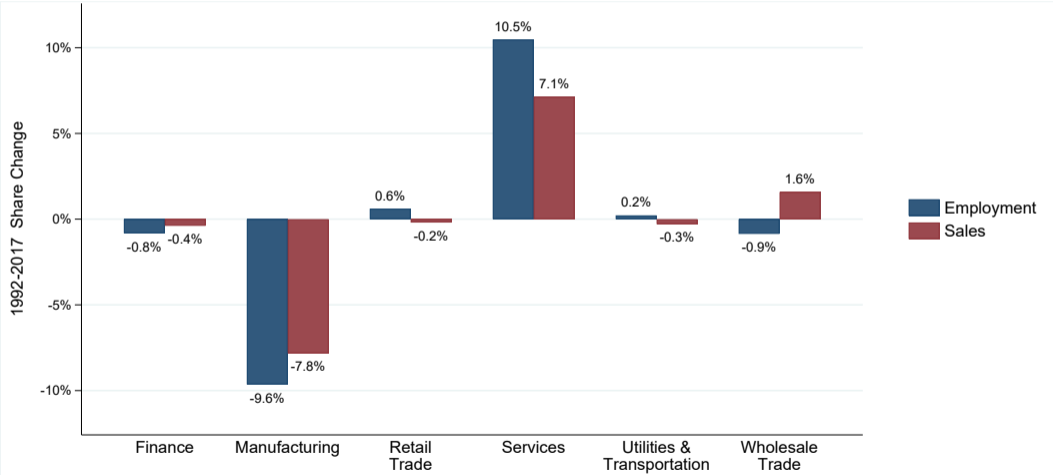
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Local industrial concentration



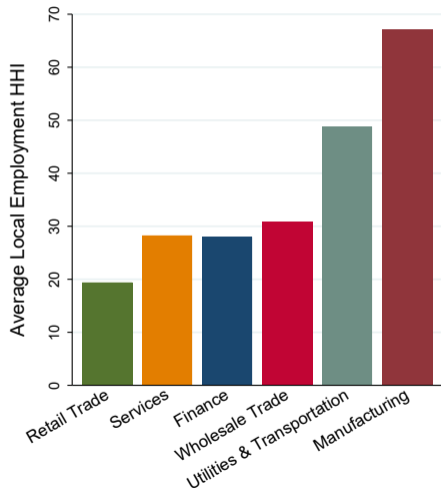
- Employment concentration *falling*, sales concentration *rising*
- Holding sector shares fixed reverses (employment) or mutes (sales) this result

Structural transformation from Manufacturing to Services, 1992-2017: Greater reallocation of employment than sales

