Monopsony Power and Firm Organization

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Motivation

- **What We Know**
  - Pervasive evidence of monopsony power by firms
    Staiger et al. (2010); Kline et al. (2019); Azar et al. (2022); Yeh et al. (2022)
  - Results in overall ↓ wages and ↓ employment, especially in high productivity firms
    Berger et al. (2022); Azkarate-Askasua and Zerecero (2023); Shubhdeep et al. (2023)

- **This paper** shows that monopsony is largely heterogeneous across *occupations*
  - Occupations: production workers and (middle) managers
  - New insights on firm size distortions and the effectiveness of minimum wage policies

What we do

- **Model:** quantitative GE model where firm-occupation-specific monopsony arises from
  - The exposure to the statutory minimum wage (institutions)
  - Idiosyncratic tastes for firms (firm substitutability)
  - The number and size of competitor firms in their markets (oligopsony)
- **Estimation:** matched employer-employee data from QP + balance sheet data from SCIE
  - Indirect inference on occupation-specific labor supply elasticities
- **Validation:** quantitatively replicate untargeted quasi-experimental evidence on
  - Pass-through of demand shocks to wages (Garin and Silvério, 2024)
  - Employment changes from minimum wage increases (Dube and Zipperer, 2024)

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Main findings

Measuring Monopsony

- Mean wage markdown of **13.9%** over production workers and **32.9%** over managers
  - Results in too few employees, especially managers, working in high-productivity firms

Policy Implications

- *Occupation-based* MWs are more effective than a *single* MW in addressing monopsony
  - But, at best, optimal MWs only recover **0.3/1.5 pp = 20%** of welfare losses from monopsony
- Production complementarities matter for optimal minimum wages
  - Despite higher monopsony over managers, utilitarian planner would keep their MW low

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Contribution to the literature

- Literature on the welfare effects of monopsony power (Bhaskar et al., 2002; MacKenzie, 2021; Berger et al., 2022; Jarosch et al., 2023; Azkarate-Askasua and Zerecero, 2023)

  Large occupational heterogeneity in monopsony power

- Literature on production organization (Garicano and Rossi-Hansberg, 2006; Caliendo and Rossi-Hansberg, 2012; Grobovsek, 2020; Mariscal, 2020; Grobovsek, 2020; Santamaria, 2023; Lawson et al., 2023)

  We develop a GE model with **monopsony power** + **management delegation choices**

- Literature on minimum wage policies (Bamford, 2021; Ahlfeldt et al., 2022; Hurst et al., 2022; Karabarbounis et al., 2022; Drechsel-Grau, 2023; Berger et al., 2023)

  Production complementarities matter and **occupation-based MWs** can improve welfare

Quantitative model

Labor market

- Continuum of locations $j \in [0, 1]$
- Location j has fixed number of firms $i \in \{1, \ldots, M_j\}$

Firms

- Firm i has idiosyncratic productivity $z_{ij} \sim F(\cdot)$

Households

- Two households indexed by occupation $o \in \{w, m\}$
- Heterogeneous in location amenities (B_{jo}) and disutility of labor supply (ϕ_o, θ_o, η_o)

Households

Preferences

$$\max_{\{n_{ijot}, c_{ijot}, K_{ot+1}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \beta^t \left[\mathbf{C}_{ot} - \varphi_o \frac{\mathbf{N}_{ot}^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}} \right], \quad \text{where} \quad \underbrace{\mathbf{N}_{ot} := \left[\int_0^1 \left(\frac{\mathbf{n}_{jot}}{B_{jo}} \right)^{\frac{\theta_o+1}{\theta_o}} dj \right]^{\frac{\theta_o}{\theta_o+1}}}_{\textit{Across-market} \text{ firm differentiation}} \quad \text{and} \quad \underbrace{\mathbf{n}_{jot} := \left[\sum_{i=1}^{M_j} n_{ijot}^{\frac{\eta_o+1}{\eta_o}} \right]^{\frac{\eta_o}{\eta_o+1}}}_{\textit{Within-market} \text{ firm differentiation}}.$$

The parameters θ_o and η_o proxy idiosyncratic firm tastes, e.g., commuting or search frictions Microfoundation

Labor supply for occupation o

$$n_{ijot} = \underbrace{B_{jo}^{1+\theta_o}}_{\text{Amenities}} \cdot \underbrace{\left(\frac{w_{ijot}}{\mathbf{w}_{jot}} \right)^{\eta_o}}_{\text{Within the market}} \cdot \underbrace{\left(\frac{\mathbf{w}_{jot}}{\mathbf{W}_{ot}} \right)^{\theta_o}}_{\text{In other markets}} \cdot \mathbf{N}_{ot}. \qquad \text{(labor supply to each individual firm)}$$

Competitors' wages

Households

Preferences

$$\max_{\{n_{ijot}, c_{ijot}, K_{ot+1}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \beta^t \left[\mathbf{C}_{ot} - \varphi_o \frac{\mathbf{N}_{ot}^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}} \right], \quad \text{where} \quad \underbrace{\mathbf{N}_{ot} := \left[\int_0^1 \left(\frac{\mathbf{n}_{jot}}{B_{jo}} \right)^{\frac{\theta_o+1}{\theta_o}} dj \right]^{\frac{\theta_o}{\theta_o+1}}}_{\textit{Across-market} \text{ firm differentiation}} \quad \text{and} \quad \underbrace{\mathbf{n}_{jot} := \left[\sum_{i=1}^{M_j} n_{ijot}^{\frac{\eta_o+1}{\eta_o}} \right]^{\frac{\eta_o}{\eta_o+1}}}_{\textit{Within-market} \text{ firm differentiation}}.$$

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Firms

Technology

managers

$$y(z, \ell = 1) = z_w \left(k^{1-\gamma}\, n_w^{\gamma}\right)^{\alpha}, \qquad \text{(single-layer organization)}$$

$$y(z, \ell = 2) = z_m\, n_m^{(1-\alpha)\alpha} \left(k^{1-\gamma}\, n_w^{\gamma}\right)^{\alpha}. \qquad \text{(two-layer organization)}$$

