Population Studies Center

PSC Research Reports

Report 15-849
November 2015

Albert Hermalin and Lisa Neidert

Homegrown or Imported: Sources of the College-Educated Population of States

Population Studies Center
University of Michigan
Institute for Social Research

www.psc.isr.umich.edu

Homegrown or Imported:

Sources of the College-Educated Population of States

Albert Hermalin
Population Studies Center
University of Michigan

Lisa Neidert
Population Studies Center
University of Michigan

Population Studies Center Research Report 15-849
November 2015

Introduction

The recognition of the importance of the level of human capital to the successful functioning of societies has led to an increased focus among states and communities on the skill and educational composition of their populations and to consideration of steps that might enhance the proportion of more highly trained people. Often, however, policies and programs are developed without due recognition of the population dynamics which account for the current levels or of the multiple pathways involved.

In this analysis, we decompose the college educated proportion of the population of each state to reveal the relative role of production and retention of the native born, in-migration from other states, and immigrants from abroad. States differ quite widely on these components and a state's recognition of its relative position can be helpful in developing the most effective policies. The results for each state are derived from an analysis of lifetime migration embedded in the American Community Survey (ACS) data for 2006-2010.

The number of migrants is, along with fertility and mortality rates, a determinant of the size and distribution of the population. The characteristics of the migrants are important factors in the social and economic development of the sending and receiving areas. Insofar as fertility and mortality levels do not vary widely across the areas of interest, migration levels will be the key factor in the distribution of the population and the changes that occur over a given period.

There are a large number of approaches to measuring migration and each has certain advantages and drawbacks. A basic distinction is between direct and indirect measures. Direct measures utilize information obtained from individuals about their moves over some period either through questions in a survey or census, or through requirements for people to register their moves. Indirect measures rely on inferring a move, generally through a demographic analysis either by utilizing vital statistics and a bookkeeping equation or by contrasting actual and expected populations (the survival technique) (Bogue et al. 1982, Chapters 3 and 4; United Nations Manual VI, 1970, Chapter II; U.S. Bureau of the Census, 1973, Vol. 2, 625-637).

Among the direct measures are questions in censuses or surveys that ask where the respondent lived at some previous time, usually one or five years ago. Comparisons with current residence provide measures of mobility and migration. Using characteristics of the respondent, one can

create age, education, sex, or race-specific rates. Another form of this approach is to compare current residence with place of birth. Place of birth is often collected as part of a census; in the United States it was included in every census from 1850 to 2000 and is also included in the replacement for the census long-form, the American Community Survey (ACS).

Techniques for utilizing the state of birth data to estimate interstate and interregional migration have been extensively developed, along with techniques for using successive censuses for estimating intercensal migration (Lee et al. 1957; Eldridge and Kim, 1968; United Nations, 1970; Shryock, 1964). With the advent of the five-year questions from 1960 on it was possible to combine data on state of birth with that information to study progressive and return migration patterns. (See U.S. Bureau of the Census 1963 Table 1 for example)

A comparison of state of birth with state of current residence reveals whether a person has made at least one move over his or her lifetime. Measures derived from such data have several advantages as well as limitations. They can be used to study the level and direction of the flow of migrants over long periods; they reveal the degree to which a state is able to keep its native born population and the degree to which it can attract people from other states; and they provide measures of the degree to which states gain or lose population due to migration.

At the same time such data do not reveal when the move took place (or why), nor whether there were multiple moves. It is also not known if those currently residing in the state of their birth once were migrants and have returned after some time away. Metaphorically, viewing migrants from this perspective is like viewing a game of musical chairs: you know who sits where at the start and when the music stops, but you do not know all the locations in between.

Questions that ask place of residence one or five years ago are often preferred because they delimit the period of a move (but also do not identify multiple moves within that period) and often collect more detailed geographic information about the earlier residence (e.g., not just state, but location with a state.) Migration analyses that make use of one or five year information on prior residence are very useful for investigating the relationship of migration to current social and economic events, such as the deep recession starting in late 2007, or the impact of major changes within a state or region, such as the oil or natural gas boom in recent years in North Dakota, Oklahoma, and several other states. They are also useful for investigating

special policies designed to deter, attract, or retain certain groups, such as changes in welfare policies, (Cebula, 1979; Gelbach, 2004; Moffit, 1992) or the effect of taxation of pensions (Conway and Houtenville, 2001,2012) or to look at the impact of migration on the growth and educational composition of specific metropolitan areas (Frey, 2004).

When prior residence data are available over time, useful trend analyses can be developed, as in the paper on the migration of the younger, single and educated population between 1965 and 2000 (Goworowska and Gardner, 2012; see also Liaw and Frey, 2007). Questions on place of birth are usually restricted to identifying the primary subdivision for native born (state of birth in U.S. censuses) and country of birth for immigrants.

It is worth noting that questions on residence one of five years ago are often more useful in capturing mobility rather than major moves. For example, in the United States between 2005 and 2010, although 35% of the population over five years of age moved, only 16% of them were living in a different state than five years earlier (Ihrke and Faber, 2012).

This paper has three main goals. It reviews and elaborates a number of measures of retention of natives and attraction of migrants. Secondly it presents a number of state-specific lifetime migration measures as of 2006-2010 with special attention to education and the impact of immigration. Lastly, it utilizes the measures developed to present a decomposition of a state's proportion of college graduates into elements that highlights the relative importance of retention and attraction and illustrates how these can contribute to appropriate policy formulation.

Data

The source of data in this analysis is the American Community Survey (ACS) drawn from IPUMS (Ruggles et.al., 2010). The ACS is the replacement for the census long-form, via an annual rolling census. The ACS collects data on 250,000 households a month and cumulates the data into 1-year, 3-year, and 5-year files every year. We use the five-year file covering the 2006 - 2010 period, which represents 6.9 million households and provides sufficient detail for each state. We exclude Washington, DC from all the state rankings as it is more akin to a metropolitan area, which is unlike other states. But, we do include the data from Washington, DC in the national totals as well as totals for regions and census divisions.

Methods and Measures

The two key questions of place of birth and current residence generate three independent measures related to lifetime migration for each state, namely:

B (i) = the total number born in state i.
E (i) = the number of natives born in state i who leave (not living in state of birth)
D (i) = the number of in-migrants to state i (living in state i, but born elsewhere[1])

From these, addition and subtraction produce two additional quantities of importance:[2]

C(i)= B(i) - E(i)= the number of current residents of state i who were born in the state.
T(i) = B(i) - E(i) + D(i) = C(i) + D(i) = the total current residents of state i.

As needed, these measures can be subdivided for further analysis into the many sociodemographic and economic characteristics also measured in the ACS, such as age, race-ethnicity, education, occupation, income, etc. In this analysis we focus on the migration dynamics by education (college educated, those with a BA or higher, versus less) and restrict the analysis to those aged 25-59, to capture the major portion of the working population.

From the basic measures a number of insights into the migration process can be readily derived. Several key ones are as follows:

R = (B – E)÷ B = C ÷ B	Retention Proportion: Current residents who are Native Born/Total Born in State
A = D ÷ T	Attraction Ratio: In-migrants / Current residents
D – E	Net gain or loss from migration
(D – E)*100 ÷ T	Percent gain or loss from migration

Unlike the retention measure, the attraction measure is not a true probability, in that not all current residents are at risk of migrating to the state.

[1] Includes both natives born in other states and immigrants from abroad

[2] Both C(i) and T(i) are observed directly in the ACS, but it is useful to see their relationship to the lifetime migration components

To develop an alternative probability measure we determine for each state a denominator which is the total number of lifetime migrants from each state (plus immigrants from abroad) less the state's number of out-migrants (since they are not at risk of being counted as in-migrants).The probability is developed for native and foreign in-migrants separately. The over-all probability measure may be defined as:

P = D ÷ H	Probability of a state receiving a migrant from another state or abroad, where D is the number of migrants and H is the total pool of immigrants: all native born not living in their state of birth, less the out-migrants from the state in question, plus immigrants from abroad.

For the United States as a whole the retention probability as of 2006 – 2010 was 62%. The complement of the retention probability for the country – 38% – is known as the interstate migration rate).[3]

Given our emphasis on education, it is worth noting that those age 25 to 59 with more education are more likely to migrate so that the retention rate for the country among the college-educated (those with a BA degree or more) is 52% compared to the national average of 62%. Concomitantly, the attraction ratio for college graduates, reflecting both native migrants and immigrants, is 58% compared to the national average of 50%.

