

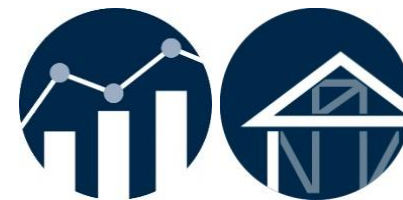


Forest Economic Advisors

FEA Economic Outlook

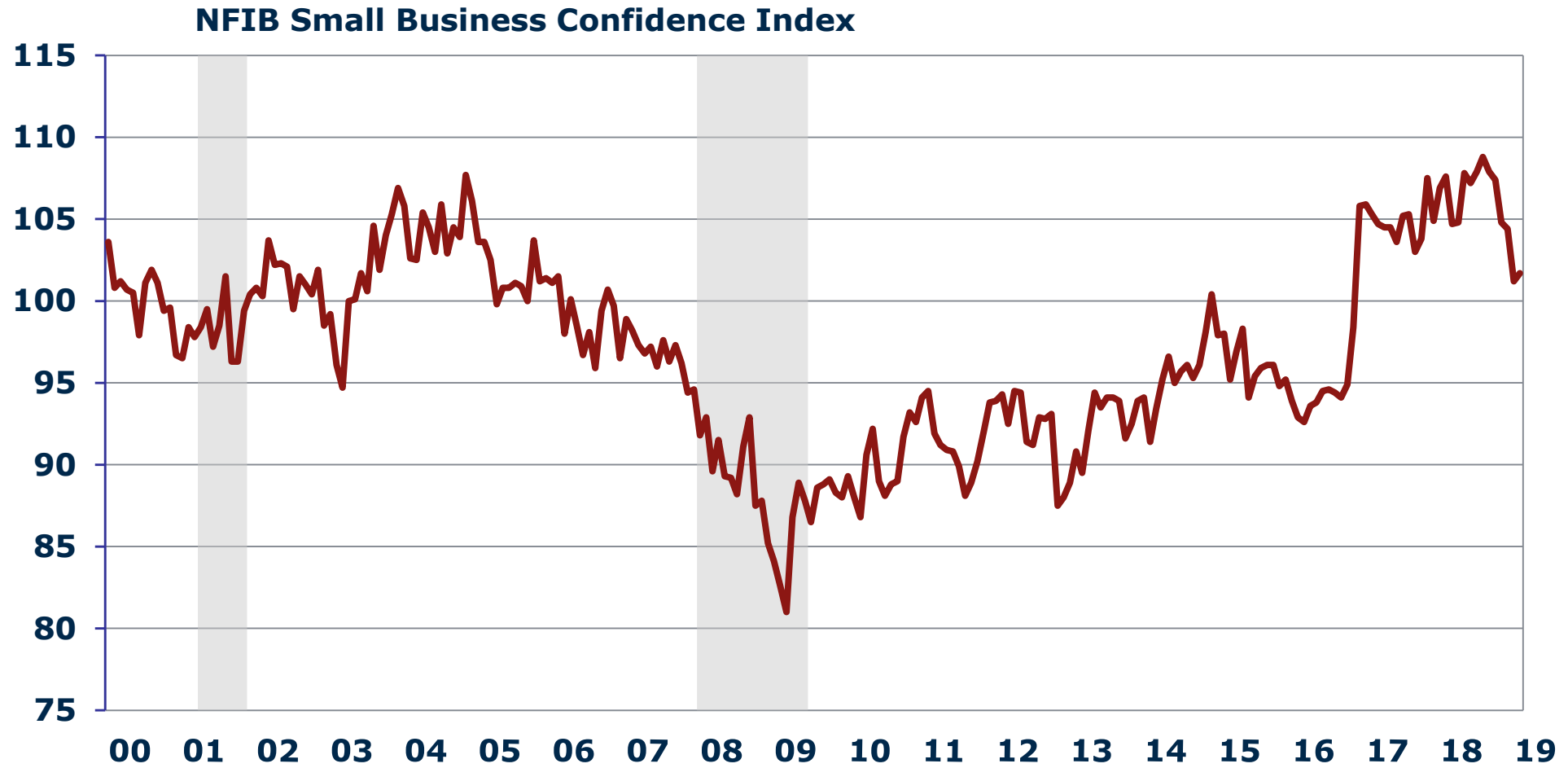
**Presented to HMA National Conference
Savannah, Georgia
March 22, 2019**

Brendan Lowney

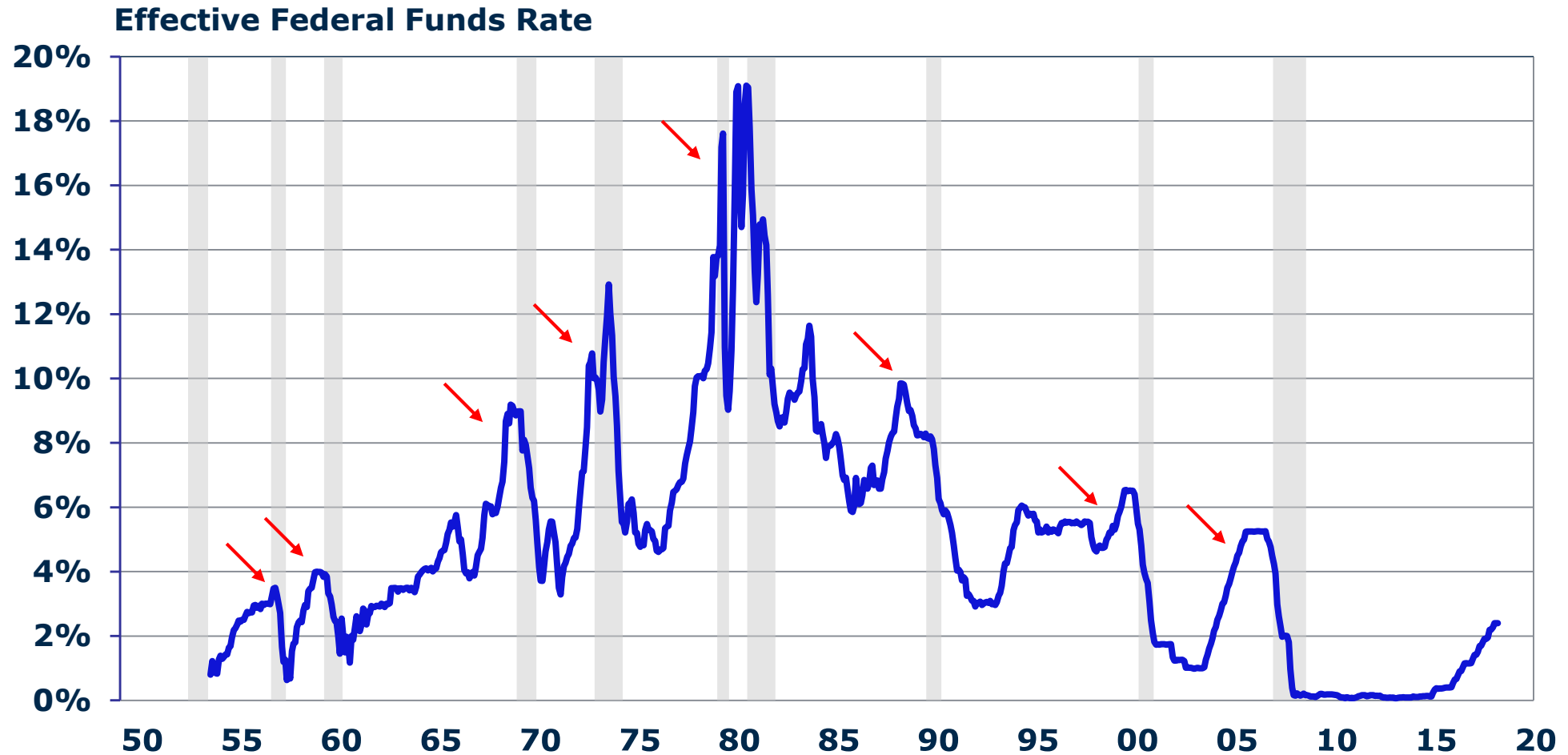


US Macroeconomic Landscape

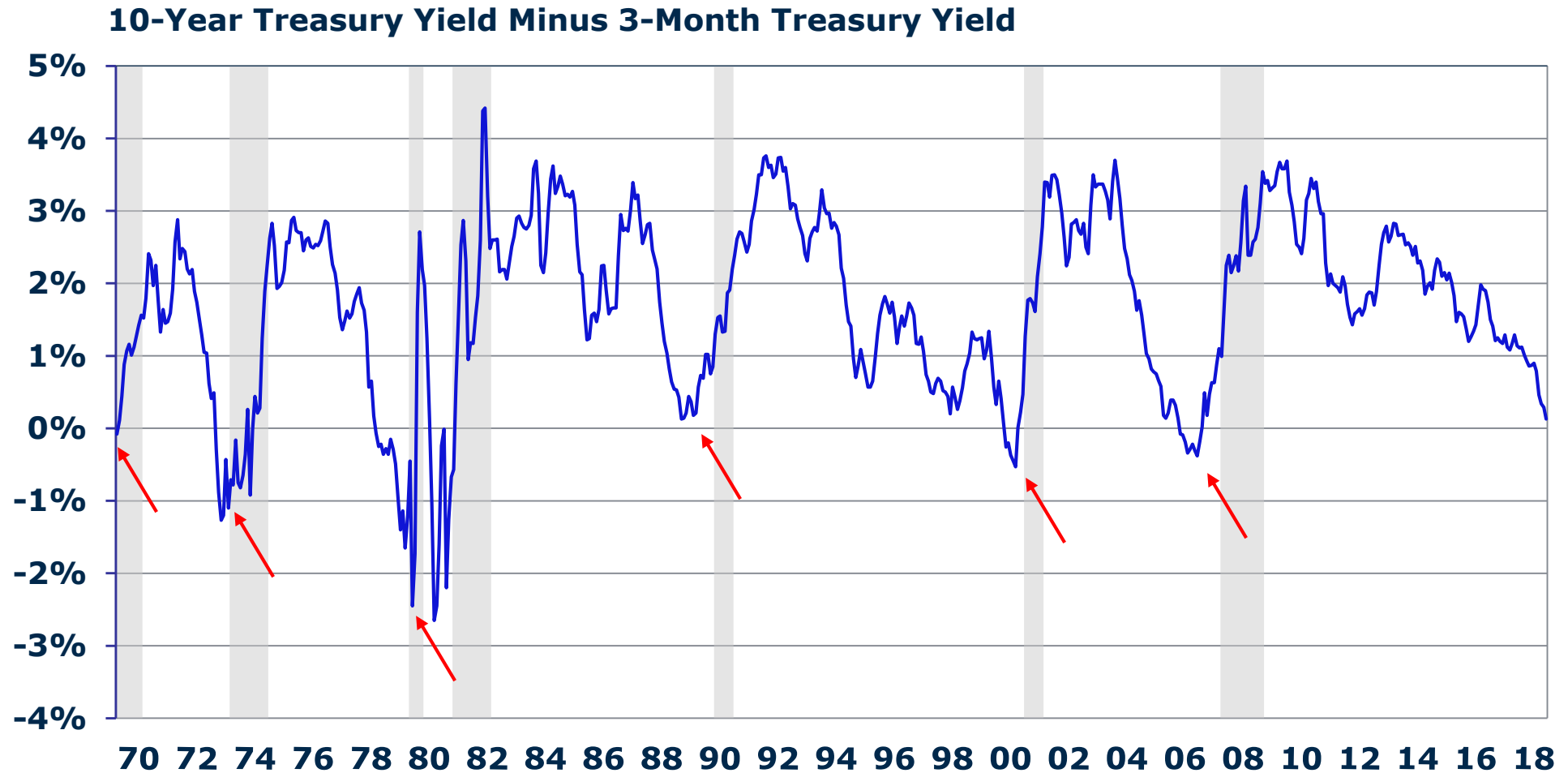
Small Business Confidence Waning From Record High



Economic Expansions Do Not Die in Their Sleep, They Are Murdered by the Fed



The Yield Curve Sending Ominous Signal



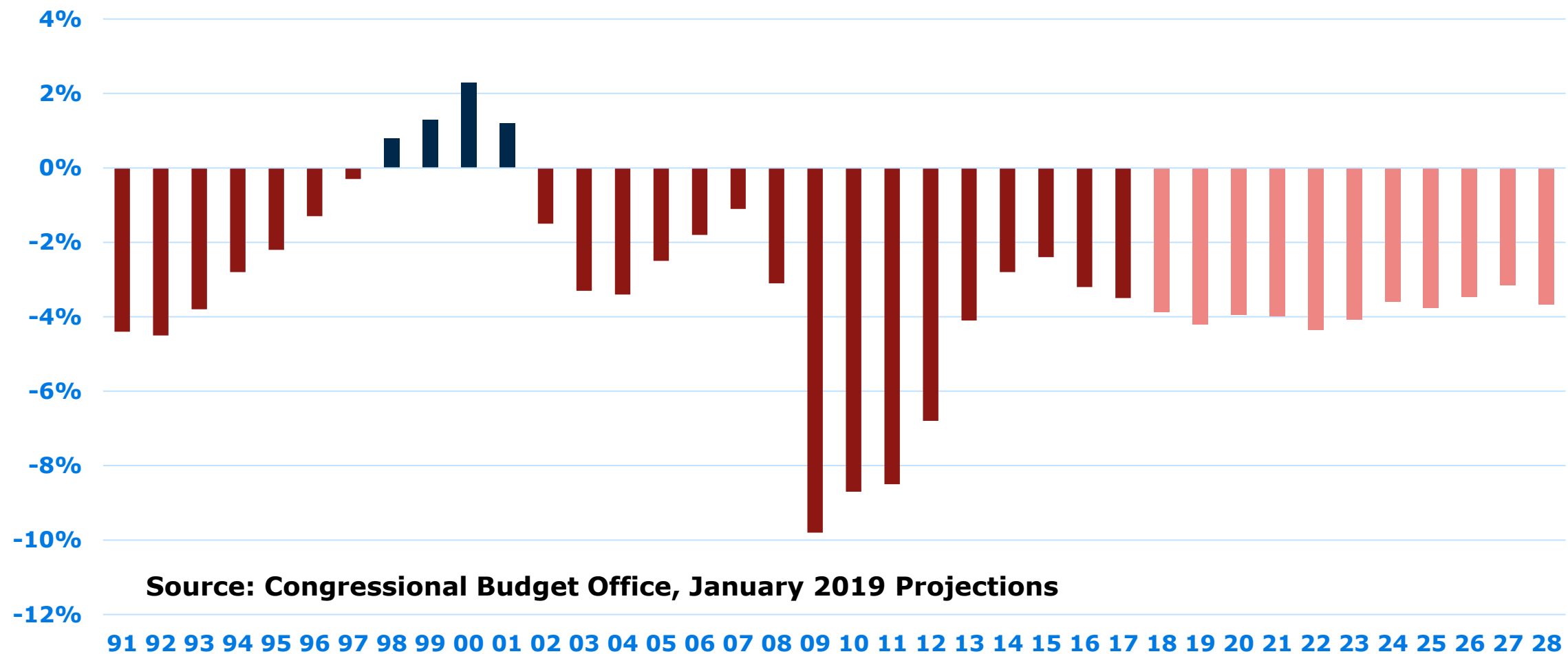
Bond Market Participants Expect Low Inflation Over Next Decade

Expected Rate of CPI Inflation over 10-Year Horizon



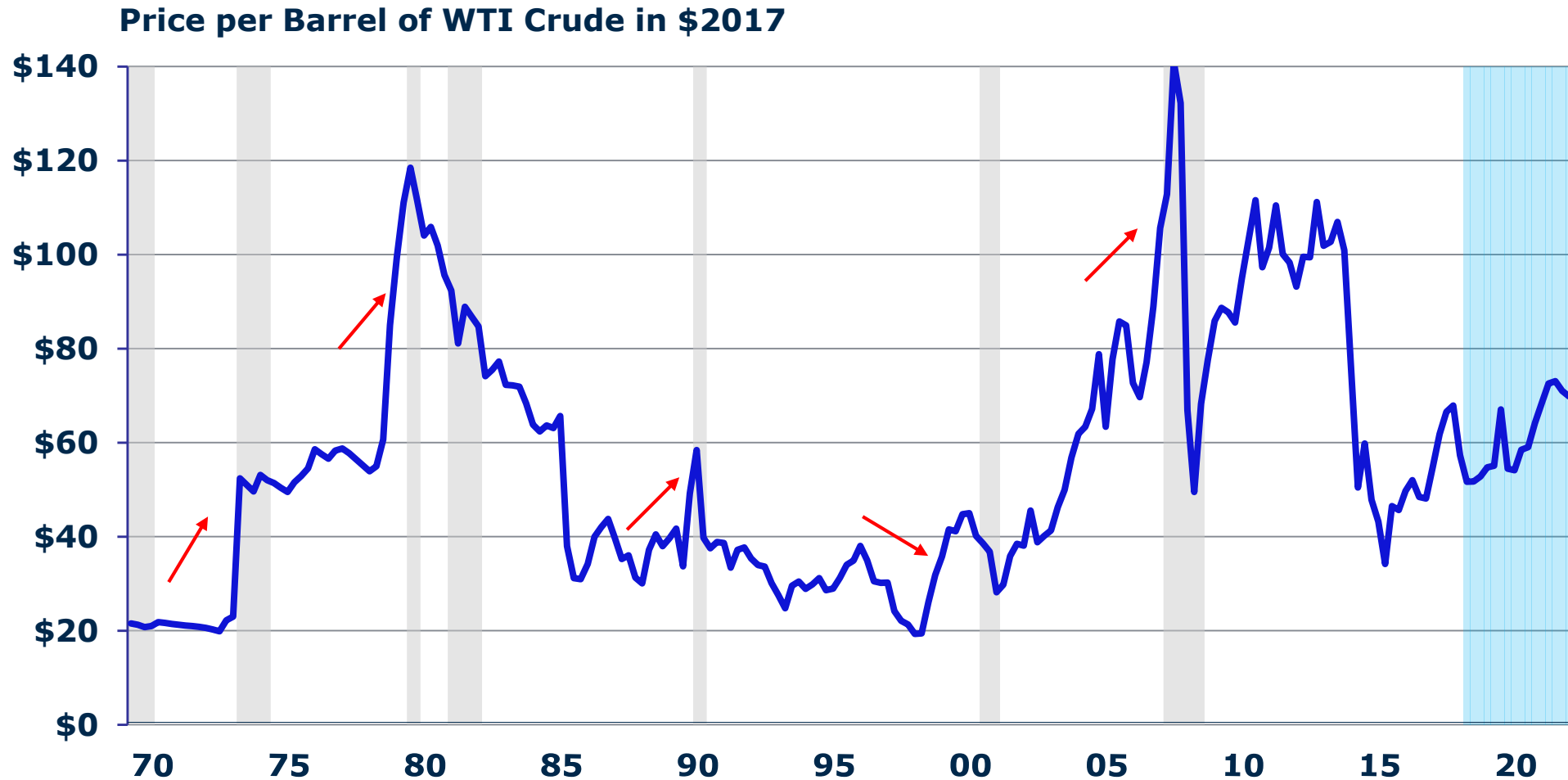
Federal Budget to Remain in the Red Despite Strong Economy

