What Drives Wage Stagnation: Monopsony or Monopoly?

Shubhdeep Deb[1] Jan Eeckhout[1] Aseem Patel[2] Lawrence Warren[3]

[1]UPF Barcelona
[2]Essex University
[3]US Census Bureau

DG Comp Workshop
Estimating the 'costs of non-competition' for the EU economy

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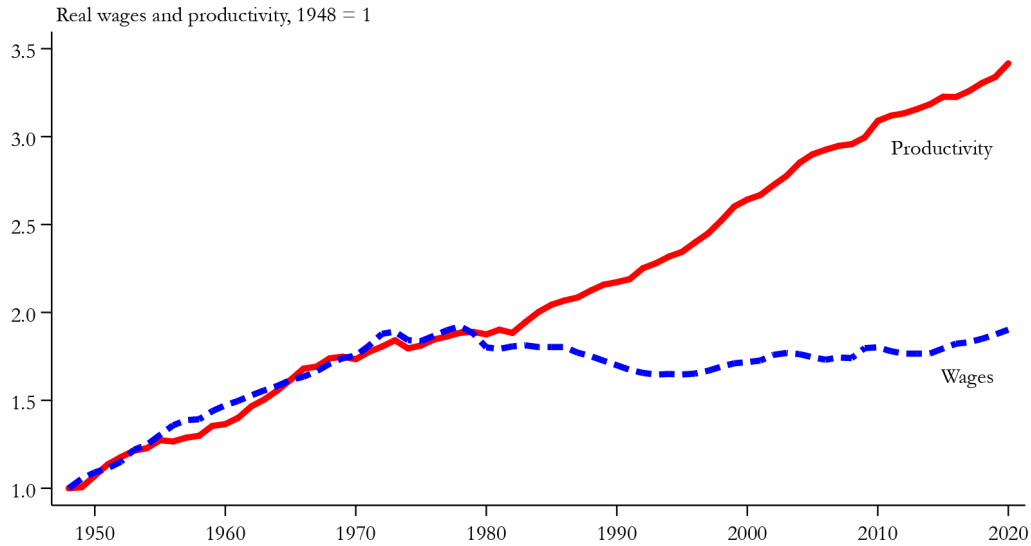
Wage Stagnation



Motivation

- Explore two mechanisms behind wage stagnation:
  1. Monopsony: direct effect from imperfect labor market
     → Lower firm-specific wages for own workers
  2. Monopoly: output market power affects labor demand – General Equilibrium effect
     → Lowers aggregate, economy-wide wages

Motivation

- Explore two mechanisms behind wage stagnation:
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     $\rightarrow$ Lower firm-specific wages for own workers
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     $\rightarrow$ Lowers aggregate, economy-wide wages

$\therefore$ Objective:
  1. Explain mechanism behind decoupling of wages and productivity
  2. Decomposition: measure contribution from Monopsony vs. Monopoly

Motivation

Findings

1. Competition has decreased over time:
   - Markups increase substantially
   - Markdowns are stable, increase only marginally
2. Wage stagnation: decoupling wages-productivity
3. Decomposition monopoly vs. monopsony: dominant force is monopoly

Model Setup

Markets

- Continuum of markets $j \in [0, J]$
- Finite numbers of firms in each market $n = 1, ..., N$
- Finite number of establishments $i = 1, ..., I$ (set of establishments i in firm n: $\mathcal{I}_{nj}$)

Household Preferences

- CES preferences over Consumption and Labor
  - Within market: goods η, labor $\hat{\eta}$
  - Between market: goods θ, labor $\hat{\theta}$
    $\rightarrow \eta > \theta$ and $\hat{\eta} > \hat{\theta}$
- maximizes static utility

$$\max_{C_{inj}, L_{inj}} \; U\left(C - \frac{1}{\bar{\phi}} \frac{L^{\frac{\phi+1}{\phi}}}{\frac{\phi+1}{\phi}}\right) \qquad \text{s.t. } PC = LW + \Pi$$

