

The Texas Association of Community Colleges

Guhan Venkatu

Vice President and Regional Executive



Federal Reserve
Bank of Dallas

The views expressed are my own and do not necessarily
reflect official positions of the Federal Reserve System.

If all economists were laid end to end, they
would not reach a conclusion.

— George Bernard Shaw

Outline and Overview

- Occupational Projections
- The Texas Economy
- Artificial Intelligence & Employment

Occupational Projections

US Employment Projections

Occupational Title	Change (Thousands), 2022 – 2032
Home health and personal care aides	805
Software developers	410
Cooks, restaurant	278
Stockers and order fillers	179
Registered nurses	177
Laborers and freight, stock, and material movers, hand	159
General and operations managers	147
Medical and health services managers	145
Light truck drivers	134
Financial managers	127
Nurse practitioners	119
Market research analysts and marketing specialists	117
Medical assistants	106
Management analysts	96
Heavy and tractor-trailer truck drivers	89

Source: Bureau of Labor Statistics.

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AI-able?

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AI-able?
Medical Care

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AI-able?
 Medical Care
 Movement of Goods

Source: Bureau of Labor Statistics.

Texas Employment Projections

Occupational Title	Employment		Change, 2022 – 2032	
	2022	2032 (Projected)	Percent	Level
Preschool Teachers, Except Special Education	47,191	56,217	19.1	9,026
Paralegals and Legal Assistants	24,727	29,474	19.2	4,747
Veterinary Technologists and Technicians	12,645	17,307	36.9	4,662
Radiologic Technologists and Technicians	18,785	22,392	19.2	3,607
Respiratory Therapists	11,517	14,275	23.9	2,758
Physical Therapist Assistants	8,482	11,181	31.8	2,699
Dental Hygienists	11,365	13,718	20.7	2,353
Medical Equipment Repairers	7,782	10,130	30.2	2,348
Computer Network Support Specialists	10,978	13,215	20.4	2,237
Engineering Technologists and Technicians, Except Drafters, All Other	9,503	11,413	20.1	1,910
Diagnostic Medical Sonographers	6,690	8,576	28.2	1,886
Architectural and Civil Drafters	14,254	16,079	12.8	1,825
Occupational Therapy Assistants	4,281	5,623	31.3	1,342
Civil Engineering Technologists and Technicians	7,953	9,228	16.0	1,275
Health Information Technologists and Medical Registrars	3,624	4,746	31.0	1,122

Source: Texas Workforce Commission.

Texas Employment Projections

Teachers

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Medical Therapists/Technicians

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Texas Employment Projections

Teachers

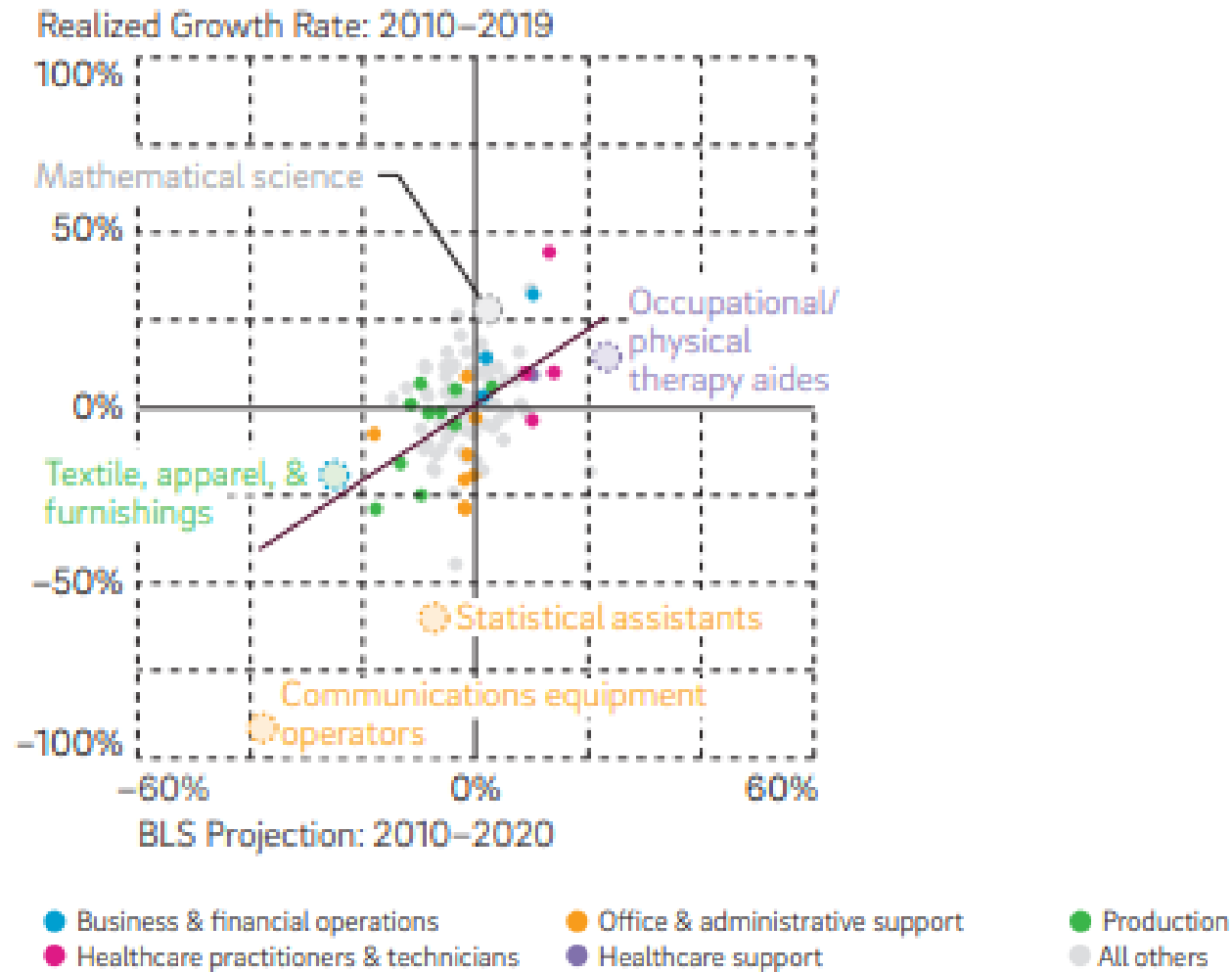
Medical Therapists/Technicians

People Making Machines Run

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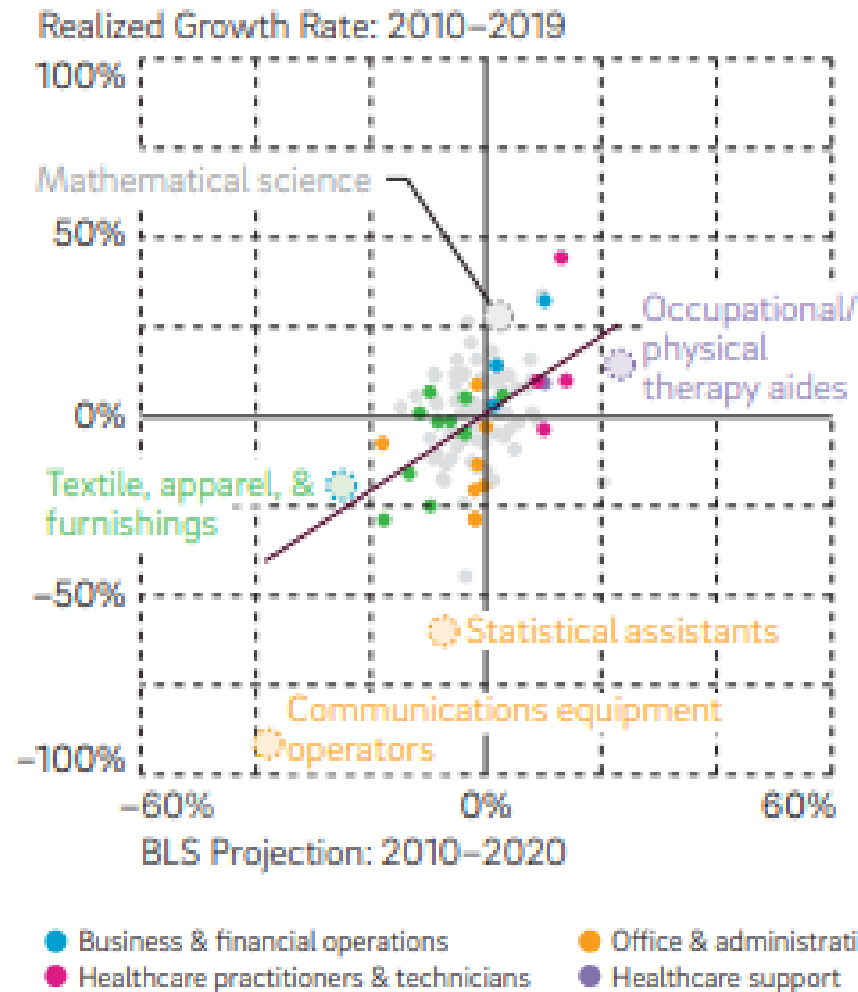
Source: Texas Workforce Commission.

US Employment Projections



Source: Atalay, E. (2020). How accurate are long-run employment projections?. Federal Reserve Bank of Philadelphia.

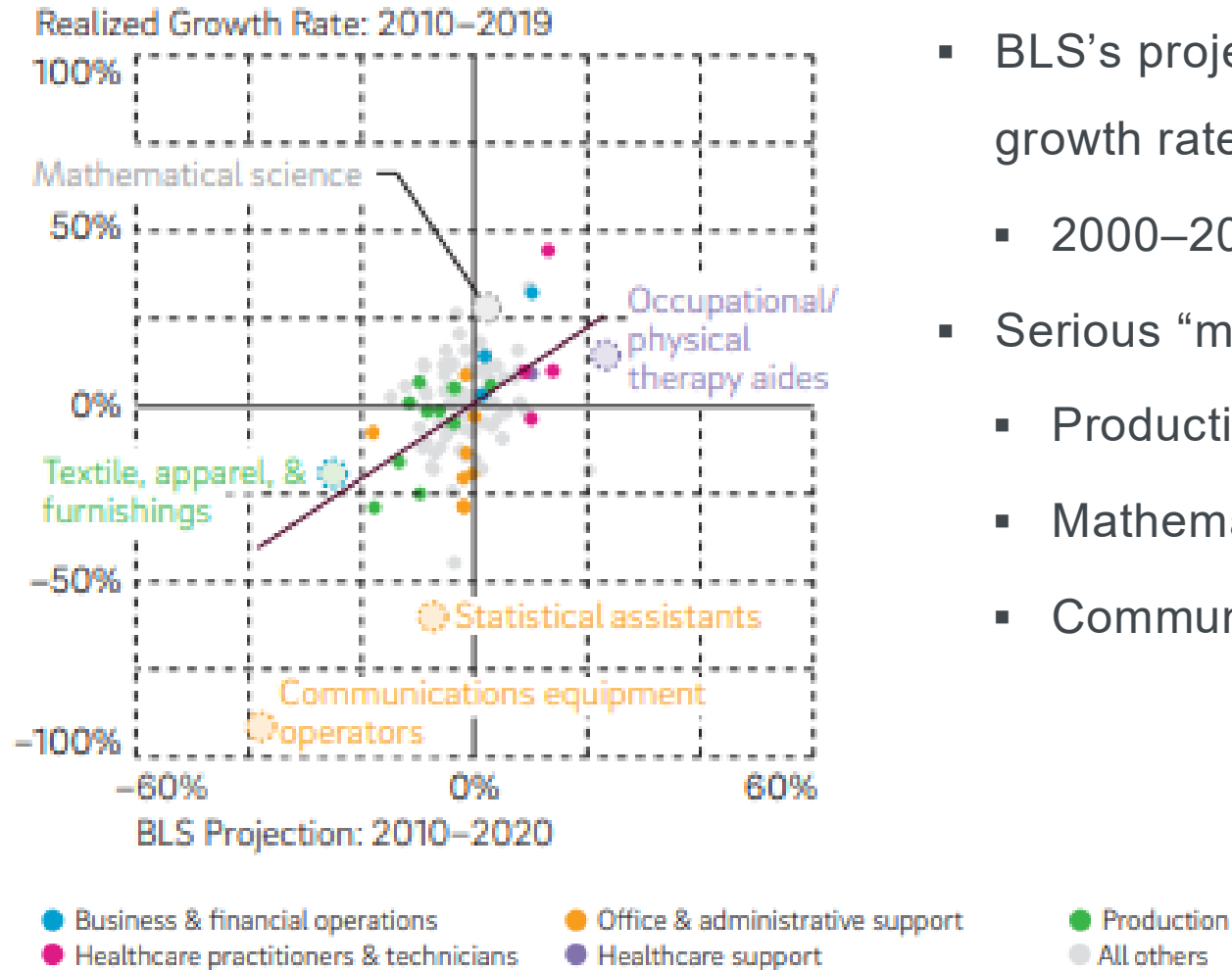
US Employment Projections



- BLS's projections: ~25% of variation in realized growth rates accounted for (ie, 75% unexplained).
- 2000–2010: ~15% of variation explained.

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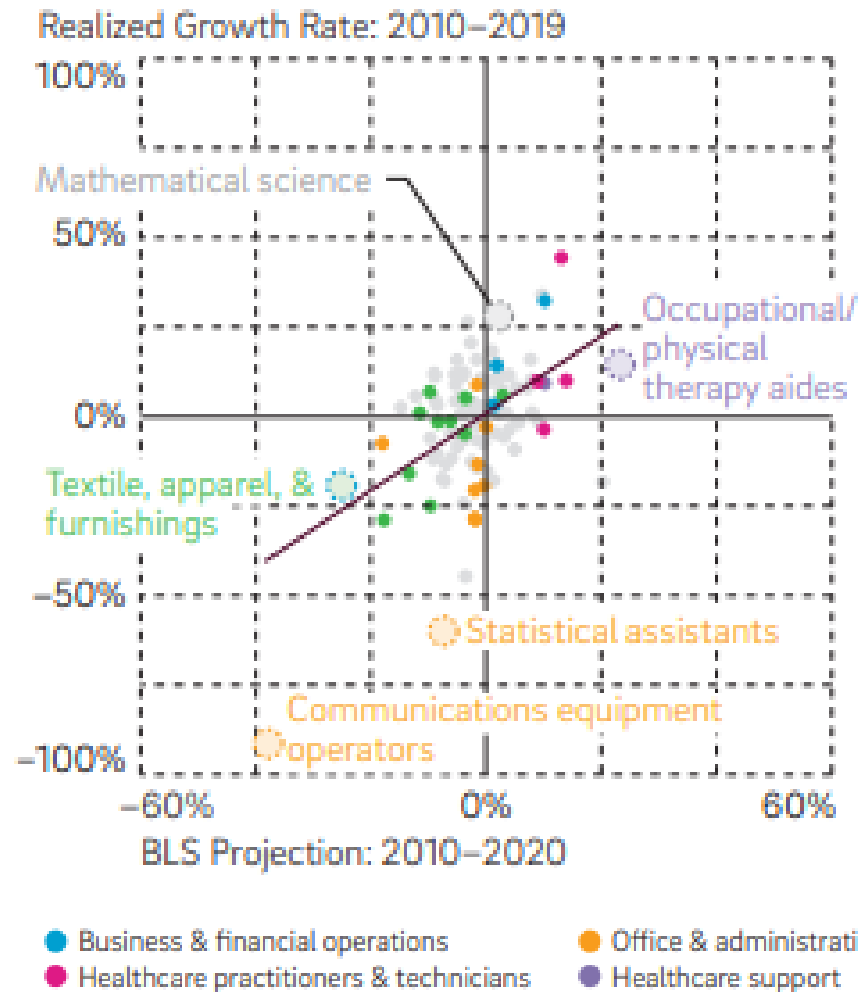
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- Serious “misses” in many occupations
 - Production occupations
 - Mathematical science
 - Communications eqp operators

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 - 2000–2010: ~15% of variation explained.
- Serious “misses” in many occupations
 - Production occupations
 - Mathematical science
 - Communications eqp operators
- Broadly correct, but a very, very cloudy crystal ball

Source: Atalay, E. (2020). How accurate are long-run employment projections?. Federal Reserve Bank of Philadelphia.

