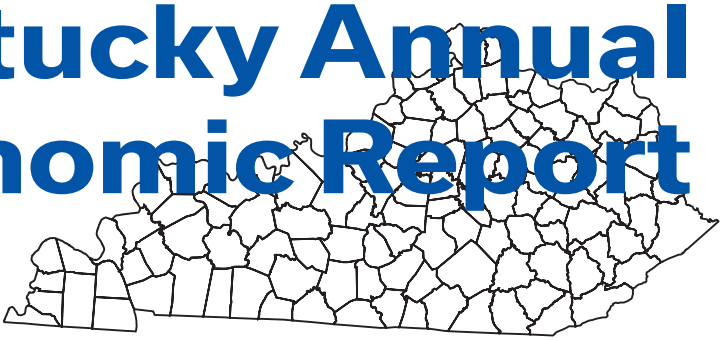
Kentucky
Annual Economic Report
2025

Gatton College of
Business and Economics
Center for Business and Economic Research

Kentucky Annual Economic Report 2025



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Center for Business and Economic Research

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The **Center for Business and Economic Research (CBER)** is the applied economic research branch of the Carol Martin Gatton College of Business and Economics at the University of Kentucky. Its purpose is to disseminate economic information and provide economic and policy analysis to assist decision makers in Kentucky's public and private sectors. CBER performs research projects for federal, state, and local government agencies, as well as for private-sector clients nationwide. The primary motivation behind its research agenda is that systematic and scientific inquiries into economic phenomena yield knowledge that is indispensable to the formulation of informed public policy. Recent projects have been conducted on manpower, labor, and human resources; tourism economics; transportation economics; health economics; regulatory reform; public finance; technology use and adoption; education policy; and economic development.

The initial Annual Economic Report was released in 1972 by the Council of Economic Advisors. This five-member council was established by an executive order signed by Governor Wendell Ford in December 1970. The Council was codified by state statute in 1972, with the responsibility to "monitor the economic progress of the Commonwealth and to advise the Office of the Governor on policies and programs for achieving the Commonwealth's full potential for economic growth." The Office of Business Development and Government Services, College of Business and Economics, University of Kentucky, acted as the secretariat, publishing various economic reports, including this Annual Report. In 1984, the Center for Business and Economic Research assumed responsibility as the secretariat for publishing the Annual Report for the Kentucky Council of Economic Advisors. In 1986, KRS 164.738 was passed, which directs CBER to maintain state economic data and produce the annual report. With passage of this statute in 1986, the Center for Business and Economic Research, under the auspices of the Department of Economics, has assumed responsibility for the mission originally set forth in 1970.

From the Director . . .

Dr. Michael W. Clark
Director, CBER

This report is one of the important ways that the Center for Business and Economic Research fulfills its mission to examine various aspects of Kentucky's economy as directed by the Kentucky Revised Statutes (KRS 164.738). The analysis and data presented here cover a variety of topics that range from a discussion of Kentucky's current economic climate to a broad presentation of factors affecting the economy.

As 2025 begins, both the national and state economies are on solid footing. Inflation has moderated and firms are continuing to add workers to their payrolls. Over the first 10 months of 2024, Kentucky's total non-farm employment was up 1.1% compared to the same period in 2023. Most of the job growth occurred in Kentucky's education and health sector. Looking forward, I expect Kentucky's economy to grow at a healthy but slower pace than over the past few years.

In addition to our economic outlook, we present a broad array of data on Kentucky that measure both economic inputs and outputs. This report includes data for Kentucky over many years, which allows one to assess change over time. We have included data on the U.S. and the twelve states considered Kentucky's main economic competitors—Alabama, Georgia, Illinois, Indiana, Mississippi, Missouri, North Carolina, Ohio, South Carolina, Tennessee, Virginia, and West Virginia. This allows the reader to assess Kentucky's relative position over time across numerous measures of economic and social well-being.

We have organized the data into thirteen thematic areas: Agriculture, Community, Economy, Economic Security, Education, Energy, Environment, Equity, Health, Infrastructure, Innovation, Population, and Public Finance.

Our outlook for Kentucky's economy over the next year is positive. The information contained in this report suggests that Kentucky has many opportunities for long-term economic progress but also faces many challenges. While Kentucky's workforce generally has less formal education than the national workforce and our competitor states' workforce, we have gained ground. As shown in this report, education is associated with significant gains in lifetime earnings. If that wasn't enough, higher levels of education are also associated with broad social benefits such as lower crime rates, better health outcomes, and lower reliance on social services. Investments and policies that help our citizens improve their education and develop the new skills needed by firms will help position the state for greater economic progress. We present this report as a resource for Kentucky's policymakers, business and community leaders, and citizens to evaluate these challenges and our progress addressing these challenges.

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Acknowledgments

The inspiration and intellectual framework for this report rests on the foundation and scaffolding constructed during the past half-century by the Department of Economics faculty, and the prior staff of the Center for Business and Economic Research, who produced the previous fifty-two *Kentucky Annual Economic Reports*. We have melded their tradition of academic rigor with the public policy breadth found in the biennial reports on trends affecting Kentucky's future produced by the staff of the Kentucky Long-Term Policy Research Center from 1993 to 2010—*Michal Smith-Mello, Billie Dunavent, Amy Watts (Burke), Mark Schirmer, Peter Schirmer,* and the late *Suzanne King*. Also, we would be remiss if we did not recognize the contributions of countless interns, undergraduates, and graduate students who assisted in the work of these annual reports over the years. We are grateful for the efforts of those who came before us, and accept responsibility for any and all omissions, mistakes, and errors contained in this report.

Economic Outlook

by Michael W. Clark, Ph.D.

NEARLY FIVE YEARS SINCE THE COVID pandemic, the economy finally seems to be normalizing. While high inflation has dominated the economic discussion since April of 2021, inflation rates are slowly returning to the Federal Reserve's 2% target rate. Worries that the Fed's efforts to combat high inflation by raising interest rates would lead to a recession have mostly evaporated. Employers continued adding workers to their payrolls throughout 2024. In fact, job growth, while not as high as in the past few years, has been healthy. Given these economic conditions, the Fed has pivoted to a more neutral monetary policy stance.

As 2025 begins, the economy appears to be well positioned to continue growing. While the economy appears to be settling into a new normal, challenges remain. Returning the inflation rate to the 2% target will take a bit more time and will not follow a straight path. And while the Fed has begun to lower interest rates, the strong economy could make the Fed to slow or even pause future rate reductions to help reduce inflation further. The usual economic risks such as volatile energy prices, geopolitical crises, and fiscal policy remain. In addition, policy issues such as tariffs and immigration will add to the economic uncertainty we face in 2025.

Inflation

Figure 1 shows price changes through November as measured by the 12-month percent change in the Consumer Price Index (CPI). Inflation peaked in June 2022 with prices rising 9% over the prior year.

continued on the next page

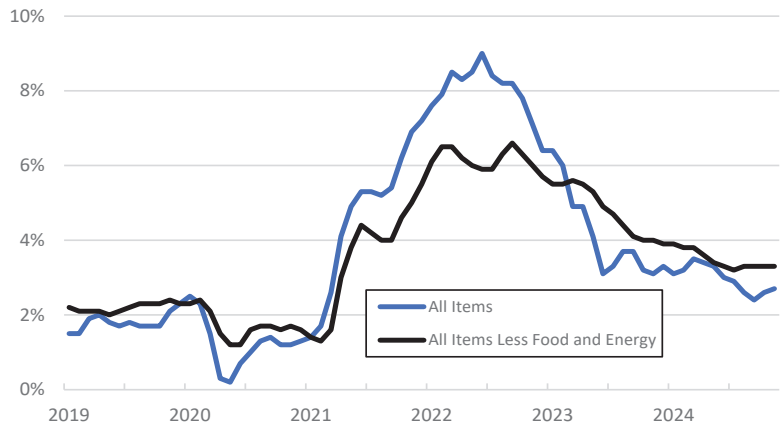
Inflationary pressures have mostly eased since then. As of November 2024, prices were up 2.7% compared to November 2023. This is still a bit higher than the Fed's target of 2% but represents a substantial improvement.

Price increases slowed across several expenditure categories over the past year. For example, households experienced a bit of a respite from high inflation as grocery prices were up only 1.6% over the prior year. Energy prices fell 3.2% compared to a year ago driven mainly by falling prices for fuel oil and gasoline. Those shopping for a vehicle also saw prices falling for much of this year. As of November, prices for used cars and trucks were 3.7% lower than last year. Prices for new vehicles were down a more modest 0.7% in November compared to a year ago. While vehicle prices were down compared to last year, prices for both new and used vehicles have begun to increase on a monthly basis.

We have seen higher prices for transportation services, which include motor vehicle maintenance and repairs and motor vehicle insurance. Much of this is related to price increases for vehicles in 2021 and 2022. It was during this time when prices for new and used cars jumped due to shortages of components for new cars. Prices for new cars increased by as much as 13% and used cars prices increased by more than 40%. These higher vehicle prices are now showing up in the cost to repair and insure vehicles. As inflation for both new and used vehicles have moderated, we should expect to see a similar trend in the cost of motor vehicle repairs and insurance.

Prices for shelter, which refers to rental prices and owners' equivalent of rent, were up 4.7 percent in November 2024 compared to a year earlier. This is still high but does represent an improvement over last year. Rental rates as measured

FIGURE 1
12-month Percent Change in Consumer Price Index (CPI)



Source: U.S. Bureau of Labor Statistics, Consumer Price Index-All Urban Consumers, Seasonally Adjusted.

by the CPI were up 4.4% in November compared to last year. However, high rental rates over the past few years led to an increase in the construction of multi-family housing. As these units are completed, they should help ease the upward pressure on rents.

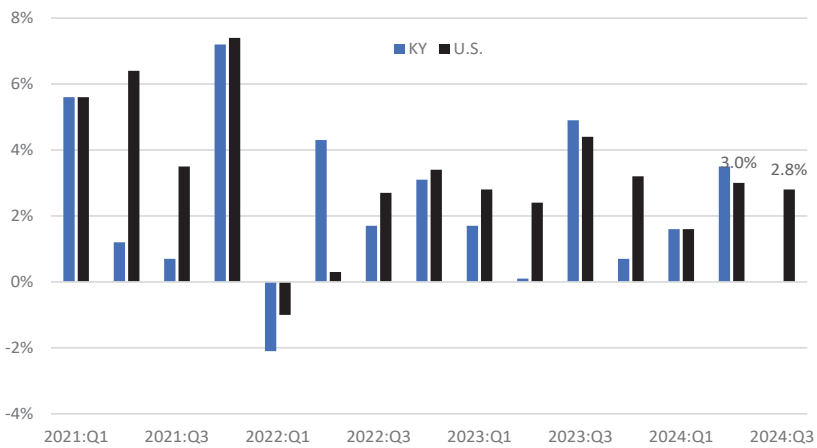
Economic Output

Figure 2 shows the percent change in real Gross Domestic Product (GDP) at annual rates for the US and Kentucky. GDP refers to the value of the goods and services produced by an economy. Nationally, GDP for 2024 has beaten expectations. During the 3rd quarter, national real GDP posted a healthy gain of 2.8 percent. Personal consumption was the main driver, accounting for 2.4 percentage points of the 2.8 percent gain in GDP. Consumer spending on services was strong for the first three quarters of the year. Consumer spending on goods was weak during the first quarter but picked up in the second and third quarters.

Businesses have increased their investments in equipment, which helps maintain and increase production capacity. However, residential investment, which includes housing, declined during the second and third quarters.

Estimates of state level GDP were only available for the first two quarters of the year as I write this. During the first half of the year, Kentucky appears to have outperformed the nation. Kentucky's GDP grew at an annual rate of 1.6% during the 1st quarter of 2024, matching the national GDP gains. Kentucky's GDP then jumped by 3.5% during the 2nd quarter, beating the nation's 3% increase.

FIGURE 2
Percent Change in Real GDP, Kentucky & U.S.
(Annual Rates)

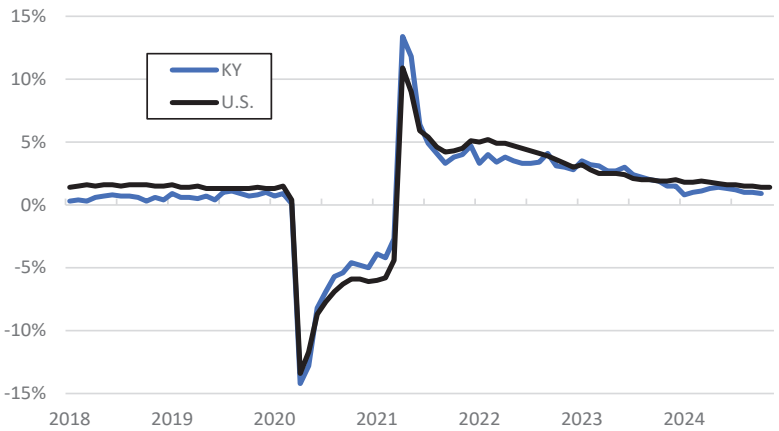


Source: U.S. Bureau of Economic Analysis. Seasonally adjusted at annual rates.

Labor Market

Figure 3 shows the 12-month percentage change in total nonfarm employment for Kentucky and the US. Kentucky's employers continued adding workers to the payrolls throughout 2024. As of October 2024, Kentucky had added 18,100 jobs compared to 12 months earlier. This represents an increase of 0.9% for the 12-month period. This is slower growth than in 2023 when we were still seeing some of the post-pandemic recovery. It does, however, represent a healthy growth rate and one that is more comparable to what we saw during the pre-pandemic years. Job growth in the nation performed better than Kentucky in 2024. As of November 2024, US jobs were up 1.4% compared to a year ago.

FIGURE 3
12-month Change in Total Nonfarm Employment, Kentucky & U.S.



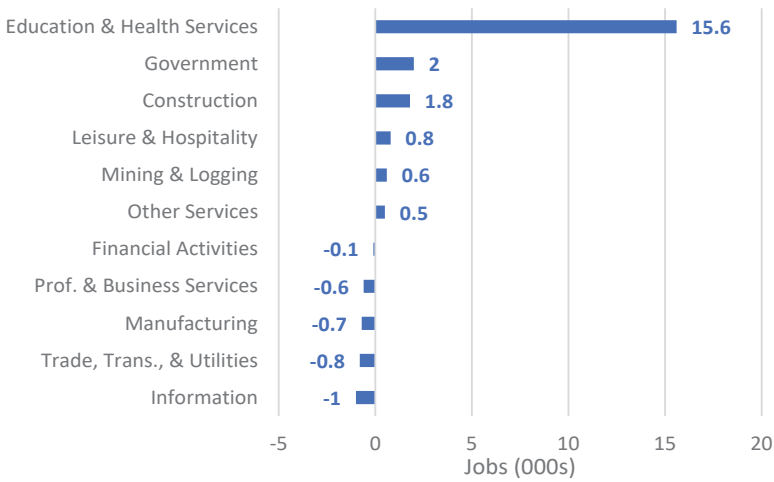
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics. Seasonally Adjusted.

Looking across the major industries, the education and health care services sector remains the main driver of job growth in the Commonwealth. This sector added 15,600 jobs from October 2023 to October 2024 and grew at a rate of 5.1% in Kentucky, which was higher than the 3.9% gain for the nation. Kentucky's job growth in this sector accounted for 86% of the state's total job gains for the period. Kentucky's mining and logging sector added 600 jobs from October 2023 to October 2024. While this accounts for a small share of total jobs in Kentucky, the Commonwealth did outperform the nation in this sector. Kentucky also saw gains in the construction, government, leisure and hospitality, and other services sectors, but the state's growth in these sectors was slower than the nation's.

Kentucky lost jobs in five sectors. Most of the job losses occurred in Kentucky's information sector, which lost 1,000 jobs, or 4.4% of jobs in this sector. The information sector includes software publishing, motion pictures, and

telecommunications. We expected manufacturing to contract somewhat in 2024 as manufacturing firms replenished their inventories and began operating at more typical levels of capacity. The decrease in jobs was less than we expected. Payrolls among Kentucky's manufacturers decreased by only 700 jobs, a loss of 0.3%. US manufacturing jobs declined by 0.4%. Kentucky has experienced some weakness in the financial activities; trade, transportation, and utilities; and professional and business services. Each of these sectors lost jobs in Kentucky while gaining jobs nationally.

FIGURE 4
Change in Kentucky Employment from October 2023 to October 2024 by Sector

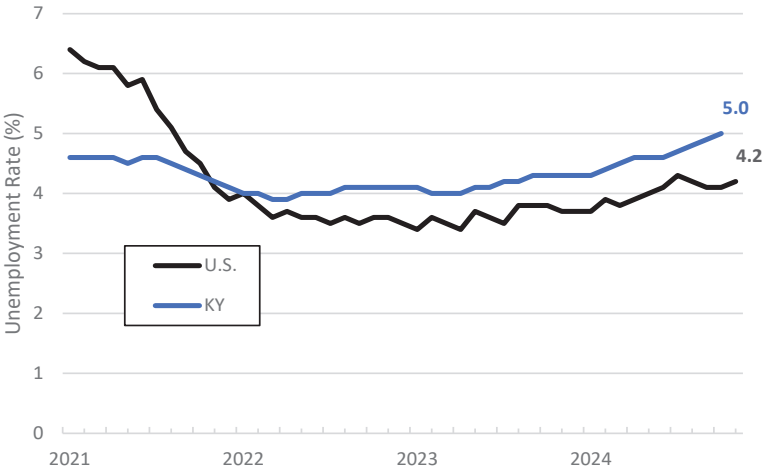


Source: U.S. Bureau of Labor Statistics, Current Employment Statistics. Seasonally Adjusted.

Kentucky began 2024 with an unemployment rate of 4.3%, but the rate has steadily increased since. By October, Kentucky's unemployment rate had increased to 5% (Figure 5). While an increasing unemployment rate is often associated with weakening economic conditions and people losing jobs, this does not appear to be the case currently. In fact, there were approximately 33,000 more people employed in Kentucky in October 2024 than October 2023.

Kentucky's unemployment rate increased in 2024 as more workers have entered the workforce. This includes both new workers entering the labor market for the first time and past workers who have returned to the workforce following an absence. This is seen in Figure 6, which shows estimates of the labor force participation rates for Kentucky and the U.S. Kentucky's labor force participation rate has increased from 57% in October 2023 to 58.1% in October 2024. This represents an increase of nearly 49,000 workers or a grow rate of 2.4%. As

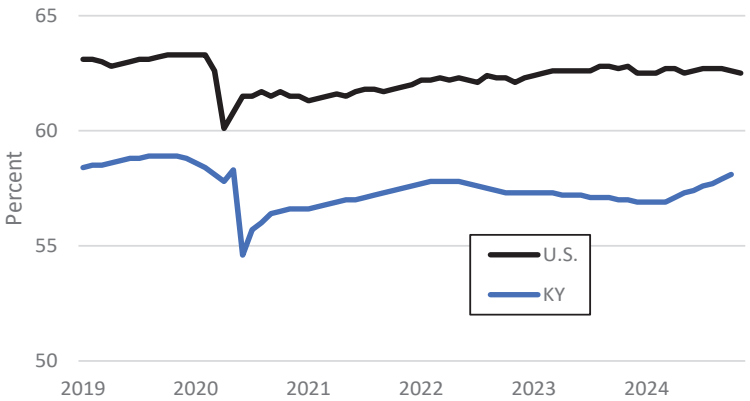
FIGURE 5
Unemployment Rates, Kentucky & U.S.



these workers enter the labor force and begin searching for work, they push the unemployment rate up until they find a job.

This is generally a good trend for the economy as a larger share of the population is participating in the workforce. One concern, however, is that the labor force is growing faster than the number of workers employed and the number of jobs in the economy. As the supply of workers grows faster than demand for workers, we should see the labor market loosen. This means firms will have an easier time finding workers, but wages might increase at a slower pace.

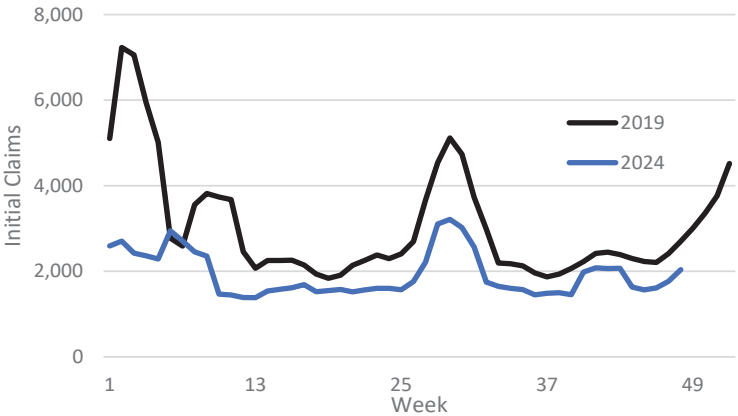
FIGURE 6
Labor Force Participation Rates, Kentucky & U.S.



Source: U.S. Bureau of Labor Statistics. Local Area Unemployment Statistics. Seasonally adjusted.

Initial claims for unemployment insurance is another indicator suggesting that employers are not downsizing their payrolls. A jump in first time claims can be an early signal that firms are starting to downsize. Despite occasional spikes that are typically related to seasonal factors, claims for unemployment benefits in Kentucky remain low and are lower than in 2019 prior to the pandemic (Figure 7).

FIGURE 7
4-week Moving Average Initial Unemployment Insurance Claims
Kentucky 2019 & 2024



Source: U.S. Department of Labor. Employment & Training Administration.

Outlook

Both the national and Kentucky economies performed above expectations in 2024 and appear to be poised to extend those gains going into 2025. With inflationary pressures easing, the Federal Reserve has begun lowering the federal funds rate. With this change in monetary policy, the Fed is beginning to shift its focus from tamping down inflation to supporting employment.

Table 1 presents my forecast. As I write this, economic data for 2024 are not complete. Therefore, the table shows the average annual estimates for 2024 based on data that were available. Looking to 2025, I expect the national and state economies will continue to grow, but at a slower pace. I expect the Fed will continue lowering its target for the federal funds rate. However, with the national labor market performing well, consumers still spending, and the inflation rate not yet reaching the Fed's target of 2%, the Fed will be cautious with its rate cuts. If employment continues to growth at a healthy pace, they might even pause or slow the pace of rate cuts.

I expect U.S. real GDP growth will slow to 2.1 percent in 2025. Firms will continue to expand their payrolls but more slowly than in 2024. Employment growth will slow to 1.1 percent nationally and 0.9 percent in Kentucky. As labor

demand eases, the annual unemployment rate will increase to 4.3% for the U.S. and 5.1% for Kentucky.

The Institute for Supply Management's (ISM) Manufacturing PMI Manufacturing activity suggests the manufacturing is still contracting as of November 2024. According to the Federal Reserve, U.S. manufacturers were operating at roughly 76% of capacity, which is down from recent months. I expect manufacturing employment will decline slightly both nationally and in Kentucky. On a positive note, ISM reported that manufacturers were beginning to see improvement in new orders. If this continues, it could prompt manufacturers to add more workers later in the year.

Barring an economic shock, inflationary pressures should continue to moderate. I expect the annual inflation rate as measured by the CPI to fall to 2.3% in 2025.

Uncertainty

There is always considerable uncertainty with the economy. Geopolitical issues such as conflicts in Ukraine and the Middle East can disrupt markets and add volatility to economic growth. However, the main source of economic uncertainty in 2025 may be related to policy issues. The incoming presidential administration has listed several policy priorities that will help to shape the economy for the next few years. At least two of these could have significant impacts on the economy.

Immigration was clearly a major concern among voters in 2024. The new administration has suggested that it will crack down on illegal immigration. Immigration, both legal and illegal, has been a major source of labor supply growth over the past year. This has helped firms find workers and eased wage pressures. While there are costs associated with immigration, a more aggressive position on immigration could slow labor supply growth. This could put upward pressure on wages and limit employment growth.

The incoming administration has also indicated that it would increase tariffs on goods imported into the U.S. While early indications suggest that the size of the tariffs could be substantial and broad-based, what the administration ultimately implements could be quite different. Large increases in the tariffs would make imported goods more expense for U.S. consumers. This can benefit domestic producers by reducing foreign competition. Tariffs can also increase the price on inputs that are used by domestic manufacturers such as steel and aluminum. If the U.S. significantly increases tariffs across a wide range of imports, it could contribute to another round of inflationary pressure. In addition, countries targeted for U.S. tariffs will likely impose retaliatory tariffs of the importation of U.S. goods to their countries. Exports originating from Kentucky account for approximately 14% of the state's GDP compared to only 12% for the U.S. Since Kentucky is a major exporter of goods, any retaliatory taxes could reduce demand for Kentucky's exporters.

It is important to note that there is a lot of uncertainty related to the scope and timing of these policies. What is eventually implemented may differ significantly from what was discussed during the campaign. These proposals may also take a considerable amount of time to be implemented. Therefore, it is not clear whether they will affect the economy in 2025 or 2026.

TABLE 1
Forecast for 2025

	2025 Forecast	2024 Actual or Best Available
Real GDP Growth—U.S.	2.1%	2.9%
Unemployment Rate—U.S.	4.3%	4.0%
Inflation—U.S.	2.3%	3.0%
Employment Growth—U.S.	1.1%	1.6%
Growth in Manufacturing Employment—U.S.	-0.3%	0%
Real GDP Growth—Kentucky	1.9%	2.2%
Unemployment Rate—Kentucky	5.1%	4.6%
Employment Growth—Kentucky	0.9%	1.1%
Growth in Manufacturing Employment—Kentucky	-0.5%	-0.3%

Agriculture

TWO FOUNDING FATHERS, Thomas Jefferson and Alexander Hamilton, advanced divergent visions of America's future. Jefferson envisioned a nation of farmers, and an economy built on agriculture, modeled after his beloved Virginia. Hamilton, on the other hand, looked to England for inspiration, and argued for an economy built on manufacturing and industrial development.

Hamilton's vision, of course, came to fruition, but Kentucky, which, after all, was formed from the western district of Virginia, grew its present-day manufacturing-based economic structure from an agricultural foundation championed by Jefferson. Despite having an economy that revolves around the manufacturing sectors of automotive, aerospace, primary metals, as well as the service industries of logistics and transportation, many of the Commonwealth's signature products, the ones people commonly associate with our state, have roots in an agricultural foundation. These include bourbon, which is corn based, thoroughbreds, tobacco, and poultry (think Kentucky fried).

Kentucky still has thousands of small farmers (about two-thirds of the total), but the family farm is becoming a quaint relic of the past as they steadily disappear from the rural landscape, evidenced by the drop from 230,000 total farms in 1950 to 69,425 in 2022 (USDA 2022 Census of Agriculture). The agricultural sector accounts for about 1.6 percent of Kentucky's gross domestic product

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(GDP) and has been steadily declining for the last several years. Even though its contribution to the state economy has been decreasing, the impact of agriculture in a local or regional economy can be significant. In a 2022 study by the UK College of Agriculture, *The Importance of Agriculture for Kentucky*, researchers found that the total economic impact of agriculture on the state's economy in 2019 was $49.6 billion of output, 271,700 jobs and $10.3 billion in labor income.

The past three decades have seen significant changes in Kentucky's agricultural profile. In 1990, tobacco was the state's signature commodity and constituted nearly a quarter of Kentucky's farm receipts (23.8%). By 2023, it had declined to 2.8 percent of Kentucky's total farm receipts. Tobacco has waned, but other commodities have taken its place. The dramatic swings in receipts for Kentucky's various farm products underscore the necessity of agricultural diversity.

Moving forward, the Kentucky AgriTech Advisory Council, a working group of public, private, and nonprofit sector representatives, has the expressed goal of positioning the state to become a global leader in the agritech industry, a melding of traditional agriculture with modern finance and technology.

A December 2024 report from economists and extension specialists with the University of Kentucky Martin-Gatton College of Agriculture, Food and Environment notes that "2025 will be a critical year for agriculture, following a couple of years of falling incomes, tightening finances and geopolitical uncertainties." They cite high input costs, reduced government support, and lower prices for key commodities as factors creating financial stress on farmers.

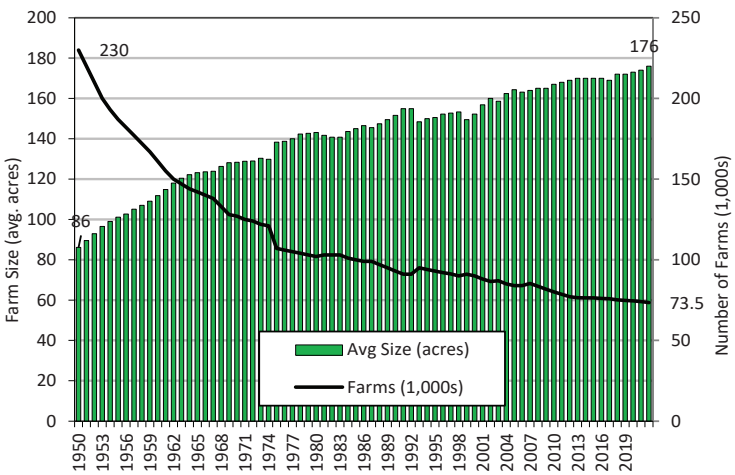
Agricultural commodities and related activities can have an important economic impact, with studies of the equine and bourbon industries, for example, showing substantial economic impacts. Kentucky's farm traditions have long yielded significant economic benefits to the state, but the development of more refined, downstream products that use these raw materials holds the promise of even greater returns. In fact, the growth of Kentucky's value-added food production has significantly outpaced the competitor states and the U.S. over the last ten years.

While some form of agricultural enterprise is present in every Kentucky county, many rural communities are more dependent on this industry for jobs and income. Several groups around the state are aspiring to create jobs and increase incomes in the agricultural sector. One low-tech strategy is to improve access to locally sourced food through the development of modern community-based farmers' markets. This is a promising strategy since farms that sell directly to consumers are more likely to stay in business. Ten years ago, there were 114 farmers' markets registered with the Kentucky Department of Agriculture, and now there are more than 170. Kentucky's agricultural future will be characterized by pursuing new opportunities while maintaining an embrace of old traditions.

Farms

The family farm has nearly become a quaint relic of Kentucky's past. Over the last half century, two major trends have transformed the state's countryside: the consolidation of small, family-owned farms into larger enterprises; and the conversion of agricultural land to urban (or suburban) uses. As seen here, roughly one-third as many farms exist today as there were in 1950, while the average size of Kentucky's farms has doubled. Currently, there are approximately 70,000 farms in Kentucky with an average size of 176 acres. Most of the farms in Kentucky are owned by an individual or a family (91%), and 43 percent of Kentucky farmers spend at least 200 days a year off the farm working in other jobs.

Kentucky Farms and Average Farm Size, 1950 to 2022

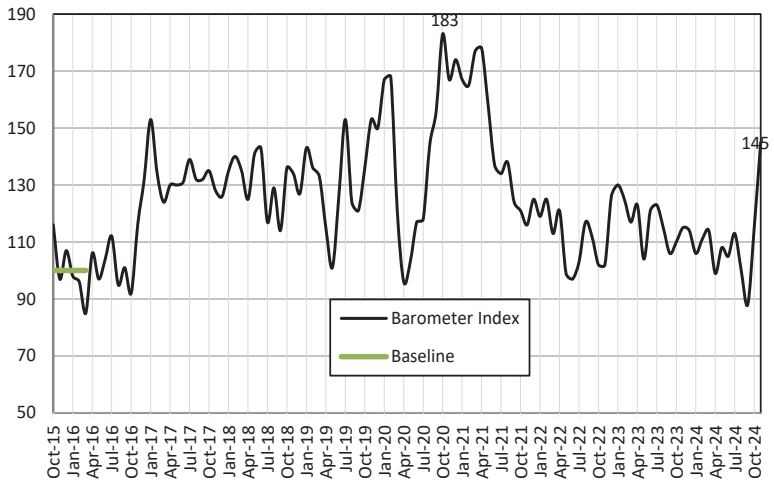


Source: Kentucky Department of Agriculture & USDA National Agricultural Statistics Service (NASS), available at https://www.nass.usda.gov/

Ag Economy Barometer

The *Ag Economy Barometer*, which is produced by Purdue University agricultural economists, is a survey based assessment of the *national* agricultural economy. It reflects the beliefs, attitudes, and sentiments of 400 U.S. agricultural producers—in other words, it captures the "mood" of key players in the national agricultural economy. It is based on five questions in a monthly survey: would you say that your operation today is financially better off, worse off, or about the same compared to a year ago?; do you think that a year from now your operation will be better off financially, worse off, or just about the same as now?; turning to the general agricultural economy as a whole, do you think that during the next twelve months there will be good times financially, or bad times?; which would you say is more likely, U.S. agriculture during the next five years will have widespread good times or widespread bad times?; and, thinking about large farm investments–like buildings and machinery — generally speaking, do you think now is a good time or bad time to buy such items? Higher input costs and lower prices for farm products (e.g., livestock and crops) were among the reasons driving the Barometer downward since late 2020. However, the respondents to this survey were apparently buoyed by the election results, evidenced by the sharp increase in the Barometer from September 2024 to November 2024.

National Ag Economy Barometer, October 2015 to November 2024

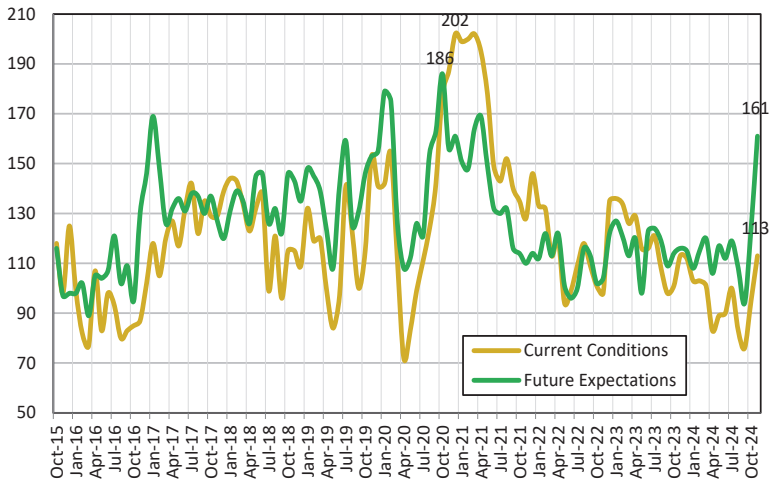


Source: Purdue University Center for Commerical Agriculture, Producer Survey, December 2024

Indices of Current Conditions & Future Expectations

As described on the facing page, the *Ag Economy Barometer* is a survey based assessment of the national agricultural economy. It reflects the collective expectations of 400 U.S. agricultural producers across the country. The *Ag Economy Barometer* can be disaggregated into current and future expectations, as illustrated in the graph below. Since the fall of 2020, both indices have trended downward due to the prolonged pandemic, and its attendant consequences, like supply-chain bottlenecks, labor shortages, and transportation problems. More recently, producers have expressed concern over inflation, rising interest rates, and lower prices for farm commodities. However, the election has apparently given the producers a shot of optimism, as demonstrated by the sharp increase in both indices immediately following the presidental election.

Indices of Current Conditions & Future Expectations, October 2015 to November 2024

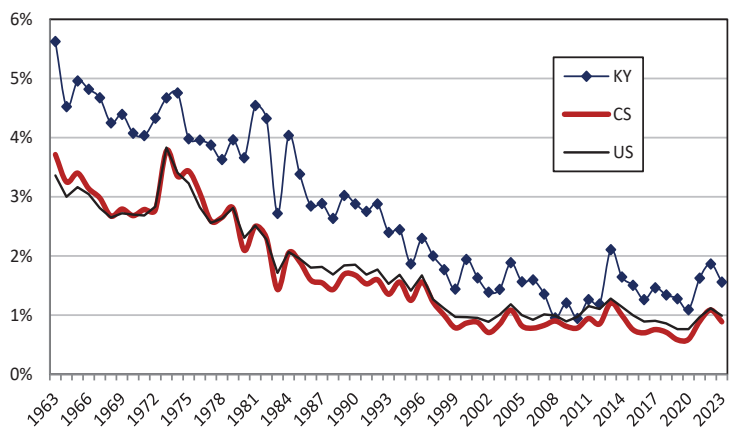


Source: Purdue University Center for Commerical Agriculture, Producer Survey, December 2024

Agriculture and GDP

While still playing an important role in some *local* and *regional* areas around the state, agriculture's role in the larger state economy has been declining for many years. Within the Agriculture, Forestry, Fishing, and Hunting sector, the Bureau of Economic Analysis (BEA) includes "establishments primarily engaged in growing crops, raising animals, harvesting timber, harvesting fish and other animals from a farm, ranch or their natural habitats." The BEA notes that "these establishments are often described as farms, ranches, dairies, greenhouses, nurseries, orchards or hatcheries...(and) the sector includes two basic activities: crop and animal production (farms) and forestry, fishing, and related activities." In 1963 agriculture accounted for about 5 percent of Kentucky's gross domestic product (GDP), compared to about three-and-a-half percent for the U.S. and competitor states. In 2023, this economic sector accounted for 1.6 percent of Kentucky's gross domestic product, compared to 1 percent in the U.S. and 0.9 percent in the competitor states. South Dakota has the highest percentage among the states with agriculture accounting for 10.4 percent of its gross domestic product while Massachusetts has the lowest at 0.1 percent. Among the competitor states, Mississippi is the highest at 2.2 percent and Virginia the lowest at 0.3 percent.

Agriculture and Related Actvities in Kentucky, Competitor States, and the U.S., 1963 to 2023
(agriculture, forestry, fishing & hunting as a percentage of GDP)

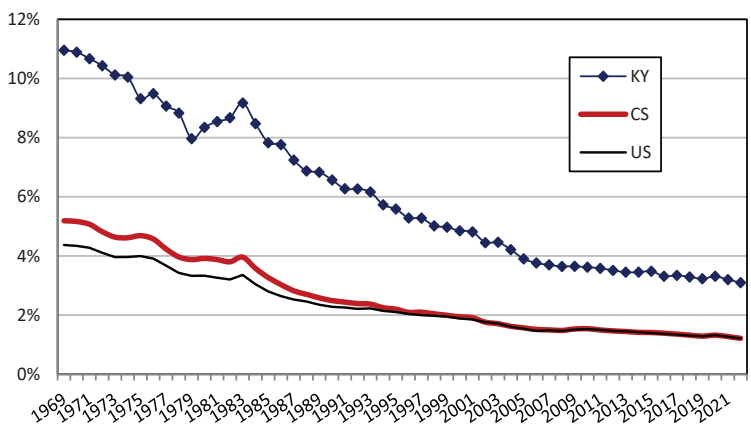


Source: U.S. Department of Commerce, Bureau of Economic Analysis, Table SAGDP2N

Farm Employment

Farm mechanization and a changing state economy have resulted in a steady decline in the percentage of Kentuckians working on the farm. Farm employment is the "number of workers engaged in the direct production of agricultural commodities, either livestock or crops; whether as a sole proprietor, partner, or hired laborer." The Bureau of Economic Analysis estimates Kentucky's farm employment at about 82,400, which is around 3.1 percent of total employment or jobs in the state. As one can see on the chart below, this is much higher than either the competitor states or the U.S., both of which are estimated at about 1.2 percent. While Kentucky's farm employment is high compared to other states and the nation, it has decreased precipitously since the late 1960s when it was about 11 percent. Kentucky's farm employment has been under 4 percent since 2005, and has continued to decline gradually since that time.

Farm Employment as a Percentage of Total Employment, Kentucky, Competitor States, and the U.S., 1969 to 2022
(percentage of total jobs, includes full- and part-time employment)

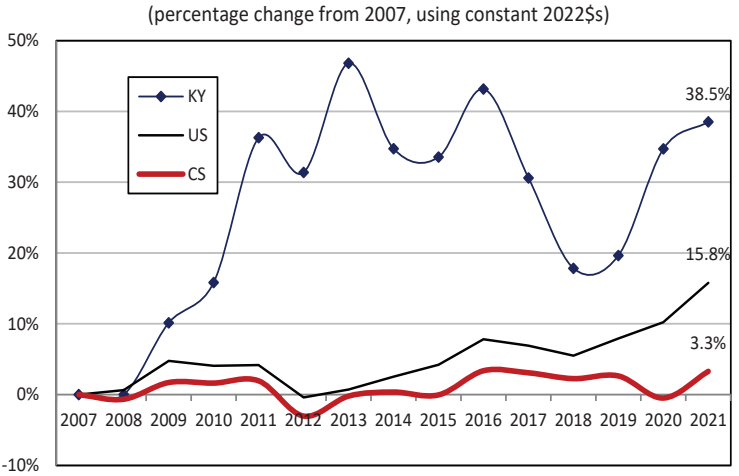


Source: U.S. Department of Commerce, Bureau of Economic Analysis derived from table SAEMP25N

Value-Added Food Production

Kentucky's farm traditions have long yielded significant economic benefits to the state, but the continued development of more refined, downstream products that use these raw materials holds the promise of even greater returns. The idea of increasing agricultural-based incomes by developing value-added food production has been embedded in the Kentucky Department of Agriculture's strategic plans going back to the mid-1990s. Salsa, not tomatoes, is an example of a value-added food product that can enrich and sustain a farm economy. There are any number of value-added food products—from salsa to wine to jerky to jam—that provide opportunities to enrich individuals as well as communities and generate new economic opportunities that help sustain Kentucky's rural areas. The chart below illustrates how the growth of Kentucky's value-added food production has significantly outpaced the competitor states and the U.S. from 2007 to 2021. Valued-added food production in Kentucky increased from $4.7 billion in 2007 to $6.5 billion in 2021 (in constant 2022$s), representing a 38.5 percent increase. By comparison, the U.S. and competitor states value-added food production grew by 15.8 and 3.3 percent, respectively, over the same time period. The continued development of the state's value-added food manufacturing sector will help provided jobs and income to Kentucky's rural communities.

Value Added to Food Products, Kentucky, Competitor States, and the U.S., 2007 to 2021
(percentage change from 2007, using constant 2022$s)



Source: U.S. Department of Commerce, Bureau of Economic Analysis, Annual Survey of Manufactures, various years. The 2017 values are interpolated.

Farm Commodities

The past three decades have seen significant changes in Kentucky's agricultural profile. In 1990, tobacco was the state's signature commodity and constituted nearly a quarter of Kentucky's farm receipts (23.8%). By 2000, tobacco ranked second and accounted for 18.5 percent of farm receipts, and by 2023 it had declined to eighth and 2.8 percent of Kentucky's total farm receipts. While tobacco's value has dropped precipitously, Kentucky's other major crops and animals—soybeans, cattle, and corn—have all shown considerable growth in sales. Poultry has also experienced dramatic growth—now one of the state's top farm commodities. In 1990, farm chickens, broilers (chickens raised for food), and chicken eggs constituted less than 1 percent of total farm receipts (0.82%). In 2023, poultry and eggs accounted for 19 percent of the $8.1 billion in total farm receipts. The dramatic swings in receipts for Kentucky's various farm products underscores the necessity of agricultural diversity, so that farmers' fortunes do not rise and fall based on the market for a single commodity.

Kentucky's Top Ten Farm Commodities, 2023 (current dollars)

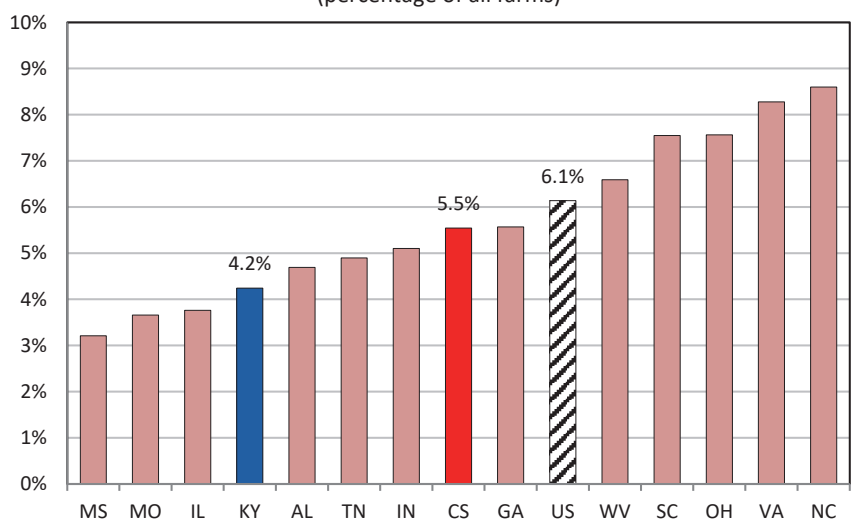
RANK	COMMODITY	VALUE OF RECEIPTS ($1,000s)
1	Soybeans	1,419,752
2	Broilers	1,287,036
3	Cattle and calves	1,259,127
4	Corn	1,239,588
5	Hay	362,308
6	Wheat	248,692
7	Chicken Eggs	245,746
8	Tobacco	225,015
9	Dairy products, Milk	196,344
10	Hogs	154,513
Total	All commodities	8,091,087

Source: USDA Economic Research Service. All other animals and products not listed (e.g., honey, turkeys, wool, floriculture) total to $1,452,966, or 18% of total.

Local Food Suppliers

Internationally, the "slow food" movement has grown exponentially, providing a boost to small farm profits in an era of industrialized agriculture and making fresher food, often organically grown, more readily available. Kentuckians are embracing the movement of foods grown closer to home, giving rise to an increasing number of bustling farmers' markets that have helped advance agricultural diversification and make healthy fare more readily available. Farms can sell directly to consumers through farmers' markets, on-site stores, online, and through a CSA, community-supported agriculture, which permit consumers to buy a portion of a farmer's output—fruits, vegetables, and other farm products delivered weekly—at the beginning of the growing season. Research shows that farms engaged in selling directly to consumers are more likely to stay in business. A dozen years ago there were 114 farmers' markets registered with the Kentucky Department of Agriculture, and now there are more than 170. Of Kentucky's nearly 69,425 farms, about 2,944 sell agricultural products directly to consumers. This represents 4.2 percent of Kentucky farms, which is lower than the competitor states (5.5%) and the U.S. (6.1%). The New England states lead the nation in selling farm goods directly to consumers, evidenced by New Hampshire (27.5%), Vermont (25.1%), and Maine (25.2%).

Farms Selling Directly to Consumers, 2022
(percentage of all farms)



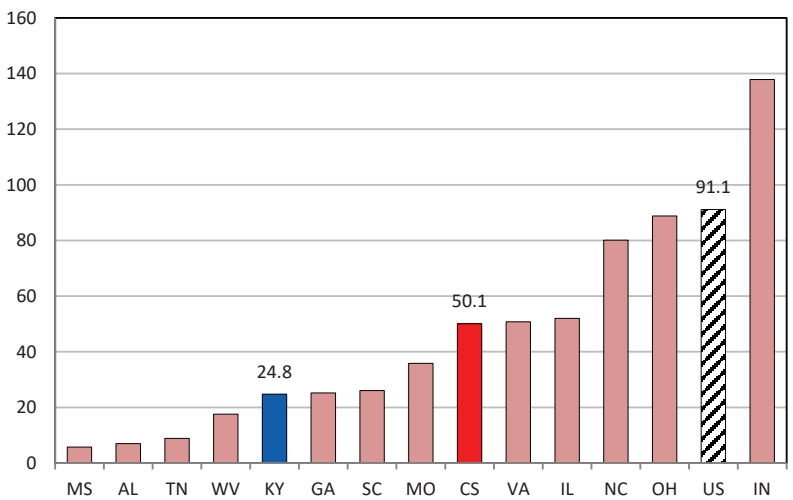
Source: 2022 Census of Agriculture
Note: CS is the weighted average of the competitor states.

Organic Farming

The outlook for organic products appears strong, as consumers continue to embrace organic and locally produced commodities. According to the U.S. Organic Trade Association (OTA), consumer demand for organic has grown by double-digits nearly every year since the 1990s, with sales increasing from $3.6 billion in 1997 to $50 billion in 2018. Citing 2016 Nielsen data, the OTA reports that 82 percent of U.S. households purchase organic products (78% in Kentucky). Nationally, the number of USDA National Organic Program certified or exempt farms decreased from 18,166 to 17,321 during the five-year period from 2017 to 2022, but sales of organically produced commodities increased by 32 percent, from $7.3 billion to $9.6 billion. While the value of sales increased in Kentucky by 164 percent during this time period, the number of farms decreased from 184 to 172—a 6.5 percent decline. Other states appear to be pursuing organic farming with greater enthusiasm. While Kentucky's network of small farms would seem to be an ideal place for the organic movement to flourish, the chart shows that—at least by this metric—Kentucky lags the U.S. and most competitor states in the rate of organic farms. Kentucky has 24.8 organic farms per 10,000 total farms, compared to 50.1 for the competitor states and 91.1 for the U.S.

Certified or Exempt Organic Farms, 2022

(per 10,000 total farms)

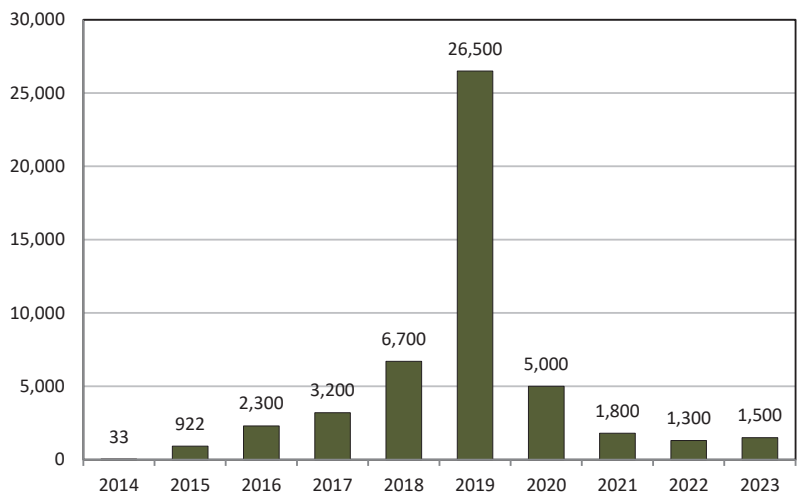


Source: USDA 2022 Census of Agriculture

Hemp

A headline from 2021, *The Hemp Boom is Over. What Now?*, stands in stark contrast to the enthusiasm surrounding hemp's economic potential from just a few years earlier (PEW Stateline, July 9, 2021). While hemp continues to attract attention, evidenced by its presence in 90 of Kentucky's counties in 2022, the excitement over its possibilities as a lucrative cash crop has waned in the last few years due to a supply glut, market uncertainties, and the pandemic. The Kentucky Department of Agriculture (KDA) reported that 960 farmers sought hemp licenses in 2020, but 157—or 16 percent of these farmers—had no plans to grow hemp in 2020; they simply needed the license to store and eventually sell crops from earlier growing years. Moreover, there were half as many approved growers in 2021, around 450, and it plummeted to 240 growers in 2022. Hemp's economic contribution to Kentucky's agricultural economy has waxed and waned through the years with changing federal laws. By April of 2020, 48 states had passed legislation allowing commercial, research, or pilot programs related to industrial hemp. Hemp production has fallen precipitously in Kentucky since 2019—as illustrated in the graph below. As the market for hemp products matures, hemp could eventually emerge as an important cash crop for Kentucky's rural communities—but for now it's a minor factor.

Planted Acres of Hemp in Kentucky, 2014 to 2023



Source: Kentucky Department of Agriculture, KDA Industrial Hemp Research Pilot Program, Annual Overview, available at: <https://www.kyagr.com/marketing/hemp-overview.html>.

Community

THERE ARE NUMEROUS COUNTY-level indices that capture various characteristics of communities. These indices include, but are not limited to, economic connectedness (page 25), social capital (26-7), social determinants of health (207, 218-9), innovation intelligence (249), distressed communities (*EIG Distressed Communities Index*), deep disadvantage (87), natural amenities (172), racial equity (204), and well-being (CORE Score of Wellbeing, *American Academy of Arts & Sciences*).

When one examines these disparate indices as a collection, a striking pattern emerges, the same communities, typically, rise to the top, fall to the bottom, or coalesce in the middle. A community that has poor health outcomes and low educational attainment will also have fewer economic opportunities. If social connections are frayed and there are historically disadvantaged populations, then community well-being will reflect it. Most of these community-level characteristics are interrelated, self-reinforcing, and firmly entrenched. Solutions to problems are necessary, because our communities, where we live, work, and play, are our essential and foundational places of importance.

Many of these challenges have exacerbated the economic divide between urban and rural America that has been widening for the last three and a half decades. Numerous social, demographic, health, and economic trends paint a picture of widespread community distress across wide swaths of the country. These trends are especially intense in Kentucky,

continued on the next page

continued from the previous page
since about 41 percent of Kentucky's population live in rural counties, compared to only 14 percent nationally. And while chasms deepen between geographic areas, the wider community remains knitted together—which ensures that distress in one area affects another.

While the fragility of rural communities reflects local trends and global forces that have been developing for several decades, the unfolding of their impact has intensified since the Great Recession. The *Distressed Communities Index* (DCI) measures the vitality of communities by drawing from educational, housing, and employment factors. Their insights include the following: community distress is more common in rural areas; prosperity is increasingly concentrated in urban areas; prosperous communities tend to be more racially and ethnically diverse, and to have higher levels of educational attainment. Their analysis shows that "Mississippi (46.7%), West Virginia (41.4%), and Kentucky (38.6%) contain the greatest shares of residents living in distressed zip codes."

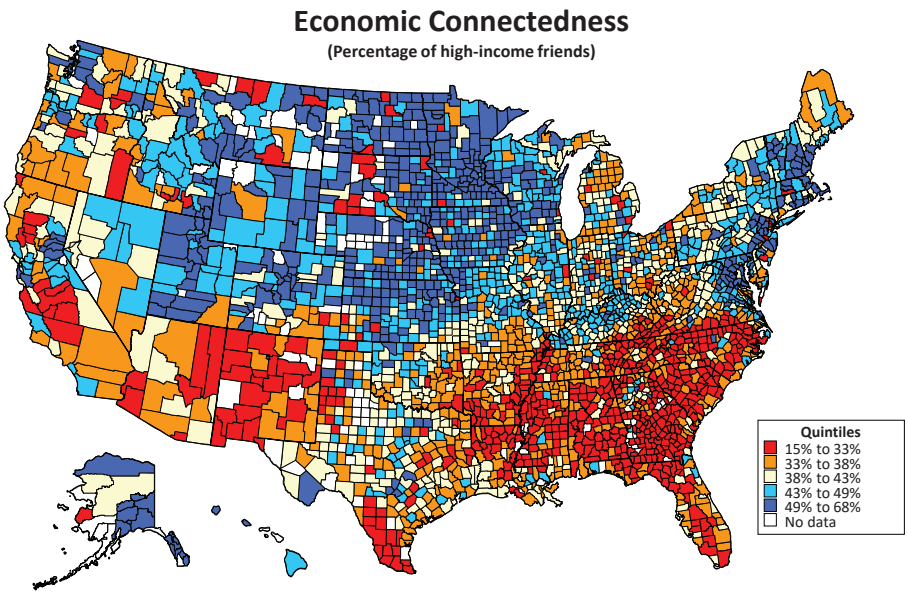
Community characteristics exert a strong influence on individual economic outcomes. Studies have long found that individual economic success is associated with neighborhood or community quality. Research published in 2015 by economists Raj Chetty and Nathaniel Hendren, *The Impacts of Neighborhoods on Intergenerational Mobility: Childhood Exposure Effects and County-Level Estimates*, concludes that the quality of a child's neighborhood can have a long-lasting effect into adulthood on college attendance, teenage birth rates, poverty status, and income. More recently Chetty and his colleagues have found that children who grow up in communities with higher levels of economic connectedness—specifically, they have friendships or connections with individuals from higher income groups—are much more likely to emerge from poverty later in life. The lesson is clear: community connections have consequences.

Having a strong and robust civil society has several benefits. For example, in May 2023, the U.S. Surgeon General, Vice Admiral Vivek Murthy, MD, MBA, released *Our Epidemic of Loneliness and Isolation: The U.S. Surgeon General's Advisory on the Healing Effects of Social Connection and Community*, which calls for a "whole-of-society approach to address the epidemic of loneliness and isolate on." It connects the dots between individual well-being, community vitality, and economic prosperity.

Concepts like community development and economic development are linked so tightly that the terms are frequently used interchangeably. Economic activities take place in our communities, so characteristics that measure community connections, strengths and weaknesses, and resiliency are vital for understanding economic conditions and future economic prospects.

Economic Connectedness

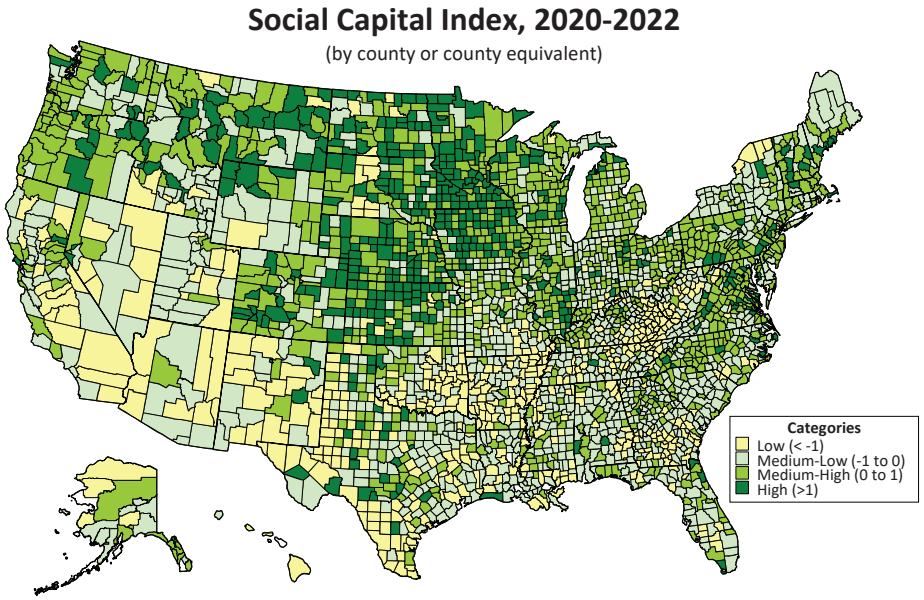
Community characteristics affect economic opportunities in multiple ways. One way is friendships. Research released in August 2022 by Raj Chetty and his colleagues with *Opportunity Insights* found that children who grow up in communities with higher levels of economic connectedness—*specifically, they have friendships or connections with individuals from higher income groups*—are much more likely to emerge from poverty later in life. The county-level map below shows estimates for the share of "above-median friends among below-median people," with cross-class connections more prevalent in the Upper Midwest than in the Southeastern part of the country. They explain this process by stating that "growing up in a more connected community may improve children's chances of rising up through a variety of mechanisms, from shaping career aspirations and norms to providing valuable information about schools and colleges to providing connections to internship and job opportunities."



Source: Opportunity Insights, Social Capital Atlas, refer to socialcapital.org.

Social Capital Index

Many scholars have advanced the idea that strong community structures are beneficial to economic health (e.g., James Coleman, 1990; Robert Putnam, 1993; Francis Fukuyama, 1995). We know that strong communities are important for several reasons, but the relationship between social capital—which the OECD defines as the "networks together with shared norms, values and understandings that facilitate co-operation within or among groups"—and economic growth is still being explored and studied. Pulling from the existing economic development literature, The World Bank notes that "development and growth specialists are uncovering the importance of social cohesion for societies to prosper economically and for development to be sustainable." Rupasingha, Goetz, and Freshwater (2000, 2006) operationalize the concept of social capital by using variables that include, but are not limited to, voting rates, the number of nonprofit organizations, and the presence of community-based membership organizations. Using the same method, we have produced updated county-level estimates—as shown in the map below. The darker areas of the map indicate denser networks of social connections while the lighter areas suggest lower levels of social capital. Kentucky is located in a region of the country where networks of social connections are less dense.

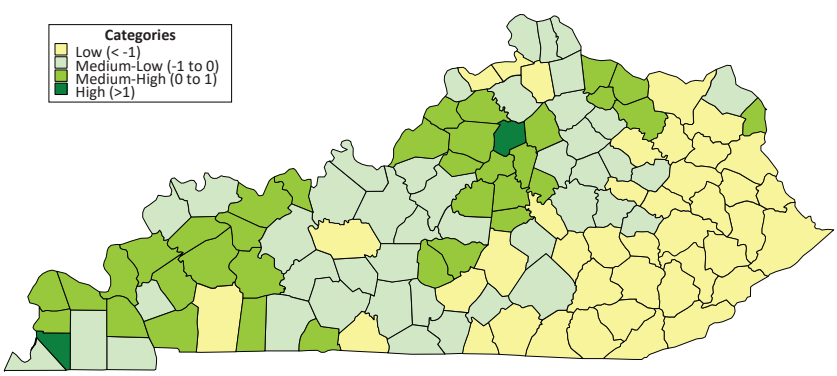


Source: Author's analysis of multiple data sources, various years (see Notes & Sources)

Social Capital Index

Strong, resilient, and vibrant communities are created and nurtured by engaged and connected citizens. The economic development literature linked to social capital suggests that areas with dense networks of citizens who are invested in their communities derive economic benefits. For example, Rupasingha, *et al.,* (2000, 2006) find that "social capital has a statistically significant, independent positive effect on the rate of per-capita income growth." These authors have developed an approach for constructing a county-level social capital index (see the facing page) which we have updated with more current data and present in the map below. These estimates reveal a relatively dense concentration of social capital in Western Kentucky and in Central Kentucky (darker areas), but much less in Eastern Kentucky (lighter areas). This is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There are no Kentucky counties in the upper 10 percent of counties nationally, but there are six in the upper 25 percent. The rest of the state's 114 counties are in the lower 75 percent of counties.

Social Capital in Kentucky, 2020 to 2022

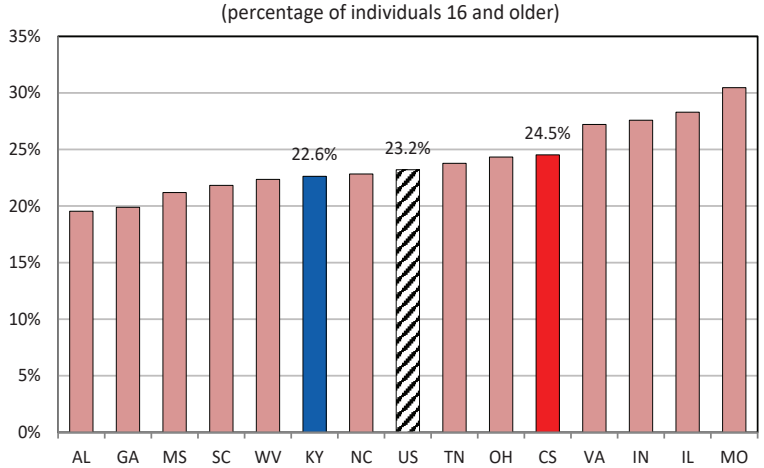


Source: Author's analysis of multiple data sources, various years (see Notes & Sources)

Volunteer Rate

Some studies have linked participation in civil society—volunteering for example—to higher levels of community prosperity, higher achievement in schools, and improved individual health. Volunteers can tackle problems such as poverty, illiteracy, and drug abuse that public or private sectors have not adequately addressed—making a community more attractive for economic development. Some research even suggests that members of communities with high levels of civic participation enjoy better health and live longer. A highly visible volunteer activity related to public safety is fire fighting. The National Fire Protection Association (NFPA) reports that the total number of volunteer firefighters in the U.S. dropped 17 percent over a five-year period, from about 815,000 in 2015 to 677,000 in 2020 (*Daily Yonder*, 2023). Volunteers, not local governments, typically are the first responders in smaller communities for "everything from fires, to car crashes to natural disaster rescue missions." Volunteering in 2021 was lower compared to 2019. An estimated 22.6 percent of Kentucky residents volunteered at some point in 2021, a percentage that is statistically no different from the U.S. average of 23.2 percent. However, before the pandemic, in 2019 for example, the U.S. volunteer rate was 30 percent. Nationally, the highest volunteer rate in 2021 belongs to Utah (40.7%), while the lowest is found in Nevada (16.8%).

Residents Who Volunteer, 2021,
Kentucky, Competitor States, and the U.S.
(percentage of individuals 16 and older)

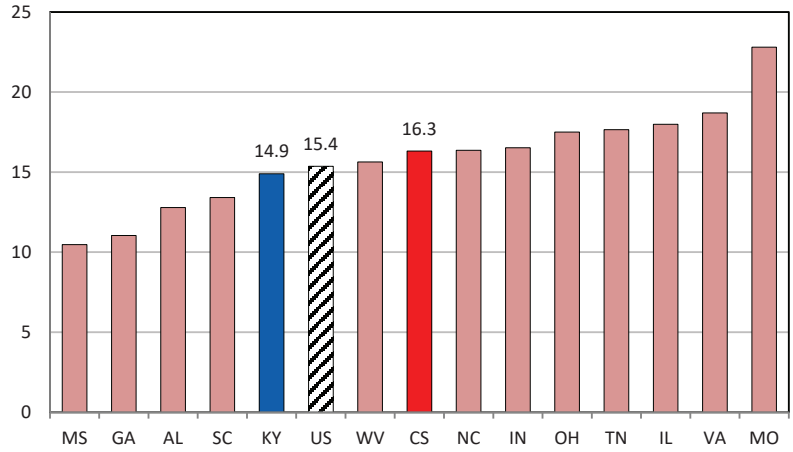


Source: Estimated by CBER using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data.

Volunteer Hours

The COVID-19 pandemic reduced volunteerism in 2021. Nonetheless, over 817,000 Kentuckians contributed roughly 54 million hours of volunteer service, with an estimated value of $1.3 billion. Kentuckians contributed an estimated 14.9 hours per resident 16 years and older in 2021. The total annual estimated value of volunteer service in Kentucky is based on the *Independent Sector*'s annual estimate of a volunteer hour in Kentucky at $24.83. The average number of volunteer hours in Kentucky (14.9) is lower than the competitor states (16.3) and U.S. (15.4) averages. At 37.2 volunteer hours per resident 16 years old and older, Utah ranks first in the country (Florida is last with 9.9 hours). Volunteers, community groups, and nonprofit organizations add essential social and economic value to Kentucky's economy and society.

Volunteer Hours, 2021,
Kentucky, Competitor States, and the U.S.
(average hours served in a year, per resident 16 and older)

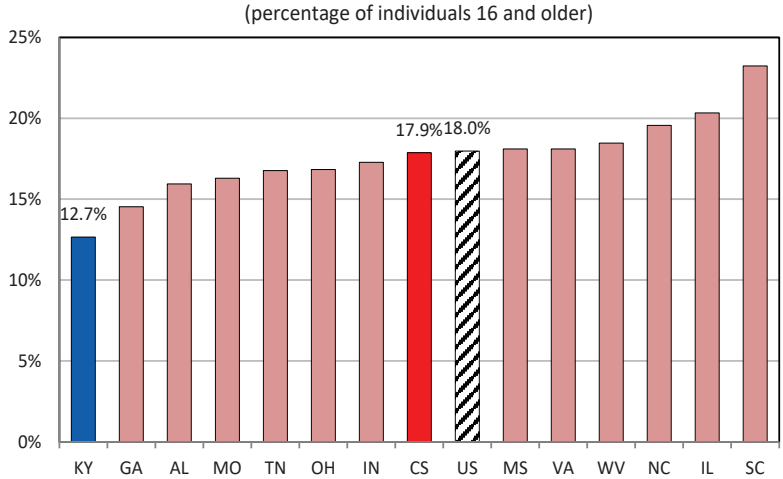


Source: Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data.

Participation in local groups

As we noted in the social capital discussion, strong, resilient, and vibrant communities are created and nurtured by engaged and connected citizens. The economic development literature linked to social capital suggests that areas with dense networks of citizens who are invested in their communities derive economic benefits. Some measures of this include the presence of community-based membership organizations. These include establishments like religious, civic, social, business, political, professional, labor, and sports organizations. It is also possible for one to participate within an *ad hoc* group that has no specific organizational mission or purpose beyond improving one's community. The question here is: *In the past 12 months, did you get together with other people from your neighborhood to do something positive for your neighborhood or the community?* An estimated 12.7 percent of Kentucky residents said "yes," and participated in a local group or organization to do something positive for their neighborhood. However, this is statistically significantly lower than the competitor state (17.9%) and U.S. averages (18.0%). Nationally, the highest participation rate belongs to Utah (35.8%), while the lowest is found in Hawaii (12.5%). All of these percentages are estimates for 2021, and are markedly lower compared to the period just before the pandemic in 2019.

Worked with Neighbors to Improve Community, 2021, Kentucky, Competitor States, and the U.S.
(percentage of individuals 16 and older)

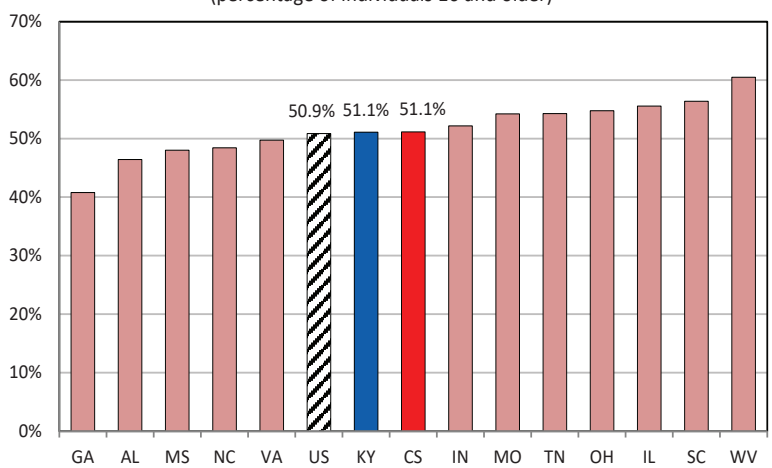


Source: Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data.

Favors for Neighbors

An indicator of community strength, social capital, and neighborhood cohesiveness is the extent to which neighbors do favors for each other. These favors include things like watching each others children, helping with shopping, house sitting, lending garden or house tools, and other small acts to lend a helping hand. About half of Americans do occasional favors for neighbors, with an estimated 50.9 percent indicating they do so with varying frequency. There are virtually no differences between Kentucky, the competitor state average, and the U.S. in the frequency with which neighbors do favors for each other. Nationally, the highest participation rate belongs to Montana (68.8%), while the lowest is found in Nevada (36.7%).

Residents Doing Favors for Neighbors, 2021, Kentucky, Competitor States, and the U.S.
(percentage of individuals 16 and older)

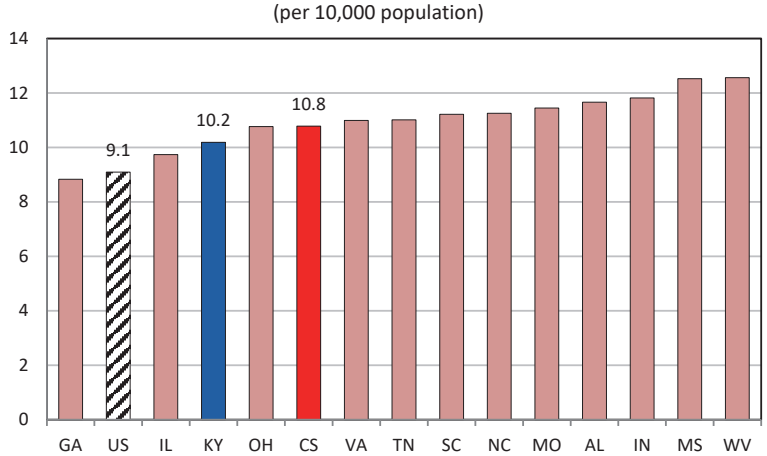


Source: Estimated by CBER using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data.

Community Based Organizations

Community-based organizations (CBOs) are public or private entities that provide services to the community and enable individuals to expand their network of associations. There are many types of community-based organizations, but here we focus on CBOs used in the creation of the social capital index shown in the beginning of the Community section of this report. These establishments encourage action through attendance or participation—not just with passive membership. These establishments and associations represent a variety of organizations, including religious entities (e.g., churches, mosques, synagogues, temples), civic and social groups (e.g., garden clubs, fraternal lodges), business associations (e.g., chambers of commerce, agricultural associations), political groups (e.g., political parties, campaigns), professional associations (e.g., lawyers, teachers, medical), labor groups (e.g., union, federation), bowling centers or alleys, fitness and recreational sports centers (e.g., gym or athletic club), golf courses (including country clubs), and sports teams (e.g., professional or semiprofessional baseball, basketball, football, hockey, etc.). Opportunities for building resilient communities should improve as the number of these organizations increases. With 10.2 CBOs per 10,000 population, Kentucky has slightly more than the U.S., and slightly less than the competitor state weighted average.

Community Based Organizations, 2022, Kentucky, Competitor States, and the U.S.
(per 10,000 population)

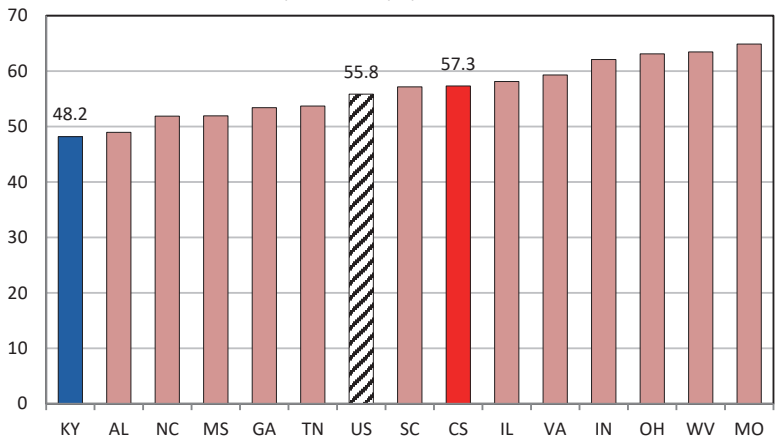


Source: U.S. Census, County Business Patterns (2022), & U.S. Census, ACS 2022 1-year population estimates.
Note: CS is the weighted average of the competitor states

Nonprofits

Like the number of volunteers or the amount of money donated to charity, the number of nonprofits is an indicator of a community's social capital. The 1.8 million nonprofits in the U.S. include social organizations (e.g., art, health, education, and advocacy groups), labor unions, business and professional organizations, and religious congregations. Nonprofits also have a direct economic impact. According to a 2019 report from the Urban Institute, *The Nonprofit Sector in Brief*, "The nonprofit sector contributed an estimated $985.4 billion to the US economy in 2015, composing 5.4 percent of the country's gross domestic product (GDP)." The average number of nonprofits per 10,000 population in the U.S. is 55.8, compared to Kentucky's 48.2. Among the competitor states, Kentucky has the fewest number of nonprofits per 10,000 population. At 64.9 per 10,000 population, Missouri has the most among competitor states. Nationally, Montana has the highest number overall with 104.3 while Utah has the lowest at 35.0. The *National Council of Nonprofits* reports that over 154,000 individuals are employmed by Kentucky's nonprofits, which is equivalent to about 9 percent of the state's private employment. As of November 2024, Kentucky had 21,798 registered nonprofit organizations with $39.4 billion in annual revenue and $73.7 billion in assets.

Registered Nonprofit Organizations, 2024, Kentucky, Competitor States, and the U.S.
(per 10,000 population)

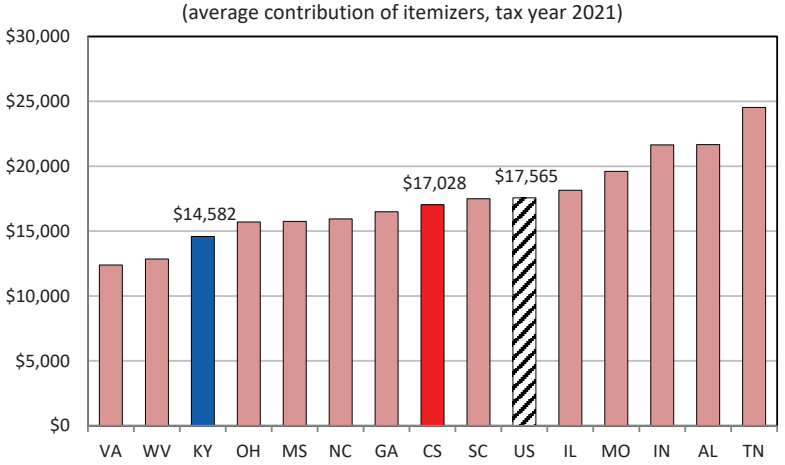


Source: Internal Revenue Service, Exempt Organizations Business Master File (2024, November) & U.S. Census, ACS 2023 1-year population estimates. Note: CS is the weighted average of the competitor states

Charitable Contributions

America's giving spirit continued to rise in 2023 with giving by individuals, bequests, foundations, and corporations increasing by an estimated 1.9 percent according to *The Giving Institute*. At $374.4 billion, charitable giving by *individuals* in 2023 was equal to about 67 percent of the estimated total contributions from all sources, $557.2 billion. Nationally the average charitable contribution among those who itemize deductions—which is about 9.3 percent of those who file an income tax return—equaled $17,565 for the 2021 tax year, compared to $14,582 in Kentucky. Among the competitor states, Tennessee has the highest amount at $24,532 and Virginia the lowest at $12,391. Nationally, Hawaii is the lowest at $7,240 and Wyoming is the highest at almost $87,700. Obviously, those who do not itemize deductions on their tax returns frequently make charitable contributions, but it is estimated that itemizers account for about 80 percent of all charitable contributions from individuals. Because of changes in the federal tax law that took effect in 2018 (e.g., increase in the standard deduction), the number of itemizers declined in the 2021 tax year by 68 percent, from 47.1 million in 2017 to 14.9 million in 2021. The total dollar amount claimed as charity on itemized returns increased from $256.3 billion in 2017 to $261.6 billion in 2021. However, this does not account for inflation during this period.

Charitable Contributions in 2021,
Kentucky, Competitor States, and the U.S.
(average contribution of itemizers, tax year 2021)

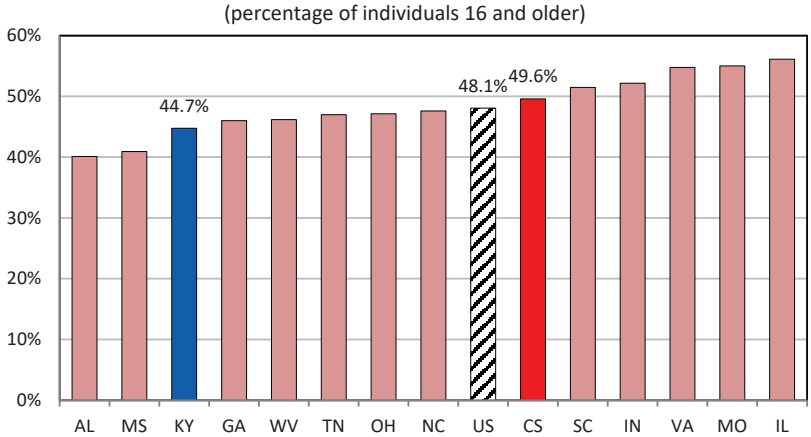


Source: Internal Revenue Service, Statistics of Income, Historical Table 2
Note: CS is the competitor state weighted average

Donations

While the facing page shows the average annual charitable contributions by those who itemize their tax returns, the figure below shows the percentage of the population age 16 and older who made a charitable donation in 2021 for selected states. Individuals were asked whether they donated more than $25 in money, assets, or property to a charitable or religious organization in the past year. At 44.7 percent, Kentucky is statistically no different from the competitor states (49.6%) or the U.S. (48.1%). Minnesota has the highest percentage at 61.8, while Florida is the lowest at 36.8 percent.

Made a Charitable Donation, 2021,
Kentucky, Competitor States, and the U.S.
(percentage of individuals 16 and older)

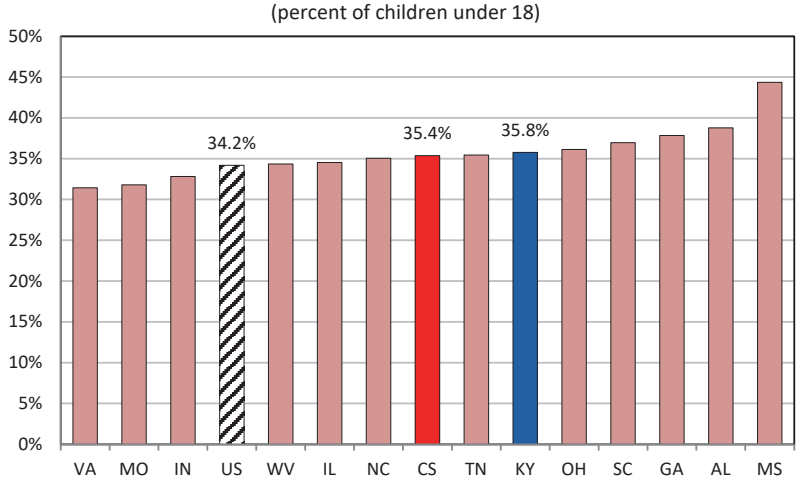


Source: CBER analysis of data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Civic Engagement and Volunteering Supplement, 2021]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0

Children in Single-Parent Families

Research shows that intergenerational (economic) mobility can be muted by the constellation of factors associated with growing up in a single-parent family (Chetty, *et al*., 2014). In 1960, approximately 12 percent of children under 18 in the U.S. lived with only one parent; in 2023, however, over one third of this county's children lived in a single-parent family (34.2%). As a country we went from about one in ten children to over one in three—a substantial demographic shift. The research shows that children living in single-parent households tend to face more significant obstacles in life, which present emotional, health, economic and academic challenges for many of these children. And there can be lifelong economic consequences. As Raj Chetty and his colleagues have noted, "the United States is better described as a collection of societies, some of which are 'lands of opportunity' with high rates of mobility across generations, and others in which few children escape poverty." Another type of living arragement, children living with at least one grandparent, increased by 36 perent nationally, from 9.3 percent in 2000 to 12.7 percent in 2019. According to a December 2023 Brookings report by Elizabeth Link, Tara Watson, and Simran Kalkat, *More Kids are Living with their Grandparents. Can Safety Net Policy keep up?,* this growing trend has implications for the well-being of the children, grandparents, and governmental finance.

Children in Single-Parent Families, 2023, Kentucky, Competitor States, and the U.S.
(percent of children under 18)

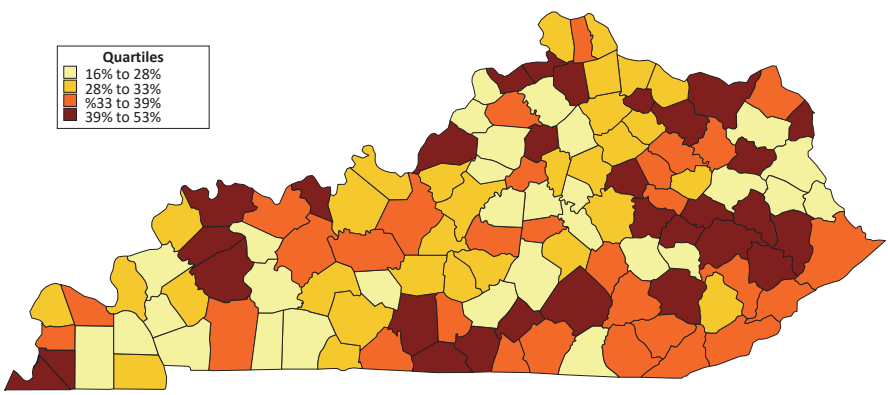


Source: Census Bureau, American Community Survey, 1-year estimate, 2023, Table B23008

Children in Single-Parent Families by County

As noted on the facing page, an estimated 35.8 percent of children in Kentucky live in single-parent families. Yet, there is wide variation among Kentucky counties, bounded by McLean County at 16 percent and Fulton County at 52 percent. Some have written that America has become two nations—not divided by class so much as by whether one comes from a single- or two-parent household. As James Q. Wilson, the eminent political scientist asserted two decades ago: *Children in one-parent families, compared to those in two-parent ones, are twice as likely to drop out of school. Boys in one-parent families are much more likely than those in two-parent ones to be both out of school and out of work. Girls in one-parent families are twice as likely as those in two-parent ones to have an out-of-wedlock birth. These differences are not explained by income....children raised in single-parent homes [are] more likely to be suspended from school, to have emotional problems, and to behave badly.* Of course, one's family environment does not determine one's future, but it can create significant obstacles for children that last into adulthood, with clear implications for the state's economy.

Children in Single-Parent Families, by Kentucky County, 2018-2022
(percentage of children under 18 years old)

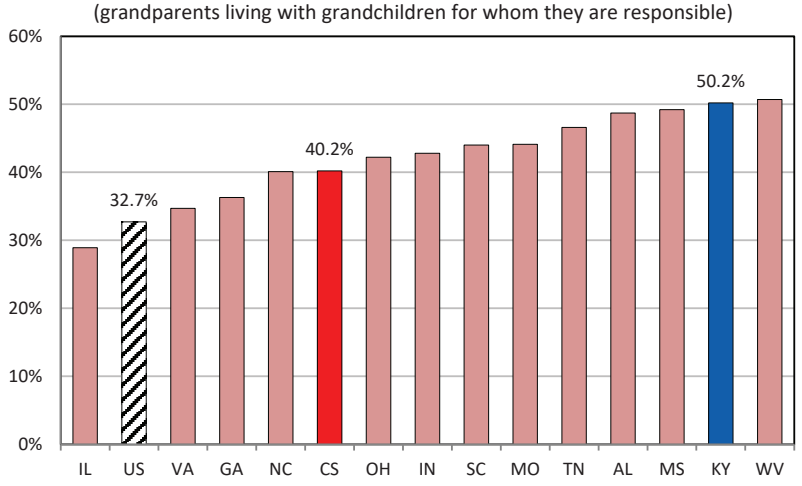


Source: American Community Survey (ACS), 2022 5-Year Estimates, Table B23008

Grandparents as Caregivers

There were approximately 103,000 Kentucky grandparents living with their grandchildren under 18 years old in 2021, constituting 3.6 percent of the state's 1.8 million households. About half (50.2%) of these grandparents are *caregiving*. In other words, they are grandparents who are responsible for their grandchildren under 18. These 50,000 or so grandparents constitute a miniscule portion of Kentucky households, but a city of this size would be the fifth largest in the state, exceeded only by Louisville, Lexington, Bowling Green, and Owensboro. As illustrated in the figure below, the percentage of Kentucky grandparents responsible for their grandchildren is much higher than the competitor state (40.2%) and national (32.7%) averages. Unfortunately, for too many grandparents, their psychological and emotional commitment to the well-being of their grandchildren is not matched by their physical abilities and financial means. In Kentucky, for example, the poverty rate is around 25 percent in households where grandparents are caring for their grandchildren, compared to an overall rate of around 17 percent. Moreover, around 33 percent of these caregiving grandparents are disabled, compared to a statewide disability rate of about 18 percent. These numbers suggest the potential value of community-based organizations in advancing the well-being of Kentucky families.

Grandparents as Caregivers, 2021,
Kentucky, Competitor States, and the U.S.
(grandparents living with grandchildren for whom they are responsible)



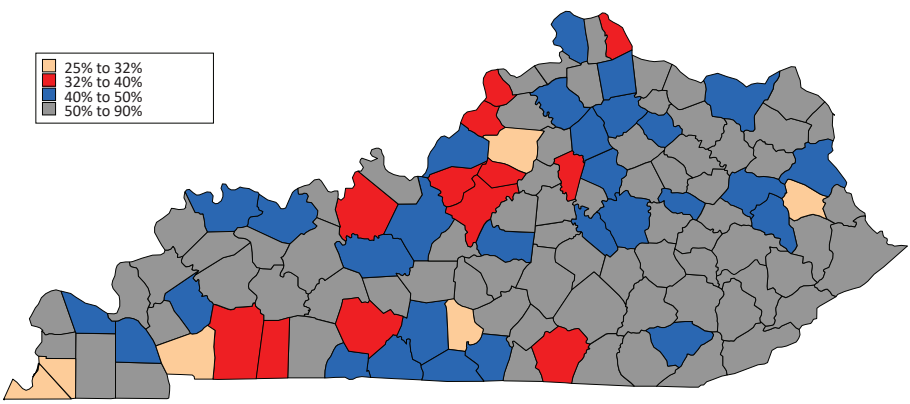
Source: Census Bureau, ACS 5-year estimate, 2021, Table DP02

Grandparents as Caregivers by County

The prevelance of caregiving grandparents varies widely across the state. Caregiving grandparents live with their grandchildren (under 18 years) and are responsible for their care and welfare. Of all Kentucky grandparents living with their grandchildren, about half, or 50.2 percent, are caregiving grandparents. As one can see on the map below, most counties in Kentucky—74 overall—are over the statewide average of 50 percent. This means that over half of the grandparents who live with their young grandchildren in these counties are responsible for them. Jefferson County is home to the highest number of caregiving grandparents, about 6,900 (or 45 percent of the grandparents living with their grandchildren). Of the caregiving grandparents in Jefferson County, about 23 percent are below the poverty line and 27 percent have a disability. There are only five Kentucky counties below 32 percent (approximately the U.S. average), and only twelve above the U.S. average but below the competitor state average of about 40 percent. Consequently, grandparents living with their grandchildren in the vast majority of Kentucky counties are more likely to be caregiving grandparents compared to the U.S. and competitor states averages.

Grandparents Responsible for Grandchildren

(percentage of grandparents living with own grandchildren under 18 years)

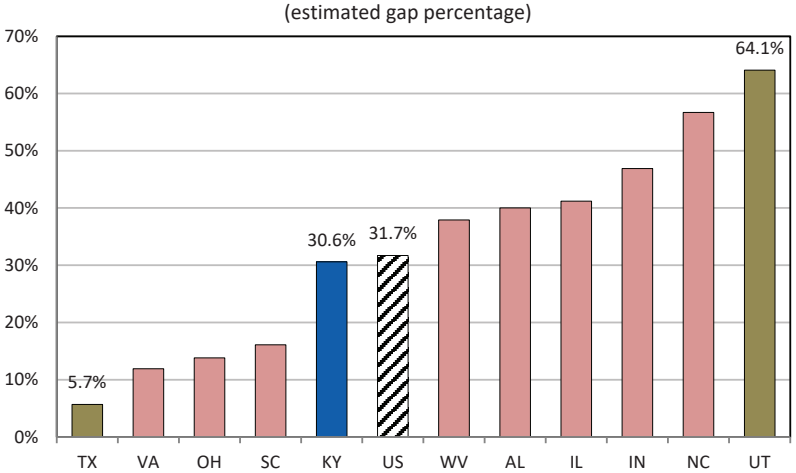


Source: U.S. Census, American Community Survey, 2021 5-year estimates, table DP02

Child Care Gaps

The availability of child care plays a vital role in ensuring parents can work. Yet, a November 2021 report by the Bipartisan Policy Center, *Child Care in 35 States*, shows a national child care gap of 31.7 percent; Kentucky's gap is 30.6 percent. Texas has the smallest gap (5.7%), and Utah has the largest (64.1%). The gap represents the difference between the potential child care need and the supply of formal child care. Kentucky's estimated gap is consistent with a Kentucky Chamber of Commerce 2023 survey finding that "one in three parents with young children report leaving the workforce altogether at some point because of child care." Indeed, a sizable portion of Kentucky's workforce are parents of small children. Economists at the Federal Reserve Bank of St. Louis estimate that around 21 percent of Kentucky's prime-age workforce (ages 25-54) are parents of children less than six years old (*The Economic Impact of Child Care by State*, 2021). About a quarter of the prime working-age individuals who are not in the labor force cite "family responsibilities" or "can't arrange childcare" as the main reason they are not looking for work (see the Economy section). This percentage could rise as pandemic-era government support for child care providers dries up in 2024, and this could reduce labor force participation among parents with small children.

