Callan

March 14, 2023

2023 Economic Outlook
and Its Impact on Employers

Capital Markets Research Group

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Agenda

- **Current market conditions**
  - Special focus on inflation
- **2023 expectations**
  - Fixed Income
  - Equity
  - Alternatives
- **Detailed 2023 projections and resulting portfolio returns**

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Current Market Conditions

Mayhem in the Capital Markets

Russian invasion of Ukraine threw expectations for an orderly transition from pandemic era out the window.

Inflation is burning out of control, with CPI-U up more than 8% year-over-year in each month from March through September.

- Inflation readings decelerated after September, coming in at 6.5% in December..

The S&P 500 and Bloomberg Aggregate were down together for three consecutive quarters through 3Q22; both were up in 4Q22.

The Fed remains on a mission to raise interest rates to fight inflation; new target range set in December 2022 is 4.25%–4.5%.

- The Fed has raised rates 425 bps since March, from a range of 0.0%-0.25%.

No place to hide in 2022; almost every asset class is down. It was the worst year for a 60/40 portfolio in decades.

Rising likelihood of recession:

- **GDP actually declined in both 1Q and 2Q**
- **Growth rebounded in 3Q to 3.2%, and to 2.9% in 4Q, but…**

Yield curve is inverted!

Equity and Fixed Income Markets Down Together in 2022

Negative returns for stocks and bonds at the same time for three quarters are extremely unusual

Global equity markets down sharply in 2022 despite rebound in 4Q

- Similar impact across all equity market segments: developed, emerging, small cap

Fixed income down with sharply higher inflation and interest rates

- Bloomberg Aggregate: -13% for the year, worst year ever for the index by a wide margin
- CPI-U: +6.5% for the year ended Dec. 2022

- Number of times stocks and bonds have been down together
  - 38 quarters in almost 100 years, about 10% of the quarters
  - But just twice on annual basis
- Inflation at highest rate in decades
- Economic data show growth hit ‘pause’
  - GDP recovered to 3.2% in 3Q22 and 2.9% in 4Q, after falling in both 2Q and 1Q
  - Growth for the year 2022 came in at 2.1%, forecasters predict as low as 1.5% for 2023.

Returns for Periods ended 12/31/22

	Quarter	Year to Date	1 Year	5 Years	10 Years	25 Years
U.S. Equity						
Russell 3000	7.18	-19.21	-19.21	8.79	12.13	7.68
S&P 500	7.56	-18.11	-18.11	9.42	12.56	7.64
Russell 2000	6.23	-20.44	-20.44	4.13	9.01	7.13
Global ex-U.S. Equity						
MSCI World ex USA	16.18	-14.29	-14.29	1.79	4.59	4.65
MSCI Emerging Markets	9.70	-20.09	-20.09	-1.39	1.44	--
MSCI ACWI ex USA Small Cap	13.31	-19.97	-19.97	0.67	5.24	6.87
Fixed Income						
Bloomberg Aggregate	1.87	-13.01	-13.01	0.02	1.06	3.97
90-day T-Bill	0.84	1.46	1.46	1.26	0.76	1.91
Bloomberg Long Gov/Credit	2.61	-27.09	-27.09	-1.21	1.57	5.38
Bloomberg Global Agg ex-US	6.81	-18.70	-18.70	-3.07	-1.64	2.71
Real Estate						
NCREIF Property	0.57	9.98	9.98	8.35	9.27	9.22
FTSE Nareit Equity	5.24	-24.37	-24.37	3.68	6.53	7.87
Alternatives						
CS Hedge Fund Index*	0.35	1.08	1.08	4.53	4.35	5.87
Cambridge Private Equity*	-5.60	3.34	3.34	18.22	15.90	14.75
Bloomberg Commodity	2.22	16.09	16.09	6.44	-1.28	1.87
Gold Spot Price	9.22	-0.13	-0.13	6.88	0.86	7.64
Inflation - CPI-U	0.00	6.45	6.45	3.78	2.60	2.47

*Cambridge PE data through 06/30/22. CS Hedge Fund Index data through 09/30/22.
Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

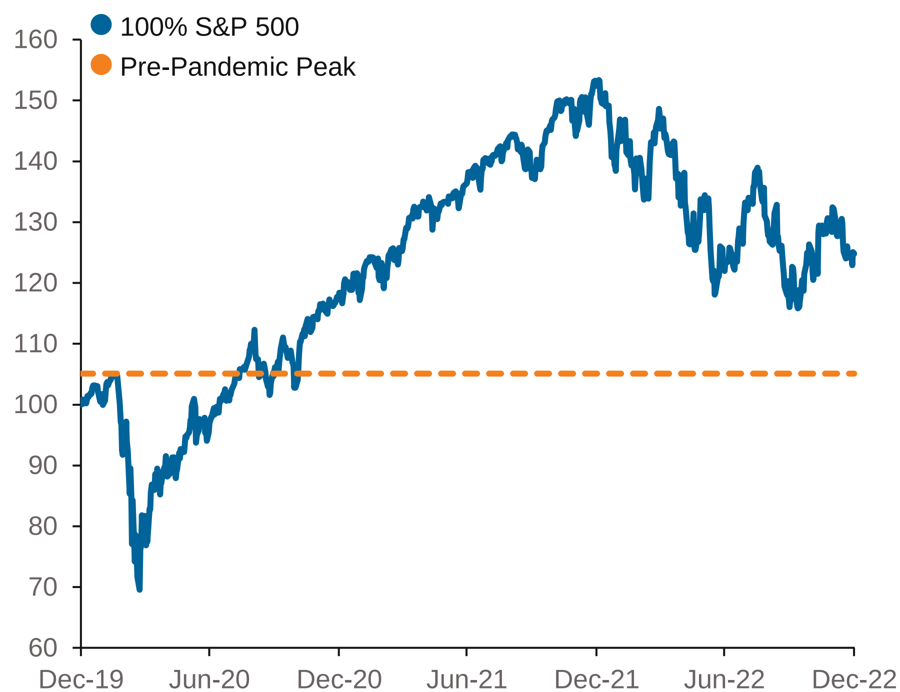
Callan Periodic Table of Investment Returns