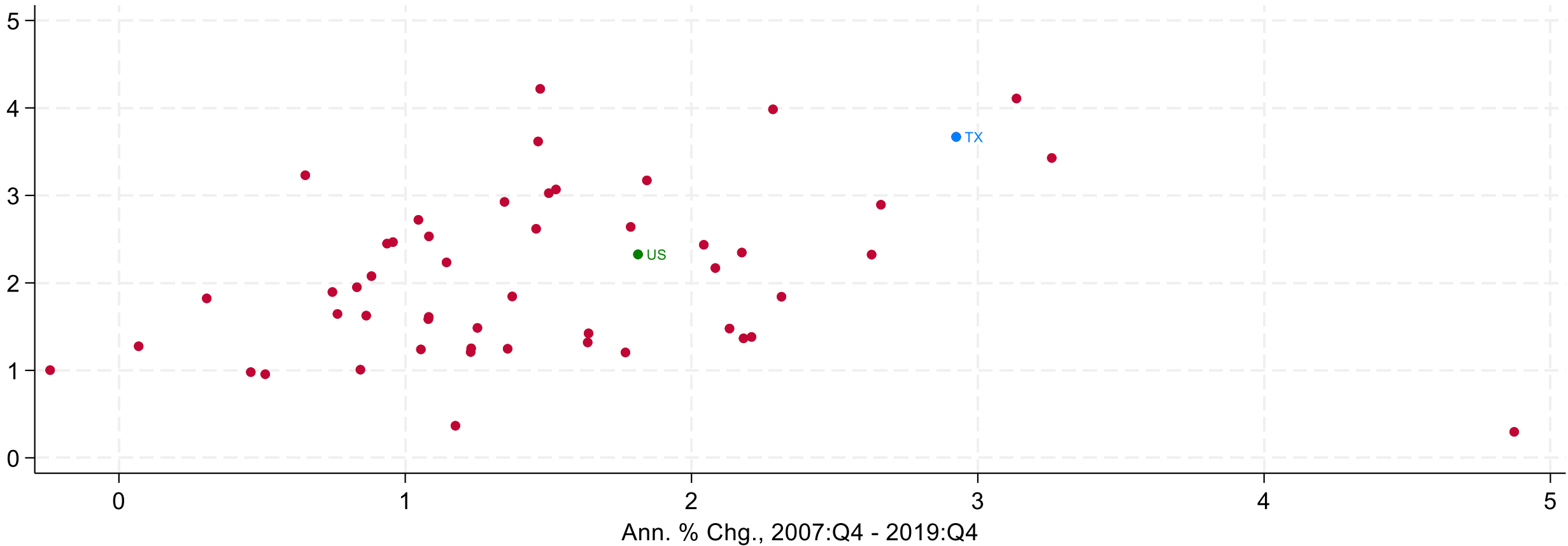
The only function of economic forecasting is to
make astrology look respectable.

— John Kenneth Galbraith

The Texas Economy

Texas is generally among the strongest growing states in the US

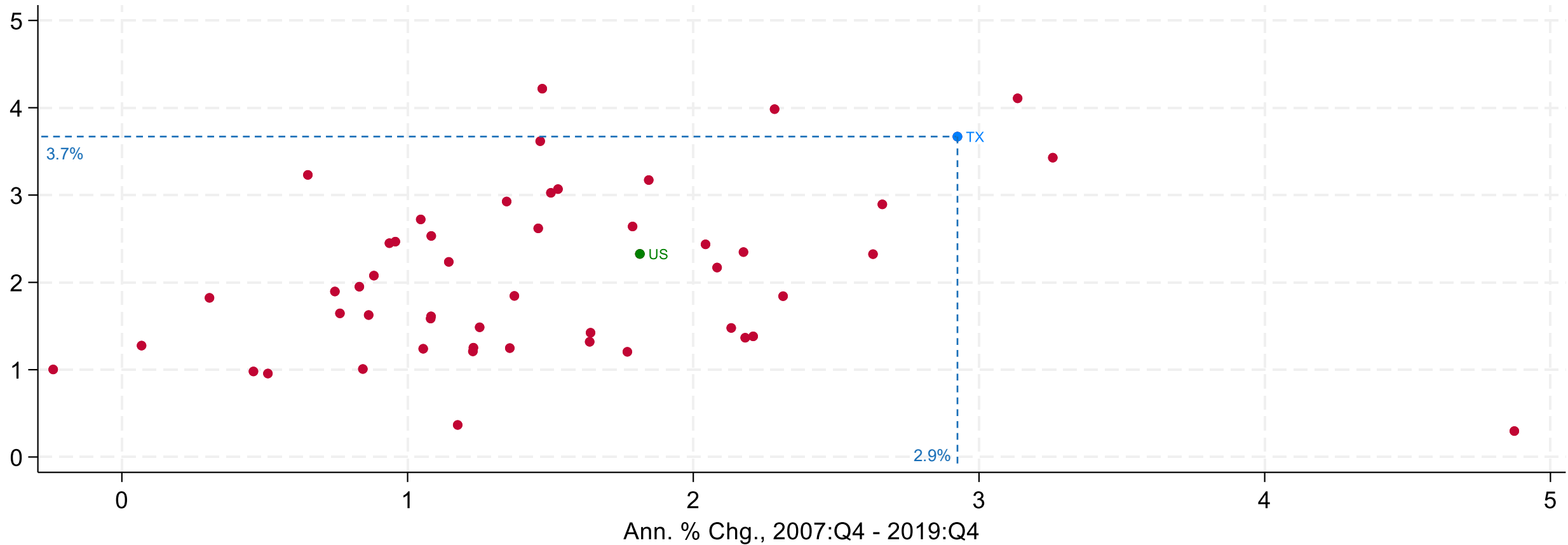
Ann. % Chg., 2019:Q4 - 2024:Q4



SOURCE: Bureau of Economic Analysis

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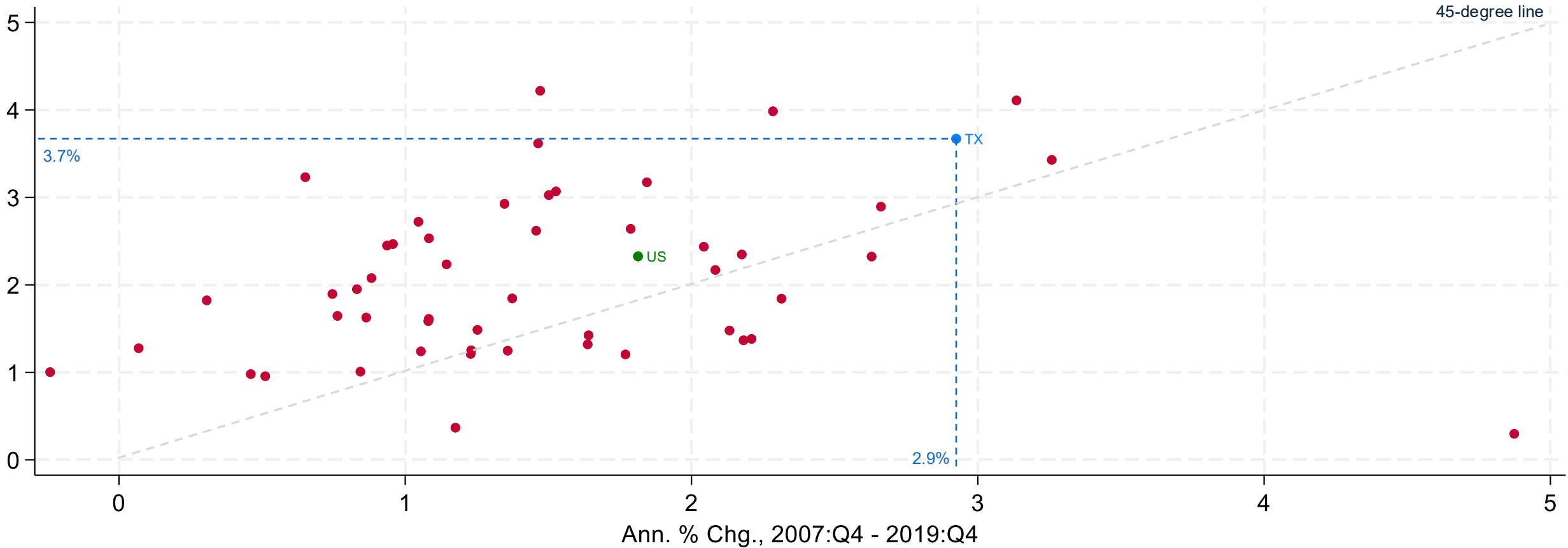
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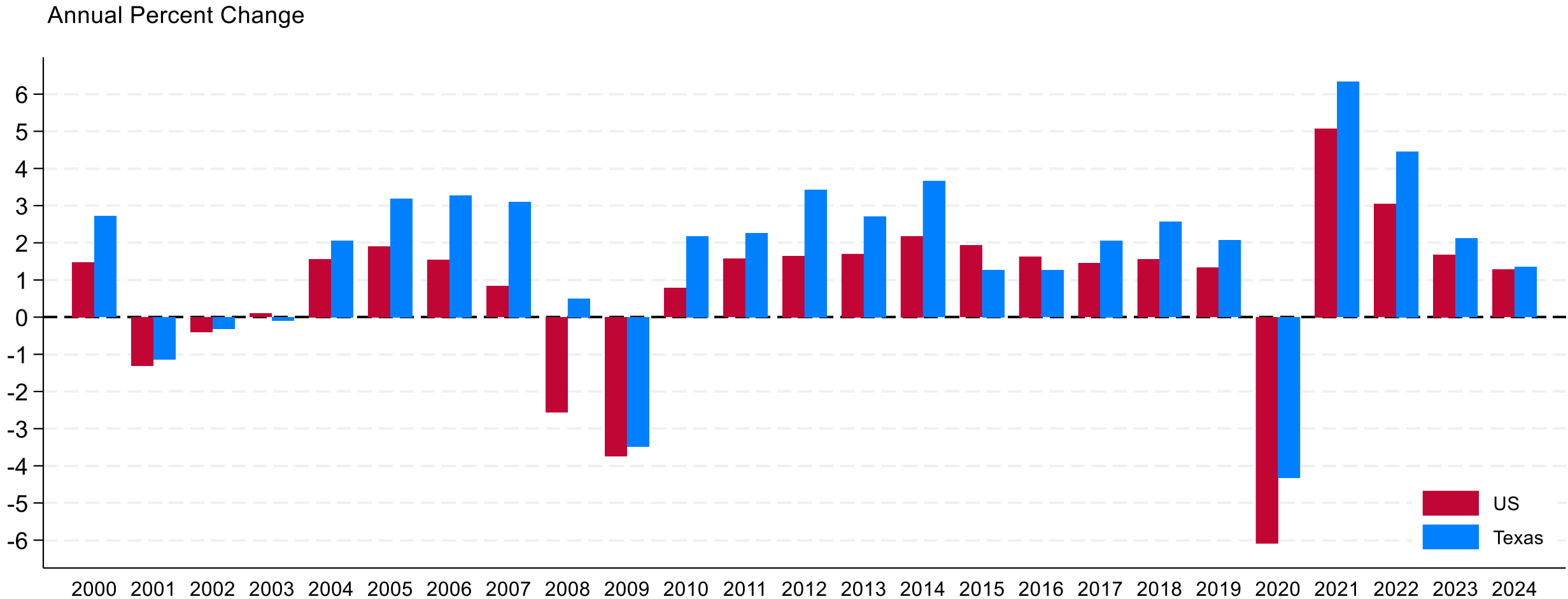
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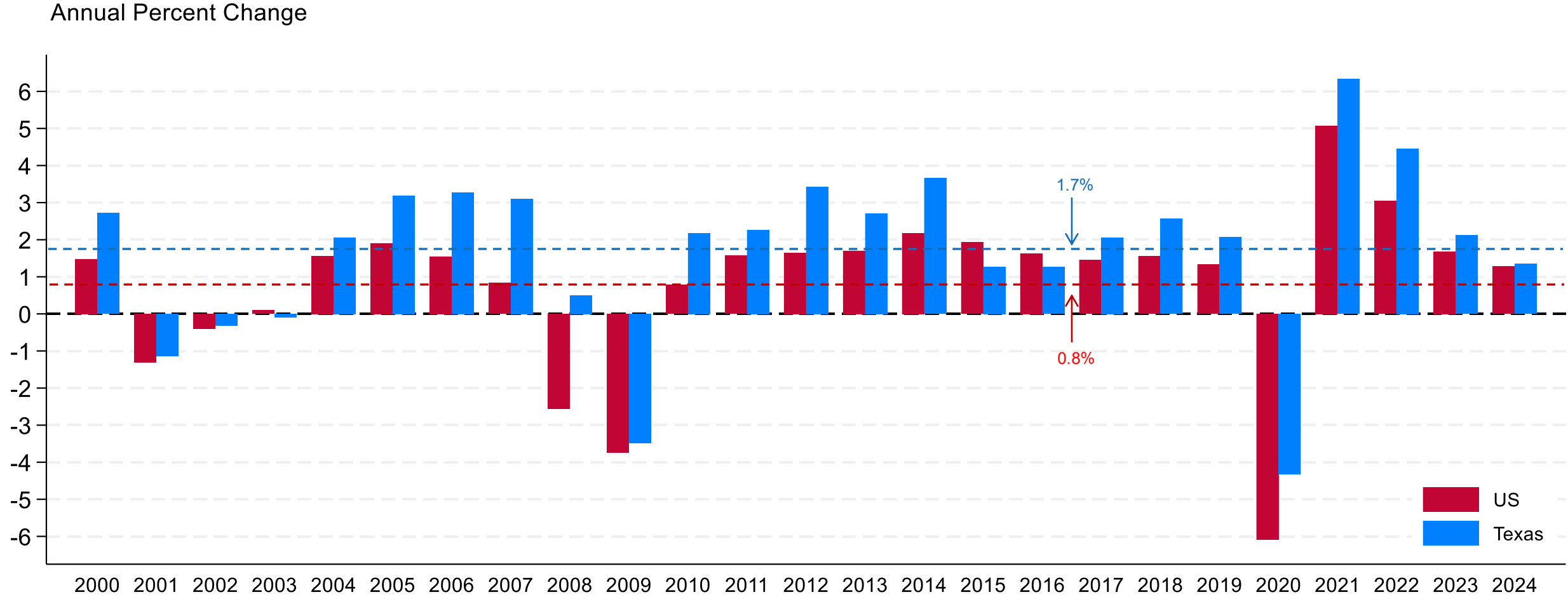
SOURCE: Bureau of Economic Analysis

Texas employment growth generally outstrips national employment growth



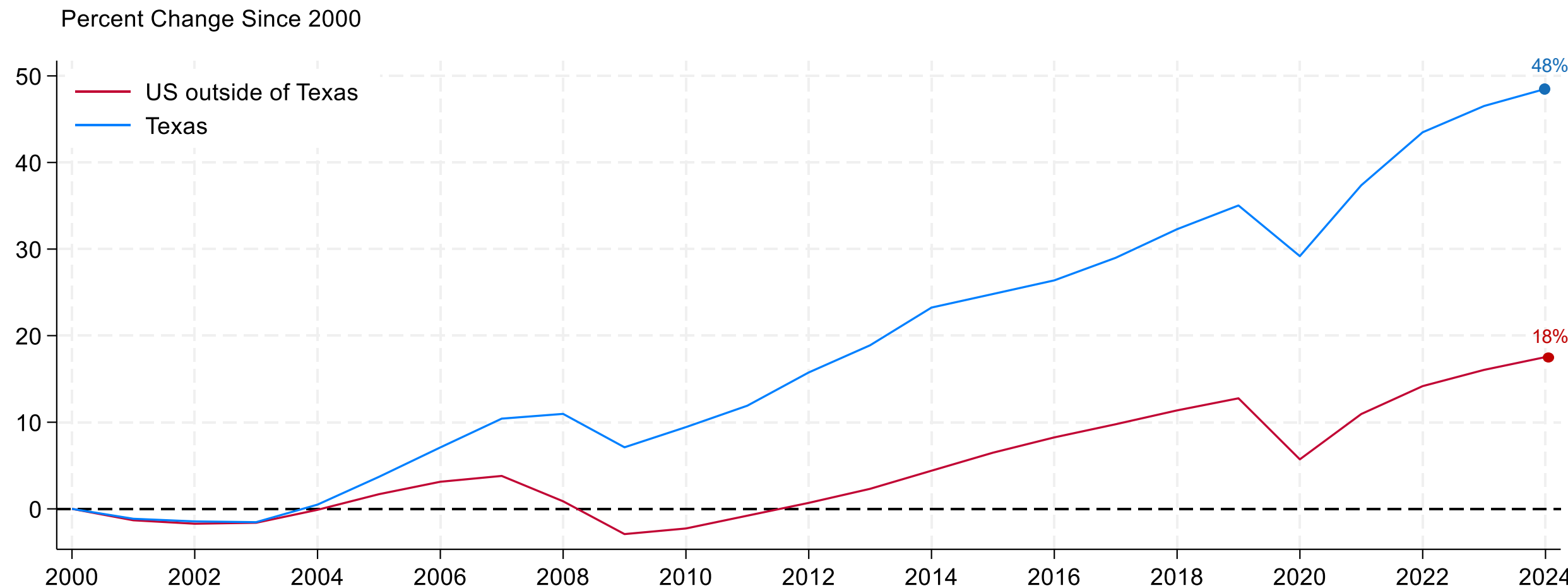
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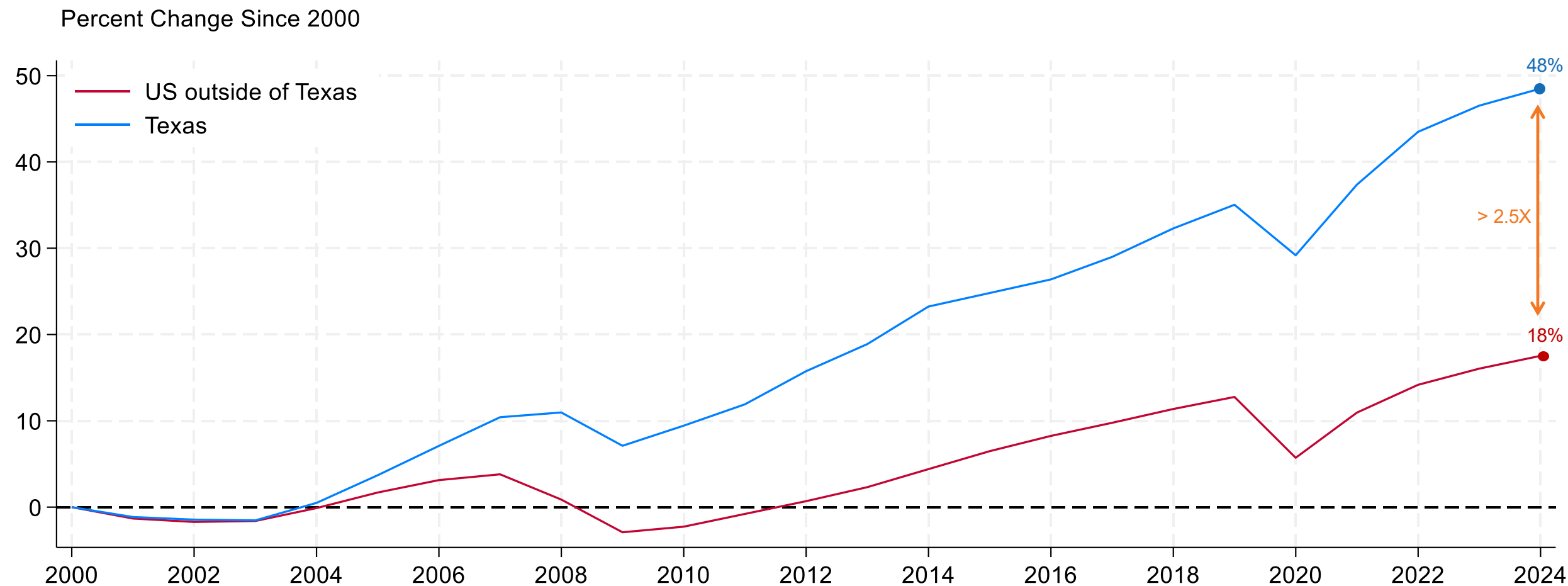
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Relative to the US, employment has grown more than twice as fast in Texas



