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Spatial Wage Inequality in North America and Western Europe: 1975-2019

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EEA-ESEM 2024 Rotterdam
Contributed Session: Income Inequality
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What we do not know about spatial inequality

- How much does spatial wage inequality contribute to **national wage inequality**?

- How does spatial wage inequality **compare across countries**?

- How has spatial wage inequality **evolved through time**?

- What are possible **drivers** of spatial wage inequality?

- Inequality in **wages vs. other sources of income**?

*And of course a lot more but this is what our project is aiming to answer in the first stage.   ◂ Some literature

This paper in a nutshell

- Contribution of places in explaining **national inequality** is low and mostly consistent over time

- **Spatial inequality** roughly doubled since the 1980s
  - The US is the most unequal country; and experienced the largest increase
  - Divergence of high wages and convergence of the lowest wages between areas

- **Drivers**: Large places are key in understanding some of the trends

* Results are preliminary and work in progress. ◂ Current stage and project goals

Data

- **Countries**: Canada, US, France, (West) Germany, and the UK from around 1975 to 2019

- **Data**: Social security records and censuses ◂ Details
  - 1-20% sample of the working population

- **Population**: Adult (age 20+) full-time workers

- **Wages**: Pre-tax weekly/daily earnings

*Every mention of Germany from here on refers to West Germany unless stated otherwise.

Definition of economic regions

Local labour market areas (LLMAs):

- Focus: Self-containment of commuting flows (minimize the commuting flows across area boundaries)

- Includes: Urban and rural areas (i.e., the whole spatial extent of a country)

◂ Details

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National wage inequality

Importance of places for national inequality

Raw Variance Share (RVS): For each year, we calculate R^2 from:

$$ln(wage_{irt}) = \alpha_t + \mu_{rt} + \varepsilon_{irt}$$

where i denotes the individual, r the LLMA, t is time and μ_{rt} LLMA fixed effects.

RVS is the percentage of variance in wages **accounted for by the variance of mean wages between areas.** ◄ Trends in national inequality

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Between-inequality contributes a rather low share
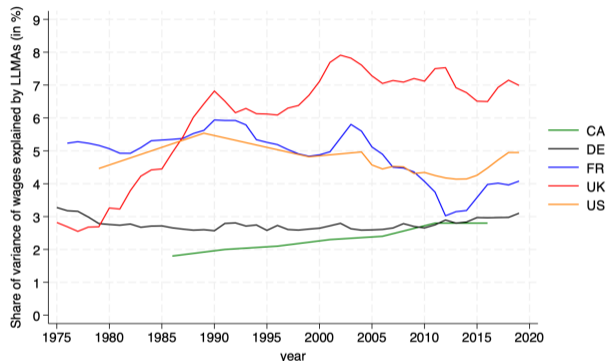
Full-time workers, 20+ years old, weekly earnings. Source: UK: ASHE/NESPD; DE: SIAB; FR: DADS; CA: CCP; US: Census/ACS

- Place relatively more important in UK/US/FR; stronger rise in UK
- Reunified Germany in 1992: 14%

◂ See counterfactual trends in national inequality

Spatial wage inequality

Spatial wage inequality

Convergence/divergence across LLMAs:

- Variance of log (i) mean (ii) p90, and (iii) p10 wages

- Drivers: The role of LLMA size

- Drivers: Worker's spatial distribution and the largest LLMAs

* All statistics are weighted by the LLMA population to reduce the effect of small LLMAs.

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Convergence/divergence: Mean wages
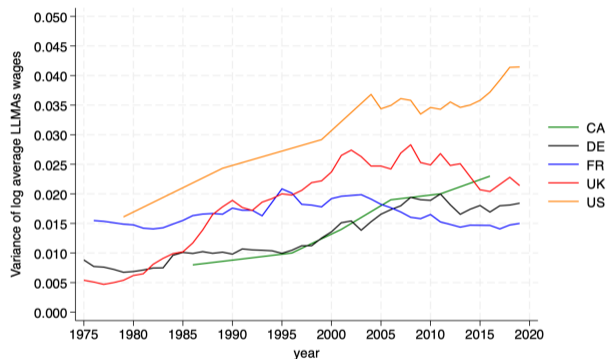
Full-time workers, 20+ years old, weekly earnings. Source: UK: ASHE/NESPD; DE: SIAB; FR: DADS; CA: CCP; US: Census/ACS.