Child Care Gaps, 2021,
Kentucky, Selected States, and the U.S.
(estimated gap percentage)

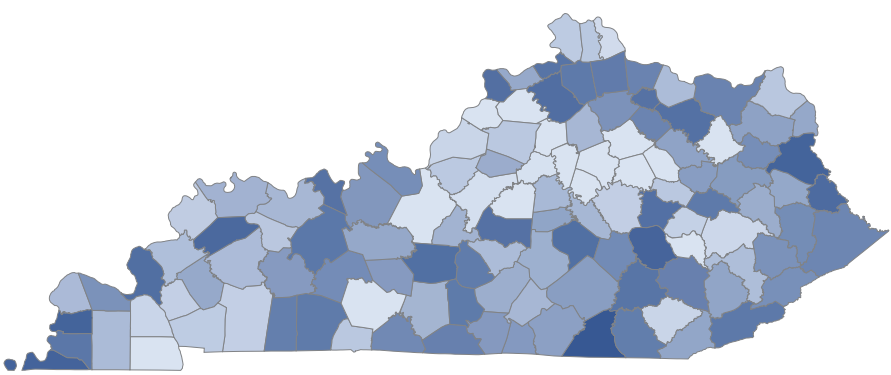


Source: Child Care in 35 States: What we know and don't know, Bipartisan Policy Center, Linda Smith, et al., November 2021, available online <https://bipartisanpolicy.org/report/child-care-gap/>.

Child Care Gaps by County

Kentucky's statewide child care gap is distributed unequally across the state and is between one-fifth and one-third of the children potentially needing child care. The potential need is the number of children under six-years-old living with working parents—200,000 children (2022 ACS 5-Year). The supply of child care "slots" at licensed providers was just over 159,000 (April 2024)—resulting in a gap of 40,700 children, or about 20 percent of the total. The gap, however, could be larger, given that the Bipartisan Policy Center (BPC) estimates Kentucky's gap to be 30.6 percent (see the facing page); although the higher estimate by the BPC is based on 2021 data. Nonetheless, the BPC finds that nationally the child care gap is larger in rural areas. As illustrated below, this is the case in Kentucky. On average, Kentucky's thirty-nine metro counties have an estimated gap of 10.3 percent. This is significantly lower than the state's twenty-one "somewhat rural" counties (29.3%) and its sixty "mostly rural" counties (50%). The higher child care gaps in rural areas make it more difficult to increase labor force participation rates, which are lower in rural areas.

Child Care Gap by County, 2024
(darker shading indicates larger gap)



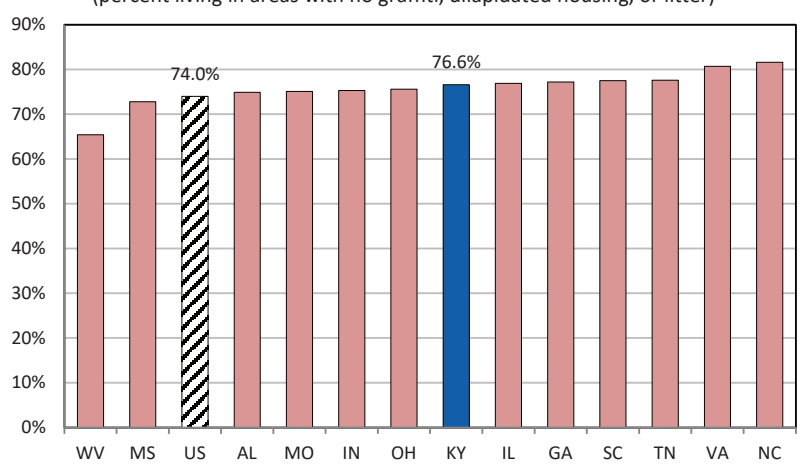
Source: Author's analysis of child care supply data from the Homeland Infrastructure Foundation-Level Data (HIFLD), available online at https://hifld-geoplatform.hub.arcgis.com/pages/hifld-open, using data current as of April 17, 2024, and U.S. Census 2022 5-Year, Table 23008, children under 6 whose parent(s) is in the labor force to estimate potential demand.

Neighborhood Quality

The incidence of crime is one way to measure the quality of a neighborhood. Other factors that detract from neighborhood quality include graffiti, dilapidated housing, and litter. To gauge the quality of neighborhoods in which children live, the National Survey of Children's Health posed several questions to survey respondents, including "In your neighborhood, is there litter or garbage on the street or sidewalk?," "Does the neighborhood contain poorly kept or dilapidated housing?," and "In your neighborhood is there vandalism such as broken windows or graffiti?" The numbers in the chart below are estimates of the percentage of children living in neighborhoods where none of these three detracting elements are present. Kentucky's percentage (76.6%) is statistically the same as the U.S. percentage (74.0%). Michigan has the highest value among all of the states (82.5%) and New York the lowest (62.7%). At 47 percent, the District of Columbia is even lower than New York.

Children Living in Neighborhoods Without Detracting Elements, KY, Competitor States, and the U.S., 2021

(percent living in areas with no graffiti, dilapidated housing, or litter)

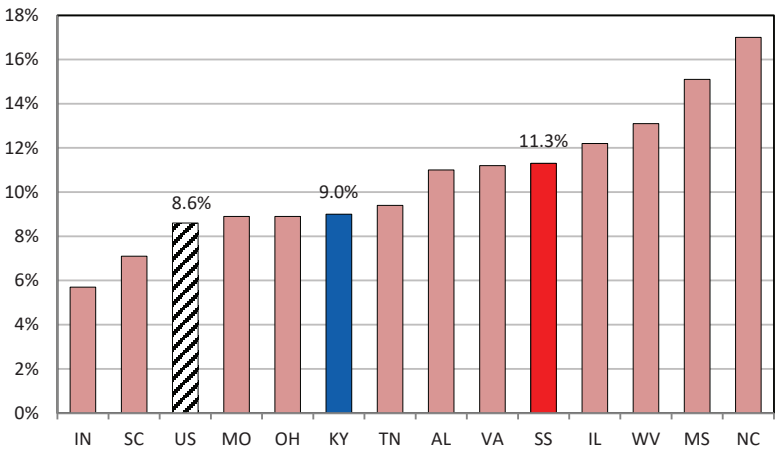


National Survey of Children's Health, Health Resources and Services Administration, Maternal and Child Health Bureau. https://mchb.hrsa.gov/data/national-surveys.

Students Feeling Unsafe at School

Another signal of community well-being is whether students feel unsafe at school, and Kentucky is at the national average. The Centers for Disease Control and Prevention (CDC) Youth Risk Behavior Surveillance System (YRBSS) Survey is a national survey of high school students, grades 9 through 12. The figure below reflects the percentage of high school students who did not go to school because they felt unsafe at school or on their way to or from school (on at least 1 day during the 30 days before the survey). Kentucky's 9 percent is not statistically different from the national (8.6%), but is statistically different from the surrounding state (SS) weighted average (11.3%). Including Kentucky, there were 41 states that participated in the survey and adopted this question; twenty-three states are statistically no different from Kentucky, five have lower percentages, and twelve have higher percentages.

High School Students Who Did Not Go to School Because They Felt Unsafe, 2021



Source: Centers for Disease Control and Prevention (CDC). 1991-2021 High School Youth Risk Behavior Survey Data. Available at http://yrbs-explorer.services.cdc.gov/. Accessed on [10/10/2023], as well as author's analysis of Centers for Disease Control and Prevention. 2021 Youth Risk Behavior Survey Microdata.
Note: SS indicates 9 surrounding states (AL, IL, MO, MS, NC, SC, TN, VA, & WV).

Adverse Childhood Experiences

Childhood experiences can have lifelong consequences, both positive and negative, for individuals, families, and the wider community. Children growing up with adverse childhood experiences (ACE) may have a range of difficulties, including, but not limited to, unstable work histories as adults who struggle with finances, jobs, and depression, all of which, of course, can affect the economy. Indeed, research suggests that ACEs levy significant economic and social costs on families, communities, and society that totals hundreds of billions of dollars each year. The table below shows the percentages of adults who experienced selected ACEs. Three areas in which Kentucky is statistically higher than both the U.S. and nearby states are: *Substance Abuse (30.3%)*, which is derived from two questions, "Did you live with anyone [as a child] who was a problem drinker or alcoholic?," or "Did you live with anyone who used illegal street drugs or who abused prescription medications?"; *Mental Illness (22.4%)*, "Did you live with anyone who was depressed, mentally ill, or suicidal?"; and *Incarcerated Household Member (13.1%)*, "Did you live with anyone who served time or was sentenced to serve time in a prison, jail, or other correctional facility?" In all three instances, Kentucky's respective percentages are statistically significantly higher than the comparison geographic areas.

Prevalence of Adverse Childhood Experiences (ACE), U.S., Selected Nearby States, and Kentucky, 2020
(Adults 18 and Older)

ACE Category	US (%)	Nearby States (%)	KY (%)
Emotional Abuse	33.4	32.0	33.2
Physical Abuse	23.9*	20.9	21.8
Sexual Abuse	13.2*	13.2	14.7
Parents Violent with One Another	17.1	16.6	17.5
Substance Abuse	27.0*	27.0*	30.3
Mental Illness	17.1*	17.6*	22.4
Parental Separation or Divorce	31.4	32.6	32.8
Incarcerated Household Member	9.7*	10.2*	13.1

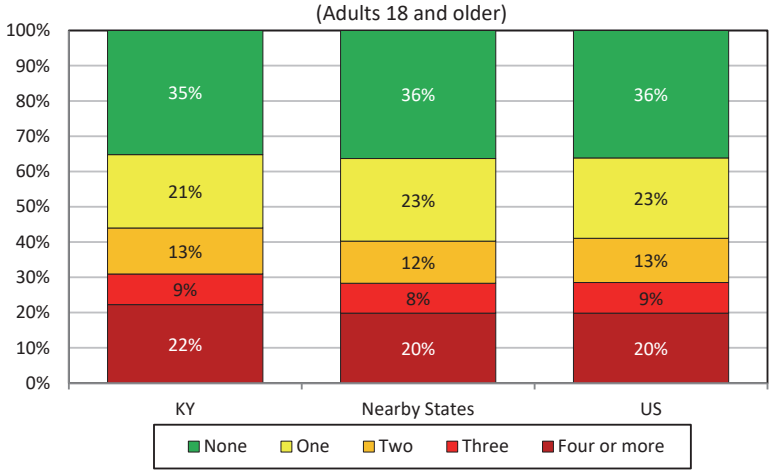
Source: Author's analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2020
Note: The selected nearby states are AL, GA, MO, MS, SC, & VA. See Notes & Sources at the end of this report for more information about each of the ACE factors.
**These percentages are statistically different from the Kentucky percentages (alpha=.05).*

Adverse Childhood Experiences

In general, about two-thirds of adults have reported at least one adverse childhood experience (ACE), and about one in five reported four or more ACEs. Adverse childhood experiences include abuse, household challenges, and neglect—with more specific factors listed in the table on the facing page. At least one study found that "a graded dose-response relationship between ACEs and negative health and well-being outcomes." In short, as the number of ACEs increases so does the risk for negative outcomes in adulthood (see Felitti, et al., "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults," *American Journal of Preventive Medicine*, vol. 14, no. 4, 1998). Kentucky looks quite similar to the U.S. and selected nearby states with regard to the number of ACEs.

Number of Adverse Childhood Experiences (ACE), Kentucky, Nearby States, and the U.S., 2020

(Adults 18 and older)

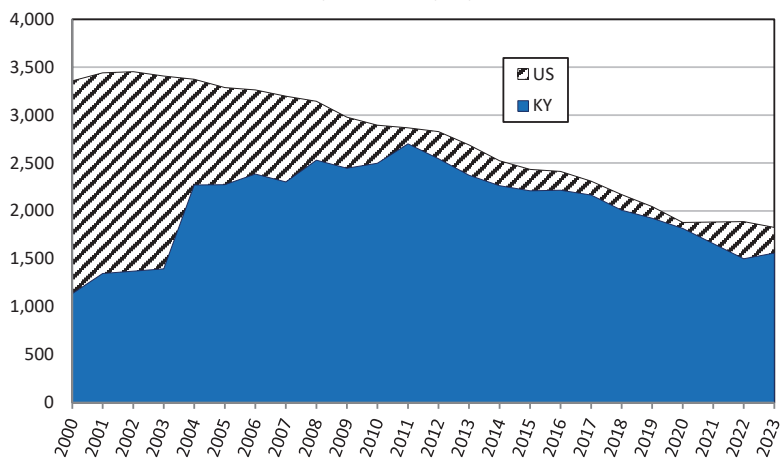


Source: Author's analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2020. Note: The selected nearby states are AL, GA, MO, MS, SC, & VA.

Property Crime Rate

Any discussion of community would be incomplete without consideration of the role of crime, which can instill fear, undermine trust, and fray connections—and impact economic development decisions and outcomes. There are two trends that are demonstrated in the figure below. First, the property crime rate has been on a downward trend for both Kentucky and the U.S. since about 2011. Second, Kentucky's property crime rate is consistently lower than the U.S. property crime rate. Kentucky's comparatively low crime rate remains a strong asset that contributes to a sense of well-being and trust, which, in turn, helps create caring places that nurture productive lives.

Property Crime Rate, KY and the U.S., 2000 to 2023
(per 100,000 people)



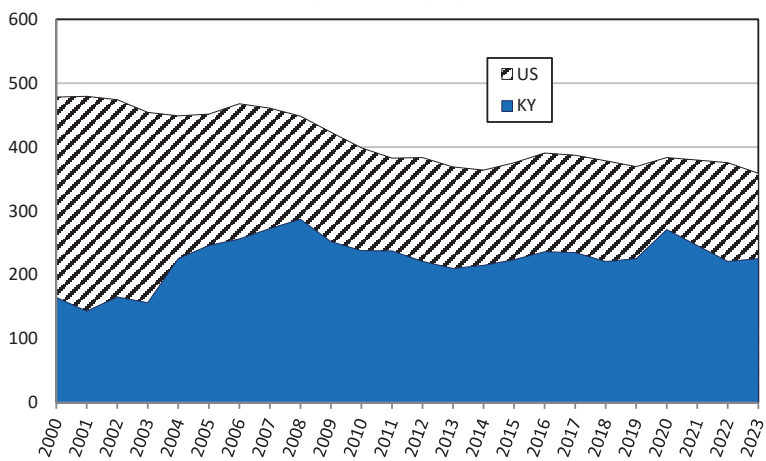
Source: Federal Bureau of Investigation, Crime Data Explorer, <https://cde.ucr.cjis.gov/>. Data downloaded December 9, 2024. Crime count converted to rate using U.S. Census population estimates. Crime count for 2021 is interpolated using 2020 and 2022 counts. These data include all property crimes.

Violent Crime Rate

There are two important factors illustrated in the figure below about the violent crime rates in Kentucky and the U.S. First, since about 2008 in Kentucky and around 2011 in the U.S., the violent crime rates has been releatively stable for several years. Second, similar to the property crime rate, Kentucky's violent crime rate is consistently lower than the U.S. rate. This represents an affirmation of the viewpoint of Kentucky's communities as relatively safe and stable places.

Violent Crime Rate, Kentucky and the U.S., 2000 to 2023

(per 100,000 people)

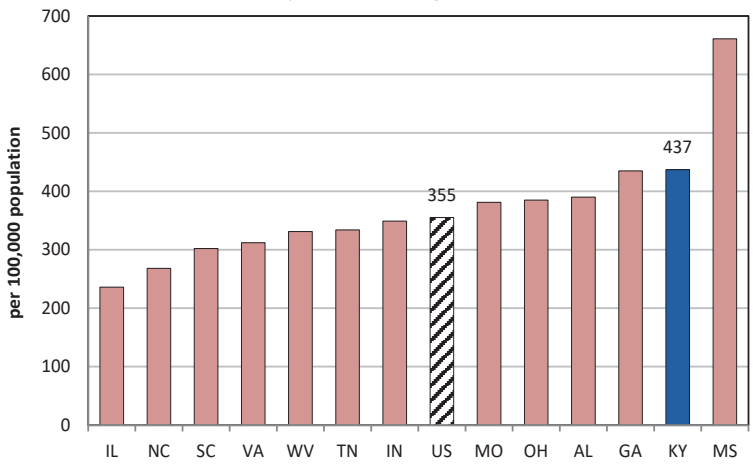


Source: Federal Bureau of Investigation, Crime Data Explorer, <https://cde.ucr.cjis.gov/>. Data downloaded December 9, 2024. Crime count converted to rate using U.S. Census population estimates. Crime count for 2021 is interpolated using 2020 and 2022 counts. These data include all violent crimes.

Incarceration Rate

Incarceration rates are windows through which one can assess the nature, quality, and character of a community. According to a November 2023 report from the U.S. Department of Justice, *Prisoners in 2022*, the United States had an estimated 1,230,100 prisoners under the jurisdiction of state and federal correctional authorities in 2022. This is equivalent to 355 prisoners per 100,000 population. Kentucky's rate, by comparison, was somewhat higher at 437. The state with the highest incarceration rate in 2022 was Mississippi (661), while Massachusetts was the lowest (94). As one can see in the chart below, Kentucky's incarceration rate is toward the high end when comparing it to the nearby states. Kentucky's prison population steadily increased from 3,588 in 1980 to 21,823 in 2007. It declined, however, to 20,330 by 2013. Unfortunately, fueled by the opioid epidemic, it started to trend upward again and reached 23,082 in 2019, but declined to 19,744 by 2022.

Prison Incarceration Rate, 2022,
Kentucky, Competitor States, and the U.S.
(prisoners of all ages)

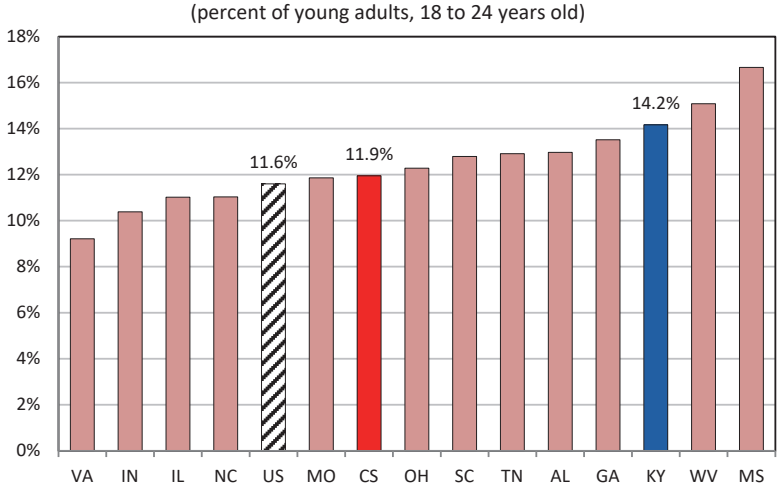


Source: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, Prisoners in 2022

Disconnected Young Adults

Strong, resilient, and vibrant communities are created and nurtured by actively engaged, invested, and connected citizens. The figure below shows the percentage of young adults (18 to 24 years old) who are "disconnected." These young adults are *not* enrolled in school, are *not* currently employed, and have *no* degree beyond a high school diploma or GED. Collectively these factors could indicate that a young person is having difficulty making a successful transition to adulthood. An estimated 66,500 of Kentucky's youth are disconnected according to this definition, which is 14.2 percent of the population in this age cohort. This percentage is *not* statistically different (using a 95% confidence interval) from six of the competitor states (i.e., AL, GA, MS, SC, TN, and WV). However, Kentucky is statistically *higher* than the competitor state (11.9%) and U.S. (11.6%) averages, as well as all of the remaining competitor states. Louisiana has the highest percentage of disconnected young adults at 16.9 percent, and North Dakota has the lowest percentage at 5.0 percent. Among all states and the District of Columbia, only one is higher (Louisiana), 29 are lower, and 20 are statically the same as Kentucky.

Disconnected Young Adults, 2023,
Kentucky, Competitor States, and the U.S.
(percent of young adults, 18 to 24 years old)

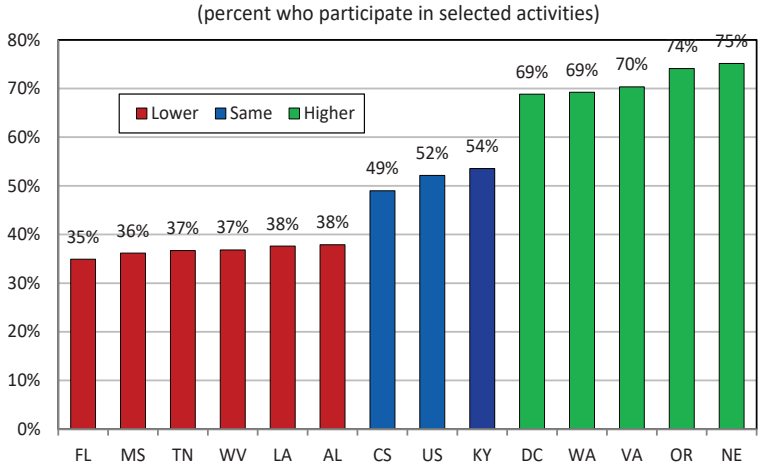


Source: Estimated by the author using data from the 2023 1-Year U.S. Census ACS PUMS.

Public Participation in the Arts

A thriving local culture is a cornerstone of a high quality of life, allowing citizens to enrich and educate themselves by experiencing the arts and learning about history. Cultural amenities can constitute an integral role in site selection decisions, with the so-called "creative class" placing a premium on living in locations that offer enriching lifestyles. From music to museums, the arts matter. The chart below shows participation in at least one of twelve activities included in the 2017 Survey of Public Participation in the Arts. These activities include, but are not limited to, whether one has visited an art museum or gallery during the last 12 months; whether one has visited a historic park or monument, toured buildings or neighborhoods for historic or design value during the last 12 months; and whether one has attended a musical stage play or an operetta performance during the last 12 months. With 54 percent of the population participating in at least one of the twelve public arts and entertainment activities, Kentucky is statistically no different from the competitor states (49%), the U.S. (52%), or 39 other states. On the other hand, Kentucky is statistically higher than six states and significantly lower than five others. As the competitive pressures of attracting a highly skilled global workforce rise, it becomes increasingly important for the Commonwealth to support a culturally competitive environment.

Public Arts and Entertainment Activities, Kentucky and Selected States, 2017
(percent who participate in selected activities)

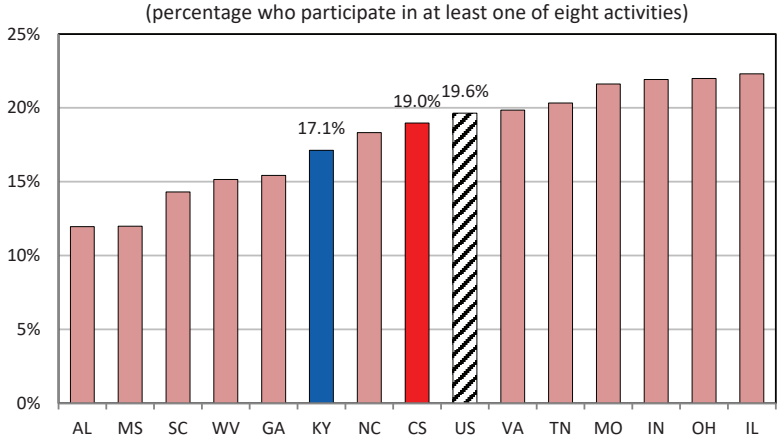


Source: Author's analysis of data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 9.0 [Public Arts Supplement, 2017]. Minneapolis, MN: IPUMS, 2021.

Public Participation in the Arts

These measures of artistic activity are estimated from the 2018 and 2020 Surveys of Public Participation in the Arts, and represent a more *active* approach in the creation of artistic works than the activities shown on the facing page. The figure below represents the percentage of individuals who have engaged in at least one of the following eight *broad* artistic activities (in the last year): written stories, poems, or plays; engaged in painting, drawing, sculpture, or printmaking; made photographs, movies, or videos; did pottery, ceramics, jewelry, leatherwork or metalwork; practiced weaving, crocheting, quilting, needlepoint, or sewing; took classes in art appreciation or art history; took creative writing lessons; or took music or music appreciation lessons. With an estimated 17.1 percent of the population participating in at least one of the eight artistic activities, Kentucky is statistically no different from the competitor states (19%), the U.S. (19.6%), or 29 other states. Kentucky is statistically higher than three states and significantly lower than 18; DC is included in the group of 18. Relative to the twelve competitor states, Kentucky is statistically higher than Alabama (12%) and Mississippi (12%), and lower than Illinois (22.3%). Otherwise, Kentucky is statistically no different from the other nine competitor states. The state with the highest percentage is Utah (34.8%), and Alabama and Mississippi are at the bottom nationally.

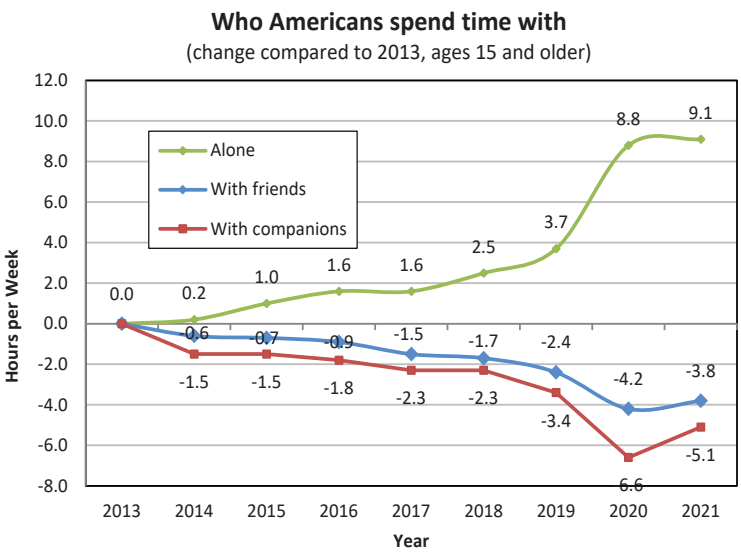
Engagement with Selected Arts and Culture,
Kentucky, Competitor States, and the U.S., 2018 & 2020
(percentage who participate in at least one of eight activities)



Source: Author's analysis of data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Public Arts Supplements, 2018 & 2020]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0

Community Engagement

Economist Bryce Ward, founder of ABMJ Consulting, published a piece in the *Washington Post* in November 2022 showing the changing patterns American's time utilization. His analysis is based on data from the Census Bureau and Bureau of Labor Statistics' *American Time Use Survey*. He writes that "the amount of time the average American spent with friends was stable, at 6½ hours per week, between 2010 and 2013. Then, in 2014, time spent with friends began to decline. By 2019, the average American was spending only four hours per week with friends (a sharp, 37 percent decline from five years before). Social media, political polarization and new technologies all played a role in the drop." He notes that the pandemic deepened these trend but did not cause it. As can be seen in the line chart below, these trends began long before Covid arrived in 2019-2020. Our examination of these data going back to 2003 reveals that the amount of time Americans spend *socializing and communicating* (e.g., spending time with family, hanging out with friends, talking with neighbors) decreased from just under five-and-a-half hours per week in 2003 to around four hours per week in 2021, a 27 percent decline. Ward writes that "friends and social connections ... boost health and lead to better economic outcomes." Community engagement is vitally important for our individual and mental health, as well as economic well-being.

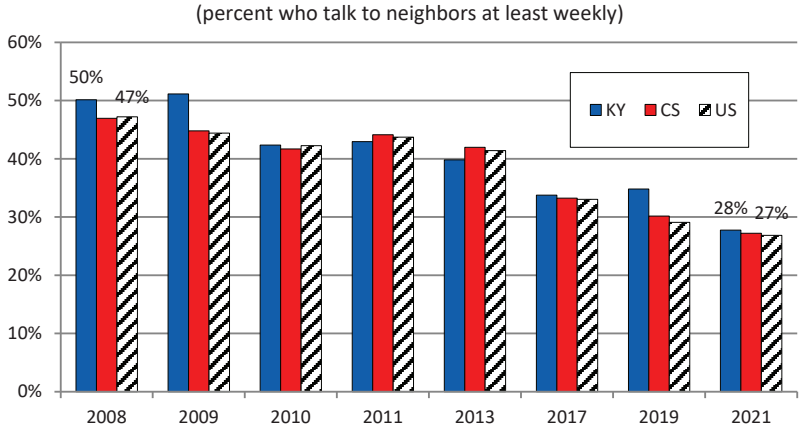


Source: Bryce Ward, "Americans are choosing to be alone. Here's why we should reverse that," Washington Post Opinion, November 23, 2022, online <https://www.washingtonpost.com/opinions/2022/11/23/americans-alone-thanksgiving-friends/>.

Talk with Neighbors

Neighbors are important. Most Americans will turn to family, friends, or neighbors for transportation, childcare, or other unexpected needs. Indeed, neighbors can be the first place we seek assistance when help is needed. Research has found that regular interactions with neighbors boost feelings of well-being and enhance one's quality of life; other research shows that in communities where people are connected to their neighbors, residents can rebound quicker from disruptive events such as natural disasters or health emergencies. Unfortunately, over the last dozen years, there has been a steady decline in the percentage of neighbors regularly talking to each other. The graph below shows the estimated percentage of people who talked to their neighbors at least weekly over the past 12 months. This includes those who responded *Basically Every Day* or *A Few Times A Week* (other responses were *A Few Times a Month, Once a Month, Less Than Once a Month,* or *Not at All*). The question did not specify whether interactions had to be in-person or not. In just over a decade, Kentucky's percentage declined from 50 percent to 28 percent, with the competitor states and the U.S. exhibiting similar declines. This decline has implications for individual well-being and community resilience.

Talk with Neighbors, 2008 to 2021
Kentucky, Competitor States, and the U.S.
(percent who talk to neighbors at least weekly)



Source: CBER analysis of data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Civic engagement and Volunteering Supplement, various years]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0

Economy

THERE ARE MANY POSITIVE SIGNALS suggesting the economy is normalizing nearly five years after the onset of the pandemic. As discussed in the Outlook section of this report, inflation rates are slowly returning to the Federal Reserve's 2 percent target rate, the national gross domestic product (GDP) growth rate exceeded expectations in 2024, Kentucky's GDP growth rate outperformed the nation (at least during the time period for which we have data to compare), workers are being added to payrolls at a healthy growth rate and one that is more comparable to what we saw during the pre-pandemic years.

Other important economic indicators show that Kentucky is on par with national trends. Private sector growth of *total* wages and salaries in a state over time is indicative of its economic energy. Over a four-year period, from 2019 (Q4) to 2023 (Q4), total (nominal) wages and salaries in the U.S. were 26.1 percent higher. In our region of the country, North Carolina's 35.6 percent increase led the way. Meanwhile, Kentucky's total wage and salary levels are up 25.8 percent, not too far below the U.S. (26.1%) and competitor state (27.4%) averages. On the national level, Idaho has the highest wage and salary growth during this period—registering an enviable 42.5 percent increase—while North Dakota experienced the lowest increase (16.5%).

Likewise, the change in private sector *total* employment is also an important signal of a state's economic dynamism. Using the same time period, from just before the onset of the pandemic

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(2019Q4), to the last quarter of 2023 (the COVID-19 Pandemic was officially declared over in May of 2023), total employment in the U.S. increased 3.7 percent. Among Kentucky's competitor states, Illinois experienced the smallest increase during this period, 0.2 percent. Meanwhile, Kentucky's total employment was up 4.4 percent. On the national level, Hawaii experienced the largest employment decline (-4.8%), while Idaho *increased* employment by 14.2 percent.

The pandemic unleashed entrepreneurial energy and fueled a surge in start-ups nationally, as evidenced in Kentucky by an increase in high-propensity business applications (HBA). The growth of HBAs, for example, has been markedly greater during the pandemic recession compared to the Great Recession. Kentucky's trends for HBAs during the months following the onset of the last two recessions—the Great Recession, which began in December 2007, and the pandemic recession which started in February 2020, are quite different. By August 2012, 56 months after the beginning of the Great Recession, the HBA rate was 5.6 percent lower than when the recession started. In contrast, 56 months after the start of the pandemic recession (in October 2024), Kentucky's HBA rate was 45 percent higher.

Similar to workers who have long viewed the benefits of globalization skeptically, businesses reassessed the virtues of globalization due to supply chain disruptions that limited access to many key inputs and contributed to higher prices. Exports have helped to bolster Kentucky's economic prosperity for the last several years, evidenced by exports of goods that have more than doubled in real dollars over the last two decades. From 1999 to 2023, the compound annual growth rate of Kentucky's exports is 6.5 percent; this is higher than the U.S. and competitor states. However, the pandemic hit the export sector hard, evidenced by a sharp decline in 2020. The value of Kentucky's exports of goods rebounded to $40.2 billion in 2023, which is equivalent to 14.4 percent of Kentucky's gross domestic product.

Creating abundant high-paying jobs in Kentucky's rural areas has been, and continues to be, one of the biggest economic development challenges for the state. Going back to at least 1969, earnings in metro areas have been consistently higher than those in rural counties—especially when compared to Kentucky's 60 "mostly rural" counties. This gap has widened with time. Based on numerous studies of rural communities across the country, economists have outlined approaches for rural America to improve rural prosperity by thinking and acting regionally, finding new economic niches in high-value knowledge industries that leverage a region's strengths, and placing a premium on homegrown entrepreneurs.

New Employers

The *Kauffman New Employer Business Indicators* include: *Rate of new employer business actualization*—business that becomes an employer within two years of filing an application. In 2021, the rate of new employer business actualization in Kentucky was 9.29%, meaning that for every 100 new business applications, about 9 of these became employers within two years; *Rate of new employer businesses*—startups that become new employers for every 100 people. In 2021, Kentucky's rate of new employer businesses was 0.10, meaning that about 100 new employer businesses were formed for every 100,000 people; *New employer business velocity*—the average amount of time, in quarters, between filing a business application and hiring a first employee. New employer business velocity in Kentucky in 2017 was 1.83, meaning that it took new employer businesses, on average, 1.83 quarters, or almost 6 months, from the filing of a business application to the time the first employee was hired; and *Employer business newness*—new employer businesses as a share of all employer firms. Employer business newness in 2019 was 5.56%, meaning that new employers were about 5.6% of all employer firms. *New Employer Business Actualization Speed (NEBAS) Index* reflects the emergence (actualization) and speed (velocity) of new employer businesses. The NEBAS Index for 2017 for the Kentucky was 0.75.

2021 New Employer Business Indicators

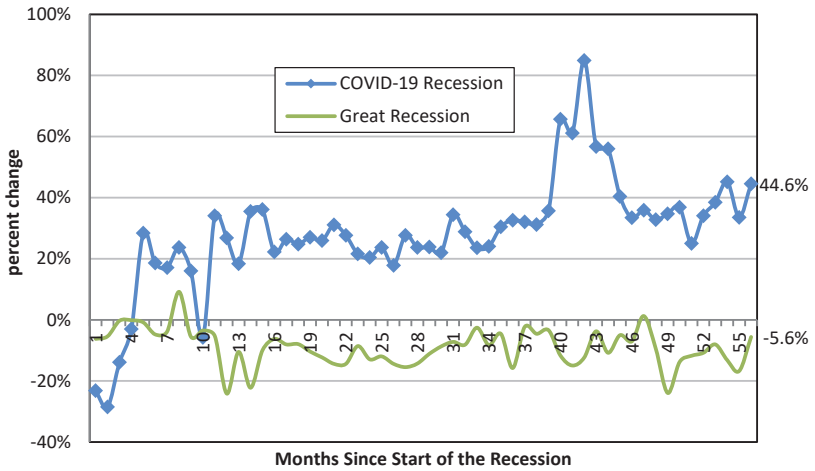
Area	Rate of New Employer Business Actualization	Rate of New Employer Businesses	New Employer Business Velocity	Employer Business Newness	NEBAS Index
US	9.16%	0.15	2.06	6.98%	0.70
AL	7.89%	0.12	1.90	5.69%	0.72
GA	6.12%	0.18	2.16	7.55%	0.62
IL	9.03%	0.14	2.13	5.98%	0.69
IN	8.66%	0.11	1.99	5.31%	0.71
KY	**9.29%**	**0.10**	**1.83**	**5.56%**	**0.75**
MS	5.51%	0.12	1.78	5.30%	0.71
MO	9.74%	0.13	1.81	6.13%	0.76
NC	9.84%	0.16	1.97	7.04%	0.73
OH	7.58%	0.10	2.05	4.90%	0.67
SC	8.44%	0.16	2.06	6.74%	0.70
TN	9.18%	0.12	1.83	6.56%	0.76
VA	8.36%	0.13	2.18	6.04%	0.65
WV	9.23%	0.07	*	4.43%	*

Source: Kauffman Indicators of Entrepreneurship, 2021 National & State Reports on Early-Stage Entrepreneurship, May 2022.
*Note: Missing values indicated by * are due to missing data in underlying source/s used to calculate the indicators.*

High-Propensity Business Formations

The growth of high-propensity business applications has been markedly greater during and after the COVID-19 Recession compared to the Great Recession. Creating a new business begins with an application for an Employer Identification Number from the IRS. The Census Bureau uses these applications to estimate whether an entity has a high probability of becoming a business with a payroll. Kentucky's trends for high-propensity business applications (HBA) during the months following the onset of the last two recessions—the Great Recession which began in December 2007, and the COVID-19 Recession which started in February 2020, are quite different. By August 2012, 56 months after the beginning of the Great Recession, the HBA rate was 5.6 percent lower than when the recession started—892 applications compared to 945 (seasonally adjusted). In contrast, there was a steep decline in the HBAs at the onset of the COVID-19 Recession in Kentucky, but the HBA rate increased 35.5 percent by April 2021, from 936 to 1,268; it has decreased somewhat, but was almost 45 percent higher in October 2024—56 months after the start of the COVID-19 Recession. The higher HBA rate during the COVID-19 Recession is a national trend and is, in part, a function of the increased ease of starting a business that is based online.

High-Propensity Business Applications in Kentucky During Two Recessions
(percentage change compared to start of recession)



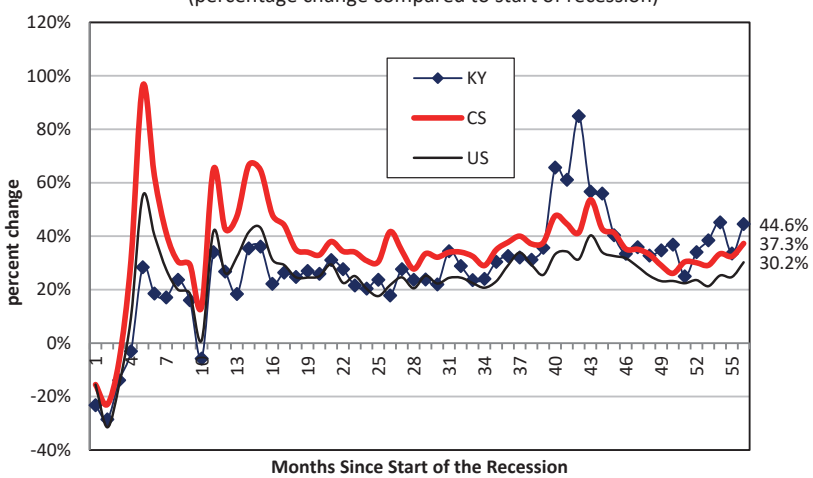
Source: Author's analysis of U.S. Census, Business Formation Statistics, based on seasonally adjusted numbers.

High-Propensity Business Formations

Kentucky has experienced a significant increase in high-propensity business applications during the COVID-19 Recession compared to the 56 months following the start of the Great Recession (see facing page). Kentucky's increase more or less follows the national trend, except in recent months. Due to a jump in the summer of 2023, Kentucky's trend is slightly higher than the competitor states and national trends. For example, in October 2024, there were 1,353 high-propensity business applications (HBA) in Kentucky, which is a 44.6 percent increase from the 936 at the onset of the recession in February of 2020. The percentage increases over the same time period for the competitor states and the U.S. are 37.3 percent and 30.2 percent, respectively. Business applications that have a high-propensity of turning into businesses with payroll are considered high-propensity business applications. According to the U.S. Census Bureau, "the identification of high-propensity applications is based on the characteristics of applications revealed on the IRS Form SS-4 that are associated with a high rate of business formation."

COVID-19 Recession High-Propensity Business Applications: Kentucky, Competitor States, and the U.S.

(percentage change compared to start of recession)



Source: Author's analysis of U.S. Census, Business Formation Statistics, seasonally adjusted numbers.

Productivity

Economic productivity is the ratio between inputs and outputs of goods and services. It is driven by three main factors: human capital (e.g., education, skills, and training of workers), physical capital (e.g., machines, automation), and technological progress (e.g., improved methods, technologies, and processes). Increases in labor productivity helped fuel American economic prosperity in the post-WWII era by increasing output in goods and services from 1947 to 2013 by a factor of nine with only marginal increases in hours worked (BLS). Policymakers are interested in boosting productivity because it is "the most consequential determinant of long-term economic growth and substantive improvements in individual living standards," (Congressional Research Service, January 2023). Moreover, increasing labor productivity is tightly linked to increases in real (i.e., inflation-adjusted) wages for workers. Furthermore, with respect to the states, productivity levels and increased productivity over time are important signals about workforce quality and business environments. Indeed, economists find that higher levels of educational attainment and economic innovation are the two most important factors affecting a state's economic success, and, year after year, corporate leaders indicate that "the availability of skilled labor" is the most important factor driving their site selection decisions (*Area Development*

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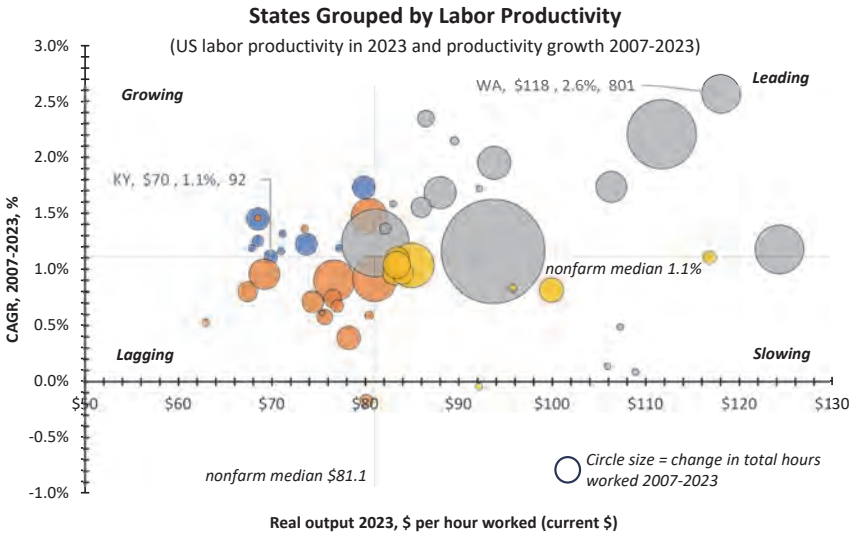

Productivity

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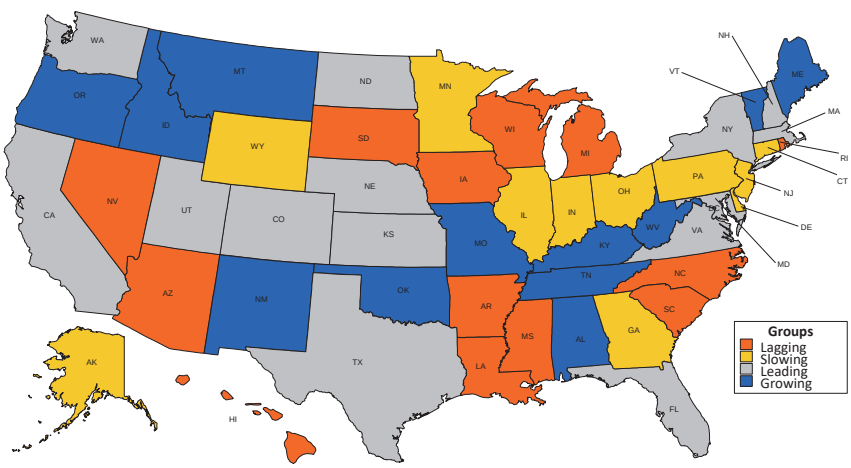
Magazine, Annual Surveys, various years). At the national level, labor productivity has slowed in the last 15 to 20 years. According to a 2023 McKinsey report, *Rekindling US Productivity for a New Era*, U.S. labor productivity increased at an average rate of 2.2 percent from 1948 to 2019, but only 1.4 percent from 2005 to 2019. At the state level, there are significant differences in labor productivity levels and rates of change. For example, New York has the highest real output per hour worked ($124) and Mississippi has the lowest ($63). And, with respect to changes over time, Washington increased at an average annual rate of 2.6 percent from 2007 to 2023, but Louisiana *decreased* by an average annual rate of 0.2 percent. Kentucky's economic output per hour ($69.9) is below the national median ($81.1) but has grown at the same rate as the national median of 1.1 percent. Using the method and approach of the McKinsey report, but with more current data, we categorize states according to labor productivity growth over a sixteen-year period and output (per hour worked) in 2023. There are four groups of states: *Growing*—states moving up from a smaller base (e.g., KY); *Lagging*—states falling behind; *Leading*—states "pulling away;" and *Slowing*—states falling back from a higher level.

Four Groups of States Based on Labor Productivity

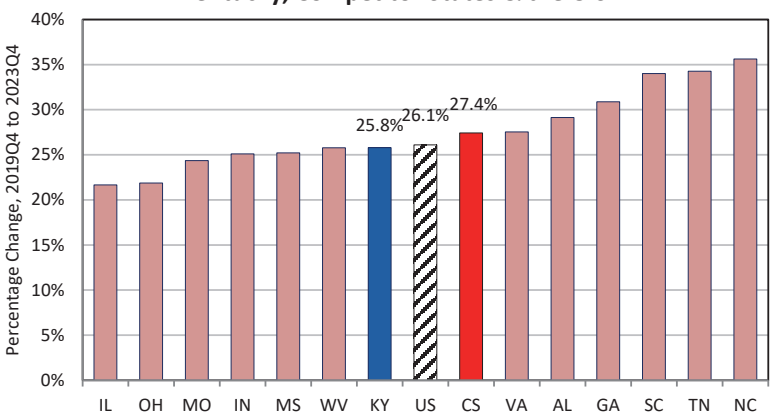


Source: Estimated by the author using productivity data from the U.S. Bureau of Labor Statistics, Office of Productivity and Technology, data released May 30, 2024

Wage & Salary Change by State

Private sector growth of *total* wages and salaries in a state over time is indicative of its economic energy. During a global pandemic, the trajectory of private sector wage growth is also indicative of a state's economic resiliency. Here we look at the growth from just before the pandemic, 2019Q4, to the end of 2023 (Q4). Over this four-year period, *total* (nominal) wages and salaries in the U.S. were 26.1 percent higher. In our region of the country, North Carolina's 35.6 percent increase led the way. Meanwhile, Kentucky's total wage and salary levels are up 25.8 percent, not too far below the U.S. (26.1%) and competitor state (27.4%) averages. On the national level, Idaho has the highest wage and salary growth during this period—registering an enviable 42.5 percent increase—while North Dakota experienced the lowest increase (16.5%).

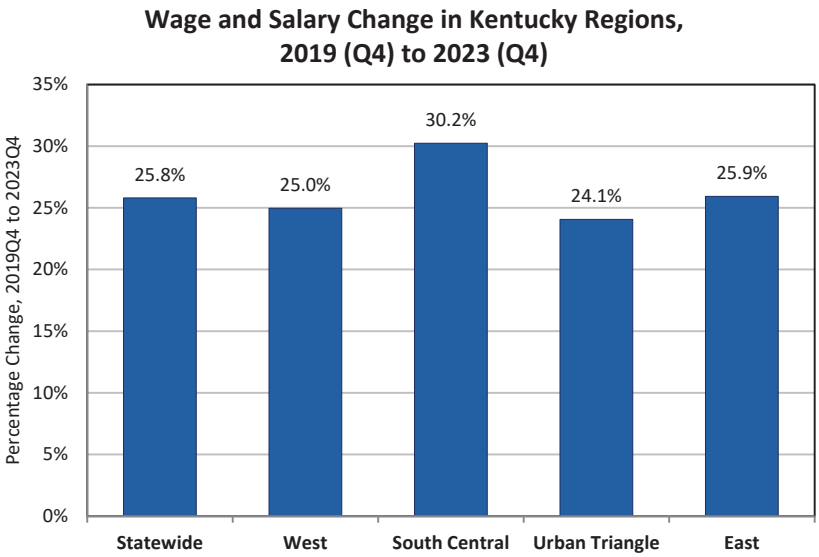
Wage and Salary Change,
2019 (Q4) to 2023 (Q4),
Kentucky, Competitor States & the U.S.



Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes). The U.S. estimate is constructed from state data.
Note: CS is a weighted average of the competitor states

Wage & Salary Change by Kentucky Region

The growth of total private wages and salaries in Kentucky and its regions is shown below. From just before the Pandemic's emergence (2019Q4), to the end of 2023, there is variation across the Commonwealth's regions. The state's economic engine—the Urban Triangle—experienced a 24.1 percent increase (a county-level map of these four regions is available in the glossary). Similarly, Western Kentucky also experienced an increase of 25 percent and Eastern Kentucky demonstrated a 25.9 percent improvement. The largest increases in wages and salaries, however, was in the South Central region, evidenced by a 30.2 percent jump.

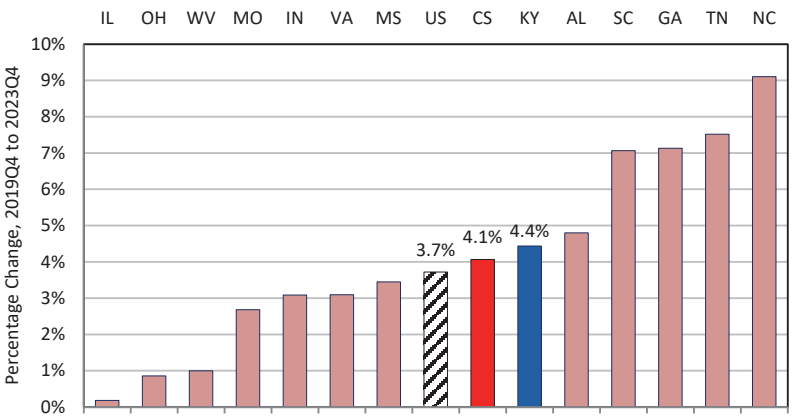


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes). See glossary for map of Kentucky regions by county.

Employment Change by State

The change in private sector *total* employment is indicative of a state's economic energy and resiliency. Here we look at the changes from the last quarter of 2019, which was just before the onset of the pandemic, to the last quarter of 2023; the COVID-19 Pandemic was officially declared over in May of 2023. Over this four-year period, *total* employment in the U.S. increased 3.7 percent. Of Kentucky's competitor states, Illinois experienced the smallest increase during this period, 0.2 percent. Meanwhile, Kentucky's total employment was up 4.4 percent. On the national level, Hawaii experienced the largest employment decline (-4.8%), while Idaho *increased* employment by 14.2 percent.

Employment Change,
2019 (Q4) to 2023 (Q4),
Kentucky, Competitor States & the U.S.

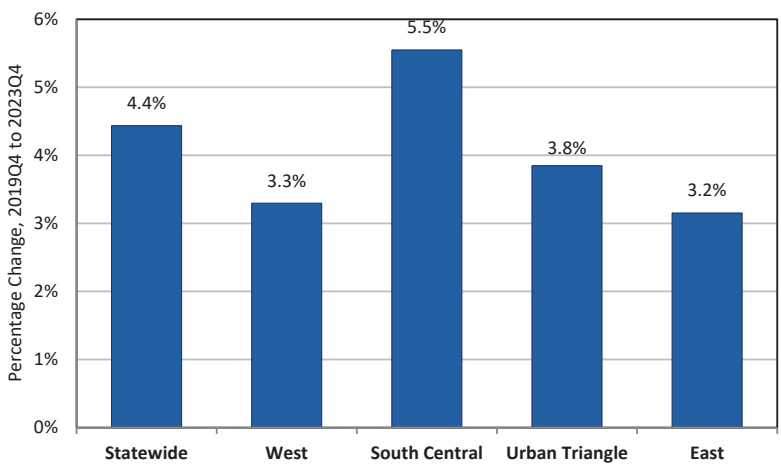


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes). The U.S. estimate is constructed from state data.
Note: CS is a weighted average of the competitor states

Employment Change by Kentucky Region

The West and East regions of Kentucky have lagged behind the rest of the state in recovering jobs lost during the pandemic. From the final quarter in 2019, which was just before the pandemic hit, to the fourth quarter of 2023, a four-year period, total private sector employment increased in Kentucky by 4.4 percent. All of the regions in Kentucky, except the South Central region, increased at rates between 3.2 and 3.8 percent. The South Central region, meanwhile, increased by 5.5 percent.

Employment Change in Kentucky Regions, 2019 (Q4) to 2023 (Q4)

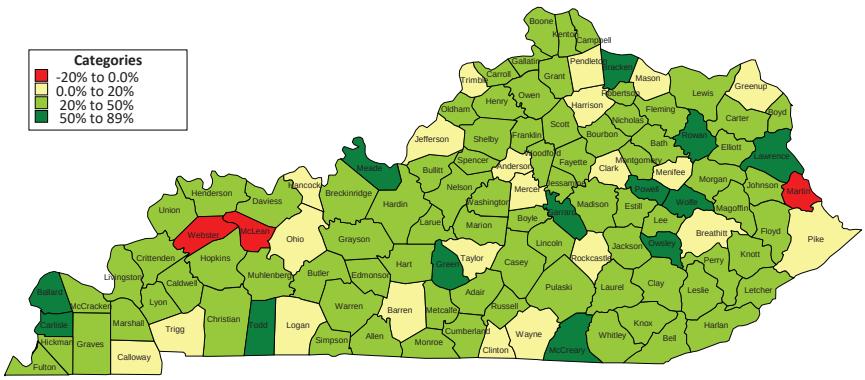


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes). See glossary for map of Kentucky regions by county.

Wage & Salary Change by Kentucky County

There is substantial variation across the Commonwealth in changes of *total* private sector wages and salaries experienced at the county level from just before the pandemic to just after it. The growth or decline of wages at the county level from the last economic quarter before the pandemic (i.e., 2019Q4) to the fourth quarter of 2023 is shown below in the county-level map. Martin County, located in Eastern Kentucky along the border with West Virginia, suffered through a 20 percent decline, while Meade County, located near Elizabethtown and Ft. Knox, enjoyed a 89 percent increase. The statewide average during this four-year period was nearly 26 percent.

Wage and Salary Change by County,
Four Years After the Pandemic Began
(percentage change, 2019 Q4 to 2023 Q4)

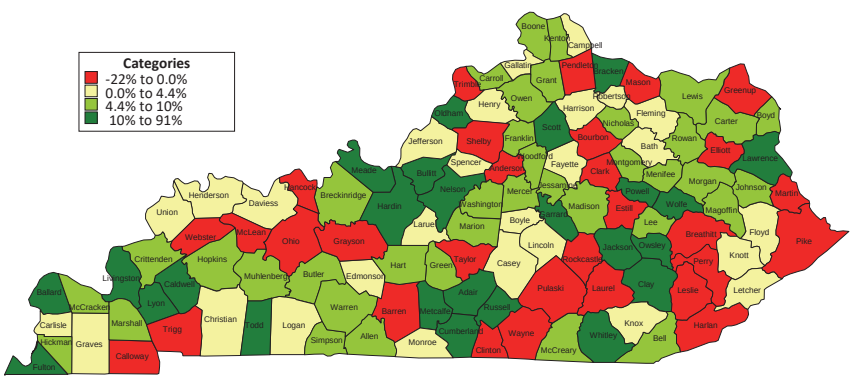


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes).

Employment Change by Kentucky County

Similar to the pattern seen in the wage changes across the state (see the facing page), there has been significant variation across the Commonwealth in how individual counties have fared with respect to employment changes during the pandemic. The growth or decline of employment at the county level from the last economic quarter before the pandemic (i.e., 2019Q4) to the fourth quarter of 2023 is shown below in the county-level map. Martin County, which also experienced the state's large wage and salary decline, has absorbed a 22.4 percent decline in total employment. Ballard County, in far Western Kentucky at the confluence of the Ohio and Mississippi Rivers, enjoyed a 91 percent increase—the state's largest increase. The statewide average during this four-year period was 4.4 percent. The counties above this state average are shown in shades of green in the map.

Employment Change by County,
Four Years After the Pandemic Began
(percentage change, 2019 Q4 to 2023 Q4)

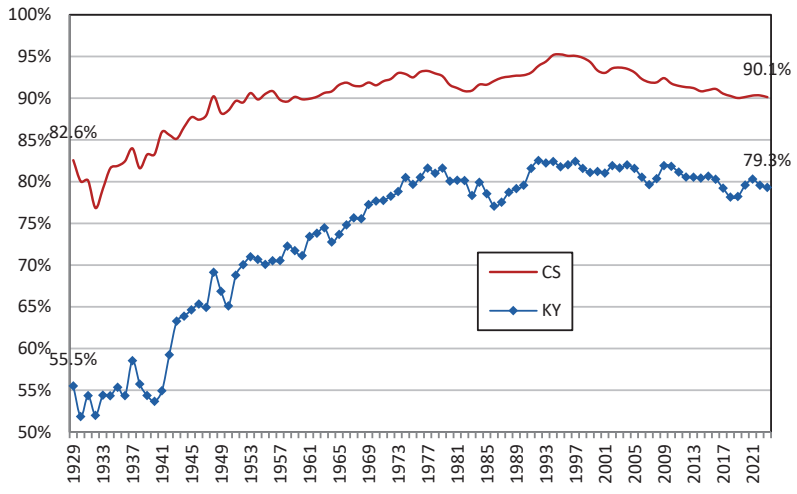


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes).

Per Capita Personal Income

While Kentucky's per capita personal income has grown significantly over the years, its position relative to the nation has not demonstrably improved since around 1974. Indeed, Kentucky's per capita income has oscillated around 80 percent of the national average since the mid-1970s. In 2023 it was just under 80 percent of the U.S. average while the average of the competitor states was just over 90 percent. Lagging growth in per capita income has kept Kentucky ranked in the bottom tier of states (i.e., 46th in 2023). Within Kentucky, there are marked differences between urban, somewhat rural, and mostly rural counties—as reflected in their respective 2023 per capita income levels of approximately $61,400, $47,400, and $44,100.

Per Capita Personal Income as a Percentage of the U.S. Average, Kentucky and Competitor States, 1929 to 2023

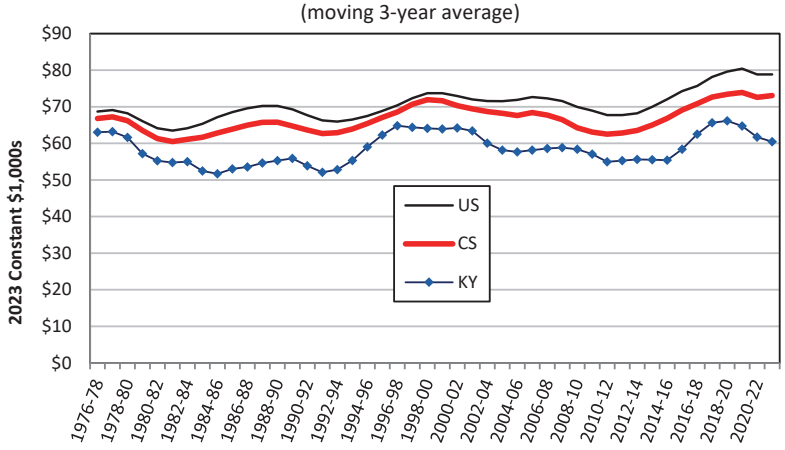


Source: U.S. Department of Commerce, Bureau of Economic Analysis, Table SAINC1

Household Income

At about $62,000, median household income in Kentucky is about 78 percent of the U.S. median; by comparison, the competitor states median is 93 percent of the U.S. median. The median level is the point at which half the households are lower, and half are higher. In real dollars, Kentucky's median household income has been trending downward for the last few years; real dollars factor out inflation and are expressed as constant dollars. Researchers at MIT estimate that, in Kentucky, two working parents with one child need to earn about $77,128 a year for a living wage. This assumes both parents work full-time, 2,080 hours per year, and each earn $18.54 per hour. About 58 percent of the households in Kentucky *do not* generate sufficient income to meet living wage standards given the state's average cost of living. The U.S. Census Bureau estimates that the average family size in Kentucky is 3.1 people. Similarly, according to the Census Bureau's American Community Survey estimates, about 1.1 million Kentucky households made less than $75,000 in 2023, which is around 59 percent of the households.

Median Household Income, 1976-2023
Kentucky, Competitor States, and the U.S.
(moving 3-year average)

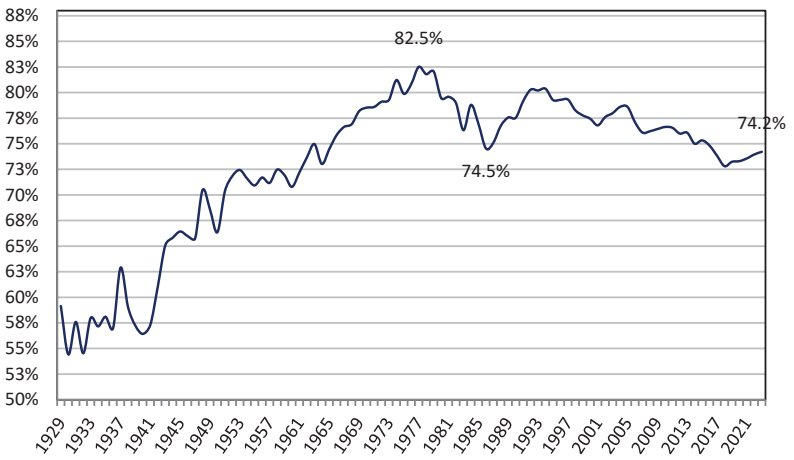


Source: Author's analysis of IPUMS-CPS data, courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Net Earnings Per Capita

Because net earnings is the portion of personal income that does not include transfer payments from various social assistance or public welfare programs or income from dividends, interest, or rent, it is a good indicator of the underlying economic vitality of a state, county, or region. Kentucky's net earnings per capita relative to the U.S. average increased steadily from 1929 to 1977; it hit its high point of 82.5 percent in 1977. Since 1977, Kentucky's net earnings per capita relative to the U.S. has dropped and is currently at 74.2 percent. This places Kentucky at 46th compared to other states and DC. Kentucky's current net earnings per capita is $31,700, significantly below the highest state, Massachusetts ($57,650) and above the lowest state, Mississippi ($27,700). The District of Columbia (DC) has net earnings even higher than Massachusetts, at $72,950.

Net Earnings Per Capita in Kentucky as a Percentage of the U.S. Average, 1929 to 2023



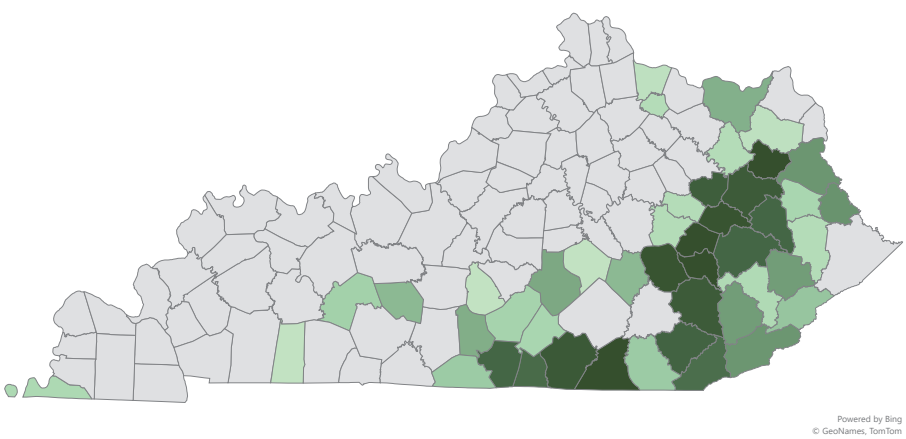
Source: U.S. Department of Commerce, Bureau of Economic Analysis, Table SAINC4 Personal income and employment by major component.

Net Earnings Per Capita by County

When President Johnson's War on Poverty was gathering steam in late 1960s, 25 of Kentucky's 120 counties had per capita net earnings placing them in the bottom five percent of the 3,000-plus counties in the United States. As we note on the previous page, net earnings is the portion of personal income that does not include transfer payments from various social assistance or public welfare programs or income from dividends, interest, or rent, and therefore is a good indicator of the underlying economic vitality of a region. By 2022—54 years later—18 of these counties, or 72 percent, were still in the bottom five percent. Nearly half of the counties nationally (42%) and in the dozen nearby competitor states (34%) that were in the bottom five percent in 1969 were still there in 2022. The map below illustrates this trend somewhat differently by highlighting counties that have consistently been in the bottom five percent of counties since 1969. There are 15 counties that have this distinction in at least 44 of the last 55 years (or 80 percent of the time from 1969 to 2023), highlighted by the darker green shading in the county map below. While most of these persistently poor counties are in Eastern Kentucky, the map also shows several counties in the south central part of the state. The counties colored in gray have not been in the bottom five percent during the time period of 1969 to 2023.

The Persistence of Povery, 1969 to 2023

The percentage of years over the last fifty-five when a Kentucky county was in the bottom five percent nationally for net earnings per capita. (percentages range from 2% to 100%, lighter to darker green)

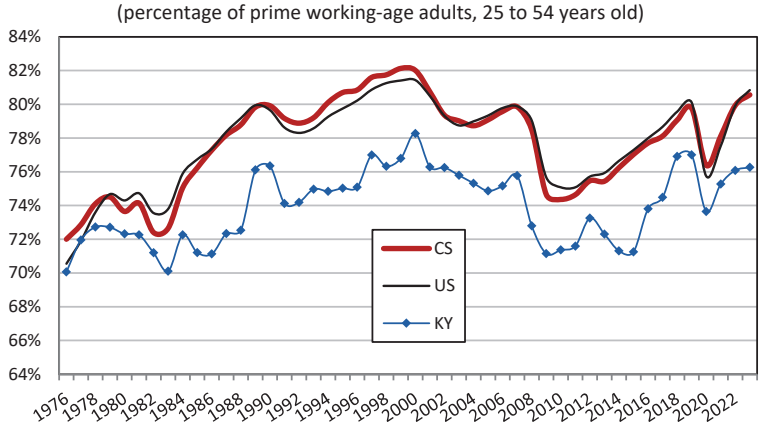


Employment-Population Ratio

This ratio is the proportion of the civilian non-institutional population that is employed, and it turned down sharply during the pandemic. According to the U.S. Department of Labor, Bureau of Labor Statistics (BLS), some believe the employment-population ratio is a better indicator of economic activity and economic performance than the more frequently referenced unemployment rate. Here, we focus on the prime working-age population, which includes those individuals between 25 to 54 years old. In 2023, Kentucky had one of the lowest employment-population ratios in the country at 76.3 percent. In fact, there are no states with a ratio that is statistically significantly lower; there are seven states statistically the same as Kentucky while the remaining 43 states and DC are statistically higher. In 1976, Kentucky and the United States had nearly identical employment-population ratios for this age group at about 70 percent. Since that time, as evidenced in the figure below, both the competitor states and the U.S. have employment-population ratios consistently higher than Kentucky. Key factors necessary for increasing the economic growth rate, both in Kentucky as well as in the U.S. overall, are to draw more individuals into the labor force (i.e., increasing the employment-population ratio) and maximizing their overall productivity.

Employment-Population Ratio, Kentucky, Competitor States, and the U.S., 1976 to 2023

(percentage of prime working-age adults, 25 to 54 years old)

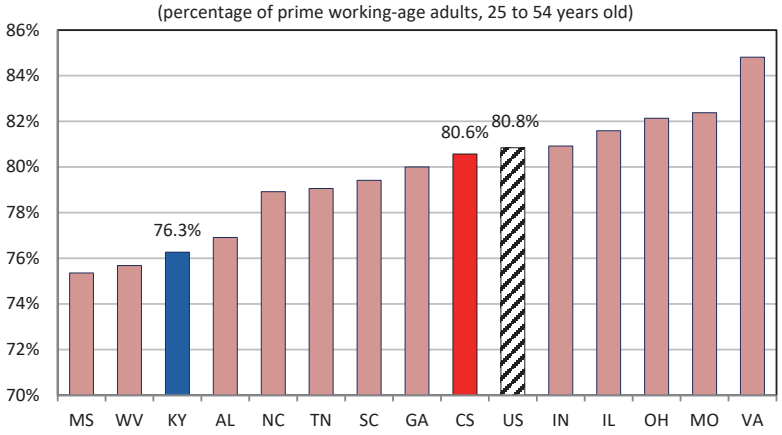


Source: Author's analysis of data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS Basic Monthly, Jan. 1976 to Oct. 2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Employment-Population Ratio

None of the competitor states have a (statistically significant) lower employment-population ratio than Kentucky among the prime working-age adults (25 to 54 years old). Alabama, Mississippi, and West Virginia are statistically no different from Kentucky, while the balance of the competitor states are statistically higher—as are the competitor state and U.S. averages. Mississippi has the lowest employment-population ratio for prime working-age adults in the U.S. (75.4%) while South Dakota has the highest (87.5%). A key for Kentucky's future economic growth is to identify and successfully implement programs that increase the employment-population ratio, particularly for prime working-age adults. These strategies include, but are not limited to, increasing the transition from high school to post-secondary education, improving the skills of non college-educated workers, addressing the substance abuse problem, focusing on family-friendly workplace policies, like child care, and embracing equity issues outlined in the equity section of this report.

Employment Population Ratio, 2023,
Kentucky, Competitor States & the U.S.
(percentage of prime working-age adults, 25 to 54 years old)

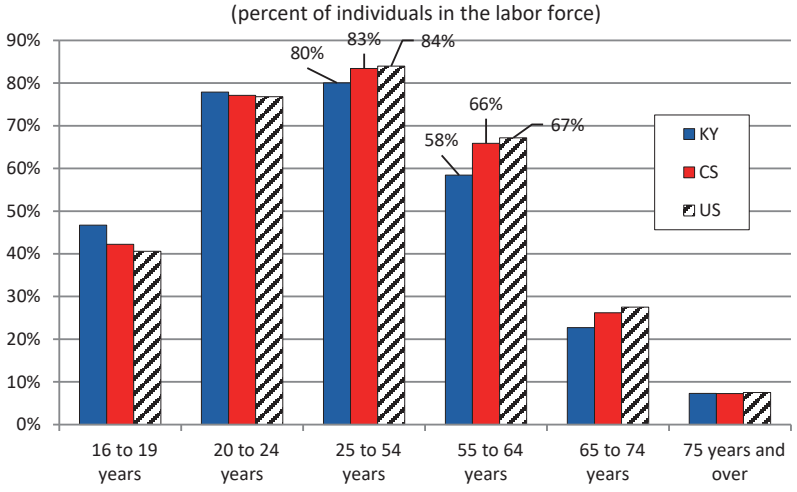


Source: Author's analysis of data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS Basic Monthly, Jan. 1976 to Oct. 2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Labor Force Participation

The labor force participation rate is the proportion of the civilian noninstitutional population that is in the labor force, which is slightly different from the employment-population ratio described on the previous pages. The labor force is comprised of individuals who are employed *as well as* individuals who are unemployed but searching for a job. The national labor force participation rate increased from around 60 percent in 1970 to about 67 percent in 2000, driven in large part by the increased participation of women. In 2023, the U.S. labor force participation rate for individuals 16 and older was 63.8 percent and Kentucky's was 60.3 percent. Kentucky's labor force participation rate for those 20 to 24 looks very similar to both the competitor states and the U.S. However, the labor force participation rate for Kentuckians 25 to 54—the prime working years—is 80.1 percent compared to 84 percent for the United States. And, in the 55 to 64 age group, Kentucky is significantly lower, as evidenced in the chart below.

Labor Force Participation by Various Age Groups, Kentucky, Competitor States, and the U.S., 2023
(percent of individuals in the labor force)

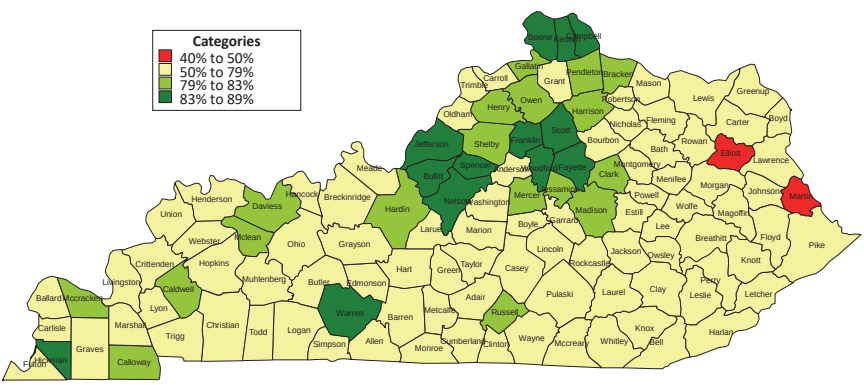


Source: U.S. Census Bureau, 2023 American Community Survey 1-Year Estimate, Table S2301

Labor Force Participation by County

There are 13 Kentucky counties with labor force participation rates among prime working-age adults (25 to 54 years old) that are equal to or greater than the U.S. average of 82.9 percent (based on the 2022 ACS 5-Year estimate). On the other hand, there are two counties with labor force participation rates below 50 percent: Elliott and Martin. Most of the counties in the urban triangle have labor force participation rates that are at least as high as the Kentucky average (78.6%), with several that are above the U.S. average. A critical factor that will determine the state's future economic growth is to identify and successfully implement programs that increase the labor force participation rate, particularly for prime working-age adults. These strategies include, but are not limited to, increasing the transition from high school to post-secondary education, improving the skills of non-college educated workers, developing childcare options, and addressing the substance abuse problem. Research published in 2017 by Princeton University economist Alan Krueger found that from 1999 to 2015 up to 20 percent of the national drop in the labor force participation rate among prime working-age men and 25 percent of the drop among women *might be* due to the use and abuse of opioids.

Kentucky Labor Force Participation Rate by County, Prime Working-Age Adults, 25 to 54 Years Old



Source: American Community Survey, 2022 5-Year Estimate, Table S2301

Main Reason for not Working

Individuals express a variety of reasons for not working, but the most frequent responses have to do with family responsibilities—including not having child care. Using U.S. Census, Current Population Survey data, we examine the *main* reasons given by prime working-age adults, 25 to 54 years old, who want a job but did not look for work in the previous four weeks. Focusing on the U.S. results, 27.8 percent cited either family responsibilities or no child care; the Kentucky responses are statistically no different from the U.S. or the competitor states. Other reasons given include they "couldn't find any work," (13.3%), had "ill-health or disability" (10.9%), and they did not have the skills employers were looking for (real or perceived); an estimated 6.7 percent indicated an expertise mismatch and 1.5 percent said inadequate education or training. Across the board, in the U.S., Kentucky, and the competitor states, over forty percent cited a family issue, a skill deficiency, or a health problem as the *main* reason. These responses are to the CPS Monthly surveys over a 48-month period, from November 2020 to October 2024.

Main Reason for Not Being in the Work Force, U.S., Competitor States, and Kentucky, 2020-2024
(prime working-age adults)

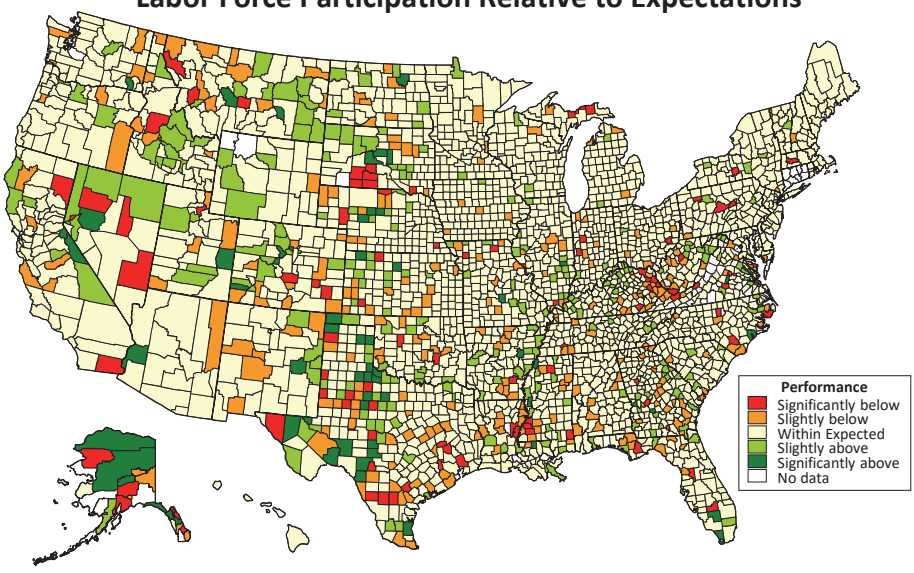
Adults, 25 to 54 years old	US (%)	CS (%)	KY (%)
Believes no work available in area of expertise	6.7*	5.4	3.4
Couldn't find any work	13.3	14.2	11.7
Lacks necessary schooling/training	1.5*	1.7*	0.5
Discrimination of some type (e.g., race, age, sex)	0.4	0.3	0.6
Can't arrange childcare	4.8	5.5	4.5
Family responsibilities	22.9	21.8	22.3
In school or other training	6.7	6.9	4.3
Ill-health, physical disability	10.9	11.7	9.2
Transportation problems	2.6	4.0	4.4
Other	30.2*	28.3*	39.1

Source: Authors' analysis of data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [November 2020 to October 2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0
**These percentages are statistically different from the Kentucky percentages (alpha=.05).*

Labor Force Participation Relative to Expectations

Many economic development professionals believe that increasing Kentucky's labor force participation rate is an essential step for bringing prosperity to the state's persistently poor communities. Some counties, of course, have labor force participation rates that exceed the national rate, while others rank in the bottom tier nationally. There are many reasons for this, some of which we discuss on the preceding pages. Using the 2022 county-level labor force participation rates, we generate estimates of what one would *expect* given a number of factors that include, but are not limited to, urbanity, age distribution, disability, education, economic structure, and whether it faces deep disadvantages. We describe the last factor, the Index of Deep Disadvantages, in the Economic Security section of this report (see page 87). Based on these factors, we use a multiple regression state fixed-effects model to generate estimates of expected labor force participation. By comparing the *expected* rates to *actual* rates, we can classify a county on the basis of whether it under- or over-performs, and by how much. While Kentucky does not have any counties performing significantly above expectations (Kenton and Taylor come close), there are several that perform slightly above expectations. It is possible, with additional research, to uncover lessons from counties that perform above expectations to help elevate others.

Labor Force Participation Relative to Expectations

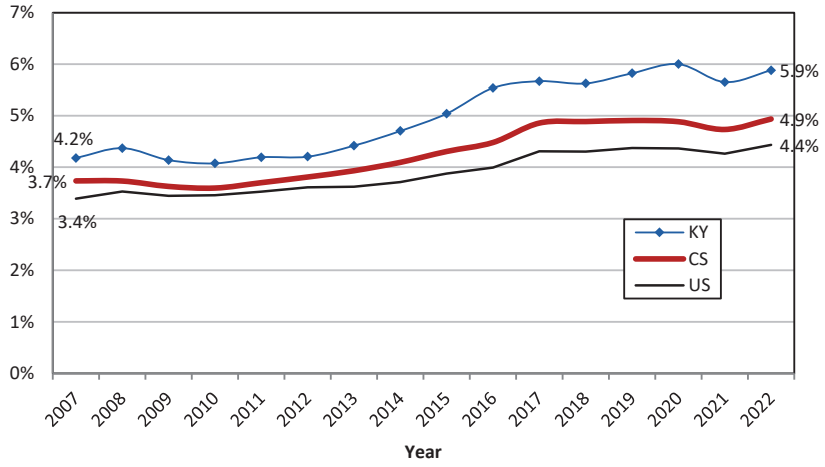


Note: Expectations are model-based estimates produced by the author. See the Notes & Sources section for details.

Employment by Foreign Companies

Foreign companies create important economic benefits for the American economy. These companies invest billions of dollars in the U.S. economy and create hundreds of thousands of jobs. Kentucky has worked hard to capitalize on the opportunities presented by globalization—reflected by the presence in the state of more than 400 international companies from nearly 30 countries. A U.S. affiliate is an American business enterprise in which there is a foreign direct investment that accounts for some of the ownership. In Kentucky, there are an estimated 155,100 individuals employed by U.S. affiliates. This equates to 5.9 percent, as a percentage of total employment, in Kentucky. This is higher than the U.S. average of 4.4 percent, as well as the competitor state average of 4.9 percent. The percentage of employment by foreign companies has been increasing since at least 2007.

Employment by All U.S. Affiliates, 2007 to 2022, Kentucky, Competitor States, & the U.S.
(percentage of total employment)

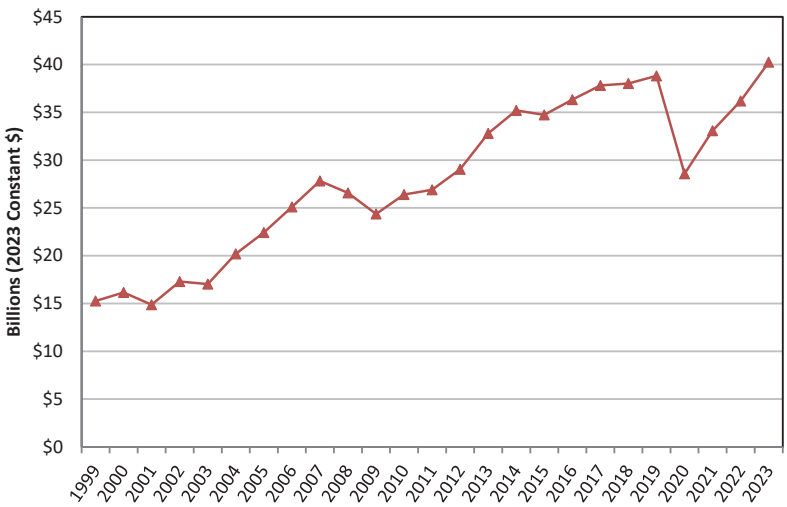


Source: Author's calculations using data from the Bureau of Economic Analysis, Regional Economic Accounts & International Data. Note: CS is a weighted average of the competitor states

Exports

Exports have helped to fuel the state's economic prosperity. Kentucky's exports of goods have more than doubled in real dollars over the last two decades. From 1999 to 2023 the compound annual growth rate of Kentucky's exports is 6.5 percent, which exceeds the U.S. (4.5%) and competitor states (4.9%). The pandemic hit the export sector hard, evidenced by a sharp decline in 2020. The value of Kentucky's exports of goods increased in 2023 to $40.2 billion, which is equivalent to 14.4 percent of Kentucky's gross domestic product. In 2023, most of Kentucky's exported goods went to Canada, which accounted for 22.8 percent of the total. The United Kingdom accounts for about 9.6 percent, followed by Mexico (9.3%), France (9.1%), and China (7.1%). Kentucky's businesses exported to nearly 126 different countries in 2023, but the top five and top ten countries received 58 percent and 78 percent, respectively, of the total value. Some traditional Kentucky products, like "beverages & tobacco products," which includes distilled products like bourbon, accounted for $526 million in exports, or 1.3 percent of the total. However, nearly 48 percent of the value of exported goods is accounted for by transportation equipment (e.g., aerospace and motor vehicle industries), followed by chemicals (17.6%), computer and electronic products (7.7%), and machinery-except electrical (5.8%).

Kentucky Exports of Goods, 1999-2023

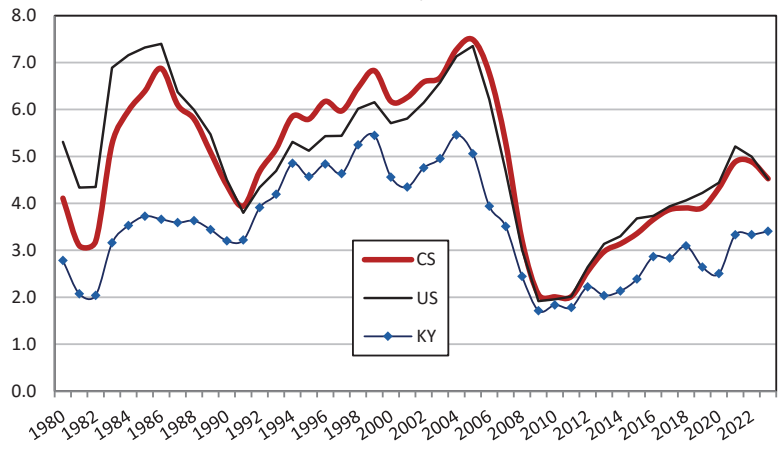


Source: Office of Trade and Industry Information (OTII), Manufacturing and Services, International Trade Administration, U.S. Department of Commerce.

Housing Starts

A housing start occurs when a new foundation is laid. Because housing starts represent the first step in a series of cascading future purchases, such as furniture, appliances, and landscaping, a housing start is considered a leading economic indicator and a foundation of determining future economic trends. Going back to 1980, Kentucky's housing starts peaked in 2004 with 22,623 and declined steadily until hitting its nadir of about 7,400 in 2009. Following the U.S. and competitor state trend, Kentucky housing starts have stabilized since then and increased to around 15,400 in 2023. In Kentucky, single family homes accounted for about 7,826 of the new starts in 2023, or about 51 percent of home construction starts. *The Wall Street Journal* reported in a May 2018 article, entitled "Rural America Has Jobs. Now It Just Needs Housing," that a lack of housing across *rural* America has become an obstacle for economic development and growth. Increasingly, new housing is being built in urban areas, not rural regions. And rural areas face new difficulties recruiting new industry and keeping younger workers because of insufficient housing stock.

Number of New Residential Housing Units,
Kentucky, Competitor States, and the U.S., 1980 to 2023
(Per 1,000 Population)



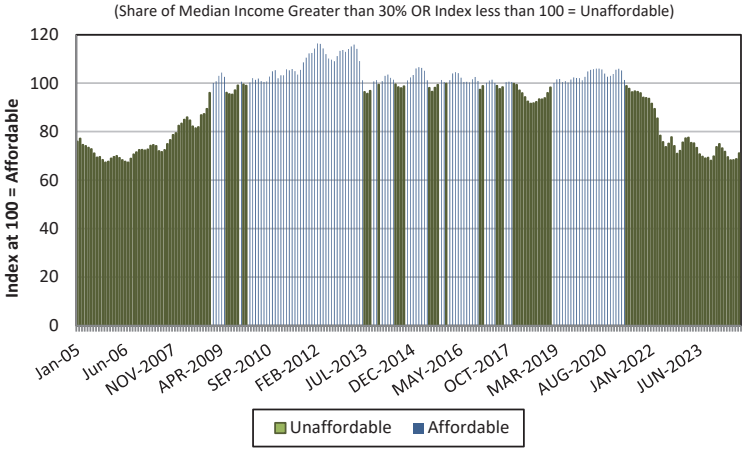
Source: U.S. Census Bureau, Building Permits Survey, Permits by State <https://www.census.gov/construction/bps/statemonthly.html>.

Home Ownership Affordability Monitor

The Federal Reserve Bank of Atlanta's *Home Ownership Affordability Monitor* (HOAM) provides a monthly measure of the median-income household's capacity to afford the median-priced home at the national, metro, and metro-county levels. HOAM takes into consideration the monthly principal and interest cost, given the current mortgage interest rates, as well as the costs associated with taxes, property insurance, and private mortgage insurance. HOAM uses the US Department of Housing and Urban Development (HUD) standard 30 percent share of income threshold to measure affordability. If the annual cost of homeownership exceeds a 30 percent share of the annual median household income, homeownership is considered unaffordable. Conversely, if the annual cost of homeownership is below a 30 percent share of the annual median household income, homeownership is considered affordable. Alternatively, HOAM allows the user to view affordability using an Affordability Index, where an index value of 100 or above indicates a median-income family could afford a median-priced home; a value below 100 indicates a median-income family would not be able to afford a median-priced home given the current interest rate (*Source: Federal Reserve Bank of Atlanta).* In August 2024, selected Kentucky values include Bowling Green (78.2), Elizabethtown (78.8), Frankfort (115.8), and Louisville (89.5).

United States Home Ownership Affordability Index, January 2005 to August 2024

(Share of Median Income Greater than 30% OR Index less than 100 = Unaffordable)

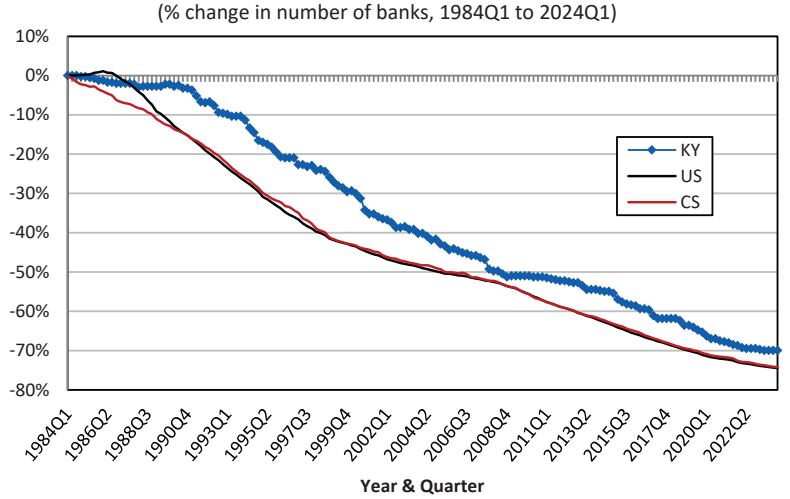


Source: The Federal Reserve Bank of Atlanta's Home Ownership Affordability Monitor (HOAM), https://www.atlantafed.org/center-for-housing-and-policy/data-and-tools/home-ownership-affordability-monitor#Tab1

Banks

Banks play a key role in a region's economic success. This is especially true of community banks, which have assets less than $10 billion and constitute about 97 percent of all banks. According to a Council of Economic Advisors Issue Brief in August 2016, community banks provide "the only local source of brick-and-mortar traditional banking services for many counties, as well as key sources of credit for rural communities and small business loans." Indeed, as Esther George, the President and CEO of the Federal Reserve Bank of Kansas City wrote in 2017, "traditional banks are essential to thousands of communities across the country." Moreover, the leaders of these banks are integral members of their communities. As President George notes, "these bankers serve on the boards of local schools, hospitals and other civic organizations, providing a key source of leadership in the community." However, the number of banks has been declining for years. There were, for example, 406 banks in Kentucky at the beginning of 1984, but only 122 by 2024 (Q1)—a 70 percent decline and a loss of nineteen since the Pandemic began. There has been a similar downward trend in the competitor states and the U.S. While the market forces affecting banks are widespread, analyses by the Federal Reserve Board show that the nation's rural areas and small towns are disproportionately affected.

