Remote Work and Labor Market Power

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The views expressed here do not reflect those of the Bank of Italy

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Introduction

Motivation

i. Distaste for commuting make distant employers imperfect substitutes
   - Key source of monopsony power (Manning & Petrongolo, 2024)

ii. Remote work has changed the geography of labor markets
   - Rarer commutes may translate into greater distance (Akan et al., 2025)

→ Has WFH significantly impacted competition in labor markets?

Approach

i. Theory

- General equilibrium model to understand:
  - How does commuting frequency affect wage markdowns?
  - How do wages adjust in the short run vs long run?
  - What if remote work adds a new dimension of employer differentiation?

ii. Empirics

- WFH exposure using the occupation-level shifts in Italy & the US
- Impact on commuting distance, markdowns, wage growth
- Tests at the worker level, firm level, market level

Theory

Environment

- Fixed number of firms partitioned in two sectors, A and B
  - Sector A is exposed to remote work; B is fully in person
- Firms produce linearly in labor, price makers in labor markets
- Worker's choice in two steps: first the sector; then the employer
- Remote work provides a utility gain, $u(r)$,
  and interacts with two sides of horizontal differentiation:
  i. Commuting distance, d_{jf}
  ii. Organizational fit, z_{jf}

Choice concentration

- Worker j's utility from firm f in sector i:

$$\log U_{jfi} = \log w_{fi} + u(r_{fi}) - (1 - r_{fi})d_{jf} + r_{fi}z_{jf} + \log \varepsilon_{jfi}$$

- $\Pr(\varepsilon_{jfi} < \varepsilon) = \exp(-\varepsilon^{-\eta}) \rightarrow$ closed-form probabilities, π_{jfi}
- Define choice concentration as

$$H_i \equiv \mathbb{E}_j \left[\sum_f \pi_{jfi}^2 \right] = \underbrace{\sum_f \left(\frac{l_{fi}}{L_i} \right)^2}_{\text{employment HHI}} + \underbrace{\sum_f \text{Var}_j(\pi_{jfi})}_{\text{worker-specific concentration}} .$$

Labor market power

- Considering a symmetric equilibrium

$$\varepsilon_{fi} \equiv \frac{\partial \log l_{fi}}{\partial \log w_{fi}} = \eta(1 - H_i)$$

- The firm's FOC gives the markdown formula

$$\boxed{\gamma_i \equiv \frac{p_i - w_i}{w_i} = \frac{1}{\eta(1 - H_i)}}$$

$\rightarrow$ More concentrated worker choices $\Rightarrow$ larger markdowns

Remote work

- Decomposing choice concentration: $H(r) = H^D(r)H^Z(r)$
- Remote work may generate two opposing forces

$$\underbrace{\frac{\partial H^D(r)}{\partial r} < 0}_{\text{Location channel}} \qquad \underbrace{\frac{\partial H^Z(r)}{\partial r} > 0}_{\text{Fit channel}}$$

$\rightarrow$ The net effect on markdowns depends on which channel dominates

Empirics

Data

i. Job postings from Lightcast (formerly Burning Glass)
   - Full text of 2018-2024 ads from Italy ($\sim$20mln) and the US ($\sim$200mln)

ii. Employer-employee matched data from social security (VisitINPS)
   - Employer's location, industry, balance sheet, income statement
   - Employee's demographics, occupation, industry, commuting distance, pay

Markdown estimation

i. We estimate translog revenue functions in $\{K, L, M\}$

- Elasticities vary by firm-year; parameters vary by 4-digit industry
  - $\varepsilon_{fit}^{R,L} \equiv \frac{\partial R_{ft}}{\partial L_{ft}} \frac{L_{ft}}{R_{ft}} = \alpha_{i,l} + 2\alpha_{i,l^2} l_{ft} + \alpha_{i,kl} k_{ft} + \alpha_{i,lm} m_{ft}$
- To deal with endogeneity: control function (Ackerberg et al., 2015)

ii. $MRPL_{ft} \equiv \frac{\partial R_{ft}}{\partial L_{ft}} = \varepsilon_{fit}^{R,L} \frac{R_{ft}}{L_{ft}} \quad \rightarrow \quad \gamma_{ft} \equiv \frac{MRPL_{ft} - w_{ft}}{w_{ft}}$