Organizational choice

$$\pi_t(z) = \max_{\ell} \left\{\pi_t(z, \ell)\right\}_{\ell=1}^{2},$$

Profits maximization for each organization type

$$\pi_t(z, \ell) \;=\; \max_{\{n_{ijot}\}_{\forall o \in \ell}} \quad y_t(z, \ell) \;-\; \sum_{o \in \ell} w_{ijot} n_{tijot} \;- R_t k_t,$$

subject to: 1. Labor supply (n_{ijot}), 2. Granularity ($\mathbf{n}_{ijt}$), 3. Minimum wage ($w_{ijot} \geq \underline{w}$)

Three channels shape monopsony power

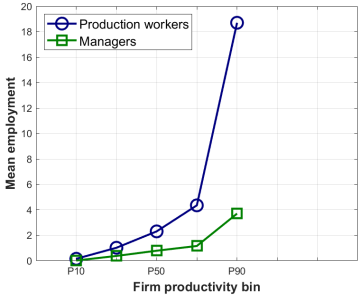
Labor demand has closed form solution when the MW is not binding:

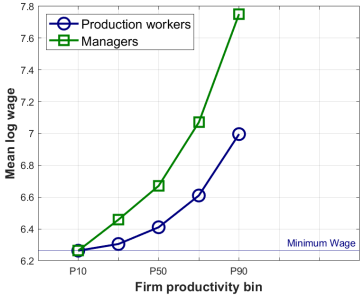
$$w^*_{ijot} = \underbrace{\frac{\varepsilon_{ijot}}{\varepsilon_{ijot}+1}}_{\text{Markdown on wages}} \cdot mrpl^*_{ijot}, \qquad \varepsilon_{ijot} = \left[\underbrace{\frac{1}{\eta_o} + \left(\frac{1}{\theta_o} - \frac{1}{\eta_o}\right)}_{\text{Strength of Firm Differentiation}} \cdot \underbrace{s_{ijot}}_{\text{Firm size}} \right]^{-1}.$$

Occupational heterogeneity in monopsony power stems from:

- Differences in labor supply elasticities $\Rightarrow (\eta_o\ ,\ \theta_o)$
- Differences in firm size $\Rightarrow s_{ijot}$
- Different impact of minimum wages $\Rightarrow \underline{w}$

Unconstrained | Constrained On | Constrained Off | Definition: Equilibrium


Production workers
Managers
Mean employment
Firm productivity bin
P10
P50
P90


Production workers
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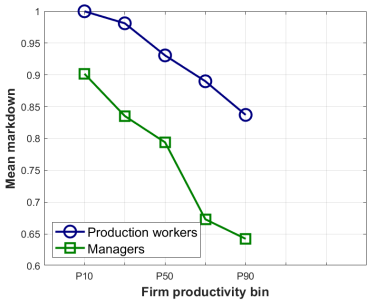
Production workers
Managers
Mean markdown
Firm productivity bin
P10
P50
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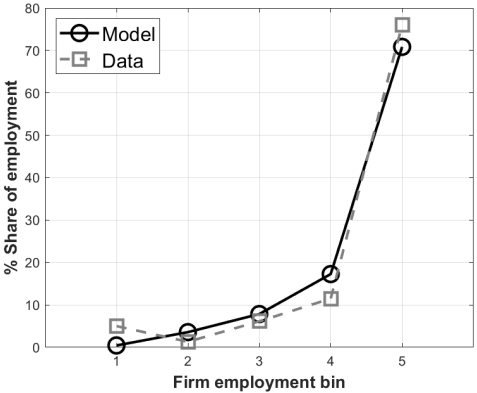
Estimation: labor supply elasticities are key for the amount of monopsony power

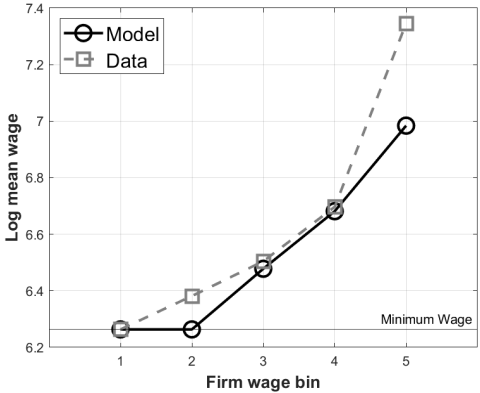
- Across-market elasticity: exploit exogenous labor demand shocks at the municipality level
  - Managerial employment is less responsive to a given municipality's labor demand shock
  - Thus, lower *across*-market elasticity for managers: $\theta_{\mathbf{w}} = \mathbf{2.4}$ and $\theta_{\mathbf{m}} = \mathbf{1.03}$
- Within-market elasticity: size-wage relationship within markets at the establishment level
  - Steeper relationship between wages and firm size for managers
  - Thus, lower *within*-market elasticity for managers: $\eta_{\mathbf{w}} = \mathbf{7.8}$ and $\eta_{\mathbf{m}} = \mathbf{2.3}$

SMM Estimation | Across-market elasticity | Within-market elasticity | Discussion on estimated elasticities

Model fit: model matches employment and wages across firms



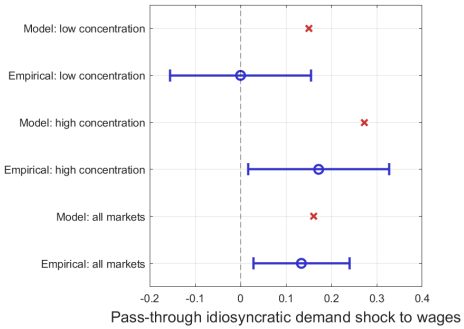
Share of employment across firms

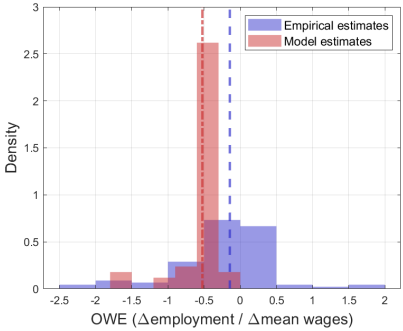


Mean wages across firms

Validation: model replicates key untargeted reduced form empirics

- Consistent with pass-through of idiosyncratic demand shocks to wages (Garin and Silvério, 2024)
- Consistent with effects of minimum wages on employment (Dube and Zipperer, 2024)