- Spatial inequality **roughly doubled** in all countries (except France)
- Divergence in 2010s; highest level and increase in the US (◄ What is high?)
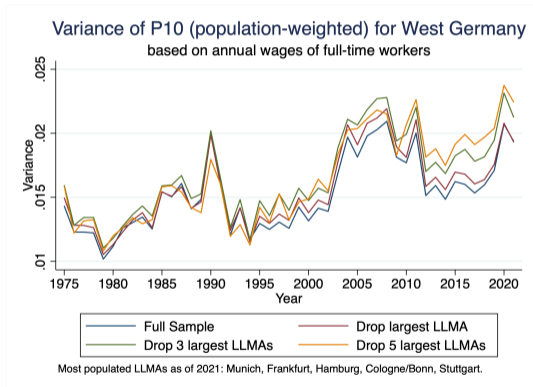
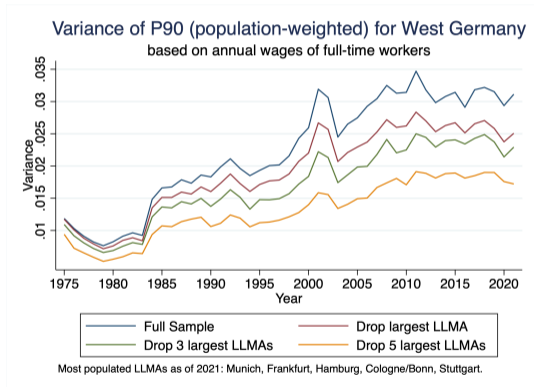# Convergence/divergence: High wages (P90) vs. low wages (P10)
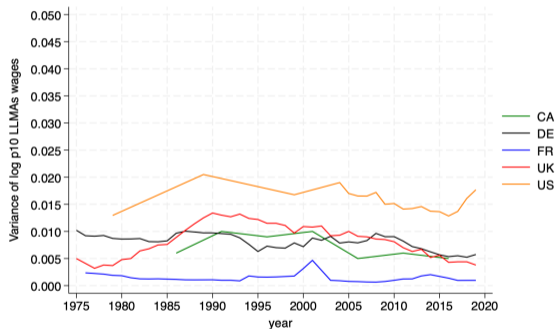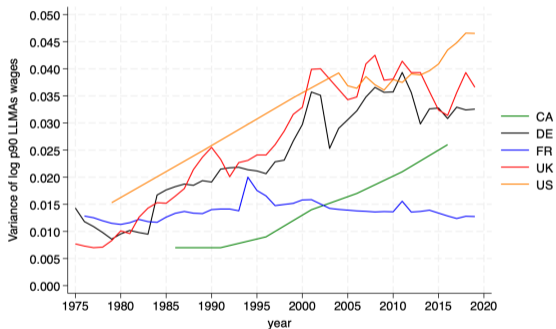
- p90: increasingly dissimilar in CA/DE/UK/US
- p10: dispersion is low and rather flat over time ◀ Median (p50)
- **Growing spatial inequality is a story of high-wage dispersion (p90)**

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The role of LLMA size

- **Growing spatial inequality seems to be a story of high wages... in the largest cities**:

  - Growth in p90 positively correlated with initial city size but not p10 ◂ Details

  - Variance of p90 largely flat once excluding largest LLMAs
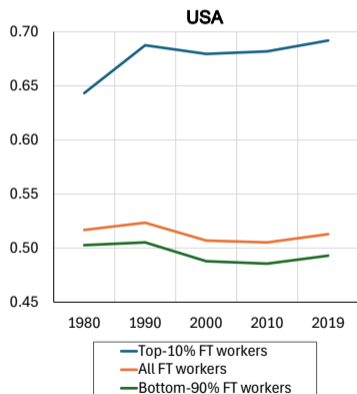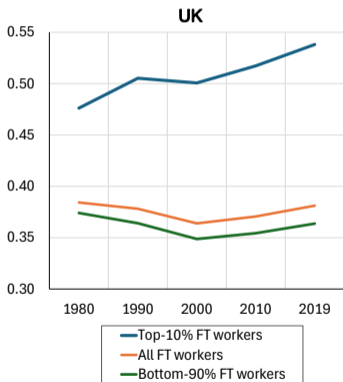
The role of the largest LLMAs: Germany

Variance of P90 (population-weighted) for West Germany
based on annual wages of full-time workers

Most populated LLMAs as of 2021: Munich, Frankfurt, Hamburg, Cologne/Bonn, Stuttgart.

