Aggregate Effects of Workfare Programs

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Overview of update

- Over the past few weeks, I worked on:
  - Building a more focussed end-goal for my project
  - Building a calibration strategy
  - Learning how to implement it (sobol + lsqnonlin $\rightarrow$ HPC)
- What I have to show today
  - Some theory that facilitates running the Muralidharan experiment in my model
  - Calibration strategy
  - Some **initial** results

Question

- Policy choice: unconditional transfers and workfare/employment guarantee programs

- If firms have wage-setting power, employment guarantees might be efficiency-improving

- Efficiency effects of transfers unclear; dev literature finds transfers do not have wealth effects

- Potential tools for redistribution: type-dependent transfers, type-agnostic transfers and workfare. How does a planner choose?

- Want: a quantitative model with labor market power and household heterogeniety

Plan for today

What is the quantitative importance of workfare effects on labor market power?

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- Indian National Rural Employment Guarantee Scheme (NREGS), 2007.
  - Guarantees upto 100 days of work/year at minimum wage, within 15 days of asking for it
  - 0.5% of Indian GDP and 600 million rural citizens eligible
- Muralidharan et al (2022) find evidence suggesting NREGS alleviated labor market power in Andhra Pradesh
- Can a standard macro model of oligopsonistic competition (Berger et al 2023, 2025) quantitatively explain the evidence?

Literature

- Development
  - Employment guarantees: Besley-Coate (1992), Basu-Kanbur-Chau (2009)
  - NREGS: Muralidharan-Sukhtankar-Niehaus (2023, 2016), Kloner-Oldiges (2022), Imbert-Papp (2015, 2020)
- Macro
  - Labor market power: Berger-Herkenhoff-Mongey (2025, 2022)
  - Using causal evidence to identify macro-models: Nakamura-Stiensson (2018)
- Macro-development
  - Labor market power: Amodio-Medina-Morlacco (2025), Armangue Jubert-Guner-Ruggieri (2025), Brooks-Kaboski-Li-Qian (2021)
  - Micro to macro: Buera-Kaboski-Shin (2021)

Evidence

- Muralidharan et al (2022) randomize improvements in NREGS in Andhra Pradesh villages
    - Smartcards reduce implementation frictions, improve program access
- NREGS employment $\uparrow$ 29%, private wages $\uparrow$ 10% and employment $\uparrow$ 18%, self-employment and idle time $\downarrow$ 14%
- Program $\downarrow$ labor market power in agriculture
    - Land profits fell
    - Bigger treatment effects when landholdings are more concentrated
- Local demand effects in non-agriculture
    - New firm entry

Model overview

- Representative household has a large number of identical workers; dislikes labor
- Continuum of villages $j \in [0, 1]$; each village contains m_j firms, productivity $z_{ij} \sim F$
- Labor is imperfectly substitutable across firms
- m_jth firm in each village is workfare, with exogenously given wage $\bar{\mathbf{w}}_\mathbf{j}$
- Experiment: improve workfare access
- Private employment and private wage $\uparrow$ provided household has sufficiently large macro-elasticity of labor supply

Household's problem: consumption

$$\max_{\{c_{ij},n_{ij}\}} \quad \frac{C^{1-\sigma}}{1-\sigma} - \frac{N^{1+\nu}}{1+\nu}$$

$$\text{s.t.} \quad C = \int_0^1 \sum_{i=1}^{m_j} w_{ij} n_{ij}\, dj + (1-\tau)\Pi$$

$$C = \int_0^1 \sum_{i=1}^{m_j-1} c_{ij}\, dj$$

- Consumption good perfect substitute across villages j and firms $1 \leq i \leq m_j - 1$.
- Profits rebated lump-sum to household; subject to tax τ

