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Rural immigrant population growth, 1950-2000: waves or ripples?

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Using U.S. Census data from 1950 to 2000, this paper provides a framework to compare the responses of immigrant and native population growth to the economic incentives offered by rural counties in the Midwest and the South. We find that in marked contrast to urban immigrant populations, rural immigrants do not congregate in ethnic enclaves. Larger rural populations of immigrants do not attract more immigrants, nor do they retard growth of the young native born population. Immigrant populations are more responsive than native populations to economic incentives. The native-born population tends to respond more to growth in specific industries, while immigrant populations are more responsive to overall employment growth. Rural immigrant population growth is not positively influenced by levels of local welfare or other public services. Compared to earlier immigrant groups, more recent waves of immigrants are influenced more by the number of jobs than by income levels in deciding where to live.

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1 Introduction

Immigrants in the United States have traditionally been geographically concentrated. Major urban centers have long been focal points for incoming immigrants arriving in the United States, and the fraction of immigrants in the population is consistently larger in urban than in rural areas (Figure 1). In 2000, over half of the immigrant population in the U.S. lived in thirteen gateway cities (Logan, 2003) with 70% living in just six states (Haider et al 2004). Because such large numbers of immigrants live in these few geographically concentrated areas, most studies of the immigrant population have also focused on those few metropolitan areas, their labor market outcomes, and their impact on local demographic groups.

As shown in Figure 1, until the 1980 Census, the fraction of immigrants in the rural population had decreased in every successive decadal census since 1890. Since 1970, the fraction of immigrants has more than doubled in urban areas, but it has grown only modestly in rural areas. Nevertheless, immigrants have begun to choose to locate to rural counties in increasing numbers since 1990. In 2000, Hispanics, the largest immigrant group, grew more rapidly in rural counties than in urban areas. This apparent shift in locational preference gives rise to the question: why do immigrants choose to locate in rural counties?

There are many approaches to answer this question. Sociologists have relied on social networks to explain immigration in rural counties. Social networks rely on existing immigrant populations in an area to attract new cohorts of immigrants to that location. These studies often detail the experiences of a specific city, industry, or immigrant group in the form of a case study. An alternative way to approach the question of why immigrants locate in rural counties is to address the economic incentives that draw immigrants. Wojan (2000) details how the occupational composition of employment has changed over time in urban and rural areas in the South. He notes that there seems to have been a shift within the rural economy to emphasize low-skill occupations over high skill jobs. Drabenstott et al (1999) shows that meatpacking plants are relocating from urban areas to rural communities. These plants are accompanied by wages low enough that few local residents may find the jobs attractive.

This change in occupation composition could have significant effects on immigration patterns in rural counties for two reasons. First, if an immigrant was working in a manufacturing plant in an urban area, that plant may now be located in a rural county. And second, if rural economies are now more reliant on low skilled labor, then immigrants may be a likely candidate population to work in the unskilled industries. This suggests that immigrants should be affected by the total employment of a county as well as the occupational, or industrial composition of a county.

Another possible factor affecting the immigrant population growth in rural counties is the history of immigration in the United States. The First Great Migration began after the end of Reconstruction and lasted until 1924. During this time, 26 million immigrants entered into the U.S., and for the first time in U.S. history, 9 million immigrants entered the U.S. in the decade from 1901 to 1910 (Borjas 1999). Before 1900, no more than 3 million immigrants had entered the United States in a decade.

This rapid increase in the foreign-born population prompted Congress to pass the

Immigration Act of 1924, which was designed to curb the growing presence of Central and Eastern Europeans by setting quotas on immigration, as well as prohibiting Asians from entering. The entrance requirements for immigrants was their educational attainment; only people with high levels of education were allowed into the U.S. Immigration legislation remained mostly unchanged over the next forty years until the Immigration and Nationality Act of 1965, which shifted emphasis of eligibility requirements for immigrants from educational attainment to family reunification.

The Immigration and Nationality Act of 1965 began the Second Great Migration and the new immigrant cohorts had different characteristics than their predecessors (the cohorts between 1924 and 1965). Before the Act, during the 1950s, two-thirds of immigrants came from either Canada or Western Europe, had higher wages than natives, and had higher educational attainment than the native population. However after the Act, in 1990, immigrants came mostly from Latin America or Asia (49% and 32% respectively), and had lower wages and education levels compared to natives (Borjas 1999).

In this study, we seek to determine the factors that attract immigrants (and natives) to rural counties of the Midwestern and the Southern states that, as shown in Figure 1, have had even smaller fractions of immigrants than for the U.S. as a whole. In our analysis, we see how demographic and industrial variables affect immigrant population growth in these nontraditional locations. Using decennial U.S. Census data from the years between 1950 and 2000, we are able to provide an expansive timeframe that allows us to determine not only what economic factors attract immigrants to rural counties, but also if those factors have changed. We address the following questions regarding the growth of the rural foreign-born[1] population:

a. What causes foreign- and native-born population growth in rural counties?
b. How do the foreign- and native-born populations differ in response to economic variables?
c. Did immigrant cohorts prior to 1965 locate in rural areas for different reasons than those after 1965

The paper opens with a migration model that highlights the factors that may attract the foreign- and native-born to rural areas. The model can be adapted to provide ordinary least squares estimation. We then present stylized immigration facts in rural counties in the Midwest and the South-Central states to provide a historical background for current discussion. The article closes with an analysis of our regression results.

2 Model

In this section we develop a migration model to explain the factors that cause the foreign-born to locate in rural areas. This model generates an econometric framework that we will use to address the factors that lead to the growth or decline in the rural immigrant population. We can extend this framework to also explain the factors that cause other populations, such as the native-born population, to locate in rural counties.

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[1] We use "immigrant" and "foreign-born" interchangeably. By immigrant or foreign-born, we refer to someone who was born outside of the U.S.