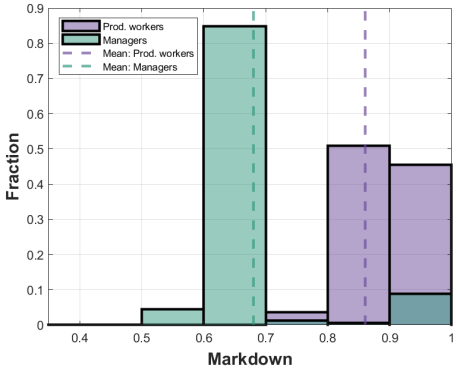




Pass-through OWE

Measurement: monopsony is twice stronger over managers than over production workers

Distribution of wage markdowns across firms



- Mean markdown: managers = **32.9%** and production Workers = **13.9%**
- Managers (i) have fewer outside firms, (ii) are more attached to their current firm, and (iii) are less affected by the MW

Monopsony power is a key determinant of employees' well-being, especially for managers

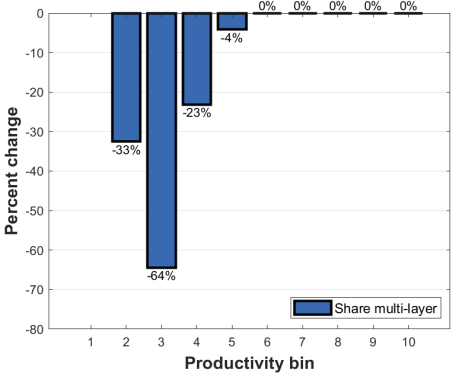
Efficient economy relative to benchmark with monopsony

	% Change		% Change
Panel A: Employment		**Panel B: Firm Organization**	
Production workers	7.9	Share multi-layer firms	-10.9
Managers	14.6	Median span of control	-4.4
Aggregate	9.1	Mean HHI	5.2
Panel C: Wages		**Panel D: Efficiency & Welfare**	
Mean: Production workers	20.5	Output	10.2
Mean: Managers	41.4	Welfare: Production workers	1.6
Managerial premium	17.3	Welfare: Managers	4.4

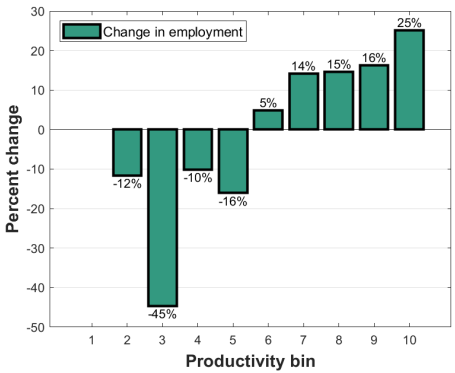
- Welfare gains stem from higher consumption and despite worker reallocation across firms

Part of the welfare gains from efficiency stem from firm reorganization

Efficient economy relative to benchmark with monopsony



Share of firms hiring managers



Managerial employment across firms

Policy implication: weaken effectiveness of raising statutory minimum wage

- The statutory minimum wage stands out as a policy to address monopsony power
- Benchmark: direct effect concentrated on low-wage occupations ($\approx$ 60% of mean wage)
  - Both in model and data nearly 94% of minimum wage earners are production workers
- Counterfactual: single minimum wage that maximizes utilitarian welfare (population weights)
  - Optimal statutory MW at 75% of benchmark production workers' mean wage
  - Utilitarian welfare gain of 0.2% ($\approx$ 13% of losses from monopsony)

More

We can do better by jointly adjusting occupation-based minimum wages

- A single MW fails to address the pervasive monopsony over high-wage workers
- Counterfactual
  - Occupation-based minimum wage that maximizes utilitarian welfare (population weights)
- Optimal occupation-based minimum wage
  - Optimal MWs to mean wage are at 75% for production workers and 30% for managers
  - i.e., production complementarities imply a low managers' MW despite strong monopsony
  - Utilitarian welfare gain of 0.3% ($\approx$ 20% of losses from monopsony)

More

Conclusion

- Quantitative GE model with firm-occupation-specific monopsony power
  - Consistent with quasi-experimental evidence on pass-through and minimum wages
- Measurement of monopsony
  - Stronger monopsony power over managers than production workers
  - Helps to explain employment, wages, and welfare across both worker types
- Implications for minimum wage policies
  - Firm heterogeneity makes optimal MWs ineffective in tackling monopsony losses
  - Optimal MWs depend on both monopsony power and production complementarities

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What is a manager?

- Matched employer-employee census of private sector employees in Portugal
- Sample: **3.2M** workers between 2010-2016 translates into **12M** worker-year observations
- Portuguese law: firms must assign workers to hierarchic categories More
  - Managers guide groups of production workers in their tasks
  - Managers account for 20% of sample and production workers for 80%
  - Managers are mostly supervisors, team leaders, and middle managers

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Quadros de Pessoal

- Annual census of private sector employees in Portugal.
- Matched employer-employee data with information on location, industry, occupation, wages, and hours worked.
- Sample period: 2010-2016.
- Sample selection: non-farm sectors, workers aged 18-65, and exclude CEOs.
- Sample size: 3.5M workers and 13M worker-year observations.

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Occupational classification

- **Occupations**: (i) managers and (ii) production workers.
- Group sub-occupations according to tasks performed, skills required, and hierarchy within the firm (Caliendo et al., 2020). Details Transitions

Summary Statistics at the Establishment Level

	Mean	P10	P25	P50	P75	P90
Production Workers						
Monthly Wage	734	511	569	644	791	1,019
Hourly Wage	4	3	3	4	5	6
Managers						
Monthly Wage	1,251	565	697	995	1,505	2,234
Hourly Wage	7	3	4	6	9	13
Span of Control	8	1	1	3	8	17

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Local labor market

- **Local Market**: Occupation $\times$ Geography (Municipality) $\times$ Industry (2-Digit NACE).
- **Municipality**: 278 regions with an average size of 320km^2 and 7,300 workers.
- **2-Digit NACE**: 88 industries.
  - *14 Manufacture of wearing apparel*.
  - *26 Manufacture of computer, electronic and optical products*.
- This results in 25,655 markets and 131,084 market-year observations.