Model Setup

Technology

Firm $n \in \{1, \ldots, N\}$ in sector $j \in [0, J]$

$$\Pi_{inj} = \max_{\{Y_{inj}\}_{i \in \mathcal{I}_{nj}}} \left[\underbrace{P_{inj}(Y_{inj}, Y_{-inj}) Y_{inj}}_{\text{Sales}} - \underbrace{W_{inj}(L_{inj}, L_{-inj}) L_{inj}}_{\text{Variable costs}} \right]$$

subject to

$$Y_{inj} = A_{inj} L_{inj}$$

Prices and Equilibrium

Cournot-Nash Competition in output markets and labor markets

Equilibrium Solution

Producer Optimality

- The firm's first order condition can be written as:

$$P_{inj} \underbrace{\left(1 + \varepsilon_{inj}^{P}\right)}_{\mu_{inj}^{-1}} A_{inj} = W_{inj} \underbrace{\left(1 + \varepsilon_{inj}^{W}\right)}_{\delta_{inj}}$$

Equilibrium Solution

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- Markups and Markdowns

$$\mu_{inj} = \frac{P_{inj}}{MC_{inj}} = \frac{1}{1 + \varepsilon_{inj}^{P}}; \qquad -\varepsilon_{inj}^{P} = \frac{1}{\theta} s_{nj} + \frac{1}{\eta}(1 - s_{nj})$$

$$\delta_{inj} = \frac{MRPL_{inj}}{W_{inj}} = 1 + \varepsilon_{inj}^{W}; \qquad \varepsilon_{inj}^{W} = \frac{1}{\hat{\theta}} e_{nj} + \frac{1}{\hat{\eta}}(1 - e_{nj})$$

Quantitative Exercise

- U.S. Census Bureau Longitudinal Business Database (LBD): Tradeable Sectors
- In the data we observe
  1. Employment by establishment: L_{inj}
  2. Average Wages by establishment: $W_{inj} = \frac{\text{Wage Bill}_{inj}}{L_{inj}}$
  3. Revenue: R_{inj}
  4. Industry classification NAICS, SIC

Quantitative Exercise

Estimation

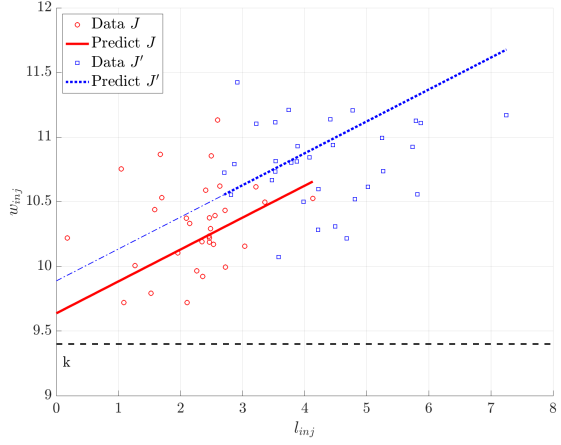
	Input/data	Output	
1. Common elasticities	W_{inj}, L_{inj}	$\hat{\theta}, \hat{\eta}$	
2. Firm-specific technology	L_{inj}	$A_{inj}, \mu_{inj}, \delta_{inj}$	system of FOCs given N
3. Market Structure	R_{inj}	N	

Estimating Labor Supply Elasticities

$$w_{inj} = \underbrace{-\frac{1}{\hat{\theta}}\log\left(\frac{1}{J}\right) \quad -\frac{1}{\hat{\theta}}l + w}_{k} \quad \underbrace{-\frac{1}{\hat{\eta}}\log\left(\frac{1}{l_j}\right) + \left(\frac{1}{\hat{\theta}} - \frac{1}{\hat{\eta}}\right) l_j}_{k_j} + \frac{1}{\hat{\eta}} l_{inj}$$

Estimating Labor Supply Elasticities

$$w_{inj} = \underbrace{-\frac{1}{\hat{\theta}}\log\left(\frac{1}{J}\right) - \frac{1}{\hat{\theta}}l + w}_{k} \quad \underbrace{-\frac{1}{\hat{\eta}}\log\left(\frac{1}{l_j}\right) + \left(\frac{1}{\hat{\theta}} - \frac{1}{\hat{\eta}}\right)l_j}_{k_j} + \frac{1}{\hat{\eta}}l_{inj}$$



