Neighborhood Effects and Job Search Behaviors

Florence Goffette-Nagot
CNRS
Univ. Lyon & GATE

Aurélie Lapierre
Univ. Lyon 2 & GATE
CY Cergy & THEMA

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GATE
Lyon / St-Etienne

Motivation

1 Neighborhood effects in labor market outcomes

- Role of contacts with employed neighbors, in access to **information on job opportunities** and **hiring** (Bayer et al., 2008; Hellerstein et al., 2011, 2014; Schmutte, 2015)
- Peer effects in **attitudes towards work** or **human capital acquisition** (Akerlof, 1980; Wilson, 1987; Crane, 1991) (Benabou, 1993; Goux and Maurin, 2007; Del Bello et al., 2015)

2 Importance of job search (JS) behaviors for LM outcomes

- **JS in theoretical models**: search and matching models (Mortensen and Pissarides, 1999) and urban search models (Zenou, 2009)
- **JS channels** (formal/informal, social contacts): impacts on JS efficiency & quality of the match (wage, job duration) (Merlino, 2014; Stupnytska and Zaharieva, 2015)
- Special role of **JS through networks** (Granovetter, 1995; Caliendo et al., 2015; Cingano and Rosolia, 2012; Jackson et al., 2020)

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Motivation

3 Empirical literature on JS
- JS behaviors: (1) **search intensity, effort**: number of actions, time spent; (2) **channels**: which actions specifically?
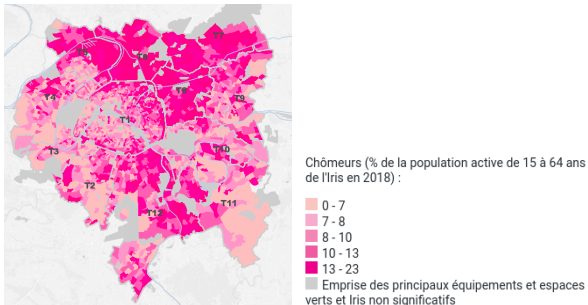
4 Lack of studies on neighborhood effects in JS
- Patacchini and Zenou (2005, 2006) investigate impact of JS behaviors in spatial unemployment inequalities

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Research question

- **Are there neighborhood effects in job search behaviors?**

- Unemployed individuals are spatially concentrated

  Unemployment rate per neighborhood in the Grand Paris area

Chômeurs (% de la population active de 15 à 64 ans de l'Iris en 2018) :

- 0 - 7
- 7 - 8
- 8 - 10
- 10 - 13
- 13 - 23
- Emprise des principaux équipements et espaces verts et Iris non significatifs

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Contributions

1. Literature on **JS behaviors**
   - Use of detailed data to investigate the channels and intensity of JS

2. Literature on **neighborhood effects in LM outcomes**
   - Test for the existence of neighborhood effects in JS behaviors
   - Focus on the pre-hiring stage

3. One of the few empirical applications of Lee's (2007) strategy for identification of social interactions

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Results preview

- ■ + 1 s.d increase in neighbors' JS intensity
  - ■ ↗ total JS intensity by 2.7%
  - ■ ↗ JS through networks intensity by 5.4%

- ■ + 1 s.d increase in % of employed neighbors
  - ■ ↗ JS through networks intensity by +1.2%

- ■ + 1 s.d increase in % of low-level occup. neighbors
  - ■ ↘ total JS intensity by 1.3%
  - ■ ↘ JS through networks intensity by 2.4%

- ■ The most impacted channel is search through networks (personal and professional contacts, digital networks)

The French Labor Force Survey (FLFS)

- A rotating panel of about 67,000 dwellings, each surveyed for 6 quarters

- Twenty-one questions related to job search, asking if the person took some action to search for a job
    - 11 are relevant (others: almost no "yes", "wait for an answer", ...)