Monthly Returns												Annual Returns
Jan 2022	**Feb 2022**	**Mar 2022**	**Apr 2022**	**May 2022**	**Jun 2022**	**Jul 2022**	**Aug 2022**	**Sep 2022**	**Oct 2022**	**Nov 2022**	**Dec 2022**	**2022**
Emerging Market Equity **-1.89%**	Small Cap Equity **1.07%**	Real Estate **4.47%**	High Yield **-3.56%**	Dev ex-U.S. Equity **0.83%**	U.S. Fixed Income **-1.57%**	Small Cap Equity **10.44%**	Emerging Market Equity **0.42%**	High Yield **-3.97%**	Small Cap Equity **11.01%**	Emerging Market Equity **14.83%**	Global ex-U.S. Fixed Income **1.31%**	High Yield **-11.19%**
Global ex-U.S. Fixed Income **-1.96%**	High Yield **-1.03%**	Large Cap Equity **3.71%**	U.S. Fixed Income **-3.79%**	U.S. Fixed Income **0.64%**	Global ex-U.S. Fixed Income **-4.50%**	Large Cap Equity **9.22%**	Small Cap Equity **-2.05%**	U.S. Fixed Income **-4.32%**	Large Cap Equity **8.10%**	Dev ex-U.S. Equity **10.65%**	U.S. Fixed Income **-0.45%**	U.S. Fixed Income **-13.01%**
U.S. Fixed Income **-2.15%**	Global ex-U.S. Fixed Income **-1.11%**	Small Cap Equity **1.24%**	Real Estate **-5.48%**	Emerging Market Equity **0.44%**	Emerging Market Equity **-6.64%**	Real Estate **7.96%**	High Yield **-2.30%**	Global ex-U.S. Fixed Income **-5.87%**	Dev ex-U.S. Equity **5.51%**	Real Estate **6.73%**	Dev ex-U.S. Equity **-0.48%**	Dev ex-U.S. Equity **-14.29%**
High Yield **-2.73%**	U.S. Fixed Income **-1.12%**	Dev ex-U.S. Equity **1.16%**	Emerging Market Equity **-5.56%**	High Yield **0.25%**	High Yield **-6.73%**	High Yield **5.90%**	U.S. Fixed Income **-2.83%**	Large Cap Equity **-9.21%**	Real Estate **2.99%**	Large Cap Equity **5.59%**	High Yield **-0.62%**	Large Cap Equity **-18.11%**
Dev ex-U.S. Equity **-4.41%**	Dev ex-U.S. Equity **-1.56%**	High Yield **-1.15%**	Dev ex-U.S. Equity **-6.57%**	Large Cap Equity **0.18%**	Small Cap Equity **-8.22%**	Dev ex-U.S. Equity **4.97%**	Large Cap Equity **-4.08%**	Dev ex-U.S. Equity **-9.26%**	High Yield **2.60%**	Global ex-U.S. Fixed Income **5.58%**	Emerging Market Equity **-1.41%**	Global ex-U.S. Fixed Income **-18.70%**
Large Cap Equity **-5.17%**	Real Estate **-2.47%**	Emerging Market Equity **-2.26%**	Global ex-U.S. Fixed Income **-6.83%**	Small Cap Equity **0.15%**	Large Cap Equity **-8.25%**	U.S. Fixed Income **2.44%**	Dev ex-U.S. Equity **-4.67%**	Small Cap Equity **-9.58%**	Global ex-U.S. Fixed Income **-0.14%**	U.S. Fixed Income **3.68%**	Real Estate **-2.79%**	Emerging Market Equity **-20.09%**
Real Estate **-5.75%**	Emerging Market Equity **-2.99%**	U.S. Fixed Income **-2.78%**	Large Cap Equity **-8.72%**	Global ex-U.S. Fixed Income **0.01%**	Real Estate **-8.69%**	Global ex-U.S. Fixed Income **1.92%**	Global ex-U.S. Fixed Income **-4.99%**	Emerging Market Equity **-11.72%**	U.S. Fixed Income **-1.30%**	Small Cap Equity **2.34%**	Large Cap Equity **-5.76%**	Small Cap Equity **-20.44%**
Small Cap Equity **-9.63%**	Large Cap Equity **-2.99%**	Global ex-U.S. Fixed Income **-3.20%**	Small Cap Equity **-9.91%**	Real Estate **-4.35%**	Dev ex-U.S. Equity **-9.41%**	Emerging Market Equity **-0.25%**	Real Estate **-6.49%**	Real Estate **-12.42%**	Emerging Market Equity **-3.10%**	High Yield **2.17%**	Small Cap Equity **-6.49%**	Real Estate **-25.10%**

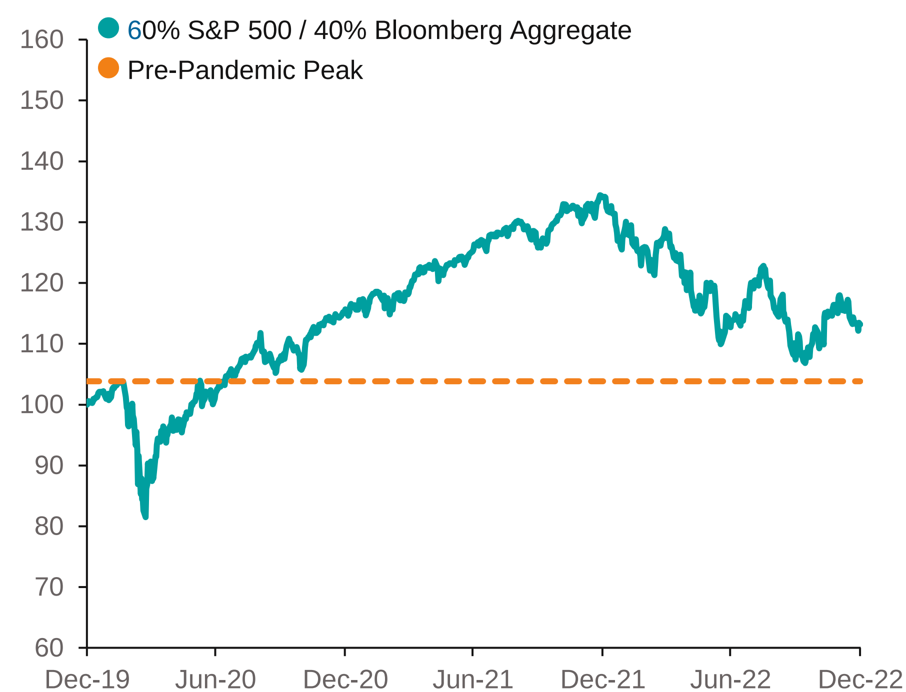
Sources: Bloomberg Aggregate • Bloomberg Corp High Yield • Bloomberg Global Aggregate ex US • FTSE EPRA Nareit Developed • MSCI World ex USA • MSCI Emerging Markets • Russell 2000 • S&P 500

