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**CEE Policy Series**

**Number 41**

**2020**

# Attracting People and Potential to Missouri and the Region by Metro Status

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**ABSTRACT**

This report summarizes the Heartland's recent economic performance relative to the rest of the United States. I focus on two key economic indicators: total population change since 1969 and net domestic migration measured using earning capacity instead of population. I find that the Heartland's metropolitan areas are significantly lagging the entire rest of the nation in working-age population and working-age earning capacity growth. I also find that the Heartland's non metropolitan areas are in absolute decline when viewed through the lens of working-age population and earning capacity. Unlike the metropolitan performance, however, there is nothing exceptional about the non-metropolitan decline. My analysis indicates that Missouri's rural areas are performing slightly better than the region and most neighboring states.

## 1. INTRODUCTION

The economic performance of Missouri has received a large amount of attention and the conclusions are unanimous: Missouri is an economic laggard and has been since at least 1970.[1] Much of this research has focused on measures of production, household income and gross domestic product (GDP). Missouri's two major metropolitan areas—St. Louis and Kansas City—have been particularly sluggish in an otherwise prosperous era for cities. However, when put into the perspective of economic performance, Missouri does not stand out as a poor performer.[2] In many ways, Missouri is an unremarkable middle-of-the-country state, and the economic benefits and problems of the entire region are not much different from those of Missouri.[3]

The Great Plains and Great Lakes have seen their greatness pass them by.[4] After two centuries holding the vanguard for the frontier in trapping, trading, farming and manufacturing, the Heartland of the country, comprised of Missouri, Kansas, Nebraska, Iowa, North Dakota, South Dakota, Minnesota, Wisconsin, Illinois, Indiana, Michigan, and Ohio, appears tired and content to live out retirement. Population and production growth in the Heartland states, on average, lag the new frontier states in the Pacific coast, Southwest, and the old shores of the New World. Some long-term relative decline was inevitable as the relatively poor South caught up with the rest of the nation and people moved to growing economic opportunities.

In this report, I summarize the Heartland's recent economic performance relative to the rest of the United States by focusing on two key economic indicators: total population change since 1969 and net domestic migration measured using earning capacity instead of population. Focusing on these measures, I find that the Heartland's metropolitan areas are significantly lagging the entire rest of the nation in working-age population and working-age earning capacity growth. I also find that the Heartland's non-metropolitan areas are in absolute decline when viewed through the lens of working-age population and earning capacity. Unlike the metropolitan performance, however, there is nothing exceptional about the non-metropolitan decline. That is, most other regions also are facing a decline in their non-metro areas with only the Mideast and the Rocky Mountain regions bucking the trend. In fact, my analysis indicates that Missouri's rural areas are performing slightly better than the region and most neighboring states.

The structure of this study is to first review the county population trends of the Heartland since 1969 to provide the big picture of population trends. I then turn to estimating earning capacity of the United States by region and state and by metro status for two periods with the best available data: the 2005-2009 and 2013-2017 American Community Survey samples. As a measure of local attractiveness, earning capacity flows are then calculated based on the migration between regions and states. The earning capacity flows show that both the Heartland and Missouri's non-metro areas are experiencing outflows of earning capacity. The magnitude, however, is within the experience of other regions and many surrounding states and largely subsided in the 2013-2017 period. Metro areas, on the other hand, report mediocre inflows and mild outflows of earning capacity depending on the period and specific subset of migration. This report ends with a summary of my results and a comparison of my findings to the relevant literature.

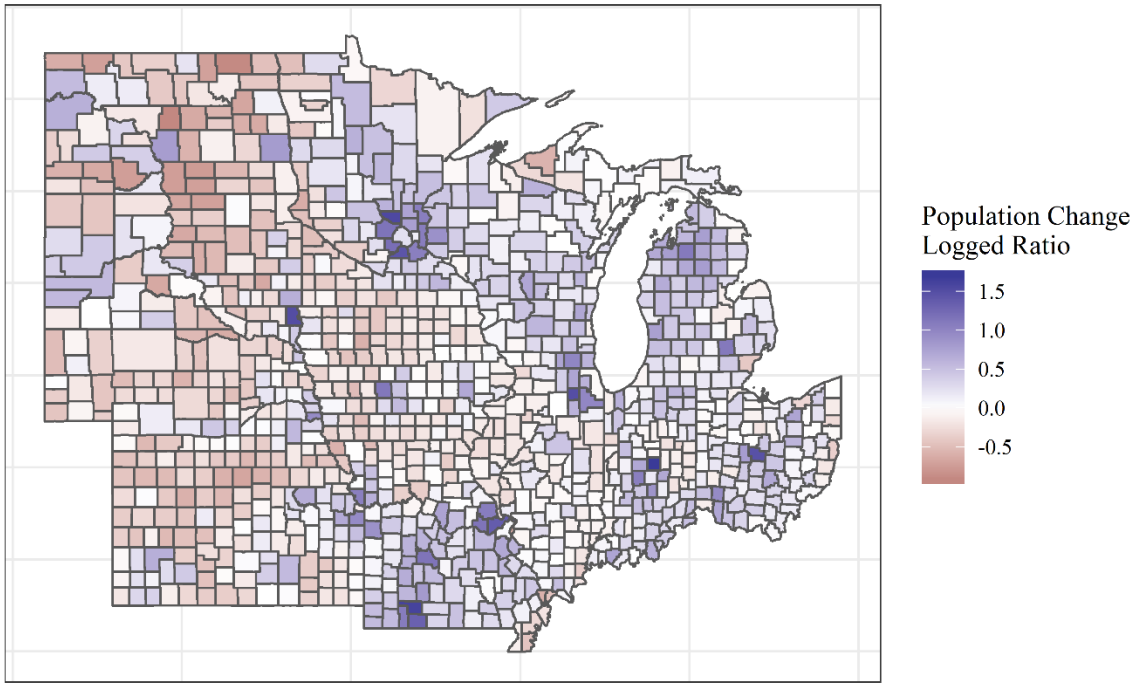
## 2. ATTRACTING PEOPLE

Americans are roughly half as mobile today as Americans of the 1950s, possibly due to an increase in risk aversion.[5] By comparison, Heartlanders are even less mobile. Using state-level IRS data, Molloy, Smith, and Wozniak (2011) show that the North Central, which is the bulk of the Heartland, has faced negative annual net migration rates for every year since 1975.[6] Additionally, Cohn and Morin (2009) conclude from their analysis of government surveys and their own survey that Midwesterners are more rooted than any other region. They find that 64 percent of those surveyed have never left their state of birth, compared to 56 percent nationwide.[7] Nearly half of Midwesterners said they never lived outside of their hometown. Individual states in the Heartland tend to be "sticky" in that a high percent of the current population was born in the same state. Not only do those born in the Heartland states tend not to move, but Heartland states tend not to be "magnet" states. That is, they have a relatively low percent of people who were born in another state. For example, only 35 percent of Missouri residents were born in another state.[8]

Nationwide, there exists a stable pattern of domestic migration driven by expected returns to human capital investment (i.e., education, training, etc.). Large metropolitan core counties typically have seen an influx of younger people while all other types of counties have negative net migration of young people and inflows of family aged people (ages 0 to 18 and roughly 30 to 60, respectively).[9]
The nature of Heartland population change is well summarized in Figure 1, which shows population changes since the early 1970s throughout the northern half of the Heartland. [10] The red hues

represent absolute population declines, while blue represents population growth. It is obvious that much of the western portion of the Heartland and its major urban areas have experienced population declines since the early 1970s. This decline is especially evident down the swath of states making up the so-called Plains States: North and South Dakota, Nebraska, and Kansas. And while the eastern portion of the Heartland in general saw population increases (the counties are predominantly blue), Missouri shows a combination of each. That is, the northern half of the state experienced a decline in population and the southern half, excluding the southeastern tip (the so-called Boot Heel), saw a population increase.

