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Human Capital in the Heartland: Evidence on Brain Drain

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Abstract

The Midwestern United States is often called the Heartland of America. The Heartland was once an engine of American economic growth, but technological change and industrial restructuring have made it difficult for many places to thrive. Skilled workers are critical for regional economic prosperity. However, the Heartland is struggling with its human capital. Specifically, the Heartland produces college-educated workers at a high rate but disproportionately loses these workers to other regions. In other words, the Midwest is suffering brain drain to other regions. In this outreach article, I present key facts about this issue and discuss possible paths forward.

JEL classification

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Keywords

human capital, regional development, migration, brain drain, Midwest, Heartland

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1. Hardship in the Heartland

The Midwest region of the U.S. is often referred to by its residents and supporters as the Heartland of America.[1] The Heartland was once an industrial powerhouse and engine of economic growth, but industrial restructuring has reduced economic prosperity in much of the Midwest, especially in places historically dependent on manufacturing. The modern economy is increasingly driven by high-skilled service sectors employing highly educated workers. Producing, retaining, and attracting skilled workers are critical for regional prosperity, but the Heartland is struggling with its human capital. The Heartland is experiencing an outflow of college-educated workers to other regions.

This article documents and discusses key facts about human capital in the Heartland. Several pieces of data point to significant brain drain. I discuss possible explanations and provide recommendations for policymakers. Improving local amenities, nurturing local businesses, and increasing remote work opportunities are important goals for improving the lives of Heartland residents and encouraging more people to live in America's Heartland.

2. Defining Human Capital

Human prosperity is no fluke. Humans are talented creatures capable of extraordinary feats both individually and collectively. We are born with incredible potential, but that potential requires cultivation. We spend our early lives acquiring and developing knowledge, skills, and abilities and then spend most of our remaining lives applying and further refining these tools. Economists use the term human capital to refer to the knowledge, skills, and abilities that are

[1] I use the U.S. Census Bureau's definition of the Midwest which includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

useful in life and the labor market (Becker, 1962; Berry & Glaeser, 2005; Moretti, 2012). Human capital provides a number of individual benefits including higher incomes, better health, and enhanced flourishing (Card, 1999; Cutler & Lleras-Muney, 2010; Ahn & Winters, 2023). An individual's human capital also benefits other people via ideas and innovations that lead to new products, job creation, and knowledge sharing (Moretti, 2012; Winters, 2013).

We acquire human capital from numerous sources including our parents, siblings, friends, teachers, classmates, textbooks, life experiences, and the world around us. Social scientists often focus on formal education as an important aspect of human capital because it is measurable, modellable, and malleable. In regional science, we often measure the human capital level of a region by the share of the population with a bachelor's degree or higher (Winters, 2011a, b). We also build models of regional economies that depend on the education level of the workforce. These simplified representations allow both theoretical and empirical insights that improve our understanding of why some regions prosper more than others. Regional education levels are malleable in that they can be increased or decreased in multiple ways. For starters, a region can educate more people from the region by providing more resources to education and lowering the costs to individuals and their families. However, migration also plays a key role in regional human capital levels (Brown et al., 2010).

3. Migration Matters for Human Capital

An area can gain or lose human capital to other areas via migration. Individuals are partially but imperfectly tied to places where they previously lived. Ties to previous locations can result from financial and psychological costs of moving, attachments to people and places, and a sense of belonging (Winters, 2022). However, there can be substantial individual benefits from

migration, and many people are geographically mobile. Some people move because the job opportunities elsewhere are much better than their previous locations (Berry & Glaeser, 2005; Storper & Scott, 2009; Winters, 2017). Others move because they prefer the amenities and quality of life offered in a new area (Rappaport, 2007; Partridge, 2010). Importantly, increased educational attainment leads to higher geographic mobility, and the most educated are typically the most geographically mobile (Winters, 2022). Furthermore, a region can often increase its stock of human capital by offering a combination of better job opportunities for skilled workers and amenities that skilled workers value. Areas with limited job opportunities and less attractive amenities for skilled workers will lose human capital.

