Compendium of key analyses for Kentucky

Collaborative Blueprint created by and for Kentucky's Economic Developers

TEAM KENTUCKY®
CABINET FOR ECONOMIC DEVELOPMENT

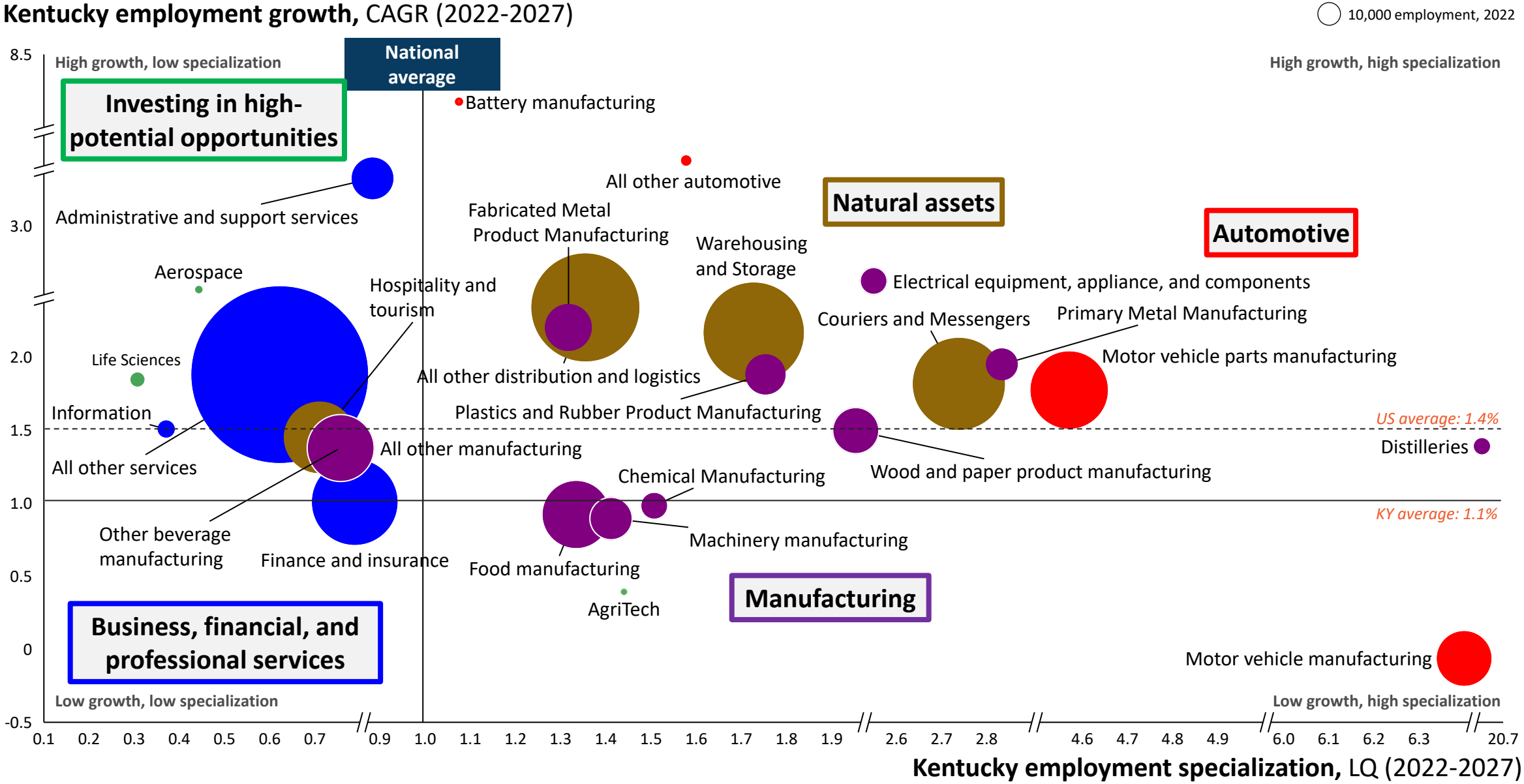
December 2023

Overview of this document

This document contains the following from the Collaborative Blueprint deliverables:

- This section provides an overview of employment specialization by industry.
- Where applicable, the levers are analyzed through multiple lenses: state-wide, geographic breakdown, and by demographic group
- Data as of Dec 2023

Kentucky has a mix of tradable sectors that are specialized and growing



Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole
Source: Lightcast, accessed 7/31/2023

Data as of Dec 2023

Kentucky has earned the "right to win" and has "opportunities to win" across priority sectors

Least differentiated ▁ ▁ ▁ ▁ ▁ ▁ Most differentiated

	Where Kentucky has "earned right to win"									Where Kentucky could see "opportunities to win"							
Priority sectors	**Share of total employ-ment in KY** (2022, %)	**KY employ-ment specializ-ation** (2022, location quotient)	**Historical employment growth in KY relative to U.S.** (2022-27)	**Projected employment growth in KY relative to U.S.** (2022-27)	**KY Research & Develop-ment spend**[1] (2021, $M)	**KY patents**[3] (2016-21, #)	**KY share of U.S. venture capital (VC) investment**[4] (2017-2022, %)	**KY share of U.S. foreign direct investment (FDI)** (2017-2022, %)	**KY exports**[6] (2017-2022, $M)	**U.S. projected employ-ment growth** (2022-27, %)	**U.S. projected employ-ment size** (2022-2027, K)	**KY average yearly wage** (2022, $ thousand)	**U.S. average yearly wage** (2022, $ thousand)	**Employment multiplier** (2022)	**Total U.S. VC investment**[4] (2017-2022, $B)	**Total U.S. FDI** (2017-2022, $B)	**Stakeholder engagement** (% ranked as top 3 most important industry)
Traditional auto-motive/electric vehicles	60.9	4.3	-1.8	-0.5	101	342	0.4	12	30,172	1.9	105	68.5	72.7	2.7	140.1	90.6	72
Materials	61.3	1.7	0.4	0.7	275	658	n/a[5]	3.3	26,706	1.2	172	71.0	74.7	2.3	n/a[5]	78.4	16
Food/beverage processing	38.6	1.5	0.5	0.5	75	170	0.02	9.2	5,025	1.6	167	66.2	57.7	2.9	36.6	28.1	18
Other manufacturing	79.6	1.2	-0.5	0.9	151	1960	0.2	2.1	34,318	0.6	146	65.8	81.4	2.1	125.6	88.0	66
Distribution and logistics	127.7	1.8	-0.9	-0.1	3	920	0.2	2.0	n/a	2.3	665	62.7	60.2	1.8	135.1	9.8	49
Hospitality and tourism	30.4	0.7	1.8	0.3	n/a	595	n/a[5]	0	n/a	2.6	447	36.9	53.9	1.6	n/a[5]	8.8	75
Business, financial, and professional services	136.4	0.7	-0.4	-0.2	157	440	0.01	0.1	n/a	2.1	1,703	87.9	135.5	2.2	170.5	47.9	82
Aerospace	2.9	0.4	-0.2	4.6	<1	97	0.03	2.2	64,889[7]	0.6	14	81.1	113.2	2.2	18.4	4.3	18
AgriTech	1.6	1.4	-1.8	-1.3	<0.5	11	1.3	0	0	1.7	8	56.1[8]	67.7	1.8	20.8	0.5	26
Life Sciences	5.9	0.3	0.9	1.4	498[2]	467	0.2	0.1	16,513	2.3	176	96.0	140.7	2.2	272.6	31.1	23

1. NSF R&D categories are not directly aligned to sector definitions by 6-digit NAICS codes; R&D funding is directional, not comprehensive
2. Life Sciences R&D spend is 2021 academic R&D; data for remaining sectors are 2020 corporate R&D spend
3. USPTO patents granted 2017-2021, based on assignee location, patents can be assigned to multiple industries
4. PitchBook data technology verticals are not directly aligned to sector definitions by 6-digit NAICS codes; VC funding is directional, not comprehensive
5. PitchBook data technology verticals did not directly align to Materials or Hospitality & Tourism sectors; VC funding may be present at a more granular level for those sectors
6. Exports of goods only, does not include services
7. Includes aerospace parts not manufactured in Kentucky that are repackaged and shipped out of Kentucky from the GE Erlanger Parts Warehouse at the Cincinnati/Northern Kentucky Air
8. Wage data is at the NAICS code level; wages for AgriTech may be higher based on occupation type within the sector (e.g., software engineer, project manager)

Exhibit data source: Lightcast™, Accessed August 30, 2023; National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2021; National Center for Science and Engineering Statistics, Higher Education Research and Development Survey, FY 2021; U.S. Patent and Trademark Office; fDi Markets, a service from the Financial Times 2023. All Rights Reserved; U.S. Census Bureau: Economic Indicators Division USA Trade Online, Source: U.S. Import and Export Merchandise trade statistics; PitchBook Inc.; Kentucky Association for Economic Development/Kentucky Cabinet for Economic Development Joint Surveys (2023). ***Data as of Dec 2023***

Kentucky's regions have different strengths

LQ ≥ 0.7 | LQ ≥ 1 | LQ ≥ 2 | LQ ≥ 3 | LQ ≥ 4

Priority sectors	KY LQ[1]	West KY employment specialization (LQ)			South-Central KY employment specialization (LQ)			Central KY employment specialization (LQ)			East KY employment specialization (LQ)					
		Green River	Penny-rile	Purchase	Barren River	Lake Cumber-land	Lincoln Trail	Blue-grass	KIPDA	Northern KY	Big Sandy	Buffalo Trace	Cumber-land Valley	FIVCO	Gateway	KY River
Traditional automotive and electric vehicles	4.3	2.0	4.0	1.9	9.9	5.8	8.7	4.9	4.8	1.4	0.5	3.5	3.7	0.0	4.0	0.0
Materials	1.7	4.5	1.3	2.1	3.4	1.1	2.5	1.3	1.2	2.0	0.2	1.3	1.0	1.5	2.7	0.3
Food and beverage processing	1.2	1.4	0.8	1.0	1.4	1.9	1.7	1.2	1.3	1.1	0.2	2.5	1.0	0.8	1.7	0.2
Other manufacturing	1.5	4.4	1.2	1.6	2.0	1.8	2.5	1.0	1.0	1.7	0.6	1.5	2.2	0.9	3.9	0.2
Distribution and logistics	1.8	0.7	1.3	2.1	0.9	0.6	0.7	0.9	2.6	4.0	0.5	0.9	1.2	1.1	0.8	0.8
Hospitality and tourism	0.7	0.4	0.6	0.6	0.8	0.5	0.4	0.8	0.8	0.9	0.2	0.4	0.6	0.4	0.3	0.3
Business, financial, and professional services	0.7	0.2	0.2	0.5	0.4	0.2	0.4	0.6	1.0	0.8	0.2	0.3	0.5	0.3	0.3	0.3
Aerospace	0.4	0.8	0.9	0.0	0.3	0.2	1.1	0.7	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
AgriTech	1.4	1.5	7.8	1.3	3.1	14.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.3	0.2	0.3	0.4	0.3	0.2	0.1	0.5	0.2	0.4	0.0	0.0	0.1	0.1	0.3	0.2

1.Note: Location quotient (LQ) is measured as the ratio of a sector's share of employment in a region to that sector's share of employment in the US

Source: Lightcast, accessed 8/30/2023

Data as of Dec 2023

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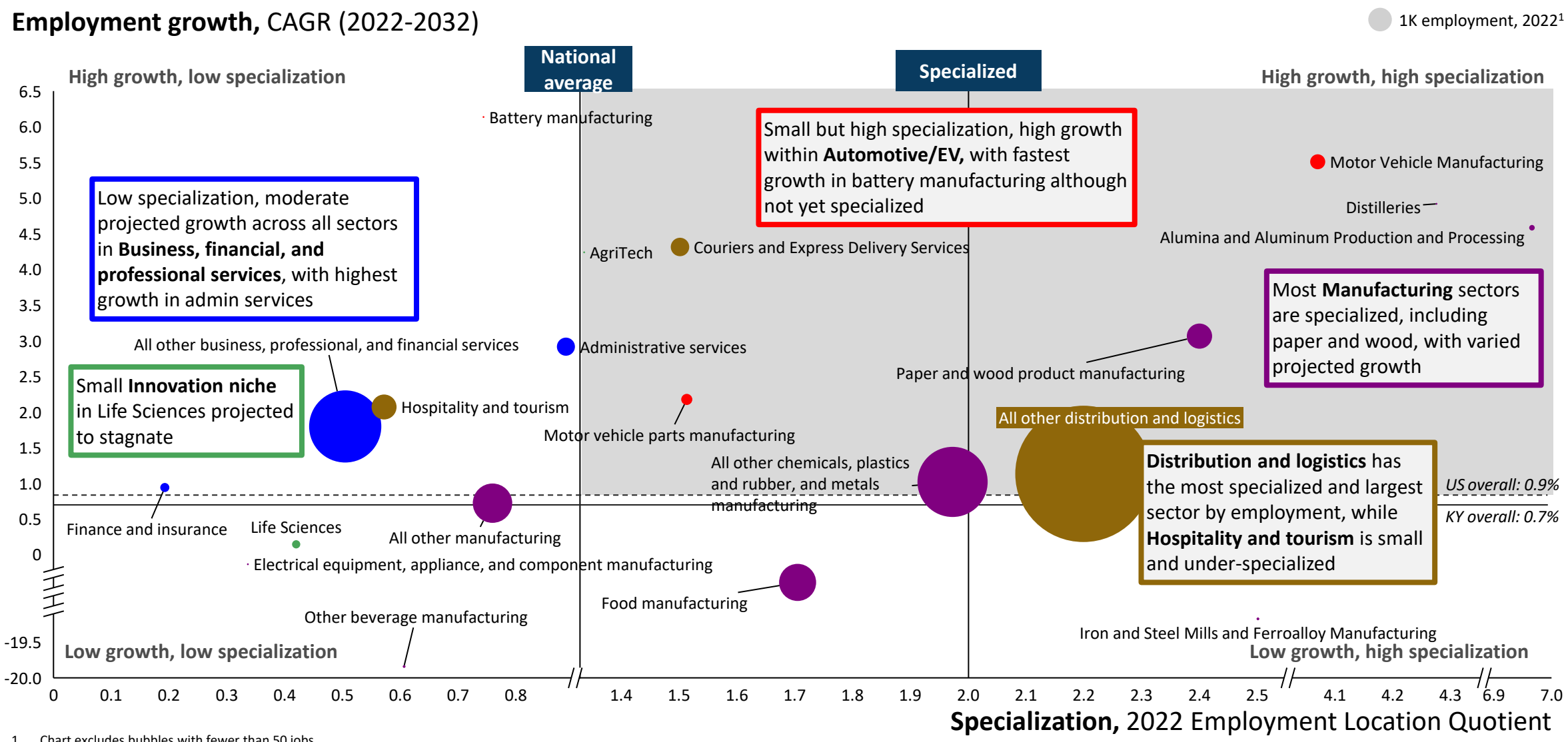
West: Purchase ADD "Bubble chart": "right to win" and "want to win"

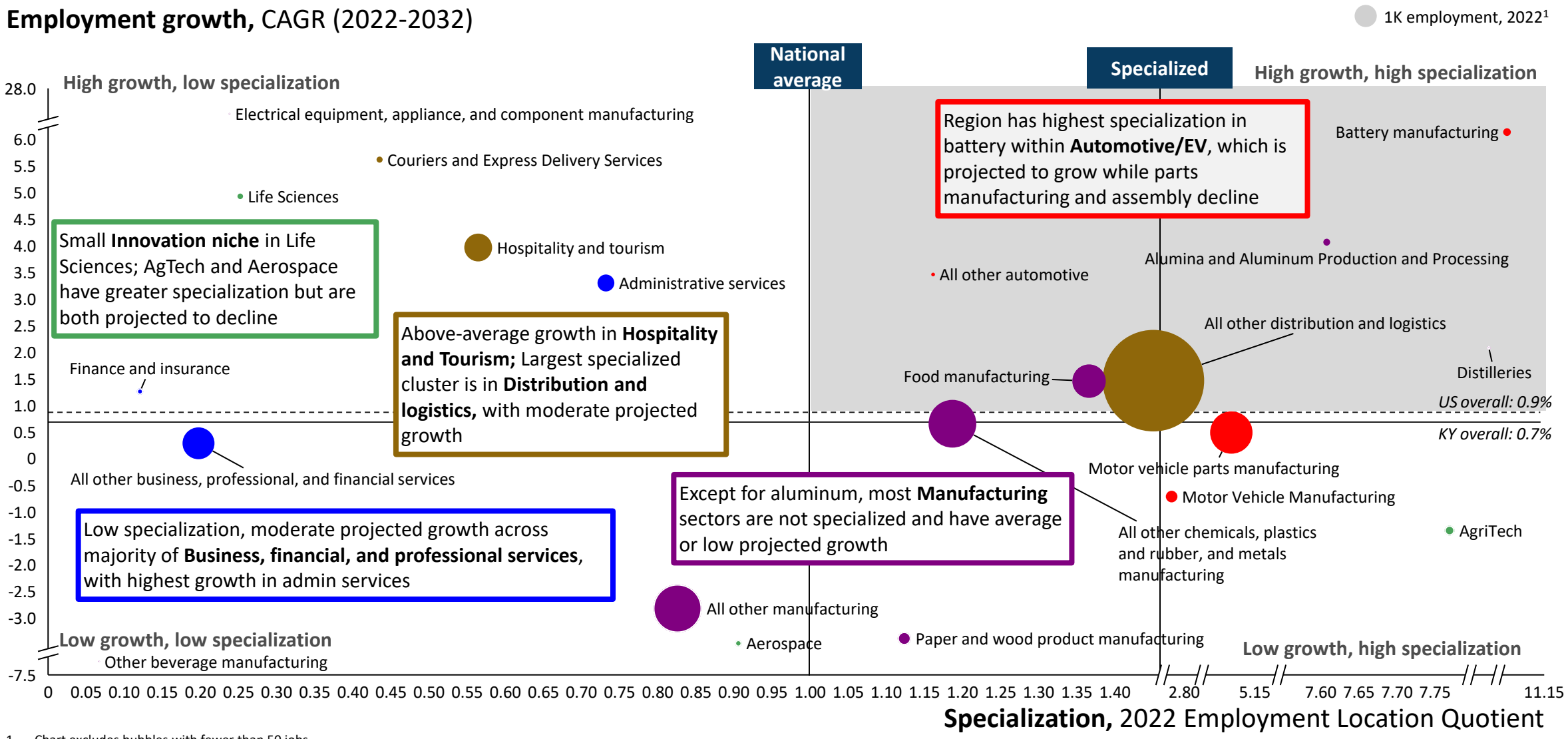


1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

West: Pennyrile ADD "Bubble chart": "right to win" and "want to win"



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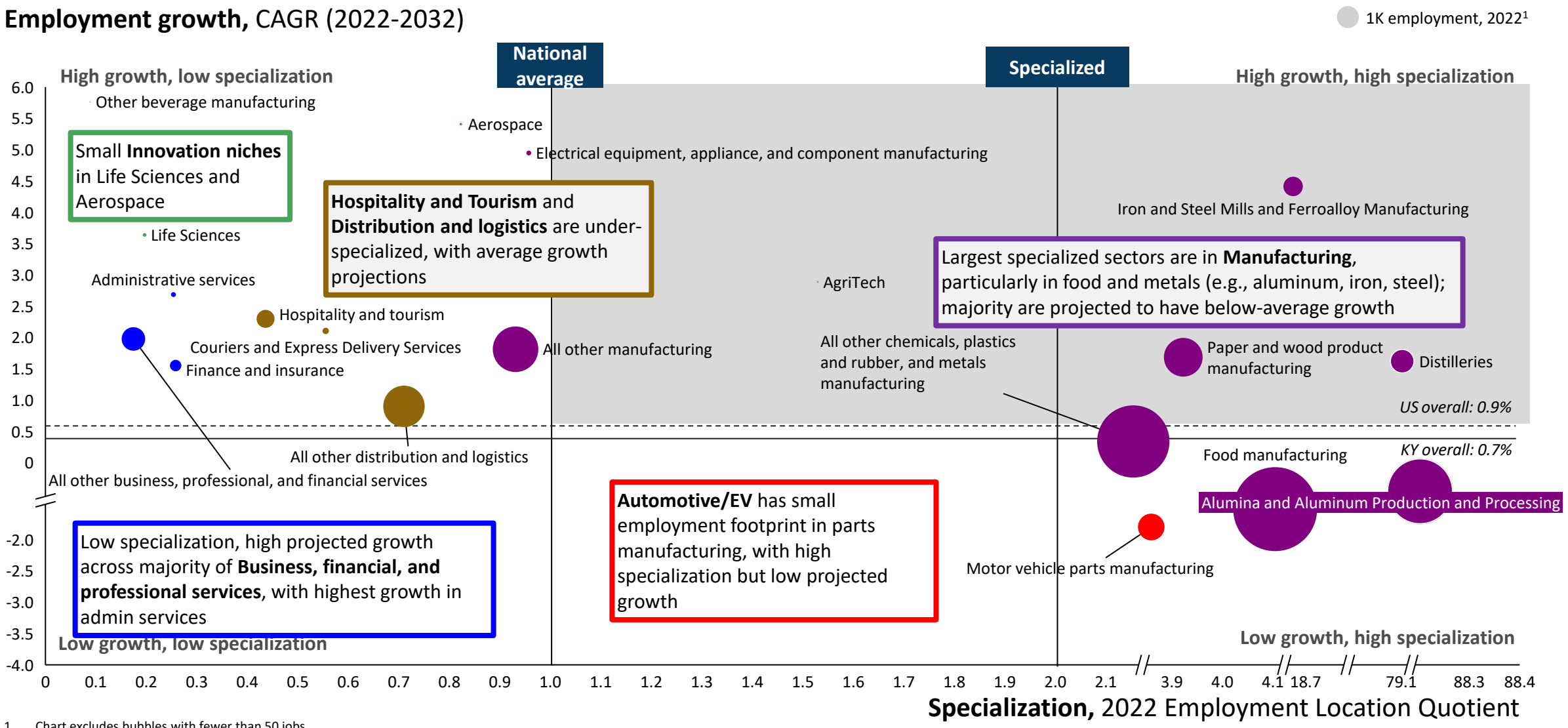
Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

West: Green River ADD "Bubble chart": "right to win" and "want to win"



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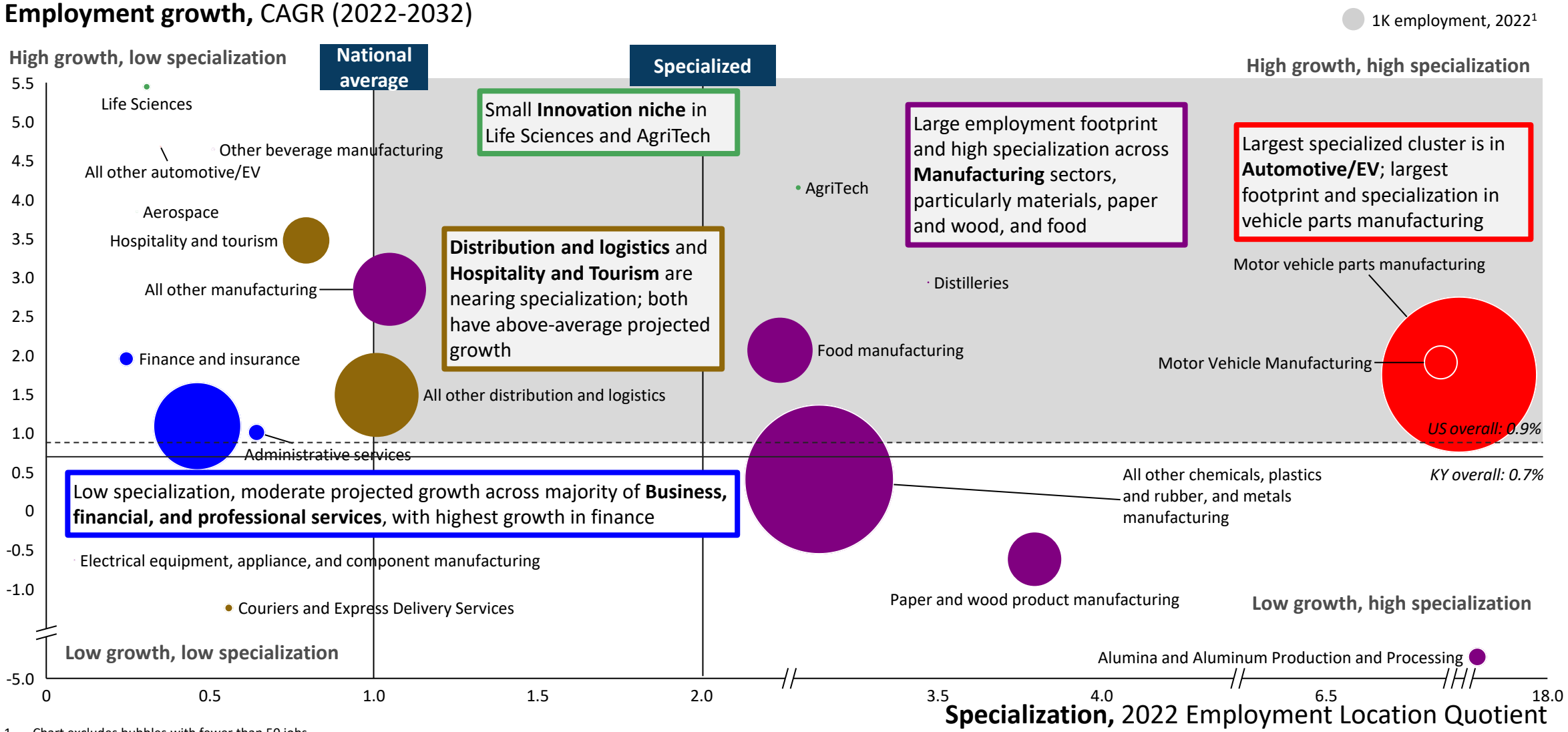
Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

South-Central: Barren River ADD "Bubble chart": "right to win" and "want to win"

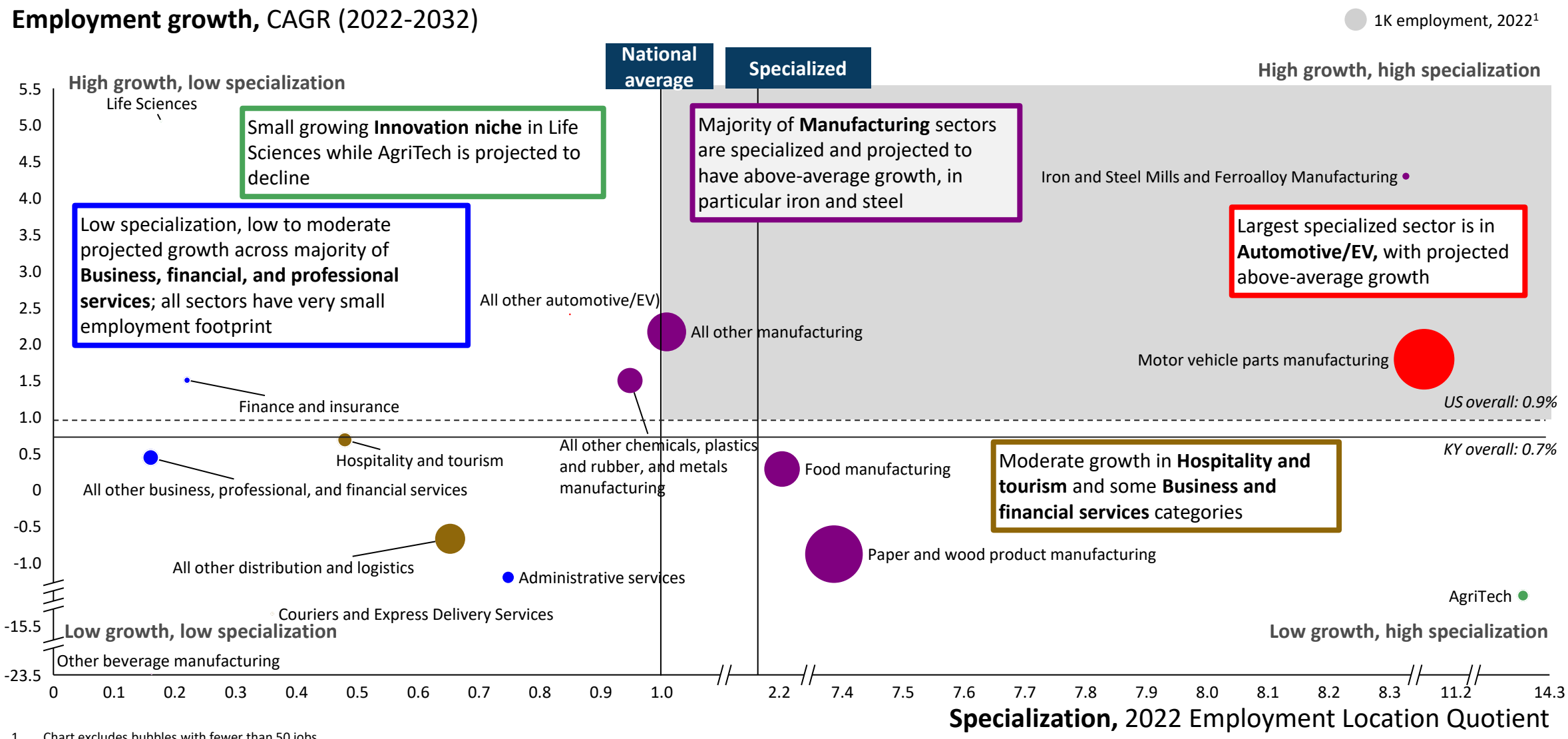


1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

South-Central: Lake Cumberland ADD "Bubble chart": "right to win" and "want to win"



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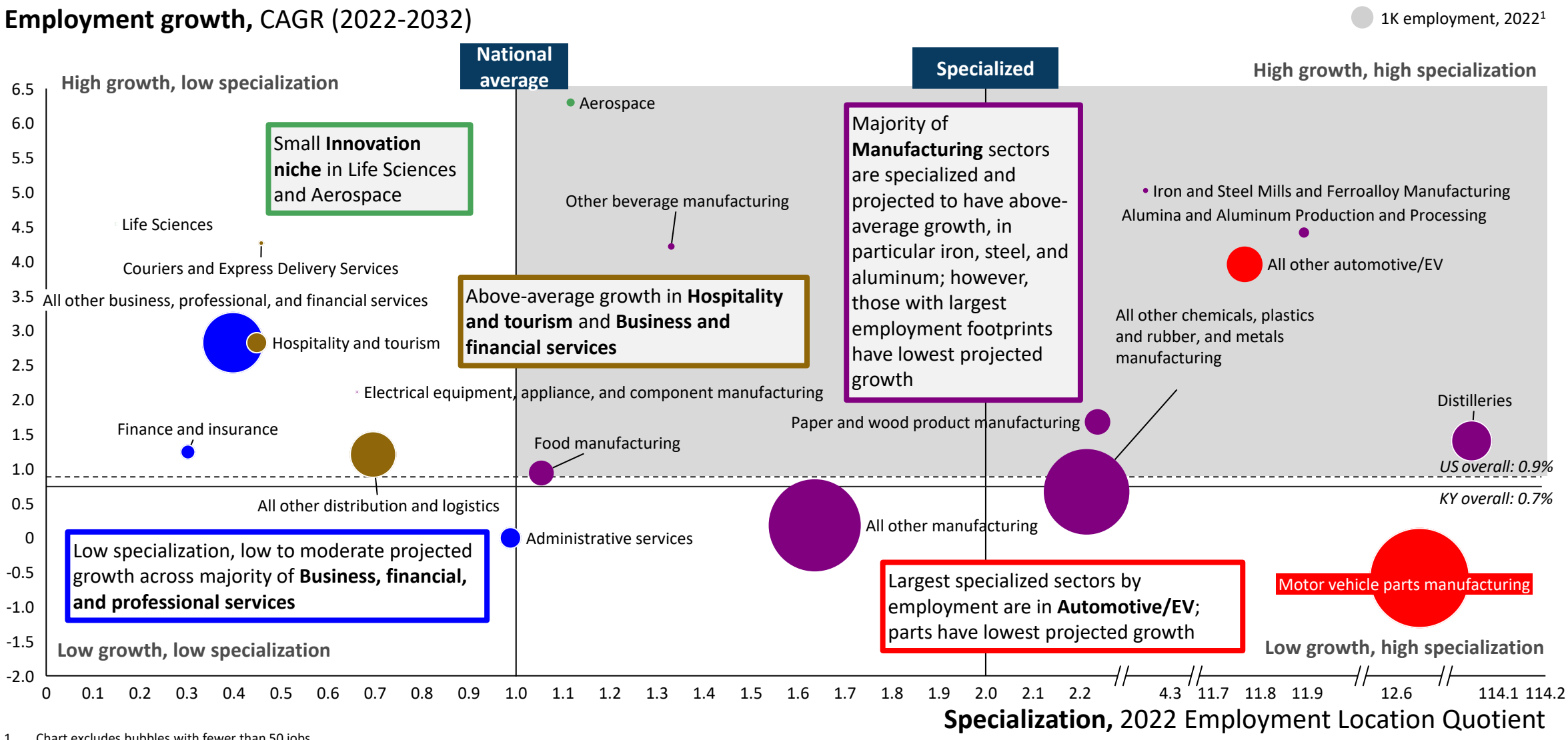
Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

South-Central: Lincoln Trail ADD "Bubble chart": "right to win" and "want to win"

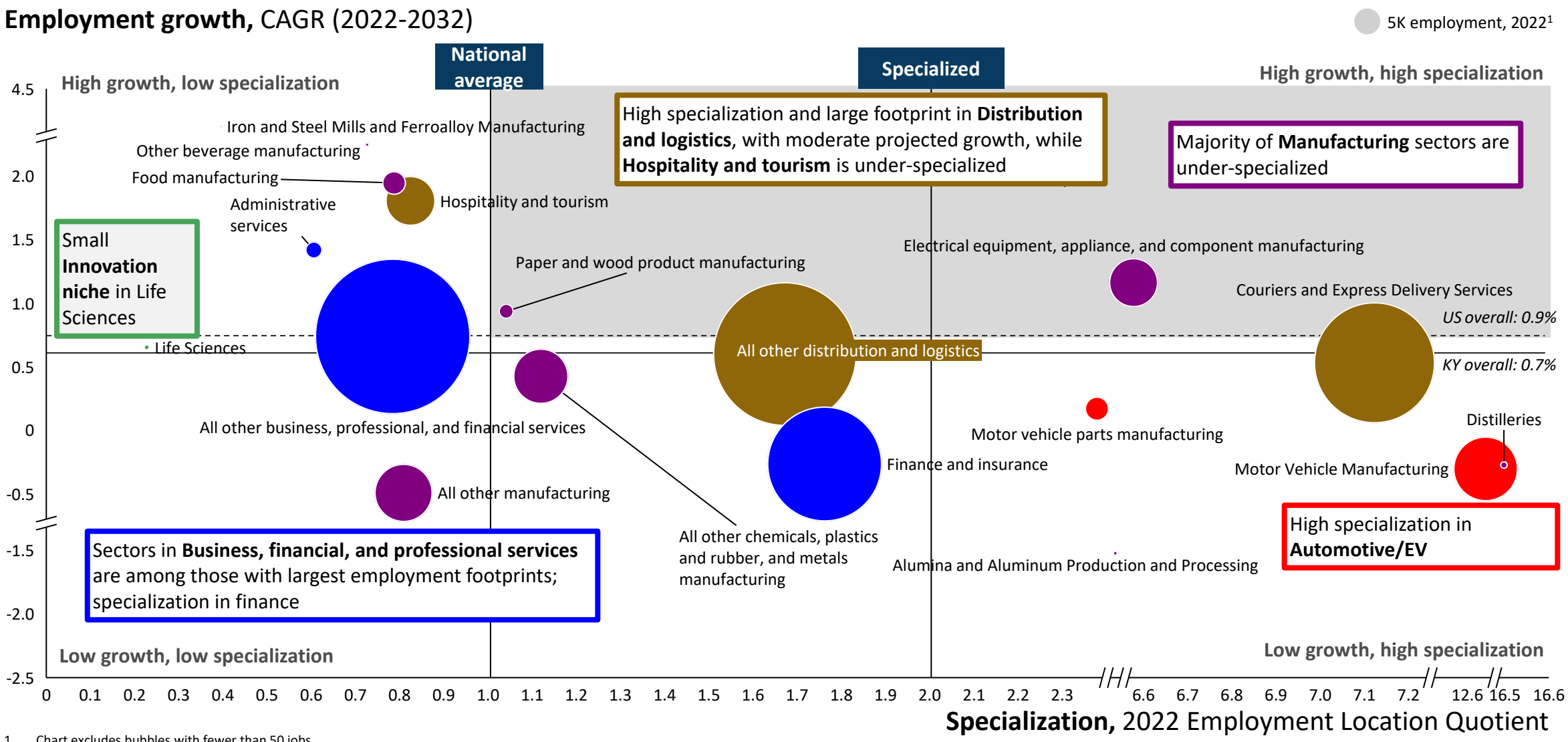


1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023

Central: KIPDA ADD "Bubble chart": "right to win" and "want to win"



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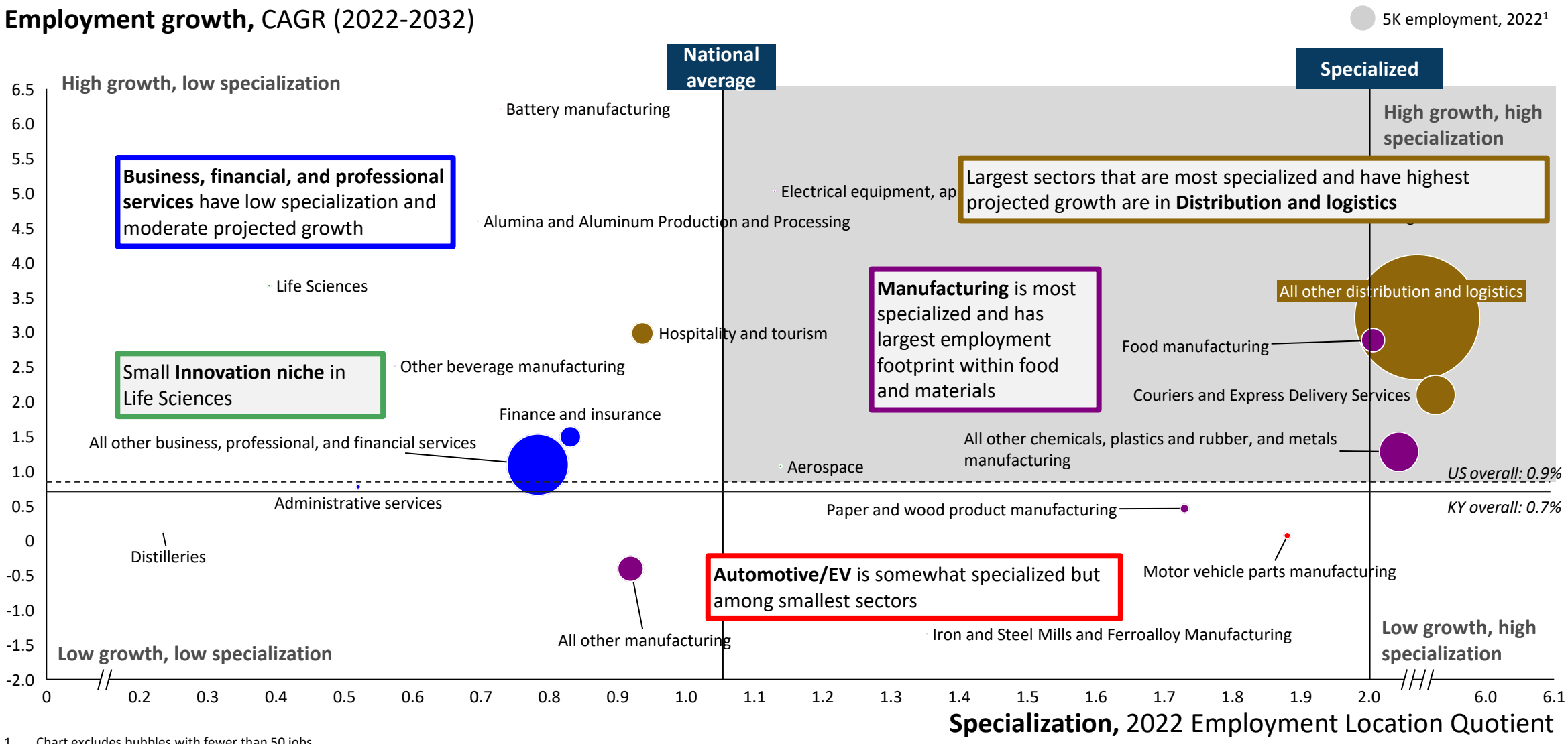
Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

Central: Northern Kentucky ADD "Bubble chart": "right to win" and "want to win"

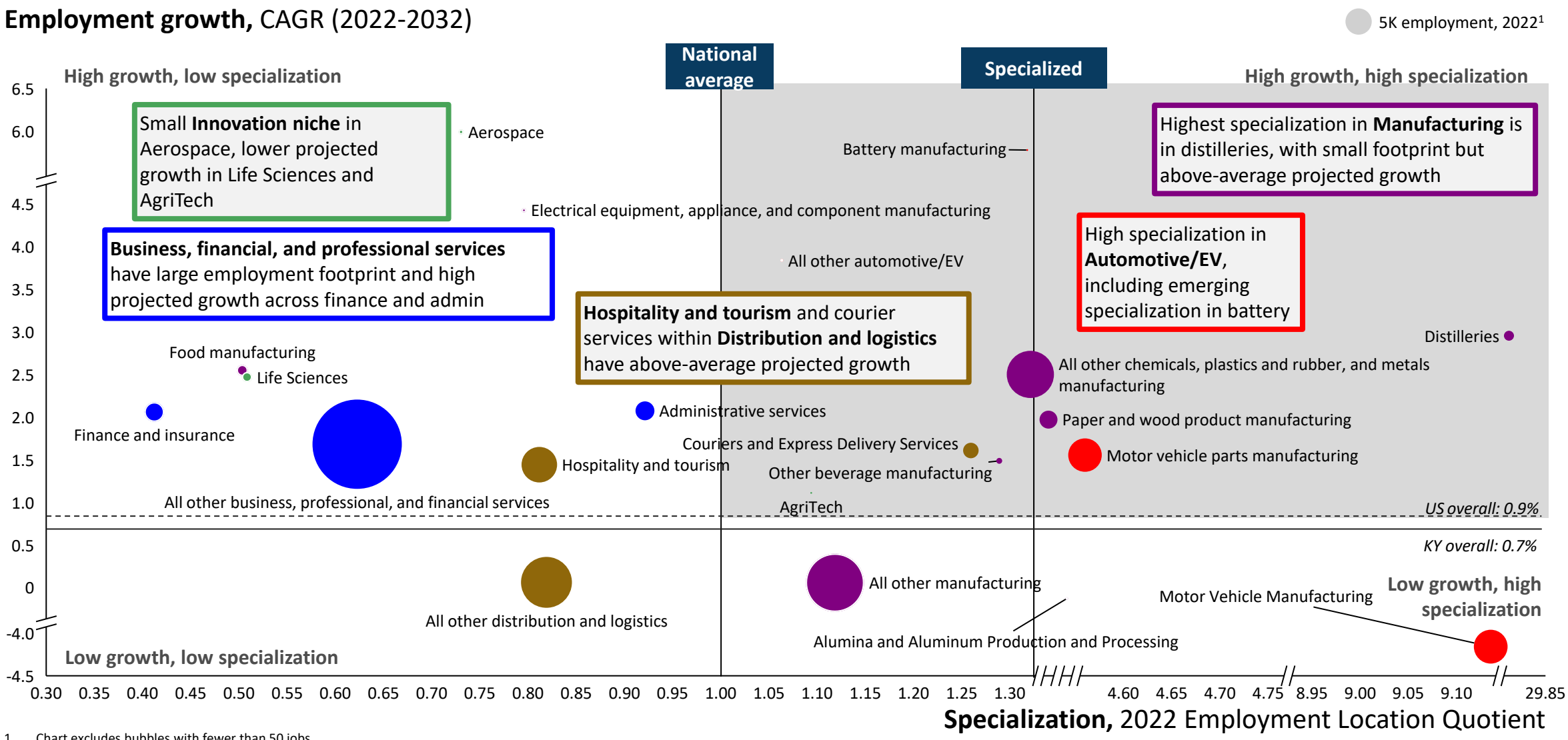


1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

Central: Bluegrass ADD "Bubble chart": "right to win" and "want to win"



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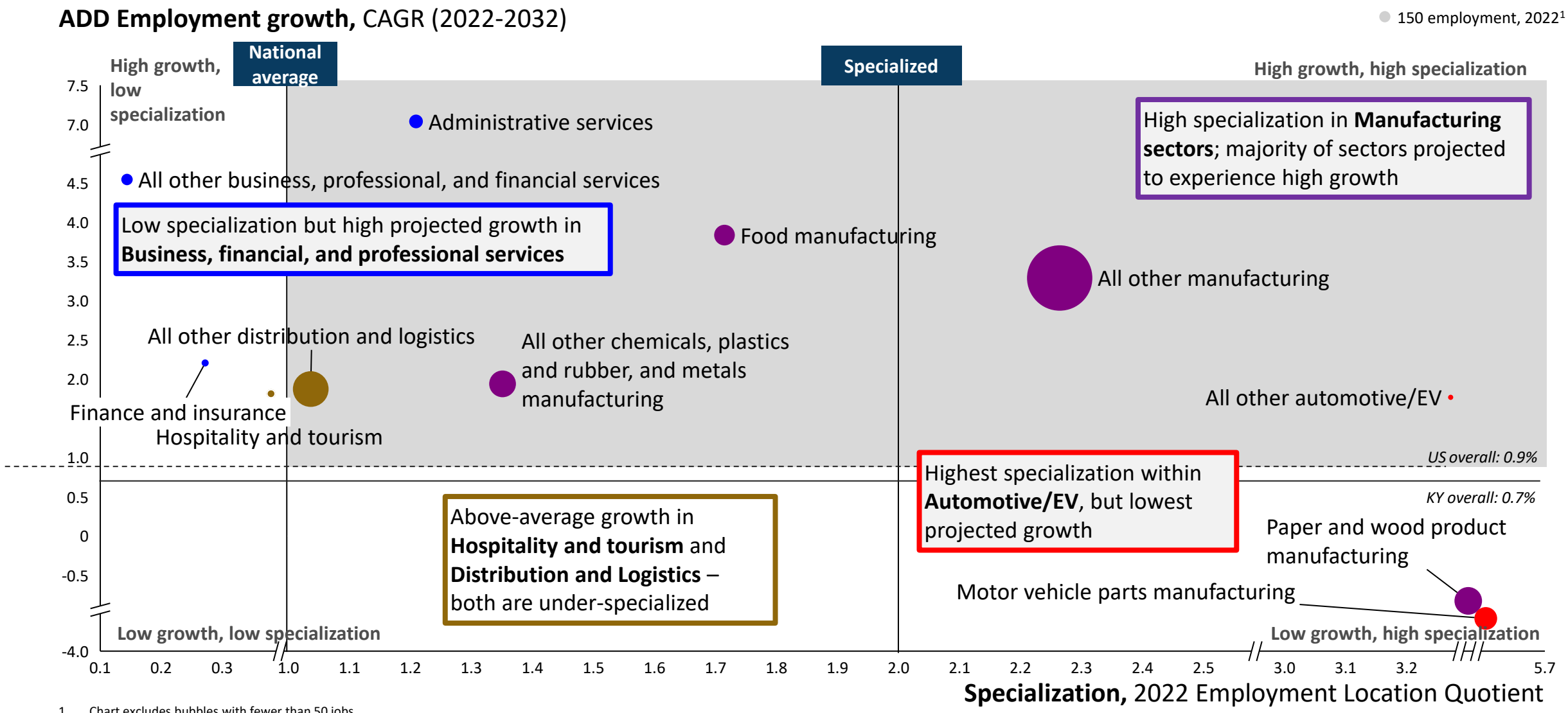
Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

East: Buffalo Trace ADD "Bubble chart": "right to win" and "want to win"

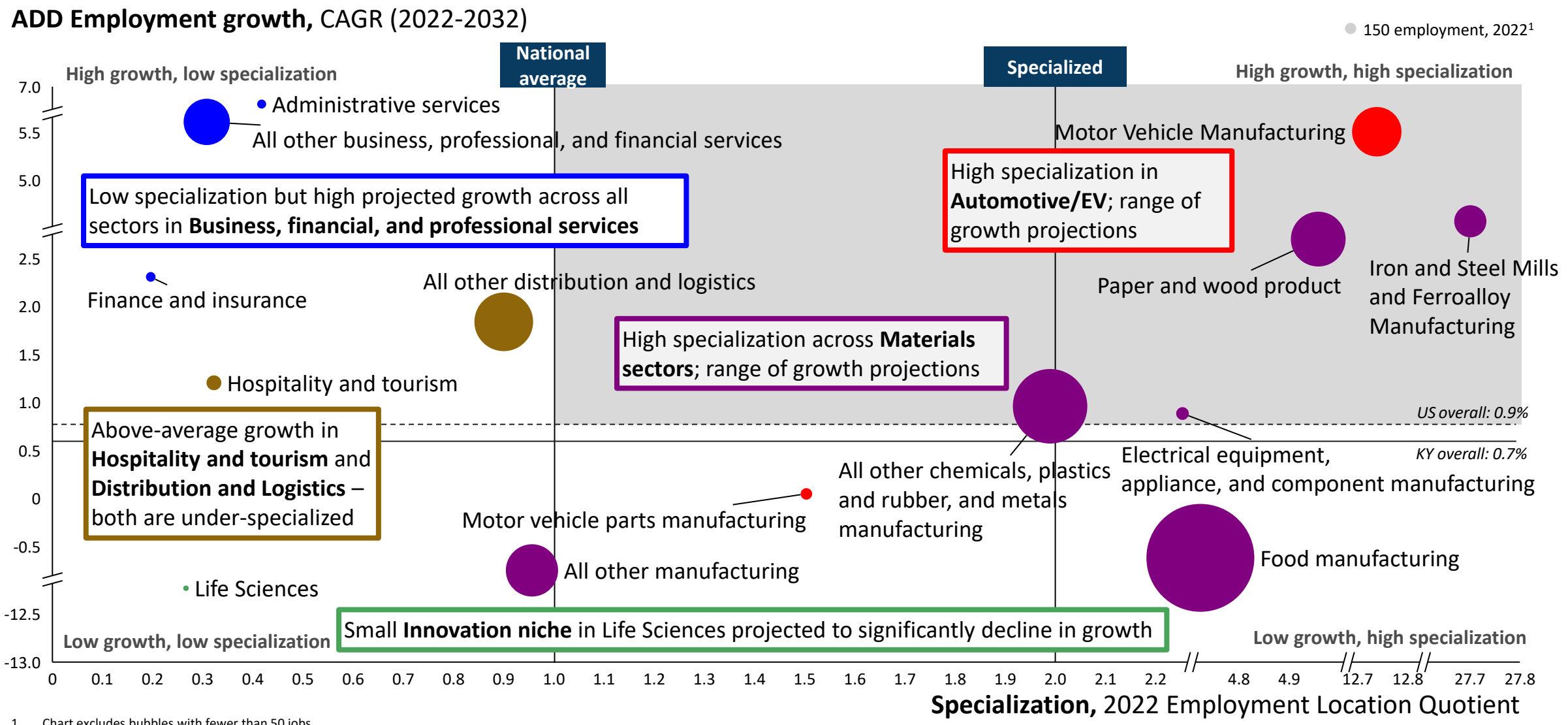


1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023

East: Gateway ADD "Bubble chart": "right to win" and "want to win"

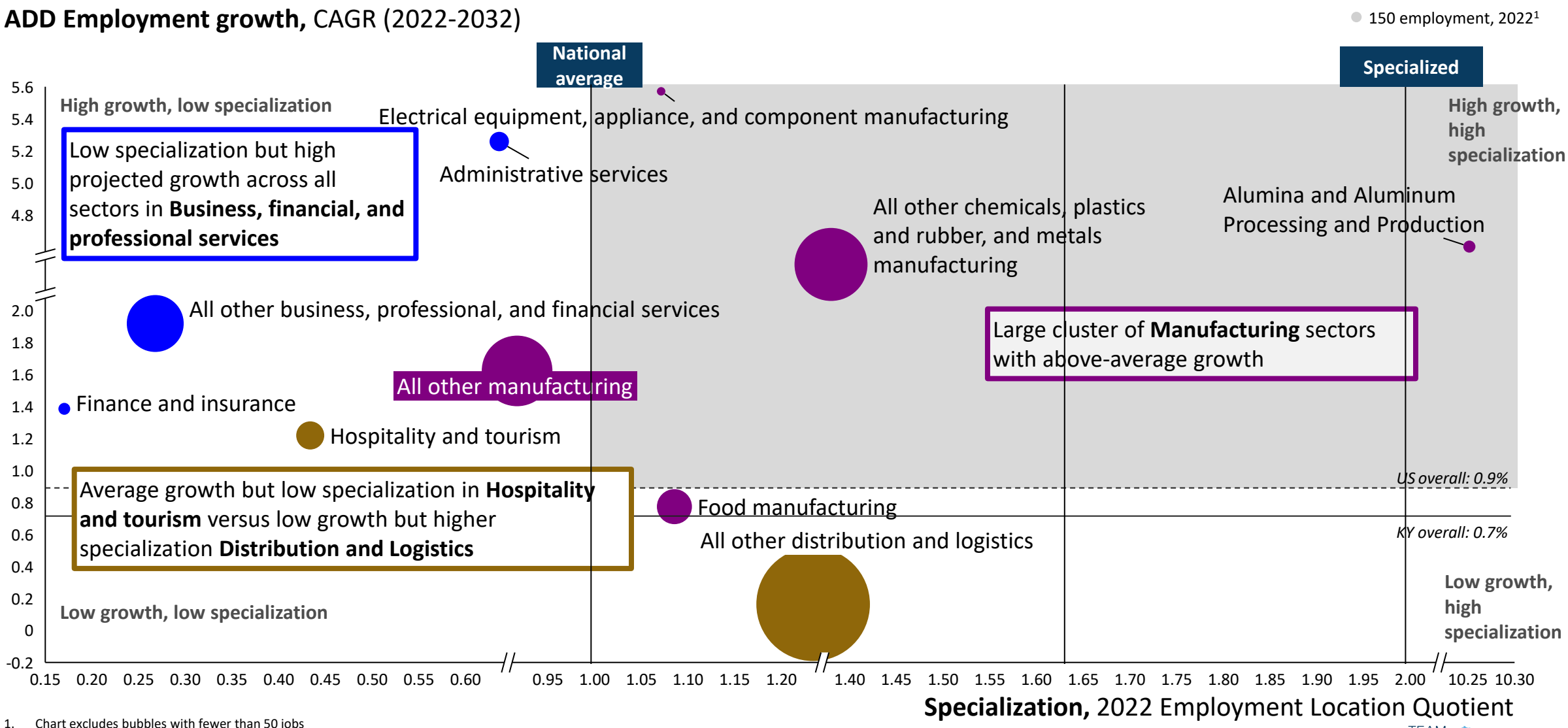


1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

East: FIVCO ADD "Bubble chart": "right to win" and "want to win"

