NO TIME TO BUY

By: Anirban Basu

MPP, MA, JD, PhD

Sage Policy Group, Inc.

On Behalf of

School Employees Retirement System of Ohio
2022 Annual Board Retreat

February 18th, 2022

2021 – Specter of Inflation

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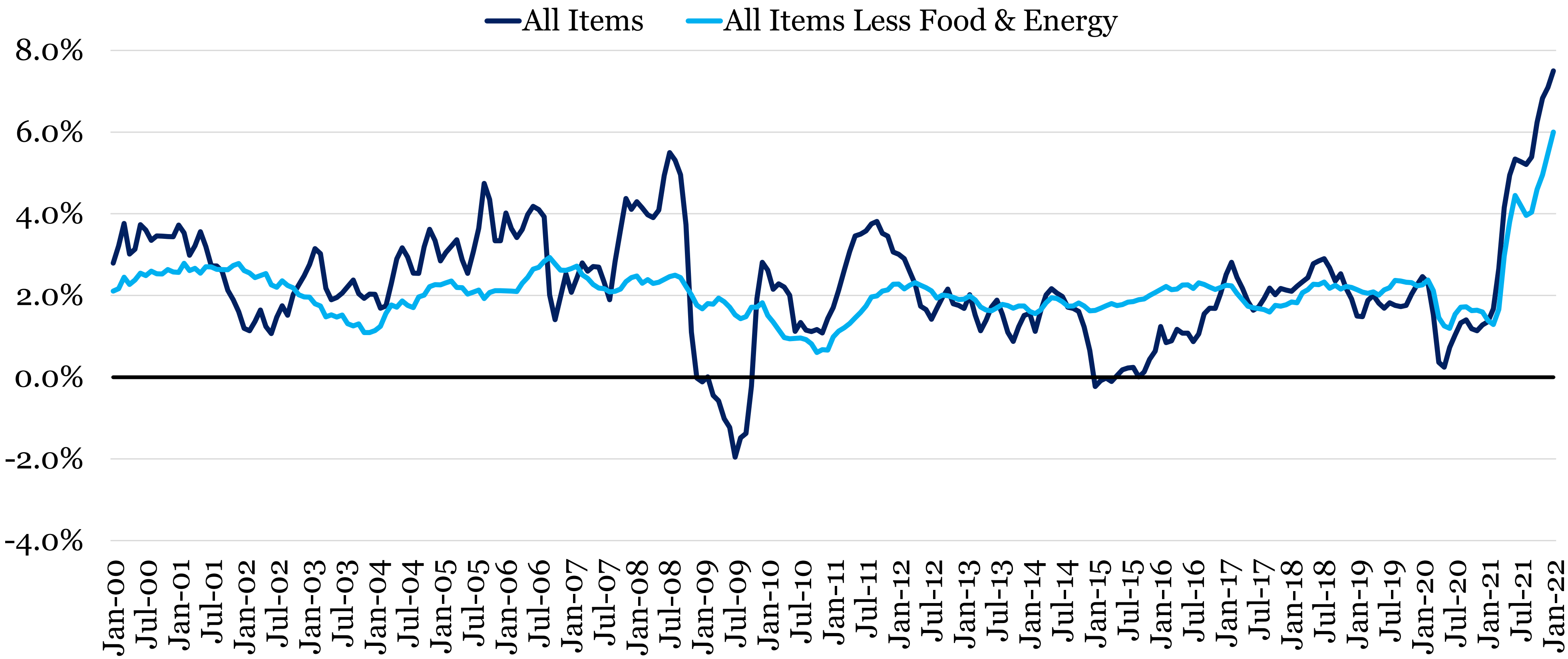
U.S. Consumer Price Index

12-Month % Change, 2000 – January 2022



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Source: U.S. Bureau of Labor Statistics

A Statement is Not Enough

"…Inflation has risen, largely reflecting transitory factors…"
(FOMC Statement, June 2021)

"…Inflation has risen, largely reflecting transitory factors…"
(FOMC Statement, July 2021)

"…Inflation is elevated, largely reflecting transitory factors…"
(FOMC Statement, September 2021)

"…Inflation is elevated, largely reflecting factors that are expected to be transitory…"
(FOMC Statement, November 2021)

"Supply and demand imbalances related to the pandemic and the reopening of the economy have continued to contribute to elevated levels of inflation."
(FOMC Statement, December 2021)

"…These problems have been larger and longer lasting than anticipated, exacerbated by waves of the virus. As a result, overall inflation is running well above our 2 percent longer-run goal and will likely continue to do so well into next year." (FOMC Chair Jerome Powell, December 2021)

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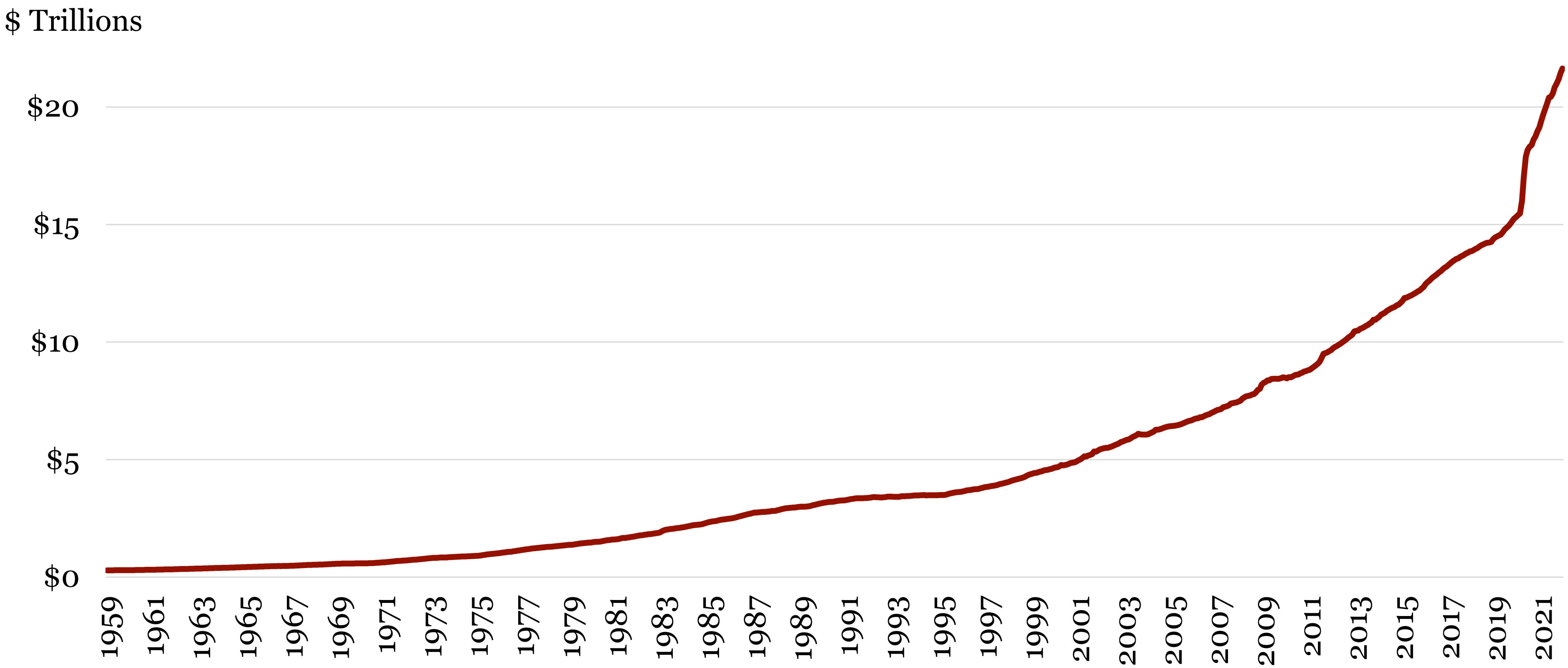
Source: Federal Reserve

U.S. Money Supply, 1959 – 2021



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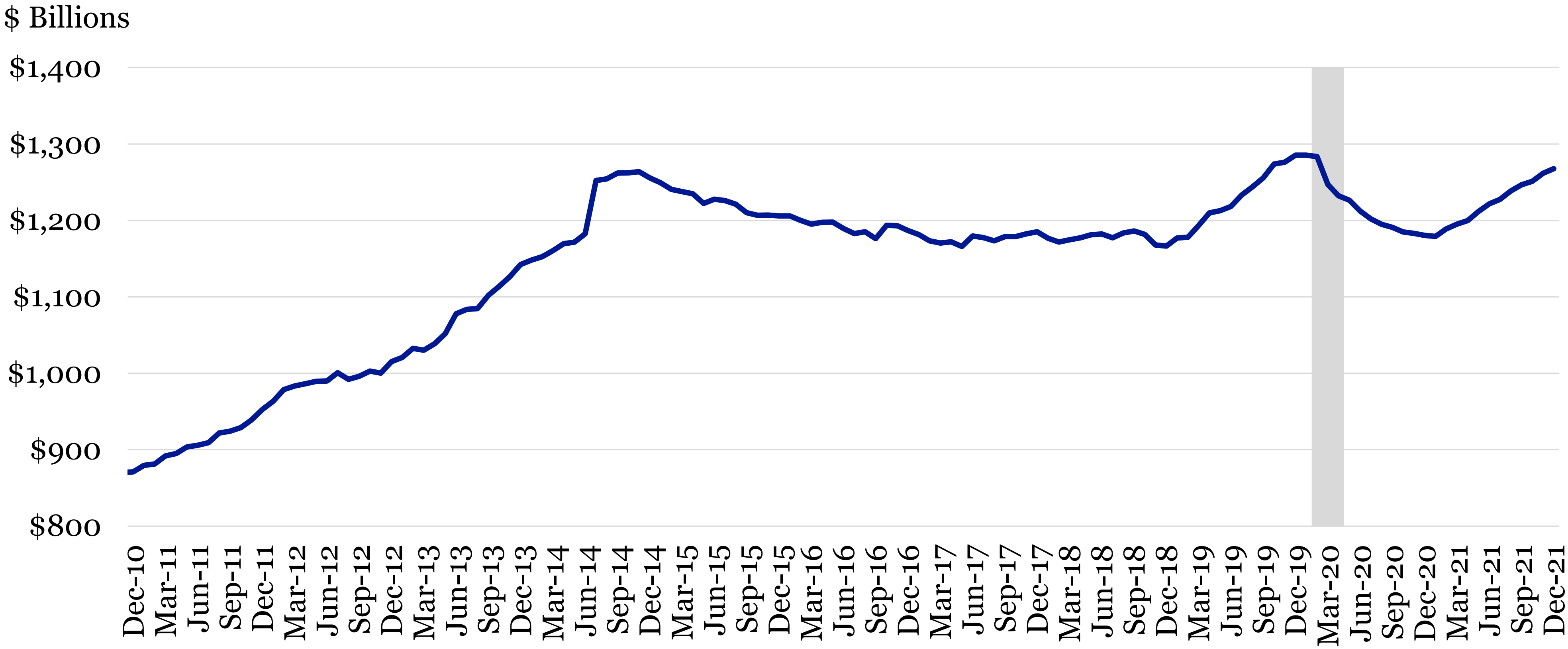
Source: Federal Reserve

U.S. Manufacturers' Unfilled Orders

2010 – December 2021



Shaded areas indicate U.S. recessions

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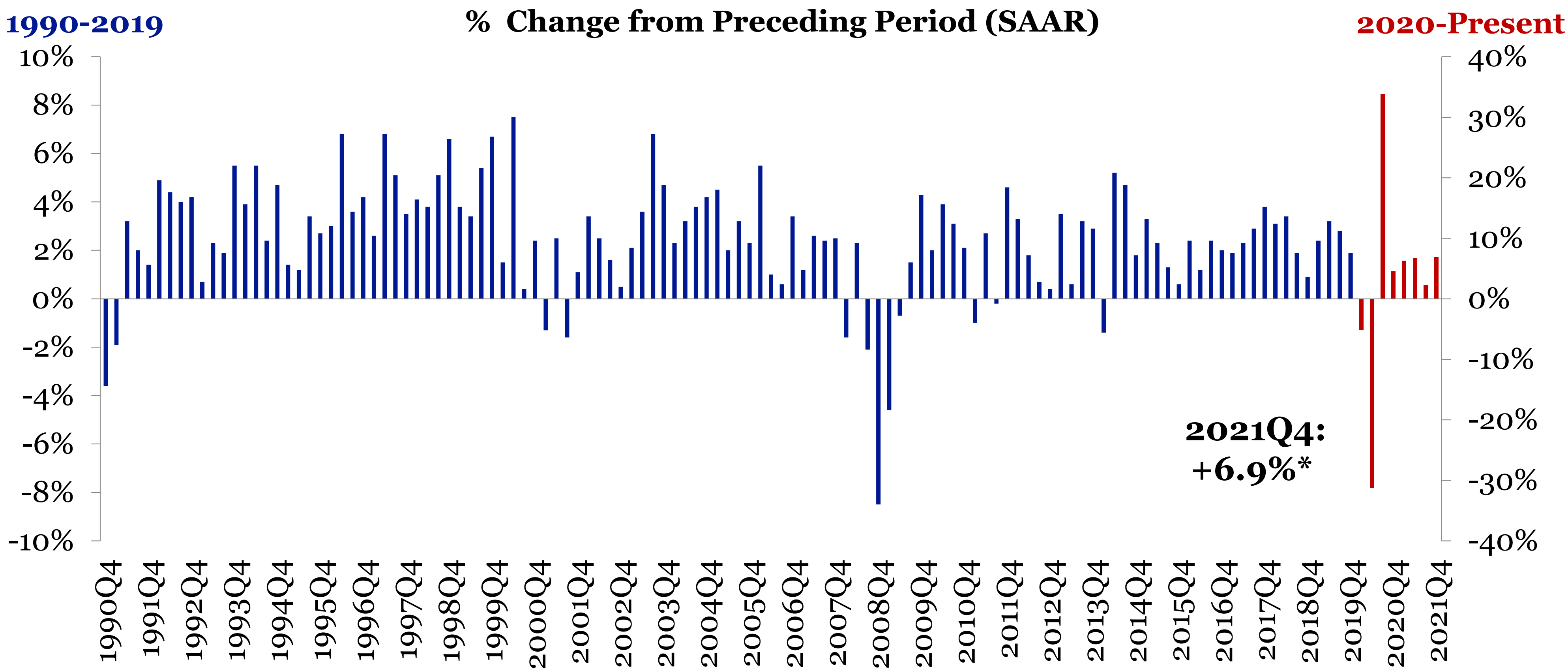
Source: U.S. Census Bureau

U.S. GDP - For Your Eyes Only



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Source: U.S. Bureau of Economic Analysis *1st (Advance) Estimate

The Employer Who Loved Me

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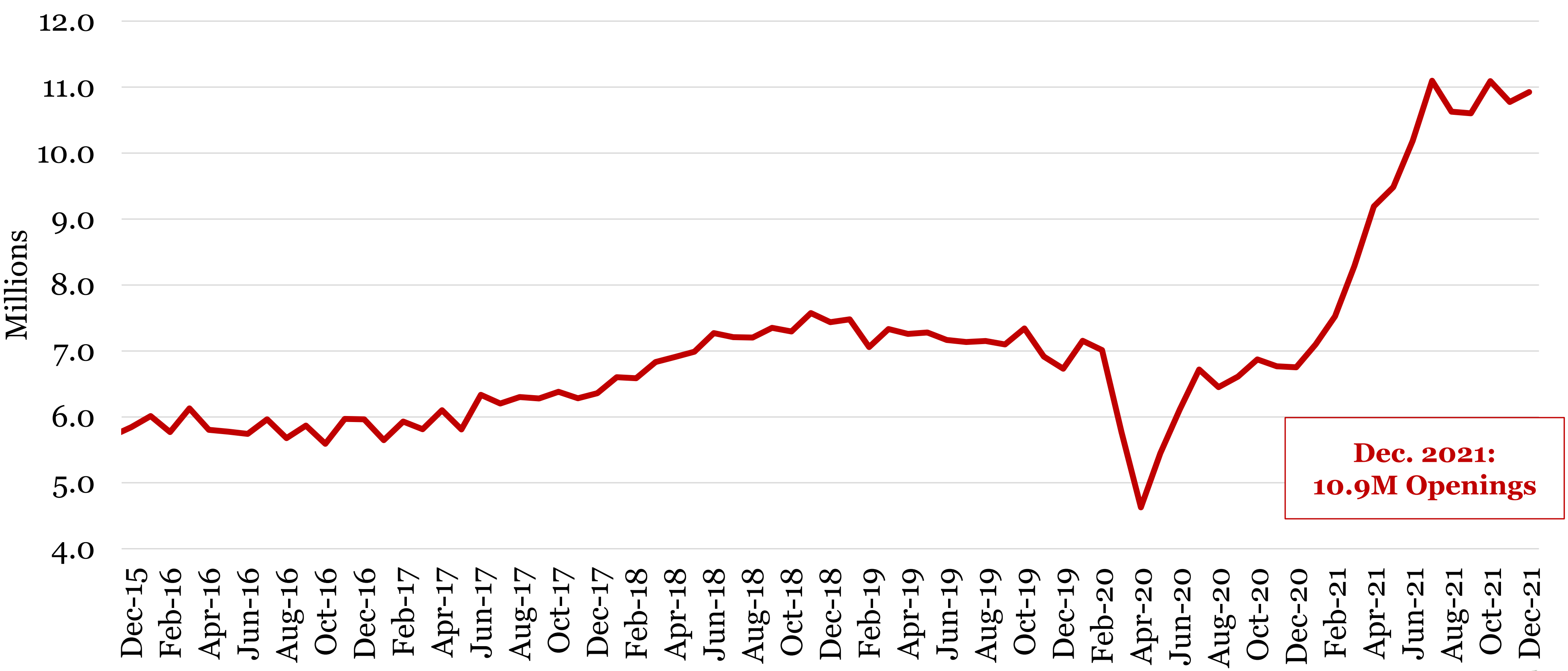
Work Another Day

U.S. Job Openings, 2015 – December 2021



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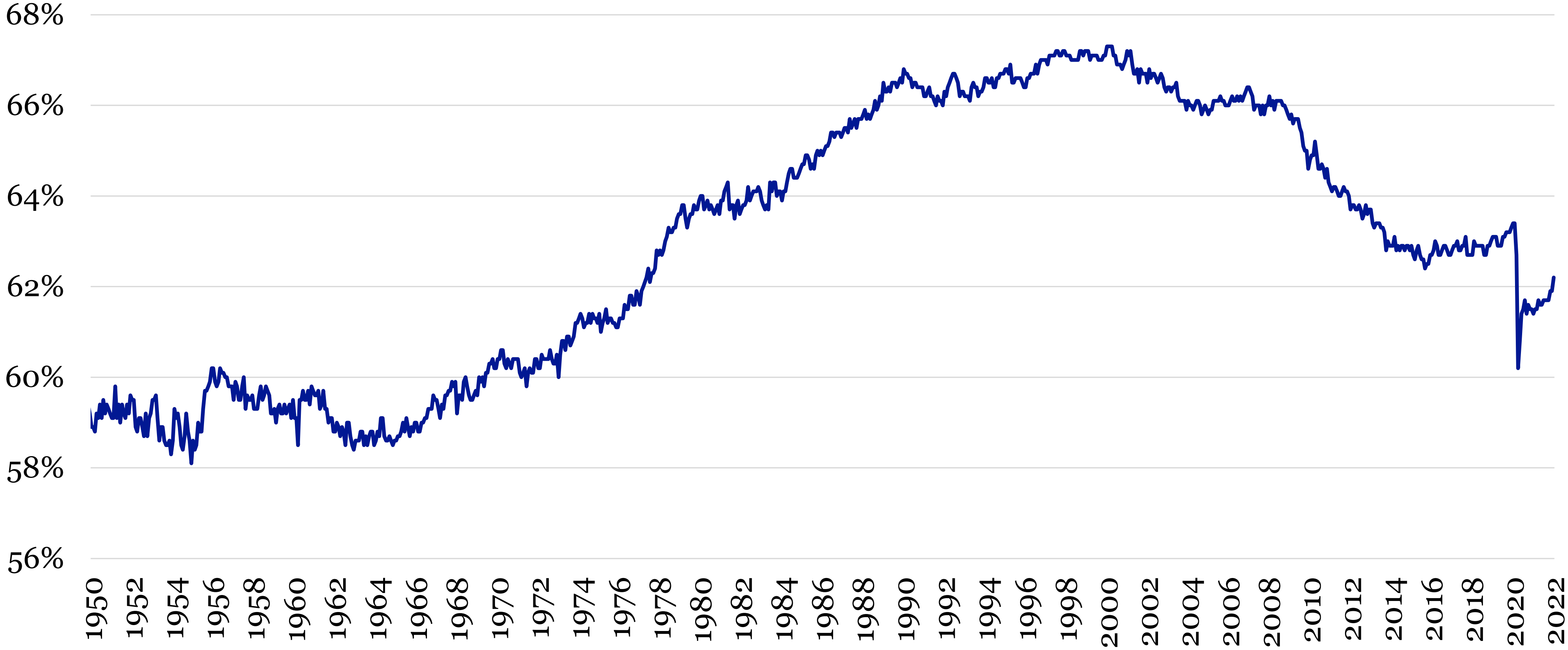
Source: U.S. Bureau of Labor Statistics

Skyfall

U.S. Labor Force Participation Rate, 1950 – January 2022



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Source: U.S. Bureau of Labor Statistics *Civilian Labor Force Participation Rate, Ages 16+

A View to a Remote Worker

GoodHire's survey of 3,500 Americans found that:

- 68% of Americans would choose remote work options over in-office work;
- 45% would either quit their job or begin searching for a new one if their employer required them to return to their office full-time;
- 74% of Americans believe that companies not offering remote working arrangements will lose major talent in the workforce.