Prior research indicates that the Midwest region has struggled with attracting and retaining college graduates and other skilled workers. Carr & Kefalas (2009) examine the hollowing out of population in America's Heartland and argue that economic and social forces combine to push out skilled young people; the education system raises their aspirations and opportunity costs and nudges them toward high-paying labor markets. They suggest that many young people perceive getting out of the Heartland, especially small towns and rural areas, as an accomplishment itself and a marker of upward mobility. Artz (2003) estimates county-level brain drain and gain for 1970-2000 and finds that the Midwest lost human capital with impacts especially pronounced in non-metropolitan counties. The Joint Economic Committee Republicans (2019) examine various measures of brain drain for 1970 and 2017 and find that multiple states in the Midwest did especially poorly in both 1970 and 2017, indicating that brain drain is a significant and persistent issue for the region.

4. Data Description

This article uses data from the 2023 American Community Survey (ACS) to provide some basic facts about human capital in the Heartland.[2] Data analysis always involves choices and limitations, and this analysis is no different. While facts are indisputable, interpretation is not. I present important facts that are available from the data. I also offer some interpretation of these facts.

I focus on individuals ages 25-64 because these ages typically correspond to peak attachment to the workforce. Most (but not all) people in these ages are done with formal schooling but not yet retired. I focus on bachelor's degree completion as the main human capital measure, while recognizing that other aspects of human capital are also important.

Migration information in public datasets is very limited, which makes many aspects of migration hard to measure. I focus on lifetime migration from birthplace (birth state or birth region) to adult location in 2023 because of data availability. The ACS does not tell us when someone moved from their birthplace, just that they did. We also do not know where exactly people were born within a state. Despite these limitations, we can use this migration information to learn about human capital in the Heartland.

5. Key Facts

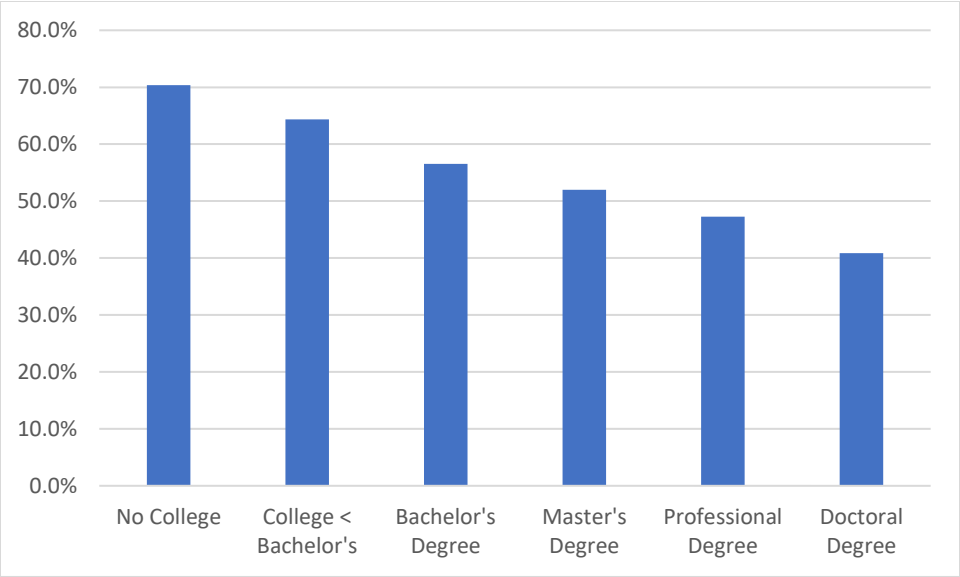
Fact 1: College graduates are more geographically mobile than non-graduates.

I first examine the percentage of individuals ages 25-64 in the 2023 ACS who live in their state of birth. I separate individuals into six education groups and report birth-state residence rates for

[2] The ACS microdata used were extracted from IPUMS (Ruggles et al., 2025). I also use county population estimates from the U.S. Census Bureau.

each group among people born in the U.S. in Figure 1. Consistent with previous literature, birth-state residence rates decrease with higher education levels from 70.4% for those with no college to 56.6% for bachelor's degree holders and 40.9% for Ph.D. recipients.

Figure 1: Birth-State Residence by Education Level, 2023



Source: author estimates from the 2023 ACS.

Fact 2: Midwest residents are less educated than Midwest natives.