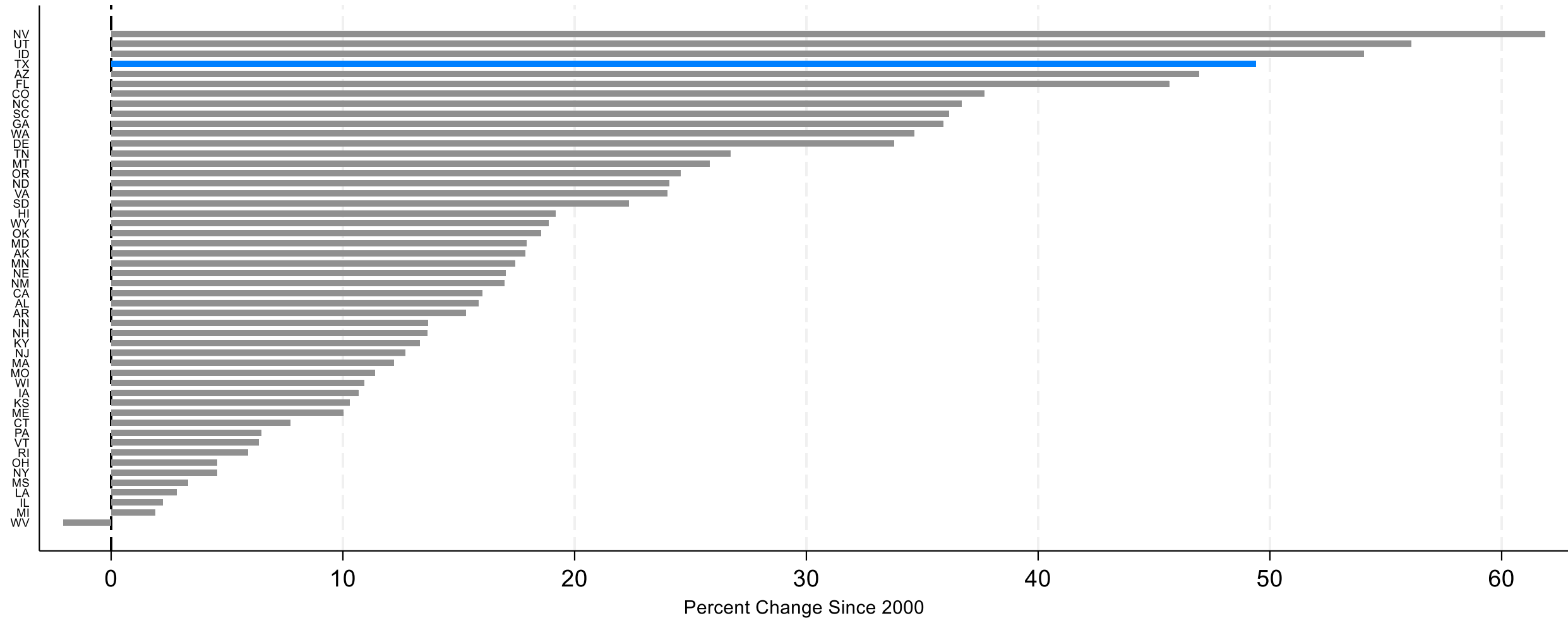
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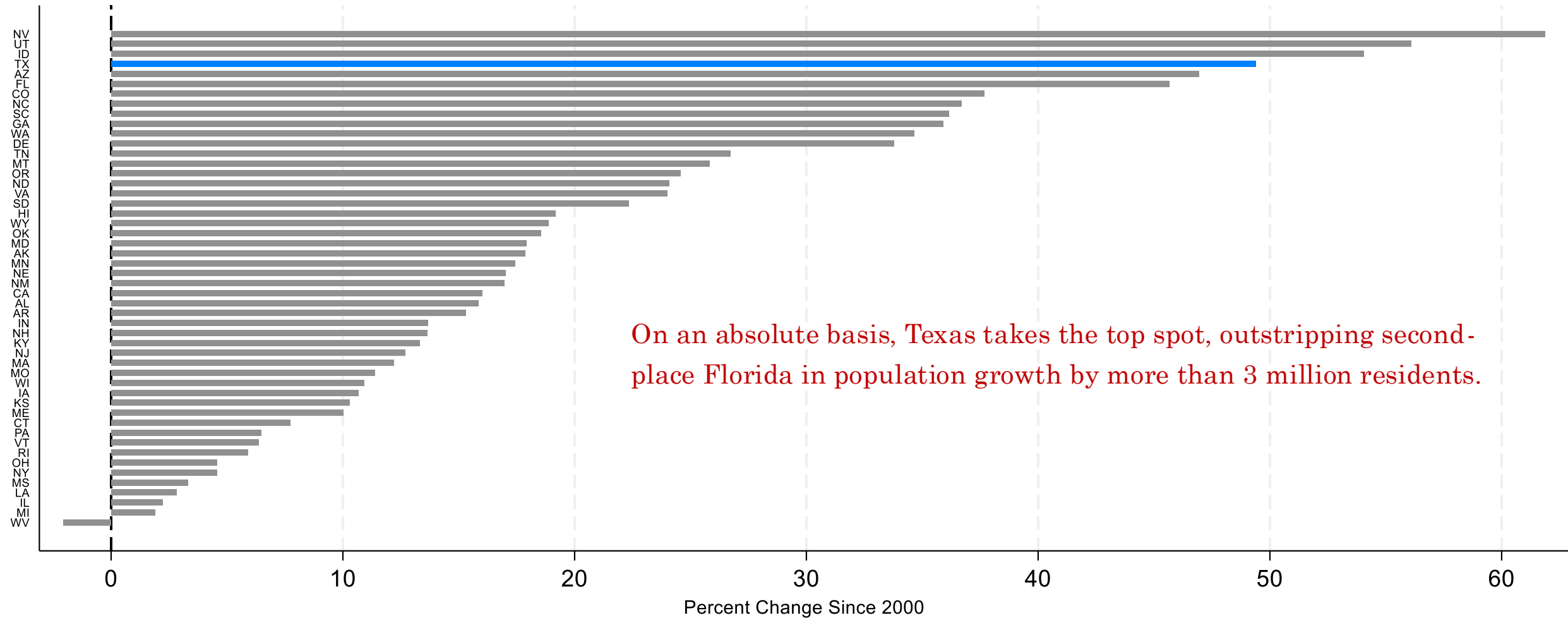
SOURCE: Bureau of Labor Statistics

Growth in Texas driven by state's strong population gains



SOURCE: Bureau of Census

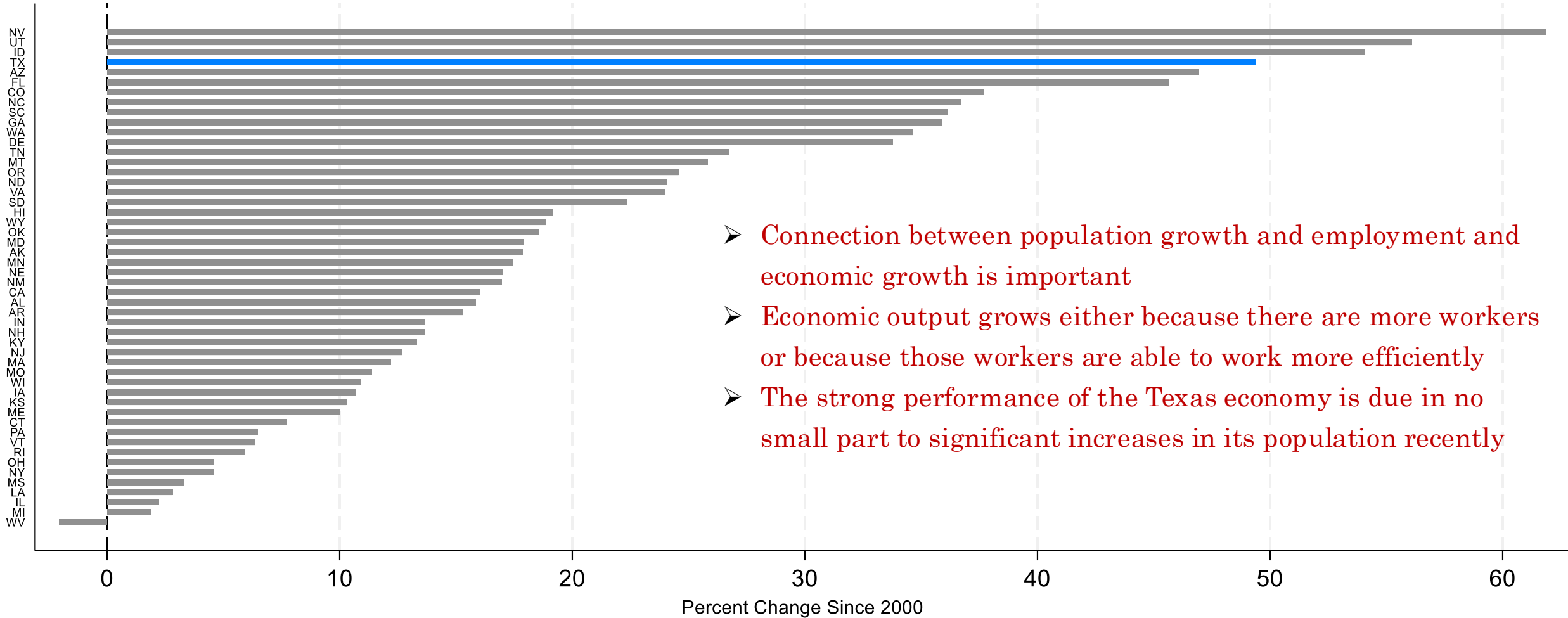
Growth in Texas driven by state's strong population gains



On an absolute basis, Texas takes the top spot, outstripping second-place Florida in population growth by more than 3 million residents.

SOURCE: Bureau of Census

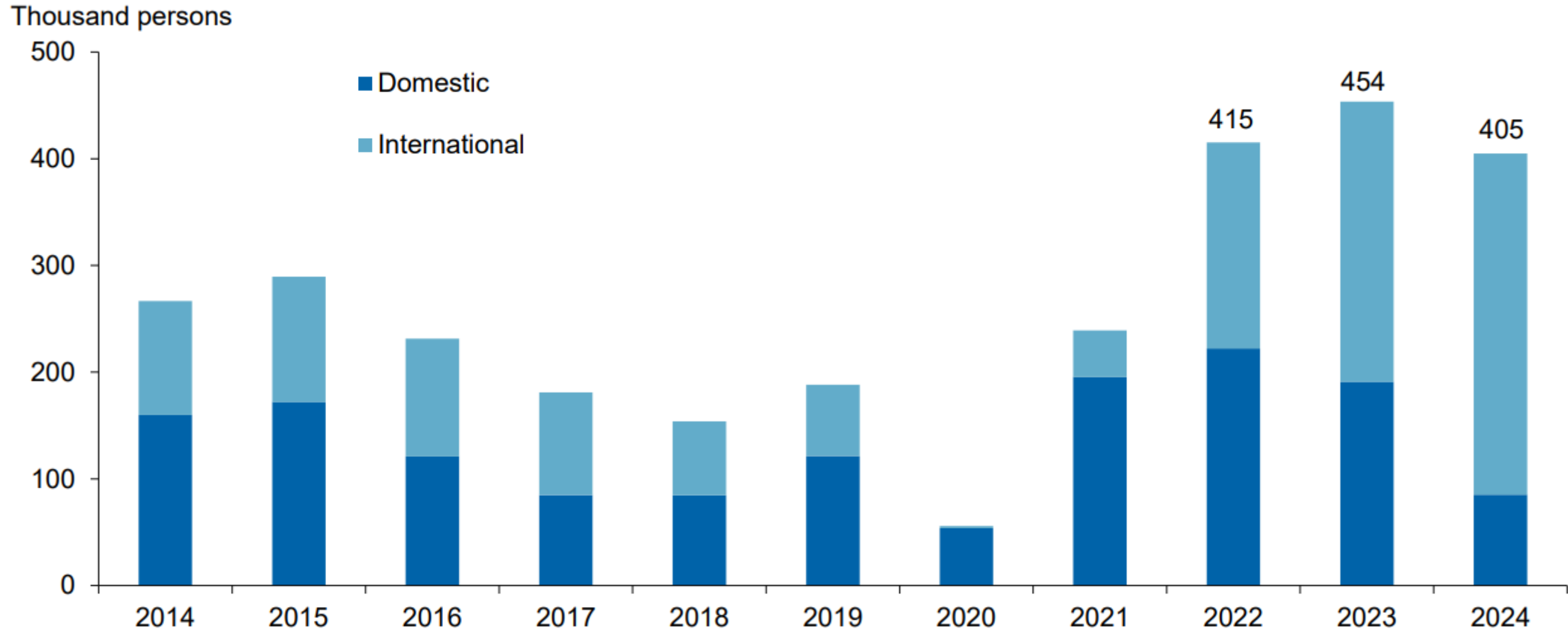
Growth in Texas driven by state's strong population gains



SOURCE: Bureau of Census

- Connection between population growth and employment and economic growth is important
- Economic output grows either because there are more workers or because those workers are able to work more efficiently
- The strong performance of the Texas economy is due in no small part to significant increases in its population recently

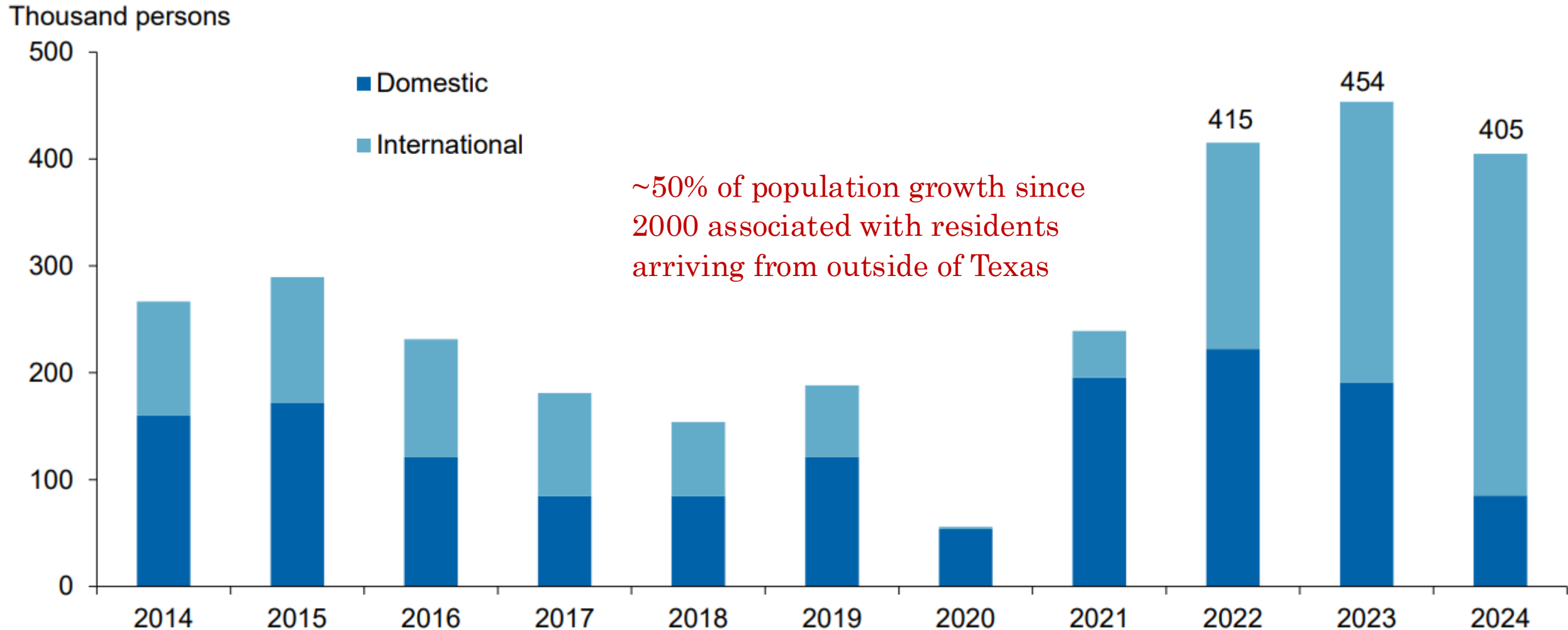
In-migration to Texas has been critical to the state's growth



NOTES: Shown are net domestic and net international migration into Texas annually.