iii. Firm-level markdowns are then aggregated using wage bill weights

- Equivalent to aggregating firm-level MRPL using employment weights

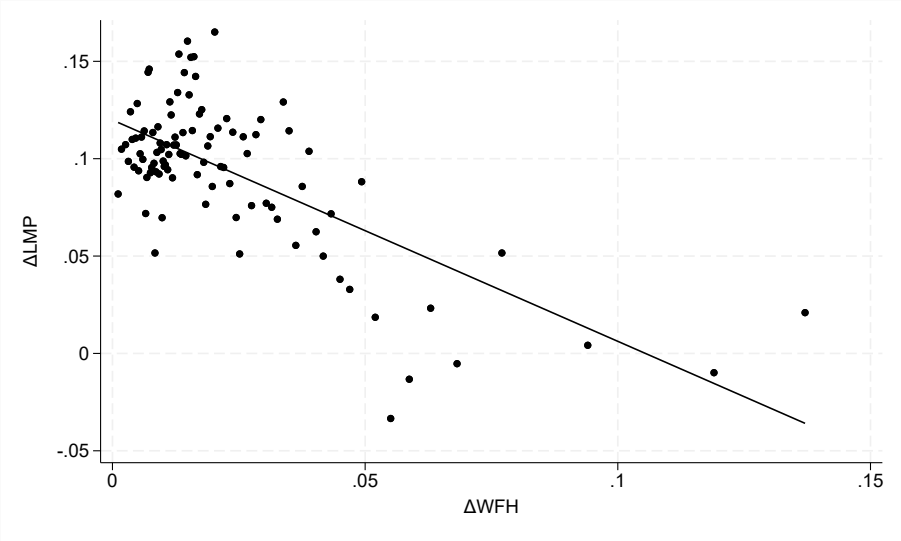
Market level: Setting

- Estimating equation: $\mathbb{E}[\Delta LMP_c] = \beta_1 + \beta_{\Delta WFH}\Delta WFH_c + \beta_X X_c$
- Shift-share regressor: $\Delta WFH_c \equiv \sum_o s_{o,c}\Delta WFH_o$
- Shift-share IV: $\Delta WFH_c^{US} \equiv \sum_o s_{o,c}\Delta WFH_o^{US}$
- Pre-determined controls: X_c

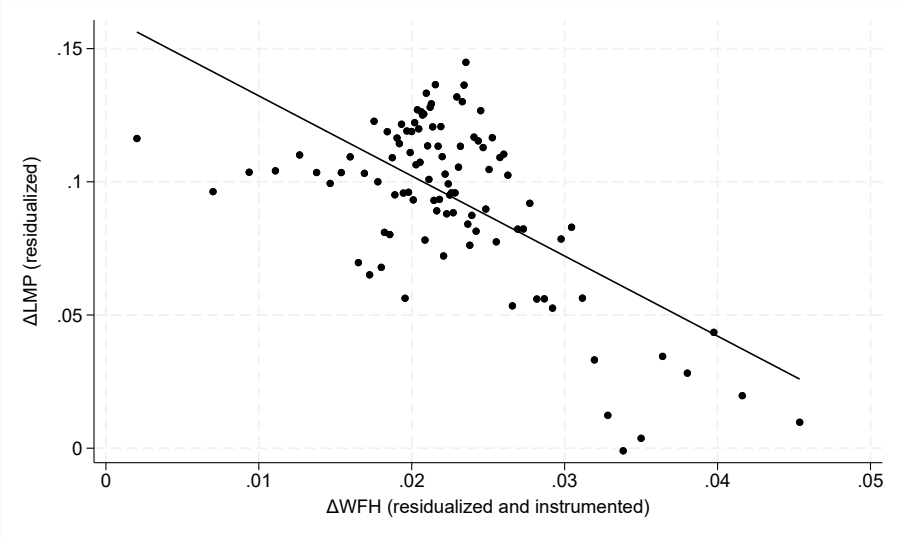
i. Share of high-skilled workers
ii. Share of college-educated
iii. Average age of workers
iv. Value added per worker (logs)
v. Labor costs per worker (logs)
vi. Workers per firm (logs)
vii. Market size in FTE (logs)
viii. Lag of the dependent variable

