



LEFT BEHIND : CAN RURAL AMERICA CATCH UP?

ANALYZING RURAL AMERICA'S STRUGGLES



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INTRODUCTION

Rural America has long been the foundation of America and American society. Its farms, small towns, and large landscapes have contributed to the value of the United States economy. However, in the 21st century, rural America faces significant challenges that threaten its prosperity and sustainability. Namely, the differences in the levels of economic growth, population trends, and overall social factors compared to urban America. As Urban America continues to thrive in innovation, wealth, and opportunities, rural America is plagued by economic stagnation, population decline, and diminishing prospects (Partridge, 2020). This analysis aims to understand how rural America has arrived at this point, illustrate the current economic and social state of rural America, and suggest strategies to aid in the revival of rural America.

Historical Background

Rural American towns historically relied on industries such as mining, manufacturing, agriculture, and fishing. By the late 20th century, globalization meant businesses and other organizations started to operate on an international scale and outsourcing goods and supplies (that is, obtaining goods and supplies from outside) leading to the displacement of many rural farming and agricultural jobs. Additionally, technological advancements contributed to the decline of manufacturing jobs in rural areas and manufacturing was moved to other countries with lower costs and cheaper labor; in contrast, urban America capitalized on knowledge-based economies (Dimitri et al., 2005). As a result, rural areas suffered from a decline in public investment, deteriorating infrastructure, and limited access to education and healthcare.

Today, rural America continues to deal with structural disadvantages and struggles to compete and adapt to the modern economy. Job creation is minimal and wages are low, further worsening poverty and inequality. Furthermore, the population decline and increased migration in rural areas are occurring at an alarming rate. Many young people leave to search for better job opportunities and an improved quality of life. Those who remain are often older, facing labor shortages, and struggling with inadequate social services, which harms growth opportunities. Low levels of educational attainment and limited access to healthcare perpetuate the cycle of poverty in these rural communities. Furthermore, participation in the digital economy remains minimal due to insufficient infrastructure to support modern economic development. The lack of high-speed internet and other essential tools further hinders progress, making efforts to address these challenges a struggle.

This issue impacts various domains of life in both rural and urban America. In politics, it has caused the urban-rural divide. Economically, urban areas rely on rural areas for food and raw materials. Socially and culturally, rural communities contribute unique cultural and recreational experiences that those in urban communities seek out. Therefore, the issue of developing rural America is a pressing one as it impacts the well-being of not only rural America but urban communities and the United States as a whole.

REPORT SPECIFICATIONS AND JUSTIFICATION

The dataset contains comprehensive data on rural counties in the U.S., categorized into five data frames.

1) Income Dataframe:

- Variables Specification:
 - PerCapitalInc: Per capita income in rural areas.
 - Poverty_Rate_ACS: Percentage of people below the poverty line.
 - Deep_Pov_All: Percentage of people in deep poverty.
- Justification
 - To explore economic disparities between rural areas and compare them with urban areas.
 - To correlate income levels with variables like migration, education, and unemployment.
 - Poverty and income levels are critical in understanding economic challenges in rural areas.

2) Jobs Dataframe:

- Variables Specification:
 - UnempRate2007 to UnempRate2021: Unemployment rates over time.
 - NumCivLaborforceXXXX: Number of people in the labor force for each year.
 - PCt Employed in different sectors
- Justification:
 - To analyze unemployment trends and their relationship with migration and income.
 - To calculate labor force participation rates by combining labor force data with total population.
 - Employment is a key driver of economic stability and migration decisions.

3) People Dataframe:

- Variables Specification:
 - TotalPopEst2010 to POPESTIMATE2021: Population estimates over time.
 - NetMigration1019 and NetMigrationRate1019: Net migration numbers and rates (2010–2019).
 - Ed1LessThanHSPct to Ed5CollegePlusPct: Percentages of educational attainment levels.

REPORT SPECIFICATIONS AND JUSTIFICATION

- Justification:
 - To analyze population growth/decline trends in rural areas.
 - To understand migration patterns and their drivers (economic or educational factors).
 - To compare education levels in rural vs. urban counties.
 - Migration and population changes are key to understanding rural challenges, such as brain drain and workforce availability.

4) County Classification Dataframe:

- Variables Specification:
 - Type_2015_Farming_NO to Type_2015_Nonspecialized_NO: Binary variables indicating the economic dependency of each county (e.g., farming, manufacturing, etc.).
 - HiCreativeClass2000: Indicator of counties with a high concentration of creative class jobs.
 - HiAmenity:
- Justification:
 - To analyze the relationship between economic typology and key variables like income, migration, and education.
 - To create visualizations showing the distribution of economic dependencies.
 - Typology explains the economic structure of rural areas, which is critical to addressing their challenges.

5) We also had a Veterans Dataframe but didn't use it as it wasn't relevant to our analysis

Why These Variables? What is its Relevance to Rural America?

These variables capture core issues in rural areas: poverty, employment, migration, population decline, and economic dependency. They also allow for direct rural vs. urban comparisons or subgroup analysis. Finally, understanding correlations and trends between these variables provides insights into how to address the challenges Rural America faces (e.g., investing in education, diversifying the economy).

ANALYSIS

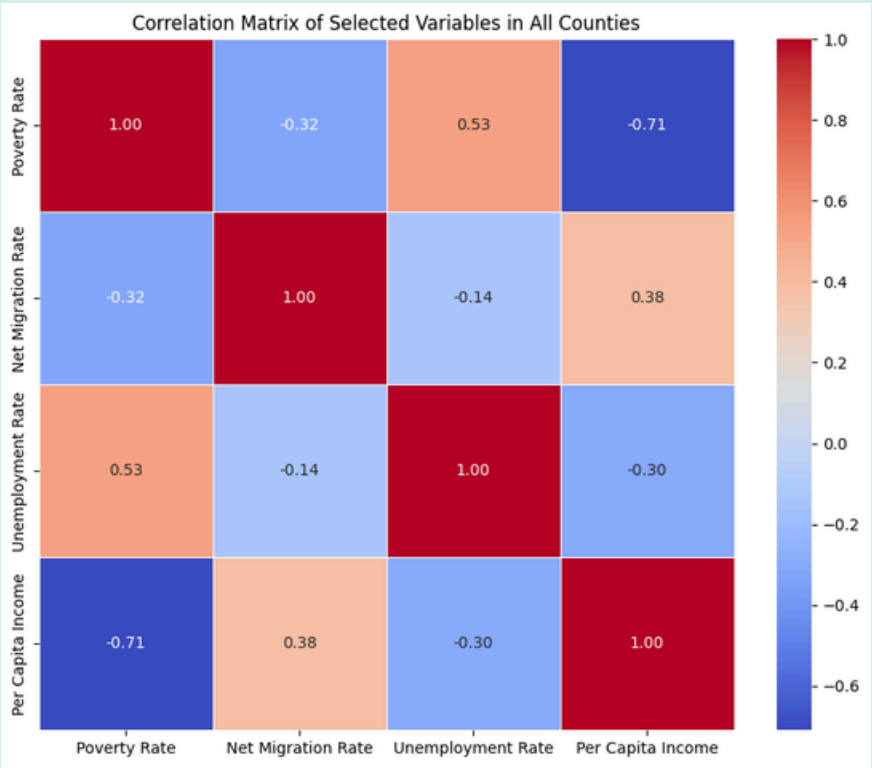


Fig. 1

To begin our analysis, we created figure 1 on the left, which is a correlation matrix of some significant variables. Namely, GDP per capita, poverty rate, net migration rate, and unemployment rate. Through this matrix, it was apparent that there is a positive correlation between poverty rate and GDP per capita, a positive correlation between poverty and unemployment rates, and a negative correlation between unemployment and GDP per capita. Wanting to investigate if the same trends existed when these variables were analyzed in rural counties only, the below correlation matrix was created.