Suppose that an immigrant's expected utility from locating to county j is defined by the utility function $U_j^i(W_j, A_j, P_j)$. The expected earnings that an immigrant would expect to receive in the county is denoted by W_j; A_j is a vector of county amenities that may benefit immigrant populations atypically; and P_j is the cost of living in the county. We assume that immigrants pick a county of residence so as to maximize their expected utility.

The same factors that would enter into the expected utility function of the foreign-born would also enter into the expected utility function of the native-born, albeit presumably with different weights. The native-born's expected utility function in county j is assumed to be of the form $U_j^n(W_j, A_j, P_j)$. Both populations will have a reference utility which reflects the expected utility across all possible locations, denoted by $\bar{U^i}$ and $\bar{U^n}$. The probability that an immigrant will move to county j is equal to the change in the fraction of all immigrants locating in county j. Let I be the total immigrant population. The relation is given by:

$$\left(\frac{\Delta I_j}{I}\right) = \alpha_i \left(\frac{\Delta U_j^i}{\bar{U^i}}\right). \tag{1}$$

where α_i is a scalar specific to the foreign-born. Similarly, the change in the fraction of the total native-born, N, residing in the county will be $\left(\frac{\Delta N_j}{N}\right) = \alpha_n \left(\frac{\Delta U_j^n}{\bar{U^n}}\right)$ where α_n is a scalar specific to the native population.

To operationalize the model for empirical work, we need to specify the elements of W_j, A_j, and P_j. The expected wage, W_j, equals the probability that a person will obtain employment in county j, E_j^m, times the income that a person will receive conditional on being employed, denoted as ω_j. In notation, $W_j = E^m \omega_j$. The superscript m refers to the different populations; $m = i, n$ where i refers to the immigrant population and n refers to the native population.

The probability of being employed, E_j^m, depends on the mix of industries located in the county. Industries that demand labor skills that match those of foreign-born workers will have high values of E_j^i, while counties whose labor skill requirements do not match immigrant workers' skills have low values of E_j^i. We approximate E_j^m by:

$$E_j^m = \prod_{l=1}^{k} \left(\frac{E_{lj}}{E_j}\right)^{\eta_l^m} = \left[\left(\frac{E_{1j}}{E_j}\right)^{\eta_1^m} \left(\frac{E_{2j}}{E_j}\right)^{\eta_2^m} \cdots \left(\frac{E_{kj}}{E_j}\right)^{\eta_k^m}\right] E_j^{\eta^m} \tag{2}$$

where $\left(\frac{E_{lj}}{E_j}\right)$ is the share of county j's employment in industry $l = 1, 2, \ldots, k$. The exponent η_l^m represents the weight each population places on the particular industrial share of employment. The product of employment shares is then multiplied by the total employment of the county, $E_j^{\eta^m}$, where the exponent refers to the weight a group attaches to the county's total employment.

The conditional probability, ω_j, is measured by the average income per unit of human capital in the county, which is assumed to be the same for foreign- and native-born labor. Letting H_j be an observed measure of human capital in county j, then we approximate expected earnings per unit of human capital by:

$$\omega_j = Y_j H_j^{-\gamma} \tag{3}$$

where Y_j is per capita income in county j and $\gamma > 0$ is a parameter translating observed human capital to actual human capital. We specify the utility function in the form of a Cobb-Douglas function:

$$U_j^m = W_j^{\beta_W^m} A_j^{\beta_A^m} P_j^{\beta_P^m} \tag{4}$$

where $m = i, n$. The parameters $\beta_{W_j}^m, \beta_{A_j}^m$, and $\beta_{P_j}^m$ are utility weights that translate the respective variable into the expected utility for group m in county j.

Now that the basics of the model are in place, we can add empirical specifications to the model that answer the questions that we first posed. Mainly, what causes growth in the foreign- and native-born populations? Do the different populations respond differently to economic variables? And have those responses changed over time?

a. What causes foreign- and native-born growth in rural counties?

We can approximate the change in the foreign-born population in county j by $\Delta I_j = (\alpha_i I U_j^i)/\bar{U^i}$. Applying our specifications in equations (1-4), and by taking logarithms and rearranging terms, we get:

$$\begin{aligned} \ln(\Delta I_j) &= \ln(\alpha_i I/\bar{U^i}) + \ln(U_j^i) \\ &= \beta_0^i + \beta_W^i \ln(Y_j) - \beta_H^i \ln(H_j) + \sum_{l=1}^{k} \beta_{El}^i \ln(E_{lj}/E_j) \\ &\quad + \beta_E^i \ln(E_j) + \beta_A^i \ln(A_j) + \beta_P^i (P_j) \end{aligned} \tag{5}$$

where $\beta_0^i = \ln(\alpha_i I/\bar{U^i})$, $\beta_H^i = \beta_W^i \gamma$, $\beta_{El}^i = \beta_W^i \eta_l^i$, and $\beta_E^i = \beta_W^i \eta_l^i$. We do not have direct information on local amenities and prices, and so we approximate them by:

$$\beta_A^i \ln(A_j) + \beta_P^i \ln(P_j) = \left\{ \sum_{d=1}^{e} \beta_{Gd}^i \ln(G_{dj}) + \beta_I^i \ln(I_{j0}) \right\} + \left\{ \beta_B^i B_j + \beta_{Pt}^i P_t \right\} + \epsilon_j. \quad (6)$$

The first term in brackets is our approximation of the utility associated with local amenities. The second term represents utility associated with local prices, and the final term is a random approximation error.