US Federal Budget Balance as a Percent of GDP

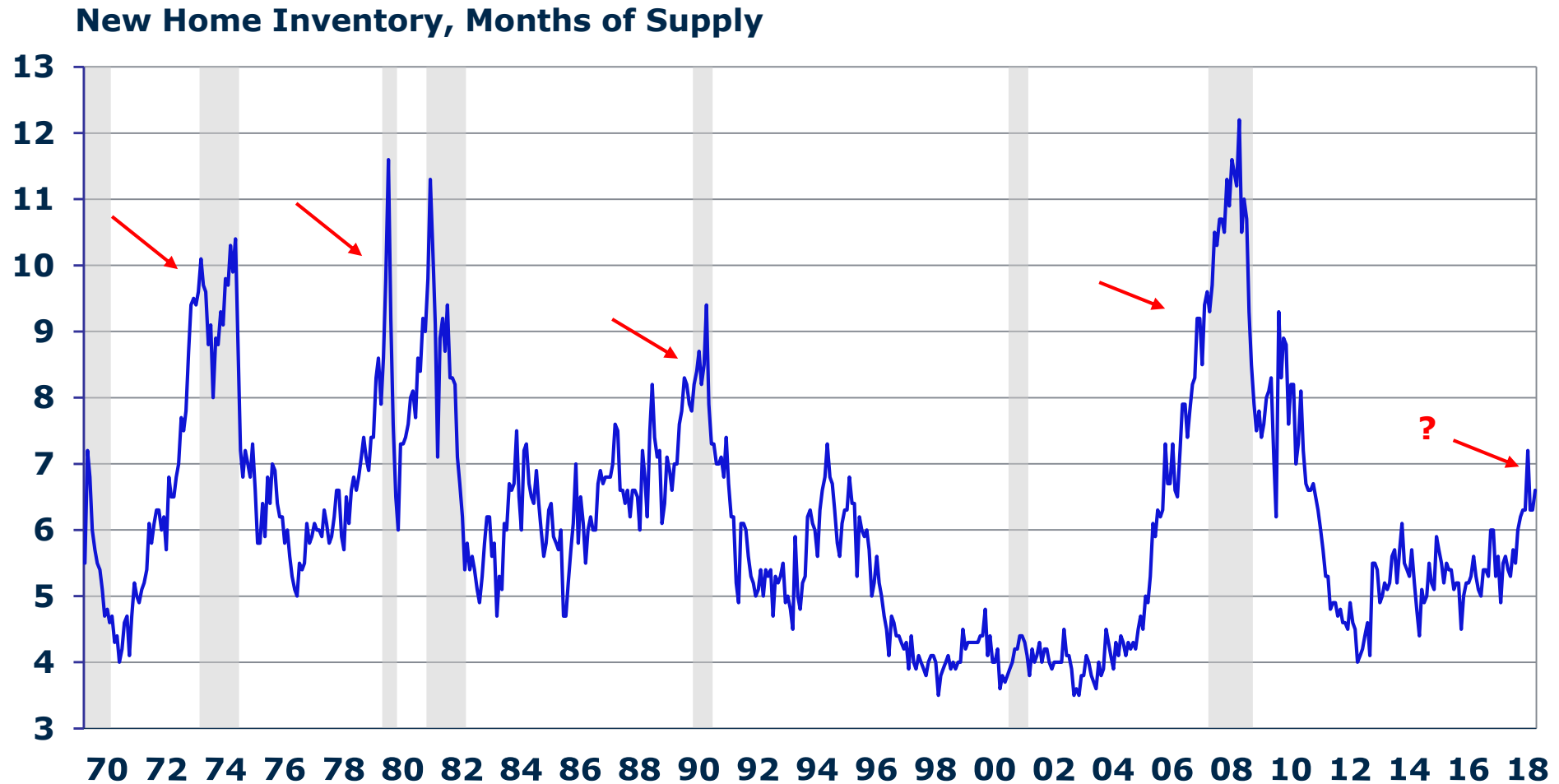


Source: Congressional Budget Office, January 2019 Projections

Real Oil Prices Spiked Prior to Five of the Last Six Recessions

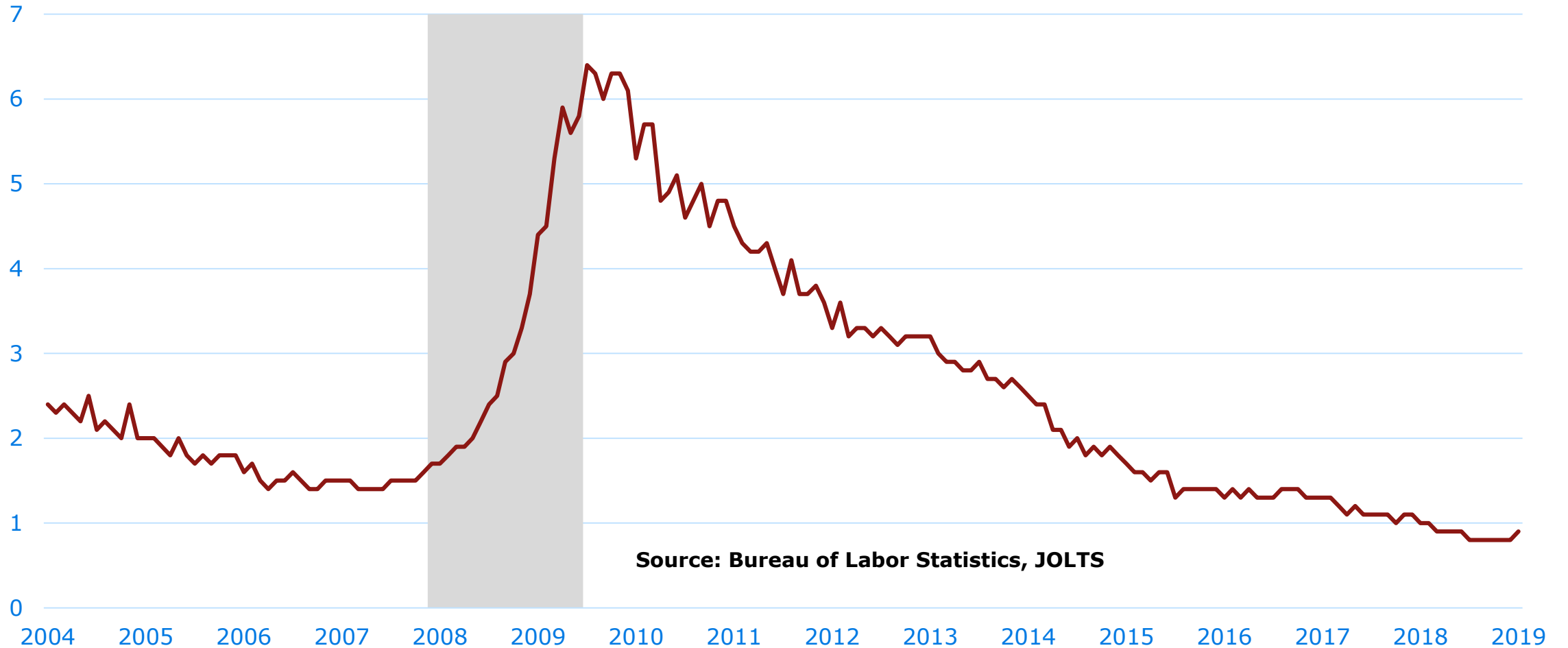


New Home Inventories Bear Watching



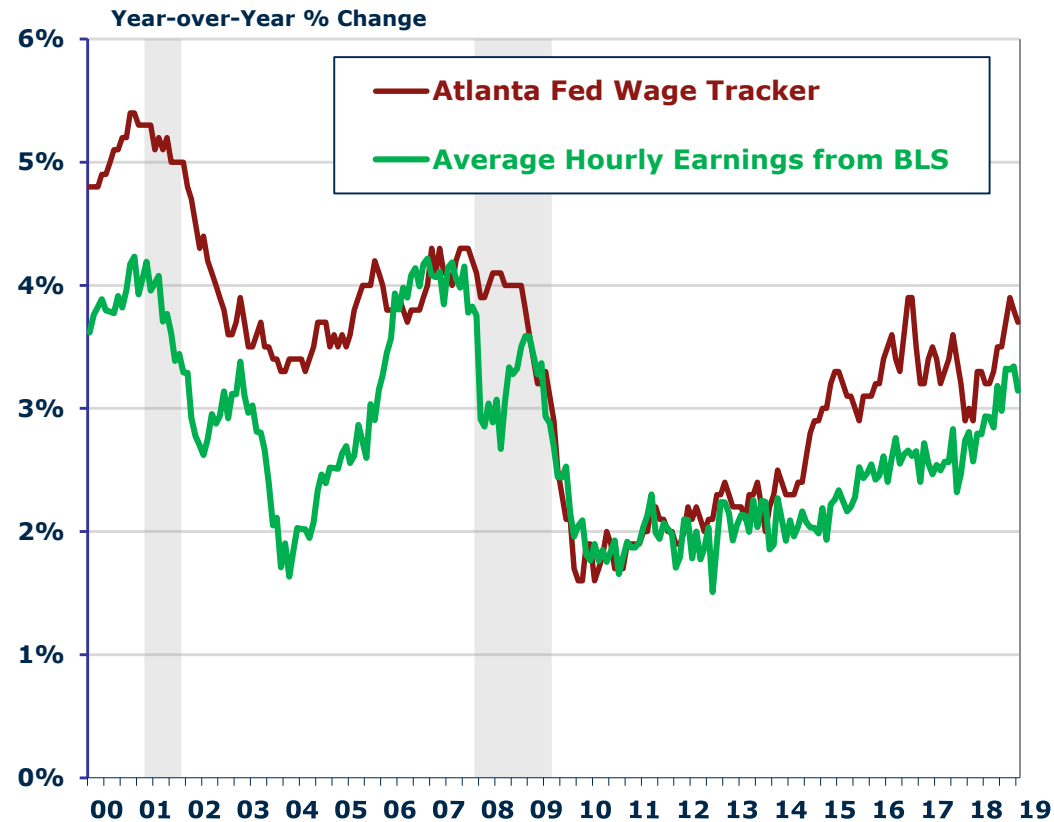
Job Market is Tight as a Drum

Number of unemployed persons per job opening, seasonally adjusted

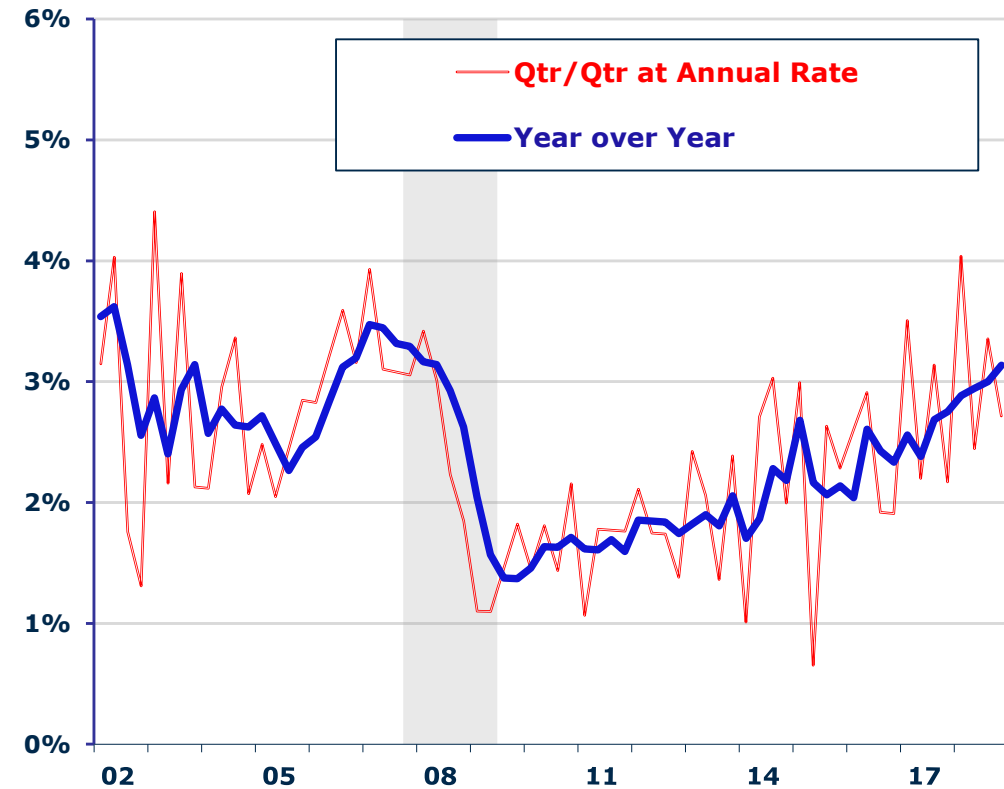


Main US Wage Indices Finally Gaining Momentum

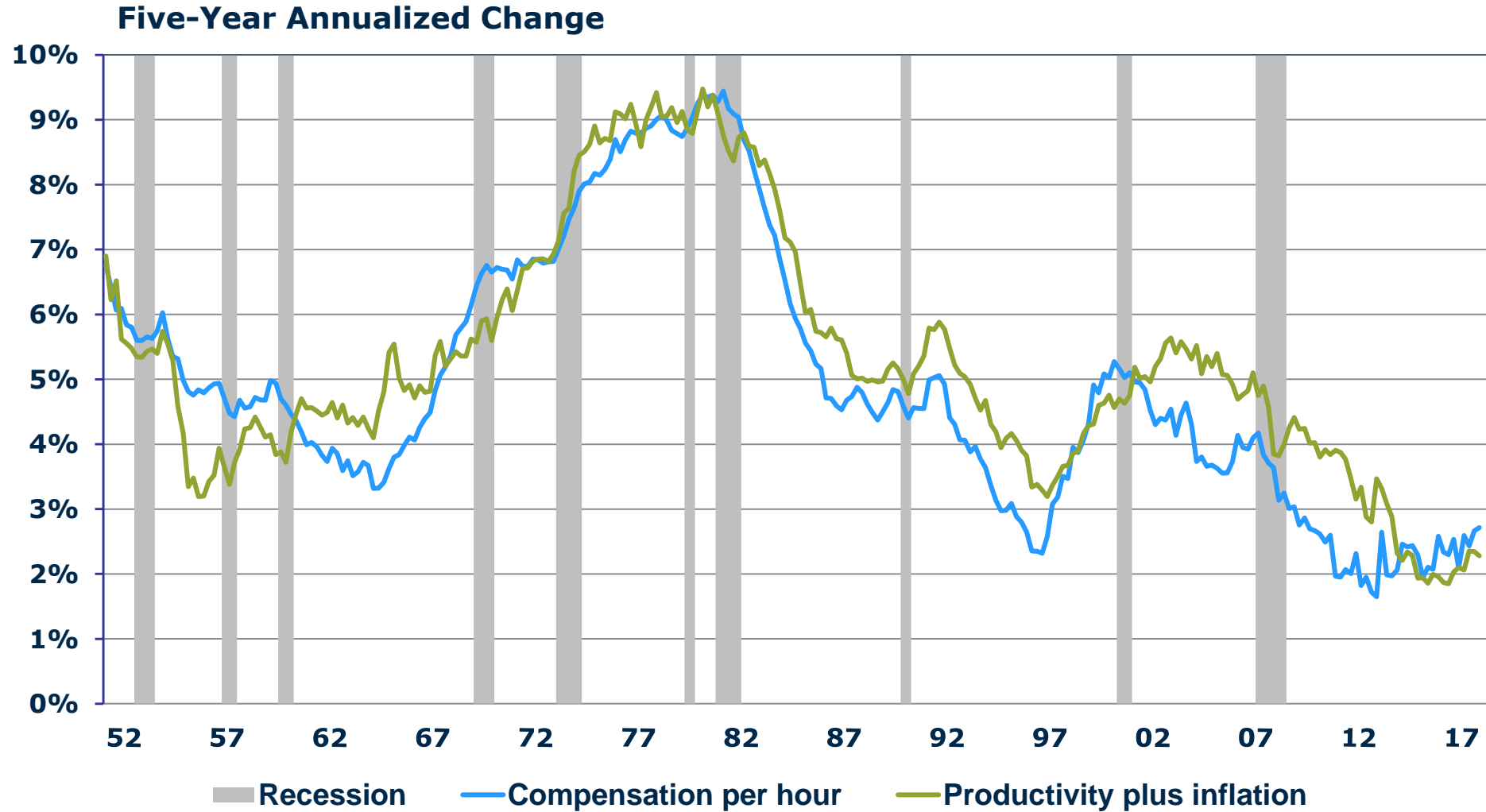
Atlanta Fed Wage Tracker and Average Hourly Earnings



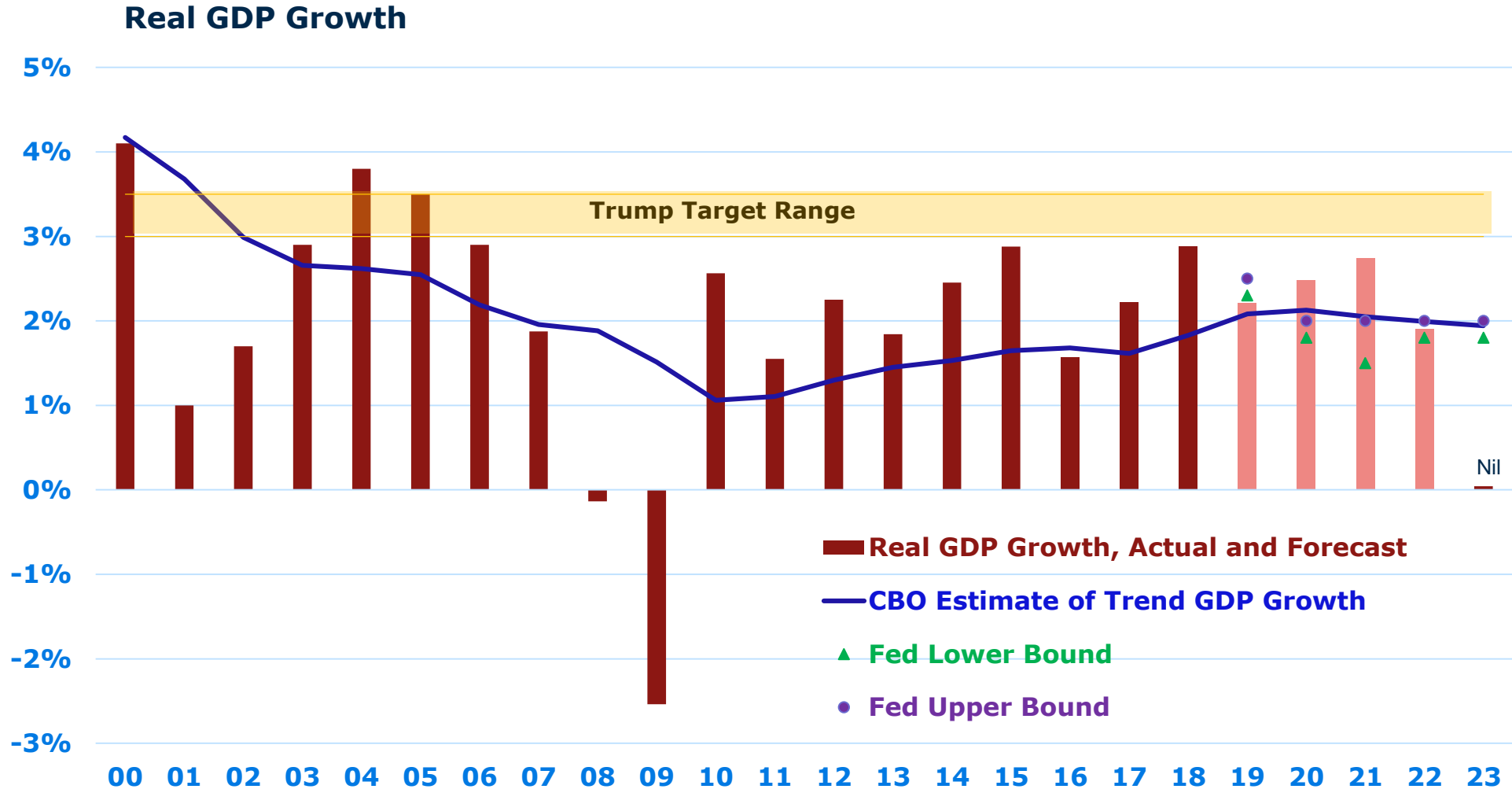
Employment Cost Index – Wages and Salaries



Compensation Tracks Productivity (plus Inflation)

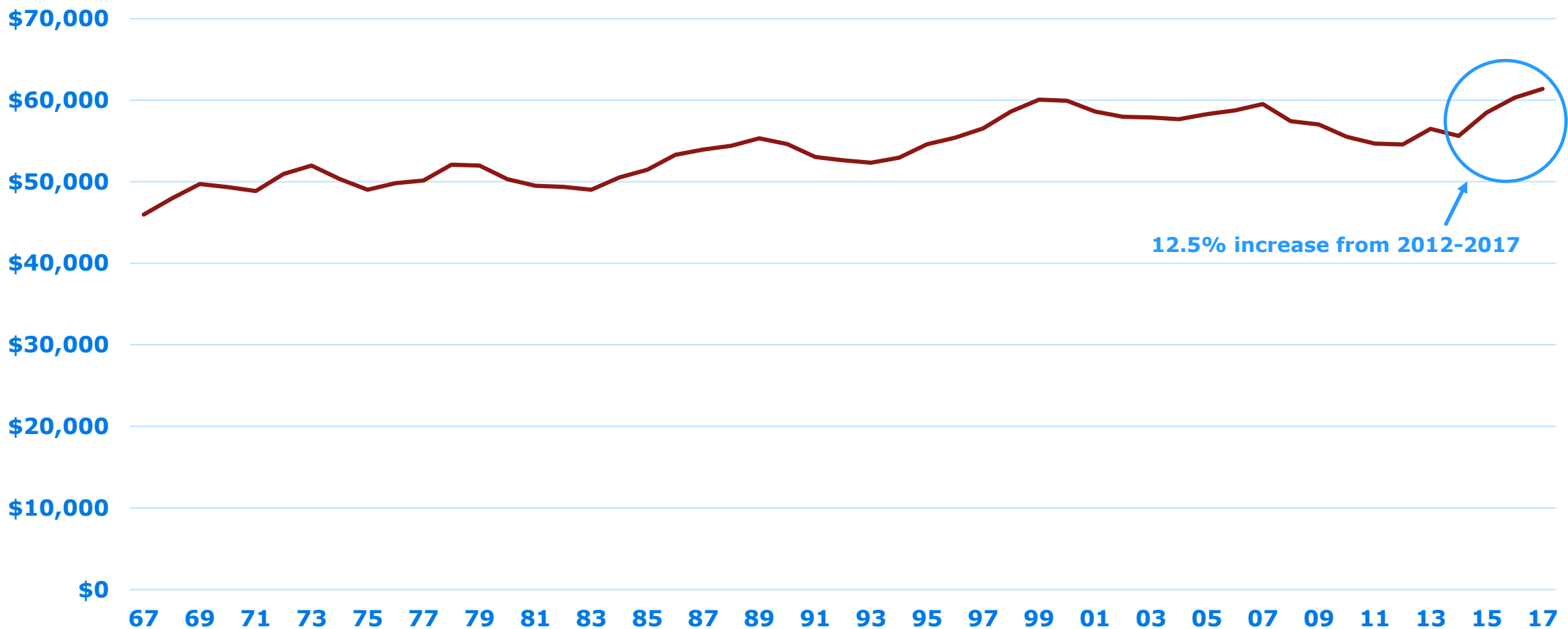


Real GDP Growth Will Slow in 2019



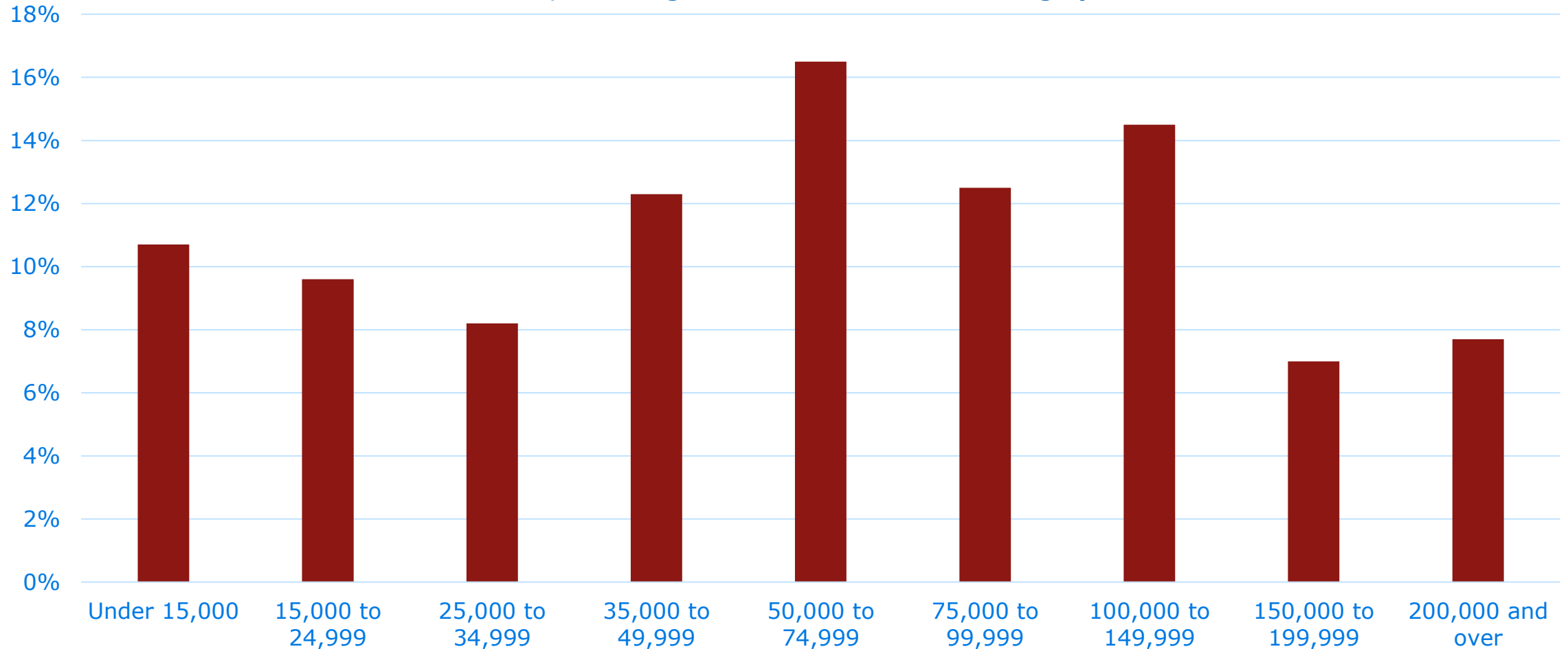
Real Household Incomes Have Rebounded

Median Real Household Income in 2017 US Dollars



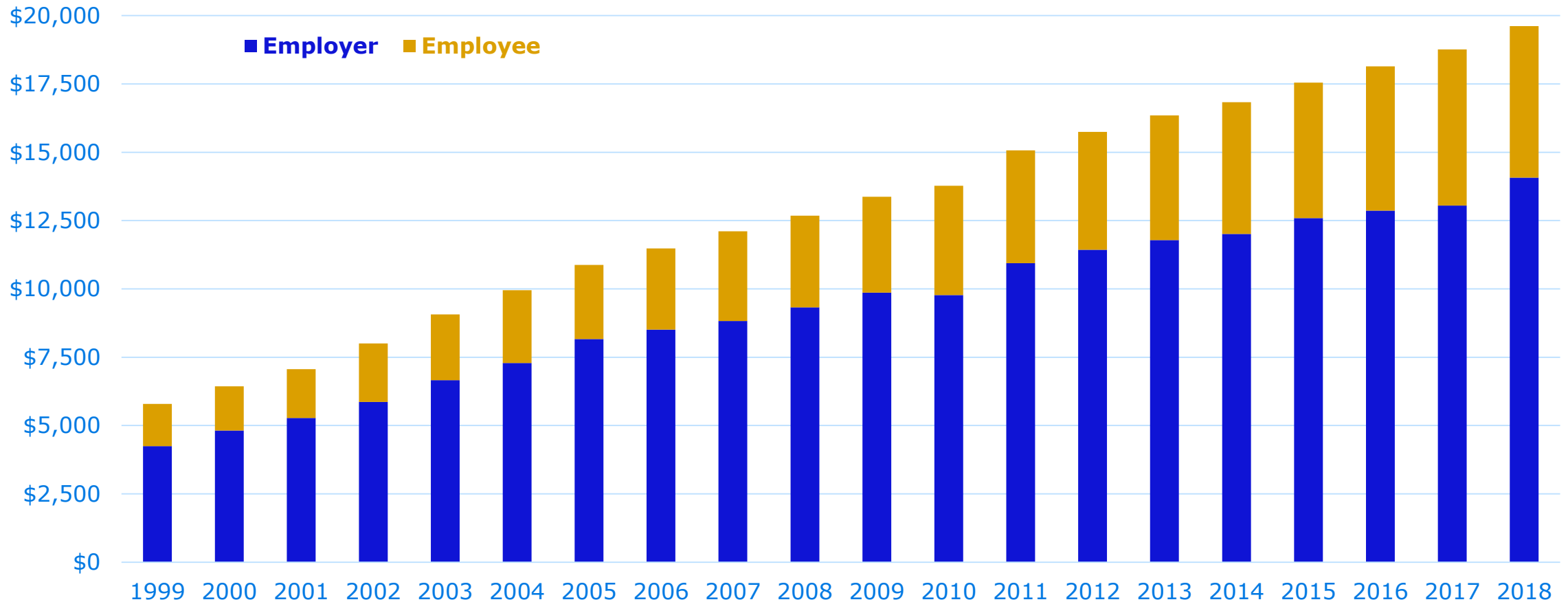
Fewer Than 30% of US Households Earned More than \$100K in 2017

Distribution of Household Income in 2017, Percentage of Households in Income Category