I next explore differences in bachelor's degree attainment rates for the four census regions: Northeast, Midwest, South, and West.[3] I examine education levels separately for each region's

[3] The Northeast includes Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The Midwest includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The South includes Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. The West includes Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

current residents and for people born in each region (natives).[4] Results are in Table 1. Among Midwest natives, 39.3% have a bachelor's degree or higher. However, only 36.8% of Midwest residents have a bachelor's degree or higher. This suggests that on net the Midwest is "losing" college graduates to other regions. However, this is only one piece of evidence with other possible explanations, e.g., the Midwest could be very successful at gaining persons with less than a bachelor's degree. I present additional evidence later supporting the interpretation of Table 1 that the Midwest is losing college graduates. The Midwest is not the only region with lower educational levels among residents than natives. The Northeast is also losing college graduates in Table 1. However, losing human capital has differing impacts on the Northeast and Midwest. The Northeast has the highest college attainment level for both residents and natives, so it is losing some of its abundance but still outperforming other regions. The Midwest has the second highest education level among natives and is ahead of the West by 2.9 percentage points and ahead of the South by 5.1 percentage points. However, human capital among residents for the Midwest is only the third highest, now below the West by 1.6 percentage points and only ahead of the South by 1.0 percentage point; the South has the lowest human capital level among both residents and natives and is a gainer of college graduates in Table 1.

Table 1: Bachelor's Degree or Higher Percentages in 2023, Ages 25-64

	Region Residents	Region Natives	Resident-Native Difference
Northeast	43.9%	45.4%	-1.5%
Midwest	36.8%	39.3%	-2.5%
South	35.8%	34.2%	1.5%
West	38.4%	36.4%	1.9%

Source: author estimates from the 2023 ACS.

[4] Residents include persons born in the U.S. and those born abroad. Patterns for residents are similar if the foreign-born are excluded.

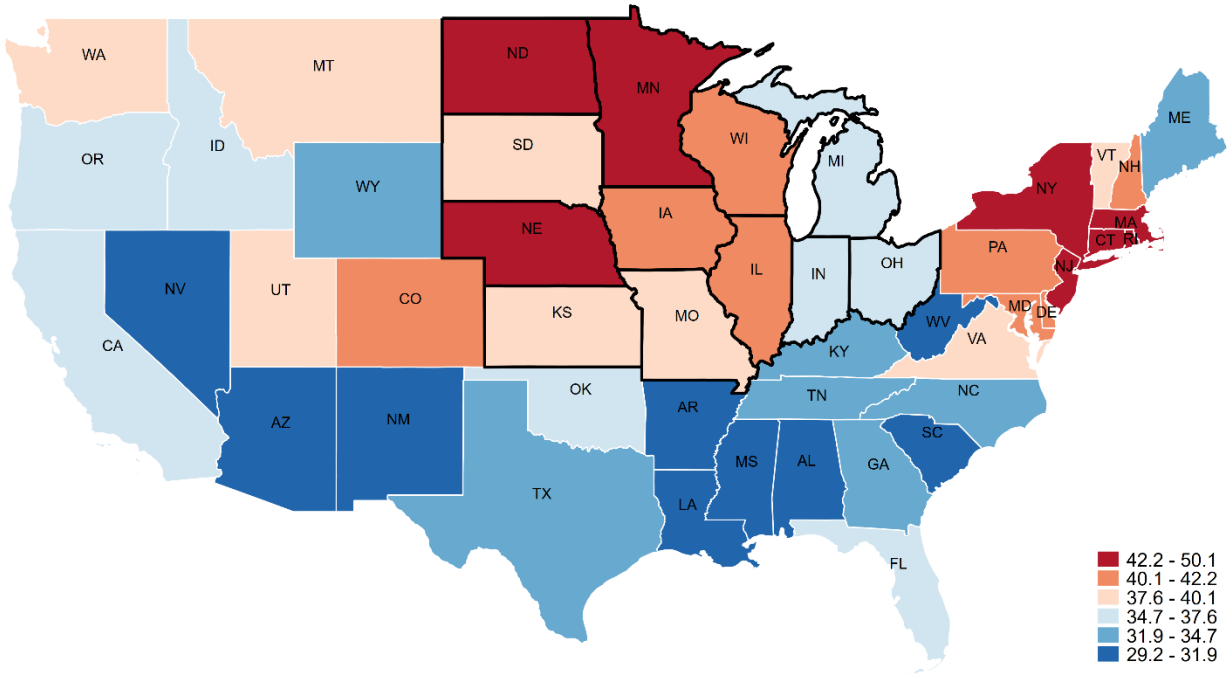
Fact 3: College graduation rates by birth state are relatively high for many Midwestern states, but this is less true for residents.