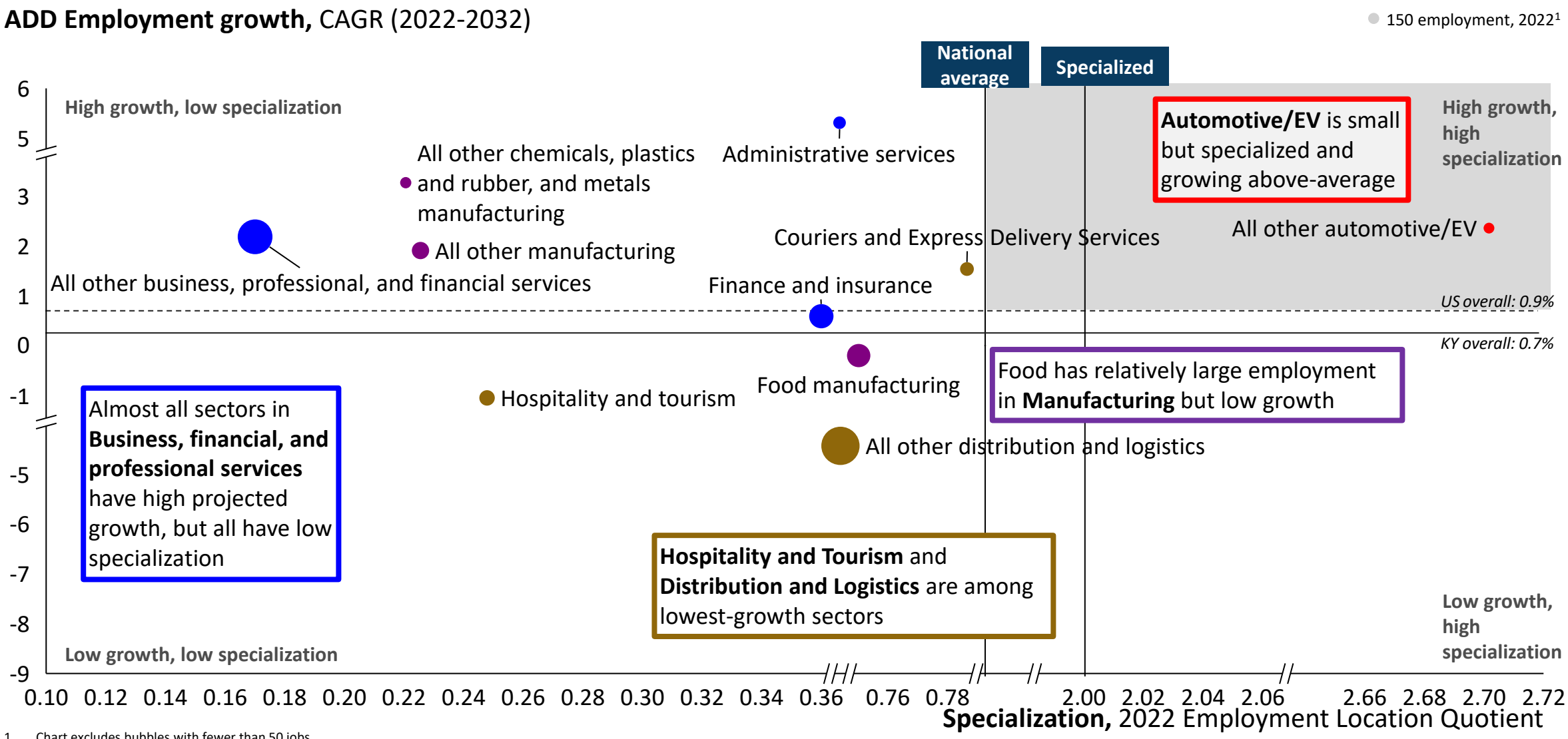


1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023

East: Big Sandy ADD "Bubble chart": "right to win" and "want to win"



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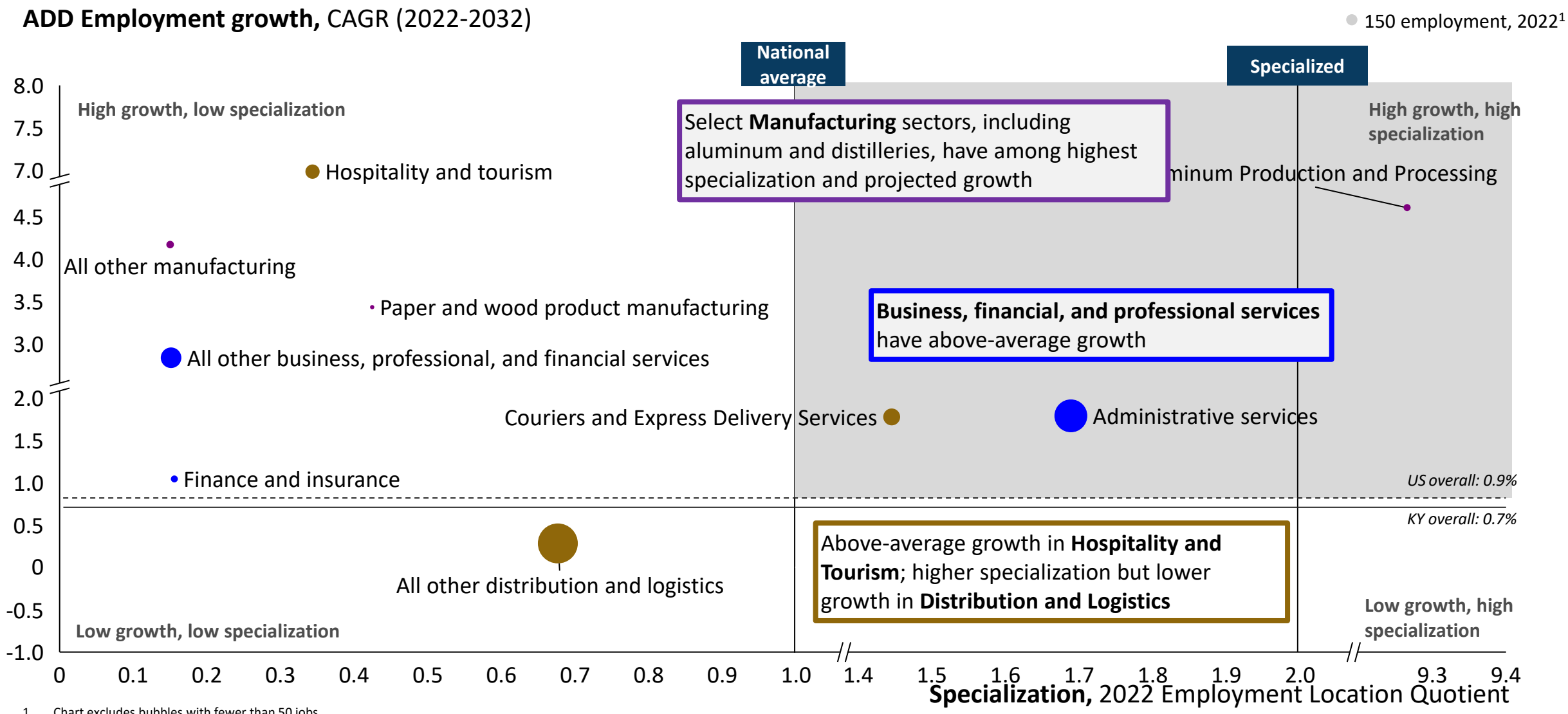
Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

East: Kentucky River ADD "Bubble chart": "right to win" and "want to win"



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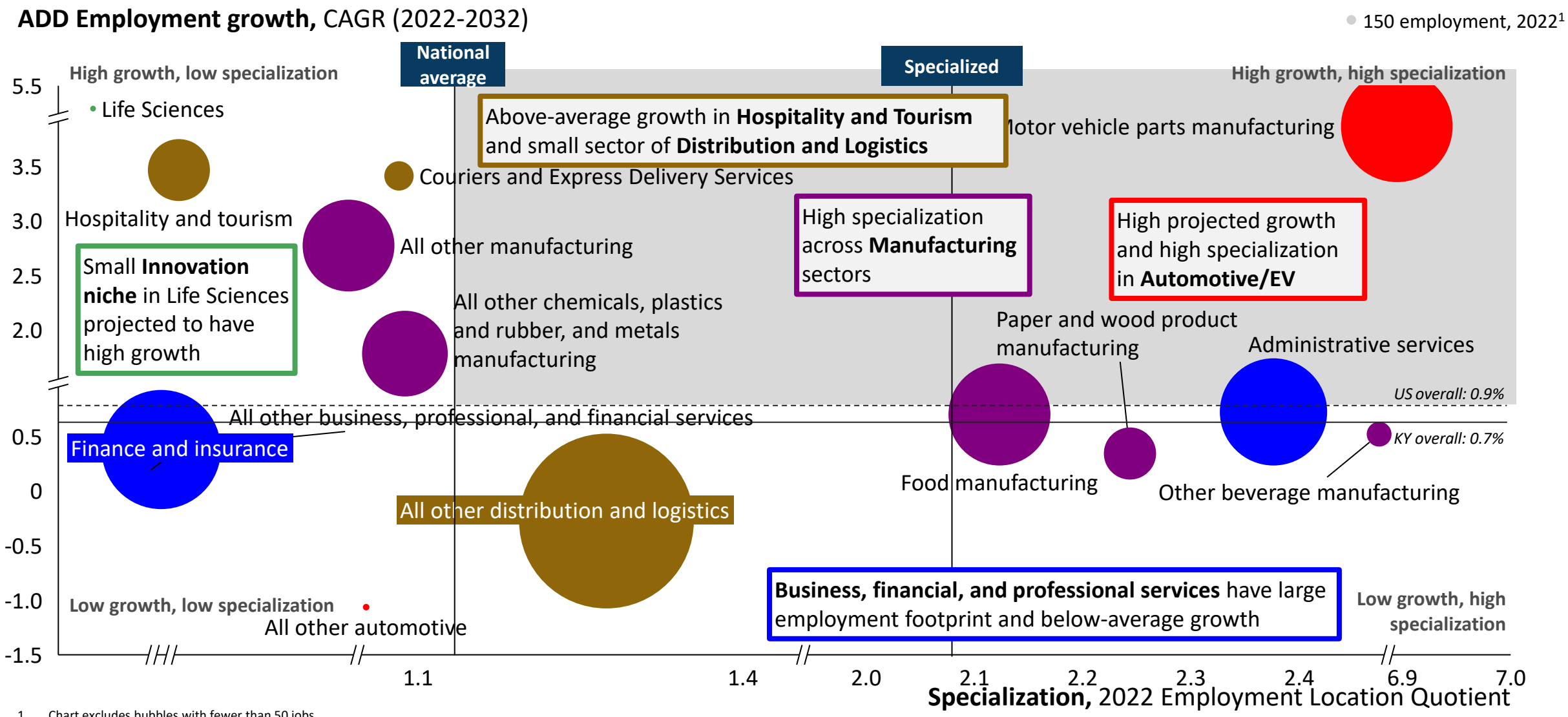
Source: Lightcast, accessed 9/18/2023, Data as of Dec 2023

East: Cumberland Valley ADD "Bubble chart": "right to win" and "want to win"



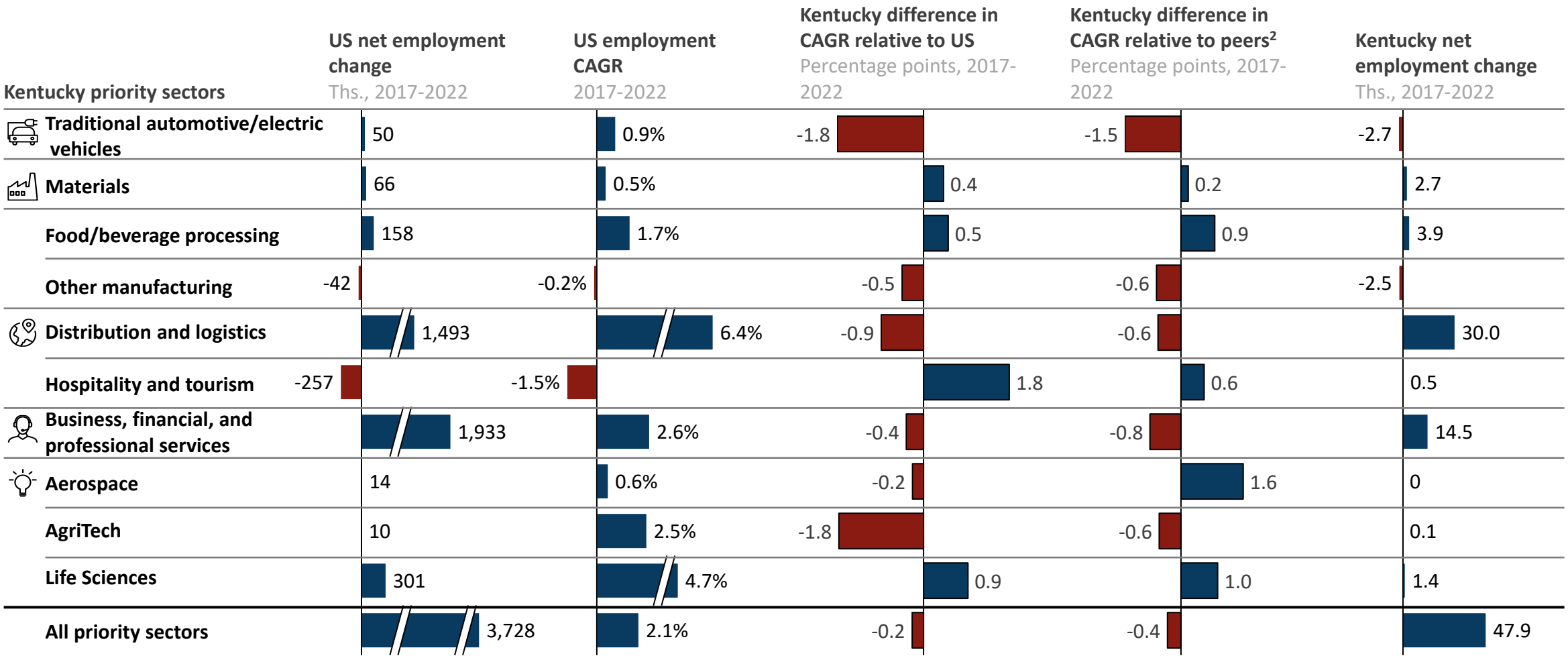
1. Chart excludes bubbles with fewer than 50 jobs

Note: Specialization is measured as the ratio of a sector's share of employment in Kentucky to that occupation's share of employment in the U.S. as a whole

Source: Lightcast, accessed 9/18/2023

Kentucky has lost market share in several sectors in the past 5 years

Historical sector growth



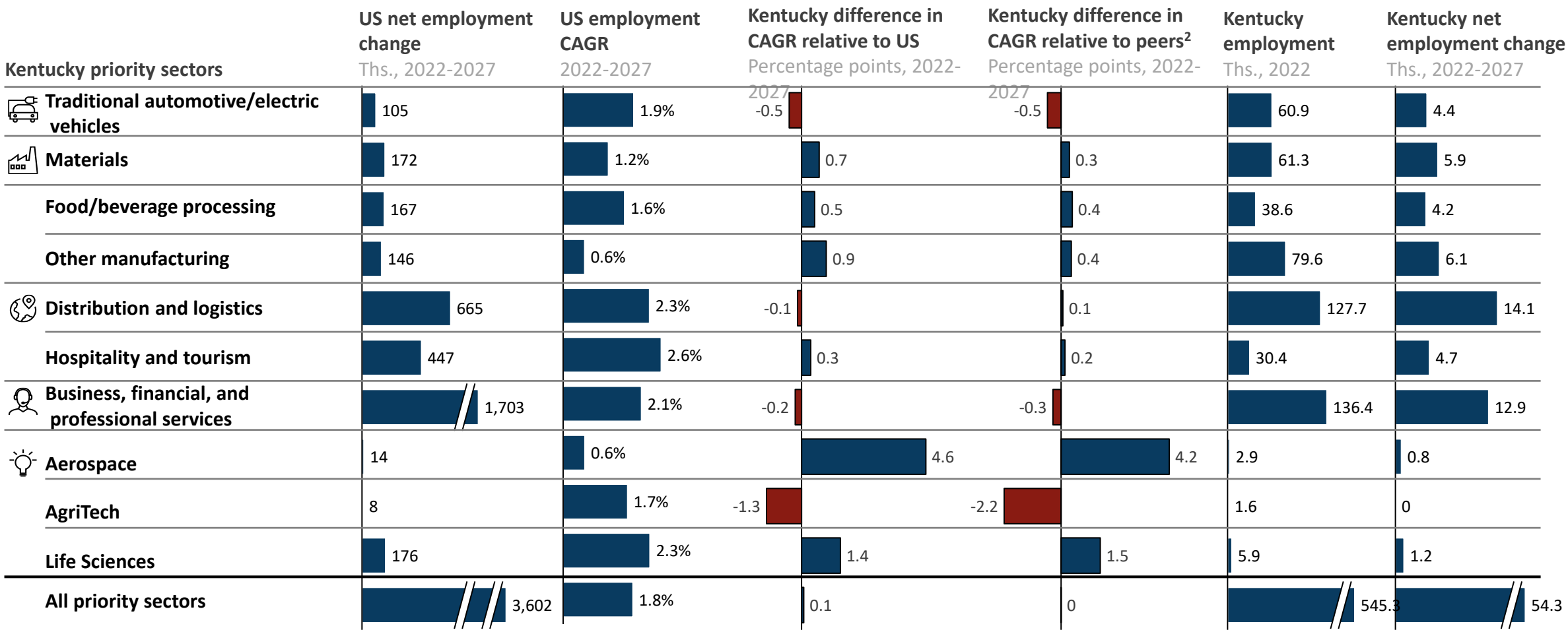
1. All manufacturing not captured in other sectors
2. Weighted average of peer states: Alabama, Arkansas , Georgia, Indiana, North Carolina, Ohio, South Carolina, and Tennessee

Source: Lightcast, accessed 8/30/2023

Data as of Dec 2023

Projections suggest U.S. growth will create large potential employment growth pools for Kentucky to win

Forecasted sector growth



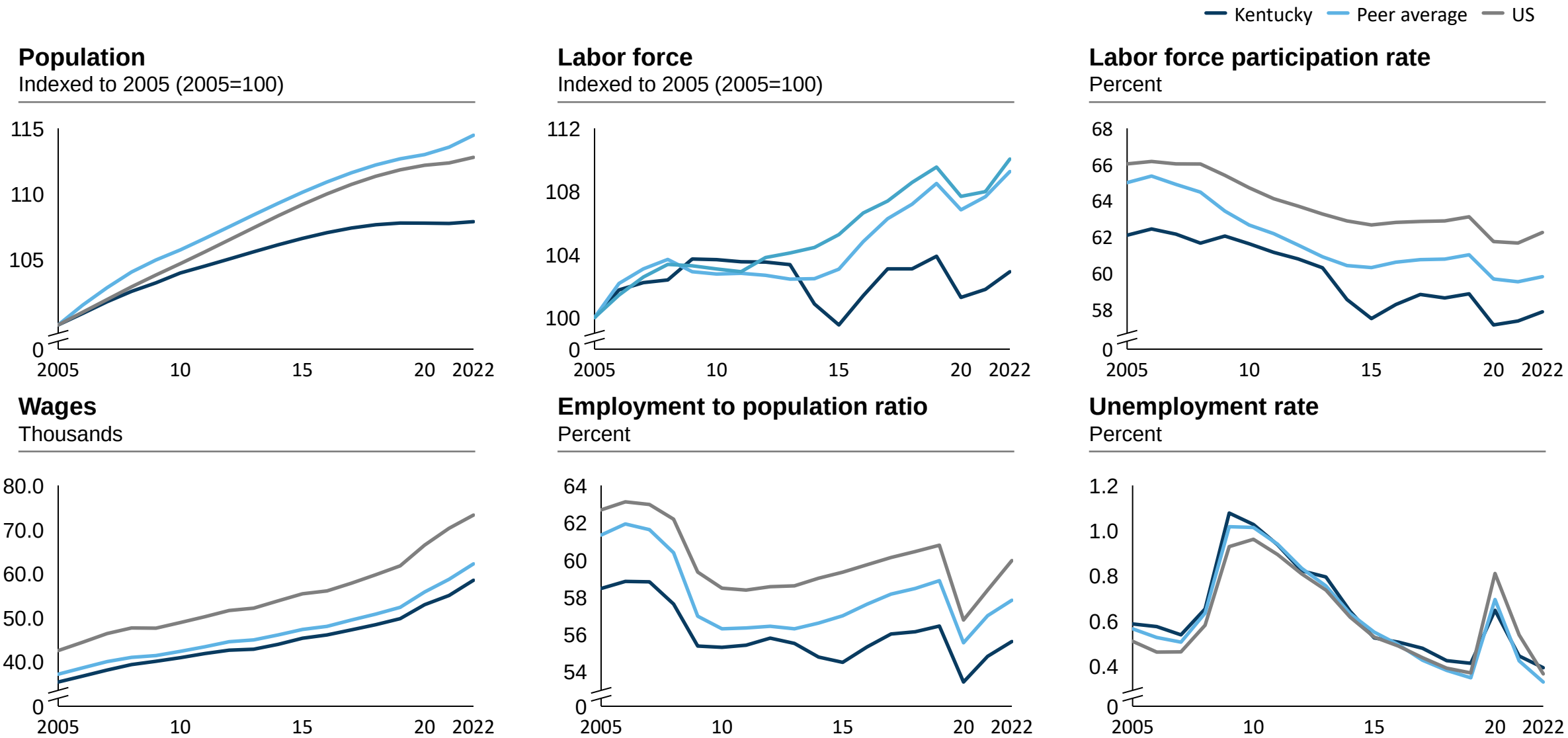
1. All manufacturing not captured in other sectors
2. Weighted average of peer states: Alabama, Arkansas , Georgia, Indiana, North Carolina, Ohio, South Carolina, and Tennessee

Source: Lightcast, accessed 8/30/2023

Data as of Dec 2023

2. Talent & Human capital

Historically, Kentucky has lagged peers and US in population growth, labor force participation, and wages



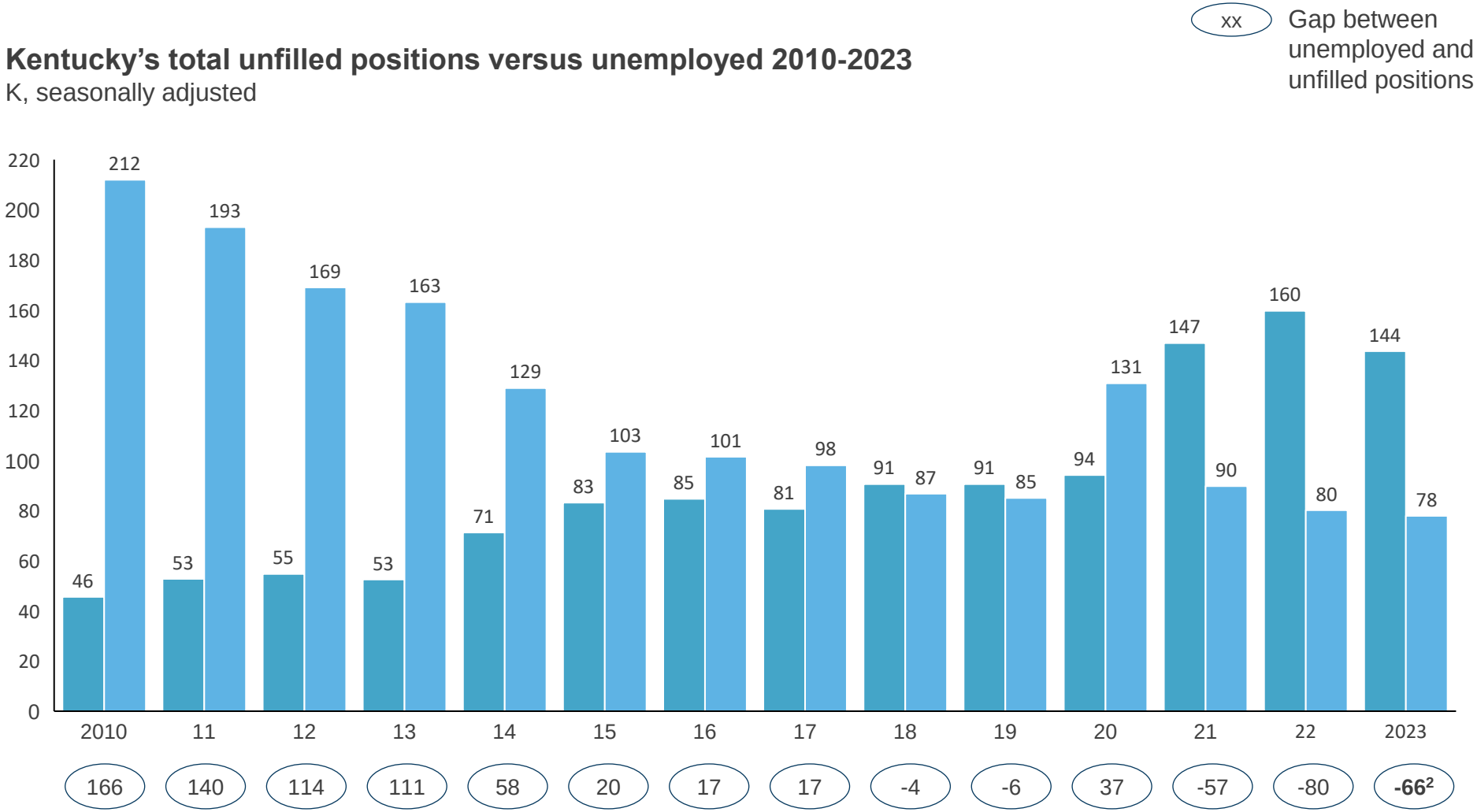
Peers include: Alabama; Arkansas; Georgia; Indiana; North Carolina; Ohio; South Carolina; Tennessee

Source: Moody's Analytics, Bureau of Labor Statistics

Kentucky has ~66k more unfilled positions than unemployed workers

Kentucky's total unfilled positions versus unemployed 2010-2023

K, seasonally adjusted



Takeaways

KY **job demand in terms of unfilled positions has grown** the last 10 years, a sign of both growth and/or a shrinking workforce

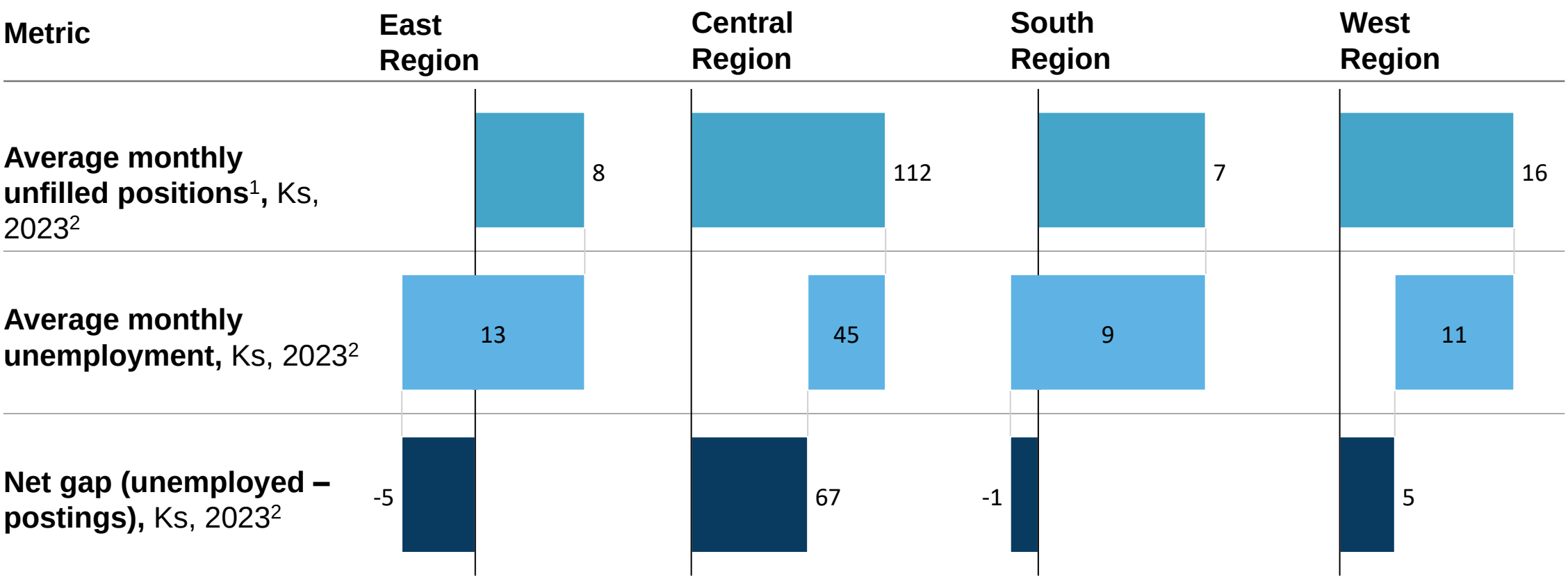
However, unemployment declines have led to an **increasing gap between open positions and available workers**

Note, the **total talent gap may be larger given location and skills mismatch** between unemployed workers and these postings

1. Unfilled positions of "job openings" are based on surveys of US employers done by the BLS and represent positions that are not filled on the last business day of the month. May 2023 data are preliminary
2. Represents the average talent shortage over the course of the year, seasonally adjusted, calculated as unemployed-unfilled positions. Current talent shortage as of May 2023 are about 66k

Source: BLS JOLTS and LAUS

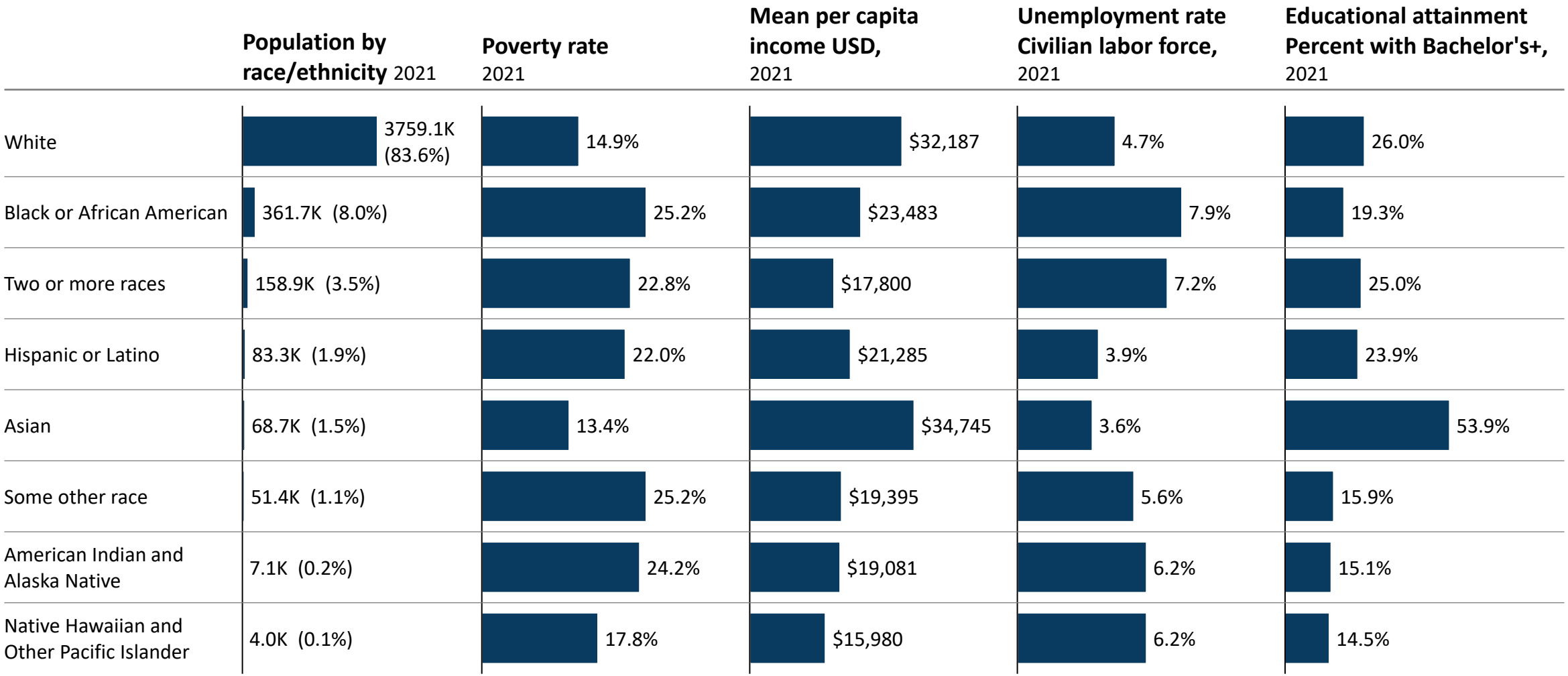
Worker shortages are concentrated in the Central Kentucky region



1. Unfilled positions as distributed by job postings; Job postings exclude those made by non-staffing companies or can't be matched to a specific Kentucky region
2. Jan - April 2023

Source: Lightcast, accessed 8/10/2023; BLS LAUS

Workforce outcomes vary across Kentucky's demographics

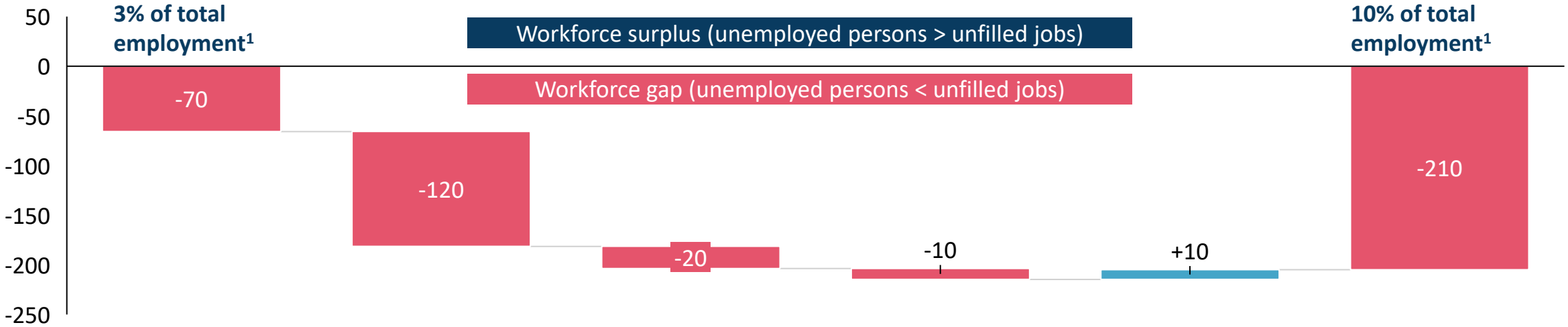


Note: Latinx are defined as 'White Hispanic or Latino' while 'White' is defined as 'White non-Hispanic or Latino'. All other Hispanic or Latino are included within their respective racial groups

Source: US Census Bureau, American Community Survey (ACS) 5-year estimates

Kentucky could see a 3x increase in its workforce gap due to job growth and stagnating labor force

Possible workforce gap in Kentucky, 2030 (Approximate number of workers, thousands)



Net workforce gap, 2023[2]

Difference between monthly unfilled positions (~144k) and unemployed persons (~78k) in 2023Q1

Net job growth

Projected job growth in Kentucky if historic industry-driven growth trends continue

Decrease from net migration

Projected loss of workers aged 16-54 today due to net out-migration

Decreasing participation of younger workers

Changes in the labor force participation rates from aging of those currently 15-54 and macro-economic trends[3]

Net new workers entering labor force

Increase in labor force as those aged less 16 begin to work, less the decline in labor force as those in aged 55+ retire

Net workforce gap, 2030

Possible workforce gap of unfilled positions in excess of unemployed workers

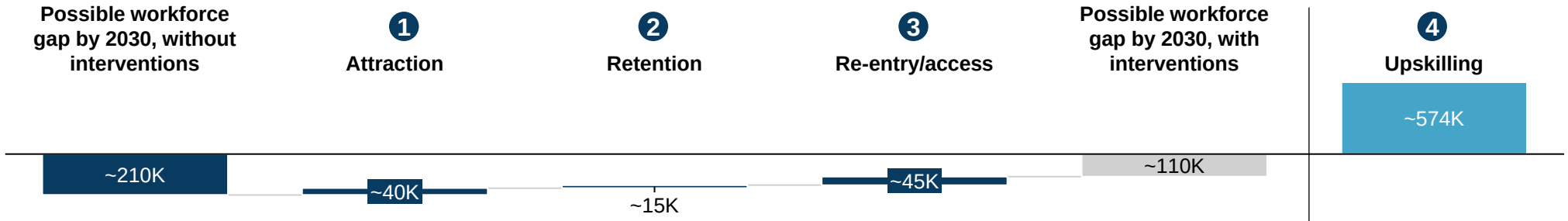
1. Total employment in KY in 2023 is 2.1M, projected total employment in 2030 is 2.2M, per Lightcast employment projections
2. Data for Jan-May 2023
3. Modeled by age brackets, adjusting labor force participation rates of current workers by the effect of aging and long-term changes in labor force participation rate of age groups forecast by the BLS

Note: Moody's Analytics baseline scenario forecasts that the US economy will not go into a recession. Since it is a baseline, by definition the probability that the economy will perform better than this projection is equal to 50%, the same as the probability that it will perform worse.

Source: Lightcast, Moody's Analytics, US. Census Bureau, Bureau of Labor Statistics

Effort and coordination will be needed to address Kentucky's workforce challenges

Illustrative



Example Approach		Increasing the number of workers moving to Kentucky via marketing and quality of life improvements	Improving the retention rate of new graduates in Kentucky institutions	Bringing workers back into workforce by reducing barriers to work (childcare, transport, opportunity)		Training displaced workers or providing access to credentials to move into a new field or up a career trajectory
Current	**210K** Possible difference of unfilled positions minus unemployed workers	**-3K annual net migration** Working-age Kentuckians leaving annually[1]	**27K** College graduates staying in Kentucky annually[2]	**~57.6%** Labor force participation rate[3]	**110K** Employment gap given estimated demand need	**574k** Kentucky workers who could be displaced and require reskilling by 2030
Example target		**-3K > +3K annual net migration** Stopping migration loss in the state of Kentucky and attracting talent	**45% → 49%** Increasing retention rate by 4 p.p to reach peer average	**~57.6% → ~58.9%** Labor force participation rate increasing 1.2 p.p to return to 2019 level		

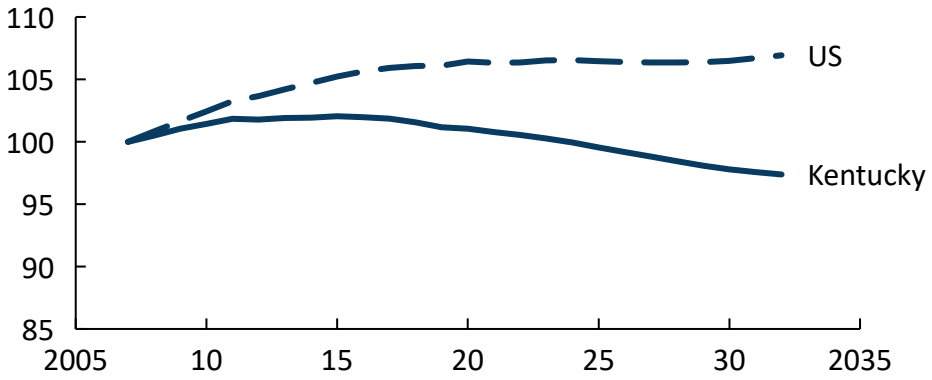
5 Outcomes vary by geography and demographic group, targeted efforts will need to address region-specific challenges

1. Based on projected demographic changes from Moody's Analytics
2. In 2021 there were ~55k degree completions in Kentucky institutions (associate's bachelor's, master's and doctor's degrees). With a retention rate of 49%, an estimated 27K of these graduates remain in-state
3. Seasonally adjusted labor force participation rate in Kentucky as of June 2023. If Kentucky increases its LFPR by 1.2 p.p, reaching the state's 2019 level, the labor force would increase by ~45K

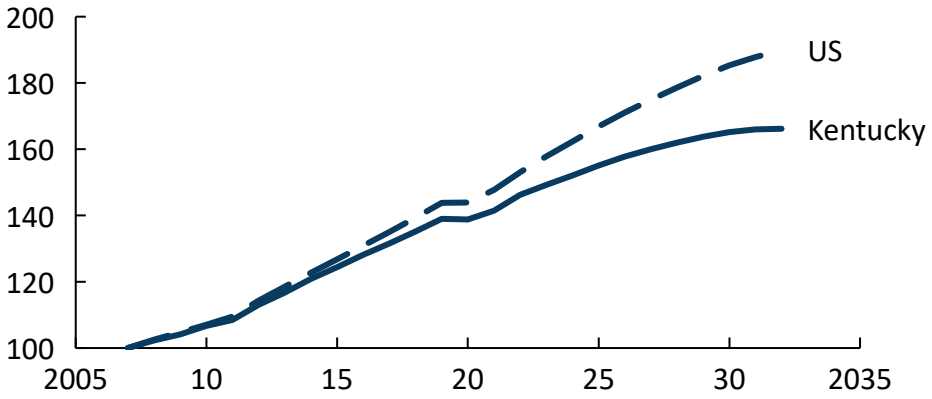
Source: Bureau of Labor Statistics, Lightcast, U.S Census Bureau, IPUMS USA, McKinsey Global Institute

1. Kentucky's working age population may decline by ~90K

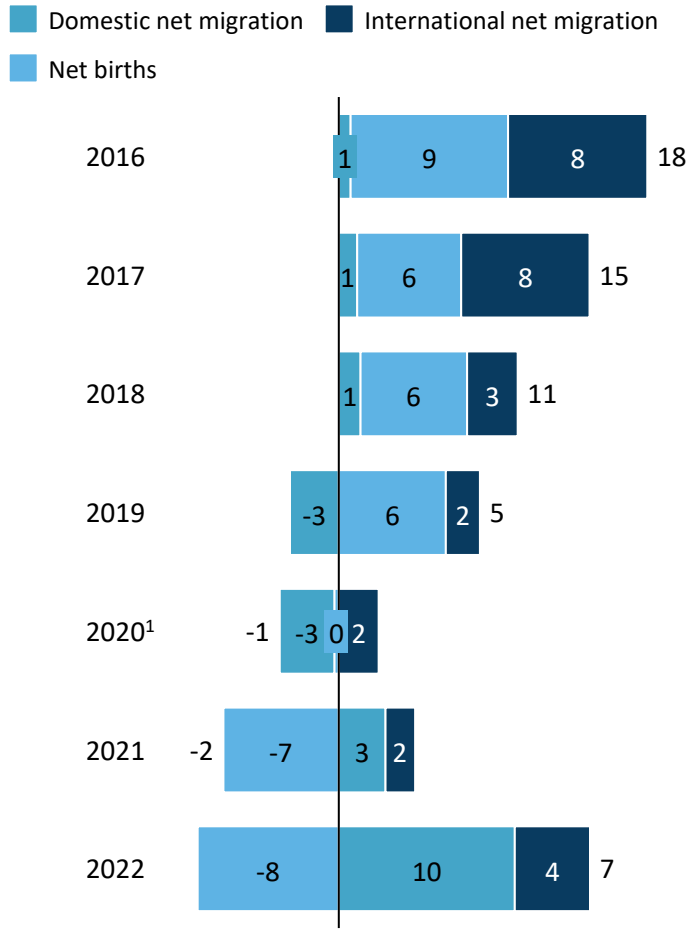
Population 15-64, Indexed to 2007



Population 65 years and older, Indexed to 2007



Drivers of total population change, Thousands



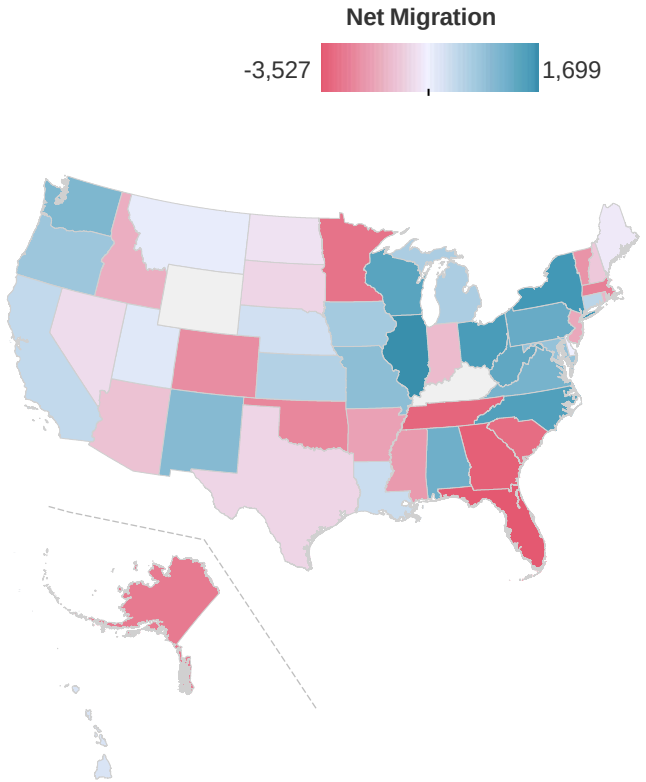
- **Total population growth** in Kentucky has ranged from **1k-13k per year** from 2016 to 2019, but **declined in 2020**
- **Net negative domestic migration** occurred in 2019 and 2020, with peak out-migration of ~3k residents in 2020, **net negative births occurred in 2021 and 2022**
- Combining the slow population growth with an aging demographic is forecast to result in an **overall decline in working age adults** in Kentucky
- While the US is forecast to see relatively constant population of working age adults, **Kentucky is expected to have ~90k fewer residents aged 15-64 in 2032 than it does in 2022**

1. The pandemic had impact on both domestic and international migration. U.S. moving rate and number hit recorded lows in 2020

Source: U.S Census Bureau, Moody's Analytics

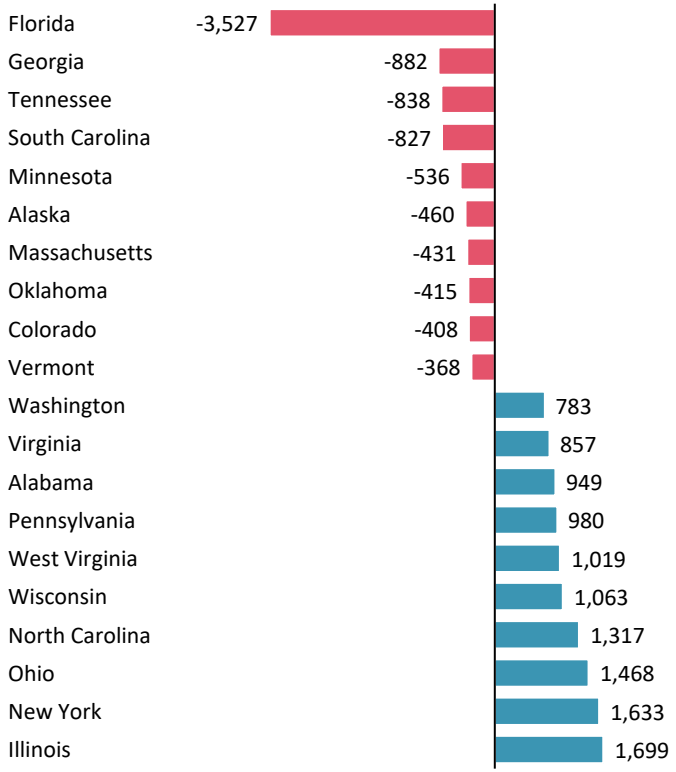
1. Kentucky is attracting people primarily for personal reasons, and losing population due to job related reasons

Migration to and from Kentucky
Net migration, 2017-2021

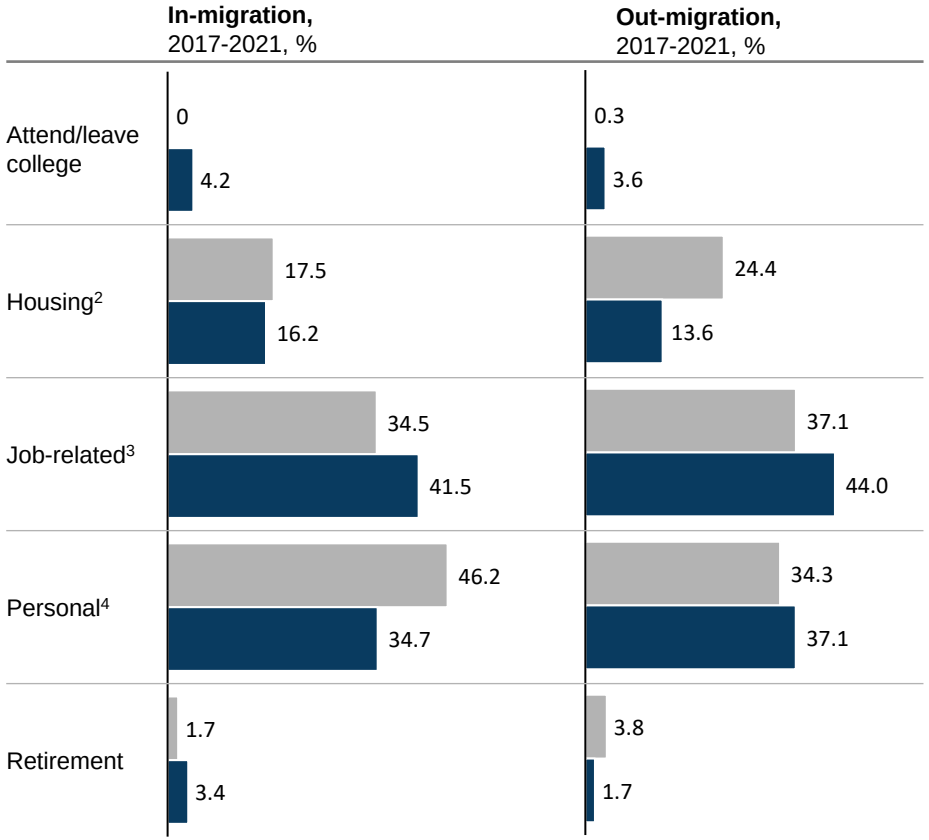


Top 10 States for migration and emigration, 2017-2021**,** Net migration

Kentucky attracts new residents primarily from Illinois, New York and Ohio



Reason for domestic migration to/from Kentucky,
Percent of total migrators (2017-2021)



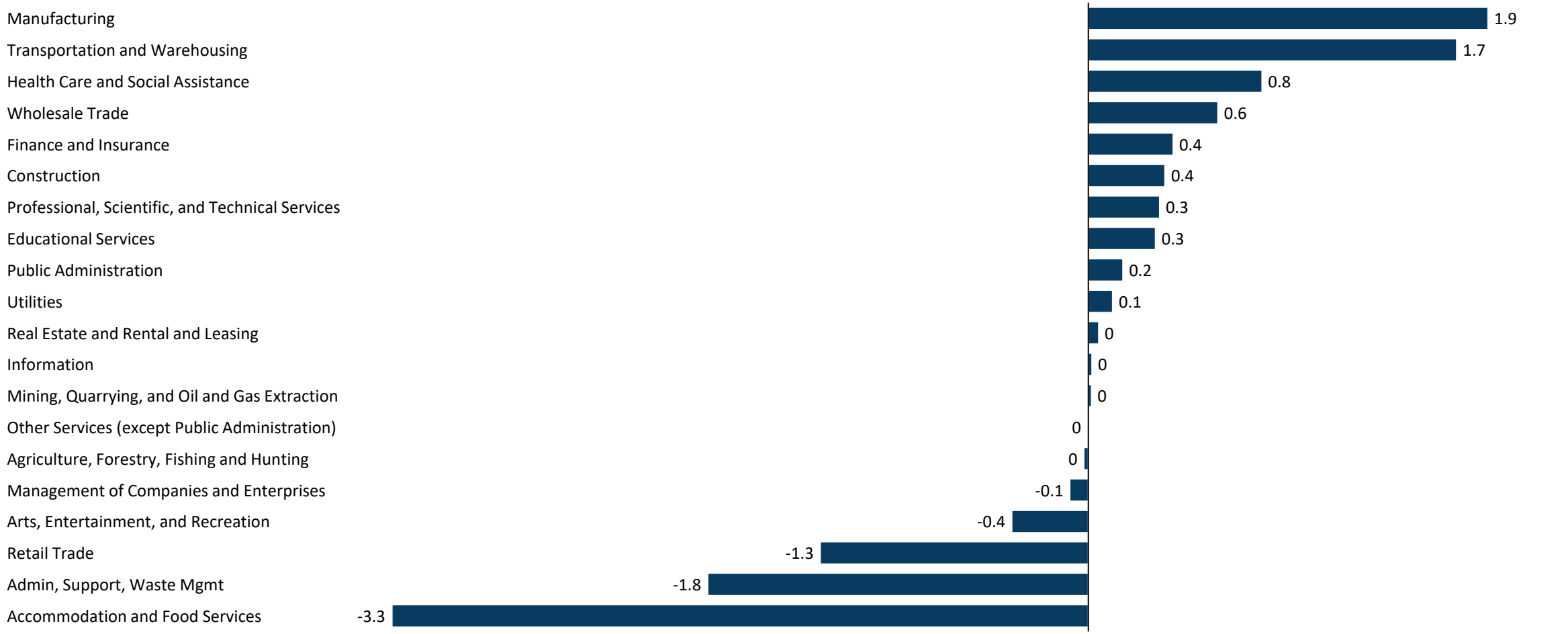
1. Totals may not match those reflected on previous analyses because of differences in survey sample size and response rate
2. Wanted to own home, wanted new or better housing, wanted better neighborhood, for cheaper housing, foreclosure or eviction, other housing reason
3. New job or job transfer, to look for work or lost job, for easier commute, other job-related reason
4. Change in marital status, to establish own household, other family reason, Change of climate, health reasons, natural disaster, other reason