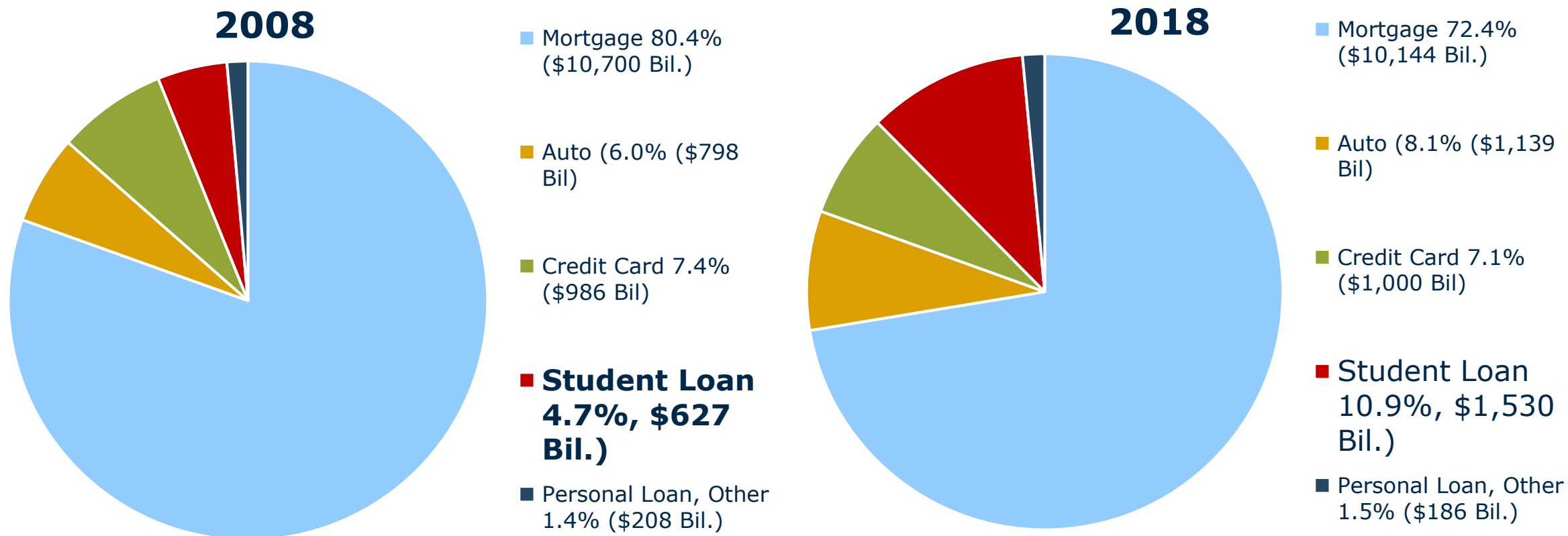
Health Care Premiums Approaching \$20K per Family

Average Annual Contributions to Premiums for Family Health Coverage



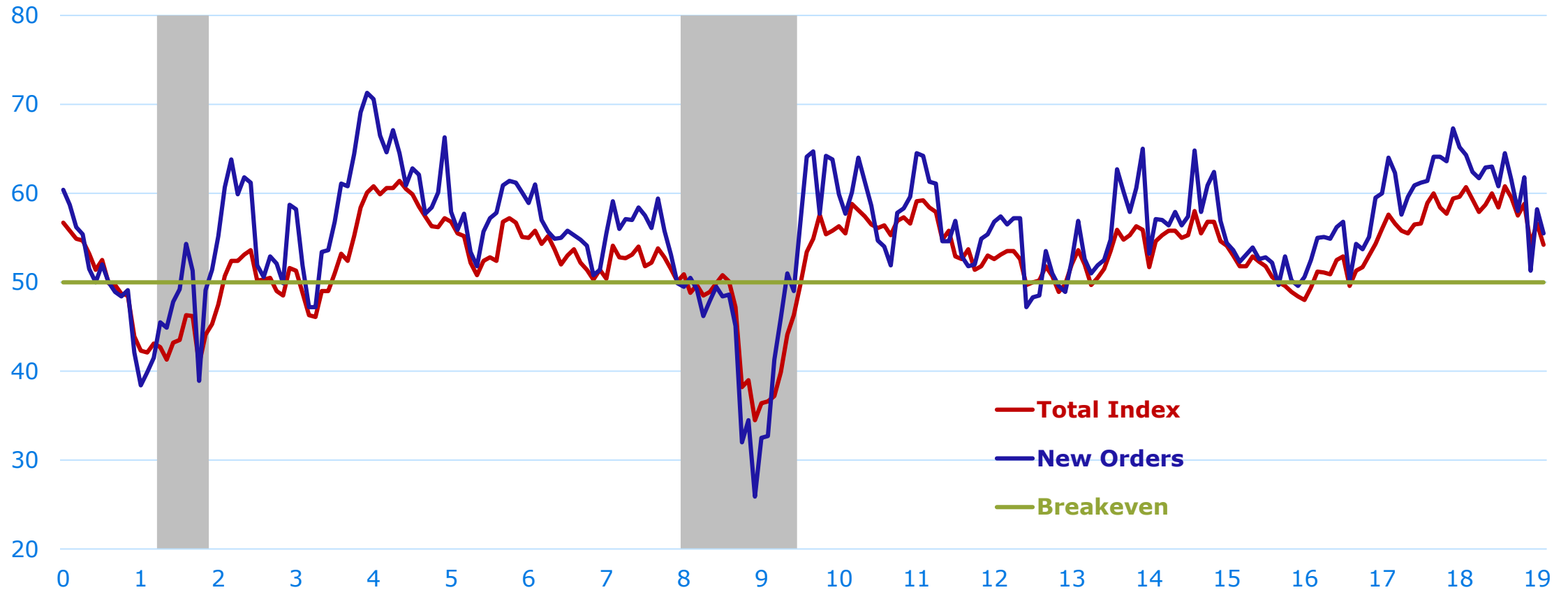
Source: Kaiser Family Foundation

Student Loan Share of Total Debt Has Doubled



Purchasing Managers' Indices Show Manufacturing Sector is Slowing

Purchasing Managers' Indices, Breakeven Level = 50

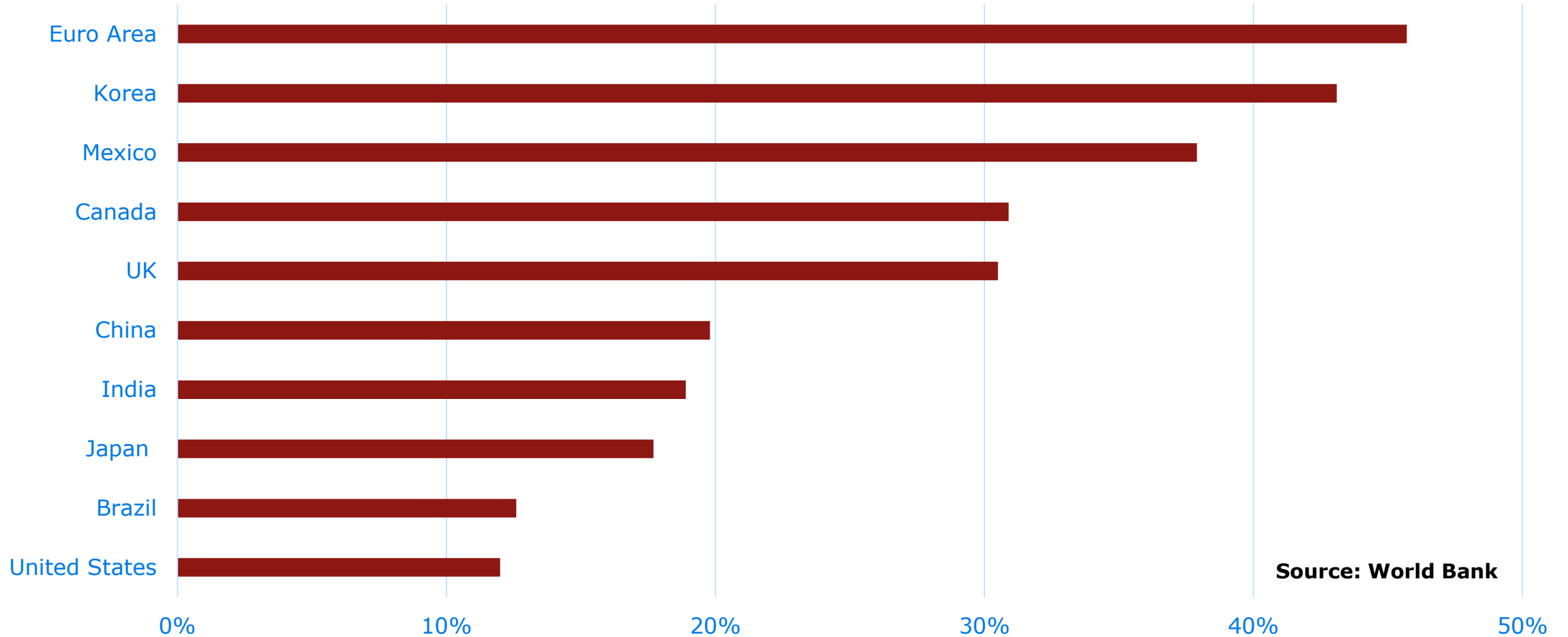


US Exports are Getting More Expensive



Trade is a Small Share of US Economy

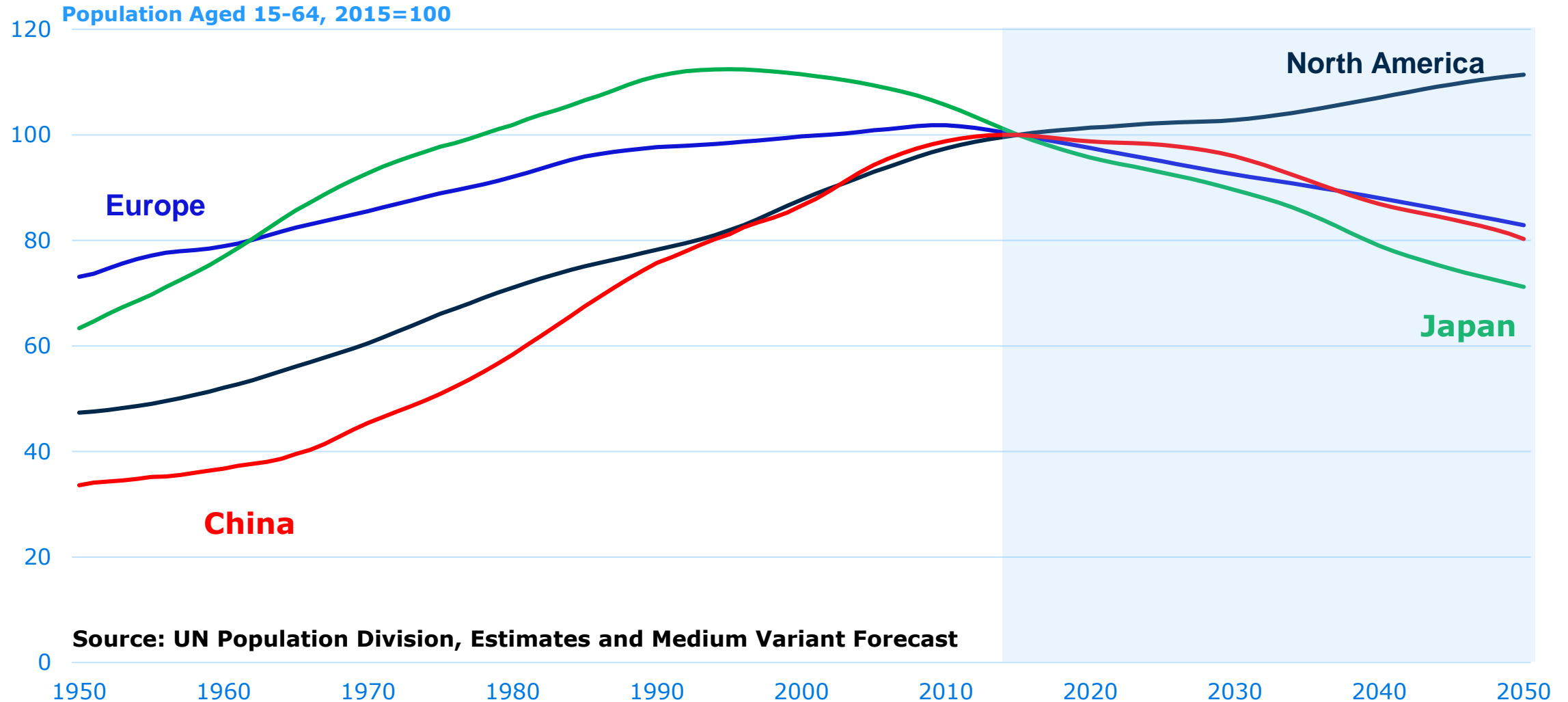
Exports as a Percent of GDP



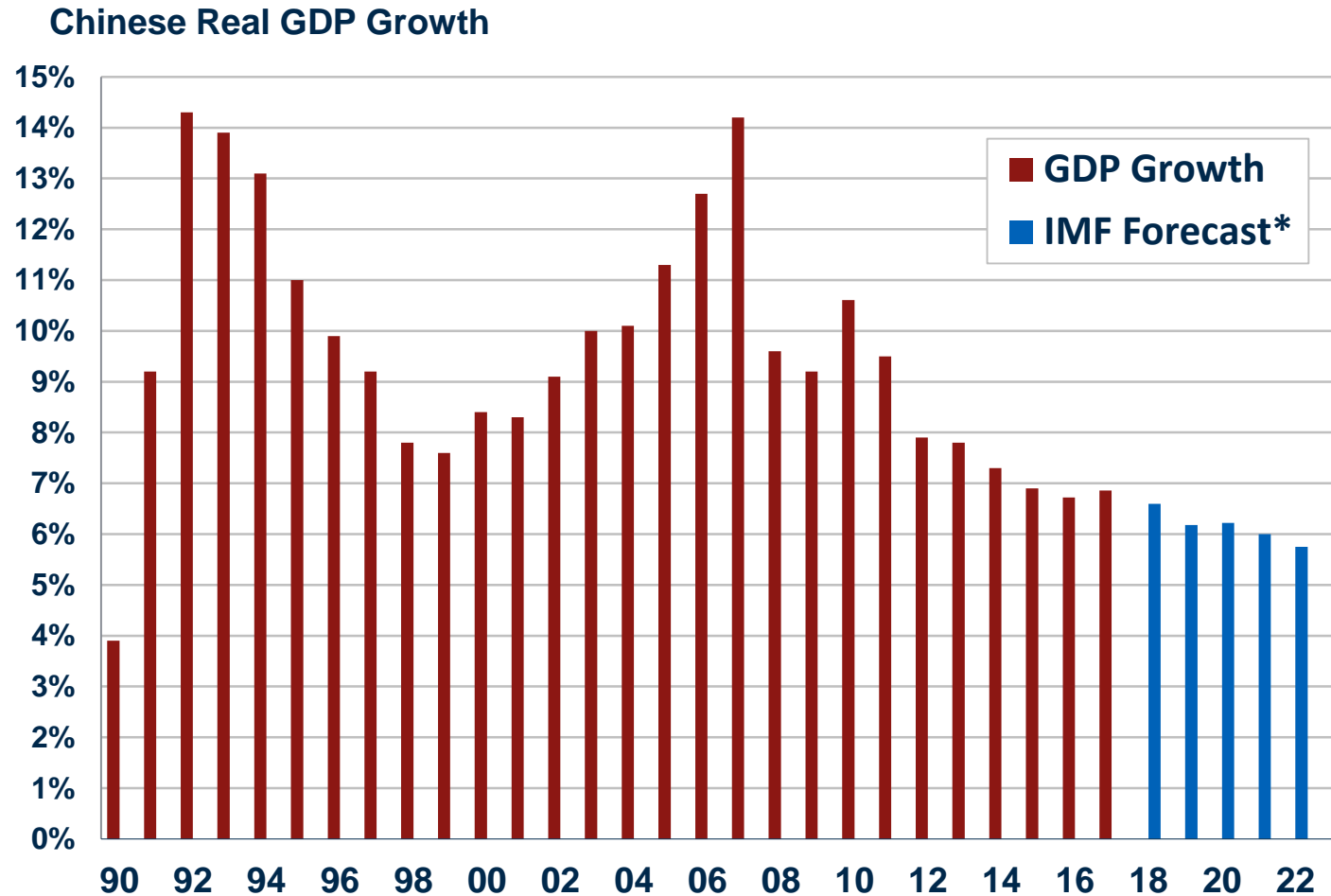
Source: World Bank

International Issues

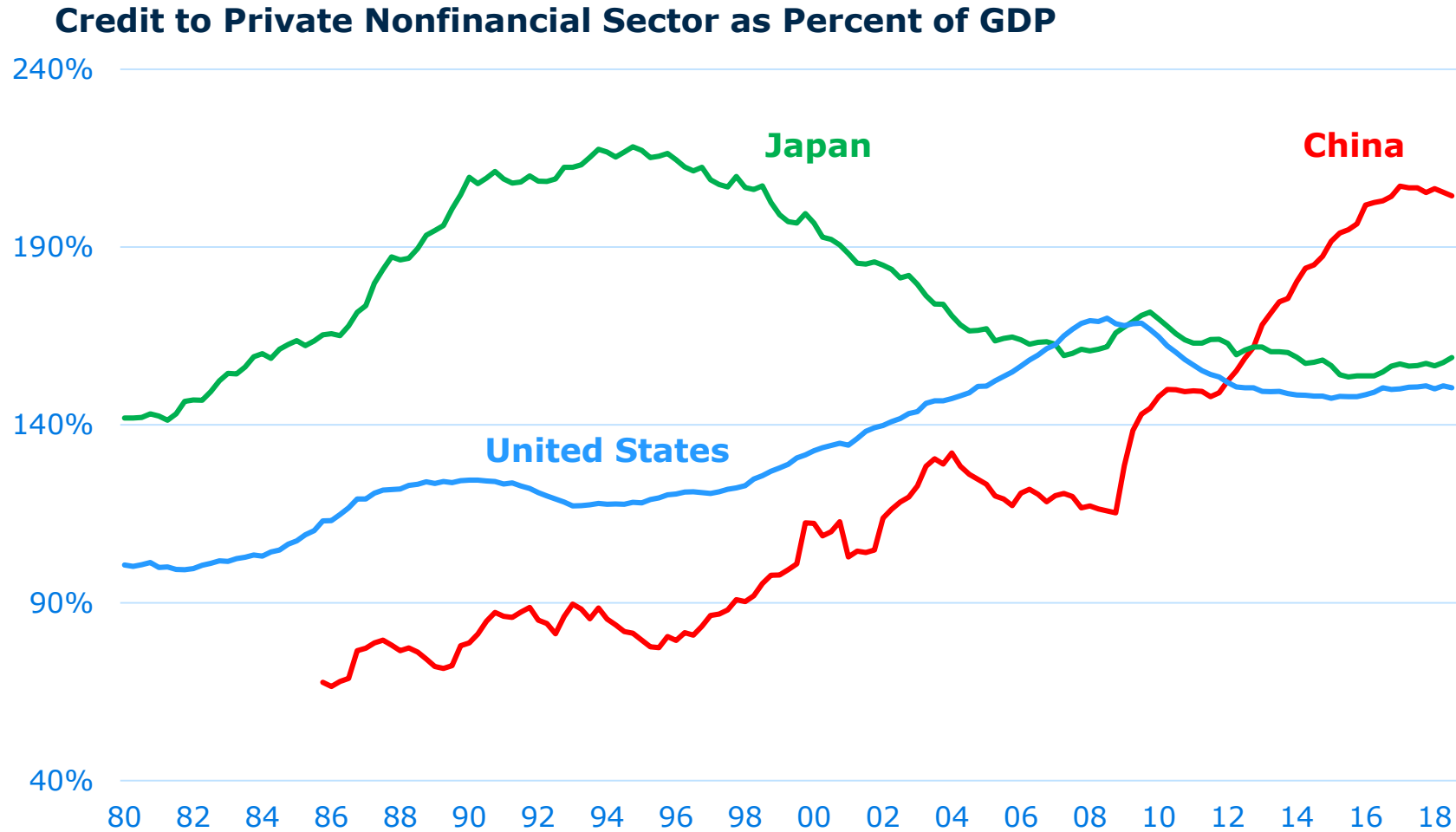
North American is Only Major Economy With Growing Working-Age Population



