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CENTER FOR BUSINESS AND ECONOMIC RESEARCH
GATTON COLLEGE OF BUSINESS AND ECONOMICS

Kentucky Annual Economic Report 2023



Center for Business and Economic Research
Department of Economics
Gatton College of Business and Economics
University of Kentucky

Center for Business and Economic Research
225M Gatton Business and Economics Building
University of Kentucky
Lexington, KY 40506-0034

Voice: (859) 257-6226
E-mail: cber@uky.edu
Web: <http://cber.uky.edu>

Dr. Michael W. Clark, *Director*
[Center for Business and Economic Research](#)
Dr. James P. Ziliak, *Chair*
[Department of Economics](#)
Dr. Simon Sheather, *Dean*
[Gatton College of Business and Economics](#)

Managing Editor
Michael T. Childress

Contributors
Michael T. Childress, Michael W. Clark, and Bethany L. Paris



CBER

Director:

Dr. Michael W. Clark

Senior Economic Research

Associate:

Dr. Bethany L. Paris

Research Associate:

Michael T. Childress

Research Assistants:

Brian Redding

Emil Shabanov

Karen Owsley

Department of Economics

Administrative Staff Associate

Department of Economics

James P. Ziliak, *Chair*

David R. Agrawal

Adib Bagh

Felipe Benguria

Joseph Benitez

Glenn C. Blomquist

Christopher R. Bollinger

J.S. Butler

Michael W. Clark

Charles Courtemanche

Anthony Creane

Rajeev Darolia

Alison Davis

Alejandro Dellachiesa

Josh Ederington

James S. Fackler

John E. Garen

J. Robert Gillette

Ana Maria Herrera, *Assoc. Chair*

Gail M. Hoyt

William Hoyt

Yoonbai Kim

Yoko Kusunose

Carlos Lamarche

Steven Lugauer

Lala Ma

Olga Malkova

Darshak Patel

Benjamin Rosa

Frank A. Scott Jr.

Daria Sevastianova

Kenneth Troske

Teresa Waters

Caroline Weber

David Wildasin

Aaron Yelowitz

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 . . .

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.

Stubbornly high inflation is the primary and immediate challenge to the nation's economy. Large and unpredictable price increases can impose significant costs across the economy. Inflation erodes households' purchasing power and reduces quality of life. It poses challenges for businesses trying to plan investments, write contracts, and set compensation packages. Inflation also forces both households and businesses to shift time and resources from other productive uses to finding ways to reduce the negative effects of inflation.

While several factors have contributed to the current period of high inflation, fundamentally inflation occurs when supply cannot keep up with demand. Over the past year, the Federal Reserve has raised interest rates seven times to restore price stability. By increasing rates, the Fed slows future demand, so price increases moderate. There are some indications that the Fed's actions are reducing consumer demand. The full impact of their rates increase will be more visible in 2023. While a recession is not certain, I expect that the economy will contract slightly in late 2023 or 2024. As economic activity slows, upward pressure on prices will diminish and the currently tight labor market will begin to loosen.

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. One finding from Education chapter stands out as a concern. After years of progress in education relative to other states, Kentucky has lost ground in recent years. While the pandemic has likely contributed to this, this trend appears to predate COVID.

The path of inflation and the possibility of a recession represent serious and immediate challenges for the economy. However, systemic challenges such as workforce development, labor force participation, health security, and racial, gender, and ethnic disparities represent long-term economic challenges for the Commonwealth. Readers of past reports know that we emphasize the importance of human capital to address

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Dr. Michael W. Clark
Director, CBER

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these issues. Investing in education and training increases productivity, raises wages, improves health, and reduces economic insecurity. By investing in our human capital, we better position our families and businesses to weather the cyclical ups and downs of the economy. Our goal in preparing this report is to help inform policy, business, and community leaders as they consider how to address Kentucky's challenges.

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Summary

The old political adage, “all politics is local,” is also applicable to the economy. While the federal and state governments play vital roles, ultimately, “all economic development is local.” Local leaders and communities that expect state or national leaders to bring them jobs will not reach their full potential.

Based on numerous studies of local communities across the country, economists have outlined approaches to improve local prosperity; they have found that economically successful communities think and act regionally, find new economic niches in high-value knowledge industries that leverage a region’s strengths, and place a premium on homegrown entrepreneurs.

These approaches are based on local leadership playing instrumental roles in the local economic development efforts. In our state, for example, local leaders can play an active role through the Kentucky Work Ready Community certificate program. This program enables communities to demonstrate their workforce quality to potential businesses by meeting requirements in five areas that are focused mostly on educational attainment and Internet availability. An October 2022 *Work Ready Communities* report by KYstats showed that 48 Kentucky counties had met all five criteria necessary for the Work Ready Certificate.

Our local communities, however, are competing nationally and globally—not just with nearby in-state counties. Throughout this report we compare Kentucky to our twelve competitor states, but here we show how our *counties* rank among the nation’s approximately 3,140 counties and county equivalents using selected factors that are related to economic success. These factors are shown in the table below, and include educational attainment, health status, community connections, and natural amenities—all factors that are related to positive economic outcomes. In addition, we include preparedness and equity factors, which are growing in importance with climate change and increasing diversity.

Kentucky’s Counties Sorted Nationally by Selected Factors (National distribution of the state’s 120 counties)			
Factor (page number)	Upper 10%	Upper 25%	Lower 75%
Economic Connectedness (page 23)	1	12	107
Social Capital (24-25)	0	6	114
Net Earnings (60-61)	5	7	108
Employment-Population Ratio (62-63)	1	12	107
Poverty (86-87)	4	3	113
Bachelor’s Degree (122-123)	4	10	106
Natural Amenities (150)	0	4	116
Racial Equity Index* (180)	0	1	3
Diabetes (191-193)	5	8	107
Disability (197)	1	4	115
Preparedness (204)	18	11	91
Internet Access (214-215)	3	16	101
Innovation Index (223)	4	11	105
Patents (224-225)	2	10	108
<p><i>*Racial Equity Index data are only available for four Kentucky counties in 2019.</i></p> <p><i>Hints for reading this table: There are four Kentucky counties in the top 10 percent nationally for the percentage of the population 25 or older who have at least a bachelor’s degree. There are another ten counties in the top quartile, or the top 25 percent, and the balance of the state’s counties (106) are in the bottom 75 percent in a sorted list of the nation’s approximate 3,140 counties or county equivalents.</i></p>			

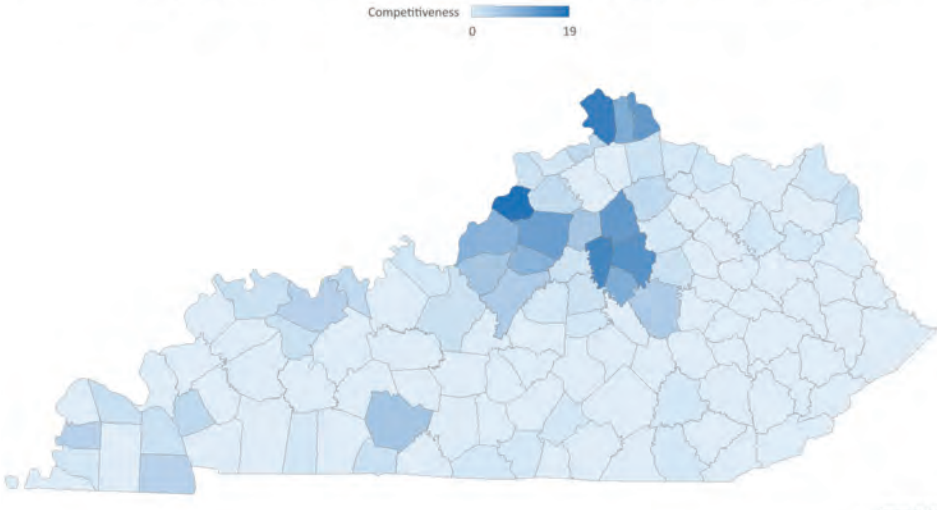
The table shows the number of Kentucky counties that rank among the top 10 percent nationally, the top 25 percent of counties not in the top 10 percent, and the bottom 75 percent of counties. Using the percentage of the population 25 or older who have at least a bachelor’s degree as an example, there are four counties in the top 10 percent nationally (i.e., Campbell, Fayette, Oldham, and Woodford Counties), another ten counties in the top 25 percent besides the four mentioned, with the balance of the state’s counties (106) ranking in the bottom 75 percent of the nation’s counties.

We aggregate the factors and give “competitive points” to counties that are in the top 10 percent or top 25 percent nationally, with additional points given for high performance in the education category. This is because education is a taproot factor that affects many other areas, and is consistently viewed as the most important factor in the various *Area Development Site Selection* surveys of corporate executives (see the Notes and Source section for more information on our scoring method, “Competitive Counties”).

As illustrated in the Kentucky county-level map, the state’s top performing counties are mainly located in the Urban Triangle. Of the state’s 120 counties, sixty-six are not in the top 10 or top 25 percent nationally on any of the factors listed in the table. Additionally, another eighteen counties perform at a high level on only one of the factors.

We consistently note the importance of education to ensure Kentucky’s long-term economic and social well-being. This has never been truer. Investing in education and training increases productivity, raises wages, improves health, and reduces economic insecurity. All communities and all individuals can perform at a high level. For example, there are forty-seven “bright spot” schools located in all regions of the state and in thirty different counties. As illustrated in the county-level map on page 126, these are diverse settings—urban-rural, east-west, distressed areas as well as prosperous ones. The enduring challenge for our state is to encourage, support, and invest in the factors that will facilitate economic development in *all* Kentucky communities. We are, after all, an interdependent Commonwealth built on the ideal that *United we stand, divided we fall*.

Kentucky Counties Competing with the Top Counties Nationally



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 *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 Suzanne King*. 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 Forecast by Michael W. Clark, Ph.D.

AS 2023 BEGINS, INFLATION REMAINS stubbornly high and represents the nation's primary economic challenge. High levels of inflation impose significant costs on the nation's economy and the Federal Reserve has a challenging task as it tries to restore price stability. Ideally, the Fed would raise interest rates just enough to slow demand and ease inflation without triggering a recession. This is what economists call a "soft landing." However, the current period of high inflation has been persistent, leading the Fed to aggressively raise interest rates. In 2022, the Fed raised interest rates seven times. Since rate increases slow economic activity with a lag, it is difficult to determine the optimal level for interest rates. However, there is growing risk that the recent rate hikes could tip the economy into a recession. While an economic downturn is far from certain, the probability of recession in 2023 or 2024 seems high.

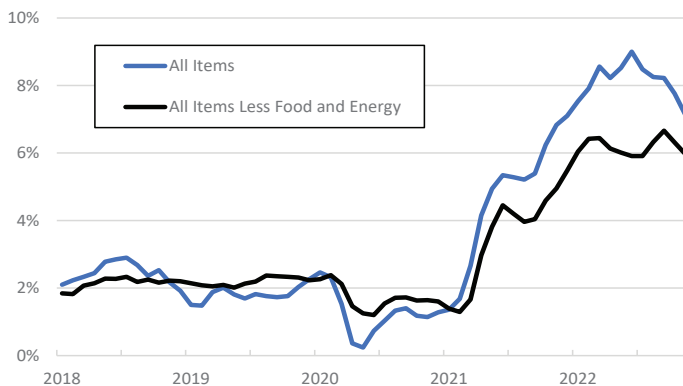
Inflation

Figure 1 shows how inflation, as measured by the Consumer Price Index, has changed over recent years. Inflation refers to how fast general price levels are rising throughout the economy. Generally, price levels tend to increase over time. From 2010 to 2019, prices increased at a rate below 1.8% per year. Inflation began to accelerate in April 2021, when prices rose by 4.2% compared to prices a year earlier. While many economic forecasters had expected inflation to slow by the end of 2021 or early 2022, prices continued to rise at an elevated pace through 2022.

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FIGURE 1
12-month Percent Change in Consumer Price Index,



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

It now appears that inflation likely peaked in June 2022, with prices 9% higher than they were in June 2021.

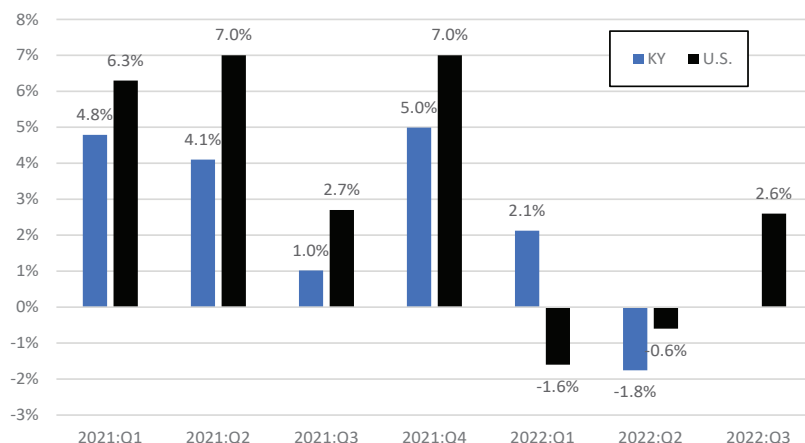
The drivers of inflation have evolved since April 2021. Initial price increases occurred as consumers began to emerge from COVID restrictions with pent-up demand and high levels of savings. Consumer demand was likely fueled by accommodative fiscal and monetary policy. These policies appeared to be somewhat successful in helping the economy bounce back as COVID restrictions were eased. However, firms were often unable to keep up with the higher demand due to disruptions in their supply chains and a lack of workers. When demand increased faster than supply, prices began to increase.

While many of these issues would have eventually eased, another inflation shock occurred in 2022 when Russia invaded Ukraine. Several countries, including the United States, responded to the invasion by banning imports of Russian oil. While this was designed to put pressure on the Russian economy, it also reduced supply of oil to these countries and pushed oil and gasoline prices up. Oil and gasoline are major inputs into the manufacturing sector and transporting goods across the economy. Higher prices for oil and gasoline pushed prices for broader consumer goods up even further.

Economic Output

Gross domestic product, or GDP, refers to the value of the goods and services produced by an economy. Figure 2 shows the percent change in real GDP at annual rates for the U.S. and Kentucky. After posting strong growth in 2021, U.S. real GDP fell during the first two quarters for 2022. Two main factors contributed to the decline. First, many businesses operated above normal production levels to catch up with strong consumer demand and to rebuild their depleted inventories. While

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



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

this boosted GDP during 2021, it created a high bar that could not be sustained. Second, while consumer spending remained strong during the first half of 2022, much of the spending went to purchase items imported from other countries. During the most recent quarter (2022 Q3), U.S. real GDP grew at an annual rate of 2.6%. Kentucky's GDP grew at an annual rate of 2.1% during the 1st quarter of 2022 and contracted by 1.8% during the 2nd quarter.

There was some confusion about whether the decline in U.S. GDP that occurred during the first two quarters of 2022 represented a recession. Media reports frequently define a recession as a decrease in GDP for two or more consecutive quarters. This is not, however, an official definition of a recession. The Business Cycle Dating Committee at the National Bureau of Economic Research is responsible for determining when recessions began and when they ended. The committee consists of economists at academic institutions who evaluate various sources of economic data to determine when the economy contracted. While the committee does consider GDP, it also considers other factors such as employment and earnings, which were very strong during the first half of 2022. At this point, the committee has not determined that this period was a recession.

Labor Market

While GDP contracted during the first two quarters of 2022, the labor market has remained very strong. Fewer available workers and strong demand for labor have put considerable pressure on labor markets.

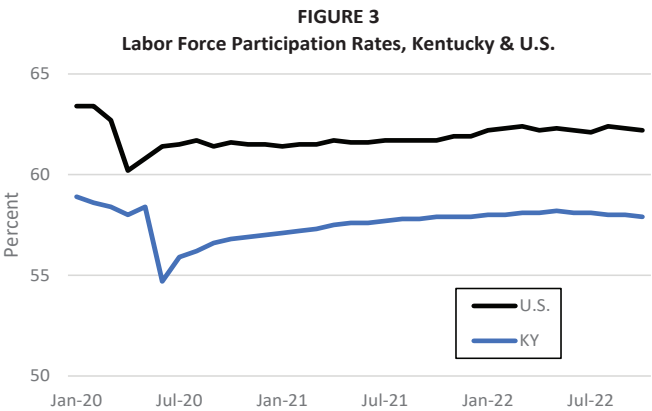
Labor force participation rates, both nationally and in Kentucky, have substantially improved but are still short of pre-pandemic levels. When the

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pandemic began, the nation’s labor force participation rates fell by 3.2 percentage points. Kentucky’s labor force participation rate was hit even harder, falling by 4.2 percentage points. Rates improved quickly as restrictions were lifted and then made slow but steady gains through May 2022. In recent months, however, U.S. labor force participation has leveled off at near 62%. This is 1.3 percentage points lower than just before the pandemic. Kentucky’s labor force participation rates have declined slightly over the past few months. As of November, Kentucky’s rate was 57.9%, 1.2 percentage points lower than pre-pandemic levels.

Nationally, participation rates have fully recovered for workers aged 16 to 24 and have nearly recovered for prime aged workers, those aged 25 to 54 years. However, while many workers over the age of 54 have returned to the labor force, participation rates among older workers are still low compared to before the pandemic.

During the summer of 2022, Kentucky posted its lowest unemployment rate, 3.7%, since the U.S. Bureau of Labor Statistics began reporting state rates in 1976. The U.S. unemployment rate fell to 3.5% in June, its lowest since 1969. Unemployment rates have increased slightly since the summer suggesting some easing of the labor.



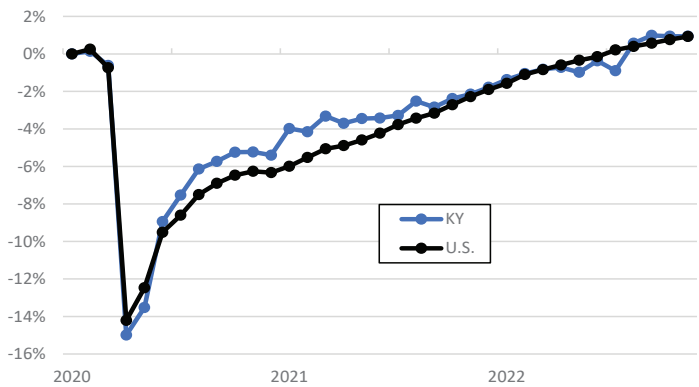
Source: U.S. Bureau of Labor Statistics. Local Area Unemployment Statistics. Seasonally adjusted.

Employers made significant additions to their payrolls in 2022. Over the summer, employment in both Kentucky and the U.S. returned to pre-pandemic levels. As of November 2022, employment in both Kentucky and the U.S. were 0.9% above levels seen in January 2020.

While total employment has steadily improved, the experience of individual industrial sectors has varied considerably. Kentucky’s employment has fully recovered in five of the eleven major industries including trade, transportation, and utilities; professional and business services; financial activities; education

and health services; and information. Six industries still lag pre-pandemic levels.

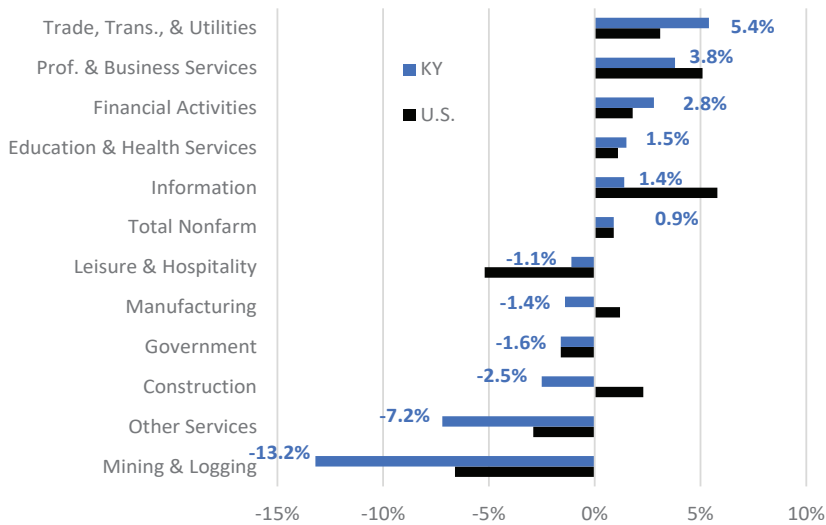
FIGURE 4
Change in Total Nonfarm Employment Since January 2020,
Kentucky & U.S.



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

While employment in Kentucky’s manufacturing sector improved, particularly over the last few months, it has not returned to pre-pandemic levels or kept up with the nation. As of November 2022, employment in Kentucky’s manufacturing sector was 1.4% below pre-pandemic levels. U.S. employment in this sector was up by 1.2%.

FIGURE 5
Change in Employment Since January 2020 by Sector



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

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Likewise, Kentucky's construction sector has not returned to pre-pandemic levels and lags the national recovery. While U.S. construction employment was up 2.3% from January 2020 to November 2022, Kentucky's construction employment was still down by 2.5%.

Outlook

For most of 2022, the Federal Reserve has been aggressively raising interest rates in an attempt to slow the economy and rein in inflation. By raising interest rates, the fed makes it more expensive for consumers to borrow money to pay for items like houses, cars, and furniture. In doing so, higher interest rates can slow inflation by reducing demand for goods and services. There are some early signals that the economy is beginning to slow. Nationally, mortgage originations and housing starts have fallen in recent months. The effects of these interest rates hikes will be much more visible in 2023.

If the Federal Reserve achieves a "soft landing," the economy would slow and inflation would moderate without causing significant or widespread declines in output and employment. However, if the Fed's tightens to much, it could choke off consumer demand and tip the economy into a recession. Inflation would also ease in this situation, but economic output and employment would decrease for a period.

I anticipate economic activity cooling significantly in 2023 and contracting slightly in late 2023 or early 2024. On an annual average basis, U.S. real GDP is expected to increase by only 0.1% in 2023 while Kentucky's GDP is expected to be flat for the year. Ultimately, I expect the Fed will over shoot its rate increases, triggering a mild recession late in 2023 or 2024.

As consumer demand declines, the labor market will loosen somewhat. Employers will stop adding workers to their payrolls and many might have to trim their payrolls. However, employers have struggled for two years to find workers and could be reluctant to dismiss their employees if they can ride out a short economic downturn. By retaining their employees, they might be better positioned when the economy begins to pick up again than if they must rebuild their workforce later. Therefore, I do not anticipate large decreases in employment. Unemployment rates for 2023 are projected to average 4.7% for the U.S. and 4.9% for Kentucky.

Inflation rates appear to have peaked and are starting to drift downward as many of the factors that drove inflation are easing. Supply chains have improved, oil and gasoline prices have fallen, and consumer spending is slowing. Inflation rates are likely to remain higher in the first few months of 2023 but will begin falling later in the year. Annual inflation for 2022 is projected to be 4.7 percent.

TABLE 1		
Forecast for 2023		
	2023 Forecast	2022 Actual or Best Available
Real GDP Growth—U.S.	0.1%	2.4%
Unemployment Rate—U.S.	4.7%	3.7%
Inflation—U.S.	4.7%	8.1%
Employment Growth—U.S.	-0.5%	4.2%
Growth in Manufacturing Employment—U.S.	-0.2%	3.7%
Real GDP Growth—Kentucky	3.5%	2.3%
Unemployment Rate—Kentucky	4.9%	3.9%
Employment Growth—Kentucky	0.0%	3.0%
Growth in Manufacturing Employment—Kentucky	-0.5%	0.4%

Agriculture

THE *Ag Economy Barometer*, produced at Purdue University, is a monthly survey based on 400 U.S. agricultural producers across the country. The *Barometer* gauges current and future expectations on a range of agricultural factors. The pandemic, supply-chain bottlenecks, labor shortages, and transportation problems have caused these indices to trend downward since 2020. More recently, producers have expressed concern over inflation, rising interest rates, and lower prices for farm commodities. The current conditions index declined 23 percent from November 2021 to November 2022, and the future expectations index was down 5 percent over the same period. These are strong signals that U.S. agricultural producers are “bearish” on the short- and medium-term future of American agriculture.

These producer sentiments, however, appear to belie the U.S. farm sector financial indicators. The U.S. Department of Agriculture, Economic Research Service, *Farm Sector Income & Finances: Highlights from the Farm Income Forecast*, (December 2022), for example, has projected farm sector profits to increase in 2022. They expect net farm income, a broad measure of profits, to reach \$160.5 billion in 2022, an increase of 13.8 percent from 2021.

The agricultural sector accounts for about 1.8 percent of Kentucky’s gross domestic product 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

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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.

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. AppHarvest, however, the start-up garnering most of the attention in Kentucky, had plans to open twelve huge, high-tech, indoor farms across Central Appalachia by 2025, but it announced in late 2022 that it was running out of cash and that "management believes there is substantial doubt about our ability to continue as a going concern."

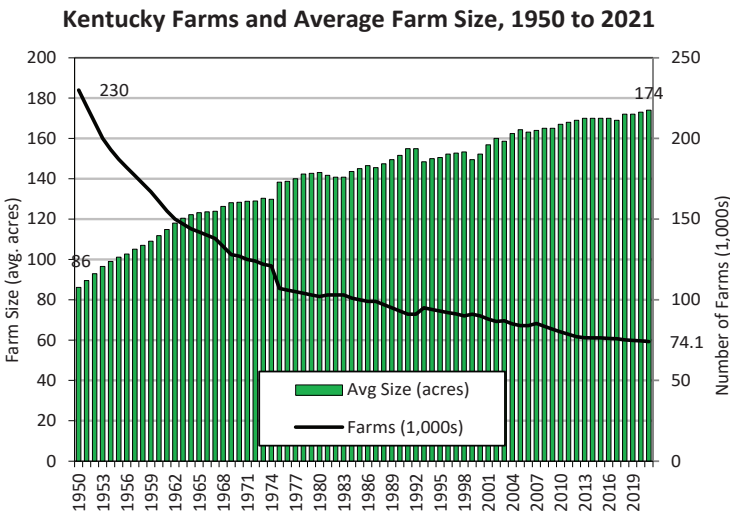
Agricultural commodities and related activities can have an important economic impact, with studies of the equine and bourbon industries, for example, showing economic impacts in the billions of dollars. Kentucky's farm traditions have long yielded significant economic benefits to the state, but the 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 farmer's 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 160.

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 2021, it had declined to 3.7 percent of Kentucky's total farm receipts. Tobacco has waned, but traditional feed crops, like feed and corn, and poultry and eggs, have ascended. In 1990, farm chickens, broilers (chickens raised for food), and chicken eggs constituted less than 1 percent of total farm receipts (0.82%). In 2021, poultry and eggs accounted for nearly 18 percent of the \$6.9 billion in total farm receipts. The dramatic swings in receipts for Kentucky's various farm products underscore the necessity of agricultural diversity.

FARMS

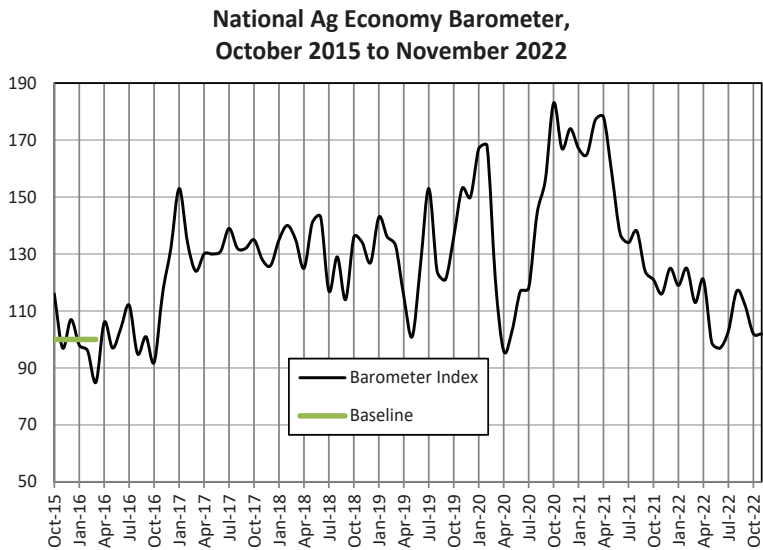
The family farm has nearly become a quaint relic of Kentucky’s past. Over the last half century, two major trends have transformed the state’s countryside: the consolidation of small, family-owned farms into larger enterprises; and the conversion of agricultural land to urban (or suburban) uses. As seen 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 74,100 farms in Kentucky with an average size of 174 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.



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

AG ECONOMY BAROMETER

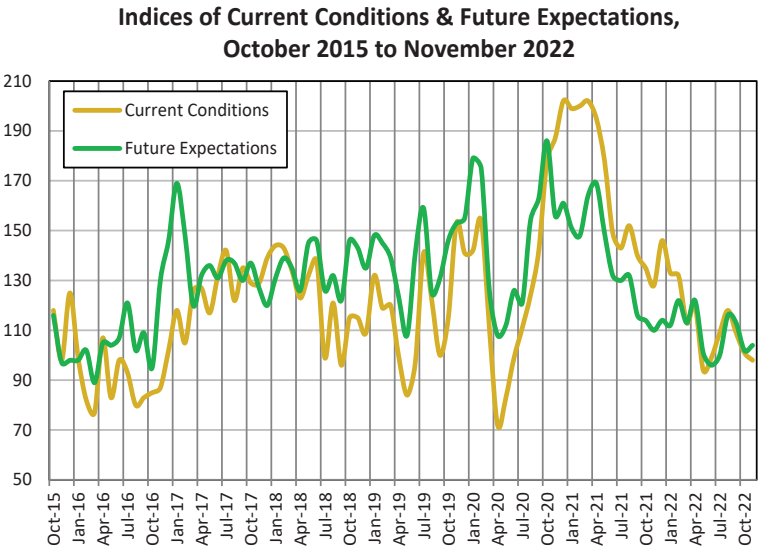
The *Ag Economy Barometer*, which is produced by Purdue University agricultural economists, is a survey based assessment of the *national* agricultural economy. It reflects the beliefs, attitudes, and sentiments of 400 U.S. agricultural producers—in other words, it captures the “mood” of key players 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, rising interest rates, lower prices for farm products (e.g., livestock and crops), and the availability of inputs have caused the *Ag Economy Barometer* to plummet in recent months; it fell from 116 in November 2021 to 102 in November 2022—a decrease of 12 percent.



Source: Purdue University Center for Commerical Agriculture, Producer Survey, December 2022

INDICES OF CURRENT CONDITIONS & FUTURE EXPECTATIONS

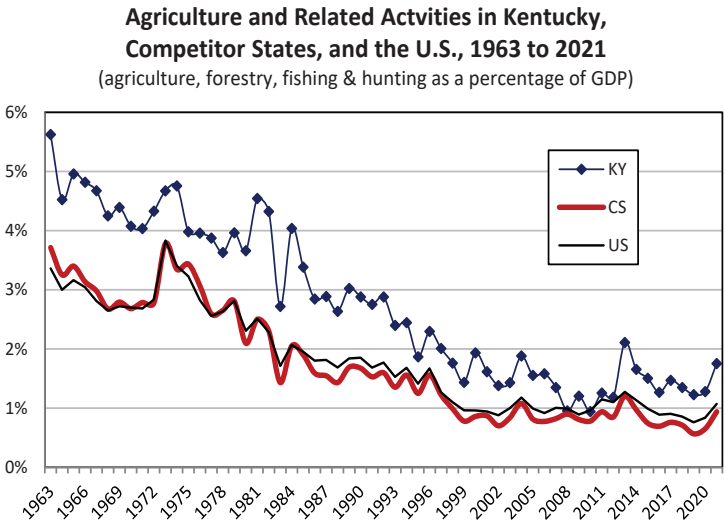
As described on the facing page, the *Ag Economy Barometer* is a survey based assessment of the national agricultural economy. It reflects the collective expectations of 400 U.S. agricultural producers across the country. The *Ag Economy Barometer* can be disaggregated into current and future expectations, 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. The current conditions index declined 23 percent from November 2021 to November 2022, and the future expectations index was down 5 percent over the same period. These are strong signals that U.S. agricultural producers are “bearish” on the short- and medium-term future of American agriculture.



Source: Purdue University Center for Commercial Agriculture, Producer Survey, December 2022

AGRICULTURE AND GDP

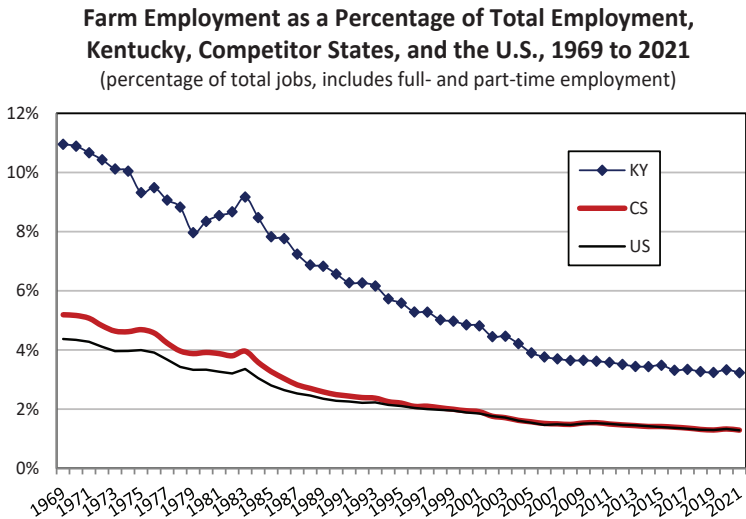
While still playing an important role in some *local* and *regional* areas around the state, agriculture’s role in the larger state economy has been declining for many years. Within the Agriculture, Forestry, Fishing, and Hunting sector, the Bureau of Economic Analysis (BEA) includes “establishments 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 2021, this economic sector accounted for 1.8 percent of Kentucky’s gross domestic product, compared to 1.1 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 9.4 percent of its gross domestic product while Massachusetts has the lowest at 0.13 percent. Among the competitor states, Mississippi is the highest at 2.5 percent and Virginia the lowest at 0.43 percent.



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

FARM EMPLOYMENT

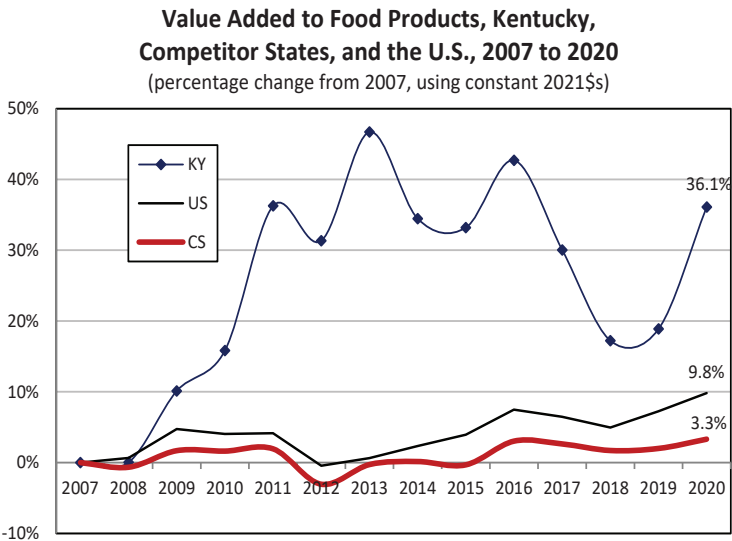
Farm mechanization and a changing state economy have resulted in a steady decline in the percentage of Kentuckians working on the farm. Farm employment is the “number of workers engaged in the direct production of agricultural commodities, either livestock or crops; whether as a sole proprietor, partner, or hired laborer.” The Bureau of Economic Analysis estimates Kentucky’s farm employment at about 82,300, which is around 3.2 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 1.3 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 since that time.



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 2020. Valued-added food production in Kentucky increased from \$4.4 billion in 2007 to \$5.9 billion in 2020 (in constant 2021\$*s*), representing a 36.1 percent increase. By comparison, the U.S. and competitor states value-added food production grew by 9.8 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.



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

FARM COMMODITIES

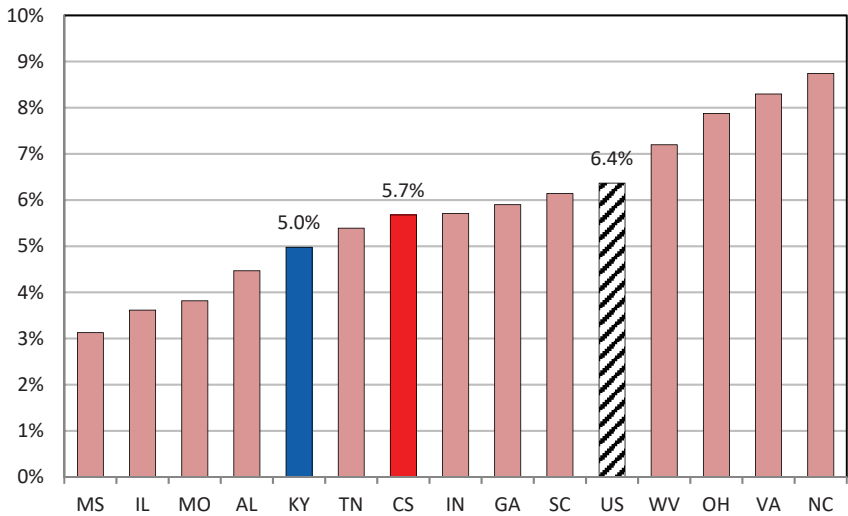
The past three decades have seen significant changes in Kentucky’s agricultural profile. In 1990, tobacco was the state’s signature commodity and constituted nearly a quarter of Kentucky’s farm receipts (23.8%). By 2000, tobacco ranked second and accounted for 18.5 percent of farm receipts, and by 2021 it had declined to sixth and 3.7 percent of Kentucky’s total farm receipts. While tobacco’s value has dropped precipitously, Kentucky’s other major crops—corn, soybeans, and hay—have all shown considerable improvement. 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 2021, poultry and eggs accounted for nearly 18 percent of the \$6.9 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 Leading Farm Commodities, 2021 (2021 current dollars)		
RANK	COMMODITY	VALUE OF RECEIPTS (\$1,000s)
1	Feed crops (e.g., corn, hay)	1,558,660
2	Poultry and eggs	1,198,949
3	Oil crops (e.g., soy beans)	1,157,995
4	Misc. animals and products	1,108,573
5	Meat animals (e.g., cattle)	1,048,795
6	Tobacco	250,994
7	All other crops (e.g., floriculture)	189,873
8	Food grains (e.g., wheat)	175,936
9	Dairy products, Milk	173,893
Total	All commodities	6,863,667
Source: USDA Economic Research Service.		

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. Ten years ago there were 114 farmers’ markets registered with the Kentucky Department of Agriculture, and now there are more than 160. Of Kentucky’s nearly 76,000 farms, about 3,800 sell agricultural products directly to consumers, up from just over 3,400 in 2012. This represents 5 percent of Kentucky farms, which is lower than the competitor states (5.7%) and the U.S. (6.4%). The New England states lead the nation in selling farm goods directly to consumers, evidenced by New Hampshire (28.9%), Vermont (26.9%), and Maine (26.9%).

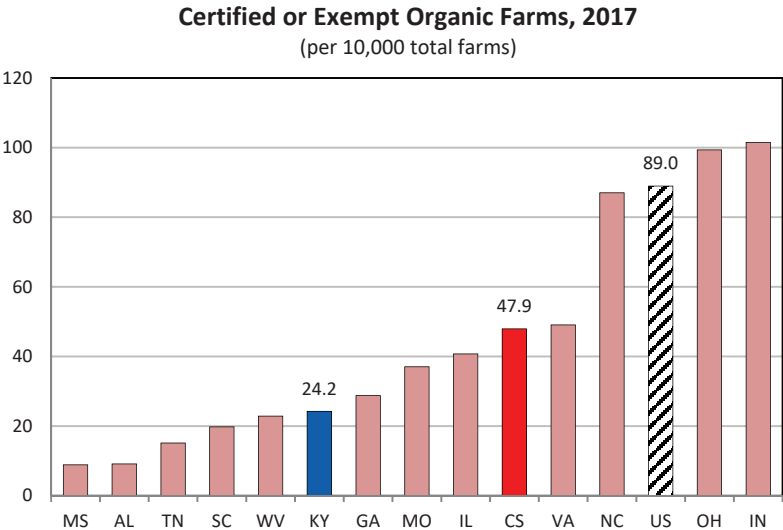
Farms Selling Directly to Consumers, 2017
(percentage of all farms)



Source: 2017 Census of Agriculture
Note: CS is the weighted average of the competitor states.

ORGANIC FARMING

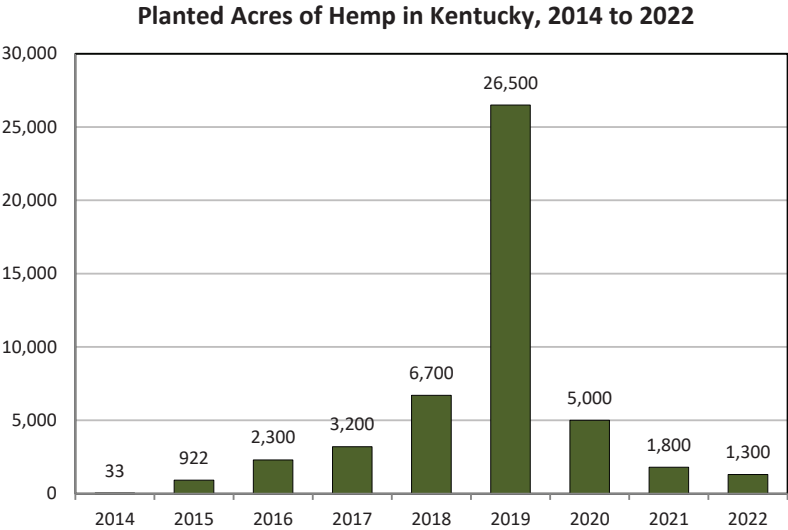
The outlook for organic products appears strong, as consumers continue to embrace organic and locally produced commodities. According to the U.S. Organic Trade Association (OTA), consumer demand for organic has grown by double-digits nearly every year since the 1990s, with sales increasing from \$3.6 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 organically certified or exempt farms increased from 14,326 to 18,166 during the five-year period from 2012 to 2017, and sales of organically produced commodities increased by 133 percent, from \$3.12 billion to \$7.28 billion. While the value of sales (244% increase) and number of farms (114%) has increased in Kentucky during this time period, 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, the number of organic farms—Kentucky lags the U.S. and most competitor states. Kentucky has 24.2 organic farms per 10,000 total farms, compared to 47.9 for the competitor states and 89 for the U.S.



Source: USDA 2017 Census of Agriculture
Note: Although exempt operations (e.g., small producers) are not required to obtain organic certification in order to represent their products as “organic,” they still need to comply with all USDA organic standards.

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.



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

Community

MULTIPLE CHALLENGES HAVE buffeted our communities in the last several years.

These include global economic forces that continue to unmoor the anchor of economic security for many, the indefatigable upward arc of drug overdose deaths that exacerbate underlying regional fragilities, the untold pain and suffering inflicted by the pandemic, and, with seemingly increased frequency and ferocity, various natural disasters, from tornados to floods, which test our fortitude and fuel our resolve.

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, since about 41 percent of Kentucky's population live in somewhat or mostly rural counties, compared to about 14 percent nationally. And while chasms deepen between geographic areas, the wider community remains knitted together—which ensures that distress in one area is felt in 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

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is more common in rural areas; prosperity is increasingly focused in urban areas; prosperous communities tend to be more racially and ethnically diverse; and prosperous areas tend 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.”

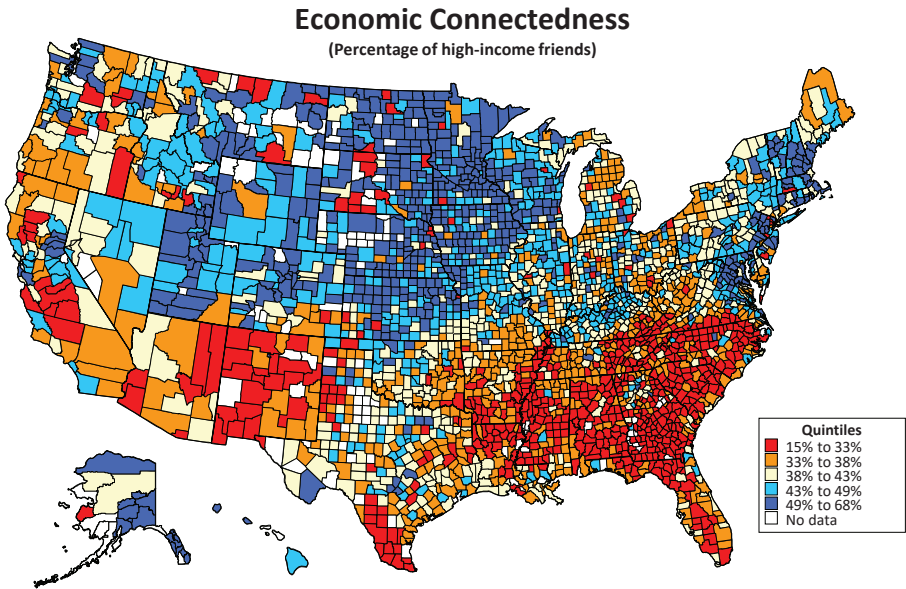
Community characteristics exert a strong influence on individual economic outcomes. Studies have long found that individual economic success is associated with neighborhood or community quality. Research published in 2015 by economists Raj Chetty and Nathaniel Hendren, *The Impacts of Neighborhoods on 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.

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. Having a strong and robust civil society has many benefits. As was noted in a report from the University of Kentucky Nonprofit Leadership Initiative, *More than Charity*, “Nonprofits provide access to the arts, protect the environment, feed the hungry, assist the disabled in finding meaningful employment, provide affordable mental health services, teach the illiterate to read, provide quality childcare for working parents and hundreds of other services that strengthen our communities and enhance our quality of life.”

Measuring a concept as amorphous as community strength and social capital is difficult. Nonetheless, except for the crime rate, Kentucky lags on many measures of community strength, including the number of hours volunteered, level of charitable giving, and number of nonprofits, lag behind the national average. The level of social capital is unevenly spread across Kentucky—as the map on page 23 reveals. Efforts to enhance social capital will take on renewed emphasis in the future as governments search out community-based organizations, non-profits, businesses, and citizens to forge partnerships in order to meet new and existing challenges facing our communities.

ECONOMIC CONNECTEDNESS

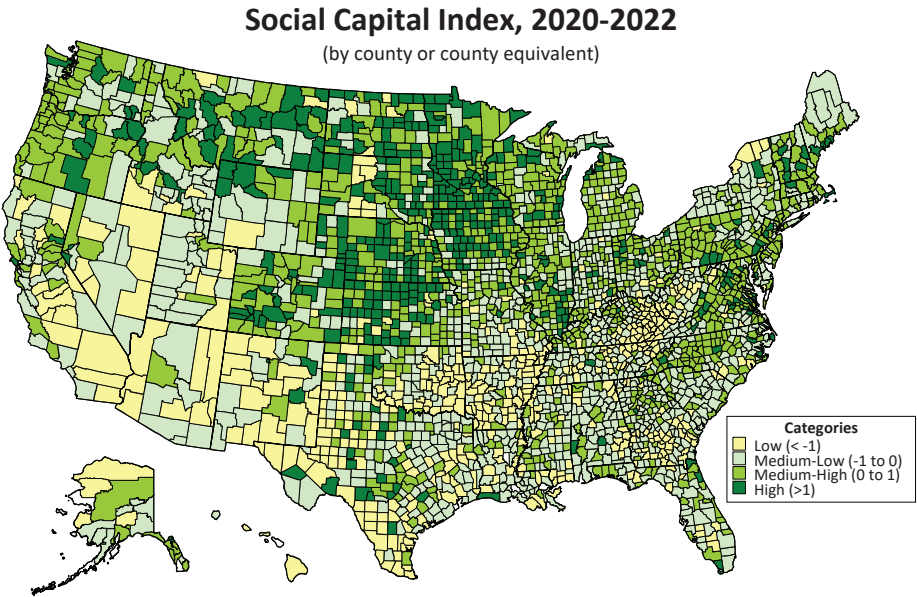
Community characteristics affect economic opportunities in multiple ways. One way is friendships. Research released in August 2022 by Raj Chetty and his colleagues with *Opportunity Insights* found that children who grow up in communities with higher levels of economic connectedness—*specifically, they 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.” This is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There is one Kentucky county in the upper 10 percent of counties nationally, Oldham County. There are twelve, however, outside the upper 10 percent but in the upper 25 percent nationally. The rest of the state’s 107 counties are in the lower 75 percent of counties.



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.

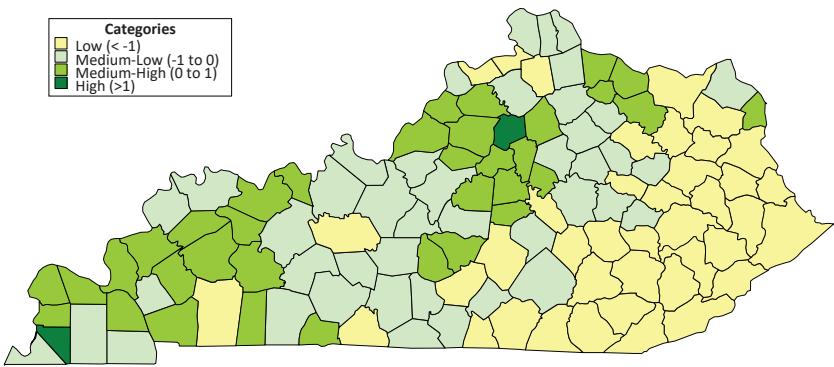


Source: Author's analysis of multiple data sources, various years (see Notes & Sources)

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.

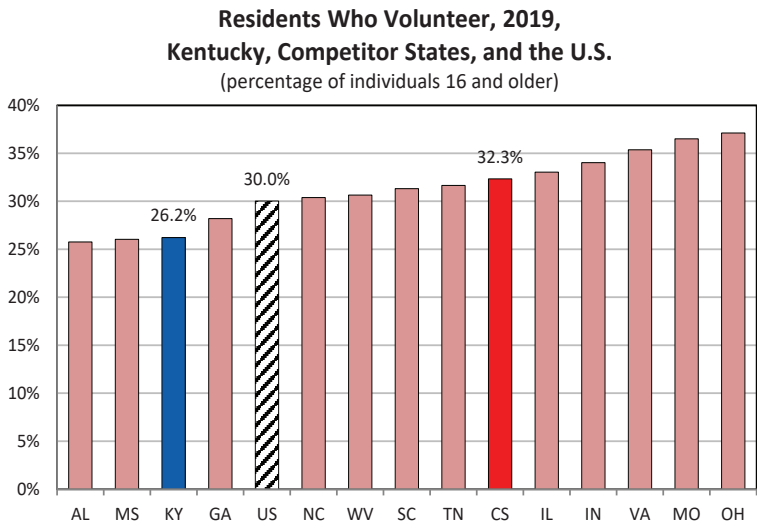
Social Capital in Kentucky, 2020 to 2022



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

VOLUNTEER RATE

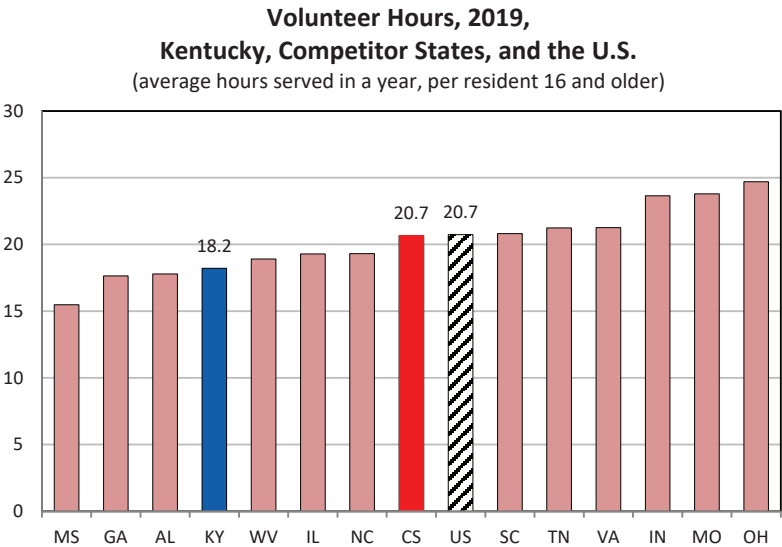
Some studies have linked participation in civil society—volunteering for example—to higher levels of community prosperity, higher achievement in schools, and improved individual health. Volunteers can tackle problems such as poverty, illiteracy, and drug abuse that public or private sectors have not 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. An estimated 26.2 percent of Kentucky residents volunteered at some point in 2019, lower than the U.S. average of 30 percent. Nationally, the highest volunteer rate belongs to Utah (49.5%), while the lowest is found in Nevada (21.8%).



Source: Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019 Volunteering and Civic Life Supplement data.

VOLUNTEER HOURS

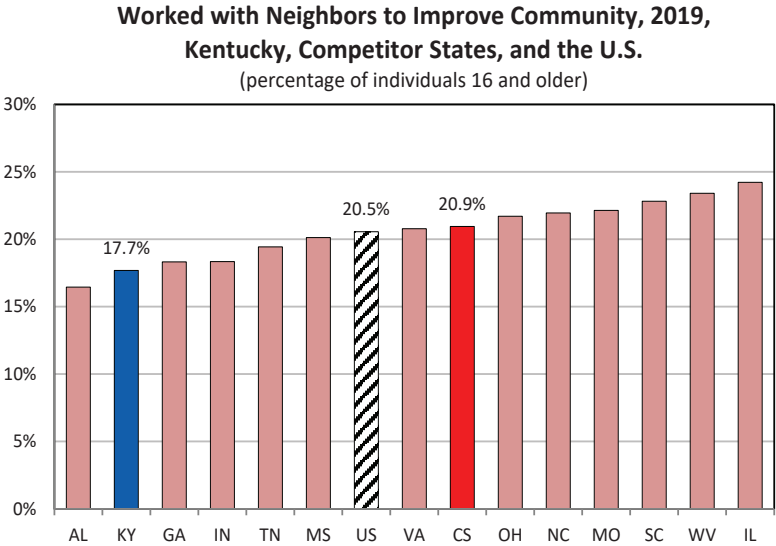
Over 935,000 Kentuckians contributed roughly 65 million hours of volunteer service in 2019, with an estimated value of \$1.6 billion. Kentuckians contributed an estimated 18.2 hours per resident 16 years and older in 2019. The total annual estimated value of volunteer service in Kentucky is based on the Independent Sector’s annual estimate of a volunteer hour in Kentucky at \$24.83. The average number of volunteer hours in Kentucky (18.2) is lower than the competitor states (20.7) and U.S. (20.7) averages. At 49.2 volunteer hours per resident 16 years old and older, Utah ranks first in the country (Louisiana is last with 12.8 hours). Volunteers, community groups, and nonprofit organizations add essential social and economic value to Kentucky’s economy and society.



Source: Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019
Volunteering and Civic Life Supplement data.

PARTICIPATION IN LOCAL GROUPS

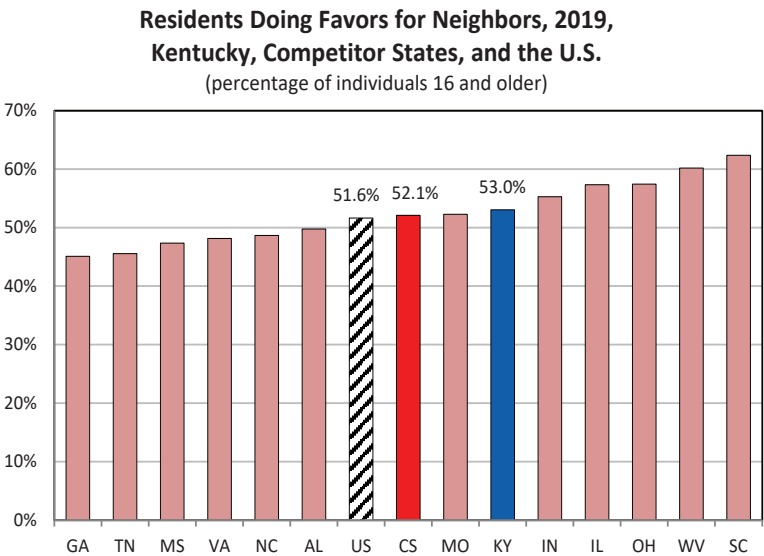
As we noted in the social capital discussion, strong, resilient, and vibrant communities are created and nurtured by engaged and connected citizens. The economic development literature linked to social capital suggests that areas with dense networks of citizens who are invested in their communities derive 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 17.7 percent of Kentucky residents said “yes,” and participated in a local group or organization to do something positive for their neighborhood. This is statistically no different from the competitor state (20.9%) or U.S. averages (20.5%). Nationally, the highest participation rate belongs to Utah (44.9%), while the lowest is found in Alabama (16.4%).



Source: Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019 Volunteering and Civic Life Supplement data.

FAVORS FOR NEIGHBORS

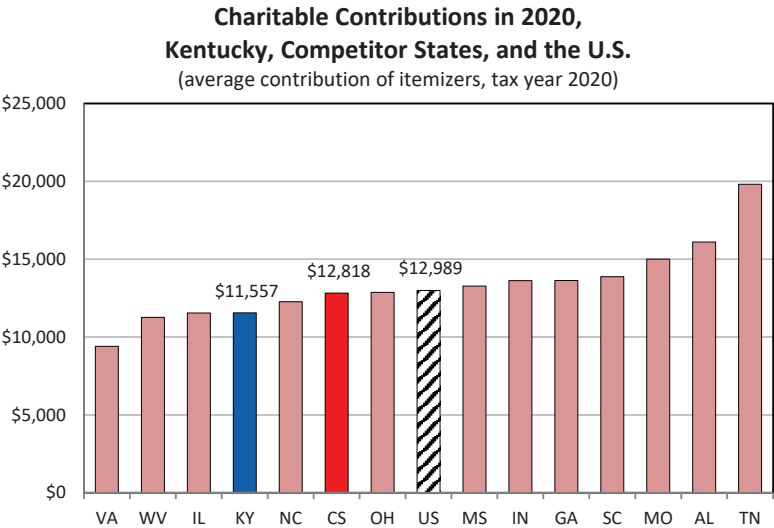
An indicator of community strength, social capital, and neighborhood cohesiveness is the extent to which neighbors do favors for each other. These favors include things like watching each others children, helping with shopping, house sitting, lending garden or house tools, and other small acts to lend a helping hand. About half of Americans do occasional favors for neighbors, with an estimated 53 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 Utah (67.8%), while the lowest is found in Hawaii (44.1%).



Source: Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019 Volunteering and Civic Life Supplement data.

CHARITABLE CONTRIBUTIONS

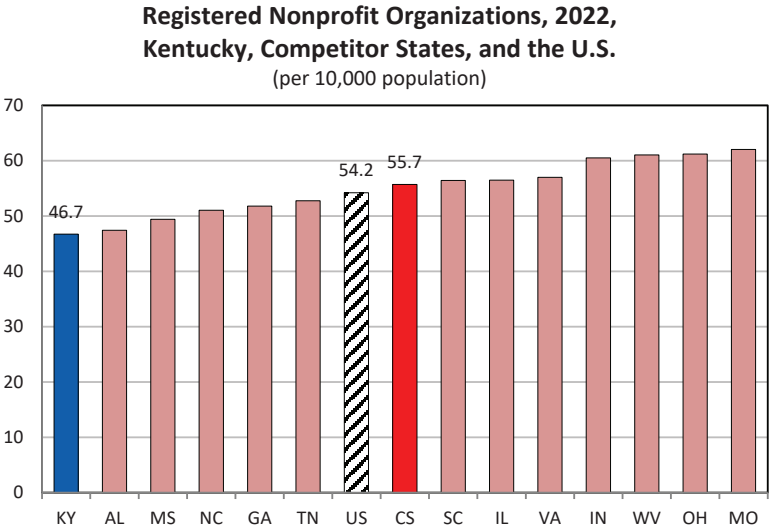
America’s giving spirit continued to rise in 2021 with giving by individuals, bequests, foundations, and corporations increasing by an estimated 4 percent according to *The Giving Institute*. At \$326.9 billion, charitable giving by individuals in 2021 was equal to about 67 percent of the estimated total contributions from all sources, \$484.9 billion. Nationally the average charitable contribution among those who itemize deductions—which is about 9.5 percent of those who file an income tax return—equaled \$12,989 for the 2020 tax year, compared to \$11,557 in Kentucky. Among the competitor states, Tennessee has the highest amount at \$19,800 and Virginia the lowest at \$9,400. Nationally, Hawaii is the lowest at \$6,370 and Wyoming is the highest at \$47,700. 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 2020 tax year by 67 percent, from 47.1 million in 2017 to 15.6 million in 2020. Likewise, the total dollar amount claimed as charity on itemized returns declined from \$256.3 billion in 2017 to \$202.8 billion in 2020—a 21 percent decrease.



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

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 54.2, compared to Kentucky’s 46.7. Among the competitor states, Kentucky has the fewest number of nonprofits per 10,000 population. At 62 per 10,000 population, Missouri has the most among competitor states. Nationally, Montana has the highest number overall with 103 while Utah has the lowest at 33.6. As of March 2022, Kentucky had 21,054 registered nonprofit organizations with \$30.4 billion in annual revenue and \$63.7 billion in assets.