The vector of amenities that attracts immigrant populations has been argued to include expenditures on government services G_{dj} (indexed by $d = 1, \ldots, e$). If immigrants are heavy consumers of public services, then they should seek out areas with more extensive government support. New immigrants may also seek the support of a population that shares the same culture and language. Urban ethnic enclaves have been shown to attract new waves of immigrants, and a similar mechanism might be expected to operate in smaller communities as well. If true, then the size of the existing population of foreign-born, I_{j0}, will be an added local amenity attracting foreign-born population.

We do not have sufficient time series information on the local cost of living. However, a major component of the variation in the cost of living will be captured by the price of land which will vary with population density and proximity to an urban market. We capture this source of price variation using the Rural-Urban Continuum Code, B_j, which increases with the rural nature of the county. In addition, prices will be changing over time, and so we use a series of decade-specific dummy variables, P_t, to correct for changes in the purchasing power of nominal dollars. Putting these elements together, the estimating equation for a given decadal change in the foreign-born population is[2]:

$$\begin{aligned}\ln(\Delta I_j) \quad = \quad & \beta_0^i + \beta_W^i \ln(Y_j) - \beta_H^i \ln(H_j) + \sum_{l=1}^{k} \beta_{El}^i \ln(E_{lj}/E_j) \\ & + \beta_E^i \ln(E_j) + \sum_{d=1}^{e} \beta_{Gd}^i \ln(G_{dj}) + \beta_I^i \ln(I_{j0}) + \beta_B^i B_j + \beta_{Pt}^i P_t + \epsilon_j. \end{aligned} \tag{7}$$

And the corresponding equation for growth of the native-born population is

$$\begin{aligned}\ln(\Delta N_j) \quad = \quad & \beta_0^n + \beta_W^n \ln(Y_j) - \beta_H^n \ln(H_j) + \sum_{l=1}^{k} \beta_{El}^i \ln(E_{lj}/E_j) \\ & + \beta_E^n \ln(E_j) + \sum_{d=1}^{e} \beta_{Gd}^n \ln(G_{dj}) + \beta_I^n \ln(I_{j0}) + \beta_B^n B_j + \beta_{Pt}^n P_t + \epsilon_j. \end{aligned} \tag{8}$$

Equations (7) and (8) provide us with regression equations that explain the log population changes as a function of variables presumed to enter into the expected utility of residing in county j relative to all other possible counties. A positive coefficient signifies that the associated factor attracts members of group m to the county. In practice, the equations will be estimated over a time series of cross-sections spanning the period 1950-2000. Population changes will be taken over a decade span, and all right-hand-side variables will be measured by their values at the start of the decade.

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[2] In our estimating equation of immigrant growth, we include the existing (or base) immigrant population as an independent variable. Using base year levels as a factor affecting future growth follows the approaches of Barro (1991) and Deller et al (2001). Barro measures the impact of base year GDP on the the future GDP growth. Deller et al, measures how the growth of a region's population depends on the population's size at the beginning of the time period.

b. How do the foreign- and native-born differ in response to economic variables?

We can identify how the growth of the native- and foreign-born populations differ in response to economic variables. Subtracting equation (8) from equation (7), we get:

$$\begin{aligned}\ln\left(\frac{\Delta I_j}{\Delta N_j}\right) &= \delta_0 + \delta_W \ln(Y_j) - \delta_H \ln(H_j) + \sum_{l=1}^{k} \delta_{El} \ln(E_{lj}/E_j) + \ \delta_E \ln(E_j) \\ &\quad + \sum_{d=1}^{e} \delta_{Gd} \ln(G_{dj}) + \delta_I \ln(I_{j0}) + \delta_B B_j + \delta_{Pt} P_t + \epsilon_j \qquad (9)\end{aligned}$$

where $\delta_f = \beta^i_f - \beta^n_f$ for a given factor f. If a factor differs in importance to the foreign-born population compared to the native born population, then $\delta_f \neq 0$. If $\delta_f > 0$, then the factor encourages faster growth of the foreign-born relative to the native-born population, and the fraction foreign-born will increase.

We can extend equation (9) to measure the differing responses between the native adults and immigrants with the native youth.

c. Are immigrant cohorts after 1965 different than those before 1965?

Let $\mathbf{X}'_{tj}$ represent all the regressors used in equation (7) and let β^i_t represent the associated vector of parameters that are indexed by decade t. If there are changes over time in the factors attracting immigrant populations to rural areas, then we would reject the hypothesis that $\beta^i_t = \beta^i_{t'} = \beta^i$ for $t \neq t'$. There has been ample evidence that the characteristics of immigrant populations changed dramatically from before to after the 1965 change in immigration policies, and so we might anticipate that the parameters governing the incentives to move to rural areas may have changed as well. To test this, we consider the regression equation:

$$\ln(\Delta I_{tj}) = \mathbf{X}'_{tj}\beta^i_{<65} + D_{65}\mathbf{X}'_{tj}(\beta^i_{>65} - \beta^i_{<65}) + \xi_{tj}. \tag{10}$$

where D_{65} is a dummy variable indicating the observation that represents immigrant populations after 1965. Since we rely on Census data, we use the first decade after 1965 to approximate the change in immigrant behavior. The coefficients with the uninteracted factors will reflect the immigrant population response before 1970, while the coefficients with the dummy variable interacted factors will reflect the change in those responses from before to after the change in policy. A rejection of the null hypothesis $\beta^i_{>65} - \beta^i_{<65} = 0$ can be interpreted as evidence that the more recent immigrant cohorts are attracted by different local attributes than were older cohorts[3].

3 Data & Empirical Strategies

In our analysis, we include each state in Table 1 except Texas. Inspection of the data shows us that when compared to other sample states, Texas' experience with immigration is very different than other states'. Due to factors unique to Texas, such as its long and continuous border with Mexico, we concluded that Texas' case was too different to be included in our analysis.

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[3] Because the change in policy occurred in the middle of the decade of the 1960s, we treat population changes before 1970 as the old immigration policy regime. Population changes after 1970 are treated as under the new policy.