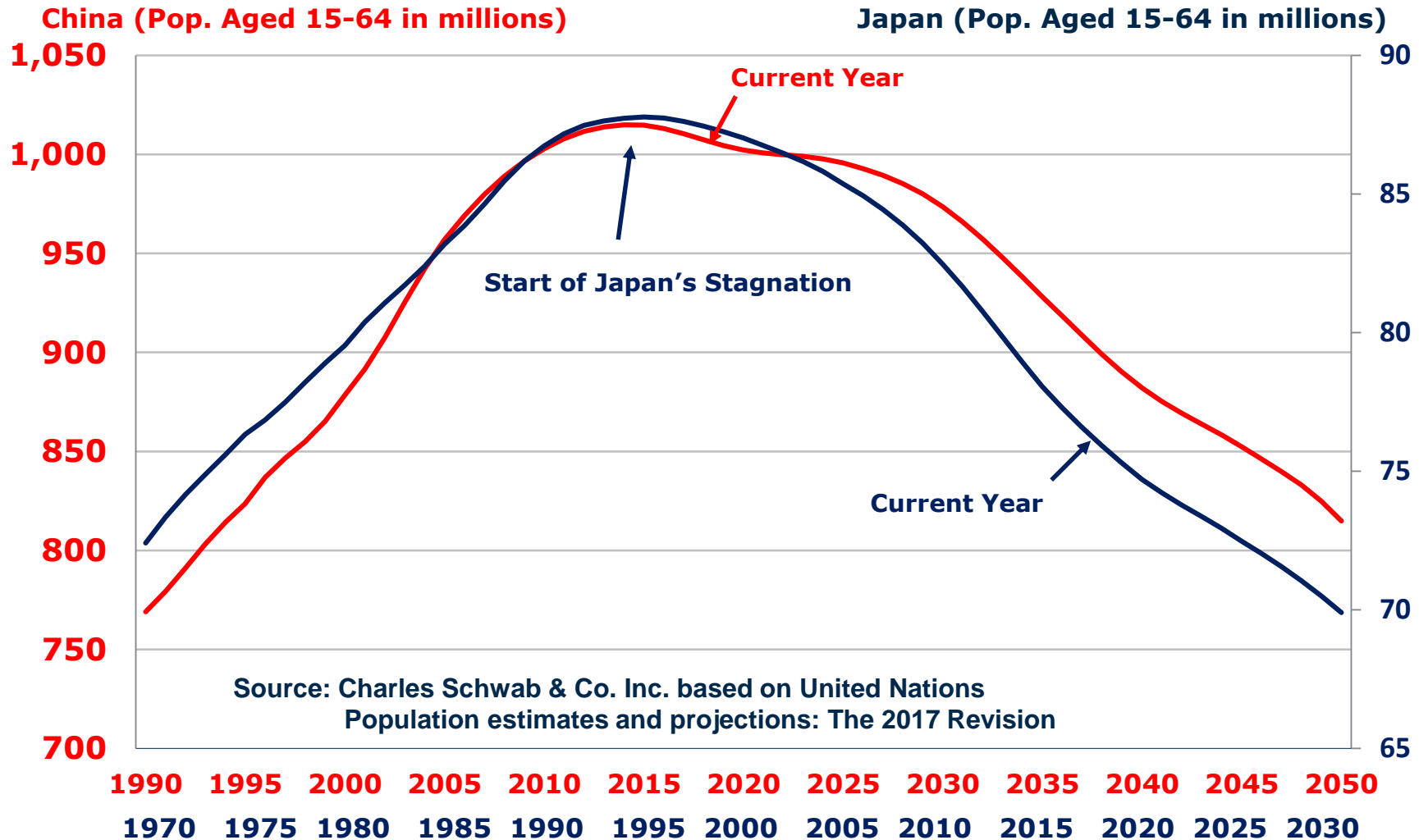
Chinese Growth is Slowing



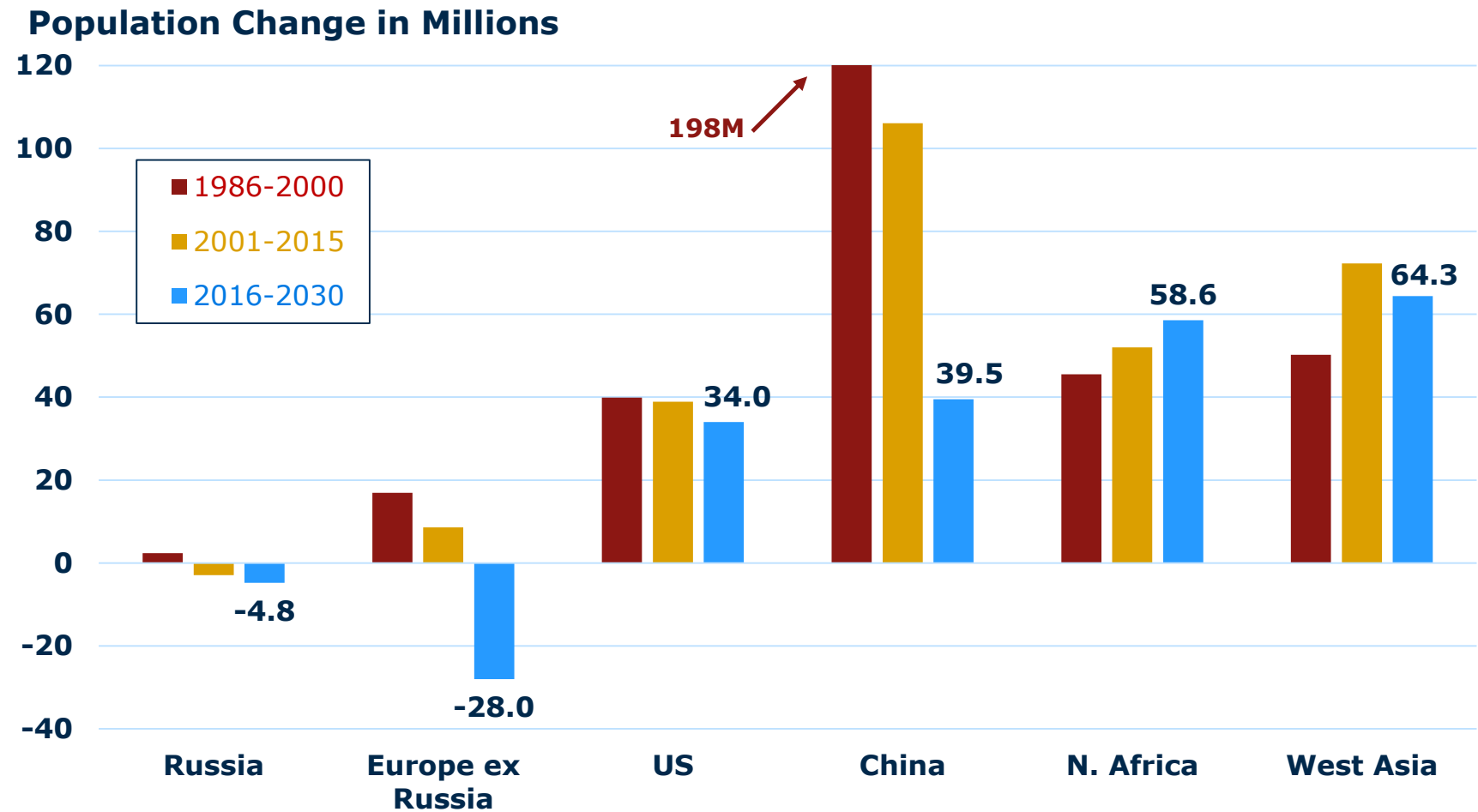
China's Debt Has Soared Since the GFC



China's Working Age Population Following Japan's Lead



Population Dynamics Between Europe and MENA Are Striking

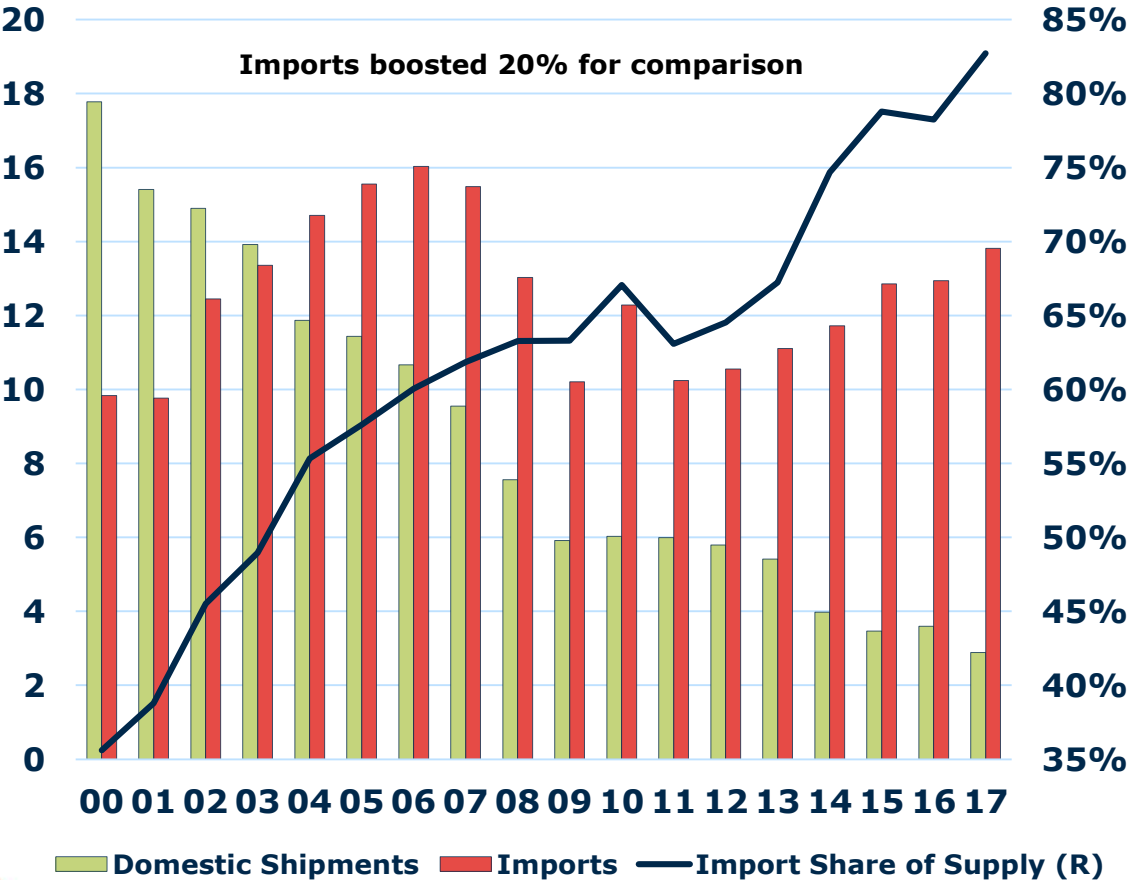


Source: UN Population Division
Medium Variant Projections

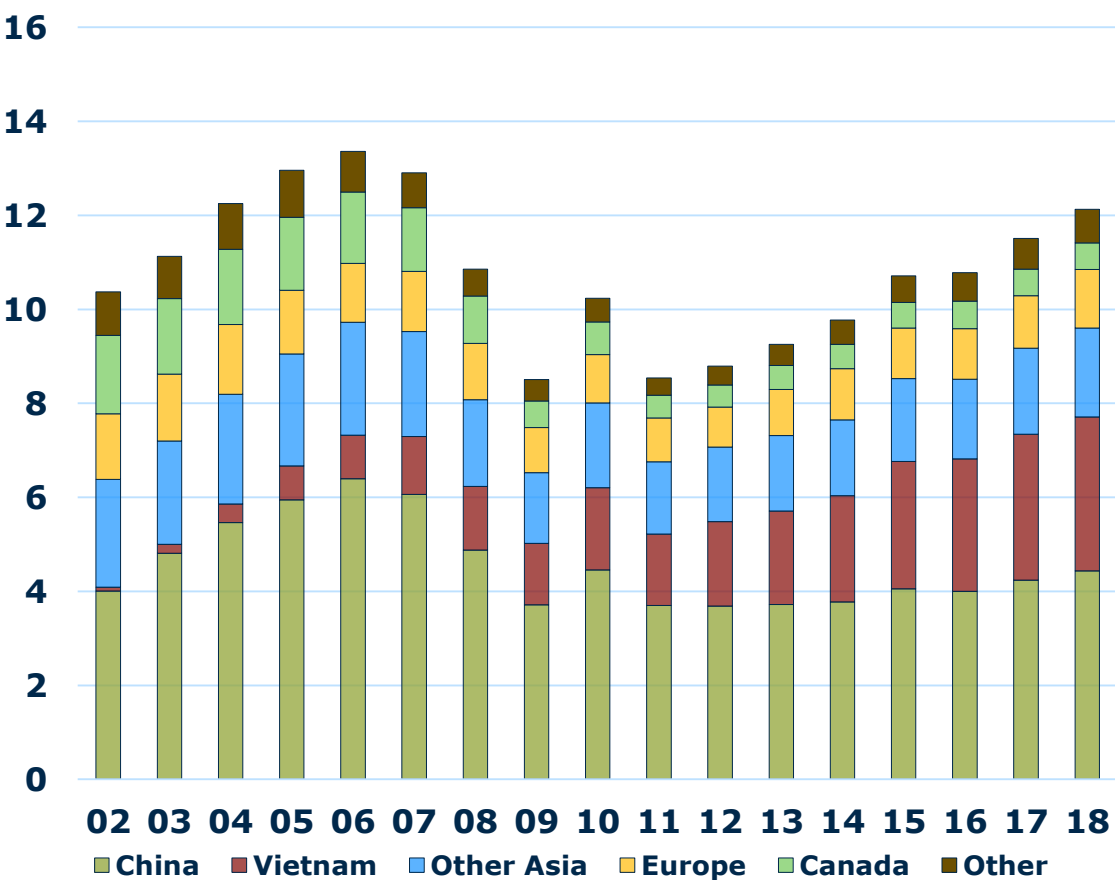
US Wood Household Furniture

Billions of 2018 USD

The Import Share Continues to Trend Higher



Asia Dominates



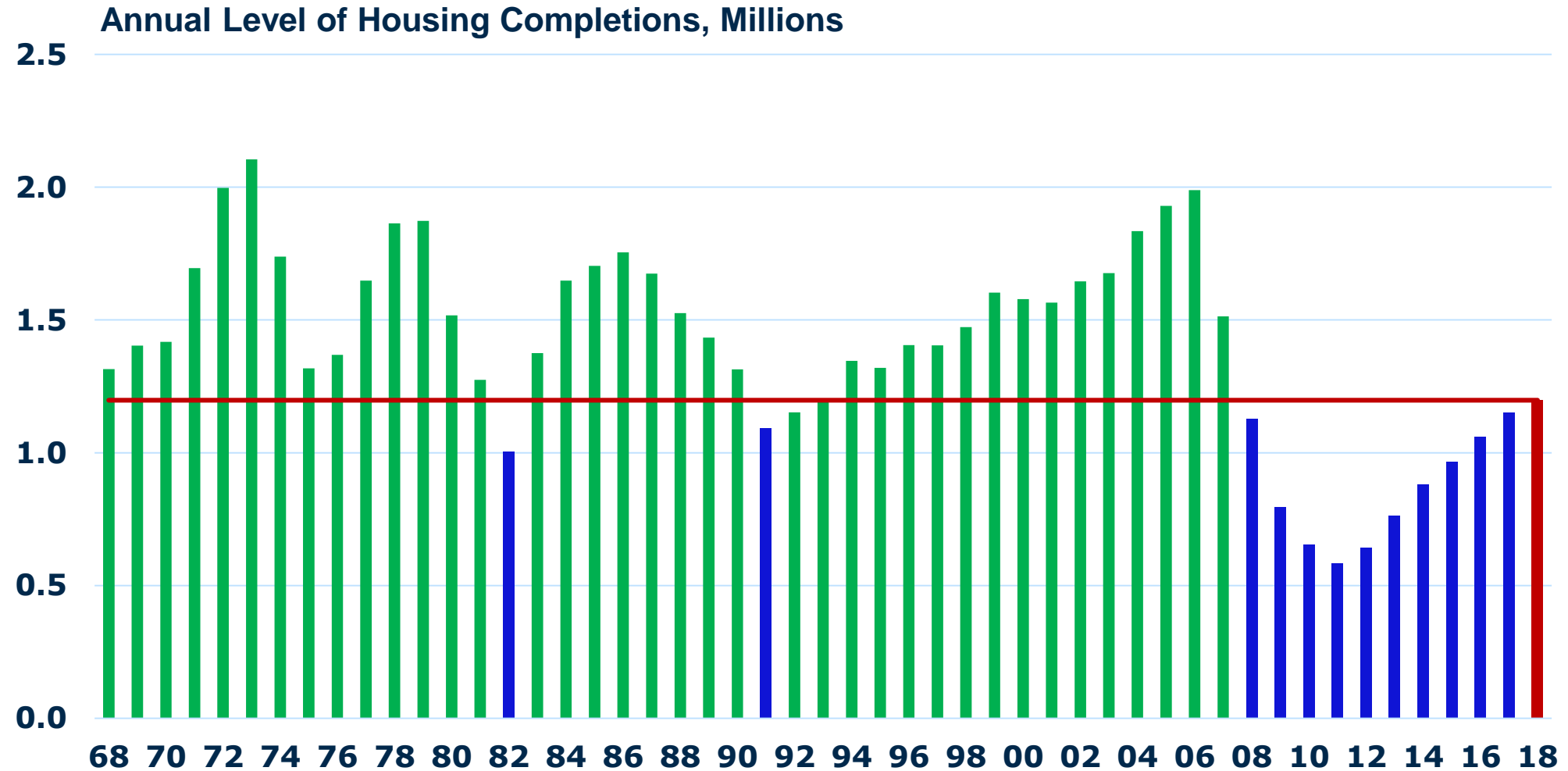
Sources: AHFA; Mann, Armistead & Epperson, Ltd; US ITC

US Housing Overview

~~Brilliant Irish Text Message~~

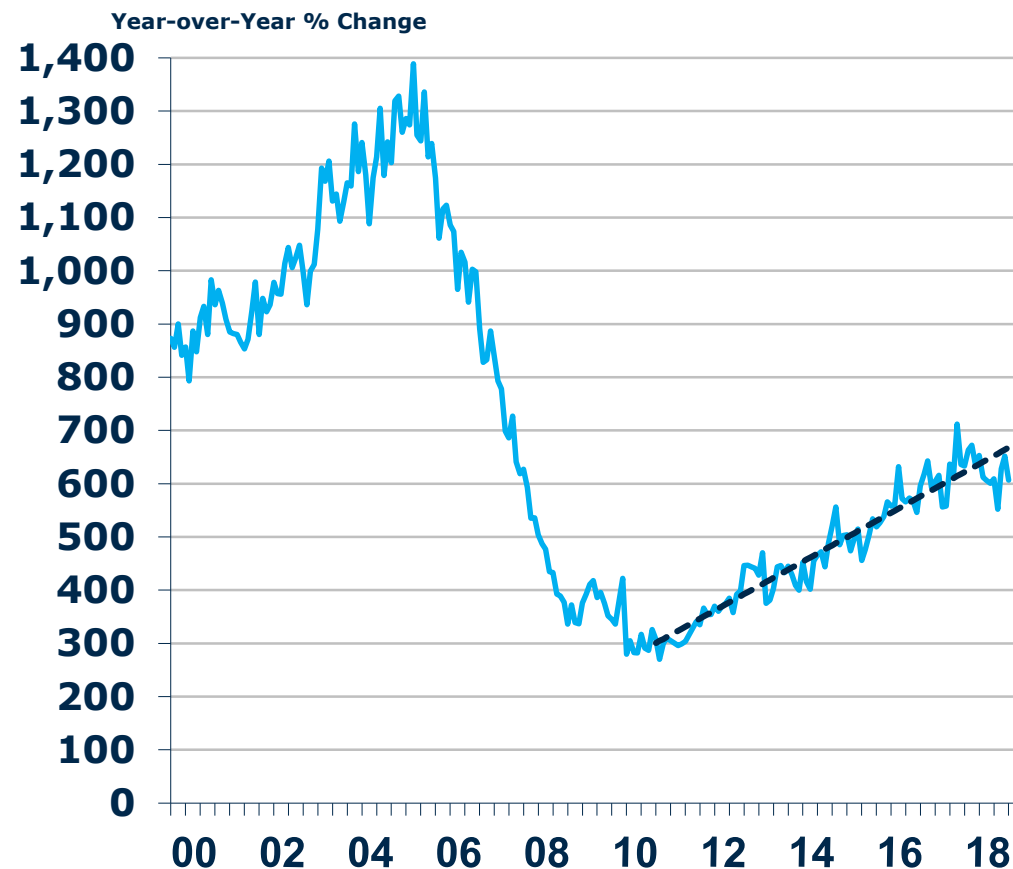
“Mary, I’m just having one more pint with the lads. If I’m not home in 20 minutes read this message again”

The 2018 Level of Housing Completions Was Typical of a Recessionary Low in Previous Economic Cycles



Our Favorite Indicator for Near-Term Housing Demand Improved in November

New Single-Family Home Sales



www.getfea.com

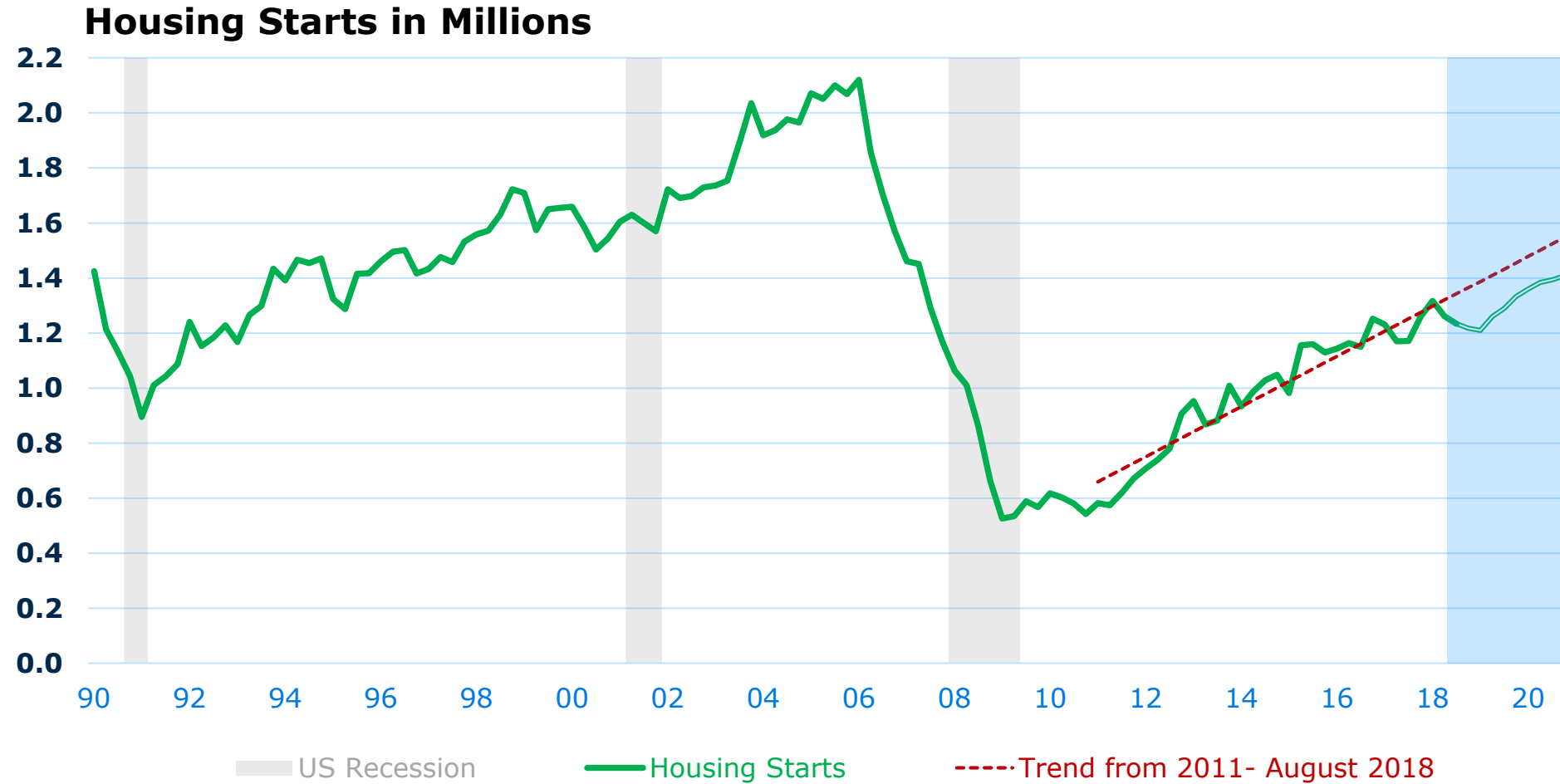
Mapping New Single-Family Home Sales to Housing Starts

New Single-Family Home Sales	610*	657**
Owner Build Share	25%	25%
Single-Family Starts Needed to Replenish Sales	813	876
Not All Starts Completed	98%	98%
Single-Family Starts Needed to Replenish Sales	830	894
Single-Family Share	70%	70%
Total Housing Starts Needed to Keep Inventories Flat	1,186	1,277

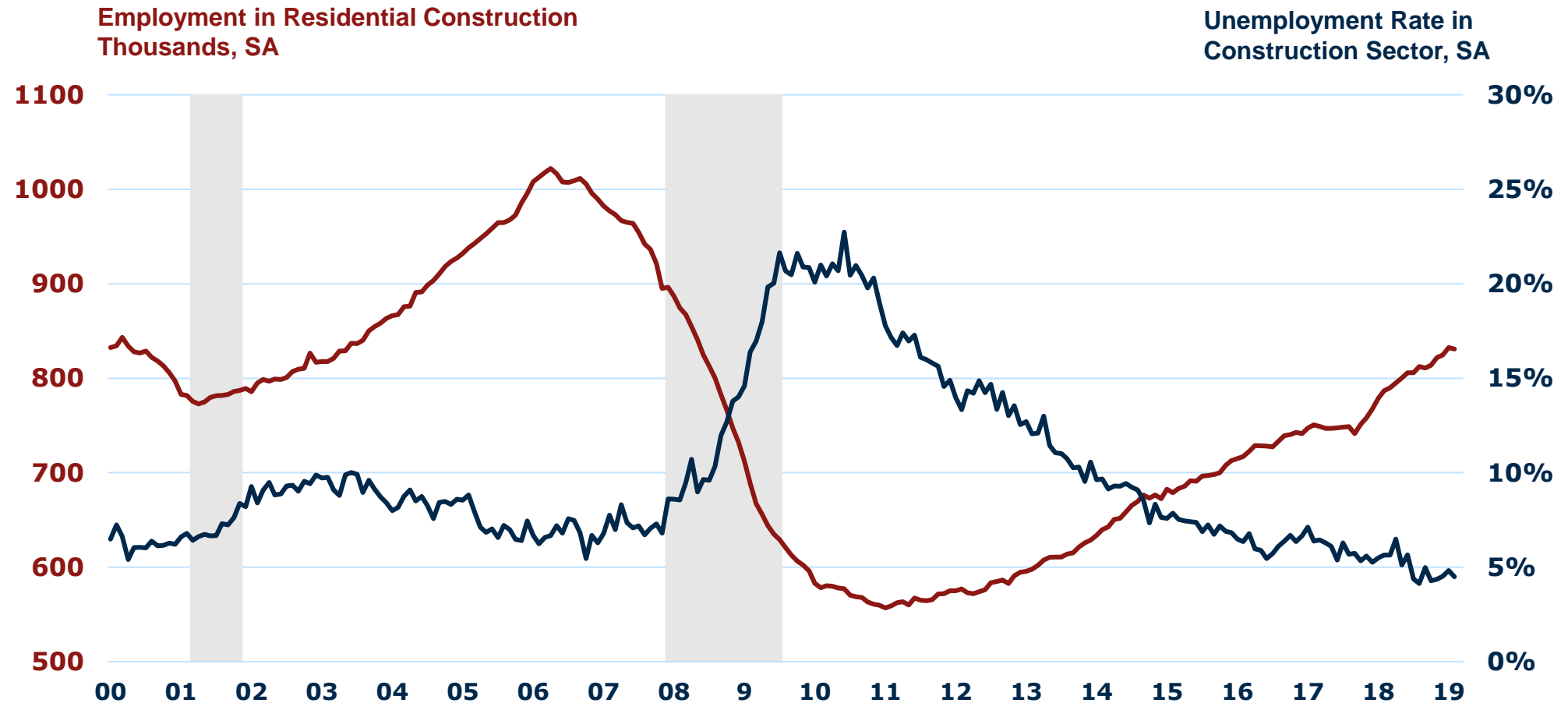
* Average of last 6 months

** Number required to meet 2019 Forecast

US Housing Starts Continue Grinding Recovery

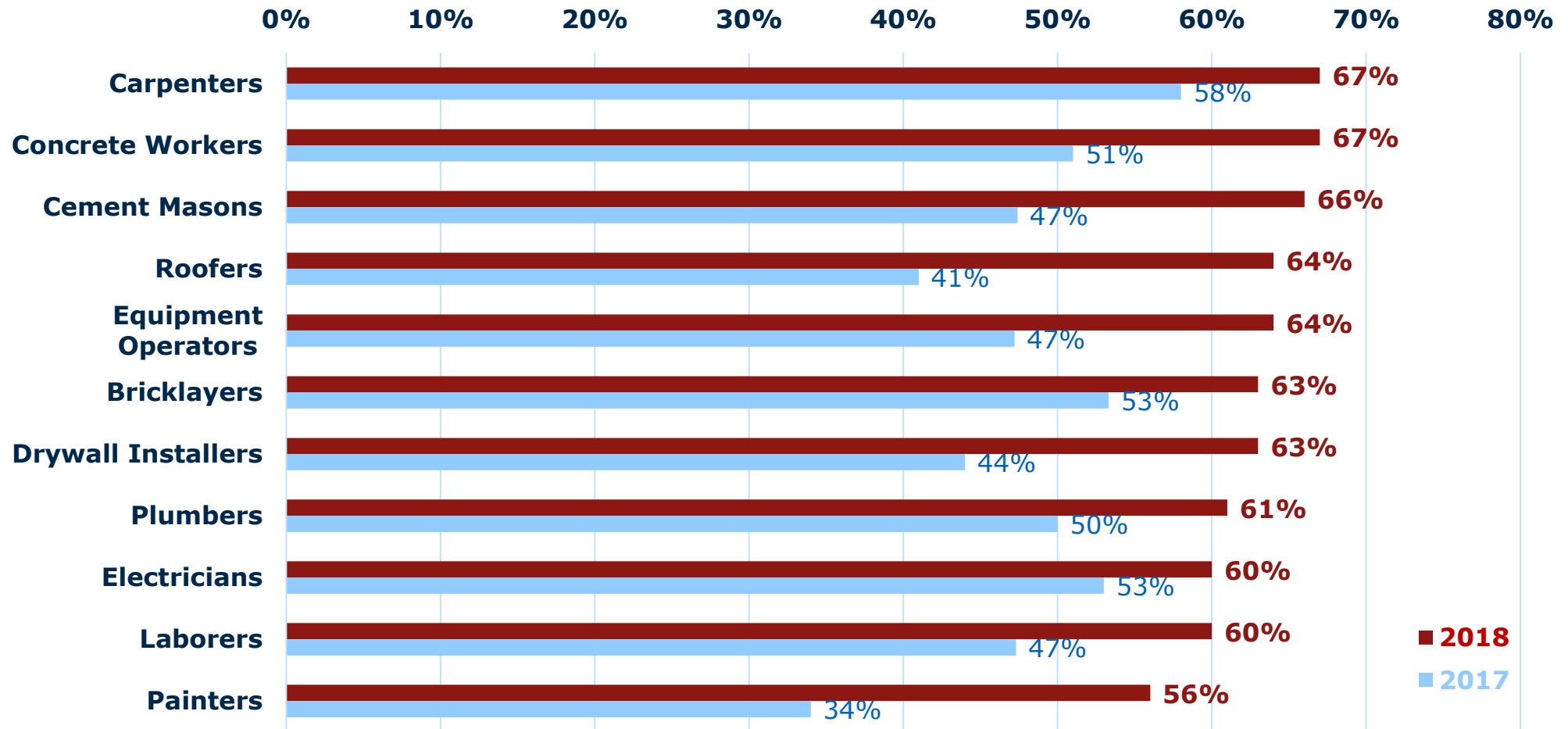


Employment in Residential Construction Has Stalled Even as the Unemployment Rate for Construction Workers Has Plunged



