

Buying out the means of production: labor management, wages, employment and productivity

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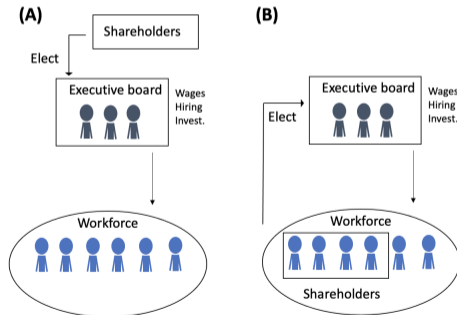
August 28, 2024

Introduction

- In conventional firms (CFs), employees have **no formal control rights**.
In **labor managed firms** (LMFs) workers have **majority ownership** and **control**

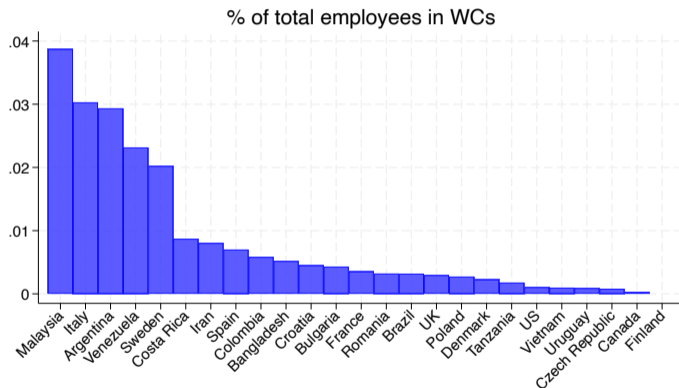
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
Motivation

- LMFs are **present all over the world**.



Absolute numbers

Motivation

- LMFs are **present all over the world**.
- **Other forms of employee control or ownership** are **widespread**, e.g. co-determination, employee stock ownership plans (ESOPs).
- **Co-operatives** are common: 1/10 workers are part of some cooperative
- In a context of **decreasing worker bargaining power** (Stansbury et al., 2020), there is **demand for** more worker **control** over firms' decisions.
- Is **worker management a viable alternative** to conventional management? 

Question: what are the implications of **labor management**?

- **LMFs represent the median worker/voter** → more **egalitarian wage distribution**.
- What does this do to **wages, employment & productivity**?
- **Optimistic view:** more co-monitoring + financial incentives → higher productivity and wages, i.e (Kandel and Lazear, 1992)
- **Pessimistic view:** free riding → brain drain → lower productivity and wages, i.e. (Holmstrom, 1982; Kremer, 1997)
- **What is true empirically?** Hard to provide convincing causal evidence.

- High quality **administrative data** from Italy: universe of employees (wage, type of contract, demographic characteristics) and firms (income statements and balance sheet data).
- Exploit **worker buy-outs** (WBOs): employees of a failing firm turn it into a worker cooperative
- **Identification: matched diff-in-diff** comparing WBOs to distressed firms that are also restructured but **stay conventionally owned**.

Preview of findings

- WBO firms **work surprisingly well**:
 1. Wage effects ~ 0 in the long run (adjusting for profits)
 2. Employment equals pre-treatment levels after 2 years
 3. Labor productivity also comparable
- Within-firm inequality decreases:
 1. Wages decrease .02 log points at median, .1 log points at P90
 2. Comes from different wage policies

Roadmap

1. Literature, background and data
2. Empirical approach
3. Results
4. Framework
5. Conclusion

Literature, background and data

- Theoretical literature on worker cooperatives (Ward, 1958; Sen, 1966; Holmstrom, 1982; Kremer, 1997)
- Empirical literature on WCs and cooperative property rights (Pencavel et al., 2006; Abramitzky, 2008; Burdín, 2016; Montero, 2022; Burdin and Garcia-Louzao, 2023)
 - Results: productivity \sim , selection of workers \downarrow
 - My contribution: observe transitions, full wage distribution and firm performance + diff-in-diff approach
- Co-determination, voice, worker representation (Blandhol et al., 2020; Jäger et al., 2021; Harju et al., 2021)
 - Results: labor representation institutions can change outcomes only if workers are sufficiently represented
 - My contribution: study an overlooked and more radical institution
- Job displacement (Lachowska et al., 2020; Bertheau et al., 2023; Schmieder et al., 2023)

Background: worker buy-outs

- After a negative shock to productivity, workers buy the firm and turn it into a **worker coop**. Governance
- **Regulated by law** from 1984
- **Rare event**: 91 since 2005.
- Can be done by all workers, or only some
- Funding comes from workers' unemployment benefits, severance pay and savings + loan from government and private sector
- Concentrated in manufacturing (70%), but also retail trade (11%) and construction (7%)



- (INPS) **Matched employee-employer** data 2005-2021
Variables: earnings, weeks worked → weekly wage
Sampling: universe private sector employees
- (Cerved) **Firm-level balance sheet** data 2005-2018
Variables: value added, assets, labor costs, profits
Sampling: all incorporated firms
- (Ministry of Firms) **Universe of cooperatives**: information on type (distinguish WCs from others) 2005-2021
- (CFI) **Universe of government-supervised WBOs** 2005-2021 (91)

Empirical approach

Empirical strategy

- **WBOs:** new WC established in year C_j , let $k = t - C_j$
- **Comparison firms:** new *conventional* firm created in year C_j , $> 60\%$ of its workers were employed together in the same firm from $C_j - 1, C_j - 3$, which ceased to exist. Link the two IDs, and define $k = t - C_j$
- A **cohort** C_j comprises both treated and control firms.
- Focus on firms **with 5+ employees** in the pre-transition period
- **WBOs:** 51 cases. **Comparison firms:** 13,271 cases.

- **Coarsened exact matching** with matching variables: quintiles of employment, hiring rate and EBITDA in $k = -3$, EBITDA in $k = -1$, manufacturing dummy.
- **If ties**, choose top 5 firms with closest **propensity score**: linear probability model with firm age, employment and 2-digit sector dummies, quintiles, average worker age, gender proportion, plus matching variables.
- Find 93 matches for 26 WBO firms $t \in [2005 - 2021]$ and $C_i \in [2009, 2021]$.
- Can use pre-periods to evaluate common trends assumption

Balance tables

	Control Mean/SE	WBO Mean/SE	t-test p-value
Log wages	6.123 (0.002)	6.208 (0.030)	0.004***
Employment	30.728 (1.063)	44.426 (5.389)	0.012**
Firm age	15.587 (0.105)	19.222 (2.226)	0.100*
Average age	38.997 (0.045)	41.636 (0.572)	0.000***
Proportion of women	0.354 (0.003)	0.255 (0.027)	0.000***
Manufacturing	0.437 (0.004)	0.706 (0.063)	0.000***
Log value added pw (1,000 EU)	3.792 (0.008)	3.736 (0.116)	0.647
EBITDA pw (1,000 EU)	13.724 [0.333]	9.177 [5.830]	0.431
N_{INPS}	13,271	51	
N_{Cerved}	8,771	46	

