

# Kentucky's Labor Market Recovery after the Great Recession

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Adam A. Millsap, Matt Crumb, and J. Patrick Higgins



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**MERCATUS CENTER**  
George Mason University

3434 Washington Blvd., 4th Floor, Arlington, Virginia 22201  
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## ABSTRACT

The Great Recession negatively impacted all US states, but there was substantial heterogeneity across the country. This study reveals some of this heterogeneity by examining what happened to the labor market in Kentucky and its seven border states, then in Kentucky's metropolitan statistical areas (MSAs), and finally within the Louisville–Jefferson County MSA, which includes counties in Kentucky and Indiana. We find that Kentucky's labor force remained below its prerecession level as of September 2015 while the state's private employment exceeded its prerecession level. Of the states studied, only Indiana and Virginia completely recovered by September 2015 according to both measures. Business starts within Kentucky have also recovered and, along with Missouri, Kentucky stands out as having a stronger entrepreneurial environment postrecession than prerecession. A deeper dive into Kentucky's MSAs provides evidence that the urban areas of Kentucky experienced stronger recoveries than the rural areas, and that the recoveries of the Kentucky counties within the Louisville–Jefferson County MSA were slightly stronger than the recoveries of the Indiana counties, on average.

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**T**he economic recession of 2007–2009 and the subsequent recovery are often analyzed and discussed in a national context. Government officials and popular media focus most of their attention on the national unemployment rate, the national GDP, and other measures of national economic health, paying less attention to regional differences. For example, the Bureau of Labor Statistics produces a heavily cited monthly news release—titled “The Employment Situation”—that reports on national labor market indicators. Similar statistics at the state or regional level are less publicized.

While the recession had a nearly universal negative effect on states and localities around the country, considerable differences can be observed among states in the growth of employment and wages and in the number of people participating in the labor force. In this study, we examine state- and local-level data on labor force participation, private employment, private-sector wages, and business starts from the Bureau of Labor Statistics (BLS) and the US Census Bureau to determine the differences in recoveries for Kentucky and its seven bordering states: Illinois, Indiana, Missouri, Ohio, Tennessee, Virginia, and West Virginia.

On the local level, we compare private employment and private-sector wages across five of Kentucky’s metropolitan statistical areas (MSAs). Finally, we examine the counties that make up the Louisville–Jefferson County MSA in order to compare private employment and private-sector wages. The Louisville–Jefferson County MSA includes counties in two states, Kentucky and Indiana. This provides an opportunity to observe any differences in performance that could be a result of state-level factors.

According to the National Bureau of Economic Research, the recession began in December 2007 and ended in June 2009.<sup>1</sup> Most of the datasets used in this study begin in mid-2007 (September for most measures) to get a picture of the economy just before the recession. The study’s primary datasets end in 2015 (September 2015

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1. National Bureau of Economic Research, “US Business Cycle Expansions and Contractions,” accessed March 16, 2017, <http://www.nber.org/cycles.html>.

“Not even the BLS, with the closest eye on labor force trends, predicted the huge effect of the recession on labor force participation.”

for most measures), which provides a relatively up-to-date analysis of the economic recovery for each state and region.

## STATE LABOR FORCE RECOVERIES

The first measure we examine is each state’s labor force. The civilian labor force includes “all persons [16 years old or older] in the civilian noninstitutionalized population classified as either employed or unemployed,” where unemployed persons are counted only if they are actively looking for work.<sup>2</sup>

A labor force that is growing with or exceeding the population growth of the eligible labor force (people 16 years old and over) is generally viewed as a sign of confidence in the economy.<sup>3</sup> A stable or decreasing labor force may be the result of an increasing rate of retirement, out-of-state migration, or a higher rate of high school or college attendance. It may also be the result of people leaving the labor force because of uncertainty about their ability to find employment.

Figure 1 is a moving weighted average (MWA) of each state’s seasonally adjusted labor force from September 2007 to September 2015, along with that of the United States as a whole.<sup>4</sup> A moving weighted average smooths the data and makes it easier to see general trends; we therefore employ it throughout this study. The MWA was indexed to September 2007 in order to clearly demonstrate how each state’s labor force fared throughout the recession and the recovery. A measure above zero means that a state’s labor force was larger at that time than in 2007.

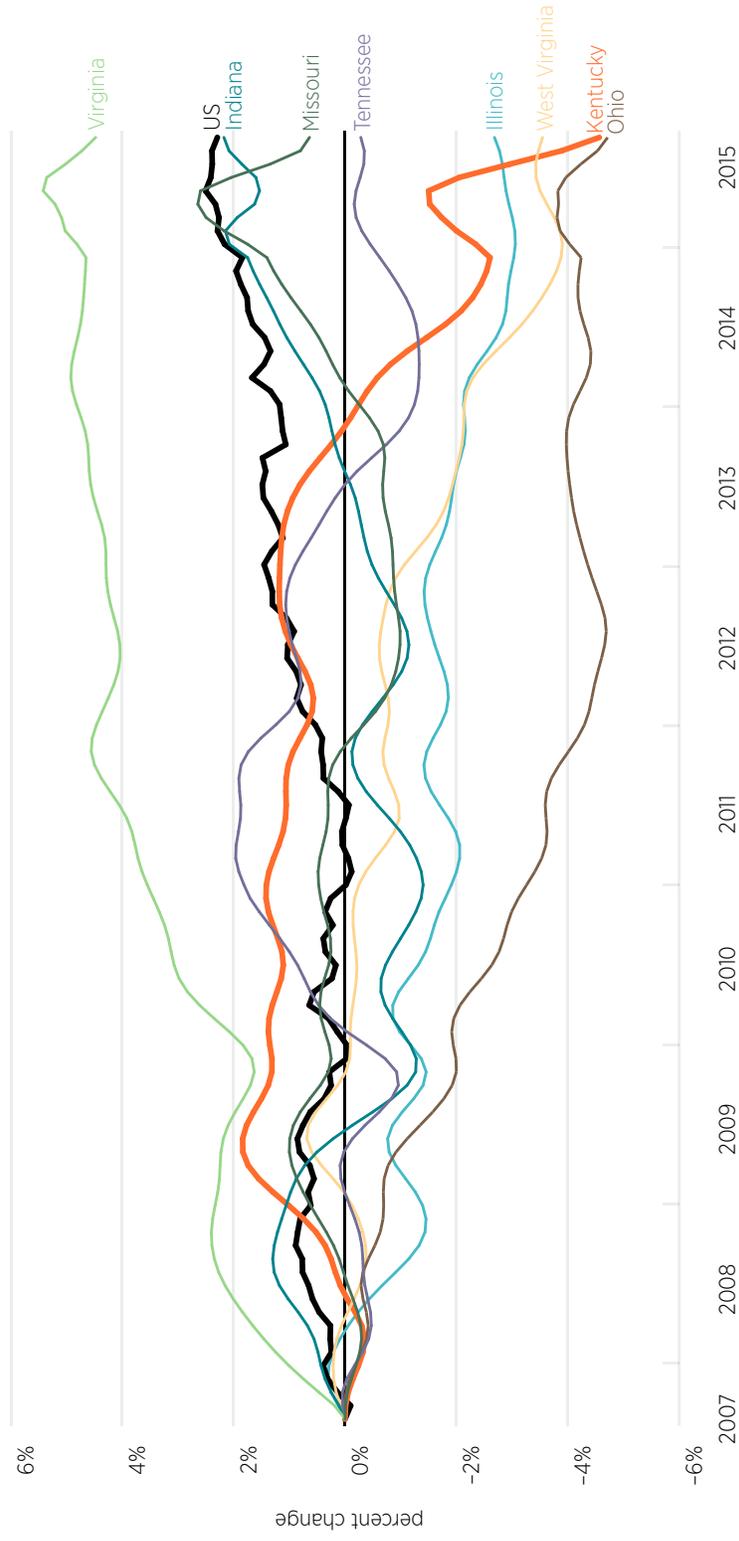
Virginia, Indiana, Missouri, and the United States as a whole all experienced growth in their labor forces over this time period, while Illinois, Ohio, West Virginia, Kentucky,

2. Bureau of Labor Statistics, “How the Government Measures Unemployment,” last modified October 8, 2015, [https://www.bls.gov/cps/cps\\_htgm.htm](https://www.bls.gov/cps/cps_htgm.htm).

3. For example, see Ben Casselman, “The Rising Unemployment Rate Is Good News,” *FiveThirtyEight*, April 1, 2016.

4. Given yearly data series  $(Y_n, Y_{n+1}, \dots, Y_k)$ , the indexed moving weighted average series is  $(\frac{Y_n}{Y_n}, \frac{2Y_{n+1} + Y_n}{3Y_n}, \frac{2Y_{n+2} + Y_{n+1}}{3Y_n}, \dots, \frac{2Y_k + Y_{k-1}}{3Y_n})$ .

FIGURE 1. LABOR FORCE GROWTH IN KENTUCKY AND ITS BORDER STATES, 2007-2015



Note: This chart displays a moving weighted average of each state's seasonally adjusted labor force, indexed to September 2007.

TABLE 1. STATE POPULATIONS, AGE 16 AND OVER, IN KENTUCKY AND ITS BORDER STATES, 2007 AND 2014

State	2007	2014	Population growth	Percent change
Illinois	9,758,656	10,061,875	303,219	3.1%
Indiana	4,845,110	5,131,665	286,555	5.9%
Kentucky	3,280,860	3,445,110	164,250	5.0%
Missouri	4,542,485	4,749,787	207,302	4.6%
Ohio	8,908,449	9,132,424	223,975	2.5%
Tennessee	4,773,950	5,178,185	404,235	8.5%
Virginia	5,872,564	6,520,436	647,872	11.0%
West Virginia	1,445,488	1,480,563	35,075	2.4%

Source: US Census Bureau, American Community Survey data on American FactFinder, accessed May 1, 2016.

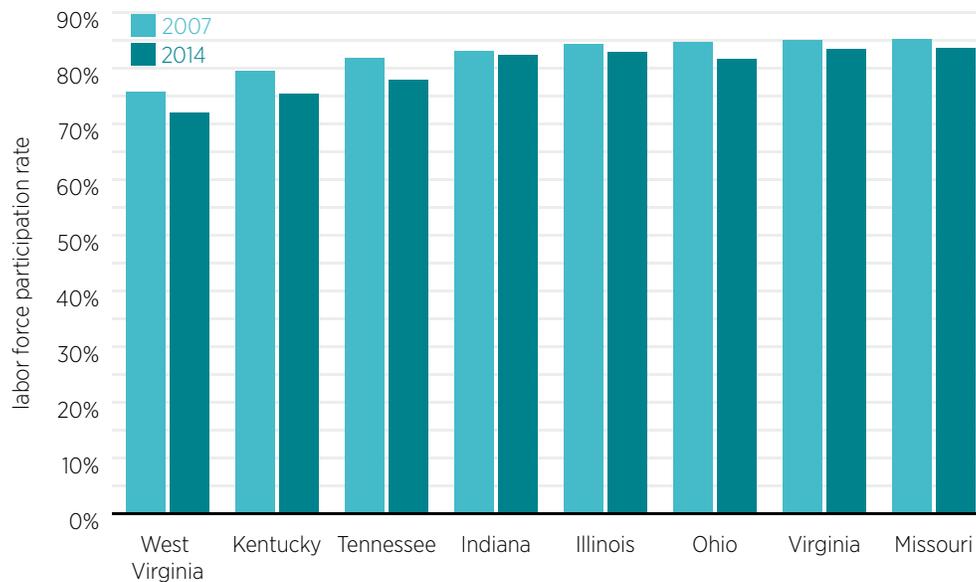
and Tennessee had people drop out of their labor forces. Kentucky and Tennessee are peculiar in that their labor forces did not start a noticeable decline until late 2012–early 2013, though Tennessee had mostly recovered by 2015.

