Immigration, Migration, and Demographic Polarization in the U.S., 1995-2000

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Abstract:

Some evidence suggests that the selective migration patterns of immigrants and natives in the U.S. during the 1980s and 1990s contributed to demographic polarization along the lines of ethnicity, race, age, income, and education. The implied assumption that this polarization was driven by native "flight" has been heavily scrutinized, however, and the extent and importance of polarization on a national scale relies on the continuation of selective migration patterns. I examine 1995-2000 county migration data for evidence of such continuation and question the native "flight" assumption. Results show that polarizing selective migration patterns continued into the late 1990s. Net of other factors, counties with larger immigrant inflow rates experienced greater native outmigration. Moreover, the distance traveled by native migrants increased as a function of immigration in surrounding counties. These findings support the implicit native "flight" assumption and reiterate the importance of extra-local effects for migration studies.

1. Introduction:

Immigration and migration patterns in the U.S. significantly shape the social landscape. The internal migration of Southerners to Northern and Western cities during the first half of the 20th century undergirded the growth of American manufacturing and shaped American culture (Tolnay 2003; Gregory 2005). And, to a large extent, immigration throughout U.S. history has been the story of America itself (Hirschman 2005). Recent research has noted, however, that the interplay between immigration and internal migration contributes to polarization in the U.S., along political (Gimpel 1999; Bishop 2008) and demographic lines (Frey 1995, 1996).

In the 1990s, Frey (e.g. 1996) argued that the U.S. was experiencing "balkanization" – demographic polarization along the lines of ethnicity, race, education, age, and income, driven by immigration and the selective migration patterns of natives. Circa 1990s California serves as an excellent example of these trends: as immigrants entered through Los Angeles, relatively low-income and lesser educated natives left California for Washington, Oregon, Nevada, and Arizona – states whose populations are determined, by and large, by the migration of natives (Frey 1995). The result was the development of two very different types of places: one inhabited by a relatively young, ethnically, racially, politically, and economically diverse and relatively young population; and the other older, and less diverse in its demographic, economic, and political make-up.

While this analysis pointed to demographic polarization, implicit assumptions regarding the drivers of selective migration patterns ignited scholarly debate. The most questioned of these assumptions was the idea that immigrants, per se, were the impetus behind natives' migration decisions. Despite extended debate, it remains unclear whether immigration causes the "flight"

of natives. Moreover, it is uncertain whether migration patterns consistent with demographic polarization persisted into the late 1990s.

Did polarizing selective migration patterns persist? Does the implicit assumption of native "flight" hold water? This analysis answers these questions with county level migration data from 1995 to 2000. Results suggest that polarizing migration patterns prevailed into the late 1990s and that, net of other social, demographic, and economic factors, counties with larger immigrant inflow rates experienced larger native outflows. Moreover, the distance traveled by native migrants from their origin county increased as the size of the immigrant population in surrounding counties increased. Together, these findings are consistent with native "flight" from immigrant populations.

2. Selective Migration Patterns in the Late 1990s:

Frey (1996) notes that the migration patterns consistent with demographic polarization during the 1980s and early 1990s were distinctive in several ways. First, immigration to the U.S. was largely confined to a few traditional immigrant entry points like Los Angeles and New York City. Second, native migrants within the U.S. were drawn disproportionately to states with little to no immigrant presence. Third, native outmigrants from states with sizeable immigrant populations outnumbered native inmigrants, such that high immigration states experienced a net loss of natives.

For the purposes of comparing past trends with those between 1995 and 2000, states must be classified based on the relative sizes of immigrant and native migrant flows. I adopt Frey's (e.g. 1995, 1996) state classification scheme, which distinguishes between "high immigration states" – states whose immigrant inflows outweigh net gains from internal, domestic migration – and "high internal migration states" – states whose net internal, domestic migration supersedes

any population growth associated with immigration. Table 1 lists the top six states from each of these two groups and notes immigration and net migration numbers by state for 1985-1990 and 1995-2000.

[Table 1 About Here]

It is clear that the high immigration states of 1985-1990 continue to act as immigrant magnets into the 1995-2000 period. California, New York, and Texas each drew more than half a million immigrants between 1995 and 2000, sustaining their position atop the list of immigrant destinations. New Jersey, Illinois, and Massachusetts are also among the high immigration states in both time periods.

Patterns of selective migration that drew internal migrants to a handful of non-"hub" states also continued into 1995-2000. Florida, Georgia, and North Carolina prove to be well-established destinations for internal migrants, as each state's net internal migration rate contributed strongly to the growth of the state population. Figures for the 1995-2000 period specifically consider the role of *native* domestic migration in sustaining these states' positions as high internal migration states. As such, states like North Carolina, Georgia, and Arizona each drew at least 25,000 more native migrants than they lost.

The chief polarizing aspect of these migration patterns lies in the sustained mutually exclusive nature of these state lists. That is, those states that draw in the largest numbers of immigrants often experience negative net internal migration between 1985 and 1990, as well as negative net native internal migration between 1995 and 2000. For example, while drawing well over half a million immigrants from abroad in 1995-2000, both California and New York also lost a net total of over half a million natives. Conversely, high internal migration states like Nevada tend to attract relatively small numbers of immigrants. This continued pattern, it is

argued, effectively concentrates immigrants and natives in different places, producing demographic polarization.

While there is considerable continuity in these migration patterns over time, two aberrations in Table 1 cast doubt on the existence of mutually exclusive immigrant and native migration streams. First, Florida's place atop the list of high internal migration states belies its attraction of large numbers of immigrants and natives, alike. In fact, were it not for natives' and domestic migrants' affinity for Florida, it would sit ahead of Illinois, New Jersey, and Massachusetts on the list of high immigration states in both time periods. Second, and corresponding with the emergence of new immigrant destinations in the mid-1990s (Massey 2008), several high immigration states began to attract larger numbers of immigrants between 1995 and 2000. To cite the most extreme example, immigration to Georgia increased by over 330 percent between the 1985-1990 and 1995-2000 time periods. Furthermore, immigration to North Carolina, Georgia, and Arizona rivaled (and in the case of Georgia, surpassed) immigration to the high immigration state of Massachusetts. As such, while migration patterns that may contribute to demographic polarization over broad geographic areas extended into the late 1990s, such patterns were not existent in some cases and, in others, showed signs of shifting.