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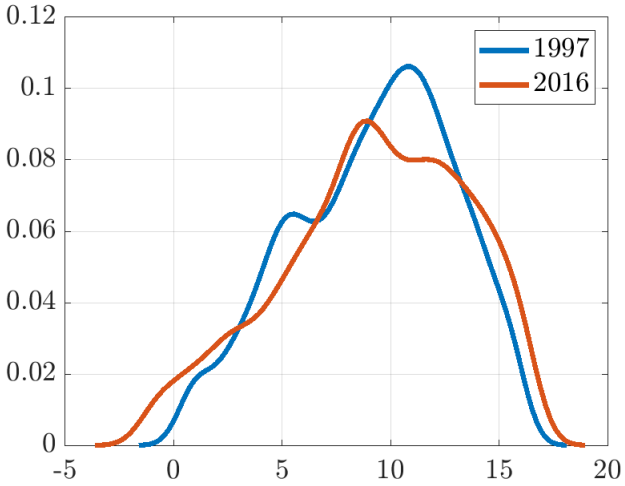
Labor Elasticities Estimates

Exogenous variation from tax differences over time

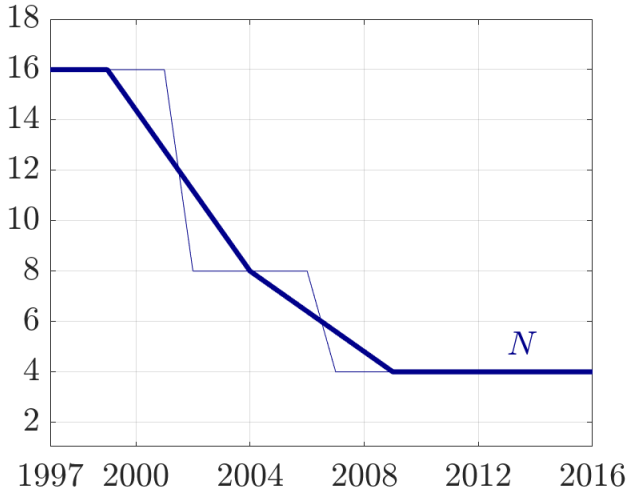
Parameter	Description	Estimate IV
$\hat{\eta}$	Within-market elasticity	3.49
$\hat{\theta}$	Between-market elasticity	1.71