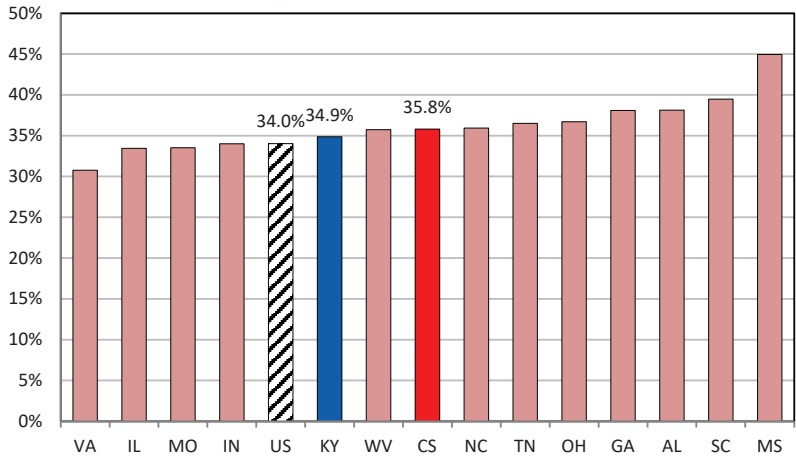


Source: Internal Revenue Service, Exempt Organizations Business Master File (2022, March) & U.S. Census, 2020.
Note: CS is the weighted average of the competitor states

CHILDREN IN SINGLE-PARENT FAMILIES

Recent 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 2020, however, over one third of this county’s children lived in a single-parent family (34%). 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.” Nationally, Mississippi has the highest rate of children living in single-parent families at 45 percent and Utah has the lowest rate at 19.2 percent. Both the Kentucky and competitor state percentages are around 35 to 36 percent, which is similar to the U.S. average.

Children in Single-Parent Families, 2020,
Kentucky, Competitor States, and the U.S.
(percent of children under 18)

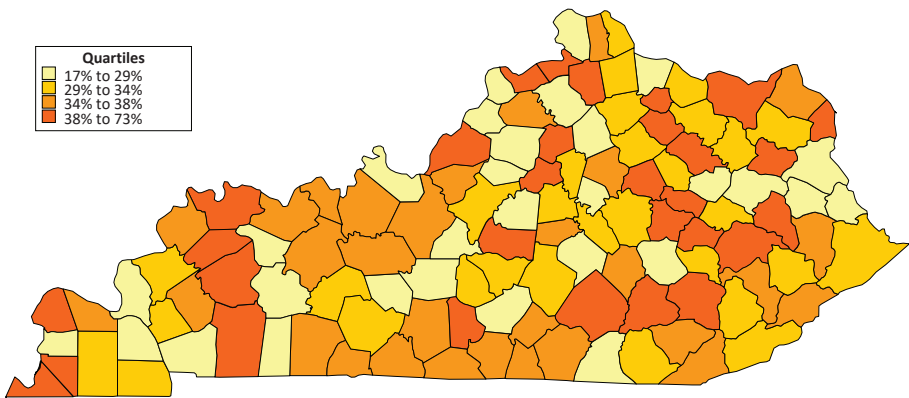


Source: Census Bureau, 5-year estimate, 2020, Table B23008

CHILDREN IN SINGLE-PARENT FAMILIES BY COUNTY

As noted on the facing page, an estimated 34.5 percent of children in Kentucky live in single-parent families. Yet, there is wide variation among Kentucky counties, bounded by Adair County at 17 percent and Fulton County at 72 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.

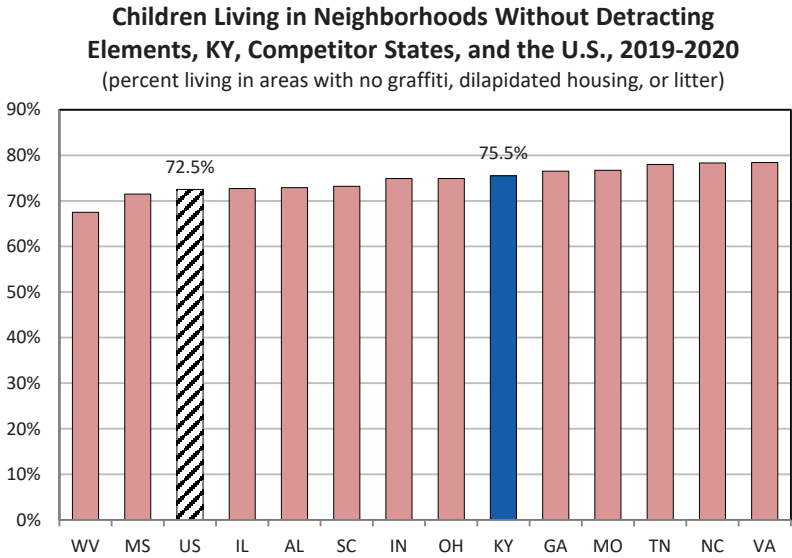
Children in Single-Parent Families, 2016-2020
(percent of children under 18 years old)



Source: American Community Survey (ACS), 2020 5-Year Estimate, Table B23008

NEIGHBORHOOD QUALITY

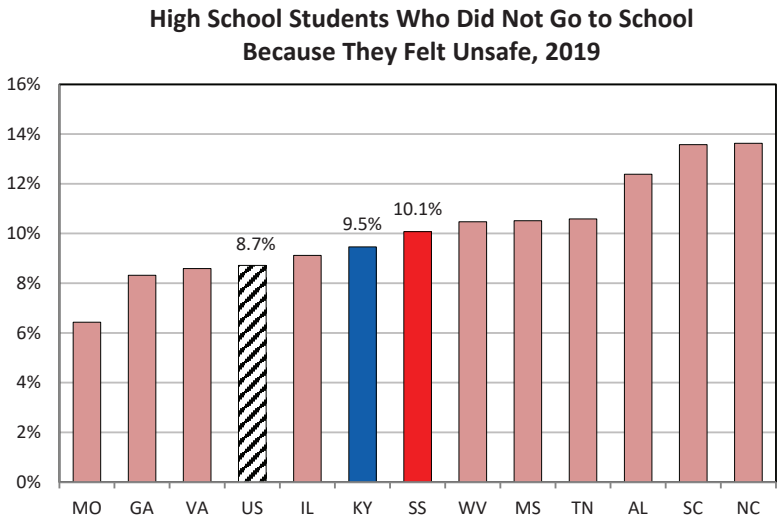
The incidence of crime is one way to measure the quality of a neighborhood. Other factors that detract from neighborhood quality include graffiti, dilapidated housing, and litter. To gauge the quality of neighborhoods in which children live, the National Survey of Children’s Health posed several questions 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 (75.5%) is statistically the same as the U.S. percentage (72.5%). Minnesota has the highest value among all of the states (80.9%) and New York the lowest (57.9%). At 47.9 percent, the District of Columbia is even lower than New York.



Source: 2019-2020 National Survey of Children’s Health

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 9.5 percent is not statistically different from the national (8.7%) or surrounding state (SS) weighted average (10.1%). Including Kentucky, there were 41 states that participated in the survey and adopted this question; twenty-three states are statistically no different from Kentucky, seven have lower percentages, and ten have higher percentages.



Source: Author's analysis of Centers for Disease Control and Prevention. 2019 Youth Risk Behavior Survey Microdata. Available at: www.cdc.gov/yrbs. Accessed on December 14, 2020.

Note: SS indicates 10 surrounding states that participated in this survey (AL, GA, IL, MO, MS, NC, SC, TN, VA, & WV).

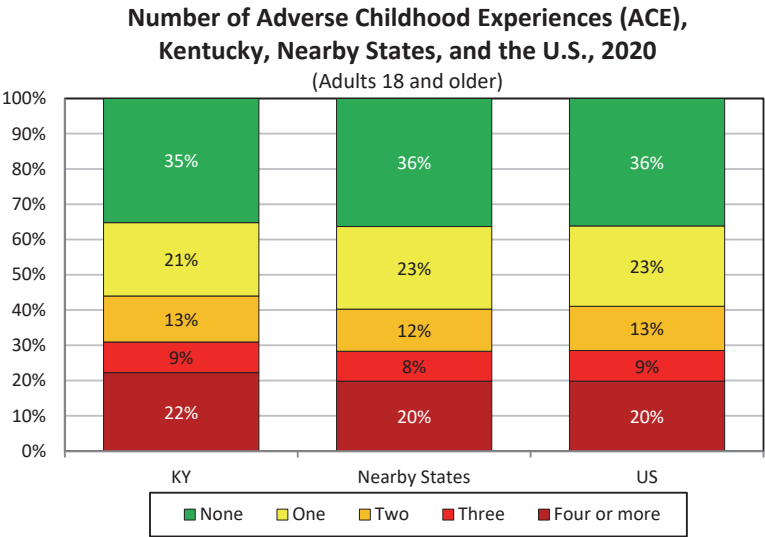
ADVERSE CHILDHOOD EXPERIENCES

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

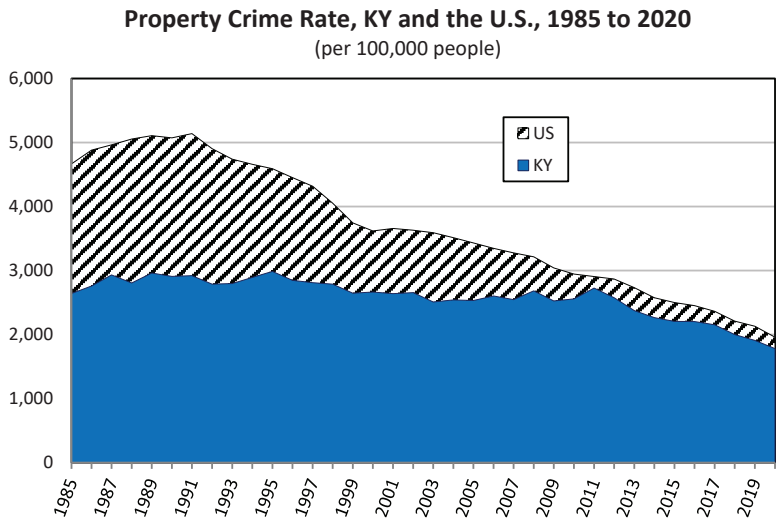
In general, about two-thirds of adults have reported at least one adverse childhood experience (ACE), and about one in five reported four or more ACEs. Adverse childhood experiences include abuse, household challenges, and neglect—with more specific factors listed in the table on the facing page. At 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.



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

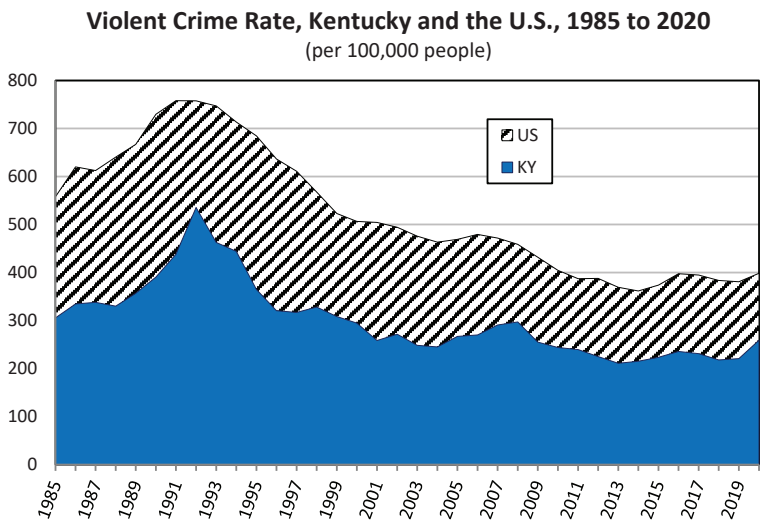
Any discussion of community would be incomplete without consideration of the role of crime, which can instill fear, undermine trust, and fray connections—and impact economic development decisions and outcomes. Nationally, the property crime rate declined 8.1 percent in 2020—the eighteenth consecutive year the property crime rate estimates have declined. Nonetheless, there were an estimated 6.5 million property crimes nationwide in 2020, which is an estimated property crime rate of 1,958.2 offenses per 100,000 inhabitants. The estimates for two of the three property crimes declined when compared with the previous year’s estimates. Burglaries dropped 7.4 percent, larceny-thefts decreased 10.6 percent, while motor vehicle thefts rose 11.8 percent. Collectively, victims of property crimes (excluding arson) suffered losses estimated at \$17.5 billion in 2020. Kentucky’s property crime rate is slightly lower at 1,779.5 offenses per 100,000 population. Among Kentucky’s nearby dozen competitor states, South Carolina has the highest property crime rate (2721.1 per 100,000 population), and West Virginia has the lowest (1,399.4). Kentucky has a relatively low property crime rate, ranking tenth among the competitor states. 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.



Source: Federal Bureau of Investigation, Crime Data Explorer, <<https://crime-data-explorer.app.cloud.gov/pages/explorer/crime/crime-trend>>.

VIOLENT CRIME RATE

According to the FBI 2020 *Uniform Crime Report*, the violent crime rate rose 5.2 percent nationwide when compared with the 2019 rate. In the U.S. overall, the estimated rate of violent crime was 387.8 offenses per 100,000 inhabitants, representing 1.28 million violent crimes, such as murder, manslaughter, forcible rape, robbery, and aggravated assault. When compared with the estimates from 2019, the estimated number of robbery offenses fell 9.3 percent and the estimated volume of rape offenses decreased 12 percent. The estimated number of aggravated assault offenses rose 12.1 percent, and the volume of murder and nonnegligent manslaughter offenses increased 29.4 percent. Kentucky’s violent crime rate, at 259.1 offenses per 100,000 population, is significantly lower than the national rate and much lower than most of the twelve competitor states. In ranking of these dozen states, only Virginia has a lower violent crime rate (208.7) than Kentucky; Tennessee has the highest violent crime rate among the competitor states, at 672.7 per 100,000 population.



Source: Federal Bureau of Investigation, Crime Data Explorer, <<https://crime-data-explorer.app.cloud.gov/pages/explorer/crime/crime-trend>>.

INCARCERATION RATE

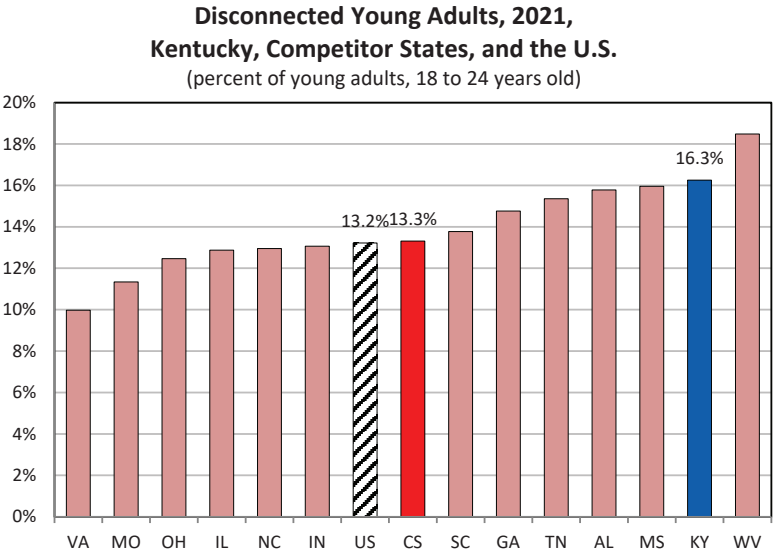
Incarceration rates are windows through which one can assess the nature, quality, and character of a community. According to a December 2022 report from the U.S. Department of Justice, *Prisoners in 2021*, the United States had an estimated 1,163,665 prisoners under the jurisdiction of state and federal correctional authorities in 2021. This is equivalent to 350 prisoners per 100,000 population. Kentucky’s rate, by comparison, was somewhat higher at 411. The state with the highest incarceration rate in 2021 was Mississippi (575), while Massachusetts was the lowest (96). 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 18,560 by 2021.



Source: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, *Prisoners in 2021*

DISCONNECTED YOUNG ADULTS

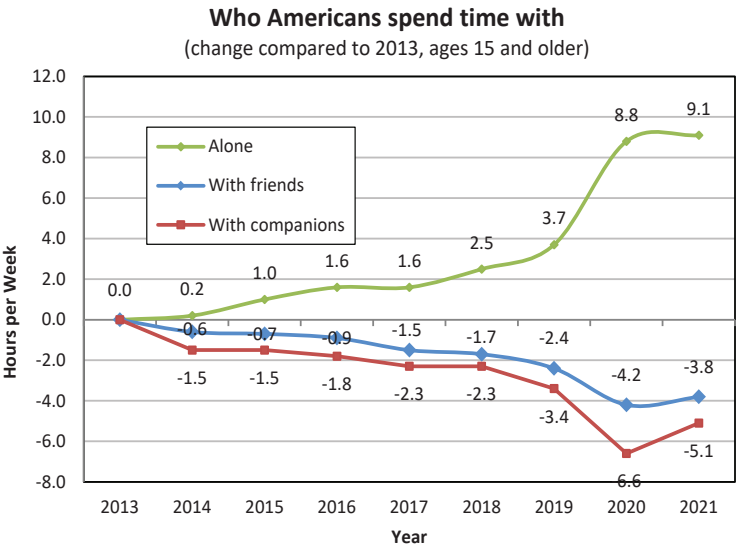
Strong, resilient, and vibrant communities are created and nurtured by actively engaged, invested, and connected citizens. The figure below shows the percentage of young adults (18 to 24 years old) who are “disconnected.” These young adults are *not* enrolled in school, are *not* currently employed, 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. Kentucky’s 16.3 percent is not statistically different (using a 95% confidence interval) from five of the competitor states (i.e., AL, GA, MS, TN and WV). However, Kentucky is statistically *higher* than the competitor state (13.3%) and U.S. (13.2%) averages, as well as most of the remaining competitor states (i.e., IL, IN, MO, NC, OH, SC & VA). New Mexico has the highest percentage of disconnected young adults at 22.7 percent, and North Dakota has the lowest percentage at 6.1 percent. Among all states and the District of Columbia, 2 are higher, 33 are lower, and 15 are statically the same as Kentucky.



Source: Estimated by the author using data from the 2021 1-Year U.S. Census ACS PUMS.

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/>>.

Economy

THE PANDEMIC RECESSION LANDED its punch in early 2020 and inflicted a loss of nearly 280,000 jobs—17 percent of Kentucky’s private sector employment—in just two months. Compared to the competitor states’ 15 percent plunge and the national 16.2 percent decline, Kentucky’s job loss was somewhat larger. By mid-2022, however, Kentucky, the competitor states, and the U.S. had employment totals equal to their pre-pandemic levels of February 2020.

Nonetheless, while the jobs have returned, the pandemic fundamentally altered the economy, and, because of this, businesses, workers, and consumers are still adapting to these changes. Many workers who left their jobs during the pandemic, particularly parents of young children and those close to retirement, have not returned to the labor force. Nationally, the employment-population ratio declined from 61.2 percent to 59.9 percent, a decrease of 1.3 percentage points from February 2020 to November 2022. Kentucky’s ratio decreased by 0.8 percentage points, from 56.2 percent to 55.4 percent, during this period.

Within the Commonwealth, total employment is lower in all regions of the state. From the final quarter in 2019 to the second quarter of 2022—a two-and-a-half-year period—total private sector employment declined in Kentucky by 1 percent, with the largest drop experienced in Eastern Kentucky (-2.1%). The other regions are not far behind, evidenced by declines in Western Kentucky (-1.6%), the Urban Triangle (-1.3%), and the South Central region

continued on the next page



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(-1.0%). The U.S., meanwhile, was down by 0.2 percent, but the competitor states increased by 0.8 percent.

On the positive side, the pandemic did unleash entrepreneurial energy and fuel 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. 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—an HBA. 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 July 2010, 31 months after the beginning of the Great Recession, the HBA rate was 6.7 percent lower than when the recession started. In contrast, 31 months after the start of the pandemic recession (in September 2022), Kentucky’s HBA rate was 28 percent higher.

Similar to workers who have long viewed the benefits of globalization somewhat skeptically, businesses are reassessing the virtues of globalization due to supply chain disruptions that have 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 2021, the compound annual growth rate of Kentucky’s exports is 5.6 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 in 2021 increased to \$29.5 billion, which is equivalent to 12.6 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

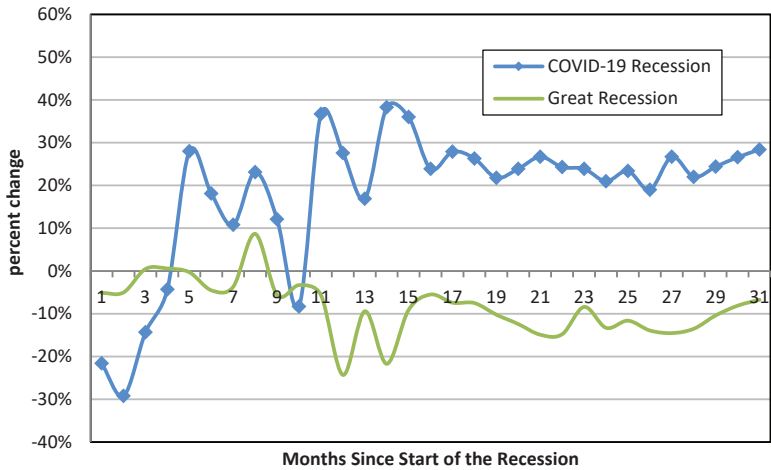
The *Kauffman New Employer Business Indicators* include: *Rate of new employer business actualization*—business that becomes an employer within two years of filing an application. In 2021, the rate of new employer business actualization in Kentucky was 9.29%, meaning that for every 100 new business applications, 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, 2010 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 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 July 2010, 31 months after the beginning of the Great Recession, the HBA rate was 6.7 percent lower than when the recession started—879 applications compared to 942. In start contrast, there was a steep decline in the HBAs at the onset of the COVID-19 Recession in Kentucky, but the HBA rate increased 38 percent by April 2021, from 939 to 1,299; it has decreased somewhat, but was 28 percent higher in September 2022—31 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.

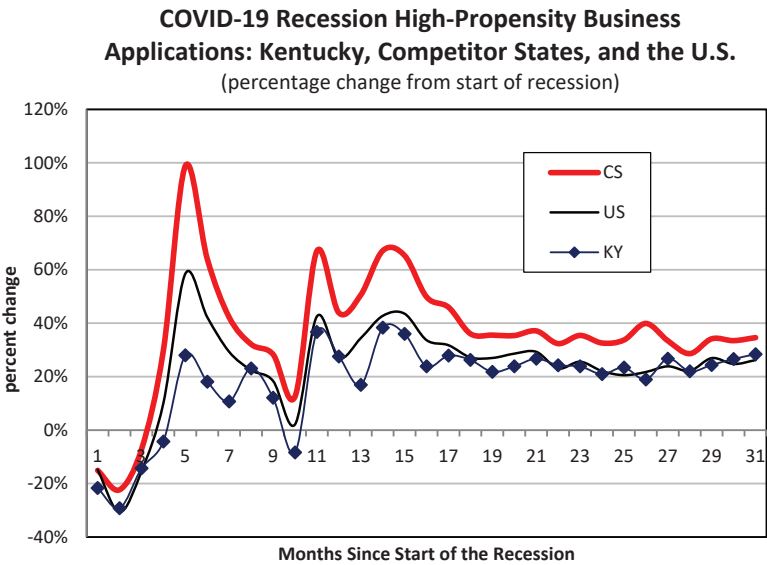
**High-Propensity Business Applications
in Kentucky During Two Recessions**
(percentage change from start of recession)



Source: Author's analysis of U.S. Census data, Business Formation Statistics

HIGH-PROPENSITY BUSINESS FORMATIONS

Kentucky has experienced a significant increase in high-propensity business applications during the COVID-19 Recession compared to the 31 months following the start of the Great Recession (see facing page). Kentucky's increase more or less follows the national trend, especially in recent months. However, it is slightly lower than the increase demonstrated by the competitor states. For example, in September 2022, there were 1,144 high-propensity business applications (HBA) in Kentucky, which is a 22 percent increase from the 939 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 36 percent and 27 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."



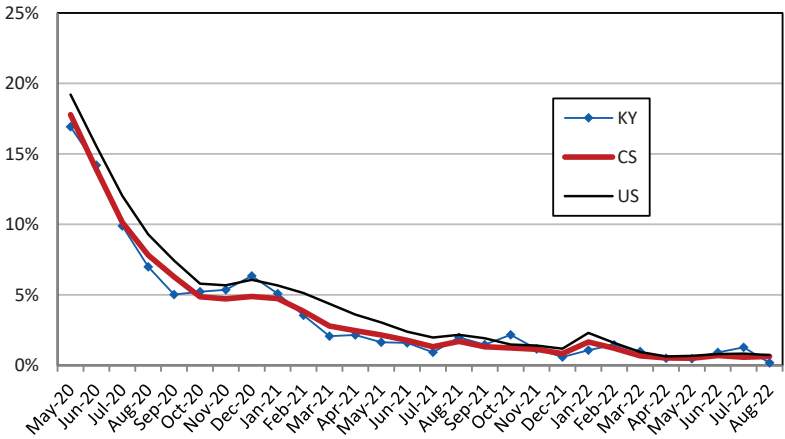
Source: Author's analysis of U.S. Census data, Business Formation Statistics

UNABLE TO WORK DUE TO COVID

Early in the pandemic, in May of 2020, about 17 percent of Kentuckians (95% CI 14.5-19.4) were unable to work during the previous four weeks because their employer closed or lost business due to the COVID-19 pandemic. The U.S. and competitor states have similar percentages to Kentucky; all three groups (Kentucky, the U.S., and the competitor states) show percentages that are statistically similar from late spring to late summer in 2020. As the figure shows, these percentages gradually decline until early fall of 2020, and have slowly stabilized at under 1 percent during the summer of 2022.

Unable to Work Due to COVID-19 Pandemic
Kentucky, Competitor States & the U.S.

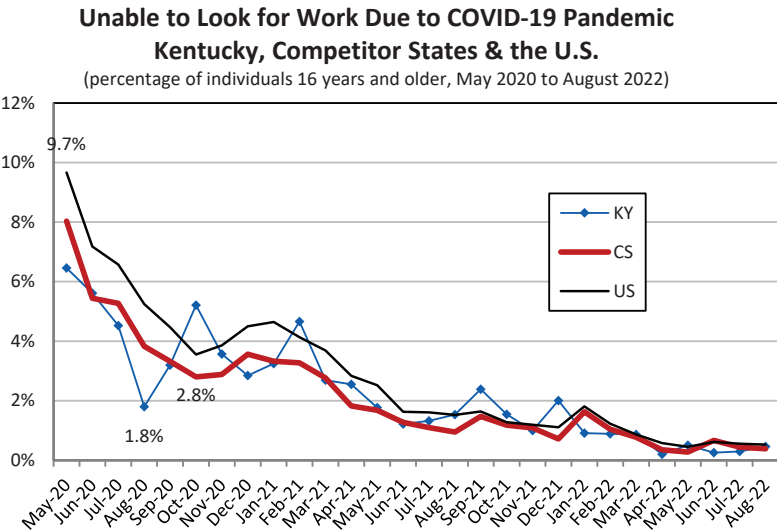
(percentage of individuals 16 years and older, May 2020 to August 2022)



Source: Author's analysis of U.S. Census CPS 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 9.0 [CPS Basic Monthly, May 2020 to August 2022]. Minneapolis, MN: IPUMS, 2021.

UNABLE TO LOOK FOR WORK DUE TO COVID

As described on the facing page, necessary closures and social distancing restrictions implemented across the country during the pandemic created obstacles for those looking for work. The percentages were higher early in the pandemic, but they are currently near zero. The volatility for Kentucky on a month-to-month basis, as illustrated in the graph, is largely a function of small sample sizes. Nonetheless, there is a statistically significant difference between Kentucky’s August of 2020 estimate (1.8%) and its October of 2020 estimate (5.2%). Generally, during the entire period shown in the graph, there are no statistically significant differences between Kentucky and the competitor states or the U.S. There are a few exceptions, however, with the U.S. significantly higher than Kentucky in May and August of 2020. The competitor states’ estimates are statistically higher than Kentucky in August of 2020 as well, but lower in October of 2020. Otherwise, all three groups (Kentucky, U.S., and competitor states) had similar experiences during this twenty-eight month period, from May of 2020 to August of 2022.



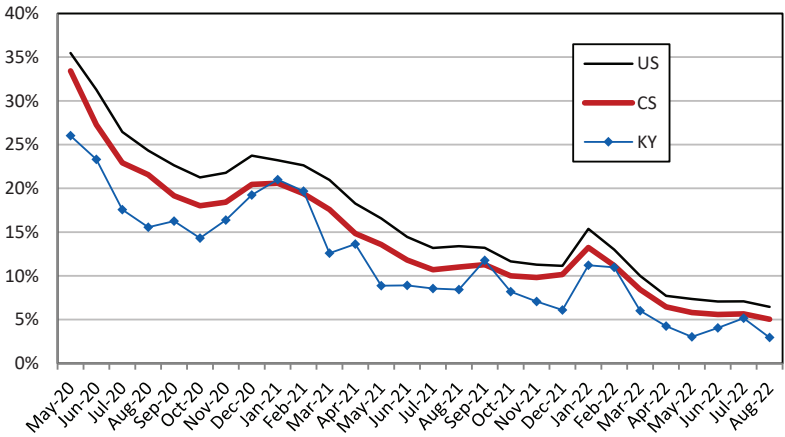
Source: Author’s analysis of U.S. Census CPS data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 9.0 [CPS Basic Monthly, May 2020 to August 2022]. Minneapolis, MN: IPUMS, 2021.

WORKED REMOTELY FOR PAY DUE TO COVID

Working remotely enhances compliance with social distancing policies used in infectious disease outbreaks; it highlights the private-sector role in the nation’s health preparedness; and it illustrates important equity issues. Our previous research shows significant differences based on income and education levels, with individuals at lower income and education levels showing lower percentages of telecommuting. Our analysis of individual-level U.S. Census data reveals statistically significant independent effects of education and income on whether an individual can work remotely or telecommute. This analysis illustrates how the less advantaged can be affected differently by disease outbreaks, disasters, and large-scale emergencies—and how workplace practices can either exacerbate or ameliorate health security. The graph below shows that the percentage of Kentuckians working remotely was 26 percent in May of 2020, but decreased to just under 12 percent by September of 2021. Since then it has declined to an estimated 3 percent, which is statistically significantly lower than the competitor states (5%) and the U.S. (6.2%). Throughout this twenty-eight month period, the U.S. average has been consistently higher than Kentucky, and in all but five months was statistically significantly higher (i.e., January, February, and September of 2021, & February and July of 2022).

Worked Remotely for Pay Due to COVID-19 Pandemic
Kentucky, Competitor States & the U.S.

(percentage of individuals 16 years and older, May 2020 to August 2022)

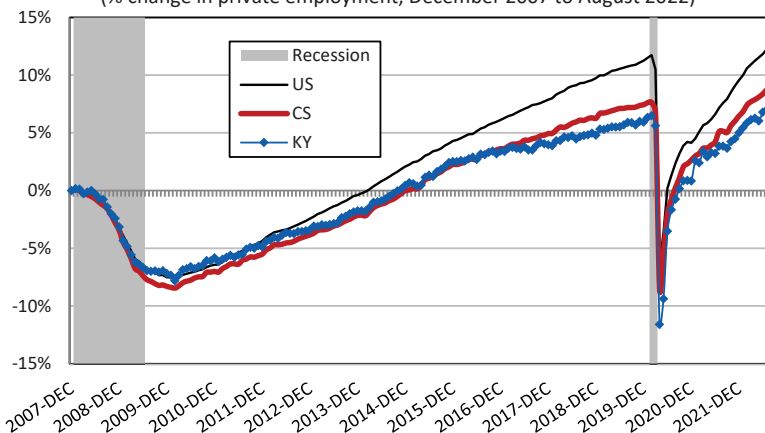


Source: Author's analysis of U.S. Census CPS data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 9.0 [CPS Basic Monthly, May 2020 to August 2022]. Minneapolis, MN: IPUMS, 2021.

JOB CHANGES

Kentucky lost nearly 121,000 jobs (seasonally adjusted) during the Great Recession, which was about 7.8 percent of the state's total private sector employment from December 2007 to February 2010. By comparison, the competitor states lost 8.5 percent and the national loss was 7.6 percent. Digging out of the Great Recession was slow, taking nearly seven years until November 2014 to reach the same level of employment it had in December 2007. The pandemic recession landed its punch in early 2020 and inflicted a loss of nearly 280,000 jobs—17 percent of Kentucky's private sector employment—in just two months. Compared to the competitor states' 15 percent plunge and the national 16.2 percent decline, Kentucky's job loss was somewhat larger. By mid-2022, Kentucky, the competitor states, and the U.S. overall had employment totals equal to their pre-pandemic levels of February 2020.

**Job Change, Kentucky, Competitor States, and the U.S.,
Peak of Last Economic Expansion to the Present**
(% change in private employment, December 2007 to August 2022)

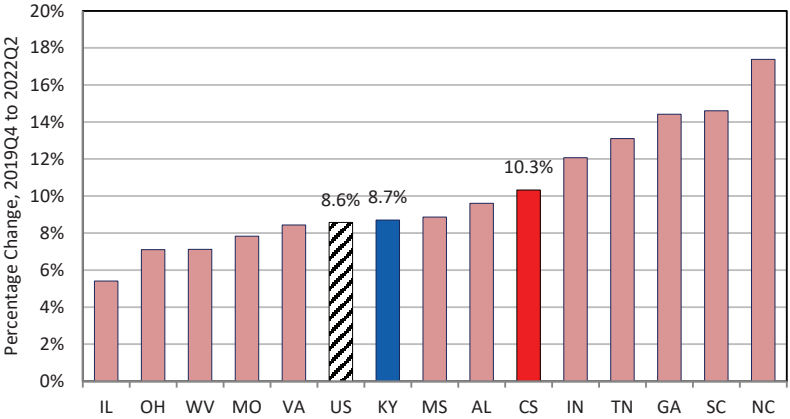


Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment, Hours, and Earnings from the Current Employment Statistics survey, total number of private employees, seasonally adjusted

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 between the peak of the economy just before the COVID-19 pandemic, which was during the fourth quarter of 2019, and the most recent data available, which is the second quarter of 2022. Over this two and a half years, *total* wages and salaries in the U.S. were 8.6 percent higher. In our region of the country, North Carolina’s 17.4 percent increase led the way. Meanwhile, Kentucky’s total wage and salary levels are up 8.7 percent, about the same as the U.S. but behind competitor state average (10.3%). On the national level, Utah has the highest wage and salary growth during this period—registering an enviable 19.1 percent increase—while North Dakota has declined the most (-2.5%).

Wage and Salary Change,
2019 (Q4) to 2022 (Q2),
Kentucky, Competitor States & the U.S.

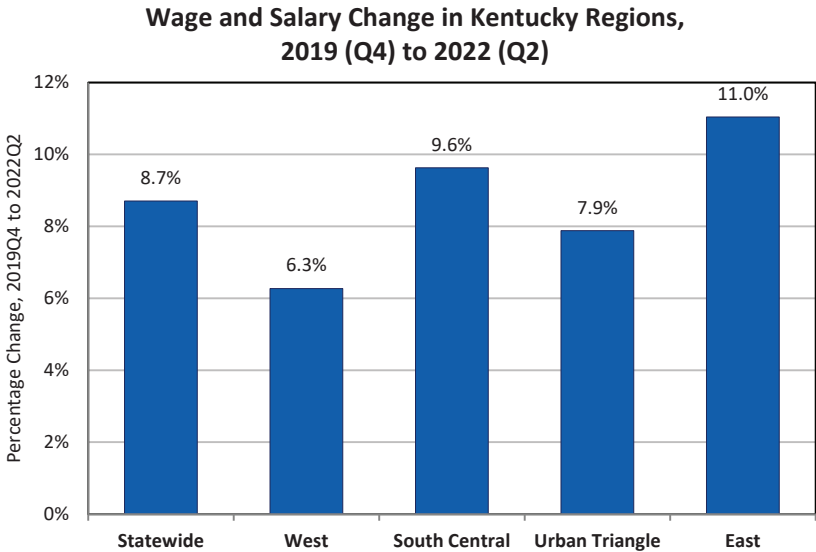


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes). The U.S. estimate is constructed from state data.
Note: CS is a weighted average of the competitor states

WAGE & SALARY CHANGE BY KENTUCKY REGION

The growth of total private wages and salaries in Kentucky and its regions is shown below. From the peak of the economic expansion just before the COVID-19 pandemic, the fourth quarter of 2019, to the most recent data available, the second quarter of 2022, there is variation across the Commonwealth’s regions. The state’s economic engine—the Urban Triangle—experienced a 7.9 percent increase (a county-level map of these four regions is available in the glossary). Similarly, Western Kentucky also experienced an increase of 6.3 percent. The largest increases in wages and salaries were in the South Central and East regions, which increased by 9.6 percent and 11 percent respectively.

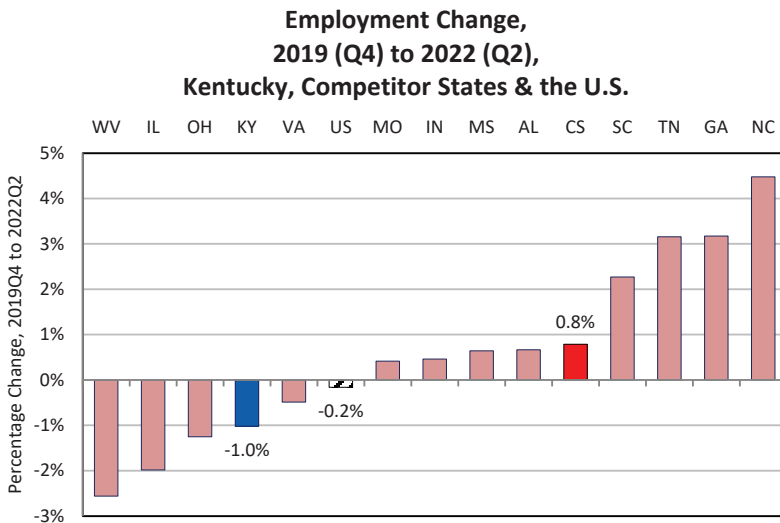
ECONOMY



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 declines between the peak of the economy just before the COVID-19 pandemic, which was during the fourth quarter of 2019, and the most recent data available, which is the second quarter of 2022. Over this two-and-a-half-year period, *total* employment in the U.S. declined 0.2 percent. Of Kentucky's competitor states, West Virginia and Illinois experienced the largest declines during this period, -2.6 percent and -2.0 percent respectively. Meanwhile, Kentucky's total employment was down 1 percent. On the national level, Hawaii experienced the largest employment decline (-8.3%), while Idaho increased employment by 8.6 percent.



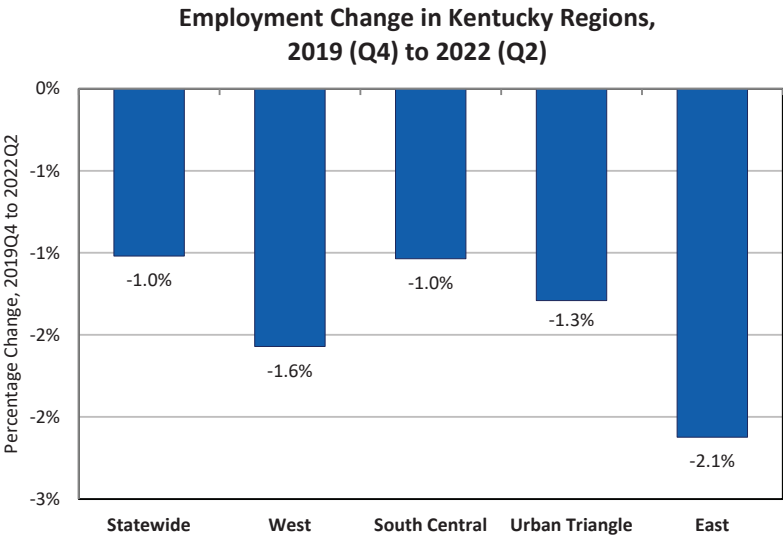
Source: Author's calculations using data from the Bureau of Labor Statistics, *Quarterly Census of Employment and Wages* (private, all industries, all sizes). The U.S. estimate is constructed from state data.

Note: CS is a weighted average of the competitor states

EMPLOYMENT CHANGE BY KENTUCKY REGION

The drop in employment in Kentucky mirrors the drop in wages and salaries. All regions of the state have experienced decreases in total employment during the COVID-19 pandemic. From the final quarter in 2019 to the second quarter of 2022, a two-and-a-half-year period, total private sector employment declined in Kentucky by 1 percent, with the largest drop experienced in Eastern Kentucky (-2.1%). The other regions are not far behind, evidenced by declines in Western Kentucky (-1.6%), the Urban Triangle (-1.3%), and the South Central region (-1.0%).

ECONOMY

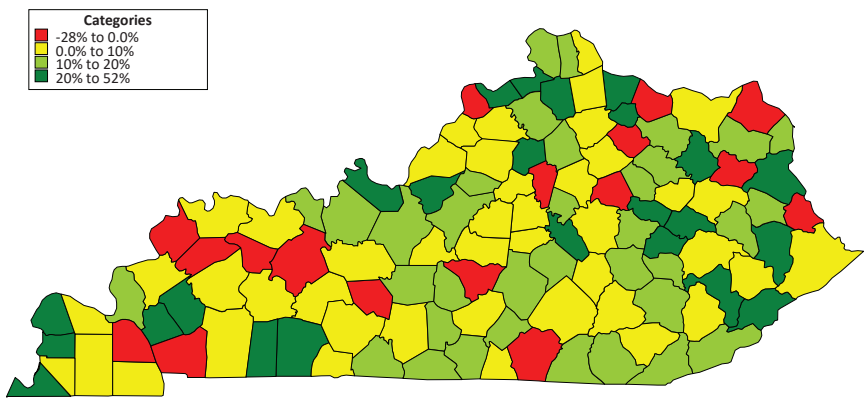


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes). See glossary for map of Kentucky regions by county.

WAGE & SALARY CHANGE BY KENTUCKY COUNTY

There is substantial variation across the Commonwealth in changes of total private sector wages and salaries demonstrated at the county level during the pandemic. The growth or decline of wages at the county level from the peak of the last economic expansion before the pandemic (i.e., 2019Q4) to the second quarter of 2022 is shown below in the county-level map. Martin County, located in Eastern Kentucky along the border with West Virginia, suffered through a 28 percent decline, while Meade County, located near Elizabethtown and Ft. Knox, enjoyed a 52 percent increase.

Wage and Salary Change During the COVID-19 Pandemic
(percentage change, 2019 Q4 to 2022 Q2)



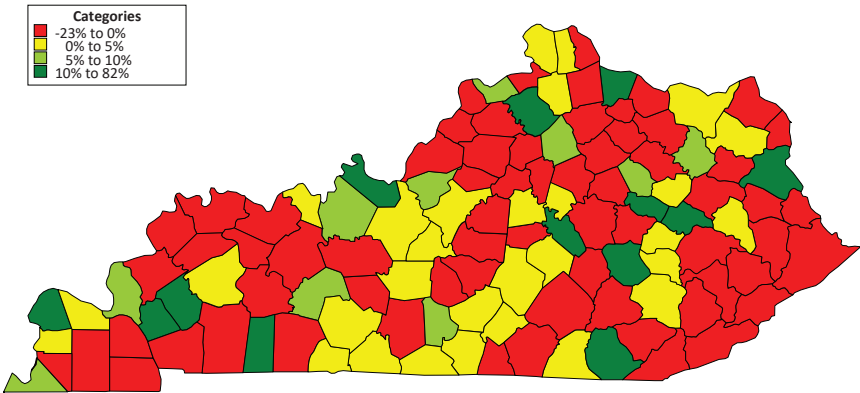
Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes).

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 peak of the last economic expansion before the pandemic (i.e., 2019Q4) to the second quarter of 2022 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 82 percent increase—the state’s largest increase.

ECONOMY

Employment Change During the COVID-19 Pandemic
(percentage change, 2019 Q4 to 2022 Q2)

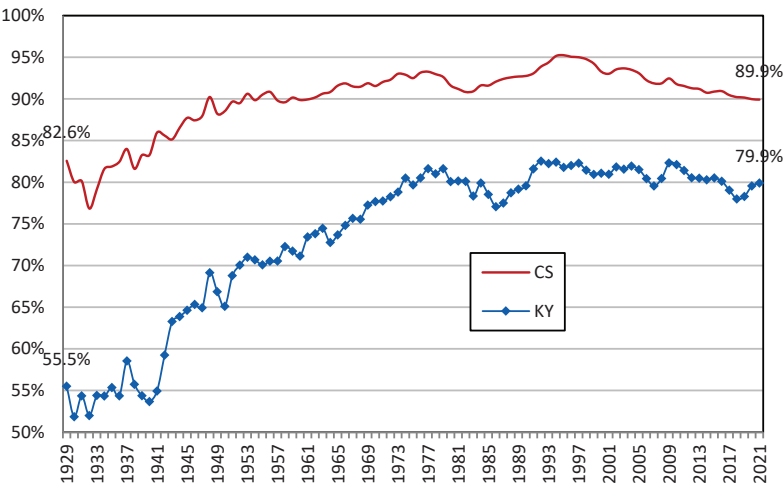


Source: Author's calculations using data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages (private, all industries, all sizes).

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 2021 it was just under 80 percent of the U.S. average while the average of the competitor states was just under 90 percent. Lagging growth in per capita income has kept Kentucky ranked in the bottom tier of states (i.e., 46th in 2021). Within Kentucky, there are marked differences between urban, somewhat rural, and mostly rural counties—as reflected in their respective 2021 per capita income levels of approximately \$56,500, \$45,260, and \$42,300.

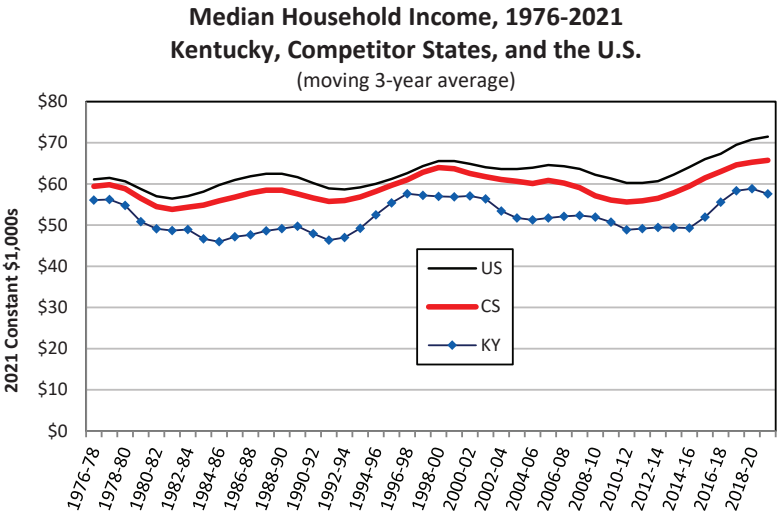
Per Capita Personal Income as a Percentage of the U.S. Average, Kentucky and Competitor States, 1929 to 2021



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

HOUSEHOLD INCOME

At about \$55,100, median household income in Kentucky is 79 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 is as high as it has been since the period from the late 1990s to the early-to-mid 2000s; 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 \$70,200 a year for a living wage. This assumes both parents work full-time, 2,080 hours per year, and each earn \$16.88 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. And, according to the Census Bureau’s American Community Survey estimates, about 809,000 Kentucky households made less than \$50,000 in 2021, which is 45.3 percent of the households.

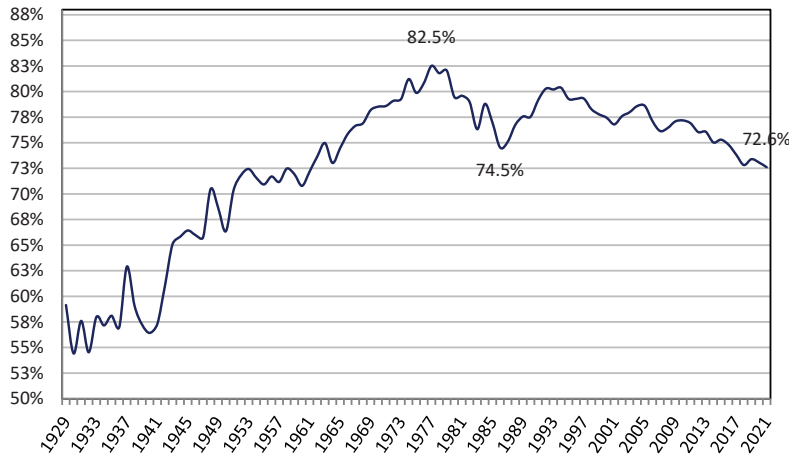


Source: Author's analysis of IPUMS-CPS data, courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 9.0 [ASEC various years]. Minneapolis, MN: IPUMS, 2021. <https://doi.org/10.18128/D030.V9.0>

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 72.6 percent. This places Kentucky at 46th compared to other states and DC, and is its lowest percentage since 1961 when it was 72.2 percent. Kentucky's current net earnings per capita is \$28,000, significantly below the highest state, Massachusetts (\$52,840) and above the lowest state, Mississippi (\$24,930). The District of Columbia (DC) has net earnings even higher than Massachusetts, at \$65,360.

Net Earnings Per Capita in Kentucky as a Percentage of the U.S. Average, 1929 to 2021

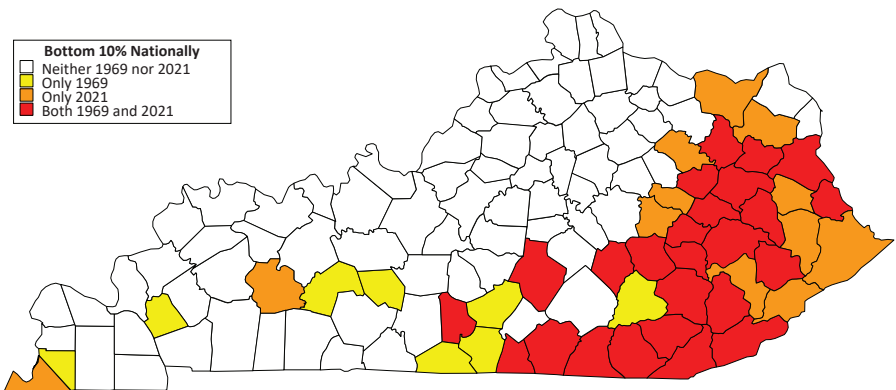


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

NET EARNINGS PER CAPITA BY COUNTY

When President Johnson’s War on Poverty was gathering steam in late 1960s, 33 of Kentucky’s 120 counties had per capita net earnings placing them in the bottom ten 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 2021—52 years later—25 of these counties, or 76 percent, were still in the bottom ten percent. Nearly half of the counties nationally (46%) and in the dozen nearby competitor states (42%) that were in the bottom ten percent in 1969 were still there in 2021. While most of these persistently poor counties are in Eastern Kentucky, the map shows several counties in the south central part of the state. Net earnings as a percentage of total personal income is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There are five Kentucky counties in the upper 10 percent of counties nationally, and an additional seven in the upper 25 percent. The rest of the state’s 108 counties are in the lower 75 percent of counties.

Kentucky Counties by Net Earnings Per Capita
(Bottom 10 Percent Nationally, 1969 and 2021)



Source: Estimated by the author using data from the Bureau of Economic Analysis

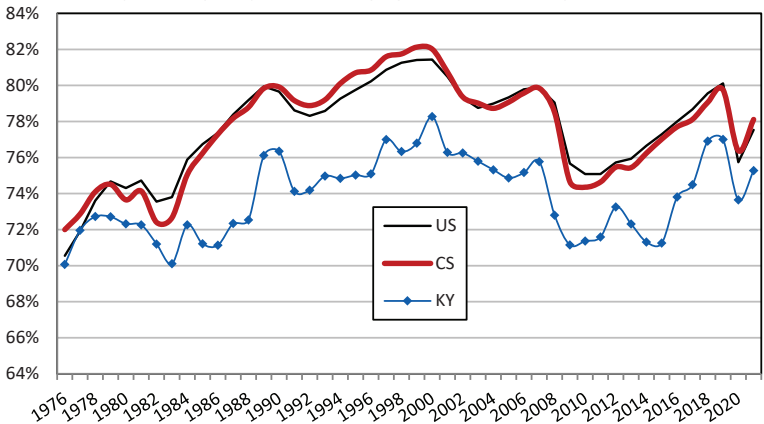
Note: Net earnings is calculated by subtracting current transfers, dividends, interest, and rent from personal income and dividing by the total population.

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 2021, Kentucky had one of the lowest employment-population ratios in the country at 75.3 percent. In fact, only three states had a ratio that is statistically significantly lower (i.e., MS, NV & NM); there are 14 states statistically the same as Kentucky while the remaining 32 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 2021

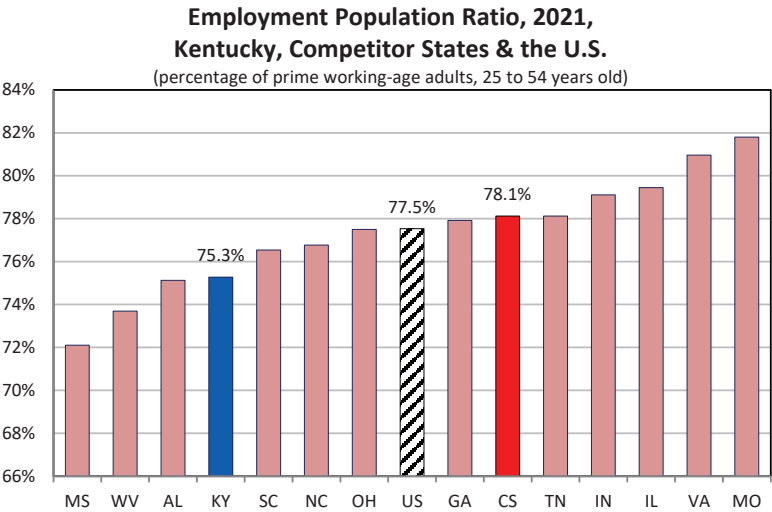
(percentage of prime working-age adults, 25 to 54 years old)



Source: Author's analysis of U.S. Census CPS data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [CPS Basic Monthly]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

EMPLOYMENT-POPULATION RATIO

Only one competitor state—Mississippi—has a (statistically significant) lower employment-population ratio than Kentucky among the prime working-age adults (25 to 54 years old). Alabama, North Carolina, South Carolina, 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. (72.1%) while North Dakota has the highest (85.5%). 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. This factor is used in the county-level assessment presented in the Summary of this report (see page xiii). There is one Kentucky county in the upper 10 percent of counties nationally, Woodford County. There are an additional twelve in the upper 25 percent. The rest of the state’s 107 counties are in the lower 75 percent of counties.

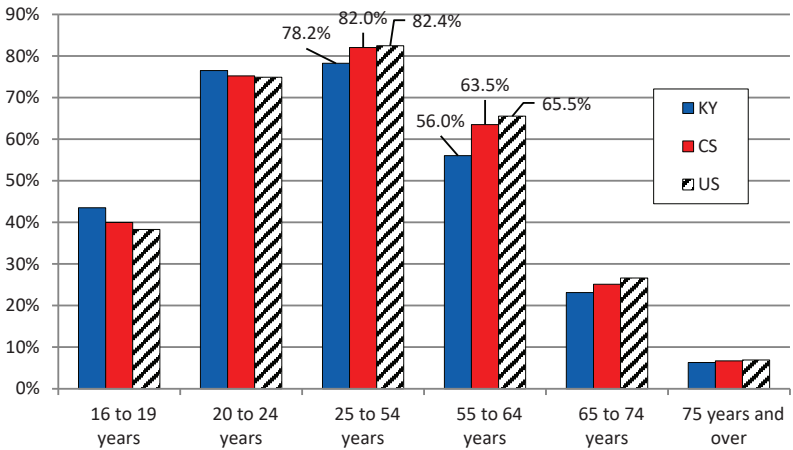


Source: Author’s analysis of U.S. Census CPS data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [CPS Basic Monthly]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

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 page. 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 2020, the U.S. labor force participation rate for individuals 16 and older was 63.4 percent and Kentucky’s was 59.5 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 78.2 percent compared to 82.4 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., 2020**
(percent of individuals in the labor force)

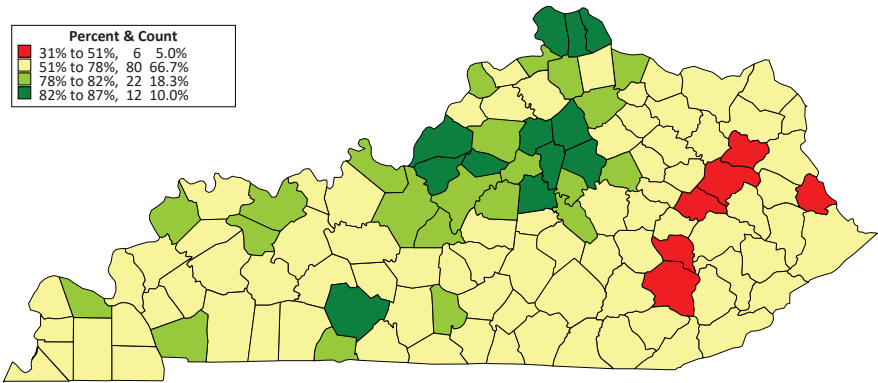


Source: U.S. Census Bureau, 2020 American Community Survey 5-Year Estimate, Table S2301

LABOR FORCE PARTICIPATION BY COUNTY

There are 12 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 82.6 percent (based on the 2020 ACS 5-Year estimate). On the other hand, there are six counties with labor force participation rates below 51 percent: Clay, Elliott, Martin, Morgan, Owsley and Wolfe. Most of the counties in the urban triangle have labor force participation rates that are at least as high as the Kentucky average (78.2%), 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. And, there are indications that substance abuse worsened in many communities during the COVID-19 pandemic.

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

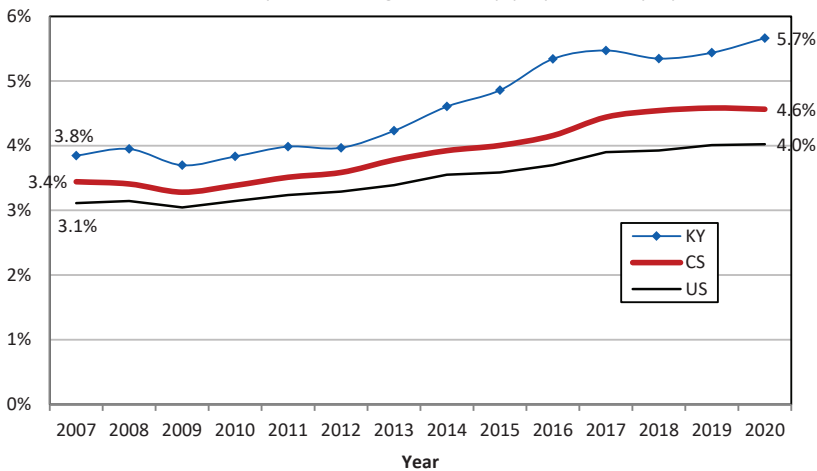


Source: American Community Survey, 2020 5-Year Estimate, Table S2301

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 majority-owned U.S. affiliate is an American business enterprise in which there is a foreign direct investment that accounts for at least 50 percent of the ownership. In Kentucky, there are an estimated 140,000 individuals employed by majority-owned U.S. affiliates. This equates to 5.7 percent, as a percentage of total full- and part-time wage, salary, and proprietor employment, in Kentucky. This is higher than the U.S. average of 4 percent, as well as the competitor state average of 4.6 percent. The percentage of employment by foreign companies has been increasing since at least 2007, but it remains to be seen how the pandemic, with its many concomitant supply-chain problems, will affect globalization in general and foreign-direct investment specifically. There are indications, for example, that several large U.S. multinational corporations are moving some of their manufacturing operations back to the United States to avoid future supply-chain problems. It is possible, perhaps likely, that foreign companies will react similarly.

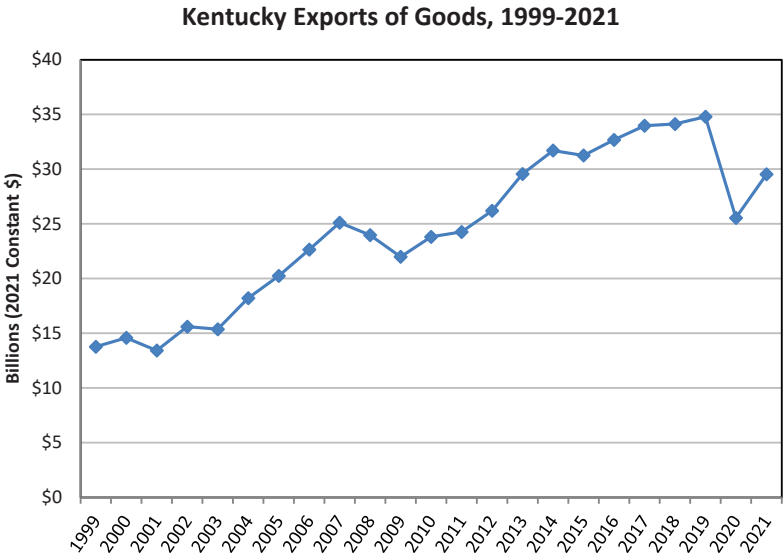
**Employment of Majority-Owned U.S. Affiliates,
2007 to 2020, Kentucky, Competitor States, & the U.S.**
(% of total full- & part-time wage and salary/proprietor employment)



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 2021 the compound annual growth rate of Kentucky’s exports is 5.6 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 increased in 2021 to \$29.5 billion, which is equivalent to 12.6 percent of Kentucky’s gross domestic product. In 2021, most of Kentucky’s exported goods went to Canada, which accounted for 27.8 percent of the total. Mexico accounts for about 9.4 percent, followed by United Kingdom (8.7%), China (8.1%), and France (6.4%). Kentucky’s businesses exported to nearly 190 different countries in 2021, but the top five and top ten countries received 60 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 \$443 million in exports, or 1.5 percent of the total. However, nearly 41 percent of the value of exported goods is accounted for by transportation equipment (e.g., aerospace and motor vehicle industries), followed by chemicals (20.5%), computer and electronic products (10.2%), and machinery-except electrical (5.7%).

