

Designing Tennessee's Workforce for the Next Decade

Presented to

ERIC

May 14, 2021

William F. Fox, Director

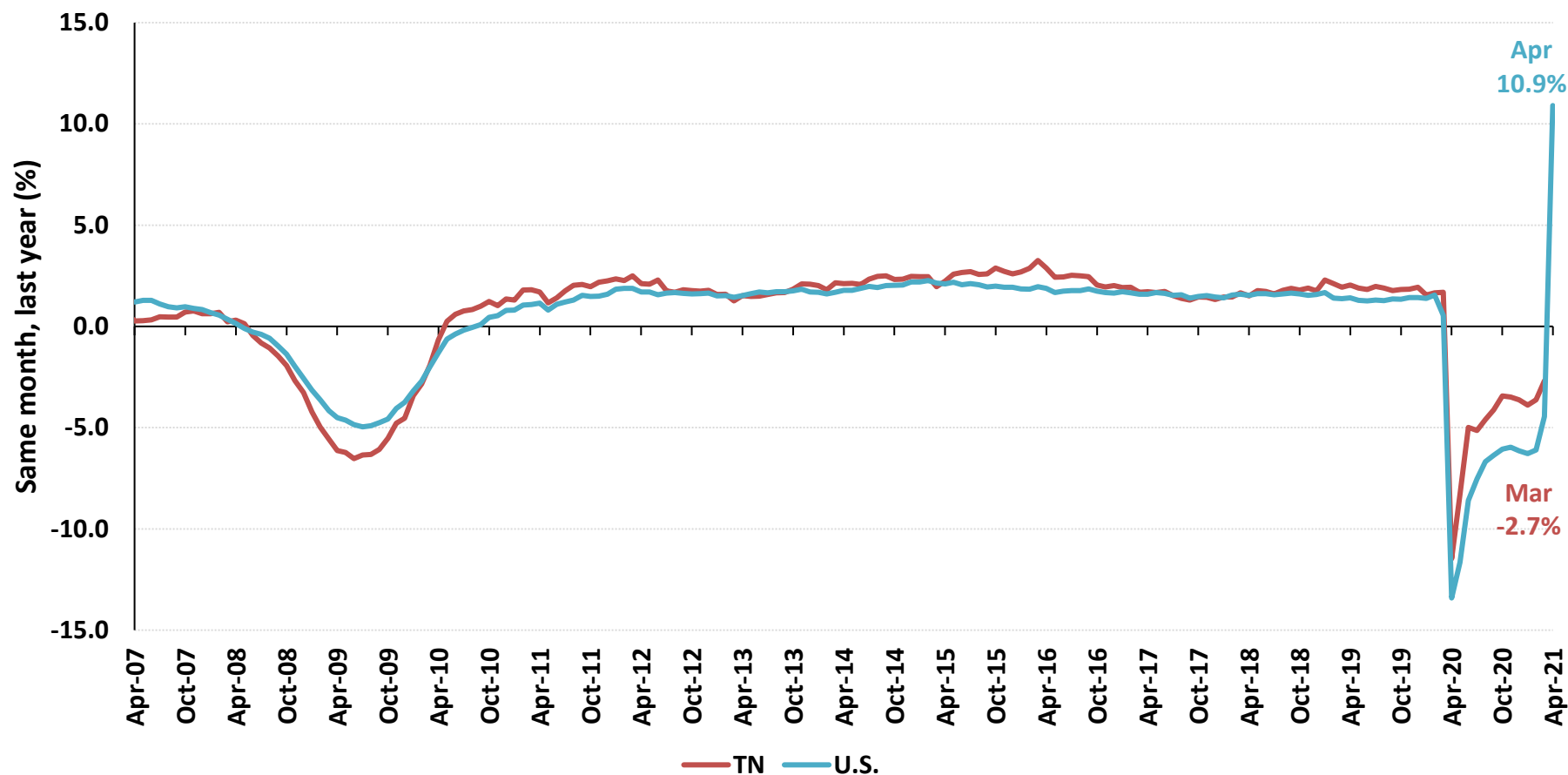


**THE UNIVERSITY OF
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KNOXVILLE**

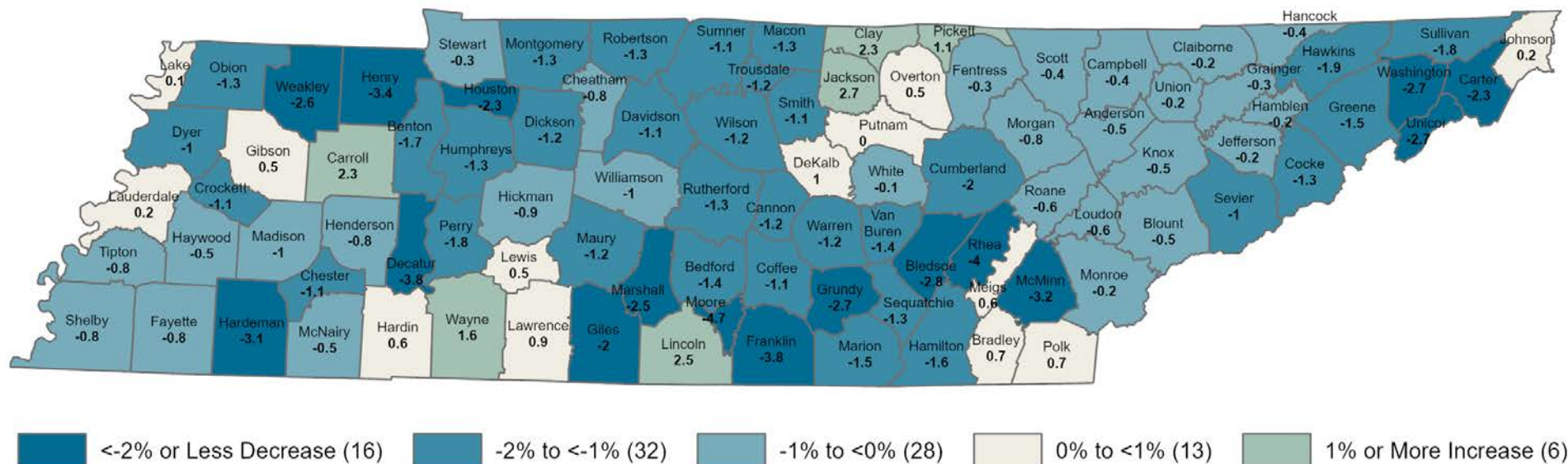
**BOYD CENTER FOR BUSINESS
AND ECONOMIC RESEARCH**

Current Economy

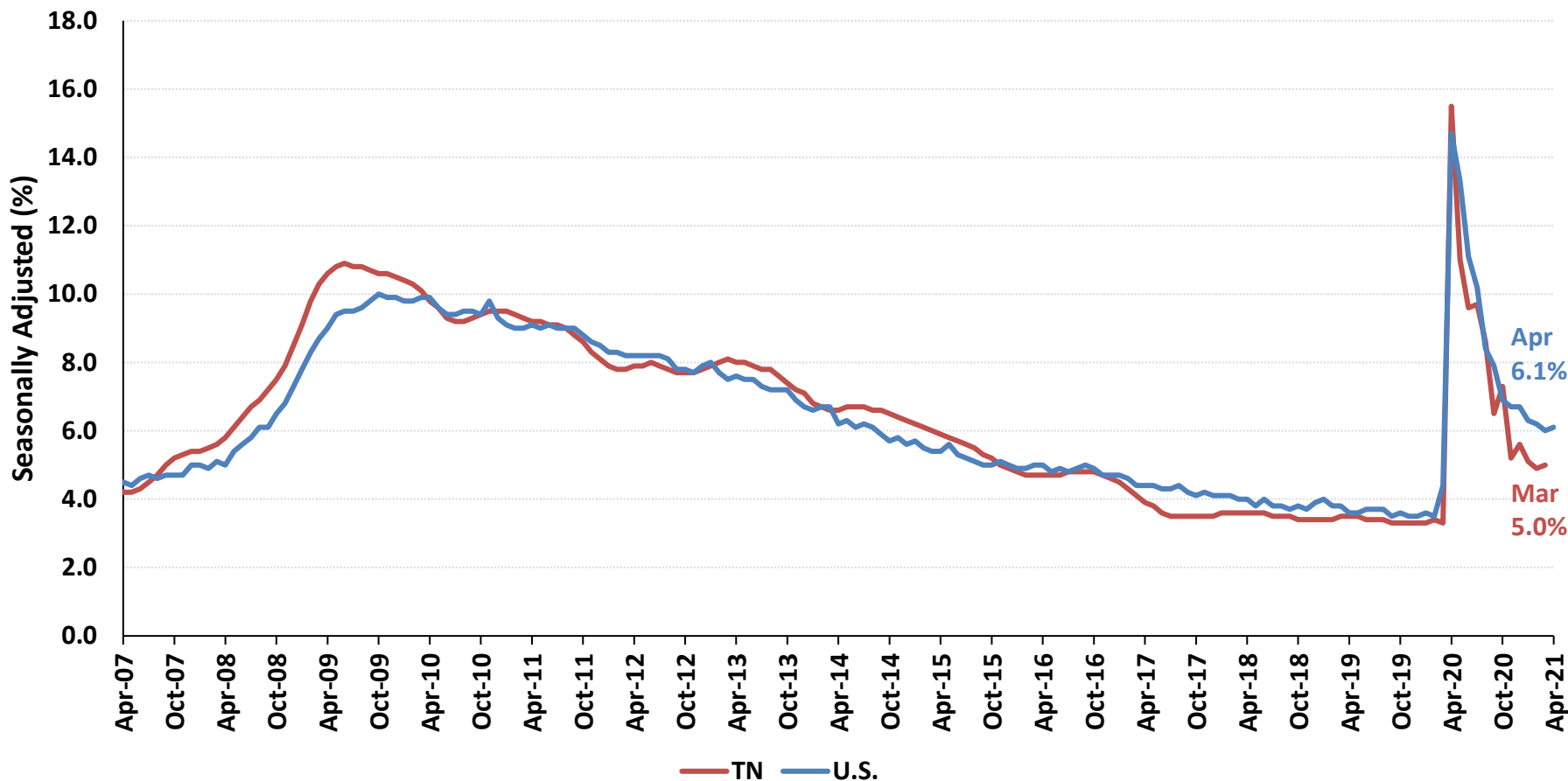
Tennessee Job Losses have been Somewhat Smaller than for the U.S. (year-over-year growth)