Figure 2 showed that the patterns observed above when analyzing these variables in the United States as a whole, persist in rural areas. Hence, we decided to investigate what strategies and changes can be made to improve rural performance on each of the three indicators, poverty rate, unemployment rate, and GDP per capita. We used all three indicators as a form of triangulation to ensure any patterns found or conclusions reached on the impact of a variable on the economy are not the result of a unique relationship between said variable and one indicator. Therefore, strengthening and validating our conclusions.

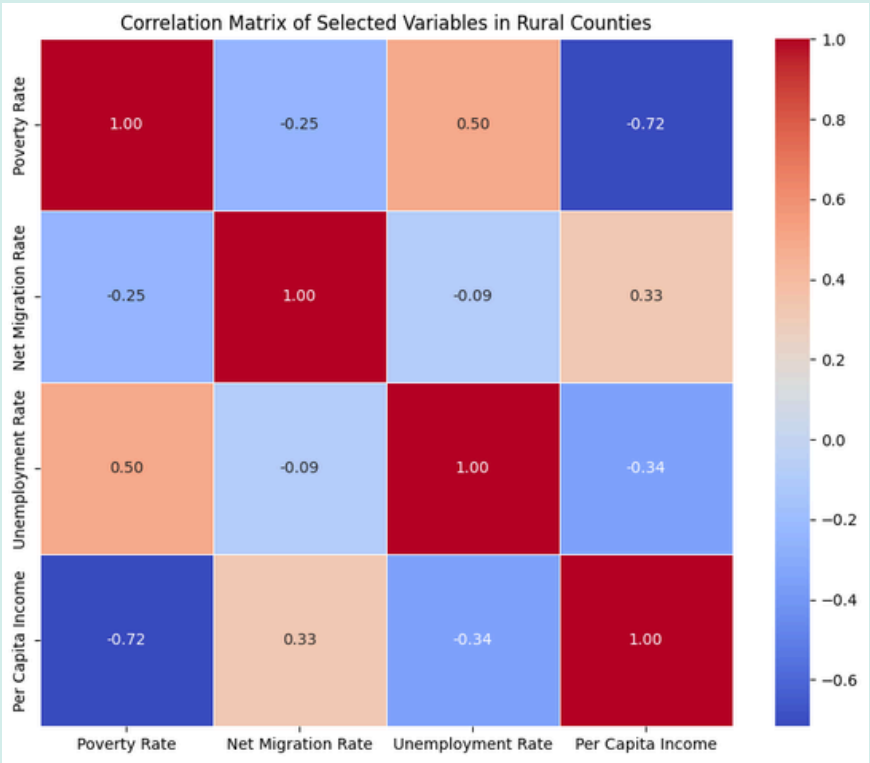


Fig. 2

ANALYSIS

Later in our analysis we divided the rural counties into the top one hundred and bottom one hundred performers for each of the three economic indicators and analyzed them in comparison to one another. Counties with high GDP per capita, low unemployment rates, and low poverty rates will be referred to as high performers, and the opposite is true for counties referred to as low performers.

To effectively recommend solutions we wanted to gain a better understanding of the current demographic and economic situation of rural America through our data set, specifically in comparison to the rest of the country.

A. AGING

First, understanding the demographics. The figures of the heatmaps, figure 3 for rural and figure 4 for urban counties, represent the percentage of the population aged 65 and above. In figure 3, rural counties are generally darker than urban counties, indicating that the population of urban counties is younger while the population of rural counties is aging. The implications of this demographic shift are discussed later in this report.

Age 65 and Older Population Percentage (Rural Counties with Urban Areas in Gray)

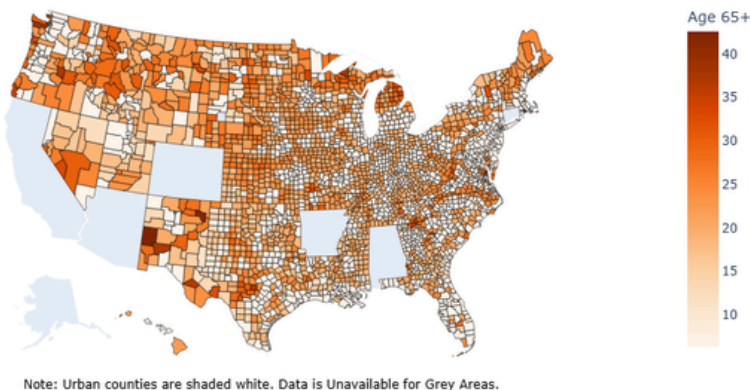


Fig. 3

Age 65 and Older Population Percentage (Urban Counties with Rural Areas in Gray)

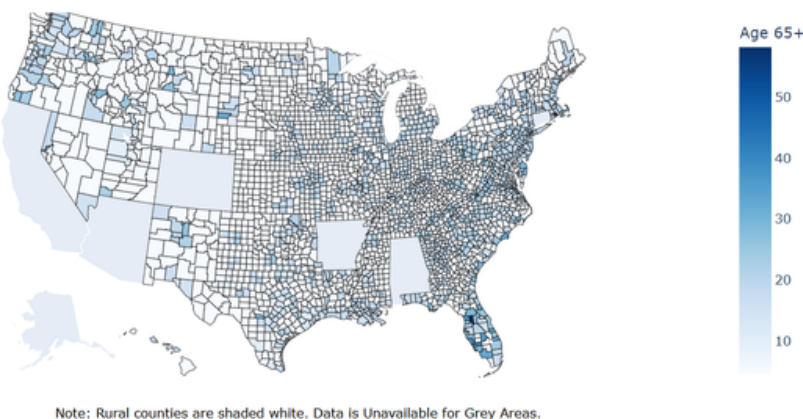


Fig. 4

ANALYSIS

B. MIGRATORY

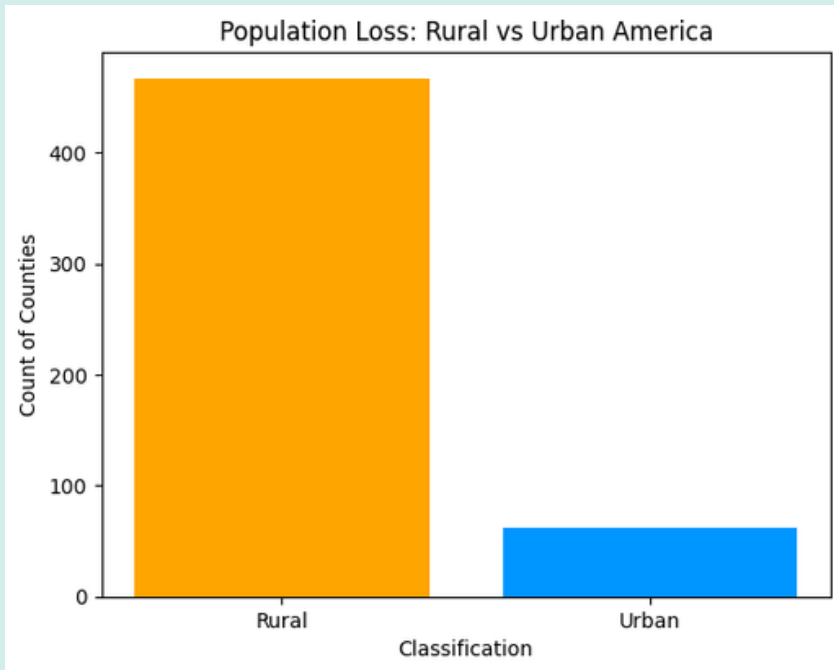


Fig. 5

Figure 5 shows a sharp contrast between average population loss in rural and urban areas. Rural areas are being more significantly affected compared to urban areas. Figure 6 gives further insight into population loss in rural counties by showing the decline in average population estimates between 2010 and 2020. Over ten years the population decreased from over 23400 to slightly more than 23225, a loss of nearly 200 people. Although it may seem small, in rural areas with a limited population may have outsized impacts when experiencing migration such as fewer workers, reduced access to services like school and healthcare, and shrinking tax bases.