Along with Kentucky, Ohio and West Virginia experienced a sharp decline in their labor forces from 2007 to 2015. Ohio stands out for experiencing a relatively sustained decline during the recession, while West Virginia followed the resilient trend of most other states in the sample before beginning a steep descent in late 2012. Seven of the eight states—all but Virginia—began to trail the United States by mid-2011, though Missouri and Indiana closely tracked the national statistics. Still, figure 1 highlights how the labor force recovery in the region was weak overall. By 2015, only three of the seven states—Virginia, Indiana, and Missouri—had a larger labor force than before the recession despite the fact that each state’s 16-and-over civilian population grew during this period, as shown in table 1.

Figure 2 provides evidence that many workers in these states are leaving the labor force for reasons other than school or retirement. The figure shows the labor force participation (LFP) rate for persons in their prime working years (25–54) in both 2007 and 2014. The data in figure 2 are available from American FactFinder using data from the American Community Survey. The labor force participation rate usually reported is the percentage of the population age 16 and over of a country or state that is employed or looking for work—in other words, the percentage of the population that is in the labor force. The prime-age LFP rate is the percentage of all 25–54-year-olds participating in the labor force.

The prime-age LFP rate provides an alternative measure of a state’s labor force that eliminates the very low LFP rates among the young due to schooling and the elderly due to retirement. Including only 25–54-year-olds means that prime-age labor force rates are typically higher than the general rates in each

FIGURE 2. LABOR FORCE PARTICIPATION RATE, AGES 25-54, 2007 AND 2014



Source: US Census Bureau, American Community Survey data on American FactFinder, 2007 one-year estimates, 2010-2014 five-year estimates, accessed May 1, 2016.

state. But as shown in figure 2, the labor force decline during the recession is still apparent. Kentucky, Tennessee, Ohio, and West Virginia’s prime-age LFP rates each declined by 3–4 percent. Indiana was the only state to lose less than 1 percent of its prime-age labor force. This is evidence that many of the workers in these states are unsure of their ability to find a job, or they have found unemployment benefits, disability payments, spouse or partner incomes, or charity to be a more attractive option and, as a result, gave up looking for employment.

The severe drop in the national LFP rate has been the subject of much analysis in recent years. The national prime-age LFP rate declined from 82.8 percent in September 2007 to 80.6 percent in September 2015. National overall participation rates were at or above 66 percent from 1988 to 2008, but the national rate has not exceeded 63 percent since March 2014. Shigeru Fujita of the Federal Reserve Bank of Philadelphia posits that much of the LFP rate drop since 2000 can be explained by an increasing rate of retirees and disabled adults.<sup>5</sup> However, according to Fujita, a substantial reason for the drop-off during the recession was “discouraged workers” who stopped looking for work. A group of researchers at the International

5. Shigeru Fujita, “On the Causes of Declines in the Labor Force Participation Rate,” Federal Reserve Bank of Philadelphia, revised February 6, 2014.

Monetary Fund attribute half of the LFP rate decline since the Great Recession to an aging workforce.<sup>6</sup> Cyclical factors are responsible for 30–40 percent more, according to the researchers. The remaining decline is due to other forces such as lower youth labor force participation and increased use of disability insurance.

In November 2007, BLS economist Mitra Toossi predicted a 2016 US labor force participation rate of 65.5 percent, nearly three points above the latest estimate, which is 62.8 percent as of April 2016.<sup>7</sup> Clearly, not even the BLS, with the closest eye on labor force trends, predicted the huge effect of the recession on labor force participation.

The decline in LFP rates for ages 25–54, as shown in figure 2, demonstrates that a significant portion of the decline in labor force participation is not due to baby boomers retiring; it is evidence that discouraged workers in their prime working years played a significant role in the labor force declines of these states.

## STATE PRIVATE EMPLOYMENT RECOVERIES

Next we analyze the private employment subcomponent of the labor force, that is, all persons who are working in a private establishment.<sup>8</sup> The state-level data come from the Quarterly Census of Employment and Wages (QCEW), which is the most comprehensive survey the BLS employs, as it reaches 97 percent of all wage and salary civilian employment in the country.<sup>9</sup>

Figure 3 shows private employment levels for each September from 2007 through 2015, indexed to September 2007. QCEW is best represented year-over-year because it is a snapshot in time of the economy.

By 2015, Kentucky, Tennessee, Virginia, Illinois, and Indiana had fully recovered to prerecession levels for private employment, while Missouri, Ohio, and West Virginia were still short of their prerecession levels. The private employment inflection point for Illinois was 2009, while all other states hit their nadir in 2010. All but West Virginia continued to experience gains in private employment through 2015. However, all of these states except Illinois trailed the US private employment recovery over this time period.

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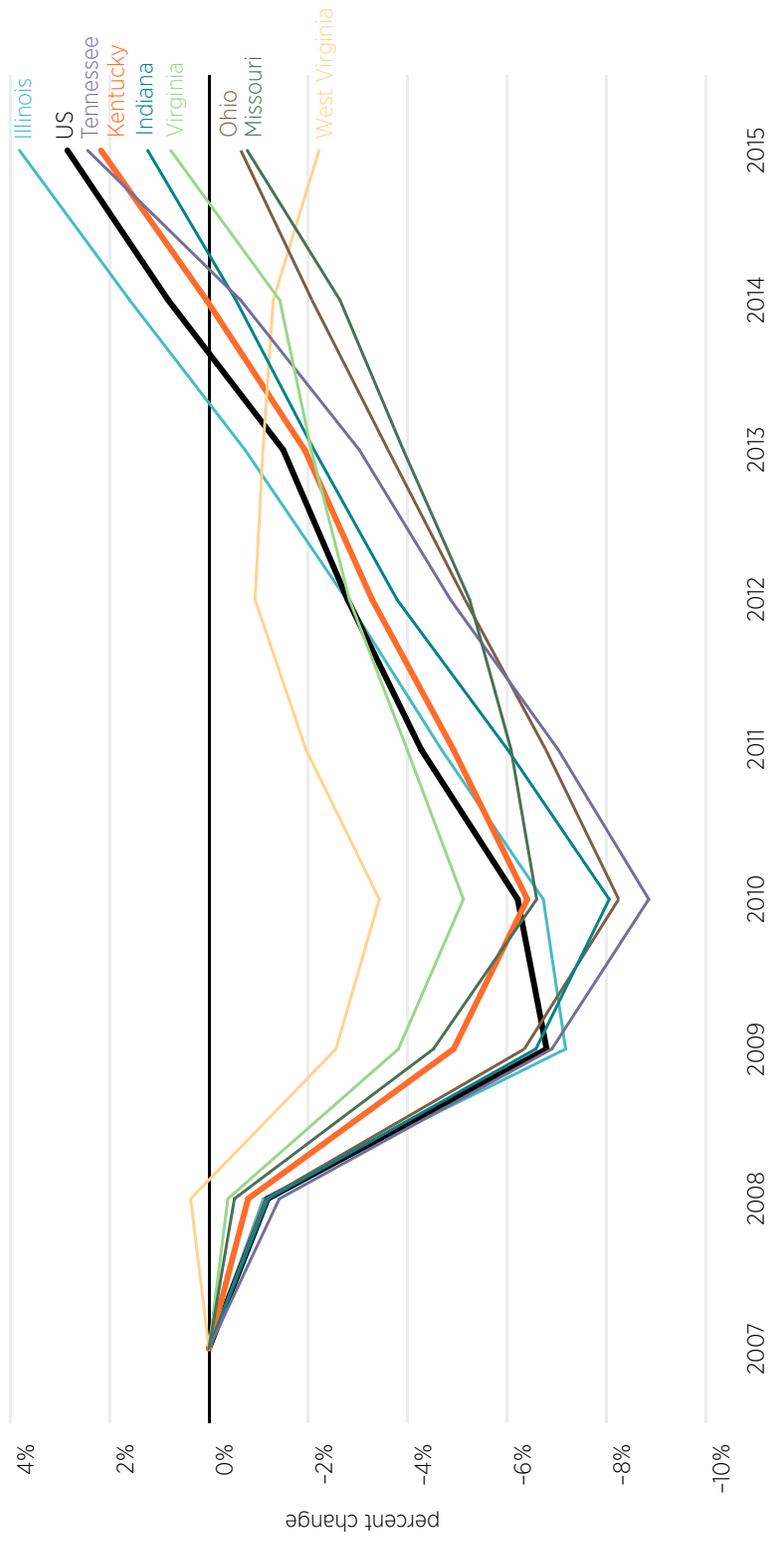
6. Ravi Balakrishnan et al., “Lost Workers,” *Finance and Development* 52, no. 3 (2015).

7. Mitra Toossi, “Labor Force Projections to 2016: More Workers in Their Golden Years,” *Monthly Labor Review*, November 2007.

8. This does not include government workers.

9. QCEW accounts for “place of employment,” meaning that each job is counted in the state or region where the employer is located. This is in contrast to “place of residence” employment, which counts where the employed person lives. Place of residence employment is counted by the BLS through the Current Population Survey.

FIGURE 3. PRIVATE EMPLOYMENT GROWTH IN KENTUCKY AND ITS BORDER STATES, 2007-2015



Note: Data points are September year-over-year measurements: September 2007, September 2008, etc.  
 Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

TABLE 2. COAL EMPLOYMENT IN KENTUCKY AND ITS BORDER STATES, 2007 AND 2014

State	2007	2014	Net jobs	Percent change
Illinois	3,946	4,218	272	7%
Indiana	2,968	3,810	842	28%
Kentucky	16,986	11,834	-5,152	-30%
Missouri	14	20	6	43%
Ohio	2,496	2,923	427	17%
Tennessee	566	222	-344	-61%
Virginia	4,763	3,627	-1,136	-24%
West Virginia	20,049	18,330	-1,719	-9%
Kentucky + border states total	51,788	44,984	-6,804	-13%
US total	81,278	74,931	-6,347	-8%
Percentage of US total	64%	60%		

Source: US Department of Labor, Mine Safety and Health Administration Form 7000-2, "Quarterly Mine Employment and Coal Production Report."