Post-Pandemic Market Performance

Growth of $100 Invested on 12/31/19



Growth of $100 Invested on 12/31/19

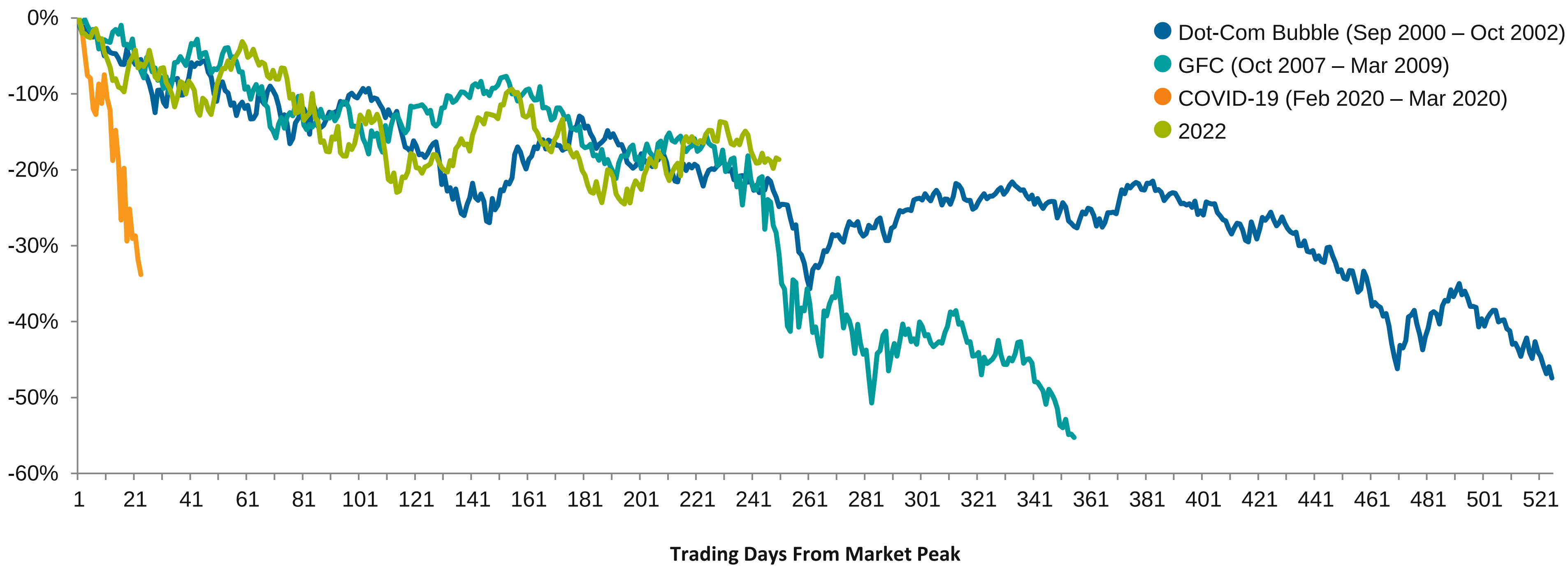


	Investment in S&P 500	Investment in 60% S&P 500 / 40% Bloomberg Agg
Gain from pre-pandemic peak to post-pandemic peak	45.9%	29.4%
Gain over pre-pandemic peak	18.8%	9.0%
Loss from post-pandemic peak	-18.6%	-15.8%
Further loss needed to return to pre-pandemic peak	-15.8%	-8.2%
Total loss if markets decline from post-pandemic peak to pre-pandemic peak	-31.5%	-22.7%

2022 Equity Drawdown: A More ‘Typical’ Correction?

S&P 500 Cumulative Returns

Market Peak-to-Trough for Recent Corrections vs. 2022 Through 12/31/22

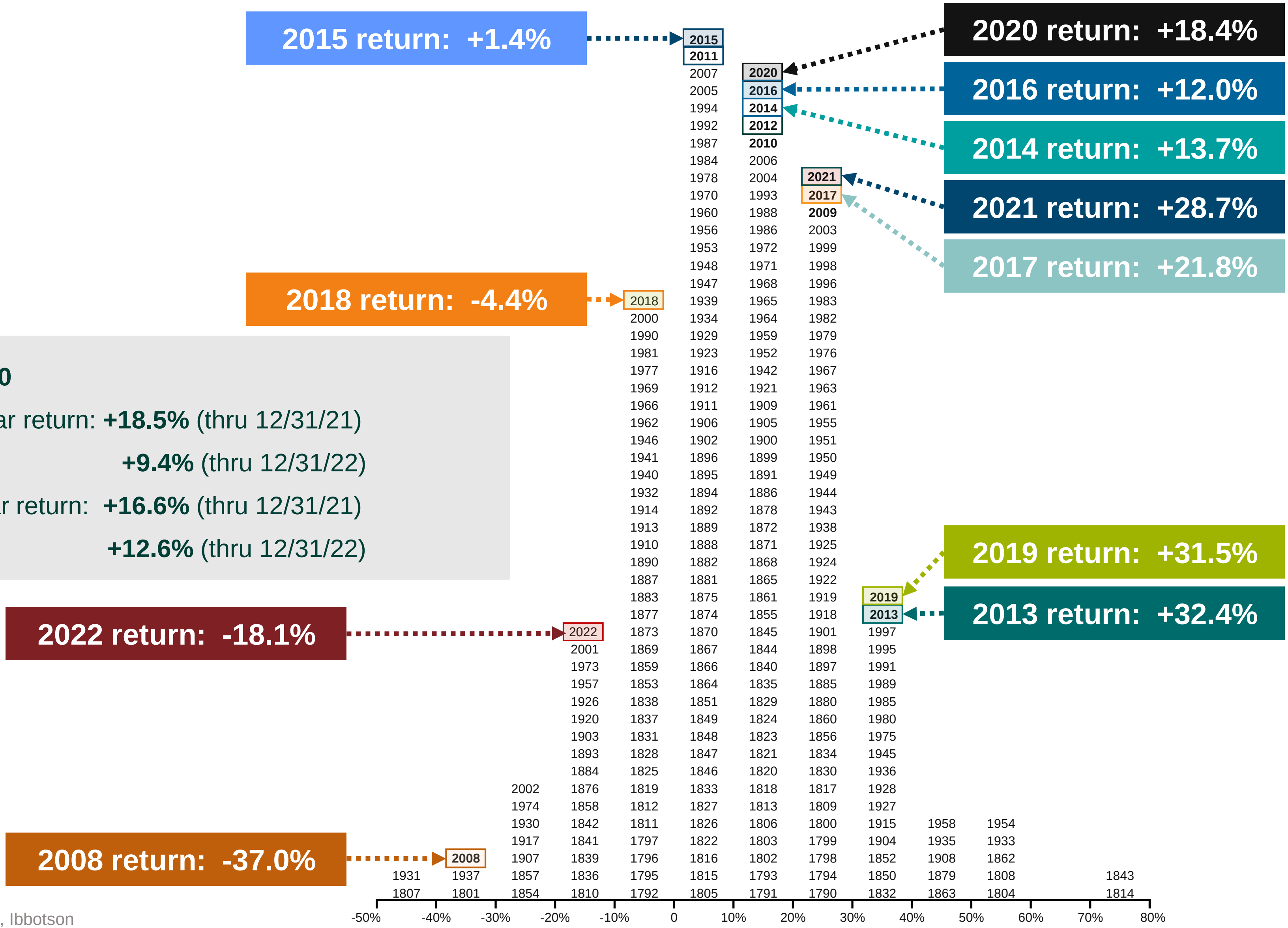


- While the COVID correction was swift and intense, the 2022 correction resembles the GFC and Dot-Com Bubble.
- The 2022 drawdown has been 250 trading days through December.
- It would take another 105 trading days to get to the bottom of the GFC and 275 trading days to get to the bottom of the Tech Bubble.