**Figure 1**
**Heartland Logged Ratio of Current to Starting Population**
**1969-1973 to 2013-2017**

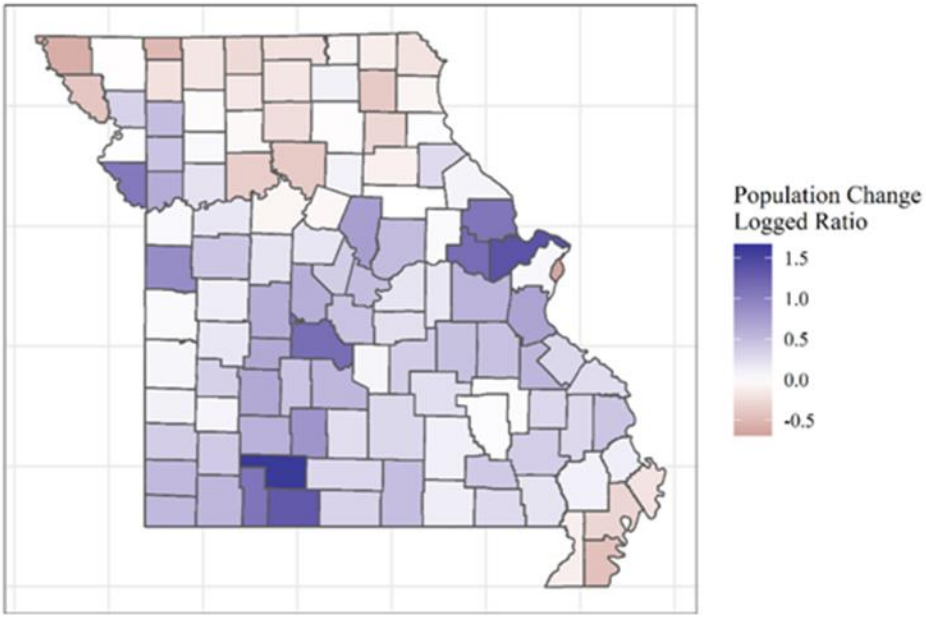



The top ten fastest growing Heartland counties have a logged population ratio greater than 1.2 (2.8 percent annual growth rate).[11] Hamilton County, Indiana, tops the list at 1.7 (3.9 percent annual growth rate). It is notable that nine of the ten counties are in a Metro Statistical Area (MSA) established by 1971 or were added to a 1971 vintage MSA. Clearly, the Heartland population is concentrating into older, established MSAs.

Figure 2 zooms in to provide a better look at Missouri. Missouri contains three of the top ten growing counties and it is a fast-growing state for the region.[12] These counties are Christian, St.

Charles, and Taney. Missouri is interesting in that its county growth is spread throughout the southern half, essentially south of I-70. In contrast, county growth in all other states, save Michigan, is largely concentrated in one MSA. This is especially true when measured by the simple change in total population. Missouri, in contrast, sees strong growth around St. Louis (and within the St. Louis MSA) and in the southwest in the relatively small MSA of Springfield.

**Figure 2**
**Missouri Logged Ratio of Current to Starting Population**
**1969-1973 to 2013-2017**




To gain a little more insight into the population movements, I use two OLS regressions that compare a county's starting conditions to its subsequent growth. One of these models predicts current population as a function of past population and metro status. It is written as

$$log(P_{2013-2017Mean}) = \alpha + \beta\, log(P_{1969-1973Mean}) + \gamma\, M + \epsilon,$$

where $log(P_{2013-2017Mean})$ is the natural log of the current population, $log(P_{1969-1973Mean})$ is the natural log of the past population, and *M* is the county's metro status. Metro status identifies the county's metro status in 1971 and 2013. There are five categories: in a metro area by 1971, added to an existing metro area after 1971 but before 2013, became its own metro area after 1971 but before 2013, became a micro area after 1971 but before 2013, and no metro status (labeled "Rural"). The last four categories are compared to the first such that a positive coefficient means that category of county attracted more people over the years than the average county in a 1971 metro area holding initial population constant. Of interest here is the estimated coefficient on $\beta$. If it is greater than one,

holding metro status constant, then large counties became larger on average; if less than one large counties became smaller.

**Table 1**
**Predictors of Heartland County Population**

| | *Dependent variable:* | |
|---|---|---|
| | Logged 2013-2017 Mean Population | |
| | Model 1 | Model 2 |
| Log of Population (1969-1973 Mean) | 1.058*** | 0.985*** |
| | (0.013) | (0.016) |
| Metro Addition by 2013 | 0.141*** | 0.099** |
| | (0.048) | (0.049) |
| Metro Area by 2013 | 0.035 | −0.060 |
| | (0.056) | (0.056) |
| Micro Area by 2013 | −0.113*** | −0.176*** |
| | (0.041) | (0.041) |
| Rural | −0.274*** | −0.314*** |
| | (0.046) | (0.047) |
| Agricultural Services Share 1969-1973 | | −0.001 |
| | | (0.012) |
| Mining Share 1969-1973 | | 0.004* |
| | | (0.002) |
| Manufacturing Share 1969-1973 | | 0.007*** |
| | | (0.001) |
| Transportation and Utilities Share 1969-1973 | | 0.008*** |
| | | (0.003) |
| Civilian Federal Share 1969-1973 | | 0.009*** |
| | | (0.003) |
| Military Federal Share 1969-1973 | | 0.006*** |
| | | (0.002) |
| State and Local Share 1969-1973 | | 0.020*** |
| | | (0.002) |
| Intercept | −0.364** | −0.046 |
| | (0.151) | (0.178) |
| Observations | 1,054 | 936 |
| Adjusted $R^2$ | 0.945 | 0.947 |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 | |

Model 2 adds to the above equation the counties' industrial mix as the share of total income produced by each industry. The industries were selected to reflect export production. The remaining industries produce goods and services that largely go the county residents. Using data for all counties in the Heartland, the results of estimating these two models are found in Table 1 above.

The first column of estimates is for Model 1. By any normal standard, this simple model explains most of the variation in the current population (the adj-R2 is 94 percent). Not surprisingly, counties with a larger population in the early 1970s hold a larger current population. Counties with 1.0 percent more people than average in the early 1970s later held 1.058 percent more people than average today. That is, on average, counties that were large in the past are slightly larger.
Model 2 estimates, found in the second column of results, indicate that the explanation is more nuanced than that, however. Estimates of this model show that the fastest growing counties are the ones near the MSAs of the 1970s. The 0.141 coefficient on *Metro Addition by 2013* shows that counties on the fringe of established MSAs grew about 15 percent faster than one would expect from starting population alone. This single fact suggests that Heartland urban areas have been unable to attract residents relative to the overall rise in US population.

The estimates of Model 2 also indicate that rural areas would be in a worse position if not for the impact of state and local government spending. The Rural coefficient in Model 1 (-0.274) measures the average impact on future population of being a rural county in the early 1970s. The coefficient shows that rural counties currently hold on average, 24 percent fewer people than one would expect from starting population alone.[13] The same coefficient in Model 2 (-0.314) is even more negative. Since Model 2 *controls* for export related industries the Rural coefficient in Model 2 is interpreted by ignoring the size of the export industries (i.e., assuming there is no export industry). Estimates from Model 2 indicate that rural population today is 27 percent less than one would expect from starting population alone.[14]

The results for Model 2 in Table 1 also show that the labor income share of mining, manufacturing, transportation and utilities have a small positive association, as does federal spending. Interestingly, state and local shares of labor income have a relatively large positive relationship to growth. A one percentage point increase in the share of state and local income is associated with a final population increase of 2 percent. No private sector impact even cracks a 1 percent impact. From the research

