

Discussion Materials

July 13, 2022

Monetary Policy in a Stagflationary Environment

A stagflationary environment is fundamentally different from a typical recession and therefore requires a different monetary policy response

- ▶ **In a typical recession with low nominal growth and low inflation, policymakers can ease monetary policy to stimulate demand**
 - E.g., easing cycles in the early 1990s, early 2000s and 2008 – 2009 recessions
- ▶ **In a stagflationary environment with low real growth but high nominal growth, policymakers need to adopt restrictive monetary policy to reduce inflation**
 - Under the Volcker-era tightening cycle of the early 1980s, inflation expectations stabilized
 - Result: Federal Reserve maintains its inflation-fighting credibility
- ▶ **Prematurely easing monetary policy in a stagflationary environment when real GDP growth slows with inflation remaining high has been a serious policy mistake**
 - Under the Arthur Burns-era monetary policy in the 1970s, inflation expectations became unanchored
 - Result: Federal Reserve lost its inflation-fighting credibility
 - Even if real GDP growth is negative, inflation can remain persistently high due to continuing supply-demand imbalances, which are exacerbated by easy monetary policy

Monetary Policy Response During Typical Recessions

The last three recessions prior to the pandemic were characterized by negative real GDP growth, modest or negative nominal GDP growth and low inflation

GDP Growth, Fed Funds Rate & Economic Conditions During Last Three Pre-Pandemic Recessions:

	1990 - 1991		2001			2008				2009	
	Q4	Q1	Q1	Q2	Q3	Q1	Q2	Q3	Q4	Q1	Q2
QoQ Growth Annualized:											
Nominal GDP Growth	(0.7%)	2.0%	1.3%	5.0%	0.0%	(0.2%)	4.4%	0.9%	(7.6%)	(4.8%)	(1.4%)
Implicit Price Deflator	2.9%	3.9%	2.6%	2.5%	1.6%	1.4%	2.1%	3.0%	0.9%	(0.2%)	(0.7%)
Real GDP Growth	(3.6%)	(1.9%)	(1.3%)	2.5%	(1.6%)	(1.6%)	2.3%	(2.1%)	(8.5%)	(4.6%)	(0.7%)
Monetary Policy Response:											
Fed Funds Rate	7.0%	6.0%	5.0%	3.8%	3.0%	2.3%	2.0%	2.0%	0.1%	0.1%	0.1%
Economic conditions (as of quarter-end):											
Unemployment Rate	6.3%	6.8%	4.3%	4.5%	5.0%	5.1%	5.6%	6.1%	7.3%	8.7%	9.5%
Core CPI - YoY	5.2%	5.2%	2.7%	2.7%	2.6%	2.4%	2.4%	2.5%	1.8%	1.8%	1.7%

In response to these typical recessions, the Federal Reserve appropriately lowered the Fed Funds rate to stimulate demand and economic growth

Failed Monetary Policy During a Stagflationary Period

Under Arthur Burns' tenure as the Chair of the Federal Reserve from 1970 to 1978, monetary policy was insufficiently restrictive in light of extremely high inflation, resulting in high inflation and inflationary expectations becoming unanchored

GDP Growth, Fed Funds Rate & Economic Conditions from 1970 to 1978:

	'70	'71	'72	'73	Recession		'76	'77	'78
					'74	'75			
Annual GDP Growth:									
Nominal GDP Growth	5.5%	8.5%	9.8%	11.4%	8.4%	9.0%	11.2%	11.1%	13.0%
Implicit Price Deflator	5.3%	5.2%	4.6%	5.8%	8.9%	9.2%	5.8%	6.5%	7.4%
Real GDP Growth	0.2%	3.3%	5.2%	5.6%	(0.5%)	(0.2%)	5.4%	4.6%	5.6%
Monetary Policy Response:									
Fed Funds Rate at Year-End	3.0%	3.5%	5.5%	9.0%	8.0%	4.9%	5.9%	6.5%	10.0%
Economic conditions (as of year-end):									
Unemployment Rate	6.1%	6.0%	5.2%	4.9%	7.2%	8.2%	7.8%	6.4%	6.0%
Core CPI - YoY	6.6%	3.1%	3.0%	4.7%	11.1%	6.7%	6.1%	6.5%	8.5%
S&P 500 Annual Total Return	3.9%	14.3%	19.0%	(14.7%)	(29.7%)	37.2%	23.9%	(7.2%)	6.6%

Stagflation: High nominal GDP growth & high inflation despite low or negative real GDP growth

Federal Reserve prematurely lowered the Fed Funds rate as real GDP growth slowed. Fed Funds rate remained lower than inflation

Inflation remains persistently high

Inflationary pressures in the 1970s, like the current environment, were driven by energy price shocks resulting from geopolitical uncertainty, government budget deficits and the growing bargaining power of labor

Successful Monetary Policy During a Stagflationary Period

Under Paul Volcker's tenure as the Chair of the Federal Reserve from 1979 to 1987, monetary policy was successful in moderating inflation by maintaining a high Fed Funds rate even in the face of slowing real GDP growth

GDP Growth, Fed Funds Rate & Economic Conditions from 1979 to 1987:

	'79	'80	'81	'82	'83	'84	'85	'86	'87	
		Recession								
Annual GDP Growth:										
Nominal GDP Growth	8.7%	11.1%	7.5%	5.5%	6.0%	7.9%	7.7%	5.7%	3.3%	
Implicit Price Deflator	5.5%	11.3%	4.9%	7.4%	1.4%	0.6%	3.5%	2.2%	(0.2%)	
Real GDP Growth	3.2%	(0.2%)	2.6%	(1.9%)	4.6%	7.3%	4.2%	3.5%	3.5%	
Monetary Policy Response:										
Fed Funds Rate at Year-End	14.0%	18.0%	12.0%	8.5%	9.5%	8.3%	7.8%	6.0%	6.9%	
Economic conditions (as of year-end):										
Unemployment Rate	6.0%	7.2%	8.5%	10.8%	8.3%	7.3%	7.0%	6.6%	5.7%	
Core CPI - YoY	11.3%	12.2%	9.5%	4.5%	4.8%	4.7%	4.3%	3.8%	4.2%	
S&P 500 Annual Total Return	18.49%	32.40%	(4.9%)	21.6%	22.6%	6.2%	31.7%	18.7%	5.3%	

Federal Reserve maintained a high Fed Funds rate, in excess of inflation, even as inflation declined

As a result of decisive and aggressive monetary policy, the Federal Reserve was able to restore its inflation fighting credibility

A Future U.S. Recession Will Likely Be Stagflationary

In Q1 2022, both nominal GDP growth and inflation remained high despite negative real GDP growth

Real and Nominal GDP Growth:

	2020				2021				2022
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
QoQ GDP Growth Annualized:									
Nominal GDP Growth	(3.9%)	(32.4%)	38.7%	6.6%	10.9%	13.4%	8.4%	14.5%	6.6%
Implicit Price Deflator	1.2%	(1.2%)	4.9%	2.1%	4.6%	6.7%	6.1%	7.6%	8.2%
Real GDP Growth	(5.1%)	(31.2%)	33.8%	4.5%	6.3%	6.7%	2.3%	6.9%	(1.6%)

Monetary Policy Response:

Fed Funds Rate at Quarter-End	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.4%
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Economic conditions (as of quarter-end):

Unemployment Rate	4.4%	11.0%	7.9%	6.7%	6.0%	5.9%	4.7%	3.9%	3.6%
Core CPI - YoY	2.1%	1.2%	1.7%	1.6%	1.6%	4.5%	4.0%	5.5%	6.5%

Q1 2022 real GDP growth was negatively impacted by approximately 320bps due to a historically large net export deficit. Excluding the impact of net exports, Q1 2022 GDP would have grown by 1.6% on a QoQ annualized basis

**Inflation is Extremely High
and Likely to Persist**

Current Run-rate Inflation Remains Extremely High

On a month-over-month basis, headline CPI and PCE figures are currently increasing at a high-single-digit to low-double-digit annualized growth rate, well in excess of the Federal Reserve's 2% inflation target

CPI & PCE month-over-month inflation:

	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22
CPI	0.7%	0.6%	0.6%	0.8%	1.2%	0.3%	1.0%
<i>MoM Annualized</i>	8.7%	7.1%	8.0%	10.0%	15.9%	4.1%	12.3%
<i>Trailing 3 Month Annualized</i>	8.2%	8.9%	8.0%	8.4%	11.3%	9.9%	10.7%
Core CPI	0.5%	0.6%	0.6%	0.5%	0.3%	0.6%	0.6%
<i>MoM Annualized</i>	6.5%	7.0%	7.2%	6.2%	4.0%	7.0%	7.8%
<i>Trailing 3 Month Annualized</i>	5.7%	7.0%	6.9%	6.8%	5.8%	5.7%	6.3%
PCE	0.6%	0.5%	0.5%	0.5%	0.9%	0.2%	0.3%
<i>MoM Annualized</i>	7.1%	6.3%	6.2%	6.6%	11.3%	3.0%	3.9%
<i>Trailing 3 Month Annualized</i>	6.4%	7.1%	6.6%	6.4%	8.0%	6.9%	6.0%
Core PCE	0.5%	0.5%	0.4%	0.3%	0.3%	0.3%	0.3%
<i>MoM Annualized</i>	5.9%	6.3%	5.4%	3.7%	4.0%	4.2%	3.9%
<i>Trailing 3 Month Annualized</i>	4.9%	6.0%	5.9%	5.1%	4.4%	4.0%	4.1%

Source: Bureau of Labor Statistics (CPI Report), Bureau of Economic Analysis (PCE Data)

CPI is the Most Relevant Inflation Measure

We believe the Federal Reserve should carefully monitor CPI inflation in addition to PCE inflation even though CPI is not explicitly identified as a target measure

- ▶ **CPI more accurately represents inflation in out-of-pocket expenditures, particularly for low- to middle-income consumers**

“I look a lot at CPI and I know PCE headline is our number but I like both of them. The CPI is more heavily weighted towards shelter and one reason I like to look at that is that’s more consistent with what lower and moderate income groups face. They face a much bigger share of their disposable income going to shelter, food and energy than upper income groups do.

So I don’t mind CPI as being kind of a good example of what lower and moderate income group in terms of inflation so I don’t dismiss it. I look at it very seriously.”

– *Christopher Waller, Member of the Federal Reserve Board of Governors*
Virtual NABE Event, July 7, 2022

- ▶ **CPI has outsized headline and media relevance compared with PCE, and therefore has a greater role in shaping consumer and business inflation expectations**
- ▶ **CPI is a key input variable in cost-of-living adjustments, wage negotiations and various other lagged price escalators**

CPI / PCE Discrepancy is Primarily Due to Scope Differences

PCE inflation has lagged CPI inflation primarily due to its lower weighting of out-of-pocket expenditures like shelter and energy and its higher weighting of categories that reflect imputed costs like healthcare and financial services

CPI & PCE Category Weightings:

	<u>CPI</u>	<u>PCE</u>
<u>Out-of-pocket expenditures:</u>		
Energy	8%	5%
Food (incl. away from home)	13%	14%
Shelter	33%	16%
Energy, food & shelter	54%	34%
<u>Categories with imputed costs:</u>		
Healthcare services	7%	16%
Financial services	0%	5%
Healthcare & financial services	7%	21%

“Scope effects. The CPI measures the change in the out-of-pocket expenditures of all urban households and the PCE index measures the change in goods and services consumed by all households, and nonprofit institutions serving households.

This conceptual difference means that some items and expenditures in the PCE index are outside the scope of the CPI. For example, the expenditure weights for medical care services in the CPI are derived only from out-of-pocket expenses paid for by consumers. By contrast, medical care services in the PCE index include those services purchased out of pocket by consumers and those services paid for on behalf of consumers—for example, medical care services paid for by employers through employer-provided health insurance, as well as medical care services paid for by governments through programs such as Medicare and Medicaid.”