- Almost no on-the-job search $\Rightarrow$ we focus on unemployed individuals' behavior

- We focus on large urban areas ($> 10,000$ jobs in the center)

- Period: Q1-2014 - Q4-2019

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Data source

Neighborhood definition and sample

- FLFS sampling scheme is based on clusters of about 20 dwellings, all of which are surveyed, at 6 consecutive quarters
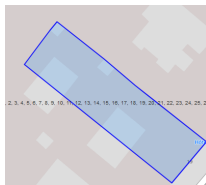
- Sample
    - 56,602 obs.: 26,427 unemployed i at quarter t (max 6 quarters)
    - 7,741 clusters g in 512 urban units
    - i's peers: her unemployed + non-unemployed neighbors
      in the same cluster g, at same quarter t

Measures of job search behavior

- We group the 11 questions to define 3 job search channels

Search through organizations		
Questions: In the past four weeks...	**Yes**	**No**
Q1: Have you contacted the French National Employment Agency (*Pôle Emploi* - personal initiative for job search or training), the Agency for the employment of Managers in France (*Association Pour l'Emploi des Cadres, APEC*), the chamber of commerce and industry or any other public institute?		
Q2: Have you contacted one (or more) temporary employment (interim) agencies or a placement operator?		
Total		
Active and direct search		
Questions: In the past four weeks...	**Yes**	**No**
Q1: Did you take part in an entry test for civil service?		
Q2: Have you made a direct approach to an employer by personally submitting an unsolicited (speculative) application at a trade fair/a job forum or in the company?		
Q3: Have you made a direct approach to an employer by sending an unsolicited application by post or e-mail or on the company's website?		
Q4: Have you reviewed some job advertisements?		
Q5: Have you responded to a job advertisement/offer?		
Q6: Have you had a job advertisement placed or posted, for example in a newspaper or on the internet?		
Total		
Search through networks		
Questions: In the past four weeks...	**Yes**	**No**
Q1: Have you turned to personal contacts such as family or friends to find a job or set up a business?		
Q2: Have you turned to professional contacts to find a job or set up a business?		
Q3: Have you shared via digital social networks that you are looking for a job, and made your professional profile known?		
Total		
Total search intensity		

- Search intensity: number of times an individual answered *"Yes"*

- Defined for each of the 3 channels + total search

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JS behaviors: measures

Distribution of the job search variables

Search intensity	0	1	2	3	4	5	6	7	8	9	10
Total	0	8.6	14.8	18.7	19.2	16.2	11.6	6.9	3.1	0.9	0.1
Networks	26.7	32.5	26.9	13.9							
Active	6.9	28.5	29.3	27.8	7.2	0.3					
Organizations	41.1	43.3	15.6								
Observations					56,602						

Characteristics of unemployed searching more through:

- Personal and professional networks: young, previsouly in **high** (vs. low) occupations, **male**

- Active actions: young, previsouly in **high** (vs. low) occupations, **female**, **French** nationality

- Organizations: young, previsouly in **low** (vs. high) occupations, **male**, **foreign** nationality

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   ■ Empirical model
   ■ Identification strategy

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Empirical model

A neighborhood effects model *à la* Manski

i's job search behavior is impacted by:

1 Her unemployed neighbors' **average JS behavior** (endogenous effects)

 Mechanisms (1): imitation effects, mutual help, spread of information

A neighborhood effects model *à la* Manski

i's job search behavior is impacted by:

1 Her unemployed neighbors' **average JS behavior** (endogenous effects)

Mechanisms (1): imitation effects, mutual help, spread of information

2 The **characteristics** of her unemployed neighbors (contextual effects)

% ex-low-level occupations among unemployed neighbors.

3 The **characteristics** of a larger, non-unemployed, group of neighbors (group effects)

% employed neighbors among non-unemployed neighbors.
% high-level, % low-level occupations among employed neighbors.

Mechanisms (2 & 3): role models, expectations about chances of finding a job, social pressure to leave unemployment, job referrals

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Empirical model

Econometric model

$$\underbrace{Y_{igst}}_{1} = \alpha + \beta \underbrace{\overline{Y}_{gst \setminus i}}_{2} + \overbrace{\sum_{j=1}^{J} \gamma_j \ \overline{Z}_{jgst \setminus i}}^{3} + \overbrace{\sum_{k=1}^{K} \delta_k \overline{W}_{kgst}}^{4} + \overbrace{\sum_{l=1}^{L} \lambda_l X_{ligs}}^{5} + \underbrace{\theta_t}_{6} + \underbrace{\eta_{s_g}}_{7} + \epsilon_{igst}$$

1. **Search intensity** of unemployed individual i in cluster g in sector s at quarter t: search through networks, or through organisations, or active and direct, or total

2. **Endogenous effects**: average job search behaviors of $g \times t$ unemployed neighbors.

3. **Contextual effects**: % of ex-low level occupations among unemployed neighbors

4. **Group effects**: % of employed among non-unemployed neighb., % of high-level, low level occupations among employed neighb.

