Ethnic Network Effects in the Spanish Immigration Boom

Nina Heuer    Marcel Smolka

University of Tübingen

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Motivation

- Large and persistent cross-country wage differences
- Level of international migration flows low relative to that of trade and capital flows

→ Substantial bilateral moving costs
→ Ethnic networks provide newcomers with social capital that alleviates the cost of finding jobs and housing; Munshi (2003, QJE)
→ Potential for migration to develop momentum? Clustering of co-ethnic migrants in space?
This Paper

- Role of ethnic networks in shaping
  (i) the aggregate dynamics (country margin) and
  (ii) the spatial distribution (province margin)
  of immigration in Spain

- Theoretical approach combines
  (i) dynamic migration model akin to Carrington et al. (1996) and
  Chau (1997) with
  (ii) random utility framework à la McFadden (1974)

- Econometric methods to explore
  (i) global network effect (country margin)
  (ii) local network effect (province margin)

- Counterfactual analysis through simulation
Why Spain?

- Among the world’s strongest **migrant magnets**
  - In 2010, stock of foreign-born individuals was up 5.3 million people from 1995
  - Foreign-born share among the total population has risen from 2.6% to 13.8% over that same period
  - Diverse ethnic background (more than 100 sources)
- “Liberal” immigration policy
- Detailed **micro- and macro-level data** freely available at the website of the Spanish Instituto Nacional de Estadística (INE); data include immigrants **with and without valid residence permits**
Other Papers

- **Sociological network theory ("cumulative causation"); economic theory of labor migration**
  - Myrdal (1957), Massey et al. (1993); Carrington et al. (1996, AER), Chau (1997, JRS)

- **Empirical literature on determinants of international migration (macro-level), often gravity-type for migration into OECD**

- **Empirical literature on migrants’ location choices in destination country (often U.S.)**
Migration Data from INE

- Yearly head count of legal and illegal inflows of all foreign nationals, detailed by Spanish provinces and nationality, 1997-2009
- Yearly head count of migrant communities in each of 52 Spanish provinces for 113 nationalities, 1997-2009
- Definition of migrant based on *nationality* (and *country of birth*)
- Other Spanish data
  - GDP per capita (INE)
  - Employment rates (INE)
  - Bilateral trade volumes
    (from DataComex Statistics on Spanish Foreign Trade)
  - Bilateral FDI flows
    (from DataInvex Statistics on Foreign Investments in Spain)
- Origin country data from various sources
Migration Stocks and Inflows, 1997-2009

Romanians

Moroccans

Ecuadorians

Colombians

Britons

Bolivians
Concentration Curves for Foreign Nationals, 1999 and 2009
Cross-Country Variation: Initial Stocks and Subsequent Flows

Emigration Rate (1997-2009)

Log Migrant Stock 1997
Within-Variation: $\Delta$ Stocks and $\Delta$ Flows
Within-Variation: $\Delta$ Spanish GDP Per Capita and $\Delta$ Flows
Within-Variation: $\Delta$ Spanish Employment and $\Delta$ Flows

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Spanish Migration Networks  
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Basic Idea

- Individual decision making embedded in a periodic two-stage framework
  - **First stage:** binary choice between migrating to Spain or staying at home; see Carrington et al. (1996) and Chau (1997)
  - **Second stage:** discrete choice of residential destination in Spain, conditional on migrating; see McFadden (1974)
  → Hierarchical information-processing (supported by evidence; see Pellegrini & Fotheringham, 2002)
First stage

- An individual’s expected net benefit in lifetime utility from migrating from country $i$ to Spain at time $t$ is

$$\delta E(V(w_t, e_t, c_{its})) - \delta E(V^*(w^*_it, e^*_it)),$$

where $w$’s are wages, $e$’s employment rates, and $c_{its} \equiv c(M_{it-1}; s)$ with $s \in (0, 1)$ and $M_{it-1}$ being the stock of migrants from $i$ in Spain at $t - 1$

- We assume

$$\frac{\partial E(V(.))}{\partial \ln w} = \alpha > 0, \quad \frac{\partial E(V(.))}{\partial \ln e} = \beta > 0, \quad \frac{\partial E(V(.))}{\partial c} = \gamma < 0,$$

and similarly for the home country

- Assuming $\partial c/\partial s = 1$, we find a unique $\tilde{s}_{it} \equiv s(w_t, e_t, w^*_it, e^*_it, M_{it-1})$ for which all individuals with $s_{it} < \tilde{s}_{it}$ expect to be strictly better off through migration
First stage (cont’d)

