



Global Economic Outlook: 2022+

January 19, 2022





Tom Kelly

Executive Director & CEO Automation Alley

Tom Kelly is a globally recognized expert on Industry 4.0 and its impact on business. As executive director and CEO of Automation Alley, Michigan's Industry 4.0 knowledge center, Kelly oversees strategic planning and all ongoing activities for the organization, including programs and services designed to help businesses increase revenue, reduce costs and make strategic decisions during a time of rapid technological change.



Natalie Chmiko

Vice President, Pure Michigan Business Connect & International Trade

Michigan Economic Development Corporation

Leads two award-winning state economic development programs aimed at connecting Michigan companies to global procurement opportunities, helping them diversify and grow their business within the state. Together, these programs have generated more than \$18 billion in new business for Michigan companies since 2011. Also responsible for leading Michigan's Industry 4.0 strategic initiative, which provides tools and resources to prepare 6,200 Michigan manufacturers to adopt I4.0 technologies.



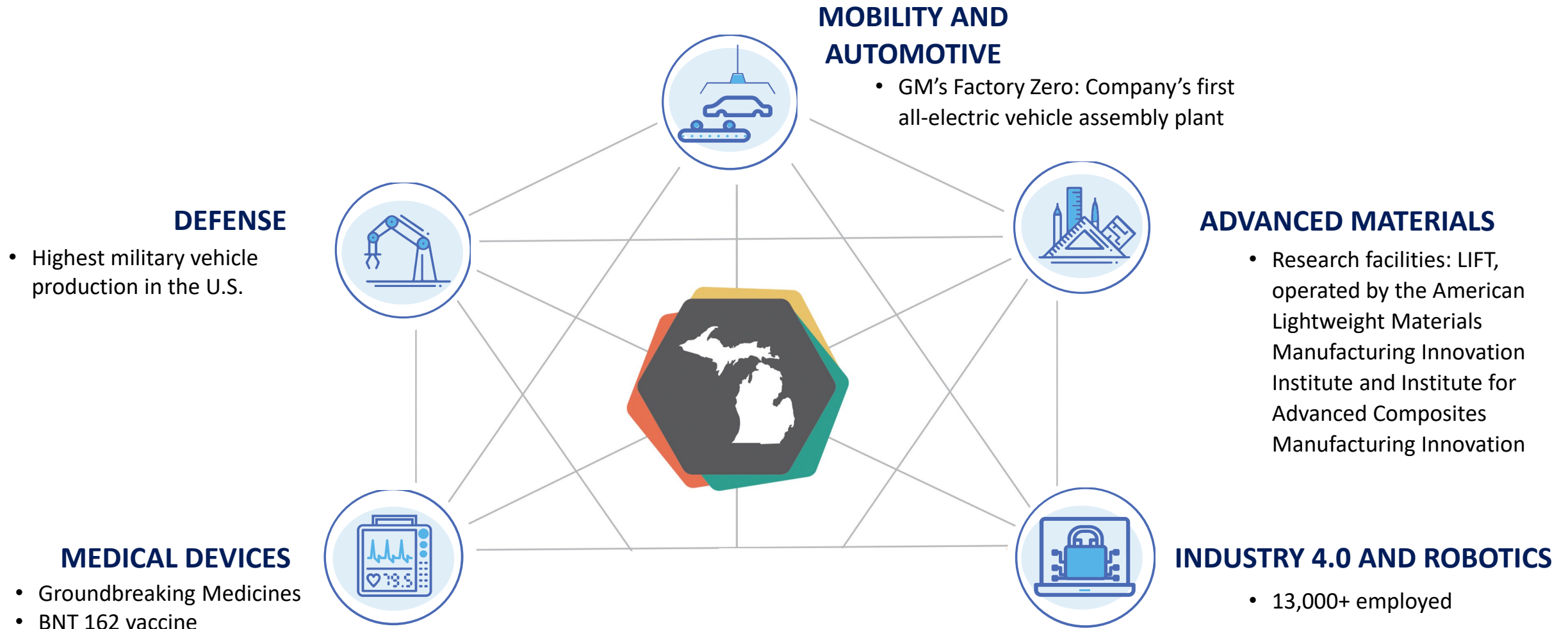
**MICHIGAN ECONOMIC
DEVELOPMENT CORPORATION**

ADVANCING MICHIGAN'S WORLD LEADING ROLE IN INDUSTRY 4.0

Natalie Chmiko

Vice President, Pure Michigan Business Connect & International Trade
Michigan Economic Development Corporation

MICHIGAN MEANS MANUFACTURING: OUR MANUFACTURING KNOW-HOW



HIGHLY SKILLED WORKFORCE



By leveraging our manufacturing know-how, highly skilled workforce and strong quality of life, we are developing a world-class ecosystem where businesses of the future can thrive.



250,000+ skilled trades workers ranking Michigan in the **top 10**



Michigan ranks **1st in the U.S.** for concentration of employment in **engineering-related occupations**. In 2020, the engineering workforce in the state totaled **over 123,000**



Governor Whitmer's goal to increase the number of Michiganders with a post-secondary credential **to 60 percent by 2030** will help define Michigan as a **preeminent home for opportunity**.



Detroit Manufacturing Systems

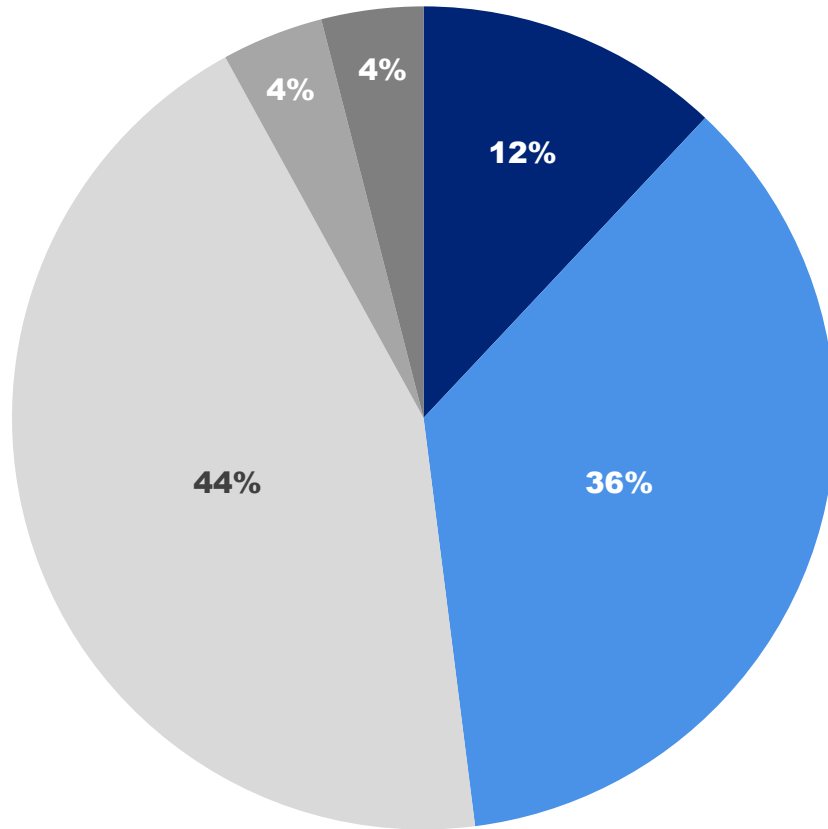
Became an Industry 4.0 “Smart Factory” by investing in manufacturing technologies and its workforce



LightGuide, Inc.

Develops the I4.0 technology that other companies can implement in their manufacturing processes

MORE THAN HALF OF ALL SMALL- AND MEDIUM-SIZED MANUFACTURERS ARE BEHIND



- Very Prepared**
Actively using several of these technologies to enhance business
- Somewhat Prepared**
Some have recently begun using one or more of these technologies
- A little Prepared**
They know it is coming and are thinking/learning about it
- Not Prepared**
Not on their radar
- Don't Know**
Not on their radar

Generally speaking, how prepared are small and medium-sized manufacturers in your community to incorporate Industry 4.0 technologies?

Source: IEDC EDRP, "Industry 4.0," 2019

CHANGING THE WAY THINGS ARE MADE

Michigan will be the national leader in Industry 4.0.

Michigan will accomplish this by implementing a multi-pronged effort to ensure that **by 2025 50% of all Michigan manufacturers – 6,200 businesses – will be prepared to adopt Industry 4.0 technologies.**



**Skilled
Workforce**



**Public-Private
Collaboration**



**Manufacturing
Expertise**

LEVERAGING NEW AND EXISTING PARTNERSHIPS

MEDC is building on existing partnerships to help traditional manufacturers understand and implement these advanced technologies while developing a robust pipeline of Industry 4.0-ready talent.



-
- Free Essential Membership
 - Access to Industry 4.0 readiness data and resources

MICHIGAN

MANUFACTURING

TECHNOLOGY

CENTER

-
- Technology assessments and recommendations
 - Training on key Industry 4.0 technology

LEVERAGING NEW AND EXISTING PARTNERSHIPS

**American Lightweight Materials Manufacturing
Innovation Institute (ALMMII) (dba LIFT)**

**Centropolis Accelerator at Lawrence
Technological University**

**Economic Development Alliance of St. Clair
County**

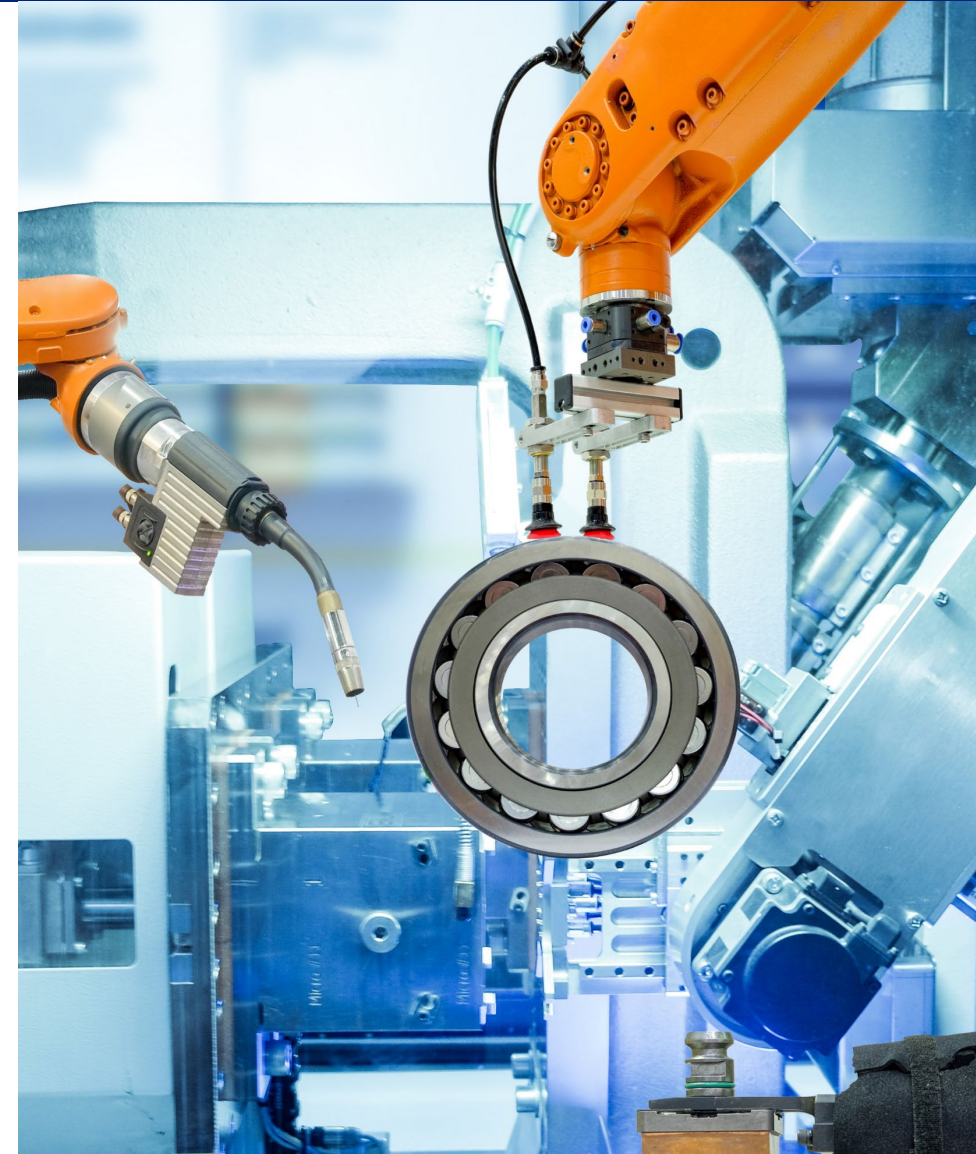
**Great Lakes Bay Manufacturers Association
Lakeshore Advantage**

Lean Rocket Lab

**Macomb County Planning and Economic
Development**

Manufacturing Growth Alliance

Networks Northwest



HOME TO THE NATION'S FIRST INDUSTRY 4.0 ACCELERATOR

*Through collaboration with Lean Rocket Lab and Lawrence Technological University's Centrepolis Accelerator and support from the MEDC, Automation Alley launched a **first-of-its-kind in the U.S.** Industry 4.0 Accelerator program to support small and medium-sized technology and manufacturing companies along their digital transformations.*



This program provides participating companies:

- Investment and fundraising strategy support
- Company growth assessments and progress planning
- Potential connections to investors and capital sources
- Shared workspace opportunities

KEY ACHIEVEMENTS TO DATE



Launched a new manufacturing newsletter to highlight peer-to-peer successes, resources and events



In year one:

- 1,471 manufacturers were served
- 3,682 individual activities/engagements



Convened statewide group of regional & industry partners to ensure alignment



**MICHIGAN ECONOMIC
DEVELOPMENT CORPORATION**

WE ARE COMMITTED TO HELPING MICHIGAN MANUFACTURERS ADOPT INDUSTRY 4.0

michiganbusiness.org/industry4-0





Noel Nevshehir

Director , International Business Services and Global Strategic Partnerships Automation Alley

Noel Nevshehir is director of Automation Alley's International Business Services and Global Strategic Partnerships. In this role, Nevshehir is responsible for leading Automation Alley's trade mission program and foreign direct investment efforts. He is also responsible for seeking out global strategic partners that align with Automation Alley's Industry 4.0 mission.



Global Economic Outlook: 2022+

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James E. Glassman

Managing Director, JPMorgan Chase & Co. *and Head Economist for Chase* Commercial Banking

Jim Glassman is the Managing Director and Head Economist for Commercial Banking. From regulations and technology to globalization and consumer habits, Jim's insights are used by companies and industries to help them better understand the changing economy and its impact on their businesses.



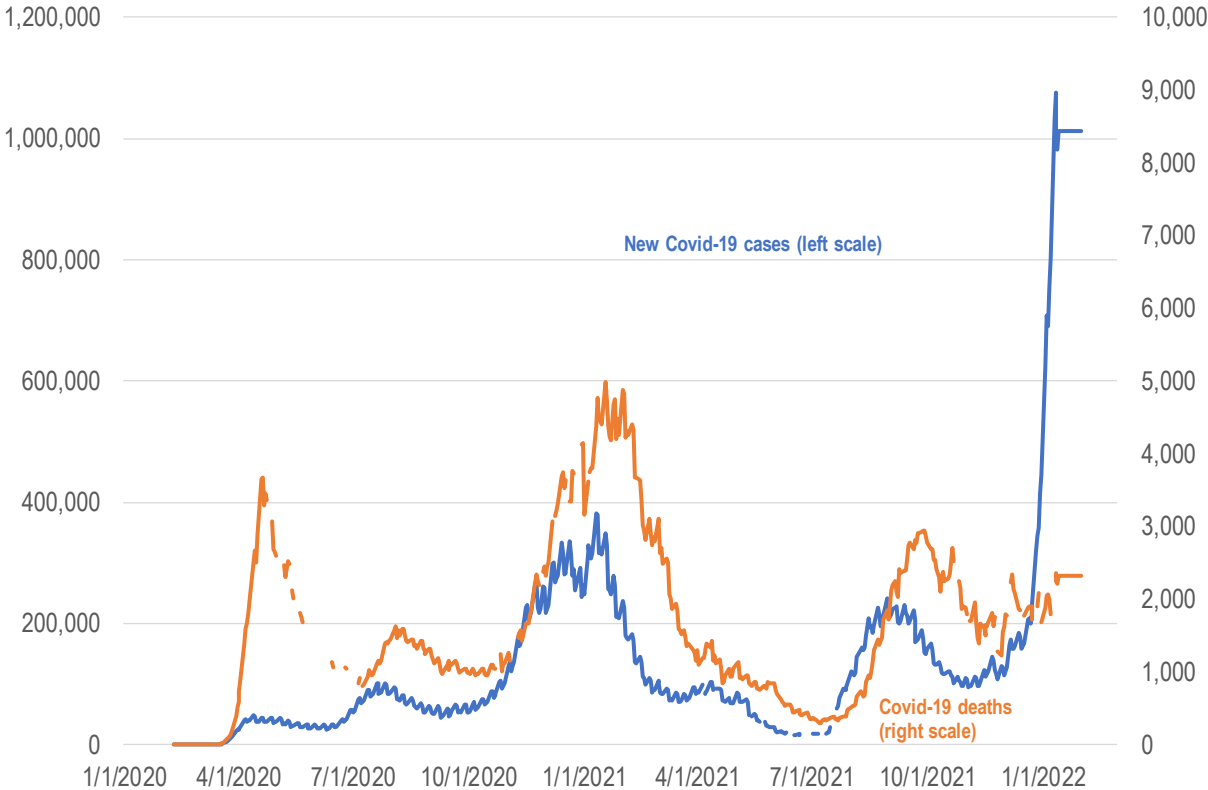
Back to the Future

January 19, 2022

Vaccines Are Breaking the Link to the Economy ...

New Covid-19 cases (daily #, 7-day moving average)

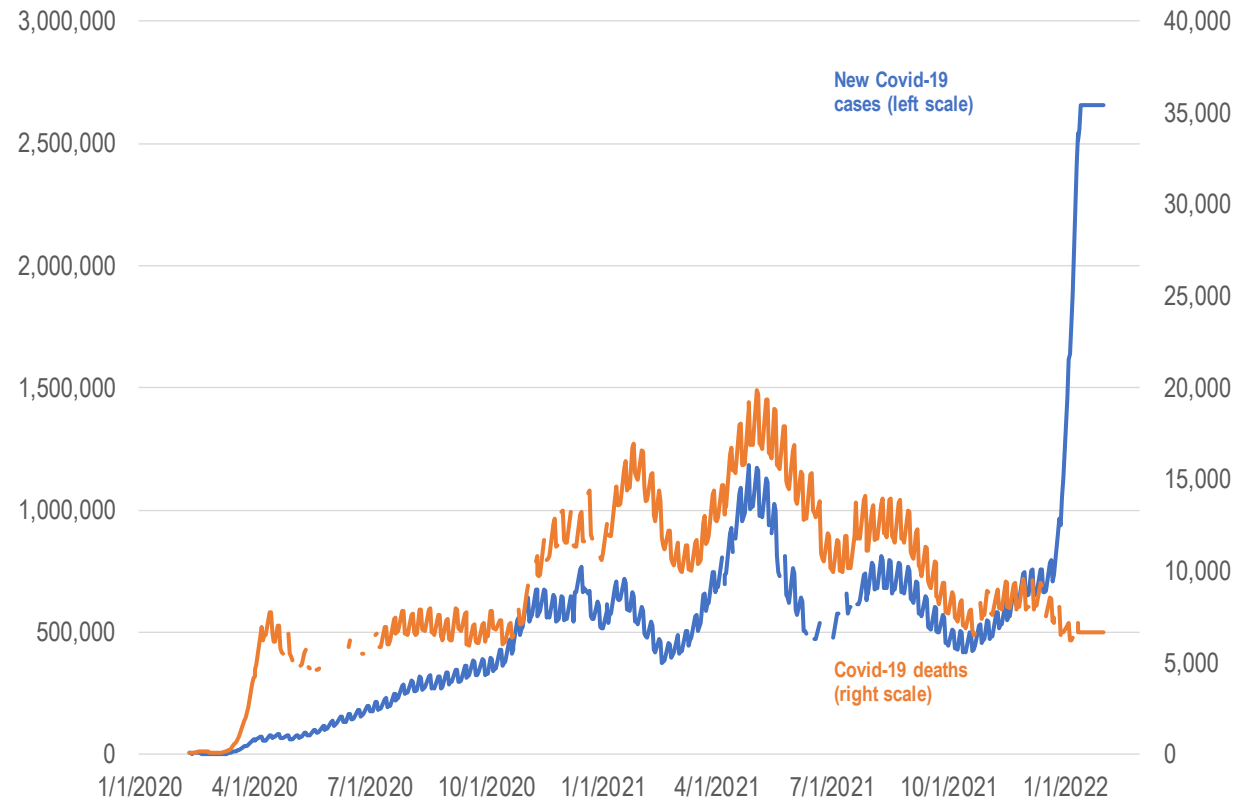
Covid-19 casualties (daily #, 7-day moving average)



Sources: Haver Analytics; Johns Hopkins University. Updated through January 14, 2022.

... Here and Elsewhere

New Covid-19 cases outside the U.S. (daily #, 7-day moving average) Covid-19 casualties (daily #, 7-day moving average)

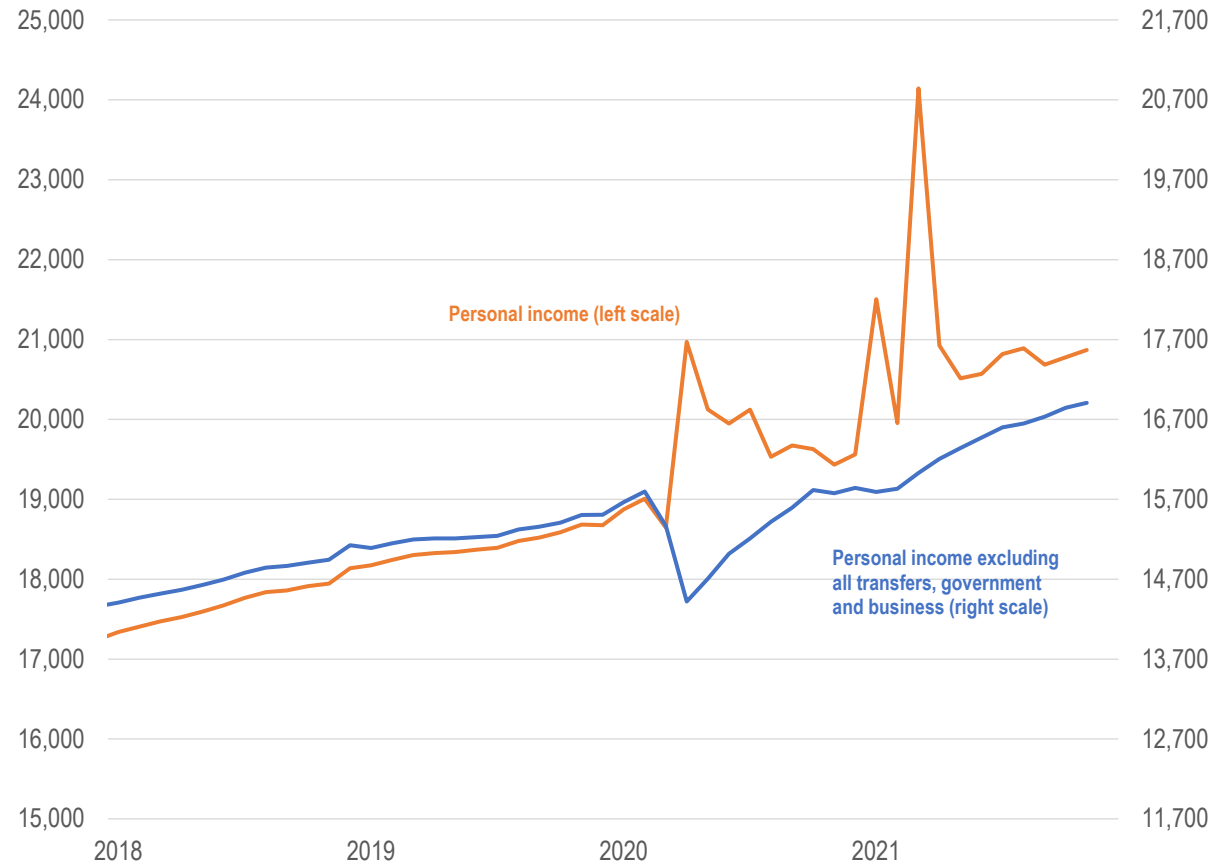


Sources: Haver Analytics; Johns Hopkins University. Updated through January 14, 2022.

Finally, We Got the Policy Response Right

Personal income (billions of dollars)
dollars)

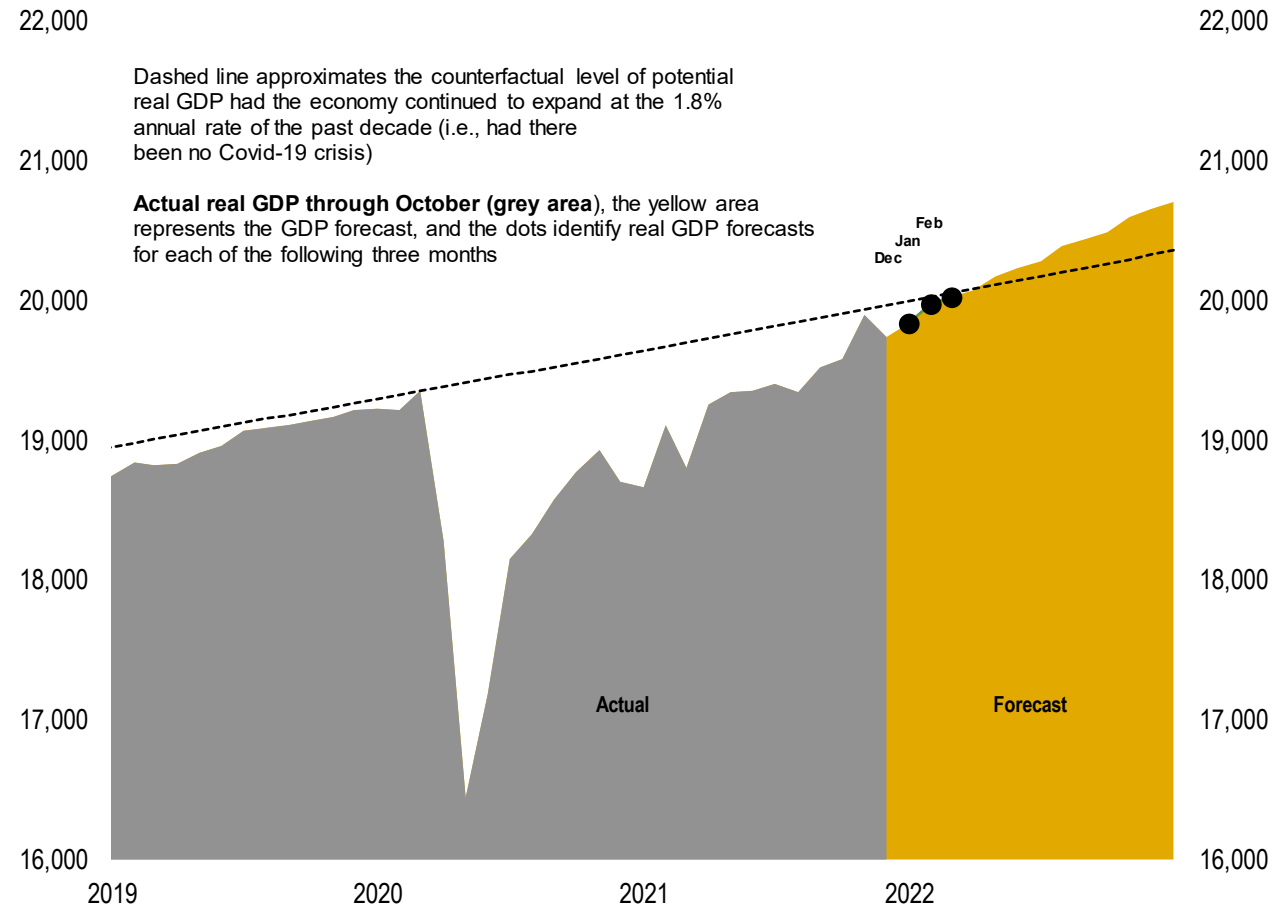
Personal income excluding all transfers (billions of
dollars)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

The Proof of the Pudding

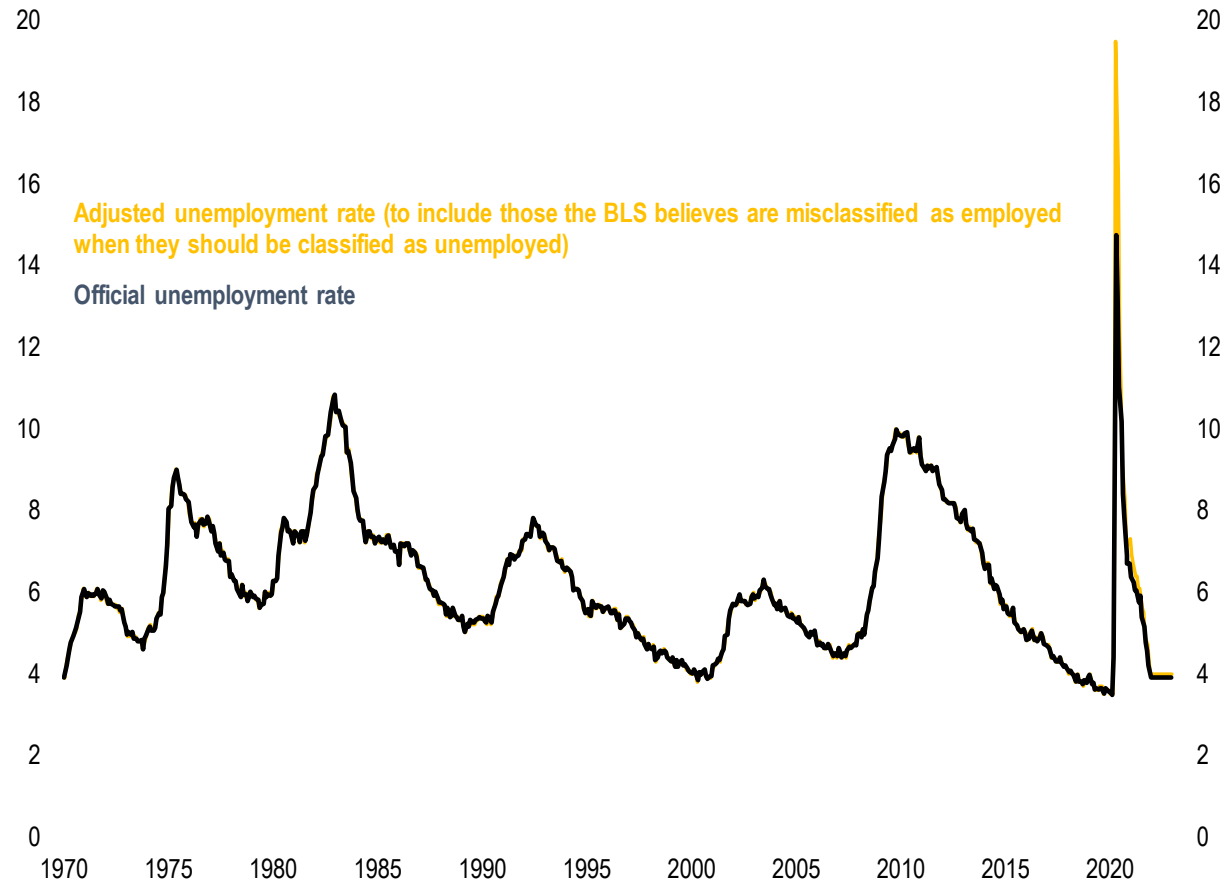
Unemployment (percent of the labor force)



Sources: Haver Analytics; U.S. Department of Labor. Updated through October 2021.

The Proof of the Pudding II

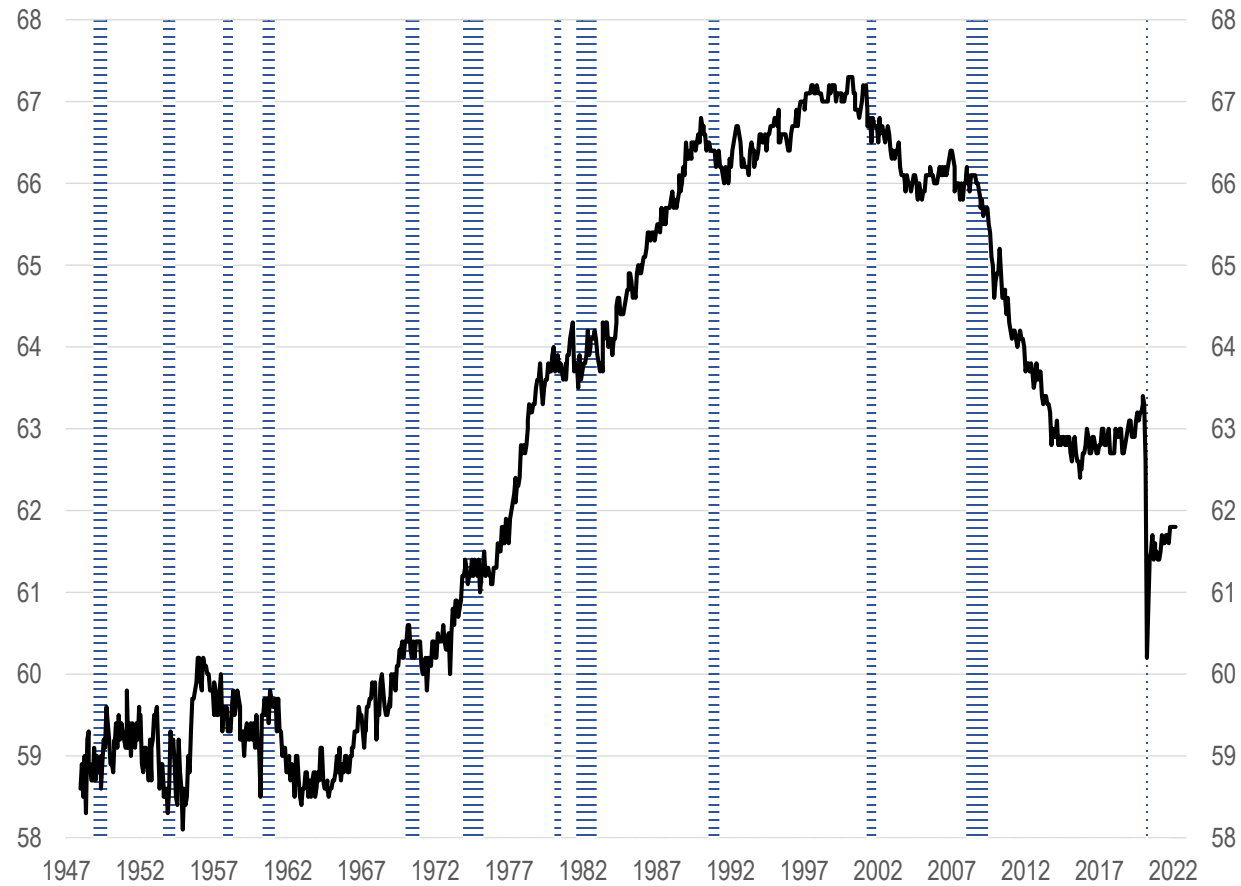
Unemployment (percent of the labor force)



Sources: Haver Analytics; U.S. Department of Labor. Updated through December 2021.

P.S. The Great Resignation Idea (4 Million Dropouts) ...

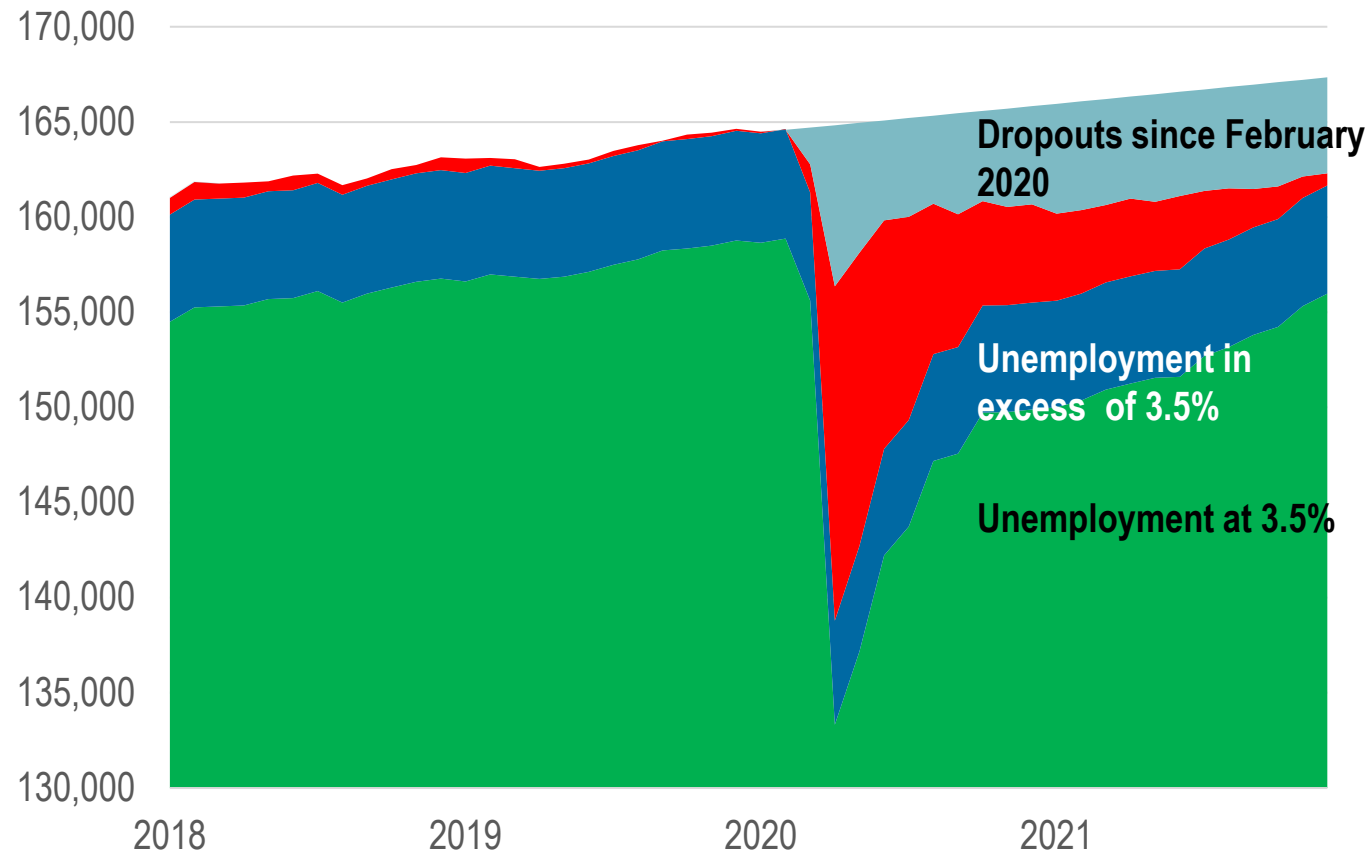
Labor force participation rate (labor force as a percent of the population)



Sources: Haver Analytics; NBER-designated recessions; U.S. Department of Labor. Updated through November 2021.

... Is Probably Nonsense

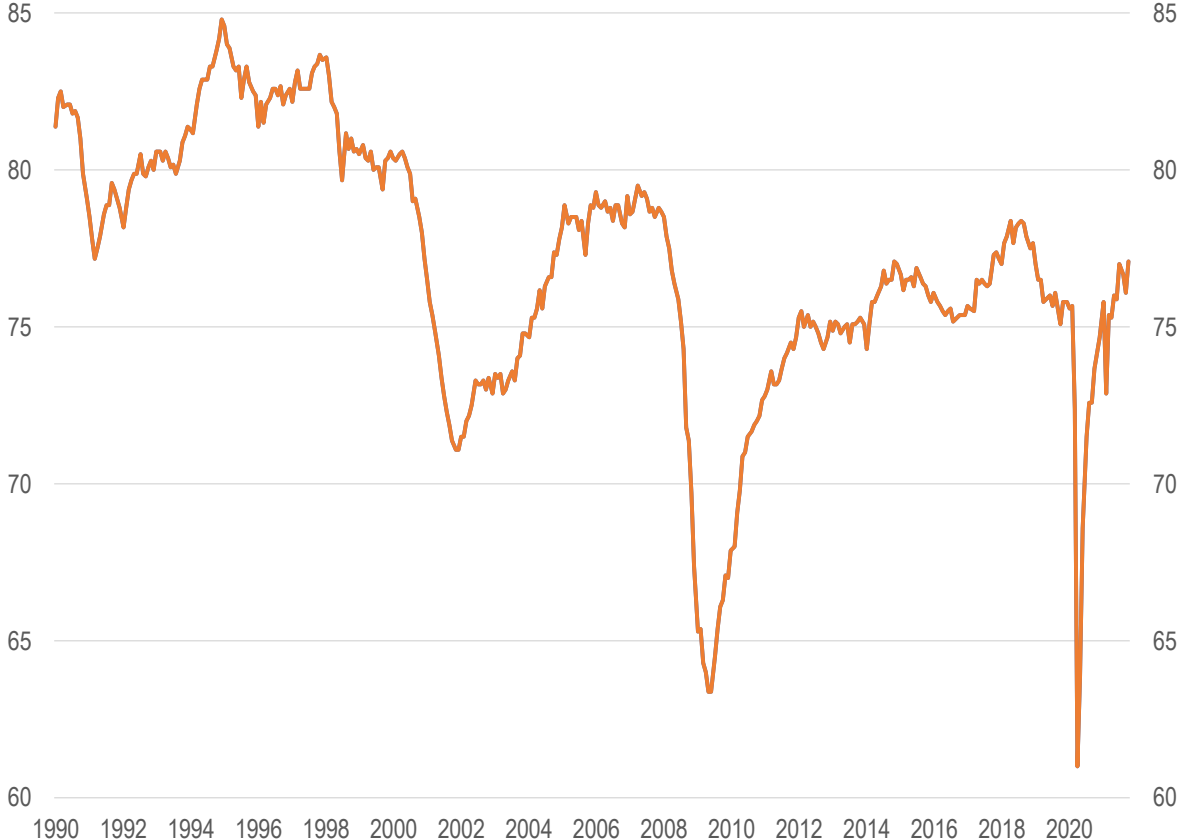
Employment and (official and hidden) unemployment (thousands of people)



Note: Figures are based on the Household Survey.
Sources: Haver Analytics; U.S. Department of Labor. Updated through December 2021.

The Proof of the Pudding III

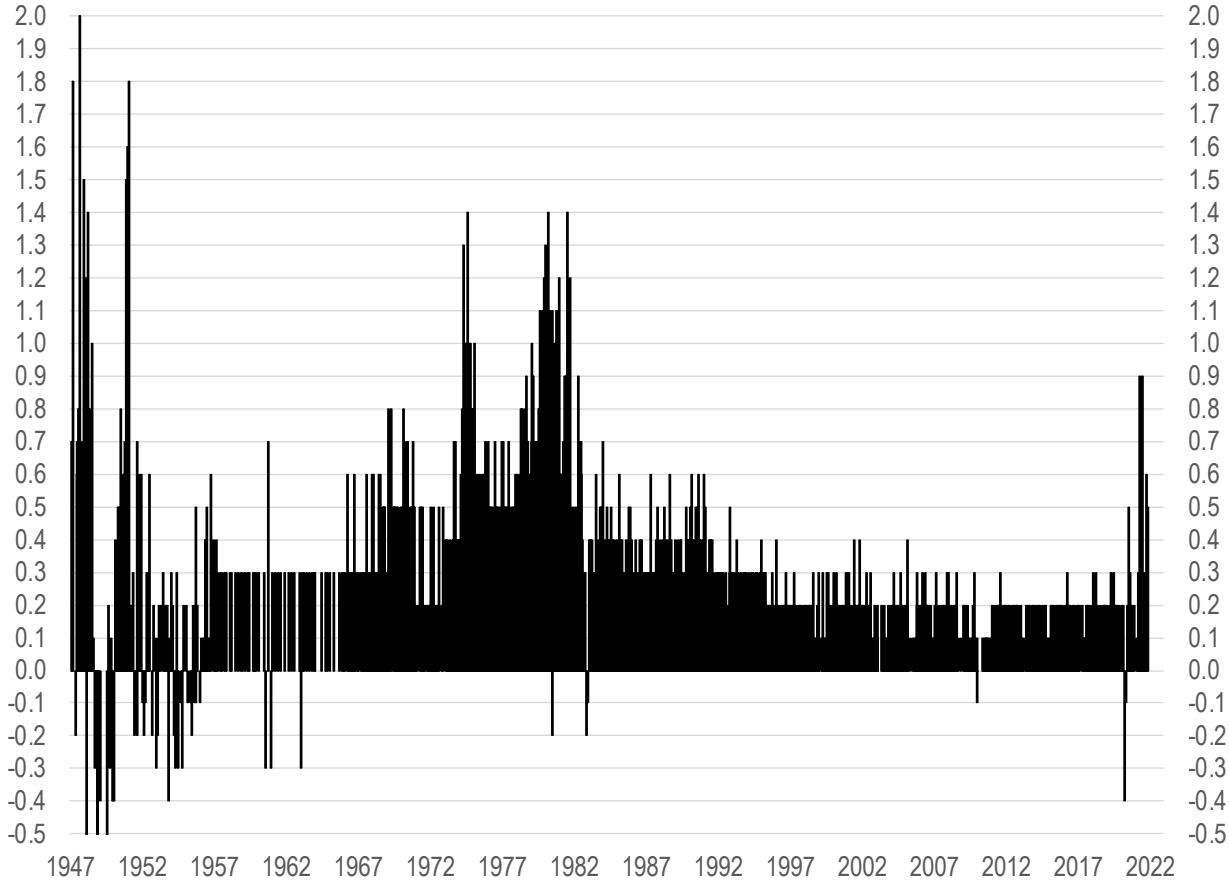
Manufacturing capacity utilization (percent of capacity in use)



Sources: Haver Analytics; U.S. Department of Federal Reserve. Updated through September 2021.