3. The Native "Flight" Assumption:

While aggregate immigration and migration trends of the late 1990s set the stage for continued demographic polarization, the mechanisms underlying these trends are less clear. Many of early statements of demographic polarization pointed to native flight from immigrant populations as a driver of selective native migration patterns. Metaphors like "balkanization" (Frey 1996) and book titles such as *The Disuniting of America* (Schlesinger 1992) suggested that a significant level of ethnic tension undergirded natives' migration decisions. But, the native

flight assumption was questioned on two fronts. First, the alarmist metaphors and rhetoric surrounding this research painted particularly bleak pictures for immigration policy and the future of U.S. society (e.g. Ellis and Wright 1998). Second, other research suggested that while correlated with native outmigration, immigration certainly is not the cause of native flight.

3.1. Linking Immigration and Native "Flight"

Pointed debate around the "flight" assumption emerged in the midst of a larger discussion regarding the impacts of immigration on labor markets in the U.S. Early work on the implications of immigration scrutinized popular claims that immigrants negatively impacted native laborers by stealing jobs and deflating wages (Walker, Ellis, and Barff 1992; Borjas, Freeman, and Katz 1996). Despite the fears and speculation, early findings indicated that immigration had little to no effect on jobs or wages. As noted by Borjas, et al. (1996), however, a major assumption of these studies is that labor pools in areas under consideration were static.

The discovery of polarizing, selective migration patterns cast doubt on this central assumption, leading some to suspect that the negative effects of immigration on native labor markets were understated because of the out-migration of natives congruent with the influx of immigrants. According to these "substitution" arguments, labor market competition in major immigrant destinations worked so as to replace native workers with immigrants; each new immigrant effectively knocked a native out of the work force, precipitating the out-migration of less educated natives. Filer's (1992) study of metropolitan migration between 1975 and 1980 found that immigration had a significant negative effect on the native net migration rate, net of other factors such as local amenities, demographic characteristics, and some indicators of economic vitality. In a state-level examination of individual likelihoods of out-migration in the 1980s, White and Liang (1998) found the likelihood of native outmigration increased

significantly with larger recent immigrant inflows. Interestingly, controlling for a number of individual characteristics, individual probabilities of out-migration were smaller in states with larger pre-existing immigrant populations (White and Liang 1998). At any rate, these findings were consistent with the idea that influxes of immigrants caused the out-migration of natives.

Despite these findings, other studies of the immigration-migration link failed to identify any significant association between immigration inflows and native migration. Card (1997), in an analysis of metropolitan areas in the 1980s and 1990s, assessed the impact of immigration on native outmigration by grouping both immigrants and natives according to skill-set and education characteristics. Results showed that native (and more established immigrant) migration between metro areas was largely insensitive to immigration forces. This suggested that the "substitution" labor market hypothesis was flawed, as competition in the labor market did have an effect on wages, but not on native migration (Card 1997: 56). Similar research by Card and DiNardo (2000) suggested that while immigration does lead to a shift in the skill distribution in metropolitan areas, it has no effect – or perhaps a *positive* effect – on the net migration of natives with comparable skills.

These studies lend credence to a less competitive "complementary" labor market process by which deindustrialization and economic restructuring in the nation's immigrant hubs encouraged the net out-migration of natives and the in-flow of immigrants simultaneously. In some cases, after accounting for the effects of economic restructuring, immigration is actually associated with the net in-migration of natives with similar skill sets (Card and DiNardo 2000). White and Imai (1994) separate the net-migration rate into its constituent in- and out-migrant flows for natives and find that in-migration by natives is *positively* associated with immigration, while native out-migration is *negatively* associated with immigration for the late 1960s and

1970s. Wright, Ellis, and Reibel (1997) model this complementary process very specifically and are careful to point out that what Frey and others point to as a "high immigration" phenomenon may, in reality, be a phenomenon associated with large places. Looking at the 100 largest metro areas in the U.S. between 1980 and 1990, Wright et al. (1997) demonstrate that there is little connection between immigration and the migration of natives with similar education levels, and that findings are strongly influenced by the largest metropolitan areas, such as New York and Los Angeles. This analysis by Wright et al. (1997) illustrates, among other things, the importance of separating the effects of immigration from the correlated characteristics of places with larger populations.

The connection between immigration and migration is further complicated by residential mobility studies which examine the micro-level migration processes that may contribute to larger macro-level phenomena. Studies of residential mobility have long noted how race structures patterns of locational attainment in metropolitan areas (Alba and Logan 1991; South and Crowder 1997; Crowder and South 2005, 2008). Crowder, Hall, and Tolnay (2011) have considered the role of immigration in residential mobility, and note that immigration to the neighborhood of origin increases natives' probability of out-migration. This probability is tempered, however, by the immigrant presence in neighboring tracts – high immigration in the closest potential destination neighborhoods tends to curb out-migration from the origin tract (Crowder, et al. 2011). The dampening effect associated with immigration to neighboring tracts may lead to the underestimation of immigration effects in origin places if not sufficiently controlled.

3.2. Explaining Inconsistent Findings

The inconsistent findings regarding the link between immigration and migration are largely attributable to differences in methodology and in the measurement of immigration and migration (Kritz and Gurak 2001). Dependent variables vary from study to study. While many predict *net* migration rates as a function of state, local, and/or individual characteristics (e.g. Frey 1996; Wright, et al. 1997), others focus on the constituent parts of the net migration rate – namely the *in*- and *out*-migration rates or counts of natives (White and Imai 1994; Card 1997). Studies analyzing net rates have the advantage of speaking directly to the "balkanization" processes Frey originally described; the immigration-migration link was thought to produce demographic polarization in the places to which immigrants were most attracted. Studies examining in- and out-migration rates, on the other hand, allow a more nuanced look at how the immigration-migration link works, and they arrive at slightly different conclusions.

Prior studies also differ in their definition of the immigrant population and in how immigration is operationalized. Some prior studies have included "long-term" immigrants (those residing in the U.S. for at least five years) in the native population (Card 2001:24-25), while others have treated these more established foreign-born persons as immigrants, nonetheless. These differences undoubtedly influence results by changing the size of the population to which natives are said to react. Likewise, immigration to a place may be operationalized as a count or a rate. Counts of immigrants allow place size to have an overwhelming effect in statistical models, as immigrants are often attracted to the largest metropolitan areas. Immigration rates are more common in past research, and often employ the total population or the size of the labor force as the rate denominator. It is the latter of these that Wright, Ellis, and Reibel (1997) conclude is most appropriate.

