Immigrant Locations and Native Residential Preferences: Emerging Ghettos or New Communities?

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International Migration and Residential Segregation

While the impact of immigrants on labor markets may be small, strong political movements voicing opposition to the growth of resident foreign-born populations are on the upswing.

This suggests that the residential aspects of this phenomenon are perceived as critically important by natives.

How do natives' residential location decisions respond to immigrant arrivals? Do natives contribute to immigrant residential segregation?

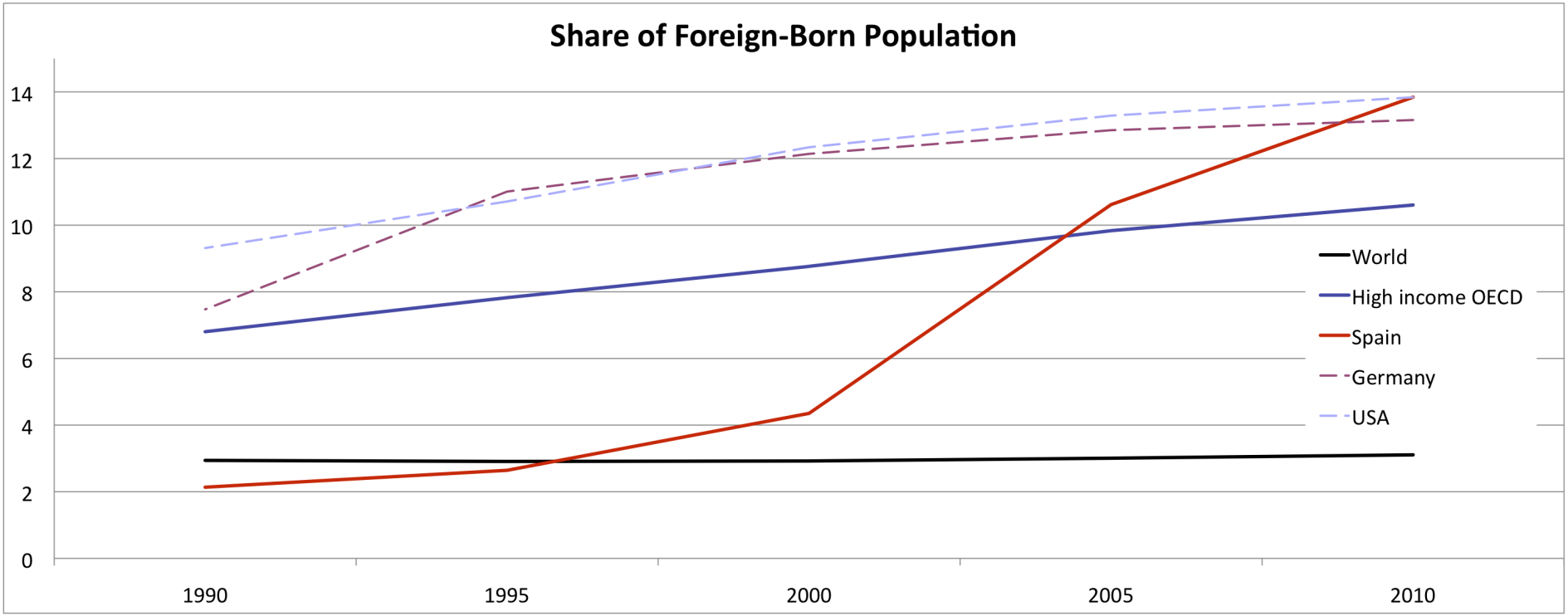
Studying a Major Urban Migration Event

Focus on one of the world's largest and swiftest immigration experiences. In only ten years, between 1998 and 2008, the immigrant share in Spain increased from 3 percent to a staggering 13 percent of the population.

Comprehensive study of natives' residential responses, combining microdata on exact addresses of the resident population, before and after the immigration shock, with distance to amenities and socioeconomic characteristics of neighborhoods.

To our knowledge, this is the most complete set of neighborhood characteristics as controls in the ethnic segregation literature. Therefore, our results are less likely to be contaminated by omitted neighborhood characteristics than in previous work.

Major Shock to residential Dynamics



Spain received 5.5 million immigrants in 1990-2010, second only to the US: 19.6 million. Germany was third: 4.8 million.

Paper Description

- Immigrants mildly displaced natives from city centers and centers of satellite towns in metro areas at a rate of -0.3 (3 immigrants in one native out)
- No evidence of tipping
- New neighborhoods in suburbs saw both immigrant and native arrivals.
- Overall effect on average immigrant segregation neutral.

Previous literature

- US-centered literature. It uses 10-year aggregated data. Examples: very long literature on white flight; Card Mas, Rothstein Cutler(2008), Glaeser and Vigdor (2008); Saiz and Wachter (2011).
- Scandinavian datasets. Inflows are much smaller than in the Spanish case. Examples: Edlin, Fredriksson and Aslund (2003); Piil Damm (2009); Jofre-Monseny, Dahlberg and Fredriksson (2012).
- Spain. Studies with limited scope. Examples: García-López (2012) focuses on aggregate measures and just one city; Bosch, Carnero and Farré (2010) show the existence of ethnic discrimination in the rental market; Ballester and Vorsatz (2014) focus on a cross-section when introducing a new measure of segregation.

The Data

- Microdata from the Spanish Municipal Registry (Padrón): population registered in Spanish municipalities as of January 1st yearly from 1998 till 2008.
- Registration gives access to municipal and regional services. For example, schooling and health.
- Undocumented migrants were allowed to register (since January 2000) and registration was used to legalize during amnesties. ▸ Evolution ▸ Law Changes
- Person characteristics: street address, place of birth, date of birth, nationality, gender, education (unreliable).

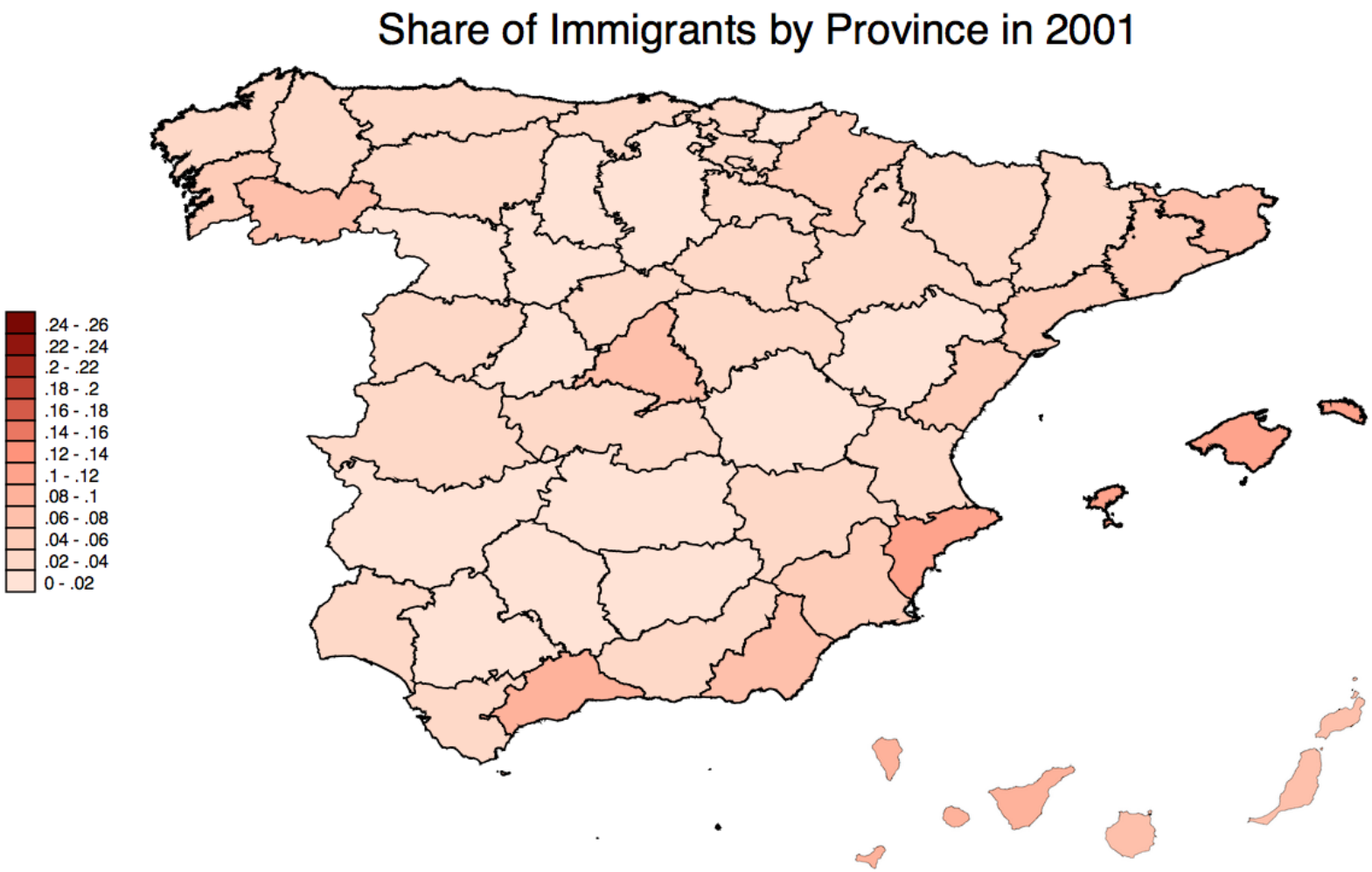
Defining Immigrants

Living in Spain (1-1-2008)	**People**	**Share**
Total:	46,157,822	100.0%
Immigrants (foreign-born)	6,044,528	13.1%
Spanish	*1,037,663*	*2.2%*
Foreigners	*5,006,865*	*10.8%*
Natives (Spanish-born)	40,113,294	86.9%
Spanish	*39,851,397*	*86.3%*
Foreigners	*261,897*	*0.6%*