The Proof of the Pudding IV (Sure, Challenge Too)

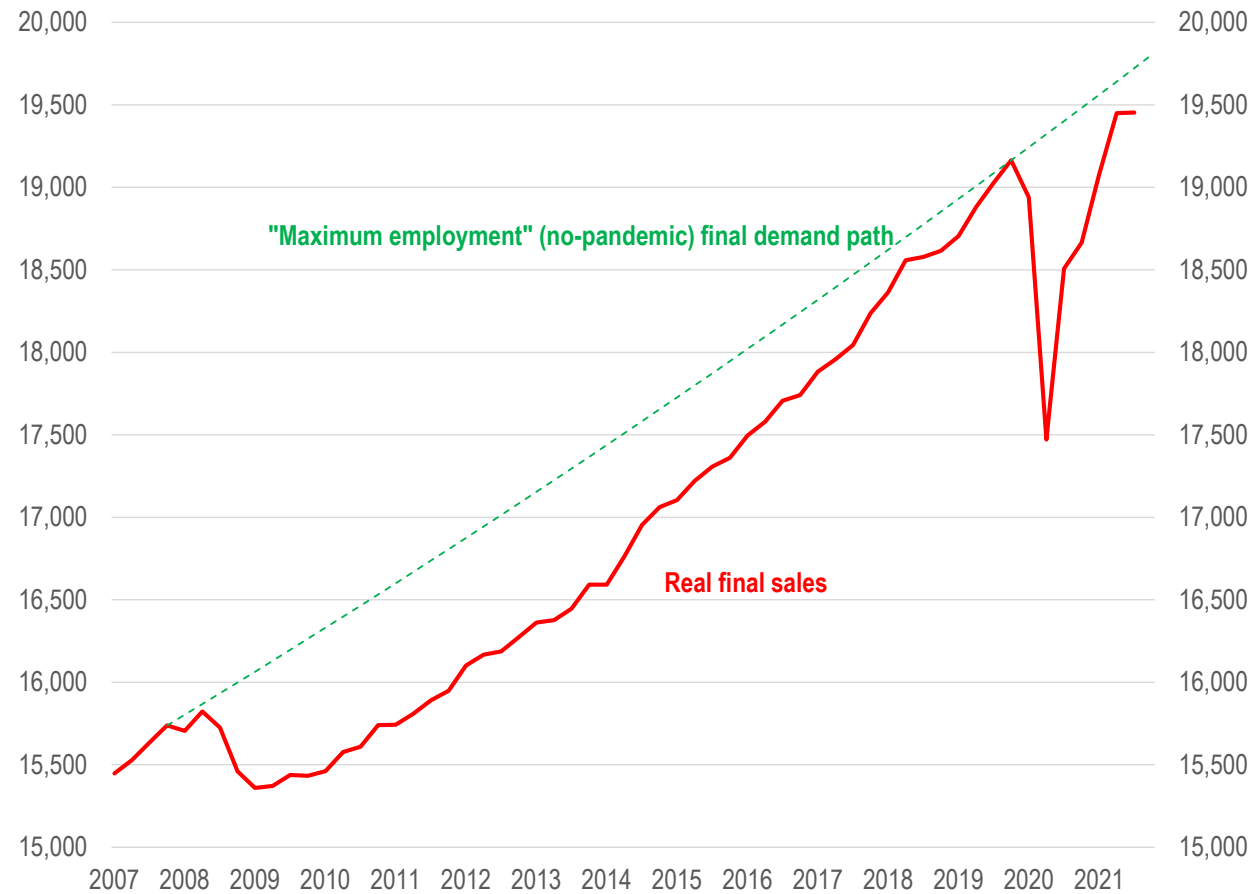
Consumer prices index (annualized percent change from the previous month)



Sources: Haver Analytics; U.S. Department of Labor. Updated through November 2021.

Overheating Claims Are Nonsense

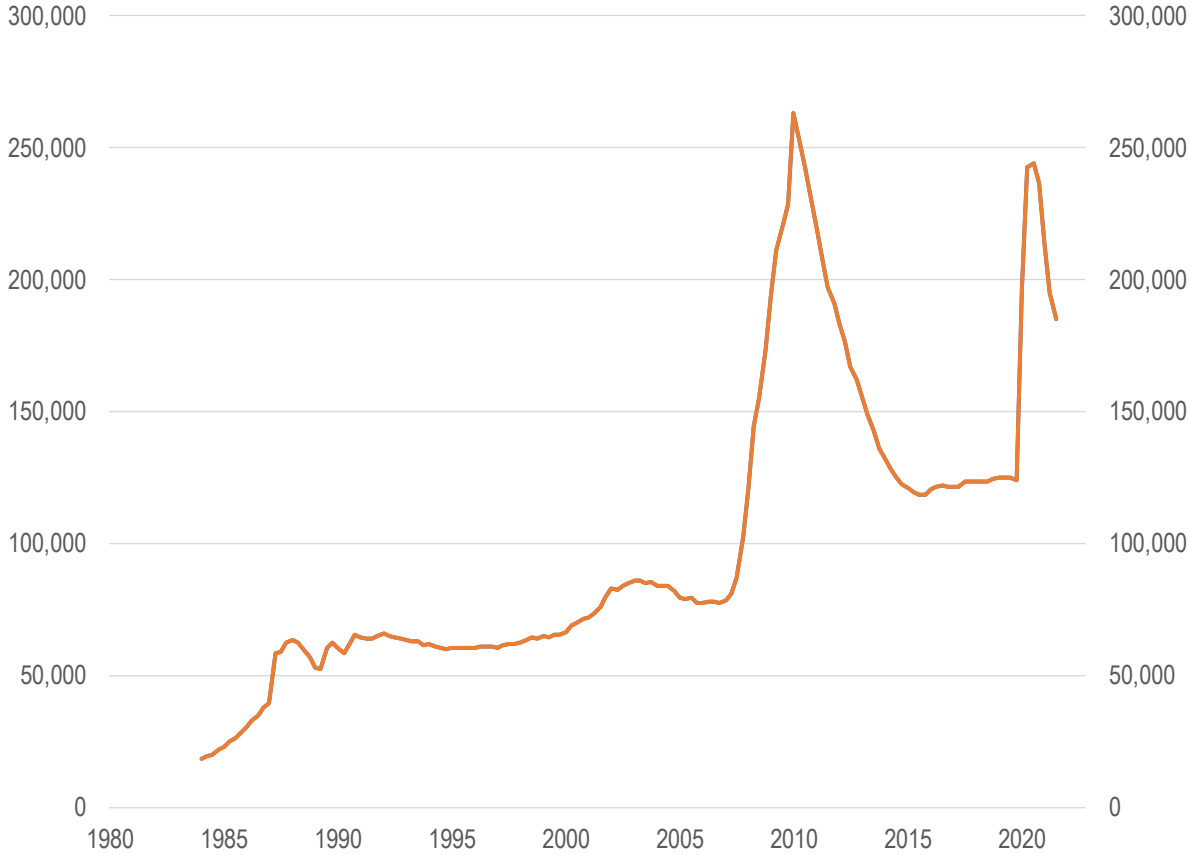
Actual and counterfactual real final sales (chained 2012 dollars)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2021 Q3.

Business Faced An Existential Crisis ...

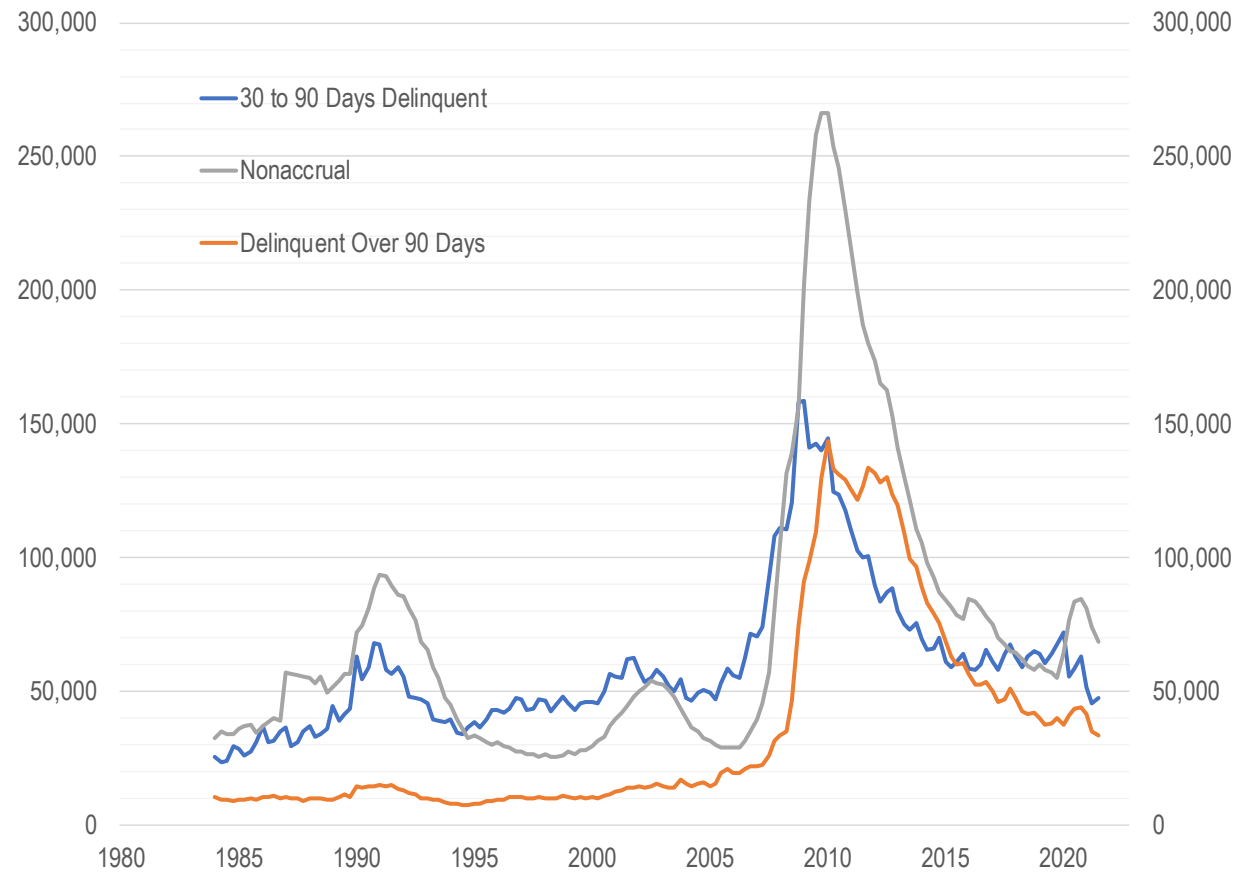
Loan loss provisions (millions of dollars)



Sources: Haver Analytics; FDIC. Updated through September 30, 2021.

... Fearing Trouble that Never Happened

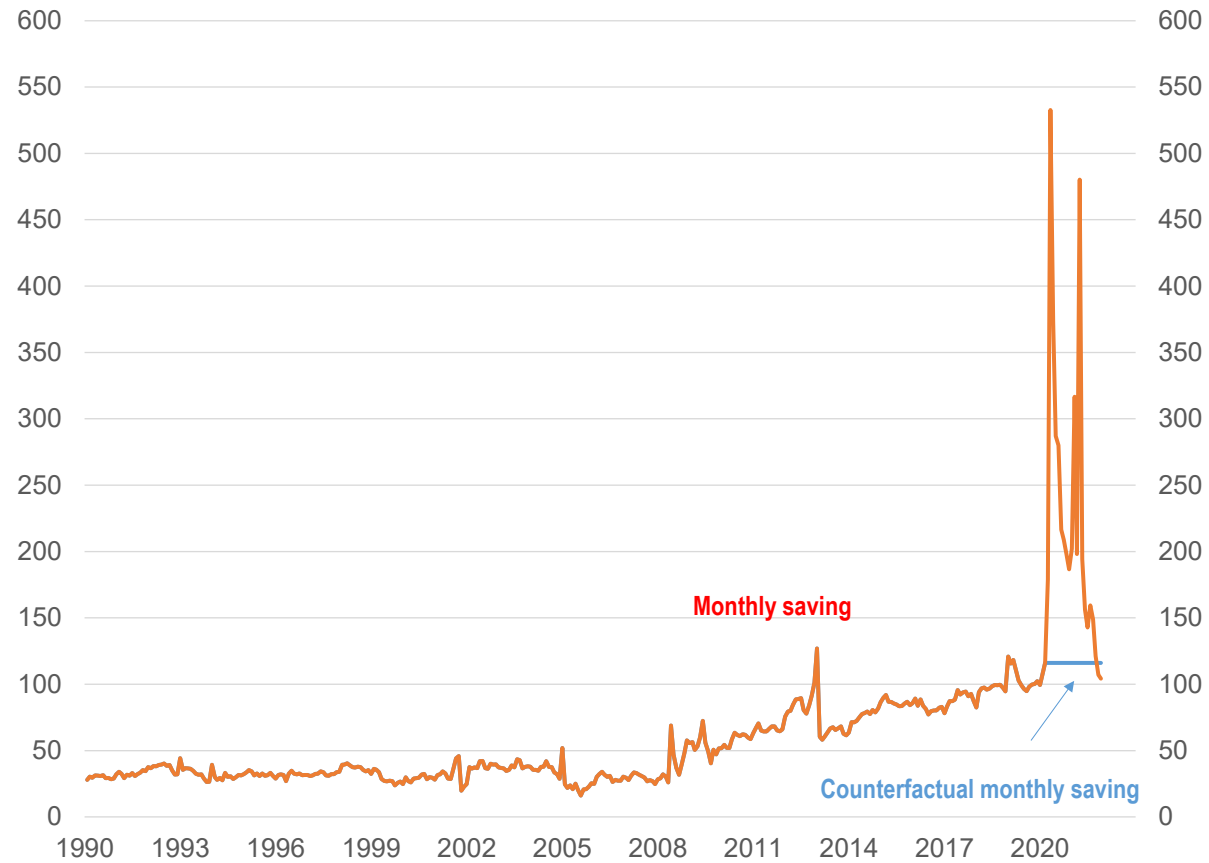
Status of bank loans (number of people)



Sources: Haver Analytics; FDIC. Updated through September 30, 2021.

2022 Looks Promising, for Consumers, ...

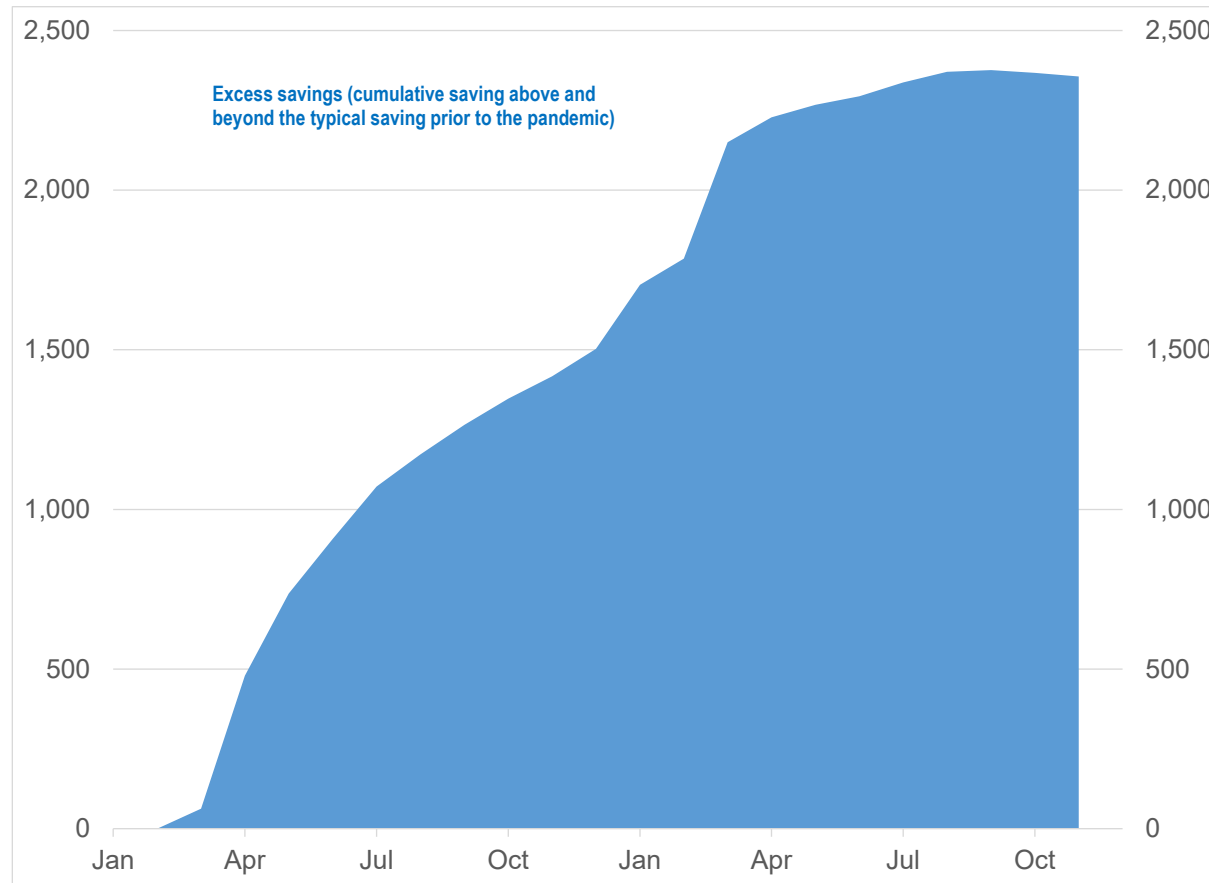
Monthly household saving compared with pre-crisis saving (billions of dollars)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

... Thanks to a Savings Buildup, ...

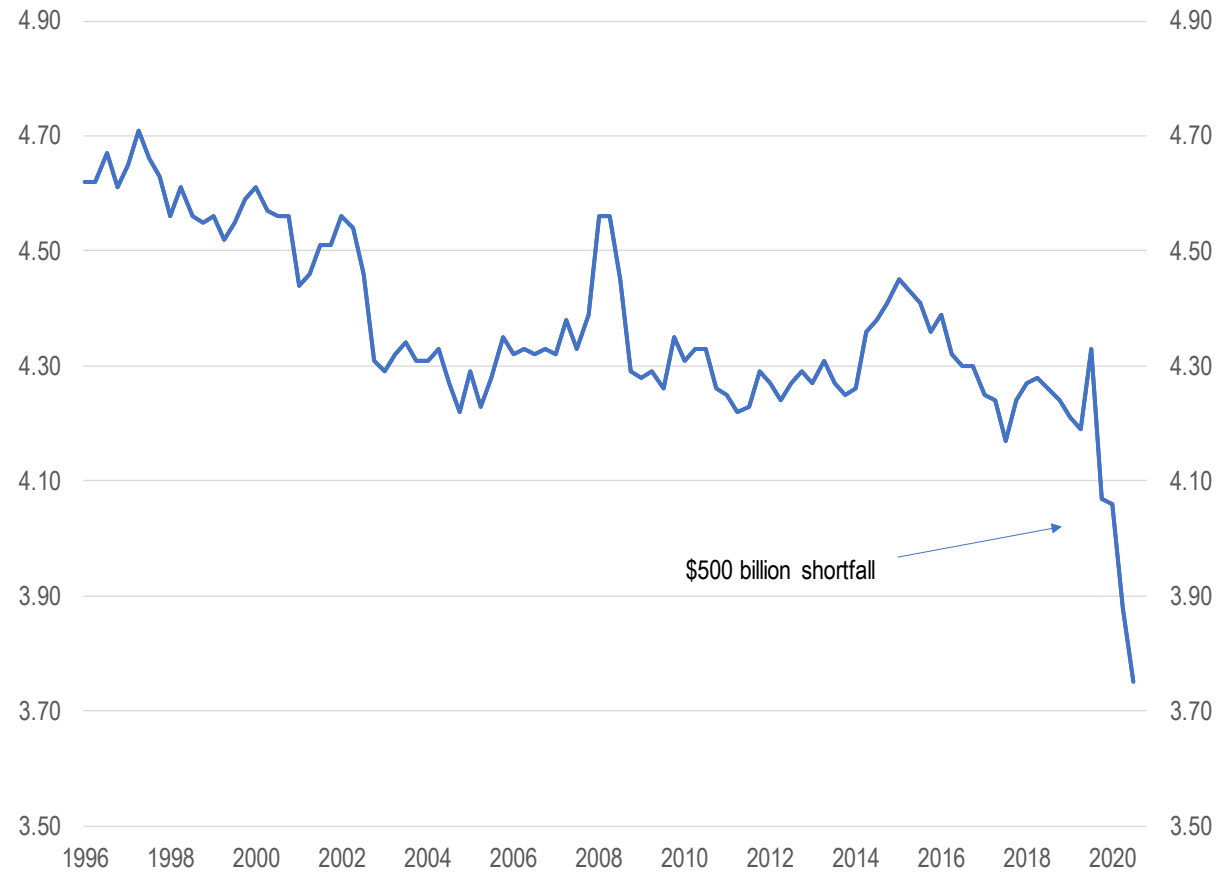
Accumulation of saving over and above the normal pace since February 2020 (billions of dollars)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

Business Inventory Restocking (Worth 2½% of GDP)

Ratio of private nonfarm inventories to final sales of goods plus structures spending

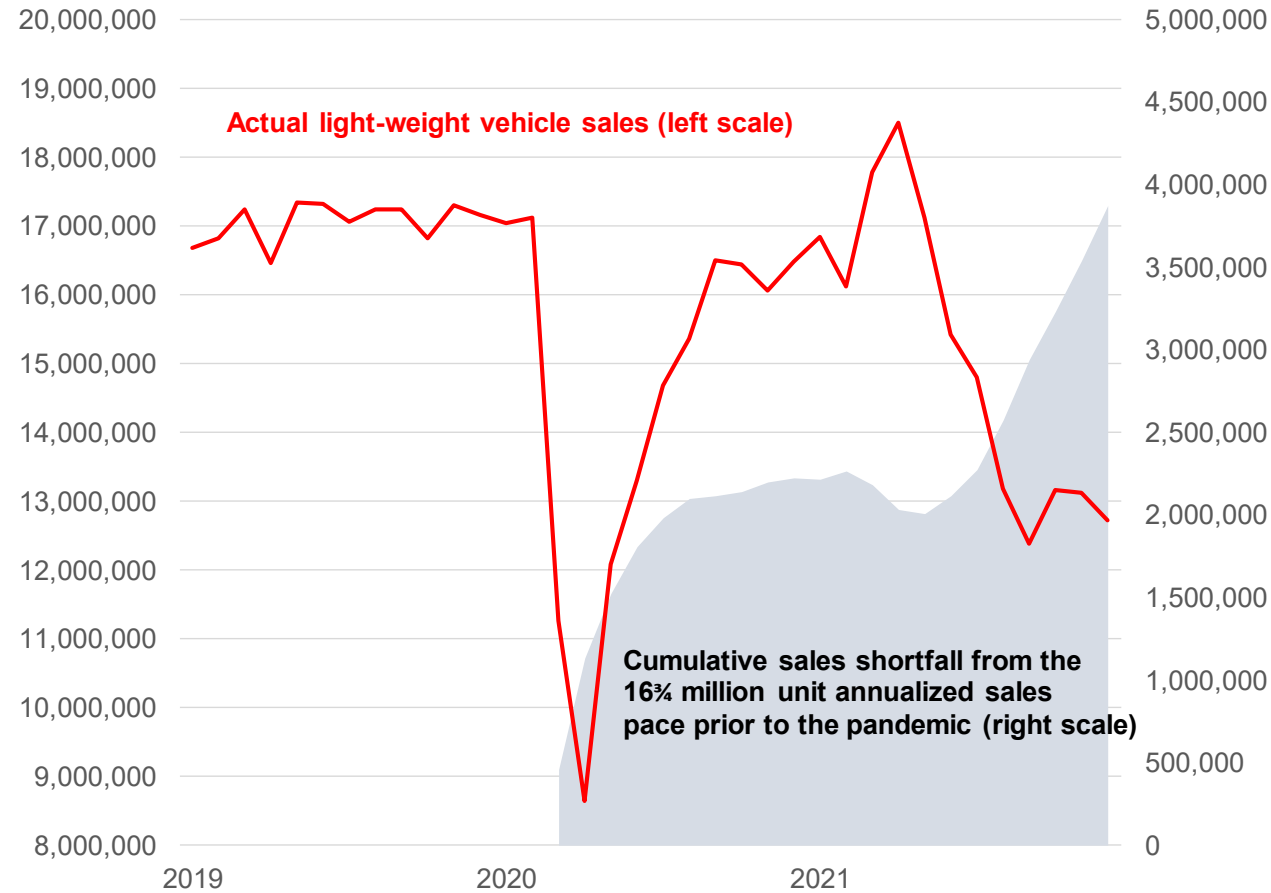


Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2021 Q2.

3¾ Million Unit Pent-Up Final Demand for Cars

Light-weight vehicle sales (millions of units annualized)

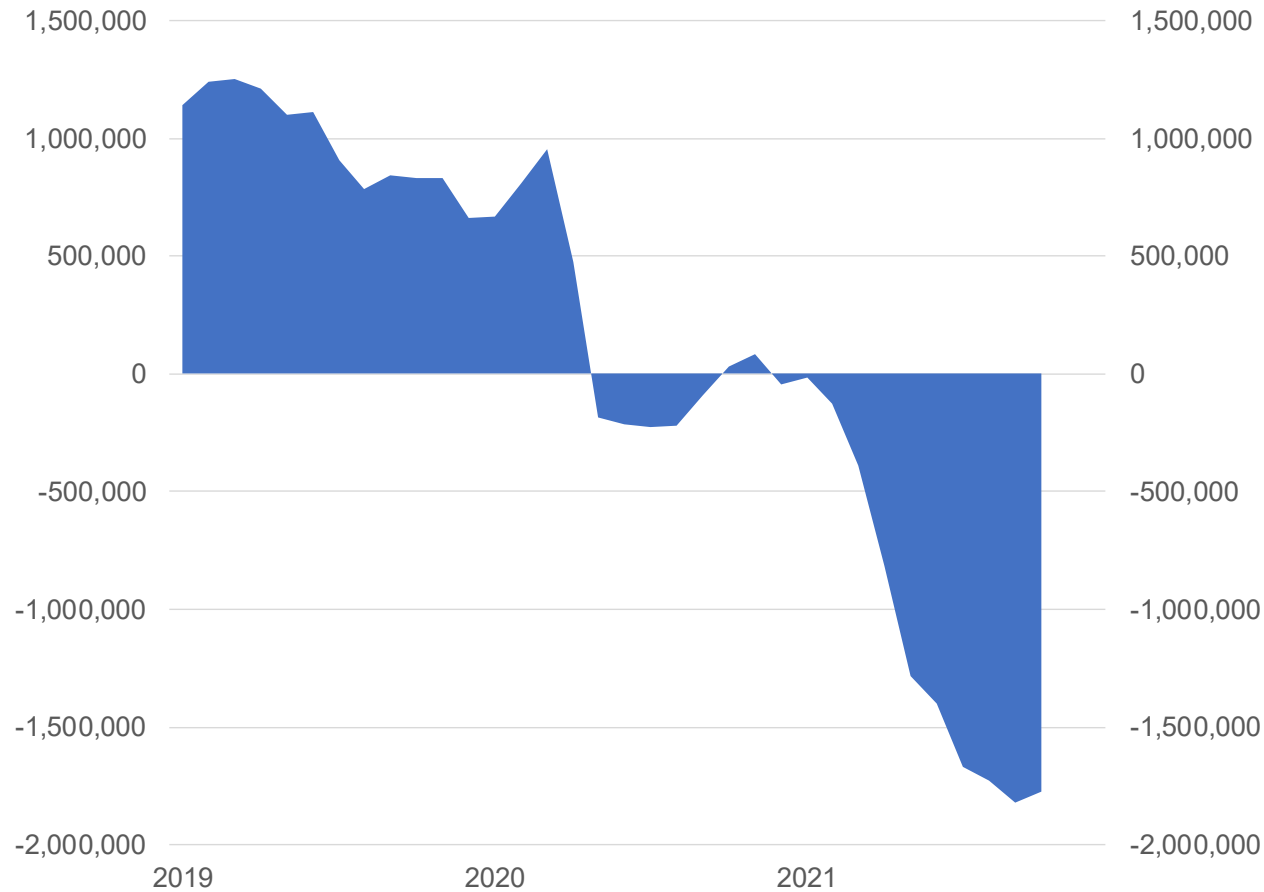
Cumulative sales shortfall from the pre-pandemic sales pace (millions of units)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through December 2021.

Almost 2 Million Unit Pent-Up Dealer Inventory Restock

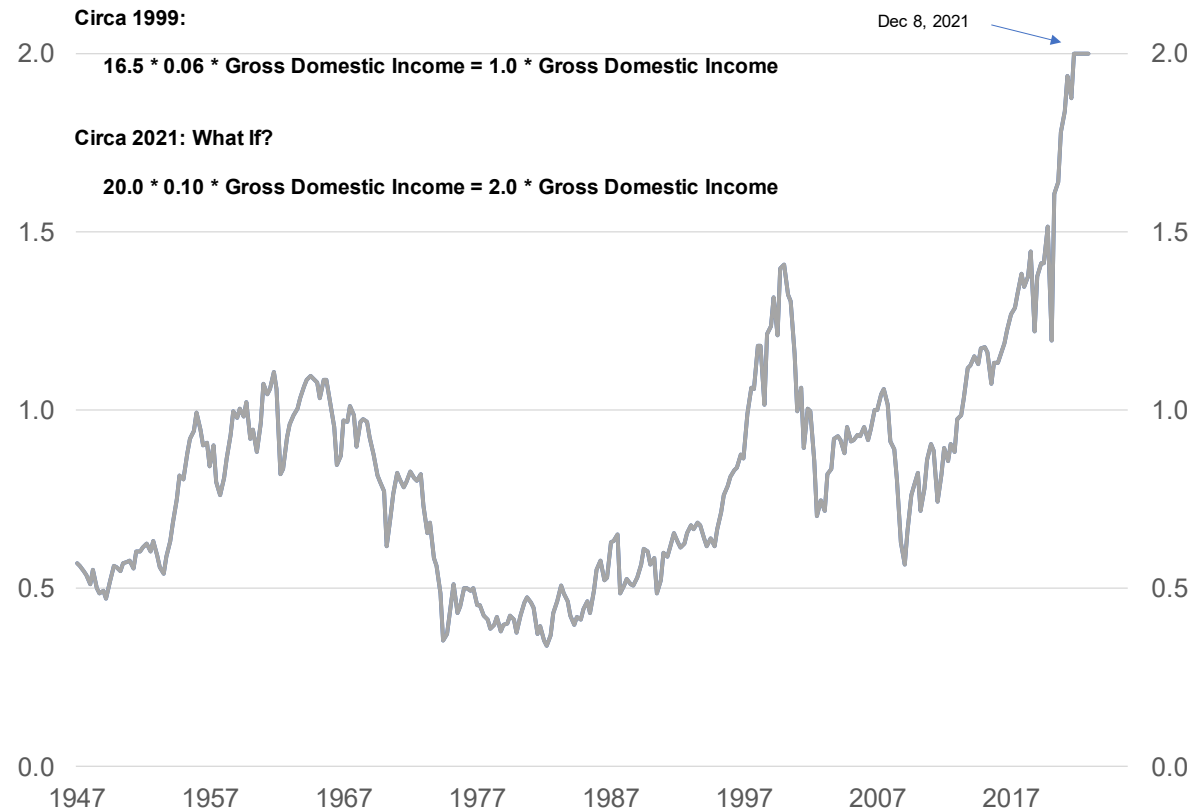
Deviation of dealer inventories of light-weight vehicles versus 60 days worth of inventory when sales are running at a 16 ¾ million-unit-annual-sales pace (number)



Sources: Haver Analytics; Wards Automotive Group. Updated through December 2021.

What About It? Bubble or a New Vision of the Future?

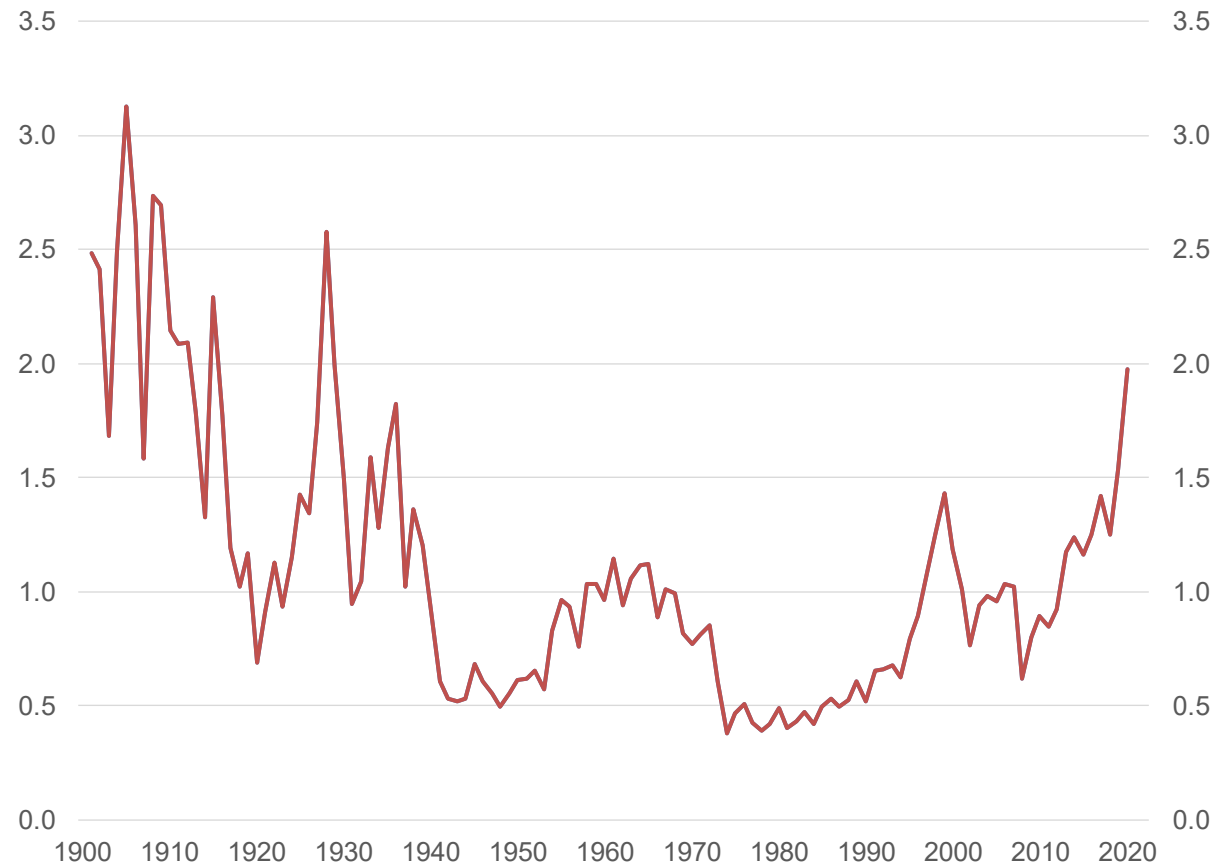
Ratio of the value of the U.S. stock market to Gross Domestic Income



Sources: Haver Analytics; Federal Reserve Board; U.S. Department of Commerce. Updated through 2021 Q2 (GDI) and December 8, 2021 (Wilshire 5000).

Some See an Echo of the 'Roaring Twenties'

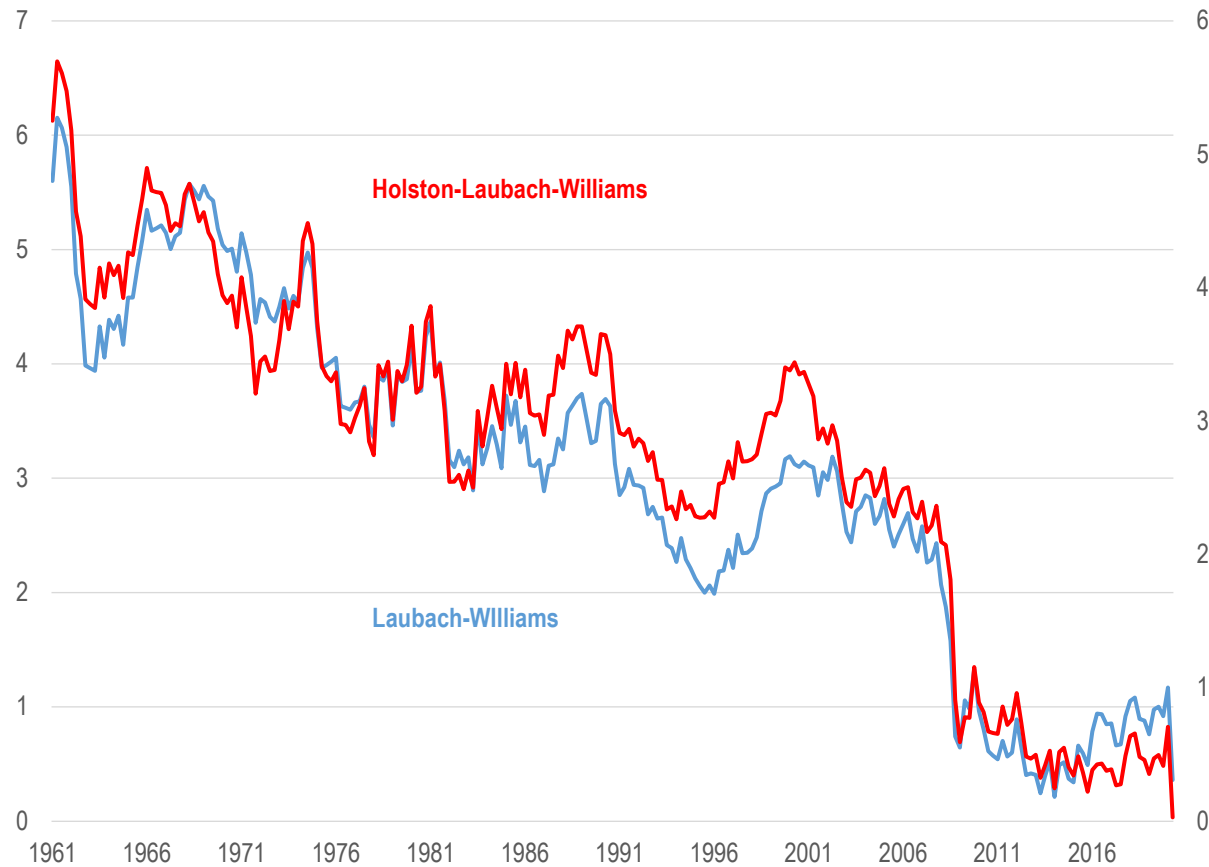
Ratio of the value of the U.S. stock market to Gross Domestic Product



Sources: Haver Analytics; Federal Reserve Board; U.S. Department of Commerce. Updated through 2020 Q3 (GDI) and May 11, 2021 (equities).

What About Equilibrium Rates (PE Multiples)?

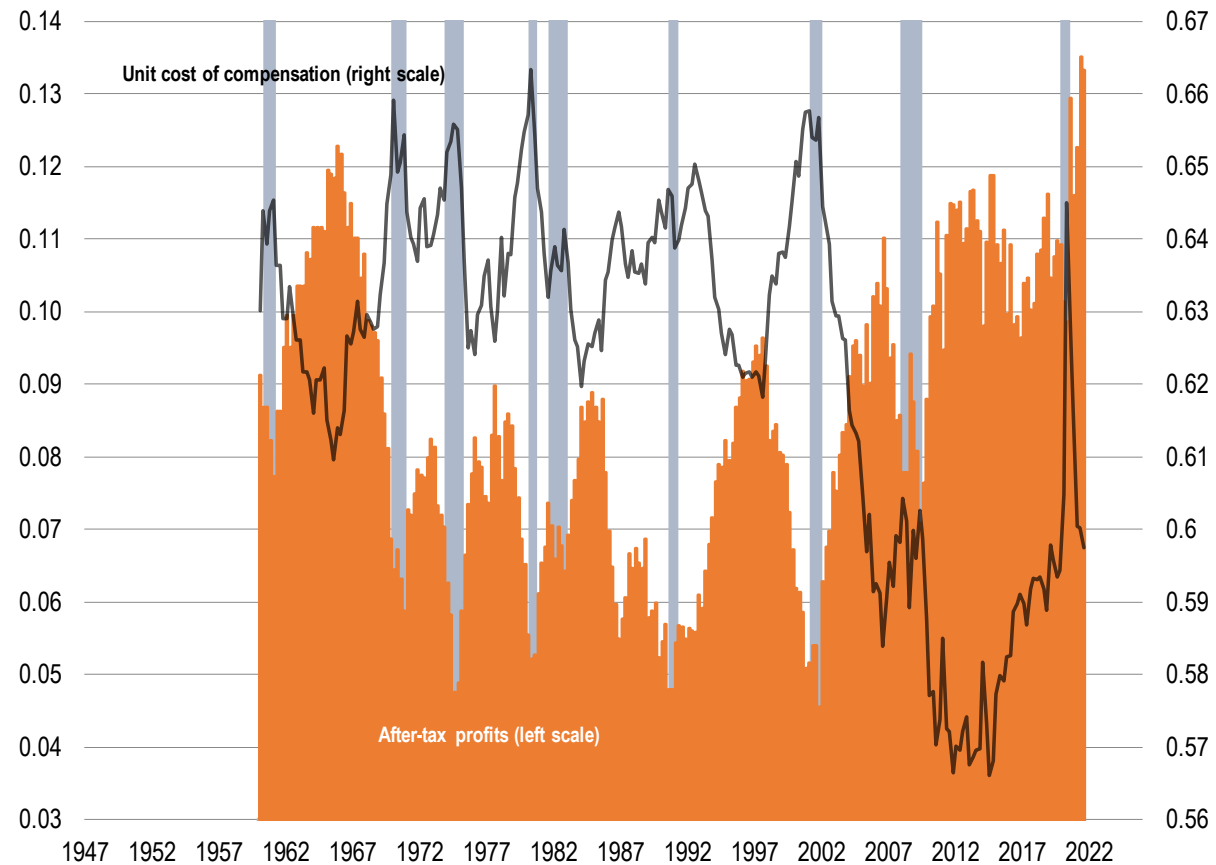
Equilibrium real risk-free rates, R-star (percent)



Source: "Measuring the Natural Rate of Interest," Holston, Laubach, and Williams, November 30, 2020.

What About Profits ...

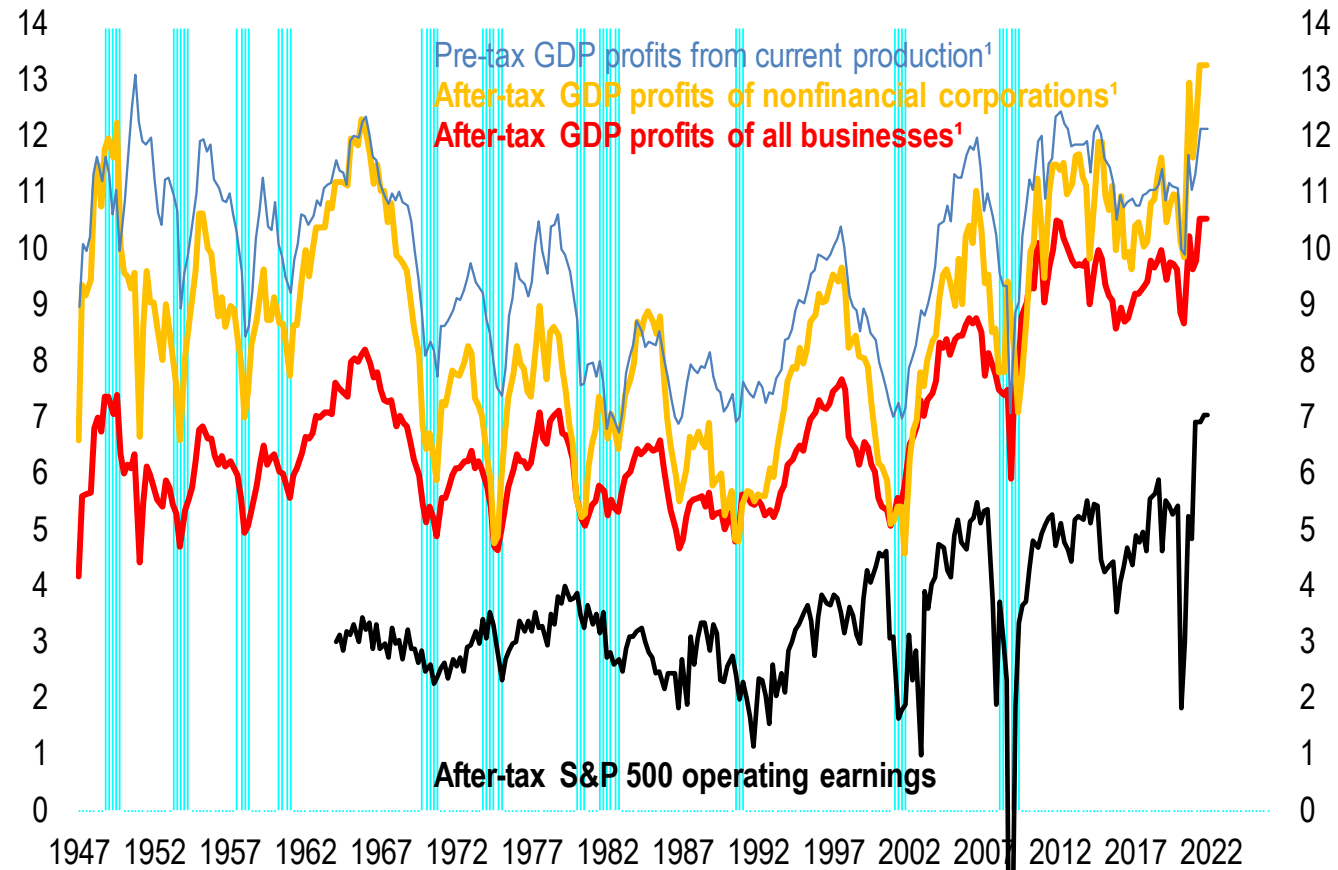
After-tax profits of nonfinancial corporations (percent of the sector's value added)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2020 Q3.

... that Refuse to Read from the Script

Selected measures of business profits (percent of Gross Domestic Income)

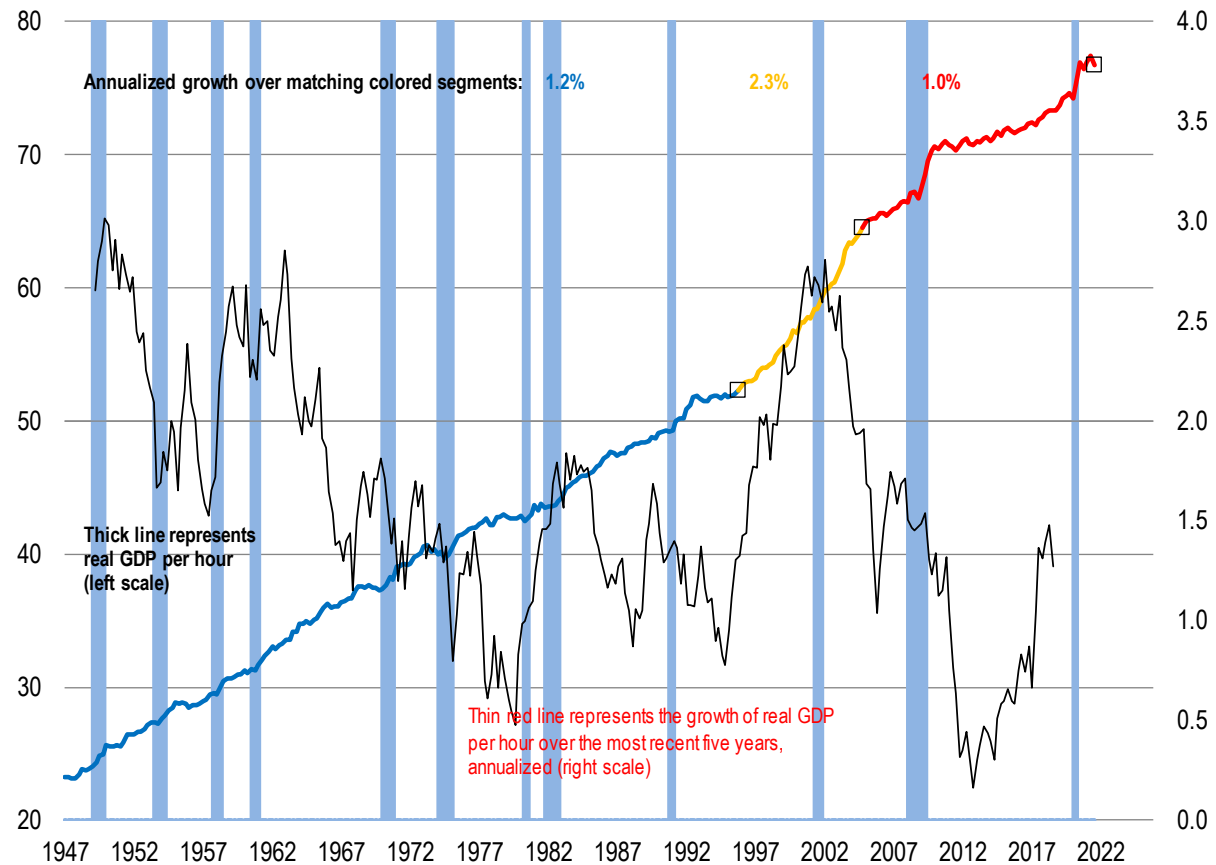


¹ GDP profits adjust for (translated to economic terms) different valuations of inventories and depreciation allowances.
Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2021 Q1.