5. Individual characteristics to control for observed heterogeneity

6. Quarter time dummies to control for common time trends

7. Sector fixed-effects

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Identification strategy

Two levels of neighborhoods in FLFS

- The FLFS sampling scheme has two nested levels of neighborhoods: clusters are grouped into sectors (with about 120 dwellings)

- In each sector, 6 clusters are surveyed in a row; each cluster surveyed for 6 quarters, and then replaced.
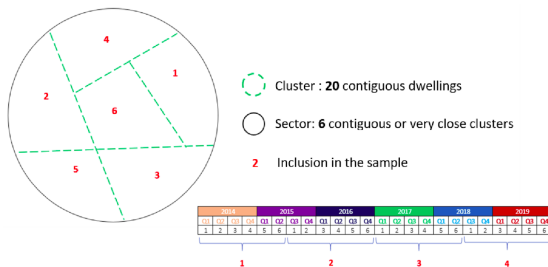
- Estimation sample: 7,741 clusters grouped into 2,621 sectors

Dealing with location endogeneity

- Location endogeneity
    - Neighborhood is endogenous because of sorting on the housing market + expectations about neighbors' behaviors
    - Individuals within a neighborhood are affected by common shocks

- Method *à la* Bayer, Ross & Topa (2008)
    - Neighborhood: cluster
    - Larger neighborhood (sector) controlled for with fixed effects
      $\Rightarrow$ endogenous, contextual and group effects are identified from cluster-level variations within sectors

- Identifying hypothesis: within each sector, the individual location choice in a specific cluster is random.

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Identification strategy

Dealing with the reflection issue

- In linear-in-means models, individuals in the same group have the same mean

  $\Rightarrow$ perfect collinearity between the endogenous and contextual effects

  $\Rightarrow$ no identification (Manski, 1993)

- Identification: Lee (2007), first applied in Boucher et al. (2014).
    - i is excluded in the computation of the mean (exclusive averaging) (Moffitt, 2001)
    - sufficient number of groups of different sizes (at least 3)
    - more efficient with small size groups. ▸ Group size ▸ Intuition

- Estimated by ML and recent R package Cdatanet (Houndetoungan, 2024)

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Main results

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Main results

Main results

	Search intensity			
	Total	P&P networks	Active	Organizations
Endogenous effects				
Un. neighbors' average intensity	**0.049*****	**0.074*****	**0.051*****	**0.043*****
	(0.004)	(0.004)	(0.004)	(0.004)
Contextual effects (among unemp. neighb.)				
% ex-low-level occupations	**-0.080*****	**-0.041*****	**-0.053*****	-0.004
	(0.020)	(0.010)	(0.011)	(0.008)
Group effects (among non-unem. neighb.)				
% employed	0.107	**0.091****	-0.017	0.023
	(0.069)	(0.036)	(0.040)	(0.027)
% low-level occupations	**-0.217*****	**-0.121*****	**-0.101****	0.009
	(0.055)	(0.028)	(0.032)	(0.021)
% high-level occupations	0.028	0.078	-0.039	-0.013
	(0.081)	(0.042)	(0.047)	(0.031)
N (Obs./ Sectors/ g × t/ Indiv.)	56,602	/ 2,621	/ 7,741	/ 26,427

*p<0.1; **p<0.05; ***p<0.01

Controls: individual's characteristics, quarter dummies and sector FE

Magnitudes

Change in search intensity in % wrt the mean
for + 1 s.d increase in explanatory variables,

	Total	Networks	Active	Organizations
Endogenous effects:				
Un. neighbors' average intensity	+2.7%	+5.4%	+2.5 %	+3.4%
Contextual effects *(among unemp. neighb.)*				
% ex-low-level occupations	−0.8%	−1.4%	−1.1%	NS
Group effects *(among non-unemp. neighb.)*				
% employed	NS	+1.2%	NS	NS
% low-level occupations	−1.3%	−2.4%	−1.3%	NS
% high-level occupations	NS	+1.1%	NS	NS
Mean of JS variables	4.03	1.28	2.01	0.75
s.d of JS variables	1.88	1.01	1.07	0.71

- Higher impact of neighborhood effects for search through networks
- Strength of the network endogenous effects
- Importance of endogenous effects vs. group effects

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Main results

Heterogenous effects: dense architectural environment / others

Dense sectors: $> 75\%$ of dwellings in city blocks or in high-rise housing projects.