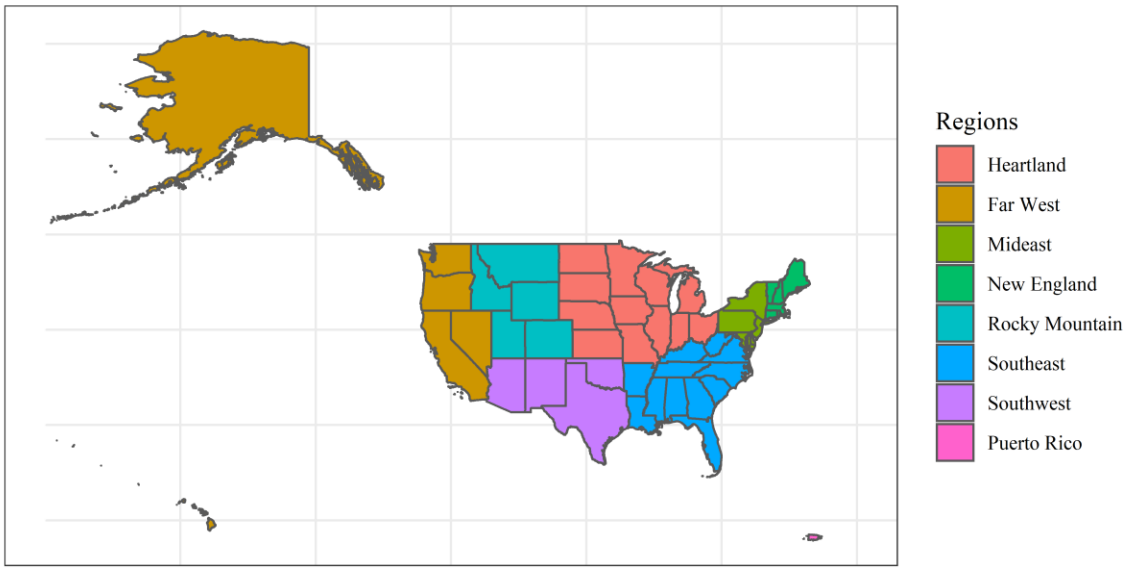
literature discussed later in this study, much of this impact comes from state spending on local facilities.

Overall, the people picture is quite like the above-mentioned production picture: the Heartland's urban areas are underperforming and the rural areas are in clear and long-term decline.[15] Had urban areas acted as an engine of growth, they would have attracted more people and all the metro status coefficients would have been negative. Instead the Heartland produced sprawl.

## 3. COMPARING THE HEARTLAND TO OTHER REGIONS

This section presents several measures to compare the Heartland to the other regions in the nation by comparing the metropolitan and non-metropolitan earning capacity of each region's working-age population. For reference, Figure 3 maps the Heartland and other US regions. Regional comparisons are organized in three arrangements: the percent change of total earning capacity, the net earnings capacity contribution of movers, and the net earning capacity contribution of movers by distance.

**Figure 3**
**Heartland and Other U.S. Regions (BEA)**




The percent change of total earning capacity is calculated as a percent change from the region's 2005-2009 average to its 2013-2017 average. This metric indicates if the region's metropolitan and non-metropolitan areas are growing in capacity. The second metric reports the contemporary net

domestic flows of earning capacity similar to net domestic migration. Positive values indicate that the region is attracting more earning capacity from the rest of the United States than it is losing to the rest of the United States, thus it is a metric of regional attractiveness. The final metric breaks up net domestic earning capacity into the types of migration: intrastate (moves within a state), intraregional (move across state lines but within the region), and interstate (moves across regional lines).

Population changes affect the local economy in ways that differ by the change in characteristic mix. Summarizing population changes to convey the overall influence on the local economy is difficult. Many migration studies group population changes by educational, sex, racial, household, and occupational categories in order to better assess the connection between population changes or migration to the local economy. Indeed, age and, to a lesser degree, education are two often used predictors of migration.[16] This practice allows one to view a rich picture, but it prohibits bottom line summaries. Given these limitations, in my analysis, I use earning capacity expectancy as my main summary statistic.

### *Expected Earnings Capacity*

Defined as the value of a person's potential future supply of labor, earning capacity expectancy is a forward-looking variable. Why use this variable? Most all urban and regional economic research focuses on estimating actual earnings or other current GDP- related variables. These variables are easily measured, widely published and directly relate to taxes and other accounting variables. However, measured earnings and GDP are not equal to most measures of economic well-being, and neither are forward looking.

Using earning capacity expectancy, in contrast, is consistent with the field of forensic economics. American courts, who appreciate the difference between earnings and well-being, use earning capacity as the standard of economic losses for individuals in cases such as personal injury. The legal definition of earning capacity is best described by Horner and Slesnick (1999):[17] earning capacity is equal to actual earnings when a person is trying to maximize earnings. In practice, "maximizing earnings" is interpreted as full-time-year-round annual earnings.

Since earning capacity is estimated using 2017-dollars and the 2013-2017 ACS sample, all percent changes are in real terms and do not account for any economy-wide productivity growth. Holding national inflation and productivity changes constant allows for direct comparisons across time periods.

Migration and earning capacity expectancy are estimated using the American Community Survey five-year samples from 2005-2009 and 2013-2017 (US Census Bureau 2010, 2018) and the 2016 United States Life Tables.[18] Because the data necessary to investigate migration are not available in the published American Community Survey (ACS) tables, the public use microdata series (PUMS) is used throughout my analysis. Except where noted, all survey standard errors are calculated using the PUMS's replication weights to provide the most accurate standard error estimates.[19]

### *Population*

In my estimation of total earning capacity, I limit the population to working age: 25 through 64. Age 25 is selected to capture people after they have made the majority of their full-time formal educational attainment.[20] Age 64 is selected as a compromise between future worklife estimates and future full-function life estimates.[21] No sex distinctions are made in the age range despite sex differences in life expectancy and worklife expectancy: females tend to have longer life expectancy and shorter worklife expectancy. Life distinctions will arise directly in the life expectancy data, which I group by sex, but worklife is not differentiated due to evidence that females and males have similar worklife expectancy when accounting for non-formal labor.[22] Since the point of estimating earning capacity is to account for labor potential, and not how it is employed, it would be inappropriate to adjust worklife by sex.

### *Results*

Overall, the Heartland's non-metro areas declined in earning capacity and the metro areas grew the slowest of all other regions. The Heartland's attractiveness, as measured by net domestic flows of earning capacity, is negative or zero for both non-metro and metro areas depending on the time period. The outflows are only stronger when one ignores in-state movers. Still, it is important not to overstate the poor performance. Heartland non-metro areas are in decline, but not exceptionally so. Heartland metro areas are at the bottom of the pack in growth but are still growing.

Table 2 reports the percent change in total earning capacity by region from 2005-2009 to 2013-2017.[23] With a few exceptions, the results show strong metro growth in the West and South and overall weak non-metro growth or decline. The Heartland metro area earning capacity growth at 1.91 percent was the slowest of all regions—the Far West and Southeast grew roughly five times faster and the Rocky Mountains and Southwest grew roughly eight times faster.

Total earning capacity in the Heartland's non-metro areas declined by 1.31 percent but, perhaps surprisingly, not by more than the Far West and Southwest, and not nearly as much as the New England areas declined.[24] Rural areas struggle throughout the United States, and the Heartland does not standout in this regard. The Rocky Mountain region is exceptional in that its non-metro areas are growing faster than most metro areas in other regions.

**Table 2**
**Percent Change in Earning Capacity by Region**
**2005-2009 to 2013-2017**

| Region | Non-Metro | z-score | Metro | z-score |
|---|---|---|---|---|
| Heartland | -1.31 | -3.81 | 1.91 | 8.11 |
| Far West | -1.40 | -2.64 | 9.60 | 50.81 |
| Mideast | 4.33 | 9.40 | 3.55 | 17.44 |
| New England | -6.39 | -9.93 | 3.13 | 9.53 |
| Rocky Mountain | 13.35 | 22.46 | 12.24 | 29.06 |
| Southeast | 1.08 | 3.70 | 9.41 | 43.85 |
| Southwest | 0.20 | 0.49 | 14.91 | 61.43 |

To assess the attractiveness of a region, I limited my view to only the people who decided to move into or out of a region, as their motivations were significant enough to overcome the cost of relocating. International migration is ignored as I am unable to identify people who have left the country.[25]

What we see in Table 3 is that, except for the Far West, a large share of earning capacity moves out of non-metro areas in the 2005-2009 sample. The Heartland's attractiveness is somewhat in the middle of the pack. In the 2005-2009 period, non-metro earning capacity domestic inflows were 9.43 percent smaller than the domestic outflows, but by the 2013-2017 period there is no difference between the inflows and outflows.

Some non-metro out migrants moved to other non-metro areas, but overall, earning capacity moved to the metro areas of the Rocky Mountains, the Southeast, and the Southwest. Only the Far West recorded non-metro inflows—4.85 percent and 5.64 percent.

