What Firms Do

Gender Inequality in Linked Employer-Employee Data

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Introduction

- The gender pay gap has decreased remarkably: the median was 13.9% in 2016 against a value above 30% in 1975 in OECD countries.
- Traditional explanations for its presence (Altonji and Blank, 1999):
  - **Demand-side**: taste or statistical discrimination;
  - **Supply-side**: productivity differences due to human capital accumulation and work effort.
- Role of traditional factors decreased in importance (Goldin et al., 2006).
- Alternative explanation: differences in psychological traits or social norms (Bertrand, 2011, and Azmat and Petrongolo, 2014).

Introduction

- Gender wage gap depends not only on individual characteristics and behaviour, but also on those of firms.
- With frictions: firms offer/bargain different wage "premia".
- Two channels of firm-related gender wage inequality:
  - between firms $\rightarrow$ sorting of women into low-pay firms (Groshen, 1991; Ludsteck, 2014; Cardoso et al., 2016);
  - within firms $\rightarrow$ bargaining power of women relative to men (Babcock et al., 2006; Bowles et al., 2007; Rozada and Yeyati, 2018).

This paper

- Focus on the role of firms' pay policy.
- Contribution to the gender pay gap along the earnings distribution, by age and cohort and over time, decomposing:
  - sorting
  - differences in bargaining power
- Build on the methodology of Card et al. (2016).
- Mechanisms:
  - sorting and gendered mobility patterns;
  - bargaining and firm environment, as proxied by exogenous changes at the top of the firm hierarchy (gender quotas).

Data

- INPS data on workers and firms: universe of workers in the Italian private sector.
- Period covered: 1995-2015.
- Information on:
  - **Workers** $\rightarrow$ employment and (some) personal characteristics.
  - **Firms** $\rightarrow$ location, industry, date of opening and closure.
- Match balance sheet data from AIDA Bureau-Van Dijk.
- M: 13.3 mln (130 mln p-y)
  W: 9.1 mln (80 mln p-y)
  Firms: 1.6 mln

◂ Descriptives

Descriptive evidence

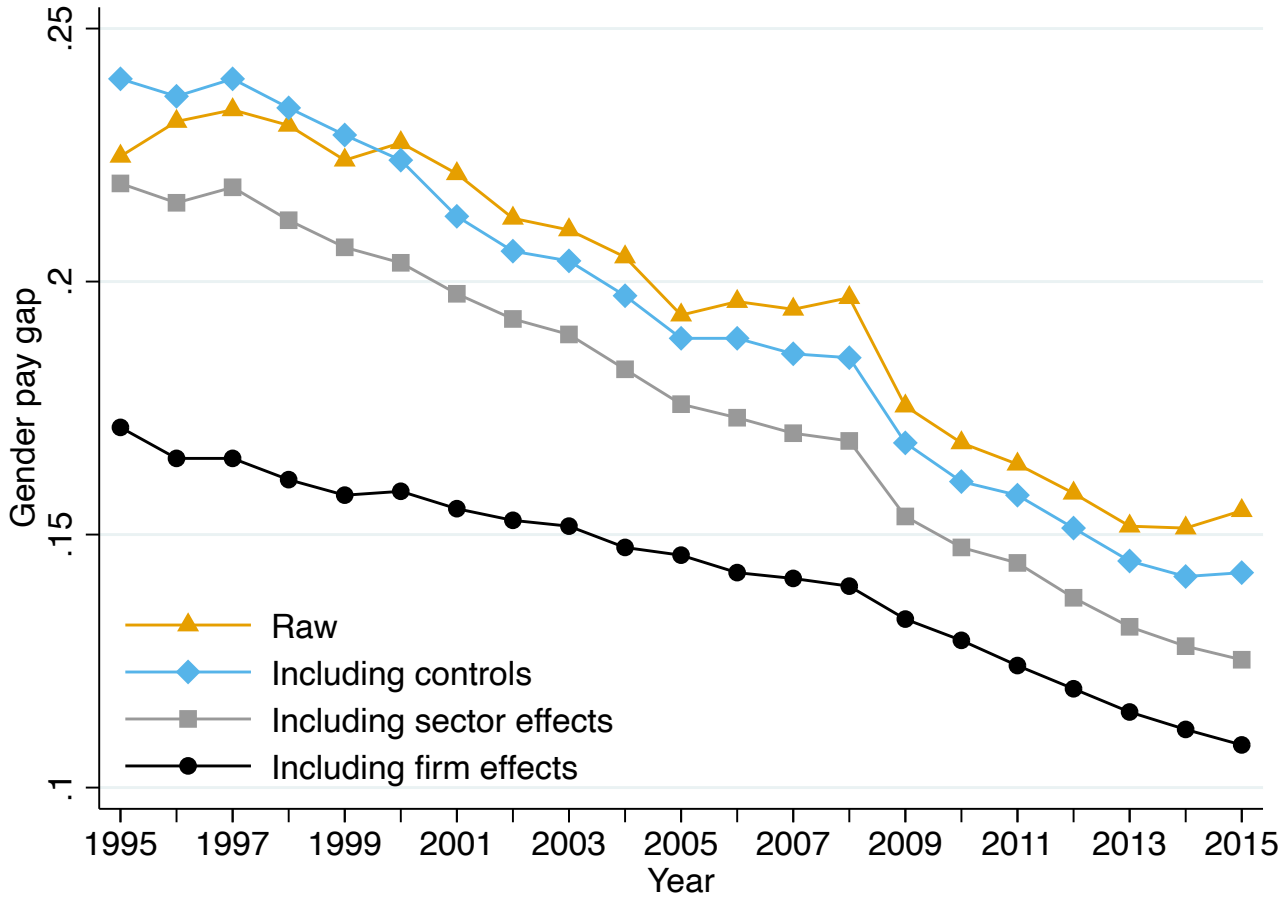


Figure: Gender pay gap over the period 1995-2015.

Notes. Controls include cubic polynomials in age, experience and tenure, a dummy for full-time contract, the number of weeks worked, occupation and province of work fixed effects.

Methodology

AKM

- Two-way fixed effects model *a la* Abowd et al. (1999):

$$w_{ijt} = \theta_i + \psi_j^g + X_{it}'\beta^g + \varepsilon_{ijt} \tag{1}$$

- Assumption:

$$\psi_j^g = \gamma^g \bar{S}_j \tag{2}$$

where:

  - $\bar{S}_j$ = average surplus at firm j.
  - γ^g = gender-specific share. ◂ Figure

Methodology

Largest connected sets and normalisation

- Estimate by OLS equation (1) for largest connected sets of female and male workers under assumption of conditional random mobility. ◂ CRM
- Build a double connected set, i.e. intersection of largest connected male and female sets. ◂ Descriptives
- Normalise firm effects with respect to average ψ_j^g in food and accommodation sector. ◂ Low surplus

Methodology

Oaxaca-Blinder Decomposition

$$\underbrace{E\left[\psi_j^M \mid g = M\right] - E\left[\psi_j^F \mid g = F\right]}_{\textbf{firm contribution}} =$$

$$= \underbrace{E\left[\psi_j^M - \psi_j^F \mid g = M\right]}_{\textbf{bargaining effect}} + \underbrace{E\left[\psi_j^F \mid g = M\right] - E\left[\psi_j^F \mid g = F\right]}_{\textbf{sorting effect}}$$

$$= \underbrace{E\left[\psi_j^M - \psi_j^F \mid g = F\right]}_{\textbf{bargaining effect}} + \underbrace{E\left[\psi_j^M \mid g = M\right] - E\left[\psi_j^M \mid g = F\right]}_{\textbf{sorting effect}}.$$