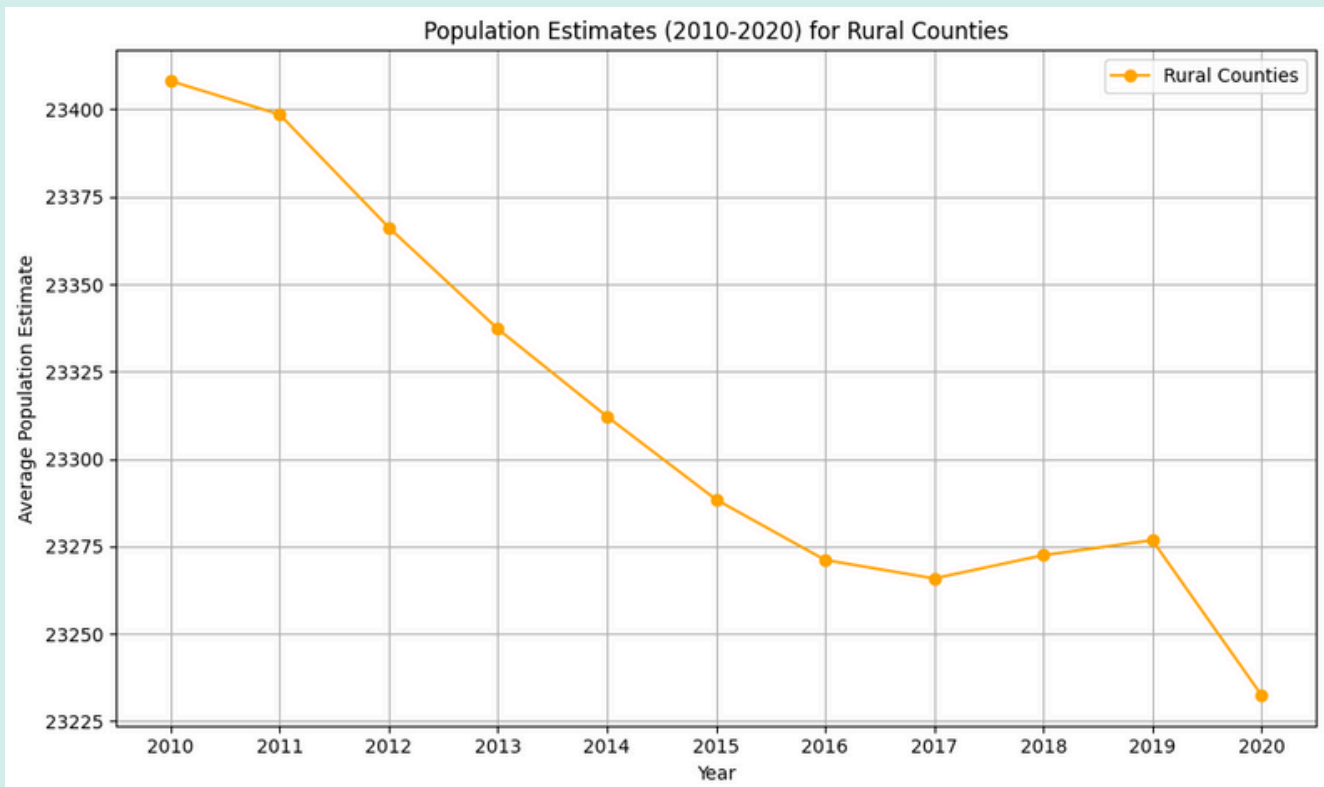


Fig. 6

ANALYSIS

C. LOW EDUCATIONAL ATTAINMENT

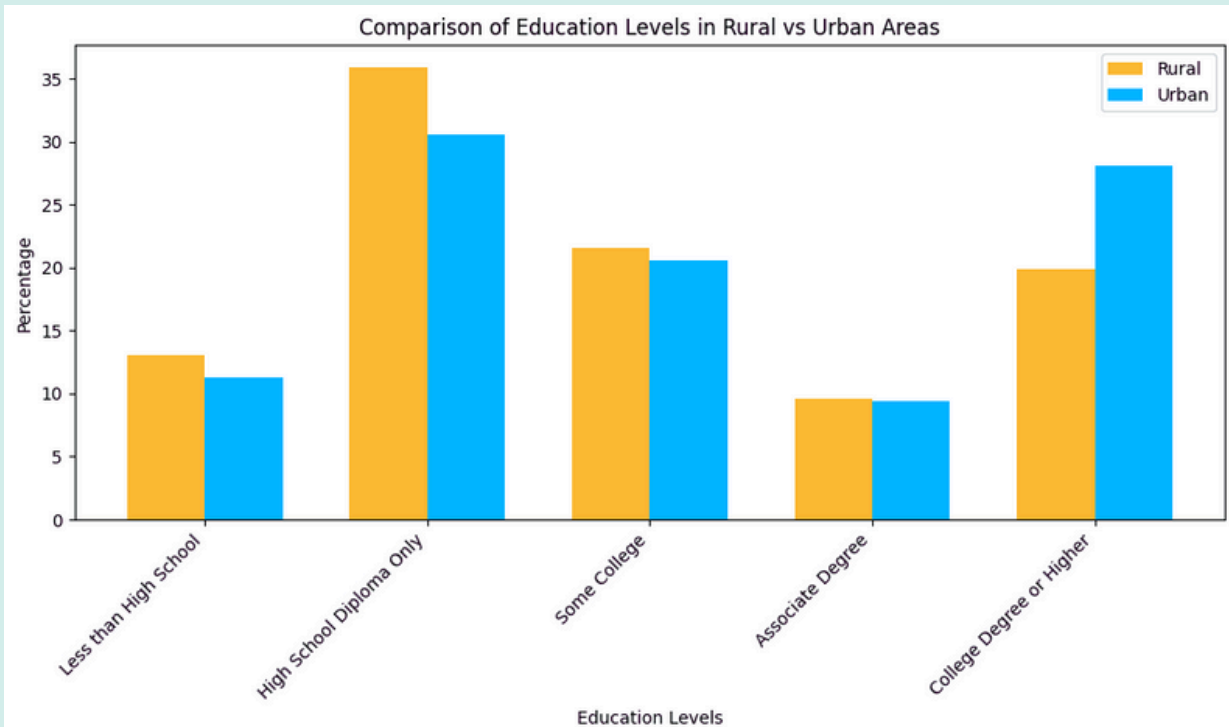


Fig. 7

Figure 7 is of a bar chart where it compares various educational levels across rural and urban areas. It's evident that a higher proportion of those in rural areas have less than high school, or high school diplomas only than in urban counties. Furthermore, a smaller proportion hold college degrees or higher levels of education compared to urban areas. These slight disparities suggest that urban areas are more likely to attain higher education levels such as college or graduate degrees. Rural areas lag behind, hindering their opportunities, as education is crucial for economic progression and social and technological advancement.