Table: Before matching

	Control Mean/SE	WBO Mean/SE	t-test p-value
Log wages	6.349 [0.026]	6.230 [0.042]	0.016**
Employment	93.860 [11.540]	45.885 [7.315]	0.001***
Firm Age	20.806 [1.396]	17.462 [2.371]	0.223
Average age	41.671 [0.384]	42.369 [0.730]	0.395
Proportion of women	0.267 [0.022]	0.290 [0.041]	0.619
Manufacturing	0.828 [0.039]	0.846 [0.072]	0.824
Log value added pw (1,000 EU)	3.953 [0.101]	3.588 [0.166]	0.061*
EBITDA pw (1,000 EU)	17.902 [4.296]	8.643 [5.938]	0.206
N_{INPS}	93	26	
N_{Cerved}	93	26	

Table: After matching

Empirical strategy

- Main specification. Compare WBOs to controls in the same cohort:

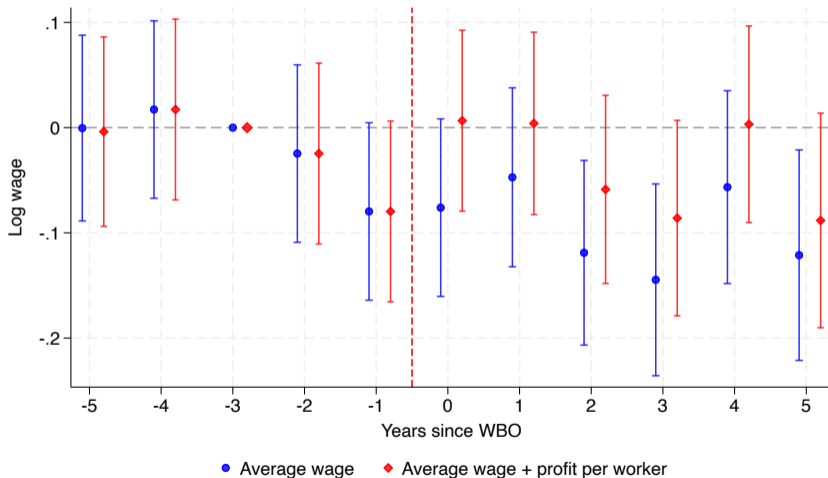
$$y_{jt} = \alpha_t \times \alpha_g + \alpha_j + \sum_{k=-5, k \neq -3}^5 \beta_k (\mathbb{1}\{k = t - C_j\} \times WBO_j) + \alpha_{>5, WBO} + \alpha_{<-5, WBO} + \varepsilon_{jt}$$

where y_{jt} is the outcome, $\alpha_j, \alpha_t, \alpha_g$ are firm, year and matched group fixed effect, $\alpha_{<-5, WBO}, \alpha_{>5, WBO}$ are shorthand for periods earlier than 5, and later than 5, interacted with WBO_j , ε_{jt} is the error term, clustered at the firm level.

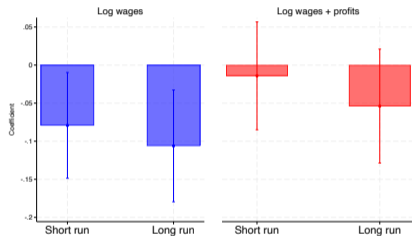
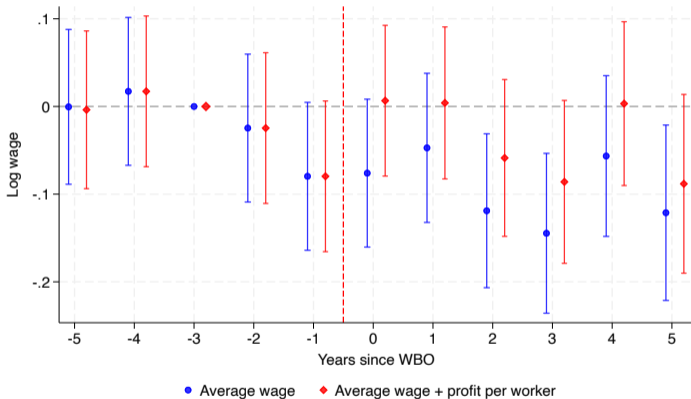
- I also estimate short run β_{SR} and long run β_{LR} treatment effects by aggregating periods $k = \{0, 1, 2\}$ and $k = \{3, 4, 5\}$

Results

Weekly wages decrease, but not when adjusted for profits



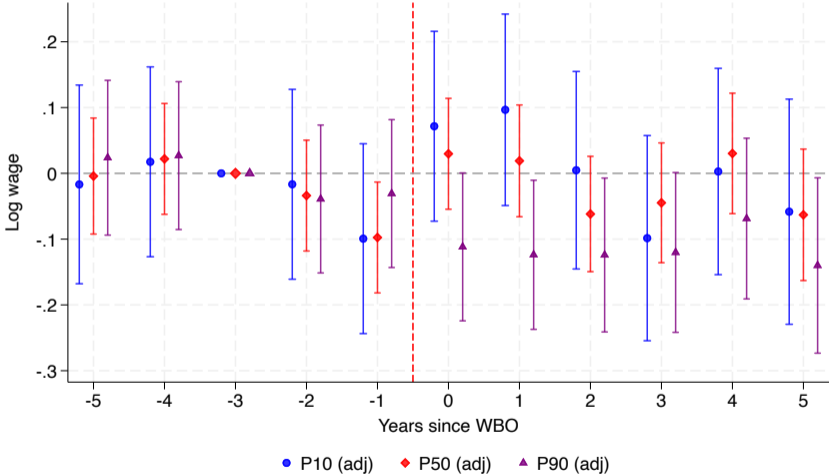
Weekly wages decrease, but not when adjusted for profits



Wage residuals

Profit adjustment by member

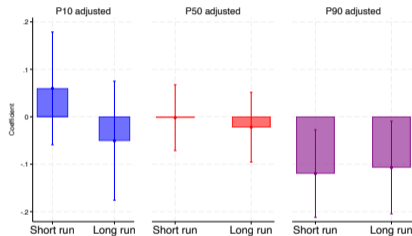
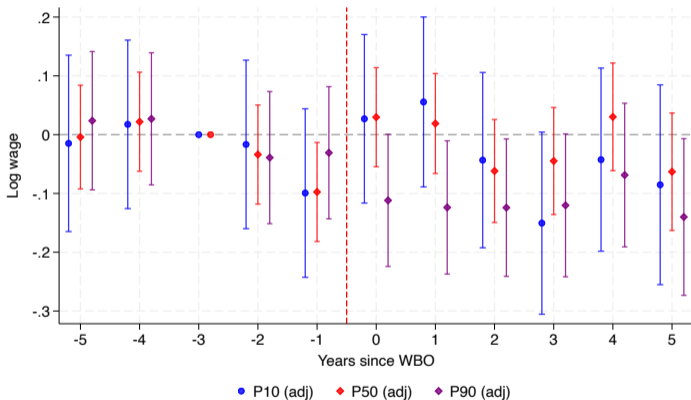
Within-firm inequality is reduced