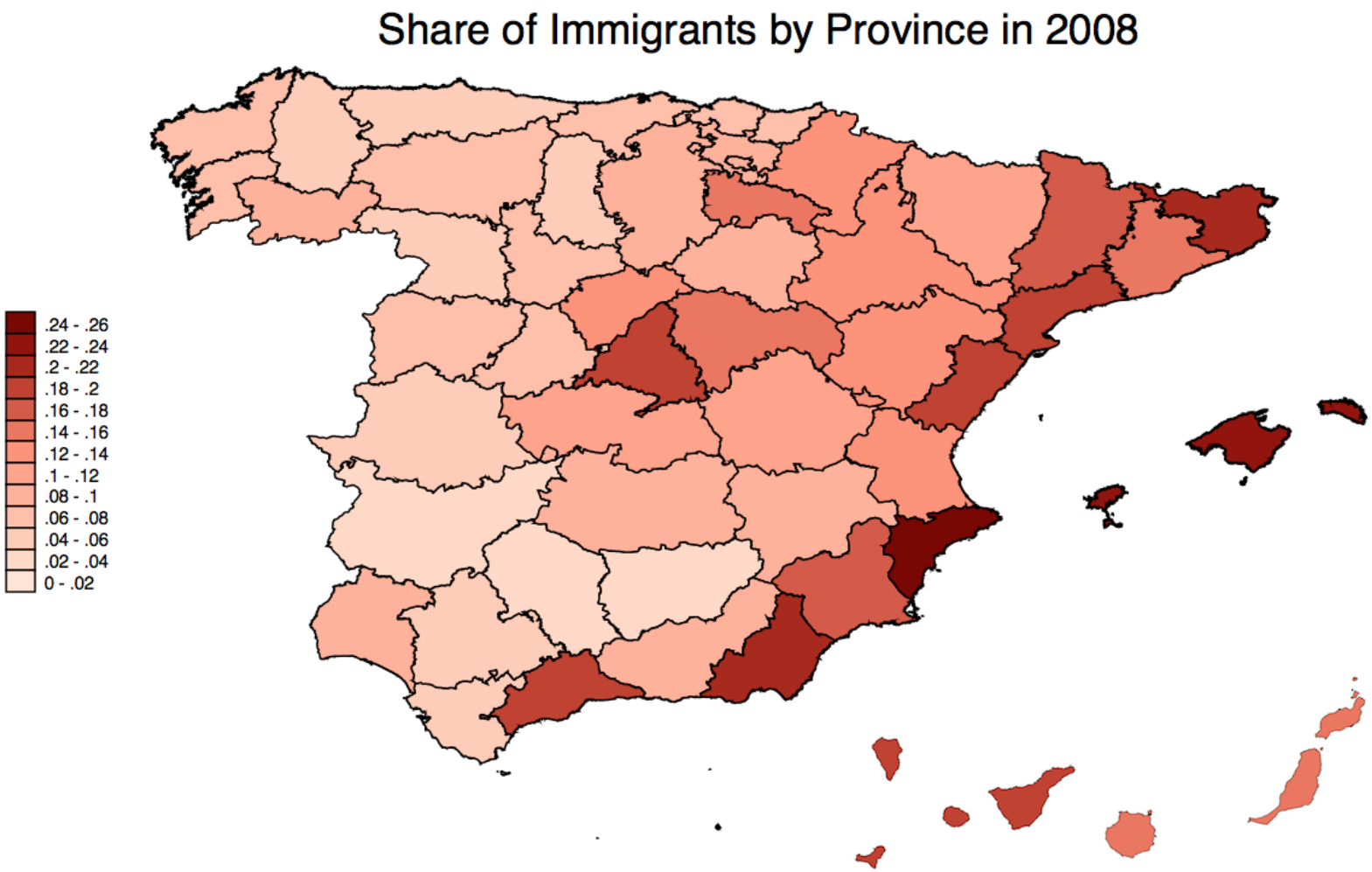
Composition

Year	Share of Total Immigration from: Eastern Europe	Latin America	Subsaharian Africa	Maghreb	Rest of Asia	Most Developed
1998	1.9%	24.5%	2.9%	17.7%	5.3%	47.7%
1999	1.9%	24.6%	3.2%	16.5%	6.9%	46.9%
2000	2.7%	26.5%	3.5%	17.4%	4.6%	45.2%
2001	5.2%	32.8%	3.7%	16.7%	4.4%	37.2%
2002	7.5%	37.7%	3.6%	15.9%	4.3%	31.1%
2003	9.9%	40.3%	3.4%	14.7%	4.3%	27.3%
2004	11.9%	42.2%	3.4%	14.2%	4.3%	24.1%
2005	13.9%	40.9%	3.6%	14.0%	4.6%	23.0%
2006	15.1%	39.3%	3.7%	13.7%	4.9%	23.2%
2007	16.9%	38.7%	3.5%	12.9%	4.6%	23.4%
2008	19.2%	38.0%	3.4%	12.3%	4.7%	22.3%
Immigrants in 2008	1,161,290	2,298,787	208,497	745,788	281,925	1,348,241
2001-2008 increase	1,058,802	1,652,565	135,755	416,610	194,503	616,435
Shares	26.0%	40.6%	3.3%	10.2%	4.8%	15.1%

2001 Map


Share of Immigrants by Province in 2001
.24 - .26
.22 - .24
.2 - .22
.18 - .2
.16 - .18
.14 - .16
.12 - .14
.1 - .12
.08 - .1
.06 - .08
.04 - .06
.02 - .04
0 - .02

2008 Map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.1 - .12
.08 - .1
.06 - .08
.04 - .06
.02 - .04
0 - .02

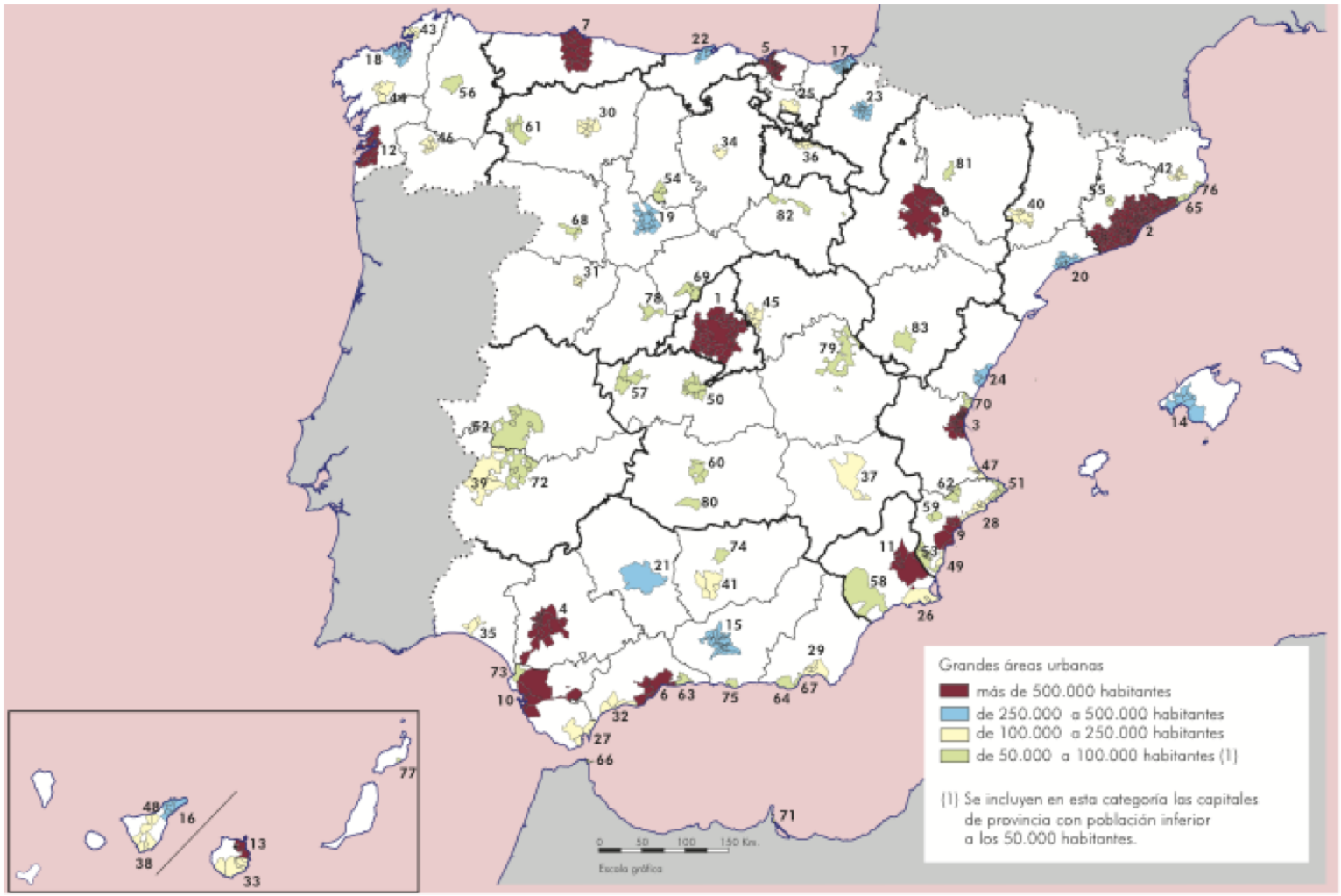
Concentration in 2008

Madrid, Canary Islands and 11 Mediterranean provinces concentrate 75.2 percent of the immigrant population and 53.3 percent of the native population.