Estimated Technology Distribution

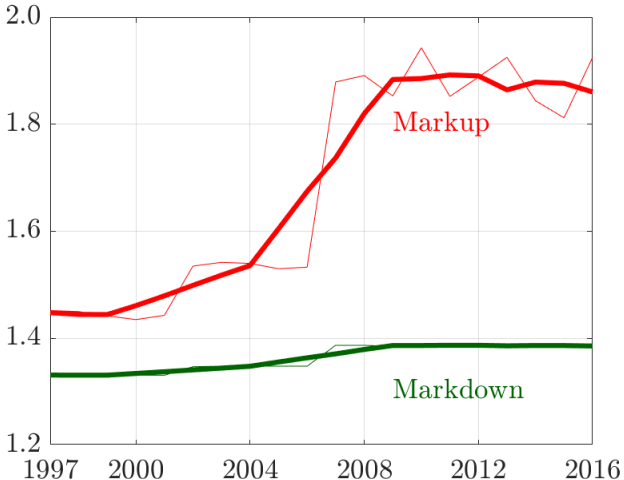
A_{inj}



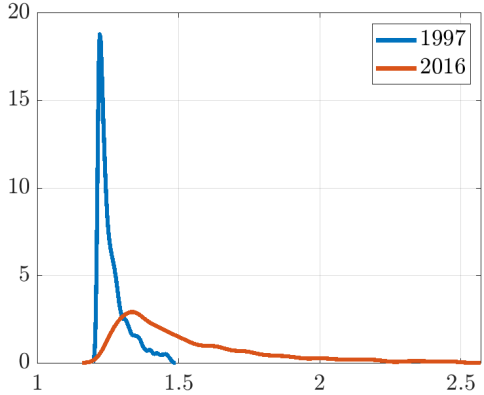
Estimated N

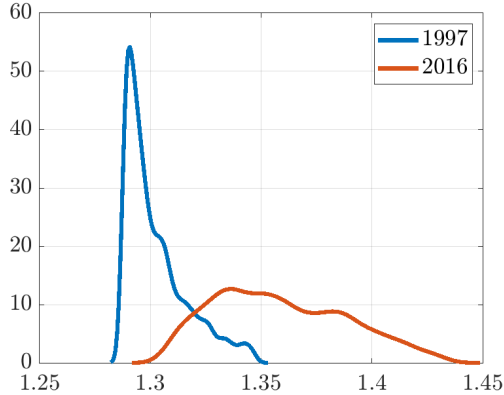


Average Markups and Markdowns

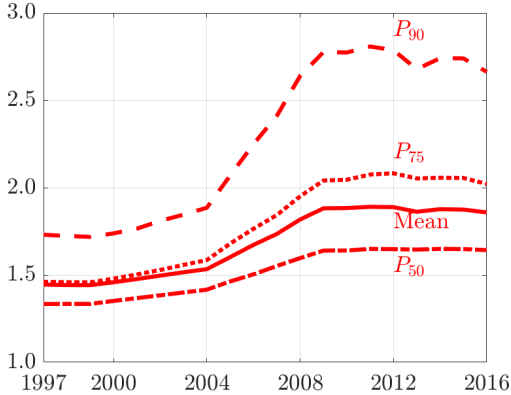


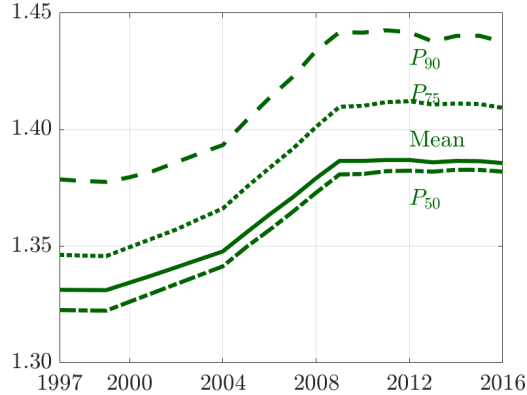
Markup and Markdown Distributions



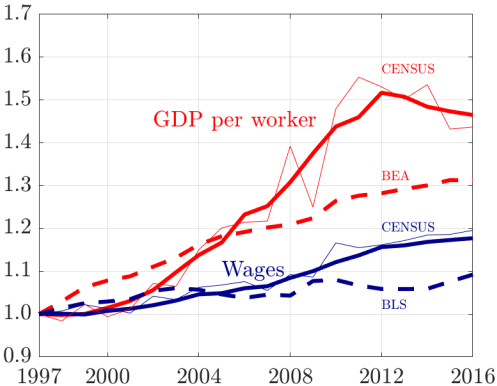


Markup and Markdown Distributions

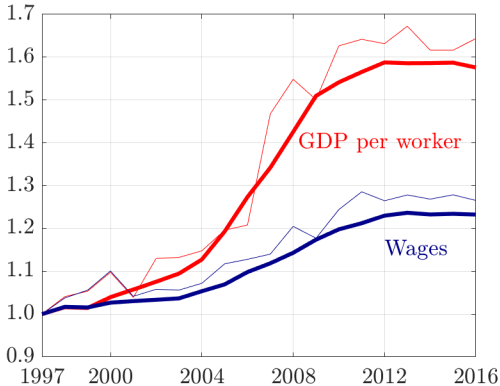




Decoupling Wages-Productivity



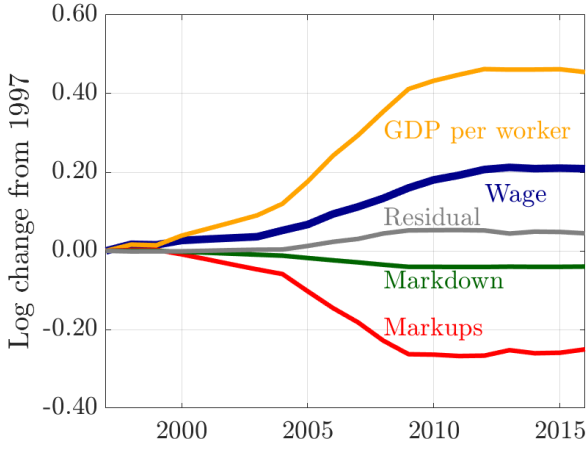
(a) Data



(b) Model

Decoupling Wages-Productivity

$$P_{inj} A_{inj} \times \mu_{inj}^{-1} = W_{inj} \times \delta_{inj} \Rightarrow \underbrace{W_{inj}}_{\text{Wage}} = \underbrace{\frac{R_{inj}}{L_{inj}}}_{\text{Rev/worker}} \times \underbrace{\mu_{inj}^{-1}}_{\text{Markup}} \times \underbrace{\delta_{inj}^{-1}}_{\text{Markdown}} \Rightarrow W = \text{GDP/Worker} \times \mu^{-1} \times \delta^{-1} \times \Omega$$