## COAL TROUBLE?

As of 2014, 60 percent of coal employees in America were employed in the eight sample states in this study. The number of coal industry employees by state in 2007 and 2014 is shown in table 2. West Virginia had the most in both years, and substantially more than the next state, Kentucky.<sup>10</sup>

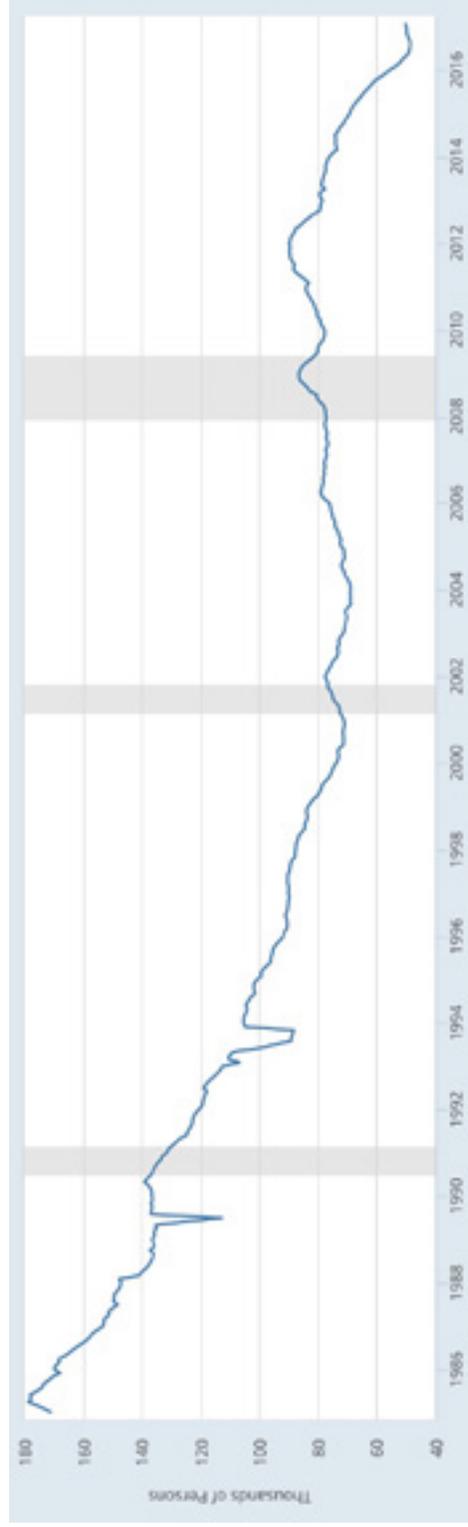
While coal employment makes up a small portion of each state's total employment, declines in the energy sector can have a large impact on a state's economy, as evidenced by fossil-fuel-rich North Dakota and Texas. Over the 2007–2014 period, mining and supporting activities have accounted for as much as 20 percent of West Virginia's private-sector GDP and as much as 5 percent of Kentucky's private-sector GDP, both of which exceeded the national average of 2–3 percent over the same period. As of 2015, however, mining as a share of private-sector GDP has declined to 16 percent in West Virginia and 2 percent in Kentucky.<sup>11</sup> Both of these states and Virginia also lost a substantial amount of coal employment: 30 percent in Kentucky, 9 percent in West Virginia, and 24 percent in Virginia.

As shown in figure 4, nationwide coal employment fell substantially between 1985 and 2000, then grew slightly between 2000 and 2011, but has been

10. Pennsylvania had the third most coal employees in 2014, with 7,938.

11. Bureau of Economic Analysis, Regional Economic Accounts, 2014 data, accessed March 2016, <http://www.bea.gov/regional/index.htm>.

FIGURE 4. NATIONWIDE COAL-MINING EMPLOYMENT, 1985-2016



Source: St. Louis Federal Reserve, "All Employees: Mining and Logging: Coal Mining," Federal Reserve Economic Data (FRED), last updated March 10, 2017.

declining again since 2012. The main threats to the coal industry during this decline have been the new availability of cheap natural gas and federal environmental regulations. Regulatory actions increased in 2007 when the Supreme Court ruled that the Clean Air Act applied to greenhouse gas emissions. This most recent downturn for coal is likely a notable reason for West Virginia's continuing economic struggles.

## BUSINESS STARTS AND ENTREPRENEURSHIP

The next measure of economic recovery that we look at is the rate of business startups in Kentucky and its border states as well as the United States as a whole since 2007. The data come from the Business Dynamics Statistics of the BLS, which measures the number of business starts between March of one year and March of the next year. For example, our first year measured, 2007, provides the number of business starts from March 2006 to March 2007.

Business starts are a commonly used proxy for the level of entrepreneurship in an area.<sup>12</sup> The rate of business starts is an important indicator of economic recovery because it reflects confidence in the economy. Figure 5 shows a moving weighted average of business starts for each state and the United States as a whole. All states in the sample and the United States followed a very similar pattern of declining startup rates during the recession followed by a moderate increase starting in 2010–2011.

As shown in figure 5, Missouri and Kentucky have had particularly strong recoveries in entrepreneurship according to this measure. In fact, they are the only two states that had significantly eclipsed their prerecession level of business starts as of 2015.<sup>13</sup> Though Kentucky and Missouri exhibited the strongest recoveries, Illinois and Virginia had the most business starts over this period, as shown in the last column in table 3.

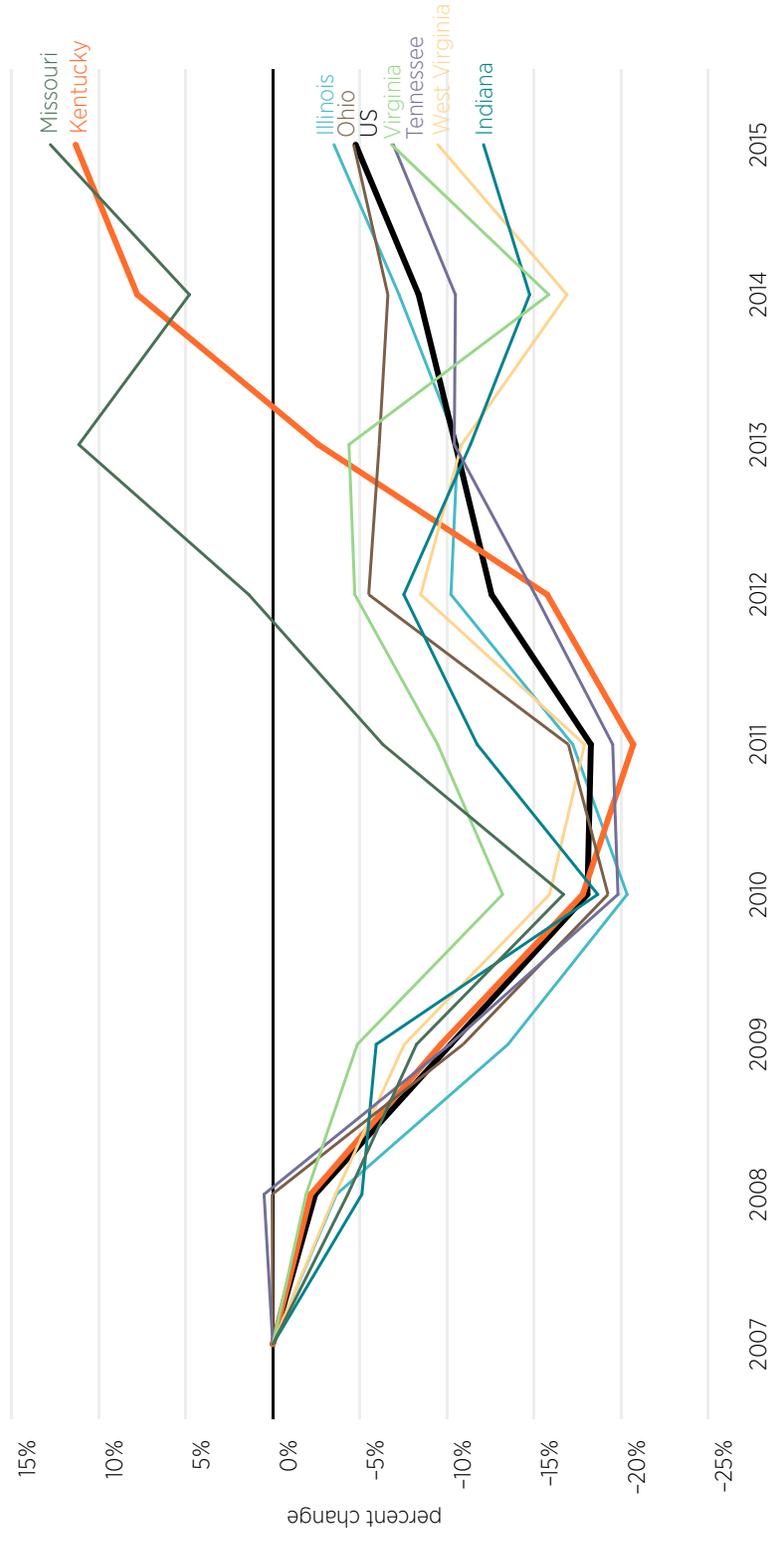
Entrepreneurs may leave employment to start a business or they may start one because they are unemployed and it is too costly to find suitable paid employment, perhaps because they would have to move. While both of these scenarios would increase business starts in the data, we think that the former is more likely

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12. Benjamin Powell and Rick Weber, "Economic Freedom and Entrepreneurship: A Panel Study of the United States," *American Journal of Entrepreneurship* 6, no. 1 (2013): 67.

13. Virginia's annual business starts in 2015 exceeded starts in 2007 by 0.5 percent, as shown in table 3, but this does not show up in figure 5 because of the use of a moving weighted average to smooth the data. We used the MWA because it accurately depicts the trends and is easier to read than the raw data.

FIGURE 5. ANNUAL BUSINESS STARTS IN KENTUCKY AND ITS BORDER STATES, 2007-2015



Note: This chart employs a moving weighted average. The data measure the number of business starts between March of the previous year and March of the specified year.  
 Source: US Census Bureau, Business Dynamics Statistics.

TABLE 3. ANNUAL BUSINESS STARTS IN KENTUCKY AND ITS BORDER STATES, 2007 AND 2015

States in order of percent change	2007	2015	Change	Percent change	9-year average
Missouri	12,221	14,608	2,387	19.5%	12,235
Kentucky	6,916	7,733	817	11.8%	6,565
Virginia	18,830	18,932	102	0.5%	17,553
United States	703,834	679,072	-24,762	-3.5%	636,289
Ohio	16,341	15,652	-689	-4.2%	15,044
Tennessee	11,860	11,297	-563	-4.7%	10,628
West Virginia	2,908	2,760	-148	-5.1%	2,610
Illinois	22,426	21,239	-1,187	-5.3%	19,510
Indiana	10,316	9,259	-1,057	-10.2%	9,277

Source: US Census Bureau, Business Dynamics Statistics.

to occur when the economy is healthy and is thus a better measure of a state’s entrepreneurial climate.