Household's problem: labor

$$\max_{\{c_{ij}, n_{ij}\}} \quad \frac{C^{1-\sigma}}{1-\sigma} - \frac{N^{1+\nu}}{1+\nu}$$

$$\text{s.t.} \quad C = \int_0^1 \sum_{i=1}^{m_j} w_{ij} n_{ij} \, dj + (1-\tau)\Pi$$

$$C = \int_0^1 \sum_{i=1}^{m_j - 1} c_{ij} \, dj$$

$$n_j^p = \left(\sum_{i=1}^{m_j - 1} (n_{ij})^{\frac{\eta+1}{\eta}} \right)^{\frac{\eta}{\eta+1}}$$

$$n_j^w = n_{m_j j}$$

$$n_j = \left(\left(n_j^p\right)^{\frac{\gamma+1}{\gamma}} + \delta \left(n_j^w\right)^{\frac{\gamma+1}{\gamma}} \right)^{\frac{\gamma}{\gamma+1}}$$

$$N = \left(\int_0^1 n_j^{\frac{\theta+1}{\theta}} \, dj \right)^{\frac{\theta}{\theta+1}}$$

- Nested CES: private and workfare within village (γ), firms within private (η), across villages (θ).
- δ is the program access friction.
- $\frac{1}{\nu}$ is Frisch elasticity of labor supply.

Firm's problem

$$\max_{n_{ij}} \left\{ z_{ij} n_{ij}^{\alpha} - w_{ij}\left(n_{ij}, n_j^p, n_j^w, N, W\right) n_{ij} \right\}$$

$$\text{subject to} \quad w_{ij}\left(n_{ij}, n_j^p, n_j^w, N, W\right) = \left(\frac{n_{ij}}{n_j^p}\right)^{\frac{1}{\eta}} \left(\frac{n_j^p}{n_j}\right)^{\frac{1}{\gamma}} \left(\frac{n_j}{N}\right)^{\frac{1}{\theta}} W$$

and W is defined as

$$w_j^p n_j^p = \sum_{i=1}^{m_j - 1} w_{ij} n_{ij}$$

$$w_j n_j = w_j^p n_j^p + \bar{w}_j n_j^w$$

$$W N = \int_0^1 w_j n_j \, dj \qquad W = \left(\int_0^1 w_j^{1+\theta} dj\right)^{\frac{1}{1+\theta}}$$

CES wage index equations

Equilibrium

An equilibrium consists of $\{w_{ij}, n_{ij}\}_{\forall i,j}$, household consumption C, output Y, government spending G and a tax rate τ such that

1. each $\{w_{ij}, n_{ij}\}$ consistent with the labor supply curve
2. each n_{ij} solves the firm's problem
3. the government's budget is balanced

$$G = \int_0^1 \bar{w}_j n_j^w dj = WN - W^p N^p$$
$$G = \tau\Pi$$

4. the goods market clears

$$C = WN + (1-\tau)\Pi$$
$$C = WN + Y - W^p N^p - \tau\Pi$$
$$C = Y$$

Results

Result (block recursivity): Markdowns in market j, $\{\mu_{ij}\}_{i=1}^{m_j-1}$, can be recovered without knowing aggregates.

Fixed point system for markdowns

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Fixed point system for markdowns

Assumption: $\bar{\mathbf{w}}_{\mathbf{j}} = \phi w_j^p$

Results

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Fixed point system for markdowns

Assumption: $\bar{\mathbf{w}}_{\mathbf{j}} = \phi w_j^p$

Result (aggregation): The following system of six equations pins down $\{Y, C, W^p, N^p, W, N\}$:

$$Y = \Omega \tilde{Z} (N^p)^\alpha \qquad W^p = \alpha \frac{\mu}{\Omega} \frac{Y}{N^p} \qquad W = \frac{-U_N}{U_C}$$

$$W = \left(1 + \frac{\phi^{1+\gamma}}{\delta\gamma}\right)^{\frac{1}{1+\gamma}} W^p \qquad N = \left(1 + \left(\frac{\phi}{\delta}\right)^{\gamma+1}\right)^{\frac{\gamma}{1+\gamma}} N^p \qquad C = Y$$

Private sector indices Agg constants Proofs outline

Results

Let Ω_t be the measure of treated villages, Ω_n be the measure of neighboring untreated villages and

$$\int_{\Omega_t} \left(n_j^p\right)^{\frac{\theta+1}{\theta}} dj = \beta \left(\int_{\Omega_n} \left(n_j^p\right)^{\frac{\theta+1}{\theta}} dj \right)$$

and define

$$\varphi(\delta_k) = \left(1 + \left(\frac{\phi}{\delta_k}\right)^{\gamma+1}\right)^{\frac{\gamma}{\gamma+1}} \qquad \lambda(\delta_k) = \left(1 + \frac{\phi^{1+\gamma}}{\delta_k^{\gamma}}\right)^{\frac{1}{1+\gamma}}$$