	Impacts for 1 s.d. in the dependent variable			
Dense sectors	Total	Networks	Active	Organizations
Endogenous effects				
Un. neighbors' average intensity	**+3.7%**	**+6.8%**	**+3.8 %**	+3.9%
Contextual effects (*unemp. neighbors*)				
% ex-low-level occupations	−1.4%	−1.9%	−1.5%	NS
Group effects (*non-unemp. neighbors*)				
% employed	+1.1%	+1.8%	NS	+1.8%
% low-level occupations	−1.6%	−2.9%	NS	NS
% high-level occupations	NS	NS	NS	−3.2%
Mean of JS variables	4.03	1.33	1.96	0.74
s.d of JS variables	1.90	1.01	1.09	0.71
Other sectors				
Endogenous effects:				
Un. neighbors' average intensity	**+2.2%**	**+4.4%**	**+2.6 %**	+3.2%
Contextual effects (*unemp. neighbors*)				
% ex-low-level occupations	−0.6%	−1.1%	−0.9%	NS
Group effects (*non-unemp. neighbors*)				
% employed	NS	NS	NS	NS
% low-level occupations	−1.1%	−2.1%	−1.4%	NS
% high-level occupations	NS	NS	NS	NS
Mean of JS variables	4.01	1.25	2.03	0.75
s.d of JS variables	1.87	1.00	1.06	0.71

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Robustness checks

An alternative measurement of search intensities

Weighted sum of the items depending on their impact of search efficiency

- Network = 0.113 personal contacts + 0.076 prof. contacts + 0.080 digital networks

- Active = 0 x entry test civil service + 0.046 x onsite application + 0.044 x mail application + 0.176 x reviewed job advertisements + 0.214 x responded job advertisements + 0.023 x job search advertisement

- Organizations = 0.078 x employment agency + 0.164 x interim

- Do we find neighborhood effects for these a bit more sophisticated measures?

- Are more efficient job search methods associated with stronger neighborhood effects?

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Robustness checks

An alternative measurement of search intensities

	Impacts for 1 s.d. in the dependent variable			
	Total	Networks	Active	Organizations
Endogenous effects				
Un. neighbors' average intensity	$+1.4\%$	$+5.1\%$	$+1.6\%$	$+2.5\%$
Contextual effects (*unemp. neighbors*)				
% ex-low-level occupations	-0.4%	-1.0%	-0.6%	NS
Group effects (*non-unemp. neighbors*)				
% employed	NS	$+1.1\%$	NS	NS
% low-level occupations	-0.7%	-2.3%	-0.7%	NS
% high-level occupations	NS	$+1.0\%$	NS	NS
Mean of synthetic JS variables	0.233	0.121	0.223	0.093
s.d of synthetic JS variables	0.087	0.092	0.086	0.091

	Total	Networks	Active	Organizations
Endogenous effects				
Un. neighbors' average intensity	$+2.7\%$	$+5.4\%$	$+2.5\%$	$+3.4\%$
Contextual effects (*unemployed neighbors*)				
% ex-low-level occupations	-0.8%	-1.4%	-1.1%	NS
Group effects (*non-unemployed neighbors*)				
% employed	NS	$+1.2\%$	NS	NS
% low-level occupations	-1.3%	-2.4%	-1.3%	NS
% high-level occupations	NS	$+1.1\%$	NS	NS
Mean of JS variables	4.03	1.28	2.01	0.75
s.d of JS variables	1.88	1.01	1.07	0.71

Robustness checks for location endogeneity

Identifying hyp.: within sectors, location in a specific cluster is random

1. Correlation between individual's and neighbors' unobservables?.

   - Look at correlations between i characteristics and neighbors' averages, controlling for sector FE. ▸ Very low R-squares.

2. Sorting due to the concentration of public housing at the cluster level?

   - Estimate the model on clusters made of 100% private housing. ▸ No significant differences in coef.

3. Some sorting within sectors for other reasons?

   - Estimate the model dropping sectors with large population composition differences across clusters. ▸ No significant differences in coef.

