

Discussion of  
“Wage Inequality and the Spatial Expansion of Firms”  
*by: Kleinman*

Teresa Fort

Dartmouth Tuck and NBER

NBER SI Macro-Productivity  
July 2023

## Big Picture: Role of firms in the rise of US income inequality

- How do large firms' spatial expansion affect US income inequality?
- Structural model of rising income inequality *within* firms
  - Exogenous declines in bilateral communication/trade costs drive expansion
  - Similar idea to Eckert (2019), but inside the firm

## Big Picture: Role of firms in the rise of US income inequality

- How do large firms' spatial expansion affect US income inequality?
- Structural model of rising income inequality *within* firms
  - Exogenous declines in bilateral communication/trade costs drive expansion
  - Similar idea to Eckert (2019), but inside the firm
- Key contribution: How firms leverage knowledge across space

## C1: How do the 'new' facts connect to existing evidence?

- Song et al. (2019): 19 log point increase in variance of  $\ln(\text{wages})$  (1981 - 2013)
  - 68% of the rise occurs *between* firms (13/19 log points)
  - 42% of increased variance among mega-firms occurs within firms
- Kleinman (2023): 17 log point increase in variance of  $\ln(\text{wages})$  (1980 - 2017)
  - 68% of the rise due to multi-region service firms
  - 45% of increased variance among multi-region service firms occurs within firms

## C1: How do the 'new' facts connect to existing evidence?

- Song et al. (2019): 19 log point increase in variance of  $\ln(\text{wages})$  (1981 - 2013)
  - 68% of the rise occurs *between* firms (13/19 log points)
  - 42% of increased variance among mega-firms occurs *within* firms
- Kleinman (2023): 17 log point increase in variance of  $\ln(\text{wages})$  (1980 - 2017)
  - 68% of the rise due to multi-region service firms
  - 45% of increased variance among multi-region service firms occurs *within* firms

## C1: How do the 'new' facts connect to existing evidence?

- Song et al. (2019): 19 log point increase in variance of  $\ln(\text{wages})$  (1981 - 2013)
  - 68% of the rise occurs *between* firms (13/19 log points)
  - 42% of increased variance among mega-firms occurs within firms
- Kleinman (2023): 17 log point increase in variance of  $\ln(\text{wages})$  (1980 - 2017)
  - 68% of the rise due to multi-region service firms
  - 45% of increased variance among multi-region service firms occurs within firms

## C1: How do the 'new' facts connect to existing evidence?

- Song et al. (2019): **19 log point increase** in variance of  $\ln(\text{wages})$  (1981 - 2013)
  - 68% of the rise occurs *between* firms (13/19 log points)
  - 42% of increased variance among mega-firms occurs within firms
- Kleinman (2023): **17 log point increase** in variance of  $\ln(\text{wages})$  (1980 - 2017)
  - 68% of the rise due to multi-region service firms
  - 45% of increased variance among multi-region service firms occurs within firms
  - **Only 9 log point increase when controlling for industry**
  - Implies that **within MU service-firm changes account for 16% of the total** (2.8/17)

## C1: How do the 'new' facts connect to existing evidence?

- Song et al. (2019): **19 log point increase** in variance of  $\ln(\text{wages})$  (1981 - 2013)
  - 68% of the rise occurs *between* firms (13/19 log points)
  - 42% of increased variance among mega-firms occurs within firms
- Kleinman (2023): **17 log point increase** in variance of  $\ln(\text{wages})$  (1980 - 2017)
  - 68% of the rise due to multi-region service firms
  - 45% of increased variance among multi-region service firms occurs within firms
  - **Only 9 log point increase when controlling for industry**
  - Implies that **within MU service-firm changes account for 16% of the total** (2.8/17)
- Haltiwanger et al. (2022): Rise in variance of log wages occurs *between* industries
  - Rise in between-firm variance accounts for 85% of total increase (1996-2018)
  - Within-firm variance *falls* over time