**Table 3**
**Percent Difference of Domestic In to Out Earning Capacity by Region and Year**

| | 2005-2009 | | | | 2013-2017 | | | |
|---|---|---|---|---|---|---|---|---|
| Region | Non-Metro | z-score | Metro | z-score | Non-Metro | z-score | Metro | z-score |
| Heartland | -9.43 | -9.04 | 0.13 | 0.19 | 0.15 | 0.16 | -2.41 | -4.08 |
| Far West | 4.85 | 2.74 | -0.92 | -1.51 | 5.64 | 3.23 | 1.02 | 1.94 |
| Mideast | -16.55 | -8.95 | -1.83 | -2.41 | -1.79 | -0.86 | -4.52 | -7.17 |
| New England | -14.56 | -5.51 | 0.91 | 0.73 | 1.58 | 0.58 | -1.52 | -1.22 |
| Rocky Mountain | -11.73 | -6.06 | 9.91 | 7.83 | -4.24 | -2.12 | 7.43 | 6.01 |
| Southeast | -3.77 | -4.02 | 3.48 | 6.42 | 0.42 | 0.44 | 1.74 | 3.59 |
| Southwest | -17.83 | -13.17 | 8.87 | 11.83 | -8.37 | -5.95 | 4.88 | 8.72 |

Non-metro outflow of earning capacity eventually subsided. The Far West continued to grow in the 2013-2017 sample, but the other regions tempered their non-metro exodus. Metro area earning capacity inflows slowed for the West and South, and the Mideast's metro outflow increased. The Heartland's metro areas also began an outflow of earning capacity: 2.41 percent outflow in 2013-2017.

While domestic in and out earning capacity provides a broad measure of attractiveness, a finer point can be made by adding distance to the breakdown. Age, education, and homeownership status are all important predictors of migration generally, but these effects vary significantly by the distance of the move. For example, Molloy, Smith, and Wozniak (2017) find that the aging population and homeownership predict about half of the variation in intracounty mobility declines; those factors do not predict interstate migration. Foster (2017) also provides evidence that the causes of migration vary by distance.[26]

Table 4 summarizes the flows of earning capacity by intraregion and interstate migration. Intraregional flows include all domestic migration across state lines but within the region. Interstate flows includes all domestic migration across regions for the longest distance and, presumably, the greatest moving cost to overcome.[27]

In the intraregion section, for each region any net outflow of non-metro areas must be matched by a net inflow of metro areas, and vice versa. The Heartland, and most regions, experienced a net flow from non-metro areas to metro areas in the 2005-2009 sample: the 12.31 non-metro earning capacity moved to metro areas to generate a 4.51 net earning capacity inflow for metro areas. For the Heartland, this movement essentially stopped in the 2013-2017 sample. There is no statistically significant change for non-metro or metro areas. In contrast, the New England, Rocky Mountain, and Southwest metro areas continued to pull earning capacity out of their non-metro areas.

**Table 4**
**Percent Difference of Domestic In to Out Earning Capacity by Type and Year**

| | 2005-2009 | | | | 2013-2017 | | | |
|---|---|---|---|---|---|---|---|---|
| Type & Region | Non-Metro | z-score | Metro | z-score | Non-Metro | z-score | Metro | z-score |
| **Intraregion** | | | | | | | | |
| Heartland | -12.31 | -3.36 | 4.51 | 1.83 | -2.26 | -0.56 | 0.76 | 0.27 |
| Far West | 26.71 | 4.38 | -3.81 | -1.39 | 6.01 | 0.89 | -0.83 | -0.33 |
| Mideast | 2.28 | 0.23 | -0.13 | -0.05 | 15.15 | 1.43 | -0.53 | -0.24 |
| New England | -17.35 | -1.88 | 5.31 | 0.99 | -26.37 | -2.71 | 8.64 | 1.76 |
| Rocky Mountain | -15.77 | -1.88 | 19.76 | 1.93 | -12.28 | -1.44 | 19.04 | 2.14 |
| Southeast | -1.01 | -0.34 | 0.33 | 0.19 | -1.34 | -0.41 | 0.38 | 0.20 |
| Southwest | -27.52 | -4.07 | 13.61 | 2.52 | -19.01 | -2.39 | 6.41 | 1.33 |
| **Interstate** | | | | | | | | |
| Heartland | -18.96 | -5.62 | -20.79 | -11.54 | -4.25 | -1.18 | -18.89 | -8.79 |
| Far West | -10.73 | -1.92 | -4.28 | -2.44 | -3.93 | -0.69 | 13.96 | 7.62 |
| Mideast | -30.76 | -5.48 | -20.06 | -11.27 | -23.84 | -3.53 | -26.92 | -13.43 |
| New England | -29.88 | -4.50 | -6.43 | -2.03 | 4.48 | 0.60 | -7.90 | -2.63 |
| Rocky Mountain | -7.90 | -1.73 | 23.83 | 7.48 | 4.36 | 0.94 | 27.91 | 9.33 |
| Southeast | 7.53 | 2.62 | 18.49 | 13.13 | 4.18 | 1.21 | 14.65 | 9.14 |
| Southwest | -13.04 | -3.04 | 46.86 | 24.34 | -14.56 | -3.11 | 31.61 | 16.65 |

Unlike intraregional flows, metro and non-metro interstate flows can both be negative for a region as the flows are measured by limiting migration to within the country but outside of the region. Here the Heartland's net flows are clearly negative for non-metro areas in the 2005-2009 sample and for metro areas in both samples. To the degree that the interstate flows provide the greatest evidence for locational attractiveness, this is an ominous sign. Only the Mideast measures greater outflows.

## 4. COMPARING MISSOURI TO THE SURROUNDING STATES

Overall, Missouri's changes and flows of earning capacity match closely with the Heartland region. First, as reported in Table 5, Missouri's metro earning capacity grew slightly (2.58 percent) while the non-metro areas generated no overall change. Table 5 also includes the surrounding states for points

of reference spanning multiple regions.[28] Missouri's non-metro areas (at zero growth) outperformed all but Nebraska (2.78 growth). Illinois and Kansas report large declines in earning capacity (12.96 and 11.11 percent losses), while the remaining states recorded moderate losses.

**Table 5**
**Percent Change in Earning Capacity by State**
**2005-2009 to 2013-2017**

| State | Non-Metro | z-score | Metro | z-score |
|---|---|---|---|---|
| Missouri | 0.62 | 0.80 | 2.85 | 4.89 |
| Illinois | -12.96 | -20.58 | 2.83 | 8.08 |
| Kansas | -11.11 | -11.47 | 14.46 | 17.21 |
| Iowa | -4.03 | -5.28 | 16.23 | 16.41 |
| Nebraska | 2.78 | 2.28 | 11.60 | 9.37 |
| Oklahoma | -4.53 | -5.50 | 17.15 | 18.86 |
| Arkansas | -2.44 | -2.67 | 10.13 | 10.99 |
| Kentucky | -1.59 | -2.37 | 4.86 | 6.62 |
| Tennessee | -2.67 | -3.89 | 9.68 | 16.90 |

Second, Missouri's non-metro net flow of earning capacity mostly matches the Heartland's. As reported in Table 6, Missouri's non-metro areas faced significant outflows of earning capacity in the 2005-2009 period (20.61 percent outflow) and the metro areas received a net inflow of earning capacity (9.09 percent inflow). Both trends ended in the 2013-2017 period as Missouri's net flows of earning capacity are essentially zero. Compared to the surrounding states, Missouri's 2005-2009 non-metro exodus was one of the worst (20.61 percent outflow), only topped by Oklahoma (30.5 percent outflow).