Its Getter Even Tougher to Hire in the Trades

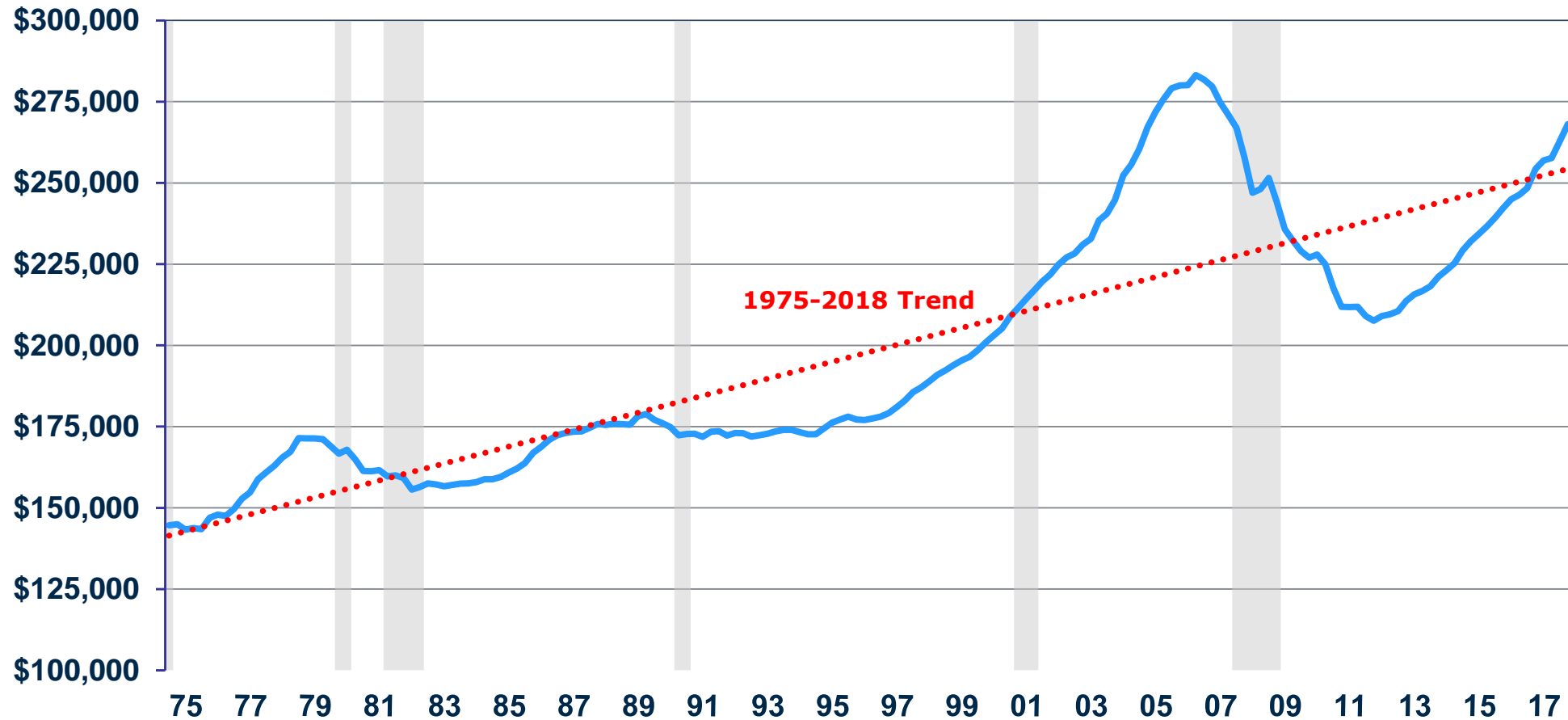
Position Types that General Contractors are Having Trouble Filling



Source: Associated General Contractors of America, 2017 and 2018 Surveys

Home Prices Once Again Above Their Long-Term Trend

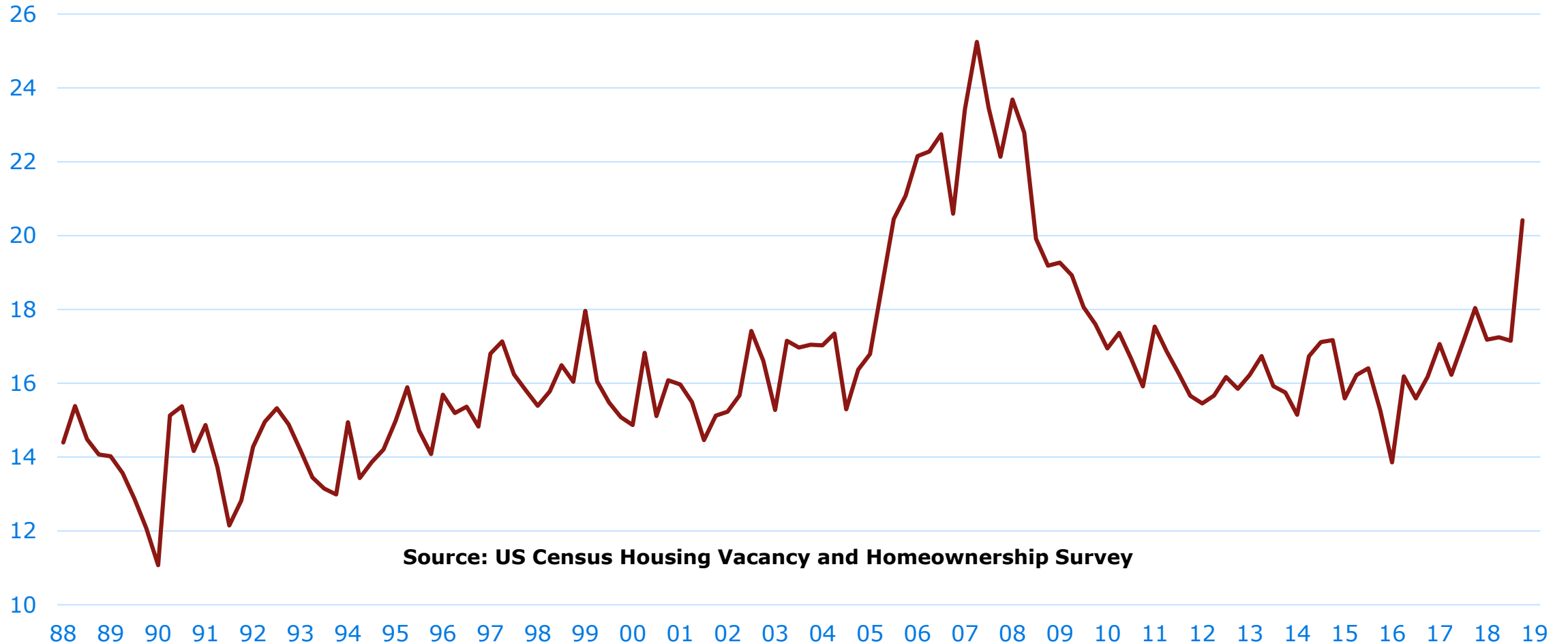
Median Existing Single-Family House Price in 2018 USD



Sources: Dallas Fed, National Association of Realtors, FEA calculations

Home Prices Are Surging Relative to Rents

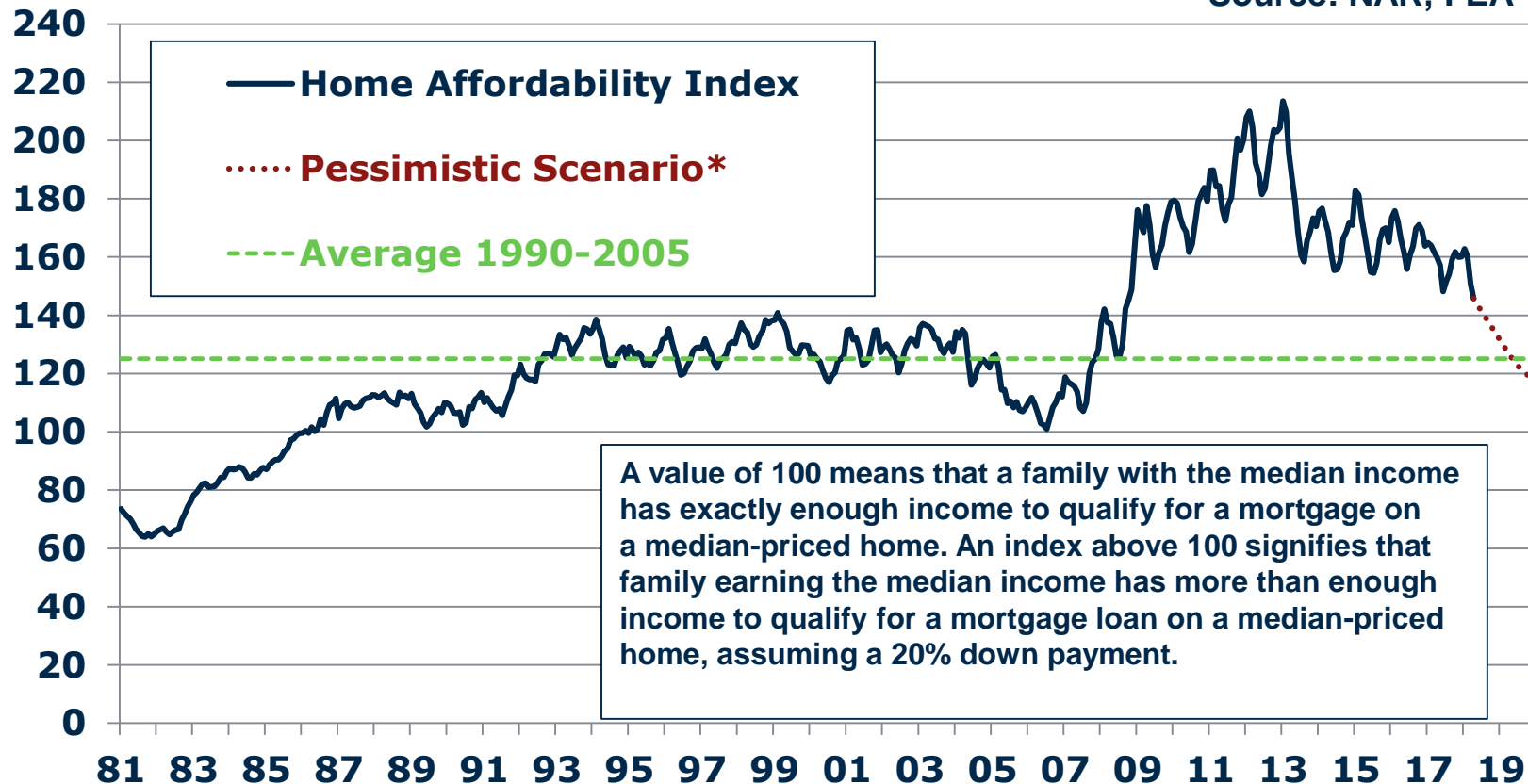
Median Home Price-to-Rent Measured in Years of Rent Required for Purchase



Source: US Census Housing Vacancy and Homeownership Survey

On a National Basis, Housing Will Remain Affordable Despite Higher Mortgage Rates and Home Prices

Source: NAR, FEA

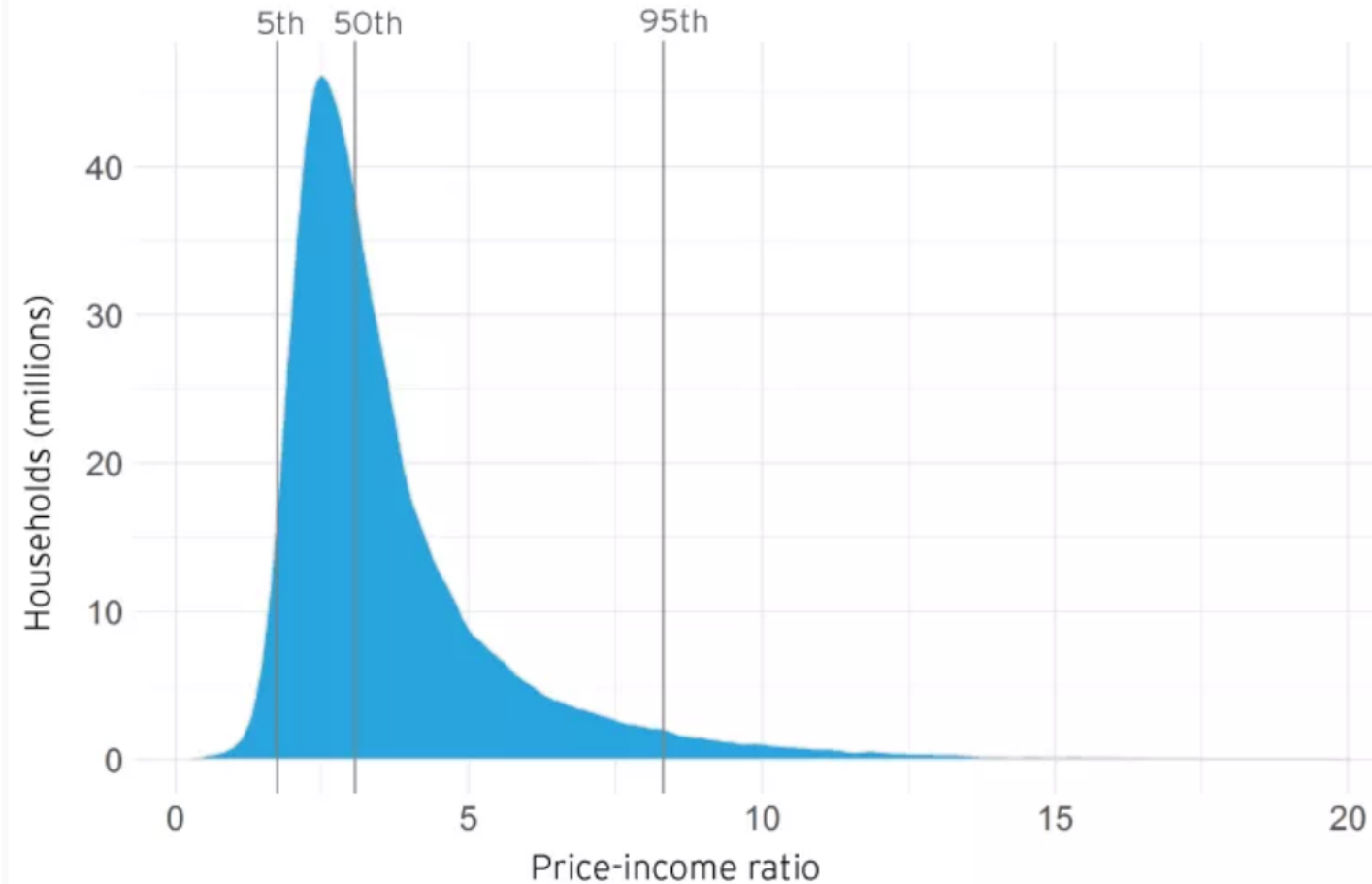


*Assumes mortgage rate gradually increases to 6% by end of 2019, nominal income growth averages 3% annually, and home prices increase at a 7% annual rate.

Affordability is Regional Problem

The U.S. does not have a national affordability problem

Household-weighted distribution of price-income ratio, 2012-16



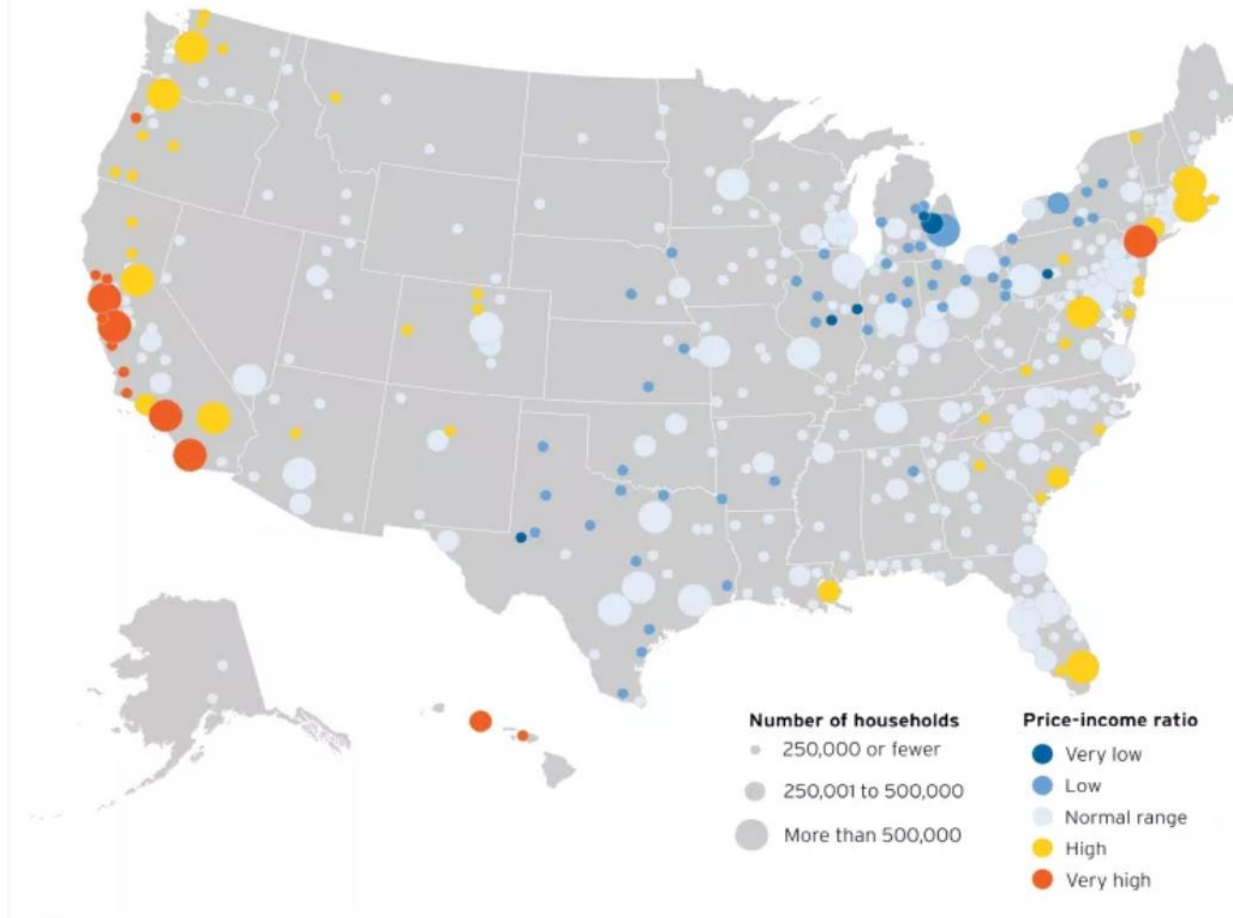
Note: Graph shows the distribution of the home price-income ratio in Census tracts weighted by the number of households living in each tract. Vertical lines indicate national percentile breaks.

Source: Brookings analysis of 2012-16 ACS data

Housing is Expensive on West Coast and Northeast

Hard to become a homeowner vs. hard to build housing wealth

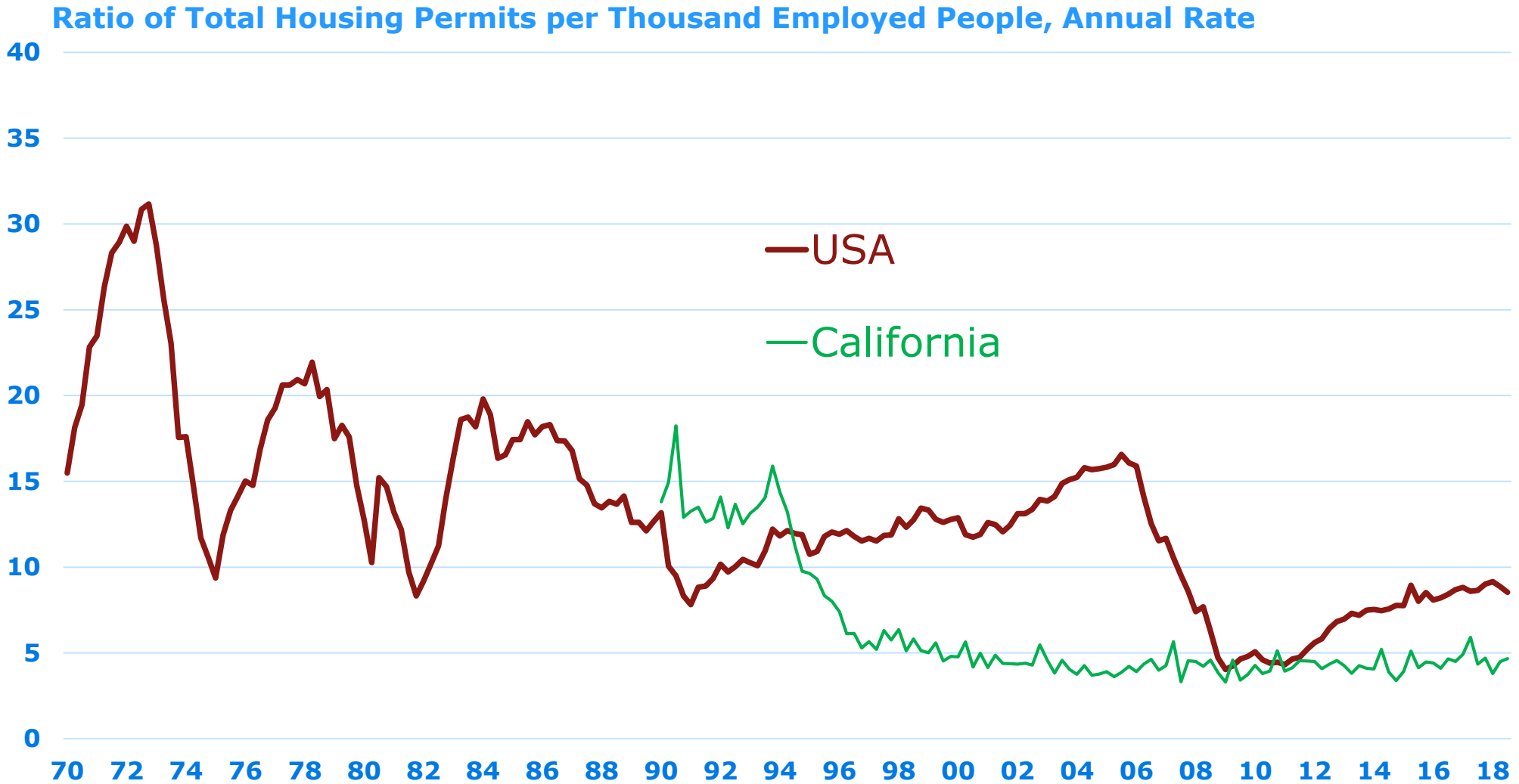
Average price-income ratio by metro area, 2012-16



Note: Metro-level price-income ratios are averages across constituent tracts. Price-income categories are assigned based on the national distribution, as follows: very low (bottom 10%), low (11-25%), normal range (26-75%), high (76-89%), and very high (top 10%). Source: Brookings analysis of 2012-16 American Community Survey data

B Metropolitan Policy Program
at BROOKINGS

California is Massively Underbuilding



San Jose, California

Sold! (for a mere \$938,000)