Source: US Census Bureau, County-to-County Migration Flows, US Census Bureau, Current Population Survey

1. Kentucky gains the most workers in manufacturing, transportation, and healthcare, and loses the most in retail trade, admin, and food services

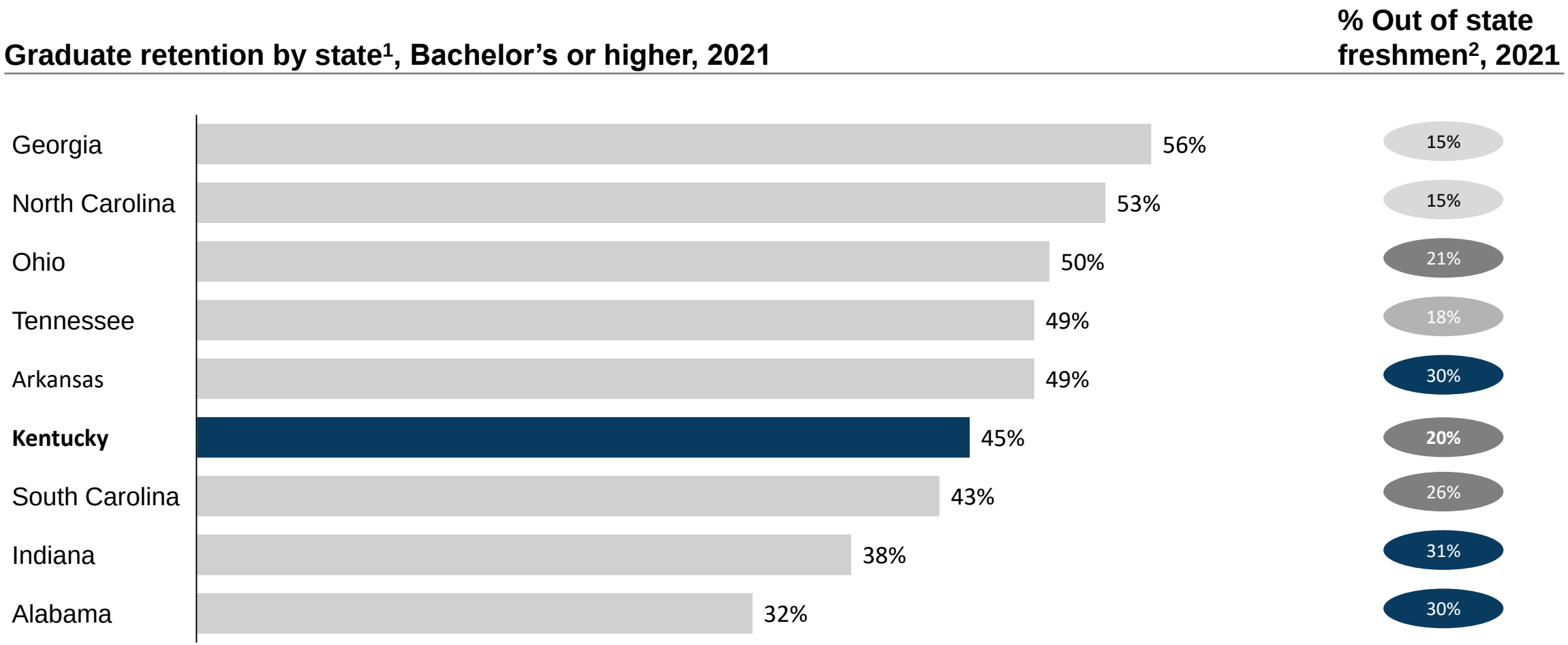
Kentucky job migration by industry of employment

Net flow of jobs, *2017-2022*



Source: US Census Bureau Job-to-Job Flows Explorer (2017 Q1-2021 Q4)

2. Kentucky retains less than half of its BA and higher graduates, ranking 6th among peers

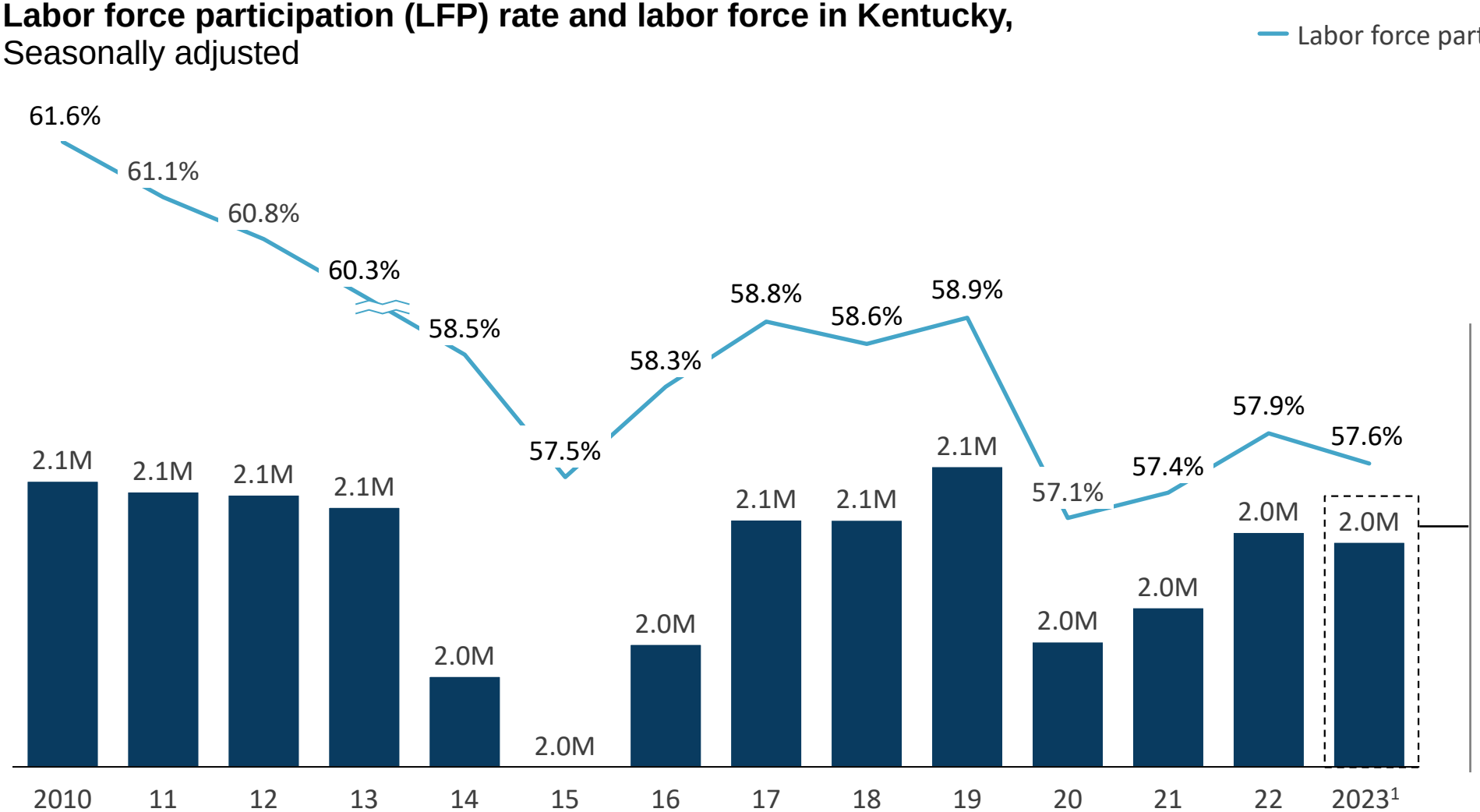


1. Profiles updated since 2018
2. Any degree level

Source: Lightcast, accessed 8/1/2023

3. Labor force participation is ~58% and still recovering

Labor force participation (LFP) rate and labor force in Kentucky,
Seasonally adjusted



Re-engaging the labor force could add more workers and change the supply narrative

- LFP at 2019 level ↑ **44K**
- LFP at 2010 level ↑ **143K**

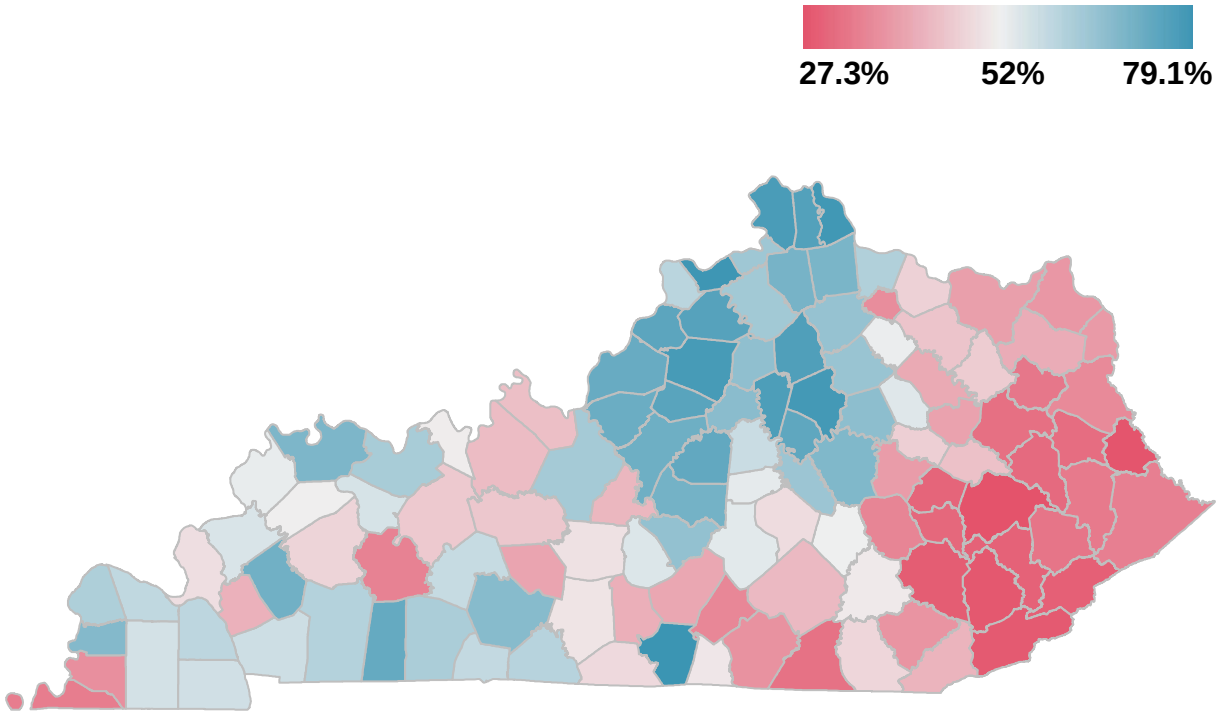
1. Data through June 2023

Source: BLS JOLTS, Local Area Unemployment Statistics

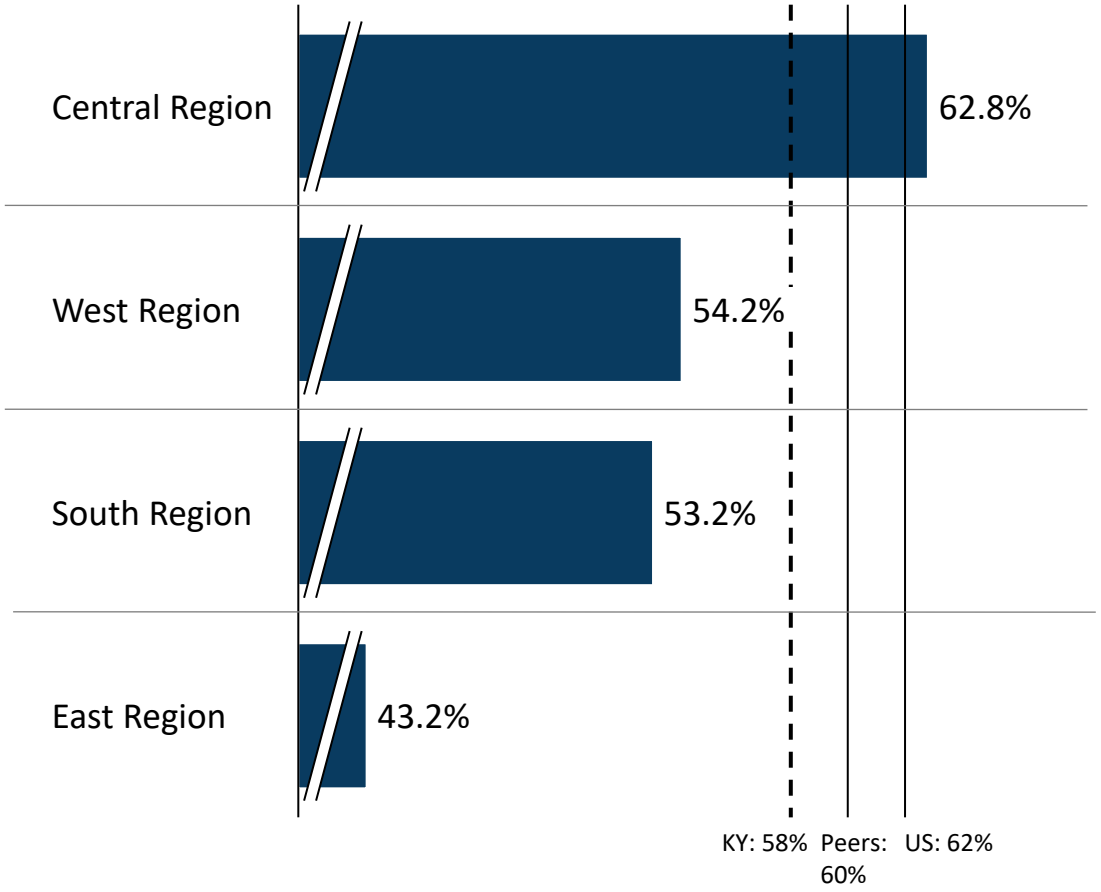
34

3. Labor force participation rate varies regionally, with East region lowest at 43%

Labor force participation rate by county in Kentucky
%, April 2023



Labor force participation rate by region,
%, April 2023



Source: Lightcast, Accessed 8/2/2023

3. Kentucky has a lower LFPR than the peers and US average across nearly all demographic groups

Labor force participation rate by selected characteristic, %, 2021[1]

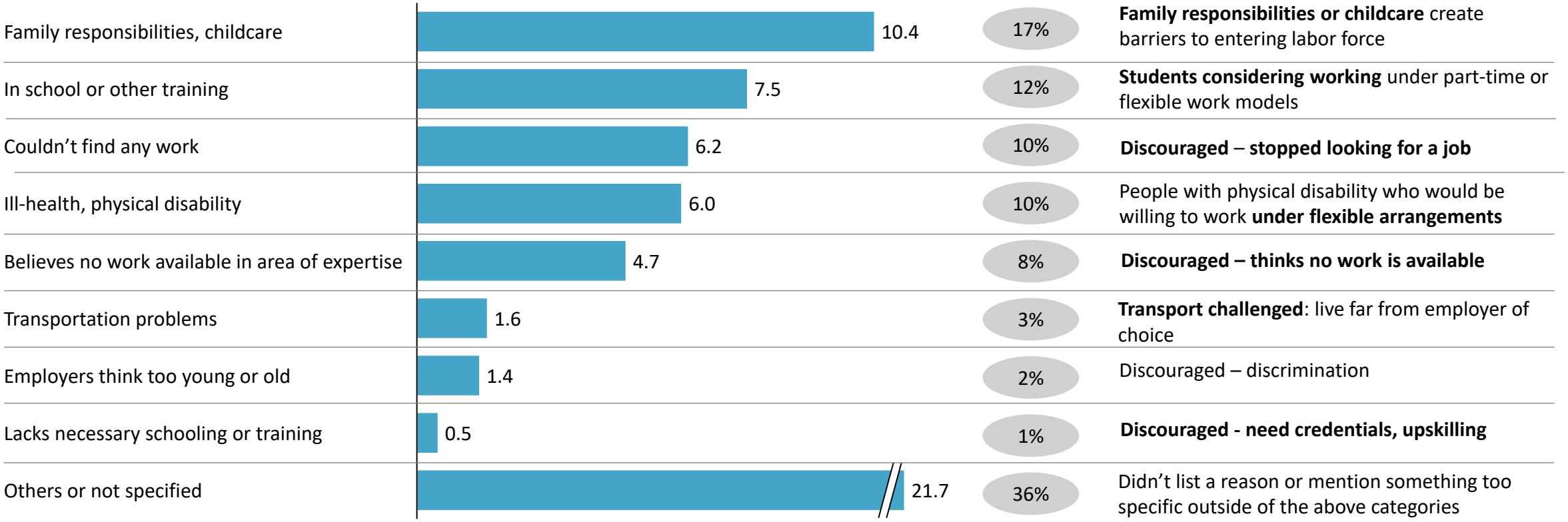
	Population characteristic	KY population estimate (K)	KY LFPR (%)	Peer average LFPR (%)	US LFPR (%)	Difference (%), KY-Peer avg.	Difference (%), KY-US	LF increase (K) if KY LFPR matched US
	16+	**3,613**	**58.8**	**61.0**	**63.0**	-2.2	-4.2	151.7
Age cohort	16-19	246	45.7	40.1	39.3	5.6	6.4	
	20-24	289	76.1	74.9	74.6	1.2	1.5	
	25-29	290	81.7	82.7	83.1	-1.0	-1.4	4.1
	30-34	292	79.2	81.5	83.1	-2.2	-3.9	11.4
	35-44	573	78.4	81.0	82.8	-2.6	-4.4	25.2
	45-54	552	75.2	79.7	81.4	-4.5	-6.2	34.2
	55-59	299	64.3	70.1	73.6	-5.8	-9.3	27.8
	60-64	302	49.1	54.8	58.7	-5.7	-9.6	29.0
	65-74	476	21.3	23.5	26.2	-2.2	-4.9	23.3
	75+	293	6.2	6.5	6.9	-0.3	-0.7	2.0
Gender[2]	Male	1,302	76.7	80.4	82.3	-3.7	-5.6	72.9
	Female	1,296	69.1	71.8	73.7	-2.7	-4.6	59.6
Race[3]	White, not Latinx	3,046	57.8	59.9	61.4	-2.1	-3.6	109.6
	Black	251	62.2	61.2	62.3	1.0	-0.1	0.3
	Asian	50	70.5	67.3	65.9	3.2	4.6	
	Latinx	117	71.3	69.3	67.5	2.0	3.8	
Education[4]	No high school	245	44.4	54.9	60.8	-10.5	-16.4	40.1
	High school	723	65.7	70.1	71.7	-4.4	-6.0	43.4
	Some college	684	75.6	78.0	79.1	-2.4	-3.5	23.9
	Bachelor's degree	659	87.1	86.6	87.2	0.5	-0.1	0.7
Other[5]	With disability	413	37.9	42.5	47.2	-4.6	-9.3	38.5
	Below poverty level	395	39.8	45.0	47.2	-5.2	-7.4	29.2

1. The labor force participation rate is different than the LRRP from BLS due to this analysis is based on U.S. census survey data (rather than statistics) that can be used to breakdown by demographics
2. Population 20 to 64 years | 2. Population 16-years and older | 3. Population 25 to 64 years | 4. Population 20 to 64 years

Source: United States Census Bureau, American Community Survey 2021 1-year estimates

3. ~60K Kentuckians could be willing to enter the workforce if the conditions are right

Top reasons for not looking for work amongst those who want a job[1]
Monthly average Jan 2019 – June 2023, thousands



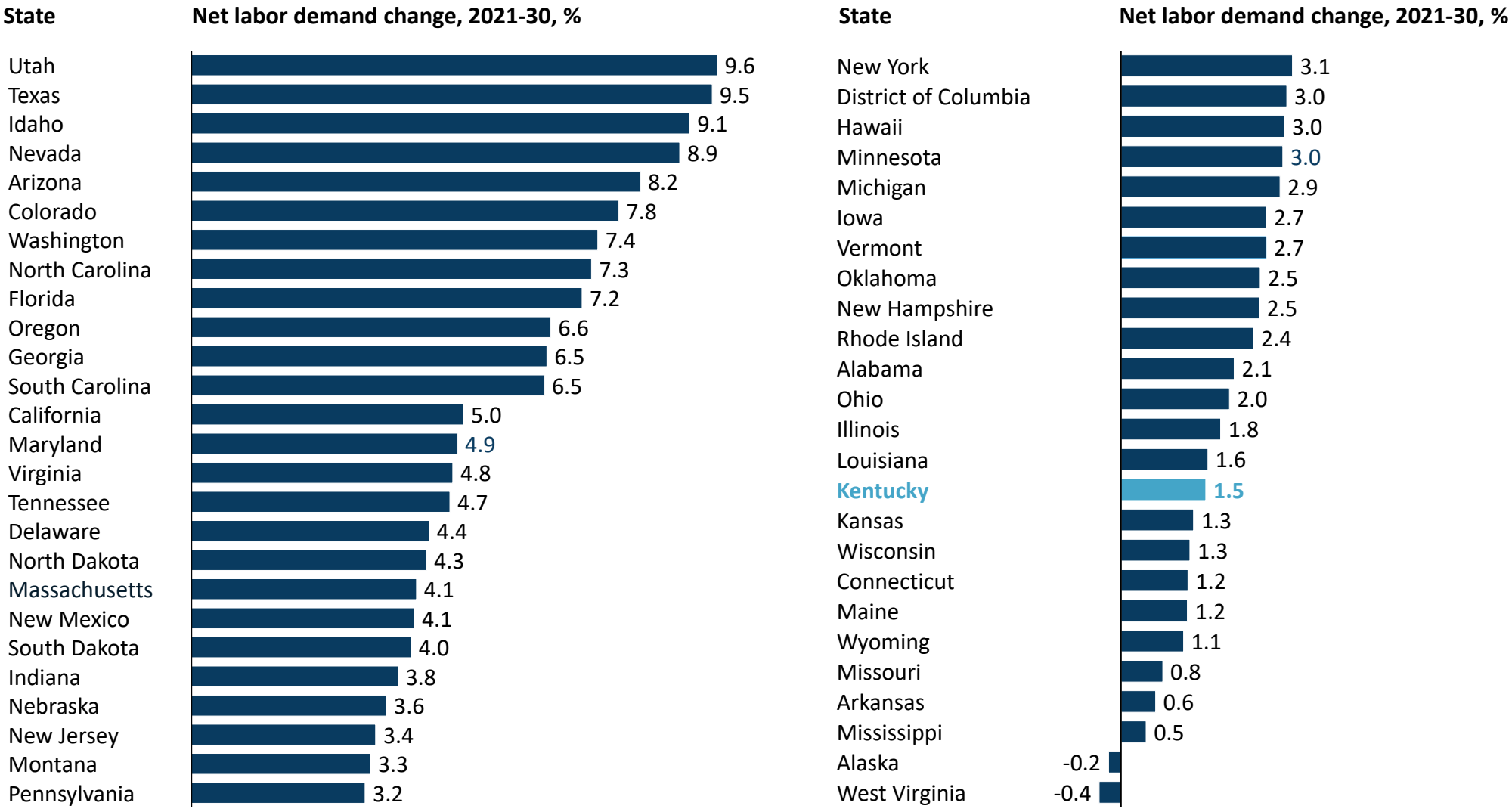
Description
Family responsibilities or childcare create barriers to entering labor force
Students considering working under part-time or flexible work models
Discouraged – stopped looking for a job
People with physical disability who would be willing to work **under flexible arrangements**
Discouraged – thinks no work is available
Transport challenged: live far from employer of choice
Discouraged – discrimination
Discouraged - need credentials, upskilling
Didn't list a reason or mention something too specific outside of the above categories

1. People who are not working or looking for a job (either full-time or part-time) but are available and searched for a job in the last 12 months but not in the past 4 weeks

Source: IPUMS CPS, January 2014 – June 2023; estimations based on representative sample size; BLS

4. Kentucky could see 1.5 percent job growth between 2021-30

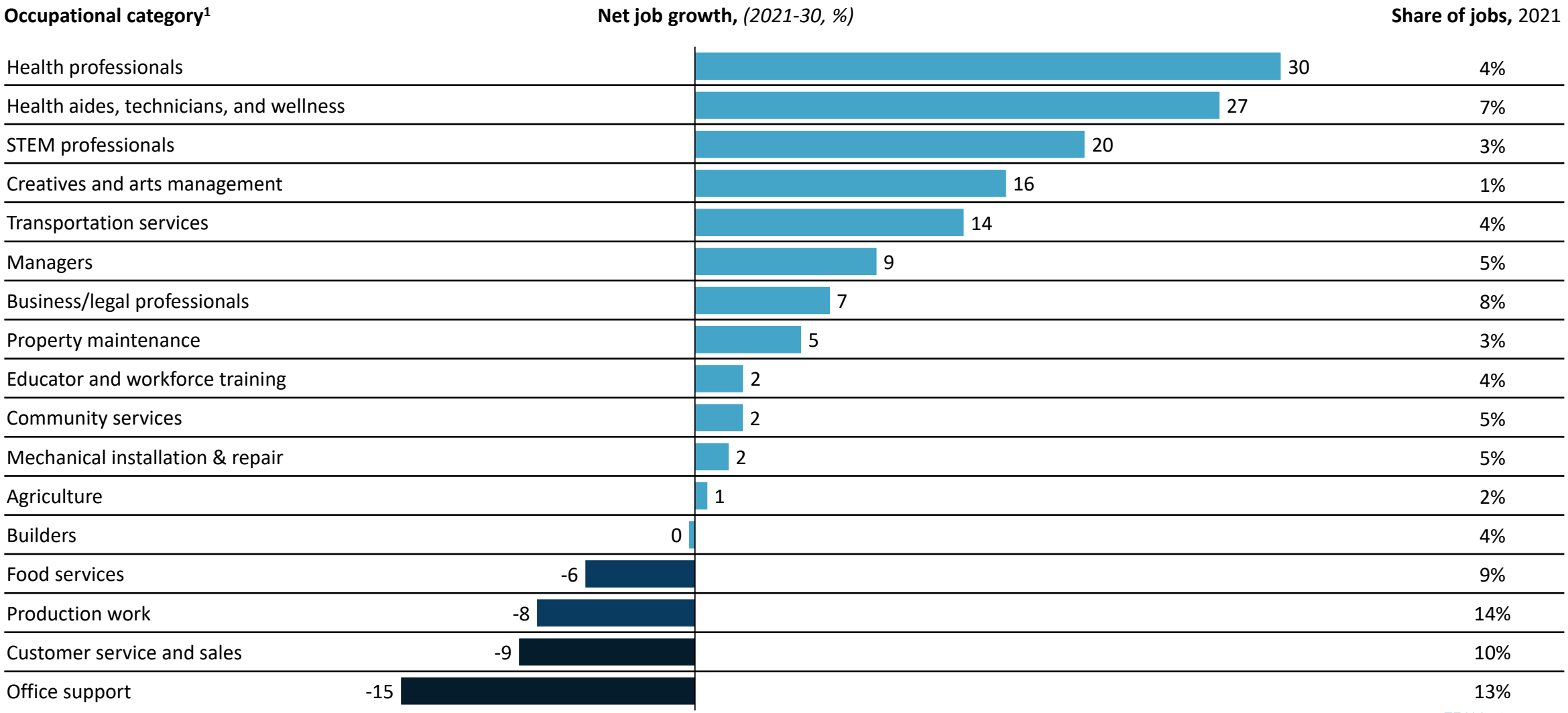
Net labor demand change, post-COVID scenario, 2021-2030, %



Source: O*NET, BLS, MGI FoW post-Covid model, September 2022; MGI The future of work in America, McKinsey Global Institute analysis

4. Jobs in healthcare and STEM may see high rates of job growth in Kentucky, while customer service and office support could decline

Net labor demand change, post-COVID scenario, 2021-2030, %



1. Occupational categories differ from previous analysis, this analysis uses O*NET occupational groupings, other analyses use SOC

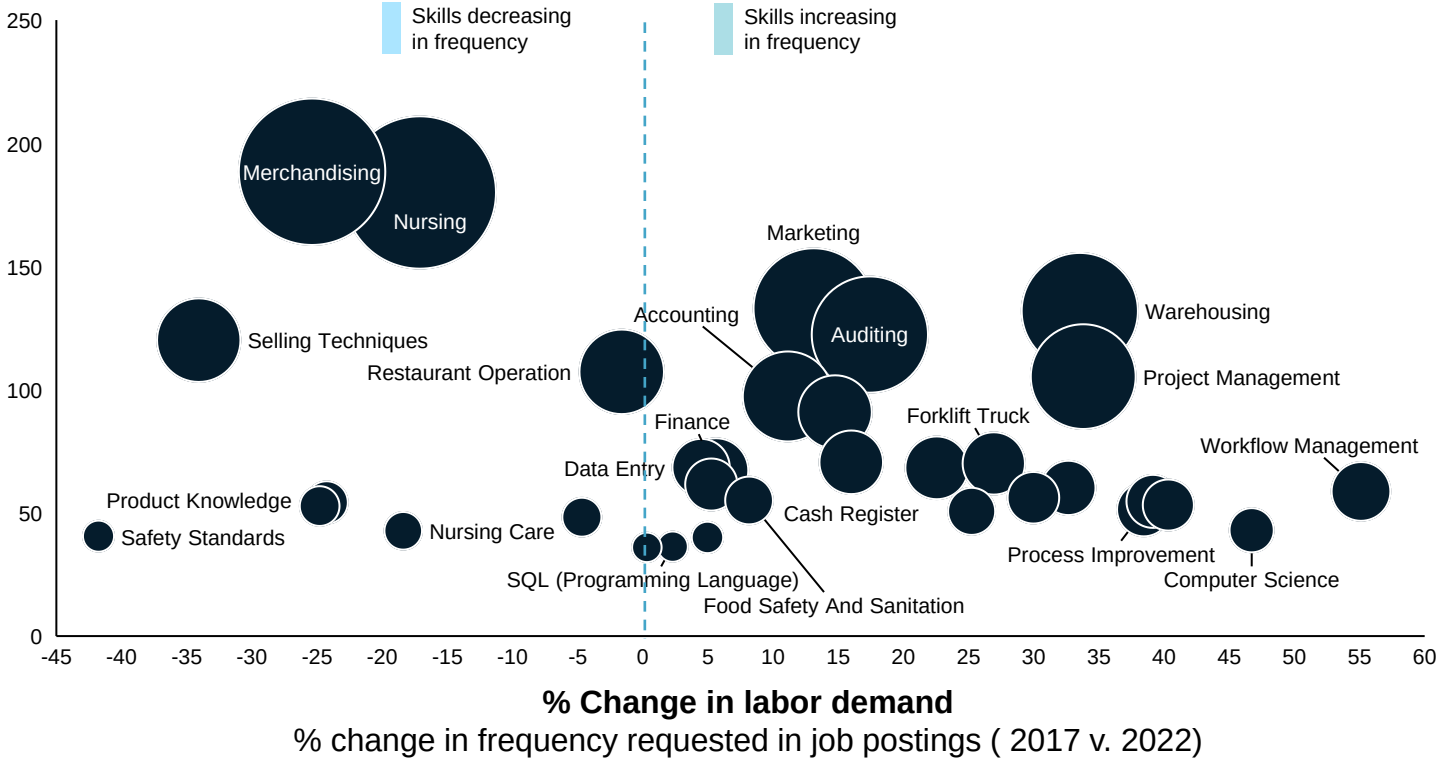
Source: O*NET; U.S. Bureau of labor statistics (BLS); MGI Automation Model October 2022; MGI FoW post-Covid model October 2022;

4. To prepare KY workforce could target in-demand tech, production and healthcare-related skills

◯ Size represents Jan 2022- Dec 2022 unique job postings (current demand)

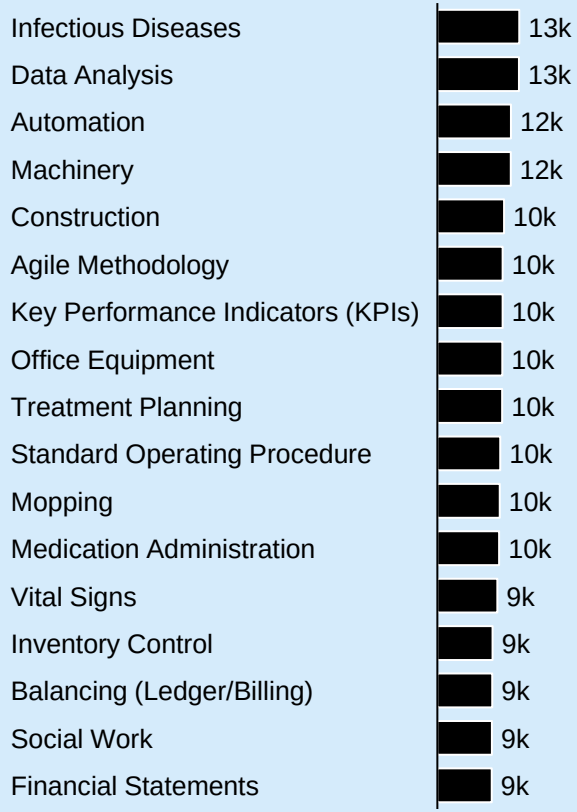
Top 50 in-demand specialized skills[1] in job postings in Kentucky

January 2022 – Dec 2022



New specialized skills entering Top 50

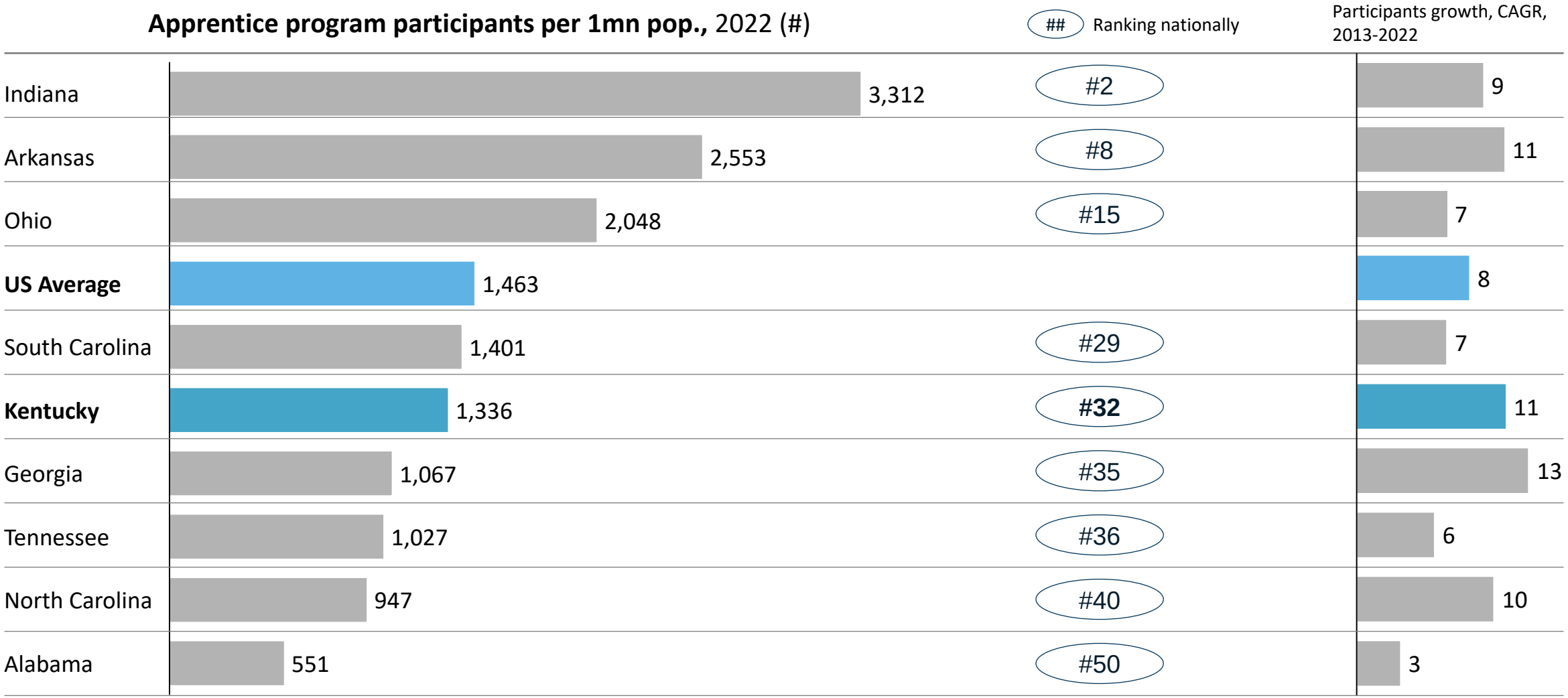
Unique postings, Jan – Dec 2022



1. Specialized skills are primarily required within a subset of or equip one to perform a specific task. Chart includes skills that were in the top 50 in both 2017 and 2022. Nascent skills, that were in the top 50 in 2022 but weren't in 2017 are shown on the right-hand side of the page

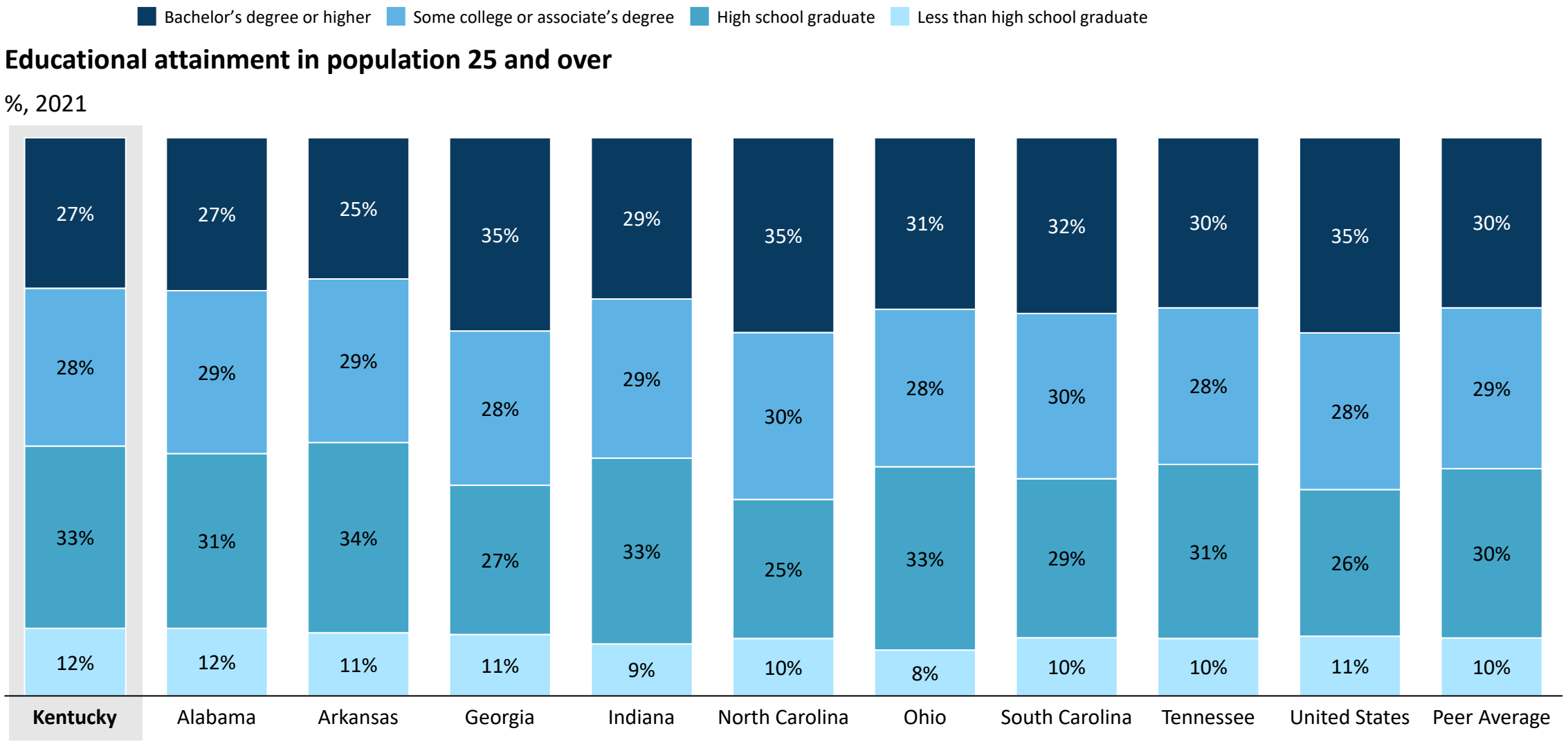
Source: Lightcast, Accessed 6/29/2023

4. Kentucky is ranked 32 nationally for apprenticeship opportunities, with above average growth since 2013



Source: US Department of Labor, Moody's Analytics, U.S. Census Bureau

4. Kentucky lags peers and US overall in educational attainment



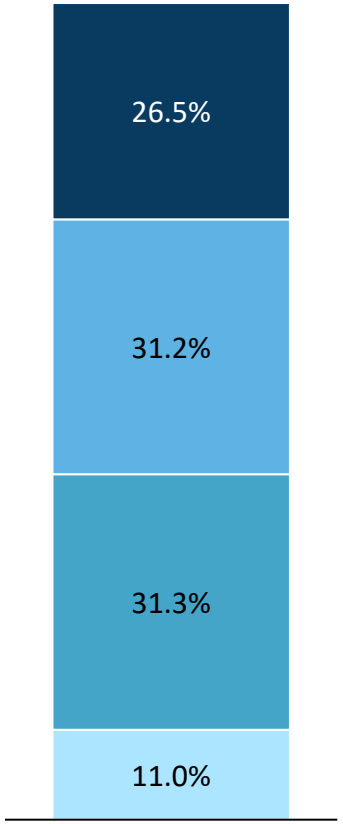
Source: US Census Bureau, American Community Survey (ACS) 1-year estimates

4. Higher educational attainment correlates to better labor force outcomes

Bachelor's degree or higher | Some college or associate's degree | High school graduate | Less than high school graduate

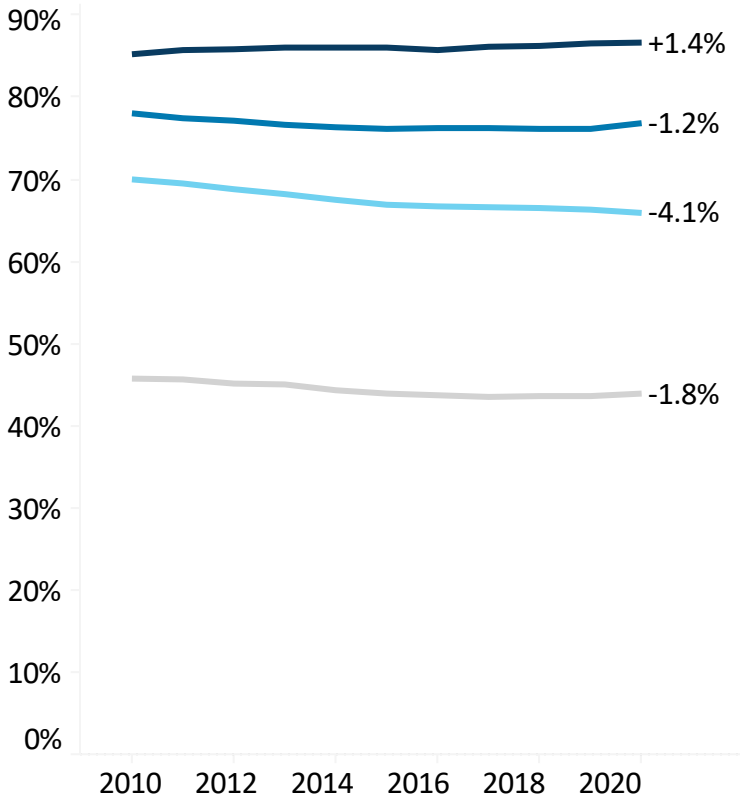
Education attainment among 25-64 year olds

Percent, 2020, 5-year estimate



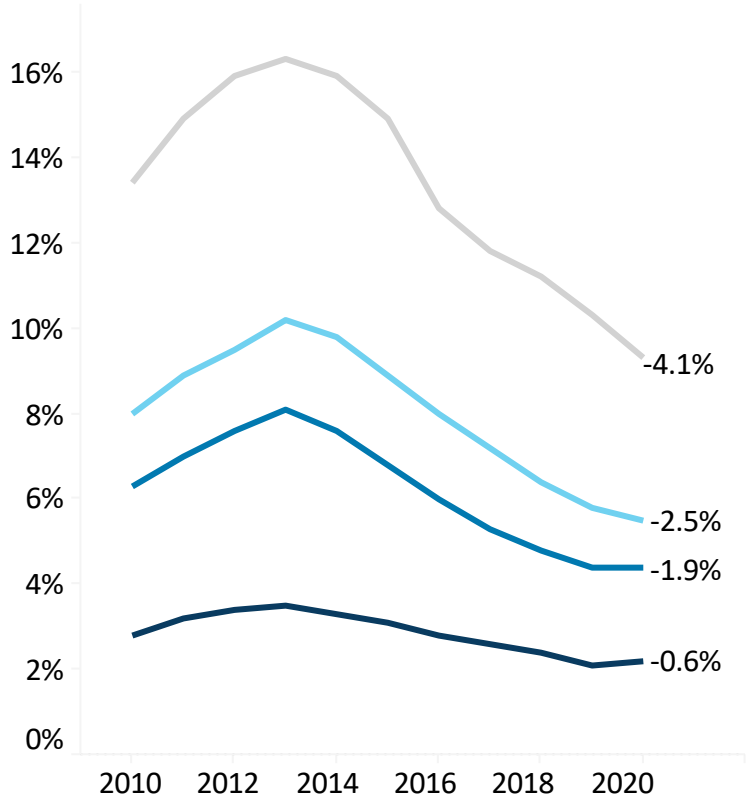
Labor force participation rate among 25-64 year olds by educational attainment

Percent



Unemployment rate among 25-64 year olds by education attainment

Percent



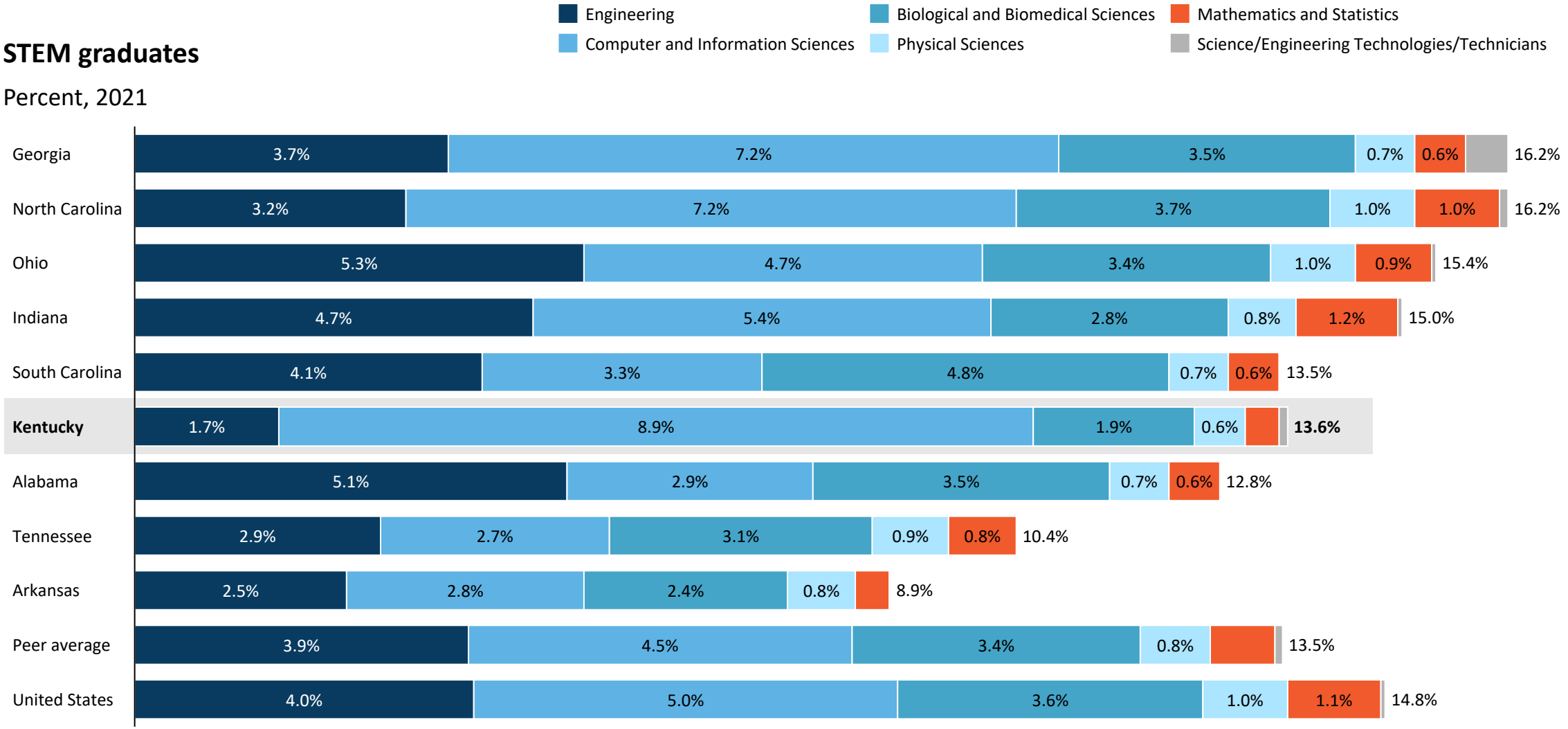
Source: US Census Bureau, American Community Survey (ACS) 5-year estimates

4. ~14% of Kentucky graduates are in STEM fields, close to peer average

FOR OFFLINE REVIEW PRELIMINARY

STEM graduates

Percent, 2021

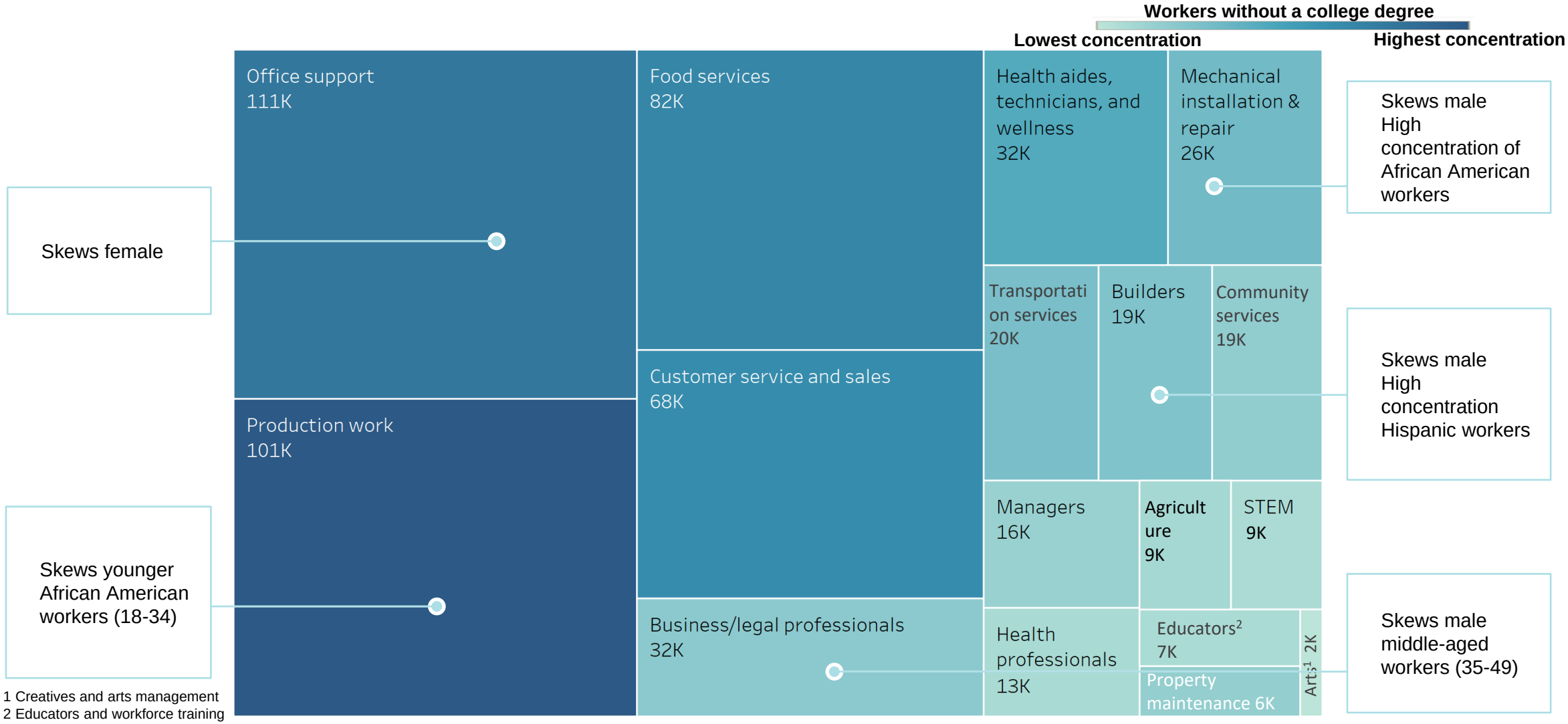


Note: Only includes awards that are Associate's or higher. Includes first and second major completions