In an effort to distinguish whether a state’s entrepreneurial activity is due to entrepreneurs motivated by the potential of their idea or entrepreneurs trying to make ends meet, we examine another measure of entrepreneurship in the United States: the Kauffman Index of Startup Activity.

The Kauffman Index has traditionally focused on identifying the activity of individual entrepreneurs rather than of the firms that they create. However, the 2015 edition of the index incorporates a measure of startup firms, labeled “Startup Density,” as one of its components to better account for new business starts.<sup>14</sup> Startup density counts the number of firms created per 100,000 residents. Rather than using BLS statistics, the Kauffman Index uses data from the US Census version of the Current Population Survey to track new businesses. Earlier versions of the index are not comparable to 2014 and 2015, so table 4 only includes data from these later years. The states are listed by their 2015 rank, with a rank of 1 being the best.

In 2015, Illinois was ranked the best state in terms of startup activity out of the eight states studied (26th overall) and West Virginia was ranked the worst (46th overall). Missouri, Illinois, and Virginia were in the middle of the 50 states in terms of startup density in the 2015 index (fifth column), while Indiana, Tennessee, Ohio, Kentucky, and West Virginia all fell in the bottom

14. Arnobio Morelix et al., *The Kauffman Index: Startup Activity; State Trends*, 2015 ed. (Kansas City, MO: Ewing Marion Kauffman Foundation, 2015). Data in the 2015 Kauffman Index are for 2014.

TABLE 4. KAUFFMAN INDEX STARTUP ACTIVITY STATISTICS FOR KENTUCKY AND ITS BORDER STATES, 2014 AND 2015

States in order of 2015 rank	Index score	Startup activity overall rank, 2015	Startup activity overall rank, 2014	2015 startup density	2015 rate of new entrepreneurs	2015 opportunity share
Illinois	-1.14	26	35	126.4	0.28	86.4%
Missouri	-1.15	27	18	128.9	0.22	76.8%
Kentucky	-1.33	31	24	93.5	0.35	69.4%
Ohio	-1.56	37	36	89.8	0.21	89.2%
Virginia	-1.74	39	39	120.9	0.22	81.5%
Indiana	-2.61	44	48	96.0	0.23	75.2%
Tennessee	-2.94	45	47	99.3	0.24	70.0%
West Virginia	-3.06	46	38	81.4	0.20	77.6%

Source: Arnobio Morelix et al., *The Kauffman Index: Startup Activity; State Trends*, 2015 ed. (Kansas City, MO: Ewing Marion Kauffman Foundation, 2015). Data in the 2015 Kauffman Index are for 2014.

10 states in terms of startup density. All the states listed were below the US average of 130.6.

The main focus of the Kauffman Index has traditionally been tracking the entry of new entrepreneurs. For this measure, the index calculates the “Rate of New Entrepreneurs,” or the number of people who start a business per month per 100,000 residents. This 2015 statistic is provided in the sixth column of table 4 and is presented as a rate. For example, Kentucky’s rate of 0.35 means that the state had 350 new entrepreneurs per month per 100,000 residents in 2015. Again, the majority of states in our study performed poorly. All states in our study fell below the median rate of 290 new entrepreneurs per month (0.29), with the exception of Kentucky (0.35).

The last component of the Kauffman Index is the “Opportunity Share of New Entrepreneurs.” This measure is meant to tease out how many entrepreneurs start a business to make ends meet versus how many are entirely motivated by their idea. The index does this by calculating how many new business owners came out of unemployment to start a new business versus how many were already employed. A 2015 score of 75.2 percent for Indiana, for example, means that about three out of every four new entrepreneurs left employment to start a business while the remaining entrepreneur was previously unemployed.

The 2015 opportunity share (last column in table 4) varied greatly among the study’s eight states. Kentucky, which showed a significant gain in business starts, had the lowest opportunity share of the states listed—only about seven out of ten entrepreneurs in Kentucky left employment to start a business. This is evidence that many of Kentucky’s new businesses were started because of a

lack of attractive employment opportunities. Missouri, which also experienced a large gain in business starts according to figure 5, had an opportunity share that fell in the middle of the states examined; its opportunity share was nearly 8 percent higher than Kentucky's.

Ohio and Illinois had a high proportion of previously employed entrepreneurs, while Indiana and Tennessee had higher proportions of previously unemployed entrepreneurs. This is an interesting finding because Ohio and Illinois performed relatively poorly in private employment and labor force growth over the 2007–2015 period, while Indiana performed relatively well on both, and Tennessee performed well in private employment growth. These BLS trends, shown in figures 1 and 3, imply that there should be more entrepreneurs starting businesses out of necessity in Ohio and Illinois than in Indiana and Tennessee, but in fact the opposite is the case.

Of course other factors that are not accounted for here can affect the results. For example, the path to entrepreneurship for unemployed persons might be easier in Indiana and Tennessee than in Ohio and Illinois. This could be due to complicated regulations or business licensing that makes it harder for unemployed persons to start a business in Ohio or Illinois, or there could be government programs that subsidize entrepreneurship in Indiana, Tennessee, and Kentucky.

In terms of entrepreneurship, both measures examined here—the Business Dynamics Statistics and the Kauffman Index—are broadly consistent with each other. Kentucky and Missouri are relatively good performers in both measures, while the other states are struggling to recover to their prerecession levels of entrepreneurial activity. However, it does appear that a relatively large portion of both Kentucky and Missouri entrepreneurs are starting businesses because of a lack of other options.

One reason for relatively poor economic recoveries of the states in this region could be federal regulation. Federal regulation has been shown to reduce the investment that leads to innovation on a national level, resulting in large negative impacts on GDP and employment.<sup>15</sup> Additionally, regulation is often demanded by large or politically connected firms in order to limit competition, and such regulation harms both firm and job creation.<sup>16</sup>

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15. Bentley Coffey, Patrick A. McLaughlin, and Pietro Peretto, “The Cumulative Cost of Regulations” (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2016).

16. George J. Stigler, “The Theory of Economic Regulation,” *Bell Journal of Economics and Management Science* 2, no. 1 (1971).

TABLE 5. FEDERAL REGULATION AND STATE ENTERPRISE (FRASE) INDEX SCORES FOR KENTUCKY AND ITS BORDER STATES, 2007

State	FRASE score for 2007	Percent change		
		Labor force	Private employment	Business starts
Illinois	0.91	-2.7%	3.8%	-3.5%
Indiana	1.38	2.2%	1.2%	-12.1%
Kentucky	1.28	-4.6%	2.2%	11.3%
Missouri	0.98	0.6%	-0.8%	13.0%
Ohio	1.01	-4.7%	-0.6%	-4.6%
Tennessee	1.00	-0.3%	2.4%	-6.9%
Virginia	0.89	4.5%	0.8%	-6.8%
West Virginia	1.31	-3.6%	-2.2%	-9.5%
correlation	1.00	-0.23	-0.25	-0.14

Source: Patrick A. McLaughlin and Oliver Sherouse, *The Impact of Federal Regulation on the 50 States*, 2016 ed. (Arlington, VA: Mercatus Center at George Mason University, 2016).

Since federal regulation impacts states differently depending on their industry composition, the negative effects on the economy are not shared equally across states. The federal regulation and state enterprise (FRASE) index created by researchers at the Mercatus Center at George Mason University measures how federal regulation affects each state.<sup>17</sup> Table 5 shows the 2007 FRASE index score for Kentucky and its border states along with their percent changes in the economic measures analyzed in this study: labor force, private employment, and business starts.

The 2007 FRASE score is used to show the relative impact of federal regulation on each state before the recession. A score of 1 means that the state was affected by federal regulation as much as the nation as a whole. The higher the score, the more a state is affected by federal regulation. Of the states included in table 5, Indiana was affected the most by federal regulation and Virginia the least in 2007.

The small sample size of only eight states precludes sophisticated multi-variable regression analysis, but Pearson correlation coefficients between the FRASE score and each of the economic variables are in the last row of the table. The correlation between all three measures of economic health and the FRASE index are weakly negative, with the strongest relationship occurring between the FRASE index and private employment (-0.25).

17. Patrick A. McLaughlin and Oliver Sherouse, *The Impact of Federal Regulation on the 50 States*, 2016 ed. (Arlington, VA: Mercatus Center at George Mason University, 2016).

The small sample size and relatively simple analysis prevent us from reaching any strong conclusions about the relationships depicted. However, this evidence is consistent with what we know about regulation as a barrier to firm entry and its negative effect on economic growth.<sup>18</sup>

In an effort to lessen the negative effects of state-level regulation, Kentucky Governor Matt Bevin launched the Red Tape Reduction Initiative in July 2016 with the stated goal of reviewing “every regulation currently on the books.”<sup>19</sup> Governor Bevin plans to eliminate regulations deemed outdated or unnecessary, simplify regulations considered too complex, and weigh the effectiveness of many others. While this initiative will not affect the state’s FRASE score, which measures the impact of federal regulation, it can reduce the state’s overall regulatory burden and make Kentucky a less costly place in which to start and run a business, which should strengthen the state’s economy and labor market.

## PRIVATE EMPLOYMENT RECOVERIES IN KENTUCKY’S METROPOLITAN AREAS

The analysis now zooms in on the state of Kentucky. The Census Bureau and the BLS collect data for several metropolitan statistical areas in Kentucky. MSAs are defined by the Office of Management and Budget as having at least one urbanized area of 50,000 or more residents along with adjacent areas that share commuting patterns, together creating a common labor market.<sup>20</sup> In other words, MSAs consist of several political jurisdictions that together form one local economy.

Figure 6 depicts the five MSAs that we analyze in this section, chosen because they are located primarily or wholly within Kentucky: Louisville–Jefferson County, Lexington–Fayette, Bowling Green, Elizabethtown–Fort Knox, and Owensboro.<sup>21</sup>

Private employment recovery in Kentucky’s MSAs is examined in the same manner statewide employment was, using year-over-year QCEW counts for each September from 2007 to 2015. Figure 7 is a moving weighted average of September employment levels during this time period.