– Bureau of Labor Statistics

PCE inflation was not formally adopted as the Federal Reserve’s target inflation measure until the January 2012 FOMC meeting. Prior to 2012, both PCE and CPI inflation were referenced by FOMC participants in their discussion of the Federal Reserve’s price stability mandate

Inflation is Increasingly Driven by Services

CPI in recent months has been increasingly driven by inflation in core services, which tends to be more persistent and has a ~60% weighting in the overall index

Month-Over-Month CPI Inflation by Consumption Category:

	% of CPI	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22
CPI	100%	0.7%	0.6%	0.6%	0.8%	1.2%	0.3%	1.0%
Food	13%	0.8%	0.5%	0.9%	1.0%	1.0%	0.9%	1.2%
Energy	8%	2.4%	0.9%	0.9%	3.5%	11.0%	(2.7%)	3.9%
Core CPI	78%	0.5%	0.6%	0.6%	0.5%	0.3%	0.6%	0.6%
Annualized MoM		6.5%	7.0%	7.2%	6.2%	4.0%	7.0%	7.8%
from Shelter Only		2.4%	2.2%	1.5%	2.6%	2.6%	2.6%	3.1%
from Core Services Only		3.4%	3.1%	3.9%	4.7%	5.3%	6.5%	5.5%
Trailing 3M Annualized		5.7%	7.0%	6.9%	6.8%	5.8%	5.7%	6.3%
Core goods:								
New cars & used cars	8%	1.8%	2.2%	0.7%	0.0%	(1.8%)	0.4%	1.4%
Household furnishings	4%	0.8%	1.2%	1.6%	0.8%	1.0%	0.5%	0.1%
Other core goods	9%	0.2%	0.3%	1.0%	0.7%	0.1%	(0.1%)	0.3%
Core goods	21%	0.9%	1.2%	1.0%	0.4%	(0.4%)	0.2%	0.7%
Core services:								
Shelter	32%	0.5%	0.4%	0.3%	0.5%	0.5%	0.5%	0.6%
Airline fares	1%	1.9%	2.5%	2.3%	5.2%	10.7%	18.6%	12.6%
Other core services	24%	0.2%	0.2%	0.6%	0.5%	0.5%	0.5%	0.3%
Core services	57%	0.4%	0.3%	0.4%	0.5%	0.6%	0.7%	0.6%
% Core CPI Inflation from Core Services		52%	44%	54%	76%	134%	92%	70%

Contribution from shelter alone accounts for ~3% annualized run-rate inflation in Core CPI

Shelter Inflation is Likely to Remain Elevated

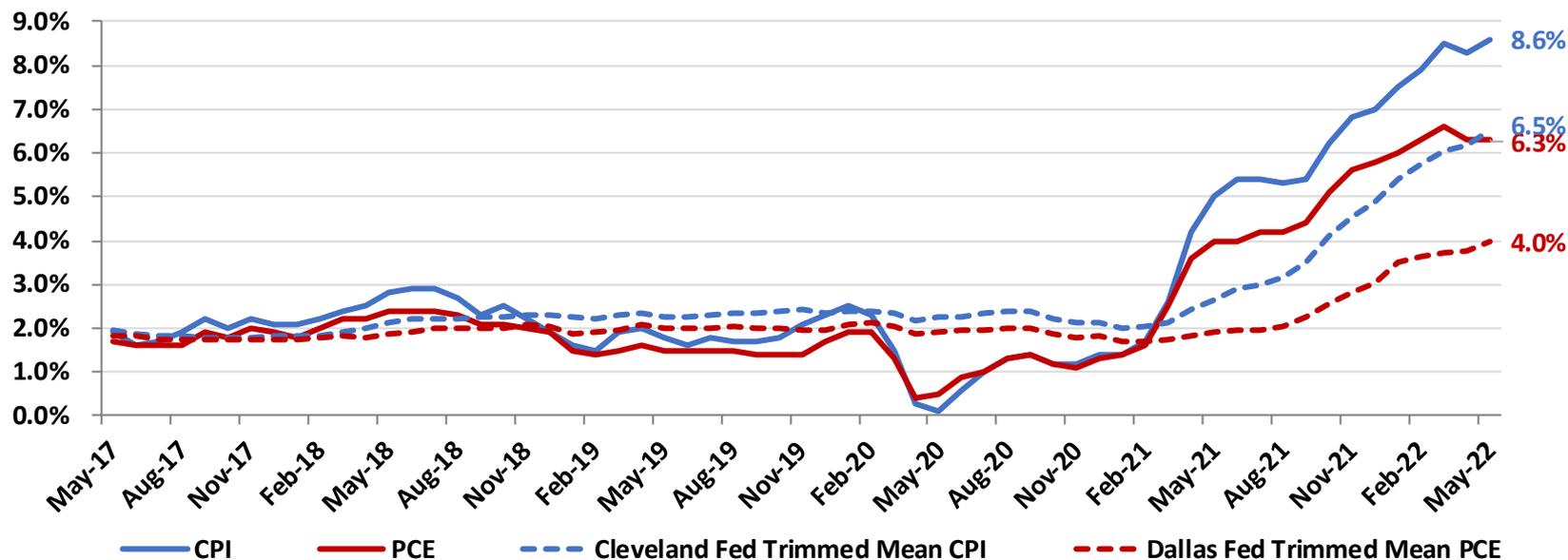
We believe shelter inflation, which accounts for approximately a third of overall CPI, is likely to remain elevated

- ▶ **CPI and PCE shelter inflation measures understate observed market trends**
 - CPI and PCE report approximately 5% to 6% year-over-year increase in shelter costs
 - CoreLogic and Zillow market indices show an approximately 20% year-over-year increase in home prices and a mid- to high-teens year-over-year increase in asking rents
- ▶ **Higher mortgage rates and higher cost of home ownership drive rental demand**
 - Rental markets likely to face additional pricing pressure as households increasingly view renting as a more affordable alternative to homeownership
- ▶ **New housing will remain supply constrained**
 - Rent control & rent stabilization policies, environmental concerns and NIMBY-ism have discouraged the construction and increased the cost of new affordable housing

Trimmed CPI and PCE Show Inflation Accelerating

Trimmed mean measures of CPI & PCE, which exclude outlier categories, are rapidly rising, reflecting the increasingly broad-based nature of underlying inflation

Year-over-year growth in CPI / PCE and Trimmed Mean CPI / PCE:



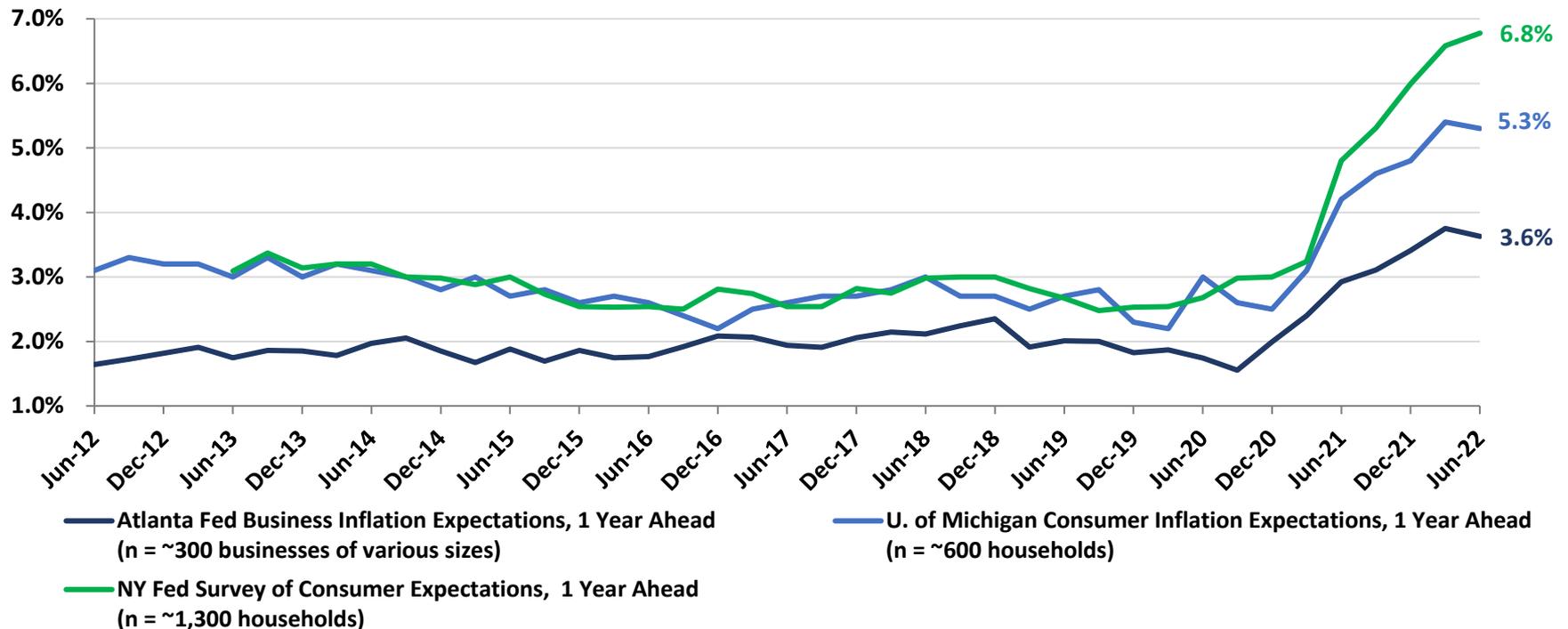
Month-over-month change:	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22
CPI	0.6%	0.6%	0.8%	1.2%	0.3%	1.0%
Cleveland Fed - 16% Trimmed Mean CPI	0.5%	0.6%	0.5%	0.5%	0.4%	0.8%
PCE	0.5%	0.5%	0.5%	0.9%	0.2%	0.6%
Dallas Fed 24% Lower / 31% Upper Tail Trimmed Mean PCE	0.4%	0.5%	0.3%	0.2%	0.2%	0.4%

Source: Bureau of Labor Statistics (CPI Report), Bureau of Economic Analysis (PCE Data), Federal Reserve Bank of Cleveland, Federal Reserve Bank of Dallas

One-Year-Ahead Inflation Expectations Have Become Unanchored

Survey-based measures of near-term inflation expectations have become unanchored, anticipating approximately 4% to 7% inflation over the next year

Median One-Year-Ahead Inflation Expectations:



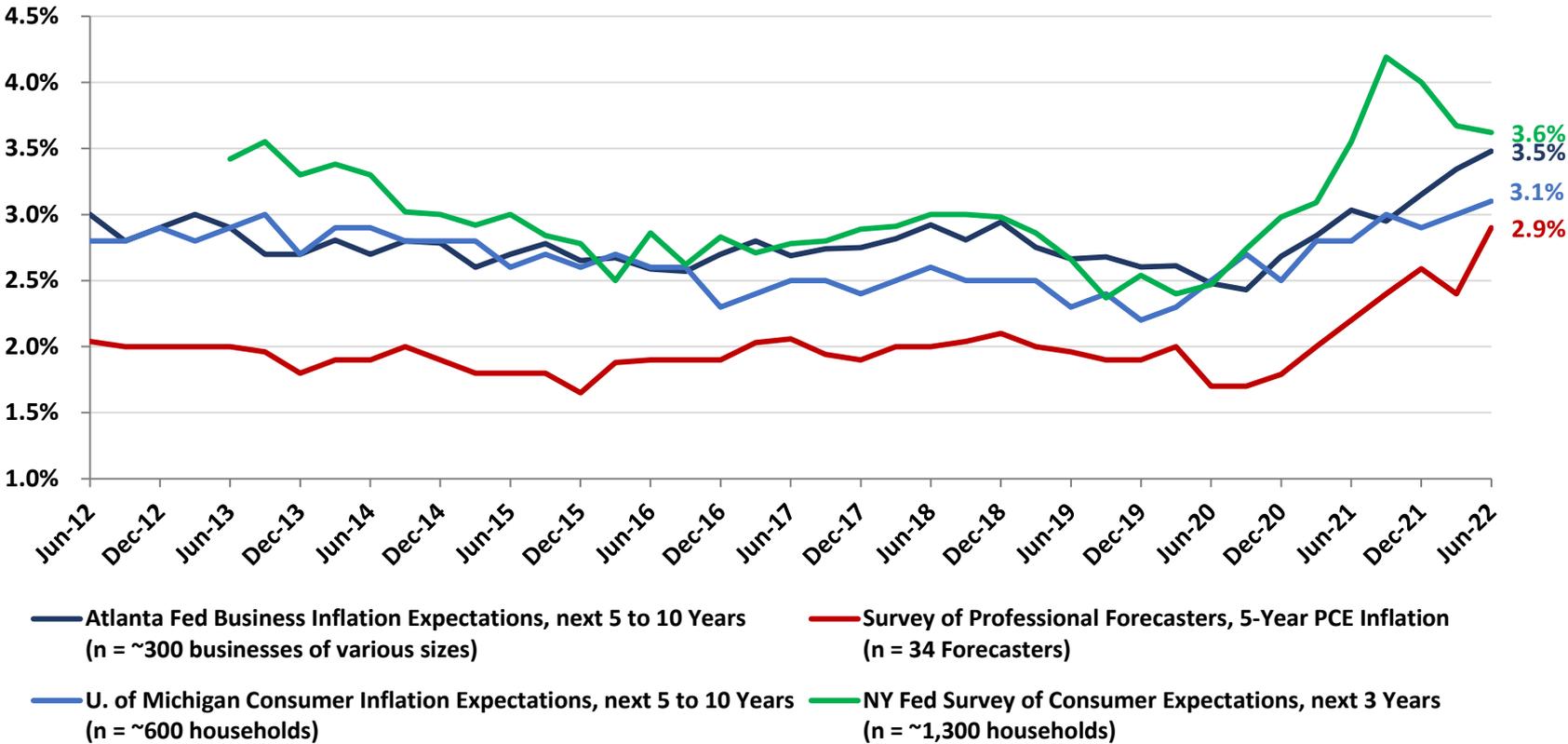
Although the Federal Reserve and market participants place greater importance on long-term inflation expectations, one-year-ahead inflation expectations likely play a pivotal role in shaping price-setting behavior by firms and increased wage demands of employees

Source: Business Inflation Expectations Survey conducted by the Federal Reserve Bank of Atlanta; University of Michigan Survey of Consumers, Survey of Consumer Expectations conducted by the Federal Reserve Bank of New York.

Long-Term Inflation Expectations Are Rising

Survey-based measures of longer-term inflation expectations have also risen sharply over the last twelve months, currently projecting approximately 3% to 4% inflation per annum over the next five- to ten-year period

Median Long-Term Inflation Expectations:



Source: Business Inflation Expectations Survey conducted by the Federal Reserve Bank of Atlanta; Survey of Professional Forecasters conducted by the Federal Reserve Bank of Philadelphia; University of Michigan Survey of Consumers, Survey of Consumer Expectations conducted by the Federal Reserve Bank of New York.

Wage Inflation Remains High

On a month-over-month basis, average hourly earnings have consistently grown at a 4% to 5% annualized rate. For production and non-supervisory employees, who represent approximately 80% of the labor force, hourly earnings are growing at an even faster pace of approximately 5% to 6%

Average hourly earnings of all employees on private nonfarm payrolls by industry (seasonally adjusted):

	<u>Dec-21</u>	<u>Jan-22</u>	<u>Feb-22</u>	<u>Mar-22</u>	<u>Apr-22</u>	<u>May-22</u>	<u>Jun-22</u>
All Private Nonfarm Employees:							
Average Hourly Earnings	\$31.4	\$31.6	\$31.6	\$31.8	\$31.9	\$32.0	\$32.1
<i>YoY Growth</i>	4.9%	5.4%	5.2%	5.6%	5.5%	5.3%	5.1%
<i>MoM Growth</i>	0.5%	0.6%	0.1%	0.5%	0.3%	0.4%	0.3%
<i>MoM Annualized</i>	5.9%	7.1%	1.5%	5.8%	4.2%	4.6%	3.8%
<i>Trailing 3 Month Growth Annualized</i>	6.1%	5.9%	4.8%	4.8%	3.9%	4.9%	4.2%
Production and Non-Supervisory Employees:							
Average Hourly Earnings	\$26.7	\$26.9	\$27.0	\$27.1	\$27.2	\$27.3	\$27.5
<i>YoY Growth</i>	6.2%	6.7%	6.7%	6.7%	6.6%	6.4%	6.4%
<i>MoM Growth</i>	0.7%	0.5%	0.3%	0.4%	0.4%	0.5%	0.5%
<i>MoM Annualized</i>	8.9%	6.0%	3.6%	5.0%	5.5%	6.4%	5.9%
<i>Trailing 3 Month Growth Annualized</i>	7.5%	7.0%	6.2%	4.9%	4.7%	5.6%	5.9%

Rising inflation expectations and high levels of wage inflation create a self-reinforcing cycle that drives higher levels of future price and wage inflation

Inflationary Pressures Likely to Persist

We believe inflationary pressures arising from the current supply-demand imbalance are likely to persist due to a combination of elevated nominal spending and continued tight supply conditions

Nominal Spending Likely to Remain Elevated

- ▶ **Rotation in spending from goods to services**
- ▶ **Significant excess household savings of ~\$2.6 trillion**
 - Equal to approximately 11% of nominal GDP and 15% of nominal PCE
- ▶ **Large untapped borrowing capacity**
 - Record low loan-to-deposits ratio in banking system
 - Modest household leverage levels relative to history

Supply Conditions Likely to Remain Tight

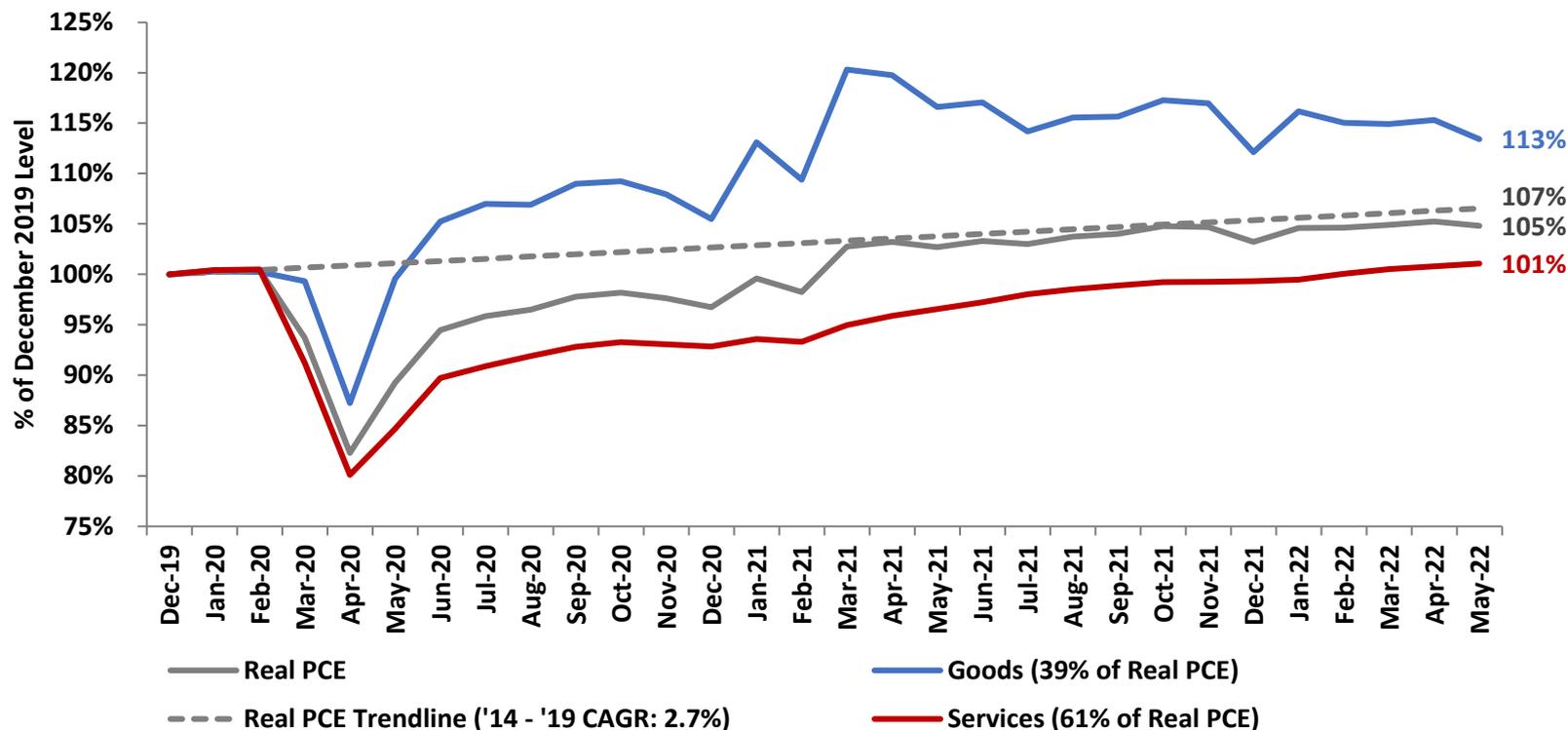
- ▶ **Labor market is extremely tight, with a 3.6% unemployment rate that is near historical lows**
 - Nearly twice the number of job openings as the number of unemployed persons
- ▶ **Industrial capacity utilization rates at peak levels**
- ▶ **Inventories on a real basis, adjusted for inflation, are in-line with historical levels**

**Nominal Spending
Likely to Remain Elevated**

Shift in Consumption from Goods to Services

While recession concerns have focused on the recent decline in goods spending, services spending – which accounts for ~60% of real personal consumption – has maintained consistent growth and remains below trend

Real Personal Consumption Expenditure (PCE) by Category as % of December 2019 Levels:

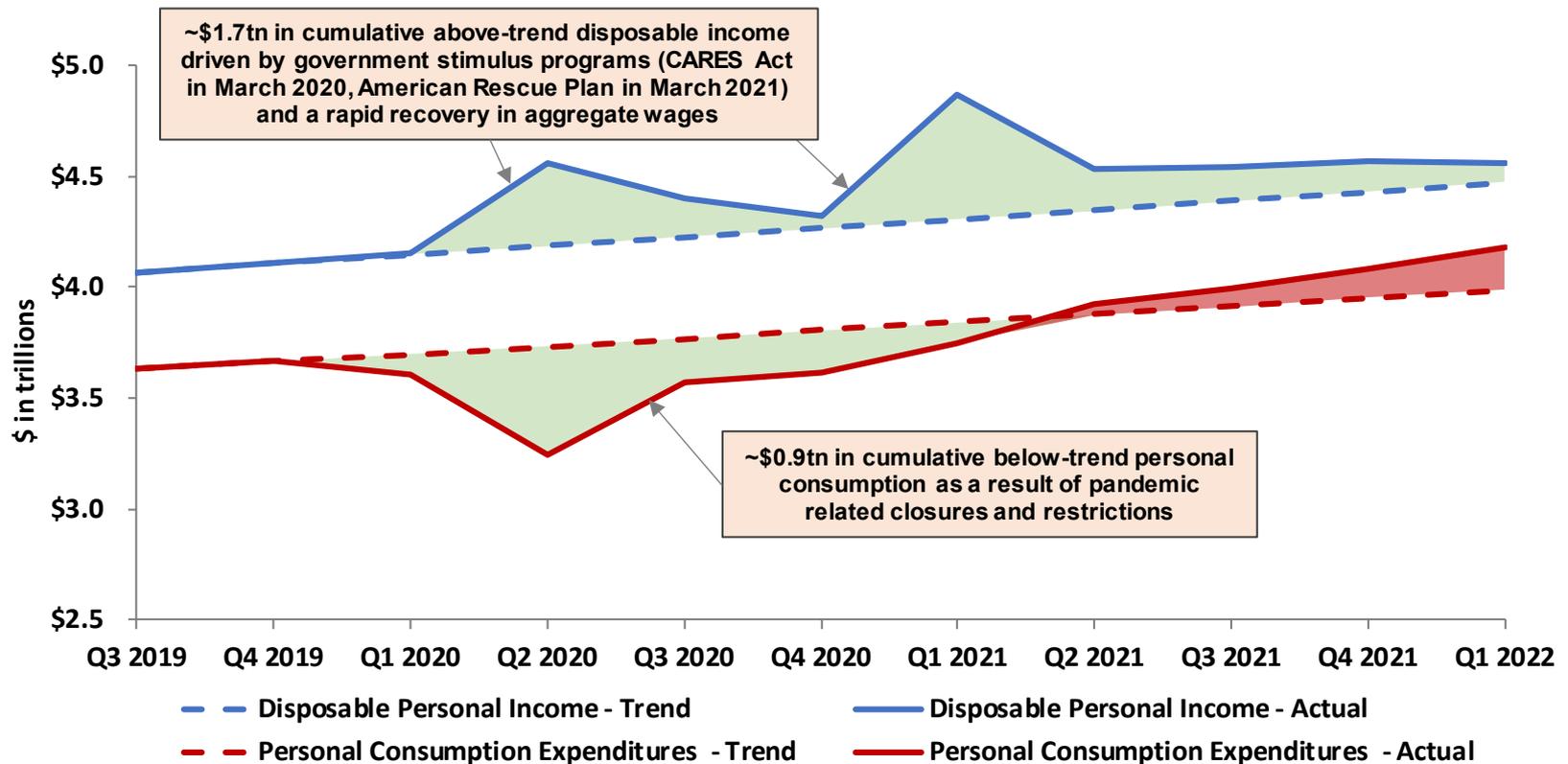


Source: Bureau of Economic Analysis

Approximately \$2.6 Trillion in Excess Savings

A combination of significantly above-trend disposable income and below-trend personal consumption during the pandemic has resulted in the accumulation of approximately \$2.6 trillion in excess savings, equal to 11% of nominal GDP

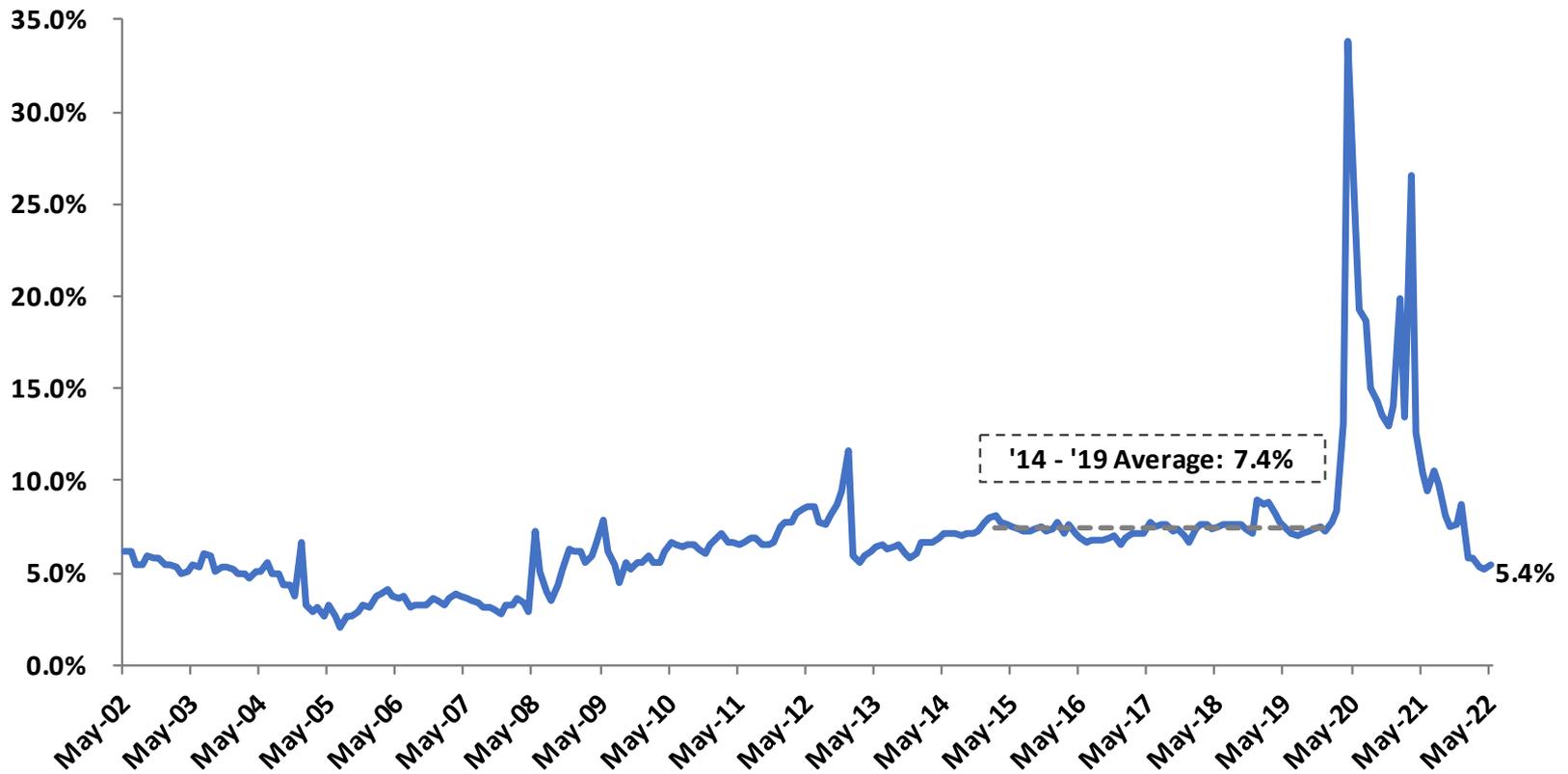
Quarterly Disposable Personal Income and Consumption | Trendline vs Actual (Nominal \$ in trillions):



Personal Savings Rate Remains Within Long-Term Historical Range

The personal savings rate recently declined to 5.4%, below its pre-pandemic level of ~7.4%, but consistent with levels seen before the GFC in 2008

Personal Savings Rate (Personal Savings / Disposable Personal Income):



Excess Savings Buffer Can Sustain a Low Savings Rate

The monthly savings deficit resulting from the recent decline in the savings rate represents a relatively small portion of the approximately \$2.6 trillion in cumulative excess savings

Monthly Personal Income & Outlays | Seasonally Adjusted (nominal \$ in trillions):

	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22
Disposable Personal Income	\$1,527	\$1,508	\$1,517	\$1,525	\$1,532	\$1,540
Less: Personal Outlays	(1,395)	(1,420)	(1,428)	(1,445)	(1,453)	(1,456)
Personal Savings (A)	\$133	\$87	\$88	\$80	\$79	\$84
<i>Savings rate</i>	8.7%	5.8%	5.8%	5.3%	5.2%	5.4%
Normalized Personal Savings (B)	\$113	\$112	\$112	\$113	\$114	\$114
'14 - '19 Avg. Savings Rate	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%
Savings Surplus / (Deficit) (A - B)	\$19	(\$25)	(\$24)	(\$33)	(\$35)	(\$30)
<i>% of Excess Savings</i>	0.8%	(1.0%)	(0.9%)	(1.3%)	(1.3%)	(1.2%)

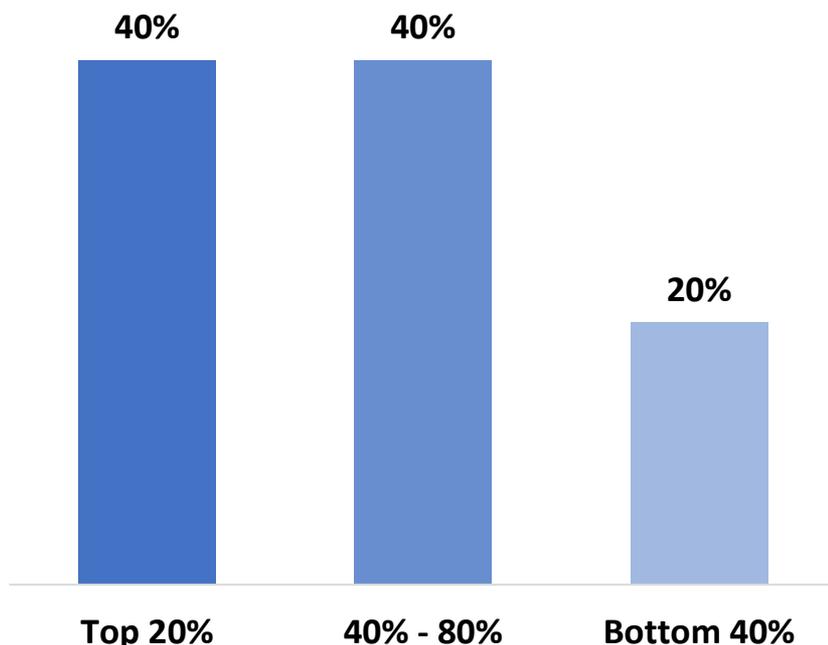
Even if the savings rate were to reach and stay at 0%, it would take approximately two years for consumers to fully deplete the approximately \$2.6 trillion in excess savings

We believe the substantial excess savings reserve will continue to allow consumers to fund a high level of nominal spending growth even as their savings rate declines

Share of Excess Savings by Income Level

Excess savings are estimated to be concentrated within households in the top 20% of the income distribution, which account for nearly 40% of all spending

Goldmans Sachs Estimate of the Share of Excess Savings by Income Level:



“People in the bottom 20% of the income distribution spend some 31% of their after-tax income on gasoline and food at home, where prices are up 30% and 7% respectively since last September, when extended/enhanced unemployment benefits ended. But these households account for only about 9% of total consumption; they don’t drive the economic cycle. By contrast, the top 20 of the income distribution account for 39% of all spending.”