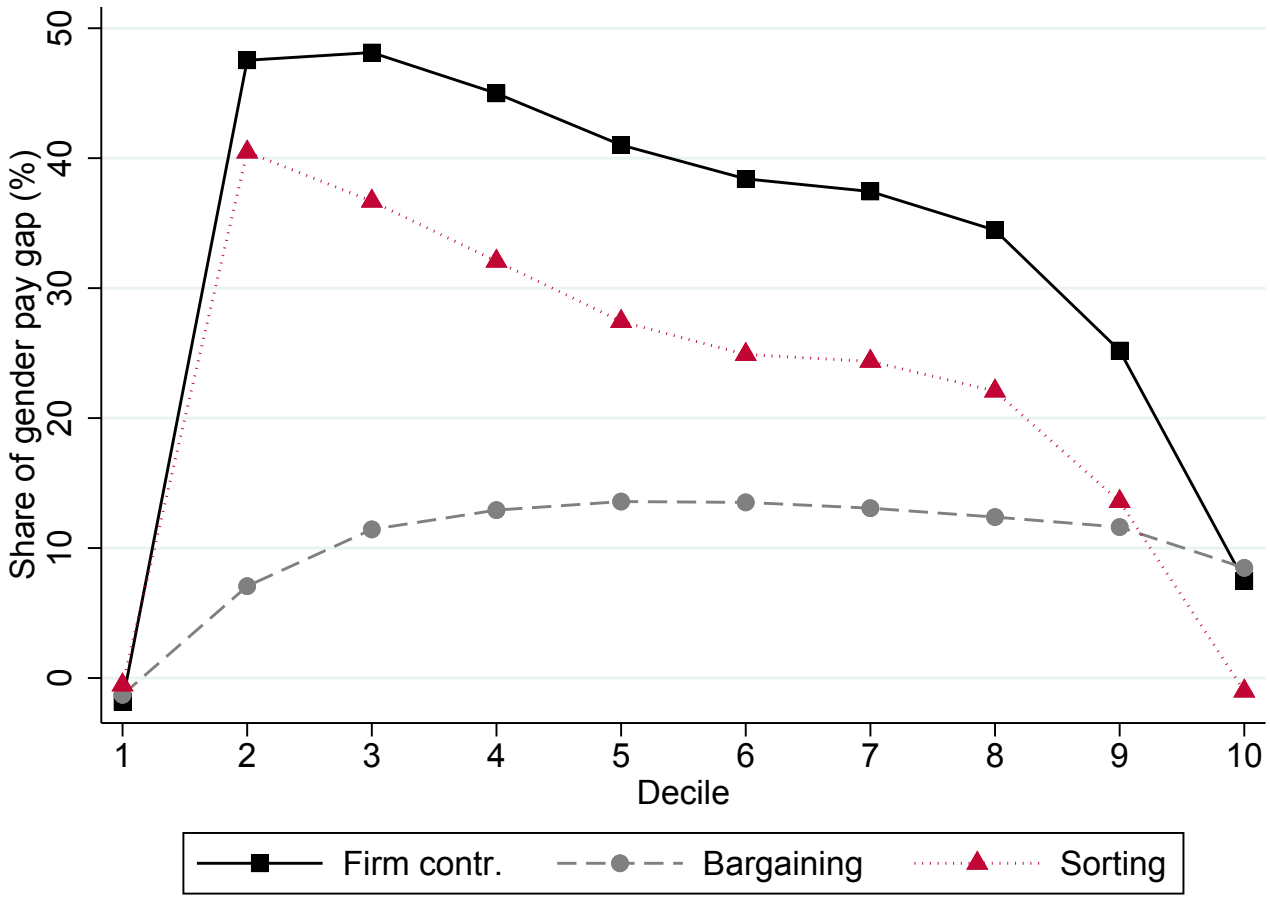
Results

	(1) Log points	(2) % of gender pay gap
Gender pay gap	0.213	
Male firm effect across males	0.113	
Female firm effect across females	0.049	
Firm effects gap	0.065	30.4%
Decomposition:		
Sorting		
Using male coefficients	0.049	22.8%
Using female coefficients	0.044	20.6%
Bargaining		
Using male distribution	0.021	9.8%
Using female distribution	0.016	7.6%
Observations	183,062,102	

◂ Occupations ◂ Sectors

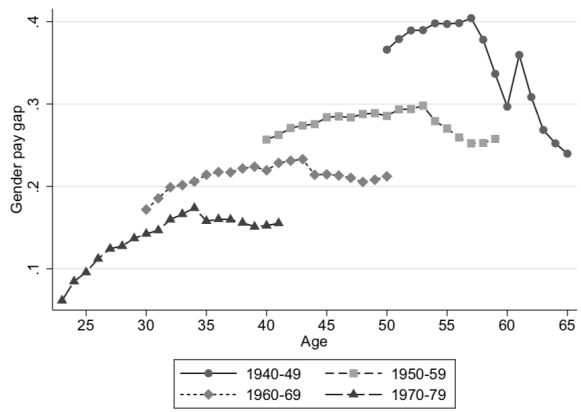
Results

Across the distribution of earnings

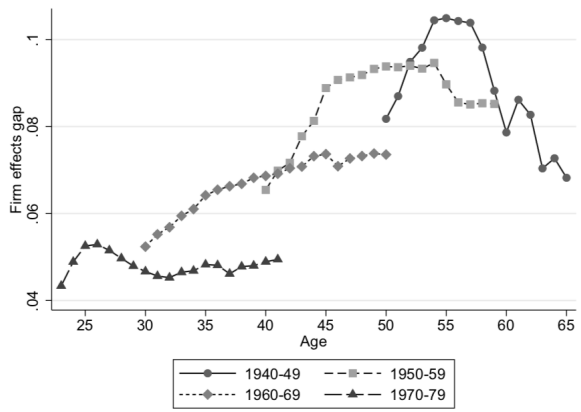


Results

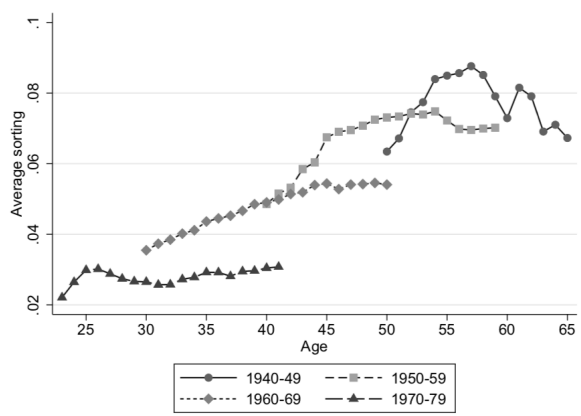
By age and cohorts



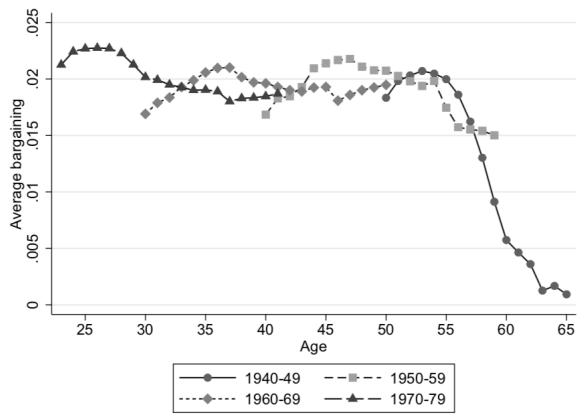
(a) Gender pay gap



(b) Firm effects gap



(c) Sorting

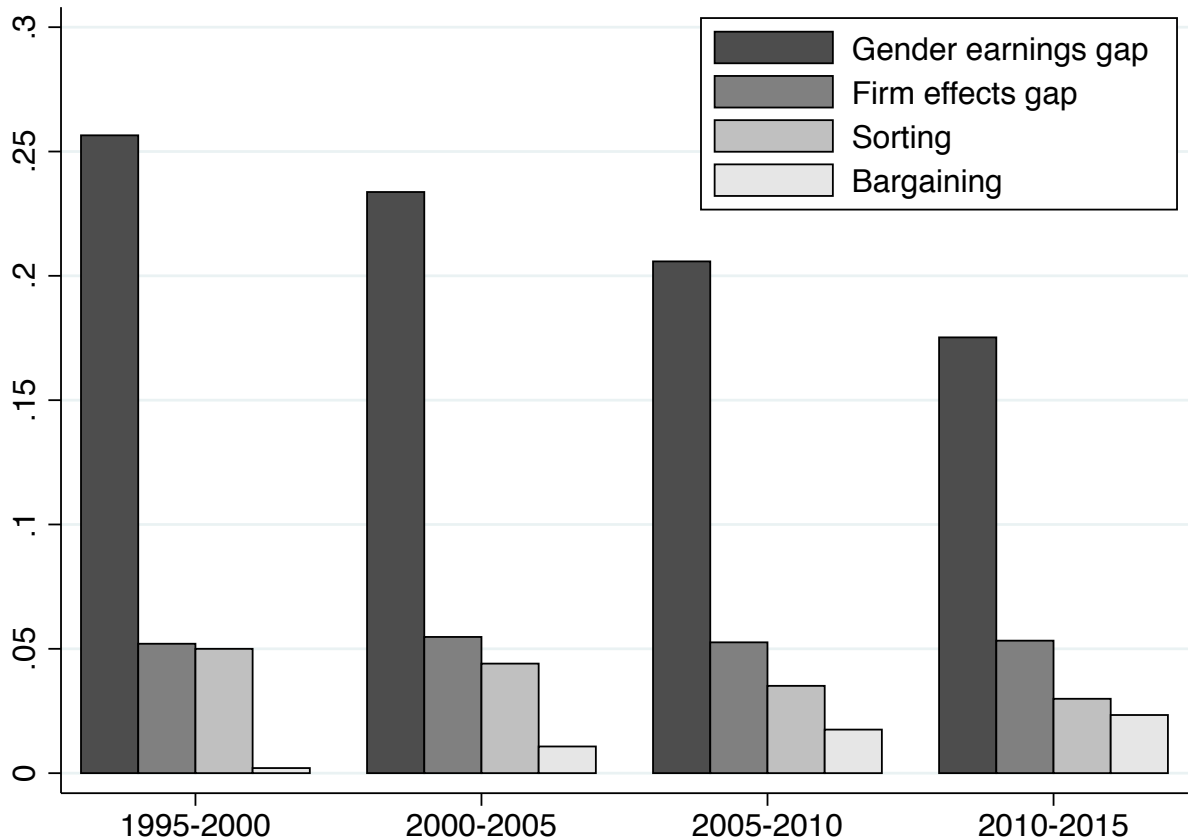


(d) Bargaining

- Important cohort effects in the evolution of the GPG, in firm contribution and in sorting;
- Bargaining more stable across cohorts.