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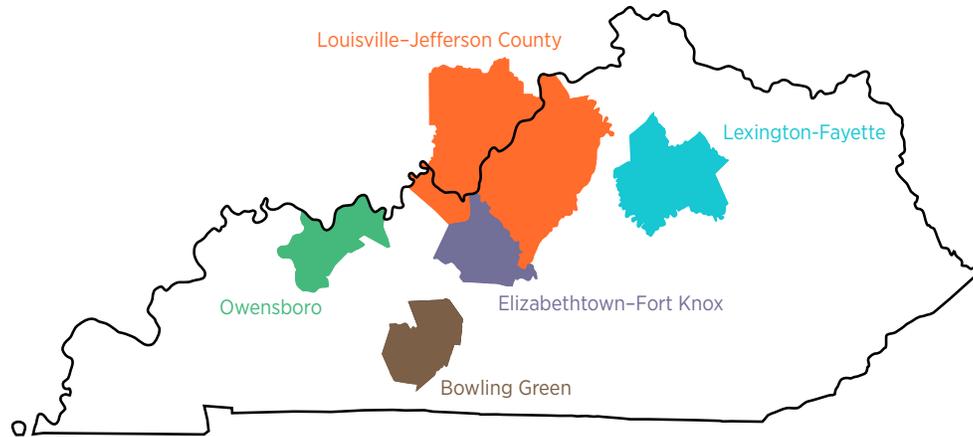
18. Leora Klapper, Luc Laeven, and Raghuram Rajan, “Entry Regulation as a Barrier to Entrepreneurship,” *Journal of Financial Economics* 82, no. 3 (2006).

19. Kentucky Governor Matt Bevin, Red Tape Reduction Initiative home page, last updated March 14, 2017, <http://redtapereduction.com/Default.aspx>.

20. Office of Management and Budget, Executive Office of the President, “Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas, and Guidance on Uses of These Areas” (OMB Bulletin No. 13-01, February 28, 2013).

21. A portion of the Louisville–Jefferson County MSA is located in Indiana.

FIGURE 6. FIVE OF THE METROPOLITAN STATISTICAL AREAS IN KENTUCKY



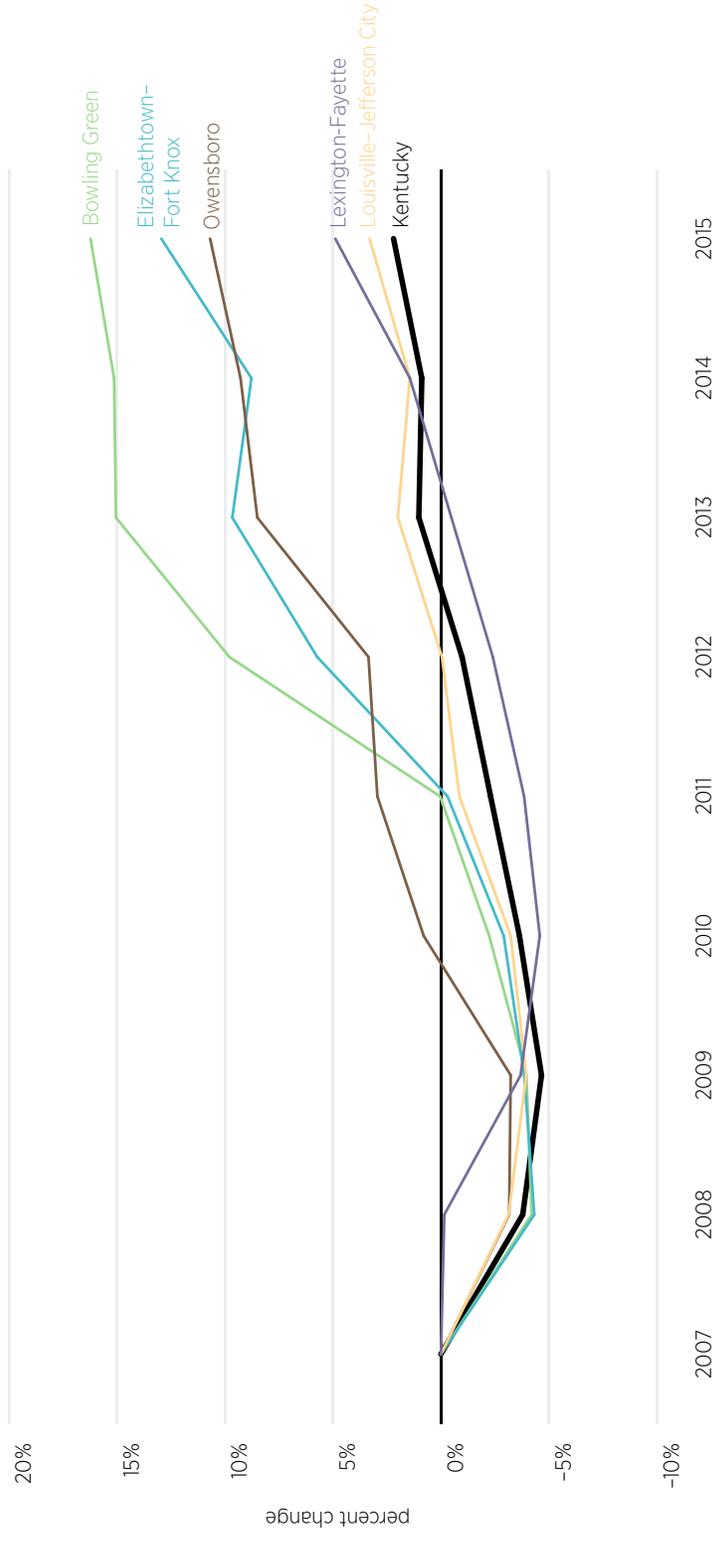
Source: Both maps are from d-maps, accessed March 23, 2017. The Kentucky map is available at [http://d-maps.com/carte.php?num\\_car=20495&lang=en](http://d-maps.com/carte.php?num_car=20495&lang=en); the Indiana counties are from the map available at [http://d-maps.com/carte.php?num\\_car=6989&lang=en](http://d-maps.com/carte.php?num_car=6989&lang=en).

Interestingly, Kentucky’s three smaller MSAs—Bowling Green, Elizabethtown–Fort Knox, and Owensboro—had much better private employment growth after the recession than Louisville–Jefferson County, the capital area of Lexington-Fayette, and Kentucky as a whole. The divide in growth rates is somewhat explained by the large differences in population between the smaller and larger MSAs. Louisville–Jefferson County (1,278,413) and Lexington-Fayette (500,535) are both many times bigger than the smaller three, the biggest of which is Bowling Green (168,436).<sup>22</sup> This means that a single large employer that opens in one of Kentucky’s smaller MSAs will have a larger statistical impact on private employment growth than if the firm locates in either of the two larger MSAs.

That being said, the growth rates of over 10 percent in the smaller MSAs warrant a closer look. Industry-specific information from the St. Louis Federal Reserve and the BLS provides insight into the relative success of Bowling Green, Elizabethtown–Fort Knox, and Owensboro.

22. Population according to 2015 estimates from the US Census Bureau.

FIGURE 7. PRIVATE EMPLOYMENT GROWTH IN KENTUCKY AND FIVE OF ITS METROPOLITAN STATISTICAL AREAS, 2007-2015



Note: Employment numbers are a moving weighted average of September employment data.  
 Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Bowling Green’s economy is especially dependent on the automotive industry, tourism, and higher education.<sup>23</sup> Chevrolet chose its plant in Bowling Green to be the only manufacturer of the popular Corvette sports car. Although the manufacturing sector in Bowling Green suffered during the recession, General Motors invested heavily in Bowling Green during the recovery, which created many new jobs. Bowling Green is also home to Western Kentucky University, which benefited the local economy by increasing its total employment during the recession: from 2010 to 2014, total employment at the university grew by 2.4 percent.<sup>24</sup>

A manufacturing resurgence in the Elizabethtown–Fort Knox region has helped it recover since the recession. The region benefited from 28 percent employment growth from September 2007 to September 2015 in each of its three largest sectors: manufacturing, professional and business services, and leisure and hospitality.<sup>25</sup>

The economy of Owensboro, Kentucky’s smallest MSA, has been driven by growth in business services, financial services, manufacturing, and health care.<sup>26</sup> U.S. Bank’s national mortgage servicing center is located in Owensboro, and it employs a significant portion of the workers in the financial services sector. Owensboro’s newest hospital, Owensboro Medical Health System, opened in 2013 and provided an additional employment boost.

The data also suggest that rural areas in Kentucky are recovering more slowly than Kentucky’s metropolitan areas and therefore are dragging down overall private employment in the state. As shown in figure 7, Kentucky’s private employment growth was less than each of its MSAs’, which

“The data . . . suggest that rural areas in Kentucky are recovering more slowly than Kentucky’s metropolitan areas and therefore are dragging down overall private employment in the state.”

23. Georgette Fernandez Laris and Charles S. Gascon, “Bowling Green, Ky.: Cars, College and Caves,” Metro Profile, Federal Reserve Bank of St. Louis, July 2015.

24. Western Kentucky University, *Fact Book 2015*, 2015, 60.

25. According to Supersector QCEW private employment data for Elizabethtown–Fort Knox MSA from the BLS, accessed March 2016.

26. Maria S. Arias and Charles S. Gascon, “Metro Profile: As Owensboro, Ky. Wraps Up Wave of Development, Hiring Slows Down,” Federal Reserve Bank of St. Louis, July 2014.

implies that the rural areas are either growing more slowly or shrinking. Declining employment in rural areas is part of a larger national trend, and it has drawn the attention of the US Department of Agriculture<sup>27</sup> and the president’s Council of Economic Advisors.<sup>28</sup> Lower employment growth in Kentucky’s rural areas may be another result of the decline of the coal industry. The majority of Kentucky’s coal industry lies in the eastern part of the state, which is heavily rural.

## PRIVATE-SECTOR WAGE GROWTH IN KENTUCKY’S METROPOLITAN AREAS

The BLS’s Quarterly Census of Employment Wages features an average weekly wage component that measures take-home pay, including bonuses and other supplementary pay. Average weekly wages are reported by the QCEW on a quarterly basis. For this study, private-sector average weekly wage data for Kentucky’s MSAs were collected for each year’s third quarter (July–September) from 2007 to 2015 and adjusted to 2009 dollars.<sup>29</sup> Figure 8 shows the ratio of each MSA’s average weekly wage indexed to 2007 as well as the wage ratio for Kentucky as a whole.

Figure 8 shows that Bowling Green and Louisville–Jefferson County were the only MSAs negatively affected by the recession in terms of wage growth, but the effect was quite small for Louisville–Jefferson County. Wages in all the MSAs exhibited an increase from 2009 to 2011 before declining from the 2011 peak until 2013. From 2013 to 2015, wages recovered in each of the MSAs, with Lexington exhibiting the weakest recovery and Owensboro the strongest.

Owensboro experienced much higher wage growth after 2012 than the rest of the metropolitan areas and Kentucky as a whole, but all the MSAs had a higher real wage in 2015 than before the recession in 2007. In a reversal of the private employment situation, metropolitan area wage growth trails the Kentucky average for most of the period studied. By 2015, only Owensboro had exceeded the state’s wage growth.