Result (aggregation with heterogenous δ): Having solved for $\{\mu_{ij}(\delta_j)\}_{i=1}^{m_j-1}$, Ω and μ, we replace two equations in the aggregation result:

$$N = \left(\frac{\beta\varphi(\delta_t)^{\frac{\theta+1}{\theta}} + \varphi(\delta_n)^{\frac{\theta+1}{\theta}}}{(1+\beta)}\right)^{\frac{\theta}{\theta+1}} N^p \qquad W = \left(\frac{\beta\lambda(\delta_t)^{\theta+1} + \lambda(\delta_n)^{\theta+1}}{(1+\beta)}\right)^{\frac{1}{\theta+1}} W^p$$

Results

Result (macro-to-micro): Village-level private employment and wage $\{n_j^p, w_j^p\}_{j\in[0,1]}$ can be recovered using the labor market equilibrium condition at the village level

$$\mu_j \alpha z_j \left(n_j^p\right)^{\alpha-1} = w_j^p = \left(\frac{n_j^p}{N^p}\right)^{\frac{1}{\theta}} W^p$$

Result (workfare and private labor ratio within-village): Within a village, workfare and private labor are in the ratio

$$n_j^w = \left(\frac{\phi}{\delta_j}\right)^{\gamma} n_j^p$$

Treatment effects in the model

1. Fix $J = 500,000, m_j = 5, \sigma = 2, \phi = 1$.
2. Fix the number of treated villages to $k = 180,000$ (avg treat intensity around treated village: 36%)
3. Fix a guess of $\{\theta, \gamma, \eta, \xi, \alpha, \tau, \Delta\delta\}$
4. Solve baseline (homogenous villages)
   4.1 $\delta_{pre} = \phi \left(\frac{n_j^p}{n_j^w} \right)^{\frac{1}{\gamma}} = \left(\frac{7.9}{4.5} \right)^{\frac{1}{\gamma}}$
   4.2 Store $n^p_{j,pre}, n^w_{j,pre}, w^p_{j,pre}$
5. Solve endline (heterogenous villages)
   5.1 $\delta_n = \delta_{pre}$ for $J - k$ villages and $\delta_t = \delta_{pre} - \Delta\delta$ for k villages
   5.2 Store $n^p_{j,post}, n^w_{j,post}, w^p_{j,post}$
6. Model adjusted-ATE for outcome y in treated villages is $\int_{j \in \Omega_t} \frac{y_{j,post} - y_{j,pre}}{y_{j,pre}} \frac{1}{\Omega_t} dj$
7. Model spillover in untreated villages is $\int_{j \in \Omega_n} \frac{y_{j,post} - y_{j,pre}}{y_{j,pre}} \frac{1}{\Omega_n} dj$

Experiment

- Model (qualitatively) performs well in reproducing patterns
  - Private employment and wages $\uparrow$ Graph Intuition
  - Treatment effect larger in villages with higher HHI Graph
  - Employment spillovers Graph
- Model mechanism: workfare reduces the markdown by reducing private market share Markdowns system

Quantification

Externally set: $J = 500,000$, $k = 180,000$, $m_j = 5, \sigma = 2, \phi = 1$

Parameters	**Moments**
δ	NREGS relative to private emp (baseline)
ϕ	NREGS relative to private wage (baseline)
η	coefficient on HHI * treatment
θ	private emp spillover
$\Delta\delta$	workfare emp ATE
ν	private employment ATE
α	private wage ATE
ξ	coefficient on HHI
γ	private wage spillover

Table: Calibration Strategy

Current state of calibration

- I calibrate 7 parameters to match 7 targets
- Procedure: use sobolmin search to identify a good guess, then lsqnonlin to locally optimize
- If I use $T = 100$ sobol points, the best I can do is:

Moment	**Target**	**Model**
workfare emp ATE	0.30	0.3876
private emp ATE	0.18	0.0069
private wage ATE	0.10	0.0076
private emp spillover	0.089	0.0008
private wage spillover	0.034	-0.0002
coef hhi	-0.594	-0.0833
coef hhi*treat	0.582	0.5359