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Classification of occupations

Level	Tasks	Skills
Top Management	Definition of the firm general policy or consulting on the organization of the firm; strategic planning; creation or adaptation of technical, scientific and administrative methods or processes	Knowledge of management and coordination of firms fundamental activities; knowledge of management and coordination of the fundamental activities in the field to which the individual is assigned and that requires the study and research of high responsibility and technical level problems
Middle Management	Organization and adaptation of the guidelines established by the superiors and directly linked with the executive work	Technical and professional qualifications directed to executive, research, and management work
Supervisors	Orientation of teams, as directed by the superiors, but requiring the knowledge of action processes	Complete professional qualification with a specialization
Higher-skilled Profesisonals	Tasks requiring a high technical value and defined in general terms by the superiors	Complete professional qualification with a specialization adding to theoretical and applied knowledge
Skilled Professionals	Complex or delicate tasks, usually not repetitive, and defined by the superiors	Complete professional qualification implying theoretical and applied knowledge
Semi-skilled Professionals	Well defined tasks, mainly manual or mechanical (no intellectual work) with low complexity, usually routine and sometimes repetitive	Professional qualification in a limited field or practical and elementary professional knowledge
Non-skilled Professionals	Simple tasks and totally determined	Practical knowledge and easily acquired in a short time

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Classification of occupations

Level	Share (%)	Share Hierarchy (%)	Mean Wage	Std. dev. Wage
Managers	19.19	100	2,007	1,554
Top Management	7.97	41.55	2,466	1,966
Middle Management	5.96	31.08	1,790	1,157
Supervisors	5.25	27.37	1,554	931
Production Workers	80.81	100	871	944
Higher-skilled Professionals	8.07	9.98	1,461	2,630
Skilled Professionals	40.44	50.04	887	493
Semi-skilled Professionals	21.48	26.58	720	294
Non-skilled Professionals	10.83	13.40	668	259

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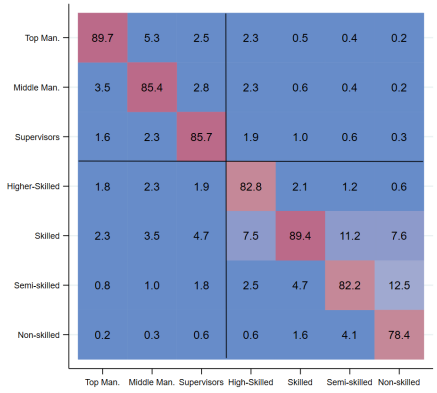
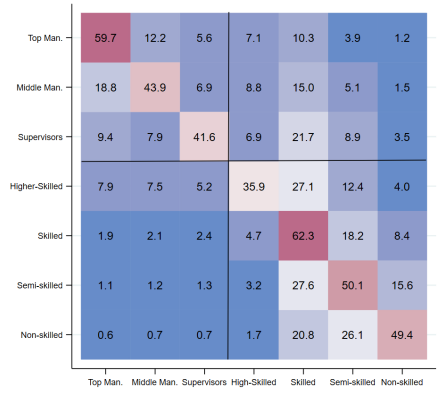
Transition probabilities



Unconditional



Conditional on Changing Firm

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Equilibrium. Given a minimum wage $\underline{w}$, the general equilibrium of this economy is a set of organizational structures $\{\ell_{ij}^*\}$, aggregate disutilities of labor supply (N_w^*, N_m^*), and employment levels $\{n_{ijw}^*, n_{ijm}^*\}$ such that:

1. *Labor supply*: Households choose aggregate disutility N_o^* and labor supply to each firm $\{n_{ijo}^*\}$ to maximize utility. That is, **??** and **??** hold $\forall o \in \{w, m\}$.

2. *Firm organization*: Firms optimally choose the organizational structure: ℓ_{ij}^*. That is, Section 2 holds $\forall j \in [0, 1],\ \forall i = \{1, \ldots, M_j\}$.

3. *Labor Demand*: Firms optimally choose employment (n_{ijw}^*, n_{ijm}^*). That is, Equations (9)-(**??**) hold $\forall j \in [0, 1],\ \forall i = \{1, \ldots, M_j\}$.

4. *Market Clearing*: Labor supply and demand are given by Equations (9) and (**??**) for firms in Cases I and II. For firms in Case III, households supply the labor demand n_{ijo}^* given by **??**.

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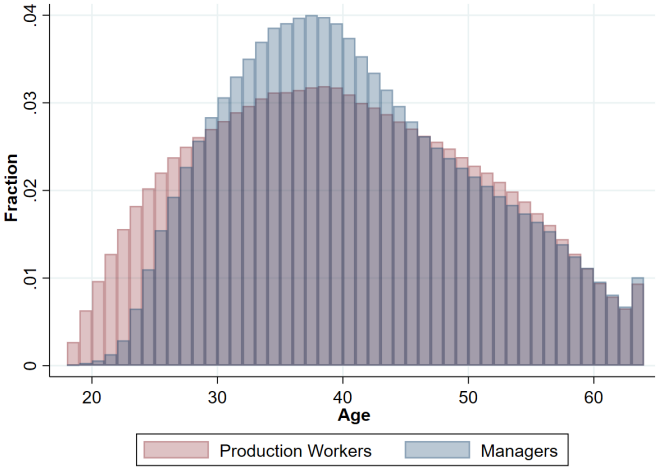