Ipsos' survey of more than 12,000 people across 29 countries found that two-thirds of working adults surveyed say that:

- They are more productive with a flexible work schedule (65%);
- They want flexibility in the amount of time they go into the office (64%);
- When COVID restrictions are no longer in effect, employers should be more flexible in terms of requiring employees to go to an office (66%).

Source: 1. GoodHire, "The State Of Remote Work In 2021: A Survey Of The American Workforce", by Sara Korolevich, 8/24/2021; 2. Ipsos, "Return to the Workplace 2021 Global Survey".

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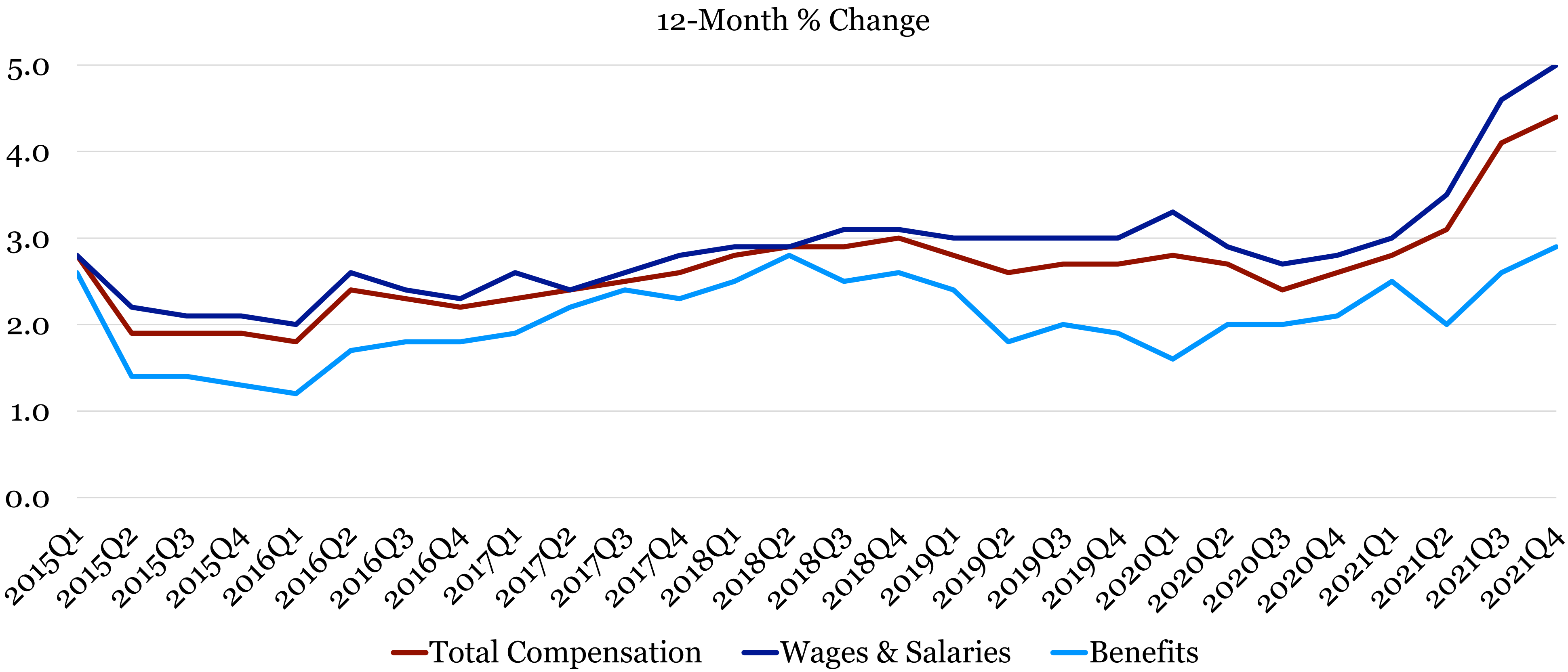
License to be Paid

Employment Cost Index, Private Sector Workers, 2015 – 2021



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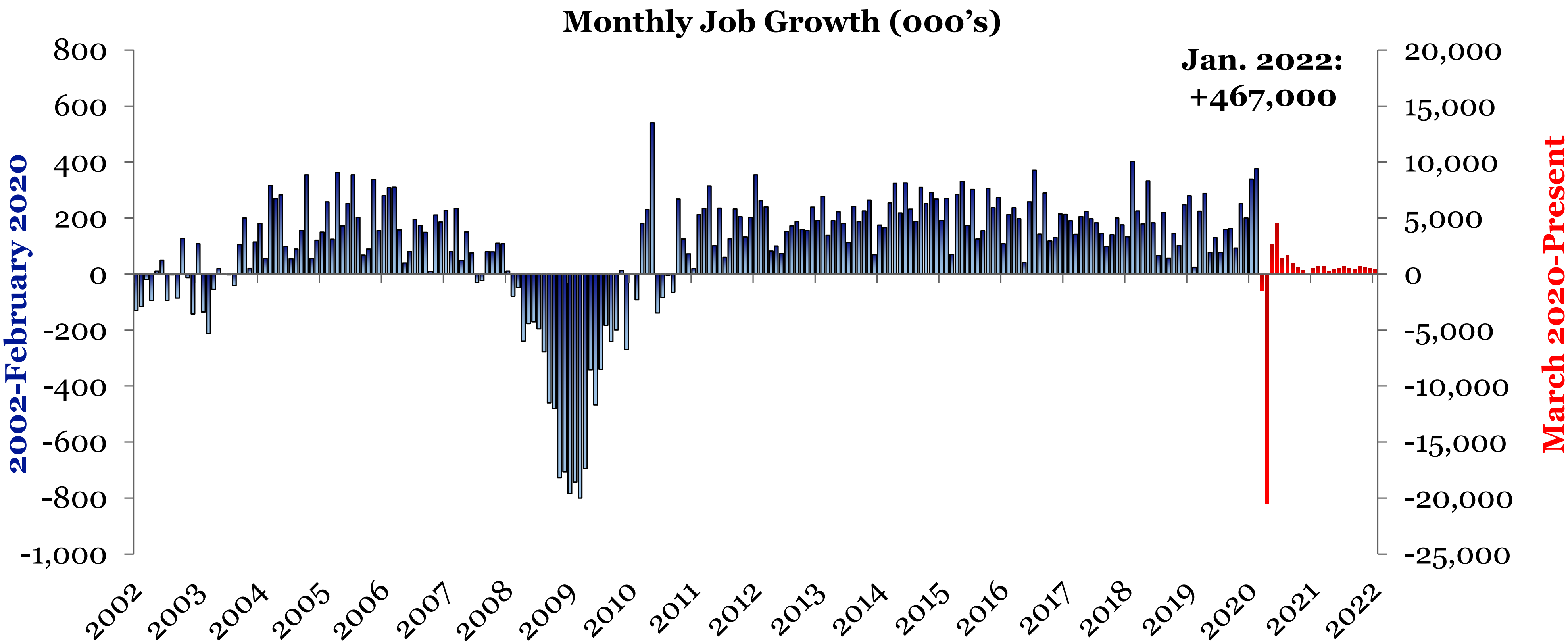
Source: U.S. Bureau of Labor Statistics

Net Change in U.S. Jobs

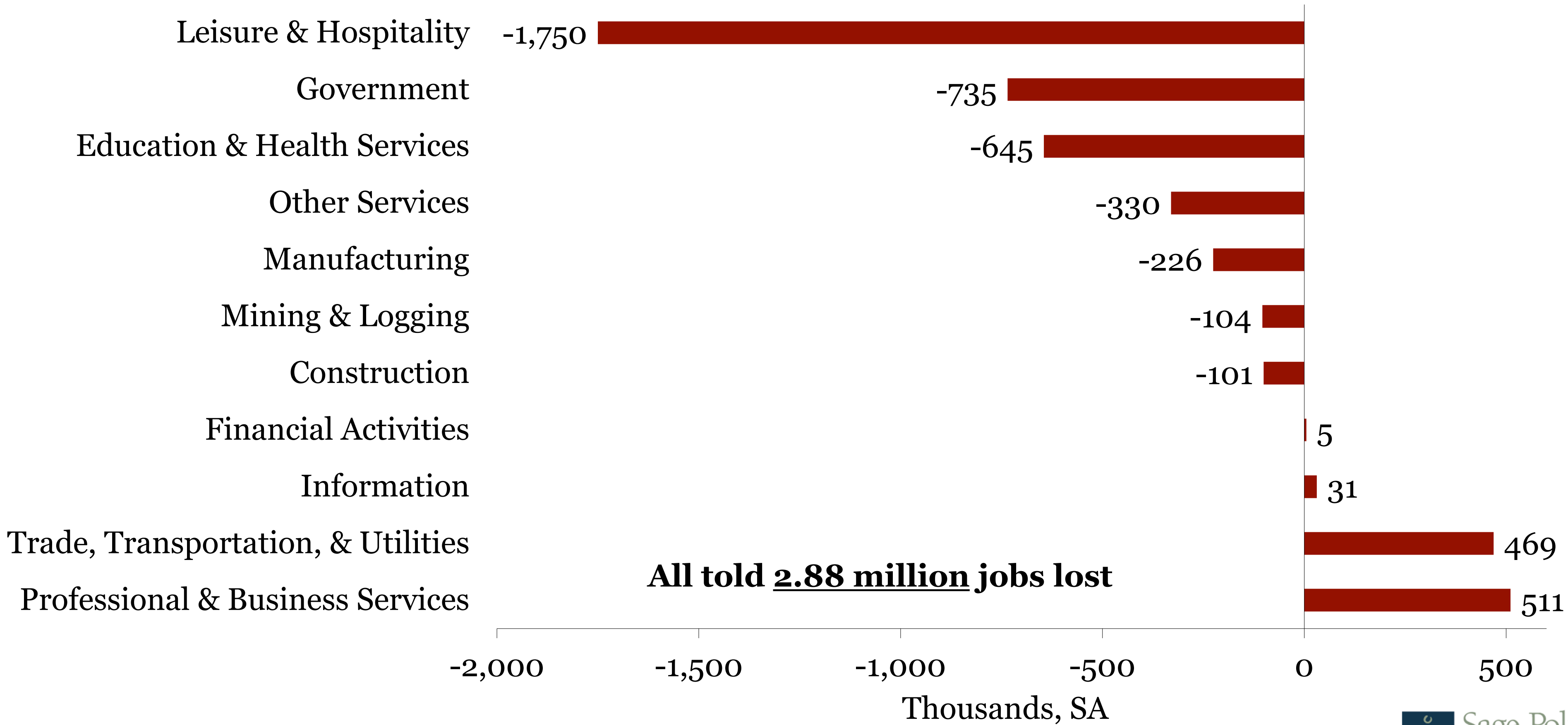
2002 – January 2022



Source: U.S. Bureau of Labor Statistics

U.S. Nonfarm Employment by Industry Sector

February 2020 v. January 2022



Source: U.S. Bureau of Labor Statistics

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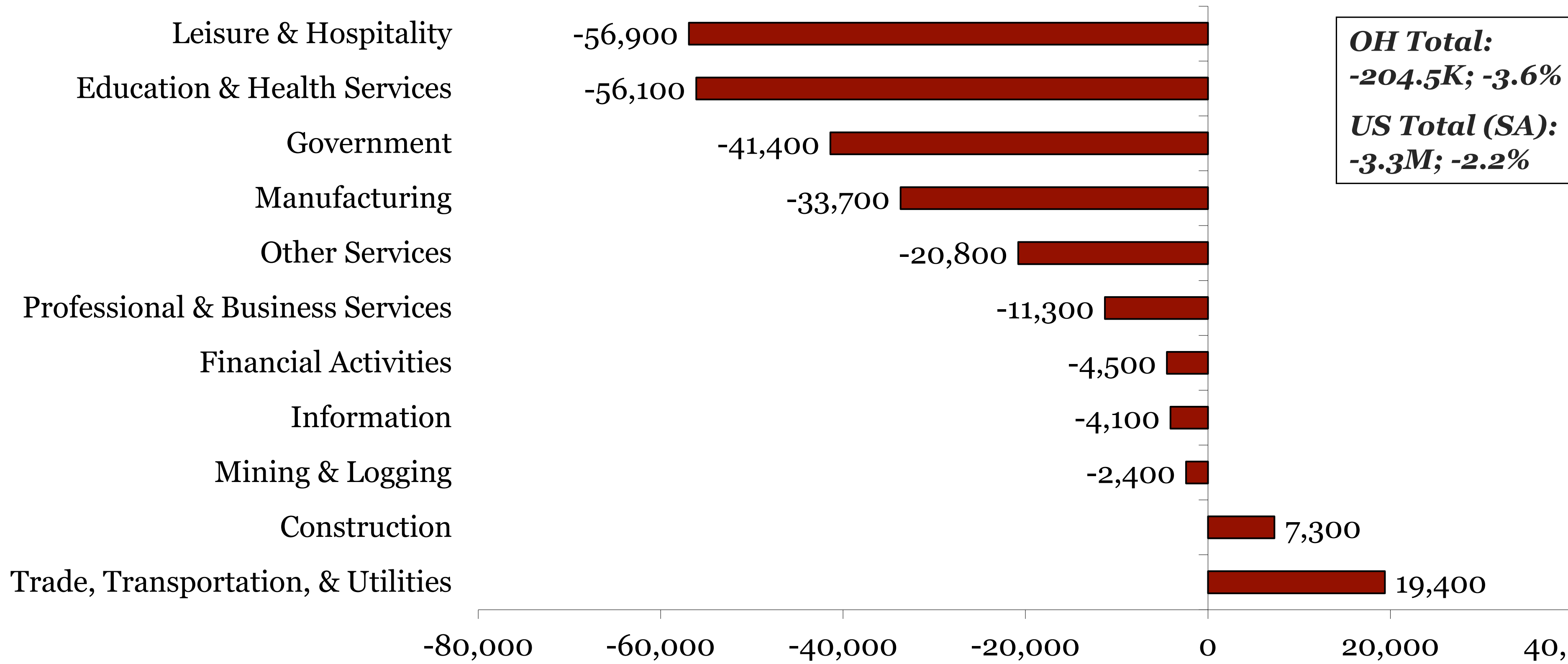
Ohio Nonfarm Employment by Sector (SA)

February 2020 v. December 2021 Absolute Change



OH Total:
-204.5K; -3.6%

US Total (SA):
-3.3M; -2.2%

*According to the Local Area Unemployment Statistics (LAUS) program OH lost 177,814 jobs between February 2020 and December 2021.