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Robustness checks

Test using a control function

1. Estimate a dyadic network formation model in which social distance explains the location of 2 unemployed in the same cluster, with heterogeneity individual effects

2. Include (a transformation of) these fixed effects in the neighborhood effect estimation

	Total search intensity	
	Baseline	W/ network formation
Endogenous effects		
Un. neighbors' aver. intensity	**0.049*****	**0.078*****
	(0.004)	(0.004)
Contextual effects *(among unemp. neighb.)*		
% ex-low-level occup.	**-0.080*****	**0.047***
	(0.020)	(0.024)
Group effects *(among non-unemp. neighb.)*		
% employed	0.107	0.134*
	(0.069)	(0.069)
% low-level occupations	-0.217***	-0.208***
	(0.055)	(0.055)
% high-level occupations	0.028	0.029
	(0.081)	(0.081)
Indiv. characteristics	Yes	Yes
Quarter dummies	Yes	Yes
Sector FE	Yes	Yes
Network formation FE	No	Yes
Log-likelihood	**-106,552**	**-106,475**
N (Obs./ Sectors/ g x t/ Indiv.)	56,602 /2,621 /7,741 /26,427	

- Changes in coef. $+$ in likelihood
  $\Rightarrow$ some cluster endogeneity

- Specificity of isolated individuals
  - Bimodal distribution of individual FE
  - Estimation w/o isolated individuals show no group endogeneity

Robustness checks: Reflection issue

- Using the maximum behavior instead of the average
  - Consider other moments of the distribution of endogenous effects to move away from the linear-in-means model, and avoid the reflection issue
  - Endogenous effect: max intensity in the cluster
  - Mechanisms behind the peers' maximum behavior being influential: role model effect, need to be "as good as", comparison to the highest behavior

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Robustness checks

Results with top search intensity

	Total search	Networks	Active	Organizations
Endogenous effects				
Un. neighbors' top search intensity	0.018***	0.034***	0.017***	−0.011**
	(0.004)	(0.004)	(0.004)	(0.005)
Contextual effects (*unemp. neighbors*)				
% ex-low-level occupations	−0.010	−0.017	−0.014	0.024***
	(0.022)	(0.011)	(0.013)	(0.008)
Group effects (*non-unemp. neighbors*)				
% employed	0.130*	0.101***	−0.004	0.031
	(0.069)	(0.036)	(0.040)	(0.027)
% low-level occupations	−0.221***	−0.128***	−0.103***	0.013
	(0.055)	(0.028)	(0.032)	(0.021)
% high-level occupations	0.028	0.082*	−0.041	−0.016
	(0.081)	(0.042)	(0.047)	(0.031)
Indiv. characteristics	Yes	Yes	Yes	Yes
Quarter dummies	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
R^2	0.028	0.033	0.020	0.029
N (Obs./ Sectors/ Clusters x t/ Indiv.)	56,602	/ 2,621	/ 30,873	/ 26,427

$^{*}p<0.1;\ ^{**}p<0.05;\ ^{***}p<0.01$

Controls: individual's characteristics, quarter dummies and sector FE

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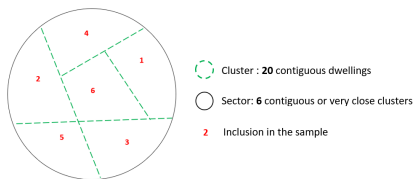
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Conclusion

- Main results
    - Endogenous effects:
        - Imitation effects, spread of information
    - Group (contextual) effects (emp. neighbors ↗ JS, low-occup. neighbors in ↘ JS)
        - Having some connection w/ the LM is important to foster JS
    - Most impacted JS channel is search through networks (most effective)

- Neighborhoods are a place of socialization, with important interactions for the LM. Even more so in dense neighborhoods.
    - Consistent w/ observations in a large survey by French sociologists *("Mon quartier, mes voisins")*.

- Public policy implications
    - Endogenous effects ⇒ favor the spread of information between unemployed (rather than social diversity policies)

- Limits
    - No way with this data to look at mechanisms

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Data: The French Labor Force Survey (FLFS)

■ Two nested levels
of neighborhoods

○ Cluster : **20** contiguous dwellings

○ Sector: **6** contiguous or very close clusters

2 Inclusion in the sample

■ Very close housing units

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Two nested levels of neighborhoods