Innovation Hasn't Been Very Visible in the Metrics

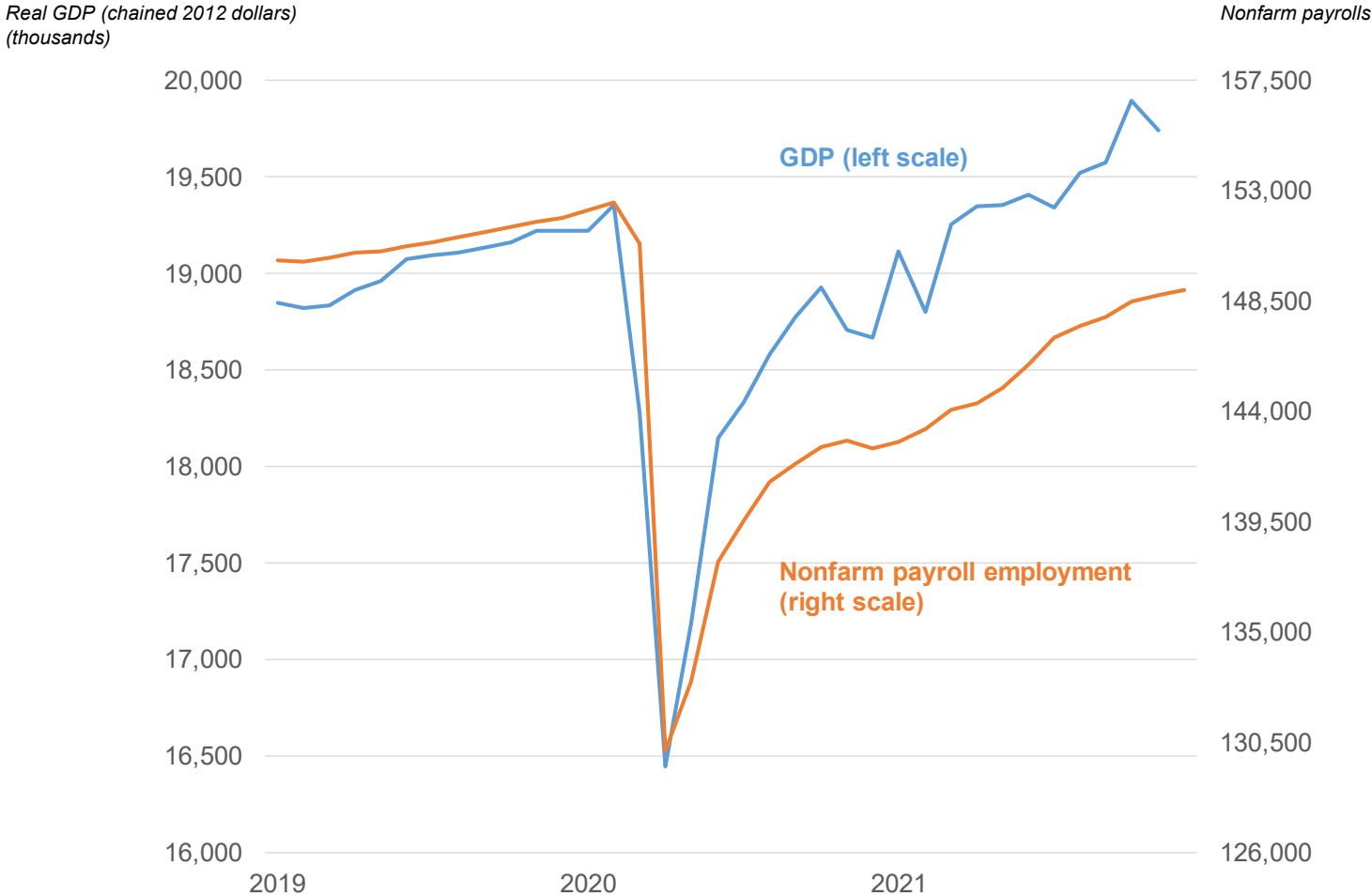
Real GDP per hour (chained 2012 dollars)

Labor productivity (annualized percent change over the most recent 5 years)



Sources: Haver Analytics; U.S. Department of Labor; U.S. Department of Commerce. Updated through 2021 Q3.

But Will that Be the Legacy of the Pandemic Era?



Sources: Haver Analytics; U.S. Department of Labor; U.S. Department of Commerce. Updated through November 2021 (GDP) and December 2021 (nonfarm payrolls).

Is Business Opening 'Somewhere Beyond the Sea'?

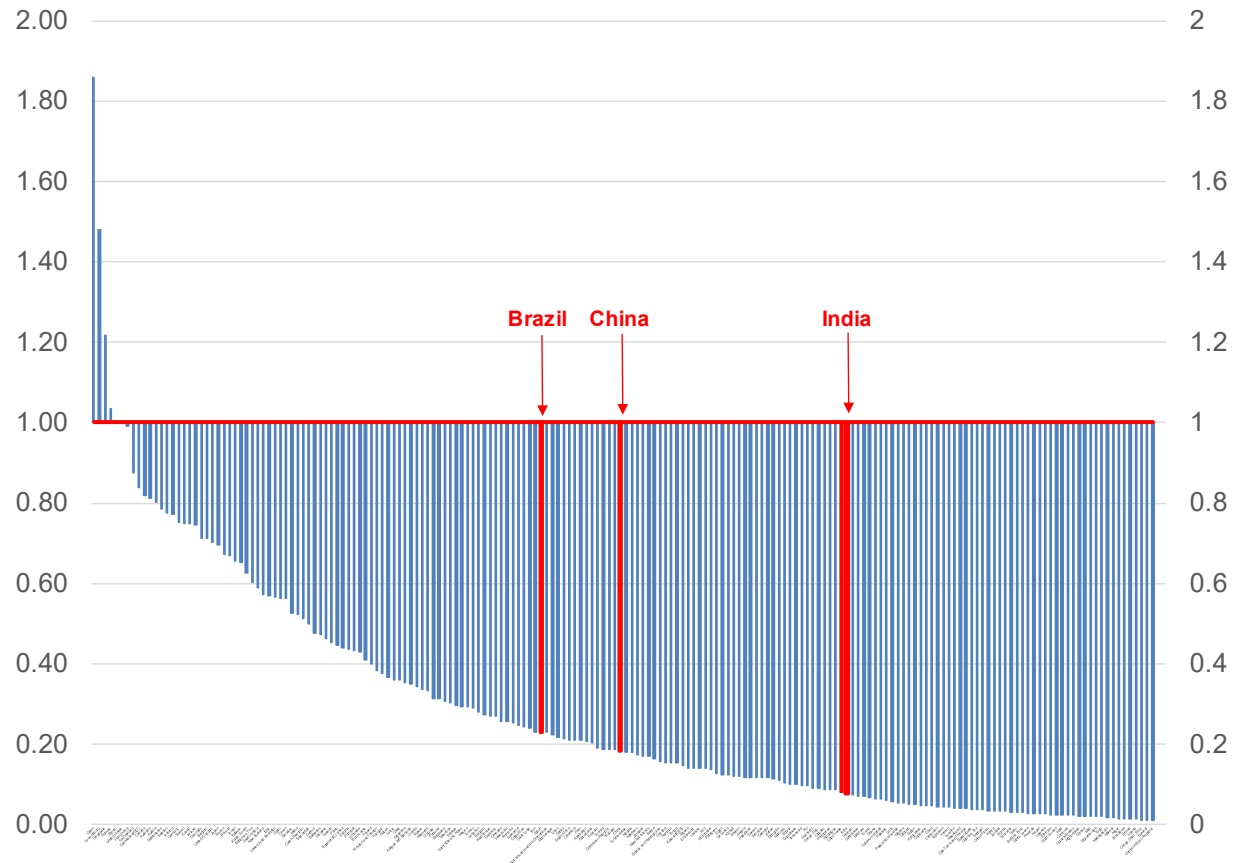
Beyond the shores of the U.S. (ratio of global real GDP to U.S. real GDP)



Sources: Haver Analytics; U.S. Department of Commerce; IMF. Updated through 2021 Q3.

Others Certainly Are Hungry

Relative real GDP per capita (ratio to U.S. real GDP per capita, 2016 dollars)



Sources: Haver Analytics; International Monetary Fund. Updated through 2020.

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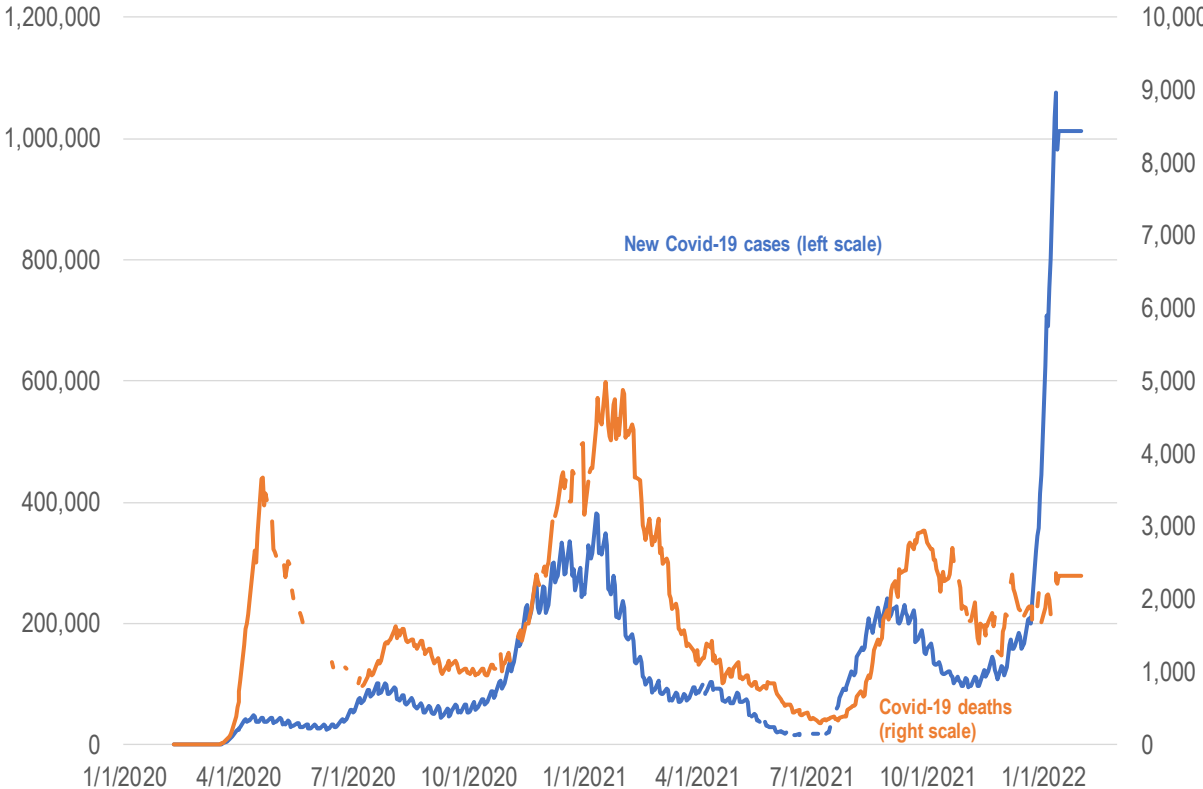
J.P.Morgan

Reality Check

Vaccine Efficacy Breaks the Link to the Economy ...

New Covid-19 cases (daily #, 7-day moving average)

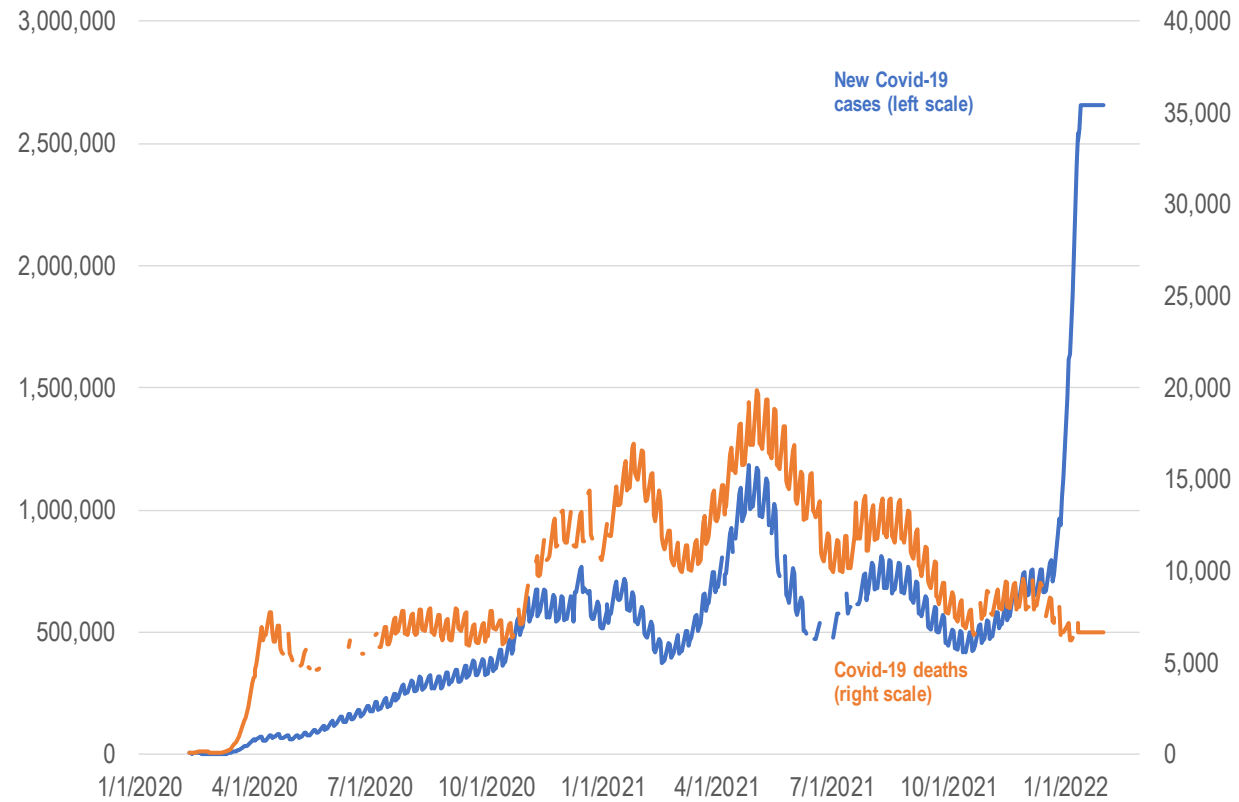
Covid-19 casualties (daily #, 7-day moving average)



Sources: Haver Analytics; Johns Hopkins University. Updated through January 14, 2022.

... and It's Visible Elsewhere Too

New Covid-19 cases outside the U.S. (daily #, 7-day moving average) Covid-19 casualties (daily #, 7-day moving average)



Sources: Haver Analytics; Johns Hopkins University. Updated through January 14, 2022.

Not Your Typical Business Cycle

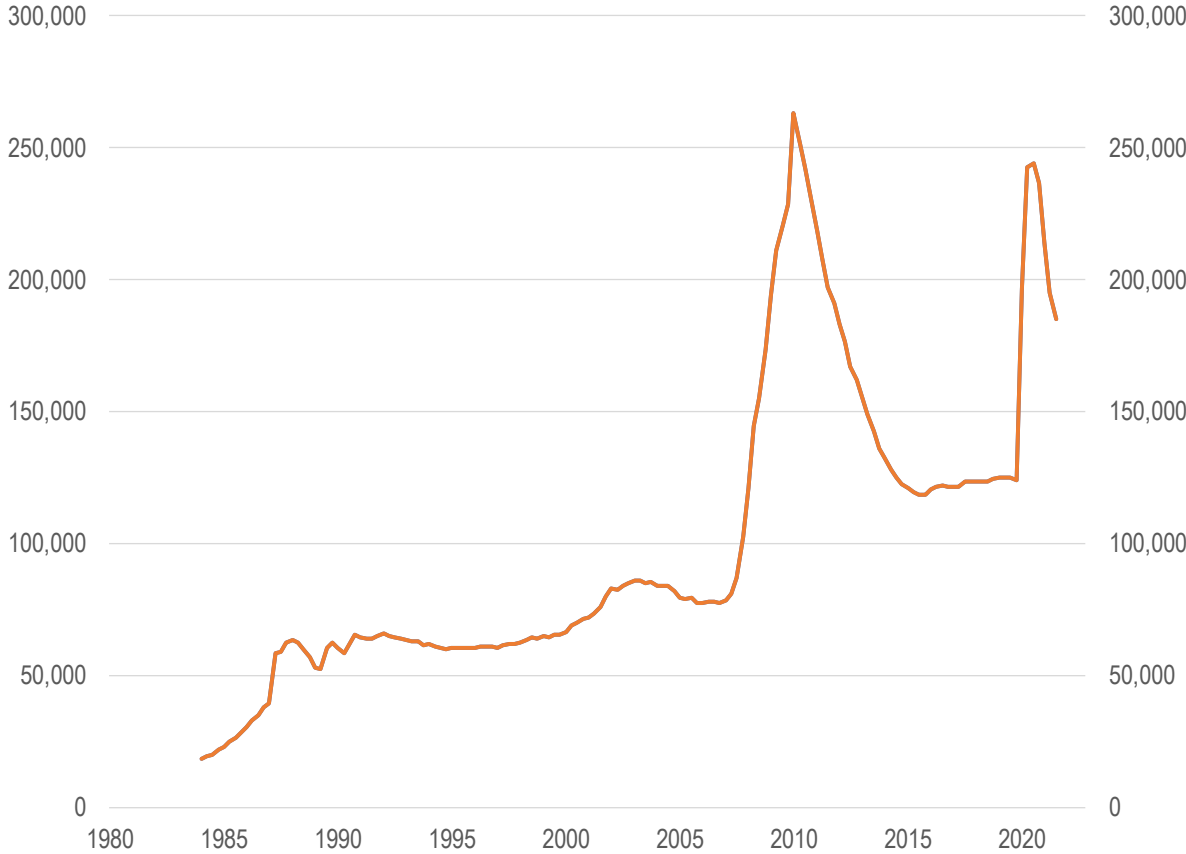
NBER-Designated Business Cycles

National Economy Bottom (Month)	(Year)	National Economy Peak (Month)	(Year)	Duration of Expansion (Months)	Duration of Next Downturn (Months)
December	1854	June	1857	30	18
December	1858	October	1860	22	8
June	1861	April	1865	46	32
December	1867	June	1869	18	18
December	1870	October	1873	34	65
March	1879	March	1882	36	38
May	1885	March	1887	22	13
April	1888	July	1890	27	10
May	1891	January	1893	20	17
June	1894	December	1895	18	6
June	1897	June	1899	24	18
December	1900	September	1902	21	23
August	1904	May	1907	33	13
June	1908	January	1910	19	24
January	1912	January	1913	12	23
December	1914	August	1918	44	7
March	1919	January	1920	10	18
July	1921	May	1923	22	14
July	1924	October	1926	27	13
November	1927	August	1929	21	43
March	1933	May	1937	50	13
June	1938	February	1945	80	8
October	1945	November	1948	37	11
October	1949	July	1953	45	10
May	1954	August	1957	39	8
April	1958	April	1960	24	10
February	1961	December	1969	106	11
November	1970	November	1973	36	16
March	1975	January	1980	58	6
July	1980	July	1981	12	16
November	1982	July	1990	92	8
March	1991	March	2001	120	8
November	2001	December	2007	73	18
June	2009	February	2020	128	2
April	2020				

Source: Haver Analytics; NBER. Updated through July 2021.

Businesses Went Into Survival Mode ...

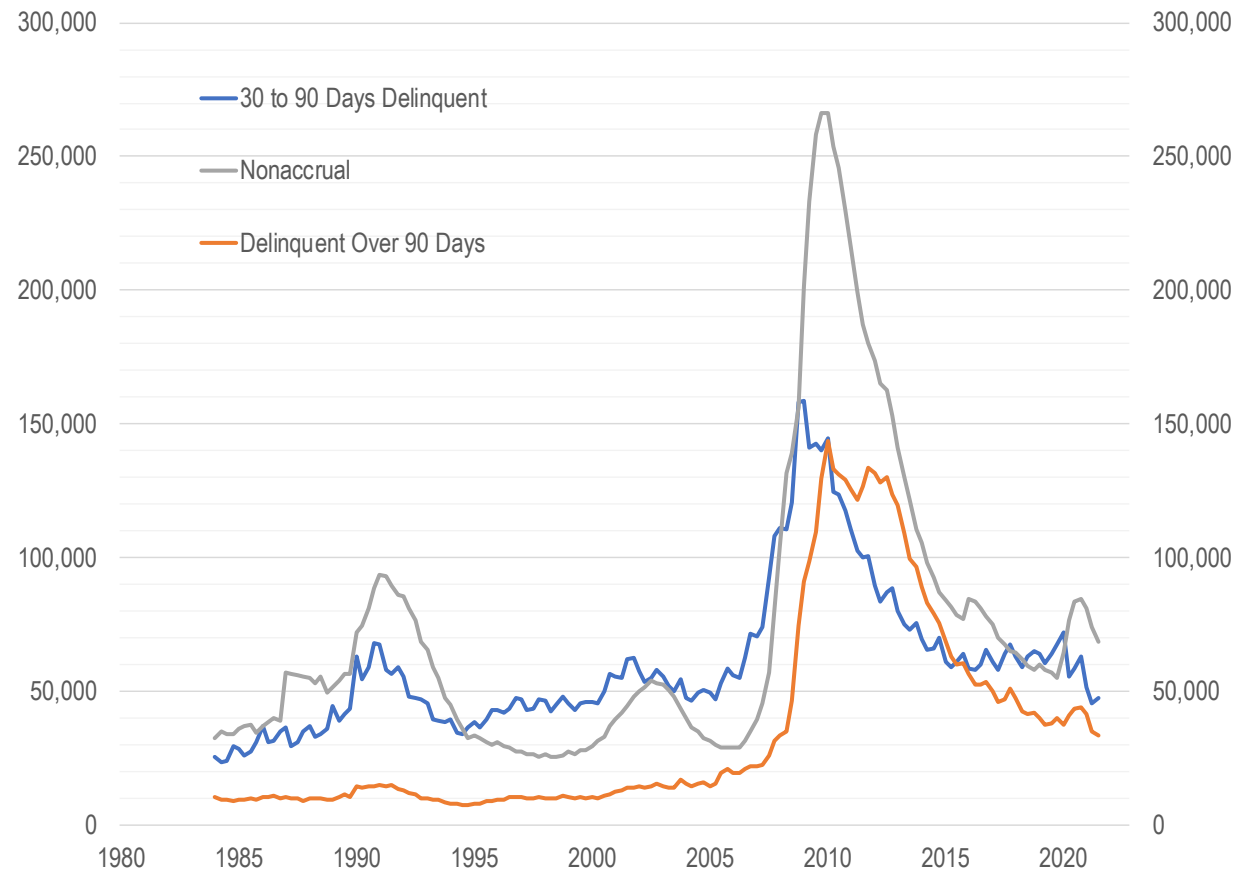
Loan loss provisions (millions of dollars)



Sources: Haver Analytics; FDIC. Updated through September 30, 2021.

... Fearing Financial Distress that Never Happened

Status of bank loans (number of people)

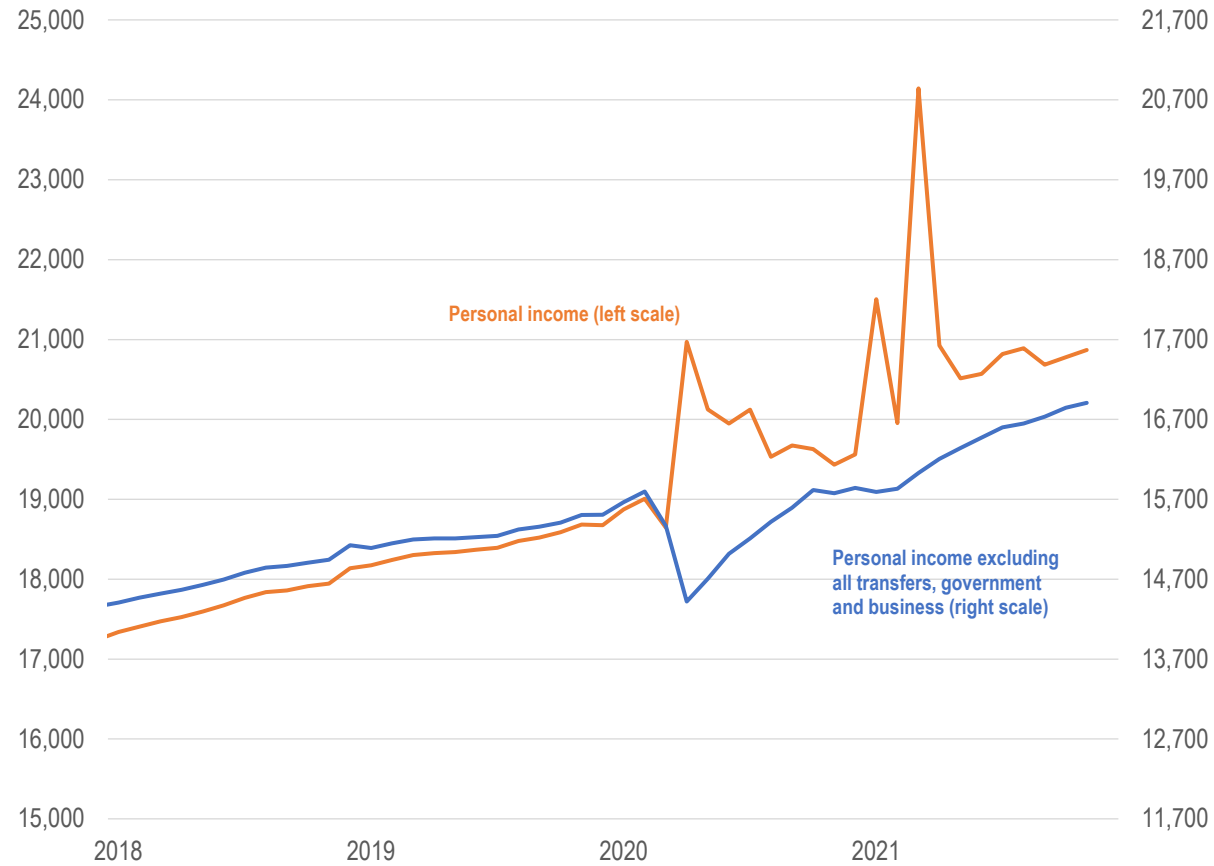


Sources: Haver Analytics; FDIC. Updated through September 30, 2021.

But Fiscal Rescues Replaced Lost Private Income and ...

Personal income (billions of dollars)
dollars)

Personal income excluding all transfers (billions of
dollars)

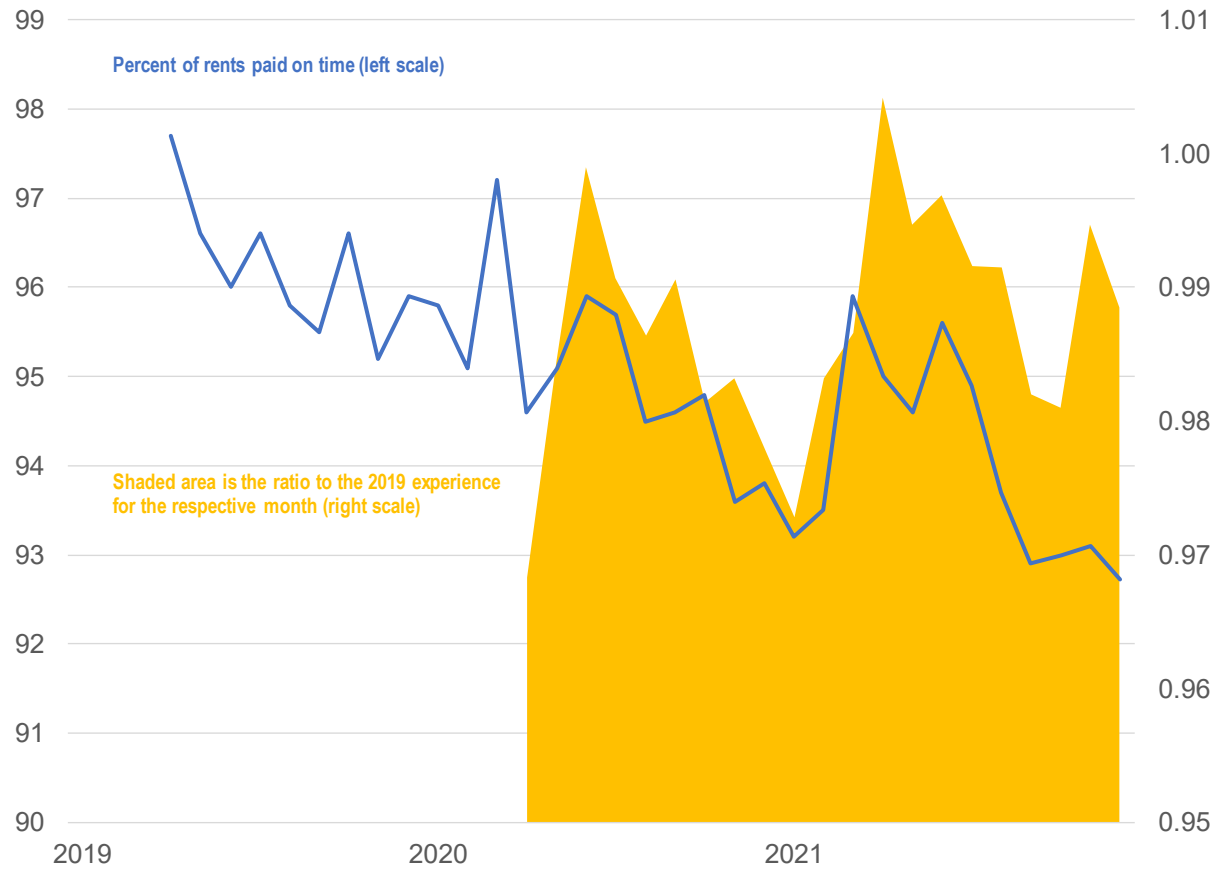


Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

... That's Why Renters Stayed Current ...

Percent of rents received by the end of the month for multifamily units

Ratio to respective month in 2019

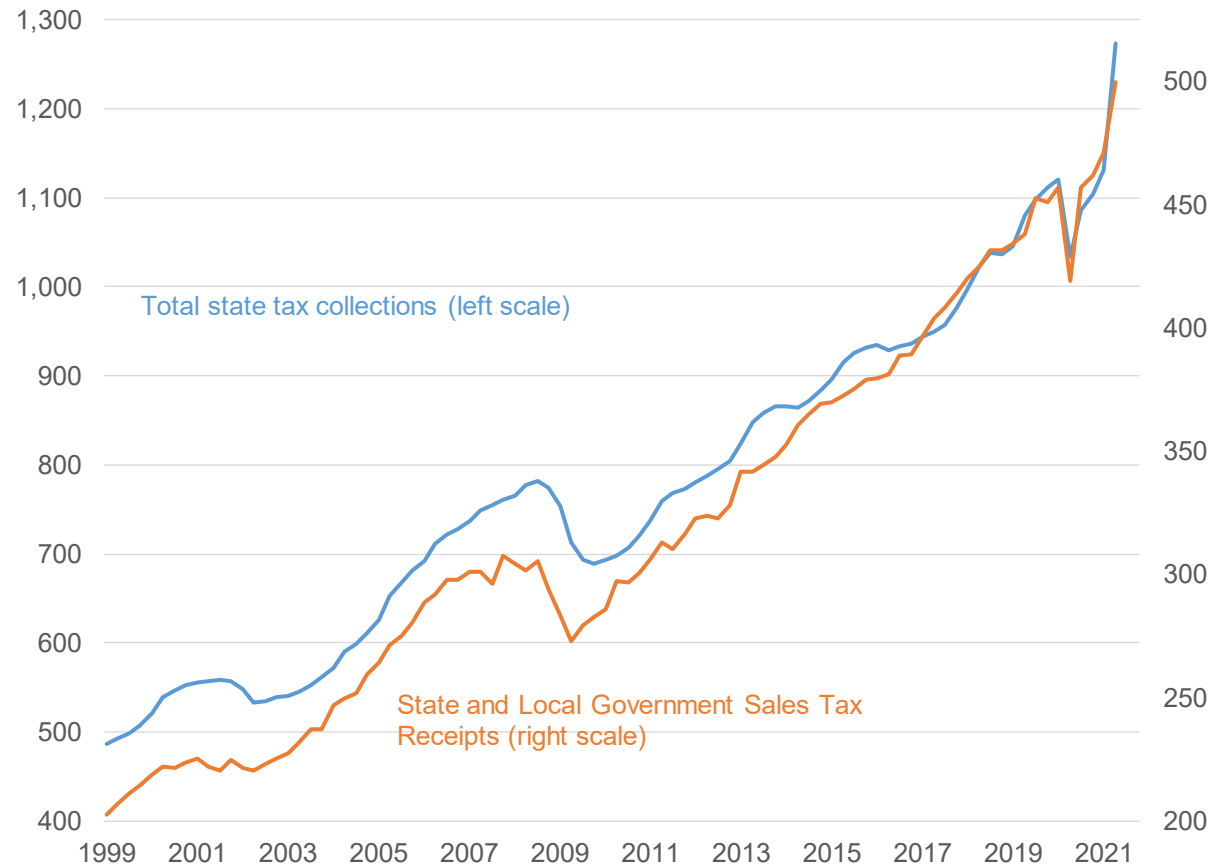


Source: National Multifamily Housing Council. Updated through December 2021.

... and Municipal Government Finances Fared Well

State tax collections (\$ billions, 4-qtr sum)

State & local government sales tax collections (\$ billions, saar)

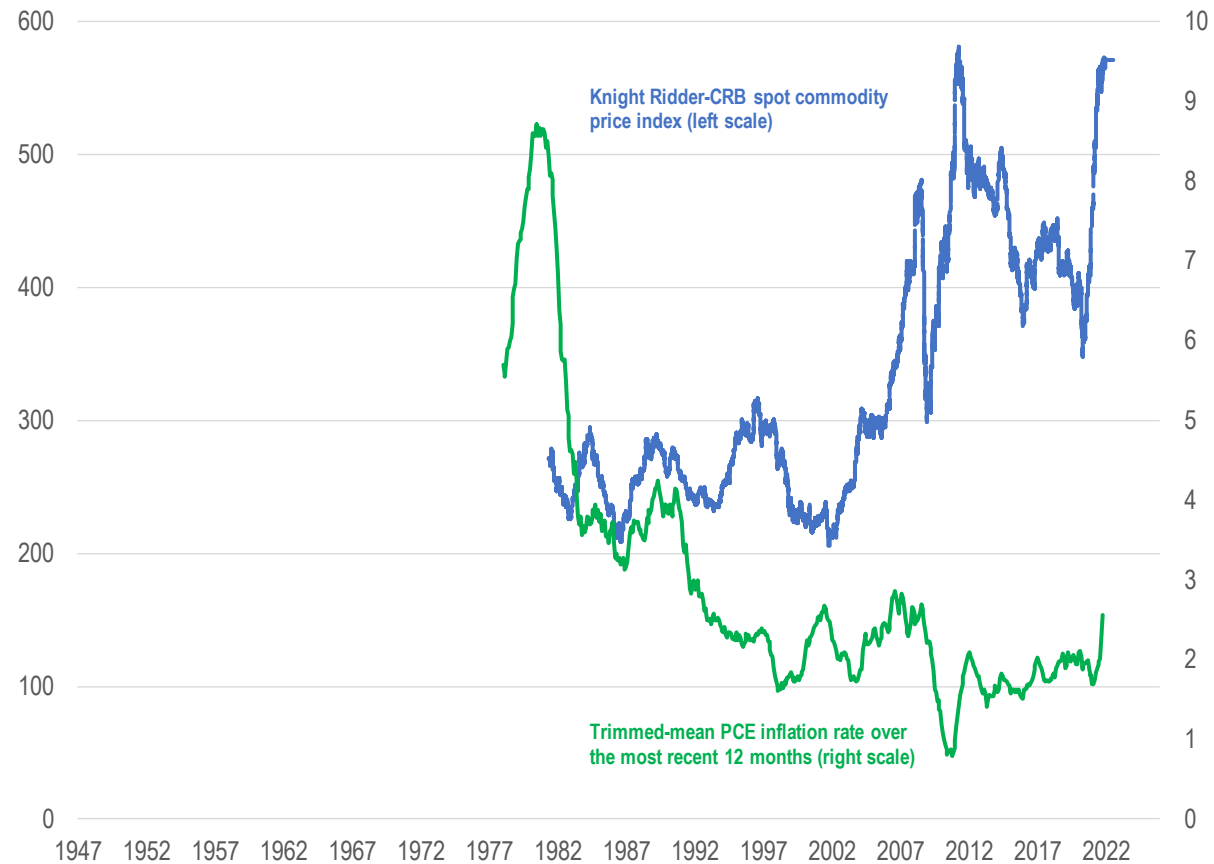


Sources: Haver Analytics; Census; Bureau of Economic Analysis. Updated through June 2021.

Despite a Convulsion of Price Increases ...

CRB spot commodity price index (1967 = 100)
change)

Trimmed-mean PCE inflation rate (annual percent
change)



Sources: Haver Analytics; Commodity Research Bureau; Federal Reserve Bank of Dallas. Updated through November 2021 (inflation) and December 20, 2021 (CRB).

... Bond Investors See No Long-Term Inflation Issue ...

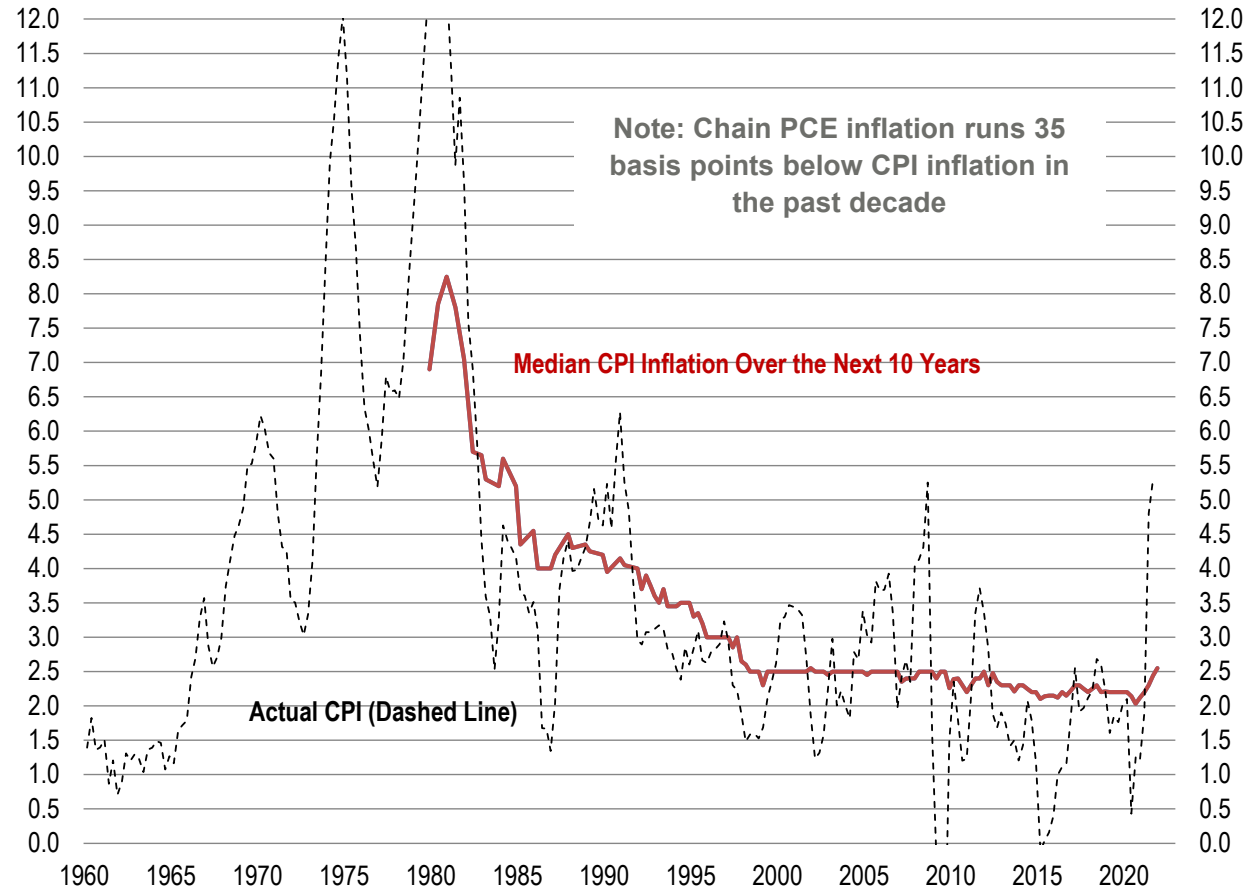
Market-based inflation expectations over the subsequent 10 years (annual rate)



Note: Assumes that the PCE inflation rate will be 0.34 percentage point, the historical differential, below the CPI inflation expectations reflected in the Treasury nominal and TIPS securities yields. Takes account of the TIPS liquidity risk premium and the inflation risk premium.
Source: Haver Analytics; Federal Reserve Board. Updated through November 30, 2021.

... and Ditto for Professional Forecasters

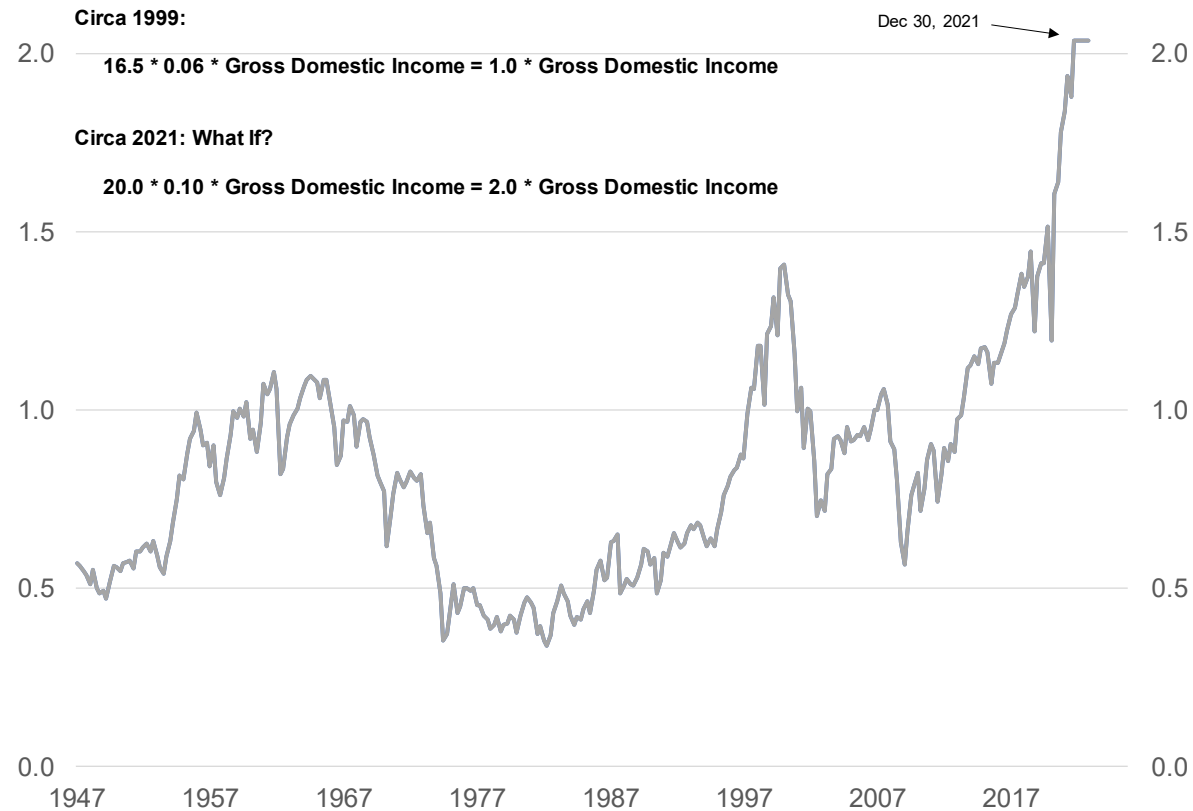
Surveys of long-term chain CPI inflation expectations of professional forecasters (annual rate)



Sources: Haver Analytics; U.S. Department of Commerce; Federal Reserve Bank of Philadelphia. Updated through October 2021 (PCE inflation) and 2021 Q4 (FRB Pa SPF).