SOURCE: Census Bureau.

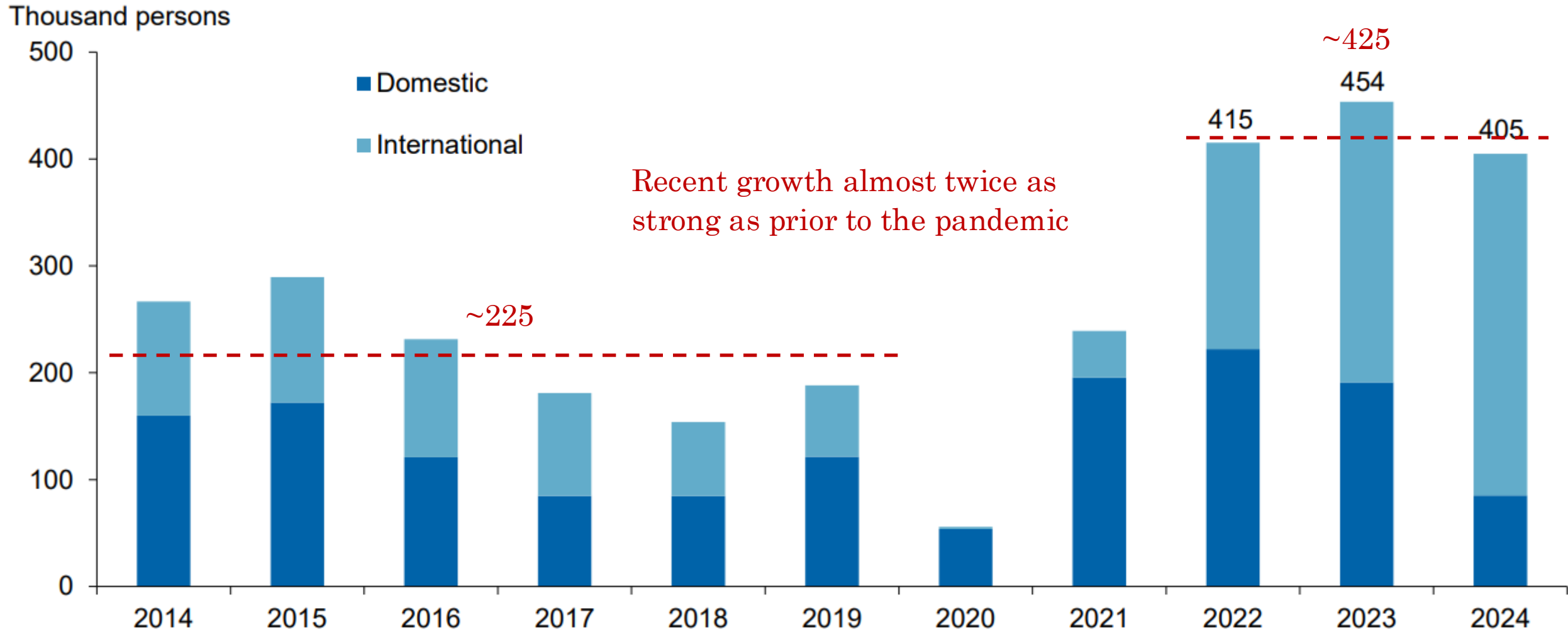
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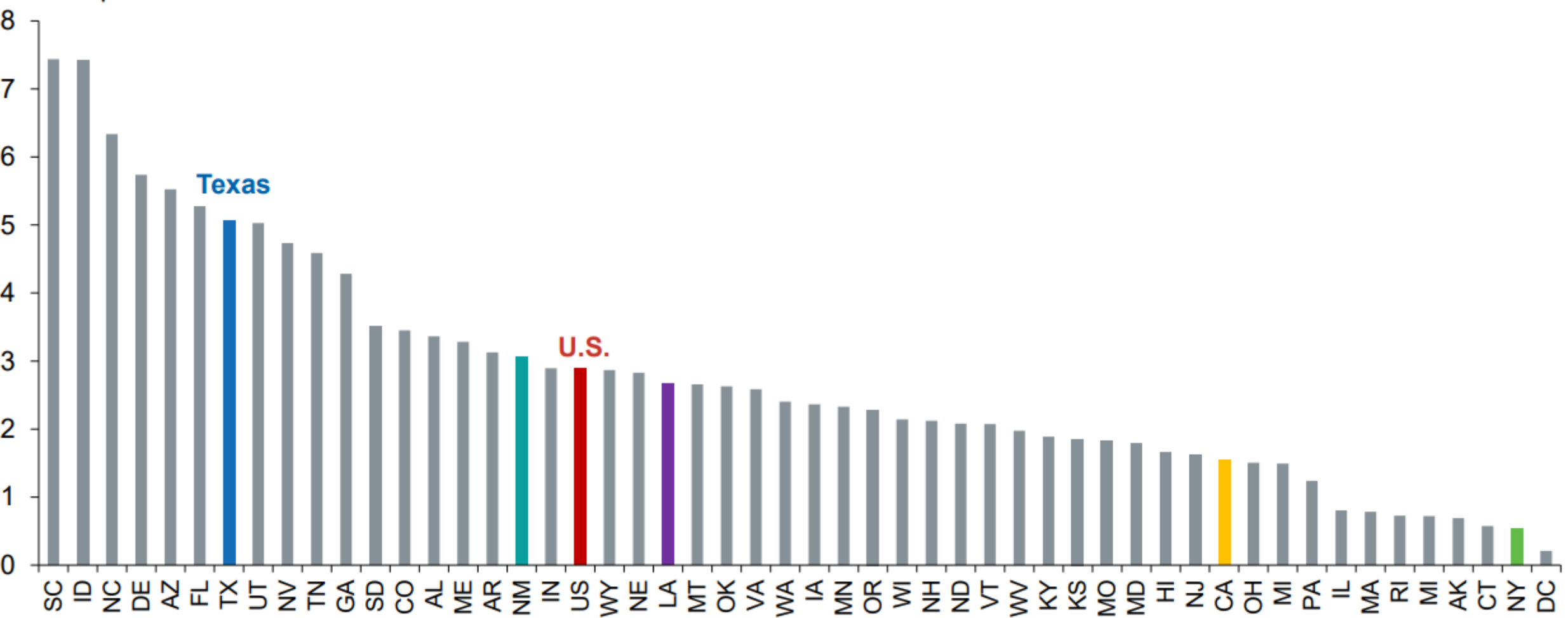


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Despite concerns about affordability, Texas has high per capita construction

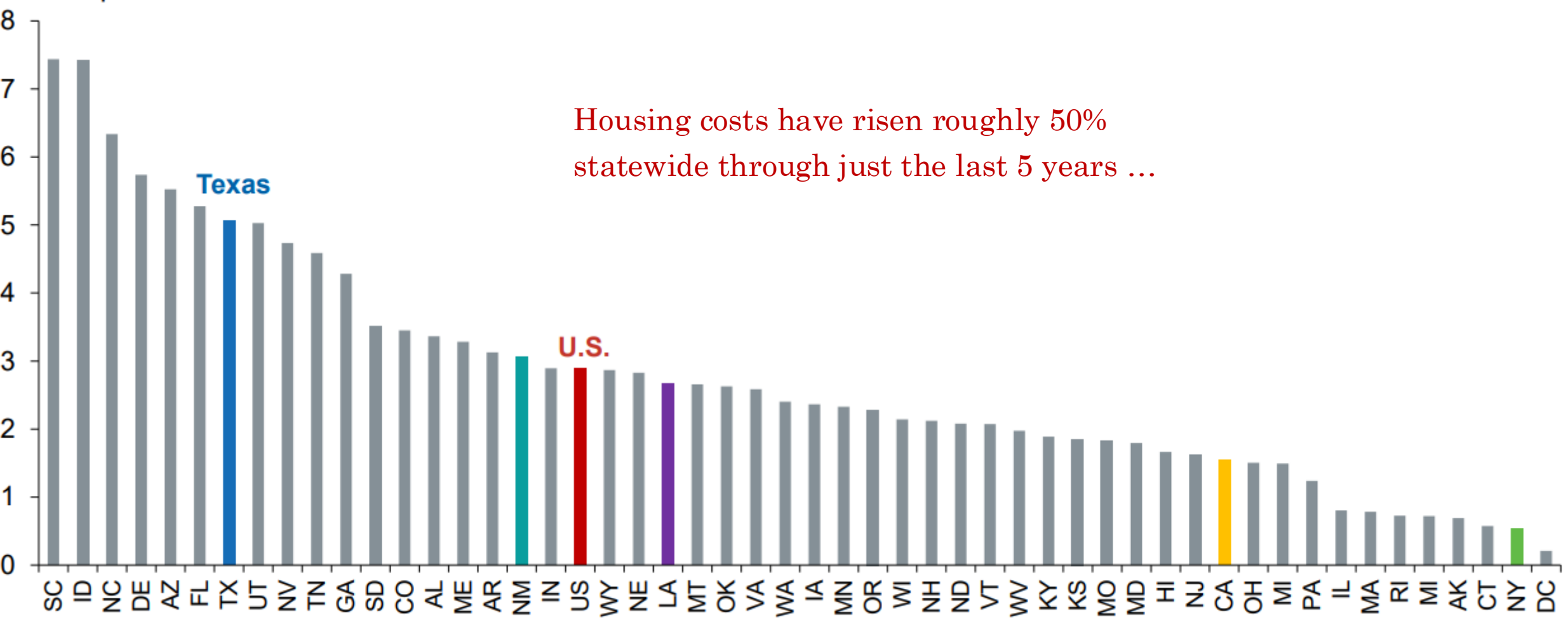
Permits per thousand residents



NOTE: Shown are January through December 2024 single family housing permits per thousand residents.
SOURCE: Census Bureau.

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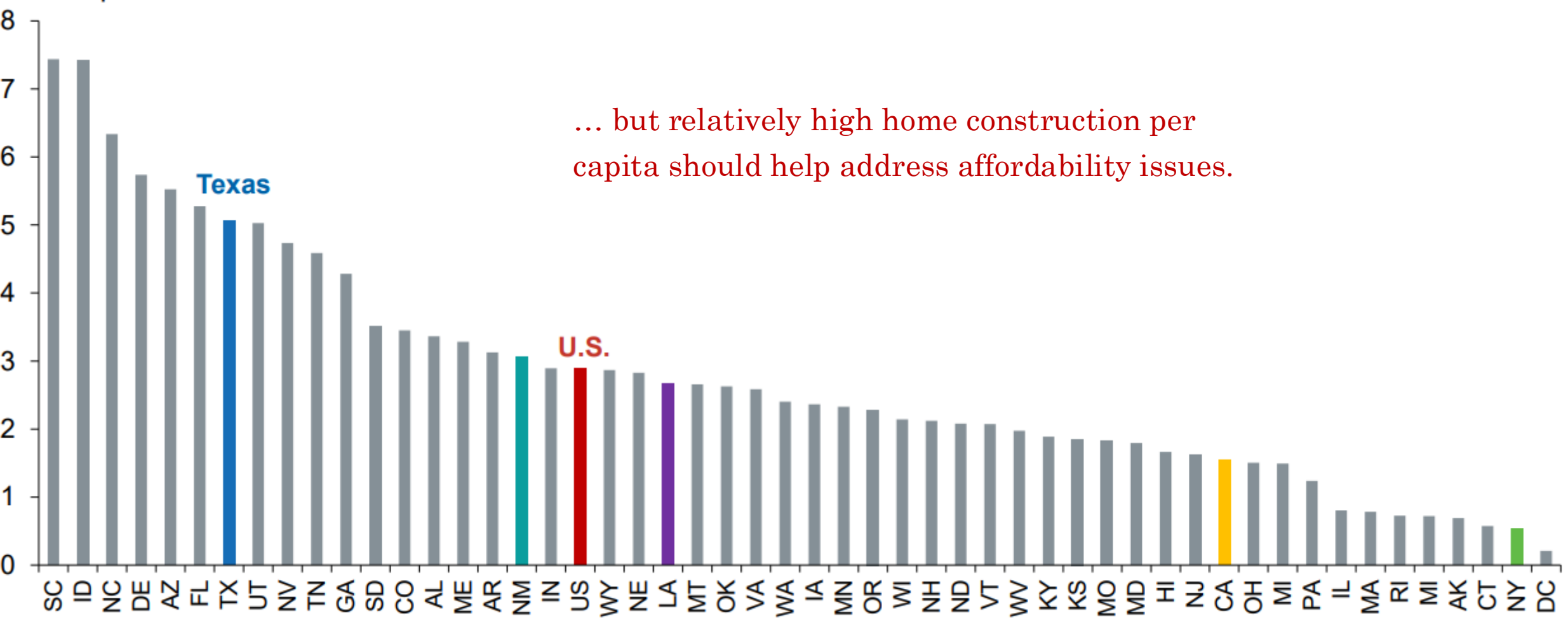
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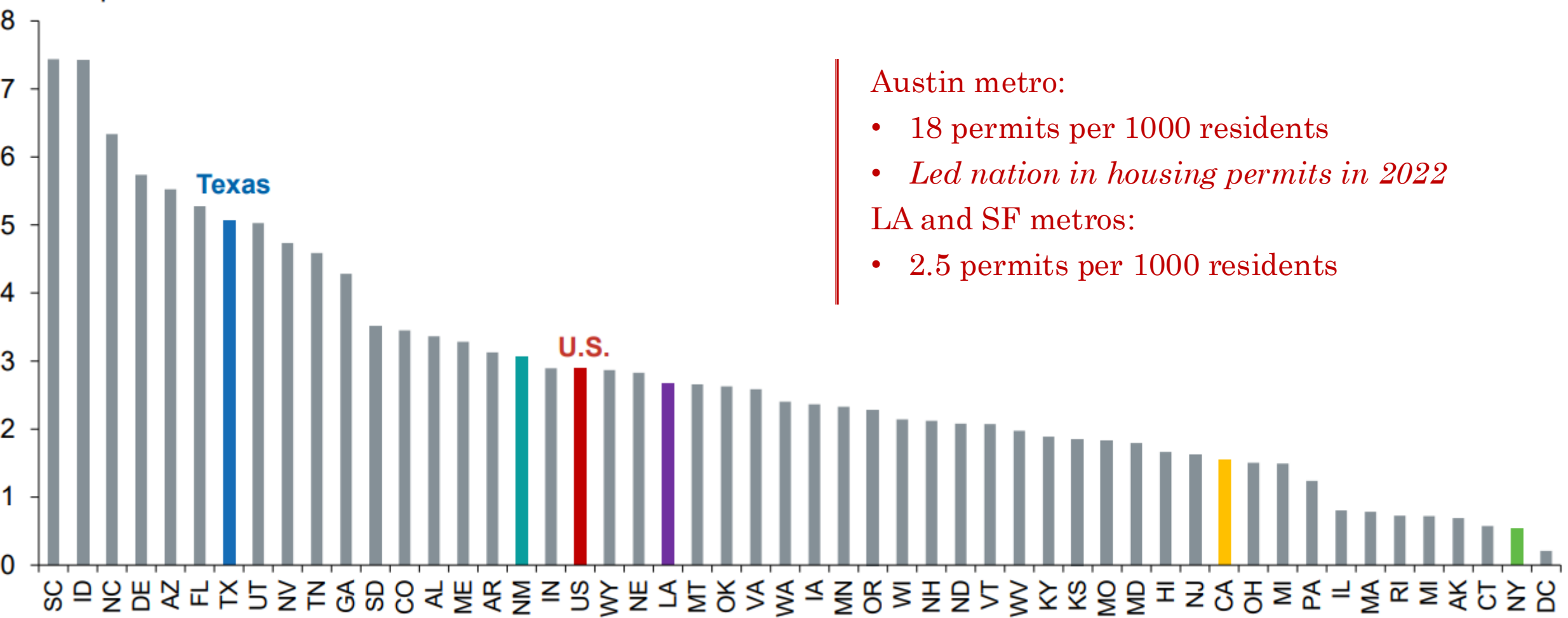


... but relatively high home construction per capita should help address affordability issues.