One of the reasons for the lower wage growth in the MSAs relative to Kentucky as a whole can be tied to what was observed previously in private

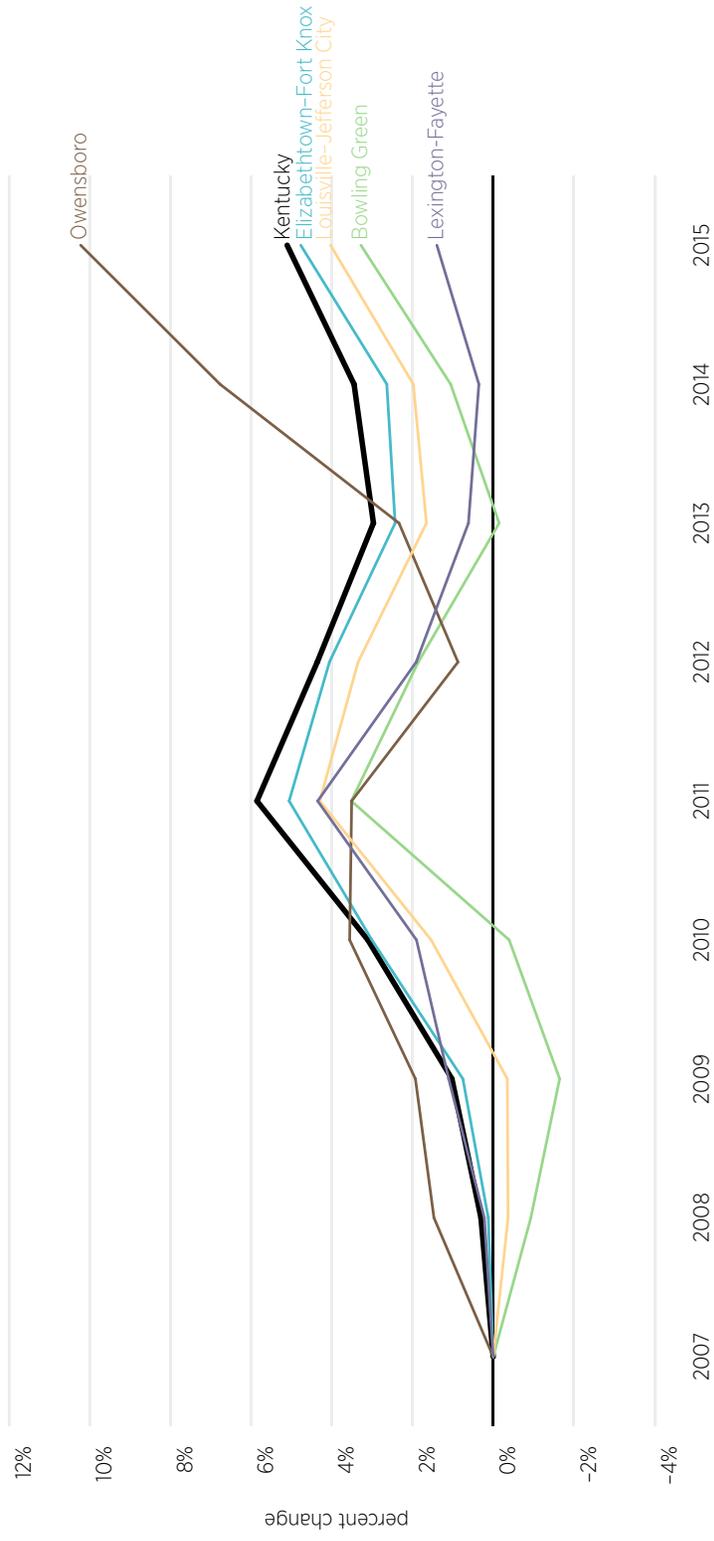
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27. “Rural America at a Glance: 2014 Edition” (Economic Brief No. 26, Economic Research Service, Department of Agriculture, November 2014).

28. Council of Economic Advisers, Office of the President, “The Current State of Rural America,” in *Strengthening the Rural Economy*, 2010.

29. QCEW data for 2015 are preliminary and therefore subject to future revisions. Adjustment to 2009 dollars employs the GDP chained price index.

FIGURE 8. AVERAGE REAL WEEKLY WAGE GROWTH IN KENTUCKY AND FIVE OF ITS METROPOLITAN STATISTICAL AREAS



Note: A moving weighted average was employed to smooth the data.  
 Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages, third quarter data for each year.

TABLE 6. NET MIGRATION IN FIVE OF KENTUCKY'S METROPOLITAN STATISTICAL AREAS (MSAs), 2009–2013

MSA	MSA migration	Principal city and its county	County migration
Louisville–Jefferson County	–2,314	Louisville (Jefferson County)	338
Lexington–Fayette	6,558	Lexington (Fayette County)	5,054
Bowling Green	5,515	Bowling Green (Warren County)	5,139
Elizabethtown–Fort Knox	2,177	Elizabethtown (Hardin County)	1,145
Owensboro	–1,113	Owensboro (Davies County)	–804
Total	10,823	Total	10,872

Source: US Census Bureau, Census Flows Mapper, 2009–2013 data by county, <https://flowsmapper.geo.census.gov/map.html>.

employment (figure 7). Increases in labor supply will dampen wage increases that would normally occur because of increases in labor demand. Figure 7 shows that private employment growth in Kentucky's MSAs is outpacing growth in the state overall, which means MSA employment is growing faster than rural employment. Intrastate and interstate migration from rural to urban areas may be a contributing factor in the slower wage growth of the MSAs relative to the state. County flows data from the Census Bureau for the period shortly after the recession (2009–2013) show that the counties containing the principal cities of the MSAs and the MSAs as a whole experienced net migration of more than 10,000 people (see table 6).

Lexington, Bowling Green, and Elizabethtown experienced in-migration and had slower wage growth than the state. Owensboro and Louisville experienced out-migration at the MSA level, but only Owensboro's wages grew more rapidly than Kentucky's as a whole. A detailed analysis of the labor force characteristics of the migrants is beyond the scope of this study, but this preliminary evidence is largely consistent with the story that in-migration dampened wage growth.

## COUNTY-LEVEL PRIVATE EMPLOYMENT AND WAGES IN THE LOUISVILLE–JEFFERSON COUNTY METROPOLITAN STATISTICAL AREA

The last analysis focuses on Kentucky's largest metropolitan area, the Louisville–Jefferson County MSA. Boasting a population of approximately 1.28 million, the Louisville–Jefferson County region is home to large employers such as Humana, Papa John's Pizza, Yum Brands, UPS Airlines, and a major Ford Motor

TABLE 7. PRIVATE EMPLOYMENT BY COUNTY IN LOUISVILLE–JEFFERSON COUNTY METROPOLITAN STATISTICAL AREA, 2007 AND 2015

State	County	Sept. 2007	Sept. 2015	Net job gain/loss	Percent change	2015 population
Kentucky	Bullitt	12,731	19,959	7,228	57%	78,702
	Henry	2,492	1,843	-649	-26%	15,620
	Jefferson	390,386	407,212	16,826	4%	763,623
	Oldham	9,543	12,244	2,701	28%	64,875
	Shelby	11,993	13,352	1,359	11%	45,632
	Spencer	1,118	1,281	163	15%	17,894
	Trimble	1,016	640	-376	-37%	8,769
Indiana	Clark	40,405	46,943	6,538	16%	115,371
	Floyd	24,085	23,370	-715	-3%	76,778
	Harrison	9,718	8,025	-1,693	-17%	39,578
	Scott	5,828	6,396	568	10%	23,744
	Washington	4,639	4,700	61	1%	27,827

Sources: Employment data from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages; county population data from the US Census Bureau, "County Population Totals Datasets: 2010–2016," accessed March 2016, <https://www.census.gov/data/datasets/2016/demo/popest/counties-total.html>.

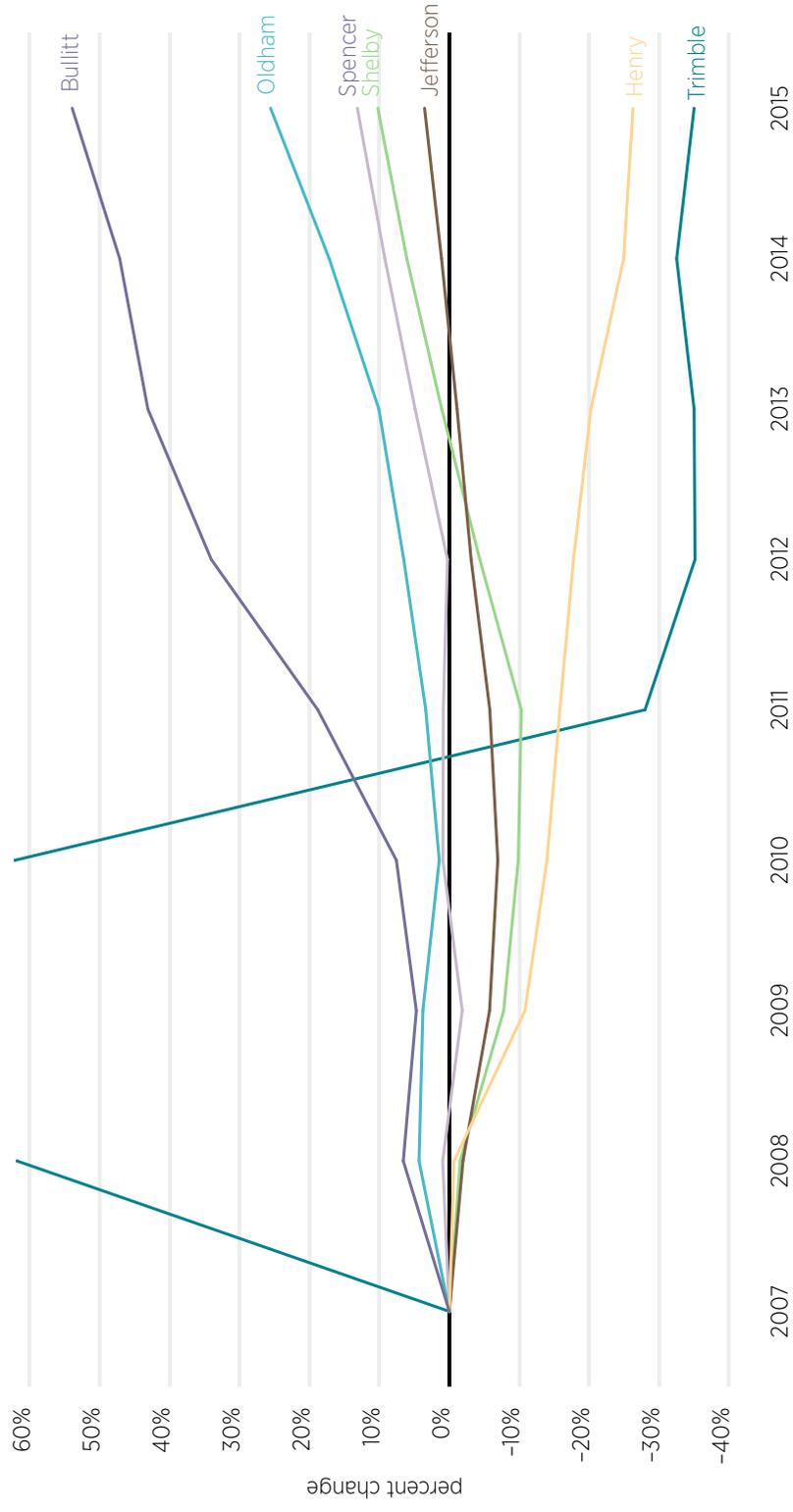
Company assembly plant. Its largest sectors based on private employment are trade, transportation, and utilities; healthcare; manufacturing; and professional and business services.