No profit adjustment

Profit adjusted by member

Within-firm inequality is reduced

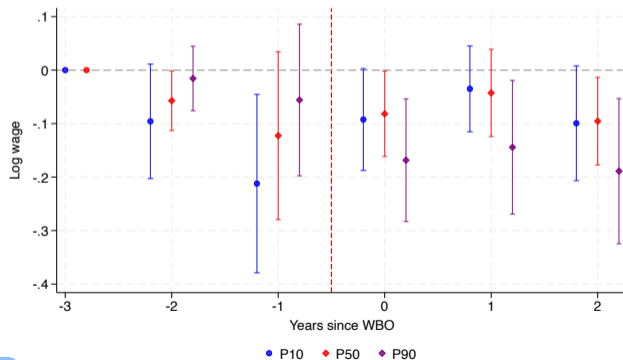


No profit adjustment

Profit adjusted by member

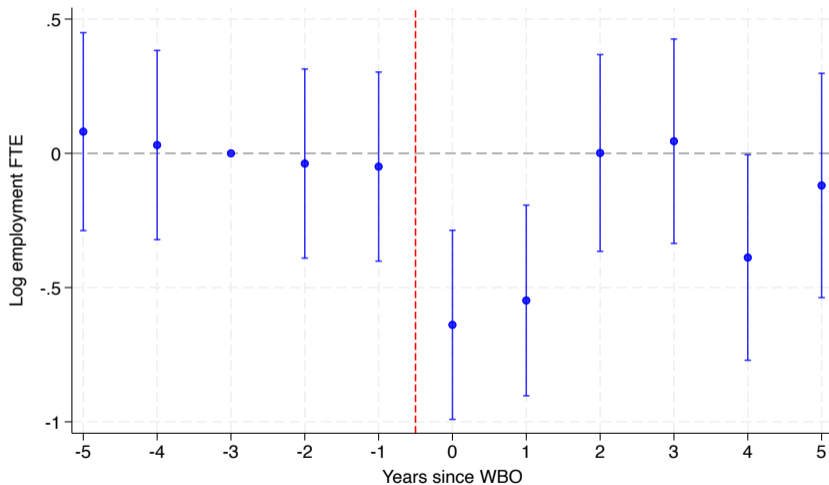
... due to firm wage policies

- Are wage effects due to changes in **wages policies** or changes in **worker composition**?
- Run event study on **stayers** only: workers employed from $k = -3$ to $k = 2$

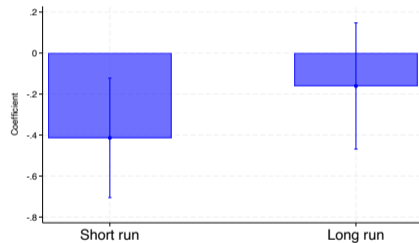
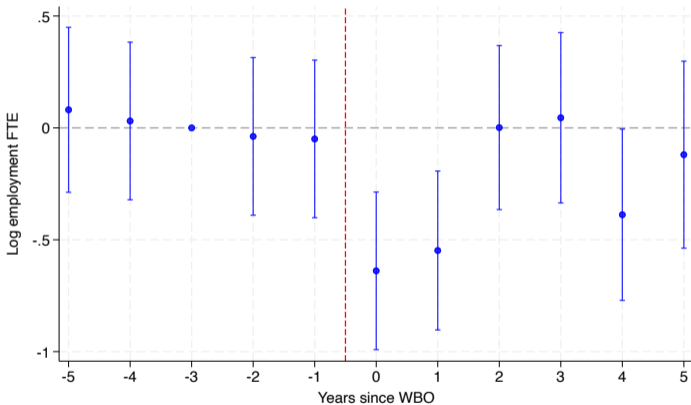


Change in within-firm inequality

Employment picks up after 2 years

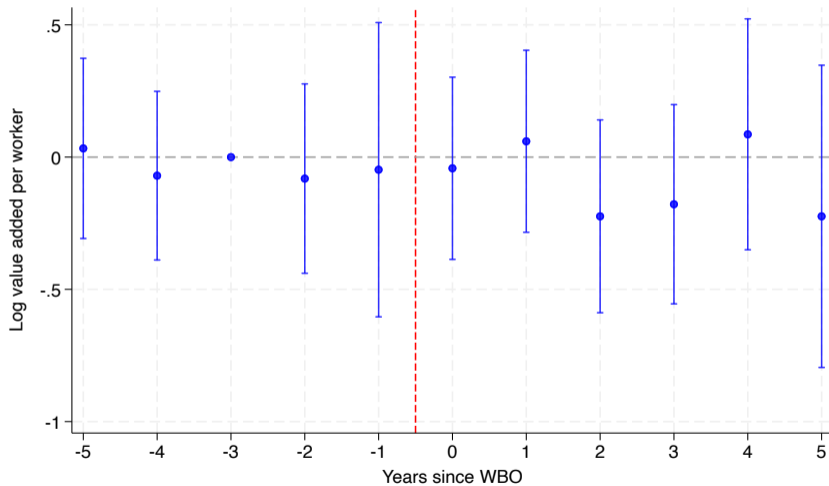


Employment picks up after 2 years



Hiring and separation rates

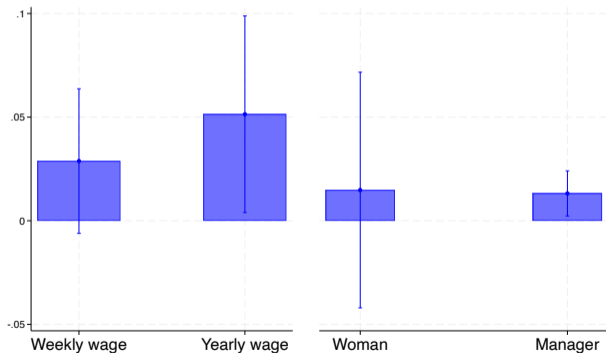
Labor productivity



Changes in composition

- Compare stayers and leavers in WBO firms vs. comparison firms, before the transition:

$$y_{it} = \alpha_{j(i)} + \delta L_i + \beta(L_i \times WBO_{j(i)}) + u_{it}$$



- I study the **effects of labor management** using cases of **WBOs** and a matched control group
- Labor management **reduces average wages by 10%**. Not when accounting for profits per worker.
- **Redistribution of losses:** zero effect below the median, large effect (10%) at the P90
- **Limited effect on employment:** -25% after 1y, zero afterwards
- **No effects on productivity**

Thank you

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Selection of workers: stayers and leavers

