Urban Spatial Sorting During the Era of Mass Migration

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Abstract

Europeans immigrating to the United States from southern and eastern European sending countries during the Era of Mass Migration experienced high levels of residential segregation relative to northern and western sending groups. An urban social issue prior to WW1 concerned the slow assimilation of these immigrant groups, which some feared left many in poor living conditions. The slow assimilation of these groups encouraged the US Congress to take action to close the border. While much work has looked at these immigrants' labor market outcomes, their remarkable desegregation over the course of the early 1900's has been left unexplained. Using three joint hypotheses, I characterize the universe of mechanisms, finding that the patterns of segregation during the early 1900's are partly driven by third-generation white out-sorting, that immigrant arrivals chose neighborhoods with higher immigrant composition relative to immigrants as a whole, and highly segregated immigrant groups chose increasingly lower composition neighborhoods. These results provide a descriptive look at decomposing the mechanisms driving the evolution of immigrant enclaves in the early 1900's.

1 Introduction

An estimated 27 million European immigrants entered the US between 1850 and 1913. These inflows were driven in large part by the relative differences in economic conditions between Europe and the US, the newly available trans-Atlantic steam ships, political and religious persecution, and the nearly unrestricted access granted European immigrants during this period. Immigrants during this period accounted for a relatively large fraction of the US population: in 1910, 22 percent of the labor force was foreign born, and was 38 percent in non-southern cities (Abramitzky et al. (2014)). While immigrants arrived in the US seeking a better life, relative to native born Americans, they faced relatively worse conditions, presenting both an economic and political issue for the rapidly developing country. This concern over assimilation and living conditions contributed to the development of both the progressive and nativist political movements of the day.

Reflecting this political concern, Congress commissioned an investigation in 1907 into the social and economic conditions of immigrants, concluding that immigrant groups particularly from southern and eastern European countries were assimilating slowly, due in large part to their relatively high levels of return migration (Benton-Cohen (2010)). Partly in response to these findings, over the course of the early 1920s Congress passed a set of immigration restrictions. These policies had a particularly restrictive effect on inflows from eastern and southern European countries such as Italy, Russia, and Poland. Figure 1 displays declining inflows from Italy and Russia, and relatively stable trends for the western European countries, England, Germany, and Ireland. With

fewer inflows, immigrant share also declined during this period, falling below 12% only after the immigration restrictions.

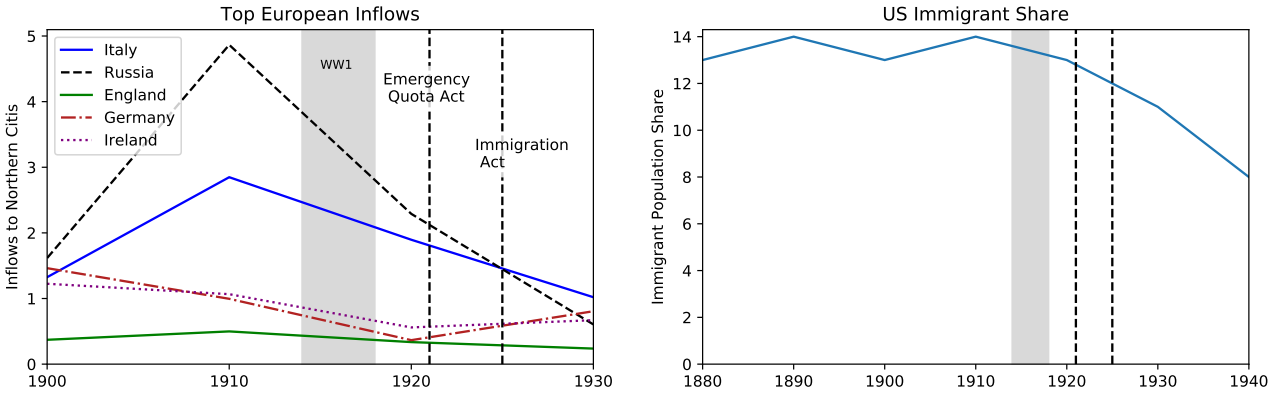

Figure 1. European Inflows and Immigrant Share[1]

During this period, southern and eastern European immigrant groups also experienced dramatic changes in residential segregation. Using a new spatially granular dataset, Figure 2 displays segregation in 10 large northern cities among the five largest immigrant group over these years. Dissimilarity declines across the decades, while isolation rises in the late 1800s and declines over the early 1900s.

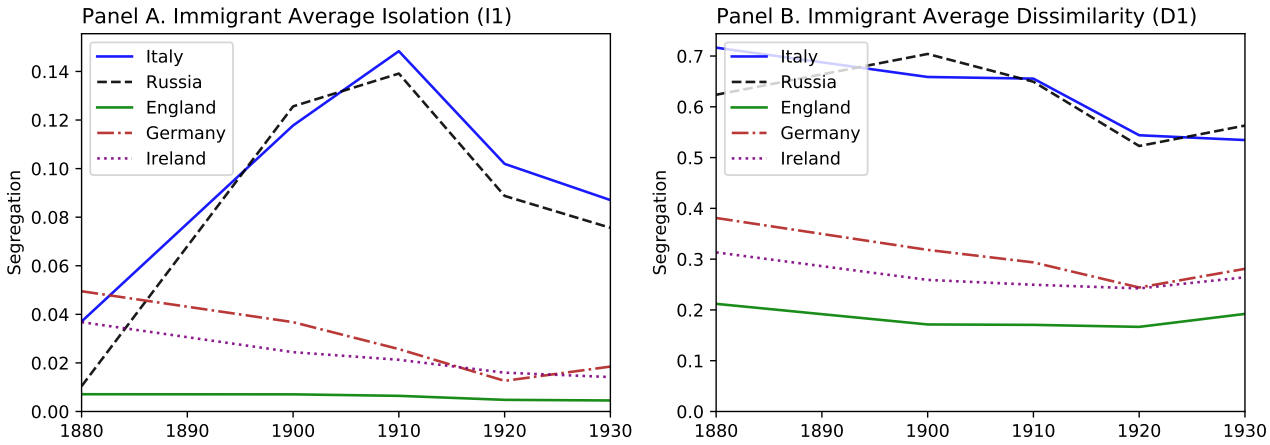

Figure 2: Trends in segregation for five sending groups

Despite the parallel trends of immigrant inflows and segregation levels in the early 1900s, the mechanisms driving these trends in segregation are unknown. To isolate the drivers of these trends in segregation, I construct a new spatially granular dataset of 10 northern US cities using the full-count census data for years 1880 to 1930. Coded variables were collected from the 1900, 1920, and 1930 Integrated Public Use Microdata Series (IPUMS) (Ruggles et al. (2010)). Neighborhood level variation is captured using synthetic neighborhoods constructed from enumeration districts using spatial interpolation according to Shertzer and Walsh (2018). To do this, I first tile the plane covering 10 cities using 0.1 square mile hexagons. Second, I select hexagons at least 95% covered by the intersection of city shape files across years 1880 - 1930. Third, I attribute census records to

[1]Data on immigrant share was taken from Gibson and Lennon (1999).

hexagonal neighborhoods based on the spatial relationship between the hexagon and the enumeration district. Relative to previous related work, this dataset has the distinct advantage of being able to observe neighborhood level demographic composition, allowing me to exploit variation at the neighborhood, city, and national levels.

This project contributes to our understanding of the unheralded success story of immigrant desegregation of the early 1900s by taking these joint hypotheses to new data spatially granular enough to pick up both the national, city, and neighborhood factors impacting immigrant segregation. These hypotheses explore whether desegregation is driven by changes in native-born whites' out-sorting (natives tastes change), by changes in immigrant inflows who select into enclaves especially early in their life-cycle (inflows change), or by changes in immigrants choices over available neighborhood types (immigrant enclave demand changes). Section 3 will detail how this data was constructed and present trends in segregation consistent with existing findings. Section 4 will present results for the joint hypotheses, showing evidence consistent with the hypothesis that flight behavior influenced segregation, evidence consistent with changes in the life-cycle patterns of cohorts, and evidence consistent with a model of changing demand for immigrant enclaves. Disentangling these hypotheses has policy implications. Many of the present day policy debates about border restrictions stem from underlying assumptions about the effects immigrants have on neighborhood conditions. Informing this conversation with findings from a period of high levels of immigration can only improve our decisions in the current political context. Before discussing the findings, Section 2 will overview the US historical setting during the Era of Mass Migration, discuss previous findings related to household residential movements and immigrant segregation, and outline the joint hypotheses in the context of these previous findings.[2]

2 Historical Setting, Household Behavior, and Segregation

The US received 27 million immigrants through nearly open borders during the Era of Mass Migration (1850-1913). By 1910, 22 percent of the labor force was foreign born, and was 38 percent in non-southern cities (Abramitzky et al. (2014)). Neither the 1891 Immigration Act, which provided the first comprehensive immigration legislation and established the Immigration Bureau with the directive to deport unlawful aliens, nor the 1906 Naturalization Act, which established a minimum English language proficiency as a condition for citizenship, presented serious barriers to European immigration. Over the course of this period, as it become less costly to cross the Atlantic and settle in the US, the composition of the immigrant inflows shifted from the wealthier western and northern European countries to relatively poorer southern and eastern European countries (Hatton et al. (1998)). English, German, Irish, and Swedish sending countries dominated early years, while Italian, Russian, and Polish immigrants began to arrive in large numbers only later in the 1800s.