## C1: How do the 'new' facts connect to existing evidence?

- 30 out of 301 NAICS 4 industries account for 98.1% of total change (Haltiwanger et al.)
  - Restaurants and General Merchandise stores largest contributors (low-paying)
  - Software (51), Computer Systems Design (54), and **Management (55)** (high-paying)
  - Mega-firms key contributors in both low- and high-paying industries
- Business Services (NAICS 5) wage growth occurs in big cities (Eckert et al., 2022)
- Kleinman (2023) is also about Business Services & role of cities
  - Re-classifies an MU firm's NAICS 51-55 estabs into their primary firm sector
  - (E.g., Amazon HQ estabs are classified in 'warehousing'?)
  - Finds that these services are in high-skill areas

## C2: Embrace key features of the data

- Document the extent & characteristics of multi-sector Business Services firms
- Use estab 'auxiliary' status to quantify *within-firm* provision of Business Services
  - 'Auxiliaries' are estabs that primarily serve other estabs of their firm
  - They pay higher wages than other esabs in same ind, FIPs, firm size-age (Ding et al. 2022)
  - Except for NAICS 55, these 'inputs' are increasingly sold to other firms
  - E.g., Amazon's Cloud-Computing Services
- Embrace the multiple locations of Business Services estabs per firm
  - I suspect this is growing in importance and dominated by big firms
  - Dropping them biases the structural estimates on falling distance costs

# C2: Embrace key features of the data



Search

Who We Are

What We Do

Our Workplace

Our Impact

Our Planet

Follow Us

Subscribe

EN

## The latest from our HQs and tech hubs



### Building on progress at Amazon's HQ2 in Arlington, Virginia

With plans nearly complete for PenPlace, the next phase of Amazon's HQ2, learn what the project will bring to the community.

[Read more](#)



### Amazon's new Boston office welcomes employees

The latest Amazon office to open in Boston Seaport will bring together 2,000 Amazon employees.

[Read more](#)



### Take a sneak peek inside the Amazon Nashville office

With more than 2,500 employees already hired in Nashville, Tennessee, we are well on our way to create more than 5,000 corporate and technology jobs in Music City.

[Read more](#)

### C3: Provide direct evidence of the model's mechanism

- Do multi-sector firms pay higher Business Services wages?
  - Compare to estabs in the same FIPs, industry, and firm size-age bins
  - Do they have higher wages for their other estabs?
- Do multi-sector firms increase Business Services wages more after expansion?
  - Ideally provide identified evidence for this fact
  - At least control for changing use of technology

## C4: What is a 'shock' to expansion?

- Firm productivity in market  $j$  when headquartered in  $i$

$$\varphi_{ij}(\omega) = A_i \tau_{ij} z_{\omega,j} \left( \prod_{s=1}^S h_{is}^{\rho_s} \right)^\gamma$$

- $\tau_{ij}$ : exogenous cost to capture distance, communications, regulation, etc.
  - Infer falling  $\tau_{ij}$  using observed changes in firm expansion
  - Assumes these changes are exogenous and what drives the expansion ('a shock')
- But big firms adopt more ICT in order to leverage themselves across space

## C4: What is a 'shock' to expansion?

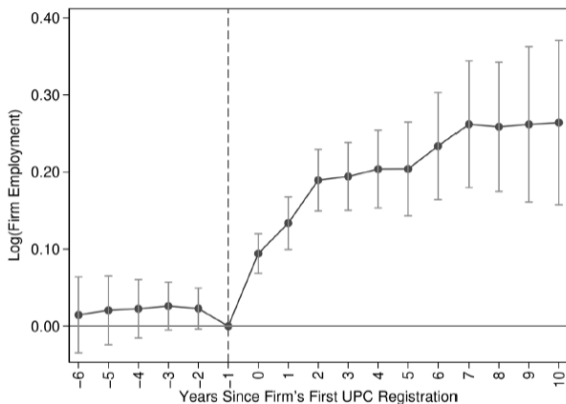
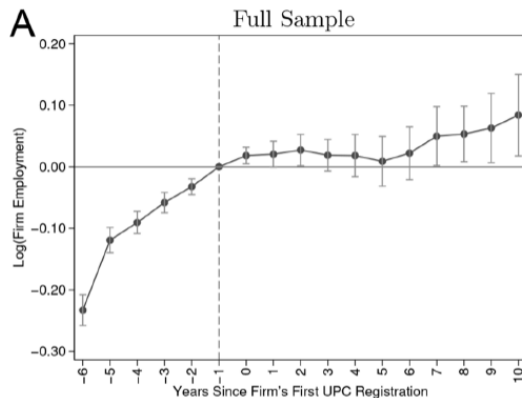


