Making their own weather?
Estimating labour-market concentration
and its wage effects

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Themes

Motivation:

- Weak wage growth observed in many countries in the 2010s
- Declining labour shares, limited MW disemployment effects, 'superstar' firms, no-poaching agreements [internet matching]
- Is employer market power important?

This paper:

- How concentrated are local labour markets? What impact on wages?
- European evidence from rich matched employer-employee panel (individual wages, occupation, location of *all* employees)
- Role of methodological choices and institutions

Literature (selection)

- Azar et al, 2017:
  - Top 26 occupations from leading U.S. jobs website, 2009-12
  - Average labour market highly concentrated (average HHI 3,200)
  - Concentration associated with large declines in posted wages (elasticity: -13%; -17% if moving from 25th to 75th HHI)
- Azar et al, 2018: nearly all online US vacancies, 2016; average HHI 3,900; 17% of empl in high-concentration markets
- Benmelech et al, 2018: U.S. plant-level manufacturing, 1977-2009; negative relationship between concentration and wages
- Duan and Martins, 2019: Firm-level manufacturing, China, 2000-2007; HHI (and firm's employment share) negative relation with wages

This paper

- Case of Portugal & rich matched data
- Avg HHI 4,200 but 9% of workers in high-concentration markets
- Exposure can double or more with different methodologies
- Negative but small wage effects: -1.5% elasticity; -3% interquartile range
- Relevance of IV and worker and firm controls (otherwise positive wage-HHI link)
  - Concentrated markets: high-productivity/rents firms, bilateral bargaining
  - Role of institutions: sectoral bargaining and extensions, despite low union density

Data set

'Quadros de Pessoal' (Personnel Records) data set, 1991-2013

- Annual census of firms in Portugal with at least one employee
- Rich individual information (40m obs): wages (October), occupation, hiring date, etc
- Occupation codes (1995-2009): 1,400 different entries, 6-digit level
- Region: 30 entries ('distritos', avg size about 3k square kms and 340k inhabitants)
- Avg of 14,500 local labour markets (occupation-region pairs) per year

Herfindhal-Hirschman index (HHI)

$$HHI_{l(o,d),t} = \sum_{j=1}^{N(l,t)} share_{j,t}^2, \tag{1}$$

l, t: local labour market of occupation o and district d in year t;
$N(l, t)$: number of employing firms (or having hired in previous 12 months)
$share_{j,t}$: 100x ratio between employment (new hires) of firm i in year t and total employment (new hires) in local labour market

Descriptive stats, district-occupation-year cells

Variable	Unweighted		Weighted			
	Mean	Std. Dev.	Mean	Std. Dev.	Min	Max
HHI (n. of workers)	4204.7	3696.0	797.6	1746	1	10000
HHI (n. of new hires)	3311.1	3880.1	1055.0	1972	0	10000
Year	2002.6	6.1	2003.0	6.5	1991	2013
Number of workers	175.9	1201.7	8386.7	17180	1	121286
Number of new hires	35.0	276.3	1759.7	3456	0	21924
Mean base pay	626.2	605.7	566.2	532	0	25837
Mean total pay	768.1	914.3	682.6	722	0	229576

318,257 observations

Interquartile range: 860 HHI points (log difference of 2.3 points)

HHI by number of employees and of new hires (weighted)
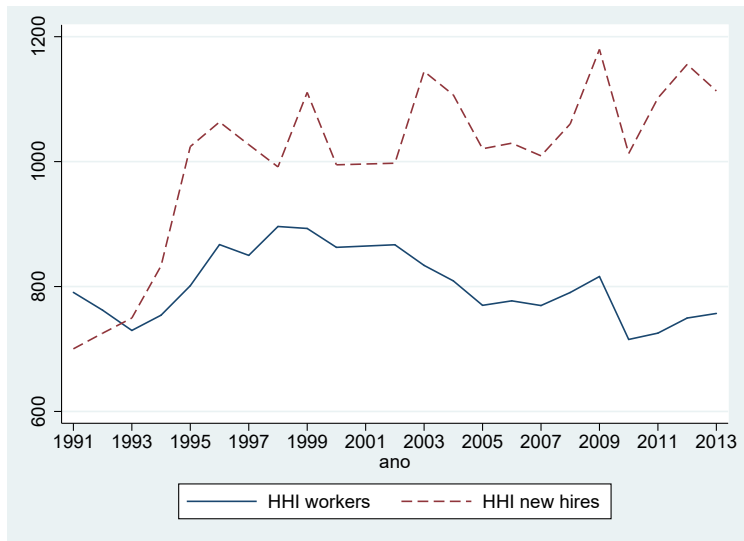
HHI values (weighted), 1991-2013

Year	HHI (workers)	HHI (hirings)	N. cells	N. workers	N. hirings
1991	790.6	700.3	10237	1963350	398971
1992	762.2	725.3	10211	1986647	380778
1993	729.7	749.6	10352	1980966	349980
1994	754.2	833.2	10469	1927961	321426
1995	801.3	1024.1	12413	1993603	339957
1996	867.2	1063.4	12272	1968477	346704
1997	849.9	1027.2	12657	2150737	438352
1998	896.1	991.5	13717	2185320	454425
1999	893.0	1110.8	15066	2283315	449316
2000	862.7	994.9	15721	2494350	552783
2002	866.9	997.4	17556	2695196	584535
2003	833.9	1144.4	18595	2800003	540625
2004	809.1	1106.8	19178	2891959	569950
2005	769.9	1020.6	19640	3065839	630755
2006	777.1	1029.5	19770	3111190	661384
2007	769.6	1009.3	19963	3220102	742339
2008	790.5	1060.4	20107	3267603	763912
2009	816.1	1179.6	19985	3125383	623430
2010	715.3	1013.0	10149	2842842	561172
2011	725.4	1101.8	10119	2797408	525329
2012	749.6	1155.6	10057	2616314	423911
2013	756.9	1113.2	10023	2608058	476152