The outbreak of WW1 began a period of practical and legislative barriers to European immigrants making the journey to the US. On the practical side, the 1915 sinking of the RMS Lusitania, a passenger ship with immigrants set for US shores, chilled trans-Atlantic immigration during WW1. On the policy side, the US Congress commissioned an investigation into the social and economic conditions faced by immigrants (Muller (1993); Moehling (1999)). The Immigra-

[2]Much work has looked at the labor market outcomes of these immigrant groups and their assimilation, but is too large to outline here (Abramitzky and Boustan (2016); Higgs 1971; McGouldrickand Tannen 1977; Blau 1980; Hannon 1982; Eichengreen and Gemery 1986; Hanes 1996; Hatton, (1997)).

tion Commission report concluded that assimilation among immigrants, particularly those from southern and eastern European countries, was unlikely, encouraging Congress to pass a set of immigration legislation measures between 1917 and 1924 (1917 Immigration act, establishing a reading requirement for immigrants over age 16; 1921 Emergency Quota Act; 1924 Immigration Act, first national limit on number of immigrants by sending country) which had a particularly restrictive impact on immigration from these southern and eastern European sending groups (Abramitzky et al. (2014); Benton-Cohen (2010); Goldin (1994)). Both the physical disruptions and legislative actions led to a sharp decline in European immigration and a subsequent decline in the share of foreign-born residents in the US population, as shown in Figure 1. While in 1910, 1.45 million European immigrants in the largest northern cities had arrived in the previous decade, in 1930 this was only true of 0.52 million.

During this period of declining European immigration, the newer immigrant groups began to experience a parallel decline in residential segregation, as shown in Figure 2, consistent with previous findings (Cutler et al. (2005); Eriksson and Ward (2018); Lieberson (1980)). Segregation evolves in highly complex ways, resulting from the residential choices of natives, newly arrived immigrants, and the existing immigrant population. Therefore, to fully decompose the trends in segregation we must consider how natives move relative to immigrants, how the neighborhood choices of newly arrived immigrants changing relative to enclaves, and how existing immigrants change their neighborhood relative to enclaves. To disentangle these relationships, this project is organized according to the three hypotheses characterizing the universe of potential mechanisms.

Hypothesis 1. Natives change. Natives diminishing out-sorting from enclaves

Previous work has shown that immigrant groups experienced native-born-white out-sorting later in US history, and that flight differs by sending group (Saiz and Wachter (2011); Cascio and Lewis (2012)). This sorting may be a response to real or perceived negative impacts immigrants place on labor markets, housing prices, and public goods (Coen-Pirani (2011); Schmick and Shertzer (2018); Eriksson and Ward (2018)). During the early 1900s, native-born whites may have sorted out of the neighborhoods with higher inflows of immigrants from unfamiliar sending countries. Declining flight from enclaves over this period would have contributed to the observed decline in segregation over the early 1900s. I capture these dynamics with a simple model of neighborhood n consistent with the flight hypothesis.

$$\Delta W_n^t = -\beta^t \Delta M_n^t + \epsilon_n^t$$

ΔW_n^t represents the change in third generation whites in year t and ΔM_n^t represents the change in an unfavored immigrant group in year t. This model will be nuanced in a later section.

Hypothesis 2. Inflows change. Immigrant inflows land in the enclave and disperse as they mature; as inflows diminish, so do enclaves.

Changes in immigrant inflows into enclaves mechanically influence segregation if over the course of their life-cycle, an immigrant enters the US by landing in an enclave, and leaves the enclave as they mature. The pattern predicted by this hypothesis is one of entering the enclave and dispersing over time. Prior work has shown that immigrants select into areas with established ethnic networks and immigrant populations predict inflows (Card and DiNardo (2000); Card (2001); Munshi

(2003)). Immigrant inflows make residential decisions in part based on informal language and ethnic networks, which offer better access to public goods (Bertrand et al. (2000); Munshi (2003) Figlio et al. (2011); Beaman (2012); Gee and Giuntella (2012)). The flip side is that as an immigrant becomes increasingly familiar with the US context, the benefits of these ethnic networks may become dominated by labor market opportunities outside the enclave, driving immigrants to endogenously select across locations in the US. Many individuals temporarily immigrated for the economic opportunities, but endogenously selected to return to their home country after a short stay (Edin et al. (2003); Abramitzky and Boustan (2016)). If these forces are enough to drive higher rates of dispersal from especially highly concentrated enclaves, slowing inflows may diminish segregation.

Hypothesis 3. Immigrants change. Immigrant demand for enclaves diminishes

If immigrants' demand for enclaves declines over time, new arrivals and existing immigrants will be more likely to land outside the enclave, diminishing residential segregation. Immigrants' residential choices depend on (1) informal networks, (2) cultural amenities, and (3) property values. As motioned above, there is strong evidence that immigrants experience better outcomes in proximity to language and ethnic networks. And more precisely, immigrants receive better labor market outcomes in proximity to mature immigrants and worse outcomes in proximity to their own cohort (Bertrand et al. (2000); Munshi (2003); Figlio et al. (2011); Beaman (2012); Gee and Giuntella (2012)). These findings suggest that if new immigrants respond to labor market opportunities, arrivals' demand for enclaves should increase in the enclave's immigrant maturity. And since second generation immigrants tend to speak the immigrant's native language, which plays an important roll in immigrants' familiarization with public goods, cultural amenities, and informal labor market opportunities, demand should be increasing in the own-group second generation population. As the maturity of cohorts and number of second generation immigrants in the general population increases, the demand for enclaves may diminish.

This project contributes to our understanding of the unheralded success story of immigrant desegregation of the early 1900s by taking these joint hypotheses to new data spatially granular enough to pick up both the national, city, and neighborhood factors impacting immigrant segregation.

3 Data and Segregation

I use the full-count census data for 1880 to 1930 to measure neighborhood demographics (Ruggles et al. (2010)). Residential behavior, segregation, and enclave dynamics occurs at the neighborhood level. This presents identification challenges using larger census tracts since neighborhood demographic variation is unobservable. To capture neighborhood level demographic variation, I construct spatially granular synthetic neighborhoods from enumeration districts. First, I tile the plane covering 10 cities using 0.1 square mile hexagons. Second, I select hexagons at least 95% covered by the intersection of city shapefiles across years 1880 - 1930. Third, I attribute census records to hexagonal neighborhoods based on the spatial relationship between the hexagon and the enumeration district. This follows the spatial interpolation approach introduced in Shertzer et al. (2016). This has the advantage of being able to identify how particular groups change location

across the early 1900s[3].

I restrict attention to sending countries with the largest inflows during this time. These groups include England, Germany, Ireland, Italy, and Russia. Similar to Abramitzky and Boustan (2016) I characterize sending countries as old (Northern and Western Europe: England, Germany, and Ireland) and new (Southern and Eastern Europe: Italy and Russia).

Similar to Cutler et al. (1999), I use both dissimilarity and isolation segregation measures to capture the level of inter-group segregation between two populations, calculated at the city level. The isolation measure captures the exposure of one group to another. The dissimilarity measure captures how far from uniform is the distribution of the population.[4] Both measures' values have range $[0, 1]$, where 0 represents the perfect spatial integration and 1 represents perfect spatial segregation. Figure 2 confirms prior results in the literature, showing a secular decline in segregation for these groups beginning in the early 1900s. Dissimilarity shows general declines across the decades, while isolation rises in the late 1800s and declines over the early 1900s.

These measures provide an aggregate view of the changes in segregation across census years, but they also simplify highly complex spatial relationships. Underlying factors in these complex adaptive relationships help explain changes in segregation. For example, when we look at Russia and Italy, the most segregated sending groups in Figure 2, relating the groups' city population share with their segregation level provides a clearer picture of the trends in segregation over these years, as shown in Figure 3.

[3]Country-city maps are included in Appendix A2.