**Table 6**
**Percent Difference of Domestic In to Out Earning Capacity by State and Year**

| | 2005-2009 | | | | 2013-2017 | | | |
|---|---|---|---|---|---|---|---|---|
| State | Non-Metro | z-score | Metro | z-score | Non-Metro | z-score | Metro | z-score |
| Missouri | -20.61 | -8.13 | 9.09 | 4.54 | 3.43 | 1.21 | -2.75 | -1.43 |
| Illinois | 10.61 | 3.92 | -4.84 | -3.80 | -3.97 | -1.48 | -5.80 | -4.31 |
| Kansas | -6.38 | -2.05 | 3.01 | 1.07 | -3.19 | -0.90 | 1.24 | 0.42 |
| Iowa | -1.01 | -0.31 | 1.23 | 0.34 | 5.75 | 1.79 | -8.18 | -2.24 |
| Nebraska | -18.53 | -4.08 | 14.13 | 3.56 | 4.69 | 1.05 | -3.33 | -0.84 |
| Oklahoma | -30.50 | -12.44 | 50.60 | 16.08 | -12.26 | -3.88 | 2.73 | 1.02 |
| Arkansas | 2.77 | 0.89 | 5.83 | 2.15 | 2.89 | 0.99 | -0.14 | -0.04 |
| Kentucky | -11.82 | -4.63 | 18.62 | 7.10 | 0.52 | 0.18 | -0.88 | -0.35 |
| Tennessee | 6.50 | 2.27 | 2.16 | 1.13 | 2.64 | 0.93 | 1.96 | 1.07 |

Most states in Table 6 reported more muted net flows of earning capacity just as is the case in the regional table (Table 3). For all states other than Oklahoma the flows essentially stopped in the 2013-2017 period. Overall the 2013-2017 period shows less net in or out migration across the states and regions, which is not surprising given the strong labor market at the beginning of the 2005-2009 period and the Great Recession at the end. However, since the Census migration location definition also changed across these two periods, it may not be possible to separate economic causes and definitional changes.

Finally, Table 7 reports net earning capacity flows by type of net migration. Unlike Table 4, Table 7 includes intrastate migration. Intrastate net flow for non-metro and metro areas must have opposite signs: a non-metro net inflow must be at the expense of a metro net outflow within a state. In the 2005-2009 period, non-metro areas lost earning capacity to metro areas, but the flow disappeared by the 2013-2017 period.

**Figure 7**
**Percent Difference of Domestic In to Out Earning Capacity by Type and Year**

| | 2005-2009 | | | | 2013-2017 | | | |
|---|---|---|---|---|---|---|---|---|
| Type & State | Non-Metro | z-score | Metro | z-score | Non-Metro | z-score | Metro | z-score |
| **Intrastate** | | | | | | | | |
| Missouri | -20.94 | -7.59 | 10.53 | 4.78 | -0.74 | -0.24 | 0.26 | 0.13 |
| Illinois | 12.84 | 4.46 | -1.90 | -1.36 | 2.55 | 0.92 | -0.34 | -0.23 |
| Kansas | -3.28 | -0.95 | 2.40 | 0.78 | -0.57 | -0.14 | 0.33 | 0.10 |
| Iowa | -1.28 | -0.36 | 1.33 | 0.33 | 10.34 | 3.05 | -7.45 | -1.86 |
| Nebraska | -16.63 | -3.37 | 12.89 | 2.92 | 1.37 | 0.29 | -0.75 | -0.17 |
| Oklahoma | -32.77 | -12.42 | 46.93 | 13.65 | -8.52 | -2.49 | 4.87 | 1.70 |
| Arkansas | 0.36 | 0.11 | -0.35 | -0.13 | 0.82 | 0.27 | -0.82 | -0.23 |
| Kentucky | -10.56 | -3.84 | 12.03 | 4.28 | 0.02 | 0.00 | -0.01 | 0.00 |
| Tennessee | 0.34 | 0.11 | -0.13 | -0.06 | -0.58 | -0.19 | 0.21 | 0.10 |
| **Intraregion** | | | | | | | | |
| Missouri | -13.84 | -1.12 | 8.06 | 1.09 | 68.63 | 4.33 | -2.52 | -0.34 |
| Illinois | -11.31 | -1.00 | -5.14 | -0.97 | -32.89 | -2.64 | -23.90 | -4.02 |
| Kansas | -29.24 | -2.12 | 12.21 | 1.24 | -26.97 | -1.82 | 17.40 | 1.80 |
| Iowa | -14.44 | -1.42 | 7.10 | 0.55 | -2.35 | -0.21 | -17.37 | -1.47 |
| Nebraska | -32.71 | -1.88 | 19.51 | 1.43 | 4.88 | 0.24 | -20.40 | -1.40 |
| Oklahoma | -24.84 | -2.16 | 47.33 | 3.26 | -30.41 | -2.06 | -9.87 | -0.75 |
| Arkansas | 23.86 | 1.69 | 29.25 | 1.84 | 19.66 | 1.23 | 0.96 | 0.05 |
| Kentucky | -18.83 | -1.80 | 45.33 | 4.52 | -14.11 | -1.30 | -26.01 | -2.26 |
| Tennessee | 38.24 | 4.14 | 14.46 | 2.63 | 2.08 | 0.19 | 14.22 | 2.29 |
| **Interstate** | | | | | | | | |
| Missouri | -21.09 | -2.85 | -0.49 | -0.08 | 12.20 | 1.47 | -21.42 | -3.39 |
| Illinois | 6.16 | 0.57 | -24.32 | -6.52 | -34.16 | -2.86 | -29.47 | -7.62 |
| Kansas | -8.92 | -1.14 | -0.71 | -0.08 | -3.43 | -0.39 | -7.76 | -0.83 |
| Iowa | 21.63 | 1.91 | -5.55 | -0.45 | -20.67 | -1.48 | -2.85 | -0.22 |
| Nebraska | -21.69 | -1.47 | 19.05 | 1.58 | 41.18 | 2.63 | -7.10 | -0.67 |
| Oklahoma | -17.62 | -2.32 | 82.27 | 8.96 | -27.69 | -2.86 | -4.96 | -0.59 |
| Arkansas | 10.92 | 1.04 | 37.58 | 4.18 | 12.78 | 1.25 | 3.21 | 0.34 |
| Kentucky | -17.09 | -1.97 | 44.40 | 5.41 | 17.46 | 1.71 | 7.29 | 1.01 |
| Tennessee | 62.70 | 5.05 | 7.23 | 1.20 | 57.73 | 4.76 | 2.77 | 0.45 |

Intraregion and interstate (migration from a state outside of the state's region) do not require opposite flow for non-metro and metro areas, and in fact, there is a small positive correlation between metro status across states. For example, Illinois shows net outflows of earning capacity for metro areas in all periods and types, and non-metro areas in most periods and types. For Missouri, there are clear outflows from non-metro areas and no net flows from metro areas in the 2005-2009 period, but that pattern disappears in the 2013-2017 period.

Overall, Missouri's reputation for being a "high-sticky" "low-magnate" state is born out in the earning capacity flows. Missouri's non-metro areas perform better than neighboring states, but only because there is little change over a twelve-year period (Table 5). Missouri's metro areas perform only slightly better than the rural areas (Table 5) and show no consistent ability to pull earning capacity out of the state's non-metro areas or areas outside of the state (Table 7).

## 5. POLICY AND DISCUSSION

The above results are consistent with more sophisticated analyses and summarize many conclusions from the literature. First, the rural economy is not a "farming" economy: The local agricultural industry is more dependent on the rural economy than the other way around.[29] Rural economies have become more diverse over the last 100 years. This is partially due to an increase in manufacturing and the service sector, but it is also due to significant labor-saving technologies in the farming industry. Farming employment make up a much smaller percent of total employment in rural areas. At the same time, farmers rely on the rural economy for roughly 89 percent of their household income.[30]

Compounding the weak connection between the rural economy and farming, rural counties that had relied on farming lost population. Predicting total county income growth from 1990 to 2001 for Midwestern counties, Monchuk et al. (2007) found that population levels and population density in 1990 positively predicted growth, while the share of county income from farming in 1990 and politician status predicted declines in growth.[31] Table 1 shows a similar pattern for the Heartland since the early 1970s. The coefficient on Agricultural Services Share is negative, which means counties with a greater concentration of farming saw population declines.[32]

Without an agricultural economic engine, rural counties must look to extraction industries and non-agricultural amenities. The boom-bust nature of extraction industries is problematic as any employment gains during booms are likely temporary, which discourages the in-migrating population from setting down roots in the community. Demand for non-agricultural amenities (e.g., open spaces and small-town culture) may be more stable, but as discussed below, has its own problems.