Finally, inconsistencies are also attributable to the various geographies examined. Frey originally discussed the immigration-migration link on the state level (Frey 1995, 1996). Results of metro area studies were mixed, but tended to find no significant immigration-migration link. Noting the incomparability of state and metropolitan area studies, some also analyzed the immigration-migration link on an intermediate level, namely at the county level (e.g. Frey 1996). While these various reports speak to specific aspects of the immigration-migration link and choose geographies accordingly, resulting discrepancies cloud our understanding of this important phenomenon.

4. Research Design

Noting the inconsistent methods and findings discussed in section 3.2 above, this research seeks to isolate the "flight" response of natives to any and all foreign-born populations at the intermediate geographic level of the U.S. County. I test for the existence of native "flight" in two ways. First, I model the count of native out-migrants at the county level as a function of immigration and other social, economic, and demographic controls. Second, I model the average distance traveled by native out-migrants as a function of immigration and other factors in the counties contiguous with the origin county. These tests are discussed in sections 4.1 and 4.2 below.

4.1. Modeling Native Out-migrant Counts at the County Level

4.1.1. Dependent Variable and Model

Unlike many previous studies, I model native out-migrant counts rather than focusing on net migration. This approach has the unique advantage of capturing native migratory reactions spurred by immigration which may remain hidden in net migration rates. This may be especially important for more populous places in which immigration is high, but population turnover is also

high and economic growth may pull in larger numbers of native workers and immigrants, alike. Furthermore, focusing on raw counts of out-migrants rather than the out-migration *rate*, for example, is necessitated by the fact that any denominator used to construct a rate would be inherently biased by other sources of population change – not least of which may be immigration. By modeling raw counts, I ensure that such additional sources of population change remain distinct from the dependent variable.

Native out-migrant counts are drawn from the U.S. Census Bureau's Migration Files for 2000 and summarized in Table 2. The migration files are built from the Census long-form question asking sampled individuals where they lived five years prior to the survey. Answers to this question are weighted to reflect the larger county population, suitably rounded to protect anonymity when minority migrant flows are low, and then cross-tabulated with a number of individual and household characteristics, including place of birth.

Limitations of Census migration files require minor assumptions regarding the dependent variable. Since the long-form question only inquires as to respondents' residence at two points in time, there is no information regarding the frequency of moves made by an individual between 1995 and 2000. Individuals leaving a place after 1995, but returning before 2000 would be considered non-migrants. Additionally, there is no way to differentiate between an individual moving in 1995 and one moving in 1999; the differing time of these moves may reflect differential responses to structural factors, but are treated identically. The advantages of this operationalization, however, lay in the power of modeling out-migration specifically, as opposed to net migration. Furthermore, this particular data source is commonly used in migration research (e.g. Frey 1995, 1996).

I model raw counts of native out-migrants with a robust negative binomial maximum likelihood estimator. Negative binomial estimation, like Poisson estimation, models counts of events. Unlike the Poisson, however, the negative binomial allows for overdispersion in the distribution of all county out-migrant counts.[i] The negative binomial estimation used here models native out-migrant counts as a function of immigration, as well as economic, socio-demographic, and geographic characteristics in both the origin and surrounding environs. The robust estimation of standard errors reduces the potential bias stemming from outlying or otherwise influential cases (StataCorp 2011).

4.1.2. Counties as the Unit of Analysis

I model native out-migrant counts at the county level, as this unit of analysis offers distinct advantages. On the one hand, relative to states, counties offer a considerable level of geographic detail. Of particular importance for this study is the fact that counties allow a view of intra-state migration patterns, potentially catching native "flight" that is missed in state-level analyses. On the other hand, relative to metropolitan areas, the county allows the geographic inclusion of the entire U.S. A metropolitan-level analysis of the 1995-2000 period may overlook, for example, the important shift in immigration toward "new" destinations in "high internal migration states" like North Carolina. Having never before experienced any sizeable immigrant population, "new" destinations may be particularly important areas to examine for native "flight". Metropolitan level analyses have been justified in past research because of their ability to approximate a local labor market area (Wright, Ellis, and Reibel 1997). By looking at a single labor market, past researchers have attempted to tease apart the effects of immigration, per se, from larger economic restructuring – both of which may influence native migration patterns. Separating these effects is important, but certain information may be lost in the process. Because

many metropolitan areas stretch across multiple counties, metro-level analyses may overlook native "flight" at the intra-metropolitan level. As such, the county provides a detailed yet comprehensive unit of analysis.

This analysis includes 3, 074 of the 3,141 counties that existed as of the 2000 Census. Many Virginian towns enjoy county status for census purposes, but I merge these geographies into their larger, surrounding neighbors in order to keep them in the analysis. Also, because of their unique populations and geographic removal from the contiguous U.S., I have dropped Alaska and Hawaii.

[Table 2 about here]

4.1.3. Capturing the Effect of Immigration

Two controls necessitated by the model and unit of analysis must first be considered in order to assess the effect of immigration on native out-migration. First is a control for the *log of the native born population* in 1990, necessitated by the fact that the dependent variable is a simple, raw count of native out-migrants. This control should have a positive effect on native out-migration. Put simply, more natives can out-migrate if there are more natives present. A second control included is the *native-born inflow rate* between 1995 and 2000, which is a count of all native-born in-migrants normalized by the size of the labor force in 1990. This variable helps to isolate the effects of its counterpart gauging the effects of foreign-born inflows, as both native- and foreign-born migrants may be attracted to the same places and characteristics, having a comparable effect on subsequent out-migration.

To gauge the effects of immigration on native out-migration, I measure the *foreign-born inflow rate* between 1995 and 2000, as well as the *foreign-born inflow rate squared*.[ii] This rate includes a count of all foreign-born persons moving into a county, regardless of their time of

entry into the U.S., normalized by the size of the 1990 labor force in the place of interest. This operationalization of the key variable of interest has significant precedent in the immigration-migration literature (e.g. Wright, et al. 1997). White and Liang (1998) illustrate the importance of also accounting for the effects of pre-existing immigrant populations, noting that places with large immigrant populations may see less drastic "flight" reactions to subsequent immigrant inflows. To control for the effects of pre-existent immigrant populations, I include the *percent foreign-born* in 1990. I also allow for non-linearity in this effect by including the *percent foreign-born squared*, noting that the nation's largest immigrant hubs may see different migratory reactions than the rest of the nation. Following previous studies of the relationship between immigration and native migration, I expect out-migration to increase as the percent foreign-born in 1990 and the inflow of foreign-born between 1995 and 2000 increase. However, given evidence from Wright, et al. (1997), the effect of immigration on out-migration may be nullified as additional controls – particularly those gauging the economic climate – are introduced.