[4]Isolation and Dissimilarity Indices are described in Appendix A1.

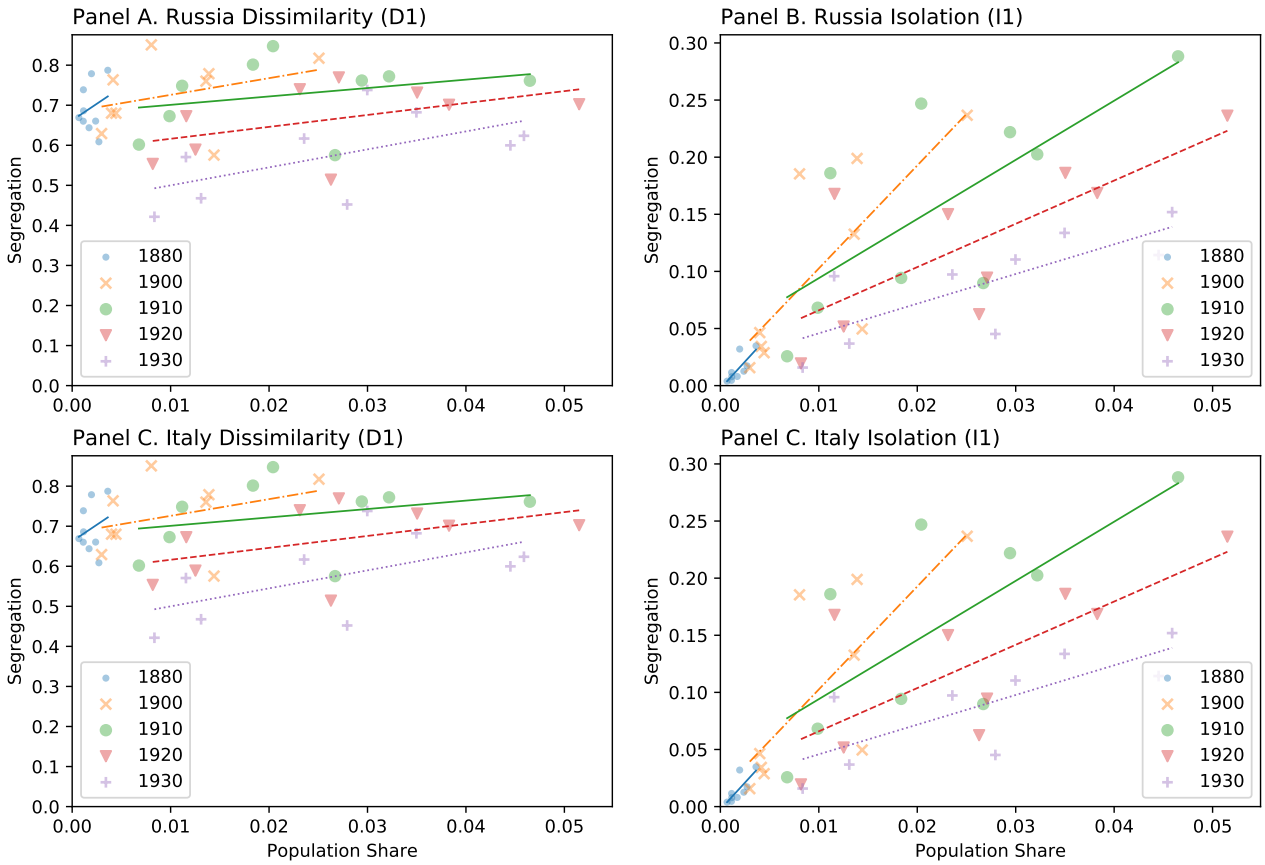

Figure 4: Segregation across sending group population share by city

Figure 4 shows that independent of measure and invariant to outliers, segregation declines at nearly every population share. Dissimilarity is less dependent on population share, while isolation depends a great deal on the population share.

4 Joint Hypotheses

The following analysis will decompose these underlying dynamics driving the trends in immigrant segregation in large northern cities during these years using the three joint hypotheses composing the universe of channels by which segregation may evolve. The segregation measures presented in Figure 2 are constructed using both the third generation white population (native born with a native born mother), newly arrived immigrants (having lived in the US for less than 10 years), and the existing immigrant population (having lived in the US for more than 10 years). In other words, changes in the third generation white population, the immigrant population base, and new arrivals characterize the entirety of the changes contributing to the changes in segregation. I approach the analysis from this framework. First, I look at how natives change, whether they exhibit out-sorting from enclaves, and whether tastes changes over time. Second, I look at the immigrants' life-cycle, whether new arrivals are especially likely to choose to live in heavily immigrant neighborhoods. And third, I look at whether immigrants move into heavily immigrant neighborhoods at a lower rate in later years. I begin by testing whether native-born whites residential choices contributed to the desegregation of (particularly southern and eastern) European immigrants.

Hypothesis 1. Natives exhibit diminishing out-sorting (Natives Change)

To test whether third-generation white natives sort out of neighborhoods with immigrant inflows from southern and eastern European sending countries, I test whether neighborhoods receiving immigrant inflows experienced white outflows. The baseline model estimates the change in the native-born white neighborhood population in response to new European immigrant inflows.

$$\Delta W_{n,c}^{T} = \sum_{s \in S} \beta_s^T \Delta M_{n,s}^{T} + \eta_c + \epsilon_{n,c,T}$$

where $\Delta W_{n,c}^{T}$ is the change in the third-generation white population (white and born to a native born mother) in neighborhood n in city c in the decade prior to year T, $\Delta M_{n,s}^{T}$ is the new immigrant arrivals (arrived within the decade prior to the census) by European sending group $s \in S$, and η_c is city fixed effects. Table 2 displays the results showing whites move into neighborhoods with inflows from western and northern European immigrant groups where significant, and positive but diminishing outflows between 1890 and 1920 in neighborhoods with inflows from Italy and Russia. For example, between 1890 and 1900 every 4 new Italian arrivals is associated with one native-born white outflow (a coefficient of -0.233).

Table 2: Baseline OLS flight model using inflows

Baseline OLS	1890-1900 change	1900-1910 change	1910-1920 change	1920-1930 change
Italy (Inflows)	-0.233***	-0.0447*	0.565***	-1.149***
Russia (Inflows)	-0.481***	-0.394***	0.574***	-0.676**
England (Inflows)	14.24***	10.69***	16.66***	4.264*
Ireland (Inflows)	-0.180	1.982***	0.728	-0.565
Germany (Inflows)	1.778***	5.198***	11.80***	2.578***
City FE	Yes	Yes	Yes	Yes
N	3529	3529	3525	3520
R^2	0.695	0.523	0.377	0.358

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The negative coefficients for both Italian and Russian arrivals in both the baseline OLS model in Table 2 suggest the presence of third-generation white out-sorting. The positive coefficient between 1910 and 1920 for both Italian and Russian inflows in both the baseline OLS and the IV models may result from non-taste-based (non-market-based) forces driving the residential decisions of both whites and immigrants during the WW1 wartime effort. If the residential choices of whites and immigrants respond to the exogenous industrial shock driven by the wartime effort, taste-based sorting may have become relatively less important, potentially reversing the sign observed in all other decades.

However, the increasing coefficients for both Italian and Russian arrivals between 1890 and 1920 may instead suggest the last coefficient captures changing attitudes toward immigrants in

the wake of the 1921 and 1924 immigration restrictions. In this scenario, third-generation white out-sorting may have also responded to both immigrant arrivals and changes in the immigrant base population. Holding constant the second generation population controls for potential biases correlated with both the third generation whites and first generation immigrants, especially during the volatility of the 1910's and 1920's. Table 3 displays results of out-sorting from neighborhoods related to both new immigrant inflows and changes in the existing immigrant population after controlling for the second generation population. These results suggest flight occurs in early years, declining over the subsequent three decades.