Basic Data for States

Table 1 presents the basic lifetime migration measures for those with a college education, aged 25 – 59, and the percent gain or loss from migration among them, for each state. There were 17 million native college educated people not living in their state of birth. Four states (New York, California, Pennsylvania, and Illinois) each experienced more than 1 million of these out migrants, accounting for almost a quarter of the total. With the addition of Ohio and Michigan, each with over 700,000 out-migrants, these top six states accounted for a third of all college level out migrants.

At the same time, three states – California, Florida and Texas – each gained over 1 million native in-migrants, accounting for nearly a quarter of the total. The addition of the next two largest

[3] For historical view of the retention probability since 1850, see Hermalin and Neidert (2014) Table 2.

gainers, Virginia (792,000) and Georgia (725,000) brings the total for these five states to over 5 million or about a third of the total.

In addition to the 17 million native college-educated migrants, there were 8 million higher educated immigrants from abroad.[4] One half of these resided in only four states – California New York Florida and Texas – with California alone gaining almost a quarter of the total (1,853,000).

Given the emphasis among states in developing a highly educated workforce, the degree of lifetime gain or loss in the college educated is of special interest. Over-all, the percent gain or loss column reveals that 22 states lost more college educated population to other states than they gained from natives of other states or from abroad. In North Dakota, South Dakota, West Virginia, and Iowa the percentage loss relative to the number of current college educated residents ranged from 49 to 76%. Eleven additional states experienced losses for this population between 11 and 30%, and seven states had losses less than 10%.

In contrast, eleven states gained 40% or more of their current college educated population through net migration, and in all cases but one, the percentage gain among the college educated exceeded their over-all percentage gain from migration. Some of these gains reflect immigration from abroad while for others it is dominated by interstate migration. Later we further analyze the dynamics of college educated gains and losses.

The percent gain or loss is often taken as an indication of "brain drain" or "brain gain" but as we show later it is an incomplete and at times misleading reflection of a state's position.

Attraction, Retention, and Attainment Levels

The state measures of retention and attraction are presented in Table 2 for the college-educated population who are age 25-59 in rank order from lowest to highest. Specifically, the table presents the retention proportion, the attraction ratio, and the probability of attraction, as defined above, as percentages. The last column presents the college attainment percentage for each state: the proportion of those born in the state that attained a BA degree or higher,

[4] Immigrants with a college degree represented 29% of all immigrants.

regardless of where they are now living .These are the key elements used in the decomposition of the higher educated proportion presented in the next section.

Focusing first on the retention probability, the table shows a very wide range across the states from a low of 16% in Alaska to a high of 69% in Texas. Twenty-two states retained 50% or more of their native born with a college degree, while at the other end 12 states retained less than 40%. The remaining 16 states were between 40 and 50%.

Like the retention percentages, the attraction ratios displayed a wide range across the states, from 34% in Louisiana to 91% in Nevada. In 20 states, domestic and foreign college educated migrants accounted for 60% or more of the BA+ population, while in 18 states, the higher educated migrants accounted for less than 50% of this population.

The probability of attraction reveals quite a different pattern than the attraction ratios. The range for the college educated is from a low of 0.15% for North Dakota to a high of 14.4% for California. Only four states – New York, Texas, Florida, and California – each attract more than 5% of the higher educated pool of all in-migrants.

From Table 2 alone it is hard to discern whether there are regional patterns and the degree of relationship among the measures of attraction and retention. Several states with high retention percentages have low attraction ratios, but others have high rankings on both. Across the 50 states the correlation between the overall retention proportion and the attraction ratio is -0.27 for the college-educated population aged 25-59 but the relationship is not linear.[5]

The last column shows the degree to which those born in each state attain a college level degree or higher regardless of their current residence. The range is from 22% in West Virginia to 40% in Massachusetts. Massachusetts is the only state to achieve 40% although Connecticut, New Jersey, and New York are close at 39%. Those three states plus Rhode Island and North Dakota are between 35 and 40%; 16 states are between 30 and 35%; 13 states are between 25 and 30%, and 14 states are in the lowest category, between 22 and 25% attainment, and all but four of these are from the South. The exceptions are 3 Southwestern states: New Mexico, Arizona, and Nevada and one state from the Northeast: Maine.

[5] Table 5 in Hermalin and Neidert (2014) distributes the states by the intersection of their quartiles of attraction and retention to display regional or other groupings.

Decomposition of Proportion College Educated

A useful analytic device is to decompose a measure of interest into components that can point to key factors that affect that measure. Given the strong interest in most states in increasing their college educated population to enhance economic growth and development, the following section presents a decomposition of this number (and its share of the total population) into elements which distinguish a state's production of college graduates from their native born, the ability to retain these graduates, and the level of success in attracting college educated in-migrants from within the country and abroad.

Equation B.1 simply presents the number of college graduates from each key source: college graduates born in the state and living there; native college graduates from other states that migrate in; and college educated immigrants who move into the state. (The subscript G indicates college graduate; the subscript N represents native born and the subscript I signifies those from abroad.)

$$B.1\ T(G) = C(G) + D(N.G) + D(I.G)$$

Equation B.2 decomposes each element into factors of interest. The first term on the right represents the number of native born with a college degree currently residing in the state. This is a function of the total number born there, the proportion obtaining a college degree (which can occur out of state) and the retention rate of those with a college degree. The second term on the right represents the number of college graduates residing in the state who were born in another state expressed in terms of the probability of attracting such a person and the total pool of these college graduates; the third term is similar but refers to the probability of attracting a college graduate from abroad and the total pool of immigrants with a college education.

$$B.2\ T(G) = B \times [B(G) \div B] \times [C(G) \div B(G)] + H(N.G) \times P(N.G) + H(I.G) \times P(I.G)$$

The proportion of a state's population who are college graduates is simply the number in equation B.2, divided by the state's total population, as shown in equation B.3.

$$B.3\ T(G) \div T = (B/T) \times (B(G) \div B \times C(G) \div B(G) + [P(N.G) \times H(N.G] \div T + [P(I.G) \times H(I.G)] \div T$$

Table 3 shows the percent college educated and uses equation B.1 to show the proportion of college graduates coming from each major component and Table 4 uses equation B.3 to subdivide the native college graduates of each state into the production, attainment, and retention elements; it also shows the percentage of a state's college graduates attributable to domestic and foreign in-migrants.

The states in Table 3 are in rank order from a low to high according to the percentage of their college population stemming from those born in the state. (Also, states in each quartile are highlighted differentially to further illustrate the underlying patterns.) There is a very wide range in the degree to which a state's college population is native to that state. In Nevada, only 9% of the current college educated population was born in the state while in eight states more than 60% of college graduates were natives of their state.

The complement of the proportion of the college-educated population due to the native born is, of course, the proportion due to in-migration from other states and from abroad. The division between domestic and foreign migrants also varies considerably across states, in each of the quartiles. In the lowest quartile for example more than a third of the college in-migrants to Florida are from abroad, while for Arizona it is only about a fifth. In the highest quartile, where 54 percent or more of a state's college graduates are native born, there is less variation in terms of in-migrants, but even here the data show that Michigan obtained more that 12% of their college population from abroad compared to less than 5% for West Virginia or North or South Dakota.

Over-all, Table 3 shows that in eight states, college educated immigrants accounted for 20% or more of the college educated population of the state, namely California, Florida, Hawaii, Maryland, Nevada, New Jersey, New York and Texas. Note that the national average is close to this at 18 percent, but that is because most of the states at 20 percent or more are populous states – driving the national average upward. In fact, Ohio is the only state in the top 10 in population, which has less than 10 percent of its college educated population coming from abroad.

Table 4 shows the contribution of each component of equation B.3 to the college educated proportion in each state in alphabetical order. Column 1 repeats the percentage of the 25-59

aged population with a BA degree or higher; columns 2 to 5 shows how the native component of that percentage arises from the over-all level of births, the attainment of a college degree by those born there, and the level of retention of natives with higher education. The product of those elements is shown in column 5. This can be thought of as native production. The last two columns are the percent of college graduates a state gets from migrants (native born followed by foreign born).

As example, for Alabama, the state's percentage of college graduates would be only 13 percent if it relied exclusively on those born there, arising basically from the quarter of their native born who attain a college degree and the 54 percent of those who remain (or return to) Alabama. But 9 percentage points are added by in-migrants born in other states with a college degree and another 1.6 percentage points by those from abroad with higher education.