Source: National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS)

4. Automation could displace ~574K jobs, affecting office support, production, food services, and customer service jobs the most

Expected job losses due to automation, 2030, post-COVID scenario, KY



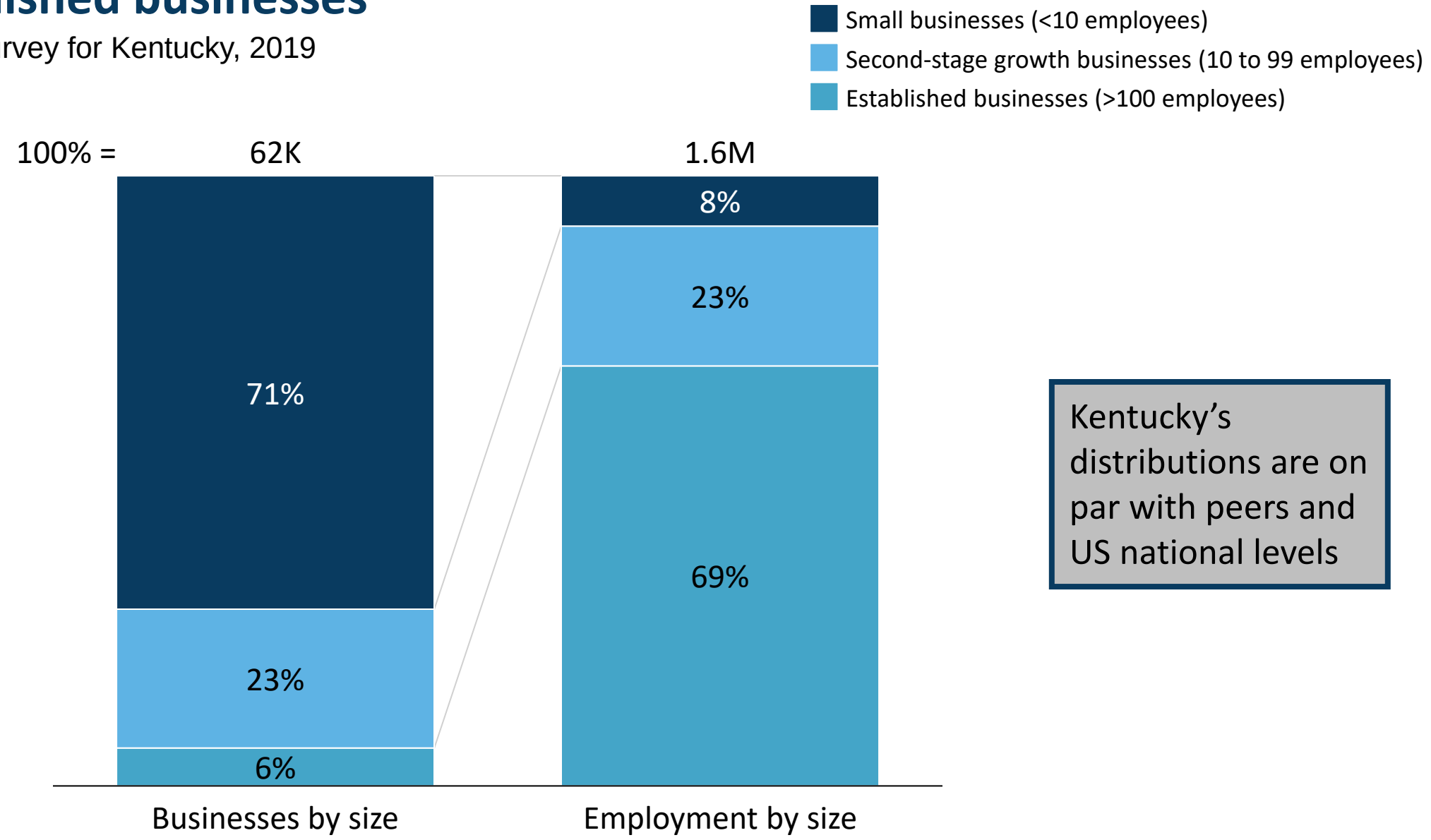
1 Creatives and arts management
2 Educators and workforce training
3. Numbers are rounded off

Source: O*NET, BLS, MGI FoW post-Covid model, September 2022; MGI The future of work in America, McKinsey Global Institute analysis

3. Capital and Innovation

Most businesses in Kentucky are small, while most employees work in larger established businesses

Annual Business Survey for Kentucky, 2019



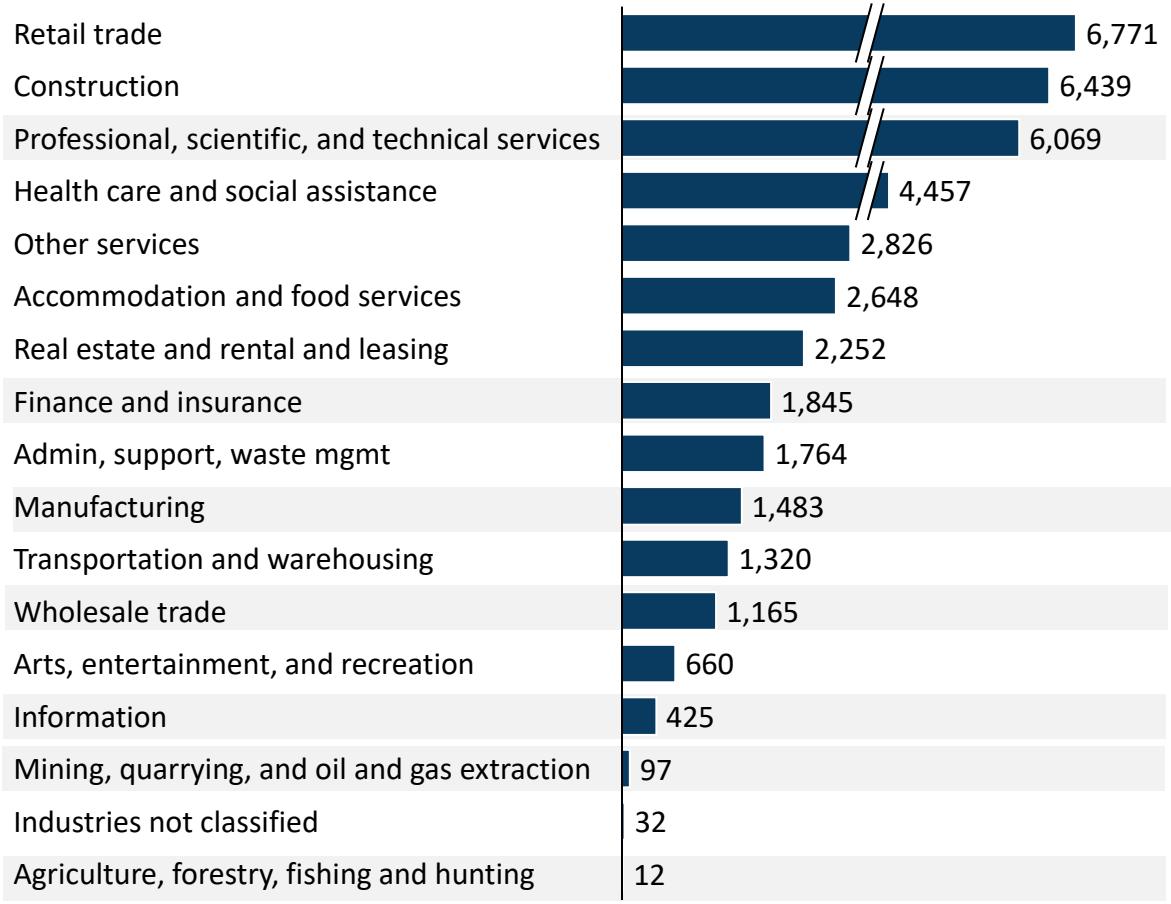
Kentucky's distributions are on par with peers and US national levels

Source: United States Census Bureau, Annual Business Survey, 2019

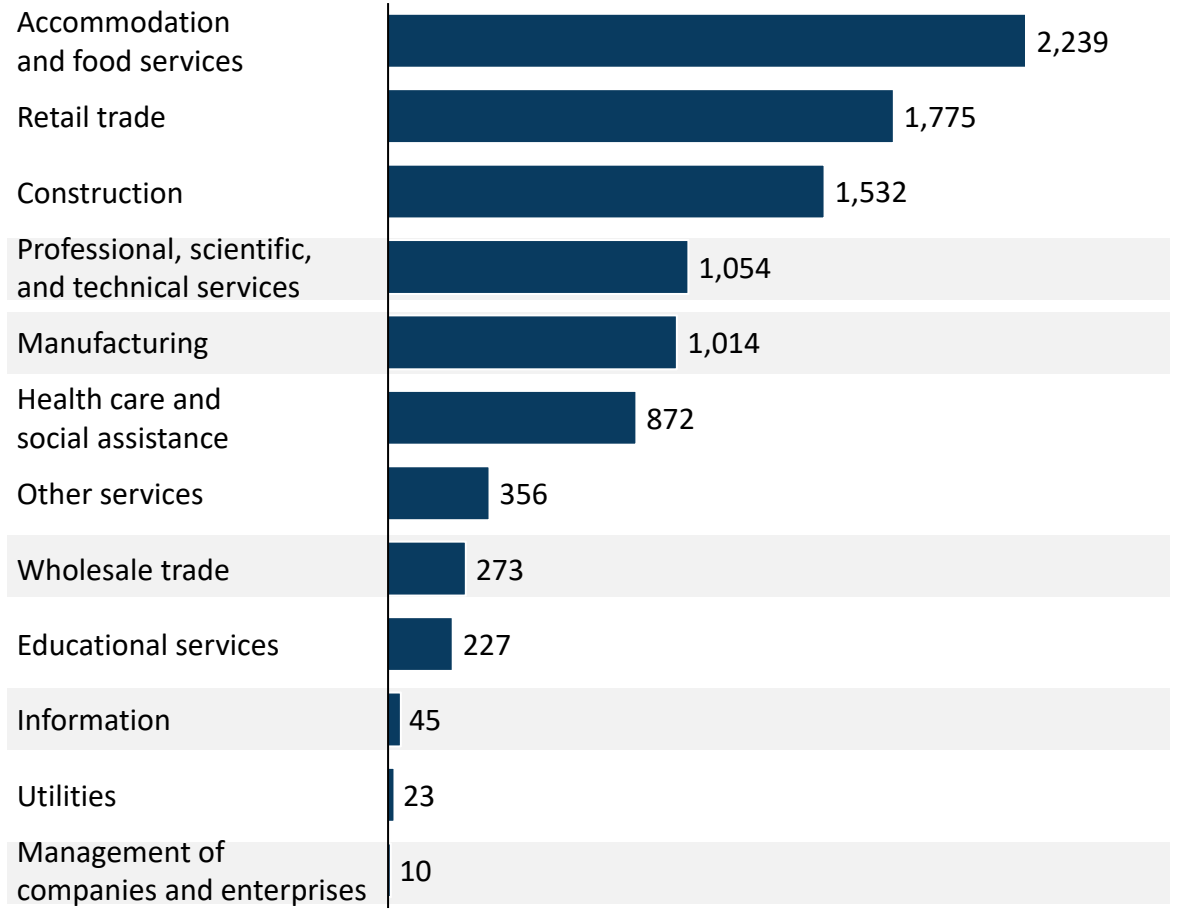
Most of Kentucky's small and second-stage growth businesses are in non-tradeable industries

Majority tradable industries

Number of small businesses[1] by industry, 2019



Number of second-stage growth businesses[2] by industry, 2019

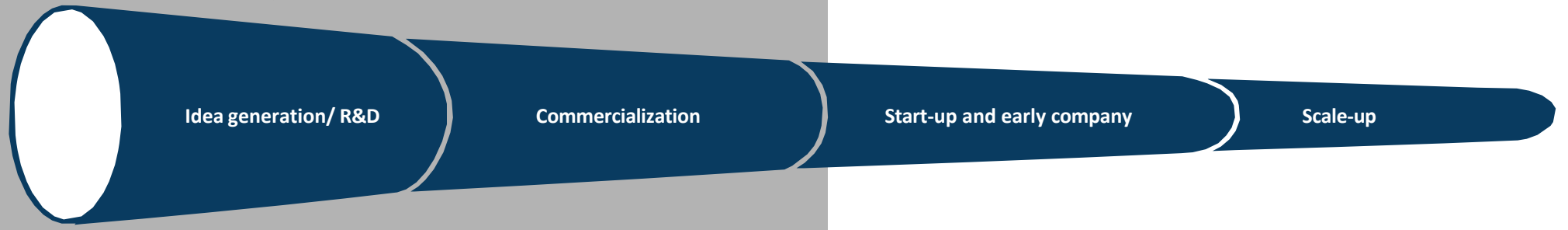


1. Companies with <10 FTEs
2. Companies with 10-99 FTEs

Source: United States Census Bureau, Annual Business Survey, 2019

Kentucky entrepreneurship and innovation-driven business creation and expansion outcomes: overview

Focal point for following pages:
Industry & university-driven innovation



Rank
#1 #50

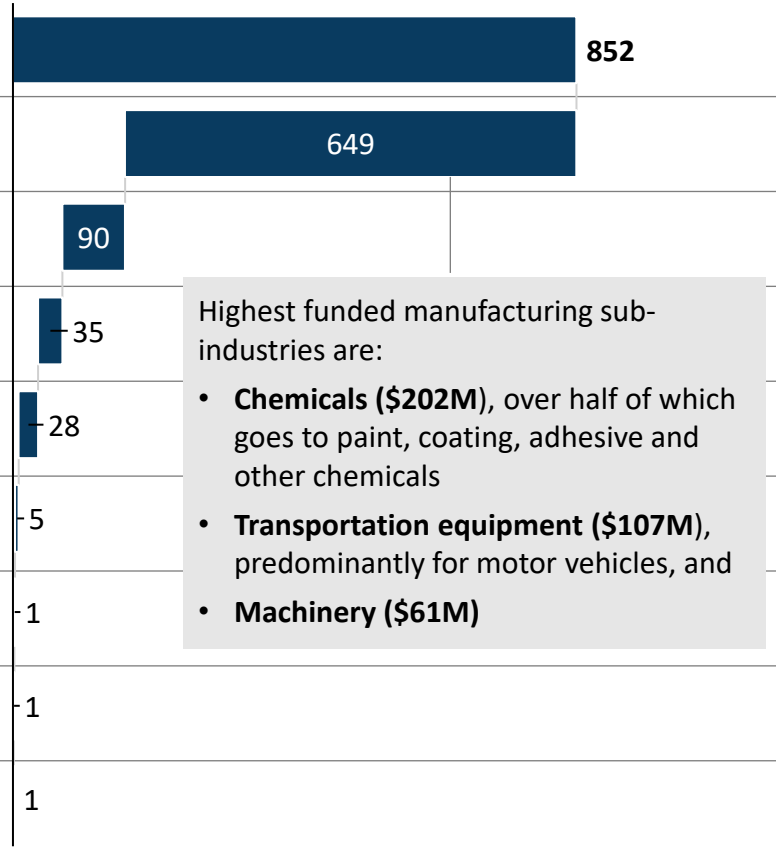
Idea generation/ R&D		Commercialization		Start-up and early company		Scale-up	
Academic science/engineering R&D, percent of GDP 2019	#40	Patents per 1m people 2022	#42	Rate of new entrepreneurs 2021	#27	Start-up early job creation 2021	#47
Business R&D, percent of GDP 2020	#43	Small Business Innovation Research/Technology Transfer, per $1m GDP 2019	#33	Start-up early survival rate 2021	#32	5-year business survival rate 2022	#25
State agency R&D, per $1m GDP 2020	#19	Venture capital per 1m people (3yr rolling total) 2019-21	#34	Business cost 2023	#10	New businesses that make a first payroll within 2yrs of business application 2020	#31
		Accelerators and incubators per capita 2023	#24	Financial accessibility 2023	#2		

Note: : Rate of 'new entrepreneurs' refers to the percent of the total number of new entrepreneurs who were not unemployed and not looking for a job as they started the new business | Business cost metric includes income tax, corporate tax, and property tax rates as of January 1, 2022 | Financial accessibility metric uses data from the Small Business Administration State Profiles to calculate the total amount of business funding available in 2021

Source: United States Patents and Trademarks Office (USPTO), National Science Foundation (NSF), Kauffman Indicators of Entrepreneurship, Moody's Analytics, PitchBook, Forbes Advisor The Best States to Start a Business

Kentucky corporate R&D spending is focused in Manufacturing

Domestic R&D paid for and performed by companies in KY, by industry[1], 2020, $M



	% of KY's total corporate R&D	% of corporate R&D nationwide	Peer leader (% of corporate R&D nationwide)
All industries[1]		0.2%	North Carolina (2%)
Manufacturing industries	76.2%	0.2%	Indiana (3%)
Information	10.6%	0.1%	North Carolina (2%)
Finance and insurance	4.1%	0.3%	North Carolina (5%)
Professional, scientific, and technical services	3.3%	0.1%	North Carolina (3%)
Wholesale trade	0.6%	0.5%	North Carolina (7%)
Mining, quarrying, oil and gas extraction	0.1%	0.1%	Georgia (2%)
Transportation and warehousing	0.1%	0.0%	Tennessee (1%)
Health care services	0.1%	0.1%	Indiana (3%)

Highest funded manufacturing sub-industries are:

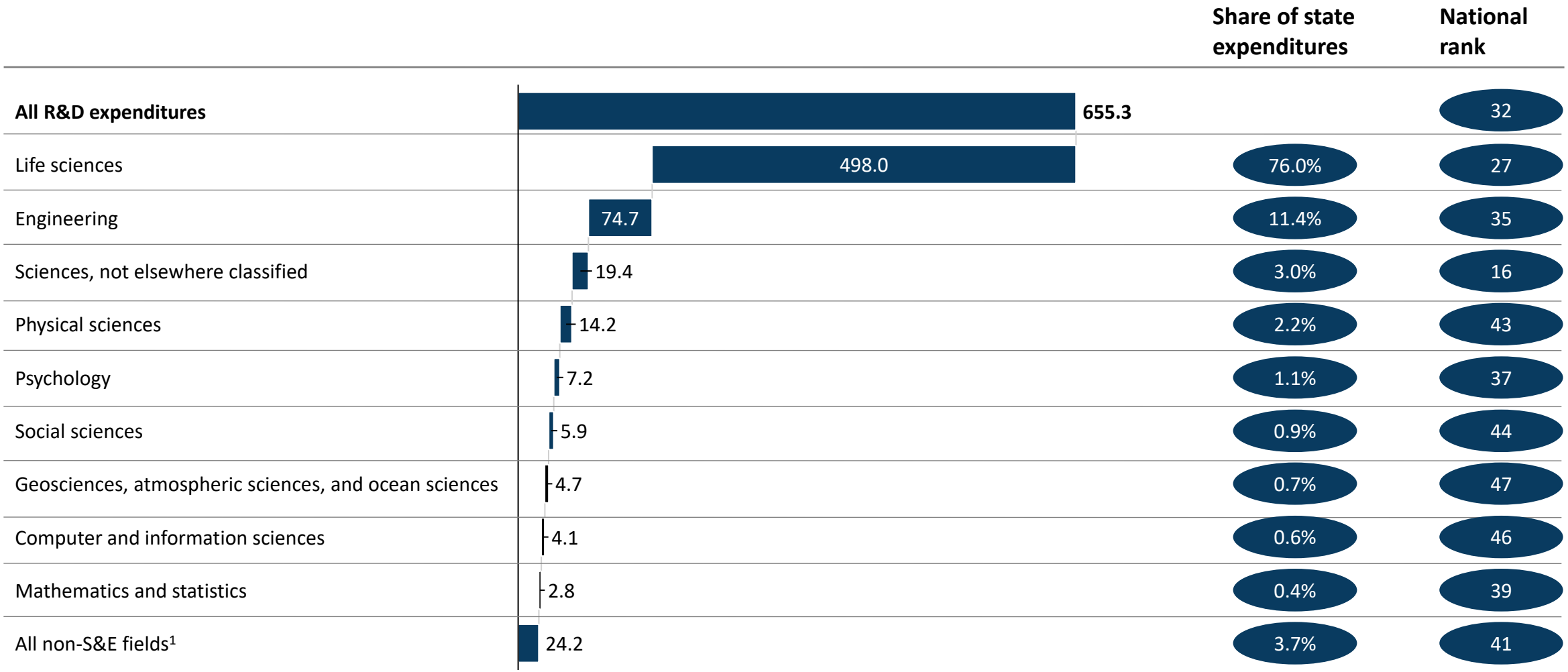
- **Chemicals ($202M**), over half of which goes to paint, coating, adhesive and other chemicals
- **Transportation equipment ($107M**), predominantly for motor vehicles, and
- **Machinery ($61M)**

1. Industries will not sum to total due to data suppression within categories with limited survey reponses

Source: NSF Business Enterprise Research and Development Survey, 2020

Kentucky's higher-education R&D expenditures are focused in Life Sciences

Higher educational R&D expenditures by field, 2021, $M



Source: NSF, HERD Survey 2021

1. Other non-science and engineering fields include Business management and business administration, Communication and communications technologies, Education; Humanities, Law, Social work, Visual and performing arts and other

TEAM KENTUCKY CABINET FOR ECONOMIC DEVELOPMENT

R&D: Kentucky's R1 university R&D compared to peer state R1 institutions

Kentucky institutions

Kentucky & peer state[1] R1 institutions by total R&D expenditures, 2021

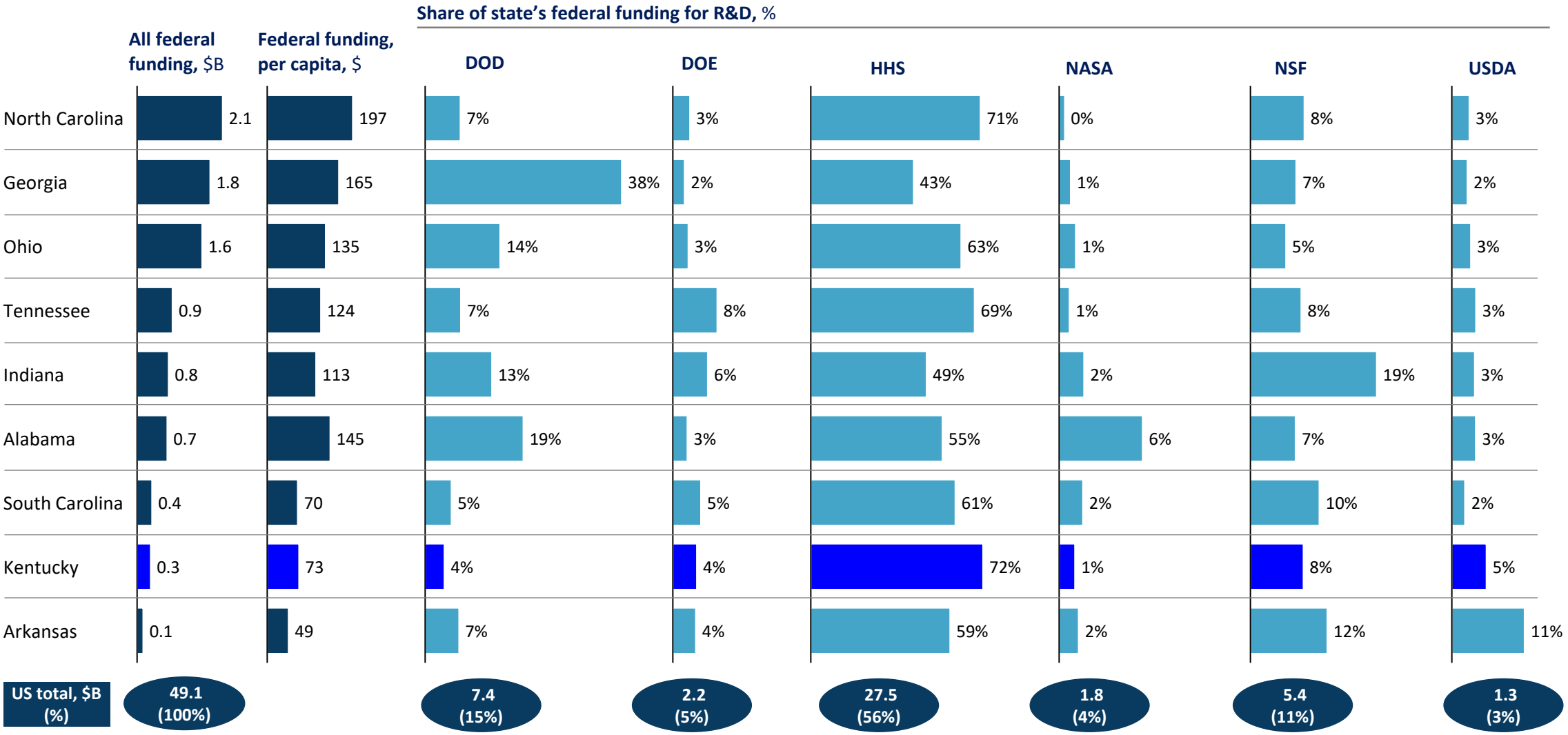
Peer Rank	Institution	State	National Rank	R&D spend $M
1	Duke University	NC	11	1,238
2	Ohio State University-Main Campus	OH	12	1,236
3	University of North Carolina at Chapel Hill	NC	13	1,206
4	Georgia Institute of Technology-Main Campus	GA	20	1,114
5	Vanderbilt University	TN	24	1,019
6	Emory University	GA	31	853
7	Indiana University-Bloomington	IN	40	695
8	Purdue University-Main Campus	IN	41	679
9	University of Alabama at Birmingham	AL	44	644
10	University of Cincinnati-Main Campus	OH	51	552
11	North Carolina State University at Raleigh	NC	53	547
12	University of Georgia	GA	57	494
13	University of Kentucky	KY	64	429
14	Case Western Reserve University	OH	66	422
15	The University of Tennessee-Knoxville	TN	85	316
16	Auburn University	AL	100	266
17	University of Notre Dame	IN	106	240
18	Clemson University	SC	107	237
19	University of South Carolina-Columbia	SC	113	215
20	Georgia State University	GA	118	206
21	University of Louisville	KY	124	200
22	University of Arkansas	AR	140	164
23	University of Alabama in Huntsville	AL	145	150
24	The University of Alabama	AL	150	130
25	University of Memphis	TN	181	67
26	Kent State University at Kent	OH	205	50
27	Ohio University-Main Campus	OH	206	50

1. Peers include: AL, AR, GA, IN, NC, OH, SC, TN

Source: National Science Foundation, Higher Education Research and Development Survey, Carnegie Classifications

R&D: Kentucky's federal funding for high-education R&D compared to peer states

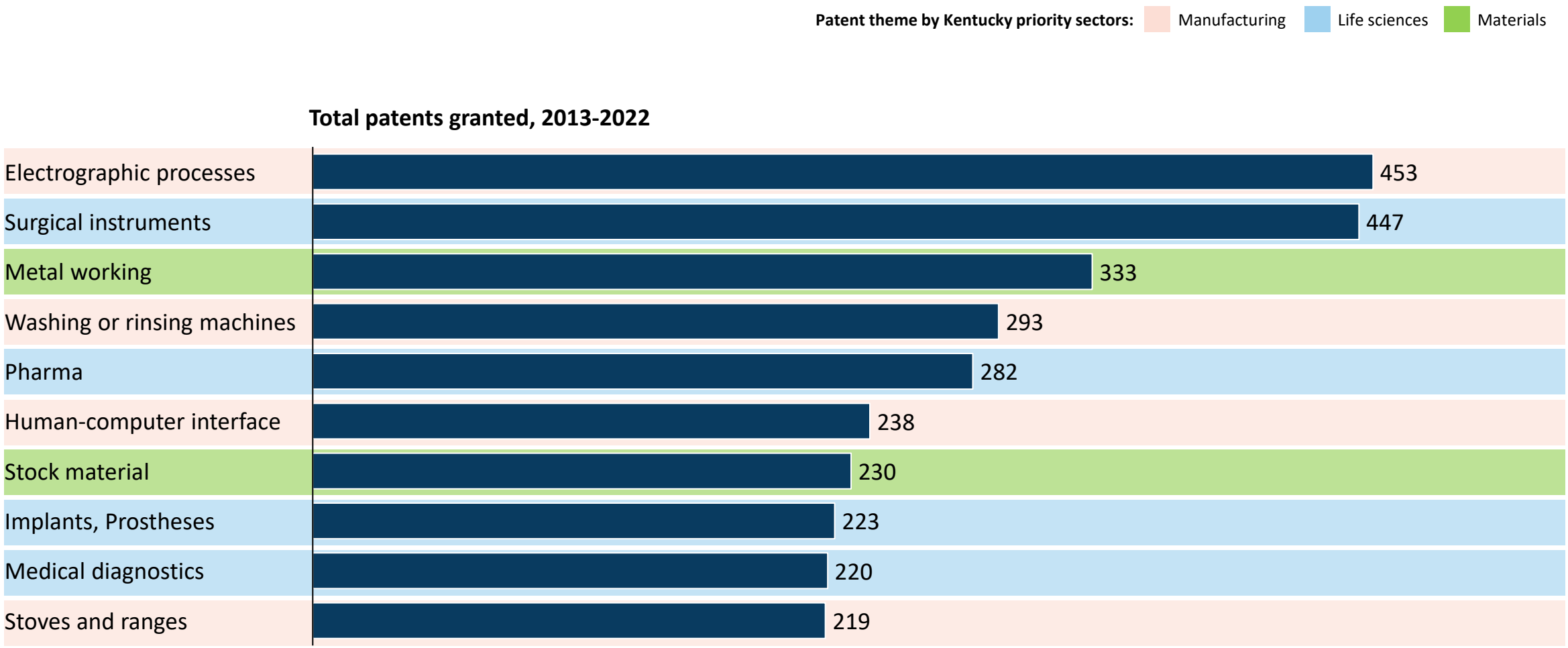
Higher education R&D expenditures by source of federal funding[1], 2021



1. DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation; USDA = Department of Agriculture. "All other" federal sources not included in chart, accounts for 7% of federal funding nationally

Source: National Science Foundation, Higher Education Research and Development Survey, Moody's Analytics

Top themes for Kentucky patents granted: Manufacturing, Life Sciences, and Materials



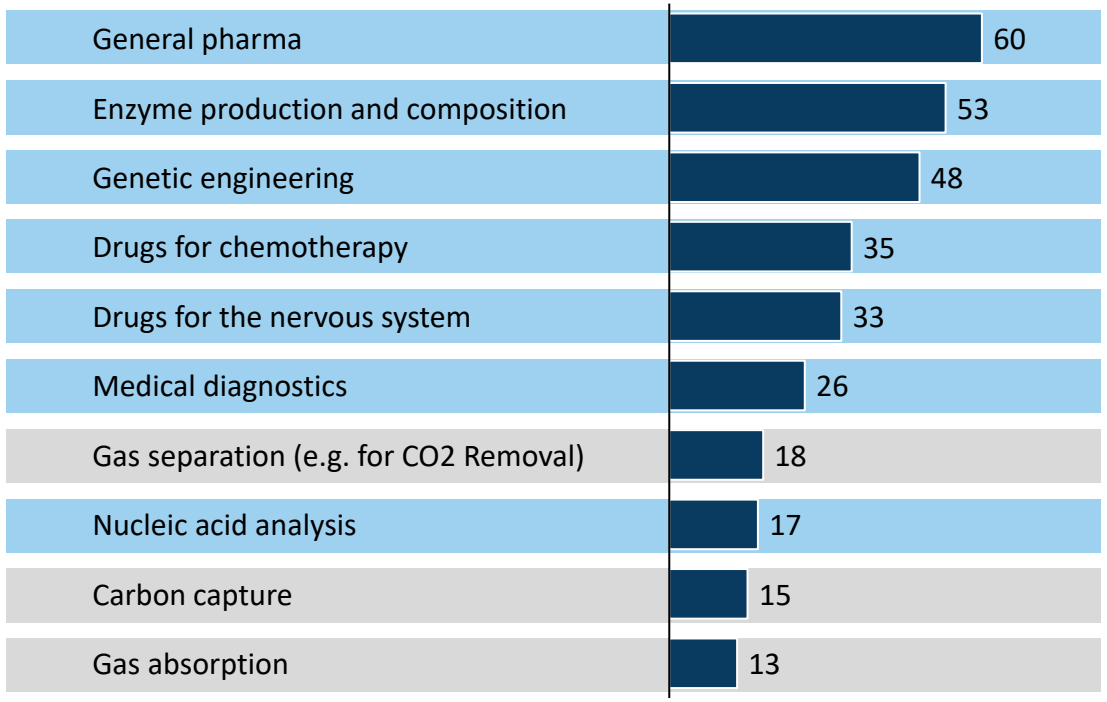
Source: USPTO & McKinsey IP Analytics

Top themes for Kentucky R1 university patents granted: Life Sciences

Patent themes: Life sciences | Other

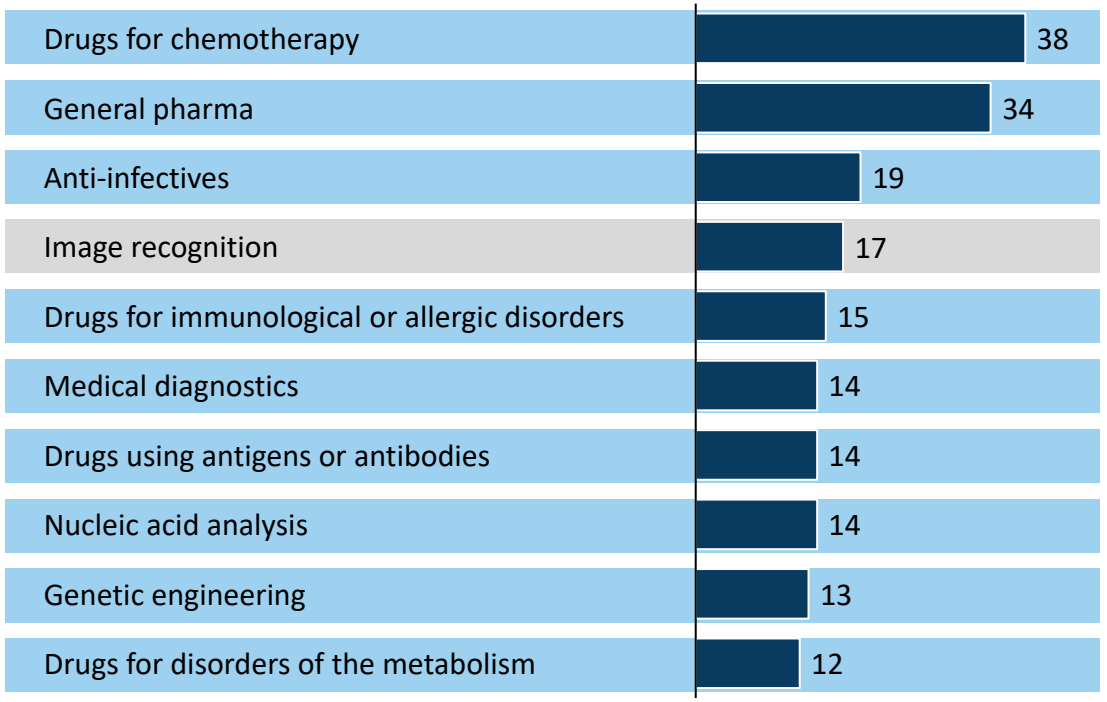
Top themes[1], University of Kentucky

Patents granted, 2013-2022, by theme (of 280 total)



Top themes[1], University of Louisville

Patents granted, 2013-2022, by theme (of 224 total)



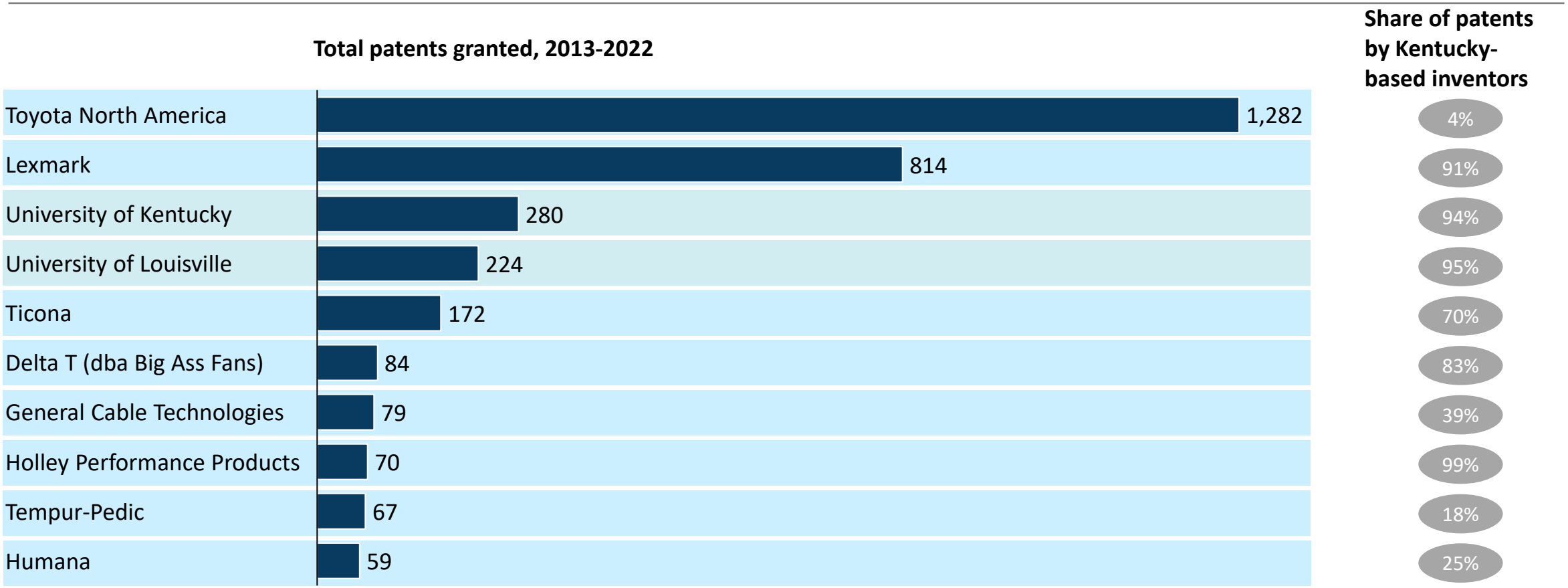
1. Themes are not mutually exclusive

Source: USPTO & McKinsey IP Analytics

Top patent generators and inventor share based in Kentucky

Patent filer type and share of total patents filed: US Corp (85% KY, 45% US avg) | University (10% KY, 4% US avg) | Foreign Corp (3% KY, 49% US avg)

Top patent filers



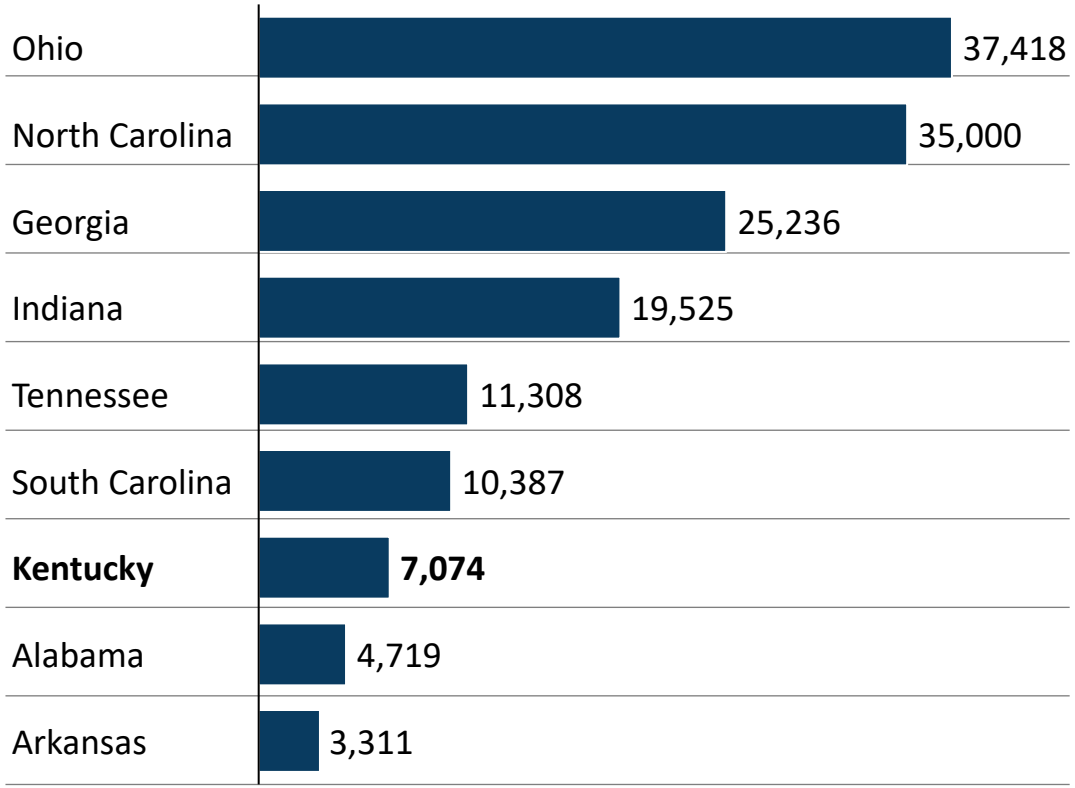
Source: USPTO & McKinsey IP Analytics

4. Infrastructure

Patents: Kentucky total and total per capita compared to peer states

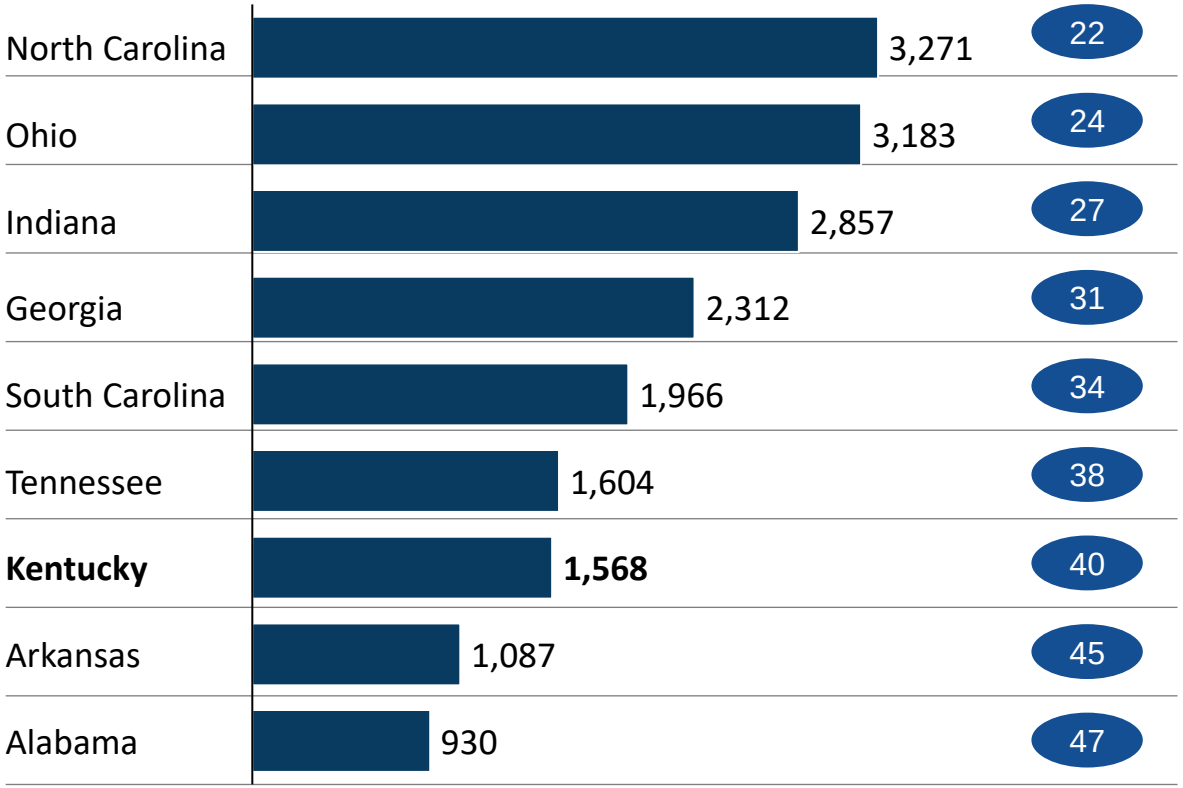
Patents granted, 2017-2022[1]

Patents



Patents granted per capita, 2017-2022[1]

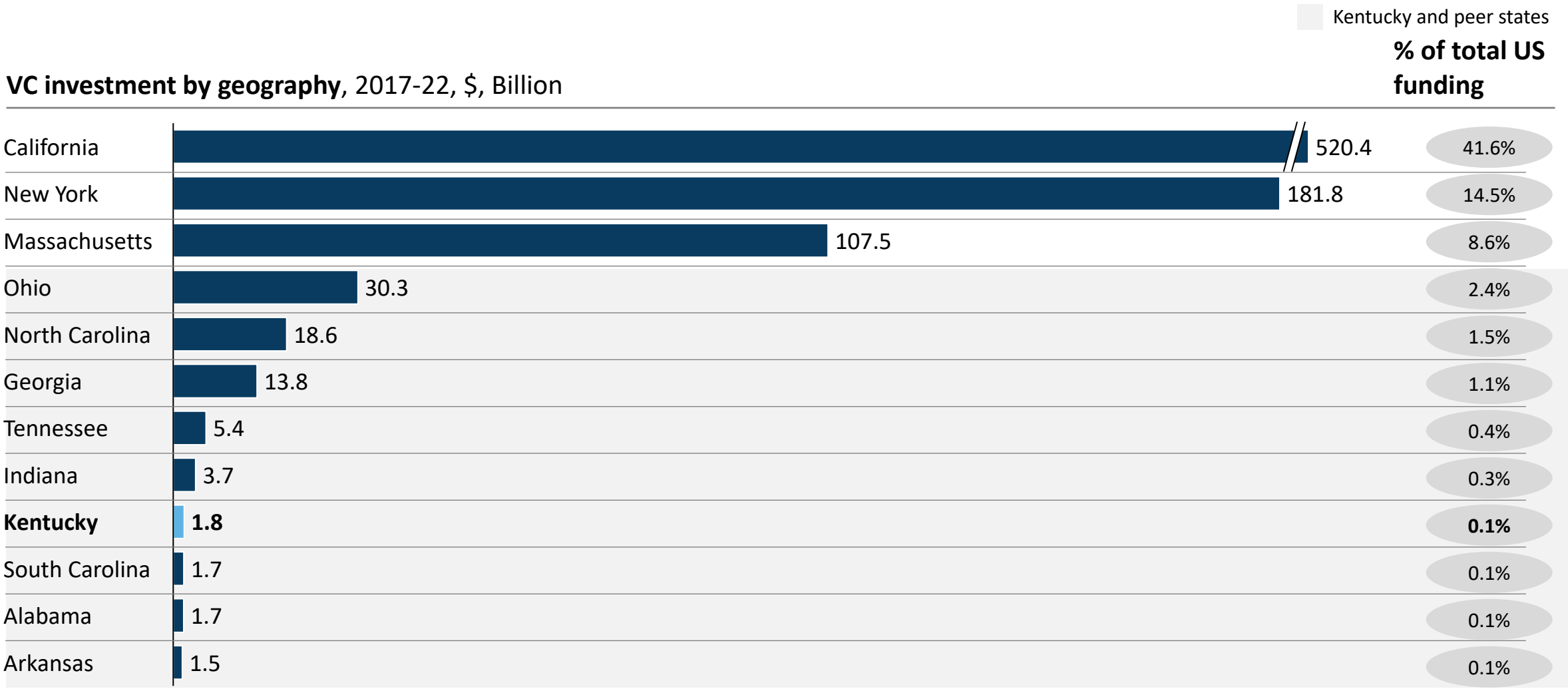
Patents per 1M of residents, 2022 population



1. Patents granted based on the location of patent inventor

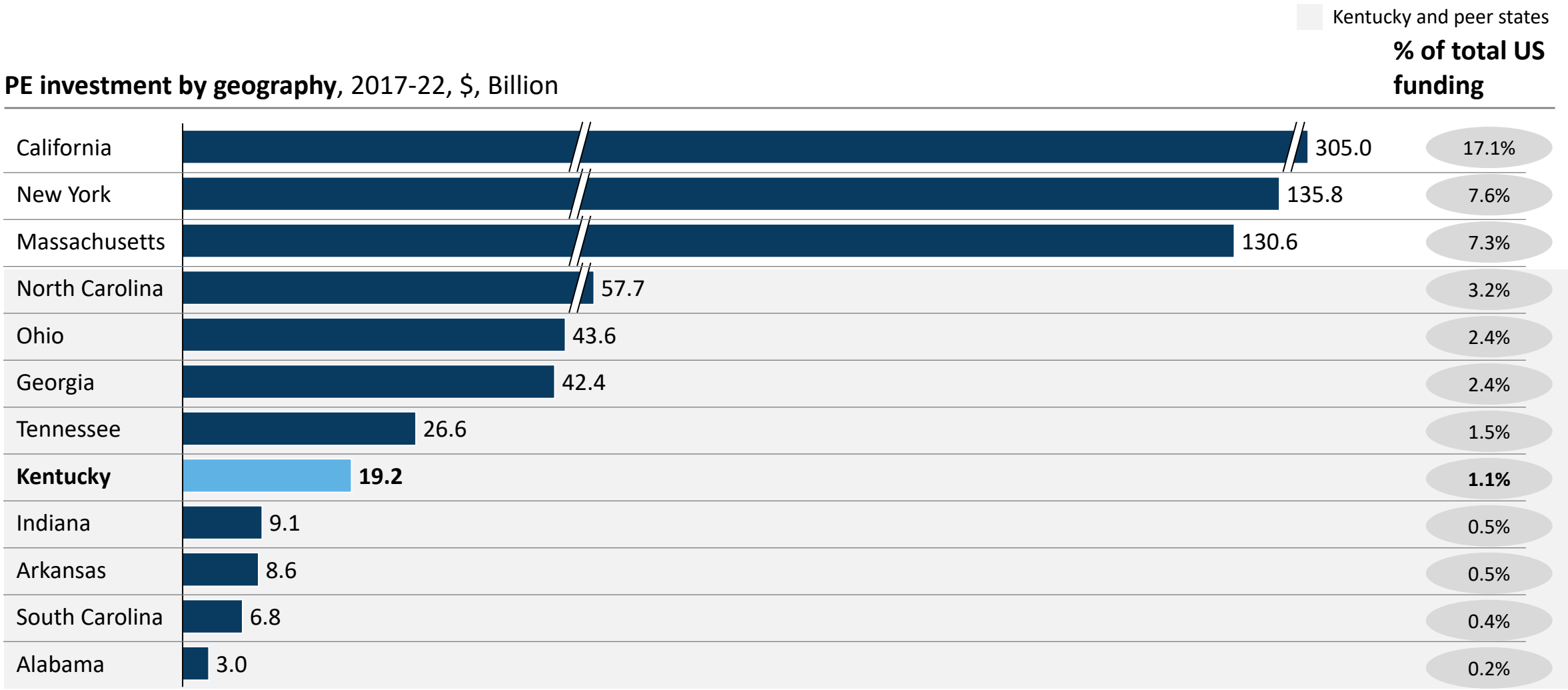
Source: U.S. Patent and Trademark Office (USPTO), Lightcast

VC funding: VC investment in top 3 recipient states and peer states



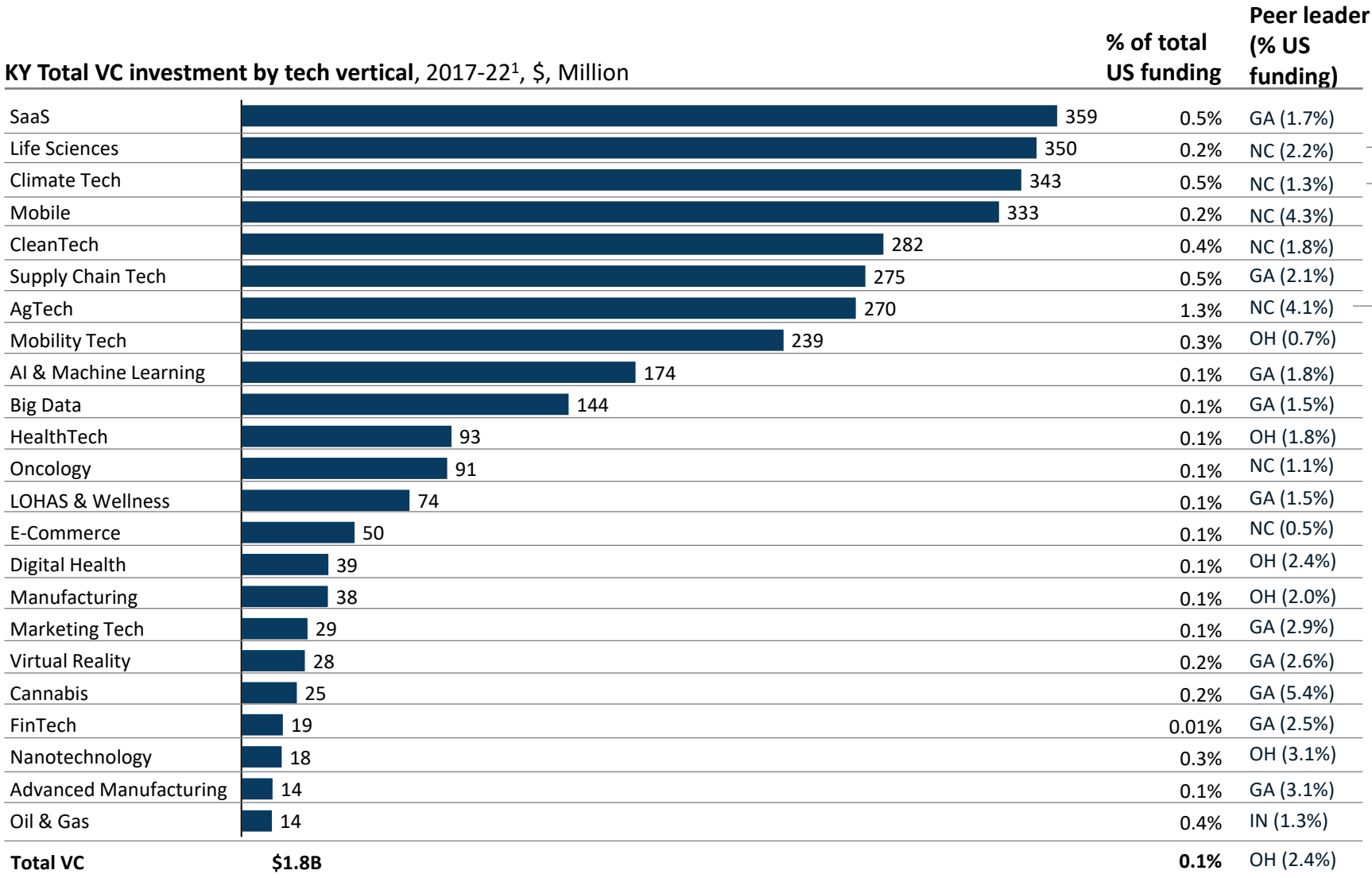
Source: : Pitchbook, accessed 12/15/2023