Table 4: OLS with immigrant neighborhood change and second generation controls

	1900 change	1910 change	1920 change	1930 change
Italy				
Second Gen	44.30***	7.466**	3.931***	2.442
Change	-0.667***	-0.113***	-0.0314*	0.0123
Inflows	-0.593***	-0.0704*	-0.168***	0.131
Russia				
Second Gen	-47.89***	-10.98***	-7.453***	-6.561***
Change	-0.787***	-0.0611***	-0.181***	-0.162***
Inflows	-0.402***	-0.112***	-0.0424	0.808***
England				
Second Gen	17.06***	9.664***	10.42***	12.42***
Change	7.390***	9.654***	10.71***	11.47***
Inflows	-2.894***	15.46***	17.36***	17.59***
Ireland				
Second Gen	0.962**	0.252	1.950***	-2.425***
Change	0.113**	0.260***	0.130**	0.687***
Inflows	0.701***	0.492***	0.876**	1.756***
Germany				
Second Gen	6.977***	4.487***	8.174***	-0.0324
Change	0.0112	0.442***	0.962***	2.413***
Inflows	-0.147	-0.735***	-0.936*	3.613***
City FE	Yes	Yes	Yes	Yes
N	3529	3529	3525	3520
R^2	0.896	0.901	0.930	0.815

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

While only suggestive, the scenario presented in Table 3 fits the trends in segregation observed in Figure 2. In early decades, Italian and Russian segregation is high, driven in part by native-born white out-sorting from neighborhoods experiencing inflows from these immigrant groups. Over the course of the early 1900's, this out-sorting declined, contributing to the desegregation experienced by southern and eastern European immigrant groups.

Taken together, Table 2 and Table 3 present robust evidence for the presence of third-generation white out-sorting associated with inflows of both immigrant arrivals and existing immigrants from southern and eastern European sending countries. This analysis is insufficient to fully distinguish between a story in which the WW1 industrial mobilization lead to both immigrant and third-generation white inflows to the same neighborhoods in the 1910's, or as Table 4 suggests, a story of declining out-sorting in response to inflows of both new arrivals and mature cohorts, mitigated by second generation immigrants. Under either scenario, this analysis finds strong evidence that third-generation white residents sort out of neighborhoods which accepted new immigrants from southern and eastern European sending countries.

Hypothesis 2. Immigrants disperse from enclaves as they mature, and as inflows diminish, so do enclaves (Inflow Sizes Change)

In addition to the sorting behavior of third-generation whites, the residential choices made by immigrants explain a portion of the dramatic desegregation of Italian and Russian immigrant groups. The trends in segregation may be partially attributable to the dispersal of immigrants from the enclave over their life-cycle, along with the decline in immigrant inflows after WW1. Under this hypothesis, immigrants enter the US by landing in enclaves, drawn by the informal networks and cultural amenities; over an immigrant's life-cycle, they leave the enclave, whether this is due to relocation within the US, return migration, or mortality; after the decline in inflows, immigrants move out of the enclave in net, leading to a decline in segregation.

Immigrant arrivals choose neighborhoods with a higher immigrant share than immigrants as a whole. Figure 5 displays the kernel density estimates of the distribution of Russian composition of neighborhoods chosen by the Russian immigrant base population, and the distribution of the neighborhood composition chosen by Russian arrivals. This provides a picture of the types of neighborhoods Russian arrivals choose relative to the Russian immigrant population as a whole. Russian immigrant arrivals select into higher Russian neighborhoods than the Russian population as a whole. Relative to the choices made by the Russian immigrant base, new arrivals' distribution of choices is lower (higher) for low (high) composition neighborhoods, and this phenomenon diminishes in later decades[5].

[5]Appendix A3 displays figures for Italian immigrants, exhibiting a similar phenomenon.

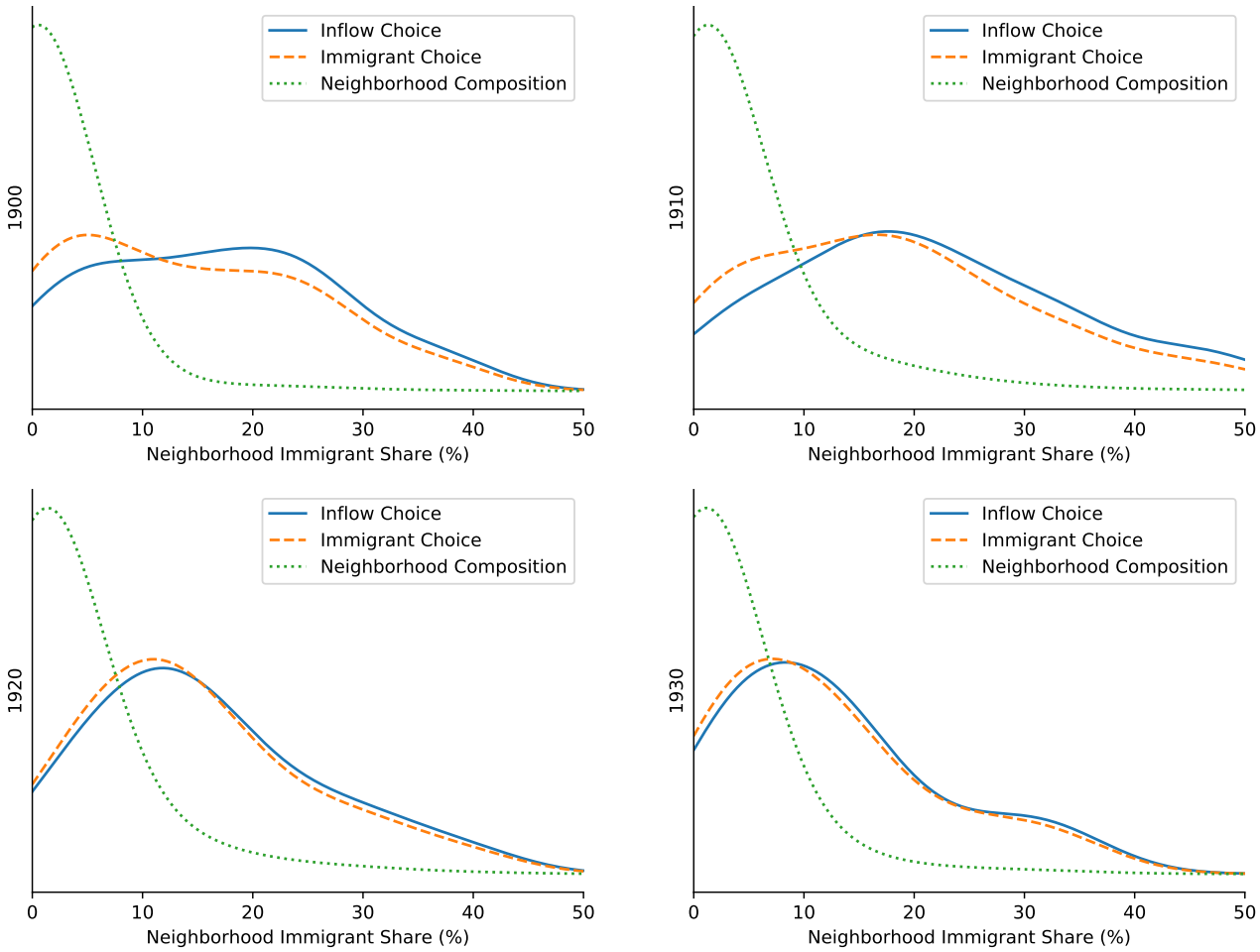

Figure 5. Russian immigrant inflow choices, Russian immigrant choices, and neighborhood immigrant composition

Inflows select into more immigrant neighborhoods relative to the existing population, suggesting that in the period after WW1 with fewer immigrant inflows arriving in the US in the post-WW1 era, segregation mechanically declined since there were fewer immigrants to choose to reside in enclaves. This pattern suggests closing the border may have had a small effect on the decline in segregation through this channel. However, Figure 5 suggests that, not only do new arrivals from southern and eastern European sending countries select into enclaves at a higher rate than the immigrant population as a whole, residential choices made by both the existing immigrant base and immigrant arrivals vary across decade, and shift toward neighborhoods with lower immigrant compositions. These changes in demand for enclaves may drive part of the desegregation of southern and eastern European immigrant groups during this period.

Hypothesis 3. Immigrant demand for enclaves diminishes (Immigrants Change)

Figure 5 displays the changes in residential choice made by Russian immigrants relative to the available neighborhoods. If Russian immigrants made residential decisions independent of neighborhood composition, their distribution would overlap the distribution of neighborhood composition. Between 1900 and 1930, Russian immigrants choose neighborhoods with increasingly smaller

Russian shares. Italian immigrants exhibit a similar pattern of increasingly smaller Italian composition chosen across the decades. This trend is not mechanical. The set of neighborhoods available to immigrants arriving in later years contains (if anything) a higher composition of immigrants. Therefore, these arrivals' choice set contains more high composition neighborhoods and would lead to an increase in high composition neighborhoods chosen if arrivals made similar residential decisions across the decades.