Recent Employment Changes Differ Across Counties, percent change March 2020-2021

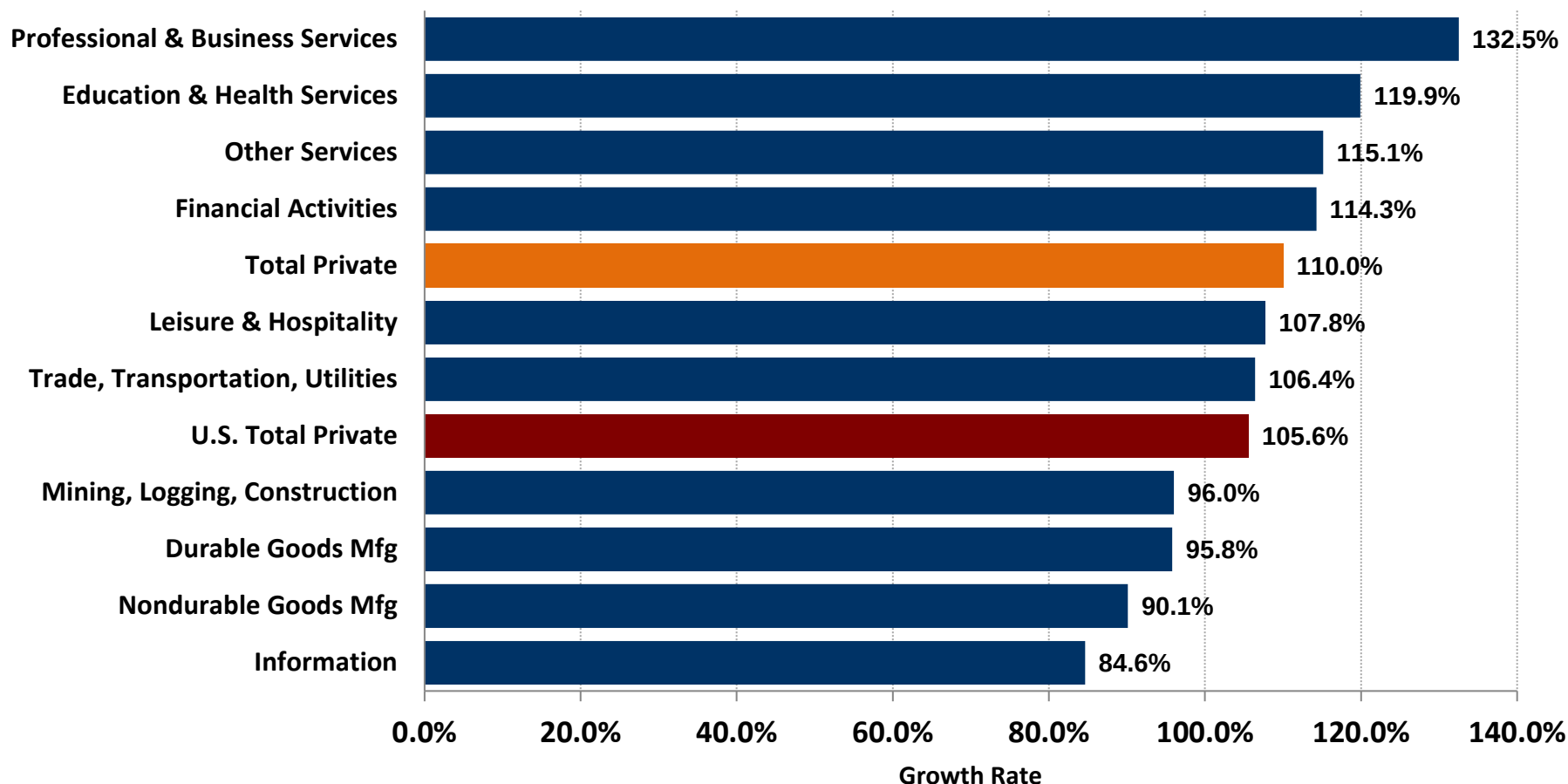


TN Unemployment Rate Notably Below the US



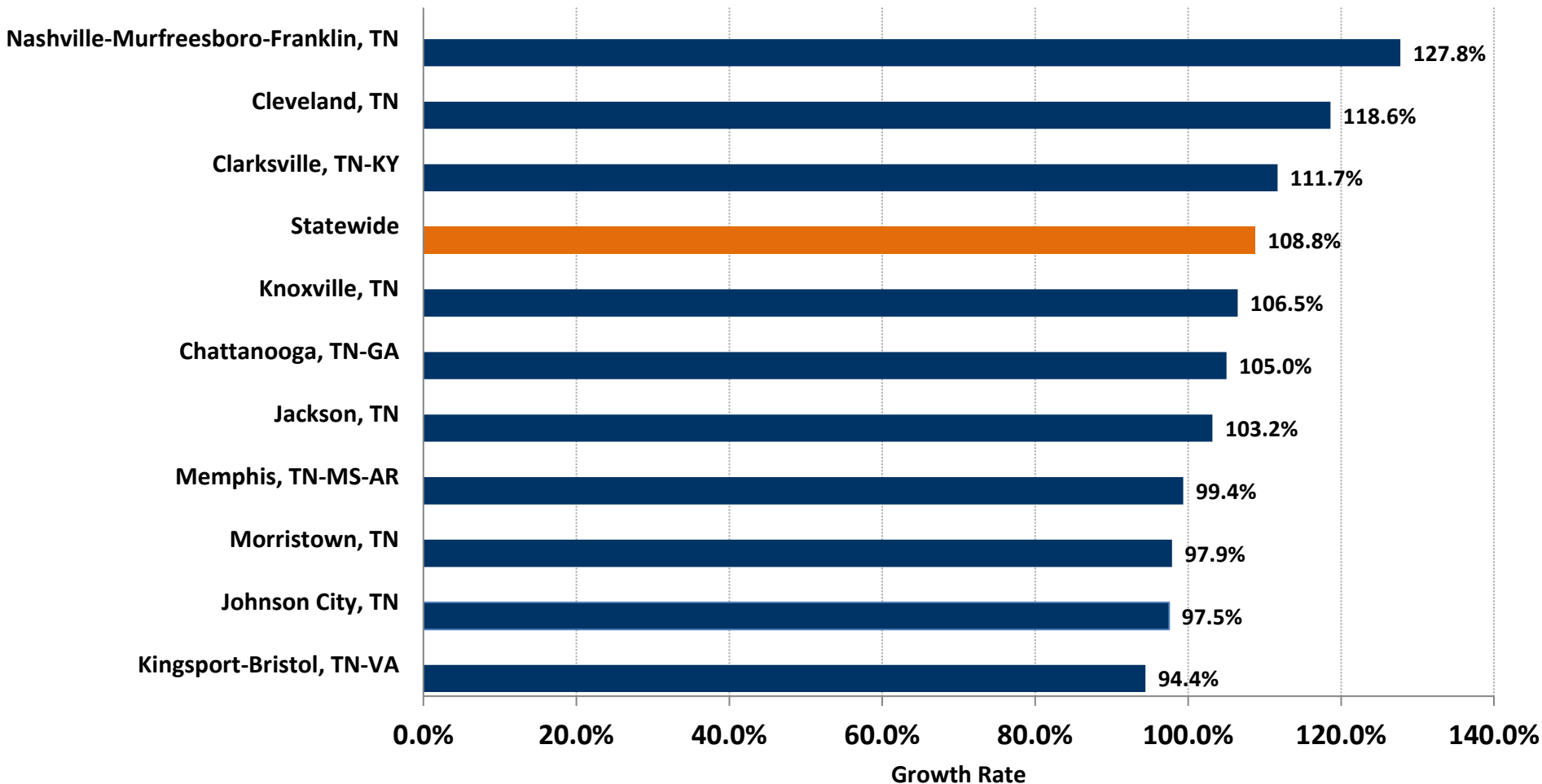
Full Recovery from the Great Recession in Most TN Sectors, Despite Covid

(Tennessee, March 2021 as a Share of December 2007)



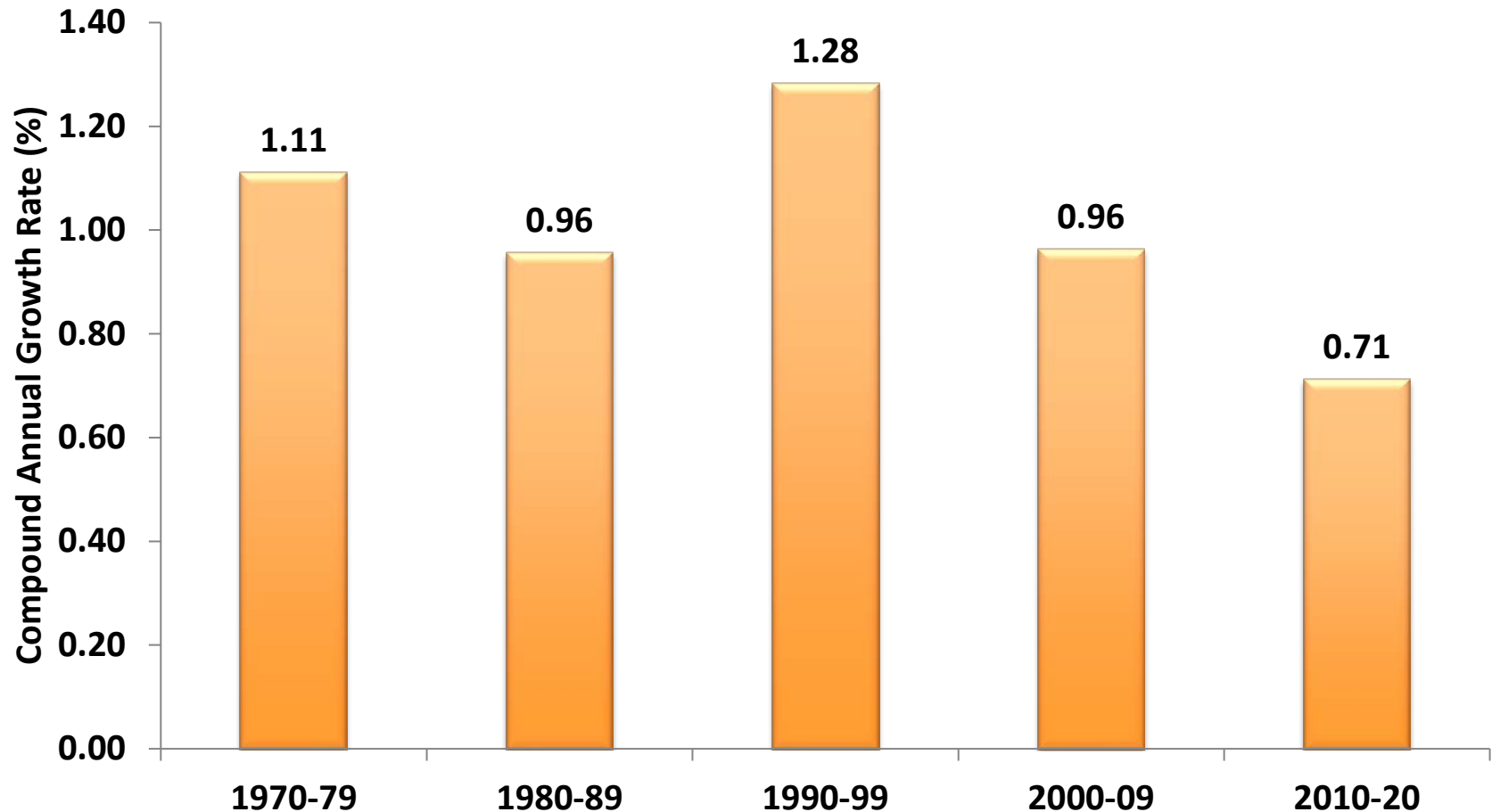
Employment Growth Differs Dramatically Across Tennessee, as Four Areas have Fewer Workers than Before the Great Recession

(Growth Since Great Recession)