PE funding: PE investment in top 3 recipient states and peer states



Source: : Pitchbook, accessed 12/15/2023

VC funding: Kentucky's VC investment and share of national total by vertical



Talaris Therapeutics, a late-clinical stage biotechnology company, leads startups in Life Sciences funding ($115M in 2020 and $100M in 2019)

Rubicon (NYS: RBT), a software platform providing full-service waste management, recycling, and smart city technology solutions, accounts for a large share of CleanTech investment ($236M, 2019 and 2017)

AppHarvest, an agriculture technology company engaged in developing and operating controlled environment indoor farms, received 5 rounds of funding from 2018-2020, totaling $159M in investment

1. Figures will not sum up to total as multiple tech verticals can be applied to one deal; removed high-level verticals that include other verticals such as "TMT", "Industrials"

Source: Pitchbook, accessed 12/15/2023

VC funding: Regional distribution of Kentucky startups receiving VC funds

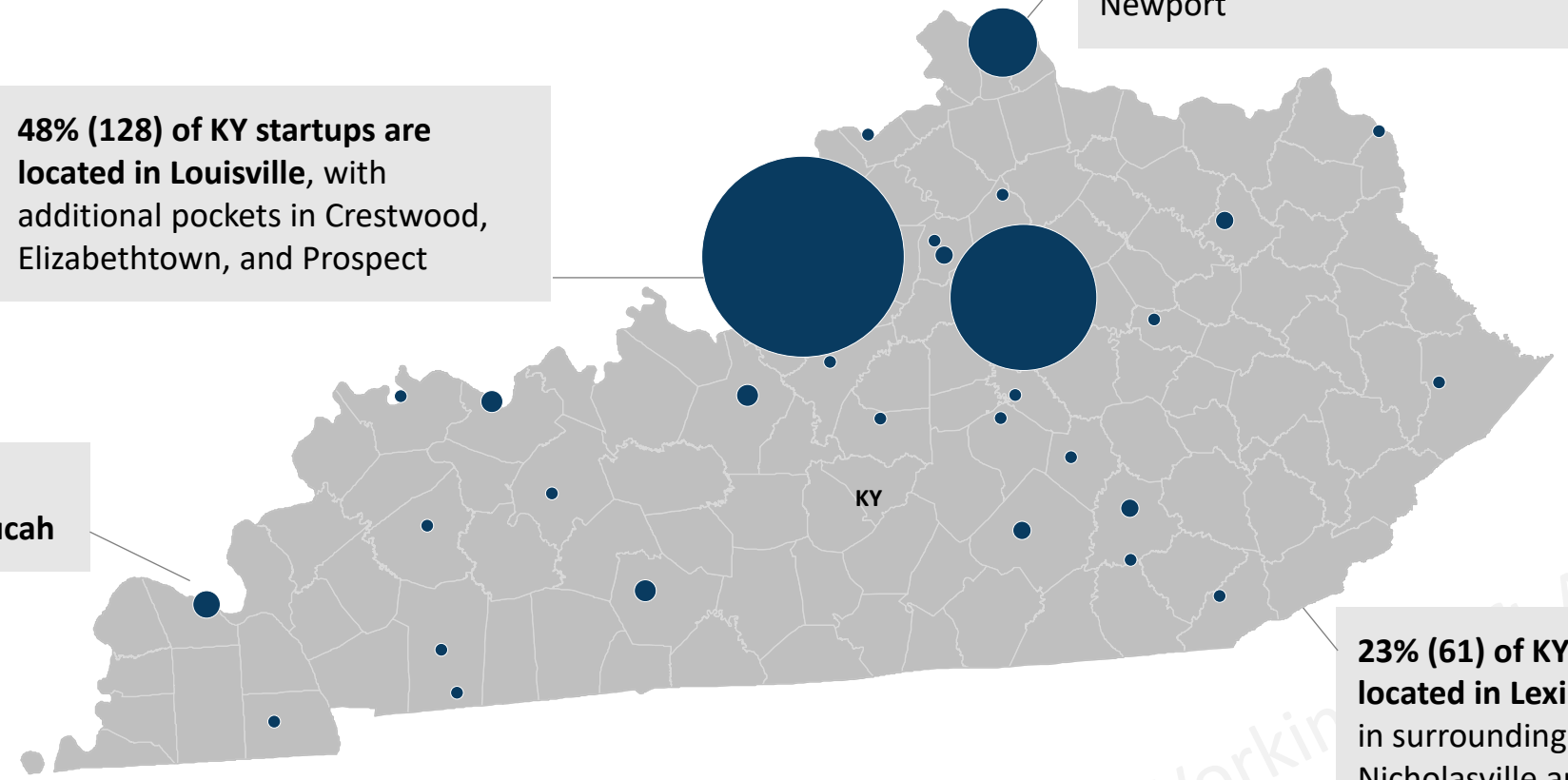
Number of startups receiving VC funding in Kentucky[1], 2017-2022

Kentucky benefits from spillover from Cincinnati's startup ecosystem, with a concentration of companies in Covington and Newport

= 3 companies

= 20 companies

48% (128) of KY startups are located in Louisville, with additional pockets in Crestwood, Elizabethtown, and Prospect



7 startups are located in Paducah

23% (61) of KY startups are located in Lexington, with several in surrounding cities like Nicholasville and Georgetown

1. Companies with HQ in Kentucky that received VC funding between 2017-2022, and are not out of business as of 8/3/23

SOURCE: : Pitchbook, accessed 8/3/2023

Kentucky outperforms on electricity costs and road quality, but trails on renewable energy consumption and broadband adoption

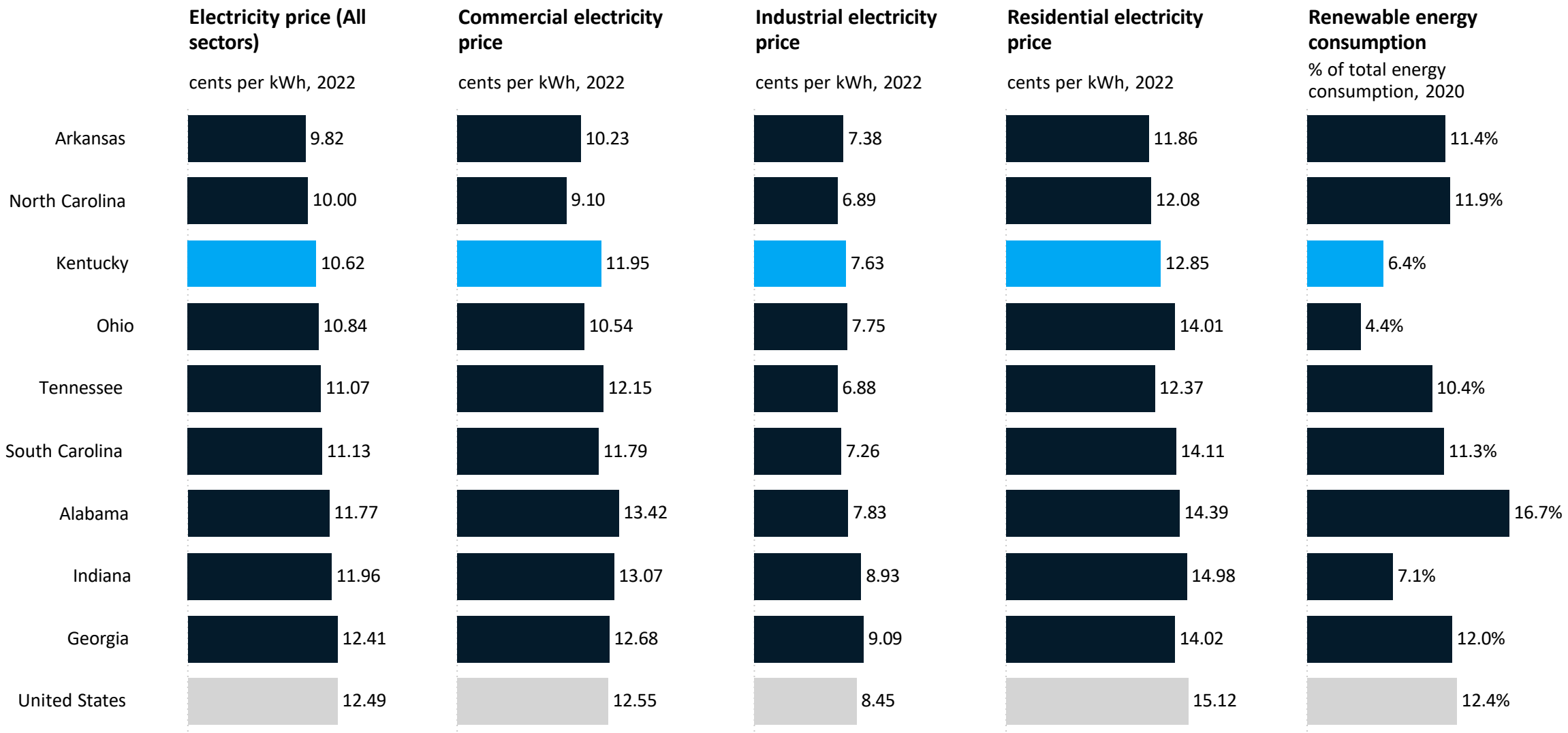
US News Best States for Infrastructure, National ranks, 2023

Rank 1 50

		Kentucky	Georgia	Tennessee	North Carolina	Indiana	South Carolina	Ohio	Alabama	Arkansas
Overall Rank	Infrastructure	23	15	16	25	26	31	32	36	40
Energy	Electricity price	18	36	24	12	33	25	23	28	10
	Power grid reliability	30	29	39	27	33	19	34	26	44
	Renewable energy usage	43	23	29	24	38	27	46	15	26
Transportation	Bridge quality	33	5	11	31	24	18	21	8	23
	Commute time	20	44	29	24	21	35	17	31	13
	Public transit usage	24	32	38	31	41	48	27	50	43
	Road quality	7	6	1	14	24	9	21	11	43
Internet access	Access to gigabit internet	8	13	4	24	10	23	26	25	15
	Broadband subscription rate	44	25	43	33	31	43	34	47	45

Source: US News Best States

Kentucky's electricity prices and renewable energy consumption are below the national average and most peers



Source: US Energy Information Administration (EIA)

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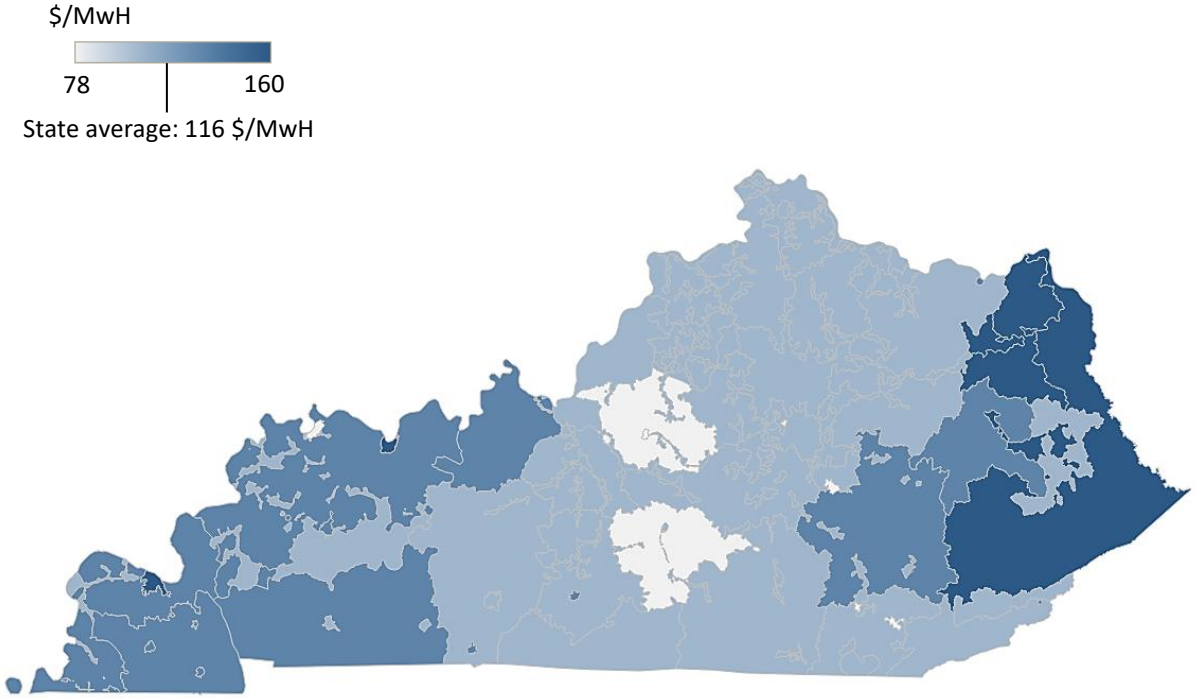
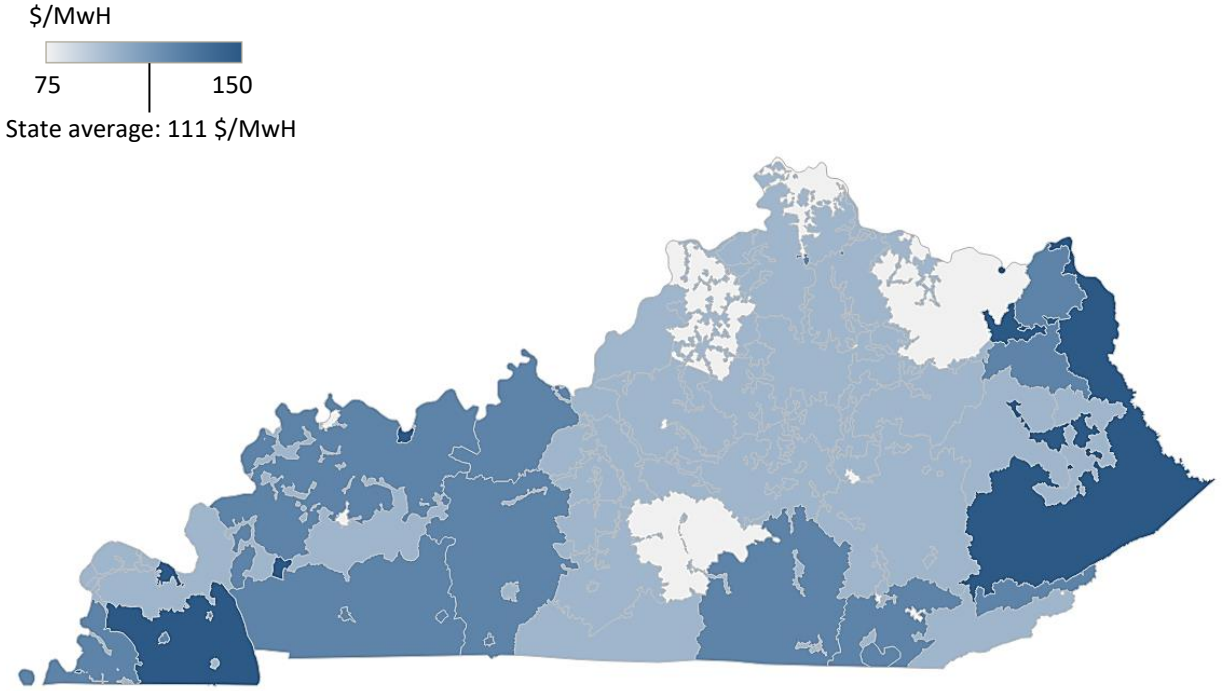
Central Kentucky has lower residential and commercial electricity rates

Residential electricity price by service area, $/MwH, 2021



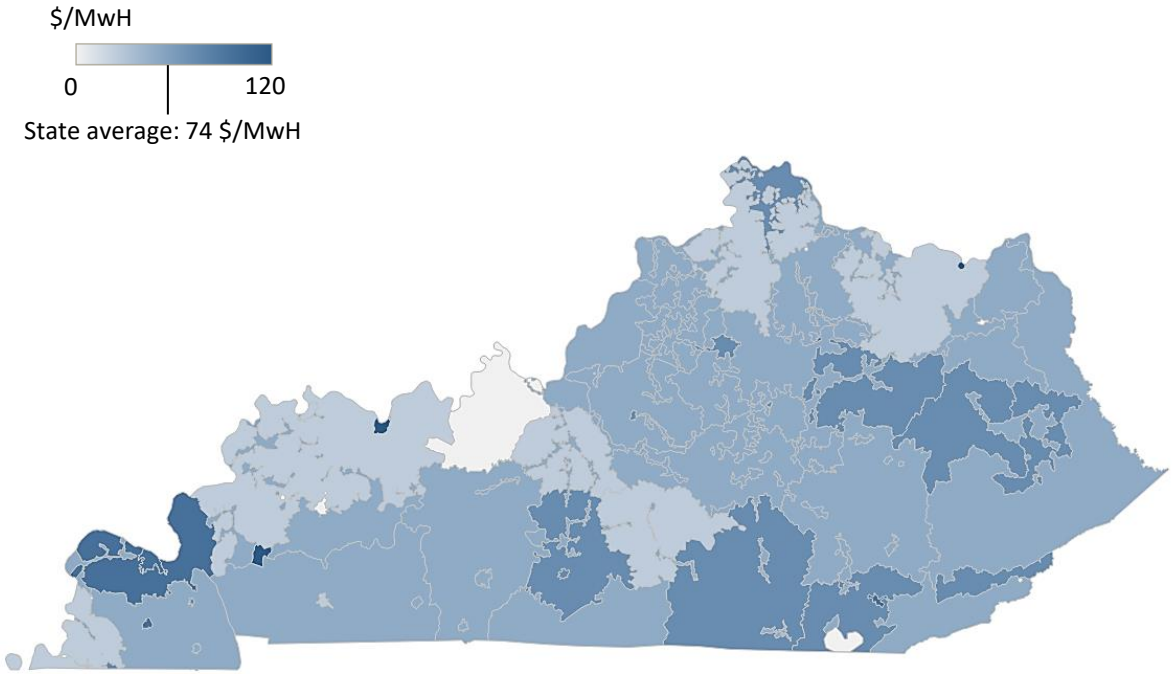
Commercial electricity price by service area, $/MwH, 2021



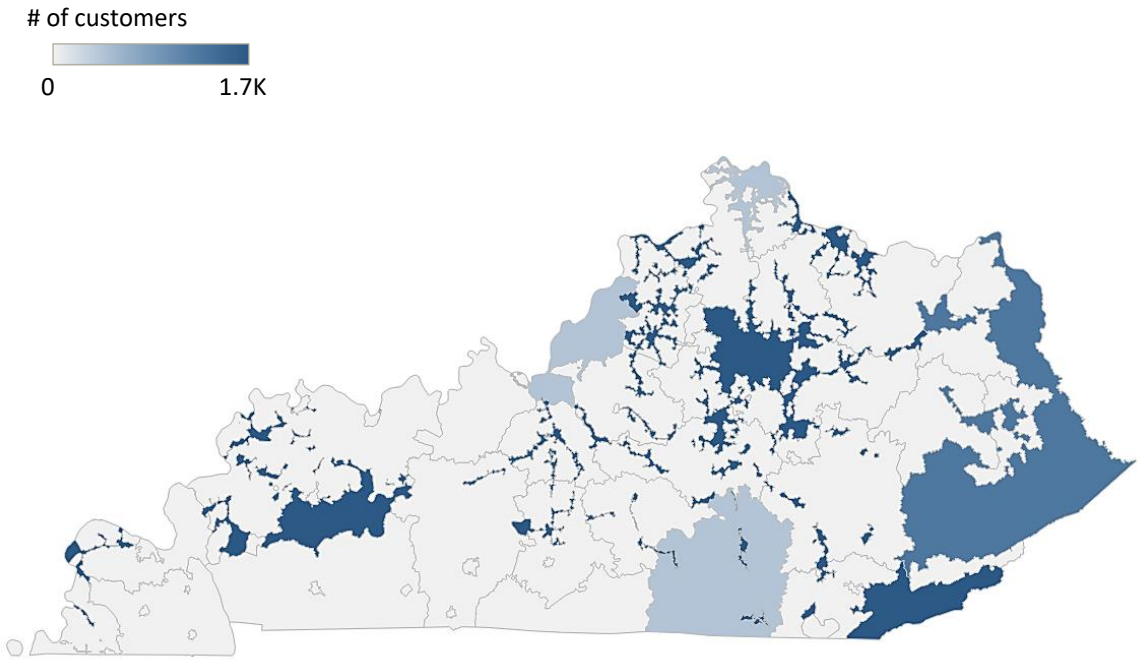
Source: Hitachi Energy Velocity, Accessed 8/23/2022

Kentucky Utilities Co (Lexington and parts of West) and Kentucky Power Co (East) have the highest number of industrial customers, both offer rates below the state average

Industrial electricity price by service area, $/MwH, 2021



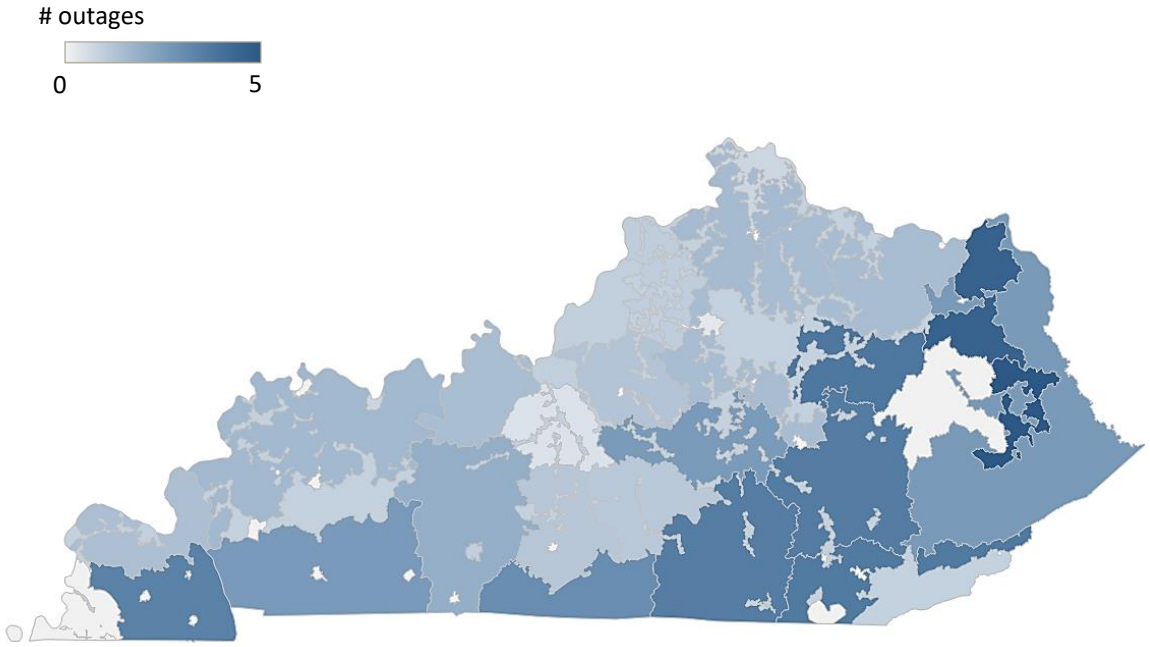
Number of industrial electric customers by service area, 2021



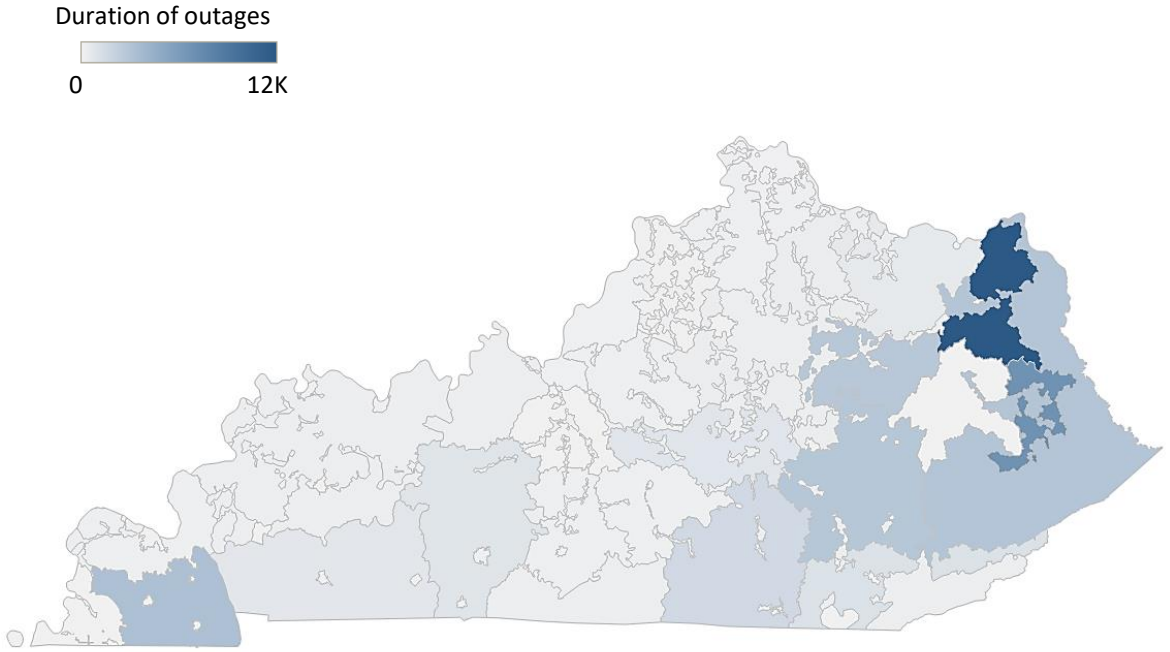
Source: Hitachi Energy Velocity, Accessed 8/23/2022

The central and northern parts of the state have more reliable electricity service

Annual outages by service area, number, 2021



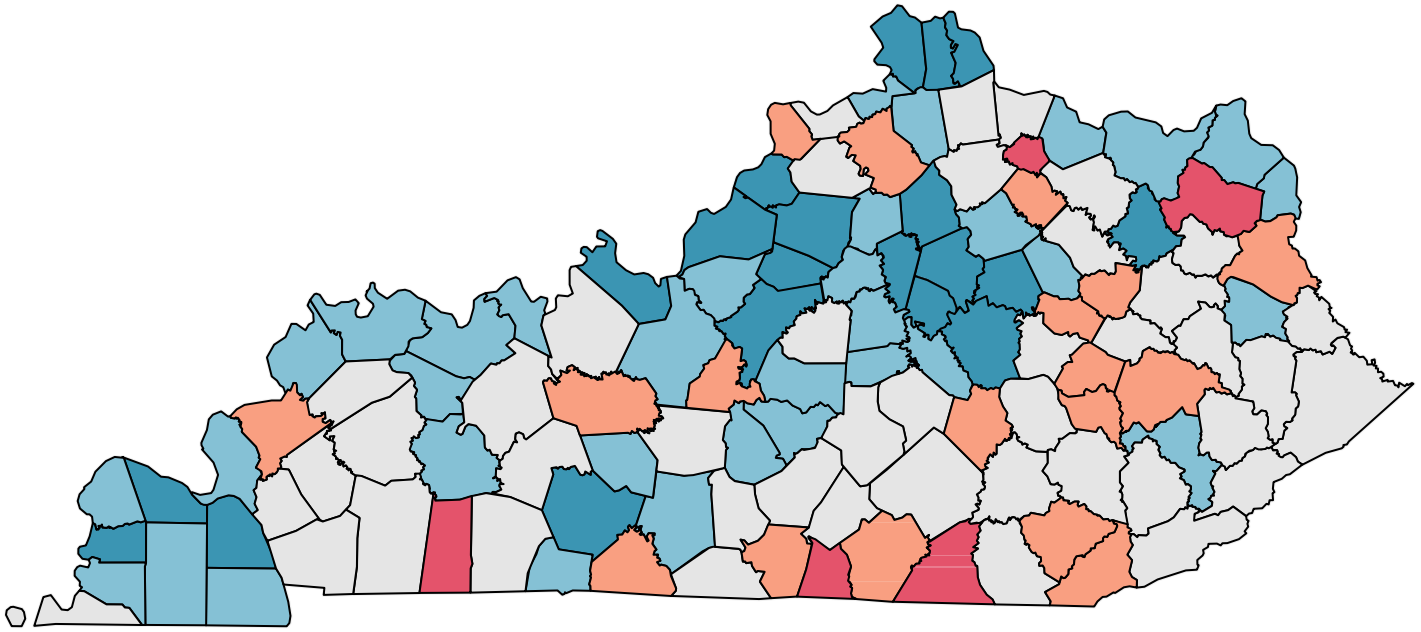
Duration of outage by service area, minutes, 2021



Source: Hitachi Energy Velocity, Accessed 8/23/2022

Kentucky’s broadband adoption varies by as much as 30 p.p. across counties

Broadband adoption by county
Percent of population in households with broadband, 2020, 5-year estimate



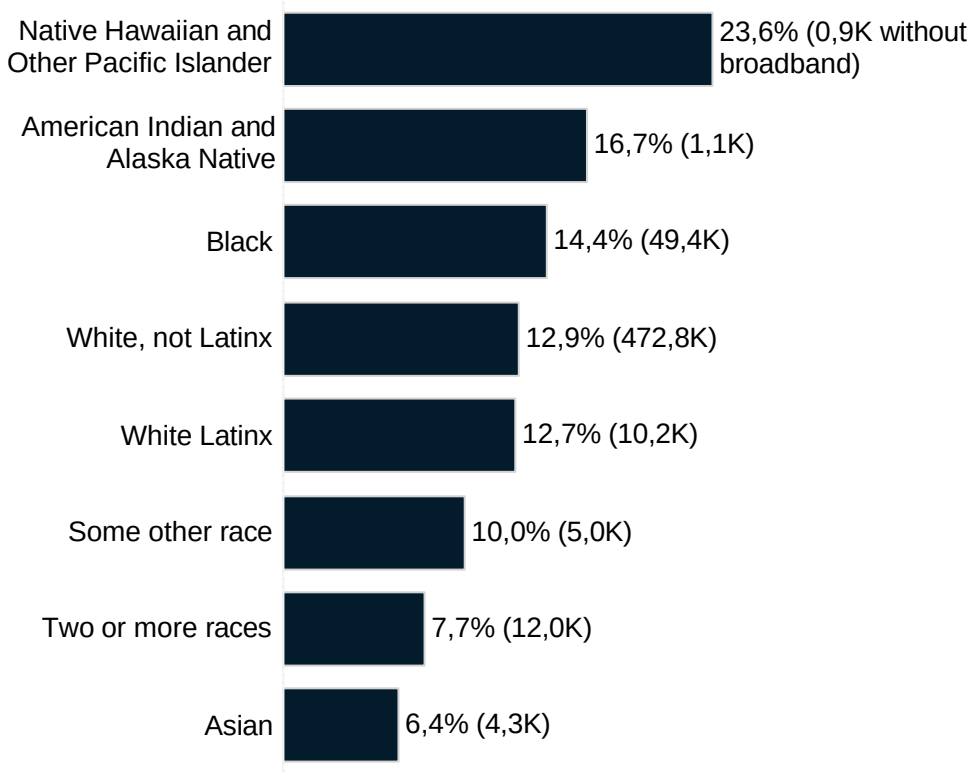
Note: Broadband is defined as households with with a computer with a broadband internet subscription such as cable, fiber optic or DSL

Source: US Census Bureau, American Community Survey (ACS)

Kentucky's communications infrastructure is less accessible for Native Hawaiian, American Indian, and Black people

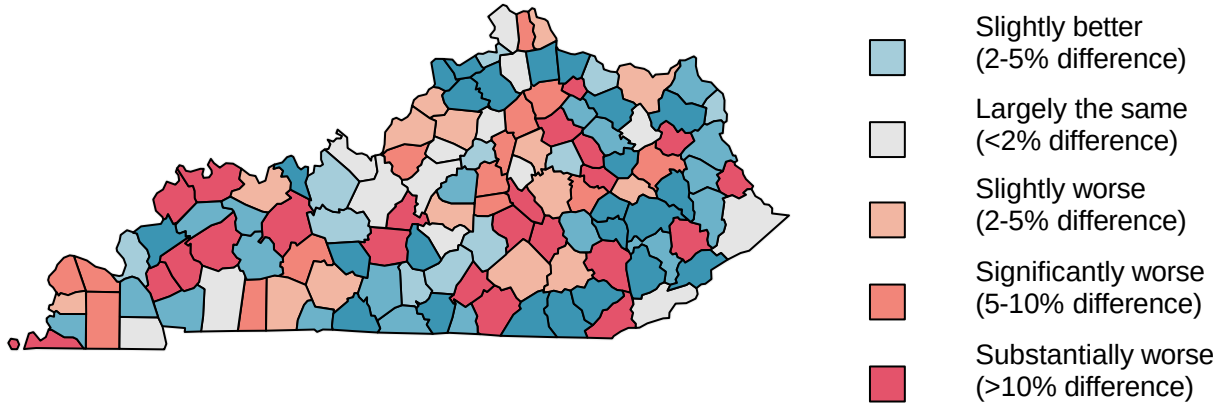
Broadband adoption

Percent of population in households without broadband, 2021, 5-year estimate



Broadband adoption gap by county

Difference in broadband access between white and non-white population p.p., 2020, 5-year estimate



Notes:
1. Broadband is defined as households with with a computer with a broadband internet subscription such as cable, fiber optic or DSL
2. 'White' is defined as 'White not hispanic or latino' while 'Non-white' includes everyone else

Source: US Census Bureau, American Community Survey (ACS)

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Kentucky's infrastructure grades compared to peer states

Infrastructure report card by state[1]

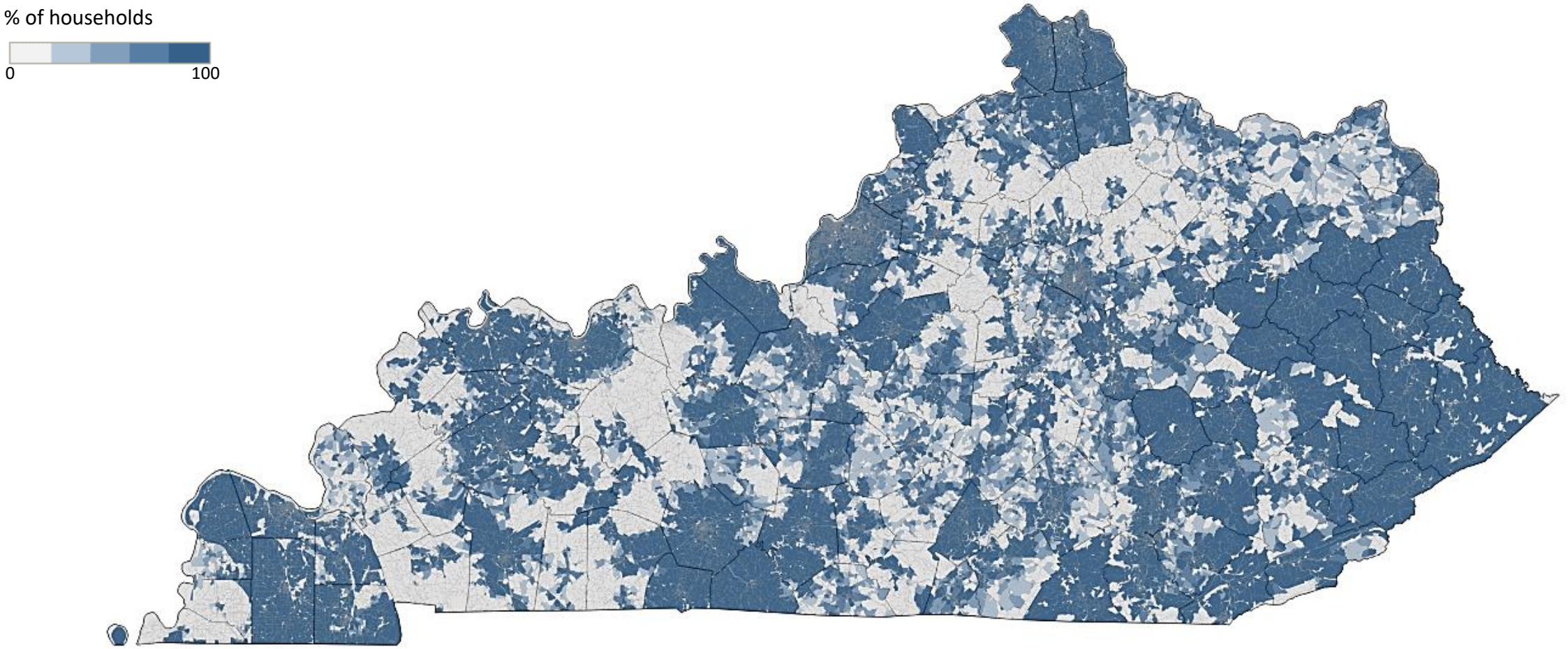
	Kentucky[2]	Alabama[3]	Georgia[4]	Ohio[5]	South Carolina[6]	Tennessee[7]
Overall Grade	C-	C-	C+	C-	D+	C
Aviation	C+	C	B+	-	D+	C+
Bridges	C-	C+	C+	C+	C	B
Dams	D+	-	D	C-	D	D+
Drinking Water	C+	C-	B-	D+	D+	C+
Energy	B-	B	B	C	-	C+
Hazardous Waste	D	-	-	D+	-	-
Levees	D+	-	-	D	-	-
Roads	D+	C-	C+	D	D	C
Solid Waste	B-	-	C	B-	-	C+
Wastewater	C-	D	D+	C-	D	C-

1. Reports have not been published for all peers, 2. 2019 report; 3. 2022 report; 4. 2019 report; 5. 2021 report; 6. 2021 report; 7. 2022 report

Source: Infrastructure Report Card

Served households

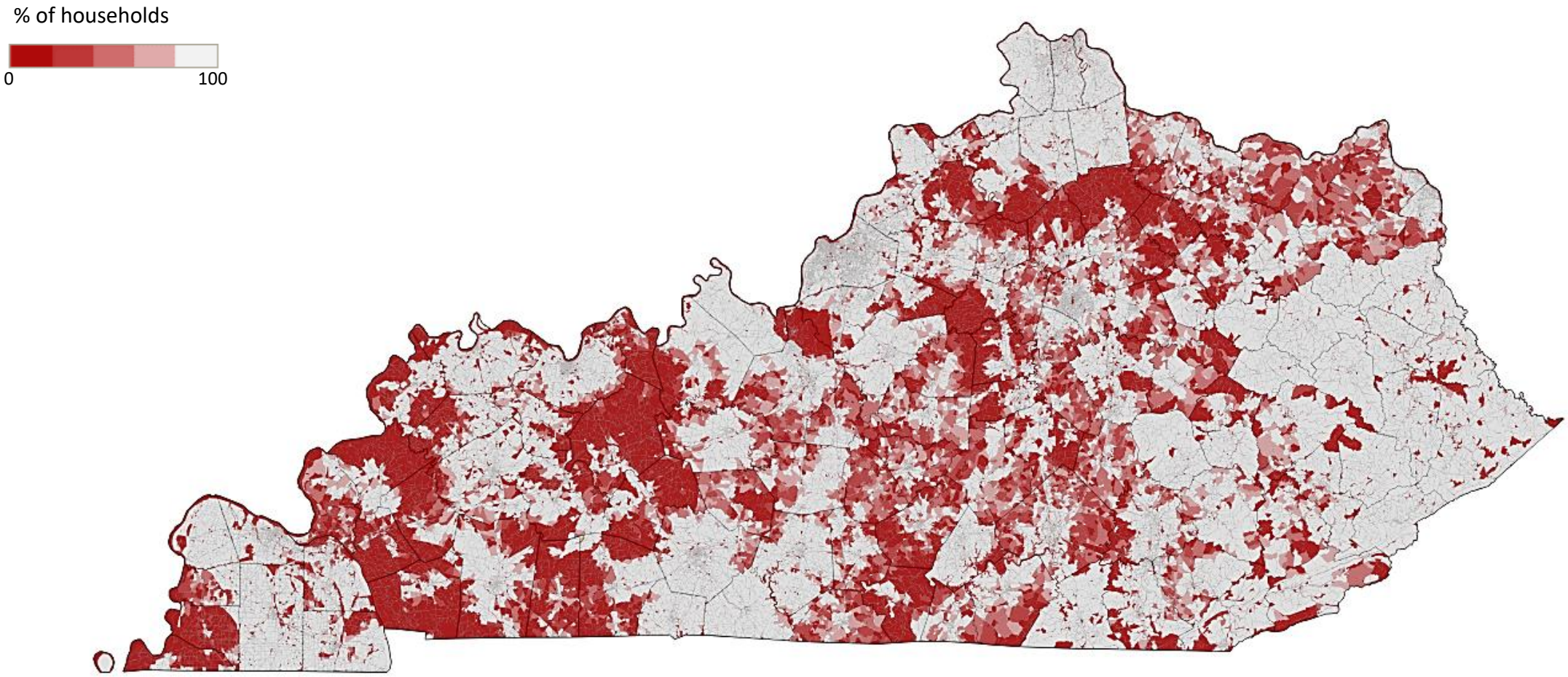
% of households with access to 100/20 mbps coverage, by Census block



Source: FCC broadband data, US Census

Underserved households

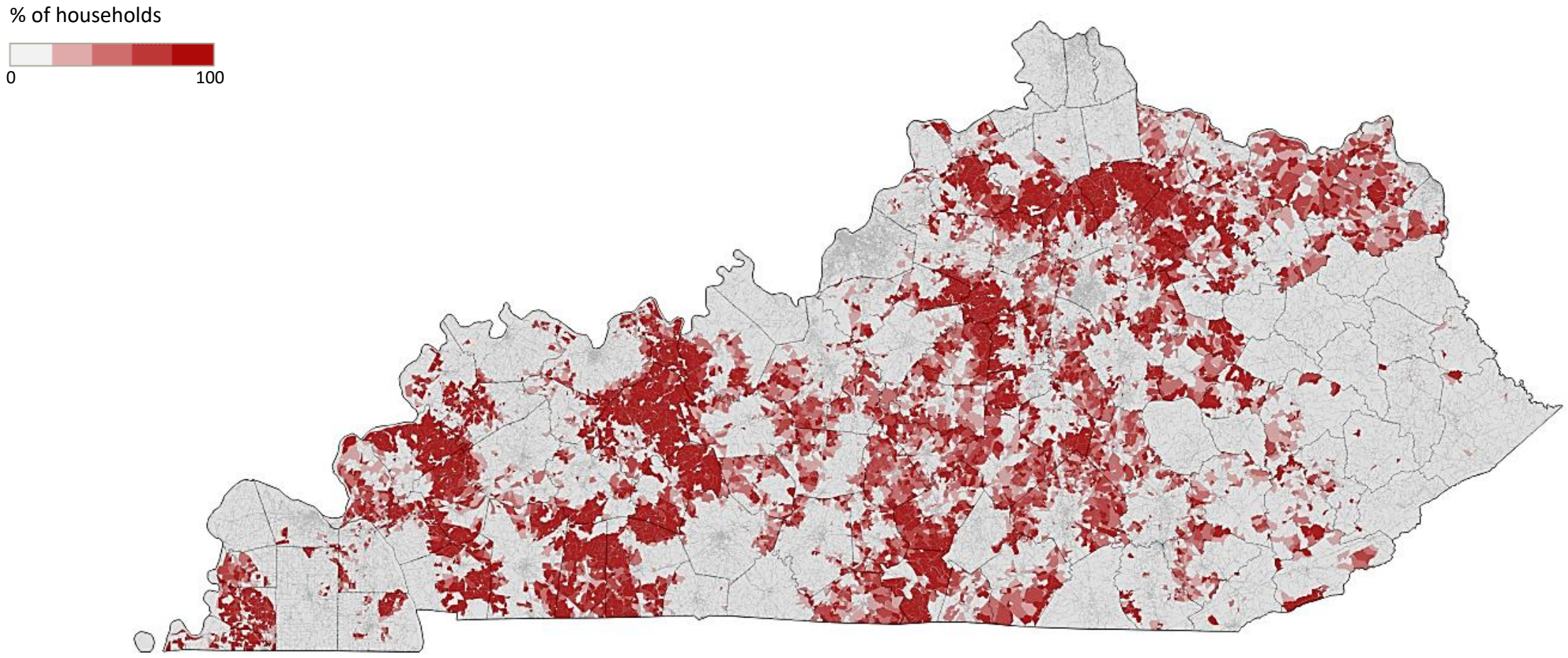
% of households with access to 25/3 mbps coverage, by Census block



Source: FCC broadband data, US Census

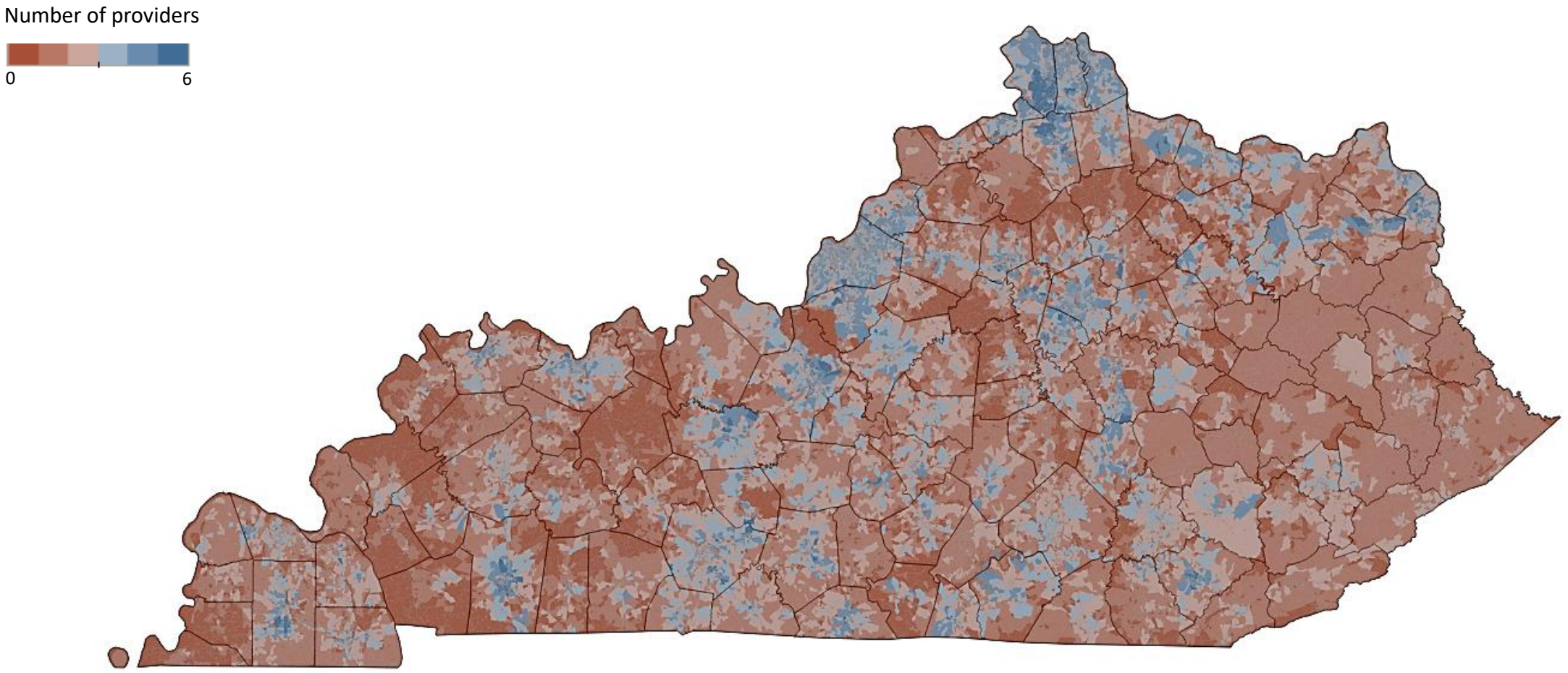
Unserved households

% of households with access to less than 25/3 mbps coverage, by Census block



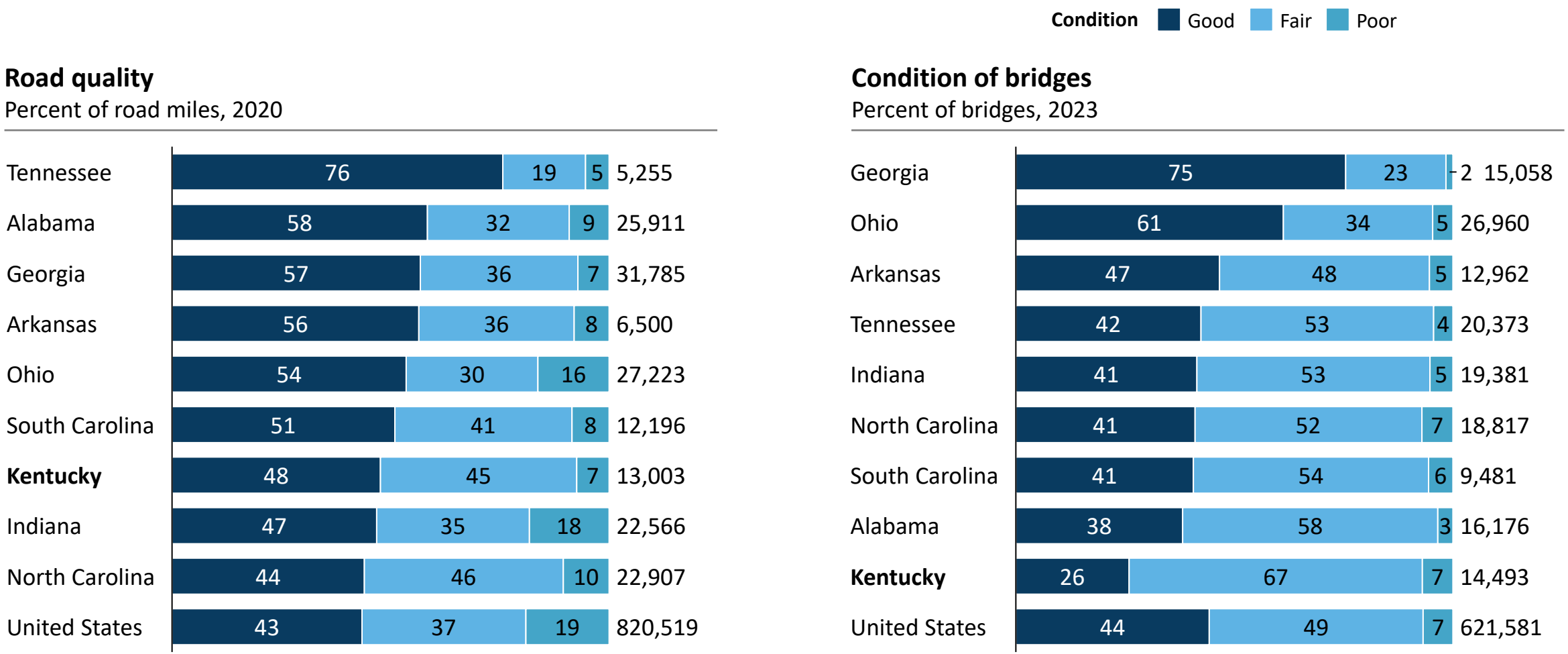
Source: FCC broadband data, US Census

Number of broadband providers by block



Source: FCC broadband data, US Census

Kentucky has better road quality than US average and some peers, bridge quality is below US average