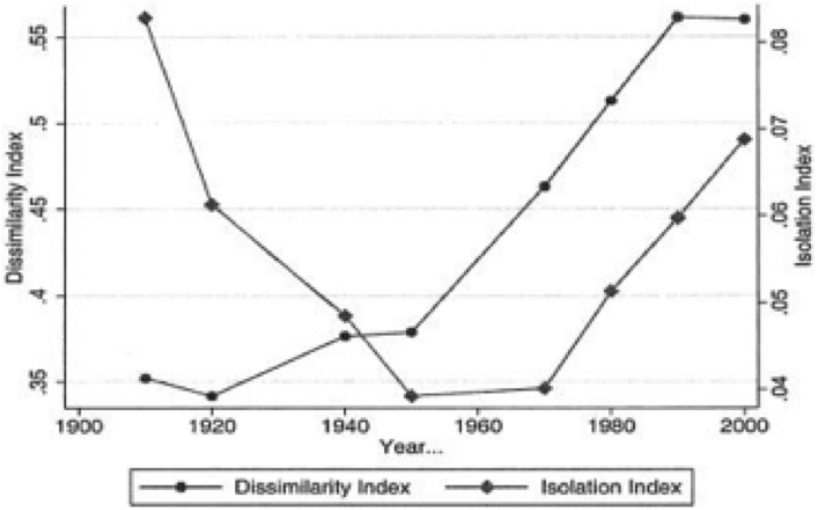
Spanish metro areas, defined by Ministerio de Vivienda (2007), concentrate 72.7 percent of the immigrant population and 66.9 percent of the native population.

2008	Natives	Immigrants	Municipalities	% Inmigrants
Metro Areas	66.9%	72.7%	744	14.1%
Rest of Spain	33.1%	27.3%	7,368	11.0%

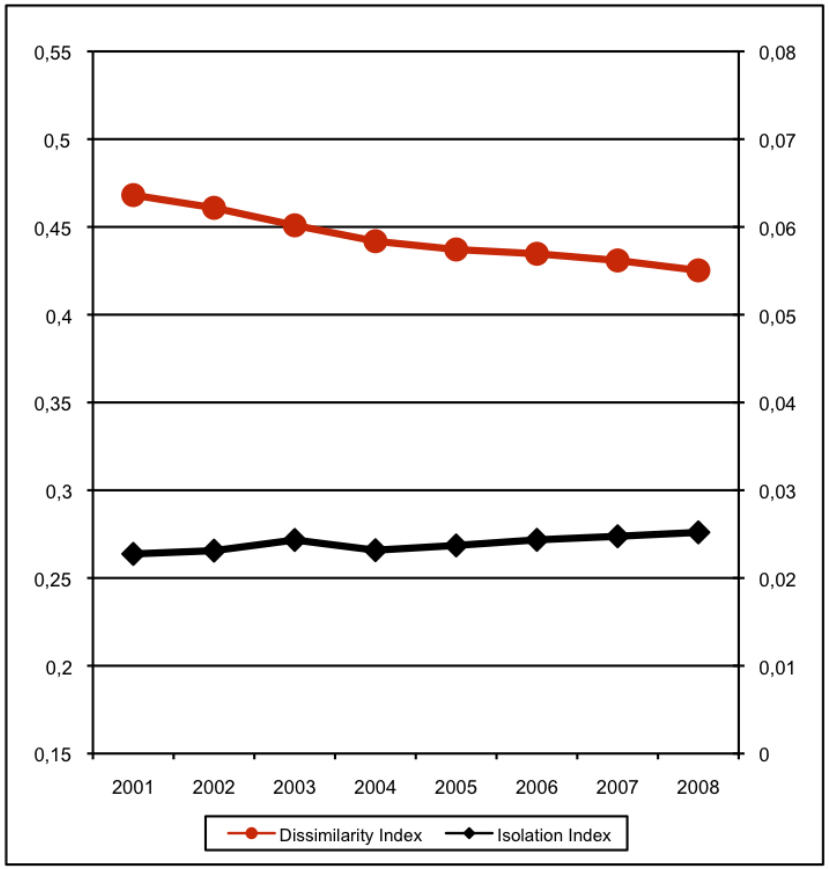
Spanish Metro Areas



Segregation in Metro Areas. Comparison with the US



US



SPAIN

Address Characteristics

We geocoded our Padrón data by matching each address with addresses from ESRI StreetMap Premium Europe NAVTEQ 2009 Release 2. We end up with 7,568,601 uniquely identified addresses.

For each address, we calculated its distance to a series of 62 features (points of interest) from the map server, such as hospitals, exit roads, schools, bus stops, metro stops, etc. In the end, for each address, we have six different measures of amenities for each of the 62 points of interest.

▸ POIs ▸ Gravities

2001 Census Data

The 2001 Spanish Census provides us with a set of variables referred to each of 34,251 censal sections in Spain. Censal sections are administrative divisions for electoral purposes and are supposed to have between 500 and 2,500 inhabitants. In 2001, their average population was 1,193 (s.d.=590). 94 percent of them had the correct size.

We assign each of our addresses to the 291 average characteristics of its censal section in 2001. Variables included are: age structure, education, unemployment rates, industry composition of the workforce, quality of the buildings and neighborhood, commuting habits, etc.

Gridding Spain

Ex post census tract boundaries are endogenous to growth and ethnic composition.

- Take censal sections in 2008 and bring them back in time. Potentially endogenous but similar results on settled areas. However, it would completely miss new settlement patterns.
- Create squares of 0.005 degrees, approximately 555 meters. We prefer this measure because it gives us similar averages while it does not depend on administrative decisions: truly random. For example, censal sections with a larger share of non-voting immigrants are larger. For 2008 metro areas, the average population of the 28,541 grids is 1,076 (s.d.=2,134).

Outflow-Inflow Parameter

We want to estimate the following average empirical relationship:

$$\Delta nat_{k,m,t} = \theta_{m,t} + \beta \triangle im_{k,m,t} + X'_{k,m,t-1}\Gamma + \gamma_n S_{k,m,t} + \varepsilon_{k,m,t}$$

Changes in the native population between t and $t-1$ here are a function of: a general metropolitan shifter ($\theta_{m,t}$); the change in the number of immigrant arrivals in the neighborhood ($\triangle im_{k,m,t}$); initial neighborhood characteristics the valuation of which may be changing ($X_{k,m,t-1}$); an additional shock to the relative attractiveness of the neighborhood due to changes in employment or amenities ($S_{k,m,t}$); and an i.i.d. random component ($\varepsilon_{k,m,t}$)

▸ Levels vs. Rates

Outflow-Inflow Parameter

$$\Delta nat_{k,m,t} = \theta_{m,t} + \beta \Delta im_{k,m,t} + X'_{k,m,t-1}\Gamma + \gamma_n S_{k,m,t} + \varepsilon_{k,m,t}$$

- The parameter of interest is β, which corresponds to the counterfactual *average* net native population loss or gain in the absence of any arrival of immigrants into the neighborhood.
- Start with linear descriptive relationship, then look at nonlinearities (tipping) at larger immigrant concentrations
- We focus on the outflow-inflow parameter (β) for two reasons: (i) there is no detailed data for housing prices at the neighborhood level in our context (no WTP);
- (ii) reduced-form demographic parameters such as β (or their nonlinear counterparts in the tipping-point literature) are of first-order importance for forecasting and policy

Outflow-Inflow Parameter

$$\Delta nat_{k,m,t} = \theta_{m,t} + \beta \triangle im_{k,m,t} + X'_{k,m,t-1}\Gamma + \gamma_n S_{k,m,t} + \varepsilon_{k,m,t}$$

If $\beta > 0$, after *controlling for all other relevant neighborhood characteristics and shocks*, one can conclude that the arrival of new immigrants into a neighborhood made it more desirable to the marginal natives moving in. The increased population levels must be accommodated via a combination of new housing supply and growth in local residential densities, with housing prices increasing due to an amenity premium.

Outflow-Inflow Parameter

$$\Delta nat_{k,m,t} = \theta_{m,t} + \beta \triangle im_{k,m,t} + X'_{k,m,t-1}\Gamma + \gamma_n S_{k,m,t} + \varepsilon_{k,m,t}$$

When $\beta < -1$ the neighborhood is losing population and the evidence unambiguously points to the existence of nativist ethnic preferences: the area became less attractive to natives compared to otherwise identical locations, despite the fact that housing there should be easier to get by. Housing prices should be growing more slowly than in comparable neighborhoods "untreated" by an immigration shock.

Outflow-Inflow Parameter

$$\Delta nat_{k,m,t} = \theta_{m,t} + \beta \triangle im_{k,m,t} + X'_{k,m,t-1}\Gamma + \gamma_n S_{k,m,t} + \varepsilon_{k,m,t}$$

With $0 > \beta \geq -1$, immigrant destinations are growing or stable, but the evidence can be consistent with a number of alternative interpretations:

- (i) a simple mechanical-displacement relationship arises because of tightness in the local housing market; as native families exit randomly, they are replaced by immigrant households living at higher residential densities, while marginal native preferences for the neighborhood have not changed;
- (i) implies housing prices not to be increasing or decreasing in the neighborhoods that receive immigrant inflows and, therefore, new housing construction not to be significantly different from that in identical neighborhoods not receiving immigrants.

Outflow-Inflow Parameter

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With $0 > \beta \geq -1$, immigrant destinations are growing or stable, but the evidence can be consistent with a number of alternative interpretations:

- (ii) a price-displacement story, where immigrant arrivals push up housing prices thereby crowding out some natives, while preserving a population of native marginal residents with higher willingness-to-pay;
- (ii) implies higher prices and —on average— construction in neighborhoods that see immigrant arrivals.