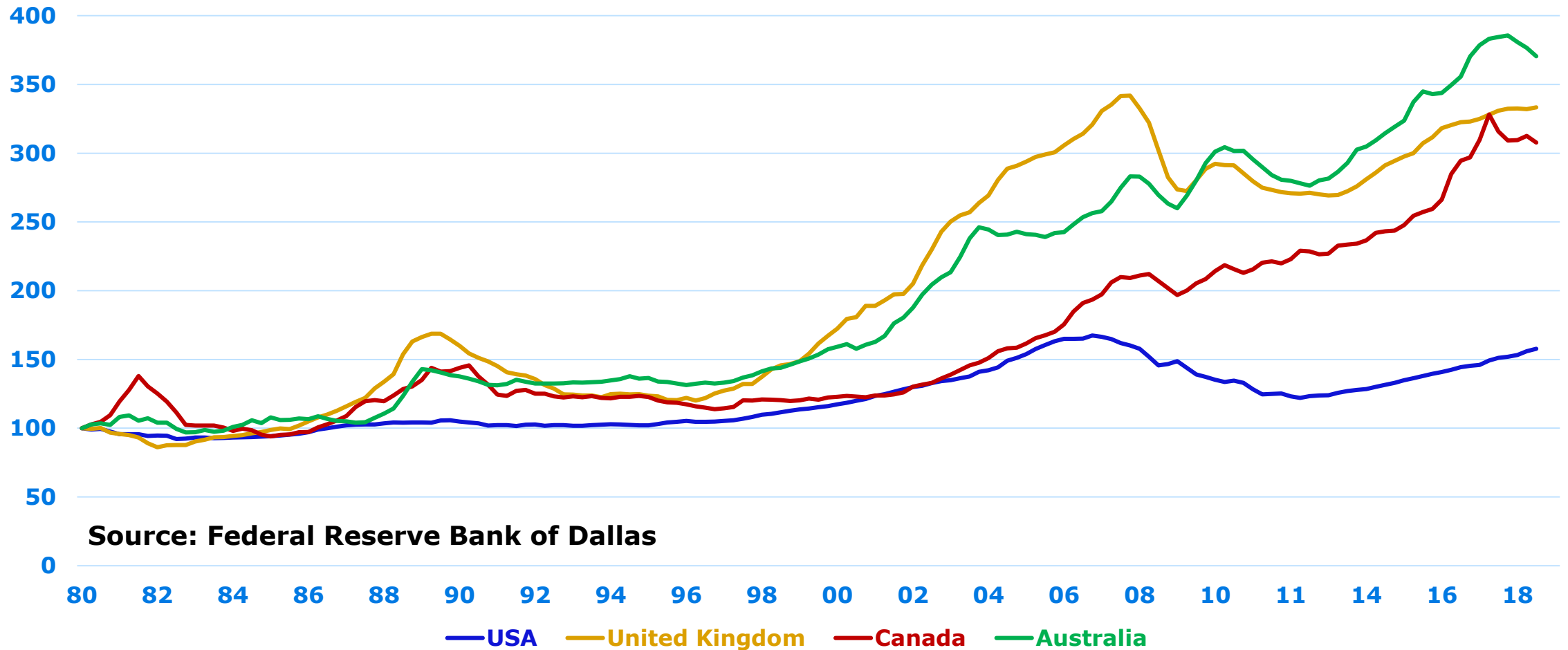
Sugarland, Texas

(List Price: \$950,000)



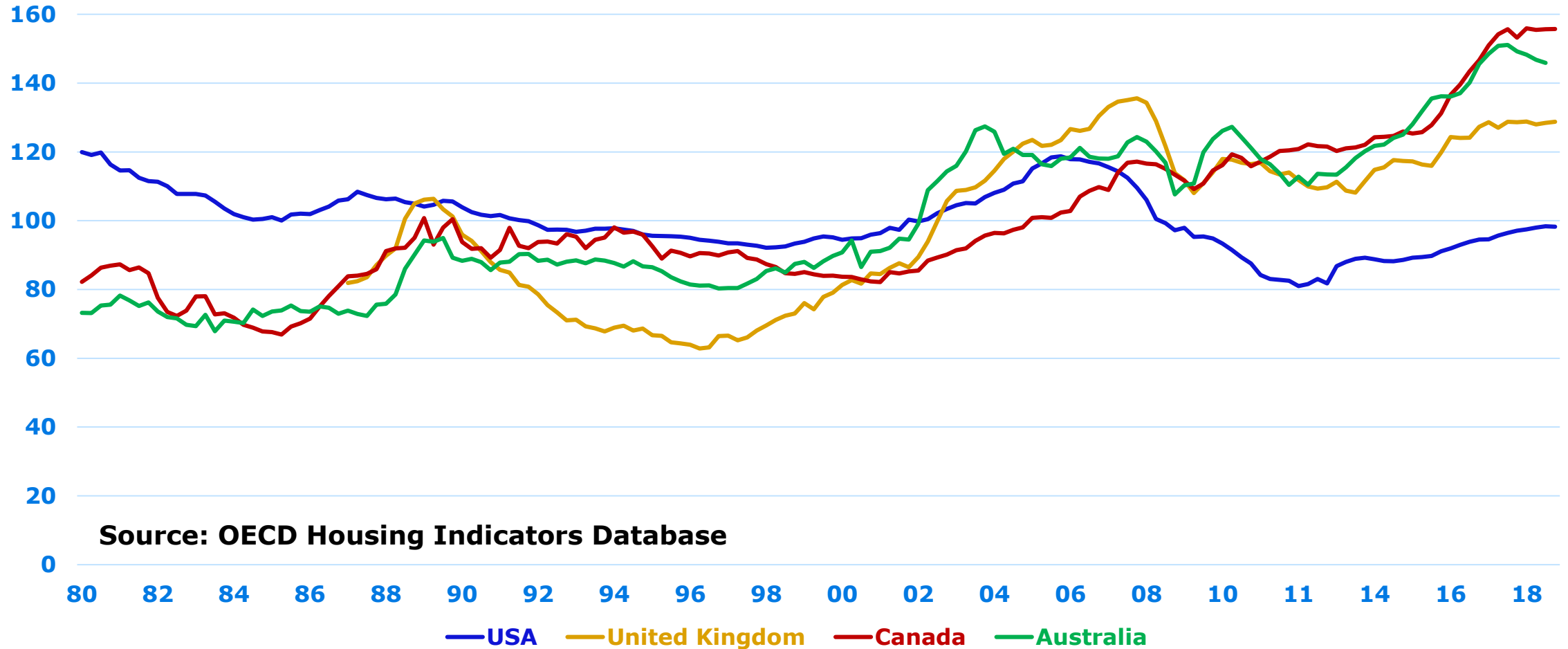
Are US Houses Expensive? (1)

Real Home Prices, 1980Q1=100

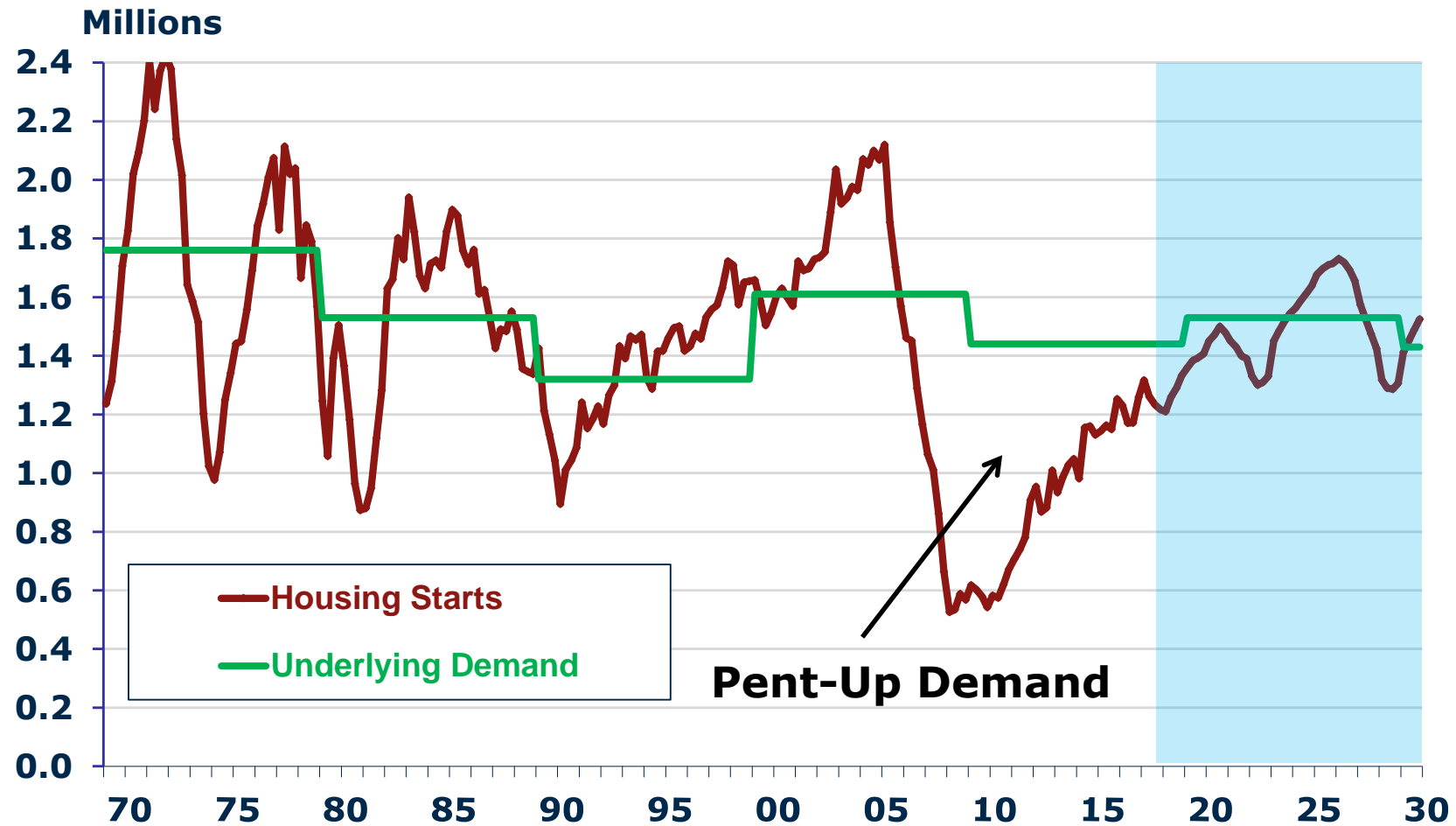


Are US Houses Expensive? (2)

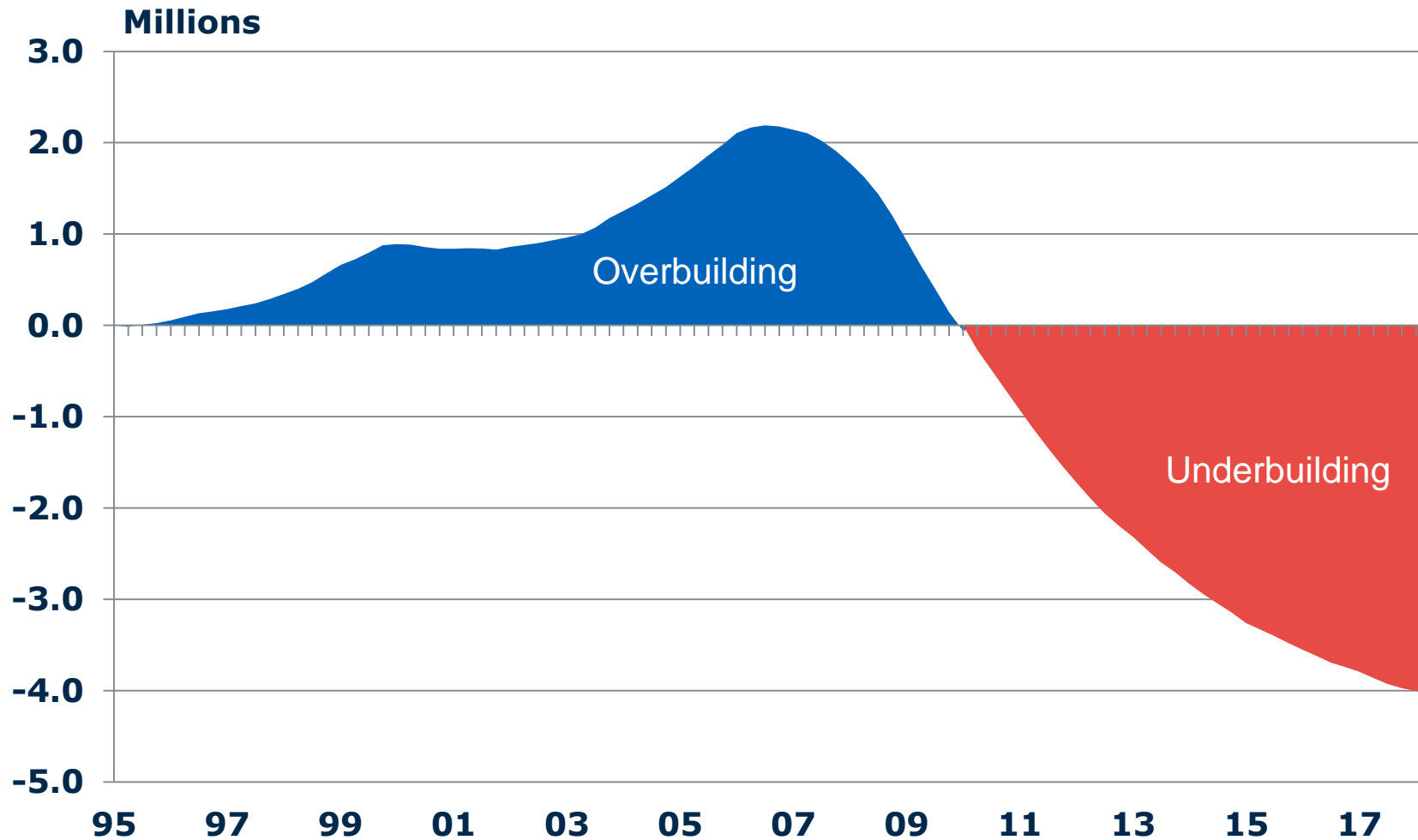
House Price-to-Income Ratio, Long-Term Average=100



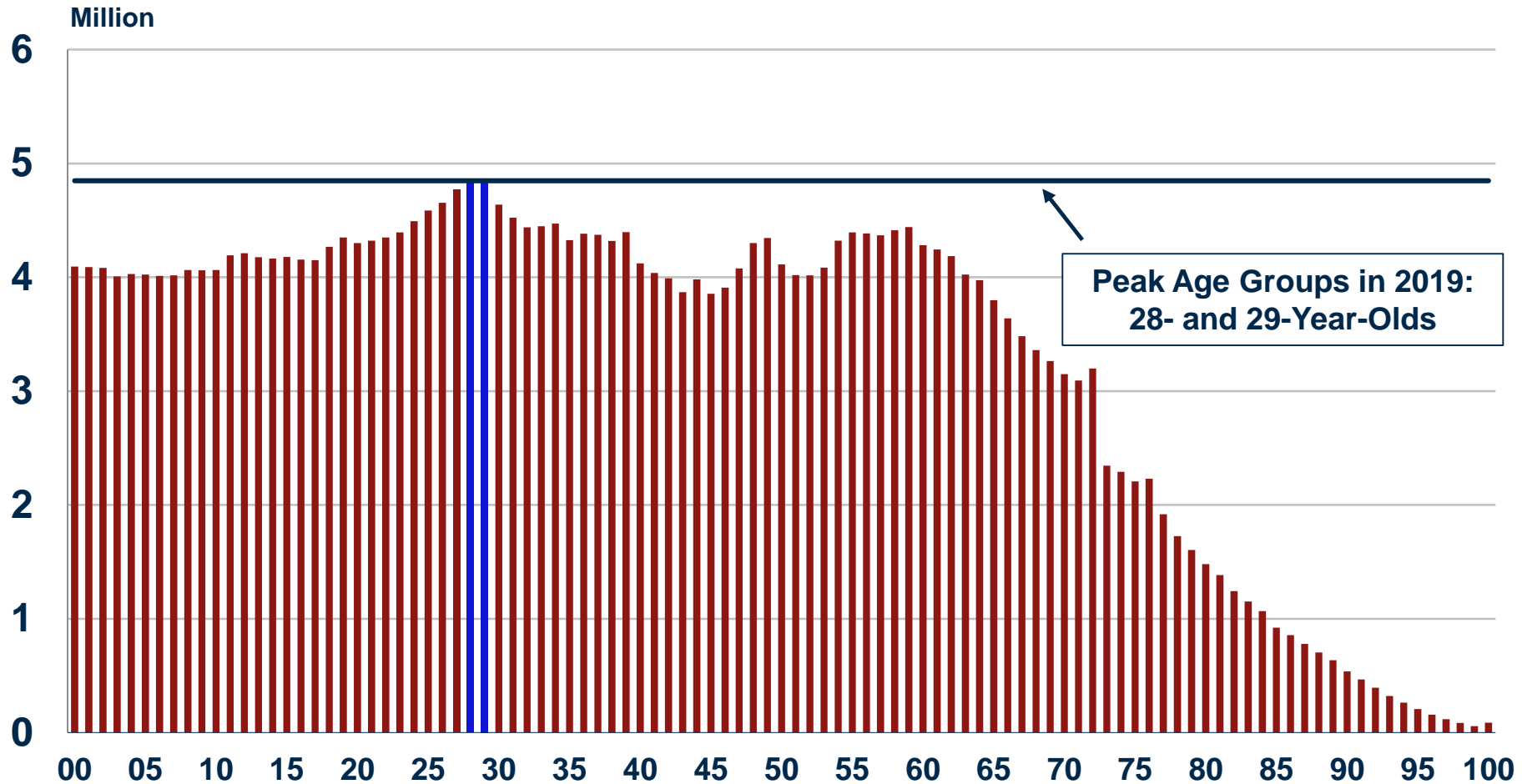
US Has Been Underbuilding for a Decade



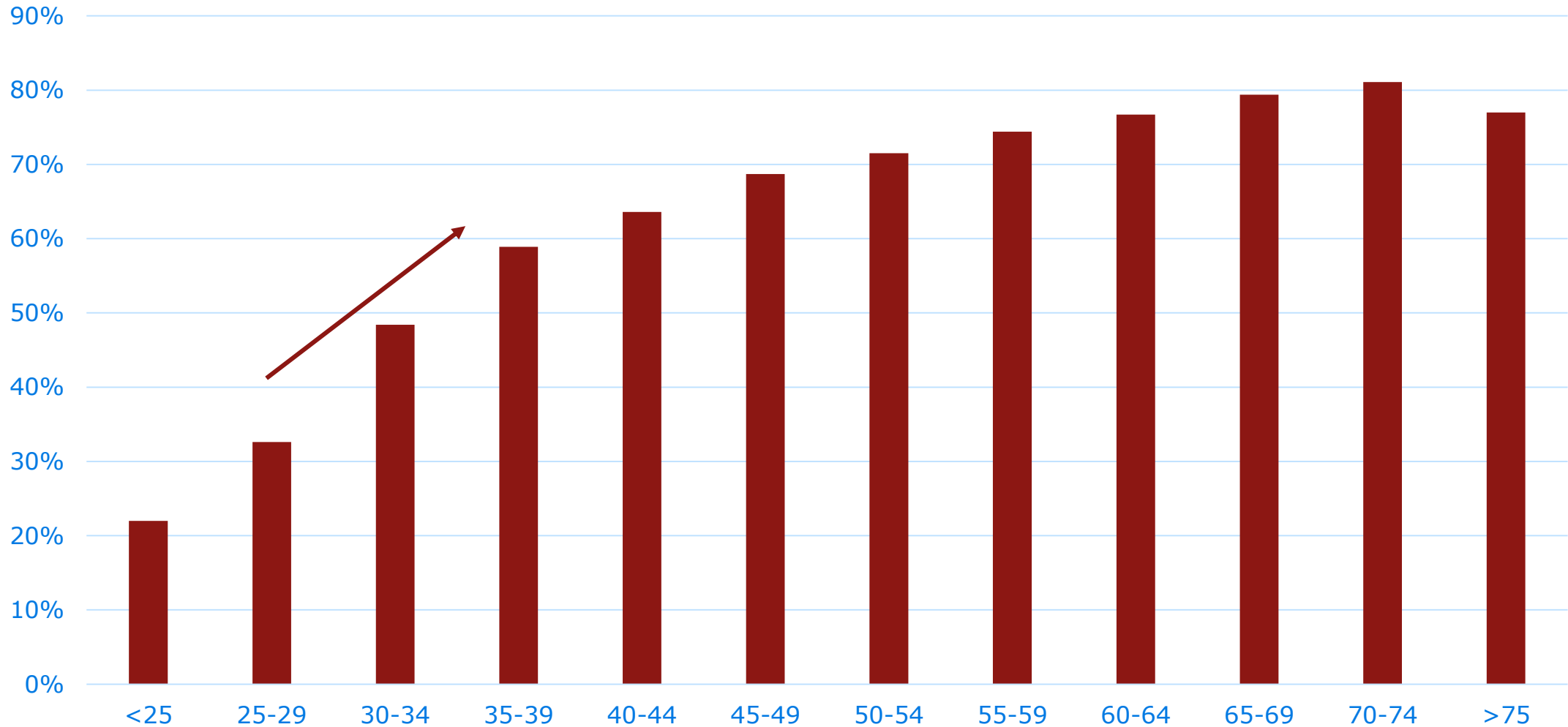
Cumulative Over-/Underbuilding of Conventional US Homes



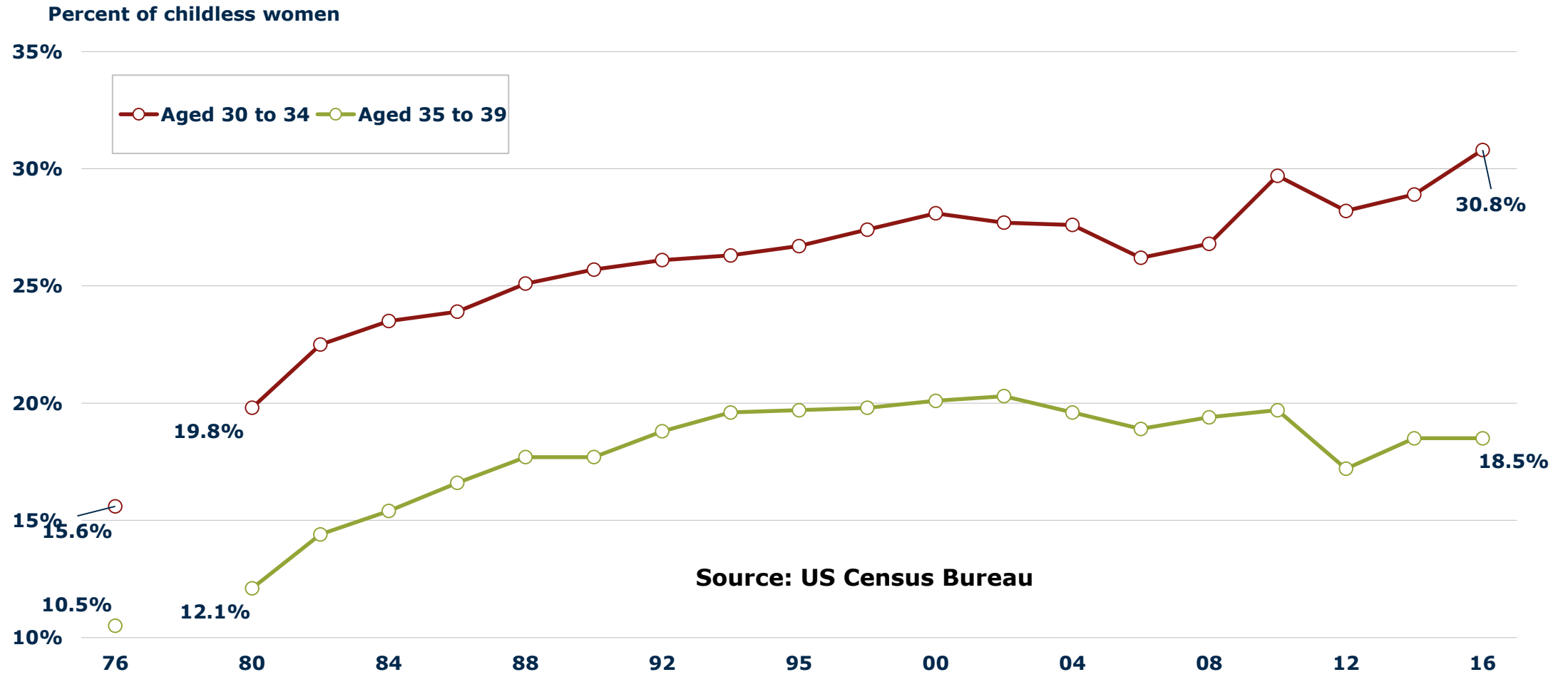
US Population by Age (as of July 1, 2019)