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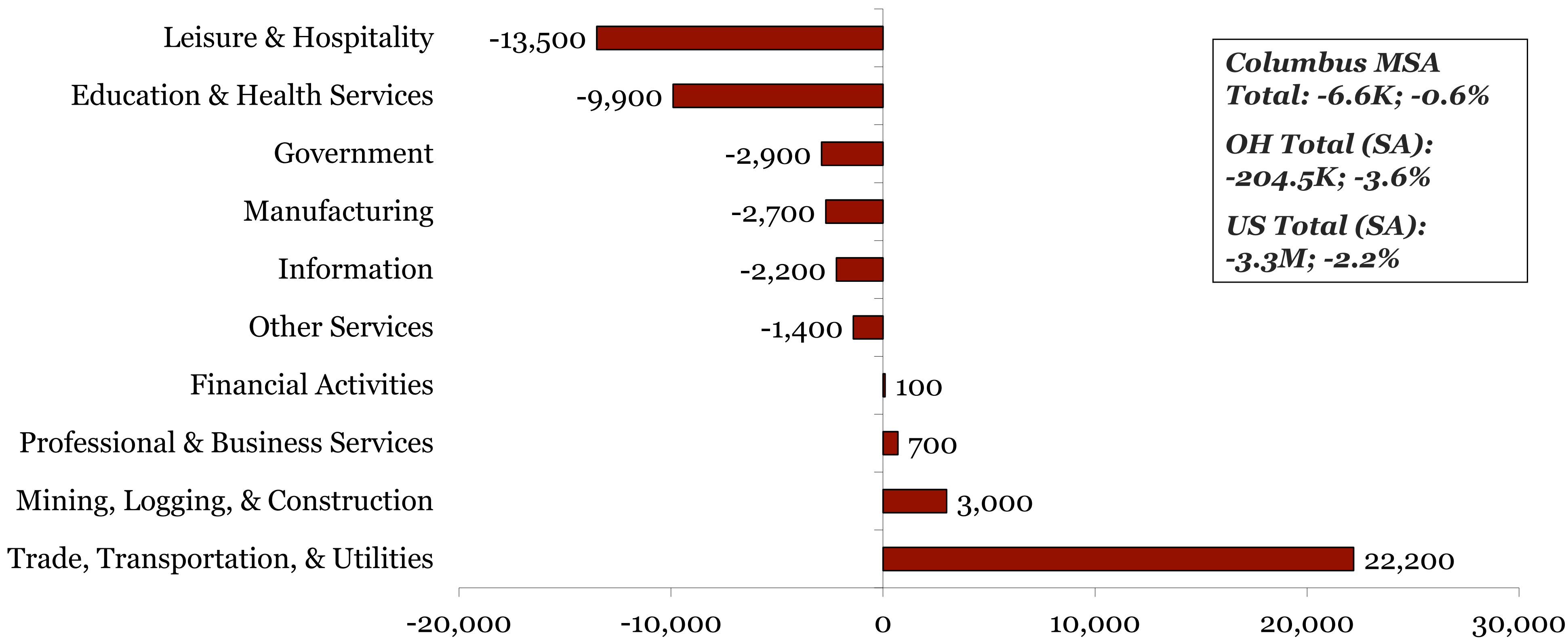
Source: U.S. Bureau of Labor Statistics

Columbus, OH MSA Nonfarm Employment

February 2020 v. December 2021 Absolute Change



Columbus MSA Total: -6.6K; -0.6%

OH Total (SA): -204.5K; -3.6%

US Total (SA): -3.3M; -2.2%

Source: U.S. Bureau of Labor Statistics

Employment Growth, 25 Largest Metros

February 2020 v. December 2021 Percent Change

Rank	MSA	%	Rank	MSA	%
1	Dallas-Fort Worth-Arlington, TX	2.9%	14	Philadelphia-Camden-Wilm., PA-NJ-DE-MD	-2.0%
2	Phoenix-Mesa-Scottsdale, AZ	2.6%			
3	Tampa-St. Petersburg-Clearwater, FL	2.1%	15	Miami-Fort Lauderdale-West Palm Beach, FL	-2.2%
4	San Antonio-New Braunfels, TX	1.4%	16	Detroit-Warren-Dearborn, MI	-2.4%
5	Atlanta-Sandy Springs-Roswell, GA	0.5%	16	St. Louis, MO-IL	-2.4%
5	Denver-Aurora-Lakewood, CO	0.5%	18	Chicago-Naperville-Elgin, IL-IN-WI	-2.6%
7	Charlotte-Concord-Gastonia, NC-SC	0.4%	19	Boston-Cambridge-Nashua, MA-NH	-2.8%
8	Riverside-San Bernardino-Ontario, CA	-0.5%	20	Minneapolis-St. Paul-Bloomington, MN-WI	-3.7%
9	Seattle-Tacoma-Bellevue, WA	-0.8%	21	San Diego-Carlsbad, CA	-3.8%
10	Baltimore-Columbia-Towson, MD	-1.2%	22	Los Angeles-Long Beach-Anaheim, CA	-4.6%
11	Houston-The Woodlands-Sugar Land, TX	-1.4%	23	San Francisco-Oakland-Hayward, CA	-5.0%
11	Portland-Vancouver-Hillsboro, OR-WA	-1.4%	24	New York-Newark-Jersey City, NY-NJ-PA	-5.1%
13	Wash.-Arlington-Alexandria, DC-VA-MD-WV	-1.6%	24	Orlando-Kissimmee-Sanford, FL	-5.1%

Source: U.S. Bureau of Labor Statistics,
Current Employment Statistics (CES) Survey.
Note: data are not seasonally adjusted.

U.S. Percent Change: -2.2%

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Unemployment Rates, 25 Largest Metros

December 2021

Rank	MSA	%	Rank	MSA	%
1	Atlanta-Sandy Springs-Roswell, GA	2.3	13	Dallas-Fort Worth-Arlington, TX	3.6
2	Phoenix-Mesa-Scottsdale, AZ	2.4	14	San Antonio-New Braunfels, TX	3.7
3	Minneapolis-St. Paul-Bloomington, MN-WI	2.5	15	Baltimore-Columbia-Towson, MD	3.8
4	Miami-Fort Lauderdale-West Palm Beach, FL	2.6	15	Orlando-Kissimmee-Sanford, FL	3.8
5	St. Louis, MO-IL	3.0	17	Denver-Aurora-Lakewood, CO	4.2
6	Boston-Cambridge-Nashua, MA-NH	3.1	17	Philadelphia-Camden-Wilm., PA-NJ-DE-MD	4.2
7	Charlotte-Concord-Gastonia, NC-SC	3.2	17	San Diego-Carlsbad, CA	4.2
8	Tampa-St. Petersburg-Clearwater, FL	3.3	20	Chicago-Naperville-Elgin, IL-IN-WI	4.3
8	Washington-Arlington-Alexandria, DC-VA-MD-WV	3.3	20	Detroit-Warren-Dearborn, MI	4.3
			22	Houston-The Woodlands-Sugar Land, TX	4.8
10	Portland-Vancouver-Hillsboro, OR-WA	3.4	23	Riverside-San Bernardino-Ontario, CA	5.1
11	San Francisco-Oakland-Hayward, CA	3.5	24	New York-Newark-Jersey City, NY-NJ-PA	5.5
11	Seattle-Tacoma-Bellevue, WA	3.5	25	Los Angeles-Long Beach-Anaheim, CA	5.6

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics (CES) Survey.
Note: data are not seasonally adjusted.

U.S. Unemployment Rate
Dec: 3.9% | Jan: 4.0%

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Live and Let Buy

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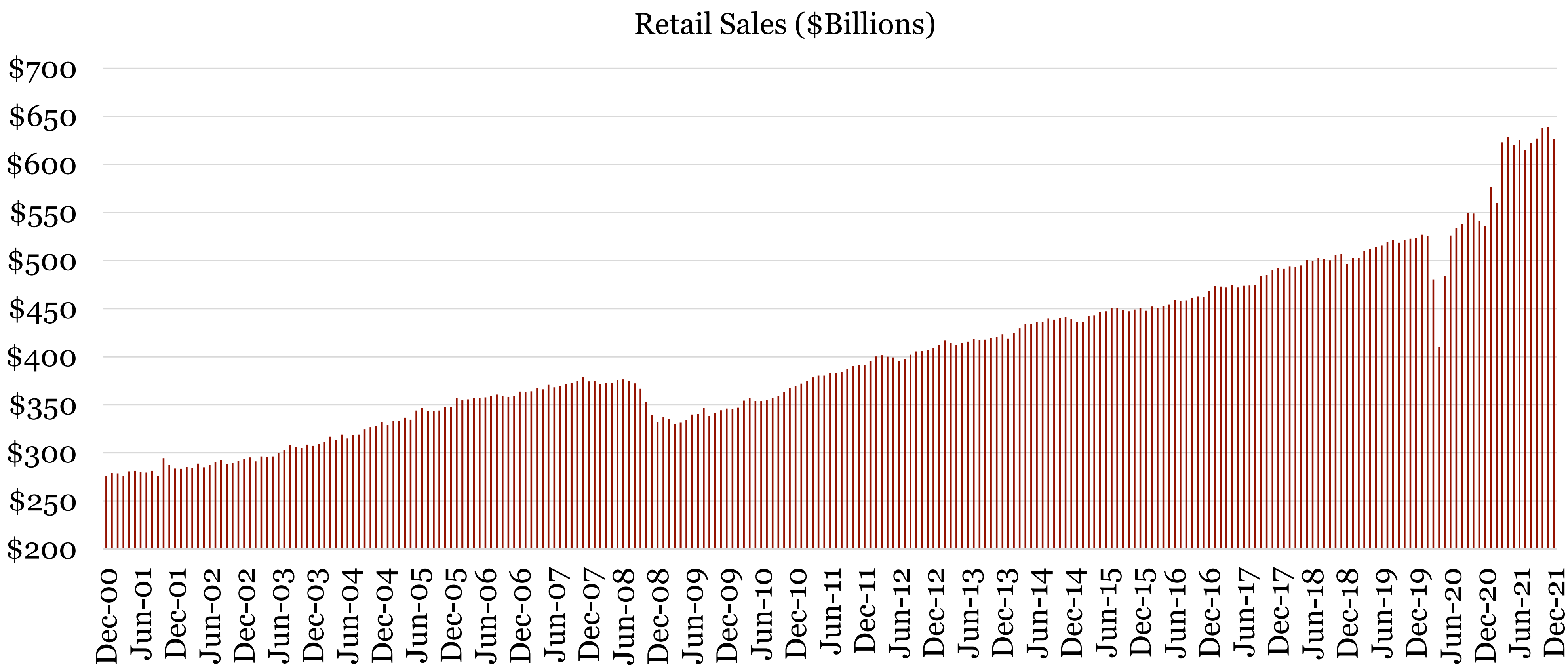
U.S. Retail Sales
2000 – December 2021



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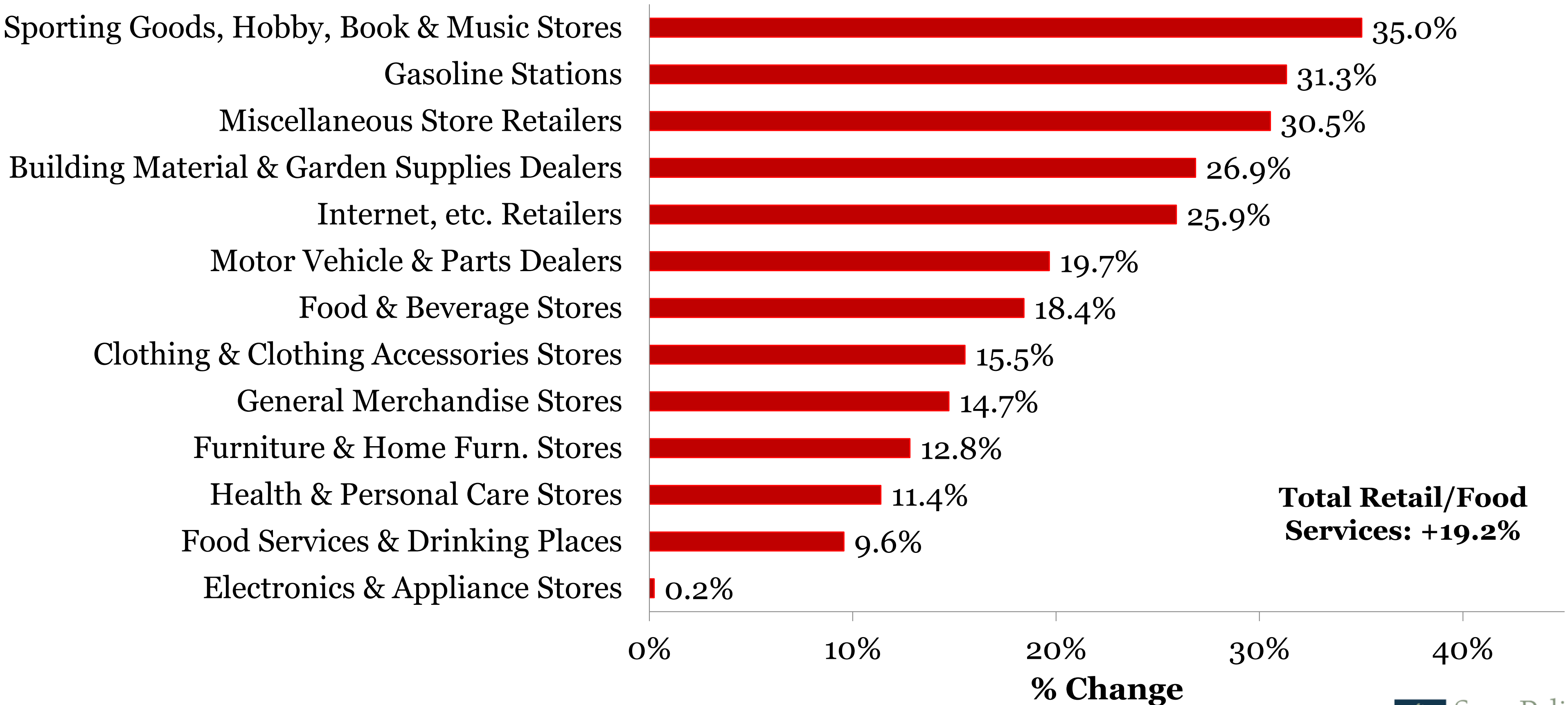
Source: U.S. Census Bureau

U.S. Retail Sales by Type of Business
February 2020 v. December 2021 % Change



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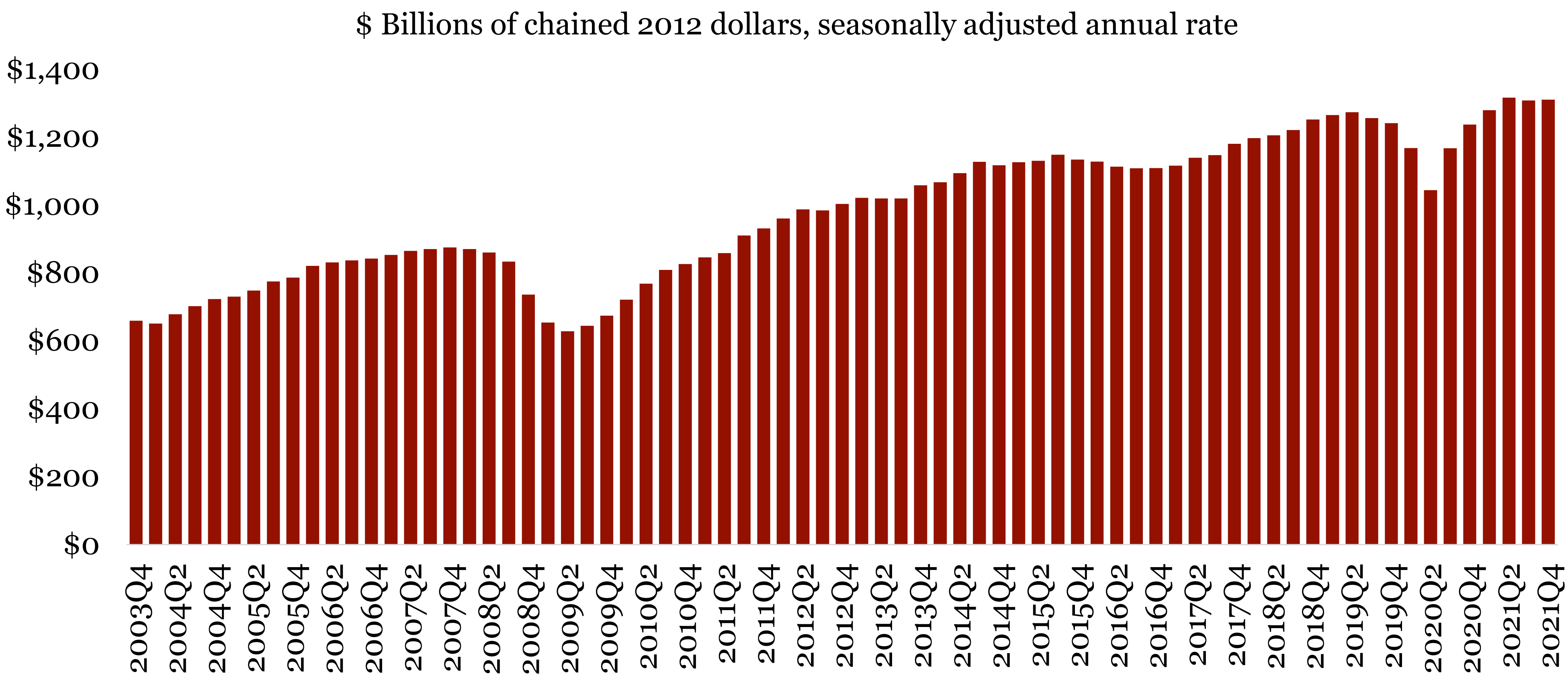
Source: U.S. Census Bureau

U.S. GDP: Nonresidential Fixed Investment in Equipment
2003 – 2021Q4*



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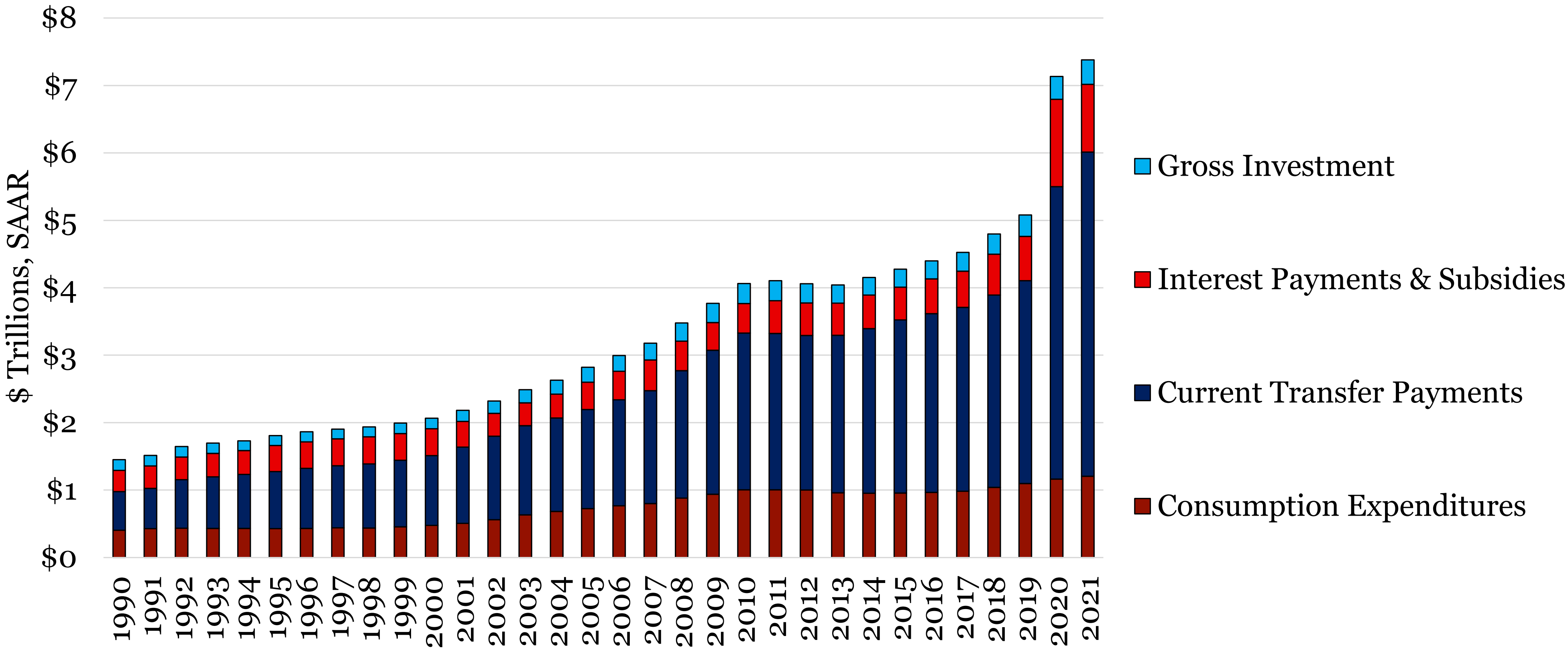
Source: U.S. Bureau of Economic Analysis *1st (Advance) Estimate