Table 4 reveals how much each of these key elements vary across states. As already noted, states vary in their attainment and retention levels as well as their degree of relative attractiveness to those from other states or from abroad. We illustrate this variation in several ways. Figure 1 locates each state at the intersection of the percent of the native born who attain a college degree and the retention of these college graduates and shows that there is very little correlation (-.123).

The correlation across the states of the components shown in Table 4 is as follows:

	(1)	(2)	(3)	(4)
(2)	.249			
(3)	-.257	-.123		
(4)	-.549	.085	-.358	
(5)	-.489	.417	.289	.147

where:

(1) Population potential
(2) Native born: Attainment
(3) Native born: Retention
(4) BA+: In-migrants (native born)
(5) BA+: Immigrants (foreign born)

The correlation matrix shows that there are a few modest correlations among the elements but little correlation among most of them. The modest negative correlations between the production potential and the two in-migrant elements arise because states with high levels of in-migration will show a lower ratio of total births to total population. The correlation of .417 between foreign immigration to a state and the attainment level suggests that other things being equal, educated migrants from abroad may take into account the quality of the education system in choosing a new location.

Tables 5 and 6 show the degree to which states cluster on the various components shown in Table 4. In Table 5, the states are divided approximately into thirds according to their level of attainment and retention, and the location at the intersection of each level is displayed. Only a relatively few states are at the extremes of both measures: high attainment and retention, or low attainment and retention. In the former category are Massachusetts, Minnesota and Wisconsin, and in the latter Nevada, New Mexico, West Virginia, and Alaska displayed low attainment and retention. At the other "corners", low attainment coupled with high retention is comprised of eight southern states – Alabama, Georgia, Kentucky, Florida, North Carolina, South Carolina, Tennessee, and Texas. The combination of high attainment and low retention is made up of five West North Central states, three Eastern states, and one Mountain state. The remaining states, roughly half the total, are at the middle level of attainment and/or retention.

Table 6 presents a similar picture of how the over-all level of migration intersects with the attainment and retention levels, by locating states by whether they are high or low on each dimension. The cut points are shown in the table. It is noteworthy, that no state displays high attainment and retention along with a high level of migration, though several states in the lower left corner (high attainment and high migration but low retention) do have retention levels of native born college graduates of over 40%. The five W. North Central states which were in the category of high attainment but low retention in Table 5 all experienced a low level of lifetime migration as well.

Almost all the southern states which comprise the low attainment – high retention category in Table 5 display high levels of migration (the exceptions are Alabama and Kentucky) and they are joined by the three contiguous Pacific states, and Arizona. The other low attainment states that are in the high migration category display low retention and are more diffuse geographically. A number of the so-called Rust Belt states – Ohio, Michigan, Wisconsin, Pennsylvania, and Illinois

are characterized by high retention and low migration with some differentiation by level of attainment.

The role of college educated immigrants from abroad can be viewed in terms of their impact on the total higher educated population of a state, or as a proportion of all college educated in-migrants to the state. Table 3 gives the percentage contribution of higher educated migrants from abroad and shows that in eight states, college educated immigrants accounted for 20% or more of the college educated population of the state.

In Table 6, we show their role in relation to all in-migrants by displaying in bold those states in which in-migrants from abroad comprise 20% or more of total higher educated in-migrants. There are 21 such states and as Table 6 reveals, the educated foreign in-migrants are an important component in both high and low migration states. In almost half the states with overall high migration the college-educated from abroad account for 20% or more of the total; and this is also true for more than a third of the states characterized by low migration. The table also reveals that highly educated immigrants are important components in many high and low retention states and in states with higher and lower attainment levels of their native born.

Relation of Gain/Loss Measure to Decomposition Algorithm

As noted at the outset, the information on lifetime migration basically generates three independent variables, so that many of the measures which build on these elements to capture aspects of migration will be interrelated algebraically. Hermalin and Neidert (2014) set forth a number of these relationships.

Here we take note of the interrelation of the gain/loss from migration measure with the components of the decomposition algorithm. The gain/loss essentially measures the degree to which a state gained more college educated natives than it lost to other states, or vice versa, expressed as a percentage of all college educated residents. This measure is often taken as a reflection of "brain gain" or "brain drain." But, it is important to note that a state can experience a large percentage gain among the higher educated, but still end up with a lower percentage of college graduates than it started with. This is a result of the differential educational composition of the out-migrants and the in-migrants.

A dramatic example is Nevada. Table 1 shows that Nevada had a 77 percent gain among the college-educated using a life-time migration framework. Nevada lost only 40,000 of the college graduates it produced, whereas it gained 257,000 via migration from other states or abroad. However, at the same time, Nevada's current percent with a college degree is 21.9, which is lower than the percent among those who were born in the state – 23.9 (See Table 4). This is illustrated in Figure 2, which ranks states from winners to losers via the differential between the current higher education proportion and the proportion among those born in the state.

To be fair, Nevada is a bit of an outlier in this figure. Most of the states with negative values are also states that were losers in the percent gain among the college educated. The exceptions are Nevada, Connecticut, New Jersey, Idaho, Utah, Delaware, Hawaii, and Arkansas – all of which were winners in the percent gain among the college educated but losers on this metric.
It is possible to express the current percentage of the population with higher education as a function of attainment, gain/loss, and the overall level of total births to total population. Equation B.4, which is derived in Appendix A, is as follows:

$$B.4 \quad \text{Current \% BA, } T(G) \div T = \text{Attainment } [B(G) \div B] \,/\, [1 - (G|L)] \times B \div T$$

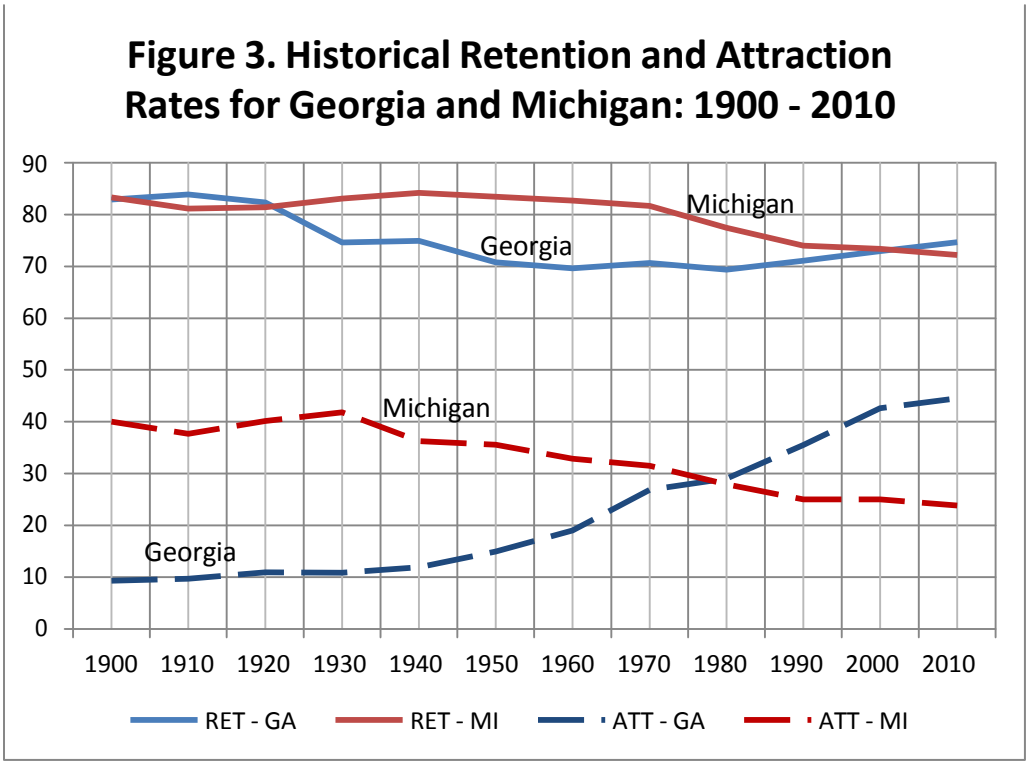
The equation shows that both attainment of the native born and the gains or losses from migration are key elements in determining the current percent with higher education. Unlike equation B.3 however in this formulation, the retention level and level of in-migration are implicitly included, preventing separate analyses of their effects.