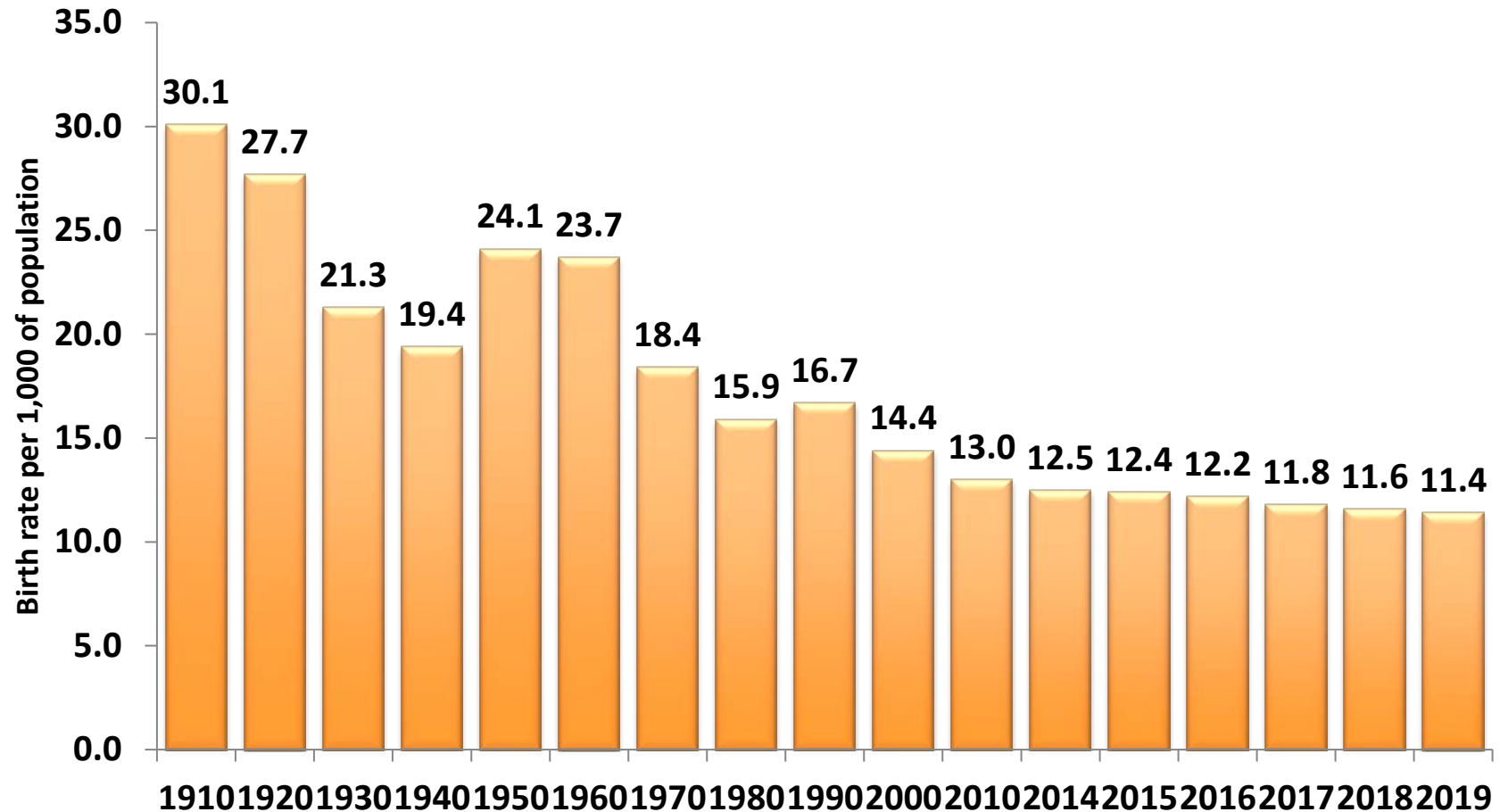
Population Demographics

U.S. Population Growing More Slowly



Birth Rates Continue to Decline

(Birth Rates per 1,000 Population)

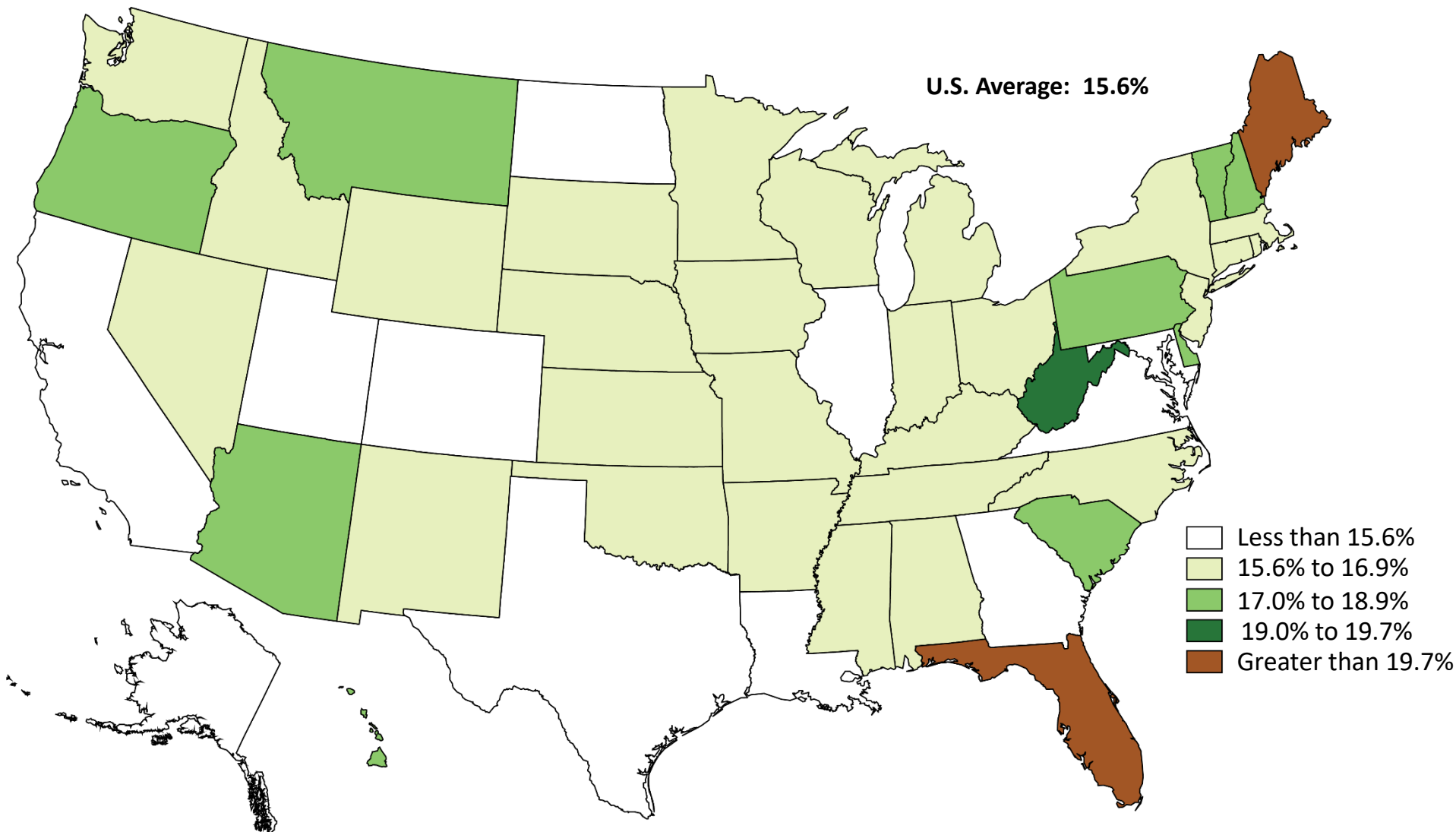


Birth rates are lower for Mothers Under 35

(Birth rates per thousand by mother age)

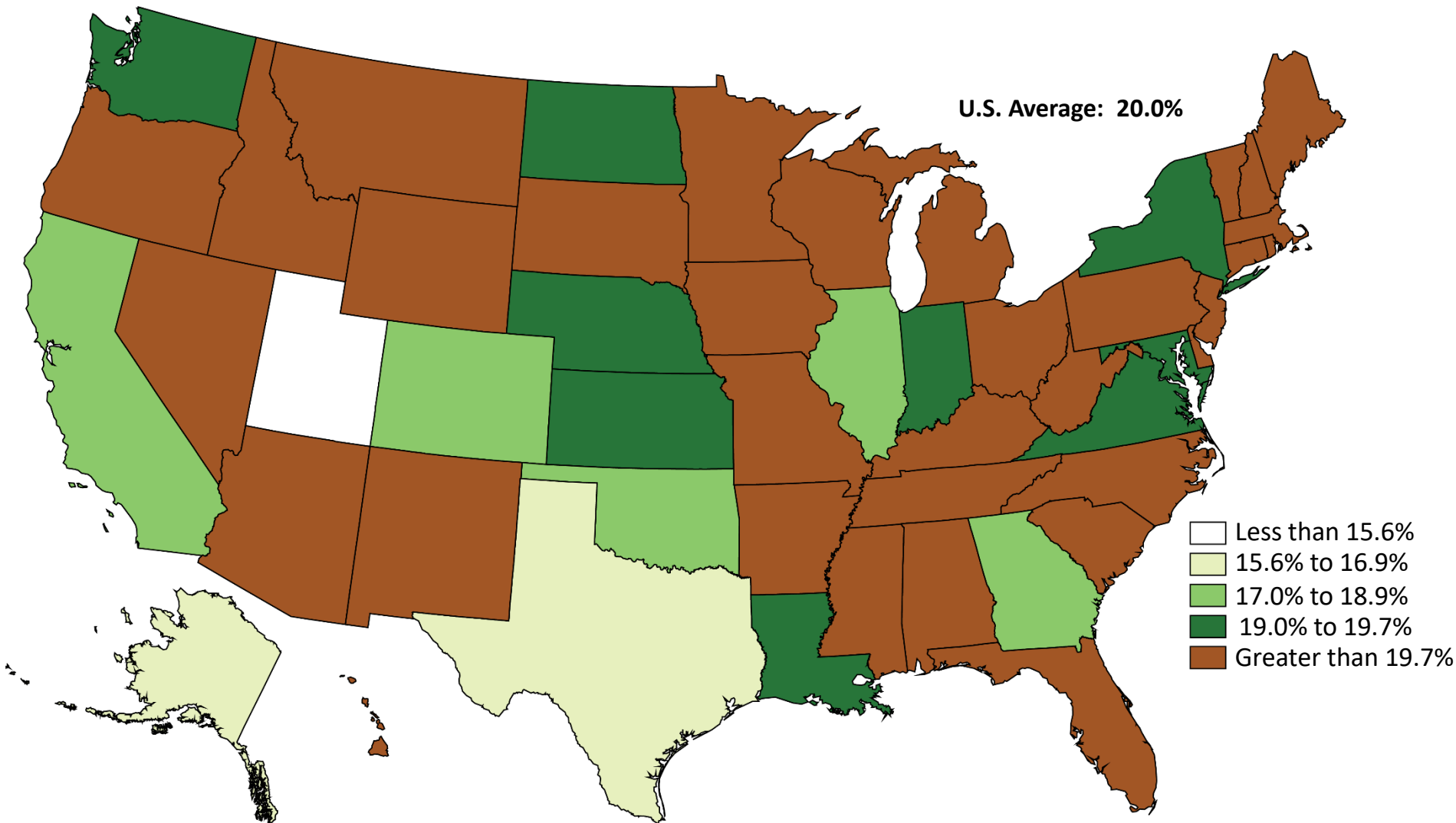
Age Band	2007 Birth Rate Per Thousand	2018 Birth Rate Per Thousand
15-19	42.5	17.4
18-19	73.9	32.3
20-24	106.3	68.0
25-29	117.5	95.3
30-34	99.9	99.7
35-39	47.5	52.6
40-44	9.5	11.8