Results

Evolution over time



- Increased role of decentralised wage setting;
- Increased female labour force participation;
- Minor role for age/cohort composition effects.

Gendered mobility patterns

- Mechanism behind sorting.
- Women tend to move less often than men and have lower wage growth (Del Bono and Vuri, 2011; Loprest, 1992) ◂ Mobility rate
- Are women less likely to move to "better" firms (higher quartile of ψ_j^g) *or* is there a gender mobility gap?
- Probit:

$$\Pr\left\{1\left[Q_{f_1}^g > Q_{f_0}^g\right]\right\} = \Phi(\alpha + \gamma F_i + \delta Z_{it} + \lambda_t + \delta_s)$$

- Heterogeneity analysis

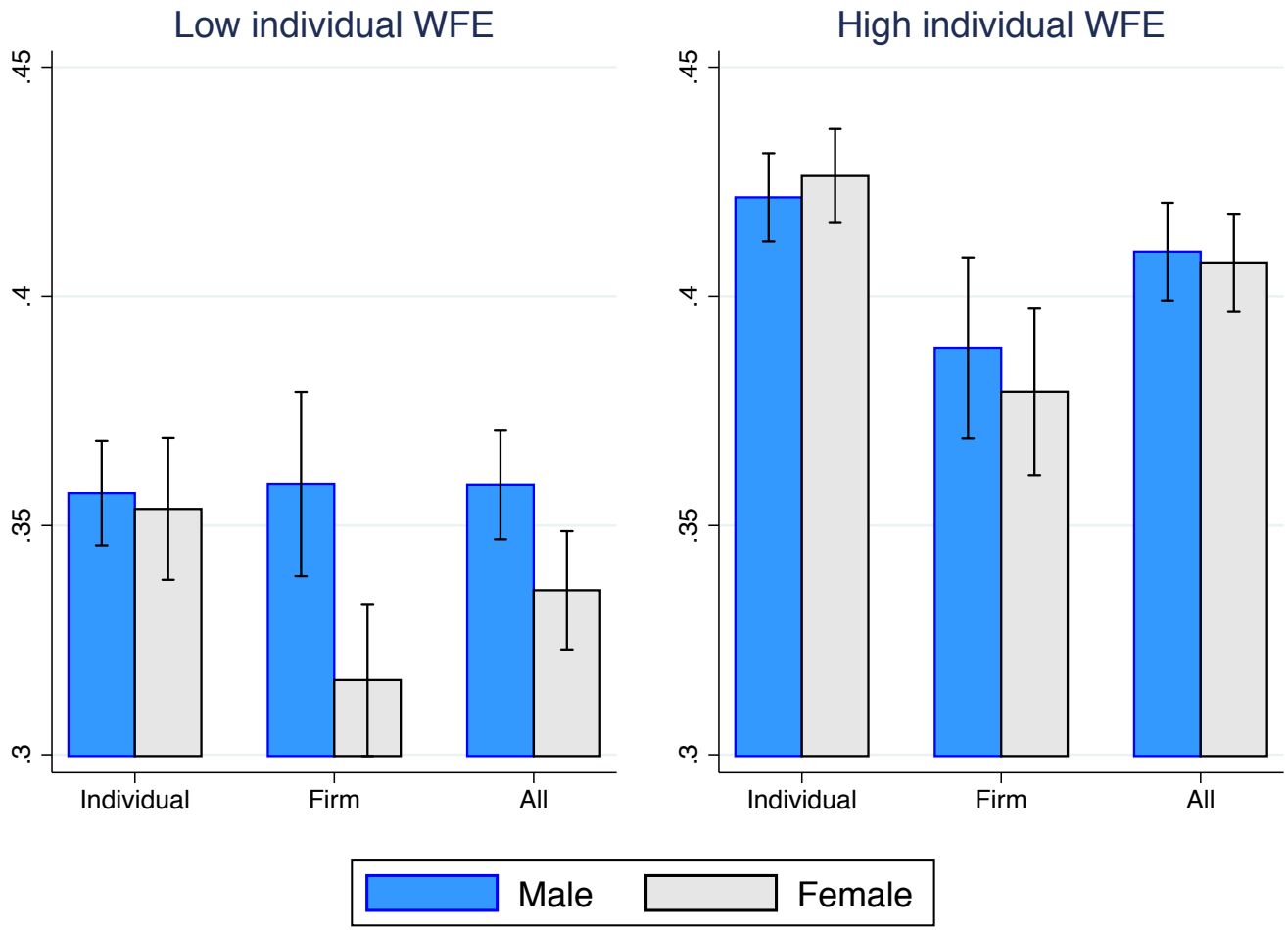
Gender mobility gap

Overall and by type of move

	(1) All	(2) Firm	(3) Individual
Woman	-0.017***	-0.034***	-0.001
	(0.006)	(0.009)	(0.007)
Age	-0.001***	0.001**	-0.002***
	(0.000)	(0.000)	(0.000)
Change province	0.028***	0.023***	0.021***
	(0.005)	(0.007)	(0.005)
Change occupation	0.036***	0.039***	0.023***
	(0.004)	(0.006)	(0.005)
Change to full-time	0.018**	-0.004	0.017
	(0.008)	(0.006)	(0.011)
Baseline Probability	0.385	0.374	0.392
Sector and year FE	Yes	Yes	Yes
Observations	3,778,512	1,571,607	2,206,905