Letting \( F(\tilde{s}_{it}) = \tilde{s}_{it} \) and \( \partial c/\partial \ln M = \theta < 0 \), we can use the “marginal migrant condition” to arrive at

\[
\frac{M_{it}}{N_{i}^{*}} = -\theta \ln \tilde{M}_{it-1} - \frac{\alpha}{\gamma} \ln w_{t} + \frac{\alpha^{*}}{\gamma} \ln w_{it}^{*} - \frac{\beta}{\gamma} \ln e_{t} + \frac{\beta^{*}}{\gamma} \ln e_{it}^{*}
\]

→ \( M_{it} \) will be the cumulative gross inflow of men aged 16-64 from country \( i \) at time \( t \)

→ Cumulative flow model, estimated with source fixed effects and time fixed effects; see also Brücker et al. (2004) and Brücker & Schröder (2011)

→ No dynamic model since \( \tilde{M}_{it-1} \) will be the observed stock of all immigrants from country \( i \) at time \( t - 1 \)

→ Augmented by bilateral trade and FDI flows
Letting $F(\tilde{s}_t) = \tilde{s}_t$ and $\partial c/\partial \ln M = \theta < 0$, we can use the "marginal migrant condition" to arrive at

$$\frac{M_{it}}{N^*} = -\theta \ln \tilde{M}_{it-1} - \frac{\alpha}{\gamma} \ln w_t + \frac{\alpha^*}{\gamma} \ln w^*_it - \frac{\beta}{\gamma} \ln e_t + \frac{\beta^*}{\gamma} \ln e^*_it$$

Parameter estimates (log-log model)

- $\theta \approx -0.5^{***}$
- $\frac{\alpha}{\gamma} \approx -3.4^{***}$
- $\frac{\alpha^*}{\gamma} \approx -0.6^*$
- $\frac{\beta}{\gamma} \approx -11.6^{***}$
- $\frac{\beta^*}{\gamma} \approx -3.1^{***}$
Second stage

- In Spain, choice of residential destinations indexed $j = 1, \ldots, J$. Expected lifetime utility from migrating from $i$ to $j$ is

$$E(U_{ijt}) = \delta E(V(w_{jt}, e_{jt}, c_{ijt})) + \varepsilon_j,$$

(3)

where all immigrants draw their personal taste components $\varepsilon_j$ from iid type I extreme value distributions. Hence,

$$\Pr \left( E(U_{ijt}) = \max_k E(U_{ikt}) \right) = \frac{m_{ijt}}{m_{it}} = \frac{\exp(\delta E(V_{ijt}))}{\sum_{k=1}^{J} \exp(\delta E(V_{ikt}))},$$

(4)

- Log-linearizing and rearranging yields

$$\ln(m_{ijt}) = \delta E(V_{ijt}) - \ln \left( \sum_{k=1}^{J} \exp(\delta E(V_{ikt})) \right) + \ln m_{it}.$$

(5)
Second stage (cont’d)

- Applying a variant of the within-transformation to eliminate $it$-specific effects results in

$$\ln \left( \frac{m_{ijt}}{m_{i\ell t}} \right) = \delta \theta \gamma \ln \left( \frac{\tilde{M}_{ijt-1}}{\tilde{M}_{i\ell t-1}} \right) + \delta \alpha \ln \left( \frac{w_{jt}}{w_{\ell t}} \right) + \delta \beta \ln \left( \frac{e_{jt}}{e_{\ell t}} \right)$$

$\rightarrow m_{ijt}$ will be the **gross inflow** of men aged 16-64 from country $i$ to province $j$ at time $t$, and similarly for reference province $\ell$ (Madrid)

$\rightarrow$ Estimated with **source-and-destination** fixed effects, **destination-and-time** fixed effects, and **source-and-region-and-time** fixed effects (computationally burdensome)

$\rightarrow$ Augmented by bilateral **trade flows** (province-level) and **FDI flows** (regional-level)
Second stage (cont’d)

- Applying a variant of the within-transformation to eliminate \( it \)-specific effects results in

\[
\ln \left( \frac{m_{ijt}}{m_{i\ell t}} \right) = \delta \theta \gamma \ln \left( \frac{\tilde{M}_{ijt-1}}{\tilde{M}_{i\ell t-1}} \right) + \delta \alpha \ln \left( \frac{w_{jt}}{w_{\ell t}} \right) + \delta \beta \ln \left( \frac{e_{jt}}{e_{\ell t}} \right)
\]

- Parameter estimates
  - \( \delta \theta \gamma \approx 0.2^{***} \)
  - \( \delta \alpha \approx 1.2^{***} \)
  - \( \delta \beta \approx 2.2^{***} \)
Work in Progress

- Multilateral resistance (Bertoli & Fernández-Huertas Moraga, 2011)
- Cross-country differences in network effects
- Simulation
  - Combine global and local network effect to simulate dynamics at the country and at the province margin of migration
  - Account for wage and employment effects of migration
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