Deficits are Forever

Federal Government Expenditures, 1990 – 2021



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Source: U.S. Bureau of Economic Analysis

Quantum of Construction

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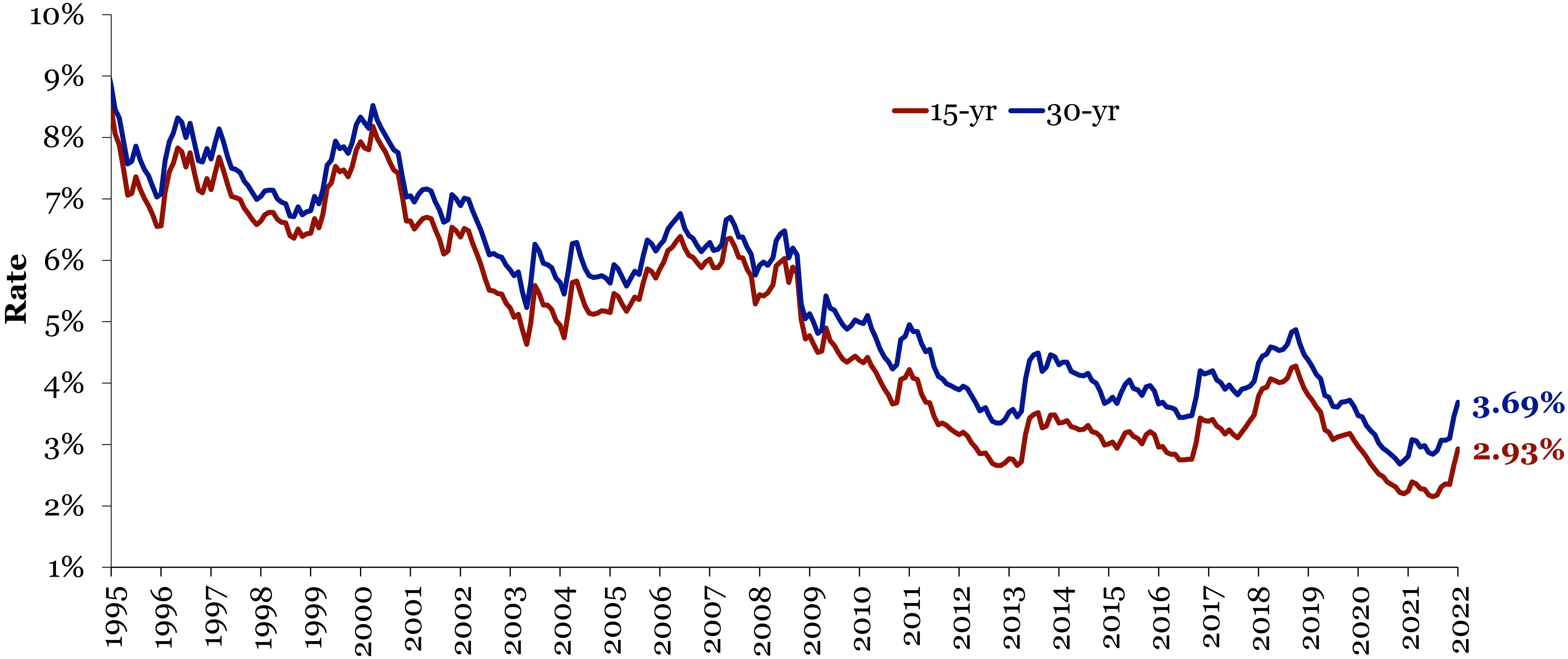
License to Borrow (at Low Rates)

15-Year & 30-Year Fixed Mortgage Rates, 1995 – February 2022*



*Week ending 2/10/2022

Source: Freddie Mac

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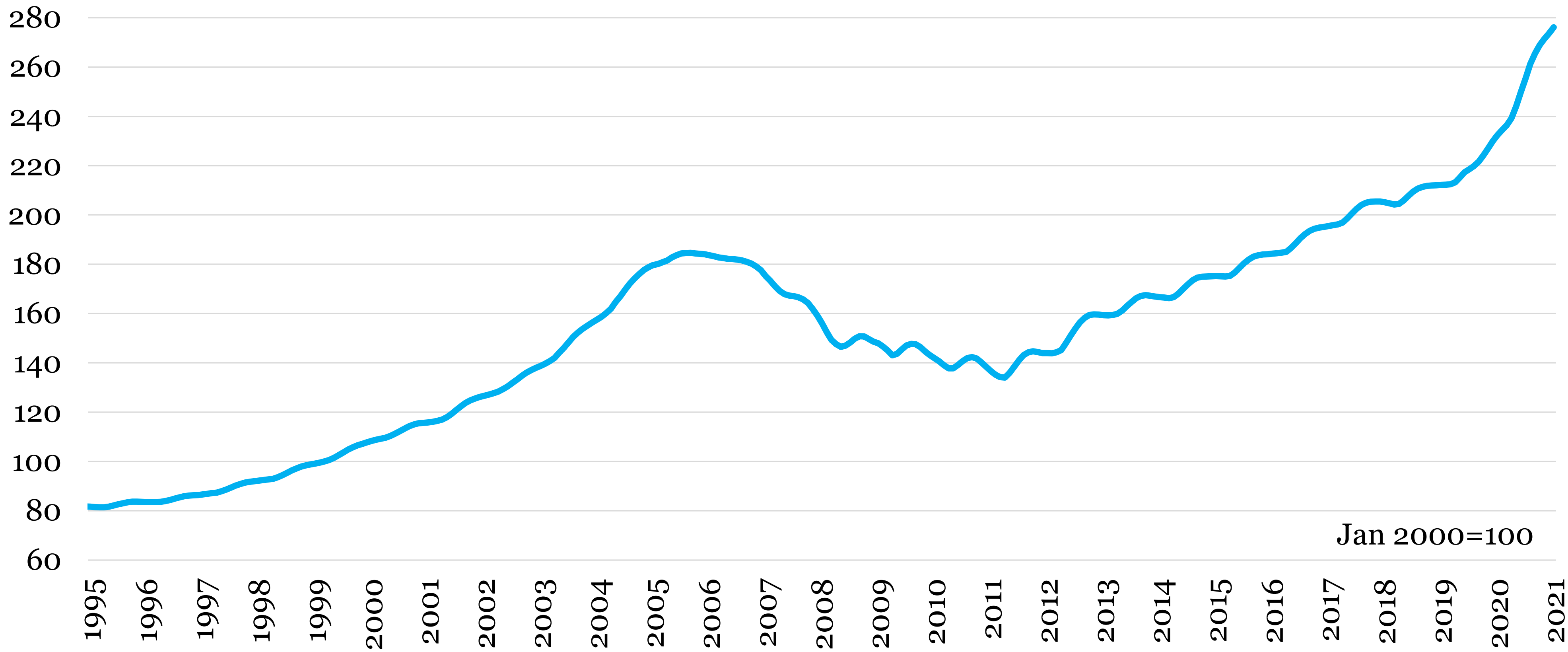
S&P Case-Shiller U.S. National Home Price Index

1995 – November 2021



Source: Standard & Poor's

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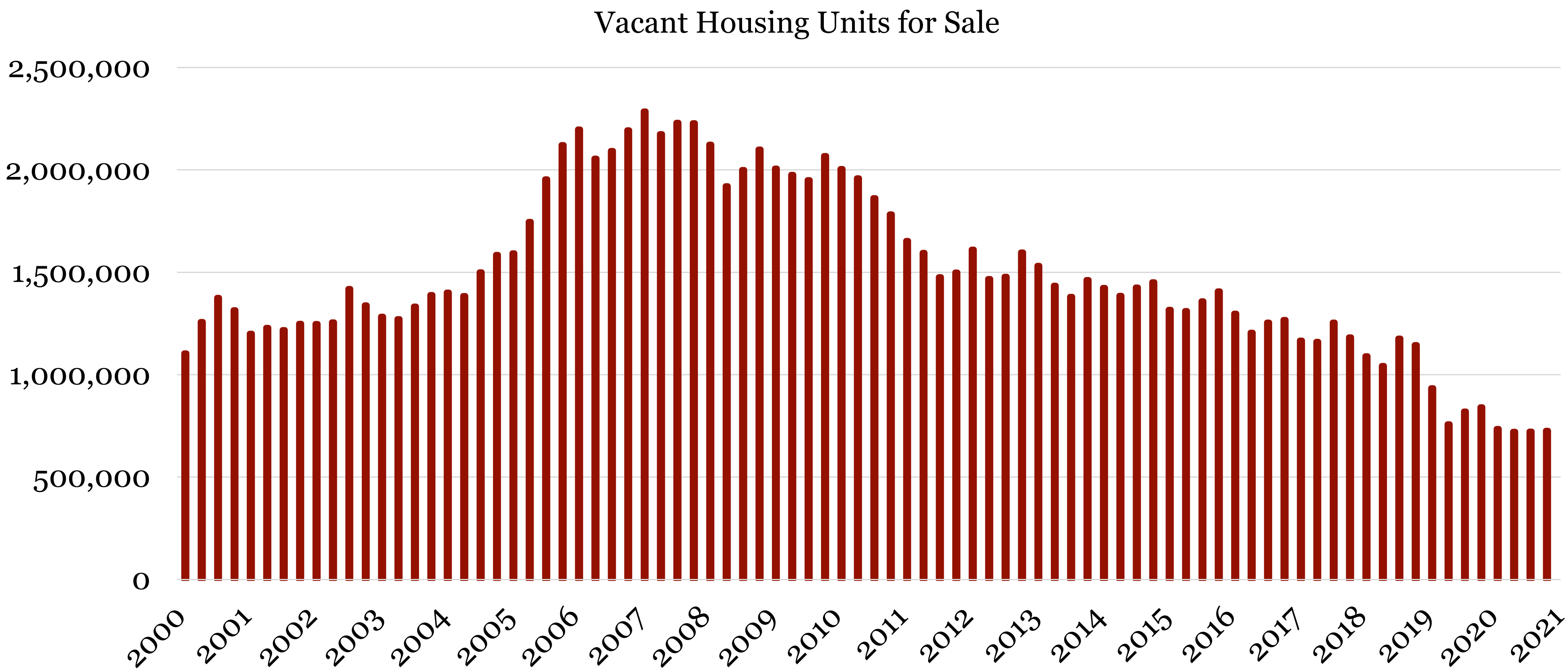
Inventory of Unsold Homes: Vacant Housing Units for Sale*
2000 – 2021Q4



*Units for sale only, excludes units both for rent and sale

Source: U.S. Census Bureau

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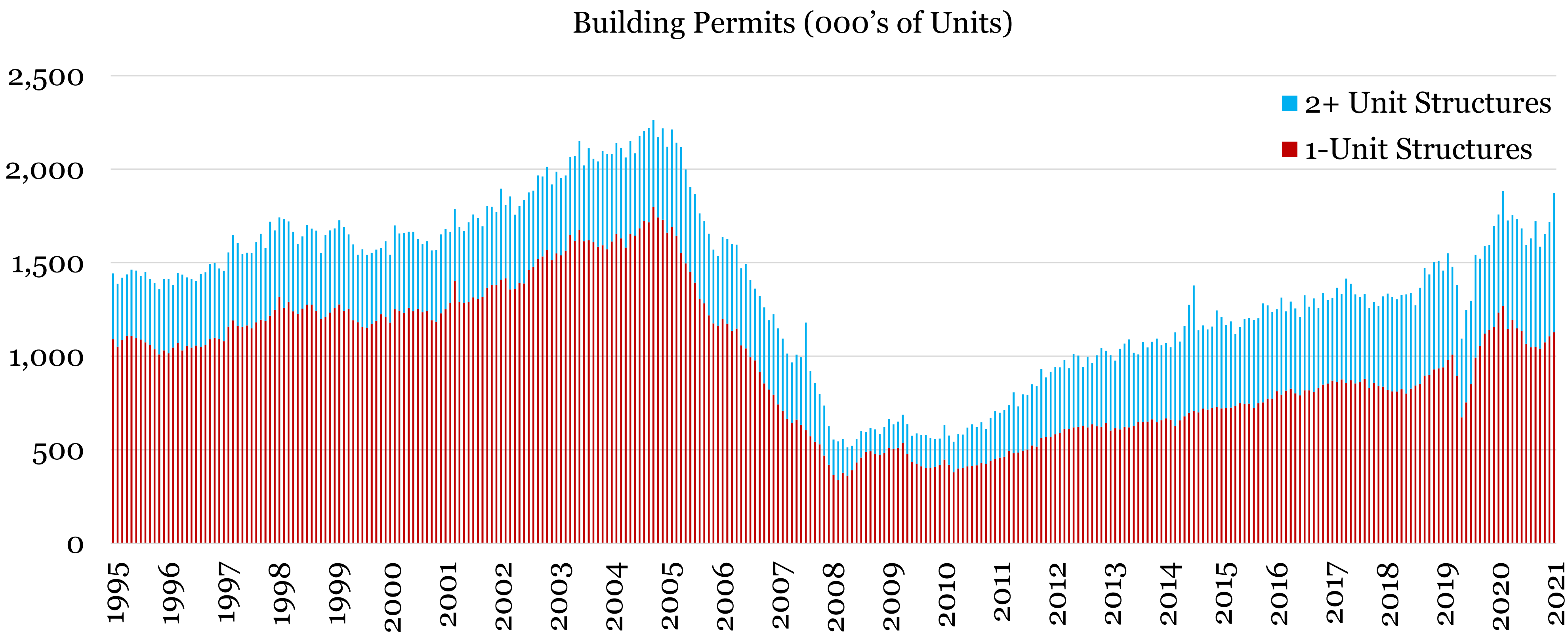
U.S. Residential Building Permits
1995 – December 2021



Source: U.S. Census Bureau

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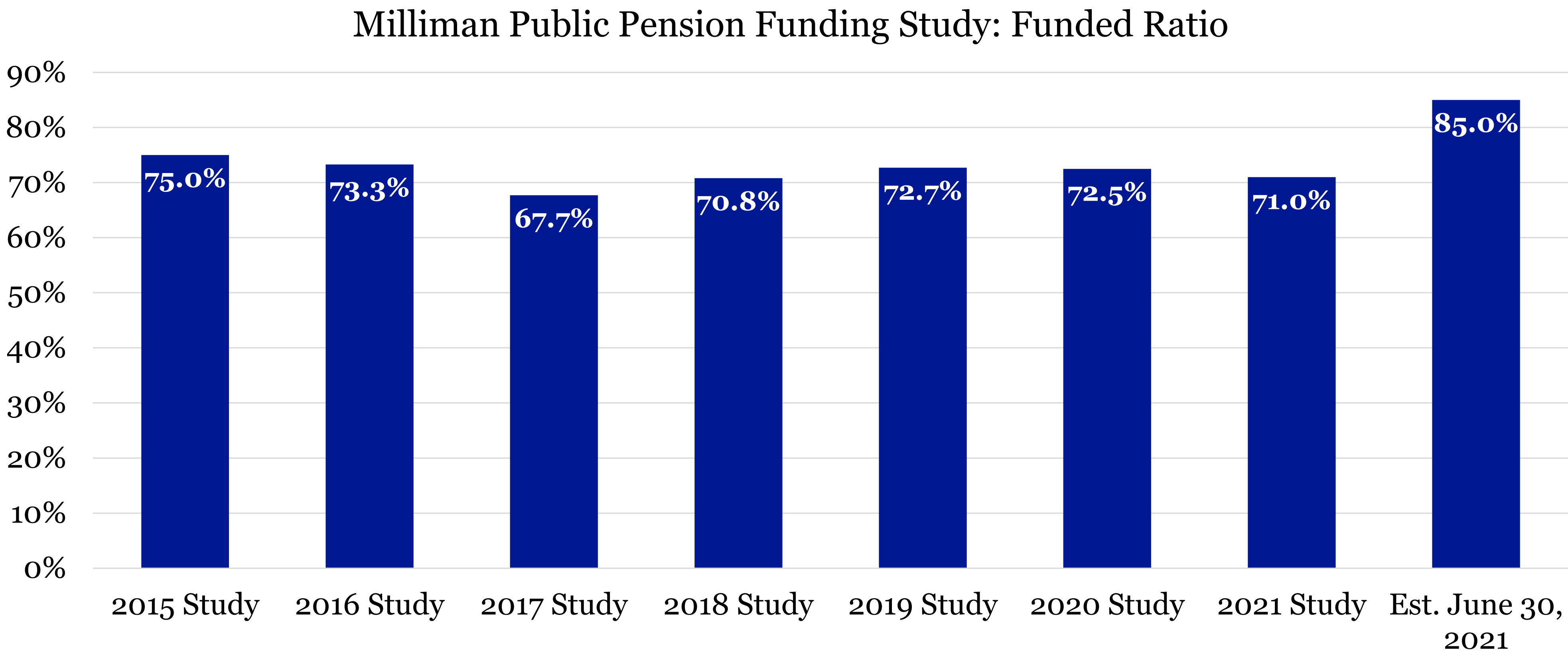
100 Largest U.S. Public Pension Plans:
Aggregate System-Reported Funded Ratio



Source: Milliman Public Pension Funding Study *2021 study covers fiscal-year ending June 2020.
June 30, 2021 estimate covers a portion of pension plans for which year-end reports were available at the time of the analysis.

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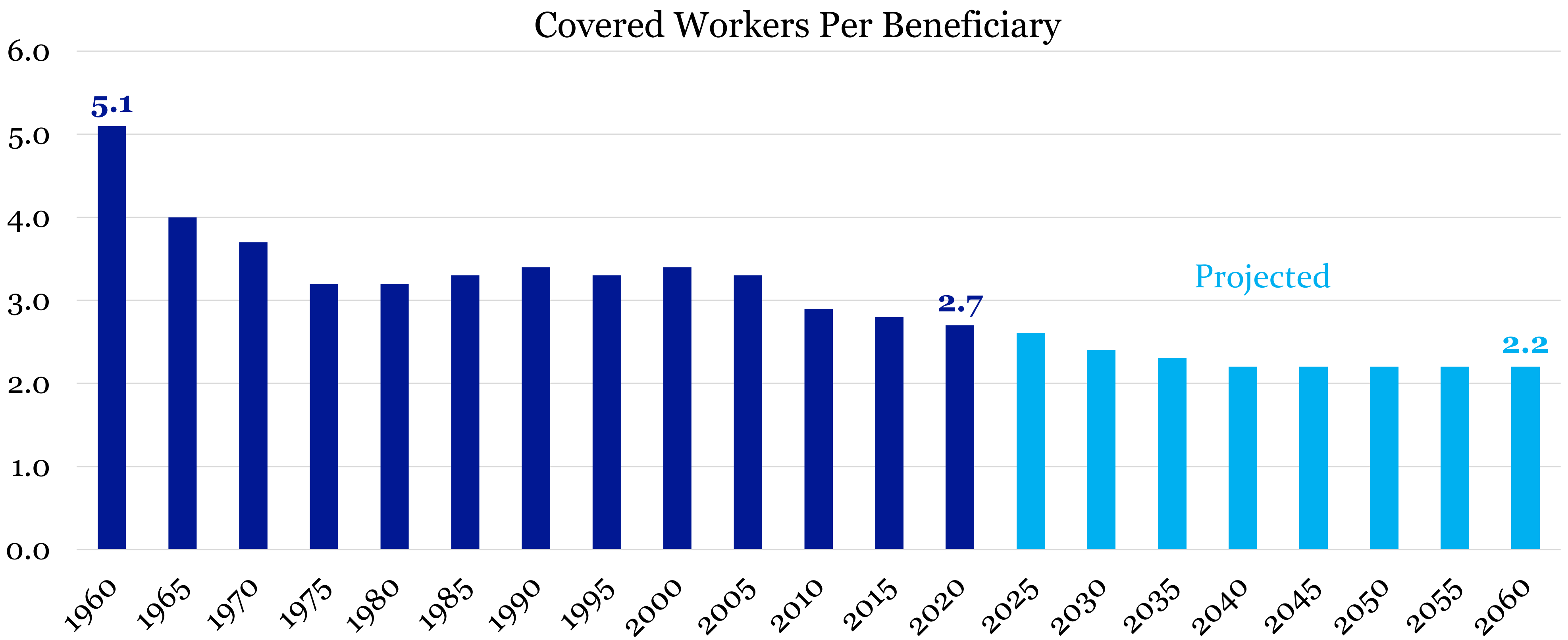
U.S. Workers Per Social Security Beneficiary
1960 – 2060 Projected



Source: Social Security Administration, "The 2021 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds”.
Beneficiaries: beneficiaries of Old-Age, Survivors Insurance, and Federal Disability Insurance (OASDI).