Past studies have considered the impact of immigration in the origin on native migration, but immigration in extra-local areas may also influence native migration patterns. In their study of neighborhood mobility, Crowder, Hall, and Tolnay (2011) find that immigration in extra-local tracts decreases the probability that natives will leave their origin tract. Similarly, Crowder and South (2008) demonstrate that whites are less likely to move from their tract of residence if surrounding tracts have relatively large or growing minority populations. To test whether this phenomenon exists at the county level with respect to nativity, I model the *percent foreign-born in neighboring counties*. This variable represents the average percent foreign-born in all counties contiguous with the origin county. Given the results of neighborhood-level analyses, I suspect

that immigration to counties surrounding the origin will negatively impact native out-migration from the origin. I make two assumptions with this variable with respect to migrants' knowledge of the immigration characteristics of neighboring counties. First, I assume that migrants' knowledge of neighboring counties (whether accurate or not) encompasses only those immediately contiguous with their origin county. Second, I make the assumption that migrants' knowledge of dynamic immigration patterns in neighboring counties (again, whether accurate or not) is limited temporally. As such, I control for the size of the pre-existing immigrant population in neighboring counties, but do not assess the degree to which immigrant inflows influence native out-migrant counts.

4.1.4. County Economic Characteristics

Prior migration research – steeped as it is in the neoclassical economics tradition of labor market "pushes" and "pulls" – has pointed to the salience of economic characteristics for long-distance migration (Greenwood 1985). Indeed, the history of the debate surrounding the connection between immigration and native migration has pivoted on the relative importance of economic restructuring in the nation's immigrant magnets (Wright, Ellis, and Reibel 1997). Following Wright, Ellis, and Reibel (1997), I control for *employment growth* between 1990 and 2000, as well as the *logged median household income*, the *percent unemployed*, the *homeownership rate* in 1990, and the *median housing costs* per month for both owner and renter households in 1990. These measures not only account for any residual economic restructuring in the later half of the 1990s, but also provide a general assessment of the economic vitality of the origin county. The effect of these variables is somewhat difficult to predict. On one hand, economic vitality may induce individuals to migrate more readily, since the means to do so are available, and long-distance moves across county lines typically favor more educated and

wealthier individuals (Long 1988). On the other hand, as predicted by (dis)equilibrium models of migration, economic vitality may encourage individuals to stay put, particularly if they are invested in their communities via homeownership (Greenwood 1985). Despite this uncertainty, however, these controls are included in order to better isolate the effects of immigration on out-migration.

4.1.5. Socio-Demographics

I control for the size of certain demographic groups because of their relative propensity to migrate or stay put. Noting the importance of the life cycle on the propensity to migrate (Greenwood 1985) I include the *percent elderly* (age 65 and older) and the *percent of households with children*, with the expectation that as the relative size of either of these populations increase, native out-migration will decrease. Similarly, as the *percent with no High School diploma* increases, out-migration will likely decrease due to decreased resources among that demographic group.[iii]

4.1.6. Geographic Controls

Because counties are not uniform with respect to size or area, I include the *log land area* in square miles. Out-migration is only captured when natives cross a county border, so as land area increases it is less likely that a resident would cross a county border, thereby decreasing out-migration. A series of dummy variables capture other unmeasured sources of variation due to differences in *metropolitan* and *non-metropolitan* places, as well as differences in the propensity of natives to migrate across geographic regions (*South*, *Northeast*, *Midwest*, and *West*). In general, populations tend to flow from non-metro to metro counties, though "turn-arounds", "rural revitalizations", and exurbanization have worked to slow or reverse this trend (Greenwood 1985). It has also been shown that regions, sub-regions, and states, through processes of "spatial

persistence" exert differential holding power on their citizens, affecting the likelihood and distance of migration (Herting, Grusky, and Van Rompaey 1997: 268). Lastly, because any number of state policies and characteristics (not discussed here) may influence either immigration or migration, I model state fixed effects, allowing the baseline out-migration counts to vary by state.[iv]

4.2 Modeling the Distance Traveled by Native Out-Migrants

4.2.1. Dependent Variable and Model

As noted in section 2, demographic polarization relies not only on the "flight" of natives from areas of high immigration, but also on the selective migration of natives to places with relatively small foreign-born populations. This supplementary analysis tests whether immigration has any effect on the destination choices of native out-migrants by modeling the average distance migrated out of a county as a function of immigration in both the origin and in extra-local areas surrounding the origin county.

Census county-to-county migration files allow the calculation of the average distance traveled by native out-migrants between 1995 and 2000; this average serves as the dependent variable in the next analysis. For every county pair in the U.S., the migration file lists the number of migrants moving between that pair. When flows are especially low (fewer than 3 migrants), data are suppressed and not reported. Using an independent Stata package called "vincenty", I calculate the Haversine, or "Great Circle", distances between the centroids of each county pair (Nichols 2003)[v]. I then weighted each distance by the size of the flow between those two counties and averaged them. As such, the average distance (in miles) traveled by native out-migrants is obtained for each county and is summarized in Table 2.

This methodology is not unprecedented. In their study of neighborhood mobility and white flight, Crowder and South (2008) examine the effects of extra-local neighborhoods on the distances traveled by white migrants out of their origin tract. These authors find that, in addition to lowering the overall probability of white out-migration from the neighborhood of origin, when whites do decide to relocate, they move farther when the closest potential destination neighborhoods have relatively large minority populations. I follow these authors' precedent and model the average distance migrated by natives from their origin county for each county in the U.S. using robust regression, but it is uncertain whether these migration phenomena will persist at the county level.

4.2.2. Neighboring County Characteristics

I make the assumption that the distance traveled by native migrants (having already made the decision to migrate across a county border) depends largely on the characteristics of areas beyond the origin county. These extra-local conditions are summarized above in column two of Table 2 (see Appendix 2 for bivariate correlation coefficients).

To determine the extent to which immigration in counties surrounding the origin influences native migratory decisions, I measure the *percent foreign-born in neighboring counties* in 1990. Increased immigration neighboring counties should act to *increase* the distance migrated by those who choose to leave the origin county. In essence, if native migrants are fleeing immigrant populations, then high immigration in in surrounding counties serves as a hurdle to native migrants over which they must jump in order to find a suitable destination. As in the above analysis of out-migrant counts (section 4.1), I make the assumption that the distance traveled by migrants, to the extent that it is influenced by immigration in extra-local geographies,

is dependent on pre-existing immigrant populations rather than dynamic immigrant inflow patterns.