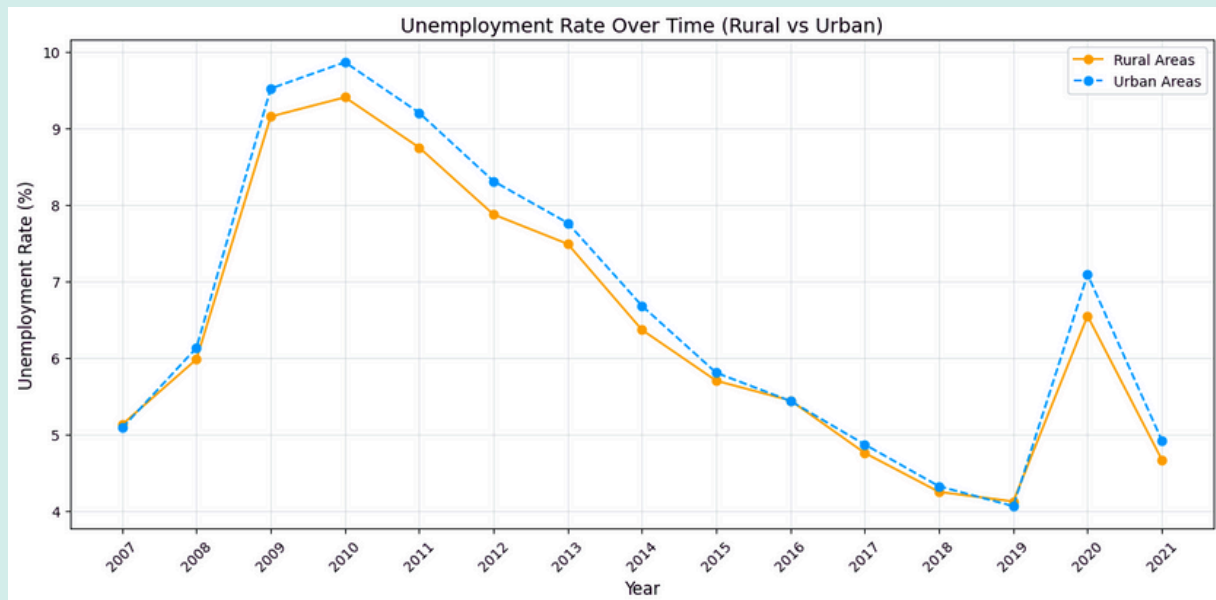


Fig.8

The time-series graph of figure 8 illustrates unemployment rates from 2007 to 2021 for both rural and urban areas.

During the economic downturn in 2008, unemployment spiked in both rural and urban areas, but urban areas consistently displayed slightly higher unemployment rates. While at first glance this may indicate that rural counties outperform urban counties on employment, a possible explanation is that rural areas show lower unemployment percentages because fewer people actively participate in the workforce, and not necessarily because of better economic conditions. This conclusion is validated by Figure 9, which is a time series illustrating labor force participation from 2010 to 2021 in urban and rural areas, where labor force participation is significantly higher in urban areas. This figure indicates that urban areas have slightly higher unemployment rates due to a larger and more active labor force, not as a result of better economic conditions.

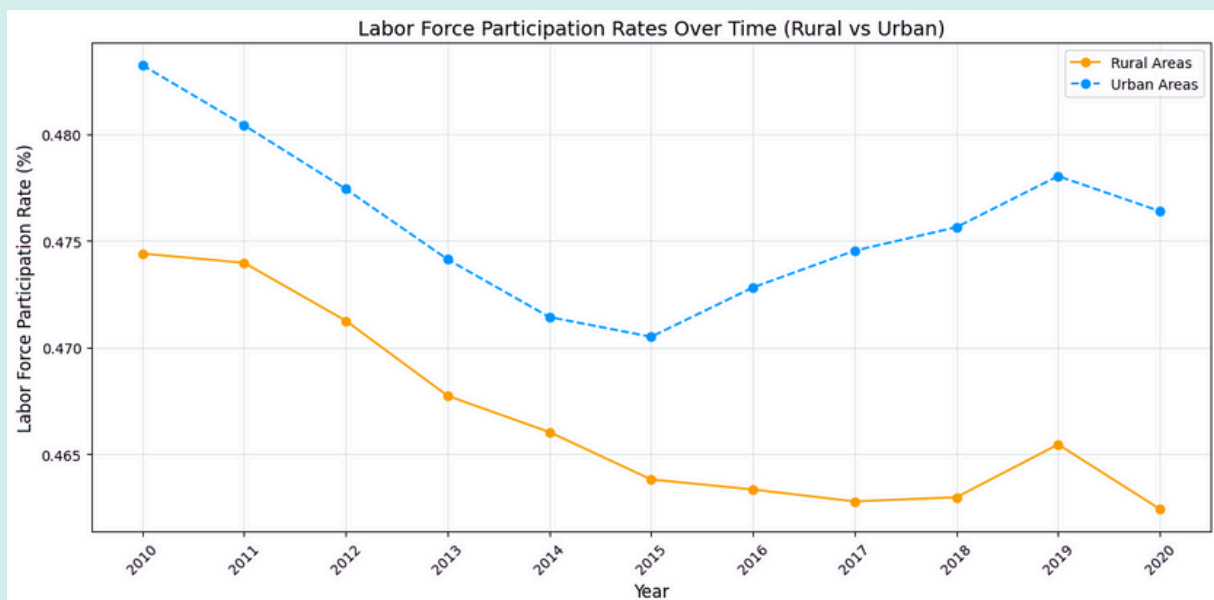


Fig. 9

It is also worth noting that figure 8 shows a consistent decline and is evident in rural areas along with urban areas from 2010 to 2015. However, as rural areas continue on the same path, urban areas' labor force participation starts to increase, suggesting that rural areas continue to face issues of employment access and demographic shifts. Their inability to overcome the lack of workforce engagement raises concerns about their possible perpetuating cycle of poverty and limiting upward mobility.

ANALYSIS

D. DECLINING INDUSTRIES

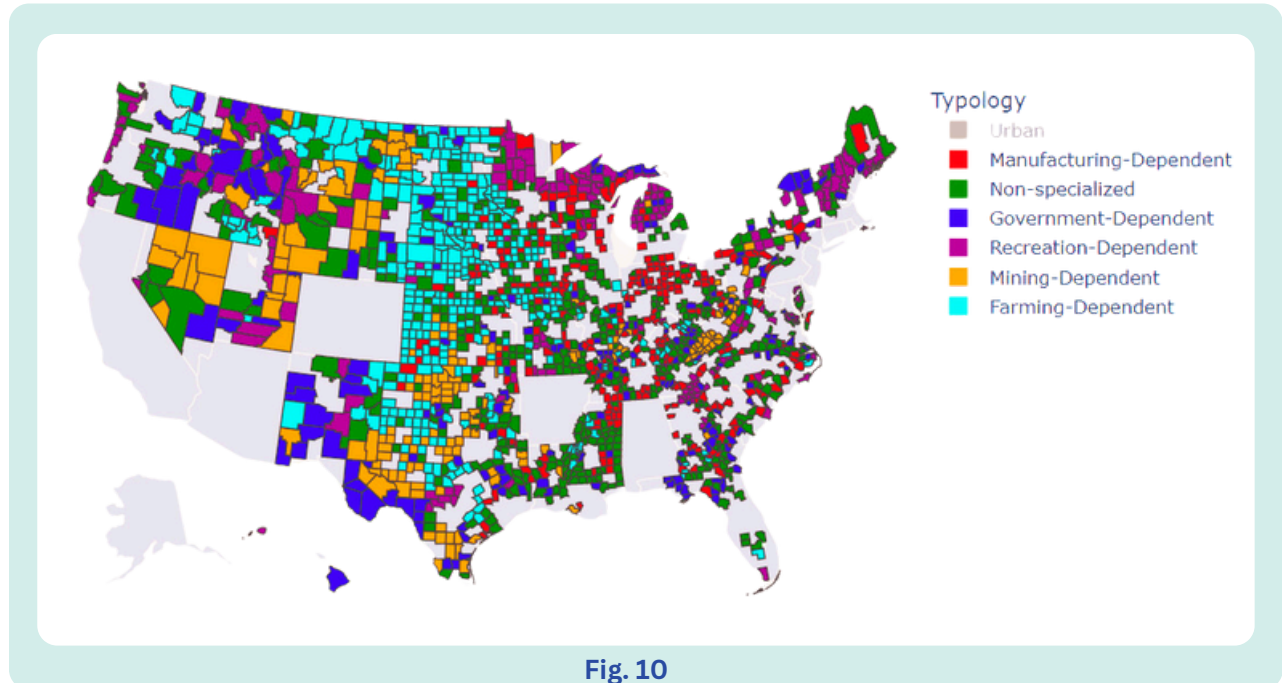


Figure 10 is a map in which it categorizes rural counties into various economic typologies such as manufacturing-dependent, mining-dependent, farming-dependent, etc. This means, respectively, that such a county relies on manufacturing, mining, farming, etc. The map shows how rural counties heavily rely on traditional industries, especially agriculture, manufacturing, and mining in cyan, red, and orange respectively, which is most visible. As previously discussed, these are declining industries in the United States, leaving these towns in a consistent state of decline if no changes are made.