- Cross-sectional regression using $k = -1$ of leaver dummy on wages:

$$L_{it} = \alpha + w_i + \alpha_{j(i)} + \alpha_t \quad (1)$$

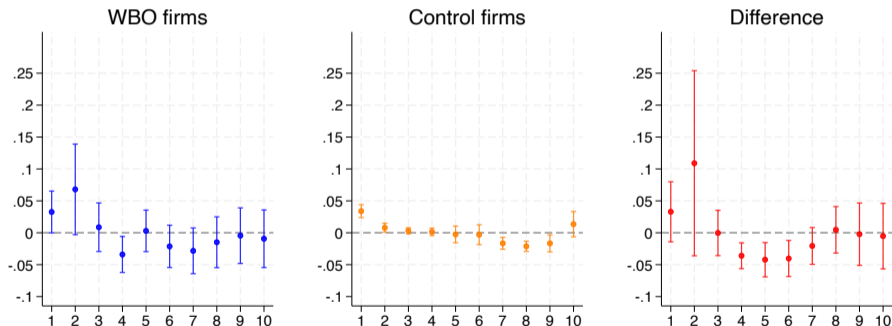
		WBO firms			Comparison firms			Difference		
		Weekly wage	Yearly wage, t-1	Weeks, t-1	Weekly wage	Yearly wage, t-1	Weeks, t-1	Weekly wage	Yearly wage, t-1	Weeks, t-1
Firm, Year FE	$k = -1$	-0.0103 (0.0159)	-0.0504** (0.0190)	-1.534*** (0.374)	-0.0480 (0.0376)	-0.104** (0.0409)	-2.844** (1.129)	0.0314 (0.0321)	0.0796** (0.0302)	1.808 (1.034)
	$k = -2$	-0.0168 (0.0106)	-0.0715*** (0.0199)	-2.028** (0.770)	-0.0271 (0.0273)	-0.110*** (0.0232)	-2.547*** (0.685)	0.0103 (0.0308)	0.0384 (0.0292)	0.519 (1.209)
$N, k = -1$		1928			1365			3293		
$N, k = -2$		2475			1560			4035		

Note: the 'Controls' specification includes third degree polynomials in age and experience and a woman dummy, as well as firm and year fixed effects. Standard errors in parentheses clustered at the worker-year level.

Other outcomes

Selection of workers: stayers and leavers

- Assign workers to deciles of the firm wage distribution in $k = -1$: regress L_i on each decile (separately).

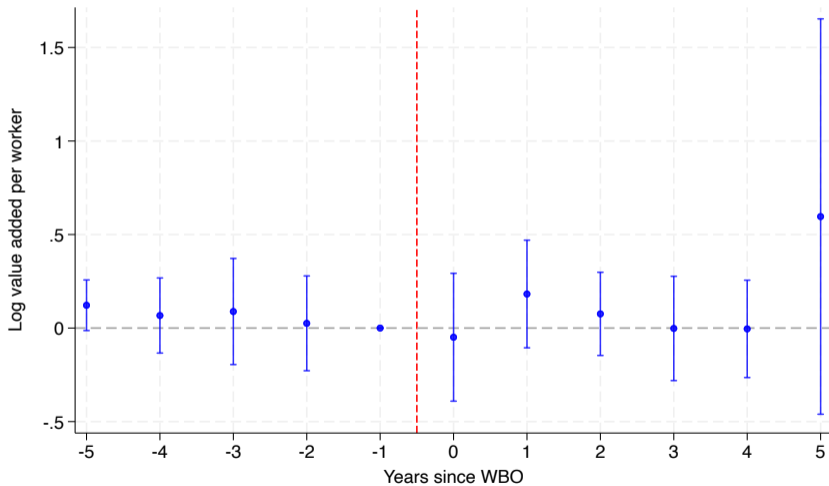


Using $k = -2$

Using overall wage distribution

Using overall wage distribution + firm FE

Productivity



Framework

Framework

- There are J identical firms indexed by j . In each firm worker types are distributed according to cdf $F(\theta) = \theta^\varphi, \varphi > 0, \theta \in [0, 1]$.
- Workers produce θ additively: $Y_j = E(\theta) = \frac{\varphi}{1+\varphi}$.
- Firms can make offers to workers in other firms. Workers pay moving cost c to switch firm. Hence, worker i 's outside option is $\theta_i - c$.
- Firms choose wages to maximize profits. In equilibrium: $w_i^{CF} = \theta_i - c$.
- LMFs set wages according to the formula:

$$e_i = \gamma\theta_i + (1 - \gamma)E(\theta|\theta < \theta'(\gamma)). \quad (2)$$

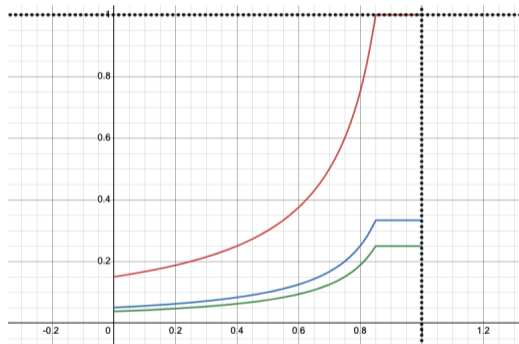
where $\theta'(\gamma)$ is the highest type in the firm. For all $\theta \leq \theta'(\gamma)$, $w_i \leq e_i$

Framework

$$\theta'(\gamma) = \begin{cases} \frac{(1+\varphi)c}{(1-\gamma)} & \text{if } \gamma \in [0, 1 - c(1 + \varphi)] \\ 1 & \text{otherwise} \end{cases}$$

$$\bar{\theta}(\gamma) = \frac{1}{1+\varphi} \theta'(\gamma)$$

- For all $\theta < \bar{\theta}(\gamma)$, $\gamma^* = 1 - c(1 + \varphi)$
- For all $\theta \geq \bar{\theta}(\gamma)$, $\gamma^* = 1$
- If $\varphi < 1$, $\theta^M < \bar{\theta}$, otherwise $\theta^M \geq \bar{\theta}$
- **No exit** induced by redistribution



Framework- buyouts

- Two time periods $t = 0, 1$. At $t = 0$, all firms are CF.
- Firms can receive 'offer' to become WC by paying a . Each worker has to contribute a/p to buy in, where p is the proportion of workers participating
- Worker i has unemployment benefits $s_i = \sigma(\theta - c)$, $\sigma \in (0, 1)$. Outside option is still $\theta_i - c$.
- All types that can afford it will buy-in. Types $\theta < \theta_{min} = \frac{a/p + \sigma c}{\sigma}$ excluded.

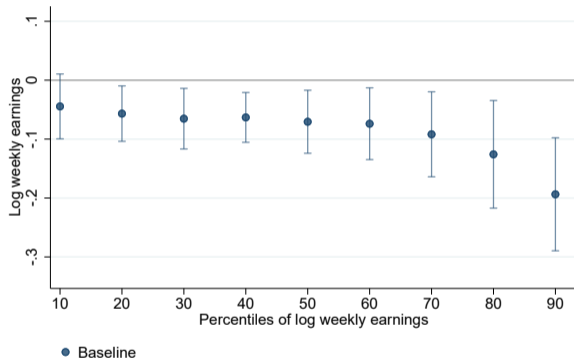
Predictions for $\varphi < 1$		
Employment	↓	✓
Within-firm inequality	↓	✓
Within-stayers inequality	↓	✓
Wages $\gamma\bar{\theta}(\gamma)$	↓ ↑	?
Productivity $\bar{\theta}(\gamma)$	↑	×

Workforce composition

- Wage cuts are larger at higher percentiles and this results in lower within-firm inequality (P90/P10 and P90/P50) Effects on P90/P10
 - Is this due to changes in **workforce composition** or **wage premia**?
1. Fix workforce composition by focusing on **stayers**
 2. Alternatively, estimate effect on **wage residuals**

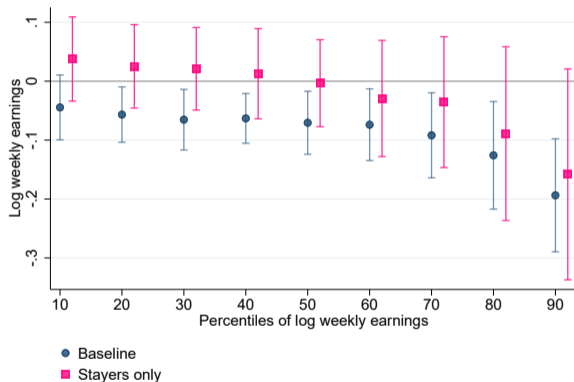
Workforce composition

- Stayers:
 - Employed for $\geq 4y$ pre-transition
 - Stay for $\geq 5y$ post-transition *or* until firm exits
- Calculate firm-level statistics using stayers only
- No differential change in composition for stayers \rightarrow effects come from changes in skill premia.