Population 65 Years and Older, 2017

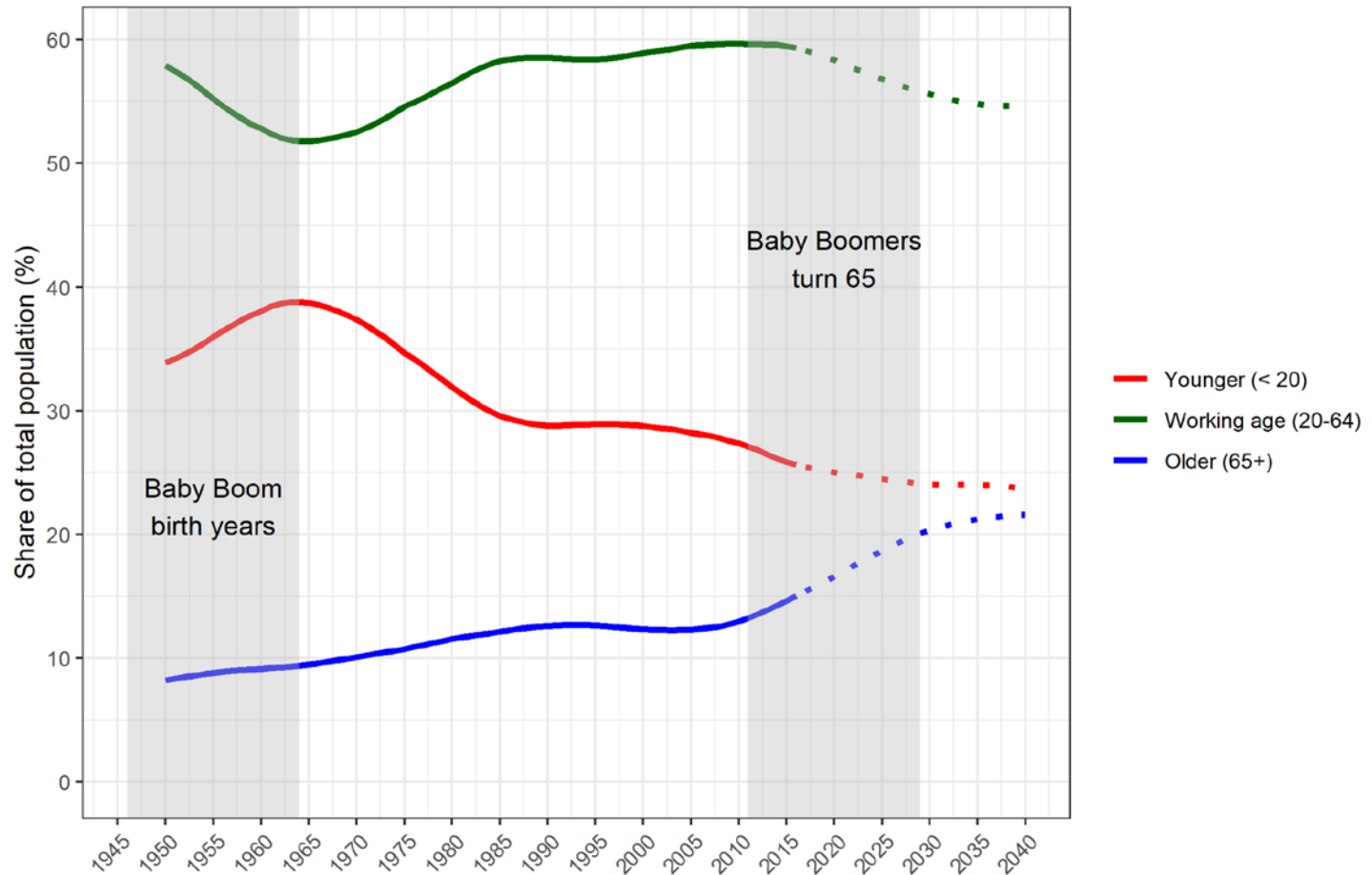


Population Aging in Every State

(Population 65 Years and Older, 2030)



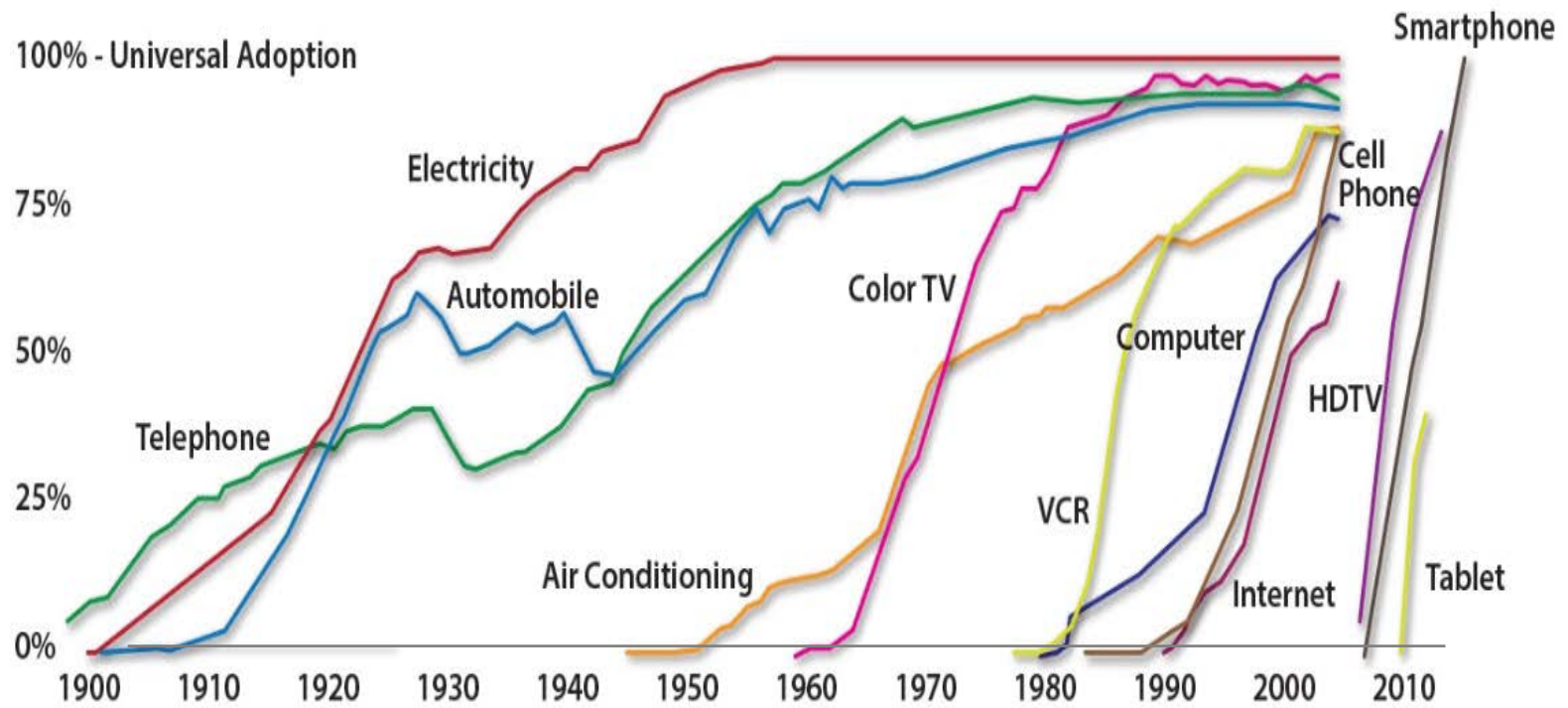
Percentage of total U.S. population, by age group



Source: Data underlying 2017 Revision of World Population Prospects, The United Nations, <https://population.un.org/wpp/>, ([https://population.un.org/wpp/DVD/Files/1_Indicators%20\(Standard\)/CSV_FILES/WPP2017_PopulationBySingleAgeSex.csv](https://population.un.org/wpp/DVD/Files/1_Indicators%20(Standard)/CSV_FILES/WPP2017_PopulationBySingleAgeSex.csv))
 First projection year is 2016, at which point lines are dotted.

Technology Effects

Adoption Rates for New Technologies are Accelerating



Source: HDR CAV Services

Some Trends Accelerated by COVID 19

- Many retail and restaurant job losses are permanent as businesses right size themselves – Best Buy laid off 5000
- Retail space falls and fulfillment space grows as online and pick up purchasing doesn't retreat
- Firms are learning new ways to use technology
 - Teleoffice and telemedicine - Acceptability of remote work has expanded
 - Replacing workers with technology – remote cleaning and disinfecting, drones; AI generally
- Says fewer low skill jobs left in the economy after the pandemic, exacerbating the labor market dichotomy

Retail Bankruptcies in 2020 & 2021

Retailer	Merchant Type	Current Rank*	Date of Bankruptcy	Additional Brands
Schurman Fine Paper Corp.	Consumer Brand Manufacturer	482	January 23, 2020	Papyrus, American Greetings, Blue Mountain, Card store, Just Wink
Pier 1 Imports	Retail Chain	99	February 17, 2020	NA
Art Van Furniture	Retail Chain	473	March 8, 2020	NA
Bluestern Brands	Catalog/Call center	57	March 10, 2020	Fingerhut, Gettington.com, Blair, Haband
Modell's Sporting Goods	Retail Chain	1312	March 11, 2020	NA
True Religion	Consumer Brand Manufacturer	898	April 13, 2020	NA
J.Crew	Retail Chain	47	May 4, 2020	J. Crew Group, J. Crew Factory, Madewell
J. Hilburn Inc.	Consumer Brand Manufacturer	316	May 4, 2020	NA
Neiman Marcus	Retail Chain	41	May 7, 2020	Bergdorf Goodman, Horchow, MyThersa.com, Neiman Marcus Last Call
Stage Stores Inc.	Retail Chain	737	May 10, 2020	Palais Royal, Bealls, Gordmans
J.C.Penney	Retail Chain	32	May 15, 2020	NA
Roots Corp.**	Consumer Brand Manufacturer	579	June 10, 2020	NA
GNC Holdings	Retail Chain	287	June 24, 2020	Lucky Vitamin, DiscountSupplements.com
Lucky Brand	Consumer Brand Manufacturer	625	July 3, 2020	NA
G-Star RAW	Consumer Brand Manufacturer	183^	July 3, 2020	NA
Brooks Brothers	Consumer Brand Manufacturer	162	July 8, 2020	NA
Sur La Table	Retail Chain	238	July 8, 2020	NA
New York & Co.	Retail Chain	184	July 13, 2020	Parent company that filed: RTW Retailwinds.
Ascena Retail Group	Retail Chain	38	July 23, 2020	Ann Taylor, Dressbarn, Justice, Lane Bryant, Lou & Grey, Catherines, Loft, Loft Outlet, Ash & Erie
Tailored Brands	Retail Chain	150	August 2, 2020	The Men's Warehouse, Jos. A. Bank
Le Tote	Web Only^^	835	August 2, 2020	Lord & Taylor
Stein Mart	Retail Chain	N/A	August 12, 2020	N/A
Century 21	Retail Chain	N/A	September 10, 2020	N/A
Guitar Center	Retail Chain	N/A	November 23, 2020	N/A
Francesca's	Retail Chain	N/A	December 4, 2020	N/A
Christophe & Banks Corp	Retail Chain	535	January 14, 2021	N/A
Belk	Retail Chain	N/A	February 24, 2021	N/A

*Digital Commerce 360 Top and Next 1000 rank

**Roots Corp. (Roots Canada) filed Chapter 7 bankruptcy for its U.S. subsidiary only.

^European rank

^^Le Tote's Lord & Taylor brand is a retail chain.