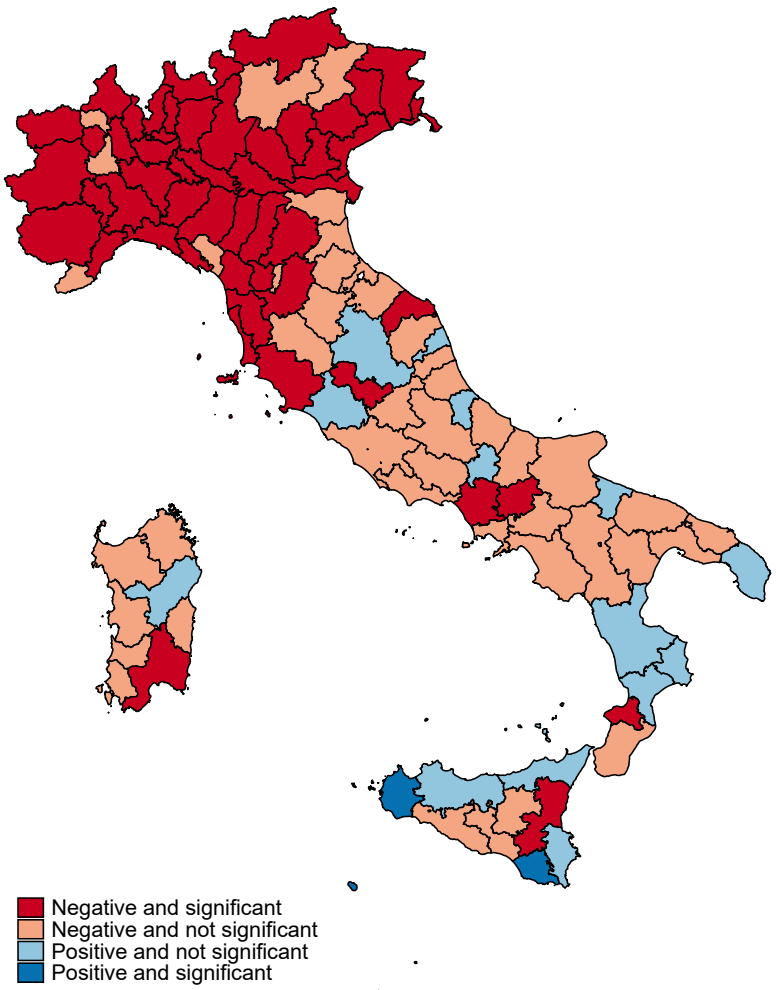
Gender mobility gap

By individual characteristics



Gender mobility gap

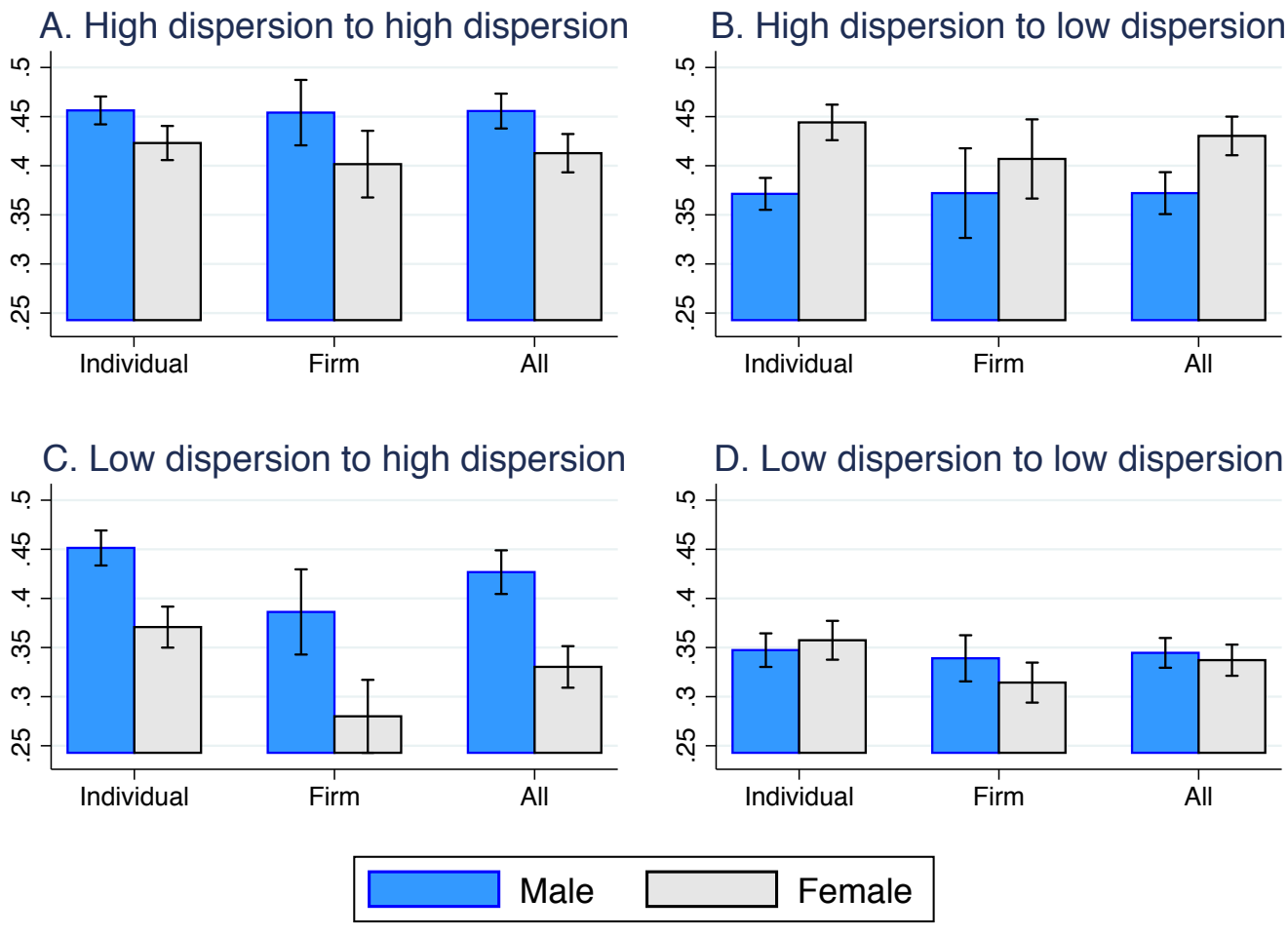
Within province



The map displays with different colours provinces according to the sign and significance of the female coefficient in a within-province probit regression of mobility.

Gender mobility gap

By earnings dispersion



◂ Definition of high/low dispersion

Gender mobility gap

Why are women less likely to move to a better firm?

- Worse outside options; lower arrival probability of job offers.
- Preference heterogeneity:
  - higher risk aversion; lower attitude to compete; higher cost of effort.
- Higher cost of mobility.
- (Higher search costs/Lower search effort related to hh responsibilities.)

Bargaining and Firm Environment

- Does the firm environment influence bargaining power?
- Firm environment captured by gender balance in board of directors.
- Exploit introduction of gender quotas in board of directors of listed firms (Law 120/2011) to obtain exogenous variation in firm environment and study how it affects the gender gap in bargaining power.

Bargaining and Gender Balance at the Top

Empirical strategy

- Estimate change in rent-sharing elasticities, regressing wages on average firm's value added in 2008-2011, to measure bargaining power
- Empirical strategy:
  - Ex-ante matched DiD and Event Study on listed vs non-listed companies
  - Worker-level analysis on the period 2008-2017 controlling for worker fixed effects

$$w_{ijt} = \kappa + \gamma^g_\Delta \, Treat_j \times Post_t \times \overline{S}^{pre}_j + f(Treat_j, Post_t, \overline{S}^{pre}_j) + \delta^g X_{it} + \eta_t + \theta_i + \varepsilon_{ijt} \quad (3)$$

◂ Balance table

Bargaining and Gender Balance at the Top

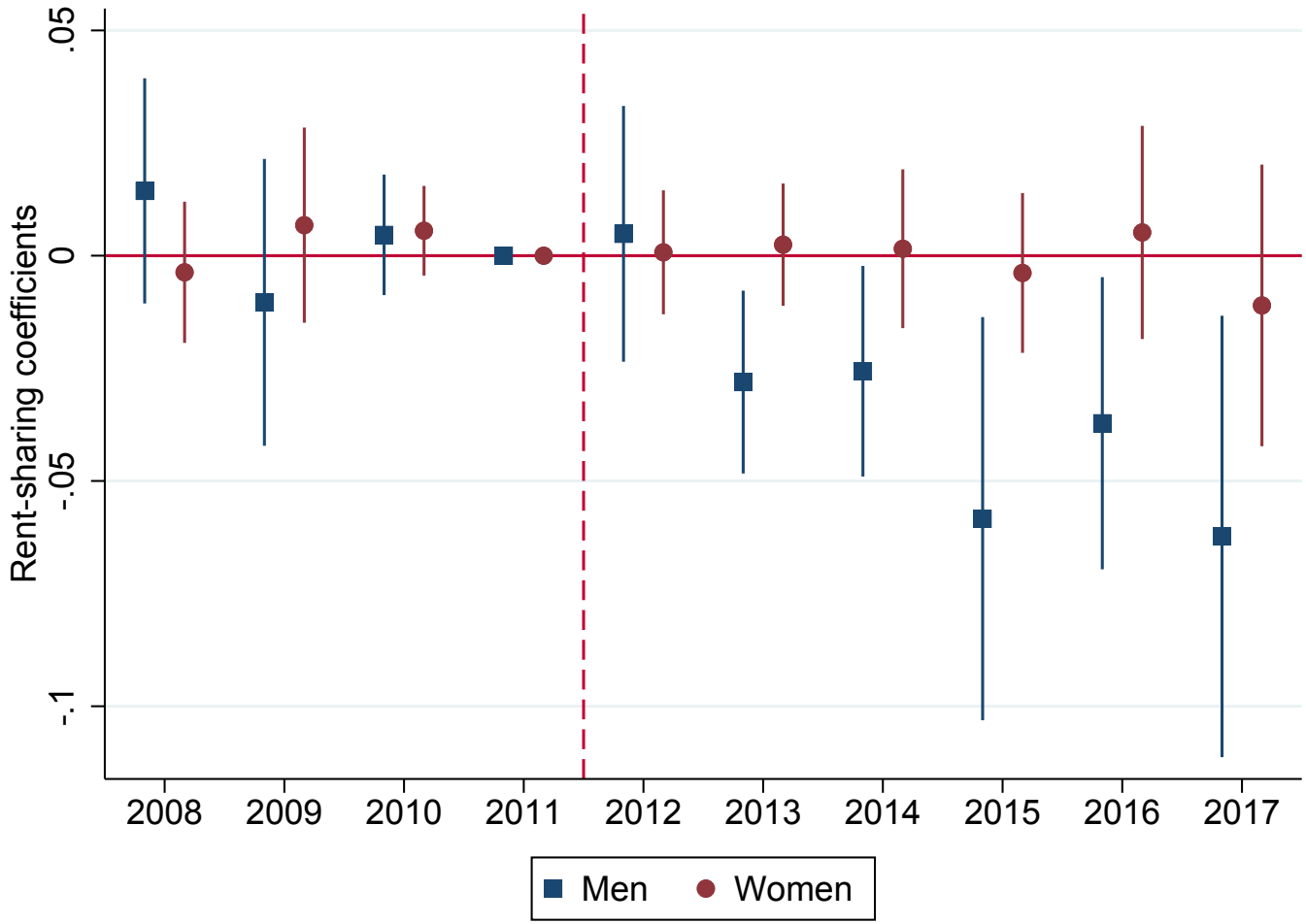
Results

	(1) Men	(2) Women	(3) Interaction
	Panel A. All workers		
Change in bargaining power	-0.032**	-0.002	0.031***
	(0.013)	(0.009)	(0.008)
Observations	2,413,309	1,356,825	3,770,134
	Panel B. New hires		
Change in bargaining power	-0.028	0.016	0.047
	(0.046)	(0.036)	(0.045)
Observations	142,392	87,693	230,085
	Panel C. Stayers		
Change in bargaining power	-0.039***	-0.005	0.035***
	(0.013)	(0.011)	(0.010)
Observations	1,241,290	597,450	1,838,740

◂ Treatment intensity ◂ Heterogeneity by occupation

Bargaining and Gender Balance at the Top

Event Study



New hires and stayers

Conclusion

- Contribution of firms' premia to the gender pay gap in Italy:
  - at the mean: 30%, 2/3 due to sorting and 1/3 to differences in bargaining;
  - along the distribution: bargaining higher at the top;
  - over time: bargaining more important in recent years.
- Evidence of gendered mobility patterns which can contribute to explaining sorting:
  - Some evidence on the role of differences in preferences or cost of effort and worse outside options.
- Firm environment influences gender gap in bargaining power:
  - impact on stayers;
  - significant when intensity of treatment is high.