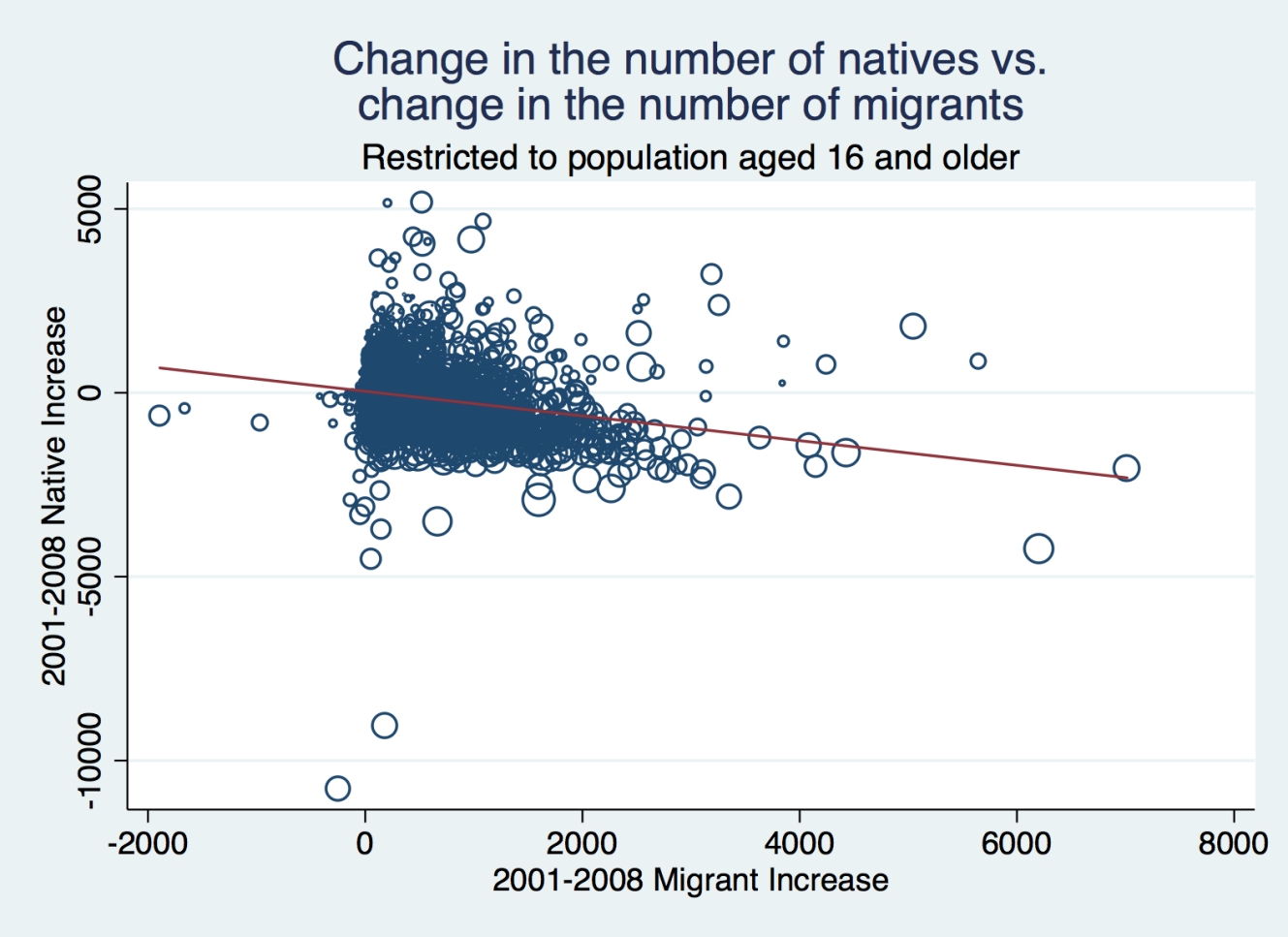
Outflow-Inflow Parameter

$$\Delta nat_{k,m,t} = \theta_{m,t} + \beta \triangle im_{k,m,t} + X'_{k,m,t-1}\Gamma + \gamma_n S_{k,m,t} + \varepsilon_{k,m,t}$$

With $0 > \beta \geq -1$, immigrant destinations are growing or stable, but the evidence can be consistent with a number of alternative interpretations:

- (iii) a native-flight story, whereby natives dislike the presence of foreigners at the margin, but these preferences are not very strong and lower prices compensate for many of them to stay in the community.
- (iii) implies lower prices and —on average— less construction than in identical "control" neighborhoods, with population growth being solely accommodated via increased residential densities of immigrants.

Raw Correlation



Variables in the Model

$$\Delta nat_{k,m,t} = \theta_{m,t} + \beta^{NW} \Delta im^{NW}_{k,m,t} + \beta^{W} \Delta im^{W}_{k,m,t} + \sum_{i=1}^{4} \kappa_i pop^{i}_{k,m,t-1} + \lambda \cdot empty_{k,m,t-1} + A'_{k,m,t}\gamma^{A}_{n} + X'_{k,m,t-1}\Omega^{S}_{n} + u_{k,m,t} \quad (1)$$

- Scale: control for a flexible function (quartic polynomial) of population at baseline ($pop_{k,m,t-1}$), and include a dummy variable for neighborhoods that were empty initially ($empty_{k,m,t-1}$), and dummies for zero population in 2008 as needed
- New immigrants are also likely to be attracted to neighborhoods with the presence of co-ethnics. We capture this effect by including the share of the foreign-born at $t-1$ ($im_{k,m,t-1}$)

Variables in the Model

- Population variables ($\Delta nat_{n,t}$, $\Delta mig_{n,t}$ and $pop_{n,t-1}$): We exclude children 0-15 years old to avoid population increases due to newly-born immigrant children born as natives.
- Mortality and age structure controls: We control for the baseline share of native population in age groups 15-24, 25-44, 45-64,>65.
- Additional neighborhood controls: distances to population-weighted metro area and to municipality center; all POI gravities; 2001 Census: unemployment, construction, housekeeping, hotel and restaurant workers, age of buildings and p.c. indices for car use, walking to work habits, height of the buildings and neighborhood cleanliness.
- New immigrants are also likely to be attracted to neighborhoods with the presence of co-ethnics. We including the share of the foreign-born at $t-1$ $(im_{k,m,t-1})$ ▸ Summary Statistics

Descriptive Evidence

Dependent variable	$\Delta nat_{k,m,2001\_2008}$					
Sample	All		Winsor			
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Non-Western Immigrants $\Delta im^{NW}_{k,m,2001\_2008}$	-0.517	-0.119	-0.272		-0.249	-0.296
	[0.020]***	[0.041]***	[0.040]***		[0.049]***	[0.076]***
Western Immigrants $\Delta im^{W}_{k,m,2001\_2008}$	2.127	1.332	3.125	2.691	3.797	4.012
	[0.325]***	[0.281]***	[0.582]***	[0.589]***	[0.804]***	[1.002]***
Eastern Europe				-0.266 [0.069]***		
Latin America				-0.425 [0.075]***		
Subsaharian Africa				-0.874 [0.193]***		
Maghreb				0.105 [0.125]		
Rest of Asia				0.010 [0.146]		
$f(pop_{k,m,2001})$ and Controls	No	Yes	Yes	Yes	Yes	Yes
Initial concentration	No	No	No	No	Yes	Yes
Population Average Weights	No	No	No	No	No	Yes
Adjusted R^2	0.179	0.329	0.422	0.428	0.426	0.535
Observations	28,521	28,521	22,041	22,041	22,041	22,041

Winsorizing Growth Outliers

- We calculate the population growth distribution at the top and bottom 1 percent of the *2001-population-weighted* grid squares. The set of neighborhoods between the top and bottom percentiles experienced population growth between -25.3 percent and 134.8 percent.
- We then exclude 4,531 grid squares with population growth below and above that range. We also drop 1,949 squares with no population in 2001. Areas excluded amount to 22.72 percent of the squares in our metropolitan grids, but to only 2 percent of the metro population in 2001 *by definition*.
- Remarkably, these neighborhoods went on to encompass 4.9 percent of the metro population in 2008 due to the construction boom, having attracted 631,277 natives and 156,417 immigrants from developing countries.