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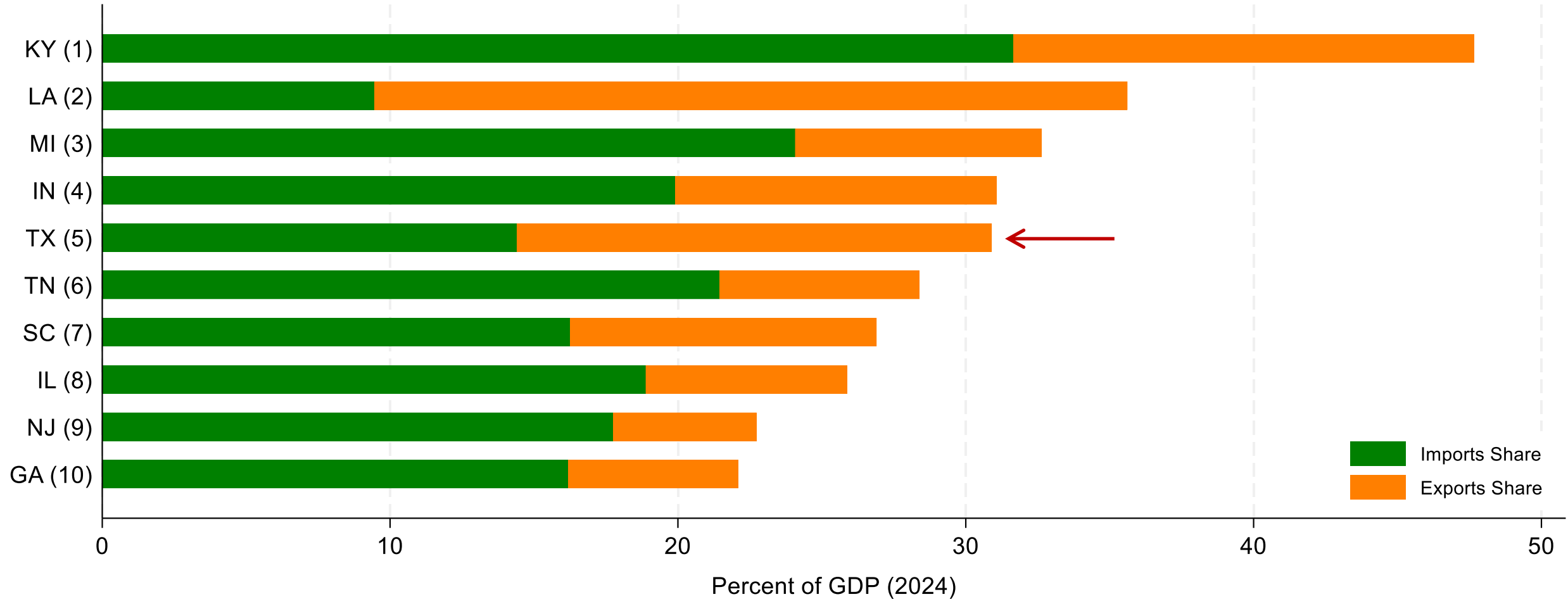
Permits per thousand residents



- Austin metro:
- 18 permits per 1000 residents
 - *Led nation in housing permits in 2022*
- LA and SF metros:
- 2.5 permits per 1000 residents

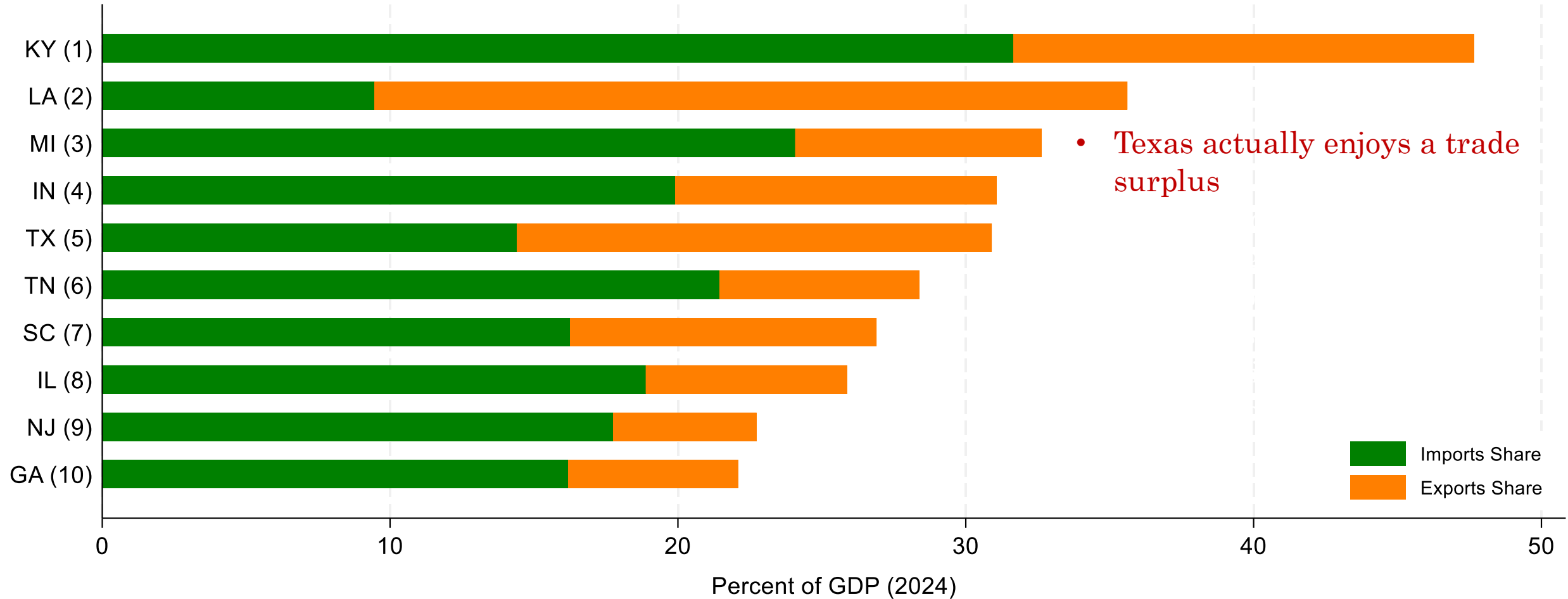
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Texas is among the most trade-intensive states



NOTE: Trade rank among states listed in parentheses.
SOURCES: Census Bureau, Bureau of Economic Analysis

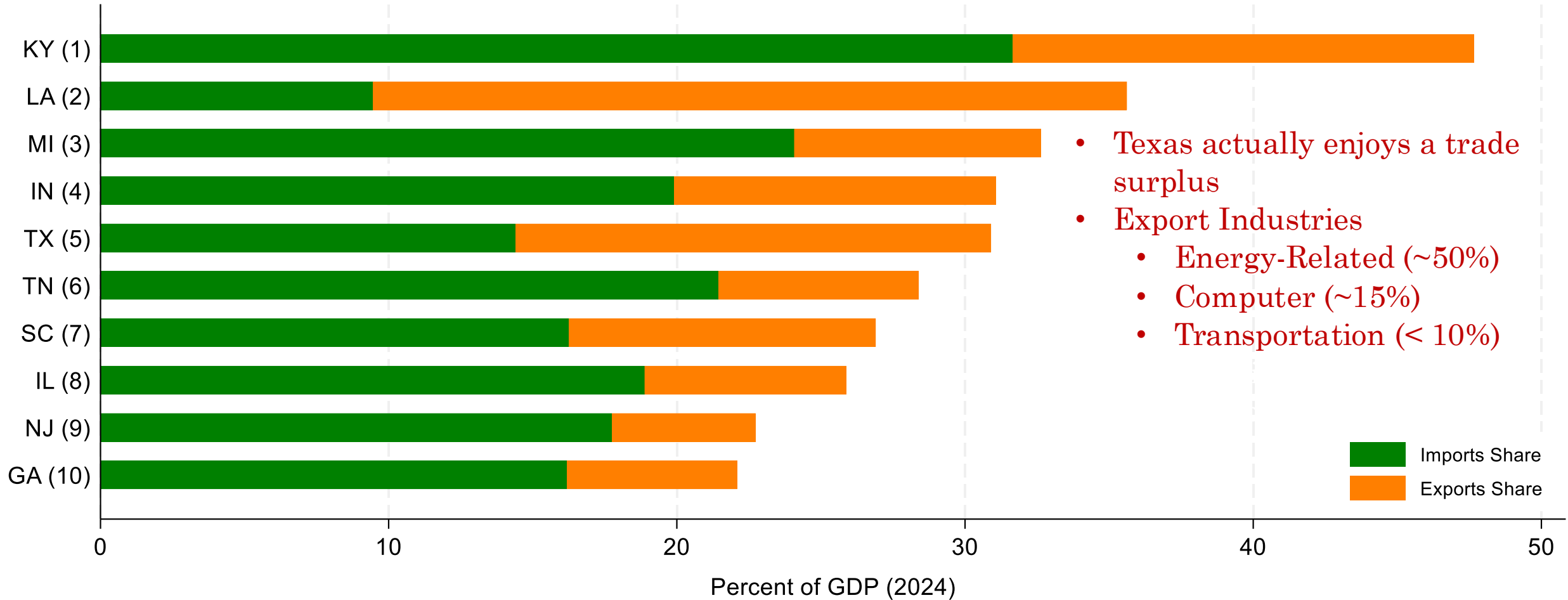
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• Texas actually enjoys a trade surplus

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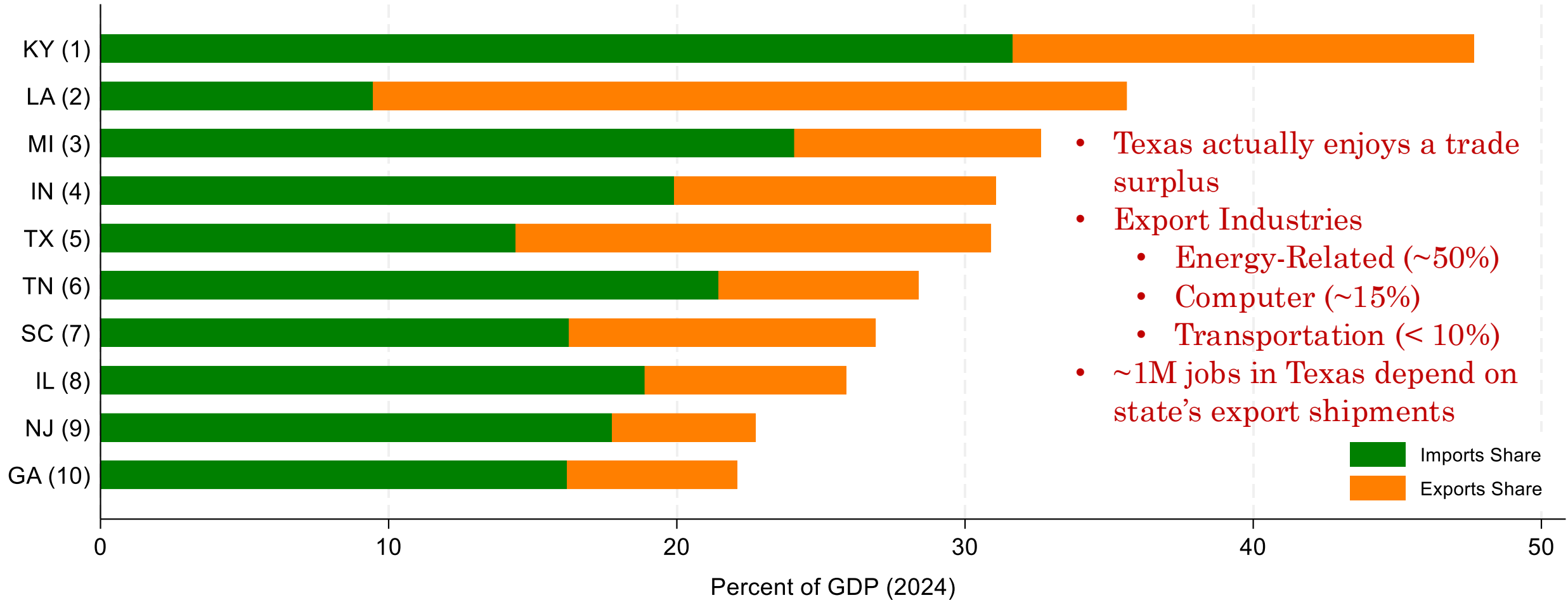
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 - Energy-Related (~50%)
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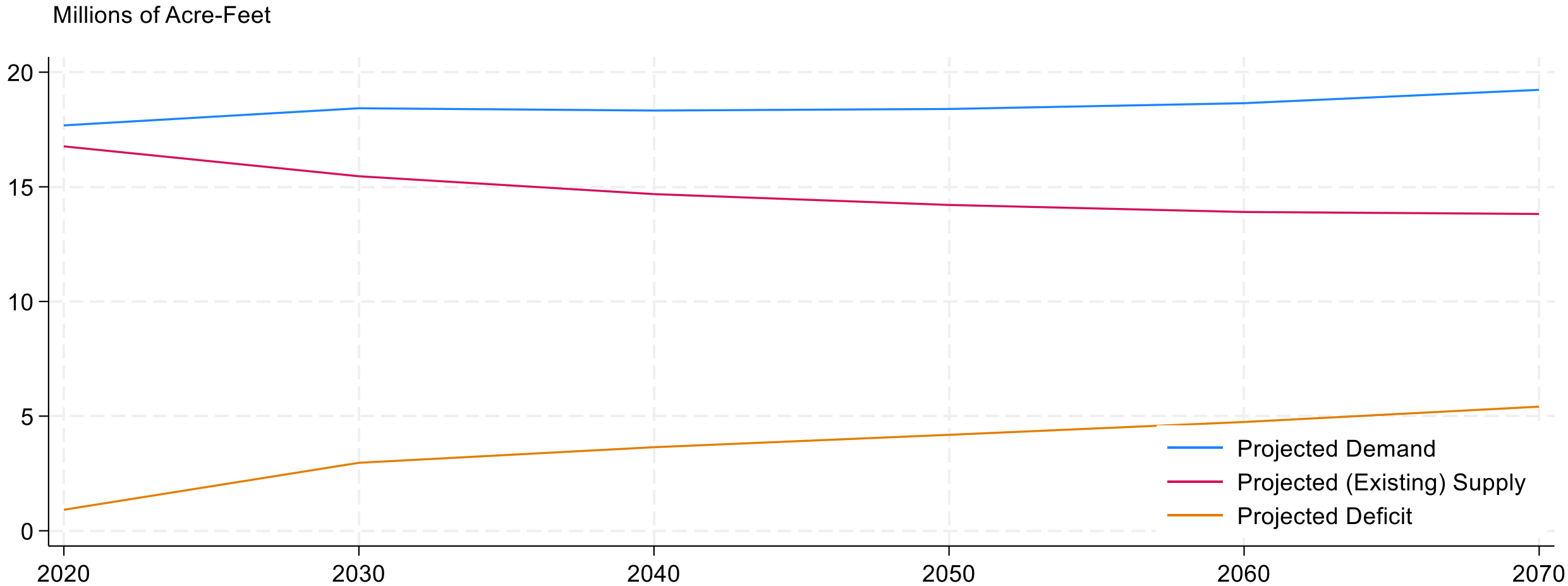
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- ~1M jobs in Texas depend on state's export shipments

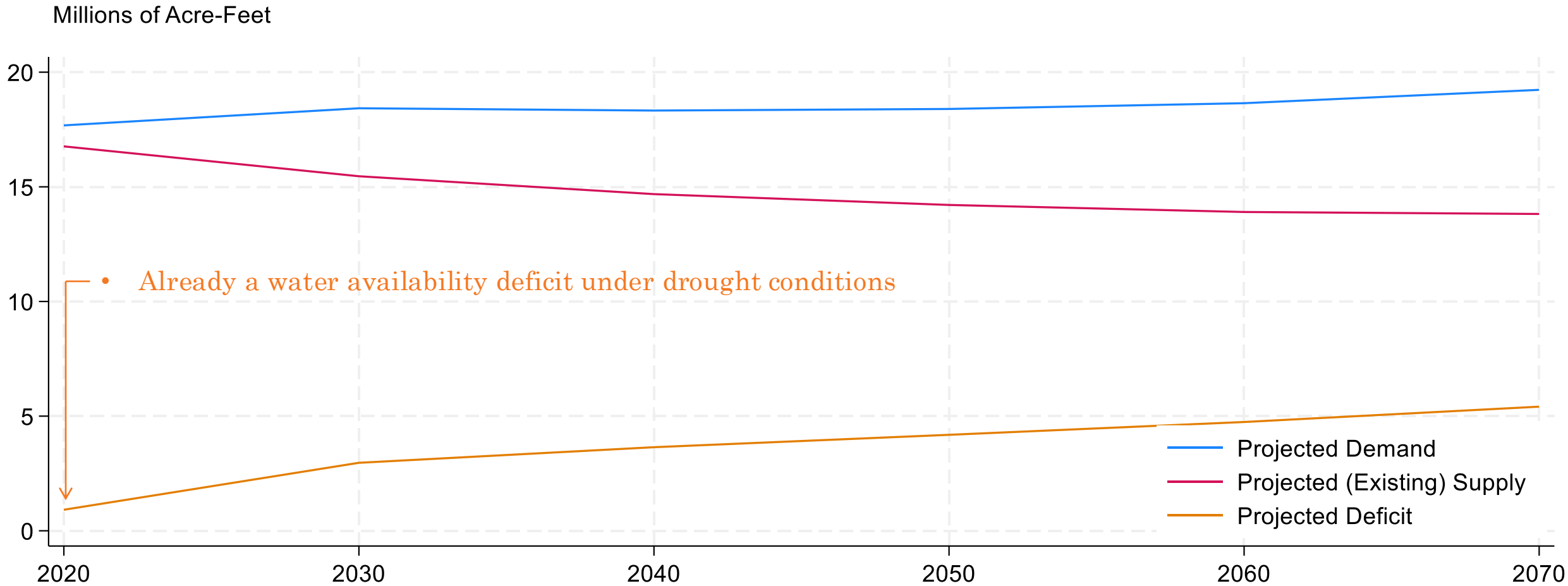
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Demand for water is projected to outstrip the existing sources



