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A LONGITUDINAL APPROACH TO GREAT PLAINS MIGRATION

JOHN C. HUDSON

Students of population and regional studies are familiar with the demographic "accounting" equation,

\[ \text{Population}_{t+x} = \text{Population}_t + \text{Births}_x - \text{Deaths}_x + \text{Immigration}_x - \text{Emigration}_x. \]  

(1)

In other words, the size of the population at time \( t+x \) is equal to the population at time \( t \) plus the births, minus the deaths, plus the immigrants, minus the emigrants, during the interval of time \( x \). This simple formula can be used to derive a variety of rates and statistics describing population change. The equation's main application is to describe short-term change in a population in terms of its various components.

Viewed another way, population size is a chain of growth components linked by generation:

\[ \text{Population} = \text{Number of immigrants} + \text{Births to immigrants} + \text{Births to children of immigrants} \ldots - \text{(Sum of deaths and emigration)}. \]  

(2)

In this view, everyone is either an immigrant or a child (grandchild, great-grandchild, ...) of an immigrant, provided the reckoning is extended backward in time to the arrival of the very first humans to live in a place. As the earliest immigrants die or leave the region, they are replaced by their children, then by their grandchildren, and so on. This type of
accounting equation has as many terms as there are generations and groups of people. Although we sometimes refer to the earliest people in an area as “native,” even groups inhabiting an area for a very long time are descended from ancestors who came from some other place.

These definitions can be applied to the study of population in the Great Plains or any other region. The migration-based approach to studying population change is especially relevant in the Plains because of the large volume of both in- and out-migration that has characterized the region’s history. Equations (1) and (2) represent two distinct approaches to the study of migration. In equation (1) migration is a process of updating the population. In every time period, arrivals are added to the total and departures are subtracted. Time is chronological and calendrical. The approach is suited for use in population studies based on census data or on other regularly collected statistics. In equation (2), time is generational, with contributions to population size being made by successive generations of immigrants and their descendants. Censuses do not record populations in this way, however, so equation (2) is of limited usefulness in regional population studies.

Equation (2) has the virtue of emphasizing that populations are long-term aggregations. The often-repeated observation that the United States is a “nation of immigrants” refers not only to the immigrants themselves but also to their successive generations of descendants who form ethnic groups within the population. The same could be said for internal migrants who constitute regionally based population groups. New Englanders, for example, often are recognized as a distinct origin group outside their region of birth.

A longitudinal approach to migration, emphasizing the contributions of origin populations over time, focuses attention on the contributions made by outside areas. Human societies and cultures within the Great Plains often have been defined with respect to the areas where each originated. Well-known ethnic concentrations include Norwegians in North Dakota, German Russians in both Dakotas, Bohemians in Nebraska, and Mexicans in Texas. American-born regional concentrations include a preponderance of Yankees in the Northern Plains, Midlanders in the Central Plains, and Southerners in Texas.

The impact of well-defined migrations of people from distant areas lingers long after the migrations have ceased. Many European migrations were of fairly brief duration but their influence on the population remains strong. Many German Russians, for example, came to the United States during a fairly brief period of intense migration activity in the late nineteenth century. Those migrations were not to be repeated. Although there were many fewer new arrivals in the following years, the German Russians became established as ethnic enclaves scattered over the Northern Plains of the United States and Canada.

Internal migrations (the movement of American-born people into the Great Plains) can have a similar pattern. In some cases, especially those involving distant origins, an early wave of migration is not repeated. New Englanders were prominent in the frontier populations of many Plains states, but the initial wave was overwhelmed by migrants from other places, and New Englanders eventually dwindled to insignificance as a percentage of local population.

**LONGITUDINAL MODEL OF MIGRATION**

A simple longitudinal migration model will allow direct comparison of migration histories for the Plains states. The longitudinal model used here is formulated to make use of census data. It is based on rates that measure the relative size of a particular migrant group living in a Plains state at some census date, for example:

\[
\frac{\text{[Number of New York-born people living in Nebraska in 1880]}}{\text{[Total population of Nebraska in 1880]}} \times 1000. \tag{3}
\]

Computation of this rate for a succession of censuses shows the relative rise or fall of the
concentration of New York-born people in Nebraska. If a plot of rates over time shows a steady increase, it means that New Yorkers are becoming proportionally more common in Nebraska's population. A marked decrease shows that the initial migration stock of New Yorkers was not replaced over time, and that this population component is dwindling from out-migration and mortality. A slow decrease suggests that the attrition is caused mainly by deaths in the early migrant group and the lack of replacement.