I next build on Table 1 and illustrate the percentage of ages 25-64 with a bachelor's degree or higher by birth state in Figure 2 and residence state in Figure 3.[5] Red indicates higher rates and blue indicates lower rates; states are divided into six groups. Midwest states are indicated with thick dark boundary lines. Three Midwestern states are in the top group for college graduation rates by birth state: Minnesota, Nebraska, and North Dakota; Iowa, Illinois, and Wisconsin are in the second highest group. Of course, the Midwest is not a monolith. Kansas, Missouri, and South Dakota are in the third group by birth state, and Indiana, Michigan, and Ohio are in the fourth group out of six. No Midwest state is in the bottom two groups by birth state human capital in Figure 2. Thus, native education levels are overall relatively high for multiple Midwest states.

For resident human capital in Figure 3, no Midwest state is in the top group, and only Illinois and Minnesota are in the second highest group. Iowa and Missouri fall to the fourth group, and Indiana and South Dakota fall to the fifth group out of six. Thus, resident human capital levels are less stellar than native rates across Midwest states.

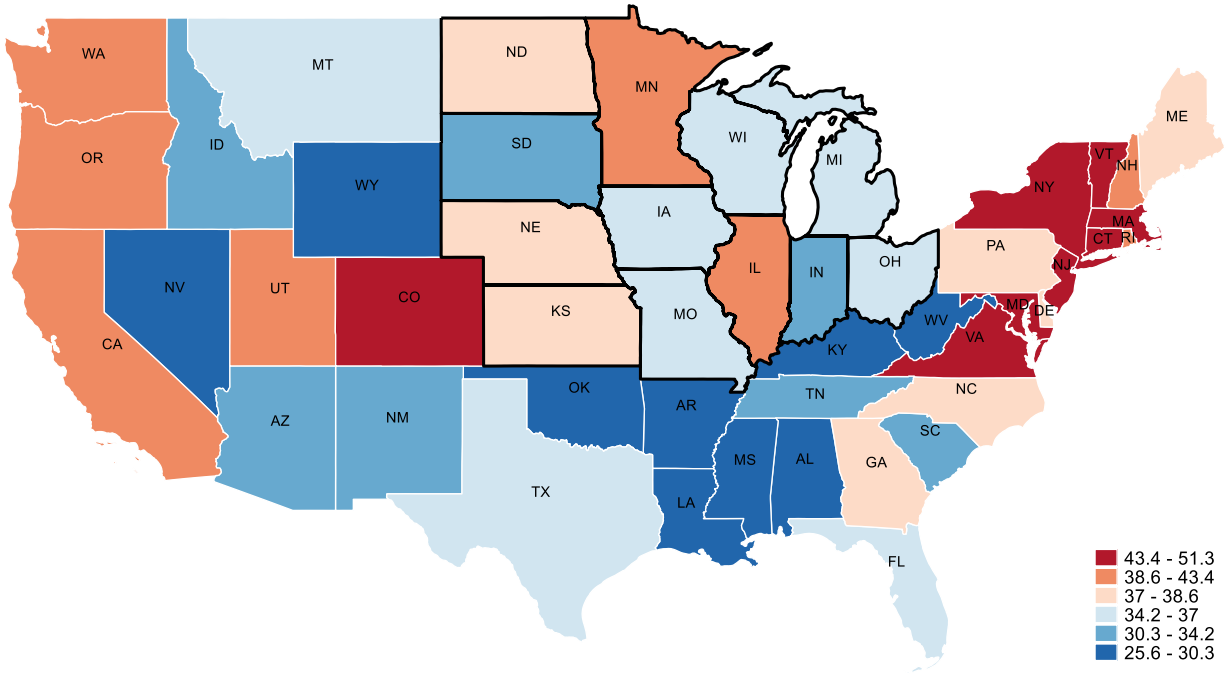
[5] Table A1 in the appendix provides detailed percentages for each state. Alaska and Hawaii are included in the analysis but excluded from the maps for ease of illustration.