FIG. 4.—Matched-sample event study: employment. Coefficient estimates and 95% confidence intervals are from an event-study regression of UPC adoption on log firm employ-

Source: Basker and Simcoe 2021

- US retailers grow after adopting the UPC

## C4: What is a 'shock' to expansion?



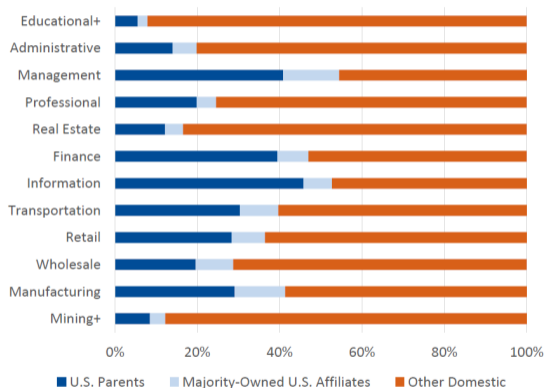
Source: Basker and Simcoe 2021

- Big firms' endogenous technology adoption *drive* the fall in costs & expansion!
- This adoption directly increases the demand for skill in big cities (Rubinton 2022)

## C5: The facts and mechanism both relate to multinationals (MNEs)

- MNEs have disproportionate employment in Business Services

### Establishment-Based

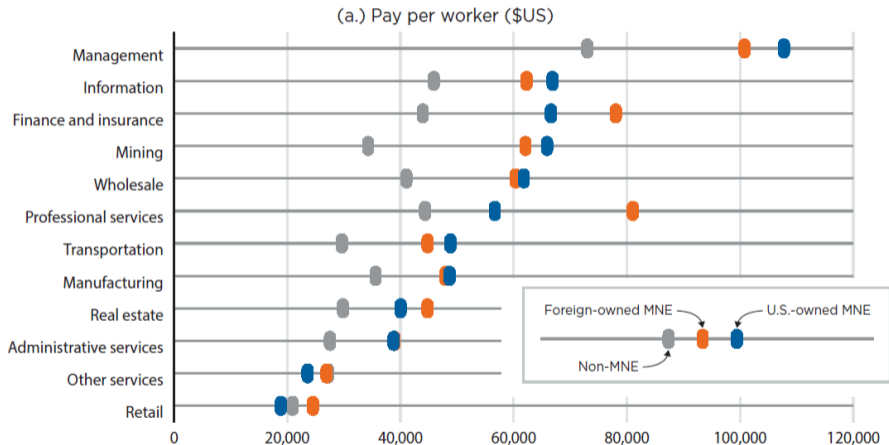


Source: Kamal et al. (2022)



## C5: The facts and mechanism both relate to multinationals (MNEs)

- US MNEs pay higher wages in Management & Information



Source: Kamal et al. (2022)

# Appendix

## Expansion in Wholesale/Retail by Multi-Market Firms

Table 4: Multi-Market Firms Present in at Least 50 Commuting Zones

	1992	2002	2012
Commuting Zones per firm	131.5	154.7	169.2
Establishments per firm	616.2	686.7	814.9
National market share	0.388	0.533	0.581
Local market share	0.032	0.033	0.034