Figure 6 Panel A displays the change in the distribution of Russian composition, showing a secular shift toward higher immigrant compositions. The changes in neighborhood composition are minimal, and generally in the direction of more high composition neighborhoods. Similarly, Figure 6 Panel B displays the distribution of Russian immigrants by neighborhood as a percentage of immigrant base across years, suggesting these changes cannot explain the evolution of neighborhood choice made by southern and eastern European immigrants.[6]

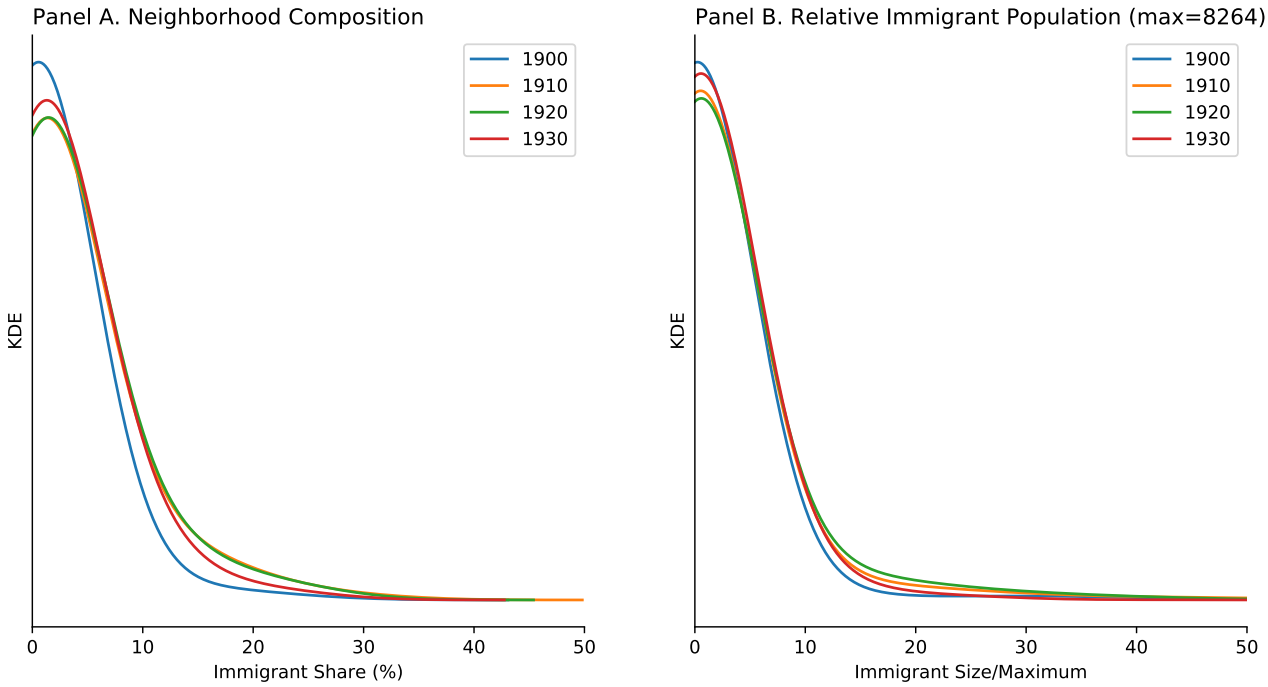

Figure 6: Distribution of Russian neighborhood composition and normalized population

While the trend observed in Figure 5 is observed for both immigrant groups experiencing high levels of segregation, immigrants experiencing less segregation exhibit a strikingly different pattern. Figure 7 displays the choices of German inflows over the German choice set. New German arrivals choose neighborhoods in proportion to available neighborhoods. Composition plays very little role in English, German, and Irish residential choice.

[6]Appendix A3 includes figures for other sending countries.

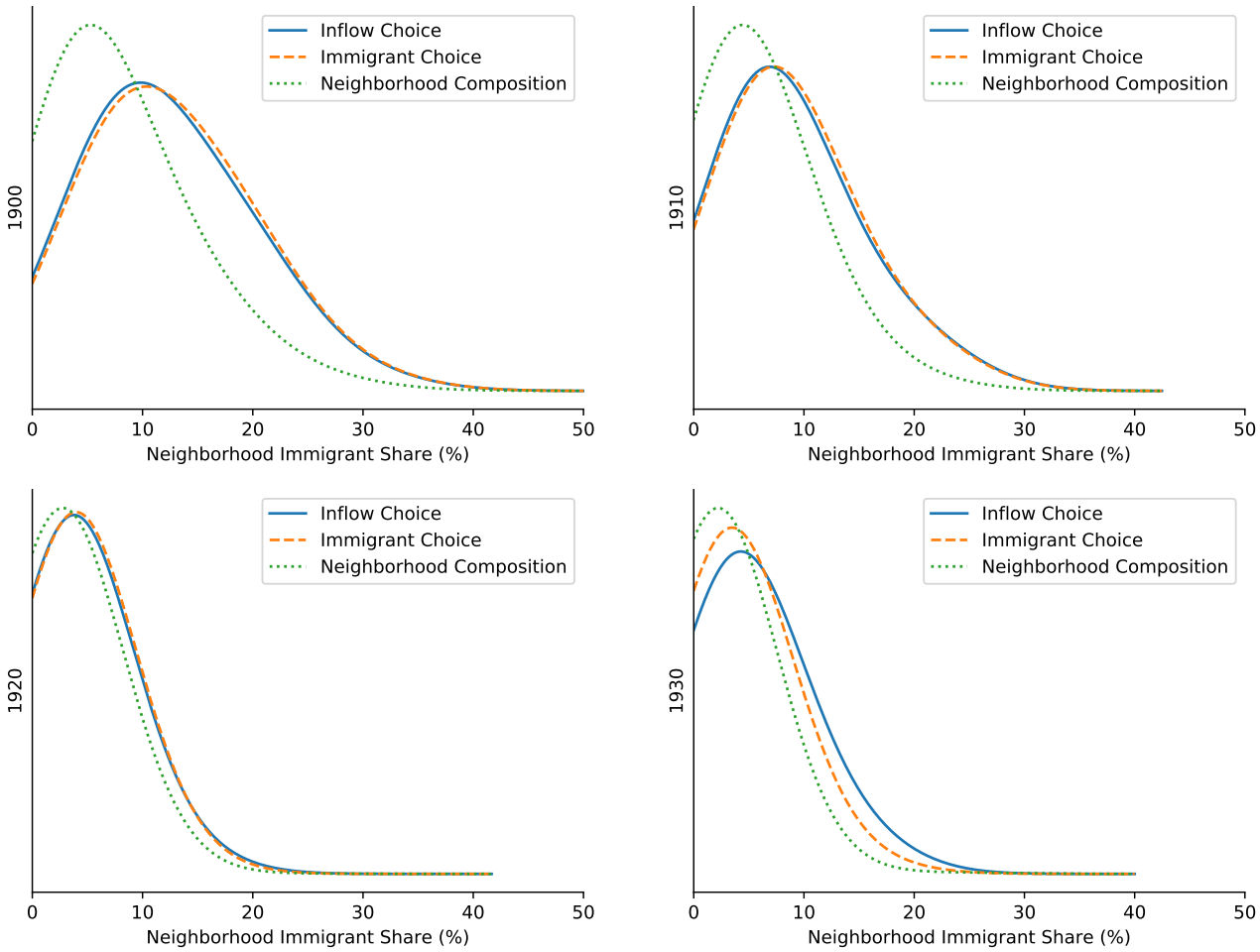

Figure 7. The German immigrant composition chosen by German inflows

Taken together Figure 6, Figure 7, and Figure 8 suggest that southern and eastern European inflows choose higher composition neighborhoods than the immigrant population as a whole, the distribution of neighborhoods chosen by immigrants from these sending countries shifts toward lower composition neighborhoods, and changes in the underlying composition of neighborhoods cannot account for these changes. Factors other than an immigrant's life-cycle, such as demand for the benefits associated with the enclave, appear to influence immigrant behavior and help explain the trends in segregation. In early years, immigrants choose neighborhoods based on immigrant composition, with declining effect in later decades.

Conclusion

During the era of mass migration, immigrants from southern and eastern European countries experienced high but declining segregation. Using three joint hypotheses, I characterize the universe of mechanisms through which segregation could have declined. I first look at whether native-born whites sort out of enclaves. I present evidence that third-generation whites sorted out of neighborhoods which accepted immigrants arriving from Italy and Russia. This sorting behavior may have been disrupted during the 1910's during a period of extra-market forces, or may have declined over the course of the early 1900's. Then I look at the life-cycle of immigrants, asking whether new arrivals select into enclaves at a higher rate than the existing immigrant base. I find that immigrant

arrivals from Italy and Russia chose neighborhoods with higher immigrant compositions relative to the immigrant population as a whole, suggesting the declines in immigrant inflows from these countries in the post-WW1 era contributed to these groups' desegregation. Finally, I show that segregated immigrant groups made residential choices heavily based on neighborhood immigrant composition, favoring higher composition neighborhoods, and particularly so in especially in early decades. In contrast, less segregated immigrant groups chose neighborhoods nearly independent of the immigrant composition. Although fully modeling immigrants' changing demand is outside the scope of this project, immigrants appear to be exhibiting diminishing demand for enclaves in later decades. These findings present descriptive evidence that multiple mechanisms drove the desegregation of the newer and poorer immigrant groups from southern and eastern European countries.