To separate the effects of immigration from other social and economic characteristics in surrounding counties, I include some now familiar controls. Included in this list of extra-local controls are: *total population (logged)*; *median household income (logged)*; *employment growth* between 1990 and 2000; *percent unemployed*; *homeownership rate*; and *median housing costs*. Because migrants typically flow toward more populated places, the average distance migrated should decrease as population in extra-local areas increases. As economic indicators improve in surrounding counties, the distance migrated by natives from the origin county should decrease. As such, median household income and employment growth should exert a negative effect on the average distance migrated, while unemployment will likely have a positive effect. Finally, tight housing markets, as indicated by high homeownership rates and high housing costs for renters and owners alike, should increase the distance natives migrate from their origin county.

4.2.2. Origin County Characteristics

There is little reason to suspect that the demographic, social, or economic characteristics of the origin county should influence the distance traveled by native out-migrants, given that they have made the decision to leave. As such, I include only geographic controls for the origin county. Because counties differ greatly in size across the U.S., I control for the origin *county land area*; as land area increases, native migrants must travel farther to leave the origin county, so this variable should exert a positive effect on the average distance moved. A series of dummy variables capture other unmeasured sources of variation due to differences in *metropolitan* and *non-metropolitan* places, as well as differences in the distances traveled by natives across geographic regions (*South*, *Northeast*, *Midwest*, and *West*). Lastly, because any number of state

policies and characteristics may influence either immigration or migration, I model state fixed effects, allowing the baseline distances migrated to vary by state.

5. Results

5.1. Immigration Exerts a Positive Influence on Native Out-Migrant Counts

Table 3 reports the results of a negative binomial regression predicting the count of native out-migrants for each county in the contiguous U.S. Models 1 and 2 attempt to gauge the effects of immigration and other control variables, respectively and independent of one another. Model 3, the full model, gauges the effects of immigration on out-migration, controlling for economic, socio-demographic, and geographic characteristics. Each model includes the county population and native inflow rate to control for place size effects, and also includes fixed effects by state (not reported).

Model 1 is consistent with expectations and finds a significant link between immigration and native out-migration. Controlling for population size and turn-over, the positive coefficient for the percent foreign-born in 1990 ($b=3.97$; $p<0.001$) indicates that out-migration counts are greater in counties with larger immigrant populations. This positive effect is attenuated, however, in the places with the largest immigrant populations, as shown by the negative quadratic term associated with pre-existing foreign-born populations ($b=-0.09$; $p<0.001$). Similarly, there is evidence that places with larger immigrant inflow rates also experienced greater native out-migrant counts ($b=1.67$; $p<0.001$), but this effect is also attenuated in counties with the largest immigrant inflow rates (-0.05; $p<0.001$). While the coefficient for the percent foreign-born in surrounding counties is in the expected negative direction – suppressing native out-migration – it is not significant at $\alpha = 0.05$ ($b=-0.50$; $p<0.060$). One-tailed tests, however,

allow the rejection of the null hypothesis that the effect is zero and support the conclusion that the effect is negative.

[Table 3 about here]

Model 2 predicts native out-migration counts as a function of economic, socio-demographic, and geographic variables without consideration for immigration effects. As is expected, employment growth and homeownership rates are negatively associated with native out-migration; controlling for all else, fewer natives leave when the local economy is growing and when they are invested in their communities via homeownership. Conversely, out-migration counts are higher in counties with higher unemployment rates and higher housing costs. Consistent with prior studies (see Greenwood 1985; Long 1988), out-migration is lower in counties whose populations tend to be less mobile. As the percentage of the population age 65 and older, percent with no High School diploma, and percent with children increase, native out-migration counts decrease. Finally, while there are no significant differences between metropolitan and non-metropolitan counties, there is evidence that out-migration counts vary by region. Counties located in the South have significantly lower numbers of native out-migrants than counties in the West.

Model 3 includes both immigration and important control variables, allowing insight into the more isolated effects of immigration on out-migration. As predicted by prior studies of the immigration-migration link (i.e. Wright, et al. 1997), introducing controls for economic characteristics dampens the effects associated with immigration. Nonetheless, the pre-existing foreign-born population ($b=1.12$; $p<0.01$) and the immigrant inflow rate ($b=0.94$; $p<0.001$) are positively associated with native out-migration counts. The non-linearity associated with these immigration terms is also weakened by the inclusion of other controls. Furthermore, the negative

effect of the percent foreign-born in neighboring counties is weakened by the introduction of other controls (b=-0.28, p<0.14). The failure to account for extra-local immigration effects, however, leads to the underestimation of the pre-existing immigrant effect in the origin (analysis not shown).[vi] Consistent with neighborhood mobility studies, extra-local immigrant effects remain salient factors in migration at the county level.

The curvilinear effects of immigration indicators – the percent foreign-born in 1990 and the immigrant inflow rate from 1995 to 2000 – are plotted in Figure 1and Figure 2, respectively. The range of values plotted for both variables are bounded by the minimum and maximum values actually observed in the sample of counties, but curves are faded for counties in the top percentile on either variable. Model 1, which includes no economic or socio-demographic controls, predicts large and widely varying effects for the pre-existing foreign-born population (Figure 1). The effect of the foreign-born population is increasingly positive for counties with up to 20 percent of their population foreign-born, decreasingly positive in counties with between 20 and 33 percent foreign-born, and negative for counties above 33 percent foreign-born. Uncertainty surrounding the size of the effects is increased at the tail of the distribution of the percent foreign-born, as very few counties have such large immigrant populations. When all controls are introduced in Model 3, the effect of percent foreign-born becomes more linear, remains positive across all observed values of percent foreign-born, and exerts the largest effect in counties that are roughly 25 percent foreign-born.

Similar effects are seen for immigration inflow rates (Figure 2). While Model 1 predicts that immigrant inflows will exert a negative influence on native out-migration when growing beyond 33 percent of the labor force in 1990, Model 3 predicts that immigration between 1995 and 2000 will positively affect native out-migration across all values observed. Taken together,

these plots support the hypothesis that immigration exerts consistent positive pressure on native out-migration counts. However, smaller positive effects associated with the counties attracting the largest numbers of immigrants suggest that traditional immigrant "hubs" exhibit distinct native migration reactions.

5.2. Immigration in Neighboring Counties Increases Distance Migrated from Origin

Table 4 presents the results of a robust regression, modeling the average distance moved by native out-migrants for each county in the contiguous U.S. Model 1 gauges the effect of pre-existing foreign born populations in neighboring counties on migration distance. Controlling for the logged population in neighboring counties and the state in which the origin county is located (state fixed effects not reported), for each one percent increase in the foreign born population in neighboring counties, natives can be expected to travel – on average – an additional 8.07 miles ($p<0.001$). This effect is dampened slightly, however, when origin county geographic controls are introduced in Model 2 ($b=7.76$, $p<0.001$).