Variance of P10 (population-weighted) for West Germany
based on annual wages of full-time workers

Most populated LLMAs as of 2021: Munich, Frankfurt, Hamburg, Cologne/Bonn, Stuttgart.

- Dropping the largest LLMAs significantly lowers the rise of spatial dispersion of high wages (p90) but not of low wages (p10) ◂ US

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Workers' spatial distribution and the largest LLMAs

- **Are workers becoming more spatially concentrated in the big cities?**

- Look at:

  - All workers

  - Top-10% workers

  - Bottom-90% workers

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Concentration: Share of full-time (FT) workers in largest 5% LLMAs

- Big cities are not growing in workers, **but more high-wage earners live there**

◀ Concentration changes

Conclusion

- Low contribution of places in explaining national inequality, BUT:

- Strong increase in spatial wage inequality

- Divergence for the "rich" and convergence for the "poor"

- Big cities are not growing in workers, but more high-wage earners live there

Future of the project:

- **Conference on spatial inequality in Berlin on December 5 & 6, 2024**
  (preliminary) hosted by the Kiel Institute

- 2025: Publicly available database and more papers

Appendix

What we already know about spatial inequalities

Place matters...

- ...for economic outcomes: Moretti (2012)

- ...for political outcomes: Becker et al. (2017)

- ...for happiness and health: De Neve and Krekel (2020); Deryugina and Molitor (2021)

* Just a few examples representing a vast literature each.   ◂ Go back

Current stage and project goals

Geographic units

- Use similarly defined local labour market areas (LLMAs)

Income

- Wages: social security records + census data (since mid-1970s)

- Total income: income tax returns + census data (since mid-1990s)

- Local costs of living: Build LLMA-level price indices

Sample

- More countries: Full coverage of Western Europe

◂ Go back

Data

Data: matched employee-employer registries + census data

- DE – SIAB – 2% sample of workers (1975-2019) – (West Germany)

- FR – DADS – 4/8% sample of workers (1976-2018)

- UK – NESPD/ASHE – 1% sample of workers (1975-2019)

- CA – CCP – 20% sample of population (1986 – 2016)

- US – Census/ACS – 1% or 5% sample of population (1979 – 2019)

◀ Go back

Geographical units: Local Labour Market Areas (LLMAs)

- Canada: 266 self-contained labour market areas

- France: 306 zones d'emploi (employment zones)

- Germany: 223 Arbeitsmarktregionen (labour market regions)

- UK: 228 travel to work areas (imputed using the 'Dorn method' for pre-1997)

- US: 741 commuting zones (imputed using the 'Dorn method')

◂ Go back

Geographical units: Self-contained LLMAs

Demand self-containment

Proportion of employees resident in the area

Number of employees
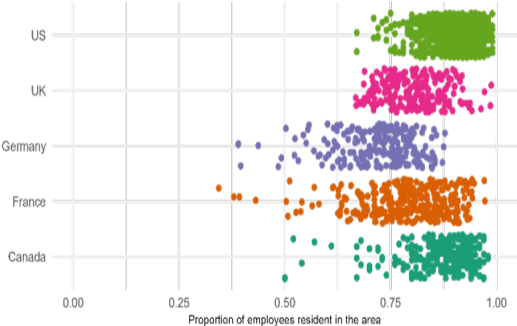
Number of people (thousands)
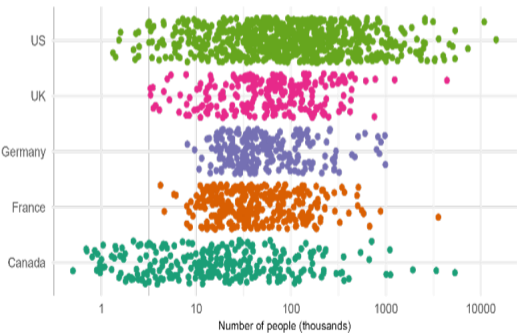
◂ Go back

Illustrating our dataset: Within-area inequality in Europe

Top 20% Share
- 35% or below
- 35 - 37.5%
- 37.5 - 40%
- 40 - 42.5%
- 42.5 - 45%
- 45 - 47.5%
- 47.5 - 50%
- 50 - 52.5%
- 52.5% or above