Winsorized Results

Dependent variable	$\Delta nat_{k,m,2001\_2008}$					
Sample	All		Winsor			
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Non-Western Immigrants $\Delta im^{NW}_{k,m,2001\_2008}$	-0.517	-0.119	-0.272		-0.249	-0.296
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Adjusted R^2	0.179	0.329	0.422	0.428	0.426	0.535
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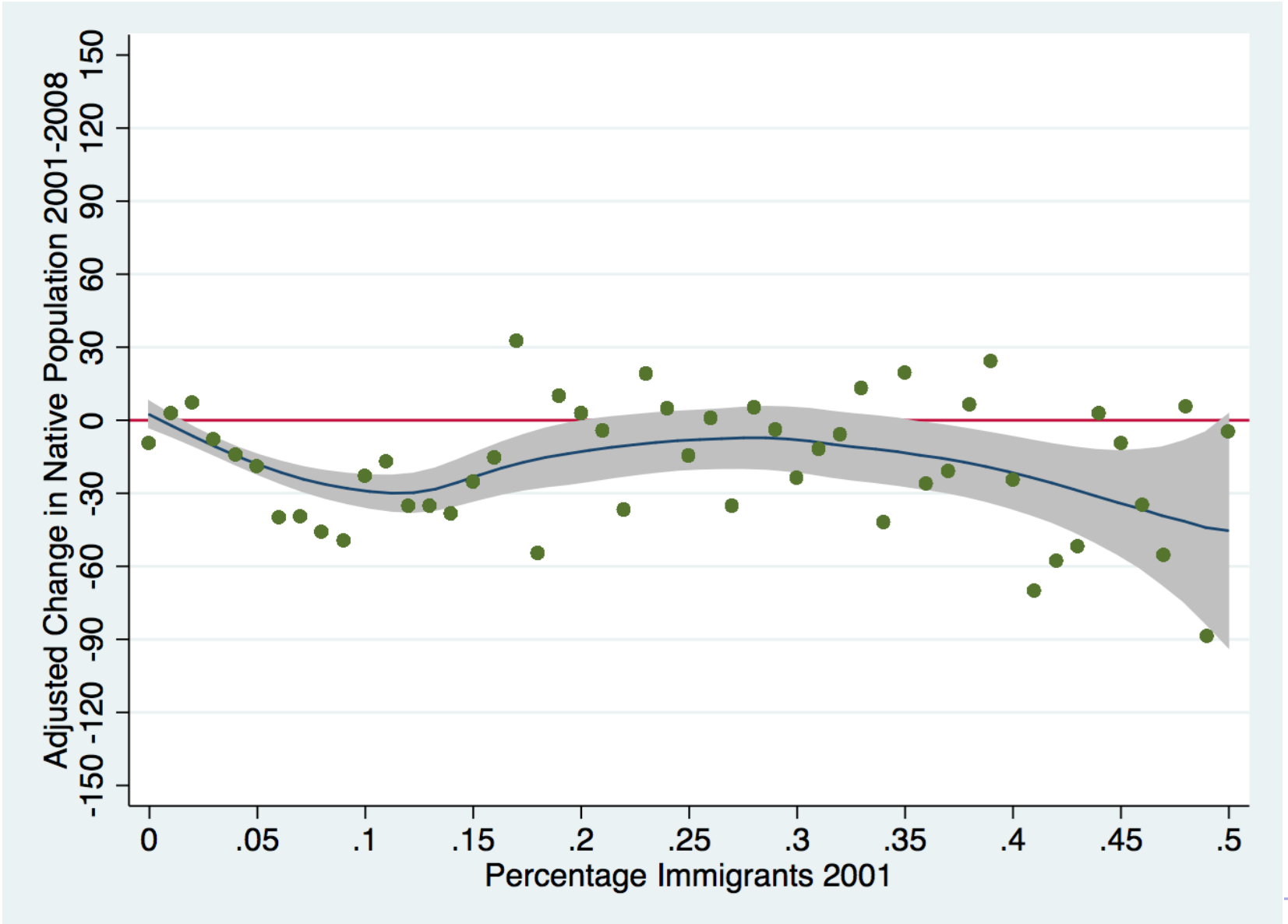
Graphical Tipping



Omitted Shocks and Reverse Causation

Consider the additional equation behind the data generation process for the relative growth of the immigrant population in neighborhood k, of city m, at time t:

$$\begin{aligned}\Delta im_{k,m,t} = \pi_{m,t} + \delta im_{k,m,t-1} + \rho \cdot F(\Delta IM_{m,t}) \cdot im_{k,m,t-1} \\ + X'_{k,m,t-1}\Omega + \gamma_i S_{k,m,t} + \alpha \Delta nat_{k,m,t} + \xi_{k,m,t}\end{aligned} \tag{2}$$

Here, $F(\Delta IM_{m,t})$ stands for a function of the total number of immigrants arrived in the metropolitan area m between t and $t-1$.

Immigrant Shocks

IV "push" Based on Bartik (1991), Card (2001) as applied by Saiz and Wachter (2011) and Kasy (2015).

Concretely, focusing on immigrants from non-Western countries we create predictions of total immigrant inflows into neighborhood k, in metro area m, in period t ($\widetilde{\Delta im}^{NW}_{k,m,t}$) as

$$\widetilde{\Delta im}^{NW}_{k,m,t} = \sum_{\forall g} \left(im^{g}_{k,m,t-1} \cdot \frac{IM^{g}_{m,t}}{IM^{g}_{m,t-1}} \right) \tag{3}$$

g denotes an ethnic group, proxied by country of birth, in the subset NW, and $IM^{g}_{m,t} = \sum_{k \in K^m} im^{g}_{k,m,t}$, with K^m representing the set of neighborhoods in metro area m.

Rationale for Variation in Push

- Identification relies on *the interaction* between country-by-metro-specific migrant shocks and lagged micro settlement patterns by country and neighborhood.
- For instance, consider two hypothetical cities: A and B. Both contain observationally-equivalent neighborhoods 1 and 2. Neighborhood 1 in each city contains a substantial and identical number of Ecuadorian immigrants at $t-1$, while neighborhood two houses a similar contingent of Bolivians. If city A receives larger subsequent inflows of Ecuadorians and city B larger contingents of Bolivians, we would expect neighborhood 1 in city A to be more substantially treated by a higher immigrant dosage, whereas the high-treatment neighborhood in city B would be 2.
- We can control for generic metropolitan fixed effects and *for the initial concentrations of immigrants in each neighborhood*.
- Moreover magnitude of shock completely unexpected in 2000

IV Results

Dependent variable	$\Delta nat_{k,m,2001\_2008}$				$\Delta Buildings_{k,m,2001\_2008}$
Sample		All	$u \geq 11\%$	$u < 11\%$	All
Variables	(1)	(2)	(3)	(4)	(5)
Non-Western Immigrants $\Delta im^{NW}_{k,m,2001\_2008}$	-0.279	-0.323	-0.517	-0.408	0.427
	[0.055]***	[0.059]***	[0.082]***	[0.130]***	[0.195]**
Western Immigrants $\Delta im^{W}_{k,m,2001\_2008}$	0.652	1.067	3.492	-0.068	1.008
	[0.354]*	[0.752]	[1.609]**	[0.495]	[0.404]**
First Stage F-stat ($\Delta im^{NW}_{k,m,2001\_2008}$)	191.19	83.38	46.55	70.12	113.96
First Stage F-stat ($\Delta im^{W}_{k,m,2001\_2008}$)	7.81	12.66	15.62	3.35	41.78
Joint Wald F-stat	19.87	61.13	189.07	56.23	180.33
Observations	28,521	28,521	13,929	14,592	26,578

Columns 2-5 use average population weights

New Construction

- All new street addresses had to be duly registered by the municipal government and appear in our dataset as soon as the first residents move in.
- However a new building (signified by a new street address) does not correspond to the same number of homes across geographies. We must make inferences.
- $Homes_{k,m,t-1} \equiv Pop_{k,m,t-1} \cdot \delta_{k,m}$
- $\delta_{k,m}$ capturing the inverse of the average number of persons per home in the grid square:
- $Homes_{k,m,t-1} \equiv Buildings_{k,m,t-1} \cdot \tau_{k,m}$
- Number of homes per address in the neighborhood ($\tau_{k,m}$)

New Construction: Inference

- $Buildings_{k,m,t-1} \equiv \frac{Pop_{k,m,t-1}}{(\tau_{k,m}/\delta_{k,m})}$
- Assume stable native densities (or % changes similar across neighborhoods)
- Denote the ratio of homes per immigrant to native person by ψ, with $1 > \psi > 0$.
- $\Delta Buildings_{k,m,t} = \frac{\Delta nat_{k,m,t}}{(\tau_{k,m}/\delta_{k,m})} + \frac{\psi \Delta im^{NW}_{k,m,t}}{(\tau_{k,m}/\delta_{k,m})}$
- $\Delta nat_{k,m,t} = \beta \Delta im^{NW}_{k,m,t} + \nu_{k,m,t}$
- $\Delta Buildings_{k,m,t} = (\psi + \beta) \frac{\Delta im^{NW}_{k,m,t}}{(Pop_{k,m,t-1}/Buildings_{k,m,t-1})} + \widetilde{\nu_{k,m,t}}$

IV Results: Housing

Dependent variable	$\Delta nat_{k,m,2001\_2008}$				$\Delta Buildings_{k,m,2001\_2008}$
Sample		All	$u \geq 11\%$	$u < 11\%$	All
Variables	(1)	(2)	(3)	(4)	(5)
Non-Western Immigrants $\Delta im^{NW}_{k,m,2001\_2008}$	-0.279	-0.323	-0.517	-0.408	0.427
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Observations	28,521	28,521	13,929	14,592	26,578

More Immigrants more Construction

- Areas receiving a number of immigrants that would have required one extra building at previous native settlement densities, actually saw the appearance of 0.4 new buildings.
- These areas are more attractive to builders: not consistent with overall decline
- Because around -0.32 buildings had been vacated by natives, this implies that $\psi = 0.72$
- A way to rationalize the results is with immigrant residential densities that were 39 percent higher than those of native households.
- The number above is exactly consistent with survey literature

Nonlinearities Redux

- The lack of clear tipping dynamics wrt to 2001 concentrations may be due to low power
- Only 5 percent of neighborhoods in 2001 had migrant concentrations above 9.5 percent
- The top percentile was at around a 20 percent migrant share.
- In contrast, subsequent new arrivals were substantial enough to push many areas beyond potential tipping points.
- For instance, the neighborhood at the 75 percentile in 2008 already had more than a 10 percent immigrant share.

Nonlinearities Redux

Generate a sequence of tipping-point indicator variables to use as potential instruments.