Equation (3) is based on relative rates because it is appropriate to focus on the origin of a population rather than its destination. Dividing the number of migrants by the receiving state's population standardizes the rate to erase the effect of overall population growth in the receiving state.

Migration Syndromes

Longitudinal migration studies reveal the long-term effects of past migrations. They also reveal shifts of migrant origins over time. Great Plains states were way stations in the westward migration process within the United States. People born in the East moved, generation by generation, to the Midwest, the Plains, and then the Far West. Fluctuations in total population numbers mask the turnover of people that is inherent in such a process.6

A “migration syndrome” refers to a characteristic type of longitudinal profile in migration rates such as those defined in equation (3). Population contributions made by a given state (or country) of origin may be characterized as either transient or maintenance in nature. Most European migrations to the Plains, as well as much of the migration from the eastern seaboard of the United States, was transient. A transient pattern is characterized by a single peak followed by (and/or preceded by) a period of much less migration. State A in Figure 1 is typical of the northeastern states. Those states sent many migrants west to the Plains during the mid- and late nineteenth century, but people from such distant origins later became relatively less common. The same transient contribution also is evident for most foreign countries.

The states in Figure 1 typically would be arrayed from east to west, with State A farthest east and State E farthest west. The lags
between the various peaks represent the length of time it took the frontier to move "one generation west." Migrants from State C typically would be one generation younger than those from States A or B, for example. Eventually the population contributed by all out-of-state sources becomes small relative to the number born within the state; this is represented in the progressive decline in the height and the flattening of the peaks from State A to State E.

Although these are generalized statistical impressions, they reflect a genuine change in population composition over time. New Englanders, New Yorkers, and Pennsylvanians figure prominently in the nineteenth-century histories of all of the central and northern Great Plains states. Men and women came west from established communities in those states and brought their "eastern" culture with them. Once the initial frontier phase had passed, people from eastern origins were relatively less numerous among newly arrived migrants to the Plains. Migrants who came after the frontier had passed included larger numbers from midwestern origins. They in turn brought with them a lifestyle common in the communities from which they had come, just like the easterners had before them.

A maintenance pattern (Fig. 2) is more common for short-distance migrations. Migrants leave their states of origin and move to adjacent states for many reasons. The migration flows differ from decade to decade, but the attraction of opportunities elsewhere—in the aggregate—remains strong enough to pull people toward new destinations. It is not surprising, for example, that people born in Iowa have remained a relatively constant fifty to ninety per thousand in Nebraska's population for well over a century (Fig. 3). The factors that have caused Iowans to move to Nebraska have changed from decade to decade, to be sure, but the flow has nonetheless been maintained through periods of hardship and periods of prosperity. Maintenance flows obviously require a constant supply of new immigrants to replace those lost through death or out-migration.
LONGITUDINAL MIGRATION PROFILES OF GREAT PLAINS STATES

I computed decade-by-decade rates of the type illustrated in equation (3) for countries and states contributing significant numbers of people to the ten states that overlap the Great Plains, from Montana and North Dakota in the north to New Mexico and Texas in the south. Not all parts of all ten states lie within the Plains region, of course, but analysis at the state scale has the advantage of larger numbers and greater data availability. Computations began with the Census of 1850 (which was the first to publish statistics on state of birth) and extended through 1990.

The migration of American-born people to Nebraska (Fig. 3) also illustrates the waves typical of frontier migration. Migrants born in Ohio and Indiana were prominent among the early arrivals, those born in Illinois formed a second wave that peaked before 1900, and Iowans thereafter outnumbered other groups in this typical east-to-west pattern.

Nebraska's foreign-born were relatively numerous in the state's population in the late nineteenth century (Fig. 4). The German-born accounted for ninety of every thousand Nebraska residents in 1870. Bohemians came next, peaking in 1880, followed by Norwegians and Swedes. German Russians formed a later wave that peaked around 1910-1920. Nebraska's pattern is typical of the Plains states, with a series of transient inputs from various European countries.

Foreign-born settlers were more common in North Dakota (and in Dakota Territory prior to 1890) than they were anywhere else in the Plains (Fig. 5). Persons born in Norway and Sweden constituted the largest group, although Canada also was an important contributor to the northern Dakota population, no doubt because of its proximity. As in Nebraska, German Russians make up a distinct, later group of arrivals in the 1890-1910 decades. Yankees (those born in New England or New York) constituted the first American-born wave to move to North Dakota (Fig. 6). In a typical
FIG. 4. *Foreign-born migrants per thousand Nebraska residents.*

FIG. 5. *Foreign-born migrants per thousand North Dakota residents.*
transient pattern of migrations, Yankees were succeeded by the Wisconsin- and Michigan-born who, in turn, were followed by the Minnesota-born. Many North Dakotans born in Wisconsin and Minnesota were of Scandinavian ancestry; they made up the first-generation ethnic stock who followed the example of their forebears in moving west. Minnesota's contribution to the North Dakota population was of the maintenance type, remaining steady after the initial settlement phase passed.  