From the remaining 17 Midwest and South-Central states, we randomly chose 18 rural counties from each state to include in our sample for each decade. In these states, 1,266 counties were designated as rural. Consequently, the sample size for each decade was 306 counties, or approximately 25% of the total number of rural counties in the Midwest and South-Central states. However, not all data was available since the Census did not report the foreign-born population for all counties in all years (especially 1950).

Figure 1 provides the historical context we must consider when studying the 1950-2000 timeframe. The time series of the percentage of foreign-born in our sample of states mimics the time series for the U.S. as a whole, but the fraction foreign born in the Midwest and the South is always lower than that for the U.S. as a whole in both urban and rural areas. To economize on our data collection efforts, we focus on a random sample of rural counties in the Midwest and the South. To verify that the foreign-born densities in our rural county sample were representative of the states as a whole, we collected the rural foreign-born population proportions for the sampled states and for the nation for each decade between 1950 and 2000. The time series data are shown in Figure 2. It is apparent that our county sample trend is consistent with the state and national trends found in Figure 2. We note that the foreign-born proportion in our sample of counties exceeds the aggregates for the Midwest and the South. There are two reasons: 1) our sample of rural counties includes counties that grew to become urban by 2000, and urban areas have higher fractions of foreign-born, and 2) the state aggregate data distinguishes between urban and rural areas within counties while our data includes urban areas within an otherwise rural county.

3.1 Immigration in Context

Table 1 shows the proportion of the total population and the rural population in each state that is foreign-born for each decade between 1950 and 2000. In 1950, Wisconsin, South Dakota, Illinois, Minnesota, and North Dakota had foreign-born proportions similar to or above the U.S. average of 5%. By 2000, Illinois and Texas had a foreign-born population comparable to the U.S. average of 11%. It is clear from Table 1 that the Midwest and the South-Central states have attracted a relatively small proportion of the past waves of immigrants compared to the U.S. as a whole.

In 1950, the South-Central states had foreign-born population densities ranging from 0.4% to 3.9%; the Midwest had higher densities ranging from 2.2% to 6.4% with Illinois, Minnesota, and North Dakota having densities above 7%. By 2000, with the exception of Texas and Illinois that had a foreign-born population density of 13.9% and 12.3% respectively, all other states had foreign-born population densities ranging from 1.4% to 5.3%, somewhat similar to their 1950 levels.

The South-Central states had modest increases in the proportion of foreign-born, both overall and as a proportion of their rural populations. Only half the Midwest states had rising proportions of foreign-born over the period, and only Missouri had an increase in its rural foreign-born density. However, these numbers mask intermediate gains and losses in foreign-born densities. Between 1990 and 2000, both the total and rural foreign-born densities in all the sample states increased. This shows that even though the foreign-born proportion remains low in most sample states, the Midwest and South-Central states have begun to absorb some of the most recent immigrant cohorts.

Table 2 shows the origin of rural immigrants compared to the rest of the U.S. in 2000. The Midwest and South-Central states have a considerably higher proportion of Europeans when compared to the U.S. average (22.4% and 15.8% respectively). Europeans make up an even larger fraction (29.7%) of the rural foreign-born in the Midwest and South-Central states. The fraction from of immigrants from Mexico in the rural Midwest and South-Central states is similar to that of the U.S. as a whole. The rural foreign-born in the Midwest and South-Central states are less likely to come from Canada or from South American countries than the U.S. as a whole.

3.2 Empirical Strategies

Since our timeframe spans half a century, many counties grew out of their rural status to become classified as urban in the years between 1950 and 2000. To avoid skewing our results, we chose counties that were rural in 1950, and then followed the same county sample throughout our timeframe. If we had chosen our rural counties from the 2000 data, and then gone back to 1950, we would have only included the slowest growing counties. If immigrants seek out the fastest growing job markets, then limiting our analysis to the slowest growing counties would lead to a downward bias of rural foreign-born population growth [4].

To categorize counties as urban or rural, we use the Rural-Urban Continuum Codes developed by Calvin Beale at the USDA. However, these codes were first applied to Census data in 1980, so we must apply the Rural-Urban Continuum Codes criteria to the 1950 data. A county is defined as rural if it corresponds to Rural-

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[4] For a more complete discussion of bias in measuring rural growth, see Artz and Orazem (2007).

Urban Continuum Code indexed by 6-9, which means that a county had to have no more than 20,000 inhabitants in 1950.

We assume that the foreign-born are primarily of working age as approximately 71% of immigrants[5] are between the ages of 20 and 64, so it is appropriate to compare the experiences of the foreign-born to the native-born population aged 20-64. Concentrating on the working age population also allows us to ignore natives moving to rural counties in retirement and children migrating with their families. Limiting our analysis to this age group also minimizes possible problems due to natural population increases or decreases due to births and deaths.

We consider three populations in our analysis; these are the native-adult, native-youth, and foreign-born populations. The native-adults are those natives aged between 20 and 64, and the native-youth are natives aged 20-34. The native-youth should be the most responsive native population to economic circumstances in deciding where to live, and so we will be able to assess whether immigrants are even more responsive than the native-youth population.

The demographic variables used in our analysis include: median income, median number of school years completed, total employment, Rural-Urban Continuum Code, and current foreign-born population. Our industrial variables correspond to the sectors of employment that can be found in the U.S. Census. The sectors are: the manufacturing, agricultural, mining, government, financial, wholesale, retail, construction, transportation & utilities, and service sectors[6]. All demographic and industrial variables were gathered from the U.S. Census for each decade between 1950 and 2000. Our amenities variables include per capita tax revenue, per capita highway expenditure, and per capita education expenditure. These were compiled from the Compendium of Government Finances. The Compendium data is available only in the 2nd and 7th years of a given decade, so we use the average of the two to represent the pattern of county government expenditures over that time span.