- $\widetilde{TT^{NW}_{k,m,t}(\mu^{**})} = \mathbf{1}\left[\frac{im^{NW}_{k,m,t-1} + \widetilde{\Delta im^{NW}_{k,m,t}}}{pop_{k,m,t-1}} > \mu^{**}\right]$
- $\widetilde{\Delta im^{NW}_{k,m,t}}$ is the shift-share instrument produced earlier
- Series of 2SLS specifications on a 50 percent search sample adding right-hand indicator for neighborhoods actually reached the potential tipping threshold μ^{**} as of 2008 $(TT^{NW}_{k,m,t}(\mu^{**}) = \mathbf{1}\left[\frac{im^{NW}_{k,m,t-1} + \Delta im^{NW}_{k,m,t}}{pop_{k,m,t-1}} > \mu^{**}\right])$ instrumented by $\widetilde{TT^{NW}_{k,m,t}(\mu{**})}$

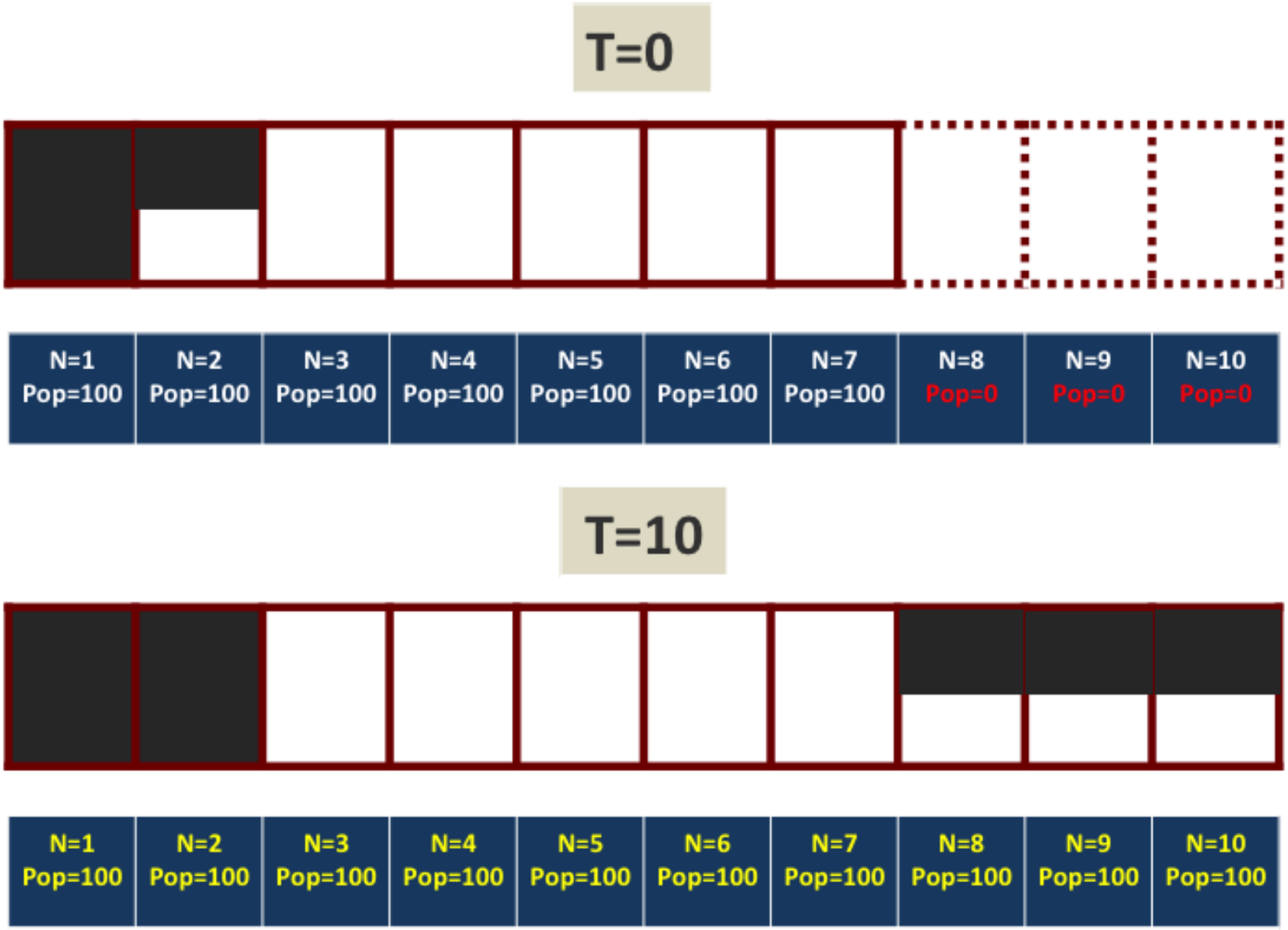
Nonlinearities Redux

- We find that the μ^{**} that maximizes the t-statistic of the parameter on $TT^{NW}_{k,m,t-1}(\mu)$ corresponds to $\mu^{**} = 0.3$ (30 percent immigrant share)
- Contrary to tipping dynamics, the coefficient in the search sample happens to be positive (this is, there was a potential positive jump in native inflows whenever immigrant levels reached 30 percent).
- We then re-estimate the 2SLS model this time in the replication sample and adding a dummy capturing neighborhoods with 30 percent immigrant shares in 2008, instrumented using $\widetilde{TT^{NW}_{k,m,t}(0.3)}$.
- The new instrument is strong. Yet the coefficient on the change of the native population is still a *positive* 9.29, with standard error of 116.37.
- There is thus no evidence of an acceleration of native exodus in neighborhoods where immigrant shares exogenously reached relatively large dimensions.

LATE in Growing Cities

- Sidestepping the analysis of new housing developments may lead researchers to an incomplete picture of ethnic segregation in metropolitan areas where increased residential mobility of minorities is accompanied by general robust demographic growth.
- Consider a theoretical city with 10 neighborhoods, 3 of which are empty in an initial period ($t = 0$)
- The share of minorities in each neighborhood is signified by the relative size of the blue area therein, and their actual location is portrayed at scale.