South Dakota's foreign-born migration (not illustrated) was similar to North Dakota's, although smaller in size. South Dakota illustrates another pattern, however, that is rather uncommon in the migration profiles (Fig. 7). In addition to the typical transient contributions made by states to the east, South Dakota received an anomalously large influx of Iowans during the first decade of the twentieth century. Among these Iowans were many who opened the dryland farming districts of the West River country of South Dakota. This was a one-time-only “land rush” from Iowa, after which Iowa’s component of South Dakota’s population declined steadily. Many Iowans who rushed into the West River country had left the state by the 1930s.

Migration of the American-born to Montana shows the waves of transient migration inputs to their fullest extent (Fig. 8). Migrants, first from New York and New England, then from Wisconsin and Michigan, then Minnesota, and finally from the Dakotas, contributed to Montana's population growth for more than a century. The Dakotas continued to supply new Montanans in later years as well, typical of the maintenance pattern of migration. Concealed within these overall rates are some specific migration flows, especially the continued westward movement of people of Scandinavian ethnic stock. New migrants from Norway and Sweden first settled in the Midwest, their American-born children then moved to North Dakota, and their North Dakota-born grandchildren moved on west to Montana in later years.

Neither Montana nor Wyoming received a particularly large number of foreign-born residents directly, but both states assimilated the
FIG. 7. Native-born migrants per thousand South Dakota residents.

FIG. 8. Native-born migrants per thousand Montana residents.
ethnic stocks produced by immigrants. The Midland (rather than Yankee) origins of Wyoming’s population illustrates the typical latitudinal zonation of frontier migration flows in the United States. For Wyoming this is illustrated by the large contribution made from Pennsylvania, Ohio, and Indiana (Fig. 9). Latter-day population growth in Wyoming also was fed by migration to the state, such as during the energy boom of the 1970s. But more recent migrations do not reflect the older tradition of latitudinal zonation. Wyoming’s recent migrants have come from all parts of the United States.

Origin populations can make both a transient and a maintenance contribution, as illustrated by the number of Missouri-born people living in Kansas (Fig. 10). Early Kansas had a large Missouri-born component. The relatively long lag between the settlement of Missouri (1830s) and the settlement of Kansas (1850s) was partly responsible because it allowed nearly a full generation to be born and grow to migration age. Some of the early Missouri migrants subsequently left Kansas and were replaced by Corn Belt natives from farther east, especially by natives of Ohio, Indiana, and Illinois. All of these represented a transient contribution to the population of Kansas. Once Kansas was past the frontier stage and the state began to develop a more diversified economy, persons born in Missouri were attracted to the state in large numbers once again, as evidenced by Missouri’s maintenance role after about 1910. Steady inputs, such as the flow of Missourians to Kansas and of Iowans to Nebraska (Fig. 3), typically are matched by return flows of roughly equal size. They represent local mobility more than they do long-term net change in population.

Like most of the other states of the central and southern Great Plains, Colorado’s growth depended far more on native-born migrants than it did on the arrival of the foreign-born. Unlike the states illustrated thus far, however, Colorado entered an accelerated growth phase in the mid-twentieth century that is reflected in the migration profiles (Fig. 11). Persons
FIG. 10. Native-born migrants per thousand Kansas residents.

FIG. 11. Native-born migrants per thousand Colorado residents.
born in the Northeast and in the industrial states of the Midwest made a transient contribution to Colorado's population in a manner typical of other Plains states until the mid-twentieth century. In Figure 11, the New York, New England, Pennsylvania, Ohio, Indiana, and Illinois curves begin to rise again after World War II, coinciding with Colorado's amenity-based growth boom. Colorado's economy was transformed as new industries and new types of employment were attracted to the state. As the state grew rapidly during the last half of the twentieth century, the number of people born in the Northeast grew proportionately as a share of Colorado's population.

New Mexico's growth has been more modest, but it illustrates the role of economic change equally well (Fig. 12). It is not surprising that Texas, given its proximity and large population, has long been the origin of most migrants to New Mexico. Persons born in Mexico outnumbered Texans in the state prior to 1890, but even the waves of migration north from Mexico after 1900 could not match the inflow from Texas. Construction of government laboratories at Los Alamos and the subsequent growth of high-technology industries beginning in the 1940s substantially enhanced New Mexico's attraction for long-distance migrants. Persons born in the Northeast, for example, have grown as a fraction of New Mexico's population since that time.