[Table 4 about here.]

Immigration in neighboring counties is correlated with many other characteristics which may bias the neighboring immigration coefficients obtained in Model 2. As such, Model 3 accounts for economic and housing market characteristics such as employment growth and median monthly housing costs. Controlling for these factors in addition to origin geography, the effect of a one percent increase in the foreign-born in neighboring counties increases the average distance migrated by native out-migrants by 7.12 miles ($p<0.001$). Standardized beta coefficients are also offered in Table 4 so that the relative influence of immigration in neighboring counties may be gauged. Relative to the percent foreign-born, unemployment and homeownership rates in neighboring counties, as well as origin county land area exert weak positive effects on the

average distance migrated. Median home costs in neighboring counties, however, exert greater positive influences on distance migrated relative to the percent foreign born in neighboring counties. Migration distance is shortened as the total population, median household income, and employment growth increase in neighboring counties. Finally, consistent with prior studies of geographic structuration which find that the West exerts little "holding power" on its residents (Herting, et al. 1997), Model 3 shows that counties in the Midwest, South, and Northeast all exhibit shorter average distances traveled by their native out-migrants. In short, however, immigrant presences in neighboring counties have a relatively strong influence on the distance migrated by natives crossing a county border.

6. Discussion and Conclusion

Immigration to traditional points of entry and selective migration by native-born populations continues to contribute to demographic polarization across broad geographic areas. In a break with trends in the 1980s and early 1990s, however, immigration and native migration flows are not as distinct in the late 1990s. States that previously attracted only native domestic migrants have also become destinations for immigrants, as well. This development likely reflects the emergence of "new" immigrant destinations in the mid-1990s. The present analysis implicitly explores the relationship between immigration and native migration in these emerging immigrant destinations by modeling all U.S. Counties. On the one hand, as discussed in section 5.1, these sorts of places would have a small pre-existing foreign-born population in 1990 and, therefore, would see a relatively small positive effect on native out-migrant counts; on the other hand, these counties would see relatively high immigration rates and might have experienced a correspondingly high number of native out-migrants. There is certainly room in future work for considering the immigration-migration connection in "new" destinations more explicitly.

The analyses presented here suggest that the selective migration patterns of natives are, to an appreciable extent, immigration-driven. Counties with larger foreign-born populations in 1990 and greater immigration between 1995 and 2000 experienced greater native out-migration. These findings are largely consistent with Frey's (1995, 1996) description of macro-level "balkanization" trends, as well as with numerous micro-level metropolitan (Filer 1992; White and Liang 1998) and neighborhood level analyses (e.g. Crowder, et al. 2011). The findings presented here, however, are slightly at odds with other studies which carefully broke net native migration into their constituent in- and out-migration components. White and Imai (1994) and Card (1997), rather than finding a significant positive relationship between immigration and native out-migration, find that immigration generally influences native in-migration, instead. Setting aside, however, the varying geographies and time periods studied, the results presented here may differ from those of White and Imai (1994) and Card (1997) because the present study effectively controls for the attenuating effects of neighboring counties' immigration profiles.

Consistent with prior work (e.g. Wright, et al. 1997) and with expectations, controlling for economic and socio-demographic characteristics tempers immigration effects on native out-migration. The positive effects of immigration remain robust, however, to these controls. It is clear that the effects of immigration on native out-migrant counts are non-linear; immigration (whether in the form of pre-existing foreign-born populations or new immigrants from abroad) tends to have a relatively small effect at relatively small or large values. Substantively, this means that counties with very small foreign-born populations or experiencing little growth in the size of the foreign-born population saw relatively low native out-migrant counts; there was too little change to make a difference. The same is true of counties with relatively large foreign-born

populations and large immigrant inflows; natives in these counties may be accustomed to immigrant populations and relatively unaffected by immigration dynamics.

The analysis of the distance migrated by native out-migrants moving to another county further implicates immigration as a driver of native migration patterns. Increased immigration to counties surrounding the county of origin not only tempers out-migration counts, but also creates a hurdle for natives who do choose to migrate. Native out-migrants travel farther when the foreign-born presence in neighboring counties is greater. This phenomenon is consistent with Crowder, et al.'s (2011) report of extra-local immigrant effects at the neighborhood level, as well as with Crowder and South's (2008) finding that the distance moved by whites at the neighborhood level depends, in part, on the minority profile of surrounding neighborhoods.

Limitations inherent in model design necessitate caution when interpreting the real-world implications of these results. First, because the data used here are aggregated at the county level, inferences regarding causation cannot reliably be made. Nevertheless, this analysis uncovers a robust association between immigration and native out-migration in U.S. counties, net of other confounding effects. Second, this analysis examines out-migration only and does not account for the often counter-balancing effects of in-migration. To the extent that native in-migrants replace out-migrants, the association between immigration and native migration may be overstated in this analysis. Third, this analysis is limited in temporal scope. While explanatory variables are lagged to more accurately model causal processes, the five-year period over which migration is measured in this analysis limits general conclusions about the relationship between immigration and migration.

Subsequent research could build upon this analysis in several ways. First, an analysis of native in-migration and the effects of immigration would help round out the story started here.

Second, this analysis could easily be extended to include subsequent time periods. In this way, the likely dynamic relationship between immigration and native migration could be gauged over time. Third, to the extent that data allows, county-level data could be modeled hierarchically in conjunction with individual level data, allowing the interplay between individual and structural factors to be elucidated. Finally, though implicit in this analysis, the link between emerging "new" immigrant destinations and native out-migration could be explicitly explored. These avenues might allow us to better understand native responses to dynamic immigration patterns in the U.S.

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i Overdispersion is present in the observed out-migration counts (i.e., the variance is greater than the mean out-migrant count). In all models presented the overdispersion parameter, α, is statistically significant, indicating that the negative binomial estimator is preferred over the Poisson.

ii The foreign born inflow includes moves originating domestically and from abroad. It may be argued that, due to processes of assimilation, foreign born inflows from abroad may have a larger effect on native out-migration (Card 2001:24-25). The models below are robust to changes in the specification of this key variable, however.