ANALYSIS

E. POVERTY

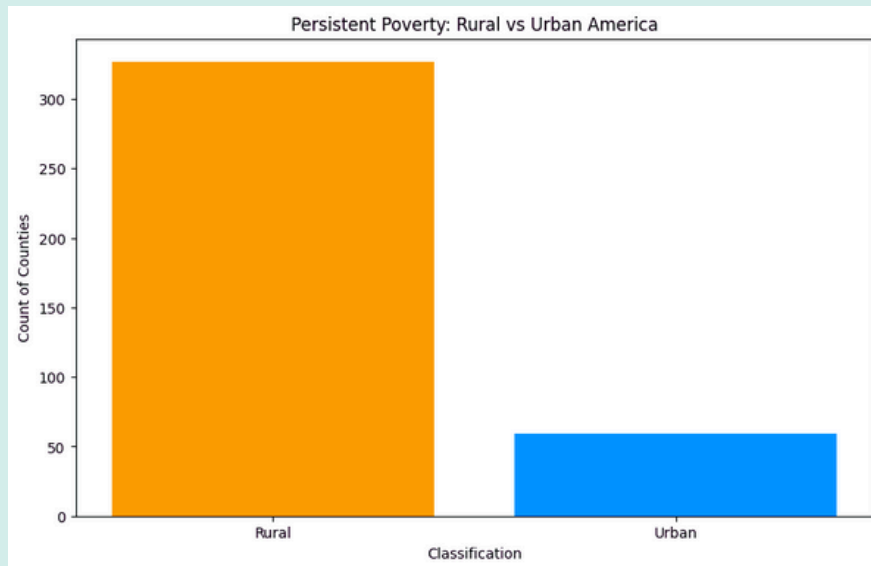


Fig. 11

Figure 11 is a bar chart that shows the count of counties experiencing persistent poverty is much higher in rural areas than in urban areas. In rural areas, a large proportion of counties, about 325, are reported to have persistent poverty.

Meanwhile, urban areas have significantly fewer counties with only 52 facing persistent poverty. It also represents a culmination of all the factors explored above. Rural America consistently performs worse than urban America on various metrics, including education and labor participation. This can be attributed to the migratory nature of the population who when educated leave these rural areas in pursuit of opportunity elsewhere, leaving rural communities and their economies behind to contribute to urban communities and economies. This includes teachers and educators, leaving rural America with fewer educational institutions, plummeting it further into a worse economy and poverty. At the same time, the migratory nature of the population can be attributed to the economic state of rural communities which gives residents several reasons to leave in favor of urban areas. This is a self-perpetuating cycle, which without intervention will not end. The next section of this report explores possible interventions and solutions.

PROPOSED SOLUTIONS

A. CREATIVE CLASS THESIS

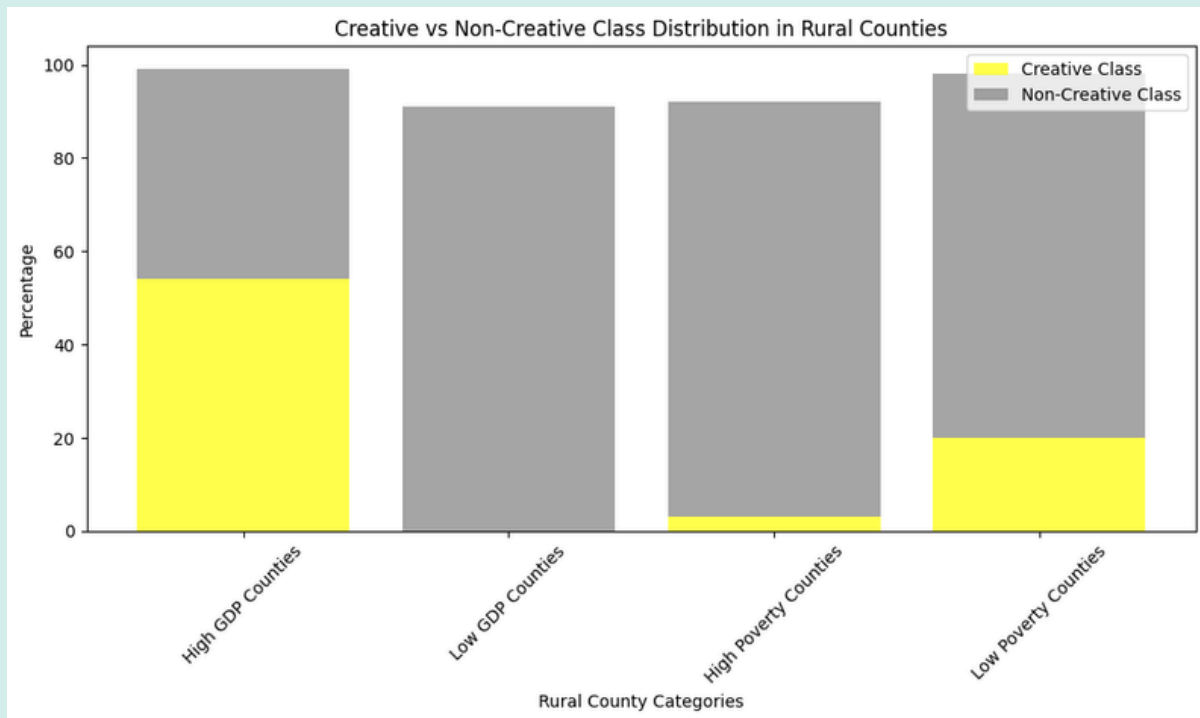


Fig. 12

The creative class thesis is the idea that rural towns need to attract professionals in creative fields such as architects, engineers, and artists to compete in the modern-day American economy. This is especially true for rural towns and counties who, as we have shown above, rely on declining industries such as mining and manufacturing, and tend to lose young talent to urban areas with more opportunity (USDA Creative class county codes). The dataset classifies counties into those that belong to the creative class (i.e. have creative professionals) and those that do not (do not have or do not attract these professionals). Figure 12 compares the proportions of creative and noncreative class counties for each of the four categories shown on the x-axis. It is apparent that of the counties that perform well on the economic indicators, a higher proportion of them belong to the creative class than those who perform poorly. It is especially noteworthy that none of the counties with low GDP per capita belong to the creative class. This indicates that implementing the creative class thesis is indeed effective at improving the performance of counties on the above economic indicators.