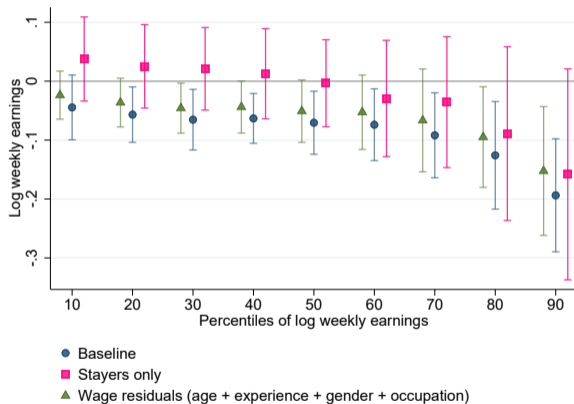
Workforce composition 3

- Focus on stayers:
 - Employed for $\geq 4y$ before transition &
 - Stay at firm post-transition for $\geq 5y$ or until firm exits
- No differential change in composition for stayers \rightarrow effects come from changes in skill premia.

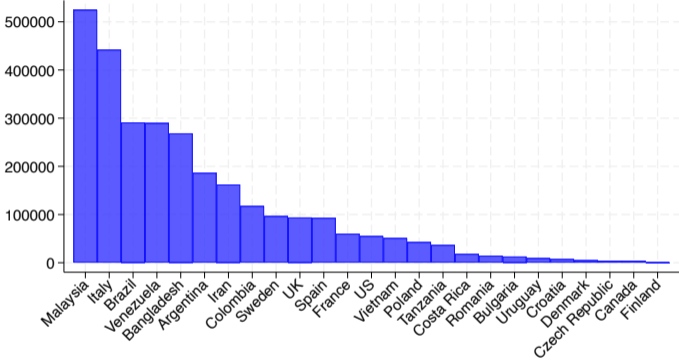


Workforce composition

- Obtain wage residuals from regression on age polynomial, experience polynomial, gender ratio, occupation ratios.
- Estimate treatment effect on residuals
- If the overall effect is driven by changes in skill premia, effects should be the same as baseline

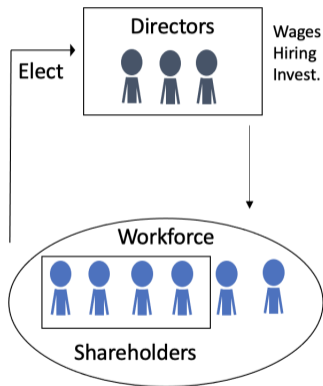


Number of employees in WCs

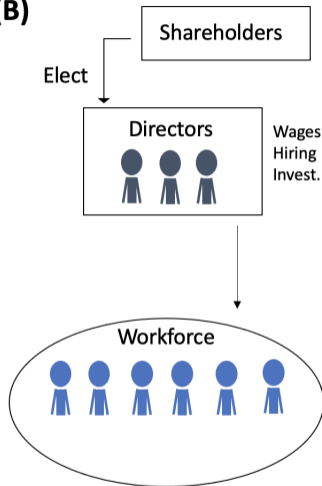


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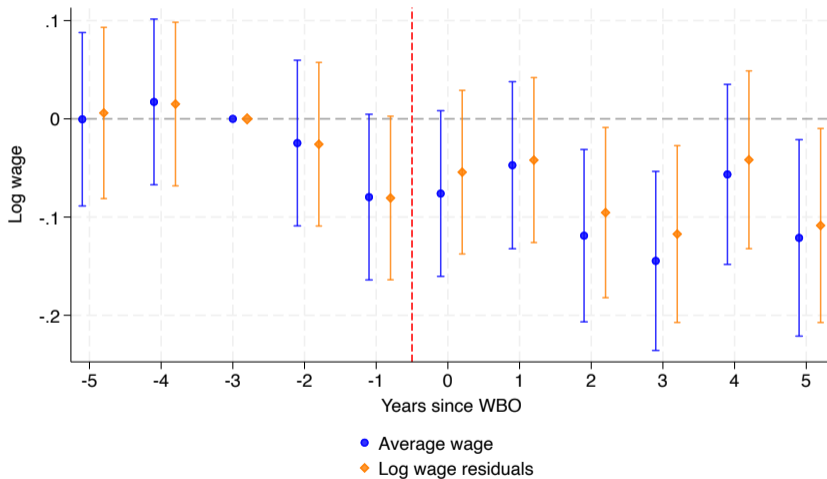
Prevalence of EOFs in selected countries

- Italy: 17,857 WCs (above 5 employees) employing 441,897 workers (source: INPS data).
- Spain: 17.603 firms employ 305.291 workers (de Cooperativas de Trabajo Asociado , COCETA).
- France: 3.801 EOFs employing some 71.084 workers (générale des SCOP , CGSCOP).
- Argentina: 13.128 EOFs
- US: 5000 (partly or fully) employee owned, with 1.5 million working for them.¹

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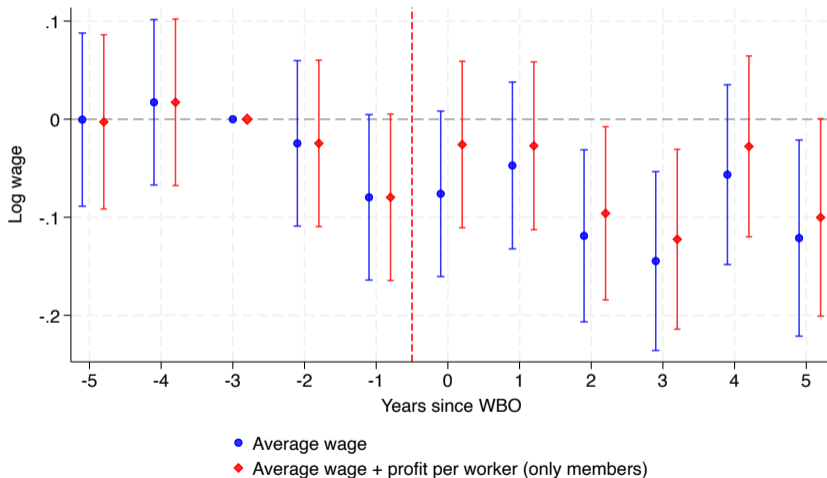
¹<https://www.certifiedeo.com/companies>