Age Distribution across Occupations

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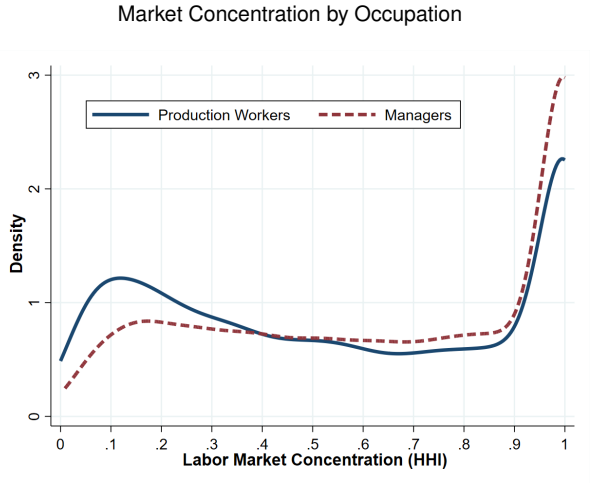
Greater labor market concentration in managerial markets



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Microfoundation for the labor supply

Preferences

$$\mathcal{U}_{ijo} = \max_{ij} \underbrace{\log w_{ijo}}_{\text{Wage}} + \underbrace{\log B_{jo}}_{\text{Market Amenity}} + \underbrace{\zeta_{ijo}}_{\text{Idiosyncratic Taste}}$$

Distribution of Idiosyncratic Tastes

$$\underbrace{F(\zeta_{1jo}, \ldots, \zeta_{MJo})}_{\text{Distribution of tastes for all firms } i \text{ across markets } j} = \exp\left[-\sum_{j=1}^{J} \left(\sum_{i=1}^{M} e^{-(1-\eta_o)\zeta_{ij}} \right)^{\frac{1+\theta_o}{1+\eta_o}} \right]$$

θ_o determines the correlation of tastes across firms in *distinct* markets

η_o determines the correlation of tastes across firms *within the same* market

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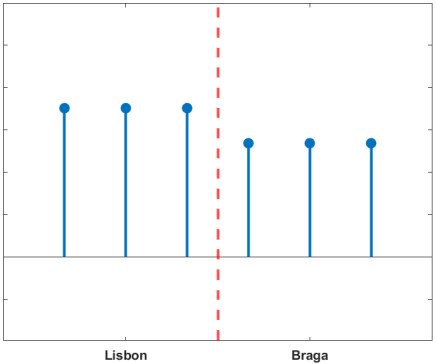
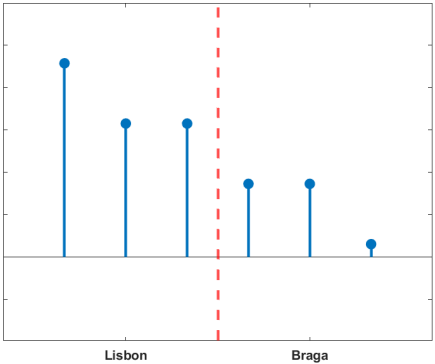


Production Workers, high θ and high η



Managers, low θ and low η

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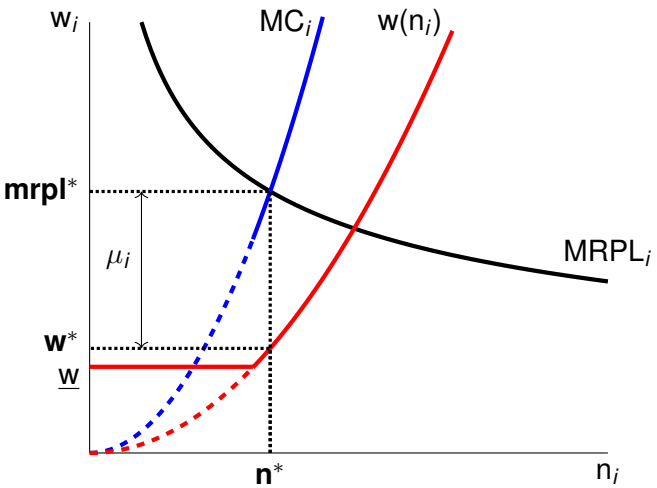
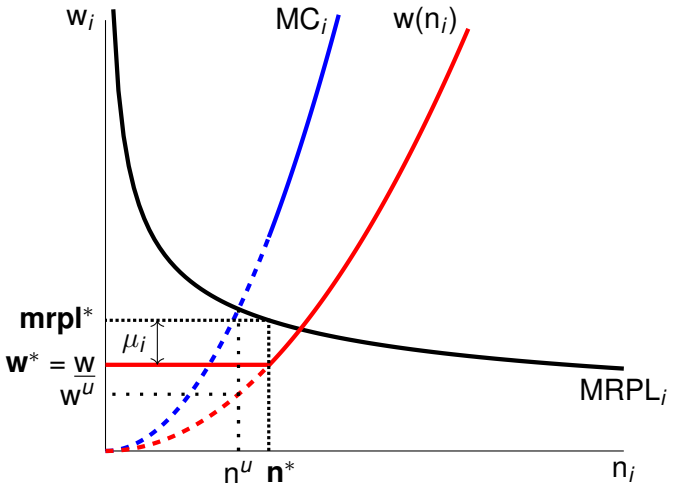
Case I: minimum wage is not binding



Case II: minimum wage is binding, and labor supply equals labor demand



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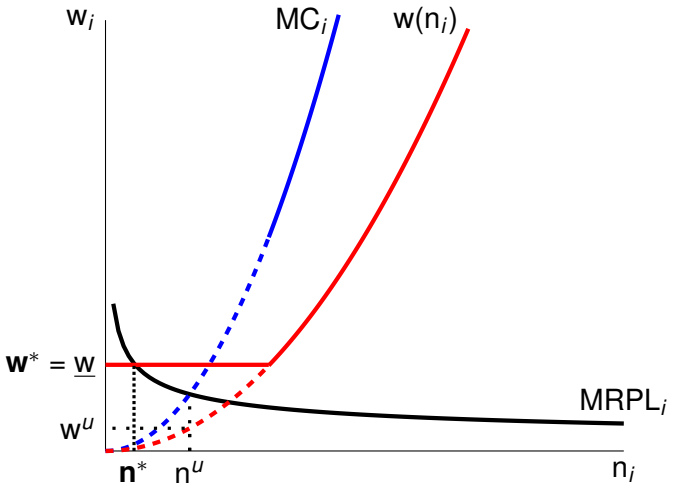
Case III: minimum wage is binding, and labor supply exceeds labor demand



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Joint estimation using the Simulated Method of Moments