FDIC Insured Banks
in Kentucky, Competitor States, & the U.S.
(% change in number of banks, 1984Q1 to 2024Q1)



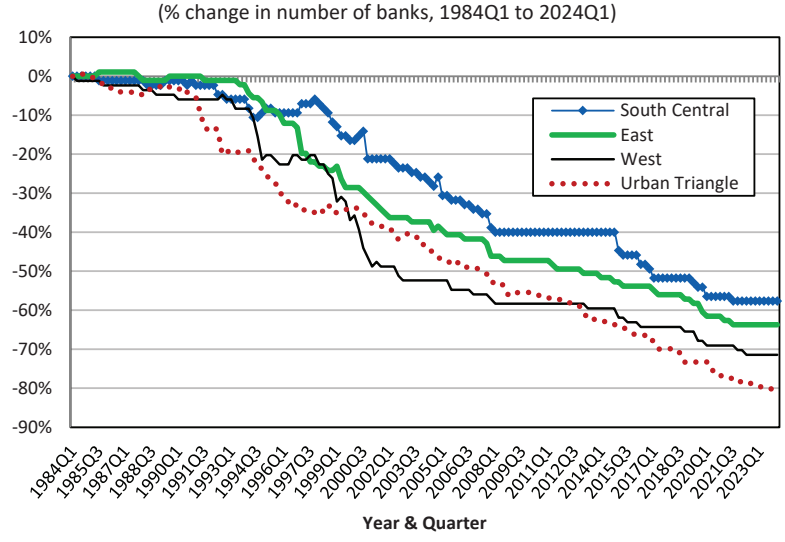
Source: Author's analysis of FDIC Community Banks Study Reference Data.

Banks by Kentucky Region

Citing the Federal Reserve Board banking data, the *Wall Street Journal* reported in 2017 that since the Great Recession small bank loans of less than $1 million, once adjusted for inflation, have not recovered in the nation's rural areas. At the same time, however, from 2010 to 2016, loans in large metropolitan areas, their suburbs, and medium-to-small metropolitan areas rebounded to pre-recession levels. Across Kentucky's regions, there has been a significant decrease in the number of banks from 1984 to 2024. Our analysis of FDIC Community Banking Study Reference Data reveals that the number of banks in Kentucky with a *commercial and industrial loan specialty* (e.g., business loans) declined from 24 banks in the fourth quarter of 1984 to only two banks by the first quarter of 2024. Total deposits at these 24 banks at the end of 1984 totaled $13.3 *billion* (in inflation adjusted 2023 dollars), compared to $74 *million* in the ***two*** banks specializing in commercial and industrial loans in 2024 (Q1). Banks that do not specialize in commercial and industrial loans still make business loans, but the precipitous decline in the number of banks specializing in business loans, as well as the decline in total deposits, is indicative of the challenges facing rural businesses.

FDIC Insured Banks in Kentucky, by Region

(% change in number of banks, 1984Q1 to 2024Q1)

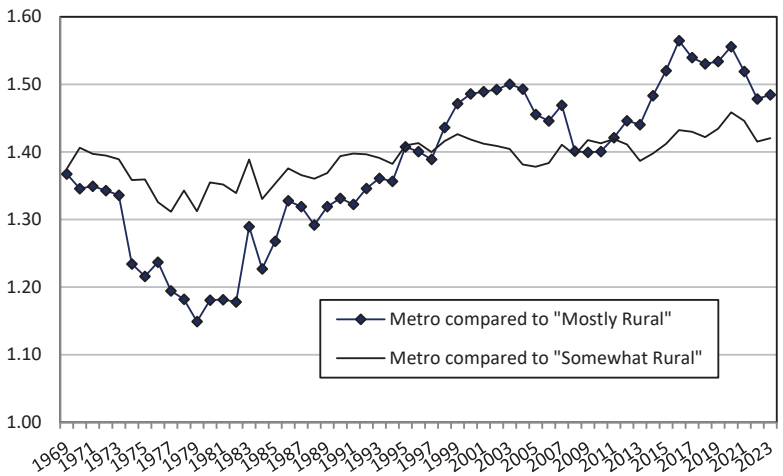


Source: Author's analysis of FDIC Community Banks Study Reference Data.

Earnings Gap

Creating abundant high-paying jobs in Kentucky's rural areas has been, and continues to be, a challenge for policymakers, economic development professionals, and civic leaders. This figure illustrates the gap in wages between workers in Kentucky's metro counties and those in "somewhat rural" or "mostly rural" counties. Going back to 1969, earnings in metro areas have been consistently higher than those in rural counties—especially when compared to Kentucky's 60 "mostly rural" counties. In 2023, for example, earnings in metro counties were about 42 percent higher than those in "somewhat rural" counties and about 48 percent higher than wages in "mostly rural" counties. While the current urban-rural earnings difference is notable, the growing gap over the last three and a half decades is perhaps more significant. The earnings differential between the 35 metro counties and 85 rural counties increased steadily from the late 1970s to the present—suggesting new approaches to rural community and economic development are needed. Based on numerous studies of rural communities across the country, economists have outlined approaches for rural America to improve rural prosperity by thinking and acting regionally, finding new economic niches in high-value knowledge industries that leverage a region's strengths, and placing a premium on homegrown entrepreneurs.

Kentucky's Urban-Rural Earnings Gap, 1969-2023
(average geograhically based per job earnings ratio)



Source: Bureau of Economic Analysis, CAINC30, Economic Profile & 2023 Urban-Rural classification.
Note: Author estimate by taking ratio between Urban-Rural Continuum Codes 9-8-7 (mostly rural), 6-5-4 (somewhat rural), and 3-2-1 (metro), based on 2023 codes over the entire time period.

Economic Security

IN 2013, JUST AFTER THE GREAT RECESSION, the Federal Reserve Board of Governors of the Federal Reserve System, the nation's central bank, began conducting an annual survey, the Survey of Household Economics and Decisionmaking (SHED). This survey is designed to assess the economic well-being of U.S. households and identify potential risks to their finances. The most recent survey, which included more than 11,000 adults, was conducted in October 2023 and released in May 2024. The survey includes a range of topics affecting the financial well-being of Americans, including credit access and behaviors, savings, retirement, economic fragility, and student loans.

The results from the *2023 Survey of Household Economics and Decisionmaking* (SHED) show relative stability over the last few years, with 72 percent of adults doing at least okay financially, compared to 73 percent in 2022. Both, however, are well below the recent high of 78 percent in 2021. Furthermore, while financial well-being was unchanged in 2023 for most people, one "notable exception was parents living with their children under age 18, where the share doing at least okay financially fell 5 percentage points from 2022." Finally, despite the decline in inflation over the course of the year, it continued to be the top financial concern.

Other interesting findings from the survey include: about 4 in 10 working parents of younger children (under age 13) used paid childcare and the typical (median) monthly cost was $800; 63 percent of adults said they would cover a hypothetical $400 emergency expense

continued on the next page

continued from the previous page
exclusively using cash or its equivalent, unchanged from 2022 but down from a high of 68 percent in 2021; median monthly rent payment was $1,100 in 2023, up 10 percent from 2022, and about 1 in 5 renters (19%) reported being behind on their rent at some point in the past year, up 2 percentage points from 2022; and thirty-four percent of non-retirees thought their retirement savings plan was on track, up from 31 percent in 2022, but down from 40 percent in 2021, while eighty percent of retirees said they were doing at least okay financially—a higher share than for U.S. adults overall.

Over a longer term, for four and a half decades, household income levels have changed at uneven rates depending upon whether one is "rich," "poor," or somewhere in-between. For Kentucky families, incomes at the 25th percentile—what some might consider "lower middle class"—declined 6.7 percent in real dollars. By comparison, incomes at the 75th percentile, or "upper middle class," increased for Kentucky and the U.S. by around 14 and 31.1 percent, respectively, in real dollars, from the late 1970s to about 2023.

Automation has increased productivity and led to stagnant wages for less-skilled workers, according to a June 2021 working paper by economists Daron Acemoglu and Pascual Restrepo, *Tasks, Automation, and the Rise in US Wage Inequality*. They conclude that "between 50% and 70% of changes in the US wage structure over the last four decades are accounted for by the relative wage declines of worker groups specialized in routine tasks in industries experiencing rapid automation." With the growing power and sophistication of artificial intelligence (AI), some jobs with higher-skilled tasks might begin to lose their immunity to automation.

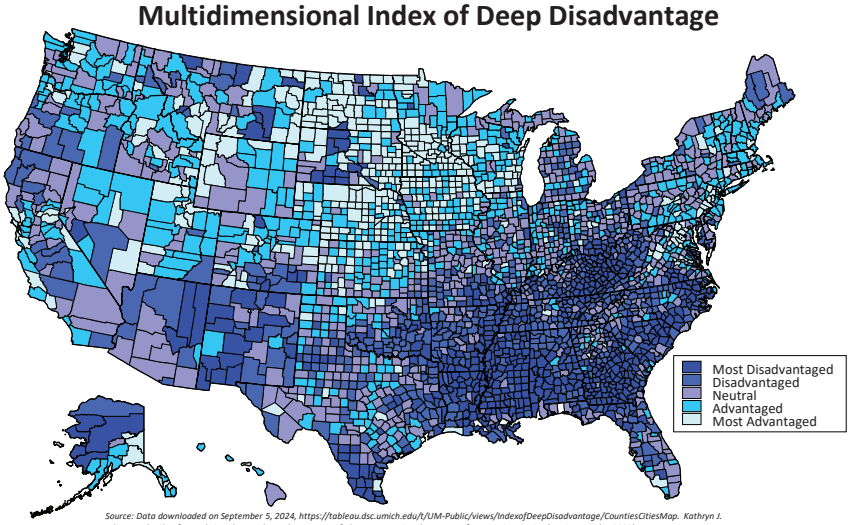
For the unfortunate Kentuckians who lose their jobs, regardless of the proximate cause, they can take small comfort in the generosity of the state's formal safety net of public assistance programs in place to support them. A Brookings assessment of state-level programs shows wide variation across the states (Safety Net Adequacy Project Database, 2023). The researchers assess government-supported public assistance support for hypothetical households with single-parent, non-immigrant, non-disabled families, and show Kentucky among the least generous of states.

The bounty of the economic expansion since the Great Recession has not been distributed evenly across industries, geographies, and individuals—and the COVID Pandemic exacerbated conditions for wide swaths of the population. Many workers have found themselves on the wrong side of globalization, mechanization, and technological change—as well as having first-hand experience with numerous other social and economic factors like low-performing schools, the disintegration of the nuclear family, and the community distress wrought by substance abuse. These individuals have scant familiarity with the comforts of economic security.

Index of Deep Disadvantage

The map below illustrates the findings from a multidimensional **Index of Deep Disadvantage** for all counties and the 500 largest cities in the United States (the cities are not shown on the map below). Based on the work of Kathryn J. Edin, H. Luke Shaefer, and Timothy J. Nelson, *The Injustice of Place: Uncovering Povery in America,* combines census and administrative data to discern community vulnerability in three interconnected areas: 1) *income*, using poverty rates; 2) *health*, using life expectancy and birth weight data; and 3) *social mobility* estimates. Using a technique called principal component analysis, the researchers weight the variables and then rank order them on a continuum of disadvantage. Their analysis revealed, to the surprise of the researchers, that the "most disadvantaged" places were mostly in rural areas. Specifically, most of the disadvantaged counties are located in the Appalachian, Delta, and south Texas regions. We use this index as one of the variables in our model of county-level labor force participation that is described in the Economy section of this report (page 75).

Multidimensional Index of Deep Disadvantage



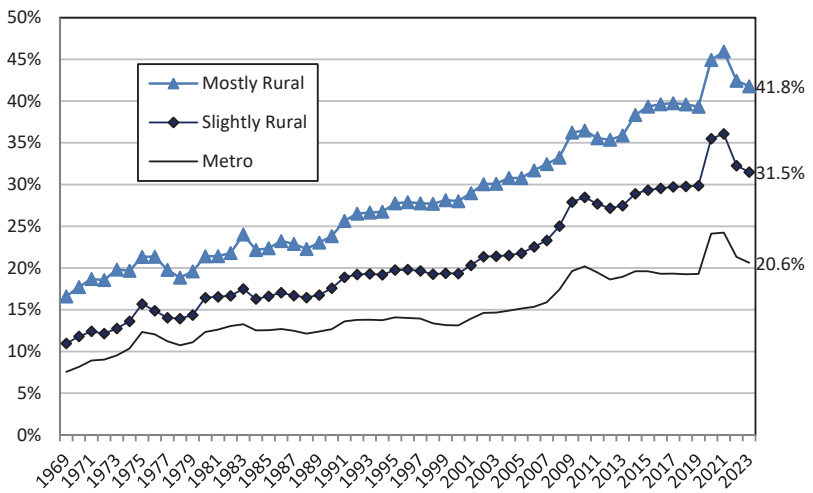
Source: Data downloaded on September 5, 2024, https://tableau.dsc.umich.edu/t/UM-Public/views/IndexofDeepDisadvantage/CountiesCitiesMap. Kathryn J. Edin, H. Luke Shaefer, and Timothy J. Nelson, The Injustice of Place: Uncovering the Legacy of Poverty in America (Mariner Books, 2023).

Transfer Payments by County Type

Transfer payments are benefits transferred from local, state, or federal governments to an individual. These payments include, but are not limited to, retirement and disability insurance benefits like Social Security, medical benefits such as those provided through Medicaid and Medicare, income maintenance benefits like TANF and SNAP, unemployment insurance compensation, and veterans' benefits. Transfer payments account for about 18.3 percent of total personal income in the U.S., up from 17.2 percent in 2019. In Kentucky, transfer payments account for 25.8 percent of total personal income, which is an increase from 24.2 percent in 2019. We use 2019 as a base year because it was just before the Pandemic and the flood of federal relief to state and local government, as well as individuals and families. Within the Commonwealth, there are marked differences between metro, slightly rural, and mostly rural counties. As shown in the chart, the portion of personal income that is comprised by transfer payments has been trending upward since 1969 for all three county types. However, mostly rural counties are more dependent on transfer payments (41.8% in 2023), than slightly rural (31.5%) or metro counties (20.6%).

Kentucky Income Transfers by County Type, 1969-2023

(as a percentage of total personal income)

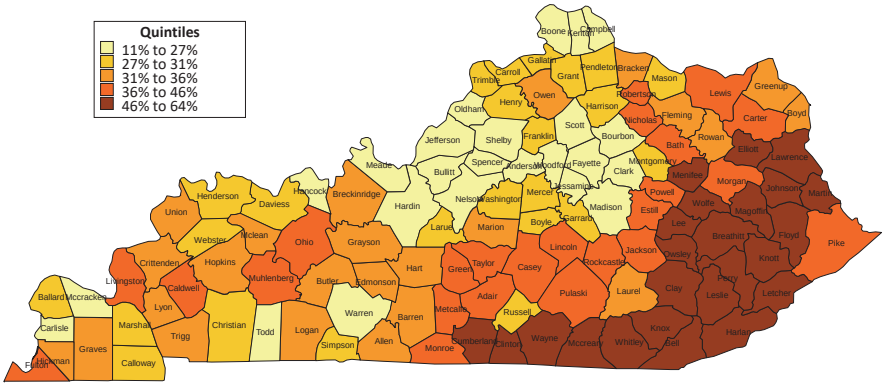


Source: Bureau of Economic Analysis, CAINC30, Economic Profile & 2023 Urban-Rural classification.
Note: Author estimate by taking ratio between Urban-Rural Continuum Codes 9-8-7 (mostly rural), 6-5-4 (somewhat rural), and 3-2-1 (metro), based on 2023 codes over the entire time period.

Transfer Payments by County

As described on the facing page, transfer payments are benefits transferred from local, state, or federal governments to an individual. Transfer payments account for 18.3 percent of total personal income for the U.S. (25.8 percent for Kentucky statewide)—but several Kentucky counties are significantly higher than the national and state averages. There are fifteen Kentucky counties over 50 percent, and 37 counties where transfer payments are over 40 percent of personal income; this is nearly one-third of the state's counties. The percentages for Kentucky's metro, slightly rural, and mostly rural counties are, respectively, approximately 20.6, 31.5, and 41.8. There are several counties that are heavily dependent on transfer payments as a source of personal income, with the highest percentages concentrated in Eastern Kentucky.

Transfer Payments by Kentucky County, 2023
(as a percentage of total personal income)

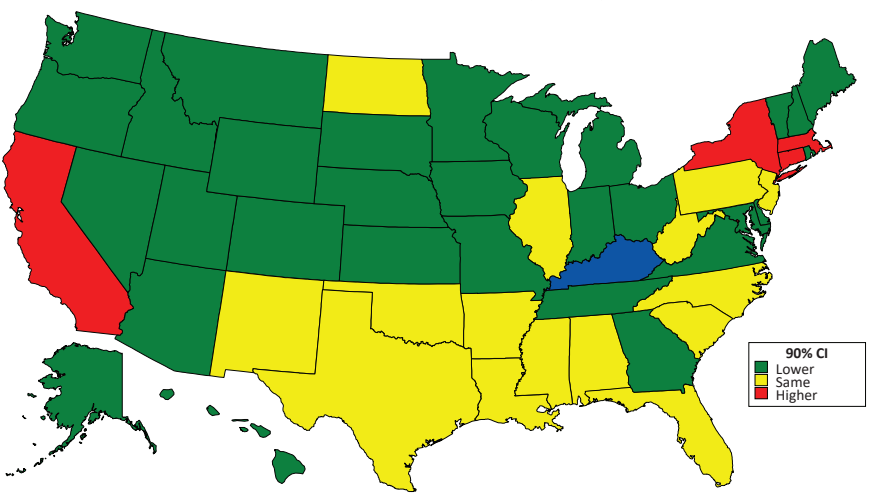


Source: Bureau of Economic Analysis, Table CAINC30

Gini Index by State

The Gini Index is a measure of income dispersion. A higher number indicates more concentration of income in fewer hands, with a value of "1" indicating that one person holds all the income. The Gini index for the United States in 2022 is estimated at 0.486. The Census Bureau estimated that in 2022 the "richest" 20 percent of households had 52.1 percent of the income—more than in 1967 when the upper 20 percent of Americans had 43.6 percent of the income. The focus on the income distribution has been an important part of the political discourse for at least the last few decades, and it arguably reached new levels of intensity among the political, economic, academic, and journalistic cognoscenti in 2013 with the publication of Thomas Piketty's opus, *Capital in the Twenty-First Century*. These debates have focused on the extent of income inequality, and what, if anything, should be done to address it. The map below shows that Kentucky, with a Gini Index value of (.485), has a higher Gini Index (more inequality) than 30 states, and is lower than 4 states and DC; it is statistically the same as 15 states. The two highest Gini Index values belong to DC (.511) and New York (.521); Alaska (.428) and Utah (.426) have the lowest values.

GINI Index of Income Inequality, 2022



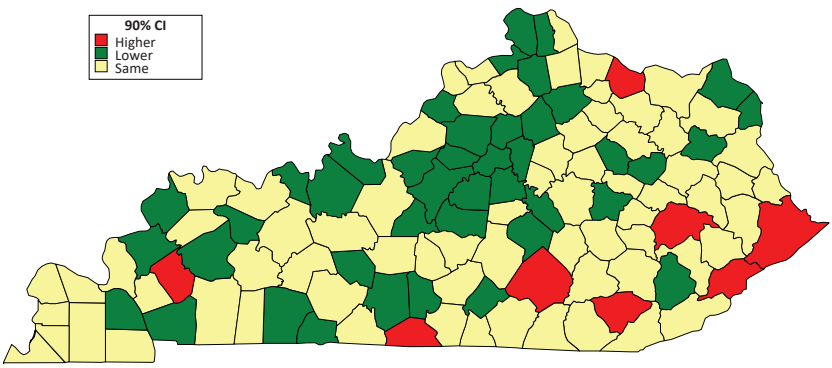
Source: U.S. Census Bureau, 2022 1-Year American Community Survey, Table B19083

Gini Index by County

This map shows the Gini Index values for Kentucky counties organized into three categories: counties that are statistically no different from the state average (.478) using a 90 percent confidence internval (.475 to .481); those that are statistically significantly higher than the state average; and those that are statistically lower than the state average. As explained on the previous page, the Gini Index is a measure of income dispersion. A higher number indicates more concentration of income in fewer hands, with a value of "1" indicating that one person holds all the income. In general, the highest Gini Index values (i.e., higher income *in*equality) are concentrated in the poorer areas of Kentucky, while the urban triangle has a higher concentration of counties with Gini Index values lower than the state average. Carlisle County has the highest Gini Index value (.561) and Menifee County has the lowest (.377).

GINI Index of Income Inequality, 2020

(Kentucky counties higher, lower, or within the state average)



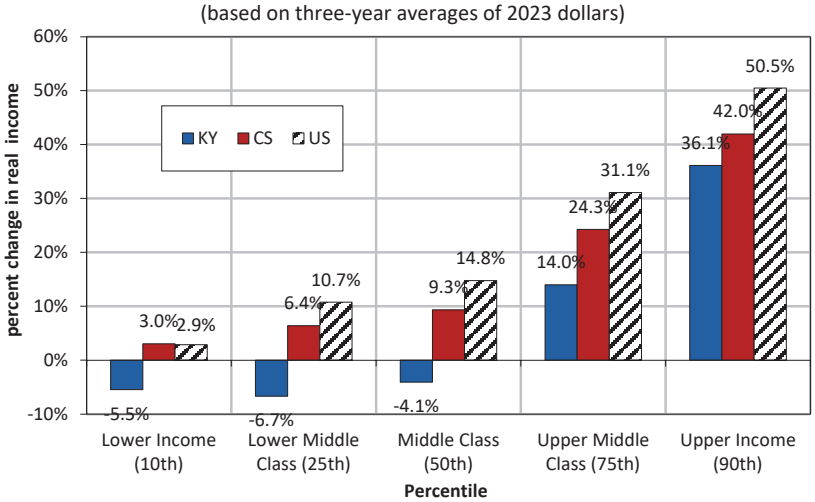
Source: U.S. Census Bureau, 2020 5-Year American Community Survey

Household Income Growth

Middle-class families have become less economically secure. Over the last 45 years, household income levels have changed at uneven rates depending upon whether one is "rich," "poor," or somewhere in-between. For Kentucky families, incomes at the 25th percentile—what some might consider "lower middle class"—*declined* by 6.7 percent compared to a 10.7 percent *increase* nationally in real dollars. By comparison, incomes at the 75th percentile, or "upper middle class," increased for Kentucky and the U.S. by around 14 and 31.1 percent, respectively, in real dollars, from the late 1970s to the early 2020s. The contrast is the greatest between incomes at the 10th and 90th percentiles, with incomes *declining* in Kentucky by 5.5 percent at the lower income level and *increasing* by 36.1 percent at the upper income level; a large difference also exists between the 10th and 90th percentiles for the competitor states and the U.S. These data reflect total pre-tax personal income from all sources for all adults in the household. Noncash benefits, such as food stamps, health benefits, or subsidizing housing are not included as household income. Many factors have contributed to the widening gap, including the rise of globalization and outsourcing, increasing returns to high-level skills, job automation, declining unionization, immigration, and tax policies.

Changes in Household Income, by Income Level, 1976-78 to 2021-23, KY, Competitor States and the U.S.

(based on three-year averages of 2023 dollars)

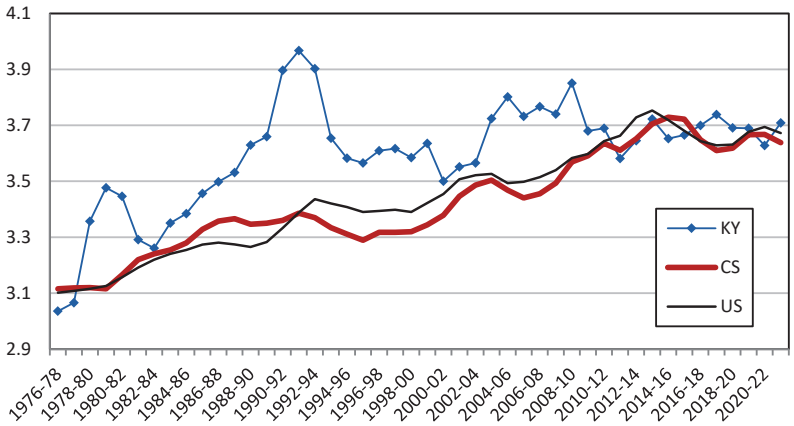


Source: Author's analysis of IPUMS-CPS data, courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Household Income Ratio

Household incomes at the 25th and 75th percentiles can be viewed as boundaries around America's middle class. In the late 1970s, upper middle class households—those at the 75th percentile—had incomes about 3 times larger than lower middle class households, which are those at the 25th percentile; this is true of Kentucky, its competitor states, and the United States overall, where the ratios were 3, 3.1, and 3.1, respectively, around 45 years ago. However, the gap has widened since then, evidenced by the ratios increasing to around 3.7 for Kentucky, its competitor states, and the U.S. by the early 2020s. The upward trending lines in the figure below are indicative of a widening income gap between those who occupy the upper and lower boundaries of the American middle class. These trends are occurring because household incomes have been increasing for the upper middle class while declining for the lower middle class (in real terms), as illustrated in the bar chart on the facing page. These household income trends suggest that, especially in Kentucky, those in the bottom half of the income distribution are facing relative economic stagnation and decline compared to those in the competitor states and the U.S.

Household Income Ratios, 75th/25th Percentiles, Kentucky, Competitor States, and the U.S., 1976-1978 to 2021-2023

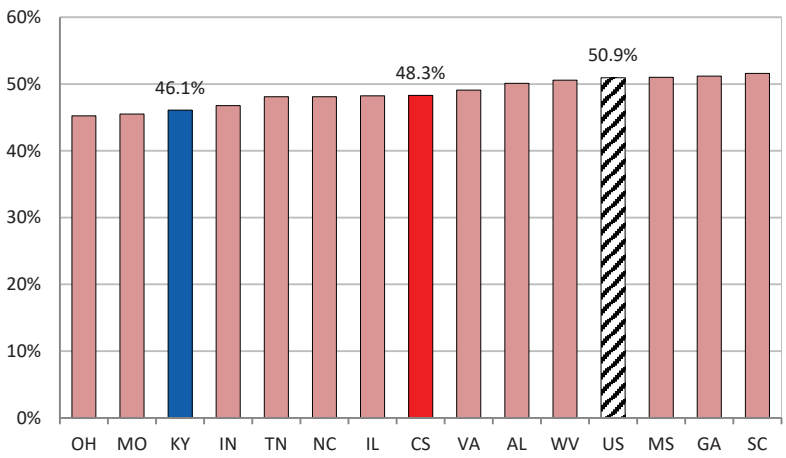


Source: Author's analysis of IPUMS-CPS data, courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Cost-Burdened Renters

According to the U.S. Census Bureau, "over 21 million renter households spent more than 30% of their income on housing costs in 2023, representing nearly half (49.7%) of the 42.5 million renter households in the United States for whom rent burden is calculated" (Sept. 12, 2024 press release). The U.S. Department of Housing and Urban Development (HUD) uses a 30 percent share of income threshold to measure whether a renter is cost burdened. If the annual cost of rent exceeds a 30 percent share of the annual median household income, rental cost is considered a finacial burden. On the other hand, if the annual cost of rent is below a 30 percent share of the annual median household income, rental cost is considered affordable and not a burden. Using this same threshold, but focusing on pooled 2021 and 2022 American Community Survey data, we estimate that 46.1 percent of Kentucky's renters are cost burdened. This percentage is statistically significantly lower than the competitor state (48.3%) and U.S. (50.9%) averages. There are only four states statisically lower than Kentucky. Meanwhile, there are 29 states with statistically significant higher percentages and 16 states and DC are statistically the same as Kentucky.

Cost-Burdened Renter-Occupied Households, Kentucky, Competitor States, and the U.S., 2021-2022

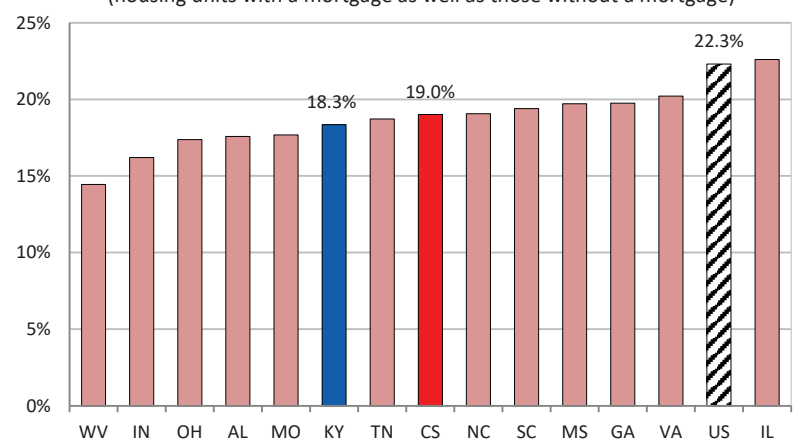


Source: Author's analysis of data provided by Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [2021 & 2022 ACS 1-year estimates pooled]. Minneapolis, MN: IPUMS, 2024. https://usa.ipums.org/usa/

Cost-Burdened Owners

Owning a home is expensive, and for over a fifth of owners nationally (22.3%) the annual cost exceeds 30 percent of their annual household income. This threshold is used by HUD (see the previous page) to measure whether a home owner is cost burdened. The chart below includes those with a mortgage as well as those without a mortgage. Even if a home is fully paid off, there are still costs associated with ownership, such as taxes, insurance, and utilities. An estimated 18.3 percent of owners in Kentucky are cost burdened, meaning that their annual costs of ownership exceed 30 percent of their annual total household income. This percentage is statistically significantly lower than the competitor state (19.0%) and U.S. averages (22.3%). There are only five states statisically lower than Kentucky. There are 32 states along with DC that have statistically significant higher percentages, and 12 states statistically the same as Kentucky.

Cost-Burdened Owner-Occupied Households, Kentucky, Competitor States, and the U.S., 2021-2022
(housing units with a mortgage as well as those without a mortgage)

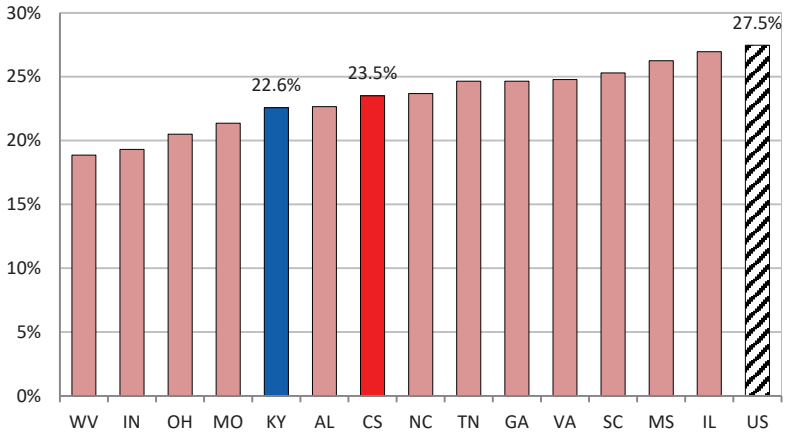


Source: Author's analysis of data provided by Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [2021 & 2022 ACS 1-year estimates pooled]. Minneapolis, MN: IPUMS, 2024. https://usa.ipums.org/usa/

Cost-Burdened Owners (with current mortgage)

This figure shows the percentage of owners with a current mortgage that are cost-burdened (see the previous two pages for an explanation of "cost-burdened"). The figure on the previous page shows all owners, including those with and without a current mortgage, but this focuses solely on owners with a mortgage. Kentucky's percentage is relatively low, evidenced by the 22.6 percent shown in the figure. There are only four states nationally with statistically significant lower percentages, and they are all competitor states (i.e., WV, IN, OH, and MO). Kentucky is statisically lower than 31 states and the District of Columbia, and statistically the same as 14 states.

Cost-Burdened Owner-Occupied Households, Kentucky, Competitor States, and the U.S., 2021-2022
(housing units with a mortgage)

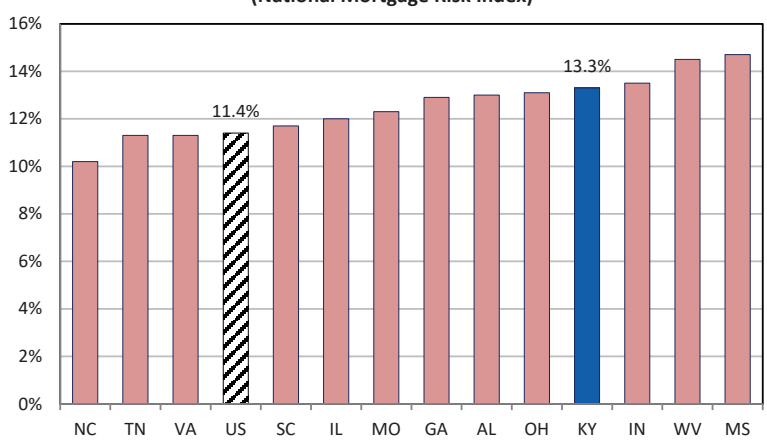


Source: Author's analysis of data provided by Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [2021 & 2022 ACS 1-year estimates pooled]. Minneapolis, MN: IPUMS, 2024. https://usa.ipums.org/usa/

Mortgage Default Rate

An estimated 13.3 percent of mortgages in Kentucky are at risk of default under economic conditions similar to those present at the start of the Great Recession. The American Enterprise Institute (AEI) refers to this risk index as a "mortgage default rate," but it is really an estimate of *potential* defaults if the economy were to experience another Great Recession. Despite being a misnomer, it is a useful indicator of economic strength. Leading up to the Great Recession, the federal government and the private sector undertook extensive efforts to increase the number of homeowners by keeping mortgage rates low and by allowing small, or nonexistent, down payments. By the fourth quarter of 2007—the peak of the economic expansion—it became clear that many of these new homeowners could not afford their homes as the foreclosure rate rose in 2008. The AEI Mortgage Default Rate measures how "the loans originated in a given month would perform if subjected to the same stress as in the financial crisis that began in 2007." Estimated rates of 7 percent or less are considered low risk, those with default rates of 7.01 to 14 percent are considered medium risk, and those with higher default rates are considered high risk. AEI has data on ninety-five of the state's counties, with only Fayette County classified as low risk (6.7%). It shows thirty-three Kentucky counties as medium, and sixty-one as high risk.

Potential Mortgage Default Rate, 2022
Kentucky, Competitor States & the U.S.
(National Mortgage Risk Index)

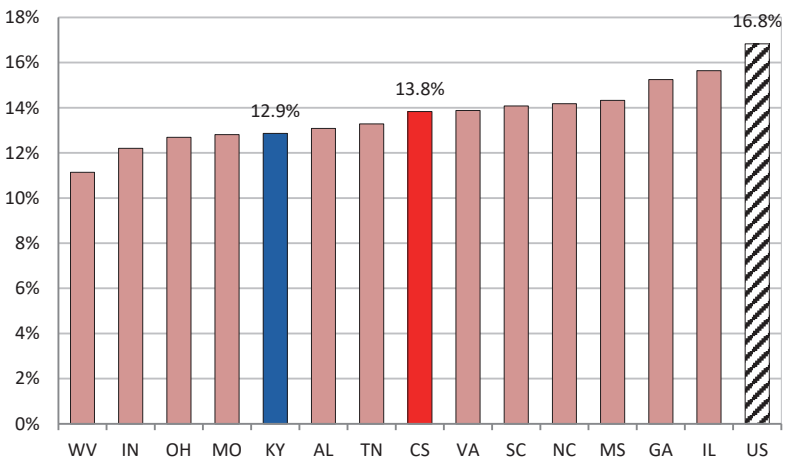


Source: American Enterprise Institute (AEI), State and County Housing Market Indicators: Update for 2022, <https://www.aei.org/the-state-of-the-housing-market/>, downloaded 11/24/2023.

Severe Housing Problems

An estimated 16.8 percent of the occupied housing units in the U.S. have at least one severe housing problem, as defined by the U.S. Department of Housing and Urban Development, based on its Comprehensive Housing Affordability Strategy (CHAS, 2017-2021). The Kentucky percentage is lower (12.9%). An occupied housing unit is considered to have a severe problem with at least one of the following: lack of complete kitchen facilities, lack of plumbing facilities, overcrowding or severely cost-burdened occupants. Housing quality matters for many quality-of-life reasons. As noted by *America's Health Rankings*, "Housing influences health and well-being. Poor quality of housing can cause disease and injury as well as affect development in children. Other housing-related factors such as neighborhood environment and overcrowding can affect mental and physical health."

Severe Housing Problems, 2017-2021,
Kentucky, Competitor States, and the U.S.

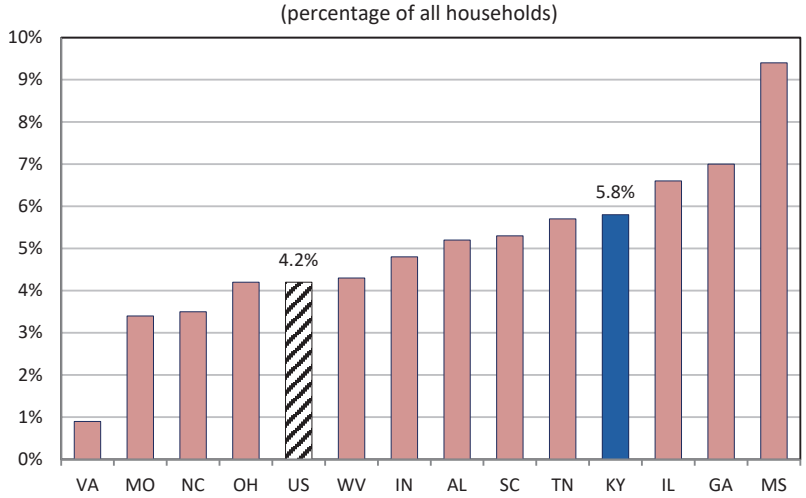


Source: U.S. Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy (CHAS) 2017-2021 survey, accessed December 1, 2024 <https://www.huduser.gov/portal/datasets/cp.html>.
Note: CS is the weighted average of the competitor states.

Banking Status

Whether someone has a bank account can have important implications for their financial well-being. According to the Federal Deposit Insurance Corporation (FDIC), "access to an account at a federally insured institution provides households with the opportunity to conduct basic financial transactions, save for emergency and long-term security needs, and access credit on fair and affordable terms." Moreover, it can help protect "households from theft and reduces their vulnerability to discriminatory or predatory lending practices." Surveys done by FDIC find that low-to-moderate income Americans are less likely to "access mainstream financial products such as bank accounts and low-cost loans." At 5.8 percent, Kentucky households are more likely to be "unbanked" than the U.S. (4.2%). In Kentucky, the percentage of unbanked households has steadily declined, from 9 percent in 2015 and 7.2 percent in 2017, to the current estimate of 5.8 percent. Factors associated with being unbanked include, but are not limited to, lower levels of education and income, being disabled, and belonging to a minority group.

Unbanked Rates, 2023,
Kentucky, Competitor States, & the U.S.
(percentage of all households)

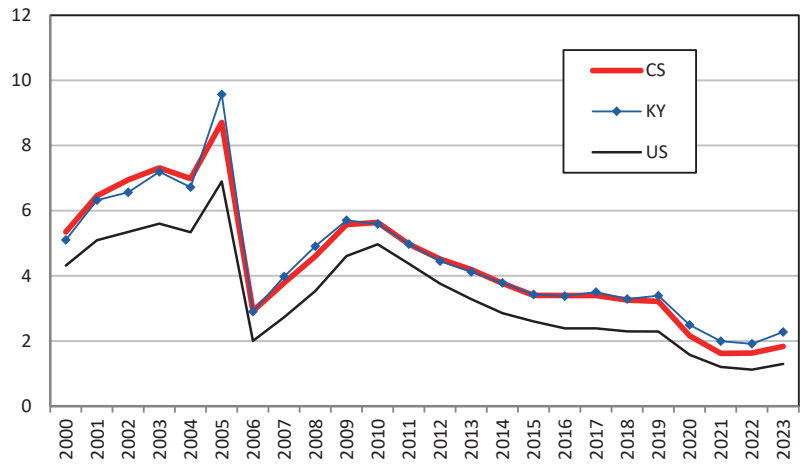


Source: Federal Deposit Insurance Corporation, How America Banks, FDIC 2023 Survey

Personal Bankruptcies

Personal bankruptcies are rising in 2023 compared to 2022. Bankruptcy is defined as "a legal proceeding involving a person or business that is unable to repay outstanding debts." The idea is to develop a plan that enables the individual (or business) to gain a fresh financial start while providing creditors with some prospect of repayment for outstanding debts. The personal bankruptcy rate provides an indication of the overall financial health of individuals and families. As consumers acquire excessive debt or economies are in recession, for example, the threat of personal bankruptcy increases. The laws governing bankruptcy changed in 2005, which had the immediate effect of reducing the number of individuals filing for bankruptcy. Kentucky's personal bankruptcy rate in 2023 was 2.3 bankruptcies per 1,000 population. The U.S. average has been somewhat lower over the 2000-2023 period, and stood at 1.3 in 2023. Overall, the bankruptcy rate has been on a downward trend since 2010, and was recently at its lowest point in the last twenty-three years. However, beginning in 2023 the bankruptcy rate as been increasing. Finally, it appears that personal bankruptcies are on the rise. The number of personal bankruptcy filings were up 14.5 percent nationally in the first three quarters of 2024 compared to the first three quarters of 2023.

Personal Bankruptcies,
Kentucky, Competitor States, and the U.S., 2000-2023
(bankruptcies per 1,000 population)

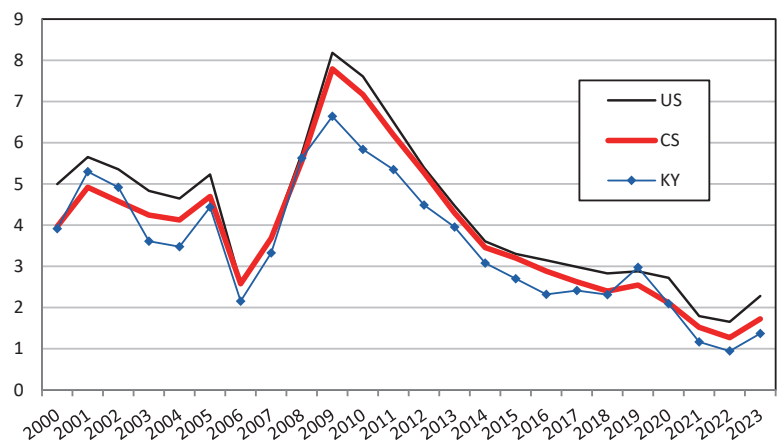


Source: Author's calculations based on Administrative Office of the U.S. Courts & Census data, various years.

Business Bankruptcies

Similar to the recent upward trend in personal bankruptcies, the business bankruptcy rate rose sharply in 2023. According to the National Bureau of Economic Research (NBER), the trough of the Great Recession was in the second quarter of 2009. It is perhaps no surprise, then, that 2009 is the peak year, as shown in the graph below, for the number of businesses that filed for bankruptcy. Across the various Circuit and District Courts in 2009, there were 60,837 bankruptcy business filings (Chapters 7, 11, 12, 13)—but this has steadily declined since then with 13,481 in 2022. However, it jumped to 18,926 in 2023. When expressed as a percentage of business establishments, Kentucky has been lower than the competitor states and the U.S. most years. In 2023 Kentucky's rate was 1.4 businesses per 1,000 business establishments. The number of businesses filing for bankruptcy increased from 87 in 2022 to 128 in 2023. Moreover, business bankruptcy filings across the U.S. in the first three quarters of 2024 (January through September) are 28.4 percent higher than the number filed in the first three quarters of 2023.

Business Bankruptcies,
Kentucky, Competitor States, and the U.S., 2000-2023
(bankruptcies per 1,000 business establishments)

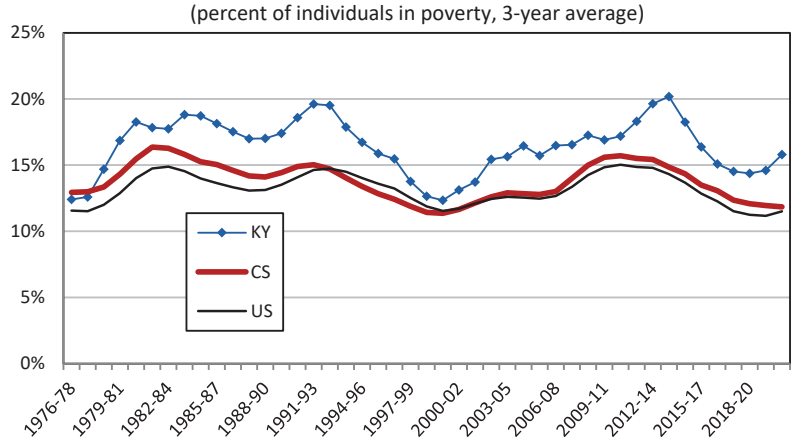


Source: Estimated from Administrative Office of the U.S. Courts data along with establishment data from the U.S. Census, County Business Patterns, various years. Note: 2023 data are estimated by using 2022 establishments and 2023 bankruptcies.

Poverty Rate

Living in poverty can have far-reaching economic, social, and cultural consequences for families and entire populations. Studies reveal that those who grow up in poverty not only experience a lack of basic needs, but that this scarcity can shape their lives and families for generations. In addition, the concentrations of poverty have a significant negative effect on the fiscal health of cities and regions that, as a result, must shoulder higher spending. The U.S. poverty rate currently stands at around 12.5 percent, depending on the data source. From about 1980 to the present, Kentucky's poverty rate has been consistently higher than both the U.S. and competitor states. The data in the chart show the 3-year moving average poverty rate estimated from the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS). According to the Census Bureau's 2023 American Community Survey 1-year estimate, another estimate of the poverty rate, Kentucky's poverty rate is 16.4 percent, which is higher than the U.S. (12.5%) poverty estimate. More information about the definition of poverty, the poverty rate, and the poverty threshold is in the Glossary of this report.

Poverty Rate 1976 to 2023,
Kentucky, Competitor States, and the U.S.
(percent of individuals in poverty, 3-year average)

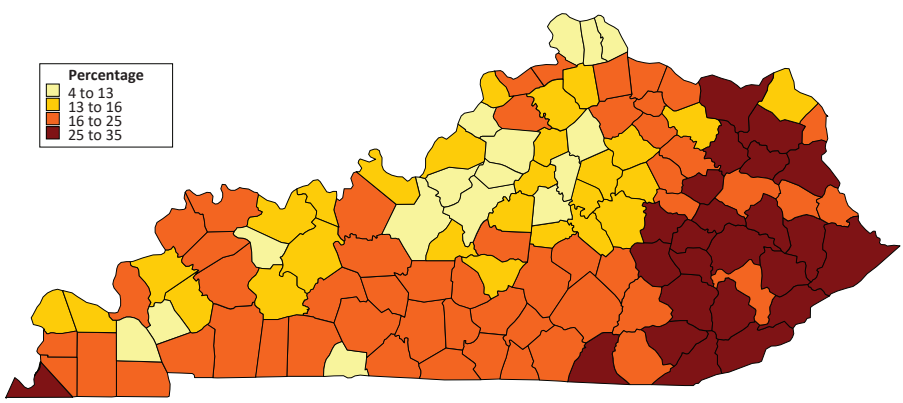


Source: Author's analysis of IPUMS-CPS data, courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC, various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Poverty Rate by County

Kentucky's persistently poor counties are concentrated in Eastern Kentucky, but high poverty is found across the state. Poverty rates in five counties are at least 33 percent—Leslie, Clay, Harlan, Knox and Wolfe Counties. Meanwhile, Boone, Oldham, Nelson, Shelby, Spencer, and Woodford Counties have rates in the single digits. There can be, of course, concentrated pockets of poverty within counties with relatively low rates. For example, the Jefferson County poverty rate is 13.7 percent. However, nearly one quarter (22.8%) of the county's population live in Census tracts where less than 5 percent of the population live in poverty, and nearly 12 percent live in tracts where the poverty rate exceeds 30 percent of the population. In general, "mostly rural" counties have higher poverty rates (22.7%) than "slightly rural" (17.8%) or metro counties (13%). The U.S. average poverty rate (12.6%) is much lower than Kentucky's statewide average (16.5%), based on the U.S. Census 2021 American Community Survey 5-year estimate.

Kentucky County-Level Poverty Rates, 2017-2021

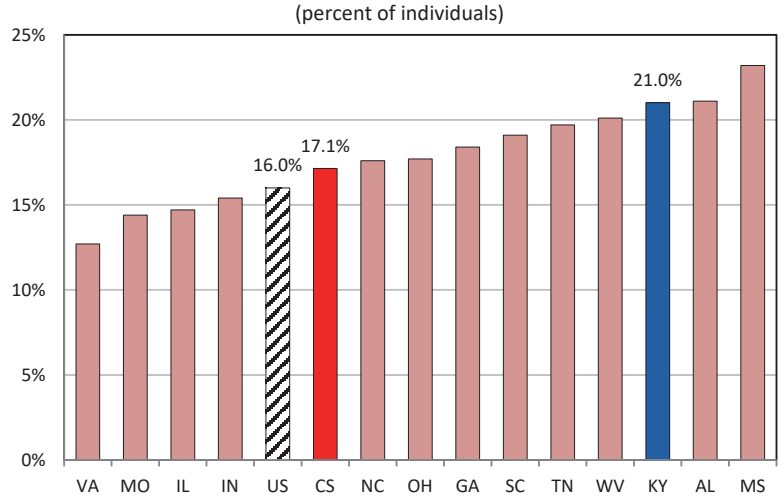


Source: American Community Survey, 2021 5-Year Estimates, Table S1701

Child Poverty

According to a national study released in late 2022, child poverty fell by 59 percent from 1993 to 2019; the authors of the study attribute this decline to the array of government programs targeted toward improving the welfare of children. The decline in child poverty was experienced by all states. Yet, child poverty, and all that it bodes for the future, continues to be disturbing and vexing problem for Kentucky. Here, we illustrate child poverty rates for Kentucky, the competitor states, and the U.S. The rates shown are for children who live in households with incomes below 100 percent of the federal poverty level. Kentucky's poverty rate for children under 18 in 2023 was 21 percent, significantly higher than the U.S. rate of 16 percent. Nationally, only two states have child poverty rates statistically significantly higher than Kentucky (i.e., Louisiana and New Mexico). At 25.3 percent, New Mexico has the highest child poverty rate in the nation; New Hampshire is the lowest with a child poverty rate of 8 percent.

Poverty Rate, 2023, Children Under 18,
Kentucky, Competitor States and the U.S.
(percent of individuals)

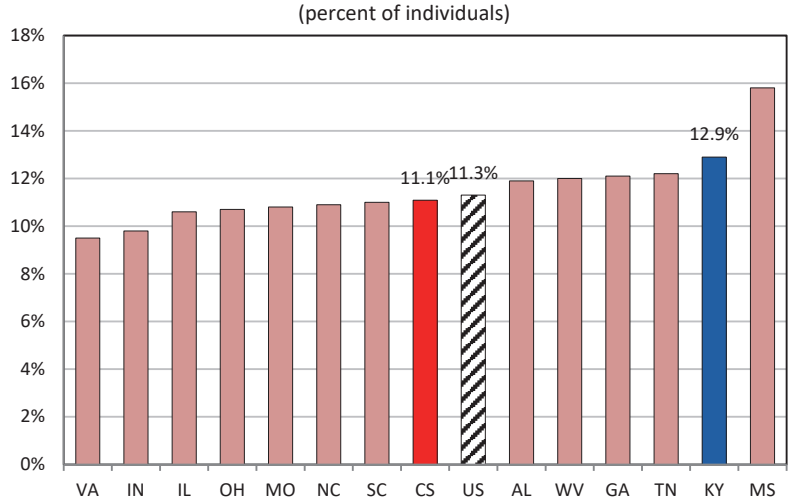


Source: 2023 American Community Survey 1-Year Estimates, Table S1701

Elder Poverty

At 12.9 percent, Kentucky's population of persons aged 65 and older who live below the poverty level is higher than most of the competitor states as well as the U.S. average of 11.3 percent. According to the (EBRI) Employee Benefit Research Institute's *2024 Retirement Confidence Survey*, which is a national survey, 74 percent of retirees are confident they have enough money for a comfortable retirement. While these survey results show that most retirees feel financially confident, current workers not yet retired feel less certain. According to the EBRI researchers, less than one-fifth (21%) of American *workers* feel *very* confident about their ability to afford a comfortable retirement. Compared to Kentucky, only two states have statistically significant higher poverty rates for individuals 65 and older, Mississippi (15.8%) and New York (14.3%).

Poverty Rate, 2023, Adults 65 and Over
Kentucky, Competitor States and the U.S.
(percent of individuals)

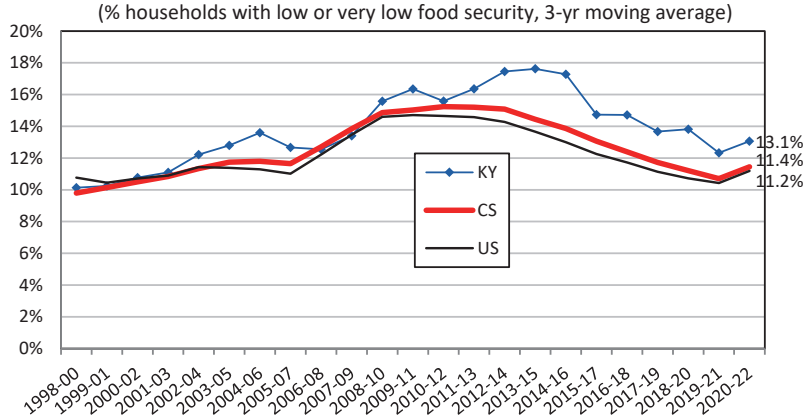


Source: 2023 American Community Survey 1-Year Estimates, Table S1701

Food Insecurity

Food security is defined as having "access at all times to enough food for an active, healthy life for all household members," while food insecurity means "that the food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food." As shown in the figure below, food *in*security has generally been higher in Kentucky than in the competitor states or the U.S. for the past decade. According to an September 2024 USDA report, *Household Food Security in the United States in 2023,* an estimated 14.5 percent of Kentucky households experienced low or very low food security, on average, during the 2021 to 2023 period. This rate is statistically significantly higher than the U.S. overall (12.2%) during the same period. Generally, national data show that rates of food insecurity tend to be higher for certain groups, such as households with children—especially young children (under age 6), households with children headed by a single parent—especially a woman, and households headed by a minority—especially Black and Hispanic.

Prevalence of Food Insecurity,
Kentucky, Competitor States, and the U.S., 1998-2022
(% households with low or very low food security, 3-yr moving average)



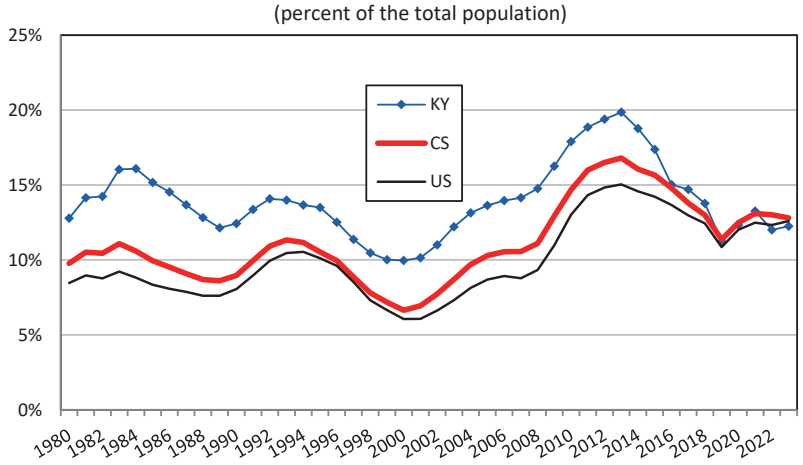
Source: Author's analysis of data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS Food Supplement, various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Food Stamp Participation

The Food Stamp Act of 1977 defines this federally-funded program as one intended to "permit low-income households to obtain a more nutritious diet." Nationally, almost 75 percent of Food Stamp Program (FSP) participants are in families with children and more than one-quarter of participants are in households with seniors or people with disabilities. As noted on the facing page, University of Kentucky economist James Ziliak has found that rates of food insecurity have remained persistently high following the Great Recession for Americans over 60. This is noteworthy since the Robert Wood Johnson Foundation has reported on research showing that seniors who participate in the Supplemental Nutrition Assistance Program (SNAP) are much less likely to be admitted to nursing homes and hospitals. The implication of this finding, of course, is that ensuring food security for elders can potentially reduce health care costs and improve health outcomes. In 2023, an estimated 12.2 percent of Kentucky's population participated in the FSP, a similar percentage as both the competitor states (12.8%) and the U.S. (12.6%). SNAP benefits are dependent on, among other factors, family size and income levels—with the average SNAP recipient in the U.S. costing about $212 a month. The average per person cost in Kentucky is around $169.

Food Stamp Program, Average Monthly Participation, Kentucky, Competitor States, and the U.S., 1980-2023

(percent of the total population)

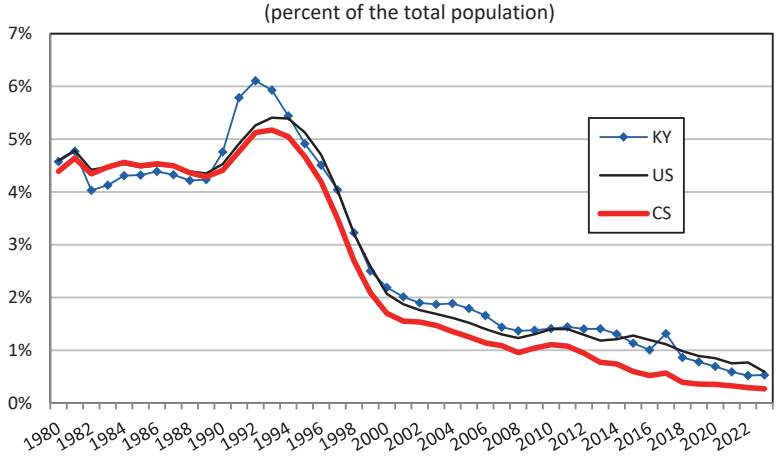


Source: University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 SNAP recipients <https://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap>.

Temporary Assistance for Needy Families

The number of Kentuckians receiving Aid to Families with Dependent Children (AFDC)—known as Temporary Assistance to Needy Families (TANF) since the 1996 welfare reform law—has decreased significantly from its high point of 229,400 in 1992 to 24,119 in 2023; roughly 84 percent of the recipients in 2023 were children. This decline is not unique to Kentucky. For example, marking the 20th anniversary of the 1996 legislation that fundamentally changed the program, the Center on Budget and Policy Priorities (CBPP) issued a report in August, 2016, noting that nationally the number of families receiving TANF (AFDC) benefits for every 100 families with children in poverty has declined sharply over time. In 1979, for instance, 82 families per 100 with children in poverty received benefits, compared to 68 in 1996—when TANF was enacted—to 23 in 2014. As a percentage of the total population, more Kentuckians received TANF benefits in 2023, about 0.5 percent, than the competitor state average of 0.3 percent. The benefit amount for a Kentucky family of three is $262 per month, which has not changed since 1996. If the benefit had been indexed to the inflation rate it would approach $514 in 2023.

AFDC/TANF Recipients,
Kentucky, Competitor States, and the U.S., 1980-2023
(percent of the total population)



Source: University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 TANF recipients <https://www.acf.hhs.gov/ofa/data/tanf-caseload-data-2023>.

Medicaid Beneficiaries

Medicaid is a state-federal partnership to provide health care coverage for people with lower incomes, older people, individuals with disabilities, and some families and children. The Medicaid program is jointly funded by states and the federal government. In Kentucky, the Department for Medicaid Services administers the program, which has a $15 billion annual budget. There are many types of services provided for Kentucky's nearly 1.6 million Medicaid beneficiaries—from inpatient hospitalization to long-term care to prescription drugs for acute care. Medicaid constitutes a significant portion of Kentucky's total state government spending. According to the National Association of State Budget Officers, *State Expenditure Report: Fiscal Years 2021-2023*, 33.1 percent of Kentucky state government expenditures were for Medicaid in FY2023. The percentage of the population on Medicaid in Kentucky, the competitor states, and the U.S. is 31, 22 and 24 percent, respectively. And, as a result of the Affordable Care Act, Kentucky has experienced one of the largest increases in Medicaid enrollment in the country. The U.S. average is a 38 percent increase in enrollment, compared to Kentucky's 129 percent.

Total Monthly Medicaid and CHIP Enrollment, Pre-ACA Compared to August 2024, U.S., Competitor States, and Kentucky

Area	Pre-ACA Average Monthly Enrollment	Total Monthly Medicaid/CHIP Enrollment	% Change	% Total Population Enrolled
US	**56,511,799**	**79,440,518**	**38%**	**24%**
AL	799,176	951,159	19%	19%
GA	1,535,090	1,985,264	29%	18%
IL	2,626,943	3,257,143	24%	26%
IN	1,120,674	1,771,698	58%	26%
KY	**606,805**	**1,389,220**	**129%**	**31%**
MS	615,556	601,843	-2%	20%
MO	846,084	1,270,265	50%	21%
NC	1,595,952	2,746,597	72%	25%
OH	2,130,322	2,877,085	35%	24%
SC	889,744	1,035,647	16%	19%
TN	1,244,516	1,442,392	16%	20%
VA	935,434	1,824,238	95%	21%
WV	354,544	513,741	45%	29%
CS	**14,694,035**	**20,277,072**	**38%**	**22%**

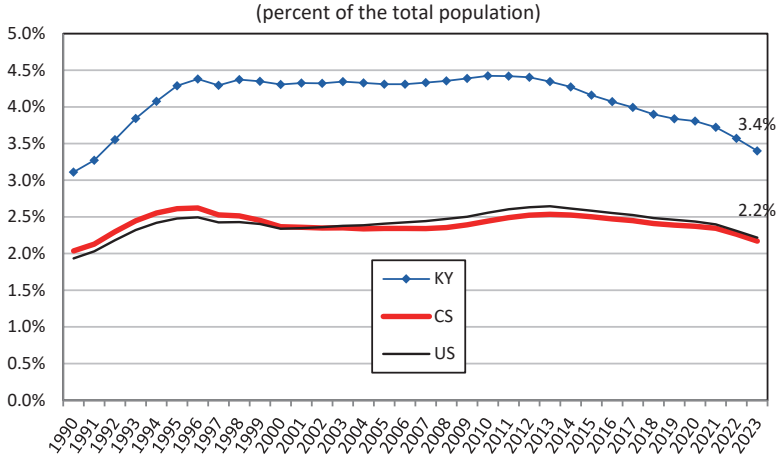
Source: CMS, Medicaid & CHIP Monthly Applications, Eligibility Determinations, and Enrollment Reports: January 2014 - August 2024 (preliminary), as of November 27, 2024.
Note: CS is a weighted average of the competitor states.

Supplemental Security Income (SSI)

The Supplemental Security Income (SSI) is a Federal income supplement program that is administered by the Social Security Administration (SSA) and funded by general tax revenues (not Social Security taxes). According to the SSA, "It is designed to help aged, blind, and disabled people, who have little or no income, and it provides cash to meet basic needs for food, clothing, and shelter." Of Kentucky's 153,857 recipients in 2023, 6 percent were aged and 94 percent were blind and/or disabled. Just over one-third of the recipients were either under 18 (14%) or over 64 years old (22%). As is evident by the figure, the percentage of Kentuckians receiving SSI benefits, 3.4 percent, is higher than the U.S. or competitive state averages (2.2%).

Supplemental Security Income (SSI) Recipients, Kentucky, Competitor States, and the U.S., 1990-2023

(percent of the total population)

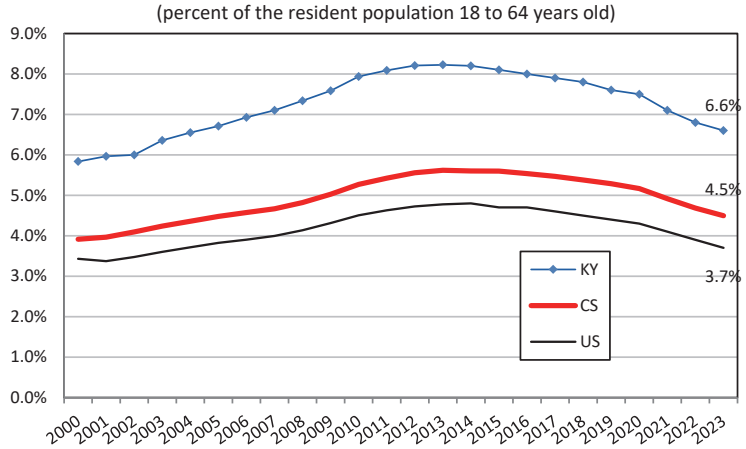


Source: University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 SSI recipients, Table 10 <https://www.ssa.gov/policy/docs/statcomps/ssi_asr/2023/sect02.pdf>.

Disability Income (DI)

According to the Social Security Administration, "Studies show that just over 1 in 4 of today's 20 year-olds will become disabled before reaching age 67." The Social Security Disability Insurance (SSDI) program pays benefits to disabled individuals and some family members if the individual worked long enough and paid Social Security taxes. Kentucky has a higher than average disability rate so it is not surprising that a higher percentage of the state's population receive DI benefits. The percentage of Kentuckians between 18 and 64 years old who receive DI benefits is 6.6 percent, markedly higher than both the competitor state (4.5%) and U.S. (3.7%) averages. The average monthly benefit nationally for disabled workers is about $1,537.

Disability Income (DI) Recipients (18-64 Years Old), Kentucky, Competitor States, and the U.S., 2000-2023
(percent of the resident population 18 to 64 years old)



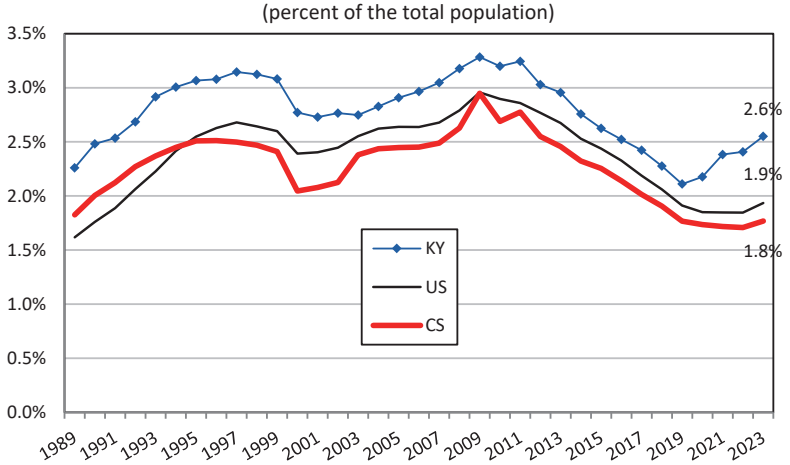
Source: Social Security Administration, Annual Statistical Report on the Social Security Disability Insurance Program, various years <available at https://www.ssa.gov/policy/docs/statcomps/di_asr/2023/>.

Women, Infants, and Children (WIC)

Women, Infants, and Children (WIC) is a federal nutrition program for "supplemental foods, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children up to age five who are found to be at nutritional risk." In Kentucky, around 2.6 percent of the population receives WIC benefits; participation has increased markedly since 2019. While Kentucky's percentage increased from 2019 to 20223 the U.S. (1.9%) and competitor states (1.8%) remained relatively unchanged.

Women, Infants, and Children (WIC) Recipients, Kentucky, Competitor States, and the U.S., 1989-2023

(percent of the total population)

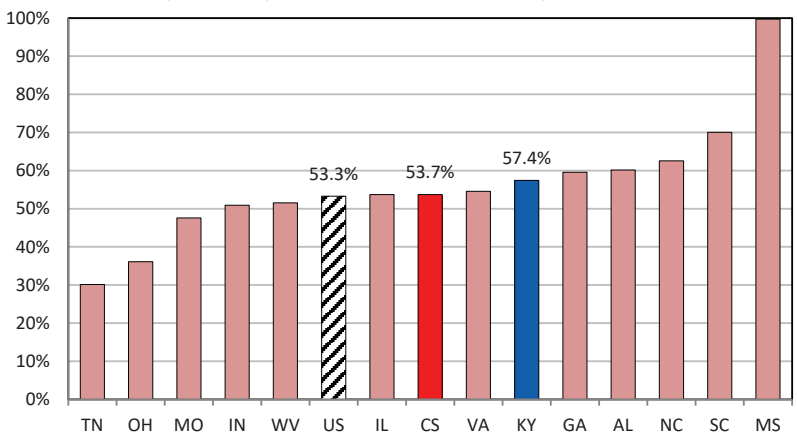


Source: University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 WIC recipients available here: <https://www.fns.usda.gov/pd/wic-program>.

Free- and Reduced-Lunch Eligibility

Less-advantaged students face many obstacles to educational success. On average, students eligible for free- or reduced-priced lunch in Kentucky follow national trends and do not score as high on standardized tests such as NAEP when compared to students who are not eligible; the same is true for Kentucky's various state-specific assessment tools, such as the Kentucky Summative Assessment (KSA). Regardless of the assessment system, less-advantaged students do not perform as well, on average, as more-advantaged students. Researchers at organizations like the Education Trust, for example, have examined the underlying reasons for the achievement gap and identified several systemic causes, such as persistent poverty. A student's eligibility for the free-lunch program is determined by household income and size. During the 2022-2023 school year, Kentucky ranked above the national average with 57.4 percent of public school students eligible for a free- or reduced-priced lunch. The national average is 53.3 percent. Among the 50 states, Mississippi has the highest percentage at 99.7 percent while New Hampshire has the lowest at 23.4 percent. Large changes in state-level percentages have been occuring since the pandemic due to changes in the National School Lunch Program (NSLP) eligibility policies.

Students Eligible for Free or Reduced-Price Lunch, Kentucky, Competitor States, and the U.S.
(percent of public school students, school year 2022-23)



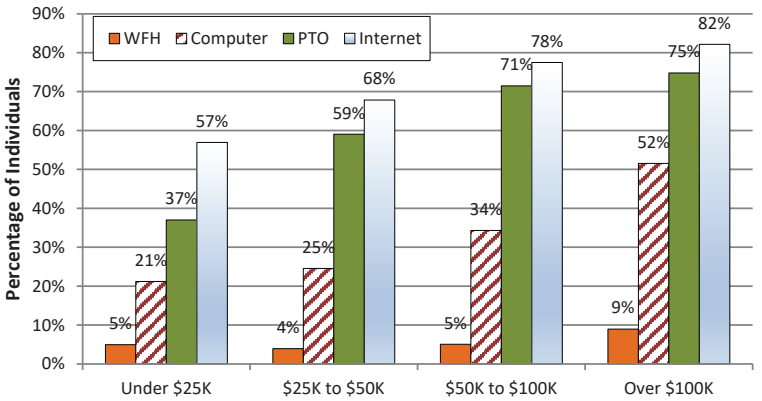
Source: U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics, 2023, Table 204.10. Number and percentage of public school students eligible for free or reduced-price lunch, by state: Selected school years, 2000-01 through 2022-23. Data were downloaded 6/3/2024.

Worker Flexibility by Income Level

With schools going virtual, businesses sending their workers home to work, and people buying basic household goods online, having a computer or smartphone, along with access to the internet, have become as essential as any other public utility. Similarly, having the flexibility to work from home or take paid time off are important benefits. Individuals with higher levels of income have a distinct advantage in worker flexibility and capability during times of social isolation, like what we have experienced during the pandemic. Being able to work at home, enjoy paid time off, having a computer at home to work at home, and accessing the internet at home increase significantly at higher income levels.

Worker Flexibility in the U.S., by Income Level

(Works from Home, Home Computer, Paid Time Off, Internet at Home)



Sources: WFH: Work from home (ACS PUMS 2019 5-Year), Computer: Computer used at home to work at home (CPS Computer and Internet Supplement, 2019), PTO: Paid Time Off (CPS March Supplements, 2012-2021, pooled 10 years), Internet: Person accesses internet at home (CPS Computer and Internet Supplement, 2019). All samples obtained from either IPUMS USA or IPUMS CPS, Minneapolis, MN: IPUMS, 2021. See Notes & Sources for a detailed citation.

Education

EDUCATION PAYS IN A LOT OF ways—higher earnings, increased labor force participation, better health, and more civic involvement are just a few of the benefits. Generally, these benefits increase as one attains higher levels of education. Given the variety and extent of the benefits, it is easy to understand why states invest so heavily in higher education. In Kentucky, for example, nearly 10 percent of general fund expenditures are for higher education alone. Kentucky's investments have mostly kept pace with nearby states and the U.S. going back to before 1980, and then exceeded them with the passage of the *Kentucky Postsecondary Education Improvement Act of 1997*. This financial commitment, however, began to lose energy with the onset of the Great Recession in 2008. While the Commonwealth's educational gains have not yet matched its competitor states, higher education investments have facilitated the development of a workforce with increasing levels of education, skills, and productive potential.

Research supports what common sense suggests. Stanford economist Eric Hanushek and his colleagues find a strong connection between academic achievement and state-level economic growth. They find, for example, that if Kentucky students performed at the same level as those in Minnesota—the state with the highest performing students in the country—then gains to Kentucky's gross domestic product over the next 80 years could top $1 trillion or

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five times the current level. Likewise, according to a 2014 paper by John Fernald at the Federal Reserve Bank of San Francisco and Charles Jones at Stanford, around three-fourths of U.S. economic growth since 1950 was fueled by just two factors—rising educational attainment and research intensity. Business leaders have found common ground with academic researchers over the relationship between education and the economy. Surveys of corporate executives show, year after year, that the availability of abundant skilled labor is one of the most valuable assets to a community.

Policy makers across the country recognize the importance of education for advancing economic growth. In Kentucky, two legislative acts in the last three-and-a-half decades laid the foundation for educational and economic change—the *Kentucky Educational Reform Act of 1990* (KERA) and the *Kentucky Postsecondary Education Improvement Act of 1997* (HB1 of 1997). The principal goal of the former was to improve K-12 educational achievement, while the main goal of the latter was to increase postsecondary educational attainment. Both have helped to increase the number of individuals in Kentucky's workforce with higher levels of education. Kentucky still trails the competitor states and the U.S. in the percentage of its prime working-age population with post-secondary education, but the gap is narrowing. The number of individuals in Kentucky's workforce with at least some college increased by 32.1 percent from mid-2001 to mid-2023, a much higher growth rate compared to the competitor states or the U.S.

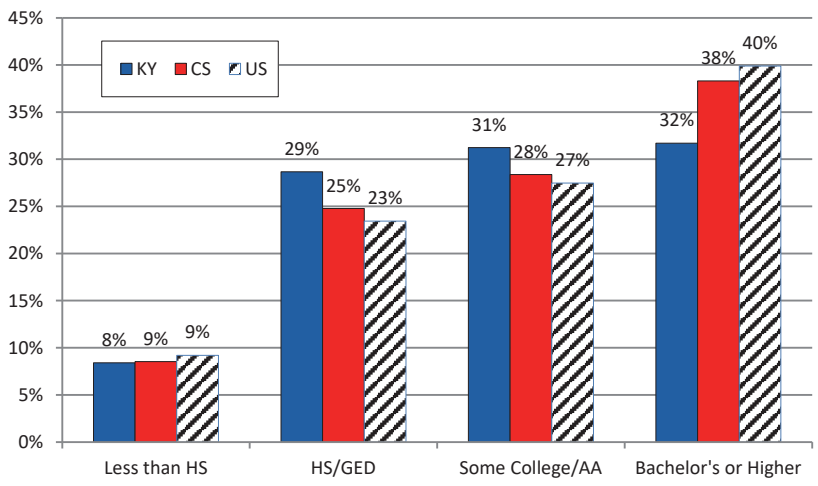
The goal, as articulated in *Higher Education Matters: A Statewide Strategic Agenda for Kentucky Postsecondary Education*, is to increase the percentage of Kentuckians with a postsecondary degree or certificate to 60 percent by the year 2030. The U.S. Bureau of Labor Statistics (BLS) estimates that nearly 67 percent of the new occupational positions created nationally from 2023 to 2033, and about 41 percent of the total jobs in 2033, will require at least some postsecondary education. The percentage of jobs requiring some education, training, or credentials beyond high school has increased over time. The percentage of prime working-age adults (25 to 54 years old) in Kentucky with at least two years of post-secondary education increased from 10 percent in 1960 to 40 percent in 2022, and the BLS occupational projections suggest a continuation of this trend.

Kentucky's future economic prosperity will be largely determined by the pursuit of and investment in educational excellence. With a highly educated population and skilled workforce, productivity improves, the economy grows, and incomes rise. The lesson is clear—if rising per capita income is the destination, then education and innovation are the tickets.

Educational Attainment

Constituting the foundation of individual well-being and community prosperity, *education* is the principal factor driving a state's current and future economic prosperity. Without a highly educated population and skilled workforce, Kentucky will fall behind in the never-ending race for competitive advantage. While economists find that higher levels of educational attainment and economic innovation are the two most important factors affecting a state's economic success, year after year corporate leaders, when surveyed, indicate that "the availability of skilled labor" is the most important factor driving their site selection decisions (*Area Development Magazine*, Annual Corporate Surveys, various years). Education, training, and other productivity-boosting factors are the key ingredients of a skilled workforce. According to a report by the Lumina Foundation, by 2025, about 60 percent of all jobs in the United States will require postsecondary education or training. This includes not only bachelor's degrees but also associate degrees, industry certifications, and apprenticeships. While nearly 63 percent of Kentucky's prime working-age population have, at a minimum, some college, the state trails the competitor states and the U.S., as each is at about 67 percent.

Educational Attainment, 2023
Kentucky, Competitor States, and the U.S.
(prime working-age adults, 25 to 54 years old)

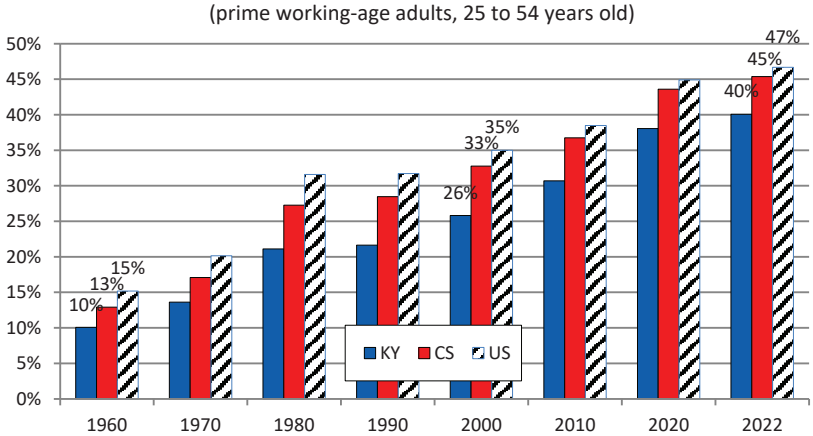


Source: Estimated by the author using data from the 2023 1-Year U.S. Census ACS PUMS.

Post-Secondary Education

The Kentucky Council on Postsecondary Education released its 2022-2030 state plan for higher education in February 2022. The overall goal, as articulated in *Higher Education Matters: A Statewide Strategic Agenda for Kentucky Postsecondary Education*, is to increase the percentage of Kentuckians with a postsecondary degree or certificate to 60 percent by the year 2030. The U.S. Bureau of Labor Statistics estimates that around 67 percent of the *new* occupational positions created nationally from 2023 to 2033, and about 41 percent of the *total* jobs in 2033, will require at least some college (BLS, Employment Projections, Table 1.2 Occupational Projections 2023-33). The percentage of jobs requiring some education, training, or credentials beyond high school has increased over time. This is reflected in the chart shown below. The percentage of prime working-age adults (25 to 54 years old) in Kentucky with at least two years of post-secondary education increased from 10 percent in 1960 to 40 percent in 2022, and the BLS occupational projections suggest a continuation of this trend. The chart also shows that Kentucky consistently lags behind the competitor states and the U.S. Kentucky, for instance, reached a level in 2020 that the U.S. and its competitor states reached a decade earlier. This suggests, of course, that our state needs to work harder to keep pace with the competition.

Two or More Years of Post-Secondary Education, Kentucky, Competitor States, and the U.S.
(prime working-age adults, 25 to 54 years old)



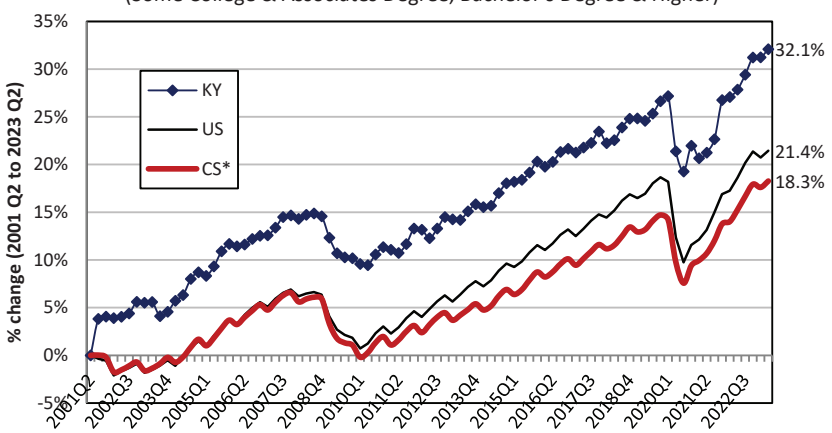
Source: Author's analysis of U.S. Census Bureau data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [1960 5% sample; 1970 Form 1 State 1%; 1980, 1990, & 2000 5% samples; 2010, 2020, & 2022 ACS 5-Year]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

Workforce by Education

Two legislative acts in the last three and a half decades laid the foundation for educational change in the Commonwealth—the Kentucky Educational Reform Act of 1990 (KERA) and the Kentucky Postsecondary Educational Improvement Act of 1997. The principal goal of the former was to improve K-12 educational achievement while the main goal of the latter was to increase educational attainment. Both have helped to increase the number of individuals in Kentucky's workforce with a higher levels of postsecondary education, which, as illustrated in the graph below, has outpaced the competitor states and the U.S. Some of the Kentucky increase, however, could be due to migration into the state. The number of individuals in Kentucky's workforce with at least a some college increased by 32.1 percent from mid-2001 to early-2023, a much higher rate compared to the competitor states (18.3%) or the U.S. (21.4%). Kentucky still trails the competitor states and the U.S. in the percentage of its prime working age population with a bachelor's degree or higher, but this growth rate suggests that the gap is narrowing. While all post-secondary degrees or credentials add value to the workforce and are, on average, associated with positive returns to an individual's income, employment, and health, to name a few benefits, it is the four-year degrees and higher that garner the greatest returns.

Employment with Postsecondary Education, Kentucky, Competitor States* & the U.S.

(Some College & Associates Degree, Bachelor's Degree & Higher)



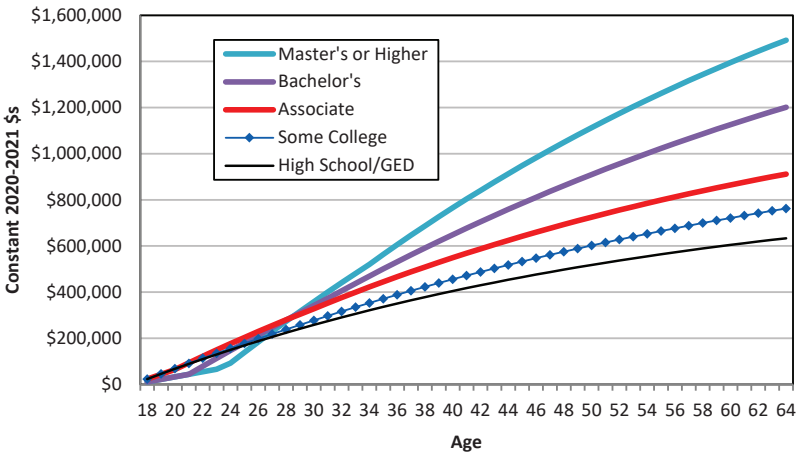
Source: Estimated by the author using U.S. Census, LED Extraction Tool, Quarterly Workforce Indicators (QWI), <https://ledextract.ces.census.gov/qwi/all>, data downloaded 7/11/2024.
Note: CS denotes a modified collection of competitor states that excludes Mississippi, due to several quarters of missing workforce data.*

Lifetime Earnings by Educational Attainment

Education pays in a lot of ways—higher earnings, increased labor force participation, better health, and more civic involvement are just a few of the benefits. These benefits accrue, on average, with each earned degree, and the wage differential between those with high and low levels of education is stark. We use statistical methods designed to isolate the impact of education on earnings from the many other known factors such as age and gender which affect earnings too. We estimate that a typical college graduate in Kentucky will have lifetime earnings, from 18 to 64 years old, nearly double that of a high school graduate, a wage premium that is 1.9 times higher. The ratios for associate degree holders (1.4) and graduate degree holders (2.4) are also significant. The estimated lifetime earnings premium for a typical Kentucky high school graduate are just over $600,000, compared to $1.2 million for a bachelor's degree holder (in 2020-2021 dollars). The trajectories of the cumulative lifetime earnings by credential illustrate that it does not take long for an individual pursuing higher education to catch up with the high school graduate and surpass them, even when accounting for the out-of-pocket costs of postsecondary education as well as the opportunity costs of delayed entry to the labor force.

Estimated Cumulative Lifetime Earnings, Kentucky, by Age & Education

(individuals 18 to 64, net earnings after higher education costs)

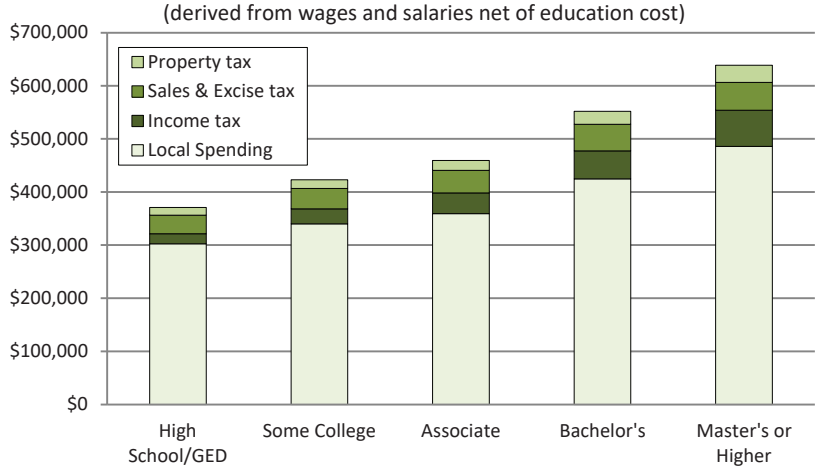


Source: Model-based estimates calculated by the Center for Business and Economic Research (CBER), Gatton College of Business and Economics, University of Kentucky, using U.S. Census, American Community Survey, 2021 and 2022 1-Year estimates, PUMS, using a 3 percent discount rate.

Financial Impact by Educational Attainment

One effect of higher personal incomes, as illustrated on the facing page, is more tax revenue for state and local governments. Using the tax distribution framework developed by the Institute on Taxation and Economic Policy (ITEP), we estimate that an individual with a bachelor's degree will pay twice the amount of state and local income, sales, and property taxes as someone with a high school diploma. Compared to a high school diploma, an associate degree (46% more), bachelor's degree (86%), and graduate degree (123%) are associated with higher tax revenue. Another financial benefit is higher levels of consumer spending. When consumers spend money at local businesses, the dollars cascade through the local economy. One person's spending is another person's salary, which can also be spent, and thereby contribute to another person's salary, and so on. This is known as the "local multiplier effect," and it can significantly boost a community's economic vitality. Using the 2023 Consumer Expenditure Survey as a guide, we can estimate average expenditures by education level. Local consumer spending is 40 percent higher for a bachelor's degree holder compared to someone with only a high school diploma, holding other factors constant. Over the course of a working career, someone with a higher income will obviously have much greater spending power, even if they are spending a lower portion of their income.

Estimated Cumulative Financial Impact,
Kentucky, Age 18 to 64, by Educational Attainment
(derived from wages and salaries net of education cost)

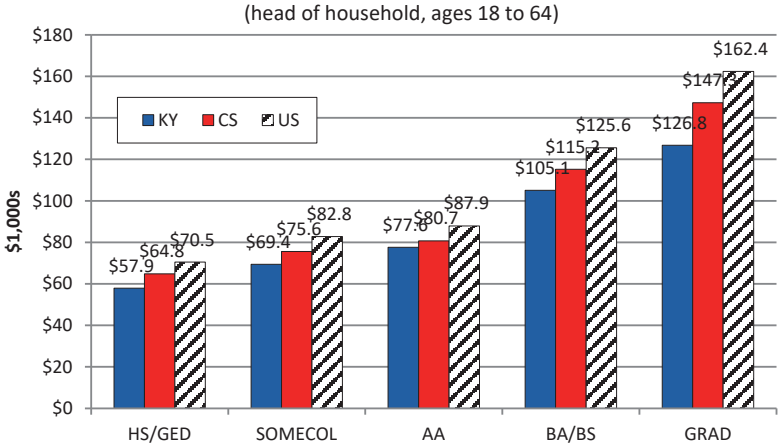


Source: Estimates calculated by the Center for Business and Economic Research (CBER), Gatton College of Business and Economics, University of Kentucky, using U.S. Census, American Community Survey, 2021 and 2022 1-Year estimates, PUMS; Institute on Taxation and Economic Policy (ITEP), Who Pays? 7th Edition

Family Income by Education

Economists and other researchers have long studied the relationship between education and earnings. On average, as eduation goes up, so do earnings. Using data from the U.S. Census Bureau American Community Survey (ACS) for the years 2021-2022, statistical methods were used to isolate the relationship between education and family income while holding other known factors constant that also affect earnings, such as age, sex, race, ethnicity, and location of residence. The differences between a high school diploma or GED and virtually any level of postsecondary education are striking. Across the board, Kentucky, the competitior states, and the U.S. show that someone with a Bachelor's degree have family income around 80 percent higher than someone with a high school diploma. An important component of family income is wages and salaries. Those with higher levels of education have realized wage gains since the 1970s, while those with only a high school credential, or less, have experienced large declines in hourly wages. Wages for Kentuckians with only a high school credential have declined since the late 1970s, while the wages of Kentuckians with with a Bachelor's degree have slightly increased. The lesson here is clear: to get ahead financially in today's labor market, it is essential to have higher levels of education.

Estimated Family Income by Education,
Kentucky, Competitor States, and the U.S., 2021-2022
(head of household, ages 18 to 64)

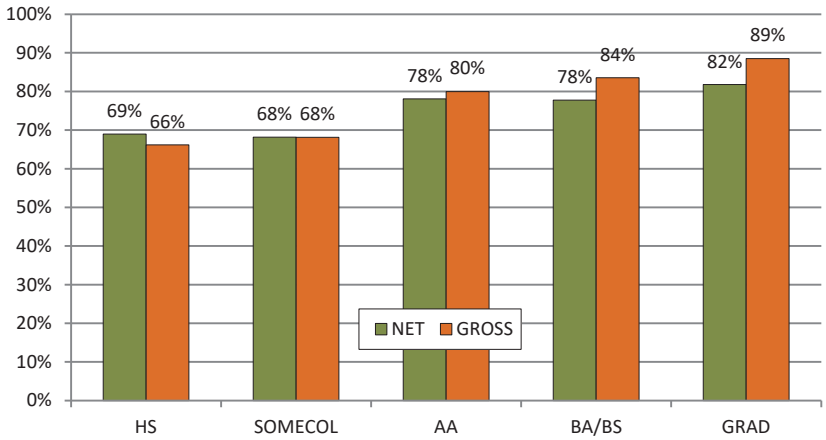


Source: Estimated by CBER using data courtesy Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [ACS 1-year 2021 & 2022]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

Labor Force Participation by Education

There is a positive association between educational attainment and labor force participation, as shown in the graph below. There is a consistent rise in the labor force participation rates as education levels increase from a high school diploma to a bachelor's degree or higher for working-age adults who are 18 to 64 years old. The "gross" estimates (i.e., averages for the educational categories) show an 18 percentage-point increase in the estimated labor force participation rate in Kentucky from high school (66%) to bachelor's degree (84%). The "net" percentages reflect the estimated relationship between educational attainment and labor force participation while holding other factors constant, like sex, age, family income, race, ethnicity, urbanity, and marital status. The same upward trend of increasing labor force participation with higher levels of educational attainment is evident. The variable used here indicates whether an individual was a part of the labor force—working or seeking work—and, if so, whether the person was currently unemployed. In short, one can be employed or unemployed, and be part of the labor force. The labor force participation net percentage differences between high school (69%) and those with an associate degree (78%), bachelor's degree (78%), or graduate degree (82%) are all statistically significant. Likewise, the gross percentages for AA, BA/BS, and GRAD are statistically different from HS.