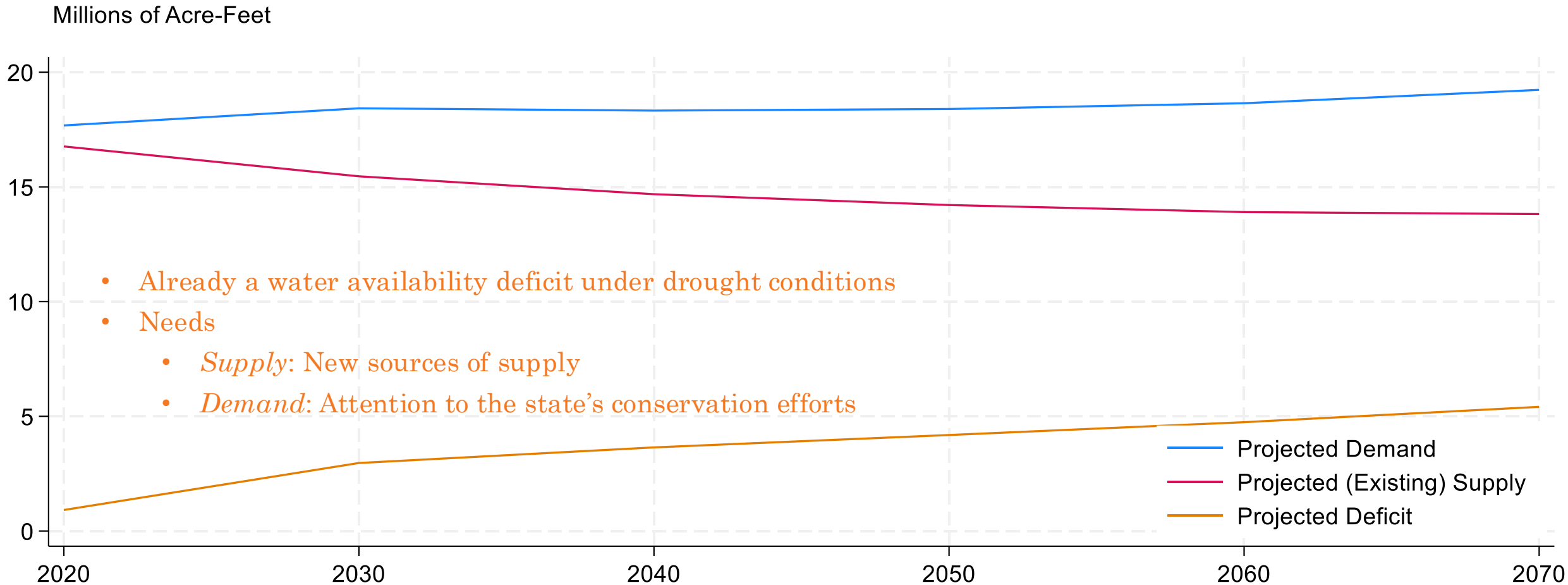
SOURCE: Texas Water Development Board

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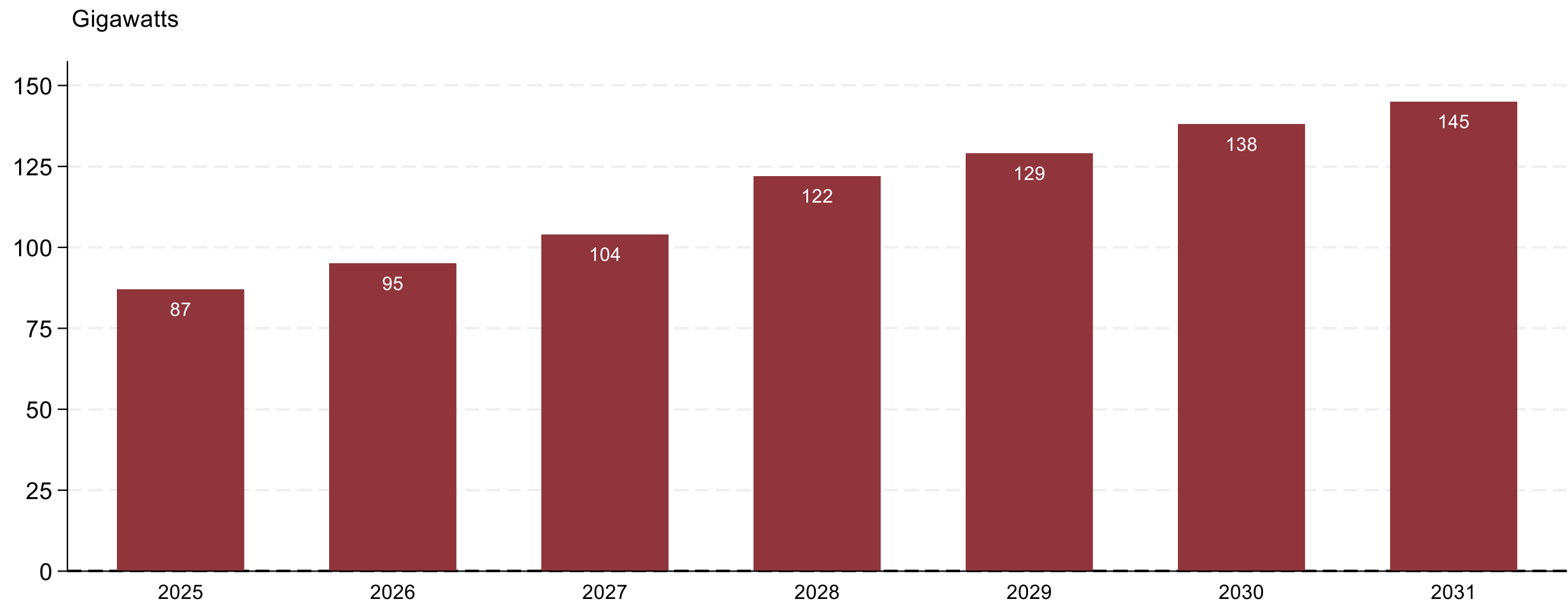
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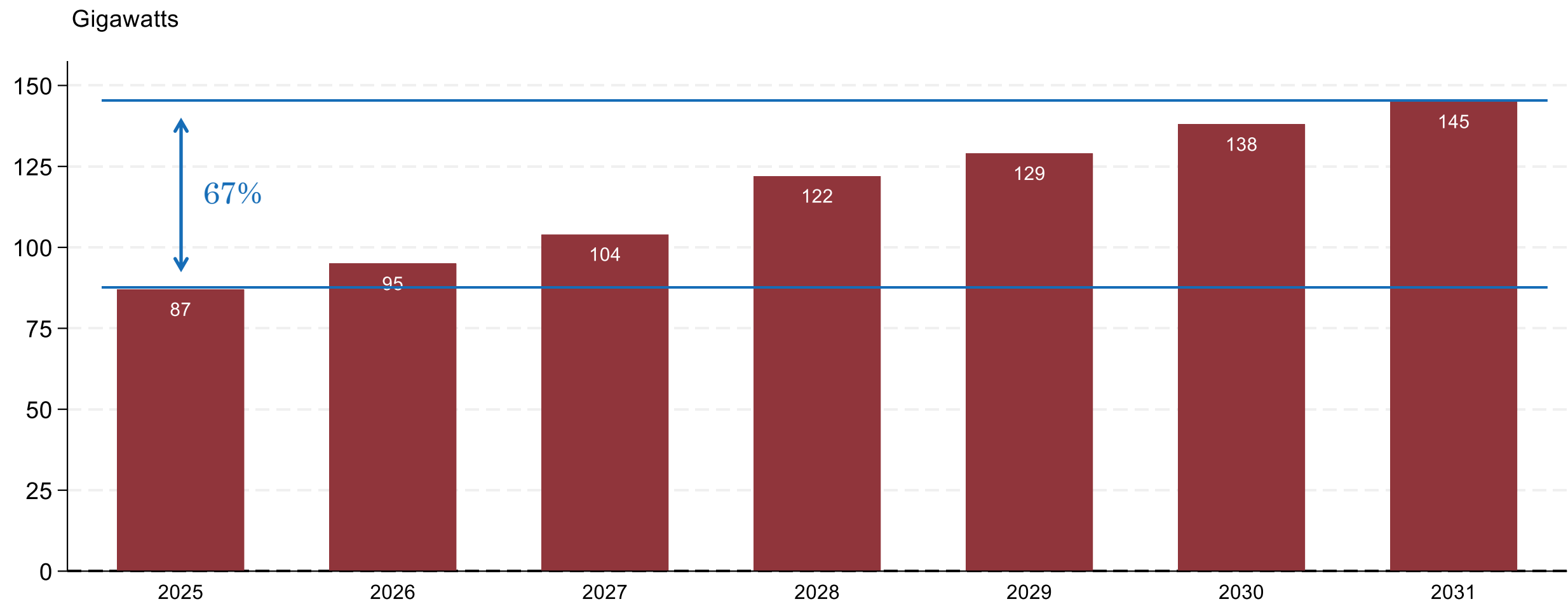
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ERCOT expects peak summer electricity demand to increase >50% by 2030



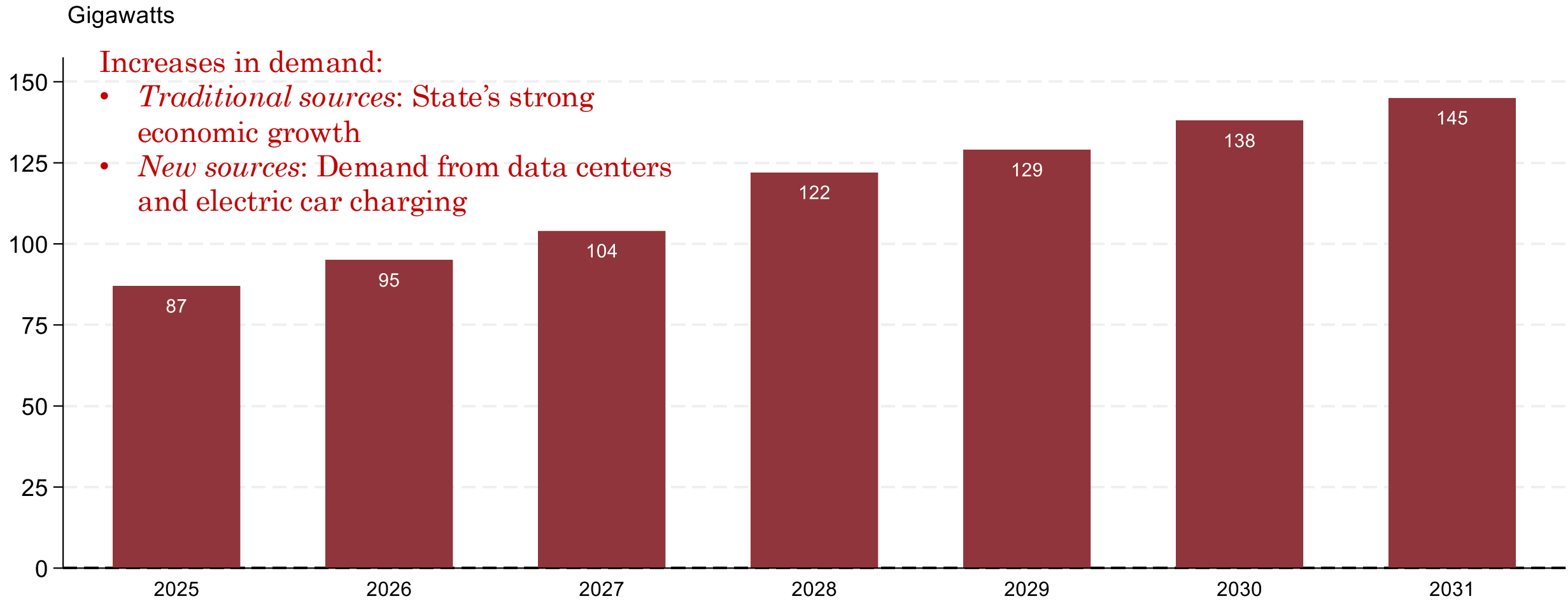
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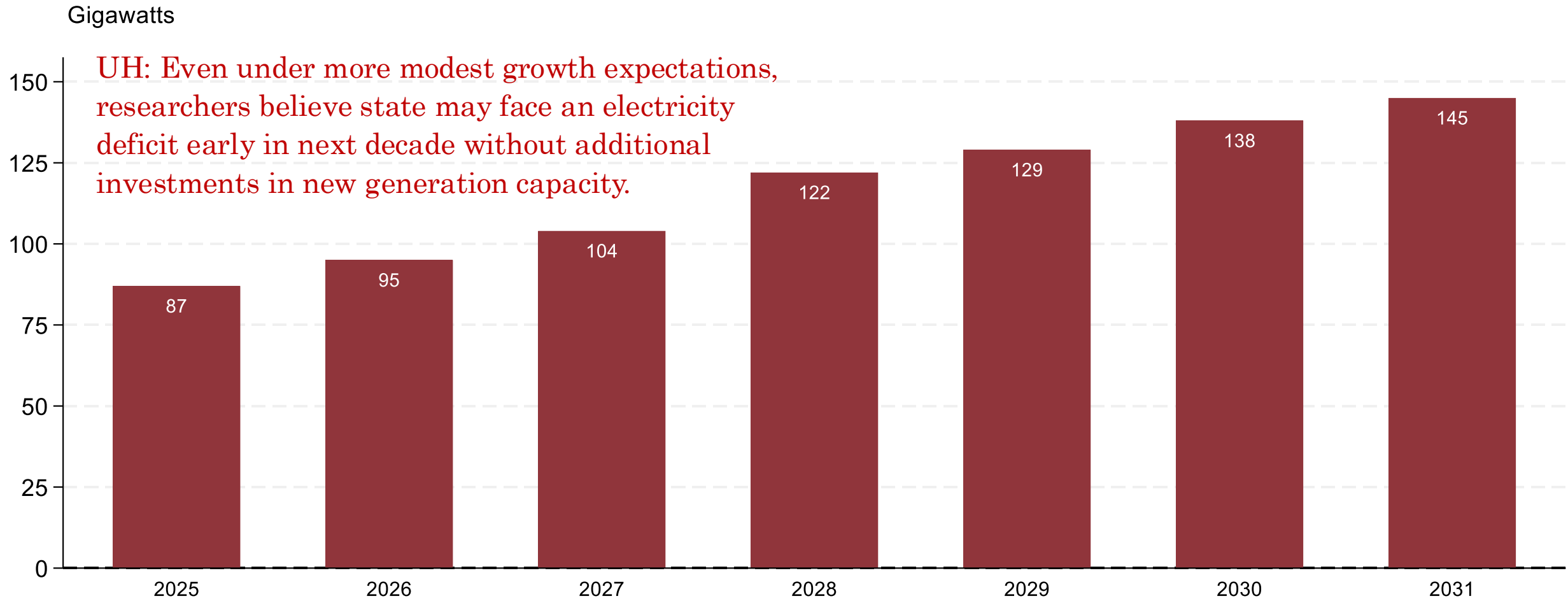
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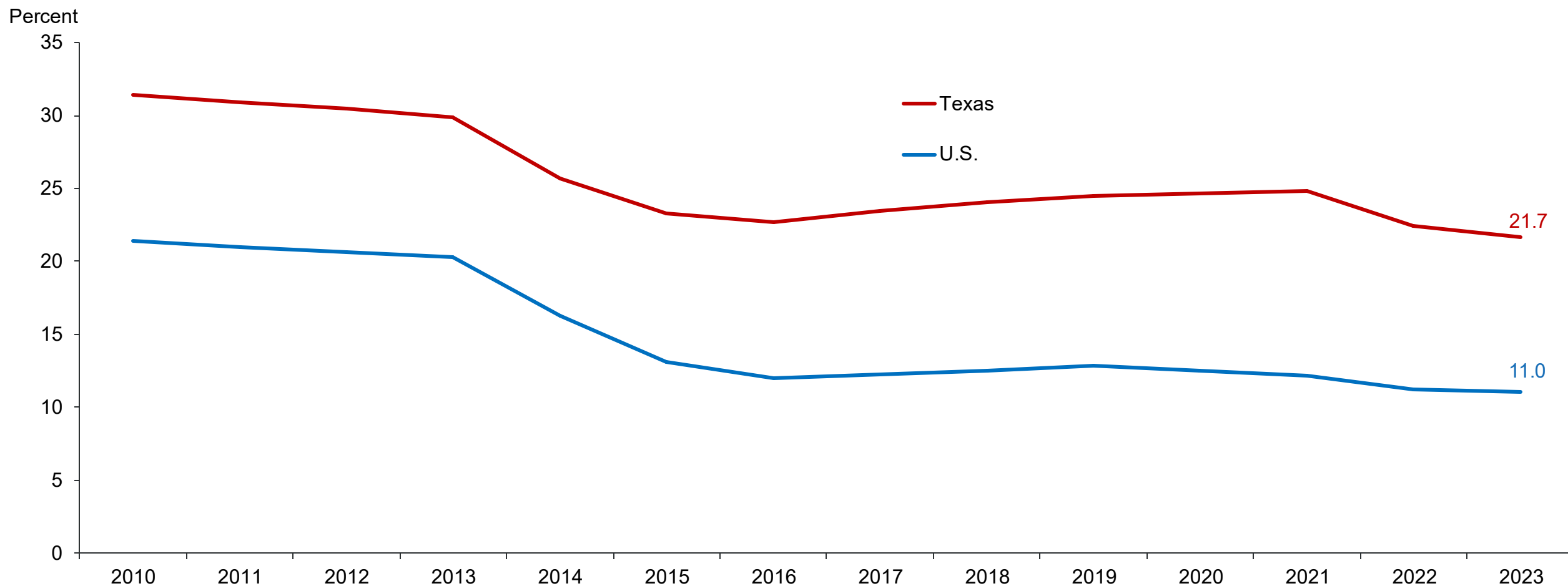
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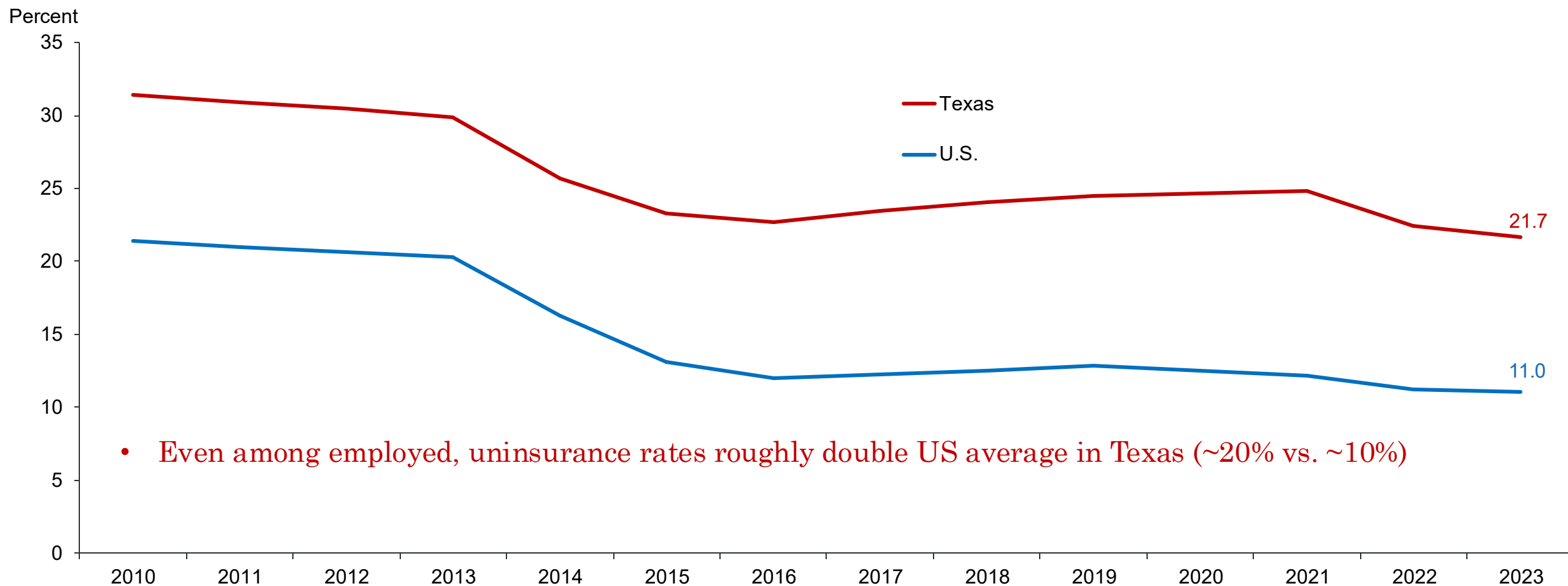
Share of population lacking health insurance is highest in Texas