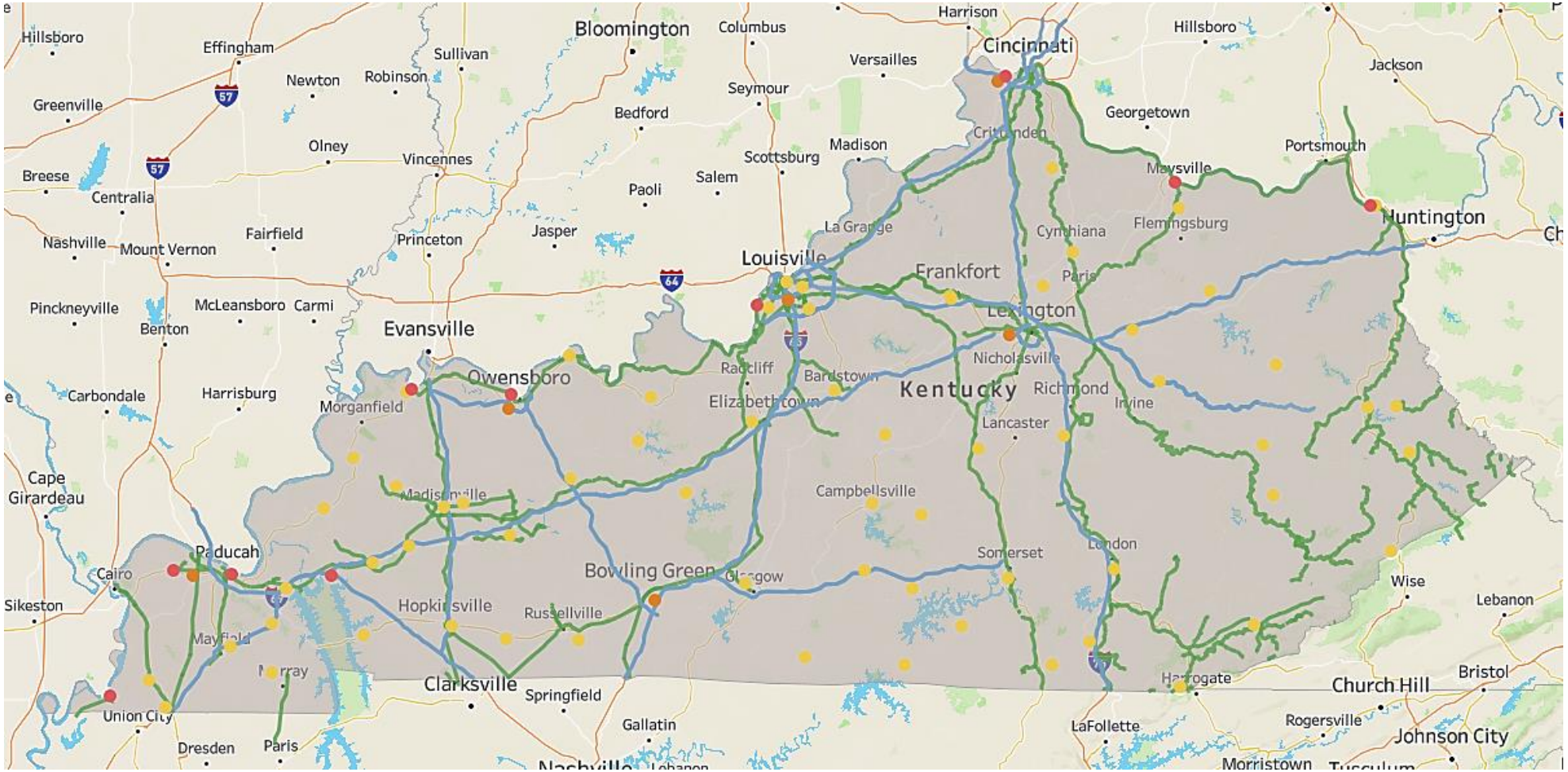


Note: Roads in 'Poor' condition are defined as having an IRI above 170 or a PSR below 2.5. Roads in 'Fair' condition are defined as having an IRI between 95 and 170 or a PSR between 2.6 and 3.9 Road quality is measured for interstates, other freeways/expressways, principal arterials, minor arterials, rural major collectors, urban minor arterials, urban major and minor collectors

Source: US Department of Transportation - Federal Highway Administration

Transportation infrastructure

Kentucky's distribution and logistics infrastructure assets, 2023

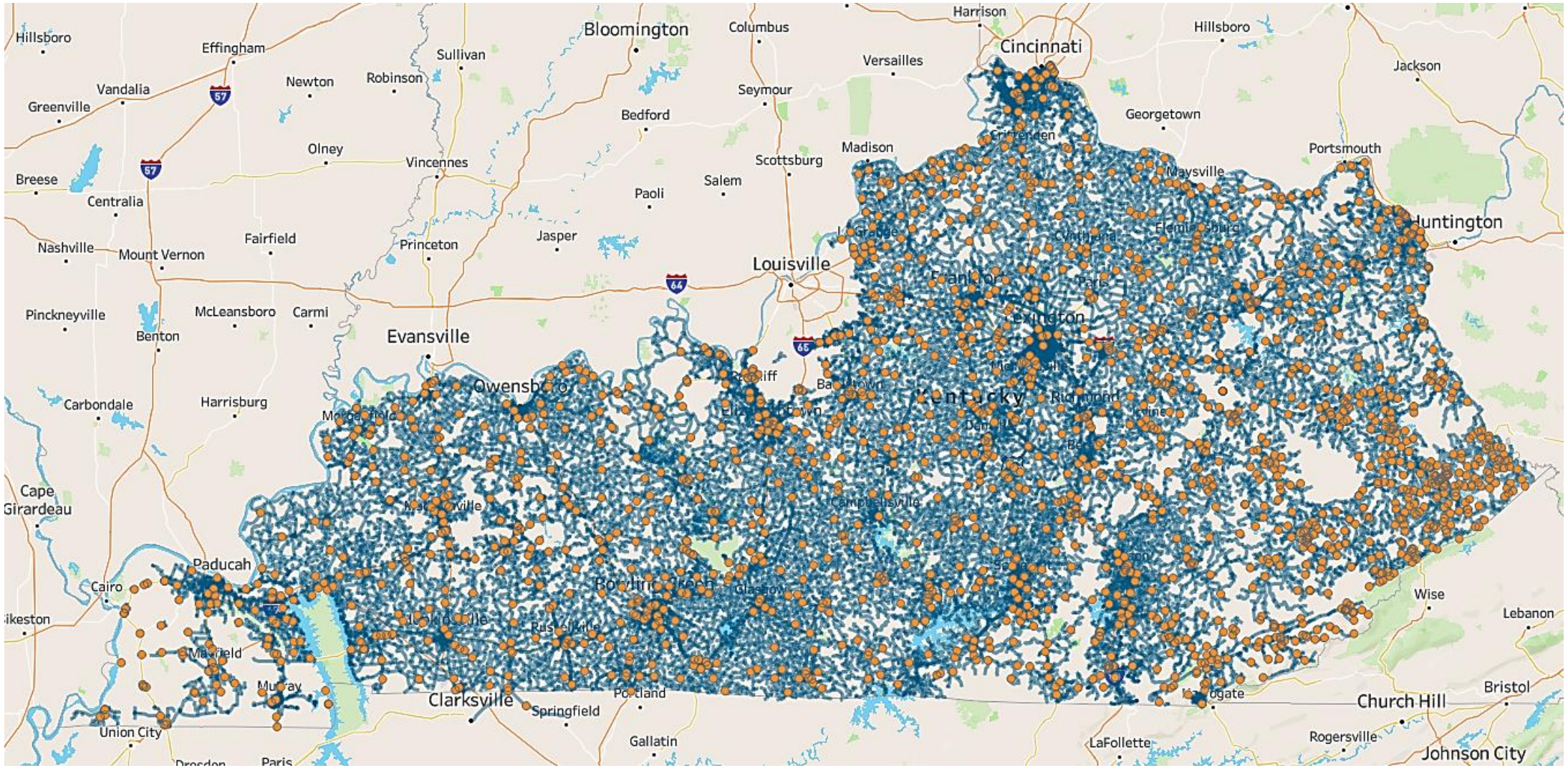


- Riverports
- Commercial service airports
- General aviation facilities
- Railroads (class I, II, and III))
- Primary roads (interstate and state highways)

Source: KYGovMaps Open Data Portal; Kentucky Riverports, Highway, and Rail Freight Study, Kentucky Transportation Cabinet; US Department of Homeland Security Homeland Infrastructure Foundation-Level Data (HIFLD)

Water infrastructure

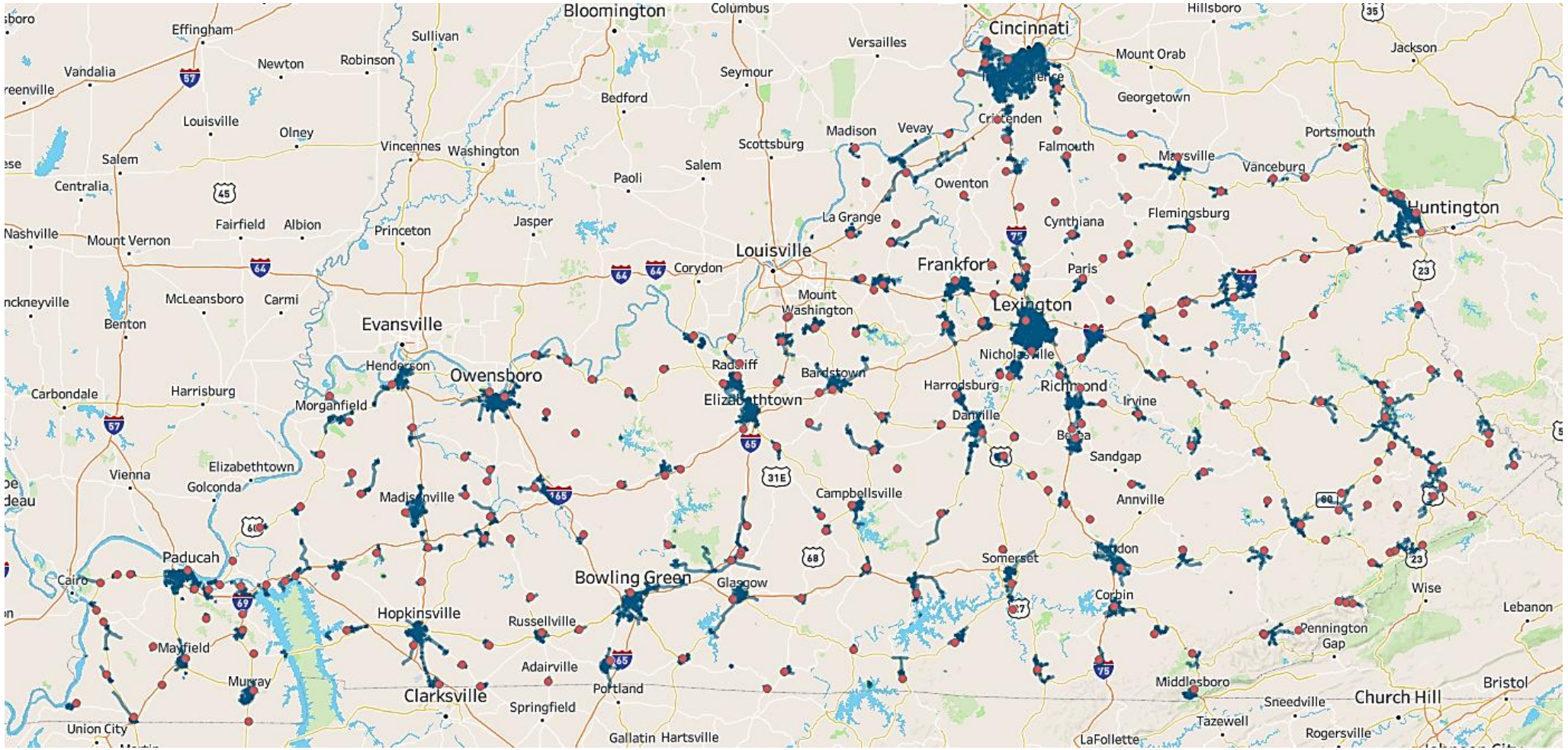
Public water systems, 2023



Source: KYGovMaps Open Data Portal

Water infrastructure

Public wastewater systems, 2023



Source: KYGovMaps Open Data Portal

5. Business climate

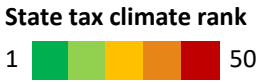
Kentucky's business attractiveness ranking varies across metrics

CNBC's Top States for Business National Ranks, 2023		Kentucky	Alabama	Arkansas	Georgia	Indiana	North Carolina	Ohio	South Carolina	Tennessee
Access to capital	Components factored into access to capital include amount of federally- and state-funded COVID-related financial support to businesses, venture capital investments, and traditional bank lending to businesses.	45	37	20	23	13	6	5	41	15
Business friendliness	Components factored into business friendliness include lawsuit and liability climates, regulations in areas like trade and labor, and overall bureaucracy.	40	42	44	35	22	10	40	32	19
Cost of doing business	Components factored into the cost of doing business include tax climate, wage and utility costs, commercial real estate rates, and incentives and tax breaks.	10	12	15	27	5	18	4	13	7

Source: CNBC's Top States for Business rankings

Kentucky has a favorable tax structure compared to peers and nationally

State tax rates and index rankings[1], as of July 1, 2022



	Kentucky	Indiana	North Carolina	Tennessee	South Carolina	Georgia	Ohio	Arkansas	Alabama
Overall Rank	18	9	10	14	31	32	37	40	41
Corporate	5.0%	4.9%	2.5%	6.5%	5.0%	5.75%	0.26%	1.0-5.9%	6.5%
Individual Income	5.0%	3.23%	4.99%	none	0-6.5%	1.0-5.75%	2.76-3.99%	2-4.9%	2-5%
Sales	6.0%	7.0%	4.75%	7.0%	6.0%	4.0%	5.75%	6.5%	4.0%
Property[2]	1.91%	2.19%	1.61%	1.61%	2.68%	2.57%	2.72%	1.69%	1.37%
Unemployment insurance	0.3-10.0%	0.5-7.4%	0.06-5.76%	0.01-10.0%	0.06-5.46%	0.04-8.1%	0.8-10.2%	0.3-14.2%	1.15-7.30%

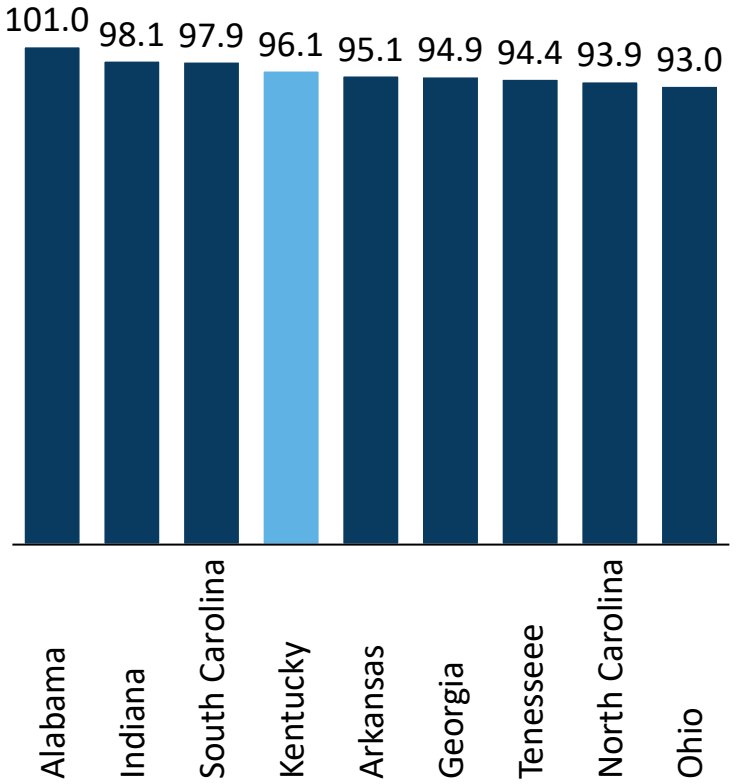
1. The State Business Tax Climate Index is designed to show how well states structure their tax systems
2. As a % of personal income

Source: Tax Foundation 2023 State Business Tax Climate Index

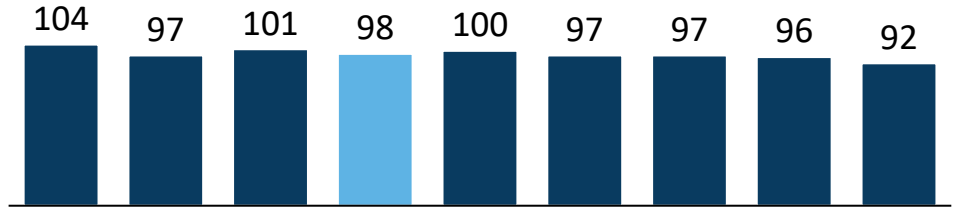
Kentucky's cost of doing business is below US average but ranks 6th among peers

Cost of Doing Business

2022, 100=US Average

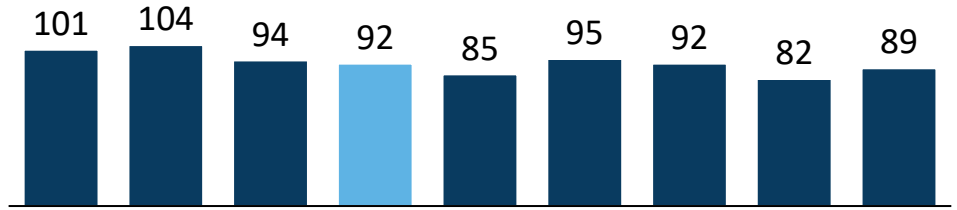


Unit Labor Cost



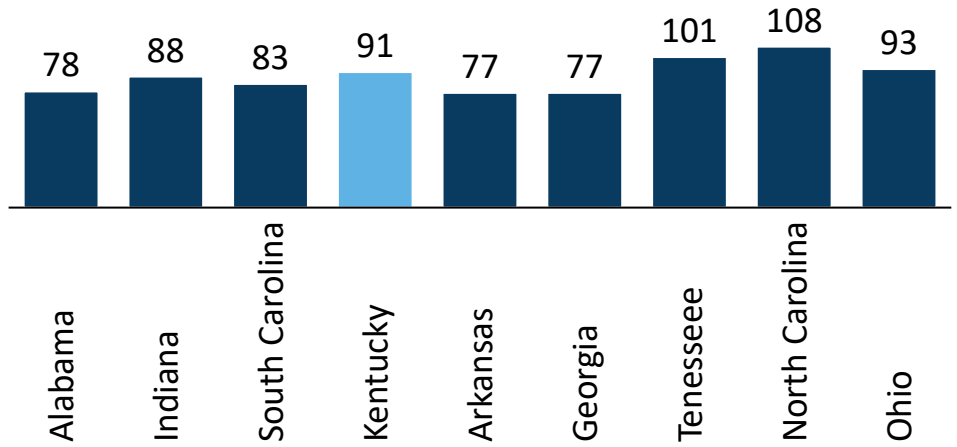
Measures compensation per dollar of output

Energy Cost



Compares average commercial and industrial electricity costs in cents per kilowatt hour

Tax Cost



Total state and local tax revenue as a percentage of total personal income in the area, indexed to the national effective tax rate

Note: a higher score indicates a higher cost of doing business. Component costs are weighted using geography-specific weights to obtain the overall cost of doing business score

Source: Moody's Analytics

6. Economic Development Operating Capabilities

Contents

1. Overview: Core elements of a high-performing state economic development function

Focus of today's discussion

Core elements for success	 **Strategic clarity across whole of government**, cascaded into initiatives, management rhythm, and then daily operations	 **Best-in-class "product" with at-scale enablers** (e.g., sites, tax policy, ecosystems) to bolster the state's value proposition	 **End-to-end "deal engine" with deal and relationship teams** that integrate deep industry expertise with generalists & proprietary analytics	 **Customer-focused whole-of-government approach** to deliver truly distinctive, customized solutions	 **At scale sustained marketing campaigns** to communicate distinctive value proposition to target segments	 **Ambitious internal talent strategy** that competes & wins talent for pivotal roles and supports high performance & organizational health	 **Collaborative REDO model** facilitated by state support to promote strategic priorities and mobilize private sector networks
Example EDOs	Georgia USA EDB SINGAPORE	Georgia USA Economic Development Partnership of North Carolina Mastered in Tennessee JobsOhio	JobsOhio EDB SINGAPORE	Georgia USA Invest Korea	Georgia USA Economic Development Partnership of North Carolina JobsOhio	JobsOhio EDB SINGAPORE	JobsOhio

2. Best-in-class "product" offerings can span the deal life cycle

Focus of today's discussion

NOT EXHAUSTIVE

	Pre-deal	During deal					Post-deal
Incentive type	**Proactive investment**	**Financial incentives**				**Non-financial incentives**	**Aftercare**
	Site development	Tax incentives	Subsidies	Grants	Loans & loan guarantees	Expedited permitting; Talent services & support	Ongoing support
Overview	Ongoing investments in site readiness, maintenance (e.g., of land and infrastructure), and placemaking	Direct offsets to company's capital investment and/or operating costs, as well as related investments the company makes in surrounding community (e.g., investment in public infrastructure)				Services and programs offered to company to facilitate investments and accelerate project's success	Relationship building and maintaining aimed at helping future expansion

1. Attracting businesses can involve different financial incentives

Not exhaustive

■■■■ More complex

	Tax incentives	Subsidies	Grants	Loans and loan guarantees
Description	Temporary reduction or elimination of taxes, in the form of tax abatement, tax credit, tax refund, and others	Form of business expense reduction, which could be in the form of discount or direct payment to supplier	Non-refundable funds that are usually conditional upon meeting certain qualifications and targeted for specific uses	Repayable financial aid from the State; Government expects repayment
Most applicable investment context	Small, mid-sized, and large enterprises	Small, mid-sized enterprises	Small, mid-sized, and large enterprises	Small, mid-sized enterprises
Risk profile	Low risk with a high degree of investment stability	Low risk with a high degree of investment stability	Low risk with a high degree of investment stability	High risk
Investment focus	Capital investment (mainly in the US) Regional and local development	Workforce expansion/retention Operations/financing Capital investment	Anchor and large capital investments Regional and local development	Operations/financing
Incentive examples	Tax abatement (e.g., property tax, corporate tax), tax refund, payment in lieu of taxes, tax increment financing	Training support, reduced utility bills, jobs credits, workforce development, talent attraction	Direct cash grants	Forgivable loans, low-interest loans
Degree of complexity	■■■□	■□□□	■□□□	■■□□

Source: Expert interviews, Incentive Monitor

1. CAPEX and OPEX intensive industries prioritize tax and subsidy incentives; smaller-scale industries may need capital financing support

Not exhaustive

	Tax incentives	Subsidies	Grants	Loans and loan guarantees
More costly				
Fiscal and accounting considerations	No direct impact in State's bud-get given that business support is foregone revenue rather than a direct cash expense on the budget[1]	Increased cash expenditure for Government but often registered under different expense categories (e.g., education, infrastructure, etc.). Monetary value to a company can be greater than actual expenditure by Government[2]	Most expensive form of business support as there is no expectation for repayment and the grant is registered as a direct cash expenditure on the State's budget	Loans register as a cash expenditure in the budget, but assets do not decrease as they are offset by an increase in accounts receivable given expectation for repayment (actual cost to government can vary based on repayment rate)
Implications for emerging sector priorities for Kentucky	Large scale operations industries (e.g., Auto/EV, Manufacturing sectors, Distribution & Logistics, and Aerospace within Innovation)	High OPEX industries (e.g., Auto/EV, Manufacturing sectors, Distribution & Logistics, and Life Sciences within Innovation)	Focus point for all industries	Smaller scale, fewer financing option companies (e.g., small Business, professional, & financial services players, AgriTech & Life Sciences start-ups)
Direct cost to government				varies

1. Impact is decreased revenue only in the event that the company would have opened operations in the State without the business support
2. i.e., company receives a full reduction in a specific cost but cost to government is only the cost of providing that service to the company

Source: Expert interviews

1. Kentucky's financial incentive toolkit emphasizes income tax incentives

Not exhaustive

Incentive program	Tax incentives: Income tax	Tax incentives: Sales and use tax	Grants	Loans and loan guarantees	Other
Kentucky Economic Development Finance Authority	**Kentucky Business Investment** • Up to 100% of corporate income tax credits and up to 4% of wage assessment incentives to new and existing businesses in target industries that locate or expand in Kentucky and invest $100K+ • Up to 10-15 years **Kentucky Reinvestment Act** • Up to 100% of corporate income tax credits for businesses that incur eligible equipment and related costs of at least $1-$2.5M (related to a qualifying Reinvestment Project) • Up to 10 years **Kentucky Small Business Tax Credit** • Up to $25K in state income tax credit for eligible small businesses that have hired and sustained at least one new job in the last year and purchased $5K+ in qualifying equipment or technology • Carryforward up to 5 years **Kentucky Angel Investment Tax Credit** • Up to 40% of confirmed investment amount in individual tax credit for qualified angel investor who invests in a qualified small business • Carryforward up to 15 years	**Kentucky Enterprise Initiative Act** • Up to $5-20M in refund of Kentucky sales and use tax paid for building and construction materials permanently incorporated as an improvement to real property, or equipment used for R&D, data processing, or flight simulation for eligible companies that make a minimum investment of $500K • Up to 7 years	**N/A**	**KEDFA Direct Loan** • Between $25K-$500K in loans at below-market interest rates for fixed asset financing for agribusiness, tourism, industrial ventures, or the service industry, to encourage business expansion and job creation • Up to 20 years	**Tax Increment Financing** • Between $10M and $200M in financing for infrastructure improvements for a project by earmarking future tax gains resulting from the development for improvements in TIF development areas • Up to 30 years
Bluegrass State Skills Cooperation	**Skills Training Investment Credit** • Up to 50% of eligible training costs (or up to $75K) in corporate income tax credit to existing businesses that sponsor occupational or skills upgrade training programs for the benefit of their employees • Carryforward up to 3 years		**Grant-in-Aid** • Up to 50% of eligible costs (or up to $75k) to companies for approved training activities • 1 year		

Source: Kentucky Cabinet for Economic Development, Incentive Program Overview, June 2021

1. Kentucky has a robust incentives toolkit, with few gaps relative to peer and competitor states

✓ Direct funding/support though dedicated program

✓ Funded indirectly or some funding available but not robust

⊗ Not funded / not available

	Incentive type	TEAM KENTUCKY	MEDC Michigan Economic Development Corporation	Georgia USA	JobsOhio	Mastered in Tennessee	Texas Economic Development Corporation	Peer sample program	KY Strengths and Challenges
Financial	Land / sites	✓	✓	✓	✓	✓	⊗	**Tennessee Site Development Grant:** grants of up to $2M for improving certified sites and preparing other sites to achieve certification	$100M in state funding toward upgrades of sites and buildings across the state through Kentucky Product Development Initiative (KPDI)
	R&D	✓	⊗	✓	✓	⊗	✓	**Georgia R&D Tax Credit:** Available to companies increasing their qualified research spending, can be used to offset up to 50% of next income tax liability	Research facility tax credit: 5% tax credit on construction of research facilities, refund on sales tax for purchase of R&D equipment through KY Enterprise Initiative Act (KEIA)
	Job creation	✓	✓	✓	✓	✓	✓	**Georgia Job Tax Credit:** provides a credit ranging from $1,250 to $4,000 per year for 5 years for every new job created	Main job creation program KY Business Initiative has industry-focused eligibility which may impede the flexibility of the programs, job targets are low or negotiable
	Expansion	✓	✓	✓	✓	✓	✓	**JobsOhio Growth Fund (~$17M/year)**: Provides capital for expansion projects (land, building, machinery, software development) to companies, with job retention or creation requirement	KY Enterprise Initiative Act offers incentives for KY companies for physical / capital expansion, no job expansion requirements
	Retention	✓	✓	✓	✓	✓	✓	Peers spend on average 2% of incentives dollars on job retention (GA, OH, TX spend 0-1%, TN spends 6%)	KY spends 3% of incentives dollars on job retention, KY Reinvestment Act (KRA) requires 85% job retention
	Talent	✓	⊗	✓	✓	✓	✓	**Texas Skills Development Fund ($30M, FY2021):** assists Texas public community and technical colleges finance customized job training for their local businesses	Workforce training credits offered through Bluegrass State Skills Cooperation, Apprentice programs and scholarships through Education and Labor Cabinet
	Small business	✓	✓	✓	✓	⊗	✓	**Texas Product Development and Small Business Incubator Fund ($435K, FY2021)**: revolving loan program financed through bond issuances, aids in development, production and commercialization of new or improved products	Multiple programs offer support for entrepreneurship and small businesses, lacking targeted support for minority and/or women-owned businesses
Non-financial	Technical assistance	✓	✓	✓	✓	⊗	⊗	Georgia's easy-to-navigate Small Business website includes assistance for starting, growing and financing a businesses, mentoring, education, coworking spaces, as well as dedicated pages for women, minority, youth, and veteran owned businesses	KY Business One Stop provides information and resources for business owners

Source: State websites

1. Select insights from Kentucky's financial incentive analysis

January 2021 – September 2023

Select insights

Kentucky incentives are predominantly tax credits while peers utilize a greater share of grants/subsidies: By total deal count, 94% of Kentucky's incentives were deployed as tax credits, the highest among peers. In comparison, OH and SC deployed 70%+ of incentives as grants/subsidies

Incentives are focused on attraction: Kentucky ranks 4th among peers in share of incentives going to attraction projects (86% vs 96% for GA) and 14% going to expansion projects

Kentucky's deals are efficient and have greater overall employment impact than peers: Kentucky's incentives are more efficient than competitive peers (e.g., TN, NC, GA)[1], which means the Commonwealth gets more capex and jobs per incentive $; compared to peers, Kentucky:

- Creates the greatest number of new jobs as a share of employment (2.5% vs next highest of 1.8% in IN)
- Ranks 6 out of 8 peers in total incentives ($1.7B) between 2021 and YTD 2023, and in the top 5 for incentives as a share of GDP, incentive to capex, and incentives to jobs
- For attraction deals, Kentucky is most efficient for incentives per capex and 2nd most efficient on incentives per jobs compared to competitive peers (excluding AR)

Incentives are concentrated in auto / manufacturing-focused counties, and deal efficiency varies by region: Regions with auto and manufacturing footprint have received highest share of incentive spend, which are among Kentucky's least efficient deals (e.g., Hardin Country, $5.8B investment from Ford and Christian County, $1B investment from Ascend)

EV battery is Kentucky's least efficient sector, though the Commonwealth is still more efficient than peers: Kentucky's incentives are efficient across most priority sectors[2] (see next page for more details); however, EV Battery, the sector with the most incentives, has the highest incentive to capex and job ratios, though Kentucky is more efficient than all EV battery peers for both capex and jobs, indicating the competitiveness of this sector and higher incentives per job

Potential implications

Today, Kentucky is efficient in incentive delivery across sectors and competed to peers

However, Kentucky may need to increase incentive investments, develop a broader toolkit (e.g., more grants / subsidies), and further tailor incentives to priority sectors to prepare for increasing competiveness in priority sectors like EV, where competitor states are increasing investment[3, 4]

Similarly, Kentucky may have to invest more to win deals in high priority regions – which could lead to less deal efficiency – in to ensure all parts of the Commonwealth benefit from deals

1. Peers excluding Arkansas, since 76% of the states deals are for expansion
2. Auto/EV, aerospace, distribution & logistics, materials, food & beverage
3. Based on research from Tim Bartik, senior economist at the WE Upjohn Institute for Employment Research, who noted that capital intensive industries could receive up to $100K per job (vs average incentives of $50K). Financial Times, Feb 2023
4. Michigan passed a bill to invest $1.5B in incentives for EVs

Source: Incentives Monitor

1. Select insights from Kentucky's financial incentive analysis in emerging priority sectors

January 2021 – September 2023

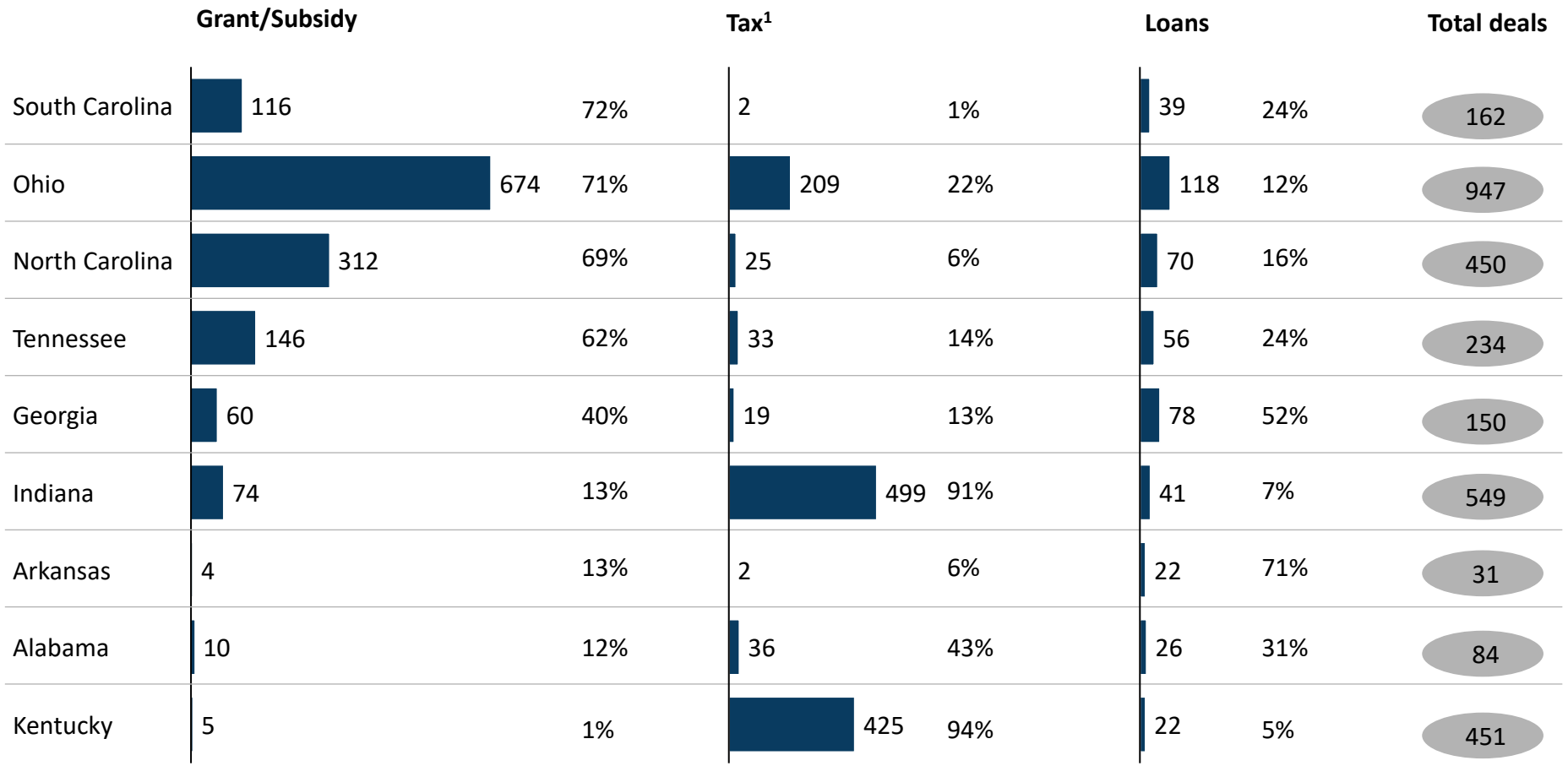
Strategic sector theme	Emerging priority sector	Select insights
Automotive future	Auto/EV	• Kentucky deployed $32M in incentives (~2% of top peer) and received $664M in CAPEX (~10% of top peer), and had highest capex and job efficiency compared to peers
	EV battery	• Kentucky deployed $960M in incentives (~25% of top peer) and received $8.7B in CAPEX (~75% of top peer) while creating the highest relative net new share of jobs (~.4% of total employment) and seeing highest capex and job efficiency compared to peers • However, these deals were the least efficient compared to other emerging priority sectors in KY
Manufacturing	Materials	• Kentucky deployed $84M in incentives (~5% of top peer) and received $2.9B in CAPEX (~10% of top peer), and had highest job efficiency and second highest capex efficiency
	Food & beverage	• Kentucky deployed $84M in incentives (~30% of top peer) and received highest CAPEX investment of $3.4B, with highest relative net new share of jobs (~.1% of total employment) and highest capex efficiency
Natural assets	Distribution & logistics	• Kentucky deployed the highest amount of incentives of $42M and received highest CAPEX investment of $78M, with capex and job efficiency on par with peer average
Innovation	Aerospace	• Kentucky deployed $6M in incentives (~5% of peers) and received $106M in CAPEX investment (~12%), with highest capex efficiency

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. Compared to majority of peers, Kentucky deploys a greater proportion of tax incentives and smaller proportion of grants/subsidies

Incentives by type, 2021-2023 YTD

Number of deals and % breakdown



Kentucky utilizes diversified incentive offerings but offers the third largest share of loans compared to peers

Kentucky offers third lowest share of grants/subsidies compared to peers

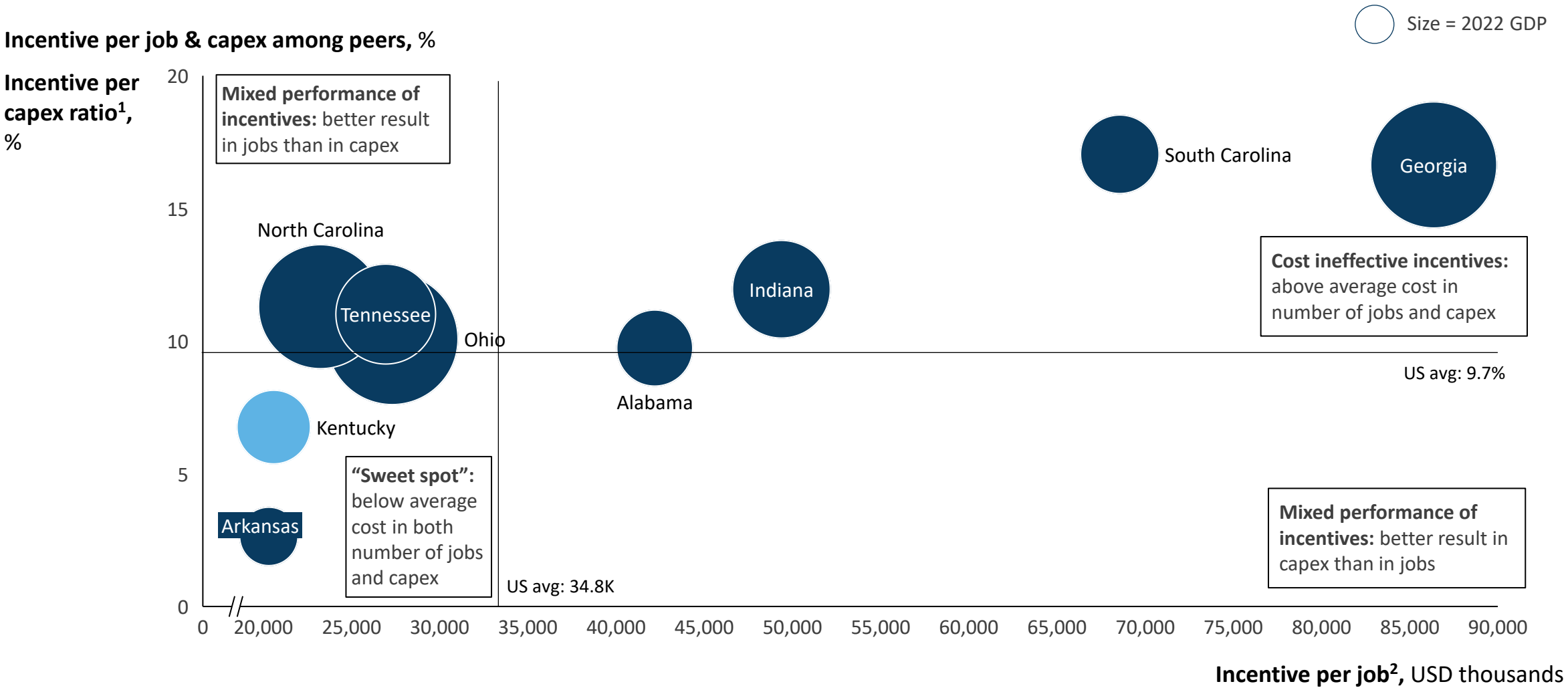
1. Includes tax credits and abatements

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. Kentucky offers lower incentives per CAPEX and per job relative to nearly all peers and US average

All deal types: Incentive per capex ratio v. incentive per job, January 2021 – September 2023

Incentive per job & capex among peers, %

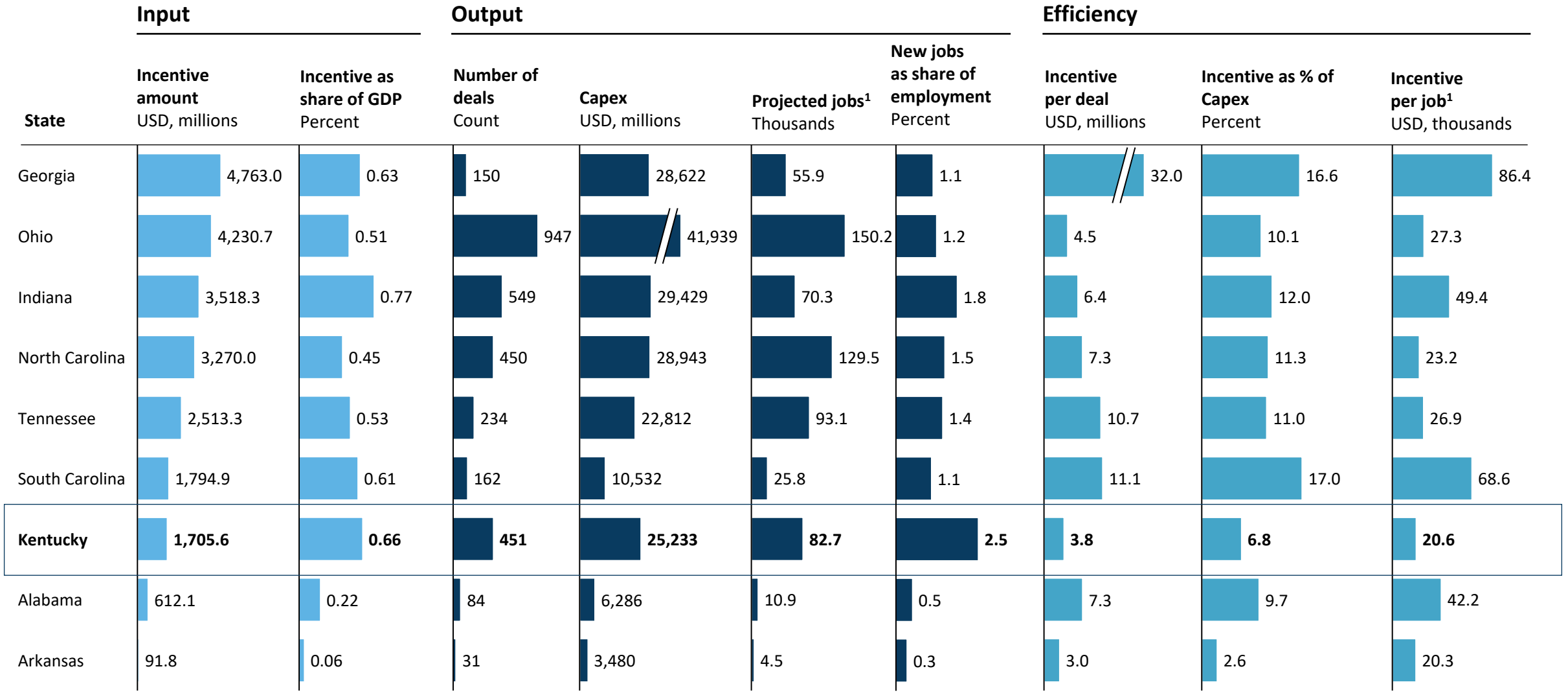


1. Incentive per capex measures total incentives divided by sum of capital expenditures occurring as a result of private sector investment
2. Incentive per job measures total incentives divided by sum of jobs created and retained through private sector investment

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. Compared to its peers, Kentucky has created highest relative net new jobs and has second highest capex and job incentive efficiency

Incentive deal analysis, January 2021 – September 2023



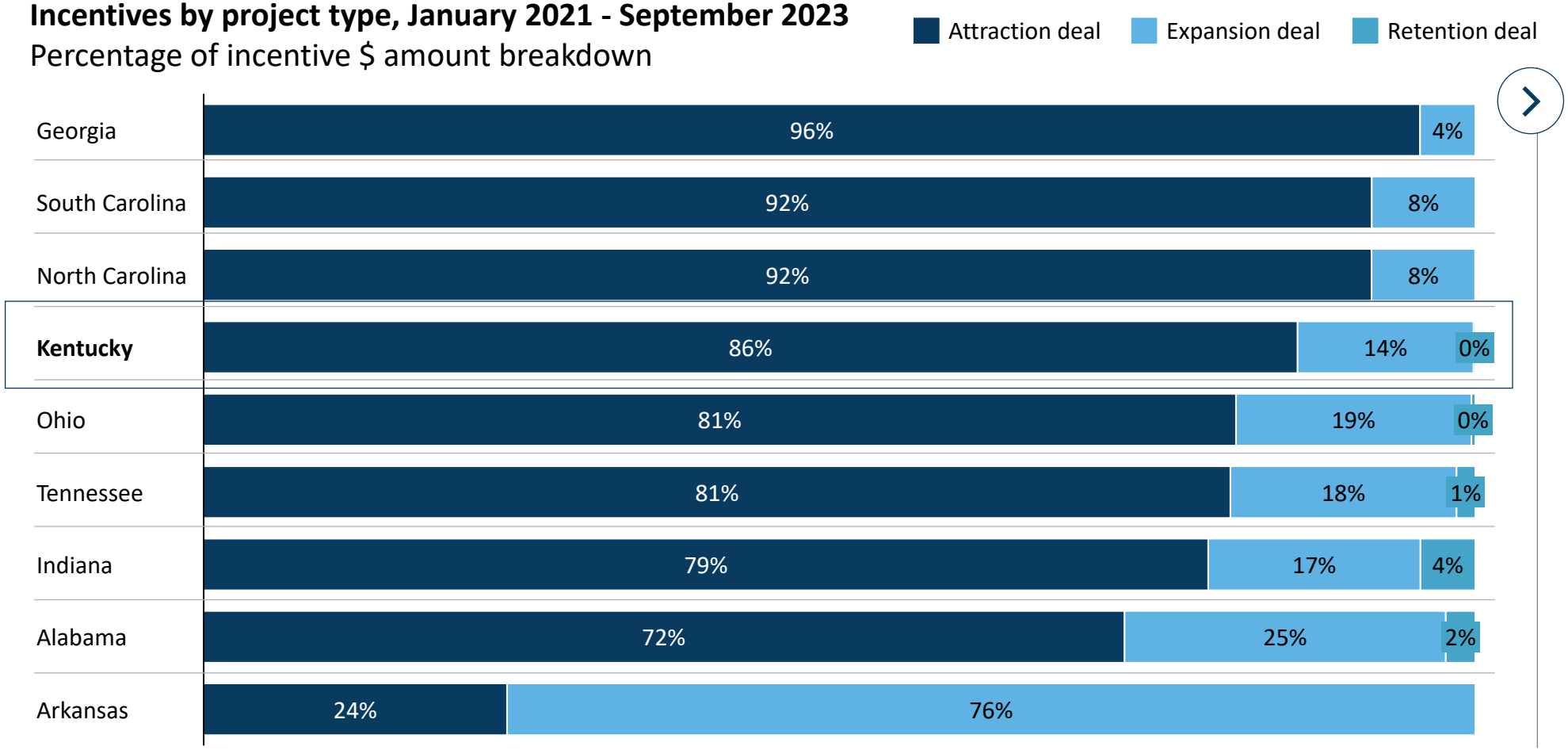
	Input		Output				Efficiency		
State	Incentive amount, USD, millions	Incentive as share of GDP, Percent	Number of deals, Count	Capex, USD, millions	Projected jobs[1], Thousands	New jobs as share of employment, Percent	Incentive per deal, USD, millions	Incentive as % of Capex, Percent	Incentive per job[1], USD, thousands
Georgia	4,763.0	0.63	150	28,622	55.9	1.1	32.0	16.6	86.4
Ohio	4,230.7	0.51	947	41,939	150.2	1.2	4.5	10.1	27.3
Indiana	3,518.3	0.77	549	29,429	70.3	1.8	6.4	12.0	49.4
North Carolina	3,270.0	0.45	450	28,943	129.5	1.5	7.3	11.3	23.2
Tennessee	2,513.3	0.53	234	22,812	93.1	1.4	10.7	11.0	26.9
South Carolina	1,794.9	0.61	162	10,532	25.8	1.1	11.1	17.0	68.6
Kentucky	**1,705.6**	**0.66**	**451**	**25,233**	**82.7**	**2.5**	**3.8**	**6.8**	**20.6**
Alabama	612.1	0.22	84	6,286	10.9	0.5	7.3	9.7	42.2
Arkansas	91.8	0.06	31	3,480	4.5	0.3	3.0	2.6	20.3

1. New and retained jobs

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. Kentucky ranks 4th among peers in share of incentives going toward attraction deals

Incentives by project type, January 2021 - September 2023
Percentage of incentive $ amount breakdown

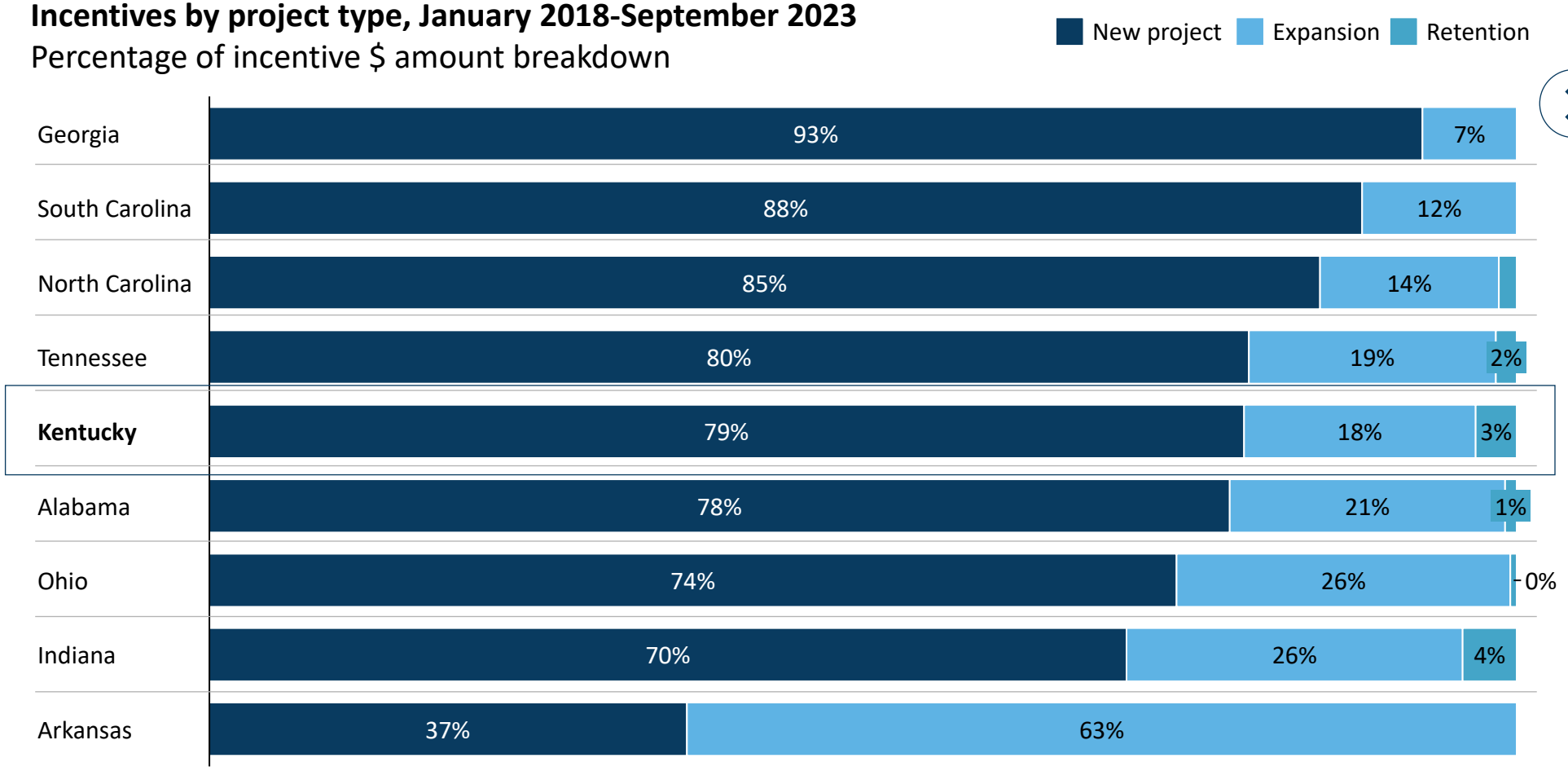


84% of Kentucky's incentives spend goes toward attraction deals

Source: FDI Intelligence Incentives Flow, accessed 9/25/2023

1. Historically, Kentucky had more expansion and retention deals

Incentives by project type, January 2018-September 2023
Percentage of incentive $ amount breakdown



Over the past 5 years, 79% of Kentucky's incentives spend has gone toward new projects

Source: FDI Intelligence Incentives Flow, accessed 9/27/2023

1. For attraction deals, Kentucky deploys tax incentives while peers utilize grants or a combination of grants and tax incentives

Incentives by type, 2021-2023 YTD

Number of deals and % breakdown

	Grant/Subsidy		Tax[1]		Loans		Total deals
South Carolina	69	91%	1	1%	1	1%	76
Georgia	46	87%	12	23%	1	2%	53
North Carolina	145	80%	20	11%		0%	182
Tennessee	58	78%	16	22%	2	3%	74
Arkansas	2	67%	1	33%		0%	3
Ohio	95	46%	125	60%	5	2%	208
Indiana	37	23%	158	99%	3	2%	160
Alabama	6	21%	17	59%		0%	29
Kentucky	3	1%	227	100%	2	1%	227