Labor Force Participation
by Educational Attainment, 2023
(Kentucky estimates, 18 to 64 years old)

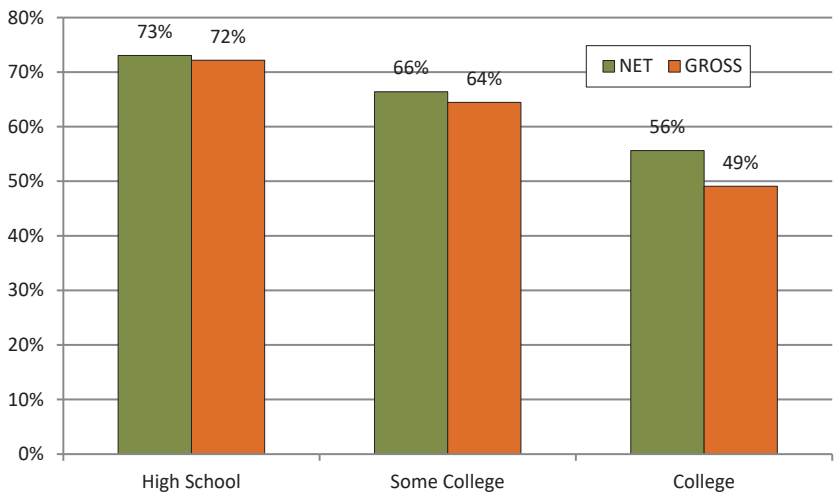


Source: Estimated by CBER using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 11.0 [CPS, Basic Monthly, Jan.-Dec. 2023]. Minneapolis, MN: IPUMS, 2023. https://doi.org/10.18128/D030.V11.0

Health by Education

An estimated 90 percent of the nation's $4.5 trillion annual health care expenditures is for people with chronic and mental health conditions, such as heart disease, cancer, stroke, diabetes, and arthritis. Much of the chronic disease is caused by four preventable health risk behaviors—lack of exercise, poor nutrition, smoking, and heavy alcohol consumption. Compared to the average American, Kentuckians are more likely to smoke, be obese, and not engage in regular physical activity. However, higher levels of education are associated with healthier behaviors and lower rates of chronic diseases. We estimate differences in chronic disease risk behaviors by education levels by analyzing data from the Behavioral Risk Factor Surveillance System (BRFSS) while controlling for other factors, such as race, ethnicity, sex, age, urbanity, marital status, and income. For Kentucky, chronic disease risk behaviors *decrease* as education levels go up. Using net percentages as an example, the estimated chronic disease risk behaviors decline from 73 percent to 56 percent as educational attainment increases from a high school diploma to a college degree. The chronic disease risk behavior net percentage differences between high school (73%) and those with some college (66%) or college (56%) are all statistically significant. The gross percentages for some college and college are statistically different from high school as well.

Chronic Disease Risk Behaviors
by Educational Attainment, 2018-2022
(Kentucky estimates, 18 to 64 years old)

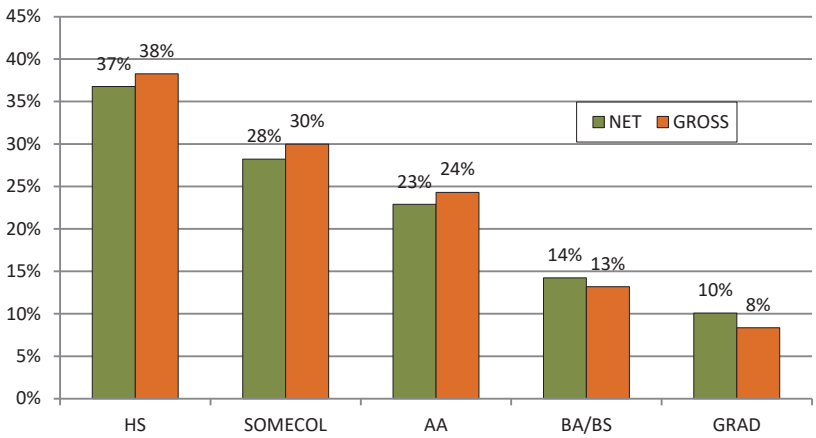


Source: Estimated by CBER using CDC Behavioral Risk Factor Surveillance System data, data pooled for 5 years.

Public Assistance by Education

In Kentucky, the percentage of high school graduates 18 to 64 years old receiving SNAP benefits (the Supplemental Nutrition Assistance Program previously known as Food Stamps), Medicaid health benefits, Supplemental Security Income (SSI), or public assistance income is 2.9 times higher than those with a bachelor's degree—38 percent compared to 13 percent (gross percentages). After controlling for age, marital status, sex, urbanity, race, and ethnicity, the relationship between education and receiving public assistance remains strong (net percentages). As illustrated below, a Kentucky high school graduate is estimated to be 2.6 times more likely to receive public assistance (37%) than someone with a bachelor's degree (14%). Studies show that public assistance participation rates decline as education levels increase, translating into cost savings for the state. Importantly, this relationship—higher levels of educational attainment associated with lower levels of public assistance program participation—holds across a range of public assistance programs. The public assistance recipient net percentage differences between high school (37%) and those with some college (28%), associate degree (23%), bachelor's degree (14%), or graduate degree (10%) are all statistically significant. The gross percentages for SOMECOL, AA, BA/BS, and GRAD are also statistically different from HS.

Public Assistance
by Educational Attainment, 2021-2022
(Kentucky estimates, 18 to 64 years old)



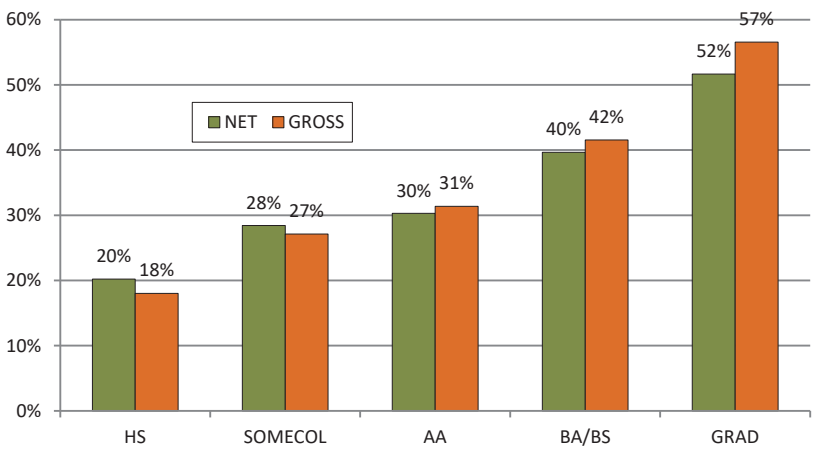
Source: Estimated by CBER using data courtesy of Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [ACS 2021 & 2022]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

Volunteer Rate by Education

Studies have linked participation in civil society, volunteering for example, to higher levels of community prosperity, higher achievement in schools, and improved individual health. Volunteers can tackle problems such as poverty, illiteracy, and drug abuse that public or private sectors have not adequately addressed, making a community more attractive for economic development. Some research even suggests that members of communities with high levels of civic participation enjoy better health and live longer. We present volunteer estimates for Kentucky for individuals with a high school degree only, some college (but no degree), associate degree, bachelor's degree, and graduate degree. The net percentages reflect the association between education and volunteering while holding other factors constant, such as income, gender, race, urbanity, and age. There is a clear and consistent relationship between increasing education levels and higher rates of volunteerism. Individuals with a bachelor's degree volunteer at a significantly higher rate (78%) than those with a high school education (69%). The volunteerism net percentage differences between high school (20%) and those with some college (28%), associate degree (30%), bachelor's degree (40%), or graduate degree (52%) are all statistically significant. The gross percentages for SOMECOL, AA, BA/BS, and GRAD are also statistically different from HS.

Volunteerism by Educational Attainment, 2002-2021

(Kentucky estimates, 18 to 64 years old)



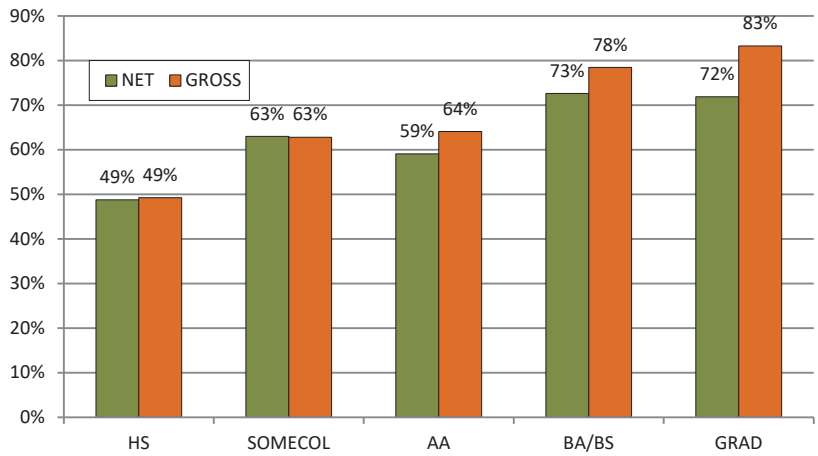
Source: Estimated by CBER using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Volunteer Supplement Survey, 2002 to 2021]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0

Voting by Education

Voting is a basic act of civic engagement and community involvement. Strong, resilient, and vibrant communities are created and nurtured by engaged and connected citizens. Many scholars have advanced the idea that strong community structures are beneficial to economic health. Pulling from the existing economic development literature, The World Bank notes that "development and growth specialists are uncovering the importance of social cohesion for societies to prosper economically and for development to be sustainable." Voting, which is an act of civic engagement that facilitates the growth of social capital, increases with higher levels of educational attainment. We estimate that in Kentucky the net association between education and voting would suggest that bachelor's degree holders (73%) would be 1.5 times more likely to vote than those with a high school diploma (49%), while holding other factors constant, such as marital status, sex, race, ethnicity, urbanity, age, and family income. The voting net percentage differences between high school (49%) and those with some college (63%), associate degree (59%), bachelor's degree (73%), or graduate degree (72%) are all statistically significant. The gross percentages for SOMECOL, AA, BA/BS, and GRAD are also statistically different from HS.

Voting by Educational Attainment, 1982-2022

(Kentucky estimates, 18 to 64 years old)

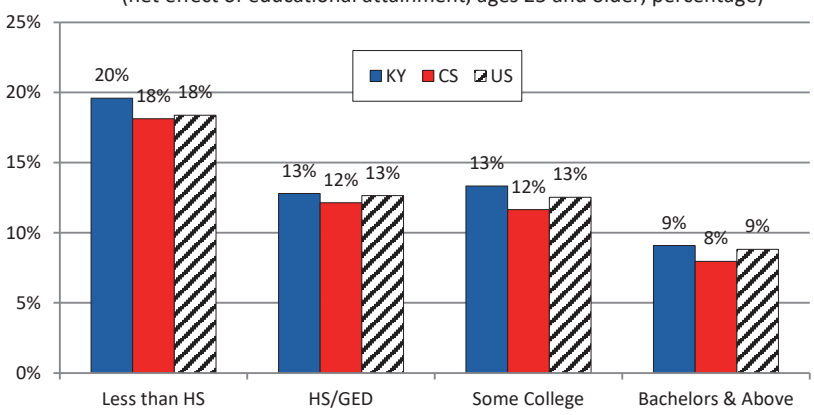


Source: Estimated by CBER using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 11.0 [Voting and Registration Supplement, 1982 to 2022]. Minneapolis, MN: IPUMS, 2023. https://doi.org/10.18128/D030.V11.0

Food Insecurity by Education

Food security is defined as having "access at all times to enough food for an active, healthy life for all household members," while food insecurity means "that the food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food." During the three-year period, from 2021 to 2023, the household food insecurity percentage in the United States and Kentucky was, respectively, 12.2 and 14.5 percent. We estimate the relationship between education and food security using a model-based approach that controls for other factors, such as work status, family income, age, gender, race, ethnicity, marital status, and whether one lives in a rural or urban area. While holding these factors constant, we find that higher levels of education are clearly associated with lower levels of food insecurity—even for individuals with similar income levels and employment statuses.

Food Insecurity by Educational Attainment
Kentucky, Competitor States and the U.S.
(net effect of educational attainment, ages 25 and older, percentage)



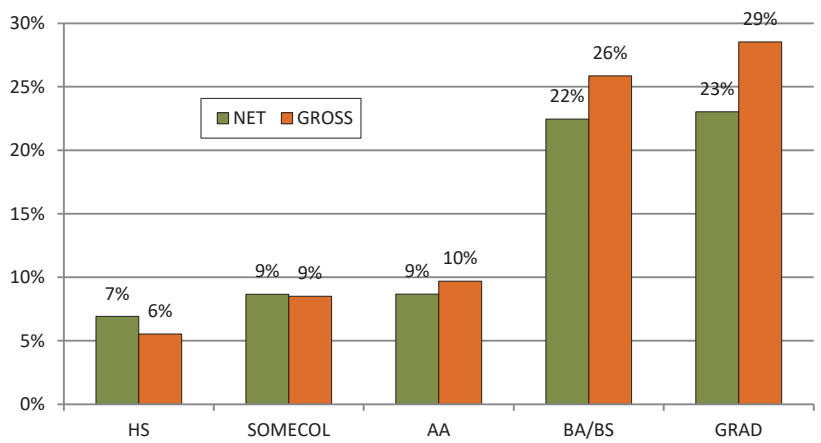
Source: Estimated by the author using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS Food Security Supplement, 2000 to 2022]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Telework by Education

Social distancing policies were used during the pandemic to thwart the spread of disease. The efficacy of these approaches, however, is largely determined by the extent to which individuals adhere to it. The ability to work remotely can facilitate adherence to social distancing requirements with minimal financial pain for workers. The ability to telework is viewed as a vital factor in improving community resilience during natural disasters. The graph below shows how a college degree is related to the ability to telework. For example, an individual in Kentucky with a high school diploma or GED is likely to have a lower likelihood of being able to telework (7%) compared to someone with a bachelor's degree (22%). This is the estimated effect of education while holding many other factors constant, including marital status, sex, age, race, ethnicity, urbanity, and family income. The teleworking net percentage differences between high school (7%) and those with a bachelor's degree (22%) or graduate degree (23%) are statistically significant. The gross percentages for SOMECOL, AA, BA/BS, and GRAD are statistically different from HS. The teleworking net percentage differences between high school (7%) and those with a bachelor's degree (22%) or graduate degree (23%) are statistically significant. The gross percentages for SOMECOL, AA, BA/BS, and GRAD are statistically different from HS.

Telework by Educational Attainment, 2022-2024

(Kentucky estimates, 18 to 64 years old)

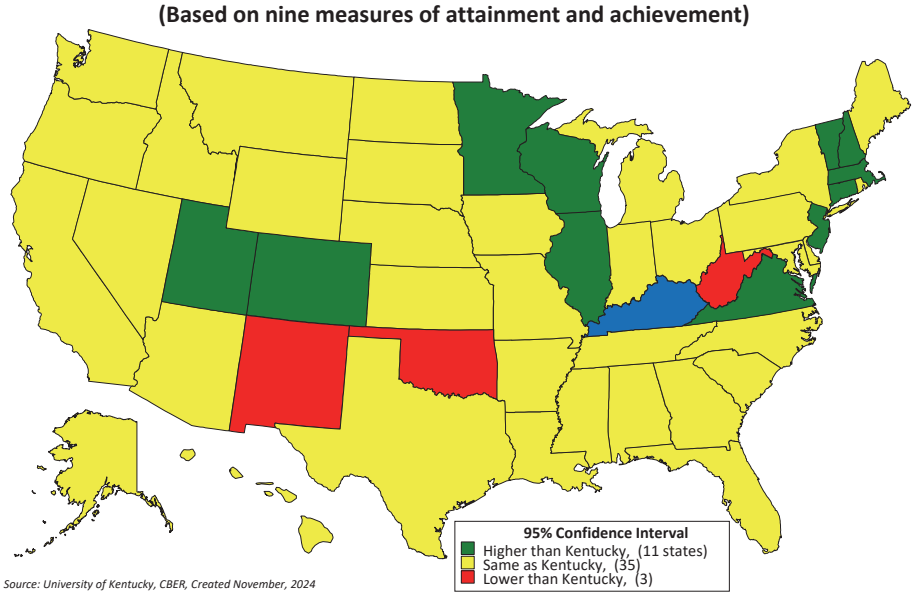


Source: Estimated by CBER using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 11.0 [CPS, Basic Monthly, October 2022 to March 2024]. Minneapolis, MN: IPUMS, 2023. https://doi.org/10.18128/D030.V11.0

Education Index

The map below shows how educational outcomes in Kentucky compare to those in other states. Based on nine educational attainment and achievement factors combined into a single index (see the table on the following page), Kentucky is statistically higher than 3 states, lower than 11 states, and no different statistically from 35 states (using a 95% confidence interval). Looking at Kentucky's competitor states, this Index shows that Kentucky ranks higher West Virginia, but lower than Illinois and Virginia. There is not a statistically significant difference between Kentucky and the other competitor states (i.e., Alabama, Georgia, Indiana, Mississippi, Missouri, North Carolina, Ohio, South Carolina, and Tennessee). This version of the educational index is slightly different from previous versions (see Notes and Sources for details).

Kentucky's Educational Position Relative to Other States, 2022-2023
(Based on nine measures of attainment and achievement)



Source: University of Kentucky, CBER, Created November, 2024

SELECTED EDUCATIONAL INDICATORS

Some key indicators used to compare states on educational outcomes are listed below. They include measures of educational attainment, such as the percentage of the population 25 to 54 (prime working age) with a high school diploma or bachelor's degree, as well as educational achievement, including the percentage of students scoring proficient or higher on the various National Assessment of Educational Progress (NAEP) reading and math. Kentucky students were statistically no different from the national public students in 4th grade math, 4th grade reading, and 8th grade reading, but significantly lower in 8th grade math. There is a considerable gap between Kentucky and the top tier of states. The top eleven states are those shown in the U.S. map on the facing page as statistically significantly higher than Kentucky on the education index.

Education Indicators for Kentucky, United States, and the Top Eleven States, 2022-2023 (percentages)

Education Indicators	Kentucky	U.S.	Average for Top Eleven States†
High School diploma (2023)	91.6	90.8	93.0
Associate degree (2023)	10.4	9.1	8.5
Bachelor's degree or Higher (2023)	31.7	39.9	46.4
Adj. Cohort HS Grad Rate (class of 2022)	90.1	87.0	86.9*
8th Grade Math NAEP (2022)	21.5	25.5	30.9
8th Grade Reading NAEP (2022)	29.0	29.4	34.6
4th Grade Math NAEP (2022)	32.6	35.1	39.3
4th Grade Reading NAEP (2022)	31.1	32.1	35.4
Advanced Placement (AP) Mastery (2023)	15.2	21.7	25.1*

†The top eleven states are statistically significantly higher than Kentucky (using a 95% confidence interval): CO, CT, IL, MA, MN, NH, NJ, UT, VA, VT, & WI.
*Indicates the number is the average of the state averages—*not a weighted average* of the eleven states.
Note: High School diploma, Associate degree, and Bachelor's Degree are for those between 25 and 54, the prime working age. The NAEP data reflect the percentage of public students scoring proficient or higher, and the U.S. data represents the National Public.

Selected Obstacles to education

While Kentucky has made educational progress compared to its pre-KERA low point, there is much to be done to improve educational outcomes—and not all of it strictly in the classroom. As is evident by the numbers in the table, obstacles to cost-effective educational performance are more prevalent in Kentucky than in most other places. Each of the factors listed below represents a potential obstacle to optimal educational performance and/or cost-effective educational spending. Considering factors like poverty, parental education, obesity, students' health status, disability rates, and missed school days, these obstacles, if addressed, could enable better educational outcomes in Kentucky.

Selected Obstacles to Cost-Effective Educational Performance, Kentucky, the U.S. & the Top 16 Performing States, 2021-2023 (percentages)

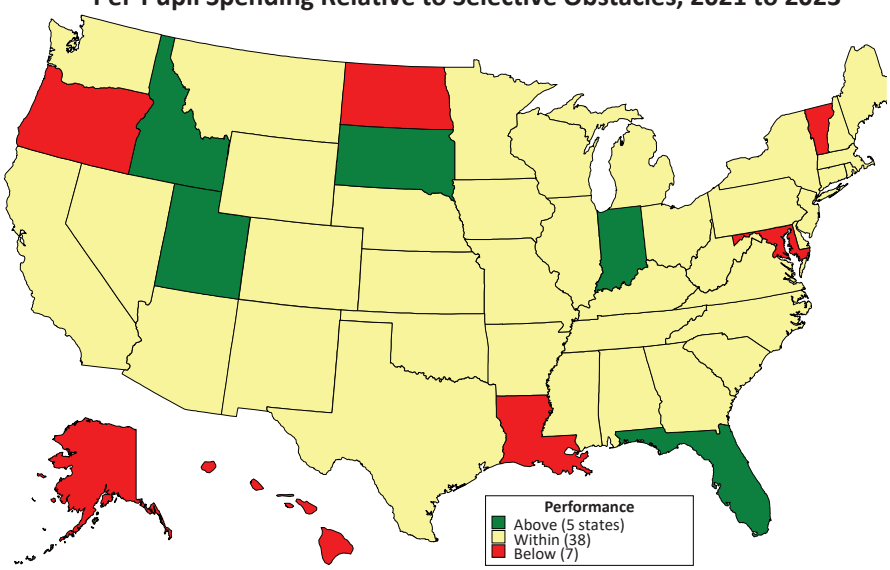
Obstacles	Kentucky	U.S.	Average Top 16 States†*
Children who have at least one parent with a postsecondary degree (2023)	52.8	59.3	66.6
Children eligible for free and reduced priced lunch (2022-23)	57.4	53.3	42.6
Students who live in rural areas (2023)	31.1	15.7	18.3
Children and teens (6 to 17) who are overweight or obese (2021-22)	39.0	33.8	30.4
Students with disabilities as a percent of public school enrollment (2022-23)	16.6	15.2	16.6
Limited English proficiency students as a of total enrollment (2021)	5.4	10.6	7.9
Children (6 to 17) who missed 11 or more school days due to illness/injury (2021-22)	6.5	5.7	6.3
Children (0 to 17) whose overall health is fair or poor (2021-22)	2.0	1.6	1.1

†The top 16 states based on the education index are: CO, CT, IL, MA, MD, ME, MN, NE, NH, NJ, PA, UT, VA, VT, WA & WI.
*Except for the first row (i.e., parents with a degree), these percentages are the averages of the state averages—not a weighted average of the top 16 states.

Educational Spending per NAEP

Kentucky's NAEP results show that, on average, an estimated 28.5 percent of 4th and 8th graders scored proficient or higher on the 2022 math and reading exams. With per pupil expenditures of $15,357 (adjusted for cost-of-living differences across the states), Kentucky gets an estimated 1.9 NAEP proficiency percentage points for every $1,000 in per pupil spending. Once we account for the relative differences in obstacles to optimal educational performance and/or cost-effective educational spending faced by the states (e.g., the obstacles are listed in the table on the facing page), we find that Kentucky and 37 other states perform as expected. There are 5 states that perform above expectations, and 7 states perform below expectations.

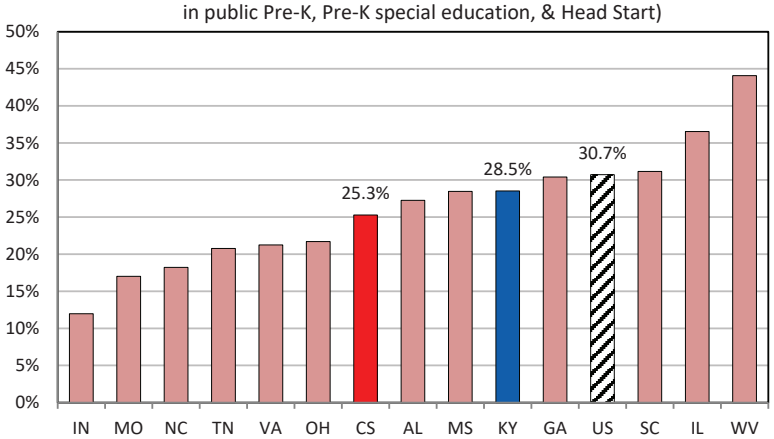
NAEP Reading & Math Proficiency/Distinquished Points per $1,000 in Per-Pupil Spending Relative to Selective Obstacles, 2021 to 2023



Public Pre-K Enrollment

The Kentucky Department of Education Kindergarten Readiness Screener data show that under half (46%) of the students who entered kindergarten in the 2022-2023 school were ready (see the facing page for more details). Early childhood development programs can help. A 2016 RAND study—*Informing Investments in Preschool Quality and Access in Cincinnati: Evidence of Impacts and Economic Returns from National, State, and Local Preschool Programs*—touts their benefits. "High-quality preschool programs represent a significant investment of resources, but that investment may be paid back through improved outcomes during the school-age years and beyond," said the authors. They found that "credible estimates of the economic return for full-scale high-quality preschool programs range from about $2 to $4 for every $1 invested." Similarly, a 2009 CBER study estimated that in Kentucky "the total estimated benefit is more than $5 for every $1 the state would invest in an expanded pre-k program." According to estimates from the National Institute for Early Education Research, 25.3 percent of Kentucky's 3- and 4-year-olds are enrolled in *public* pre-kindergarden programs.

Enrollment in Pre-K Programs, 2022-2023 School Year
Kentucky, Competitor States and the U.S.
(estimated percent of all children 3- and 4-years-old
in public Pre-K, Pre-K special education, & Head Start)

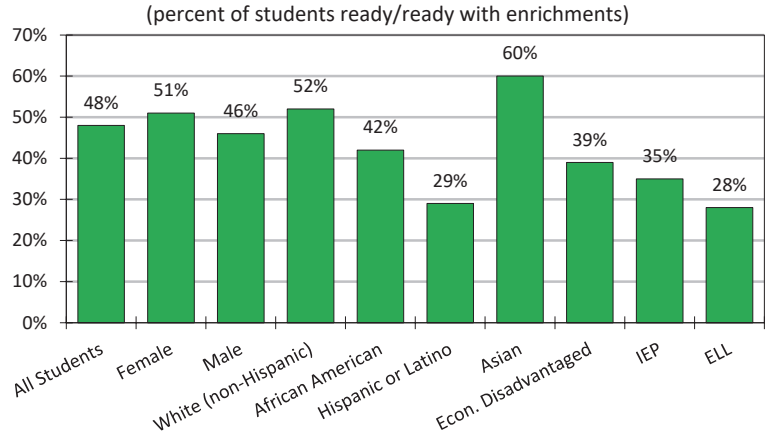


Source: Estimated from The State of Preschool 2023, State Preschool Yearbook, National Institute for Early Education Research. Note: These estimates likely include some double-counted children since some Head Start children are likely in State Pre-K programs too.

KINDERGARTEN READINESS

Kindergarten students in Kentucky are evaluated on their readiness. The data show that under half (48%) of the students who entered kindergarten in the 2023-2024 school year were ready when assessed on three scales: academic/cognitive; language development; and physical development. Moreover, children with limited English proficiency (28%), poor children (39%), and those with a disability (35%) have even lower levels of readiness. Among race and ethnic groups, Asians, on average, have the highest level of readiness (60%), followed by white non-Hispanics (52%), Blacks (42%), and Hispanics (29%). Research shows that kids who start behind in the early grades have difficulties catching up in the later grades. Early childhood development programs can help mitigate educational disparities. In fact, there is abundant research supporting the efficacy of these enrichment programs. However, according to findings by the Brookings Institution published in early 2022, "high rates of teacher turnover are among the greatest barriers to building high-quality early childhood education (ECE) systems." Their research finds that increasing teacher pay can substantially reduce teacher turnover, leading to better student outcomes. These programs are expensive, but cost-benefit analyses consistently demonstrate the long-term benefits exceeding the initial investments.

Kindergarten Readiness in Kentucky
by Selected Categories, 2023-2024 School Year
(percent of students ready/ready with enrichments)



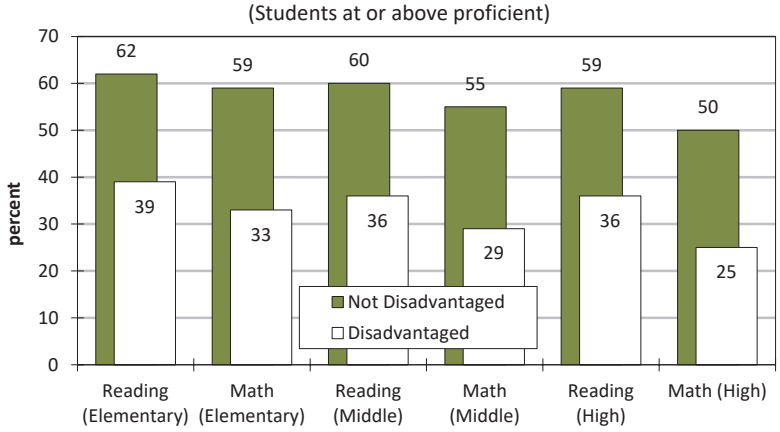
Source: Kentucky Department of Education (KDE), Kindergarten Screen Data, https://education.ky.gov/AA/Assessments/Pages/K-Screen.aspx
Note: IEP signifies students with disabilities, ELL is English Learner

Educational Achievement Gap: KSA

The academic success of disadvantaged children will affect whether the state's future remains one of disproportionate poverty or gives way to rising prosperity. Economic disadvantage has a significant negative drag on academic performance, and the sheer number of economically disadvantaged students in Kentucky adversely affects overall performance on both state and national tests. Kentucky has one of the nation's largest populations of students eligible for free or reduced-price lunches (57.4%), a reliable proxy for poverty and need. The different outcomes on Kentucky's Summative Assessment exams are stark. The percentage of students scoring at or above proficiency is consistently and markedly lower for economically disadvantaged students in every grade and subject area. As shown below in the figure, proficiency levels for disadvantaged students are generally less than half the level of more-advantaged students.

Kentucky Summative Assessment (KSA) Results by Economic Status, 2023-2024 School Year

(Students at or above proficient)



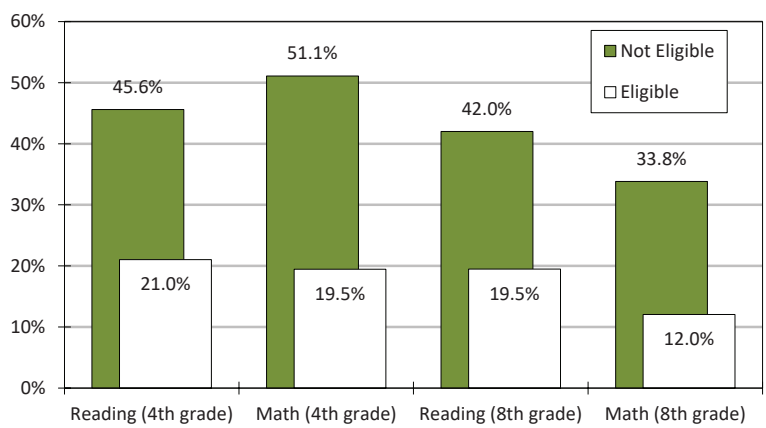
Source: Kentucky Department of Education, Assessment and Accountability Datasets 2023-2024, downloaded 10/23/2024, available at: https://www.education.ky.gov/Open-House/data/Pages/Assessment_Accountability_Datasets_2023-2024.aspx

EDUCATIONAL ACHIEVEMENT GAP: NAEP

The different outcomes on the National Assessment of Educational Progress (NAEP) exams are as striking as those on the Kentucky Summative Assessment (see the facing page). The percentage of students scoring at or above proficiency is consistently and markedly lower for less-advantaged students regardless of grade or subject area. As evident below in the figure, proficiency levels for less-advantaged students are generally less than half the level of more-advantaged students. Kentucky is not alone—the achievement gap between economically advantaged and disadvantaged students is just as pronounced for the U.S. overall and the competitor states. For example, the gap between eligible and not eligible 4th grade math students is basically 31 percentage points for Kentucky, the competitor states, and the U.S. overall.

Kentucky 2022 NAEP Results by Free- and Reduced-Lunch Eligibility

(percent of students scoring at or above proficient)

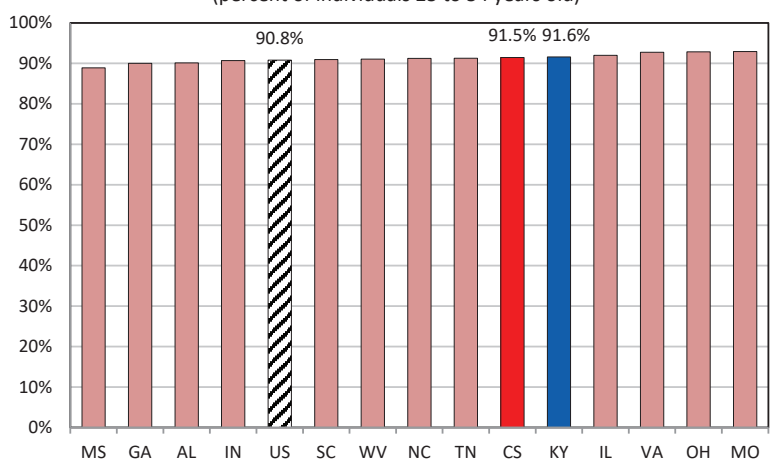


Source: https://www.nationsreportcard.gov/ndecore/xplore/NDE, accessed October 24, 2022

High School Attainment

Kentucky's labor force increasingly competes in a global environment that demands rising levels of educational attainment. At a minimum, today's workers need a high school diploma. Following the education reforms of the early 1990s, Kentucky's adult population (25 and older) made significant gains, as the portion with a high school diploma or higher rose from 65 percent in 1990 to 89.5 percent in 2023. At the same time, the nation improved to 89.8 percent, which is statistically no different from Kentucky's 89.5 percent. Looking just at those individuals 25 to 54—the prime working age group—Kentucky's 91.6 percent is statistically higher than the U.S. average of 90.8 percent, but statistically the same as the competitor state average of 91.5 percent. Among the competitor states, four have statistically significant lower rates (i.e., MS, AL, IN, GA), three are statistically significantly higher (i.e., OH, MO, & VA), and five are statistically the same as Kentucky (NC, WV, SC, TN & IL). Among all states, 22 are higher, 12 are lower, and 15 are statistically the same as Kentucky. California has the lowest high school attainment rate (86.9%) and Vermont has the highest (97%).

High School Graduate or Higher,
Kentucky, Competitor States and the U.S., 2023
(percent of individuals 25 to 54 years old)

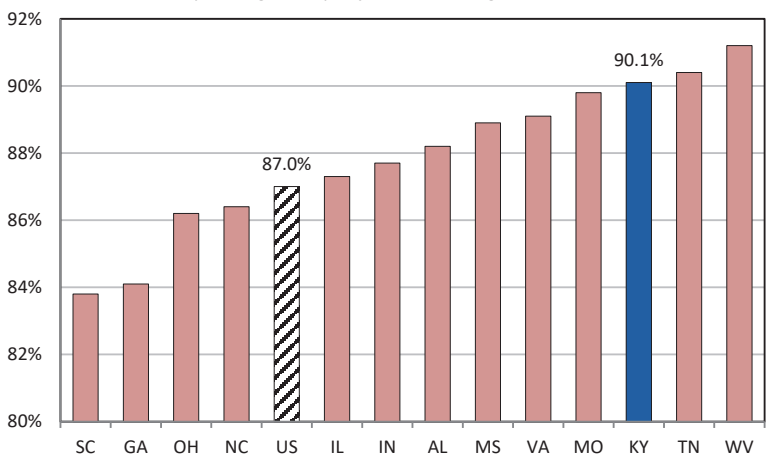


Source: Estimated by the author using the 2023 1-Year U.S. Census ACS PUMS.

High School Graduation Rate

The adjusted cohort graduation rate (ACGR) for public high school students in the United States in the 2021–2022 school year was 87 percent. Nationally, however, there is wide variation among racial and ethnic groups (i.e., Asian/Pacific Islander students, 94%; white, 90%; Hispanic, 83%; Black, 81%; and American Indian/Alaska Native: 74%). There are important economic consequences of dropping out of high school—for the individual, of course, but also for the wider community. The U.S. Department of Education data shown in the figure below are the latest data for the competitor states and Kentucky, which are for the 2021-2022 school year. As one can see by the figure, Kentucky is well positioned among the competitor states with a 90.1 percent adjusted cohort graduation rate (ACGR). At 91.2 percent, West Virginia has the highest ACGR in the country while New Mexico has the lowest at 76.6 percent; DC is lower than any state, with a value of 76.4 percent.

Graduation Rate, 2021-2022 School Year, Kentucky, Competitor States, and the U.S.
(four-year regulatory adjusted cohort graduation rate)

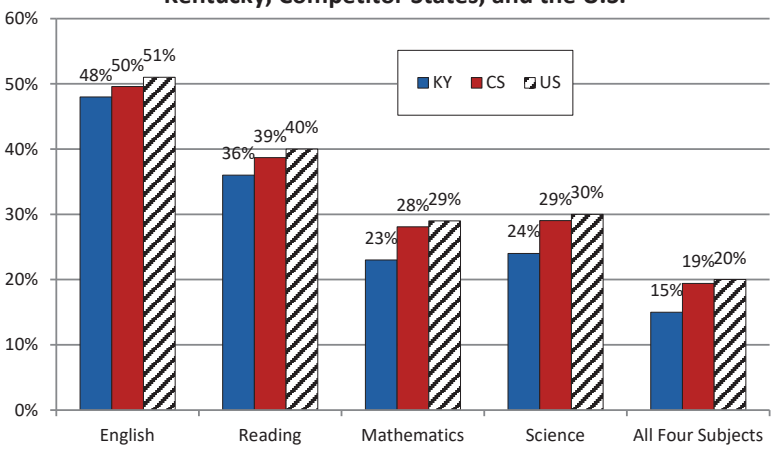


Source: U.S. Department of Education, ED Data Express, Data Library, Four-Year Adjusted-Cohort Graduation Rate and Cohort Count, data as of 5/24/2023

College Readiness

The national average Composite score for the graduating class of 2024 is 19.4, down slightly from 19.5 for the graduating class of 2023, the lowest average score since 1991. The reason: it is thought that the academic challenges created by the COVID-19 pandemic dampened performance. However, Kentucky was on a downward trend before the pandemic. An estimated 15 percent of Kentucky's recent high school graduates are considered "college ready" in all four of the tested subjects—English, reading, mathematics, and science—a decrease from 18 percent in 2021, 19 percent in 2020, 20 percent in 2019, and 22 percent in 2018. The percentage of students nationally and in the competitor states who are "college ready" in all four subjects is higher than it is in Kentucky, 20 and 19 percent respectively. And, like the Kentucky college and career percentages, both the national and competitor state performances are lower than a year earlier. It should be noted that one reason for Kentucky's lower percentage is that since 2009 state law mandates that *every* 11th grader take the ACT—even those who have no interest or intention of going to college. In contrast, 51 percent of the graduating class in the competitor states and 36 percent nationally took the ACT in 2024. There is a strong inverse relationship between the percentage of students tested and the percentage who are college and career ready.

Percent of 2024 ACT-Tested High School Graduates Meeting College Readiness Benchmarks by Subject, Kentucky, Competitor States, and the U.S.

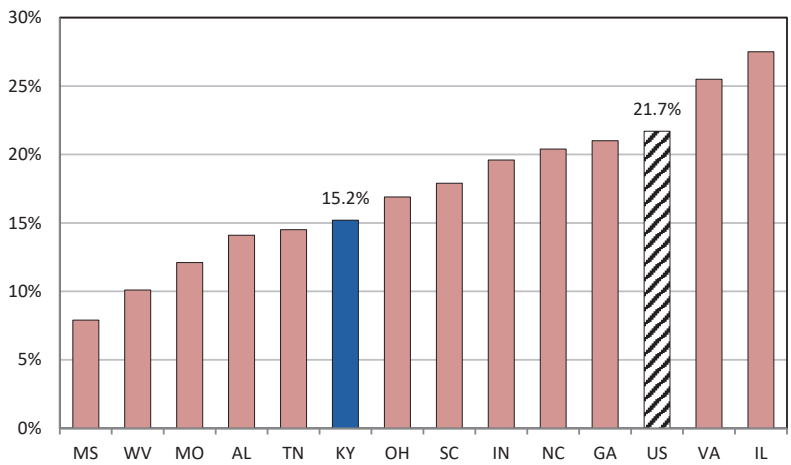


Source: U.S. High School Class of 2024 Graduating Class Data, 2024, ACT, Inc.

Advanced Placement Exam Mastery

In order to pass an Advanced Placement (AP) examination, a high school student must demonstrate mastery of college-level material. Indeed, many colleges and universities award college credit for students showing AP mastery (scoring 3+ on an exam). The National Conference of State Legislatures reports that 28 to 40 percent of first-time undergraduates take at least one remedial course. These high percentages highlight the importance of high school students being challenged academically so they are better prepared in college. The College Board, which administers the advanced placement program, offers 35 different AP exams each spring on subjects ranging from Art History to Calculus to Macroeconomics. In 2023, there were nearly 1.2 million U.S. public high school graduates who had taken an AP exam at some point, with 21.7 percent scoring a 3 or higher. This is a substantial increase from the 16.2 percent in 2010, but a decline from 22.5 in 2021. Kentucky's students have also increased their performance on AP exams over the years, from 11.3 percent in 2010 to 15.2 percent in 2023. Massachusetts had the highest percentage of students in the class of 2023 scoring a 3 or higher on an AP exam during high school—60 percent. Mississippi, Nevada, and Oklahoma at 10 percent, were the lowest. We should note, however, that these states test all graduates, whereas only 7 percent were tested in Massachusetts.

High School Students Scoring 3+ on AP Exams, Kentucky, Competitor States, and the U.S., 2023
(percent of graduating students)



Source: College Board, AP Report to the Nation, various years, and the AP Cohort Data, Graduating Class, 2023

Performance on Standardized Tests: NAEP

The pandemic exacted a high cost on student learning. The National Assessment of Educational Progress (NAEP), commonly known as the "Nation's Report Card," gauges student progress in a variety of subject areas, including reading, mathematics, and science. When the 2022 results were released in October 2022, it showed falling math and reading scores in nearly every state. Here we present the test results for 4th and 8th graders from 2005 to 2022. Before the pandemic, Kentucky 4th graders experienced large gains in math and more modest gains in reading. At the 8th grade level, Kentucky students have demonstrated modest gains in math, but have consistently trailed the national performance. Reading proficiency for Kentucky 8th graders rose to levels that were significantly higher than the national percentages in 2011 and 2013, but have since fallen to a level similar to 2007. Performance in science has been unchanged, but generally better than the national public. In 2022, Kentucky students were statistically no different from the national public students in 4th grade math, 4th grade reading, and 8th grade reading, but significantly lower in 8th grade math. While 25.5 percent of the nation's 8th graders scored proficient or higher on the math assessment in 2022, around 21.5 percent reached this level in Kentucky—a statistically significant difference.

Kentucky's Math, Reading, and Science NAEP Results, Percentage Scoring Proficient or Higher, By Subject, Grade, and Year

	2005	2007	2009	2011	2013	2015	2017	2019	2022
Math 4	26↓	31↓	37	39	42	41	40	40	33
Math 8	23↓	27↓	27↓	31↓	30↓	28↓	29↓	29↓	22↓
Reading 4	31	33	36↑	35	36	40↑	38	35	31
Reading 8	31	28	33	36↑	38↑	36	34	33	29
Science 4	-	-	45↑	-	-	44↑	-	-	-
Science 8	-	-	34↑	34↑	-	35	-	-	-

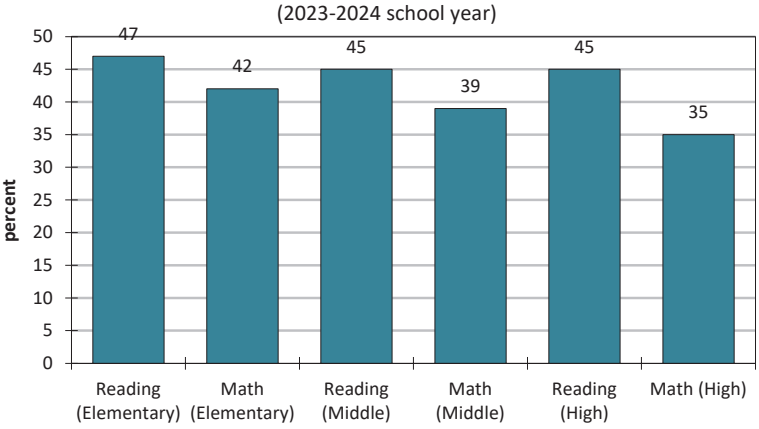
Source: National Center for Education Statistics (NCES), Institute of Educational Sciences (IES), National Assessment of Educational Progress (NAEP), Kentucky State Profile.
Note: A dash (-) in the cell indicates that this test was not taken by Kentucky students. An arrow pointed down (↓) next to a number indicates that the percentage is statistically significantly lower than the National public percentage. Conversely, an arrow pointed up (↑) next to a number indicates that the percentage is significantly higher. No arrow indicates that the Kentucky percentage is not significantly different from the National public.

Performance on Standardized Tests: KSA

Kentucky students take the Kentucky Summative Assessment (KSA) to meet federal and state testing requirements. Previously, these tests were called Kentucky Performance Rating for Educational Progress (K-PREP). They are developed by Kentucky teachers and align with the Kentucky Academic Standards in each content area. There are a number of tests used to assess academic performance, such as reading, math, science, social studies, and writing. The percentage of students who are considered proficient or distinguished—the levels we want students to achieve—are less than half. The figure below illustrates reading and mathematics proficiency or higher on the most recent school year (2023-2024).

Kentucky Summative Assessment (KSA) Results, Percentage of Students at or above Proficient

(2023-2024 school year)

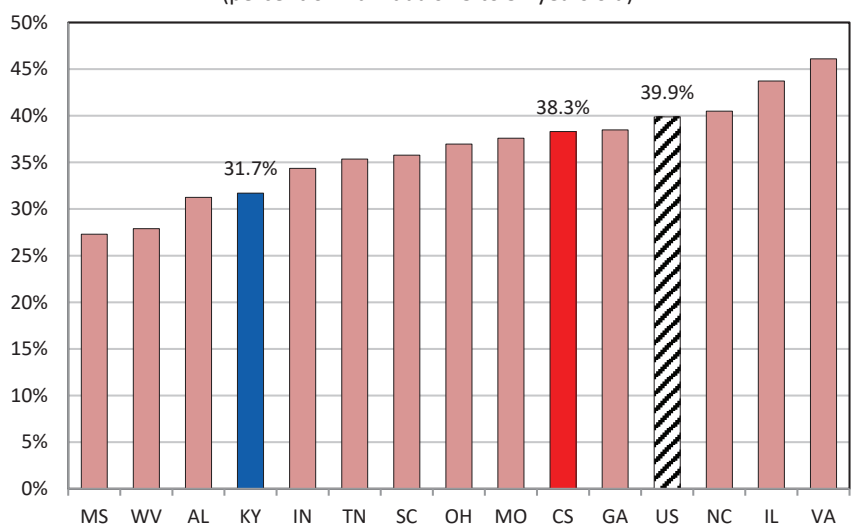


Source: Source: Kentucky Department of Education, Assessment and Accountability Datasets 2023-2024, downloaded 10/23/2024, available at: https://www.education.ky.gov/Open-House/data/Pages/Assessment_Accountability_Datasets_2023-2024.aspx

College Attainment

Today, any "routine" job and a growing number of high-skill jobs can be automated and outsourced. Competition in such an environment requires providing something that others cannot. That "something" will come from workers who have high levels of education and skill. Essentially, the rigors of the global economy require creative, highly skilled, college-educated workers. Since 1990, Kentucky has made important progress, as the proportion of adults 25 and older with a four-year degree or higher climbed from 13.6 percent to 27.8 percent in 2023; by comparison, the U.S. percentage in 2023 was 36.2. Among prime working age adults 25 to 54, however, the state continues to significantly lag the competitor states and the nation in educational attainment at the college level—31.7 percent for Kentucky compared to 38.3 and 39.9 percent for the competitor states and U.S. respectively. Virtually all of the competitor states are (statistically) significantly higher than Kentucky, while Mississippi and West Virginia are significantly lower; Alabama is statistically the same as Kentucky. Massachusetts has the highest rate in the nation (54.2%) and Mississippi the lowest (27.3%). Nationally, 39 states have higher rates than Kentucky while six are lower and four are statistically the same as Kentucky.

Bachelor's Degree or Higher,
Kentucky, Competitor States and the U.S., 2023
(percent of individuals 25 to 54 years old)

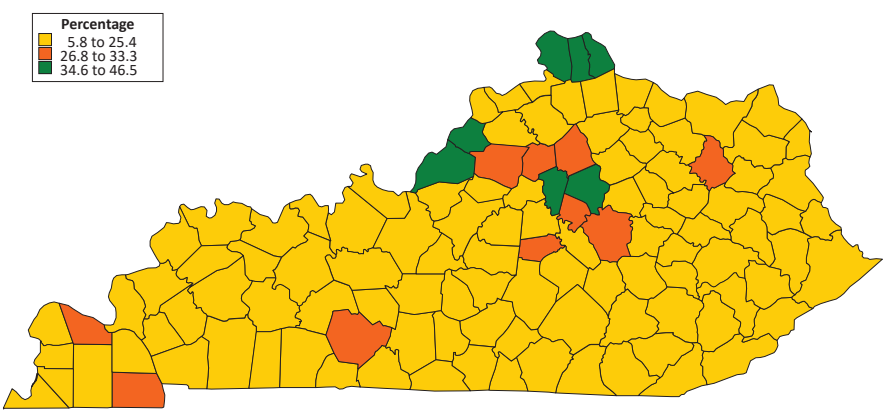


Source: Estimated by the author using data from the 2023 1-Year U.S. Census ACS PUMS.

College Attainment by County

There are seven Kentucky counties where the percentage of the population with a bachelor's degree or higher (using the 2018-2022 American Community Survey 5-year estimate) exceeds the U.S. average of 34.3 percent. These seven counties anchor the so-called urban triangle—Fayette (46.5%), Oldham (45.4%), Woodford (40.7%), Campbell (39.3%), Kenton (36.5%) Jefferson (36.1%), and Boone (34.6%). There are ten counties that are above the Kentucky average of 26.5 percent but below the U.S. average—ranging from Boyle County's 26.8 percent to Madison County's 33.3 percent. Kentucky's remaining 103 counties are below the Kentucky average, with five counties in the single digits. It is extremely difficult for any geographic region—whether a city, a county, a state, or a country—to be globally competitive without a skilled and educated population.

Kentucky County-Level Bachelor's Degree or Higher, 2018-2022
(individuals 25 years and older)



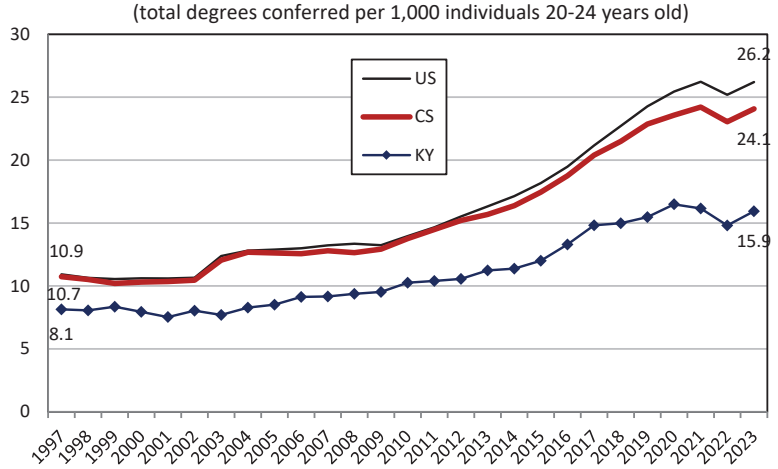
Source: U.S. Census, American Community Survey, 2022 5-Year Estimate, Table S1501

Science and Engineering Graduates

Being competitive in the global economy depends upon many things—including continuous innovation in products and services and having a highly skilled workforce. It is especially important to have a workforce with a high level of science, technology, engineering, and mathematics (STEM) training and expertise. The national average wage for all STEM occupations in 2023 was $112,770, nearly double the national average wage for non-STEM occupations ($62,080). And not only are wages nearly double for STEM occupations compared to non-STEM occupations, so too is the job growth rate. Employment in STEM occupations grew by 19.2 percent nationally, or nearly 1.5 million jobs, between May 2007 and May 2018, compared with 6.6 percent growth in the number of jobs overall. While remaining substantially below the competitor states and the U.S., the total number of science and engineering degrees conferred per 1,000 individuals from 20 to 24 years old in Kentucky has increased since 1997—from 8.1 to 15.9. By comparison, the competitor states (24.1) and the U.S. (26.2) awarded significantly more STEM-designated bachelor's degrees in 2023. Over the last two and a half decades, the percentage increase in these numbers is greater in the U.S. (140%) and the competitor states (124%) than in Kentucky (96%).

STEM-Designated Bachelor's Degrees Awarded, Kentucky, Competitor States, and the U.S., 1997-2023

(total degrees conferred per 1,000 individuals 20-24 years old)

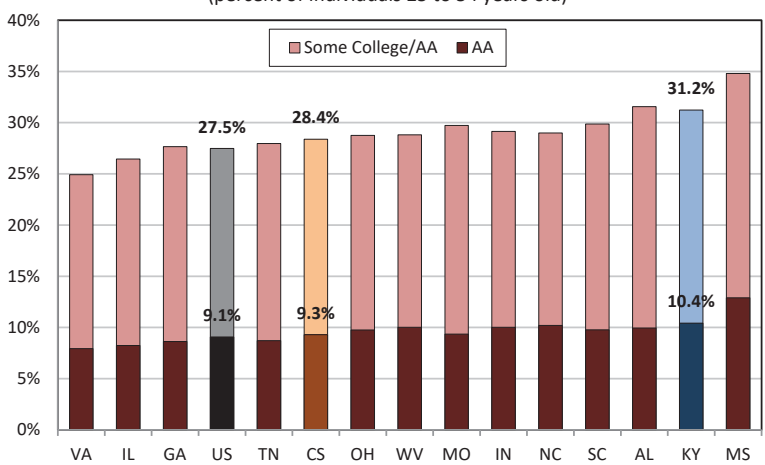


Source: Author's analysis of Integrated Postsecondary Education Data System (IPEDS) data using 2013 designated CIP Codes to identify STEM degrees & U.S. Census data for population estimates

Some College or Associate Degrees

The associate degree is a terminal degree for many people, while others use it as a springboard toward a bachelor's degree. A significant portion of the population, however, have one or more years of college but no degree. Individuals with some college but no degree are good candidates for continuing their education toward a degree or credential. Our analyses on the economic and societal benefits of postsecondary education show that an individual with an associate degree or a bachelor's degree will, on average, have higher income, less unemployment, and better health outcomes—to name a few of the benefits afforded by higher education—than someone with lower levels of education. The percentage of prime working age adults between 25 and 54 years old in Kentucky with an associate degree is an estimated 10.4 percent. Among the competitor states, five have statistically significant lower percentages (i.e., GA, IL, MO, TN, & VA), and this includes the competitor states (9.3%) and the U.S. (9.1%). We also show the percentage of prime working-age adults who attended college but did not graduate combined with those who have earned an associate degree (i.e., AA & Some College combined). Nearly 31 percent of Kentucky's prime working-age population (31.2%), for example, have an associate degree or at least some college without earning a four-year degree.

Some College or Associate's Degree Attainment, Kentucky, Competitor States and the U.S., 2023
(percent of individuals 25 to 54 years old)

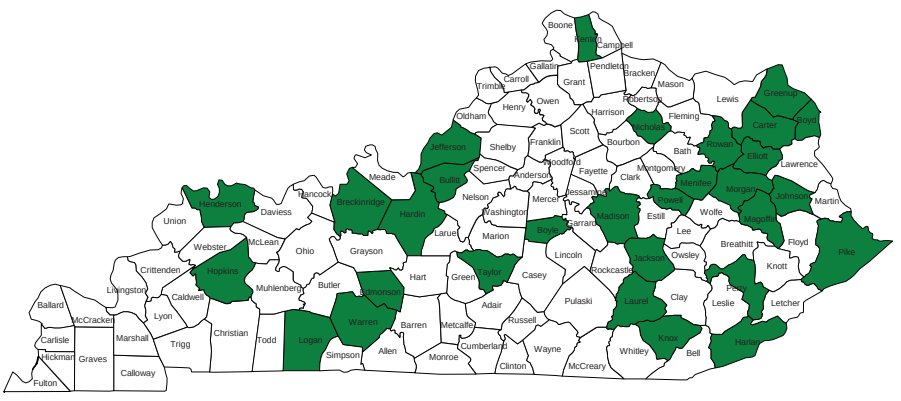


Source: Estimated by the author using data from the 2023 1-Year U.S. Census ACS PUMS.

Bright Spot Schools

Sometimes schools perform better than expected on things like the percentage of elementary students who achieve proficiency or distinguished in reading, or the proportion of less-advantaged middle school students who show a similar level of competency on the math assessment. Using school-level data that includes educational and demographic factors over an eight-year period, we estimate an expected level of performance and then compare it to the actual performance for each school. There are two conditions that a school must meet in order to satisfy our definition as a "bright spot." First, we evaluate all students on an outcome measure, such as K-PREP elementary mathematics outcomes, to assess whether a school exhibits better-than-expected performance at least once from 2011 to 2018. Second, while focusing on the same educational outcome measure, but for at-risk students (e.g., low-income or disabled students), we analyze the model residuals to assess whether a school exhibits a significant improvement in performance relative to expectations over the time period. Using this approach, we identified 47 "bright spot" schools located in all regions of the state and in 30 different counties. As illustrated in the county-level map below, these are diverse settings (e.g., urban-rural, east-west, distressed areas as well as prosperous ones), showing that all students are capable of performing at a high level.

Kentucky Counties with "Bright Spot" Schools



Energy

PUBLIC POLICIES AROUND energy, power requirements for artificial intelligence (AI), and consumer preferences around electric vehicles (EV) have created significant uncertainty about the future direction of the U.S. energy supply and demand trends. The 2021 Infrastructure Investment and Jobs Act, as well as the 2022 Inflation Reduction Act, included billions of dollars to incentivize the development and use of renewable energy.

While this created significant momentum for renewables, the political, economic, and energy climate has been changing. The incoming federal administration has signaled a retreat from renewables and a renewed emphasis on carbon-based energy sources. Moreover, climbing electricity demand, driven in part by AI, is elevating the importance of coal and natural gas. An AI query, for example, requires ten times more electricity than a single Google search. Regarding consumer demand, a J.D. Power forecast released in August 2024 indicated that U.S. EV sales are expected to reach just 9 percent of the market this year, lowering its previous forecast of 12 percent.

Compelled by financial concerns and incentivized by federal legislation, electric utility companies have been transitioning away from coal and toward natural gas as a fuel source. In 2023, natural gas accounted for 43 percent of the U.S. electricity generation; coal, by comparison, accounted for 16 percent. The use of natural gas to produce electricity—and the concomitant decline

continued on the next page

continued from the previous page
in the use of coal—has been going on for nearly 25 years.

Meanwhile, over the long-term, renewable energy is expected to grow as an energy source. While there are many uncertainties about the future direction of energy production and consumption, the U.S. Energy Information Administration (EIA) notes in its *Annual Energy Outlook 2023* that renewable energy sources will continue to grow and slowly replace fossil fuels. In the mid-term, the EIA states in a different report, the *World Energy Outlook 2022*, that "By 2030, thanks in large part to the U.S. Inflation Reduction Act, annual solar and wind capacity additions in the United States grow two-and-a-half-times over today's levels, while electric car sales are seven times larger."

In the short term, however, almost all of the top twenty fossil fuel-producing countries plan to produce more oil, gas, and coal in 2030 than they do today. This comes from a 2023 United Nations backed report, *The Production Gap: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises*. According to the *New York Times*, "In 2030, if current projections hold, the United States will drill for more oil and gas than at any point in its history. Russia and Saudi Arabia plan to do the same."

The power of the global financial markets to impact the global energy portfolio suggests that no single entity can determine the future of energy generation—and the markets are betting on renewables. Of Kentucky's total energy production, nearly 8 percent is from renewable sources, and it is growing rapidly here and across the United States.

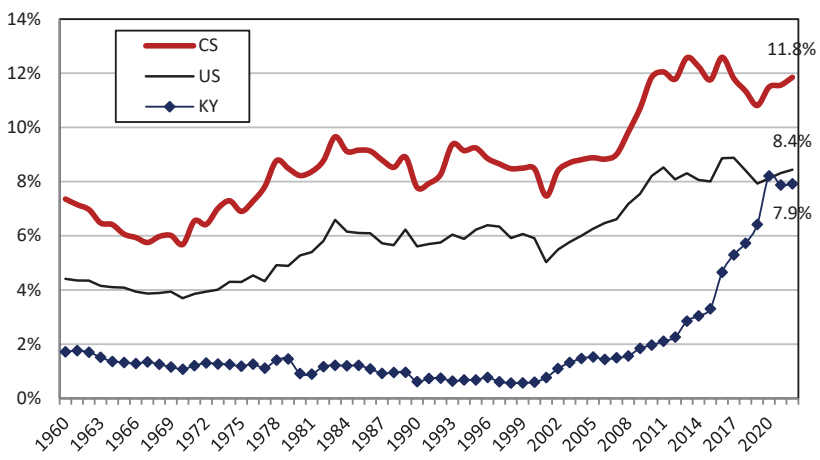
Business is embracing "green," and the implications of a shifting energy landscape will be felt now and in the future as the Kentucky economy and labor markets are compelled to adapt and react. For example, Toyota, which employs approximately 8,000 individuals in Scott County, is encouraging its manufacturing plants to use increasing amounts of renewable and hydrogen energy as it pursues *Environmental Challenge 2050*, its corporate-level plan of zero CO2 emissions. Toyota is not alone. Some of the largest corporate employers in Kentucky—GE, UPS, Ford, and Walmart—have environmental and energy plans to reduce greenhouse gases and use more renewable energy.

The changing economics of the coal industry have been widely publicized. Statewide coal production in 2023 remained about the same as in 2022, 28.5 million tons, an 8 percent upswing from 2021. However, coal production in the first three quarters of 2024 is down 14.2 percent compared to the first three quarters of 2023.

Renewable Energy Production

Renewable energy sources include biomass, geothermal, wind, solar, and hydropower. The U.S. Energy Information Administration (EIA) considers multiple future energy production scenarios. According to the EIA *Annual Energy Outlook 2023*, "Renewables displace fossil fuels in the electric power sector due to declining renewable technology costs and rising subsidies for renewable power." The growth of renewables is especially pronounced in Kentucky, as illustrated by the graph below. There could be important future economic implications for Kentucky as a result of this anticipated shift in energy production. Rising employment in solar, wind, and natural gas has coincided with the shift in energy generation by source. Of Kentucky's total energy production, 7.9 percent is from renewable sources. This is just below the national average (8.4%), but nearly four percentage points behind the competitor state average (11.8%).

Renewable Energy Production,
Kentucky, Competitor States, and the U.S., 1960 to 2022
(expressed as a percentage of total energy production)

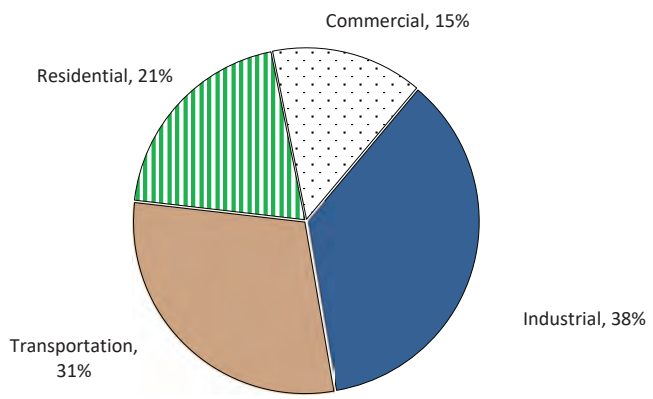


Source: U.S. Energy Information Administration, State Energy Data Production, State Energy Data System (SEDS), 1960-2022 estimates, https://www.eia.gov/state/seds/

Energy Consumption by End-Use Sector

Energy consumption is categorized into four broad sectors: industrial, commercial, residential, and transportation. Industry consumes the bulk of energy in Kentucky, accounting for 38 percent of the total consumption (2021). As noted in the Kentucky Department for Energy Development and Independence, *2017 Energy Profile*, our state has large manufacturing operations like General Electric, Ford, and Toyota, as well as other "energy-intensive manufacturing processes including; aluminum smelting, iron and steel mills, paper mills, chemical production, and glass manufacturing." By comparison, industrial consumption by the competitor states and the U.S. as a percentage of total energy consumption is 31 and 33 percent, respectively. The transportation sector in Kentucky is the second largest consumer of energy, accounting for 31 percent, compared to 28 percent in the competitor states as well as in the U.S. The residential sector in Kentucky, the competitor states, and the U.S., consumes 21, 24, and 21 percent. And while the commercial sector in Kentucky accounts for only 15 percent, it represents 18 to 19 percent of total energy consumption for the competitor states and the U.S. Broadly speaking, these distributions suggest that public policies affecting energy usage will be disproportionately felt in Kentucky by *industrial* users.

Kentucky Energy Consumption by Sector, 2021
(consumption by end-use sector)

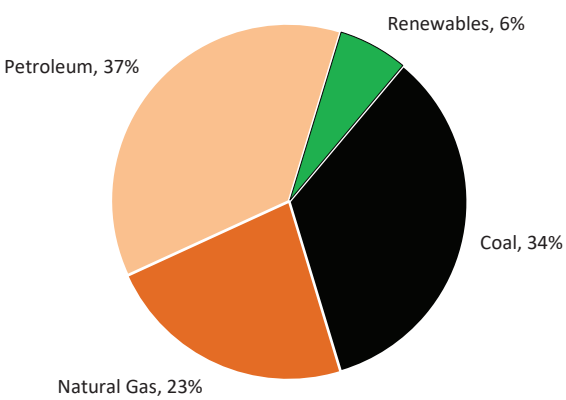


Source: U.S. Energy Information Administration, State Energy Data System 2021

Energy Consumption by Source

Of the four broad energy sources used in Kentucky—coal, natural gas, petroleum, and renewables—petroleum has surpassed coal, and accounts for the majority of the total consumption at 37 percent (2021). In 2011, coal was the main source and constituted over half at 52 percent, but in 2021 it was 34 percent. While the chart below represents energy consumption for all uses, Kentucky relies heavily on coal for electricity generation. According to the Kentucky Department for Energy Development and Independence, *2023 Energy Profile*, "Coal accounts for 69% of Kentucky's electricity portfolio and 32% of its total energy consumption." This is expected to change, however, given the many factors affecting coal usage, such as federal environmental regulations, aging coal generators, and low natural gas prices. The upshot is that Kentucky will become increasingly dependent upon natural gas for future electricity generation. By comparison, coal consumption by the competitor states and the U.S. as a percentage of total energy consumption is 16 and 11 percent, respectively, and is declining. Natural gas is about 23 percent in Kentucky (and rising), but much higher as well as rising in the U.S. (32%) and the competitor states (29%). The competitor states and the U.S.—as well as Kentucky—are moving away from coal and toward natural gas.

Kentucky Energy Consumption by Source, 2021
(consumption by fuel type)

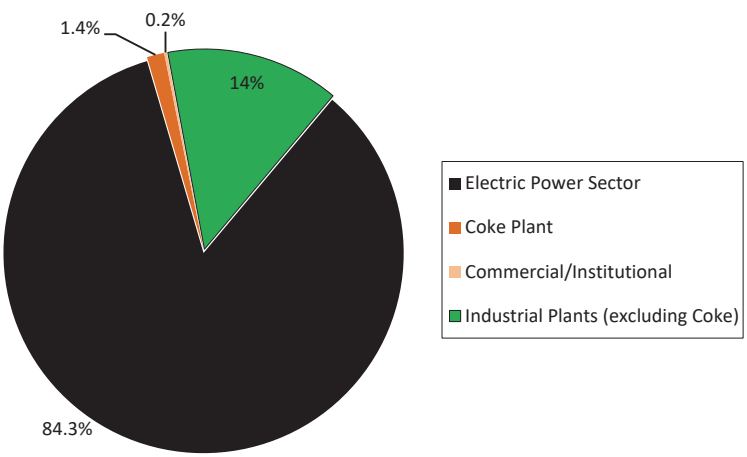


Source: U.S. Energy Information Administration, State Energy Data System 2021

Kentucky Coal Distribution

The vast majority of Kentucky coal is used to generate electricity. Of the 24.4 million tons of Kentucky coal distributed in 2023, roughly 22.5 million tons was distributed domestically among the four categories shown below: electric power sector; coke plant; commercial & institutional; and industrial plants (excluding coke). An additional amount of Kentucky coal is exported out of the country—just under 1 million tons in 2023. Of the Kentucky produced coal that was consumed domestically in 2023, it is estimated that 84.3 percent went toward electric power generation. However, for a variety of reasons, electrical power plants are moving away from coal and toward natural gas as a fuel source (see the next page), and this has been a major factor in the decline of Kentucky's coal industry.

Kentucky Coal Distribution, 2023
(domestic consumption by end-user type)



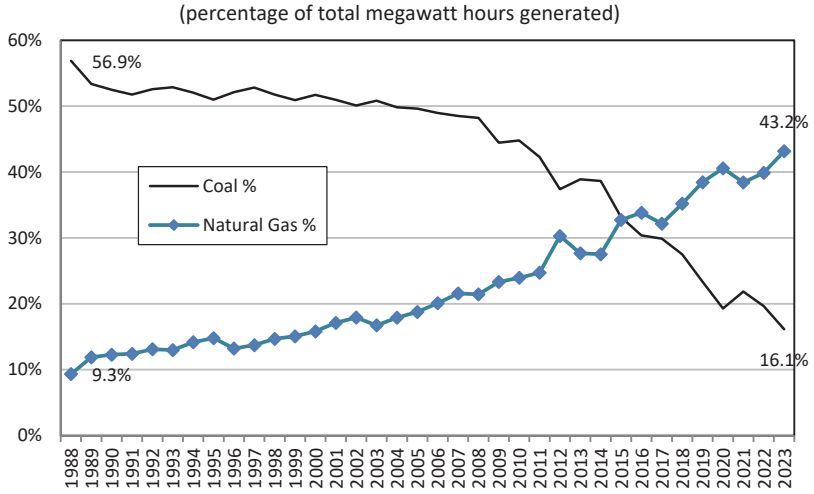
Source: U.S. Energy Information Administration, Annual Coal Distribution Report 2023, available at: https://www.eia.gov/coal/distribution/annual/

Natural Gas Supplanting Coal

The use of natural gas to produce electricity—and the concomitant decline in the use of coal—has been going on for over 35 years. In 1988, coal accounted for about 57 percent of the total megawatt hours generated and natural gas accounted for just over 9 percent. This was the high point for coal and the low point for natural gas when viewed over the 74 year period from 1949 to 2023. Since 1988, coal has been declining and natural gas has been increasing, as is readily evident by the line chart below. This is a watershed moment for coal. Natural gas has supplanted coal as the principal source of fuel for generating electricity in the United States—accounting for 43.2 percent; coal, by comparison, accounts for 16.1 percent. Nuclear is another major energy source of electricity in the U.S. at 18.5 percent. The fracking boom has made natural gas a more financially attractive source of fuel for generating electricity. Relatively cheap natural gas, the rising importance of renewable sources, which currently accounts for about 21.4 percent of total net electricity generation in the U.S., and the mounting environmental concerns surrounding coal-fired power plants, are making fundamental changes to the global energy market—which, of course, are being felt in Kentucky's coal regions. Coal-fired power plants are being retired in large numbers in the U.S., and portend a continuing decline in the coal industry.

U.S. Electricity Generation, by Source, Coal and Natural Gas, 1988-2023

(percentage of total megawatt hours generated)

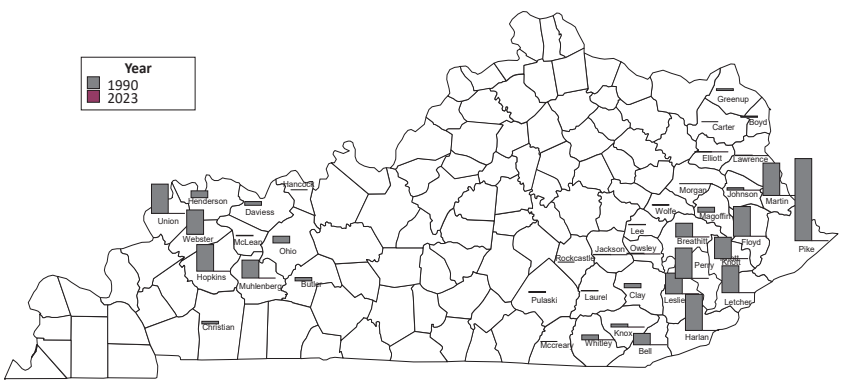


Source: Energy Information Adminstration, State Energy Data System

Coal Production

The changing economics of the coal industry have been widely publicized. Cheaper sources of energy, like natural gas and renewables, more stringent air-quality regulations, and weaker-than-expected demand for coal in Asia are leading to decreases in the amount of coal produced in Kentucky. Statewide coal production in 2023 remained about the same as in 2022, 28.5 million tons, a 8 percent upswing from 2021. However, this is one of the lowest levels of recorded annual production since the early 1900s. The high point of coal production in the state was in 1990 when 179 million tons was mined in 40 Eastern and Western Kentucky counties. Coal production has been declining since that time, evidenced by the production totals in recent years as well as the lower number of counties (21) reporting some level of production. The map below shows the 1990 and 2023 production levels, with every county experiencing a decline over the 33-year period. As is evident by the map, the declines are steep in Eastern Kentucky as well as in Western Kentucky. Moreover, coal production in the first three quarters of 2024 is down 14.2 percent compared to the first three quarters of 2023.

Kentucky Coal Production by County, 1990 & 2023
(total tonnage)



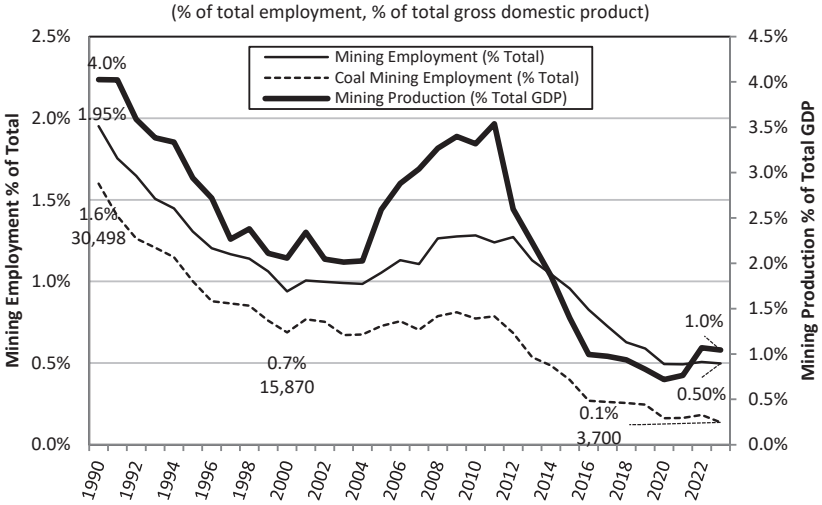
Source: U.S. Energy Information Administration, Annual Coal Report, various years.

MINING & COAL

In 2023, an estimated 3,706 persons were employed at Kentucky coal mines, a drop from 4,815 in 2022. One has to go back over 120 years to find employment levels this low; there were an average of 6,399 coal miners in the state in 1898. While Kentucky mines a significant amount of coal in both Western and Eastern Kentucky, the bulk of the job losses have been in Eastern Kentucky. When viewed within the context of the state's wider economy, mining employment and coal mining employment are 0.5% and 0.1% of total employment, respectively. Similarly, mining production accounts for 1.0% of Kentucky's gross domestic product. While the effects of declining production and loss of jobs are small relative to the size of the state's overall economy, the communities where these jobs are concentrated have been hit extremely hard. According to the latest employment numbers from the Kentucky Energy and Environment Cabinet, in the third quarter of 2024 (July to September), coal related employment was 2,812 in Eastern Kentucky and 1,574 in Western Kentucky. These employment numbers include all employees engaged in production, preparation, processing, development, maintenance, repair, shop or yard work at mining operations, mining operations management and all technical and engineering personnel (these numbers also include office workers).

Kentucky Mining Employment & Production, 1990-2023

(% of total employment, % of total gross domestic product)



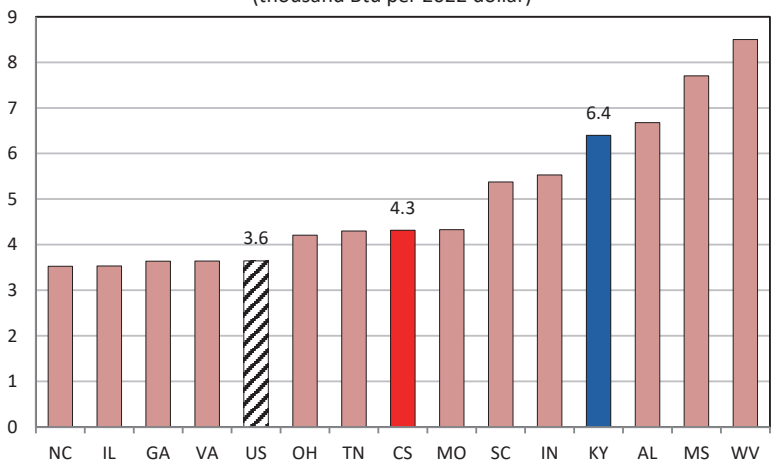
Source: Bureau of Economic Analysis & Energy Information Administration, Annual Coal Report, various years, and Kentucky Coal Facts, various years

Energy Consumption per GDP

Kentucky has an energy intensive economy. To generate $1 in state gross domestic product, Kentucky consumes about 6,400 Btu (2022). By comparison, the U.S. average is around 3,600 Btu and the competitor state average is 4,300 Btu. This difference is driven, in part, by Kentucky's larger than average manufacturing sector, which, of course, depends greatly upon energy as a production input. One implication of this higher dependence on energy as an economic input is that, compared to most of the competitor states, Kentucky's economy is more sensitive to energy prices.

Energy Consumption per Real Dollar of GDP, 2022, Kentucky, Competitor States, and the U.S.

(thousand Btu per 2022 dollar)

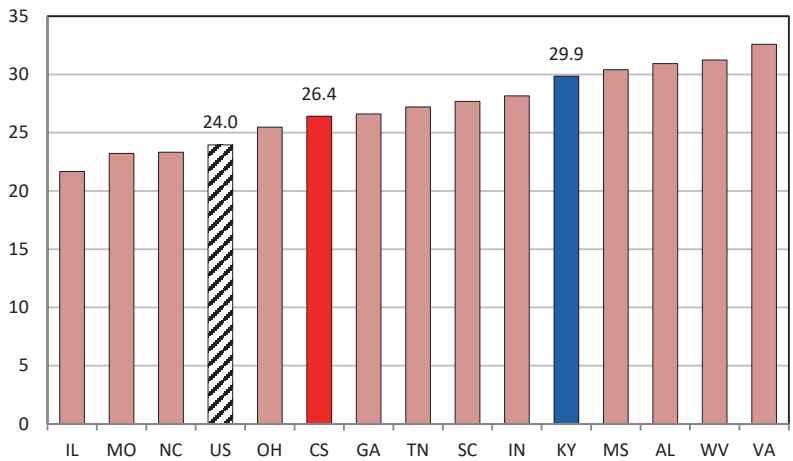


Source: Calculated using data from the U.S. Energy Information Administration and Bureau of Economic Analysis

ENERGY EFFICIENCY

This variable is an indicator of energy efficiency and conservation. It is the number of megawatt hours of electricity sold to all customers; it is inclusive of residential, commercial, industrial, and transportation sales and customers. It is not a perfect measure of energy efficiency, since it is affected by the industrial mix in a state. If we limited this to only residential sales and customers, then Kentucky's energy usage/efficiency improves somewhat when compared to the competitor states and the U.S. For example, while Kentucky has the fifth highest usage when including *all sales and customers* (see below, comparing competitor states only), it is the seventh highest when only examining *residential* usage/efficiency. Kentucky's megawatt usage per residential customer is 11.9 (in thousands of megawatt hours), which is below Mississippi (13.9), the highest competitor state; Illinois is the lowest competitor state using the residential measure (8.0). The residential only competitor state average is 11.3 while the U.S. average is 10.3—both lower than Kentucky's residential per customer usage (11.9).

Megawatt Hours per Energy Customer, 2022, Kentucky, Competitor States, and the U.S.
(thousands of megawatt hours)



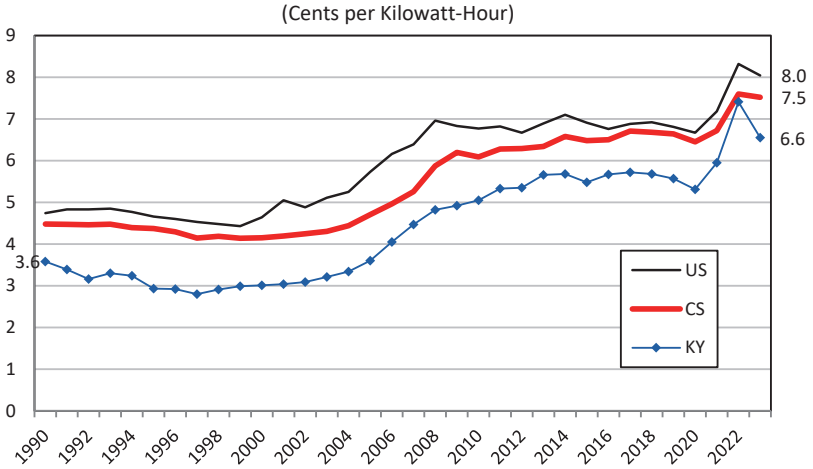
Source: Calculated using data from the U.S. Energy Information Administration

Industrial Electricity Costs

Frequently cited as an important factor to recruit new industries to Kentucky as well as keep existing industries competitive, electricity prices here are consistently below the U.S. and competitor state averages. Kentucky's industrial rates are lower because of an abundance of coal and coal-fired power plants in the state and region. However, the average retail price of electricity to industrial customers increased in Kentucky by 134 percent from its nadir of 2.8 cents in 1997 to 6.6 cents in 2023 (current dollars). As prices have increased so too have the worries that Kentucky is losing its comparative advantage in low-cost utility rates; price increases for the U.S. and competitor states during the same time period (from 1997 to 2023) have been about 80 percent. Nonetheless, in 1990 Kentucky had the seventh lowest industrial rate in the country and in 2023 it was still the seventh lowest. And among the competitor states Kentucky's industrial rates are the second lowest, trailing only Tennessee. Kentucky's annual rate in 2023—at 6.6 cents per kilowatt-hour—was below the U.S. (8.0) and competitor states (7.5).

Average Retail Price of Electricity, Industrial Customers, Kentucky, Competitor States, and the U.S., 1990-2023

(Cents per Kilowatt-Hour)



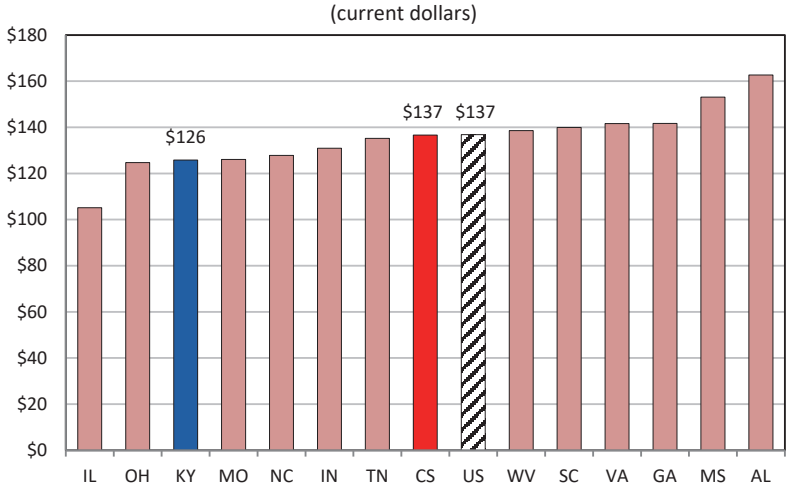
Source: U.S. Energy Information Administration

Note: The CS values are calculated as an unweighted average each year using the 12 competitor states.

RESIDENTIAL ELECTRICITY COSTS

According to the U.S. Census Bureau, Consumer Expenditure Survey, the typical "consumer unit" had $77,280 in average annual expenditures in 2023—with annual electricity expenses of $1,763. In the South Region of the U.S.—where Kentucky and eight of the competitor states are located—average annual expenditures were $68,364 and annual electricity expenses were $1,962. Electricity costs range in these two examples from 2.3 to 2.9 percent of total expenditures. Using data from the U.S. Energy Information Administration, residential average monthly electricity bills, among the competitor states, ranged from a low of $105 in Illinois to a high of $163 in Alabama. At $126, Kentucky's average residential monthly bill is about the same as the U.S. and competitor state averages. Like industrial customers of electricity, Kentucky's residential customers enjoy somewhat lower rates than most competitor states.

Residential Average Monthly Electricity Bill, 2023, Kentucky, Competitor States, and the U.S.
(current dollars)



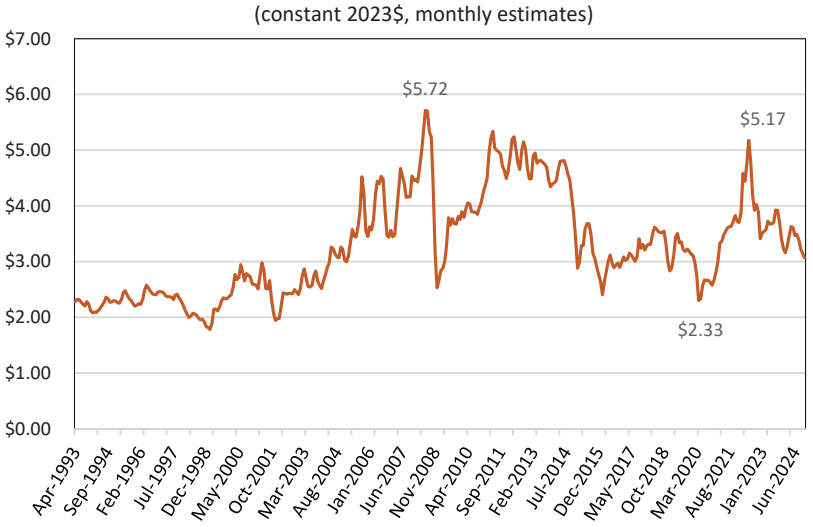
Source: U.S. Energy Information Administration
Note: The competitor states average (CS) is an unweighted average.

Motor Gasoline Expenditures

The typical American "consumer unit," what most would consider the average household, spent $77,280 on various products and services in 2023 according to the Consumer Expenditure Survey; "gasoline and motor oil" accounted for $2,694—about 3.5 percent of the total. This is a large decrease compared to 2022 when it was 4.2 percent. The high point for gasoline in the last thirty years was in June 2008, when it reached $5.72 a gallon (constant 2023 dollars). Soon after the pandemic began in April 2020, the price was down to $2.30. Prices peaked again in June 2022 ($5.17), but declined to around $3.07 by November 2024. High gasoline prices can affect people differently depending on where they live. Many rural residents in Kentucky have longer commute times (and therefore probably longer distances to travel) compared to Kentuckians living in metro areas. The average commute times for Kentucky's metro, somewhat rural, and completely rural residents are 25.9, 25.5, and 27.6 minutes, respectively (based on U.S. Census ACS 2021, 5-year estimates).

U.S. All Grades, All Formulations, Retail Gasoline Prices, Dollars per Gallon, April 1993 to November 2024

(constant 2023$, monthly estimates)



Source: Energy Information Adminstration, State Energy Data System

Environment

ENVIRONMENTAL POLICY IS LIKELY to change with the incoming administration, but it is not yet clear how and to what extent. Two major acts of federal legislation in the last few years, the $1.2 trillion Infrastructure Investment and Jobs Act of 2021 and the Inflation Reduction Act of 2022, include heavy doses of environmentalism. Both bills include significant funding designed to affect environmental quality. However, during his campaign, President-elect Trump said he wants to "get rid of virtually all Biden administration regulations intended to cut carbon emissions and move away from fossil fuels," and also "called for the repeal of the Inflation Reduction Act, Biden's signature climate law" (PBS, November 2024).

The stated priorities of the Infrastructure Investment and Jobs Act, for instance, include delivering (italics added) "*clean water* to all American families and eliminating the nation's lead service lines," repairing and rebuilding "roads and bridges with a focus on *climate change mitigation*," reducing "*greenhouse emissions* through the largest investment in public transit in U.S. history," building "a national *network of electric vehicle (EV) chargers*," upgrading the "power infrastructure to deliver *clean, reliable energy*," deploying "cutting-edge energy technology to achieve a *zero-emissions future*," making "infrastructure resilient against the impacts of *climate change*, cyber-attacks, and *extreme weather events*," and delivering "the largest investment in tackling *legacy pollution* in American history by *cleaning up*

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Superfund and brownfield sites, *reclaiming abandoned mines*, and capping orphaned oil and gas wells."

Some of the funds allocated for Kentucky thus far include several environmental projects, including orphaned well site plugging, brownfields redevelopment, revegetation of mined lands, and clean water projects.