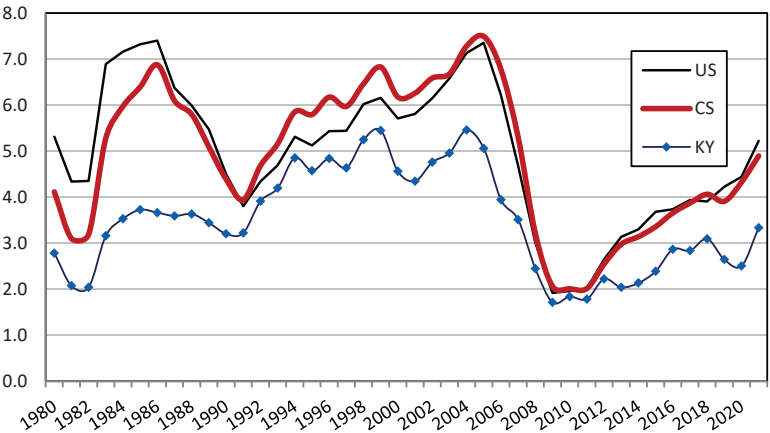


Source: Office of Trade and Industry Information (OTII), Manufacturing and Services, International Trade Administration, U.S. Department of Commerce.

HOUSING STARTS

A housing start is 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 15,000 in 2021. The overall trends nationally have seen relatively strong gains in multifamily housing, such as apartment buildings, and somewhat lackluster growth in single-family homes, which is a much bigger driver of economic growth. In Kentucky, single family homes accounted for about 10,260 of the new starts in 2021, or about 68 percent of the total market. *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 2021**
(Per 1,000 Population)

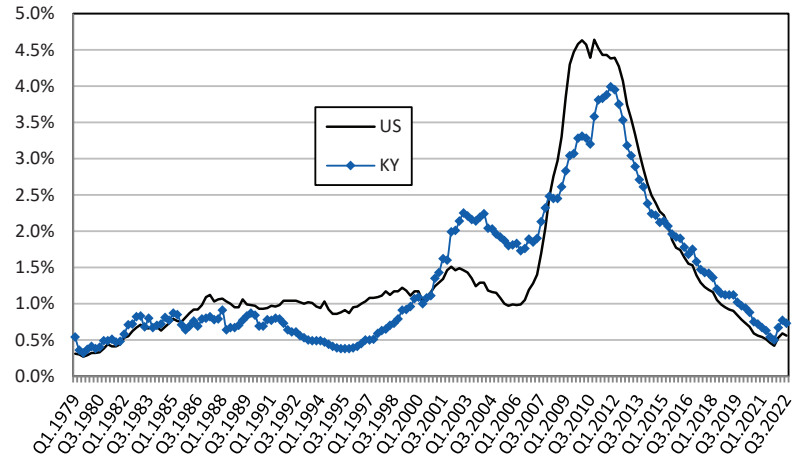


Source: U.S. Census Bureau, Building Permits Survey

FORECLOSURES

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 last economic expansion—the homeownership rate was 69 percent nationally and 75 percent in Kentucky. It became clear, however, that many of these new homeowners could not afford their homes, as evidenced in the figure below by a sharp increase in foreclosures beginning in 2008. In Kentucky, the percentage of mortgage loans in foreclosure peaked in the fourth quarter of 2011 at 4 percent. The foreclosure rate has declined since then and currently stands at 0.73 percent; the national rate is 0.56 percent. The foreclosure rates are at historically low levels, but, as evidenced in the graph below, have moved up slightly in the past year.

Mortgage Foreclosure Inventory,
Kentucky and the U.S., 1979 (Q1) to 2022 (Q3)
(foreclosures as a % of all mortgages, not seasonally adjusted)

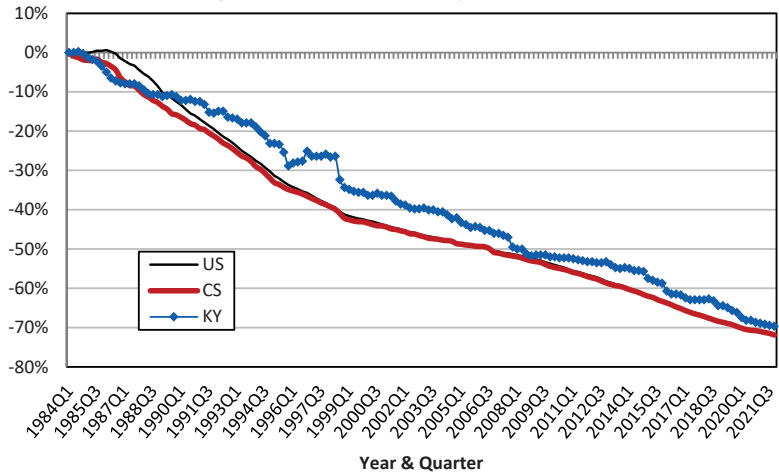


Source: Mortgage Bankers Association

COMMUNITY BANKS

Community banks—financial institutions with assets less than \$10 billion—are fundamentally important for the economic vibrancy of many regions. 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 community banks has been declining for many years. There were, for example, 402 community banks in Kentucky at the beginning of 1984, but only 122 by the end of 2021—a 70 percent decline and a loss of 14 since the Pandemic began. There has been a similar downward trend in the competitor states and the U.S. overall. While the market forces affecting banking are felt in all regions, analyses by the Federal Reserve Board show that, at least since 2005, the nation’s rural areas and small towns have been disproportionately affected.

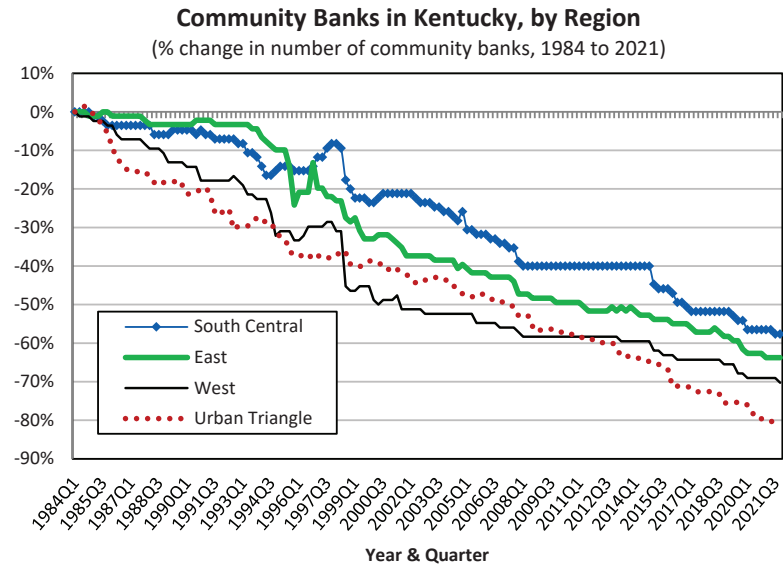
Community Banks
in Kentucky, Competitor States, & the U.S.
(% change in number of community banks, 1984 to 2021)



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

COMMUNITY 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 community banks from 1984 to 2021. Our analysis of FDIC Community Banking Study Reference Data reveals that the number of community banks with a *commercial and industrial loan specialty* (e.g., business loans) declined from 23 banks in the fourth quarter of 1984 to only one bank by the fourth quarter of 2021. Total outstanding loans (e.g., mortgages, commercial real estate, commercial and industrial, etc.) by these 23 banks at the end of 1984 totaled \$9.6 billion (in inflation adjusted 2021 dollars), compared to \$28.9 million in total outstanding loans by the **one** bank specializing in commercial and industrial loans at the end of 2021. Community banks that do not specialize in commercial and industrial loans still make business loans, but the precipitous decline in the number of community banks specializing in business loans, as well as the decline in total outstanding loans, is indicative of the challenges facing rural businesses.

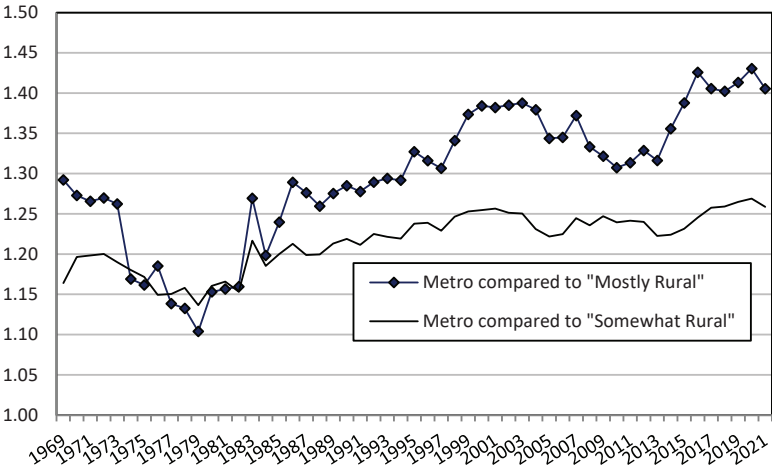


Source: Author's analysis of FDIC Community Banks Study Reference Data

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 2021, for example, earnings in metro counties were about 26 percent higher than those in “somewhat rural” counties and about 41 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, 1969-2021
(average geographically based per job earnings ratio)



Source: Bureau of Economic Analysis, CAINC30, Economic Profile
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).

Economic Security

BUFFETED BY A CONSTANT whirlwind of difficult headwinds, including coronavirus mutations, accelerating inflation, rising interest rates, and a bear market, the mental, physical, and financial security of Americans has been tested repeatedly over the last few years. Nonetheless, a majority of Americans began 2022 feeling confident about their financial well-being, according to a Federal Reserve survey conducted in the fall of 2021. The *Economic Well-Being of U.S. Households in 2021* notes that “self-reported financial well-being reached its highest level since the survey began in 2013, with 78 percent of adults doing okay or living comfortably financially.” Moreover, all racial and ethnic groups surveyed experienced gains in financial well-being.

It remains to be seen, however, if the recent gains among workers, such as increased flexibility in work arrangements and strong wage growth within selected sectors, represents a long-lasting reset in the work-life balance or is a temporary reprieve from long-term trends.

The four tickets to the middle class—higher education, good health care, a house, and a retirement nest egg—are increasingly beyond the financial reach of too many Americans. In this annual economic report, we present our analysis of how middle-class families have become less economically secure. For at least 40 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—

continued on the next page



continued from the previous page

what some might consider “lower middle class”—declined 2.5 percent in real dollars. By comparison, incomes at the 75th percentile, or “upper middle class,” increased for Kentucky and the U.S. by around 18.5 and 33.8 percent, respectively, in real dollars, from the late 1970s to about 2021.

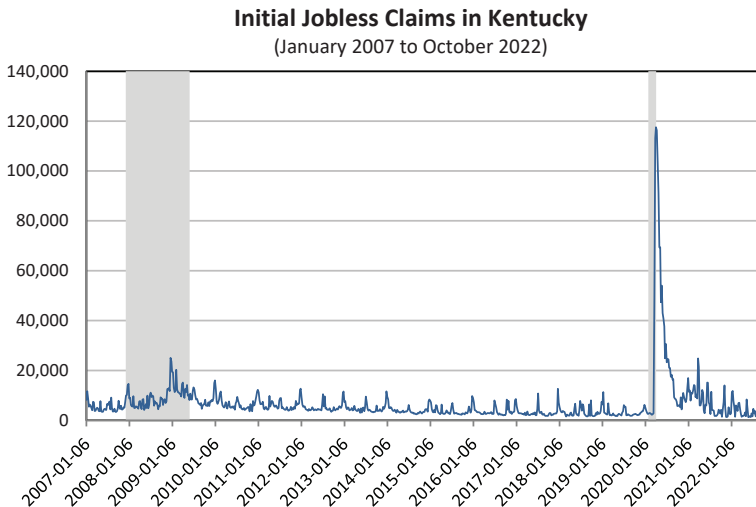
Automation has been the principal cause of stagnant wages for less-skilled workers, according to a June 2021 working paper by economists Daron Acemoglu and Pascual Restrepo, *Tasks, Automation, and the Rise in US Wage Inequality*. They conclude that “between 50% and 70% of changes in the US wage structure 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.” There is evidence that the tight labor market and social distancing requirements during the pandemic has accelerated automation. With the growing power and sophistication of artificial intelligence, jobs with higher-skilled tasks might begin to lose their immunity to automation.

The pandemic has brought the importance of worker flexibility to the forefront of economic security. With schools going virtual, businesses sending their workers home to work, and people buying basic household goods online, having a computer or smartphone connected to the internet has 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 and education have a distinct advantage in worker flexibility and capability during times of social isolation. 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 the foundation of economic security.

Factors from the last few years have exacerbated existing trends that threaten economic security. The bounty of the economic expansion since the Great Recession was not distributed evenly across industries, geographies, and individuals—and the COVID Pandemic exacerbated conditions for wide swaths of the population. Many 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. Only time will tell whether recent gains for workers, especially at lower income levels, represent the beginning of a shifting current that benefits a majority of working Americans, or a reprieve that will be a short-term abeyance.

JOBLESS CLAIMS

The COVID-19 pandemic shook the foundation of economic security for many Americans, as evidenced by the unprecedented spike in the number of jobless claims beginning in March of 2020. The chart below shows initial jobless claims in Kentucky, from January 2007 (just before the onset of the Great Recession) to October 2022. The gray areas in the chart mark the dates for economic recessions. As one can see, the spike in jobless claims during the COVID pandemic overshadows the increase during the Great Recession. From late March 2020 to late April 2020, over 100,000 Kentuckians, on average, were filing for unemployment benefits each week. The economic dislocation caused by the pandemic, as suggested by the pattern of initial jobless claims, subjected many households to extreme financial stress. In October 2021, however, Kentucky's (seasonally adjusted) unemployment rate was 4.2 percent, nearly the level of October 2019, just prior to the onset of the pandemic, when it was 4.1 percent. By late summer of 2022, Kentucky's unemployment rate was 3.8 percent, the lowest ever recorded since the U.S. Bureau of Labor and Statistics began reporting state rates in 1976.

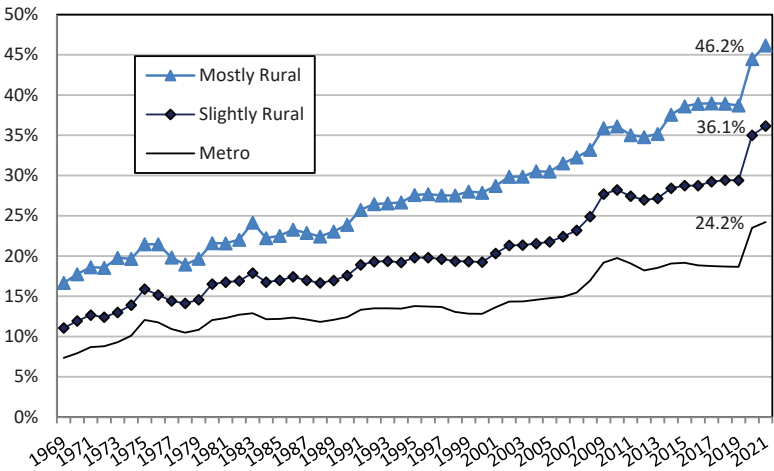


Source: U.S. Employment and Training Administration, Initial Claims in Kentucky [KYICLAIMS], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/KYICLAIMS>, October 7, 2022.

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 21.7 percent of total personal income in the U.S., up from 16.9 percent in 2019. In Kentucky, transfer payments account for 30.2 percent of total personal income, which is an increase from 23.9 percent in 2019. The large increase in transfer payments from 2019 to 2021 reflects the various federal stimulus programs designed to counteract the pandemic-induced downward pressure on the economy. 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 (46.2% in 2021), than slightly rural (36.1%) or metro counties (24.2%).

Kentucky Income Transfers by County Type, 1969-2021
(as a percentage of total personal income)



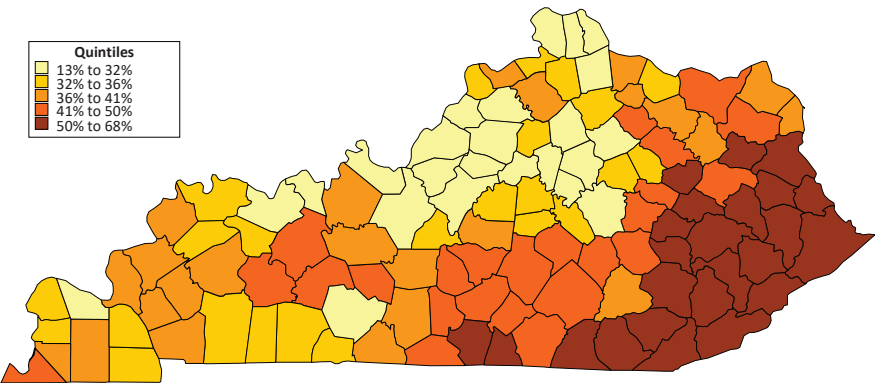
Source: Bureau of Economic Analysis, CAINC30, Economic Profile

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).

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 21.7 percent of total personal income for the U.S. (30.2 percent for Kentucky statewide)—but several Kentucky counties are significantly higher than the national and state averages. There are twenty-four Kentucky counties over 50 percent, and 56 counties where transfer payments are over 40 percent of personal income; this is nearly half of the state’s counties. The percentages for Kentucky’s metro, slightly rural, and mostly rural counties are, respectively, approximately 24, 36, and 46. 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.

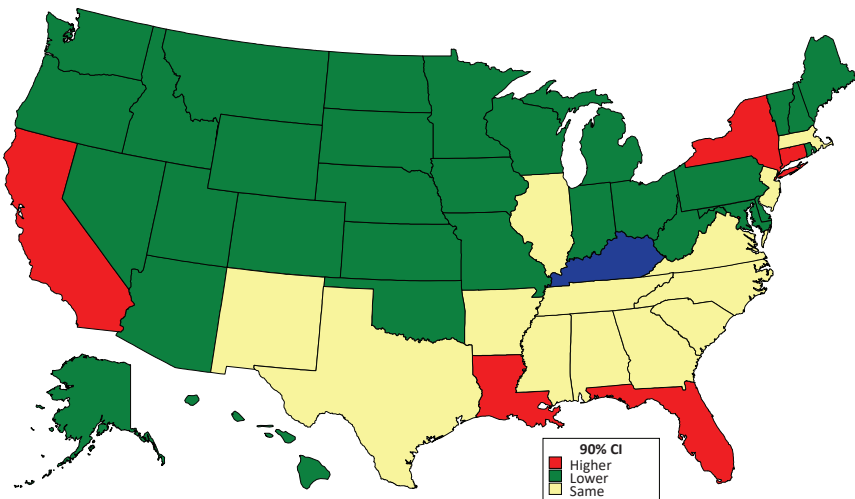
Transfer Payments by County, 2021
(as a percentage of total personal income)



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 2020 is estimated at 0.482. The Census Bureau estimated that in 2020 the “richest” 20 percent of households had 52.2 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 (.478), has a higher Gini Index (more inequality) than 31 states, and is lower than 5 states and DC; it is statistically the same as 13 states. The two highest Gini Index values belong to DC (.527) and New York (.514); Alaska (.423) and Utah (.422) have the lowest values.

GINI Index of Income Inequality, 2020

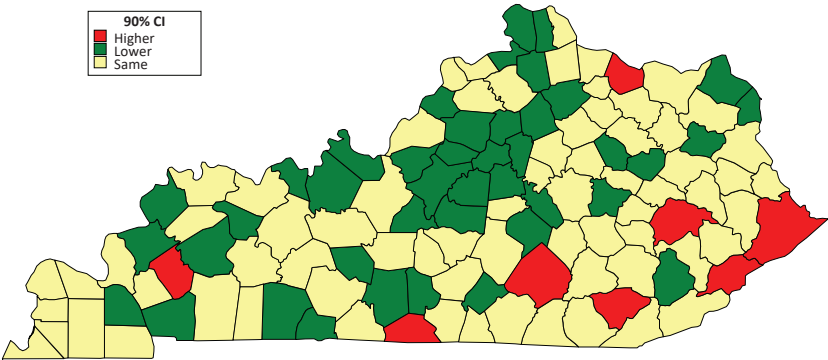


Source: U.S. Census Bureau, 2020 5-Year American Community Survey

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 interval (.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 *inequality*) 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)

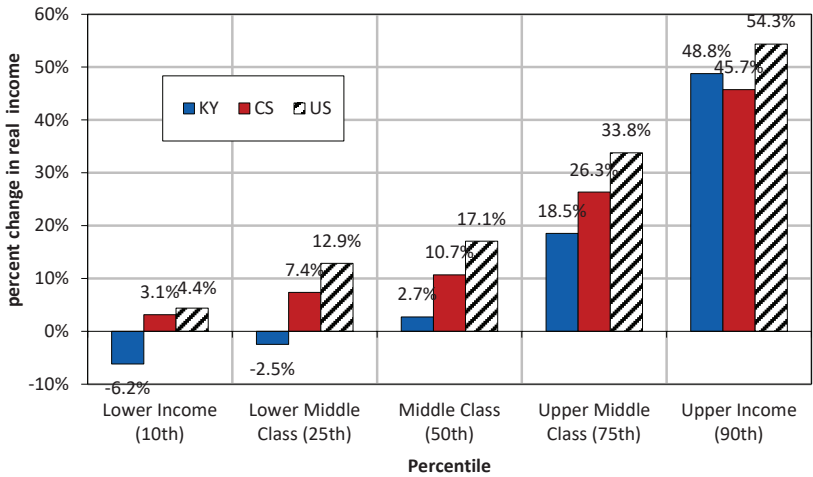


Source: U.S. Census Bureau, 2020 5-Year American Community Survey

HOUSEHOLD INCOME GROWTH

Middle-class families have become less economically secure. Over the last 40 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 2.5 percent compared to a 12.9 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 18.5 and 33.8 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 6.2 percent at the lower income level and *increasing* by 48.8 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.

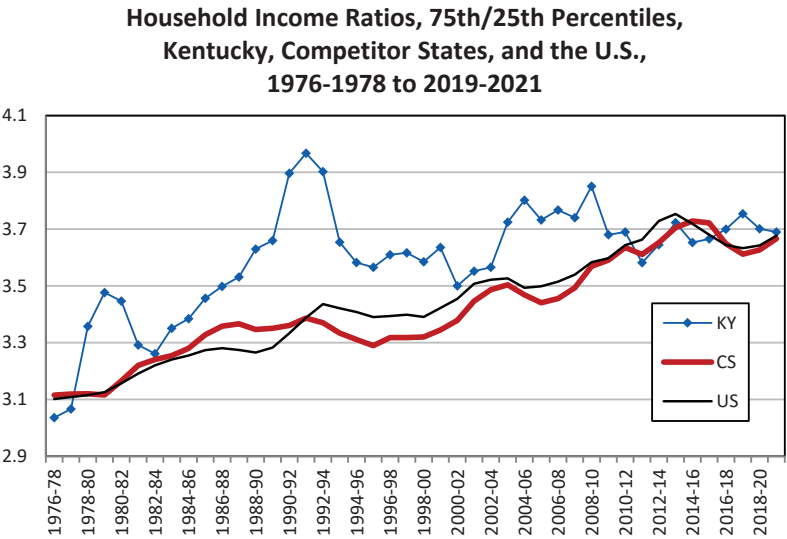
**Changes in Household Income, by Income Level,
1976-78 to 2019-21, KY, Competitor States and the U.S.**
(based on three-year averages of 2021 dollars)



Source: Author’s analysis of IPUMS-CPS 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 [ASEC various years]. Minneapolis, MN: IPUMS, 2021. <https://doi.org/10.18128/D030.V9.0>

HOUSEHOLD INCOME RATIO

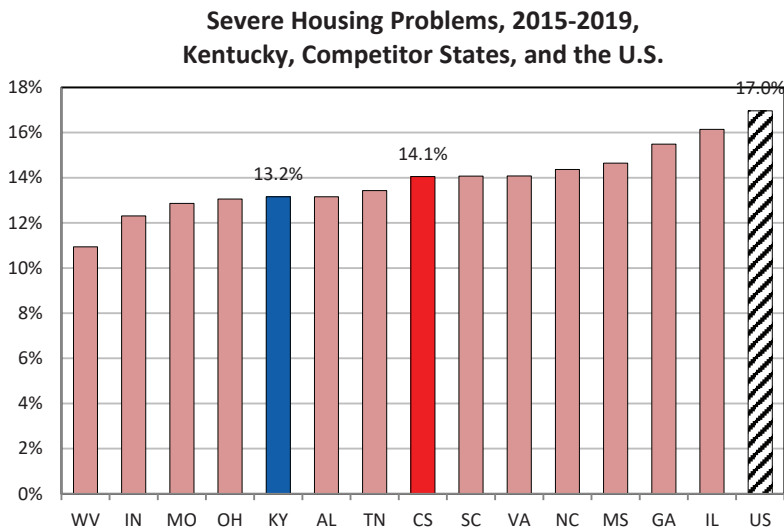
Household incomes at the 25th and 75th percentiles can be viewed as boundaries around America’s middle class. In the late 1970s, upper middle class households—those at the 75th percentile—had incomes about 3 times larger than lower middle class households, which are those at the 25th percentile; this is true of Kentucky, its competitor states, and the United States overall, where the ratios were 3, 3.1, and 3.1, respectively, around 40 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 late 2010s. 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.



Source: Author's analysis of IPUMS-CPS 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 [ASEC various years]. Minneapolis, MN: IPUMS, 2021. <https://doi.org/10.18128/D030.V9.0>

SEVERE HOUSING PROBLEMS

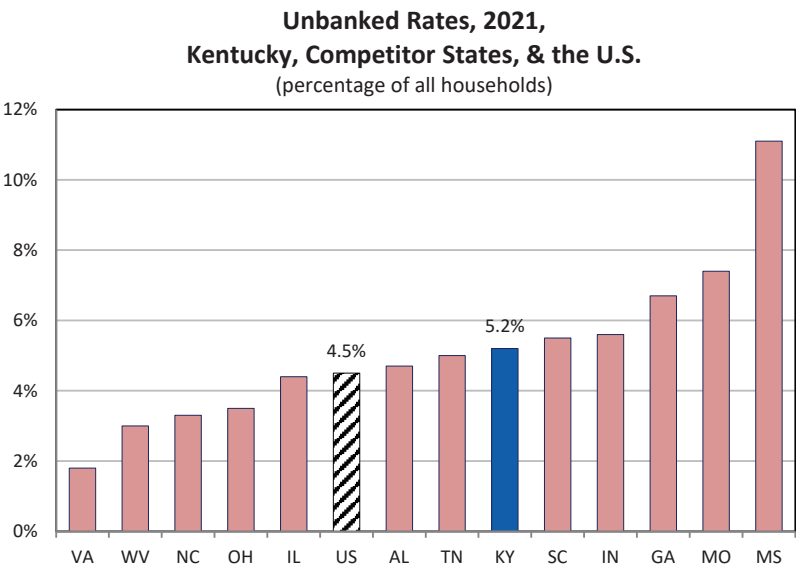
An estimated 17 percent of the occupied housing units in the U.S. have at least one severe housing problem, as defined by the U.S. Department of Housing and Urban Development, based on its Comprehensive Housing Affordability Strategy (CHAS, 2015-2019). The Kentucky percentage is lower (13.2%). An occupied 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. 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."



Source: U.S. Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy (CHAS) 2015-2019 survey, accessed November 30, 2022 <<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 5.2 percent, Kentucky households are slightly more likely to be “unbanked” than the U.S. (4.5%). The U.S. experienced a statistically significant decrease in the unbanked rate from 5.4 percent in 2019 to 4.5 percent in 2021. 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 5.2 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.

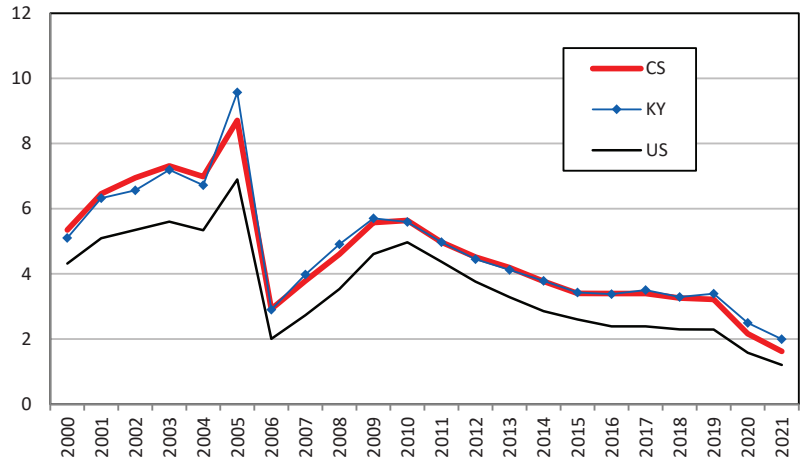


Source: Federal Deposit Insurance Corporation, *How America Banks*, FDIC 2021 Survey

PERSONAL BANKRUPTCIES

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 2021 was 2.0 bankruptcies per 1,000 population. The U.S. average has been somewhat lower over the 2000-2021 period, and stood at 1.6 in 2021. Overall, the bankruptcy rate has been on a downward trend since 2010, and is at its lowest point in the last twenty years. The number of personal bankruptcy filings were *down* 9 percent nationally in the first three quarters of 2022 compared to the first three quarters of 2021.

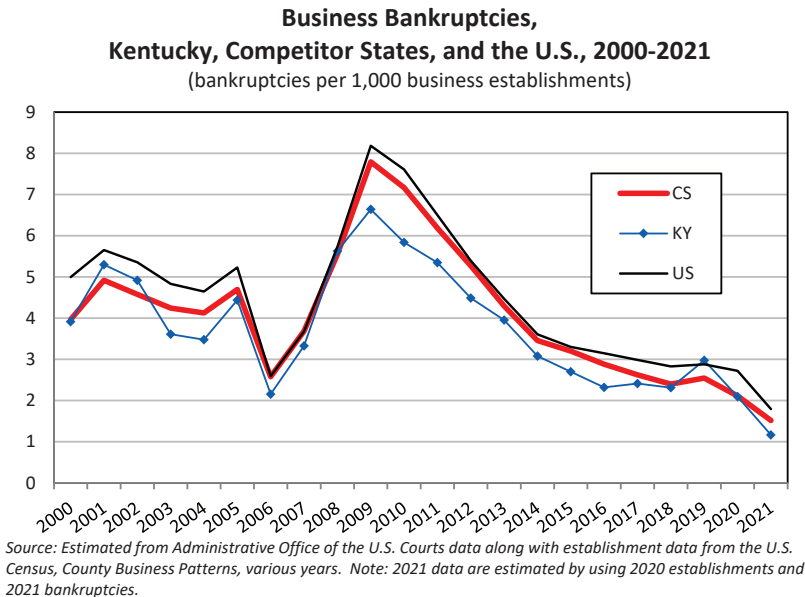
Personal Bankruptcies,
Kentucky, Competitor States, and the U.S., 2000-2021
(bankruptcies per 1,000 population)



Source: Estimated using data from Administrative Office of the U.S. Courts & Census data, various years.

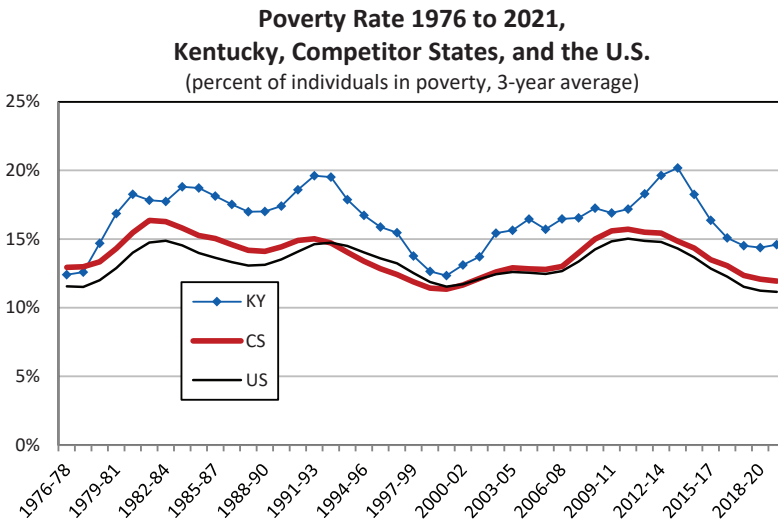
BUSINESS BANKRUPTCIES

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 14,347 in 2021. When expressed as a percentage of business establishments, Kentucky has been lower than the competitor states and the U.S. most years. However, it spiked up in Kentucky in 2019, but has since decreased to 1.2 businesses per 1,000 business establishments in 2021. This is, by far, the lowest level over the last twenty years. Business bankruptcy filings across the U.S. in the first three quarters of 2022 (January through September) are 11 percent *lower* than the number filed in the first three quarters of 2021.



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 13 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 2021 American Community Survey 1-year estimate, another estimate of the poverty rate, Kentucky's poverty rate is 16.5 percent, which is higher than the U.S. (12.8%) poverty estimate. More information about the definition of poverty, the poverty rate, and the poverty threshold is in the Glossary of this report.

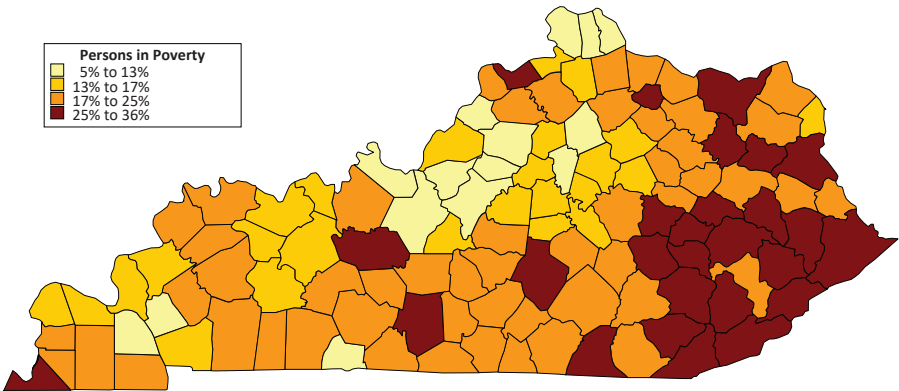


Source: Author's analysis of IPUMS-CPS data, Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [ASEC various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

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—Breathitt, Clay, Harlan, Knox and Wolfe Counties. Meanwhile, Boone, Oldham, Nelson, and Spencer 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 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" (23.4%) counties have higher poverty rates than "slightly rural" (18.3%) or metro counties (13.5%). The U.S. average poverty rate (12.8%) is much lower than Kentucky's statewide average (16.6%), based on the U.S. Census 2020 American Community Survey 5-year estimate. The poverty rate is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There are four Kentucky counties in the upper 10 percent of counties nationally (for having low poverty rates), and an additional three in the upper 25 percent (again, for lower poverty). The rest of the state's 113 counties are in the lower 75 percent of counties for higher rates of poverty.

Kentucky County-Level Poverty Rates, 2016-2020

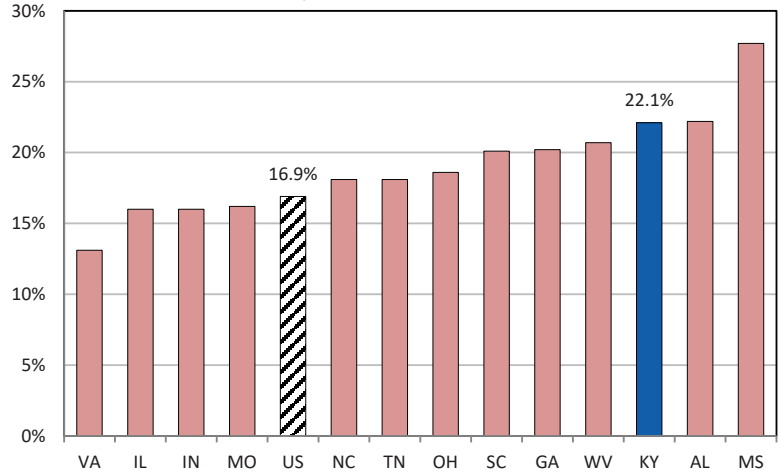


Source: American Community Survey, 2020 5-Year Estimate, Table S1701

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 2021 was 22.1 percent, significantly higher than the U.S. rate of 16.9 percent. Nationally, only two states have child poverty rates statistically significantly higher than Kentucky (i.e., Louisiana and Mississippi). At 27.7 percent, Mississippi has the highest child poverty rate in the nation; New Hampshire is the lowest with a child poverty rate of 9.2 percent.

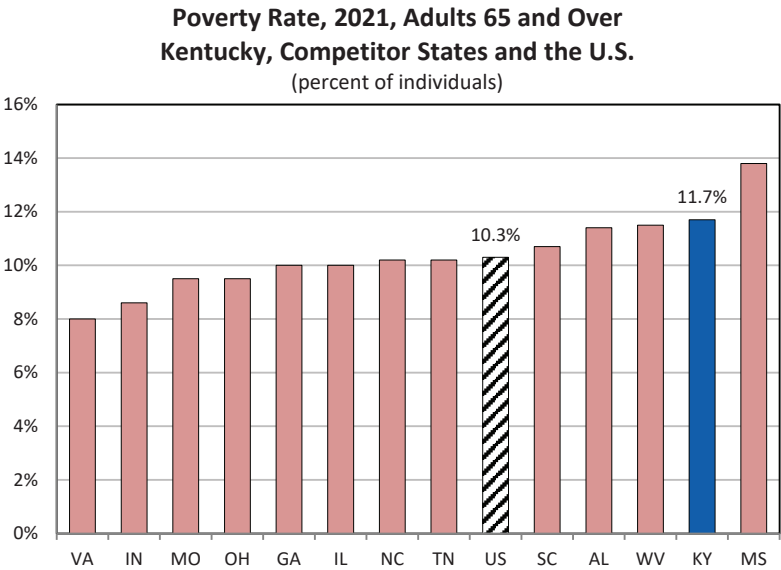
Poverty Rate, 2021, Children Under 18,
Kentucky, Competitor States and the U.S.
(percent of individuals)



Source: 2021 American Community Survey 1-Year Estimates, Table S1701

ELDER POVERTY

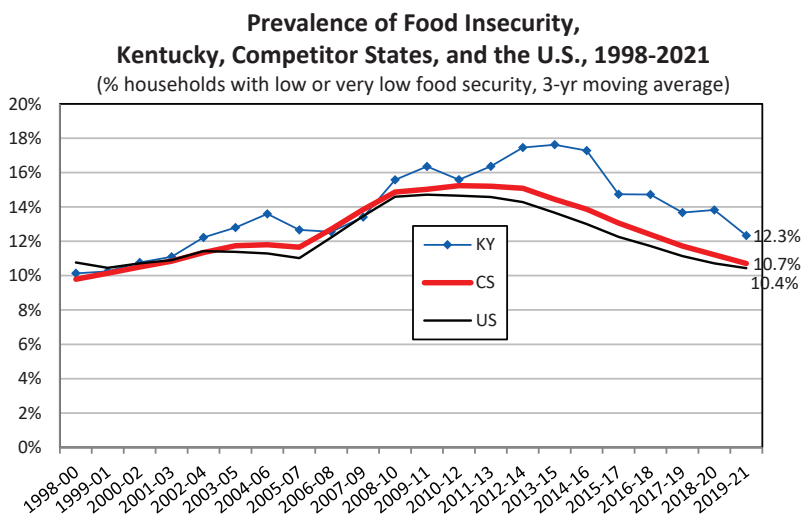
At 11.7 percent, Kentucky’s population of persons aged 65 and older who live below the poverty level is higher than most of the competitor states as well as the U.S. average of 10.3 percent. According to the (EBRI) Employee Benefit Research Institute’s *2022 Retirement Confidence Survey*, which is a national survey, 77 percent of retirees are confident they have enough money for a comfortable retirement. Researchers also found that 84 percent of retirees feel confident they will have enough money to take care of basic expenses in retirement, and 78 percent are confident that they have enough money to take care of medical expenses. 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-third of American workers feel very confident about their ability to afford a comfortable retirement.”



Source: 2021 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 insecurity has generally been higher in Kentucky than in the competitor states or the U.S. for the past decade. According to a September 2022 USDA report, *Household Food Security in the United States in 2021*, an estimated 12.3 percent of Kentucky households experienced low or very low food security, on average, during the 2019 to 2021 period. This is a rate that is statistically significantly higher than the U.S. overall (10.4%) 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.

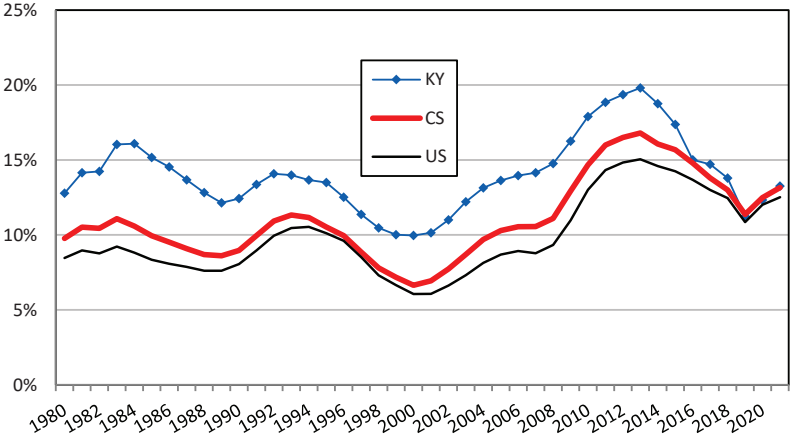


Source: Author's analysis of data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [Food Security Supplement, various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

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 2021, an estimated 13.3 percent of Kentucky’s population participated in the FSP, a similar percentage as both the competitor states (13.2%) and the U.S. (12.5%). SNAP benefits are dependent on, among other factors, family size and income levels—with the average SNAP recipient in the U.S. costing about \$218 a month. The average per person cost in Kentucky is around \$225.

Food Stamp Program, Average Monthly Participation, Kentucky, Competitor States, and the U.S., 1980-2021
(percent of the total population)

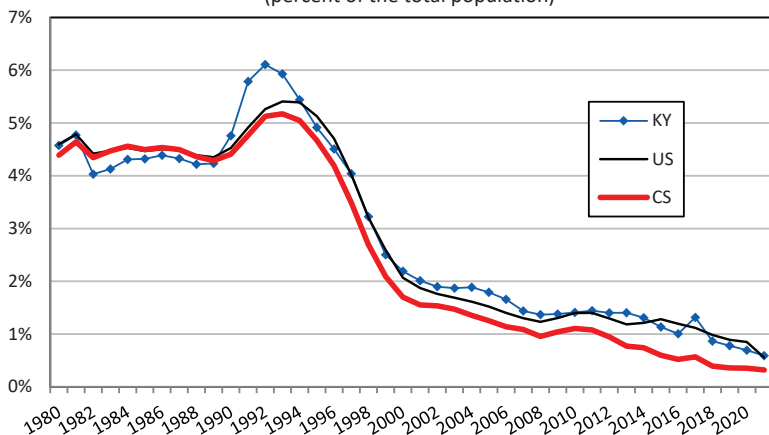


Source: University of Kentucky Center for Poverty Research. 2022. “UKCPR National Welfare Data, 1980-2020.” URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 SNAP recipients <<https://www.fns.usda.gov/sites/default/files/resource-files/SNAPZip69throughCurrent-10.zip>>.

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 26,600 in 2021; roughly 85 percent of the recipients in 2021 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 2021, about 0.6 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 \$500 in 2022.

**AFDC/TANF Recipients,
Kentucky, Competitor States, and the U.S., 1980-2021**
(percent of the total population)



Source: University of Kentucky Center for Poverty Research. 2022. "UKCPR National Welfare Data, 1980-2020." URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 TANF recipients <<https://www.acf.hhs.gov/ofa/data/tanf-caseload-data-2021>>.

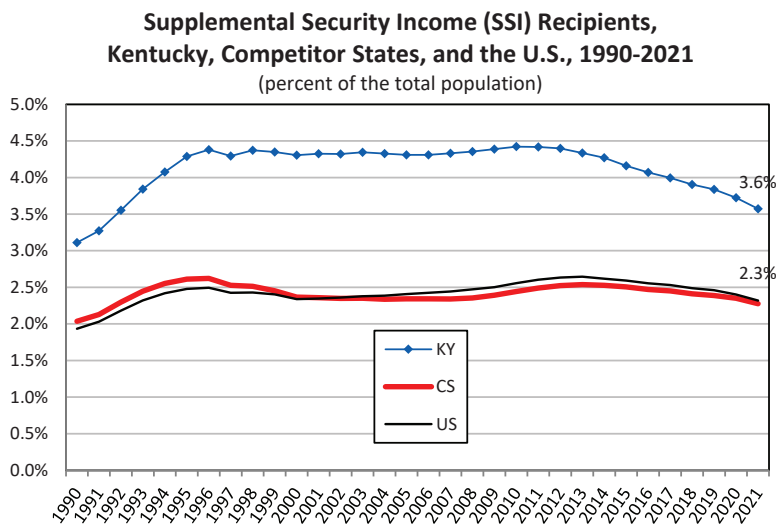
MEDICAID BENEFICIARIES

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 \$11.5 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 2019-2021*, 33.5 percent of Kentucky state government expenditures were for Medicaid in FY2021. The percentage of the population on Medicaid in Kentucky, the competitor states, and the U.S. is 35, 25 and 27 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 57 percent increase in enrollment, compared to Kentucky’s 159 percent.

Total Monthly Medicaid and CHIP Enrollment, Pre-ACA Compared to July 2022, 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	89,960,717	57%	27%
AL	799,176	1,135,431	42%	23%
GA	1,535,090	2,387,169	56%	22%
IL	2,626,943	3,654,106	39%	29%
IN	1,120,674	1,940,766	73%	29%
KY	606,805	1,571,310	159%	35%
MS	615,556	743,139	21%	25%
MO	846,084	1,310,291	55%	21%
NC	1,595,952	2,259,950	42%	21%
OH	2,130,322	3,270,899	54%	28%
SC	889,744	1,259,803	42%	24%
TN	1,244,516	1,732,293	39%	25%
VA	935,434	1,930,611	106%	22%
WV	354,544	626,789	77%	35%
CS	14,694,035	22,251,247	51%	25%
Source: Kaiser Family Foundation, derived from CMS, Medicaid & CHIP Monthly Applications, Eligibility Determinations, and Enrollment Reports: January 2014 - July 2022 (preliminary), as of October 28, 2022.				
Note: CS is a weighted average of the competitor states.				

SUPPLEMENTAL SECURITY INCOME (SSI)

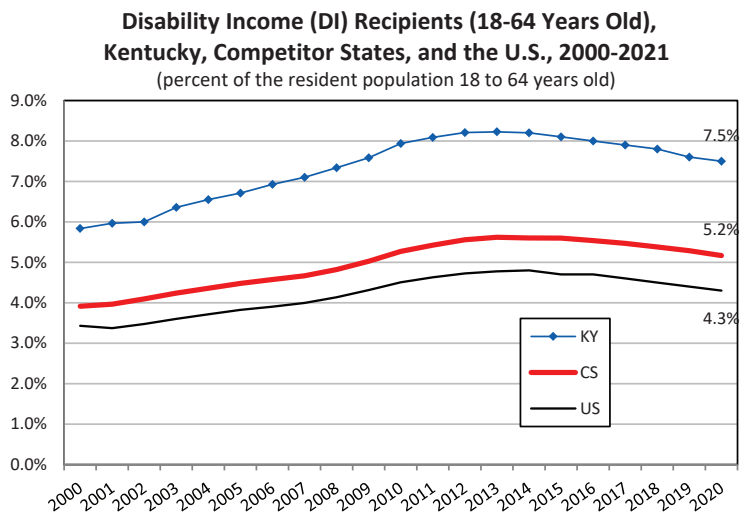
The Supplemental Security Income (SSI) is a Federal income supplement program that is administered by the Social Security Administration (SSA) and funded by general tax revenues (not Social Security taxes). According to the SSA, “It is designed to help aged, blind, and disabled people, who have little or no income, and it provides cash to meet basic needs for food, clothing, and shelter.” Of Kentucky’s 161,150 recipients in 2021, 5 percent were aged and 95 percent were blind and/or disabled. Just over one-third of the recipients were either under 18 (14%) or over 64 years old (20%). As is evident by the figure, the percentage of Kentuckians receiving SSI benefits, 3.6 percent, is much higher than the U.S. or competitive state averages (2.3%).



Source: University of Kentucky Center for Poverty Research. 2022. “UKCPR National Welfare Data, 1980-2020.” URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 SSI recipients, Table 10 <https://www.ssa.gov/policy/docs/statcomps/ssi_asr/2021/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 7.1 percent, markedly higher than both the competitor state (4.9%) and U.S. (4.1%) averages. The average monthly benefit nationally for disabled workers is about \$1,358.

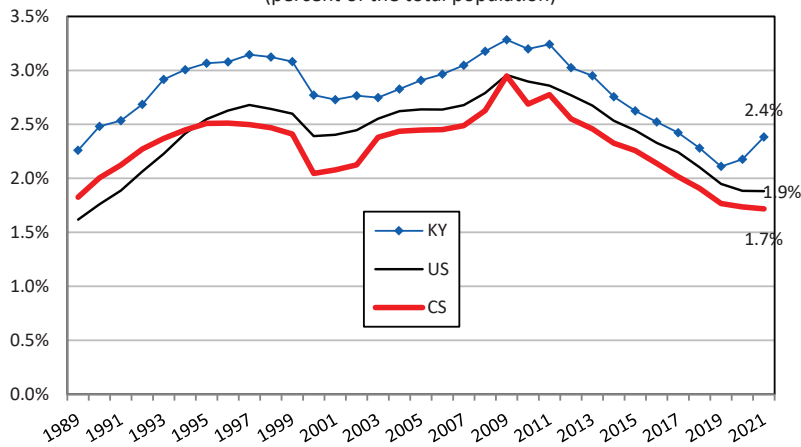


Source: Social Security Administration, Annual Statistical Report on the Social Security Disability Insurance Program, various years <available at https://www.ssa.gov/policy/docs/statcomps/di_asr/2021/>.

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 2.4 percent of the population receives WIC benefits; participation has increased markedly since 2019. While Kentucky’s percentage increased during the pandemic, the U.S. (1.9%) and competitor states (1.7%) continued to decrease in 2021.

**Women, Infants, and Children (WIC) Recipients,
Kentucky, Competitor States, and the U.S., 1989-2021**
(percent of the total population)

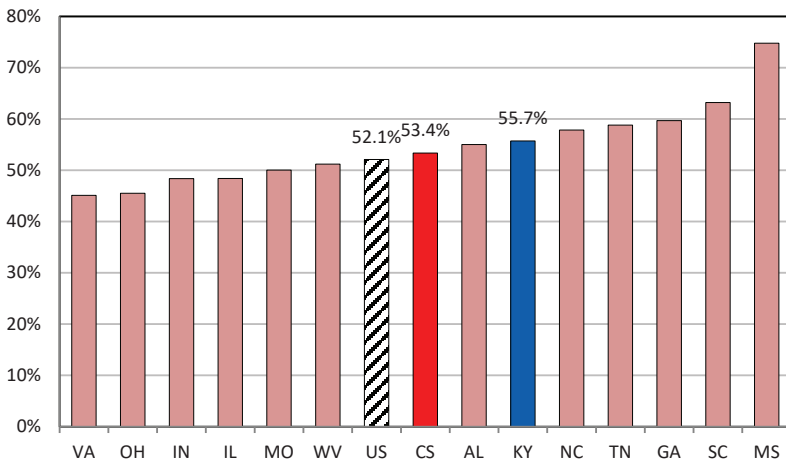


Source: University of Kentucky Center for Poverty Research. 2022. “UKCPR National Welfare Data, 1980-2020.” URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 WIC recipients available here: <<https://fjns-prod.azureedge.us/sites/default/files/resource-files/26wifypart-10.xls>>.

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. A student's eligibility for the free-lunch program is determined by household income and size. During the 2019-2020 school year, Kentucky ranked above the national average with 55.7 percent of public school students eligible for a free- or reduced-priced lunch. The national average is 52.1 percent. Among the 50 states, Mississippi has the highest percentage at 74.8 percent while New Hampshire has the lowest at 24.7 percent.

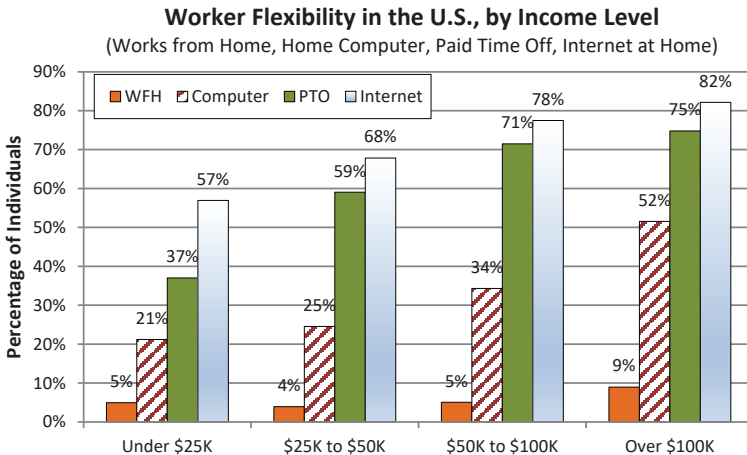
**Students Eligible for Free or Reduced-Price Lunch,
2019-20, Kentucky, Competitor States, and the U.S.**
(percent of public school students, school year 2019-20)



Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "Public Elementary/Secondary School Universe Survey," 2019-20, downloaded 6/10/2022

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.



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

THE MOST CONSEQUENTIAL factor affecting Kentucky's future is *education*. The skills, knowledge and abilities of our people are to prosperity what the quality of soil is to a growing tree. Without a highly educated population and skilled workforce, Kentucky can grow, but it will not flourish.

Despite the importance of education, it has not always ranked high as a public-policy priority. Historian William E. Ellis wrote in *A History of Education in Kentucky* (2011) that "the quality of education in Kentucky has always been considered substandard compared to the rest of the nation..." It is not hard to marshal evidence to support this claim. He writes that "in 1970 Kentucky stood last in median years of schooling and tied for forty-eighth in the years of high school completed. Ten years later, the state ranked last in the nation in the percentage of high school graduates." Historian James C. Klotter characterized Kentucky during this period as "cowered at or near the bottom in almost all educational categories."

The Kentucky Educational Reform Act of 1990 and the Kentucky Postsecondary Educational Improvement Act of 1997 provided the impetus to improve the state's educational standing. Our analysis from a few years ago, which is based on twelve educational attainment and achievement factors combined into a single index, showed measurable progress. Kentucky was statistically higher than nine states, lower than seventeen states, and no different

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from twenty-three states. Unfortunately, after several years of educational improvement, the state plateaued and has started to decline relative to other states. Currently, Kentucky is statistically higher than five states instead of nine, lower than eighteen states, and no different statistically from twenty-six states. The state's educational slippage began before the pandemic, and recent test results show that there has been a marked decline in student achievement during the COVID-19 pandemic. Kentucky, as well as many other states, experienced student declines in student achievement (NAEP), college and career readiness (ACT), and Advanced Placement (AP) exam mastery.

In early 2022, the Kentucky Department of Education released results from the 2022 Impact Kentucky Working Conditions Survey, which revealed numerous challenges facing Kentucky's educators. Around 33,000 teachers and 5,000 staff (e.g., principals, counselors) responded to the survey; nearly 80 percent of teachers participated. The results identify a number of areas requiring attention: 40 percent do not feel effective at their job; about one third are concerned about their own emotional well-being as a result of their work, and 75 percent said they were concerned, to some degree, about the well-being of their colleagues; more than a half said that their school's resources are not sufficient, with 76 percent saying that their schools needed additional specialists to support students. These survey results confirm what common sense suggests—the pandemic has exacted a heavy toll on the morale of educators.

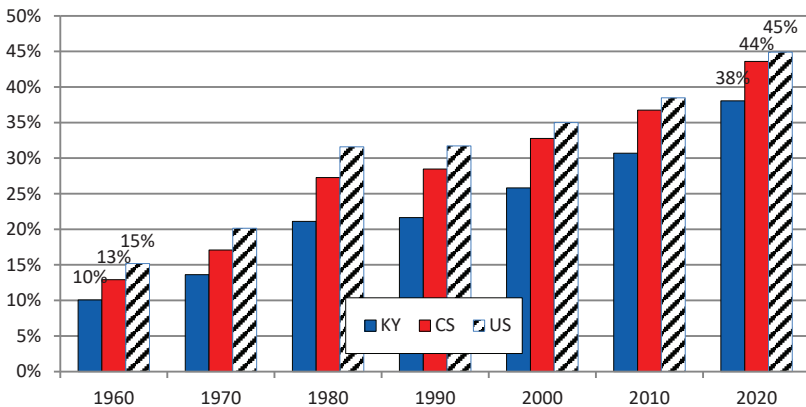
Yet, to improve educational outcomes in Kentucky, we cannot limit our focus solely to the classroom. Kentucky faces many obstacles to cost-effective educational performance, ranging from high poverty to poor health to inadequate internet access—especially in the state's rural areas. Moderating the harmful effects of poverty on learning will help to reduce these obstacles and facilitate even higher returns to educational investments.

Student outcomes, of course, are the bottom lines for schools and districts, and there is a wide distribution of outcomes across the state's public schools. Our analysis of Kentucky's schools, based on a broad range of student outcomes, family and community backgrounds, and school characteristics, has yielded forty-seven schools that have performed better than expected (*Kentucky Public Schools as Educational Bright Spots*, 2020). Understanding the reasons for better-than-expected performance is fundamentally important. Identifying and investing in the constellation of factors facilitating exceptional performance is the key to moving the needle on educational performance in the Commonwealth. Without a highly educated population and skilled workforce, our state will not succeed in the never-ending race for competitive advantage.

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 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). 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 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 38 percent in 2020, 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 we need to work harder to keep pace with the competition.

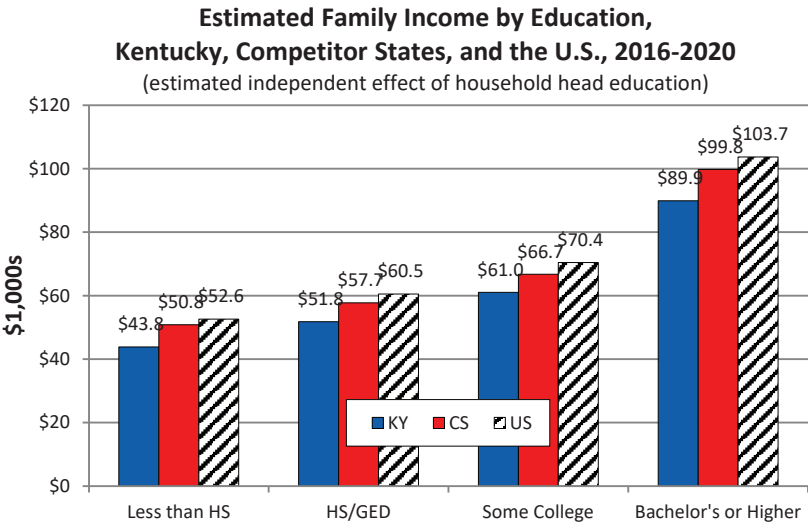
**Two or More Years of Post-Secondary Education,
Kentucky, Competitor States, and the U.S.**
(prime working-age adults, 25 to 54 years old)



Source: Author's analysis of U.S. Census Bureau data from Steven Ruggles, Sarah Flood, Ronald Goeken, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 12.0 [1960 5% sample; 1970 Form 1 State 1%; 1980, 1990, & 2000 5% samples; 2010 & 2020 ACS 5-Year]. Minneapolis, MN: IPUMS, 2022.
<https://doi.org/10.18128/D010.V12.0>

FAMILY INCOME BY EDUCATION

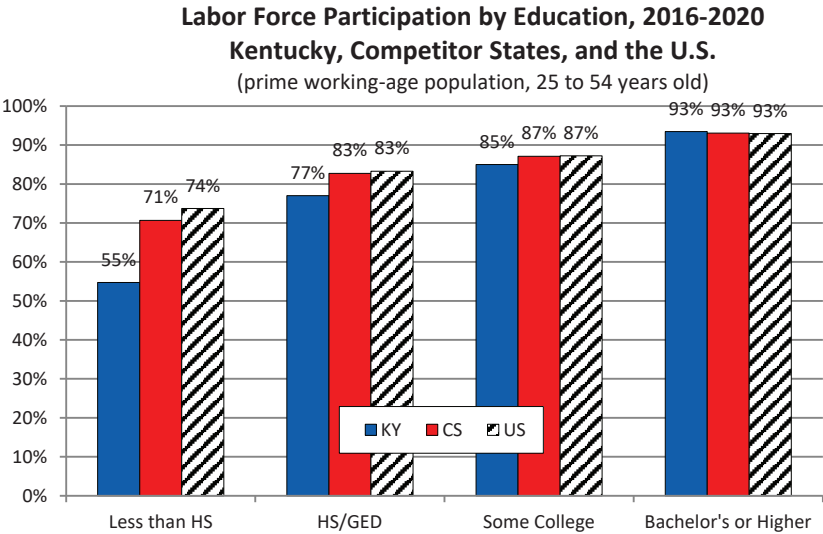
Economists and other researchers have long demonstrated the relationship between education and earnings. Using data from the U.S. Census Bureau American Community Survey (ACS) for the years 2016-2020, statistical methods were implemented to isolate the impact of education on earnings from the many other known factors, such as age and gender which affect earnings as well. In Kentucky, there is roughly a \$10,000 difference, on average, for a family where the head of the household has less than a high school credential, a high school diploma or equivalent, or some college—which includes an associate’s degree; even more striking, earning a bachelor’s degree or higher leads to an 89 percent higher family income than a family headed by a high school graduate. 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. Kentuckians with only a high school credential declined by about 5 percent from the late 1970s to the present. At the same time, the wages of those individuals with a Bachelor’s degree increased slightly, by 4 percent. The lesson here is clear: to get ahead financially in today’s labor market, it is essential to have higher levels of education.