Figure 2: College Graduate Share in 2023 by Birth State, Ages 25-64



Source: author estimates from the 2023 ACS.

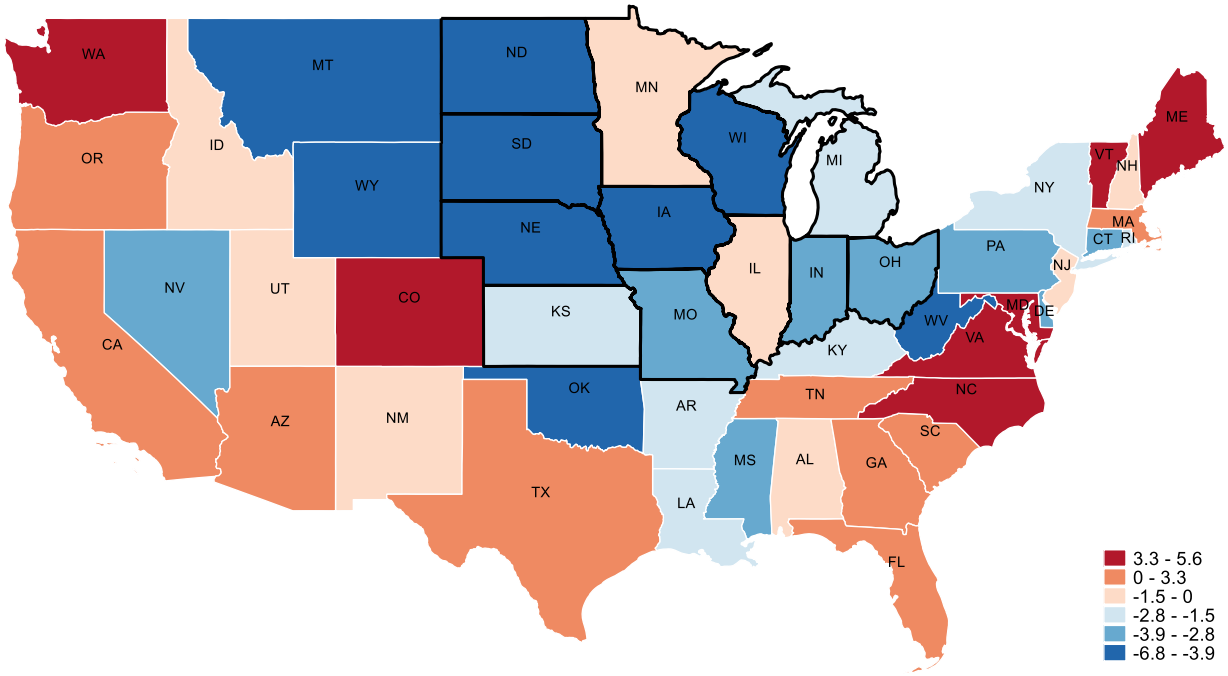
Figure 3: College Graduate Share in 2023 by Residence State, Ages 25-64



Source: author estimates from the 2023 ACS.

Figure 4 presents for each state the difference between college attainment rates of residents (Figure 3) and natives (Figure 2). Figure 4 is structured so that more positive values (redder) mean higher education levels for residents than natives indicating brain gain; more negative values (bluer) mean lower levels for residents than natives indicating brain drain. Figure 4 indicates that brain drain is very pronounced in the Midwest with several states in the bottom group and none in the top two groups.

Figure 4: Resident-Native Brain Gain (+) or Drain (-) by State



Source: author estimates from the 2023 ACS.

Fact 4: Midwest native college graduates are less likely to live in their birth state and birth region than persons from the South and West.

Table 2 provides additional evidence on Midwest brain drain by examining the percentage of each region's native college graduates ages 25-64 who live in their birth state and birth region. For both measures, the Northeast is the lowest, and the Midwest is the second lowest; the South

has the highest rate for both measures. These percentages imply that Northeast and Midwest states are relatively bad at retaining the college graduates they produce while the South and West are relatively good at human capital retention. Again, the Northeast has some loss of human capital, but their high human capital levels above suggest that they are losing some of their human capital abundance but still doing quite well. Brain drain is a more consequential issue for the Midwest, and the Midwest is lagging at retaining human capital compared to the South and West. While only 67.3% of college graduates born in the Midwest reside in their home region during ages 25-64, 77.7% of college graduates born in the West reside in their home region and 82.2% of those born in the South do so.