HHI (employees) across local labour markets, 2006
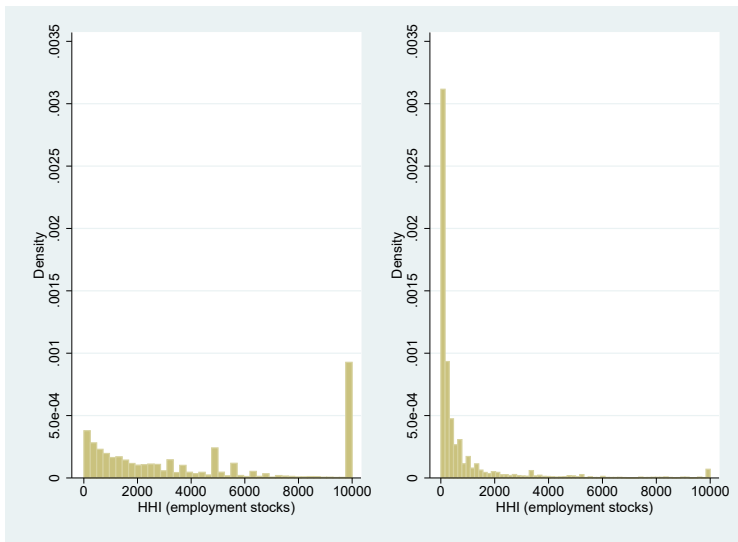
left: unweighted; right: employment-weighted

HHI mean values, different measurement approaches

Measurement type	HHI		Average number of			% workers
	Workers	Hirings	cells	workers	hirings	HHI≥2,500
Benchmark case	799.4	1006.9	14466	2544392	506190	8.7
Hirings (prev 6 months only)	799.4	1169.7	14466	2544392	334755	12.9
Collective barg job titles	1779.9	2010.5	79078	2618743	563196	19.9
Less aggregated regions	1476.8	1881.5	59864	2544392	534710	17.7
Only firms 10+ employees	1123.9	1425.6	12396	1892149	382946	12.5
Manufacturing sector only	1190.3	1683.6	8653	652751	89342	13.7

Wage effects - Specification

$$logY_{i,l(o,d),t} = \alpha + \beta logHHI_{l(o,d),t} + \delta_{l(o,d)} + \phi_t + \tau_i + \epsilon_{l(o,d),t}, \qquad (2)$$

- $Y_{i,l(o,d),t}$: (monthly) wage of worker i in local labour market $l(o,d)$ in year t
- $HHI_{l(o,d),t}$: Herfindhal index of same local labour market $l(o,d)$ in year t
- $\delta_{l(o,d)}$: local labour market fixed effects; ϕ_t: year fixed effects; τ_i: worker fixed effects
- IV: average number of employers in same occupation and year but different region (Azar et al, 2017)
- Standard errors clustered at the local labour market level

Wage results, OLS incl worker fixed effects

	(1)	(2)	(3)
Log Herfindhal Index	0.009	0.003	0.004
	(0.001)***	(0.001)***	(0.001)***
Constant	6.683	6.716	6.710
	(0.006)***	(0.004)***	(0.007)***
N	40141430	40141392	40137450
adj. R^2	0.713	0.723	0.726
Year FEs	1	1	1
Occupation FEs	0	1	0
District FEs	0	1	0
(Occupation x District) FEs	0	0	1
Firm FEs	0	0	0
Worker FEs	1	1	1

Wage results, IV incl worker fixed effects

	(1)	(2)	(3)
Log Herfindhal Index	0.027	0.001	0.001
	(0.002)***	(0.006)	(0.005)
N	40065321	40065305	40061388
adj. R^2	0.712	0.722	0.725
Year FEs	1	1	1
Occupation FEs	0	1	0
District FEs	0	1	0
(Occupation x District) FEs	0	0	1
Firm FEs	0	0	0
Worker FEs	1	1	1
Auxilliary regression (First-stage)			
Log inverse of number of firms	0.755	0.563	0.645
	(0.026)***	(0.030)***	(0.031)***
adj. R^2	0.794	0.879	0.956
F	854.4	359.5	426.2
Shea's R2	.4526	.04062	.1295

Wage results, IV incl worker *and firm* fixed effects

	(1)	(2)	(3)
Log Herfindhal Index	0.013	-0.016	-0.014
	(0.000)***	(0.000)***	(0.000)***
N	39947797	39947781	39943834
adj. R^2	0.758	0.763	0.765
Year FEs	1	1	1
Occupation FEs	0	1	0
District FEs	0	1	0
(Occupation x District) FEs	0	0	1
Firm FEs	1	1	1
Worker FEs	1	1	1
Auxilliary regression (First-stage)			
Log inverse of number of firms	0.744	0.561	0.630
	(0.000)***	(0.001)***	(0.000)***
adj. R^2	0.847	0.903	0.959
F	13,759,899	891,624	1,654,358
Shea's R2	.4616	.0464	.124

Conclusions

- Evidence on labour market concentration from all employees in Southern Europe (Portugal)
- 9% of workers exposed to concentration levels thought to raise market power concern
  - Potentially (much) higher under different measurement choices
- Small wage-HHI elasticities: -1.5% (interquartile range: 3%)
  - IV and worker and firm effect controls important in reaching negative estimates
- Potential role of institutions (sectoral bargaining)