Source: Estimated by the author using data courtesy Steven Ruggles, Sarah Flood, Ronald Goeken, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 12.0 [ACS 2020 5-Year]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D010.V12.0>

LABOR FORCE PARTICIPATION BY EDUCATION

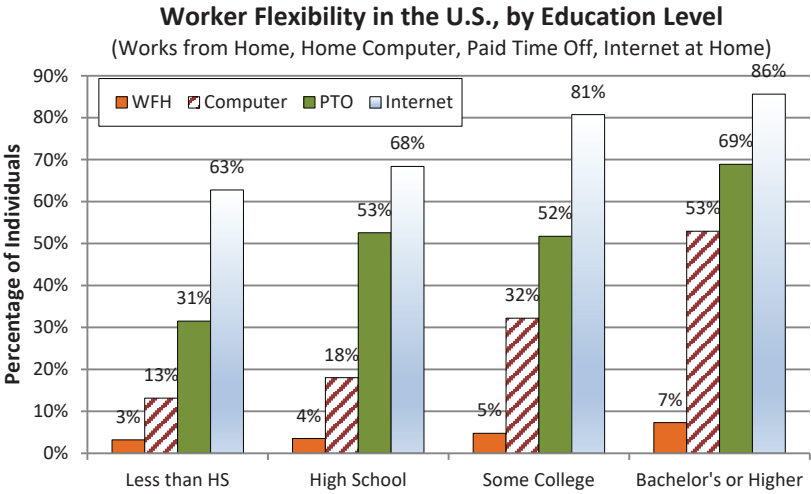
While it is well known that a positive relationship exists between educational attainment and earnings for those who are in the labor market, an important part of how education impacts the economy is the labor force participation rate. Looking at labor force participation rates during the 2016 to 2020 period for Kentucky, the competitor states, and the U.S. overall, the graph below shows the clear relationship between educational attainment and labor force participation. These data illustrate a consistent rise in the labor force participation rates as education levels increase from less than a high school diploma to a bachelor's degree or higher. The graph below is focused on prime working-age adults, from 25 to 54 years old. The variable used here, EMPSTAT, indicates whether the respondent to the Current Population Survey (CPS) 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.



Source: Estimated by the author using data courtesy Steven Ruggles, Sarah Flood, Ronald Goeken, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 12.0 [ACS 2020 5-Year]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D010.V12.0>

WORKER FLEXIBILITY BY EDUCATION

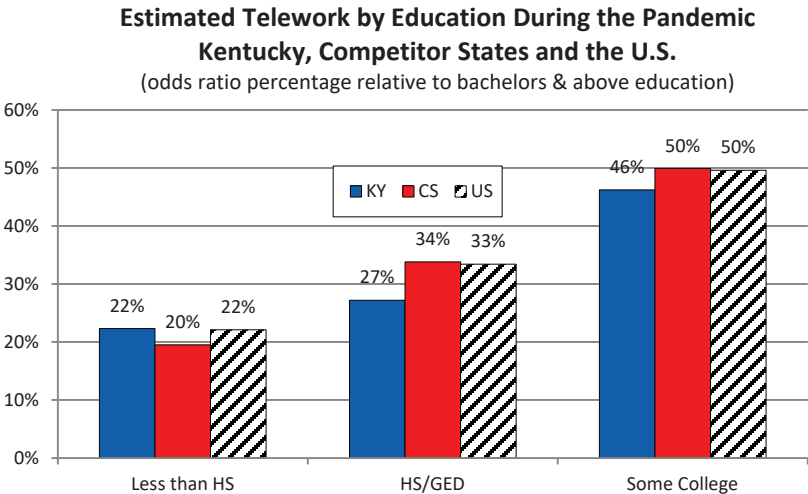
Even before the COVID-19 pandemic, the internet was an essential connection for many to be politically informed, socially integrated, and economically successful. But now, with schools going virtual, businesses sending their workers home to work, and people buying basic household goods online, having a computer or smartphone, along with access to the internet, have become as essential as any other public utility. Individuals with higher levels of education 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 educational attainment levels.



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.

TELEWORK BY EDUCATION

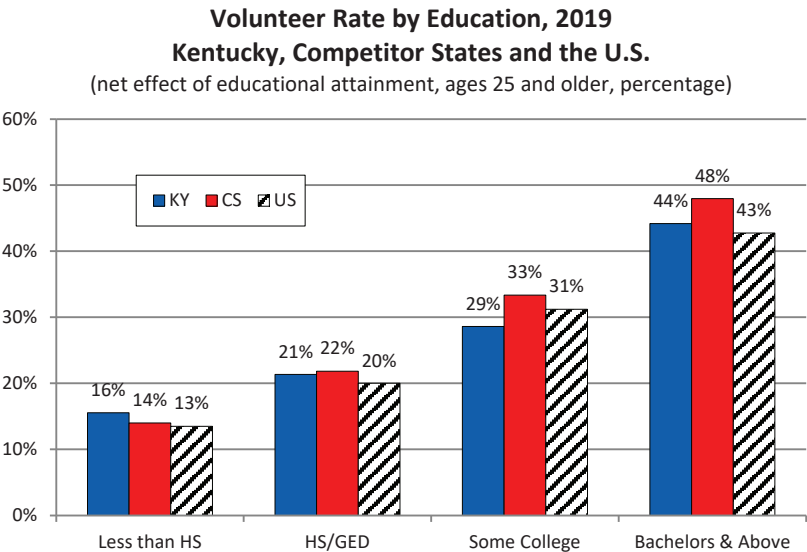
Social distancing policies, such as school closures and self-quarantine measures, were used during the pandemic to thwart the spread of disease. The efficacy of these approaches, however, is largely determined by the extent to which individuals adhere to it. The ability to work remotely can facilitate adherence to social distancing requirements with minimal financial pain for workers. A question from a recent U.S. Census survey reports whether the respondent teleworked or worked from home for pay due to the COVID-19 pandemic. The graph below shows various odds ratio percentages for three education levels relative to a bachelors or higher (estimated from a logistic regression model). For example, an individual in Kentucky with a high school diploma or GED is likely to have a much lower probability of being able to telework—about 27 percent as much—compared to someone with a bachelor’s degree or higher. This is the estimated effect of education while holding many other factors constant, including, but not limited to, occupation, gender, age, and race. These results are consistent with 2022 research published in the *International Journal of Environmental Research and Public Health* (see Asfaw, A. Racial and Ethnic Disparities in Teleworking Due to the COVID-19 Pandemic in the United States: A Mediation Analysis. *Int. J. Environ. Res. Public Health* **2022**, *19*, 4680.).



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 9.0 [CPS Basic Monthly, May 2020 to March 2022]. Minneapolis, MN: IPUMS, 2021. <https://doi.org/10.18128/D030.V9.0>

VOLUNTEER RATE BY EDUCATION

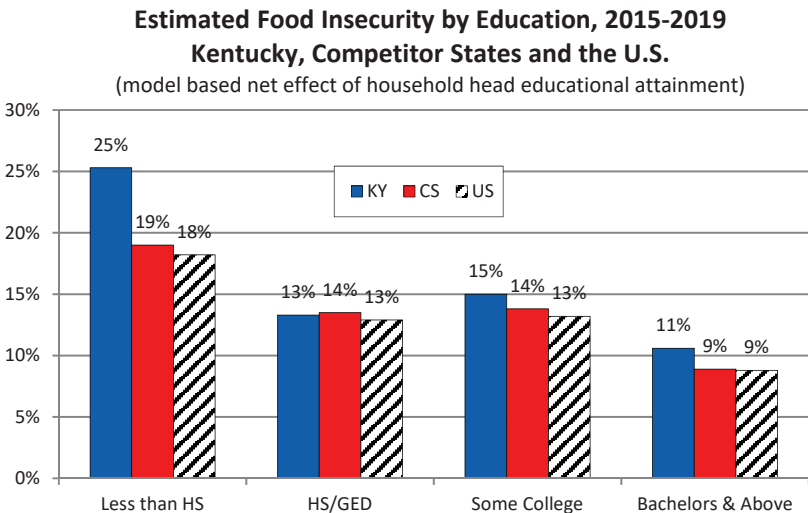
In the Community section of this report, we present data on volunteer rates for Kentucky, its competitor states, and the U.S., and discuss some of the social and economic benefits that result from high levels of community service and volunteerism. In the figure below we present volunteer rates for Kentucky, its competitor states, and the U.S. for four broad education groups: individuals with less than a high school degree, individuals with a high school degree only, individuals with some college (including associates degrees), and individuals with at least a bachelor’s degree. The percentages below reflect the net effect of education on volunteering while holding other factors constant, such as income, gender, race, urbanity, and age. Kentucky’s volunteer rates shown in the figure are consistent with the U.S. and competitor states for all of the education categories. There is, in addition, 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 than those with less education. This is important given the social and economic benefits realized from volunteer activities.



Source: Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019
Volunteering and Civic Life Supplement data.

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 five-year period, from 2015 to 2019, the head of household food insecurity percentage in the United States, competitor states, and Kentucky was, respectively, 11.7, 12.3, and 14.8. We estimate the independent effect of education 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.

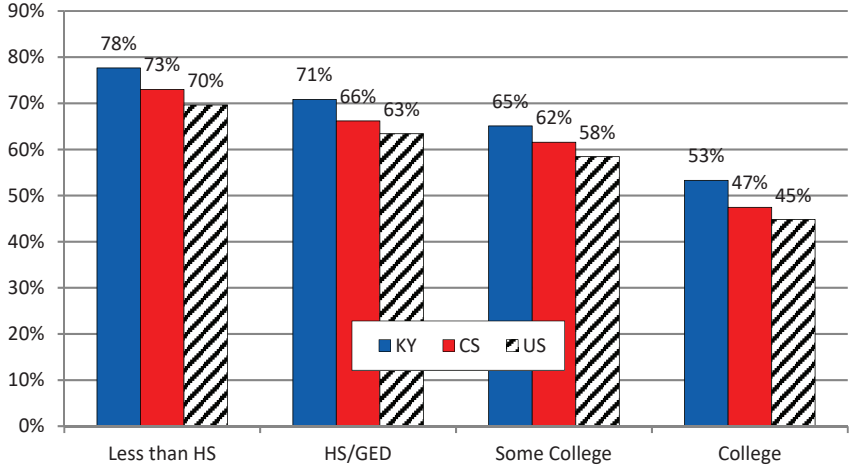


Source: Estimated by the author using data courtesy of Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles and J. Robert Warren. Integrated Public Use Microdata Series, Current Population Survey: Version 8.0 [Food Security Supplement]. Minneapolis, MN: IPUMS, 2020. <https://doi.org/10.18128/D030.V8.0>

HEALTH BY EDUCATION

It is estimated that more than 75 percent of health care costs are due to chronic 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. When compared to the U.S., as well as states that are widely considered to be Kentucky’s competitors for economic development prospects, Kentuckians are more likely to smoke, be obese, and not engage in regular physical activity. However, higher levels of education are generally associated with healthier behaviors and lower rates of chronic diseases. We analyzed data from the Behavioral Risk Factor Surveillance System (BRFSS) to explore these relationships. These data represent a comprehensive sample of Kentuckians and provide information on whether a person is at risk for chronic disease, evidenced by the four health risk behaviors. Our models control for other factors, such as race, gender, age, and income, and estimate differences in chronic disease risk behaviors by education levels. For Kentucky, the competitor states, and the U.S. overall, the chronic disease risk behaviors decrease as education levels go up. In Kentucky, for example, the estimated chronic disease risk behaviors go from 71 percent to 53 percent as educational attainment increases from a high school diploma to a college degree.

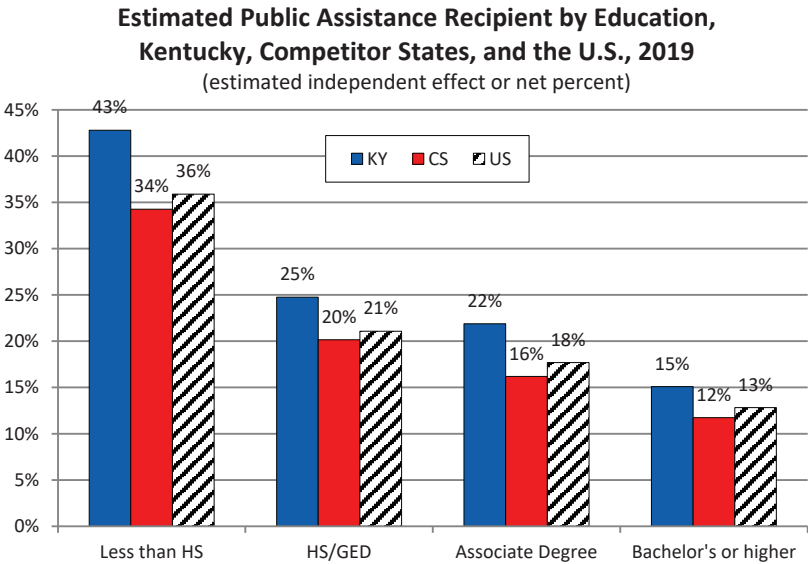
Estimated Chronic Disease Risk Behaviors by Education, Kentucky, Competitor States, and the U.S., 2016-2020
(estimated independent effect or net percent)



Source: Estimated by the author using CDC Behavioral Risk Factor Surveillance System data, data pooled for 5 years, 2016 to 2020

PUBLIC ASSISTANCE BY EDUCATION

In Kentucky, the percentage of *high school graduates* who are the head of a household 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 3.8 times higher than those with a bachelor's degree or higher—29.4 percent compared to 7.8 percent. After controlling for age, income, gender and race, the net effect of education on whether one is receiving public assistance is still strong. As illustrated in the bar chart, a Kentucky high school graduate is estimated to be 1.7 times more likely to receive public assistance (25%) than someone with a bachelor's degree or higher (15%). 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 including, of course, those described above, but not limited to these four programs. Research done, for example, by the College Board and RAND show a robust relationship across several public assistance programs, such as the National School Lunch Program, Unemployment Insurance, and various housing programs. Public assistance participation rates decline as education levels increase. In short, investing in education reduces the need and usage of public assistance programs.

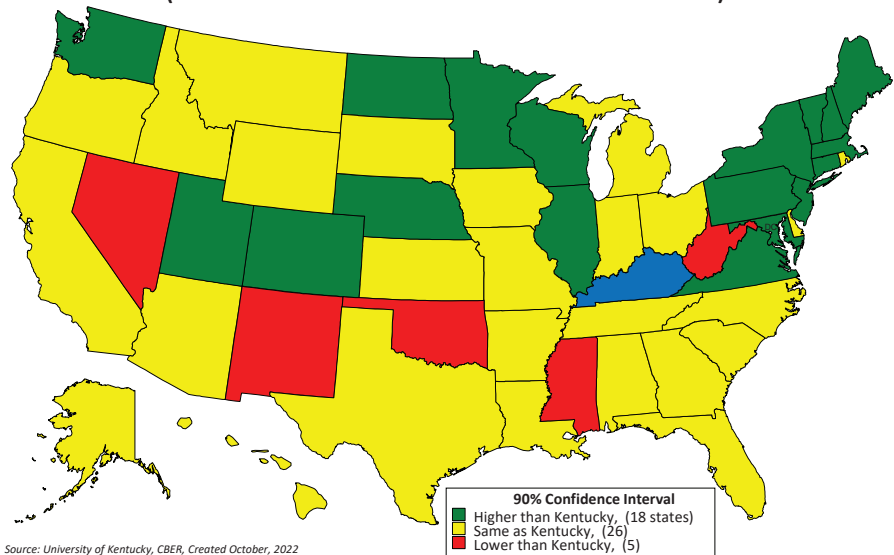


Source: Estimated by the author using U.S. Census, 2019 1-year PUMS

EDUCATION INDEX

The map below shows how educational outcomes in our state compare to those in other states, and an increasing number of states are outperforming Kentucky. Based on 12 educational attainment and achievement factors combined into a single index (see the table on the following page), Kentucky is statistically higher than 5 states, lower than 18 states, and no different statistically from 26 states (using a 90% confidence interval). Looking at Kentucky’s competitor states, this Index shows that Kentucky ranks higher than Mississippi and 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, Missouri, North Carolina, Ohio, South Carolina, and Tennessee). It appears that Kentucky is losing ground to the highest performing states. For the *2019 Kentucky Annual Economic Report*, we analyzed the same 12 factors using data from 2015 to 2018. At that time, Kentucky was statistically higher than more states, 9 instead of 5, lower than 17 states, and no different statistically from 23 states (using a 90% confidence interval).

Kentucky's Educational Quality Relative to Other States, 2015-2022
(Based on 12 measures of attainment and achievement)



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, math, and science exams. 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. The pandemic has exacted a heavy toll on Kentucky’s educational achievement. NAEP proficiency, ACT college and career readiness, and AP mastery are all lower compared to a few years ago. Moreover, there is a considerable gap between Kentucky and the top tier of states. The top 18 states are those shown in the U.S. map on the facing page as statistically significantly higher than Kentucky on the education index.

Comparing Education Indicators for Kentucky, United States, and the Top 18 States, 2015-2022 (percentages)			
Education Indicators	Kentucky	U.S.	Average for Top 18 States†
HS Diploma or Higher (2021)	90.3	90.4	92.3
Two-Year Degree (2021)	10.3	9.2	9.1
Bachelor’s Degree or Higher (2021)	31.3	38.6	44.4
Adj. Cohort HS Grad Rate (2019-20)	91.1	86.5	86.9*
ACT % College/Career Ready (2022)	15.0	22.0	33.0
8th Grade Math NAEP (2022)	21.5	25.5	29.5
8th Grade Reading NAEP (2022)	29.0	29.4	33.3
8th Grade Science NAEP (2015)	34.5	33.1	38.2*
4th Grade Math NAEP (2022)	32.6	35.1	36.9
4th Grade Reading NAEP (2022)	31.1	32.1	33.8
4th Grade Science NAEP (2015)	44.4	36.5	41.2*
AP % Exam Mastery (2021)	16.3	22.5	24.1*
†The top 18 states are statistically significantly higher than Kentucky (using a 90% confidence interval): CO, CT, IL, MA, MD, ME, MN, ND, NE, NH, NJ, NY, PA, UT, VA, VT, WA & WI. *This is the average of the state averages—not a weighted average of these 18 states. Note: HS Diploma, Two-Year 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.			

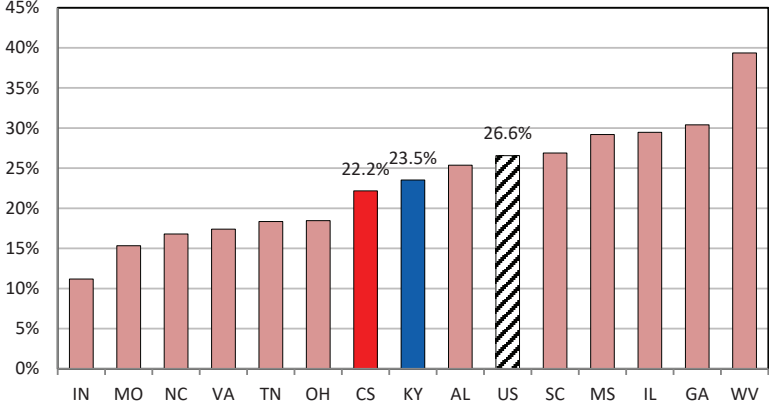
PUBLIC PRE-K ENROLLMENT

The Kentucky Department of Education Kindergarten Readiness Screener data show that under half (44%) of the students who entered kindergarten in the 2021-2022 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, 23.5 percent of Kentucky’s 3- and 4-year-olds are enrolled in *public* pre-kindergarten programs.

EDUCATION

Enrollment in Pre-K Programs, 2020-2021 School Year
Kentucky, Competitor States and the U.S.

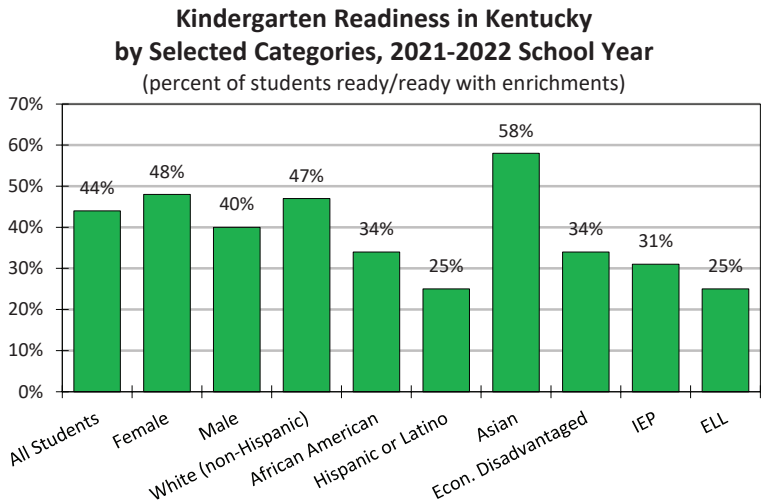
(estimated percent of all children 3- and 4-years-old
in public Pre-K, Pre-K special education, & Head Start)



Source: Estimated from *The State of Preschool 2021*, *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

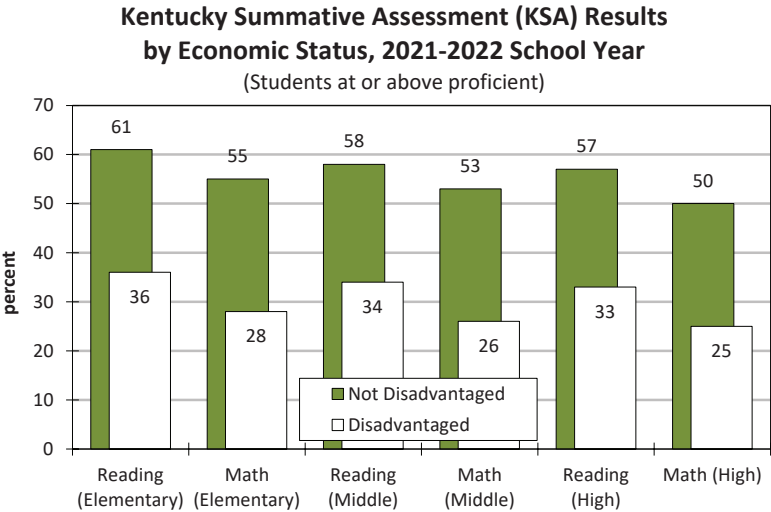
Kindergarten students in Kentucky are evaluated on their readiness. The data show that under half (44%) of the students who entered kindergarten in the 2021-2022 school year were ready when assessed on three scales: academic/cognitive; language development; and physical development. Moreover, children with limited English proficiency (25%), poor children (34%), and those with a disability (31%) have even lower levels of readiness. Among race and ethnic groups, Asians, on average, have the highest level of readiness (58%), followed by white non-Hispanics (47%), Blacks (34%), and Hispanics (25%). 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.



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

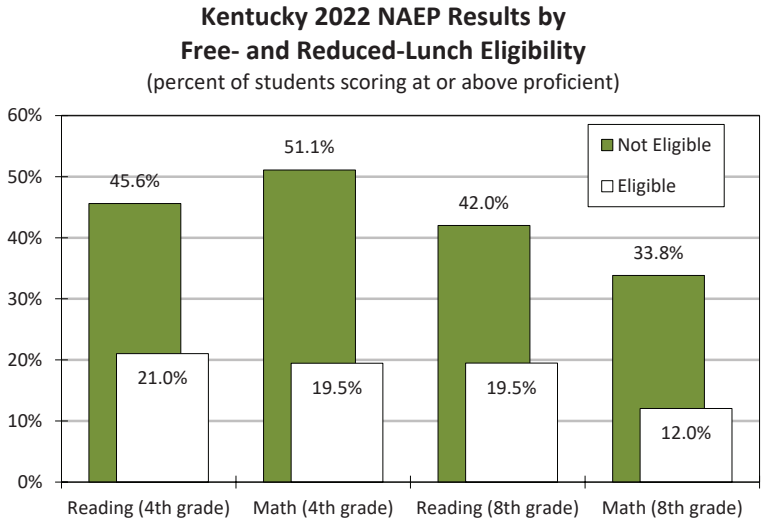
The academic success of disadvantaged children will affect whether the state’s future remains one of disproportionate poverty or gives way to rising prosperity. Economic disadvantage has a significant negative drag on academic performance, and the sheer number of economically disadvantaged students in 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 (55.7%), 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.



Source: Kentucky Department of Education, State Report Card 2021-2022, downloaded 11/8/2022, available at: https://www.kyschoolreportcard.com/organization/20/school_accountability/

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.

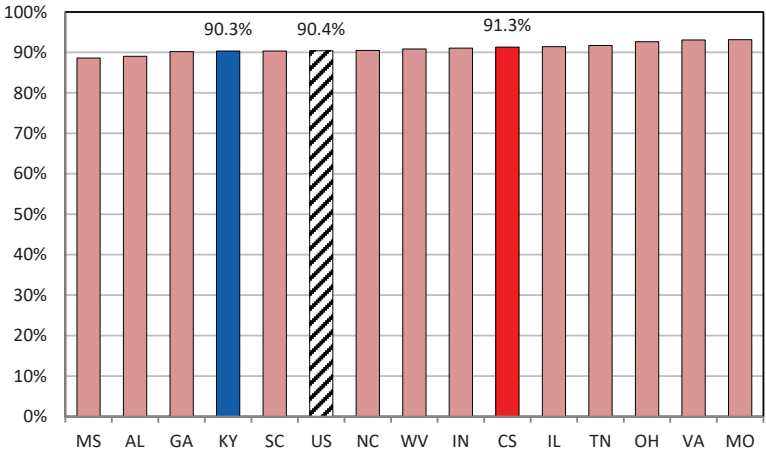


Source: <https://www.nationsreportcard.gov/ndecore/xplore/NDE>, accessed October 24, 2022

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 88.1 percent in 2021. At the same time, the nation improved to 89.4 percent, which is a statistically significant difference from Kentucky’s 88.1 percent. Looking just at those individuals 25 to 54—the prime working age group—Kentucky’s 90.3 percent is statistically the same as the U.S. average of 90.4 percent, but statistically lower than the competitor state average of 91.3 percent. Among the competitor states, two have statistically significant lower rates (i.e., MS & AL), five are statistically significantly higher (i.e., IL, MO, OH, TN, & VA), and five are statistically the same as Kentucky (GA, IN, NC, SC, & WV). Among all states, 30 are higher, 9 are lower, and 10 are statistically the same as Kentucky. California has the lowest high school attainment rate (86.2%) and North Dakota has the highest (96.0%).

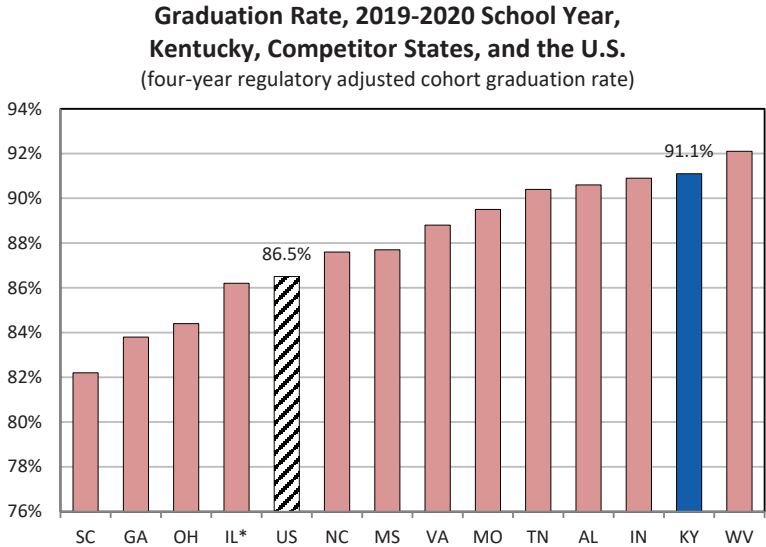
High School Graduate or Higher,
Kentucky, Competitor States and the U.S., 2021
(percent of individuals 25 to 54 years old)



Source: Estimated by the author using the 2021 1-Year U.S. Census ACS PUMS.

HIGH SCHOOL GRADUATION RATE

High-school graduation rates hit a new high of 86.5 percent in the U.S. in the 2019-20 academic year, according to the Department of Education, continuing a ten-year trend of gains in a basic and fundamental credential for gaining employment and access to higher education and training. 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 2019-2020 school year (except for Illinois, which reflects the 2018-2019 school year). As one can see by the figure, Kentucky is well positioned among the competitor states with a 91.1 percent adjusted cohort graduation rate (ACGR). At 92.1 percent, West Virginia has the highest ACGR in the country while New Mexico has the lowest at 76.9 percent; DC is lower than any state, with a value of 73 percent.

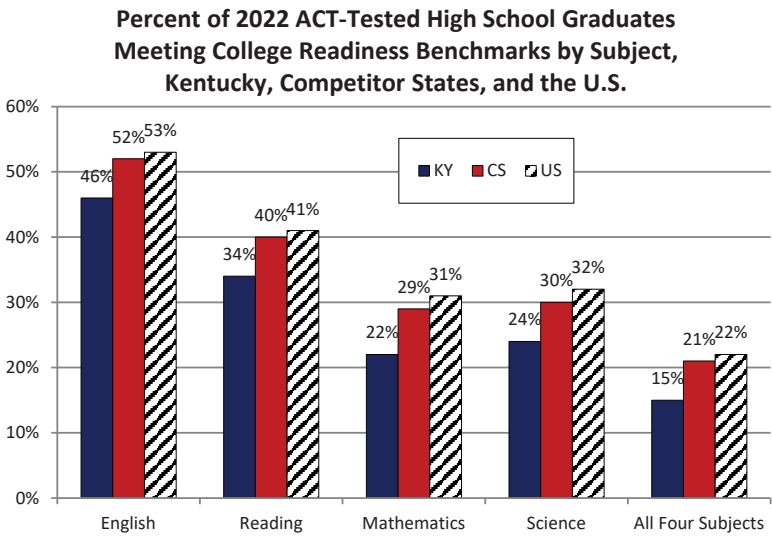


Source: U.S. Department of Education
* Illinois reflects 2018-2019 data

COLLEGE READINESS

The national average Composite score for the graduating class of 2022 is 19.8, down from 20.3 for the graduating class of 2021, 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, 22 and 21 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, 53 percent of the graduating class in the competitor states and 36 percent nationally took the ACT in 2022.

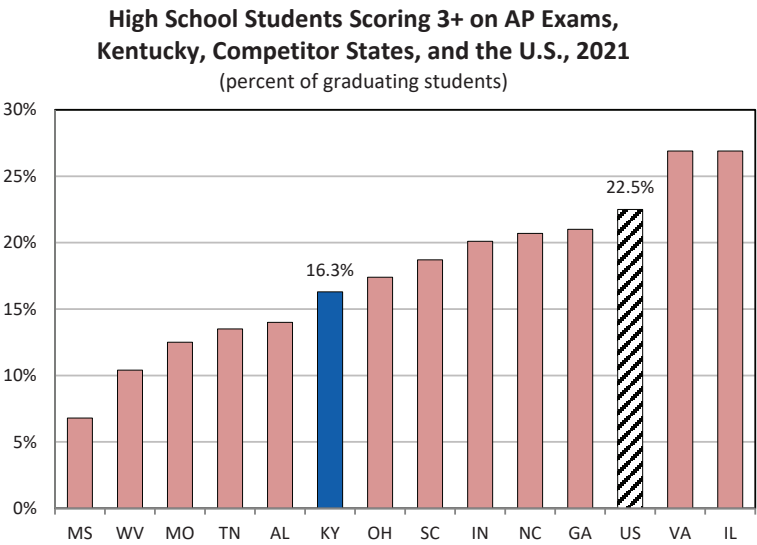
EDUCATION



Source: The Condition of College & Career Readiness, 2022, various state reports, 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 2021, there were nearly 1.2 million U.S. public high school graduates who had taken an AP exam at some point, with 22.5 percent scoring a 3 or higher. This is a substantial increase from the 16.2 percent in 2010, but a decline from 24.4 in 2020. Kentucky's students have also increased their performance on AP exams over the years, from 11.3 percent in 2010 to 16.3 percent in 2021. However, like nearly every state, Kentucky's percentage declined from a year earlier (18.2%). Massachusetts had the highest percentage of students in the class of 2021 scoring a 3 or higher on an AP exam during high school—31.1 percent. Mississippi, at 6.8 percent, was the lowest.



Source: College Board, AP Report to the Nation, various years, and the AP Cohort Data, Graduating Class, 2021

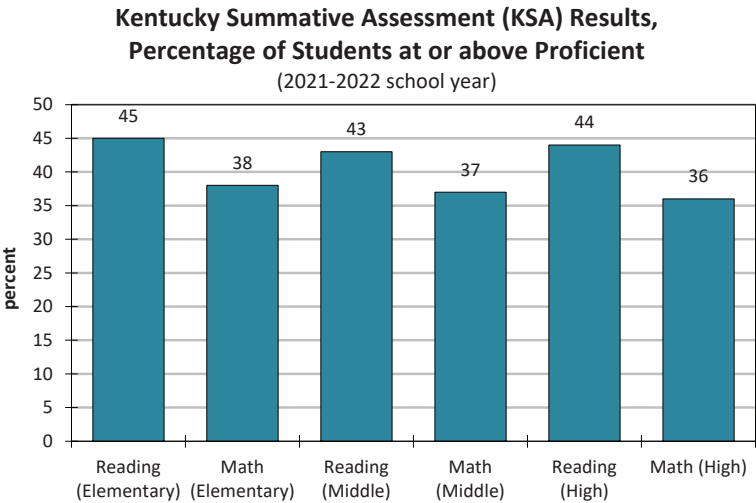
PERFORMANCE ON STANDARDIZED TESTS: NAEP

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	-	-	-
<i>Source: National Center for Education Statistics (NCES), Institute of Educational Sciences (IES), National Assessment of Educational Progress (NAEP), Kentucky State Profile.</i> <i>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.</i>									

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 (2021-2022).

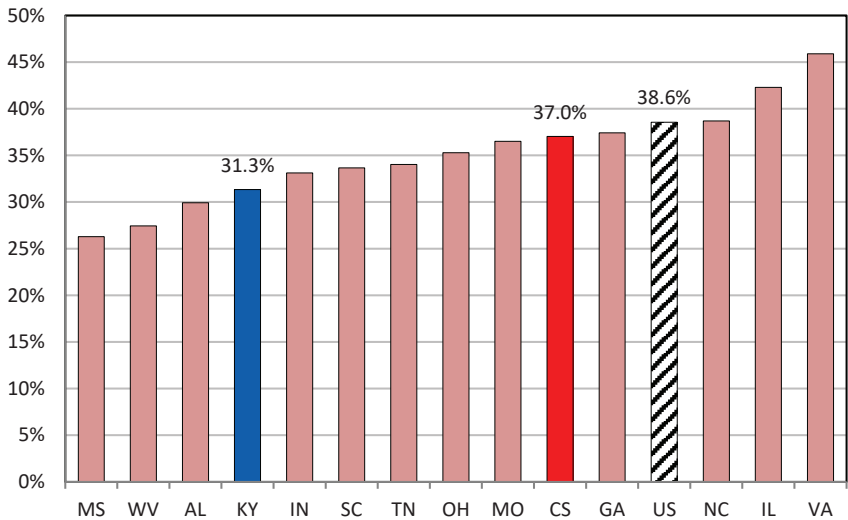


Source: Kentucky Department of Education, State Report Card 2021-2022, downloaded 11/8/2022, available at: https://www.kyschoolreportcard.com/organization/20/school_accountability/

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 27.3 percent in 2021; by comparison, the U.S. percentage in 2021 was 35.0. 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—31.3 percent for Kentucky compared to 37.0 and 38.6 percent for the competitor states and U.S. respectively. Virtually all of the competitor states are (statistically) significantly higher than Kentucky. Alabama is statistically no different from Kentucky, but Mississippi and West Virginia are significantly lower. Massachusetts has the highest rate in the nation (52.8%) and Mississippi the lowest (26.3%). Nationally, 38 states have higher rates than Kentucky while 6 are lower (5 are statistically the same as Kentucky).

**Bachelor's Degree or Higher,
Kentucky, Competitor States and the U.S., 2021**
(percent of individuals 25 to 54 years old)

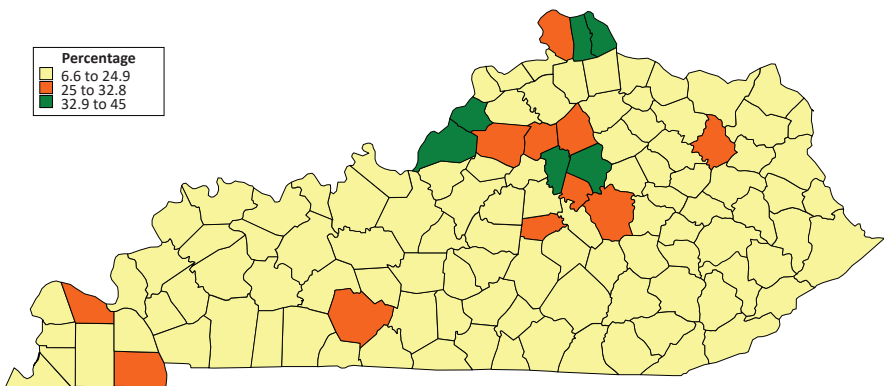


Source: Estimated by the author using data from the 2021 1-Year U.S. Census ACS PUMS.

COLLEGE ATTAINMENT BY COUNTY

There are six Kentucky counties where the percentage of the population with a bachelor's degree or higher (using the 2016-2020 American Community Survey 5-year estimate) exceeds the U.S. average of 32.9 percent. These six counties anchor the so-called urban triangle—Fayette (45%), Oldham (43%), Campbell (37.5%), Woodford (36.8%), Jefferson (33.9%), and Kenton (33.8%). There are eleven counties that are above the Kentucky average of 25 percent but below the U.S. average—ranging from McCracken County's 25.6 percent to Warren County's 32.2 percent. Kentucky's remaining 103 counties are below the Kentucky average, with several 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. The percentage of individuals with a bachelor's degree or higher is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There are four 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 106 counties are in the lower 75 percent of counties.

Kentucky County-Level Bachelor's Degree or Higher, 2016-2020
(percentage of individuals 25 years old or older)



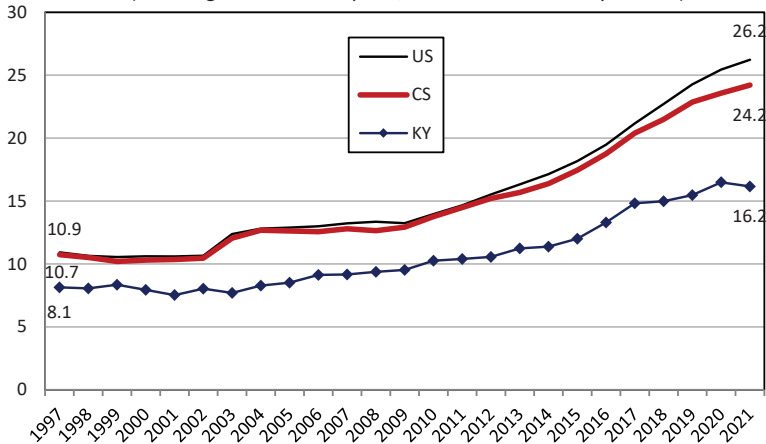
Source: U.S. Census, American Community Survey, 2020 5-Year Estimate, Table S1501

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 2021 was \$100,910, nearly double the national average wage for non-STEM occupations (\$55,260). 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 16.2. By comparison, the competitor states (24.2) and the U.S. (26.2) awarded significantly more STEM-designated bachelor's degrees in 2021. 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 (125%) than in Kentucky (98%).

**STEM-Designated Bachelor's Degrees Awarded,
Kentucky, Competitor States, and the U.S., 1997-2021**

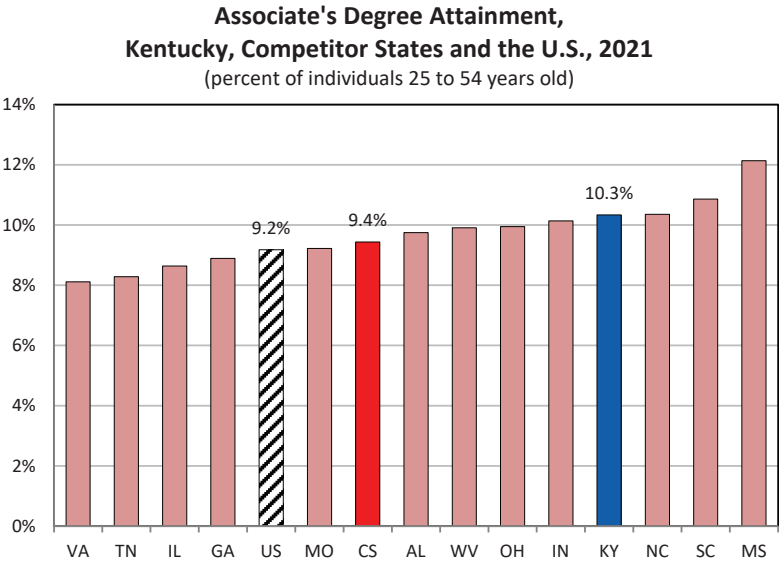
(total degrees conferred per 1,000 individuals 20-24 years old)



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

ASSOCIATE'S DEGREES

The associate's degree is a terminal degree for many people, while others use it as a springboard toward a bachelor's degree. Our analyses on the economic and societal benefits of postsecondary education show that an individual with an associate's 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's degree is an estimated 10.3 percent. Among the competitor states, several have statistically significant lower percentages (i.e., GA, IL, MO, TN & VA), and this also includes the weighted average of the competitor states (9.4%) and the U.S. (9.2%). Nationally, 9 states are higher, 20 are lower, and 20 are statistically the same as Kentucky. Connecticut is the lowest at 7.0 percent and North Dakota is the highest at 17.1 percent.



Source: Estimated by the author using data from the 2021 1-Year U.S. Census ACS PUMS.

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.

A map of Kentucky showing all 120 counties. Ten counties are highlighted in dark green, indicating the highest percentage of the population aged 65 and over. These counties are Boone, Campbell, Hancock, Harlan, Jackson, Johnson, Madison, Meade, Morgan, and Wayne. The map also shows other counties in light green and white, with county names labeled throughout the state.

Energy

THE INFRASTRUCTURE INVESTMENT AND JOBS ACT, which became law in 2021, is one of the largest federal infrastructure investments in U.S. history. This bill will funnel \$1.2 trillion to states and local governments for infrastructure upgrades over the next several years—including over \$5 billion to Kentucky. While labeled as an infrastructure bill, it is replete with references to *energy* sources and *environmental* impacts. This federal legislation promises to prod the country even faster toward a carbon neutral future, built on renewable energy.

A more recent federal legislative act, the 2022 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 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...”

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 2021, natural gas accounted for 38 percent; coal, by comparison, accounted for 22 percent. The use of natural gas to produce electricity—and the concomitant decline in the use of coal—has been going on for nearly 25 years.

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Meanwhile, over the long-term, renewable energy is expected to grow as an energy source. The U.S. Energy Information Administration (EIA) notes in its *Annual Energy Outlook 2021* that “petroleum and natural gas remain the most-consumed sources of energy in the United States through 2050, but renewable energy is the fastest growing. Wind and solar incentives, along with falling technology costs, support robust competition with natural gas for electricity generation, while the shares of coal and nuclear power decrease in the U.S. electricity mix.” 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.”

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, 12 percent is from renewable sources, and it is growing rapidly here and across the United States.

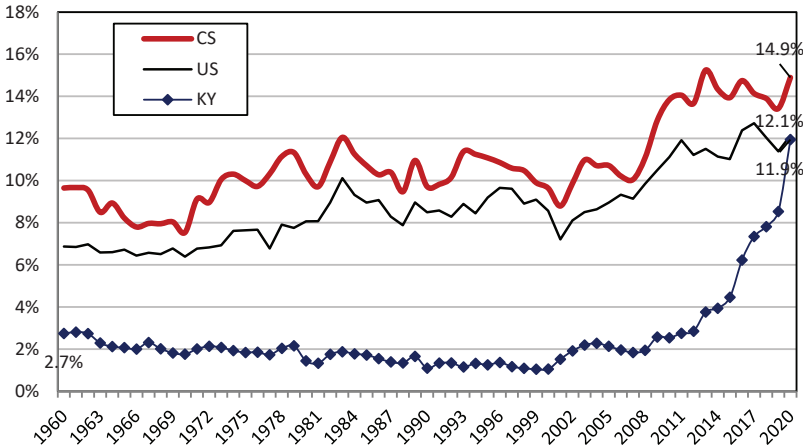
Business is embracing “green,” and the implications of a shifting energy landscape will be felt now and in the future as the Kentucky economy and labor markets are compelled to adapt and react. For example, Toyota, which employs approximately 8,000 individuals in Scott County, is encouraging its manufacturing 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. And the transition is happening beyond the electricity generation sector. Auto makers, including General Motors Co., Ford Motor Co., and Jeep maker Stellantis are aiming to make electric vehicles (EV) account for 40 to 50 percent of their U.S. sales by 2030; Toyota also announced an EV target by 2030 that would equal about one third of its current global sales.

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 have led to decreases in the amount of coal produced in Kentucky. Recently coal prices have jumped, which has led to an upturn in the state’s coal production. Most analysts, however, view this as a temporary response to the global energy crisis brought on by Russia’s invasion of Ukraine, and do not expect a long-term shift that would favor a tighter embrace of fossil fuels.

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 2022*, “petroleum and natural gas remain the most-consumed sources of energy in the United States through 2050, but renewable energy is the fastest growing.” This is especially true 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, 11.9 percent is from renewable sources. This is essentially equal to the national average (12.1%), but three percentage points behind the competitor state average (14.9%).

**Renewable Energy Production,
Kentucky, Competitor States, and the U.S., 1960 to 2020**
(expressed as a percentage of total energy production)

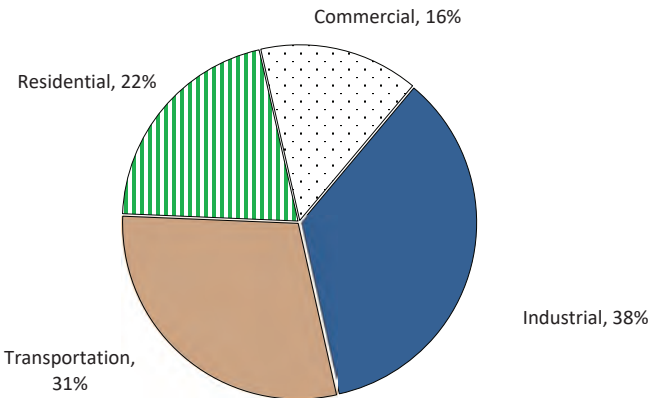


Source: U.S. Energy Information Administration, State Energy Data Production, State Energy Data System (SEDS), 1960-2020 estimates, <https://www.eia.gov/state/seds/>

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 (2020). 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 34 percent, respectively. The transportation sector in Kentucky is the second largest consumer of energy, accounting for 31 percent, compared to 27 percent in the competitor states and 26 percent in the U.S. The residential sector in Kentucky, the competitor states, and the U.S., consumes 22, 24, and 22 percent. And while the commercial sector in Kentucky accounts for only 16 percent, it represents 19 to 18 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 End-Use Sector, 2020

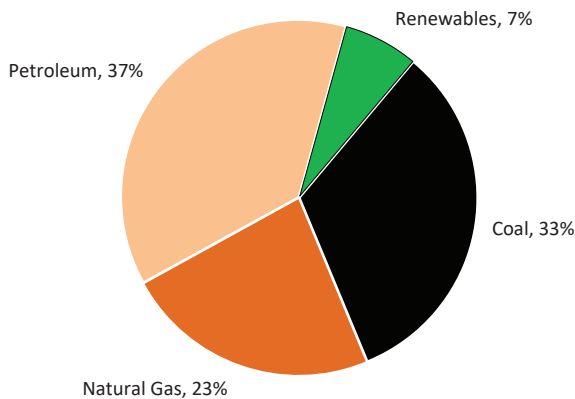


Source: U.S. Energy Information Administration, State Energy Data System

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 (2020). In 2011, coal was the main source and constituted over half at 52 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, *2019 Energy Profile*, “Coal accounts for 75% of Kentucky’s electricity portfolio and 39% 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 15 and 10 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. (34%) and the competitor states (31%). The competitor states and the U.S.—as well as Kentucky—are moving away from coal and toward natural gas.

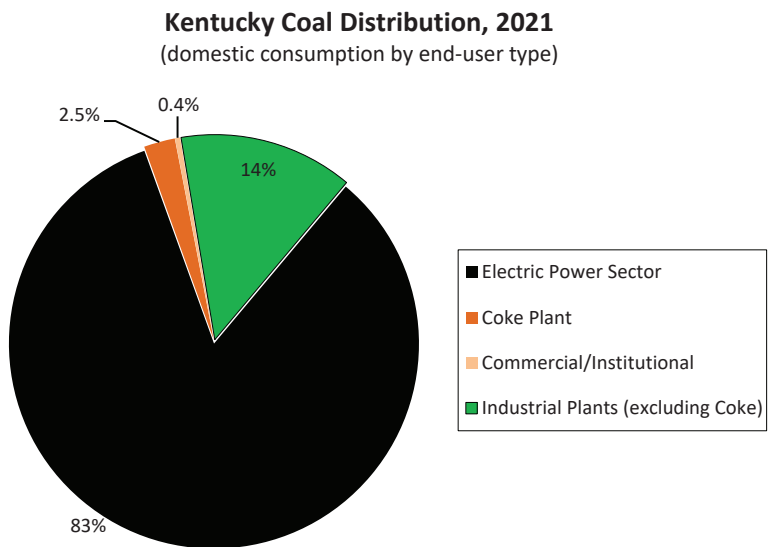
Kentucky Energy Consumption by Source, 2020
(consumption by fuel type)



Source: U.S. Energy Information Administration, *State Energy Data 2020, Consumption*

KENTUCKY COAL DISTRIBUTION

The vast majority of Kentucky coal is used to generate electricity. Of the 25.4 million tons of Kentucky coal distributed in 2021, roughly 23 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—roughly 4.1 million tons in 2021. Of the Kentucky produced coal that was consumed domestically in 2021, it is estimated that 84 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.



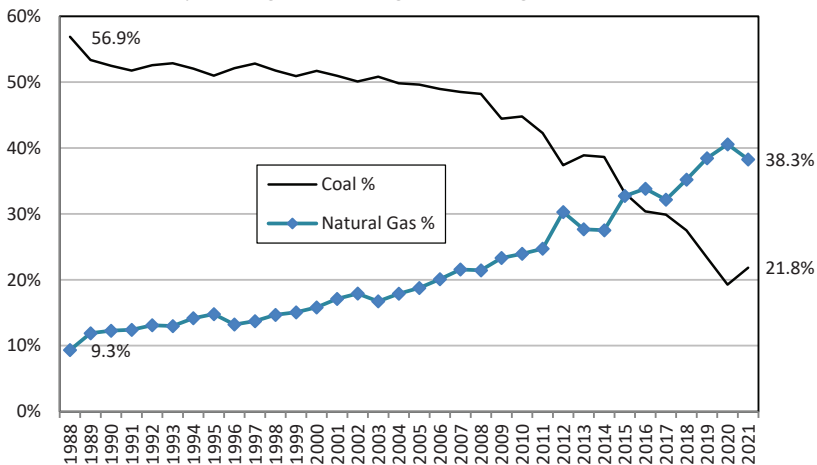
Source: U.S. Energy Information Administration, *Annual Coal Distribution Report 2021*, available at: <https://www.eia.gov/coal/distribution/annual/>

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 20 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 72 year period from 1949 to 2021. 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 38.3 percent; coal, by comparison, accounts for 21.8 percent. Nuclear is another major energy source of electricity in the U.S. at 19.7 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 20.1 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, 1988-2021**

(percentage of total megawatt hours generated)

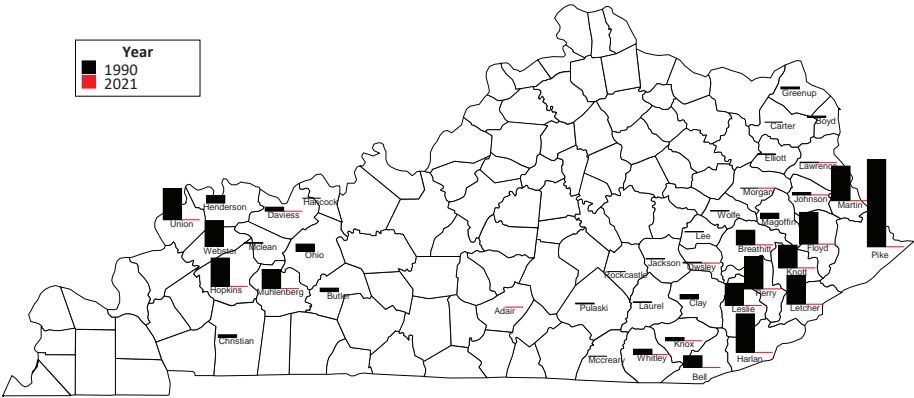


Source: Energy Information Administration, State Energy Data System

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 *increased* in 2021 to 26.4 million tons, a 9 percent upswing from 2020; this marks the first annual increase in several years, but, nonetheless, 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 2021 production levels, with every county except one—Adair—experiencing a decline over the 31-year period (Adair County has no recorded coal production in 1990). As is evident by the map, the declines in the Eastern Kentucky counties have been much steeper than those experienced in Western Kentucky. Nonetheless, coal production in the first two quarters of 2022 is up nearly 7 percent compared to the first two quarters of 2021. Global coal demand is up this year due, in part, to rising natural gas prices.

Kentucky Coal Production by County, 1990 & 2021
(total tonnage)

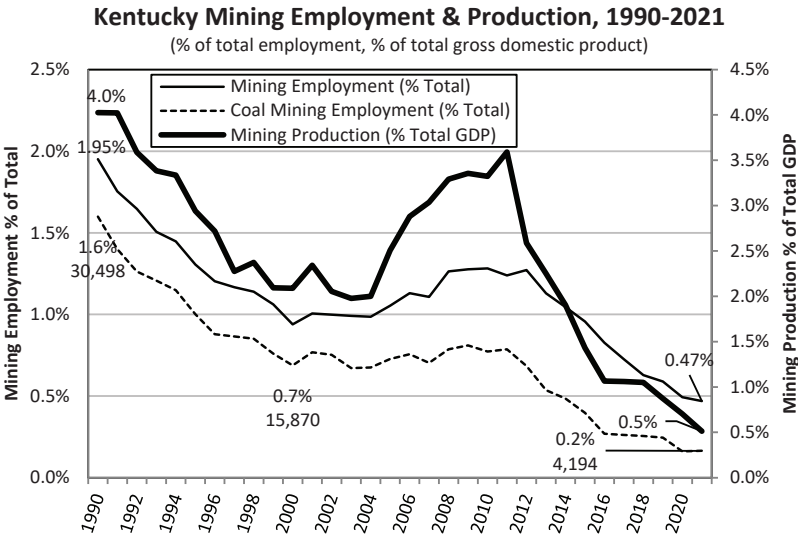


Source: U.S. Energy Information Administration, Annual Coal Report, various years.

MINING & COAL

In 2020, an estimated 4,006 persons were employed at Kentucky coal mines, but it increased slightly in 2021 to 4,194. One has to go back 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 0.47% and 0.2% of total employment, respectively. Similarly, mining production accounts for 0.5% 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 second quarter of 2022 (April to June), coal mining employment was 2,955 in Eastern Kentucky and 1,630 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).

ENERGY

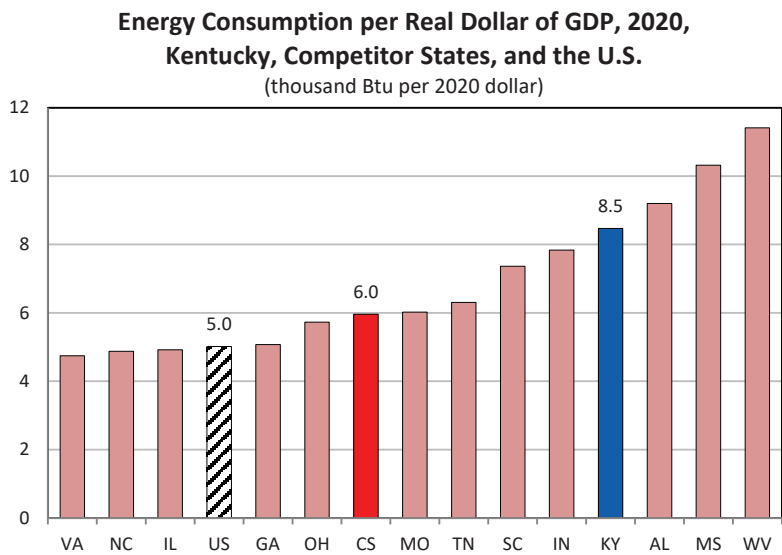


Source: Bureau of Economic Analysis & Energy Information Administration, Annual Coal Report, various years, and Kentucky Coal Facts, various years

ENERGY CONSUMPTION PER GDP

Kentucky has an energy intensive economy. To generate \$1 in state gross domestic product, Kentucky consumes about 8,500 Btu (2020). By comparison, the U.S. average is around 5,000 Btu and the competitor state average is 6,000 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

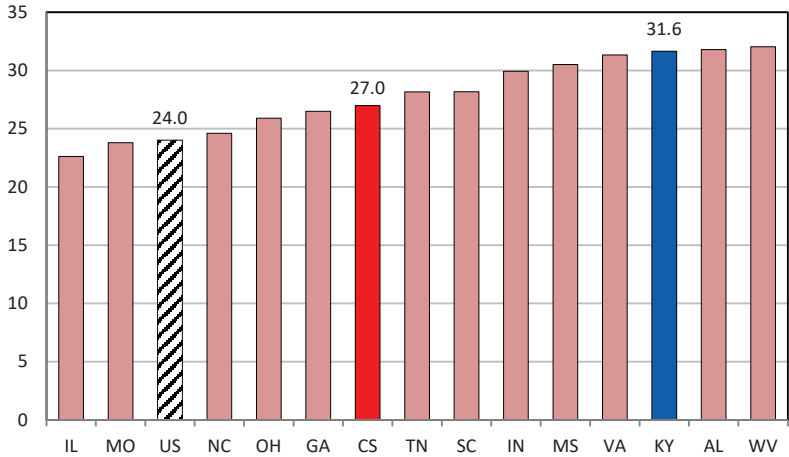


Source: Calculated using data from the U.S. Energy Information Administration and Bureau of Economic Analysis

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 third highest usage when including *all sales and customers* (see below, comparing competitor states only), it is the fifth highest when only examining *residential* usage/efficiency. Kentucky’s megawatt usage per residential customer is 13.0 (in thousands of megawatt hours), which is well below Tennessee (14.2), the highest competitor state; Illinois is the lowest competitor state using the residential measure (8.7). The residential only competitor state average is 12.0 while the U.S. average is 10.6—both lower than Kentucky’s residential per customer usage (13.0).