Second, transportation infrastructure in combination with the rise of the service sector creates a complicated influence on rural and urban development. Urban sprawl is more prevalent. In this case rural communities grow in population and income by becoming suburban communities.[33] Transportation infrastructure also promotes rural brain-drain. Urban areas consistently produce higher returns to human capital investment, thus, any promoting of post-secondary education will also encourage people to move to urban areas.[34]

This effect creates a seemingly strange negative relationship between rural aggregate educational promotion and population growth.[35] Attempts to promote educational investment does increase income for the individual but they likely reduce aggregate income for rural areas. This is because expected gains to educational investment encourages young people to move out of their non-metropolitan location of origin.[36]

Third, post-war migration can be explained largely by consumption amenities. Many of these amenities are geographical, e.g., average January temperature is an excellent predictor of US county population growth over the last 100 years. People seem to like coastlines, lakes, mountains, and open spaces, and they vote their preferences with their feet and their wallet. Overall there is a strong positive relationship between rural in-migration and specific natural amenities such as undulating topography, streams, lakes, forested areas, and access to outdoor recreation.[37]

Other amenities are social, like access to a particular school district, a selection of theaters, or the "vibe" of a small-town atmosphere, which may benefit rural economies, but there is scant research in this area. Much of the social amenity research has focused on the diversity of amenities in urban areas, or so-called "consumer cities." These amenities seem to exert a strong and possibly growing

influence on urban growth. Since diversity, of any kind, necessarily requires high population density, it is incompatible with the definition of rural.

Rural areas, almost by definition, provide open spaces and allow one access to natural amenities in ways cities cannot. These amenities give rural areas a migration advantage and a curse. The more people move in, the less access to open space there is, and congestion will reduce easy access to the beaches, lakes, and mountains. Housing prices also adjust to in-migration, which will eventually limit the migration response. In cases where demand for amenities are strong, congestion and rising house prices may generate rural gentrification as the early residents are crowded out.

A rural natural amenity advantage is also a problem because its essential nature does not scale. Allowing many people to move to the views destroys the views and destroys the small rural town "vibe" precisely because more view cannot be manufactured. But limiting access to popular places pushes up housings prices and pushes down wages. In short, high-amenity rural living is not available to the masses.

Natural amenities are also an increasing component of urban growth. "Superstar Green Cities" that curb pollution and expand physical amenities tend to attract highly educated people.[38] Social amenities, measured by subjective quality of life surveys, are also increasingly attracting people to dense metro areas.[39]

Finally, sector-based rural policies in general have been a failure in that there is no clear recipe to attract people. While policymakers may prefer to focus attention on only a few industries, rural economies with a few concentrated industries grow more slowly and rural areas with greater public services show no increase in population growth. This point may seem to run counter to the above emphasis on non-agricultural amenities, but even labor-intensive manufacturing firms are attracted to natural amenities.[40] Kilkenny and Partridge (2009) found a strong connection between natural amenities (non-agricultural open space) and rural economic development. Promoting and/or protecting natural amenities do not run counter to a diverse rural economy. [41]

Furthermore, productive metropolitan economic development strategies are likely to be counterproductive for non-metropolitan areas. For example, state-level policymakers will have a hard time justifying promoting education in a metro area at the exclusion of non-metro areas.
Place-based policies tailored to specific locations and designed to promote the local economy either through "big-push" short term efforts or long-term community investment programs produce inconsistent results.[42] Some enterprise zones, primarily in urban areas, have been shown to increase employment, but others result in no discernible change or even declines. Even when employment effects are positive much of the gains can be captured by rising real estate prices and traffic congestion. There is currently no clear recipe to promote urban development.

Given the strong connection between amenities and local economic growth, it is not surprising that the coastal and mountainous regions performed so well in earning capacity growth and attraction. Likewise, in Missouri, the Branson and Lake-of-Ozarks areas attracted population (see Figure 1 and 2). It is these areas that have keep the average Missouri rural earning capacity performance slightly better than the neighboring states (see Table 5).

However, without significant increases in international migration, remote rural areas of the Heartland and Missouri devoid of popular natural amenities are likely to face at best slow population growth and, more likely, further population declines. Effective policy to reverse this trend will be expensive or require rural Heartland to become "resort Heartland," essentially gentrifying the countryside, as efforts to improve natural amenities will be capitalized into prices, pushing land prices up and wages down.

International migration may effectively stabilize non-metropolitan areas without significant impacts to wages. Recent international immigration only weakly impacts non-metropolitan wages because of negative net migration of non-metropolitan natives.[43] This result is particularly strong in high poverty non-metropolitan counties, where international migrants essentially replace outgoing domestic residents.

# APPENDIX

## Earning Capacity

Earning capacity is calculated by estimating the parameters of age-earnings equation and then estimating the earning capacity of each person in the ACS PUMS. Individual earning capacity is adjusted for the risk of future death. As with the life expectancy calculations, aggregate risk-adjusted earning capacity is summing the product of individual earning capacity and the population weight by geography and migration status.

The age-earnings equation is a simple semi-log equation

$$log(earn) = \alpha + \beta_1 Age + \beta_2 Age^2 + \beta_3 Age^3 + \epsilon,$$

where $log(earn)$ is the natural log of annual earnings. The equation is estimated using the annual earnings of all people with full-time[44] employment history in the last twelve months and grouped by education, as reported by the ACS PUMS 2013-2017 sample.

The age-earnings equation is fit using a quantile regression using the Frisch-Newton interior point method.[45] A quantile regression is important due to the ACS top-coding of earnings.

Estimated parameters are reported in Table 8. Age coefficients produce the expected convex age-earnings profile across all education groups.

**Table 8**
**Median Age-Earnings Profile Quantile Regression**

| | *Dependent variable:* | | | |
|---|---|---|---|---|
| | Logged 2013-2017 Full-Time Earnings | | | |
| | Advanced | Bachelors | Some College | High School or Less |
| Age | 0.203*** | 0.136*** | 0.133*** | 0.042*** |
| | (0.005) | (0.003) | (0.002) | (0.003) |
| $Age^2$ | −0.003*** | −0.002*** | −0.002*** | −0.0004*** |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| $Age^3$ | 0.00002*** | 0.00001*** | 0.00001*** | 0.0000002 |
| | (0.000001) | (0.000001) | (0.0000004) | (0.000001) |
| Intercept | 7.498*** | 8.328*** | 8.170*** | 9.400*** |
| | (0.065) | (0.043) | (0.034) | (0.046) |
| Observations | 711,092 | 1,117,495 | 1,411,971 | 1,378,388 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

Age-earnings estimates are not grouped by sex. While female annual earnings tend to be lower than males, raw differences in labor market earnings are not important for earning capacity for two primary reasons. First, earning capacity is meant to capture a person's full production capacity based on their broad skill set, including non-market and non-traded production. Females tend to produce more in household production relative to males,[46] which will at least partially offset the difference in formal labor market earnings.

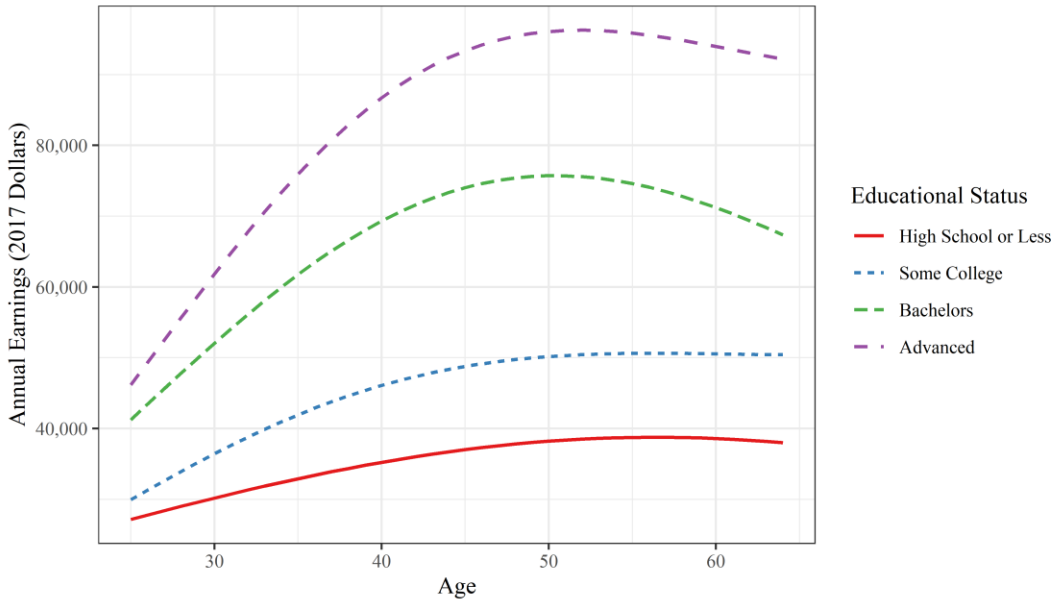
Second, earning capacity should measure a person's ability to maximize earnings, not predict how the productivity capacity is employed. A high opportunity cost reflects a high value of leisure which is an important component of welfare. Furthermore, when labor hours are employed, workers may choose lower wages to capture other non-monetary compensation in the form of compensating differentials.