Social Planner's Problem

$$V = \max_{\{C_{inj}, L_{inj}\}} \quad U\left(C - \frac{1}{\bar{\phi}} \frac{L^{\frac{\phi+1}{\phi}}}{\frac{\phi+1}{\phi}}\right)$$

$$\text{s.t.} \quad C_{inj} = Y_{inj} = A_{inj} L_{inj}$$

Counterfactual Economies

1. Decentralized Equilibrium: $L^{\star\star}_{inj}$

$$A_{inj} P_{inj} \quad \mu_{inj}^{-1} \quad = \quad W_{inj} \quad \delta_{inj}$$

Counterfactual Economies

2. Social Planner's Solution: L^{oo}_{inj}

$$A_{inj} P_{inj} \quad = \quad W_{inj}$$

Counterfactual Economies

3. Goods Market Power; No Monopsony: $L^{\star o}_{inj}$

$$A_{inj} P_{inj} \quad \mu_{inj}^{-1} \quad = \quad W_{inj}$$

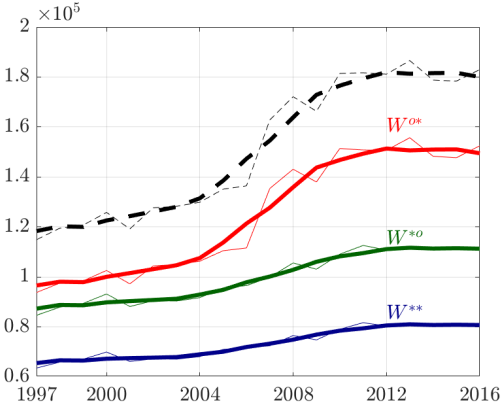
Counterfactual Economies

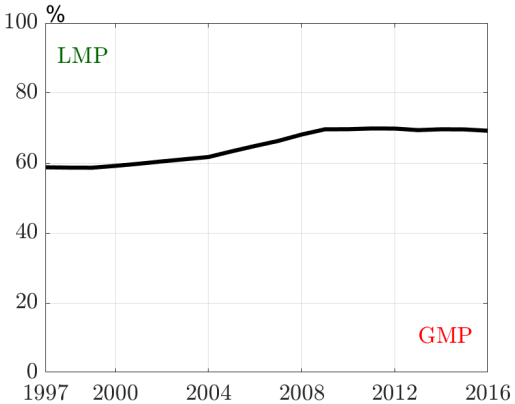
4. No Goods Market Power; Monopsony: $L_{inj}^{o\star}$

$$A_{inj} P_{inj} \quad = \quad W_{inj} \quad \delta_{inj}$$

Counterfactual Economies

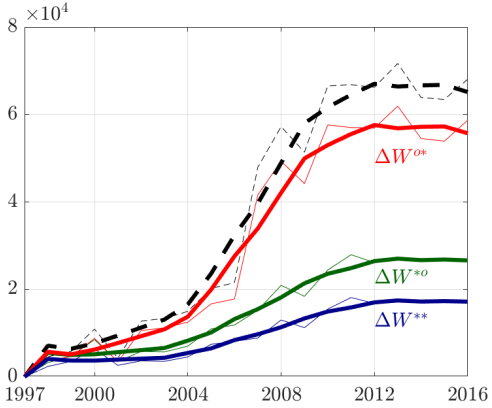
Wage Decomposition

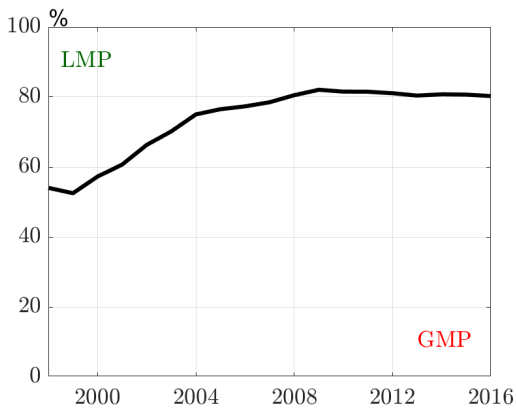




Counterfactual Economies

Wage Growth/Stagnation





Conclusion

- Our Main Findings:
  1. Market Power has increased over time:
     - Markups increase from 1.45 to 1.93
     - Markdowns are stable, increase only marginally from 1.33 to 1.38
  2. Wage stagnation: decoupling wages-productivity
  3. Decomposition: indirect effect from monopoly dominates direct effect from monopsony

     69% of wage level; 80% of the wage stagnation

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