Policy and Program Applications

The analysis of lifetime migration and the decomposition algorithm presented above can assist states in developing effective policy to enhance their proportions of higher educated populations, even while recognizing that no relatively simple analysis can provide all the answers. It should also be kept in mind that recent events may be quite different in magnitude and character than the longer term picture and need to be incorporated into these decisions. Keeping these cautions in mind, we illustrate several potentially fruitful approaches.

As lifetime migration data are available over a long period in the United States, they can be used to provide a long-term perspective on the interstate moves that have taken place and the

consequences for size and composition. In particular, a state can compare its history to another state that is deemed competitive with it or with which it is tied historically or geographically. For instance, the state of Georgia has recently overtaken Michigan in population size. The figure below, taken from Hermalin and Neidert (2014), traces the retention and attraction rates for Michigan and Georgia based on place of birth and residence data from 1900 through 2010 across all ages. It shows that Georgia had low attraction rates through much of the 20th century but that the rate increased steadily in the post-World War II period and that it overtook Michigan by 1980. As of 2010, Georgia was 20 percentage points ahead of Michigan on attraction rates, in contrast to a 30 point deficit in 1900.



A more direct use is provided by the decomposition algorithm, which allows for specific analysis of potential steps that can enhance a state's level of human capital. The first term in Equation B.3, highlights the attainment and retention of native born that are the key elements in determining the native portion of the higher educated population. The formal structure of this term is the product of the attainment, retention and the size potential means. This means that an x percent increase in either will add the same amount to the native component (namely x percent of the existing share). However, states would do well to examine the feasibility and cost-benefit of focusing on higher attainment or higher retention separately.

In Michigan, the retention rate of native graduates is 54.3%, which places it in the top tier of states as shown in Table 5. This means that for every two additional native born graduates, roughly one will remain. It is unlikely that Michigan can easily increase its retention rate at a reasonable cost, though politicians and policymakers quite often mistakenly attribute its population issue and/or skill level to low retention. At the same time its attainment level is a bit below 30%, placing it in the second tier of Table 5. Michigan is one of only 11 states, which spends more on corrections than higher education (American Academy of Arts and Sciences, 2015, p. 10). This prioritization of spending weakens the educational system and increases the cost of higher education for students, not to mention the effect incarceration has on families and neighborhoods. The end result is that this policy makes it less likely that a Michigan native will complete high school and move through college successfully. Given its current profile on the key decomposition elements, Michigan would do well to invest much more in its educational system at all levels, ensuring that more children graduate from high school college-ready and are able to afford college and complete it successfully. These actions would not only lead to more native born college graduates, but increase the state's attractiveness to migrants, another dimension on which Michigan lags, as shown in Tables 3 and 6.

Much the same logic applies to several of the other states which display high retention in Table 5 but lower levels of attainment, in particular the block of eight states in the upper right quadrant. Many of the states show an above average proportion of college graduate in-migration. Given their high retention levels, upgrading their educational system to produce more native college graduates should enhance their higher education profile while further improving their attractiveness to potential domestic and foreign migrants.

At the other corner of Table 5, are states with high attainment of their native-born population, but low retention. In a few of the states, the loss of higher educated natives is compensated for by in-migrants, but for many their migration potential is limited. These states would do well to try to develop innovative programs to retain more of their higher educated natives perhaps with financial inducements via tuition subsidies in return for remaining in the state after graduation. Another potential policy is to develop programs that will induce more of their highly educated natives to return to the state. Wyoming, South Dakota, and Idaho have developed state run programs to contact young native born who have left the state, offering to help them find jobs and touting the amenities that might appeal to them (Turkewitz, 2015).

It is not likely of course that any one program or policy change by itself will lead to rapid change, given all the considerations that enter into decisions on where to live. Improving graduation rates in the hope of retaining more of a state's home-grown population must be coupled with programs that provide appropriate job opportunities and appropriate residential and recreational options. The decomposition algorithm does however allow for counterfactual calculations that can facilitate the setting of goals and for assessing the feasibility of various strategies.

For example, using equation B.3 one can ask what the higher education proportion in Michigan would be if it obtained the native college attainment rate of Illinois, namely 33.8% percent, and its probability of attracting domestic migrants 3.7% (vs. Michigan's percentage of 1.8%). Keeping other elements constant, these changes would increase the current percentage college educated from 27.4% to 37.2%.

In the same vein, how much would the proportion of college educated in Wyoming change if it could increase its retention level to that of Idaho, i.e., from 25.4% to 37.7%, keeping the other elements constant. This would increase the domestic component from 7% to 10%, a 43% gain and would raise its over-all current percent higher educated from 28 to 31%. As Idaho's retention level is still in the lowest tier, this goal would not seem out of reach.

It was pointed out in discussing the gain/loss measure vis-à-vis the decomposition algorithm that it is possible for a state to display a percentage gain in its college educated exchanges but for its current percentage with a college degree or more to be lower than that attained by those born in the state. Figure (2) showed that 29 states have a lower current percentage higher educated than that attained by those born in-state. Among these, 8 of them show a positive gain in college graduates due to migration.

The lifetime migration data can be used by a state in this situation to calculate how many higher educated migrants it would need (or the number of higher educated natives it would need to retain) in order to eliminate that loss. Alternately, one can also calculate the change in the educational mix of in-migrants that will preserve the percent obtained by the native born. We illustrate this with the data from Nevada:

Gain/ Loss of BA+ from migration	+77%
Current % BA+	21.5%
BA+ Attainment of Native born	23.6%
Additional college migrants and/or native born retained to equal home-grown attainment level	46,542
Percentage of lifetime migrants with BA+	21.7&
Hypothetical percentage to equal home-grown attainment level	24.0%

Summary and Limitations

This paper presents an analysis of lifetime migration as of 2006-2010 for the population aged 25-59, with a focus on decomposing a state's higher education percentage into the components representing the attainment and retention of the native born and the level of domestic and foreign in-migration. As such, it affords a long-term perspective on the way migration has shaped the current size and educational composition of states.

The analysis presented can be augmented in several ways. Most obviously, the basic analyses can be expanded to include race/ethnicity, gender, or other characteristics of interest that are likely to affect the dynamics of migration. The data on current residence in the census or the ACS allow for a closer look at where within a state domestic and foreign migrants settle. For instance, the growth in Georgia's population has not been equally distributed across the state. And, in fact, having a metropolitan area that is attracting population is a key to boosting a state's attraction rate (Illinois vs Michigan; Georgia vs Alabama). The availability of these data over a long time period, can provide an historical picture of how key forces have evolved over time as illustrated above by the Michigan-Georgia comparison. The data can also capture some of the more recent migration trends. In Hermalin and Neidert (2014), key lifetime migration measures for 2006-2010 are compared with 1990 and show both a general persistence of a state's position along with substantial changes among some states.

At the same time, the lifetime data cannot identify when major changes occurred. These analyses covering the 25-59 age group incorporate births that occurred over 60 years and moves that are likely to be concentrated over the last 25 to 30 years. For some types of detailed analyses, it may be possible to supplement the lifetime data with other information on moves over one of five years from the ACS or earlier censuses. This may be particularly useful if one observes major changes in a state's economy that may have strong migration repercussions. But even here, as Hermalin and Neidert (2014) show in examining North Dakota's recent oil boom, these changes are often only small ripples in a state's long-term migration pattern.

References

American Academy of Arts & Sciences. 2015. "Public Research Universities: Changes in State Funding". The Lincoln Project: Excellence and Access in Public Higher Education.

Bogue, Donald J., Kenneth Hinze, and Michael White. 1982. *Techniques of Estimating Net Migration.* Chicago: Community and Family Study Center at the University of Chicago.

Cebula, Richard J. 1979. "A Survey of the Literature on the Migration-Impact of State and Local Government Policies." *Public Finance* 34(1):69-84.

Conway, Karen Smith and Andrew J. Houtenville. 2001. "Elderly Migration and State Fiscal Policy: Evidence from the 1990 Census Migration Flows." *National Tax Journal* 54(1):103-24.

Conway, Karen Smith and Andrew J. Houtenville. 2012. "No Country for Old Men (or Women)—Do State Tax Policies Drive Away the Elderly?" *National Tax Journal* 65(2): 313-356.