**Megawatt Hours per Energy Customer, 2021,
Kentucky, Competitor States, and the U.S.**
(thousands of megawatt hours)

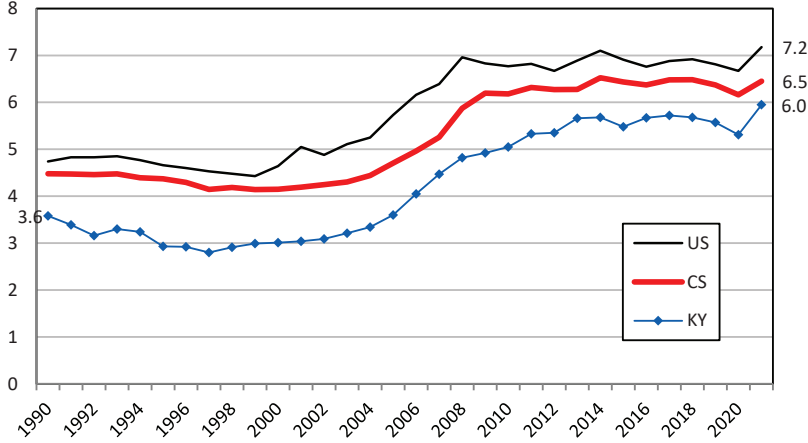


Source: Calculated using data from the U.S. Energy Information Administration

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 113 percent from its nadir of 2.8 cents in 1997 to 6.0 cents in 2021. 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 2021) have been about 57 percent. Nonetheless, in 1990 Kentucky had the seventh lowest industrial rate in the country and in 2021 the state was tied with Mississippi with the fourth lowest—trailing Oklahoma, Tennessee, and Washington. And among the competitor states Kentucky's industrial rates are the second lowest, trailing only Tennessee. Kentucky's annual rate in 2021—at 6.0 cents per kilowatt-hour—was below the U.S. (7.2) and competitor states (6.5).

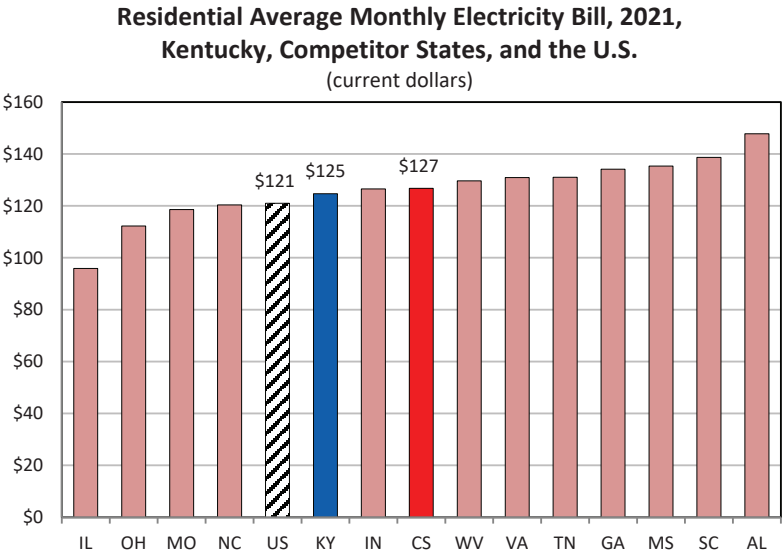
**Average Retail Price of Electricity, Industrial Customers,
Kentucky, Competitor States, and the U.S., 1990-2021**
(Cents per Kilowatt-Hour)



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 \$66,928 in average annual expenditures in 2021—with annual electricity expenses of \$1,551. In the South Region of the U.S.—where Kentucky and eight of the competitor states are located—average annual expenditures were \$61,473 and annual electricity expenses were \$1,745. Electricity costs range in these two examples from 2.3 to 2.8 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 \$96 in Illinois to a high of \$148 in Alabama. At \$125, 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.

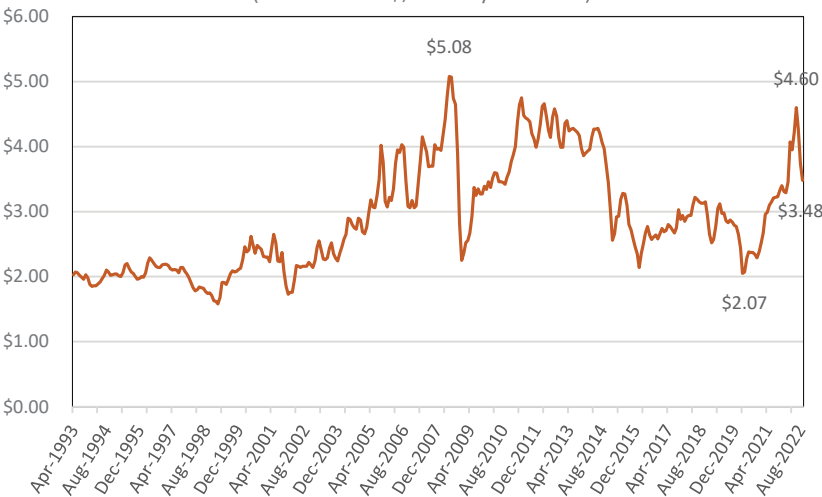


Source: U.S. Energy Information Administration
Note: The competitor states average (CS) is not a weighted average.

MOTOR GASOLINE EXPENDITURES

The typical American “consumer unit,” what most would consider the average household, spent \$66,928 on various products and services in 2021 according to the Consumer Expenditure Survey; “gasoline and motor oil” accounted for \$2,148—about 3.2 percent of the total; this represents an increase from 2020 when it was 2.6 percent. The high point in the last thirty years was in June 2008, when it reached \$5.08 a gallon (constant 2021 dollars). Soon after the pandemic began in April 2020, the price was down to \$2.07. Prices peaked again in June 2022 at (\$4.60), but declined to \$3.48 by September 2022. While not shown on the graph below, gasoline prices began increasing again in October 2022 due to an OPEC+ decision to decrease production. 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 25.7, 25.3, and 27.7 minutes, respectively (based on U.S. Census ACS 2020, 5-year estimates).

**U.S. All Grades, All Formulations, Retail Gasoline Prices,
Dollars per Gallon, April 1993 to September 2022**
(constant 2021\$, monthly estimates)



Source: Energy Information Administration, State Energy Data System

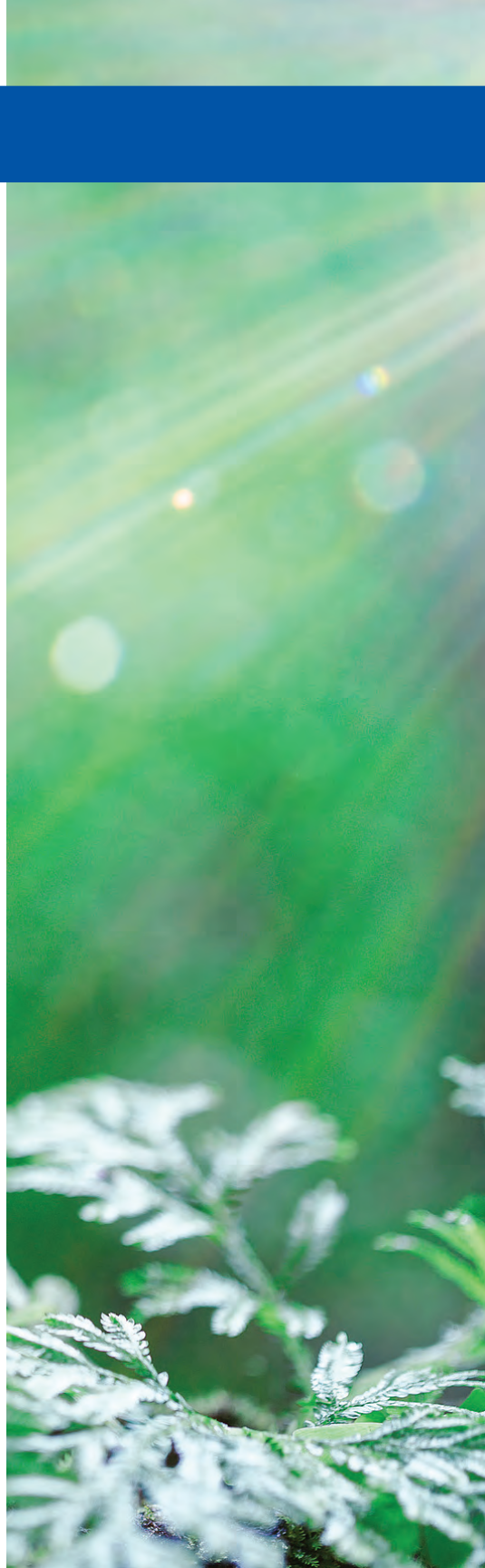
Environment

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 and energy usage.

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

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

continued on the next page



continued from the previous page

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...”

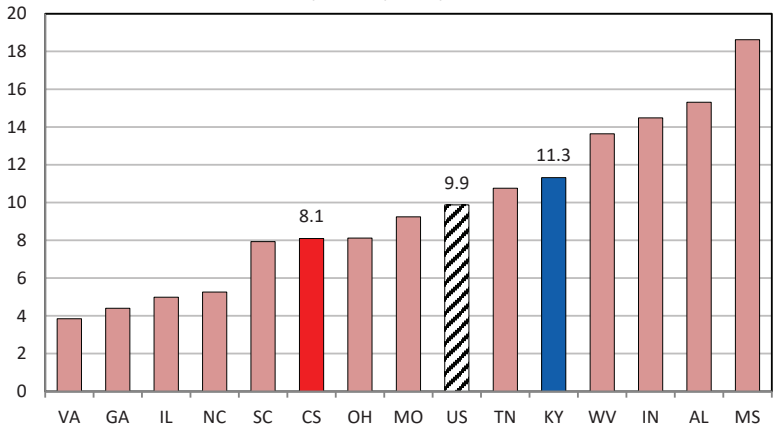
While both bills address a range of other issues, there is clearly an emphasis on addressing climate change in the Investment and Jobs Act as well as the Inflation Reduction Act. Another federal initiative, the U.S. Global Change Research Program, highlights the relationship between the environment and the economy as well in the *Fourth National Climate Assessment*. Mandated by The Global Change Research Act of 1990, the report on climate change is delivered to Congress and the President no less than every four years. They wrote in late 2018 that “climate change creates new risks and exacerbates existing vulnerabilities in communities across the United States, presenting growing challenges to human health and safety, quality of life, and the rate of economic growth.” They go on to say, “without substantial and sustained global mitigation and regional adaptation efforts, climate change is expected to cause growing losses to American infrastructure and property and impede the rate of economic growth over this century.”

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 2021, the EPA reports that Kentucky experienced 11.3 pounds of toxic releases per capita (the 13th highest nationally); this is an increase from 9.9 pounds in 2019 and 10.3 in 2020. The most recent data show that Kentucky exceeds the national (9.9 pounds) and competitor states (8.1) averages.

Toxic Chemicals Disposed of or Otherwise Released, 2021
Kentucky, Competitor States, and the U.S.
(pounds per capita)

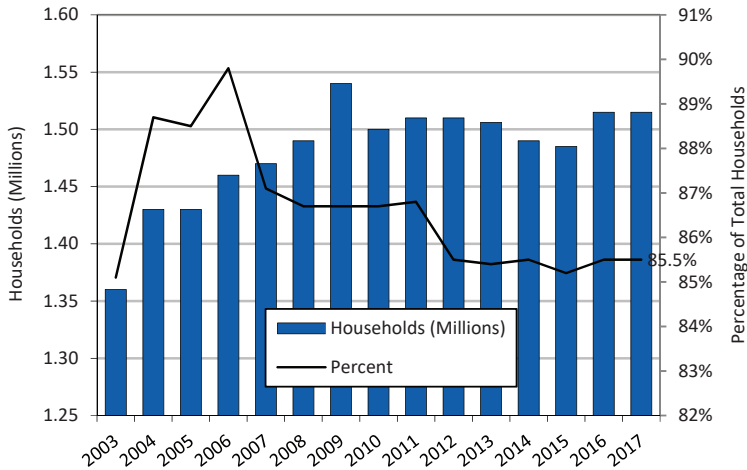


Source: United States Environmental Protection Agency. (2022). TRI Explorer (Preliminary 2021 Dataset (released September 2022)) [Internet database]. Retrieved from <https://enviro.epa.gov/triexplorer/>, (October 12, 2022).

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.

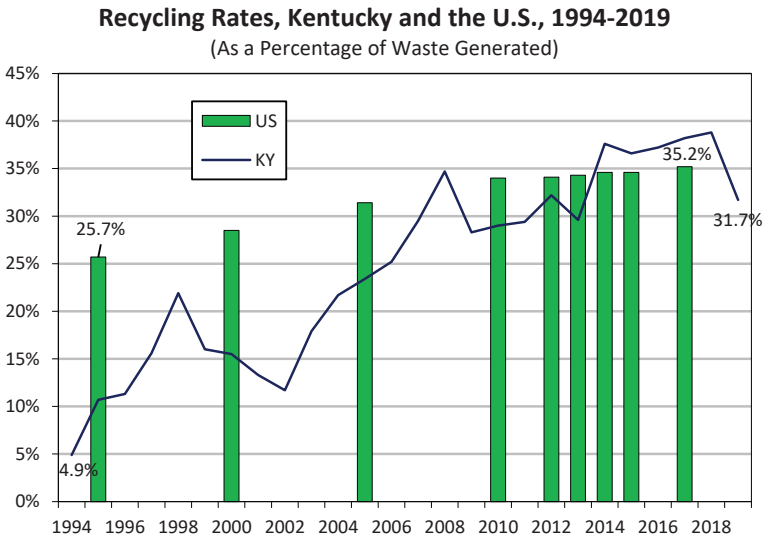
Kentucky Households Participating in Municipal Solid Waste (MSW) Collection, 2003-2017



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

RECYCLING

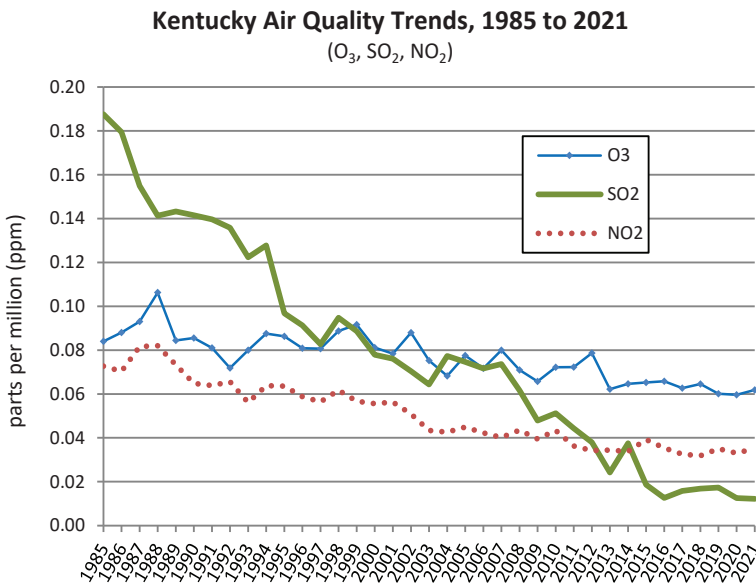
According to the Kentucky Division of Waste Management, Kentuckians recycled 31.7 percent of common household recyclables in 2019 (e.g., aluminum, cardboard, steel, plastic, newspaper, glass, and paper). As one can see in the figure, the percentage of generated waste that is recycled has climbed steadily over the last two decades—but dropped sharply in 2019 due to COVID-19 and weakness in the global commodities market for recycled material. And, according to the U.S. Environmental Protection Agency (EPA), Americans generated about 267.8 million tons of trash in 2017 and recycled (or composted) approximately 94 million tons of this material—resulting in a 35.2 percent recycling rate. Americans generate around of 4.51 pounds of individual waste per person each day and recycle or compost 1.6 pounds of it.



Source: Kentucky Division of Waste Management, Annual Reports, various fiscal years, and U.S. EPA

AIR QUALITY

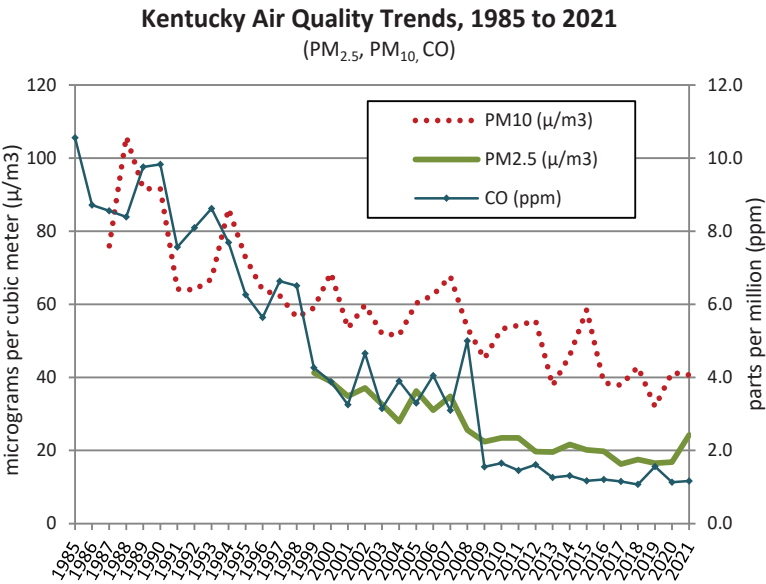
The Kentucky Division for Air Quality reports that Kentuckians are breathing cleaner, healthier air. The Division points out that “this improvement is a direct result of reduced air pollution. For example, emissions of sulfur dioxide (SO₂) from Kentucky coal-fired power plants totaled 1.5 million tons 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 (O₃), Sulfur Dioxide (SO₂), and Nitrogen Dioxide (NO₂). While individual pollutants oscillate from year to year, overall the trend shows a decline in pollution levels from 1985 to 2021. 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.



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 (PM₁₀), Fine Particulate Matter (PM_{2.5}). And, just like with Ozone (O₃), Sulfur Dioxide (SO₂), and Nitrogen Dioxide (NO₂) shown on the previous page, the pollutants in the graph below have been declining gradually over the time period shown. 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.

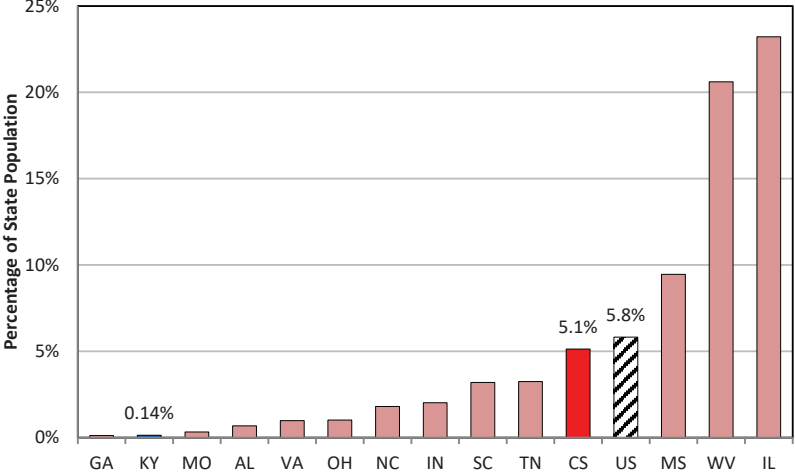


Source: Kentucky Energy and Environment Cabinet, Division for Air Quality

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 2021 there were just over 73,700 violations of the Safe Drinking Water Act among community water systems that served around 76.2 million people, which represents around 23 percent of the U.S. population. Of these 73,700 violations, an estimated 7,340 were violations of the Lead and Copper Rule, affecting approximately 19.3 million people. 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 the Lead and Copper Rule in 2021, Kentucky experienced a relatively small number, affecting an estimated 0.14 percent of the state population. The competitor state and U.S. averages were higher, at 5.1 and 5.8 percent, respectively.

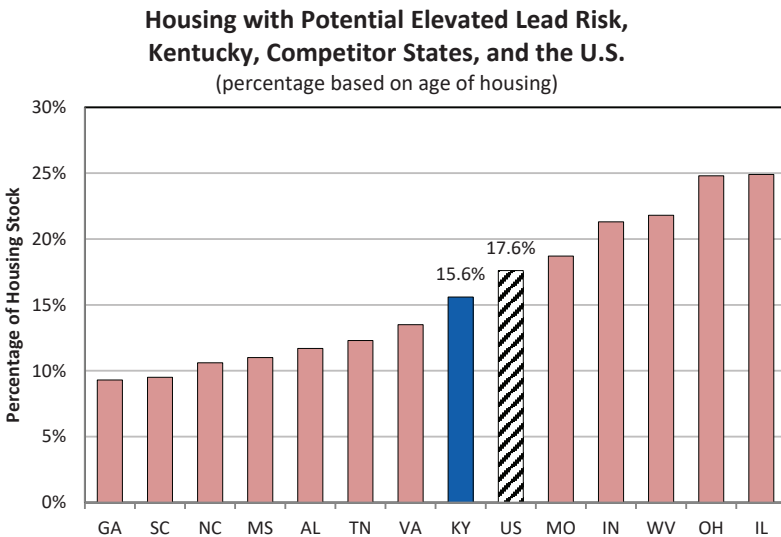
Population Served by a Community Water System with a Safe Drinking Water Violation of the Lead & Copper Rule, Kentucky, Competitor States, and the U.S., 2021



Source: Author's analysis of EPA SDWIS data.

LEAD RISK

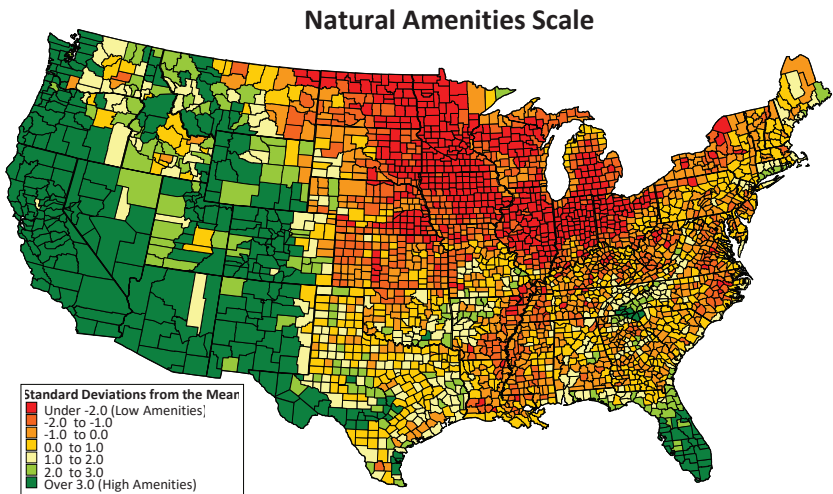
Lead poisoning has serious health consequences. According to the Mayo Clinic, “Exposure to even low levels of lead can cause damage over time, especially in children. The greatest risk is to brain development, where irreversible damage may occur. Higher levels can damage the kidneys and nervous system 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 15.6 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 17.6 percent.



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

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 82 percent of corporate executives as "important" or "very important," in the *2021 Area Development Corporate Survey* on site selection factors. There are no Kentucky counties in the top 10 percent of counties nationally on this index, but there are four in the top quartile (i.e., Laurel, Lyon, Russell, and Whitley Counties).



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

Equity

CORE TENETS OF THE AMERICAN DREAM include the belief that hard work pursued within a framework of equal opportunity will result in merit-driven outcomes that benefit not only the individual, but the wider community as well. Yet, we know that this is an ideal state that has remained beyond the reach of too many Americans.

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

A community lacking a dense network of connections, one that is insulated or characterized by cleavage rather than association, can affect economic opportunities in multiple ways. One way is friendships. Research released in

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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. 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.”

Economic and social gaps that reflect racial or ethnic divisions can have economy-wide implications. 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.

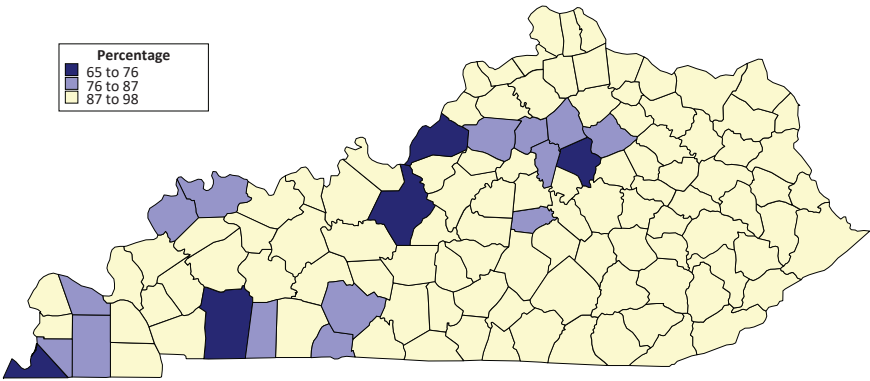
The Kentucky Chamber of Commerce Task Force on Racial Inequality offers several recommendations in its January 2021 report, *Achieving Equity to Build a Stronger Kentucky*, designed to close education and income gaps. These include items like improving educational opportunities, addressing criminal justice 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*. It is hoped that this database, with its listing of more than 1,100 minority-owned businesses, will facilitate their growth and expansion across the Commonwealth.

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 60 percent of the U.S. population and 84 percent of the Kentucky population is white (alone), non-Hispanic (based on the 2020 5-Year U.S. Census data). Using this as a measure of diversity, Christian County—where Ft. Campbell is located—is the state’s most diverse county at 65 percent white (alone), non-Hispanic. Jefferson, Fayette, and Fulton Counties are second, third, and fourth at 67, 70, and 71 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.

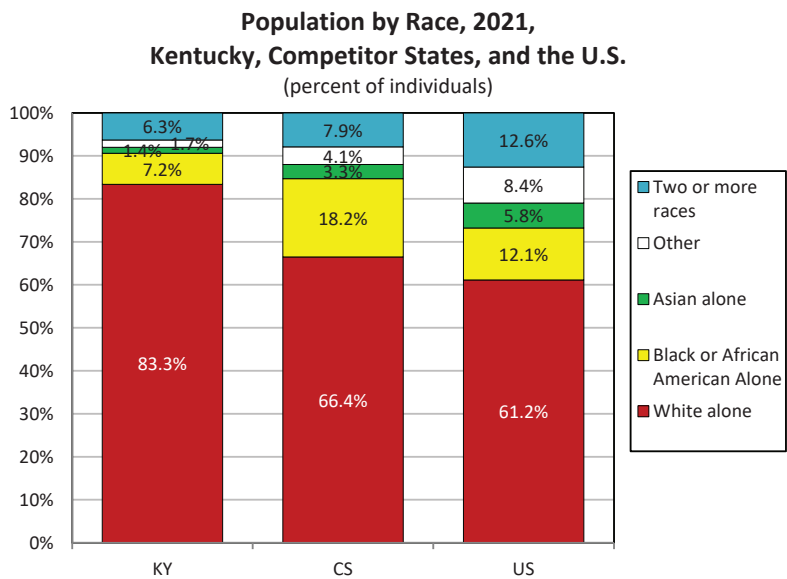
White Alone (non-Hispanic) Population, 2016-2020



Source: U.S. Census, American Community Survey, 2020 5-Year estimate, Table DP05

POPULATION BY RACE

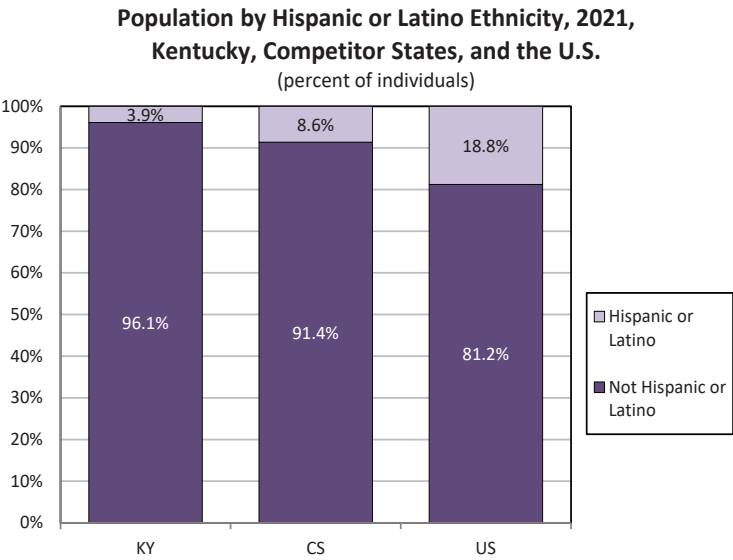
Diversity is increasingly important and recognized as a community asset in today’s global economy. Kentucky, however, is not a racially diverse state. In 2021, racial minorities comprised about 39 and 34 percent of U.S. and competitor state populations, respectively, and around 17 percent of the Kentucky population. Kentucky’s racial composition breaks down like this: white (83.3%), Black or African American (7.2%), Asian (1.4%), and other (8%). Kentucky’s racial minority population is concentrated in the state’s metropolitan areas; in 2020 (based on the U.S. Census 5-year estimate), four of every five racial minorities in Kentucky lived in metropolitan areas. Roughly 63 percent of Kentucky racial minorities live in one of five metropolitan counties—Christian, Fayette, Hardin, Jefferson, or Warren. Overall, racial minorities comprise about 19 percent of the population in the state’s 35 metropolitan counties, 8 percent in the 25 somewhat rural counties, and just over 6 percent in Kentucky’s 60 mostly rural counties.



Source: U.S. Census Bureau, ACS 2021 1-Year Estimate, Table DP05

HISPANIC POPULATION

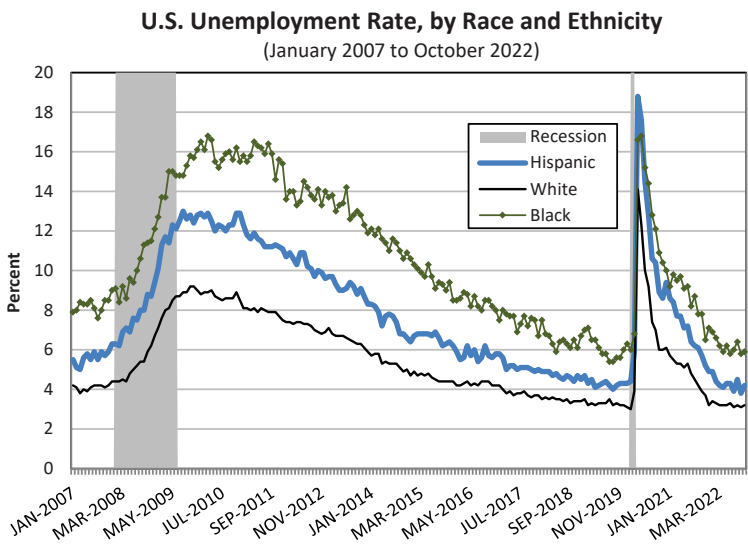
There are about 177,000 Kentuckians who identify as Hispanic or Latino, which is about 3.9 percent of the population. Compared to the U.S. (18.8%) and competitor states (8.6%), Kentucky has a relatively small Hispanic population. Almost three-quarters (73%) of the state’s Hispanic population live in 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 35 metropolitan counties, 2.4 percent in the 25 somewhat rural counties, and just under 2 percent in Kentucky’s 60 mostly rural counties.



Source: U.S. Census Bureau, U.S. Census Bureau, ACS 2021 1-Year Estimate, Table DP05

UNEMPLOYMENT RATE

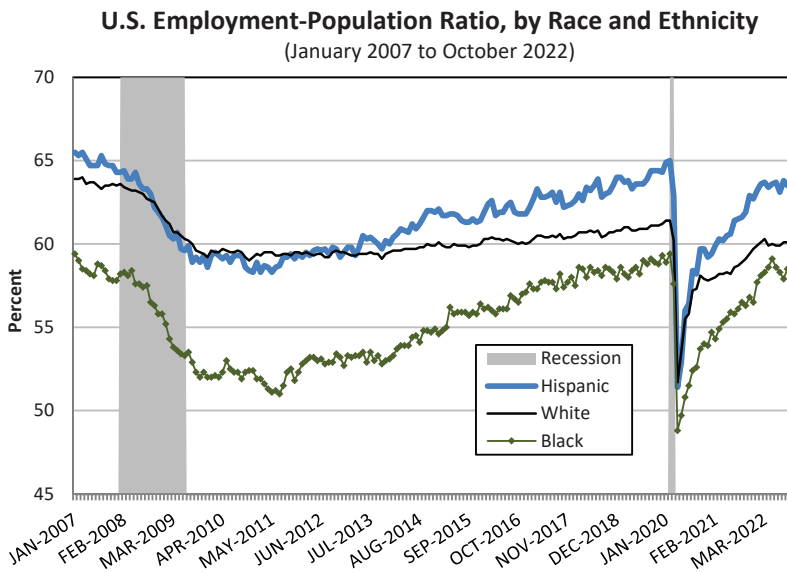
The national unemployment rate is perhaps the most widely known labor market indicator; it reflects the number of unemployed people as a percentage of the labor force. However, therein lies its fundamental weakness—it does not include individuals who have dropped out of the labor force. Nonetheless, 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 October 2022, 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 October 2022, the respective percentages were 3.2, 5.9, and 4.2. 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.



Source: Bureau of Labor Statistics, Current Population Survey

EMPLOYMENT-POPULATION RATIO

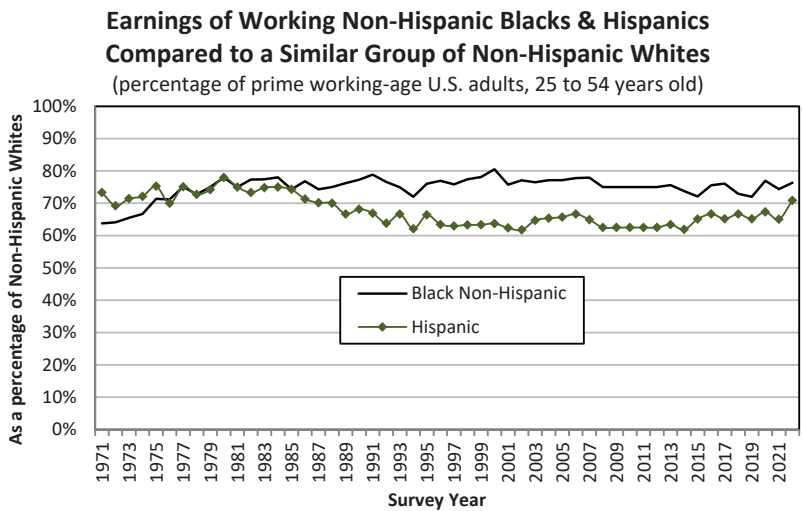
Many economists believe the employment-population ratio is a better labor market indicator than the more frequently referenced unemployment rate. This ratio is the proportion of the civilian non-institutional population that is employed, and it shows a somewhat different picture of the labor market than 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 October 2022 the ratio for white, Black, and Hispanic persons was, respectively, 60, 58.4, and 63.4. 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.



Source: Bureau of Labor Statistics, Current Population Survey

MINORITY EARNINGS GAP

The minority earnings gap has been persistent for 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 67 and 77 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.



Source: Author's analysis of U.S. Census CPS 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 [Annual Social and Economic Sup., various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

Note: Survey year asks about earnings for the previous year, so 2022 survey year reflects 2021 earnings.

EARNINGS BY RACE, ETHNICITY, & METRO STATUS

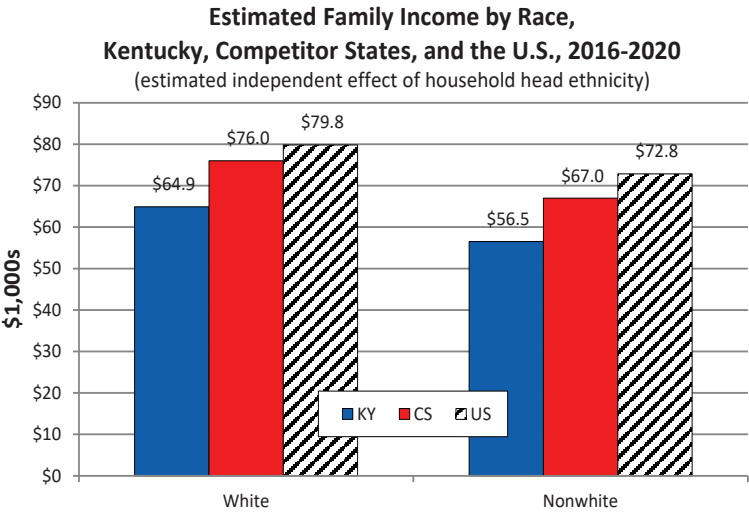
As we indicate on the previous page, there has been a persistent minority earnings gap in the U.S., and the same is true in Kentucky. The table below presents median earnings by race, ethnicity, and metro status for prime working-age adults who are currently employed. White non-Hispanic persons consistently 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 17 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 40 percent.

EQUITY

Median Earnings in Kentucky by Race, Ethnicity, & Metro Status, 2015-2019 (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	\$29,202	\$26,073	\$34,092	\$33,368
Metro Area	\$32,000	\$28,765	\$44,745	\$41,717
Metro status indeterminable	\$32,373	\$28,765	\$38,353	\$37,769
Source: Authors’ analysis of data from Steven Ruggles, Sarah Flood, Sophia Foster, Ronald Goeken, Jose Pacas, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 11.0 [2015-2019, ACS 5-year]. Minneapolis, MN: IPUMS, 2021. https://doi.org/10.18128/D010.V11.0 .				

FAMILY INCOME BY RACE

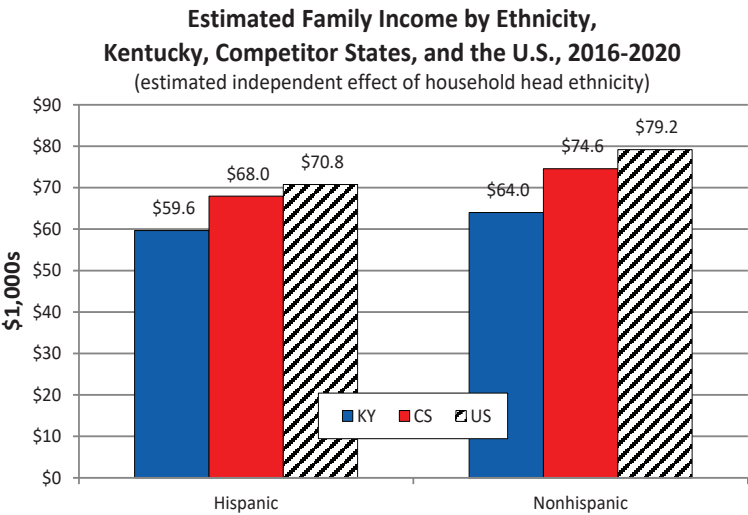
Economists and other researchers have long demonstrated the relationship between education and earnings. We explore that specific relationship more fully in the Education section of this report using the same statistical model used here. Using data from the U.S. Census Bureau American Community Survey (ACS) for the years 2016-2020, we estimate the independent effect of race on earnings while holding other factors constant, such as age, gender, employment status, educational attainment, marital status, ethnicity, and metro status—all factors that affect earnings. In Kentucky, there is an \$8,400 difference for a family where the head of the household is white compared to one headed by someone who is not white. This relationship holds up across the competitor states and the U.S. overall, as shown in the figure below. While introducing other variables or employing different statistical techniques might affect these results and estimated dollar differences, the literature on this topic is consistent and clear—race is a fundamental factor associated with income and wealth accumulation. Narrowing this disparity requires a multipronged approach, but research by Nora Cahill and William Gale with the Brookings Institution shows that using the Earned Income Tax Credit (EITC) and Child Tax Credit (CTC) shows tremendous promise in bridging the racial wealth gap.



Source: Estimated by the author using data courtesy Steven Ruggles, Sarah Flood, Ronald Goeken, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 12.0 [ACS 2020 5-Year]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D010.V12.0>

FAMILY INCOME BY ETHNICITY

As described on the facing page, we use data from the U.S. Census Bureau American Community Survey (ACS) for the years 2016-2020 to estimate the independent effect of ethnicity, or more precisely, whether one is Hispanic or not, on earnings. Other factors held constant in our statistical model include age, gender, employment status, educational attainment, marital status, race, and metro status. In Kentucky, there is an estimated \$4,400 difference for a family where the head of the household is not Hispanic compared to one headed by someone who is Hispanic or Latino. And, similar to the relationship to race and family income, this relationship is also evident in the U.S. overall as well as in the competitor states.

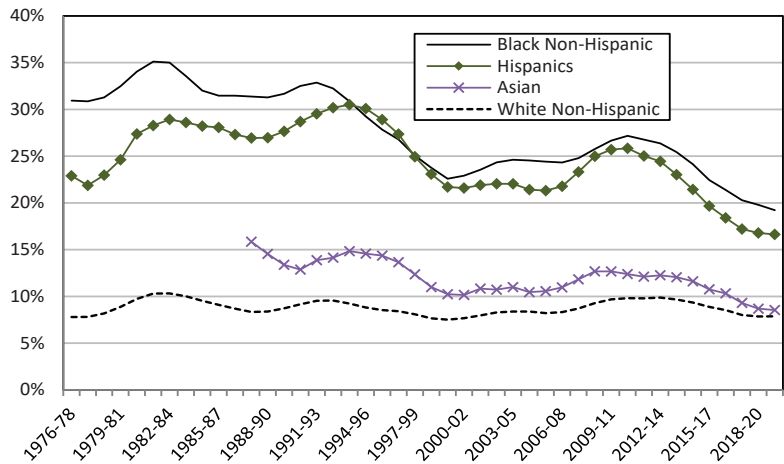


Source: Estimated by the author using data courtesy Steven Ruggles, Sarah Flood, Ronald Goeken, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 12.0 [ACS 2020 5-Year]. Minneapolis, MN: IPUMS, 2022.
<https://doi.org/10.18128/D010.V12.0>

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 13, 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 2019 to 2021 (3-year average) is almost 8 percent for white non-Hispanic individuals and just over 19 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.”

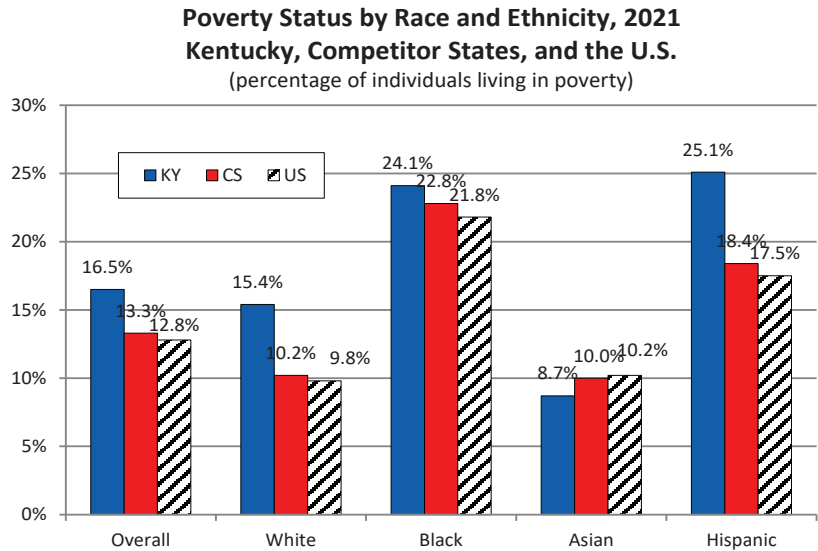
U.S. Poverty Rates by Race & Ethnicity, 1976 to 2021
(percent of individuals in poverty, 3-year average)



Source: Author's analysis of IPUMS-CPS data, 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 [ASEC various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

POVERTY RATE BY RACE & ETHNICITY

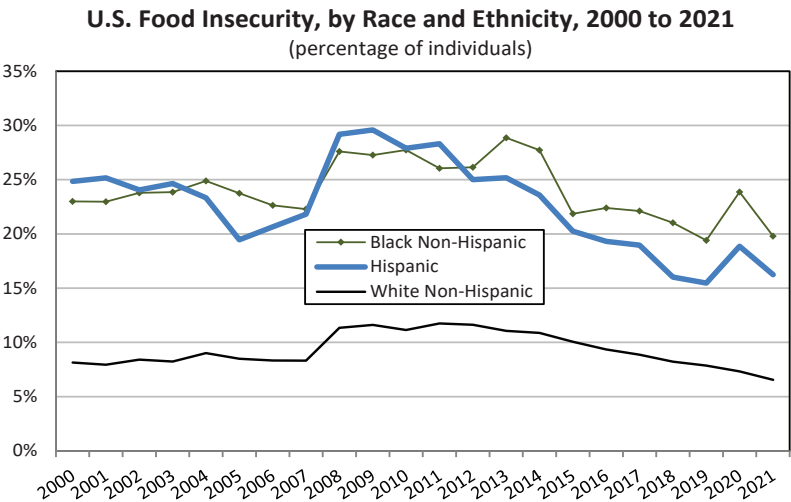
Kentucky’s poverty rate is consistently higher than the U.S. and the competitor states for white persons, Black persons, and Hispanics. Moreover, the same pattern presented for the U.S. on the facing page is evident for Kentucky. White individuals experience poverty at much lower rates than Black and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



Source: U.S. Census, American Community Survey, Table S1701, 2021 1-Year Estimate.

FOOD INSECURITY BY RACE & ETHNICITY

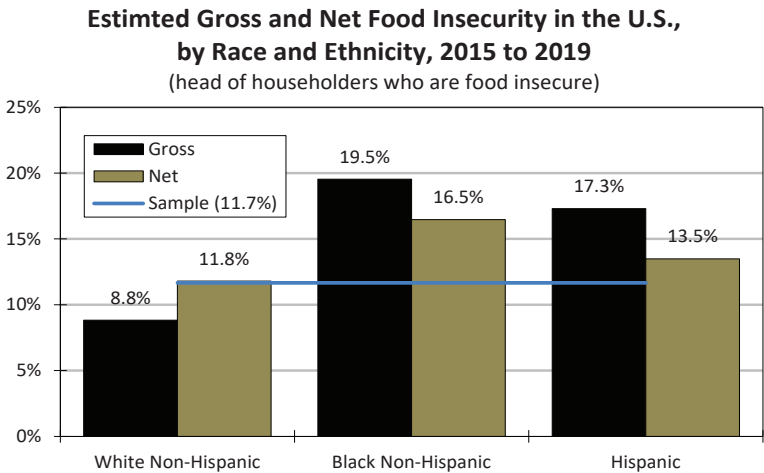
While the Pandemic Recession revealed that many Americans, regardless of race, ethnicity, or neighborhood, were much closer to food insecurity than they realized, minorities experience higher rates of food insecurity both before and during the pandemic. Food security is defined as having “access at all 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.



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>

FOOD INSECURITY BY RACE & ETHNICITY

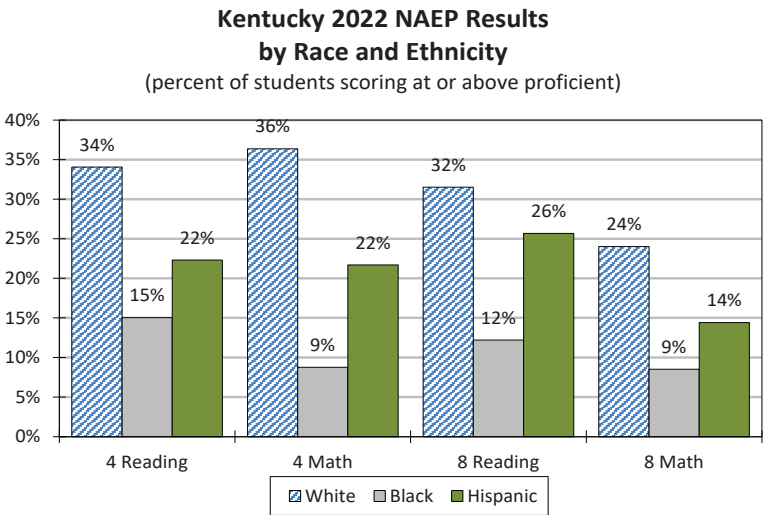
Black non-Hispanic and Hispanic persons are more likely to experience food insecurity than white non-Hispanic persons. The chart shows the net and gross effects. The net effect in the chart is an estimate of how individuals differ along a single dimension while holding all other factors constant, while the gross percentages are the subpopulation values. 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 this five-year period, from 2015 to 2019, the overall head of household food insecurity percentage in the United States, competitor states, and Kentucky was, respectively, 11.7, 12.3, and 14.8. We estimate the independent effect of race and ethnicity at the U.S. level using a model-based approach that controls for other factors, such as education, work status, family income, age, gender, marital status and whether one lives in a rural or urban area. While holding these factors constant, we estimate that Black non-Hispanic and Hispanic persons experience statistically significant higher levels of food insecurity than white non-Hispanic persons. This is illustrated by the net percentages, with Black non-Hispanic and Hispanic persons expected to have 4.7 and 1.7 percent higher food insecurity levels, respectively, than white persons.



Source: Estimated by the author using 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>

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.



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

EDUCATIONAL ACHIEVEMENT GAP: KSA

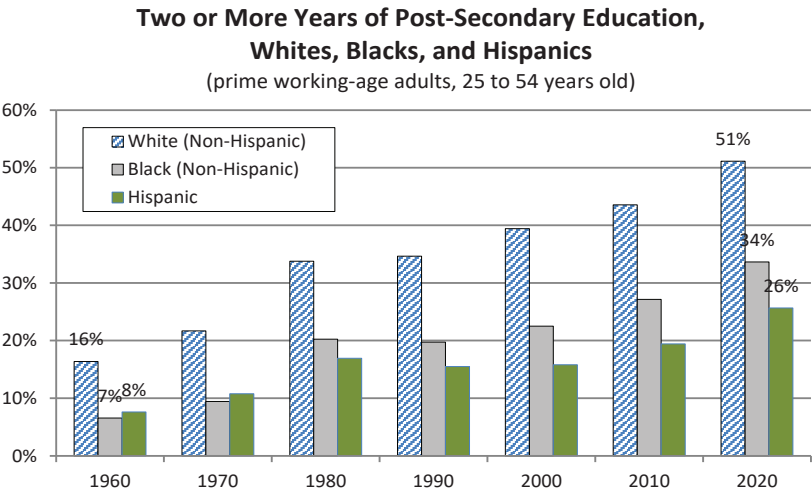
Similar to student performance on the NAEP examination (see the facing page), there is a minority achievement gap on the Kentucky Summative Assessment (KSA). Kentucky students take the KSA to meet federal and state testing requirements. Previously, these tests were called Kentucky Performance Rating 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.

EQUITY

Kentucky Summative Assessment (KSA) by School Level, Subject, Race, and Ethnicity Students Scoring Proficient or Higher in Reading & Math (2021-2022 academic year)				
School Level	Subject	White (%)	Black (%)	Hispanic (%)
Elementary	Reading	49	24	34
	Math	43	16	27
Middle	Reading	48	22	32
	Math	41	15	26
High	Reading	47	23	32
	Math	40	16	26
Source: Kentucky Department of Education, State Report Card 2021-2022, downloaded 11/8/2022, available at: https://www.kyschoolreportcard.com/organization/20/school_accountability/				

POST-SECONDARY EDUCATION BY RACE & ETHNICITY

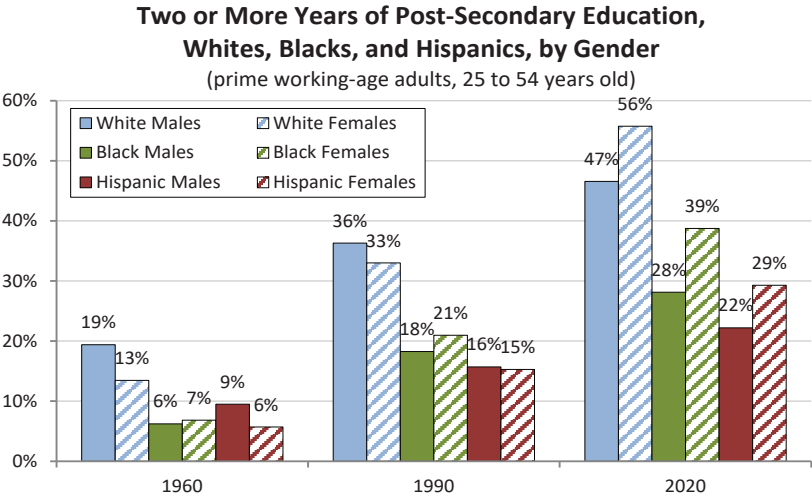
There are marked differences nationally in the percentages of prime working-age whites, Blacks, and Hispanics with at least two years of post-secondary education. This is important because the percentage of jobs requiring some education, training, or credentials beyond high school has increased over 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 whites (51%), Blacks (34%), and Hispanics (26%) in the percentage of prime-working age adults who have attained at least two years of post-secondary education (2020). Finally, while these data reflect national trends, the pattern is evident in Kentucky too.



Source: Author's analysis of U.S. Census Bureau data from Steven Ruggles, Sarah Flood, Ronald Goeken, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 12.0 [1960 5% sample; 1970 Form 1 State 1%; 1980, 1990, & 2000 5% samples; 2010 & 2020 ACS 5-Year]. Minneapolis, MN: IPUMS, 2022.
<https://doi.org/10.18128/D010.V12.0>

POST-SECONDARY EDUCATION BY RACE, ETHNICITY & GENDER

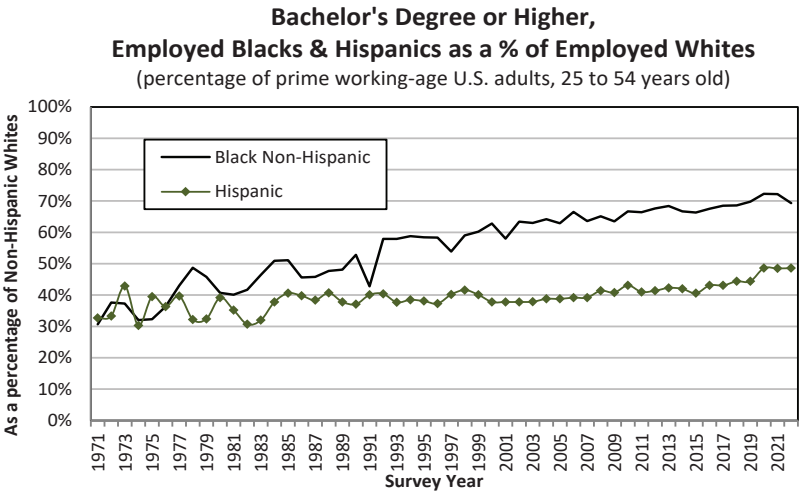
As described on the facing page, to become economically successful now and in the future, it will increasingly require some education and training beyond high school. And, while educational attainment levels have increased dramatically for every race and ethnic group over the last fifty years, there 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-Hispanics (34%) and Hispanics (26%) 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 2020). Illustrating gender differences, the chart below shows that in 2020 Hispanic *females* (29%) have about the same attainment level as Black non-Hispanic *males* (28%), and Black non-Hispanic *females* (39%) have much higher attainment levels than Black non-Hispanic *males* (28%). 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* 56 to 47 percent.



Source: Author's analysis of U.S. Census Bureau data from Steven Ruggles, Sarah Flood, Ronald Goeken, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 12.0 [1960 5% sample; 1970 Form 1 State 1%; 1980, 1990, & 2000 5% samples; 2010 & 2020 ACS 5-Year]. Minneapolis, MN: IPUMS, 2022.
<https://doi.org/10.18128/D010.V12.0>

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 does help facilitate access to jobs paying higher wages.



Source: Author's analysis of U.S. Census CPS 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 [Annual Social and Economic Sup., various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>
Note: Survey year asks about education for the previous year, so 2022 survey year reflects 2021 attainment.

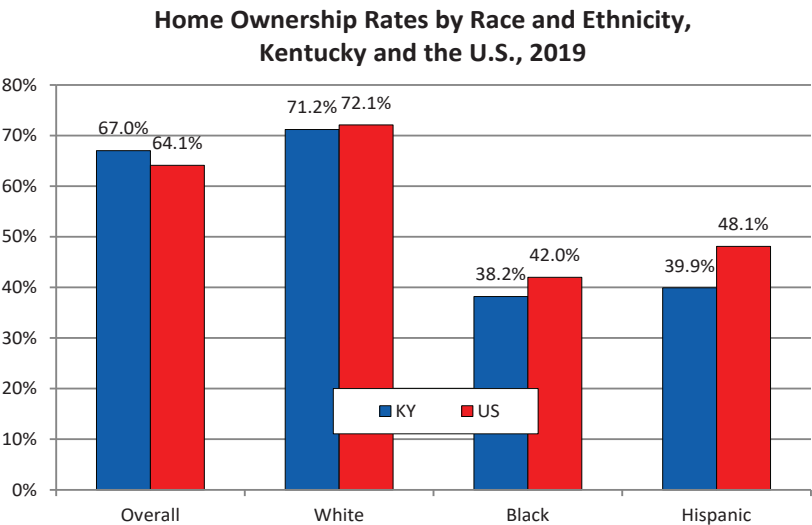
COLLEGE DEGREES BY RACE, ETHNICITY, & METRO STATUS

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. Moreover, the table shows that individuals living in a metro area earn more 4-year college degrees than those not in a metro area for all race and ethnic groups. The metro area degree difference is especially pronounced for white non-Hispanic workers. White non-Hispanic workers between the ages of 25 and 54 living in non-Metro areas have earnings, on average, about 17 percent higher than a similar category of Black non-Hispanic workers, and, at nearly 40 percent, the earnings gap between Blacks and Whites is much more significant in Kentucky’s metro areas.

Bachelor’s Degree or Higher, Kentucky Race & Ethnicity by Metro Status, 2019 (prime working-age, working adults)				
Adults, 25 to 54 years old	Black Non- Hispanic	Hispanic	White Non- Hispanic	Total
Not in Metro Area	17.0*	21.6	24.3	24.4
Metro Area	25.2*	23.0*	44.0	41.0
Metro status indeterminable	22.0*	17.2*	26.4	26.0
Source: Authors’ analysis of data from Steven Ruggles, Sarah Flood, Sophia Foster, Ronald Goeken, Jose Pacas, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 11.0 [2015-2019, ACS 5-year]. Minneapolis, MN: IPUMS, 2021. https://doi.org/10.18128/D010.V11.0 .				
*These percentages are statistically different from the White percentages (alpha=.05).				

HOME OWNERSHIP RATES BY RACE & ETHNICITY

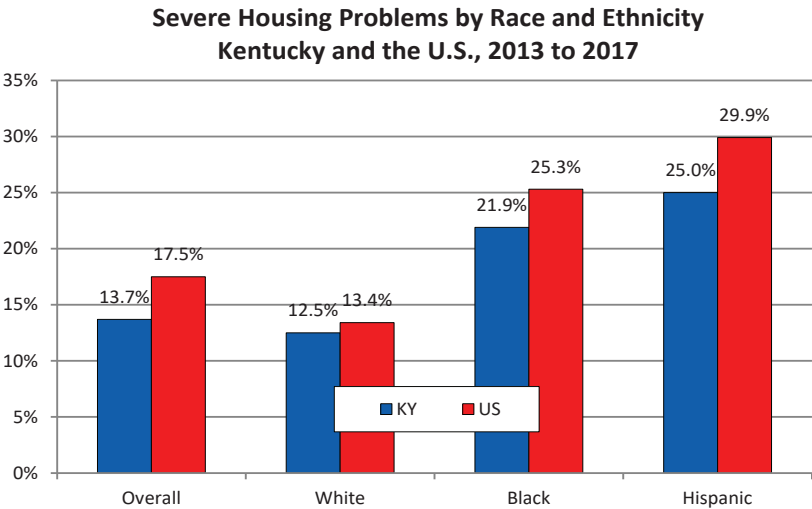
The chart below shows the home ownership rate by race and ethnicity in 2019, revealing a wide gap between white, Black, and Hispanic persons, both nationally and in Kentucky. According to a September 2020 report from the Board of Governors of the Federal Reserve System, *FEDS Notes*, “Disparities in 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.”



Source: America’s Health Rankings 2020, United Health Foundation, AmericasHealthRankings.org, Accessed 2021.

SEVERE HOUSING PROBLEMS BY RACE & ETHNICITY

An estimated 17.5 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, 2013-2017). The Kentucky percentage is lower (13.7%). 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.”

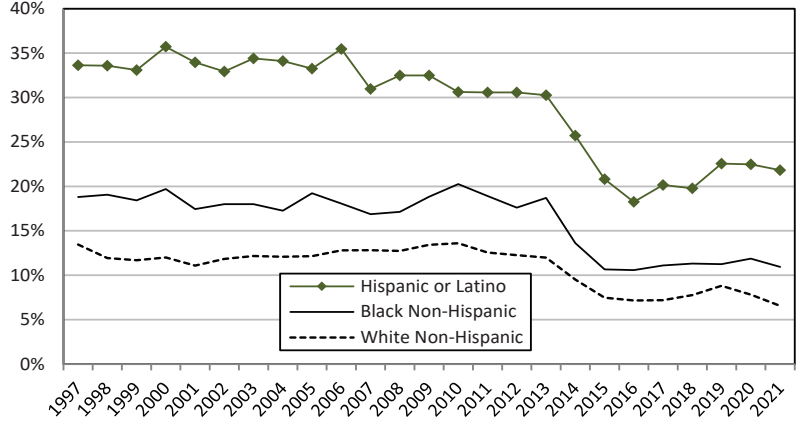


Source: America’s Health Rankings analysis of U.S. Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy (CHAS), United Health Foundation, *AmericasHealthRankings.org*, Accessed 2021.