The Louisville–Jefferson County MSA crosses state borders into Indiana, which holds about a fifth of the area’s population. For this analysis, private employment and average weekly wages are compared across the seven Kentucky counties and five Indiana counties that make up the MSA.

Table 7 shows each county’s net private employment gain or loss and the percent change, as well as each county’s size according to July 2015 US Census population estimates. Jefferson County, Kentucky, is the most populous county and contains 60 percent of the MSA’s population.

Figure 9 shows MWAs of private employment levels for each Kentucky county in the Louisville–Jefferson County MSA from September 2007 through September 2015, indexed to 2007. Figure 10 shows the same information for the Indiana counties in the Louisville–Jefferson County MSA. It is important to note that QCEW reports “place of work” employment, not “place of residence” employment. Applied at the county level, place of work data count the job in the county where the business is located, not the county where the employee lives. Analysis on commuting trends is beyond the scope of this study, but readers

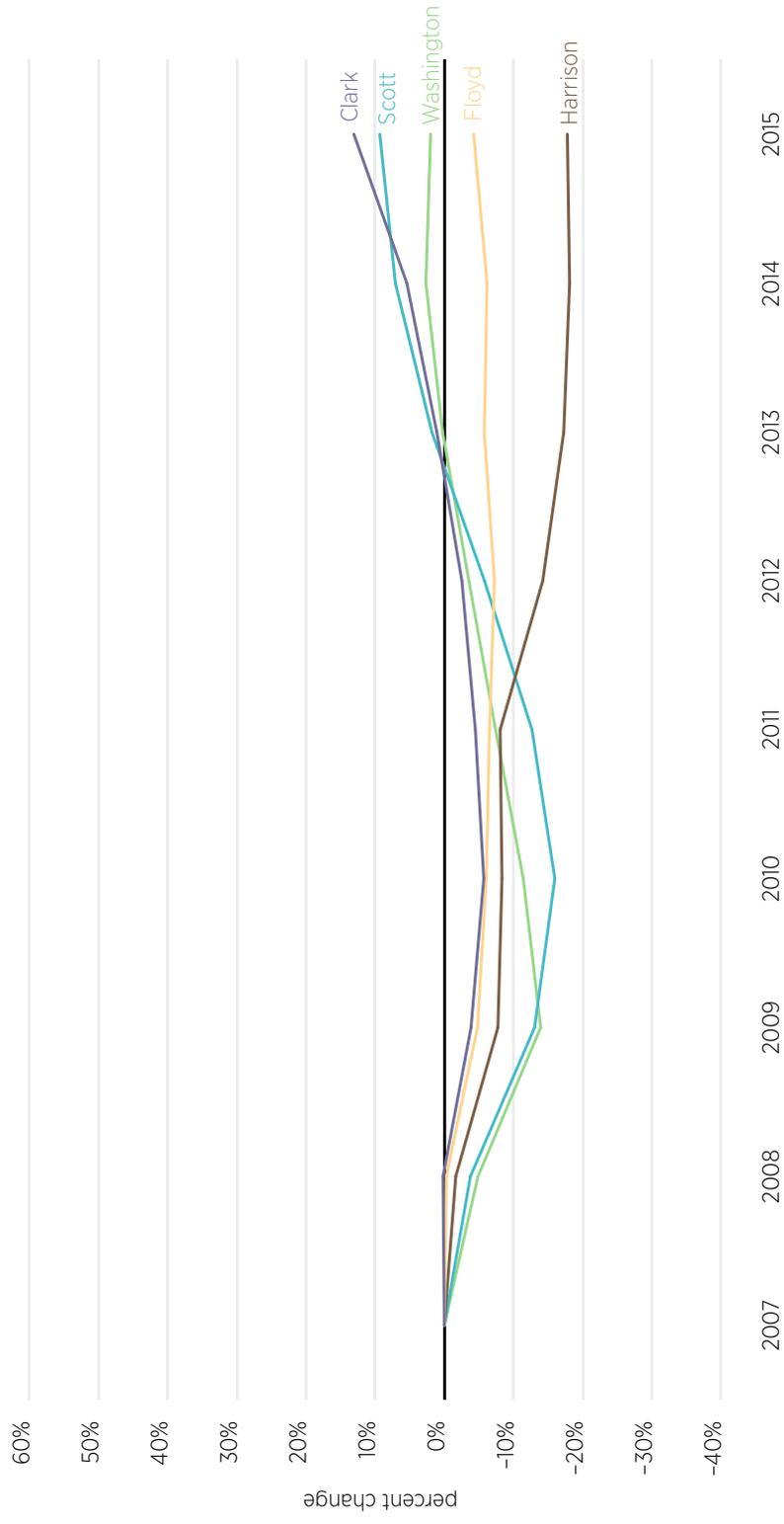
FIGURE 9. PRIVATE EMPLOYMENT GROWTH FOR KENTUCKY COUNTIES IN LOUISVILLE-JEFFERSON COUNTY METROPOLITAN STATISTICAL AREA, 2007-2015



Note: We restrict the vertical axis to 60% in order to facilitate comparisons between the Kentucky and Indiana county figures.

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

FIGURE 10. PRIVATE EMPLOYMENT GROWTH FOR INDIANA COUNTIES IN LOUISVILLE-JEFFERSON COUNTY METROPOLITAN STATISTICAL AREA, 2007-2015



Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

should be aware that some counties may be residential hubs and others business hubs.

The first notable feature of Kentucky counties in figure 9 is the explosion of employment in Trimble County until 2009, followed by a drop thereafter; employment grew by 167 percent from 2007 to 2009. This increase is due to the construction of a coal-fired power plant between 2006 and 2010. At peak construction, around 3,000 employees worked on the power plant, a number that is three times the size of the county's entire employment in 2007.<sup>30</sup> The plant was completed in 2011 and, as a result, many construction jobs left the county.

Private employment declined in four of the seven counties during the recession—Henry, Jefferson, Shelby, and Spencer—but had recovered by 2015 in all but Henry County. As noted earlier, Trimble County had a large initial spike in employment, but by 2015, it and Henry County had the most severe drops in private employment. Trimble and Henry are also the two smallest counties in the MSA by population. Two of the midsize counties, Bullitt and Oldham, had relatively high growth over the period.

All the counties on the Indiana side experienced a drop in employment during the recession (figure 10). Private employment started to grow in Clark, Scott, and Washington counties by 2010 and eventually eclipsed its prerecession levels in those counties. Harrison and Floyd counties, on the other hand, have yet to recover, with Harrison experiencing an especially large drop, similar to those of Henry and Trimble counties in Kentucky. On average, the employment changes in the Indiana counties were smaller than the changes in the Kentucky counties.

Figure 11 shows average weekly wage growth for Kentucky counties in the Louisville–Jefferson County MSA for each third quarter (July–September) from 2007 through 2015, adjusted for inflation.<sup>31</sup> In Kentucky, real average weekly wages increased by 5 percent or more in Spencer, Oldham, Henry, and Jefferson counties. Wages were flat in Shelby and Bullitt counties and declined sharply in Trimble after an initial large increase (of 49 percent), likely because of the completed construction of the aforementioned power plant and the subsequent loss of the relatively high-paying construction jobs.

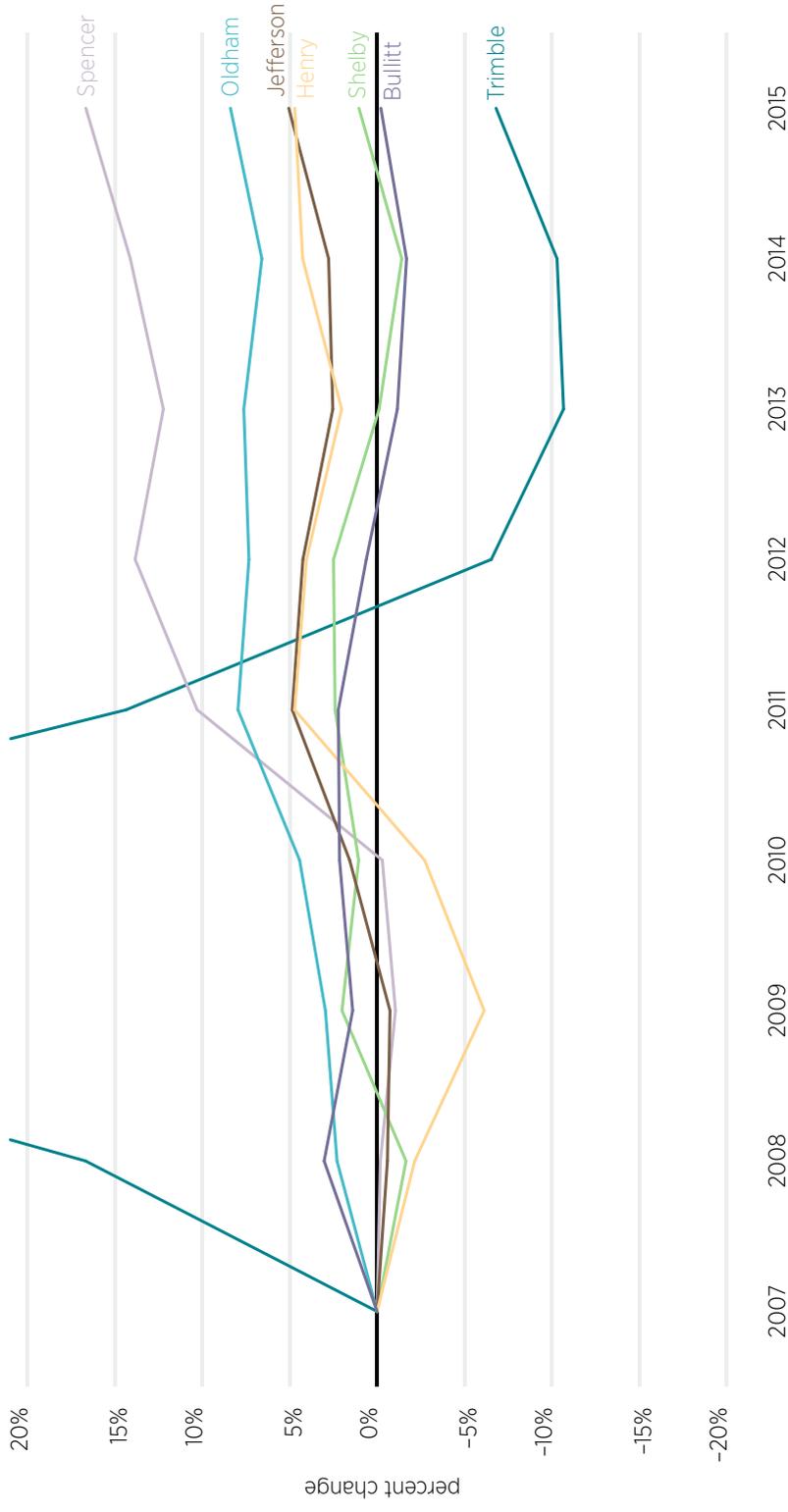
As seen in figure 12, wage growth in the Indiana counties was smaller on average than in the Kentucky counties. Three of the five counties—Harrison, Scott, and Washington—experienced real wage growth from 2007 to 2015, but

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30. Brian Wheeler, "Visiting LG&E's Newest Power Plant," *Power Engineering*, November 1, 2012.