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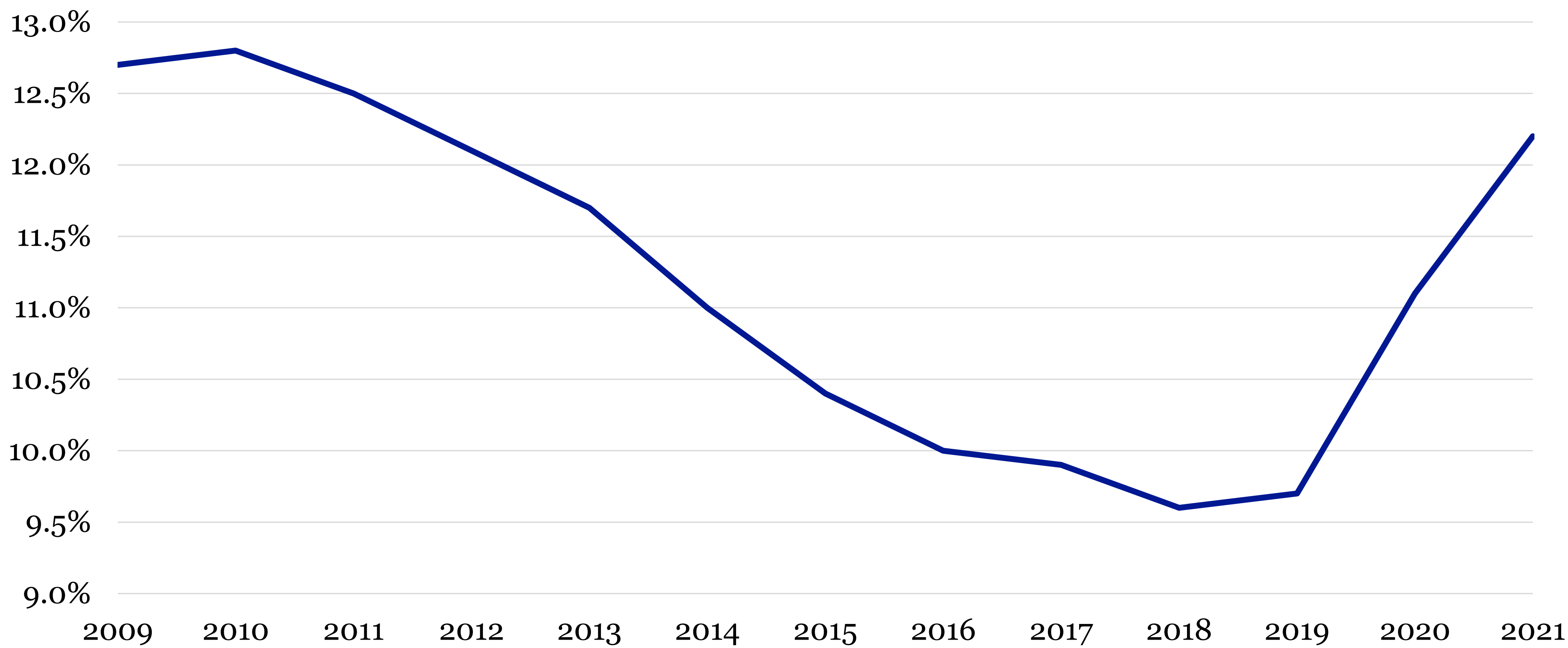
Occupancy is Not Enough

U.S. Office Vacancy, 2009 – 2021



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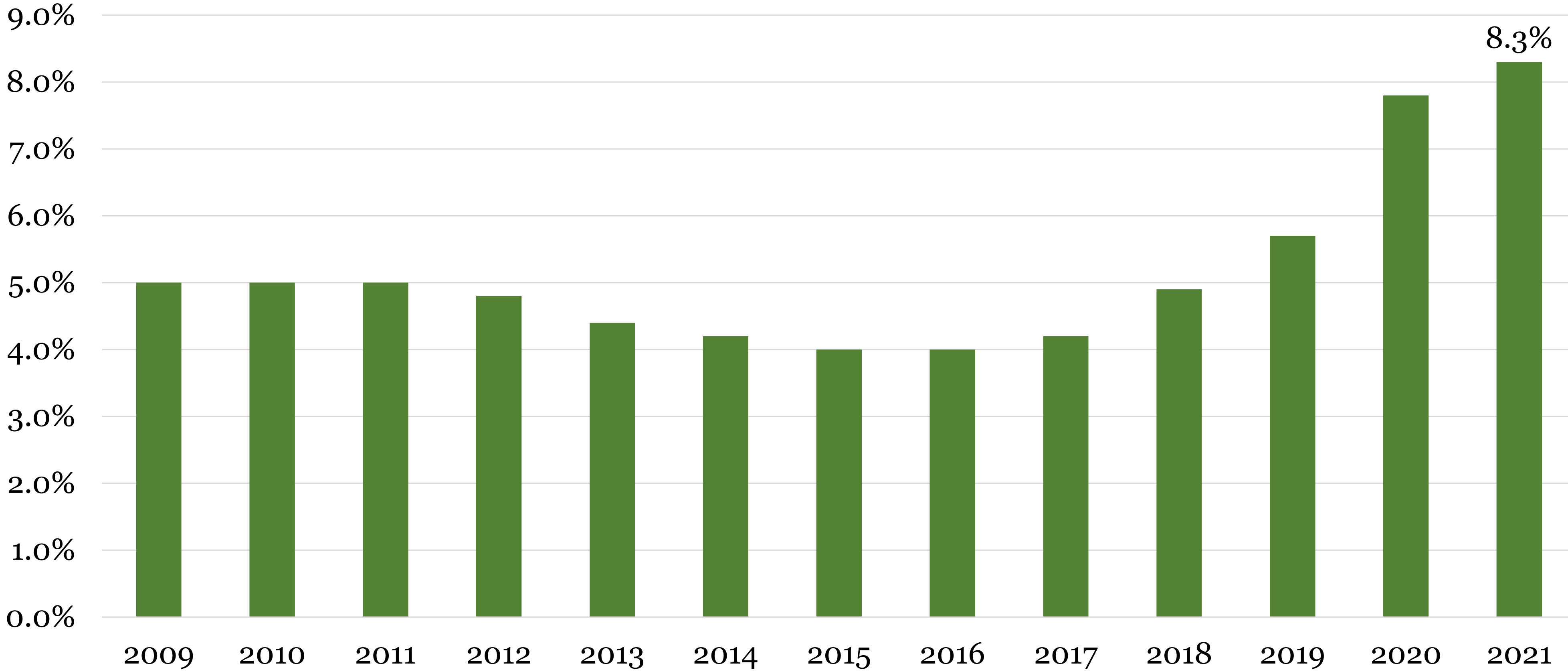
Source: Costar

U.S. Retail Space Vacancy: Malls, 2009 – 2021



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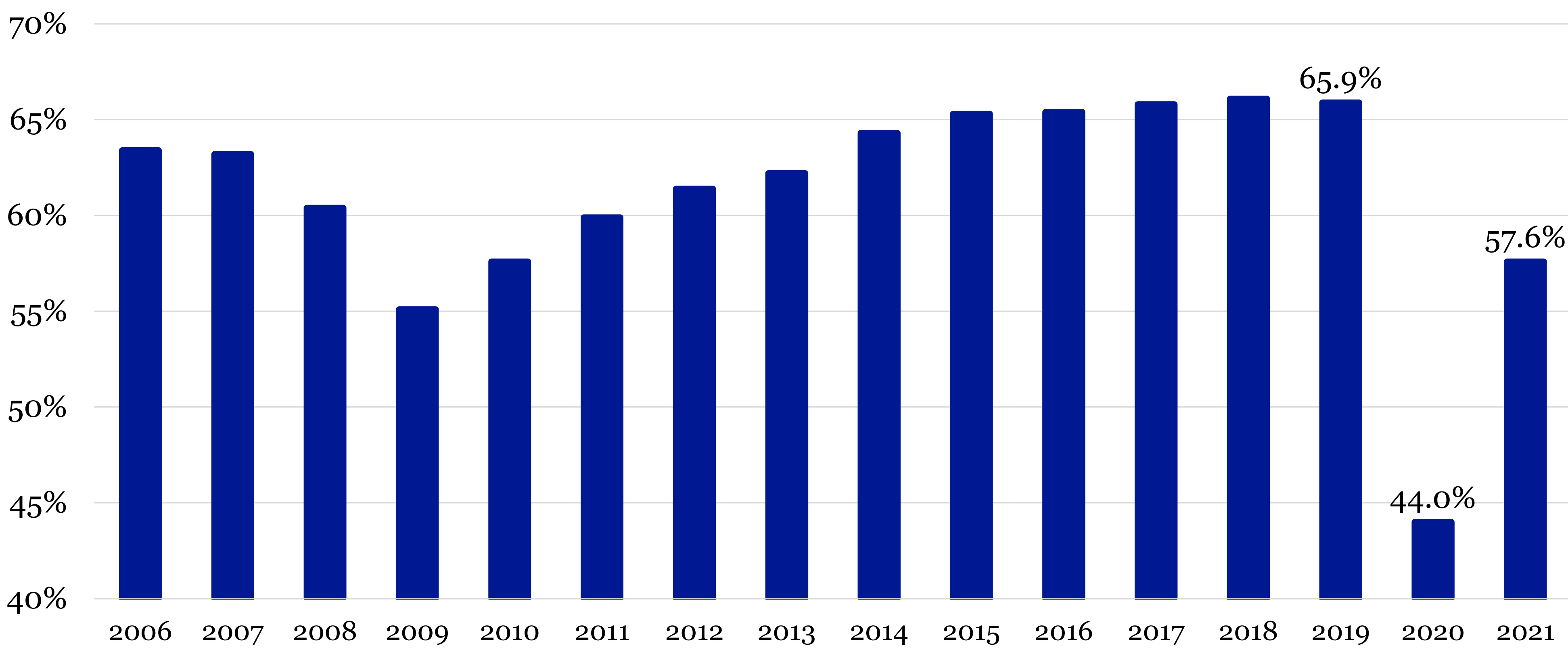
Source: Costar

U.S. Hotel Occupancy, 2006 – 2021



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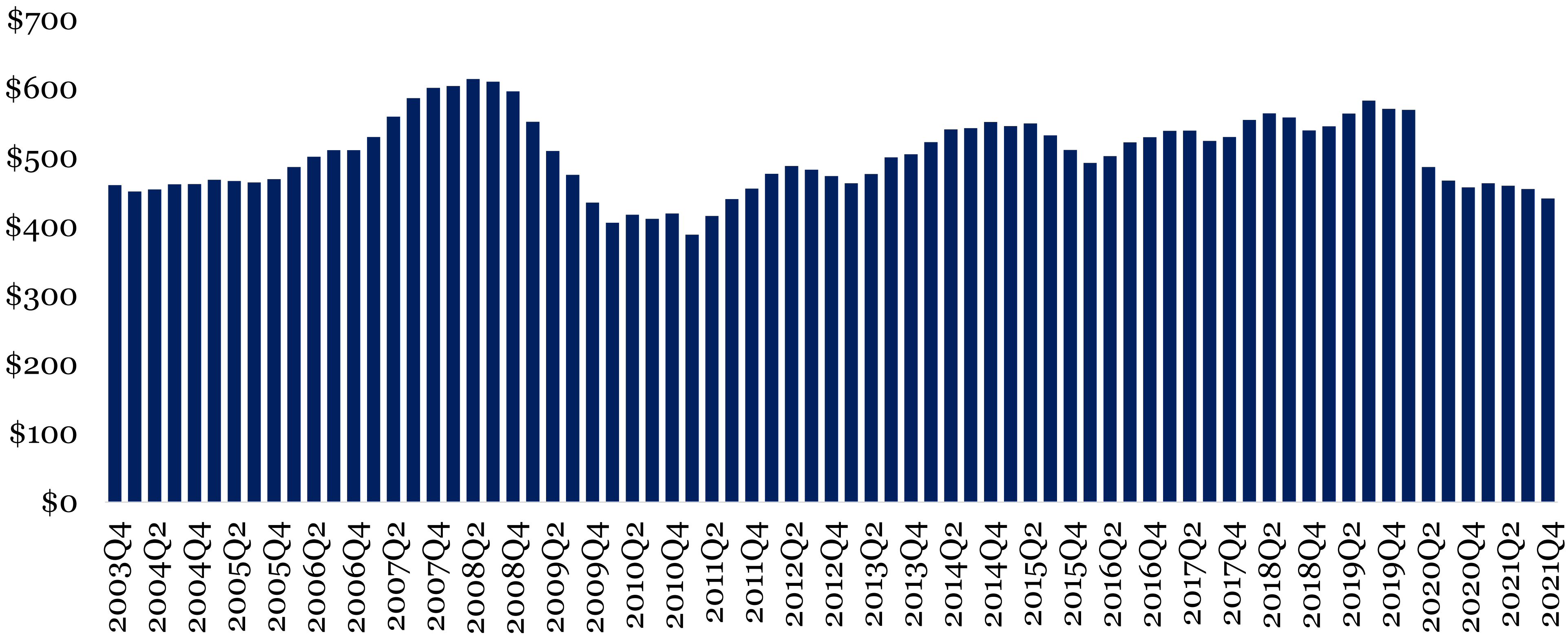
Source: Costar

U.S. GDP: Nonresidential Fixed Investment in Structures

2003 – 2021Q4*

$ Billions of chained 2012 dollars, seasonally adjusted annual rate



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Source: U.S. Bureau of Economic Analysis   *1st (Advance) Estimate

My Name is Ban, Anirban

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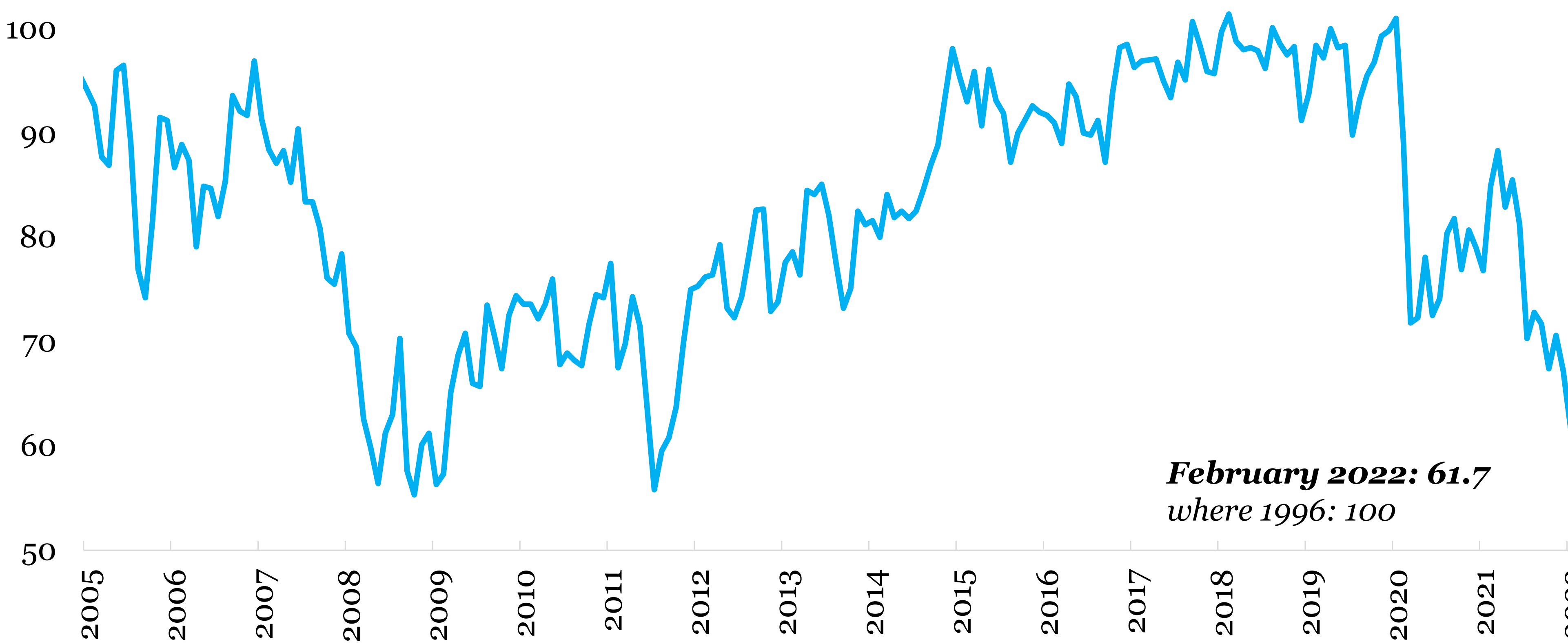
University of Michigan Index of Consumer Sentiment