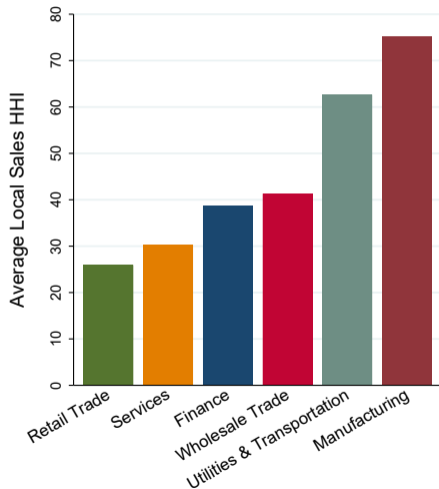


Manufacturing is more locally (and nationally) concentrated than services

Panel A: Average Employment HHI



Panel B: Average Sales HHI



Role of structural transformation: Shift-share decomposition

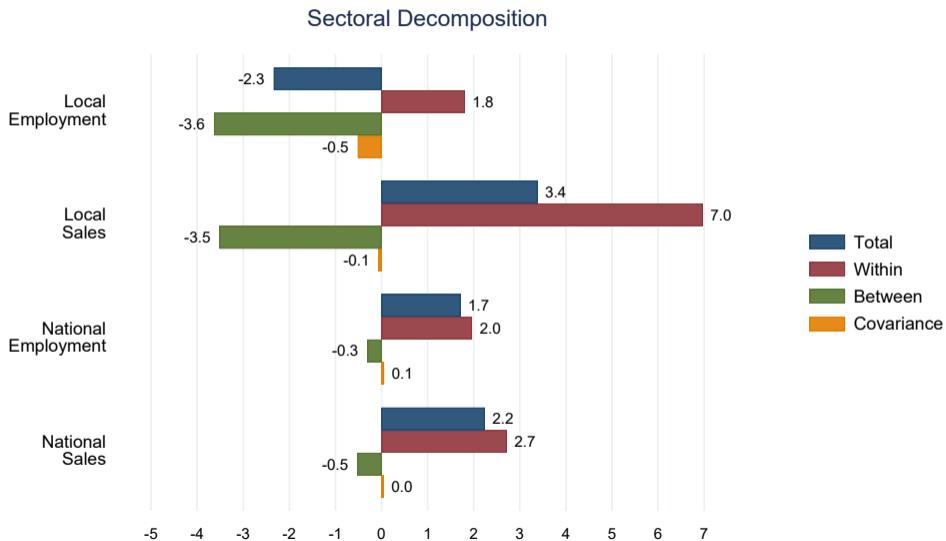
- Economy-wide HHI decomposition between base period 0 and t :

$$\Delta HHI_t^l = \underbrace{\sum_k \omega_{k0}^l \Delta HHI_{kt}^l}_{\text{within effect}} + \underbrace{\sum_k HHI_{k0}^l \Delta \omega_{kt}^l}_{\text{between effect}} + \underbrace{\sum_k \Delta \omega_{kt}^l \Delta HHI_{kt}^l}_{\text{covariance effect}}, \quad (6)$$

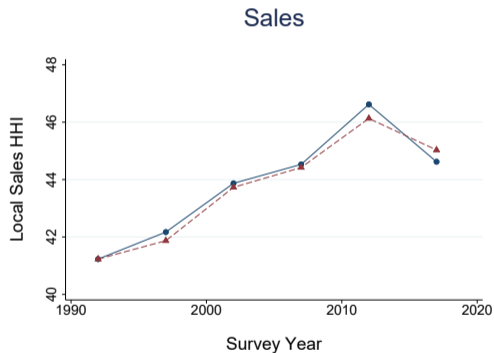
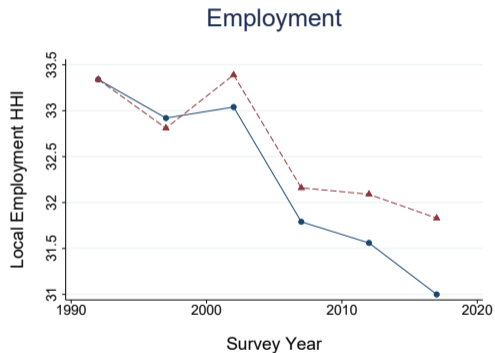
where HHI_{kt}^l is the average local HHI^l in sector k in year t ; ω_{kt}^l is national share of outcome l in kt .

- We also do NAIC6 industry version where sector k is replaced by industry j
- Decomposition over **sectors** (industries) only holds w_{kt} fixed for the within-effect. County weights are allowed to shift over time.

Decomposition: Within sectors HHI is rising, offset by reallocation



**Note: Fixing initial county distribution of emp (left) or sales (right) —
Has no qualitative impact on these local HHI trends**



—●— Local HHI - -▲- - Local HHI with fixed county-weight

Summary so far

- ① Fall in local employment concentration
- ② Rise in local sales concentration
- ③ Concentration is rising within sectors
- ④ But sectoral shift from manufacturing to services is buffering this rise
- ⑤ In case of local employment HHI, the sectoral shift more than fully offsets
- ⑥ In case of local sales HHI, the sectoral shift mitigates but does not reverse that shift

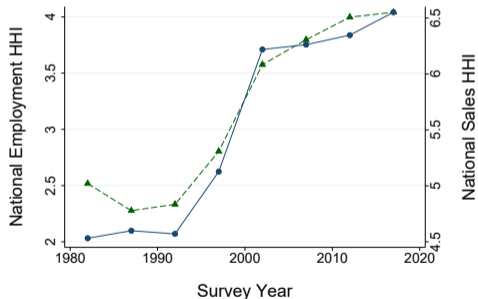
Some robustness checks

- ① **Using an extra decade of data from 1982**
- ② Higher level of geographic aggregation - states
- ③ Accounting for sector size using value-added weights
- ④ Accounting for coarseness of non-manufacturing industry categories
- ⑤ Accounting for online sales

