Place of Work and Place of Residence
Informal Hiring Networks and Labor Market Outcomes

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JPE December 2008

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March 6, 2009
1. Motivation
2. Data
3. Empirical Design
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Question of interest

Social networks influence economic outcomes. For example: crime, welfare program participation, technology adoption, peer effects in education, knowledge spillovers and economies of agglomeration, etc.

- How do social interactions among neighbors effect labor market outcomes?
- Are you more likely to work in the same location as your neighbor?
  - How important are neighborhood referrals in labor markets?
Problem

- Selection effect: Individuals are not randomly sorted into neighborhoods.
- What are some unobserved characteristics that might determine where you live that would also effect where you work?
- How can we identify the neighborhood effects apart from individual and neighborhood characteristics?
**Solution**

- Obtain data at a very acute spatial scale: the city block
  - individual data that includes the city blocks in which they live and work

- Assume zero correlation between unobservable characteristics among city block residents, after accounting for slightly broader neighborhood attributes.
Data

- 1990 US Census for the Boston MSA at the individual level
- Residential and employment locations by census block
- Socio-demographic: age, gender, marital status, education, race, family structure, and residential tenure
- Labor market: labor force status, weeks and hours worked, salary and wage income
Reference Group

Randomly chosen neighborhood in the Boston MSA
Reference Group

Reference group: Census block group (identified by the U.S. Census, i.e.,
average of 10 blocks per group.

Alternative reference Group: the set of ten closest blocks to that block using
physical distance between block centroids.
Pairing Individuals

Are two individuals more likely to work together if they are neighbors?

- Use data to generate pairs of individuals
- All pairs in the same reference group
- Not in the same household
- Reference group: 2,037,600
- Alternative reference group: 2,671,270
## TABLE 1: Composition of Pairs Residing in Same Neighborhood Reference Group

<table>
<thead>
<tr>
<th>Sample</th>
<th>Pairs Residing in Same Census Block Group</th>
<th>Pairs Residing in Ten-Closest-Blocks Reference Group</th>
<th>Percentage That Work in Same Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable Name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full sample</td>
<td>100.00</td>
<td>100.00</td>
<td>0.36</td>
</tr>
<tr>
<td>Both high school drop out</td>
<td>0.53</td>
<td>0.67</td>
<td>1.03</td>
</tr>
<tr>
<td>Both high school graduate</td>
<td>15.50</td>
<td>14.84</td>
<td>0.47</td>
</tr>
<tr>
<td>Both college graduate</td>
<td>36.41</td>
<td>37.56</td>
<td>0.34</td>
</tr>
<tr>
<td>HS drop out - HS grad</td>
<td>4.75</td>
<td>5.12</td>
<td>0.51</td>
</tr>
<tr>
<td>HS drop out – College grad</td>
<td>4.95</td>
<td>5.36</td>
<td>0.29</td>
</tr>
<tr>
<td>HS grad – College grad</td>
<td>37.87</td>
<td>36.46</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Reside in Same Census Block Group but Not Same Block
Reside in Ten Closest Blocks but Not Same Block
Reside on Same Block
Outline

1. Explores the propensity for two individuals to work in the same location given that they live in the same census block or reference group.
   - Data set only includes individuals in the workforce who do not work at home.

2. Examines the impact on labor market outcomes of these neighbor interactions, estimated in part 1.
   - Data set includes individuals not currently employed.
Detecting Referral Effects

Equation 1

\[ W_{ij}^b = \rho_g + \alpha_0 R_{ij}^b + \epsilon_{ij} \]

- \( i \) and \( j \) denote two individuals residing in the same reference group but not the same household
- \( W_{ij}^b = 1 \) if \( i \) and \( j \) work in the same census block
- \( \rho_g \) residential reference group fixed effects
- \( R_{ij}^b = 1 \) if \( i \) and \( j \) live in the same census block

How can we be sure \( \alpha \) and \( \rho \) are measuring what we want them to measure?
Detecting Referral Effects

Coefficients of interest:

1. $\rho_g$: controls for any correlation in unobserved attributes among individuals residing in the same neighborhood.