Eldridge, Hope T. and Yun Kim. 1968. *The Estimation of Intercensal Migration from Birth-Residence Statistics: A Study of Data for the United States, 1950 and 1960.* Analytical and Technical Report No. 7. Philadelphia: University of Pennsylvania, Population Studies Center.

Frey, William H. 2004. "Brain Gains/Brain Drains." *American Demographics* 26(5)19-23.

Gelbach, Jonah B. 2004. "Migration, the Life Cycle, and State Benefits: How Low is the Bottom?" *Journal of Political Economy* 112(5):1091-130.

Goworowska, Justyna and Todd K. Gardner. 2012. *Historical Migration of the Young, Single, and College Educated: 1965 to 2000, Population Division Working Paper No. 94.*Washington DC: U.S. Census Bureau.

Hermalin, Albert and Lisa Neidert. 2014. "Lifetime Migration in the United States as of 2006-2010: Measures, Patterns, and Applications." *PSC Research Report* No. 14-832. December 2014.

Ihrke, David K. and Carol S. Faber. 2012. *Geographical Mobility: 2005 to 2010. Current Population Reports. P20-567.* Washington D.C.: U.S. Census Bureau.

Lee, Everett S., Ann Ratner Miller, Carol P. Brainerd, and Richard A. Easterlin. (Prepared under the direction of S. Kuznets and D. S. Thomas.) 1957. *Methodological Considerations and Reference Tables.* Vol. 1, *Population Redistribution and Economic Growth, United States, 1870-1950.* Independence Square, Philadelphia: The American Philosophical Society.

Liaw, Kao-Lee and William H. Frey. 2007. "Multivariate Explanation of the 1985-1990 and 1995-2000 Destination Choices of Newly Arrived Immigrants in the United States: The Beginning of a New Trend." *Population, Space and Place* 13(5):377-99.

Moffitt, Robert. 1992. "Incentive Effects of the U.S. Welfare System: A Review." *Journal of Economic Literature* 30(March):1-61.

Ruggles, Steven J., Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database]. Minneapolis: University of Minnesota, 2010.

Shyrock, Henry S., Jr. 1964. *Population Mobility within the United States.* Chicago: Community and Family Study Center, University of Chicago.

Turkewitz, Julie. "Wyoming, Long on Pride but Short on People, Hopes to Lure Some Back. *New York Times*. (July 15, 2015).

United Nations. 1970. *Manuals on Methods of Estimating Population. Manual VI: Methods of Measuring Internal Migration, Population Studies, No. 47*. ST/SOA/Series A/47. Department of Economic and Social Affairs. New York: United Nations.

U.S. Census Bureau. 1973. *The Methods and Materials of Demography*. By Henry S. Shryock, Jacob S. Siegel, and Associates. Second Printing. Washington D.C.: U.S Government Printing Office.

U.S. Census Bureau. 1963. *United States Census of Population: 1960, Subject Reports, Lifetime and Recent Migration, Final Report PC(2)-2D*. Washington, D.C.: Government Printing Office.

Appendix A

The Relationships between the Gain/Loss Metric, the Attainment Measure and the Current Higher Education Level of a State

As noted in the text, a state may have a positive exchange ratio of the college educated but still experience a lower percentage college educated than that attained among those born in the state. The formal relationships are as follows:

As before, let:
D = the in-migrants to a state
E = the native out-migrants;
B = the total number born in the state;
C = the number of current residents of the state who were born there; and
T = the total current residents of the state.
````The subscript G represents those with a college education.

| | |
|---|---|
| 1. Gain/Loss Ratio (G ÷ L) = | D(G) – (E(G)÷ T(G)) |
| 2. G ÷ L = | [D(G) – (B(G) – C(G)) ÷ T(G)] |
| 3. G ÷ L = | [(D(G) + C(G) – B(G)] ÷ T(G) and since D(G)+ C(G) = T(G) we have |
| 4. G ÷ L = | (T(G) – B(G)) ÷ T(G) |
| 5. Attainment of Native Born = | B(G) ÷ B |
| 6. Current % College Grads | T(G) ÷ T, so that |
| 7. Current % Attainment | (T(G) ÷ T)/(B(G)/B)<br>= T(G) ÷ [(T x B) ÷ B(G)]<br>= 1 ÷ [(1 – G ÷ L) x (B ÷ T]<br>and |
| 8. Current % College Grads | (B(G) ÷ B) ÷ [(1 – G) ÷ (G÷L)] x B ÷ T<br>= Attainment ÷ [1 – (G ÷ L] x B ÷ T |
````

Equation 8 expresses the current percent with higher education as a function of the gain/loss proportion, the attainment level of the native born, and the ratio of the number born in the state to the current population. The retention level and the in-migration levels explicit in formula B.3 in the text are implicit in this formulation.

Example:

The text notes that Nevada is a dramatic example of a state with a high positive G/L ratio but with a lower current percent with a college degree than that attained among the native born. How does this happen?

For Nevada, equation 8 shows the following magnitudes:

$$\% \text{ with college degree} = [.239 \div (1-.77) \text{ x. } 211 = .219$$

where the values for the equation are taken from Tables 1 and 4 in the text.

Guide to Electronic Version of Tables

[print versions of tables follow this page]

Table	Title	Link
Table 1	Lifetime Migration Data for College Graduates, Age 25 to 59: ACS, 2006-2010	https://docs.google.com/spreadsheets/d/1Z2EElN2wWXQxcfustysX2efaOLPjlDbelbs9A5HTh9Q/edit?usp=sharing
Table 2	State Ranking on Retention and Attraction Measures for the College Educated Population, 25 to 59: ACS 2006-2010	https://docs.google.com/spreadsheets/d/1Bls8wq318IAwRqCD190ip5Wa4OLhjIxXZ13SKkWkST4/edit?usp=sharing
Table 3	Relative Distribution of the Migration Components of College Graduates across States	https://docs.google.com/spreadsheets/d/1VOejSbk-CV6GZ47relx9n6AkwOGZXHR0Iu4wQwKq6bQ/edit?usp=sharing
Table 4	The Decomposition of the Percent College Graduate across States	https://docs.google.com/spreadsheets/d/1C3oeglW5jcGDogDrc5EK5UXLdAyLJrWbbpEigo9TDZk/edit?usp=sharing
Table 5	Attainment & Retention of College Graduates	https://docs.google.com/document/d/116OZ4ASlamp1mh-gC8fr2nbjVU5BEH5yu2qiYTAlwpU/edit?usp=sharing
Table 6	Attainment, Retention, and Migration for the College-Educated Population, 25 to 59 by States	https://docs.google.com/document/d/1mQ4kBVbjUoMpkgz8klWpQn-5ybExx5ObvD-5neL82gI/edit?usp=sharing
Figure 1	Retention vs Attainment for the Native Born College-Educated Population 25 to 59	https://docs.google.com/presentation/d/1VvHt_rB5irPqdUj7qf8malEXvveS4Vnb6Bb_LEfywMw/edit?usp=sharing
Figure 2	Winners and Losers: Current College Graduates (%) – College Graduates (%) of those Born in State	https://docs.google.com/document/d/1CEJG3LXZNn_QPywzYrEbQDffb800Y31Iu8uPXlwFYsg/edit?usp=sharing
Appendix Tables		
A1	Lifetime Migration Counts for States: Ages 25 to 59, ACS 2006-2010	https://docs.google.com/spreadsheets/d/17pQxg3BAcq9ykhRfJENK7RTTwDo8R7kwQWHtccUmMQI/edit?usp=sharinghttps://docs.google.com/spreadsheets/d/17%20pQxg3BAcq9ykhRfJENK7RTTwDo8R7kwQW%20HtccUmMQI/edit?usp=sharing

Table 1. Lifetime Migration Data for College Graduates: Age 25 to 59, ACS 2006-2010