Individual determinants of job search behaviors

	Networks	Active	Organizations
Previous occupation			
Low-level occ.	-0.210***	-0.052***	0.045***
Other occ.	Ref.	Ref.	Ref.
High-level occ.	0.337***	0.037*	-0.070***
Has never worked	-0.369***	-0.132***	-0.072***
Age			
15-29	0.069*	0.173***	0.053***
30-39	0.014	0.032**	0.001
40-49	Ref.	Ref.	Ref.
50-59	-0.051***	-0.096***	-0.099***
Above 60	-0.109***	-0.280***	-0.21***
Sex (female)	-0.081***	0.058***	-0.173***
> 1 child (0/1)	0.021**	-0.033***	-0.027***
Foreigner (0/1)	-0.001	-0.129***	0.057***
Partner's status			
Employed partner	0.035***	-0.001	-0.018**
Unemployed partner	-0.002	-0.003	-0.025
No partner	Ref.	Ref.	Ref.
Inactive partner	-0.036**	-0.122***	-0.023**
Quarter dummies	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
Peer effects	Yes	Yes	Yes
N (Obs. / g x t / Sect.)	60,171 /	32,090 /	2,622

*p<0.1; **p<0.05; ***p<0.01

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Two nested levels of neighborhoods

Complementarity of JS channels

| | Explained variable | | | | | |
	Networks		Active		Organizations	
Active	0.157^{***}					0.057^{***}
	(0.005)					(0.004)
Organizations		0.065^{***}		0.121^{***}		
		(0.007)		(0.008)		
Networks			0.199^{***}		0.039^{***}	
			(0.006)		(0.004)	
Indiv. FE	Yes	Yes	Yes	Yes	Yes	Yes
Indiv. FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Obs. / Indiv.			56,602 / 26,427			
R^2	0.026	0.004	0.026	0.007	0.010	0.013

*p$<$0.1; **p$<$0.05; ***p$<$0.01

Number of neighbors by characteristics
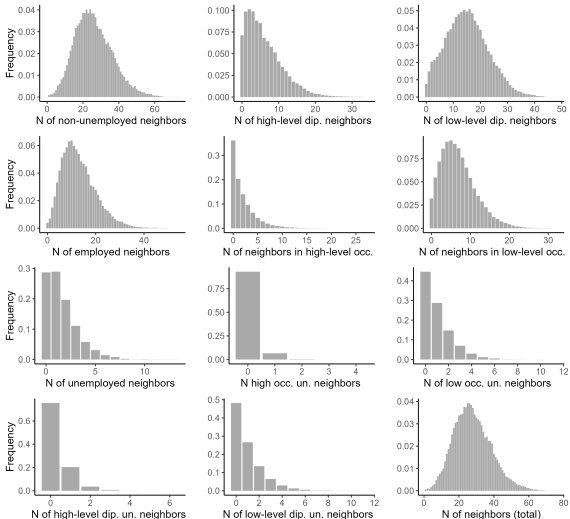
Distribution: endogenous, contextual, group effects

	Min	Q1	Median	Q3	Max	Mean	SD
Endogenous effects	*Un. neighbors' average intensity*						
Total	0	0	3	4.5	10	2.86	2.25
Networks	0	0	1	1.5	3	0.89	0.92
Active	0	0	1.5	2.3	5	1.43	1.18
Organizations	0	0	0.5	1	2	0.54	0.59
Contextual effects	*among unemployed neighbors*						
% low-level diploma	0	0	0.33	1	1	0.41	0.43
% high-level diploma	0	0	0	0	1	0.15	0.31
% low-level occupations	0	0	0.50	1	1	0.44	0.44
% high-level occupations	0	0	0	0	1	0.04	0.18
Group effects							
Among non-unemployed neighbors							
% employed	0	0.39	0.50	0.61	1.00	0.47	0.16
% low-level diploma	0	0.45	0.60	0.73	1.00	0.58	0.21
% high-level diploma	0	0.11	0.20	0.33	1.00	0.24	0.18
Among employed neighbors							
% low-level occupations	0	0.38	0.56	0.75	1.00	0.55	0.26
% high-level occupations	0	0	0.09	0.22	1.00	0.15	0.18
Estimation sample	56,602 obs. / 2,621 sectors / 30,873 g × t / 26,427 indiv.						

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Robustness checks

Spatial sorting test: non-unemployed neighbors

Identifying hypothesis indirectly tested by measuring the **correlation between observables**:

R2 of regressions of individual's characteristics on **neighbors**' characteristics, with sector fixed effects.