- Standard errors: Adao, Kolesar, & Morales (QJE 2019)

Labor market power vs WFH (no controls, no IV)



Labor market power vs WFH (baseline)



Market level: Baseline

	(1) ΔLMP	(2) ΔLMP	(3) ΔWFH	(4) ΔLMP	(5) ΔWFH	(6) ΔLMP
ΔWFH	-1.13***	-1.29***		-3.01***		-3.01***
	(0.12)	(0.12)		(0.27)		(0.98)
ΔWFH^{US} (IV)			0.36***		0.36***	
			(0.01)		(0.11)	
I stage F-Stat			997.92		11.37	
Method	OLS	OLS	2SLS (I)	2SLS (II)	2SLS (I)	2SLS (II)
Standard errors	Heterosk.	Heterosk.	Heterosk.	Heterosk.	AKM	AKM
Controls	None	Full set	Full set	Full set	Full set	Full set
LMP measure	Revenues	Revenues	Revenues	Revenues	Revenues	Revenues
Weighting	None	None	None	None	None	None
Minimum FTE	15	15	15	15	15	15
Observations	17,974	17,715	17,715	17,715	17,715	17,715
Unit	CZ-industry	CZ-industry	CZ-industry	CZ-industry	CZ-industry	CZ-industry

Market level: Pre-trends

	(1) ΔLMP	(2) $\Delta LMP_{2015-2019}$
ΔWFH	-2.99***	-0.15
	(0.95)	(0.67)
I stage F-Stat	11.37	11.37
Method	2SLS (II)	2SLS (II)
Standard errors	AKM	AKM
Controls	Full set \lag	Full set \lag
LMP measure	Revenues	Revenues
Weighting	None	None
Minimum FTE	15	15
Observations	17,715	17,715
Unit	CZ-industry	CZ-industry

Market level: Robustness

	(1) ΔLMP	(2) ΔLMP	(3) ΔLMP	(4) ΔLMP	(5) $\Delta \%W$
ΔWFH	-4.06***	-2.58**	-3.56***	-2.00**	2.03**
	(1.28)	(1.08)	(1.11)	(0.82)	(0.91)
I stage F-Stat	11.43	10.94	10.98	18.96	11.76
Method	2SLS (II)	2SLS (II)	2SLS (II)	2SLS (II)	2SLS (II)
Standard errors	AKM	AKM	AKM	AKM	AKM
Controls	Full set	Full set	Full set	Full set	Full set
LMP measure	Production	Revenues	Revenues	Revenues	Revenues
Weighting	None	FTE (gm)	None	None	None
Minimum FTE	15	15	0	1,500	15
Observations	17,743	17,715	23,681	871	17,743
Unit	CZ-industry	CZ-industry	CZ-industry	CZ-industry	CZ-industry

Counterfactuals

Scenario	WFH transition (2019-2023)	Markdown (2023)	Difference
Observed data	$\Delta WFH_{i,j}$	0.3	-
i. No transition	0	0.37	+23%
ii. Rome FE	$\Delta WFH_{i,j} - \theta_j + \theta_{Rome}$	0.27	-11%
iii. Milan FE	$\Delta WFH_{i,j} - \theta_j + \theta_{Milan}$	0.26	-13%
iv. IQR	$\Delta WFH_{i,j} + \Delta WFH_{IQR}$	0.24	-19%
v. SD	$\Delta WFH_{i,j} + \Delta WFH_{SD}$	0.23	-23%

Additional empirical results

- Worker level:
  - Significant increase in commuting distance (10%) and wage growth (4pp)
- Firm level:
  - Directionally consistent with market-level findings, but lower magnitude
- Market level:
  - Null results on employment concentration and labor productivity

Conclusion

Conclusion

- New evidence on the impact of remote work on labor market power

  +1SD in WFH exposure
  - → +10% in commuting distance
  - → -7pp in markdowns
  - → +4pp in wage growth

- Under the model's lenses:
  - Fall in location differentiation » rise in organizational differentiation
  - Enhanced competition » extra labor supply