Table: Model performance

Current state of calibration

- The parameters that produce the sobol-best result

Parameter	Value
θ	0.7843
γ	2.8483
η	2.5287
α	0.7219
ν	0.2142
ξ	7.6828
$\Delta\delta$	0.1297

Table: Calibrated parameters

- Best case: δ to match NREGS/private days per month (4.9/7.5), $\Delta\delta$ to match 30% increase in workfare employment
- Model ATE on private employment $<$ 5% (18% in data), ATE on private wages $\sim$ 3% (10% in data)

Takeaway today

- (As of now) structural oligopsony a la BHM quantitatively accounts for between 4% and 33% of Muralidharan's ATE on employment, depending on calibration

Plan for winter

- Fix code and complete the full calibration excercise
- Need some validation of my model: is the market shares mechanism the right way to think about workfare effects on private economy?
- Introduce household heterogeniety to perform optimal policy excercise

Thanks!

CES wage index equations

$$w_j^p n_j^p = \sum_{i=1}^{m_j-1} w_{ij} n_{ij} \quad w_j^p = \left(\sum_i^{m_j-1} w_{ij}^{1+\eta} \right)^{\frac{1}{1+\eta}}$$

$$w_j n_j = w_j^p n_j^p + \bar{w}_j n_j^w \quad w_j = \left((w_j^p)^{1+\gamma} + \left(\frac{1}{\delta\gamma} \right) (\bar{w}_j)^{1+\gamma} \right)^{\frac{1}{1+\gamma}}$$

$$WN = \int_0^1 w_j n_j \, dj \quad W = \left(\int_0^1 w_j^{1+\theta} dj \right)^{\frac{1}{1+\theta}}$$

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Markdowns

We define the private payroll share:

$$s_{ij} = \frac{n_{ij} w_{ij}}{\sum_i^{m_j - 1} n_{ij} w_{ij}}$$

Result (block recursivity): Markdowns in market j are the solution to:

$$s_{ij} = \frac{\left[\mu(s_{ij}) z_{ij}\right]^{\frac{\eta+1}{1+\eta(1-\alpha)}}}{\sum_i^{m_j - 1} \left[\mu(s_{ij}) z_{ij}\right]^{\frac{\eta+1}{1+\eta(1-\alpha)}}}$$

$$\mu(s_{ij}) = \frac{\varepsilon(s_{ij})}{\varepsilon(s_{ij}) + 1}$$

$$\varepsilon(s_{ij}) = \left((1 - s_{ij}) \frac{1}{\eta} + s_{ij} \left(1 - \left(\frac{n_j^p}{n_j} \right)^{\frac{\gamma+1}{\gamma}} \right) \frac{1}{\gamma} + s_{ij} \left(\frac{n_j^p}{n_j} \right)^{\frac{\gamma+1}{\gamma}} \frac{1}{\theta} \right)^{-1}$$

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Markdowns

Assumption: $\bar{w}_j = \phi w_j^p$

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$$\mu(s_{ij}) = \frac{\varepsilon(s_{ij})}{\varepsilon(s_{ij}) + 1}$$

$$\varepsilon(s_{ij}) = \left((1 - s_{ij})\frac{1}{\eta} + s_{ij}(1 - \xi)\frac{1}{\gamma} + s_{ij}\xi\frac{1}{\theta}\right)^{-1}$$

where

$$\xi = \left(1 + \left(\frac{\phi}{\delta}\right)^{\gamma+1}\right)^{-1}$$

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Aggregate private wage index

Let

$$N^p = \left(\int_0^1 \left(n_j^p \right)^{\frac{\theta+1}{\theta}} \right)^{\frac{\theta}{\theta+1}} \qquad W^p N^p = \int_0^1 w_j^p n_j^p dj$$

which implies

$$W^p = \left(\int_0^1 \left(w_j^p \right)^{1+\theta} \right)^{\frac{1}{1+\theta}}$$