Correlation individual's characteristics
/ all (non unemployed) neighbors' average characteristics

R^2 in percentages	Fixed effects		
	None	Urb. unit	Sector
Education			
High-level diploma	8.287	5.365	0.091
Baccalaureate	0.216	0.127	0.005
Low-level diploma	7.864	5.056	0.165
Previous occupation			
Indep. worker	0.056	0.020	0.005
Executive	6.256	3.992	0.167
Intermediate prof.	0.577	0.367	0.004
Blue-/white-collar workers	2.072	1.624	0.117
Citizenship			
French	7.200	3.781	0.052
Foreign	7.274	3.811	0.053
Mean age	0.659	0.528	0.075
Observations (cluster $\times$ quarter)		30,873	

R-squares in percentages: 8.296 means that the RHS variable explains 8.296 percent of the LHS variable's variance.

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Robustness checks

Spatial sorting test: employed neighbors

R2 of regressions of individual's characteristics on **employed** neighbors' characteristics, with sector fixed effects.

Correlation individual's characteristics
/ employed neighbors' average characteristics

R^2 in percentages	Fixed effects		
	None	Commune	Sector
Education			
High-level diploma	7.135	4.684	0.131
Baccalaureate	0.034	0.012	0.021
Low-level diploma	6.053	3.898	0.121
Previous occupation			
Indep. worker	0.078	0.027	0.002
Executive	6.338	4.236	0.221
Intermediate prof.	0.354	0.239	0.001
Blue-/white-collar workers	3.830	2.595	0.240
Citizenship			
French	5.884	3.001	0.067
Foreign	5.892	3.007	0.067
Mean age	0.681	0.443	0.059
Observations (cluster $\times$ quarter)		30,716	

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Spatial sorting test: unemployed neighbors

R2 of regressions of individual's characteristics on **unemployed** neighbors' characteristics, with sector fixed effects.

Correlation individual's characteristics
/ unemployed neighbors' average characteristics

R^2 in percentages	Fixed effects		
	None	Commune	Sector
Education			
High-level diploma	2.197	1.075	0.793
Baccalaureate	0.044	0.002	0.992
Low-level diploma	2.300	0.999	0.677
Previous occupation			
Indep. worker	0.015	0.030	1.269
Executive	1.139	0.389	1.709
Intermediate prof.	0.159	0.026	1.081
Blue-/white-collar workers	0.696	0.205	0.836
Has never worked	0.196	0.052	0.443
Citizenship			
French	3.099	1.167	0.503
Foreign	3.113	1.171	0.507
Mean age	0.425	0.119	0.601
Observations (cluster × quarter)		15,647	

Discarding public housing clusters

We keep clusters made of private housing only.

	Search intensity			
	Total	Network	Active	Organizations
Endogenous effects				
Un. neighbors' average intensity	0.047***	0.068***	0.051***	0.049***
	(0.006)	(0.006)	(0.006)	(0.006)
Contextual effects (*unemp. neighbors*)				
% ex-low-level occupations	−0.113***	−0.047***	−0.079***	−0.010
	(0.026)	(0.014)	(0.015)	(0.010)
Group effects *non-unemp. neighbors*)				
% employed	−0.114	−0.029	−0.108*	0.016
	(0.097)	(0.051)	(0.056)	(0.037)
% low-level occupations	−0.212***	−0.088**	−0.089*	−0.032
	(0.082)	(0.046)	(0.047)	(0.047)
% high-level occupations	−0.008	0.047	−0.059	0.004
	(0.103)	(0.054)	(0.065)	(0.039)
Indiv. characteristics	Yes	Yes	Yes	Yes
Quarter dummies	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Log-likelihood	−60,149	−40,359	−43,699	−30,941
N (Obs./ Sectors/ Clusters x t/ Indiv.)	32,736 /	2,288 /	20,461 /	15,728

$^{*}p<0.1;$ $^{**}p<0.05;$ $^{***}p<0.01$

Controls: individual's characteristics, quarter dummies and sector FE

▸ N clusters per sector   ▸ Back

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Robustness checks

Discarding heterogenous sectors

We drop sectors in which the coefficient of variation of the % of high-level occupations is > 1.5.