Wage residuals



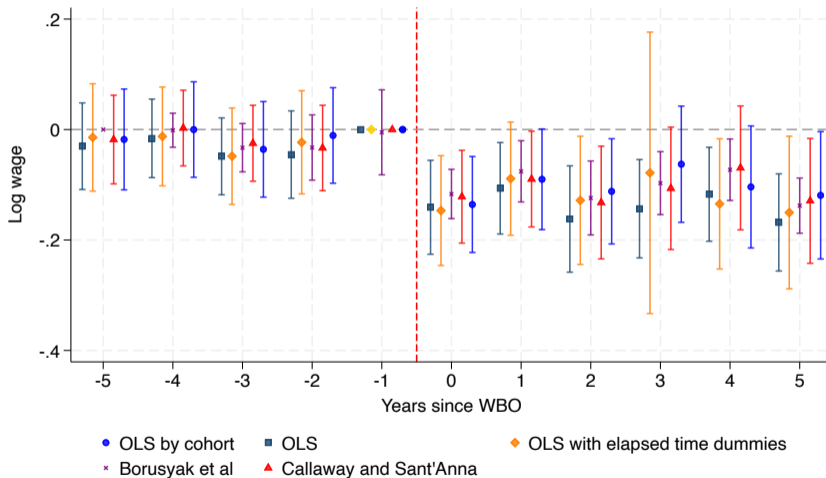
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Average wages adjusted for members only



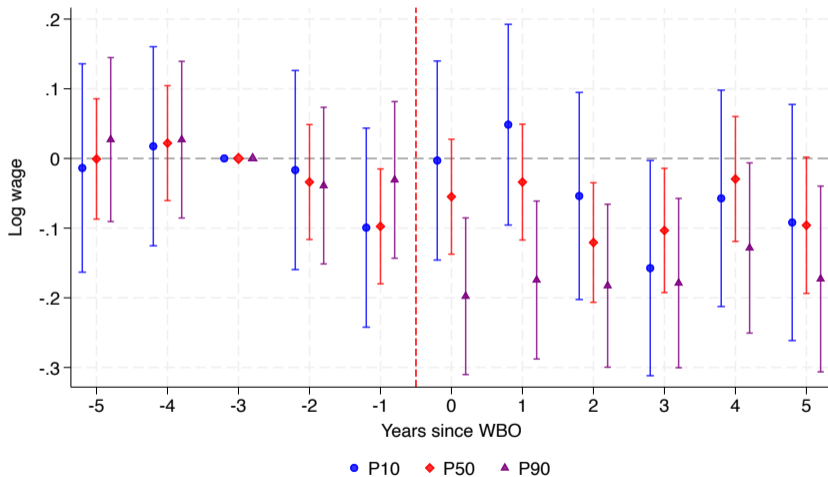
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Average wages - other event study estimators



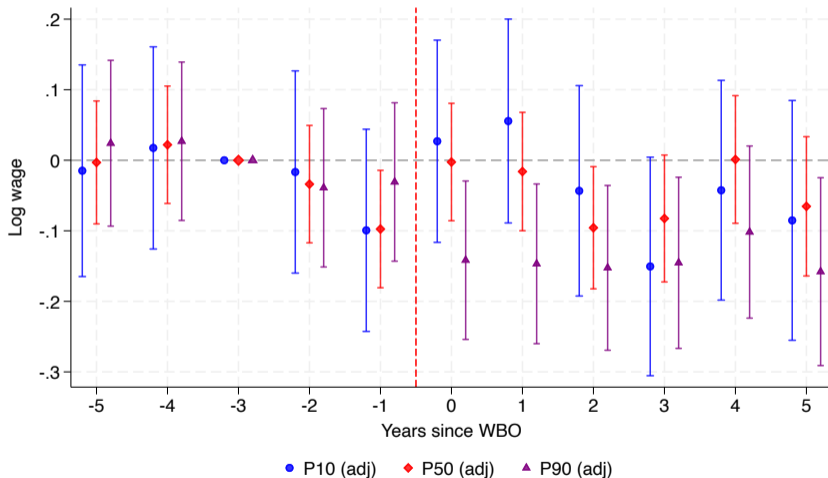
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Percentiles - profit adjusted



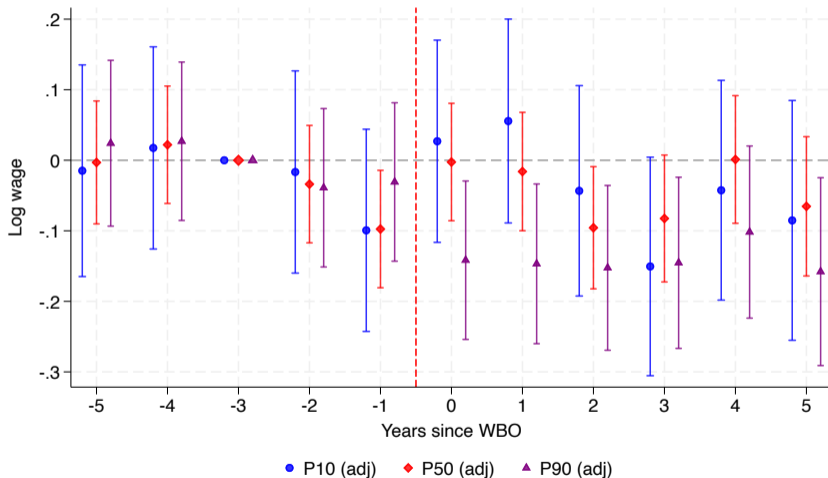
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Percentiles - profit adjusted for members only



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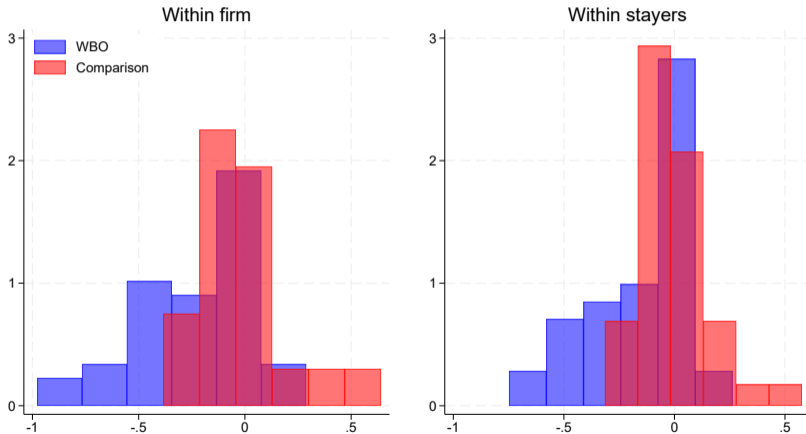
Percentiles - profit adjusted for members only