–Ian Shepherdson, Chief Economist
Pantheon Macroeconomics
May 23, 2022

The economic cost of inflation is most acute for lower income households who have a lower level of excess savings and spend an outsized portion of their income on necessities like food and energy, which have experienced substantial inflation

Aggregate Wage Growth Remains Robust

Aggregate wages for private nonfarm employees is currently increasing at an annualized rate of approximately 7%, driven by job gains and wage inflation

Aggregate wages for private nonfarm employees:

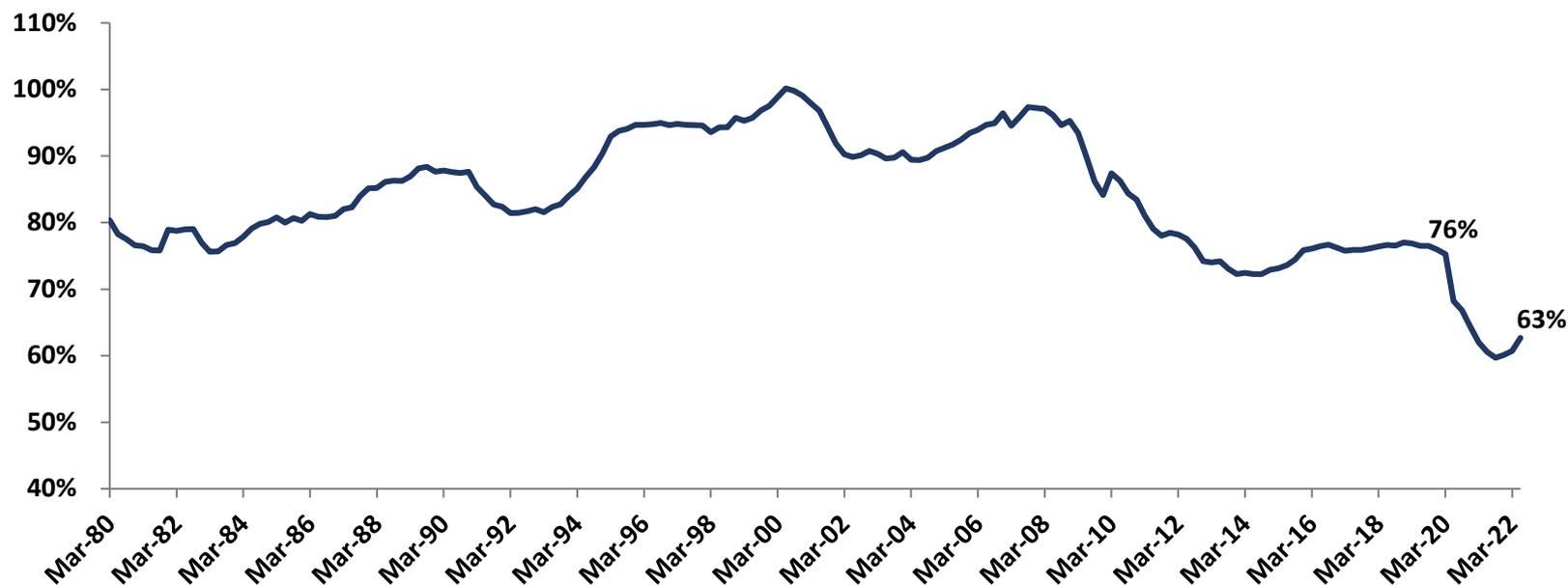
	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22
Private Nonfarm Employees (mm)	127.1	127.6	128.3	128.7	129.0	129.4	129.8
<i>Payroll adds (K)</i>	561	492	704	385	368	336	381
<i>MoM Growth</i>	0.4%	0.4%	0.6%	0.3%	0.3%	0.3%	0.3%
<i>MoM Annualized</i>	5.5%	4.7%	6.8%	3.7%	3.5%	3.2%	3.6%
<i>YoY Growth</i>	5.2%	5.2%	5.2%	5.0%	5.1%	5.0%	4.9%
Average Hourly Earnings	\$31.4	\$31.6	\$31.6	\$31.8	\$31.9	\$32.0	\$32.1
<i>MoM Growth</i>	0.5%	0.6%	0.1%	0.5%	0.3%	0.4%	0.3%
<i>MoM Annualized</i>	5.9%	7.1%	1.5%	5.8%	4.2%	4.6%	3.8%
<i>YoY Growth</i>	4.9%	5.4%	5.2%	5.6%	5.5%	5.3%	5.1%
<i>Average Weekly Hours</i>	34.8	34.6	34.7	34.6	34.6	34.5	34.5
Aggregate Wages (Annualized bn)	\$7,217	\$7,245	\$7,315	\$7,351	\$7,397	\$7,423	\$7,468
<i>MoM Growth</i>	0.9%	0.4%	1.0%	0.5%	0.6%	0.3%	0.6%
<i>MoM Annualized</i>	11.7%	4.7%	12.3%	6.0%	7.9%	4.2%	7.5%
<i>YoY Growth</i>	10.7%	9.7%	11.0%	9.9%	9.9%	9.4%	9.3%

Even if consumers do not draw from their excess savings or borrowing capacity, we believe robust growth in aggregate wages should sustain a high level of nominal spending growth

Significant Lending Capacity in Banking System

The substantially lower growth in credit relative to deposits has resulted in a historically low loan-to-deposits ratio of only 63%, which is down 13 percentage points from its pre-pandemic level of 76%

Loan-to-Deposits Ratio | U.S. Commercial Banking System:

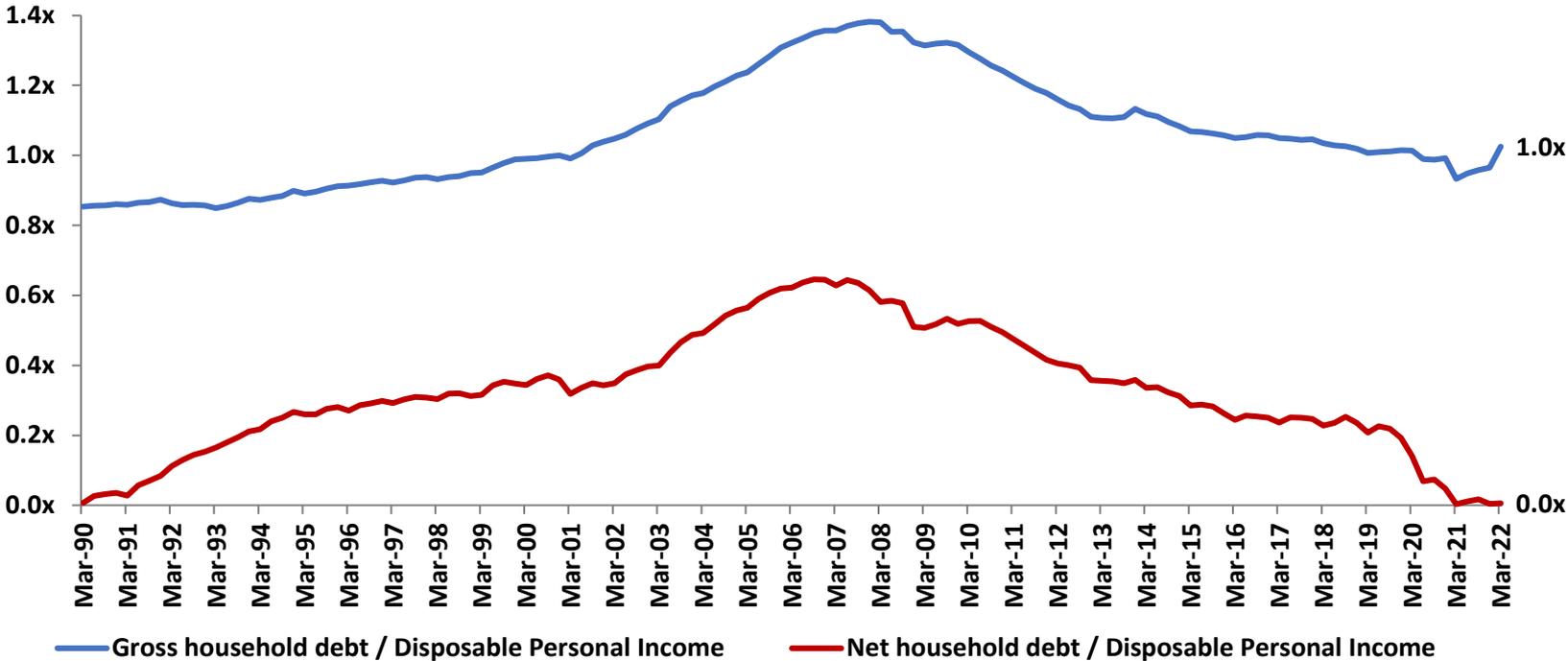


We believe a normalization of the loan-to-deposits ratio can substantially offset the impact of quantitative tightening on deposit and credit growth. If deposits were to stay at the same level, a return to the pre-pandemic loan-to-deposits ratio of 76% would support approximately \$2.4 trillion in additional lending

Modest Household Leverage

Gross household leverage is in-line with historical levels. Net leverage, as a result of an accumulation in excess savings and cash holdings, has decreased materially relative to its pre-pandemic level

Gross and net household leverage:



Source: Federal Reserve (Release Z.1 Financial Accounts), Bureau of Economic Analysis
 Note: Gross household debt is comprised of home mortgages, consumer credit and other household liabilities. Net household debt is gross household debt less cash and cash-like deposits. Disposable personal income denominator reflects the average disposable personal income of the trailing four quarters.

**Supply Conditions
Likely to Remain Tight**

Strong Labor Market

The economy has nearly recovered the entirety of the employment shortfall caused by the pandemic, with total employment only 755K jobs lower than its level in February 2020

Current vs Pre-Pandemic Employment Summary | Figures in millions:

	<u>Feb-20</u>	<u>Jun-22</u>	<u>Difference</u>
Total employed in labor force	158.9	158.1	(0.8)
Unemployed in labor force	5.7	6.0	0.2
Headline U-3 unemployment rate	3.5%	3.6%	0.1%
<i>U-6 unemployment rate¹</i>	7.0%	6.7%	(0.3%)
Total civilian labor force	164.6	164.0	(0.6)
<i>Labor force participation rate</i>	63.4%	62.2%	
Total civilian non-institutional population (16+)	259.6	263.8	4.2
<i>Employed / Population</i>	61.2%	59.9%	

The headline U-3 unemployment rate is only 10bps higher than its February 2020 level. The U-6 unemployment rate is 30bps below its February 2020 level and is at a historical low

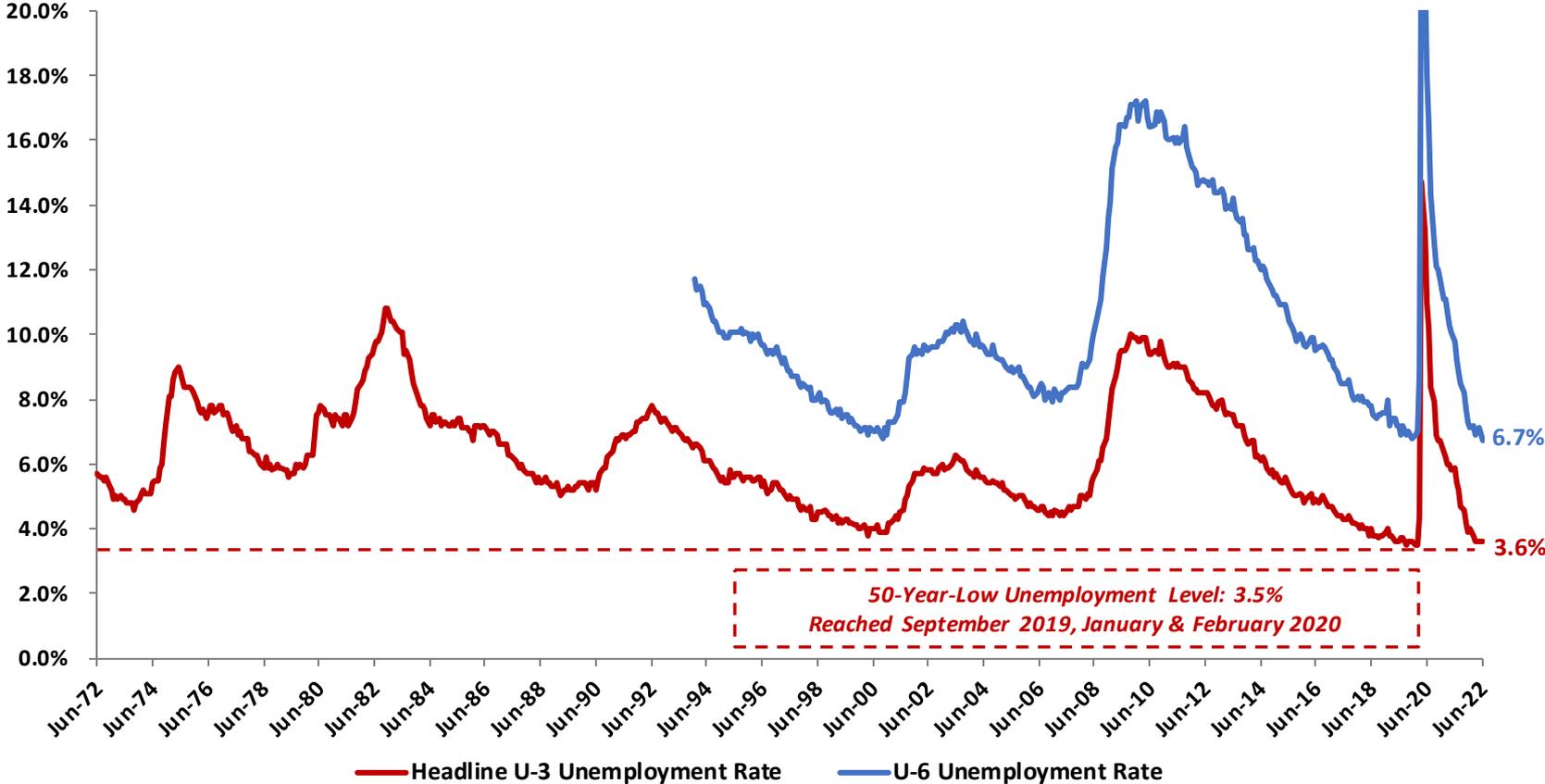
Source: Bureau of Labor Statistics (Employment Situation Report)