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Appendix: Aggregation constants

$$\tilde{Z} = \left[\int_0^1 z_j^{\frac{1+\theta}{1+\theta(1-\alpha)}}\, dj\right]^{\frac{1+\theta(1-\alpha)}{1+\theta}}, \quad z_j = \left[\sum_{i=1}^{m_j-1} z_{ij}^{\frac{1+\eta}{1+\eta(1-\alpha)}}\right]^{\frac{1+\eta(1-\alpha)}{1+\eta}}$$

$$\mu = \left[\int_0^1 \left(\frac{z_j}{\tilde{Z}}\right)^{\frac{1+\theta}{1+\theta(1-\alpha)}} \mu_j^{\frac{1+\theta}{1+\theta(1-\alpha)}}\, dj\right]^{\frac{1+\theta(1-\alpha)}{1+\theta}}, \quad \mu_j = \left[\sum_{i=1}^{m_j-1} \left(\frac{z_{ij}}{z_j}\right)^{\frac{1+\eta}{1+\eta(1-\alpha)}} \mu_{ij}^{\frac{1+\eta}{1+\eta(1-\alpha)}}\right]^{\frac{1+\eta(1-\alpha)}{1+\eta}}$$

$$\Omega = \int_0^1 \left(\frac{z_j}{\tilde{Z}}\right)^{\frac{1+\theta}{1+\theta(1-\alpha)}} \left(\frac{\mu_j}{\mu}\right)^{\frac{\alpha\theta}{1+\theta(1-\alpha)}} \omega_j dj, \quad \omega_j = \sum_{i=1}^{m_j-1} \left(\frac{z_{ij}}{z_j}\right)^{\frac{1+\eta}{1+\eta(1-\alpha)}} \left(\frac{\mu_{ij}}{\mu_j}\right)^{\frac{\eta\alpha}{1+\eta(1-\alpha)}}$$

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Appendix: Aggregation Formulas (BHM)

In market j, we have the following six conditions (four firm-level optimality and two market-level aggregation):

$$y_{ij} = z_{ij} n_{ij}^{\alpha} \quad n_{ij} = \left(\frac{w_{ij}}{w_j}\right)^{\eta} n_j \quad w_{ij} = \mu_{ij} mrpl_{ij}$$

$$mrpl_{ij} = \alpha z_{ij} n_{ij}^{\alpha-1} \quad y_j = \sum_{i=1}^{m_j} y_{ij} \quad w_j = \left(\sum_{i=1}^{m_j} w_{ij}^{1+\eta}\right)^{\frac{1}{1+\eta}}$$

which deliver

$$y_j = \omega_j z_j n_j^{\alpha} \quad w_j = \mu_j \alpha z_j n_j^{\alpha-1}$$

where z_j, ω_j, μ_j have the appropriate expressions. Back

Appendix: Aggregation Formulas (D)

In market j, we have the following six conditions (four firm-level optimality and two market-level aggregation):

$$y_{ij} = z_{ij} n_{ij}^{\alpha} \quad n_{ij} = \left(\frac{w_{ij}}{w_j^p}\right)^{\eta} n_j^p \quad w_{ij} = \mu_{ij} mrpl_{ij}$$

$$mrpl_{ij} = \alpha z_{ij} n_{ij}^{\alpha-1} \quad y_j = \sum_{i=1}^{m_j-1} y_{ij} \quad w_j^p = \left(\sum_{i=1}^{m_j-1} w_{ij}^{1+\eta}\right)^{\frac{1}{1+\eta}}$$

which deliver

$$y_j = \omega_j z_j \left(n_j^p\right)^{\alpha} \quad w_j^p = \mu_j \alpha z_j \left(n_j^p\right)^{\alpha-1}$$

where z_j, ω_j, μ_j have the appropriate expressions. Back

Appendix: Aggregation formulas (BHM)

Across markets, we have the following six conditions (four market-level aggregation and two economy-level aggregation)

$$y_j = \omega_j z_j n_j^{\alpha} \quad n_j^p = \left(\frac{w_j}{W}\right)^{\theta} N \quad w_j = \mu_j mrpl_j$$

$$mrpl_j = \alpha z_j n_j^{\alpha-1} \quad Y = \int_0^1 y_j dj \quad W = \left(\int_0^1 w_j^{1+\theta}\right)^{\frac{1}{1+\theta}}$$

which deliver

$$Y = \Omega Z N^{\alpha} \quad W = \mu \alpha Z N^{\alpha-1}$$

where Z, Ω, μ have the appropriate expressions. Back

Appendix: Aggregation formulas (D)