	Search intensity			
	Total	Network	Active	Organizations
	(1)	(2)	(3)	(4)
Endogenous effects				
Un. neighbors' average intensity	0.044***	0.067***	0.048***	0.039***
	(0.005)	(0.005)	(0.005)	(0.005)
Group effects (*non-unemp. neighbors*)				
% employed	0.163**	0.113***	0.005	0.034
	(0.076)	(0.039)	(0.044)	(0.029)
% low-level occupations	−0.227***	−0.139***	−0.081**	−0.004
	(0.061)	(0.031)	(0.035)	(0.023)
% high-level occupations	0.031	0.073	−0.011	−0.033
	(0.086)	(0.045)	(0.050)	(0.033)
Contextual effects (*unemp. neighbors*)				
% ex-low-level occupations	−0.073**	−0.034***	−0.056***	−0.001
	(0.021)	(0.011)	(0.012)	(0.008)
Indiv. characteristics	Yes	Yes	Yes	Yes
Quarter dummies	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Log-likelihood	-89,817	-60,066	-65,044	-46,702
N (Obs./ Sectors/ Clusters x t/ Indiv.)	47,833 /	2,316 /	26,835 /	22,496

*p<0.1; **p<0.05; ***p<0.01

Controls: individual's characteristics, quarter dummies and sector FE

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Distribution of the number of clusters per sector
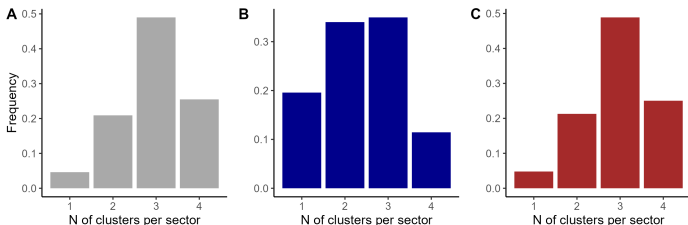
The above figure shows the distribution of the number of clusters per sector in: A = the estimation sample, B = the sample discarding public housing clusters and C = the sample removing heterogenous sectors.

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Identification issues in Manski's model

A model of social interactions

$$y_i = \alpha + \beta E(y|x_i) + E(z|x_i)'\gamma + z_i'\eta + u_i$$

- y_i individual's outcome, x_i group, z_i exogenous characteristics, u_i error term
- $E(y|x_i)$ average behavior, $E(z|x_i)$ average characteristics

■ Three sources of correlated behaviors in the group
   1. Endogenous effects $\beta \neq 0$
   2. Contextual effects $\gamma \neq 0$ $\left.\right\}$ social interaction effects
   3. Correlated effects if $E(u_i|x_i, z_i) \neq 0 = x_i'\delta$

■ Identification issues
   ■ Social interactions (1 & 2) *versus* correlated (3): **group endogeneity** and common shocks bias the estimates of social interaction effects
   ■ Endogenous (1) *versus* contextual (2): simultaneity in behaviors induces a perfect collinearity between between $E(y|x_i)$ and $E(z|x_i)$ in linear-in-means models = **reflection issue**

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Dealing with the reflection issue

- **Intuition:**
  - When i is excluded from the mean of his group, there is a negative correlation between his X, y and the average of his neighbors. The more "capable" are associated on average with the "less able" and vice versa.
  - The impact reduction caused by contextual and endogenous effects have different shapes, that can be used to identify the two effects separately.
  - As the intensity of the negative correlation depends on the size of the groups, variation in group sizes gives an exogenous variation in coefficients across groups that allows to identify the effects.

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Identification issues

Dealing with the reflection issue

Intuition (details):

- Contextual effects: When i is excluded from the mean peer characteristics (attributes) of his group, there is a negative correlation between his attributes and the mean of his peer attributes. Ex. Individuals w/ an education level above average have peers with mean education level below average. This *reduces* the dispersion in outcomes.

- Endogenous effects: When i is excluded from the mean behavior of his group, there is a negative correlation between his behavior and the mean of his peer behaviors. Ex. Individuals w/ JS behaviors above average have peers with JS behaviors below avergae. Further *reduction* in outcome dispersion.

- The impact reduction caused by contextual and endogenous effects have different shapes. This difference can be used to separately identify endogenous from contextual effect.

- As the intensity of the negative correlation depends on the size of the groups, variation in group sizes gives an exogenous variation in coefficients across groups that allows to identify the effects.

- Identification of the effects is more efficient if we have small groups: variance in mean peers behavior and attributes is higher in smaller groups. *"As group size increases, peer effects have less bite on how differences in covariates & behaviors affect differences in outcomes"* (Boucher et al., 2014).

- When there is a sufficient amount of different group sizes, endogenous effects are not