Conclusion

- We contribute to understanding role of firms in influencing the gender wage gap.
- Differences in firm pay policy have increased over time as a share of the gender earnings gap:
  - Behaviour of firms critical to any attempt of tackling the gender pay gap.
- Differences in bargaining are important at the top, where women advancement has been more limited.
- Policy should take into account reasons behind gender differences in upward mobility and gender balance in corporate structure as important factors behind sorting and bargaining.

	(1)	(2)	(3)	(4)
	All		Dual connected	
	Male	Female	Male	Female
Age	39.59	38.17	39.79	38.34
Tenure	5.17	5.00	5.25	5.02
Experience	19.35	17.33	19.53	17.50
Adjusted weeks	43.62	37.42	44.14	37.85
Weekly earnings	561.34	439.29	583.68	448.12
N. workers per firm	8.33	5.34	10.39	6.67
% blue-collar	63.54	44.31	61.19	44.52
% white-collar	28.33	50.43	30.30	50.46
% executive	1.72	0.36	1.92	0.40
% middle manager	3.91	1.94	4.43	2.14
% apprentice	2.50	2.95	2.16	2.48
% part-time	6.14	31.18	5.69	29.95
Observations	129,048,272	79,620,898	112,721,072	70,341,016
Number of workers	13,330,473	9,060,341	12,248,104	8,315,143
Number of firms	1,618,072	1,618,072	1,205,878	1,205,878

◂ Back to Methods ◂ Back to Data

	(1)	(2)	(3)	(4)	(5)
	Appr.	Blue collar	White collar	Middle man.	Exec.
Gender pay gap	0.041	0.227	0.271	0.123	0.234
Firm effects gap	0.020	0.089	0.070	0.024	0.058
% of gender pay gap	*49.0%*	*39.4%*	*25.9%*	*19.5%*	*24.6%*
Sorting					
Using male coefficients	0.007	0.071	0.057	-0.004	0.047
% of gender pay gap	*16.6%*	*31.1%*	*20.9%*	*-3.1%*	*20.3%*
Using female coefficients	0.003	0.070	0.049	-0.009	0.026
% of gender pay gap	*7.9%*	*30.7%*	*18.2%*	*-7.2%*	*11.2%*
Bargaining					
Using male distribution	0.017	0.020	0.021	0.033	0.031
% of gender pay gap	*41.1%*	*8.7%*	*7.7%*	*26.7%*	*13.5%*
Using female distribution	0.013	0.019	0.013	0.028	0.010
% of gender pay gap	*32.5%*	*8.3%*	*5.0%*	*22.6%*	*4.3%*
Observations	4.2	100.3	69.7	6.5	2.4

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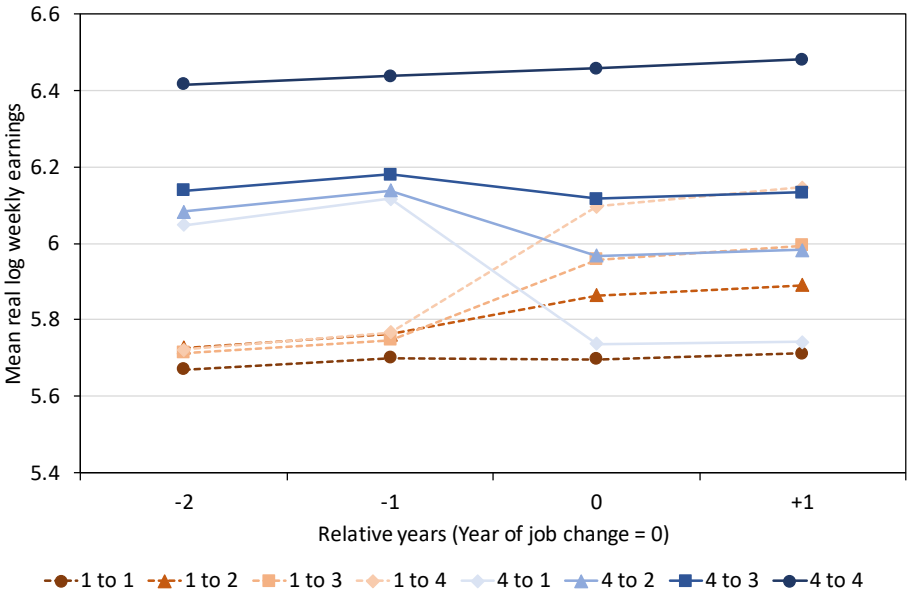
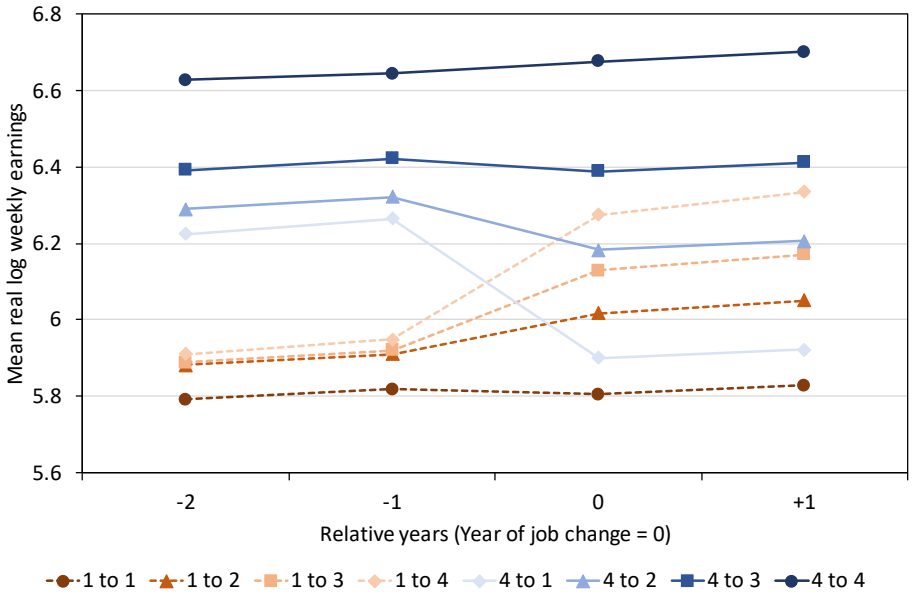
Conditional Random Mobility

Figure: Mean wages of movers across firm effects quartiles (Female left panel)





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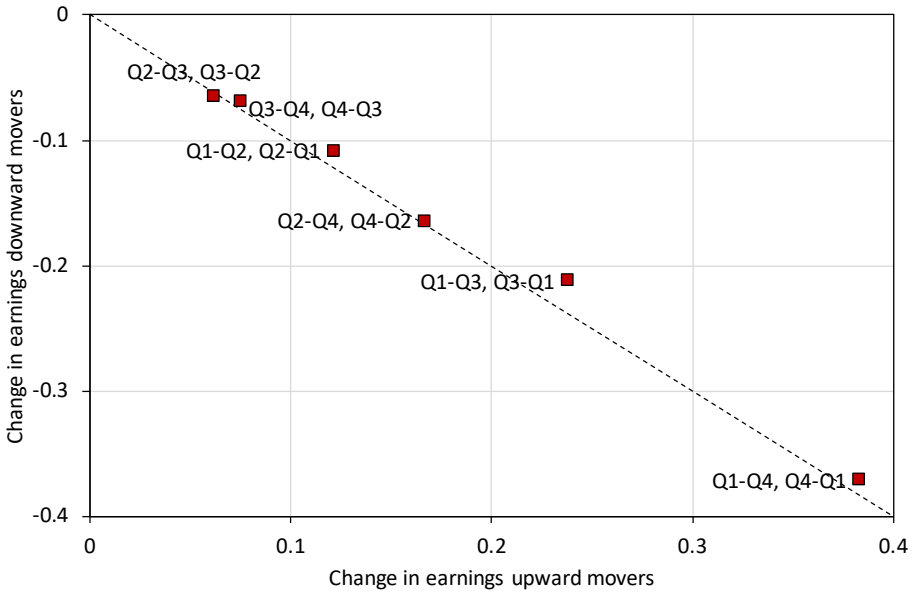
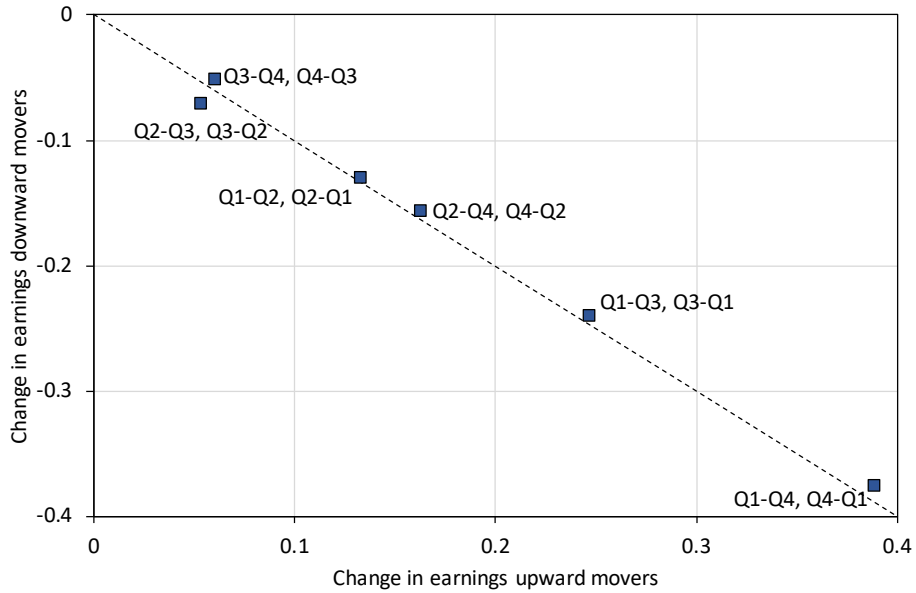
Conditional Random Mobility