Source: Digital Commerce 360 analysis of company reports & CNET. Data as of February 17, 2020.

1 in 5 Jobs are in Vehicle Intensive Occupations, 2019

	Tennessee		U.S.	
	Employment	Share	Employment	Share
Total Employment	2,614,962	100.00%	126,307,286	100.00%
Vehicle Manufacturing	72,652	2.78%	1,054,481	0.83%
Vehicle Support	124,253	4.75%	5,526,730	4.38%
Motor Vehicle Operators & Other On-the-Job Drivers	364,910	13.95%	18,383,130	14.55%
Total, Vehicle-Related	561,815	21.48%	24,964,341	19.76%

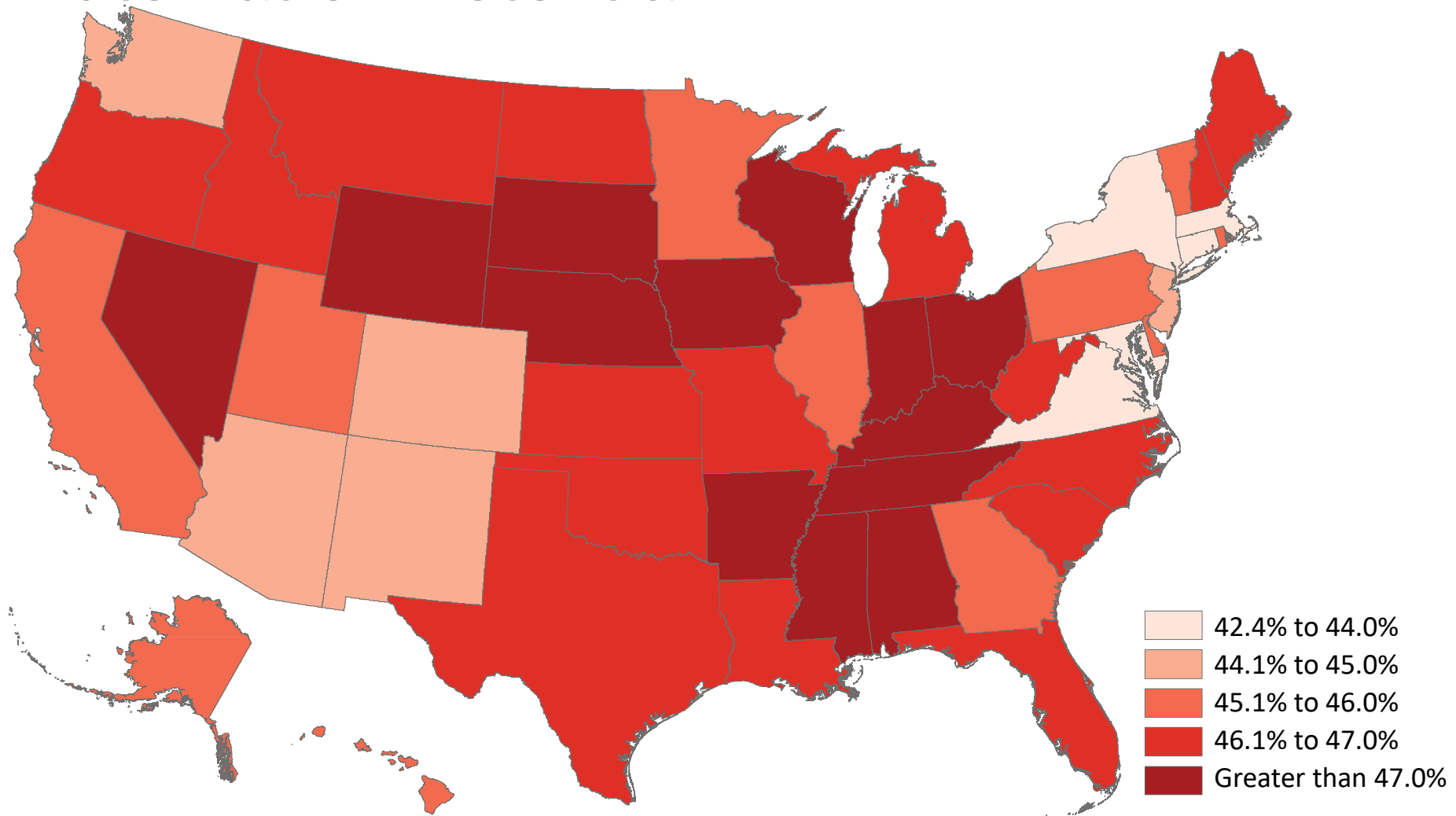
Notes: 2019 data are preliminary

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

AVs and Tennessee Taxes, (\$thousands)

	AVs fully adopted	Current Practice
Gasoline Tax	0	1,023,824
Motor Fuel Tax	0	328,833
Gasoline Inspection	0	78,377
Motor Vehicle Registration	192,196	384,393
Motor Vehicle Title	30,128	60,256
Motor Vehicle Sales Tax	1,300,568	2,601,136
Privilege Tax	14,725	13,154
Electric Vehicles	346,381	
Total Vehicle Related	1,883,998	4,489,972

Tennessee Jobs have Above Average Automation Potential



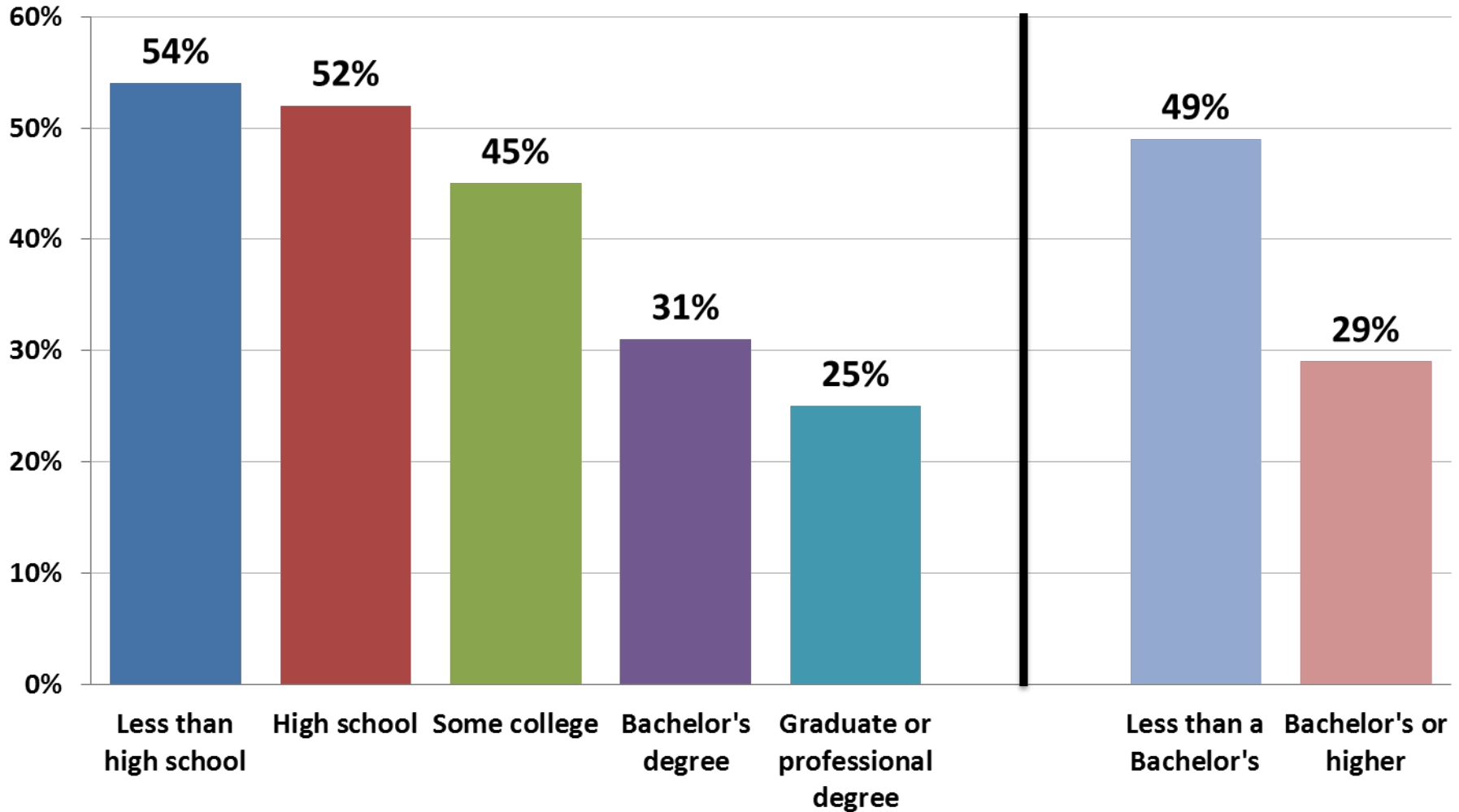
Source: Mark Muro, et.al, Brookings Institute. *Automation and Artificial Intelligence: How Machines Are Affecting People and Places*. January 2019.

The Potential for Automation Differs Significantly Across Occupations, but Highest for Low Wages

Occupation	Average wage	Automation potential	Typical education required
Packaging & Filling Machine Operators & Tenders	\$31,000	100%	Less than Bachelor's Degree
Food Preparation Workers	\$23,000	91%	Less than Bachelor's Degree
Payroll & Timekeeping Clerks	\$44,000	87%	Less than Bachelor's Degree
Light Truck or Delivery Services Drivers	\$35,000	78%	Less than Bachelor's Degree
Computer Network Support Specialists	\$68,000	62%	Less than Bachelor's Degree
Medical Assistants	\$33,000	54%	Less than Bachelor's Degree
Retail Salespersons	\$27,000	47%	Less than Bachelor's Degree
Computer Programmers	\$85,000	38%	Bachelor's Degree or More
Registered Nurses	\$72,000	29%	Bachelor's Degree or More
Maids & Housekeeping Cleaners	\$24,000	18%	Less than Bachelor's Degree
Home Health Aides	\$24,000	11%	Less than Bachelor's Degree
Software Developers, Applications	\$105,000	8%	Bachelor's Degree or More
Management Analysts	\$92,000	4%	Bachelor's Degree or More
U.S. total	\$49,600	46%	