Across markets, we have the following six conditions (four market-level aggregation and two economy-level aggregation)

$$y_j = \omega_j z_j \left(n_j^p\right)^{\alpha} \quad n_j^p = \left(\frac{w_j^p}{W^p}\right)^{\theta} N^p \quad w_j^p = \mu_j mrpl_j$$

$$mrpl_j = \alpha z_j \left(n_j^p\right)^{\alpha-1} \quad Y = \int_0^1 y_j dj \quad W^p = \left(\int_0^1 \left(w_j^p\right)^{1+\theta}\right)^{\frac{1}{1+\theta}}$$

which deliver

$$Y = \Omega Z \left(N^p\right)^{\alpha} \quad W = \mu\alpha Z \left(N^p\right)^{\alpha-1}$$

where Z, Ω, μ have the appropriate expressions. Back

Evidence against collusion

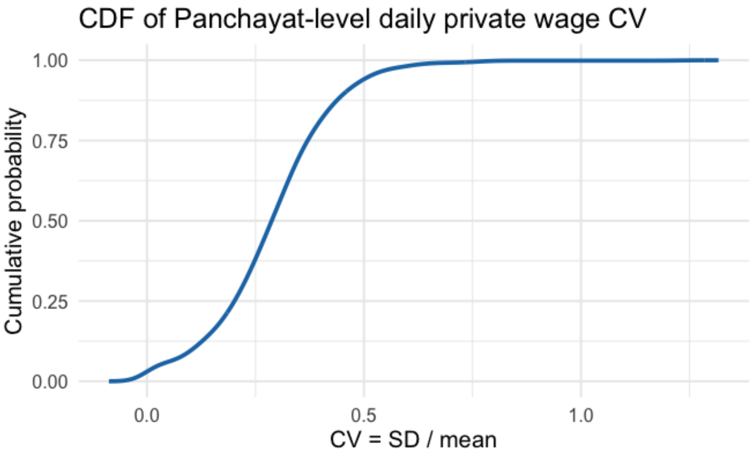

Figure: Source: Muralidharan et al baseline data; top 5% winsorized

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Calibration

Parameter	Description	Value
θ	Elasticity of substitution between villages	0.5
η	Elasticity of substitution between firms	2
γ	Elasticity of substitution between private and workfare labor	2.5
δ	Disutility of workfare labor	1-2
α	Production elasticity of labor (returns to scale)	0.7
ϕ	Workfare wage relative to private wage	1.2
ξ	Pareto shape parameter (firm productivity distribution)	8
$m_j - 1$	Number of firms in each village	4
J	Number of villages	500,000
σ	Risk aversion	2
ν	Frisch	0.4