Homeownership Rates Increase Markedly In 30-39 Age Cohort

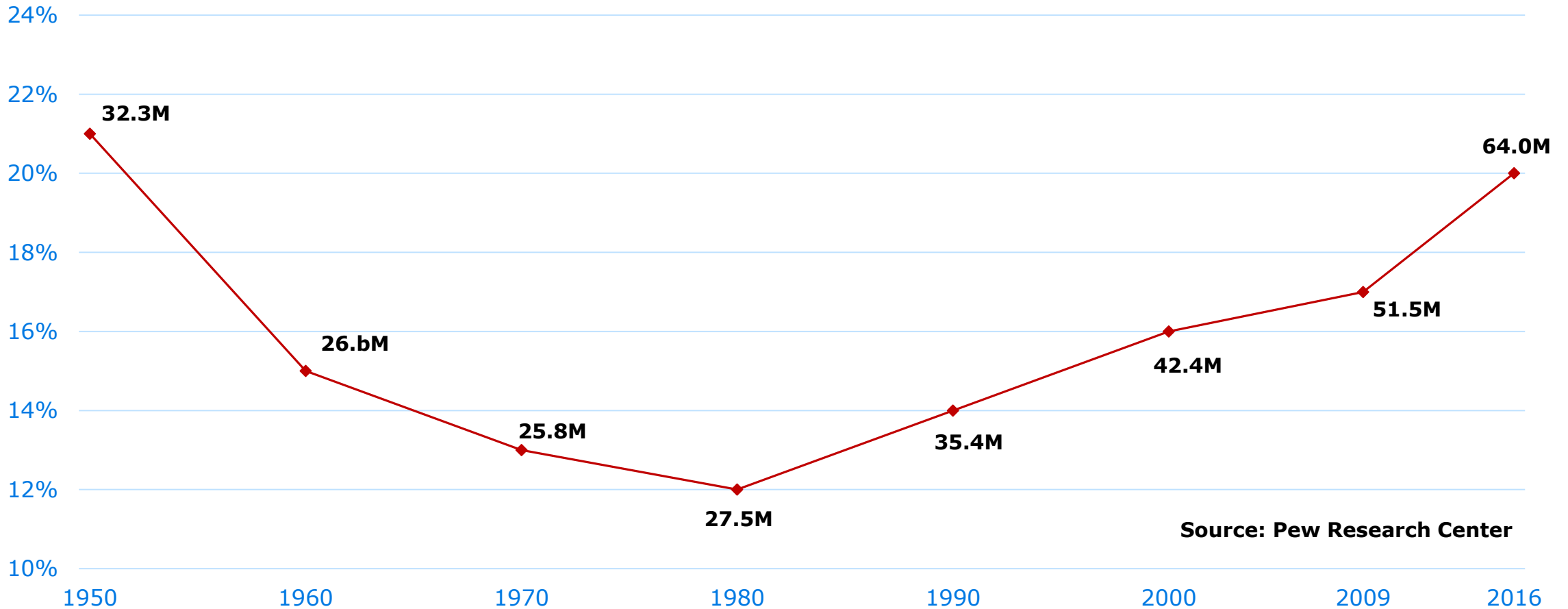


Women Increasingly Delaying Birth Until Late 30s



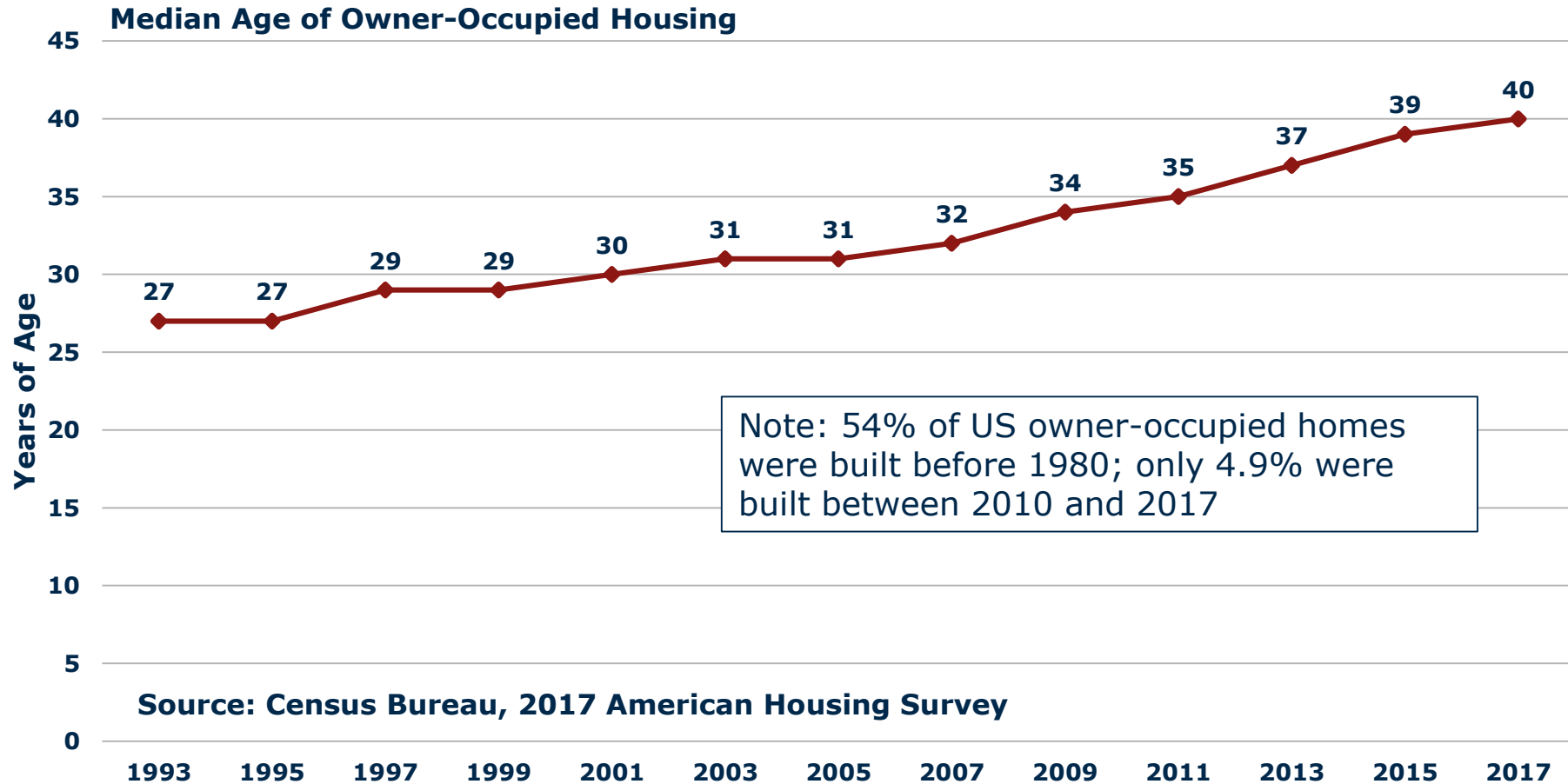
Multigenerational Living Arrangement on the Rise

% of population in multi-generational households



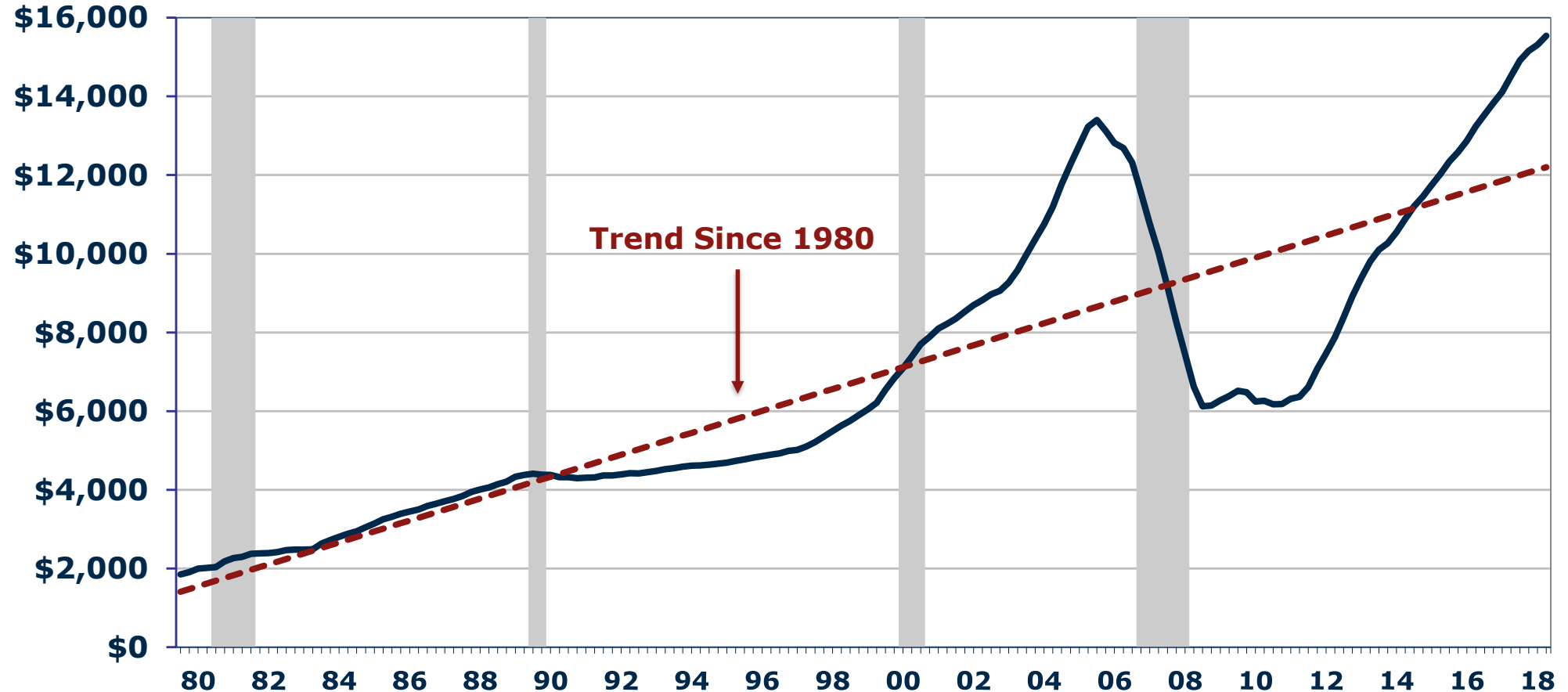
Source: Pew Research Center

The US Housing Stock Has Aged Considerably

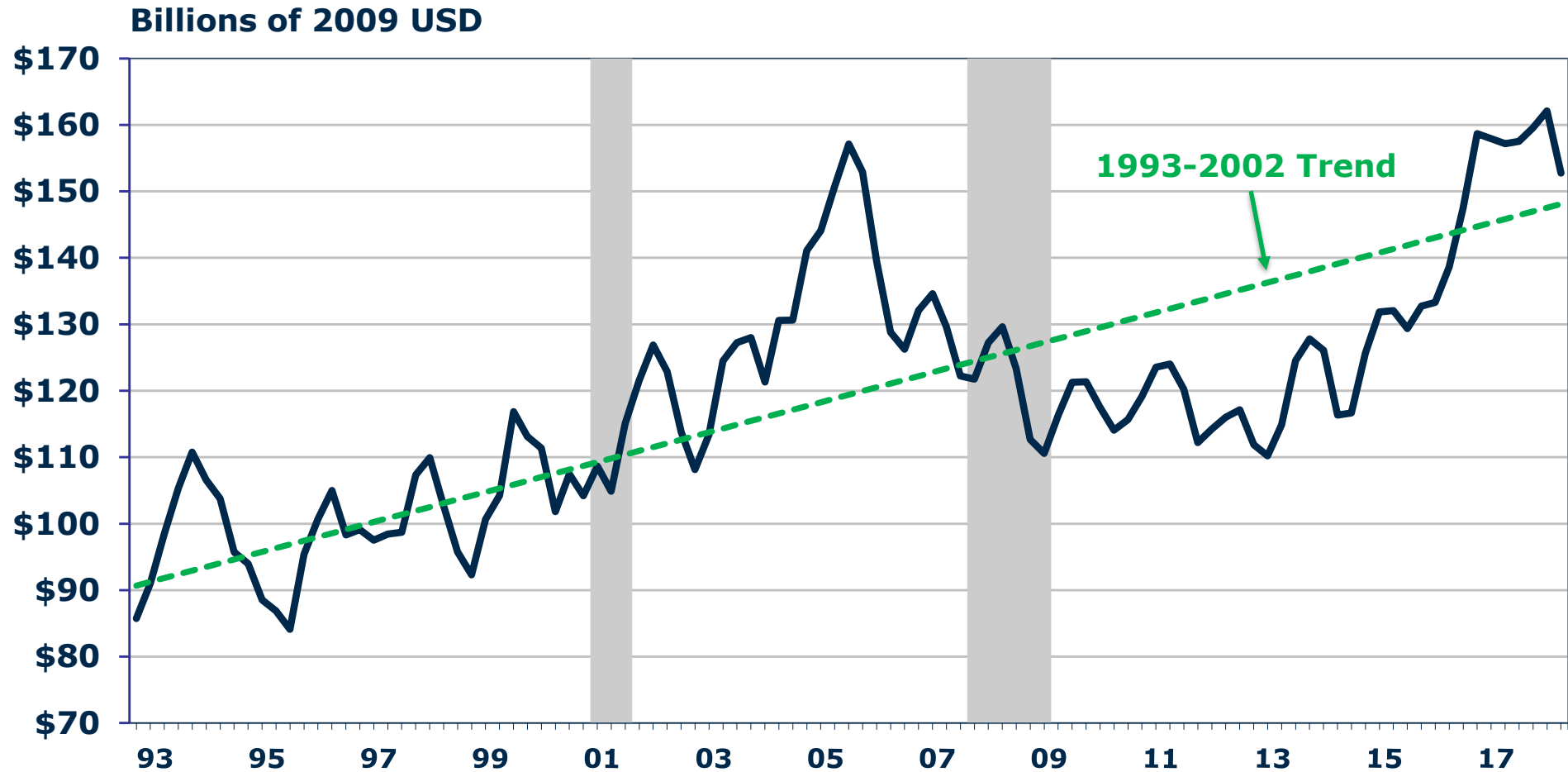


Rapid Increase in Home Equity Should Boost Improvements

Owners' Equity in Household Real Estate - Net Worth in \$Bil.

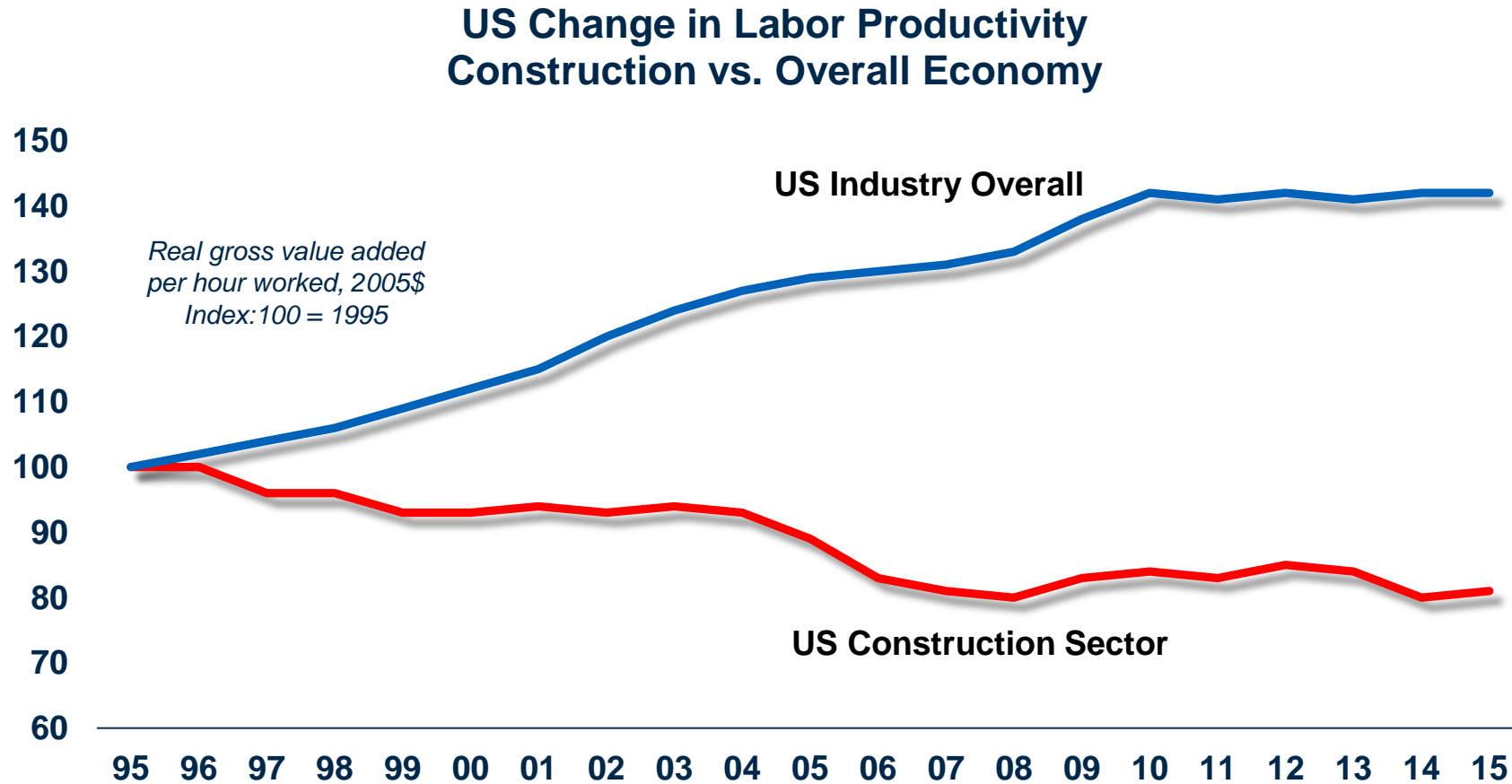


Improvement Expenditures Remain Above Trend



We Are on the Verge of a Revolution in the Construction Industry

The Construction Industry Has A Miserable Productivity Record




Source: McKinsey Global Institute, Reinventing Construction Through a Productivity Revolution

Something Needs to Change



Construction is a Productivity Laggard

	Circa 1940s	Circa 2016	Key advances	Productivity Growth ¹
Agriculture			Land assembly and automation for scale Advanced bioengineering to increase yields	1,512
Manufacturing			Entirely new concepts of flow Modularized and standardized designs Aggressively automated to increase production	760
Retail			Utilized scale advantages and cutting edge logistics to provide affordable goods to the masses	699
Construction			Limited improvements in technological capabilities, production methods, and scale	6

¹ Cumulative real growth in the United States, %, 1947-2010

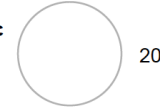
Residential Construction Trails on Productivity & Growth

US example

Specialty
Building

Civil
Industrial

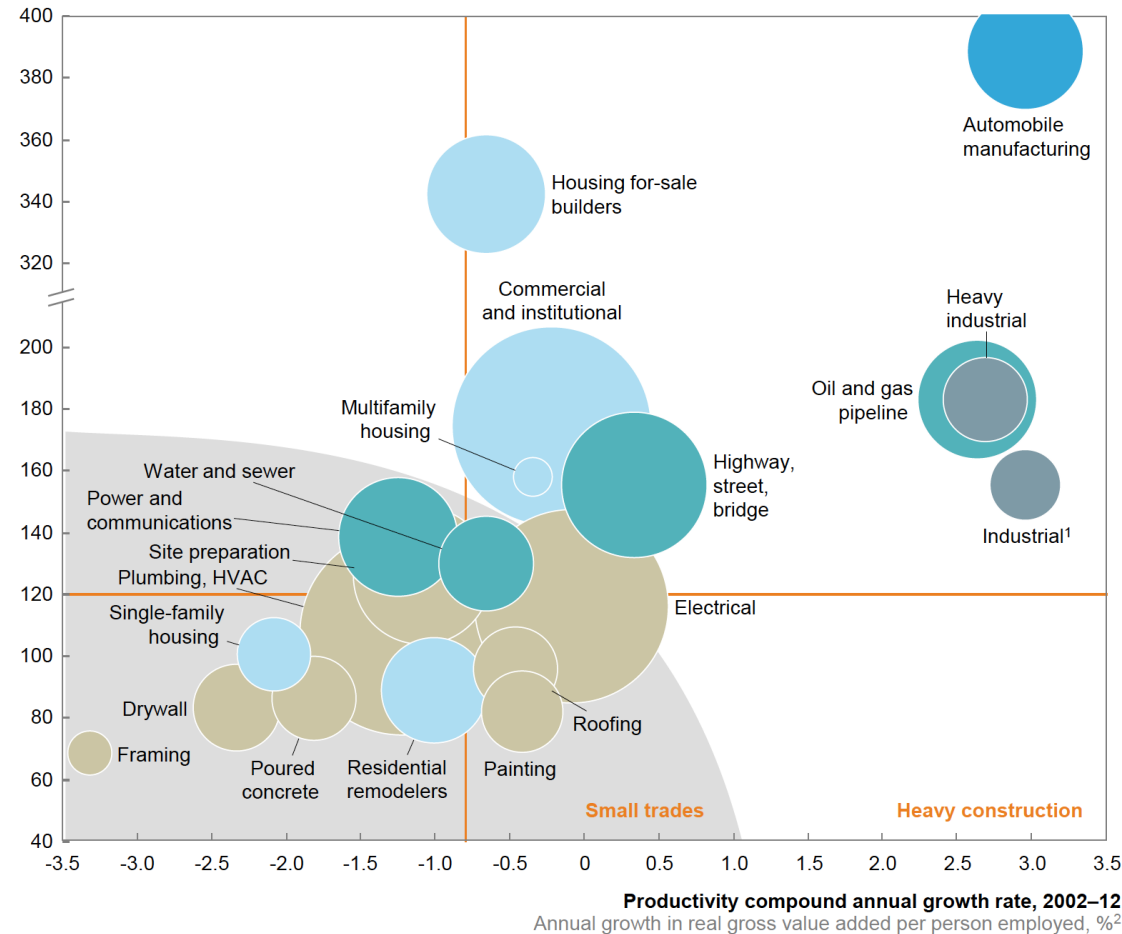
Size indicates economic value added, 2012
2015 \$ million