Earning capacity estimates are also not adjusted for industry or geography despite those variables' availability. This omission generates a problem as broad educational categories only hint at differences in human capital. There are well-known variations in human capital within those categories which will likely vary by migration status. Without the assistance of longitudinal data and other formal measures of human capital (e.g., standardized test scores), I do not want to make further adjustments which may be correlated with the labor-leisure decision or compensating differentials.

Since polynomial parameters are difficult to interpret, I include predicted annual earnings by age and education in Figure 4. Annual earnings peak in a person's early 50s across all education levels. Those with a college degree see a decline in median annual earnings.

Median annual earning predictions are reduced for the annual risk of death using the 2016 United States Life Tables for all males and all females. Annual risk of death is equal to one minus the probability of reaching one's next integer age. Since females have a lower annual risk of death, estimated earning capacity is slightly higher for females.

**Figure 4**
**Median Age Earnings Profile by Education: Ages 25 through 64**




## Metro and Non-Metro Definitions

Net domestic migration, the central statistics of this report, is measured as the twelve-month inflows minus the twelve-month outflows for population and earning capacity. The ACS PUMS reports if a person has moved in the last twelve months and, if so, where they last lived. Locations are reported by state and Census PUMA (public use microdata area). PUMAs are defined for each decennial census and are designed to capture as homogeneous an area as possible while containing a similar total population. High-population density urban counties will be comprised of many PUMAs, while several rural counties may be contained in one PUMA.

PUMAs never cross state lines but they do cross county and metro statistical area (MSA) boundaries, making PUMA great for state-level analysis but problematic for MSA-level work. PUMA change with each decennial census and MSAs change much more frequently. To maintain as much spatial definitional stability as possible, I set the metropolitan standard to the 2013 vintage definition of an MSA.

I connected PUMAs to their corresponding MSA using the wonderful geographic correspondence engine (MABLE) maintained by the Missouri Census Data Center (MCDC).[47] Using MCDC's engine, MABLE, I assess the percent overlap between counties and the 2000 PUMAs and the 2012

PUMAs by population in 2010. All PUMAs with at least 80 percent of their 2010 population within an MSA were defined as a metro PUMA, while all others were defined as non-metro.

Special migration PUMAs are created by the Census Bureau to protect privacy; thus, they do not correspond to standard PUMAs. There is also no migration PUMA match using MABLE. To assess the metro status of where people lived before they moved, I used the Census migration crosswalks from migration PUMAs to regular PUMAs for the 2013-2017 dataset and the crosswalk from migration PUMAs to counties for the 2005-2009 dataset. No other options are available. All migration PUMAs with at least 80 percent of their 2010 population within an MSA were defined as a metro PUMA, while all others were defined as non-metro.

Spatially, migration PUMAs can be large enough to swallow a small MSA and still contain more than 20 percent non-metro population. This problem not only generates statistical noise, but it also biases non-metro net domestic migration downwards, as some people will be incorrectly labeled as moving from a non-metro area.

International migration is not included as a separate source of population gain. I excluded international changes in net migration as there is no way to identify people leaving an area for an international location. Puerto Rico is an exception. Being a part of America, it is included in the American Community Survey. All people moving from a state to Puerto Rico are captured in net domestic migration; however, I have not included Puerto Rico in the state summaries.

I subset domestic migration by source into three categories: intrastate, intraregion, and interstate. Intrastate migration is within state migration, intraregion migration is all migration from out of the state but within the region, and interstate is all migration from the United States and outside the region. Since PUMAs and migration PUMAs do not cross state lines there is no error in definition across these three definitions.

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*Funding for this study was made possible by the Hammond Institute's Center for Economics and the Environment, Lindenwood University.*

*A version of this study appeared in the Spring/Summer 2020 issue of the Missouri Policy Journal. It is accessible at https://www.lindenwood.edu/academics/beyond-the-classroom/publications/missouri-policy-journal/number-9-spring-summer-2020/*

## NOTES

[1] For reference see Joseph H. Haslag, "The 49th State: Revisiting Missouri's GDP Sector by Sector," Show-Me Institute Essay, October 24, 2014, accessed at https://showmeinstitute.org/publication/taxes-income-earnings/49th-state-revisiting-missouri%E2%80%99s-gdp-sector-sector; Joseph H. Haslag and Michael Austin, "Was Missouri Always Like This? A Comparison of Missouri's Growth with That of the United States," Show-Me Institute Essay, July 11, 2017, accessed at https://showmeinstitute.org/publication/employment-jobs/was-missouri-always-comparison-missouris-growth-united-states; and Rik W. Hafer and William H. Rogers, "The Missing Million: Missouri's Economic Performance Since the Moon Landing," Show-Me Institute Essay, April 17, 2019, accessed at https://showmeinstitute.org/publication/employment-jobs/missing-million-missouris-economic-performance-moon-landing.

[2] Ibid., Hafer and Rogers.

[3] Many economic reports organize their results using state rankings. However, ranking states will often produce misleading impressions if the difference between the 8th state and the 38th state is small.

[4] Geographically, economically, and culturally, Missouri connects the Midwest, the Plains, and the South. Its history and economy are hard to group well with any other states. The Great Lakes and Great Plains are the collection of states that Missouri usually is grouped with in federal government statistics.

[5] For reference see Raven Molloy, Christopher L. Smith, and Abigail Wozniak, "Job Changing and the Decline in Long-Distance Migration in the United States," *Demography* 54, no. 2 (2017): 631–653; and Mark D. Partridge, Dan S. Rickman, Rose Olfert, and Kamar Ali, "Dwindling U.S. Internal Migration: Evidence of Spatial Equilibrium or Structural Shifts in Local Labor Markets?" *Regional Science and Urban Economics* 42, no. 1–2 (2012): 375–388.

[6] See Raven Molloy, Christopher L. Smith, and Abigail Wozniak, "Internal Migration in the United States," *Journal of Economic Perspectives* 25, no. 3 (2011): 173–196.

[7] D'Vera Cohn and Rich Morin, "American Mobility: Who Moves? Who Stays Put? Where's Home?" *Pew Research Center* (2009).

[8] Cohn and Morin (2009) used the 2005-2007 ACS iPUMA average to calculate their percentages.

[9] For reference see Kenneth M. Johnson and Richelle L. Winkler, "Migration Signatures Across the Decades: Net Migration by Age in U.S. Counties, 1950-2010," *Demographic Research* 32 (2015): 1065–1079; Devajyoti Deka, "Are Millennials Moving to More Urbanized and Transit-Oriented Counties?" *The Journal of Transportation and Land Use* 11, no. 1 (2018): 443–461; and Kenneth M. Johnson, Paul R. Voss, Roger B. Hammer, Glenn V. Fuguitt, and Scott McNiven, "Temporal and Spatial Variation in Age-Specific Net Migration in the United States," *Demography* 42, no. 4 (2005): 791–812.

[10] Figure 1 uses logged ratios to measure population change. A logged ratio is a rescaling of a ratio that sets no-change to zero and all increases and decreases are symmetric. This is particularly useful when values are represented as a color.

[11] Converting a logged ratio (r) into an annual growth rate (g), where there are forty-four years in the sample, is as follows: $g = 100 * (exp(r)^{1/44} - 1)$. The top ten counties are Hamilton (IN), Christian (MO), Sherburne

(MN), Lincoln (SD), Kendall (IL), Delaware (OH), Scott (MN), St. Charles (MO), Taney (MO), and Carver (MN). Expanding to the top twenty does not change the result.