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[5] Based on 1998 data from the Immigration and Naturalization Service.

[6] In our regression analysis we include the total employment of a county as well as the employment share of each industry. To prevent multi-collinearity problems, we leave out the mining sector from our analysis.

4 Regression Results

The estimates for equations $(7-9)$ are reported in Table 3. The model explains 51% of the variation in foreign-born population growth, 25% of the variation for the native-adult population growth, and 33% of the variation in the native-youth population growth. The higher R^2 for the immigrant population suggests that they are particularly sensitive to observable economic factors influencing their incentives to migrate. The native-adults lower R^2 is consistent with the native-born responding to more unobserved tastes such as climate[7], local loyalty, or family ties when locating to rural counties. The native-youth are more sensitive to economic circumstances than are native-adults.

Our results for median income are consistent with our migration theory, as the three populations respond positively to an increase in the median income. The foreign-born are much more sensitive to wage earnings; holding all else constant, a 10% increase in income leads to a 1.9% increase in the foreign-born population. The comparable effects for the native-adult and native-young are 0.5% for both populations.

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[7] We do not include any variables for climate in our analysis as choosing a county based on climate is a luxury and is not something that a working aged immigrant is likely to do. For a more complete analysis of how climate and topography induce growth, see McGranahan (1999).

The human capital effect is measured by the number of school years completed. The impact of residential human capital on foreign-born population growth is negative, consistent with the theory summarized by equation (7). For the native populations, the effect is positive but insignificant.

Foreign-born populations cannot get welfare benefits in the first five years of residence[8]. Consistent with that fact, government welfare programs have an insignificant impact on foreign-born populations. Perhaps surprising given media reports of the strain on public services caused by the influx of foreign children, we find that public education expenditures have a negative effect on the foreign-born. The local tax levels have no effect on the growth of the foreign-born population. County government services have no impact on the growth of native-born populations. The only local fiscal measure that affects the rural native-born population is per capita tax revenue which slows growth. The effect of per capita taxes is slightly larger for the native-youth than for the native-adults.

Perhaps the most interesting result of this analysis is how the populations respond to the existing foreign-born population of a county. In urban areas, ethnic enclaves have been shown to attract new waves of immigrants with shared ethnicity. One would expect that larger foreign-born populations would attract new waves of immigrants in rural areas as well. However, we find that a 10% increase in the existing population of the foreign-born at the start of the decade lowers the growth of the foreign-born population by 3.2% over the following decade. Interestingly, the population of native-youth responded positively to the size of the local foreign-born population. Furthermore, the native-adults responded in a positive and significant way to the magnitude of the foreign-born population.

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[8] This is due to the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA). For further discussion see Haider et al 2004.

Rising Rural-Urban Continuum Codes signify increasing remoteness. Higher Rural-Urban Continuum Codes are associated with lower growth of both foreign-born and native populations. For the foreign-born, a 10% increase in the Continuum Code induces a 2% decrease in the growth rate; a 10% increase in the Continuum Code causes a 1% and 2% decrease in the growth rates for the native-adult and native-youth populations, respectively.

The model captures the probability of employment with a vector of industry employment shares. The foreign-born are particularly sensitive to the composition of industry employment shares. The industrial employment shares that attracted the foreign-born were manufacturing, transportation & utilities, retail, service, government, and construction. The wholesale and government sectors were both positive and statistically significant for the foreign-born.

The native-adults responded positively to the manufacturing, financial, retail, construction, and government sectors. The native-youth were positively and significantly affected by the manufacturing and construction sectors. Also, the retail, service, construction, financial, and government sectors had marginal effects on the native-youths growth rates.

Regardless of nationality, rural populations seem to be attracted to the manufacturing, retail, government, and construction sectors. The native populations are attracted to manufacturing in a positive and significant manner. The foreign-born and native-youth are also attracted to the service sector. Neither the native-adults nor the native-youth are influenced by the wholesale sector. Agriculture has no impact on the native-youth. In general, this shows that the native and foreign-born populations are attracted to the same types of jobs.

Interestingly, both the total employment and the mix of jobs are important to the foreign-born. In contrast, the native-born react to the industrial composition, but not to the growth of rural total employment.

4.1 Are location decisions of recent immigrant cohorts different that past cohorts?

The Immigration and Nationality Act of 1965 changed the weight placed on refugee and family status relative to education in qualifying for U.S. residency. Before 1965, immigrants had higher educational levels than average U.S. citizen, but after 1965, immigrants had less education than the average native. This change in the composition of immigrant skills may have caused a change to take place in the foreign-born's incentives to locate to rural labor markets.

To evaluate this statement, we partition the data into two periods: an early period (1950-1970) and a late period (1970-2000). We allowed the coefficients on each variable to vary between the periods. This allows us to test whether there was a change in either the native- or foreign-born's responses to rural economic incentives between the two periods. The coefficients from the split sample estimation are presented in Table 4. F-tests of the null hypothesis of no change in the coefficients were easily rejected at the 0.01 significance level for each population. Therefore, all three populations' responded differently to the factors influencing location decisions in the late period compared to the early period.

Many of the changes in the populations' responses were modest, and tests of individual coefficients do not reject the null hypothesis of no change. Nevertheless, there are some important changes in the response to some factors that are worth highlighting.

First, foreign-born population growth is negatively correlated with the size of the existing foreign-born population in both periods, and the magnitude of the negative effect increases in the later period. In contrast, native-born population growth is not adversely influenced by the size of the existing foreign-born population in either period. Apparently, in rural areas, there is no role of ethnic enclaves as an attraction to new immigrants or as a source of conflict with native-born populations. This is true in the later period as well as the early period.