NOTES: Data from 2010 to 2016 represent ages 18–64, while data from 2017 to 2023 represent ages 19–64. Data from 2020 were unavailable; an average of 2019 and 2021 data are shown.
SOURCE: American Community Survey one-year estimates.

Federal Reserve Bank of Dallas

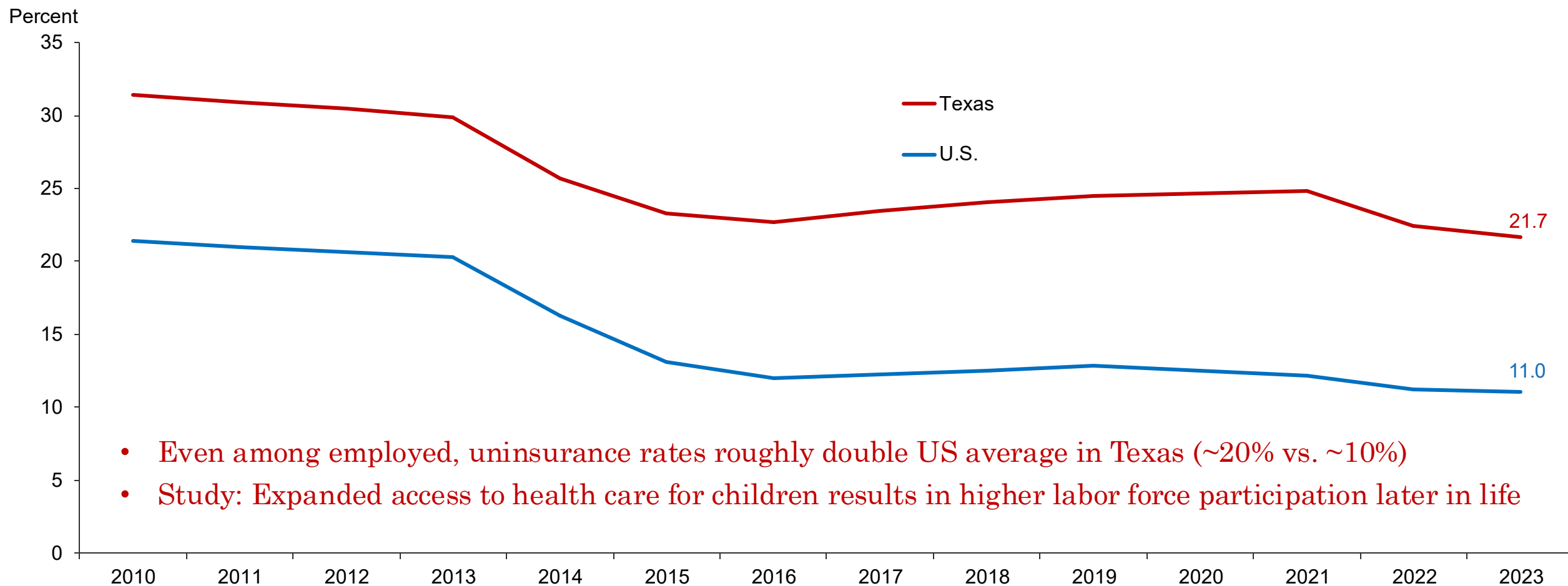
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Texas schools score high on outcomes after adjusting for demographics

National Assessment of Educational Progress

		Rank	
		Unadjusted	Adjusted
4th Grade	Reading	37th	9th
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8th Grade	Reading	44th	10th
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Sources: National Center for Education Statistics and Urban Institute.

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- After demographic adjustments, Texas's schools scored high, ranking in the top 10
- That's despite per-pupil finding for public schools that puts the state in the bottom 10

Sources: National Center for Education Statistics and Urban Institute.

If your plan is for one year, plant rice. If your plan is for ten years, plant trees. If your plan is for one hundred years, educate children.

— Confucious

Artificial Intelligence

A world without work?

Digital technologies change rapidly ... As a result, millions of people are being left behind. Their incomes and jobs are being destroyed, leaving them worse off ...

Source: Brynjolfsson, E. and A. McAfee (2012). Race against the machine. Lexington: Digital Frontier Press.

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— Erik Brynjolfsson and Andrew McAfee (2012)

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A world without work?

In the years ahead, more sophisticated software technologies are going to bring civilization ever closer to a near-workerless world ... forcing millions onto the unemployment roles.

— Jeremy Rifkin (1995)

Source: Rifkin, Jeremy (1995). The end of work. New York: Putnam Book.

A world without work?

... a study by the International Metalworkers Federation in Geneva forecast[s] that within thirty years, as little as 2 percent of the world's current labor force “will be needed to produce all the good necessary for total demand.”

— Jeremy Rifkin (1995)

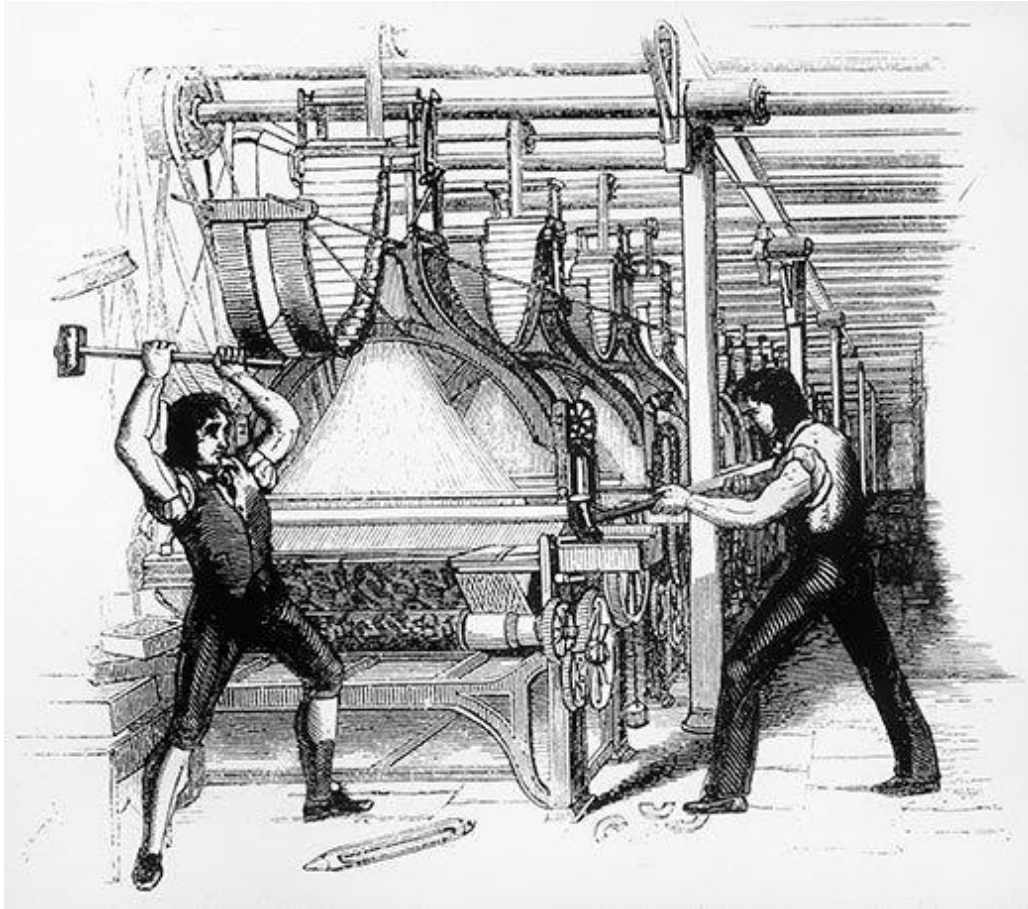
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A world without work?

Consider thou what the invention could do to my poor subjects. It would assuredly bring them to ruin by depriving them of employment, thus making them beggars.

— Queen Elizabeth I (1589)

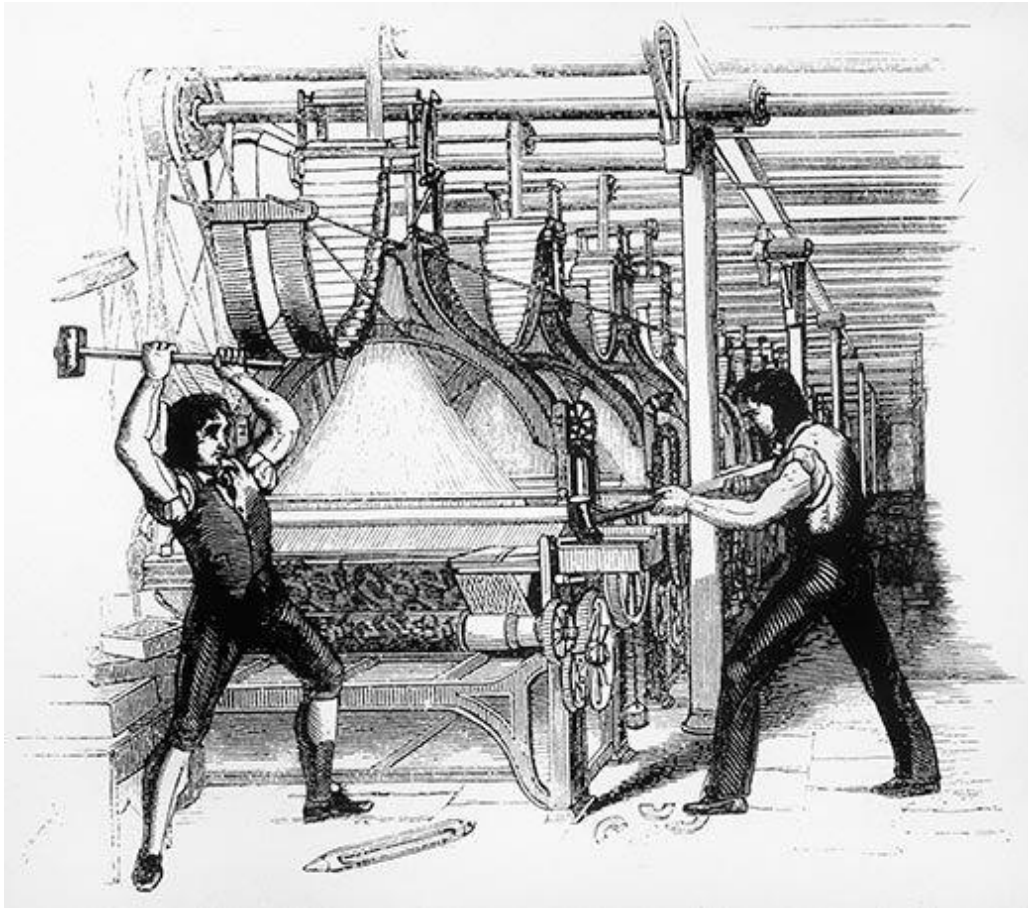
The Luddites



Source: <http://www.history.com/news/ask-history/who-were-the-luddites>

- The Luddites were British weavers and textile workers who objected to the increased use of automated looms and knitting frames

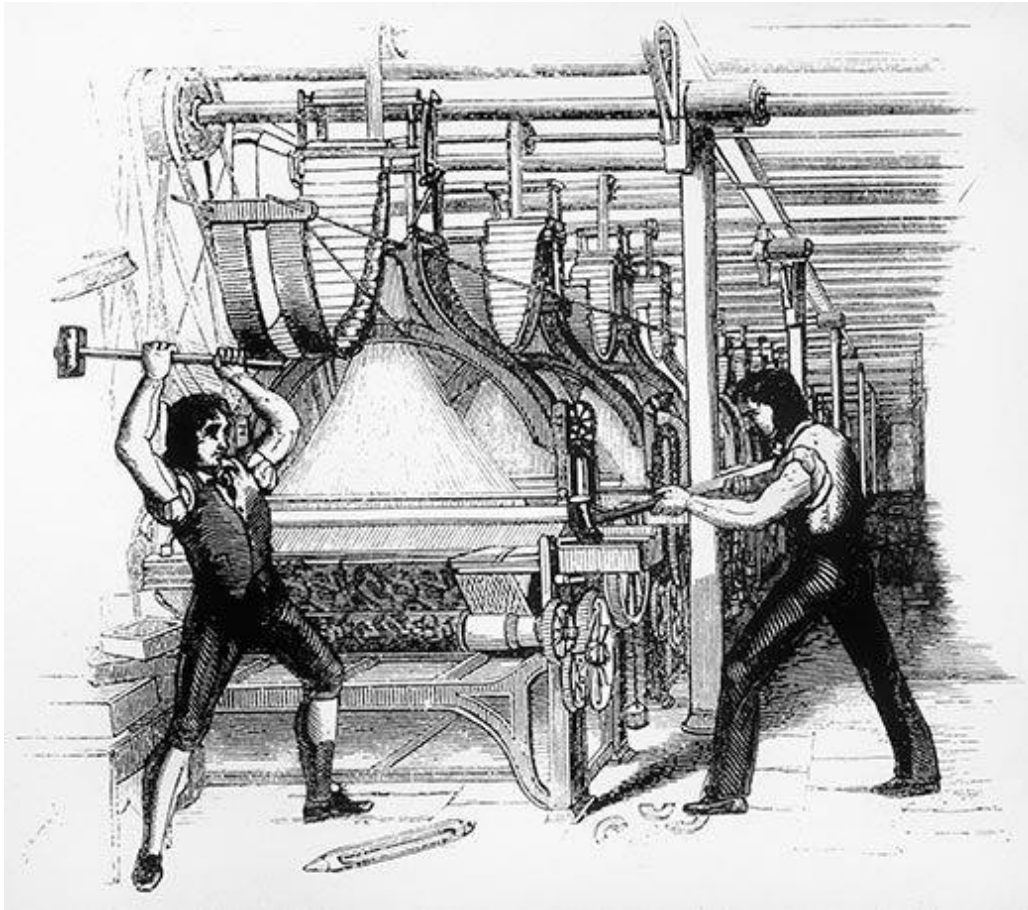
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- Most were trained artisans; they feared that unskilled machine operators were robbing them of their livelihood
- When appeals for government aid and assistance were ignored, some began breaking into factories and smashing textile machines

The Luddites

- The first power loom (c. 1784) was one of the transformative technologies of the Industrial Revolution, automating weaving tasks and allowing a weaver to produce twice as much cloth per hour. Subsequent improvements allowed for twenty times as much cloth per hour
 - Other innovations in the textile industry: flying shuttle, spinning jenny, and spinning mule