(1) U-6 unemployment rate represents total unemployed, plus all persons marginally attached to the labor force, plus total employed part time for economic reasons, as a percent of the civilian labor force plus all persons marginally attached to the labor force

Unemployment Rate at Historical Lows

Over the last 50 years, there have only been three months when the headline unemployment rate was lower than the current level of 3.6%

Headline U-3 & U-6 Unemployment Rate:

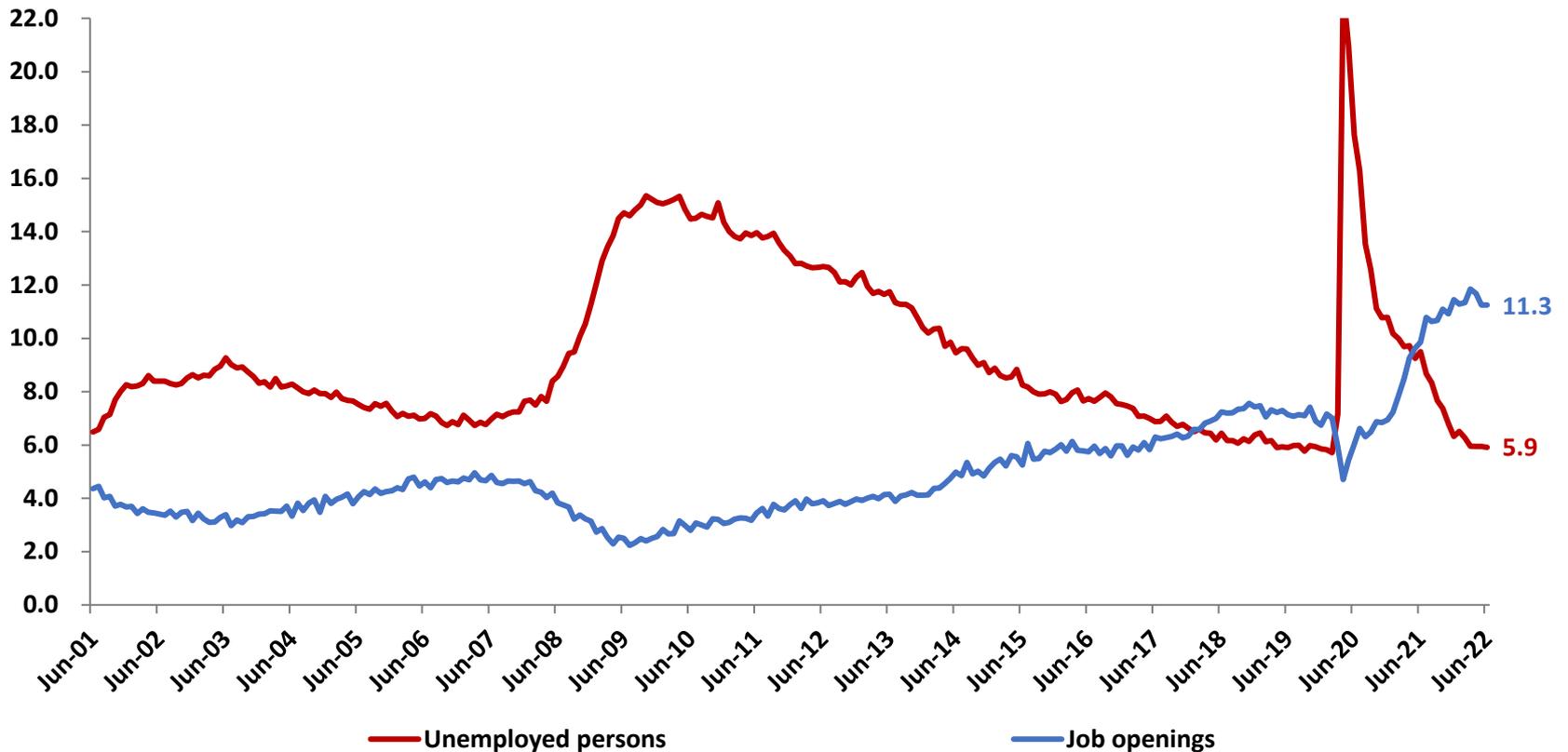


Source: Bureau of Labor Statistics (Employment Situation Report)

Job Openings at Historical Highs

There are an unprecedented 11.3 million job openings in the economy, 5.3 million more than the number of unemployed persons, the widest gap since job openings data first became available

Number of Job Openings and Total Unemployed Persons in Labor Force | Figures in millions:

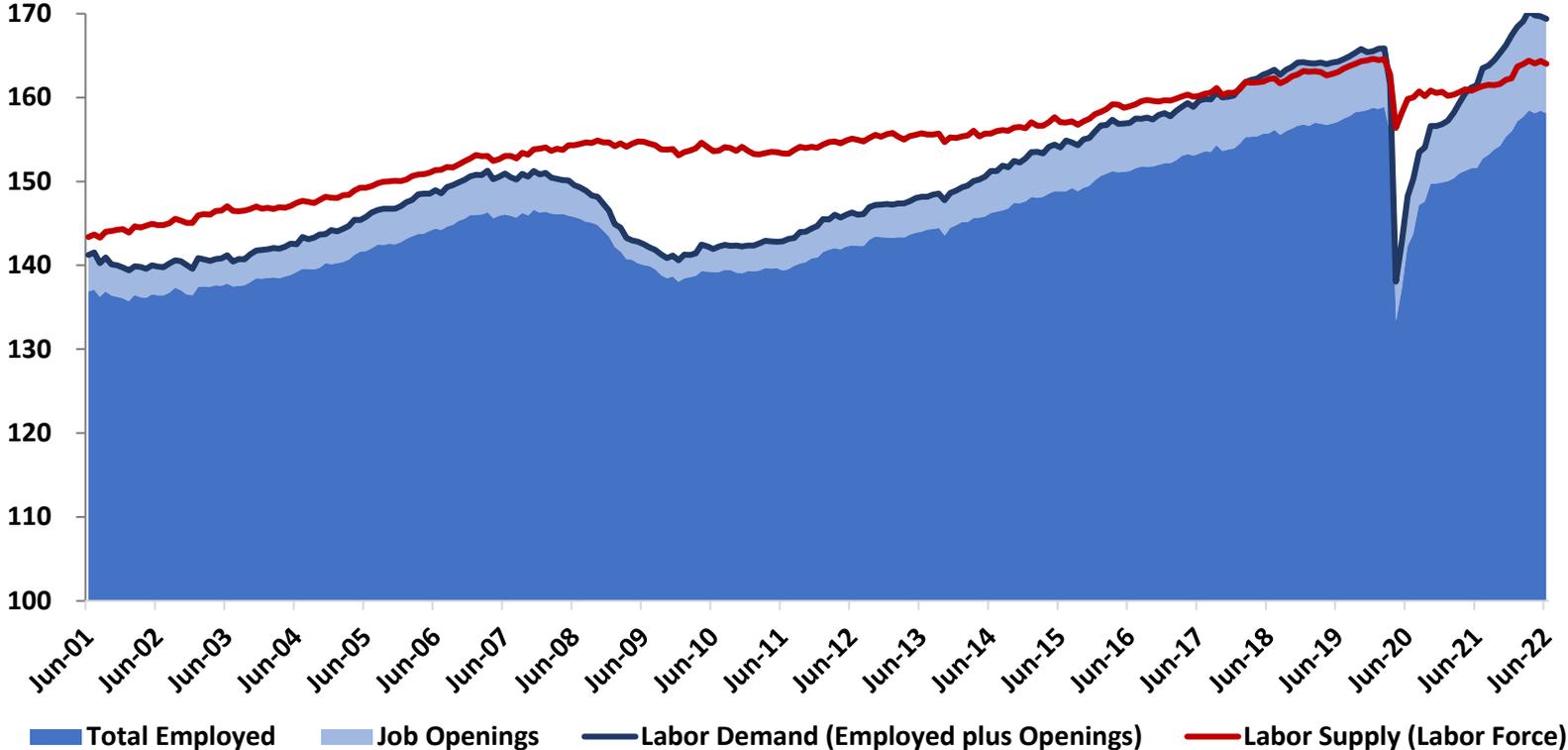


Source: Bureau of Labor Statistics (Job Openings and Labor Turnover Survey)

Recovery in Labor Demand vs Supply

Labor demand (employment plus job openings) has rapidly recovered with approximately 4 million more jobs available today than in December 2019, whereas the labor force remains approximately 300k workers below its December 2019 level

Labor Demand (Employment plus Job Openings) & Labor Supply (Labor Force) | Figures in millions:

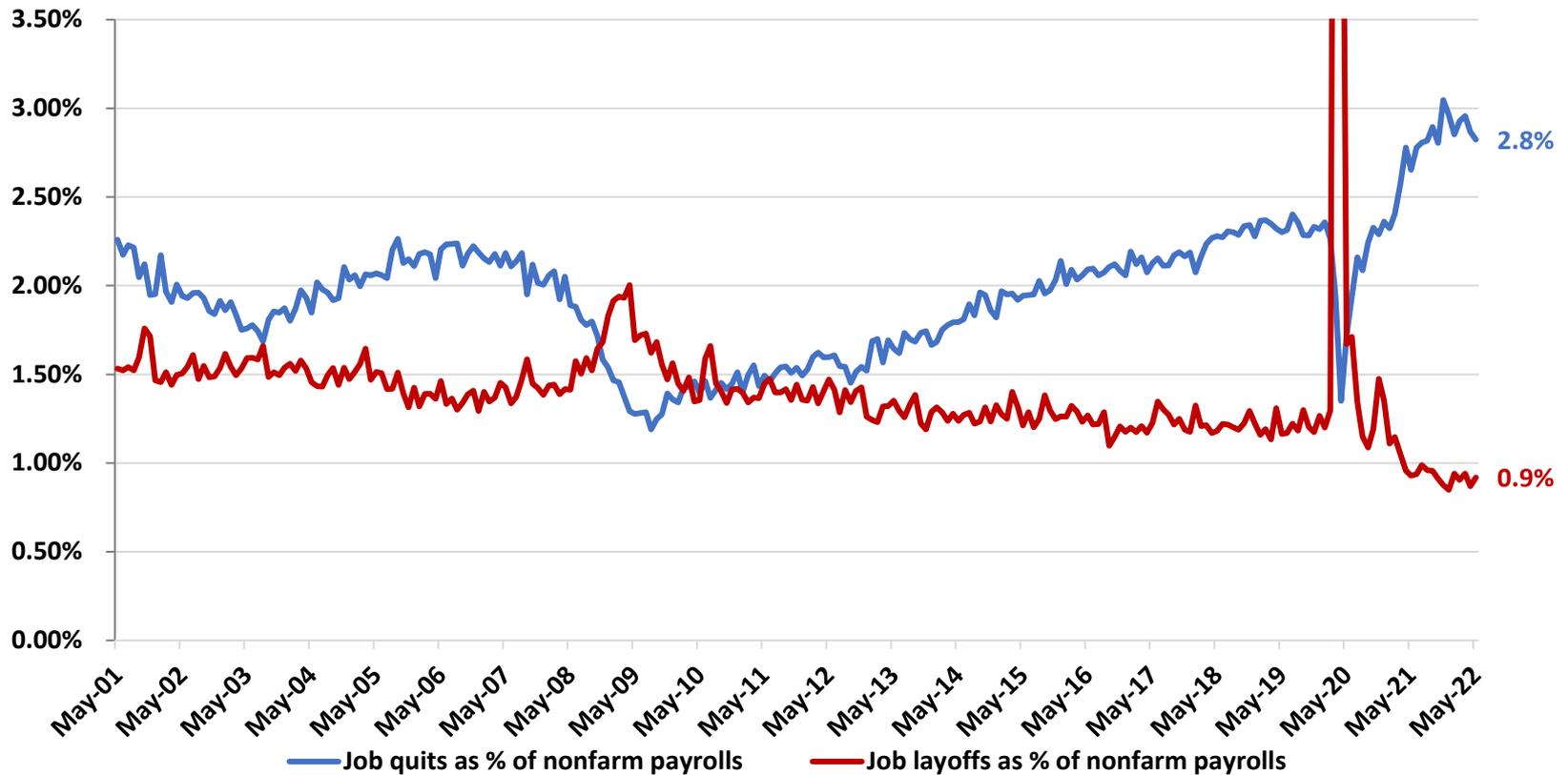


Source: Bureau of Labor Statistics (Job Openings and Labor Turnover Survey)

Low Job Layoff and High Voluntary Quit Rates

Current high rate of job separations is primarily comprised of voluntary quits. Job layoffs, as a percentage of nonfarm payrolls, are at their lowest level since data first became available

Monthly job layoffs and job quits as % of nonfarm payrolls:



Source: Bureau of Labor Statistics (Job Openings and Labor Turnover Survey)

Recent (June 29, 2022) Commentary from Paychex Confirms Economic Strength and Continued Job Growth

Paychex is a leading provider of payroll and human resource outsourcing services for small- to medium-sized businesses

“Macroeconomic trends have been positive this year, but with inflation at a 40-year high, there are concerns for potential of a recession in the near future. **We continue to monitor key leading indicators for any signs of a change in the macroeconomic environment, but have not seen any signs of deterioration at this time.**

Typically, **the first signs of a macroeconomic recession would be a decline in employment levels at existing clients and uptick in non-processing clients or a slowdown in sales activities. These indicators continue to trend in a positive direction.**

The latest Paychex IHS Small Business Employment Watch reflected a 12-month consecutive -- **a 12th consecutive month of increasing hourly earnings gains, though we did notice slowing a bit of the pace of job growth in May. However, this is more reflective of being near full employment and the difficulty of finding employees.**

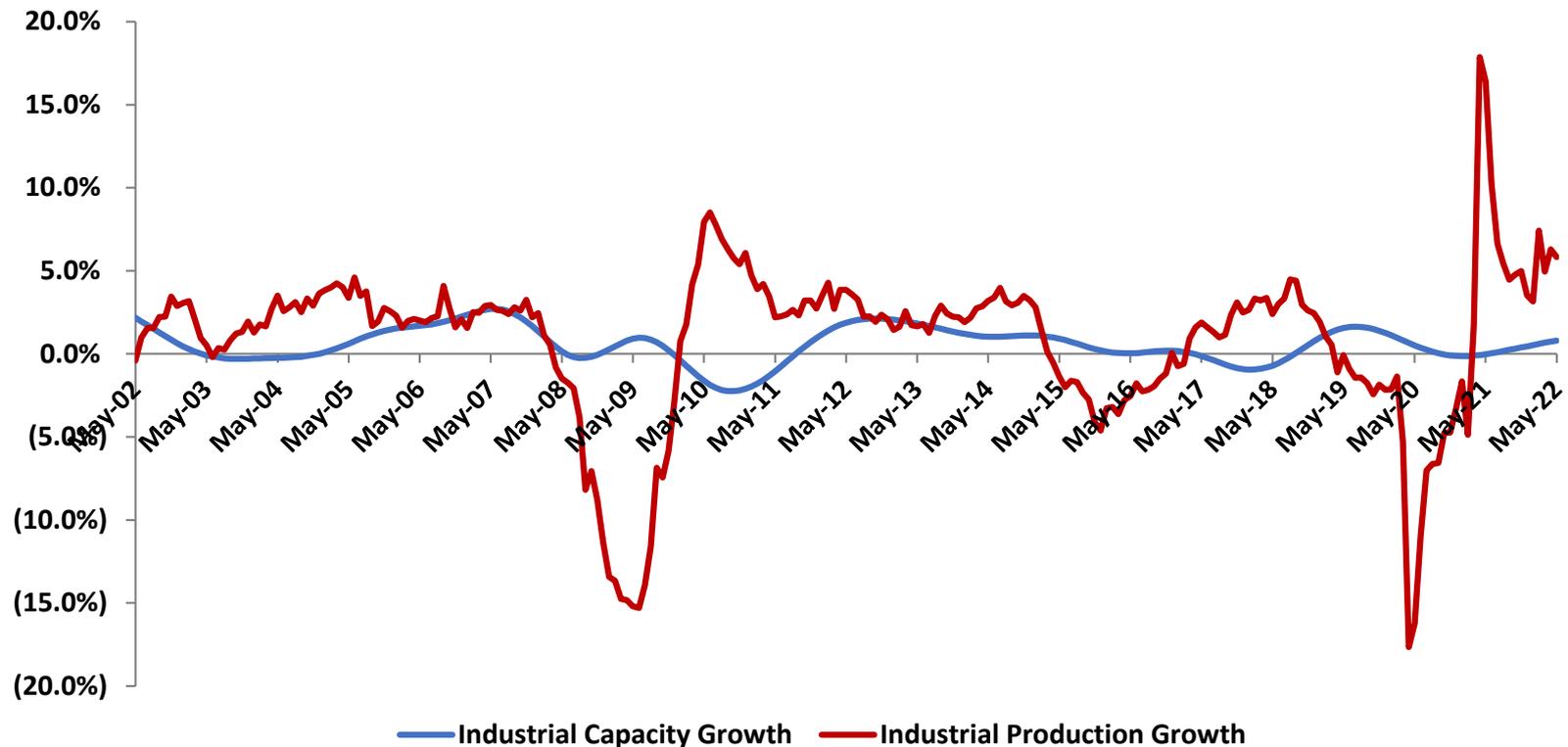
Job growth at U.S. small businesses remained strong in the face of a tight labor market and inflation pressures.”

– Martin Mucci, Chairman and **CEO of Paychex**
Paychex Q4 FY 2022 Earnings Call, June 29, 2022

U.S. Industrial Capacity Growth Remains Limited

Whereas industrial production is highly cyclical, industrial capacity is relatively inelastic and has typically grown at a low-single-digit rate per annum

Year-over-year growth in U.S. industrial capacity & production:

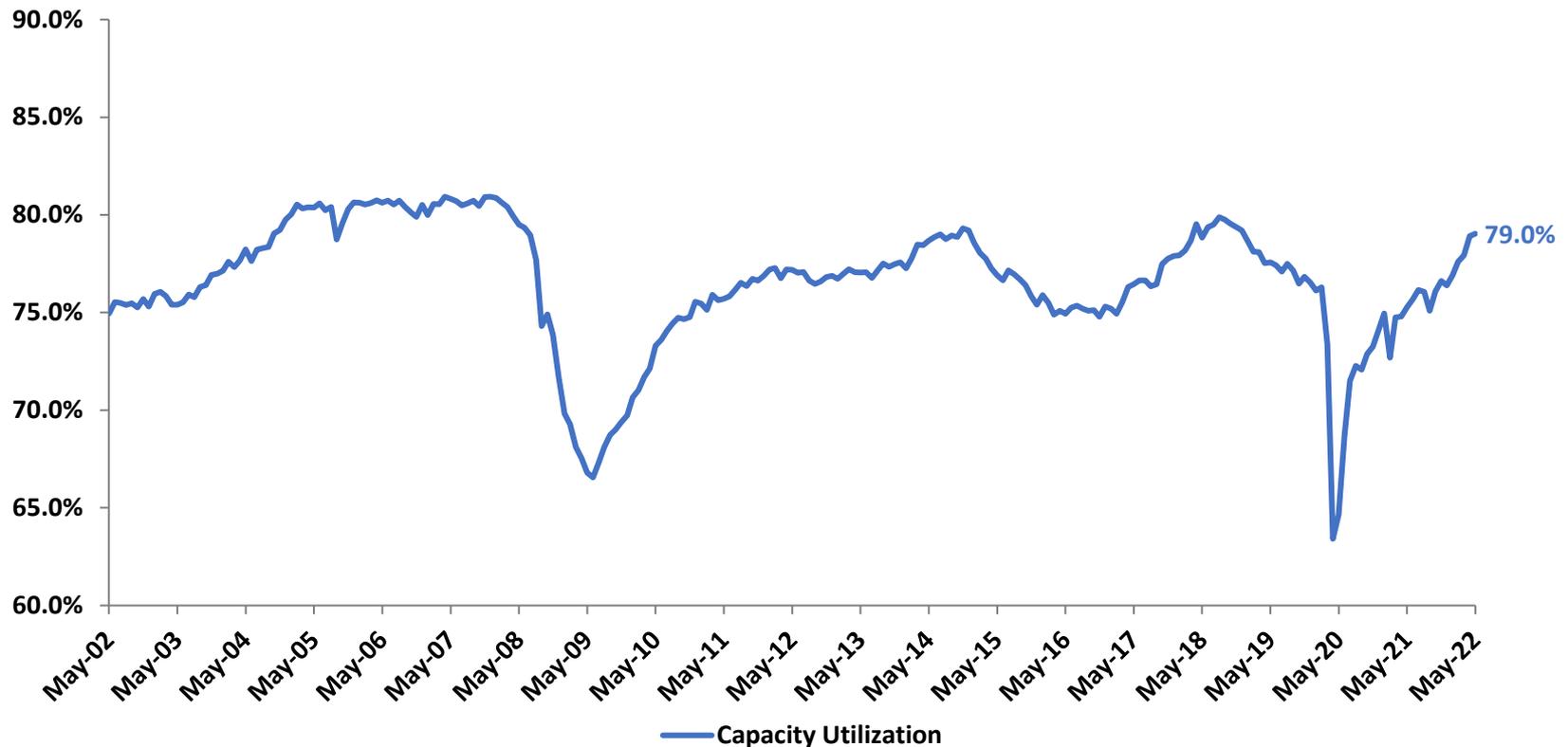


Source: Federal Reserve (Release G.17 Industrial Production and Capacity Utilization)

Industrial Capacity Utilization at Peak Levels

Current industrial capacity utilization is nearing peak levels seen over the last twenty years

U.S. Industrial Capacity Utilization (Production / Capacity):