PROPOSED SOLUTIONS

A. CREATIVE CLASS THESIS

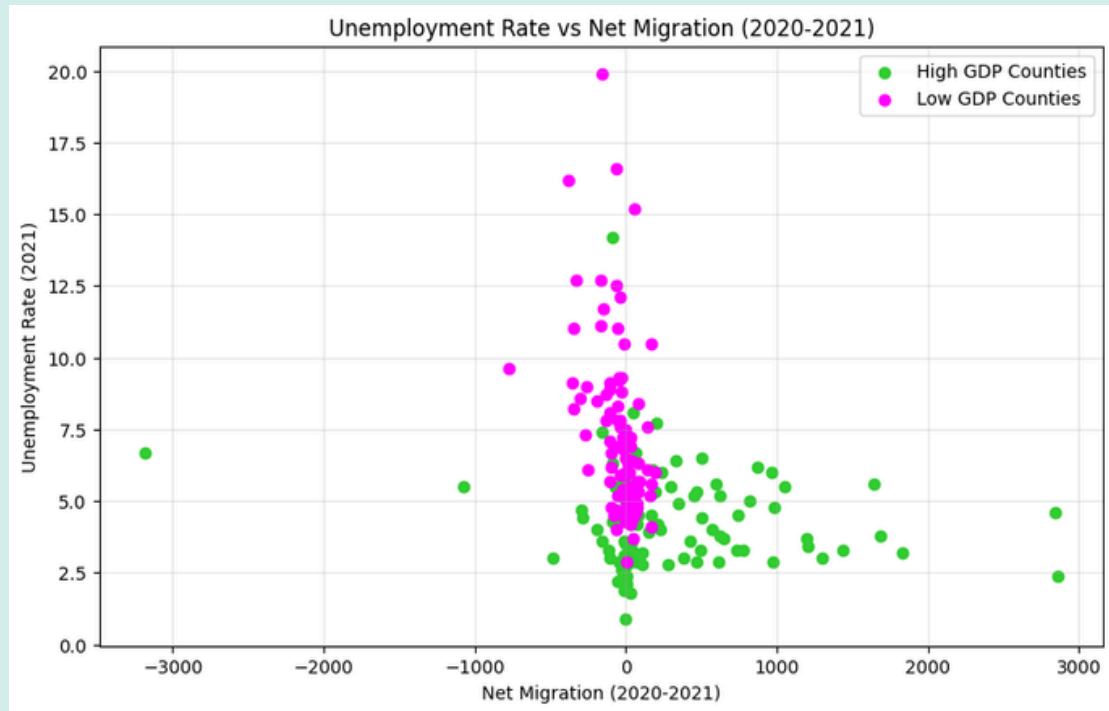


Fig. 13

It is worth noting that the relationship may be bidirectional, that is, counties that attract those professionals have higher GDP per capita and lower poverty rates, and those professionals tend to move to counties with low poverty rates and high GDP per capita. The possibility of this bidirectional nature is supported by the above figures. In Figure 13, the points representing counties with high GDP per capita are concentrated to the right of the 0 net migration point and around the lower half of the y-axis representing the unemployment rate. The points for counties with low GDP per capita are concentrated higher on the unemployment rate and around the 0 point for net migration but slightly to the left. This indicates that counties with high GDP per capita tend to attract residents (as indicated by the positive net migration) and those residents can find employment. On the other hand counties with low GDP per capita tend to either not attract residents or lose them (as indicated by the concentration around the zero and negative net migration. Additionally, those who remain are more likely to be unemployed.

PROPOSED SOLUTIONS

A. CREATIVE CLASS THESIS

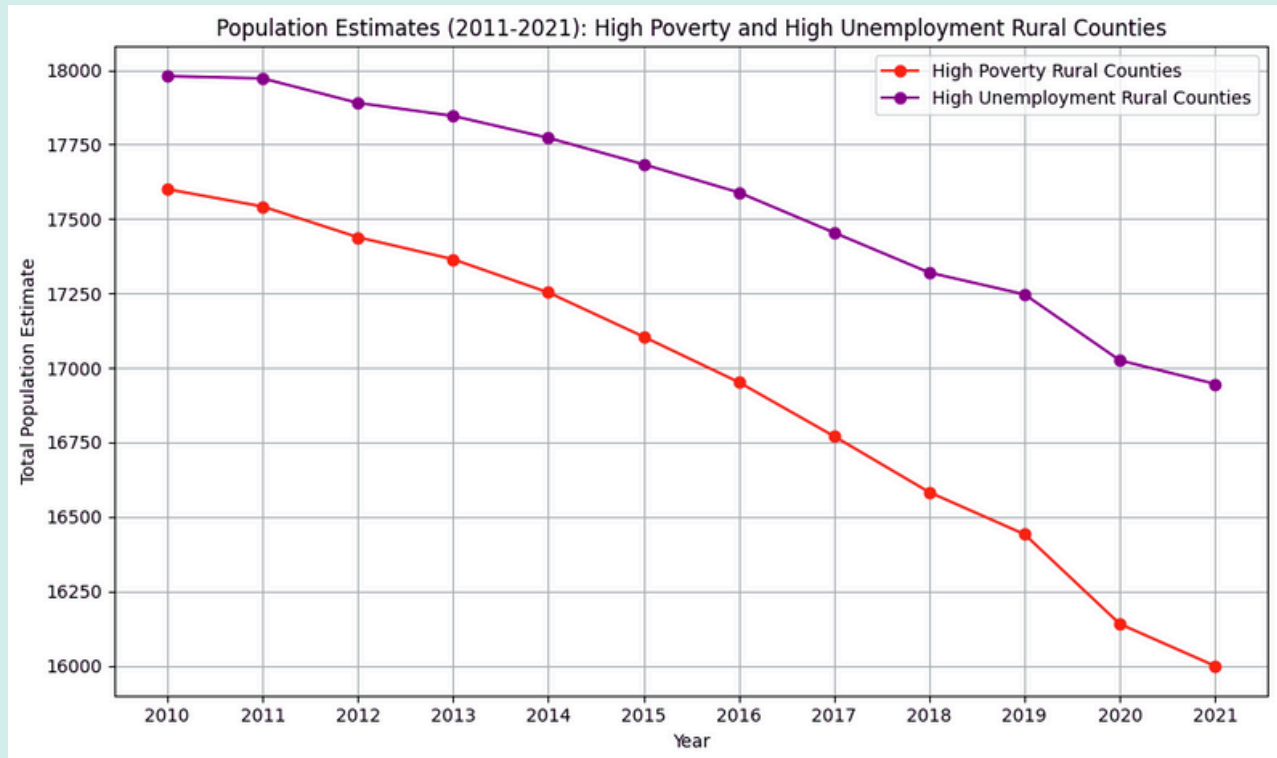


Fig. 14

Figure 14 shows that population estimates consistently decline from the year 2010 to 2021 for the counties with the lowest GDP per capita and the highest poverty rates, while the opposite is true for those with the highest GDP and lowest poverty rates.