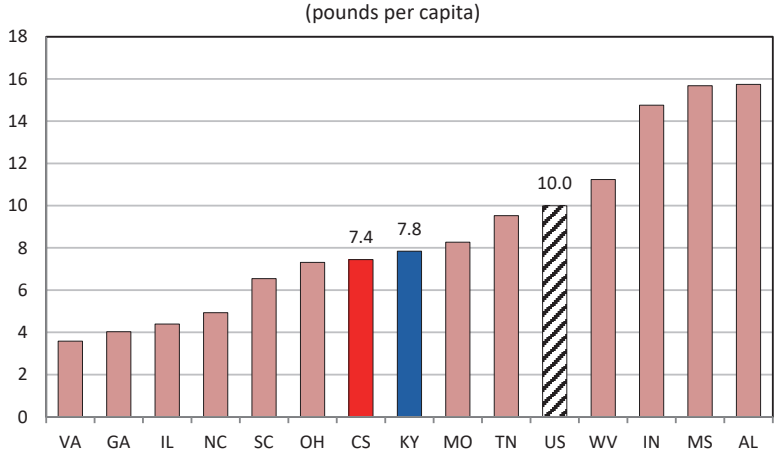
The Inflation Reduction Act includes an additional $370 billion in spending and tax credits to support alternative forms of energy to fight climate change. According to an assessment of the legislation by the *Committee for a Responsible Federal Budget*, this legislation will create "new or expanded tax credits to promote clean energy generation, electrification, green technology retrofits for homes and buildings, greater use of clean fuels, environmental conservation, and wider adoption of electric vehicles…"

While both bills address a range of other issues, there is clearly an emphasis on addressing climate change in the Investment and Jobs Act, as well as the Inflation Reduction Act. Our economic development policies and practices can, and do, affect the quality of the air, water, land, and other environmental assets of the state. At the same time, a body of literature has emerged demonstrating how community amenities, such as a clean and beautiful environment, are used as a tool for attracting and retaining entrepreneurs and innovators—who can also be job creators. Environmental regulations are important considerations for CEOs exploring sites for industrial expansion or relocation—but so are "quality of life" considerations, which might include a clean environment. At a time when the broad-based threats to the environment resulting from climate change appear to be gaining traction as an important public-policy issue around the globe, the typical Kentuckian is breathing cleaner air, drinking cleaner water, and being more responsible with solid waste than ever before. The economic, natural, and public-policy landscapes are dynamic, requiring resiliency and thoughtfulness, as we consider policy options that frequently compete with each other and are ever-changing.

TOXIC RELEASES

Toxic pollutants can cause cancer or other serious health effects, such as reproductive or birth defects, as well as adverse ecological and environmental consequences. The Environmental Protection Agency (EPA) provides data to help communities identify chemical disposal facilities and other toxic release patterns that warrant public vigilance. Combined with hazard and exposure information, these data can be valuable in risk identification. Given that toxic releases are often by-products of manufacturing processes, it is not surprising that Kentucky, which is home to an above-average manufacturing base, typically exceeds the U.S. average in toxic releases. In 2023, however, the EPA reports that Kentucky experienced 7.8 pounds of toxic releases per capita (the 23th highest nationally); this is a decrease from 12.6 pounds in 2022. The most recent data show that Kentucky is below the national level (10 pounds) but is slightly higher than the competitor states average (7.4).

Toxic Chemicals Disposed of or Otherwise Released, 2023
Kentucky, Competitor States, and the U.S.
(pounds per capita)

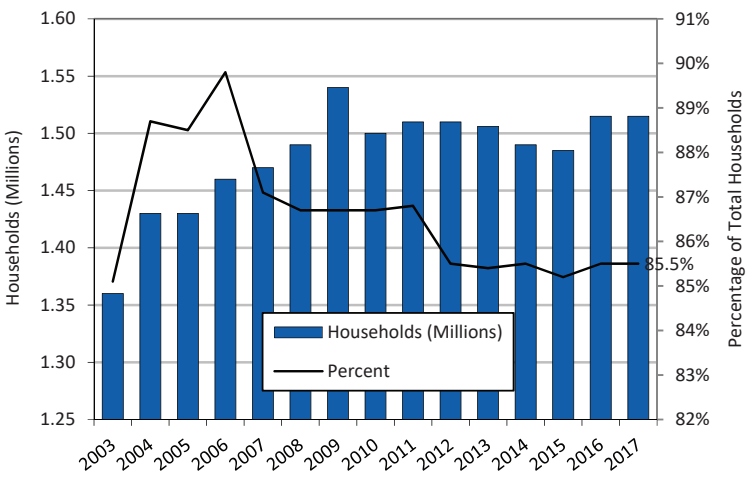


Source: United States Environmental Protection Agency. (2024). TRI Explorer (2023 National Analysis Dataset (updated October 2024, released October 2024)) [Internet database]. Retrieved from https://enviro.epa.gov/triexplorer/, (November 22, 2024).

Solid Waste

Beginning in 2002, state law required waste haulers and recycling haulers to register and report to each county in which they provide service, thereby providing data on the number of households that participate in municipal solid waste collection (MSW). The 2016 and 2017 statewide household participation rates for MSW collection were around 85.5 percent. The Kentucky Division of Waste Management (DWM) estimates that another 5-10 percent of households either legally self-haul their waste to transfer stations or are otherwise not counted in these numbers because they use dumpsters in multi-unit housing complexes. Consequently, the real percentage of households participating in municipal solid waste collections is likely 90 to 95 percent according to the DWM. The remaining 5 to 10 percent of households are thought to illegally dump their waste. The DWM notes in its 2018 Annual Report that household municipal solid waste participation remains steady in 2017.

Kentucky Households Participating in Municipal Solid Waste (MSW) Collection, 2003-2017



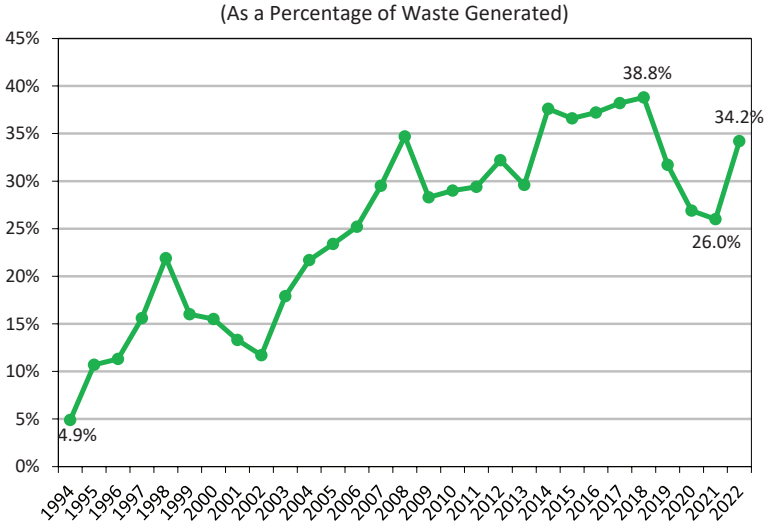
Source: Kentucky Division of Waste Management Annual Reports, various years

RECYCLING

According to the Kentucky Division of Waste Management, Kentuckians recycled 34.2 percent of common household recyclables in 2022 (e.g., aluminum, cardboard, steel, plastic, newspaper, glass, and paper), up from 26 percent a year earlier. The 2021 recycing rate was the lowest percentage since 2006. The percentage of generated waste in Kentucky that is recycled climbed steadily from the mid-1990s to 2018—as evidenced by the nearly eightfold increase in the recycling rate from 1994 to 2018. However, the rate dropped sharply in 2019 as the demand for recycled material in the global commodities market softened during the pandemic, and continued its downward trend until 2021. Nationally, Americans generated about 292.4 million tons of municipal sold waste (MSW) in 2018, according to the U.S. Environmental Protection Agency (EPA), and recycled (or composted) approximately 94 million tons of this material—resulting in a 32.1 percent recycling rate. Americans generate around of 4.9 pounds of waste per person each day and recycle or compost 1.6 pounds of it. There are economic benefits associated with recycling. An EPA study, for example, found that recycling and reuse activities in the United States accounted for 681,000 jobs and $37.8 billion in wages.

Kentucky's Recycling Rates, 1994-2022

(As a Percentage of Waste Generated)

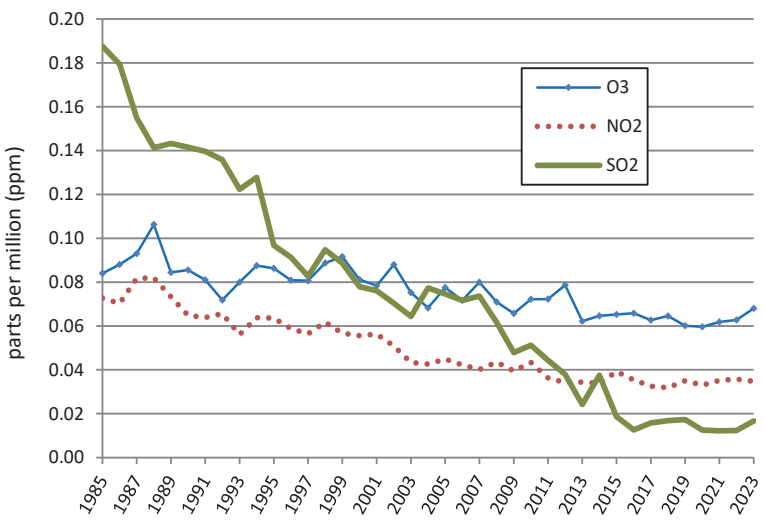


Source: Kentucky Division of Waste Management, Annual Reports, various fiscal years

Air Quality

The Kentucky Division for Air Quality reports that Kentuckians are breathing cleaner, healthier air. The Division points out that "this improvement is a direct result of reduced air pollution. For example, emissions of sulfur dioxide (SO_2) from Kentucky coal-fired power plants totaled 1.5 million tons in 1976. In 2015, those emissions had dropped to 131,696 tons – a remarkable 91 percent reduction." The Division notes that the "decrease is all the more dramatic considering Kentucky's population and economy have grown significantly during that same time period. New air pollution control technologies, improved vehicle fuel economy, and a growing emphasis on energy efficiency have all contributed to cleaner air." The pollutants shown in the figure below are Ozone (O_3), Sulfur Dioxide (SO_2), and Nitrogen Dioxide (NO_2). While individual pollutants oscillate from year to year, overall the trend shows a decline in pollution levels from 1985 to 2023. The pollutants are shown in terms of parts per million (ppm). Other important air pollutants, expressed in both parts per million and micrograms per cubic meter (µ/m3) are shown on the facing page. This graph shows generalized pollution trends through time. It does not show trends for specific sites nor does it demonstrate attainment for any particular area. While individual pollutants may spike in certain years, overall trends show declines in pollution levels.

Kentucky Air Quality Trends, 1985 to 2023
(O_3, SO_2, NO_2)



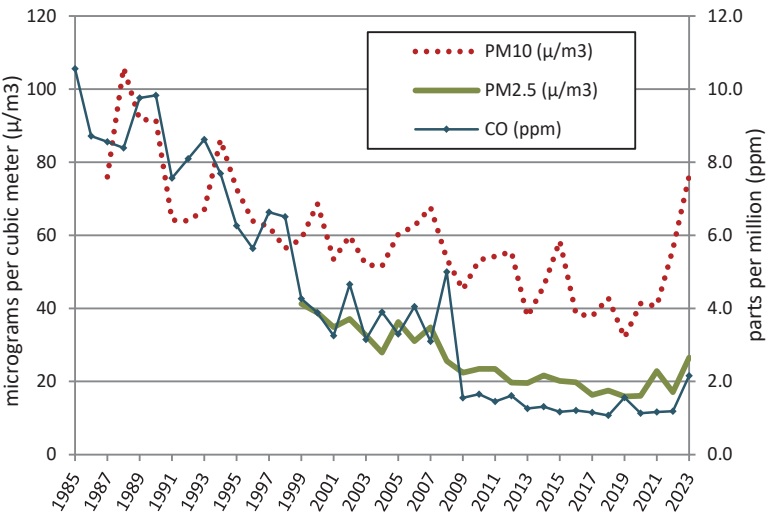
Source: Kentucky Energy and Environment Cabinet, Division for Air Quality

AIR QUALITY

As noted on the facing page, the Kentucky Division for Air Quality reports that Kentucky's air is getting cleaner. The pollutants shown in the figure below are Carbon Monoxide (CO), Particulate Matter (PM_{10}), Fine Particulate Matter ($PM_{2.5}$). And, just like with Ozone (O_3), Sulfur Dioxide (SO_2), and Nitrogen Dioxide (NO_2) shown on the previous page, the pollutants in the graph below have been declining gradually over the time, with an increase in the last few years. This graph shows generalized pollution trends through time. It does not show trends for specific sites nor does it demonstrate attainment for any particular area. While individual pollutants may spike in certain years, overall trends show declines in pollution levels.

Kentucky Air Quality Trends, 1985 to 2022

($PM_{2.5}$, PM_{10}, CO)

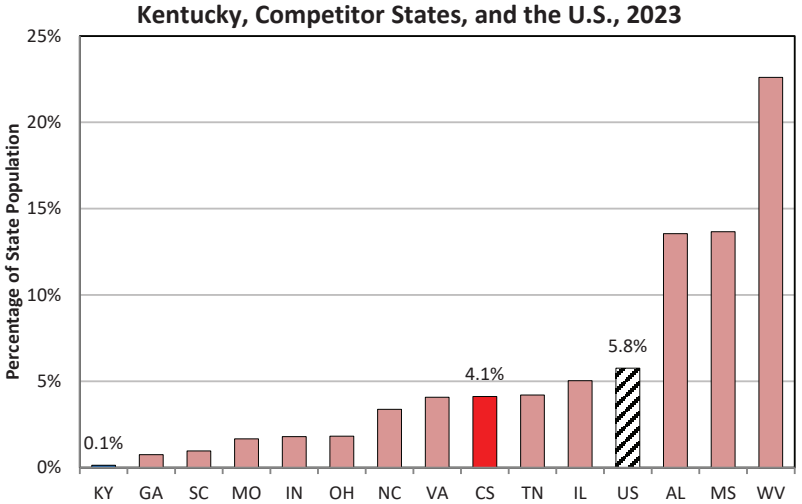


Source: Kentucky Energy and Environment Cabinet, Division for Air Quality

Lead & Copper Rule Violations

The United States enjoys one of the safest and most reliable supplies of drinking water in the world. Clearly, the Safe Drinking Water Act of 1974 plays an important role in maintaining high standards for quality. While the water supply is generally violation-free, in 2023 there were just over 79,800 violations of the Safe Drinking Water Act among community water systems that served around 89.1 million people, which represents around 27 percent of the U.S. population. Of these 79,800 violations, an estimated 7,271 were violations of the Lead and Copper Rule, affecting approximately 19.3 million people. A violation of the Lead and Copper Rule is considered serious. Lead water pipes have been used for many years, but exposure to lead is extremely serious and can cause life-altering consequences, especially for children. A 2017 NBER Working Paper by Anna Aizer and Janet Currie, *Lead and Juvenile Delinquency: New Evidence from Linked Birth, School, and Juvenile Detention Records*, finds strong connections between childhood lead exposure and antisocial behavior, leading to increased school suspension rates as well as increased incarceration rates later in life. With three violations of this rule in 2023, Kentucky experienced a relatively small number, affecting an estimated 0.1 percent of the state population. The competitor state and U.S. averages were higher, at 4.1 and 5.8 percent, respectively.

Population Served by a Community Water System with a Safe Drinking Water Violation of the Lead & Copper Rule, Kentucky, Competitor States, and the U.S., 2023

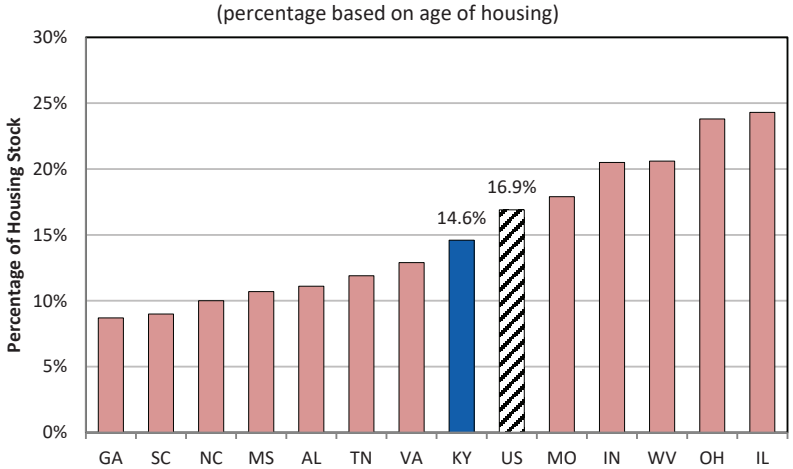


Source: Author's analysis of EPA SDWIS data.

Lead Risk

Lead poisoning has serious health consequences. According to the Mayo Clinic, "Exposure to even low levels of lead can cause damage over time, especially in children. The greatest risk is to brain development, where irreversible damage may occur. Higher levels can damage the kidneys and nervous system in both children and adults. Very high lead levels may cause seizures, unconsciousness and possibly death." Using a method that assigns relative risk based on housing age (which predicts the likelihood of lead paint), potential lead exposure risk due to housing stock age are shown below for Kentucky, the competitor states, and the U.S. overall. Housing built before 1978 carries an elevated risk for lead exposure, and housing built before 1950 has the highest risk of lead exposure. Due to a ban on lead-based paint in 1978, housing built after this year carries minimal risk. The environmental health literature finds that kids are more likely to come into contact with lead in older houses and that living in conditions of poverty elevates the risk. Risk levels are not uniform within a state, of course, since there are many factors that determine its potential to harm. The data show, nonetheless, that 14.6 percent of Kentucky's housing stock, based on its age, presents a potentially elevated risk of lead exposure to its inhabitants; this is slightly lower than the U.S. overall, which is 16.9 percent.

Housing with Potential Elevated Lead Risk, Kentucky, Competitor States, and the U.S.
(percentage based on age of housing)

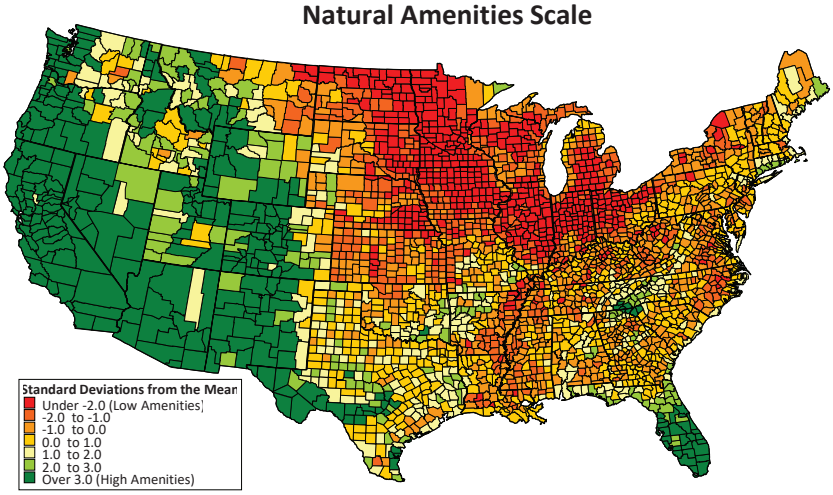


Source: America's Health Rankings analysis of U.S. Census Bureau, 2021 American Community Survey, United Health Foundation, AmericasHealthRankings.org, accessed 2023.

Natural Amenities Scale

The natural amenities scale is a measure of the physical characteristics of a county area that enhance it as a place to live. It was developed by David McGranahan, an economist with the USDA, Economic Research Service. The scale was constructed by combining six measures of climate, topography, and water area that reflect environmental qualities most people prefer. These measures are warm winter, winter sun, temperate summer, low summer humidity, topographic variation, and water area. These factors are highly related to rural county population change over the last several years. The Natural Amenities Index is related to many factors affecting a community's economic development prospects. For example, average population change in nonmetropolitan counties is low among counties low on the natural amenities index, and much higher among counties high on the index. Also, most retirement counties and recreation counties score in the top quarter of the amenities index. And, employment change is also highly related to natural amenities. Importantly, quality-of-life factors was cited by 87.1 percent of corporate executives as "important" or "very important," in the *2022 Area Development Corporate Survey* on site selection factors. This factor was ranked second in overall importance. Only labor costs was ranked higher, with 89.1 percent indicating it was important or very important.

Natural Amenities Scale



Source: USDA, Economic Research Service <https://www.ers.usda.gov/data-products/natural-amenities-scale/>.

Equity

AS THE COUNTRY APPROACHED the Civil War Centennial in 1961, Kentucky's most acclaimed author, Robert Penn Warren, authored an essay reflecting on the war's legacy that was published in the iconic *Life* magazine.

He described a society with unresolved issues over race and responsibility. These issues linger today, sixty-four years later. Martin Luther King, Jr. reminded us that "the arc of the moral universe is long, but it bends toward justice." Change happens, eventually. But we cannot assume that the arc will bend toward justice without purposeful action to ensure it. Because the path is circuitous with fits and starts, it requires leadership and a community of committed citizens to stay focused on the ideal of equal opportunity.

Despite the indelible value of every individual, there are many who are neglected and left behind—which affects our entire society. Comprising roughly 39 percent of the U.S. population and 17 percent of Kentucky's population, minorities experience, on average, a number of disadvantages that include, but are not limited to: higher unemployment, lower wages, less intergenerational wealth, more poverty, more food insecurity, greater obstacles to educational opportunities, less home ownership, more problematic housing, less health insurance coverage, increased deaths from chronic disease, and more vulnerability in health security emergencies, such as during pandemics or natural disasters.

The roots of these differences run deep and include the varying economic and

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educational opportunities that have been systemically afforded or withheld over the decades based on race, ethnicity, creed, gender, and geography.

Ken Chenault, the former chairperson and CEO of American Express, and Ken Frazier, the former president and CEO of Merck, argued in an August 2023 opinion piece in the *Wall Street Journal* that "there is a business as well as moral argument for strengthening Black prosperity." They note that a 2022 Treasury Department report, "Racial Inequality in the United States," concluded that racial inequality holds back *all* Americans. Treasury secretary Wally Adeyemo stated it succinctly, "the exclusion of communities of color from the ladder of economic opportunity holds back economic growth for the entire country."

A Citi Global Perspectives & Solutions report released in September 2020, *Closing the Racial Inequality Gaps: The Economic Cost of Black Inequality in the U.S.*, estimates that not addressing racial gaps between Black and white persons has cost the U.S. economy up to $16 trillion from 2000 to 2020. This is foregone income not available for investment, consumption, and wealth creation. To put this into context, the U.S. gross domestic product was about $21 trillion in 2020. Offering approaches to narrow these gaps, Citigroup estimates the U.S. economy could realize a $5 trillion increase over the next five years by addressing key areas of racial inequality.

The Kentucky Chamber of Commerce Task Force on Racial Inequality offers several recommendations in its January 2021 report, *Achieving Equity to Build a Stronger Kentucky*, designed to close education and income gaps. These include items like improving educational opportunities, addressing criminal justice disparities, and creating new economic pathways for minorities. The Chamber subsequently created the *Center for Diversity, Equity, and Inclusion*, and has launched the *Kentucky Minority-Owned Business Database*.

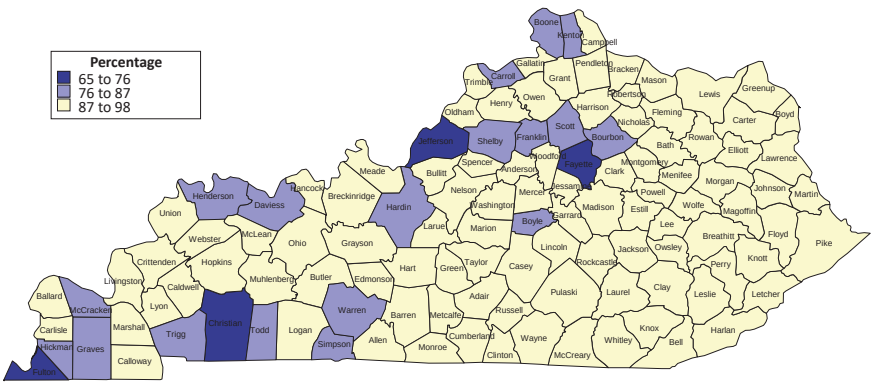
We have opportunities—opportunities to address systemic inequalities systematically. These inequalities run broad and deep through society, but by addressing them we can leverage a wealth of talent, innovation, and expertise that might otherwise be underutilized. As diversity and inclusion gain saliency with respect to corporate governance, business decisions on site selection could also begin to gain traction—potentially affecting a core component of the state's economic development strategy. The renewed focus on social justice over the past several months have brought us full circle to founding ideas, like *e pluribus unum*, and injected new meaning into an old ideal, like the American Dream, that every citizen of the United States should have an equal opportunity to achieve success and prosperity through persistence, determination, and initiative.

WHITE, NON-HISPANIC POPULATION

Racial and ethnic diversity is increasingly viewed as a necessary community characteristic for creating a vibrant and robust local economy. An estimated 63 percent of the U.S. population and 84 percent of the Kentucky population is white (alone), non-Hispanic (based on the 2023 5-Year U.S. Census American Community Survey data). Using this as a measure of diversity, Jefferson County—where Louisville is located—is the state's most diverse county at 65 percent white (alone), non-Hispanic. Christian (Ft. Campbell), Fulton, and Fayette Counties are second, third, and fourth at 67.7, 69.6, and 69.9 percent, respectively. The state's least diverse counties are clustered mainly in the east, with several counties at or above 95 percent white (alone), non-Hispanic. The averages for Kentucky's metropolitan, somewhat rural, and mostly rural counties are 78.6, 90.2, and 93.3 percent, respectively (using the 2023 rural-urban continuum codes).

White Alone (non-Hispanic) Population, 2019-2023

(percentage of total county population)

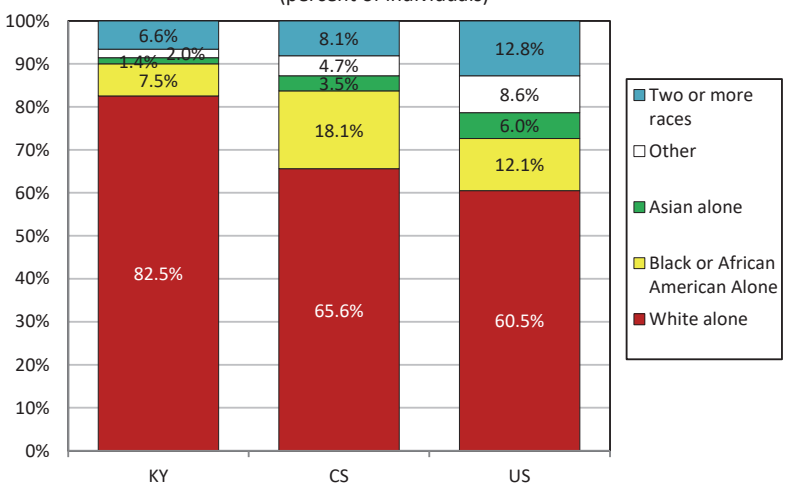


Source: U.S. Census, American Community Survey, 2023 5-Year estimate, Table DP05

Population by Race

Diversity is increasingly important and recognized as a community asset in today's global economy. Kentucky, however, is not a racially diverse state. In 2023, racial minorities comprised about 39 and 34 percent of U.S. and competitor state populations, respectively, and around 17 percent of the Kentucky population. Kentucky's racial composition breaks down like this: white (82.5%), Black or African American (7.5%), Asian (1.4%), and other (8.6%). Kentucky's racial minority population is concentrated in the state's metropolitan areas; in 2023 (based on the U.S. Census 5-year estimate), four of every five (81.2%) racial minorities in Kentucky lived in metropolitan areas. Just over 66 percent of Kentucky racial minorities live in one of seven metropolitan counties—Boone, Christian, Fayette, Hardin, Jefferson, Kenton, or Warren. Overall, racial minorities comprise over 21 percent of the population in the state's 39 metropolitan counties, nearly 10 percent in the 21 somewhat rural counties, and almost 7 percent in Kentucky's 60 mostly rural counties.

Population by Race, 2023,
Kentucky, Competitor States, and the U.S.
(percent of individuals)

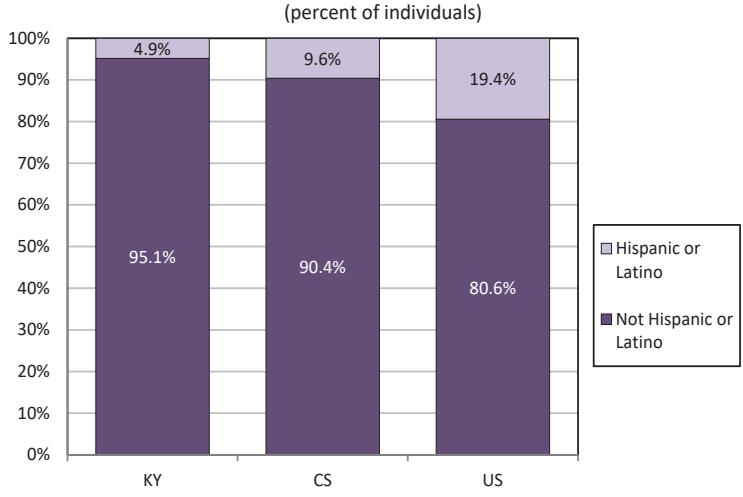


Source: U.S. Census Bureau, ACS 2023 1-Year Estimate, Table DP05

HISPANIC POPULATION

There are about 219,500 Kentuckians who identify as Hispanic or Latino, which is about 4.9 percent of the population. Compared to the U.S. (19.4%) and competitor states (9.6%), Kentucky has a relatively small Hispanic population. Almost three-quarters of the state's Hispanic population live in a metropolitan county, with a majority in Jefferson and Fayette Counties. Still, Hispanics comprise only about 5 percent of the population in the state's metropolitan counties, 2.4 percent in the somewhat rural counties, and just under 2 percent in Kentucky's mostly rural counties.

Population by Hispanic or Latino Ethnicity, 2023, Kentucky, Competitor States, and the U.S.
(percent of individuals)



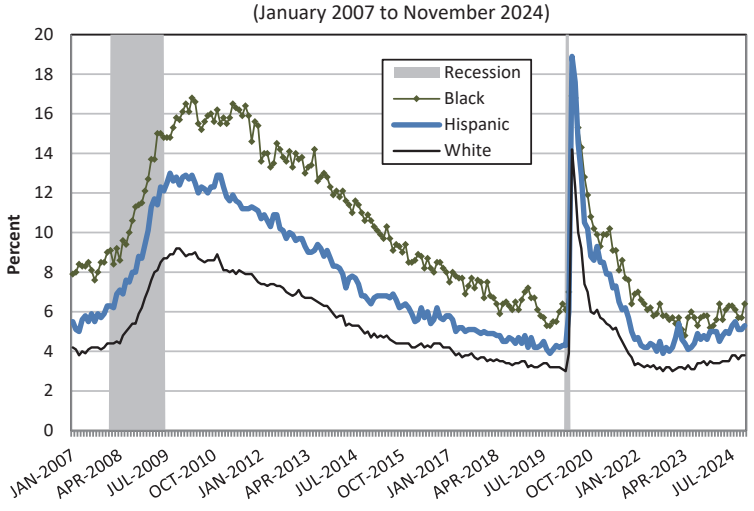
Source: U.S. Census Bureau, U.S. Census Bureau, ACS 2023 1-Year Estimate, Table DP05

Unemployment Rate

The national unemployment rate is perhaps the most widely known labor market indicator; it reflects the number of unemployed people as a percentage of the labor force. However, therein lies its fundamental weakness—it does not include individuals who have dropped out of the labor force. Nonetheless, the unemployment rate is a useful indicator of the relative labor market experiences of various racial and ethnic groups. The graph below, for example, illustrates the differences between white, Black, and Hispanic persons in the U.S. from January 2007 to November 2024, covering the Great Recession as well as the Pandemic Recession. As one can see, there are notable differences between the three groups, with much higher unemployment rates experienced, on average, by Black and Hispanic persons, compared to white persons. At the height of the Pandemic Recession in April of 2020, the unemployment rates were 14.1, 16.7, and 18.9, respectively, for white, Black, and Hispanic persons. In November 2024, the respective percentages were 3.8, 6.4, and 5.3. The roots of these differences run deep and include the varying economic and educational opportunities that have been systemically afforded or withheld over the decades based on race, ethnicity, creed, gender, and geography.

U.S. Unemployment Rate, by Race and Ethnicity

(January 2007 to November 2024)



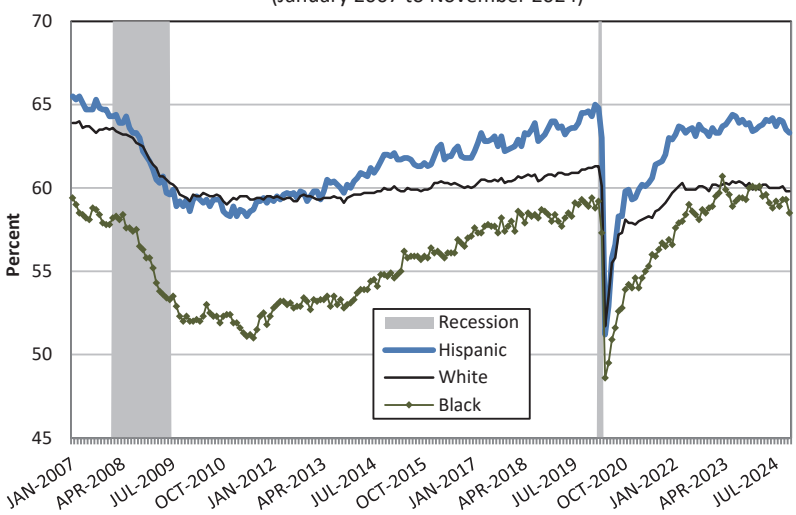
Source: Bureau of Labor Statistics, Current Population Survey

Employment-Population Ratio

Many economists believe the employment-population ratio is a better labor market indicator than the more frequently referenced unemployment rate. This ratio is the proportion of the civilian non-institutional population that is employed, and it shows a somewhat different picture of the labor market than the unemployment rate. Hispanic persons have demonstrated a higher employment-population ratio than white persons and Black persons during much of the time period shown in the graph below. Indeed, in February of 2020, just before the labor market plummeted as a result of COVID-19, the ratio for Hispanic individuals was 65 percent, compared to 61.3 for white persons and 59.3 for Black persons. In November 2024 the ratio for white, Black, and Hispanic persons was, respectively, 59.8, 58.5, and 63.3. Both the unemployment rate and the employment-population ratio reflect the civilian noninstitutional population 16 years and over. Aaronson, *et al.*, suggest numerous proposals to mitigate the "racial and ethnic unemployment rate gaps that have been remarkably persistent over the decades." In their September 2021 Brookings piece, *A hot labor market won't eliminate racial and ethnic unemployment gaps*, they mention several options, from reducing barriers to minorities in the innovation and entrepreneurial arena, to a more coherent workforce development system.

U.S. Employment-Population Ratio, by Race and Ethnicity

(January 2007 to November 2024)



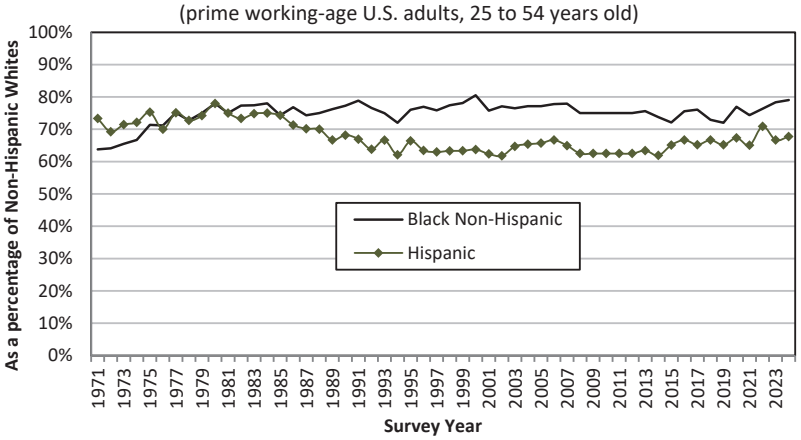
Source: Bureau of Labor Statistics, Current Population Survey

Minority Earnings gap

The minority earnings gap has been persistent for at least the last 40 years, despite increases in educational attainment among minorities throughout that time period. Compared to white non-Hispanic prime working-age (25 to 54 years old) adults in the U.S. who are currently working, Hispanic as well as Black non-Hispanic persons in a similar group (i.e., prime working age and currently working) earn between 68 and 79 percent as much, respectively. These percentages are calculated using the median earnings of wages, salaries, and self-employed income. And, as the graph illustrates, the earnings gap between white and Black persons has not changed much since about 1980, while Hispanic persons have lost some ground relative to whites. Yet, during the same time period, both Black and Hispanic persons have steadily moved closer to white persons with respect to college degree attainment. Economists who have studied this persistent pay gap point to several factors, including, but not limited to, the economic sectors where many minorities work, such as manufacturing, the way in which globalization and automation have affected those sectors, as well as the underlying systemic disadvantages faced by minorities in the labor market.

Earnings of Working Non-Hispanic Blacks & Hispanics Compared to a Similar Group of Non-Hispanic Whites

(prime working-age U.S. adults, 25 to 54 years old)



Source: Author's analysis of U.S. Census CPS data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0 .
Note: Survey year asks about earnings for the previous year, so 2024 survey year reflects 2023 earnings.

Earnings by Race, Ethnicity, & Metro Status

As we indicate on the previous page, there has been a persistent minority earnings gap in the U.S., and the same is true in Kentucky. The table below presents median earnings by race, ethnicity, and metro status for prime working-age adults who are currently employed. White non-Hispanic persons consistently earn more than Black non-Hispanic and Hispanic persons. Moreover, the table illustrates that individuals living in a metro area earn more than those not in a metro area for all race and ethnic groups. The metro area earnings boost is especially pronounced for white non-Hispanic persons. White non-Hispanic workers between the ages of 25 and 54 living in non-Metro areas have earnings, on average, about 20 percent higher than a similar category of Black non-Hispanic persons. Similarly, the earnings gap between Black and white individuals is more significant in Kentucky's metro areas, reaching nearly 37 percent.

Median Earnings in Kentucky by Race, Ethnicity, & Metro Status, 2018-2022
(total annual personal earned income, prime working-age, working adults)

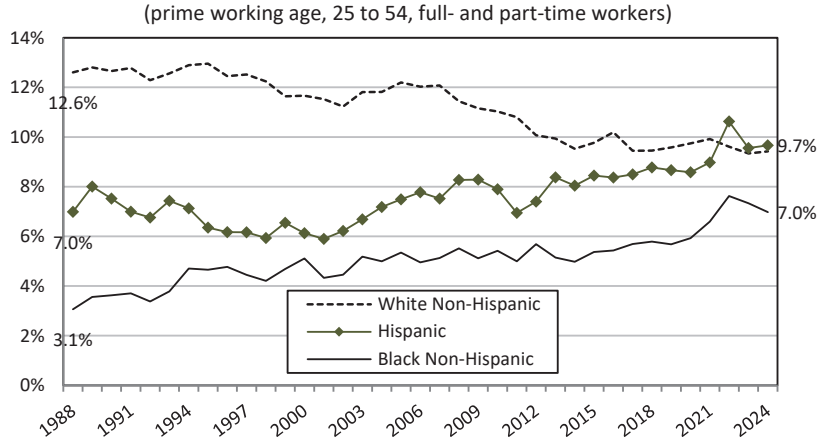
Adults, 25 to 54 years old	Black Non-Hispanic	Hispanic	White Non-Hispanic	Total
Not in Metro Area	$32,634	$31,346	$39,207	$38,913
Metro Area	$37,832	$34,800	$51,884	$48,225
Metro status indeterminable	$37,000	$40,000	$45,326	$44,780

Source: Authors' analysis of data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [ACS 2022 5-Year]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

Self-Employed by Race & Ethnicity

White non-Hispanic prime working-age (25 to 54 years old) persons in the U.S. are more likely to be self-employed than Black non-Hispanic persons, but are statistically tied with Hispanic persons. The self-employed include a diverse and broad range of occupations, from farmers to landscapers to doctors. One characteristic the self-employed share is the willingness to chart their own economic path. Either out of necessity or opportunity, these individuals demonstrate the spirit needed to create an entrepreneurial economy. Overall, around 9.2 percent of part- and full-time working prime working-age adults in the United States are self-employed. Nationally, over the last thirty years, these percentages have been trending slightly downward for white non-Hispanic persons. This downward trend is evident in the chart below showing the decline from 12.6 percent in 1988 to 9.4 percent in 2024. At the same time, self-employed Black non-Hispanics and Hispanics have been increasing. The differences between white non-Hispanics and Black non-Hispanics are statistically significant in every year from 1988 to 2024. The same is true for the differences between white non-Hispanics and Hispanics except for four years—2018, 2022 to 2024. Improving the economic empowerment and independence of all people, with a focus on historically disadvantaged populations, would benefit the entire Commonwealth.

U.S. Self-Employment Rates
by Race & Ethnicity, 1988-2023
(prime working age, 25 to 54, full- and part-time workers)



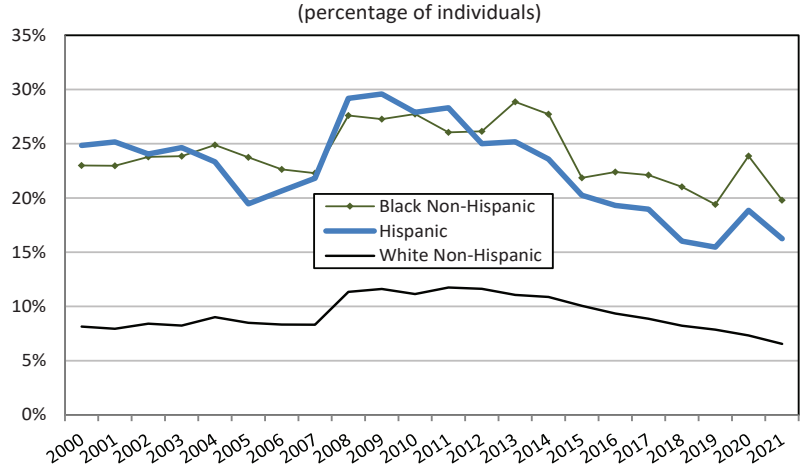
Source: Estimates generated by the author using data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC, 1988-2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0.

Food Insecurity by Race & Ethnicity

While the Pandemic Recession revealed that many Americans, regardless of race, ethnicity, or neighborhood, were much closer to food insecurity than they realized, minorities experience higher rates of food insecurity both before and during the pandemic. Food security is defined as having "access at all times to enough food for an active, healthy life for all household members," while food insecurity means "that the food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food." As shown in the figure below, food *in*security has generally been higher for Black non-Hispanic and Hispanic persons than white non-Hispanic persons. In 2021, the percentage of food insecure individuals was just under 7 percent for white non-Hispanic persons, about 16 percent for Hispanic and around 20 percent for Black non-Hispanic persons.

U.S. Food Insecurity, by Race and Ethnicity, 2000 to 2021

(percentage of individuals)



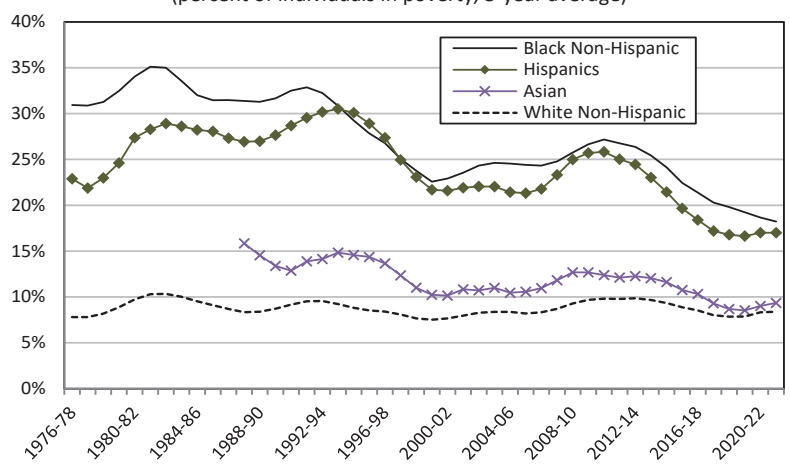
Source: Estimated by the author using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Food Security Supplement, various years]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0

Poverty Rate by Race & Ethnicity

Living in poverty can have far-reaching economic, social, and cultural consequences for families and can stretch across generations. Studies reveal that those who grow up in poverty not only experience a lack of basic needs, but that this scarcity can shape their lives and families for generations. The U.S. poverty rate increased during the Great Recession as well as during the Pandemic Recession, and currently stands at around 12.5, depending on the data source. And, as the chart below shows, there are notable differences between race and ethnic groups, with Black non-Hispanic persons experiencing poverty rates at least twice the level as white Non-Hispanic persons. For instance, the poverty rate from 2021 to 2023 (3-year average) is 8.3 percent for white non-Hispanic individuals and 18.7 percent for Black non-Hispanic individuals. A June 2021 report by researchers from the American Enterprise Institute and Brookings, *Long Shadows: The Black-White Gap in Multigenerational Poverty*, finds that poverty persists much longer in Black families than in white families, and that Black families are overrepresented among the persistently poor. They report that Black families not only have higher poverty rates, they also "are over 16 times more likely than white families to experience three generations of poverty."

U.S. Poverty Rates by Race & Ethnicity, 1976 to 2023

(percent of individuals in poverty, 3-year average)

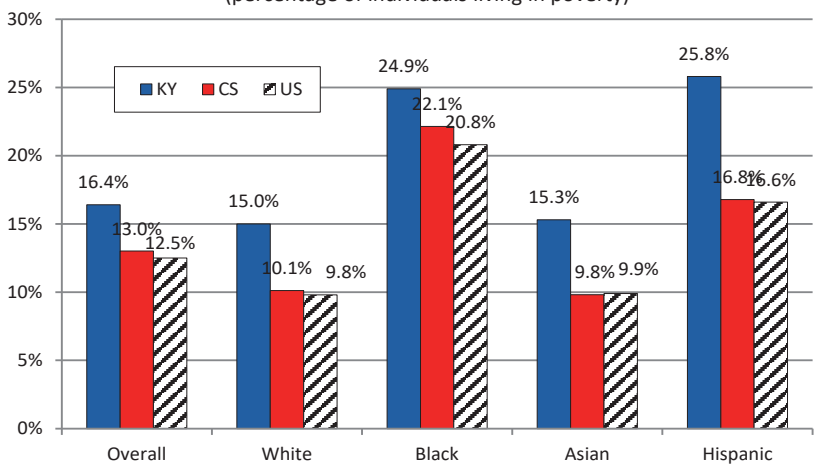


Source: Author's analysis of IPUMS-CPS data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC, various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Poverty Rate by Race & Ethnicity

Kentucky's poverty rate is consistently higher than the U.S. and the competitor states for white persons, Black persons, Asians, and Hispanics. Moreover, the same pattern presented for the U.S. on the facing page is evident for Kentucky. White individuals experience poverty at much lower rates than Black and Hispanic individuals.

Poverty Status by Race and Ethnicity, 2023
Kentucky, Competitor States, and the U.S.
(percentage of individuals living in poverty)



Source: U.S. Census, American Community Survey, Table S1701, 2023 1-Year Estimate.

Disconnected Young Adults by Race & Ethnicity

These young adults are not enrolled in school, are not currently employed, and have no degree beyond a high school diploma or GED. Collectively these factors could indicate that a young person is having difficulty making a successful transition to adulthood. Non-Hispanic Black and Hispanic young adults are more likely to be disconnected from educational or work environments compared to non-Hispanic white young adults. The table below shows the percentage of young adults (18 to 24 years old) who are "disconnected." Statistically significant differences include Kentucky's higher percentage of disconnected white non-Hispanic persons (12.8%) compared to the U.S. (9.2%) and competitor states (9.7%). Other significant differences are non-Hispanic Black young adults compared to white non-Hispanic young aduls in Kentucky, the U.S., and competitor states. Hispanic perons evidence statistically significant differences compared to white non-Hispanic persons in the U.S. and competitor states but are statistically no different within Kentucky. Understanding and recognizing these race and ethnic differences could provide insights on developing tailored approaches to engage young adults in ways that will connect them to educational or employment opportunities.

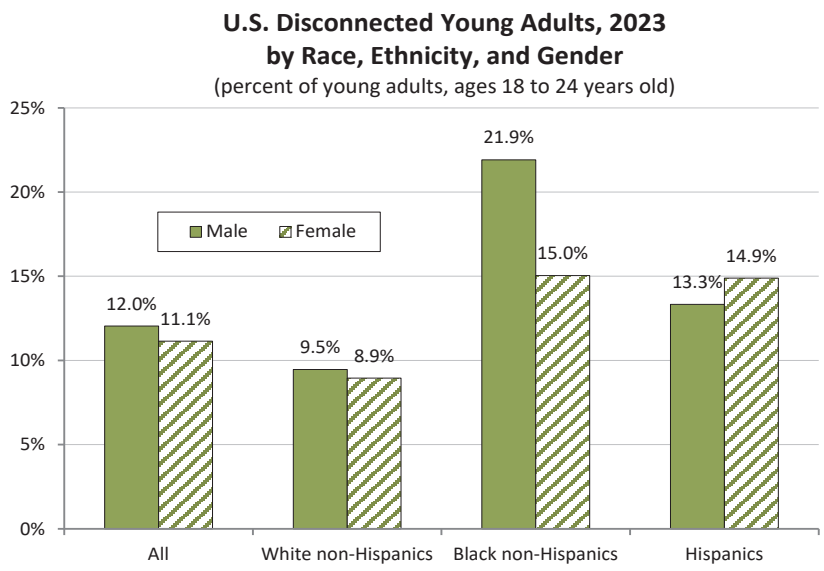
Disconnected Young Adults, 2023
Kentucky, Competitor States, and the U.S.
(percentage point estimates with 95-percent confidence intervals)

Area	All	White non-Hispanic	Black non-Hispanic	Hispanic
US	11.6◆ (11.5-11.7)	9.2◆ (9.1-9.4)	18.5* (18.0-19.0)	14.1* (13.8-14.4)
CS	11.9◆ (11.7-12.2)	9.7◆ (9.4-9.9)	19.0* (18.3-19.7)	13.0* (12.3-13.7)
KY	14.2 (13.1-15.3)	12.8 (11.6-14.0)	23.3* (18.3-28.3)	16.9 (12.5-21.3)

Source: Estimated by the author using data from the 2023 1-Year U.S. Census ACS PUMS.
Indicates an estimate is statistically significant using a 95 percent confidence interval when compared to **white non-Hispanics within a specific geographic grouping, e.g., within the U.S.*
◆Indicates an estimate is statistically different from Kentucky's estimate within a specific race or ethnic category, e.g., white non-Hispanics in the US and CS have significant differences from KY.

Disconnected Young Adults by Race, Ethnicity & Gender

As described on the facing page, disconnected young adults are 18 to 24 years old, not enrolled in school, not currently employed, and have no degree beyond a high school diploma or GED. These characteristics collectively indicate that a young person is having difficulty making a successful transition to adulthood. The prevalence of disconnected youth not only varies between racial and ethnic groups but between genders as well. In the U.S., for example, Black non-Hispanic males exhibit the highest rates of disconnection from educational and employment experiences (22.9%); this percentage is statistically different from all other percentages shown in the chart, including Black non-Hispanic females (15.0%).

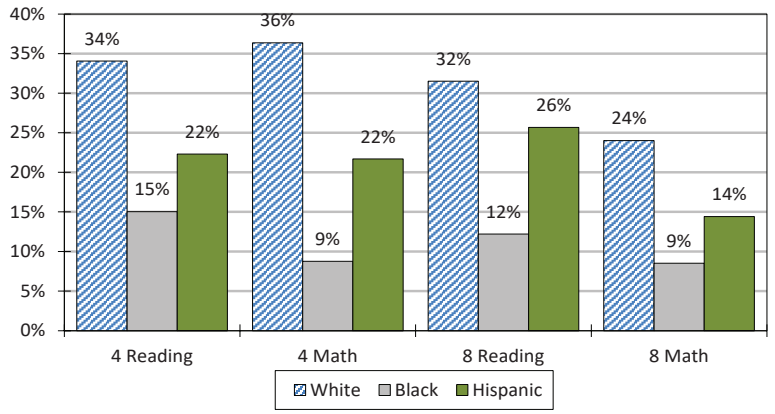


Source: Estimated by the author using data from the 2023 1-Year U.S. Census ACS PUMS

Educational Achievement Gap: NAEP

There is a minority educational achievement gap nationally and in Kentucky, but it can be bridged with time, resources, and attention. The National Assessment of Educational Progress (NAEP), commonly known as the "Nation's Report Card," gauges student progress in a variety of subject areas. Here we present the 2022 reading and math test results by race and ethnicity for 4th and 8th graders. Before the pandemic, Kentucky 4th graders experienced large gains in math and more modest gains in reading. At the 8th grade level, Kentucky students have demonstrated modest gains in math, but have consistently trailed the national performance. Reading proficiency for Kentucky 8th graders rose to levels that were significantly higher than the national percentages in 2011 and 2013, but have since fallen to a level similar to 2007. In 2022, Kentucky students were statistically no different from the national public students in 4th grade math, 4th grade reading, and 8th grade reading, but significantly lower in 8th grade math. Earlier gains were made possible because of meaningful investments. Yet, Kentucky's Black and Hispanic students consistently score at lower levels than white students. Research shows that all students can perform at a high level, regardless of race or ethnicity, when nurtured and provided the necessary time, energy, and resources essential for them to perform at a high level.

Kentucky 2022 NAEP Results
by Race and Ethnicity
(percent of students scoring at or above proficient)



Source: https://www.nationsreportcard.gov/ndecore/xplore/NDE, downloaded on 11/8/2022

Educational Achievement Gap: KSA

Similar to student performance on the NAEP examination (see the facing page), there is a minority achievement gap on the Kentucky Summative Assessment (KSA). Kentucky students take the KSA to meet federal and state testing requirements. Previously, these tests were called Kentucky Performance Rating for Educational Progress (K-PREP). They are developed by Kentucky teachers and align with the Kentucky Academic Standards in each content area. Across the board, regardless of subject or grade, there is a wide proficiency gap between white, Black, and Hispanic students. All students, regardless of race or ethnicity, can perform at a high level, when nurtured and provided the necessary time, energy, and resources needed for them to perform at a high level.

Kentucky Summative Assessment (KSA)
by School Level, Subject, Race, and Ethnicity
Students Scoring Proficient or Higher in Reading & Math
(2023-2024 academic year)

School Level	Subject	White (%)	Black (%)	Hispanic (%)
Elementary	Reading	52	27	34
	Math	47	20	30
Middle	Reading	50	24	32
	Math	44	16	27
High	Reading	50	24	34
	Math	40	15	23

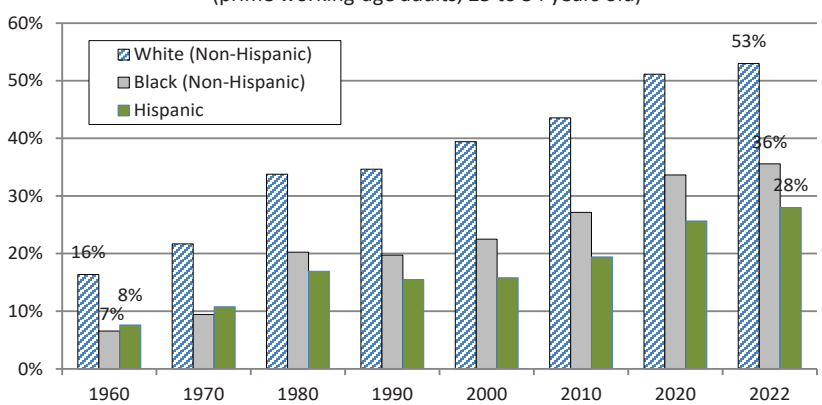
Source: Kentucky Department of Education, Assessment and Accountability Datasets 2023-2024, downloaded 10/23/2024, available at: https://www.education.ky.gov/Open-House/data/Pages/Assessment_Accountability_Datasets_2023-2024.aspx

Post-Secondary Education by Race & Ethnicity

There are marked differences nationally in the percentages of prime working-age white, Black, and Hispanic individuals with at least two years of post-secondary education. This is important because the percentage of jobs requiring some education, training, or credentials beyond high school has increased over time, and the U.S. Bureau of Labor Statistics (BLS) estimates that around 50 percent of the *new* occupational positions created nationally from 2020 to 2030, and about 40 percent of the *total* jobs in 2030, will require at least some college (BLS, Employment Projections, Table 1.7 Occupational Projections 2020-30). Moreover, the Kentucky Council on Postsecondary Education 2022-2030 State Plan for Higher Education, released in February 2022, sets the goal of increasing the percentage of Kentuckians with a postsecondary degree or certificate to 60 percent by the year 2030. All racial and ethnic groups have increased their educational attainment over the last fifty years, but there are large differences in attainment among groups. This is evidenced, for example, by the differences between white (53%), Black (36%), and Hispanic individuals (28%) in the percentage of prime-working age adults who have attained at least two years of post-secondary education (2022). Finally, while these data reflect national trends, the pattern is evident in Kentucky too.

Two or More Years of Post-Secondary Education, Whites, Blacks, and Hispanics

(prime working-age adults, 25 to 54 years old)



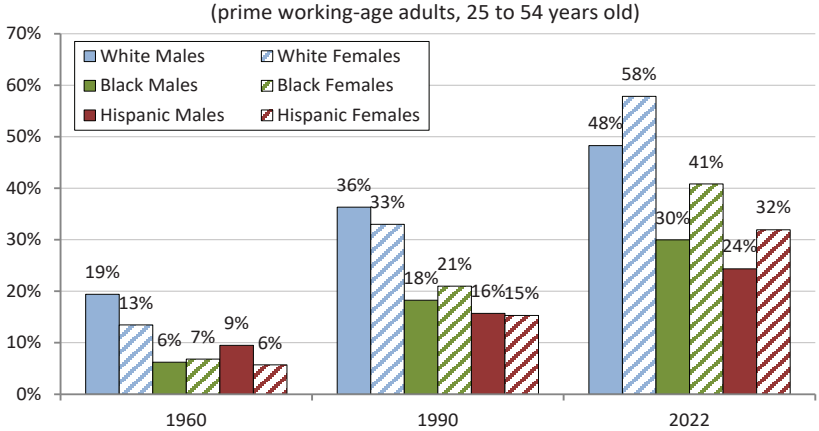
Source: Author's analysis of U.S. Census Bureau data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [1960 5% sample; 1970 Form 1 State 1%; 1980, 1990, & 2000 5% samples; 2010, 2020, & 2022 ACS 5-Year]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

Post-Secondary Education by Race, Ethnicity & Gender

As described on the facing page, to become economically successful now and in the future, it will increasingly require some education and training beyond high school. And, while educational attainment levels have increased dramatically for every race and ethnic group over the last fifty years, there are, nevertheless, persistently large gaps in attainment between groups. However, a more complex picture emerges when examining gender differences within race and ethnic groups. This is evidenced, for instance, by the differences between Black non-Hispanic (36%) and Hispanic persons (28%) in the percentage of prime-working age adults who have attained at least two years of post-secondary education (see the graph on the facing page, data for 2022). Illustrating gender differences, the chart below shows that in 2022 Hispanic *females* (32%) have about the same attainment level as Black non-Hispanic *males* (30%), and Black non-Hispanic *females* (41%) have much higher attainment levels than Black non-Hispanic *males* (30%). As shown in the graph, the group with the highest post-secondary educational attainment level using the threshold of two or more years is white non-Hispanic *females*, who outperform white non-Hispanic *males* 58 to 48 percent.

Two or More Years of Post-Secondary Education, Whites, Blacks, and Hispanics, by Gender

(prime working-age adults, 25 to 54 years old)

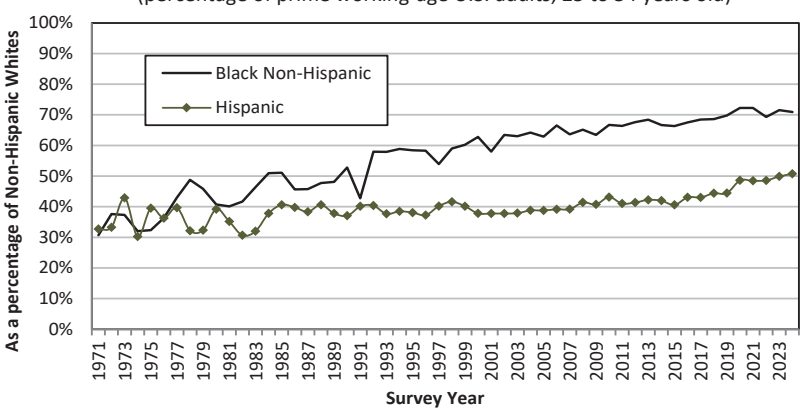


Source: Author's analysis of U.S. Census Bureau data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [1960 5% sample; 1990 5% sample; 2022 ACS 5-Year]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

College Degrees by Race & Ethnicity

The gap in bachelor's degree attainment between minorities and whites has narrowed over the last 40 years, but is still wide. Compared to white non-Hispanic prime working-age (25 to 54 years old) adults in the U.S. who are currently employed, Hispanic as well as Black non-Hispanic persons in a similar group (i.e., prime working age and currently working) earn 4-year degrees at about half and three-fourths the percentages, respectively. Workers face growing competition for low-wage, low-skill jobs, and increasingly for high-skill jobs. Today, any "routine" job and a growing number of high-skill jobs can be automated and outsourced. Competition in such an environment requires providing something that others cannot. That "something" will come from workers who have high levels of education and skill. Essentially, the rigors of the global economy require creative, highly-skilled, college-educated workers. While a college degree, or commensurate skill at a trade, does not guarantee a high-paying job, it is does help facilitate access to jobs paying higher wages.

Bachelor's Degree or Higher,
Employed Blacks & Hispanics as a % of Employed Whites
(percentage of prime working-age U.S. adults, 25 to 54 years old)



Source: Author's analysis of U.S. Census CPS data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0 .
Note: Survey year asks about earnings for the previous year, so 2024 survey year reflects 2023 earnings.

College Degrees by Race, Ethnicity, & Metro Status

As we show on the facing page, there has been a persistent minority bachelor's degree attainment gap in the U.S., and the same is true in Kentucky. The table below presents the attainment of a bachelor's degree or higher by race, ethnicity, and metro status for prime working-age adults who are currently employed. White non-Hispanic workers consistently have higher attainment of 4-year degrees than Black non-Hispanic and Hispanic workers. This degree difference is especially pronounced in metro areas where non-Hispanic white individuals have markedly higher attainment rates (47.6%) than non-Hispanic Black (27.9%) or Hispanic individuals (25.7%).

Bachelor's Degree or Higher, Kentucky
Race & Ethnicity by Metro Status, 2018-2022
(percentage of prime working-age, working adults)

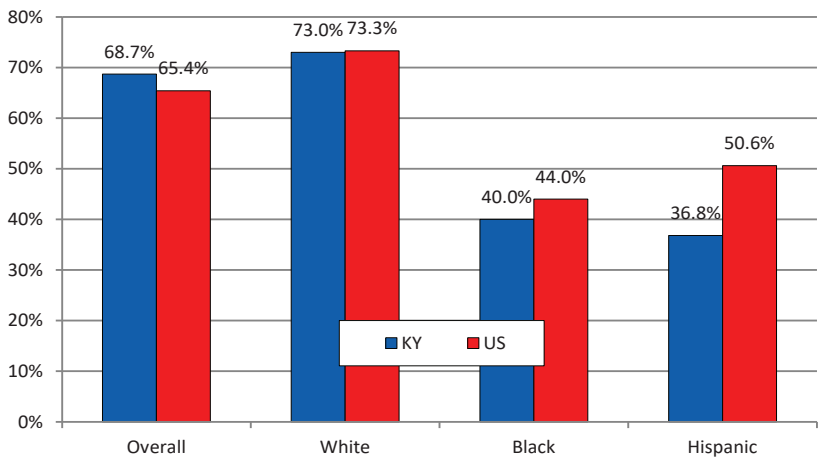
Adults, 25 to 54 years old	Black Non-Hispanic	Hispanic	White Non-Hispanic	Total
Not in Metro Area	26.7	25.6	26.7	27.0
Metro Area	27.9*	25.7*	47.6	44.3
Metro status indeterminable	25.0*	19.0*	29.2	28.8

Source: Authors' analysis of data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [ACS 2022 5-Year]. Minneapolis, MN: IPUMS, 2024.
https://doi.org/10.18128/D010.V15.0
**These percentages are statistically different from the White percentages (alpha=.05).*

Home Ownership Rates by Race & Ethnicity

The chart below shows the home ownership rate by race and ethnicity in 2021, revealing a wide gap between white, Black, and Hispanic persons, both nationally and in Kentucky. According to a September 2020 report from the Board of Governors of the Federal Reserve System, *FEDS Notes*, "Disparities in Wealth by Race and Ethnicity in the 2019 Survey of Consumer Finances," Bhutta, *et al.*, report that housing is the biggest component of wealth for many families. They note that there are significant gaps in home values between racial and ethnic groups that are "caused both by gaps in purchase prices and housing appreciation, which are a reflection of a combination of factors including resource gaps (e.g., income and down payments), residential segregation, and age of entry into homeownership." In a more pointed analysis released in February 2021, researchers at the Federal Reserve Bank of Minneapolis state that "generations of discriminatory policies and practices created and reinforce racial disparities in homeownership." They note that "For generations, while government and private financial institutions have actively subsidized homeownership for White households, these institutions have erected barriers that exclude Black households, other households of color, and Native American households from the same opportunities."

Home Ownership Rates by Race and Ethnicity, Kentucky and the U.S., 2021

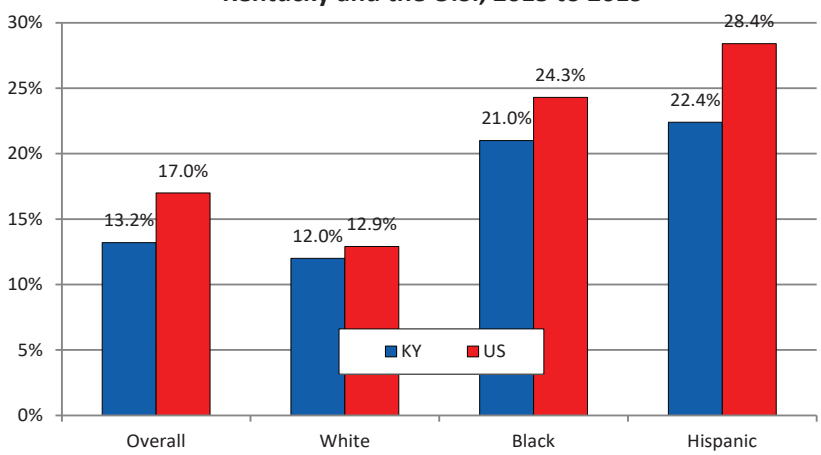


Source: America's Health Rankings 2022, United Health Foundation, AmericasHealthRankings.org, Accessed October 30, 2023.

Severe Housing Problems by Race & Ethnicity

An estimated 17 percent of the occupied housing units in the U.S. have at least one severe housing problem, as defined by the U.S. Department of Housing and Urban Development, based on its Comprehensive Housing Affordability Strategy (CHAS, 2015-2019). The Kentucky percentage is lower (13.2%). An occupied housing unit is considered to have a severe problem with at least one of the following: lack of complete kitchen facilities, lack of plumbing facilities, overcrowding or severely cost-burdened occupants. Importantly, there are notable race and ethnicity differences, as shown in the chart below. Minorities are more likely to occupy housing units with severe problems than whites. Housing quality matters for many quality-of-life reasons. As noted by *America's Health Rankings*, "Housing influences health and well-being. Poor quality of housing can cause disease and injury as well as affect development in children. Other housing-related factors such as neighborhood environment and overcrowding can affect mental and physical health. A recent study found that having substandard housing is associated with being uninsured."

Severe Housing Problems by Race and Ethnicity
Kentucky and the U.S., 2015 to 2019

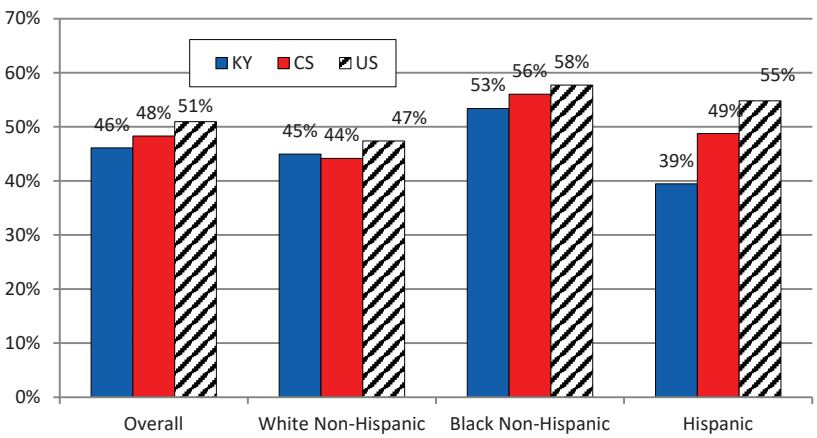


Source: America's Health Rankings analysis of U.S. Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy (CHAS), United Health Foundation, AmericasHealthRankings.org, Accessed October 30, 2023.

Cost-Burdened Renters

According to the U.S. Census Bureau, "over 21 million renter households spent more than 30% of their income on housing costs in 2023, representing nearly half (49.7%) of the 42.5 million renter households in the United States for whom rent burden is calculated" (Sept. 12, 2024 press release). The U.S. Department of Housing and Urban Development (HUD) uses a 30 percent share of income threshold to measure whether a renter is cost burdened. If the annual cost of rent exceeds a 30 percent share of the annual median household income, rental cost is considered a finacial burden. On the other hand, if the annual cost of rent is below a 30 percent share of the annual median household income, rental cost is considered affordable and not a burden. Using this same threshold, but focusing on pooled 2021 and 2022 American Community Survey data, we estimate that 46.1 percent of Kentucky's renters are cost burdened. Nationally there is a marked difference based on race and ethnicity. In Kentucky, this is demonstrated by the differences between cost-burdened white Non-Hispanics (45%) and Black non-Hispanics (53%).

Cost-Burdened Renter-Occupied Households, by Race and Ethnicity, 2021-22, Kentucky, Competitor States, and the U.S.



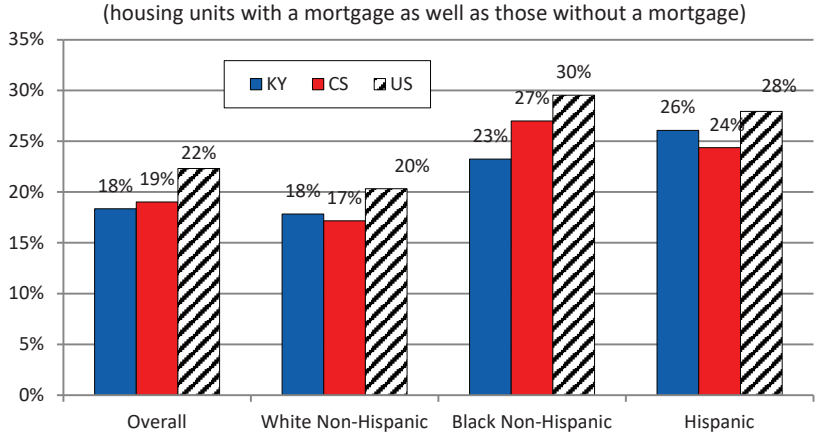
Source: Author's analysis of data provided by Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [2021 & 2022 ACS 1-year estimates pooled]. Minneapolis, MN: IPUMS, 2024. https://usa.ipums.org/usa/

Cost-Burdened Owners

Owning a home is expensive, and for over a fifth of owners nationally (22.3%) the annual cost exceeds 30 percent of their annual household income. This threshold is used by HUD (see the previous page) to measure whether a home owner is cost burdened. The chart below includes those with a mortgage as well as those without a mortgage. Even if a home is fully paid off, there are still costs associated with ownership, such as taxes, insurance, and utilities. An estimated 18.3 percent of owners in Kentucky are cost burdened, meaning that their annual costs of ownership exceed 30 percent of their annual total household income. This percentage is statistically significantly lower than the competitor state (19.0%) and U.S. averages (22.3%). The figure also illustrates striking differences between white Non-Hispanic, Black non-Hispanic, and Hispanic owners. Whether it is Kentucky, the competitor states, or the U.S. overall, minority owners are more likely to be cost-burdened.

Cost-Burdened Owner-Occupied Households, by Race and Ethnicity, 2021-22, Kentucky, Competitor States, and the U.S.

(housing units with a mortgage as well as those without a mortgage)



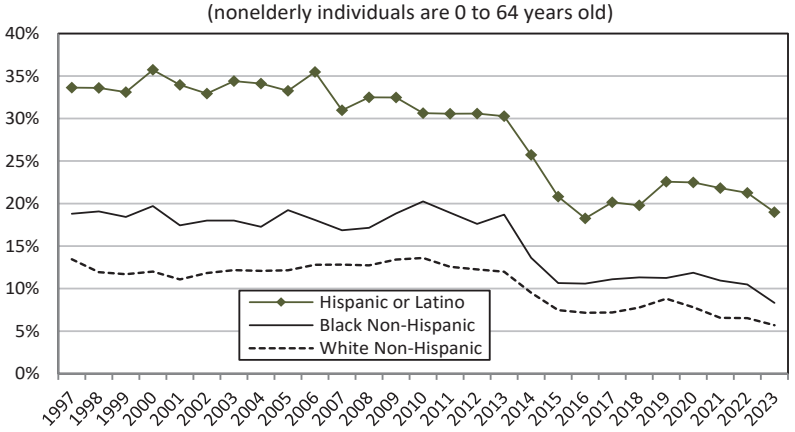
Source: Author's analysis of data provided by Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [2021 & 2022 ACS 1-year estimates pooled]. Minneapolis, MN: IPUMS, 2024. https://usa.ipums.org/usa/

Health Insurance by Race & Ethnicity

An estimated 26.1 million Americans were without health insurance in 2023, with the percentage of uninsured people declining slightly since 2019. In Kentucky, 241,200, or 5.4 percent of the total state population, did not have health insurance in 2023. Medicaid has historically played a key role in providing health coverage for disproportionately poor Kentuckians, insuring an estimated 31 percent of the population here in 2024, compared to about 22 percent in the competitor states and 24 in the U.S. The implementation of the Affordable Care Act (ACA) has increased the number of individuals on Medicaid over the past few years. Prior to the ACA, minorities were more likely to be uninsured compared to whites. And while the uninsured rate among nonelderly minorities has trended down since 2010, Black non-Hispanic and Hispanic persons remain uninsured at higher rates compared to white non-Hispanic persons. Generally, the higher uninsured rates among minorities reflect more limited access to affordable health coverage options, including employer provided coverage. Access to health insurance is fundamentally important for millions of Americans' quality-of-life. The Commonwealth Fund, a foundation that supports independent research on health care issues, notes that "while insurance alone does not ensure access to care, evidence shows it protects people from illness and death."

U.S. Health Uninsured Rates, Nonelderly Population by Race & Ethnicity, 1997 to 2023

(nonelderly individuals are 0 to 64 years old)



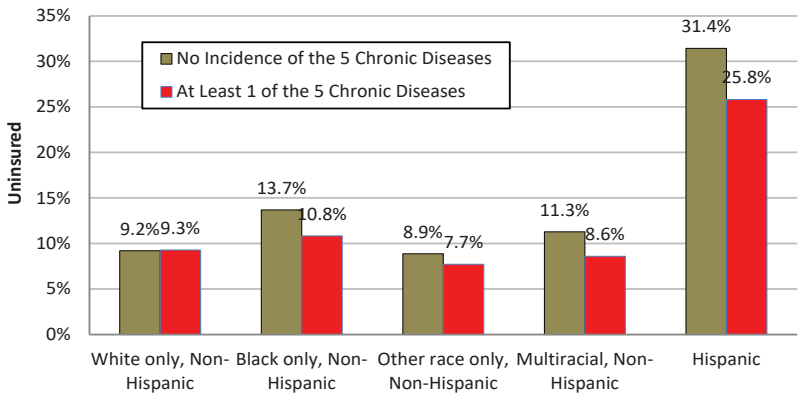
Source: Author's analysis of IPUMS-NHIS data, courtesy of Lynn A. Blewett, Julia A. Rivera Drew, Miriam L. King, Kari C.W. Williams, Daniel Backman, Annie Chen, and Stephanie Richards. IPUMS Health Surveys: National Health Interview Survey, Version 7.4 [NHIS 1997-2023]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D070.V7.4

Health Insurance by Chronic Disease, Race & Ethnicity

Among prime working-age Americans (25 to 54 years old), there are notable differences between racial and ethnic groups in health insurance status and the incidence of chronic disease. The CDC notes that chronic diseases such as heart disease, cancer, and diabetes are the leading causes of death and disability in the United States, and they are also leading drivers of the nation's $3.8 trillion in annual health care costs. Research published in 2018 concluded that more than two thirds of all deaths are caused by one or more of these five chronic diseases: heart disease, cancer, stroke, chronic obstructive pulmonary disease, and diabetes. The incidence of chronic disease is also linked to higher absenteeism and employer costs. Research published in 2016 found that "Absenteeism costs associated with chronic diseases and health risk factors can be substantial. Employers may incur these costs through lower productivity, and employees could incur costs through lower wages." White non-Hispanic persons who have at least one of the five chronic diseases are less likely to be uninsured (9.3%), than Black non-Hispanic (10.8%), or Hispanic persons (25.8%); these are all statistically significant differences. Individuals with a higher incidence of chronic disease, as well as lacking health insurance, are less likely to seek preventive or ongoing care for a potentially costly, debilitating, and/or deadly chronic condition.

Health Insurance and the Incidence of Chronic Disease, Heart Disease, Cancer, Stroke, COPD, or Diabetes, by Race & Ethnicity, 2018 to 2022

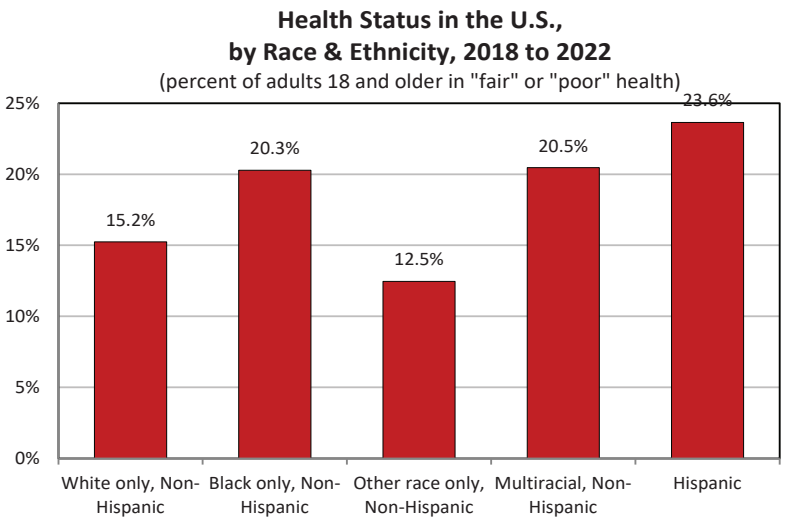
(U.S. prime working-age, 25 to 54 years old)



Source: Author's analysis of data from the Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2018-2022 pooled data.

Health Status by Race & Ethnicity

Minorities are more likely to report higher rates of "fair" or "poor" health. A core question on the Centers for Disease Control (CDC) and Prevention, Behavioral Risk Factor Surveillance System annual survey is: "*Would you say that in general your health is: (pick one) excellent, very good, good, fair, poor (or don't know)?*" An estimated 15.2 percent of white Non-Hispanic adults say "fair" or "poor," compared to 20.3 percent of Black non-Hispanic adults and 23.6 percent of Hispanic adults. A recent study published in the *Journal of the American Medical Association* (JAMA), "The Economic Burden of Racial, Ethnic, and Educational Health Inequalities in the US," (May 2023, LaVeist, Thomas A., et al.), concluded that in 2018, "the overall economic burden of failing to achieve the health equity goals was $1.03 trillion." This total reflects the cost of premature death, excess medical care, and lost labor market productivity. The researchers conclude that the "economic burden of health inequities is unacceptably high and warrants investments in policies and interventions to promote health equity for racial and ethnic minorities and adults with less than a 4-year college degree."



Source: Author's analysis of data from the Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2018-2022 pooled data.

Leading Causes of Death

Health disparities exist across many dimensions, including, but not limited to, gender, geography, socioeconomic, race, and ethnicity. The Pandemic brought many of these disparities to the forefront, evidenced by the risk of death from COVID-19 being much higher for American Indian or Alaska Native, non-Hispanic persons, Black or African American, non-Hispanic persons, and Hispanic or Latino persons, compared to white, non-Hispanic persons (CDC NCHS, as of 9/9/2021). In 2022, Black non-Hispanic persons experienced higher death rates than white non-Hispanic or Hispanic persons for most, but not all, of the leading causes of death. The leading cause of death in the U.S. is heart disease, and the rate for Black persons (216.9 per 100,000 population) far exceeds both white (173.1) and Hispanic persons (114.6). The same is true for cancer, the second leading cause of death. The rate for Black persons is 165, which is also higher than the rate for white (149) and Hispanic persons (104.3). Accidents is the third leading cause of death for the overall population, 64 per 100,000 for the entire population. The causes of death in the table are the ten leading causes of death in the United States in 2022.

Leading Causes of Death in the U.S., by Race & Ethnicity, 2022
(Age-adjusted rate per 100,000 population)

Cause of Death	Overall	White, Non-Hispanic	Black, Non-Hispanic	Hispanic
Heart disease	167.2	173.1	216.9	114.6
Cancer (malignant neoplasms)	142.3	149.0	165.0	104.3
Accidents (unintentional injuries)	64.0	67.9	80.7	48.9
COVID-19	44.5	43.9	53.9	47.2
Stroke (cerebrovascular diseases)	39.5	38.3	57.2	35.3
Chronic lower respiratory diseases	34.3	39.6	26.7	14.3
Alzheimer's disease	28.9	30.4	26.9	27.0
Diabetes mellitus	24.1	21.3	42.9	28.3
Chronic liver disease and cirrhosis	13.8	14.7	8.9	17.0
Kidney disease (nephritis)	13.8	12.5	26.9	12.4

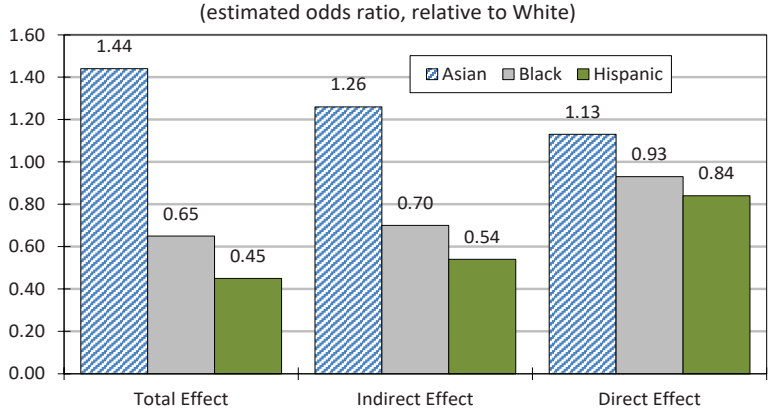
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2018-2022 on CDC WONDER Online Database, released in 2024. Data are from the Multiple Cause of Death Files, 2018-2022, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/ucd-icd10-expanded.html on Dec 7, 2024 11:39:28 AM.

Racial & Ethnic Teleworking Disparities

Numerous studies have found racial and ethnic disparities in teleworking among workers. See, for example, Abay Asfaw, "Racial and Ethnic Disparities in Teleworking Due to the COVID-19 Pandemic in the United States: A Mediation Analysis, *International Journal of Environmental Research and Public Health*, 2022, 19, 4680. Asfaw estimated racial disparities in teleworking due to the COVID-19 pandemic and the extent to which these disparities were mediated by four-year college education and occupation. Some of the key results are illustrated by the logistic regression odds ratios in the graph shown below. The total effect model shows the adjusted odds ratios for race while controlling for several factors (e.g., sex, age, income, marital, employment, and metro status). The results showed that in the reduced model (total effect), the odds for Black and Hispanic workers to telework were 35 and 55 percent lower, respectively, and for Asian workers 44 percent higher than for white workers. The full model (direct effect) shows the adjusted odds ratios when also controlling for education and occupation, with the odds for Black and Hispanic workers to telework 7 and 16 percent lower, respectively, and 13 percent higher for Asian workers compared to white workers. The indirect effect is the difference between the total and the direct effects, measuring the effect of race through the education and occupation variables.

Total, Direct, and Indirect Effects of Race on Teleworking, by Race and Ethnicity

(estimated odds ratio, relative to White)

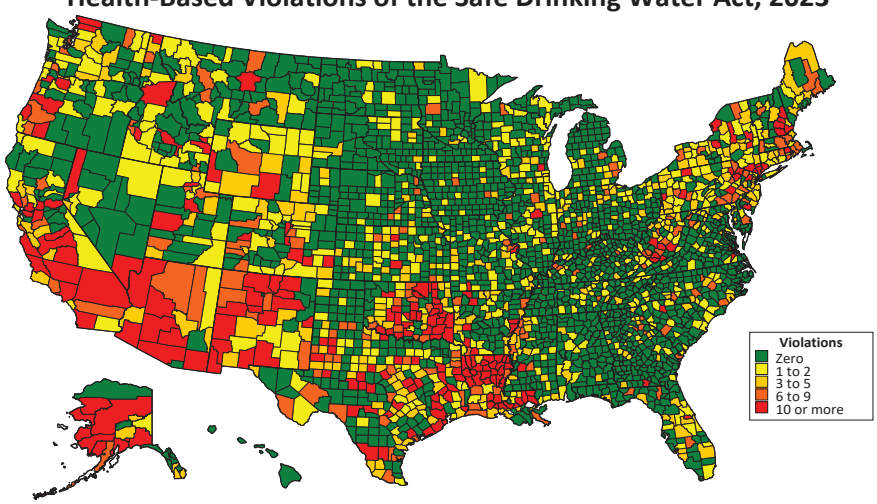


Source: Abay Asfaw, "Racial and Ethnic Disparities in Teleworking Due to the COVID-19 Pandemic in the United States: A Mediation Analysis, International Journal of Environmental Research and Public Health, 2022, 19, 4680. https://doi.org/10.3390/ijerph19084680

Environmental Disparities

Minorities are more likely to live in areas with adverse environmental characteristics, such as poorer air or water quality. Indeed, recognizing these disparities, the Environment Protection Agency (EPA) created the Office of Environmental Justice in 1992. According to Spencer Banzhaf, Lala Ma, and Christopher Timmins, "Environmental Justice: The Economics of Race, Place, and Pollution," *Journal of Economic Perspectives* (2019), there is a burgeoning body of research from multiple disciplines "documenting the correlation between pollution and race and poverty." The White House *Fact Sheet on the Bipartisan Infrastructure Deal* notes "26% of Black Americans and 29% of Hispanic Americans live within 3 miles of a Superfund site, a higher percentage than for Americans overall." The map shows the 1,238 counties where at least *one* health-based violation of the Safe Drinking Water Act occurred in 2022. Minorities constitute around 41.8 percent of the population nationwide, but, at about 54.6 percent, are overrepresented in counties with 10 or more violations. This is consistent with the analysis done by the National Resources Defense Council, *Watered Down Justice* (2019), where they report that "communities of color, low-income communities, and communities that lack transportation and/or live under crowded housing conditions had higher rates of drinking water violations than other communities."

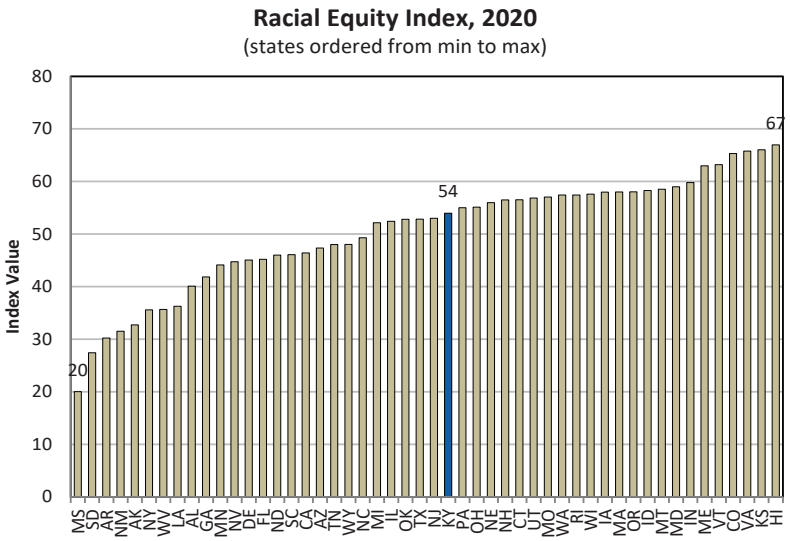
Health-Based Violations of the Safe Drinking Water Act, 2023



Source: Author's analysis of EPA SDWIS data.

Racial Equity Index

Kentucky ranks 24th out of 50 on the Racial Equity Index at the state level. In 2020, Hawaii was ranked first with the highest Racial Equity Index value of 67 and Mississippi had the lowest value of 20. The Racial Equity Index value is based on the Inclusion score and the Prosperity score. The Racial Equity Index is a data tool designed to help communities identify priority areas for advancing racial equity, track progress over time, and set specific goals for closing racial gaps. It provides a snapshot of overall equity outcomes for cities, counties, regions, and states. The Index is based on nine indicators scored separately for inclusion and prosperity. The inclusion score measures racial disparities, where a higher score indicates smaller racial gaps. The prosperity score measures outcomes for the total population, where a higher score indicates better results overall. The nine factors used to assess the scores are: median wage, unemployment, poverty, educational attainment, disconnected youth, school poverty, air pollution, commute time, and rent burden. While Kentucky ranks in the middle of the pack nationally, its score is closer to that of the top ranked states than it is to the states at the bottom of the Index.



Source: National Equity Atlas, downloaded 9/30/2023 <https://nationalequityatlas.org>

Health

KENTUCKY'S HEALTH SHORT-COMINGS are well-known—*America's Health Rankings 2023*, delineates our high rates of drug overdose deaths, chronic disease, and disability, by ranking the state 41st overall. It lists areas considered to be strengths (i.e., high supply of primary care providers, low prevalence of excessive drinking, low violent crime rate), as well as its challenges (i.e., high smoking rate, high prevalence of non-medical drug use, high cancer death rate). A troubling trend is Kentucky's increasing adult diabetes rate, which increased by 40 percent between 2013 and 2022, from 10.6 to 14.8 percent.

Among adults in Kentucky, about one quarter have a depressive disorder, but it is not only adults who struggle with depression. It will take years to fully understand the consequences of the pandemic on the mental health and well-being of our youth, but the individual isolation resulting from widespread school closures exacerbated existing mental health challenges.

Drug abuse is, of course, related to mental health. There were 2,270 drug overdose deaths in Kentucky during 2022, down from 2,380 in 2021—with much of it fueled by opioids. While the growing opioid crisis garners increased attention, chronic diseases are responsible for 7 of 10 deaths each year and drive most of the nation's health care costs. Among Kentucky's prime working-age adults, smoking (19%), obesity (42%), and physical inactivity (23%) put many at risk for chronic disease. Overall, around 23 percent of Kentucky's prime working-age

continued on the next page

continued from the previous page
adults exhibit multiple chronic disease-causing behaviors, and these risk factors lead to higher absenteeism at work and increase employer costs. The Milken Institute has estimated that the economic toll of chronic disease on the Kentucky economy measured in billions of dollars, reflecting the cost of treating avoidable medical expenses as well as the resulting lower labor force productivity and subsequent lower economic growth rates.

Kentucky's poor health outcomes have large economic effects and societal consequences. At the most basic level, good health enables workers to be more productive. Indirectly, higher levels of health facilitate, for example, more education and schooling, which directly affects economic outcomes. Conversely, poor health can lead to premature death, lower workforce participation, higher public assistance costs, and less-than-optimal worker productivity. Studies have found, for instance, that labor time lost due to health reasons totals in the billions of dollars per year in lost economic output. Moreover, given the importance of workforce quality on firm location decisions, communities with high disability rates and poor health status are at a competitive disadvantage. For these reasons, investments in improving the health outcomes of individuals and communities can and do have vital and long-lasting economic benefits.