[iii] Frey's (1995, 1996) finding that the migratory responses of less-skilled, less-educated workers might be disproportionately sensitive to immigration implies an interaction effect between the percent with no High School diploma and immigrant inflow rates. I tested this interaction in the models discussed in section 4.1, but found no significant interaction effects between high-school dropout rates and immigration. These results are not reported in the final models for the sake of parsimony.

[iv] For example, Frey, Liaw, Xie, and Carlson (1996) consider the effects of state welfare policies on the migration patterns of native populations, in general, and the impoverished population, in particular. While their multivariate analysis suggests that state policies exert little "pull" effect on natives, it is clear that county out-migrant counts may differ by state even after controlling for all of the factors discussed in section 4.1. Moreover, though not reported in Table 3, state fixed effects improve the fit of all models as judged by the BIC.

[v]This formula accounts for the curve of the Earth's surface when determining distances between two coordinate points and assumes a spherical Earth. While the Earth is actually ellipsoidal, the distances calculated are not biased to any appreciable extent by the spherical assumption. Calculating the distances between county centroids involves the assumption that, on average, the distances traveled between two counties by migrants will approximate the distance between geographic centroids. A more defensible distance calculation might calculate distances between county population centers, but this would also entail problematic assumptions.

[vi] When extra-local immigration effects are not modeled, the coefficient for the *percent foreign-born in 1990* shrinks in both magnitude and significance, from 1.12 ($p<0.01$) to 0.90 ($p<0.05$).

Tables

Table 1: Immigration and Migration in Key States, 1985-1990 and 1995-2000

1985-1990[a]			1995-2000[b]		
High Immigration States	**Immigration**	**Net Internal Migration**	**High Immigration States**	**Immigration**	**Net Native-Born Internal Migration**
California	1,356,920	173,586	California	1,189,612	-518,187
New York	550,846	-820,886	New York	583,769	-669,102
Texas	268,498	-331,369	Texas	563,810	131,538
New Jersey	186,510	-193,533	Illinois	287,160	-318,776
Illinois	173,548	-342,144	New Jersey	257,625	-186,933
Massachusetts	133,897	-96,732	Massachusetts	152,179	-56,324
High Internal Migration States			**High Internal Migration States**		
Florida	314,039	1,071,682	Florida	476,743	518,255
Georgia	51,419	302,597	North Carolina	139,381	293,525
North Carolina	32,059	280,882	Georgia	174,276	281,312
Virginia	90,133	227,872	Arizona	141,602	275,814
Washington	67,145	216,270	Nevada	58,625	178,965
Arizona	56,518	216,177	Tennessee	48,425	135,615

[a] Frey (1996, pg. 744)
[b] Author tabulations of 2000 US Census Bureau Migration Files

Table 2: Summary Statistics for All Modeled Variables

Variable	Mean	Std. Dev.	Variable	Mean	Std. Dev.
DEPENDENT VARIABLES			NEIGHBORING COUNTY CHARACTERISTICS		
Native Out-Migration Count, '95-'00	13,920.56	36,391.13	Total Population (logged)	12.87	1.30
Average Distance Migrated, '95-'00	272.58	127.14	Percent Foreign-Born	2.72	3.68
			Median HH Income (logged)	10.11	0.21
ORIGIN COUNTY CHARACTERISTICS			Employment Growth, '90-'00	13.18	12.99
Immigration			Percent Unemployed	5.89	2.07
Percent Foreign-Born	2.21	3.59	Homeownership Rate	69.80	5.93
Foreign-Born Inflow Rate, '95-'00	3.33	4.17	Median Home Costs	3.96	1.15
Economy			GEOGRAPHY		
Median HH Income (logged)	10.04	0.25	Land Area (1,000s of mi^2)	0.96	1.31
Employment Growth, '90-'00	13.87	17.17	Intra-County Moves (logged)	-0.71	1.56
Percent Unemployed	6.12	2.91	Metropolitan	0.35	--
Homeownership Rate	72.75	7.51	Non-Metropolitan	0.65	--
Median Home Costs ($100s)	3.61	1.27	South	0.45	--
			Northeast	0.07	--
Socio-Demographic			Midwest	0.34	--
Native Population (logged)	10.12	1.36	West	0.13	--
Native Inflow Rate, '95-'00	44.28	20.20			
Percent Elderly	14.96	4.33	N	3,074	
Percent w/ No HS Diploma	30.46	10.34			
Percent of HHs w/ Children	37.24	5.44			

All variables, unless otherwise noted, are measured in 1990. Migration counts, rates, and distances are calculated from the 2000 U.S. Census Migration File and represent immigration and migration between counties from 1995 to 2000. Unemployment estimates are drawn from the Bureau of Labor Statistics. All other variables are drawn from the 1990 (and, in the case of employment growth, the 2000) U.S. Census SF1 and SF3. Neighboring county characteristics represent the average characteristics of all counties contiguous with the origin county of interest.

Table 3: Robust Negative Binomial Regression Results Predicting Native Out-Migration, 1995-2000

DV: Native Out-migrant Count	1		2		3	
Native Population, 1990 (logged)	0.98 (0.00)	***	0.90 (0.01)	***	0.90 (0.01)	***
Native-Born Inflow Rate, '95-'00 §	0.63 (0.03)	***	0.51 (0.04)	***	0.52 (0.05)	***
IMMIGRATION						
Percent Foreign-Born, 1990 §	3.97 (0.62)	***	--		1.12 (0.39)	**
Percent Foreign-Born (squared) §	-0.09 (0.02)	***	--		-0.02 (0.01)	*
Foreign-Born Inflow Rate, '95-'00 §	1.67 (0.34)	***	--		0.94 (0.27)	***
Foreign-Born Inflow Rate (squared) §	-0.05 (0.01)	***	--		-0.02 (0.01)	*
Percent Foreign-Born in Neighboring Counties §	-0.50 (0.26)	+	--		-0.28 (0.19)	
ECONOMY (lagged, 1990)						
Median HH Income (logged) §	--		-3.25 (3.94)		-5.17 (3.91)	
Employment Growth (1990-2000) §	--		-0.17 (0.04)	***	-0.20 (0.04)	***
Percent Unemployed §	--		0.76 (0.20)	***	0.74 (0.20)	***
Percent Owner HHs §	--		-0.99 (0.07)	***	-0.80 (0.08)	***
Median Home Costs §	--		7.59 (0.83)	***	6.28 (0.88)	***
SOCIO-DEMOGRAPHIC (lagged, 1990)						
Percent Elderly §	--		-0.82 (0.19)	***	-0.82 (0.19)	***
Percent w/ No HS Diploma §	--		-0.96 (0.09)	***	-1.07 (0.09)	***
Percent HHs w/ Children §	--		-0.30 (0.15)	*	-0.27 (0.14)	
GEOGRAPHY						
County Land Area §	--		0.87 (0.28)	**	0.92 (0.29)	**
Metropolitan §	--		1.07 (0.88)		1.47 (0.89)	
Non-Metropolitan (Ref.)	--		--		--	
South	--		-0.13 (0.04)	**	-0.12 (0.04)	**
Northeast	--		0.13 (0.14)		0.11 (0.15)	
Midwest	--		-0.04 (0.04)		-0.03 (0.04)	
West (Ref.)	--		--		--	
Constant	-1.51 (0.06)	***	0.43 (0.39)		0.53 (0.39)	
Log-Likelihood	-25392		-24780		-24747	
BIC	51234		50057		50032	