Equity Investors Are So Over Pandemic

Ratio of the value of the U.S. stock market to Gross Domestic Income

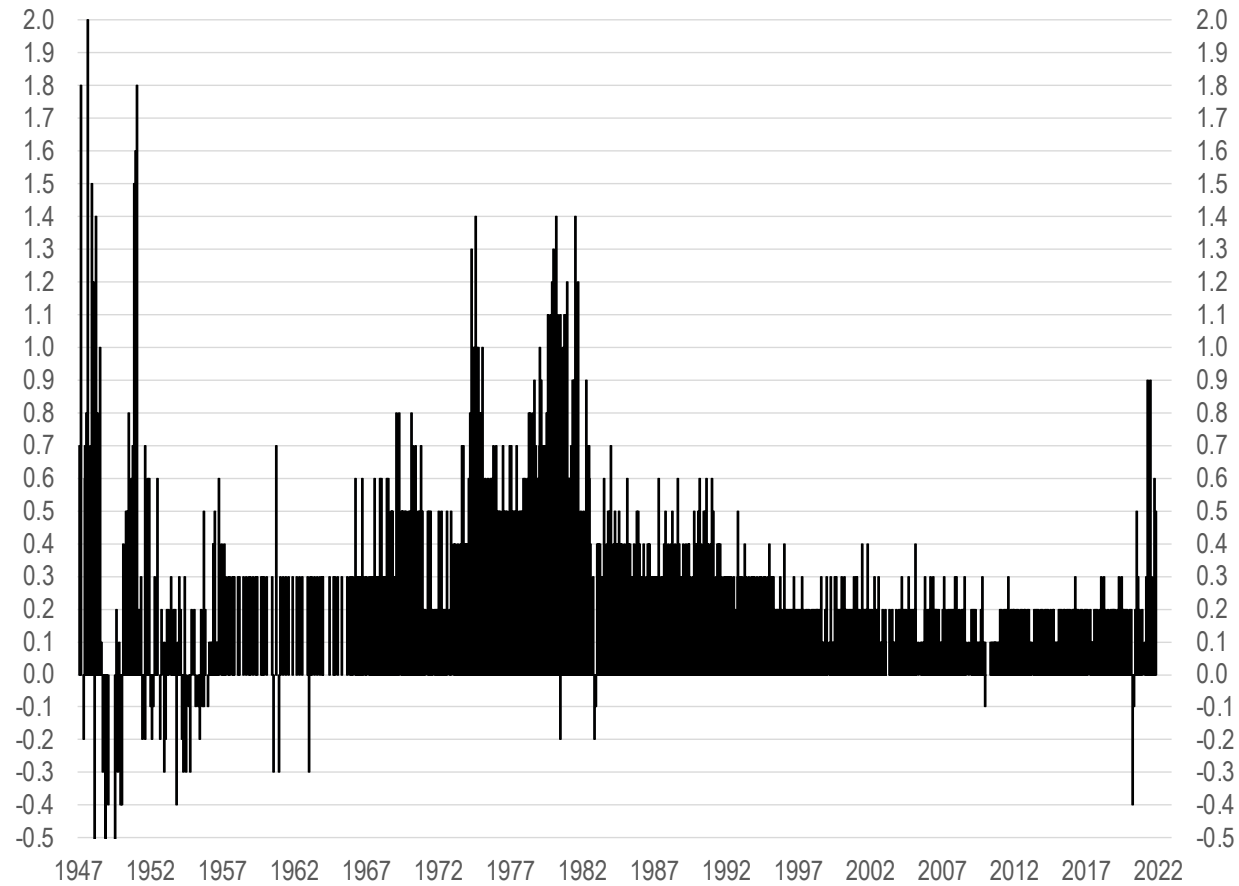


Sources: Haver Analytics; Federal Reserve Board; U.S. Department of Commerce. Updated through 2021 Q3 (GDI) and December 30, 2021 (Wilshire 5000).

Bottlenecks and Price Convulsion, Not Your Usual Suspects

If It Comes Out of Nowhere, It Won't Last

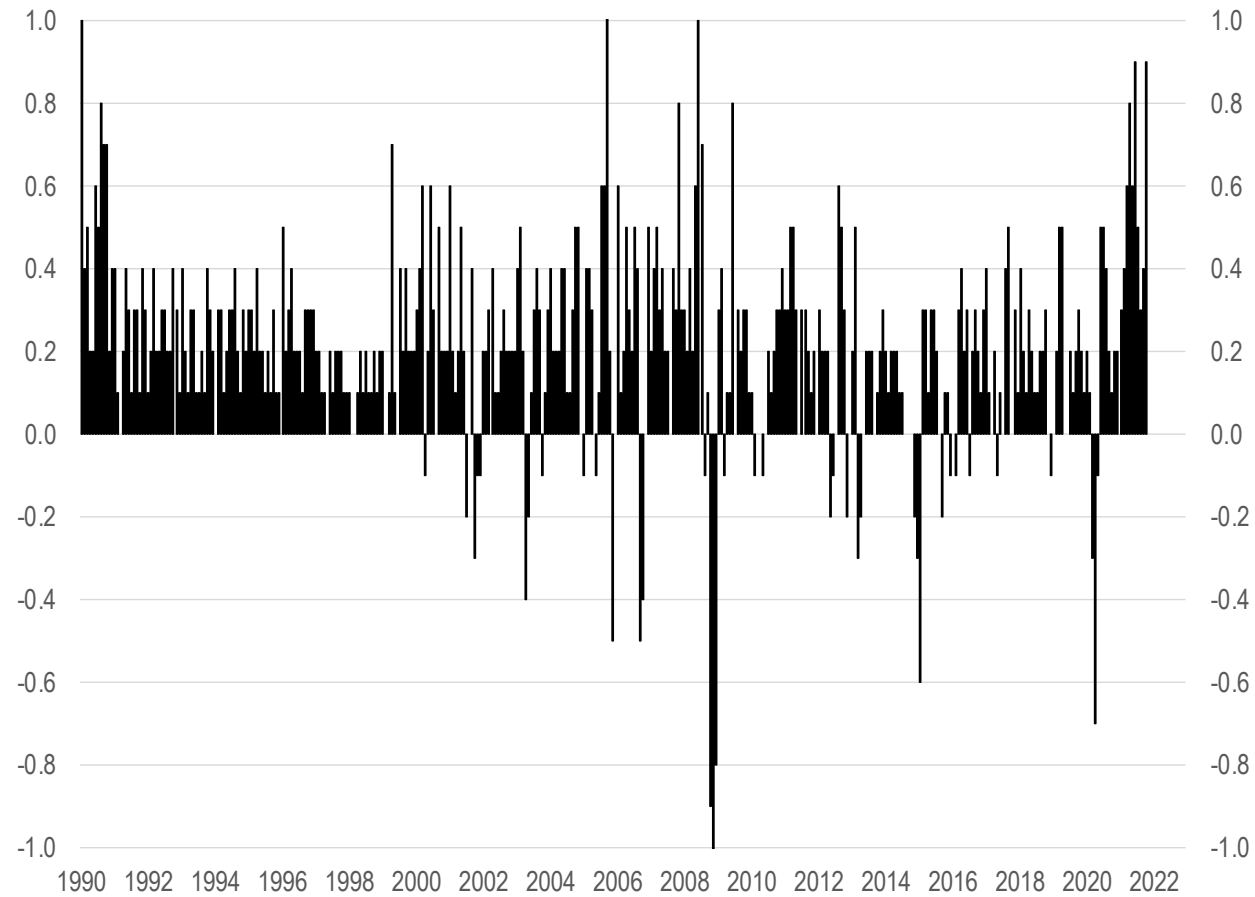
Consumer prices index (annualized percent change from the previous month)



Sources: Haver Analytics; U.S. Department of Labor. Updated through November 2021.

This Was Sudden and ...

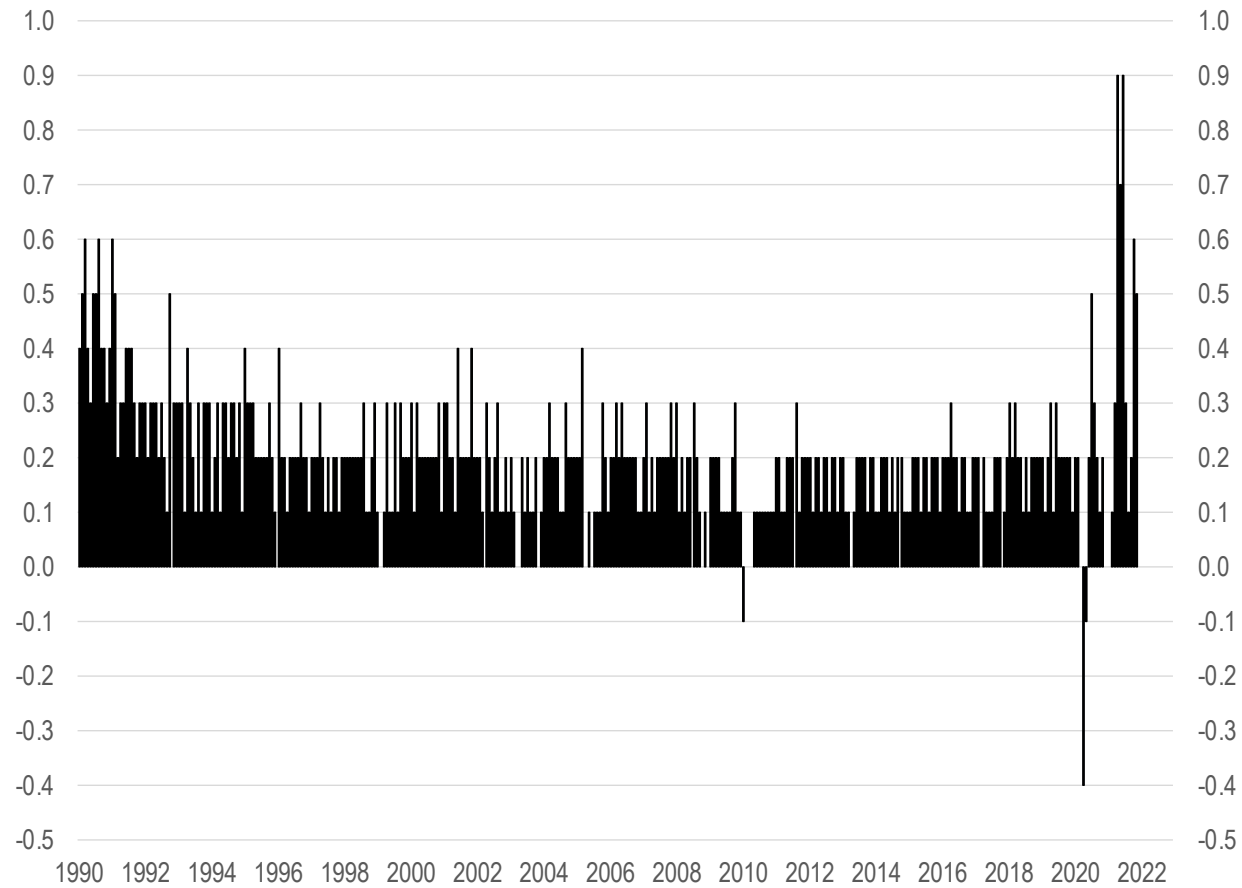
CPI (percent change from the previous month)



Sources: Haver Analytics; U.S. Department of Labor. Updated through November 2021.

... Narrowly Based ...

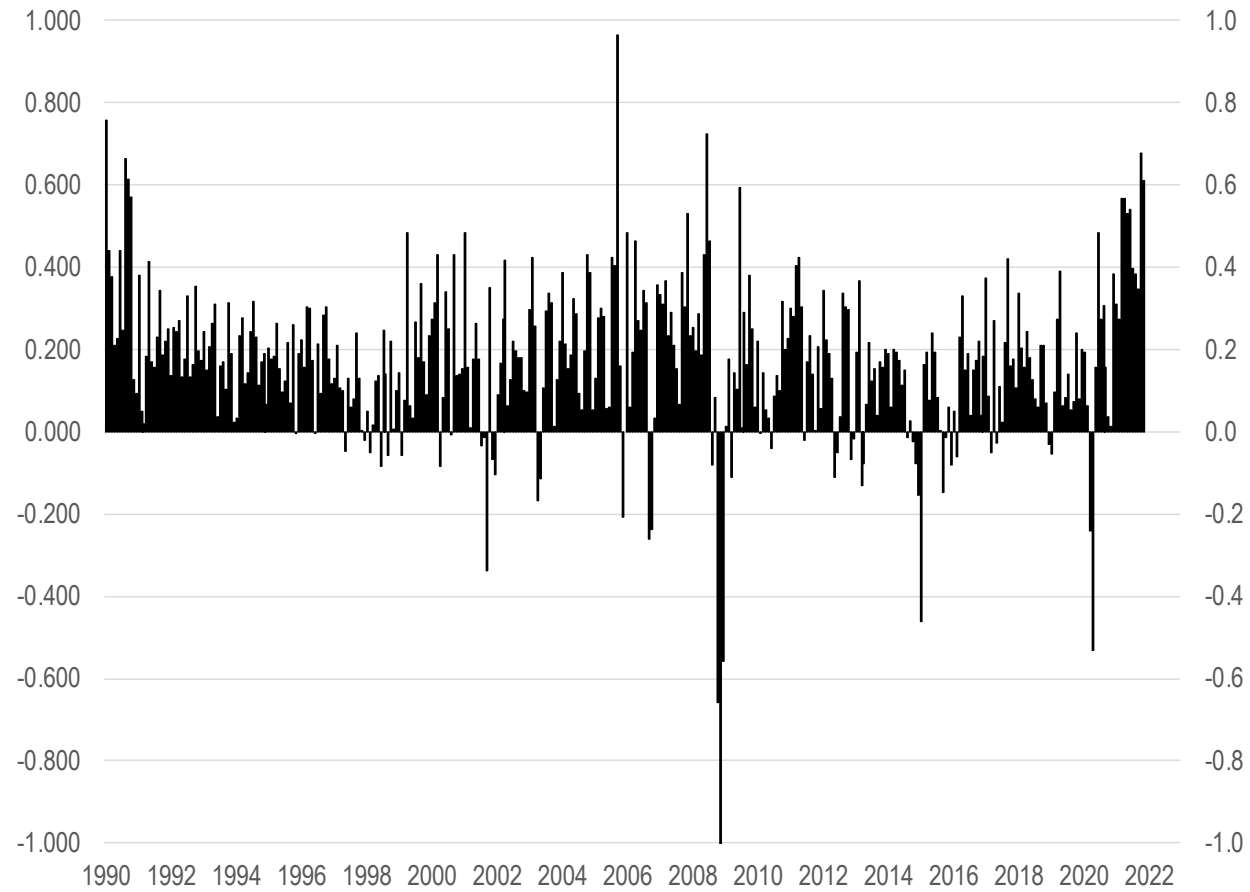
Core CPI (percent change from the previous month)



Sources: Haver Analytics; U.S. Department of Labor. Updated through November 2021.

... and Is More About the Businesses ...

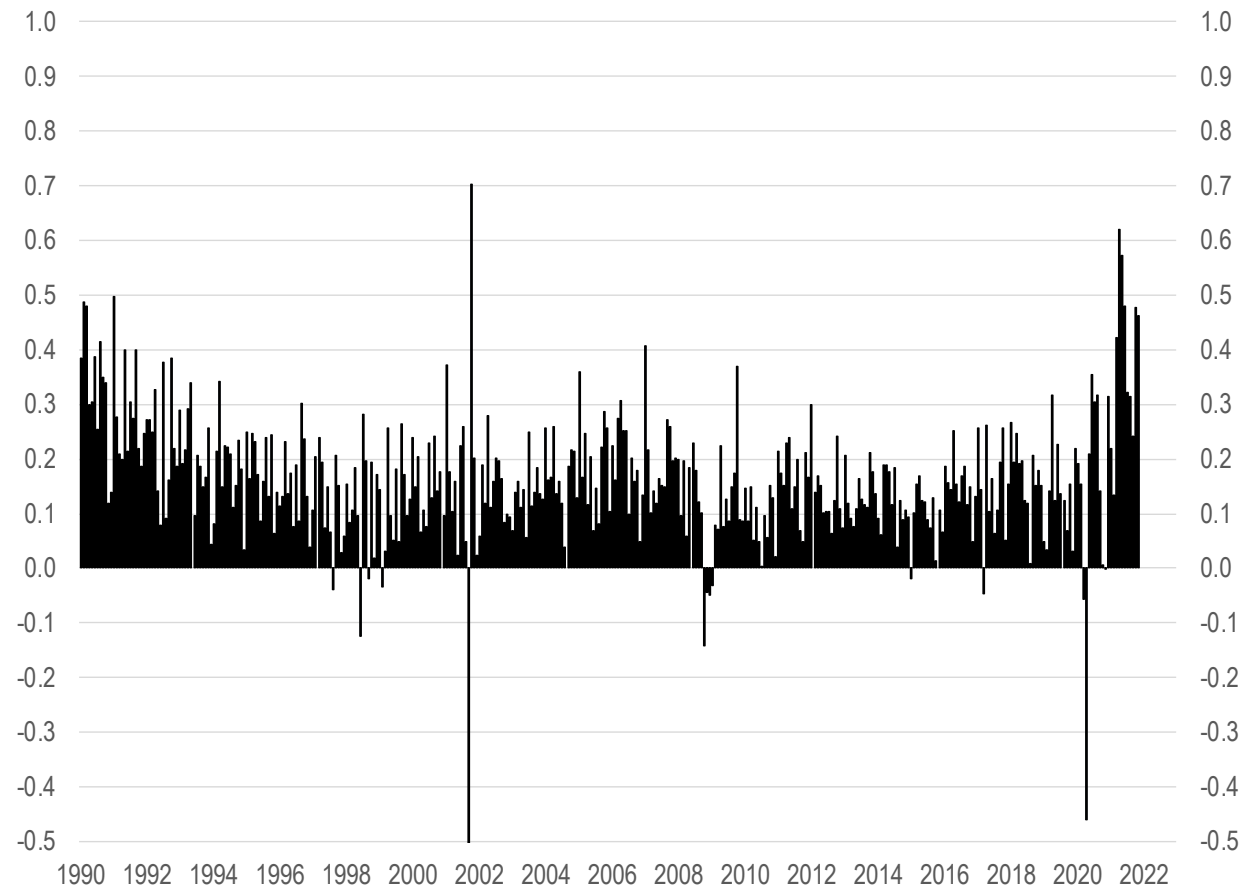
Chain PCE price index (percent change from the previous month)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

... Who Were Focuses on Survival

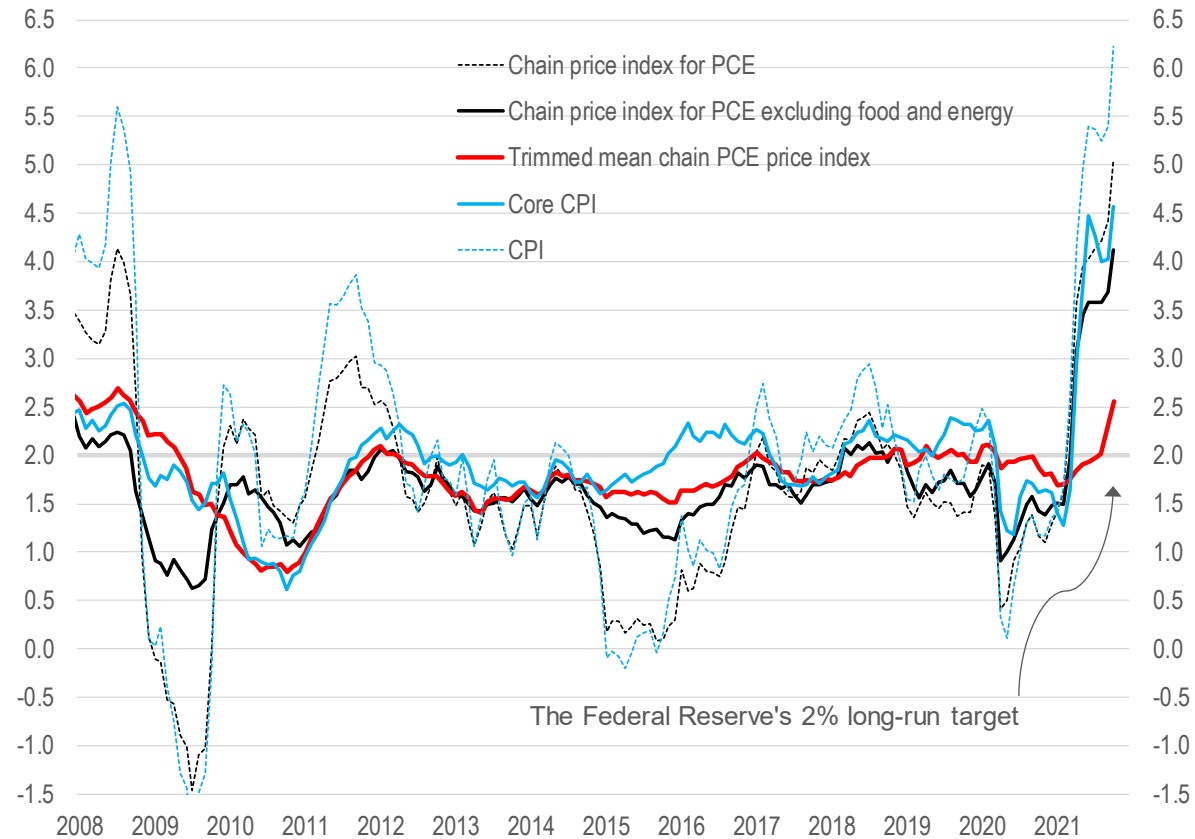
Core chain PCE price index (percent change from the previous month)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

This Has “Pandemic” Written All Over It

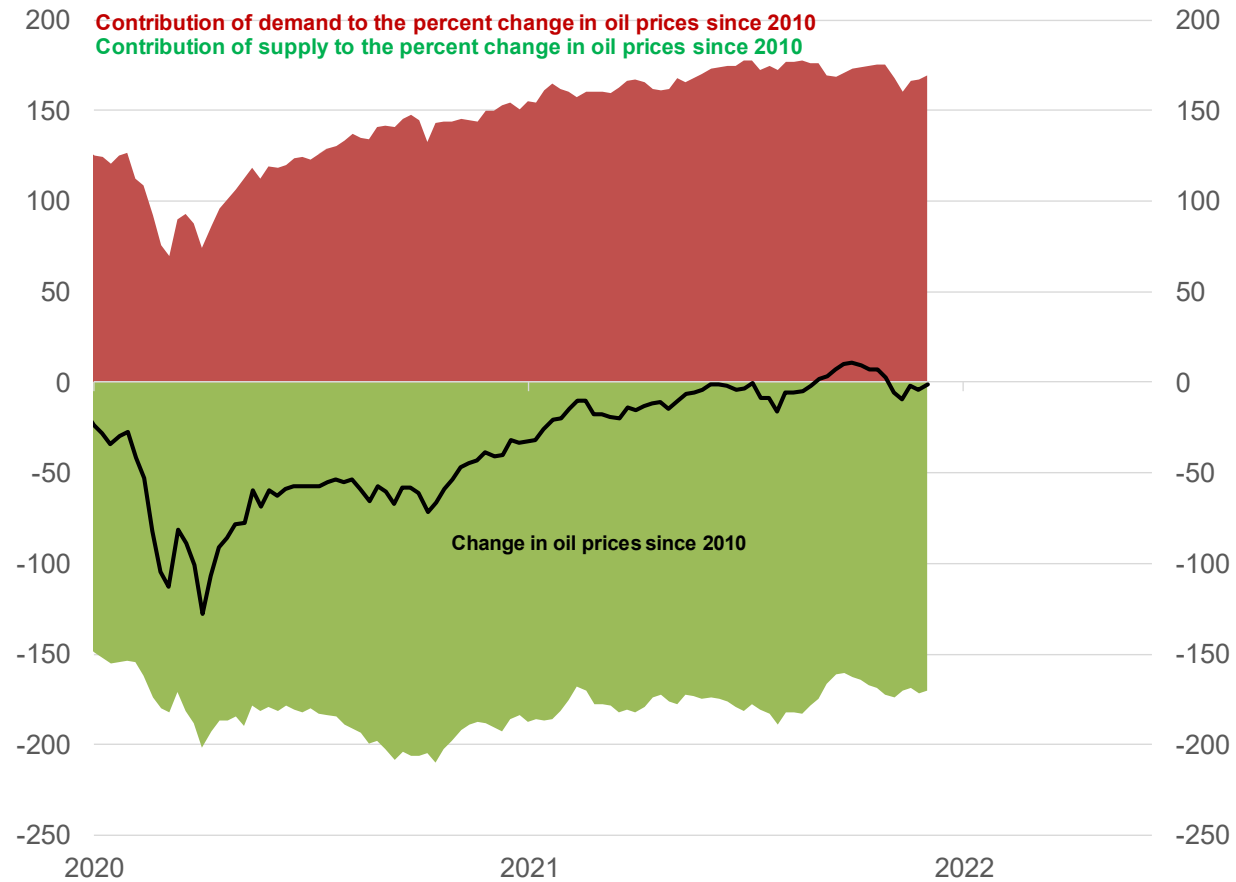
Selected inflation measures (percent change from 12 months earlier)



Sources: Haver Analytics; U.S. Department of Commerce; U.S. Department of Labor; Federal Reserve Bank of Dallas. Updated through October 2021 (PCE readings) and November 2021 (CPI)

The Energy Sector Is On the Front Lines of This Story

Estimated contribution of demand and supply factors to Brent oil prices (percent change since 2010)

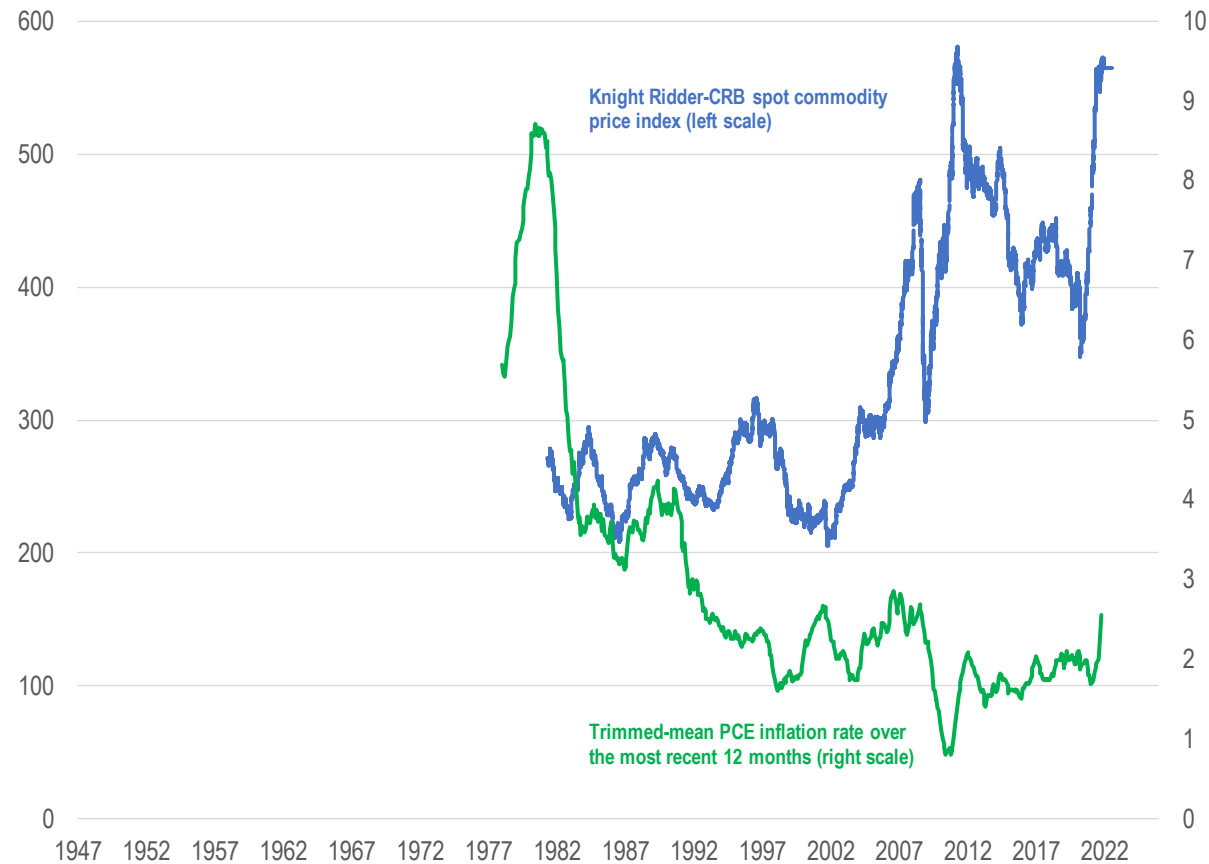


Source: Federal Reserve Bank of New York. Updated through December 24, 2021.

P.S. Consumers Don't See What Businesses See

CRB spot commodity price index (1967 = 100)
change)

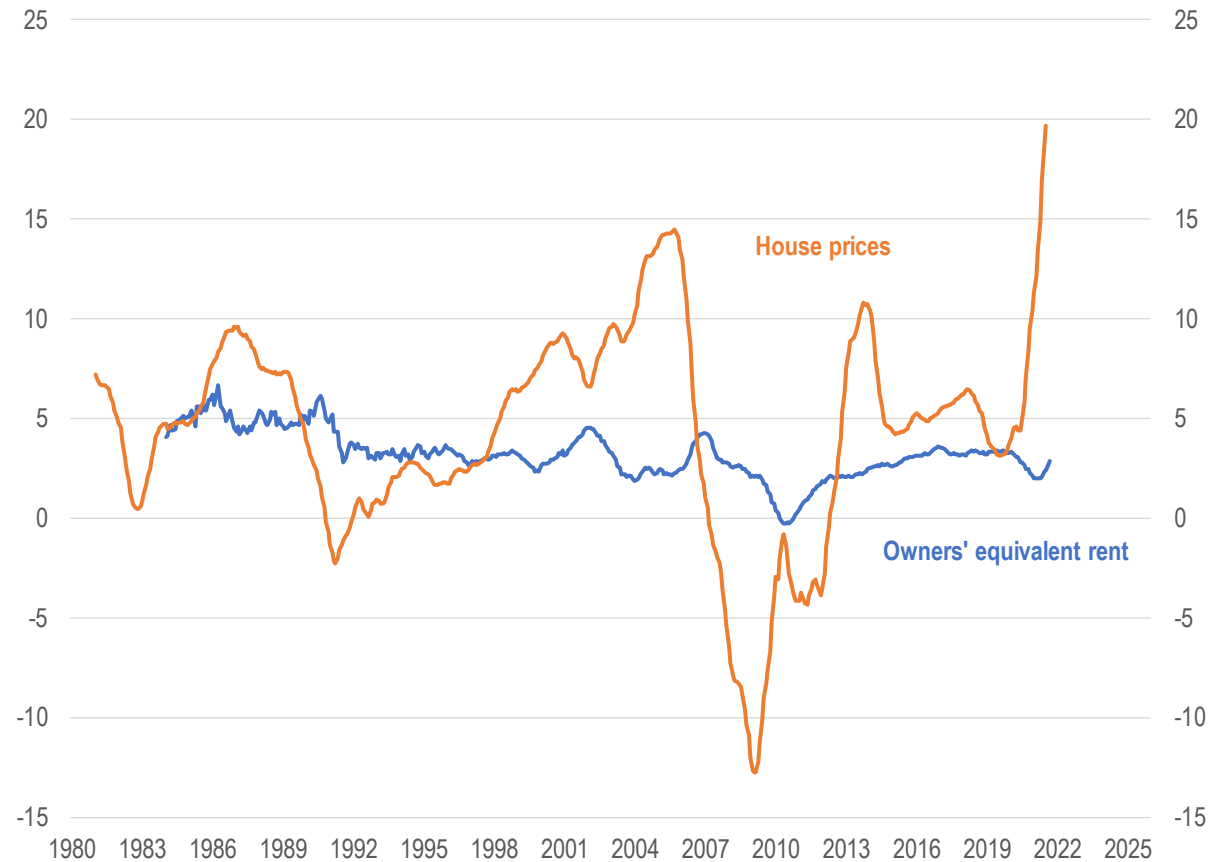
Trimmed-mean PCE inflation rate (annual percent
change)



Sources: Haver Analytics; Commodity Research Bureau; Federal Reserve Bank of Dallas. Updated through September 2021 (inflation) and November 20, 2021 (CRB).

P.S.S. Price Indexes Don't See What Realtors See

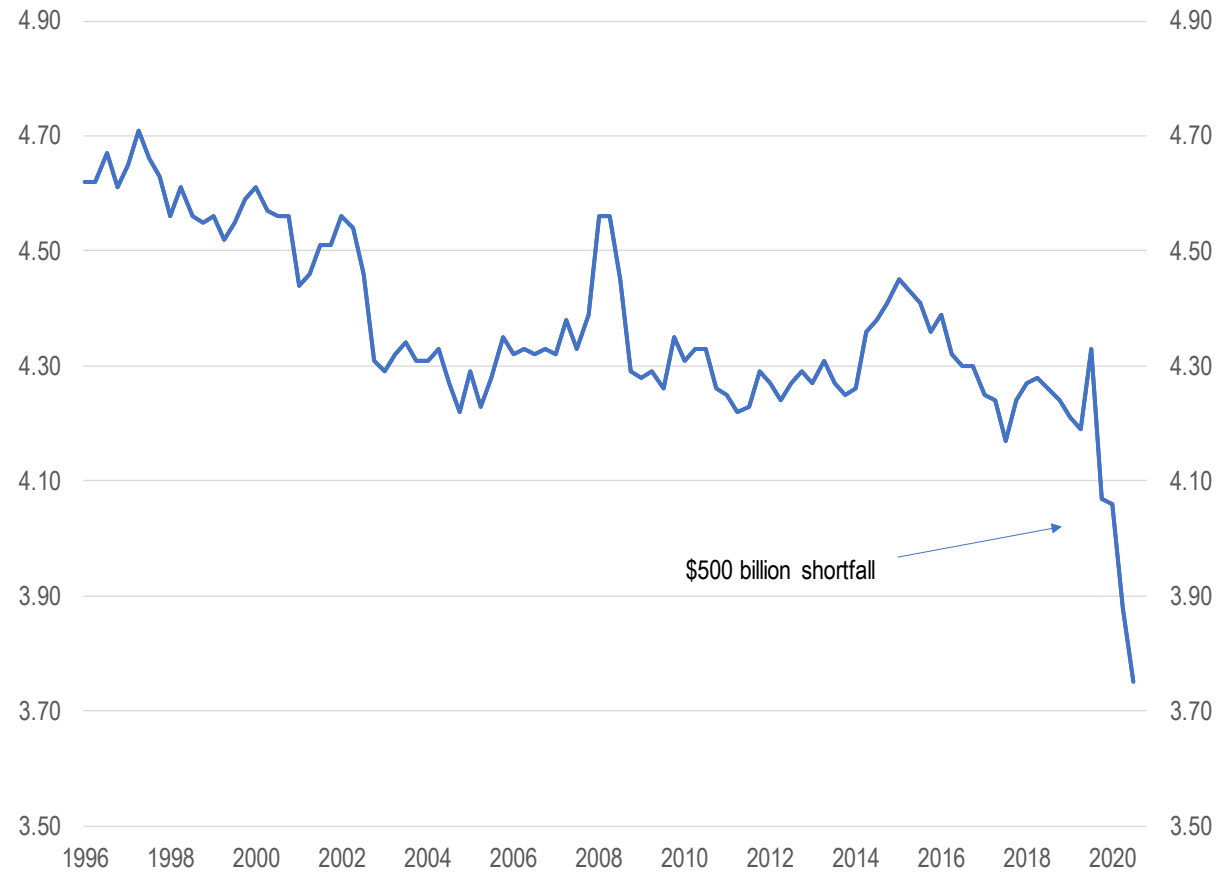
House prices and owners' equivalent rent (percent change from 12 months earlier)



Sources: Haver Analytics; Case-Shiller; U.S. Department of Labor. Updated through September 2021.

(1) Supply Shocks Wreak Havoc on Just-In-Time

Ratio of private nonfarm inventories to final sales of goods plus structures spending

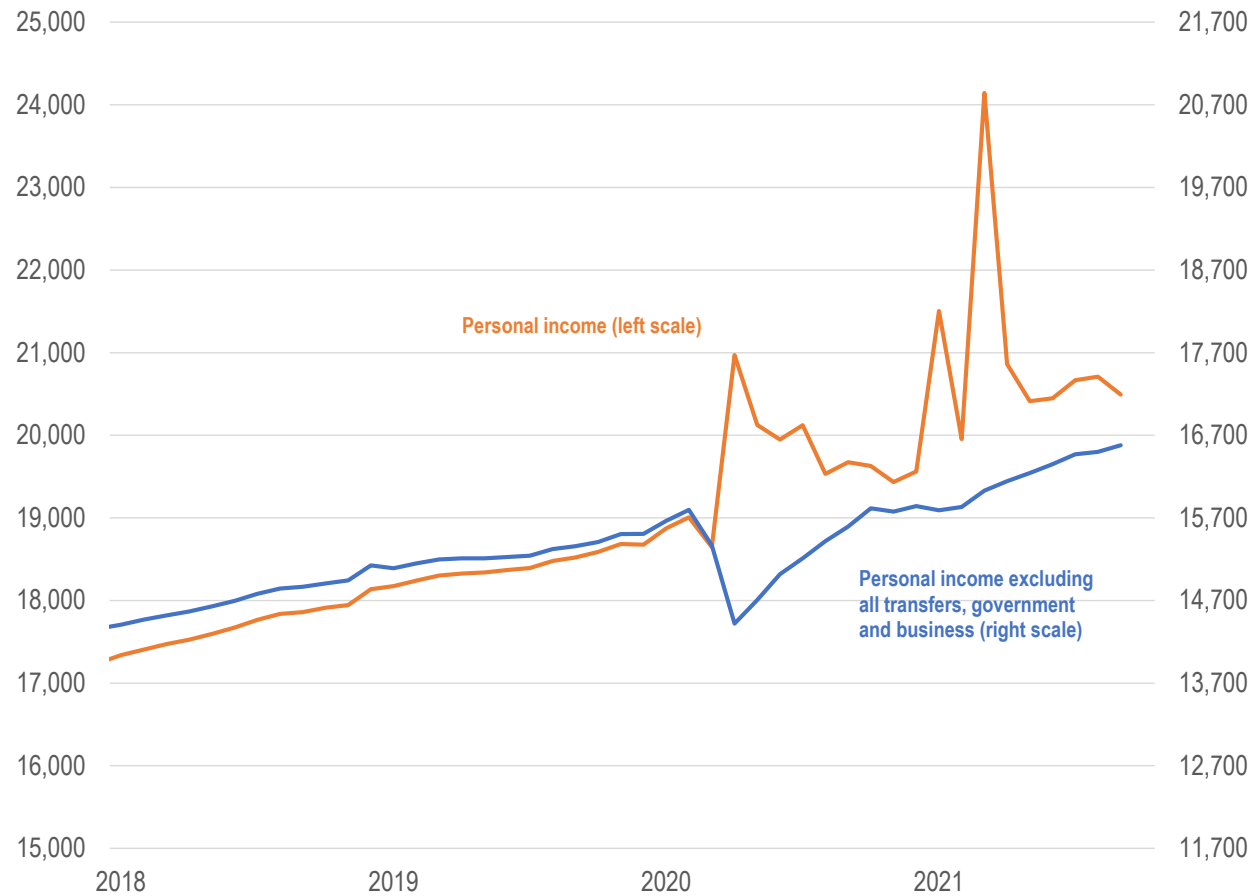


Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2021 Q2.

(2) Businesses Shut Down, Consumers Didn't

Personal income (billions of dollars)
dollars)

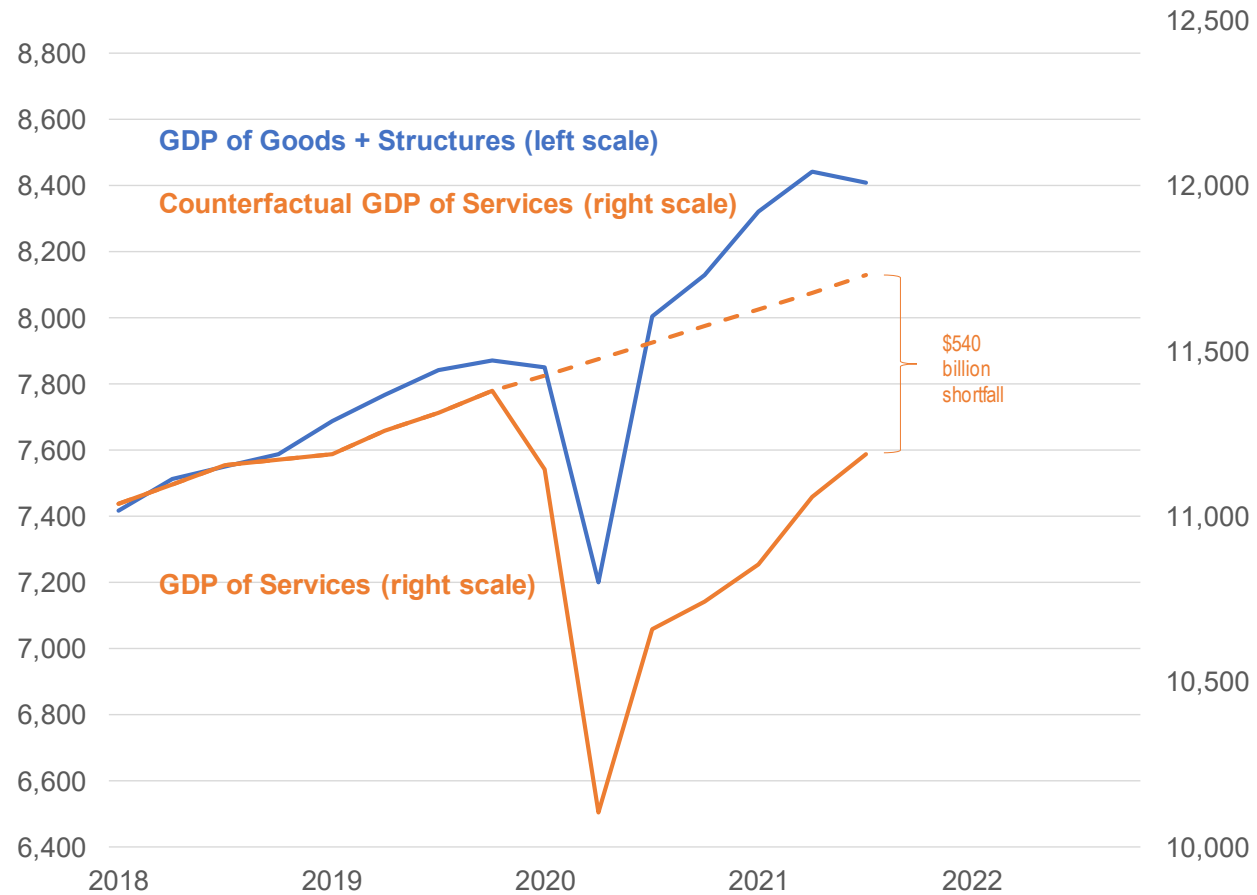
Personal income excluding all transfers (billions of
dollars)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through September 2021.

Goods GDP Thrive In the Online Arena ...

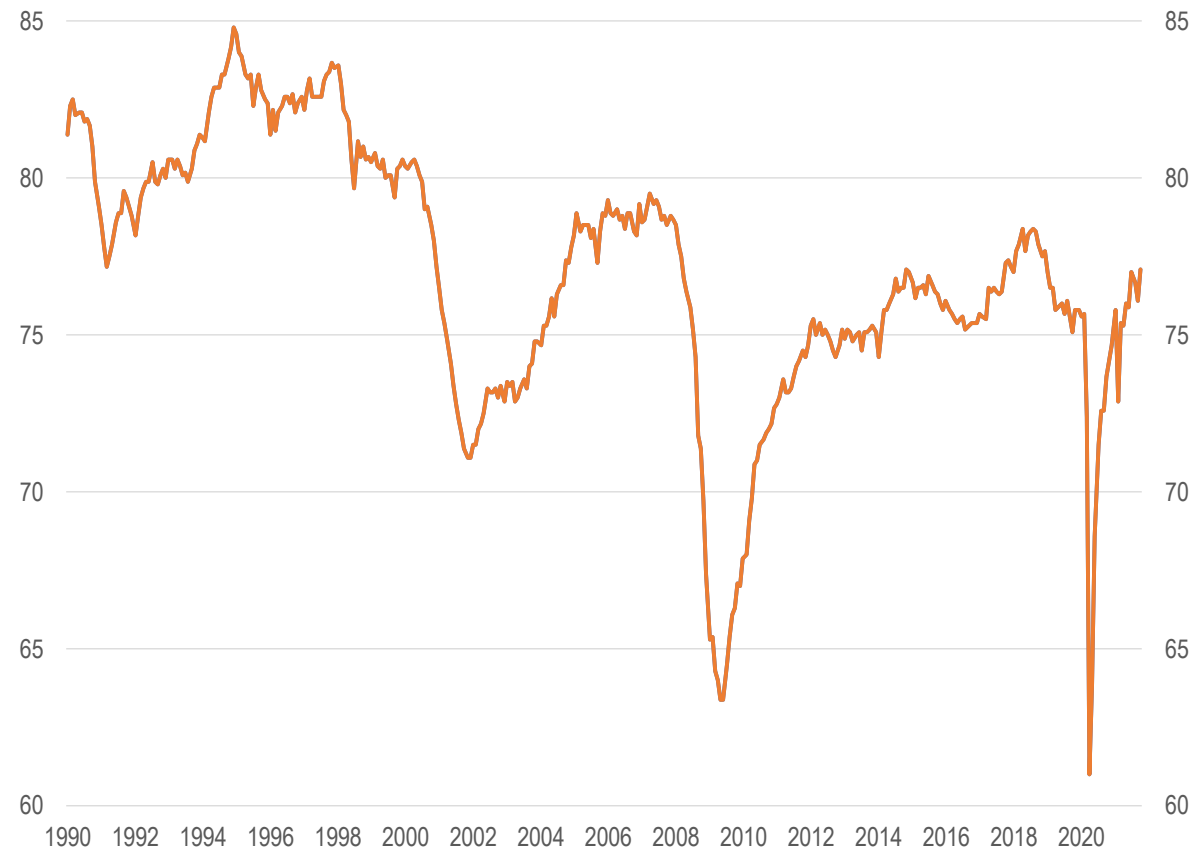
Real GDP in the goods and services economy (chained 2012 dollars)



Sources: Haver Analytics, U.S. Department of Commerce. Updated through 2021 Q3.

... but Even That Isn't Straining Our Capacity

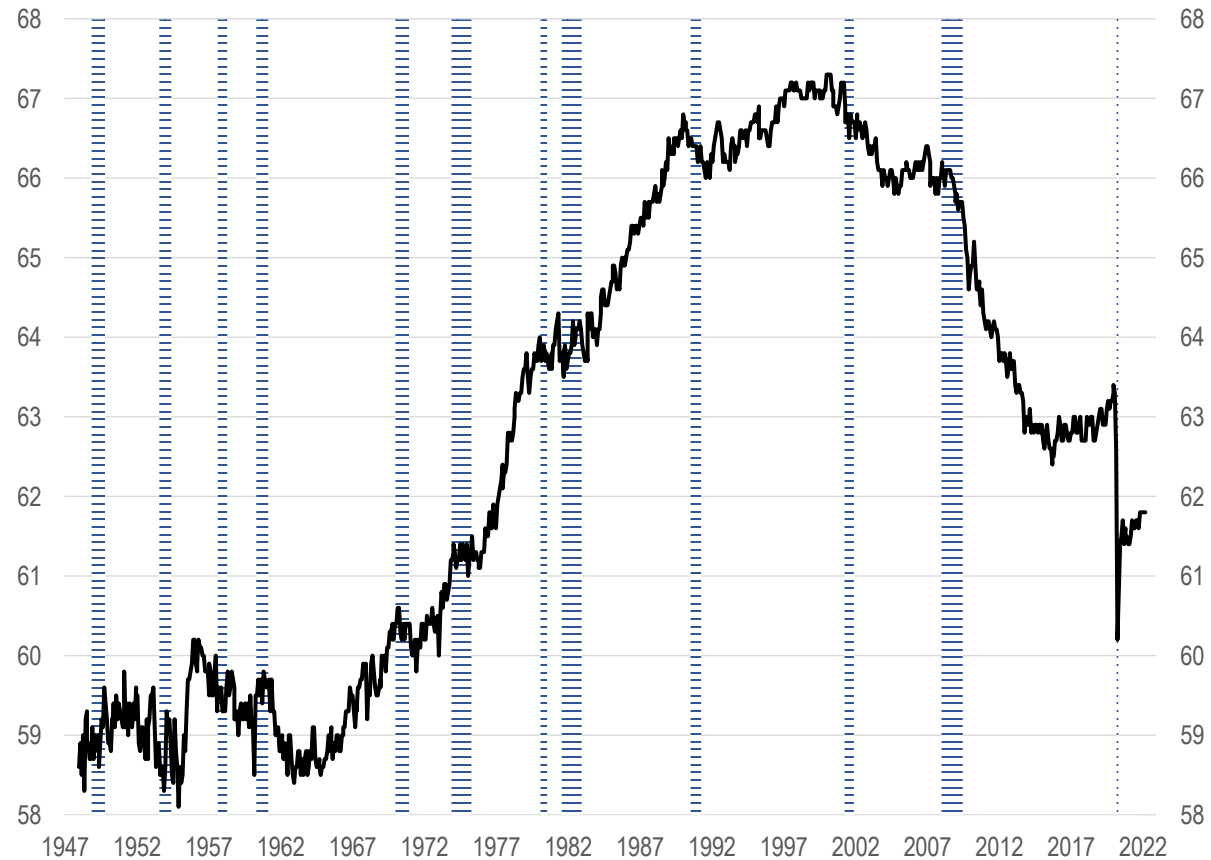
Manufacturing capacity utilization (percent of capacity in use)



Sources: Haver Analytics; U.S. Department of Federal Reserve. Updated through September 2021.