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A1. Measures of Segregation

The dissimilarity and isolation segregation measures capture the level of inter-group segregation between two populations, calculated at the city level. These measures are similar to Cutler et al. (1999). The isolation measure captures the exposure of one group to another. The dissimilarity measure captures how far from uniformly distributed the populations are. Both measures' values have range $[0, 1]$, where 0 represents the perfect spatial integration and 1 represents perfect spatial segregation.

Sending Group Dissimilarity

The dissimilarity index of segregation is calculated using

$$D_1 = \frac{1}{2} \sum_{k \in K} \left(\left| \frac{S_k}{S} - \frac{T_k}{T} \right| \right) \tag{1}$$

where T_k is the third generation white population (native born mother) in neighborhood k, T is the third generation population in the city, S_k is the sending group population in neighborhood k, S is the sending group population in the city.

Sending Group Cohort Dissimilarity

The first dissimilarity index of cohort segregation is calculated using

$$D_2 = \frac{1}{2} \sum_{k \in K} \left(\left| \frac{S_{c,k}}{S} - \frac{T_k}{T} \right| \right) \tag{2}$$

where T_k is the third generation white population (native born mother) in neighborhood k, T is the third generation population in the city, $S_{c,k}$ is the sending group cohort c population in neighborhood k, S is the sending group population in the city.

The second dissimilarity index of cohort segregation is calculated using

$$D_3 = \frac{1}{2} \sum_{k \in K} \left(\left| \frac{S_{c,k}}{S_c} - \frac{T_k}{T} \right| \right) \tag{3}$$

where T_k is the third generation white population (native born mother) in neighborhood k, T is the third generation population in the city, $S_{c,k}$ is the sending group cohort c population in neighborhood k, S_c is the sending group cohort c population in the city.

Sending Group Isolation

The isolation index of segregation for European sending groups is calculated using

$$I_1 = \frac{\left(\sum_{k \in K} \frac{S_k}{S} \frac{S_k}{T_k} \right) - \frac{S}{T}}{\frac{1}{t_{min}} - \frac{S}{T}} \tag{4}$$

where S_k is the sending group population in neighborhood k, S is the sending group population in the city, and T_k is the population in neighborhood k, T is the total city population. Defining $t_{min} = \max\left(1, \frac{\min(T_1, T_2, \ldots)}{S}\right)$ captures the worst case scenario, when the entire population of the sending group lives in one neighborhood with no other residents. Constructing the measure this way avoids issues when the minimum neighborhood size is zero.

Sending Group Cohort Isolation

The first isolation index of segregation for cohort c is calculated in a similar way to I_1, instead looking at cohort population, using

$$I_2 = \frac{\left(\sum_{k \in K} \frac{S_{c,k}}{S_c} \frac{S_{c,k}}{T_k}\right) - \frac{S_c}{T}}{\frac{1}{t_{min}} - \frac{S_c}{T}} \tag{5}$$

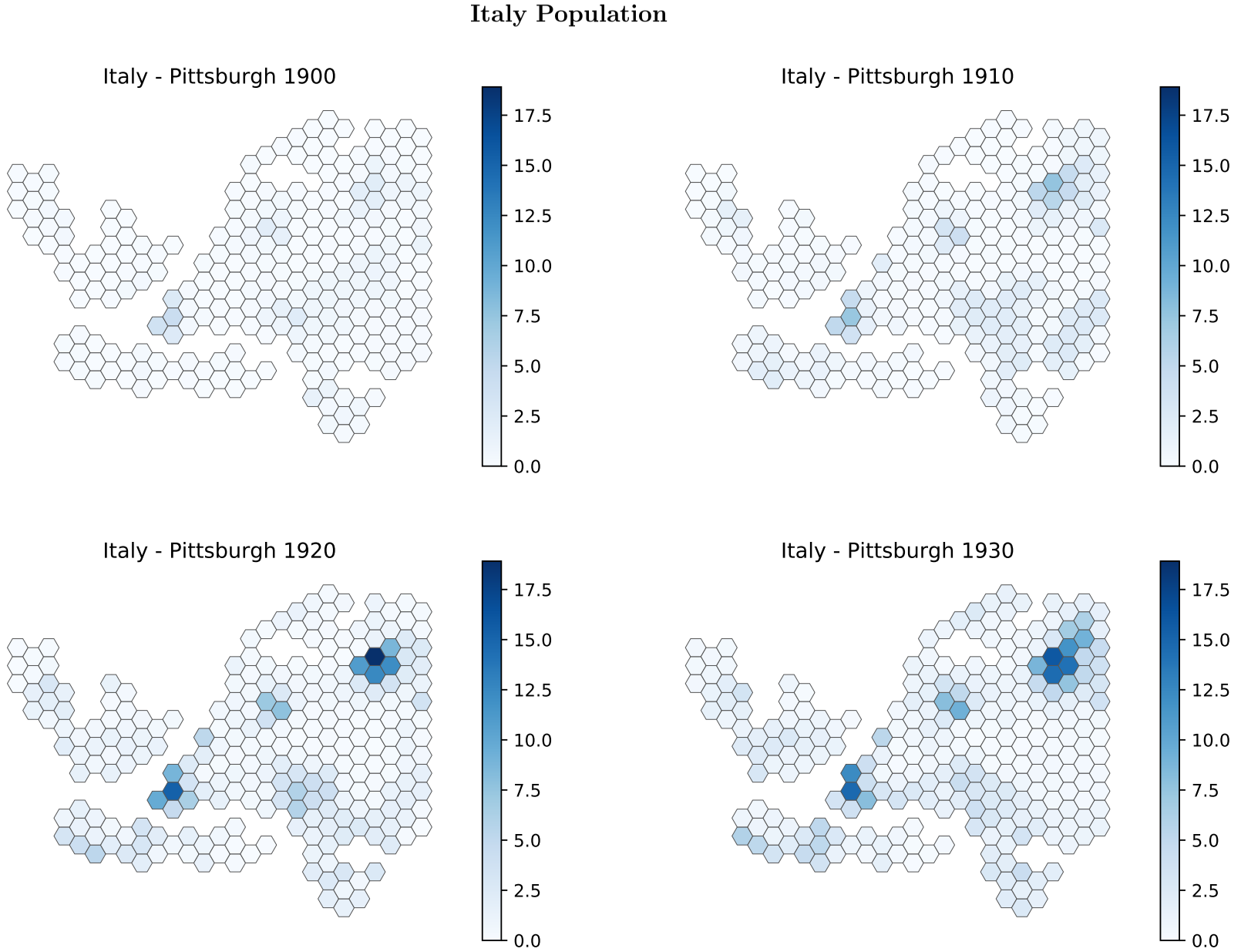
where $S_{c,k}$ is the sending group cohort c population in neighborhood k, S_c is the sending group cohort c population in the city, T_k is the total population in neighborhood k, and T is the total city population. Defining $t_{min} = \max\left(1, \frac{\min(T_1, T_2, \ldots)}{S_c}\right)$ captures the worst case scenario, when the entire population of the sending group lives in one neighborhood with no other residents. Constructing the measure this way avoids issues when the minimum neighborhood size is zero.

The second isolation index of segregation for cohort c captures both the relative share of immigrants from group A in neighborhood k and the relative share of the immigrants from group A in neighborhood k in cohort c.