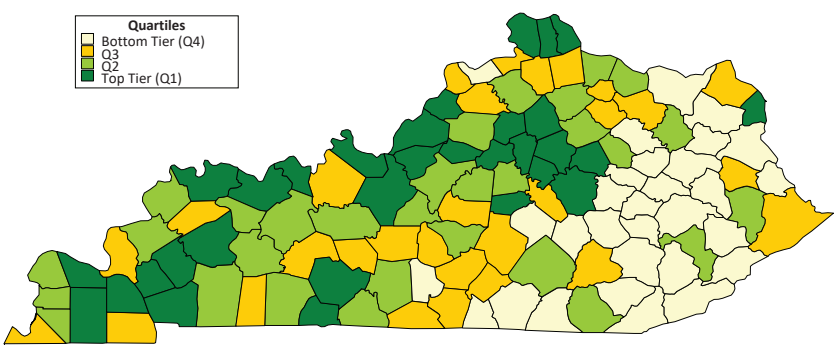
Investments to improve health outcomes in Kentucky can exert important economic benefits. Our analyses suggest that opioid abuse has reduced Kentucky's labor force participation rate by 1.3 to 3.1 percentage points. This translates to a loss of 23,100 to 55,200 workers, $1.0 to $2.8 billion in earnings, and $63 to $169 million in state tax revenues—a considerable economic toll. When we analyze the economic consequences of smoking in Kentucky, we identify effects in three areas—reduced wages for smokers who work, reduced employment among smokers (a loss of 28,500 workers) and increased premature deaths for smokers. Combined, the impact of smoking in Kentucky's reduces total earnings by $1.8 billion to $2.9 billion annually and its state tax revenues by $111 million to $176 million annually. Likewise, there are significant costs associated with other chronic diseases, like diabetes.

Factors like job stability, educational attainment, and neighborhood safety exert a strong influence over health outcomes. By addressing the place-based, social determinants of health in Kentucky communities, policy makers can improve the health of, and by extension economic outcomes for, citizens of the Commonwealth. The findings are clear—poor health can have deleterious economic effects, while good health can improve earnings, employment, and one's quality of life.

Social Determinants of Health

The health of individuals is affected by many factors, including, of course, individual behaviors regarding diet and exercise, but also including community characteristics. The U.S. Department of Health and Human Services advances a "place-based" framework under the auspices of the *Healthy People 2030* initiative to explain and understand the factors affecting health outcomes. This framework includes five principal areas that constitute the *social determinants of health*: economic stability; education; social and community context; health and health care; and neighborhood and built environment. Using 24 separate factors organized into these five categories, we estimate the strength of the social determinants of health at the county level. Using a technique known as principal component analysis, we rank Kentucky's 120 counties into quartiles, or four equal groups, by analyzing variables that include, but are not limited to, the poverty rate, the rate of successful transition to adult life after high school graduation, the number of community associations, the number of various types of health care providers, and environmental conditions such as air and water quality. Together, these factors reflect critical elements in our social and physical environments that affect individual health. Counties in Central and Western Kentucky show the best outcomes, with less favorable outcomes in Eastern Kentucky.

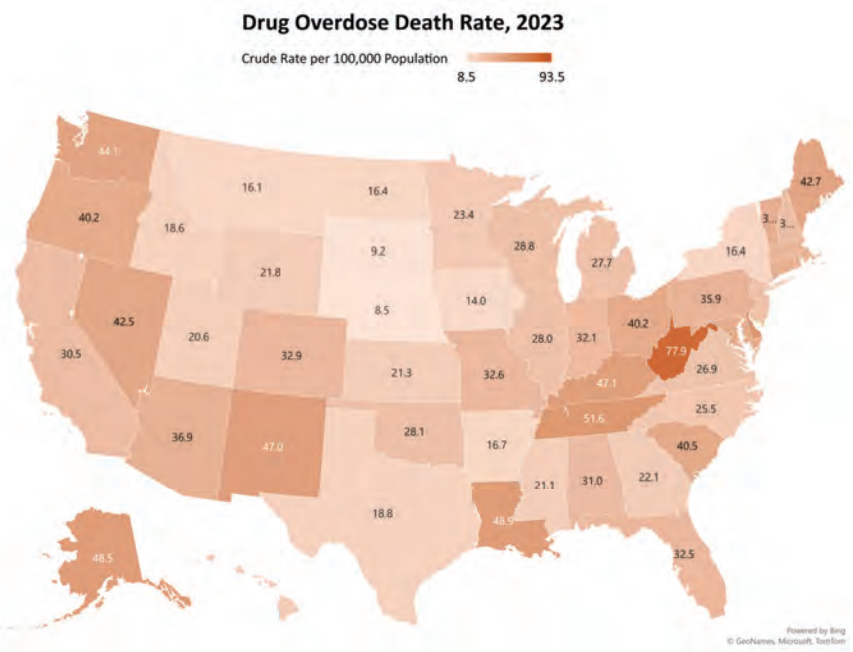
Social Determinants of Health by Kentucky County



Source: Calculated by the author from multiple data sources. Refer to the Notes & Sources.

Drug Overdose Death Rate

Drug overdose deaths, which have been largely fueled by the illegal use of the opioid fentanyl, declined slightly in 2023. While over 100,840 Americans died from a drug overdose in 2023, this represents a 4.3 percent *decline* from 105,400 in 2022. With 2,125 deaths in 2023 compared to 2,309 in 2022, Kentucky experienced an even larger decline over the same time period—8 percent. Unfortunately, Kentucky still has one of the highest drug overdose death rates in the country. An estimated 47.1 individuals per 100,000 population died from a drug overdose in 2023. As shown in the map below, Kentucky is among the states in the highest quintile, ranking seventh nationally. West Virginia, at 77.9 deaths per 100,000 population, has the highest overdose death rate among the states, but DC is the highest overall (93.5). The impact of the opioid epidemic continues to exert significant economic and social consequences on the country, individual states, local communities, and extended families. The costs include, but are not limited to, reduced labor force participation, lost wages, lower productivity, lost tax revenue, higher government expenditures, and emotional distress.

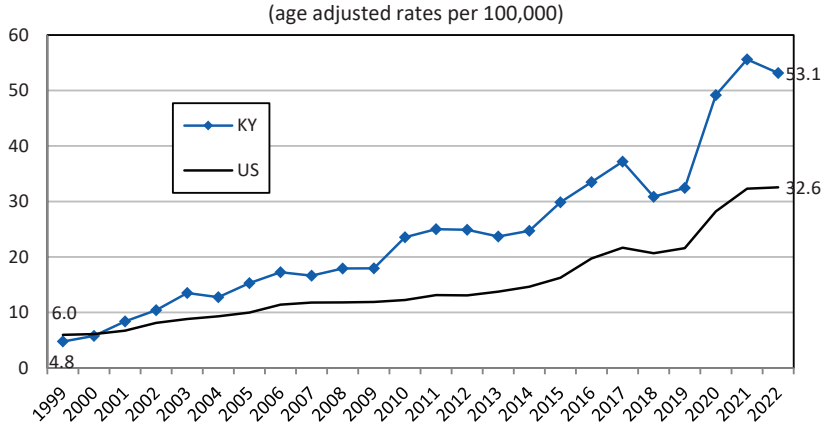


Source: Calculated by CBER using CDC National Center for Health Statistics, Vital Statistics Rapid Release, Monthly Provisional Drug Overdose Death Counts, released May 2024, and U.S. Census, ACS 2022 1-Year population estimates.

Drug Overdose Death Rate

The number of Kentuckians, and Americans, dying from a drug overdose remains high, but the upward trend is slowing. The primary culprit in drug overdose deaths is opioid abuse, especially heroin and fentanyl. According to CDC estimates, there were 2,270 drug overdose deaths in Kentucky during 2022, down from 2,380 in 2021. The U.S. drug overdose death rate (age adjusted) increased by a factor of 5.4 from 1999 to 2022, but in Kentucky it increased by a factor of 11.1. The Kentucky Office of Drug Control Policy reports in the *2023 Overdose Fatality Report* that the five Kentucky counties with the highest death rates in 2023 were Estill (187.3 deaths per 100,000 residents), Lee (155.9), Breathitt (150.6), Powell (121.1), and Floyd (109.9). These drug overdose death rates put significant financial stress on local governments and exert an economic impact on communities. For example, despite the considerable uncertainty regarding the extent to which opioids reduce labor force participation, our 2019 analyses suggested that opioid abuse reduced Kentucky's labor force participation rate by 1.3 to 3.1 percentage points. This translates to a loss of 23,100 to 55,200 workers, $1.0 to $2.8 billion in earnings, and $63 to $169 million in state tax revenues—a considerable economic toll.

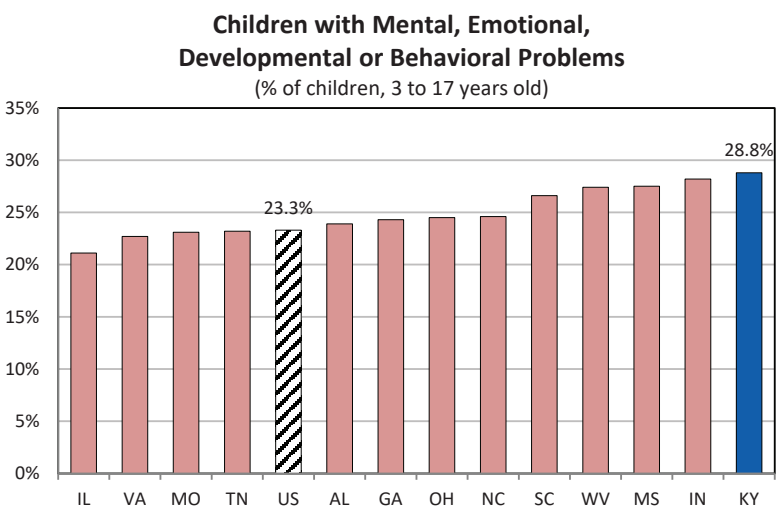
Drug Overdose Death Rates,
Kentucky and the U.S., 1999-2022
(age adjusted rates per 100,000)



Source: Suggested Citation: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2018-2022 on CDC WONDER Online Database, released in 2024. Data are from the Multiple Cause of Death Files, 2018-2022, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/mcd-icd10-expanded.html on May 22, 2024 2:09:04 PM

Children with MEDB Problems

Even before the pandemic delivered its blow to the collective psyche of America's youth (ages 3 to 17), the baseline of mental, emotional, developmental, or behavioral (MEDB) problems was at troubling levels. This is evidenced by over one-fifth of youth nationally (22.6%) and more than one-quarter of Kentucky youth (25.8%) showing at least one MEBD problem in 2019-2020. Unsurprisingly, the mental health of many young people worsened during the pandemic (2020-2021), as shown in the figure below. Kentucky's percentage, for example, increased from 25.8 percent at the beginning of the pandemic to 28.8 percent at the pandemic's height in 2020-2021. This measure, which is based on ten conditions, reflects the percentage of youth having at least one of the following: Tourette Syndrome; anxiety problems; depression; behavioral and conduct problem; developmental delay; intellectual disability; speech or other language disorder; learning disability; Autism or Autism Spectrum Disorder (ASD); and Attention Deficit Disorder or Attention-Deficit/Hyperactivity Disorder (ADD or ADHD). New Hampshire has the highest percentage of youth with at least one MEDB problem (31.3%), and Hawaii the lowest (15.2%).



Source: Child and Adolescent Health Measurement Initiative. 2020-2021 National Survey of Children's Health (NSCH) data query. Data Resource Center for Child and Adolescent Health supported by the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau (MCHB). Retrieved [10/11/23] from [www.childhealthdata.org].

TEENS' MENTAL HEALTH

There is a growing percentage of American youth facing mental health challenges. It will take years to fully understand the consequences of the pandemic on the mental health and well-being of our youth, but the individual isolation resulting from widespread school closures likely exacerbated existing mental health challenges. The Centers for Disease Control and Prevention Youth Risk Behavior Surveillance System (YRBSS), which is a system of surveys—not just a single survey—monitors six categories of health-related behaviors that contribute to the leading causes of death and disability among youth. These include, but are not limited to, mental health and well-being. The data shown in the table below are estimated from the 2021 Combined High School Youth Risk Behavior Survey, focusing on students in grades 9 through 12, mostly 15 to 18 years old. The percentage of youth facing serious mental health challenges has been growing at an alarming rate for the mental health and suicide indicators tracked by the CDC. Kentucky tracks the national trends for many mental health indicators for adolescents. Research published in *JAMA Pediatrics,* as described in *The New York Times* in October 2023, found that about 20 percent of adolescents had symptoms of major depressive disorder in 2021, but less than half who needed treatment received it.

Mental Health and Suicide Indicators among High School Students U.S., Selected Nearby States, and Kentucky, 2021
(High school youth, 9th through 12th grades)

Survey questions	US (%)	Nearby States (%)	KY (%)
Experienced persistent sadness or hopelessness	42.3*	30.4	30.5
Seriously considered suicide	22.2*	17.8*	16.7
Made a suicide plan	17.6*	14.4	13.8
Attempted suicide	10.2*	9.3	8.8
Injured in a suicide attempt requiring medical treatment	2.9	3.3	3.2

Source: Author's analysis of data from Centers for Disease Control and Prevention (CDC), Youth Risk Behavior Survey, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2021.
Note: The selected nearby states are AL, GA, IL, IN, MO, MS, NC, SC, TN, WV & VA. See Notes & Sources at the end of this report for more information about each of the survey questions.
**This percentage is statistically different from the Kentucky's percentage (alpha=.05).*

Poor Mental Health Days

To gauge the mental health status of American adults, the Centers for Disease Control (CDC) posed this question on its 2022 Behavioral Risk Factor Surveillance System Survey: *Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?* Limiting our focus to prime working age adults, 25 to 54 years old, Kentucky shows a statistically significant lower value (4.9 days) than both the U.S. (5.4) and competitor states (5.7). There are 18 states that have statistically significant higher values than Kentucky, while 31 states and the District of Columbia are statistically the same as Kentucky. Overall, Kentucky performs relatively well, ranking 11th, on a recent national assessment of state-level mental health. Mental Health America (MHA) uses 15 different measures that reflect the mental health status of adults and children, as well as measures of the mental health care infrastructure. MHA finds that Kentucky, on balance, tends to have lower prevalence of mental illness and higher rates of access to care when compared to most other states and DC. Refer to Reinert, M, Fritze, D. & Nguyen, T. (October 2022). "The State of Mental Health in America 2023" Mental Health America, Alexandria VA.

Number of Poor Mental Health Days, 2022
Kentucky, Competitor States and the U.S.
(working age adults, 25 to 54 years old)

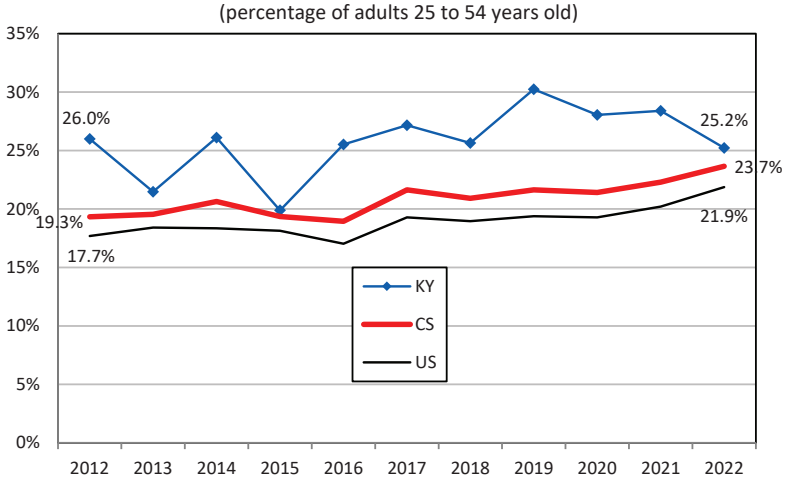
Source: Author's analysis of CDC Behavioral Risk Factor Surveillance System data, Ques: "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"

DEPRESSION

The economic costs of depression for individuals, families, and businesses, are estimated to be high and rising. According to a 2021 study published in *Pharmacoeconomics*, "the economic burden of major depressive disorder among U.S. adults was an estimated $236 billion in 2018, an increase of more than 35% since 2010 (year 2020 values)." These include: *direct costs*, such as medical services and medications; *workplace costs*, including absenteeism and reduced productivity; and s*uicide-related costs*. Kentucky's relatively high self-reported rates of depression, shown in the graph below, belie its upper tier ranking of 11th nationally on the Mental Health America, *The State of Mental Health in America 2023*. This report finds that Kentucky, on balance, tends to have lower prevalence of mental illness and higher rates of access to care when compared to the most other states and DC. Yet, responses to the CDC's Behavioral Risk Factor Surveillance System Survey question about depression [i.e., *Ever told you had a depressive disorder (including depression, major depression, dysthymia, or minor depression)?*], show that from 2012 to 2022 Kentucky consistently exhibits higher rates of depression among prime working age adults 25 to 54 years old than the U.S. or competitor states. Kentucky's percentages are statistically significantly higher than the U.S. and competitor states in nearly every year.

Depression Diagnosis Among Prime Working-Age Adults, Kentucky, Competitor States, and the U.S., 2012-2022

(percentage of adults 25 to 54 years old)



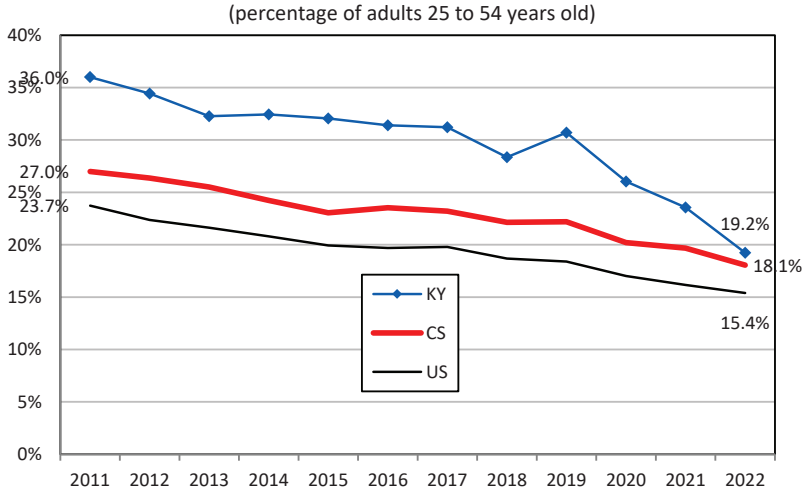
Source: Author's analysis of CDC Behavioral Risk Factor Surveillance System data, various years

Adult Smokers

Despite a steady decline in smoking over the last decade, Kentucky still has one of the highest adult smoking rates in the nation. Consequently, smoking-related causes of death, including lung cancer and heart disease, exert a disproportionately high cost. With a smoking rate among prime working-age adults (25 to 54 years old) of 19.2 percent, Kentucky is well above the national average of 15.4 percent. Kentucky is statistically tied with 24 other states and the competitor state average (18.1%). The other 23 states, DC, as well as the U.S. average, have statistically significant lower rates. The economic costs associated with smoking are high. A 2019 report from the Center for Business and Economic Research (CBER), *The Effect of Smoking on Kentucky's Workforce*, finds that smoking leads to poorer labor market outcomes. Smokers are more likely to be unemployed, earn lower wages, and die prematurely than non-smokers. These negative labor market effects reduce economic activity and lower tax revenues, adding to the social costs and fiscal impact that smoking imposes. Combined, these three effects—reduced wages for smokers who work, reduced employment among smokers, and increased premature deaths for smokers—reduce Kentucky's total earnings by $1.8 billion to $2.9 billion annually and its state tax revenues by $111 million to $176 million annually.

Prime Working-Age Adults Who are Current Smokers, Kentucky, Competitor States, and the U.S., 2011-2022

(percentage of adults 25 to 54 years old)



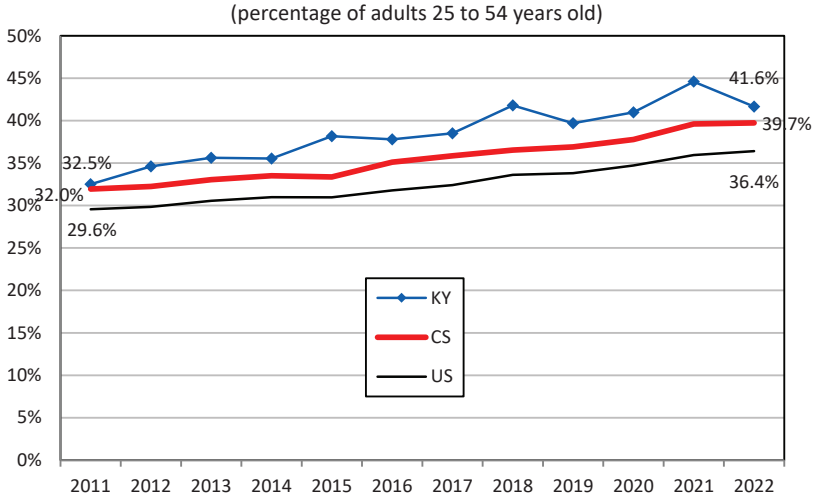
Source: Author's analysis of CDC Behavioral Risk Factor Surveillance System data, various years

ADULT OBESITY

Obesity can lead to heart disease, stroke, type 2 diabetes, and certain types of cancer. The Centers for Disease Control and Prevention (CDC) notes that the medical care costs of obesity in the United States are in the billions of dollars. One consequence of obesity—diabetes—is addressed in a 2019 Center for Business and Economic Research (CBER) report, *The Economic Impact of Diabetes in Kentucky*. It notes that the percentage of Kentucky adults diagnosed with diabetes has increased from 9.9 percent in 2007 to 12.8 percent in 2017. Currently, approximately 450,000 Kentuckians have diabetes. Research shows that diabetes is associated with lower employment and earnings. In Kentucky, diabetes reduces employment by approximately 15,700 workers, representing a loss of $551.3 million in earnings and $33.1 million in state tax revenue annually. With the number of obese adults in Kentucky at an all-time high, the economic impact of diabetes in Kentucky will likely increase. Currently, about 41.6 percent of prime working-age adults (25 to 54 years old) in Kentucky are obese, about 5 percentage points above the national average of 36.4 percent. The competitor state average and 24 states are statistically no different from Kentucky. The other 25 states, DC, and the U.S. average are statistically lower. There are no states statistically significantly higher than Kentucky.

Obesity Among Prime Working-Age Adults, Kentucky, Competitor States, and the U.S., 2011-2022

(percentage of adults 25 to 54 years old)



Source: Author's analysis of CDC Behavioral Risk Factor Surveillance System data, various years

Risk Behaviors and Chronic Disease

According to the Centers for Disease Control and Prevention (CDC), more than 75 percent of health care costs are due to chronic conditions such as heart disease, cancer, stroke, diabetes, and arthritis. Many patients have multiple chronic conditions and their care costs up to seven times as much as those with one chronic condition. Much of the chronic disease is caused by four *preventable* health risk behaviors—lack of exercise, poor nutrition, smoking, and heavy alcohol consumption. When compared to the U.S. as well as states that are widely considered to be Kentucky's competitors for economic development prospects, *prime working-age* (25 to 54 years old) Kentuckians are *more* likely to smoke, be obese, and not engage in regular physical activity, but are *less* likely to be heavy drinkers.

Four Risk Behaviors that Contribute to Chronic Disease, U.S., Competitor States, and Kentucky, 2022
(prime working-age adults)

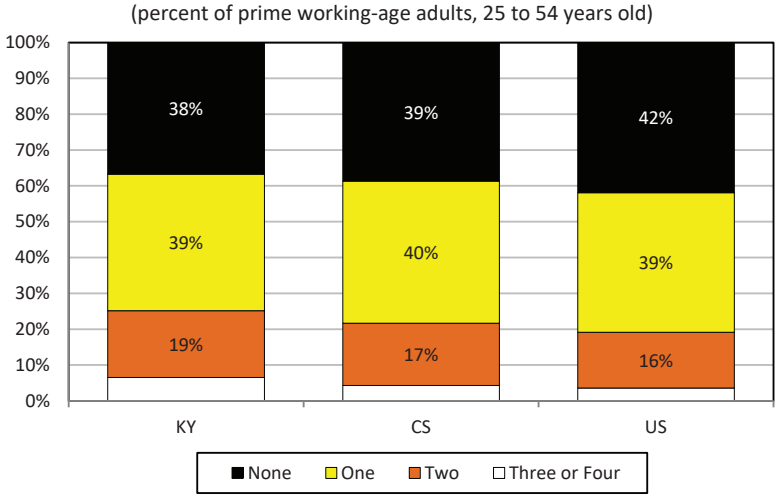
Adults, 25 to 54 years old	US (%)	CS (%)	KY (%)
Current Smoker	15*	18	19
Obese	36*	40	42
Lack of Physical Activity	21	22	23
Heavy Alcohol Consumption	8*	8*	5

Source: Authors' analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2022
Note: The competitor states are AL, GA, IL, IN, MO, MS, NC, OH, SC, TN, VA, & WV.
**These percentages are statistically different from the Kentucky percentages (alpha=.05).*

Number at Risk for Chronic Disease

Overall, 23 percent of Kentucky's prime working-age (25 to 54 years old) adults engage in multiple chronic disease causing behaviors. About 38 percent have none of the risk factors of smoking, obesity, inactivity, or heavy drinking, and 39 percent have one. However, 19 percent have two and over 4 percent exhibit three or four. Much of chronic disease is caused by these four risk factors and it is estimated that 75 percent of health care costs are due to chronic conditions such as heart disease, cancer, stroke, diabetes, and arthritis. Compared to the competitor states and the U.S., prime working-age adults in Kentucky are more likely to have one or more chronic disease risk factors. These risk factors, particularly smoking, physical inactivity, and obesity, are linked to higher absenteeism and employer costs. Research published in 2016 found that "Absenteeism costs associated with chronic diseases and health risk factors can be substantial. Employers may incur these costs through lower productivity, and employees could incur costs through lower wages." This association brings the health status of the state's workers to the forefront when considering strategies for improving Kentucky's economic prospects.

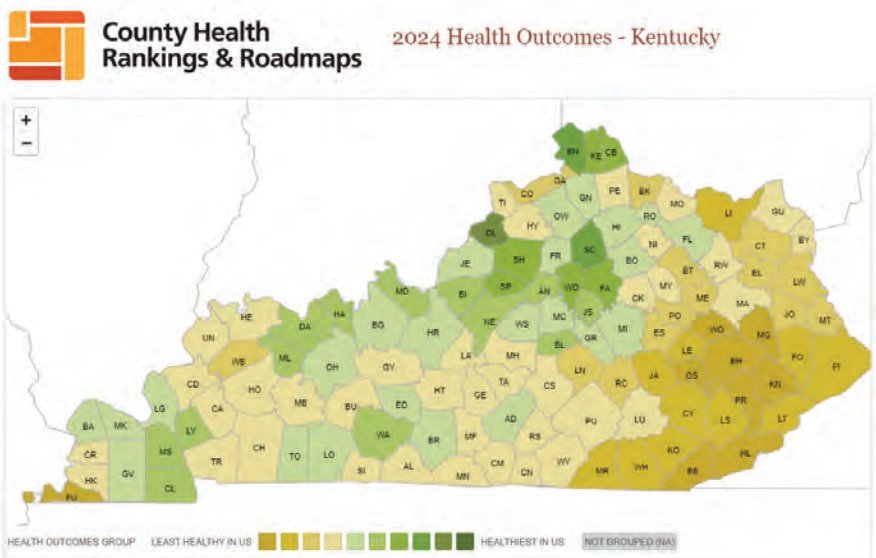
Number of Key Chronic Disease Causing Behaviors, 2022, Kentucky, Competitor States, and the U.S.
(percent of prime working-age adults, 25 to 54 years old)



Source: Author's analysis of Behavioral Risk Factor Surveillance System data

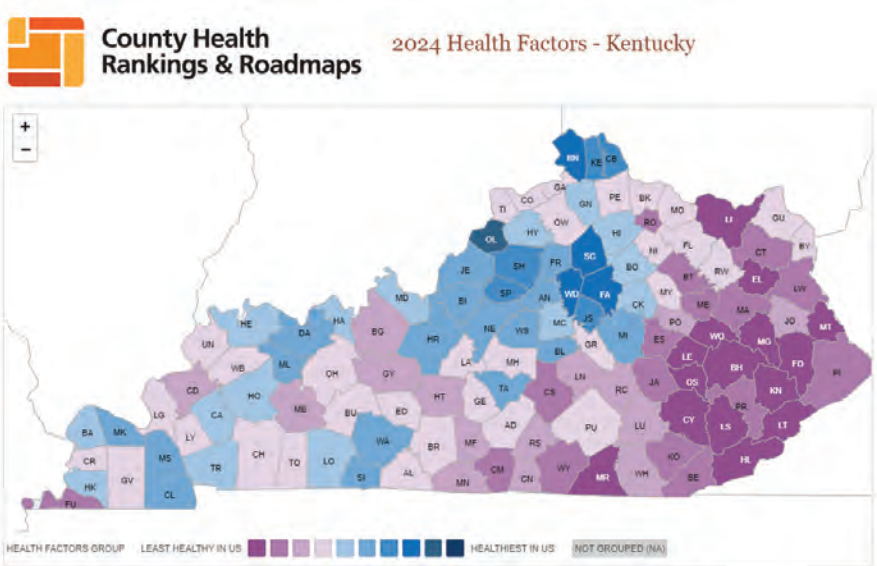
Health Outcomes

Researchers use over 30 measures to produce the *2024 County Health Rankings.* They assess the health status of individuals and generate county-level ranks, state-by-state, to "help communities understand how healthy their residents are today (health outcomes) and what will impact their health in the future (health factors)." The map below shows the county-level ranks for Kentucky's health outcomes. The researchers measure *length of life* and *quality of life* to estimate the health outcomes among Kentucky's counties. The upper quartile of counties (ranks 1 to 30), have better health outcomes, and are sprinkled throughout the state—but mainly concentrated in the Urban Triangle. The counties with the lowest outcomes (i.e., ranks 91 to 120, or the lowest quartile) are mainly concentrated in Eastern Kentucky.



Health Factors

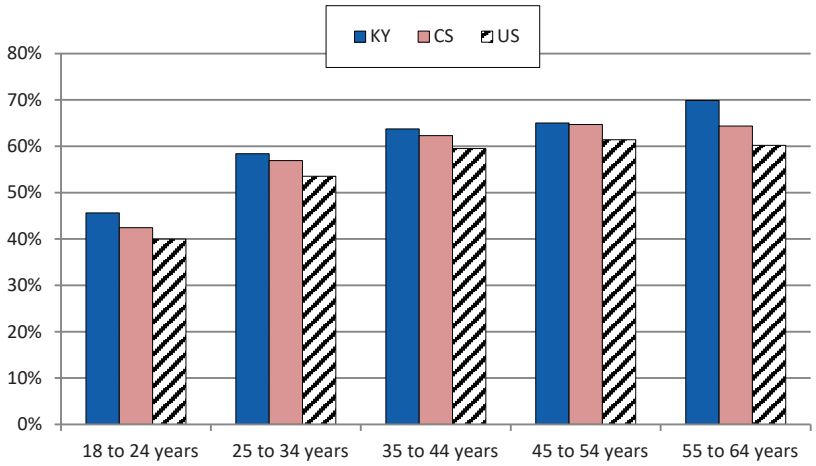
This map of health factors, also part of the *2024 County Health Rankings* (see the opposite page), shows Kentucky's 120 counties grouped into quartiles; counties ranking 1 to 30 (i.e., the upper quartile) have the best health factors. The researchers note that health factors, such as healthy individual behaviors, access to high-quality health care, safe communities, and a clean environment, are factors that can be changed to improve the overall health of a community. Similar to the health outcomes on the facing page, the counties with better health factors are mostly found in the Urban Triangle, with most of the counties in the lowest quartile found in Eastern Kentucky.



Chronic Disease Risk by Age Group

Chronic disease risk increases with age, but this risk does not change substantially across the age groups for those *25 and older*. We base the risk of chronic disease on whether any of these conditions exist: smoking, obesity, lack of exercise, or heavy alcohol consumption. An estimated 63 percent of Kentucky adults 25 and older demonstrate at least one of the four behaviors that put them at risk of developing a chronic disease, compared to 61 percent in the competitive states and 58 percent in the United States. These rates have been consistent and stable for at least the last decade—an indication of how difficult it is to change chronic disease causing activities, not only in Kentucky but across the United States.

Chronic Disease Risk by Various Age Groups, Kentucky, Competitor States, and the U.S.
(percent of individuals at risk for chronic disease, 2022)

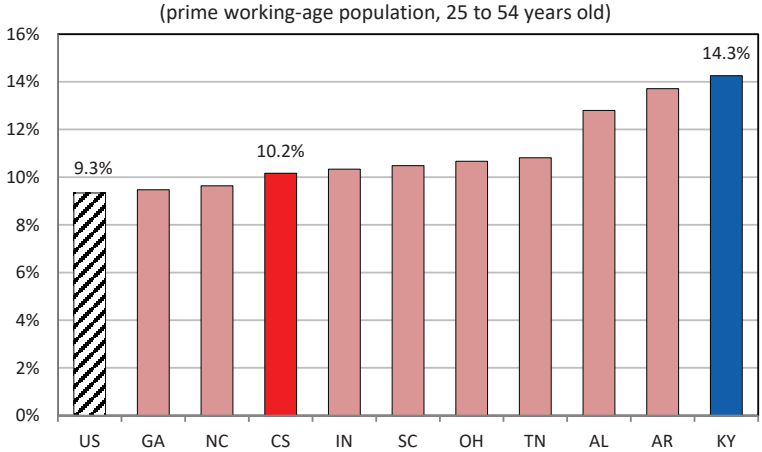


Source: Author's analysis of Behavioral Risk Factor Surveillance System data

DISABILITY

High disability rates can diminish a state's economic competitiveness by decreasing worker productivity, reducing labor force participation, and increasing business costs. Kentucky's economic potential is likely hindered since it has one of the highest disability rates in the country. Approximately 14.3 percent of prime working-age Kentuckians identify as having a disability. The other states with high disability rates are Arkansas (15.8%), Mississippi (16.6%), Oklahoma (15.7%), and West Virginia (16.8%). The rates of these five states are statistically indistinguishable from each other. The Census Bureau tracks six types of disabilities: hearing, visual, cognitive, ambulatory, self-care, and independent living. The percentages shown in the figure below represent those with at least one of the six disabilities. Kentucky's rate (14.3%) is statistically significantly higher than the U.S. (9.3%) and competitor state averages (10.2%). No state has a statistically significant higher rate than Kentucky, and there are 45 states, along with the District of Columbia, that have statistically significant lower rates.

Individuals with Disabilities, 2021-2022
Kentucky, Competitor States and the U.S.
(prime working-age population, 25 to 54 years old)

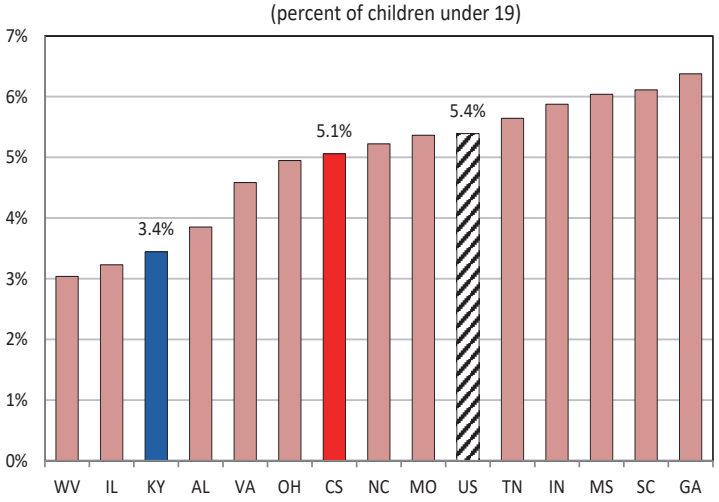


Source: Estimated by the author using data courtesy Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [ACS 2021 & 2022]. Minneapolis, MN: IPUMS, 2024.

Health Insurance Coverage: Children

An estimated 36,600 Kentucky children under 19 years old were not covered by health insurance in 2023, or about 3.4 percent of children. The percentage of uninsured children, which was around 11 percent in 1999, has been generally declining as children were added to the Kentucky Children's Health Insurance Program (KCHIP) or Medicaid. The Kentucky Children's Health Insurance Program is free or low-cost health insurance for children. KCHIP is for children younger than 19 who do not have health insurance and whose family income is at or less than 218 percent of the federal poverty level. For example, a family of four can earn up to $66,456 a year and qualify for KCHIP. The percentages of uninsured children (under 19) in the competitor states and U.S. are 5.1 percent and 5.4 percent, respectively in 2023. Investments in children's health insurance can have high long-term payoffs. A 2019 study by Nathaniel Hendren and Ben Sprung-Keyser, *A Unified Welfare Analysis of Government Policies*, found that "direct investments in low-income children's health and education have historically had the highest Marginal Value of Public Funds (MVPF)" when examining 133 policy changes in the United States over a 50 year period. In short, they find the largest "bang for the buck" when investing in children, particularly in programs that improve the health and education of low-income children.

Children without Health Insurance Coverage, Kentucky, Competitor States and the U.S., 2023
(percent of children under 19)

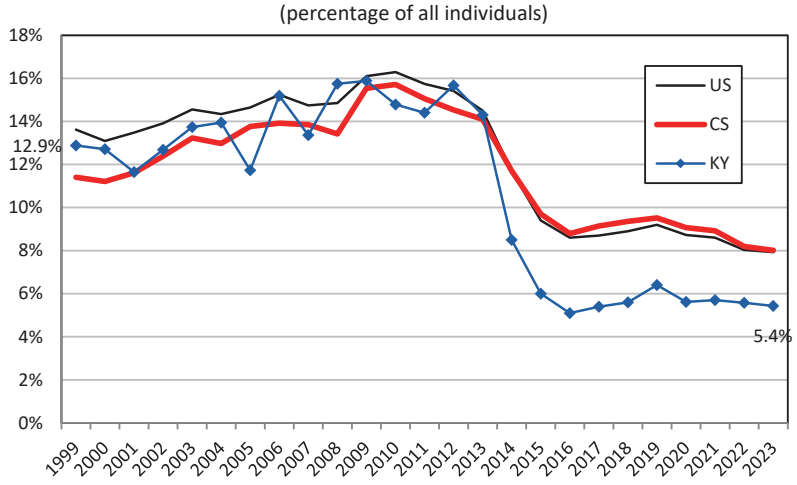


Source: U.S. Census 2023 American Community Survey 1-Year Estimates, Table S2701

Health Insurance Coverage: Everyone

An estimated 26.2 million Americans were without health insurance in 2023, with the percentage of uninsured people declining slightly since 2019. In Kentucky, 241,200, or 5.4 percent of the total state population, did not have health insurance in 2023. Medicaid has historically played a key role in providing health coverage for disproportionately poor Kentuckians, insuring an estimated 31 percent of the population here in 2023, compared to about 22 percent in the competitor states and 24 in the U.S. The implementation of the Affordable Care Act has increased the number of individuals on Medicaid over the past several years.

Individuals without Health Insurance Coverage, Kentucky, Competitor States, and the U.S., 1999-2023
(percentage of all individuals)



Source: U.S. Census, Health Insurance Historical Tables - HIB Series (1999 to 2012) and American Community Survey, 1-Year Estimates (2013-2019, 2021-2023), ACS 5-year estimates used for 2020.

Youth Health-Related Behaviors

Research shows important links between health-related behaviors and educational outcomes. Specifically, lower academic achievement among high school students is associated with a lack of physical activity and inadequate nutrition. Based on data from the CDC's Youth Risk Behavior Survey (YRBS), researchers examined the linkages between several dietary, physical activity, sedentary risk behaviors, and students' grades in school. The findings show that, when compared to students with lower grades (mostly D's/F's), students who reported higher grades (mostly A's) are: more likely to engage in physical activity; play on at least one sports team; eat breakfast; eat fruits and vegetables as well as drink 100% fruit juice; drink milk; and *not* drink soda. Furthermore, the better students were less likely to watch television for extended periods, or play video games, or use a computer 3 or more hours per day. The table below shows how Kentucky high school students compare to the U.S. and selected surrounding states. In general, Kentucky students get less physical activity, evidenced by statistically significant differences. In addition, compared to the U.S., Kentucky students generally have poorer dietary practices. Improving the health of today's high school students can help create a healthier and better prepared workforce in the future.

Health-Related Behaviors of High School Students, U.S., Selected States, and Kentucky, 2021

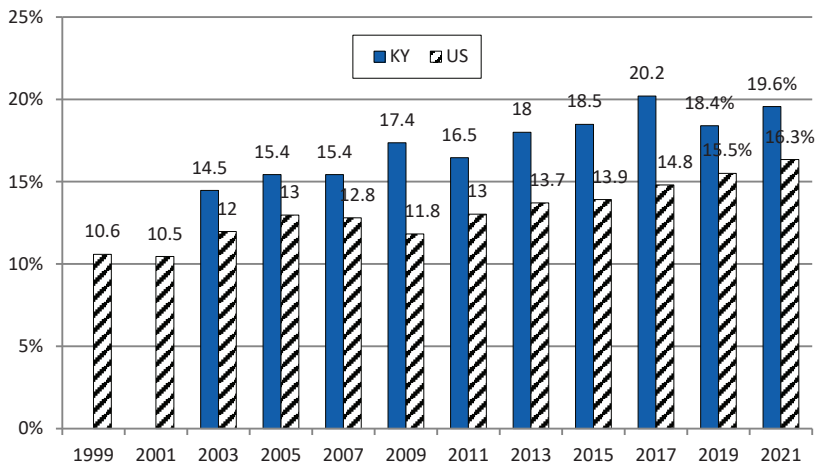
9th through 12th graders	US (%)	SS (%)	KY (%)
Ate breakfast on all 7 days before the survey	25.0*	30.8	30.8
Ate fruit or drank 100% fruit juices one or more times per day during the 7 days prior to the survey	52.9*	55.0*	49.6
Ate vegetables one or more times per day during the 7 days before the survey	54.7	56.8*	54.7
Drank one or more glasses per day of milk during the 7 days before the survey	24.2*	33.2*	31.4
Did not drink a can, bottle, or glass of soda or pop during the 7 days before the survey	31.0*	22.9*	21.1
Physically active at least 60 minutes per day on 5 or more days during the 7 days before the survey	45.3*	43.0*	37.9
Played on at least one sports team during the 12 months before the survey	49.1	54.0*	48.8
Spent 3 or more hours per day on screen time (in front of a TV, computer, smart phone, or other electronic device watching shows or videos, playing games, accessing the Internet, or using social media, not counting time spent doing schoolwork, on an average school day)	75.9	73.6	73.7

Source: Authors' analysis of data from Centers for Disease Control and Prevention (CDC), Youth Risk Behavior Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2021
Note: The selected states (SS) are AL, GA, IL, IN, MO, NC, MS, SC, TN, VA, & WV. These are weighted averages. IN did not ask the "breakfast" question, IN & VA did not ask the "vegetable" question, IN, NC, SC, & VA did not ask the "milk" question, AL & GA did not ask the "soda" question, and GA, IL, IN, & VA did not ask the question on "playing on sport teams."
**These percentages are statistically different from the Kentucky percentages (alpha=.05).*

Youth Obesity

Some research findings indicate that being significantly overweight or obese can lower a student's academic achievement. Overweight or obese students, it is argued, are more likely to suffer from adverse health consequences, such as asthma, type 2 diabetes, depression, and sleep apnea, which can then lead to higher absenteeism and negatively affect their academic performance. According to a 2007 study, obesity is a stronger predictor of school absenteeism than race, socioeconomic status, age, or gender. The obesity rate for Kentucky high school students in 2021 was one of the highest in the country. There is only one state with a statistically significant higher rate (West Virginia, 26.9%), while there are 21 states with statistically significant lower rates (out of the 41 states to which we can compare Kentucky). The obesity rate for the competitor states is 17.4 percent. There is a statistically significant difference between Kentucky's youth obesity rate and the U.S. rate in every year shown in the graph below. Kentucky's obesity rate has been trending upward over time. The 2021 rate of 19.6 percent is statistically higher than the rates from 2003 through 2007, but is statistically no different from any of the rates from 2009 to 2019.

Obese High School Students,
Kentucky and the U.S., 1999 to 2021
(percent of individuals in grades 9 through 12)



Source: Author's analysis of CDC Youth Risk Behavior Survey data, various years.

Youth Smoking & Vaping

The percentage of high school students who smoke cigarettes has dropped dramatically over the last two decades, as evidenced by the Centers for Disease Control and Prevention, *High School Youth Risk Behavior Survey* results shown in the table below. In Kentucky, for example, the percentage went from almost half (47%) in 1997 to 4.9 percent in 2021—one-tenth the amount. While cigarettes have become somewhat passé, new products have emerged, such as vaping devices, which include e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, and hookah pens. Just over one-fifth (21.9%) of Kentucky high school students were using electronic vapor products in 2021, and just under one-fifth of high school students nationally (18.0%). While less harmful than cigarette smoking, the growing use of vaping devices among teens alarms public health officials nonetheless because it is still highly addictive and harmful to one's respiratory and circulatory systems. Consequently, the federal and state governments have been combating the e-cigarette industry for its marketing practices. In June 2022, the FDA ordered the leading e-cigarette brand in the U.S., Juul Labs Inc., to remove its e-cigarettes from the market. Also, in September 2022, Juul agreed to pay nearly $440 million in a settlement with 33 states over allegations that it marketed its products to underage users.

Percent of Kentucky & U.S. High School Students† Who Smoke Cigarettes or Use Electronic Vapor Products, Selected Years

	Smoke Cigarettes**		Use Electronic Vapor Products***	
Year	KY	US	KY	US
1997	47.0	36.4*	-	-
2003	32.7	21.9*	-	-
2005	26.2	23.0	-	-
2007	26.0	20.0*	-	-
2009	26.1	19.5*	-	-
2011	24.1	18.1*	-	-
2013	17.9	15.7	-	-
2015	16.9	10.8*	23.4	24.1
2017	14.3	8.8*	14.1	13.2
2019	8.9	6.0	26.1	32.7*
2021	4.9	3.8	21.9	18.0

† Grades 9-12
* Statistically different from Kentucky (alpha=.05).
** Currently smoke cigarettes (on at least 1 day during the 30 days before the survey)
*** Currently used electronic vapor products (including e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, and hookah pens on at least 1 day during the 30 days before the survey)
Source: Centers for Disease Control and Prevention, High School Youth Risk Behavior Survey, various years

Youth Alcohol and Drug Use

A range of behavioral risks can compromise the health and well-being of young people. Here, we illustrate trends of two such behaviors. These numbers are down sharply from recent years. In 2019 roughly one-quarter of Kentucky high school students—23.6 percent of males and 23.1 percent of females—were considered current drinkers (at least 1 drink of alcohol on at least one day during the 30 days before the survey). However, by 2021 these percentages declined to 14.4 and 19.8, respectively, for males and females. Kentucky's overall percentage in 2021, 17.5 percent, is statistically significantly lower than the U.S. percentage of 21.7 percent (using a 95 percent confidence interval). Forty states participated in the survey in 2021, and only one is significantly lower than Kentucky—Utah (8.1%). The percentage of Kentucky youth who reported using marijuana one or more times in the past month has also been on a downward trend over the last two decades, but is still in the double digits—10.9 percent of males and 12.8 percent of females. Kentucky's overall percentage in 2021 is 11.9 percent, which is statistically significantly lower than the U.S. percentage of 15.3 percent. One state is statistically lower than Kentucky (Utah, 7.8%), 19 the same, and 21 statistically higher.

Percent of Kentucky High School Students* Who Drank Alcohol or Used Marijuana*** in Past 30 Days, Selected Years**

	Alcohol Use**		Marijuana Use***	
Year	Male	Female	Male	Female
1997	53.8	44.5	33.5	23.3
2003	46.3	44.2	22.5	19.5
2005	38.0	36.8	18.1	13.4
2007	41.0	40.1	17.4	15.4
2009	40.4	35.2	19.6	12.5
2011	35.6	33.3	20.6	17.4
2013	32.6	28.0	20.0	15.3
2015	25.6	31.2	17.5	16.9
2017	24.4	28.6	14.6	16.7
2019	23.6	23.1	16.9	14.8
2021	14.4	19.8	10.9	12.8

* Grades 9-12
** Currently drank alcohol (at least 1 drink of alcohol, on at least 1 day during the 30 days before the survey)
*** Currently used marijuana (one or more times during the 30 days before the survey)
Source: Centers for Disease Control and Prevention, High School Youth Risk Behavior Survey, various years

Oral Health

The oral health of our citizens is important for several reasons. First, it is important as a quality-of-life issue; healthy teeth and gums can translate into a better appearance, higher self-esteem, and more self-confidence, which are key to a better quality of life. Second, missing and decayed teeth or diseased gums can make it difficult to find employment and perform well on the job, adversely affecting the pocketbooks of individuals and families as well as the state's capacity to realize economic development and increase prosperity. Third, and perhaps most important, missing teeth, inflamed gums, and cavities often make it difficult to eat a balanced diet, and increasingly research links poor oral health to illness, chronic disease, and even early mortality. While real public health gains have been made in oral health here, Kentucky's overall status can best be termed as slightly below average. Compared to the competitor states (64.8%) and U.S. overall (66.0%), a statistically significant lower percentage of Kentucky prime working-age adults (58.8%) responded "None," when asked this question: *Not including teeth lost for injury or orthodontics, how many of your permanent teeth have been removed because of tooth decay or gum disease?*

Oral Health Indicators, U.S., Competitor States, and Kentucky, 2022
(prime working-age adults, 25 to 54 years old)

Oral Status	US (%)	CS (%)	KY (%)
Missing 1 to 5 permanent teeth	27.1	26.8	29.1
Missing 6 or more teeth, but not all	5.2*	5.9*	7.7
Missing all teeth	1.7*	2.5*	4.4
Visited dentist in last 12 months	61.5	59.3	61.0

Source: Author's analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2022
Note: The competitor states are AL, GA, IL, IN, MO, MS, NC, OH, SC, TN, VA, & WV.
**These percentages are statistically different from the Kentucky percentages (alpha=.05).*

Infrastructure

ABOUT 26% OF KENTUCKY'S private-sector economy is in goods-producing industries that are highly dependent on transportation, compared to about 19 percent in the U.S. Infrastructure development and maintenance are fundamentally important for Kentucky's future economic advancement, and it is easy to understand why; it includes aviation, bridges, dams, drinking water, energy, hazardous waste disposal sites, levees, public parks, roads, schools, solid waste processing plants, telecommunications, and wastewater facilities. Infrastructure is all encompassing and provides a foundation for future economic progress.

Congress passed one of the largest infrastructure bills in American history with the bipartisan Infrastructure Investment and Jobs Act in November 2021. The $1.2 trillion bill, the largest federal infrastructure investment in U.S. history, will funnel billions to states and local governments for roads, bridges, transit systems, water systems, broadband, and more, over the next several years.

Surveys of CEOs and consultants who engage in industrial site selection decisions show that infrastructure considerations play a key role in their decision-making. Choosing from a list of thirty distinct factors, ranging from labor costs to environmental regulations, respondents to the *2023 Area Development Site Selection Survey* ranked several varied factors related to infrastructure as either "important" or "very important." For example, "ICT/broadband" ranked fifth

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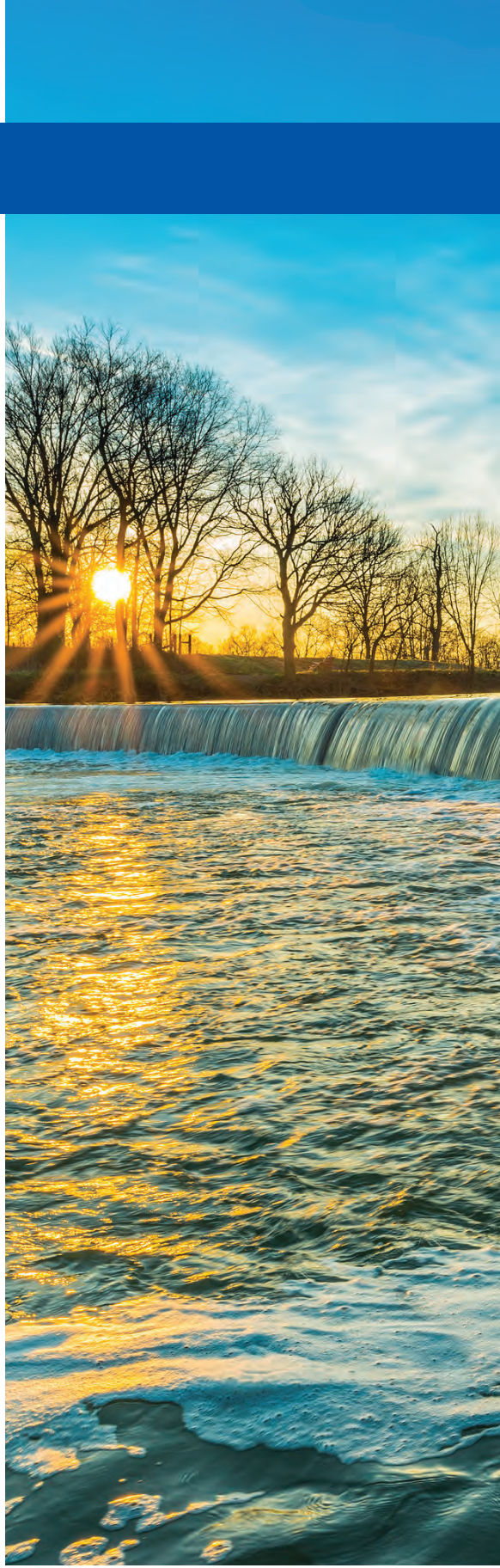

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on the list at 79 percent and "highway accessibility" ranked nineth on the list at 76.9 percent. The most crucial factor on the list is "labor costs" at 92.5 percent.

The 2021 bipartisan infrastructure bill allocates $6.4 billion to Kentucky over a five-year period and includes: $4.6 billion for highways; $647 million to improve drinking water infrastructure; $438 million for bridge replacement and repairs; $204 million for airports; $100 million to improve broadband coverage; $69 million to support the expansion of an electric vehicle charging network; $19 million to protect against wildfires; and $18 million to protect against cyberattacks.

Kentucky can become more economically competitive with a more robust and resilient infrastructure. The state received a "C-" on the *2019 Report Card on Kentucky's Infrastructure*, which was produced by the Kentucky Section of the American Society of Civil Engineers (ASCE); America's infrastructure also got a grade of "C-" on the 2021 ASCE infrastructure national assessment. The engineers evaluate sixteen separate categories from aviation to wastewater according to capacity, condition, funding, future need, operation and maintenance, public safety, and resilience. The Kentucky assessment in 2019 examined ten categories.

The Kentucky Report Card presents three broad areas for improving the state's infrastructure: an integrative and comprehensive big picture approach to planning that anticipates the future challenges while addressing current needs; a concentrated investment in the multimodal freight network to support the distribution and logistics needs of growing industries; and a recognition that rural communities often lack the financial wherewithal to address vital infrastructure needs—particularly with respect to the drinking water infrastructure.

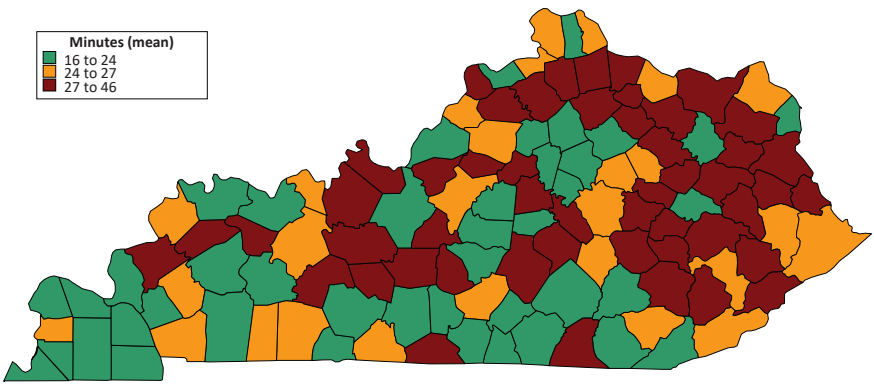
The pandemic revealed numerous broadband gaps in rural areas, leaving workers, students, and citizens without adequate connections to the information resources they need. Understandably, broadband accessibility and speed are increasingly viewed as fundamentally important components of a state's infrastructure. In September 2020, a broad coalition of groups, including, but not limited to, the Prichard Committee for Academic Excellence, Kentucky Chamber of Commerce, Kentucky Farm Bureau, and Kentucky Primary Care Association, implored state officials to make closing the digital divide a top priority. Then, in June 2022, the Governor's office announced $203 million in grant awards to expand reliable and affordable high-speed internet to twelve internet service providers and local governments across 35 Kentucky counties.

Maintaining—let alone expanding—Kentucky's existing infrastructure, whether school buildings or roads, requires a tremendous amount of money. The funds provided by the Infrastructure Investment and Jobs Act represent a unique opportunity to make fundamental investments in the state's infrastructure, bolstering the state's economic competitiveness and enhancing future prosperity.

Commuting

Since 2010, average commute times have increased by about one minute in Kentucky, from 22.6 to 23.7 minutes. On average, from 2017 to 2021, an estimated 76 percent of Kentuckians 16 years and older drove to work alone. By comparison, carpooling was around 9.9 percent and public transportation accounted for less than one percent. The rest used some other form of transportation, like biking, or work from home. Average commute times in Kentucky (23.7) are less than the U.S. average of 26.8 minutes (2021 ACS 5-year estimate). There is an economic impact associated with commuting and traffic congestion. The transportation-analytics firm *Inrix* found that "the typical American driver lost 51 hours in congestion [in 2022], up 15 hours from 2021 but still nearly 50% below pre-pandemic levels." They also report that because workers are returning to the office, higher fuel prices, and general inflation, "congestion cost the average driver $869 in time lost, up $305 from last year, and higher fuel costs saw an average increase of $129 more being spent at the gas pump to commute." These findings were included in the firm's *2022 Global Traffic Scorecard* (released January 2023). They estimate Lexington's "lost hours in congestion" at 22, and Louisville's at 11. The longest commute times in Kentucky are in *mostly rural* counties (27.6 minutes)—a few minutes longer than in *somewhat rural* (25.5) or *metro* counties (25.9).

Average Travel Time to Work, 2017-2021
(workers 16 years and older)

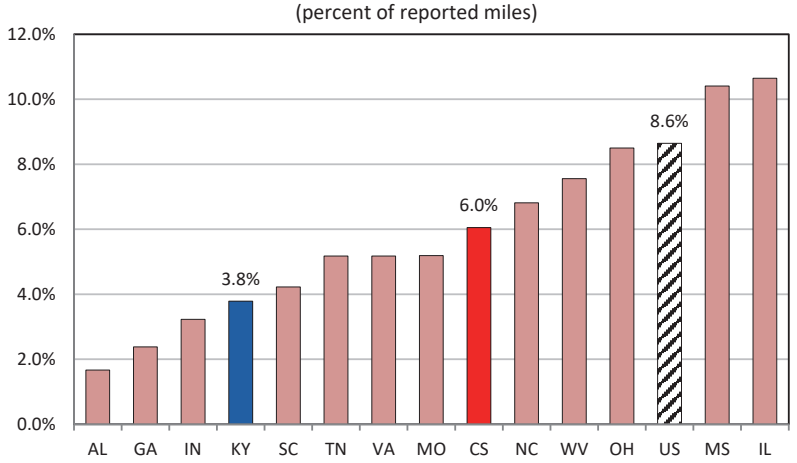


Source: U.S. Census Bureau, 2021 5-Year American Community Survey, Table DP03

Road Condition

Ideas, innovation, and intellectual capital form the foundation of the evolving knowledge economy. But Kentucky, like most states, is still centered on making and growing things, extracting and transporting raw materials, and moving people and products to markets and workplaces. Thus, the traditional transportation infrastructure—the road system—is still an essential piece of the economic development puzzle. About 26 percent of Kentucky's private-sector economy is in goods-producing industries that are highly dependent on transportation, compared to about 19 percent in the U.S. And even as the nation's economy evolves over the next few decades, the movement of freight along the country's highways, a quintessential "old economy" activity, will continue to grow. An extensive and efficient transportation system, both now and in the future, can facilitate lower industry production costs and consumer prices, widen access to commodities for businesses and consumers, and broaden the pool of workers for business while creating more job opportunities. The bottom line: roads and road quality still matter. In the figure below, road condition depends on pavement roughness, with rougher roads indicating poorer condition; only a small percentage (3.8%) of Kentucky's roads are in poor condition. The U.S. (8.6%) and competitor state (6.0%) percentages are much higher.

Roads in Poor Condition, 2022
Kentucky, Competitor States and the U.S.
(percent of reported miles)

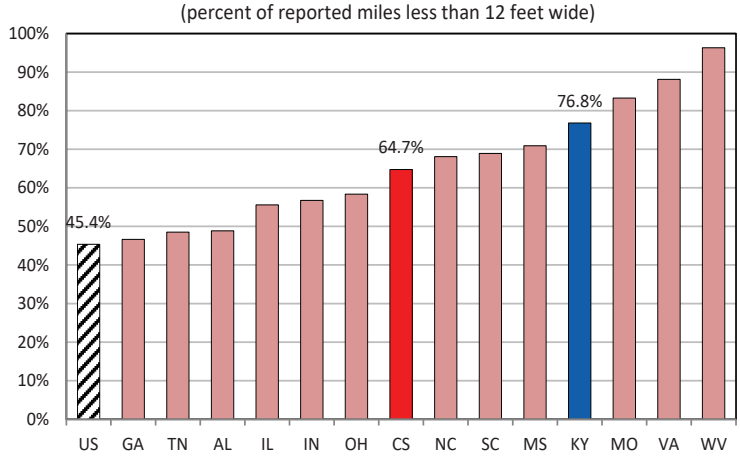


Source: Author's calculations based on Table HM-64, Highway Statistics 2022, Federal Highway Administration.
CS is the weighted average of the competitor states.

Narrow Roads

This is a measure of lane width for "other principal arterial" roads, minor arterial, and major collector roads. It does not include interstates, other freeways, or expressways. A narrow lane is one that is less than 12 feet wide. Obviously, the more narrow the lane, the more difficult it is to move products and materials with large trucks. Consequently, the state and condition of the transportation infrastructure can affect economic development decisions. Here we focus on rural roads, not urban. An estimated 76.8 percent of Kentucky's other principal arterial, minor arterial, and major collector rural roads are narrow, compared to 45.4 percent nationally and 64.7 percent for the competitor states.

Narrow Rural Roads, 2020
Kentucky, Competitor States and the U.S.
(percent of reported miles less than 12 feet wide)

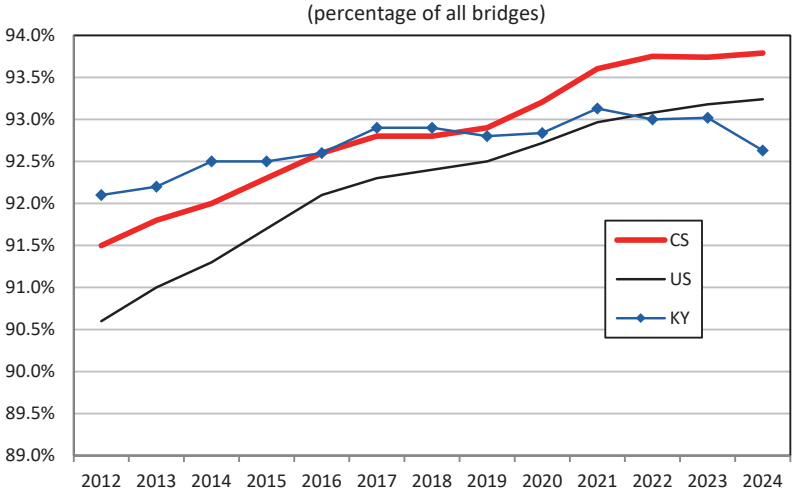


Source: Author's calculations based on Table HM-53, Highway Statistics 2020, Federal Highway Administration.
CS is the weighted average of the competitor states.

Bridges

The Federal Highway Administration (FHWA) categorizes the country's highway bridges using a "Good-Fair-Poor" condition framework, outlined in the *Pavement and Bridge Condition Performance Measures* final rule, which was published in January of 2017. Of the 14,548 highway bridges in Kentucky, 7.4 percent of them are considered to be in poor condition, which is slightly more than the competitor states (6.2%) and the U.S. (6.8%). The real difference between Kentucky, the competitor states, and U.S. lies in the distribution of bridges in the other two categories—good and fair. The percentage of Kentucky bridges deemed to be in good condition (26.6%) is much lower than the competitor states (46.2%) or the U.S. (44.1%); and, is much higher in the "fair" category (66.1%) compared to the competitor states or the U.S., where are 47.6 and 49.1 percent respectively. While 92.6 percent of Kentucky bridges were considered to be in good or fair condition in 2024, Kentucky had only the 34th highest percentage among all the states and DC. Nevada is the highest with 98.9 percent and Iowa the lowest with 80.8 percent.

Bridges in Good or Fair Condition,
Kentucky, Competitor States, and the U.S., 2012-2024
(percentage of all bridges)

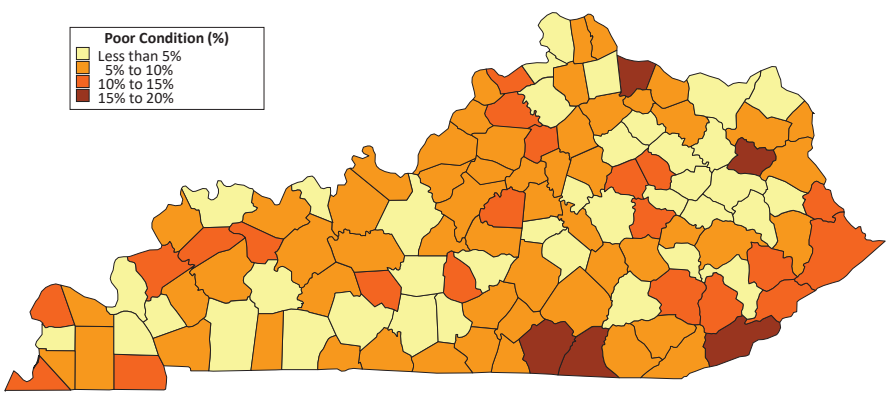


Source: U.S. Department of Transportation, Federal Highway Administration, Office of Bridges and Structures

Problem Bridges by County

This map shows that the highest concentration of bridges in poor condition are located in the southeastern part of the state, but are found across the Commonwealth. Counties are divided into four groups: 0 to 5 percent of the bridges are in poor condition (38 counties across the state); 5 to 10 percent (56); 10 to 15 percent (21); and 15 to 20 percent (5). Bracken County has the highest percentage in the state, with 18.4 percent of its bridges deemed to be in poor condition.

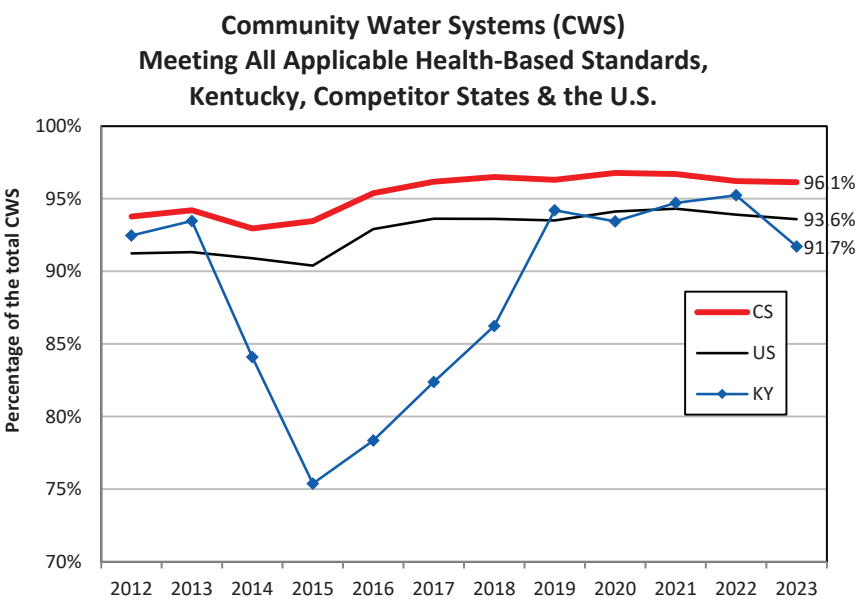
Highway Bridge Condition by Kentucky County, 2024



Source: U.S. Department of Transportation, National Bridge Inventory (NBI), <https://www.fhwa.dot.gov/bridge/nbi.cfm>.

Water Quality

The United States enjoys one of the safest and most reliable supplies of drinking water in the world. The Safe Drinking Water Act of 1974 sought to preserve the nation's water supply while maintaining high standards for quality. Most Americans get their water from a community water system (CWS), 48,824 of which served approximately 322.8 million people nationally in 2023, according to the Environmental Protection Agency. Around 6.3 percent of the U.S. population received its water from a community water system that reported at least one health-based violation in 2023, while it was about 5.2 percent in Kentucky. Of Kentucky's 374 community water systems, an estimated 91.7 percent met all applicable health-based standards and were free of violations in 2023. From 2014 to 2018, the percentage of community water systems in Kentucky meeting all applicable health-based standards has been lower than the competitor states and the U.S., as illustrated in the chart. The low point for Kentucky going back the last several years was in 2015, when only about 75 percent of community water systems were violation-free on health-based standards.

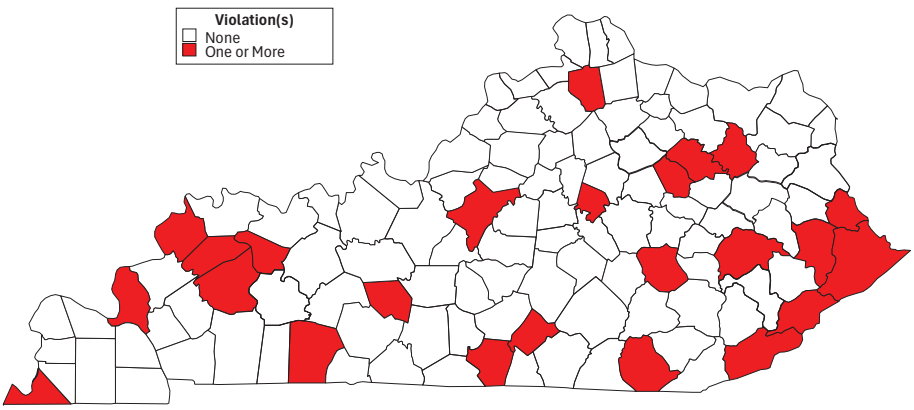


Source: Author's analysis of EPA SDWIS data.

Health-Based Violations

Safe and sanitary drinking water is vital to a community's health and wellbeing. Community (public) water supplies and systems that have difficulty providing water that meets the health-based standards are more likely to be systems that are not adequately maintained or operated. This map shows the 24 Kentucky counties with community water systems (CWS) that experienced one or more *health-based* violations of the Safe Drinking Water Act in 2023. There were 64 violations committed by 31 community water systems (out of 374 total CWS in Kentucky). These violations affected nearly 237,000 individuals who were served by the 31 systems—with some systems having multiple violations.

Community Water Systems with Health-Based Violations, 2023

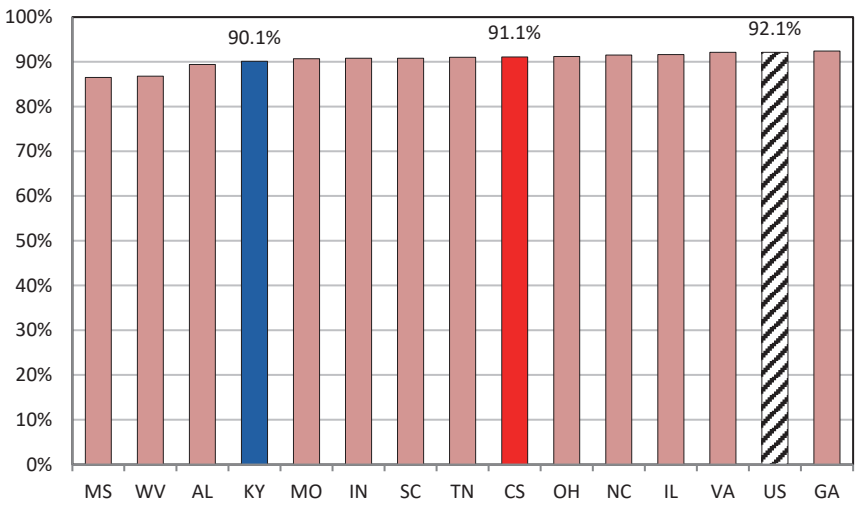


Source: Author's analysis of EPA SDWIS data.

High-Speed Internet

Access to and use of the internet is essential to become politically informed, socially integrated, and economically successful in the Information Age. As illustrated by the figure below, the differences between states are small when comparing the percentages of households that have high-speed broadband of any type. However, there are many differences within states between urban and rural communities. Kentucky is a good example of the urban-rural digital divide (see the next page). Based on the 2024 U.S. Census Bureau Local Estimates of Internet Adoption (LEIA), which are county-level household estimates, and the U.S. Department of Agriculture Economic Research Service 2023 Rural-Urban Continuum Codes, the household internet adoption (unweighted average) for urban counties across the country is 71.5 percent. By comparison, it is 63.6 percent for somewhat rural counties and 60.2 percent for mostly rural counties. Studies suggest that enhancing the nation's broadband infrastructure can improve innovation, entrepreneurship, and productivity. According to the Federal Communications Commission (FCC), the digital divide between urban and rural areas continues to narrow, but there is still a gap that leaves workers, students, and citizens without adequate connections to the information resources they need for work, school, and health care.

High-Speed Internet Connections, 2023
(percentage of households)

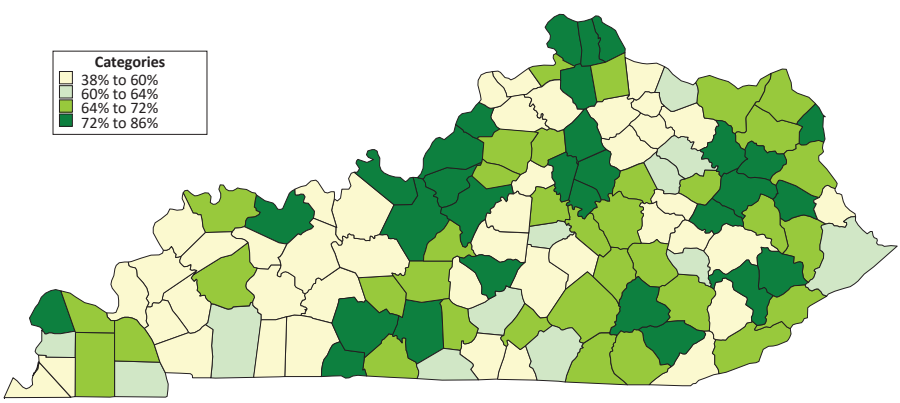


Source: U.S. Census, American Community Survey, 2023 1-Year Estimate, Table S2801

High-Speed Internet by County

The urban-rural digital divide has been difficult to bridge. As is evident in the map below, Kentucky's urban areas tend to have much higher broadband adoption rates. Kentucky's metro counties have an average percentage (68.6%) that is higher than somewhat rural (63.7%) and mostly rural counties (60.9%) in the state. According to a June 2017 *Wall Street Journal* article, "Rural America is Stranded in the Dial-up Age," high-speed internet is vital for the economic prospects of rural communities: "Counties without modern internet connections can't attract new firms, and their isolation discourages the enterprises they have..." Unfortunately, five years later a June 2022 *Wall Street Journal* article, "Why Rural Internet Is Still Terrible, Despite Billions in Federal Spending," lamented that "many residents are still stuck with service that isn't fast enough to do video calls or stream movies—speeds that most take for granted." With low internet speeds in the rural areas of the state, and generally higher speeds in metro areas, there are a number of Kentucky counties that will continue to face significant economic challenges as the urban-rural digital divide persists. Boone County has the highest percentage of households with broadband access (86.2%), while Caldwell County is ranked at the bottom (38.4%).

Kentucky County-Level Estimates Internet Adoption, 2022
(percentage of households with a wired internet connection)

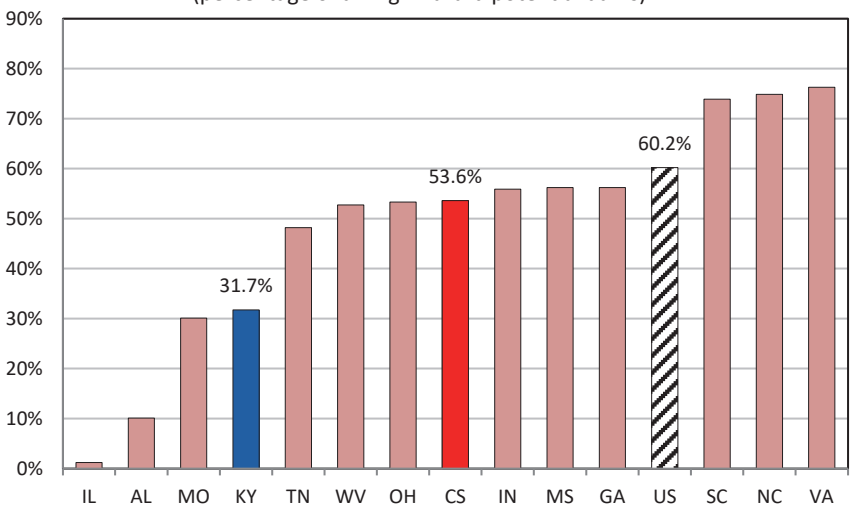


Source: U.S. Census, 2024 release of Local Estimates of Internet Adoption (LEIA), accessed on September 11, 2024 at <https://www.census.gov/data/experimental-data-products/local-estimates-of-internet-adoption.html>.

Dams

The Oroville Dam in Northern California captured the national headlines in February 2017 when the threat of its failure forced the evacuation of almost 200,000 people. Of Kentucky's 1,075 dams, 268 are classified as "high hazard potential" in 2024. Dams are assigned to one of five categories (high, significant, or low hazard potential—and undetermined or not available are options) by Dam Safety Program engineers based on the likely loss of human life, level of property damage, environmental destruction, and economic loss that would likely ensue *if* the structure failed. A high hazard dam is one that, if it failed, may cause loss of life or serious damage to houses, industrial or commercial buildings, important public utilities, main highways or major roads. Of Kentucky's 268 high hazard potential dams, 31.7 percent are deemed to be in "satisfactory" or "fair" condition based on a classification scheme that has the following categories: satisfactory, fair, poor, or unsatisfactory (not rated & not available are also options). At 31.7 percent, Kentucky has the 44th highest percentage of dams in satisfactory or fair condition among the states. Kentucky is substantially lower than the competitor state (53.6%) and U.S. averages (60.2%); in Kentucky there are 83 high hazard dams in *poor* condition, eight in *unsatisfactory* condition, one that is not rated, and 91 not available.

High-Hazard Potential Dams in Satisfactory or Fair Condition, 2024
(percentage of all high-hazard potential dams)



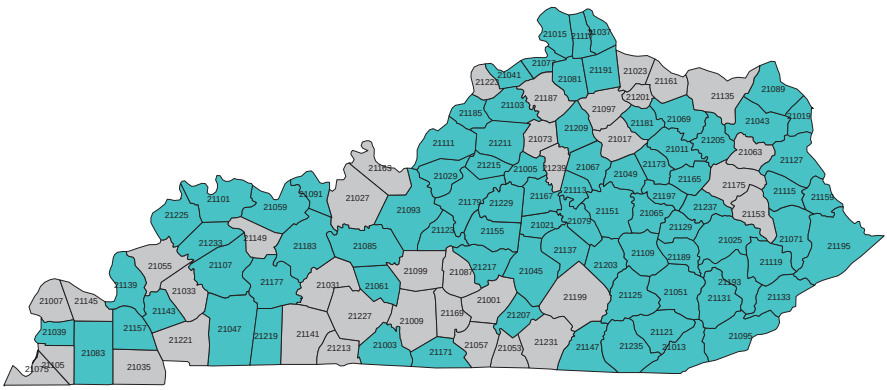
Source: Author's calculations based on data from the National Inventory of Dams, data downloaded 11/21/2024.

High Hazard Potential Dams

This map shows the Kentucky counties that have at least one of the state's 268 high hazard potential dams. As we explain on the facing page, if one of these dams fails, it may cause loss of life or serious damage to houses, industrial or commercial buildings, important public utilities, main highways or major roads. We do not have data on the conditions of specific dams, but we do know that 83 of them are in "poor" condition—31 percent of all high-hazard dams in Kentucky. In 2022, a Crittenden County dam without an Emergency Action Plan (EAP) was begining to fail and could have sent millions of gallons of water toward developments and a hospital. However, as of 2023, a new law in Kentucky requires dam owners to develop Emergency Action Plans for their dams. These plans are a written document that "identifies incidents that can lead to potential emergency conditions at a dam, identifies the areas that can be affected by the loss of reservoir and specifies pre-planned actions to be followed to minimize property damage, potential loss of infrastructure and water resource, and potential loss of life because of failure or mis-operation of a dam." Essentially, an EAP is a plan of action to be taken to reduce the potential for property damage and loss of life in an area affected by a dam failure or large flood.

High Hazard Potential Dams in Kentucky Counties, 2024

(highlighted counties have at least one high hazard potential dam)

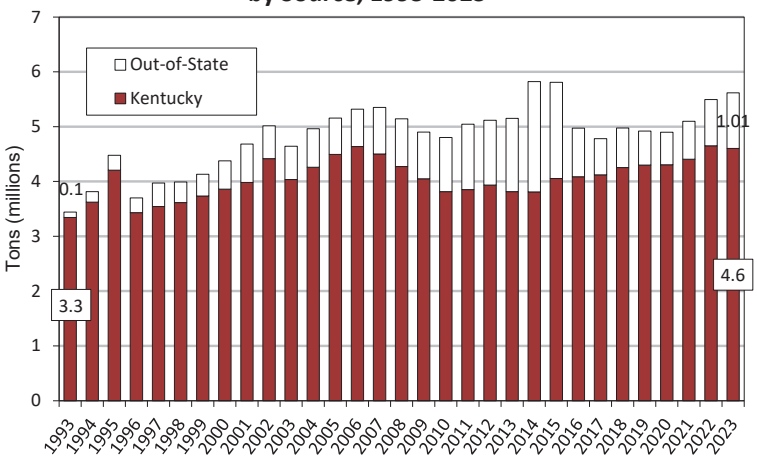


Source: Author's analysis of the 2024 National Inventory of Dams (NID) database.
Note: FIPSCODE shown for county identification.

Solid Waste Disposal

Thirty years ago (1992) the Kentucky General Assembly set an ambitious goal to reduce the amount of municipal solid waste (MSW) deposited in Kentucky landfills in each subsequent year. However, the amount of MSW has continued to increase. In fact, while the total amount of solid waste deposited in Kentucky landfills has waxed and waned over the years, it is currently at 5.6 million tons—63 percent higher than the 3.4 million tons in 1993. The amounts shown in the graph below do not include industrial or special waste. The increase since 2020 is due, in part, to the softened global demand for recycled material brought on during the COVID-19 pandemic. The percentage of solid waste recycled in Kentucky decreased from almost 39 percent in 2018 to 26 percent in 2021. Consequently, more material was sent to landfills. Moreover, a large amount of waste is from *out-of-state* sources; in 2023 it was just over one million tons (1.01) and constituted 18.1 percent of MSW. Landfills, "landfarms," and other specially designated areas for solid waste disposal are expensive to open, maintain, operate, monitor, or close. For example, the Division of Waste Management reports that "a total of 100 historic landfills have been closed...and 521 historic landfills remain to be closed. Total costs associated with the closure projects exceed $74 million." Policies, actions, and incentives to reduce waste disposal are economically beneficial.

Solid Waste Disposed in Kentucky Landfills, by Source, 1993-2023



Source: Kentucky Division of Waste Management Annual Reports <https://eec.ky.gov/Environmental-Protection/resources/Pages/annual-reports.aspx>, and databases <https://eec.ky.gov/Environmental-Protection/Waste/Pages/solid-waste-facility-reports.aspx>.

Innovation

THE BREADTH AND DEPTH OF technologies collected under the umbrella term of artificial intelligence (AI) continue to expand in our collective experiences. We can sense an emerging economic shift catalyzed and propelled by AI, but its economic outlines are too blurry for analysts to precisely describe its future shape. We do know, however, that AI will affect jobs, some more than others, and their respective tasks, both positively and negatively. Innovations often increase productivity, create new jobs, and lead to new tasks.

Because occupations are amalgamations of tasks and abilities, AI is best thought of, at least in its current state, as a technology that affects tasks and abilities—especially those involving language modeling and image generation. States with more "highly-educated, highly-paid, white-collar occupations" will be impacted more deeply and broadly by generative AI. Our analysis shows that states like Maryland and Virginia have more of these occupations, while states like Mississippi, as well as Kentucky, have fewer of them.

State leaders have been intentional about creating an innovative and entrepreneurial economy for at least the last twenty-five years. An early version of the *Kentucky Strategic Plan for Economic Development*, released in 1997 by the Kentucky Economic Development Partnership Board, included language to "promote entrepreneurial activities," and "fund and implement the Commonwealth Venture Fund." Shortly thereafter the Office for the New Economy was created to advance a knowledge-based economy

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through education, research, innovation, and commercialization.

The goal to create an innovative and entrepreneurial economy continues today. Unfortunately, over two decades of these efforts to plant and grow the innovative seeds in Kentucky and elsewhere, researchers have found that not a lot has changed. Boston, Seattle, San Diego, San Francisco, and Silicon Valley garnered 90 percent of the "high-tech jobs" created from 2005 to 2017. Meanwhile, Kentucky is ranked 45th in the *2022 State Technology and Science Index*, which combines several indicators that reflect a state's research and development inputs, risk capital and entrepreneurial infrastructure, human capital investments, technology and science workforce, and technology concentration and dynamism.

Our state needs innovative ideas, adequate finances, and energetic human capital to create and support high-growth enterprises—but it also might need some help to make this happen. Researchers at the Brookings Institution, for example, have called for "a massive federal effort to transform a short list of 'heartland' metro areas into self-sustaining 'growth centers' that will benefit entire regions."

Our examination of high-technology establishments over the period of 2003 to 2022 shows that Kentucky has consistently trailed the competitor states and the U.S. In 2022, 9.2 percent of establishments in competitor states and 10 percent in the U.S. are considered "high-tech." In the same year only 8.0 percent of Kentucky establishments are considered "high-tech."

Why should anyone care about startups, innovations, and the funding for research and development that powers them? The answer is simple: in the long term, our collective standard of living will depend on it. Economists have found that around three-fourths of U.S. economic growth since 1950 was fueled by just two factors—rising educational attainment and research intensity—with the latter accounting for nearly 60 percent of the growth. Despite the tight connections between research intensity, economic growth and job creation, total research and development expenditures as a percentage of gross domestic product are significantly lower in Kentucky (1.0%) compared to the competitor states (2.0%) and the U.S. (3.1%).

Changes in our economy and our society are redefining how we create economic opportunities and build successful enterprises. Given the importance of young high-growth firms for wage and job growth, it is vital for states, regions, communities, and universities to effectively leverage their assets toward the development of entrepreneurs, creation of startups, and sustainment of high-growth enterprises.

Early-Stage Entrepreneurship

The Kauffman Foundation Index of Early-Stage Entrepreneurship is based on four factors: 1) the *rate of new entrepreneurs*, which reflects the percent of adults becoming entrepreneurs in a given month, as a year average; 2) the *opportunity share of new entrepreneurs*, which shows the percent of entrepreneurs driven by opportunity (instead of necessity); 3) the *startup early job creation*, which reflects the jobs created by startups per 1,000 people; and 4) the *startup early survival rate*, which is the percentage of firms surviving one year after founding. The last column in the table below is the *Kauffman Early-Stage Entrepreneurship (KESE) Index*, an equally weighted average or composite of the four indicators. The KESE Index score for 2021 for all 50 states and Washington, D.C. ranged from -6.0 (Rhode Island) to 8.8 (Florida), with a median of 0.6 (North Dakota). The index is pegged to 0 using the national average over the two-decade period from 1996 to 2005. Kentucky's score of -1.8 is below average.

Indicators of Entrepreneurship, 2021

Area	New Entrepreneurs	Opportunity Entrepreneurs	Startup Early Job Creation	Startup Early Survival	KESE Index (AVG 4)
US	0.36%	80.9%	4.7	81.7%	2.2
AL	0.26%	77.2%	3.5	77.9%	-2.6
GA	0.47%	81.6%	5.7	79.8%	4.4
IL	0.27%	73.7%	4.3	84.8%	0.2
IN	0.23%	76.3%	3.8	83.6%	-1.0
KY	**0.29%**	**72.3%**	**3.2**	**80.1%**	**-1.8**
MO	0.37%	81.7%	4.7	77.1%	0.8
MS	0.37%	81.9%	3.4	82.4%	2.2
NC	0.34%	76.5%	5.8	82.7%	1.9
OH	0.28%	73.8%	3.7	81.4%	-1.4
SC	0.29%	84.0%	3.9	82.3%	1.0
TN	0.35%	81.1%	4.6	80.7%	1.4
VA	0.26%	79.9%	4.6	79.5%	-1.2
WV	0.17%	82.3%	3.4	81.1%	-2.8

Source: Kauffman Indicators of Entrepreneurship, 2021 National & State Reports on Early-Stage Entrepreneurship, April 2022.

AI Impact on Selected Occupations

Early 19th Century English workers began protesting the introduction of machinery in the textile mills—a movement that became known as the Luddite Rebellion—because they could sense an emerging threat to their economic livelihoods. Yet, few individuals, if any, could envision the economic transformations that the ensuing Industrial Revolution would produce throughout the 19th Century. Likewise, we can sense an emerging economic shift catalyzed and propelled by artificial intelligence (AI), but its economic outlines are too blurry for analysts to ascertain its future shape with certainty. We do know, however, that AI will affect jobs, some more than others, and their respective tasks, both positively and negatively. Innovations often increase productivity, create new jobs, and lead to new tasks. Because occupations are amalgamations of tasks and abilities, AI is best thought of, at least in its current state, as a technology that affects tasks and abilities—especially those involving language modeling and image generation. For example, a radiologist performs tasks that AI will impact deeply, such as reading images and identifying patterns. But there are other tasks likely to remain firmly in human hands, at least for the near future, like understanding the subtleties of images and communicating with patients. Indeed, while AI will surely displace some jobs entirely, it will simultaneously help workers perform certain

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Estimated Impact of Artificial Intelligence (AI) on Selected Occupations
(purple indicates higher AI impact, green indicates lower AI impact)

Occupation	Language Model	Image Generation	Employment (KY)
Interior Designers	0.822	2.421	180
Chemical Engineers	0.906	2.256	180
Art Directors	0.727	2.249	200
Accountants and Auditors	1.214	1.572	11,840
Computer Programmers	1.025	1.673	1,330
Registered Nurses	0.272	-0.048	44,970
Cashiers	-0.107	-0.855	46,490
Heavy and Tractor-Trailer Truck Drivers	-1.400	-0.288	28,210
Cooks, Fast Food	-0.391	-1.511	42,480
Stockers and Order Fillers	-1.193	-2.101	50,090
Dishwashers	-1.561	-1.787	3,570
Landscaping & Grounds Keeping Workers	-1.656	-1.702	9,250
Slaughterers and Meat Packers	-1.543	-2.529	1,830
Dining Room and Cafeteria Attendants and Bartender Helpers	-1.433	-2.709	3,140
Exercise Trainers and Group	-1.257	-3.308	2,130

Source: Estimates based on work by Felten, Edward W. and Raj, Manav and Seamans, Robert, Occupational Heterogeneity in Exposure to Generative AI (April 10, 2023). Available at SSRN: https://ssrn.com/abstract=4414065 or http://dx.doi.org/10.2139/ssrn.4414065, and BLS OES state estimates of jobs in Kentucky.

