Immigrant Concentration and Language Acquisition in U.S. Metropolitan Areas

Julia Beckhusen, Raymond J.G.M. Florax, Brigitte S. Waldorf and Thomas de Graaff

NARSC 2009

November 20, 2009
Introduction

A common language facilitates social interaction
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- Interaction leads to trade
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- Trade leads to revenue
A common language facilitates social interaction

Interaction leads to trade

Trade leads to revenue

Revenue increases with the probability of meeting members of the majority
A common language facilitates social interaction
Interaction leads to trade
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Probability of learning the host language
Communication can occur in a variety of places around the immigrant’s residence.
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Place of residence and place of work
Motivation

- Communication can occur in a variety of places around the immigrant’s residence
- Place of residence and place of work
- Spatial scales
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- How does the probability of meeting other English speakers in different locations impact the probability of acquiring the host language?
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- Place of residence and place of work
- Spatial scales
- How does the probability of meeting other English speakers in different locations impact the probability of acquiring the host language?
- Does this vary across immigrant groups?
Language Acquisition

- Influenced by
  - personal characteristics
  - characteristics of their location
Language Acquisition

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- The ethnic distribution of their location
Language Acquisition

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Lazear (1999): theoretical foundation

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- Trade occurs when two individuals meet who share the same language; meeting probability, $p_x$
- Gains from trade normalized to 1 so that expected revenue $= 1 - p_x$
Lazear (1999): theoretical foundation

Based on a random encounter model

Trade occurs when two individuals meet who share the same language; meeting probability, $p_x$

Gains from trade normalized to 1 so that expected revenue $= 1 - p_x$

Individual specific cost, $t_j$; $t_j$ has a pdf and cdf, $g(t_j)$ and $G(t_j)$, respectively.
Lazear (1999): theoretical foundation

- \( \text{prob} (\text{Eng}) = f(p_x, p_x^2) \)
Lazear (1999): theoretical foundation

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- **Result**: language proficiency is inversely related to the proportion of a particular immigrant group
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New Model

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  $p^{m}_{res} = \frac{I^m}{P^m}$
The meeting probability, $p_x$ is expanded to account for interactions at different locations and at different spatial scales:

- $p_{res} = \frac{I}{P}$; $p_{occ} = \frac{I_s}{P_s}$
- $p_{res}^m = \frac{I^m}{P^m} = \frac{I_{puma}}{P^m} + \frac{I_{msa}}{P^m}$
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New Model

Meeting probability

\[ \eta_x = \mu (p_{res}^{puma} + p_{res}^{msa}) + (1 - \mu) (p_{occ}^{puma} + p_{occ}^{msa}) \]

- *puma* indicates residential neighborhood of immigrant
- *msa* indicates all other neighborhoods in the MSA
- \( \mu \) fraction of time spent away from work

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Immigrant Concentration and Language Acquisition
Overview

- 2005 ACS data extracted from IPUMS database
Overview

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- **Mexican and Chinese immigrants living in metropolitan areas of the United States**
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- 25 years or older when immigrated and not in school
Overview

- 2005 ACS data extracted from IPUMS database
- Mexican and Chinese immigrants living in metropolitan areas of the United States
- 25 years or older when immigrated and not in school
- 7,212 Mexican immigrants and 2,006 Chinese immigrants
Highlights of Dataset

English Fluency

- Chinese: 66%
- Mexican: 34%

Citizenship

- Chinese: 72%
- Mexican: 28%
Highlights of Dataset

**Mexican Immigrants**
- High school: 33%
- Less than High School: 60%
- Bachelor's degree or more: 7%

**Chinese Immigrants**
- Less than High School: 17%
- Bachelor's degree or more: 55%
- High school: 28%
## Highlights of Dataset

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mexican Immigrants</th>
<th>Mexican Immigrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>$p^p_x$</td>
<td>0.16</td>
<td>0.044</td>
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<tr>
<td>$p^m_x$</td>
<td>0.11</td>
<td>0.016</td>
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<tr>
<td>$p^{puma}_{res}$</td>
<td>0.01</td>
<td>0.001</td>
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<tr>
<td>$p^{msa}_{res} \mu$</td>
<td>0.05</td>
<td>0.008</td>
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<tr>
<td>$p^{puma}_{occ} (1 - \mu)$</td>
<td>0.08</td>
<td>0.009</td>
</tr>
<tr>
<td>$p^{msa}_{occ} (1 - \mu)$</td>
<td>0.08</td>
<td>0.011</td>
</tr>
</tbody>
</table>
Residential and Occupational Segregation by PUMA

Mexican immigrants

Chinese immigrants

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Immigrant Concentration and Language Acquisition
Marginal values for non-citizen, married, 45 year-old males who have lived in the U.S. for 12 years, have a high school degree and average income

<table>
<thead>
<tr>
<th></th>
<th>Mexican Immigrants</th>
<th></th>
<th>Chinese Immigrants</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$p_x$</td>
<td>-0.9746***</td>
<td>-</td>
<td>-3.197**</td>
<td>-</td>
</tr>
<tr>
<td>$p_x^2$</td>
<td>1.0543**</td>
<td>-</td>
<td>6.494</td>
<td>-</td>
</tr>
<tr>
<td>$p_x^m$</td>
<td>-</td>
<td>-1.4321***</td>
<td>-</td>
<td>-11.436***</td>
</tr>
<tr>
<td>$(p_x^m)^2$</td>
<td>-</td>
<td>2.7415**</td>
<td>-</td>
<td>113.631**</td>
</tr>
</tbody>
</table>
Lazear Replication

Mexican immigrants

Chinese immigrants

P(ENG)

P(ENG)

0
0

0.2
0.4
0.6
0.8
1

0.2
0.4
0.6
0.8
1

0.00
0.20
0.40
0.60
0.80

PUMA

MSA

PUMA

MSA

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</thead>
<tbody>
<tr>
<td>$p_{res}^{pumap_{res}} \mu$</td>
<td>$-4.0310^{**}$</td>
<td>$-149.31^{***}$</td>
</tr>
<tr>
<td>$(p_{res}^{pumap_{res}})^2 \mu$</td>
<td>$15.423^{**}$</td>
<td>$12233.5^{**}$</td>
</tr>
<tr>
<td>$p_{res}^{msa} \mu$</td>
<td>$-0.3297$</td>
<td>$-3.9355$</td>
</tr>
<tr>
<td>$(p_{res}^{msa})^2 \mu$</td>
<td>$2.2762^{***}$</td>
<td>$-106.15$</td>
</tr>
<tr>
<td>$p_{occ}^{pumap_{occ}} (1 - \mu)$</td>
<td>$-0.9811$</td>
<td>$0.3125$</td>
</tr>
<tr>
<td>$(p_{occ}^{pumap_{occ}})^2 (1 - \mu)$</td>
<td>$-1.0718$</td>
<td>$61.884^{*}$</td>
</tr>
<tr>
<td>$p_{occ}^{msa} (1 - \mu)$</td>
<td>$-1.2829^{**}$</td>
<td>$-0.7081$</td>
</tr>
<tr>
<td>$(p_{occ}^{msa})^2 (1 - \mu)$</td>
<td>$1.9057$</td>
<td>$-68.981$</td>
</tr>
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</table>
Predicted Probability of Speaking English

Mexican immigrants

Chinese immigrants

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- **Chinese immigrants**: residential population proportions in their immediate neighborhood
- **Mexican immigrants**: residential population proportions in both their immediate and surrounding neighborhoods; occupational population proportions in their metropolitan area

**Extensions**: expand data set; endogeneity between location choice and language acquisition
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