Sources: Callan, S&P Dow Jones Indices

Stock Market Returns by Calendar Year

2022 YTD performance in perspective: History of the U.S. stock market (233 years of returns)



S&P 500

Five-year return: **+18.5%** (thru 12/31/21)

+9.4% (thru 12/31/22)

Ten-year return: **+16.6%** (thru 12/31/21)

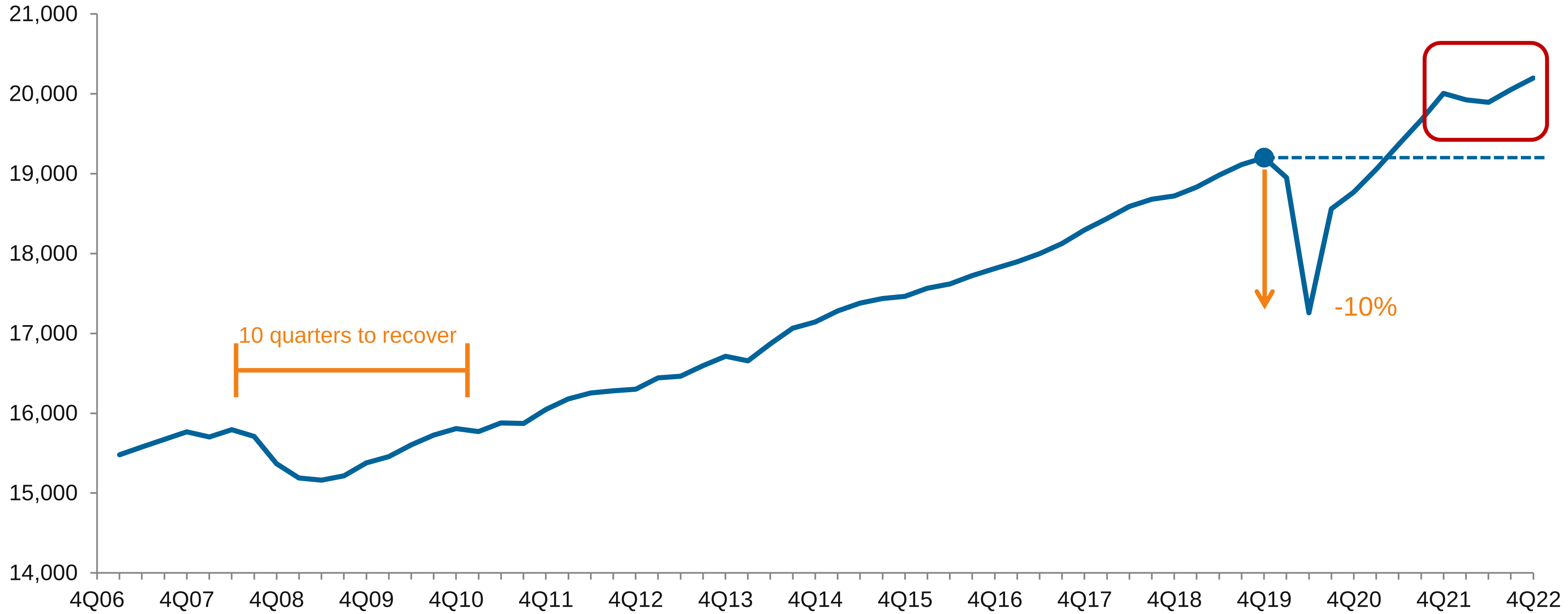
+12.6% (thru 12/31/22)

Sources: Callan, Ibbotson

GDP Fell for Two Consecutive Quarters in First Half, Up 3.2% and 2.9% in 3Q and 4Q