State	Tot CG	BIS: Stay	BIS: Left	Mig: D	Mig: I	G|L
Alabama	521,814	287,858	242,478	198,727	35,229	-1.6
Alaska	93,749	13,533	69,964	70,370	9,846	10.9
Arizona	761,915	130,475	136,406	508,463	122,977	65
Arkansas	274,823	136,882	135,917	119,899	18,042	0.7
California	5,486,773	2,034,245	1,087,833	1,599,048	1,853,480	43.1
Colorado	908,077	207,078	234,844	605,657	95,342	51.3
Connecticut	655,207	263,570	312,627	275,447	116,190	12.1
Delaware	122,261	34,935	66,881	67,444	19,882	16.7
Florida	2,333,799	445,428	397,027	1,219,433	668,938	63.9
Georgia	1,346,033	408,656	289,540	724,759	212,618	48.1
Hawaii	196,337	81,104	97,071	71,422	43,811	9.3
Idaho	176,952	54,599	90,334	110,849	11,504	18.1
Illinois	2,058,628	1,091,972	1,011,526	596,259	370,397	-2.2
Indiana	746,632	410,111	450,565	273,819	62,702	-15.3
Iowa	386,505	234,061	343,617	125,153	27,291	-49.5
Kansas	418,098	189,812	240,882	192,611	35,675	-3
Kentucky	462,640	249,147	218,531	181,365	32,128	-1.1
Louisiana	461,994	304,911	291,406	121,284	35,799	-29.1
Maine	178,093	74,863	88,073	92,049	11,181	8.5
Maryland	1,070,685	264,494	300,418	572,183	234,008	47.2
Massachusetts	1,340,487	636,591	564,090	450,802	253,094	10.4
Michigan	1,292,424	840,445	706,488	292,203	159,776	-19.7
Minnesota	877,861	466,319	326,710	326,010	85,532	9.7
Mississippi	280,527	172,721	191,454	94,527	13,279	-29.8
Missouri	773,849	410,797	403,117	304,075	58,977	-5.2
Montana	136,206	57,127	93,822	73,982	5,097	-10.8
Nebraska	256,234	142,804	181,230	95,942	17,488	-26.5
Nevada	282,212	25,404	39,568	188,162	68,646	77
New Hampshir	227,856	50,827	77,297	154,260	22,769	43.8
New Jersey	1,635,828	613,104	696,585	540,095	482,629	19.9
New Mexico	231,518	72,067	117,125	134,963	24,488	18.3
New York	3,292,041	1,754,965	1,911,783	656,005	881,071	-11.4
North Carolina	1,259,286	467,837	295,971	653,601	137,848	39.3
North Dakota	94,119	56,925	108,468	33,168	4,026	-75.7
Ohio	1,458,100	916,280	868,300	412,253	129,567	-22.4
Oklahoma	408,023	202,392	215,165	172,112	33,519	-2.3
Oregon	543,240	158,633	160,043	316,546	68,061	41.3
Pennsylvania	1,774,512	1,096,068	1,026,950	481,835	196,609	-19.6
Rhode Island	166,529	75,848	102,663	68,374	22,307	-7.2
South Carolina	537,049	218,013	180,923	274,965	44,071	25.7
South Dakota	102,549	55,911	103,770	42,708	3,930	-55.7
Tennessee	741,002	315,659	256,647	366,423	58,920	22.8
Texas	3,102,226	1,331,910	588,111	1,148,217	622,099	38.1
Utah	351,548	164,498	127,721	150,668	36,382	16.9
Vermont	105,592	25,535	47,050	73,504	6,553	31.3
Virginia	1,407,814	341,991	381,264	791,590	274,233	48.6
Washington	1,032,755	313,314	246,318	531,857	187,584	45.8
West Virginia	166,858	98,391	158,536	60,391	8,076	-54
Wisconsin	762,309	465,451	392,716	244,819	52,039	-12.6
Wyoming	62,240	18,341	53,900	40,923	2,976	-16.1
Total	**43,523,539**	**18,505,426**	**17,009,032**	**17,009,032**	**8,009,081**	**18.4**

C	Heading	Description	Notation
(2)	Tot CG	Total number of college graduates	T(g)
(3)	BIS:Stay	Born in state and still remain	[B(g) - E(g)]
(4)	BIS:Left	Born in state and live in another	E(g)
(5)	Mig: D	In-migrant to state from another state	D(n.g)
(6)	Mig: I	Immigrant from abroad	D(i.g)
(7)	G|L	%gain or loss in exchange of college graduates	[(D(g) - E(g))*100 ÷T(g)

Table 2. State Ranking on Retention and Attraction Measures for the College Educated Population

ST	Ret
AK	16.2
WY	25.4
DE	34.3
ND	34.4
SD	35.0
VT	35.2
ID	37.7
MT	37.9
NM	38.1
WV	38.3
NV	39.1
NH	39.7
IA	40.5
RI	42.5
KS	44.1
NE	44.1
HI	45.5
CT	45.7
ME	46.0
MD	46.8
NJ	46.8
CO	46.9
VA	47.3
MS	47.4
IN	47.7
NY	47.9
OK	48.5
AZ	48.9
OR	49.8
AR	50.2
MO	50.5
LA	51.1
OH	51.3
PA	51.6
IL	51.9
US	**52.1**
FL	52.9
MA	53.0
KY	53.3
WI	54.2
AL	54.3
MI	54.3
SC	54.7
TN	55.2
WA	56.0
UT	56.3
GA	58.5
MN	58.8
NC	61.3
CA	65.2
TX	69.4

ST	Att
LA	34.0
MI	35.0
OH	37.2
PA	38.2
MS	38.4
WI	38.9
IA	39.4
ND	39.5
WV	41.0
NE	44.3
AL	44.8
IN	45.1
SD	45.5
KY	46.2
NY	46.7
MN	46.9
MO	46.9
IL	47.0
AR	50.2
OK	50.4
MA	52.5
UT	53.2
RI	54.5
KS	54.6
TX	57.1
TN	57.4
US	**57.5**
ME	58.0
MT	58.1
HI	58.7
SC	59.4
CT	59.8
NJ	62.5
CA	62.9
NC	62.9
NM	68.9
ID	69.1
GA	69.6
WA	69.7
WY	70.5
OR	70.8
DE	71.4
MD	75.3
VA	75.7
VT	75.8
CO	77.2
NH	77.7
FL	80.9
AZ	82.9
AK	85.6
NV	91.0

ST	Pr ATT
ND	0.15
WY	0.18
SD	0.19
WV	0.28
AK	0.32
MT	0.32
VT	0.32
DE	0.35
RI	0.36
ME	0.41
MS	0.43
HI	0.46
NE	0.46
ID	0.49
AR	0.55
IA	0.62
LA	0.64
NM	0.64
NH	0.71
UT	0.75
OK	0.83
KY	0.86
KS	0.92
AL	0.94
NV	1.03
WI	1.21
SC	1.28
IN	1.37
MO	1.47
OR	1.55
CT	1.59
MN	1.67
TN	1.72
MI	1.86
OH	2.24
AZ	2.54
CO	2.83
PA	2.83
MA	2.88
WA	2.90
NC	3.20
MD	3.26
GA	3.79
IL	4.03
NJ	4.21
VA	4.33
NY	6.65
TX	7.25
FL	7.67
CA	14.43
US	**---**

ST	%CG BiS
MA	40.2
CT	39.4
NY	38.8
NJ	38.8
ND	36.6
RI	35.6
NE	34.5
MN	34.1
IL	33.8
SD	33.6
IA	33.3
KS	32.9
PA	32.9
CO	32.6
WI	32.5
MT	32.5
HI	32.4
DE	32.0
NH	31.7
UT	31.0
MD	30.8
MO	30.2
Total	**30.2**
WA	29.4
MI	29.4
OH	29.2
WY	29.1
CA	29.0
OK	28.5
VT	28.4
VA	28.3
ID	27.8
IN	27.8
OR	27.7
FL	25.8
TX	25.5
AK	25.5
NC	24.7
NM	24.6
LA	24.4
AL	24.2
TN	24.1
ME	24.0
NV	23.9
AZ	23.8
GA	23.8
SC	23.6
MS	23.0
AR	22.7
KY	22.7
WV	22.4

Table 3. Relative Distribution of the Migration Components of College Graduates across States