Table 2: College Graduate Birth-State and Birth-Region Residence by Birth Region, 2023

	Lives in Birth State	Lives in Birth Region
Northeast	49.8%	66.4%
Midwest	53.2%	67.3%
South	58.0%	82.2%
West	56.9%	77.7%

Source: author estimates for ages 25-64 from the 2023 ACS.

Fact 5: Midwest local labor markets are on average smaller than other regions.

Midwest residents are more likely to live in non-metropolitan areas and smaller metropolitan statistical areas (MSAs) than residents of other regions. Table 3 illustrates population shares for each region that live in any MSA and MSAs with population at least 500,000 and 5,000,000. The Midwest has the lowest share for each category, indicating that Midwest residents on average live in smaller local markets.

Larger labor markets typically offer a number of advantages including higher wages and salaries for workers in the present, more opportunities for career growth and advancement, more access to innovative industries and new products, more diverse consumption, recreation, cultural,

and social opportunities, and a perceived dynamism that young educated people often value (Glaeser & Saiz, 2004). The smaller local markets of the Midwest may put it at a disadvantage relative to other regions.[6]

The smaller markets in the Midwest result in part from the historical importance of agriculture and manufacturing for the region. Agricultural productivity encourages high land per person, i.e., low population density. Much of the historical Midwest manufacturing base also flourished in smaller "factory cities" with good access to iron, coal, and water transportation. While many older industrial cities have transformed themselves into high-human capital service economy hubs, others have been less successful in this (Moretti, 2012). Agriculture and manufacturing are important industries for the Midwest still today, and these industries rely less on formal schooling than modern service industries that now dominate the U.S. economy (Winters, 2025).

Table 3: Percentage of Population in Large Labor Markets by Region, 2023

	Any Metro	MSA 500K+	MSA 5M+
Northeast	86.0%	76.0%	45.3%
Midwest	78.2%	57.0%	13.7%
South	84.9%	66.9%	27.1%
West	91.1%	75.0%	22.6%

Source: author calculations from U.S. Census Bureau population estimates for 2023.

Fact 6: Human capital levels within the Midwest increase with labor market size.

[6] Appendix Table A2 explores differences in mean and median earnings for college graduates by residence region both for nominal reported income values and for incomes adjusted for cost of living differences via Regional Price Parities produced by the U.S. Bureau of Economic Analysis. Nominal incomes are highest in the Northeast and West regions, but these regions also have higher cost of living. Cost of living adjusted incomes for the Midwest are largely comparable to other regions.

The discussion above suggests that college graduates are especially drawn toward larger labor markets. Table 4 shows this relationship within the Midwest by illustrating the share of residents with a bachelor's degree or higher by MSA status and size.[7] The rate is highest for Chicago MSA, the only MSA in the Midwest with at least five million people. The rate decreases systematically as we move toward smaller markets and is lowest for non-MSAs. Thus, labor market size largely explains human capital levels within the Midwest and likely helps explain human capital levels in the Midwest relative to other regions.

Table 4: Bachelor's or Higher Shares within the Midwest, 2023

	Residents
Chicago MSA (Pop. 5.0M+)	44.9%
Large MSAs (Pop. 1.5-5.0M)	42.2%
Medium MSAs (Pop. 0.5-1.5M)	37.9%
Small MSAs (Pop. < 0.5M)	34.8%
Non-MSAs	23.8%

Source: author estimates for ages 25-64 from the 2023 ACS.

Fact 7: Natural amenity scores are lowest in the Midwest.

Table 5 reports population-weighted mean natural amenity scores by region using the USDA county-level natural amenity scale described in McGranahan (1999).[8] The natural amenity scale is an aggregate index of scores for January temperature, January sunlight, July temperature, July humidity, topography score, and the percent of the local geographic area that is water. A higher score indicates a more desirable amenity level.

[7] The publicly available data includes birth state but not the county or metropolitan area of birth, so I cannot compute college graduate shares by birth place in Table 4.

[8] I use year 2000 county population estimates from the U.S. Census Bureau to construct population-weighted averages, but results are very similar if using unweighted averages. USDA natural amenity scores are not available for Alaska and Hawaii.