Preferences

- Labor disutility shifter of workers (φ_w) $\Rightarrow$ Average firm size
- Labor disutility shifter of managers (φ_m) $\Rightarrow$ Economy-wide share of managers

Firm organization

- Organization efficiency ($\bar{z}_w, \bar{z}_m$) $\Rightarrow$ Mean wage of prod. workers and manager wage premium
- Decreasing returns to scale (α) $\Rightarrow$ Labor income is 62 percent of GDP
- Std. Dev. firm productivity (σ_z) $\Rightarrow$ Mean HHI production workers

Back Table Targeted Untargeted

Parameter Value	Description	Value	Moment
Panel I: Exogenous calibration			
ϕ	Aggregate Frisch elasticity	0.50	Berger et al. (2022)
$\underline{w}$	Minimum wage	525	Real minimum wage in 2016
Panel II: Endogenous calibration			
β	Discount factor	0.96	Annual discount rate of 4%
δ	Share of capital depreciation	0	Annual interest rate of 4%
α	Decreasing returns to scale	0.55	Labor share of 62%
γ	Exponent on labor	0.82	Capital share of 31%
(η_w, η_m)	Within-market firm substitutability	(7.82 , 2.32)	Within-market labor supply elastic

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Parameter Value	Description	Value	Moment
Panel II: SMM Estimation			
A: Preferences			
φ_w	Labor disutility shifter: workers	122	Average firm size
φ_m	Labor disutility shifter: managers	1.4	Share managers
B: Firm Organization			
$\bar{z}_w$	Worker efficiency	1,062	Mean wage of prod. workers
$\bar{z}_m/\bar{z}_w$	Managerial efficiency	2.1	Wage gap managers vs prod. workers
σ_z	Std. Dev. firm TFP	0.7	Weighted mean HHI prod. workers
C: Market Characteristics			
B_{ijw}	Amenities in small markets	0.7	Share workers in markets $M_j \leq 10$
$G(\cdot)$	Firm distribution		Mean, variance, and mass single-firm
D: Firm Substitutability			
(θ_w, θ_m)	Across-market firm substitutability	(2.4 , 1.0)	Across-municipality labor supply elasticity

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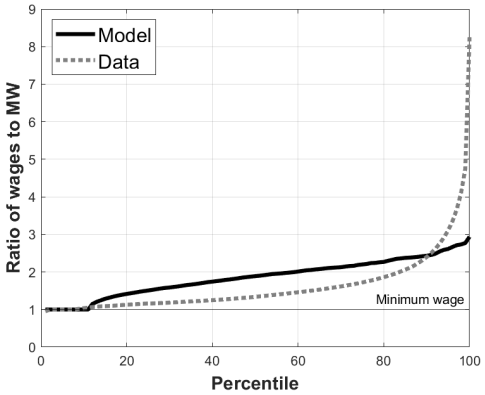
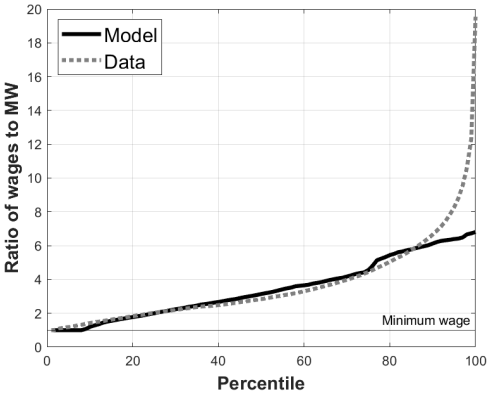
Model Fit: model closely fits wage distribution across occupations



Production Workers



Managers

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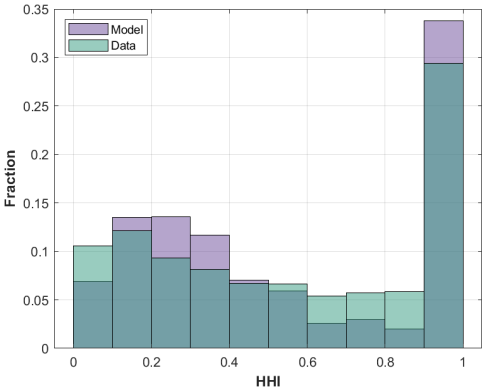
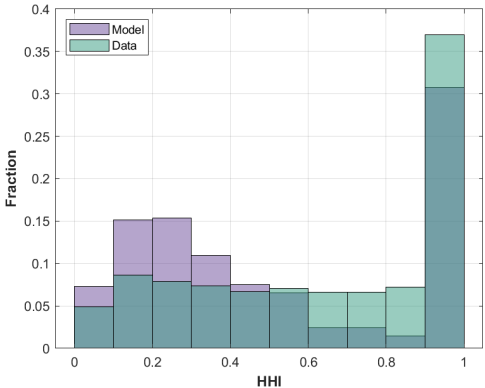
Model fit: model closely fits that most markets are highly concentrated



Production Workers



Managers

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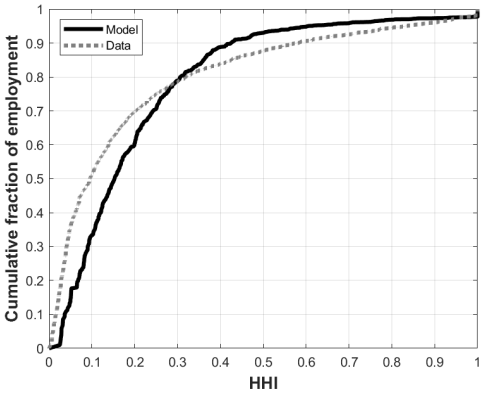
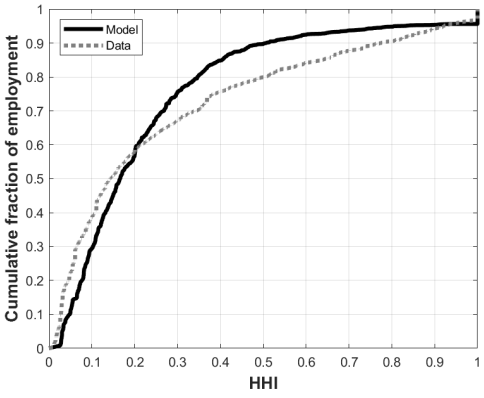
Model fit: model approximates well that most workers sort into low concentrated markets