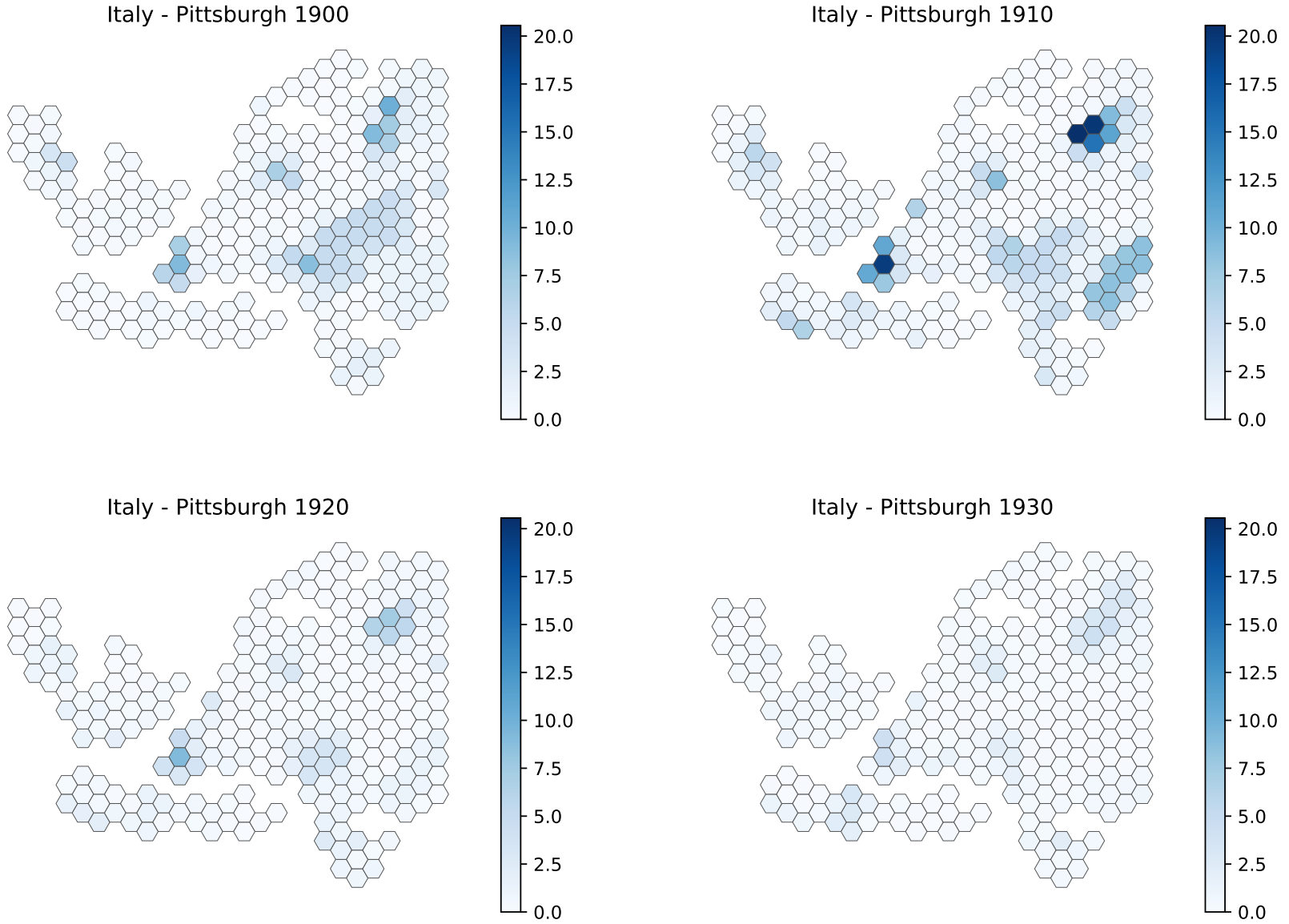
$$I_3 = \frac{\left(\sum_{k \in K} \frac{S_k}{S} \frac{S_{c,k}}{T_k}\right) - \frac{S}{T}}{\frac{1}{t_{min}} - \frac{S}{T}} \tag{6}$$

where S_k is the sending group population in neighborhood k, $S_{c,k}$ is the sending group cohort c population in neighborhood k, S is the sending group population in the city, T_k is the third generation white population (at least one parent native born) in neighborhood k, and T is the population in the city. Defining $t_{min} = \max\left(1, \frac{\min(T_1, T_2, \ldots)}{S}\right)$ captures the worst case scenario, when all individuals in the sending group live in one neighborhood, and no other individuals live in the neighborhood. Constructing the measure this way allows us to avoid issues when the minimum neighborhood size is zero.

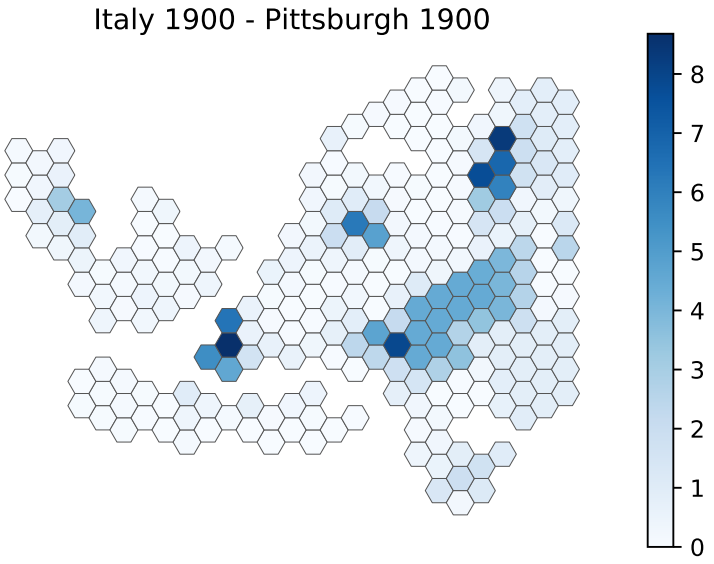
A2. City-Country Maps

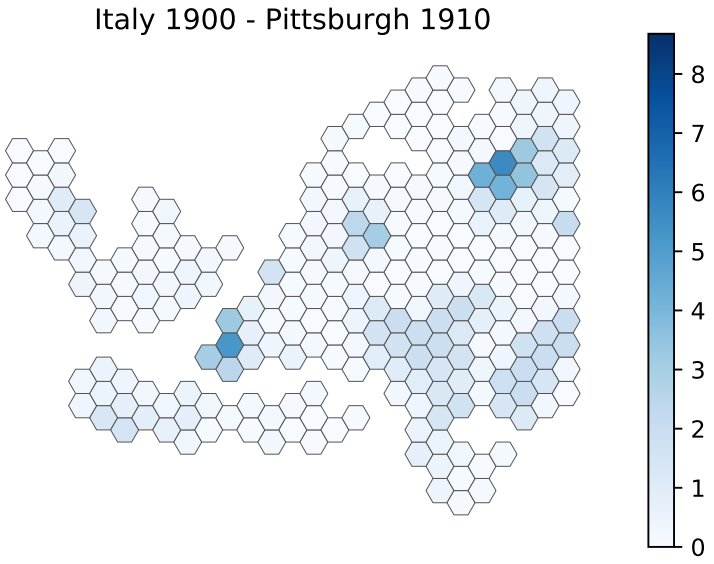

Italy Population
Italy - Pittsburgh 1900
Italy - Pittsburgh 1910
Italy - Pittsburgh 1920
Italy - Pittsburgh 1930
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0