Recovered pre-pandemic level in 2Q21 after deepest drop in 75 years

Seasonally Adjusted Real GDP in Billions of Dollars Through 9/30/22

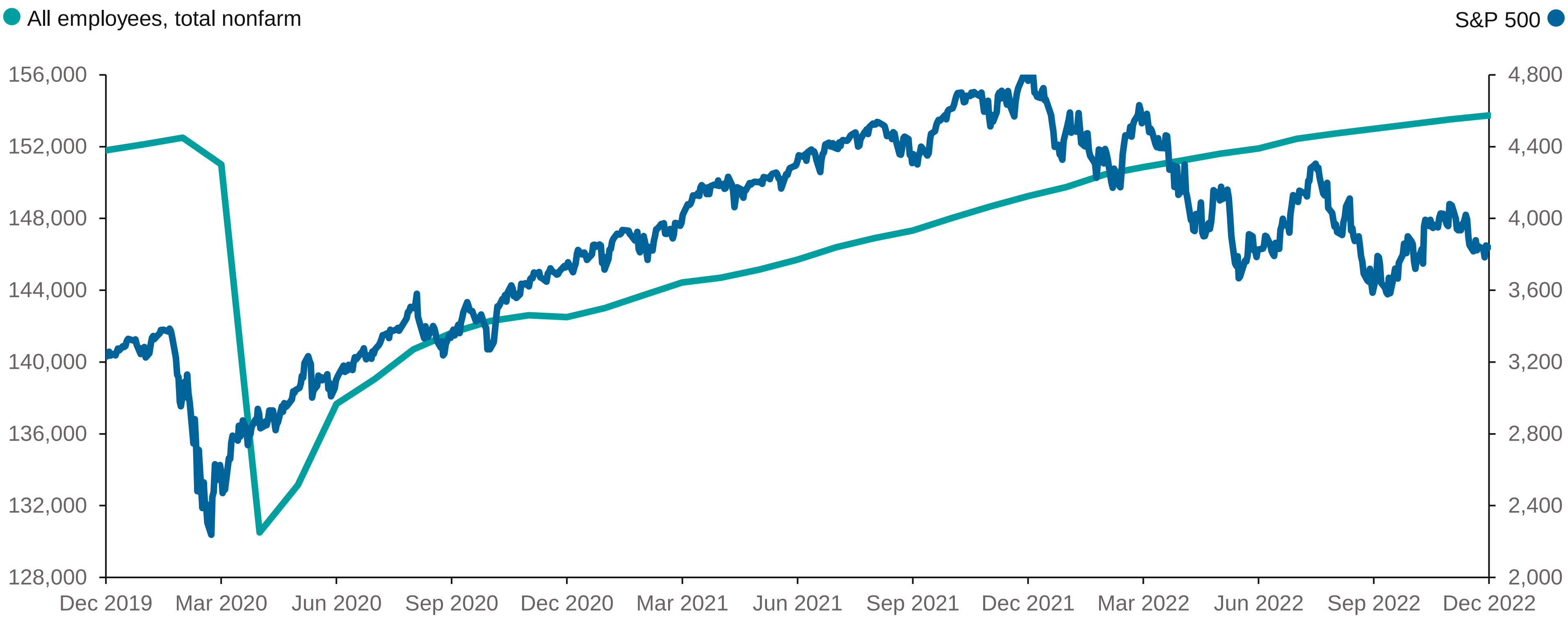


GDP growth in 2022 came in at 2.1% for the year, after starting the year with consecutive quarterly losses

- 3Q22 GDP rose 3.2%, 4Q rose 29%, after falling 1.6% in 1Q22 and 0.6% in 2Q22.
- Loss of business and consumer confidence followed the start of the conflict in Ukraine.
- Consumer wealth hit by stock and bond market drop, and now a sharp slowdown in residential housing, as mortgage rates doubled from the start of the year.

Source: Federal Reserve Bank of St. Louis

The Stock Market Is Not the Economy



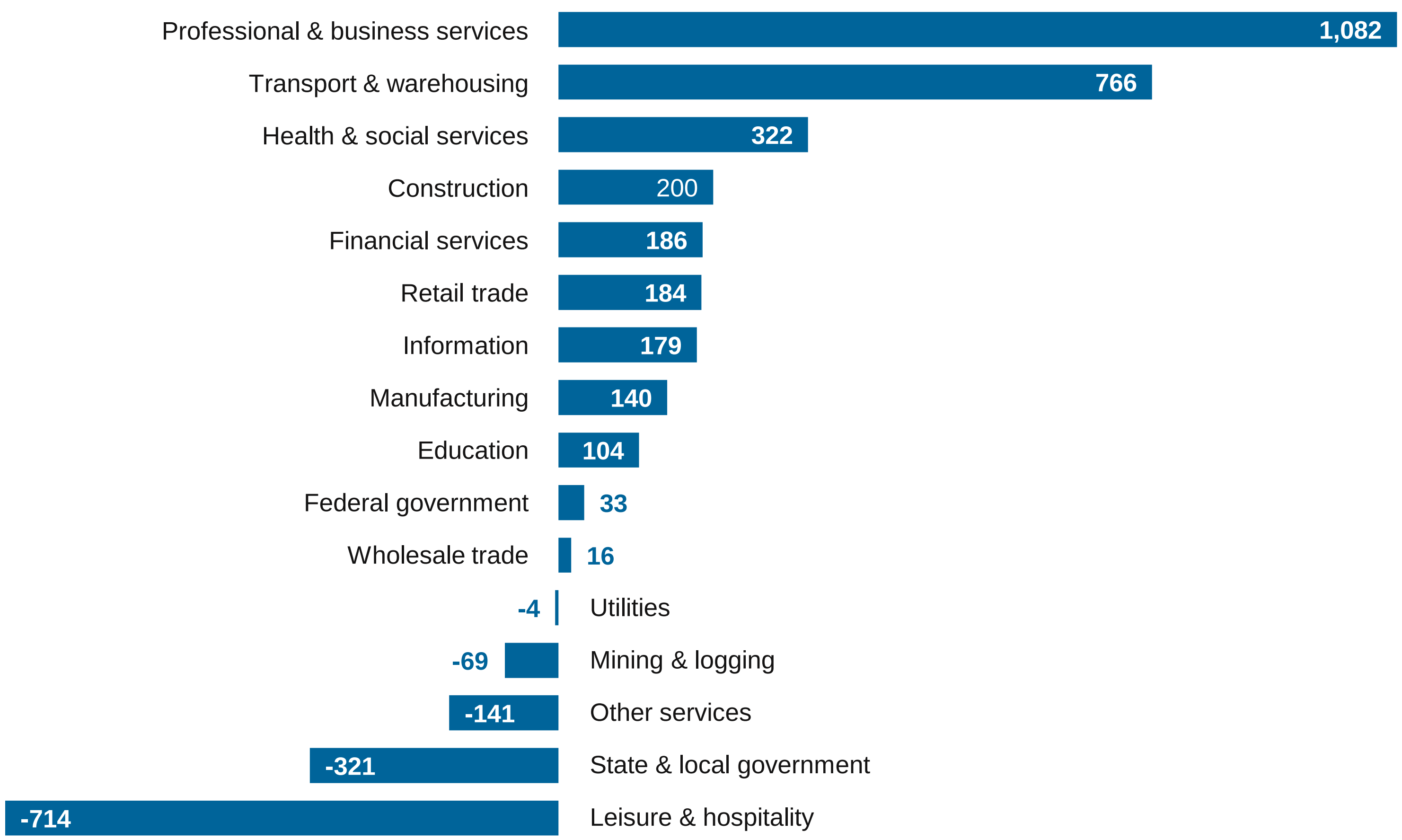
- The job market lost over 22 million jobs in the pandemic, and just regained the pre-pandemic high water mark in the summer of 2022.
- Steep structural challenges face many job-laden sectors of the economy that are underrepresented in the current stock market valuation.

Sources: St. Louis FRED, S&P Dow Jones Indices

While the Recovery Continues, Employment Landscape Remains Uneven

Leisure / hospitality remains by far the hardest-hit sector for job losses

Change in Payroll Employment Since 12/31/19 through 12/31/22 (thousands)