Note: DE 1985, FR 1986, UK 1984-1986

Top 20% Share
- 35% or below
- 35 - 37.5%
- 37.5 - 40%
- 40 - 42.5%
- 42.5 - 45%
- 45 - 47.5%
- 47.5 - 50%
- 50 - 52.5%
- 52.5% or above

Note: DE 2018, FR 2018, UK 2017-2019

Illustrating our dataset: Within-area inequality in North America

Top 20% Share
- 35% or below
- 35 - 37.5%
- 37.5 - 40%
- 40 - 42.5%
- 42.5 - 45%
- 45 - 47.5%
- 47.5 - 50%
- 50 - 52.5%
- 52.5% or above

Note: CA 1986, US 1989

Top 20% Share
- 35% or below
- 35 - 37.5%
- 37.5 - 40%
- 40 - 42.5%
- 42.5 - 45%
- 45 - 47.5%
- 47.5 - 50%
- 50 - 52.5%
- 52.5% or above

Note: CA 2016, US 2018
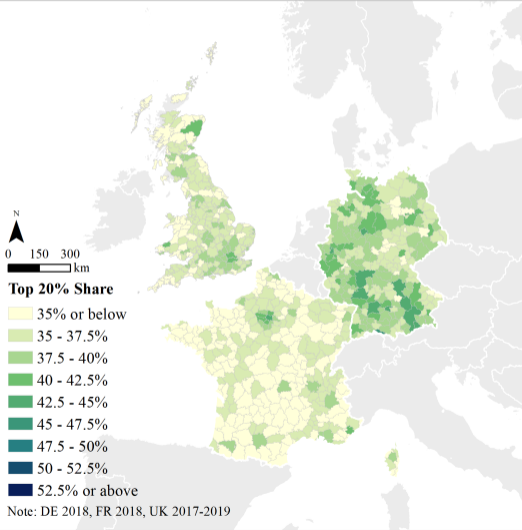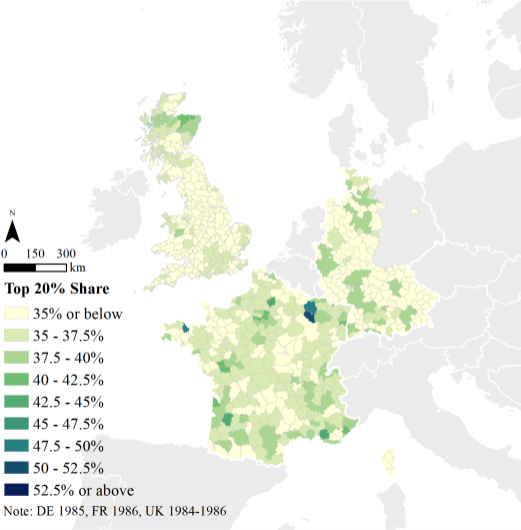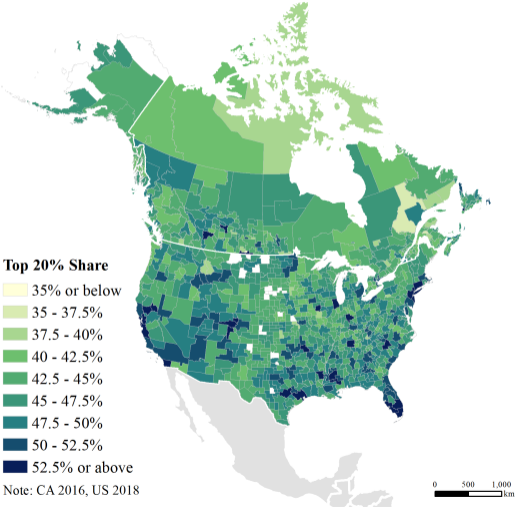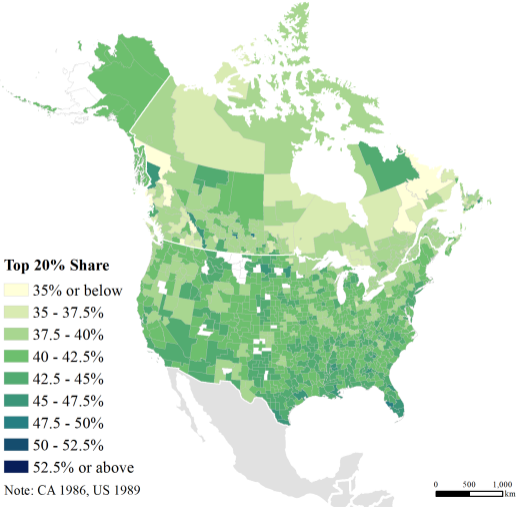
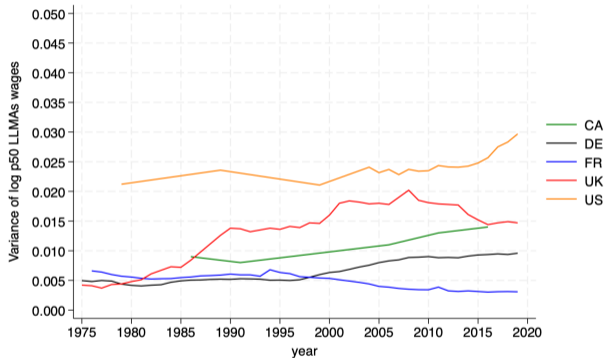# Setting the scene: the rise in national wage inequality
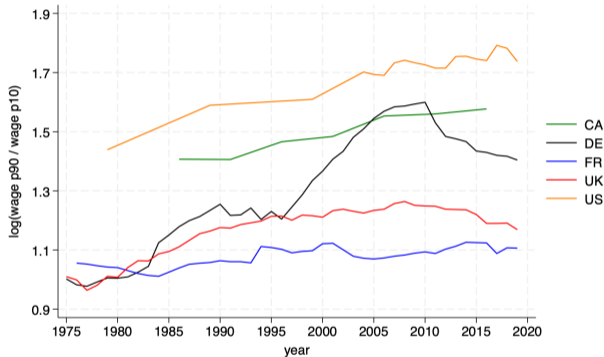
Full-time workers, 20+ years old, weekly earnings. Source: UK: ASHE/NESPD; DE: SIAB; FR: DADS; CA: CCP; US: Census/ACS.