Median income seems to have become less important to all populations between the two periods. Prior to 1970, the three populations responded positively to median income with the foreign-born being the most responsive. But in the late period, all three populations displayed negative responses to the median income in a county.

The joint test of equality of responses to the composition of employment found that all rural county population growth rates changed in response to the mix of jobs between the two periods. However, most of the changes in the estimated response to specific industrial sectors were not statistically significant. However, there are some exceptions. For all populations, high shares in the agricultural and manufacturing sectors change from a population draw to a source of population decline, with the change being statistically significant for the native youth (at the 5% level) and for the foreign-born (at the 10% level). High employment shares in the government sector became a less important factor affecting population growth for all groups in the later period. On the other hand, the total number of jobs became more important for all populations, and most significantly so for immigrants. Between 1950 and 1970, only the foreign-born population placed a positive weight on the total employment in a county. All populations responded less to median income in the late period than they had in the early period. The finding that rural population growth appears more responsive to the availability of jobs than to median income levels is consistent with the finding of Khan et al (2001).

5 Conclusion

This study uses a stylized migration model to determine the factors that affect the population growth of immigrants, native-adults, and native-young adults in rural counties. Our analysis of Census data between 1950 and 2000 suggests that the immigrant population was the most responsive to economic incentives in deciding county of residence, both before and after the 1965 change in immigration law.

Unlike major metropolitan labor markets where immigrants congregate in ethnic enclaves, we find that new immigrants tend to migrate to counties with smaller existing immigrant populations. Ironically, larger immigrant populations in a county do not discourage the growth of the native population and may even contribute modestly to the growth of the young native-born population.

While the native-born population tends to be more responsive to the growth of specific industries in a county, the immigrant population is more responsive to overall employment growth. More recent waves of immigrants react even more strongly to the growth in overall job numbers. In contrast, while older immigrant cohorts were sensitive to local income levels, more recent cohorts appear to follow jobs and not income levels.

A popular perception is that immigrants locate in areas with high levels of public services such as education and welfare. We find that this is not the case, consistent with prohibitions against immigrant receipt of many welfare benefits. Immigrant migration patterns are either insensitive or negatively related to levels of rural county government expenditures.

Our analysis of the patterns of immigrant population growth in the rural Midwest and South suggests that recent growth is more a ripple than a wave. The pattern of responses to jobs and public expenditures suggests that immigrants react to weakening labor market conditions in a county by leaving for counties with improving job prospects rather than staying and consuming government services. Consequently, rural areas that retain large populations of immigrants will do so only by having relatively strong demand for labor, the same factors that lead to retention of young populations of the native-born.

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Table 1: Foreign-Born as a Percentage of Total Population, by Rural Residence and State, 1950-2000.

	Foreign-Born as a Percentage of Total						1950-2000 Percent Change in		
	1950	1960	1970	1980	1990	2000	Total Population	Rural Total Population	Rural Foreign-Born Population
South-Central									
Alabama	.21[a]	0.25	0.19	0.54	0.45	1.1	45.2	15.1	404.9
	[.48][b]	[.46]	[.46]	[1.00]	[1.08]	[2.0]			
Arkansas	0.42	0.46	0.26	0.59	0.6	1.36	40	-0.76	236.1
	[.54]	[.42]	[.43]	[.98]	[1.06]	[2.8]			
Kentucky	0.29	0.36	0.17	0.46	0.35	0.76	37.3	-3.9	167.6
	[.58]	[.55]	[.52]	[.95]	[.93]	[2.0]			
Louisiana	0.49	0.34	0.32	0.83	0.64	0.85	66.5	0.95	75
	[1.15]	[.94]	[1.09]	[2.03]	[2.07]	[2.6]			
Mississippi	0.29	0.18	0.2	0.59	0.41	0.79	31.1	-7.3	156.9
	[.43]	[.37]	[.32]	[.93]	[.79]	[1.4]			
Oklahoma	0.74	0.56	0.33	0.7	0.71	1.32	54.5	-7.2	95.7
	[.91]	[.86]	[.79]	[1.86]	[2.08]	[3.8]			
Tennessee	0.23	0.2	0.19	0.56	0.49	1.1	72.8	12.5	381.4
	[.49]	[.44]	[.48]	[1.05]	[1.21]	[2.8]			
Texas	3.52	2.19	1.66	3.14	4.42	5.1	170.4	26.9	85.7
	[3.91]	[3.12]	[2.77]	[6.02]	[8.97]	[13.9]			
Midwest									
Illinois	3.17	2	1.32	3.07	1.12	1.2	42.6	-22.6	-71.2
	[9.17]	[6.81]	[5.66]	[7.21]	[8.33]	[12.3]			
Indiana	1.26	0.88	0.66	0.89	0.75	0.99	54.6	13	-10.9
	[2.62]	[2.00]	[1.60]	[1.85]	[1.70]	[3.1]			
Iowa	2.99	1.69	1.04	0.93	0.56	1.10	11.6	-16.9	-68.27
	[3.28]	[2.04]	[1.42]	[1.64]	[1.56]	[3.1]			
Kansas	2.06	1.39	0.84	1.05	1.15	1.70	41.1	-15.8	-34.3
	[2.17]	[1.53]	[1.24]	[2.03]	[2.53]	[5.0]			
Minnesota	5.96	3.16	1.8	1.38	0.83	1.40	64.9	5.3	-75.5
	[7.16]	[4.22]	[2.58]	[2.64]	[2.58]	[5.3]			
Missouri	0.84	0.65	0.42	0.7	0.57	1.00	41.5	12.5	38.3
	[2.40]	[1.80]	[1.40]	[1.74]	[1.63]	[2.7]			
Nebraska	3.71	1.98	1.23	1.01	0.75	1.40	29.1	-26.4	-72.1
	[4.38]	[2.85]	[1.94]	[1.97]	[1.79]	[4.4]			
North Dakota	8.24	4.78	2.93	1.94	1.07	1.20	3.6	-37.8	-91.5
	[8.02]	[4.73]	[2.98]	[2.27]	[1.47]	[1.9]			
South Dakota	4.97	2.76	1.54	1.19	0.69	0.80	15.5	-16.7	-86.7
	[4.82]	[2.73]	[1.63]	[1.39]	[1.11]	[1.8]			
Wisconsin	4.99	2.79	1.83	1.44	1.06	1.2	56.2	17.5	-71
	[6.43]	[4.34]	[2.96]	[2.66]	[2.48]	[3.6]			

Source: Authors' computations using Census data.