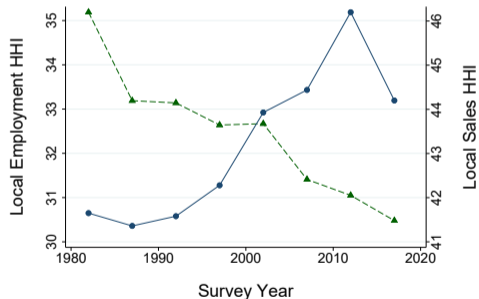
Robustness: Looking back an additional decade

Concentration measures, excluding Finance and Utilities & Transportation

Average National Concentration



Average Local Concentration



---▲--- Employment HHI —●— Sales HHI

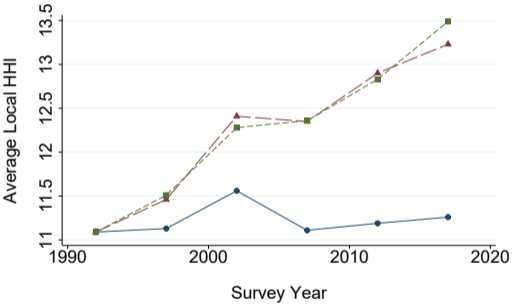
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Aggregating to state geography splits diff btwn local and national HHI trends

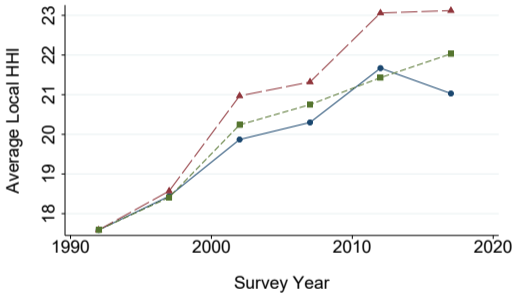
Employment

All industries, State-level



Sales

All industries, State-level



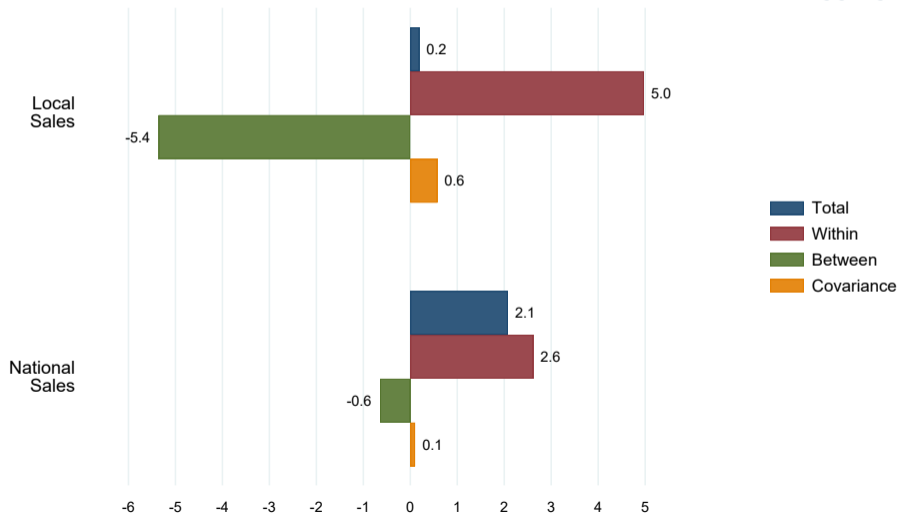
—●— Local HHI -▲- Local HHI with fixed sector-weights -■- Local HHI with fixed industry-weights

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Robustness: Value added weights