Source: Smith and Ocampo (2023)

## Rise in variance of log wages occurs across industries

Table 1: Variance decomposition, by seven-year interval

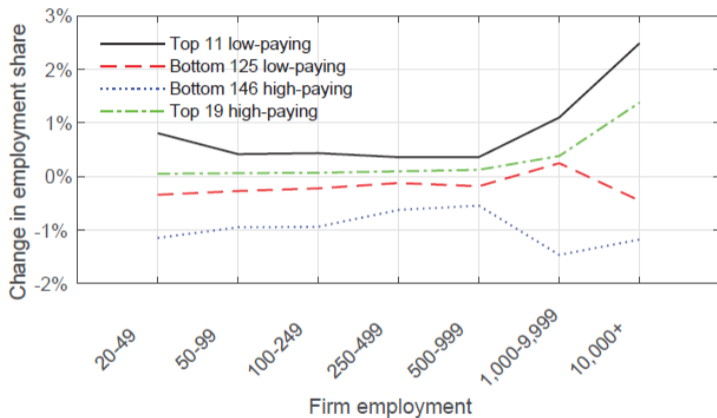
	Interval 1: 1996-2002	Interval 2: 2004-2010	Interval 3: 2012-2018	Growth: 1 to 3
<i>Variance, in levels:</i>				
Total variance	0.794	0.862	0.915	0.121
Within-firm	0.512	0.532	0.531	0.018
Between-firm, within-industry	0.112	0.127	0.140	0.028
Between-industry	0.170	0.203	0.245	0.075
<i>Variance, as percent of total:</i>				
Within-firm	64.6%	61.7%	58.0%	14.9%
Between-firm, within-industry	14.0%	14.7%	15.3%	23.1%
Between-industry	21.4%	23.6%	26.8%	61.9%

Source: Haltiwanger, Hyatt, and Spletzer (2022)

- Rise in between-firm variance accounts for 85% of total increase (1996-2018)
- Within-firm variance *falls* over time

## Mega-Firms are key players in the 'inequality industries'

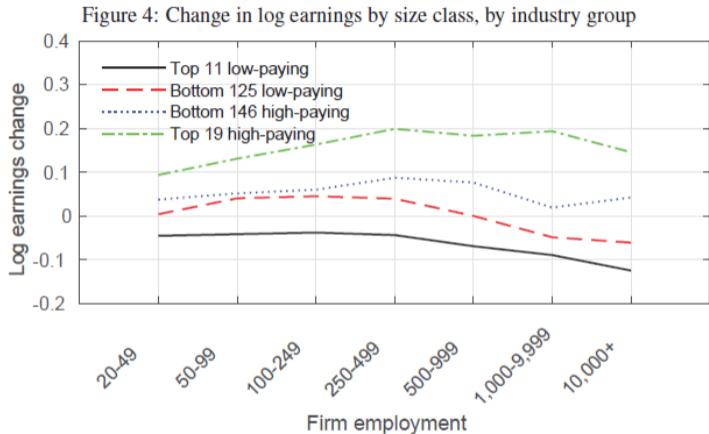
Figure 3: Change in employment share by size class, by industry group



Source: Haltiwanger, Hyatt, and Spletzer (2022)

- Mega-firms grow in both the high and low-paying jobs

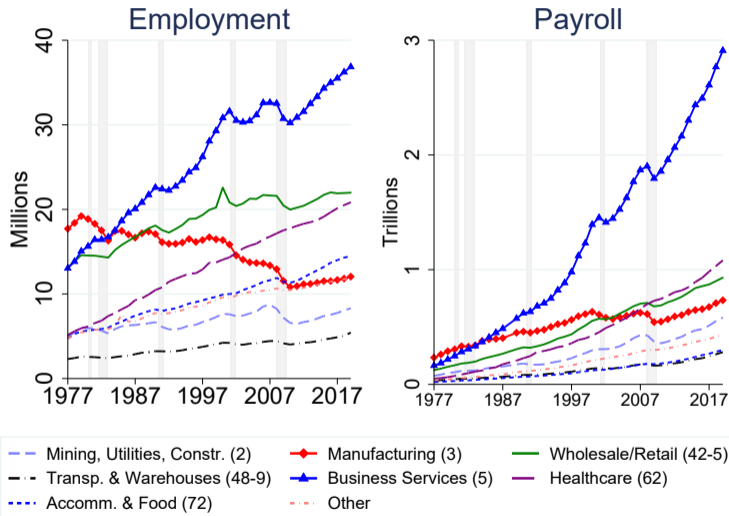
## Mega-Firms are key players in the 'inequality industries'