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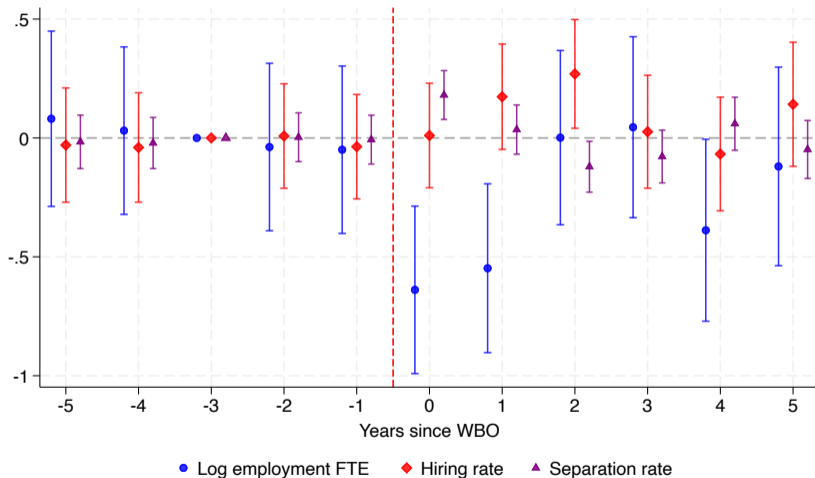
Percentiles - profit adjusted for members only

Change in $\ln(P90) - \ln(P50)$



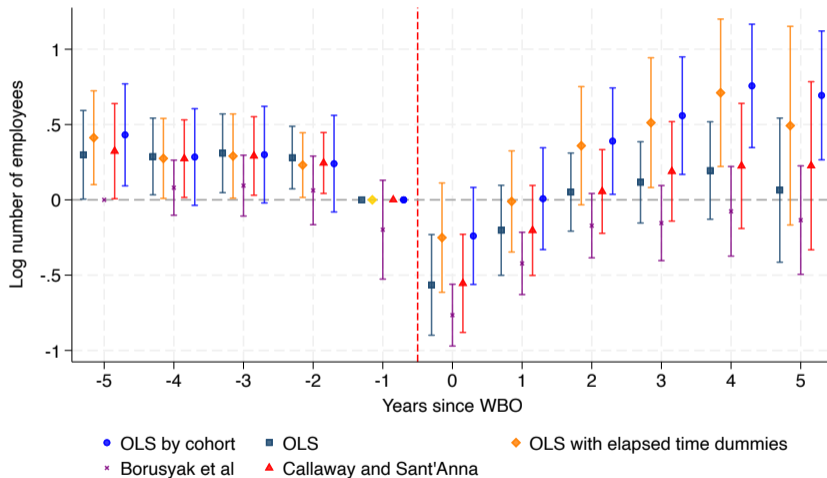
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Employment, hiring and separation rates



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Employment - other event study estimators



Return

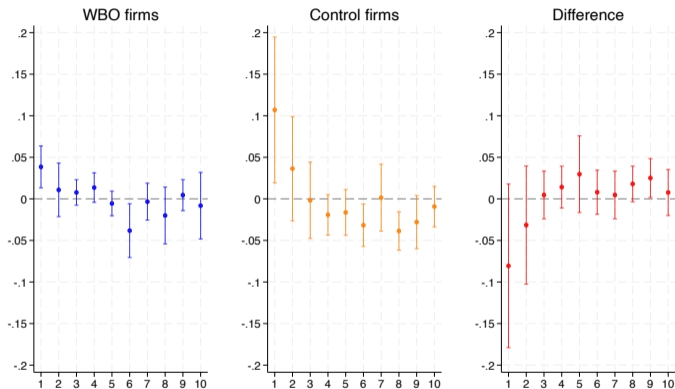
Stayers vs. leavers - other characteristics

		WBO firms						Comparison firms						Difference					
		Age	Woman	Tenure	Exp.	Manag.	Blue c.	Age	Woman	Tenure	Exp.	Manag.	Blue c.	Age	Woman	Tenure	Exp.	Manag.	Blue c.
Firm, Year FE	$k = -1$	1.069 (0.818)	0.0587** (0.0195)	-0.184 (0.164)	1.014 (0.593)	0.00400 (0.00473)	-0.0473 (0.0343)	0.838 (0.621)	-0.0138 (0.0230)	-2.498*** (0.291)	0.402 (0.743)	-0.00380 (0.00545)	-0.0111 (0.0331)	1.313* (0.799)	-0.0161 (0.0201)	-2.933*** (0.165)	1.002 (0.590)	-0.00601 (0.00454)	0.00890 (0.0344)
	$k = -2$	1.056 (0.686)	0.0505** (0.0174)	-0.300** (0.133)	1.111* (0.522)	0.00866 (0.00497)	-0.0565 (0.0327)	0.228** (0.0951)	-0.00112 (0.00313)	-0.486*** (0.0895)	0.0368 (0.112)	0.00695*** (0.000755)	-0.0217*** (0.00331)	-0.257 (1.024)	0.0666** (0.0299)	2.633*** (0.306)	0.109 (1.008)	0.0147 (0.00872)	-0.0654 (0.0467)

Note: Standard errors in parentheses clustered at the worker-year level.

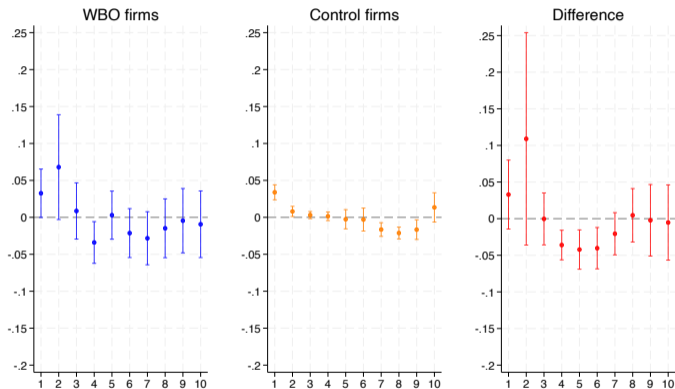
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Stayers vs. leavers types, $k=-2$



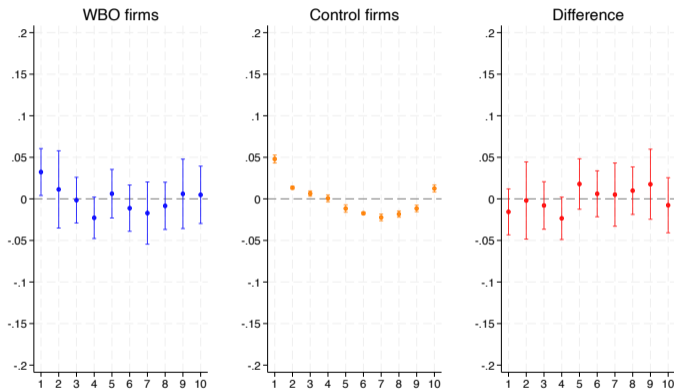
Return

Stayers vs. leavers types, overall wage distribution



Return

Stayers vs. leavers types, overall wage distribution + firm FE



Return

Worker cooperatives in Italy

- Governance: most important decisions are approved by the general assembly
- Employ about 4% of private sector employees (441,897).
- Compared to conventional firms: [Show comparison](#)
 - ↑ size (n. employees)
 - ↓ wages
 - ↓ productive (v.a. per worker)
 - ↓ manager ratio
- Since 2005: 29,466 newly created WCs