Table: Calibration

Back

Result: workfare improves as $\delta \downarrow$

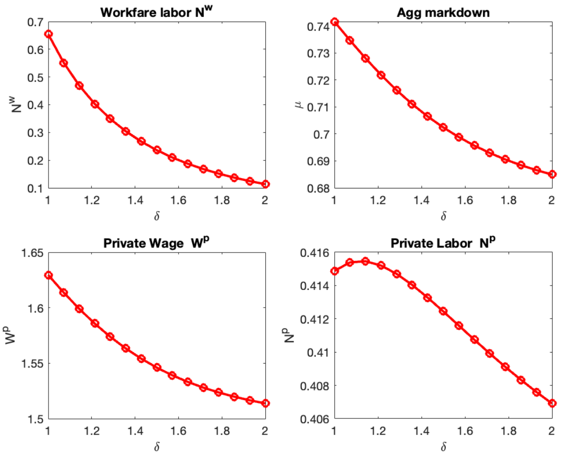

Figure: $\gamma = 2.5, \eta = 2, \theta = 0.5, \nu = 0.25, m_j - 1 = 4$

Markdowns Back

Intuition

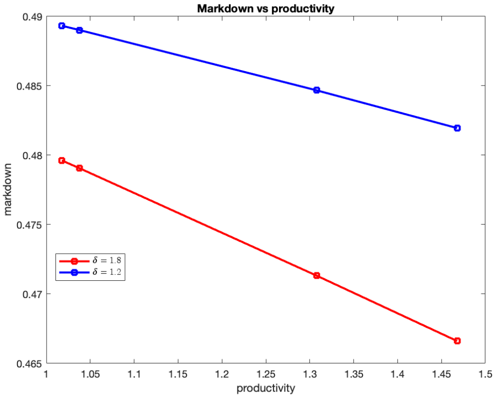

Figure: Markdowns against productivity

Markdowns Back

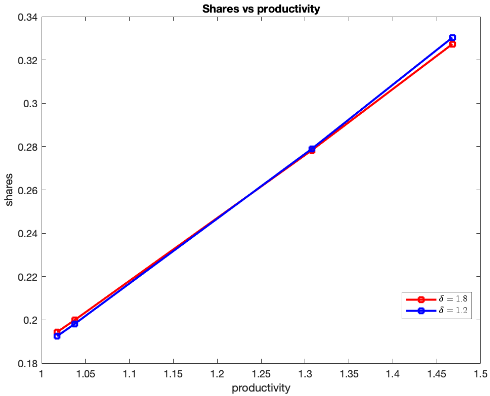

Figure: Shares against productivity

Markdowns Back

Result: workfare improves as $\delta \downarrow$

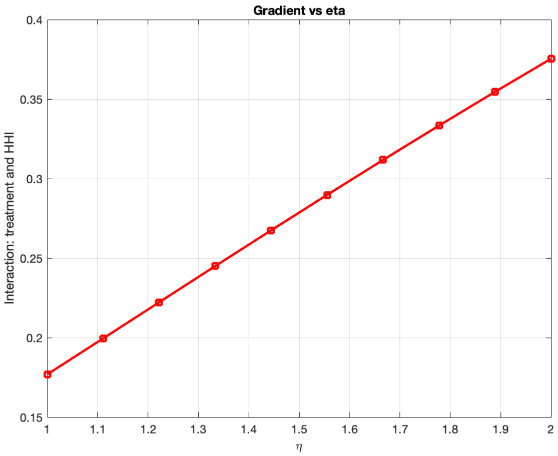

Figure: Back

Result: workfare improves as $\delta \downarrow$

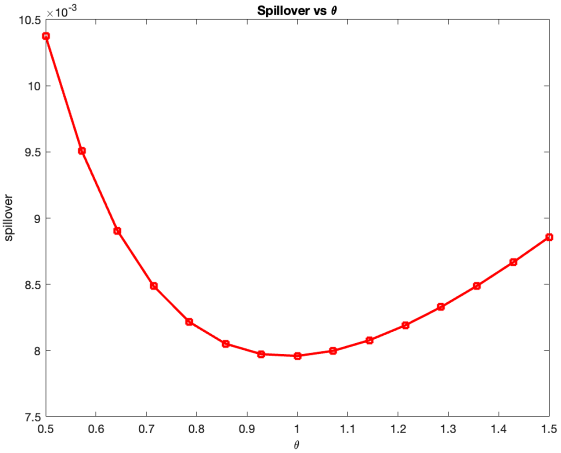

Figure: Back

Trade-off: macro-Frisch and market power

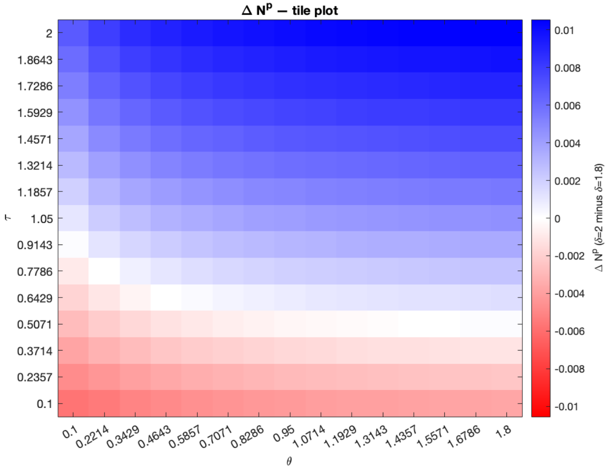

Figure: $\delta : 2 \to 1.8,\ \gamma = 2.5, \eta = 2$ Back

Empirical Specification in Muralidharan et al

$$Y_{ipmd} = \alpha + \beta_T T_{md} + \beta_N N^R_{pmd} + \gamma \bar{Y}^0_{pmd} + \delta_d + \lambda PC_{md} + \epsilon_{ipmd}$$