[a] Rural Foreign-Born as a percentage of all rural residents, using current Census definition of rural.

[b] Foreign-Born as a percentage of total population in brackets.

Table 2: Percent Distribution of the Foreign-born by Origin in 2000

			Midwest & South-Central	
	US	**Texas**	**Total**	**Rural**
Europe	15.8	5.3	22.4	29.7
Asia	26.4	16.1	28.2	22.2
North America	48.3	73.9	42.4	42.6
Mexico	29.4	64.8	33.4	29.5
South America	6.2	2.3	2.9	2.9
Africa	2.8	2.2	3.6	1.7

Table 3: Least Squares Regression Analysis for Sample Populations, 1950-2000

	Populations:			Difference Bewteen Foreign-Born and:	
Variables	**Foreign-Born**	**Natives 20-64**	**Natives 20-34**	**Natives 20-64**	**Natives 20-34**
Median Income	0.19	0.05	0.05	0.14	0.15
	(1.99)	(1.71)	(1.15)	(1.49)	(1.53)
Yrs of School Completed	-0.37	0.04	0.10	-0.41	-0.47
	(8.02)	(0.51)	(1.02)	(-1.73)	(-1.96)
Per Capita Welfare Expenditure	-0.01	-0.00	0.00	-0.01	-0.01
	(-1.45)	(-0.39)	(-1.17)	(-1.32)	(-0.92)
Per Capita Education Expenditure	-0.14	0.01	-0.03	-0.14	-0.11
	(-1.99)	(0.23)	(-1.13)	(-2.11)	(-1.53)
Per Capita Tax Revenue	0.02	-0.07	-0.10	0.09	0.12
	(0.34)	(-4.53)	(-4.47)	(1.82)	(2.22)
Current Foreign-Born Pop.	-0.32	0.01	0.02	-0.33	-0.34
	(-15.92)	(2.20)	(1.83)	(-16.73)	(-16.52)
Rural-Urban Continuum Code	-0.02	-0.01	-0.02	-0.00	-0.00
	(-1.36)	(-3.31)	(-3.04)	(-0.32)	(-0.09)
Total Employment	0.37	-0.01	-0.01	0.38	0.38
	(8.02)	(-0.79)	(-0.68)	(8.32)	(8.21)
Proportion of Jobs in:					
Manufacturing	0.01	0.03	0.06	-0.01	-0.04
	(0.59)	(3.60)	(5.31)	(-0.57)	(-1.64)
Agriculture	-0.07	-0.02	0.00	-0.06	-0.08
	(-2.11)	(-1.49)	(0.04)	(-1.66)	(-2.12)
Transportation & Utilities	0.01	-0.01	-0.01	0.02	0.02
	(0.19)	(-0.73)	(-0.52)	(0.44)	(0.41)
Wholesale	0.09	0.00	-0.00	0.08	0.09
	(2.11)	(0.13)	(-0.09)	(2.07)	(2.10)
Financial	-0.08	0.02	0.01	-0.10	-0.09
	(-1.45)	(1.12)	(0.50)	(-1.86)	(-1.7)
Service	0.05	-0.03	0.02	0.08	0.03
	(0.54)	(-1.00)	(0.48)	(0.87)	(0.33)
Retail	0.06	0.02	0.05	0.05	0.01
	(0.66)	(0.51)	(1.28)	(0.51)	(0.13)
Government	0.12	0.02	0.03	0.10	0.09
	(2.73)	(1.43)	(1.41)	(2.27)	(2.09)
Construction	0.05	0.09	0.10	-0.04	-0.06
	(0.86)	(5.03)	(4.28)	(-0.79)	(-0.98)
R^2	0.51	0.25	0.33	0.45	0.45
N	1329	1342	1342	1329	1329

All variables except Rural-Urban Continuum Code are in log form and can thus be thought of as elasticities. The t-statistics are in parentheses.

Table 4: Population Growth Regressions for Early and Late Periods, by Population Group