Help Wanted Signs Are the Result of this, ...

Labor force participation rate (labor force as a percent of the population)

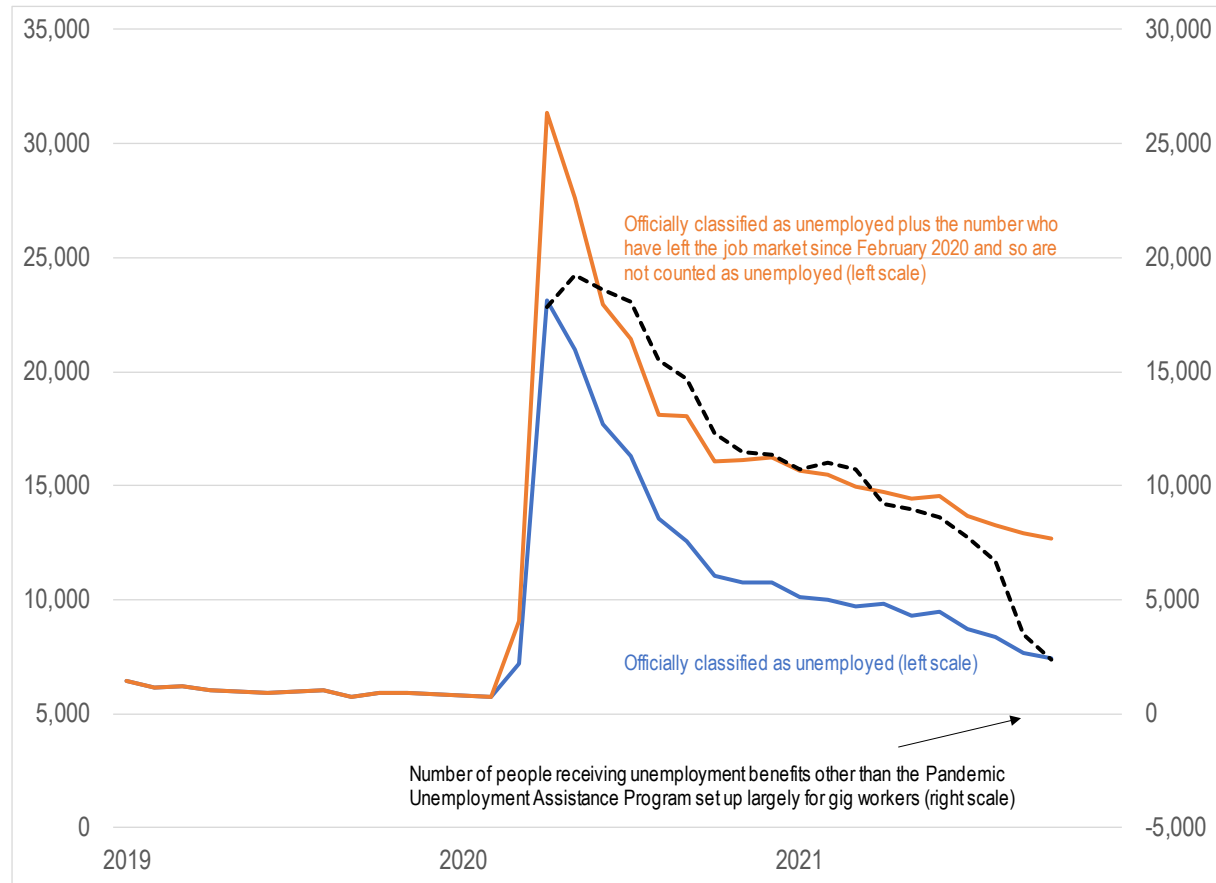


Sources: Haver Analytics; U.S. Department of Labor. Updated through November 2021.

... the 4 Million Who Jumped Ship With Benefits

Job openings (number)

(percent of employment plus job openings)

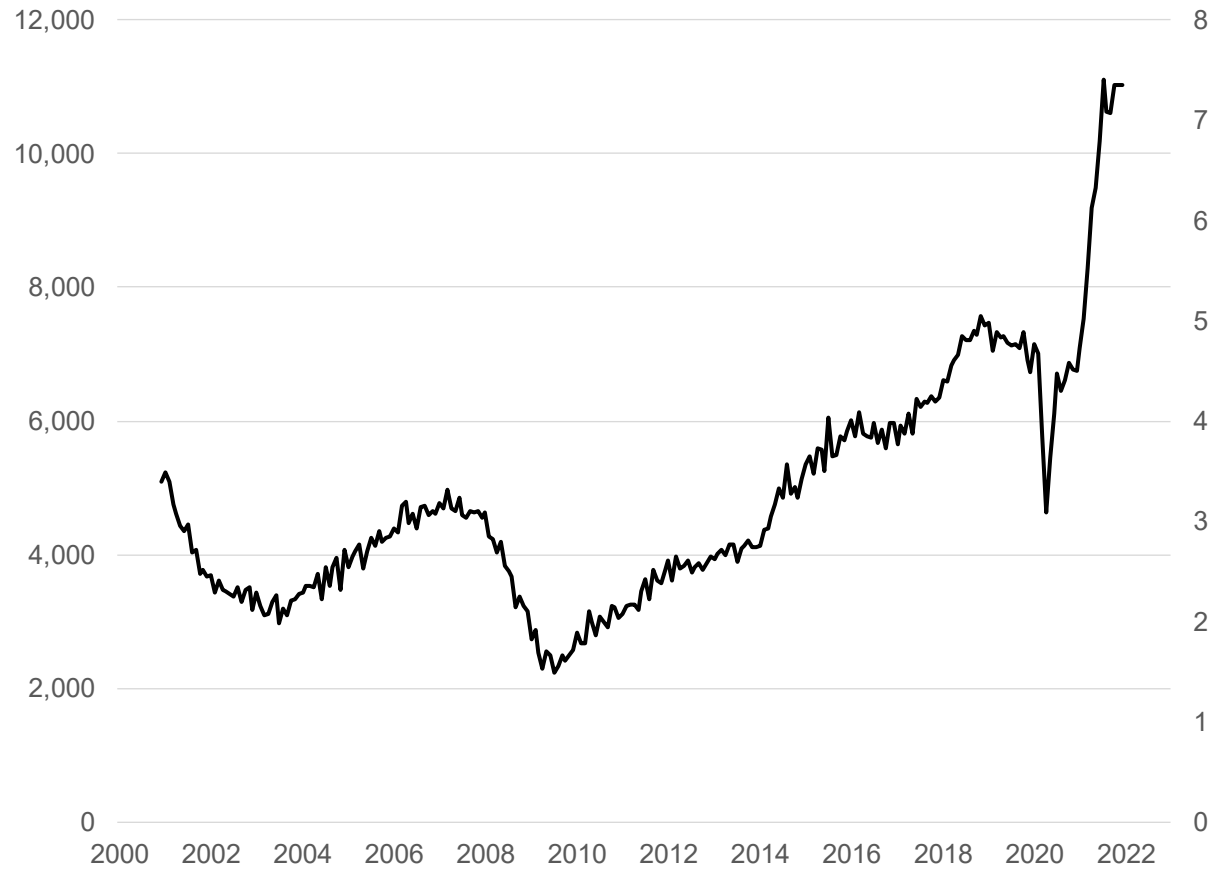


Sources: Haver Analytics; U.S. Department of Labor. Updated through October 2021.

Adding to Long-Emerging Worker Shortfalls

Job openings (number)

(percent of employment plus job openings)

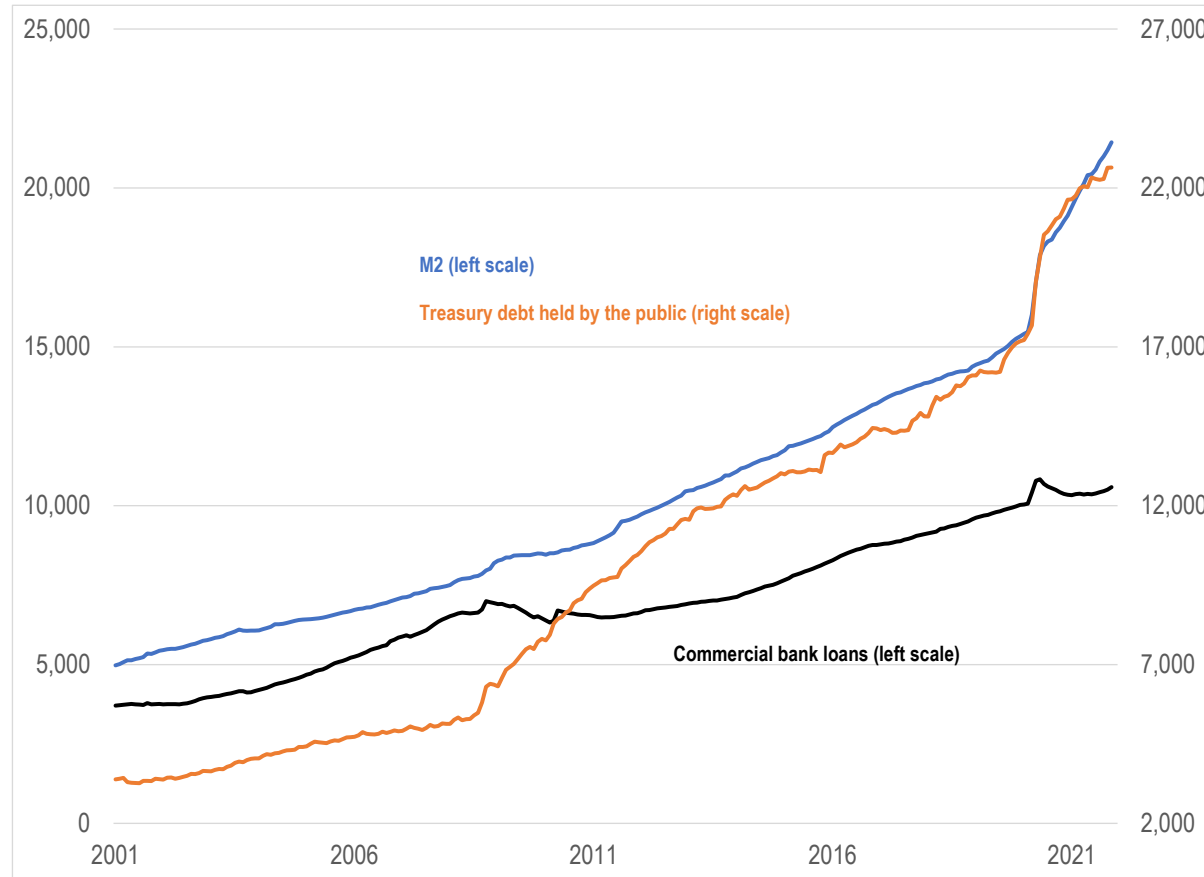


Sources: Haver Analytics; U.S. Department of Labor. Updated through October 2021.

Treasury Doesn't Create Real Money

M2 and commercial bank loans (\$ billions)
billions)

Treasury debt held by the public (\$
billions)

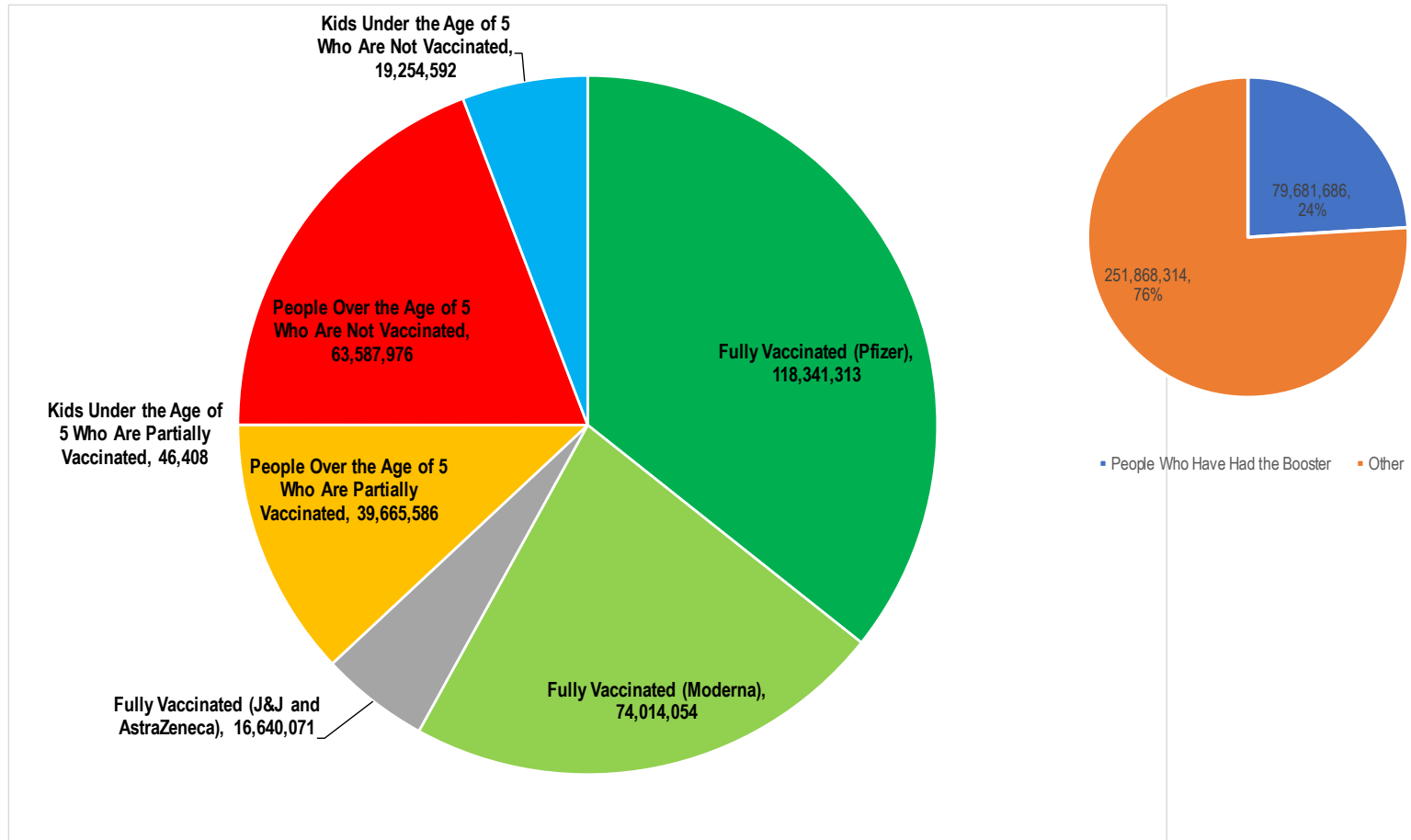


Sources: Haver Analytics; Federal Reserve Board; Treasury. Updated through November 2021.

Progress Report on the Vaccine Effort

Herd Immunity in the US ...

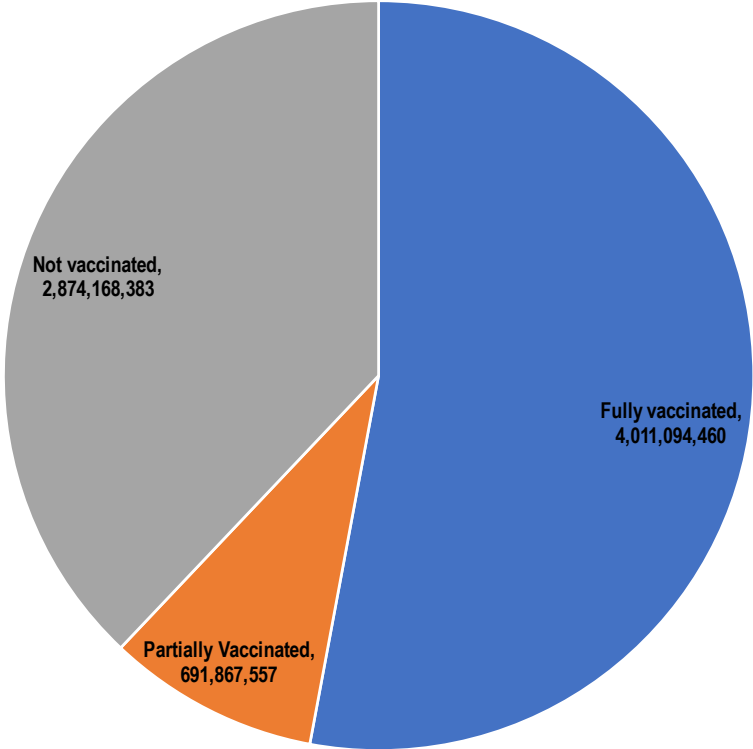
Vaccination status of the U.S. population (number of people)



Sources: State, Territory (Guam, American Samoa, Republic of Palau, Federated States of Micronesia, Northern Mariana Islands, Marshall Islands, and Virgin Islands) and Federal Entities (Bureau of Prisons, Department of Defense, Indian Health Services, and Veterans Health). Updated through January 15, 2022.

Slower Vaccination Progress Elsewhere ...

Vaccination status of the global population (number of people)

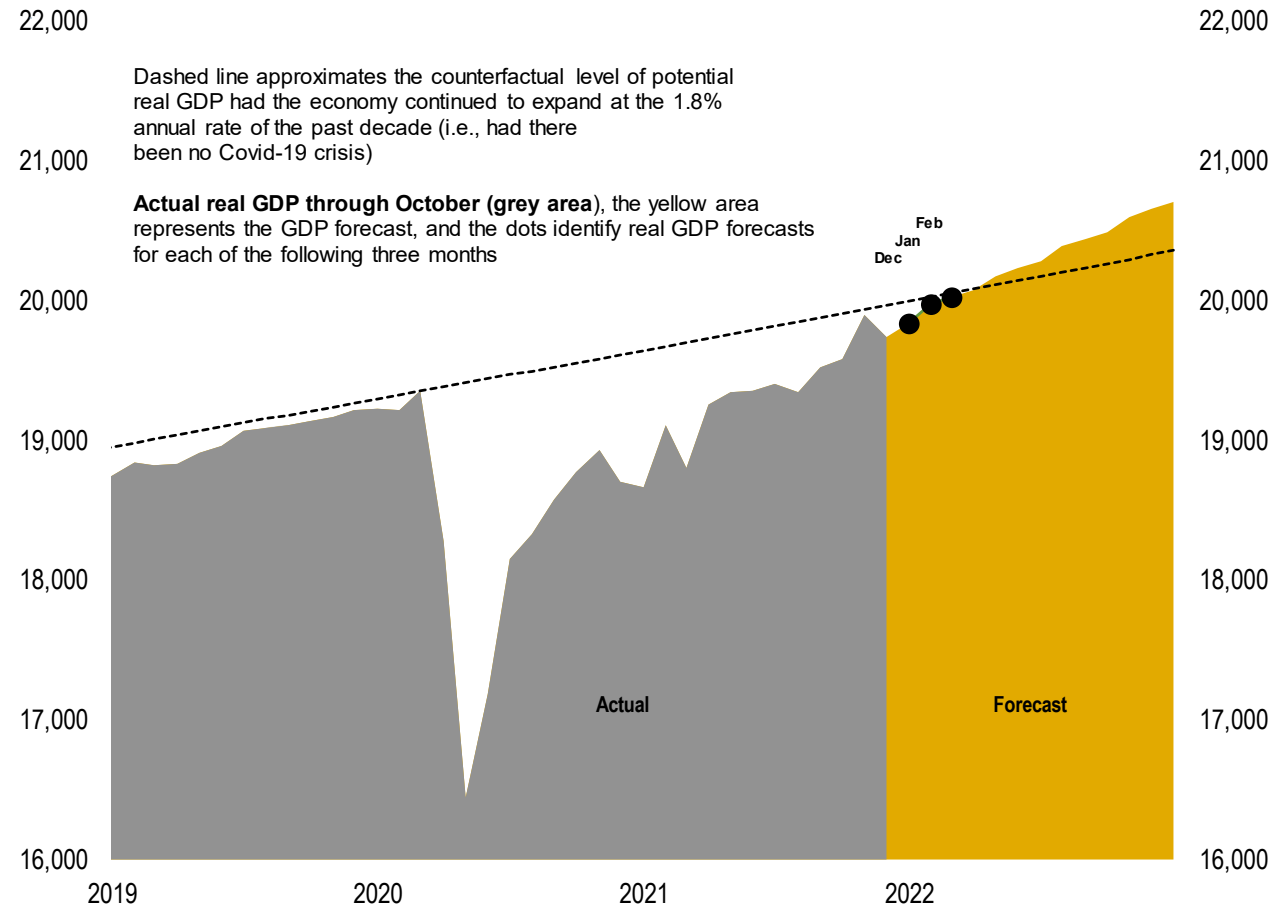


Sources: Our World in Data. Updated through January 15, 2022.

Macro Progress Report

National Output Is Back Where We Started and ...

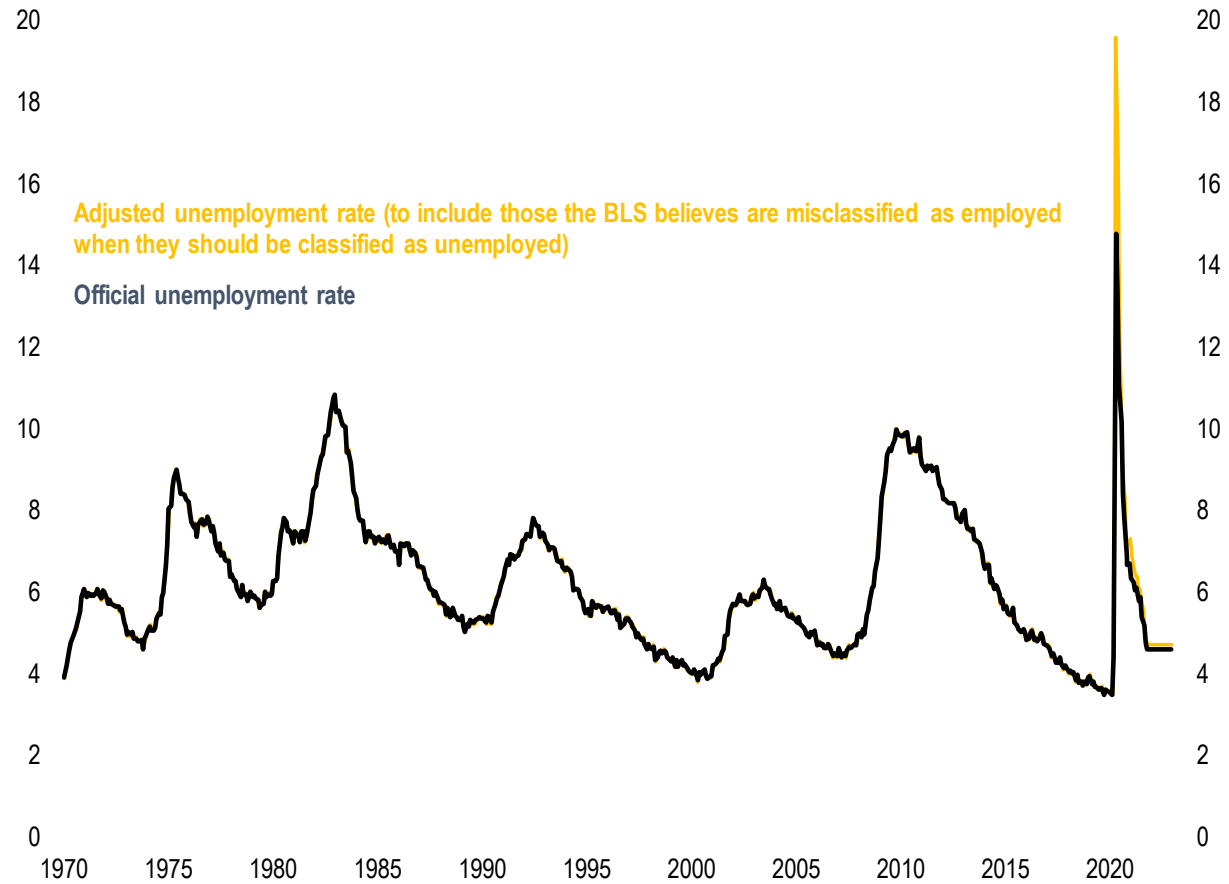
Unemployment (percent of the labor force)



Sources: Haver Analytics; U.S. Department of Labor. Updated through October 2021.

... “Full Employment” Is In Focus ...

Unemployment (percent of the labor force)

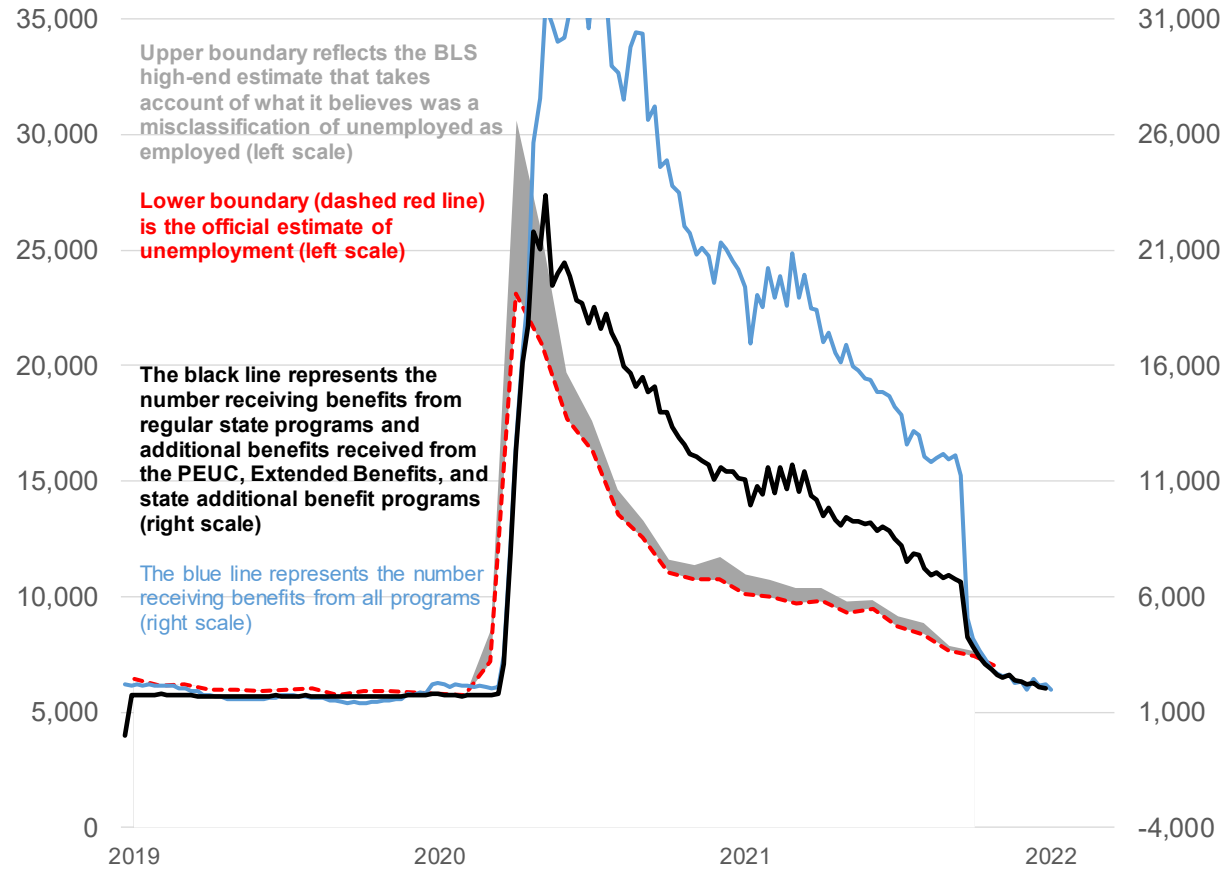


Sources: Haver Analytics; U.S. Department of Labor. Updated through October 2021.

Welcome Home! ...

Monthly unemployment estimates, Household Survey (thousands)

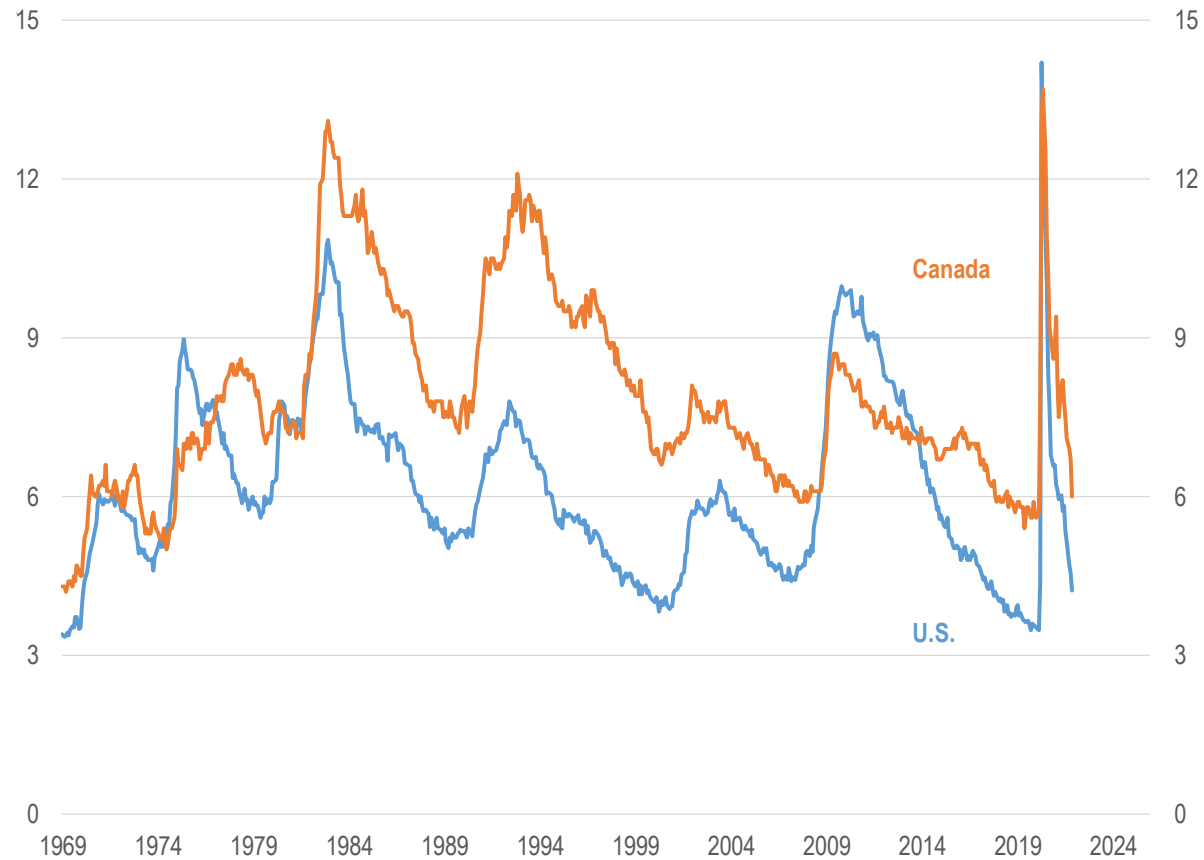
Insured unemployment, regular programs and PEUC, EB, and state EB programs (thousands)



Sources: Haver Analytics; U.S. Department of Labor. Updated through November 2021 (unemployment), December 11, 2021 (additional benefit programs) and December 18, 2021 (regular state claimants).

... All Across North America

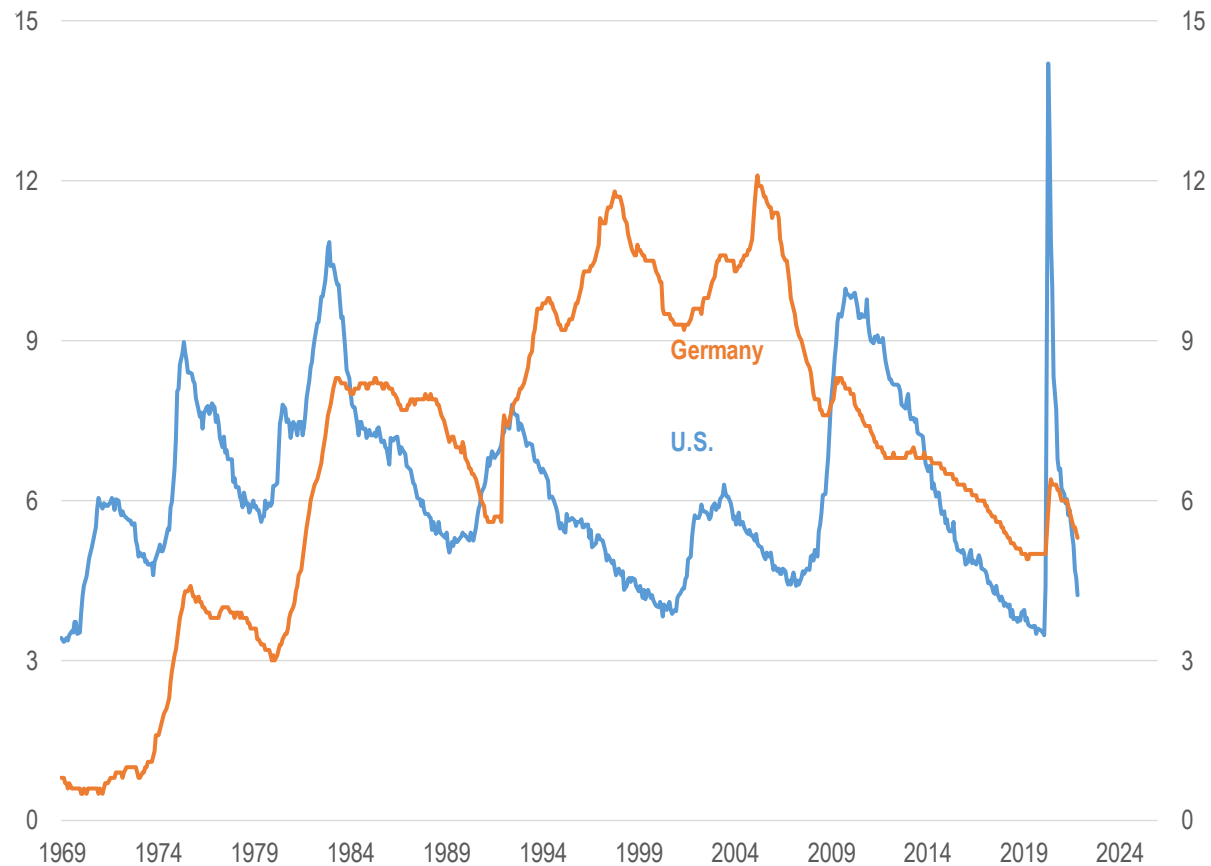
Unemployment (percent of the labor force)



Sources: Haver Analytics; U.S. Department of Labor. Updated through November 2021.

P.S. Germany Has Something Worth Exploring

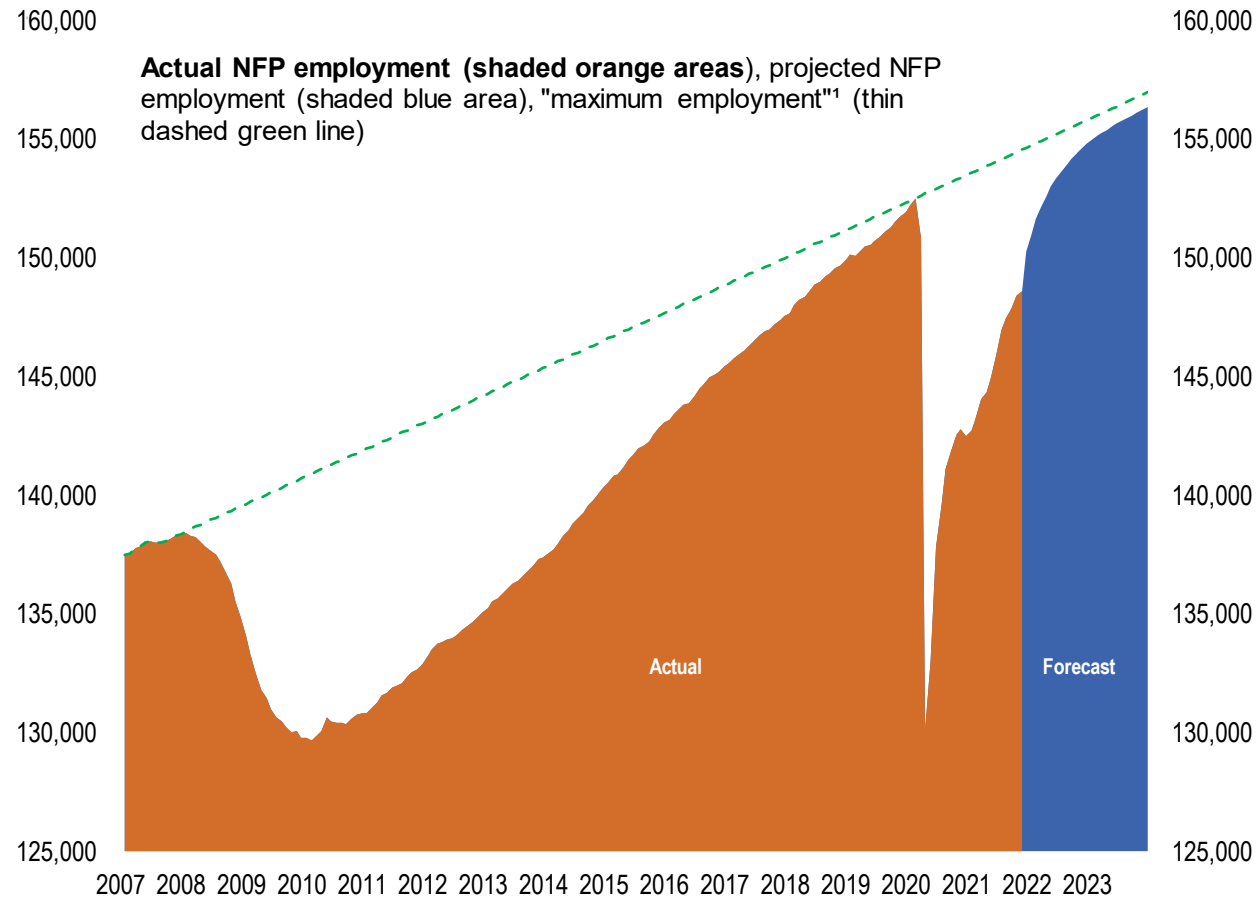
Unemployment (percent of the labor force)



Sources: Haver Analytics; U.S. Department of Labor; Eurostat. Updated through November 2021.

Employment Isn't Quite There Though

Nonfarm payrolls (thousands of jobs)



Sources: Haver Analytics, U.S. Department of Labor. Updated through November 2021.

5-6 Million Shy of the ‘Maximum Employment’ Goal ...

	Compared with Pre-Pandemic Levels (February 2020)	Compared With a No-Pandemic Counterfactual ¹	
	(thousands)	(thousands)	(% shortfall)
Labor Force	-2,206	-3,899	
Employed (Headcount)	-3,380	-5,345	-4.0%
Self Employed	662	662	
Other	-4,042	-6,007	
Unemployed	1,160	1,447	
Household Survey Approximation of the Nonfarm Payroll Concept ²	-4,573	-6,630	-5.5%
Nonfarm Payrolls (Job Count)	-3,912	-5,945	-3.9%

¹ The counterfactual reference point assumes that the respective employment metric would have continued to increase at the 2019 pace --that is, by about 100,000 monthly--after February 2020.

² The measure of the number of jobs based on the Current Population Survey that approximates the population covered by nonfarm payroll for example, that excludes self employed workers and includes multiple job holdings (assuming such people hold only one other job).

... Mostly in Ed, Healthcare, and Leisure/Hospitality

Economic Indicator	Deviation from the "No-Pandemic" Path as of November 2021 ¹	
	Shortfall (thousands)	Shortfall (%)
GDP (if real GDP rose 0.5% in November)		0.0
Nonfarm Payrolls (Establishment Survey)	-5,945	-3.8
Private Sector	-5,072	-3.8
Mining and Logging	-38	-5.6
Construction	-138	-1.8
Manufacturing	-122	-1.0
Trade, Transportation & Utilities	-307	-1.1
Wholesale Trade	-137	-2.1
Retail Trade	-180	-1.2
Transportation and Warehousing	-3	0.0
Utilities	-10	-1.8
Information	-108	-3.7
Financial Activities	-59	-0.7
Professional and Business Services	-602	-2.7
Education and Health Services	-1,732	-6.8
Private Educational Services	-288	-7.4
Health care	-1,005	-5.9
Social Assistance	-449	-9.9
Leisure and Hospitality	-1,882	-10.8
Other Services	-4	-3.6
Government	-1,002	-4.4
Federal	0	0.0
State	-297	-5.6
Local	-705	-4.8
Memo: State and Local Education	-612	-5.7

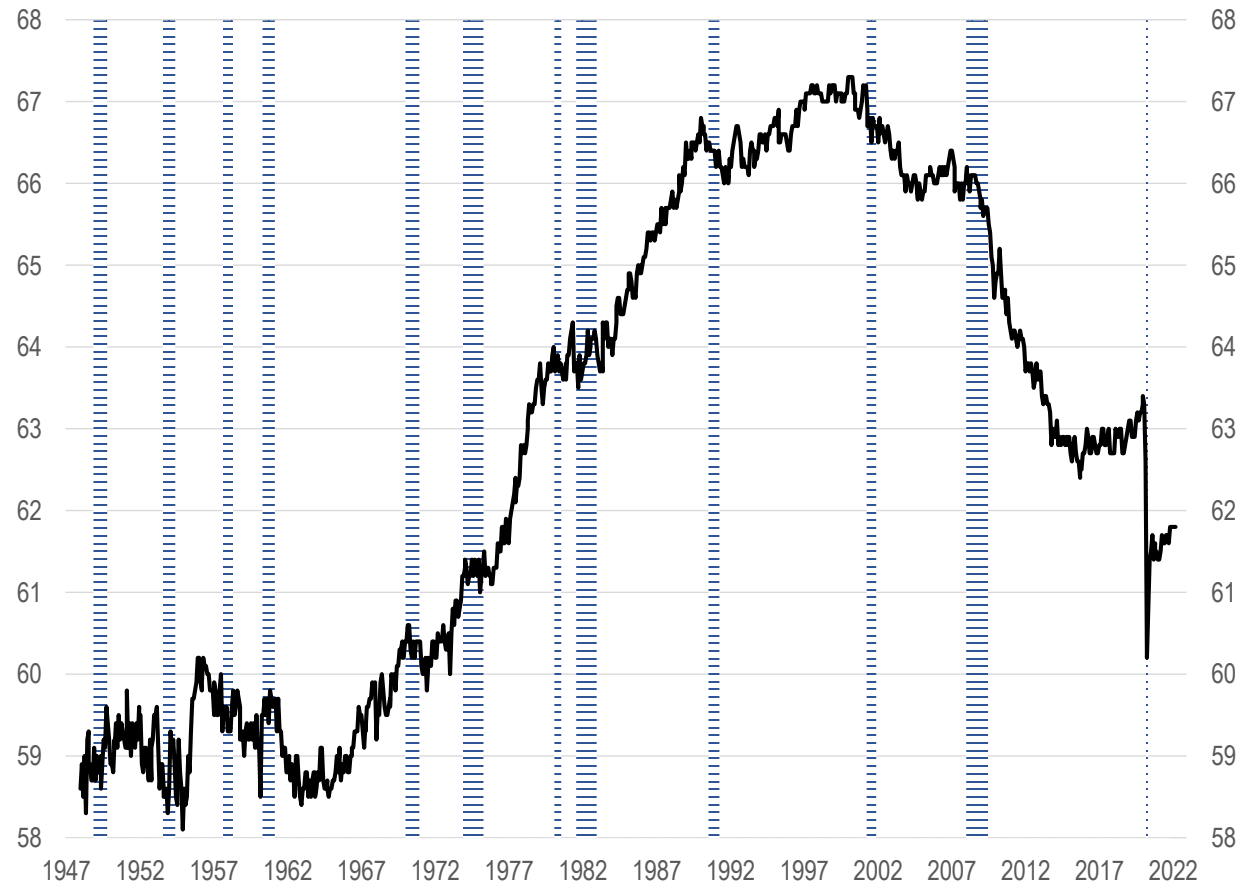
¹ Each "No-Pandemic" path starts with the actual February 2020 level and then expands at the 2019 pace.

P.S. Gender Impact

	Deviation from February 2020 (thousands)
<u>Household Survey (Head Count)</u>	
Employed	-4,516
Women	-2,448
Men	-2,068
Unemployed	1,684
Women	836
Men	848
Number of People Who Left the Workforce After February 2020	2,734
Women Who Left the Workforce After February 2020	1,612
Men Who Left the Workforce After February 2020	1,122
<u>Payroll Survey (Job Count)</u>	
Nonfarm Payrolls	-4,204
Change in the Number of People Working Several Jobs	-1,174
Jobs Held by Women	-2,407
Change in the Number of Women Working Several Jobs	-679
Jobs Held by Men	-1,797
Change in the Number of Men Working Several Jobs	-471

The Great Resignation Idea (4 Million Dropouts) ...