Production Workers



Managers

Back

Untargeted Moments

	Production Workers		Managers	
	Model	**Data**	**Model**	**Data**
Panel A: Minimum Wage				
Share minimum wage earners	0.11	0.06	0.09	0.02
Share | Minimum wage earner	0.85	0.94	0.15	0.06
Panel B: Firm Organization				
Median span of control	3.57	3.14		
P25 firm size	1	1	0	0
P50 firm size	2	2	1	1
P90 firm size	13	9	4	5
P99 firm size	55	59	9	34
Panel D: Market Concentration				
Weighted mean HHI			0.24	0.27
Weighted mean Max s_{ij}	0.31	0.30	0.34	0.38

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Indirect inference to estimate the across-market elasticity (θ_o)

- Goal: replicate reduced-form inverse LS elasticities (β) from municipality-level regression

$$\text{Log } w_{m,o,t} = \beta_o \text{ Log } L_{m,o,t} + \alpha_{m,o} + e_{m,o,t},$$

- Instrument: standard value added shift-share instrument for municipality's employment (Lamadon et al., 2022)

$$\hat{L}_{m,o,t} = \sum_s \left(\underbrace{\frac{y_{i,m,s,o,2004}}{\sum_i y_{i,m,s,o,2004}}}_{\text{Industry-municipality share}} \times \underbrace{\sum_i y_{i,s,o,t}}_{\text{National value added in industry } s} \right).$$

- Estimates: We estimate $\theta_w = 2.4$ for production workers and $\theta_m = 1.0$ for managers

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Calibrate the within-market elasticity (η_o)

- The model implies the following equilibrium relationship between wages and employment:

$$\log(w_{ijo,t}) \;=\; \beta_o \log(n_{ijo,t}) \;+ \mu_{jo,t} \;+\; \nu_{ijo,t},$$

  where $\beta_o = \frac{1}{\eta_o}$

- Goal: choose within-market elasticity (η_o) to match β_o in previous firm-level regression

- Instrument: value added shift-share instrument for firm's employment (Ahlfeldt et al., 2022)

$$\hat{n}_{ijo,t} = \sum_s \Bigg(\underbrace{\frac{y_{is,2004}}{\sum_i y_{is,2004}}}_{\substack{\text{Industry-firm} \\ \text{share}}} \times \underbrace{\sum_i y_{is,t}}_{\substack{\text{National value added} \\ \text{in industry } s}} \Bigg).$$

- Estimates: We estimate $\eta_w = 7.8$ for production workers and $\eta_m = 2.3$ for managers

Back

Discussion on estimated firm substitutability parameters

- Our results range within the range of similar estimates in the literature (Berger et al., 2022; Azkarate-Askasua and Zerecero, 2023; Shubhdeep et al., 2023):
  - Estimates range are $\theta \in [0.4, 2]$ and $\eta \in [1.2, 10.9]$.
- Our key finding is that production workers are more mobile than managers in Portugal.
  - Consistent with low-elasticity of college workers (Diamond, 2016)
  - Consistent with low-elasticity of top earners (Langella and Manning, 2021)
  - Consistent with performing non-cognitive non-routine tasks (Bachmann et al., 2022)
  - Consistent with low-elasticity of long tenure faculty (Goolsbee and Syverson, 2023)

Back

Replication pass-through of idiosyncratic demand shocks to wages

- Garin and Silvério (2024) quantify pass-through of idiosyncratic demand shocks to wages
  - Exploit unexpected export demand shocks in *Portugal* during 2008-2009
- Replication
  - Limit sample to firms with > 11 employees to match mean firm size in GS (2024)
  - Draw random firms and change their idiosyncratic TFP to $z\epsilon$ where $\epsilon \sim N(\mu_\epsilon, \sigma_\epsilon)$
  - To replicate negative shocks, we set $\mu_\epsilon = 0.95$ and $\sigma_\epsilon = 0.05$ (results are robust)
- Measurement of pass-through elasticities
  - Regress log firm's mean wages ($\bar{w}_{ijt}$) on log total value added (y_{ijt}) with firm-specific FE

Back

Replication of minimum wage own elasticity

- Dube and Zipperer (2024) document a comprehensive set of OWE estimates from 90 studies
  - OWE = $\frac{\Delta \text{employment} / \Delta \text{MW}}{\Delta \text{mean wages} / \Delta \text{MW}}$
  - Thus, OWE is a meaningful measure of the employment effects of MW policies
- Replication
  - OWE might not be invariant to different changes of the minimum wage
  - We simulate changes in real MWs observed in Portugal during recent decades: $\underline{w} \in [400, 950]$
- Measurement of OWE
  - Compute OWE using changes in aggregate employment and mean wages relative to baseline

Back

Regression migration on occupation

Occupation and migration across municipalities

	(1)	(2)	(3)	(4)	(5)
Manager	-0.012***	-0.008***	-0.012***	-0.002***	-0.003***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
AME/Baseline	-17.1%	-11.4%	-17.1%	-5.7%	-4.3%
Year FE	No	Yes	Yes	Yes	Yes
Sex	No	Yes	Yes	Yes	Yes
Age	No	Yes	Yes	Yes	Yes
Education	No	No	Yes	Yes	Yes
Temporary	No	No	No	Yes	Yes
Industry	No	No	No	No	Yes
N	6,628,978	6,628,978	6,615,462	6,572,412	6,572,412
Baseline	0.07	0.07	0.07	0.07	0.07

Back

Regression sectoral mobility on occupation

Occupation and sectoral mobility

	(1)	(2)	(3)	(4)	(5)
Manager	-0.012***	-0.008***	-0.014***	-0.005***	-0.006***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
AME/Baseline	-20%	-13.3%	-23.3%	-8.3%	-10%
Year FE	No	Yes	Yes	Yes	Yes
Sex	No	Yes	Yes	Yes	Yes
Age	No	Yes	Yes	Yes	Yes
Education	No	No	Yes	Yes	Yes
Temporary	No	No	No	Yes	Yes
Industry	No	No	No	No	Yes
N	9,825,202	9,825,202	9,805,652	9,743,686	9,743,686
Baseline	0.06	0.06	0.06	0.06	0.06