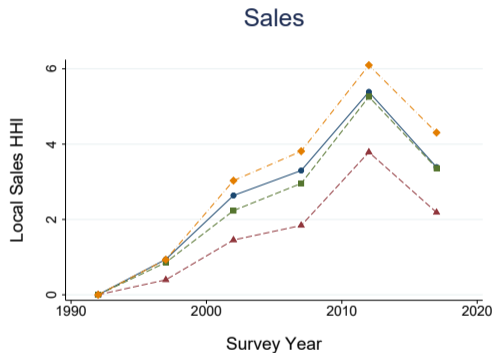
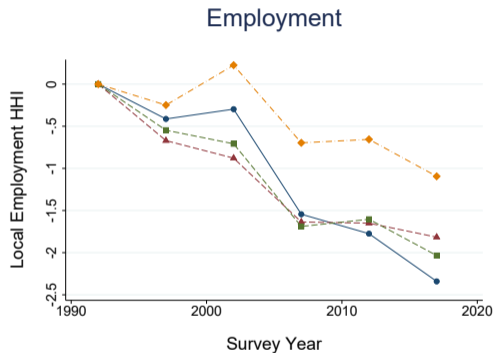
Sales concentration shift-share decomposition, value-added sectoral aggregation



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Robustness: Local concentration, alternative industry aggregation



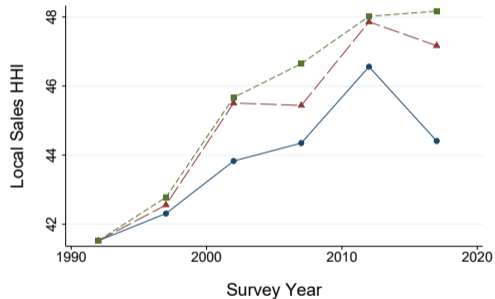
—●— 6-digit NAICS (baseline) - - -▲- - - 3-digit NAICS - - -■- - - 4-digit NAICS - - -◆- - - Manufacturing: 4-digit NAICS

Some robustness checks

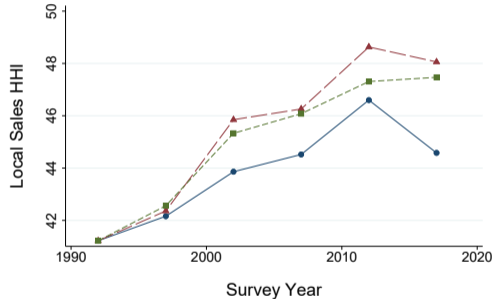
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Robustness: Online sales

E-commerce sales excluded



E-commerce sales reallocated



● Local Sales HHI ▲ Local Sales HHI with fixed Sector Weights ■ Local Sales HHI with fixed Industry Weights

Summary

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- **Bad news?:** Concentration rising within sectors

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- **Is fall in local concentration net positive for workers?**
 - Average new entrant worker faces less concentration and so more job offers
 - But if mobility frictions between industries due to specific skills, etc. then incumbents facing increasing concentration may suffer

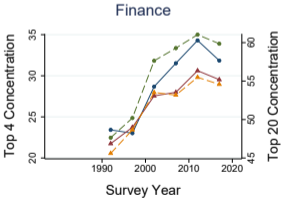
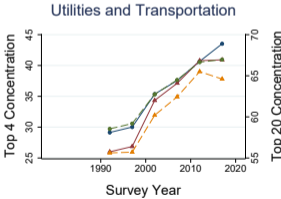
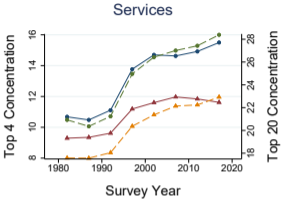
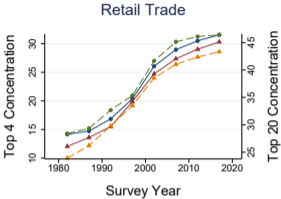
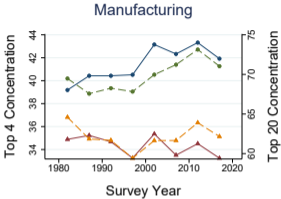
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- **Next steps:**
 - Matched Census and LBD to LEHD.
 - Examine role of local and national market structure (labor *and* product market competition) on earnings

Appendix

SIC-based sectoral average concentration-ratios

[▶ Back](#)