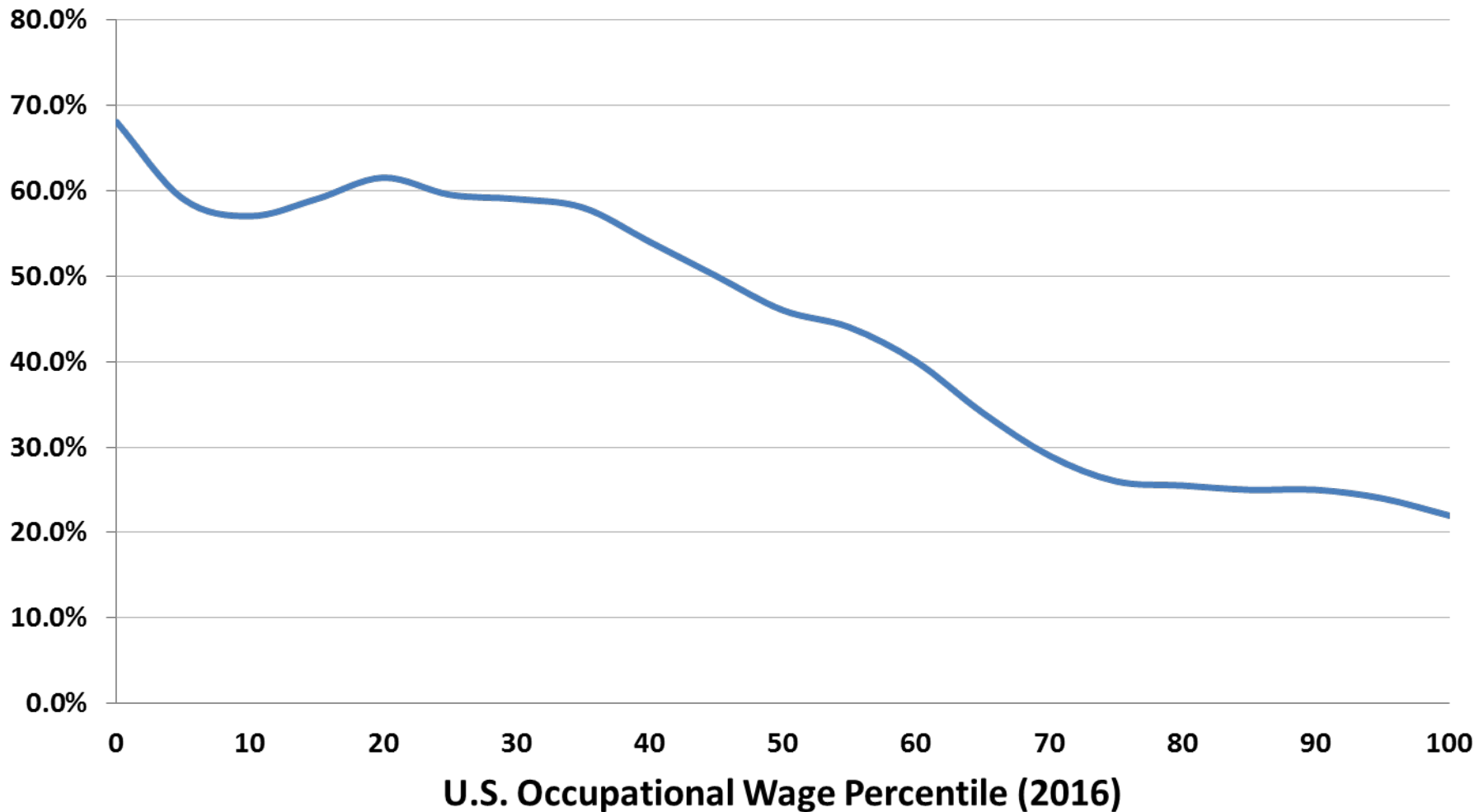
Source: Mark Muro, et.al, Brookings Institute. *Automation and Artificial Intelligence: How Machines Are Affecting People and Places*. January 2019.

Less-Educated Workers Will Experience Greater Job Change from Automation



Source: Brookings analysis of 2016 American Community Survey 1-Year microdata (U.S. data).

Lowest-Wage Jobs Most Susceptible to Automation

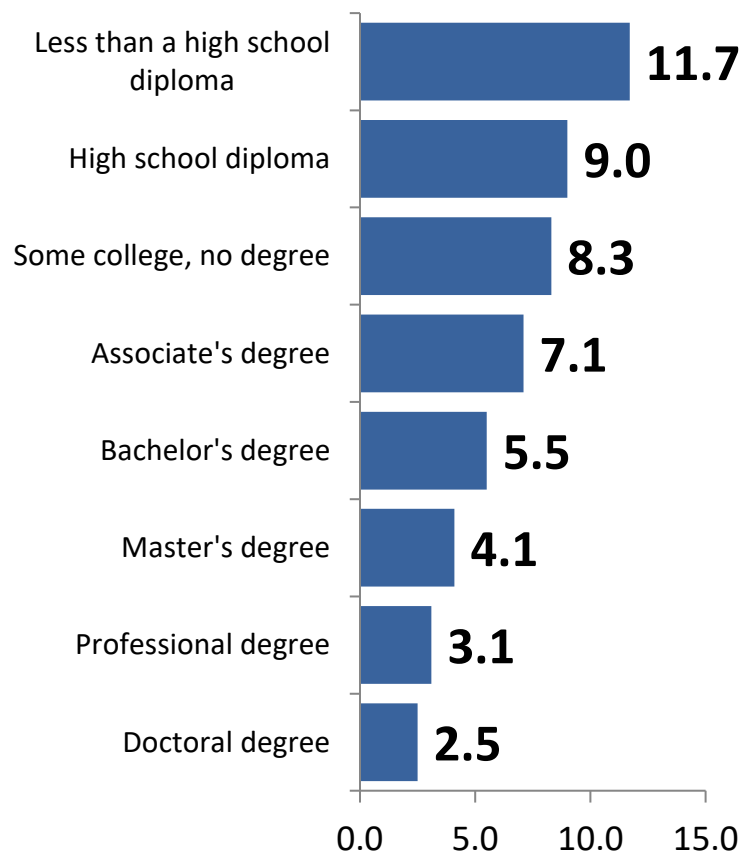


Source: Brookings analysis of BLS, Census, and McKinsey data.

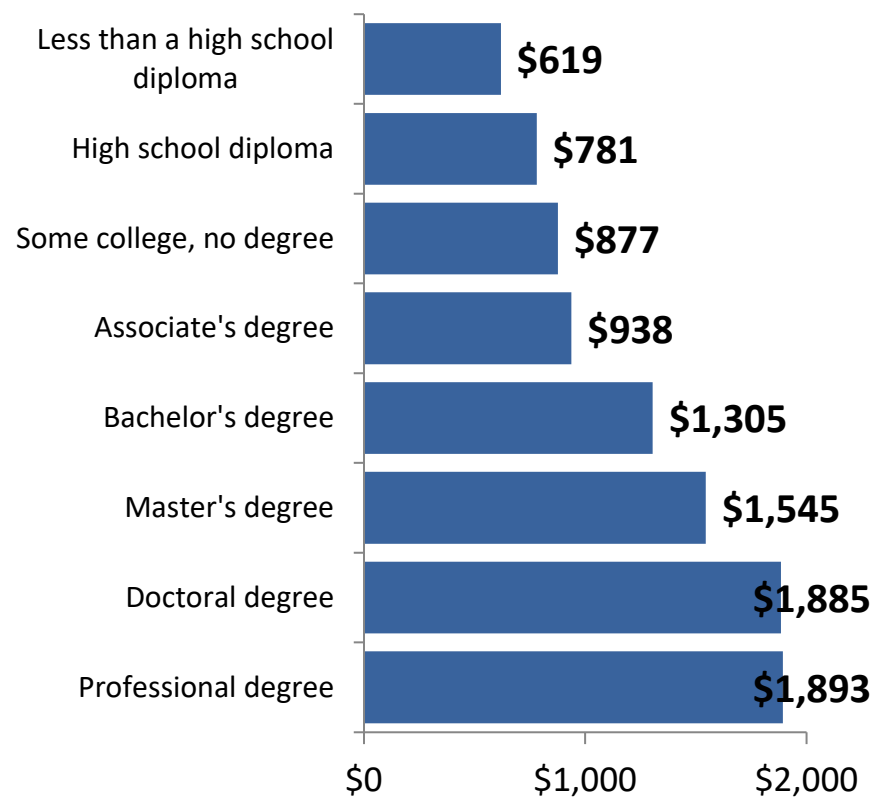
Tennessee's Preparation for the New Economy

Continued Importance of Education is Apparent

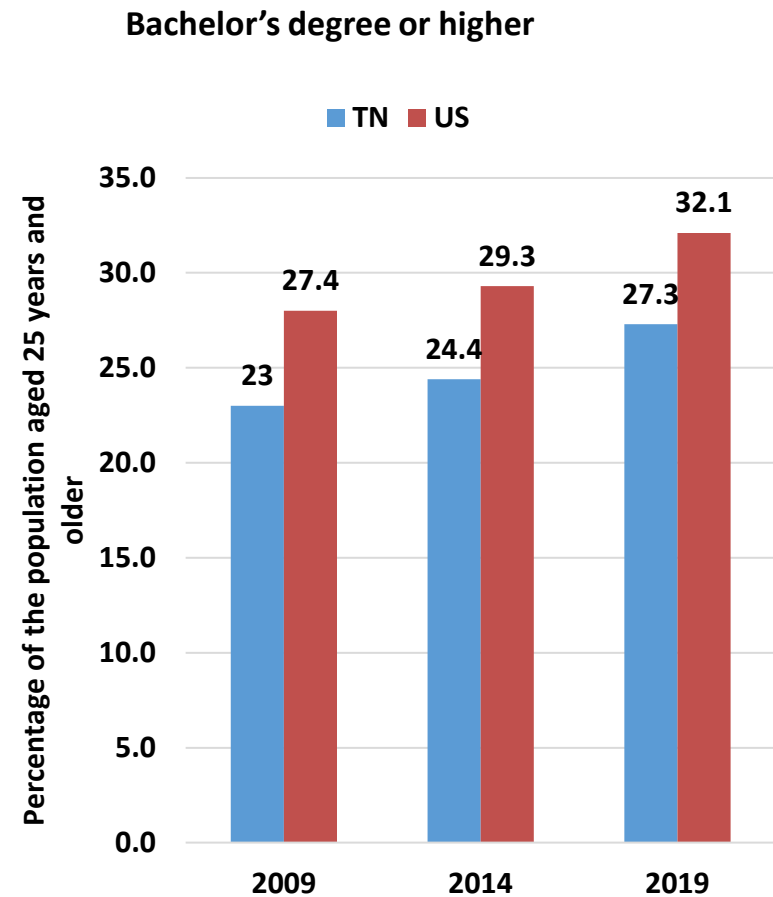
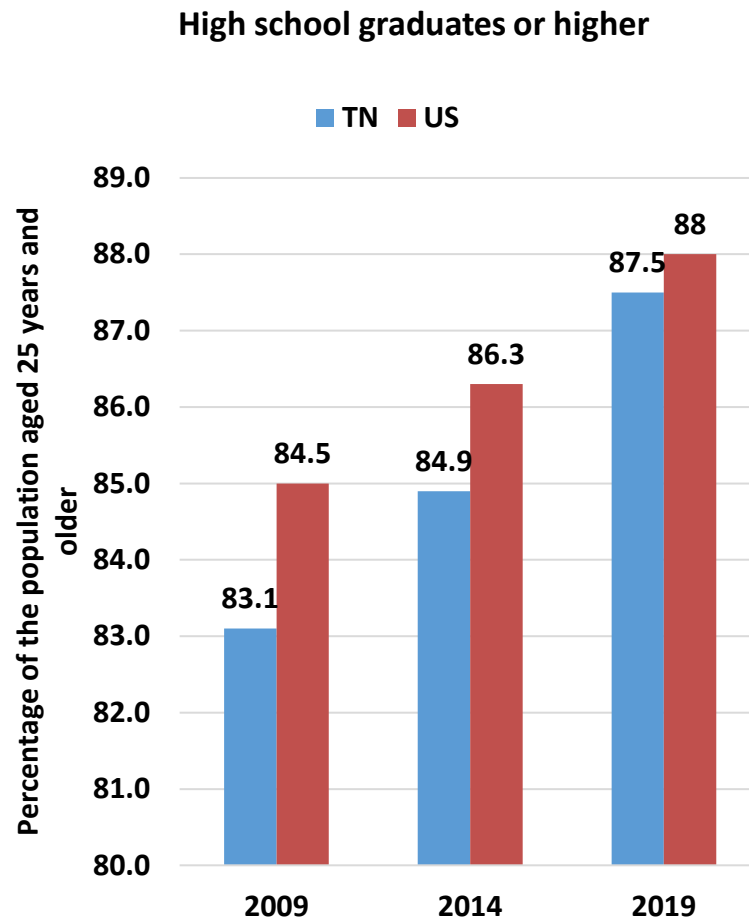
Unemployment Rate (%)