AI Imact on State Economies

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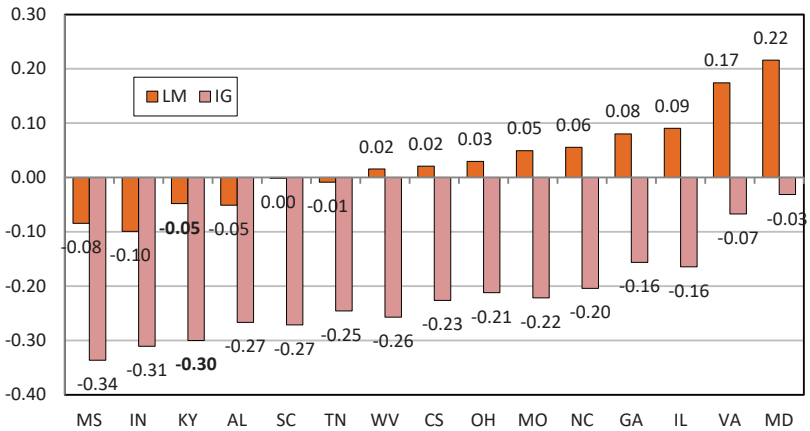
job functions better and create new jobs not yet envisioned. The Felten et al. methodology, selected results of which are shown here, links ten AI applications (e.g., image generation, language modeling, abstract strategy games, etc.) to 52 human abilities (e.g., oral comprehension, oral expression, inductive reasoning, arm-hand steadiness, etc.), and applies it to over 800 occupations using the Occupational Information Network database developed by the United States Department of Labor. The table on the facing page shows five jobs that will be highly affected by AI (positive numbers) as well as minimally affected (negative number); the estimated number of these jobs in Kentucky is presented in the last column. The five jobs listed in the middle of the table, such as registered nurses, are common jobs in Kentucky. We apply the occupation-level results from Felton to the mix of jobs in Kentucky and selected states. States with more "highly-educated, highly-paid, white-collar occupations" will be impacted more deeply and broadly by generative AI. Our analysis shows that states like Maryland and Virginia have more of these occupations, while states like Mississippi, as well as Kentucky, have fewer of these occupations. AI is changing fast however, and these estimates are *relative* impacts. Virginia might be affected more than Kentucky, but our state will be affected, of course, and perhaps in ways not yet imagined.

Estimated Impact of Artificial Intelligence, Language Model (LM) and Image Generation (IG), on Jobs in Selected States

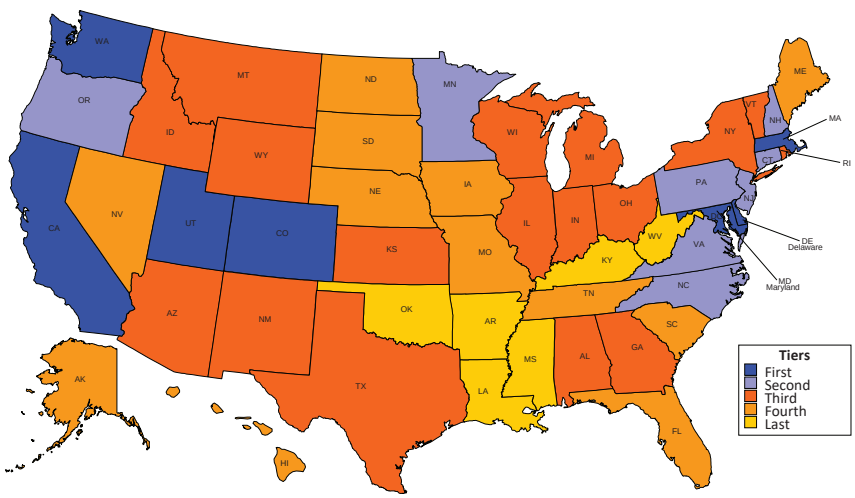


Source: Estimates based on work by Felten, Edward W. and Raj, Manav and Seamans, Robert, Occupational Heterogeneity in Exposure to Generative AI (April 10, 2023). Available at SSRN: https://ssrn.com/abstract=4414065 or http://dx.doi.org/10.2139/ssrn.4414065, and BLS OES state estimates of jobs.

Science & Technology Index

Combining several indicators organized around five subindex components that reflect a state's research and development inputs (RDI), risk capital and entrepreneurial infrastructure (RCI), human capital investments (HCI), technology and science workforce (TSW), and technology concentration and dynamism (TCD), the Milken Institute has ranked the states according to their science and technology prowess in a 2022 report, *State Technology and Science Index*. Kentucky is ranked 45th, in the bottom tier of states. The top state is Massachusetts, followed by California, Colorado, Maryland, Uah, Washington, and Delaware. These seven states represent the top tier in the Index. Kentucky's highest ranking (34th) is on the RCI grouping; it ranges between 42nd and 45th on the other four subindex components.

State Technology and Science Index 2022

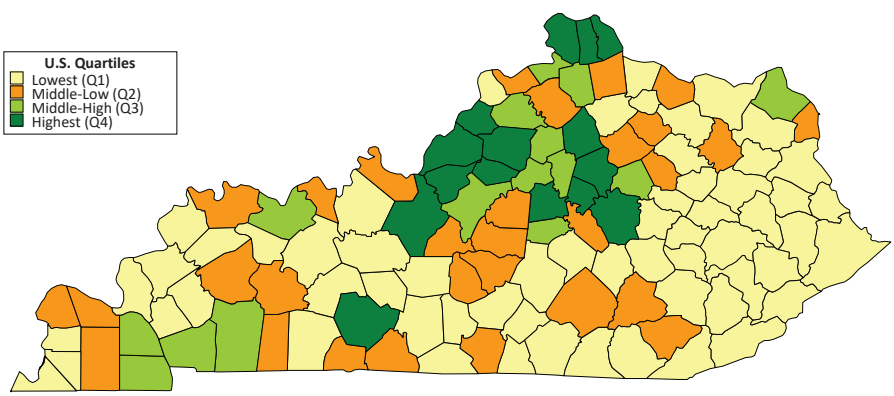


Source: Milken Institute 2022 State Technology and Science Index

County-Level Innovation Index

The *Innovation Intelligence Index (II3)* helps users explore regional characteristics related to innovation and entrepreneurship in order to advance economic development strategies. Kentucky's county-level results from the *II3* are illustrated on the map below, with the highest innovation index values anchoring the three corners of the urban triangle (i.e., the Louisville area, Northern Kentucky, and the Fayette County area) and extending west to Hardin and Warren Counties. These regions, of course, are the locations of the state's major universities. The index is based on five broad categories and includes 56 different measures. The five broad categories include Human Capital and Knowledge Creation, Business Dynamics, Business Profile, Employment and Productivity, and Economic Well-Being. Some of the variables include educational attainment, high-technology employment, broadband adoption, venture capital investments, patent creation, worker productivity, proprietor income, the poverty rate, and per capita income. The map below shows Kentucky's counties distributed within categories representing the national quartiles, or four equal categories. That is, by taking all counties in the U.S. and ranking them lowest to highest, 15 Kentucky counties are in the top quartile or upper 25 percent of counties nationally. There are 60 Kentucky counties in the bottom national quartile.

Innovation Intelligence Index, by Kentucky County

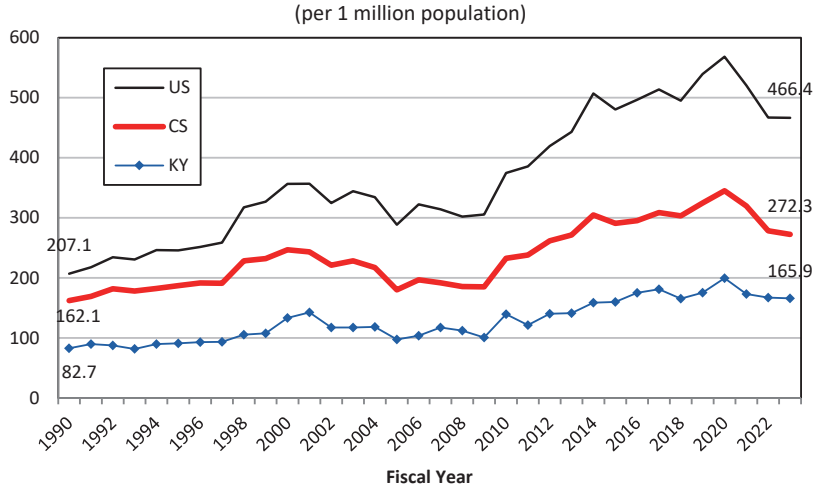


Source: The Innovation Intelligence Index (II3) is produced by the Indiana Business Research Center. II3 explores regional characteristics related to innovation and entrepreneurship to help advance economic development strategies. These data were downloaded on 10/16/2022, and are available here: https://www.statsamerica.org/downloads/default.aspx

Patents

Innovation, as measured by the number of patents issued, is widely regarded as a measure of a state's entrepreneurial energy. Research finds that innovation, along with education, has a significant impact on a state's per capita income. A study by the Federal Reserve Bank of Cleveland shows that states which generate innovation, as measured by patents, can reap economic rewards that endure for generations. The authors conclude, "A state's knowledge stocks (as measured by patents and education levels) are the main factors explaining a state's relative per capita income." In other words, Kentucky's much lower-than-average patent stock—which has trailed the U.S. as well as the competitor states for the last 50 years—along with lagging educational attainment rates, are why the state's per capita income has languished at just over 80 percent of the U.S. average for the last several decades. Overall, the number of patents has increased significantly since 2009, but there is a markedly lower prevalence of patents in Kentucky (165.9 per million population) compared to the U.S. (466.4 per million population) and competitor states (272.3 per million population). Not surprisingly, the trends tilted downward during the COVID-19 pandemic.

Number of Patents,
Kentucky, Competitor States, and the U.S., 1990-2023
(per 1 million population)

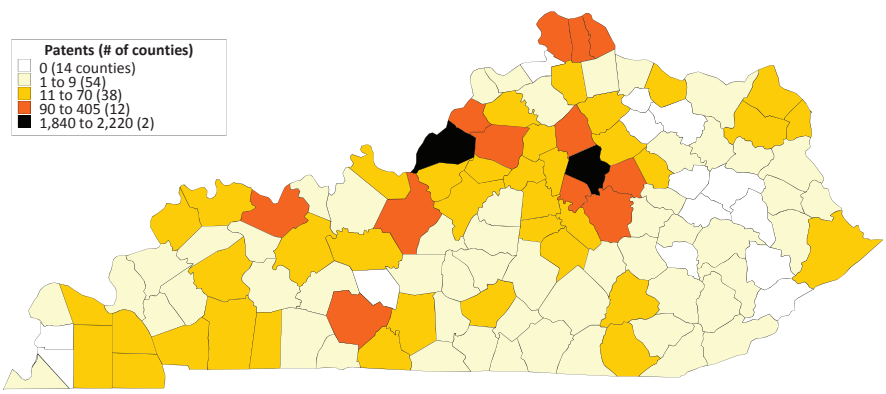


Source: Calculated by the author using US Patent and Trademark Office and U.S. Census Bureau data.
Note: Data include utility, design, plant, and reissue patents.

Patents by County

From 2000 to 2015, Kentucky businesses and individuals acquired 7,639 utility patents, which are patents for invention. Of this total, 4,066 or 53 percent were from two counties: Fayette and Jefferson. The next 12 counties account for 2,310 or 30 percent. The county-level map illustrates the concentrated nature of patent generation in Kentucky. The number of patents is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There are two Kentucky counties in the upper 10 percent of counties nationally, and an additional ten in the upper 25 percent. The rest of the state's 108 counties are in the lower 75 percent of counties.

Utility Patents by County, 2000-2015

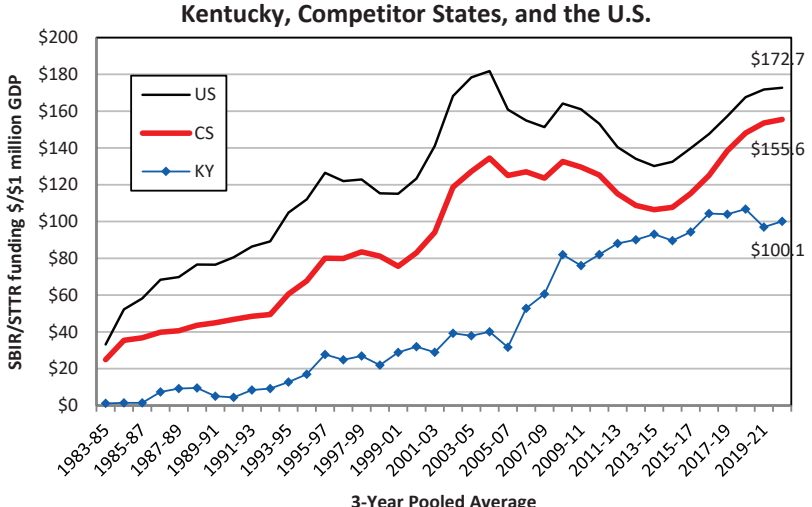


Source: U.S. Patent and Trademark Office, U.S. State Patenting, Breakout by Regional Component, Count of 2000-2015 Utility Patent Grants

Small Business Innovation Research

Small Business Innovation Research (SBIR) and Technology Transfer (STTR) funding is available to companies with 500 or fewer employees; it is designed to stimulate high-technology innovation and facilitate the commercialization of scientific and technological discoveries. According to the National Science Foundation, "a high value indicates that small business firms in a state are doing cutting-edge development work that attracts federal support." When compared to competitor states and the U.S. average, Kentucky has consistently lagged behind. Since the mid-2000s, SBIR/STTR funding as a percentage of gross domestic product has been steadily increasing in Kentucky. However, as the figure shows, Kentucky's $100.1 per $1 million in state gross domestic product during the 2020-2022 period is still well below the U.S. ($172.7) and competitor states ($155.6).

Small Business Innovation Research (SBIR) & Technology Transfer (STTR) Funding, 1983-2022, Kentucky, Competitor States, and the U.S.

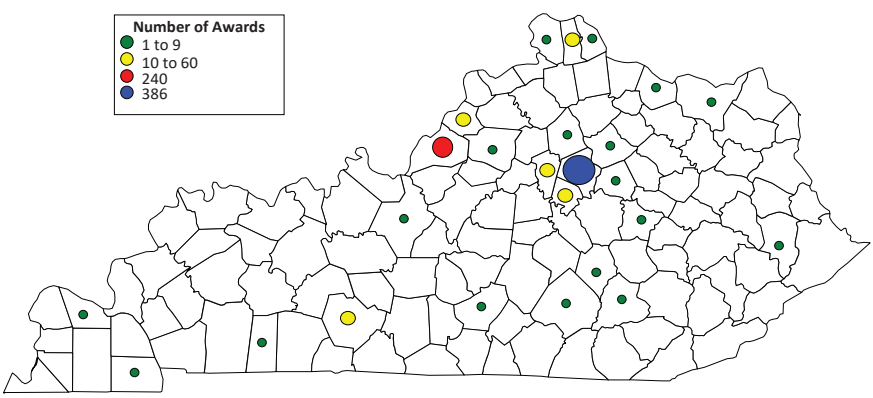


Source: Author's calculations of SBIR/STTR data

SBIR/STTR Awards by County

Of all the dollars invested through the SBIR and STTR programs from 1983 to 2022, the majority went to ventures in two counties: Fayette and Jefferson. There were 797 awards in Kentucky during this time and 386 were in Fayette County, representing 44 percent of the total *funding*. Jefferson County was the second highest recipient with 240 awards and 38 percent of the total funding. Jessamine, Kenton, Oldham, Warren and Woodford Counties received 123 awards and 15 percent of the total funds. These *seven counties* account for virtually all of Kentucky's SBIR/STTR awards (94%) and funding (96%) during this period, which is indicative of the geographic concentration of Kentucky's innovation ecosystem.

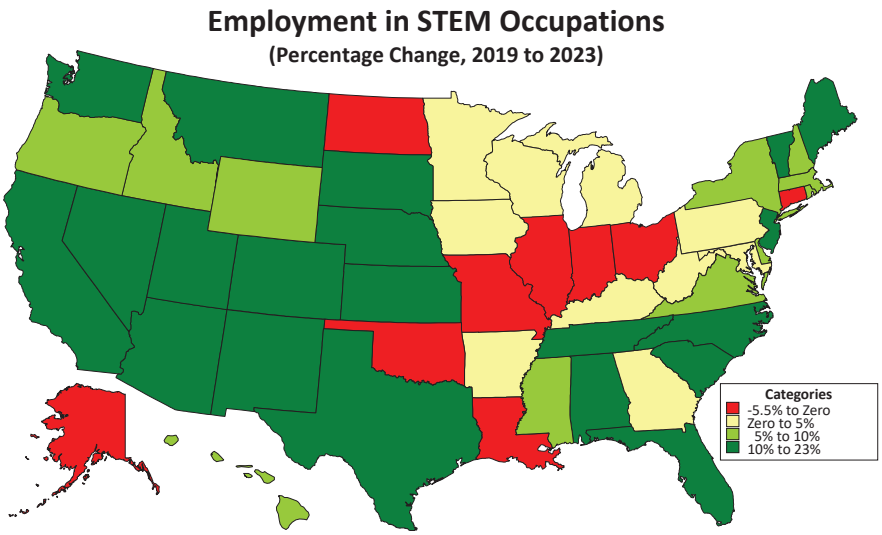
Kentucky SBIR/STTR Awards by County, 1983-2022



Source: Authors' analysis of data from www.sbir.gov

STEM OCCUPATIONS BY STATE

Science, technology, engineering, and mathematics (STEM) occupations accounted for 6.7 percent of the jobs in the U.S. in 2023, compared to 4.2 percent in Kentucky. The presence of STEM occupations can be viewed as the successful outcome of an entrepreneurial ecosystem that supports innovation. Over half of the STEM jobs nationally are in two broad areas: computers and engineering. According to the Bureau of Labor Statistics, computer occupations make up about 45 percent of STEM employment, while engineers make up around 20 percent. Wages are generally higher for STEM occupations. The national average wage for all STEM occupations in 2023 was $112,770, nearly double the national average wage for non-STEM occupations ($62,080). Nationally, STEM occupations increased by 8.8 percent from 2019 to 2023, while non-STEM occupations went up by 3.3 percent. STEM occupations also fared better in Kentucky during this four-year period; STEM jobs increased by 4.5 percent, while non-STEM occupations rose by 3.4 percent. At 22.5 percent, Florida had the largest increase in STEM occupations from 2019 to 2023, followed closely by North Carolina at 20.1 percent.

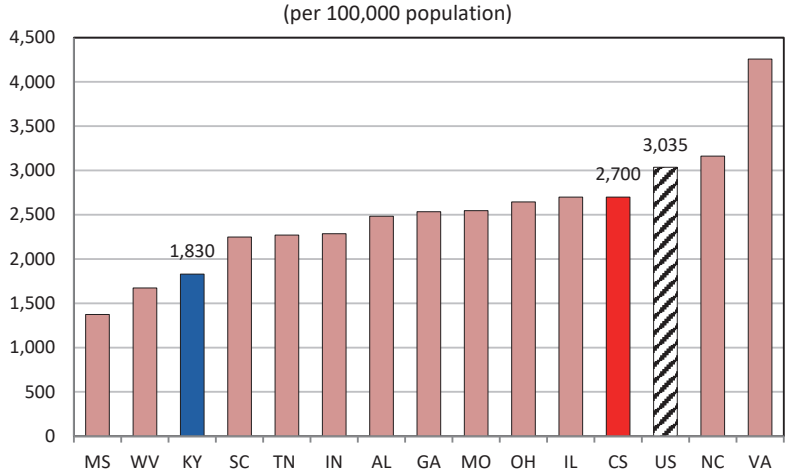


Source: U.S. Bureau of Labor Statistics, OES, May 2019 & May 2023, https://www.bls.gov/oes/additional.htm

STEM Jobs

There has been widespread agreement among policy makers nationally for the last few decades regarding the desirability of increasing the numbers of science, technology, engineering, and mathematics (STEM) occupations. These are high-wage jobs in economic sectors that are highly coveted by economic development professionals, community leaders, and individual workers. In 2023, an estimated 4.2 percent of occupations in Kentucky are in the STEM area, which translates to about 1,830 jobs per 100,000 population. This number is significantly lower than both the competitor states (2,700) and U.S. (3,035) averages. DC (11,251) and Massachusetts (5,091) are ranked first and second, while Mississippi (1,373) is ranked last. Among the 50 states and DC, Kentucky is ranked 46th. Women offer an area of potential growth, both in Kentucky and nationally. The U.S. Census Bureau reports that "In 1970, women made up 38% of all U.S. workers and 8% of STEM workers. By 2019, the STEM proportion had increased to 27% and women made up 48% of all workers." In short, men are overrepresented in STEM jobs, accounting for 73 percent of all STEM workers nationally, while women comprise the remaining 27 percent.

STEM Jobs in 2023
Kentucky, Competitor States, and the U.S.
(per 100,000 population)

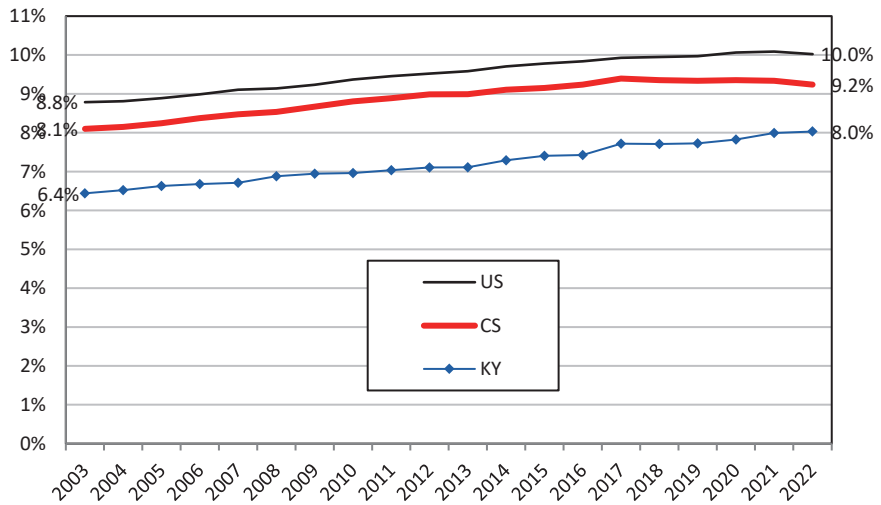


Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2023 OES Data
Note: CS is the competitor state weighted average

High-Technology Establishments

According to the National Science Foundation (NSF), high-technology industries have at least twice the number of scientific, engineering, and technical occupations compared to the average for all industries. These workers have extensive education and training in the sciences, mathematics, and engineering. We use 50 different industries (at the 4-digit NAICS level) to identify high-technology establishments. Using the 46 sectors identified by NSF and four additional identified by the Milken Institute, we calculate the number of high-technology establishments as a percentage of total establishments. Dating back to 2003 Kentucky has consistently trailed the competitor states and the U.S. In 2022, 9.2 percent of establishments in competitor states and 10 percent in the U.S. are considered "high-tech." In the same year 8.0 percent of Kentucky establishments are considered "high-tech," ranking it 37th nationally (including DC with the states). The top ranked state is Delaware with 16 percent (DC is higher at 17.9%), and Mississippi is ranked last with 6.5 percent.

High-Technology Establishments,
Kentucky, Competitor States, and the U.S., 2003-2022
(as a percent of total establishments)

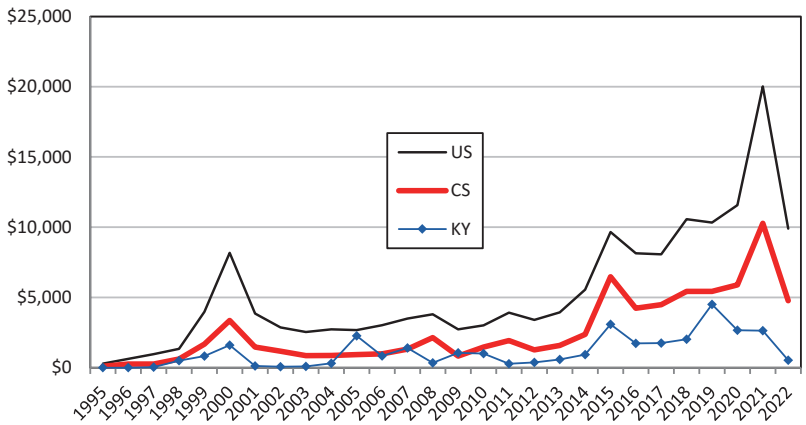


Source: Author's analysis of County Business Patterns, U.S. Census Bureau, various years

VENTURE CAPITAL

According to the Kauffman Foundation, most young companies are started from the savings of their founders and then sustained by positive cash flow. The next largest source of capital for young companies is credit cards, followed by borrowed money from family and friends, banks, and then venture capital. Research also shows that less than 20 percent of the fastest growing companies in the United States took any venture money. Moreover, venture capital investments are typically concentrated in a just few states, such as California, New York, and Massachusetts. In 2022, for instance, these three states accounted for 61 percent of all venture capital funding. Nevertheless, the level of venture capital in a state's economy is frequently used as an indicator of innovation capacity and entrepreneurial energy. In 2022, venture capital investments in Kentucky were $525 per $1 million of state gross domestic product (in constant 2022 dollars), which is slightly more than one-tenth of the competitor states ($4,766) and substantially below the U.S. average ($9,900). The 2022 decline is clearly a result of the pandemic-induced recession.

Venture Capital Investments,
Kentucky, Competitor States, and the U.S., 1995-2022
(Constant 2022 dollars, per $1 million/state GDP)

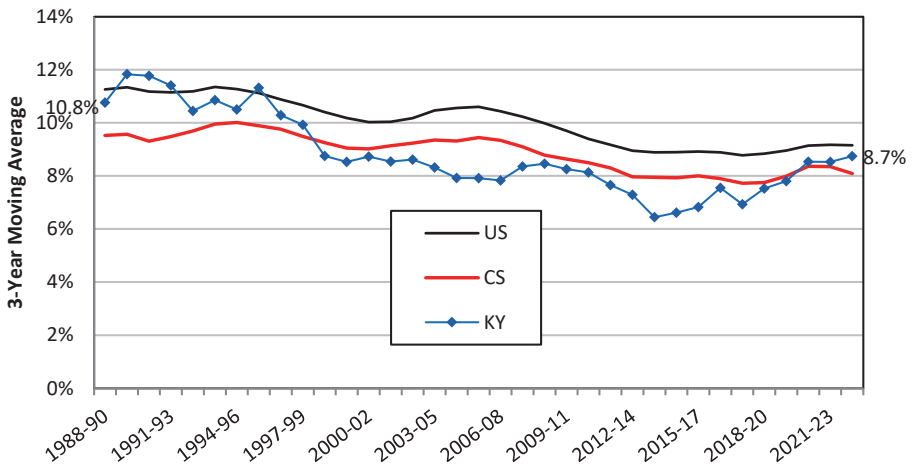


Source: National Science Board. "Venture Capital Disbursed per $1 Million of Gross Domestic Product." Science and Engineering Indicators: State Indicators. Alexandria, VA: National Science Foundation. https://ncses.nsf.gov/indicators/states/indicator/venture-capital-per-1-million-state-gdp. Accessed on 11/14/24.

Self-Employed

The self-employed include a diverse and broad range of occupations, from farmers to landscapers to doctors. One characteristic that can be attributed to each of them, is the willingness to chart their own economic path. Either out of necessity or opportunity, these individuals demonstrate the spirit needed to create an entrepreneurial economy. Around 8.7 percent of part- and full-time working prime working age adults (25 to 54 years old) in Kentucky are self-employed, which is statistically no different from the competitor states (8.1%) or the U.S. (9.2%). Nationally, over the last thirty years, these percentages have been trending slightly downward. However, in Kentucky the percentage of self-employed workers has been trending upward since 2015. Around 125,000 *prime working age* individuals are self-employed in Kentucky—compared to over 1.3 million prime working age Kentuckians who work for a wage or salary earned at a business, a nonprofit, or in government. There are five states with statistically higher self-employment rates, led by Montana at 13.5 percent. Most states—forty-four—are statisically no different from Kentucky. Washington D.C. (4.6%) is statisically lower than Kentucky.

Self-Employed,
Kentucky, Competitor States, and the U.S., 1988-2024
(prime working age, 25 to 54, full- and part-time workers)

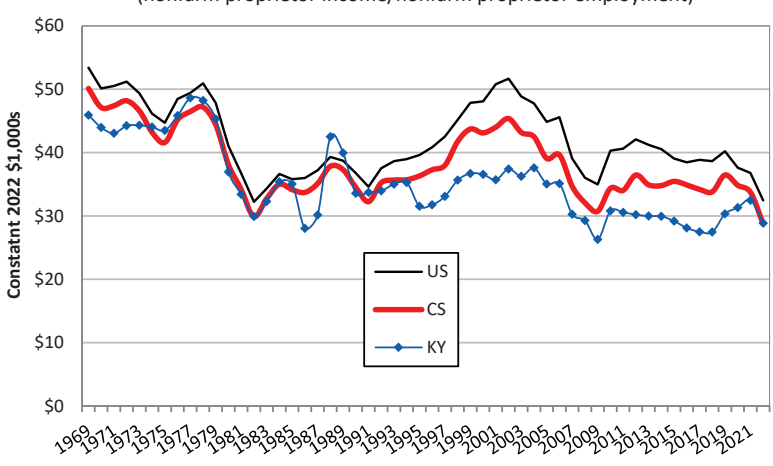


Source: Estimates generated by the author using data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC, 1988-2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Entrepreneurial Depth

Entrepreneurship is a particularly promising vehicle for economic development, as reflected in the January 2012 update of the Kentucky Cabinet for Economic Development *Strategic Economic Development Plan*. Entrepreneurs help create new jobs, and generate wealth and new growth. They are innovative users of assets and resources and appear to be a critical mechanism for bringing new ideas and innovations to the marketplace. The depth of entrepreneurship can be gauged by examining the value created by entrepreneurs in a region as measured by the ratio of self-employment income to the number of self-employed workers in an economy. Unlike breadth, which measures the number of entrepreneurs in a region, depth examines the value. High-value entrepreneurs clearly earn more, add more value, and enhance regional growth and prosperity more than other entrepreneurs. Kentucky has generally trailed the United States and competitor states in entrepreneurial depth. However, in 2022, Kentucky and the competitor states both had average proprietor incomes of around $29,000. Each lags the U.S. by approximately $3,600 given its average of nearly $32,500. The chart below shows average proprietor incomes in constant 2022 dollars, so the downward trend from 1969 to 2022 is an inflation adjusted real decrease in average proprietor incomes for each of the three geographies, e.g., U.S., KY, and CS.

Average Self-Employment Income,
Kentucky, Competitor States, and the U.S., 1969-2022
(nonfarm proprietor income/nonfarm proprietor employment)

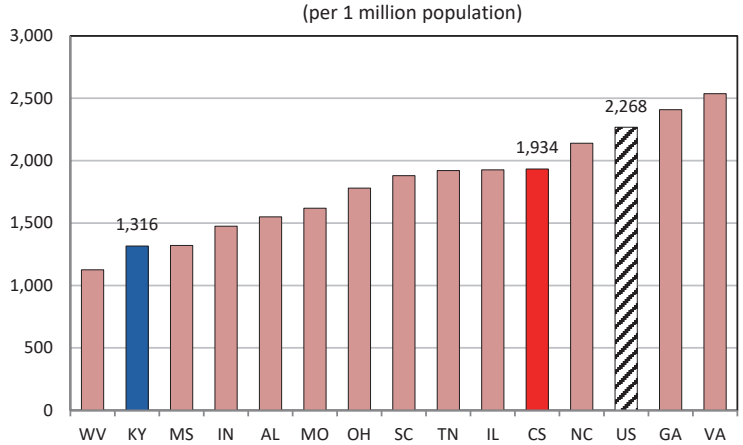


Source: U.S. Department of Commerce, Bureau of Economic Analysis

Nonemployer Establishments

Another measure of self-employment related to innovation is the number of nonemployer establishments. According to the Census Bureau, "A nonemployer business is one that has no paid employees, has annual business receipts of $1,000 or more ($1 or more in the Construction industry), and is subject to federal income taxes." Some examples of these businesses are beauty salons, child-care providers, landscaping services, barber shops, real estate agents, tax preparers, and electricians—just to name a few. These types of small enterprises are important components of the economic landscape, but they are typically not viewed as part of the dynamic high-technology sector. Leveraging research done by others in the high-technology area (Economic Innovation Group, 2023), we focus on five categories of businesses considered high-tech: Data Processing, Hosting, and Related Services (NAICS 5182); Other Information Services (5191); Architectural, Engineering, and Related Services (5413); Computer Systems Design and Related Services (5415); and Scientific Research and Development Services (5417). In 2021, Kentucky had just over 5,900 of these high-technology nonemployer establishments, which is 1,316 per million population (ranked 47th). This is significantly lower than most of the competitor states and the U.S. overall. The state with the highest value is Colorado (3,425 per million population).

Nonemployer Establishments in High Technology
Kentucky, Competitor States, and the U.S., 2021
(per 1 million population)



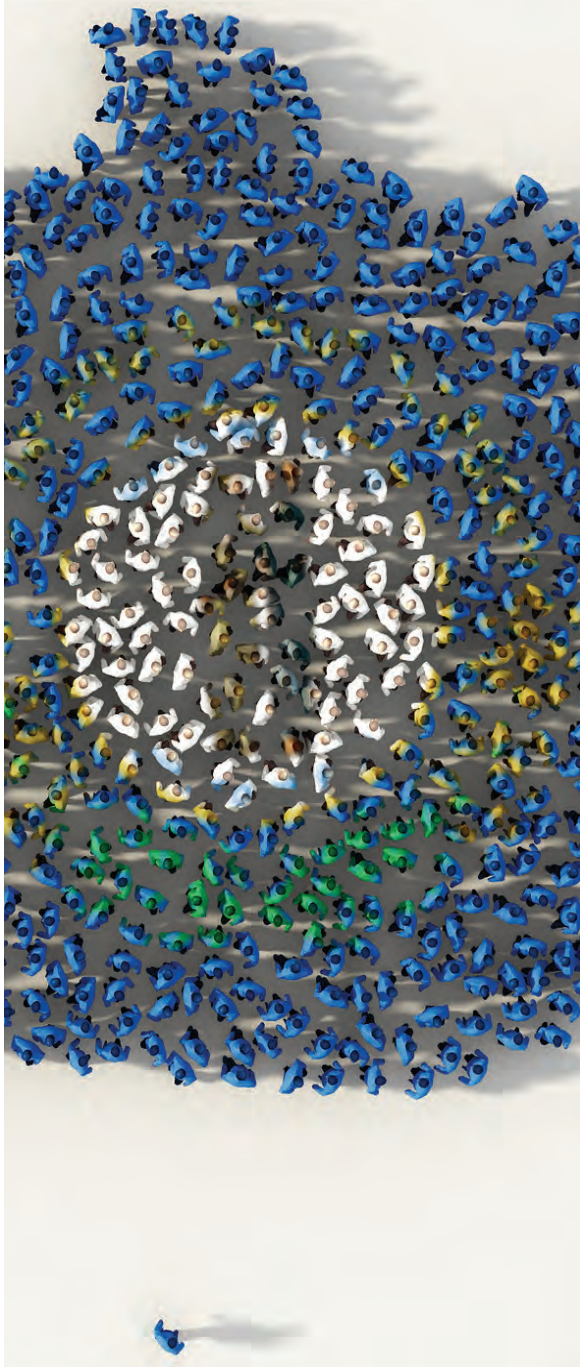
Source: Source: Author's analsyis of data from the U.S. Census Bureau, using the EIG method we define "high technology" as establishments in 11 NAICS codes, but only 5 of them are evident in these data (i.e., 5182, 5191, 5413, 5415, & 5417). Note: CS is the competitor state weighted average

Population

KENTUCKY'S POPULATION IN the 2020 Decennial Census was 4,505,836, representing a 3.8 percent increase from the 2010 Decennial Census population of 4,339,367, maintaining its rank as the 26th most populous state. With 3.8 percent growth over that decade, the state grew at about half the rate experienced from 2000 to 2010 (7.4 %). Moreover, Kentucky experienced the 34th largest gain over the decade, when compared to the other states and D.C.

Population growth is indicative of a state's economic energy. There is a consistency between population growth rates and total *private* employment growth during the same time period. Between the 2010 and 2020 Decennial Census counts, Kentucky experienced slower population growth than the U.S. (7.4%) or the competitor state averages (5.3%). Because Kentucky is generally more rural, has fewer minority citizens, and is somewhat older, the population has grown slower here compared to the U.S. Utah has the largest percentage increase over the decade, 18.4 percent, and three states lost population—West Virginia (-3.2%), Mississippi (-0.2%), and Illinois (-0.1%).

Between the peak of the economic expansion before the Great Recession, which was during the fourth quarter of 2007, and the present (2023), there were marked regional differences within the state in population change. Kentucky's Urban Triangle experienced an 11.3 percent increase; South Central Kentucky is higher at 11.9 percent. However, the



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population in Western Kentucky has remained flat (-0.4%) and in Eastern Kentucky it *declined* by 6.6 percent. For comparison purposes, Kentucky's overall population increased 6.3 percent over the same time period.

There are several counties with population levels lower in 2023 compared to 2007. In fact, fifty-eight counties, largely in Eastern Kentucky, but several in the western part of the state, lost population during this time period. The five largest declines were in Knott (-20.1%), Bell (-19.7%), Harlan (-18.5%), Floyd (-18.1), and Martin Counties (-17.6%). On the other hand, population growth in much of Northern and Central Kentucky has been strong. The five fastest growing counties all experienced double-digit increases, and include Scott (39.8%), Warren (36.1%), Boone (24.5%), Oldham (24%), and Shelby Counties (21.9%).

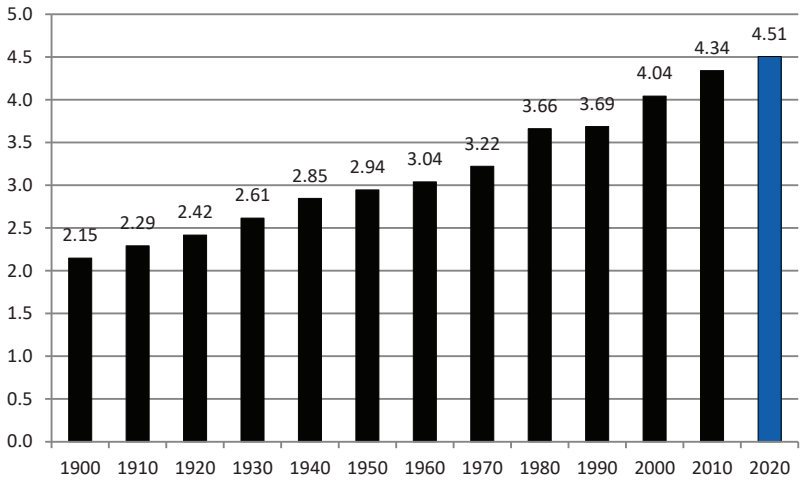
William H. Frey, a demographer at Brookings, has identified five key national trends in the 2020 Decennial Census: first, an almost unprecedented stagnation in U.S. population growth (e.g., the second smallest decade-long growth in U.S. history); second, a continued decrease in geographic mobility (i.e., fewer Americans are moving); third, a pronounced aging of the population (with a growing segment who are "kinless"), driven by the baby boomer generation; fourth, a first-time decline in the nation's white population; and fifth, greater racial diversity among younger cohorts, especially millennials and Gen Z. His key conclusion is that immigration is essential for countering further population stagnation.

In today's global economy, diversity is increasingly important and recognized as a community asset. In 2023, racial minorities comprised about 39 and 34 percent of U.S. and competitor state populations, respectively, and around 17 percent of the Kentucky population. While immigration can help diversify and grow a state's population, Kentucky's foreign-born population is small (4.5%). By comparison, the competitor state and U.S. averages are 8.6 and 14.3 percent, respectively. As their numbers increase, immigrants can strengthen our communities and bolster our economy. Census data show, for example, much higher educational attainment levels for foreign-born compared to native-born Kentuckians. Economist Dr. Jenny Minier notes that "more than 40% of Fortune 500 companies, including American icons like Apple, Budweiser, Google, and McDonald's, were founded by immigrants or the children of immigrants." Their economic contribution extends across the entire range of jobs in the labor force, from those who harvest agricultural products to those occupying Fortune 500 CEO suites.

POPULATION TOTALS

Kentucky's population in the 2020 Decennial Census was 4,505,836, representing a 3.8 percent increase from the 2010 Decennial Census population of 4,339,367, maintaining its rank as the 26th most populous state. With 3.8 percent growth over that decade, the state grew at about half the rate it experienced from 2000 to 2010 (7.4 %). Kentucky's population was essentially flat from 1940 to 1970, growing by just over 13 percent while the U.S. population increased by over 55 percent. However, from 1990 to 2010, Kentucky's population has been increasing at a steady rate, evidenced by 22.2 percent growth over the 30 year period. However, this is still lower than the competitor states (29.2 percent) and the United States (33.2 percent) over the same time period. Among Kentucky's competitor states, Georgia grew the most over this 30 year period, a blistering 65.4 percent, followed closely by North Carolina with a 57.4 percent growth rate. West Virginia's population, on the other hand, has experienced the most anemic growth among the competitor states—zero growth from 1990 to 2020. Kentucky estimated population in 2023—4,526,000—is slightly more than the 2020 Decennial Census.

Population Totals, Kentucky, 1900-2020
(millions)

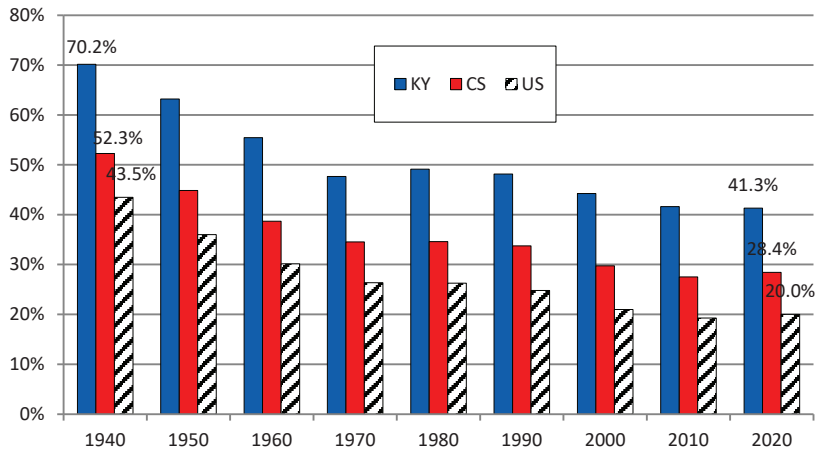


Source: U.S. Census Bureau

Rural Population

While Kentucky has become increasingly urban over the years, a significant portion of Kentucky's population live in rural areas—especially compared to its competitor states and the U.S. In the 2020 Census, an estimated 41.3 percent of Kentucky's population resided in rural areas (the balance of 58.7 percent live in urban areas), compared to about 28.4 percent in the competitor states and around 20 percent in the U.S. Rural communities can have many unique and appealing assets that provide a foundation for economic development activities. For example, natural amenities such as mountains, lakes, streams, forests, and wildlife can be used to leverage economic development and attract individuals hoping to find more idyllic surroundings. At the same time, there are many development challenges associated with building diverse economies and providing an adequate infrastructure in rural areas. It is interesting to see that in 2020 Kentucky's population residing in rural areas was essentially the same as the U.S. average in 1940 when the national proportion was 43.5 percent.

Population Living in Rural Areas,
Kentucky, Competitor States, and the U.S.
(percent of individuals)

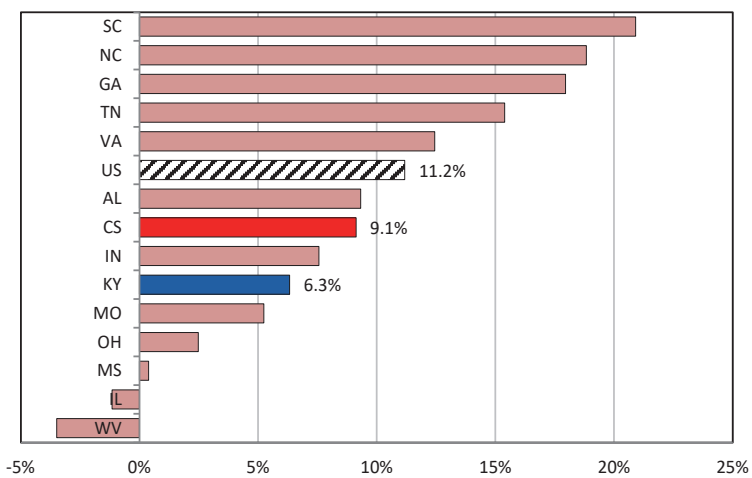


Source: U.S. Census Bureau

Population Change

A state's population growth rate is indicative of its economic energy. Here we present state growth rates between the peak of the economic expansion before the Great Recession, which was during the fourth quarter of 2007, and the "present" (2023). By 2023, the U.S. population was 11.2 percent higher than the peak of the economic expansion ended by the Great Recession (or in 2007). As evidenced in the chart below, Kentucky experienced slower population growth (6.3%) than the U.S. or the competitor state average (9.1%). Generally, there is a consistency between these population growth rates and total *private* employment growth during the same time period. The populations of South Carolina, North Carolina, Georgia, Virginia, and Tennessee grew at a faster rate than the U.S.; Kentucky, however, grew at about 56 percent of the U.S. rate. At 31.6 percent, Utah has the highest growth rate during this period, and West Virginia has the lowest (-3.5%); Kentucky has the 35th highest growth rate among the states and DC.

Percentage Change in Population 2007-2023, Kentucky, Competitor States, & the U.S.



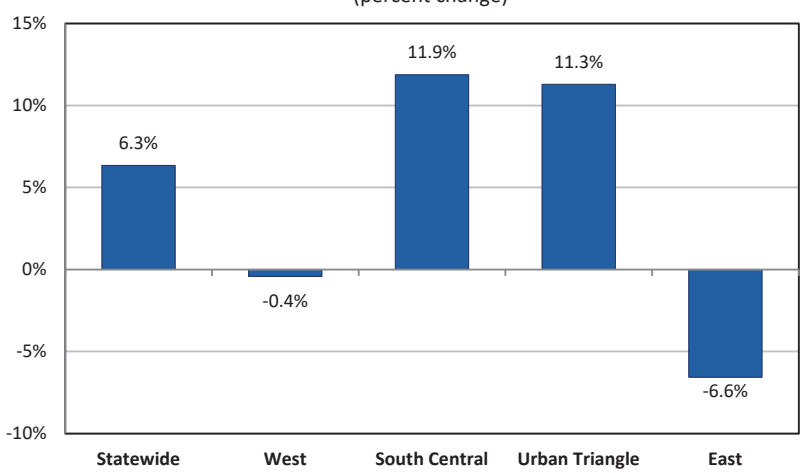
Source: U.S. Census Bureau, 2007 & 2023 ACS 1-year estimates

Regional Population Changes

Population growth rates within a state can serve as an indicator of economic trends. The population growth rate of Kentucky and its regions from the peak of the last economic expansion just before the Great Recession in 2007, to the present (2023) is shown below (a county-level map of these four regions is available in the glossary). Kentucky's Urban Triangle experienced a 11.3 percent increase, and South Central Kentucky is higher at 11.9 percent. However, the population in Western Kentucky has remained essentially flat (-0.4%), and in Eastern Kentucky it *declined* by 6.6 percent. For comparison purposes, Kentucky's overall population increased 6.3 percent over the same time period.

Population Change in Kentucky Regions, 2007 to 2023

(percent change)



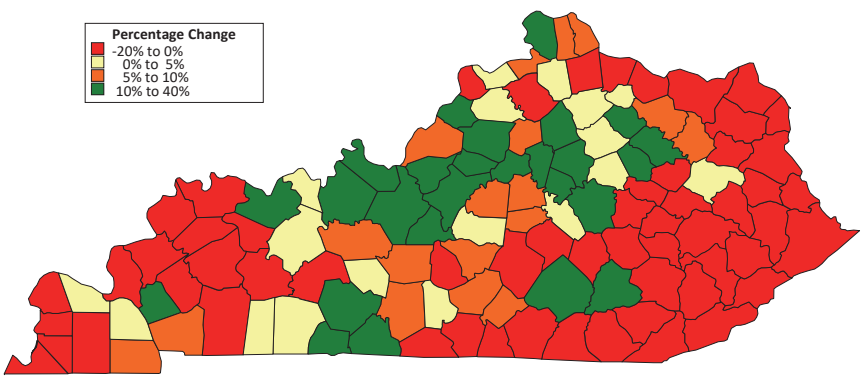
Source: Author's calculations using data from the U.S. Census Bureau, county-level estimates at: https://www2.census.gov/programs-surveys/popest/datasets/. See glossary for map of Kentucky regions by county.

County Population Changes

From the peak of the last economic expansion just before the Great Recession in 2007 to the present (2023), there have been some significant county-level population changes in Kentucky. As illustrated in the map below, the population in several counties was lower in 2023 compared to 2007. Overall, in fact, 58 counties, largely in Eastern Kentucky, but several in the western part of the state, lost population during this time period. The five largest declines were in Knott (-20.1%), Bell (-19.7%), Harlan (-18.5%), Floyd (-18.1), and Martin Counties (-17.6%). On the other hand, population growth in much of Northern and Central Kentucky has been strong. The five fastest growing counties all experienced double-digit increases, and include Scott (39.8%), Warren (36.1%), Boone (24.5%), Oldham (24%), and Shelby Counties (21.9%). By comparison, Kentucky's population increased by 6.3 percent during this sixteen year period.

Kentucky County Population Change

(population change from 2007 to 2023)

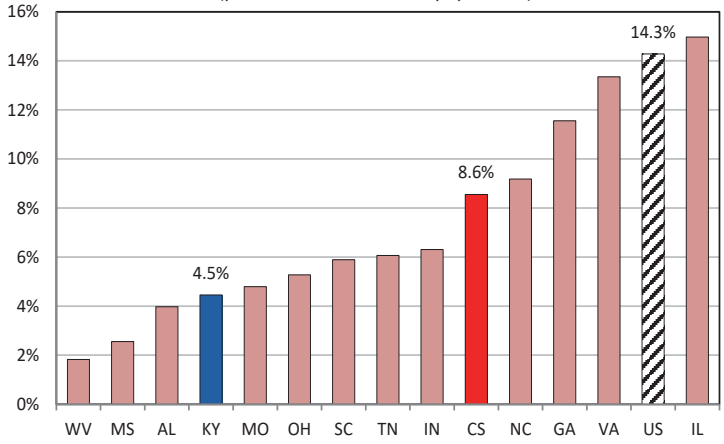


Source: U.S. Census, annual county-level estimates.

Foreign-Born Population

Immigrants strengthen our communities and bolster our economy. In a September 2017 paper, *Immigrants Benefit the Community and Economy*, authored by economist Dr. Jenny Minier, she notes that "more than 40% of Fortune 500 companies, including American icons like Apple, Budweiser, Google, and McDonald's, were founded by immigrants or the children of immigrants." Moreover, Minier cites a study which finds that "over half of the 87 technology startups valued at over $1 billion were co-founded by immigrants, and on average, these companies had created 760 new jobs." The economic contribution of immigrants extends, of course, across the entire range of jobs in the labor force, from those who harvest agricultural products to those occupying Fortune 500 CEO suites. Moreover, a 2024 NBER Working Paper by Caiumi and Peri reports that "immigration, thanks to native-immigrant complementarity and college skill content of immigrants, had a positive and significant effect between +1.7 to +2.6% on wages of less educated native workers, over the period 2000-2019 and no significant wage effect on college educated natives. We also calculate a positive employment rate effect for most native workers." The percentage of foreign-born individuals in Kentucky is 4.5 percent, just over half of the competitor state average (8.6%) and about a third of the U.S. average (14.3%).

Foreign-Born Population, 2023,
Kentucky, Competitor States and the U.S.
(percent of total resident population)

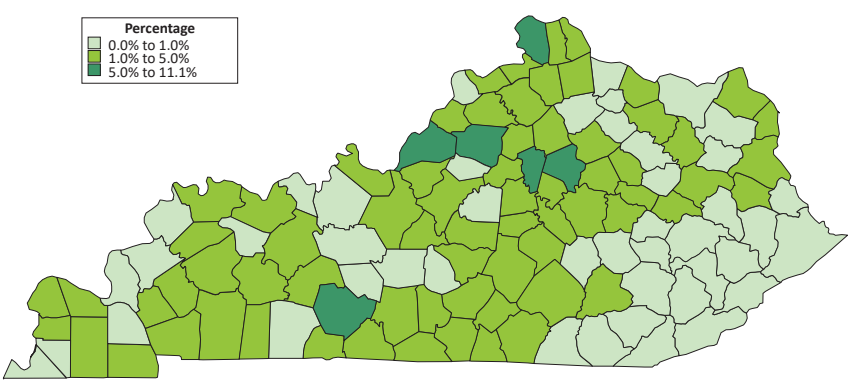


Source: American Community Survey, Table B05002 2023 1-Year Estimate
Note: "CS" is the weighted average of the competitor states.

Foreign-Born Population by County

Kentucky's percentage of foreign-born population is relatively low, but it is approaching or just above ten percent in a few areas, such as Fayette (11%), Warren (9.9%), and Jefferson Counties (9.5%). As one can see on the map below, the Kentucky counties with the highest percentages of foreign-born individuals are disproportionately located in the urban triangle, the area of the state's economic engine. Nonetheless, even in counties with a small number of foreign-born individuals, these immigrants frequently play an outsized role in their local communities as business owners, entrepreneurs, and health care providers. Indeed, many are serving in medically underserved areas of rural Kentucky. One telling statistic, that is indicative of their impact, is this: the percentage of U.S. or native-born Kentuckians with a Bachelor's degree or higher is about 23 percent, while the percentage of foreign-born Kentuckians with a Bachelor's or higher is around 34 percent—one out of three. The percentage of foreign-born in Kentucky overall is about 4.4 percent, much lower than the U.S. average of 13.9 percent.

Foreign-Born Population, by Kentucky County, 2019-2023

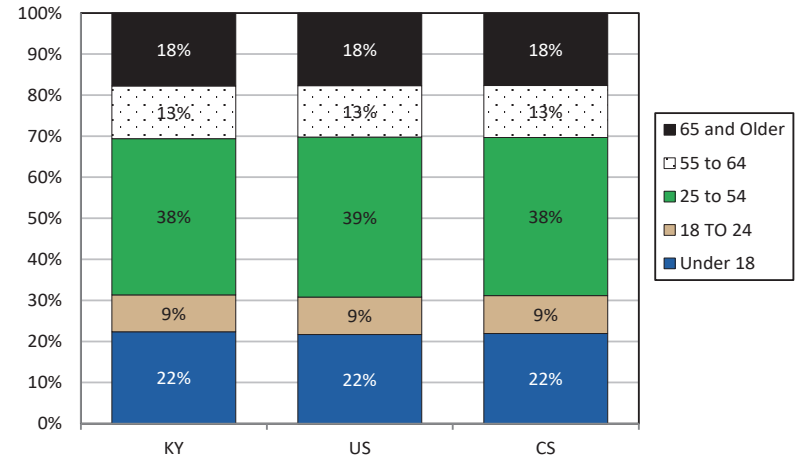


Source: U.S. Census, American Community Survey, 2023 5-Year Estimate, Table B05002

Population by Age Group

Kentucky's population is aging, evidenced, in part, by the median age increasing from 35.9 years in 2000 to 38.1 in 2010—and on to 39.2 in 2023. The U.S. median age in 2023 was also 39.2 years. As the Boomers age, it will be felt, for example, as they leave the workforce, rely increasingly on pensions and other forms of public assistance, and join the nation's cadre of volunteers. The number of persons in Kentucky aged 65 and above is estimated at 805,000 in 2023. At 18 percent of Kentucky's total population, it represents about the same proportion as in the U.S. and the competitor states. The same is true for the other age groups—the distribution of age groups in Kentucky is more or less consistent with the U.S. percentages. For example, the prime working age group, 25 to 54, comprises 38 percent of Kentucky's total population, compared to 39 percent in the U.S.

Population Distribution by Age, 2023
Kentucky, Competitor States, and the U.S.
(percent of total state population)

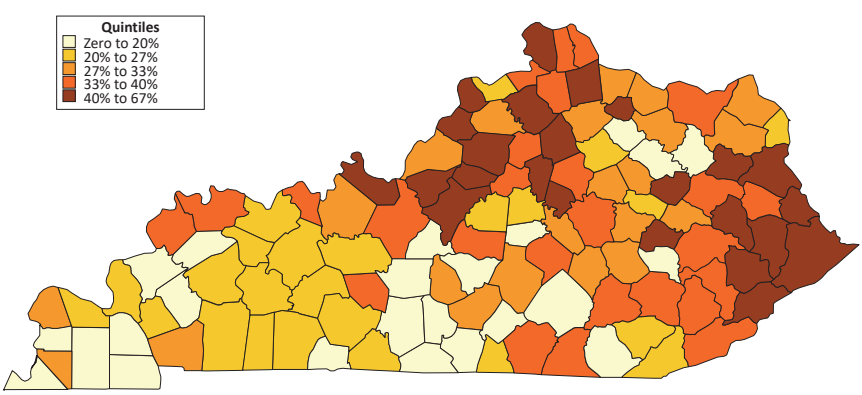


Source: U.S. Census Bureau, ACS 2023 1-Year estimate, Table S0101

Aging Population

The age composition of the population, as well as how quickly it ages, can have important implications for government policy and business practices. The types of programs and services, from schools to senior centers to health care to housing, is affected by the age distribution. There are, for example, nearly 1.6 million Kentuckians on Medicaid, with about 109,000 seniors (aged 65 or older), or 7 percent of the total Medicaid population. A *New York Times* article in December of 2022, "Who Will Care for 'Kinless' Seniors?," highlighted a growing trend of older Americans, currently estimated at about 1 million, who have no immediate family members to provide assistance if needed. This could have important implications for governments, nonprofits, and the faith communities, as the kinless senior population grows. Business and commerce is also affected since labor force participation, disability rates, health care costs, consumer spending, the tax base, and a number of other factors are affected as the population ages. The county map shows the changes in the proportion of the population 65 and older. For example, Woodford County's 65 and older poplation increased from 12.1 percent of the county's total population in 2010 to 20.1 percent in 2023, a 66 percent increase in the proportion of the county's total population 65 or older. This was the largest increase of any county, placing it in the highest quintile.

Kentucky's Aging Population
(rate of change from 2010 to 2023 in 65 and older)

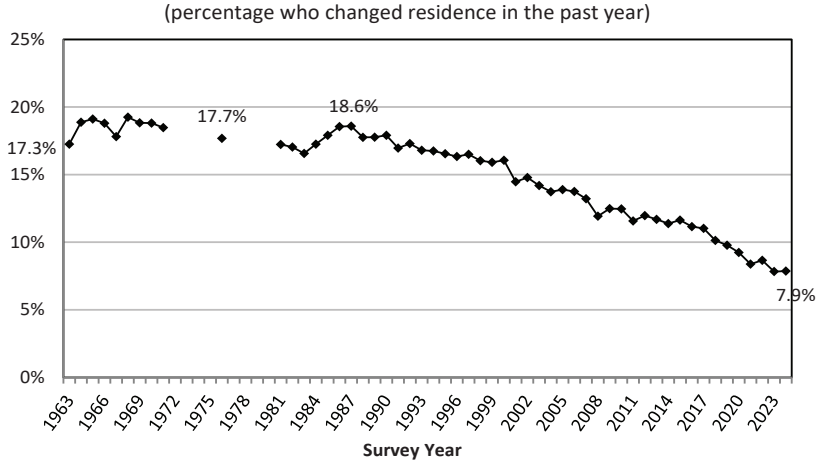


Source: U.S. Census, American Community Survey, 2010 and 2023, Table S0101

Population Mobility

U.S. migration trends have been in steady decline since the late-1980s. For several decades prior, going back to the late-1940s, nearly one-fifth of Americans changed their residence each year. By 2023, it had decreased to under 10 percent (7.9%). This time period, from the late-1980s to the present, coincides with the digital economy or the Internet Age, when it became increasingly possible for individuals to work remotely, to live in one area while working for an enterprise based in another, and to experience the loosening of a place-based economic imperative. These trends have many workers asking themselves, "*Why move to another geographic location—possibly with higher housing costs, more traffic, and more crime—for economic opportunity if technology allows me to live almost anywhere?*" The broader economic transition to a service-based economy, along with the pandemic, with its renewed emphasis on work from home, appears to be providing geographic locations with lower cost-of-living, less traffic congestion, and more outdoor natural amenities, with an increased comparative advantage to attract individuals who enjoy the flexibility of this option. As an October 2021 *Wall Street Journal* article teases with its title, "Remote Workers Can Live Anywhere," so cities and small towns are luring them with perks to boost populations with "offers of cash, free coffee and grandparent stand-ins."

Geographic Mobility in the U.S., 1963-2024
(percentage who changed residence in the past year)



Source: Author's calculations based on data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC, 1963-2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0

Public Finance

TWO SOURCES OF REVENUE—THE individual income tax and the sales and use tax—account for 75.4 percent of Kentucky general fund revenue (FY2023). Fifty-five years ago, the sales and use tax comprised about 51 percent of Kentucky's general fund receipts, while income tax collections accounted for around 22 percent. However, by the mid-1980s, the income tax accounted for more general fund revenue than the sales and use tax. The changing distribution of tax receipts reflects fundamental changes in the economy—the gradual shift away from making products and toward providing services.

Most states, including Kentucky, tend to apply a broad-based sales tax to goods but not services. Consequently, the state's tax base has gradually become more narrow and lost some elasticity—a measure of whether revenue is keeping pace with the economy. Over the last few years Kentucky has made a policy decision to move away from a state income tax. During the 2022 Session of the General Assembly, House Bill 8 was passed, which is designed to eliminate the state income tax by 2032. House Bill 1 was passed during the 2023 Session, which reduced the top income tax rate from 4.5 percent to 4 percent effective January 1, 2024, and an additional one-half of one percentage point cut, reducing the rate to 3.5 percent, is expected during the 2025 session of the General Assembly. These changes will place more emphasis on other sources of revenue.

Our state receives a significant amount of its revenue from the federal government.

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These intergovernmental transfers are mainly for health care (Medicaid), education, transportation, and public safety. The pandemic precipitated an extraordinary amount of additional federal spending, evidenced by six major bills passed by Congress during 2020 and 2021, totaling about $5.3 trillion, to mitigate the pandemic's health, economic, and public finance effects. State and local government financial ledgers were affected by these bills, regardless of whether intergovernmental transfers are provided. For example, direct federal support of individuals, families and businesses affects state and local government expenditures and revenue in multiple ways, through tax collections and social program spending. By 2022, this amounted to 38.1 percent of Kentucky's total state and local revenue, with the U.S. average at about 26.5 percent, representing increases from before the pandemic.

Focusing exclusively on state-level finances, the portion of federal funds used for state expenditures has increased to record levels, as evidenced by the National Association of State Budget Directors (NASBO), *2024 State Expenditure Report*, which estimates Kentucky's FY2024 percentage at 42.9 percent of total state expenditures—and increase from 36.4 percent from FY2019. The percentage also increased nationally during this period, from 30.6 to 34.2 percent.

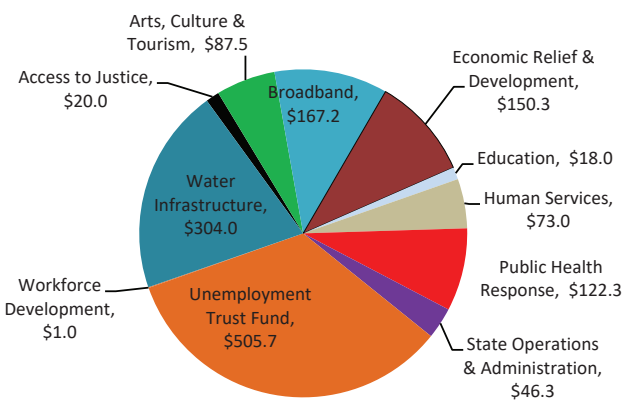
There are stubborn budgetary challenges facing the Commonwealth. Kentucky's public pension programs, for example, are in less-than-optimal financial shape, as evidenced by an estimated unfunded actuarial accrued liability (UAAL) that equaled $41.4 billion in 2023. By multiple measures, Kentucky's public pension system ranks as one of the most financially troubled among the fifty states and DC. The funded ratios of the state's major public-sector pension plans have decreased over the last two decades, from 108 percent in 2001 to 49.9 percent in 2023, the lowest ratio among the states and DC.

Improving the funded ratio of Kentucky's major public sector pension plans could require tough decisions on spending priorities within the state budget. Kentucky's required annual contribution to its public pension programs is equal to about 10.4 percent of state and local general revenue from own sources, which ranks second highest among the states. Inflationary pressures are squeezing state pensioners who have not received a cost-of-living adjustment in over a decade. If the portion of state and local revenue going to pension funding grows, it will either claim a larger portion of the budget and/or create pressure for increasing revenue to fund vital state programs and services.

ARPA Fund Allocations

President Biden signed the $1.9 trillion American Rescue Plan Act (ARPA) on March 11, 2021. This was a federal stimulus bill to aid public health and economic recovery from the COVID-19 pandemic. The plan included $350 billion in emergency funding for state, local and territorial and tribal governments, known as the Coronavirus State and Local Fiscal Recovery Funds (CSLFRF). State governments and the District of Columbia will receive $195.3 billion of the state portion of the CSLFRF. States must obligate the CSLFRF dollars by December 31, 2024, and spend the funds by December 31, 2026. The National Conference of State Legislatures (NCSL) has been tracking state-level fund allocations, and reports that Kentucky has allocated **$1,495.3 million** of the **$2,183 million** disbursed by the U.S. Department of Treasury. As of March 2024, the four largest categories for Kentucky are: **$505.7 million** to the Employment Services budget unit for payment of interest and principal for advances under the state unemployment fund; **$304 million** to the Kentucky Infrastructure Authority for the Drinking Water Wastewater Grant Program, with a focus on unserved rural customers; **$167.2 million** to increase broadband internet access; and **$150.3 million** for economic relief and development of nonprofit organizations. NCSL estimates that 50 to 75 percent of Kentucky's funds have been allocated.

ARPA State Fiscal Recovery Fund Allocations, Kentucky
($ millions)



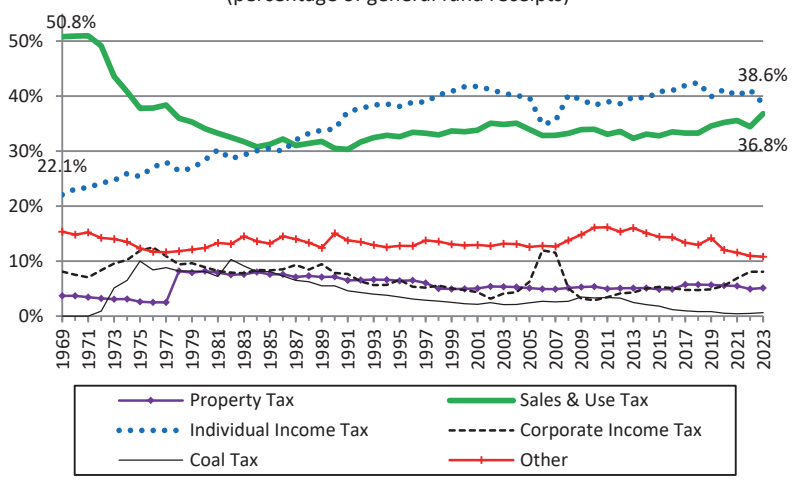
Source: National Conference of State Legislatures (NCSL), <https://www.ncsl.org/research/fiscal-policy/arpa-state-fiscal-recovery-fund-allocations.aspx>, accessed October 6, 2023.

General Fund Receipts by Source

Two sources of revenue—the individual income tax and the sales and use tax—account for 75.4 percent of Kentucky general fund revenue (FY2023). This figure illustrates how Kentucky's revenue system has fundamentally changed since 1969. Fifty-five years ago, the sales and use tax comprised about 51 percent of Kentucky's general fund receipts, while income tax collections accounted for around 22 percent. However, by the mid-1980s, the income tax accounted for more general fund revenue than the sales and use tax. The changing distribution of tax receipts reflects fundamental changes in the economy—the gradual shift away from making products and toward providing services. Most states, including Kentucky, tend to apply a *broad-based* sales tax to goods but not services. Consequently, the state's tax base has gradually become more narrow and lost some elasticity—a measure of whether revenue is keeping pace with the economy. Over the last few years Kentucky has made a policy decision to move away from a state income tax. During the 2022 Session of the General Assembly, House Bill 8 was passed, which is designed to eliminate the state income tax by 2032. House Bill 1 was passed during the 2023 Session, which reduced the top income tax rate from 4.5 percent to 4 percent effective January 1, 2024. These changes will likely place more emphasis on other sources of revenue.

Kentucky's General Fund Receipts by Major Sources, FY69 to FY23

(percentage of general fund receipts)

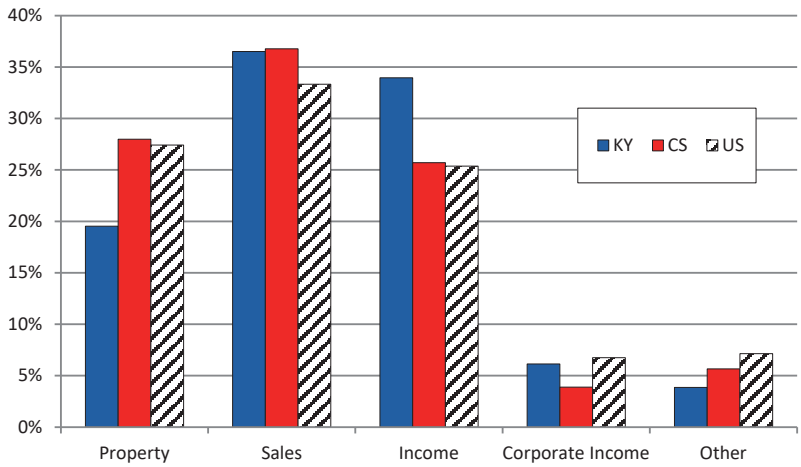


Source: Authors' calculations based on data from the Kentucky Finance and Administration Cabinet, the Kentucky Revenue Cabinet, and the Office of the State Budget Director.

State and Local Tax Revenue by Source

This figure shows the percentage of revenue collected by each reported tax source for Kentucky and a weighted-average of its competitor states and the U.S. (i.e., the average of all states and DC). Kentucky is significantly less reliant on property taxes than its competitors (and the U.S.), who raise a much larger share of local tax revenue from the property tax, and particularly those states to the north of Kentucky. Kentucky has no general sales tax option for any local governments, something a number of its competitor states (and 38 states in the U.S.) allow. Unlike many of its competitors, Kentucky allows local individual income (occupation license) taxation. According to the Tax Foundation in a 2023 report, "Although the majority of U.S. cities and counties do not impose a local income tax, they are imposed by 5,055 jurisdictions (encompassing counties, cities, school districts, and special taxing districts) in 16 states." Not surprisingly, then, Kentucky collects a larger share of combined state and local tax revenues from income taxation.

State and Local Tax Revenue by Source, 2022
Kentucky, Competitor States, and the U.S.
(percent of total tax revenue)

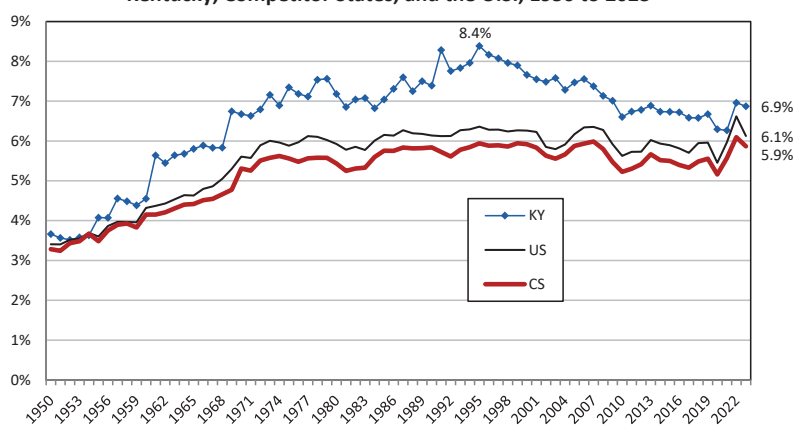


Source: U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances

Tax Collections and Personal Income

Kentucky is a more centralized state with regard to revenue collection, with the relative balance titled toward state government revenue collection instead of local government revenue collection. For example, in 2022, Kentucky's state-level own-source revenue constituted 70 percent of total state and local own-source revenue, ranking Kentucky 8th highest among the states. This state-level percentage of 70 percent is much higher than both the national (58.5%) and competitor state (58.1%) averages. The higher reliance upon state government for revenue collection in Kentucky, compared to most other states, is reflected in the chart below with a consistently higher percentage of state-level tax collections as a percentage of personal income. Moreover, Kentucky's recurring revenue problems are due, in part, to the long-term decline in revenue elasticity. There are several economic, demographic, and political factors contributing to the gradual reduction in elasticity. Regardless of how we assess the adequacy of the revenue structure, Kentucky's main revenue sources are growing slower than its economy. This point is illustrated by examining Kentucky's total tax collections as a percentage of personal income, which declined from its peak of 8.4 percent in 1995 to 6.3 percent in 2021. It increased, however, to 6.9 percent in 2023.

Total State-Level Tax Collections as a % of Total Personal Income, Kentucky, Competitor States, and the U.S., 1950 to 2023

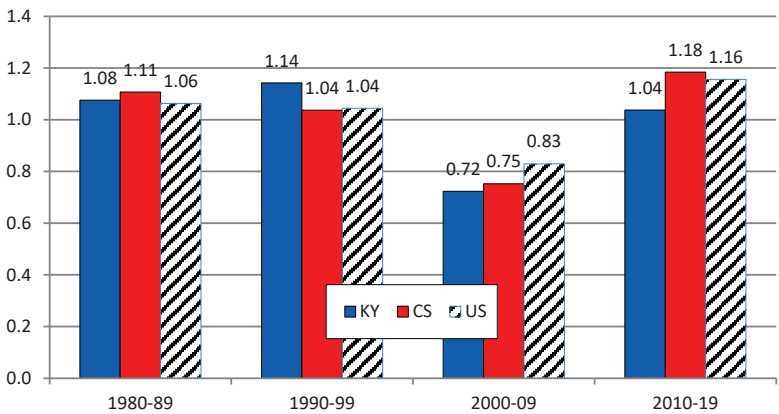


Source: Author's calculations based on data from the U.S. Department of Commerce, Bureau of Economic Analysis (Table SAINC4), and U.S. Census Bureau, State Government Tax Collections, various years

Growth Rates, Taxes and Income

Kentucky's revenue growth kept pace with the economy from 2010 to 2019—the last year before the COVID-19 pandemic and its attendant aftereffects altered the course of personal incomes and state tax collections—thus making it difficult to compare trends from 2020 onward to earlier years. Federal stimulus packages, the growth of remote work, and shifting shopping routines had huge effects on personal income and tax collections. Revenue growth rates are affected by both changes in the revenue base and tax rates. The revenue systems in most states failed to keep pace with overall economic growth during the decade from 2000 to 2009 due to one or both of these factors. The Great Recession had a significant impact on both taxes and income during this period. Using the ratio between the compound annual growth rates (CAGR) of revenue and personal income, we compare Kentucky to the competitor states and the U.S. during four time periods. A ratio of 1.0 indicates that the revenue is growing at the same rate as the economy—a desirable outcome. In Kentucky, as well as in many of the competitor states, the growth in total tax revenue slowed relative to the economy in the 2000s. However, since 2010 the ratios have increased to around 1.18 and 1.16 among the competitor states and in the U.S., respectively; in Kentucky, the ratio is close behind at 1.04.

Ratio Between Compound Annual Growth Rates of Total Taxes and Personal Income, Various Periods, Kentucky, Competitor States, and the U.S.



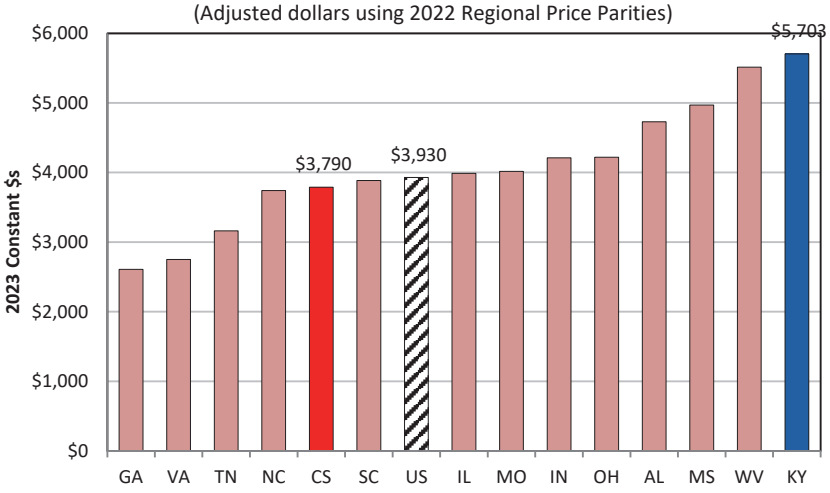
Source: U.S. Census Bureau, Bureau of Economic Analysis & State Government Tax Collections
Note: Total taxes are not adjusted for sales tax increases. Adjustments will produce slightly different results.

Revenue from Federal Transfers

Kentucky receives a significant amount of its total revenue from federal intergovernmental transfers. In 2022, this amounted to 38.1 percent of Kentucky's total revenue. The competitor state average was about 27.5 percent and the U.S. average was about 26.5 percent. Traditionally, these transfers are mainly for health care (Medicaid), education, transportation, and public safety. However, in 2022 a large portion was pandemic related funding. On per capita basis, Kentucky received about $5,700 in revenue from federal transfers, compared to around $3,790 and $3,930 for the competitor states and U.S., respectively. Alaska had the highest amount at $8,574 and Georgia the lowest at $2,609. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

State and Local Revenue From Federal Transfers, Per Capita, 2022, Kentucky, Competitor States, & the U.S.

(Adjusted dollars using 2022 Regional Price Parities)

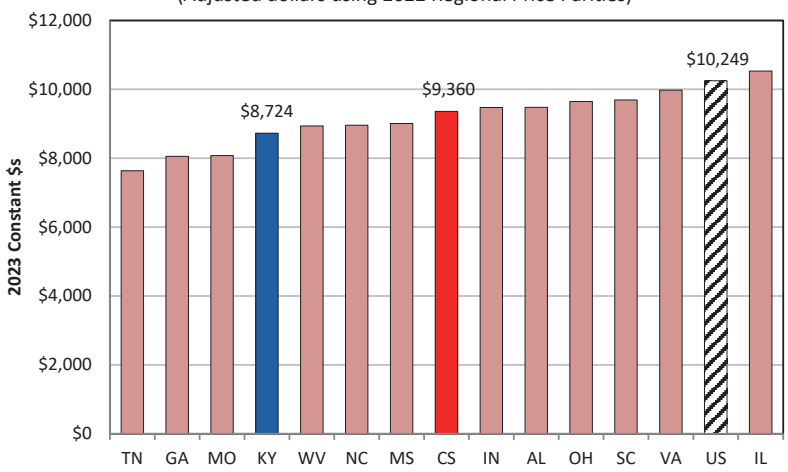


Source: U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances

State and Local Own Source Revenue

Since states differ in the relative distribution of tax burdens between state and local governments, any comparison of revenue burdens among states requires a consideration of combined state and local revenue burdens. Here we report state and local own revenue burdens for Kentucky and its competitor states in 2022. On a per capita basis, Kentucky's per capita own-source state and local revenue was $8,724 in 2022 (in constant 2023 dollars), lower than the competitor state average of $9,360 as well as the U.S. average of $10,249. North Dakota had the highest amount at $17,300 and Arizona the lowest at $7,165. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

State and Local Own Source Revenue, Per Capita, 2022, Kentucky, Competitor States, and the U.S.
(Adjusted dollars using 2022 Regional Price Parities)



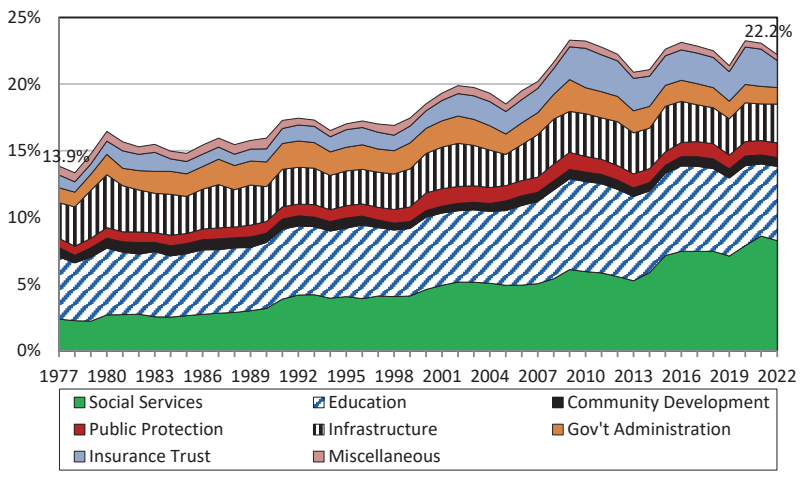
Source: U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances

State and Local Expenditures, Kentucky

Total state and local government expenditures as a percentage of Kentucky's gross domestic product (GDP) have increased significantly over the last 45 years, from 13.9 to 22.2 percent. The spending categories shown below are: *Social Services*, which includes public welfare, public assistance, and Medicaid; *Education*, which includes elementary and secondary education and higher education; *Community Development*, which includes libraries, natural resources, parks and recreation, and housing and community development; *Public Protection*, which includes police, fire, corrections, as well as protective inspection and regulation; *Infrastructure*, which includes highways, water, sewers, utilities, and solid waste. The remaining categories include *Government Administration* (which includes interest paid on debt), *Insurance Trust* (e.g., workers' compensation, unemployment, retirement), and miscellaneous expenditures. The overall percentage increase is driven primarily by growth in social services, which more than tripled in its share of GDP, from 2.4 to 8.3 percent. The insurance trust category doubled, from 1 to 2 percent of GDP. Public protection increased by a factor of 1.6 (0.7% to 1.1%), education rose by a factor of 1.2 (4.7% to 5.6%), and the remaining categories experienced smaller increases.

Kentucky State & Local Government Expenditures, by Major Category, 1977 to 2022

(as a percentage of state gross domestic product)

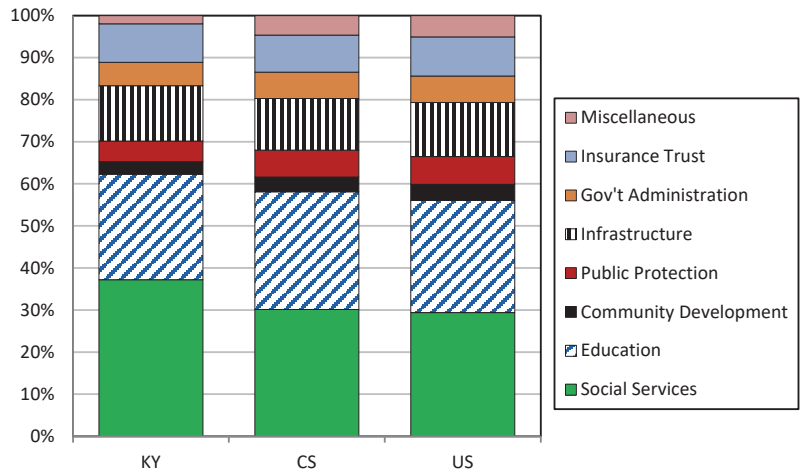


Source: U.S. Census Bureau, Annual Surveys of State and Local Government Finances, various years

STATE AND LOCAL EXPENDITURES

For Kentucky, the competitor states, and the U.S., five categories—Social Services, Education, Community Development, Public Protection, and Infrastructure—account for around 79 to 83 percent of state and local government expenditures (2022). As a percentage of total state and local government expenditures, Kentucky spends about the same on education, more on social services, and less on public protection, community development, and infrastructure compared to the U.S. overall. Kentucky's expenditures on government administration are lower than the U.S. overall, and higher in the insurance trust category—which includes worker's compensation, unemployment, and retirement. However, as the figures on the following pages show, when comparing per capita expenditures, a slightly different picture emerges. On a per capita basis, Kentucky expenditures are generally lower than the U.S. for every category except social services, where they have been about the same, but exceeded the U.S. since 2015.

Distribution of Selected State and Local Expenditures, 2022, Kentucky, Competitor States, and the U.S.
(percent of total state and local expenditures)

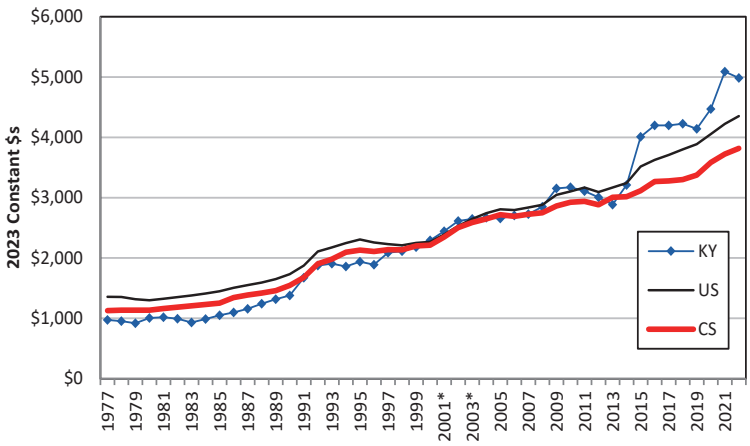


Source: U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances

Social Services Expenditures

We combine five categories—public welfare, hospitals, health, social insurance, and veteran's services—into a single category called social services; this covers expenditures associated with three Federal programs—Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), and Medicaid. State and local expenditures for social services increased steadily on a per capita basis (in constant 2023 dollars) from 1977 to 2022 in Kentucky, among the competitor states, and in the U.S. overall. Kentucky's large increase in 2014 reflects the effect of Medicaid expansion under the Affordable Care Act of 2010. The Act's Medicaid expansion provision became optional for states with a U.S. Supreme Court ruling in 2012. In 2014, the state formerly expanded Medicaid to include more people. When viewed over this 46-year period, Kentucky has a higher percentage increase (412%) in social service expenditures than the competitor states (239%) or the U.S. (221%). Also, Kentucky expended more of its cumulative gross domestic product on social services during this time period (5.6%) than either the competitor states (4.4%) or the U.S. (4.3%). Kentucky's lower-than-average educational attainment rate and higher-than-average poverty rate are important factors driving the higher-than-average social service expenditure growth over the last several decades.

State and Local Social Services Expenditures, Per Capita, 1977-2022, Kentucky, Competitor States, and the U.S.

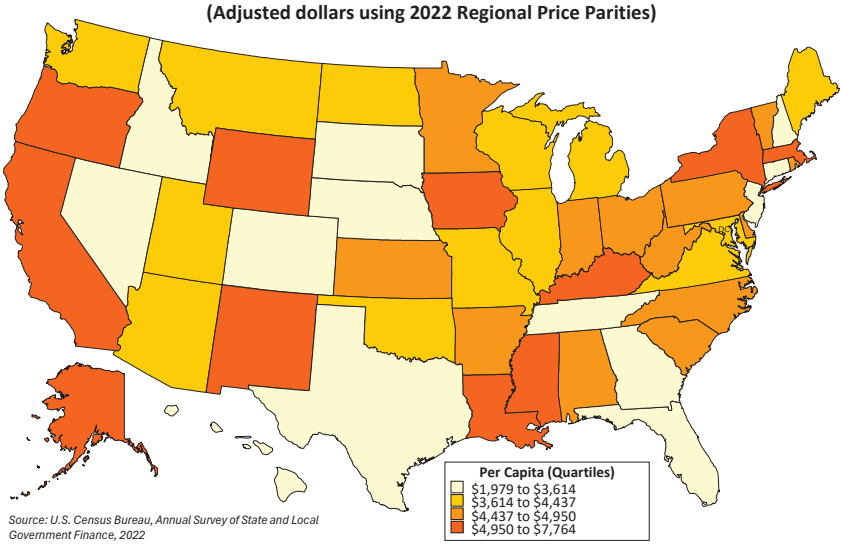


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

Social Services Expenditures in the U.S.

Kentucky exhibits high per capita social services expenditures. With per capita spending of $5,580, Kentucky's state and local expenditures for social services in 2022 are in the fourth or top quartile. New Mexico is the highest state at $7,763 and Connecticut is the lowest at $1,979. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

Social Services Expenditures, 2022
(Adjusted dollars using 2022 Regional Price Parities)

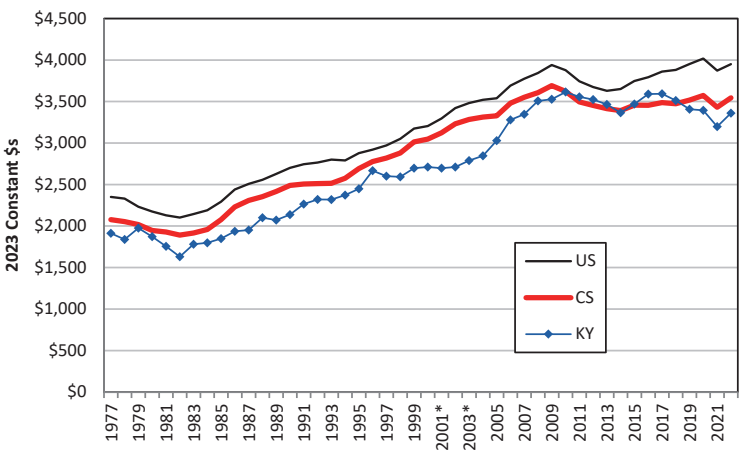


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance, 2022

Education Expenditures

Education expenditures include elementary and secondary education, higher education, and other education such as adult, technical, or vocational education equal to or less than two years of college. State and local expenditures for education steadily increased on a per capita basis (in constant 2022 dollars) from the early 1980s until the Great Recession. For the last decade, however, Kentucky's expenditures have been essentially flat. When viewed over the 46-year period from 1977 to 2022, Kentucky has a slightly higher percentage increase (76%) than the competitor states (71%) or the U.S. overall (68%). Also, Kentucky has expended more of its cumulative gross domestic product on education during this time period (5.7%) than either the competitor states (5.2%) or the U.S. (5.2%). These investments, along with some important reforms, enabled Kentucky to improve its educational standing relative to other states. Research shows that investments in human capital—education—are vital for a state's economic success. The "availability of skilled labor" ranks as the third most important factor for respondents to the *2023 Annual Survey of Corporate Executive and Consultants on Site Selection*, with 87.2 percent ranking it as either "important" or "very important." Moreover, our research on the returns to state investments in postsecondary education shows large positive impacts.