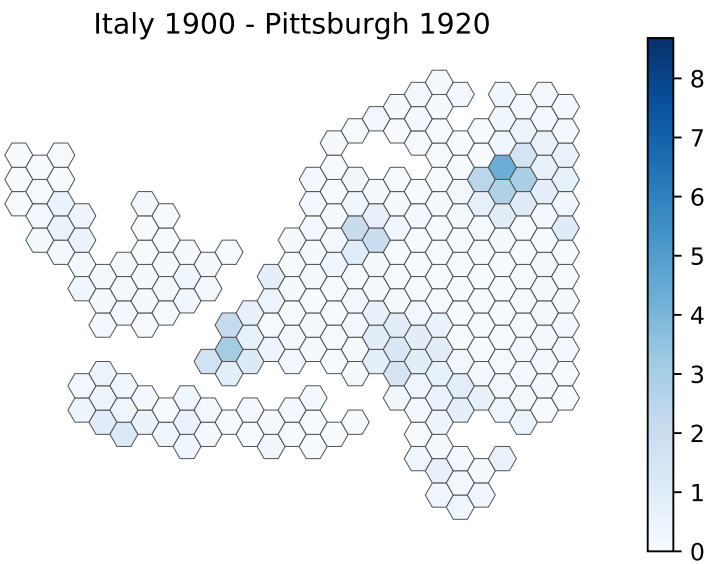
Italy Inflows

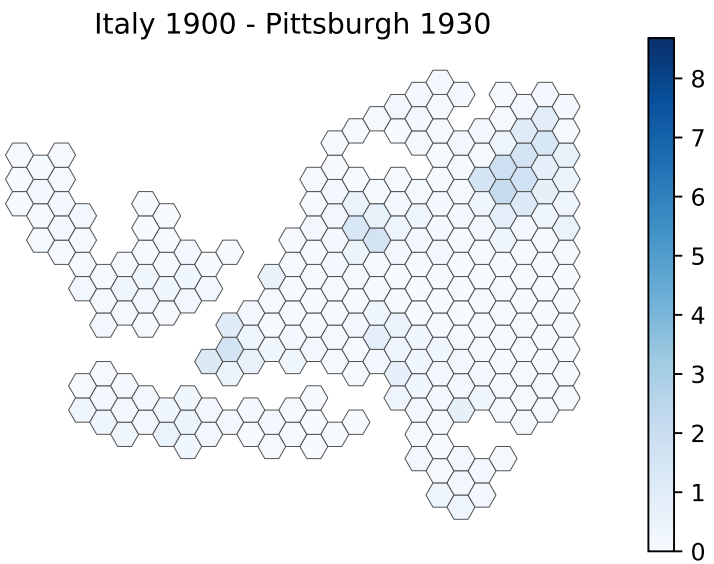


Italy Cohort 1900

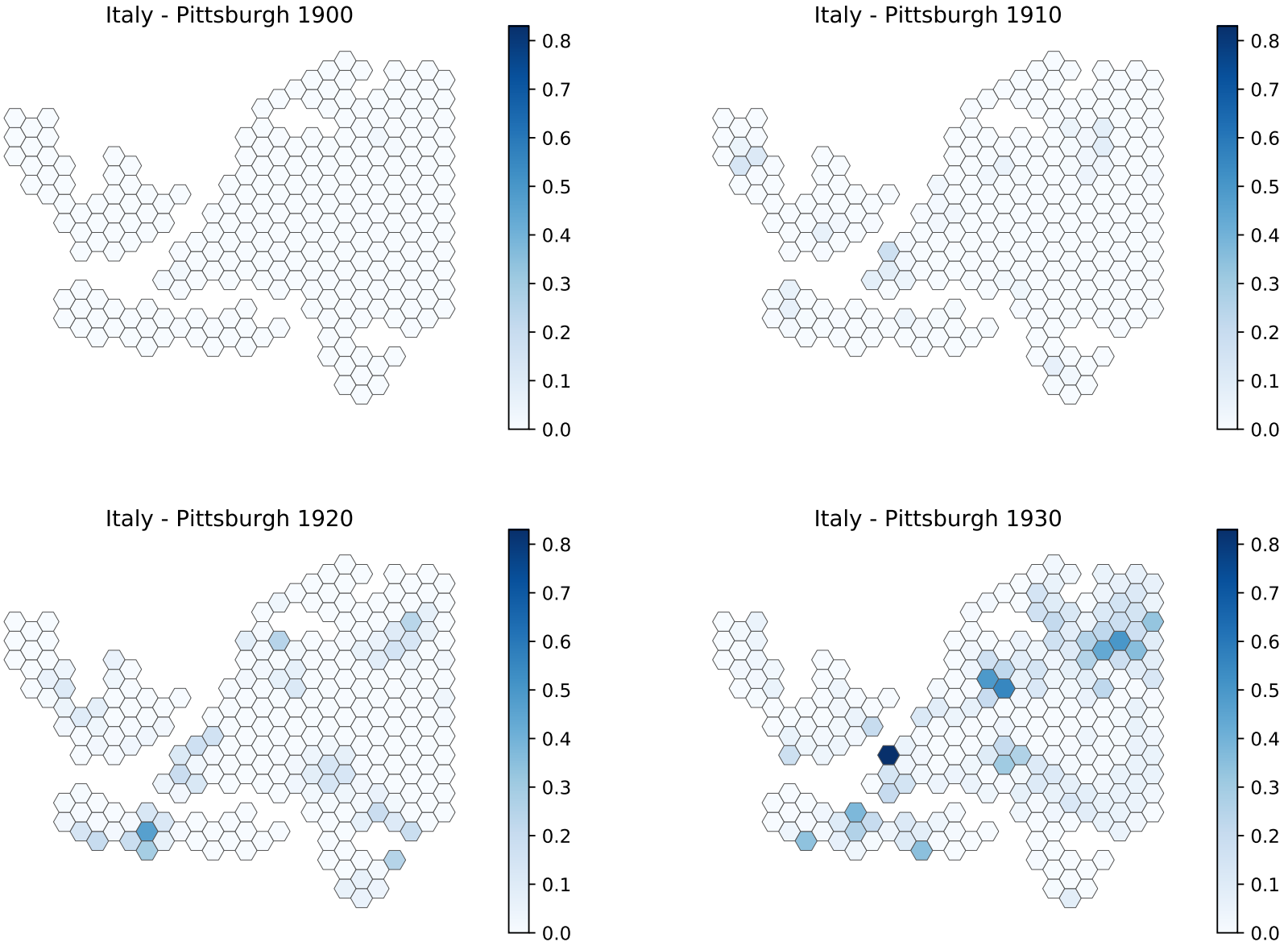








Italy Second Generation



A3. Inflow Choices

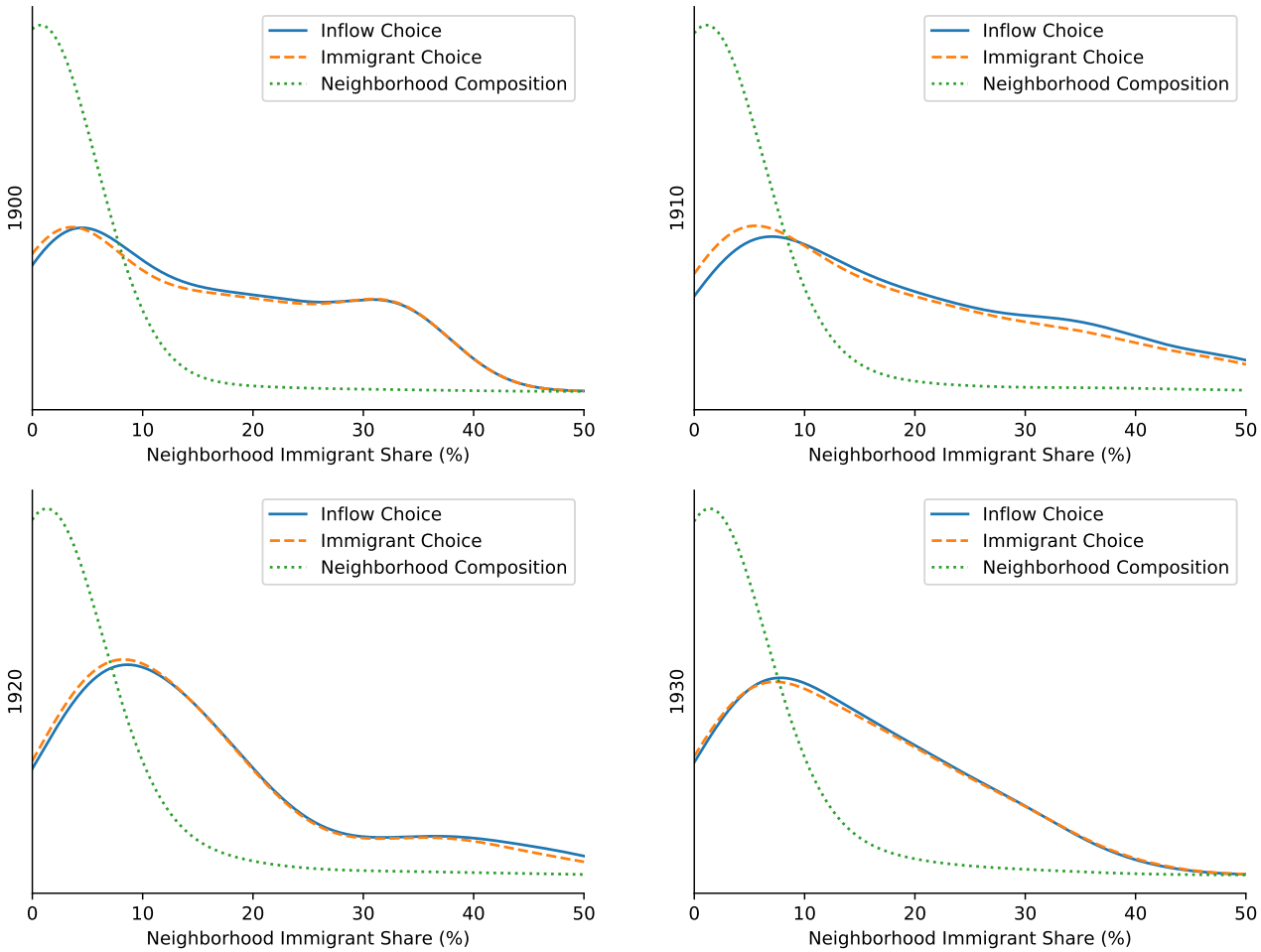


Figure 5. Italian immigrant inflow choices, Italian immigrant choices, and neighborhood immigrant composition