HEALTH INSURANCE BY RACE & ETHNICITY

An estimated 28.2 million Americans were without health insurance in 2021. In Kentucky, 251,000, or 5.7 percent of the total state population, did not have health insurance in 2021. Medicaid has historically played a key role in providing health coverage for disproportionately poor Kentuckians, insuring an estimated 28.7 percent of the population here in 2021, compared to 21.1 percent nationally. 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 2021**
(nonelderly individuals are 0 to 64 years old)

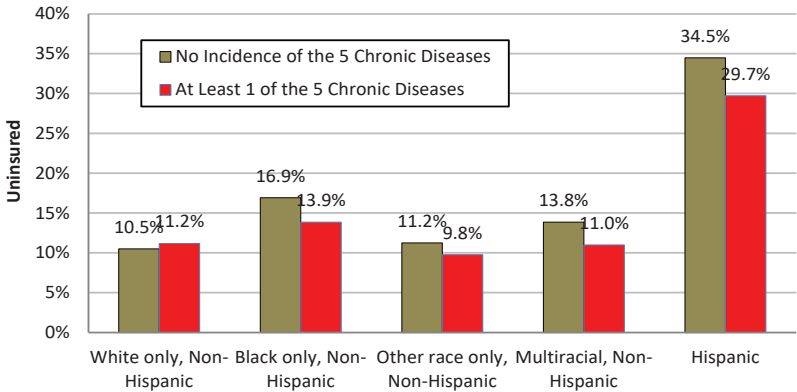


Source: Author's analysis of IPUMS-NHIS data, Lynn A. Blewett, Julia A. Rivera Drew, Miriam L. King, Kari C.W. Williams, Natalie Del Ponte and Pat Convey. IPUMS Health Surveys: National Health Interview Survey, Version 8.1 [NHIS 1997-2021]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D070.V8.1>

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 (11.2%), than Black non-Hispanic (13.9%), or Hispanic persons (29.7%). 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, 2017 to 2021**
(U.S. prime working-age, 25 to 54 years old)

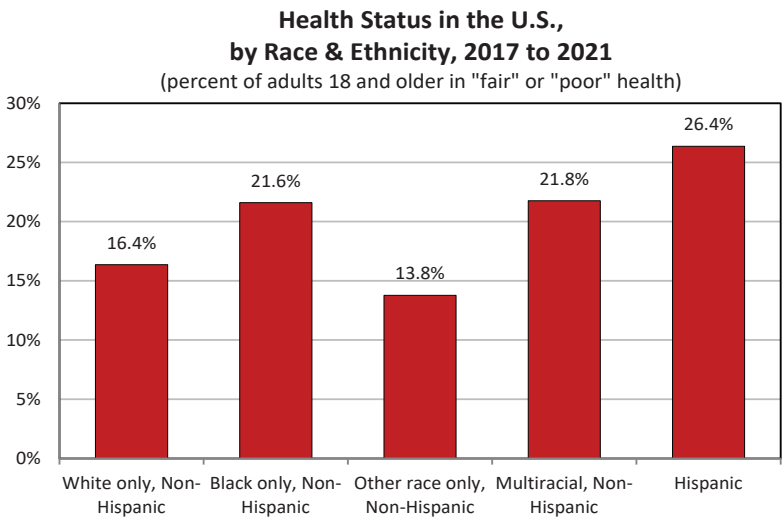


Source: Author's analysis of data from the Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2017-2021 pooled data.

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 16.4 percent of white Non-Hispanic adults say “fair” or “poor,” compared to 21.6 percent of Black non-Hispanic adults and 26.4 percent of Hispanic adults.

EQUITY



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, 2017-2021 pooled data.

LEADING CAUSES OF DEATH

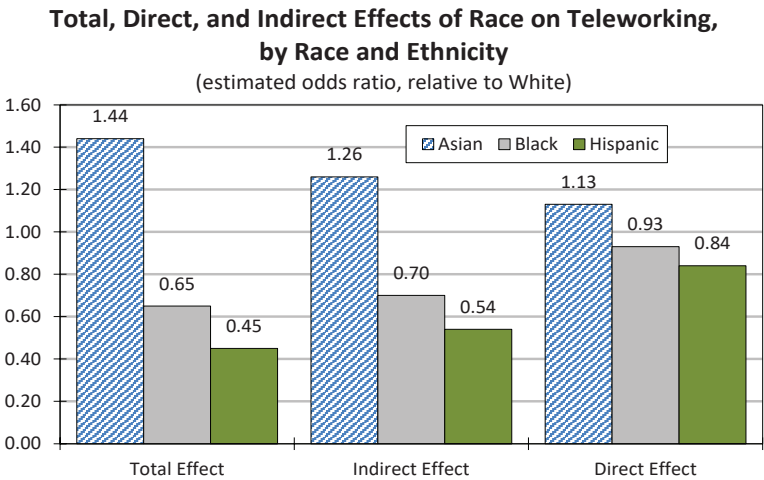
Health disparities exist across many dimensions, including, but not limited to, gender, geography, socioeconomic, race, and ethnicity. The Pandemic brought many of these disparities to the forefront, evidenced by the risk of death from COVID-19 at 2.4 times higher for American Indian or Alaska Native, non-Hispanic persons, 2 times higher for Black or African American, non-Hispanic persons, and 2.3 times higher for Hispanic or Latino persons, compared to white, non-Hispanic persons (CDC NCHS, as of 9/9/2021). In 2020, 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 Blacks (228.6 per 100,000 population) far exceeds both whites (170.1) and Hispanics (122.7). The same is true for cancer, the second leading cause of death. The rate for Blacks is 166.7, which is also higher than the rate for whites (149.9) and Hispanics (103.6). COVID-19 is the third leading cause of death for the overall population, but the leading cause of death for Hispanics (155.5). The causes of death in the table are the ten leading causes of death in the United States in 2020.

EQUITY

Leading Causes of Death in the U.S., by Race & Ethnicity, 2020 (Age-adjusted rate per 100,000 population)				
Cause of Death	Overall	White, Non- Hispanic	Black, Non- Hispanic	Hispanic
Heart disease	168.2	170.1	228.6	122.7
Cancer (malignant neoplasms)	144.1	149.9	166.7	103.6
COVID-19	85.0	66.3	140.0	155.5
Accidents (unintentional injuries)	57.6	62.8	67.1	41.2
Stroke (cerebrovascular diseases)	38.8	37.1	56.8	34.9
Chronic lower respiratory diseases	36.4	41.2	30.2	15.9
Alzheimer's disease	32.4	33.9	31.3	29
Diabetes mellitus	24.8	21.1	46.8	30.9
Intentional self-harm (suicide)	13.5	11.2	26.1	11.7
Chronic liver disease and cirrhosis	13.3	12.7	17.0	12.1
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, 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.html on Nov 9, 2022 5:05:47 PM.				

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.

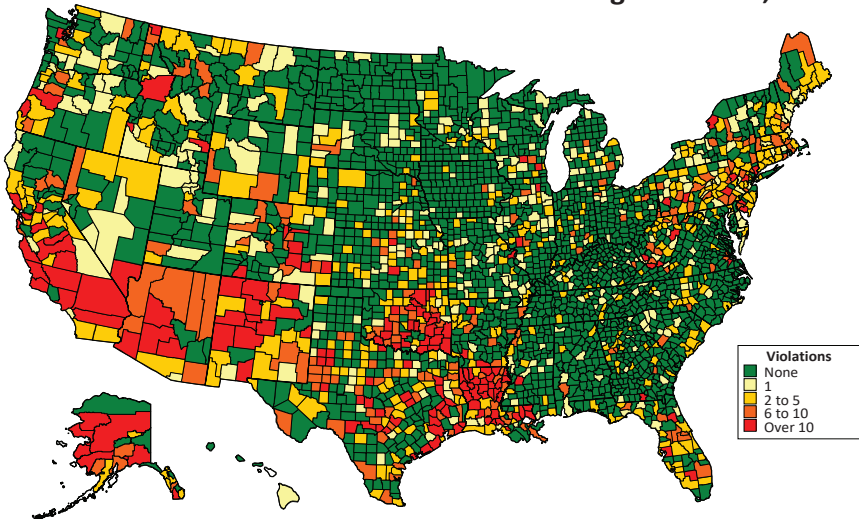


Source: Abay Asfaw, “Racial and Ethnic Disparities in Teleworking Due to the COVID-19 Pandemic in the United States: A Mediation Analysis,” *International Journal of Environmental Research and Public Health*, 2022, 19, 4680. <https://doi.org/10.3390/ijerph19084680>

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 1,196 counties where at least one health-based violation of the Safe Drinking Water Act occurred in 2021. Minorities constitute around 39.9 percent of the population nationwide, but, at about 55 percent, are overrepresented in counties with over 10 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.”

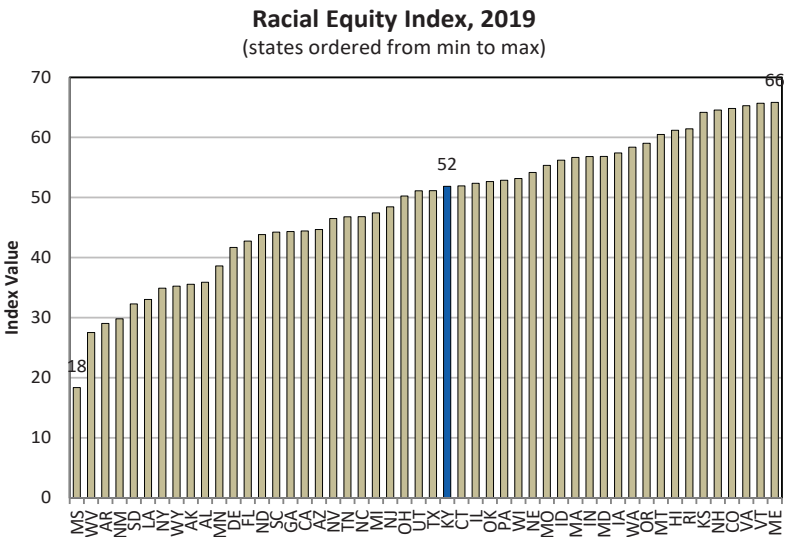
Health-Based Violations of the Safe Drinking Water Act, 2021



Source: Author's analysis of EPA SWWIS data.

RACIAL EQUITY INDEX

Kentucky ranks 24th out of 50 on the Racial Equity Index at the state level. In 2019, Maine was ranked first with the highest Racial Equity Index value of 66 and Mississippi had the lowest value of 18. 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. This is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). Four Kentucky counties are assessed, with Fayette County in the upper 25 percent.



Health

THE COVID-19 PANDEMIC HAS been the most significant test of the U.S. health system in more than a century. With over ninety-six million confirmed cases in the United States and over one million deaths, COVID-19 has levied a significant cost (Centers for Disease Control, September 2022); Kentucky has experienced 1.6 million cases and almost 17,000 deaths (Kentucky Cabinet for Health and Family Services, KDPH, September 2022).

One of the lingering consequences of the pandemic is its mental health toll. Among adults in Kentucky, about one quarter have a depressive disorder. 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. Prior to the pandemic, in 2019, an estimated 37 percent of Kentucky high school students revealed that they experience persistent sadness or hopelessness.

With 4,132 deaths in 2020, COVID-19 has been one of the leading causes of death in Kentucky, but there are other health conditions that account for more sickness and death. The two leading causes of death in Kentucky are heart disease (11,345) and cancer (10,181), with COVID-19 ranking third. Accidents (3,950) are fourth and chronic lower respiratory disease (3,236) is fifth.

Kentucky's health short-comings are well-known—America's *Health Rankings 2021*, delineates our high rates of drug overdose deaths, chronic disease, and

continued on the next page



continued from the previous page

disability, by ranking the state 47th on health outcomes and 48th on health behaviors. It lists areas considered to be strengths (i.e., high percentage of high school graduation, high percentage of fluoridated water, low racial disparity in premature death rates), as well as its challenges (i.e., high prevalence of multiple chronic conditions, high prevalence of insufficient sleep, high prevalence of cigarette smoking).

The 2,082 drug overdose deaths in Kentucky in 2020 were up from 1,377 in 2019. While the coronavirus and opioids get the headlines, 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 (24%), obesity (45%), and physical inactivity (26%) put many at risk for chronic disease. Overall, around 27 percent of Kentucky's prime working-age 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 the 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.

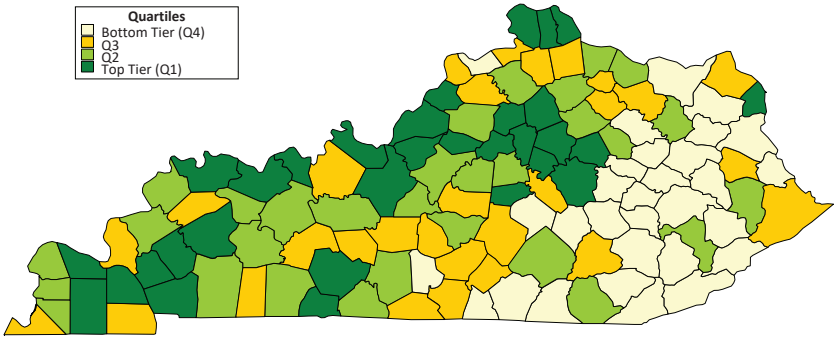
Kentucky's poor health outcomes have large economic effects and societal consequences. At the most basic level, good health enables workers to be more productive. Indirectly, higher levels of health facilitate, for example, more education and schooling, which directly affects economic outcomes. Conversely, 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.

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 have the opportunity to 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.

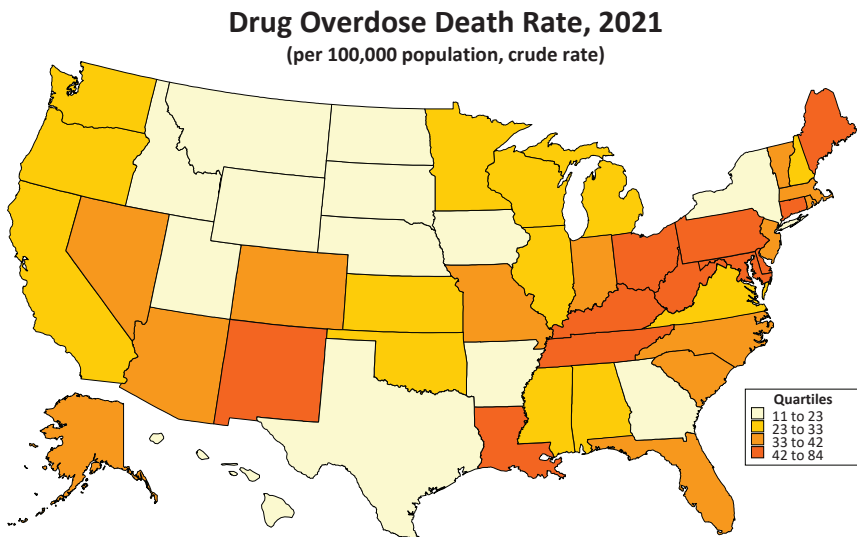
Social Determinants of Health by Kentucky County



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

DRUG OVERDOSE DEATH RATE

Drug overdose deaths, largely fueled by the opioid fentanyl, hit an all-time high in 2021—over 107,600 Americans died. This is a substantial increase from the 92,500 deaths in 2020. Kentucky, unfortunately, has one of the highest drug overdose death rates in the country. Nearly 2,400 Kentuckians, about 53 individuals per 100,000 population, died from a drug overdose in 2021. As can be seen in the map below, Kentucky is among the states in the highest quartile nationally. There have been, and will continue to be, significant economic consequences for the county, individual states, and local communities. These costs include lost wages, lower productivity, lost tax revenue, and higher government expenditures.

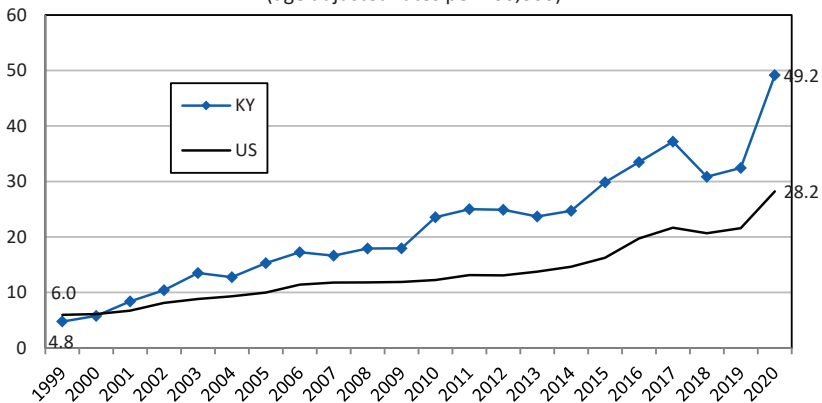


Source: Estimated by the author using CDC National Center for Health Statistics, Vital Statistics Rapid Release, Monthly Provisional Drug Overdose Death Counts, released May 2022.

DRUG OVERDOSE DEATH RATE

The number of Kentuckians, and Americans, dying from a drug overdose continues along its upward arc. The primary culprit in drug overdose deaths is opioid abuse, especially heroin and fentanyl. According to CDC estimates, there were 2,082 drug overdose deaths in Kentucky during 2020, up from 1,377 in 2019. The U.S. drug overdose death rate (age adjusted) increased by a factor of 4.7 from 1999 to 2020, but in Kentucky it increased by a factor of 10.3. The Kentucky Office of Drug Control Policy reports in the *2021 Overdose Fatality Report* a large increase in 2021 (not shown in the chart below). They report 2,250 drug overdose deaths (52.9 per 100,000 age-adjusted deaths); representing an increase of 14.5 percent from 2020 to 2021 in total deaths. The five counties with the highest age-adjusted rates in 2021 were Estill (147.9), Gallatin (145.9), Perry (141.8), Rowan (130.8), and Knott (122.7). 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., 1999-2020**
(age adjusted rates per 100,000)

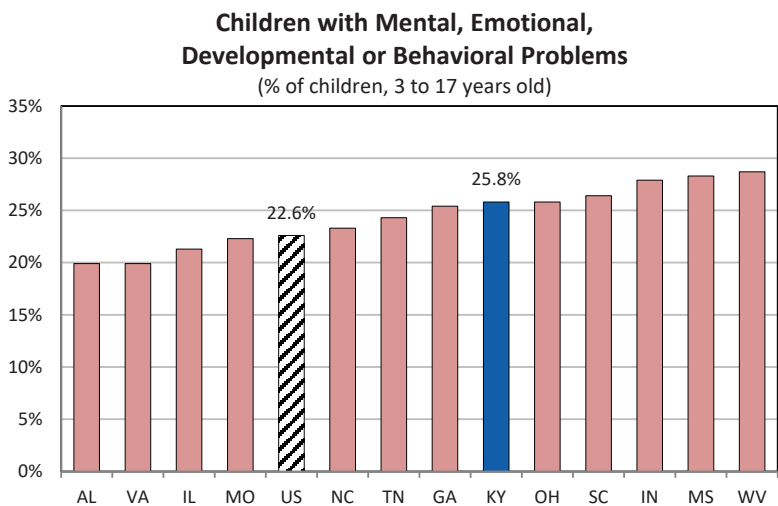


Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program.

Accessed at <http://wonder.cdc.gov/mcd-icd10.html> on May 12, 2022 12:55:39 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 in Kentucky (25.8%) showing at least one MEDB problem. 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%).



Source: Child and Adolescent Health Measurement Initiative. 2019-2020 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 [6/30/22] from [www.childhealthdata.org].

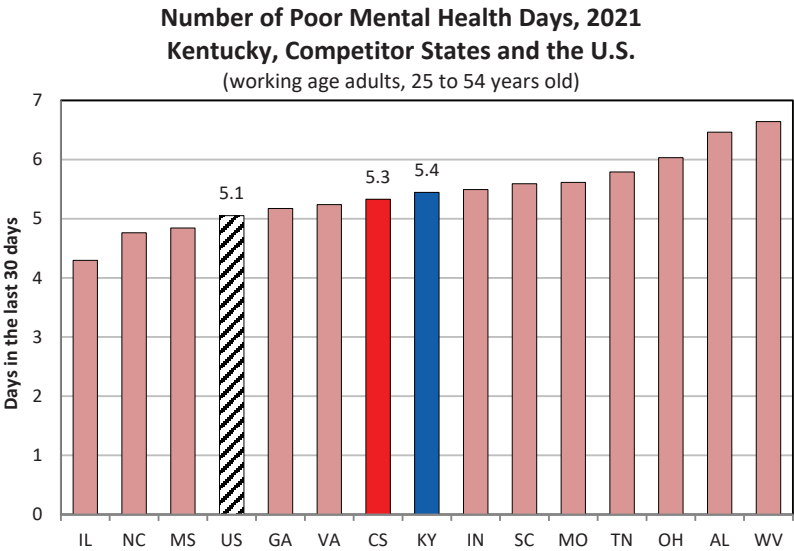
TEENS' MENTAL HEALTH

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 2019 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. For example, over a ten-year period, from 2009 to 2019, the percentage of students experiencing persistent sadness or hopelessness increased from 26.1 to 36.7 percent nationwide, with similar trends evidenced in Kentucky and in nearby states. Kentucky has tracked the national trends, with only minor differences that are not statistically significant.

Mental Health and Suicide Indicators among High School Students U.S., Selected Nearby States, and Kentucky, 2019 (High school youth, 9 th through 12 th grades)			
Survey questions	US (%)	Nearby States (%)	KY (%)
Experienced persistent sadness or hopelessness	36.7	34.7	37.2
Seriously considered suicide	18.8	18.6	18.4
Made a suicide plan	15.7	14.2	15.9
Attempted suicide	8.9	9.9*	8.1
Injured in a suicide attempt requiring medical treatment	2.5	3.1	3.0
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, 2019. Note: The selected nearby states are AL, GA, IL, 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

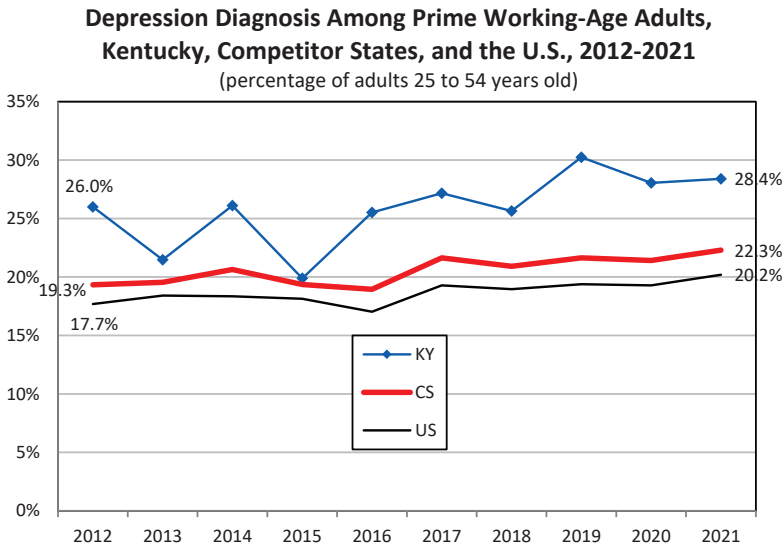
To gauge the mental health status of American adults, the Centers for Disease Control (CDC) posed this question on its 2021 Behavioral Risk Factor Surveillance System Survey: *Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during 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 higher value (5.4 days) than both the US (5.1) and competitive states (5.3), but there is not a statistically significant difference between them. There are two states that are statistically significantly higher than Kentucky (AL and WV), 34 states and the District of Columbia are statistically the same as Kentucky, and 13 states are lower. Overall, Kentucky performs relatively well, ranking 15th, 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 2021. *The State of Mental Health in America 2022*, Mental Health America, Alexandria, VA.)



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 *suicide-related costs*. Kentucky’s relatively high self-reported rates of depression, shown in the graph below, belie its upper tier ranking of 15th nationally on the Mental Health America, *The State of Mental Health in America 2022*. This October 2021 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 2021 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 significantly higher than the U.S. and competitor states in nearly every year.



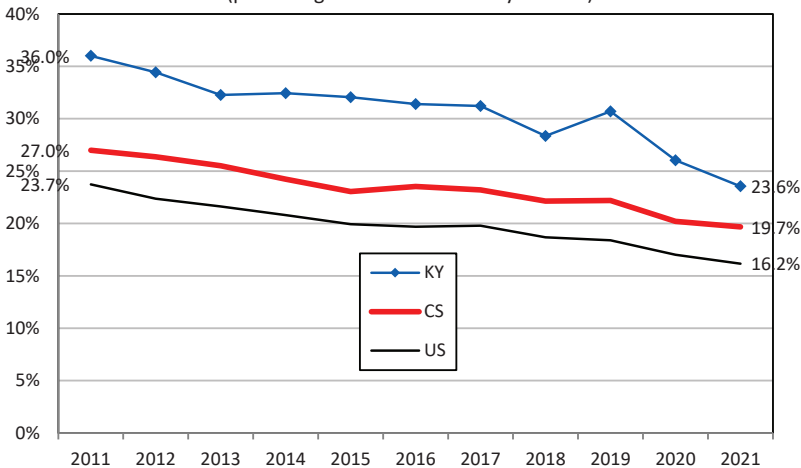
Source: Author's analysis of CDC Behavioral Risk Factor Surveillance System data, various years

ADULT SMOKERS

Kentucky 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 23.6 percent, Kentucky is well above the national average of 16.2 percent. Kentucky is statistically tied with 14 other states, but West Virginia is statistically higher (29.9%). The other 34 states, DC, as well as the competitor states and 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., 2011-2021**

(percentage of adults 25 to 54 years old)

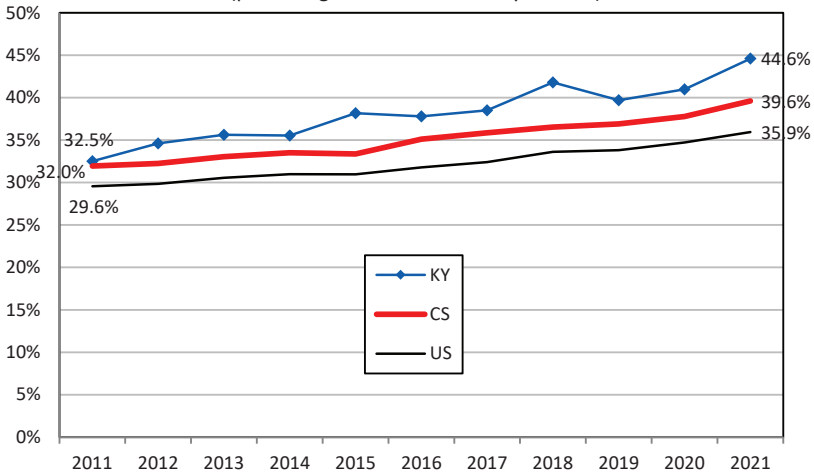


Source: Author's analysis of CDC Behavioral Risk Factor Surveillance System data, various years

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 475,000 Kentucky adults 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 44.6 percent of prime working-age adults (25 to 54 years old) in Kentucky are obese, nearly 9 percentage points above the national average of 35.9 percent. There are 11 states statistically no different from Kentucky. The other 38 states, DC, as well as the competitor states and U.S. average, have statistically significant lower rates. There are no states statistically significantly higher than Kentucky.

**Obesity Among Prime Working-Age Adults,
Kentucky, Competitor States, and the U.S., 2011-2021**
(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. One chronic condition, the diabetes rate, is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There are five Kentucky counties in the upper 10 percent of counties nationally (for having low diabetes rates), and an additional eight in the upper 25 percent (again, for lower diabetes rates). The rest of the state’s 107 counties are in the lower 75 percent of counties for higher rates of diabetes.

Four Risk Behaviors that Contribute to Chronic Disease,
U.S., Competitor States, and Kentucky, 2021
(prime working-age adults)

Adults, 25 to 54 years old	US (%)	CS (%)	KY (%)
Current Smoker	16*	20*	24
Obese	36*	40*	45
Lack of Physical Activity	21*	22*	26
Heavy Alcohol Consumption	7*	7*	5

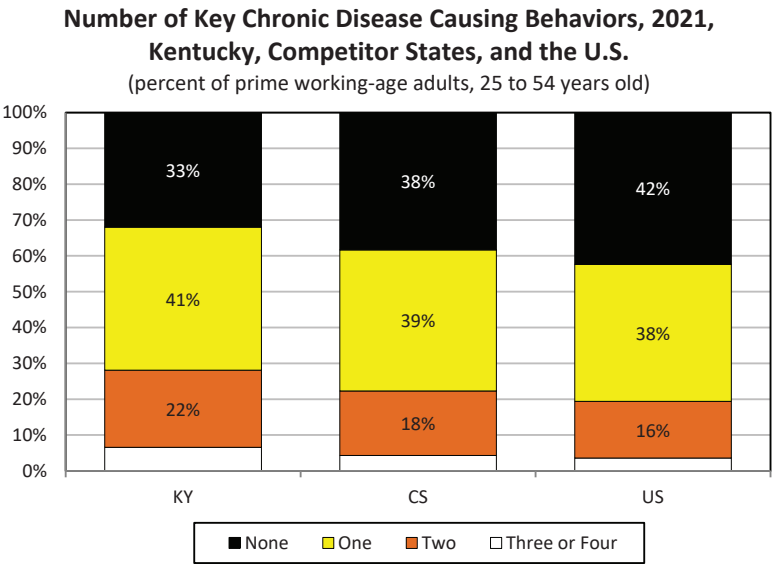
Source: Authors’ analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2021

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, 27 percent of Kentucky’s prime working-age (25 to 54 years old) adults engage in multiple chronic disease causing behaviors. About 33 percent have none of the risk factors of smoking, obesity, inactivity, or heavy drinking, and 41 percent have one. However, 23 percent have two and nearly 5 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.

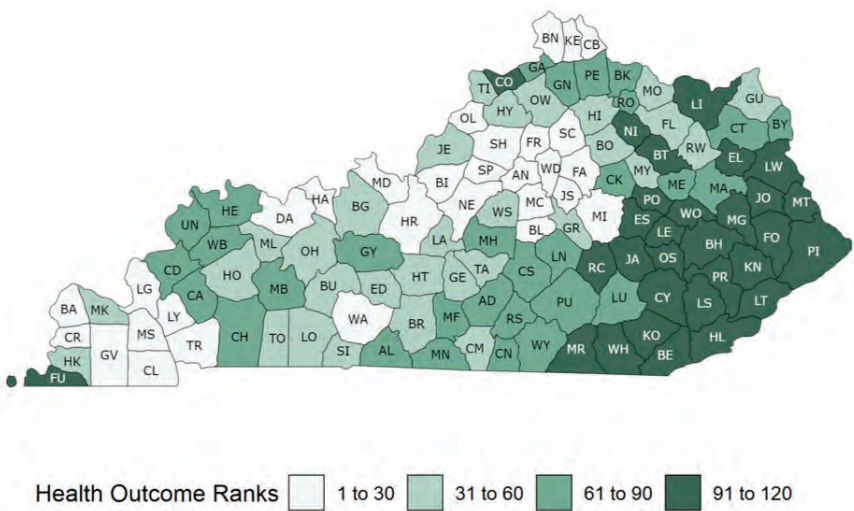


Source: Author’s analysis of Behavioral Risk Factor Surveillance System data

HEALTH OUTCOMES

Researchers use over 30 measures to produce the *2022 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.

2022 Health Outcomes - Kentucky

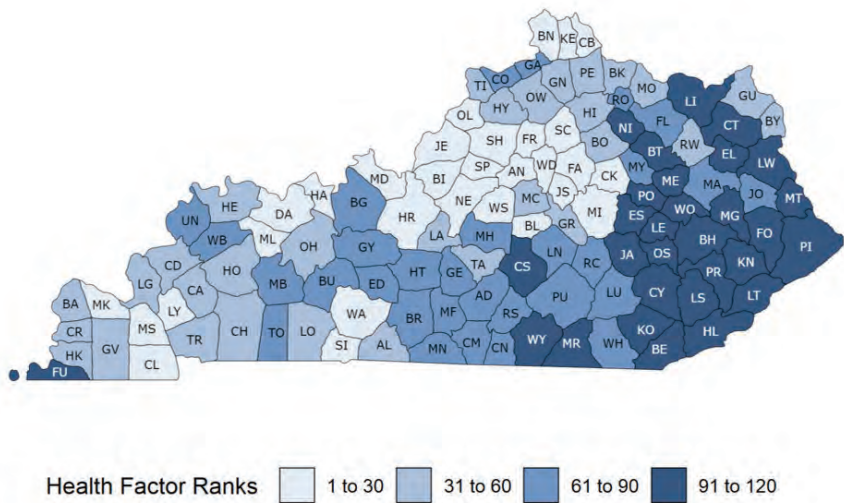


County Health
Rankings & Roadmaps
Building a Culture of Health, County by County

HEALTH FACTORS

This map of health factors, also part of the *2022 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.

2022 Health Factors - Kentucky

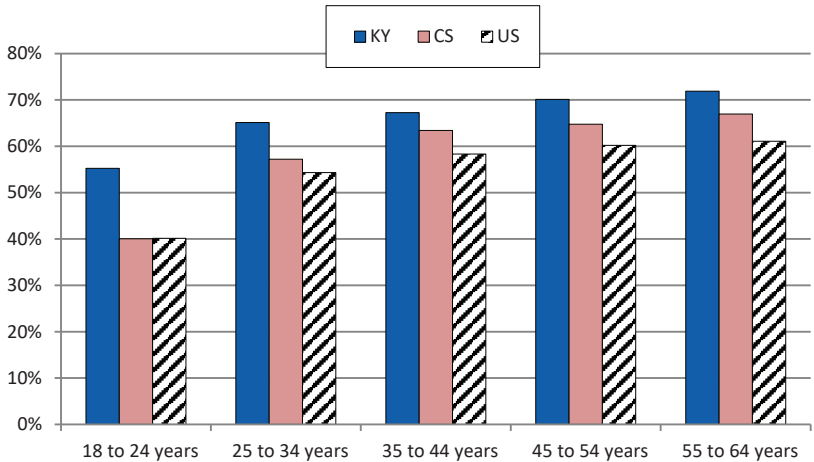


County Health
Rankings & Roadmaps
Building a Culture of Health, County by County

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 67 percent of Kentucky adults demonstrate at least one of the four behaviors that put them at risk of developing a chronic disease, compared to 62 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, 2021)

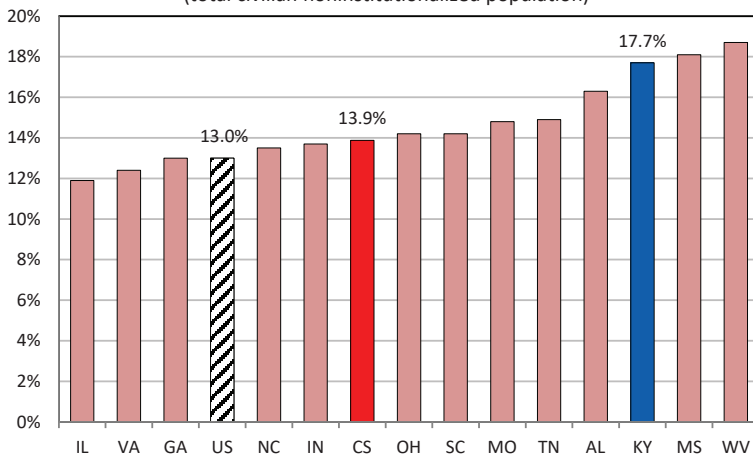


Source: Author's analysis of Behavioral Risk Factor Surveillance System data

DISABILITY

Kentucky has one of the nation's highest rate of disability (17.7%); the national average is 13 percent. 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? The disability rate is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There is one Kentucky county, Oldham, in the upper 10 percent of counties nationally (for having a low disability rate), and an additional four in the upper 25 percent (again, for lower disability rates). The rest of the state's 115 counties are in the lower 75 percent of counties for higher rates of disability.

Disabled Individuals, 2021
Kentucky, Competitor States and the U.S.
 (total civilian noninstitutionalized population)

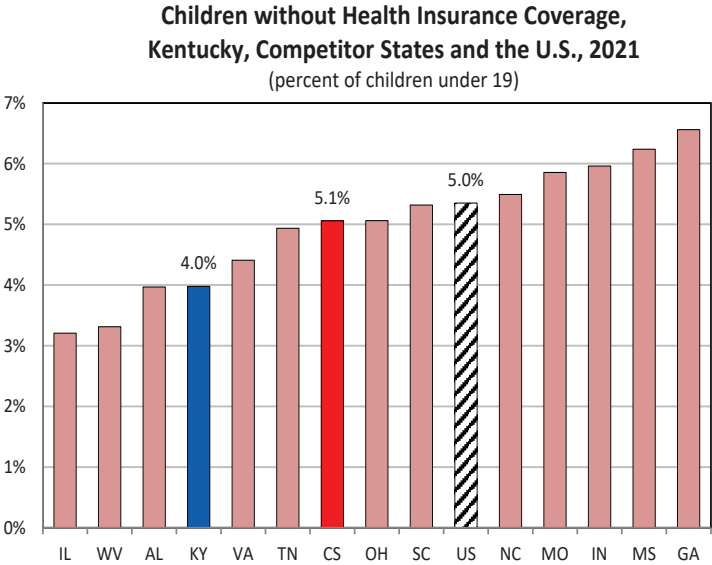


Source: U.S. Census, 2021 American Community Survey 1-Year Estimates, Table S1810

HEALTH INSURANCE COVERAGE: CHILDREN

An estimated 42,700 Kentucky children under 19 years old were not covered by health insurance in 2021, or about 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 200 percent of the federal poverty level. For example, a family of four can earn up to \$55,500 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 percent, respectively in 2021. 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.

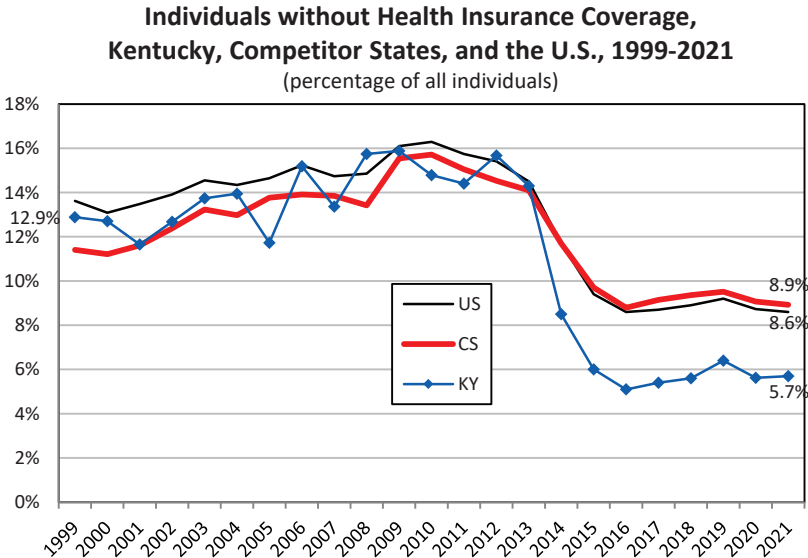
HEALTH



Source: U.S. Census 2021 American Community Survey 1-Year Estimates

HEALTH INSURANCE COVERAGE: EVERYONE

An estimated 28.2 million Americans were without health insurance in 2021, with the percentage of uninsured people declining slightly since 2019. In Kentucky, 251,000, or 5.7 percent of the total state population, did not have health insurance in 2021. Medicaid has historically played a key role in providing health coverage for disproportionately poor Kentuckians, insuring an estimated 28.7 percent of the population here in 2021, compared to about 19.3 percent in the competitor states and 21.1 in the U.S. The implementation of the Affordable Care Act has increased the number of individuals on Medicaid over the past few years.



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

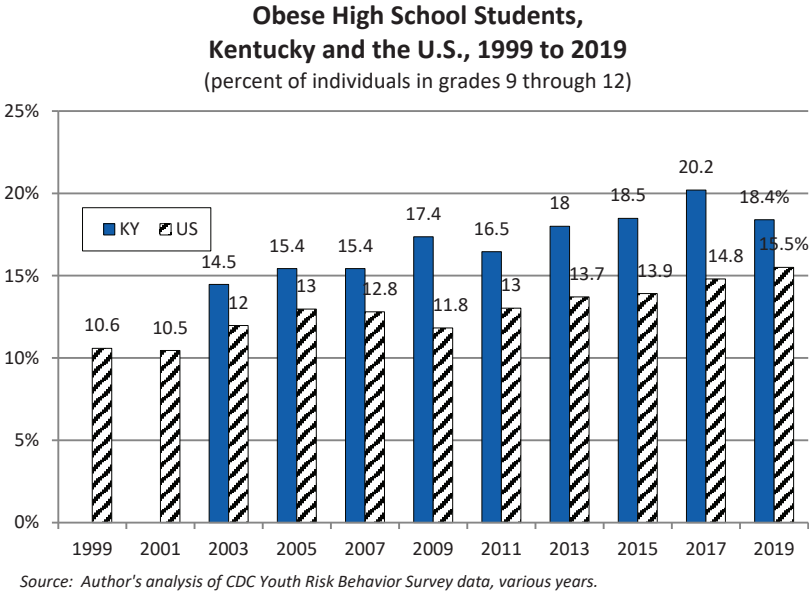
YOUTH HEALTH-RELATED BEHAVIORS

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, 2019			
9 th through 12 th graders	US (%)	SS (%)	KY (%)
Ate breakfast on all 7 days before the survey	33.1*	28.5	26.5
Ate fruit or drank 100% fruit juices one or more times per day during the 7 days prior to the survey	58.2*	52.6*	47.5
Ate vegetables one or more times per day during the 7 days before the survey	59.3*	52.5*	48.2
Drank one or more glasses per day of milk during the 7 days before the survey	28.6*	23.3	24.6
Did not drink a can, bottle, or glass of soda or pop during the 7 days before the survey	31.7*	28.2*	25.4
Physically active at least 60 minutes per day on 5 or more days during the 7 days before the survey	44.1*	43.0*	37.4
Played on at least one sports team during the 12 months before the survey	57.4*	52.3*	45.9
Watched television 3 or more hours per day on an average school day	19.8	20.7	21.3
Played video or computer games or used a computer 3 or more hours per day on the average school day	46.1	43.5*	47.5
<i>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, 2015</i> <i>Note: The selected states (SS) are AL, GA, IL, MO, NC, MS, SC, TN, VA, & WV. These are weighted averages. VA did not ask the “vegetable” question, VA & NC did not ask the “milk” question, GA did not ask the “soda” question, and VA, NC, & MO did not ask the question on “playing on sport teams.”</i> <i>*These percentages are statistically different from the Kentucky percentages (alpha=.05).</i>			

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 2019 was one of the highest in the country. There are only three states with statistically significant higher rates, while there are 24 states with statistically significant lower rates (out of the 41 states to which we can compare Kentucky). 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. Finally, Kentucky’s obesity rate has been increasing over time. However, while the 2019 rate of 18.4 percent is statistically higher than its 2003 rate, the 2019 rate is statistically no different from any of the rates from 2005 to 2017.



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 about 9 percent in 2019. 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. Approximately one-quarter (26.1%) of Kentucky high school students were using electronic vapor products in 2019, and around one-third of high school students nationally (32.7%). 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				
Year	Smoke Cigarettes**		Use Electronic Vapor Products***	
	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*
[†] 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, <i>High School Youth Risk Behavior Survey, various years</i>				

YOUTH ALCOHOL AND DRUG USE

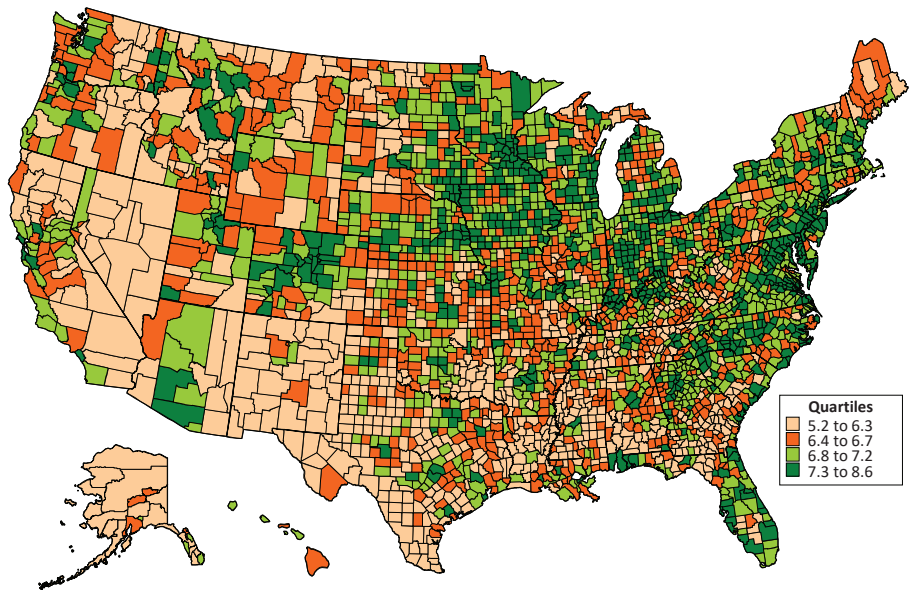
A range of behavioral risks can compromise the health and well-being of young people. Here, we illustrate trends of two such behaviors. While down sharply in recent years, roughly one-quarter of Kentucky high school students—23.6 percent of males and 23.1 percent of females—are considered current drinkers (at least 1 drink of alcohol on at least one day during the 30 days before the survey). Kentucky’s overall percentage in 2019, which is 23.5 percent, is statistically significantly lower than the U.S. percentage of 29.2 percent (using a 95 percent confidence interval). Forty states participated in the survey in 2019, and only three are significantly lower than Kentucky—California (7.1%), Georgia (6.2%), and Utah (4.3%). 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—16.9 percent of males and 14.8 percent of females. Kentucky’s overall percentage in 2019 is 16.1 percent, which is statistically significantly lower than the U.S. percentage of 21.7 percent. Three states are statistically lower than Kentucky, 19 the same, and 19 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
* 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				

NATIONAL HEALTH SECURITY AND PREPAREDNESS

The pandemic, tornados, fires, and widespread flooding over the last few years show how disasters and other health emergencies affect the economy, businesses, and communities. Results from the National Health Security Preparedness Index demonstrate that health security is not simply a governmental responsibility. Individual businesses and the private sector at large contribute to many of the health security measures that comprise the Index, such as offering paid time off and telecommuting options for employees, promoting vaccination coverage in the workforce, and supporting workers who train and volunteer in emergencies. This county-level version of the health security preparedness index, shown in the map below, is derived from 84 factors. The Index reveals that Kentucky's Urban Triangle region, as well as other counties with a metropolitan area, evidence higher levels of health security preparedness than counties located in more rural areas. Given the necessity of closer proximity to health care resources, reliable high-speed internet, and a more robust governmental infrastructure, among other factors, it is not surprising that, on average, metropolitan counties demonstrate higher levels of preparedness and capability than rural and slightly rural counties. More information about the Index is available at nhspi.org.

County-Level Health Security Preparedness Index



Note: Map generated on April 4, 2021, from data produced April 1, 2021 (84 measures)

Infrastructure

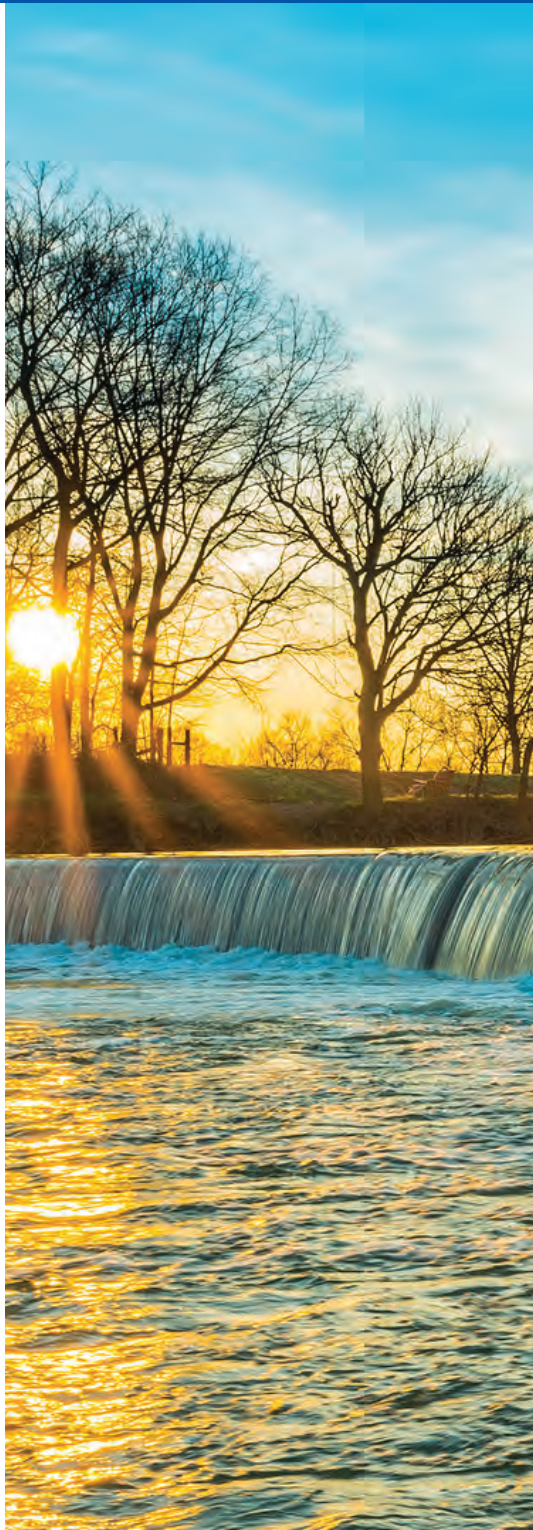
INFRASTRUCTURE DEVELOPMENT and maintenance are fundamentally important for Kentucky's future economic advancement, and it is easy to understand why; it includes aviation, bridges, dams, drinking water, energy, hazardous waste disposal sites, levees, public parks, roads, schools, solid waste processing 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 are involved in industrial site selection decisions show that infrastructure considerations play an important role in their decision-making. For example, choosing from a list of twenty-eight distinct factors, ranging from labor costs to environmental regulations, the single most important factor for respondents to the *2021 Area Development Site Selection Survey* was labor costs, evidenced by 96.4 percent ranking it as either "important" or "very important." By comparison, "highway accessibility" ranked fifth on the list at 93.1 percent.

The 2021 bipartisan infrastructure bill will send over \$5 billion to Kentucky over

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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.

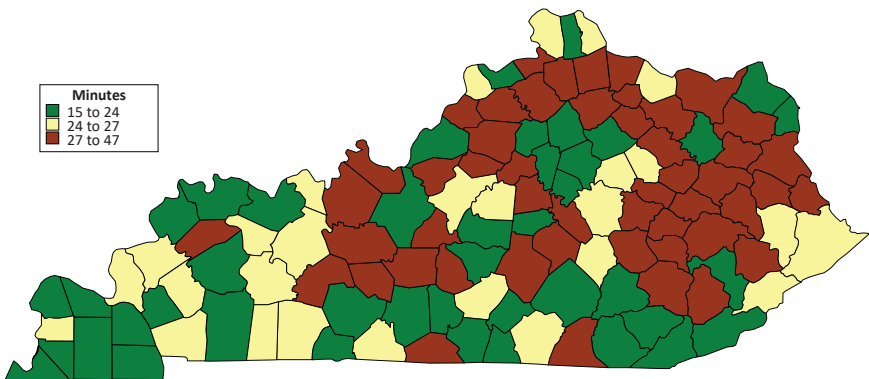
Maintaining—let alone expanding—Kentucky’s existing infrastructure, whether school buildings or roads, requires a tremendous amount of money. The funds provided by the Infrastructure Investment and Jobs Act represent a unique opportunity to make fundamental investments in the state’s infrastructure,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

COMMUTING

Since 2010, average commute times have increased by 4.4 percent in Kentucky, from 22.6 to 23.6 minutes. In 2021, in the middle of the pandemic, an estimated 76.4 percent of Kentuckians 16 years and older drove to work alone. By comparison, carpooling was around 8.4 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 (23.6) are less than the U.S. average of 25.6 minutes (2021 ACS 1-year estimate). Much has changed since COVID-19 arrived with a vengeance in early 2020. People started working from home, which fundamentally changed daily commuting patterns. According to a December 2021 report in the *Wall Street Journal*, “traffic congestion around the U.S. is creeping back up but remains lighter than before the pandemic...a result of many workers not yet returning to the office...” The assessment, conducted by transportation-analytics firm *Inrix*, found that, on average, “U.S. commuters are on pace to lose 36 hours to congestion in 2021, 10 hours more than in 2020 but 63 hours less than in 2019.” These findings were included in the firm’s 2021 *Global Traffic Scorecard*. The longest commute times in Kentucky are in *mostly rural* counties (27.7 minutes)—a few minutes longer than in *somewhat rural* (25.3) or *metro* counties (25.7).

Average Travel Time to Work, 2016-2020

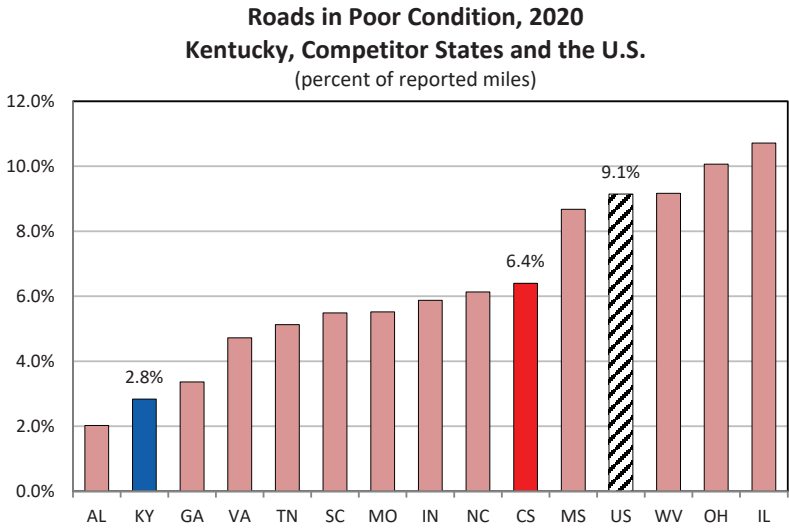
(Workers 16 Years and Older)



Source: U.S. Census Bureau, 2020 5-Year American Community Survey, Table DP03

ROAD CONDITION

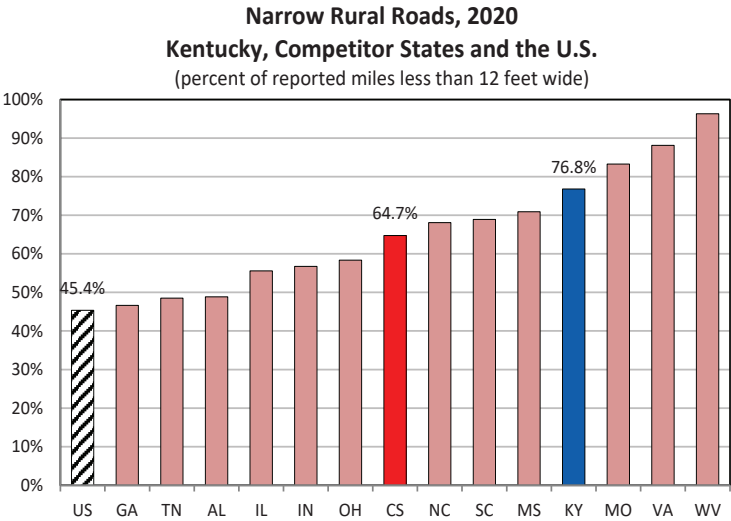
Ideas, innovation, and intellectual capital form the foundation of the evolving knowledge economy. But Kentucky, like most states, is still centered on making and growing things, extracting and transporting raw materials, and moving people and products to markets and workplaces. Thus, the traditional transportation infrastructure—the road system—is still an essential piece of the economic development puzzle. Around 25 percent of Kentucky’s economy is in goods-producing industries that are highly dependent on transportation. 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 (2.8%) of Kentucky’s roads are in poor condition. The U.S. (9.1%) and competitor state (6.4%) percentages are much higher.



Source: Author's calculations based on Table HM-64, Highway Statistics 2020, 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.

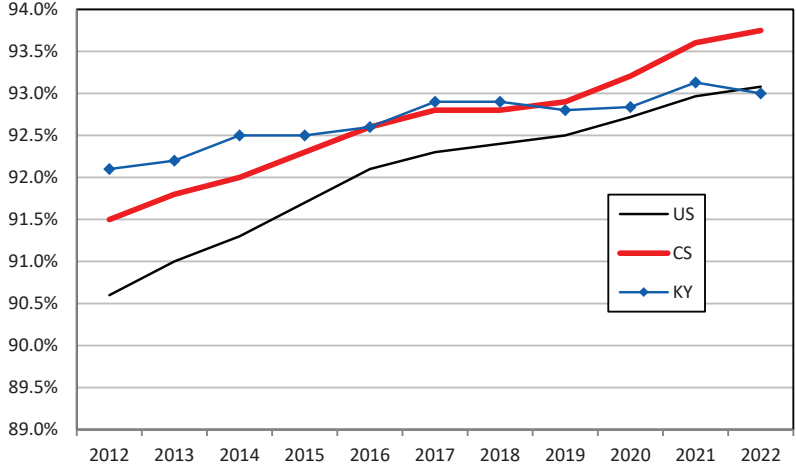


Source: Author's calculations based on Table HM-53, Highway Statistics 2020, Federal Highway Administration. CS is the weighted average of the competitor states.

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 14,482 highway bridges in Kentucky, 7 percent of them are considered to be in poor condition, which is about the same as the competitor states (6.2%) and the U.S. (6.9%). 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 (27%) is much lower than the competitor states (46.7%) or the U.S. (44.5%); and, is much higher in the “fair” category (66%) compared to the competitor states or the U.S., where are 47.1 and 48.6 percent respectively. While 93 percent of Kentucky bridges were considered to be in good or fair condition in 2021, Kentucky had only the 34th highest percentage among all the states and DC. Arizona is the highest with 98.7 percent and West Virginia the lowest with 80 percent. We should note that these data *do not* reflect any bridge damage inflicted by the flooding in Eastern Kentucky in July 2022.

Bridges in Good or Fair Condition,
Kentucky, Competitor States, and the U.S., 2012-2022
(percentage of all bridges)

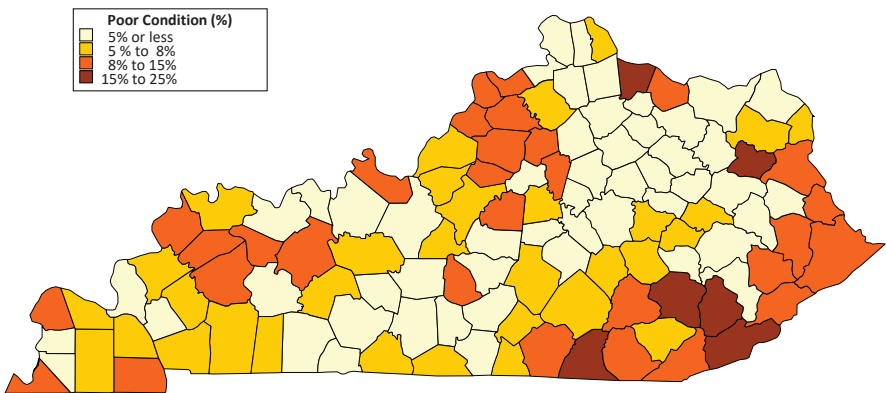


Source: U.S. Department of Transportation, Federal Highway Administration, Office of Bridges and Structures

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. Counties are divided into four groups: 0 to 5 percent of the bridges are in poor condition (52 counties across the state); 5 to 8 percent (32); 8 to 15 percent (30); and 15 to 25 percent (6). Harlan County has the highest percentage in the state, with 22 percent of its bridges deemed to be in poor condition. We should note that these data *do not* reflect any bridge damage inflicted by the flooding in Eastern Kentucky in July 2022.

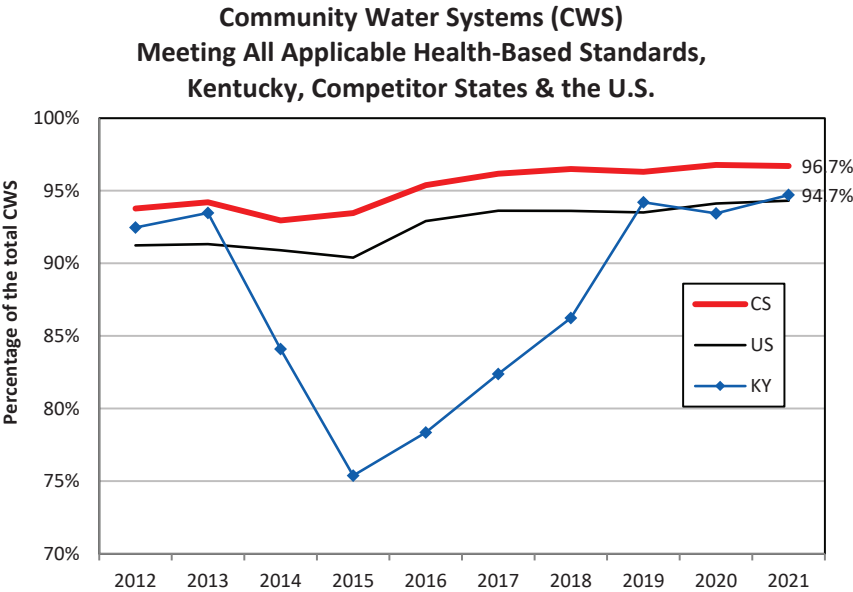
Highway Bridge Condition by Kentucky County, 2022



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), 49,500 of which served approximately 315.4 million people nationally in 2021, according to the Environmental Protection Agency. Around 7.3 percent of the U.S. population received its water from a community water system that reported at least one health-based violation in 2021, while it was about 3.6 percent in Kentucky. Of Kentucky’s 378 community water systems, an estimated 94.7 percent met all applicable health-based standards and were free of violations in 2021. 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.