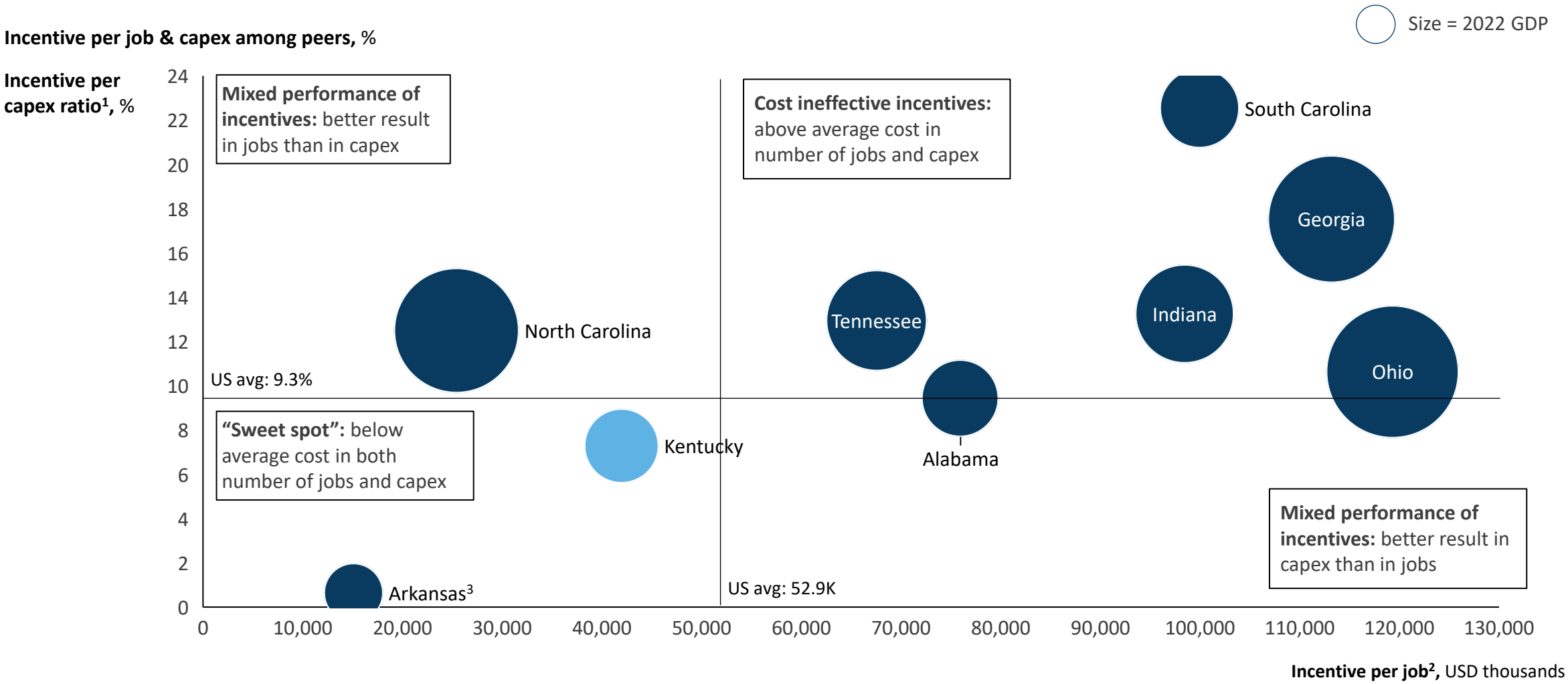
Kentucky offers the 2nd lowest proportion of grant/subsidy incentives for new deals compared to peers, and the 2nd highest share of loans

1. Includes tax credits and abatements

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. For attraction deals, Kentucky offers lower incentives per capex and per job relative to nearly all peers and US average

New deals: Incentive per capex ratio v. incentive per job, January 2021 – September 2023



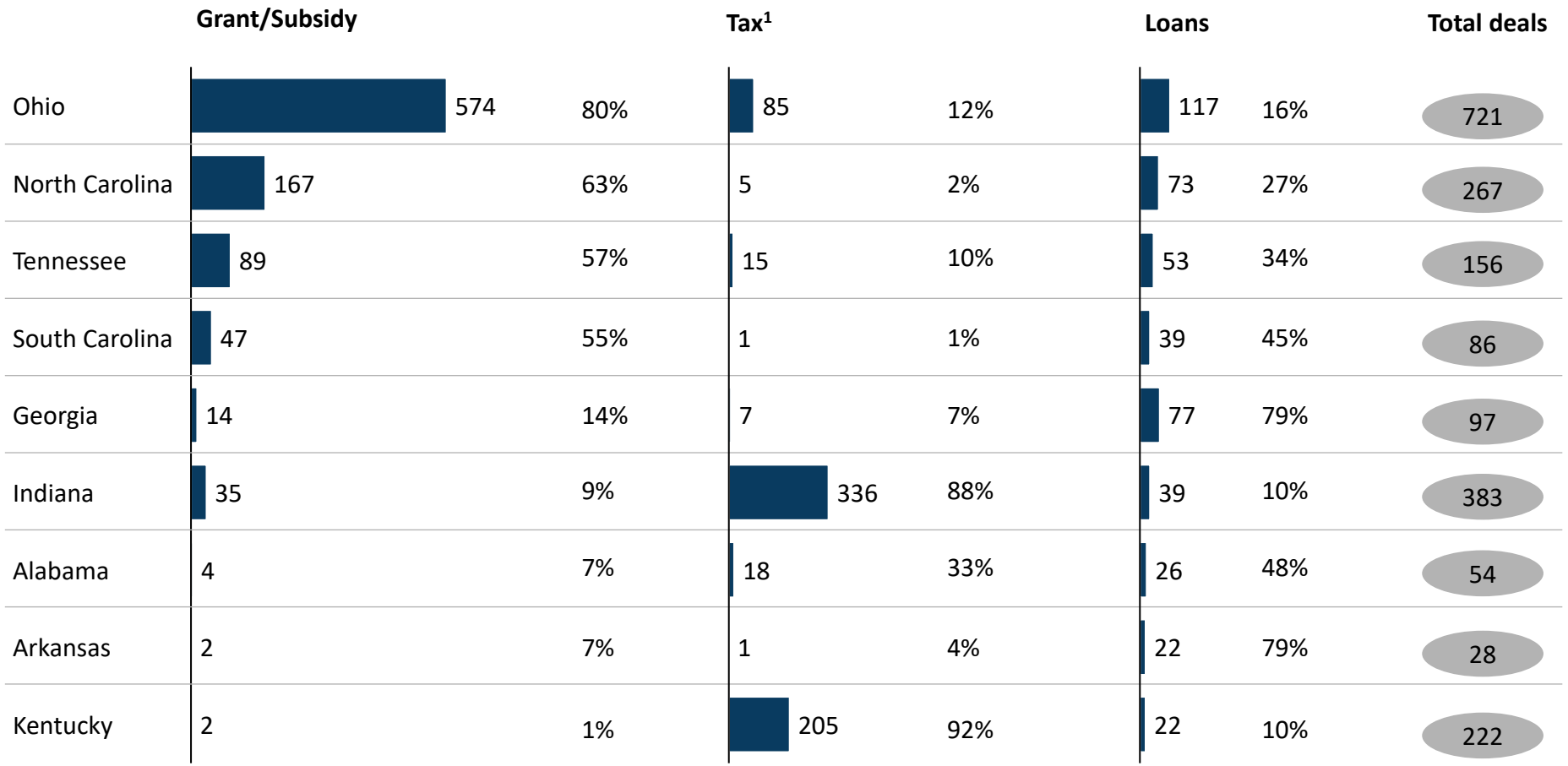
1. Incentive per capex measures total incentives divided by sum of capital expenditures occurring as a result of private sector investment
2. Incentive per job measures total incentives divided by sum of jobs created and retained through private sector investment
3. 76% of Arkansas projects are retention projects

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. For expansion deals, states utilize a mix of incentive types, while Kentucky relies mostly on tax incentives

Incentives by type, 2021-2023 YTD

Number of deals and % breakdown



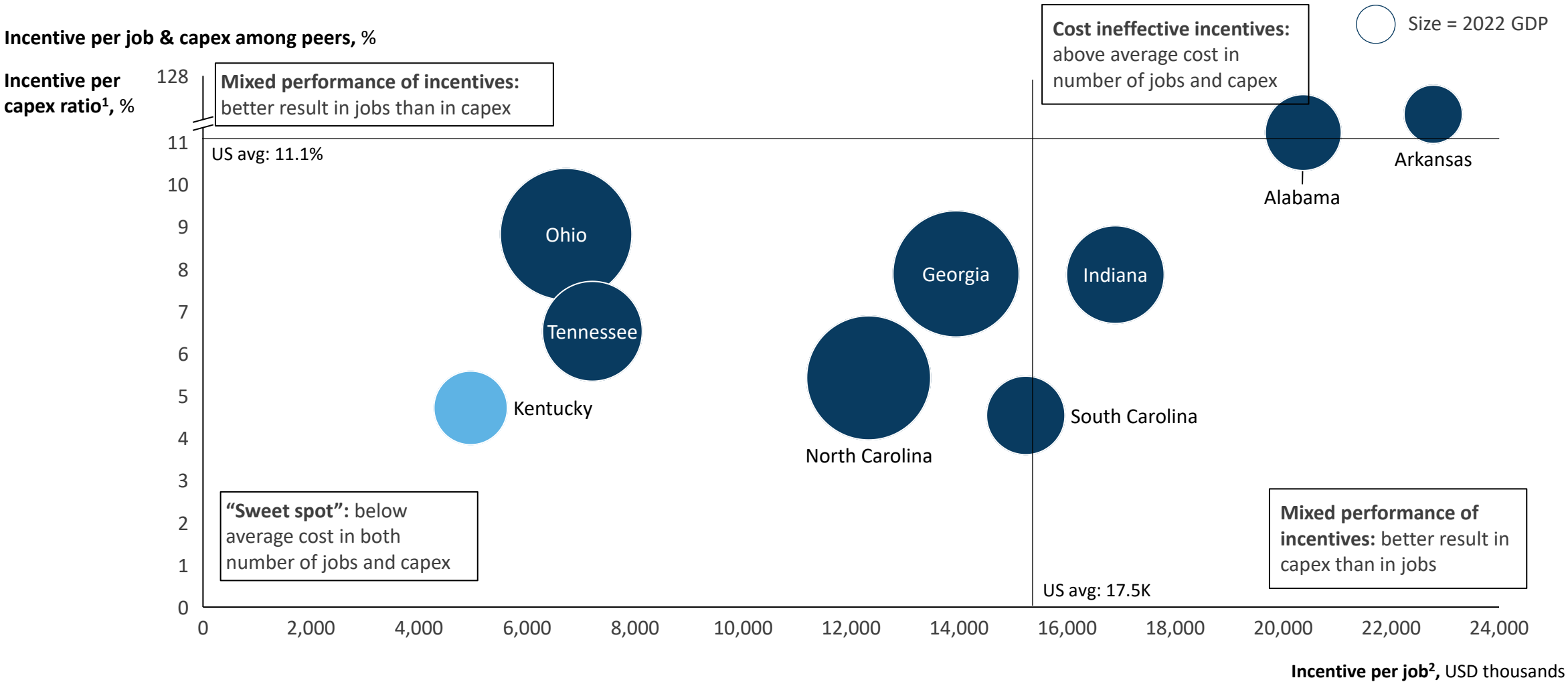
Expansion deal funding mechanisms vary more widely than new deal funding, some states rely heavily on tax incentives for expansion (Kentucky, Indiana), while others (Tennessee, South Carolina) utilize more grants/subsidies

1. Includes tax credits and abatements

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. For expansion deals, Kentucky offers the lowest incentives per job and lower incentive per capex relative to most peers

Expansion deals: Incentive per capex ratio v. incentive per job, January 2021 – September 2023



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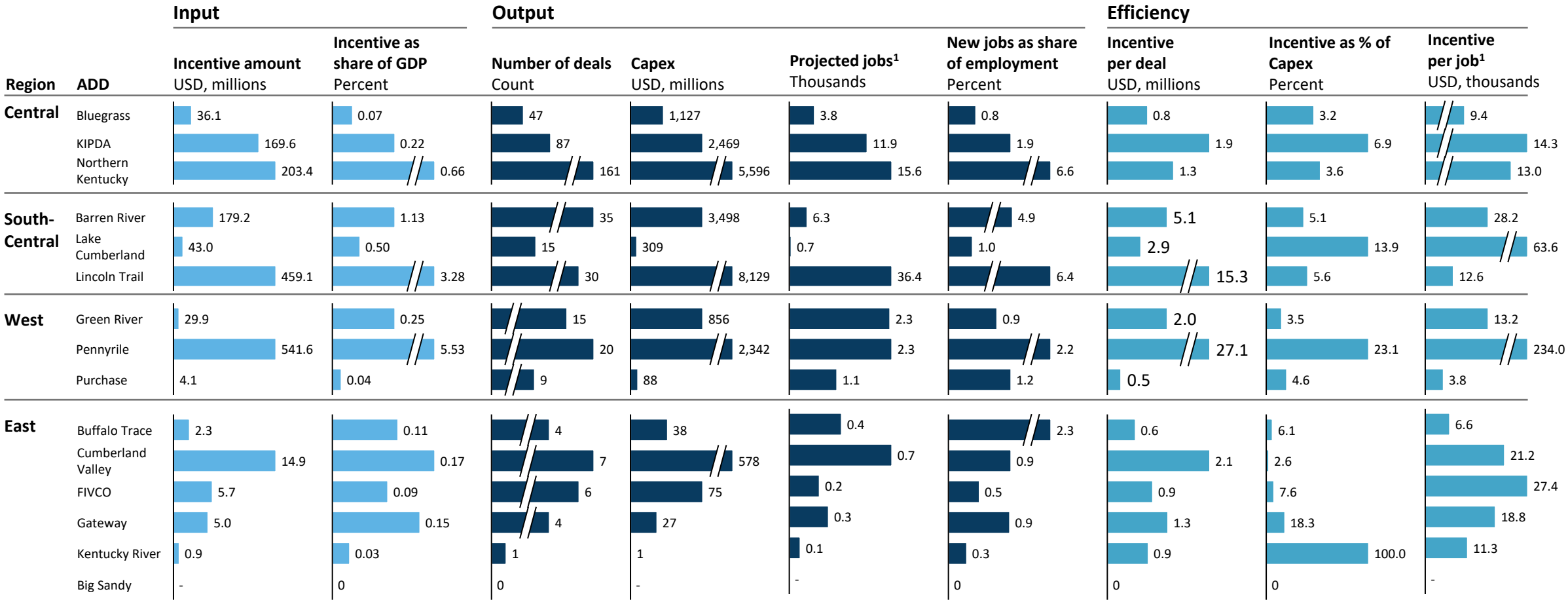
2. Incentive per job measures total incentives divided by sum of jobs created and retained through private sector investment

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. In Kentucky, deal activity and efficiency varies by region

Incentive deal analysis, January 2021 – September 2023



1. New and retained jobs

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

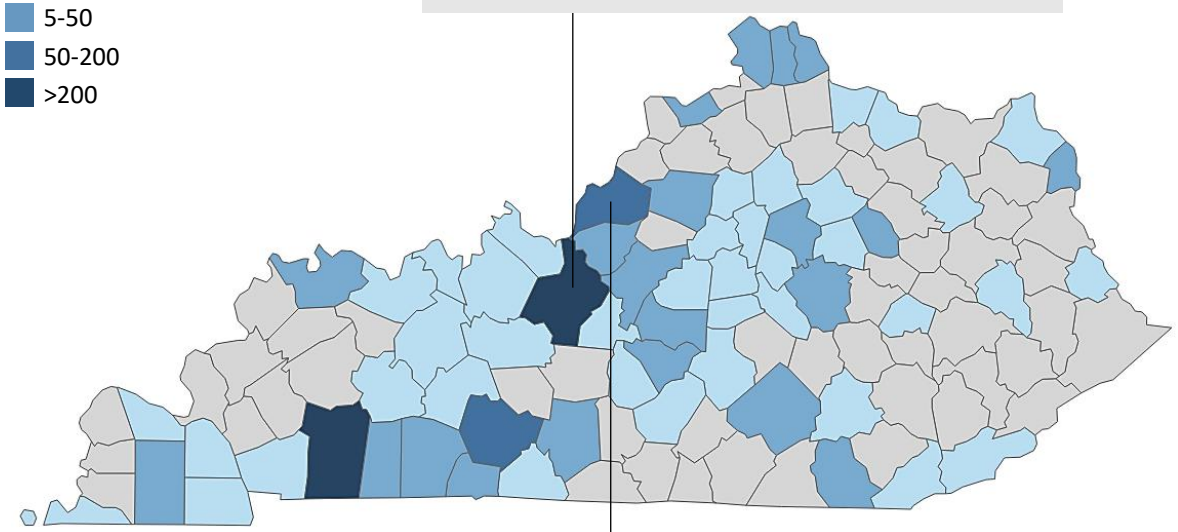
1. Incentive investments vary with heavy auto and manufacturing counties receiving a higher share

January 2021 – September 2023

Incentives spend per county[1]

Incentive amt., $M
- 0
- <5
- 5-50
- 50-200
- >200

Hardin County: A $430M deal with **Ford to manufacture batteries for its new line of EVs** generated **5.5K jobs and $5.8B capex** (2021)

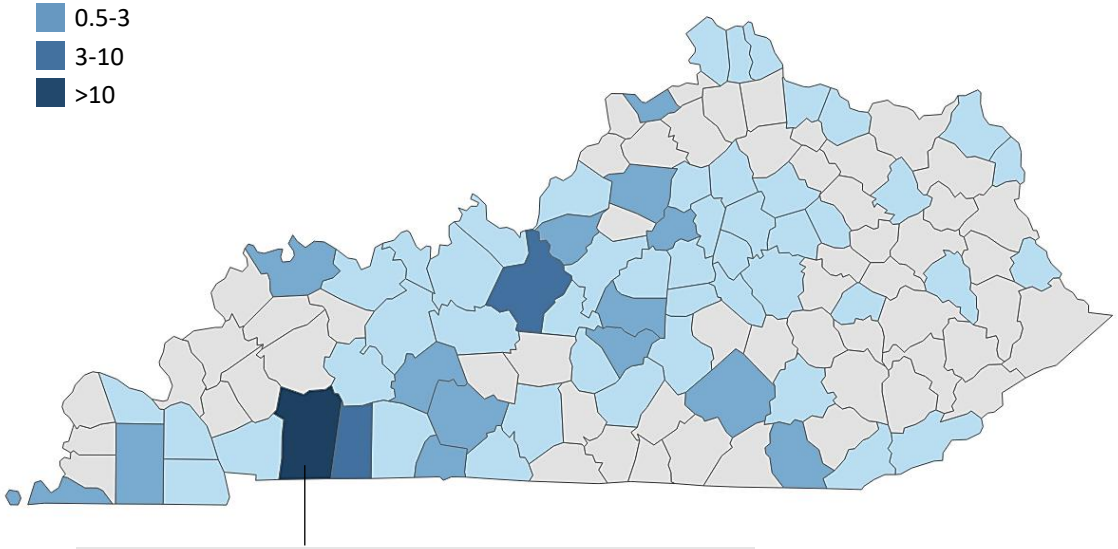


Jefferson County: Received ~$120M in incentives and had the highest level of job creation – 7.6K new jobs

A third of total incentives spend in the county were toward one deal valuing **$40M with GE, generating 1K new jobs and $450M in capex** (2021)

Incentives spend as a % of GDP, by county[2]

Incentive % of GDP
- 0
- <0.5
- 0.5-3
- 3-10
- >10



Christian County: Received the most incentives relative to county GDP, driven by 2022 deal valued at nearly $500M with **Ascend Elements** (battery mfg), which created **400 new jobs and $1B in capex**; this was among Kentucky's least efficient deals

1, 2. Excludes deals that involve multiple counties

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

Contents

2. Tailored peer state selection for Kentucky's financial incentive analysis in priority sectors

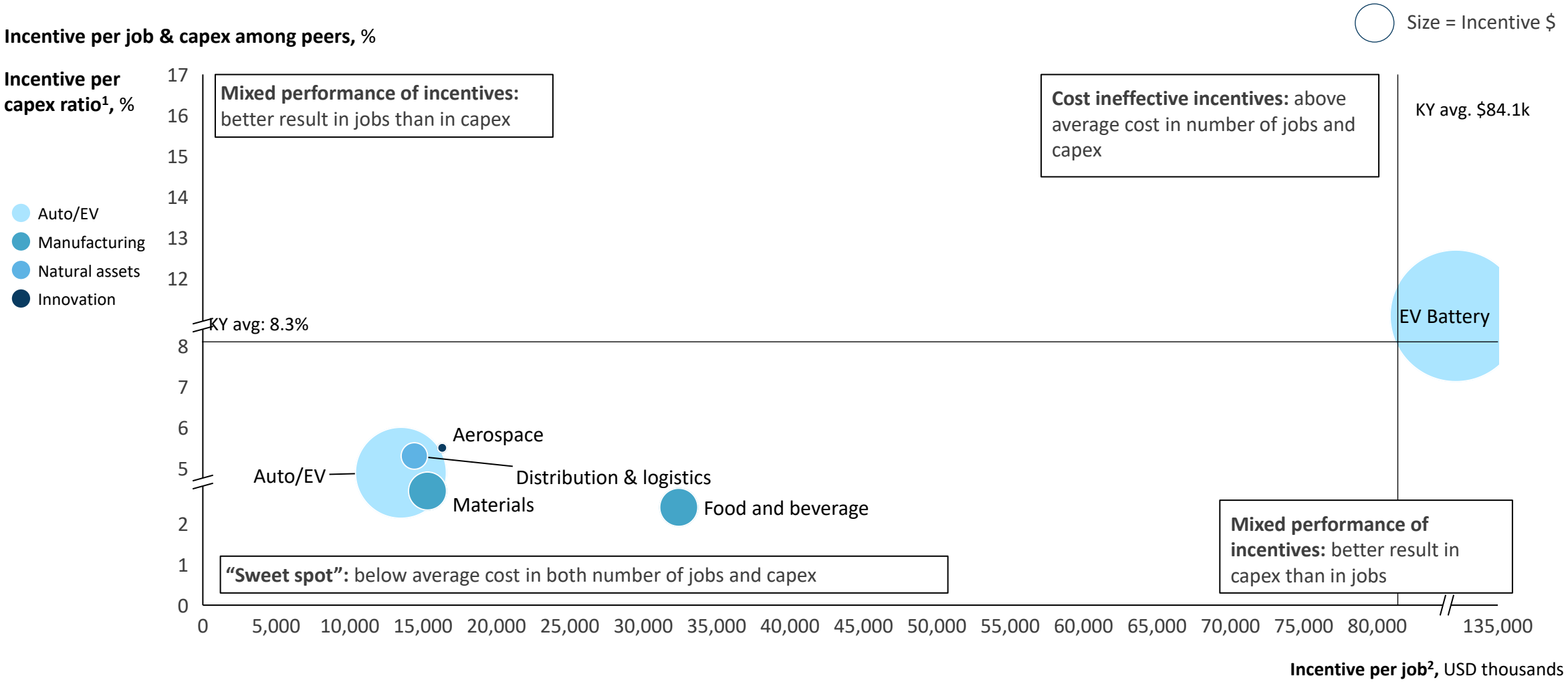
January 2021 – September 2023

Strategic sector theme	Priority sector	Top 5 peers by gross size of incentives in sector
Automotive future	Auto/EV	Georgia, North Carolina, South Carolina, Tennessee, Ohio
	EV battery	Georgia, North Carolina, Indiana, Michigan, Nevada
Manufacturing	Materials	Indiana, New York, Texas, West Virginia, Louisiana
	Food & beverage	New York, Texas, Washington, Iowa, Alabama
Natural assets	Distribution & logistics	Indiana, New York, Tennessee, Louisiana, Ohio
Innovation	Aerospace	North Carolina, California, Connecticut, Illinois, Indiana

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. Kentucky's EV battery deals are the largest and least efficient among priority sectors

Deals by sector: Incentive per capex ratio v. incentive per job, January 2021 – September 2023



1. Incentive per capex measures total incentives divided by sum of capital expenditures occurring as a result of private sector investment
2. Incentive per job measures total incentives divided by sum of jobs created and retained through private sector investment

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. Auto/EV: Kentucky's incentives are significantly smaller per deal and are the most capex and job efficient compared to peers

Incentive deal analysis, January 2021 – September 2023

	Input		Output				Efficiency		
State	**Incentive amount** USD, millions	**Incentive as share of GDP** Percent	**Number of deals** Count	**Capex** USD, millions	**Projected jobs**[1] Thousands	**New jobs as share of employment,** Percent	**Incentive per deal** USD, millions	**Incentive as % of Capex** Percent	**Incentive per job**[1] USD, thousands
Georgia	1,489	0.20%	9	6,697	10.7	0.21%	165.4	22.2	139.3
Tennessee	1,379	0.29%	9	6,249	7.2	0.22%	153.2	22.1	190.9
South Carolina	1,366	0.46%	8	3,971	5.1	0.22%	170.8	34.4	268.2
North Carolina	1,255	0.17%	21	4,290	9.7	0.17%	59.8	29.3	129.3
Ohio	619	0.08%	35	6,820	17.0	0.12%	17.7	9.1	36.4
Kentucky	32	**0.01%**	19	664	2.4	0.11%	1.7	4.9	13.5

Kentucky deployed lowest absolute value of incentives compared to peers

Kentucky received 1/10th of the CAPEX investment in Georgia and Tennessee; net new job creation in Kentucky was ½ of top-performing peers

Kentucky's incentives per deal were the smallest in absolute value and the most efficient per dollar of Capex and job

1. New and retained jobs

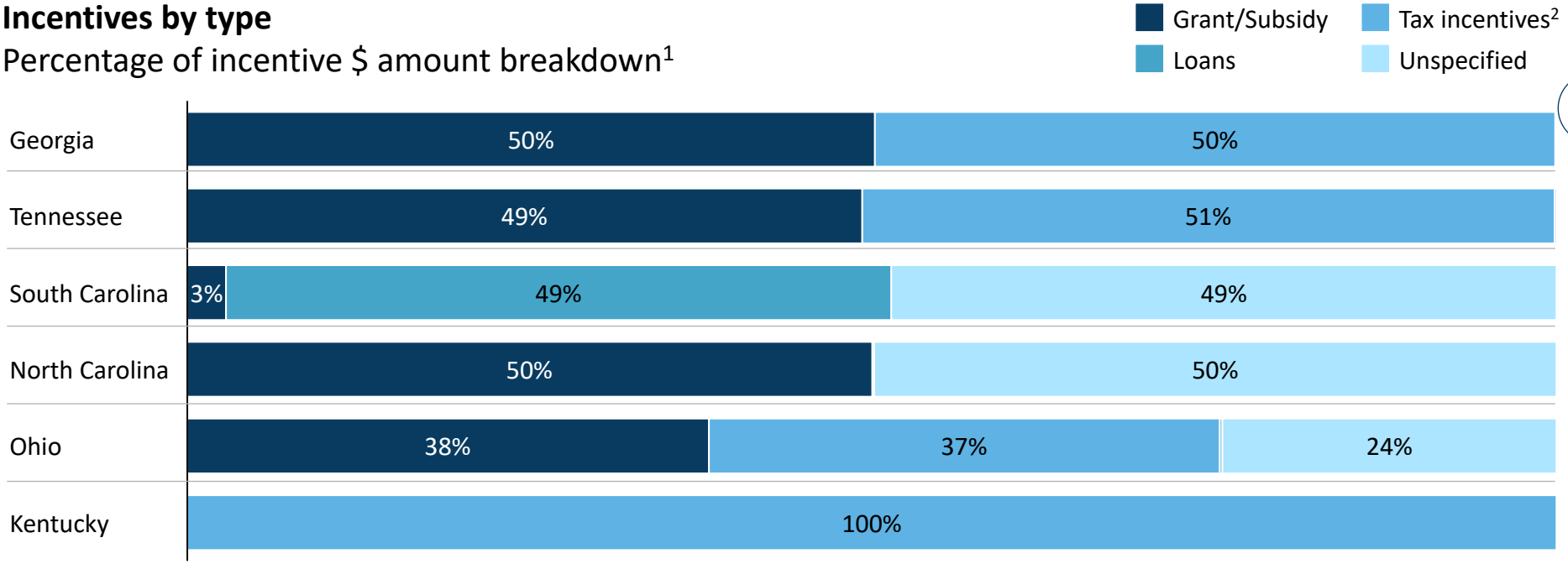
Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. Auto/EV: Kentucky has deployed tax incentives for Auto/EV deals while peers have leveraged a combination of financial incentive types

Incentive deal analysis, January 2021 – September 2023

Incentives by type

Percentage of incentive $ amount breakdown[1]



While peers use a broader range of incentive types for auto/EV deals, Kentucky has deployed tax incentives

1. Incentive deals may use more than one type of incentives program, so dollars may be double counted across incentive types
2. Includes tax credits and abatements

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. EV Battery:[1] Kentucky has seen highest relative increase in new jobs and has the most capex and job efficient incentives compared to peers

Incentive deal analysis, January 2021 – September 2023

	Input		Output				Efficiency		
State	**Incentive amount** USD, millions	**Incentive as share of GDP** Percent	**Number of deals** Count	**Capex** USD, millions	**Projected jobs[2]** Thousands	**New jobs as share of employ-ment,** Percent	**Incentive per deal** USD, millions	**Incentive as % of Capex** Percent	**Incentive per job[2]** USD, thousands
Michigan	3,751.8	0.60%	9	11,843.3	10.3	0.23%	416.9	31.7	365.2
Georgia	2,897.0	0.38%	8	13,640.8	13.4	0.27%	362.1	21.2	216.6
Nevada	2,864.1	1.33%	6	2,007.3	2.8	0.18%	477.3	142.7	1,031.4
Indiana	1,816.4	0.40%	4	6,695.0	3.7	0.11%	454.1	27.1	488.7
Kentucky	959.1	0.37%	7	8,660.7	7.3	0.35%	137.0	11.1	132.1
Kansas	829.0	0.39%	1	4,000.0	4.0	0.27%	829.0	20.7	207.3

Kentucky deployed second lowest absolute value of incentives compared to peers

Kentucky ranked third among peers for number of deals and CAPEX investment, yet created the highest relative share of new jobs compared to peers

Kentucky's incentives per deal were the smallest in average value compared to peers

1. Includes EV Battery/EV Assembly joint projects
2. New and retained jobs

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. Auto/EV and EV Battery: Multiple states have earmarked funds for EV/battery manufacturing and advanced mobility technology deployment

Vehicle incentives | Battery incentives | Vehicle and battery incentives | Technology deployment | Auto/EV peer state

State	Incentive type	Description
California		**Advanced Transportation Tax Exclusion** – Sale and tax exclusion for manufacturers of transportation products, components, or systems that reduce pollution and energy use and promote economic development
Georgia		**Alternative Fuel and Advanced Vehicle Job Creation Tax Credit** – Annual tax credit for up to 5 years based on new jobs created for businesses that manufacture alternative energy products for use in battery, biofuel, and electric vehicle enterprises
Illinois		**Reimagining Energy and Vehicles Act** – Tax incentives program, including up to 100% of income tax, 5 year sales tax exemption on building materials, and 10 year exemption on utilities aimed at attracting companies all along electric vehicle and renewables supply chain
Michigan		**Michigan Mobility Funding Platform** – Provides grants to mobility and electrification companies looking to deploy technology solutions focused on sustainability, equity and multimodal transportation
Nevada		**Electric Vehicle Manufacturer Franchise Exemption** – Regulation that exempts vehicle manufacturers from selling through franchised dealers if they produce cars powered solely by at least one electric motor
New Mexico		**Alternative Fuel and Advanced Vehicle System Manufacturing Incentive** – Provides credit against combined reporting taxes for manufacturers of alternative energy products such as fuel cell vehicle systems and electric and hybrid EVs
South Carolina		**Battery Manufacturing Tax Incentive** – Reduces taxable fair market value of manufacturing machinery and equipment purchased for use at a renewable energy manufacturing facility by 20% of the original cost
Wisconsin		**Vehicle Battery and Engine Research Tax Credits** – Annual tax credit equal to 11.5% of expenses incurred on research focused on batteries for hybrid electric vehicles or improving internal combustion engine design and production processes

Michigan also leverages the **Critical Industry Program**, an incentive program for manufacturers creating or retaining qualified jobs as a result of a technological shift in product or production – which may be relevant to auto suppliers retooling their plants to transition from ICE to EV components

Source: Department of Energy; Illinois Department of Commerce and Economic Opportunity; Michigan Economic Development Corporation

2. Materials: Kentucky's incentives are significantly smaller per deal and are the most capex efficient compared to peers

Incentive deal analysis, January 2021 – September 2023

	Input		Output				Efficiency		
State	**Incentive amount** USD, millions	**Incentive as share of GDP** Percent	**Number of deals** Count	**Capex** USD, millions	**Projected jobs**[1] Thousands	**New jobs as share of employ-ment,** Percent	**Incentive per deal** USD, millions	**Incentive as % of Capex** Percent	**Incentive per job**[1] USD, thousands
West Virginia	1,675.8	1.75%	3	2,850.0	1.0	0.15%	558.6	58.8	1,611.3
New York	791.1	0.04%	60	4,114.0	5.7	0.05%	13.2	18.2	138.8
Texas	729.5	0.03%	25	9,291.0	5.2	0.04%	29.2	7.7	130.6
Indiana	510.4	0.11%	115	4,494.0	11.1	0.32%	4.4	11.1	45.9
Louisiana	288.5	0.10%	31	25,900.0	4.5	0.11%	9.3	1.1	63.9
Kentucky	83.5	0.03%	58	2,927.0	5.5	0.18%	1.4	2.8	15.3

Kentucky deployed lowest absolute value of incentives compared to peers

Kentucky received second lowest CAPEX investment yet created the second highest absolute share of new jobs compared to peers

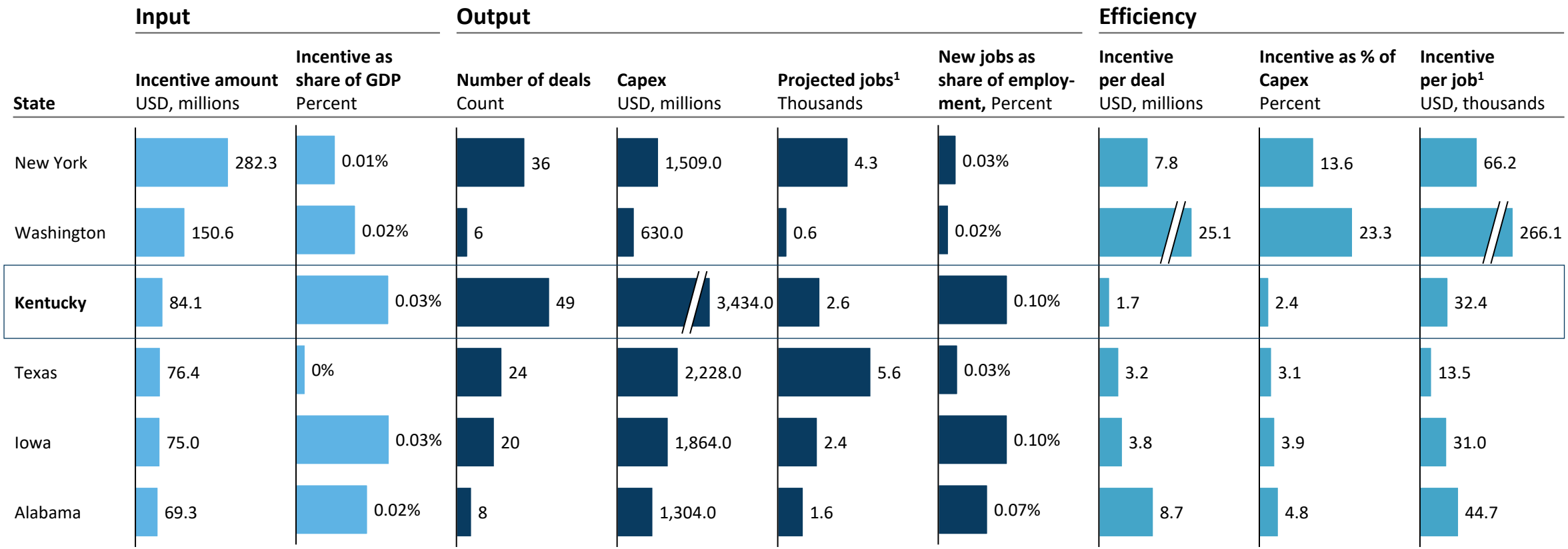
On average, Kentucky's incentives per deal were the smallest in value compared to peers

1. New and retained jobs

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. Food and beverage: Kentucky received highest capex investment while deploying most capex effective incentives compared to peers

Incentive deal analysis, January 2021 – September 2023



Kentucky deployed an average incentive to GDP ratio compared to peers

Kentucky received the highest CAPEX investment and created the highest absolute share of new jobs compared to peers (on par with Iowa)

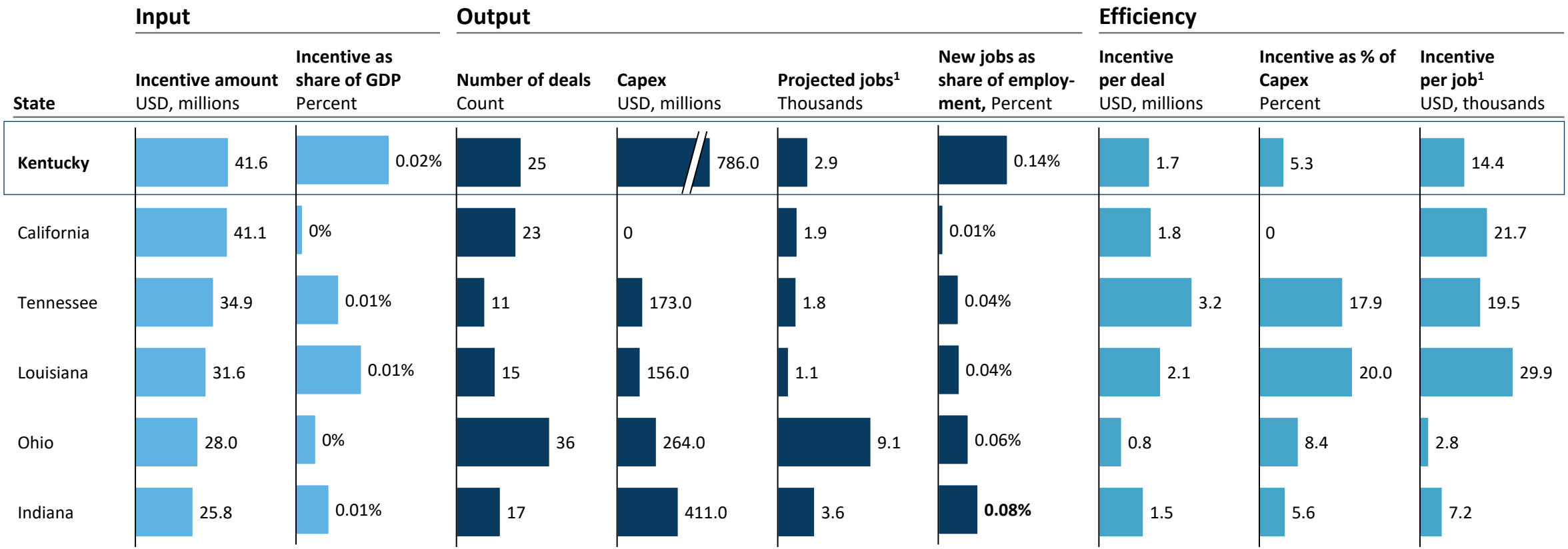
On average, Kentucky's incentives per deal were the smallest in value compared to peers

1. New and retained jobs

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. Distribution and logistics: Kentucky deployed most incentives, receiving highest capex investment and relative new jobs compared to peers

Incentive deal analysis, January 2021 – September 2023



Kentucky deployed the highest value of incentives compared to peers

Kentucky received the highest CAPEX investment and created the highest absolute share of new jobs compared to peers

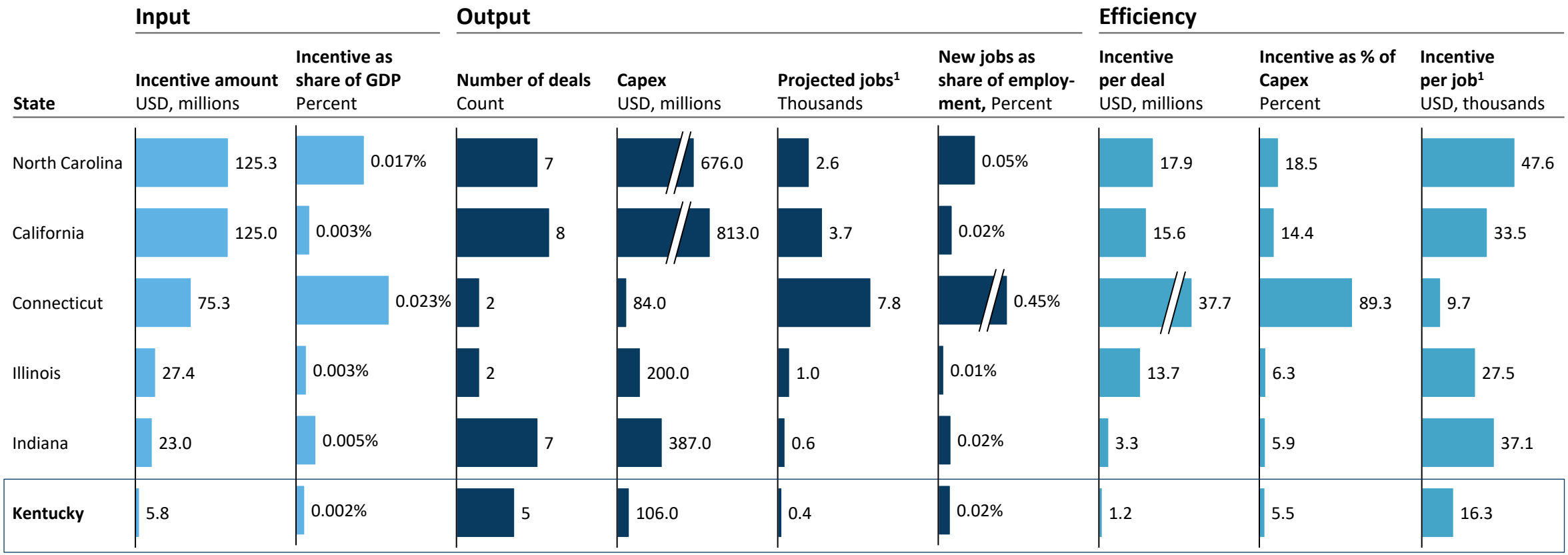
Kentucky's average value of incentive per deal was on par with peer average

1. New and retained jobs

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

2. Aerospace: Kentucky's incentives were the smallest on average and most capex and job efficient compared to peers

Incentive deal analysis, January 2021 – September 2023



Kentucky deployed an average incentive to GDP ratio compared to peers

Kentucky deal count was on par with peer average (5); Kentucky received the third smallest CAPEX investment

On average, Kentucky's incentives per deal were the smallest in value compared to peers

1. New and retained jobs

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

Foreign direct investment & exports analysis

Contents

1 Preliminary findings

After a slowdown during COVID, FDI into the US is growing from numerous countries

- FDI is recovering rapidly after COVID-19 in the US; since 2020, FDI as a share of GDP in the US has grown by 121% versus 24% globally
- From 2017-2022, Japan leads FDI in the US, with total inbound investment of $64B; South Korea and Taiwan are second and third largest sources of FDI in the US, respectively
- From 2020-2022, compared to pre-pandemic levels in 2017-2019, FDI from Japan dropped by 15% while South Korea and Taiwan both increased FDI by over 3x

Kentucky has already developed a strong FDI and export strategy

- From 2017-2022, Japan leads FDI in Kentucky, with total inbound investment of $7B; South Korea and China are second and third largest sources of FDI in the US, respectively
- Kentucky's FDI incentive packages are smaller on average than peers ($4.5M per deal vs $8.5M per deal) but are more efficient in terms of incentives as a % of CAPEX (4.5% vs 9.2%) and incentive per new job ($38.1k vs $50.9k)
- As of 2021, Kentucky ranks 4th nationally in FDI jobs as a share of total employment
- Aerospace is Kentucky's largest export among priority sectors (over $26B from 2017-2022)[1], while Life Sciences has grown fastest (over 11% from 2017-2022), driven by pharmaceutical product exports
- As of 2022, Kentucky ranks 3rd nationally for exports as a share of GDP

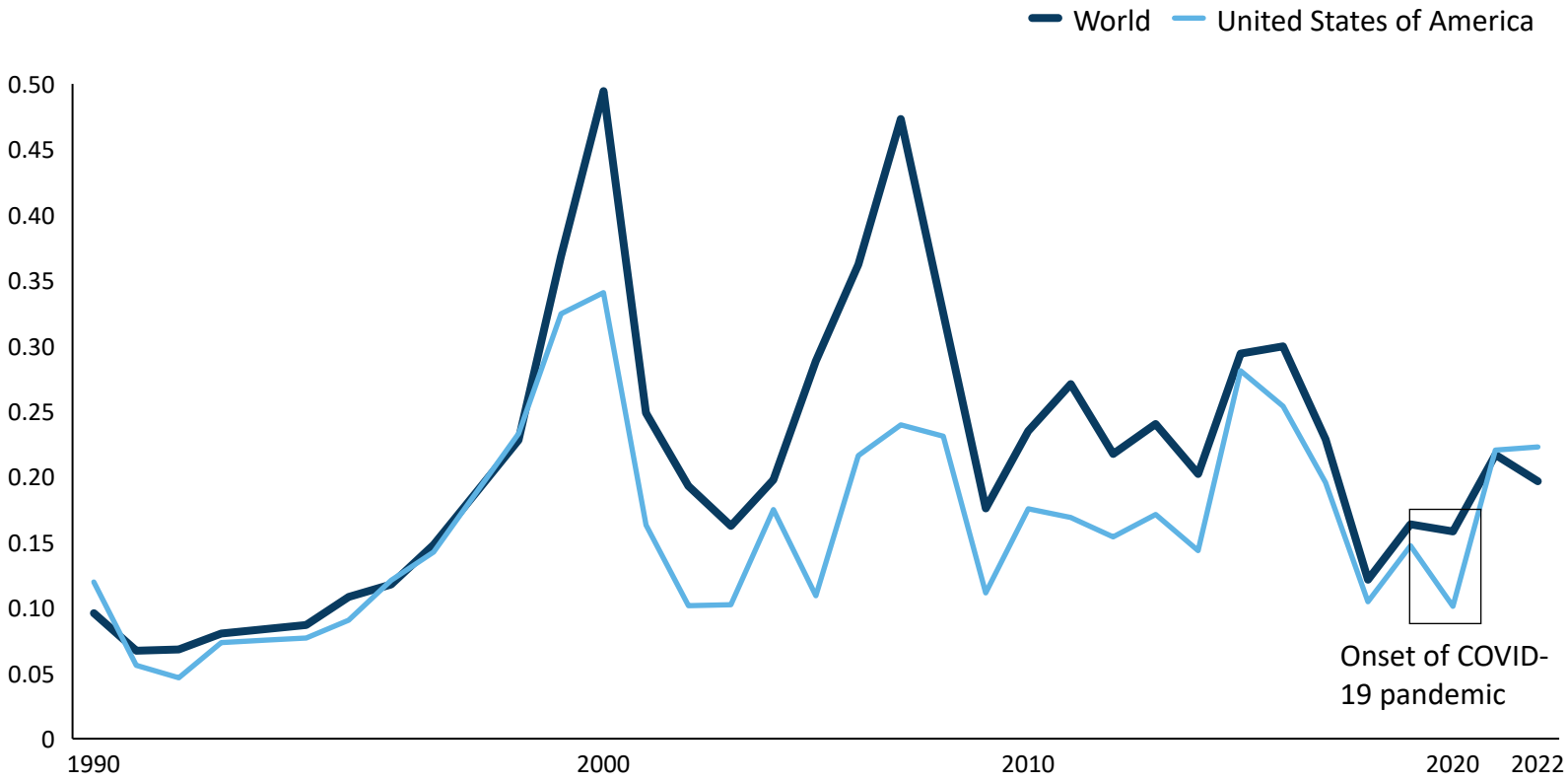
Kentucky has a strong foundation to build off. To effectively capture FDI opportunities, it will be important to develop targeted strategy to help prioritize resources

1. Includes aerospace parts not manufactured in Kentucky that are repackaged and shipped out of Kentucky from the GE Erlanger Parts Warehouse at the Cincinnati/Northern Kentucky Airport

1. While global foreign direct investment activity is slowing down, domestic inward FDI as a share of GDP has recovered rapidly since 2020

Foreign direct investment flows as share of GDP

Inward FDI, nominal GDP, %



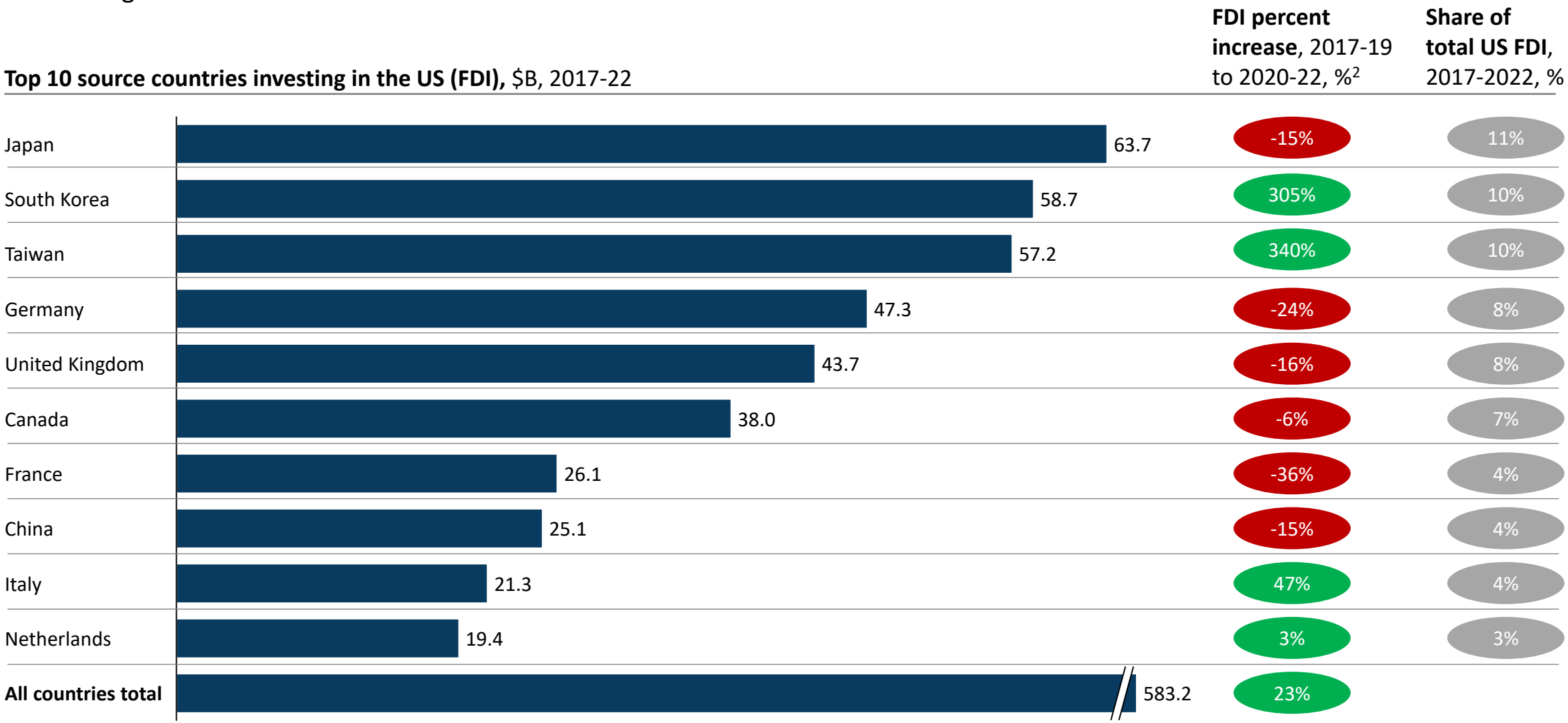
Domestically, the rapid recovery of inward FDI since 2020 is likely spurred by investment incentives in federal legislation such as the Inflation Reduction Act

While global inward FDI activity is on downward trend since 2021, domestic FDI continues to show growth

Source: Oxford Economics

1. Japan is top source of FDI for US; South Korea and Taiwan have increased US investment 3x since before the pandemic

New Foreign Direct Investment in the U.S.[1]