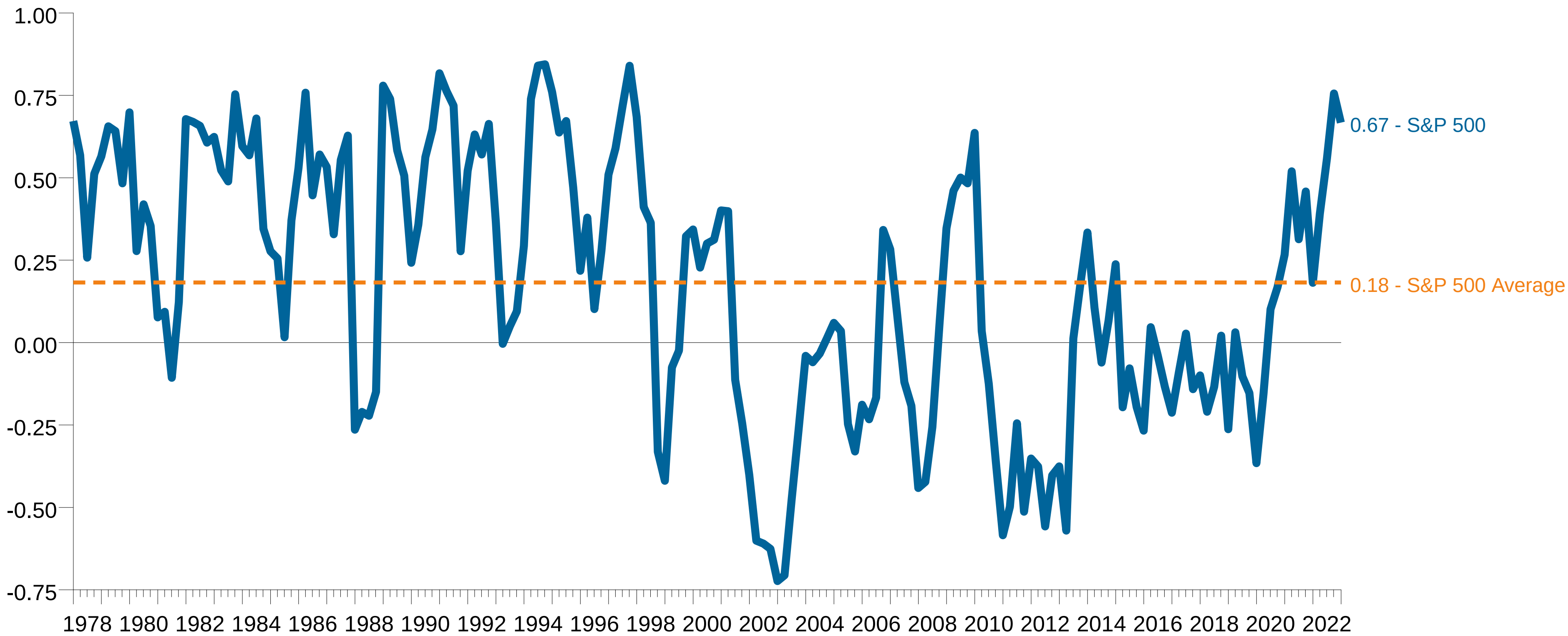


Sources: IHS Markit, Department of Labor

Did Diversification Fail in 2022?

Stocks and bonds down together in each of the first three quarters of 2022; up together in 4Q22

Rolling 1 Year Correlation of S&P 500 to Bloomberg Aggregate for 45 Years Ended 12/31/22



Are we seeing a return to a regime of higher correlation between stocks and bonds, potentially lessening the diversification benefit of bonds to stocks?

Sources: Bloomberg, Callan, S&P Dow Jones Indices

Did Diversification Fail in 2022?

How capital markets interact under stress

S&P 500 was down 4.6% in 1Q22, 16.1% in 2Q, and another 4.9% in 3Q

- Worst year since 2008 (-18.1%) despite strong rebound in 4Q (+7.6%)

Bloomberg Aggregate was down 5.9% in 1Q22, 4.7% in 2Q, and another 4.8% in 3Q; -13.1% for the year

Less decline in local currency around the global markets, but the strong U.S. dollar made things worse for U.S. investors

- MSCI ACWI ex USA down 16.0% in USD, 9.6% in local currency
- Global Aggregate down 16.3% in USD, 11.2% hedged to the U.S. dollar

How often does this happen?

- Stocks and bonds declined together in 10% of all quarters back to 1926.
- In quarters when the stock market declined, bonds declined 33% of the time.

The "curse" of zero correlation

- In a market drawdown, investors want correlation between stocks and bonds to be -1: when stocks go down, bonds are likely to be up.
- In real life, correlation of stocks to bonds is closer to zero.
  - *Zero correlation = when one asset class is down, the probability that the other asset class is up or down is similar; zero means no discernable pattern between the returns of the two asset classes.*

In normal times, correlation close to zero suggests a strong diversification benefit

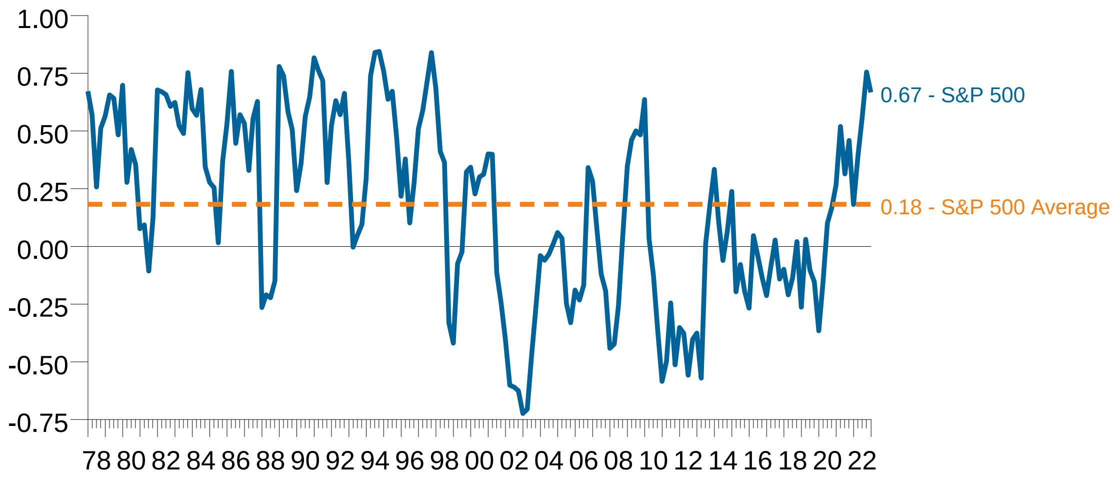
- A diversified portfolio of stocks and bonds will not see negative returns for stocks and bonds together 90% of the time.
- Note that when stocks are down, bonds can also be down about 1/3 of the time.