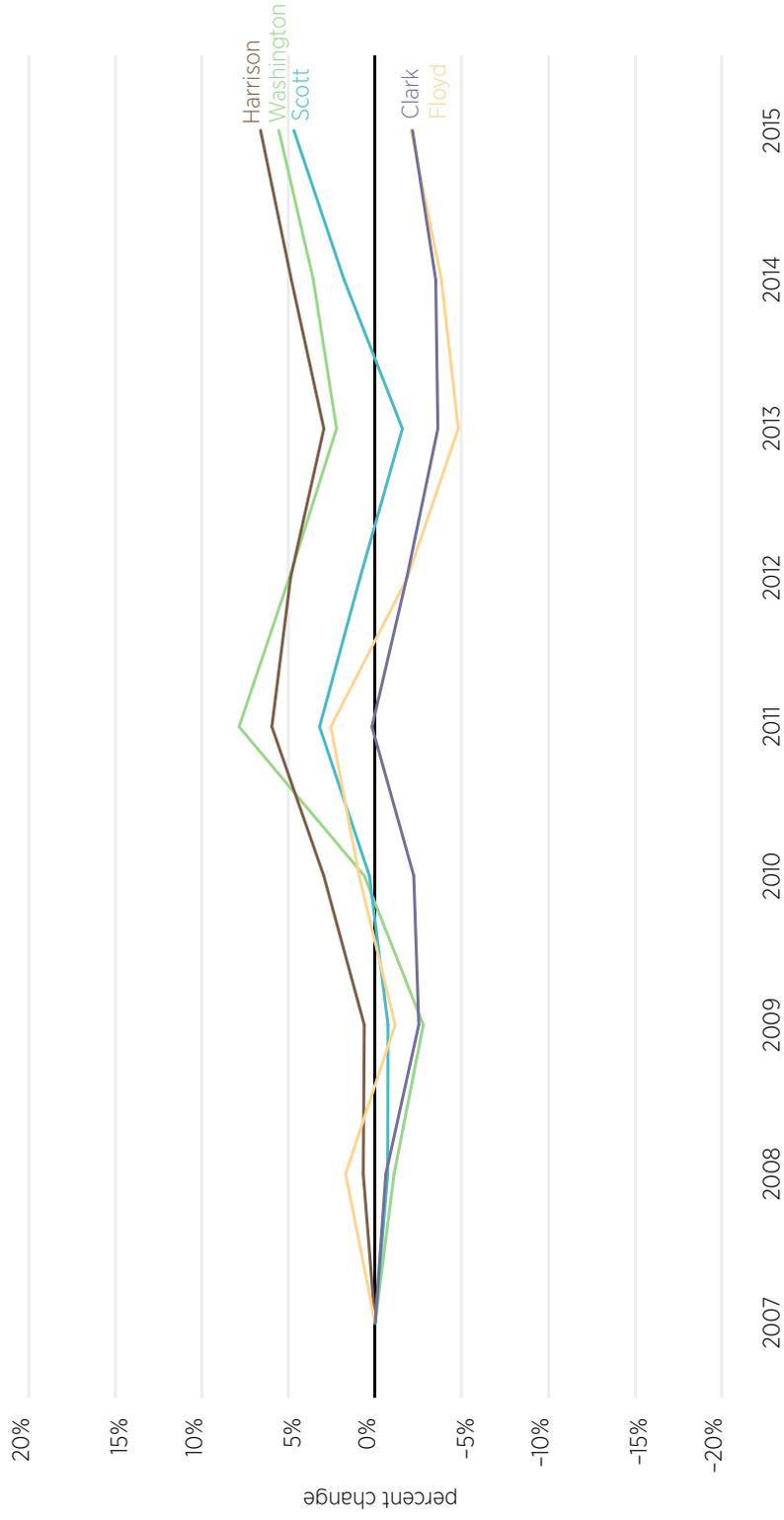
31. Wages were adjusted for inflation using the GDP chained price index from the Office of Management and Budget.

FIGURE 11. REAL WAGE GROWTH FOR KENTUCKY COUNTIES IN LOUISVILLE-JEFFERSON COUNTY METROPOLITAN STATISTICAL AREA, 2007-2015



Note: We restrict the vertical axis to 20% in order to facilitate comparisons between the Kentucky and Indiana county figures.  
 Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

FIGURE 12. REAL WAGE GROWTH FOR INDIANA COUNTIES IN LOUISVILLE-JEFFERSON COUNTY METROPOLITAN STATISTICAL AREA, 2007-2015



Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

growth did not exceed 7 percent in any of the counties. As shown previously, Floyd County's private employment had yet to recover by 2015 and the lingering effects of the recession show up in its wage data as well. Clark County's wages were also still below its prerecession level, but unlike Floyd County, its relatively large gain in employment since 2007 implies that perhaps both labor supply and labor demand increased by similar amounts, which prevented wages from growing.

## CONCLUSION

The recovery from the Great Recession in the United States has not been equal across states and regions. This study compares key labor market indicators across Kentucky and its bordering states and across Kentucky's metropolitan statistical areas during the Great Recession and the subsequent recovery.

First, the indicators of private employment and labor force, as well as signals of entrepreneurship such as business starts, are compared on a statewide basis for Kentucky and its seven bordering states: Illinois, Indiana, Missouri, Ohio, Tennessee, Virginia, and West Virginia. Private employment trends show where jobs are being created and where they are not; labor force trends are an indicator of how much confidence residents have in their state's economy. Measures of entrepreneurship, in this case business starts and measures from the Kauffman Index, are yet another vote of confidence or no confidence in a state's private economy.

As shown in figures 1 and 3, Indiana and Virginia were the only states to have recovered to their prerecession levels of private employment and labor force size by September 2015, while Illinois, Ohio, and West Virginia had not yet recovered in either measure. Virginia had the highest growth in its labor force (4.4 percent) while Kentucky, West Virginia, and Ohio each lost more than 3.5 percent of their labor forces from September 2007 to September 2015. Illinois had the strongest private employment recovery, and West Virginia was the biggest private employment loser.

Yearly business starts from 2007 to 2015 provided a proxy for the level of entrepreneurship in each state. Only Missouri and Kentucky had substantially more business starts postrecession than prerecession. Delving further into entrepreneurship, results from the Kauffman Foundation's 2015 Index of Startup Activity<sup>32</sup> were summarized for the eight states included in this study.

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32. Morelix et al., *Kauffman Index*. Results are for 2014.

While most of the states were low performers, Illinois and Missouri placed in the top half of all US states for startup density.<sup>33</sup> Kentucky and Missouri also stood out for having relatively high marks in the index’s “Rate of New Entrepreneurs” measure.<sup>34</sup> The index’s measure of “Opportunity Share of New Entrepreneurs” showed that previously unemployed entrepreneurs were most prevalent in Indiana and Tennessee, while Illinois and Ohio had a relatively larger share of entrepreneurs who were previously employed.

The second purpose of the study was to compare recovery trends in private employment and average weekly wages across five of Kentucky’s metropolitan statistical areas. All the MSAs exceeded their prerecession employment levels by September 2015. The three smaller MSAs—Bowling Green, Elizabethtown–Fort Knox, and Owensboro—had private job growth of over 10 percent, far outpacing Louisville–Jefferson County and Lexington-Fayette.

Average weekly wages were higher in 2015 than in 2007 in all Kentucky’s MSAs, though wage growth only exceeded that of the state as a whole in the Owensboro MSA. One possible reason for this is that workers are migrating to Kentucky’s urban areas in order to take advantage of the better labor markets.

Last, the study measured private employment growth and average weekly wage growth across the twelve counties that make up Kentucky’s largest MSA, Louisville–Jefferson County. Seven counties are located in Kentucky and five are in Indiana, providing an opportunity to observe any across-state differences in our two measures. Eight counties in this MSA experienced private-sector employment growth and four counties lost jobs. As for wages, seven of the twelve counties recovered by 2015 and had higher wages than in 2007. The counties in Kentucky experienced higher private employment and wage growth on average than those in Indiana.

Being aware of interstate and intrastate economic variation can help policymakers and government officials at all levels of government make better decisions. We think that this paper is a useful contribution toward that end.

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33. Ibid. Startup firms per 100,000 residents.

34. Ibid. Number of people who start a business per month per 100,000 residents.

## ABOUT THE AUTHORS

Adam A. Millsap is a research fellow for the State and Local Policy Project at the Mercatus Center at George Mason University. He conducts research on urban development and growth, population trends, labor markets, and federal and local urban public policy. His academic research has been published in journals such as *Papers in Regional Science* and his popular writing has appeared in national outlets such as *USA Today*, *Real Clear Policy*, *The Hill*, and *US News & World Report*, as well as regional outlets such as the *Detroit Free Press*, *Las Vegas Sun*, *Cincinnati Enquirer*, and *Orange County Register*, among others. He is also a *Forbes* contributor and blogs at the Mercatus Center's *Neighborhood Effects*. In addition to his research and writing, he has taught courses in economics at the undergraduate and graduate level at Clemson University and George Mason University. He earned his master's and PhD in economics from Clemson University and a BS in economics and a BA in comparative religion from Miami University in Oxford, Ohio.

Matt Crumb is a master's student in economics at George Mason University and a former Mercatus MA Fellow. He now serves as an economic opportunity division scholar at the National Governors Association Center for Best Practices. Crumb has contributed to numerous policy publications, blogs, and news articles as a Tax Foundation intern, Mercatus MA Fellow, and research associate at the John K. MacIver Institute for Public Policy in Wisconsin.

J. Patrick Higgins is a master's student in economics at George Mason University. During fall 2014, Higgins worked at the Institute for Humane Studies as an academic networks intern. He has also worked for the Interdisciplinary Center for Economic Science at George Mason University as a lab administrator, grant writer, and researcher. Higgins's research interests include public choice, Austrian economics, the tradition of neoliberalism in Europe, and economic history. He has a master's in sociology from George Mason University and a BS in sociology and a BA in economics from Virginia Tech.

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