- The U.S. is the most unequal, France the most equal
- The highest increase in Germany (esp. 1995-2007) ◀ Go back

Counterfactual national inequality: log(p90/p10)

- What would have the national inequalities looked like, if there had been no differences in the average wage across the regions?

$$p_{rt} = \frac{Y_t}{Y_{rt}}$$

- What would have the national inequalities looked like, if there had been no differences in the average wage across the regions?

- Policy equivalent $\rightarrow$ increasing average income tax in high-wage places and decreasing in low-wage places

◂ Go back

Removing spatial inequality has almost no effect on wage inequality
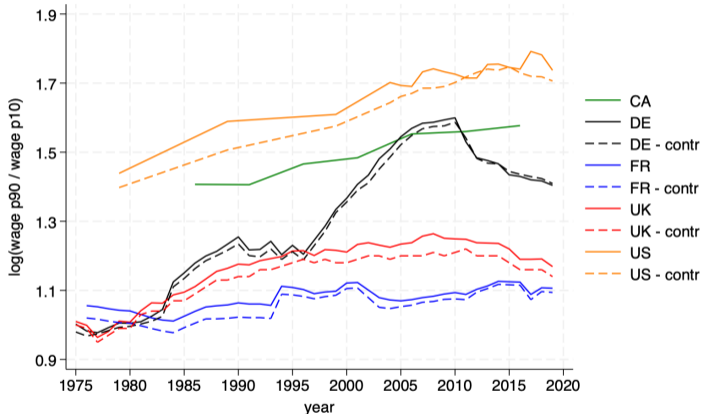
Full-time workers, 20+ years old, weekly earnings. Source: UK: ASHE/NESPD; DE: SIAB; FR: DADS; CA: CCP; US: Census/ACS.

What is high spatial inequality: Reunified Germany
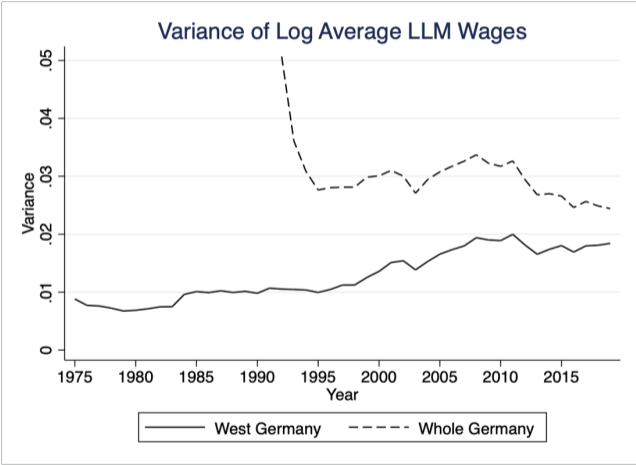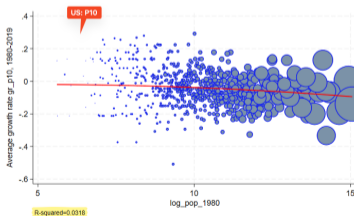