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Sample characteristics across occupations

	(1) **Production Workers**	(2) **Managers**
	Mean	Mean
Share Age$\leq$25	0.11	0.04
Share Age$\leq$30	0.25	0.17
Share Temporary	0.31	0.16
Share College	0.07	0.55
Share Change Establishment	0.10	0.08
Share Change Municipality	0.07	0.06
Share Change NUTS-3 Region	0.03	0.02
Share Change Sector	0.06	0.05
Observations	11,286,635	2,690,239

Mobility and sample characteristics

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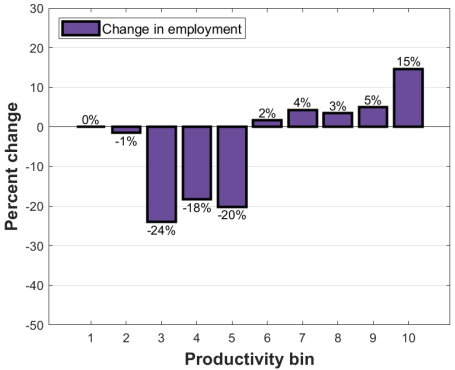
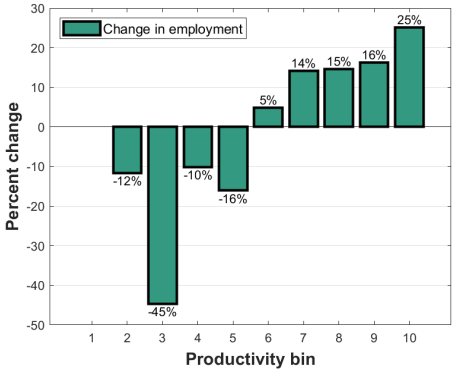
Efficient economy: worker reallocation

Effect of monopsony power on employment reallocation



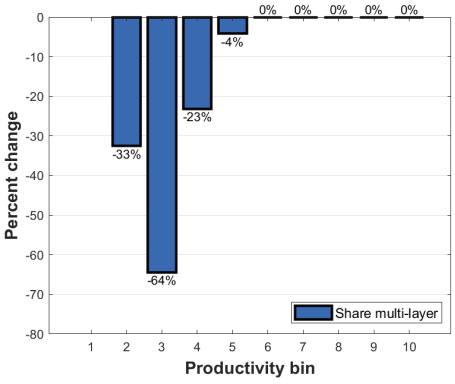
Production workers



Managers

Monopsony incentivizes managerial delegation

Share of multi-layer firms in the efficient relative to benchmark economy



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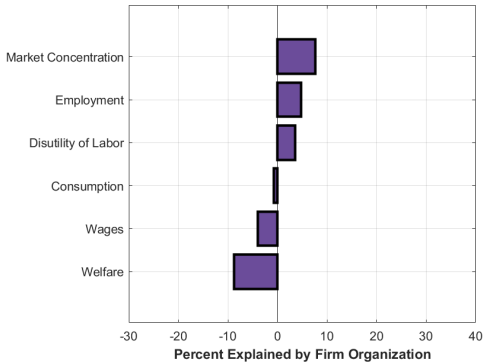
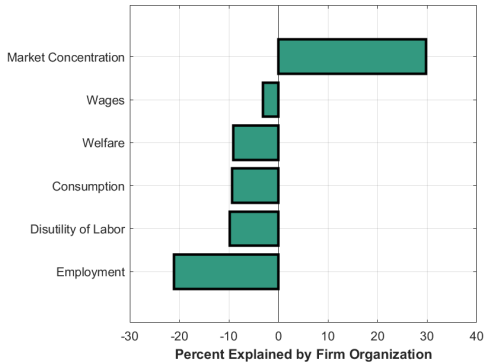
Efficient Economy: firm organization channel

Firm organization channel



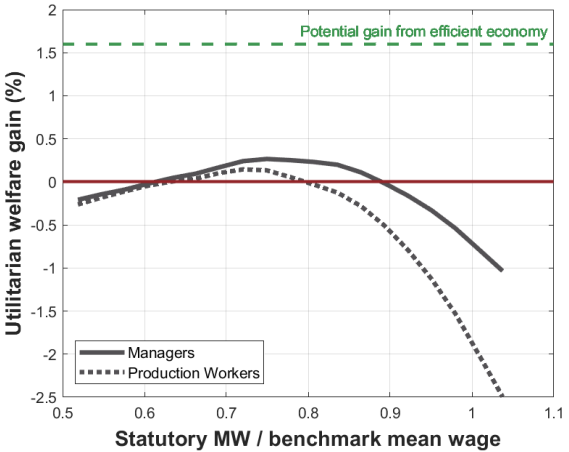
Production Workers



Managers

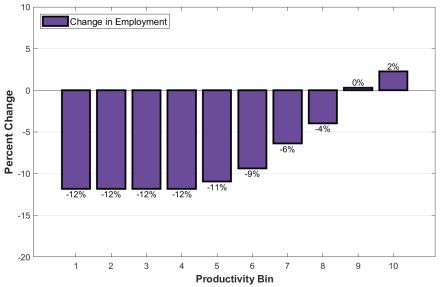
Optimal statutory minimum wage

Effect of the minimum wage reform on welfare relative to the benchmark Back

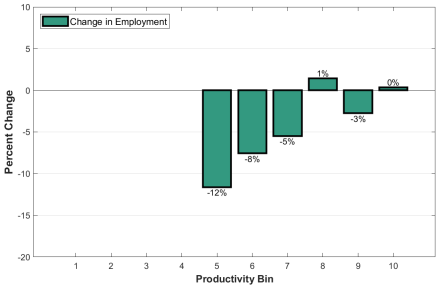


Minimum wages: worker reallocation

Effect of the minimum wage reform on employment reallocation



Production Workers



Managers

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Optimal occupation-sepecific minimum wage

Effect of the occupation-specific minimum wage reform on welfare relative to the benchmark Back