Figure: Adjusted wage change of symmetric job moves across firm effects quartiles (Female left panel)





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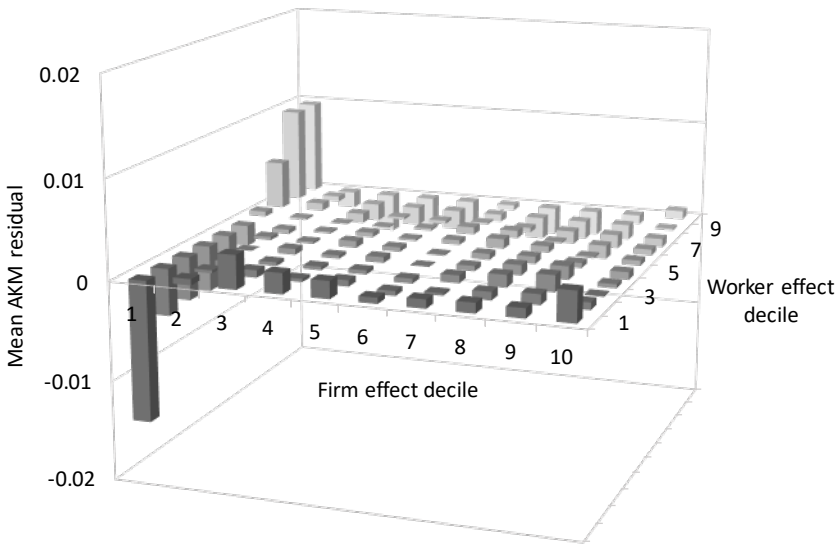
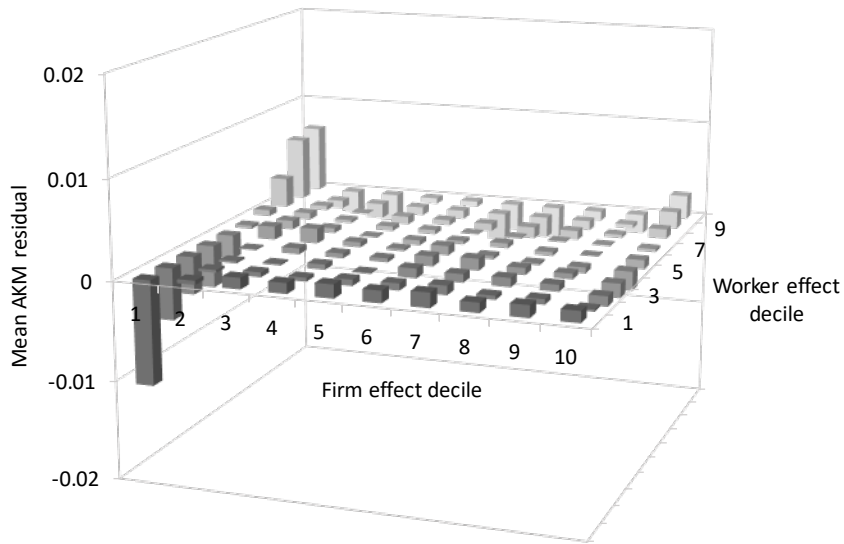
Conditional Random Mobility

Figure: Mean AKM residuals across deciles of person and firm effects (Female left panel)





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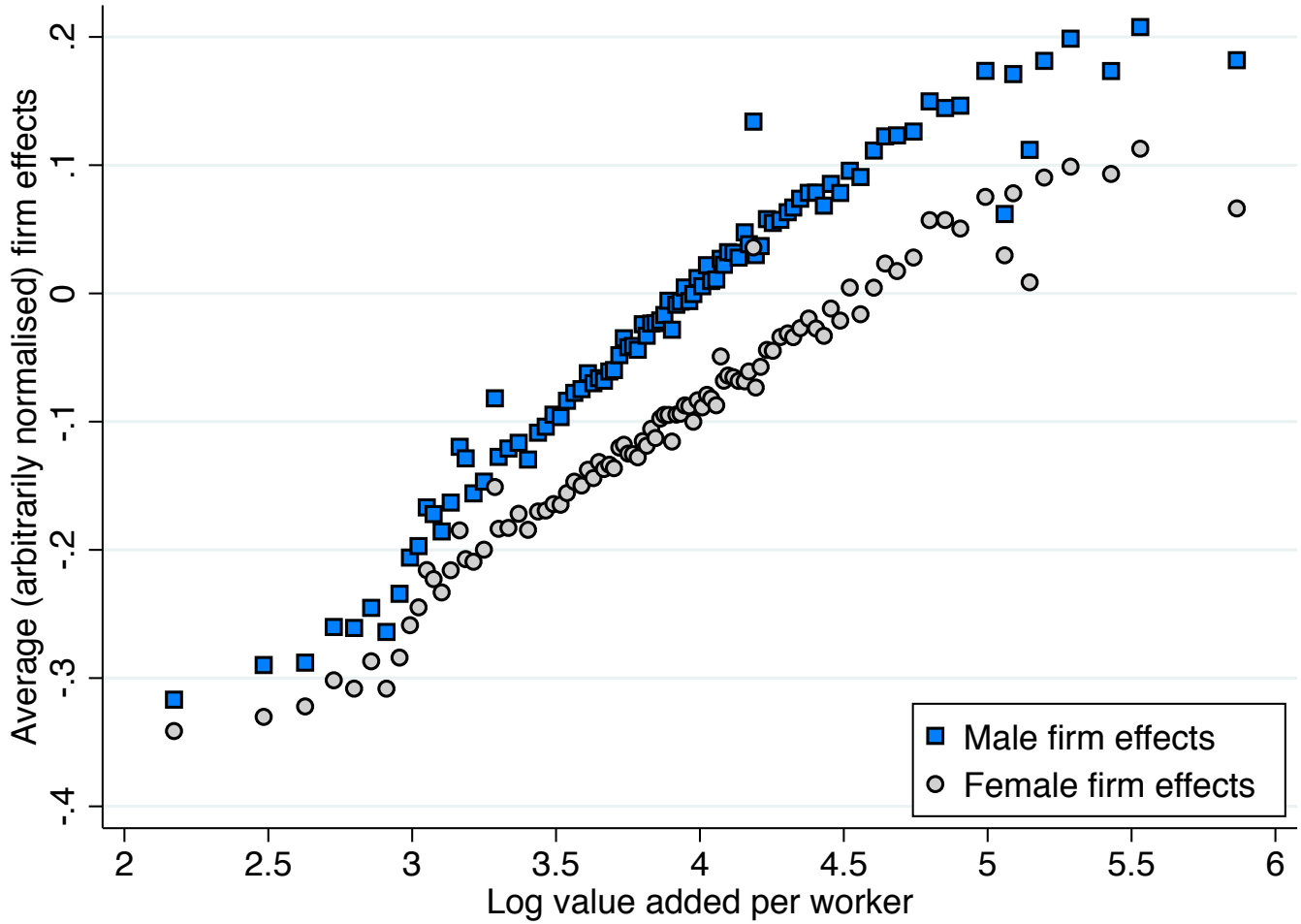
Firm effects and value added

Figure: Firm effects against log value added per worker.