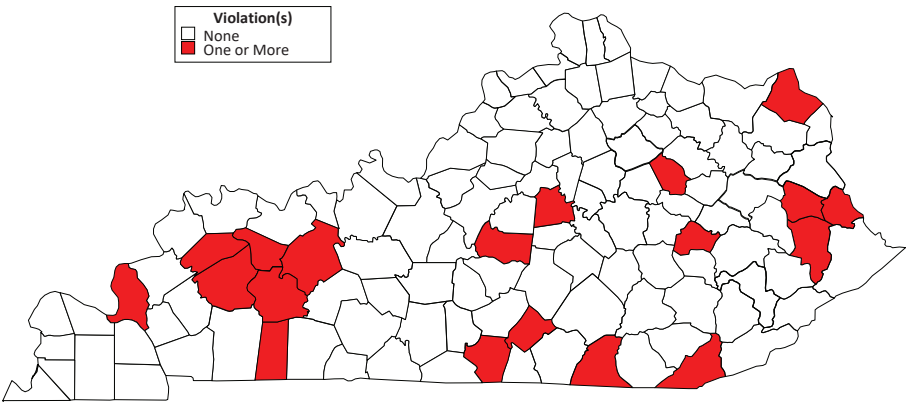


Source: Author’s analysis of EPA SDWIS data.

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 19 Kentucky counties with community water systems (CWS) that experienced one or more *health-based* violations of the Safe Drinking Water Act in 2020. There were 35 violations committed by 20 community water systems (out of 378 total CWS in Kentucky). These violations affected over 162,000 individuals who were served by the 20 systems—with some counties experienced multiple violations.

Community Water Systems with Health-Based Violations, 2021



Source: Author's analysis of EPA SDWIS data.

HIGH-SPEED INTERNET

Access to and use of the internet is essential for anyone becoming politically informed, socially integrated, and economically successful in the Information Age. 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. The table below shows the overall, urban, and rural percentages for the U.S., Kentucky, and twelve competitor states. As noted in the FCC *Fourteenth Broadband Deployment Report*, “the rural–urban [digital] divide is rapidly closing; the gap between the percentage of urban Americans and the percentage of rural Americans with access to 25/3 Mbps fixed broadband has been nearly halved, falling from 30 points at the end of 2016 to just 16 points at the end of 2019.” The vast majority of Americans—nearly 96 percent—now have access to fixed terrestrial broadband service at 25/3 Mbps and Mobile 4G LTE 5/1 Mbps; it is 94 percent in Kentucky. Nonetheless, the pandemic has revealed many gaps in rural areas, leaving workers, students, and citizens without adequate connections to the information resources they need for work, school, and health care.

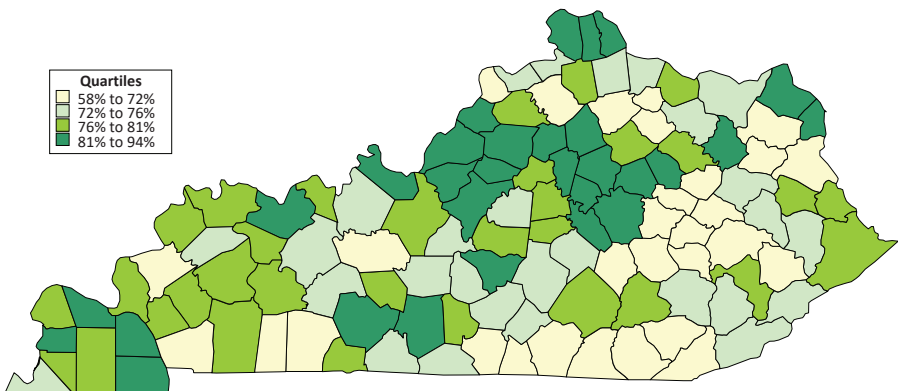
High-Speed Internet Deployment & Adoption, U.S., Competitor States, and Kentucky, 2019-2020 (percentage of population)				
Area	Access Overall	Urban Deployment	Rural Deployment	Broadband Adoption*
US	96	99	83	85.2
AL	88	98	73	79.9
GA	94	98	81	84.4
IL	98	99	88	85.4
IN	96	99	87	83.2
KY	94	99	86	81.6
MS	80	98	63	75.8
MO	93	99	79	83.2
NC	95	99	87	83.4
OH	97	99	88	84.5
SC	91	98	79	81.2
TN	94	99	84	81.5
VA	94	98	82	86.1
WV	81	94	68	78.9
Source: Data in columns 2-4 are from the Federal Communications Commission (FCC), <i>Fourteenth Broadband Deployment Report</i> , January 2021. It reflects Deployment of Fixed Terrestrial 25/3 Mbps and Mobile 4G LTE With a Minimum with an Advertised Speed of 5/1 Mbps (see Appendix B). *Broadband adoption is of any type for a household, e.g., cellular, satellite, cable, DSL, or fiber optic (U.S. Census, ACS, 2020 5-year estimates).				

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. 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. The percentage of households with an internet connection is one of the factors used in the county-level assessment presented in the Summary of this report (see page xiii). There are three Kentucky counties in the upper 10 percent of counties nationally, and an additional sixteen in the upper 25 percent. The rest of the state's 101 counties are in the lower 75 percent of counties.

High-Speed Broadband Internet Connections, 2016-2020

(percentage of households)

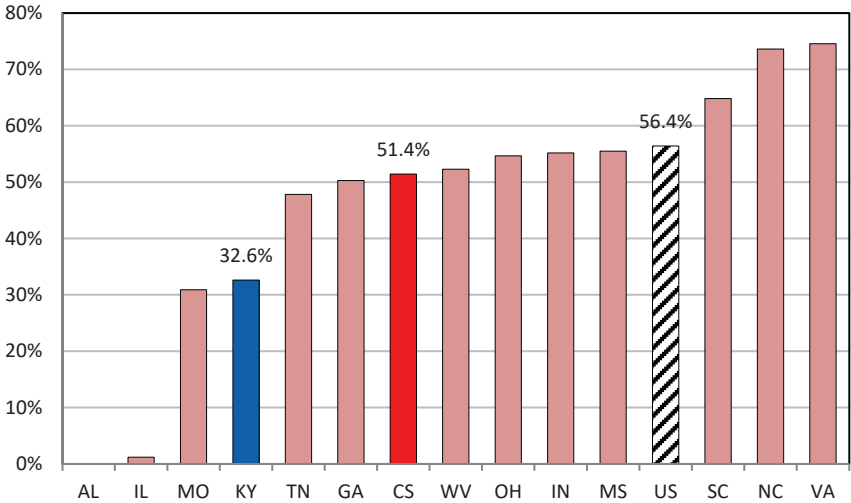


Source: American Community Survey, 2020 5-Year Estimate, Table S2801

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 1,089 dams, 279 are classified as “high hazard potential” in 2022. 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 279 high hazard potential dams, 32.6 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 32.6 percent, Kentucky has the 42nd highest percentage of dams in satisfactory or fair condition among the states. Kentucky is substantially lower than the competitor state (51.4%) and U.S. averages (56.4%); in Kentucky there are 79 high hazard dams in poor condition, two that are not rated, and 99 not available.

High-Hazard Potential Dams
in Satisfactory or Fair Condition, 2022
(percentage of all high-hazard potential dams)



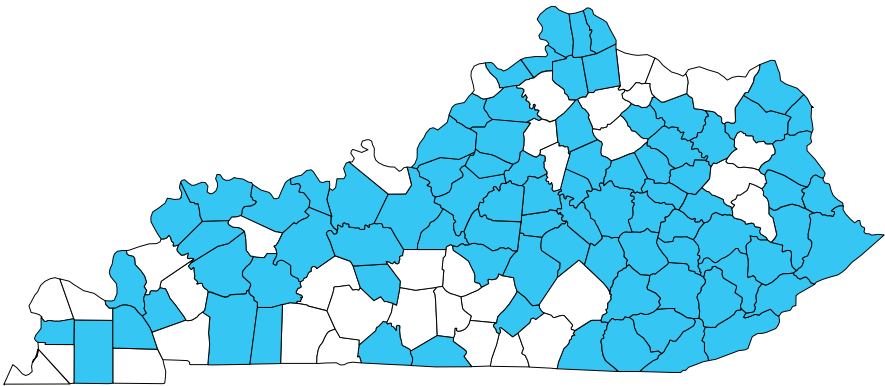
Source: Author’s calculations based on data from the National Inventory of Dams.

HIGH HAZARD POTENTIAL DAMS

This map shows the Kentucky counties that have at least one of the state's 279 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 79 of them are in “poor” condition—32.6 percent of all high-hazard dams in Kentucky. Dam owners are encouraged to develop Emergency Action Plans (EAP) 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. There are 13 high hazard potential dams in Kentucky, all privately owned, that do *not* have an Emergency Action Plan; the rest either have them or an EAP is not required.

High Hazard Potential Dams in Kentucky Counties, 2022

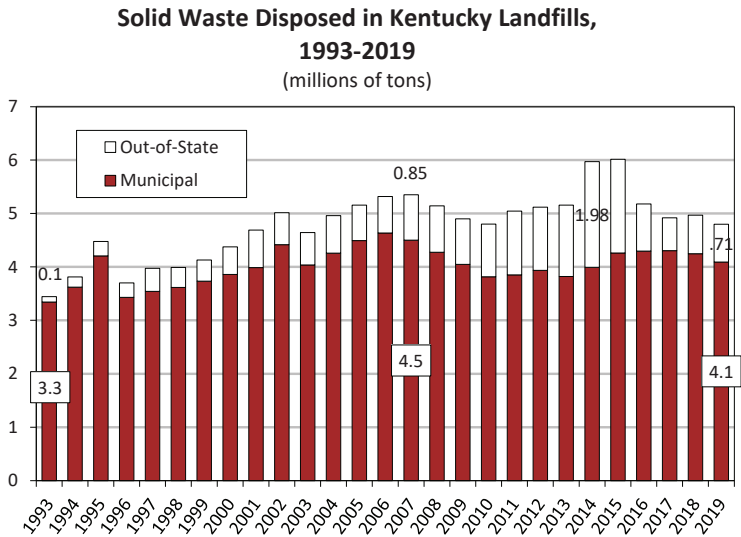
(highlighted counties have at least one high hazard potential dam)



Source: Author's analysis of the 2022 National Inventory of Dams (NID) database.

SOLID WASTE DISPOSAL

In 1992, the Kentucky General Assembly set the ambitious goal of reducing the amount of municipal solid waste (MSW) deposited in Kentucky landfills in each subsequent year—but the amount of waste remains steady. While the total amount of solid waste deposited in Kentucky landfills trended downward from its peak of 5.35 million tons in 2007 to just over 5 million tons in 2013, the amount deposited in 2014 and 2015 increased to around 6 million tons. A growing portion of the total, as evidenced in 2014 and 2015, is solid waste from *out-of-state sources*; it reached a record high of almost 2 million tons in 2014 and remained high in 2015 with 1.75 million tons, a significant increase since the early to mid-1990s. As a result of this growing trend, out-of-state solid waste constituted 33 percent of the total amount of waste deposited in Kentucky’s landfills in 2014—compared to less than 5 percent in the early to mid-1990s. However, there was a sudden decrease in 2016, evidence by a decline to just under a million tons (0.88), and this decreased to just over a half-million tons (0.62) in 2017. In 2019, about 14.7 percent of the state’s nearly 4.8 million tons of solid waste was from out of state. Landfills, “landfarms,” and other specially designated areas for solid waste disposal are expensive to open, maintain, operate, monitor, or close. Policies, actions, and incentives to reduce waste disposal are economically beneficial.



Source: KY Division of Waste Management

Innovation

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 through education, research, innovation, and commercialization. The goal was to capture some of the burgeoning high-tech economic dynamism found along Route 128 in Boston, Silicon Valley in the Bay Area, or, at a minimum, to become the next Research Triangle Park in North Carolina. Kentucky was not alone, as many states jumped on board the innovation train.

The goal continues today and is evidenced by the missions, focuses, and actions of multiple groups, including, but not limited to, the state Office of Entrepreneurship and Small Business Innovation, the Lexington Economic Partnership, and Greater Louisville Inc. Unfortunately, over two decades into these efforts to plant and grow the innovation 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 44th in the *2020 State Technology and Science*

continued on the next page



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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. Likewise, The Kauffman Foundation’s *Index of Early-Stage Entrepreneurship*, another index similar to the *State Technology and Science Index*, has Kentucky at “below average.” And the *Innovation Intelligence Index*, produced by *StatsAmerica*, which is funded in part by the U.S. Commerce Department’s Economic Development Administration, has Kentucky ranked in the bottom decile of states.

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.” (Atkinson, et al., *The case for growth centers: How to spread tech innovation across America*, Brookings, December 9, 2019)

Our examination of high-technology establishments over the period of 2003 to 2020 shows that Kentucky has consistently trailed the competitor states and the U.S. In 2020, 9.4 percent of establishments in competitor states and 10.1 percent in the U.S. are considered “high-tech.” In the same year only 7.8 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. John Fernald at the Federal Reserve Bank of San Francisco and Charles Jones at Stanford University 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 opportunity and build successful enterprises, and compelling critical examinations of how we pursue economic development in Kentucky. 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

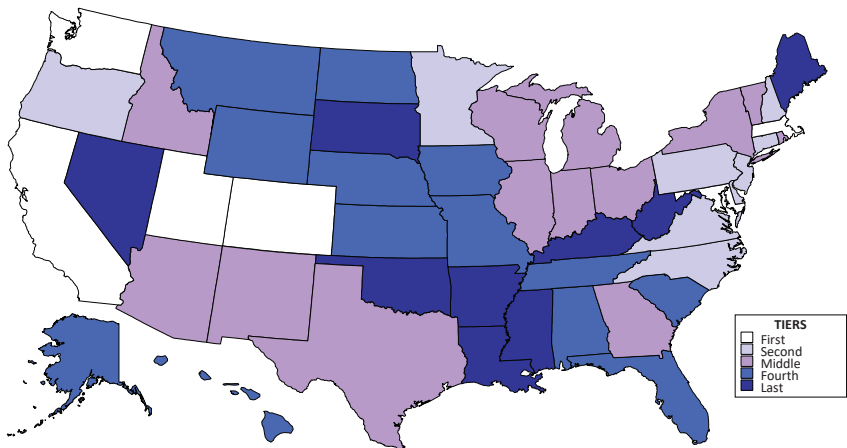
The Kauffman Foundation Index of Early-Stage Entrepreneurship is based on four factors: 1) the *rate of new entrepreneurs*, which reflects the percent of adults becoming entrepreneurs in a given month, as a year average; 2) the *opportunity share of new entrepreneurs*, which shows the percent of entrepreneurs 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.					

SCIENCE & TECHNOLOGY INDEX

Combining 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, the Milken Institute has ranked the states according to their science and technology prowess in a 2020 report, *State Technology and Science Index*. Kentucky is ranked 44th, in the bottom tier of states. The top state is Massachusetts, followed by Colorado, California, Maryland, Washington, and Utah. These six states represent the top tier in the Index.

State Technology and Science Index 2020

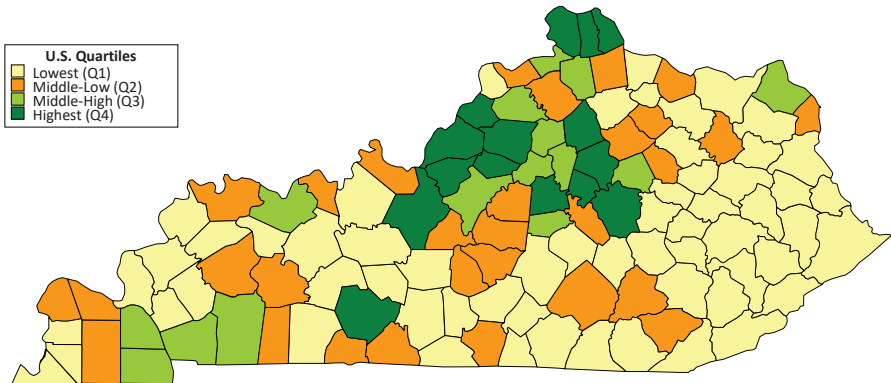


Source: Milken Institute 2020 State Technology and Science Index

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

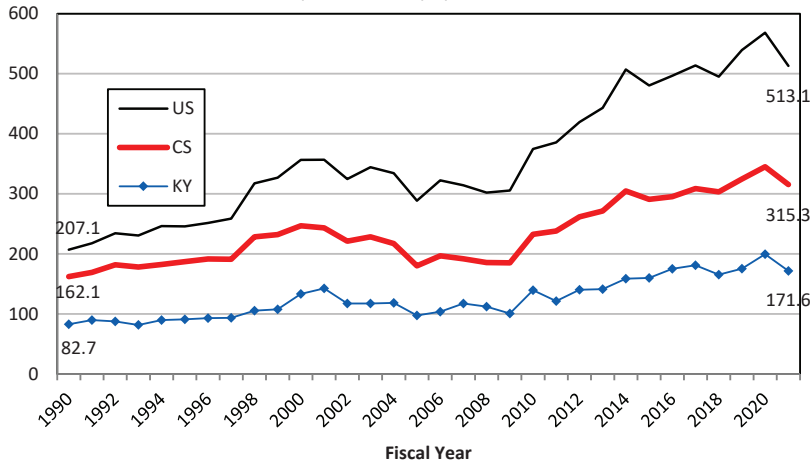


Source: The Innovation Intelligence Index (II3) is produced by the Indiana Business Research Center. II3 explores regional characteristics related to innovation and entrepreneurship to help advance economic development strategies. These data were downloaded on 10/16/2022, and are available here: <https://www.statsamerica.org/downloads/default.aspx>

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 (171.6 per million population) compared to the U.S. (513.1 per million population) and competitor states (315.3 per million population). Not surprisingly, the trends have tilted downward during the COVID-19 pandemic.

Number of Patents,
Kentucky, Competitor States, and the U.S., 1990-2021
(per 1 million population)

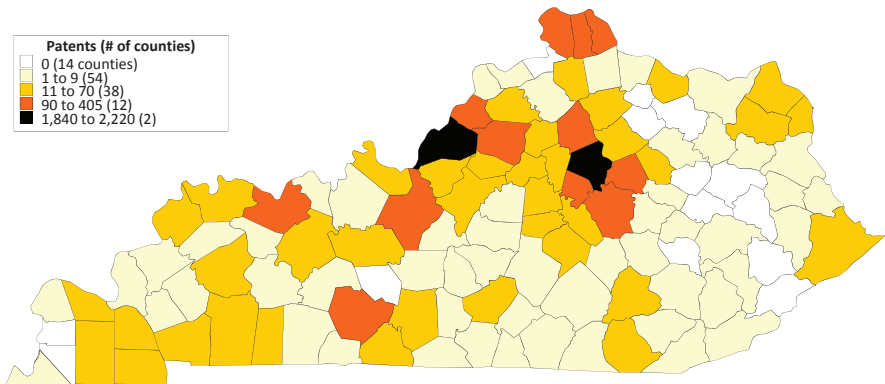


Source: Calculated by the author using US Patent and Trademark Office and U.S. Census Bureau data.
Note: Data include utility, design, plant, and reissue patents.

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

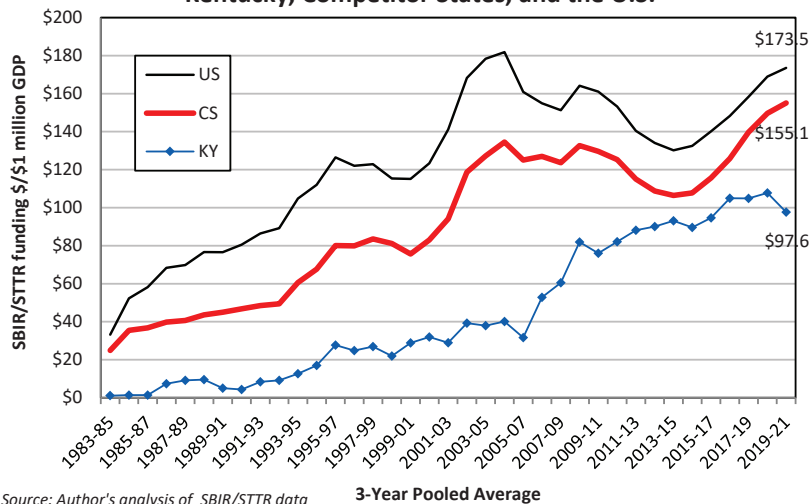


Source: U.S. Patent and Trademark Office, U.S. State Patenting, Breakout by Regional Component, Count of 2000-2015 Utility Patent Grants

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—but this appears to be changing. 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 \$97.6 per \$1 million in state gross domestic product during the 2018-2021 period is still well below the U.S. (\$173.5) and competitor states (\$155.1).

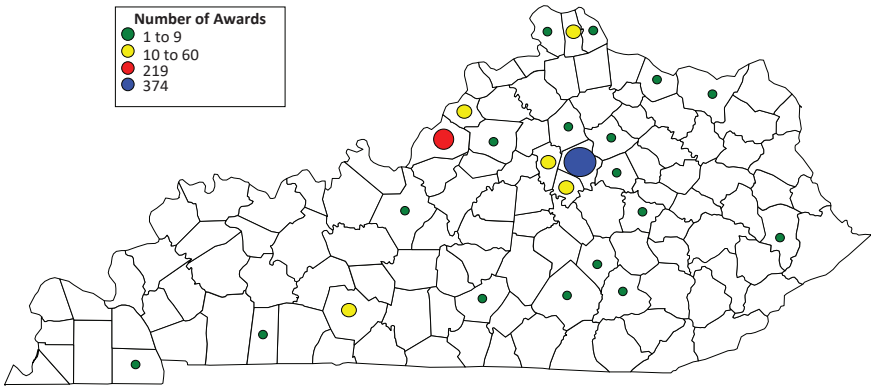
Small Business Innovation Research (SBIR)
& Technology Transfer (STTR) Funding, 1983-2021,
Kentucky, Competitor States, and the U.S.



SBIR/STTR AWARDS BY COUNTY

Of all the dollars invested through the SBIR and STTR programs from 1983 to 2021, the majority went to ventures in two counties: Fayette and Jefferson. There were approximately 734 awards in Kentucky during this time and 342 were in Fayette County, representing 43 percent of the total *funding*. Jefferson County was the second highest recipient with 219 awards and around 37 percent of the total funding. Jessamine, Kenton, Oldham, Warren and Woodford Counties received 122 awards and 16 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, 1983-2021

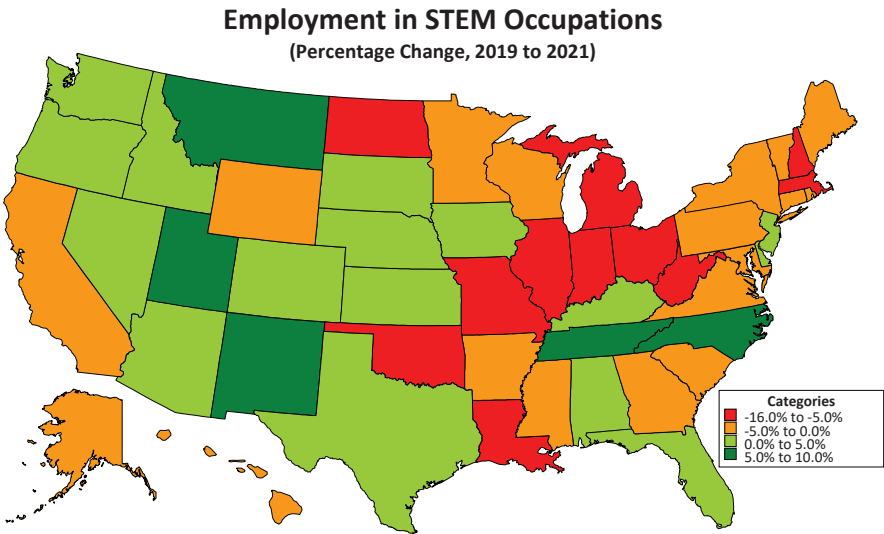


Source: Authors' analysis of data from www.sbir.gov

STEM OCCUPATIONS BY STATE

Science, technology, engineering, and mathematics (STEM) occupations accounted for 6.6 percent of the jobs in the U.S. in 2021, compared to 4.3 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 2021 was \$100,910, nearly double the national average wage for non-STEM occupations (\$55,260). STEM jobs weathered the Pandemic Recession better than non-STEM occupations. Nationally, STEM occupations declined by less than 1 percent (-0.9%) from 2019 to 2021, while non-STEM occupations went down by over 4 percent (-4.3%). STEM occupations also fared better in Kentucky during this two-year period; STEM jobs held their own (0.1% increase), while non-STEM occupations declined by 3.2 percent.

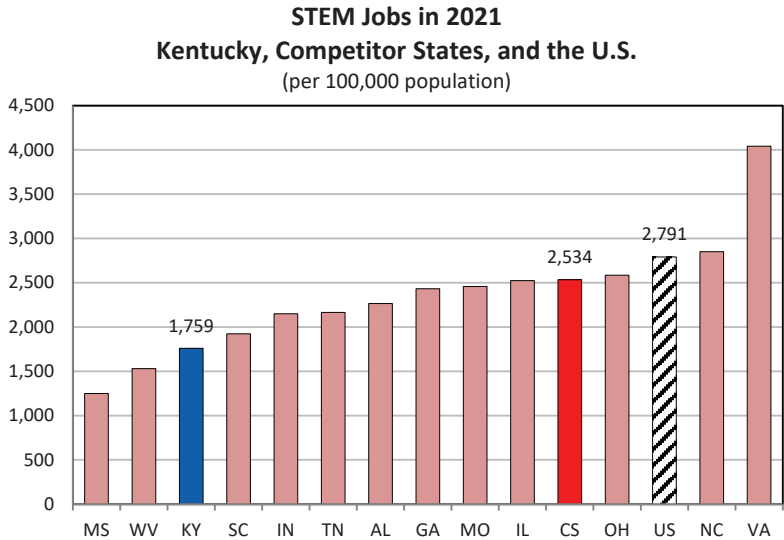
INNOVATION



Source: U.S. Bureau of Labor Statistics, OES, May 2019 & May 2021, <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 2021, an estimated 4.3 percent of occupations in Kentucky are in the STEM area, which translates to about 1,759 jobs per 100,000 population. This number is significantly lower than both the competitor states (2,534) and U.S. (2,791) averages. DC (11,348) and Massachusetts (4,445) are ranked first and second, while Mississippi (1,249) 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.

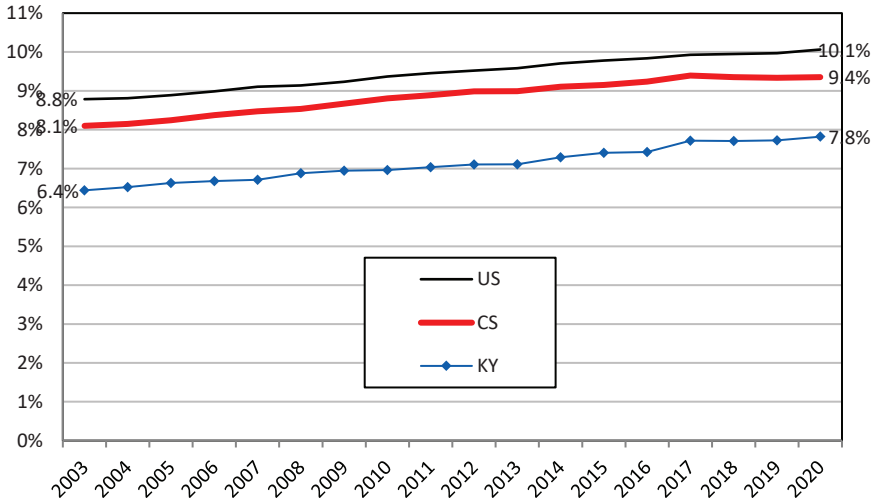


Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2021 OES Data
Note: CS is the competitor state weighted average

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 2020, 9.4 percent of establishments in competitor states and 10.1 percent in the U.S. are considered “high-tech.” In the same year only 7.8 percent of Kentucky establishments are considered “high-tech,” ranking it 42th nationally (including DC with the states). The top ranked state is Delaware with 14.3 percent (DC is higher at 18.8%), and South Dakota is ranked last with 6.5 percent.

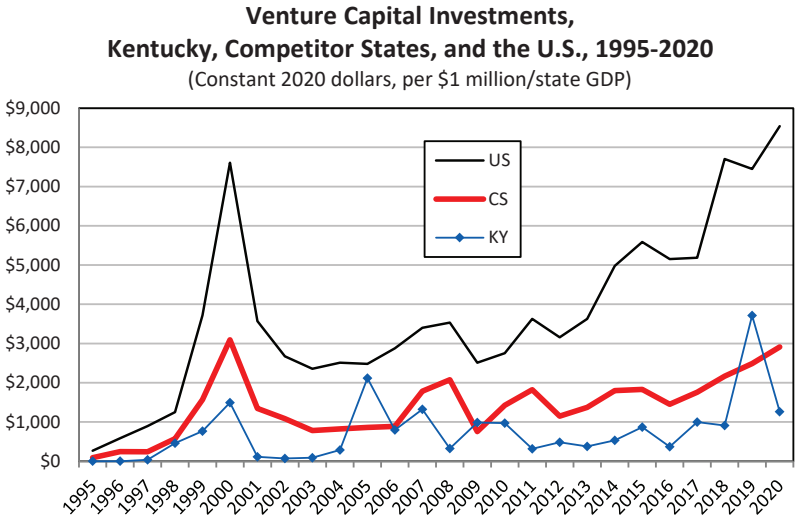
**High-Technology Establishments,
Kentucky, Competitor States, and the U.S., 2003-2020**
(as a percent of total establishments)



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 2020, for instance, these three states accounted for nearly 73 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 2020, venture capital investments in Kentucky were \$1,211 per \$1 million of state gross domestic product (in constant 2021 dollars), which is about half the amount of the competitor states (\$2,793) and substantially below the U.S. average (\$8,200).

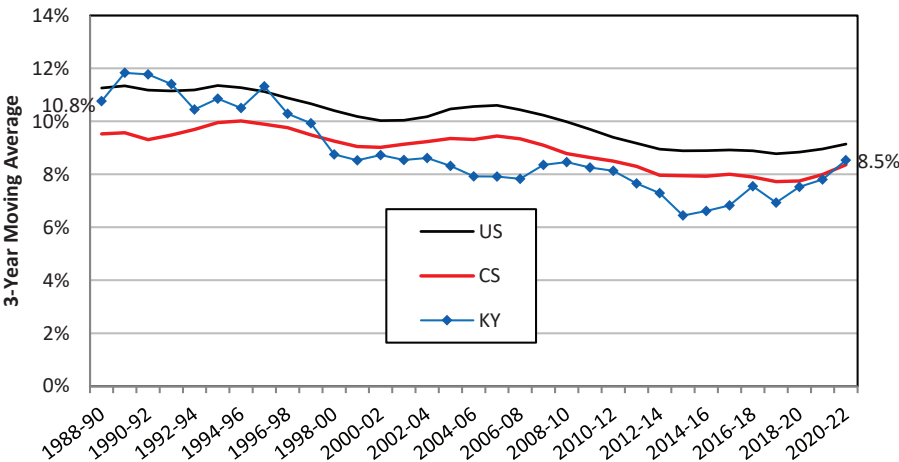


Source: National Science Board. "Venture Capital Disbursed per \$1 Million of Gross Domestic Product." *Science and Engineering Indicators: State Indicators*. Alexandria, VA: National Science Foundation. State Indicator S-58, <https://nces.nsf.gov/indicators/states/indicator/venture-capital-per-deal>. Accessed on 11/18/22.

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 8.5 percent of part- and full-time working prime working age adults (25 to 54 years old) in Kentucky are self-employed, which is about the same as the competitor states' average. The percentage of self-employed Americans is somewhat higher at 9.1 percent. 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 100,000 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.

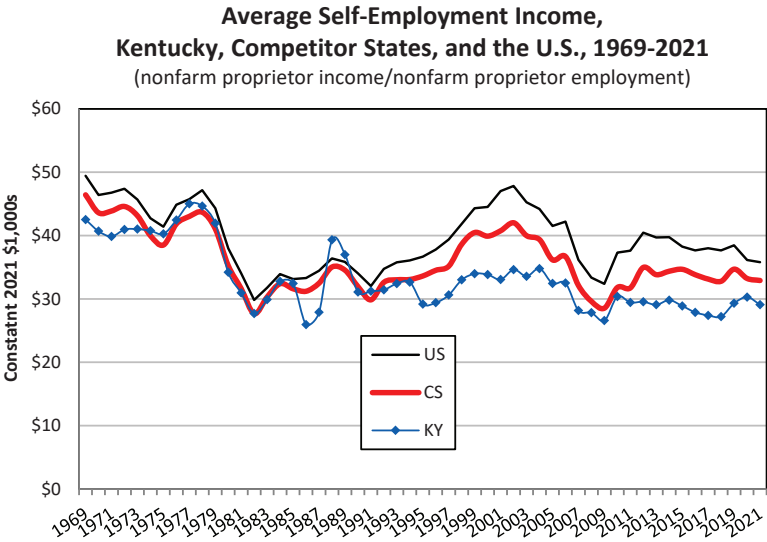
Self-Employed,
Kentucky, Competitor States, and the U.S., 1988-2022
(prime working age, 25 to 54, full- and part-time workers)



Source: Estimates generated by the author using data from Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [CPS ASEC, various years]. Minneapolis, MN: IPUMS, 2022.
<https://doi.org/10.18128/D030.V10.0>

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. In 2021, Kentucky lagged the U.S. and competitor states by approximately \$6,700 and \$3,800 respectively.

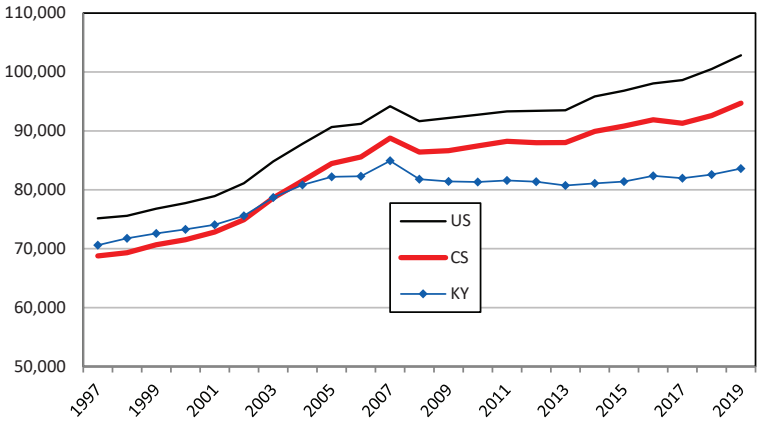


Source: U.S. Department of Commerce, Bureau of Economic Analysis

NONEMPLOYER ESTABLISHMENTS

This is another measure of self-employment. 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 grew steadily from the late 1990s until the Great Recession in 2008, when the growth rate stalled. Since then, the U.S. and the competitor states have rebounded and are now slightly above their pre-recession rates. Historically, Kentucky’s rate has been lower than the competitor states and the U.S., and since the Great Recession Kentucky’s rate has been essentially flat.

Nonemployer Establishments,
Kentucky, Competitor States, and the U.S., 1997-2019
(per 1 million population 16 and older)



Source: Author's analysis of data from the U.S. Census Bureau

Population

POPULATION GROWTH IS INDICATIVE of a state's economic energy.

Generally, 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%).

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 the last 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.

Between the peak of the economic expansion before the Great Recession, which was during the fourth quarter of 2007, and the present (2021), there were marked regional differences within the state in population change. Kentucky's Urban Triangle experienced a 9.9 percent increase; South Central Kentucky is not far behind at 7.4 percent. However, the population in Western Kentucky only

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grew less than 1 percent and in Eastern Kentucky it *declined* by 3.6 percent. For comparison purposes, Kentucky’s overall population increased 5.6 percent (ACS 2021 5-year estimate) over the same time period.

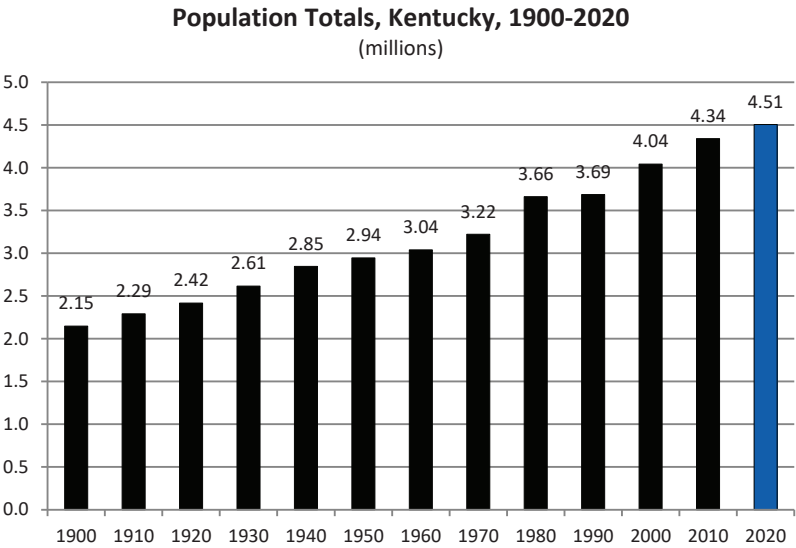
There are several counties with population levels lower in 2021 compared to 2007. In fact, 56 counties, largely in Eastern Kentucky, but several in the western part of the state, lost population during this time period. The five largest declines were in Bell (-14.3%), Martin (-13.8%), Cumberland (-13.5%), Owsley (-13.4%), and Knott Counties (-12.8%). 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 (29.4%), Warren (24.1%), Boone (19.8%), Shelby (17.8%), and Spencer (17.8%).

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 2020, 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 relatively small (4%). By comparison, the competitor state and U.S. averages are 7.8 and 13.6 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 the last decade, the state grew at about half the rate 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 2021 was essentially unchanged from 2020, 4.51 million.

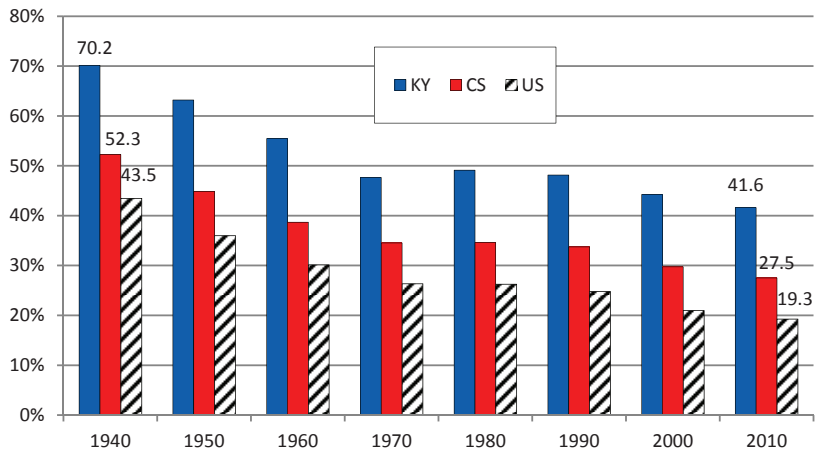


Source: U.S. Census Bureau

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 2010 Census, nearly 42 percent of Kentucky’s population resided in rural areas (the balance of 58 percent live in urban areas), compared to about 28 percent in the competitor states and around 19 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.

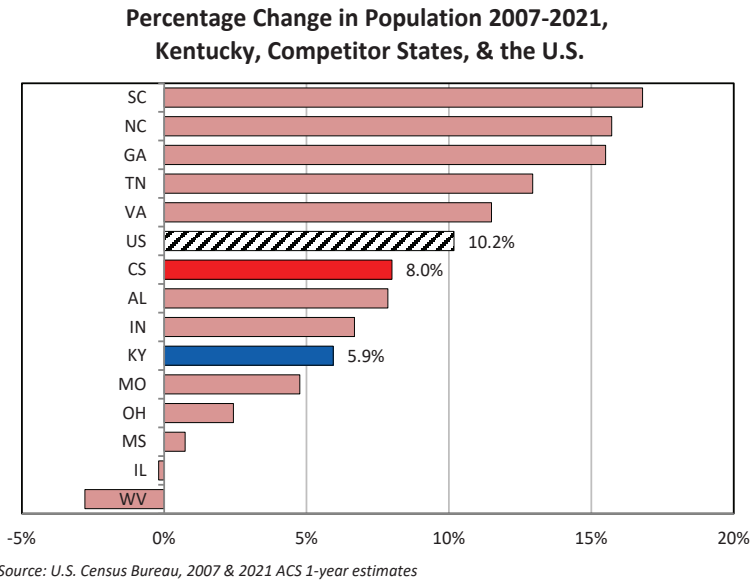
Population Living in Rural Areas,
Kentucky, Competitor States, and the U.S.
(percent of individuals)



Source: U.S. Census Bureau

POPULATION CHANGE

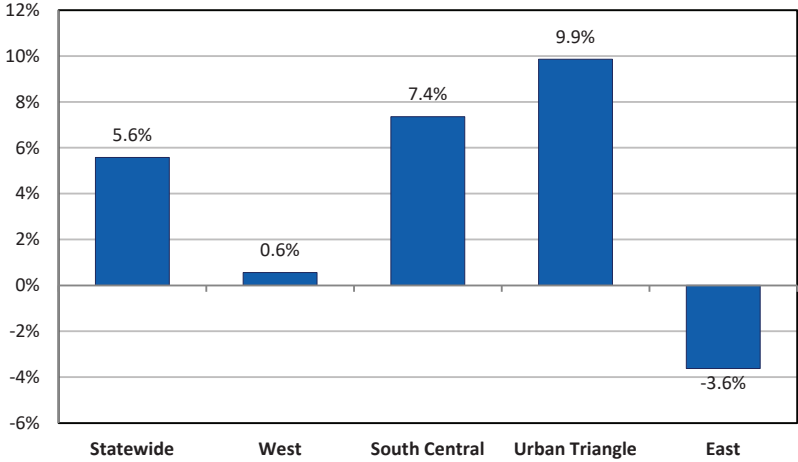
A state’s population growth rate is indicative of its economic energy. Here we present state growth rates between the peak of the economic expansion before the Great Recession, which was during the fourth quarter of 2007, and the “present” (2021). By 2021, the U.S. population was 10.2 percent higher 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 (5.9%) than the U.S. or the competitor state average (8.0%). 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 59 percent of the U.S. rate. At 28.5 percent, Utah has the highest growth rate during this period, and West Virginia has the lowest (-2.8%); Kentucky has the 34th highest growth rate among the states and DC.



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 (2021) is shown below (a county-level map of these four regions is available in the glossary). Kentucky’s Urban Triangle experienced a 9.9 percent increase; South Central Kentucky is not far behind at 7.4 percent. However, the population in Western Kentucky only grew less than 1 percent and in Eastern Kentucky it *declined* by 3.6 percent. For comparison purposes, Kentucky’s overall population increased 5.6 percent (ACS 5-year estimate) over the same time period.

Population Change in Kentucky Regions, 2007 to 2021
(percent change)

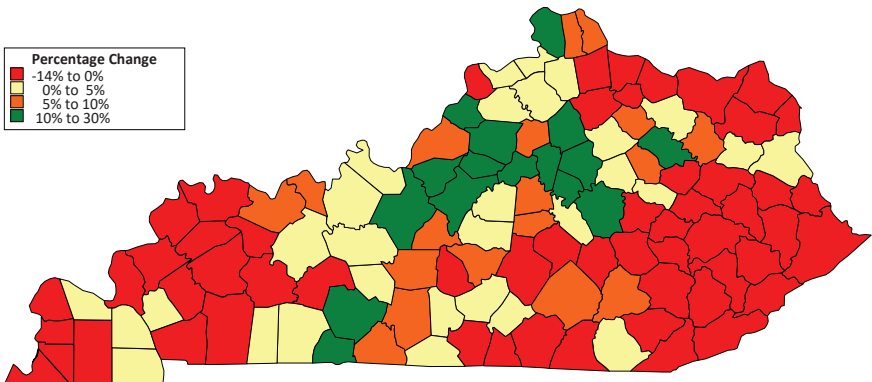


Source: Author’s calculations using data from the U.S. Census Bureau, ACS 5-year estimates. See glossary for map of Kentucky regions by county.

COUNTY POPULATION CHANGES

From the peak of the last economic expansion just before the Great Recession in 2007 to the present (2021), 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 2021 compared to 2007. Overall, in fact, 56 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 Bell (-14.3%), Martin (-13.8%), Cumberland (-13.5%), Owsley (-13.4%), and Knott Counties (-12.8%). 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 (29.4%), Warren (24.1%), Boone (19.8%), Shelby (17.8%), and Spencer Counties (17.8%). By comparison, Kentucky's population increased by 5.6 percent during this fourteen year period.

Kentucky County Population Change, 2007 to 2021



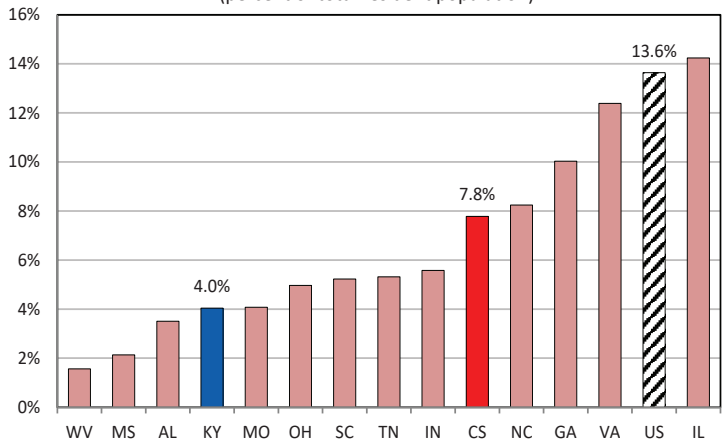
POPULATION

Source: U.S. Census, American Community Survey, 2007 and 2021 5-Year 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 recent 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. The percentage of foreign-born individuals in Kentucky is 4 percent, just over half of the competitor state average (7.8%) and about a third of the U.S. average (13.6%).

Foreign-Born Population, 2021,
Kentucky, Competitor States and the U.S.
(percent of total resident population)

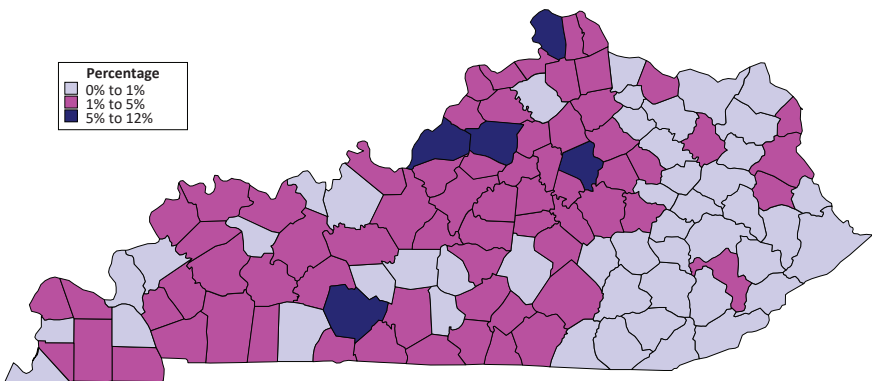


Source: American Community Survey, Table B05002 2021 1-Year Estimate
Note: "CS" is the weighted average of the competitor states.

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 (10.1%), Warren (8.9%), and Jefferson Counties (8.5%). 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 percent, much lower than the U.S. average of 13.6 percent.

Foreign-Born Population, by Kentucky County, 2017-2021

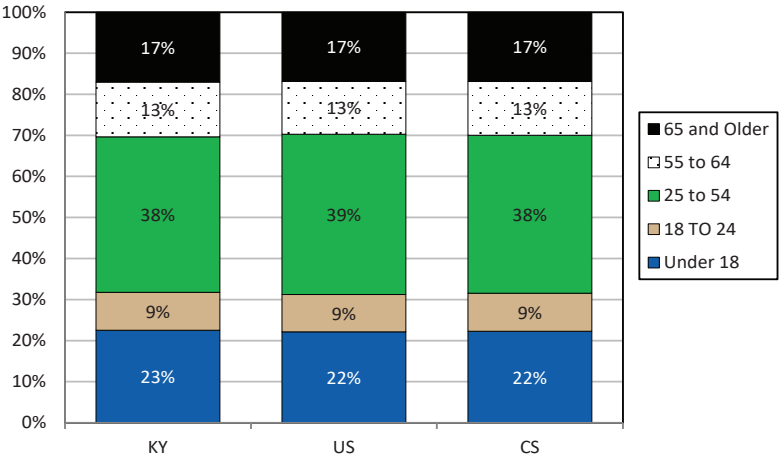


Source: U.S. Census, American Community Survey, 2021 5-Year Estimate, Table DP02

POPULATION BY AGE GROUP

Kentucky’s population is aging, evidenced by the median age increasing from 35.9 years in 2000 to 38.1 in 2010—and on to 39.1 in 2021. The U.S. median age, by comparison, is slightly lower, evidenced by 37.2 in 2010 and 38.8 in 2021. The number of persons in Kentucky aged 65 and above increased by 264,748, or by 53 percent, from 2000 to 2021; by comparison, this age group increased by 60 percent in the U.S. However, at 17 percent of Kentucky’s total population, it represents about the same proportion as in the U.S. (17%). 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, 2021
Kentucky, Competitor States, and the U.S.
(percent of total state population)

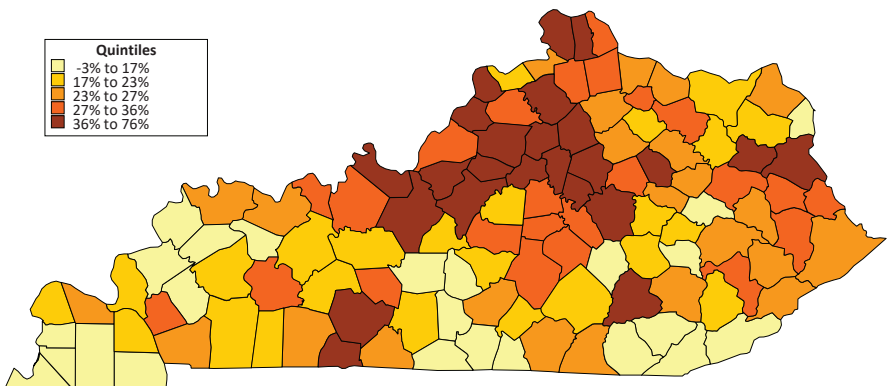


Source: U.S. Census Bureau, ACS 2021 1-Year estimate, Table S0101

AGING POPULATION

The age composition of the population 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 percentage of the population aged 65 and older increased nationally by 37 percent from 2010 to 2021; in Kentucky, the number of seniors 65 and older increased from 561,000 to 735,000, or 31 percent, over the same eleven-year period. There is a wide distribution of growth in the senior population at the county level across Kentucky. This population grew over 70 percent since 2010 in Boone, Bullitt, Oldham, and Scott Counties.

Population Growth, Age 65 and Older (percentage change from 2010 to 2021)

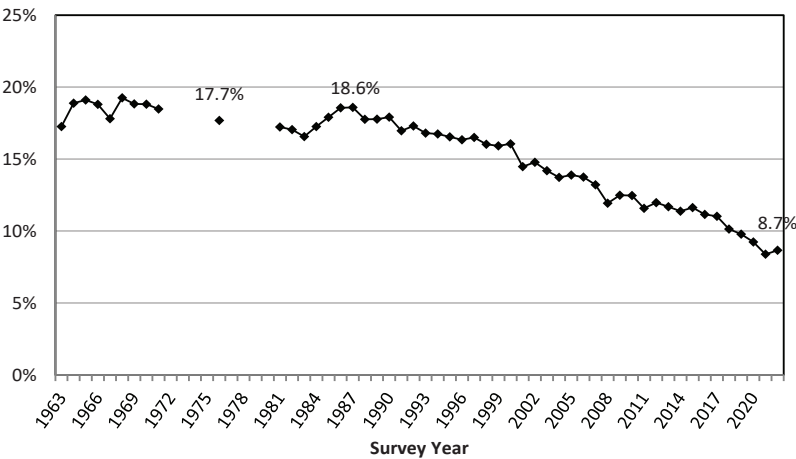


Source: U.S. Census, American Community Survey, 2010 and 2021 5-Year estimates, Table S0101

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 2021, it had decreased to under 10 percent (8.7%). 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., 1963-2022
(percentage who changed residence in the past year)



Source: Author's calculations based on 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 [ASEC, 1963 to 2022]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

Public Finance

THE COMMONWEALTH'S FINANCES are strong as we emerge from the depths of the Pandemic Recession. General Fund receipts grew at the highest rate in 31 years during the 2022 fiscal year (FY), which ended in June 2022. This growth led to a \$1.03 billion state government General Fund surplus and contributed to a record-high total in Kentucky's Rainy Day Fund of \$2.7 billion; this is equal to nearly 20 percent of FY2023 General Fund appropriations.

Our state receives a significant amount of its revenue from the federal government. Before the pandemic, this amounted to 27.8 percent of Kentucky's total *state and local* revenue in 2019; the U.S. average was about 18.7 percent. 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 2020, this amounted to 32.2 percent of Kentucky's total state and local revenue, with the U.S. average at about 21.3

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percent, representing substantial increases from a year earlier.

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), *2022 State Expenditure Report*, which estimates Kentucky's FY2022 percentage at 46.4 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 38 percent.

Kentucky's budgetary situation over the last few years has been heavily affected by a combination of increasing General Fund revenue and federal spending in response to the pandemic, which has helped to create a political and fiscal environment to initiate major changes to Kentucky's tax system. For example, the state is planning to gradually phase out the state income tax by 2032, which accounts for 40.1 percent of Kentucky's General Fund Revenue. Currently the income tax brings in the largest portion of General Fund revenue; the sales and use tax is second at 35.6 percent. However, there are two key reduction conditions that need to be met annually in order to keep pace with the 10-year glide path down to no individual income tax: the Budget Reserve Trust Fund must be equal to or greater than ten percent of General Fund revenues for the preceding fiscal year; and General Fund revenues must exceed General Fund appropriations for the preceding fiscal year by an amount that is equivalent to a one percentage point reduction in the individual income tax rate for that year.

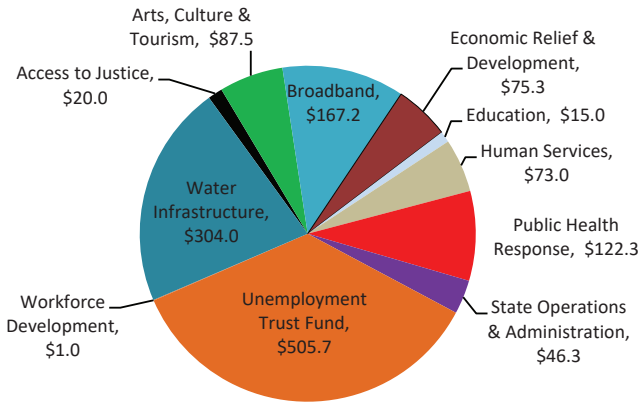
To be certain, despite the recent financial good news, there are lingering budgetary challenges that remain. Kentucky's public pension programs, for example, are in less-than-optimal financial shape, as evidenced by an estimated unfunded actuarial accrued liability (UAAL) that equaled \$41.5 billion in 2021. 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 47.4 percent in 2021—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 10.6 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 **\$1,417.3 million** of the **\$2,183 million** disbursed by the U.S. Department of Treasury. As of September 2022, 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 **\$122.3 million** to the Health and Human Services Cabinet for testing of Covid-19, assisting providers of treatment centers, and for providing Covid-19 testing at schools.

ARPA State Fiscal Recovery Fund Allocations, Kentucky
(\$ millions)



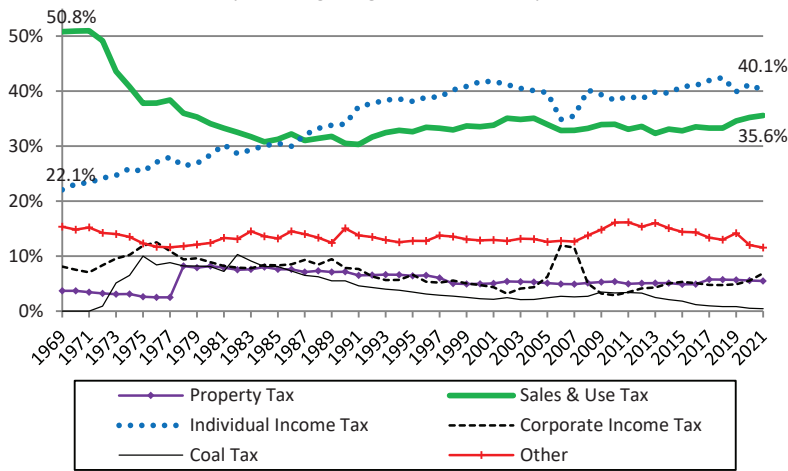
Source: National Conference of State Legislatures (NCSL), <<https://www.ncsl.org/research/fiscal-policy/arpa-state-fiscal-recovery-fund-allocations.aspx>>, accessed September 27, 2022.

GENERAL FUND RECEIPTS BY SOURCE

Two sources of revenue—the individual income tax and the sales and use tax—account for 75.7 percent of Kentucky general fund revenue (FY2021). This figure illustrates how Kentucky’s revenue system has fundamentally changed since 1969. Fifty 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 more basic changes in the economy—the gradual shift away from making products and toward providing services. Most states, including Kentucky, tend to apply a *broad-base* sales tax to goods but not services. Consequently, the state’s tax base is gradually becoming narrower and has lost some elasticity—a measure of whether revenue is keeping pace with the economy. There were reports during the 2022 session of the Kentucky General Assembly suggesting the possibility of major changes to the state’s income and sales taxes at some future date. Some of the plans include reducing the state income tax and broadening the sales tax to include more services. Broadening the base and reducing the rate are central principles of public finance policy.

Kentucky's General Fund Receipts by Major Sources,
FY69 to FY21

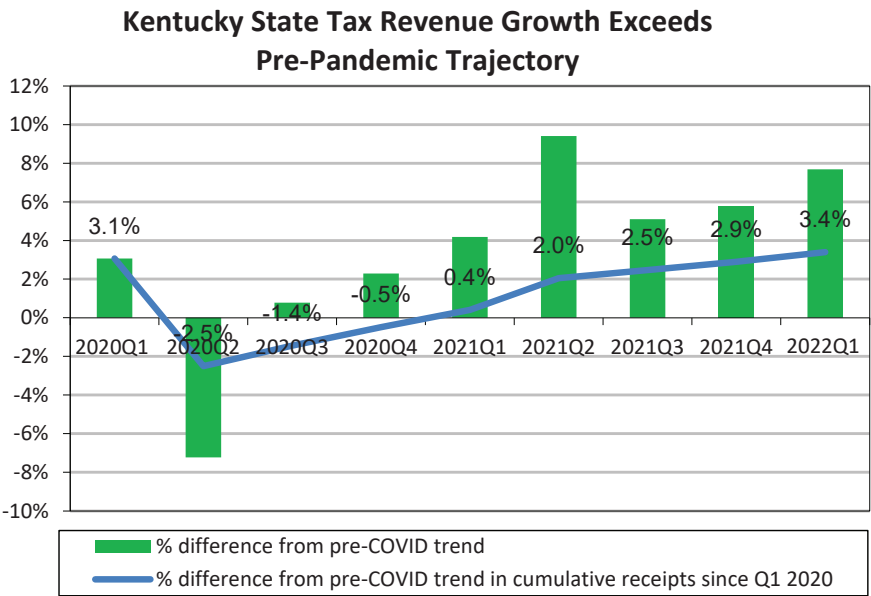
(percentage of general fund receipts)



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 TAX REVENUE GROWTH

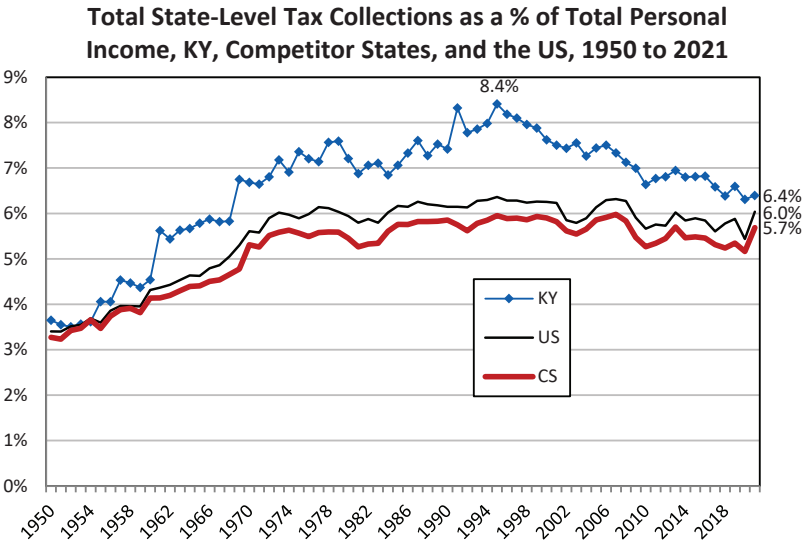
The pandemic’s initial economic impact affected both sides of the public finance ledger, placing tremendous stress on government finances. It increased selected governmental expenditures, such as unemployment insurance, while reducing or delaying revenue collection. But according to research released by the Pew Charitable Trusts in September 2022, “In nearly two-thirds of states—the most since the pandemic’s start—tax revenue had outperformed its pre-COVID growth trajectory by the end of the first quarter of 2022, when combining all receipts since January 2020.” Here we show Kentucky’s total state revenue from the first quarter of 2020 to the first quarter of 2022. The green bars show the estimated percentage difference from the state’s pre-COVID growth trend, and the blue line shows the estimated percentage difference from the state’s pre-COVID growth trend in *cumulative* receipts since Q1 2020. This analysis was done by Pew researchers Justin Theal and Alexandre Fall, under the auspices of Pew’s States Fiscal Health Project, and is based on data provided under license by the Urban Institute and the U.S. Census. While these data suggest that many states’ revenue collections are higher than expected, the future outlook is somewhat cloudy given inflation spikes, tightened energy supplies, and the potential for slower economic growth globally.