Unfortunately for the Midwest, it has the lowest mean natural amenity score among the four regions. The West tops the list followed by the South and Northeast. The Midwest has very cold winters, relatively warm summers, and relatively flat topography, which combine to give it a low average score on the natural amenity index (McGranahan, 1999). This suggests that natural amenities may play some role in the Midwest's struggles in attracting and retaining human capital.

Table 5: Mean Natural Amenity Score by Region

Region	Amenity Rank	Mean Natural Amenity Score
Northeast	3	0.17
Midwest	4	-1.66
South	2	0.93
West	1	6.21

Source: author calculations from USDA natural amenity scale.

Natural amenities are strongly correlated with long-run population growth (McGranahan, 1999; Rappaport, 2007; Partridge, 2010). Furthermore, college graduates may be especially responsive to amenity differences across areas when making migration decisions because they have higher incomes and greater ability and willingness to pay to live in local areas with better amenities (Whisler et al., 2008; Diamond, 2016). To explore this further, I also correlate state natural amenity scores with the resident-native brain gain/drain value from Figure 4. The simple correlation is 0.40, indicating that states with higher natural amenity scores have more brain gain while states with lower natural amenity scores have more brain drain on average. For example, Colorado has the largest brain gain rate from Figure 4 and has the seventh highest natural amenity score due to its mountains and agreeable climate. At the opposite extreme, North Dakota has the largest brain drain in Figure 4 and has the lowest natural amenity score among

the 48 contiguous states. USDA natural amenity scores may not perfectly measure natural amenities, but natural amenities do appear to play a role in the Heartland's ability to attract and retain human capital.

6. Discussion

The Midwest is struggling to attract and retain human capital, and this hinders the long run economic prosperity of the region. Historical industrial structure and low population density are likely partial explanations. Much of the Midwest also has especially cold winters and low natural amenity scores compared to the South and West, and this likely affects migration decisions (Rappaport, 2007; Lee & Winters, 2024). Less populated areas of the Midwest also experience low relative earnings premiums for college graduates that make those areas less attractive (Winters, 2021).

However, some areas of the Midwest have done relatively well recently. They typically have a combination of good job opportunities, affordable housing, and high quality of life. Some of these are small- and medium-population MSAs anchored by large universities that bring in, develop, and partially retain high human capital residents (Winters, 2011a, b; Austin 2017).

The quality of life and bundle of local amenities appear to be increasingly important for local vitality in the Midwest (Austin et al., 2022). People value access to outdoor recreational amenities such as lakes and mountains that facilitate water sports, skiing, and hiking. They also value high quality restaurants, cultural opportunities, and entertainment options. Public services including education, transportation, and public safety are also important. Local areas of the Midwest have varying access to these, but all areas can enhance and leverage the resources that they do have.

Some outsiders and even young people from the Heartland likely have misperceptions about what the region offers. They may view the Midwest as less dynamic and offering fewer opportunities for personal and professional growth. There is perhaps some truth to this in areas of the Heartland still dominated by agriculture and manufacturing, but there are also places in the Midwest with diverse economies, excellent opportunities, and bright futures. In addition to improving amenities and quality of life, there is also much to be gained by improving the narrative about the Heartland and improving its visibility and perception among skilled workers, locally and globally.

While job opportunities are lacking in some areas, chasing jobs via firm relocation incentives is not generally considered a winning strategy by economists (Partridge et al., 2020; Hicks et al., 2025). The incentives erode the tax base, and the new firms often strain other local resources including transportation, energy, water, and air quality. Incentives to a small subset of employers can also crowd out other potential employers and hinder overall employment growth. Instead of pursuing outside firms to relocate, state and local policymakers are better advised to encourage home-grown entrepreneurship and nurture local businesses (Markusen, 2013; Conroy & Deller, 2014). Similarly, some observers have advocated for reducing or even eliminating state personal income taxes to attract residents and increase economic growth, but the research evidence questions the effectiveness of doing so (Rickman & Wang, 2018, 2020, 2025). In particular, Rickman & Wang (2018) show that major tax reductions in two Midwestern states, Kansas and Wisconsin, did not spur growth and instead more likely harmed economic performance in those states. While tax cuts may seem desirable on the surface, reductions in tax revenue also require less spending on public services, which can harm economic performance in both the short run and long run and repel previous and potential residents.