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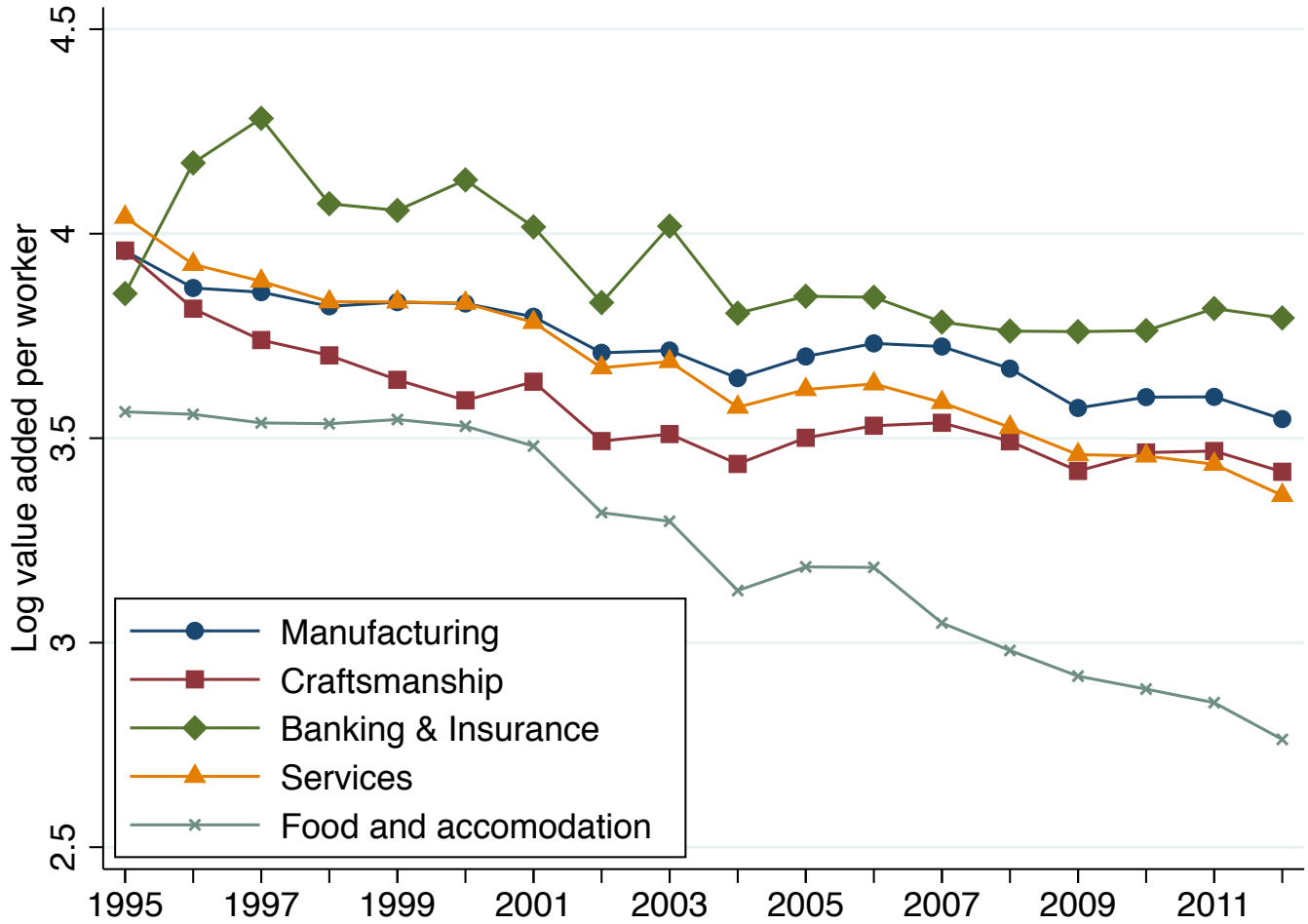
Low surplus firms

Figure: Log value added per worker by sector



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Definition of high/low earnings dispersion firms

Standard deviation of average residual earnings by firm:

- estimate log earnings regressions at the firm level controlling for sectors, occupational structure and share part-time;
- compute residuals and the standard deviation of residuals for each firm over time;
- high-dispersion firms are those with standard deviation higher than the 75th percentile of the distribution of standard deviations.

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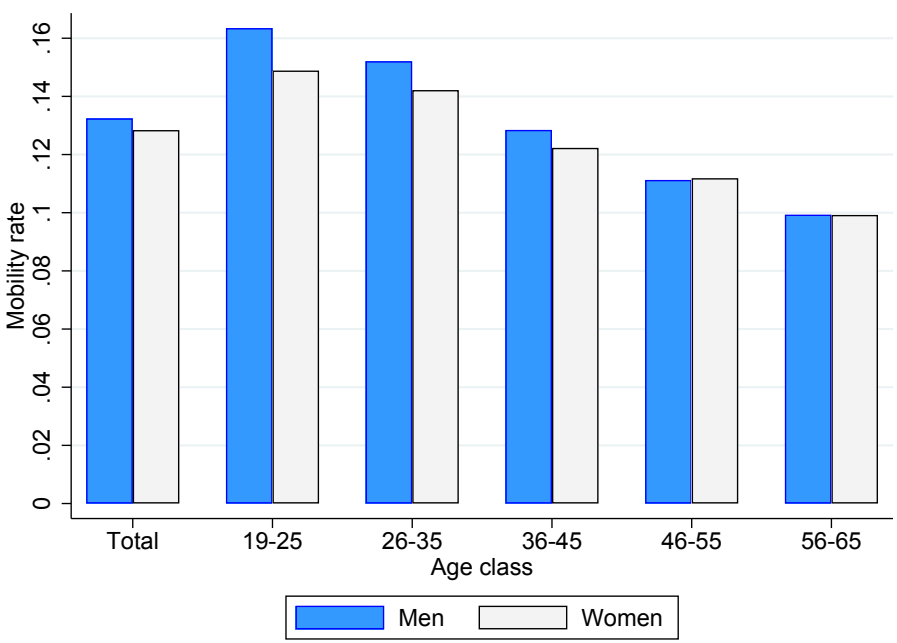
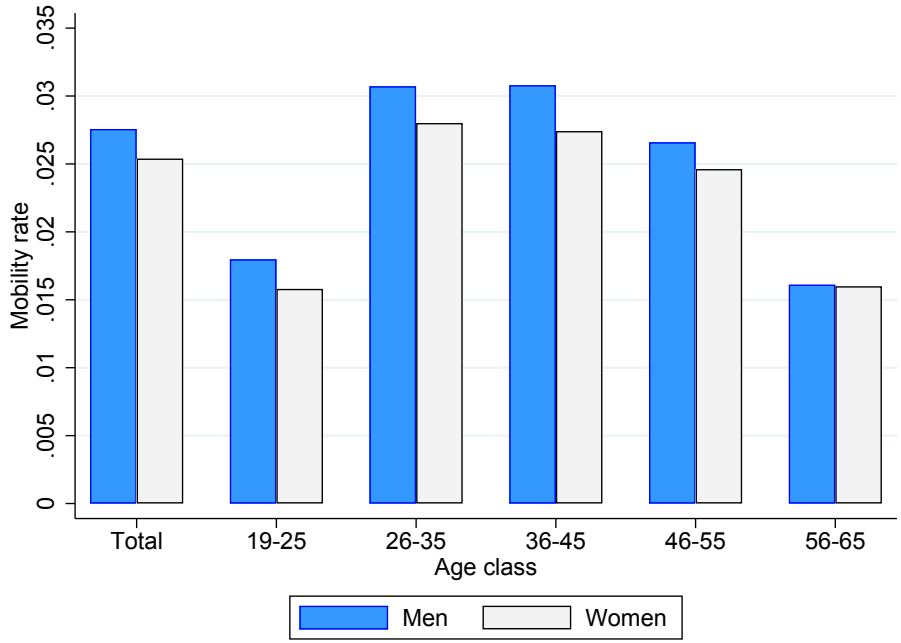
Mobility rate





Notes. The mobility rate is defined as the share of workers changing employer between two *consecutive* years. The full sample (left panel) considers all moves. The restricted sample (right panel) retains only moves such that the worker stays in the destination firm for at least two years after the move.

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Balance table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Unmatched Control	Matched Control	Treated	Unmatched Difference	Unmatched P-value	Matched Difference	Matched P-value
Open-ended contract	0.902	0.939	0.934	0.032	0.000	-0.005	0.614
Part-time	0.094	0.068	0.064	-0.030	0.000	-0.004	0.695
Part-time female	0.212	0.154	0.143	-0.069	0.000	-0.011	0.445
Female hiring rate	0.082	0.068	0.078	-0.004	0.641	0.010	0.442
Age group 35-54	0.645	0.669	0.657	0.011	0.239	-0.012	0.360
Age group 55+	0.102	0.094	0.100	-0.002	0.797	0.006	0.453
Log weekly earnings	6.307	6.588	6.637	0.329	0.000	0.049	0.253
Female log weekly earnings	6.227	6.450	6.473	0.246	0.000	0.023	0.547
Blue-collar	0.444	0.251	0.208	-0.236	0.000	-0.042	0.173
White-collar	0.471	0.532	0.537	0.066	0.000	0.005	0.832
Executives	0.023	0.084	0.103	0.080	0.000	0.018	0.348
Female executives	0.010	0.041	0.050	0.040	0.001	0.009	0.608
Middle managers	0.037	0.118	0.136	0.099	0.000	0.018	0.214
Log value added per worker	5.685	6.438	6.641	0.957	0.000	0.203	0.133
Log sales per worker	7.072	7.564	7.736	0.664	0.000	0.172	0.103
Log firm size	3.617	5.428	5.637	2.020	0.000	0.209	0.351
Industry	0.481	0.476	0.464	-0.017	0.669	-0.012	0.834
Construction	0.047	0.024	0.048	0.001	0.951	0.024	0.216
Trade, transports, accom.	0.276	0.145	0.108	-0.167	0.000	-0.036	0.330
Information & comm.	0.032	0.084	0.090	0.058	0.010	0.006	0.847
Finance & insurance	0.032	0.175	0.139	0.106	0.000	-0.036	0.390
Real estate	0.023	0.006	0.018	-0.005	0.613	0.012	0.249
Prof. and admin. services	0.072	0.078	0.090	0.018	0.421	0.012	0.695
Arts, entertainment & other	0.017	0.012	0.030	0.013	0.323	0.018	0.209
North	0.689	0.765	0.711	0.022	0.531	-0.054	0.298
Centre	0.182	0.169	0.229	0.047	0.154	0.060	0.197
South	0.153	0.072	0.084	-0.069	0.002	0.012	0.716
N. firms	16,040	154	166				