State	% BA+	% due to following migration sources			
	Total	Native Born	Migrants		
			Total	Domestic	Foreign
Nevada	21.9	9.0	91.0	66.7	24.3
Alaska	27.0	14.4	85.6	75.1	10.5
Arizona	26.6	17.1	82.9	66.7	16.1
Florida	27.2	19.1	80.9	52.3	28.7
New Hampshire	35.0	22.3	77.7	67.7	10.0
Colorado	37.2	22.8	77.2	66.7	10.5
Vermont	35.0	24.2	75.8	69.6	6.2
Virginia	36.4	24.3	75.7	56.2	19.5
Maryland	38.0	24.7	75.3	53.4	21.9
Delaware	29.4	28.6	71.4	55.2	16.3
Oregon	29.8	29.2	70.8	58.3	12.5
Wyoming	23.8	29.5	70.5	65.8	4.8
Washington	32.0	30.3	69.7	51.5	18.2
Georgia	29.1	30.4	69.6	53.8	15.8
Idaho	25.5	30.9	69.1	62.6	6.5
New Mexico	24.9	31.1	68.9	58.3	10.6
California	30.9	37.1	62.9	29.1	33.8
North Carolina	28.3	37.2	62.8	51.9	10.9
New Jersey	38.2	37.5	62.5	33.0	29.5
Connecticut	38.2	40.2	59.8	42.0	17.7
South Carolina	25.2	40.6	59.4	51.2	8.2
Hawaii	30.7	41.3	58.7	36.4	22.3
Montana	29.8	41.9	58.1	54.3	3.7
Maine	27.6	42.0	58.0	51.7	6.3
United States	**29.9**	**42.5**	**57.5**	**39.1**	**18.4**
Tennessee	24.7	42.6	57.4	49.4	8.0
Texas	26.8	42.9	57.1	37.0	20.1
Kansas	32.2	45.4	54.6	46.1	8.5
Rhode Island	33.1	45.5	54.5	41.1	13.4
Utah	30.0	46.8	53.2	42.9	10.3
Massachusetts	42.4	47.5	52.5	33.6	18.9
Oklahoma	24.0	49.6	50.4	42.2	8.2
Arizona	20.8	49.8	50.2	43.6	6.6
Illinois	33.4	53.0	47.0	29.0	18.0
Minnesota	34.6	53.1	46.9	37.1	9.7
Missouri	27.8	53.1	46.9	39.3	7.6
New York	35.2	53.3	46.7	19.9	26.8
Kentucky	22.4	53.9	46.1	39.2	6.9
South Dakota	28.1	54.5	45.5	41.6	3.8
Indiana	24.6	54.9	45.1	36.7	8.4
Alabama	23.5	55.2	44.8	38.1	6.8
Nebraska	30.7	55.7	44.3	37.4	6.8
West Virginia	19.0	59.0	41.0	36.2	4.8
North Dakota	31.5	60.5	39.5	35.2	4.3
Iowa	27.9	60.6	39.4	32.4	7.1
Wisconsin	28.2	61.1	38.9	32.1	6.8
Mississippi	20.7	61.6	38.4	33.7	4.7
Pennsylvania	29.8	61.8	38.2	27.2	11.1
Ohio	26.7	62.8	37.2	28.3	8.9
Michigan	27.4	65.0	35.0	22.6	12.4
Louisiana	22.1	66.0	34.0	26.3	7.7

Table 4. The Decomposition of the Percent College Graduate across States

State	Pct CG	Born in State: Production & Retention			Percent of College Grads from		
		Size Pot	Attainment	Retention	Att & Ret	Mig: NB	Mig: FB
Alabama	0.235	0.987	0.242	0.543	0.130	0.090	0.016
Alaska	0.270	0.941	0.255	0.162	0.039	0.202	0.028
Arizona	0.266	0.392	0.238	0.489	0.046	0.178	0.043
Arkansas	0.208	0.909	0.227	0.502	0.103	0.091	0.014
California	0.309	0.605	0.290	0.652	0.115	0.090	0.104
Colorado	0.372	0.554	0.326	0.469	0.085	0.248	0.039
Connecticut	0.382	0.854	0.394	0.457	0.154	0.161	0.068
Delaware	0.294	0.766	0.320	0.343	0.084	0.162	0.048
Florida	0.272	0.381	0.258	0.529	0.052	0.142	0.078
Georgia	0.291	0.635	0.238	0.585	0.088	0.156	0.046
Hawaii	0.307	0.859	0.324	0.455	0.127	0.112	0.068
Idaho	0.255	0.752	0.278	0.377	0.079	0.160	0.017
Illinois	0.334	1.008	0.338	0.519	0.177	0.097	0.060
Indiana	0.246	1.023	0.278	0.476	0.135	0.090	0.021
Iowa	0.279	1.251	0.333	0.405	0.169	0.090	0.020
Kansas	0.322	1.009	0.329	0.441	0.146	0.148	0.027
Kentucky	0.224	0.999	0.227	0.533	0.121	0.088	0.016
Louisiana	0.221	1.169	0.244	0.511	0.146	0.058	0.017
Maine	0.276	1.052	0.240	0.459	0.116	0.143	0.017
Maryland	0.380	0.650	0.308	0.468	0.094	0.203	0.083
Massachusetts	0.424	0.945	0.402	0.530	0.201	0.143	0.080
Michigan	0.274	1.114	0.294	0.543	0.178	0.062	0.034
Minnesota	0.346	0.915	0.341	0.588	0.184	0.128	0.034
Mississippi	0.207	1.165	0.230	0.474	0.127	0.070	0.010
Missouri	0.278	0.968	0.302	0.505	0.148	0.109	0.021
Montana	0.298	1.014	0.325	0.378	0.125	0.162	0.011
Nebraska	0.307	1.125	0.345	0.441	0.171	0.115	0.021
Nevada	0.219	0.211	0.239	0.391	0.020	0.146	0.053
New Hampshire	0.350	0.622	0.317	0.397	0.078	0.237	0.035
New Jersey	0.382	0.789	0.388	0.468	0.143	0.126	0.113
New Mexico	0.249	0.827	0.246	0.381	0.078	0.145	0.026
New York	0.352	1.008	0.388	0.479	0.187	0.070	0.094
North Carolina	0.283	0.693	0.247	0.613	0.105	0.147	0.031
North Dakota	0.315	1.514	0.366	0.344	0.191	0.111	0.013
Ohio	0.267	1.121	0.292	0.513	0.168	0.075	0.024
Oklahoma	0.240	0.862	0.285	0.485	0.119	0.101	0.020
Oregon	0.298	0.632	0.277	0.498	0.087	0.174	0.037
Pennsylvania	0.298	1.085	0.329	0.516	0.184	0.081	0.033
Rhode Island	0.331	0.997	0.356	0.425	0.151	0.136	0.044
South Carolina	0.252	0.794	0.236	0.546	0.102	0.129	0.021
South Dakota	0.281	1.301	0.336	0.350	0.153	0.117	0.011
Tennessee	0.247	0.794	0.241	0.552	0.105	0.122	0.020
Texas	0.268	0.649	0.255	0.694	0.115	0.099	0.054
Utah	0.300	0.803	0.310	0.563	0.140	0.129	0.031
Vermont	0.350	0.846	0.284	0.352	0.085	0.244	0.022
Virginia	0.364	0.661	0.283	0.473	0.088	0.205	0.071
Washington	0.320	0.588	0.294	0.560	0.097	0.165	0.058
West Virginia	0.190	1.307	0.224	0.383	0.112	0.069	0.009
Wisconsin	0.282	0.977	0.325	0.542	0.172	0.091	0.019
Wyoming	0.238	0.948	0.291	0.254	0.070	0.156	0.011
Total	**0.299**	**0.809**	**0.302**	**0.521**	**0.127**	**0.117**	**0.055**

Table 5. Attainment & Retention of College Graduates

	Attainment		
Retention	***High*** *(≥32)*	***Middle*** *(≥27 to <32*	***Low*** *(<27)*
High *(≥53)*	MA MN WI	CA MI UT WA	AL GA FL KY NC SC TN TX
Middle *(>44 to <53)*	CO CT HI IL NJ NY PA	IN MD MO OH OK OR VA	AZ AR LA ME MS
Low *(≤44)*	DE IA KS MT NE NH RI ND SD	ID VT WY	AK NV NM WV

Table 6. Attainment, Retention, and Migration for the College-Educated Population, 25 to 59 by States

	Attainment			
	High *(≥30)*		***Low*** *(<30)*	
	Migration		**Migration**	
Retention	***High*** *(≥57)*	***Low*** *(<57)*	***High*** *(≥57)*	***Low*** *(<57)*
High *(≥49)*		**IL MA MN** MO **PA** UT WI	AZ **CA FL GA** NC OR SC TN **TX WA**	AL AR KY **LA MI OH**
Low *(<49)*	CO **CT DE HI MD** MT NH **NJ**	IA KS NE ND **NY RI** SD	AK ID ME **NV** NM VT **VA** WY	IN MS OK WV