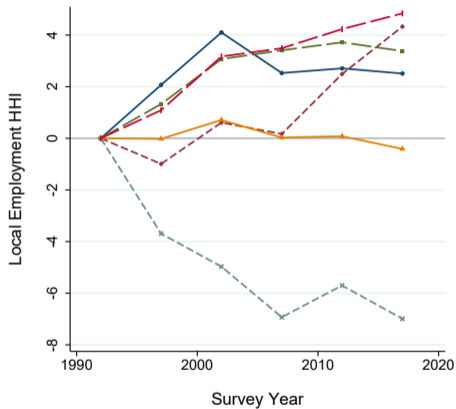


● CR4 with Sales ● CR20 with Sales
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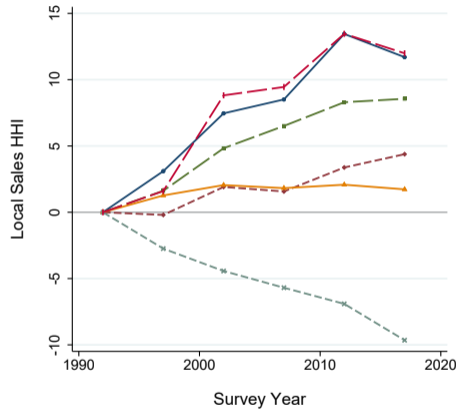
Change in local Herfindahl-Hirschman Index by sector

[▶ Back](#)

Panel A: Δ_{10} Employment HHI



Panel B: Δ_{10} Sales HHI



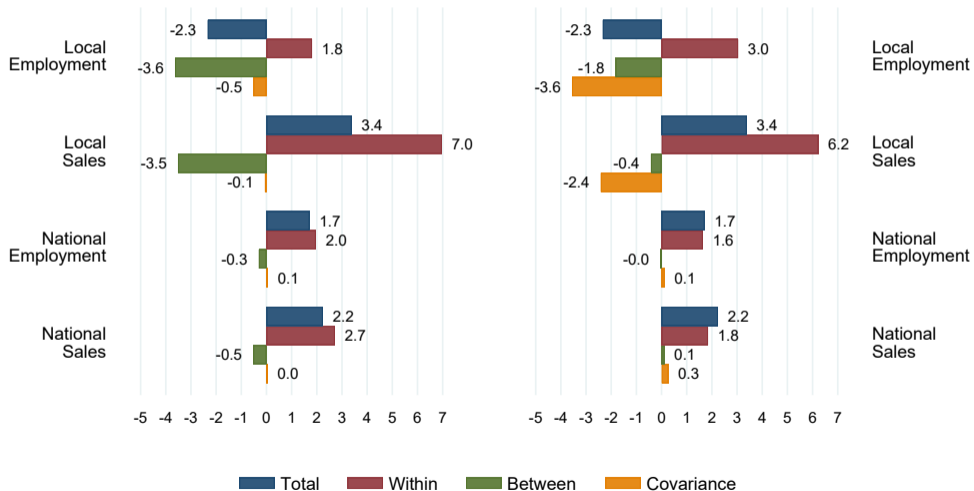
- Retail Trade
- ▲— Services
- Finance
- ◆— Wholesale Trade
- ×— Utilities & Transportation
- Manufacturing

Herfindahl-Hirschman Index shift-share decomposition

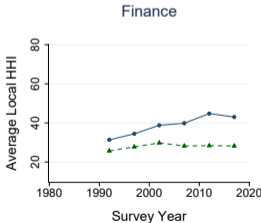
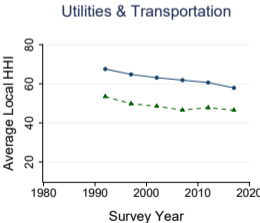
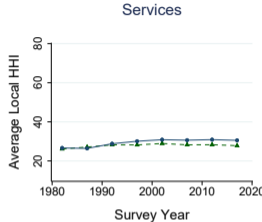
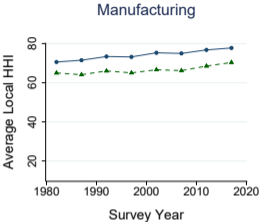
▶ Back