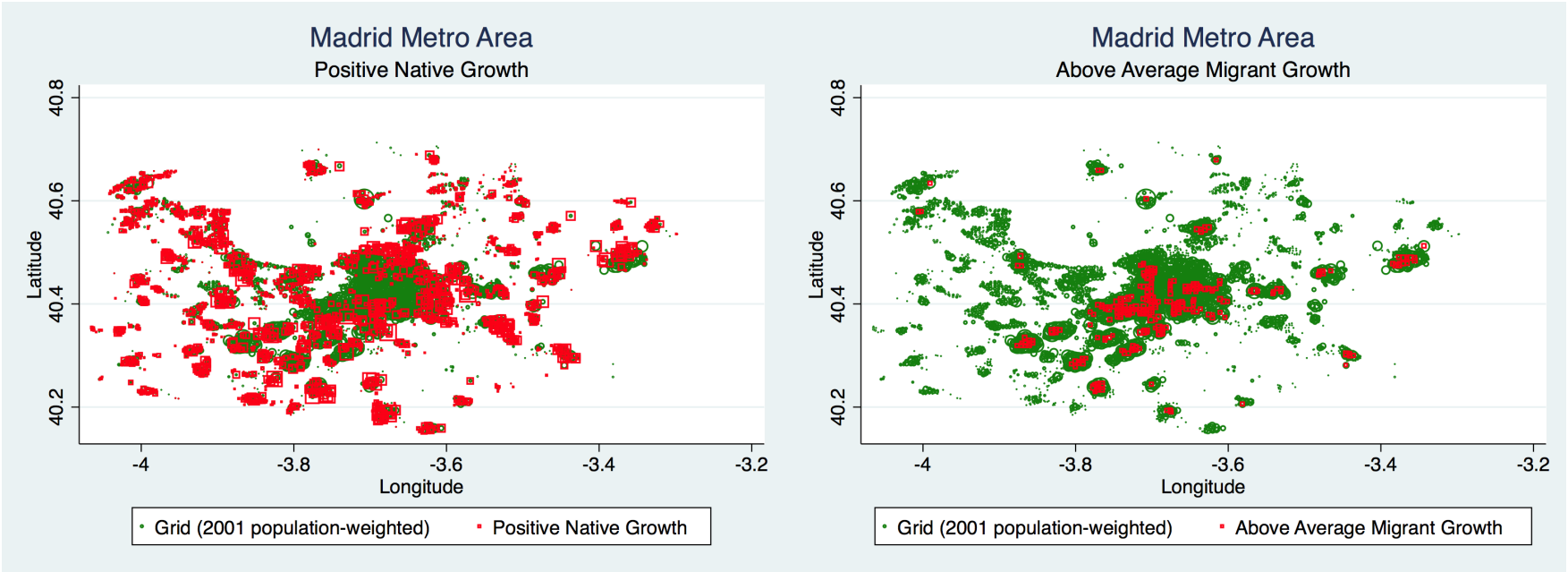
Using Settled Neighborhoods LATE



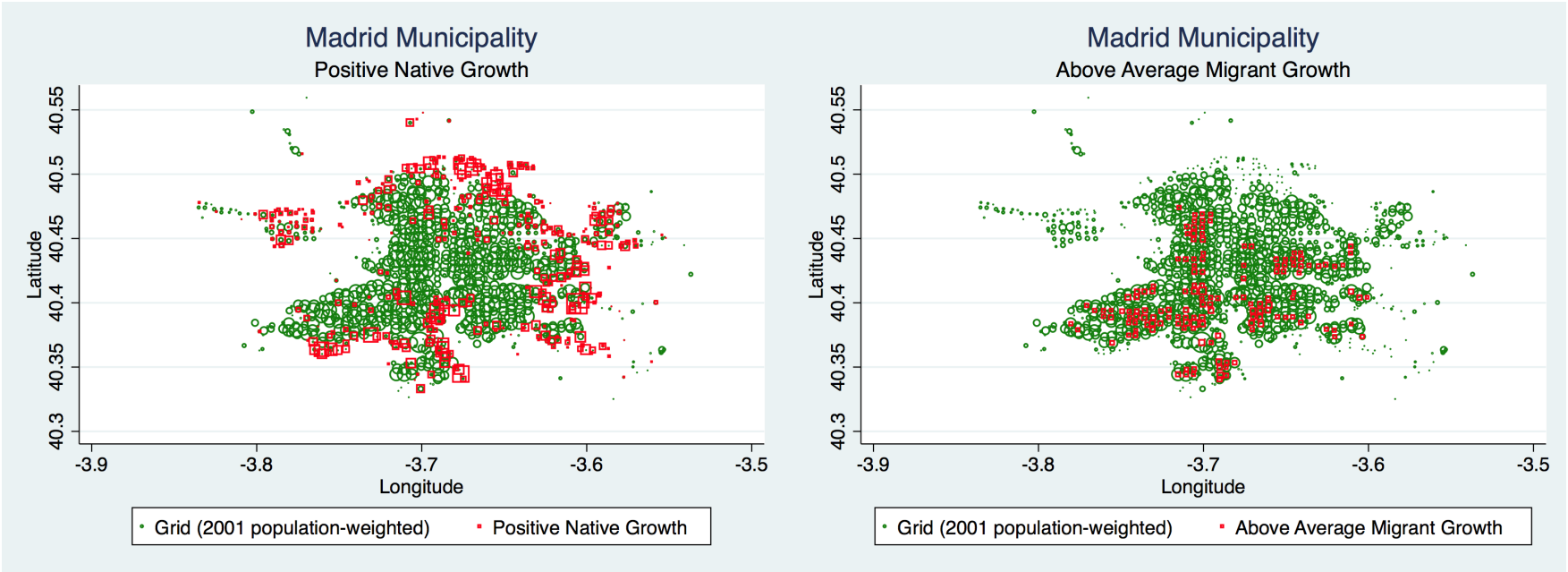
New Growing Neighborhoods Were Mixed

- Large cities (above 100,000 inhabitants in 2001) lost around 0.5 million natives while attracting 1.5 million immigrants.
- In contrast, metropolitan municipalities with less than 100,000 inhabitants (mostly suburbs or satellite cities in major conurbations) gained both 0.8 million natives and 1.1 million immigrants.
- Native displacement therefore happened more conspicuously in dense areas of the largest cities, in a few instances even generating the appearance of immigrant ghettos.
- However, the *average* displacement effect, even in central cities, was not inordinately large. In addition, substantial ethnic mixing was happening in less conspicuous locations in the suburbs or in satellite cities.