	Foreign-Born			**Natives 20-64**			**Natives 20-34**		
Variables	**1950-1970[a]**	**1970-2000[b]**	**D[d]**	**1950-1970**	**1970-2000**	**D[d]**	**1950-1970**	**1970-2000**	**D[d]**
Median Income	0.54	-0.10	**	0.15	0.03	*	0.22	-0.02	**
	(3.44)	(-0.82)		(2.88)	(0.60)		(3.28)	(-0.44)	
Yrs of School Completed	-0.74	0.29	**	0.17	-0.01		0.17	0.11	
	(-2.05)	(0.92)		(1.46)	(-0.08)		(1.11)	(0.84)	
Per Capita Welfare Expenditure	0.01	-0.02		-0.01	0.00		-0.00	-0.00	
	(0.70)	(-1.93)		(-1.00)	(0.34)		(-0.48)	(-1.10)	
Per Capita Education Expenditure	-0.15	-0.07		-0.02	0.04		-0.08	0.03	*
	(-1.48)	(-0.73)		(-0.55)	(1.25)		(-1.76)	(0.80)	
Per Capita Tax Revenue	-0.15	0.02		-0.14	-0.06	**	-0.20	-0.08	**
	(-1.42)	(0.26)		(-4.22)	(-3.20)		(-4.54)	(-3.08)	
Current Foreign-Born Pop.	-0.21	-0.45	**	0.02	0.01		0.02	0.01	
	(-7.07)	(-16.82)		(1.79)	(1.32)		(1.45)	(1.18)	
Beale Code	-0.01	-0.02		-0.03	-0.01	**	-0.04	-0.01	**
	(-0.17)	(-1.23)		(-3.26)	(-1.92)		(-3.45)	(-1.49)	
Total Employment	0.21	0.56	**	-0.03	-0.00		-0.06	0.01	
	(2.68)	(9.89)		(-1.28)	(-0.06)		(-1.64)	(0.34)	
Proportion of Jobs in:									
Manufacturing	0.09	-0.01	*	0.03	0.02		0.08	0.03	**
	(2.19)	(-0.42)		(2.57)	(1.78)		(4.68)	(1.84)	
Agriculture	0.09	-0.05		0.01	-0.03		0.07	-0.03	**
	(1.12)	(-1.34)		(0.53)	(-2.08)		(2.02)	(-1.63)	
Transportation & Utilities	-0.01	0.05		0.01	-0.02		0.03	-0.04	
	(-0.07)	(0.71)		(0.36)	(-1.05)		(0.88)	(-1.35)	
Wholesale	0.09	0.04		0.00	0.00		-0.02	0.01	
	(1.23)	(0.76)		(0.08)	(0.11)		(-0.50)	(0.38)	
Financial	-0.17	-0.02		-0.02	0.03		-0.03	0.03	
	(-2.00)	(-0.39)		(-0.72)	(1.66)		(-0.91)	(0.93)	
Service	0.09	0.20		-0.02	-0.06		0.05	-0.06	
	(0.63)	(1.71)		(-0.46)	(-1.43)		(0.84)	(-1.08)	
Retail	0.23	0.09		-0.00	0.03		0.02	0.06	
	(1.52)	(0.71)		(-0.06)	(0.73)		(0.25)	(1.13)	
Government	0.32	0.04	**	0.07	0.00	**	0.11	-0.00	**
	(3.72)	(0.68)		(2.55)	(0.13)		(2.98)	(-0.21)	
Construction	-0.04	0.12		0.06	0.11		0.07	0.11	
	(-0.42)	(1.68)		(2.02)	(4.63)		(1.95)	(3.60)	
R^2	0.49			0.19			0.24		
N	1336			1349			1349		
F(17, N-17)[C]	39.9		*	12.9		*	18.6		*

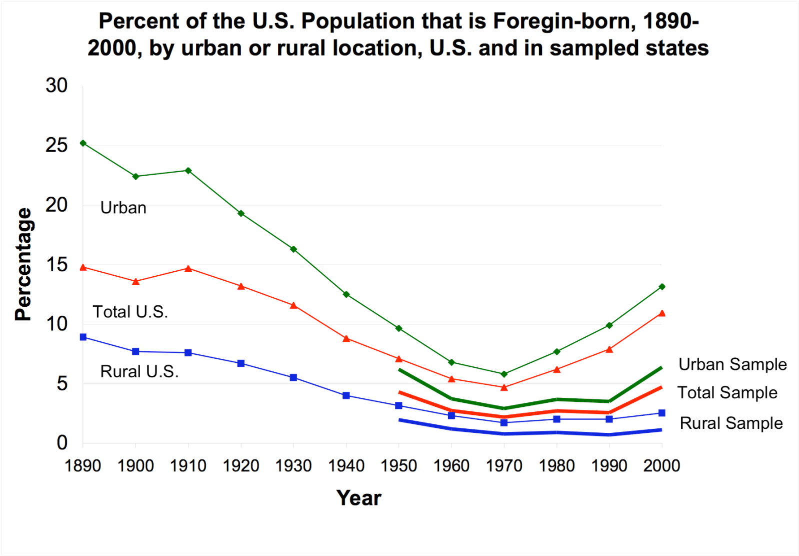
[a] The early period is from 1950 to 1970. [b]The late period is from 1970 to 2000.

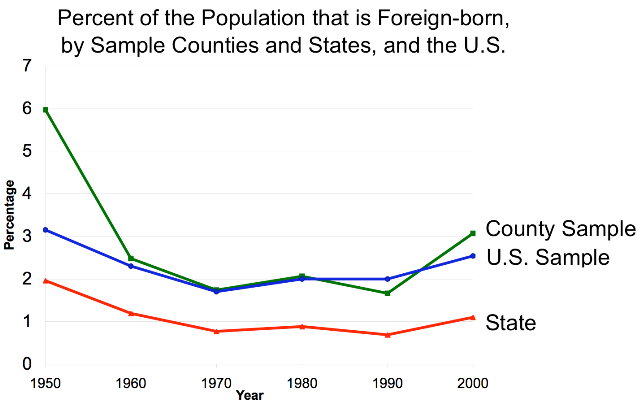
[c] F-statistics for the hypothesis that all coefficients are jointly equal across the early and late periods.

[d] D: the test of equality of the specific coefficient between the early and late period.

* indicates that the difference is significant at the 10% level.

** indicates that the difference is significant at the 5% level.


Percent of the U.S. Population that is Foregin-born, 1890-2000, by urban or rural location, U.S. and in sampled states
Percentage
30
25
20
15
10
5
0
Urban
Total U.S.
Rural U.S.
Urban Sample
Total Sample
Rural Sample
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
Year


Percent of the Population that is Foreign-born,
by Sample Counties and States, and the U.S.
Percentage
7
6
5
4
3
2
1
0
1950
1960
1970
1980
1990
2000
Year
County Sample
U.S. Sample
State