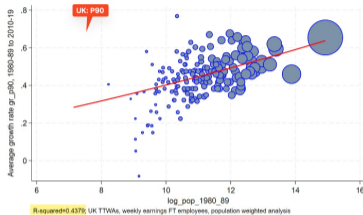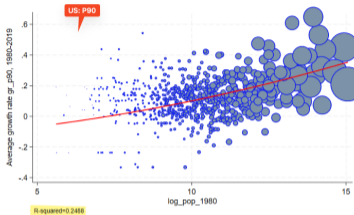- Around reunification close to 0.05 (i.e., similar to the US today) ◂ Go back
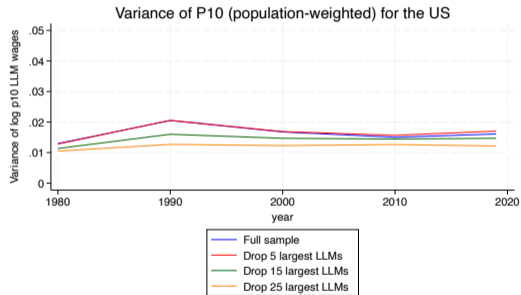
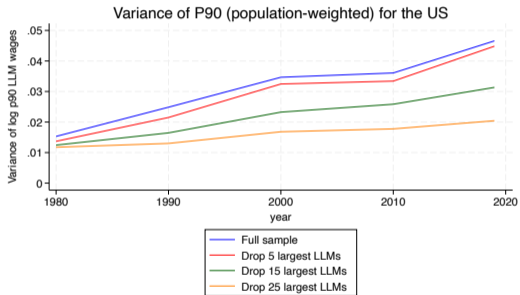# Convergence/divergence: Median wages (p50)

Full-time workers, 20+ years old, weekly earnings. Source: UK: ASHE/NESPD; DE: SIAB; FR: DADS; CA: CCP; US: Census/ACS.

- Dispersion of median wages (p50) rather flat through time

◂ Go back

p90 and p10 growth and initial city size: UK and US
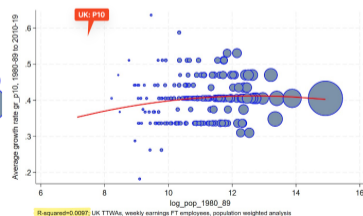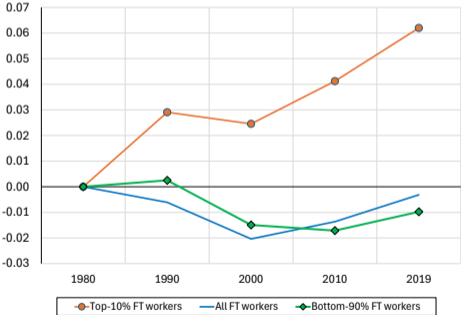
The role of the largest LLMAs: US

- Dropping the largest LLMAs significantly lowers the rise of spatial dispersion of high wages (p90) but not of low wages (p10)
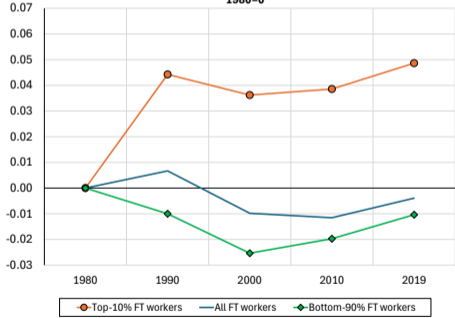
◄ Go back

Concentration: Share of FT workers in largest 5% LLMs (1980 = 0)

UK: share of population groups in the top-5% largest cities, 1980-2019
1980=0

Legend: Top-10% FT workers — All FT workers — Bottom-90% FT workers

US: share of population groups in the top-5% largest cities, 1980-2019
1980=0

Legend: Top-10% FT workers — All FT workers — Bottom-90% FT workers

◀ Go back