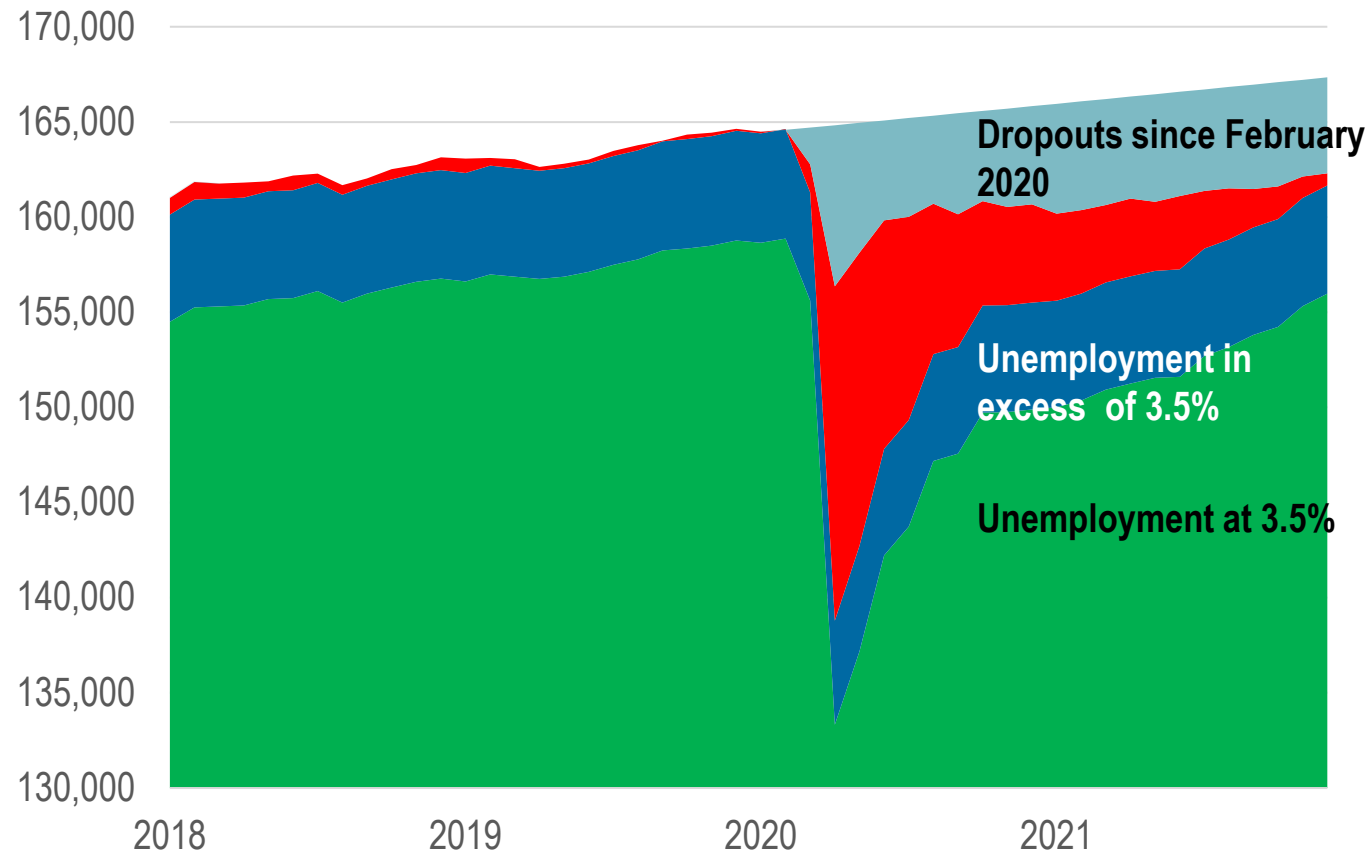
Labor force participation rate (labor force as a percent of the population)



Sources: Haver Analytics; NBER-designated recessions; U.S. Department of Labor. Updated through November 2021.

... Is Nonsense

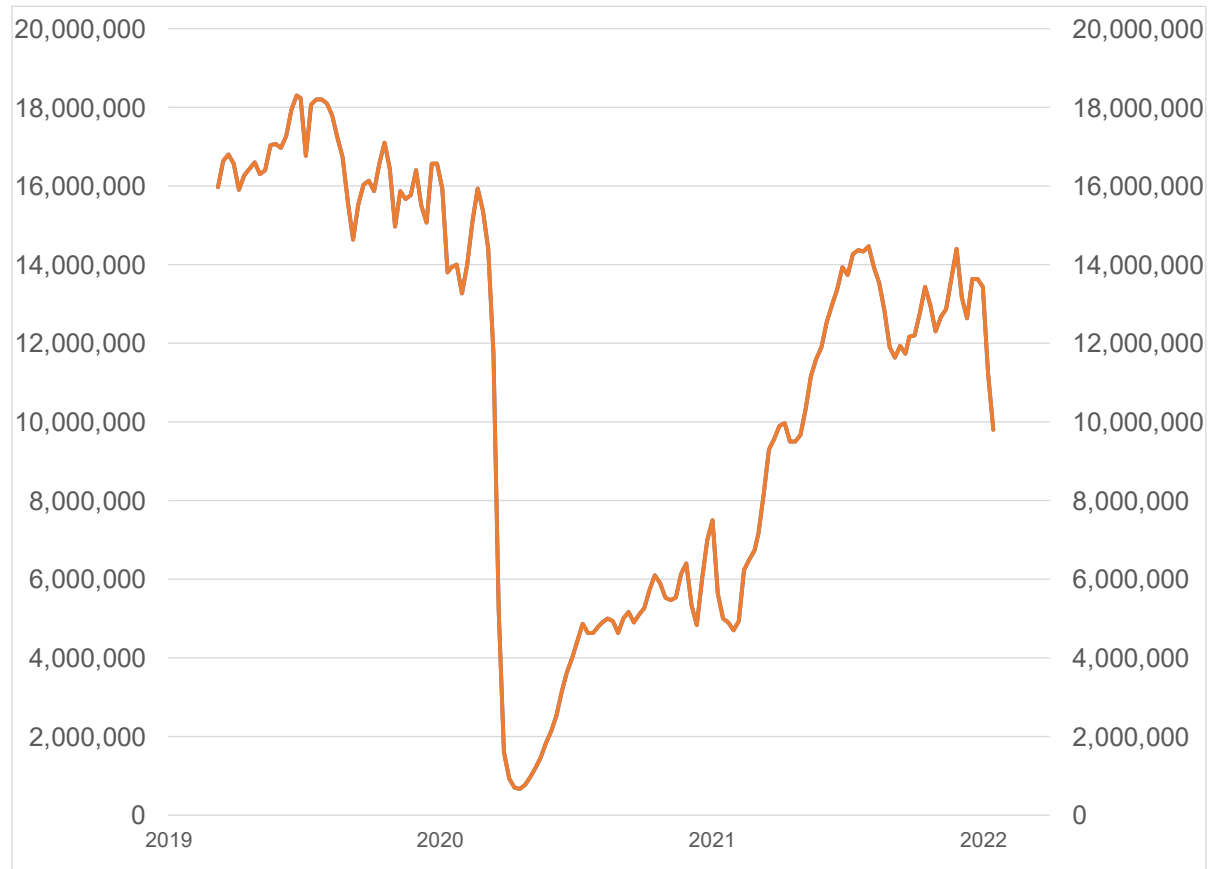
Employment and (official and hidden) unemployment (thousands of people)



Note: Figures are based on the Household Survey.
Sources: Haver Analytics; U.S. Department of Labor. Updated through December 2021.

Airports Are Busy Again ...

Number of travelers passing through TSA security lines each week

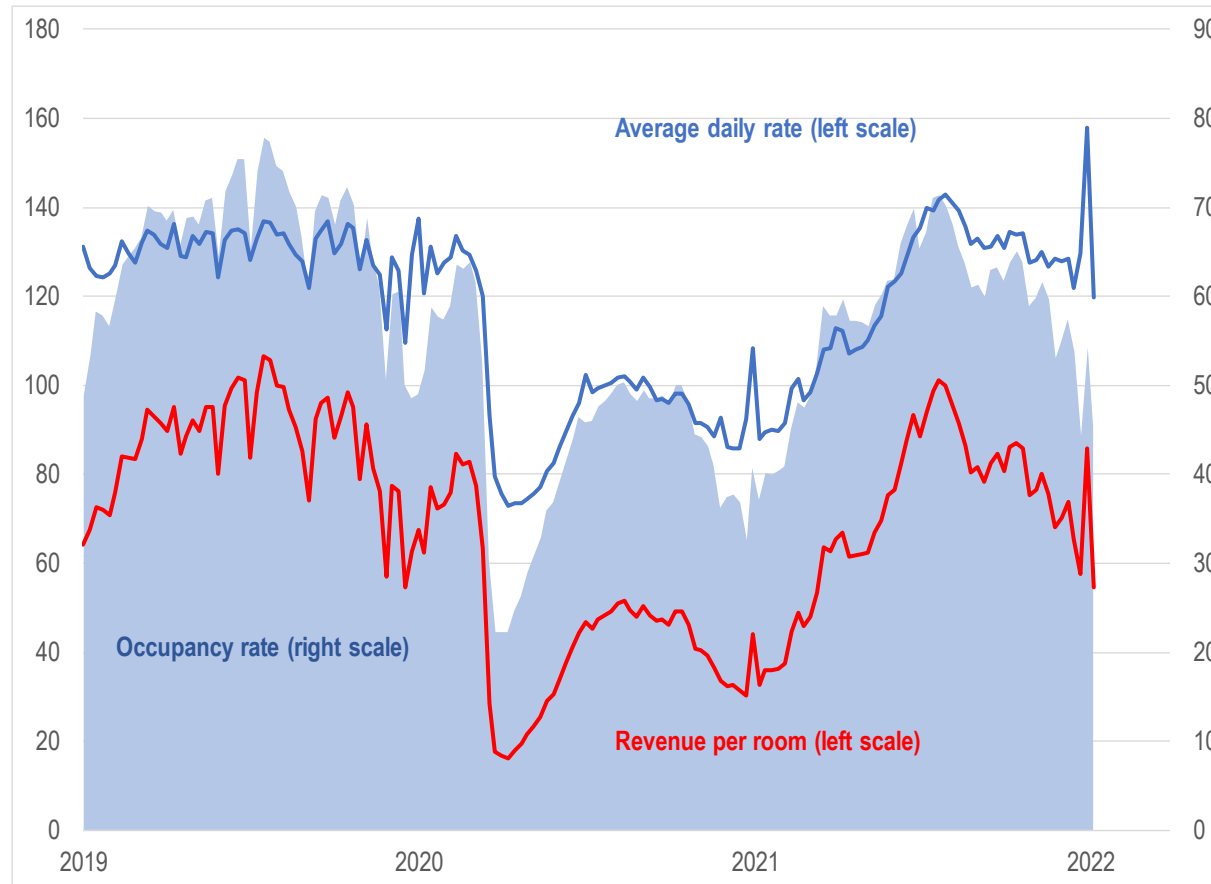


Sources: Haver Analytics; Transportation Security Administration. Updated through January 14, 2022.

... and that's Helping Hotels

Daily rate (dollars)

Hotel occupancy rate (percent of occupancy)

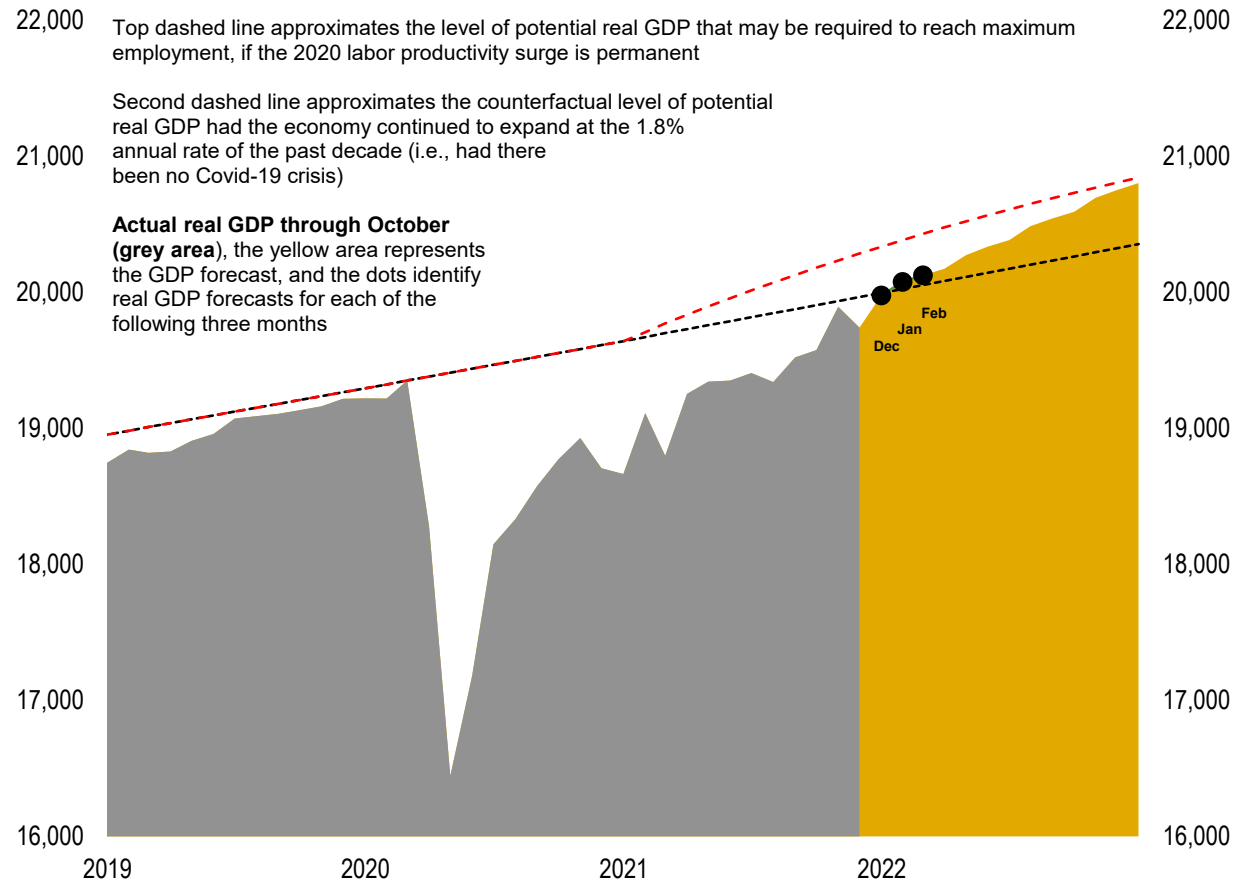


Sources: Haver Analytics; Smith Travel Research Hotel Statistics Weekly. Updated through January 8, 2022.

Back to the Future & Key Drivers

Productivity Raises the Bar

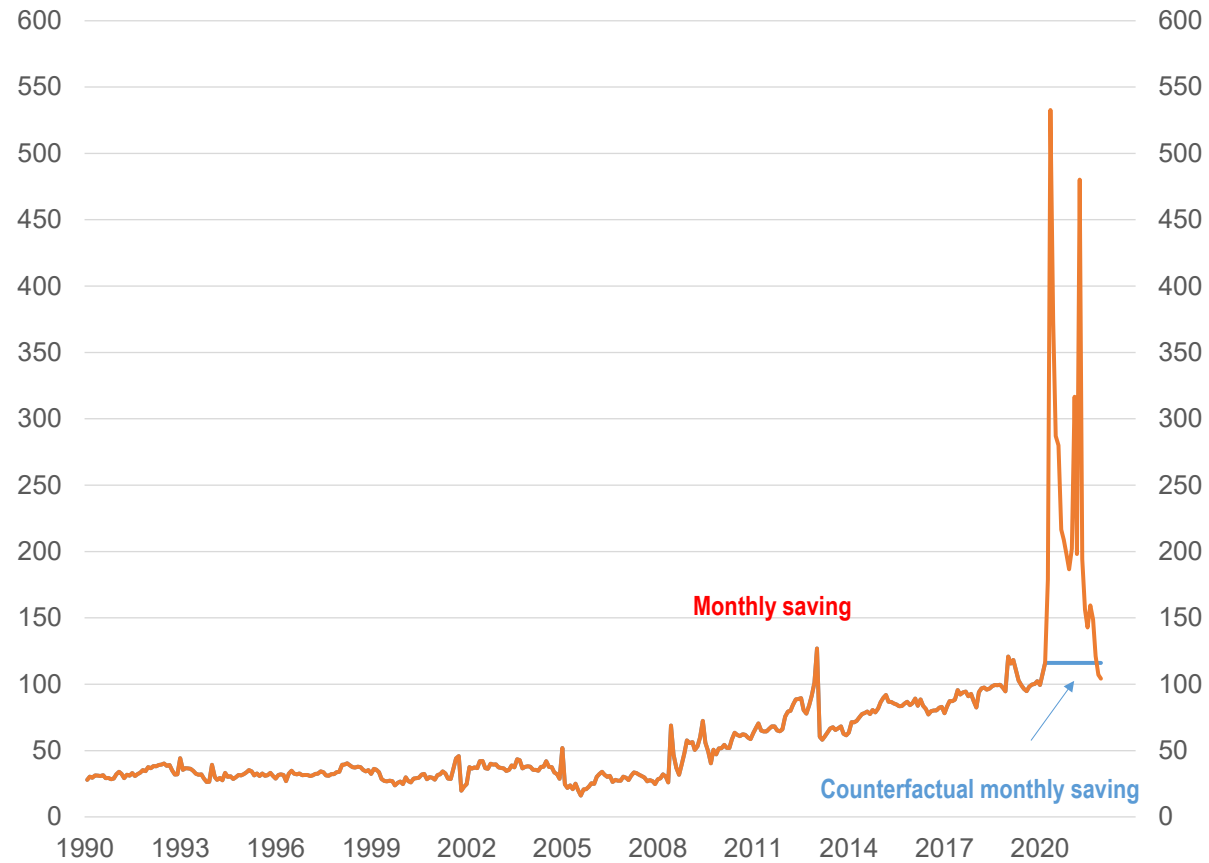
Actual and counterfactual real GDP paths (chained 2012 dollars)



Sources: Haver Analytics; IHS Markit. Updated through September 2021.

Consumers Have the Means ...

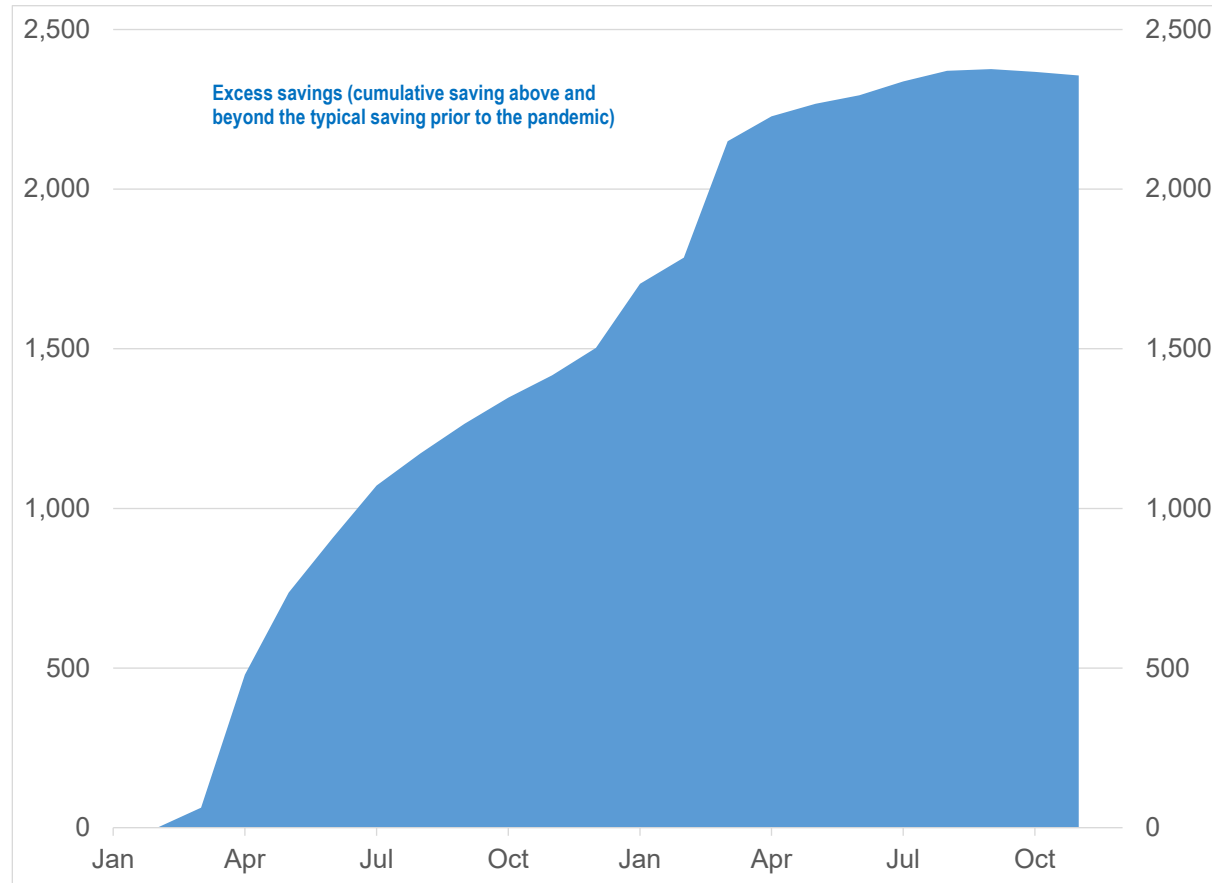
Monthly household saving compared with pre-crisis saving (billions of dollars)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

... a Savings Buildup ...

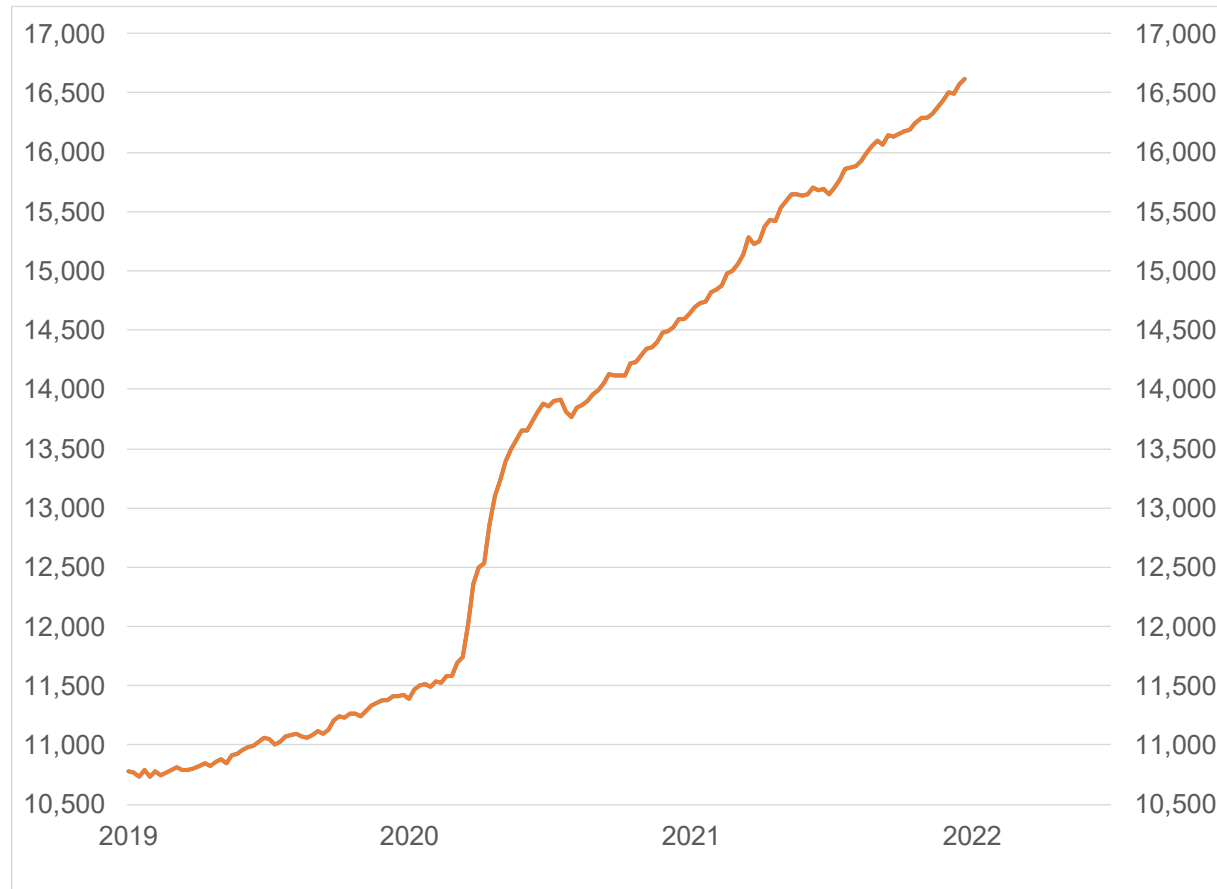
Accumulation of saving over and above the normal pace since February 2020 (billions of dollars)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

... That Is Still Sitting In the Bank

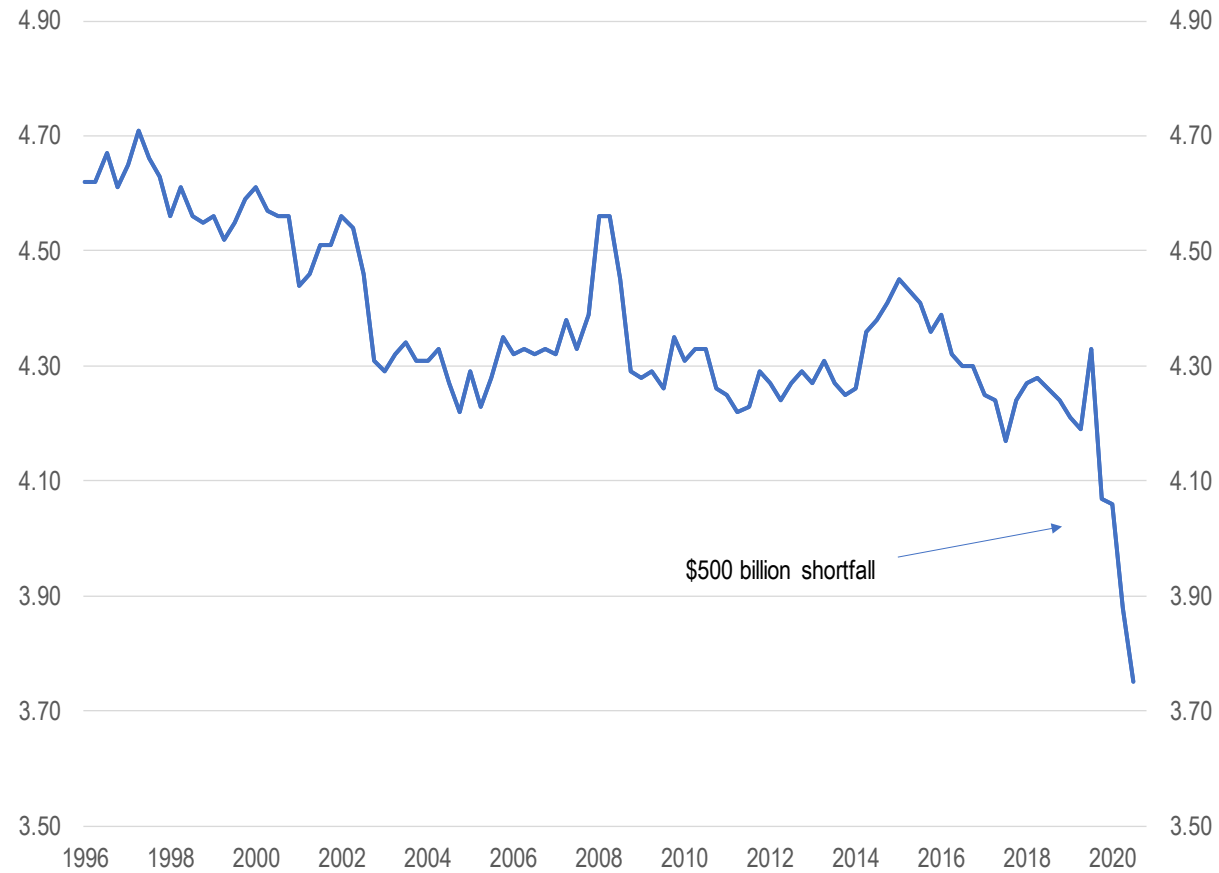
Commercial bank deposits other than large time deposits (billions of dollars)



Sources: Haver Analytics; Federal Reserve Board. Updated through December 22, 2021.

Business Has Some Wood to Chop (2½% of GDP)

Ratio of private nonfarm inventories to final sales of goods plus structures spending

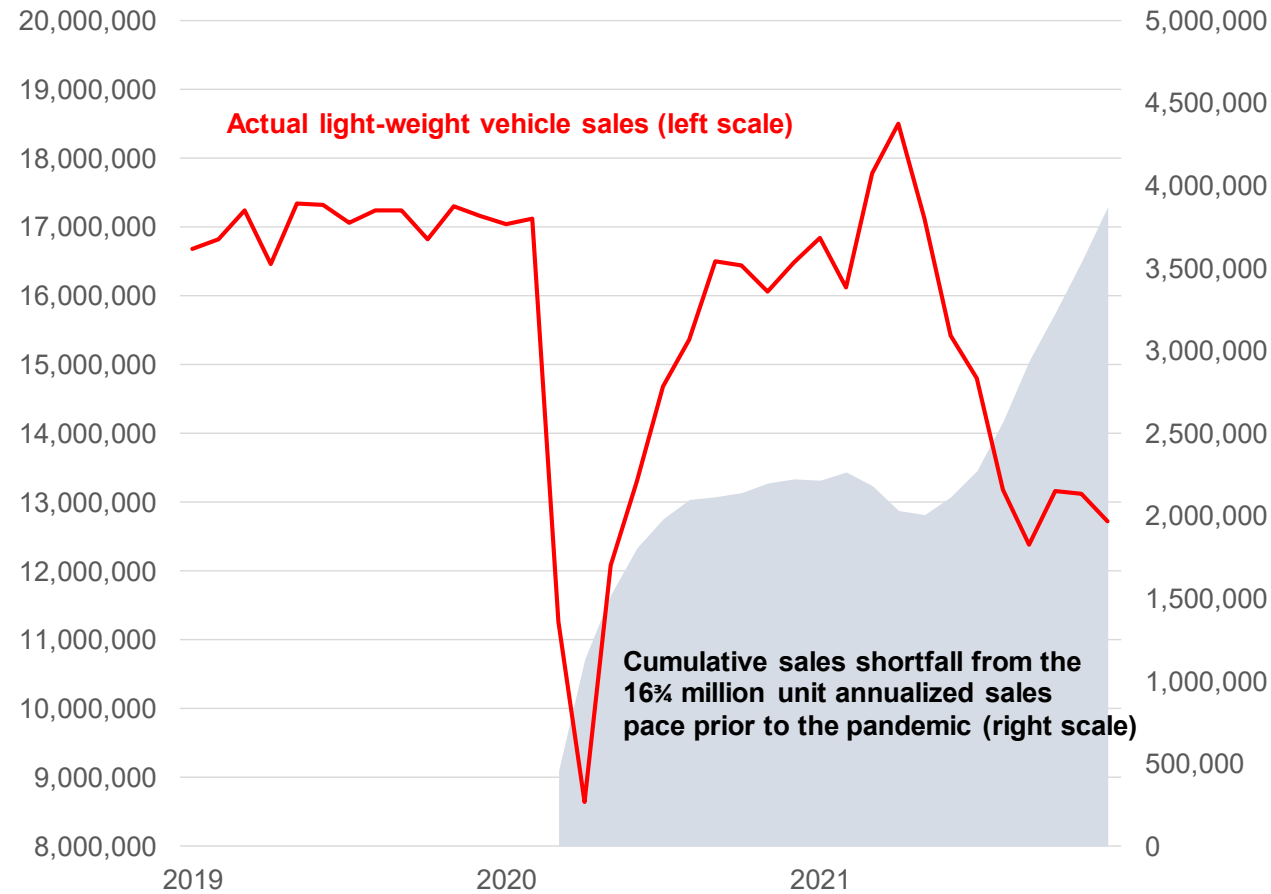


Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2021 Q2.

3¾ Million Unit Pent-Up Final Demand for Cars

Light-weight vehicle sales (millions of units annualized)

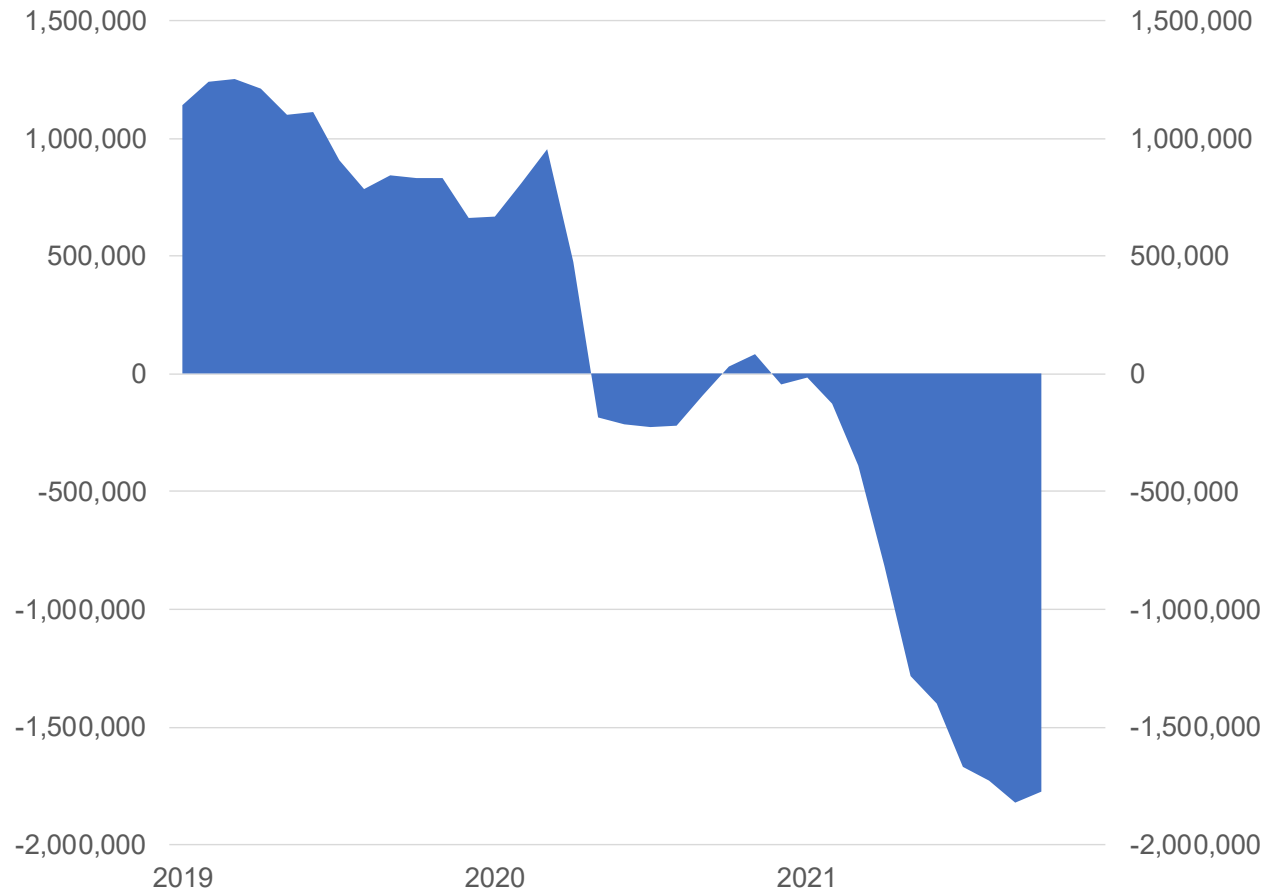
Cumulative sales shortfall from the pre-pandemic sales pace (millions of units)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through December 2021.

Almost 2 Million Unit Pent-Up Dealer Inventory Restock

Deviation of dealer inventories of light-weight vehicles versus 60 days worth of inventory when sales are running at a 16 ¾ million-unit-annual-sales pace (number)

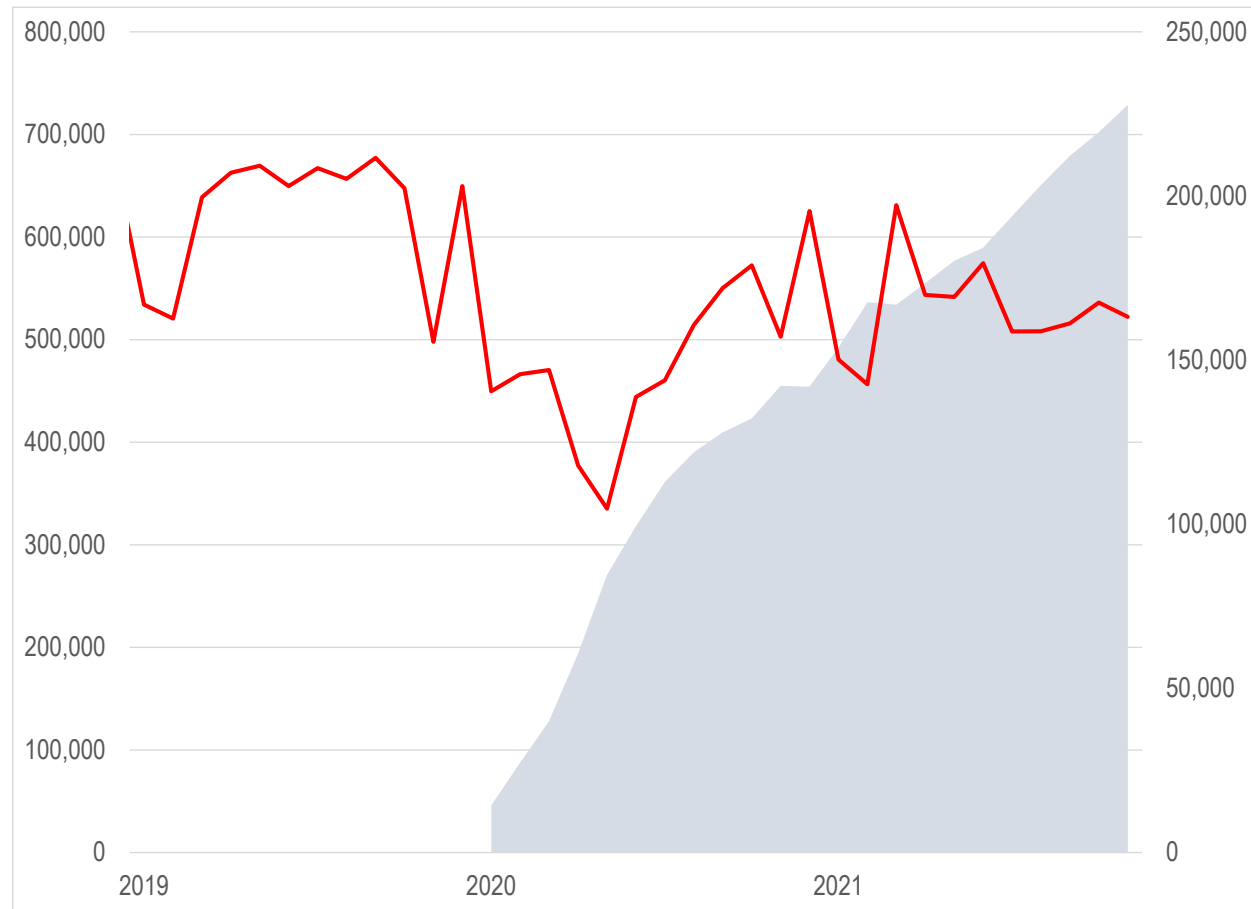


Sources: Haver Analytics; Wards Automotive Group. Updated through December 2021.

Pent-Up Final Demand for Cars of 3.5 Million Units

Heavy duty truck sales (number, annualized rate)

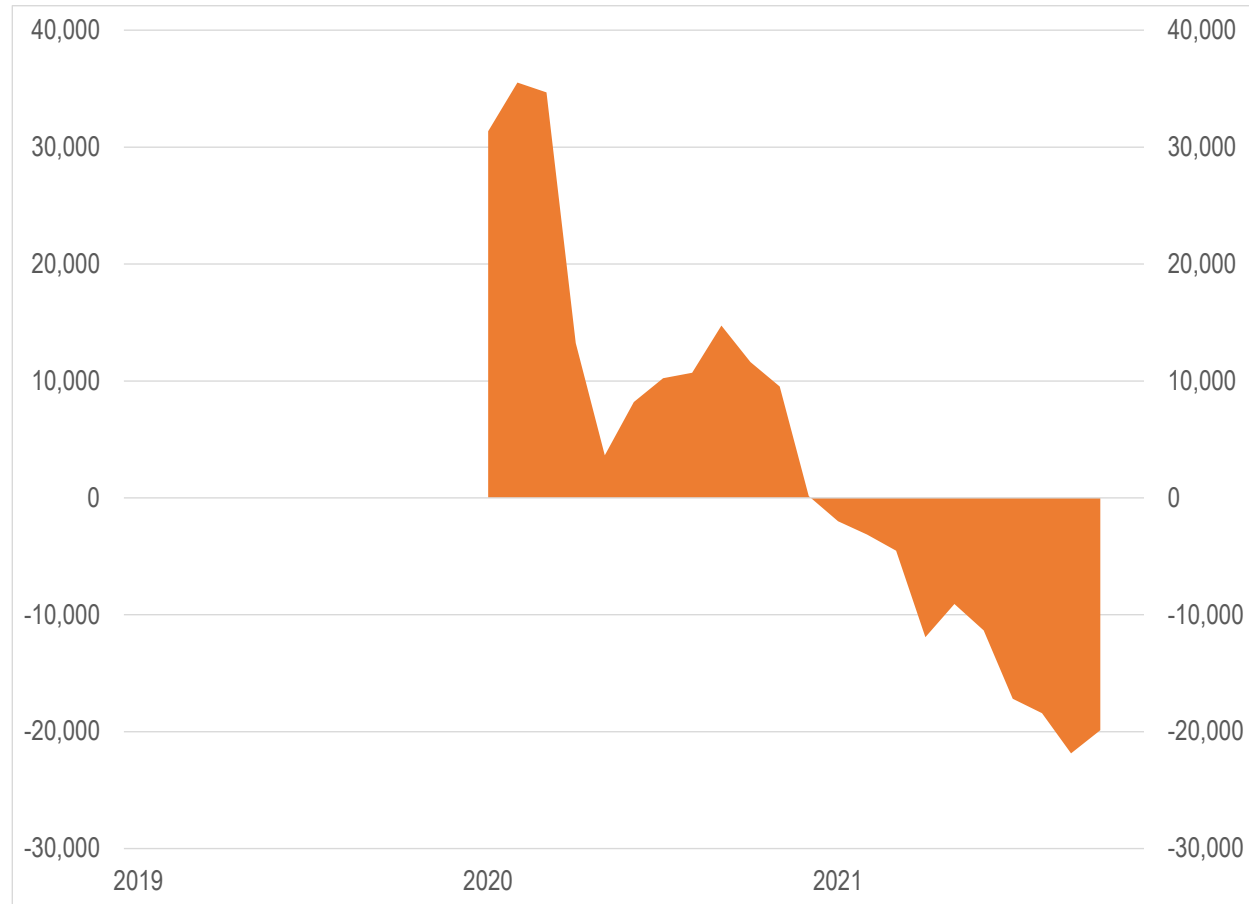
Cumulative sales shortfall from the 600,000 annual pre-pandemic sales pace (number of trucks)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through November 2021.

20,000 Shortfall of Truck Inventory on Dealer Lots

Deviation of dealer light-weight vehicle inventories from desired inventories¹ (number)



¹Desired dealer inventories are assumed to be 60 days worth of sales, if sales are assumed to be 16 ½ million units annualized.
Sources: Haver Analytics; Wards Automotive Group. Updated through October 2021.

Fed Policy Normalization

Because the FOMC Mandates Are In View ...

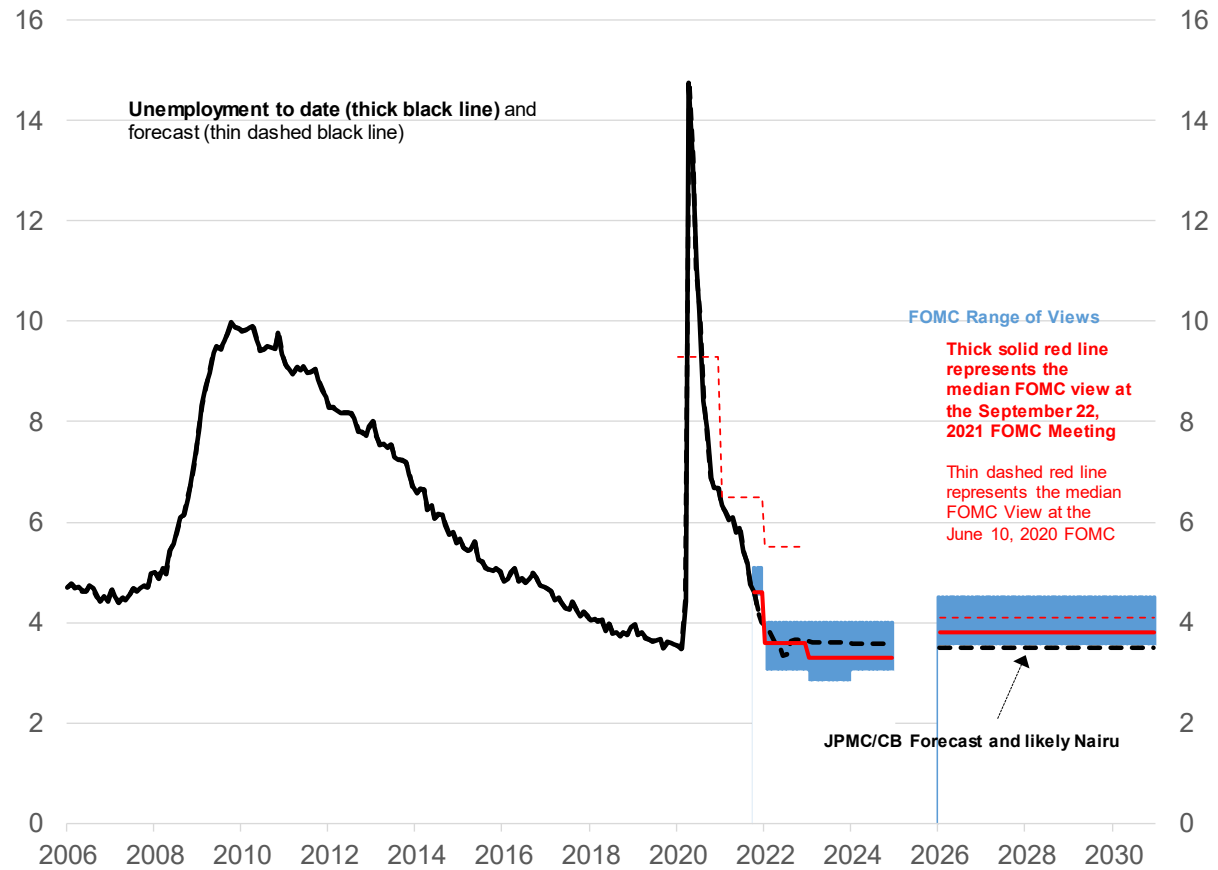
FOMC forecasts (percent change over the four quarters of the respective year or, in the case of unemployment and the funds rate, the rate at year's end)

	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>Long Term</u>
Real GDP (% Change Over the Four Quarters)					
Median	5.5	4.0	2.2	2.0	1.8
Central Tendency	5.5	3.6 - 4.5	2.0 - 2.5	1.8 - 2.0	1.8 - 2.0
Range	5.3 - 5.8	3.2 - 4.6	1.8 - 2.8	1.7 - 2.3	1.6 - 2.2
PCE Inflation (% Change Over the Four Quarters)					
Median	5.3	2.6	2.3	2.1	2.0
Central Tendency	5.3 - 5.4	2.2 - 3.0	2.1 - 2.5	2.0 - 2.2	2.0
Range	5.3 - 5.5	2.0 - 3.2	2.0 - 2.5	2.0 - 2.2	2.0
Unemployment Rate (% by the Fourth Quarter)					
Median	4.3	3.5	3.5	3.5	4.0
Central Tendency	4.2 - 4.3	3.4 - 3.7	3.2 - 3.6	3.2 - 3.7	3.8 - 4.2
Range	4.0 - 4.4	3.0 - 4.0	2.8 - 4.0	3.1 - 4.0	3.5 - 4.3
Federal Funds Rate (% by the Fourth Quarter)					
Median	0.125	0.875	1.625	2.125	2.500
Central Tendency	0.125	0.625 - 0.875	1.375 - 1.875	1.875 - 2.875	2.250 - 2.500
Range	0.125	0.375 - 1.125	1.125 - 2.125	1.875 - 3.125	2.000 - 3.000

Source: Federal Reserve Board. As of December 15, 2021.