2005 – February 2022



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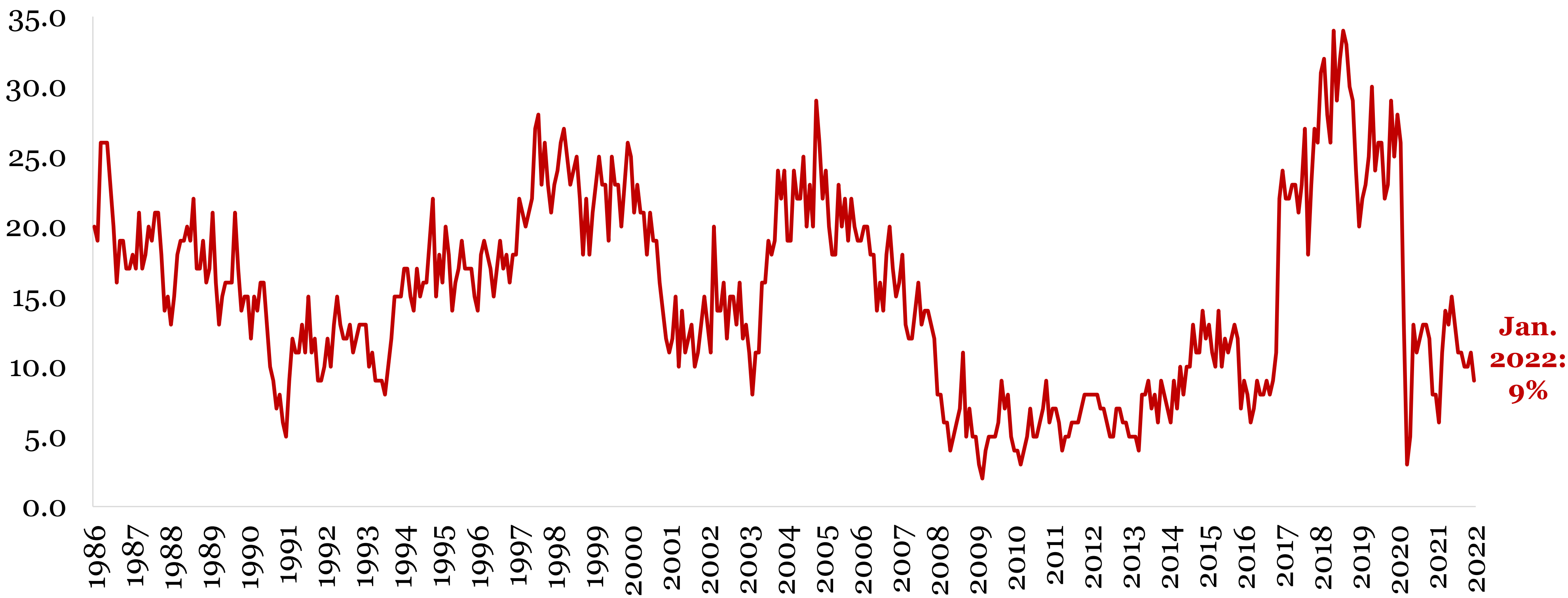
Source: University of Michigan

NFIB Index of Small Business Optimism: Good Time to Expand
1986 – January 2022



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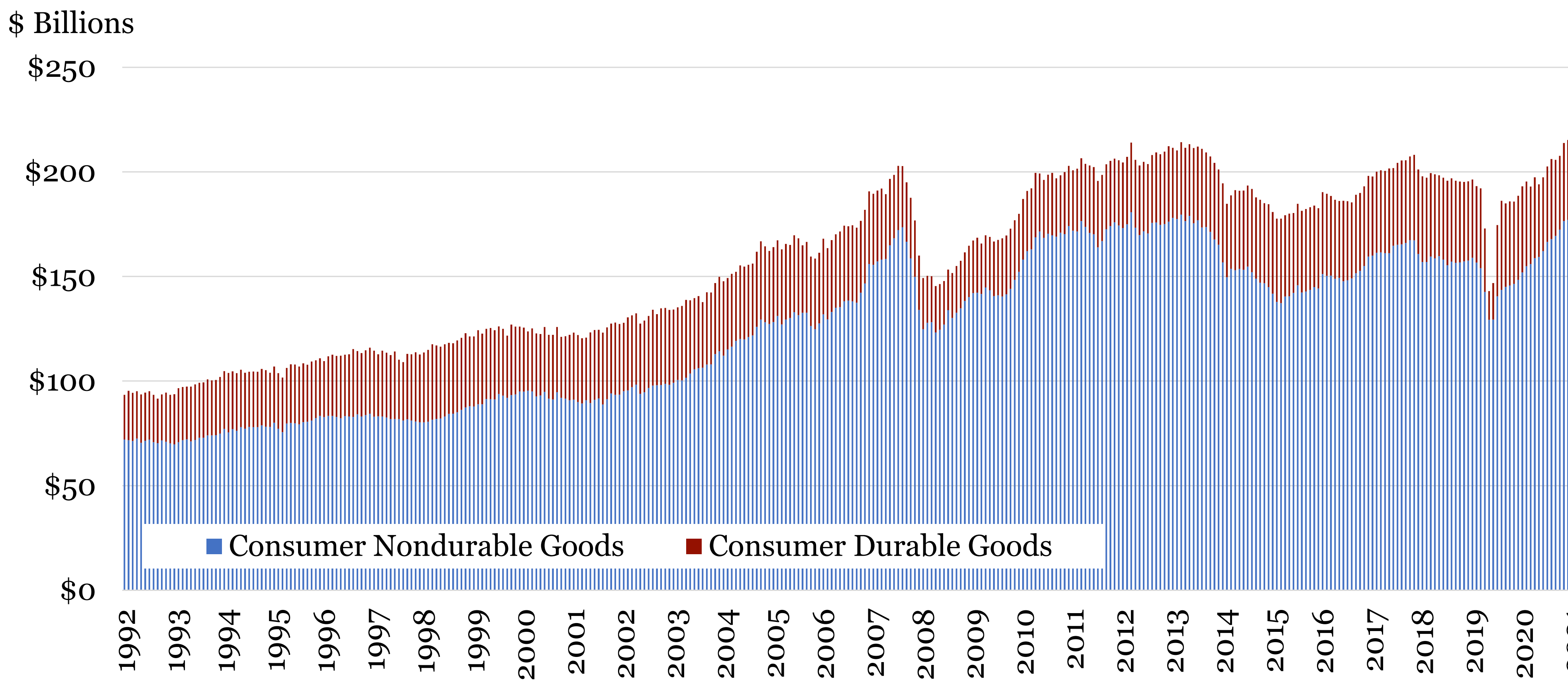
Source: National Federation of Independent Business (NFIB)

U.S. Manufacturers' New Orders: Consumer Goods

1992 – December 2021



Source: U.S. Census Bureau. Note: Due to the nature of nondurable goods, the reporting figure for both their Shipments and New Orders will be identical.

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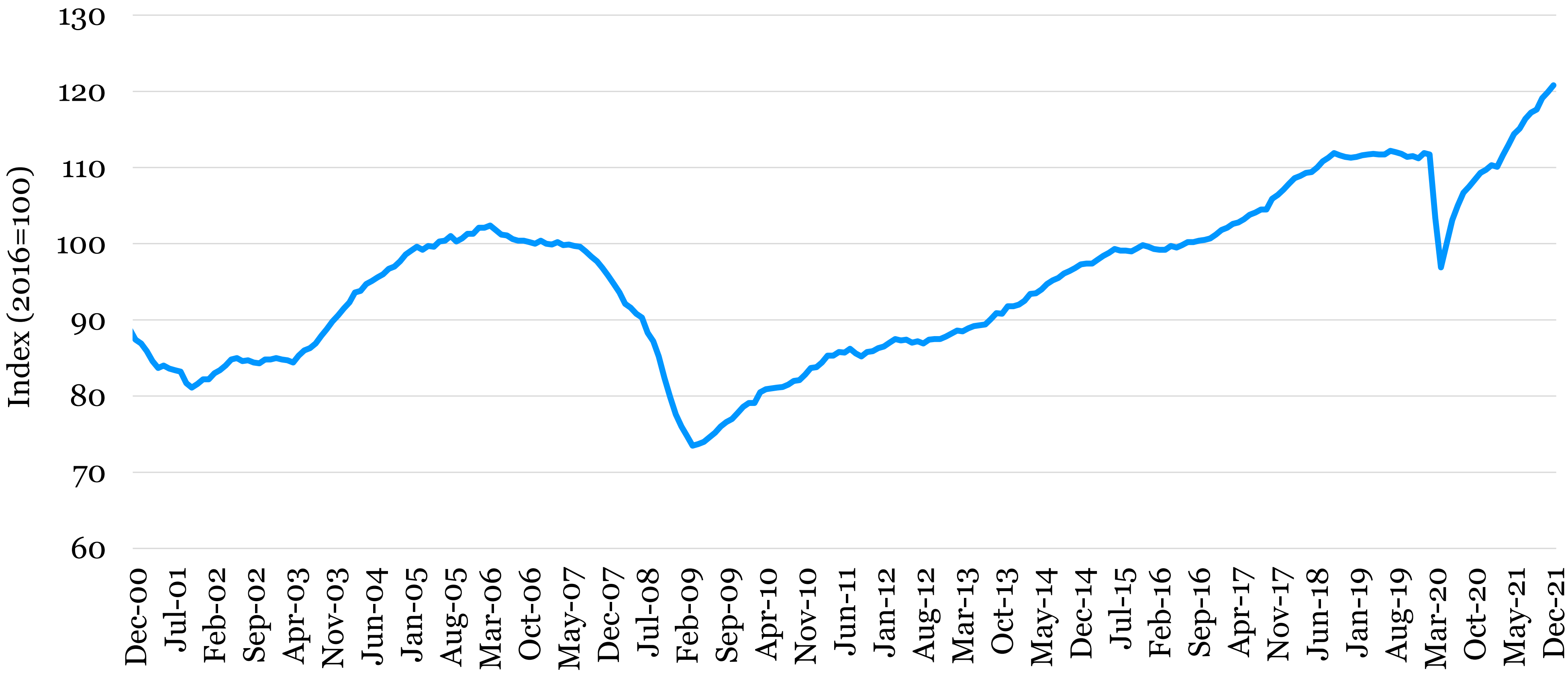
Conference Board: U.S. Leading Economic Index

2000 – December 2021



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Source: The Conference Board

You Only Forecast Twice

- This will be a year of growth.
- But the economy will remain unbalanced, with supply struggling to keep up with demand.
- Along with rising wages amidst the Great Resignation, that translates into higher than average economywide inflation in 2022.
- Yes, I'm an economist, so I am forecasting interest rates to increase.
- Beware of rapid declines in commodity and asset prices at some point in '22!

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Thank You

Please follow me on Twitter -- @sageanirban

Please follow my newsletter at Basu.substack.com.

Please look for updates of information at www.sagepolicy.com.

Please contact us when you require economic research & policy analysis.

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MARKET INSIGHTS

Guide to the Markets®

U.S. | 1Q 2022

As of February 9, 2022

J.P.Morgan
ASSET MANAGEMENT

David Lebovitz

GTM | U.S.

David M. Lebovitz
Executive Director
Global Market Strategist

David M. Lebovitz, Executive Director, is a Global Market Strategist on the J.P. Morgan Asset Management Global Market Insights Strategy Team. In this role, David is responsible for delivering timely market and economic insights to clients across the country. Since joining the team, David has helped build the Market Insights program in the United Kingdom and Europe, has appeared on both Bloomberg TV and CNBC, and is often quoted in the financial press.

David joined J.P. Morgan in 2010. Prior to joining the firm, David was a Research Analyst at Kobren Insight Management.

David obtained a B.A. in Political Science and Philosophy, with a concentration in Leadership Studies, from Williams College in 2009. He earned a dual-MBA degree from Columbia University and London Business School in 2015.

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ASSET MANAGEMENT

Agenda

GTM | U.S.

- **The near-term outlook for growth and inflation**
- **Calibrating the near-term with the long-term**
- **The outlook for monetary policy**
- **Expected returns and the efficient frontier**

3

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International

Global economic activity momentum

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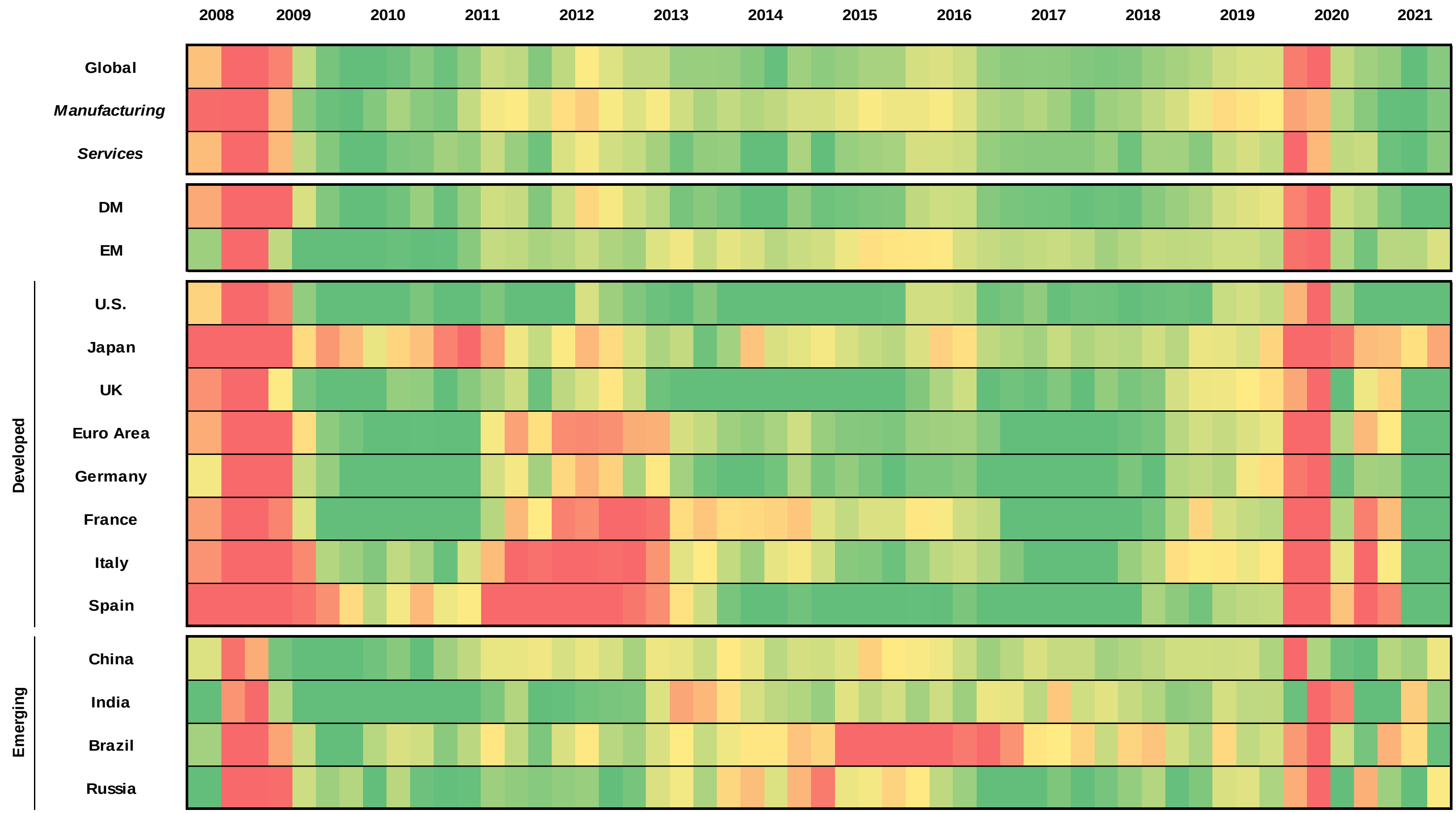
Global Composite (manufacturing & services combined) Purchasing Managers' Index, quarterly



	2021 Dec	Jan
Global	54.3	51.4
Manufacturing	54.3	53.2
Services	54.7	51.3
DM	54.8	51.3
EM	53.3	-
U.S.	57.0	51.1
Japan	52.5	49.9
UK	53.6	54.2
Euro Area	53.3	52.3
Germany	49.9	53.8
France	55.8	52.7
Italy	54.7	50.1
Spain	55.4	47.9
China	53.0	50.1
India	56.4	53.0
Brazil	52.0	50.9
Russia	50.2	50.3

Source: Markit, J.P. Morgan Asset Management.
The Composite PMI includes both manufacturing and services sub-indices. Heatmap colors are based on PMI relative to the 50 level, which indicates acceleration or deceleration of the sector, for the time period shown. Heatmap is based on quarterly averages, with the exception of the two most recent figures, which are single month readings. Data for the U.S. are back-tested and filled in from December 2007 to September 2009 due to lack of existing PMI figures. DM and EM represent developed markets and emerging markets, respectively.
Guide to the Markets – U.S. Data are as of February 9, 2022.

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International

Global inflation

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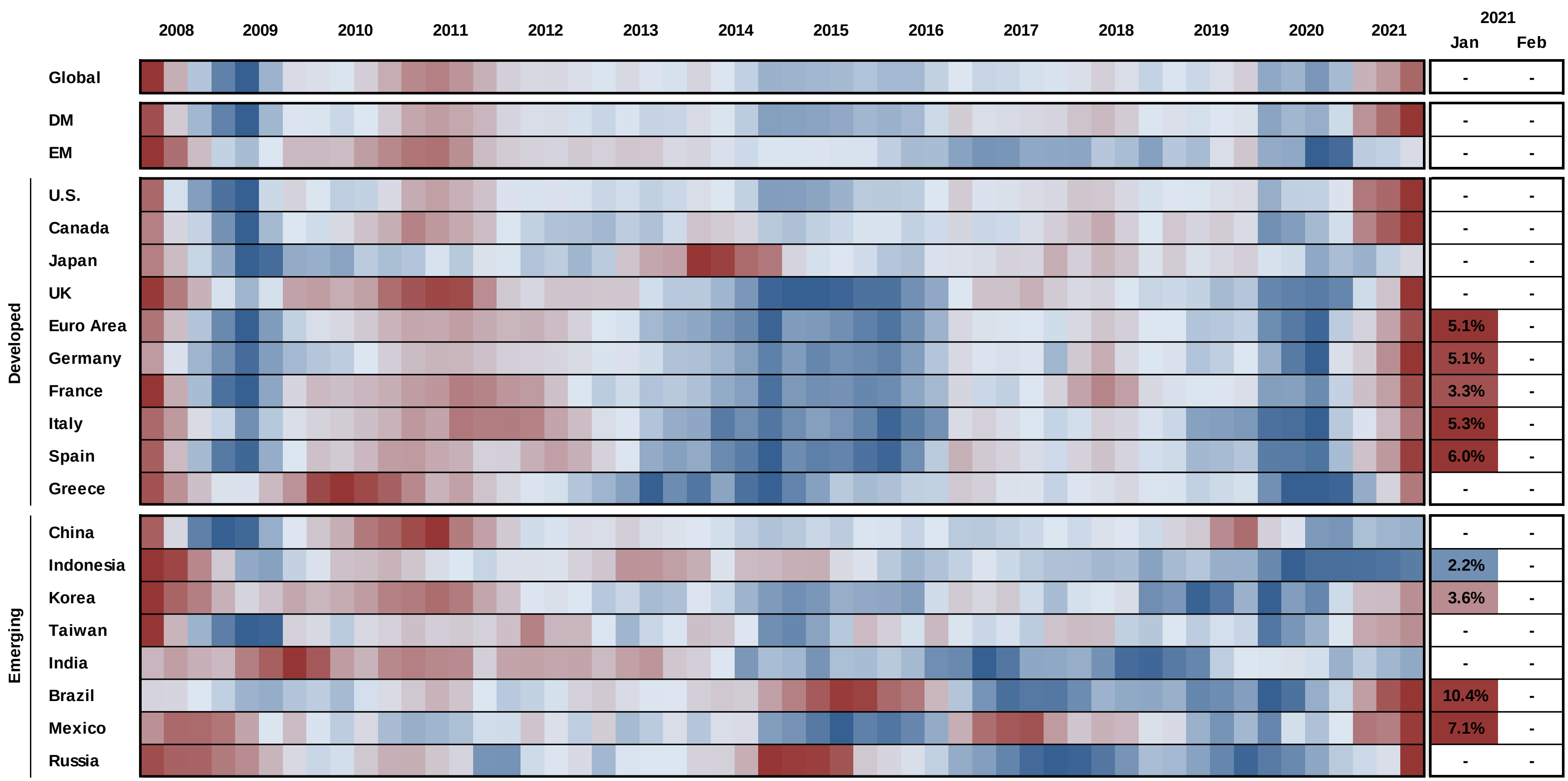
Year-over-year headline inflation by country and region, quarterly



Source: Bank of Mexico, DGBAS, Eurostat, FactSet, Federal Reserve, Goskomstat of Russia, IBGE, India Ministry of Statistics & Programme Implementation, Japan Ministry of Internal Affairs & Communications, Korean National Statistical Office, Melbourne Institute, National Bureau of Statistics China, Statistics Canada, Statistics Indonesia, UK Office for National Statistics (ONS), J.P. Morgan Asset Management. Heatmap is based on quarterly averages, with the exception of the two most recent figures, which are single month readings. Colors determined by percentiles of inflation values over the time period shown. Deep blue = lowest value, light blue = median, deep red = highest value. DM and EM represent developed markets and emerging markets, respectively.
Guide to the Markets – U.S. Data are as of February 9, 2022.