Remote work is another opportunity with significant untapped potential to increase access to good jobs, especially for workers in rural areas, small towns, and smaller cities (Winters, 2024). Broadband internet access is a constraint to remote work in non-metropolitan areas, and some individuals may also face challenges due to lack of experience with remote work software tools and lack of information on where to find remote jobs. Local areas in the Heartland concerned about lack of jobs should seek to improve broadband and provide training and information to make remote work a viable option for existing residents. Remote work can facilitate high human capital workers staying in less densely populated areas of the Heartland who might otherwise leave due to lack of jobs. Better remote work opportunities may help the Heartland attract outsiders, but the real boon may be in retaining existing residents by facilitating better employment opportunities for people who already want to be there.

Policymakers and other stakeholders in the Heartland who care about their region should understand that attracting and retaining human capital is critical for long-term success. There is no simple recipe or one-size-fits-all approach that will work for every community. Local areas need to address their strengths and weaknesses and pursue thoughtful policies to grow their human capital.

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Appendix

Table A1: Bachelor's Degree or Higher Percentages by State in 2023, Ages 25-64

State	Birth State	Residence State	Difference
Alabama	30.8%	29.9%	-1.0
Alaska	33.0%	31.3%	-1.7
Arizona	31.8%	34.2%	2.4
Arkansas	30.2%	27.8%	-2.4
California	36.4%	38.7%	2.3
Colorado	41.7%	47.3%	5.6
Connecticut	49.3%	45.5%	-3.8
Delaware	40.6%	37.7%	-2.9
Florida	34.9%	36.0%	1.2
Georgia	33.9%	37.2%	3.3
Hawaii	38.5%	38.2%	-0.3
Idaho	34.8%	33.4%	-1.4
Illinois	41.4%	41.0%	-0.3
Indiana	35.5%	32.2%	-3.3
Iowa	40.5%	34.3%	-6.2
Kansas	40.1%	37.7%	-2.4
Kentucky	32.0%	29.7%	-2.4
Louisiana	30.4%	28.1%	-2.3
Maine	33.6%	38.1%	4.5
Maryland	41.6%	45.6%	4.0
Massachusetts	50.1%	51.3%	1.2
Michigan	37.3%	34.9%	-2.4
Minnesota	43.5%	43.4%	-0.1
Mississippi	29.2%	26.1%	-3.1
Missouri	38.5%	35.4%	-3.1
Montana	39.3%	35.4%	-3.9
Nebraska	43.6%	37.5%	-6.1
Nevada	31.6%	28.8%	-2.8
New Hampshire	42.2%	42.2%	0.0
New Jersey	48.6%	47.2%	-1.4
New Mexico	31.7%	30.7%	-1.0
New York	45.9%	43.7%	-2.2
North Carolina	34.7%	38.6%	3.9
North Dakota	44.7%	37.8%	-6.8
Ohio	37.2%	34.4%	-2.8
Oklahoma	35.0%	29.2%	-5.9
Oregon	35.6%	38.9%	3.3
Pennsylvania	41.2%	38.3%	-2.9
Rhode Island	42.9%	41.3%	-1.5
South Carolina	31.9%	34.2%	2.4
South Dakota	39.0%	33.7%	-5.3
Tennessee	32.7%	33.8%	1.1
Texas	33.9%	35.3%	1.5
Utah	39.5%	39.2%	-0.2
Vermont	40.1%	44.1%	4.0
Virginia	39.7%	44.6%	4.9
Washington	37.8%	41.9%	4.0
West Virginia	31.3%	25.6%	-5.7
Wisconsin	40.6%	36.7%	-3.9
Wyoming	34.7%	30.3%	-4.4

Source: author estimates from the 2023 ACS.

Table A2: College Graduate Incomes by Residence Region in 2023

	Mean	Median
A. Nominal Income Values		
Northeast	$105,055	$77,000
Midwest	$88,649	$68,000
South	$90,663	$65,000
West	$103,989	$76,000
B. Incomes Adjusted for Cost of Living via Regional Price Parities		
Northeast	99,701	73,473
Midwest	94,154	71,514
South	93,247	67,916
West	96,903	71,213

Source: author estimates for ages 25-64 from the 2023 ACS and Regional Price Parities from the Bureau of Economic Analysis.