... Maximum Employment ...

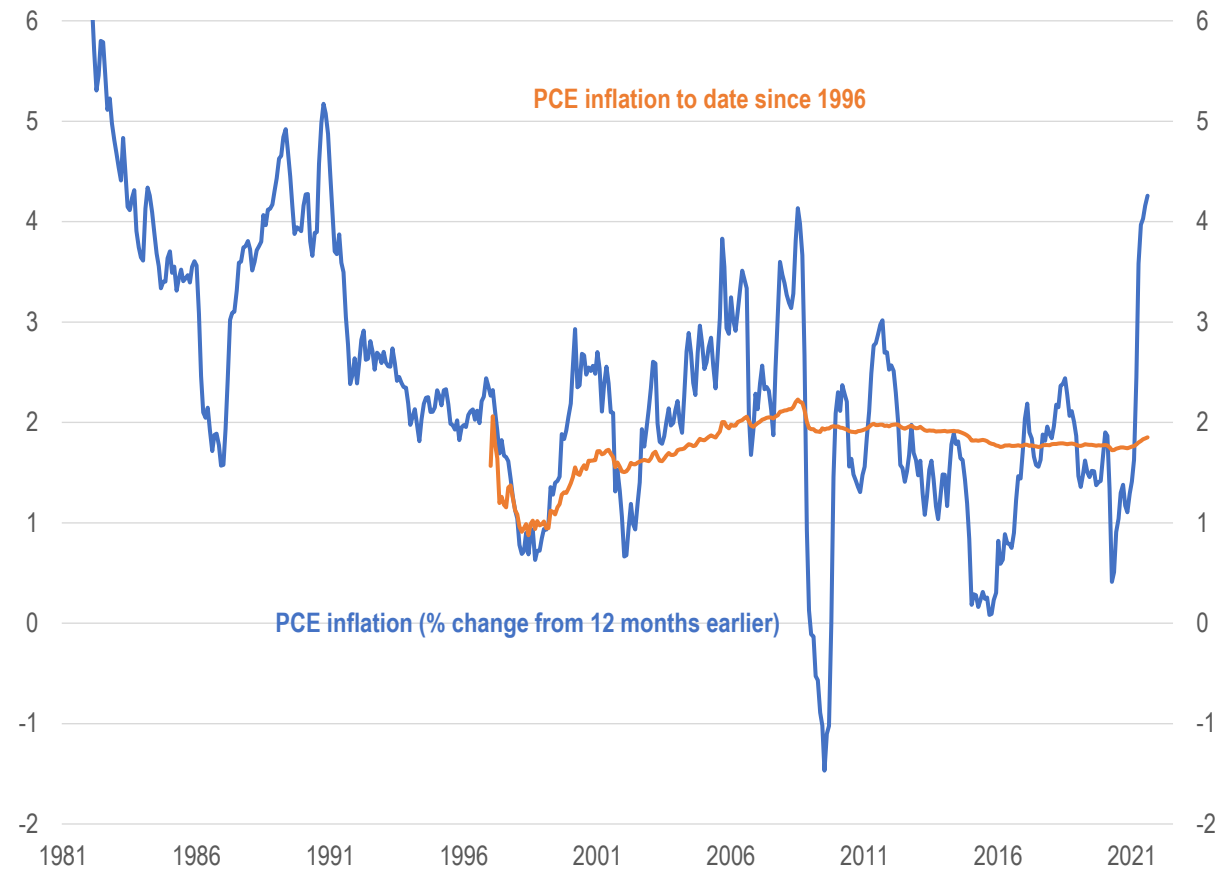
Unemployment rate (percent of the labor force)



Sources: Haver Analytics; U.S. Department of Labor; Federal Reserve Board. Updated through November 2021 (unemployment) and September 22, 2021 (FOMC).

... and 2% Inflation, Looking Beyond, ...

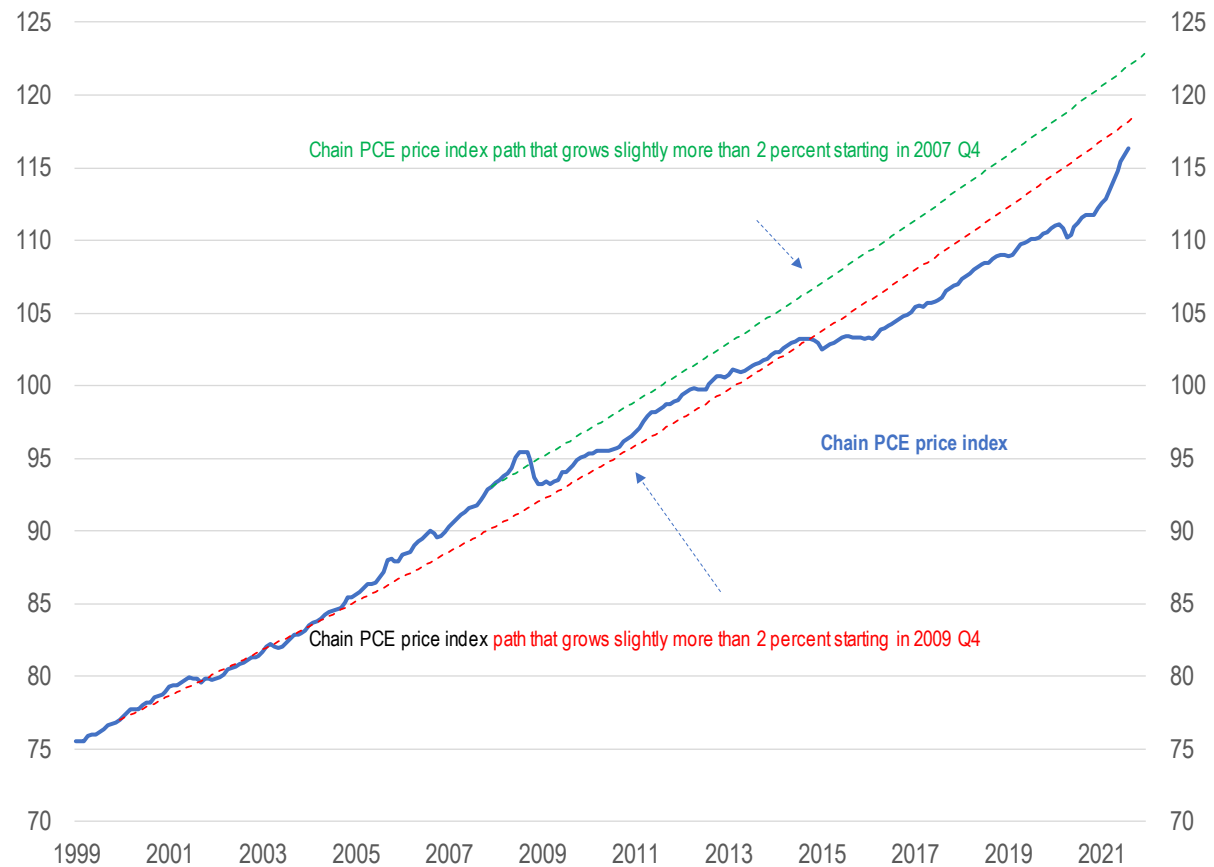
Chain PCE price index, annual change and 1996-to-date rate (annual percent change)



Sources: Haver Analytics; U.S. Department of Labor; U.S. Department of Commerce. Updated through August 2021.

... —That Is, Looking Over the Cycle— ...

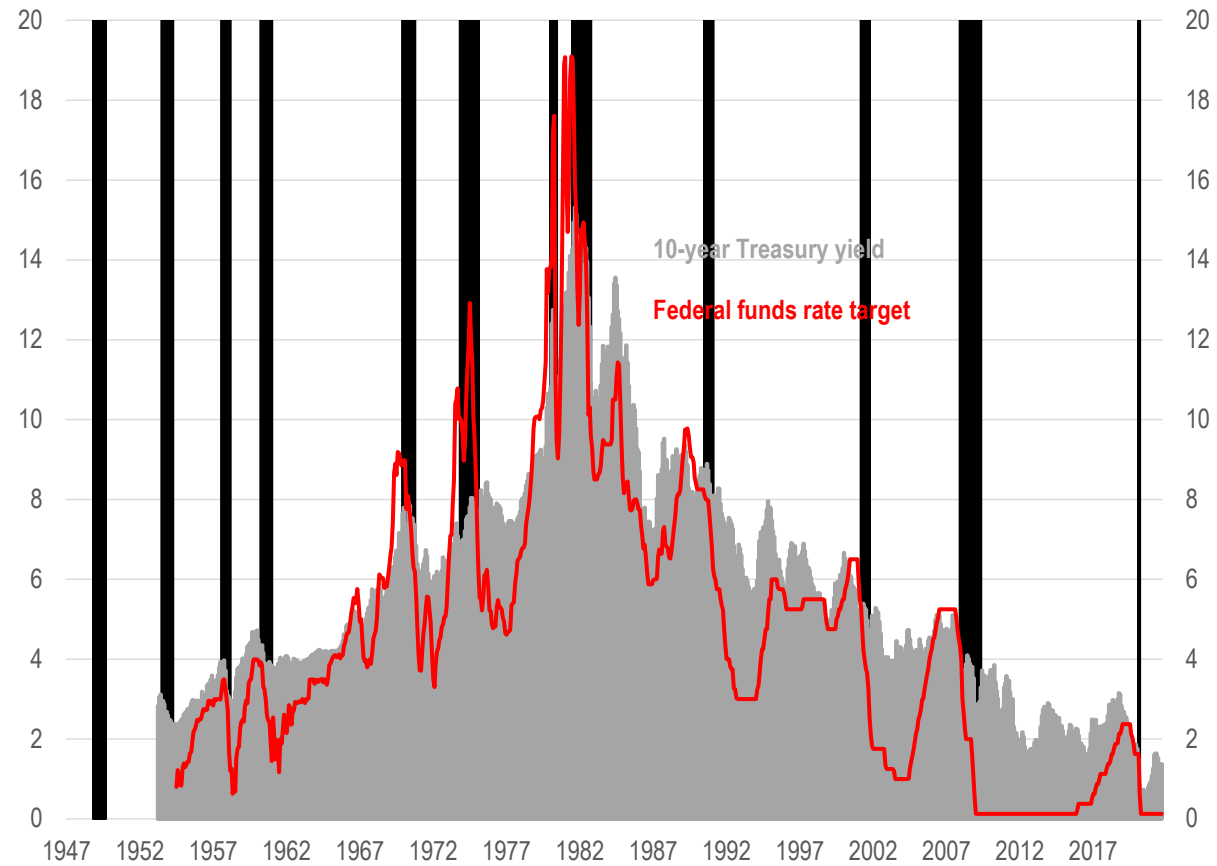
Chain PCE price index and the Federal Reserve's 2% target (2012 = 100)



Sources: Haver Analytics; U.S. Department of Commerce, Eurostat; Bank of Japan. Updated through September 2021.

[P.S. The Back Story]

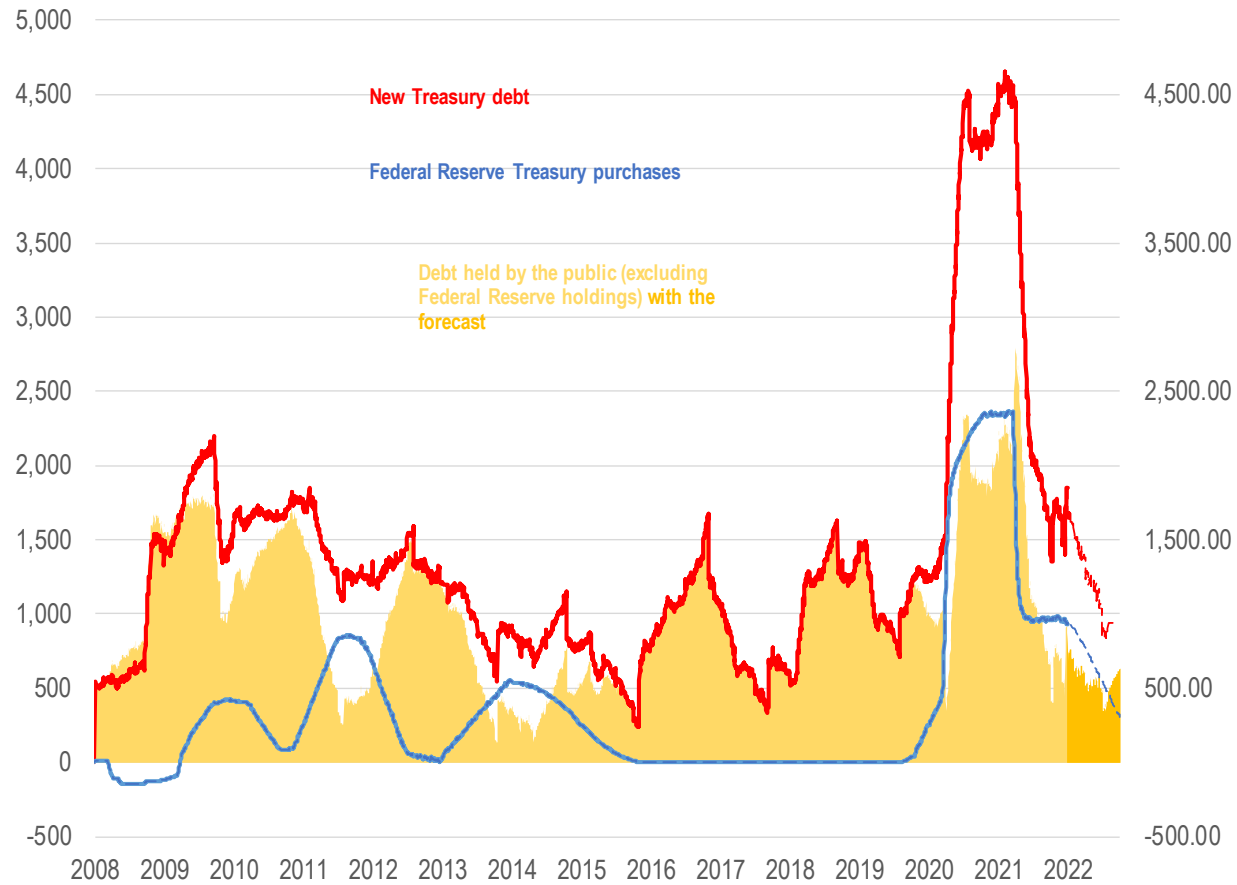
Federal funds rate and 10-year Treasury yield (percent)



Sources: Haver Analytics; NBER-designated recession bars; Federal Reserve Board. Updated through October 22, 2021.

The Fed Is Tapering but So Is the Treasury ...

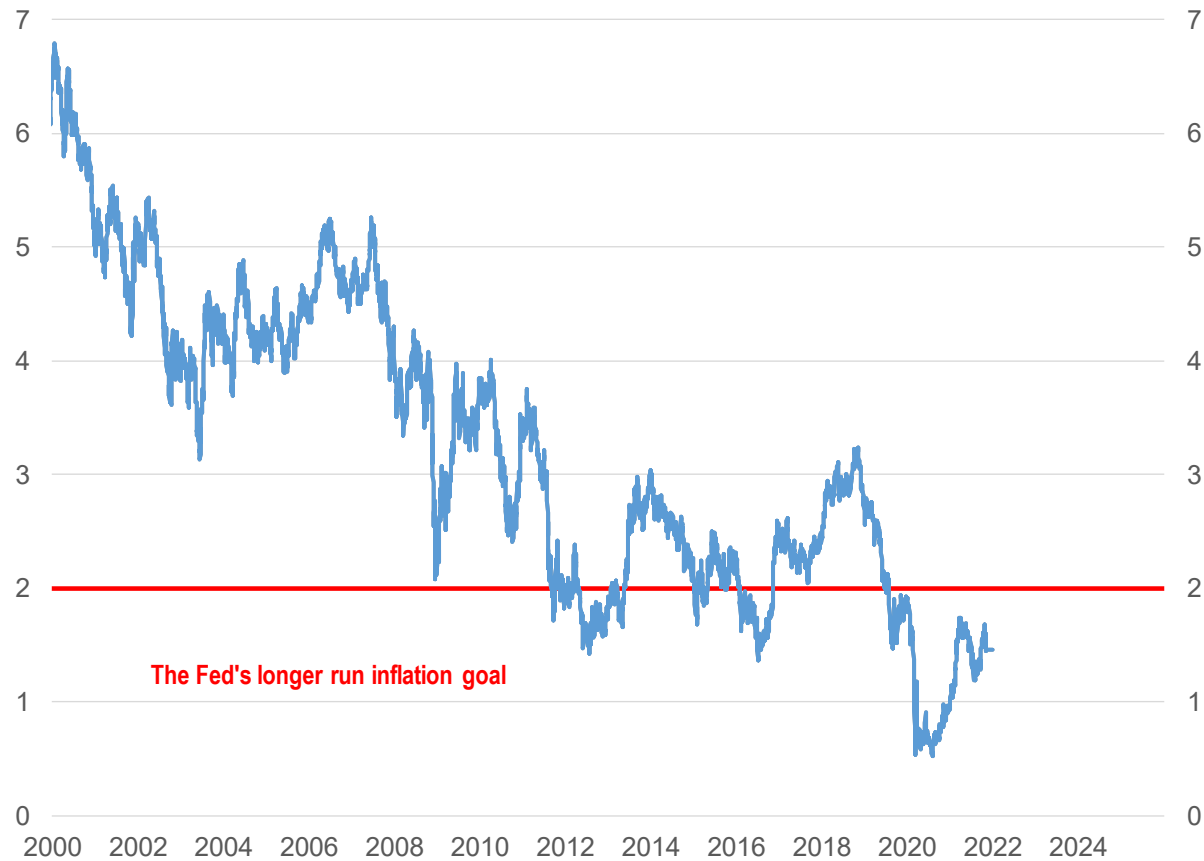
Flows of Treasury debt, Federal Reserve holdings of Treasuries, and public Treasury holdings (change in billions of dollars over the most recent 12 months)



Sources: Haver Analytics; U.S. Treasury; Federal Reserve Board. Updated through December 27, 2021.

... and That's Why Bonds Don't Care

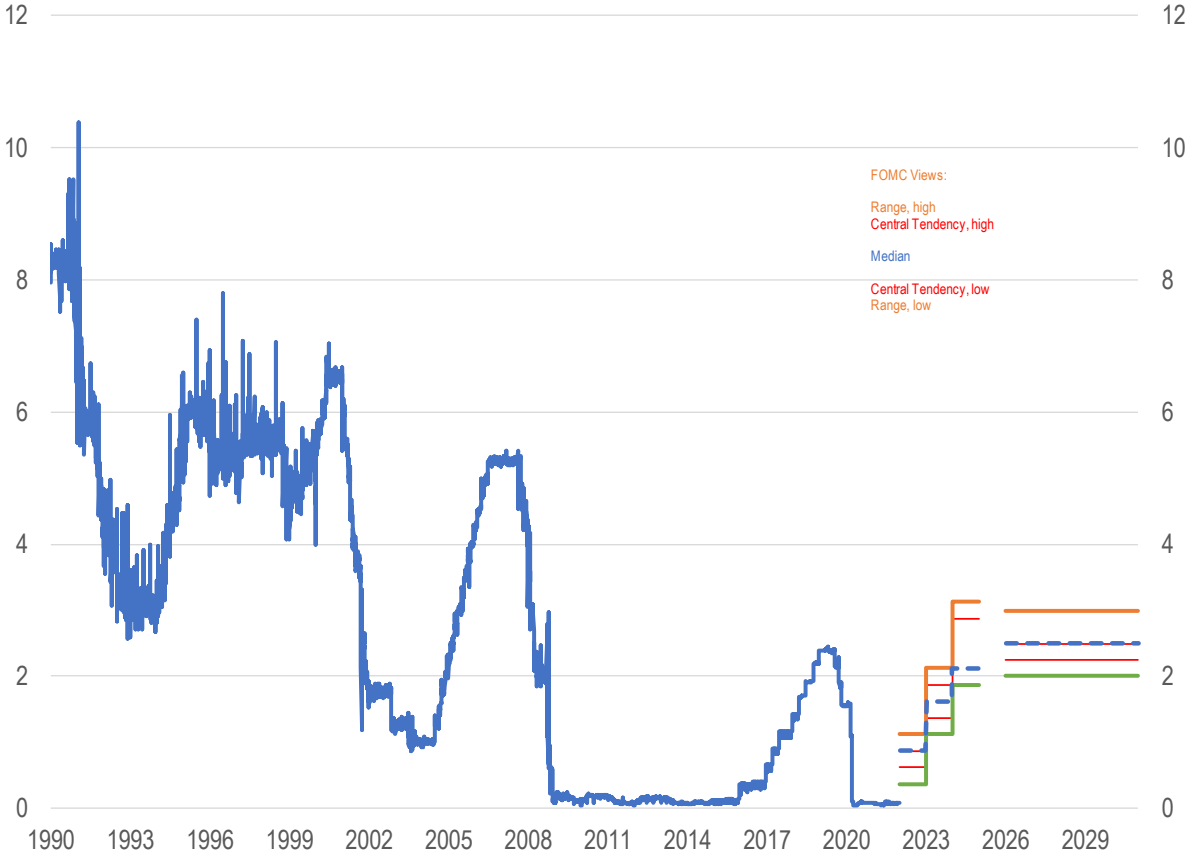
10-year Treasury note yield (percent)



Sources: Haver Analytics; Federal Reserve Board. Updated through November 9, 2021.

Rate Increases Next

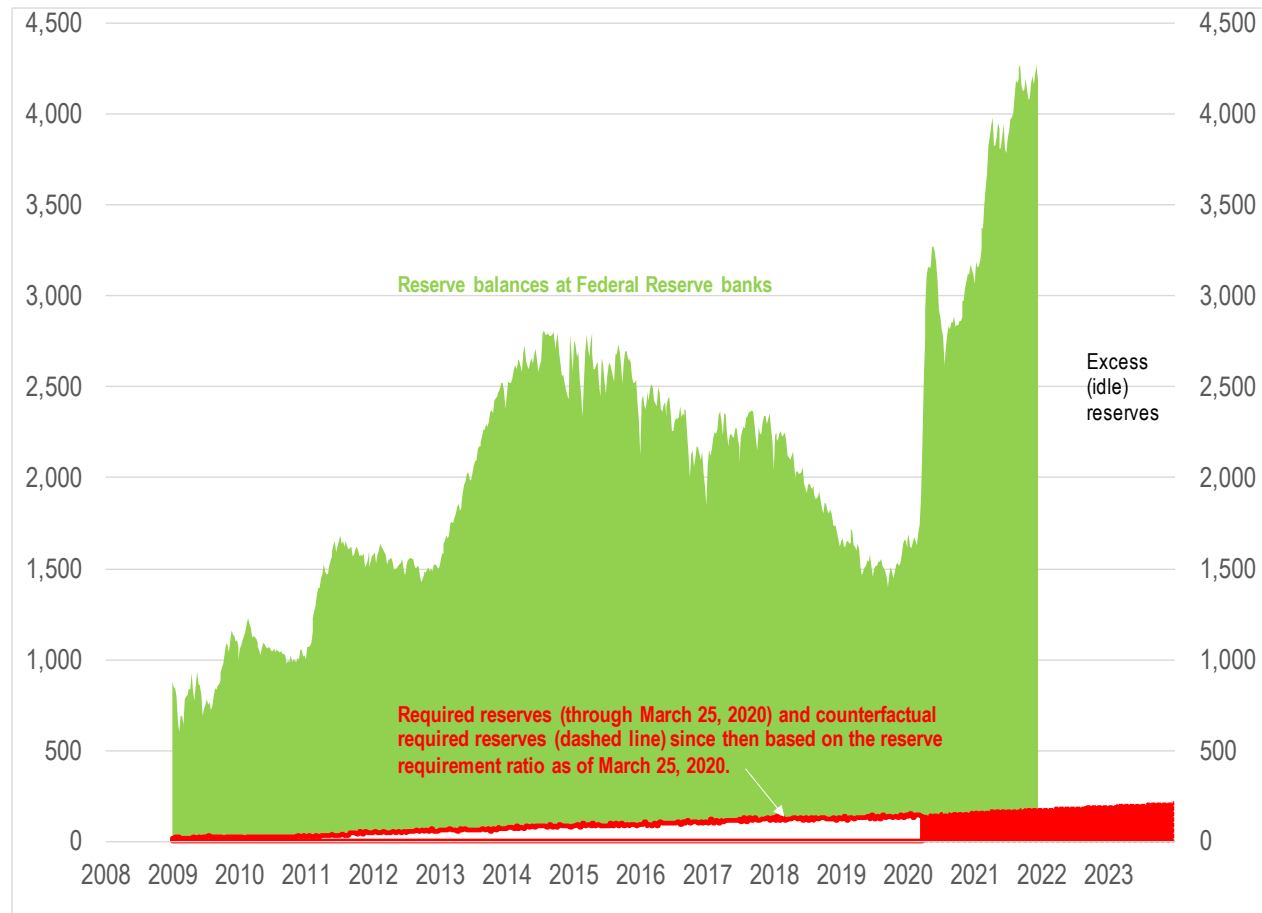
Effective federal funds rate and FOMC rate forecasts (percent per annum)



Sources: Haver Analytics; Federal Reserve Board. Updated through December 15, 2021 (FOMC forecasts) and December 31, 2021 (funds rate).

No Decision Yet on the Balance Sheet Size

Reserves, required reserves and estimated required reserves (billions of dollars)

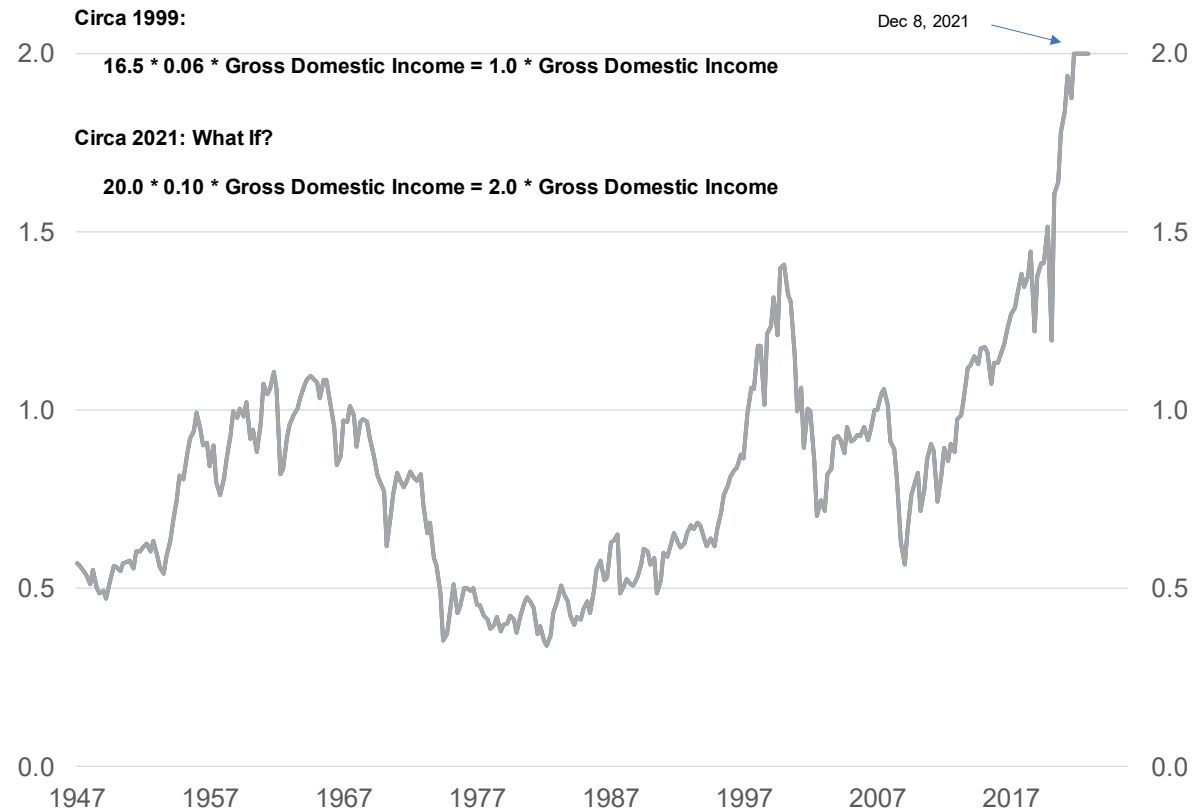


Sources: Haver Analytics; Federal Reserve Board. Updated through December 22, 2021.

Equities

Bubble, Or New Frontiers

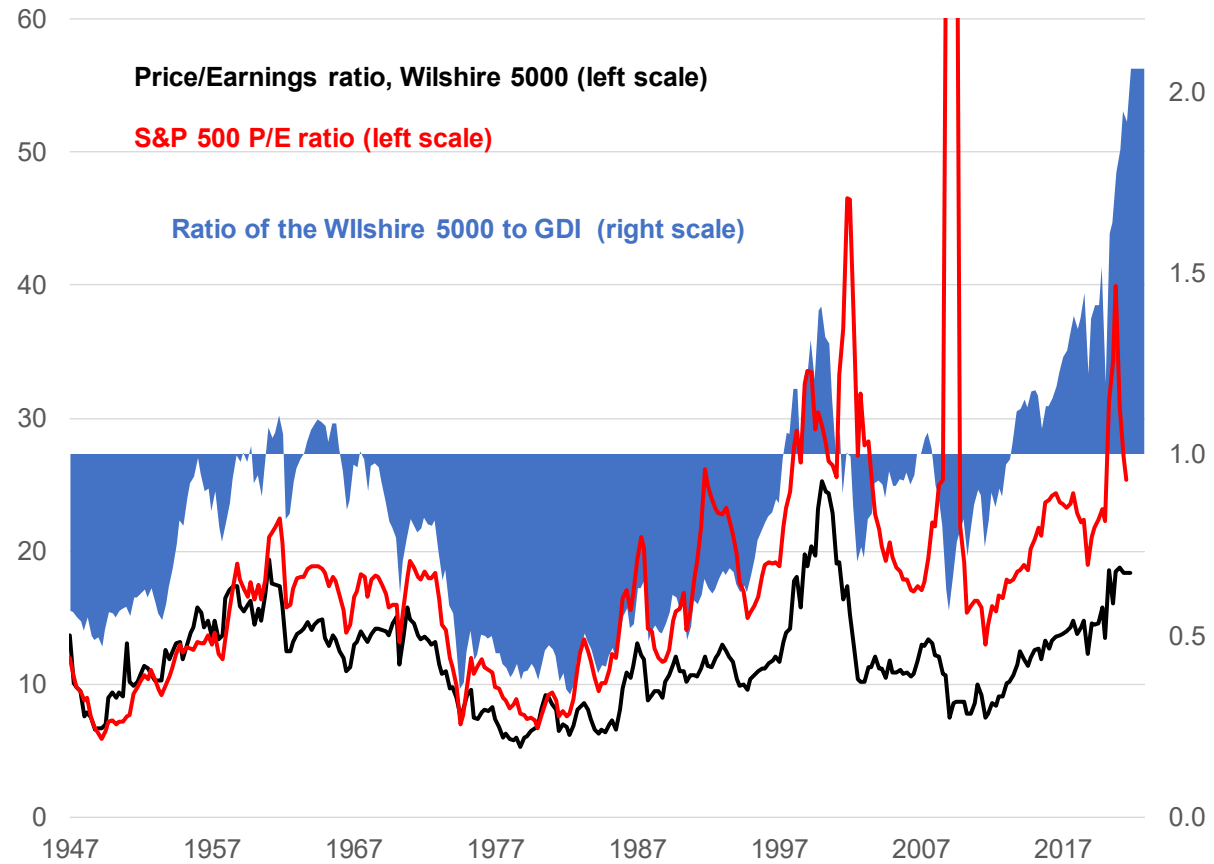
Ratio of the value of the U.S. stock market to Gross Domestic Income



Sources: Haver Analytics; Federal Reserve Board; U.S. Department of Commerce. Updated through 2021 Q2 (GDI) and December 8, 2021 (Wilshire 5000).

“Valuation measures are high relative to historical norms”

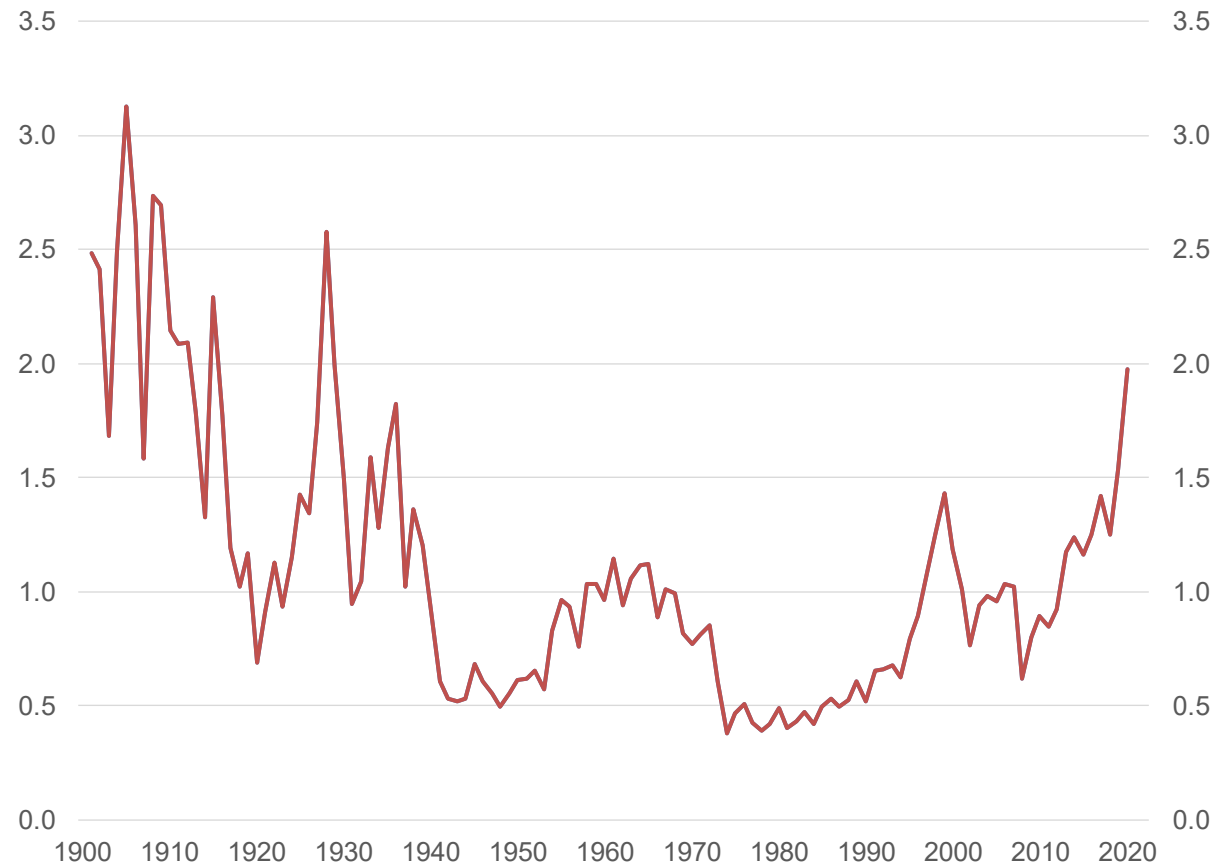
Selected measures of business profits (percent of Gross Domestic Income)



¹ GDP profits adjust for (translated to economic terms) different valuations of inventories and depreciation allowances.
Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2021 Q2 and November 8, 2021 (stocks)

Some See an Echo of the 'Roaring Twenties'

Ratio of the value of the U.S. stock market to Gross Domestic Product



Sources: Haver Analytics; Federal Reserve Board; U.S. Department of Commerce. Updated through 2020 Q3 (GDI) and May 11, 2021 (equities).

But Why Are Historical Norms Useful?

Equilibrium real risk-free rates are low by historical norms ...

Demographics (ageing workforces)

Global saving (lifted by international trade imbalances)

Risk premia are low by historical norms ...

Declining inflation risk, looking past pandemic dislocations

The Fed's 2% inflation target blunts political risk in monetary policy

The Fed's new reaction function lessens the chance of a monetary policy mistake

through Geopolitical risks are low by historical norms, with the EU's survival
an economic crisis and living standards upping the cost of conflict (a
future of elephants and tigers)

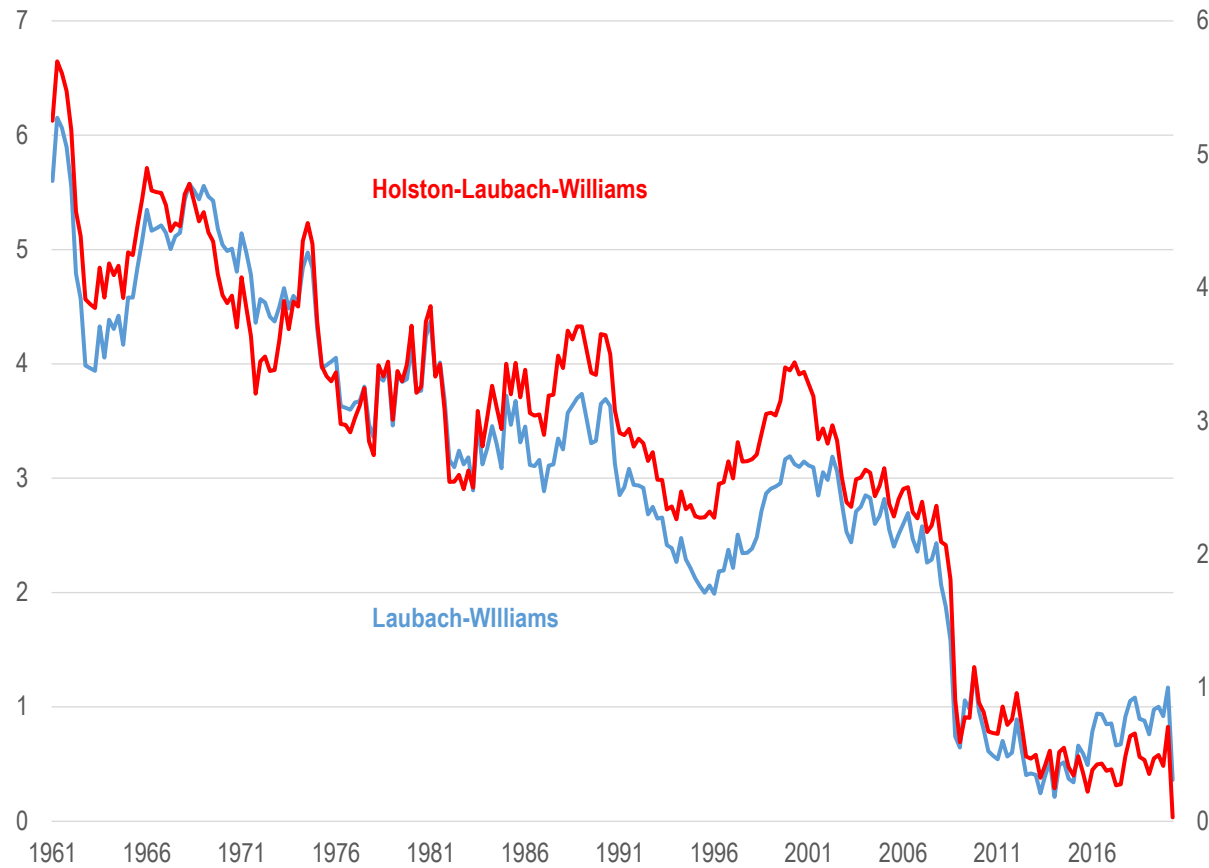
Business performance is elevated by historical norms ...

The unlocking of technological innovation forced by the pandemic

Global awakening increased the amount of GDP beyond the US borders

Equilibrium Risk Free Real Rates

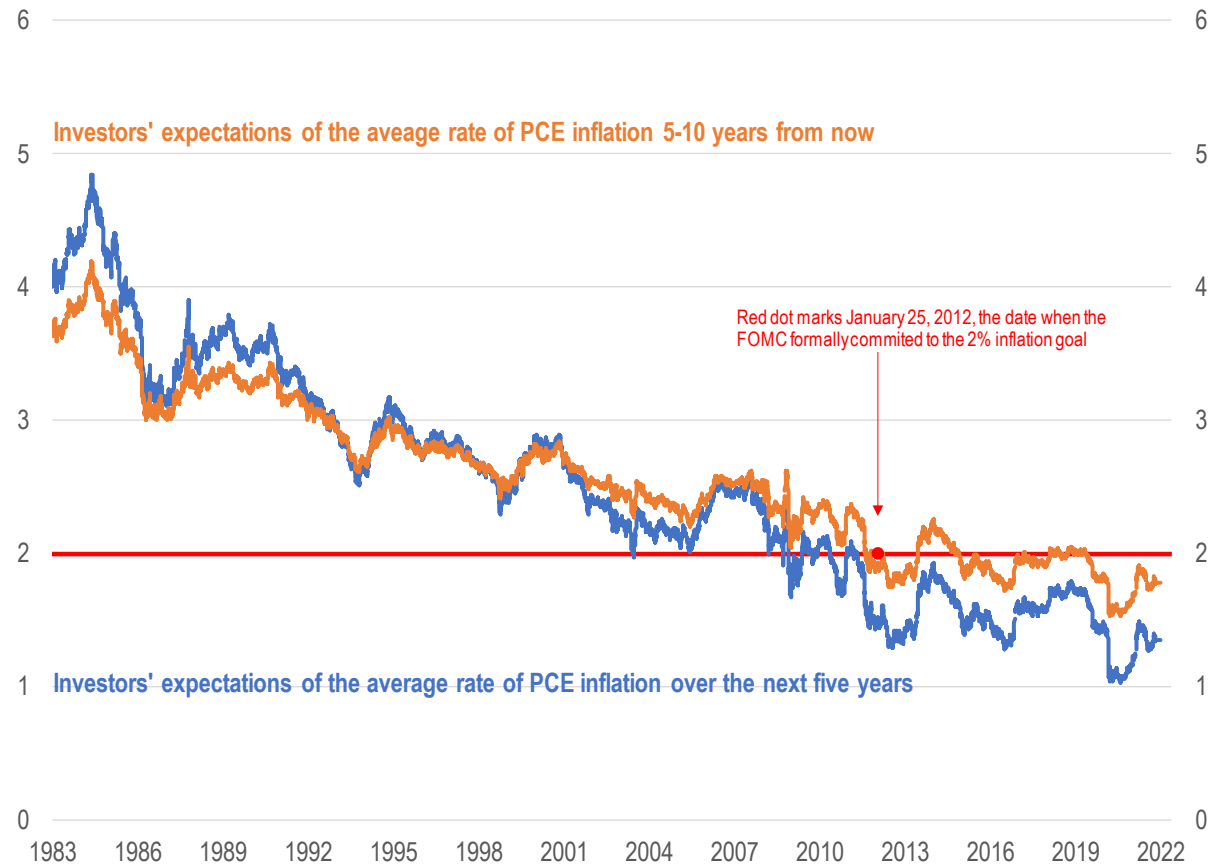
Equilibrium real risk-free rates, R-star (percent)



Source: "Measuring the Natural Rate of Interest," Holston, Laubach, and Williams, November 30, 2020.

Fed Policy Enjoys High Credibility

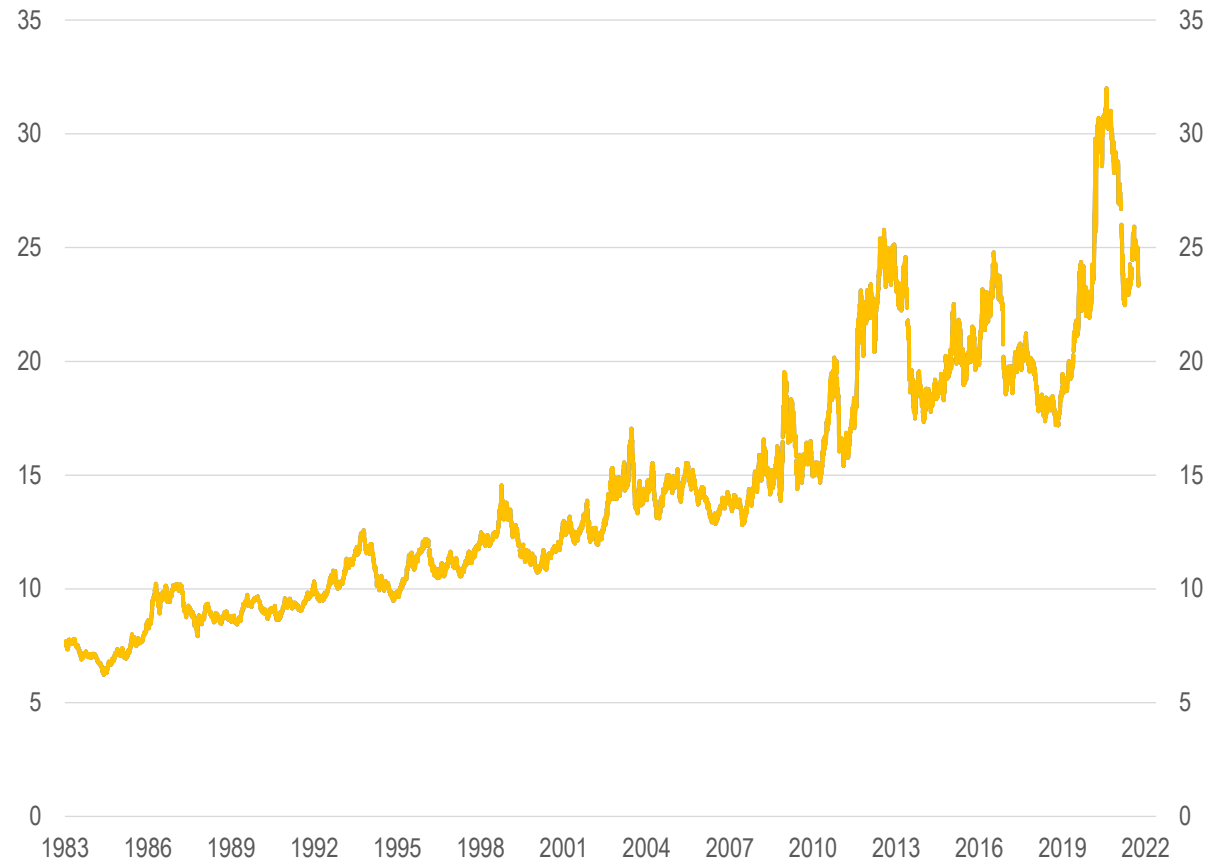
Market based inflation expectations over selected horizons (annual rate)



Note: Assumes that the PCE inflation rate will be 0.31 percentage point, the historical differential, below the CPI inflation expectations reflected in the Treasury nominal and TIPS securities yields.
Source: Haver Analytics; Federal Reserve Board. Updated through October 31, 2021.