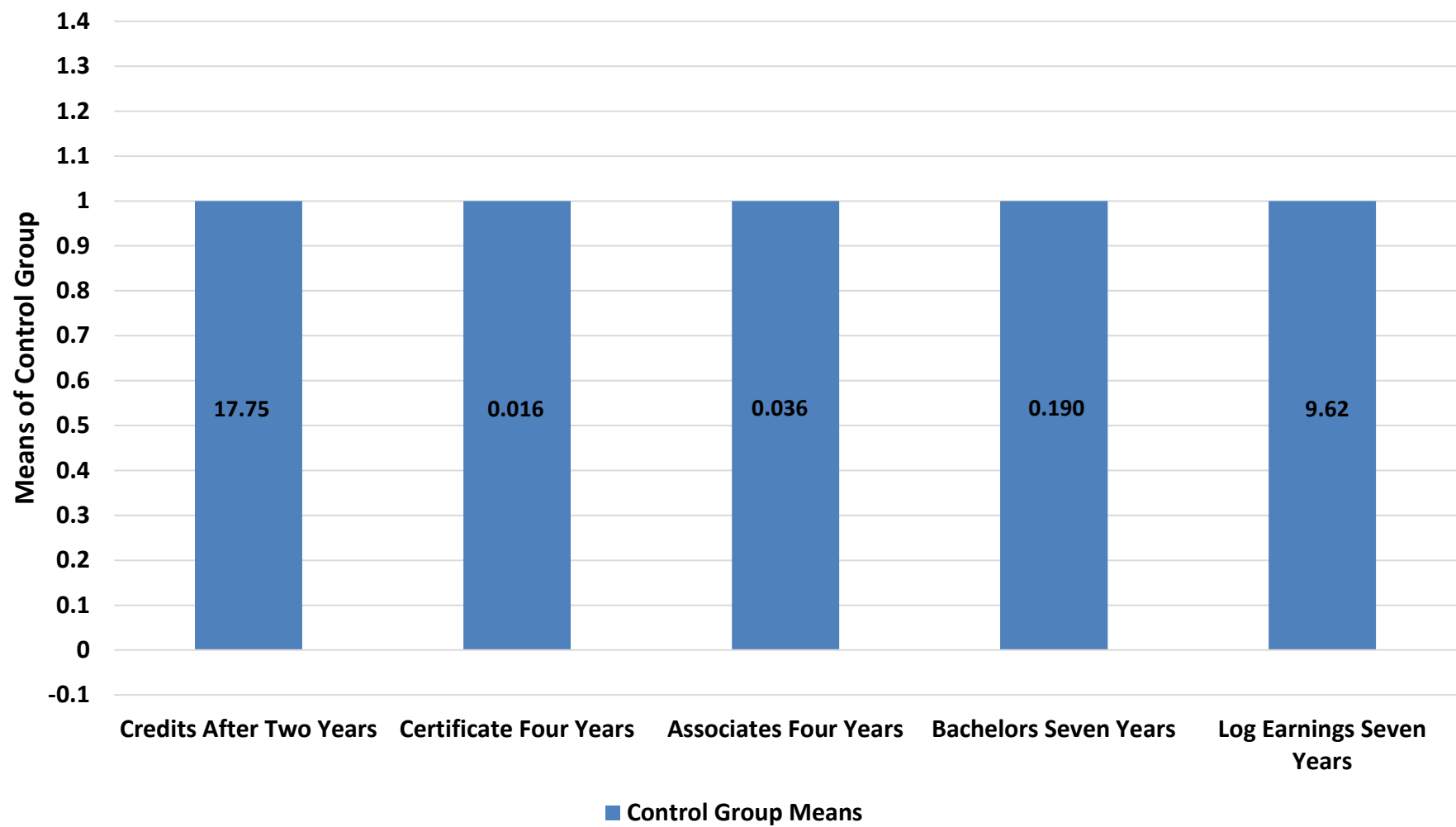
Median Weekly Earnings (\$)



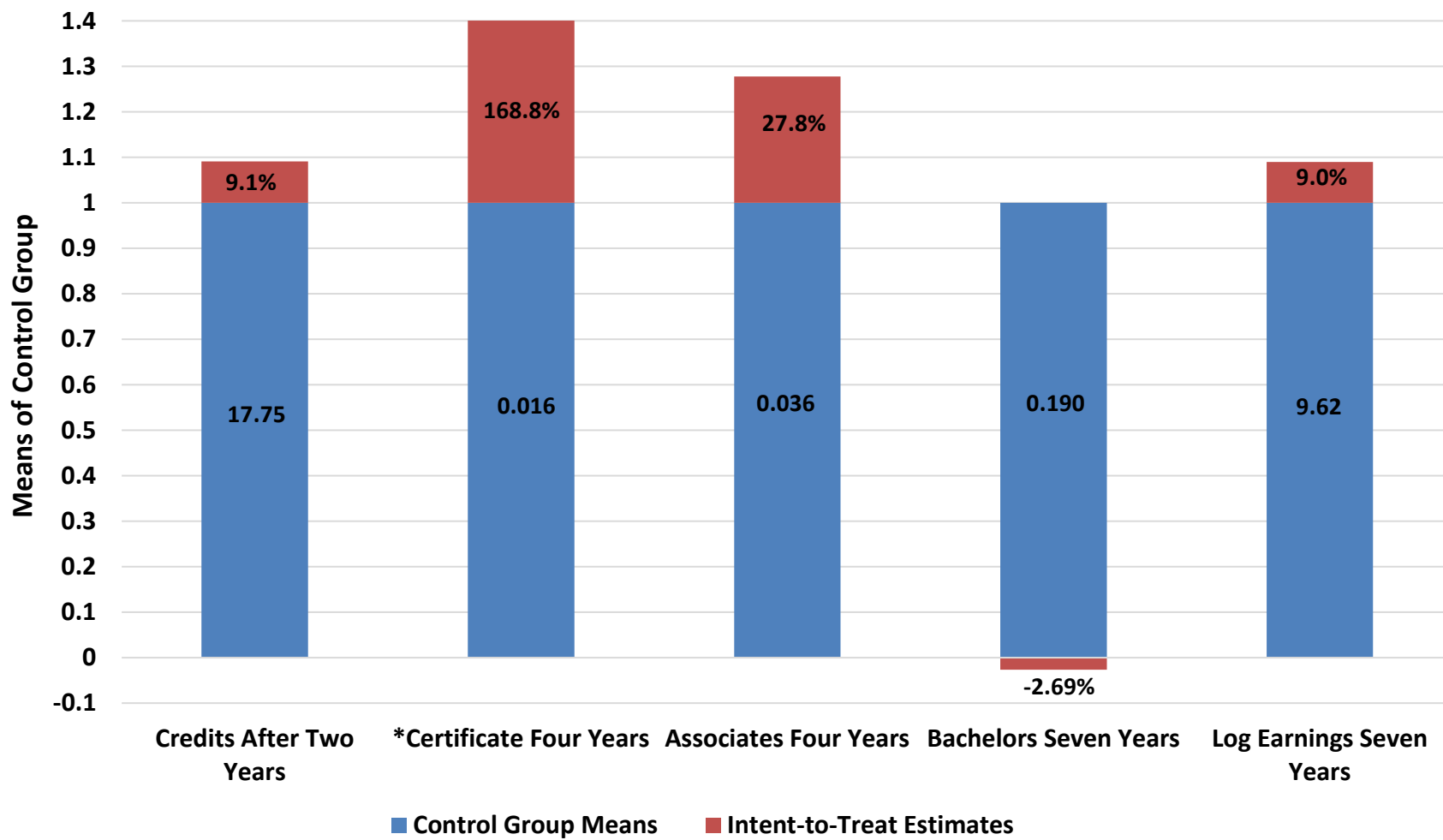
Tennesseans Have Lower Educational Attainment Levels



Some Metrics for Tennessee Achieves



Effects of Knox Achieves



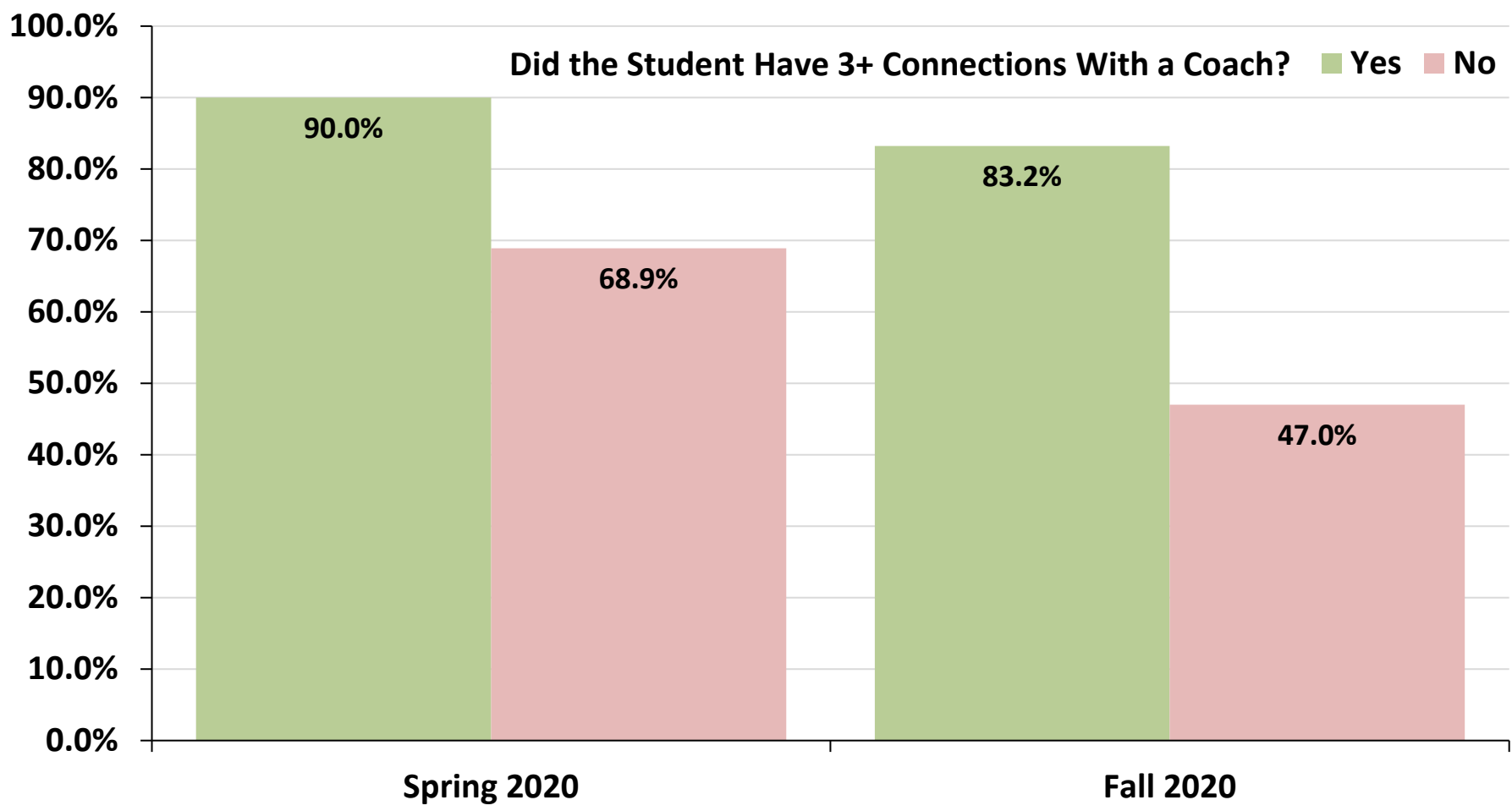
*Certificate Four Years Extends Past the Vertical Axis and Reads 2.68 on the Scale