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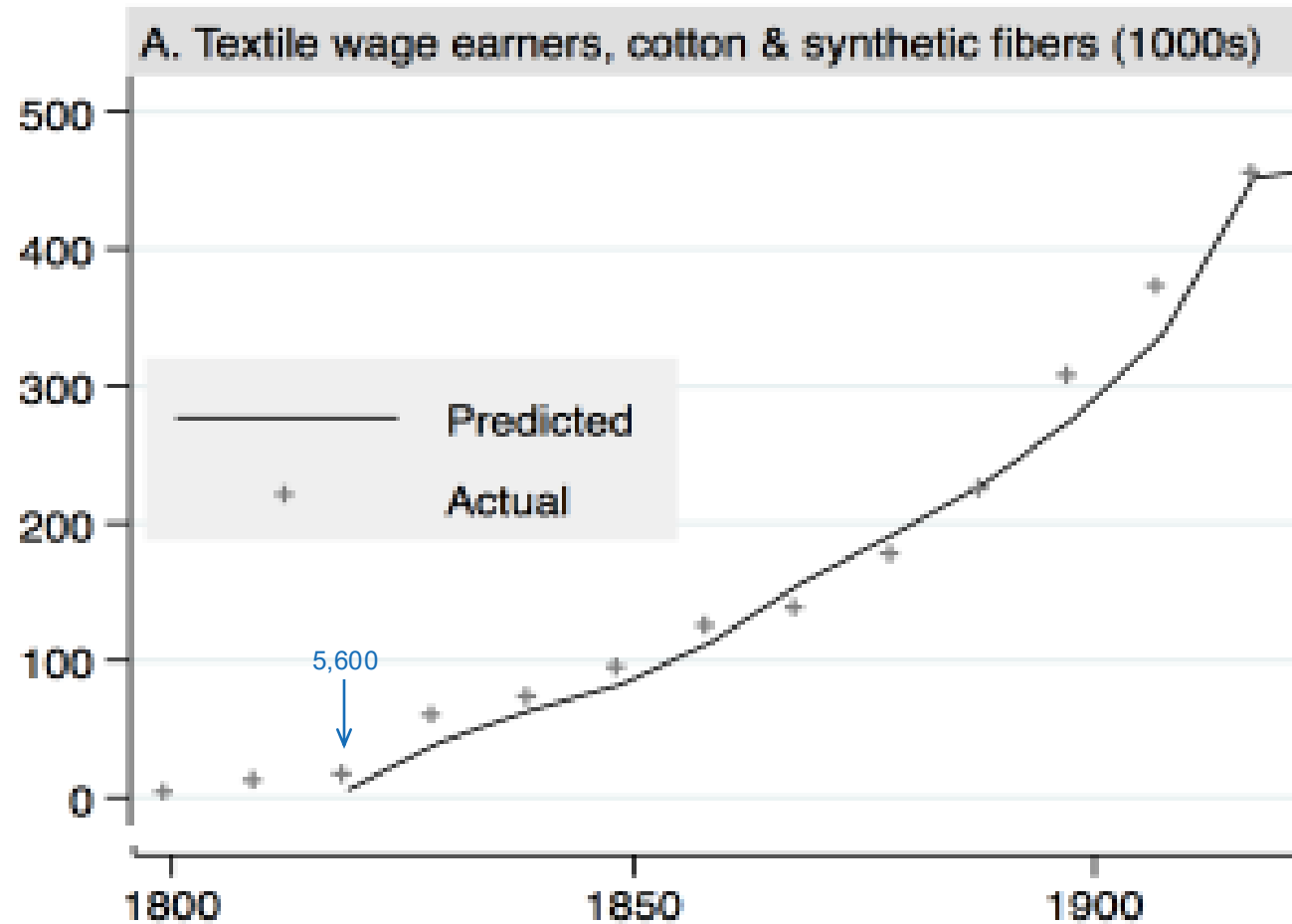
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- Luddite protests led the British Government make “machine breaking” a capital crime with the Frame Breaking Act (1812) and the Malicious Damage Act (1861)

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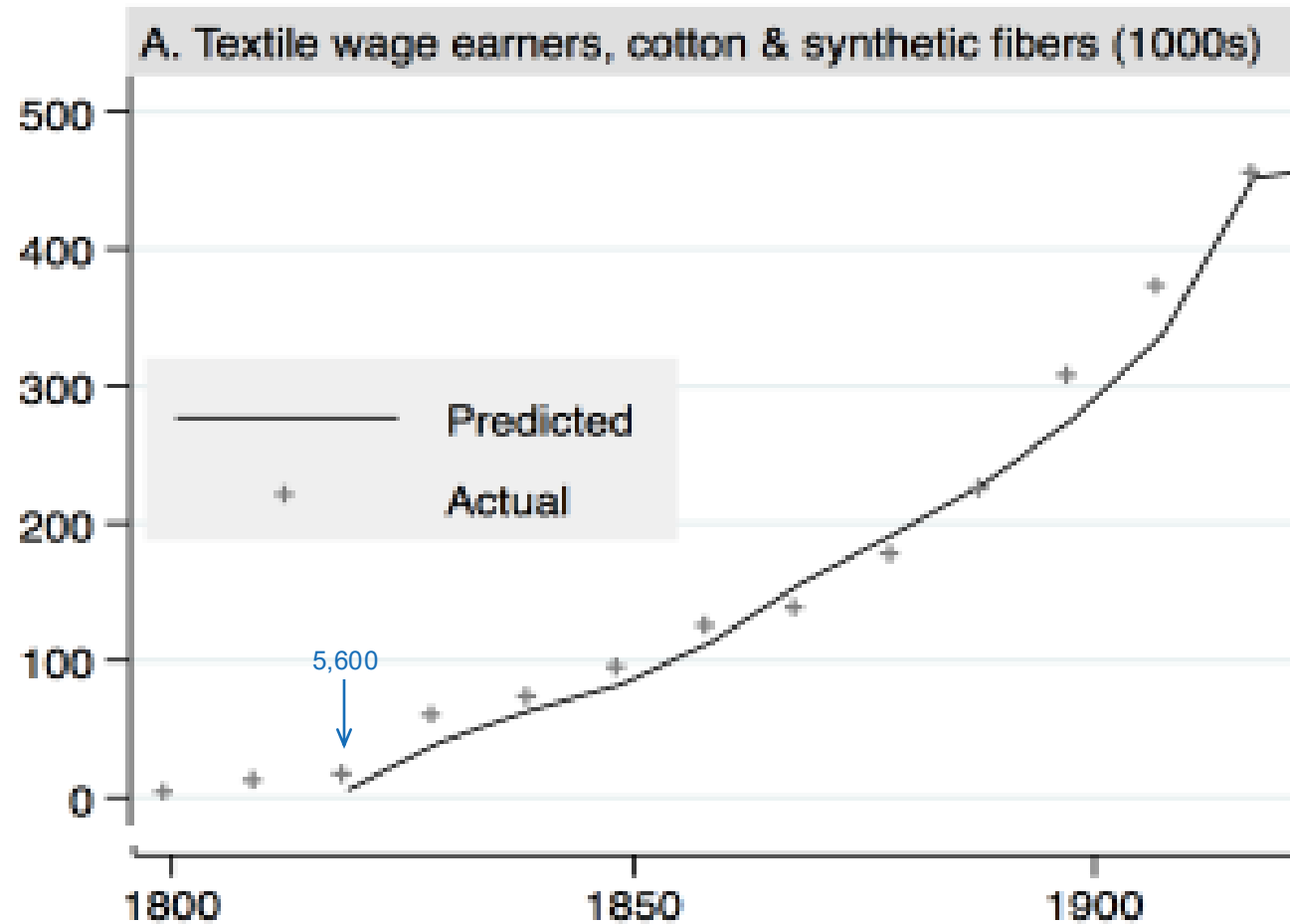
Mass Unemployment?



- Did these developments depress industry employment as the Luddites had feared?

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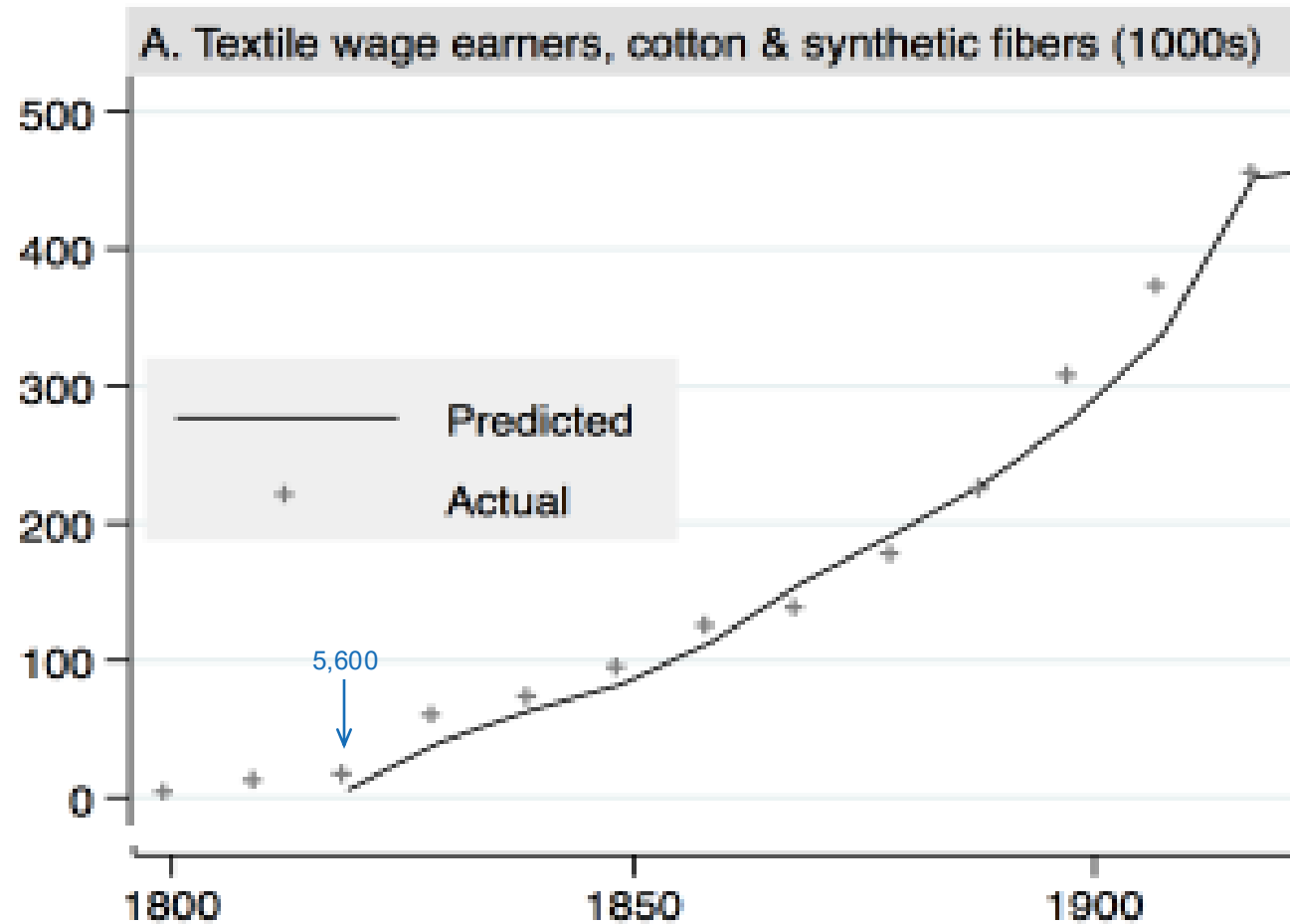
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 - No.
- In fact, employment in the industry rose almost 100-fold over the course of nearly the next century.

Is AI starting to hit the labour market?

Total number of workers in particular US occupations and sectors (May 2023 = 100)



*Respective wider sectors = Computer & data services; Publishing, advertising & entertainment

Source: FT analysis of the US Current Population Survey, Brookings Institution and OpenAI

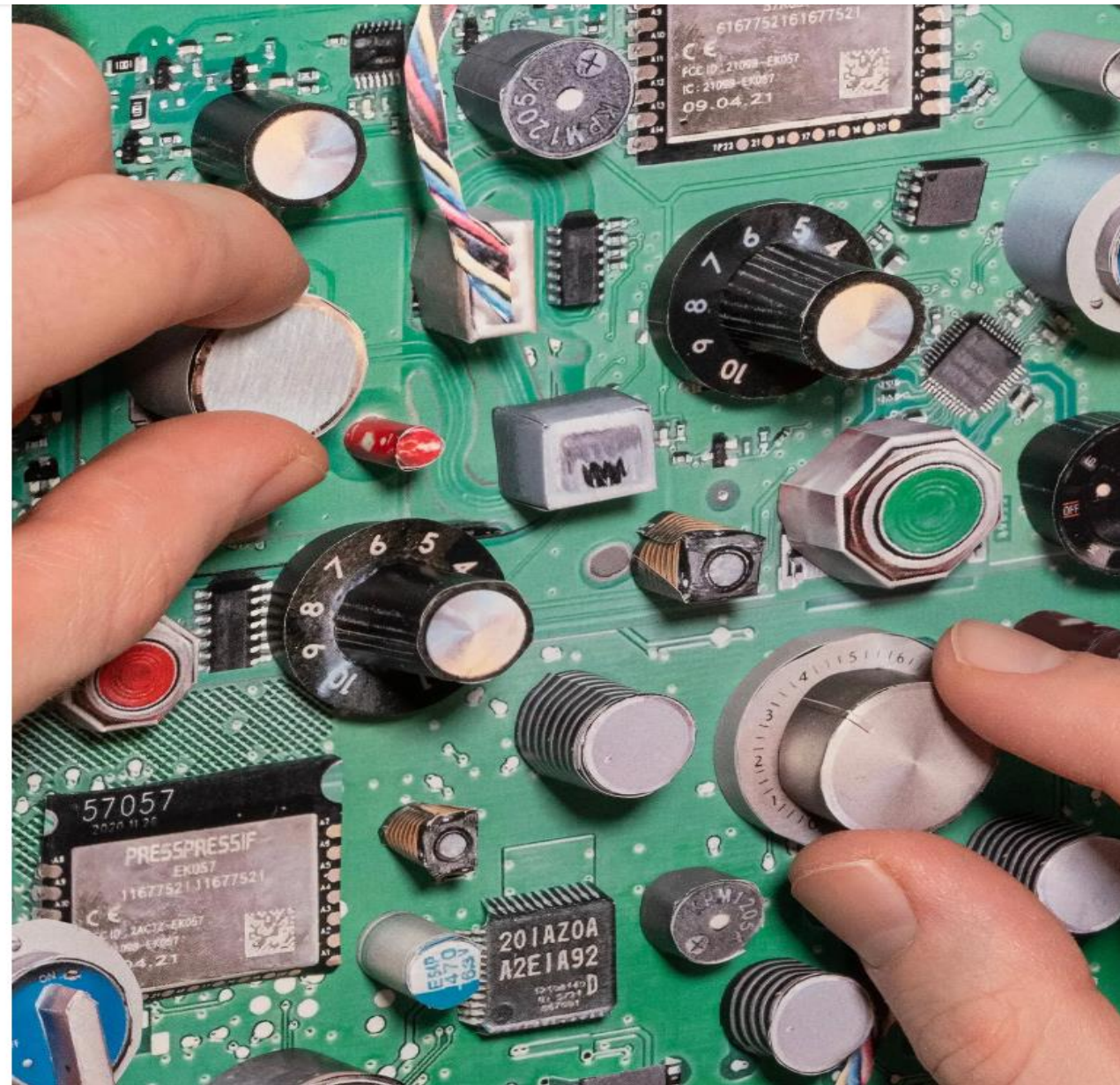
FT graphic: John Burn-Murdoch / @jburnmurdoch

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THE SHIFT

Not a Coder? With A.I., Just Having an Idea Can Be Enough.

I'm not a programmer. But I've been creating my own software tools with help from artificial intelligence.



Mass Unemployment?

Table 8–1. Industrial Composition of the Labor Force by Type of Employment, 1870–2010

			1870	1910	1940	1970	2009
Farmers and Farm Laborers	(1)		45.9	30.7	17.4	3.1	1.1
Blue Collar	Total		33.5	38.2	39.0	35.8	19.9
	Craft Workers	(2)	11.4	11.5	11.6	13.6	8.3
	Operatives	(3)	12.7	16.0	18.2	17.8	10.2
	Laborers	(4)	9.4	10.7	9.3	4.4	1.4
White Collar	Total		12.6	19.6	28.3	37.7	41.4
	Clerical Workers	(5)	1.1	5.4	10.4	17.9	12.1
	Sales Workers	(6)	2.3	4.5	6.3	7.2	11.6
	Domestic Service Workers	(7)	7.8	5.5	4.5	1.5	0.6
	Other Service Workers	(8)	1.4	4.2	7.2	11.0	17.1
Managers, and Professionals	Total		8.0	11.6	15.2	23.4	37.6
	Proprietors	(9)	3.4	4.4	4.3	2.0	2.7
	Managers	(10)	1.6	2.5	3.7	5.9	14.4
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 - Indeed, ½ worked on farms
 - Today, the two categories employ about 20% of the workforce

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 - Humans always seem to want more and more things
- Still, the transitions for workers can be challenging, making your work as important as ever

An investment in knowledge pays the best interest.

— Ben Franklin



Federal Reserve
Bank of Dallas

Building a strong economy together