P-Es Should be Higher than Historical Norms

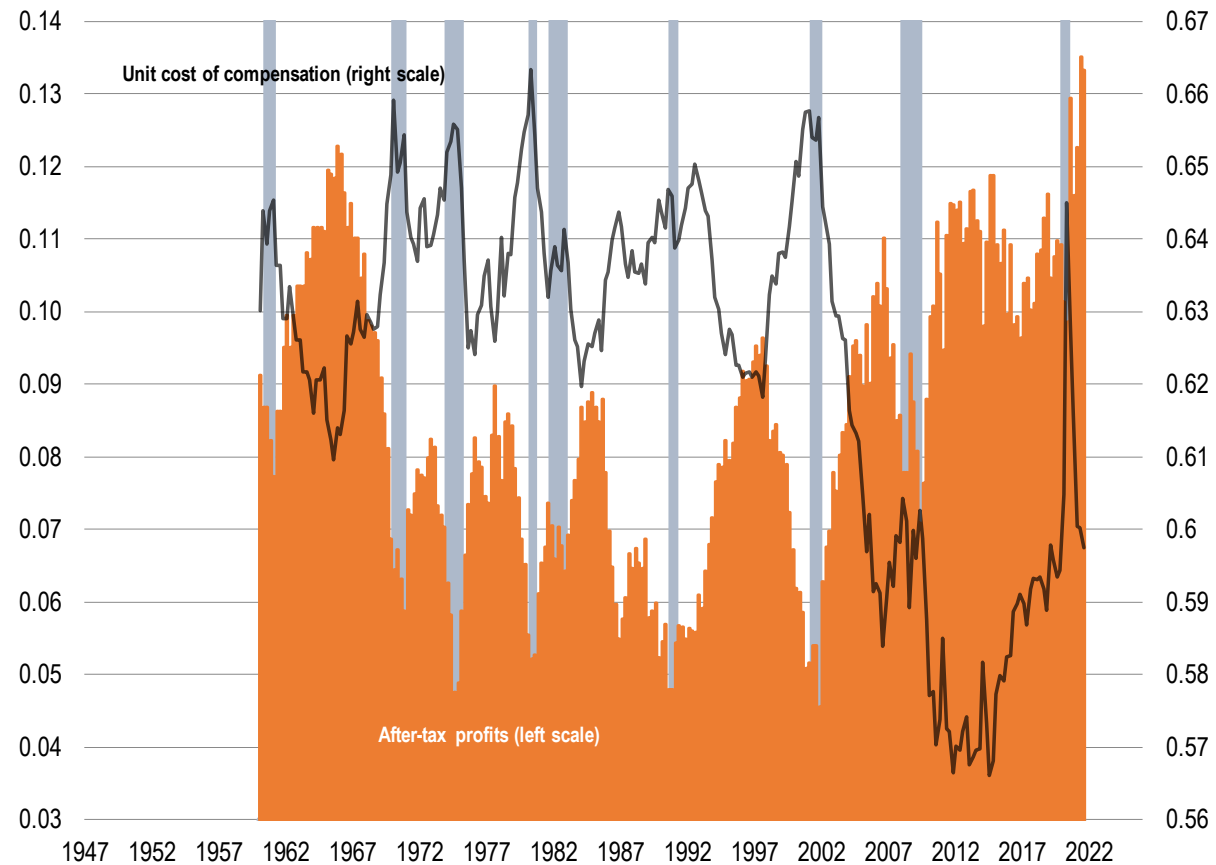
Implied P-E multiple (1/ (10-year Treasury yield plus 2 percentage points for the equity risk premium))



Source: Haver Analytics; Federal Reserve Board. Updated through September 30, 2021.

Profits Don't Behave Like Historical Norms ...

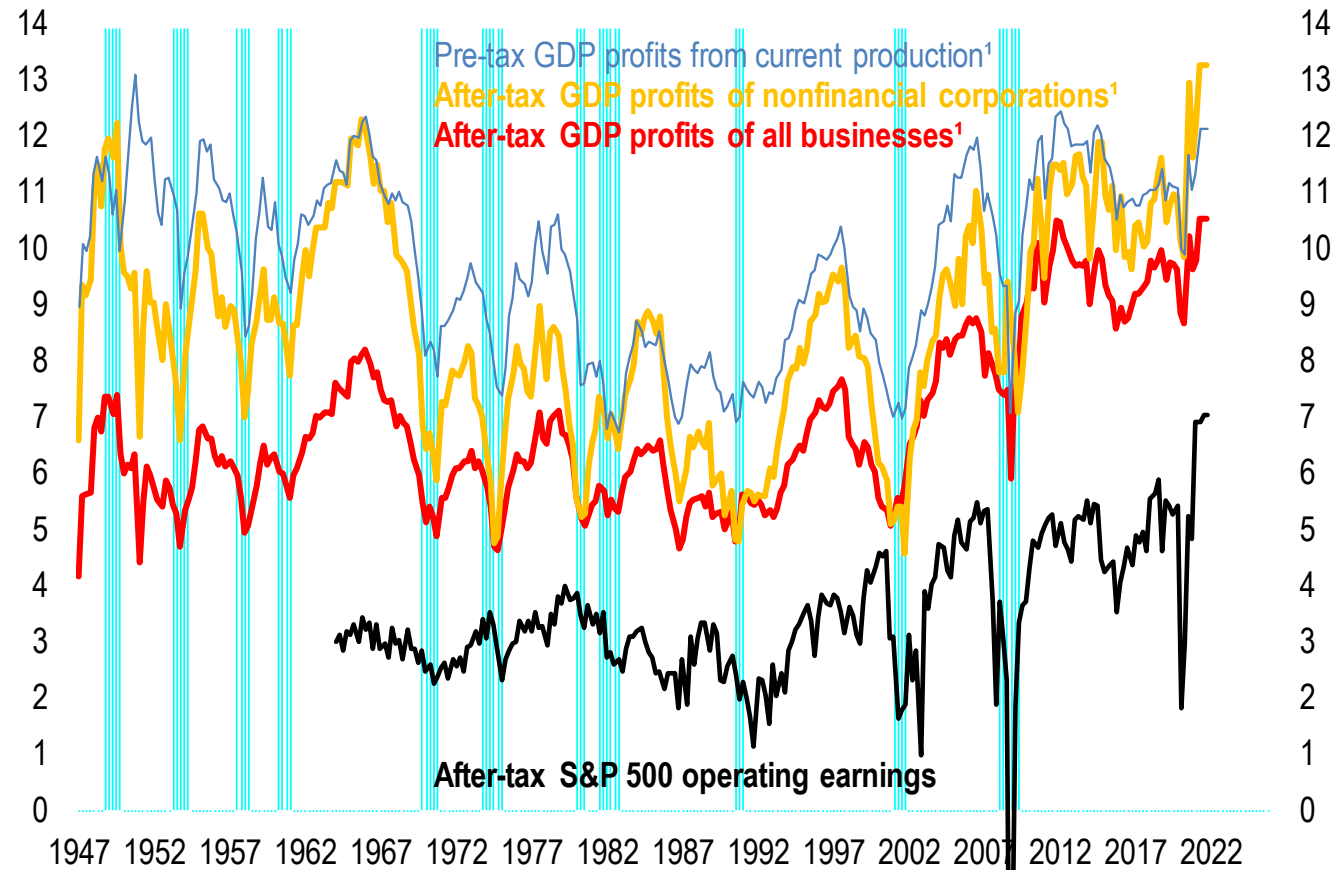
After-tax profits of nonfinancial corporations (percent of the sector's value added)



Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2020 Q3.

... Defying the 'Reversion' Idea

Selected measures of business profits (percent of Gross Domestic Income)



¹ GDP profits adjust for (translated to economic terms) different valuations of inventories and depreciation allowances.
Sources: Haver Analytics; U.S. Department of Commerce. Updated through 2021 Q1.

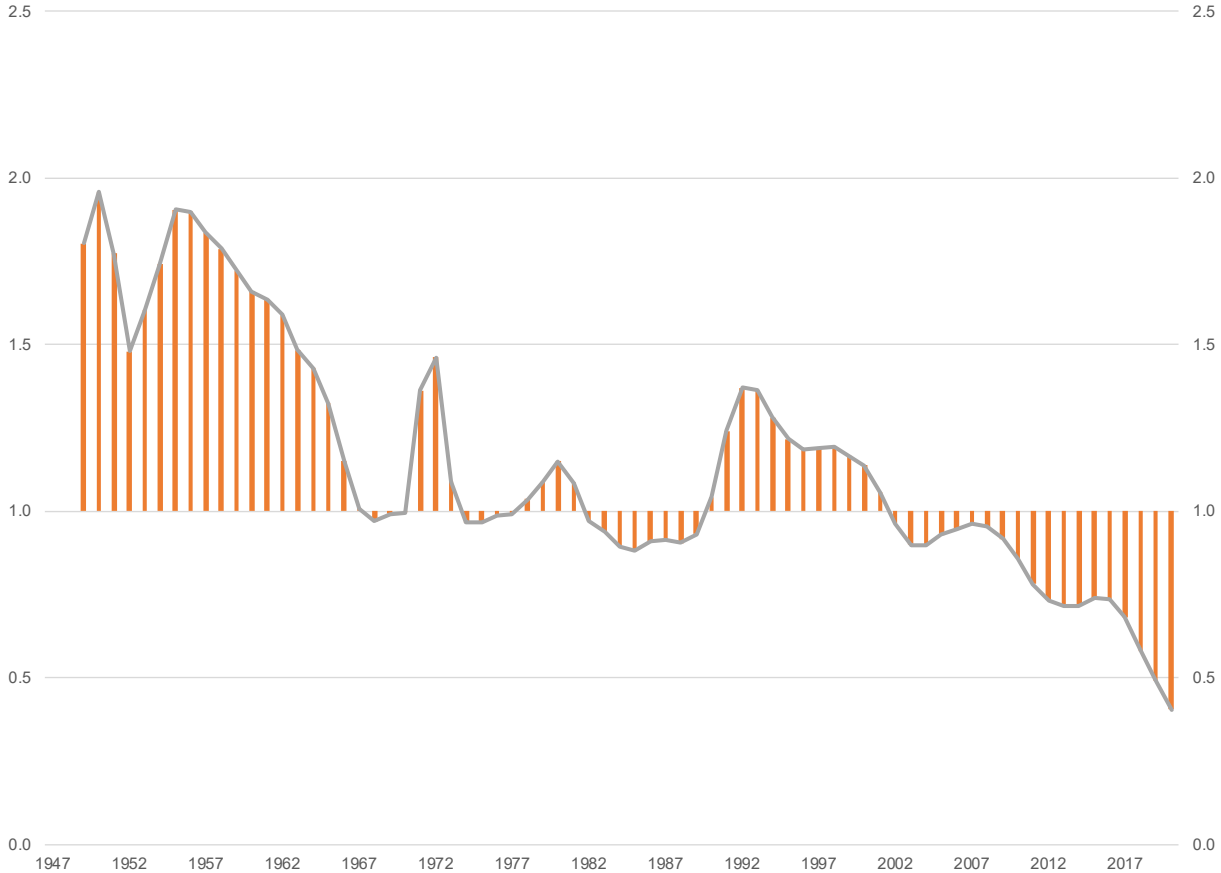
Where Are We In the Cycle of
Life? New Game or Same
Game But In Extra Innings?

Appendixes

Population and the Economy

Slowing Population Growth Is Irrelevant ...

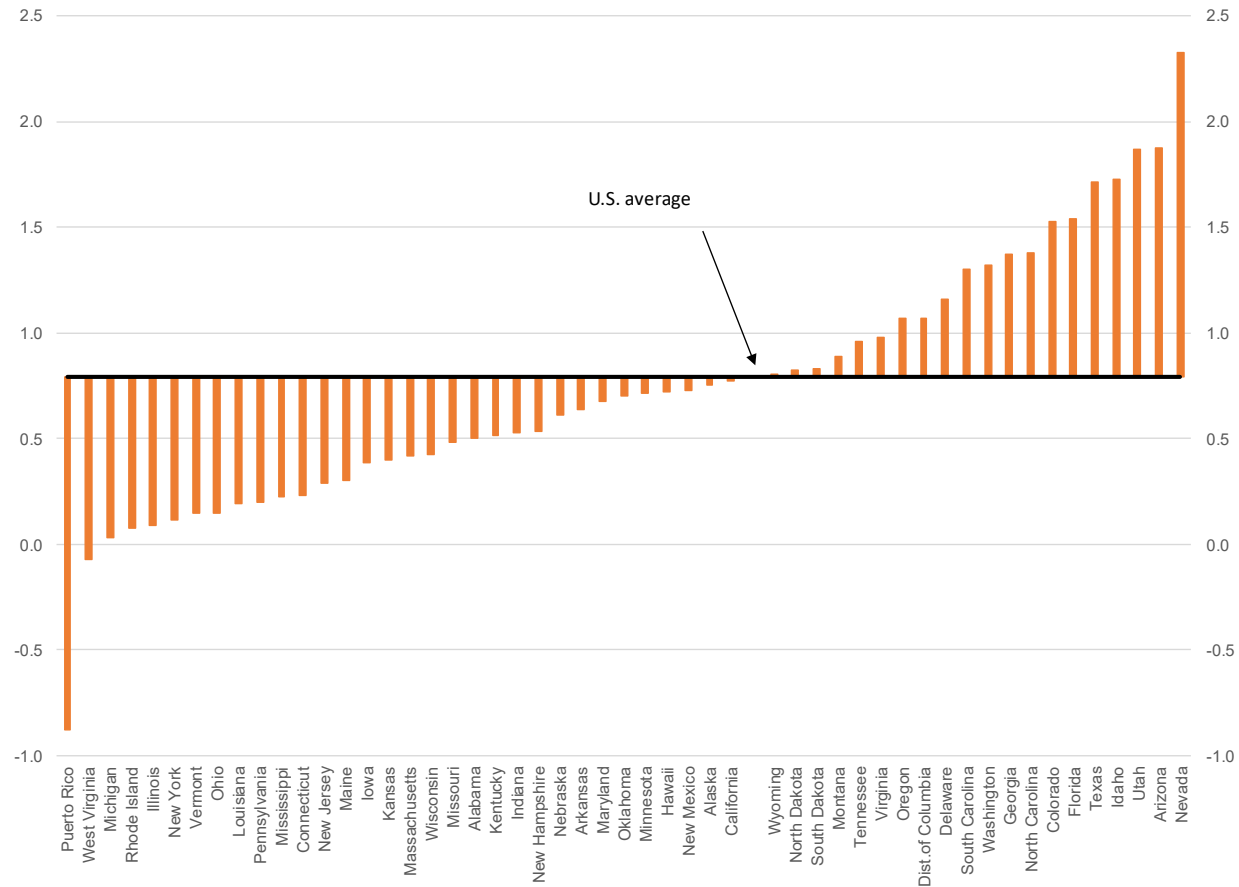
U.S. population growth (annual percent change over two-year rolling intervals)



Sources: Haver Analytics; U.S. Department of Labor. Updated through January 2021.

... With People In Motion ...

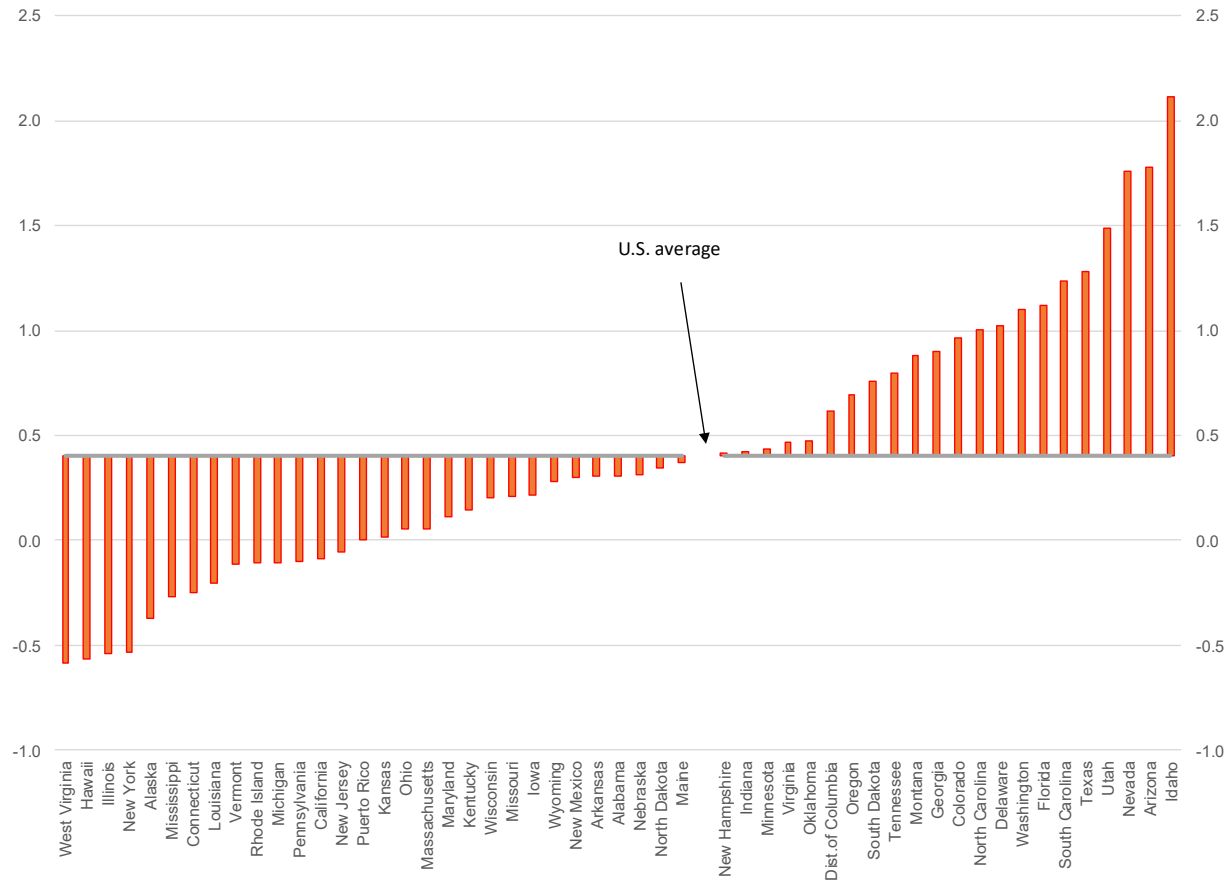
Annual population growth since 1999 (percent change)



Sources: Haver Analytics; Census. Updated through 2020.

... All Across the Nation

Annual percent change since 2018 (percent)



Sources: Haver Analytics; Census. Updated through 2020.

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J.P.Morgan



Chris Holman

Founder and CEO

Michigan Business Network

Chris Holman is the founder and CEO of Michigan Business Network. For over 40 years Chris has used his skills as an entrepreneur to successfully start businesses, launch magazines, run companies, serve on community boards, and host various talk show programs on both radio and internet. Currently, he is the primary host of on MBN's talk program Michigan Business Beat.

Michigan Future Business Index

Q4 2021

Chris Holman

Founder & CEO
Michigan Business Network

ROI  INSIGHT



Michigan Future Business Index Methodology

- Statewide survey of 609 small to medium-sized businesses
 - **Mixed-mode survey, conducted online and by phone**
- Commissioned by Cinnaire & Michigan Business Network
- Conducted by ROI Insight
 - **Field Dates: November 3 through December 3, 2021**
- Credibility Interval: $\pm 4.5\%$ or less
 - **95% Degree of Confidence**

Key Takeaways

- While we are seeing a rebound in sales and profits from our June survey; talent shortages, supply chain challenges and inflation are creating uncertainty for future projections.
- Wage inflation continues to provide a drag on profits.
- While past surveys showed that talent acquisition challenges stemmed primarily from a lack of qualified candidates applying for open positions, most respondents now say they are having difficulty attracting any applicants, whether qualified or not.
- Businesses continue to warm to the idea of providing remote work opportunities, especially in the white-collar sectors. More are also considering vaccine requirements, though most still say they will not require employees to get the COVID-19 vaccine.

The Past Six Months

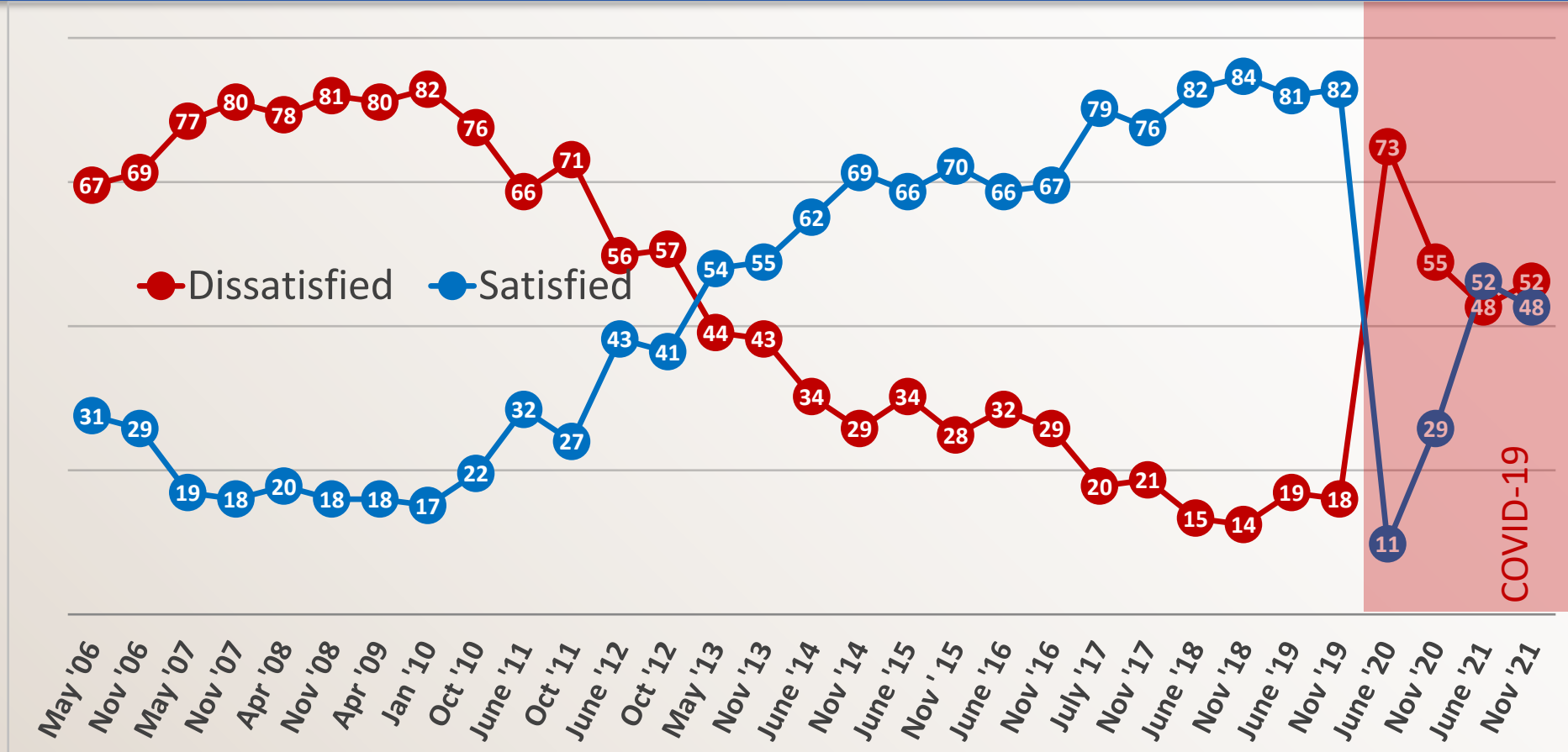
- After hitting record lows in June, most indicators are on the rebound.
- Wage inflation continues to set records.
 - **Wage increases hit record level**
 - **Nearly six in ten (59%) say their employee wages have increased in last six months.**
 - **Sales rebounding significantly since June to pre-pandemic levels**
 - **More than four in ten (42%) say sales have increased in the last six months.**
 - **Uptick in hiring, while employee decreases drop from record level in June**
 - **Those reporting new hires back to pre-pandemic level of 20%.**
 - **Profits rising, while decreases dropped 10 points since June**
 - **One quarter (25%) report profit increases, up four points since June.**
 - **Investments increasing after cutbacks hit record high in June**
 - **Increased capital investments (22%) now outpacing decreases (15%).**

Satisfaction with Economy

- Satisfaction with the business economy has slipped slightly since June.
 - A majority (52%) is again dissatisfied: 30% “somewhat dissatisfied” and 22% “very dissatisfied”
 - Up from 48% dissatisfied in June.
 - 48% say they are satisfied with the economy (37% somewhat and 11% very satisfied) – down from 52% in June.
 - “Very dissatisfied” outpacing “very satisfied” two to one.
 - Satisfaction is strongest in the Real Estate/Insurance/Finance sector (66%), while dissatisfaction is highest in Retail/Food Service (62%) and Manufacturing/Construction (57%).

Satisfaction with Economy Trends

As it Affects Your Business

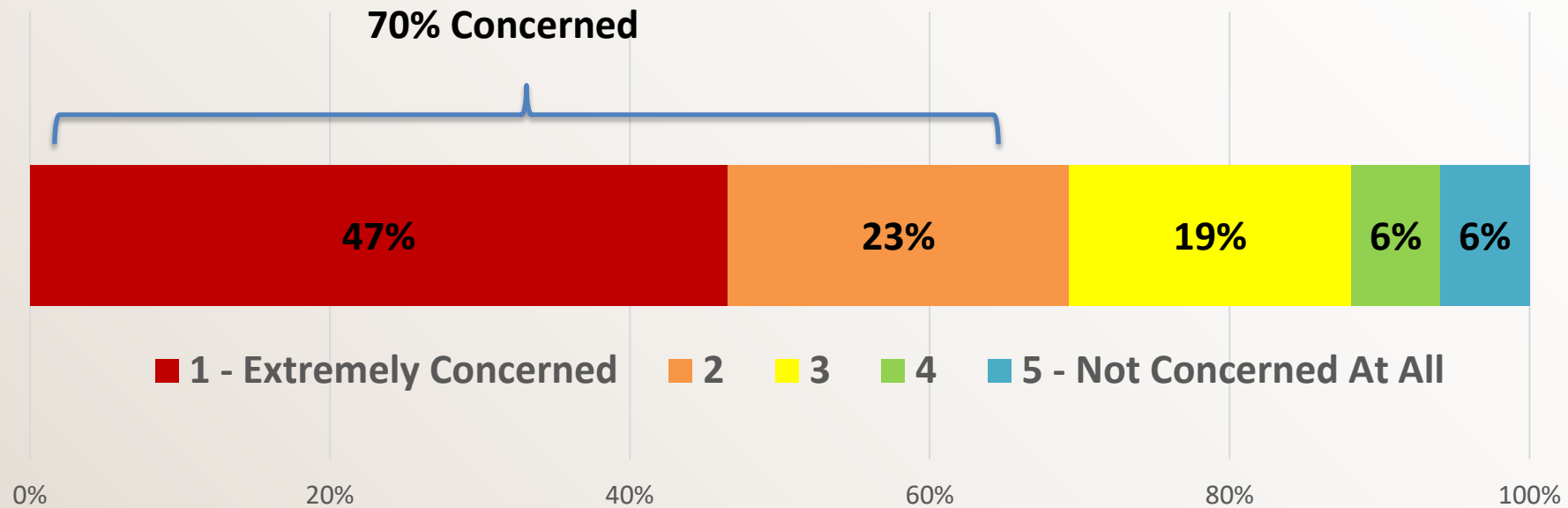


Greatest Challenges To Doing Business

	Nov 2019	June 2021	Now	Since June
Acquiring Talent	46%	49%	45%	-4
New Supply Chain Challenges			34%	
Inflation		23%	29%	+6
Cost of Health Insurance	40%	25%	25%	No Change
Wage Inflation	19%	27%	23%	-4
Retaining Talent	25%	26%	23%	-3
COVID-19 Regulations		19%	23%	+4
Finding Customers	28%	22%	17%	-5
Other Government Regulations		19%	17%	-2
Taxes	23%	17%	17%	No Change
Retaining Customers	16%	14%	8%	-6
Access to Capital	10%	3%	5%	+2

Multiple responses were accepted. Percentages add up to more than 100%.

Significant Concern About Inflation



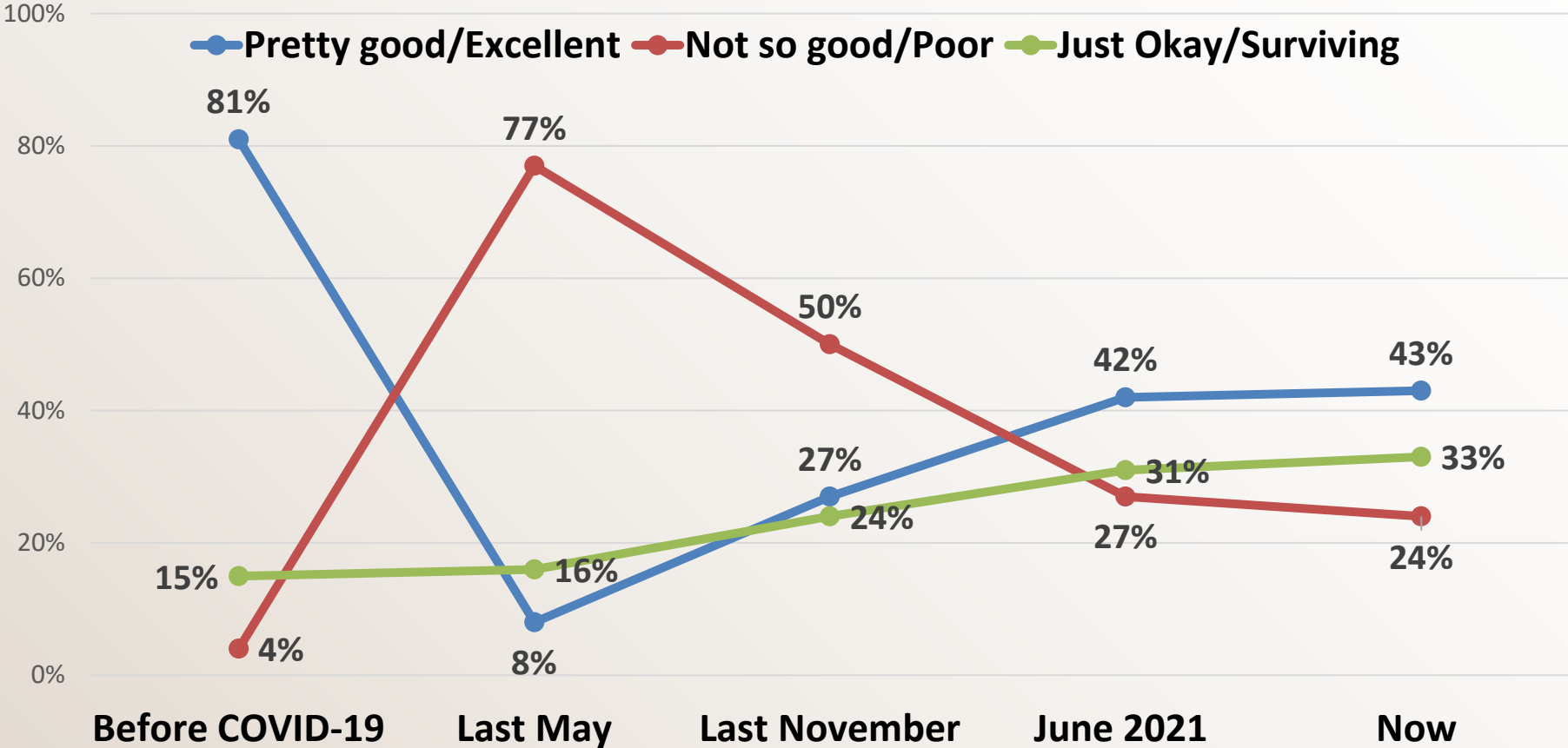
■ 1 - Extremely Concerned ■ 2 ■ 3 ■ 4 ■ 5 - Not Concerned At All

Mean = 2.0

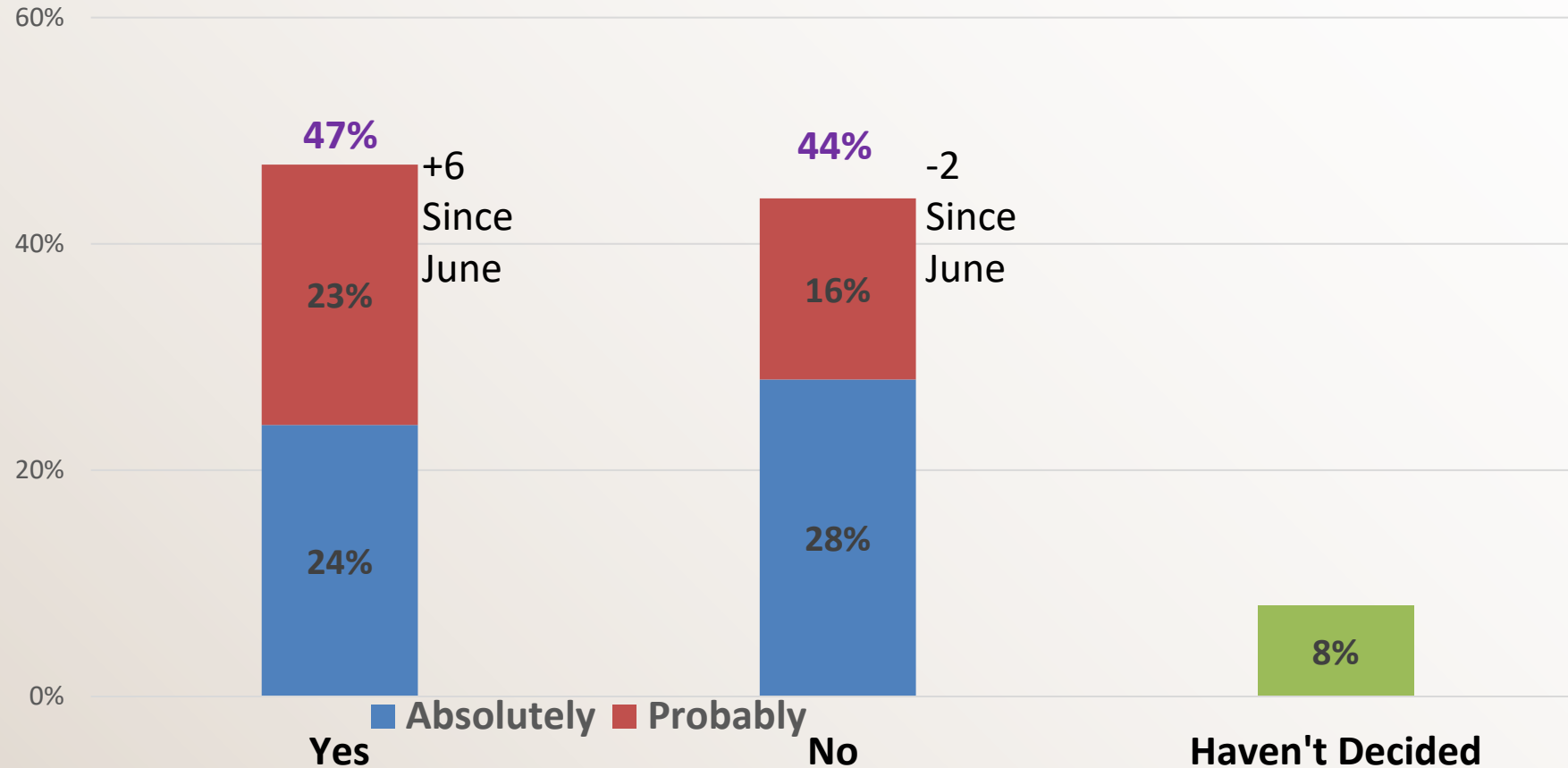
Greatest Reasons for Optimism

	Nov 2019	June 2021	Now	Since June
Business Growth/Expansion	11%	17%	17%	+1
Demand For Products/Services	17%	15%	18%	+3
Great Customers	13%	10%	11%	+1
End of COVID-19 Pandemic		9%	7%	-2
My Staff/Team/Employees	7%	7%	6%	-1
More Opportunities	6%	8%	5%	-3
We Survived/Resilient/Longevity		7%	5%	-2
Our Ability to be Flexible/Nimble/Innovative	1%	5%	5%	No Change
Politics/Hope For Reforms	5%	4%	5%	+1
The Economy	10%	8%	3%	-5
Business Is Good	4%	7%	2%	-5

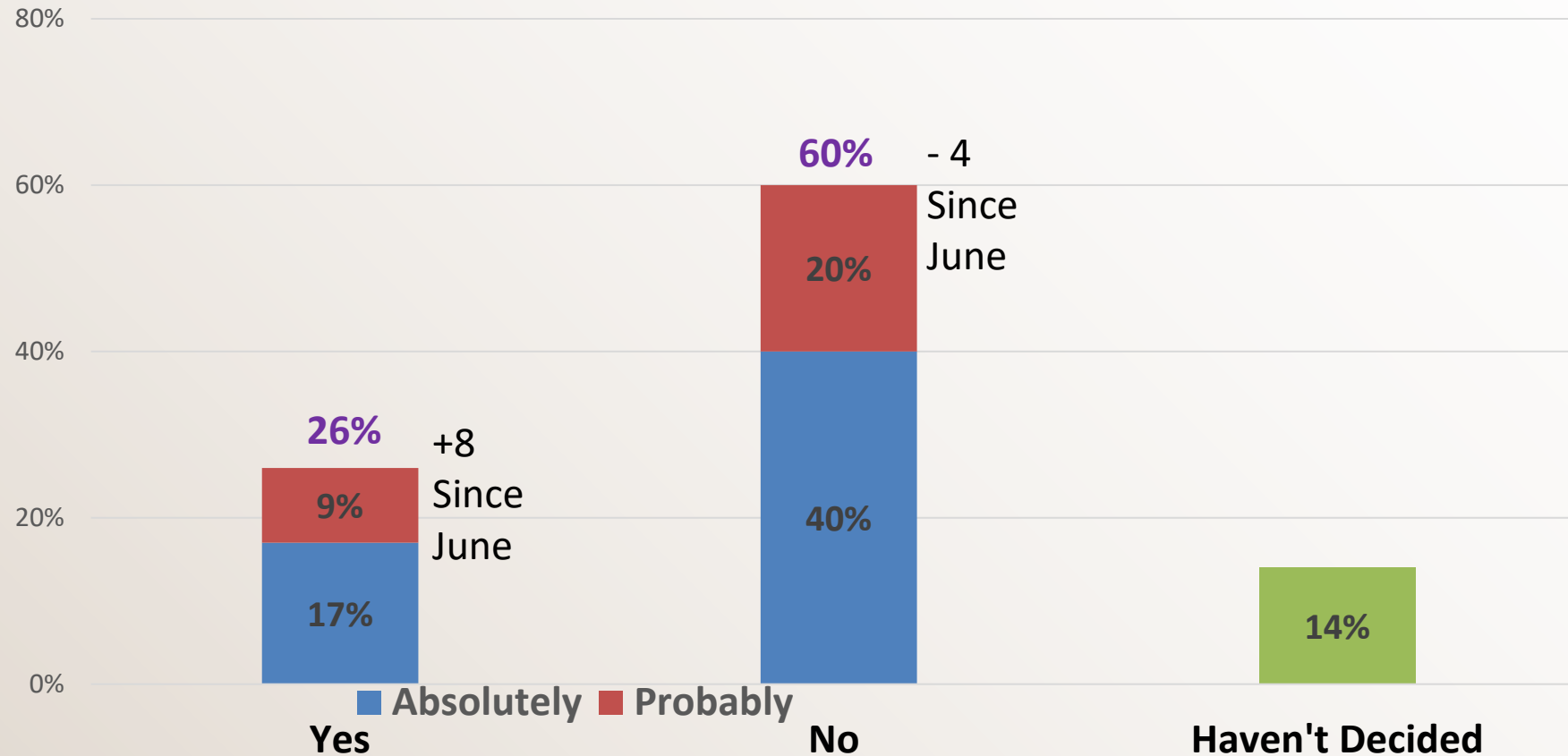
Emerging From Covid ... How Is Your Business Doing Now?



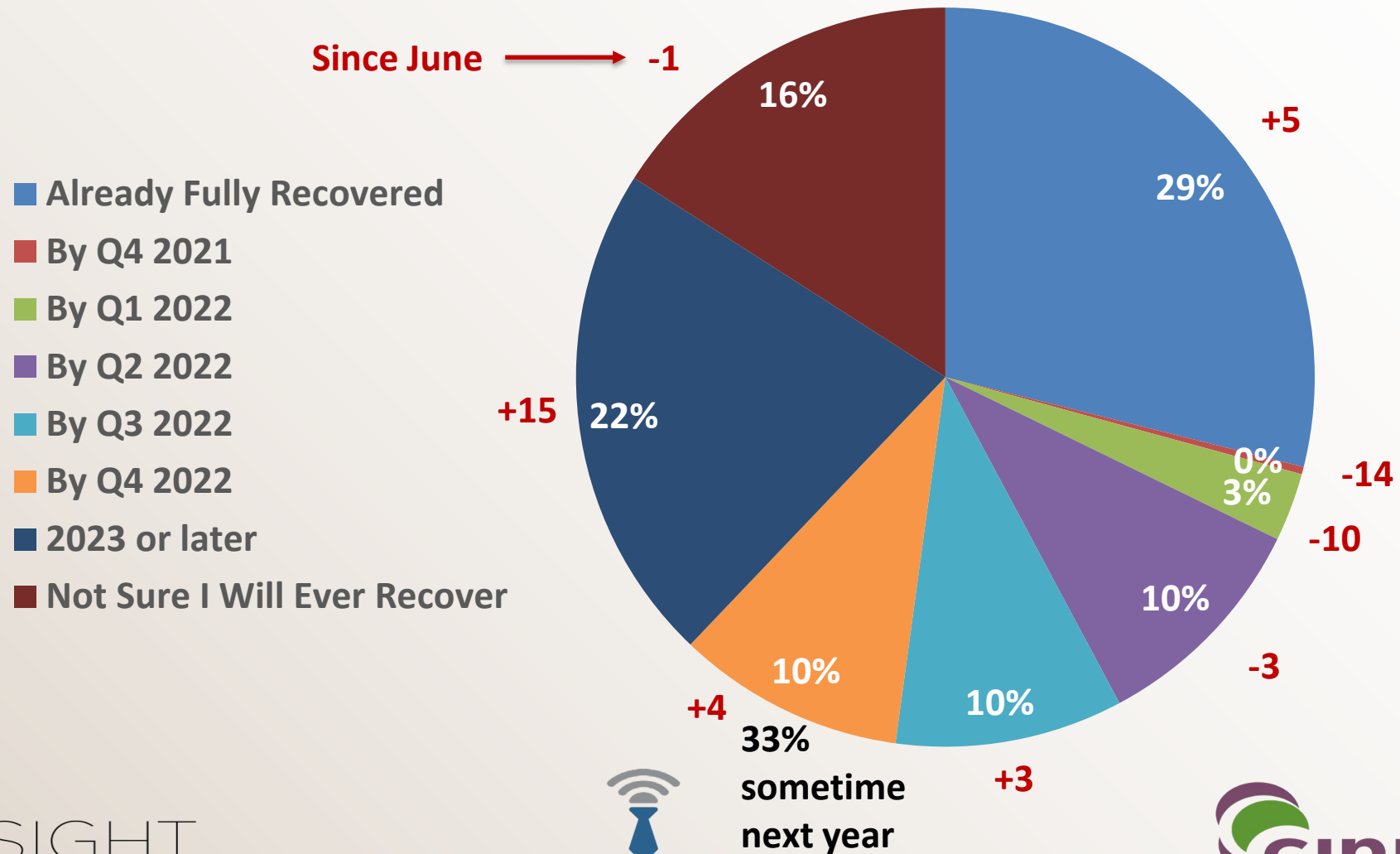
Emerging From COVID-19 ... Will You Offer Remote Work Options?



Emerging From COVID-19 ... Will You Require Vaccinations?



Emerging From COVID-19 ... When do you expect to fully recover?



Slump in Sales & Profit Projections

- Percentages of those projecting sales and profits decreases have both increased since June. Projections for decreased profits have now hit a new MFBI record (22%).
 - Projected sales growth at 53% — down four points from June and down seven points from November 2019
 - Twenty two percent (22%) expect profits to continue to decline in the next six months — up two points from June. A plurality (39%) believes profits will increase, but that is five points lower than June and thirteen points lower than November 2019.
- Expectations for sales growth is highest in the Insurance/ Finance/Real Estate sector (63%), while profit declines are most expected in the Retail/Food Service (32%)and Manufacturing/Distribution/Construction sectors (27%).

Talent Demand Continues to Set New Records

- Besting the record set in June, nearly half of all respondents again say they will be hiring in the next six months.
 - **Forty-nine percent (49%) say they plan to hire more employees over the next six months, up three points from June of this year and up 11 points from November of 2019.**
 - **Forty-two percent (42%) will maintain staff at current levels, down two points from June.**
 - **Only 5% say they plan to lay off employees, no change since June.**
- The Retail/Food Service (57%), Manufacturing/Distribution/Construction (54%) and Non-Profit (54%) sectors are significantly most likely to be hiring.

New Record Set For Those Reporting a Lack of Job Applicants

- Setting a new **MFBI record**, nearly two-thirds (64%) rate their access to qualified talent as “only fair” or “poor.” Only 26% say is “pretty good” or “excellent.”
- Six in ten (61%) are having difficulty filling open jobs, up eight points since November 2019.
 - No change since June, 80% of those actively searching for talent are having difficulty — up eight points since November 2019.
 - 57% attribute that difficulty to a lack of any applicants – up 22 points since November 2019 and setting a new MFBI record.
 - 29% attribute it to a lack of qualified applicants — down 28% since November 2019.
 - A majority (51%) say the positions remain open. Others are training less qualified applicants, using temp agencies or doing the work themselves.

Wage Inflation Continues to Set Records

- **Reminder:** earlier in the survey, nearly six in ten (59%) said they've raised wages in the past six months, a new MFBI record.
- Nearly half (47%) also say they will continue to raise wages in the next six months—up six points from June 2019 and another new MFBI record
- Projections for wage growth are strongest in the Retail/Food Service and Childcare/Recreation sectors

Projected Investments & Growth

Employee Training Remains Key

- A majority (59%) plan to invest in **employee training** within the next 6 months – up three points since June and one point since November 2019.
- Half (50%) will invest in **advertising** – down seven points since November 2019.
- Just over one quarter (26%) plan to invest in **new equipment** – no change since June 2019.
- Over one-third (34%) plan to add a **new product line or service** — down one point since November 2019

Conclusions:

- Satisfaction with the economy has stalled since June.
- While sales and profits have rebounded since June, optimism for future sales and profits has softened as business owners navigate labor shortages, supply chain challenges, wage inflation and overall inflation.
- Even as employers continue to increase wages at record levels, they are still experiencing significant challenges with attracting applicants for open positions.
- Price inflation for goods and services continues to cause increased anxiety, as seven in ten small business owners consider it a significant concern right now.

Conclusions:

- While strong majority still believes Michigan is a great place to do business, this survey shows a slight softening of positive perceptions since June:
 - Nearly two-thirds (64%) still believe Michigan is a pretty good (47%) or excellent (17%) market for their business, but that's down 6 points since June.
 - Two-thirds (66%) rate our state taxes as mostly (60%) to very (6%) fair, down three points since June.

Thank you!

We appreciate your interest in the MFBI. For more information or detailed findings, please contact Michigan Business Network.

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Global Economic Outlook: 2022+

January 19, 2022