[12] The logged population ratio for the Heartland (excluding Missouri) is 0.17, while Missouri's is 0.25. The logged population ratio of the non-Heartland United States is 0.69 (1.6 percent annual growth rate), which places Missouri at the lower end of state growth.

[13] Exp(-0.274) – 1 = 24 percent.

[14] Exp(-0.314) – 1 = 27 percent.

[15] Overall, Missouri does not produce a significant difference from the Heartland regressions and thus is not included in this report.

[16] See Molloy, Smith, and Wozniak, "Internal Migration in the United States," 173–196.

[17] See Stephen M. Horner, and Frank Slesnick, "The Valuation of Earning Capacity: Definition, Measurement and Evidence," *Journal of Forensic Economics* 12, no. 1 (1999): 13–32.

[18] Elizabeth Arias, Jiaquan Xu, and Kenneth D. Kochanek, "United States Life Tables, 2016," *National Vital Statistics Reports* 68, no. 4 (2019).

[19] A technical description of the standard error calculation procedure I used is found in Steven G. Heeringa, Brady T. West, and Patricia A. Berglund, *Applied Survey Data Analysis*, 2nd ed. (Boca Raton, Florida: CRC Press, 2017).

[20] An alternative approach would be to include all ages prior to 25 and impute the expected educational attainment based on their household conditions at the time of the survey. For example, John Kane, Lawrence Spizman, and Don Donelson, "Educational Attainment Model for a Minor Child: The Next Generation," *Journal of Forensic Economics* 24, no 2 (2013): 175–190, provides a systematic method for estimating educational attainment of minors.

[21] For reference see Gary R. Skoog, James E. Ciecka, and Kurt V. Krueger, "The Markov Process Model of Labor Force Activity: Extended Tables of Central Tendency, Shape, Percentile Points, and Bootstrap Standard Errors," *Journal of Forensic Economics* 22, no. 2 (2011): 165–229; and Kurt V. Krueger, *Healthy Life Expectancy, 2017*, Expectancy Data (2017); and Pennifer Erickson, Ronald Wilson, and Ildy Shannon, "Years of Healthy Life," *Statistical Notes* 7 (April 1995). A working 25-year-old male with a college degree has a worklife expectancy of 37.5 years to age 62.5. The same male has a full-function life expectancy of 47.9 years to age 72.9. Worklife expectancy, as published, varies by age, sex, race, and education. Full-function life expectancy varies by age, sex and race.

[22] For reference see Kurt V. Krueger and Frank Slesnick, "Total Worklife Expectancy," *Journal of Forensic Economics* 25, no. 1 (2014): 51–70.

[23] All earning capacity tables include z-scores to allow the reader to assess the validity of the sample estimate. For reference, any z-score with an absolute value of 1.96 is considered statistically significant at the 5 percent level.

[24] The Heartland's 1.31 decline is statistically indistinguishable from the Far West and Southwest.

[25] Mechanically, the percent change in earning capacity is driven by a change in the population of 25 to 64-year-olds, a change in the average age of that group, and a change in the share of higher educational degrees. All three variables are largely driven by slow-moving demographic changes. Domestic in and out earning capacity (akin to net domestic migration) is assessed for each five-year ACS PUMS group by calculating the ratio of twelve-month movers in a location to twelve-month movers from the rest of the United States who came from said location. The ratio is subtracted by one and multiplied by 100 to arrive at a percent difference: 100×(In_l/Out_l-1), where In_l is the total from people moving into location l and Out_l is the total from people moving from location l. Table 3

summarizes the results by ACS sample. Z-scores are included to assess the sampling accuracy of the percent differences.

[26] Thomas B. Foster, "Decomposing American Immobility: Compositional and Rate Components of Interstate, Intrastate, and Intracounty Migration and Mobility Decline," *Demographic Research* 37 (2017): 1515–47.

[27] The net flows of intrastate migration were not included as the net values are mostly near zero.

[28] State-level z-scores are generally lower as the standard errors are higher at smaller geographies. High standard errors make it impossible to conduct this analysis for individual metro areas.

[29]For reference see Elena G. Irwin, Andrew M. Isserman, Maureen Kilkenny, and Mark D. Partridge, "A Century of Research on Rural Development and Regional Issues," *American Journal of Agricultural Economics* 92, no. 2 (2010): 522–53.

[30] See USDA, *2007 Farm Bill Theme Papers, Rural Development*, 2006.

[31] See Daniel C. Monchuk, John A. Miranowski, Dermot J. Hayes, and Bruce A. Babcock, "An Analysis of Regional Economic Growth in the U.S. Midwest," *Applied Economic Perspectives and Policy* 29, no. 1 (2007): 17–39.

[32] The Agricultural Services Share coefficient is statistically insignificant and economically small. Monchuk et al. (2007) use a more sophisticated statistical technique, limited their data to a decade, and expanded their analysis to the United States. The state dummy variables used in their analysis also show significantly lower growth for Illinois and stronger growth for Minnesota, South Dakota, and Wisconsin compared to Iowa. Their analysis included a spatial econometric structure to account for spatial autocorrelation and estimation results did not change significantly when they subset their data to rural counties.

[33] In the early 2000s, I was frequently told by Colorado farmers that the most profitable crop was condominiums.

[34] See Bruce Weber, Alexander Marre, Monica Fisher, Robert Gibbs, and John Cromartie, "Education's Effect on Poverty: The Role of Migration," *Review of Agricultural Economics* 29, no. 3 (2007): 437–445.

[35]See Tzu-Ling Huang, Peter F. Orazem, and Darin Wohlgemuth, "Rural Population Growth, 1950-1990: The Roles of Human Capital, Industry Structure, and Government Policy," *American Journal of Agricultural Economics* 84, no. 3 (2002): 615–627. Local efforts to increase the local share of college graduates will encourage out-migration all else equal.

[36] For reference see Bradford Mills and Gautam Hazarika, "The Migration of Young Adults from Non-Metropolitan Counties," *American Journal of Agricultural Economics* 83, no. 2 (2001): 329–340.

[37] For reference see David McGranahan, "Landscape Influence on Recent Rural Migration in the U.S," *Landscape and Urban Planning* 85 (2008): 228–240.

[38] For reference see Matthew E. Kahn, and Randall Walsh, "Cities and the Environment," in *Handbook of Regional and Urban Economics*, vol. 5A, edited by Gilles Duranton, J. Vernon Henderson, and William C. Strange (Amsterdam: Elsevier, 2015): 405–465.

[39] For reference see Jordan Rappaport, "Consumption Amenities and City Population Density," *Regional Science and Urban Economics* 38, no. 6 (2008): 533–552.
[40] See Maury Granger and Glenn Blomquist, "Evaluating the Influence of Amenities on the Location of Manufacturing Establishments in Urban Areas," *Urban Studies* 36 (1999): 1859-1873.

[41] For reference see Maureen Kilkenny and Mark D. Partridge, "Export Sectors and Rural Development," *American Journal of Agricultural Economics* 91, no. 4 (2009): 910–929.

[42] For reference see David Neumark and Helen Simpson, "Place-Based Policies," In *Handbook of Regional and Urban Economics*, vol. 5B, edited by Gilles Duranton, J. Vernon Henderson, and William C. Strange (Amsterdam: Elsevier, 2015).

[43] For reference see Mark D. Partridge, Dan S. Rickman, and Kamar Ali, "Recent Immigration and Economic Outcomes in Rural America," *American Journal of Agricultural Economics* 90, no. 5 (2008): 1326–1333.

[44] Full-time employment history is defined as usually working at least 38 hours while being employed at least 48 out of the last 52 weeks. Observations are also limited to positive earnings.

[45] For reference see Roger Koenker, Pin Ng, and Stephen Portnoy, "Quantile Smoothing Splines," *Biometrika* 81, no. 4 (1994): 673–680.

[46] See Kurt V. Krueger, *Dollar Value of a Day, 2018*, Expectancy Data (2018).

[47] See http://mcdc.missouri.edu/applications/geocorr2014.html.