Sectoral Decomposition

Industrial Decomposition

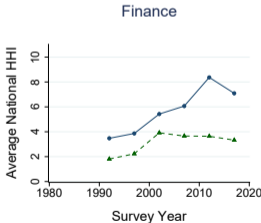
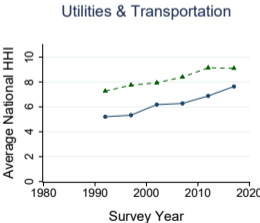
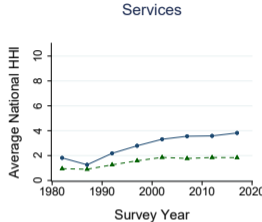
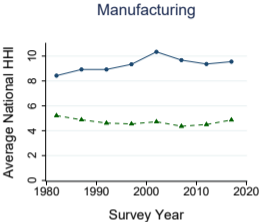


Average local Herfindahl-Hirschman Index by sector



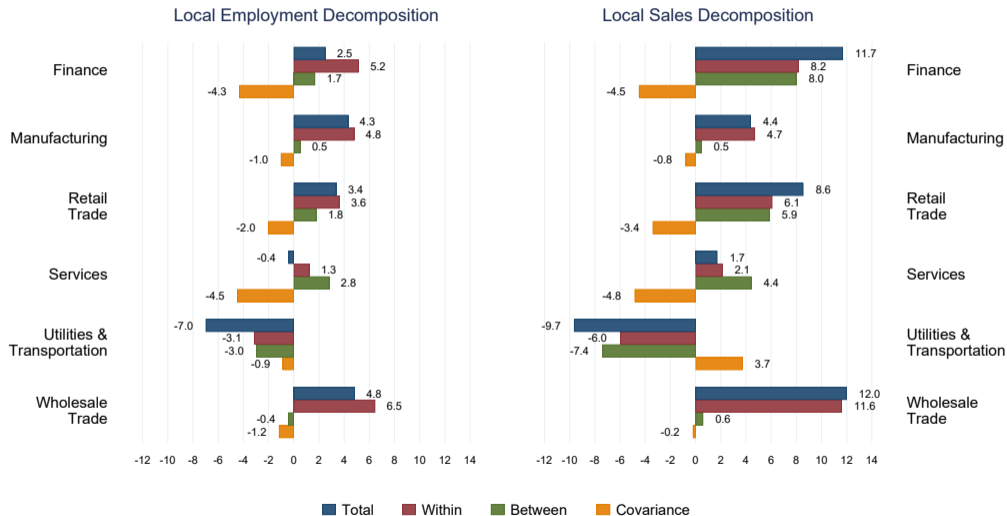
--▲-- Employment HHI ●— Sales HHI

Average national Herfindahl-Hirschman Index by sector

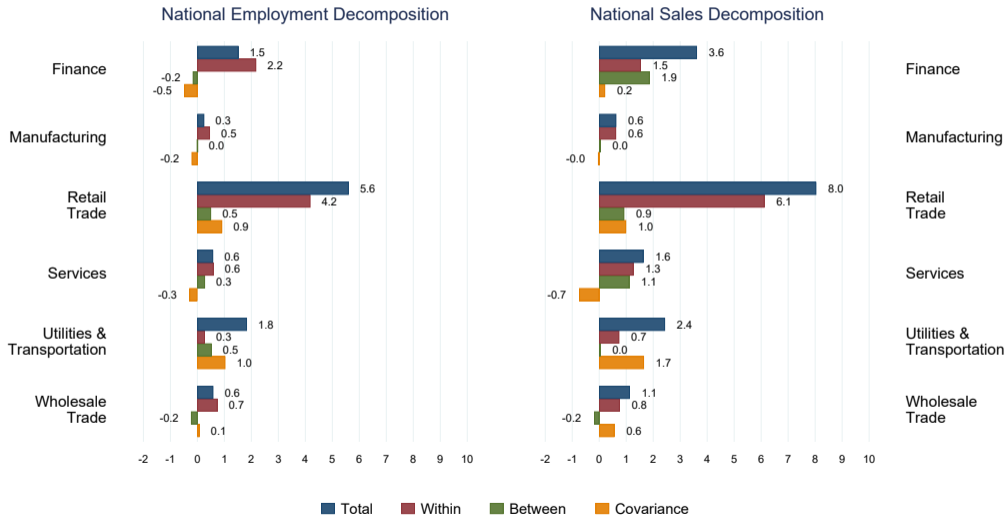


---▲--- Employment HHI —●— Sales HHI

Local concentration shift-share decomposition by sector



National concentration shift-share decomposition by sector



Summarizing the summary...