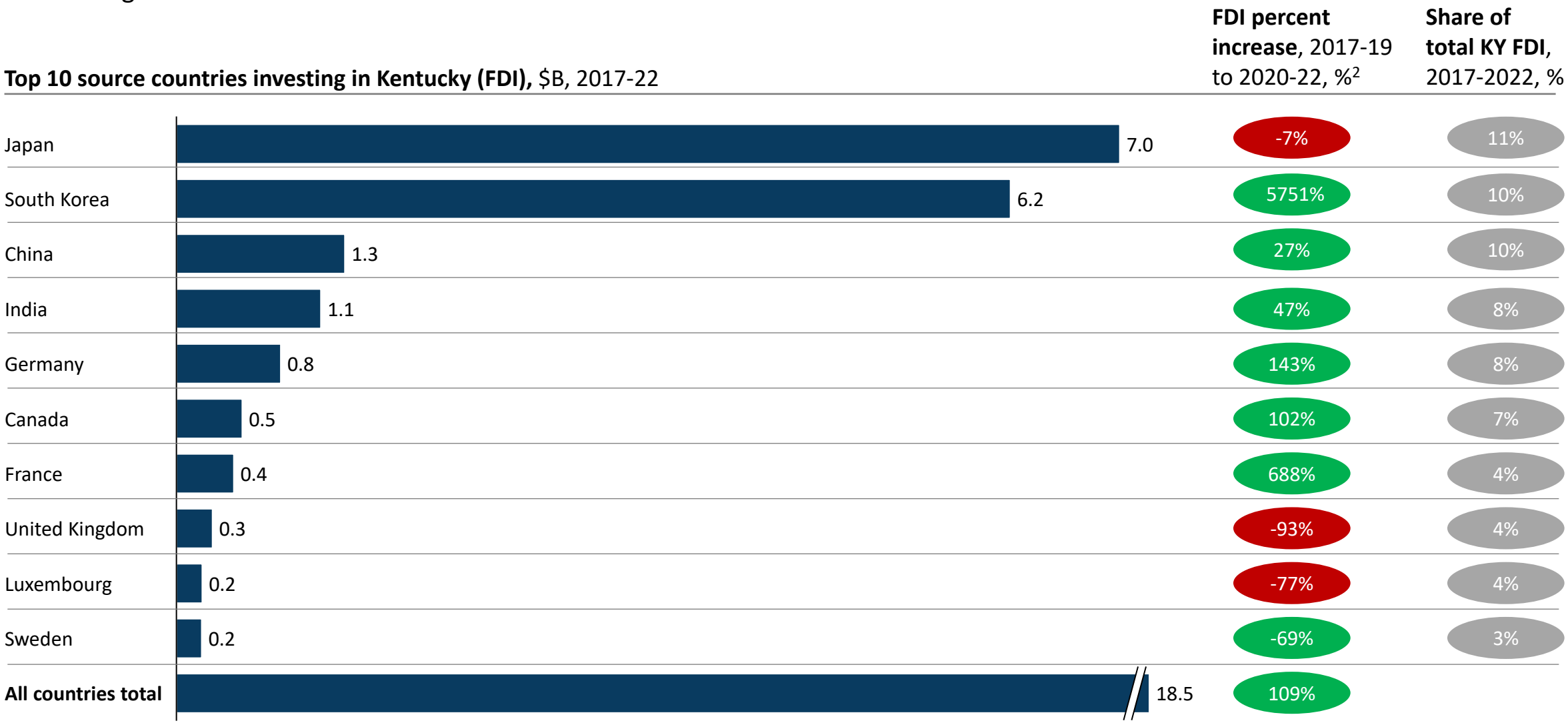


1. Greenfield investment, some deals may be missing as totals are based on publicly announced deals
2. Data shown is the percentage increase from the sum of FDI in 2017-2019 to the sum of FDI in 2020-2022. CAGR unable to be calculated given multiple countries did not invest in the years 2017 or 2022

Source: FDI Intelligence

1. Japan is top source of FDI for Kentucky; South Korea has increased US investment 50x since before the pandemic

New Foreign Direct Investment in the U.S.[1]

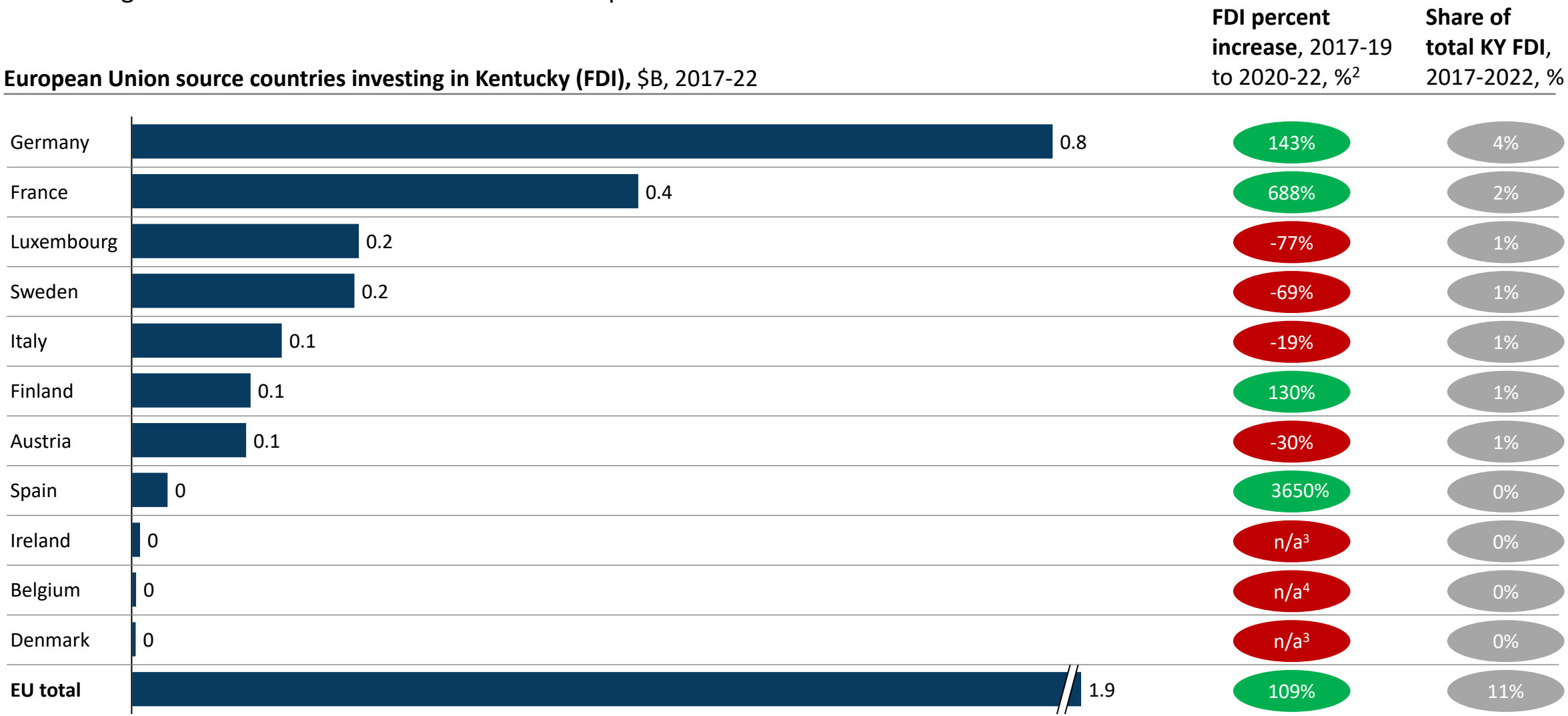


1. Greenfield investment, some deals may be missing as totals are based on publicly announced deals
2. Data shown is the percentage increase from the sum of FDI in 2017-2019 to the sum of FDI in 2020-2022. CAGR unable to be calculated given multiple countries did not invest in the years 2017 or 2022

Source: FDI Intelligence

1. European Union represents 11% of total FDI for Kentucky, with highest investment from Germany and France

New Foreign Direct Investment in the U.S. from European Union[1]



1. Greenfield investment, some deals may be missing as totals are based on publicly announced deals
2. Data shown is the percentage increase from the sum of FDI in 2017-2019 to the sum of FDI in 2020-2022. CAGR unable to be calculated given multiple countries did not invest in the years 2017 or 2022
3. No FDI in 2020-2022
4. No FDI in 2017-2019

Source: FDI Intelligence

1. Kentucky spends less incentives per FDI deal than peers, but has more efficient FDI deals than peers and US overall

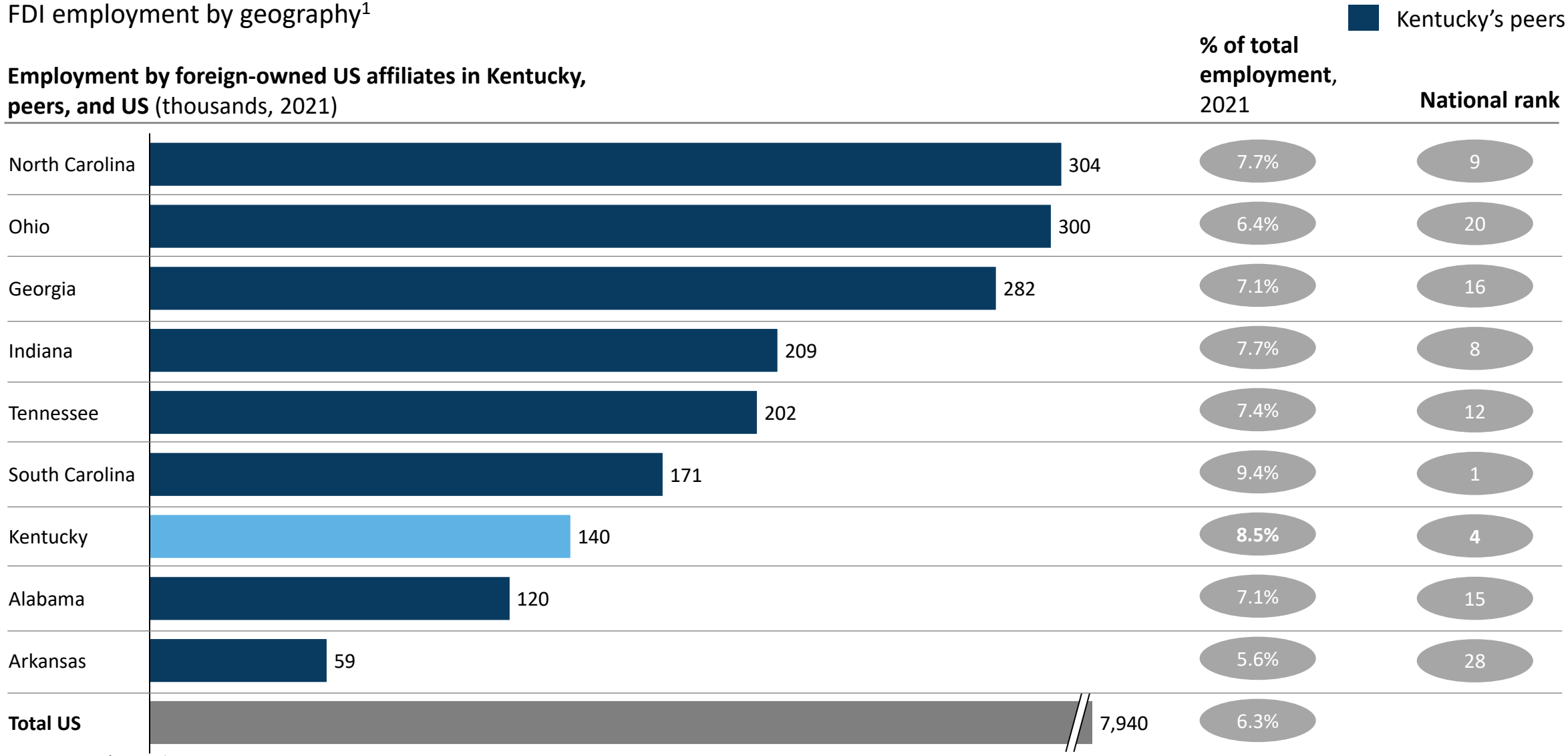
FDI incentive deal analysis, 2017-2022

	Input	Output			Efficiency		
Geography	**Incentive amount** USD, millions	**Number of deals** Count	**Capex** USD, millions	**Total new jobs** Thousands	**Incentive per deal** USD, millions	**Incentive as % of Capex** Percent	**Incentive per new job** USD, thousands
Kentucky	620.0	137.0	13,742.0	16.3	4.5	4.5	38.1
Peer average[1]	913.0	108.0	9,895.0	17.9	8.5	9.2	50.9
US total	19,835.0	2,428.0	265,150.0	452.5	8.2	7.5	43.8

Source: FDI Intelligence Incentives Flow, accessed 9/21/2023

1. Kentucky ranked 4th nationally in FDI jobs as a share of total employment in 2021

FDI employment by geography[1]

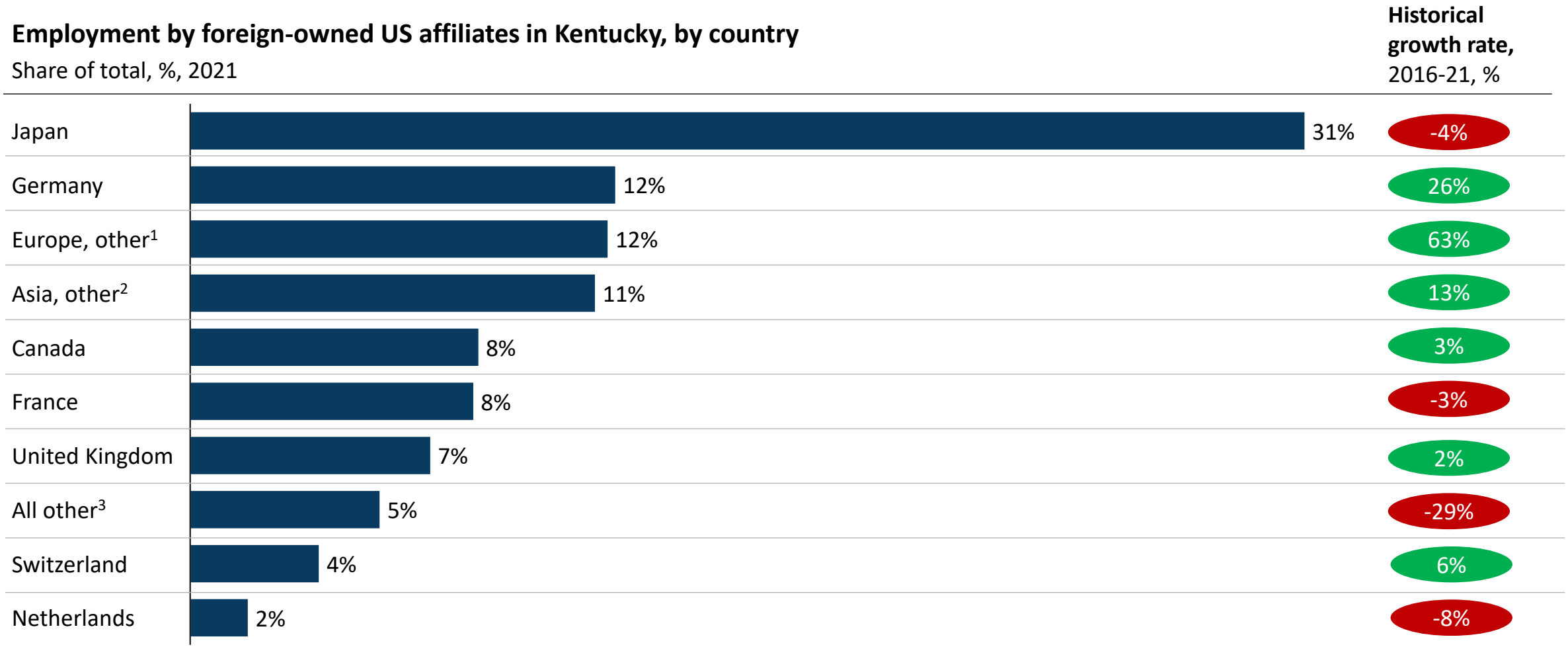


1. Private, non-farm employment

Source: Bureau of Economic Activity (BEA), International Trade and Investment, Kentucky FDI Report

1. Japan is a leading source of current FDI jobs, but recently European FDI has grown more rapidly

Employment by foreign-owned US affiliates in Kentucky, by country
Share of total, %, 2021



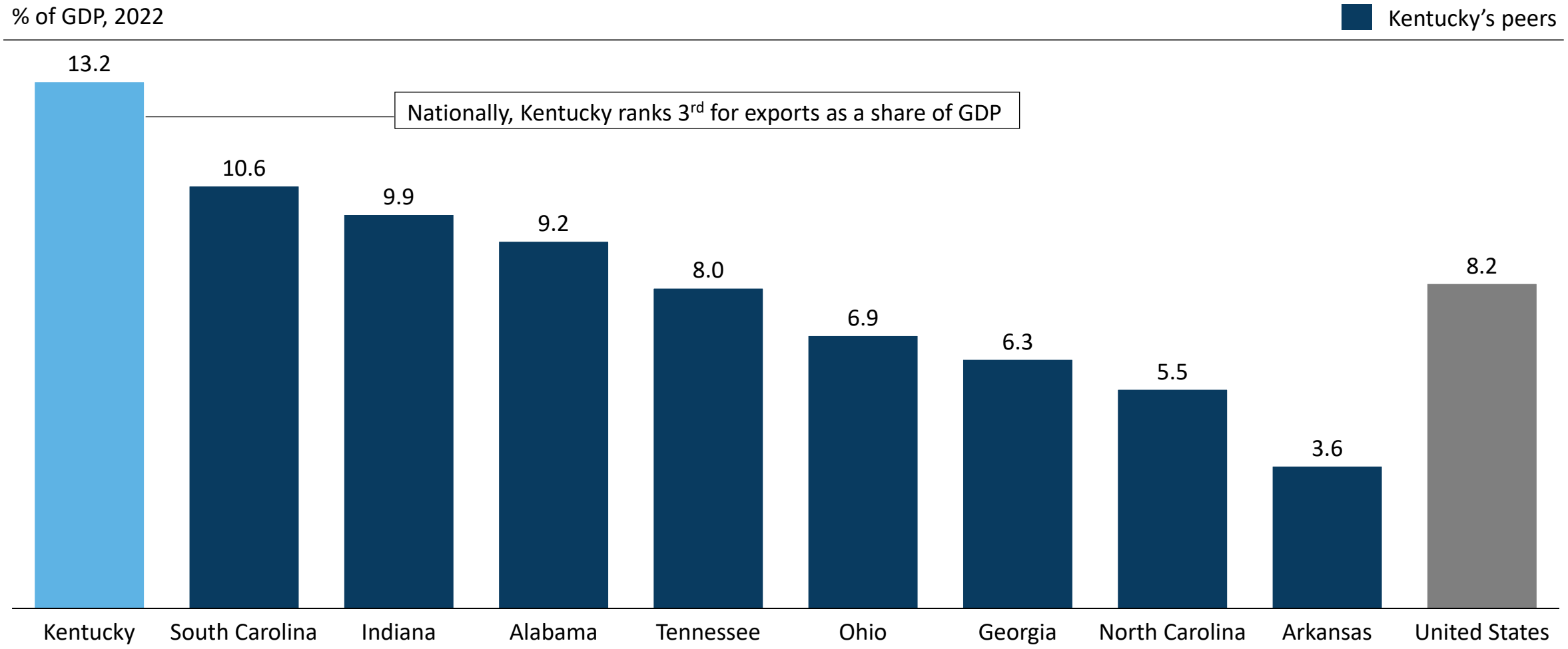
1. Other than France, Germany, Netherlands, Switzerland, United Kingdom
2. Other than Japan; can include South Korea, China
3. Other than Canada, Europe and Asia; can include Latin America, Africa

Source: Bureau of Economic Activity (BEA), International Trade and Investment

1. Kentucky exports make up a larger share of its GDP than the US overall and peers

Total exports in Kentucky, peers, and US

% of GDP, 2022



Source: Moody's Analytics, US Census Bureau Foreign Trade Division

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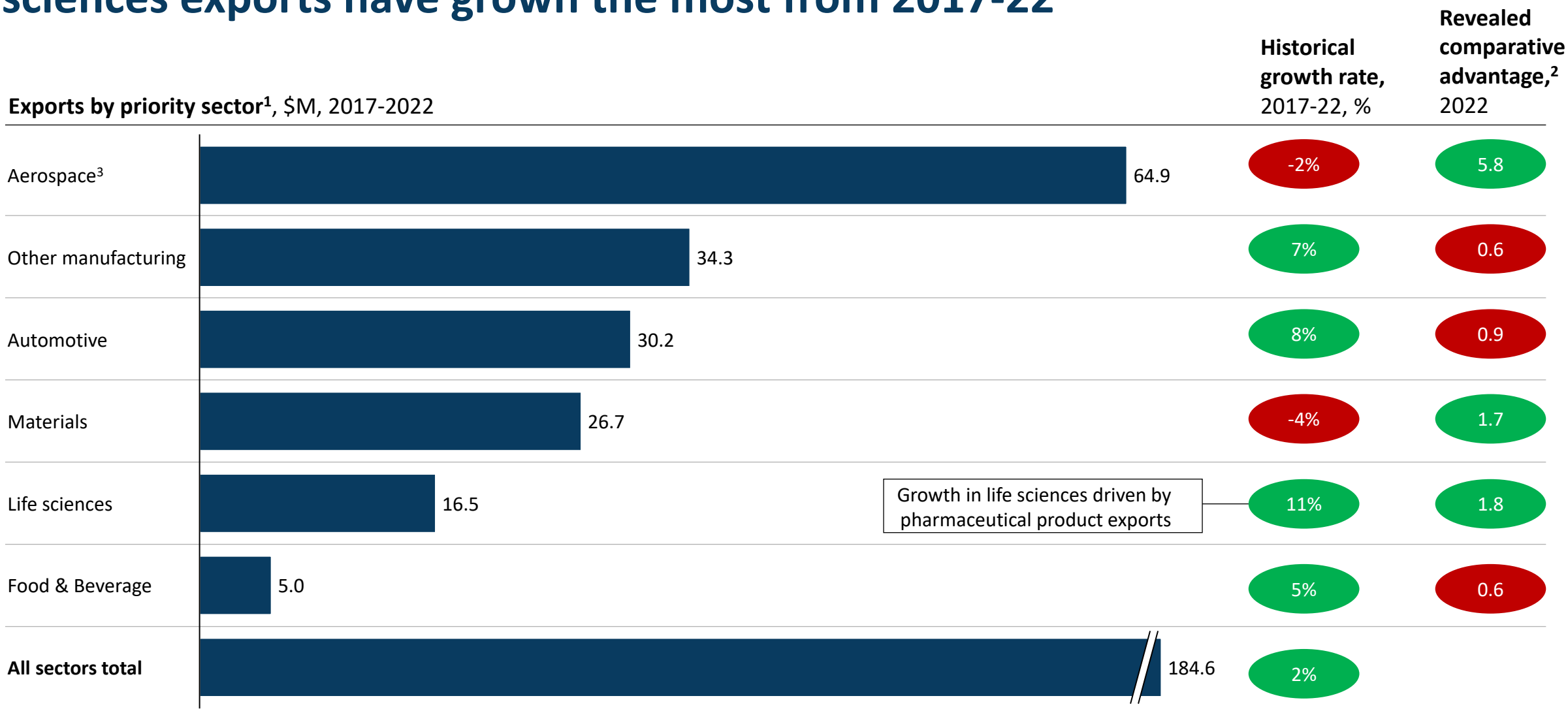
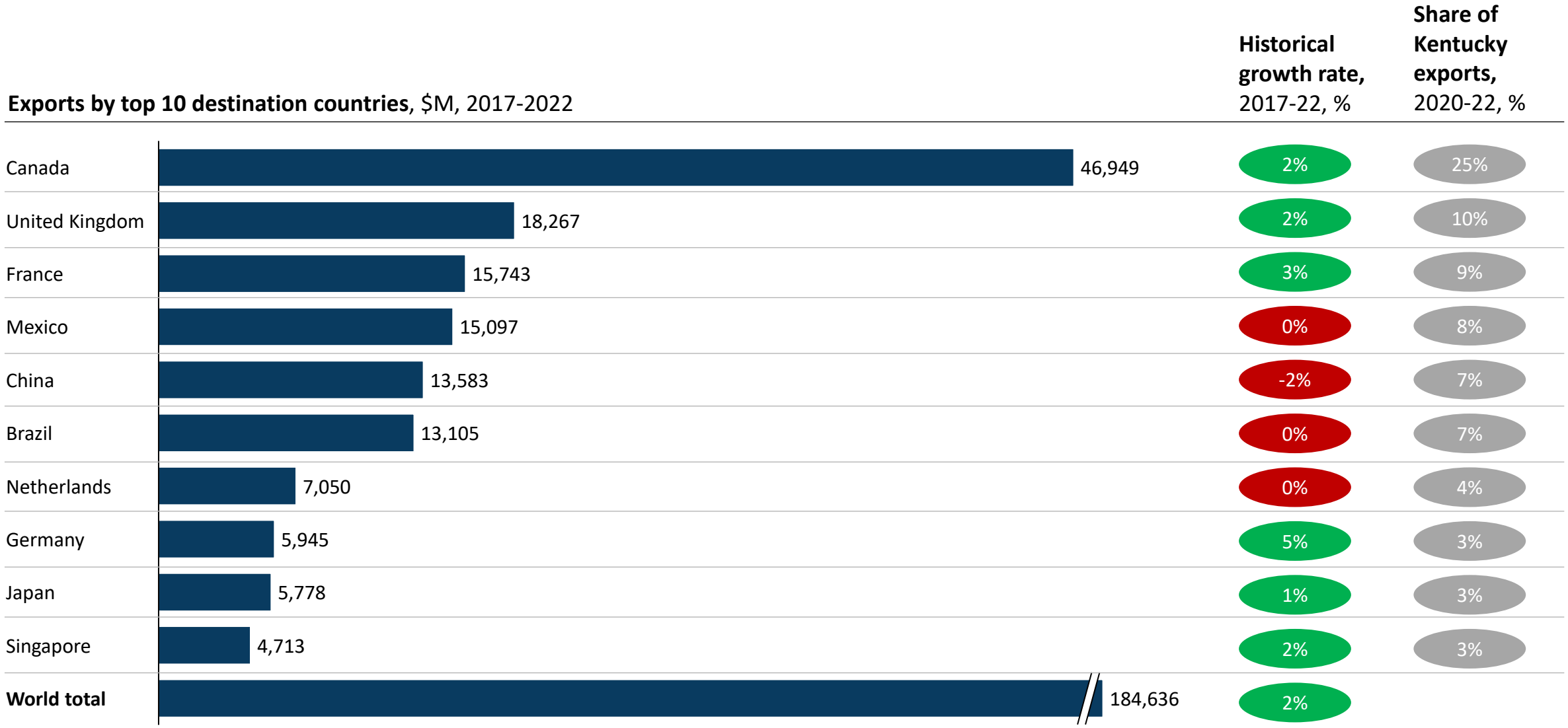
1. Aerospace is Kentucky's largest export among priority sectors, Life sciences exports have grown the most from 2017-22



1. US Census Bureau trade data matched to KY priority sectors using 4-digit NAICS industries
2. The revealed comparative advantage (RCA) is an index used for calculating the relative advantage or disadvantage of a certain geography in a certain class of goods or services as evidenced by trade flows, KY is compared here against other US states. RCA>1 means KY has a comparative advantage over other states
3. Includes aerospace parts not manufactured in Kentucky that are repackaged and shipped out of Kentucky from the GE Erlanger Parts Warehouse at the Cincinnati/Northern Kentucky Airport

Source: US Census Bureau, USA Trade Online

1. Kentucky exports the most to Canada, Mexico, and the UK; exports to Malaysia have increased most rapidly since 2017



Source: US Census Bureau, USA Trade Online

Contents

2. Preliminary findings by sector and country

Topic	Preliminary findings
By sector	• FDI and export "right to win" and "want to win" reinforce Kentucky's emerging sector themes ○ Traditional automotive/EV has strongest "right to win" and "want to win" among sector themes, and 2 countries have over $4B in FDI flows from 2017-2022 ○ Materials has strongest "right to win" and "want to win" among manufacturing sectors; 6 countries have over $100M in FDI flows from 2017-2022 ○ Other manufacturing also has strong "right to win" and "want to win; 3 countries have over $100M in FDI flows from 2017-2022 ○ Distribution and logistics also has emerging FDI "right to win" and "want to win" • Export "right to win" is also strong in innovation sector themes (e.g., Life Sciences, aerospace)
By country	• APAC (e.g., South Korea, Japan), EU (e.g., France, Germany), and Canada have high Kentucky FDI and US FDI, and receive a high share of Kentucky exports in priority sectors (e.g., automotive/EV and manufacturing) • Countries either have distinct sector focuses or invest along the value chain • South Korea activity is concentrated in EV value chain; China and India have highest FDI in other manufacturing and materials, respectively • Japan, Germany, and Canada are investing along the automotive and materials value chains

2. Questions to consider for sector and country strategy

Region	Potential questions to consider
APAC	How can CED adapt approaches to build a deeper presence in priority APAC regions (e.g., South Korea)? How can CED leverage both large OEM opportunities as well as smaller players along supply chains?
Europe	How can CED build on momentum of smaller wins with core partner countries, such as France and Germany? How can CED expand sector focus to other priority sectors in addition to manufacturing, including Business and financial services (e.g., from United Kingdom)?
North America	How can CED capture manufacturing reshoring opportunities from neighbors in Canada, and potentially Mexico?

What is the best operating model for CED and its overseas teams to execute FDI strategy (e.g., dedicated full-time presence, contracted support)?

What type of management approach is necessary to ensure optimal performance from overseas teams (e.g., finalizing KPIs across all offices, management review rhythm)?

2. Earned "Right to win" and "opportunities to win" factors for FDI are strongest in automotive and manufacturing sectors

		Where Kentucky has "earned the right to win"			Where Kentucky may "want to win"
Strategic goals	**Potential priority sectors**	**Kentucky FDI**[1] (2017-22, $M)	**Share of US FDI**[1] (2017-22, %)	**Kentucky Exports**[2,3] (2017-22, $M)	**US FDI**[1] (2017-22, $M)
Win in the automotive future	Traditional automotive/EV	10,917	12.0	30,172	90,639
Be a leader in the U.S. manufacturing renaissance	Materials	2,600	3.3	26,706	78,421
	Other manufacturing	1,822	2.1	34,318	87,971
	Food and beverage processing	2,582	9.2	5,025	28,068
Capitalize on what makes Kentucky unique	Distribution and logistics	195	2.0	n/a	9,768
	Hospitality and tourism	-	-	n/a	8,838
Capture our "fair share" of tomorrow's jobs	Business and financial services	35	0.1	n/a	47,873
Cultivate innovation where we can compete and win	Aerospace	96	2.2	64,889[4]	4,331
	AgriTech	-	-	0	460
	Life Sciences	39	0.1	16,513	31,135

1. Shading by quartile
2. Exports of goods only, does not include services
3. Shading by % of total exports in Kentucky
4. Includes aerospace parts not manufactured in Kentucky that are repackaged and shipped out of Kentucky from the GE Erlanger Parts Warehouse at the Cincinnati/Northern Kentucky Airport

Source: Kentucky Cabinet for Economic Development, New and expanding industry data, accessed 9/19/2023; FDI Intelligence; US Census USA Trade

2. Kentucky has strengths and opportunities in FDI and export growth across priority sectors and source countries

Kentucky FDI, $M, 2017-22

Top quartile of KY FDI[1] from 2020-2022 by sector

Kentucky's top 3 export destination countries in 2020-22 by sector

Top 3 US FDI source country from 2020-2022 by sector

Select source country[2]	Automotive	Materials	Other manufacturing	Food & Beverage	Distribution & Logistics	Hospitality and Tourism	Business and financial services	Aerospace	AgriTech	Life Sciences
Japan	4,586	317	179	1,892	11	-	6	-	-	-
South Korea	5,850	254	50	34	-	-	5	-	-	-
China	98	0	1,147	-	-	-	4	-	-	1
India	-	1,072	-	-	-	-	-	-	-	-
Germany	136	430	43	-	145	-	9	-	-	1
Canada	86	178	199	4	6	-	3	-	-	-
France	-	127	25	261	13	-	-	-	-	-
United Kingdom	-	5	2	131	19	-	-	96	-	-
Luxembourg	-	-	5	150	-	-	-	-	-	37
Switzerland	-	18	-	21	-	-	-	-	-	0
Netherlands	-	-	-	-	-	-	-	-	-	-

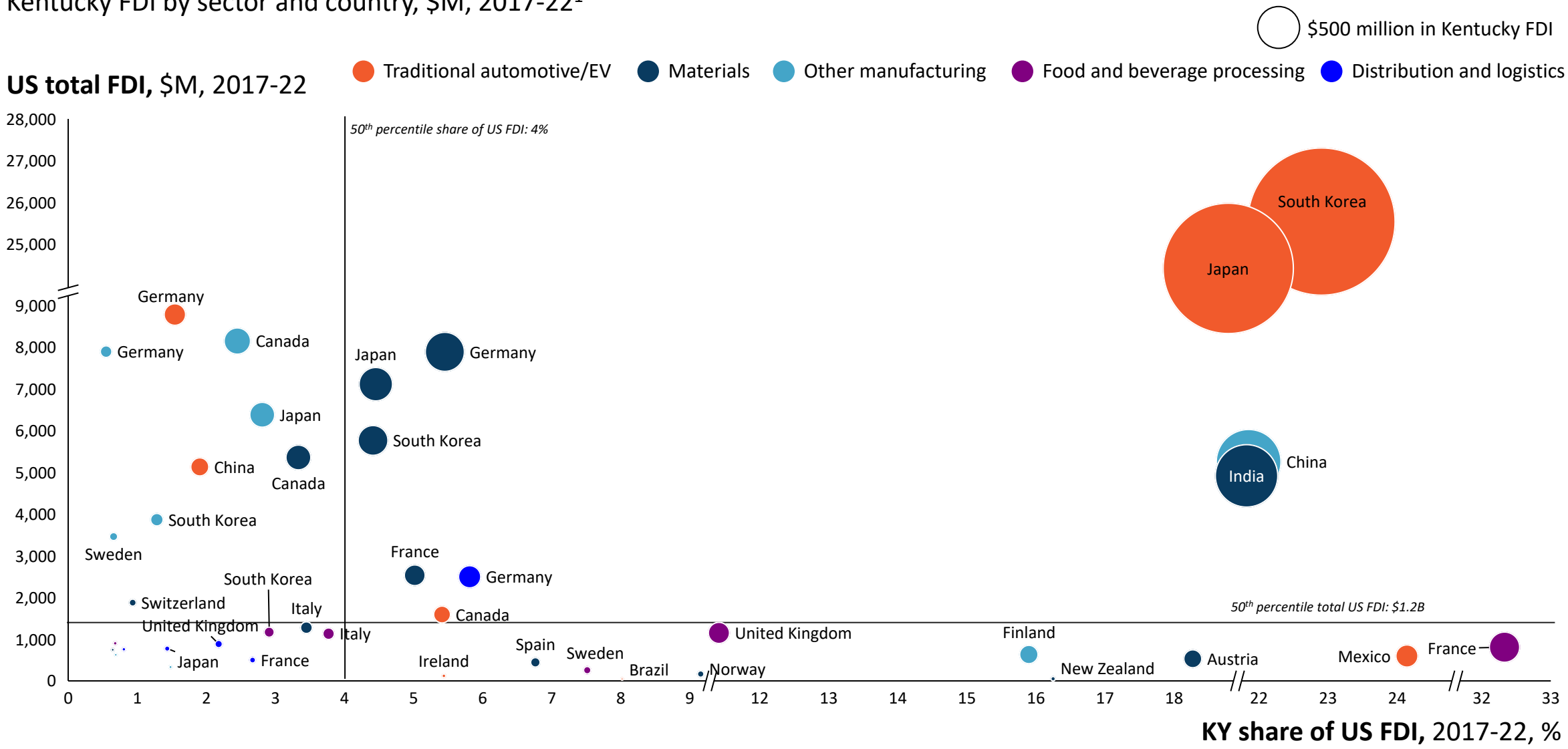
Deep dive to follow

1. Top quartile of countries that have any amount of FDI, excludes countries with $0 FDI
2. Source countries include those within the top 5 source countries for Kentucky FDI, top 1 Kentucky export destination country, and/or top 3 source countries for US FDI per sector, ranked by highest total FDI in Kentucky

Source: Kentucky Cabinet for Economic Development, New and expanding industry data, accessed 9/19/2023; FDI Intelligence; US Census USA Trade

2. Kentucky has strengths and opportunities in FDI and export growth across priority sectors and source countries

Kentucky FDI by sector and country, $M, 2017-22[1]



1. Where Kentucky's share of US FDI is above 1%

Source: Kentucky Cabinet for Economic Development, New and expanding industry data, accessed 9/19/2023; FDI Intelligence; US Census USA Trade

2. For auto/EV, Kentucky received highest FDI from South Korea and Japan, but had slowdown in export activity with both countries

Traditional automotive/EV FDI and exports

Select source country[1]	**Kentucky FDI,** $M, 2017-22	**US FDI,** $M, 2017-22	**Kentucky share of US FDI,** 2017-22, %	**Kentucky export volume**, $M, 2017-22	**Export growth,** 2017-22, %
South Korea	5,850	25,540	23%	337	-22%
Japan	4,586	24,416	19%	441	-4%
Mexico	144	597	24%	4,147	5%
Germany	136	8,779	2%	174	31%
China	98	5,129	2%	1,659	-41%
Canada	86	1,590	5%	20,752	-3%

1. Countries shown include the top 5 countries for inbound Kentucky FDI, top 3 countries for inbound US FDI, and top 1 country for export growth from Kentucky

Source: FDI Intelligence, US Census USA Trade

2. Within auto/EV, Battery manufacturing received the most investment, while more countries invest in motor vehicle parts manufacturing

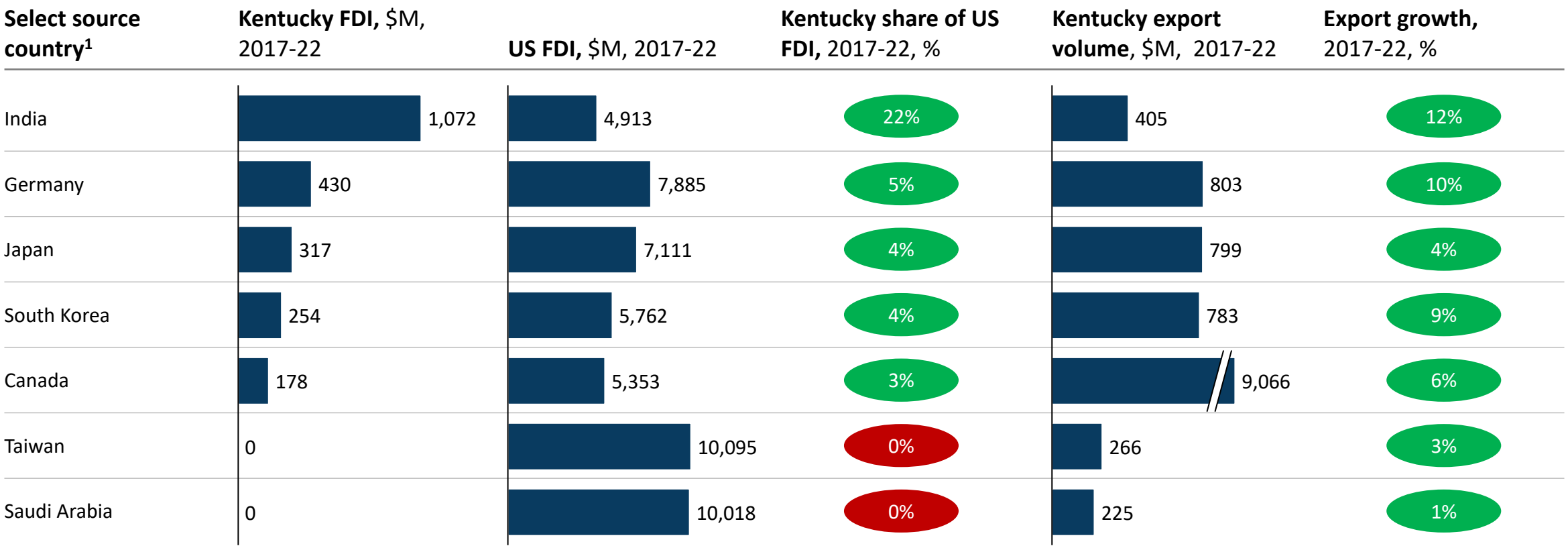
Traditional automotive/EV sub-sector deep dive: Kentucky FDI, $M, 2017-22

All FDI source countries in Kentucky	Battery manufacturing	Motor vehicle body and trailer manufacturing	Motor vehicle manufacturing	Motor vehicle parts manufacturing
Brazil				4
Canada			40	46
China	98			
Germany				136
Ireland				6
Italy				4
Japan	2,000		2,150	436
South Korea	5,800			50
Mexico		114		30
Spain				1
Thailand				2
Total	7,898	114	2,190	665

Source: Kentucky Cabinet for Economic Development, New and expanding industry data, accessed 9/19/2023

2. For materials, Kentucky received highest FDI from India, Germany, and Japan and had 20%+ growth in export activity with all 3 countries

Materials FDI and exports



1. Countries shown include the top 5 countries for inbound Kentucky FDI, top 3 countries for inbound US FDI, and top 1 country for export growth from Kentucky

Source: FDI Intelligence, US Census USA Trade

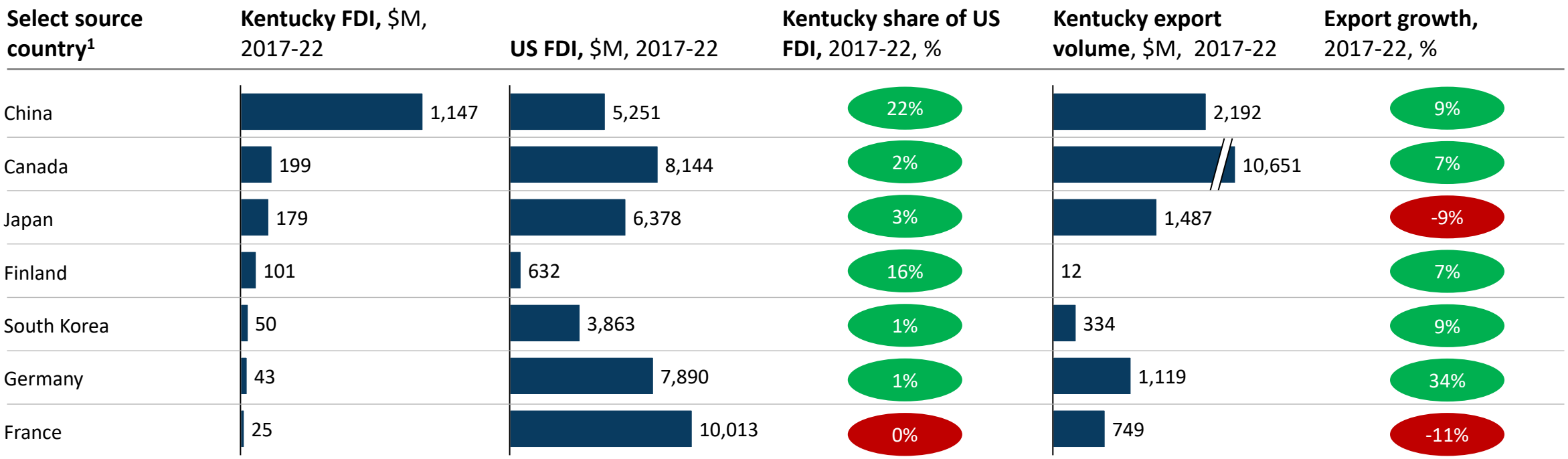
2. Within Materials, the highest investment was in primary metal manufacturing, with large investments coming from India and South Korea

Materials sub-sector deep dive: Kentucky FDI, $M, 2017-22

All FDI source countries in Kentucky	Chemical manufacturing	Fabricated metal manufacturing	Plastics and rubber product manufacturing	Primary metal manufacturing
Australia	0.3			
Austria		39.8	56.9	
Canada	14.9		20.5	143.1
China	0.4			
France	110.6		16.4	
Germany	81.5	3.3	30.9	314.4
India	13.5		7.4	1,051.1
Italy		15.0		29.0
Japan	22.4	146.4	79.3	68.6
South Korea		15.6		238.7
New Zealand			2.2	6.0
Norway				15.0
Spain				30.0
Sweden			4.8	
Switzerland	5.0		12.5	
United Kingdom		2.2	2.4	
Total	248.6	222.2	233.3	1,895.9

2. For other manufacturing, Kentucky received highest share of US FDI from China, and had nearly 10% growth in export activity

Other manufacturing FDI and exports



1. Countries shown include the top 5 countries for inbound Kentucky FDI, top 3 countries for inbound US FDI, and top 1 country for export growth from Kentucky

Source: FDI Intelligence, US Census USA Trade

2. Within other manufacturing, the highest investment was in electrical components, with large investments from China and Japan

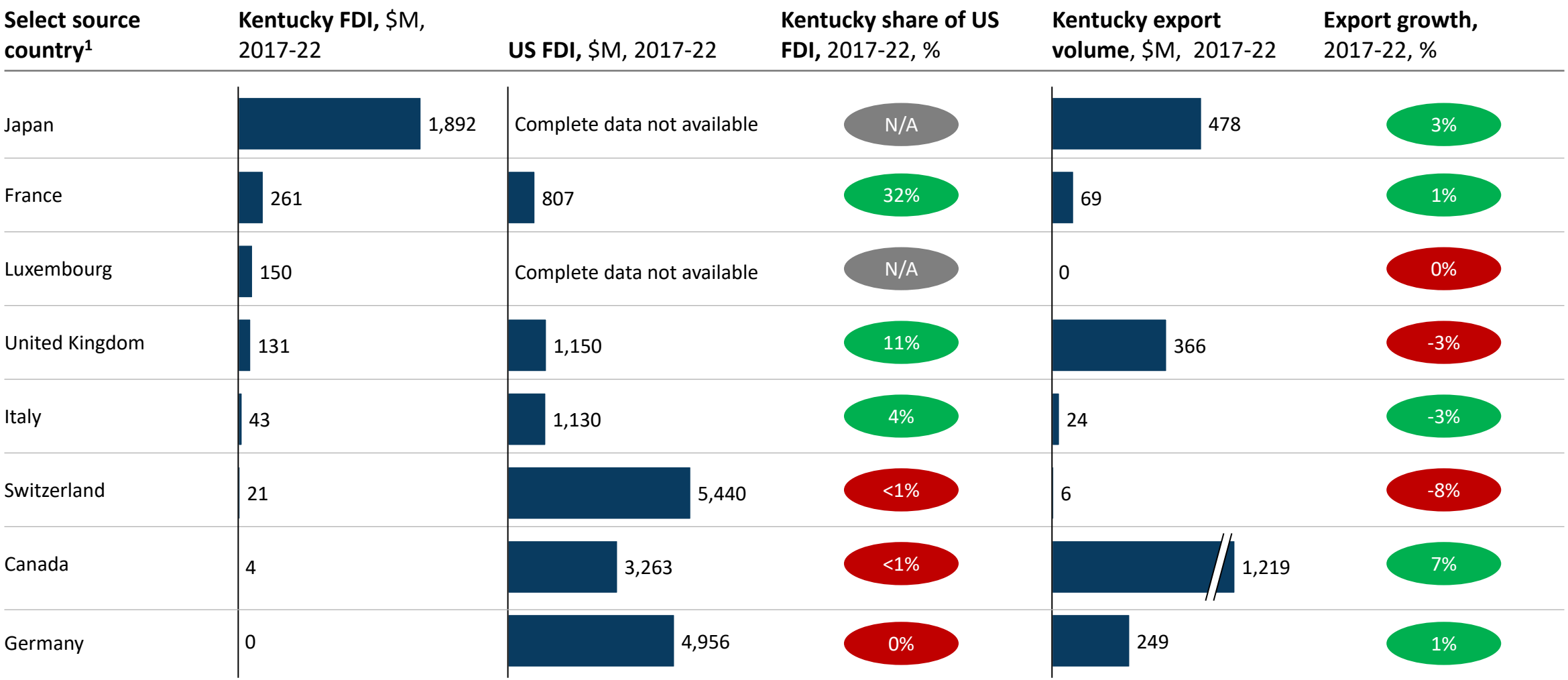
Other manufacturing sub-sector deep dive: Kentucky FDI, $M, 2017-22

All FDI source countries in Kentucky	Electrical equipment, appliance, component manufacturing	Nonmetallic mineral product manufacturing	Paper manufacturing	All other manufacturing
Australia				1.0
Belgium				4.3
Canada	5.9	16.0	173.2	1.0
China	792.0	5.5	350.0	4.3
Curacao				2.0
Finland		70.0	27.0	0.2
France		0.9		39.4
Germany	2.2	0.1	0.1	0.2
Italy	3.9			39.4
Japan	129.5	12.9	10.5	3.4
South Korea				9.7
Luxembourg				49.6
Sweden	0.2		22.6	49.6
United Kingdom		2.0		2.0
Total	933.6	105.5	583.5	1,822.2

Source: Kentucky Cabinet for Economic Development, New and expanding industry data, accessed 9/19/2023

2. For food and beverage, Kentucky received highest share of US FDI from Japan and France, and saw increase in export activity with both countries

Food and beverage processing FDI and exports

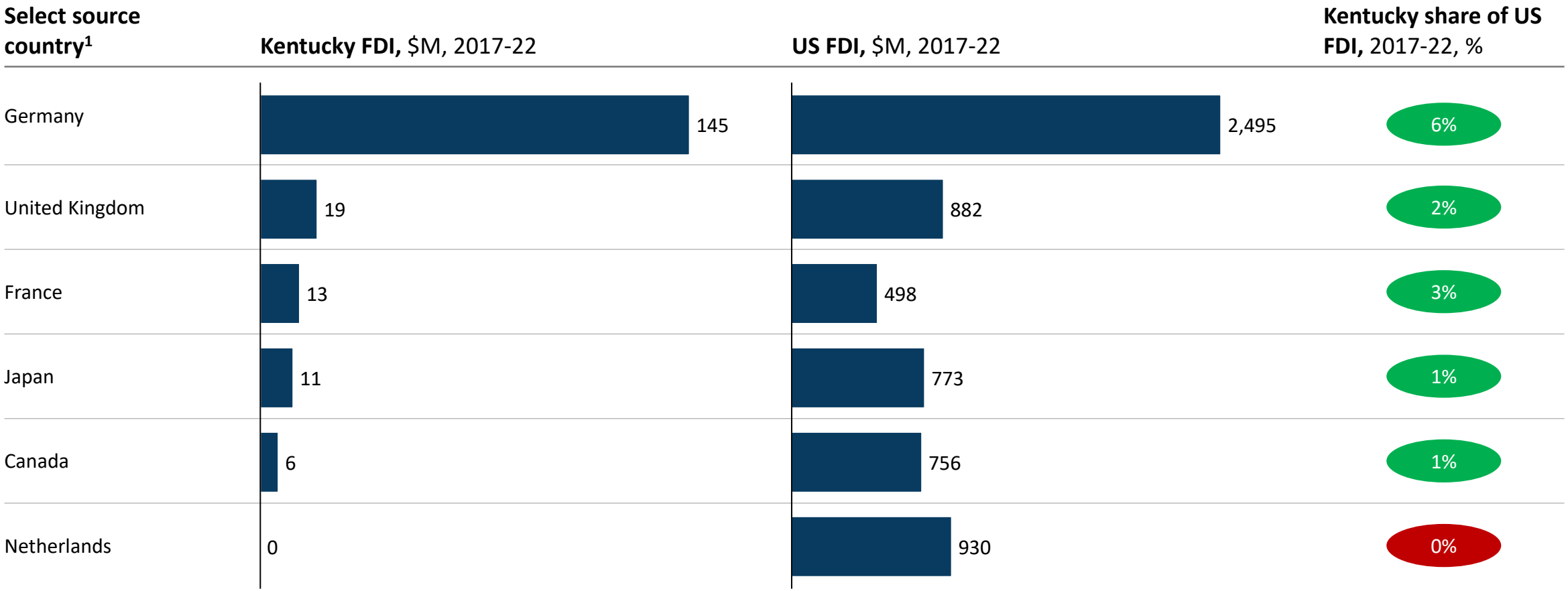


1. Countries shown include the top 5 countries for inbound Kentucky FDI, top 3 countries for inbound US FDI, and top 1 country for export growth from Kentucky

Source: FDI Intelligence, US Census USA Trade

2. Kentucky received 10% of Germany's distribution & logistics FDI, the highest investing country in the US

Distribution and logistics FDI



1. Countries shown include the top 5 countries for inbound Kentucky FDI, top 3 countries for inbound US FDI, and top 1 country for export growth from Kentucky

Source: FDI Intelligence, US Census USA Trade

2. Kentucky can consider can different strategies to promote FDI attraction

Strategy	Description	Case example
Investment Promotion Agency (IPA)	IPA's targets end-user (e.g., multinational enterprises, MNEs), organizations and intermediaries who advise and influence MNEs on the investment location	Costa Rica's IPA CINDE, has developed a "multiplier strategy[1]" to engage with intermediaries, whereas for most IPAs in the region this is a new approach to attracting FDI. Since 2017, there has been a continuous employment growth of ~13% annual in the 367 companies supported by CINDE
Digital marketing	Innovation in developing an inward investment website**.** Survey[2] evidence indicates that a website is the most effective and highest-impact marketing tool for IPA's	Netherlands Foreign Investment Agency website identified as highly innovative and among the best in the world. The IPA was established 40 years ago and has, since then, supported ~4K companies from more than 50 countries in the establishment or expansion of their international activities in the Netherlands.
Promotion at subnational level	Develop strategies at subnational level for investment promotion	Invest in Canada Bureau supports investment promotion by co-funding in investment promotion capacity building and strategy development at the subnational level, such as the work together done with the Montreal International IPA. The IPA has a strategic focus to double the amount of FDI investment in the next five years. Invest in Canada praised this model and reported that it should become the model followed across Canada.
Supply chain development and linkages	Supply chain development and linkages can help embed foreign investors into the local economy and create a multiplier impact on additional FDI	Northeast England started the world's first comprehensive supplier development program and was a model for other countries. The CzechInvest case showed how the use of a website and specialized sector databases can help in linkages with local suppliers, increasing the capability of local SMEs to enter supply chains
Skills and training	Skills and training is critical for investors in many industries, particularly in export-oriented and knowledge-based services and in manufacturing	The "Faststart" program of Louisiana Economic Development focuses on four key issues for investors: understanding a company's skills and training needs; assisting with recruitment; assisting with pre-hiring; and assisting with training.
Track and measure FDI	Track foreign direct investment and measure performance in attracting it	Dubai developed an innovative approach in real-time tracking of FDI, which enabled it to promote Dubai more effectively as a location, and to provide efficient facilitation and aftercare services to investors.

1. The multiplier strategy consists of support from the beginning of the site selection phase, through installation and during the operational phase in Costa Rica, companies will have specialized investment advice. CINDE offers its complete list of service providers that includes more than 80 companies to support entry into the country. In addition, CINDE provides support to the communication strategy for expansion, reinvestment or other impact programs that the company carries out in the country. 2. Development Counsellors International "Winning Strategies" (2017), based on 331 corporate executives

Source: Inter-American Development Bank, CINDE