State and Local Education Expenditures, Per Capita, 1977-2022, Kentucky, Competitor States, and the U.S.

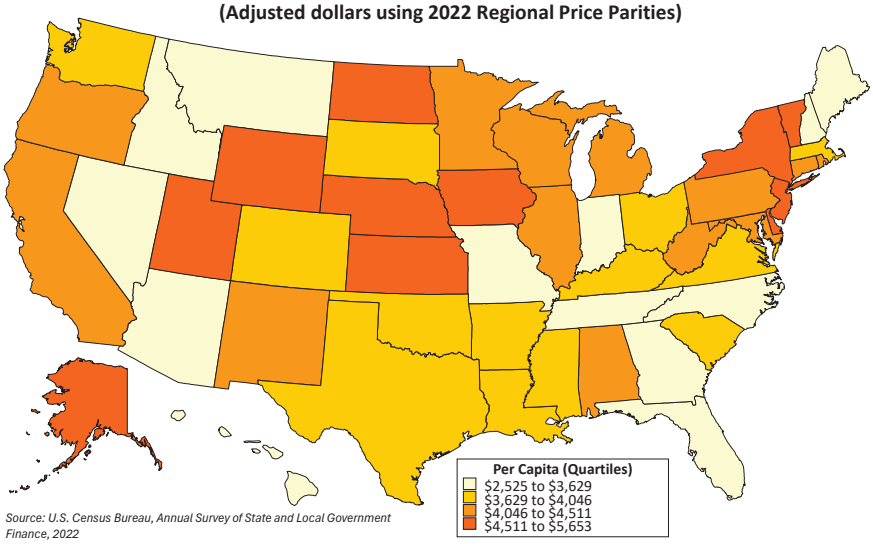


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

Education Expenditures in the U.S.

One way to reasonably assess a state's position relative to other states is by ranking the states and placing them into four more or less equal groups, or quartiles. Kentucky's per capita state and local expenditures for education in 2022 are in the second lowest quartile of states. North Dakota is the highest at $5,624 and Florida is the lowest at $2,525. Kentucky's per capita spending is $3,761. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis. The relationship between educational spending and student outcomes has been extensively studied. Higher spending can lead to better academic achievement, but it is a complex relationship affected by many factors, including where funds are expended.

Education Expenditures, 2022
(Adjusted dollars using 2022 Regional Price Parities)

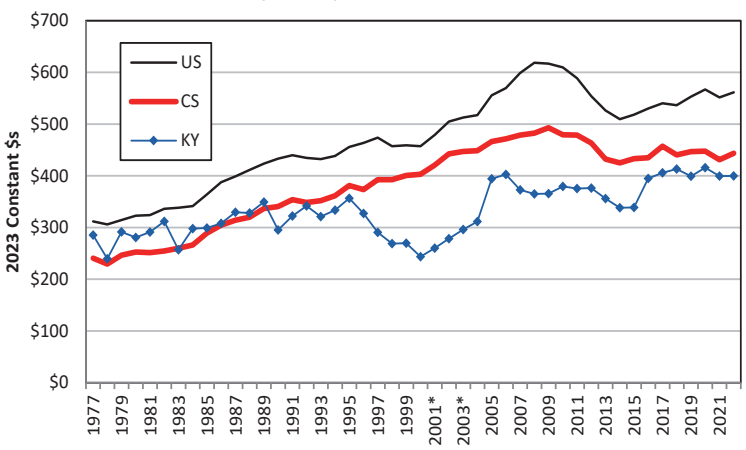


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance, 2022

Community Development Expenditures

We combine four broad areas—libraries, natural resources, parks & recreation, and housing & community development—into a single category called community development. State and local expenditures for community development in Kentucky increased on a per capita basis (in constant 2023 dollars) from 1977 to 2022, but have been consistently lower than the competitor states and the U.S. overall for the last three decades. When viewed over the 46-year period from 1977 to 2022, Kentucky has a lower percentage increase (40%) than the competitor states (84%) or the U.S. overall (80%). Kentucky has expended slightly less of its cumulative gross domestic product on community development during this time period (0.7%) than the U.S. (0.8%), but about the same as the competitor states (0.7%). Quality of life factors, which can include social amenities like libraries, parks, and natural open spaces, ranks as the second most important factor for respondents to the *2023 Annual Survey of Corporate Executive and Consultants on Site Selection*, evidenced by 78.3 percent ranking it as either "important" or "very important."

State and Local Community Development Expenditures, Per Capita, 1977-2022, Kentucky, Competitor States, and the U.S.

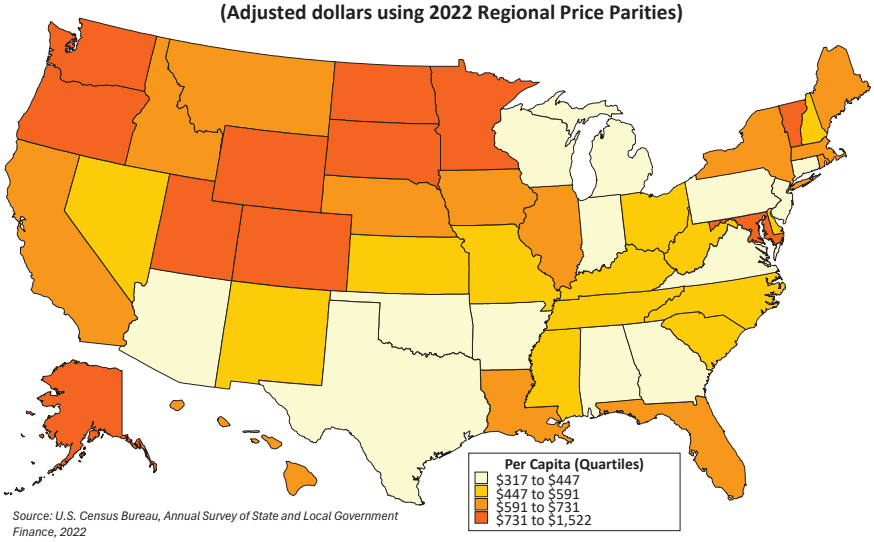


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

Community Development Expenditures in the U.S.

Here we see a wide range of values in community development expenditures. With per capita spending of $447, Kentucky's state and local expenditures for community development in 2022 are in the second quartile. Alaska is the highest state at $1,521 and Georgia is the lowest at $317. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

Community Development Expenditures, 2022
(Adjusted dollars using 2022 Regional Price Parities)

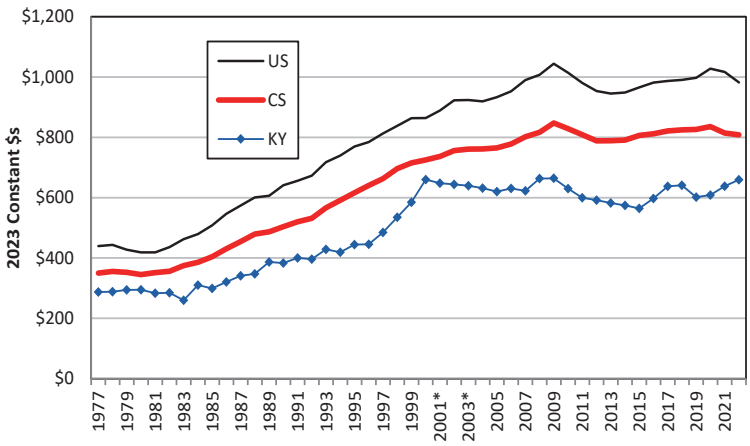


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance, 2022

Public Protection Expenditures

We combine four categories—police protection, fire protection, corrections (e.g., prisons and jails), and protective inspection (e.g., building & construction inspections and licensing)—into a single category called public protection. Kentucky's state and local expenditures for public protection increased steadily on a per capita basis (in constant 2023 dollars) from 1977 to 2001, but have remained more or less unchanged for the last two decades. In contrast, public protection expenditures by the competitor states and the U.S. overall increased steadily until the Great Recession era in 2009, and then flattened. When viewed over this 46-year time span, Kentucky (129%) has increased at about the same rate as the competitor states (131%) and the U.S. overall (123%). Kentucky expended a slightly lower percentage of its cumulative gross domestic product on public protection during this time period (1.1%) compared to the competitor states (1.2%) and the U.S. (1.3%).

State and Local Public Protection Expenditures, Per Capita, 1977-2022, Kentucky, Competitor States, and the U.S.

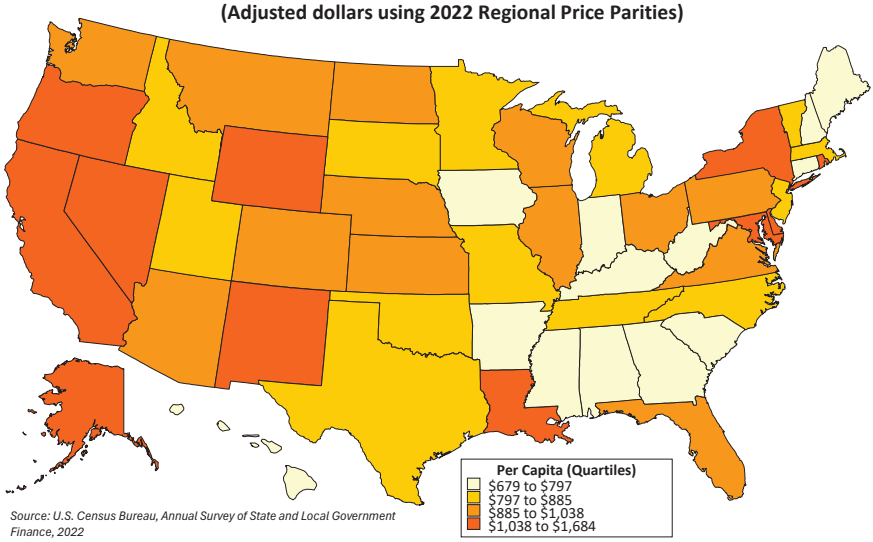


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

Public Protection Expenditures in the U.S.

Perhaps due to the relatively low crime rates in Kentucky—both property and violent crime—per capita public protection expenditures are relatively low here. See the Community section for more information on the state's crime rate. With per capita spending of $738, Kentucky's state and local expenditures for public protection in 2022 are in the first or lowest quartile. In fact, Kentucky has one of the lowest per capital expenditure value of any state and was the lowest in 2020. Maine is the lowest with $679, and Alaska is the highest state at $1,683. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

Public Protection Expenditures, 2022
(Adjusted dollars using 2022 Regional Price Parities)

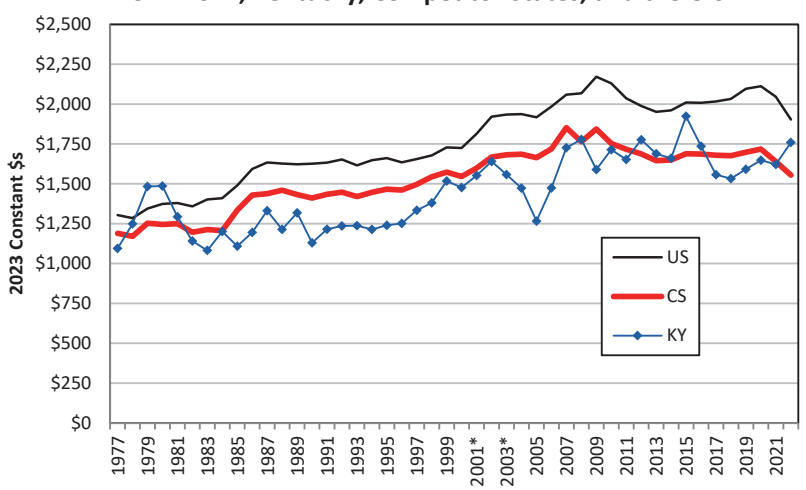


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance, 2022

Infrastructure Expenditures

We combine several expenditure categories into a single catchall to estimate infrastructure expenditures; this includes highways, air transportation, sea & inland ports, parking facilities, sewerage, solid waste management, and utilities like water supply, electric power, gas supply & transit. State and local expenditures for infrastructure have steadily increased on a per capita basis (in constant 2023 dollars). When viewed over the 46-year period from 1977 to 2022, Kentucky has a larger increase (61%) than the competitor states (31%) or the U.S. overall (46%). Kentucky has expended slightly more of its cumulative gross domestic product on infrastructure (2.9%) than the competitor states (2.7%) or the U.S. (2.8%). Numerous infrastructure factors are ranked high in the *2023 Annual Survey of Corporate Executive and Consultants on Site Selection*, led by "ICT/broadband," which is listed as the fifth most important site selection factor with 79 percent indicating it is either "important" or "very important." A more traditional infrastructure consideration, "highway accessibility," is tied at ninth with the corporate tax rate, garnering 76.9 percentage points on the importance ranking.

State and Local Infrastructure Expenditures, Per Capita, 1977-2022, Kentucky, Competitor States, and the U.S.

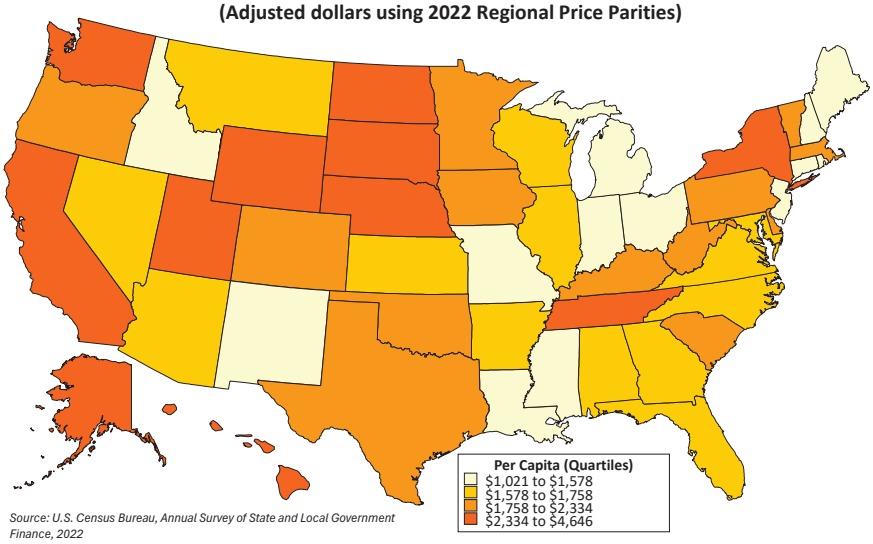


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

Infrastructure Expenditures in the U.S.

With per capita spending of $1,969, Kentucky's state and local expenditures for infrastructure in 2022 are in the third quartile. Nebraska is the highest state at $4,645 and New Hampshire is the lowest at $1,021. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis. In November of 2021, President Biden signed a $1 trillion infrastructure bill into law that will funnel billions to states and local governments to upgrade and construct roads, bridges, transit systems, and broadband networks. These expenditures will take place over several years, but for context, state and local government infrastructure expenditures in 2022 were about $609 billion, or roughly equal to 60 percent of the $1 trillion infrastructure bill.

Infrastructure Expenditures, 2022
(Adjusted dollars using 2022 Regional Price Parities)

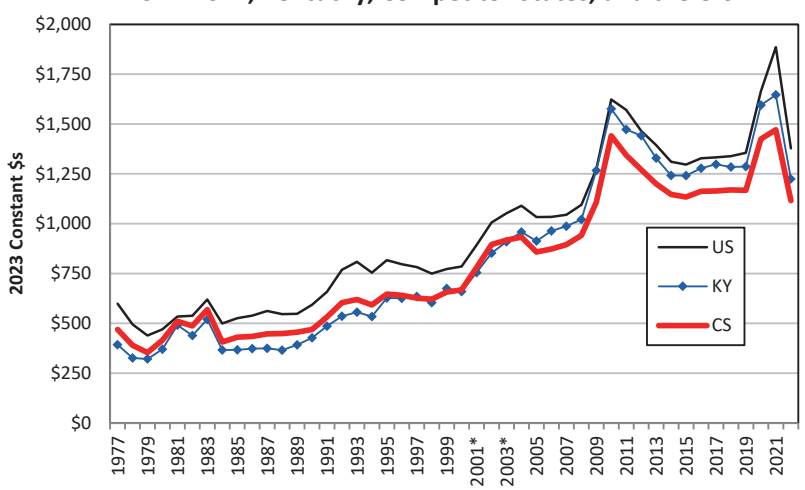


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance, 2022

Insurance Trust Expenditures

We combine several expenditure categories into a single grouping to estimate insurance trust expenditures; this includes workers' compensation, unemployment, retirement, and miscellaneous expenditures. In 2021, two of these categories constituted nearly all of Kentucky's $6.6 billion insurance trust expenditures: retirement (71%) and unemployment (27%). Obviously, the pandemic drove unemployment expenditures upward. By 2022, the state's insurance trust expenditures declined to $5.3 billion and unemployment constituted only 6.4 percent of the total. Nonetheless, state and local expenditures in the insurance trust grouping have steadily increased on a per capita basis (in constant 2023 dollars). When viewed over the 46-year period from 1977 to 2022, Kentucky has a higher percentage increase (212%) than the competitor states (138%) or the U.S. (130%). Kentucky has expended slightly more of its cumulative gross domestic product on insurance trust (1.9%) than the competitor states (1.6%) or the U.S. (1.7%).

State and Local Insurance Trust Expenditures, Per Capita, 1977-2022, Kentucky, Competitor States, and the U.S.

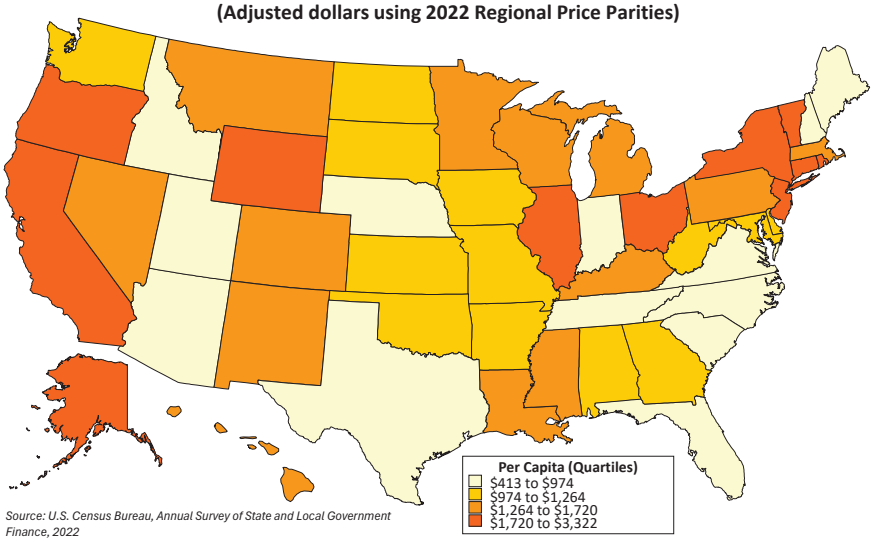


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

Insurance Trust Expenditures in the U.S.

With per capita spending of $1,371, Kentucky's state and local expenditures for insurance trust in 2022 are in the third quartile. Vermont is the highest state at $3,321 and Tennessee is the lowest at $413. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

Insurance Trust Expenditures, 2022
(Adjusted dollars using 2022 Regional Price Parities)

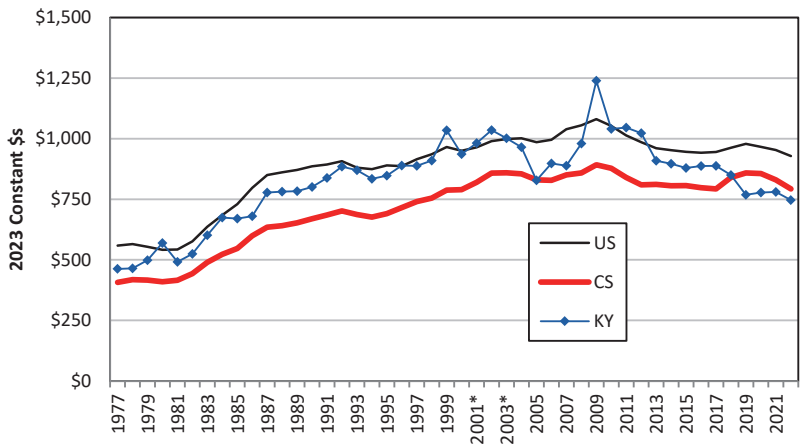


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance, 2022

Government Administration Expenditures

A variety of expenditure categories are included in governmental administration: *financial administration* (i.e., officials and central staff agencies concerned with tax assessment and collection, accounting, auditing, budgeting, purchasing, custody of funds, and other finance activities); *judicial and legal* (i.e., courts, both criminal and civil, and activities associated with courts, legal services, and legal counseling of indigent or other needy persons); *general public buildings* (i.e., construction, equipping, maintenance, and operation of general public buildings not related to specific functions or agencies); *interest on general debt* (i.e., amounts paid for use of borrowed monies, except those on utility debt, paid by all funds of the government); and *other governmental administration*. In 2022, interest on the general debt was the largest portion of Kentucky's governmental administration expenditures, constituting 31.3 percent of the $3.2 billion total. State and local governmental administration expenditures have steadily increased on a per capita basis (in constant 2023 dollars). When viewed over the 46-year period from 1977 to 2022, Kentucky has a lower percentage increase (61%) than the competitor states (95%) or the U.S. (66%). However, Kentucky has expended more of its cumulative gross domestic product on government administration (1.7%) than the competitor states (1.3%) or the U.S. (1.4%).

State and Local Government Administration Expenditures, Per Capita, 1977-2022, Kentucky, Competitor States, and the U.S.



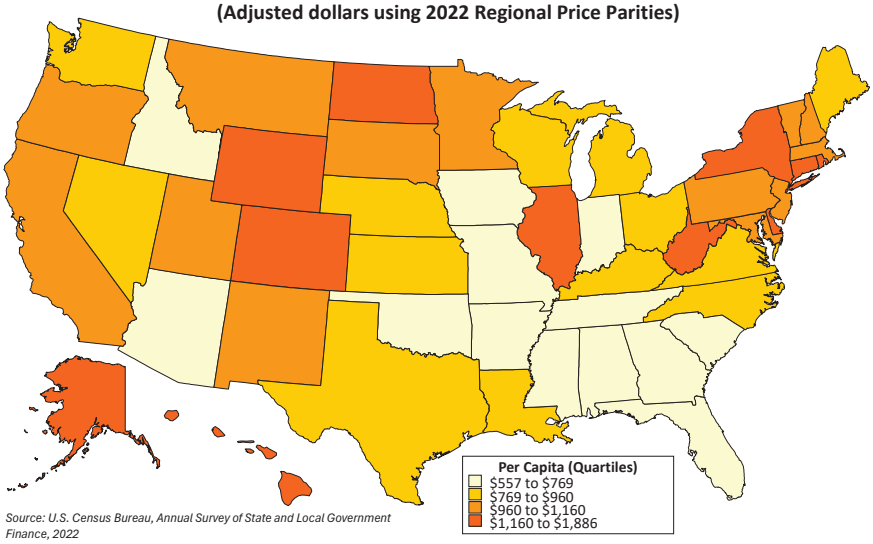
Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

Government Administration Expenditures in the U.S.

With per capita spending of $836, Kentucky's state and local expenditures for insurance trust in 2022 are in the second quartile. Alaska is the highest state at $1,885, and Arizona is the lowest at $557. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

Governmental Administration Expenditures, 2022

(Adjusted dollars using 2022 Regional Price Parities)

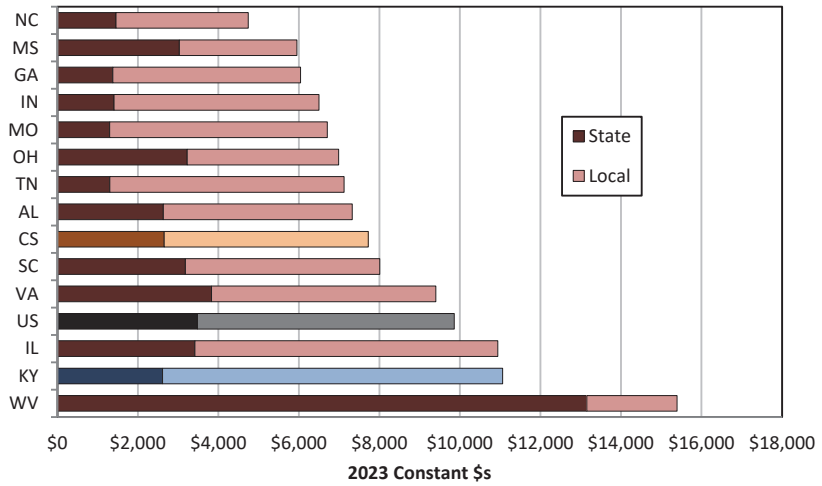


Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance, 2022

Debt

State and local government debt is defined as "all interest-bearing short-term credit obligations and all long-term obligations incurred in the name of the government and all its dependent agencies, whether used for public or private purposes." Governments issue bonds and incur debt for big-ticket items like roads or large construction projects. Nationally, state and local governments had over $3.1 trillion in outstanding debt in 2022, with about 65 percent at the local government level and 35 percent at the state government level. The figure shows combined state and local debt per capita, with Kentucky second among the competitor states at $11,058, 24 percent of which is held by state government. The U.S. per capita debt for state and local governments is $9,860. These dollars have been adjusted to reflect state-level cost-of-living differences using regional price parity estimates from the U.S. Bureau of Economic Analysis.

Debt Outstanding, Per Capita, 2022
Kentucky, Competitor States, and the U.S.
(state and local debt, by total, RPP adjusted $s)

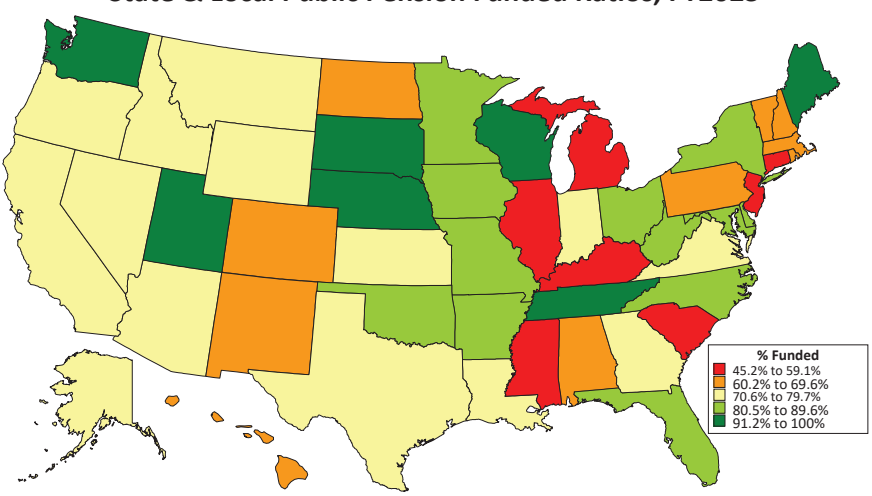


Source: U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances

Public Pension Funding Gaps

Despite a renewed commitment from state government to provide badly needed funding, Kentucky's public pension programs are in dire financial shape, evidenced by an estimated unfunded liability that remains in the billions of dollars. By multiple measures, Kentucky's public pension system ranks as one of the most financially troubled among the 50 states. There are eight public pension programs: County Employees' Retirement System (Hazardous & Non-Hazardous); Kentucky Employees' Retirement System (Hazardous & Non-Hazardous); State Police Retirement System; Judicial Retirement Fund; Legislators' Retirement Fund; and the Teachers' Retirement System. In 2023, these pension funds were funded at approximately half the amount needed to be fully funded—one of the lowest funded ratios in the country. The map below, which is produced from the Public Plans Data (PPD) from the Center for Retirement Research at Boston College in partnership with the MissionSquare Research Institute and the National Association of State Retirement Administrators, shows Kentucky's position relative to other states, and it is not good. The state's ability to improve the finances supporting these public pension programs is tightly linked to the state's overall financial health, as discussed on the preceding pages.

State & Local Public Pension Funded Ratios, FY2023



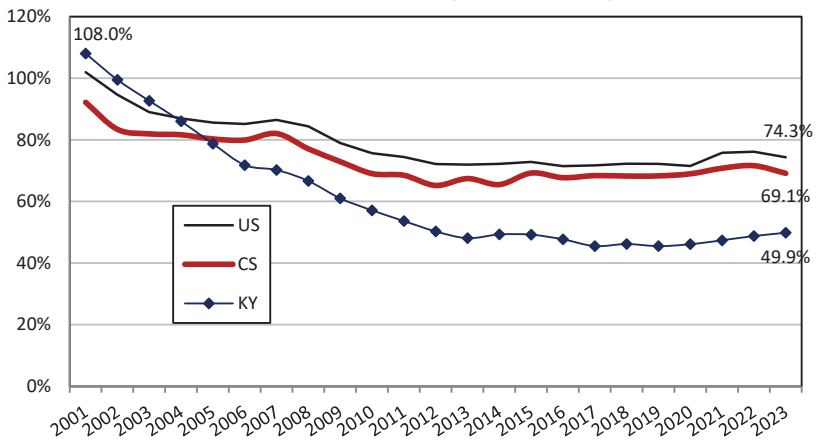
Source: Estimated by the author using Public Plans Data. 2001-2023. Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and Government Finance Officers Association. Data downloaded on 11/20/24.

Pension Funded Ratio

The funded ratios of major public sector pension plans have decreased over the last two decades. The chart below reflects the funded ratios for 229 public pension plans administered by state and local governments from 2001 to 2023. These plans cover 95 percent of public pension membership and assets nationwide. Kentucky's funded ratio dropped precipitously from over 100 percent in 2001 to 49.9 percent in 2023, a steeper decline than the competitor states or the U.S. as a whole experienced. This ratio reflects traditional GASB 25 standards and is equal to actuarial assets divided by actuarial liabilities. The Center for Retirement Research at Boston College, which produces this database, includes three Kentucky state pension plans and one local public pension plan: the County Employees Retirement System (CERS); the Kentucky Employees Retirement System (KERS); the Teachers' Retirement System of Kentucky (TRS); and the Lexington-Fayette County Policemen's and Firefighters' Retirement Fund. In 2023, the assets for these four plans equaled about $41.1 billion while liabilities equaled around $82.5 billion. The unfunded actuarial accrued liability (UAAL) equaled $41.4 billion. Kentucky's funded ratio consistently places it among the lowest states. Improving the funded ratio will require substantial future financial commitments to the state's public pension systems.

Funded Ratio of Major Public Sector Pension Plans, 2001 to 2023

(actuarial assets divided by actuarial liability)

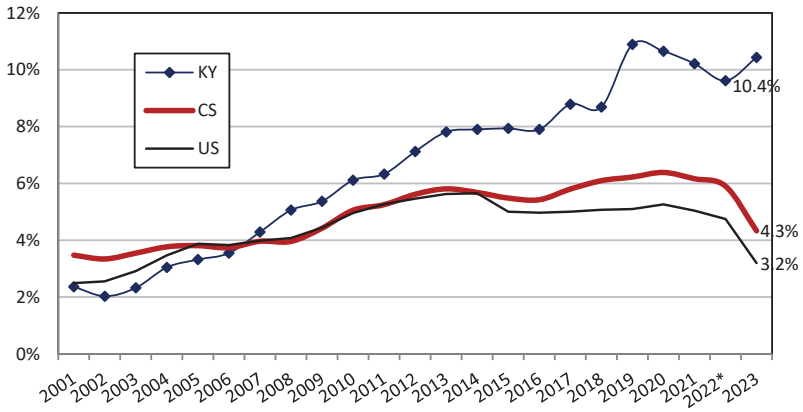


Source: Estimated by the author using Public Plans Data. 2001-2023. Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and Government Finance Officers Association. Data downloaded on November 20, 2024.

Pension Funding

Improving the funded ratio of Kentucky's major public sector pension plans will likely require difficult decisions on spending priorities within the state budget. Kentucky's required annual contribution to its public pension programs is equal to over 10 percent of state and local general revenue from own sources, one of the highest percentages in the nation. If the portion of state and local revenue going to pension funding continues to grow, it will either claim a larger portion of the budget and/or create pressure for increasing revenue to fund vital state programs and services. By comparison, the U.S. and competitor state averages are around 6 percent, as illustrated in the figure below.

Annual Required Contribution to Major Public Sector Pension Plans as a Percentage of State & Local General Revenue from Own Sources, 2001 to 2023



Source: Estimated by the author using Public Plans Data. 2001-2023. Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and Government Finance Officers Association. Data downloaded on November 20, 2024.
**2023 General Revenue from Own Sources forecasted from 2001 to 2022 values.*

Notes & Sources

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Agriculture and GDP—U.S. Department of Commerce, Bureau of Economic Analysis, Gross domestic product (GDP) by state (millions of current dollars). The numerator is "Agriculture, forestry, fishing and hunting" and the denominator is "All Industry Total."

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Air Quality (part 2)—See the endnote above for detailed information on the source. Notes about specific pollutants: CO—Based upon annual statewide averages of all valid

second highest daily maximum 1-hour concentrations [3 sites used for 2023 average (ppm)]; $PM_{2.5}$—Based upon annual statewide averages of all valid 98th percentile 24-hour concentrations [17 sites used for 2023 average (µg/m3)]; and PM_{10}—Based upon annual statewide averages of all valid first maximum 24-hour concentrations [5 sites used for 2023 average (µg/m3)].

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Charitable Contributions—Internal Revenue Service, Statistics of Income <www.irs.gov/uac/SOI-Tax-Stats---Historic-Table-2>.

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working-mothers-gains/>.

Child Care Gaps by Counties—The data estimates on child care supply are from the Homeland Infrastructure Foundation-Level Data (HIFLD), available online at https://hifld-geoplatform.hub.arcgis.com/pages/hifld-open, using data current as of April 17, 2024, and U.S. Census 2022 5-Year, Table 23008, children under 6 whose parent(s) is in the labor force to estimate potential demand.

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College Degrees by Race, Ethnicity, & Metro Status—Authors' analysis of data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0

[ACS 2022 5-Year]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0.

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Community-Based Organizations—This is estimated using U.S. Census Bureau, County Business Patterns data using the following NAICS: Religious organizations (NAICS 813110); Civic and Social associations (NAICS 813410); Business associations (NAICS 813910); Political organizations (NAICS 813940); Professional organizations (NAICS 813920); Labor organizations (NAICS 813930); Bowling centers (NAICS 713950); Fitness and Recreational Sports Centers (NAICS 713940); Golf Courses and Country Clubs (NAICS 713910); and Sports Teams and Clubs (NAICS 711211).

Community Development Expenditures (in the U.S.)—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. We use the following Census Bureau Item Codes to create this category: E52, F52, G52, E55, F55, G55, E56, F56, G56, E59, F59, G59, E61, F61, G61, E50, F50, and G50.

Commuting—U.S. Census, American Community Survey, 2021 5-Year Estimate, Table DP03-Selected Economic Statistics. The *INRIX 2022 Global Traffic Scorecard* is available at: <https://inrix.com/scorecard/>.

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not included, and members who did not live in the household during the previous year but who had joined the household by the time of the census or survey, are included.

County Population Changes—Census data obtained from the U.S. Census Bureau.

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Depression—We use micro data from the Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey (BRFSS), Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, to estimate these results—using BRFSS variable DEPDIA2. The question changed slightly on the 2019 survey. They are (2012-2018), *(Ever told) you that you have a depressive disorder, including depression, major depression, dysthymia, or minor depression?*, and (2019-2022) *(Ever told) (you had) a depressive disorder (including depression, major depression, dysthymia, or minor depression)?*

Disability—The Census Bureau asks six questions to determine the types and prevalence of disabilities. They include the following: *Hearing Disability*—Is this person deaf or does he/she have serious difficulty hearing?; *Visual Disability*—Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?; *Cognitive Disability*—Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions?; *Ambulatory Disability*—Does this person have serious difficulty walking or climbing stairs?; *Self-Care Disability*—Does this person have difficulty dressing or bathing?; and, *Independent Living Disability*—Because of a physical, mental, or emotional condition, does this person have difficulty doing errands alone such as visiting a doctor's office or shopping? Using 2021 and 2022 American Community Survey data from USA IPUMS, we estimate one is "disabled" if they indicate they have at least one of the six disabilities.

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Economy Introduction—We use the BLS Consumer Price Index for All Urban Consumers

(CPI-U) monthly estimates, not seasonally adjusted (CUUR0000SA0), using the average of the monthly estimates for April, May, and June in 2019 and 2023 for our deflators. For the average wage estimates we rely upon the BLS Quarterly Census of Employment and Wages, 2019Q2 and 2023Q2, for the average wage estimates. Finally, for the labor force participation and employment-population ratio estimates we use BLS Local Area Unemployment Statistics.

Education Expenditures (in the U.S.)—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. We use the following Census Bureau Item Codes to create this category: E12, F12, G12, E16, E18, F16, F18, G16, G18, E21, F21, G21, and J19.

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Energy Consumption per GDP—U.S. Energy Information Administration and U.S. Department of Commerce, Bureau of Economic Analysis.

Energy Efficiency—U.S. Energy Information Administration.

Energy Introduction—SEI, Climate Analytics, E3G, IISD, and UNEP. (2023). *The Production Gap: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises*. Stockholm Environment Institute, Climate Analytics, E3G, International Institute for Sustainable Development and United Nations Environment Programme. https://doi.org/10.51414/sei2023.050. Also see Hiroko Tabuchi, "Nations That Vowed to Halt Warming Are Expanding Fossil Fuels, Report Finds," *New York Times*, November 8, 2023.

Entrepreneurial Depth—U.S. Department of Commerce, Bureau of Economic Analysis, SA4 Personal Income and Employment by Major Component and SA30 Economic Profile.

Environmental Disparities—United States, Environmental Protection Agency, Safe Drinking Water Information System data, various years. These estimates are generated by the author using a method employed by the Natural Resources Defense Council and described in a May 2017 report, *Threats on Tap: Widespread Violations Highlight Need for Investment in Water Infrastructure and Protections* <https://www.nrdc.org/resources/threats-tap-widespread-violations-water-infrastructure>. Our assessment of the county-level minority population is derived from U.S. Census data. We define minority as someone other than white alone (not Hispanic or Latino). The total population is from ACS 5-Year 2022, Table DP05, and the white alone (not Hispanic or Latino) population is from ACS 5-Year 2022, Table B01001H. Subtracting this total from the total gives us the minority population.

Exemplar School Districts—*Kentucky School Districts as Educational Bright Spots*, Center for Business and Economic Research, <http://cber.uky.edu/brightspots>.

Exports—U.S. Department of Commerce, International Trade Administration, <https://www.trade.gov/report/tradestats-express-national-and-state-trade-data>.

Family Income by Education—Estimated by the author using data courtesy Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [ACS 1-year 2021 & 2022]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0. To estimate the effect of education on family income, we used a multiple regression model that utilized mostly dummy variables on family income (FTOTINC). The independent variables inlcude: AGE, MARRIED, GENDER, WHTNONHISP, BLKNONHISP, HISPANIC, NOHS_D, HS_D, SC_D, AA_D, BACH_D, GRAD_D, [location of residence variables MIXED, NOTMETRO, METROCITY, METRONOTCITY, and METROMIXED], and YEAR. The omitted variables are less than high school education, and metropolitan status indeterminable (MIXED). We limited the analysis to PERNUM=1 and individuals from 18 to 64 years old.

Family Income by Ethnicity—Using the same data and model described in FAMILY INCOME BY EDUCATION (see above), except focusing on the independent effect of HISPANIC.

Family Income by Race—Using the same data and model described in FAMILY INCOME BY EDUCATION (see above), except focusing on the independent effect of WHITEONLY.

Farm Commodities—United States Department of Agriculture, Economic Research Service, U.S. and State Farm Income and Wealth Statistics <www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>.

Farm Employment—U.S. Department of Commerce, Bureau of Economic Analysis, SA25N Total full-time and part-time employment by NAICS industry.

Farms—These data come from various sources, including the Kentucky Department of Agriculture's annual report, *Kentucky Agricultural Statistics* and the United States Department of Agriculture, *Farms and Land in Farms*, various years. There are differing estimates on the number of farms in Kentucky depending on the data source. The USDA 2022 Census of Agriculture, which is conducted every five years, reports that Kentucky had 75,966 farms in 2017 and 69,425 in 2022.

Favors for Neighbors—Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data.

Financial Impact by Educational Attainment—Refer to the CBER report on the returns from higher education for more details <https://cber.uky.edu/publications>.

Food Insecurity—Author's analysis of data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS Food Supplement, various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0. The data for the 2021-2023 period cited in the text are from Rabbitt, M.P., Reed-Jones, M., Hales, L.J., & Burke, M.P. (2024). *Household food security in the United States in 2023* (Report No. ERR-337). U.S. Department of Agriculture,

Economic Research Service.

Food Insecurity by Educational Attainment—Model-based estimates are produced by the author using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS Food Supplement, various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0. To estimate the independent effect of education on food insecurity, we used a multiple regression model that utilized mostly dummy variables (i.e., LESSHS, SOMECOL, BA, FINCQ2, FINCQ3, FINCQ4, WORKING (in the labor force & employed), MARRIED, GENDER, AGE3554, AGE5564, AGE65PLUS, WHTNONHISP, BLKNONHISP, HISPANIC, NOTMETRO, OUTCC, METROUNK, and YEAR); the omitted variables are high school education, lowest income group (FINCQ1), aged 25 to 34, and metropolitan status as "metro" or "central city" (CENCITY). The analysis is limited to individuals at least 25 years old.

Food Insecurity by Race & Ethnicity—Author's analysis of data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles and J. Robert Warren. Integrated Public Use Microdata Series, Current Population Survey: Version 8.0 [Food Security Supplement]. Minneapolis, MN: IPUMS, 2020. https://doi.org/10.18128/D030.V8.0

Food Insecurity by Race & Ethnicity (Net-Gross differences)—The model-based estimates were derived from separate regression models where the food security status for a head-of-household individual is a function of several variables, including working status, family income in quartiles (i.e., FAMINCQ2, FAMINCQ3, FAMINCQ4), education (i.e., LESSHS, SOMECOL, BA), metro status, gender, age (i.e., AGE_25_34, AGE_35_44, AGE_45_54, AGE_55_64, and OVER65), race (i.e., white Non-Hispanic, Black Non-Hispanic), Hispanic, marital status, and year. The sample is from CPS IPUMS, Food Security Supplement, pooled from 2015 to 2019. See Food Insecurity by Race & Ethnicity.

Food Stamp Participation—University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 SNAP recipients <https://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap>.

Foreign-Born Population (by County)—U.S. Census, American Community Survey, 2023 1-Year and 5-Year Estimates (Table B05002). The citation for the NBER paper is "Immigration's Effect on US Wages and Employment Redux," by Alessandro Caiumi & Giovanni Peri, Working Paper 32389, DOI 10.3386/w32389, Issue Date April 2024.

Free or Reduced-Price Lunch Eligibility—U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics, 2023, Table 204.10. Number and percentage of public school students eligible for free or reduced-price lunch, by state: Selected school years, 2000-01 through 2022-23. Data were downloaded 6/3/2024.

General Fund Receipts by Source—Kentucky Finance and Administration Cabinet and the Kentucky Revenue Cabinet, Annual Reports, various years. Kentucky Department of Revenue Annual Reports available online <https://revenue.ky.gov/News/Publications/

Pages/default.aspx>.

General Fund Tax Receipts—Kentucky Office of the State Budget Director, Monthly Tax Receipts, various press releases <https://osbd.ky.gov/Publications/Pages/Monthly-Tax-Receipts.aspx>.

Gini Index (by State and County)—U.S. Census Bureau, American Community Survey, various years.

Government Administration Expenditures—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. A variety of expenditure categories are included in governmental administration: financial administration (i.e., officials and central staff agencies concerned with tax assessment and collection, accounting, auditing, budgeting, purchasing, custody of funds, and other finance activities); judicial and legal (i.e., courts, both criminal and civil, and activities associated with courts, legal services, and legal counseling of indigent or other needy persons); general public buildings (i.e., construction, equipping, maintenance, and operation of general public buildings not related to specific functions or agencies); interest on general debt (i.e., amounts paid for use of borrowed monies, except those on utility debt, paid by all funds of the government); and other governmental administration.

Grand Parents as Caregivers (by State and County)—U.S. Census Bureau, American Community Survey, various years, Table DP02. Additional information is available from the Census Bureau at <https://www.census.gov/acs/www/about/why-we-ask-each-question/grandparents/>.

Growth Rates, Taxes and Income—U.S. Census Bureau, Bureau of Economic Analysis & State Government Tax Collections.

Health by Education—Estimated using multiple regression analysis on CDC BRFSS data, pooled 5 years of data (2018-2022). Other model variables include education, income, gender, age and race. The results shown in the graph reflect the net effect of education on health while holding other factors (i.e., income, gender, age and race) constant. The net percentages are the model-based estimates, and the gross percentages are the simple averages for the education category.

Health-Based Violations—United States, Environmental Protection Agency, Safe Drinking Water Information System data, various years.

Health Factors—University of Wisconsin Population Health Institute. County Health Rankings National Findings Report 2024. Available online at: <www.countyhealthrankings.org>.

Health Insurance Coverage: Children—U.S. Census Bureau, Health Insurance Historical Tables, H1B Series, HIB-5. Health Insurance Coverage Status and Type of Coverage by State—Children Under 18: 1999 to 2012 <www.census.gov/hhes/www/hlthins/data/historical/files/hihistt5B.xls> and American Community Survey (various years, 1-Year estimates, Table S2701).

Health Insurance Coverage: Everyone—U.S. Census Bureau, Health Insurance Historical Tables, H1B Series, HIB-4. Health Insurance Coverage Status and Type of Coverage by

State--All Persons: 1999 to 2012 <www.census.gov/hhes/www/hlthins/data/historical/files/hihistt4B.xls> and American Community Survey (various years, 1-Year Estimates, Table S2701). The estimates of the Medicaid population come from the 2023 ACS, 1-Year estimates, Table B27007.

Health Insurance, by Race & Ethnicity—Author's analysis of IPUMS-NHIS data, courtesy of Lynn A. Blewett, Julia A. Rivera Drew, Miriam L. King, Kari C.W. Williams, Daniel Backman, Annie Chen, and Stephanie Richards. IPUMS Health Surveys: National Health Interview Survey, Version 7.4 [NHIS 1997-2023]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D070.V7.4.

Health Insurance, by Race & Ethnicity and Chronic Disease—Author's analysis of data from the Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2018-2022 pooled data.

Health Outcomes—University of Wisconsin Population Health Institute. County Health Rankings National Findings Report 2024. Available online at: <www.countyhealthrankings.org>.

Health Status, by Race & Ethnicity—Author's analysis of data from the Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2018-2022 pooled data. See also LaVeist TA, Pérez-Stable EJ, Richard P, et al. The Economic Burden of Racial, Ethnic, and Educational Health Inequities in the US. JAMA. 2023;329(19):1682–1692. doi:10.1001/jama.2023.5965.

High Hazard Potential Dams—National Inventory of Dams <http://nid.usace.army.mil/>, data were accessed 11/21/2024.

High-Propensity Business Formations—U.S. Census Bureau, Business Formation Statistics, available at <https://www.census.gov/econ/bfs/index.html>.

High School Attainment—Estimated by the author using American Community Survey, 2023 1-Year Estimate, Public Use Microdata Sample (PUMS) data.

High School Graduation Rate—U.S. Department of Education, EDFacts Data Group 695, School year 2021–2022 <https://eddataexpress.ed.gov/>.

High-Speed Internet (by County)—These estimates are from the American Community Survey, 2023 1-Year estimate, Table S2801. The county-level estimates are from the U.S. Census September 2024 release of the 2022 Local Estimates of Internet Adoption (LEIA), available at https://www.census.gov/data/experimental-data-products/local-estimates-of-internet-adoption.html.

High-Technology Establishments—Using the National Science Foundation and Milken Institute designations of 4-digit NAICS codes and County Business Patterns data on number of establishments, we calculation the percentage that are considered high-tech establishments. Here are the 50 NAICS codes used: 1131, 1132, 2111, 2211, 3241, 3251, 3252, 3253, 3254, 3255, 3259, 3332, 3333, 3336, 3339, 3341, 3342, 3343, 3344, 3345, 3346, 3353, 3364, 3369, 4234, 4861, 4862, 4869, 5112, 5161, 5171, 5172, 5173, 5174,

5179, 5181, 5182, 5211, 5232, 5413, 5415, 5416, 5417, 5511, 5612, 8112, 3391, 5121, 5191, 6215.

Hispanic Population—U.S. Census Bureau, ACS 2023 1-Year estimates.

Home Ownership Affordability Index—The Federal Reserve Bank of Atlanta's Home Ownership Affordability Monitor (HOAM), https://www.atlantafed.org/center-for-housing-and-policy/data-and-tools/home-ownership-affordability-monitor#Tab1.

Home Ownership Rates by Race & Ethnicity— *America's Health Rankings 2021*, United Health Foundation, AmericasHealthRankings.org, Accessed October 30, 2023 <https://www.americashealthrankings.org/api/v1/downloads/210>.

Household Income Growth—Author's analysis of IPUMS-CPS data, courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0.

Household Income Ratio—See Household Income Growth above for data source information.

Household Income—See Household Income Growth above for data source information. Household income includes income of the householder and all other people 15 years and older in the household, whether or not they are related to the householder. The median is the point that divides the household income distribution into halves, one half with income above the median and the other with income below the median. The median is based on the income distribution of all households, including those with no income. The distributional data is a one-year (2023) estimate from the American Community Survey.

Housing (severe) Problems by Race and Ethnicity—America's Health Rankings analysis of U.S. Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy (CHAS), United Health Foundation, AmericasHealthRankings.org, Accessed 2021. Data available at <https://www.americashealthrankings.org/api/v1/downloads/210>, with descriptive information at <https://www.americashealthrankings.org/explore/annual/measure/severe_housing_problems/state/ALL>.

Housing Starts— U.S. Census Bureau, Building Permits Survey, Permits by State <https://www.census.gov/construction/bps/statemonthly.html>.

Incarceration Rate—See Prisoners in 2022 – Statistical Tables <https://bjs.ojp.gov/library/publications/prisoners-2022-statistical-tables>.

Income Sources by Location—U.S. Department of Commerce, Bureau of Economic Analysis, and the 2013 Urban-Rural Continuum Code, available at <www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx#.UqR_ZeLs2HY>.

Index of Deep Disadvantage—More information, including the geographic data, is available here: https://poverty.umich.edu/projects/understanding-communities-of-deep-disadvantage/>. There is also a published volume about the research, see Edin, K., Shaefer, H. L., & Nelson, T. J. (2023). *The injustice of place: uncovering the legacy of poverty in America*. First edition. New York, Mariner Books.

Industrial Electricity Costs—U.S. Energy Information Administration <www.eia.gov/beta/state/data.cfm?sid=KY#Prices>.

Infrastructure Expenditures (in the U.S.)—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. We use the following Census Bureau Item Codes to create this category: E44, F44, G44, E45, F45, G45, E94, F94, G94, I94, E01, F01, G01, E87, F87, G87, E91, F91, G91, I91, E80, F80, G80, E60, F60, G60, E92, F92, G92, I92, E93, F93, G93, I93, E81, F81, and G81.

Innovation Introduction—The Brookings Institution report quote is from Atkinson, et al., *The case for growth centers: How to spread tech innovation across America*, Brookings, December 9, 2019.

Insurance Trust Expenditures—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. We combine several expenditure categories into a single grouping to estimate insurance trust expenditures; this includes workers' compensation, unemployment, retirement, and miscellaneous expenditures.

Job Growth—U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics, total private, all employees, seasonally adjusted <www.bls.gov/>.

Jobless Claims—U.S. Employment and Training Administration, Initial Claims in Kentucky [KYICLAIMS], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/KYICLAIMS, November 17, 2023.

Kentucky Coal Distribution—*Annual Coal Distribution Report 2023*, U.S. Energy Information Administration, <www.eia.gov/coal/distribution/annual/archive.cfm>.

Kindergarten Readiness—Kentucky Department of Education (KDE), Kindergarten Screen Data, https://education.ky.gov/AA/Assessments/Pages/K-Screen.aspx.

Labor Force Participation (by County and State)—American Community Survey, U.S. Census Bureau, 2023 1-year estimate (Table S2301). The county-level data are from the 2022 ACS 5-Year estimate (Table S2301).

Labor Force Participation by Education—LABFORCE is a dichotomous variable indicating whether the respondent participated in the labor force during the preceding week. See EMPSTAT for a more detailed employment status variable. Those coded as "yes" in LABFORCE were either: were at work; held a job but were temporarily absent from work due to factors like vacation or illness; were seeking work; or were temporarily laid off from a job during the reference period. The estimates reflect the independent effect of education using a multiple regression model while holding other variables constant (i.e., MARRIED, GENDER, WHTNONHISP, BLKNONHISP, HISPANIC, URBAN, LESSHS, [HS omitted] SOMECOL, AA, BA, GRAD, AGE_25_34, AGE_35_44, [AGE_45_54 omitted], [FAMINCQ1 omitted] FAMINCQ2, FAMINCQ3, and FAMINCQ4). Estimated by the author using data courtesy Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 11.0 [CPS, Basic Monthly, Jan.-Dec. 2023]. Minneapolis, MN: IPUMS, 2023. https://doi.org/10.18128/D030.V11.0

The net percentages are the model-based estimates, and the gross percentages are the simple averages for the education category.

Labor Force Participation Relative to Expectations—We use a state fixed-effect mulitiple regression model to estimate 2022 labor force participation rates. The independent variables are whether the county is classified as METRO (i.e., 1, 2, or 3 on the urban-rural continuum code), the percentage of the population 65 and older, the percentage disabled, the percentage of jobs in the goods producing sector (as opposed to service providing or government), the percentage of the population that is female, the percentage that is Hispanic, the percentage with a bachelor's degree or higher, the percentage of households with an internet connection, and the county's value on the Index of Deep Disadvantage. For most years, our data is from 2022. The r-squared is 0.7982, and all coefficients are statistically significant and in the expected direction. However, Kentucky's state level coefficient is not statistically significant (t = -1.55), since it is only slightly lower than the control state (Georgia).

Lead & Copper Rule—United States, Environmental Protection Agency, Safe Drinking Water Information System data, various years. These estimates are generated by the author using a method employed by the Natural Resources Defense Council and described in a May 2017 report, *Threats on Tap: Widespread Violations Highlight Need for Investment in Water Infrastructure and Protections* <https://www.nrdc.org/resources/threats-tap-widespread-violations-water-infrastructure>.

Lead Risk—America's Health Rankings analysis of U.S. Census Bureau, 2021 American Community Survey, United Health Foundation, AmericasHealthRankings.org, accessed 2023.

Leading Causes of Death—Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2018-2022 on CDC WONDER Online Database, released in 2024. Data are from the Multiple Cause of Death Files, 2018-2022, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/ucd-icd10-expanded.html on Dec 7, 2024 11:39:28 AM.

Lifetime Earnings by Educational Attainment—Refer to the CBER report on the returns from higher education for more details <https://cber.uky.edu/publications>.

Local Food Suppliers—U.S. Department of Agriculture, *2022 Census of Agriculture* (Table 2, pages 292-296, Market Value of Agricutural Products Sold Including Food Marketing Practices and Value-Added Products: 2022 and 2017). Personnel with the Kentucky Department of Agriculture provided data on CSA and farmers' markets that is discussed in the narrative, and also Kentucky Department of Agriculture <https://www.kyagr.com/marketing/farmers-market.html>.

Main Reason for not Working—Using CPS-IPUMS, we pool monthly CPS data from November 2020 to October 2024 for the analysis and limit the sample to prime working-age adults, 25 to 54 years old. There are two variables of interest: LABFORCE and WNLOOK. LABFORCE is a dichotomous variable indicating whether the respondent participated in

the labor force during the preceding week. See EMPSTAT for a more detailed employment status variable <online: https://cps.ipums.org/cps/>. Those coded as "yes" in LABFORCE were either: were at work; held a job but were temporarily absent from work due to factors like vacation or illness; were seeking work; or were temporarily laid off from a job during the reference period. Those coded "no" were none of these things—and this is where we focused. The second key variable, WNLOOK, identifies the main reason persons who want a job were not looking for work during the previous four weeks. The items in the table show the most common responses.

Medicaid Beneficiaries—Kaiser Family Foundation, derived from CMS, Medicaid & CHIP Monthly Applications, Eligibility Determinations, and Enrollment Reports: January 2014 - August 2024 (preliminary), as of November 27, 2024.

Mining and Coal—These data are from the Bureau of Economic Analysis and the Energy Information Administration, Annual Coal Report, various years and quarters. Available online at: <https://eec.ky.gov/Energy/News-Publications/Pages/Coal-Facts.aspx>.

Minority Earnings Gap—Author's analysis of U.S. Census CPS data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0. Survey year asks about earnings for the previous year, so 2024 survey year reflects 2023 earnings.

Mortgage Default Rate—American Enterprise Institute (AEI), State and County Housing Market Indicators: Update for 2022, <https://www.aei.org/the-state-of-the-housing-market/>, data downloaded 11/24/2023. The AEI methodology is described here: <https://www.aei.org/wp-content/uploads/2018/03/Housing-Risk-NMRI-methodology-March-2018-FINAL.pdf?x91208&x91208>.

Motor Gasoline Expenditures—U.S. Energy Information Administration, State Energy Data System.

Narrow Roads—Federal Highway Administration, Highway Statistics 2017, Table HM-53 <www.fhwa.dot.gov/policyinformation/statistics.cfm>.

Natural Gas Supplanting Coal—U.S. Energy Information Administration, Electricity Net Generation Total (All Sectors). Data downloaded December 9, 2024, at: <https://www.eia.gov/totalenergy/data/annual/index.php>.

Neighborhood Quality—Child and Adolescent Health Measurement Initiative. 2021 National Survey of Children's Health (NSCH) data query. Data Resource Center for Child and Adolescent Health supported by the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau (MCHB). Retrieved [10/09/23] from [www.childhealthdata.org].

Net Earnings per Capita (by County)—U.S. Department of Commerce, Bureau of Economic Analysis, Table SAINC4 Personal income and employment by major component.

Net Earnings—U.S. Department of Commerce, Bureau of Economic Analysis.

New Employers—2021 New Employer Business Indicators in the United States: National

and State Trends, Kauffman Indicators of Entrepreneurship, May 2022.

Nonemployer Establishments—U.S. Census Bureau, Nonemployer Statistics <www.census.gov/econ/nonemployer/historical.htm>. For more information about research on high-technology businesses, see "Like the Broader Economy, the High Tech Sector is Becoming Less Dynamic," Economic Innovation Group, June 22, 2023 <https://eig.org/high-tech-dynamism/>. While the researchers have identified 11 relevant 4-digit NAICS categories, only 5 are applicable (NAICS 5182, 5191, 5413, 5415, and 5417) in the nonemployer establishment Census data.

Nonprofits—Internal Revenue Service, Exempt Organizations Business Master File (2024, November). File downloaded on November 24, 2024, <https://www.irs.gov/charities-non-profits/exempt-organizations-business-master-file-extract-eo-bmf>.

Number At Risk for Risk Behaviors—Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2022.

Oral Health—Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2022 <https://www.cdc.gov/brfss/annual_data/annual_2022.html>.

Organic Farming—USDA *2022 Census of Agriculture*.

Participation in Local Groups—Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data.

Patents (by County)—The county-level data are from the U.S. Patent and Trademark Office, Utility Patents <www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utlh.htm>. The state-level data are from the USPTO Annual Reports, Workload Tables (USPTOFY22WorkloadTables.xlsx, tab 8) available at <www.uspto.gov/about-us/performance-and-planning/uspto-annual-reports>. Population data are from the U.S. Census Bureau <www.census.gov>. The competitor states is a weighted average of AL, GA, IL, IN, MS, MO, NC, OH, SC, TN, VA, and WV.

Pension Funded Ratio—Center for Retirement Research at Boston College, State and Local Public Plans Database <https://publicplansdata.org/public-plans-database/download-full-data-set/>.

Pension Funding—Center for Retirement Research at Boston College, State and Local Public Plans Database <https://publicplansdata.org/public-plans-database/download-full-data-set/>. Estimates of state and local general revenue from own sources are based on U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. The 2023 estimate is forecasted using the Excel forecasting tool on data from 2000 to 2022.

Per Capita Personal Income—U.S. Department of Commerce, Bureau of Economic Analysis, SA1-3 Personal income summary, and CAINC1 County and MSA personal income summary: personal income, population, per capita personal income, for the numbers in the text for urban, somewhat rural, and mostly rural counties (2023 Urban-Rural

Continuum Codes).

Performance on Standardized Tests (NAEP & KSA)—U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various assessments, <nces.ed.gov/nationsreportcard/naepdata/>. The Kentucky Summative Assessment (KSA) data are from the Kentucky Department of Education, Assessment and Accountability Datasets 2023-2024, downloaded 10/23/2024, available at: https://www.education.ky.gov/OpenHouse/data/Pages/Assessment_Accountability_Datasets_2023-2024.aspx.

Personal Bankruptcies—The Administrative Office of the U.S. Courts <www.uscourts.gov/Statistics/BankruptcyStatistics/quarterly-filings-3-month-chapter-district.aspx>. The population data are from the U.S. Census.

Poor Mental Health Days—Author's analysis of CDC 2022 Behavioral Risk Factor Surveillance System data, Ques: "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?" We use the CDC's recoded variable, MENDAZE ['NUMBER OF DAYS MENTAL HEALTH NOT GOOD (Recode)]' for our analysis.

Population by Age Group—U.S. Census, American Community Survey, 2023 1-Year Estimates, Table S0101.

Population Change—U.S. Census Bureau, Decennial Census, 2000 and the American Community Survey 2007 and 2022 1-year estimates.

Population Mobility—Author's calculations based on data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC, 1963-2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0.

Population by Race—U.S. Census Bureau, 2023 1-year American Community Survey.

Population Totals—U.S. Census Bureau, Urban and Rural Population: 1900 to 1990 <www.census.gov/population/www/censusdata/files/urpop0090.txt>. The 2000 and 2010 population totals were obtained from the Census totals available at <www.census.gov>.

Post-Secondary Education (by Race, Ethnicity & Gender)—Author's analysis of U.S. Census Bureau data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [1960 5% sample; 1970 Form 1 State 1%; 1980, 1990, & 2000 5% samples; 2010, 2020, & 2022 ACS 5-Year]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

Poverty Rate by County—U.S. Census Bureau, American Community Survey, 2021 5-Year Estimates, Table S1701.

Poverty Rate—Author's analysis of IPUMS-CPS data, courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS

CPS: Version 12.0 [CPS ASEC, various years]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0.

Poverty Rate by Race & Ethnicity—See Poverty Rate, as well as U.S. Census, American Community Survey, Table S1701, 2023 1-Year estimate.

Productivity— This work is informed by Mark Staples, Charles Atkins, et al., *Rekindling US Productivity for a New Era*, McKinsey Global Institute, February 2023, as well as Lida R. Weinstock, *Introduction to U.S. Economy: Productivity*, Congressional Research Service, In Focus, January 3, 2023. Using the McKinsey method and approach, we used more current productivity data (released in May 2024) available at the Bureau of Labor Statistics (BLS), Office of Productivity and Technology: <https://www.bls.gov/productivity/tables/>.

Public Assistance by Education—CBER analysis of data from Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [ACS 2021 & 2022]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0. Using multiple regression analysis, we estimate the relationship between education and whether one has received public assistance while holding other variables constant, like sex, income, race, ethnicity, marital status, and age. The net percentages are the model-based estimates, and the gross percentages are the simple averages for the education category. Research done, for example, by the College Board and RAND shows a robust relationship across several public assistance programs, such as the National School Lunch Program, Unemployment Insurance, and various housing programs. The savings for government can be significant. A study published in 2008 estimated that the public assistance savings for state and local governments (i.e., various public assistance programs, Medicaid, unemployment benefits) are $32,500 for an individual over a lifetime who completes college compared to a high school diploma (Trostel, P. A. (2008). The Fiscal Impacts of College Attainment. New England Public Policy Center. Boston: Federal Reserve Bank of Boston. Retrieved from Federal Reserve Bank of Boston: https://www.bostonfed.org/pdf/neppcwp0702.pdf).

Public Engagement in the Arts—The 2017 public arts and entertainment activities are CBER's analysis of data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 9.0 [Public Arts Supplement, 2017]. Minneapolis, MN: IPUMS, 2021. The 2018 and 2020 estimates of enagagement with selected arts and culture are CBER's analysis of data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Public Arts Supplements, 2018 & 2020]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0.

Public Pension Funding Gaps—The PEW Charitable Trusts, Public Sector Retirement Systems <www.pewtrusts.org/en/projects/public-sector-retirement-systems>.

Public Pre-K Enrollment—*The State of Preschool 2023: State Preschool Yearbook*, The National Institute for Early Education Research, estimates derived from Table 4 <nieer.org/yearbook>.

Public Protection Expenditures (in the U.S.)—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. We use the following Census Bureau Item Codes to create this category: E04, F04, G04, E05, F05, G05, E62, F62, G62, E24, F24, G24, E66, F66, and G66.

Quarterly Percentage Change in Real GDP, U.S.—U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Account Tables, Section 1 <www.bea.gov/national/nipaweb/DownSS2.asp>.

Racial & Ethnic Teleworking Disparities—Abay Asfaw, "Racial and Ethnic Disparities in Teleworking Due to the COVID-19 Pandemic in the United States: A Mediation Analysis, International Journal of Environmental Research and Public Health, 2022, 19, 4680. https://doi.org/10.3390/ijerph19084680.

Racial Equity Index—National Equity Atlas, downloaded 9/30/2023 <https://nationalequityatlas.org>.

Recycling—Kentucky Energy and Environment Cabinet, Division of Waste Management, *Annual Report—Fiscal Year 2023* <waste.ky.gov>, and the United States Environmental Protection Agency (EPA), National Overview: Facts and Figures on Materials, Wastes, and Recycling <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials#recycling>.

Regional Population Change—Author's calculations using data from the U.S. Census Bureau, county-level estimates at: https://www2.census.gov/programs-surveys/popest/datasets/. See glossary for map of Kentucky regions by county.

Renewable Energy Production—U.S. Energy Information Administration, State Energy Data Production, State Energy Data System (SEDS), 1960-2022 estimates <www.eia.gov/state/seds/>. In October 2023, the U.S. EIA updated the way they calculate primary energy consumption of electricity generation from noncombustible renewable energy sources (solar, wind, hydroelectric, and geothermal). See this link for more information: https://www.eia.gov/state/seds/seds-change/index.php/.

Residential Electricity Costs—U.S. Energy Information Administration, *Electricity* <www.eia.gov/electricity/sales_revenue_price/xls/table5_a.xls>.

Revenue from Federal Transfers—U.S. Census Bureau, 2021 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. These per capita estimates have been adjusted to reflect cost-of-living differences across the states using the 2021 regional price parity estimates from the Bureau of Economic Analysis.

Risk Behaviors and Chronic Disease—Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2022.

Road Condition—Federal Highway Administration, Highway Statistics 2022, Table HM-64 <www.fhwa.dot.gov/policyinformation/statistics.cfm>.

Rural Population—U.S. Census Bureau, Urban and Rural Population: 1900 to 1990 <www.census.gov/population/www/censusdata/files/urpop0090.txt>. The 2000 and 2010 population totals were obtained from the Census totals available at <factfinder2.

census.gov/faces/nav/jsf/pages/index.xhtml>. The 2020 estimates are available at: <https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2020-ua-facts.html>. The competitor state average is a weighted average of the 12 competitor states.

SBIR/STTR Awards by County—Small Business Innovation Research, Small Business Technology Transfer <www.sbir.gov/past-awards>.

Science & Technology Index—Milken Institute, *2022 State Technology and Science Index* <www.milkeninstitute.org>.

Science and Engineering Graduates—Calculated from the Integrated Postsecondary Education Data System (IPEDS) using 2013 STEM-designed CIP codes. Note that the STEM degrees are normalized using the number of individuals in the population 20 to 24 years old, but this does not mean that all of these degrees were conferred upon individuals in this age range.

Selected Educational Indicators—Refer to Michael T. Childress, "Kentucky's Educational Performance & Points of Leverage," CBER Issue Brief, December 2015 <cber.uky.edu/>.

Selected Obstacles to Education— Refer to Michael T. Childress, "Kentucky's Educational Performance & Points of Leverage," CBER Issue Brief, December 2015 <cber.uky.edu/>.

Self Employed (by Race & Ethnicity)—BLS Current Employment Statistics survey for wage and salary worker employment. Self-employment estimates generated by the author using data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 12.0 [CPS ASEC, 1988-2024]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D030.V12.0. We use the variable CLASSWKR, work status, last *week* (as opposed to last *year*).

Severe Housing Problems—U.S. Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy (CHAS) 2017-2021 survey, accessed December 1, 2024 <https://www.huduser.gov/portal/datasets/cp.html>.

Small Business Innovation Research—Small Business Innovation Research, Small Business Technology Transfer <www.sbir.gov/past-awards>.

Social Capital Index—Using principal component analysis, we generate county-level scores based on: associational density data from 2020 County Business Patterns (NAICS 713910, 713940, 713950, 713990, 813110, 813410, 813910, 813920, 813930, and 813940); voter turnout for the 2020 general election data from the MIT Election Data and Science Lab <https://electionlab.mit.edu/> and the Election Advisory Commission; the county-level response rate to the 2020 U.S. decennial census (U.S. Census Bureau); and the number of tax-exempt non-profit organizations (Business Master File, March 2022) from the National Center for Charitable Statistics. We follow a method outlined in A. Rupasingha et al., "The production of social capital in US counties," *The Journal of Socio-Economics* 35 (2006) 83-101. Also see A. Rupasingha et al., "Social Capital and Economic Growth: A County-Level Analysis," *Journal of Agricultural and Applied Economics*, 33 (2000) 565-572.

Social Determinants of Health—We use 24 variables organized around five broad thematic areas used in the U.S. Department for Health and Human Services, Healthy People 2020 framework: HEALTH (using data from the 2020 *County Health Rankings*, we use the number of Dentists, Mental Health Providers, and Primary Care Physicians (per capita), as well as the percentage of the population with health insurance); EDUCATION (high school graduation is obtained from the Kentucky Department of Education (KDE), using the four-year cohort numbers for the 2018-2019 academic year, successful transition to adulthood using higher education, work, and military, enrollment in higher education, also derived from the same data source, language and literacy data using the ACT Reading Benchmark numbers, and early childhood education and development data on kindergarten readiness); ECONOMIC STABILITY (poverty rate from the U.S. Census ACS, unemployment rate from BLS, food insecurity from Feeding America [Gundersen, C., A. Dewey, E. Engelhard, M. Strayer & L. Lapinski. *Map the Meal Gap 2020: A Report on County and Congressional District Food Insecurity and County Food Cost in the United States in 2018*. Feeding America, 2020.], housing stability using U.S. Census estimates of the number of households paying over 30 percent of income on rent, and Gini Index values from the Census ACS); SOCIAL (associational density data from 2018 County Business Patterns (NAICS 713910, 713940, 713950, 713990, 813110, 813410, 813910, 813920, 813930, and 813940), voter turnout for the 2016 general election data from the Kentucky State Board of Elections, the county-level response rate to the 2010 U.S. decennial census (U.S. Census Bureau), and the number of tax-exempt non-profit organizations (Business Master File, July 2020) from the National Center for Charitable Statistics.); NEIGHBORHOOD & BUILT ENVIRONMENT (ESHE Index on the availability of health food, severe housing problems using data from County Health Rankings, specified as the number of households experiencing overcrowding, high housing costs, or lack of kitchen or plumbing facilities. These data come from the Census Bureau and HUD's Comprehensive Housing Affordability Strategy, crime rate data from the Kentucky State Police, a lead risk index generated from housing age and poverty, air pollution data from EPA, and water quality data from County Health Rankings which uses EPA data on health-based violations). We perform a principal component analysis on each of the five thematic areas and average the results at the county-level to generate a county score. All data are transformed and ordered so that a high positive number is considered "good" for health outcomes.

Social Services Expenditures (in the U.S.)—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. We use the following Census Bureau Item Codes to create this category: J67, J68, E74, E75, E77, F77, G77, E79, F79, G79, E73, E67, E36, F36, G36, E32, F32, G32, E22, F22, G22, E85, F85, G85, and J85.

Solid Waste (Disposal)—Kentucky Energy and Environment Cabinet, Division of Waste Management, *Annual Report—Fiscal Year 2014 to 2023* <https://eec.ky.gov/Environmental-Protection/Waste/Pages/division-reports.aspx>, and selected Waste

Quantity Reports available here <https://eec.ky.gov/Environmental-Protection/Waste/Pages/solid-waste-facility-reports.aspx>.

Some College or Associate's Degrees—Estimated by the author using American Community Survey, 2023 1-Year Estimate, Public Use Microdata Sample (PUMS) data.

Sources of Personal Income—U.S. Department of Commerce, Bureau of Economic Analysis, SA04 State income and employment summary.

State and Local Expenditures (Kentucky)—U.S. Census Bureau, 2021 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. The Kentucky data are from all years 1977 to 2022. The denominator, total expenditures (Expenditures, line 54), has included *Insurance trust expenditure*, line 120, in all data releases *except* in 2022. To ensure the time series comparisons are appropriate, we add insurance trust expenditures to the total expenditures (line 120 + line 54) to create a denominator that is consistent across the years shown in the graph.

State and Local Own Source Revenue—U.S. Census Bureau, 2021 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. More information about the BEA Regional Price Parities is available at <https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area>.

State and Local Tax Revenue by Source—U.S. Census Bureau, 2022 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>.

STEM Jobs—Occupational Employment Statistics (OES) Survey, Bureau of Labor Statistics, Department of Labor, <www.bls.gov/oes>.

Students Feeling Unsafe at School—Centers for Disease Control and Prevention (CDC). 1991-2021 High School Youth Risk Behavior Survey Data. Available at http://yrbs-explorer.services.cdc.gov/. Accessed on [10/10/2023], as well as author's analysis of Centers for Disease Control and Prevention. 2021 Youth Risk Behavior Survey Microdata. Note: SS indicates 9 surrounding states (AL, IL, MO, MS, NC, SC, TN, VA, & WV).

Summary—See Middle Class Income and the American Dream.

Supplemental Security Income (SSI)—University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 SSI recipients, Table 10 <https://www.ssa.gov/policy/docs/statcomps/ssi_asr/2023/sect02.pdf>.

Talk with Neighbors—CBER analysis of data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Civic engagement and Volunteering Supplement, various years]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0.

Tax Collections and Personal Income—U.S. Department of Commerce, Bureau of Economic Analysis, and U.S. Census Bureau, State Government Tax Collections, various years <www.census.gov/govs/statetax/>.

Technology Use by Education—Estimated using Current Population Survey Computer and Internet Use Supplement, November 2019. This is a measure of Internet use from any

location and is constructed using these variables, where PEINHOME=1 OR PEINWORK=1 OR PEINSCHL=1 OR PEINCAFE=1 OR PEINTRAV=1 OR PEINLICO=1 OR PEINELHO=1 OR PEINOTHR=1. More information available at the U.S. Department of Commerce, NTIA, Digital Nation Data Explorer <www.ntia.doc.gov/other-publication/2016/digital-nation-data-explorer>.

Teens' Mental Health—Author's analysis of data from Centers for Disease Control and Prevention (CDC), Youth Risk Behavior Survey, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2021. For additional information on the *JAMA Pediatrics* article, see Matt Richtel, "Teen Depression Rose Sharply During the Pandemic, but Treatment Didn't Follow," *The New York Times,* October 9, 2023.

Temporary Assistance for Needy Families—University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 TANF recipients <https://www.acf.hhs.gov/ofa/data/tanf-caseload-data-2023>.

Toxic Releases—United States Environmental Protection Agency. (2024). TRI Explorer (2023 National Analysis Dataset (updated October 2024, released October 2024)) [Internet database]. Retrieved from https://enviro.epa.gov/triexplorer/, (November 22, 2024).

Transfer Payments by County—Bureau of Economic Analysis, Table CAINC30.

Unemployment Rate—Bureau of Labor Statistics (BLS), Current Population Survey <https://www.bls.gov/cps/data.htm>, Series IDs LNS14000003, LNS14000006, & LNS14000009.

Value-Added Food Production—U.S. Census Bureau, Annual Survey of Manufactures, various years. For the most recent data we use Table AM1831BASIC02, Annual Survey of Manufactures, Summary Statistics for Industry Groups and Industries in the U.S. and States: 2018-2021, NAICS code 311, Food Manufacturing.

Venture Capital—National Science Board. "Venture Capital Disbursed per $1 Million of Gross Domestic Product." Science and Engineering Indicators: State Indicators. Alexandria, VA: National Science Foundation. State Indicator S-58, https://ncses.nsf.gov/indicators/states/indicator/venture-capital-per-1-million-state-gdp.

Volunteer Hours—Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data.

Volunteer Rate by Educational Attainment—Estimated by the author using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Volunteerism Supplement, 2002 to 2021]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0. To estimate the independent effect of education, we used a multiple regression model that utilized mostly dummy variables (i.e., LESSHS, SOMECOL, BA, FINCQ2, FINCQ3, FINCQ4, INLF (in the labor force), MARRIED, GENDER, AGE3554, AGE5564, AGE65PLUS, WHTNONHISP, BLKNONHISP, NOTMETRO, OUTCC, METROUNK, and YEAR); the omitted variables are high school education, lowest

income group (FINCQ1), aged 25 to 34, and metropolitan status as "metro" or "central city" (CENCITY). The analysis is limited to individuals at least 25 years old. The net percentages are the model-based estimates, and the gross percentages are the simple averages for the education category.

Volunteer Rate—Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2021 Volunteering and Civic Life Supplement data. Volunteers are considered individuals who performed unpaid volunteer activities through or for an organization at any point during the 12-month period, from September 1 of the prior year through the survey week in September of the survey year. The information about the decline of volunteer fire fighting is from by Caitlin Randall, "Calls are up, volunteers are down," *Daily Yonder*, October 5, 2023, online <https://dailyyonder.com/calls-are-up-volunteers-are-down-a-crisis-looms-for-vermonts-fire-departments/2023/10/05/?utm_medium=email>.

Voting by Education—Estimated by the author using data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Megan Schouweiler, and Michael Westberry. IPUMS CPS: Version 11.0 [Voting and Registration Supplement, 1982 to 2022]. The estimates in the graph reflect the expected voting rate, using multiple regression, by educational attainment while holding other variables constant, such as age, marital status, sex, race, ethnicity, family income, location of residence (e.g., metro or non-metro), and year. The net percentages are the model-based estimates, and the gross percentages are the simple averages for the education category.

Wage & Salary Growth by Kentucky Region—U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages, private, all industries, all establishment sizes, <www.bls.gov/cew/>.

Wage & Salary Growth by State—U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages, private, all industries, all establishment sizes, <www.bls.gov/cew/>.

Water Quality—United States, Environmental Protection Agency, Safe Drinking Water Information System data, various years. These estimates are generated by the author using a method employed by the Natural Resources Defense Council and described in a May 2017 report, *Threats on Tap: Widespread Violations Highlight Need for Investment in Water Infrastructure and Protections* <https://www.nrdc.org/resources/threats-tap-widespread-violations-water-infrastructure>.

White, Non-Hispanic Population—U.S. Census Bureau, American Community Survey, 2023 5-Year estimate, Table DP05.

Women, Infants, and Children (WIC)—University of Kentucky Center for Poverty Research. 2024. "UKCPR National Welfare Data, 1980-2022." URL: http://ukcpr.org/resources/national-welfare-data (accessed <12/3/2024>). The FY2023 WIC recipients available here: <https://www.fns.usda.gov/pd/wic-program>.

Workforce by Education—Estimated by the author using U.S. Census, LED Extraction

Tool, Quarterly Workforce Indicators (QWI), <https://ledextract.ces.census.gov/qwi/all>.

Youth Alcohol and Drug Abuse—Centers for Disease Control and Prevention, *Youth Risk Behavior Surveillance System (YRBSS)*, <www.cdc.gov/healthyyouth/yrbs/index.htm>.

Youth Health-Related Behaviors—Centers for Disease Control and Prevention, *Youth Risk Behavior Surveillance System (YRBSS)*, <www.cdc.gov/healthyyouth/yrbs/index.htm>. See Rasberry CN, Tiu GF, Kann L, et al. Health-Related Behaviors and Academic Achievement Among High School Students — United States, 2015. *MMWR Morb Mortal Wkly Rep* 2017;66:921–927. DOI: http://dx.doi.org/10.15585/mmwr.mm6635a1.

Youth Obesity—Centers for Disease Control and Prevention, *Youth Risk Behavior Surveillance System (YRBSS)*, various years <www.cdc.gov/healthyyouth/data/yrbs/data.htm>. The 17.4% obesity rate given for the competitor states in 2021 does not include Ohio, but does include the remaining eleven nearby states.

Youth Smoking and Vaping—Centers for Disease Control and Prevention, *Youth Risk Behavior Surveillance System (YRBSS)*, various years <www.cdc.gov/healthyyouth/data/yrbs/data.htm>.

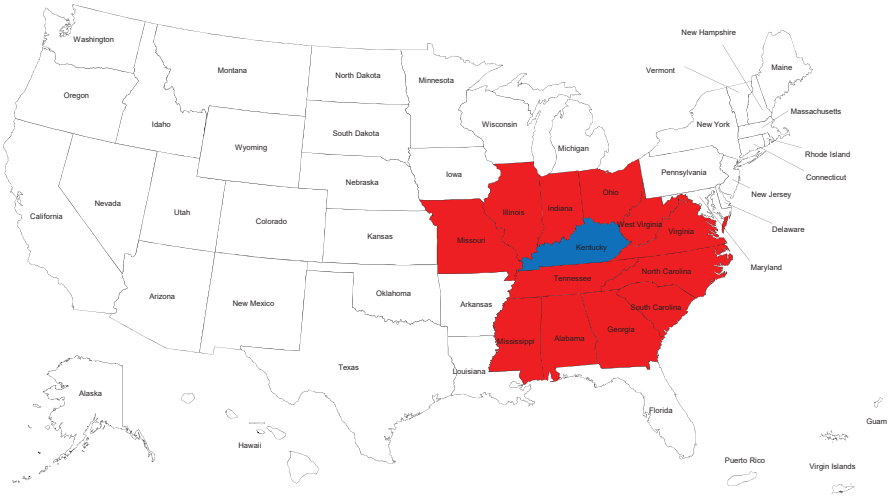
Glossary

Bankruptcy—A legal proceeding involving a person or business that is unable to repay outstanding debts.

Commodity—A product, either raw or manufactured, that can be purchased or traded.

Competitor States—States that are similar to Kentucky in terms of economic and demographic characteristics which are viewed as the main competitors to Kentucky for industrial development. There are twelve states: Alabama, Georgia, Illinois, Indiana, Mississippi, Missouri, North Carolina, Ohio, South Carolina, Tennessee, Virginia, West Virginia.

Kentucky's Principal Competitor States



Compound Annual Growth Rate (CAGR)—The rate of increase in the value of a quantity that is compounded over several years.

Constant dollars—Nominal or current dollar amounts that are adjusted to remove the effect of inflation.

Consumer Price Index (CPI)—The U.S. Department of Labor, Bureau of Labor Statistics, defines the CPI as a "measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services."

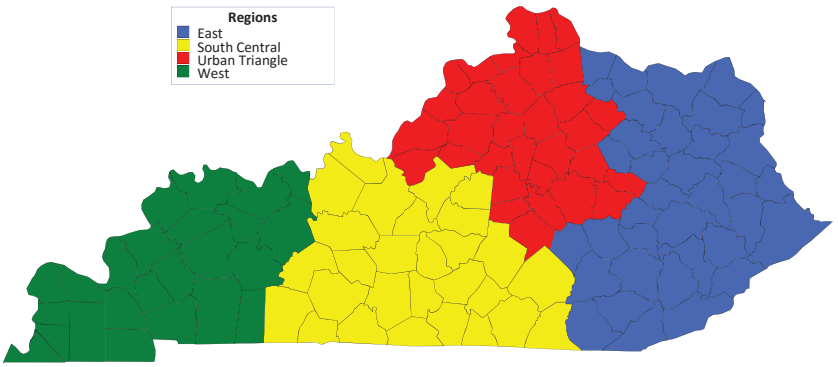
Current dollars—Also called nominal dollars, these dollar amounts are not adjusted to remove the effect of inflation and represent the current value of the dollar during a given year.

Dividends—The portion of the profits generated by a corporation that is dispersed to its shareholders.

Eastern Kentucky—Counties in Kentucky located in the eastern most Area Development Districts (ADDs), including Bath, Bell, Boyd, Bracken, Breathitt, Carter, Clay, Elliott, Fleming,

Floyd, Greenup, Harlan, Jackson, Johnson, Knott, Knox, Laurel, Lawrence, Lee, Leslie, Letcher, Lewis, Magoffin, Martin, Mason, Menifee, Montgomery, Morgan, Owsley, Perry, Pike, Robertson, Rockcastle, Rowan, Whitley, and Wolfe Counties.

Kentucky Regions



Export—Goods and/or services generated in one country and sold in another.

Functionally Obsolete (FO) (Bridges) —"A bridge is considered 'functionally obsolete' when it does not meet current design standards (for criteria such as lane width), either because the volume of traffic carried by the bridge exceeds the level anticipated when the bridge was constructed and/or the relevant design standards have been revised." See "2010 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance."

Gini (coefficient) Index—A measure of income dispersion, ranging from zero, which indicates perfect equality, to one, which indicates absolute inequality. A higher number indicates more concentration of income in fewer hands, with a value of one indicating that one person holds all the income.

Globalization—An adjective describing the interdependent relationship between national economies that has both positive and negative impacts on international markets.

Great Recession—The period of decline in annual real world gross domestic product per capita experienced in the U.S. from December of 2007 until June of 2009, leading to a decrease international trade, a notable rise in unemployment, and deflated commodity prices.

Gross Domestic Product (GDP)—The total value of a country's goods and services. This includes private consumption, investment, government spending, and exports (subtracting imports from this value).

Inflation—The phenomenon where the price of goods and services increases, while the value of the currency used to purchase those items remains stagnant; getting less "bang for your buck."

Interest—The rate lenders charge borrowers to compensate for risk attributed to making funds available to borrowers, also known as the cost of borrowing

Mean (*syn* Average)—The sum of all values divided by the total number of values.

Median—The most central number in a data set; the number separating the upper half of the sample/population from the lower half.

Middle-class—The Census Bureau has no official definition of middle-class. See U.S. Census Bureau; "Middle Class in America," (2010) U.S. Department of Commerce, Economics and Statistics Administration. However, there are many definitions of "middle class" and opinions on what should be included when categorizing households (e.g., income, net worth, government transfers, etc.).

Nominal dollars—An unadjusted dollar value that reflects the historical value; it has not been adjusted to remove the effect of inflation.

Outsourcing—Transferring business activities outside of a firm in order to reduce costs.

Patent—A property right granted by the government of the United States of America to an inventor "to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States" for a limited time in exchange for public disclosure of the invention when the patent is granted.

Per Capita—An adjustment made to reflect the size of the population. For example, per capita income represents the level of income for every child, woman, and man in the base population.

Personal Income—Income received by persons from all sources. It includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj), rental income of persons with CCAdj, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.

Poverty Rate—The percentage of people (or families) living below the poverty line ($14,880 for individuals; $29,950 for a family of four, 2022 thresholds). Thresholds are updated annually by the U.S. Census Bureau <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>.

Poverty—The Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps)..

Property Crimes—In the FBI's Uniform Crime Reporting (UCR) Program, property crime includes the offenses of burglary, larceny-theft, motor vehicle theft, and arson.

The object of the theft-type offenses is the taking of money or property, but there is no force or threat of force against the victims.

Real dollars—Analogous to constant dollars, it reflects the nominal dollar that has been adjusted to remove, for example, the effect of inflation over a period of time.

Real Growth—Represents growth in real or constant dollars.

Recession—In general usage, the word recession connotes a marked slippage in economic activity. The National Bureau of Economic Research (NBER) is charged with officially marking the beginning and ending of a recession. The NBER recession is a monthly concept that takes account of a number of monthly indicators—such as employment, personal income, and industrial production—as well as quarterly GDP growth.

Return on Investment (ROI)—ROI measures the amount the return on an investment relative to the cost of the investment.

Rural—The 2013 Rural-Urban Continuum Codes form a classification scheme that distinguishes metropolitan counties by the population size of their metro area, and nonmetropolitan counties by degree of urbanization and adjacency to a metro area. The official Office of Management and Budget (OMB) metro and nonmetro categories have been subdivided into three metro and six nonmetro categories. Each county in the U.S. is assigned one of the 9 codes.

Social Capital—The networks of relationships among people who live and work in a particular society, enabling that society to function effectively.

South Central Kentucky—Counties in Kentucky located in the Area Development Districts (ADDs) to the south of the Bluegrass District (greater Fayette County), including Adair, Allen, Barren, Breckinridge, Butler, Casey, Clinton, Cumberland, Edmonson, Grayson, Green, Hardin, Hart, Larue, Logan, Marion, McCreary, Meade, Metcalfe, Monroe, Nelson, Pulaski, Russell, Simpson, Taylor, Warren, Washington, and Wayne Counties.

Structurally Deficient (SD) (Bridges)—A bridge that is characterized by deteriorated conditions of significant bridge elements and potentially reduced load-carrying capacity. See "2010 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance."

Urban (*syn* Metropolitan)—The 2013 Rural-Urban Continuum Codes form a classification scheme that distinguishes metropolitan counties by the population size of their metro area, and nonmetropolitan counties by degree of urbanization and adjacency to a metro area. The official Office of Management and Budget (OMB) metro and nonmetro categories have been subdivided into three metro and six nonmetro categories. Each county in the U.S. is assigned one of the 9 codes.

Urban Triangle—Counties in Kentucky located in the Area Development Districts (ADDs) encompassing Louisville, Lexington, and the Cincinnati area of Northern Kentucky, including Anderson, Boone, Bourbon, Boyle, Bullitt, Campbell, Carroll, Clark, Estill, Fayette, Franklin, Gallatin, Garrard, Grant, Harrison, Henry, Jefferson, Jessamine, Kenton, Lincoln, Madison, Mercer, Nicholas, Oldham, Owen, Pendleton, Powell, Scott, Shelby, Spencer, Trimble, and Woodford Counties.

Value Added—The gross output of an industry or a sector less its intermediate inputs; the contribution of an industry or sector to gross domestic product (GDP). Value added by industry can also be measured as the sum of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus.

Venture Capital Investments—Capital invested in a project in which there is a substantial element of risk, typically a new or expanding business.

Violent Crimes—In the FBI's Uniform Crime Reporting (UCR) Program, violent crime is composed of four offenses: murder and nonnegligent manslaughter, rape, robbery, and aggravated assault. Violent crimes are defined in the UCR Program as those offenses which involve force or threat of force.

Western Kentucky—Counties in Kentucky located in the western most Area Development Districts (ADDs), including Ballard, Caldwell, Calloway, Carlisle, Christian, Crittenden, Daviess, Fulton, Graves, Hancock, Henderson, Hickman, Hopkins, Livingston, Lyon, Marshall, McCracken, McLean, Muhlenberg, Ohio, Todd, Trigg, Union, and Webster Counties.

Notes

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