- **Outcome:** Y_{ipmd} is the outcome for individual i in GP p, mandal m, district d.
- **Direct effect ($\hat{\beta}_T$):** Effect of assignment to treatment ($T_{md} = 1$).
- **Neighborhood exposure ($\hat{\beta}_N$):** Effect of treatment intensity in nearby GPs outside the mandal (N^R_{pmd}).
- **Controls:** Baseline GP mean $\bar{Y}^0_{pmd}$, district fixed effects, and mandal PC used for stratification.
- **Adjusted total effect (AdjTE):** $\hat{\beta}_T + \hat{\beta}_N \cdot \bar{N}_T$, where $\bar{N}_T = 36\%$ (mean exposure among treated GPs).
- **Reporting:** We report $\hat{\beta}_T$ (main effect) and $\hat{\beta}_N \cdot \bar{N}_T$ (spillover) separately.

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Results from Muraidharan et al

Table 2: Employment and wages in June

	Wage			Employment		
	(1) Reservation wage	(2) Wage realization	(3) Wage realization (weighted)	(4) Days self-employed or not working	(5) Days worked in NREGS	(6) Days worked in private sector
Adjusted TE	6.9**	13***	10**	-2.4***	1.3**	1.4*
$(\beta_T + 0.36 * \beta_N)$	(3.2)	(4.3)	(5)	(.79)	(.55)	(.8)
	{3.5}	{4.6}	{5.2}	{.81}	{.56}	{.78}
Main effect	5.8**	8.8**	7.9*	-1.5**	.89*	.74
(β_T)	(2.8)	(3.6)	(4.1)	(.59)	(.47)	(.57)
	{2.9}	{3.6}	{4.1}	{.6}	{.51}	{.57}
Nbhd effect	1.1	4.3*	2.5	-.95**	.39	.71*
$(0.36 * \beta_N)$	(1.7)	(2.4)	(3)	(.42)	(.27)	(.4)
	{1.7}	{2.6}	{3.1}	{.41}	{.24}	{.38}
Control mean	97.2	127.9	128	17.3	4.5	7.9
Adjusted R^2	.054	.076	.058	.073	.076	.020
Observations	12,677	7,016	6969	13,951	14,009	14,278

The unit of analysis is an adult. "Wage realization" is the average daily wage, in Rs. per day, received by adults who worked (for "weighted," we weight by days worked). "Reservation wage" is the wage at which an individual would have been willing to work for someone else. The outcome in Columns 4-6 is the number of days out of the past 30 spent in the respective occupations (including partial days). Estimation is as described in Section 2.3. Appendices J and G discuss recall and sensitivity to outliers in more detail. Standard errors in parentheses are clustered by mandal; those in brackets are spatial as in Conley (2008). Significance based on the former is denoted: $^{*}p < .10, ^{**}p < .05, ^{***}p < .01$.

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Table 6: Heterogeneous effects on days worked by land concentration

	Raw HHI (full sample)	Raw HHI (above 1 acre)	Standardized (full sample)	Standardized (above 1 acre)
	(1)	(2)	(3)	(4)
Treatment	.46	.45	.6	.6
	(.57)	(.57)	(.55)	(.55)
	{.58}	{.58}	{.55}	{.56}
H^*	-4.7**	-6.2*	-.56**	-.63*
	(2.1)	(3.2)	(.25)	(.33)
	{2.6}	{2.9}	{.3}	{.3}
Treatment × H^*	4.6**	6.5*	.55**	.66*
	(2.3)	(3.4)	(.27)	(.34)
	{3}	{3.2}	{.35}	{.33}
Control Mean	7.9	7.9	7.9	7.9
Adjusted R^2	.019	.020	.019	.020
Observations	13,827	13,798	13,827	13,798

The unit of analysis is an adult. The outcome variable is the same as Column 5 of Table 2. "H^*" is the Herfindahl index of land ownership in the village, and each column represents a different measure of the index; for both the full sample and a restricted sample of those who own above 1 acre, both normalized (raw) and standardized separately for treatment and control areas. Estimation is as described in Section 2.3. Standard errors in parentheses are clustered by mandal; those in brackets are spatial as in Conley (2008). Significance based on the former is denoted: $^*p < .10, ^{**}p < .05, ^{***}p < .01$.

Figure: Back