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Global supply chains and inflation

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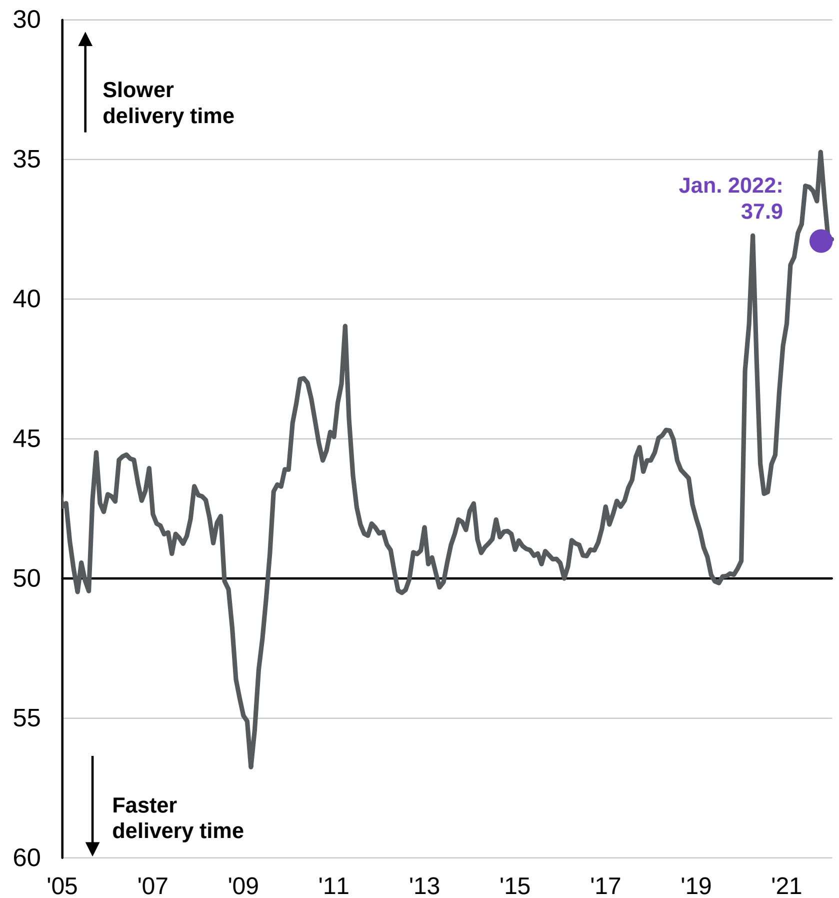
International

Global PMI suppliers' delivery times index*



Global PMI input and output prices**

Source: IHS Markit, J.P. Morgan Asset Management.
*Participants in IHS Markit's PMI business surveys, conducted in 44 countries, are asked: "Are your suppliers' delivery times slower, faster or unchanged on average than one month ago?". Index includes the manufacturing and construction sectors. A reading of 50 = no change, >50 = faster delivery time, <50 = slower delivery time.**Participants are asked: "Are input/output prices the same, higher or lower?". Values shown reflect the composite index, which includes both manufacturing and services. A reading of 50 = no change, >50 = price increase, <50= price decrease.
Guide to the Markets – U.S. Data are as of February 9, 2022.

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Economy

Unemployment and wages

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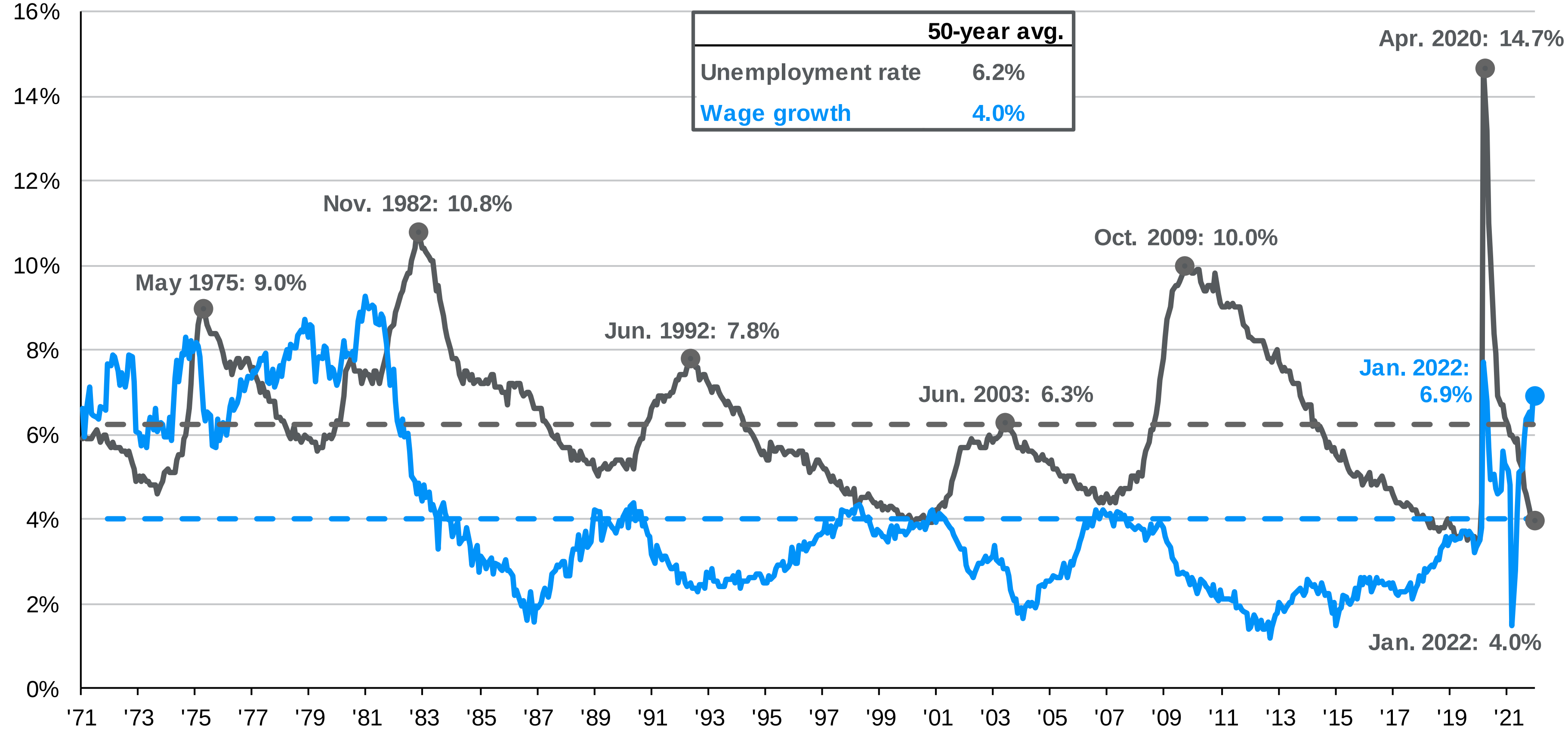
Civilian unemployment rate and year-over-year wage growth

Private production and non-supervisory workers, seasonally adjusted, percent



Source: BLS, FactSet, J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of February 9, 2022.

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Agenda

GTM | U.S.

- **The near-term outlook for growth and inflation**
- **Calibrating the near-term with the long-term**
- **The outlook for monetary policy**
- **Expected returns and the efficient frontier**

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LTCMA macroeconomic assumptions

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Compound 10- 15-year GDP Growth and Inflation (%)

	DM*	U.S.	Europe	U.K.	Japan
2022 LTCMAs					
Real GDP	1.50 ↓	1.70 ↓	1.20 ↓	1.40 ↓	0.70 ↓
Inflation	1.80 ↑	2.30 ↑	1.50 ↑	2.20 ↑	0.70
2021 LTCMAs					
Real GDP	1.60	1.80	1.30	1.60	1.00
Inflation	1.60	2.00	1.30	2.00	0.70

	EM*	China	India	Brazil	Russia
2022 LTCMAs					
Real GDP	3.70 ↓	4.20 ↓	6.00 ↓	2.00 ↓	0.80 ↓
Inflation	3.30	2.50	4.50 ↓	4.30	5.00 ↓
2021 LTCMAs					
Real GDP	3.90	4.40	6.90	2.40	1.10
Inflation	3.30	2.50	5.00	4.30	5.30

PRODUCTIVITY AND INFLATION UPLIFTS

- **Growth** – Small downgrades to U.S. and China, and last year's cyclical bonuses gone, but upward trend revisions for several others
- **Population** – Demographic drag persists as labor forces to grow slowly by historical standards
- **Productivity** – More optimism about medium-term upside, led by tech investment
- **Inflation** – Broad-based upward revision to inflation outlooks for the first time in many years

Source: J.P. Morgan Asset Management; estimates as of September 2020 and September 2021. *EM: Emerging Markets; DM: Developed Markets.

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Agenda

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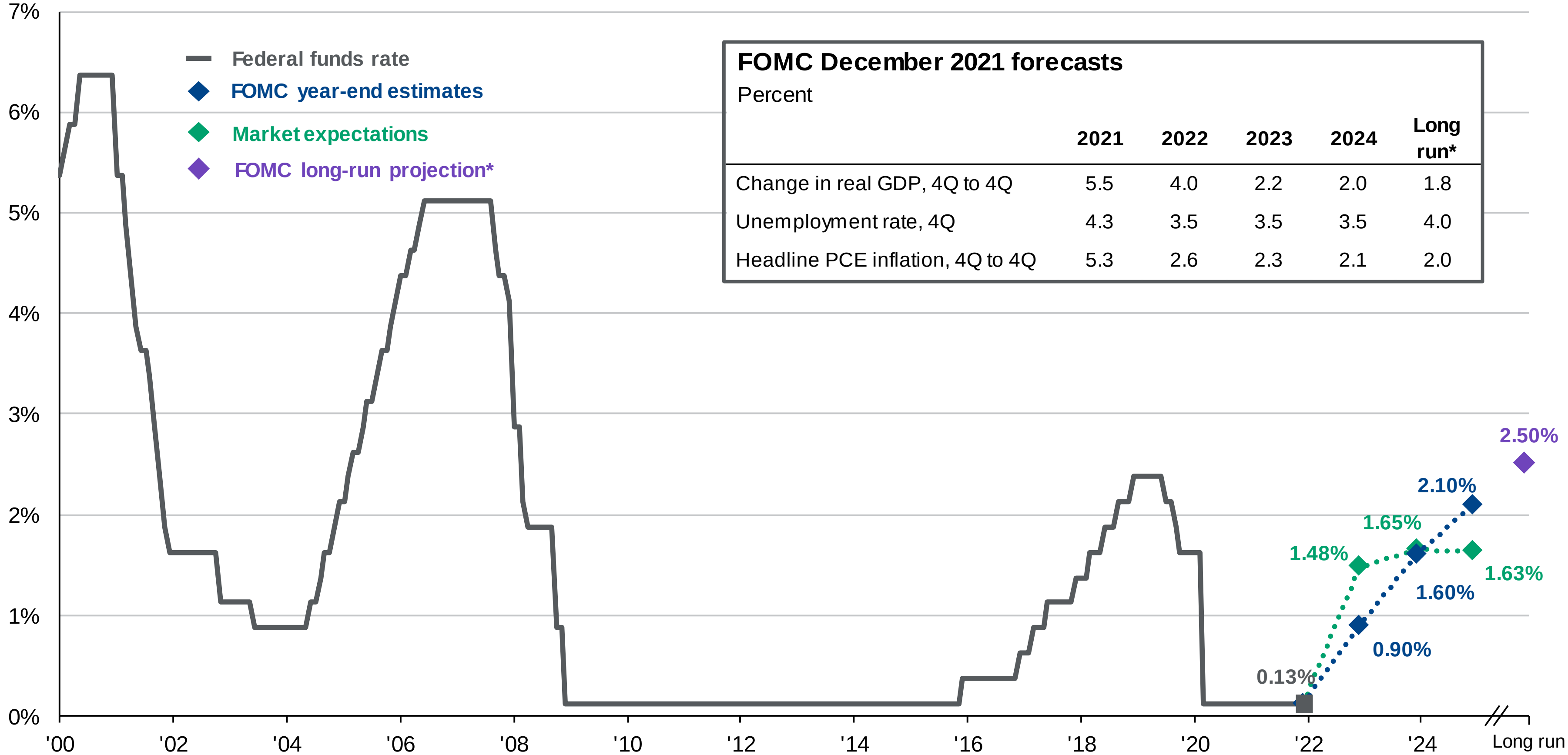
Fixed Income

The Fed and interest rates

GTM | U.S. | 31

Federal funds rate expectations

FOMC and market expectations for the federal funds rate



FOMC December 2021 forecasts

Percent

	2021	2022	2023	2024	Long run*
Change in real GDP, 4Q to 4Q	5.5	4.0	2.2	2.0	1.8
Unemployment rate, 4Q	4.3	3.5	3.5	3.5	4.0
Headline PCE inflation, 4Q to 4Q	5.3	2.6	2.3	2.1	2.0

Source: Bloomberg, FactSet, Federal Reserve, J.P. Morgan Asset Management.
Market expectations are based off of the USD Overnight Index Forward Swap rates. *Long-run projections are the rates of growth, unemployment and inflation to which a policymaker expects the economy to converge over the next five to six years in absence of further shocks and under appropriate monetary policy. Forecasts are not a reliable indicator of future performance. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.
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2022 efficient frontier (USD)

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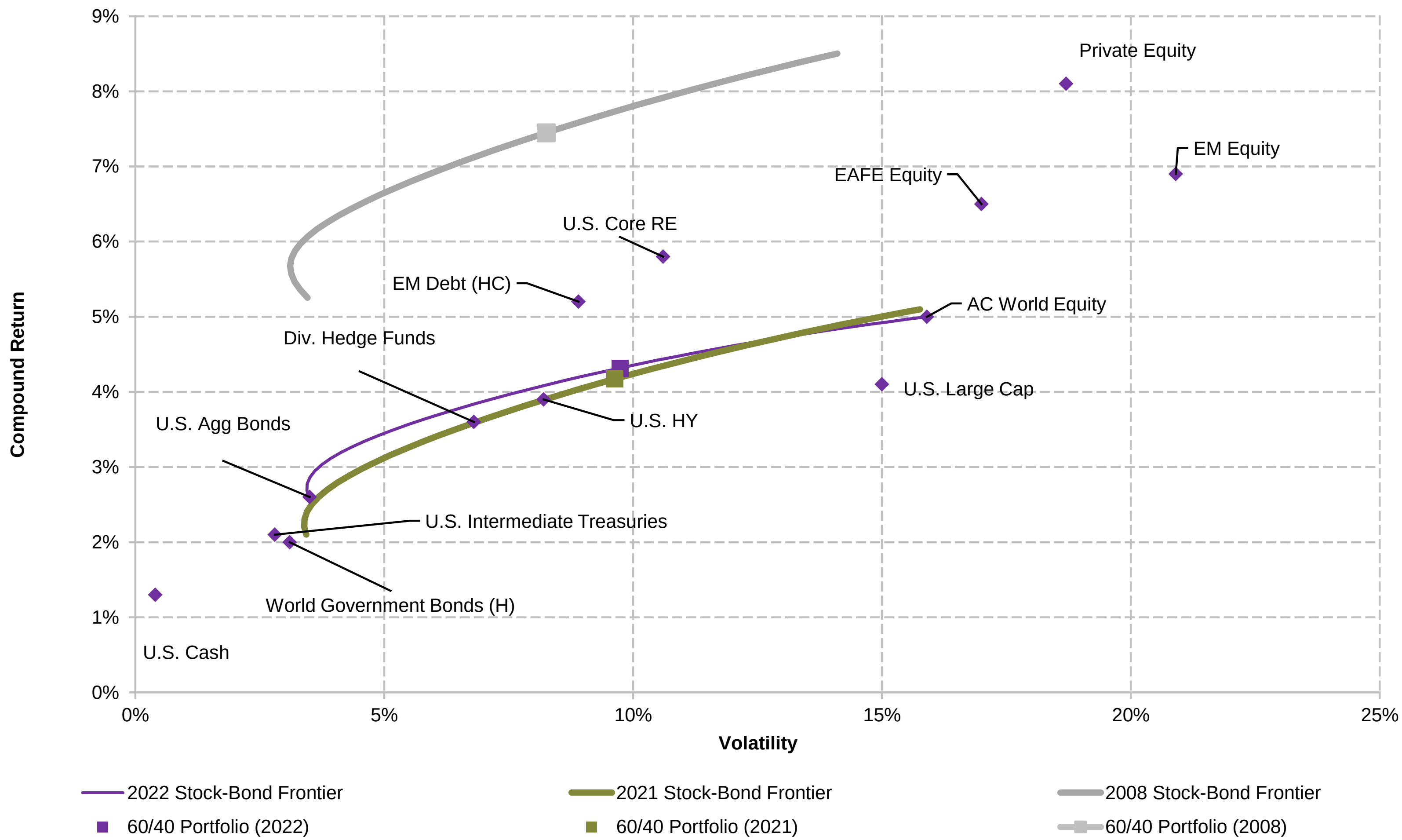

Sources: J.P. Morgan Asset Management. Data are as of September 30, 2021.

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Fixed income assumptions

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Fixed income assumptions, 2022 vs. 2021 (USD)

	Inflation rate	Cash rate	10-yr bond yield	20+-yr bond yield	U.S. IG	U.S. HY	EMD (hard)	EMD (hard corp)
2022 LTCMAs								
Equilibrium Rate / Spread	2.30%	2.00%	3.00%	3.40%	160 bps	480 bps	380 bps	400 bps
Rate / spread on Sept 30, 2021	-	0.25%	1.45%	2.05%	70 bps	330 bps	370 bps	285 bps
Return (%)	-	1.30%	2.40%	1.70%	2.80%	3.90%	5.20%	4.80%
2021 LTCMAs								
Equilibrium Rate / Spread	2.00%	1.90%	3.00%	3.30%	160 bps	500 bps	375 bps	400 bps
Rate / spread on Sept 30, 2020	-	0.25%	0.70%	1.20%	140 bps	560 bps	460 bps	400 bps
Return (%)	-	1.10%	1.60%	0.30%	2.50%	4.80%	5.20%	4.70%

FIXED INCOME KEY POINTS

- We raise our cash rate assumptions modestly, in line with higher inflation expectations.
- The window for normalization of yields has shortened across major G4 markets.
- Central banks' differentiated inflation-targeting credibility has made cash rates pathways and normalization more differentiated across DM.
- US HY and EMD returns are still attractive with most of the drag coming from the normalization in government bond yields.
- HY returns look comparable to equities.