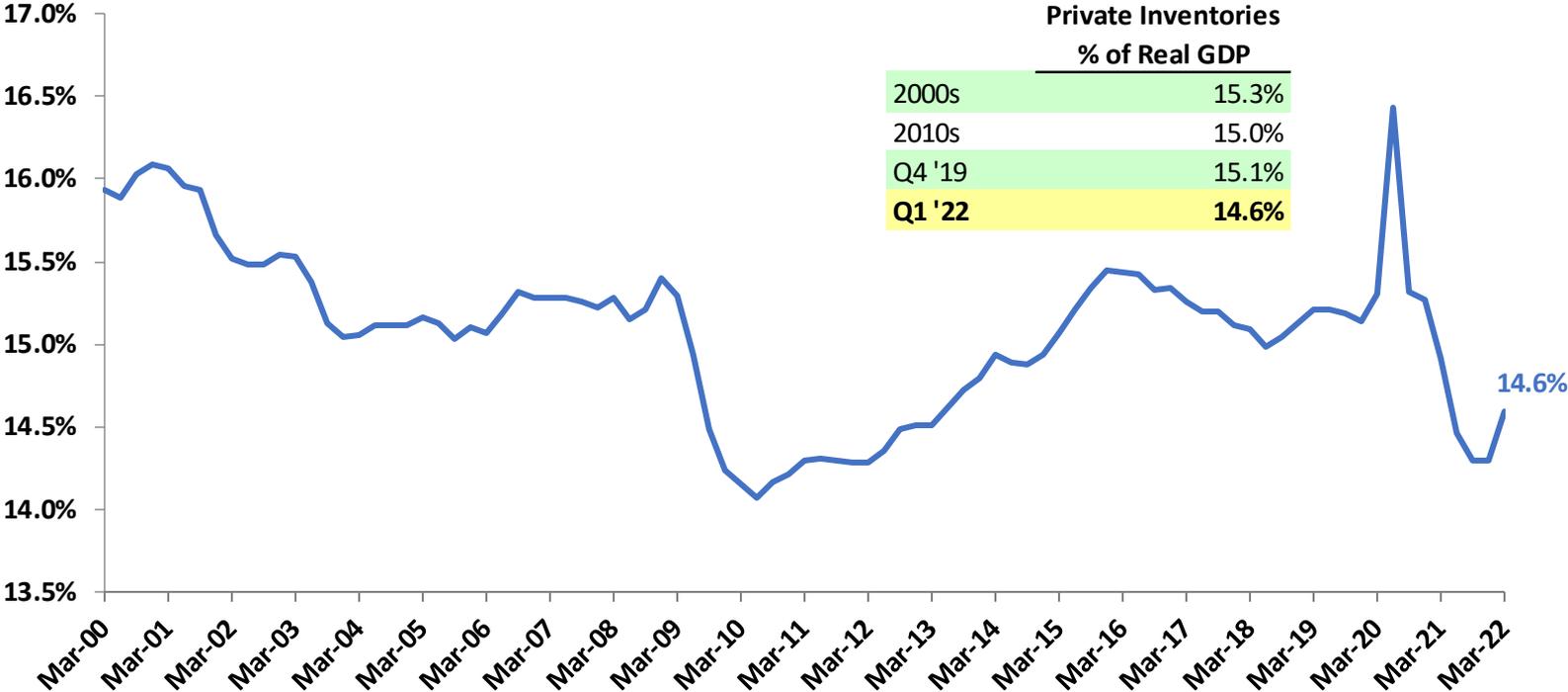


Source: Federal Reserve (Release G.17 Industrial Production and Capacity Utilization)

Real Inventory as % of GDP Is Below Historical Trend

Real private inventory levels, which reflect inventory units on a price-adjusted basis, do not appear to be at unsustainably high levels relative to real GDP

Real Private Inventories as % of Real GDP:



The economy may stabilize at a higher level of real private inventories relative to GDP as companies recalibrate towards a “just in case inventory” vs a “just in time inventory” operating model

Source: Bureau of Economic Analysis

Retail Inventory-to-Sales In-line With Historical Levels

Current nominal inventory-to-sales ratios are in-line with their historical pre-pandemic levels across most retail sales categories

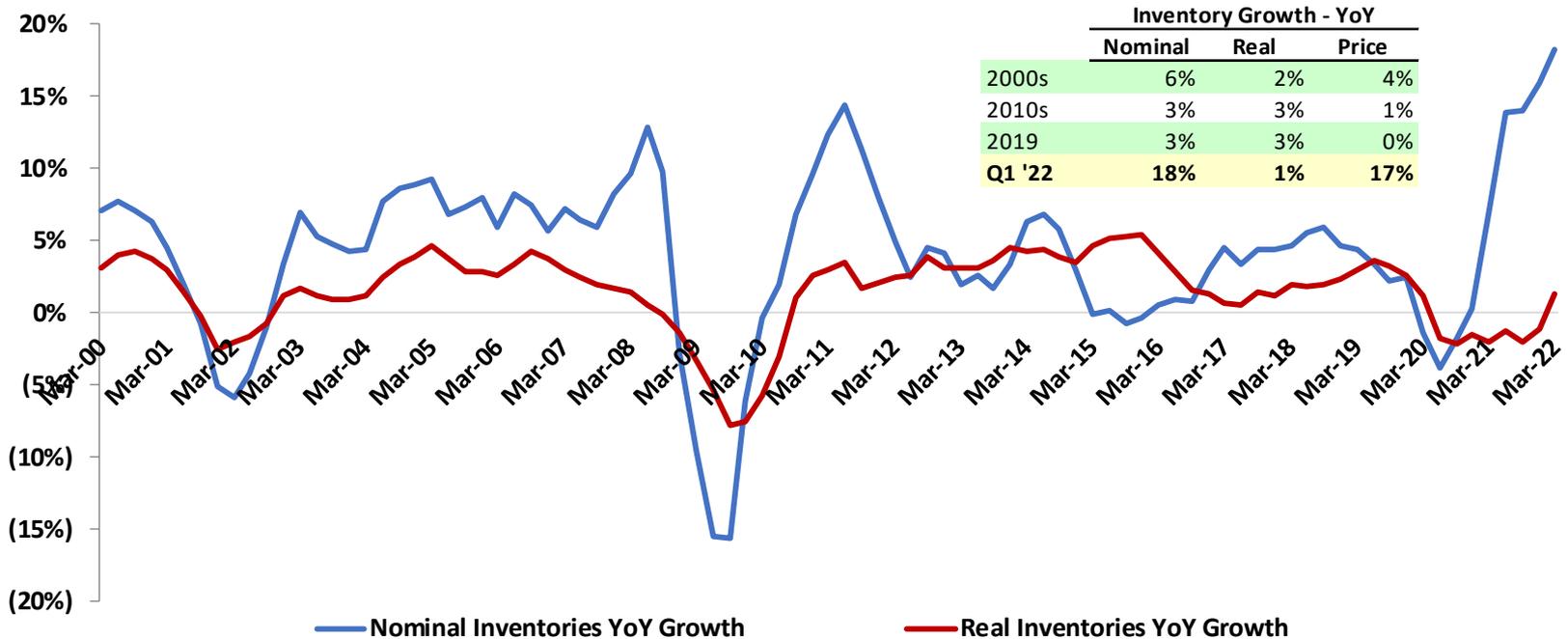
Nominal inventory-to-sales ratios by category:

	% of Sales	Historical Averages					Current	% Above / (Below)	
		'00-'09	'10-'19	2019	2020	2021		'10-'19	2019
Total Retail Sales	100%	1.54x	1.44x	1.47x	1.34x	1.13x	1.18x	(18%)	(20%)
Total Ex. Motor Vehicle and Parts	78%	1.37x	1.24x	1.22x	1.15x	1.07x	1.15x	(7%)	(6%)
Motor Vehicle and Parts	22%	2.04x	2.11x	2.31x	2.07x	1.32x	1.28x	(39%)	(45%)
Furniture, Electronics, & Appliance	3%	1.76x	1.61x	1.57x	1.65x	1.34x	1.62x	1%	3%
Building Materials & Garden	7%	1.72x	1.83x	1.84x	1.66x	1.72x	1.87x	2%	2%
Food and Beverage	13%	0.81x	0.79x	0.79x	0.73x	0.74x	0.78x	(1%)	(2%)
Clothing & Accessories	4%	2.55x	2.42x	2.42x	4.24x	1.90x	2.12x	(12%)	(12%)
General Merchandise	12%	1.66x	1.44x	1.37x	1.27x	1.26x	1.58x	10%	15%
Department Stores	2%	2.11x	2.11x	2.07x	2.11x	1.76x	2.12x	1%	2%
Other	36%	2.10x	2.11x	2.07x	2.11x	1.76x	2.12x	1%	2%

Rapid Inventory Growth is Driven by Inflation

Although inventory levels appear to be growing rapidly on a nominal basis, the growth is entirely due to elevated levels of price inflation. In Q1 2022, on a price-adjusted basis, real inventories (units) were only up 1% year-over-year

Year-over-year growth in nominal and real private inventories:



We expect that large growth in nominal inventories due to price should have very different discounting dynamics than large growth primarily due to units, which suggests that widespread discounting is unlikely

Long-Term Structural Headwinds to Supply Growth

Several emerging structural forces, which are not yet reflected in recently reported data, will likely add substantial long-term inflationary pressures

- ▶ **Renewed focus on national and resource security**
 - Desire for energy independence drives local resource production
- ▶ **De-globalization and re-shoring of supply chains**
 - Recent supply chain disruptions have highlighted the need for improved supply chain control and redundancy
- ▶ **Adoption of ESG standards and de-carbonization**
 - Long-term capacity growth for commodities production (e.g., new mines, pipelines, drilling rigs) remains highly challenged due to environmental and regulatory considerations
- ▶ **Labor bargaining power**
 - Rise of unionization (e.g., Starbucks and Amazon)
 - Lack of immigration
- ▶ **Stakeholder capitalism**

Conclusion

While there are some early signs of a slowdown in real economic growth, we believe inflationary pressures are likely to persist due to ongoing supply-demand imbalances

- ▶ **High inflation is a tax on economic growth**
 - Inflation has an outsized negative impact on low- to middle- income households
 - Persistently high inflation hampers the ability of consumers and businesses to plan and invest for the long-term
- ▶ **Historical precedents suggest that prematurely easing monetary policy in a stagflationary environment is a serious policy mistake**
 - Insufficiently restrictive monetary policy in the 1970s led to high persistent inflation and inflationary expectations becoming unanchored
- ▶ **Raising and maintaining the Fed Funds rate at a sufficiently high level has been the only proven policy response to stabilizing inflation and inflationary expectations**
- ▶ **Once inflation has been quelled, the economy can experience a lengthy and robust expansion similar to the recovery that followed the Volcker-era tightening cycle**

Prudent Risk Management & Inflation Expectations

We agree with Cleveland Federal Reserve President Loretta Mester's proposed risk management approach to monetary policy and inflation expectations

“In the current situation, from a risk-management perspective, it is important for policymakers to ask which situation would be more costly: erroneously assuming longer-term inflation expectations are well anchored at the level consistent with price stability when, in fact, they are not? Or erroneously assuming that they are moving with economic conditions when they are actually anchored? Simulations of the Board's FRB/US model suggest that the more costly error is assuming inflation expectations are anchored when they are not. If inflation expectations are drifting up and policymakers treat them as stable, policy will be set too loose. Inflation would then move up and this would be reinforced by increasing inflation expectations. If, on the other hand, inflation expectations are actually stable and policymakers view the drift up with concern, policy will initially be set tighter than it should. Inflation would move down, perhaps even below target, but not for long, since inflation expectations are anchored at the goal.

These simulation results, coupled with research suggesting that persistent elevated inflation poses an increasing risk that inflation expectations could become unanchored, strongly argue against policymakers being complacent about a rise in longer-term expectations. Indeed, inflation expectations are determined not only by movements in inflation but also by policymakers' actions to follow through on their strongly stated commitment to return inflation to its longer-run goal, thereby justifying the public's belief in the central bank's commitment.”

– Loretta Mester, President of the Federal Reserve Bank of Cleveland
The Role of Inflation Expectations in Monetary Policymaking: A Practitioner's Perspective
June 29, 2022

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