States in bold are states where 20% or more of total college in-migration is foreign

Figure 1. Retention vs Attainment for the Native Born College-Educated Population 25 to 59

r = -.123

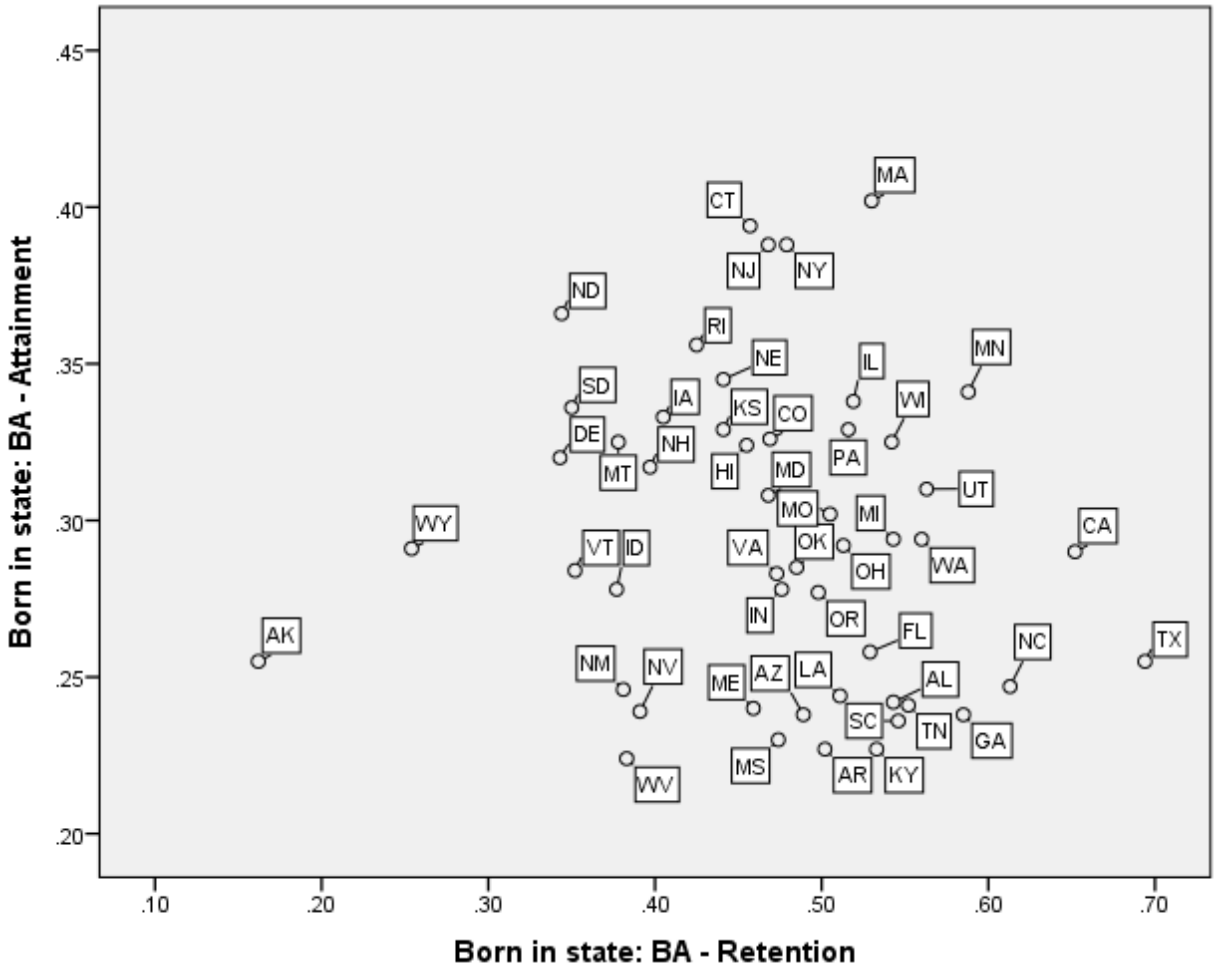
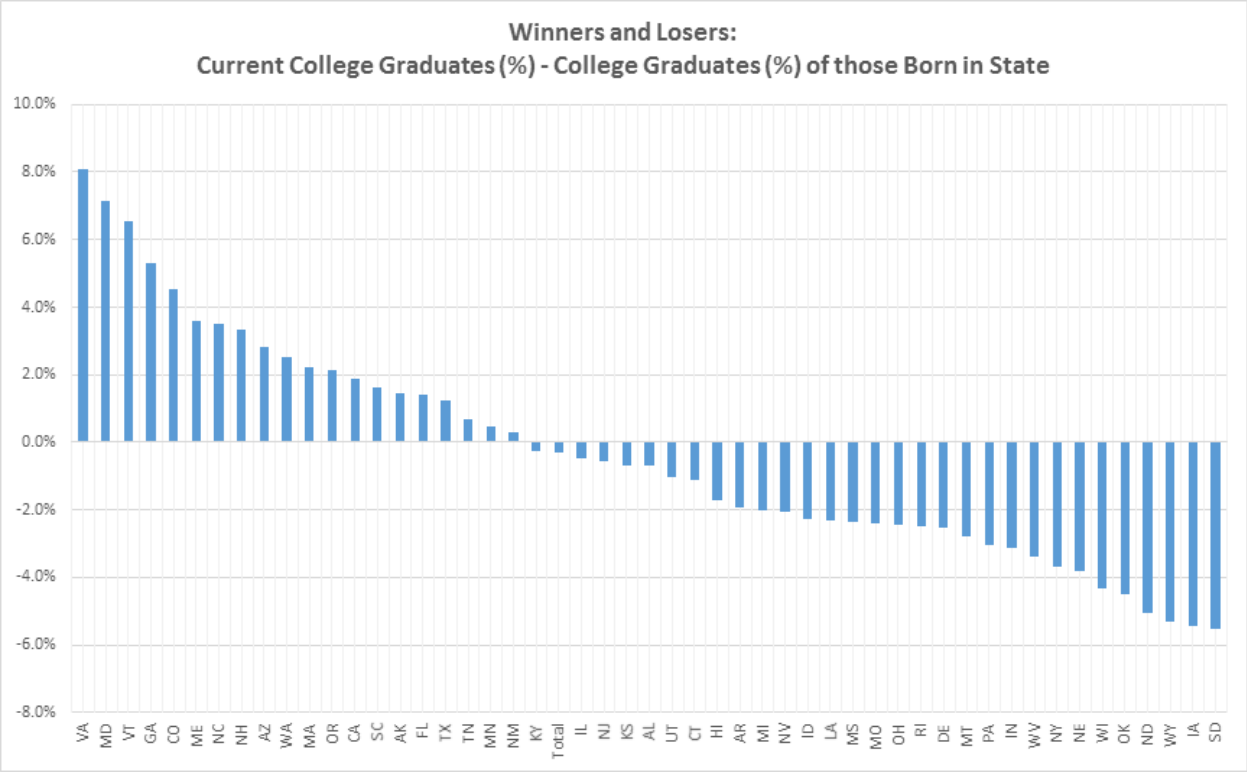


Figure 2


Winners and Losers:
Current College Graduates (%) - College Graduates (%) of those Born in State
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
VA MD VT GA CO ME NC NH AZ WA MA OR CA SC AK FL TX TN MN NM KY Total IL NJ KS AL UT CT HI AR MI NV ID LA MS MO OH RI DE MT PA IN WV NY NE WI OK ND WY IA SD

PSC Research Reports

The **Population Studies Center** (PSC) at the University of Michigan is one of the oldest population centers in the United States. Established in 1961 with a grant from the Ford Foundation, the Center has a rich history as the main workplace for an interdisciplinary community of scholars in the field of population studies.

Currently PSC is one of five centers within the University of Michigan's Institute for Social Research. The Center receives core funding from both the Eunice Kennedy Shriver National Institute of Child Health and Human Development (R24) and the National Institute on Aging (P30).

PSC Research Reports are **prepublication working papers** that report on current demographic research conducted by PSC-affiliated researchers. These papers are written for timely dissemination and are often later submitted for publication in scholarly journals.

The **PSC Research Report Series** was initiated in 1981.

Population Studies Center
University of Michigan
Institute for Social Research
PO Box 1248, Ann Arbor, MI 48106-1248 USA
www.psc.isr.umich.edu