2. $\alpha_0$: social interaction effect, want to test $H_0 : \alpha_0 = 0$
   - Key assumption needed to interpret $\alpha_0$ this way: after correcting for the larger neighborhood characteristics, correlation of unobserved characteristics across the city block is equal to zero.
   - Thin housing market at the block level
Detecting Referral Effects

**Equation 2**

\[ W_{ij}^b = \lambda_i + \lambda_j + \alpha_0 R_{ij}^b + \varepsilon_{ij} \]

- \( i \) and \( j \) denote two individuals residing in the same reference group but not the same household.
- \( W_{ij}^b = 1 \) if \( i \) and \( j \) work in the same census block.
- \( \lambda_i \) individual fixed effects.
- \( R_{ij}^b = 1 \) if \( i \) and \( j \) live in the same census block.

Measures the block-level sorting on observable individual attributes.
Detecting Referral Effects

Equations 3 and 4

\[ W_{ij}^b = \rho_g + \beta' X_{ij} + (\alpha_0 + \alpha_1 X) R_{ij}^b + \epsilon_{ij} \]
\[ W_{ij}^b = \lambda_i + \lambda_j + \beta' X_{ij} + (\alpha_0 + \alpha_1 X) R_{ij}^b + \epsilon_{ij} \]

- \( i \) and \( j \) denote two individuals residing in the same reference group but not the same household
- \( W_{ij}^b = 1 \) if \( i \) and \( j \) work in the same census block
- \( \lambda_i \) individual fixed effects
- \( R_{ij}^b = 1 \) if \( i \) and \( j \) live in the same census block

Allows the social interaction effect to vary across specific socio-demographic characteristics of the matched pair.
Testing key assumptions

Key assumption: after correcting for the larger neighborhood characteristics, correlation of unobserved characteristics across the city block is equal to zero.

1. Analyze the correlation between observable individual and neighborhood characteristics at the block level. Correlations are much stronger at the neighborhood level. Indicates feasibility.

2. Direct test of the importance of block-level sorting on observables. Are the relatively small correlations, seen in 1, enough to significantly increase the probability of pairs to work in the same block? No!

3. Robustness of sample design.

Heterogenous Referral Effects

- Estimation results for equations 3 and 4
- Pairs that live in the same reference group are more likely to work in the same city block if
  - they are high school versus college graduates
  - have young children
  - are young adults
  - are married males
- Results vary by the inclusion of individual fixed effects and by neighborhood type.
  - including individual fixed effects helps control for some unobserved traits
  - referral effect increases with density
Heterogenous Referral Effects

- Estimation results are consistent with previous literature
- Informal hiring networks are used more intensively by individuals with less education and use declines with age
- Strong assortative matching within social networks
Motivation

Does the strength of neighborhood network effects, measured previously, impact labor market outcomes?

- although referrals may be more prominent among neighbors, it may have little impact on the labor market

Estimate a series of labor market outcome regressions that include a measure of match quality defined at the individual level.
Empirical Design

- Defining the match quality variable
- the mean of social interaction effects among all possible matches
- if $M_{ij} = \hat{\alpha}_1 X_{ij}$, then the average match quality for individual $i$ is

$$Q_{ib} = \frac{1}{|N_{ib}|} \sum_{j \in N_{ib}} M_{ij}$$

where $N_{ij}$ is the set of other individuals that reside on the same block, $b$, but not in the same household.

- The model to be estimated in given by

$$E_{ib} = \Theta_b + \delta_3 Q_{ib} + \delta_4 X_{ib} + u_{ib}$$

where $\Theta_b$ are block level fixed effects and $X_{ib}$ is a vector of individual attributes.
Results

- A one standard-deviation increase in match quality raises labor force participation by 3.3 percentage points, average hours worked by week by 1.8 hours and earnings by 3.4 percentage points.
- For females, the increase in earnings is 8.1 percentage points
- 65-75 percent of referrals result in employment of an individual who would otherwise not be employed
Conclusion

- There is significant evidence of social interactions: residing in the same block increases the probability of working together by over 33%.
- These social interactions are more likely to take place between individuals with similar characteristics.
- Labor market outcomes are significantly influenced by these social interactions. Increases in earnings are related to increases referral opportunities.