Correlation Changes With Interest Rate Regimes and Economic Conditions

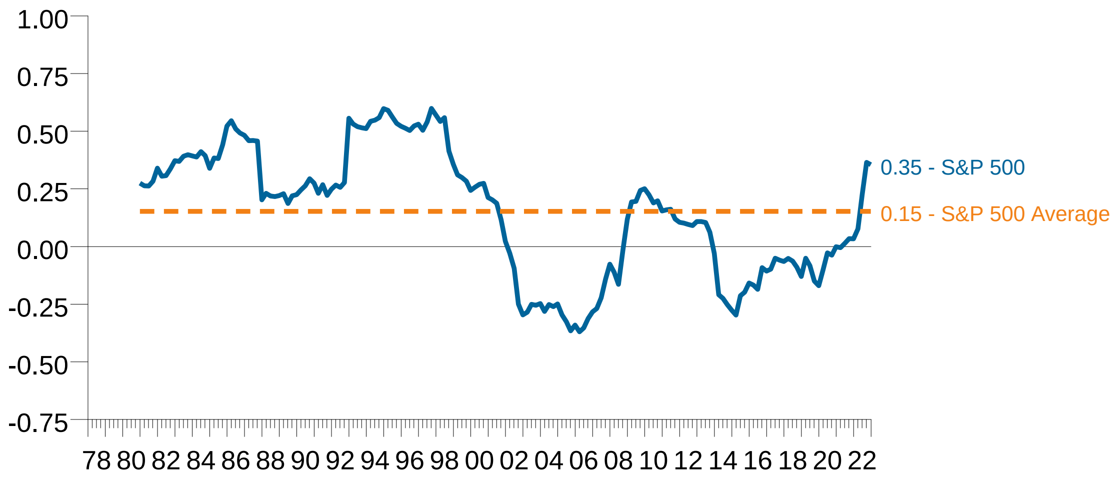
- Rolling one-year correlation spiked in 2021 and 2022.
- Rolling five-year shows how correlation runs in cycles over time.
- Table below examines correlation and the occurrence of negative returns for stocks and bonds together in three interest rate and inflation regimes. Regime 2 shows higher stock/bond correlation and suggests less diversification benefit under rising rates and inflation.

Period	Regime Description	Negative Return Frequency	Stock/ Bond Correlation
Regime 1 1926–1965	Low, stable interest rates	7%	0.13
Regime 2 1966–1981	Secular rate rise	26%	0.48
Regime 3 1982–present	Secular rate decline	6%	0.05

Rolling 1 Year Correlation of S&P 500 to Bloomberg Aggregate



Rolling 5 Year Correlation of S&P 500 to Bloomberg Aggregate



Sources: Bloomberg, Callan, S&P Dow Jones Indices

Recession Watch

Common definition of recession: two consecutive quarters of decline in GDP

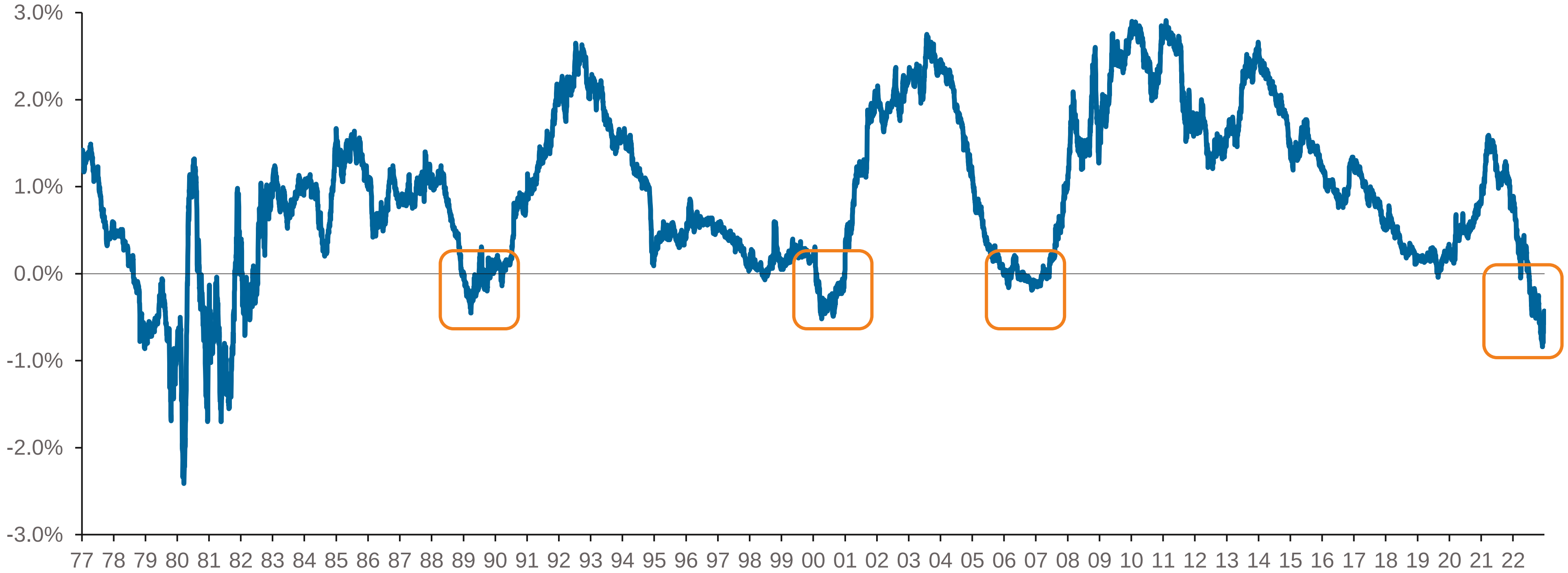
- Actual definition: The National Bureau of Economic Research (NBER) Business Cycle Dating Committee defines a recession as "a significant decline in economic activity that is spread across the economy and that lasts more than a few months."

Indicators to watch

- GDP declined in 1Q and 2Q22, the proverbial two-quarters-in-a-row rule of thumb that often indicates recession.
  - However, GDP rose 3.2% in 3Q, reversing the trend.
- Housing market is weakening with more than a doubling of mortgage rates since the start of 2022.
- Job market remains strong, with substantial job creation year to date; job listings remain larger than the number of seekers.
  - Initial unemployment claims are creeping up: a leading indicator.
- PMI is showing initial signs of recession in the business activity and output indices; PMI is also a leading indicator.
- Exports have weakened with slowing growth overseas, geopolitical uncertainty, and a strong dollar.
- Inflation remains historically high, sapping purchasing power and eroding confidence.
- Federal Reserve is committed to raising interest rates to combat inflation; target Fed Funds rate is 4.25%–4.50%.
- Fed's resolve may be tested if economy slows sharply in the fourth quarter or the first half of 2023.

Why Is the Bond Market Expecting a Recession?

10-Year Treasury vs. 2-Year Treasury Spread



- ▶ The 10-year to 2-year Treasury spread went negative two days in April and has been negative for most of 3Q and 4Q.
- ▶ Inversion in this spread does not always forecast a recession, but most recessions are preceded by a yield curve inversion.
  - – Yield curve inversion means investors expect a recession will occur and that interest rates will be cut, and therefore increase their demand for securities with longer duration, and therefore a higher potential for capital gain when rates fall.
- ▶ The 10-year Treasury to cash spread turned negative, which may be a better indicator of whether recession has already struck.