The Knox Promise Cohort grew Rapidly as TN Community College Enrollment Declined

Fall 2019 Cohort	Total
Knox Promise	1,426
Tennessee Promise	15,838

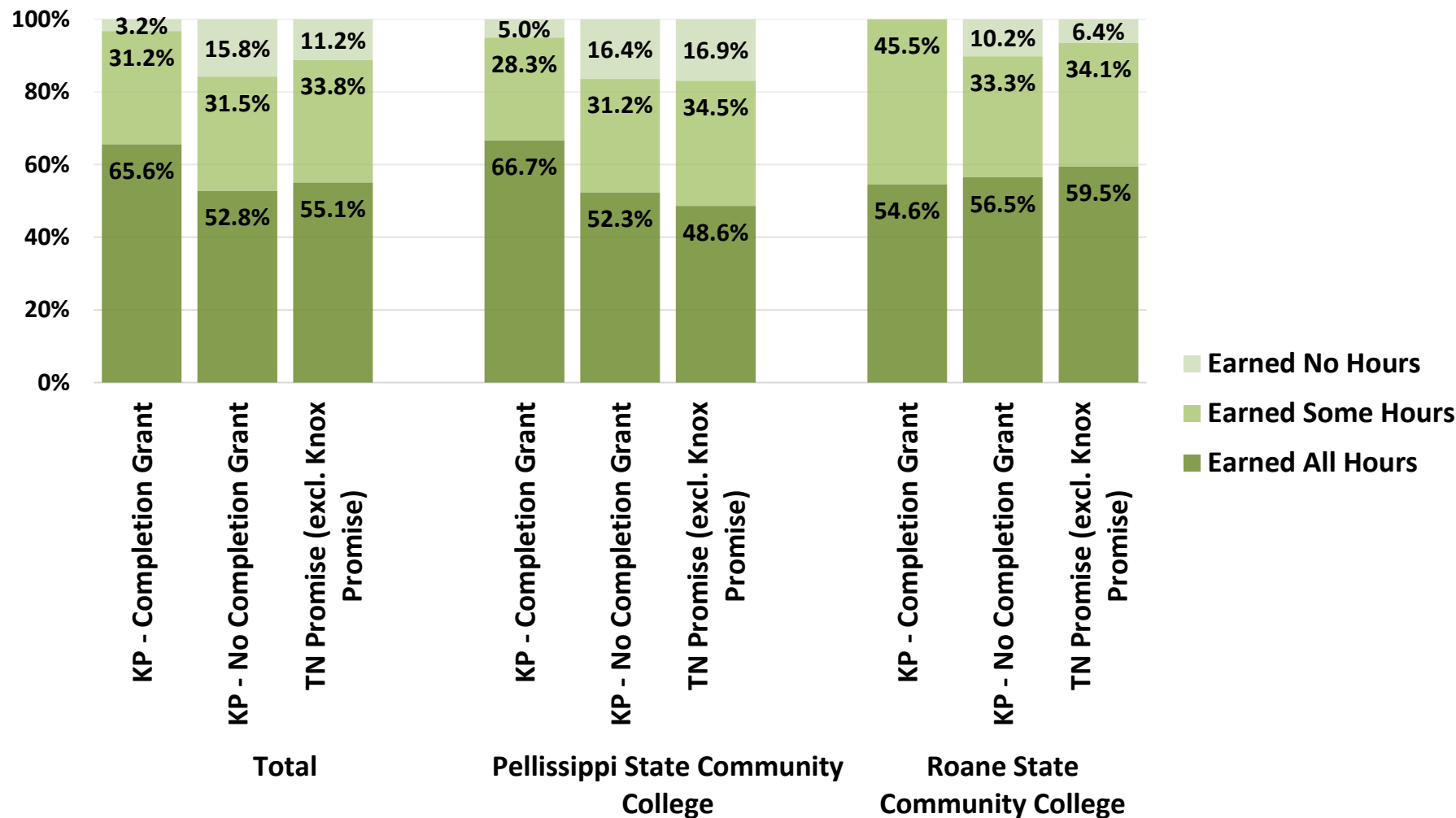
Fall 2020 Cohort	Total
Knox Promise	1,504

Coaching Makes a Big Difference, as These Students are Much More Persistent: Fall 2019 Cohort



Spring 2020 enrollment is based on the THEC 14 day files for students with current Knox Promise eligibility.
Fall 2020 enrollment includes more expansive enrollment data from Knox Promise with NSCH matching for all original cohort members.

Completion Grant Students More Likely to earn Attempted Hours Fall 2019



Leakages Occur at Every Point in the Education System

Tennessee 9th Grade Pipeline

9th Grade Year

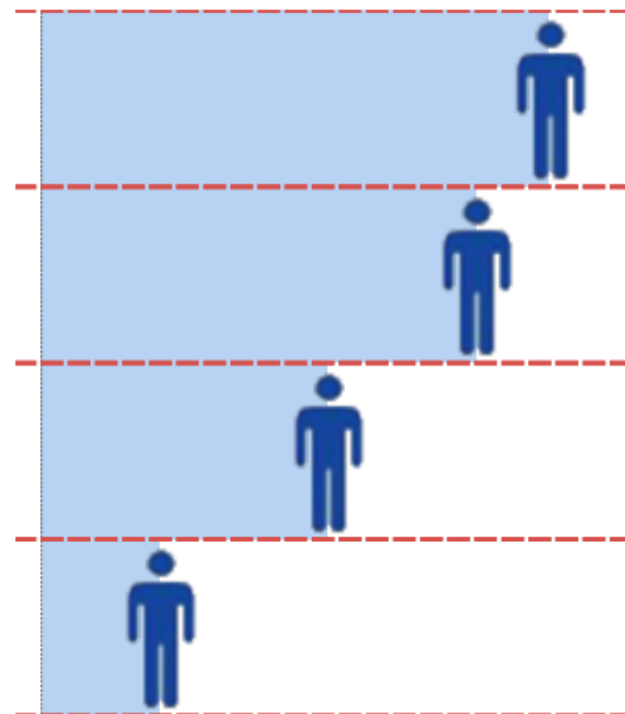
2007

For every **100** ninth-graders in Tennessee

86 graduate high school in four years

56 enroll in a postsecondary institution

23 graduate college within six years of high school



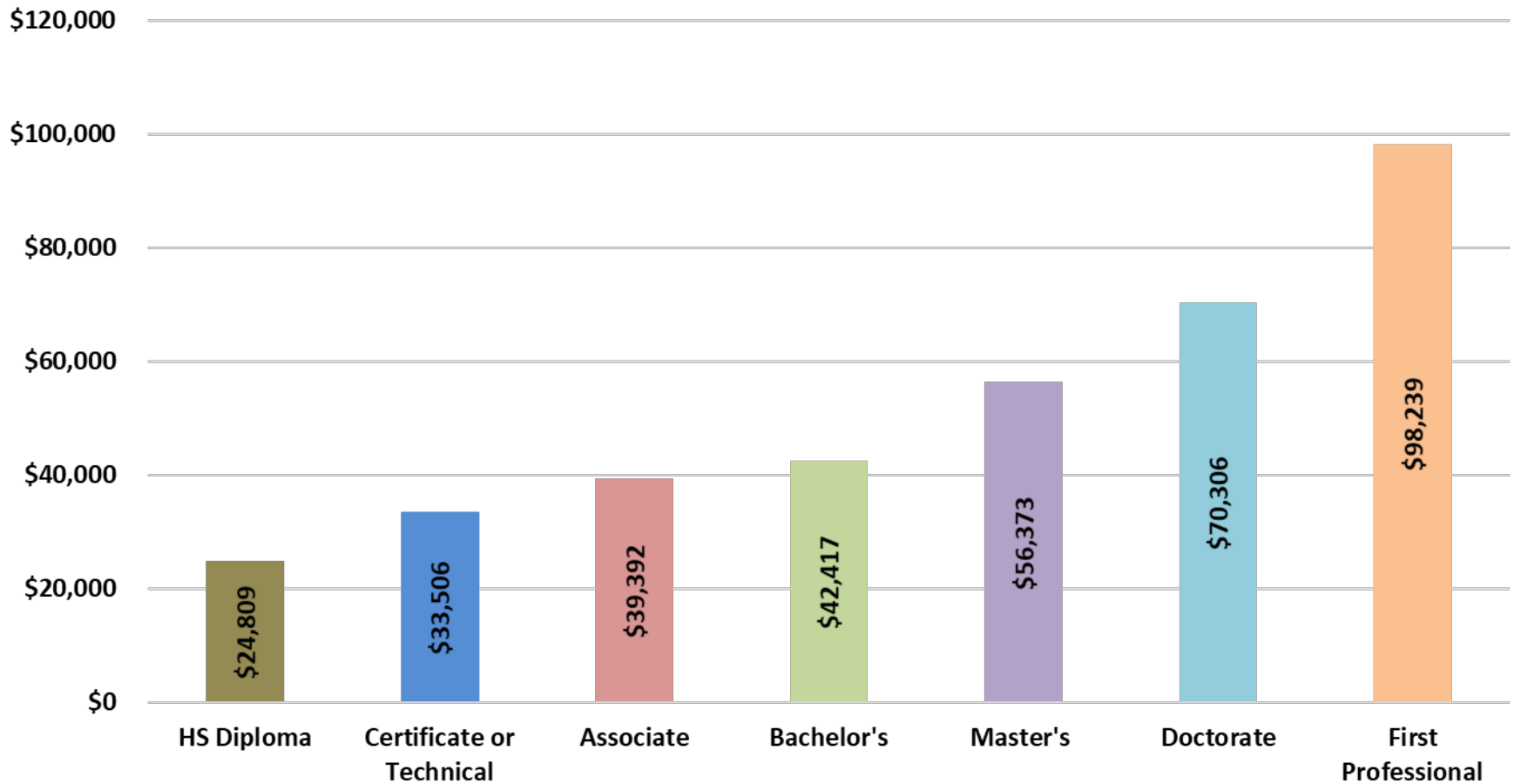
STEM Education and Technological Change

- STEM workers appear scarce, but is likely the new job-relevant skills that are in short supply rather than STEM workers per se
- Initial earnings for STEM workers are high, but earnings differential drops across career so many leave within about 10 years
- Careers with high rate of task change
 - Lower wage growth as technology reduces value of ed
 - On-the-job training gains are small
- Highest ability STEM workers are most likely to switch out of STEM during their career

Some Steps for Upgrading the Labor Force

- Expand the number of TCATs, particularly joint with high schools
- Expand non-tuition assistance programs at TCATs and 2 year schools (coaching, limited financial assistance)
- Use AI to identify the types of jobs being created, necessary skills, available labor force – Burning Glass data
- Train workers to accept and work with automation

Average Full-Time Income of Tennessee Students 5 Years After Graduation



Adapted using data from P20 Connect (TN Longitudinal Data System) and the Boyd Center for Business and Economic Research's Do Tennessee's Higher Education Graduates Work in Tennessee? Revisited Report.