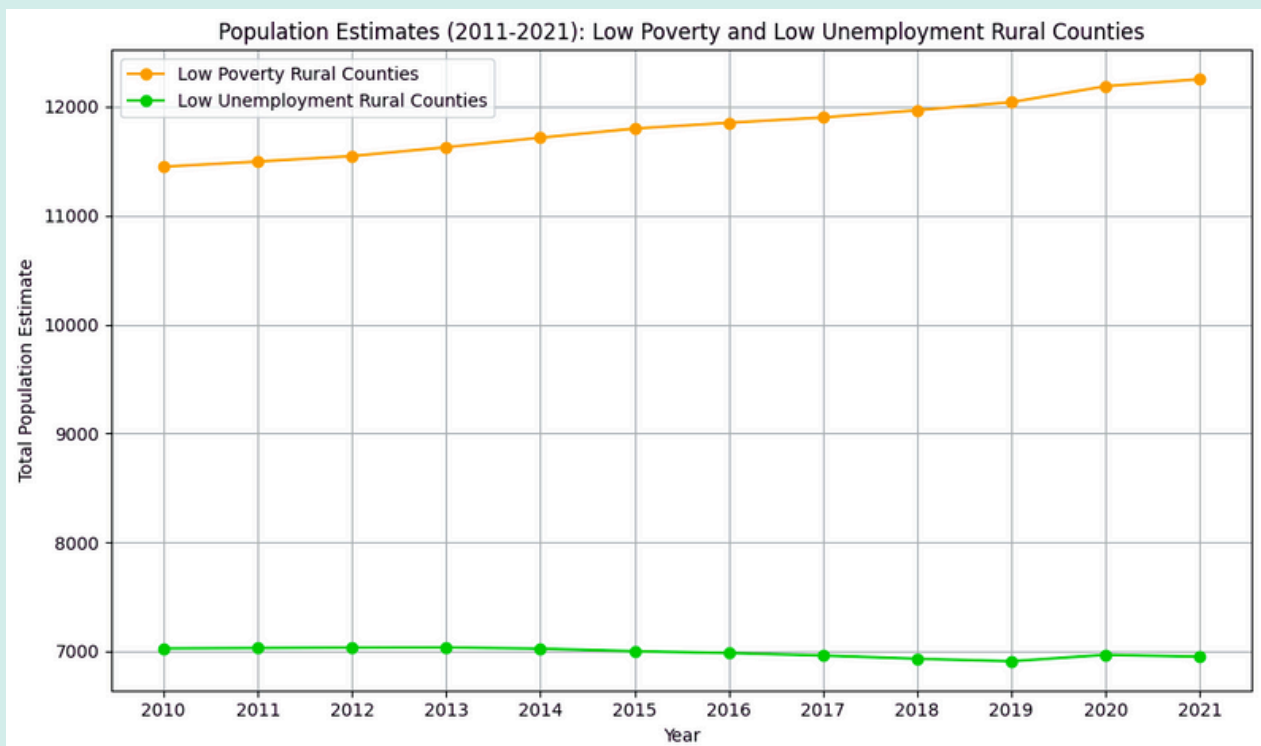


Fig. 15

PROPOSED SOLUTIONS

B. NATURAL AMENITIES

The USDA classifies whether counties have high natural amenities based on six measures of climate, topography, and water area. Those that have the environmental qualities that people prefer, such as topographic variation and warm winters, are considered to be high amenity counties (USDA Natural amenities scale).



Fig. 16

Figure 16 compares the proportion of high amenity counties in counties with the best and worst performance for both GDP per capita and poverty rates. High amenity counties make up 46.7%, nearly half, of the counties with the highest GDP per capita. Meanwhile, only 18.9% of the counties with the lowest GDP are considered high amenity counties. This indicates a relationship between a country's amenities and its economic performance.

To further explore this the same pie charts were produced using poverty as an indicator. A similar pattern is seen where a higher percentage (34.4%) of counties with low poverty are considered high amenity counties, while a low percentage of those with the highest poverty rates (performing worse on the poverty indicator) are high amenity counties. Further validating the relationship between a county's amenities and economic performance. While a county's amenities are beyond human control, it is important to recognize the economic potential preferable amenities represent, in the form of tourism and recreation and attracting professionals.

PROPOSED SOLUTIONS

C. INDUSTRIES TO AVOID

Thus far, this report recommended sectors and areas for potential economic development. With the context that rural America has arrived at where it is today due to dying industries, it is also worth analyzing which industries and sectors counties should move away from.