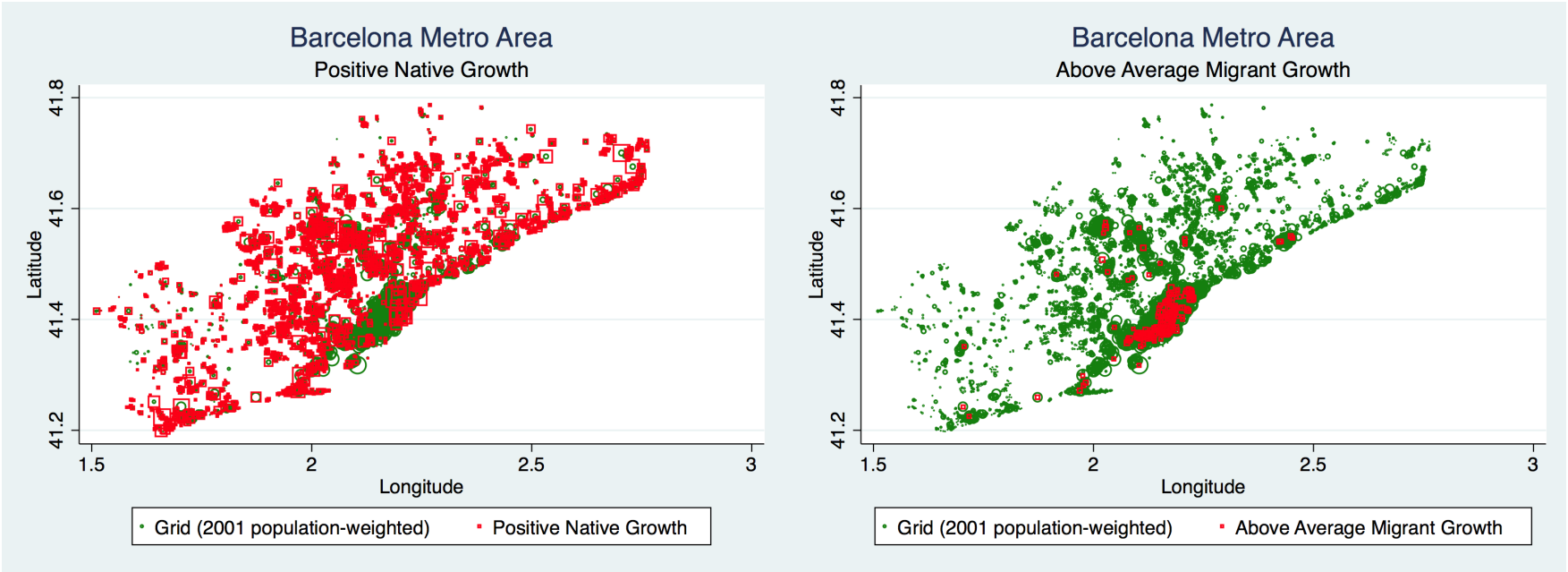
Madrid Metro Area



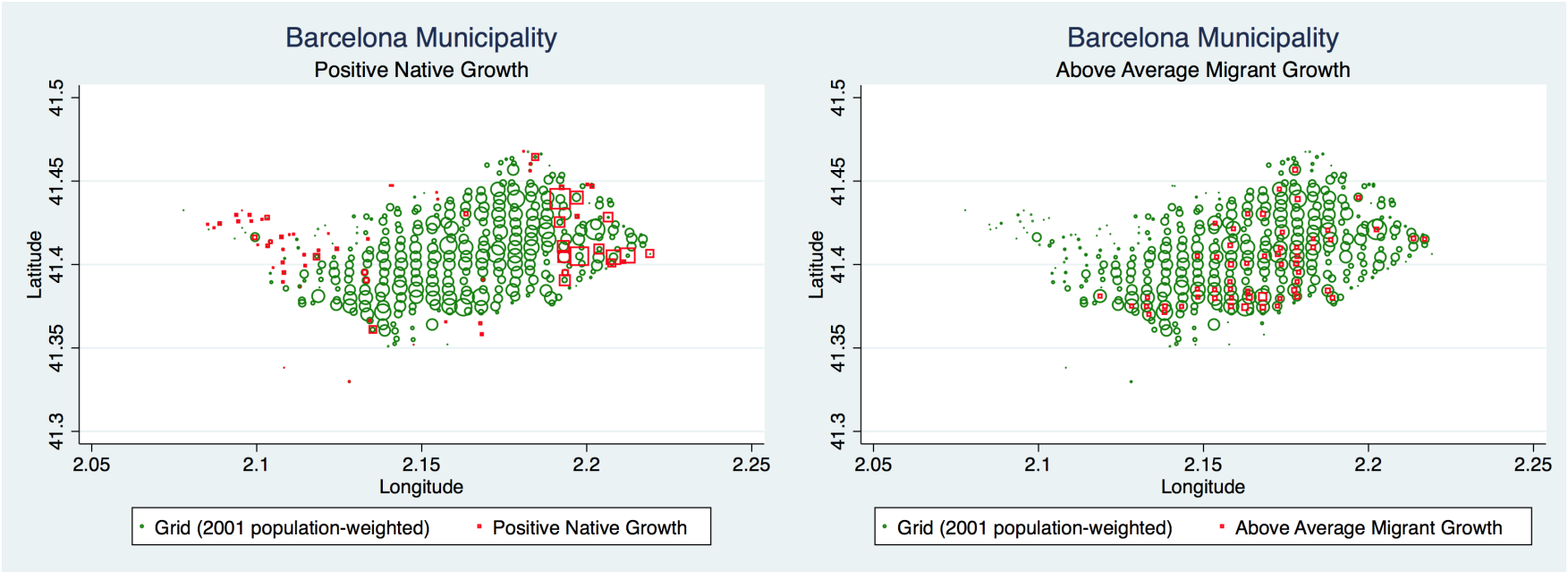
Madrid Municipality



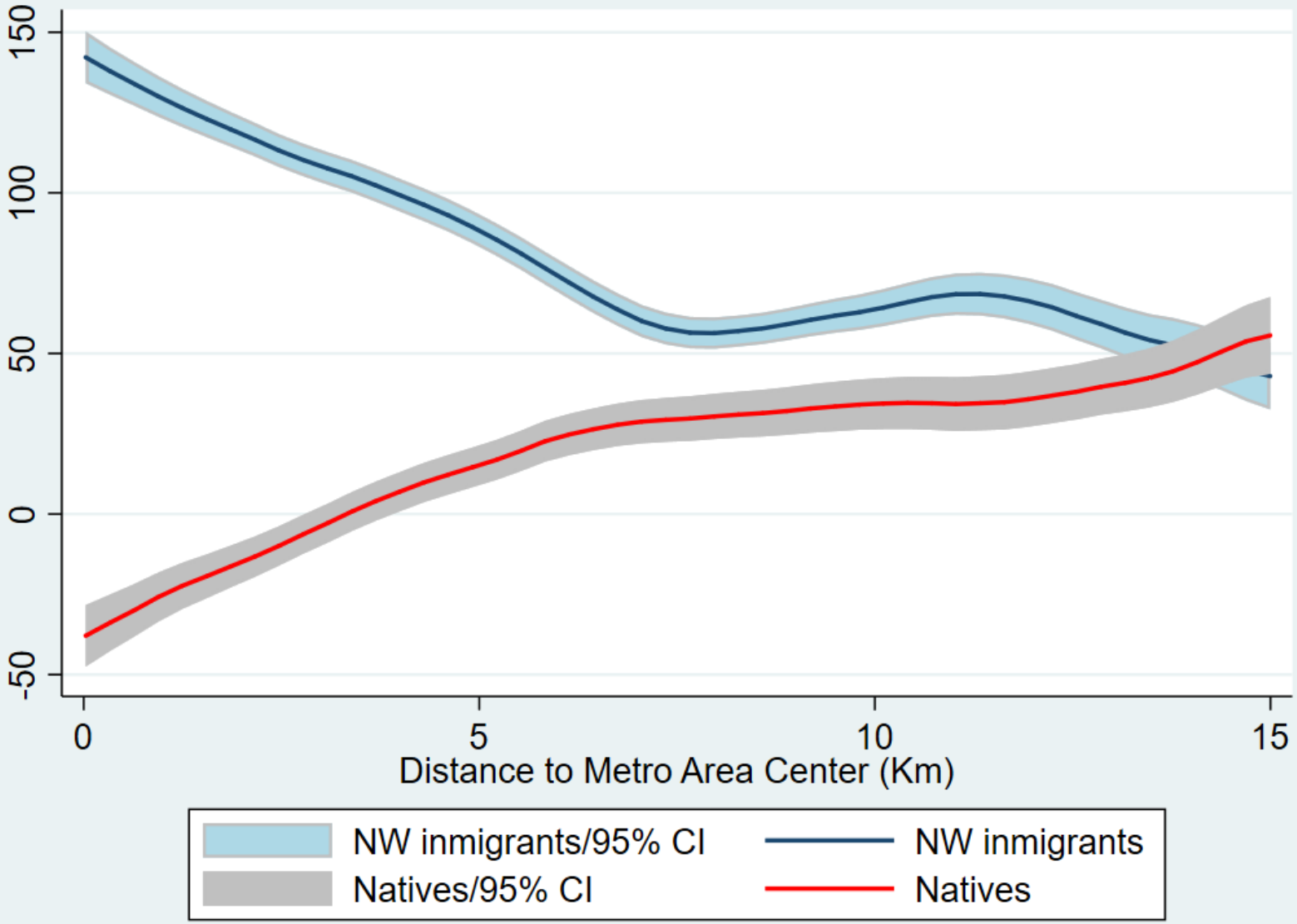
Barcelona Metro Area



Barcelona Municipality



Immigrants, Immigrants Everywhere!



Conclusions

- Immigrants mildly displace natives 3 for one in a counterfactual sense
- No evidence of tipping
- Construction increased with immigration
- Substantial positive inflows in booming suburbs
- Consistent with no strong ethnic preferences
- However, expectations may be uncertain in large migration episodes

Points of Interest

Exits (from highways or roads)	Restaurant	Performing Arts	Museum
Winery	Nightlife	Bowling Centre	City Hall
ATM	Historical Monument	Sports Complex	Police Station
Train Station	Bank	Park/Recreation Area	Post Office
Commuter Rail Station	Shopping	Casino	Department Store
Bus Station	Hotel	Convention/Exhibition Centre	Home Specialty Store
Ferry Terminal	Ski Resort	Golf Course	Pharmacy
Marina	Other Accommodation	Civic/Community Centre	Specialty Store
Public Sports Airport	Tourist Information	Amusement Park	Sporting Goods Store
Airport	Rental Car Agency	Sports Center	Medical Service
Business Facility	Parking Lot	Ice Skating Rink	Consumer Electronics Store
Grocery Store	Parking Garage/House	Tourist Attraction	Industrial Zone
Automobile Dealership	Park & Ride	Hospital	Place of Worship
Petrol/Gasoline Station	Auto Service & Maintenance	Higher Education	Embassy
Motorcycle Dealership	Cinema	School	Book Store
	Rest Area	Library	

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Summary Statistics: main variables

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Variable	Average	St. dev.	Min	Max
$\Delta nat_{n,2001\_2008}$	12.19	311.72	-10773.00	5160.00
$\Delta mig_{n,2001\_2008}$	91.58	256.71	-1890.00	7014.00
$pop_{n,2001}$	824.08	1785.53	0.00	25139.00
Share of migrants in 2001	0.08	0.16	0.00	1.00
No population in 2001	0.07	0.25	0.00	1.00
Share of pop. aged 15-24	0.13	0.09	0.00	1.00
Share of pop. aged 25-44	0.31	0.15	0.00	1.00
Share of pop. aged 45-64	0.21	0.13	0.00	1.00
Share of pop. aged 65+	0.14	0.14	0.00	1.00
Log distance to metro area center	1.58	1.01	-6.02	9.43
Log distance to municipality center	1.11	1.78	-5.06	9.43

Summary Statistics: 2001 Census variables

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Variable	Average	St. dev.	Min	Max
Unemployment Rate	11.21	6.89	0.00	60.39
Share construction employment	10.52	6.63	0.00	48.68
Share hospitality employment	5.88	5.45	0.00	53.97
Share services employment	2.80	1.44	0.00	12.50
Share buildings from 1941-1950	3.31	5.48	0.00	99.92
Share buildings from 1951-1960	7.05	8.69	0.00	99.62
Share buildings from 1961-1970	12.73	12.99	0.00	100.00
Share buildings from 1971-1980	19.33	15.29	0.00	100.00
Share buildings from 1981-1990	15.81	14.30	0.00	100.00
Share buildings from 1991-2000	19.38	17.57	0.00	100.00
Car use index	26.65	19.32	-18.71	81.49
Pedestrian index	45.58	15.10	0.00	85.79
Building height index	61.22	79.35	-61.46	254.78
Neighborhood quality index	85.43	50.57	-25.18	226.65

Population Sizes

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Year	Population	Immigrants	Share
1998	39,852,650	1,173,767	2.9%
1999	40,202,158	1,259,054	3.1%
2000	40,499,790	1,472,458	3.6%
2001	41,116,842	1,969,269	4.8%
2002	41,837,894	2,594,052	6.2%
2003	42,717,064	3,302,440	7.7%
2004	43,197,684	3,693,806	8.6%
2005	44,108,530	4,391,484	10.0%
2006	44,708,964	4,837,622	10.8%
2007	45,200,737	5,249,993	11.6%
2008	46,157,822	6,044,528	13.1%

Law Changes

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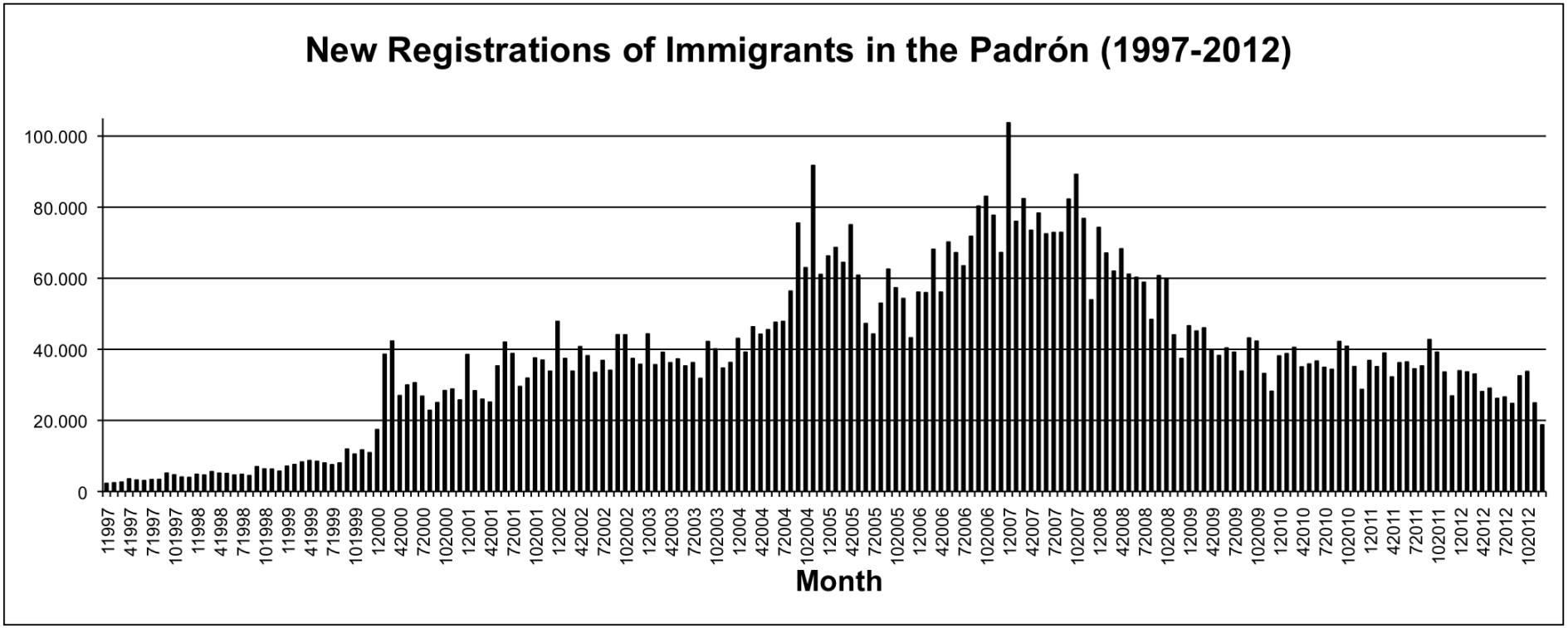

- January 2000. Law 4/2000.
- November 2004. 2005 Amnesty is announced.
- January 2007. Romania and Bulgaria enter the EU.

Gravities

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The first measure is the minimum distance between each address and each of the points of interest.

The other five measures are gravities: sums of points of interest in Spain weighted by distance. That is:

$$g_i^{p,\alpha} = \sum_{n_p=1}^{N_p} d_{i,n_p}^{-\alpha}$$

where i is an address, p is a point of interest (i.e. hospitals), N_p is the number of points of interest p in the radius where i is located, α is a coefficient that takes values $\{0.5; 1; 2; 3; 4\}$ and d_{i,n_p} is the distance between address i and point of interest n_p (i.e. one particular hospital).