US construction average

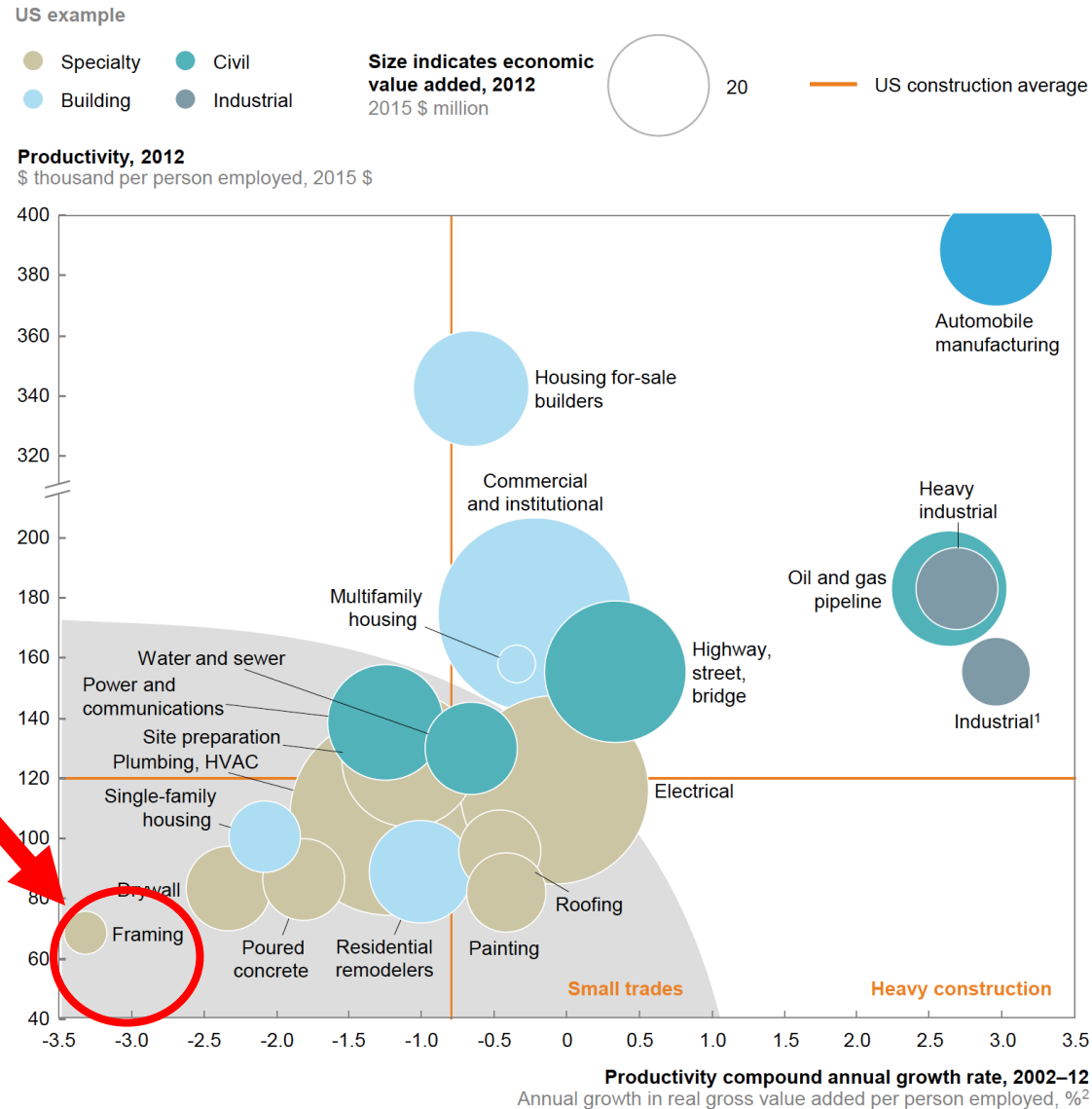
Productivity, 2012

\$ thousand per person employed, 2015 \$



Source:
US Economic Census
McKinsey Global Institute
www.getfea.com

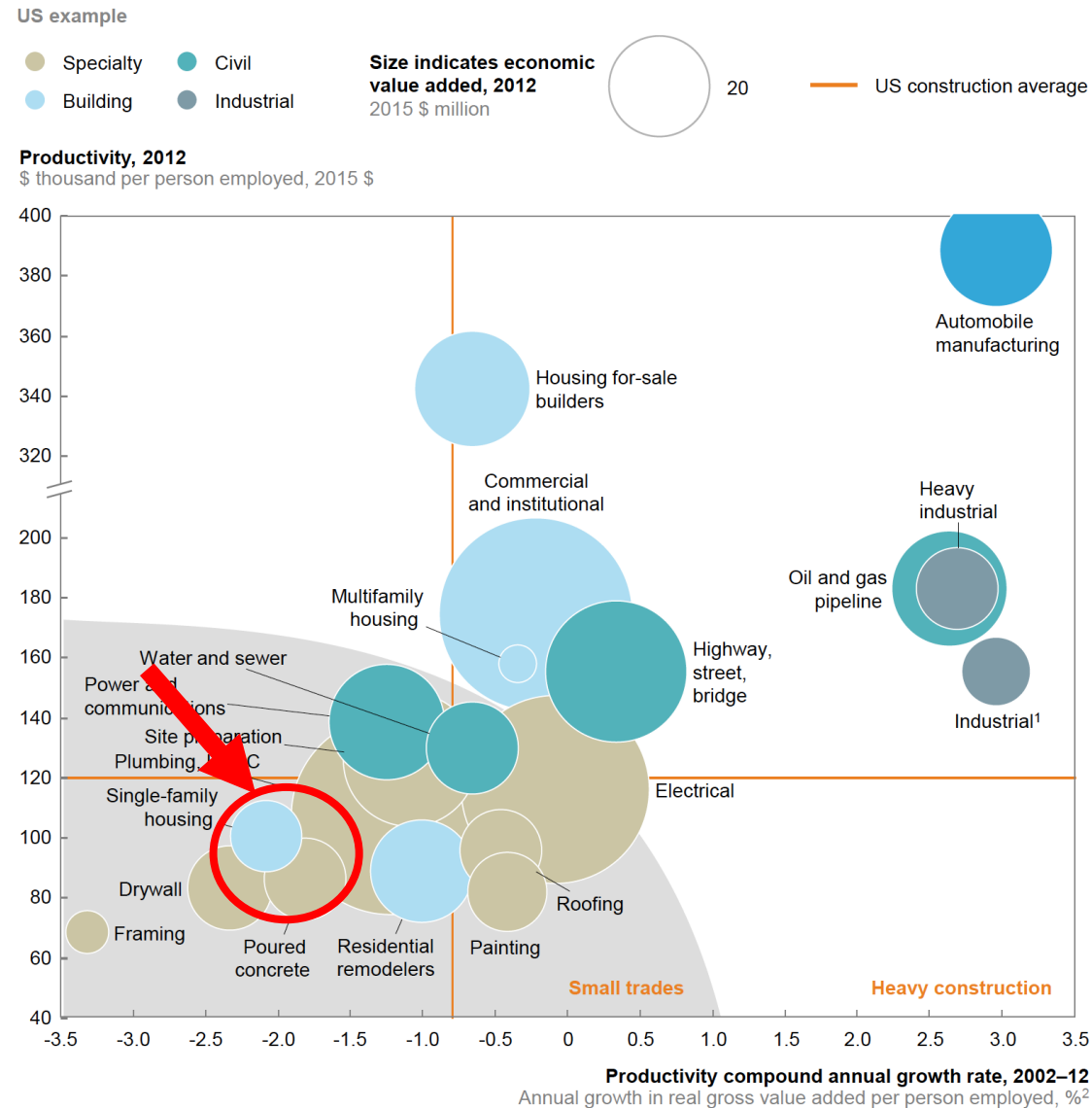
Framing is at the bottom of the heap



Source:
US Economic Census
McKinsey Global Institute

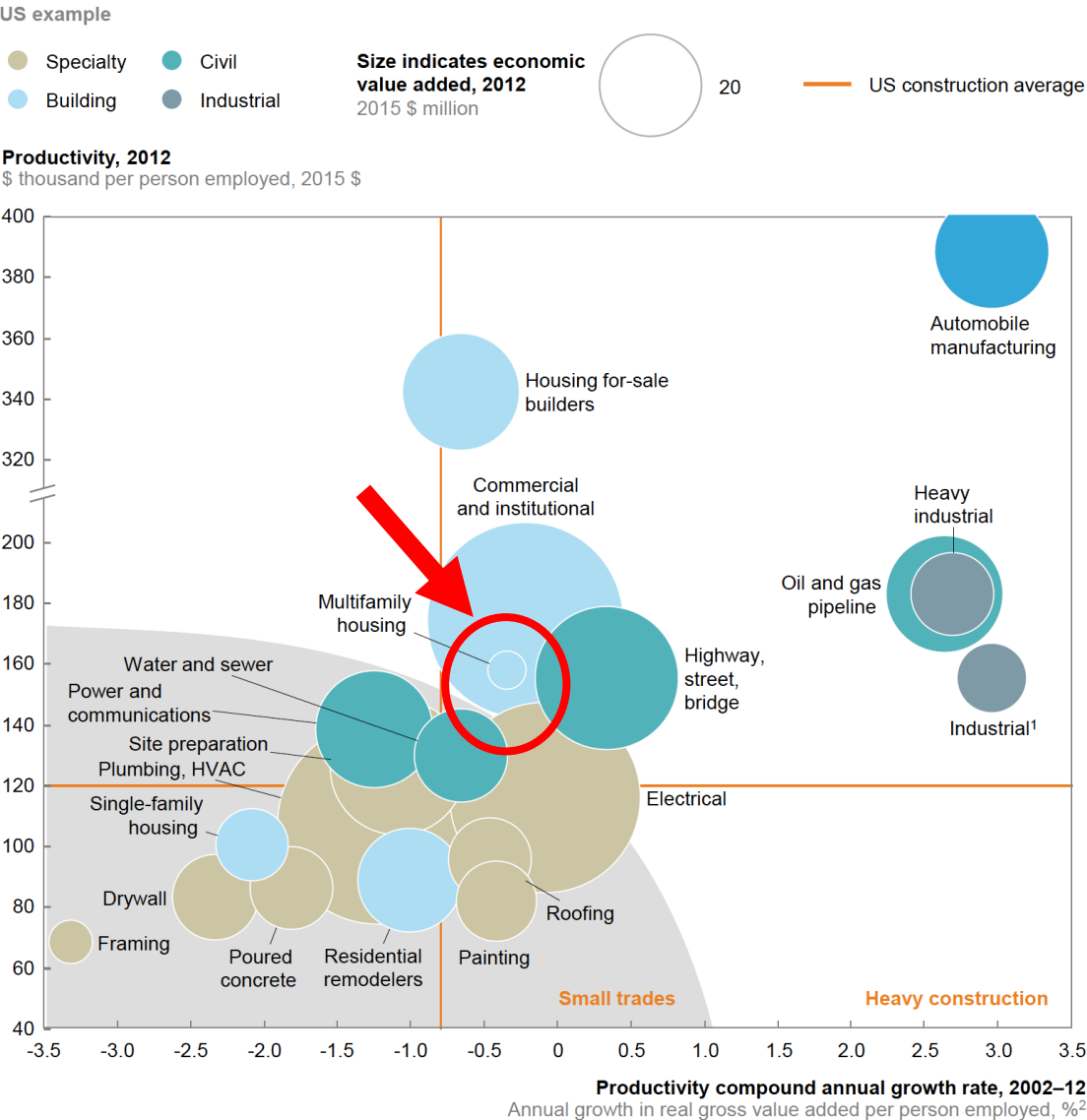
Single Family Housing isn't much better

Source:
US Economic Census
McKinsey Global Institute



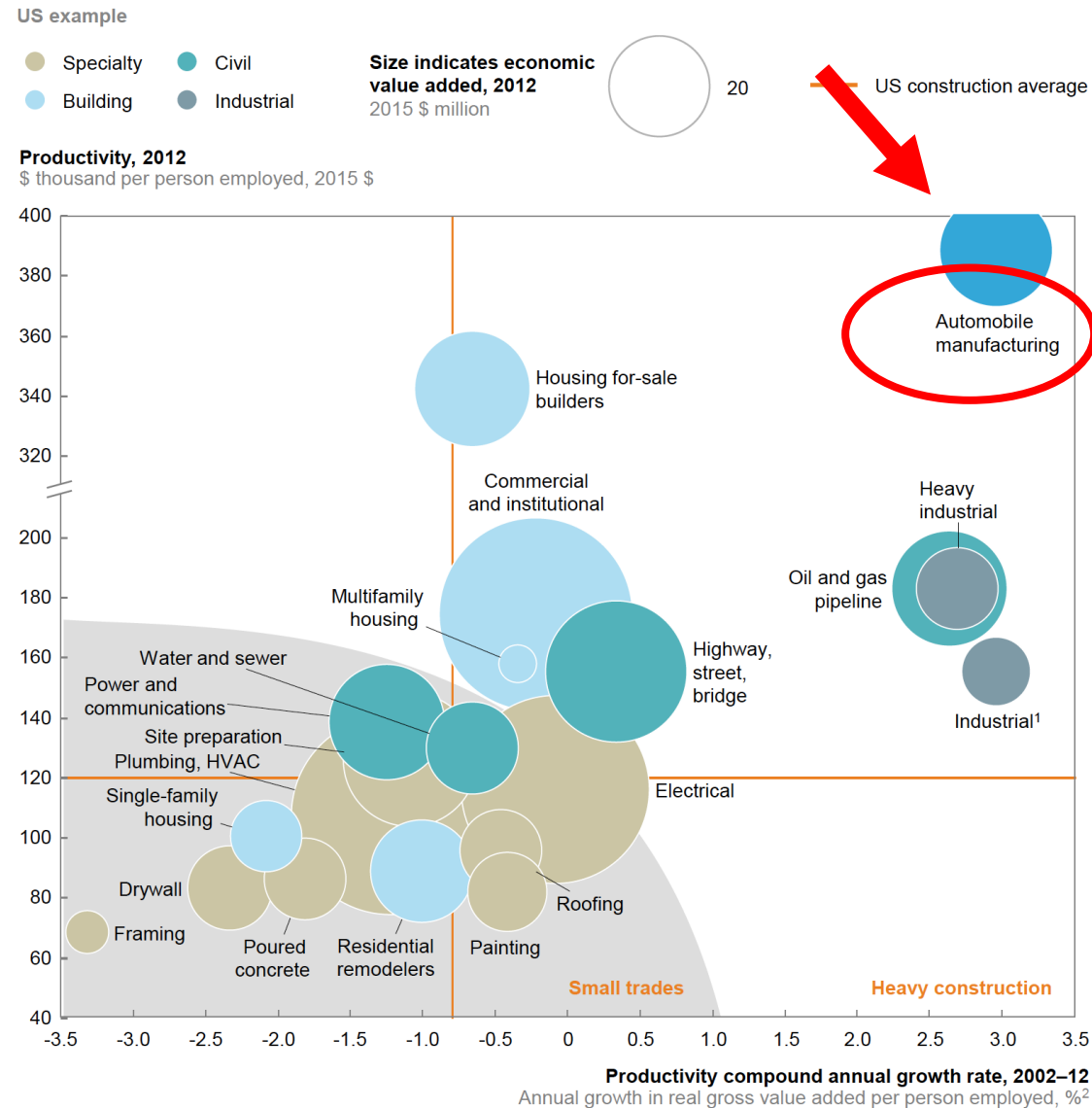
Multi Family Housing is better, but...

Source:
US Economic Census
McKinsey Global Institute

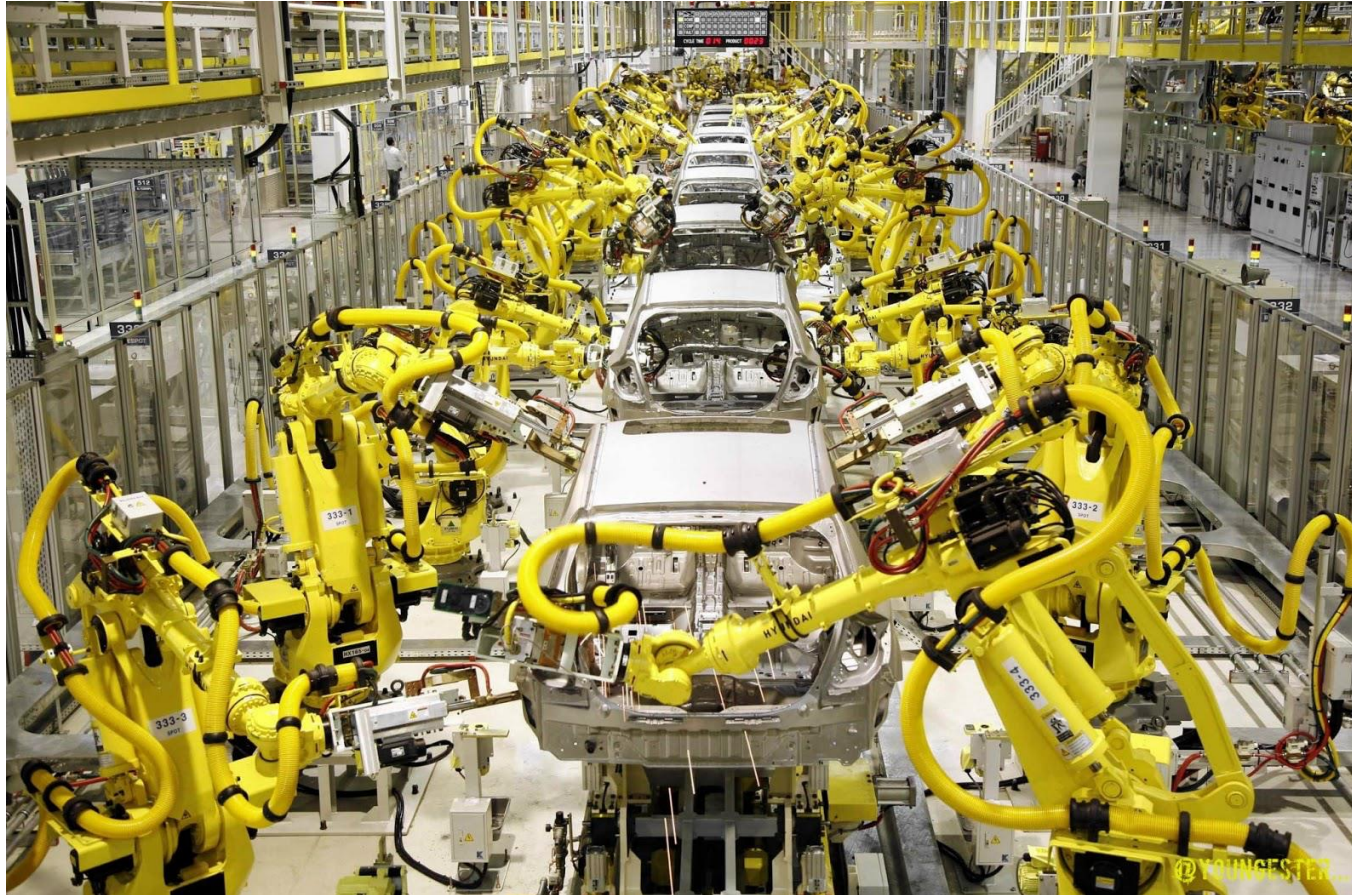


It Still Lags Automobile Manufacturing Productivity

Source:
US Economic Census
McKinsey Global Institute



Why Has Automobile Manufacturing Experienced Such High Productivity Growth?



**We don't
build cars
in our
driveways**

Benefits of Offsite Construction

- **Weather:** construction is indoors, where the weather is always sunny!
Delivery is JIT and assembly is fast
- **Greater efficiency, quality & predictability:** greater precision in the manufacturing process, resulting in higher quality (fewer callbacks and warranty issues) – **and far less waste!**
- **Greater procurement efficiency:** material requirements more accurately calculated, buying in bulk – **and buying direct from manufacturer**
- **Safety:** Falls from height and equipment accidents not as much of an issue offsite



Brock Commons, in Vancouver recently completed



Marriott is Pioneering Modular



Marriott is Pioneering Modular



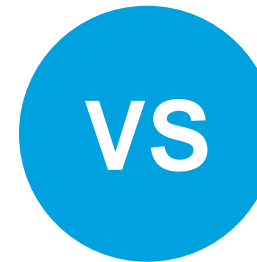
Benefits of FIOSS – Faster Build



Stick Framing



15 Days
or 71 Man-Days



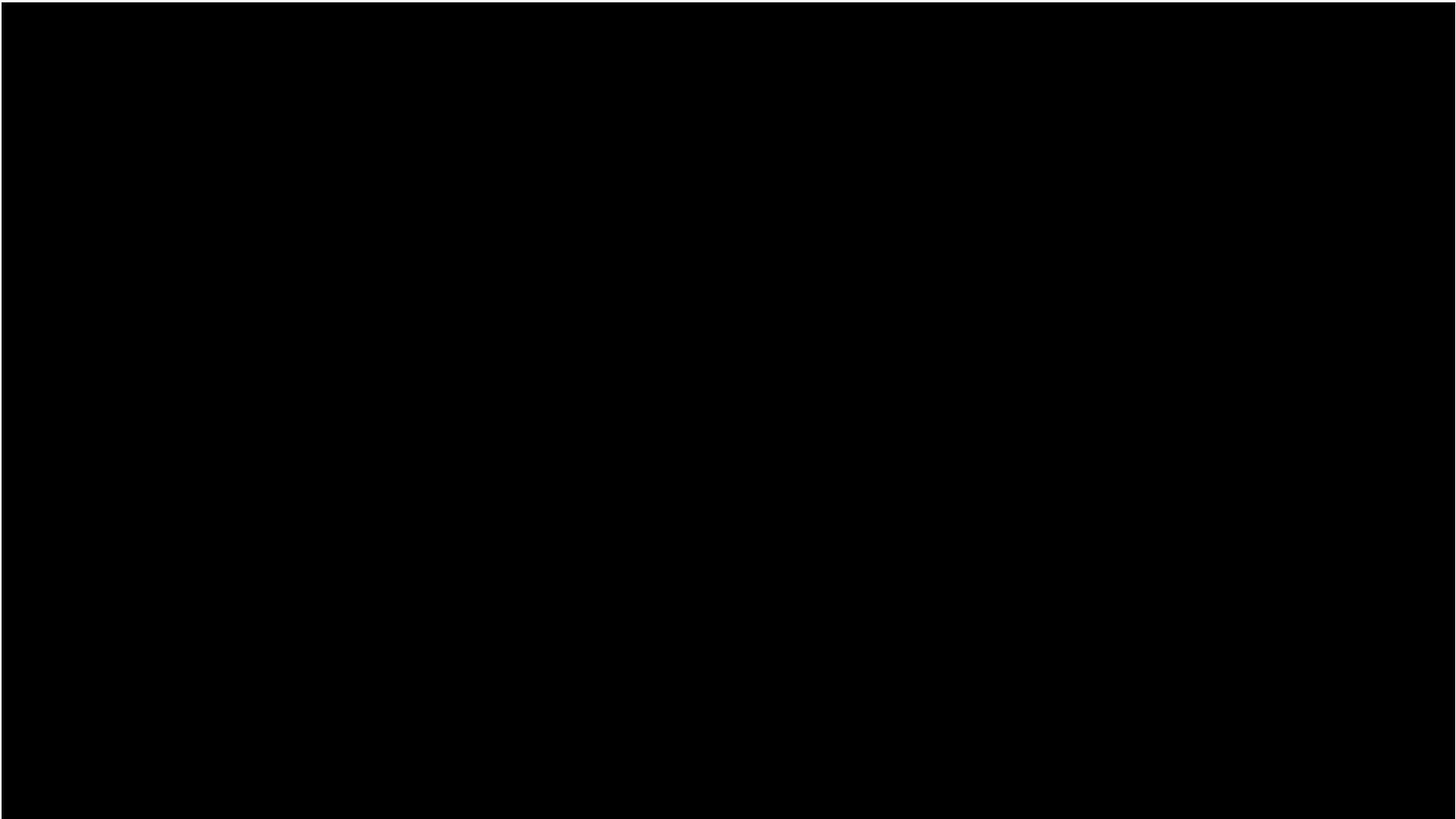
FIOSS



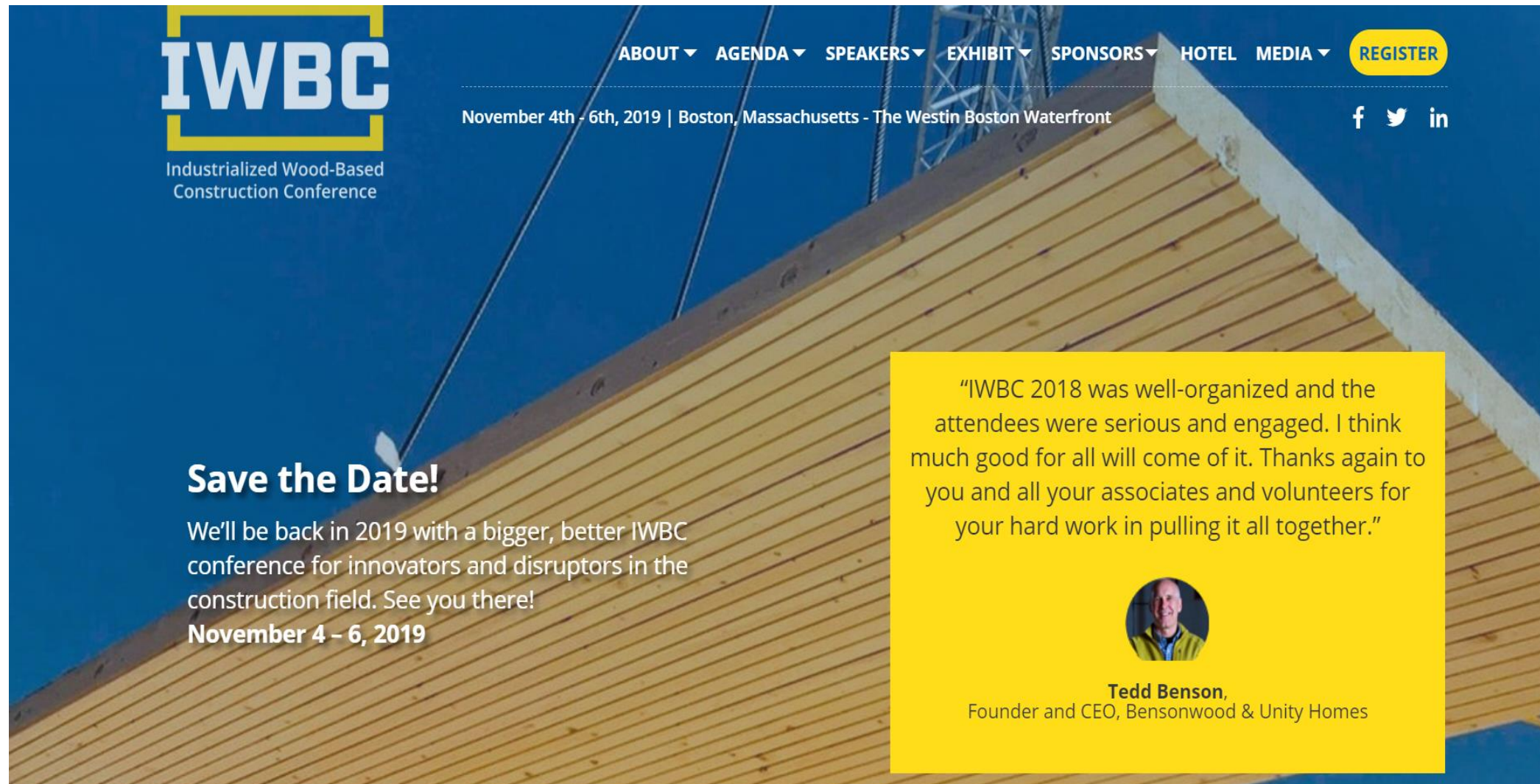
4 Days
or 14 Man-Days


**Productivity Increase
of 507%**





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Industrialized Wood-Based
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Save the Date!

We'll be back in 2019 with a bigger, better IWBC conference for innovators and disruptors in the construction field. See you there!
November 4 - 6, 2019

"IWBC 2018 was well-organized and the attendees were serious and engaged. I think much good for all will come of it. Thanks again to you and all your associates and volunteers for your hard work in pulling it all together."



Tedd Benson,
Founder and CEO, Bensonwood & Unity Homes

Questions?

If you have questions or comments please don't hesitate to contact me at:

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Principal, Macroeconomics and Housing
Forest Economic Advisors

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blowney@getfea.com

www.getfea.com