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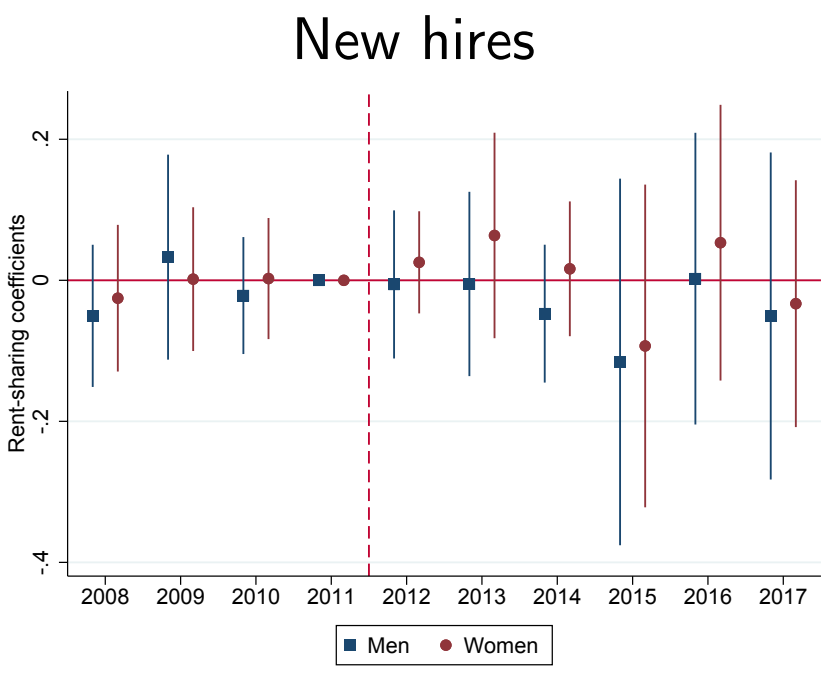
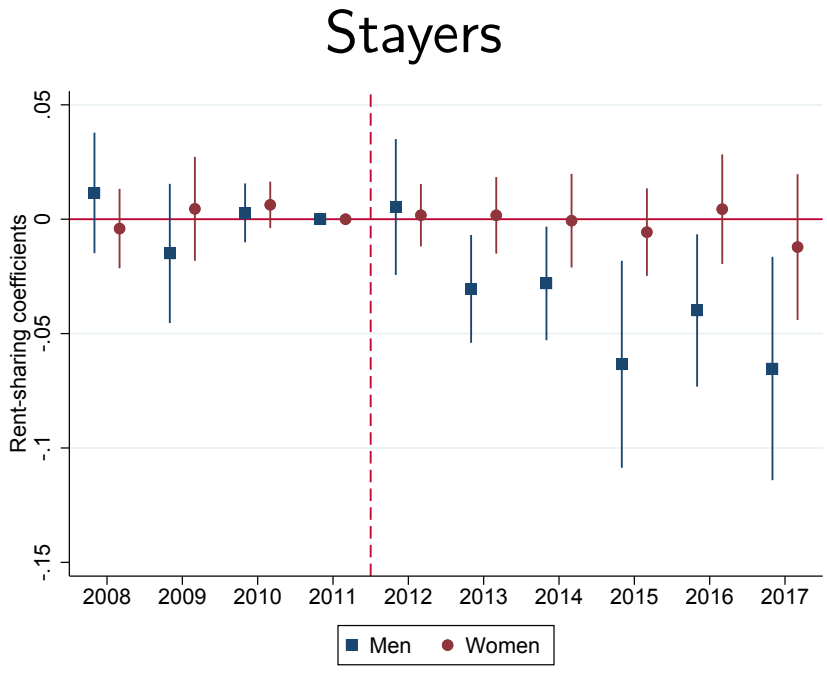
New hires and stayers





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Treatment Intensity

	(1) Men	(2) Women	(3) Interaction
	Panel A. Low intensity		
Change in bargaining power	0.002	0.017	0.015
	(0.017)	(0.018)	(0.013)
Observations	874,834	418,356	1,293,190
	Panel B. High intensity		
Change in bargaining power	-0.028**	-0.000	0.030***
	(0.012)	(0.009)	(0.008)
Observations	2,260,717	1,267,530	3,528,247

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Heterogeneity by occupation

	(1) Men	(2) Women	(3) Interaction
	Panel A. Blue-collar		
Change in bargaining power	0.012	-0.005	-0.022
	(0.017)	(0.017)	(0.022)
Observations	596,761	241,922	838,683
	Panel B. White-collar		
Change in bargaining power	-0.034**	-0.003	0.035***
	(0.014)	(0.010)	(0.009)
Observations	1,192,916	851,396	2,044,312
	Panel C. Executives		
Change in bargaining power	-0.013	0.006	0.021*
	(0.019)	(0.020)	(0.012)
Observations	623,632	263,507	887,139

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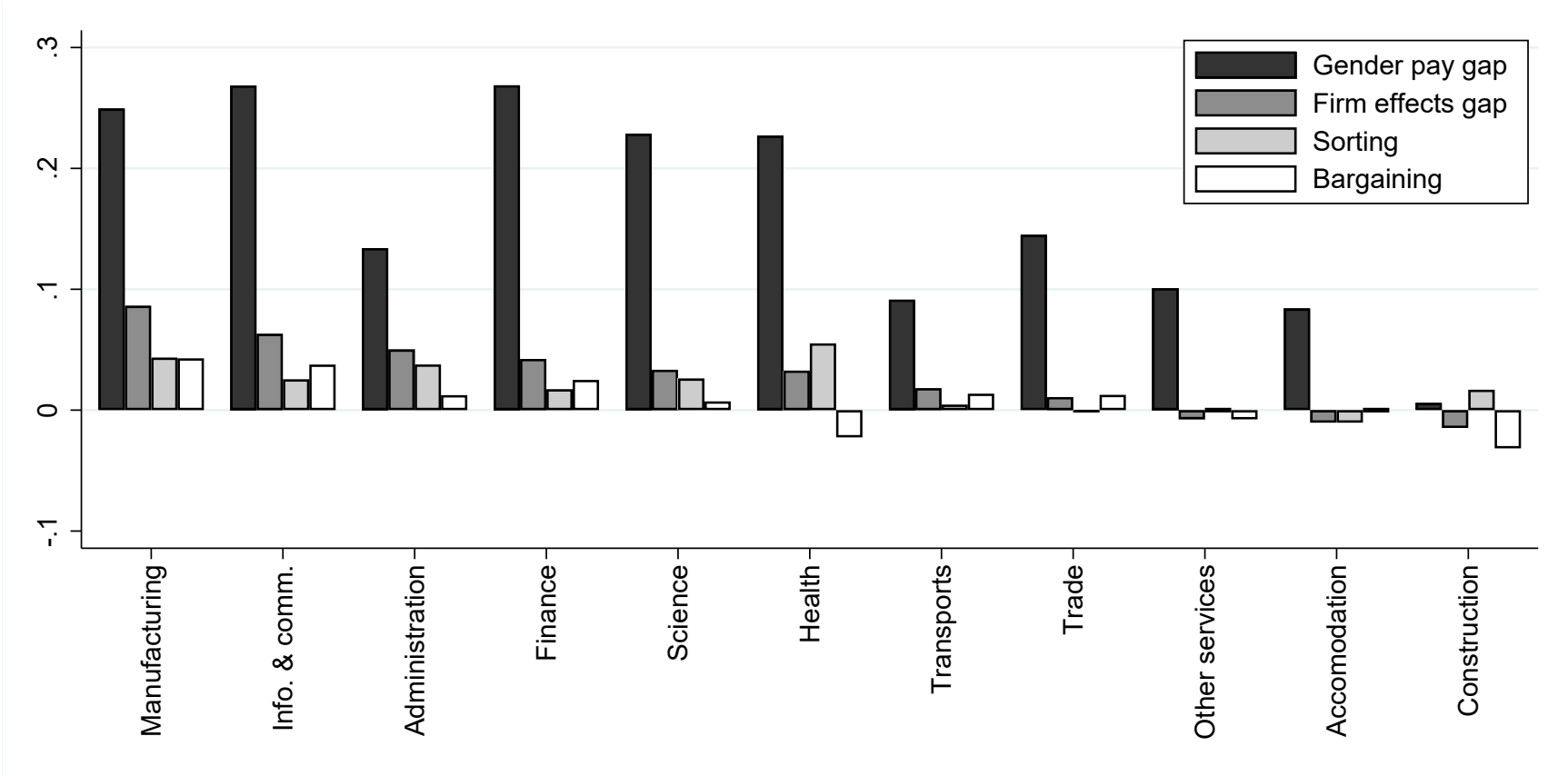
Results

By sectors



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