Source: Pew analysis of data licensed by the Urban Institute, which adjusts the U.S. Census Bureau’s quarterly summary of state and local tax revenue. *Tax Revenue in Most States Surpasses Pre-Pandemic Growth Trend*, by Justin Theal and Alexandre Fall, September 7, 2022.

TAX COLLECTIONS AND PERSONAL INCOME

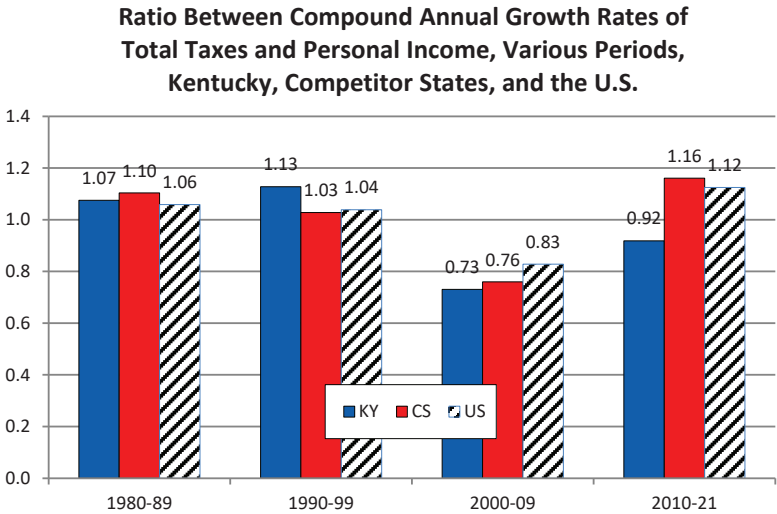
Kentucky is a more centralized state with regard to revenue collection, with the relative balance tilted toward state government revenue collection instead of local government revenue collection; this has been a defining characteristic of Kentucky’s state and local public finance system for many years. For example, in 2020, Kentucky’s state-level own-source revenue constituted 67.5 percent of total state and local own-source revenue, ranking Kentucky 8th highest among the states. This state-level percentage of 67.5 percent is much higher than both the national (53.9%) and competitive state (54.5%) 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 has declined steadily from its peak of 8.4 percent in 1995 to 6.4 percent in 2021.



Source: Author’s calculations based on data from the U.S. Department of Commerce, Bureau of Economic Analysis and U.S. Census Bureau, State Government Tax Collections, various years

GROWTH RATES, TAXES AND INCOME

Kentucky’s revenue growth has fallen just short of keeping pace with the economy from 2010 to 2021. Revenue growth rates are affected by both changes in the revenue base and tax rates. Most states’ revenue systems 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. As shown in the graph, the ratio between Kentucky’s total tax CAGR and personal income CAGR declined to 0.73 with the competitor states declining to 0.76 and the U.S. to 0.83. Since 2010, the ratios have increased to around 1.16 and 1.12 among the competitor states and in the U.S., respectively; in Kentucky, the ratio is much lower at 0.92.

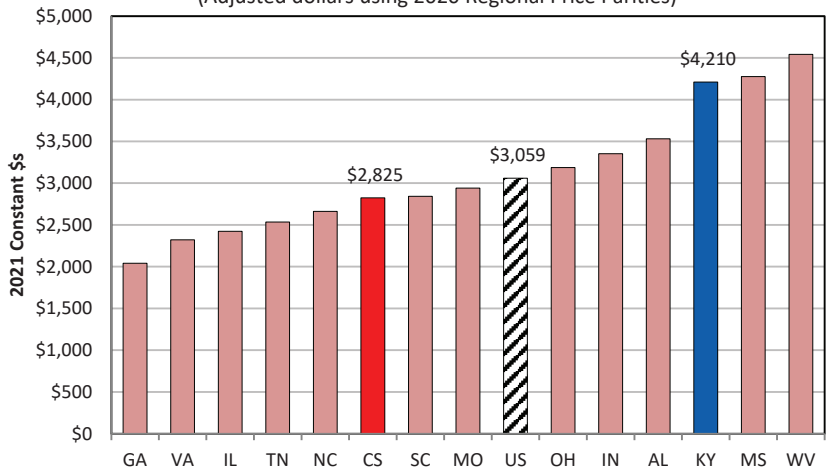


Source: U.S. Census Bureau, Bureau of Economic Analysis & State Government Tax Collections
 Note: Total taxes are not adjusted for sales tax increases. Adjustments will produce slightly different results.

REVENUE FROM FEDERAL TRANSFERS

Kentucky receives a significant amount of its total revenue from federal intergovernmental transfers. In 2020, this amounted to 32.2 percent of Kentucky’s total revenue. The competitor state average was about 22 percent and the U.S. average was about 21.3 percent. These transfers are mainly for health care (Medicaid), education, transportation, and public safety. On per capita basis, Kentucky received about \$4,210 in revenue from federal transfers, compared to \$2,825 and \$3,059 for the competitor states and U.S., respectively. Wyoming had the highest amount at \$7,769 and Georgia the lowest at \$2,041. 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.

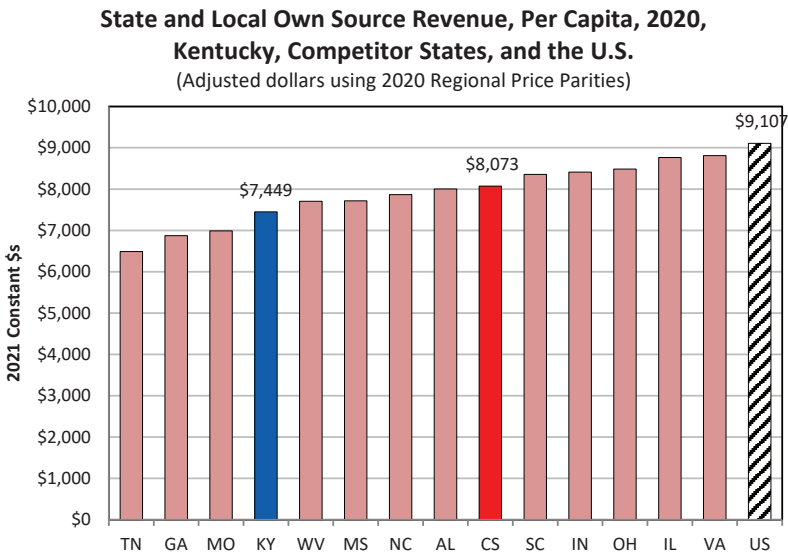
State and Local Revenue From Federal Transfers,
Per Capita, 2020, Kentucky, Competitor States, & the U.S.
(Adjusted dollars using 2020 Regional Price Parities)



Source: U.S. Census Bureau, 2020 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 2020. On a per capita basis, Kentucky’s per capita own-source state and local revenue was \$7,449 in 2020 (in constant 2021 dollars), lower than the competitor state average of \$8,073 as well as the U.S. average of \$9,107. North Dakota had the highest amount at \$12,745 and Arizona the lowest at \$6,040. 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.

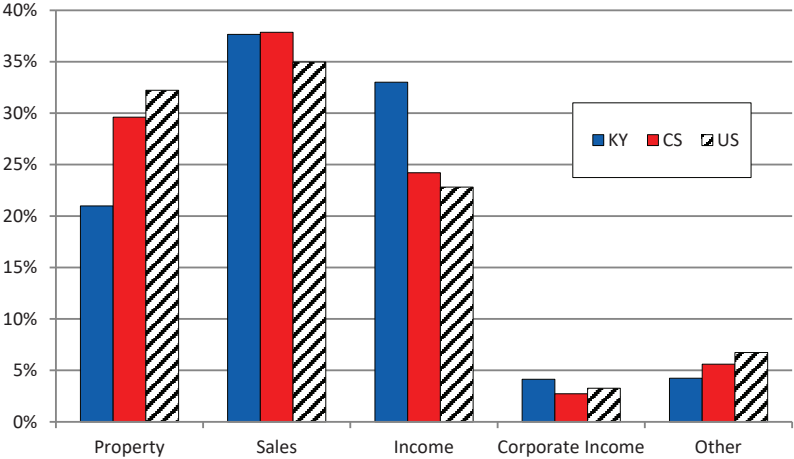


Source: U.S. Census Bureau, 2020 Annual Surveys of State and Local Government Finances

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 2019 report, “local income taxes are imposed by 4,964 taxing jurisdictions across 17 states, with a heavy concentration in Rust Belt states, particularly Ohio and Pennsylvania.” Not surprisingly, then, Kentucky collects a smaller share of combined state and local tax revenues from sales taxation and more from income taxation.

State and Local Tax Revenue by Source, 2020
Kentucky, Competitor States, and the U.S.
(percent of total tax revenue)

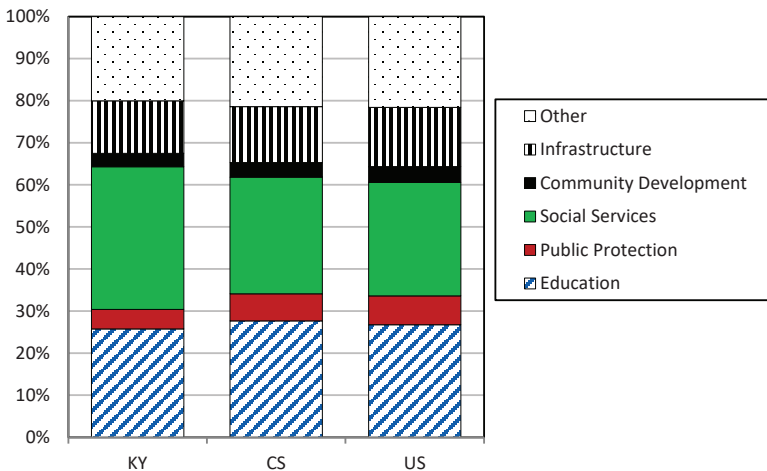


Source: U.S. Census Bureau, 2020 Annual Surveys of State and Local Government Finances

STATE AND LOCAL EXPENDITURES

Here, we present data that illustrate Kentucky's state and local spending by selected functional categories: *Education*, which includes elementary and secondary education and higher education; *Public Protection*, which includes police, fire, and corrections; *Social Services*, which includes public welfare, public assistance, and Medicaid; *Community Development*, which includes libraries, natural resources, parks and recreation, and housing and community development; and *Infrastructure*, which includes highways, water, sewers, utilities, and solid waste. For Kentucky, the competitor states, and the U.S., these five categories account for around 80 percent of state and local government expenditures (2020). 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. average. The Other category includes government administration, interest paid on debt, and insurance. 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,
2020, Kentucky, Competitor States, and the U.S.**
(percent of total state and local expenditures)

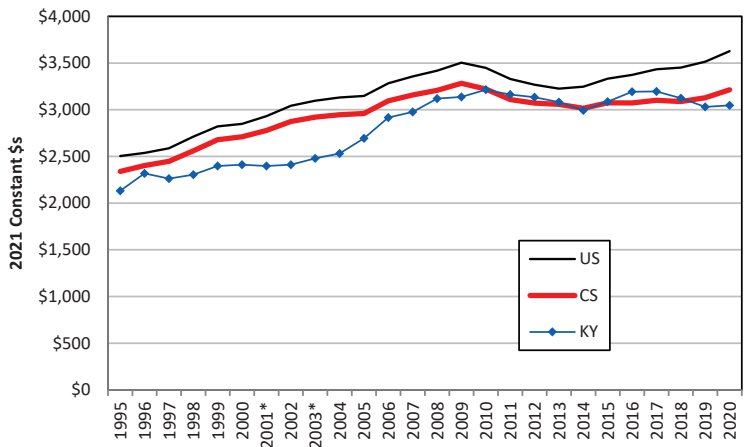


Source: U.S. Census Bureau, 2020 Annual Surveys of State and Local Government Finances

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 2021 dollars) from 1995 until 2009-2010. These expenditures have been more or less stable since 2010 for Kentucky and the competitor states, but trending upward slightly for the U.S. since about 2013. When viewed over the 26-year period from 1995 to 2020, Kentucky has a slightly higher percentage increase (43%) than the competitor states (37%), and is similar to the U.S. overall (45%). Kentucky has expended more of its cumulative gross domestic product on education during this time period (6.0%) than either the competitor states (5.3%) or the U.S. (5.3%). These investments have enabled the state to improve its educational standing relative to the 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 most important factor for respondents to the 2020 *Annual Survey of Corporate Executive and Consultants on Site Selection*, with 91.4 percent ranking it as either “important” or “very important.”

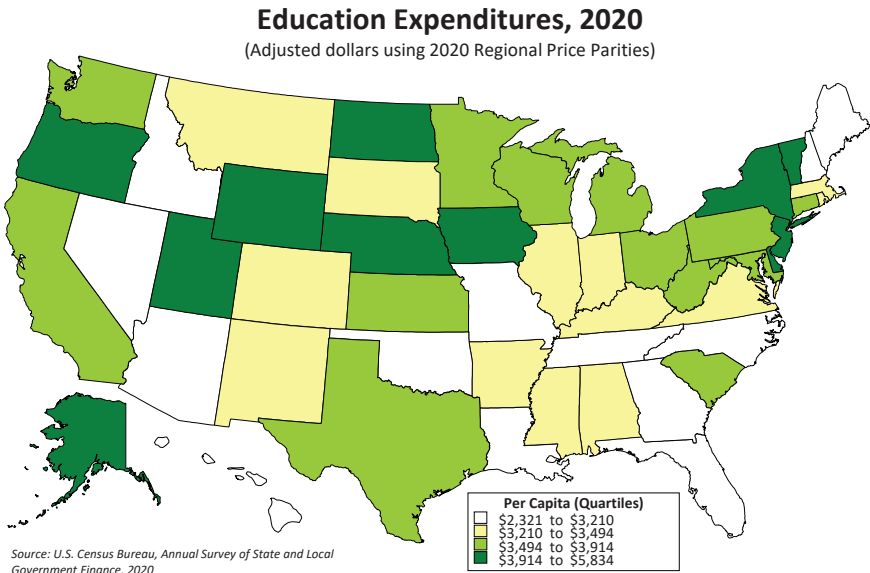
State and Local Education Expenditures, Per Capita, 1995-2020, Kentucky, Competitor States, and the U.S.



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.

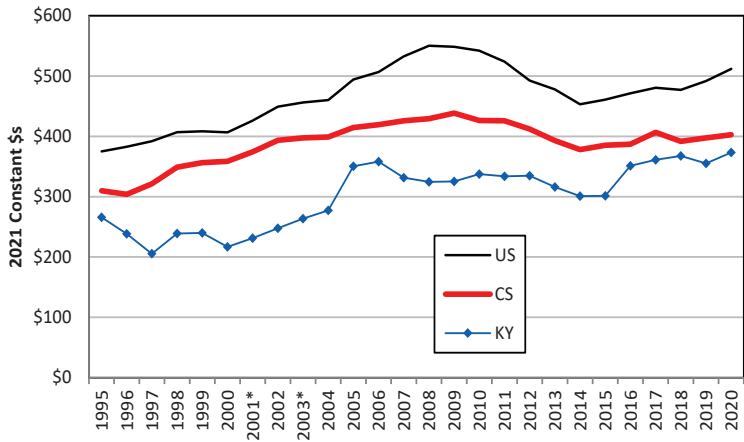
One way to reasonably assess a state’s position relative to other states is by ranking the states and placing them into four more or less equal groups, or quartiles. Kentucky’s per capita state and local expenditures for education in 2020 are in the second quartile of states. Vermont is the highest at \$5,833 and Florida is the lowest at \$2,321. Kentucky’s per capita spending is \$3,242. 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

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 steadily increased on a per capita basis (in constant 2021 dollars) from 1995 until 2005-06, but have been more or less stable since that time. When viewed over the 26-year period from 1995 to 2020, Kentucky has a higher percentage increase (40%) than the competitor states (30%) or the U.S. overall (36%). Kentucky has expended less of its cumulative gross domestic product on community development during this time period (0.65%) than either the competitor states (0.70%) or the U.S. (0.78%). Quality of life factors, which can include social amenities like libraries, parks, and natural open spaces, ranks as the fourth most important factor for respondents to the *2020 Annual Survey of Corporate Executive and Consultants on Site Selection*, evidenced by 84.8 percent ranking it as either “important” or “very important.”

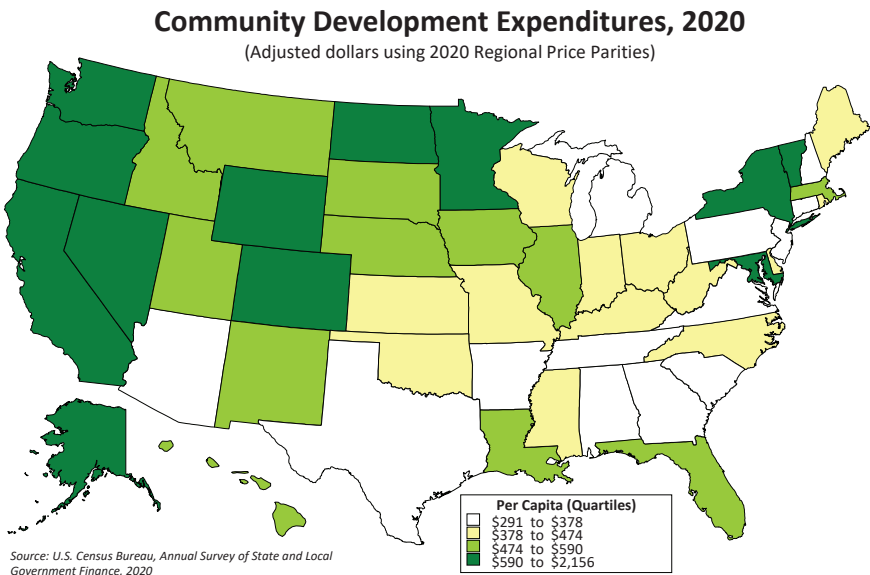
State and Local Community Development Expenditures,
Per Capita, 1995-2020,
Kentucky, Competitor States, and the U.S.



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.

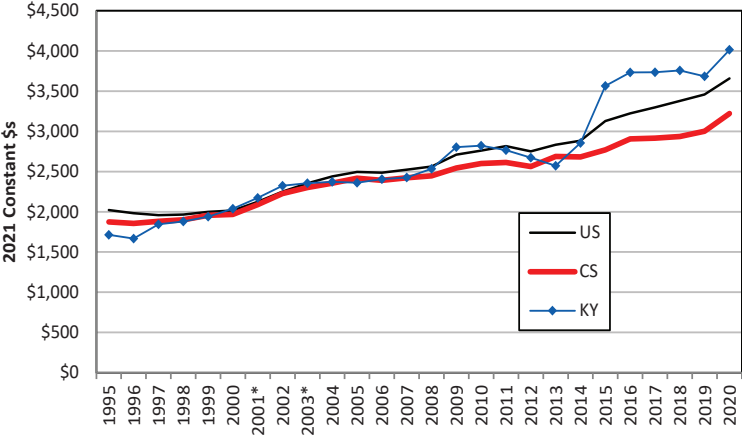
Here we see a wide range of values in community development expenditures. With per capita spending of \$397, Kentucky's state and local expenditures for community development in 2020 are in the second quartile. Alaska is the highest state at \$1,145 (DC is higher at \$2,155) and New Jersey is the lowest at \$291. 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

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 2021 dollars) from 1995 to 2020 in Kentucky, among the competitor states, and in the U.S. overall. The large increase in Kentucky beginning in 2014 reflects the effect of Medicaid expansion. When viewed over this 26-year period, Kentucky has a higher percentage increase (134%) than the competitor states (72%) or the U.S. (81%). Also, Kentucky expended more of its cumulative gross domestic product on social services during this time period (5.8%) than either the competitor states (4.5%) or the U.S. (4.4%).

State and Local Social Services Expenditures,
Per Capita, 1995-2020,
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.

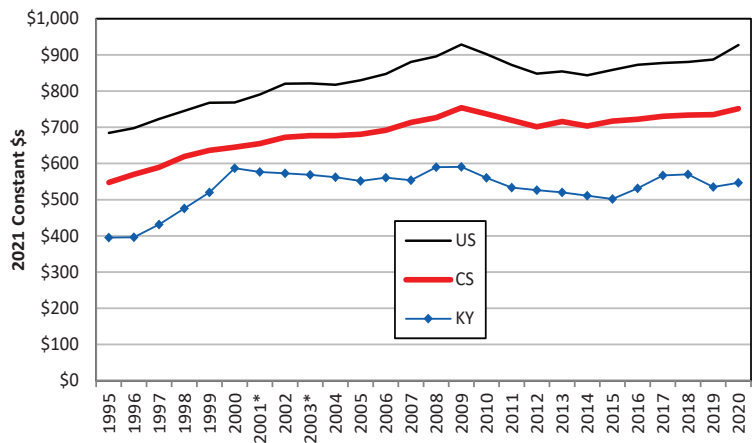
Kentucky exhibits high per capita social services expenditures. With per capita spending of \$4,270, Kentucky's state and local expenditures for social services in 2020 are in the fourth or top quartile. New York is the highest state at \$5,096 (DC is higher at \$6,876) and Connecticut is the lowest at \$1,782. 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

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. State and local expenditures for public protection increased moderately on a per capita basis (in constant 2021 dollars) from 1995 to 2020 in Kentucky, among the competitor states, and in the U.S. overall. When viewed over this 26-year period, Kentucky (38%) has increased at about the same rate as the competitor states (37%), but higher than the U.S. overall (36%). Also, Kentucky expended about the same percentage of its cumulative gross domestic product on public protection during this time period (1.1%) as the competitor states (1.2%) and the U.S. (1.4%).

State and Local Public Protection Expenditures,
Per Capita, 1995-2020,
Kentucky, Competitor States, and the U.S.



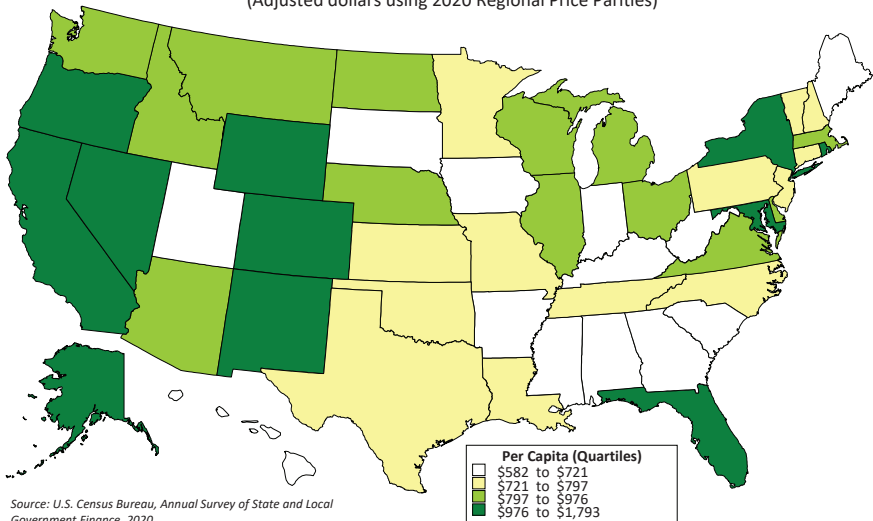
Source: U.S. Census Bureau, Annual Survey of State and Local Government Finance
Note: KY and CS data for 2001 and 2003 are interpolated.

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 \$582, Kentucky’s state and local expenditures for public protection in 2020 are in the first or lowest quartile. In fact, Kentucky has the lowest per capital expenditure value of any state in 2020; Kentucky was also the lowest in 2019. Alaska is the highest state at \$1,350 (DC is higher at \$1,792). 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, 2020

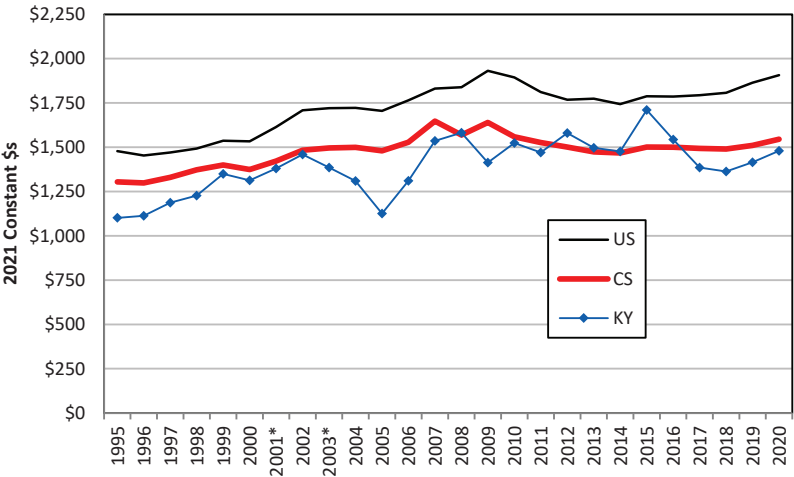
(Adjusted dollars using 2020 Regional Price Parities)



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 2021 dollars). When viewed over the 26-year period from 1995 to 2020, Kentucky has a higher percentage increase (34%) than the competitor states (18%) or the U.S. (29%). Kentucky has expended slightly more of its cumulative gross domestic product on infrastructure (3.0%) than the competitor states (2.7%) or the U.S. (2.8%). Numerous infrastructure factors are ranked high in the *2018 Annual Survey of Corporate Executive and Consultants on Site Selection*, led by “highway accessibility,” which listed as the second most important site selection factor with 88.7 percent indicating it is either “important” or “very important.”

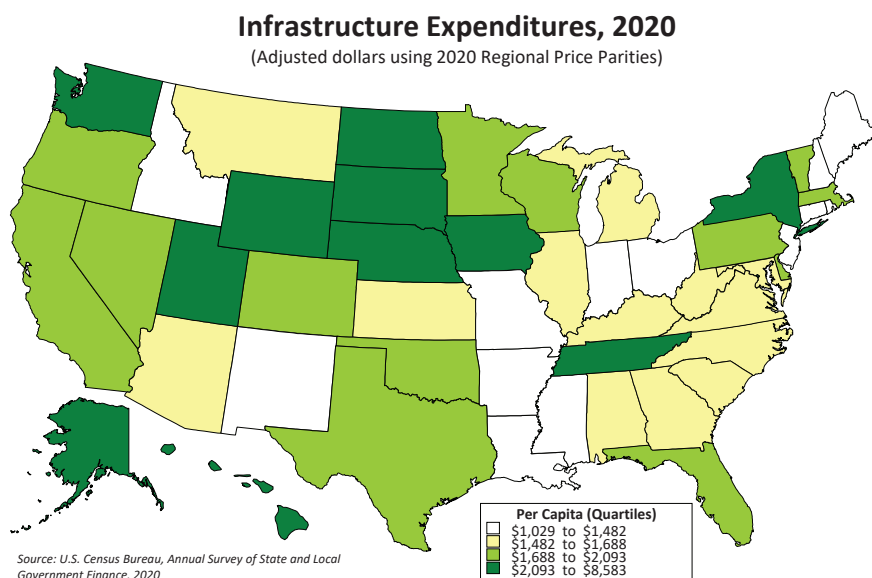
State and Local Infrastructure Expenditures, Per Capita, 1995-2020, Kentucky, Competitor States, and the U.S.



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.

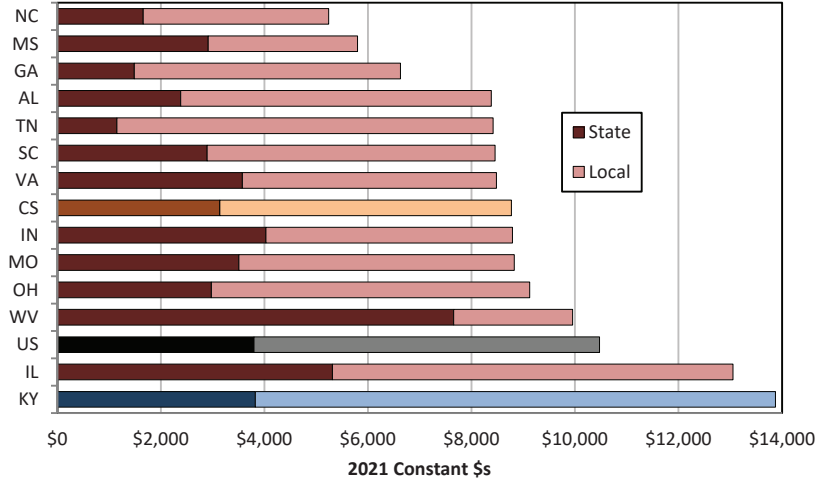
With per capita spending of \$1,574, Kentucky's state and local expenditures for infrastructure in 2020 are in the second quartile. Nebraska is the highest state at \$3,954 (DC is higher with spending of \$8,582) and New Hampshire is the lowest at \$1,029. These dollars have been adjusted to reflect 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 2020 were about \$595 billion, or roughly equal to 60 percent of the \$1 trillion infrastructure bill.



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 \$3.2 trillion in outstanding debt in 2020, with 64 percent at the local government level and 36 percent at the state government level. The figure shows combined state and local debt per capita, with Kentucky first among the competitor states at \$13,872, 28 percent of which is held by state government. The U.S. per capita debt for state and local governments is \$10,475. 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, 2020
Kentucky, Competitor States, and the U.S.
(state and local debt, by total, RPP adjusted \$s)

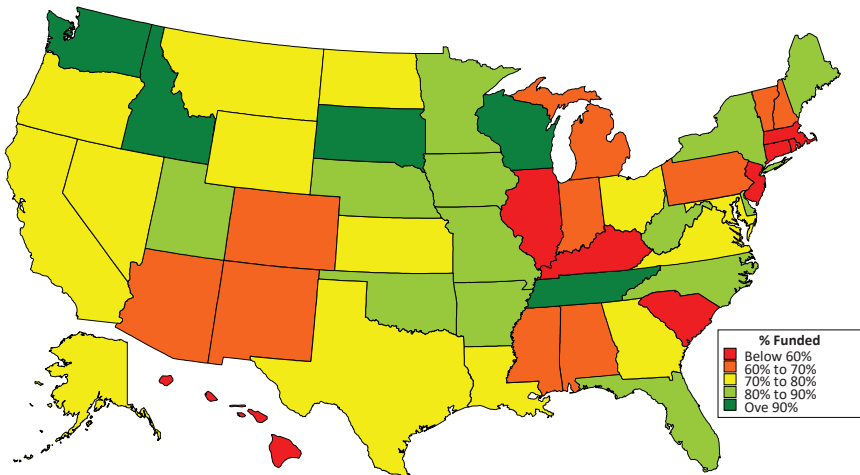


Source: U.S. Census Bureau, 2020 Annual Surveys of State and Local Government Finances

PUBLIC PENSION FUNDING GAPS

Despite robust stock market returns and 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 \$41.5 billion unfunded liability (based on 2021 actuarial assumptions). 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 2021, these pension funds were funded at approximately 47.4 percent of the level needed to be fully funded—the lowest funded ratio 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, FY2021



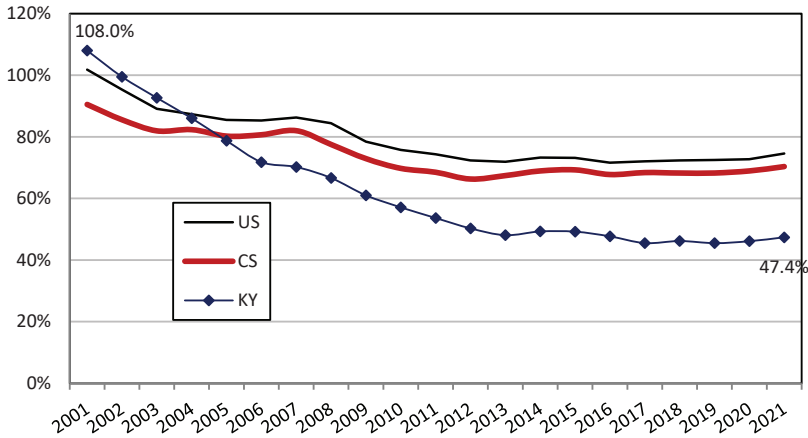
Source: Estimated by the author using Public Plans Data, 2001-2021. Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and Government Finance Officers Association. Data downloaded on December 7, 2022.

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 219 public pension plans administered by state and local governments from 2001 to 2021. 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 about 47.4 percent in 2021, 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 2021, the assets for these four plans equaled about \$37.3 billion while liabilities equaled around \$78.8 billion. The unfunded actuarial accrued liability (UAAL) equaled \$41.5 billion. Kentucky’s funded ratio of 47.4 percent ranks 51st, the lowest ratio among the states and DC. 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 2021**

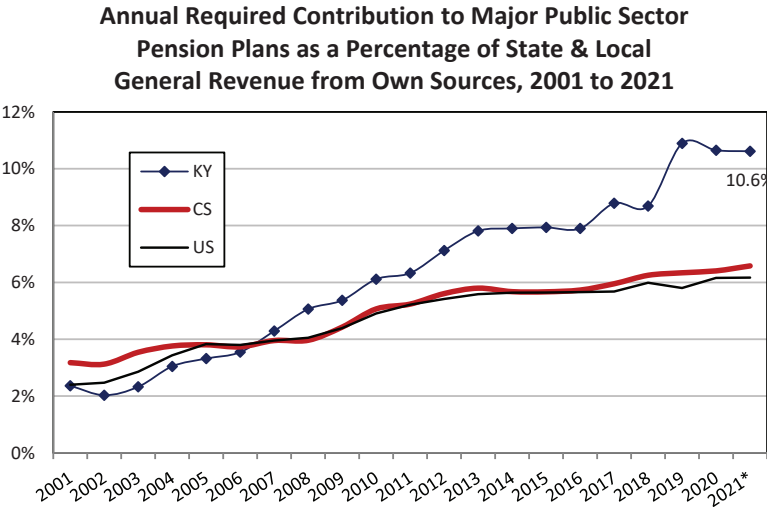
(actuarial assets divided by actuarial liability)



Source: Estimated by the author using Public Plans Data, 2001-2021. Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and Government Finance Officers Association. Data downloaded on December 7, 2022.

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 10.8 percent of state and local general revenue from own sources. Kentucky ranks second among the states, along with with California, which is also at 10.8 percent. Illinois ranks first at about 18.2 percent. 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.



Source: Estimated by the author using Public Plans Data, 2001-2021. Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and Government Finance Officers Association. Data downloaded on December 7, 2022.
*2021 General Revenue from Own Sources forecasted from 2001 to 2020 values.

NOTES & SOURCES

Advanced Placement Exam Mastery—College Board, *AP Report to the Nation*, <apreport.collegeboard.org/> and *AP Cohort Data: Graduating Class of 2021*.

Agriculture and GDP—U.S. Department of Commerce, Bureau of Economic Analysis, Gross domestic product (GDP) by state (millions of current dollars).

Air Quality (part 1)—Kentucky Energy and Environment Cabinet, Department for Environmental Protection, Division for Air Quality <air.ky.gov/>. The data on air quality trends were obtained via email from the Jenna Nall, Division for Air Quality on November 21, 2022. Notes about specific pollutants: O₃—Based upon annual statewide averages of all fourth highest daily maximum 8-hour concentrations [29 sites used for 2021 average (ppm)]; NO₂—Based upon annual statewide averages of all 98th percentile daily concentrations 1-hour averages [7 sites used for 2021 average (ppm)]; and SO₂—Based upon annual statewide averages of all 99th percentile daily maximum 1-hour concentrations [12 sites used for 2021 average (ppm)].

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 second highest daily maximum 1-hour concentrations [3 sites used for 2021 average (ppm)]; PM_{2.5}—Based upon annual statewide averages of all 98th percentile 24-hour concentrations [19 sites used for 2021 average (μ/m³)]; and PM₁₀—Based upon annual statewide averages of all maximum 24-hour concentrations [8 sites used for 2021 average (μ/m³)].

Associate's Degrees—Estimated by the author using American Community Survey, 2021 1-Year Estimate, Public Use Microdata Sample (PUMS) data.

Banking Status—2021 *FDIC National Survey of Unbanked and Underbanked Households*, <<https://www.fdic.gov/analysis/household-survey/index.html>>.

Bridges & Problem Bridges by County—U.S. Department of Transportation, National Bridge Inventory (NBI), <<https://www.fhwa.dot.gov/bridge/nbi.cfm>>

Bright Spot Schools—*Kentucky Schools as Educational Bright Spots*, Center for Business and Economic Research, <<http://cber.uky.edu/>>.

Business Bankruptcies—The Administrative Office of the U.S. Courts <www.uscourts.gov/Statistics/BankruptcyStatistics/quarterly-filings-3-month-chapter-district.aspx>. The establishment data from the County Business Patterns.

Charitable Contributions—Internal Revenue Service, Statistics of Income <www.irs.gov/uac/SOI-Tax-Stats---Historic-Table-2>.

Child Poverty—U.S. Census Bureau, Poverty Status in the past 12 months, 2021 American Community Survey 1-Year Estimates, Table S1701, <<https://data.census.gov/>>.

Children in Single-Parent Families—U.S. Census, American Community Survey, 5-Year estimate, 2020, Table C23008. The citation referenced in the text is Raj Chetty, Nathaniel Hendren, Patrick Kline, and Emmanuel Saez, “Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States,” *The Quarterly Journal of*

Economics, Vol. 129, Issue 4, November 2014, pp. 1553-1623.

Chronic Disease Risk by Age Group—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, 2021.

Coal Production—Kentucky Energy and Environment Cabinet, Kentucky Quarterly Coal Reports <energy.ky.gov/Pages/CoalFacts.aspx>.

College Attainment by County—U.S. Department of Commerce, American Community Survey, 2020, 5-year estimates.

College Attainment—Estimated by the author using American Community Survey, 2021 1-Year Estimate, Public Use Microdata Sample (PUMS) data.

College Readiness—*The Condition of College & Career Readiness*, 2022, various state reports, ACT, Inc. The Competitor States values reflect a weighted average of the 12 states.

College Degrees by Race & Ethnicity—Author's analysis of U.S. Census CPS 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 [Annual Social and Economic Sup., various years]. Minneapolis, MN: IPUMS, 2022.

College Degrees by Race, Ethnicity, & Metro Status—Authors' analysis of data from Steven Ruggles, Sarah Flood, Sophia Foster, Ronald Goeken, Jose Pacas, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 11.0 [2015-2019, ACS 5-year]. Minneapolis, MN: IPUMS, 2021. <https://doi.org/10.18128/D010.V11.0>.

Community Banks—FDIC Community Banking Study microdata, analyzed by the author <<https://www.fdic.gov/regulations/resources/cbi/study.html>>.

Community Development Expenditures (in the U.S.)—U.S. Census Bureau, 2020 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, 2020 5-Year Estimate, Table DP03-Selected Economic Statistics.

Competitive Counties—There are fourteen factors used to rank Kentucky's 120 counties nationally: *Economic Connectedness*, Raj Chetty, et al., <<https://opportunityinsights.org/paper/social-capital-ii-determinants-of-economic-connectedness/>>; *Social Capital*, see the reference in this section; *Net Earnings*, BEA, Regional Economic Accounts, Table CAINCC4, total net earnings divided by total personal income; *Employment-Population Ratio*, BLS labor force data by county, population 16 and older, 2021 annual averages, <<https://www.bls.gov/lau/tables.htm>>; *Poverty*, U.S. Census, ACS 2021 5-year estimates, Table S1701; *Bachelor's Degree*, population 25 years and older, U.S. Census, ACS 2021 5-year estimate, Table S1501; *Patents*, see the reference in this section; *Natural Amenities*, USDA ERS, <<https://www.ers.usda.gov/data-products/natural-amenities-scale/>>; *Racial Equity Index*, <<https://nationalequityatlas.org/>>; *Diabetes*, CDC, diagnosed diabetes, age-adjusted population, 20 and older <<https://gis.cdc.gov/grasp/diabetes/diabetesatlas-surveillance.html#>>; *Disability*, U.S. Census, ACS 2021 5-year estimate, Table S1810;

Preparedness, National Health Security Preparedness Index, Key Findings <<https://nhspi.org/wp-content/uploads/2021/06/NHSPI-2021-Key-Findings.pdf>>; *Internet Access*, U.S. Census, ACS 2021 5-year estimate, Table S2801; *Innovation Index*, see the county-level innovation index below. The percentile values were determined using all available U.S. counties or county equivalents. Kentucky counties were given 2 points for being in the upper 10%, and 1 point for ranking in the upper 25% nationally. The one exception was for the bachelor's degree factor. In that case, an upper 10% ranking garnered 4 points whereas an upper 25% ranking resulted in 3 points. All points were tallied to generate county competitive points.

County Population Changes—Census data obtained from the U.S. Census Bureau.

County-Level Innovation Index—Innovations in America's Regions, a project funded in part by the U.S. Commerce Department's Economic Development Administration. Work was conducted by the Purdue Center for Regional Development, the Indiana Business Research Center at Indiana University's Kelley School of Business, and other research partners. Data are available online at <www.statsamerica.org/innovation/index.html>.

Crime Rate—Federal Bureau of Investigation, *Crime in the United States 2020*, Table 4, Crime in the United States, by Region, and Table 5, Crime in the United States by State <www.fbi.gov/>.

Current Smokers—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, 2011-2021.

Dams—National Inventory of Dams <<http://nid.usace.army.mil/>>, data were accessed 9/28/2022.

Debt—U.S. Census Bureau, 2020 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate>.

Disability Income (DI)—U.S. Social Security Administration, Office of Retirement and Disability Policy, Office of Research, Evaluation, and Statistics, *Annual Statistical Report on the Social Security Disability Insurance Program, 2021* <www.socialsecurity.gov>, and the University of Kentucky Center for Poverty Research. 2022. "UKCPR National Welfare Data, 1980-2020." URL: <http://ukcpr.org/resources/national-welfare-data> (accessed November 1, 2022).

Disability—U.S. Department of Commerce, American Community Survey, 2021, 1-year estimates, Table S1810 <www.census.gov/acs/www/>.

Disconnected Young Adults—Percentages are estimated from 2021 1-year PUMS data. In addition to the age variable (AGEP), there are three variables used to create this recoded variable: ESR—Employment Status Recode (where ESR=3 or 6); SCHL—Educational Attainment (where SCHL≤19); and SCH—School Enrollment (where SCH=1).

Drug Overdose Death Rate—Author's analysis of data from the Centers for Disease Control and Prevention (CDC), National Center for Health Statistics, Multiple Cause of Death 1999-2018 on CDC WONDER Online Database.

Early-Stage Entrepreneurship—Kauffman Indicators of Entrepreneurship, 2021

National & State Reports on Early-Stage Entrepreneurship, April 2022. <<https://indicators.kauffman.org/>>.

Earnings by Race, Ethnicity, & Metro Status—Author’s analysis of data from Steven Ruggles, Sarah Flood, Sophia Foster, Ronald Goeken, Jose Pacas, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 11.0 [2015-2019, ACS 5-year]. Minneapolis, MN: IPUMS, 2021. <https://doi.org/10.18128/D010.V11.0>.

Earnings Gap—Bureau of Economic Analysis, CA30, Economic Profile, and the 2013 Urban-Rural Continuum Code, available at <www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx#UqR_ZeLs2HY>.

Education Expenditures (in the U.S.)—U.S. Census Bureau, 2020 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.

Education Index—Refer to Michael T. Childress, “Kentucky’s Educational Performance & Points of Leverage,” CBER Issue Brief, December 2015 <cber.uky.edu/>.

Educational Achievement Gap—National Center for Education Statistics, NAEP Data Explorer <nces.ed.gov/nationsreportcard/naepdata/dataset.aspx>.

Elder Poverty—U.S. Census Bureau, Poverty Status in the past 12 months, 2021 American Community Survey 1-Year Estimates <www.census.gov/acs/www/>. The Employee Benefit Research Institute 2022 *Retirement Confidence Survey* results are available at <www.ebri.org/surveys/rcs/>.

Employment by Education—Refer to Christopher R. Bollinger, “Want a Job? Get a College Degree,” CBER Issue Brief, October 2015 <cber.uky.edu/>.

Employment by Foreign Companies—Foreign Direct Investment in the U.S., Majority-Owned Bank and Nonbank U.S. Affiliates, Employment. Bureau of Economic Analysis, Regional Economic Accounts & International Data.

Employment Growth by Kentucky Region—U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages <<http://www.bls.gov/cew/data.htm>>.

Employment Growth by State—U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages <<http://www.bls.gov/cew/data.htm>>.

Employment-Population Ratio—Author’s analysis of U.S. Census CPS 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 [CPS Basic Monthly]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

Employment-Population Ratio (by Race & Ethnicity)—Bureau of Labor Statistics (BLS), Current Population Survey <<https://www.bls.gov/cps/data.htm>>, Series IDs LNS12300003, LNS12300006, & LNS12300009.

Energy Consumption by End-Use Sector—U.S. Energy Information Administration, State Energy Data System, Table C1: Energy Consumption Overview: Estimates by Energy Source and End-Use Sector, 2020 <www.eia.gov>.

Energy Consumption by Source—U.S. Energy Information Administration, *State Energy Data 2020: Consumption*, and *Kentucky State Energy Profile and Energy Estimates* <www.eia.gov>.

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.

Entrepreneurial Depth—U.S. Department of Commerce, Bureau of Economic Analysis, SA4 Personal Income and Employment by Major Component and SA30 Economic Profile.

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, <tse.export.gov/TSE/TSEhome.aspx>.

Family Income by Education—Estimated by the author using data courtesy Steven Ruggles, Sarah Flood, Sophia Foster, Ronald Goeken, Jose Pacas, Megan Schouweiler and Matthew Sobek. IPUMS USA: Version 11.0 [ACS 2015 to 2019]. Minneapolis, MN: IPUMS, 2021. <https://doi.org/10.18128/D010.V11.0>. To estimate the independent effect of education, we used a multiple regression model that utilized mostly dummy variables (e.g., EMPLOY, LESSHS, SOMECOL, BACHORMORE, NOTMETRO, METROCITY, METRONOTCITY, METROMIXED, GENDER, AGE_25_34, AGE_35_44, AGE_45_54, AGE_55_64, OVER65, WHITEONLY, HISPANIC); we also included YEAR. The omitted variables are high school education, aged less than 25, and metropolitan status indeterminable (mixed).

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.

Favors for Neighbors—Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019 Volunteering and Civic Life Supplement data.

Food Insecurity—Author's 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 [Food Security Supplement, various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

Food Insecurity by Education—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 Nonhispanic, Black Nonhispanic), Hispanic, marital status, and year. The sample is from CPS IPUMS, Food Security Supplement, pooled from 2015 to 2019.

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. 2022. “UKCPR National Welfare Data, 1980-2020.” URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 SNAP recipients <<https://www.fns.usda.gov/sites/default/files/resource-files/SNAPZip69throughCurrent-10.zip>>.

Foreclosures—Mortgage Bankers Association, National Delinquency Survey.

Foreign-Born Population (by County)—U.S. Census, American Community Survey, 2021 5-Year Estimate, Table DP02.

Free or Reduced-Price Lunch Eligibility—U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), “Public Elementary/Secondary School Universe Survey,” 2019-20, downloaded 6/10/2022

General Fund Receipts by Source—Kentucky Finance and Administration Cabinet and the Kentucky Revenue Cabinet, Annual Reports, various years.

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.

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 (2015-2019). 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.

Health-Based Violations—United States, Environmental Protection Agency, Safe Drinking Water Information System data, various years.

Health Insurance Coverage: Children—U.S. Census Bureau, Health Insurance Historical Tables, H1B Series, H1B-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/hihist5B.xls> and American Community Survey (various years, 1-Year estimates).

Health Insurance Coverage: Everyone—U.S. Census Bureau, Health Insurance Historical Tables, H1B Series, H1B-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/hihist4B.xls> and American Community Survey (various years, 1-Year Estimates).

Health Insurance, by Race & Ethnicity—Author's analysis of IPUMS-NHIS data, Lynn A. Blewett, Julia A. Rivera Drew, Miriam L. King, Kari C.W. Williams, Natalie Del Ponte and Pat Convey. IPUMS Health Surveys: National Health Interview Survey, Version 8.1 [NHIS 1997-2021]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D070.V8.1>

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, 2017-2021 pooled data.

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, 2017-2021 pooled data.

High Hazard Potential Dams—National Inventory of Dams <<http://nid.usace.army.mil/>>, data were accessed 9/28/2022.

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, 2021 1-Year Estimate, Public Use Microdata Sample (PUMS) data.

High School Graduation Rate—U.S. Department of Education, EDFacts Data Group 695, School year 2019–20.

High-Speed Internet (by County)—The reported data in the Infrastructure chapter are from two different Federal Communications Commission (FCC) reports, 2020 Measuring Broadband America Fixed Broadband Report <<https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-report-2019>> and the 2020 Broadband Progress Report <<https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2019-broadband-progress-report>>. We obtained the data found in the Innovation chapter from the American Community Survey, 2020 5-Year estimate, Table GCT2801.

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 calculate 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 2021 1-Year estimates.

Home Ownership Rates by Race & Ethnicity— *America's Health Rankings 2020*, United Health Foundation, AmericasHealthRankings.org, Accessed 2021 <<https://www.americashealthrankings.org/api/v1/downloads/210>>.

Household Income Growth—Author's analysis of IPUMS-CPS data, courtesy of Miriam King, Steven Ruggles, J. Trent Alexander, Sarah Flood, Katie Genadek, Matthew B. Schroeder, Brandon Trampe, and Rebecca Vick. Integrated Public Use Microdata Series, Current Population Survey: Version 3.0. [ASEC, various years]. Minneapolis: University of Minnesota, 2020.

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 (2021) 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>.

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>.

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, 2020 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.

Job Growth—U.S. Department of Labor, Bureau of Labor Statistics, Current Employment

Statistics, total private, all employees, seasonally adjusted <www.bls.gov/>.

Kentucky Coal Distribution—*Annual Coal Distribution Report 2021*, U.S. Energy Information Administration, <www.eia.gov/coal/distribution/annual/archive.cfm>.

Labor Force Participation (by County) & (by Education)—American Community Survey, U.S. Census Bureau, 2021 1-year estimate (Table S2301). The county-level data are from the ACS 5-Year estimate (Table S2301).

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>>.

Leading Causes of Death—Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, 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.html> on Nov 9, 2022 5:05:47 PM.

Local Food Suppliers—U.S. Department of Agriculture, *2012 Census of Agriculture* (Table 43: Selected Practices). Personnel with the Kentucky Department of Agriculture provided data on CSA and farmers' markets that is discussed in the narrative.

Medicaid Beneficiaries—Kaiser Family Foundation, <www.statehealthfacts.org> and Centers for Medicare & Medicaid Services, State/County Penetration File, (various years).

Mining and Coal—These data are from the Bureau of Economic Analysis and the Energy Information Administration, Annual Coal Report, various years.

Minority Earnings Gap—Author's analysis of U.S. Census CPS 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 [Annual Social and Economic Sup., various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

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).

Neighborhood Quality—2019-2020 National Survey of Children's Health <childhealthdata.org>.

Net Earnings per Capita (by County)—U.S. Department of Commerce, Bureau of Economic Analysis.

Net Earnings—U.S. Department of Commerce, Bureau of Economic Analysis.

Nonemployer Establishments—U.S. Census Bureau, Nonemployer Statistics <www.census.gov/econ/nonemployer/historical.htm>.

Nonprofits—Internal Revenue Service, Exempt Organizations Business Master File (2022, March).

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, 2020.

Obstacles to Achievement—Author's calculations using district-level fixed effects panel regression model results. Percentages reflect moving a school's percentage of nonwhite students from "low" (10th percentile value of 2.8%) to "high" (90th percentile, 56.8%), while holding other predictor variables constant. See *Kentucky Public Schools as Educational Bright Spots*, <<https://cber.uky.edu/publications/research-report/2020/kentucky-public-schools-educational-bright-spots>>. This report provides complete information about the data, variables, method and model.

Organic Farming—USDA *2017 Census of Agriculture*.

Patents (by County)—U.S. Patent and Trademark Office, Utility Patents <www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utlh.htm>. 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.

Per Capita Personal Income—U.S. Department of Commerce, Bureau of Economic Analysis, SA1-3 Personal income summary.

Performance on Standardized Tests—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/>.

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/>>.

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.

Population by Age Group—U.S. Census, American Community Survey, 2021 1-Year Estimates.

Population Change—U.S. Census Bureau, Decennial Census, 2000 and the American Community Survey 2021 1-year estimate.

Population by Race—U.S. Census Bureau, Decennial Census, 2020, and various releases of the 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>.

Poverty Rate by County—U.S. Census Bureau, American Community Survey, 2020 5-Year Estimates.

Poverty Rate—Estimated by the author using the CPS-IPUMS constructed variable OFFPOV (Official Poverty Status, person-level variable). 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 [ASEC various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>

Poverty Rate by Race & Ethnicity—See Poverty Rate, as well as U.S. Census, American Community Survey, Table S1701, 2021 1-Year estimate.

Public Assistance by Education—U.S. Census Bureau, 2019 1-Year, Public Use Microdata Sample (PUMS). Four variables are used from the 2019 PUMS to create the public assistance variable: FS - Food Stamps (SNAP); HINS4 - Medicaid; PAP - Public Assistance Income; and SSIP - Supplemental Security Income. Using multiple regression analysis, we estimate the net effect of education on whether one has received public assistance while holding gender, income, race and age constant.

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 2021: 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, 2020 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>.

Recycling—Kentucky Energy and Environment Cabinet, Division of Waste Management, *Annual Report—Fiscal Year 2020* <waste.ky.gov>.

Regional Population Change—U.S. Census Bureau.

Renewable Energy Production—U.S. Energy Information Administration, State Energy Data Production, State Energy Data System (SEDS), 1960-2020 estimates <www.eia.gov/state/seds/>.

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, 2020 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 2018 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, 2021.

Road Condition—Federal Highway Administration, Highway Statistics 2020, 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 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, *2020 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—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 and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [CPS ASEC, various years]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V10.0>.

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, 2020 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 2020* <<https://eec.ky.gov/Environmental-Protection/Waste/Pages/division-reports.aspx>>.

Sources of Personal Income—U.S. Department of Commerce, Bureau of Economic Analysis, SA04 State income and employment summary.

State and Local Expenditures—U.S. Census Bureau, 2020 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>.

State and Local Own Source Revenue—U.S. Census Bureau, 2020 Annual Surveys of State and Local Government Finances <www.census.gov/govs/estimate/>. More information about the BEA Regional Price Parities is available at <www.bea.gov/regional/pdf/RPP2015.pdf>.

State and Local Tax Revenue by Source—U.S. Census Bureau, 2020 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>.

Supplemental Security Income (SSI)—University of Kentucky Center for Poverty Research. 2022. “UKCPR National Welfare Data, 1980-2020.” URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 SSI recipients, Table 10 <https://www.ssa.gov/policy/docs/statcomps/ssi_asr/2021/sect02.pdf>.

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>.

Temporary Assistance for Needy Families—University of Kentucky Center for Poverty Research. 2022. “UKCPR National Welfare Data, 1980-2020.” URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 TANF recipients <<https://www.acf.hhs.gov/ofa/data/tanf-caseload-data-2021>>.

Toxic Releases—U.S. Environmental Protection Agency, Toxics Release Inventory, TRI Explorer <iaspub.epa.gov/triexplorer/tri_release.chemical>. These data are TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for All industries, for All chemicals, 2021.

Transfer Payments by County—Bureau of Economic Analysis.

Unable to Look for Work due to COVID—Author’s analysis of U.S. Census CPS 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 9.0 [CPS Basic Monthly, May 2020 to August 2022]. Minneapolis, MN: IPUMS, 2021.

Unable to Work due to COVID—Author’s analysis of U.S. Census CPS 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 9.0 [CPS Basic Monthly, May 2020 to August 2022]. Minneapolis, MN: IPUMS, 2021.

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.

Venture Capital—PricewaterhouseCoopers, National Venture Capital Association, Money Tree Report, historical trend data, <www.pwcmoneytree.com/MTPublic/ns/nav.jsp?page=historical>.

Volunteer Hours—Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019 Volunteering and Civic Life Supplement data.

Volunteer Rate by Education—These data are from the 2019 Current Population Survey (CPS) September Volunteer Supplement results, based on adults aged 25 and older.

Volunteer Rate—Estimated by the author using U.S. Census, Current Population Survey (CPS), September 2019 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.

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.

Women, Infants, and Children (WIC)—Source: University of Kentucky Center for Poverty Research. 2022. “UKCPR National Welfare Data, 1980-2020.” URL: <http://ukcpr.org/resources/national-welfare-data> (accessed <November 1, 2022>). The FY2021 WIC recipients available here: <[UNIVERSITY OF KENTUCKY](https://fns-prod.azureedge.us/sites/default/files/resource-</p>
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files/26wifypart-10.xls>.

Worked Remotely for Pay due to COVID—Author’s analysis of U.S. Census CPS 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 9.0 [CPS Basic Monthly, May 2020 to August 2022]. Minneapolis, MN: IPUMS, 2021.

Worker Flexibility—There are two graphs focused on worker flexibility. One examines it by income level, the other by educational attainment.

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>.

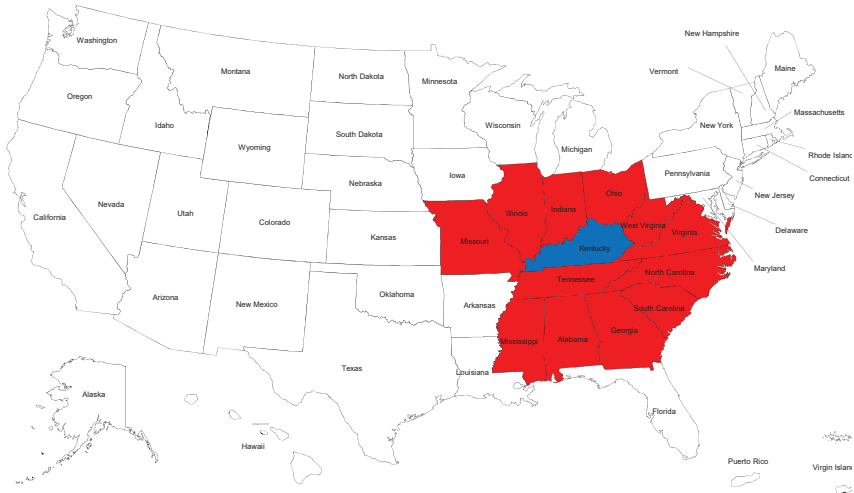
GLOSSARY

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.”

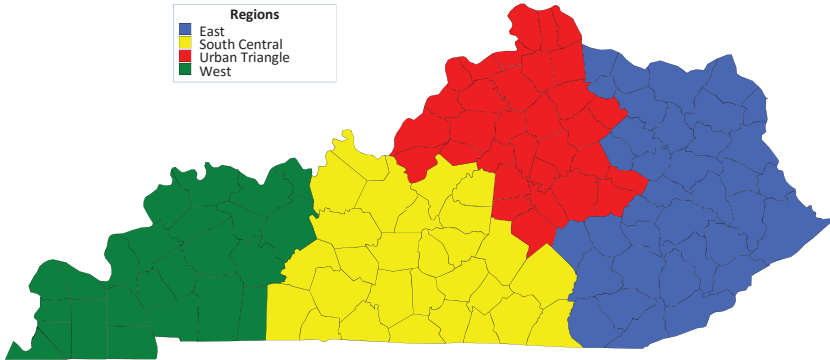
Current dollars—Also called nominal dollars, these dollar amounts are not adjusted to remove the effect of inflation and represent the current value of the dollar during a given year.

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 (\$12,488 for individuals; \$25,094 for a family of four, 2017 thresholds).

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.

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