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WC comparison

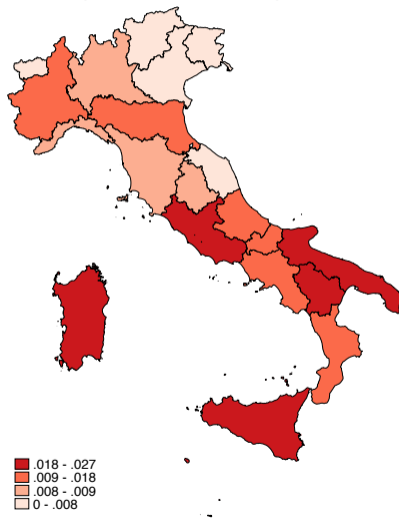
	Conv. firms	Worker coops
Weekly real earnings	400	354
S.d. log earnings	.26	.21
Employment	18	44
Age	38.47	40.27
Proportion of women	.38	.32
Manager	.01	.002
<i>N. Observations</i>	388,576	149,783
V.A. per worker (1,000 EU)	47	28
Fixed assets	1934	353
Revenue	6607	2511
EBIT	247	41
<i>N. Observations</i>	166,305	97,959

Note: sample includes firms with at least 5 employees

[Return](#)

Regional distribution

Proportion of worker cooperatives



Top 5 sectors by firm type

Conv. firms

(C) Manufacturing 29%
(G) Wholesale and Retail 19%
(I) Accomodation and Food 17%
(F) Construction 14%
(H) Transportation 4%

Worker coops

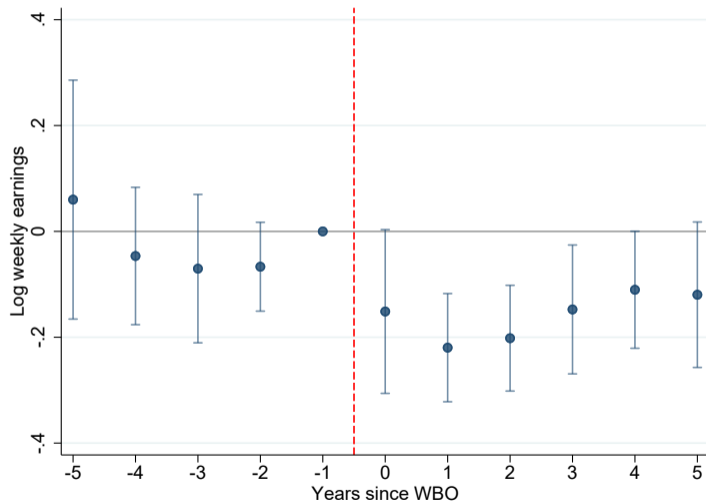
(N) Administrative and support services 25%
(H) Transportation 22%
(F) Construction 14%
(C) Manufacturing 11%
(R) Arts, entertainment and recreation 7 %

Note: sample includes firms with at least 5 employees

WBOs in Italy - how do they work?

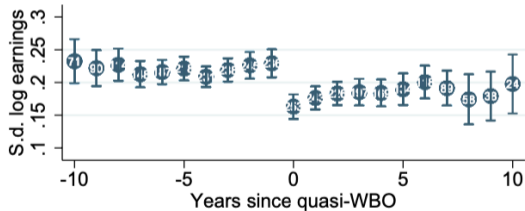
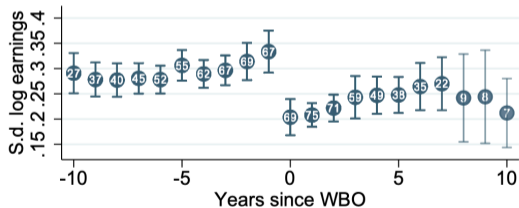
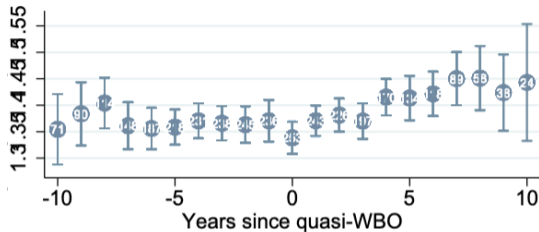
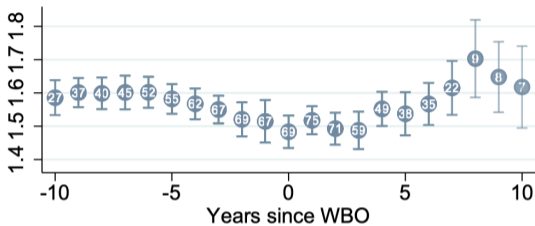
1. Firm in distress (bankruptcy, entrepreneur succession, business choice)
2. Workers get in touch with coop movement (Legacoop, Confcooperativa) and/or government agency (CFI)
3. Analysis phase:
 - Business plan
 - Financing plan
 - Buyout plan
4. Approval from government agency
5. Establish new coop, start buying/renting assets and start business

Within-firm inequality decreases



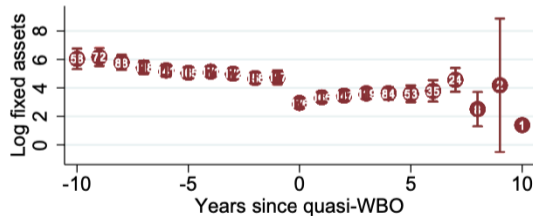
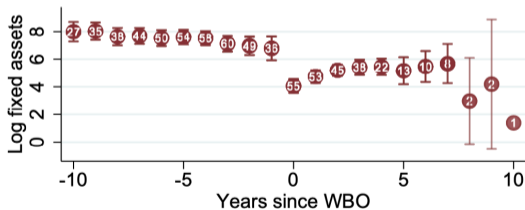
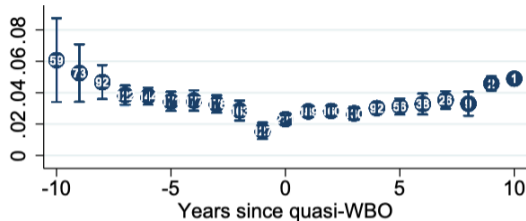
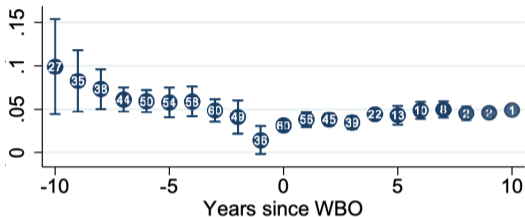
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Trend comparison/1: wages

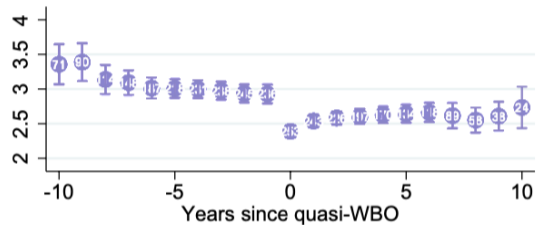
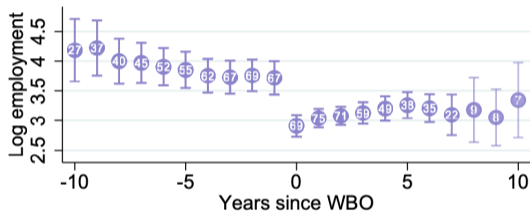


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Trend comparison/2: productivity and assets



Trend comparison/3: employment



[Return](#)

Comparison by firm type

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Fixed assets	1934	353
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Sector residuals