Robust Standard Errors are in parentheses. All variables are measured in 1990 unless otherwise noted. Though not reported, state fixed effects are included in all models and significantly improve model fit. Migration rates are normalized by the county labor force in 1990.

+ p<0.1; *p<0.05; **p<0.01; ***p<0.001

§ Coefficients and Standard Errors are multiplied by 100.

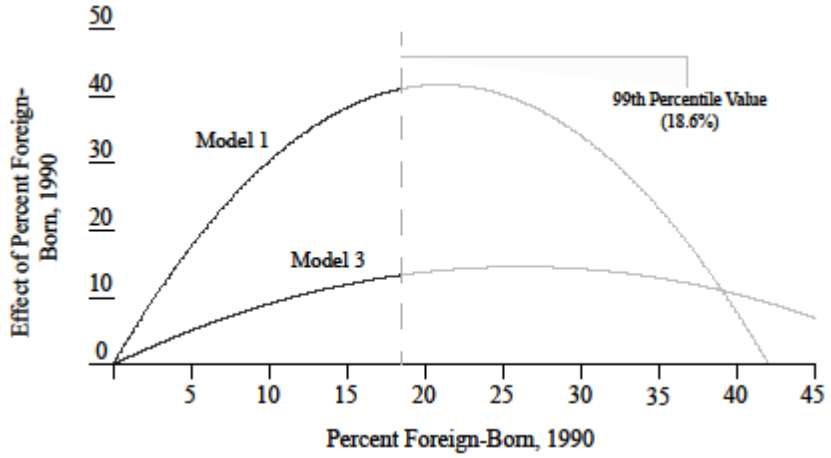
Table 4: Robust Regression Results Predicting the Average Distance Migrated by Native Out-Migrants, 1995-2000

DV: Distance Migrated (miles)	Model 1		Model 2		Model 3		Standard Betas
NEIGHBOR CHARACTERISTICS							
Total Population (logged)	-1.21 (1.76)		-12.35 (1.81)	***	-10.42 (2.57)	***	-0.11
Percent Foreign-Born	8.07 (0.84)	***	7.76 (0.65)	***	7.12 (0.75)	***	0.21
Median HH Income (logged)	--		--		-139.15 (28.05)	***	-0.23
Employment Growth	--		--		-0.46 (0.16)	**	-0.05
Percent Unemployed	--		--		1.17 (1.35)		0.02
Percent Owner HHs	--		--		3.14 (0.45)	***	0.15
Median Home Costs	--		--		39.87 (5.32)	***	0.36
ORIGIN CHARACTERISTICS							
County Land Area	--		0.12 (0.02)	***	0.13 (0.02)	***	0.13
Metropolitan	--		55.32 (4.12)	***	55.56 (4.17)	***	0.21
Non-Metropolitan (Ref.)	--		--		--		--
South	--		-106.59 (83.52)		-108.78 (82.55)		-0.43
Northeast	--		-121.61 (52.54)	*	-124.47 (51.88)	*	-0.25
Midwest	--		-233.97 (66.99)	***	-181.86 (65.95)	**	-0.68
West (Ref.)	--		--		--		--
Constant	389.77 (49.21)	***	608.04 (69.31)	***	1594.08 (264.19)	***	--
Adjusted R-squared	0.4783		0.5132		0.5266		--
BIC	36,862		36,679		36,628		--

Robust Standard Errors are listed in parentheses. All variables are measured in 1990 unless otherwise noted. Though not reported, state fixed effects are included in all models and significantly improve model fit.
*p<0.05; **p<0.01; ***p<0.001

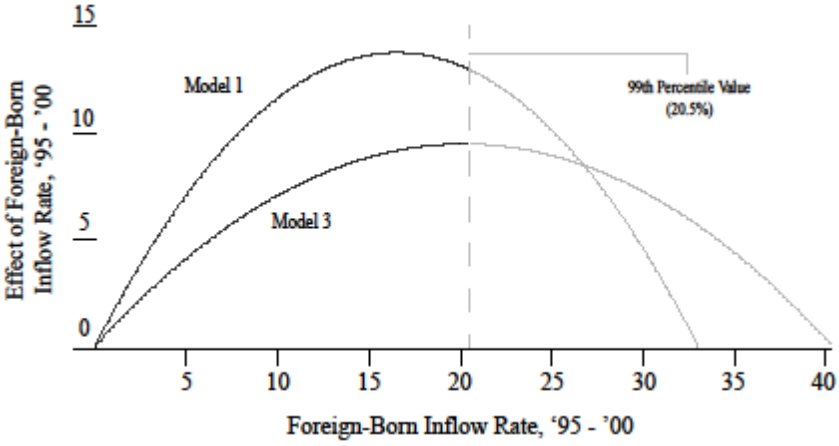
Figures

Figure 1: Non-Linear Effect of Percent Foreign-Born in 1990 on Native Out-Migration Counts, 1995-2000



See Table 3 for a full account of Models 1 and 3. Expected coefficients are plotted across observed values of percent foreign-born in 1990 and range from 0.0 (Carlisle County, KY, among others) to 45.0 percent (Miami-Dade County, FL). This distribution, however, is skewed heavily in the positive direction with only a few counties having 1990 Foreign-Born populations greater than 19 percent.

Figure 2: Non-Linear Effect of Immigration Inflows on Native Out-Migration Counts, 1995-2000



See Table 3 for a full account of Models 1 and 3. Expected coefficients are plotted across observed values of immigrant inflow rates between 1995 and 2000 and range from 0.0 (Carlisle County, KY, for example) to 40 percent (Presidio County, TX). This range, however, is skewed heavily in the positive direction with only a few counties having immigrant inflow rates greater than 20 percent between 1995 and 2000.

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