Texas's nineteenth-century population was drawn heavily from the southeastern states (as was Oklahoma's, which is not illustrated here because of the lack of census data on the state prior to 1900). Tennesseans and Kentuckians were important in the days of the Texas Republic. When cotton culture moved west to Texas in the 1870s, people from Georgia, Alabama, and Mississippi became more numerous (Fig. 13). Apart from the early arrival of Germans, Texas had relatively few foreign-born settlers and, as elsewhere in the Plains, that original ethnic stock was not replaced in subsequent generations.\(^\text{13}\) Migration from Mexico to Texas boomed with the development of irrigated agriculture in the 1920s and later
FIG. 13. Native- and foreign-born migrants per thousand Texas residents.

decades. Here again an economic shift is identified with a change in migration flows.

All of the profiles for the Plains states shown here refer to migration into the Plains rather than to out-migration. The profiles can be placed in a larger context by including several profiles for migration to California, an important destination state for people leaving the Plains for more than a century (Fig. 14). Given the large volume of migration to California, the rates shown here are standardized on the basis of the net in-migrant population rather than the state’s total population.

From the 1880s until recent decades, the Midwest was the most important source region for new Californians. Migrant contributions from Iowa, Missouri, Kansas, and Nebraska grew in importance over the first half of the twentieth century at a time when many migrants to California came from rural and small-town backgrounds. Arkansas and Oklahoma both experienced massive out-migrations during the Dust Bowl and poverty years of the 1930s; these flows are represented as a significant spike in the Arkansas and Oklahoma totals. Beginning in the 1940s, California began to attract migrants from nearly all parts of the nation in response to growth in its postwar defense-contracting industries. After 1950 migrants from the Midwest and Great Plains played a smaller role in populating California than they had prior to that time.

DISCUSSION

The longitudinal analysis of migration developed here emphasizes the changing contributions made over time by various countries, regions, and states to the population of the Great Plains. It emphasizes that migration is an ongoing process, not a once-and-for-all shift in populations. Transient flows, in which a succession of different origin areas dominate the migration over a long period, are most common. Maintenance flows generally characterize shorter-distance migrations, and they remain relatively constant over longer periods of time. A third type is illustrated by the
migration profiles for Colorado and New Mexico, where revitalization of the state's economy gives rise to a new pattern of migration not seen before.

A succession of transient flows characterizes most of the northern Great Plains states. Absent new patterns of immigration large enough to produce substantial growth, the northern states have had to rely mainly on natural increase for their growth. Kansas and Nebraska, both of which developed urban and/or industrial economies decades after the frontier had passed, both illustrate the important role of maintenance flows in population growth. Colorado, New Mexico, and Texas have experienced substantial population growth from migration in recent decades based on attractions unknown in the nineteenth and early twentieth centuries; their in-migration patterns show characteristic upturns in the profiles for distant sending states.

In 1862, when the Homestead Act was passed, about half the population of the ten Great Plains states lived in Texas. There followed a massive influx of new settlers into the Northern Plains states, and by 1920 the percentage of the ten-state total living in Texas had dropped to about 35 percent. Decades of population stagnation or loss in the Northern Plains slowly reversed this trend. The 2000 Census found that 55 percent of the ten-state population total lived in Texas, and nearly two-thirds was accounted for by Texas and Colorado combined. Many of the attractions that fueled the growth of Colorado, New Mexico, Texas, and other western Plains states lie outside the Plains portion of those states, but this only emphasizes the importance of new economic developments in stimulating sustained growth. Lacking these more recent growth stimuli, the Northern Plains states are likely to continue their decline as a percentage of the region's population.

NOTES


6. Historian James Malin was among the first to link migration studies with population turnover in the Plains; see James C. Malin, *History and Ecology: Studies of the Grassland* (Lincoln: University of Nebraska Press, 1984).

7. The ten states are North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Montana, Wyoming, Colorado, and New Mexico.

8. Changes in national status and boundaries within Europe must be taken into account in longitudinal migration studies. For example, Bohemia is listed as a separate country in the censuses of 1870 and 1880, whereas Germany is broken down into fifteen provinces. The 1890 Census includes a single category for Germany and lists Bohemia as one of four “Slavic nations.” In 1910 Bohemia is included under Austria and in 1920 it appears as part of Czechoslovakia.