Source: Haltiwanger, Hyatt, and Spletzer (2022)

- Mega-firms seem to push down low-paying wages...but what about geography?

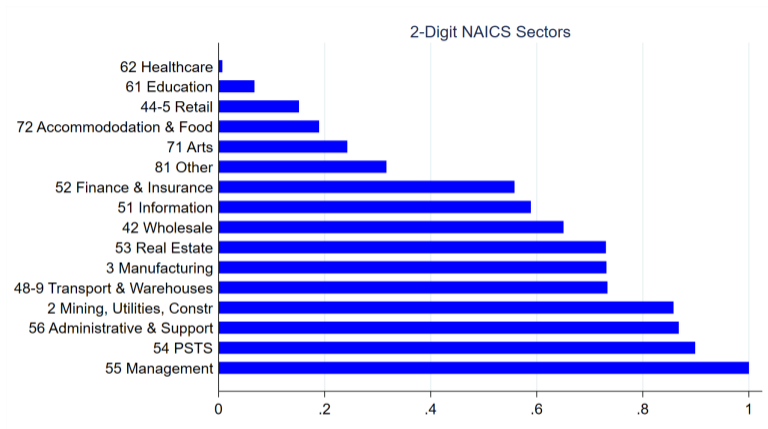
# Rise of Business Services plays a key role in rising inequality



Source: Ding et al. (2022)

- Business Services are primarily inputs

# Business Services are essentially inputs



Source: Ding et al. (2022)

- Except for NAICS 55, these 'inputs' are increasingly sold to other firms
- E.g., Amazon's Cloud-Computing Services



## Support establishments pay higher wages

Table 2: Auxiliary Establishment Premia

Dependent variable is the log of variable in column for establishment  $i$ , in industry  $j$ , and year  $t$

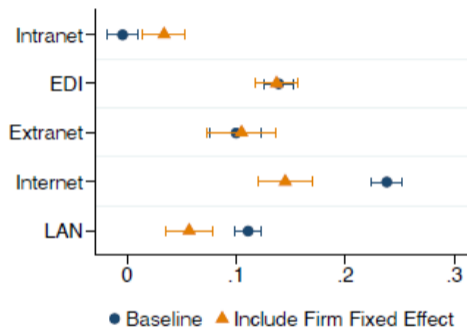
	$\ln(emp_{ijt})$		$\ln(sales_{ijt})$		$\ln(wage_{ijt})$	
	(1)	(2)	(3)	(4)	(5)	(6)
$Aux_{ijt}$	0.764*** (0.027)	-0.078*** (0.021)	0.970*** (0.025)	-0.158*** (0.021)	0.383*** (0.016)	0.064*** (0.011)
Adj. R-Squared	0.22	0.84	0.24	0.86	0.35	0.95
Observations (000s)	4,389	4,389	4,389	4,389	4,389	4,389
Firm Controls	No	Yes	No	Yes	No	Yes

Source: Ding et al. (2022)

- 'Auxiliary' Estabs are those that primarily serve other estabs of firm
- Regressions include estab NAICS, FIPS, and year FEs
- Takeaway: Estabs that provide input services within the firm pay higher wages

## ICT also facilitates across-firm expansion

### C. External Communication with Suppliers



Source: Jiang 2023

- These technologies also facilitate across firm relationships