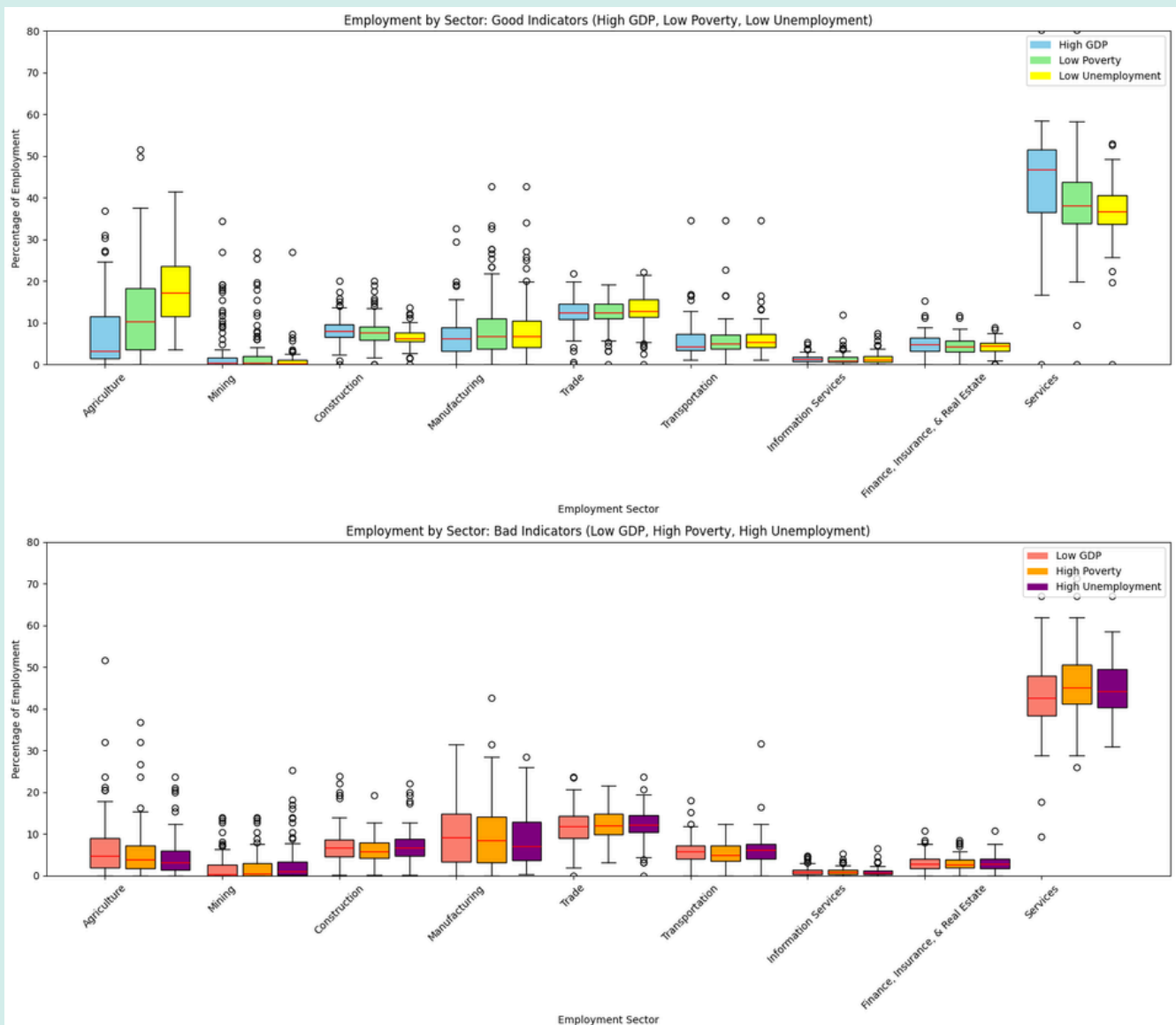


Fig. 17

Figure 17 is a box plots that compares the employment patterns across various sectors for regions performing well versus poorly on economic and social indicators. The top plot shows areas with good conditions, characterized by high GDP, low poverty, and low unemployment rates. In these areas, the agriculture sector shows a wider distribution amongst the 3 good indicators. Most notably, those performing poorly have higher percentages of people employed in mining, and manufacturing and a lower percentage of people employed in agriculture. In regions with strong indicators, there is a higher percentage of employment in agriculture. Contrarily, poorly performing regions demonstrate a lower reliance on agriculture for employment. This disparity suggests that economies performing well have likely diversified beyond agriculture, focusing on higher-value sectors. The services sector dominates, with the highest median and largest spread, reflecting its significant role in economies with favorable conditions. Sectors like manufacturing, trade, and finance exhibit moderate medians and narrower spreads, suggesting stable and consistent employment contributions. Meanwhile, information services and transportation represent minimal employment percentages, with limited spread, highlighting their specialized or niche roles. In contrast, the bottom plot shows areas with bad conditions, which are low GDP, high poverty, and high unemployment rates. The relatively lower dependency on agriculture in poorly performing regions indicates a lack of economic diversification and over-reliance on primary industries. The services sector continues to play a crucial role in the job market, though its median and spread are noticeably reduced compared to regions with good indicators. Sectors such as mining, construction, and manufacturing show lower medians and spreads, suggesting that they have unstable contributions and weaken the economy. Mining tends to be capital-intensive (i.e. requires large amounts of investment to produce the service) and exposes economies to unpredicted price fluctuations, leading to economic instability. Similarly, manufacturing's higher share in underperforming regions may reflect a reliance on low-skill, labor-intensive industries, which are more vulnerable to global competition. Furthermore, employment percentages in the finance, insurance, and real estate sectors are relatively similar across both well-performing and poorly performing regions. This consistency suggests that these industries are less sensitive to the broader economic health of a region, possibly due to the essential and universally applicable nature of financial services. To overcome this, strategies to modernize agricultural practices must be implemented while promoting industrial and service sectors to diversify income sources and reduce poverty. Given the sector's potential for high economic returns, poorly performing regions could benefit from targeted initiatives to expand this sector. It is also worth noting that the consistently low employment percentages in the information sector across both groups highlight the significant opportunity for growth as it offers high wages and opportunities. These findings suggest a need for regions heavily dependent on these sectors to invest in skill development, technology adoption, and diversification into advanced manufacturing or knowledge-intensive industries while shifting away from weaker industries like mining and manufacturing. Additionally, increasing access to finance, improving digital infrastructure, and supporting entrepreneurship could push economic growth and attract investments.

PROPOSED SOLUTIONS

D. EDUCATION

Figure 18 below is a plot that categorizes counties based on economic performance to compare education attainment levels. The green bars represent counties performing well which are high GDP, low poverty, and low unemployment, while the magenta bars represent counties performing poorly which are low GDP, high poverty, and high unemployment. Counties with lower levels of educational attainment including individuals with less than a high school diploma or only a high school diploma show a higher percentage compared to counties with higher levels of education. This is seen as the lower performing counties in less than high school educational attainment have more than doubled than higher performing counties with an average of 23% compared to 9% respectively. Similarly, The counties with higher levels of education show a higher percentage in educational attainment compared to those counties whose education was limited at high school level. In the bar graph, this is seen where individuals with the education level of college or more have an average of 30% compared to lower performing counties with 15%, which is also about double in comparison. This disparity highlights the impact of higher education on innovation, productivity, and economic resilience. When there is a low number of educated people, there is a larger population of migrants. Hence, fewer teachers and more schools are shut down, creating a lack of access to education. These barriers such as migratory populations, lack of educational access, economic pressures, and limited creative and technical programs worsen the situation and call for desperate changes. Finally, this emphasizes the need for low-performing counties to invest in education and good schools to build the creative class mentioned before and retain the population of talented individuals.

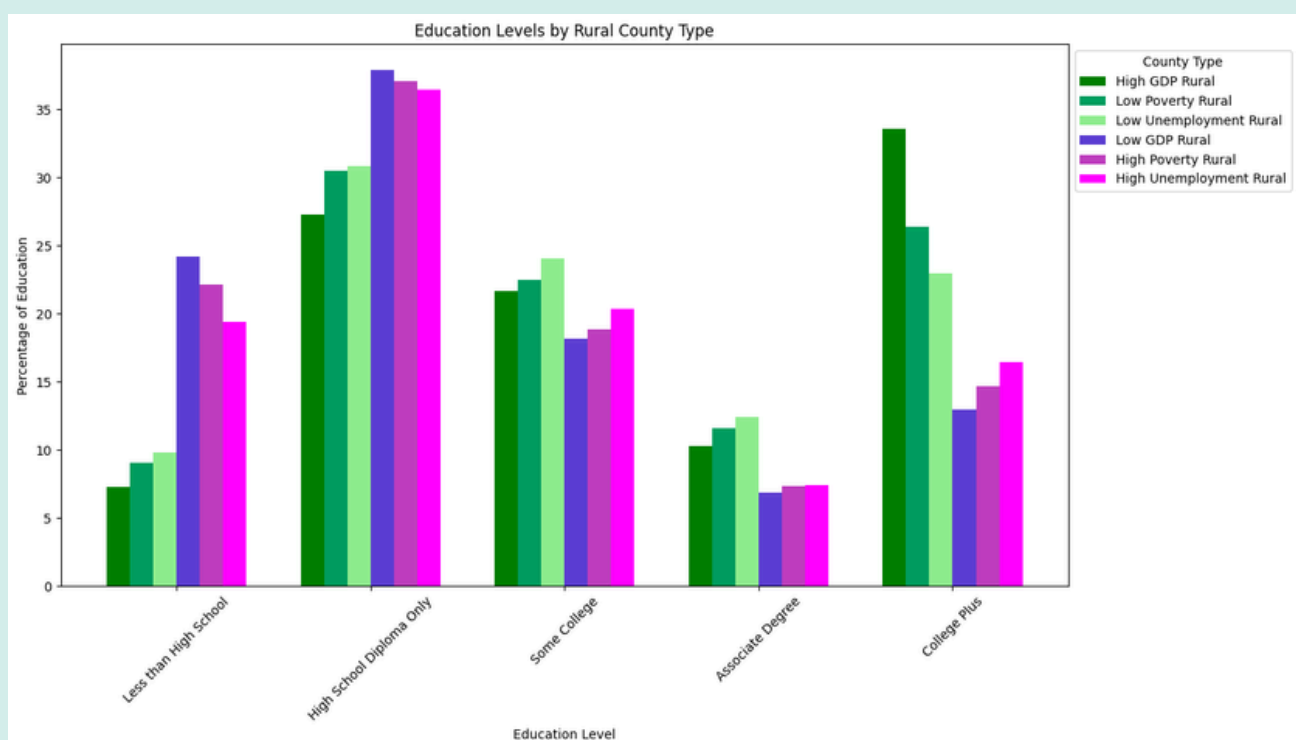


Fig. 18

DISCUSSION AND RECCOMENDATIONS

Our analysis revealed various steps and strategies that can be used to enhance the economic development of rural America. The first of these is attracting the 'creative class', rural counties who do attract these professionals perform better on all three economic indicators than those who do not. Attracting these professionals can shift the rural American economy towards growing sectors and away from declining ones. The 'creative class' may also start businesses and create opportunities that give young educated professionals a reason to stay, reducing the issue of migration.

While the availability of natural amenities is beyond a county's control, counties to whom preferable natural amenities are available should take advantage of them and integrate them into their economic strategy as our analysis also showed that natural amenities such as warm winters and varying topographies are linked to improved economic performance in rural counties. Additionally, we have identified a relationship between specific declining sectors and poor economic performance, suggesting that counties should not only move towards the aforementioned industries but also move away from these sectors. Those sectors are; mining and manufacturing.

Our analysis also showed that a key difference in education between low-performing and high-performing rural counties is the percentage of people with a college degree or higher, which was lower in low-performing counties. This suggests that increasing higher education should be a key component of the strategy for developing rural economies.

Future research into this area may include case studies of specific countries that have developed their economies. It is also worth investigating the specific types of economies that fall under the creative class separately and in more detail to provide a more detailed and thorough strategy recommendation.

CONCLUSION

Before our analysis, we established that rural America faces a unique combination of factors that leave it in a self-perpetuating cycle that leads to economic decline and poverty. These factors were a migratory and aging population, low labor force participation, and low education levels. Through our analysis, we have compared rural counties that are doing well across three economic indicators and identified steps that can be taken to improve the economic performance of rural counties. These steps are; attracting the 'creative class', taking advantage of high amenities where possible, shifting away from declining industries, and increasing the proportion of the population with higher education.

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