Source: J.P. Morgan Asset Management; estimates as of September 2021 and September 2020. IG = Investment Grade; HY = High Yield; EMD = Emerging Market Debt. Spreads are listed in bps terms.

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Public equity assumptions

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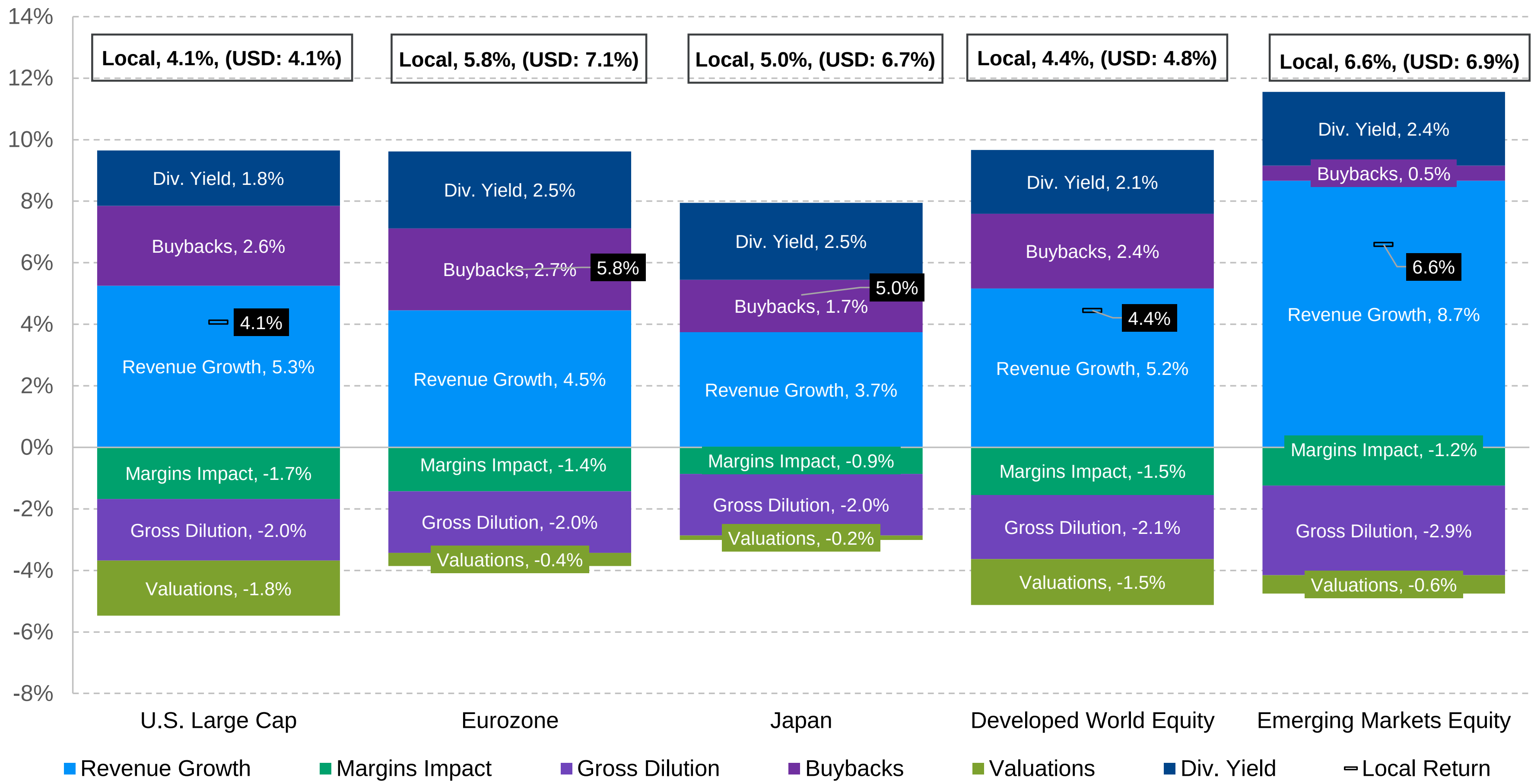

Source: J.P. Morgan Asset Management as of September 2021. Note that final return assumptions are rounded to nearest 10 bps, and sum of building blocks will therefore differ slightly. Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met. * Note: totals may not sum due to rounding.

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Alternative asset class assumptions

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FINANCIAL ALTERNATIVES	2022	2021
PRIVATE EQUITY (USD)		
Cap-weighted composite**	8.10	7.80
Small cap	7.40	7.30
Mid cap	7.60	7.40
Large/mega cap	8.40	8.00
PRIVATE DEBT (USD)		
Direct lending†	6.90	6.80
HEDGE FUNDS (USD)		
Equity long bias	3.30	3.40
Event-driven	3.20	3.10
Relative value	3.80	3.60
Macro	2.70	2.20
Diversified††	3.60	3.30
Conservative††	3.30	3.10

REAL ASSETS	2022	2021
REAL ESTATE - DIRECT (LOCAL CURRENCY)		
U.S. core‡	5.80	5.90
U.S. value-added	7.70	8.10
European core‡‡◊	4.80	5.00
European value-added◊	6.80	7.70
Asia-Pacific core‡‡	6.50	6.60
REITS (LOCAL CURRENCY)		
U.S. REITs	5.70	6.50
European REITs◊◊	5.10	5.90
Asia-Pacific REITs^	5.00	6.40
Global REITs^^	5.40	6.40
INFRASTRUCTURE (USD)		
Global Core	6.10	6.10
TRANSPORT (USD)		
Global Core	7.40	7.60
COMMODITIES (USD)		
Broad Commodities	2.60	2.30
Gold	3.00	2.90

Source: J.P. Morgan Asset Management; estimates as of September 30, 2020, and September 30, 2021.
* All return assumptions incorporate leverage, except for commodities, where it does not apply.
** The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.
† The diversified assumption represents the projected return for direct lending.
†† The diversified assumption represents the projected return for multi-strategy hedge funds. The conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.
‡ U.S. core real estate in our assumptions comprises 90% prime high quality real estate assets and 10% value-added development assets. This exposure is consistent with the composition of the benchmark NFI-ODCE Index.

‡‡ Our 2022 assumptions are not directly comparable to our 2021 assumptions due to a change in methodology: For our 2022 estimates, to improve consistency across regions, we match the composition of European and Asia-Pacific core real estate to that of the U.S. (90% prime core and 10% value-added risk exposure). Previously, our European and Asia-Pacific core real estate assumptions included only prime core exposure.
◊ This year, we combine previously separate assumptions, for European ex-UK and the UK, into our European assumptions for both core and value-added real estate.
◊◊ As with core real estate, in 2022 we have combined two previously separate assumptions, European ex-UK and UK REITs, into a single European REITs assumption.
^ Asia-Pacific REITs follow a developed market construct and cover a slightly different geographic exposure from that of Asia-Pacific core real estate.
^^ The global composite is built assuming the following weights: roughly 60% U.S., 20% Europe and 20% Asia-Pacific.

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J.P. Morgan Asset Management – Index definitions

All indexes are unmanaged and an individual cannot invest directly in an index. Index returns do not include fees or expenses.

Equities:

The **Dow Jones Industrial Average** is a price-weighted average of 30 actively traded blue-chip U.S. stocks.

The **MSCI ACWI (All Country World Index)** is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.

The **MSCI EAFE Index(Europe, Australasia, Far East)**is a free float-adjusted market capitalization index that is designed to measure the equity market performance of developed markets, excluding the US & Canada.

The **MSCI Emerging Markets Index** is a free float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets.

The **MSCI Europe Index** is a free float-adjusted market capitalization index that is designed to measure developed market equity performance in Europe.

The **MSCI Pacific Index** is a free float-adjusted market capitalization index that is designed to measure equity market performance in the Pacific region.

The **Russell 1000 Index**® measures the performance of the 1,000 largest companies in the Russell 3000.

The **Russell 1000 Growth Index**® measures the performance of those Russell 1000 companies with higher price-to-book ratios and higher forecasted growth values.

The **Russell 1000 Value Index**® measures the performance of those Russell 1000 companies with lower price-to-book ratios and lower forecasted growth values.

The **Russell 2000 Index**® measures the performance of the 2,000 smallest companies in the Russell 3000 Index.

The **Russell 2000 Growth Index**® measures the performance of those Russell 2000 companies with higher price-to-book ratios and higher forecasted growth values.

The **Russell 2000 Value Index**® measures the performance of those Russell 2000 companies with lower price-to-book ratios and lower forecasted growth values.

The **Russell 3000 Index**® measures the performance of the 3,000 largest U.S. companies based on total market capitalization.

The **Russell Midcap Index**® measures the performance of the 800 smallest companies in the Russell 1000 Index.

The **Russell Midcap Growth Index** ® measures the performance of those Russell Midcap companies with higher price-to-book ratios and higher forecasted growth values. The stocks are also members of the Russell 1000 Growth index.

The **Russell Midcap Value Index** ® measures the performance of those Russell Midcap companies with lower price-to-book ratios and lower forecasted growth values. The stocks are also members of the Russell 1000 Value index.

The **S&P 500 Index** is widely regarded as the best single gauge of the U.S. equities market. The index includes a representative sample of 500 leading companies in leading industries of the U.S. economy. The **S&P 500 Index** focuses on the large-cap segment of the market; however, since it includes a significant portion of the total value of the market, it also represents the market.

Fixed income:

The **Bloomberg 1-3 Month U.S. Treasury Bill Index** includes all publicly issued zero-coupon US Treasury Bills that have a remaining maturity of less than 3 months and more than 1 month, are rated investment grade, and have $250 million or more of outstanding face value. In addition, the securities must be denominated in U.S. dollars and must be fixed rate and non convertible.

The **Bloomberg Global High Yield Index** is a multi-currency flagship measure of the global high yield debt market. The index represents the union of the US High Yield, the Pan-European High Yield, and Emerging Markets (EM) Hard Currency High Yield Indices. The high yield and emerging markets sub-components are mutually exclusive. Until January 1, 2011, the index also included CMBS high yield securities.

The **Bloomberg Municipal Index**: consists of a broad selection of investment-grade general obligation and revenue bonds of maturities ranging from one year to 30 years. It is an unmanaged index representative of the tax-exempt bond market.

The **Bloomberg US Dollar Floating Rate Note (FRN) Index** provides a measure of the U.S. dollar denominated floating rate note market.

The **Bloomberg US Corporate Investment Grade Index** is an unmanaged index consisting of publicly issued US Corporate and specified foreign debentures and secured notes that are rated investment grade (Baa3/BBB or higher) by at least two ratings agencies, have at least one year to final maturity and have at least $250 million par amount outstanding. To qualify, bonds must be SEC-registered.

The **Bloomberg US High Yield Index** covers the universe of fixed rate, non-investment grade debt. Eurobonds and debt issues from countries designated as emerging markets (sovereign rating of Baa1/BBB+/BBB+ and below using the middle of Moody's, S&P, and Fitch) are excluded, but Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included.

The **Bloomberg US Mortgage Backed Securities Index** is an unmanaged index that measures the performance of investment grade fixed-rate mortgage backed pass-through securities of GNMA, FNMA and FHLMC.

The **Bloomberg US TIPS Index** consists of Inflation-Protection securities issued by the U.S. Treasury.

The **J.P. Morgan Emerging Market Bond Global Index(EMBI)**includes U.S. dollar denominated Brady bonds, Eurobonds, traded loans and local market debt instruments issued by sovereign and quasi-sovereign entities.

The **J.P. Morgan Domestic High Yield Index** is designed to mirror the investable universe of the U.S. dollar domestic high yield corporate debt market.

The **J.P. Morgan Corporate Emerging Markets Bond Index Broad Diversified (CEMBI Broad Diversified)**is an expansion of the **J.P. Morgan Corporate Emerging Markets Bond Index (CEMBI)**. The CEMBI is a market capitalization weighted index consisting of U.S. dollar denominated emerging market corporate bonds.

The **J.P. Morgan Emerging Markets Bond Index Global Diversified (EMBI Global Diversified)** tracks total returns for U.S. dollar-denominated debt instruments issued by emerging market sovereign and quasi-sovereign entities: Brady bonds, loans, Eurobonds. The index limits the exposure of some of the larger countries.

The **J.P. Morgan GBI EM Global Diversified** tracks the performance of local currency debt issued by emerging market governments, whose debt is accessible by most of the international investor base.

The **U.S. Treasury Index** is a component of the U.S. Government index.

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J.P. Morgan Asset Management – Definitions

Other asset classes:

The **Alerian MLP Index** is a composite of the 50 most prominent energy Master Limited Partnerships (MLPs) that provides investors with an unbiased, comprehensive benchmark for the asset class.

The **Bloomberg Commodity Index** and related sub-indices are composed of futures contracts on physical commodities and represents twenty two separate commodities traded on U.S. exchanges, with the exception of aluminum, nickel, and zinc

The **Cambridge Associates U.S. Global Buyout and Growth Index®** is based on data compiled from 1,768 global (U.S. & ex –U.S.) buyout and growth equity funds, including fully liquidated partnerships, formed between 1986 and 2013.

The **CS/Tremont Hedge Fund Index** is compiled by Credit Suisse Tremont Index, LLC. It is an asset-weighted hedge fund index and includes only funds, as opposed to separate accounts. The Index uses the Credit Suisse/Tremont database, which tracks over 4500 funds, and consists only of funds with a minimum of US$50 million under management, a 12-month track record, and audited financial statements. It is calculated and rebalanced on a monthly basis, and shown net of all performance fees and expenses. It is the exclusive property of Credit Suisse Tremont Index, LLC.

The **HFRI Monthly Indices (HFRI)** are equally weighted performance indexes, utilized by numerous hedge fund managers as a benchmark for their own hedge funds. The HFRI are broken down into 4 main strategies, each with multiple sub strategies. All single-manager HFRI Index constituents are included in the HFRI Fund Weighted Composite, which accounts for over 2200 funds listed on the internal HFR Database.

The **NAREIT EQUITY REIT Index** is designed to provide the most comprehensive assessment of overall industry performance, and includes all tax-qualified real estate investment trusts (REITs) that are listed on the NYSE, the American Stock Exchange or the NASDAQ National Market List.

The **NFI-ODCE**, short for NCREIF Fund Index -Open End Diversified Core Equity, is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy, some of which have performance histories dating back to the 1970s. The NFI-ODCE Index is capitalization-weighted and is reported gross of fees. Measurement is time-weighted.

Definitions:

Investing in **alternative assets** involves higher risks than traditional investments and is suitable only for sophisticated investors. Alternative investments involve greater risks than traditional investments and should not be deemed a complete investment program. They are not tax efficient and an investor should consult with his/her tax advisor prior to investing. Alternative investments have higher fees than traditional investments and they may also be highly leveraged and engage in speculative investment techniques, which can magnify the potential for investment loss or gain. The value of the investment may fall as well as rise and investors may get back less than they invested.

Bonds are subject to interest rate risks. Bond prices generally fall when interest rates rise.

Investments in **commodities** may have greater volatility than investments in traditional securities, particularly if the instruments involve leverage. The value of commodity-linked derivative instruments may be affected by changes in overall market movements, commodity index volatility, changes in interest rates, or factors affecting a particular industry or commodity, such as drought, floods, weather, livestock disease, embargoes, tariffs and international economic, political and regulatory developments. Use of leveraged commodity-linked derivatives creates an opportunity for increased return but, at the same time, creates the possibility for greater loss.

Derivatives may be riskier than other types of investments because they may be more sensitive to changes in economic or market conditions than other types of investments and could result in losses that significantly exceed the original investment. The use of derivatives may not be successful, resulting in investment losses, and the cost of such strategies may reduce investment returns.

Distressed Restructuring Strategies employ an investment process focused on corporate fixed income instruments, primarily on corporate credit instruments of companies trading at significant discounts to their value at issuance or obliged (par value) at maturity as a result of either formal bankruptcy proceeding or financial market perception of near term proceedings.

Investments in **emerging markets** can be more volatile. The normal risks of investing in foreign countries are heightened when investing in emerging markets. In addition, the small size of securities markets and the low trading volume may lead to a lack of liquidity, which leads to increased volatility. Also, emerging markets may not provide adequate legal protection for private or foreign investment or private property.

The price of **equity** securities may rise, or fall because of changes in the broad market or changes in a company's financial condition, sometimes rapidly or unpredictably. These price movements may result from factors affecting individual companies, sectors or industries, or the securities market as a whole, such as changes in economic or political conditions. Equity securities are subject to "stock market risk" meaning that stock prices in general may decline over short or extended periods of time.

Equity market neutral strategies employ sophisticated quantitative techniques of analyzing price data to ascertain information about future price movement and relationships between securities, select securities for purchase and sale. Equity Market Neutral Strategies typically maintain characteristic net equity market exposure no greater than 10% long or short.

Global macro strategies trade a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed income, hard currency and commodity markets.

International investing involves a greater degree of risk and increased volatility. Changes in currency exchange rates and differences in accounting and taxation policies outside the U.S. can raise or lower returns. Some overseas markets may not be as politically and economically stable as the United States and other nations.

There is no guarantee that the use of **long and short positions** will succeed in limiting an investor's exposure to domestic stock market movements, capitalization, sector swings or other risk factors. Using long and short selling strategies may have higher portfolio turnover rates. Short selling involves certain risks, including additional costs associated with covering short positions and a possibility of unlimited loss on certain short sale positions.

Merger arbitrage strategies which employ an investment process primarily focused on opportunities in equity and equity related instruments of companies which are currently engaged in a corporate transaction.

Mid-capitalization investing typically carries more risk than investing in well-established "blue-chip" companies. Historically, mid-cap companies' stock has experienced a greater degree of market volatility than the average stock.

Price to forward earnings is a measure of the price-to-earnings ratio (P/E) using forecasted earnings. **Price to book value** compares a stock's market value to its book value. **Price to cash flow** is a measure of the market's expectations of a firm's future financial health. **Price to dividends** is the ratio of the price of a share on a stock exchange to the dividends per share paid in the previous year, used as a measure of a company's potential as an investment.

Real estate investments may be subject to a higher degree of market risk because of concentration in a specific industry, sector or geographical sector. Real estate investments may be subject to risks including, but not limited to, declines in the value of real estate, risks related to general and economic conditions, changes in the value of the underlying property owned by the trust and defaults by borrower.

Relative Value Strategies maintain positions in which the investment thesis is predicated on realization of a valuation discrepancy in the relationship between multiple securities.

Small-capitalization investing typically carries more risk than investing in well-established "blue-chip" companies since smaller companies generally have a higher risk of failure. Historically, smaller companies' stock has experienced a greater degree of market volatility than the average stock.

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J.P. Morgan Asset Management – Risks & disclosures

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Unless otherwise stated, all data are as of February 9, 2022 or most recently available.

Guide to the Markets – U.S.

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