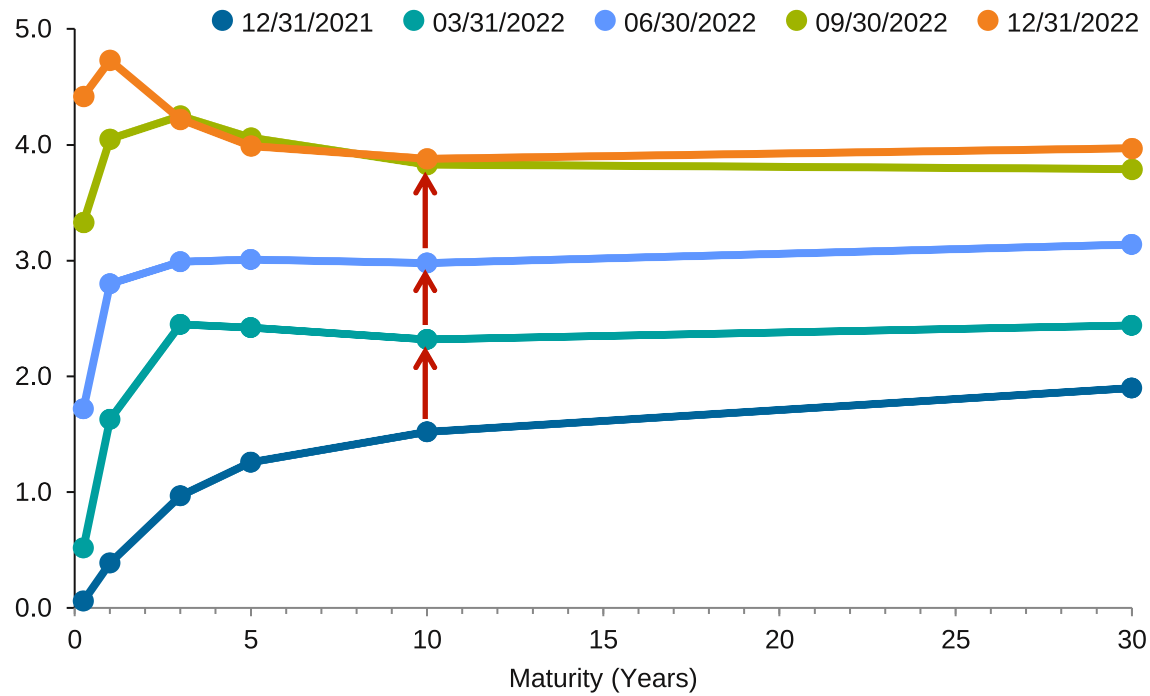
Source: Federal Reserve Bank of St. Louis

Yield Curve Continued to Rise and Became Inverted in Second Half of 2022

The Treasury yield curve has steadily shifted higher in 2022, especially on the short end.

- The yield curve inverted in mid-July and has remained inverted consistently since, with the 1- and 3-year yields exceeding 10- and 30-year yields.
- Higher yields increase the risk of inducing recession, which could lead to a reversal in interest rate policy and a lower return.

Treasury Yield Curve Change



	3 Month	1 Year	3 Year	5 Year	10 Year	30 Year
12/31/2021	0.06	0.39	0.97	1.26	1.52	1.90
03/31/2022	0.52	1.63	2.45	2.42	2.32	2.44
06/30/2022	1.72	2.80	2.99	3.01	2.98	3.14
09/30/2022	3.33	4.05	4.25	4.06	3.83	3.79
12/31/2022	4.42	4.73	4.22	3.99	3.88	3.97

Sources: Bloomberg, Federal Reserve

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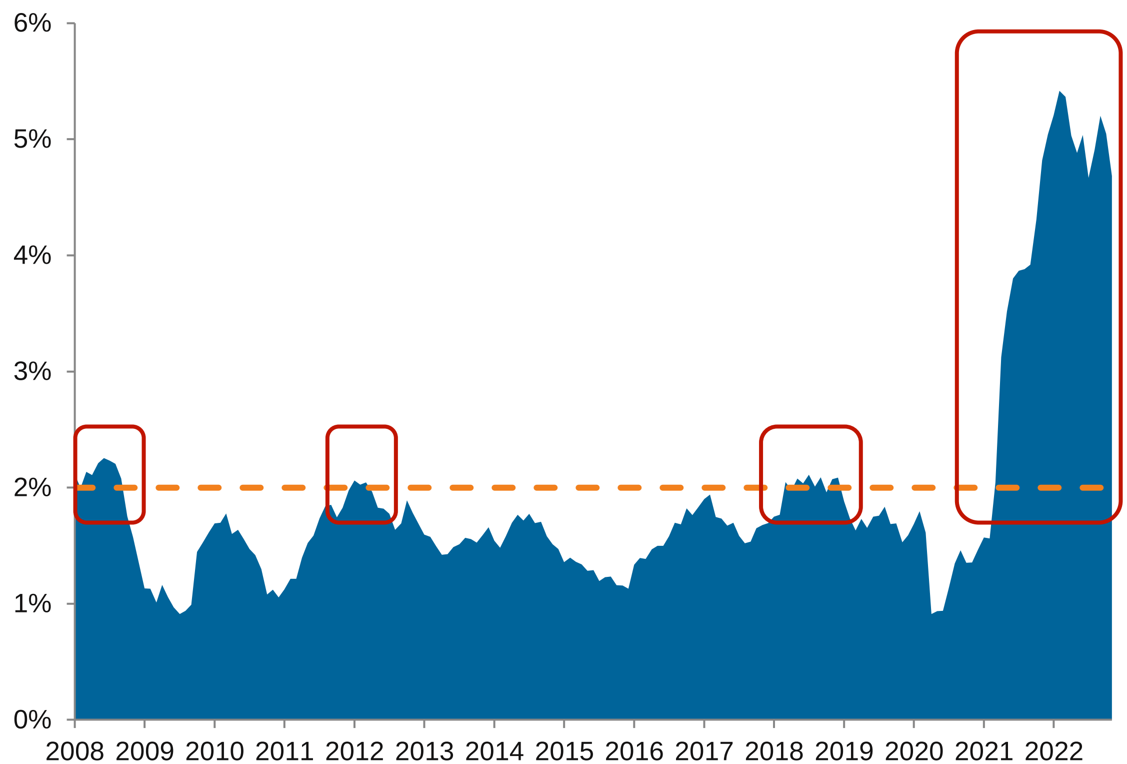
Current Market Conditions:
Special Focus on Inflation

The Fed's New Inflation Framework

Targeting core Personal Consumption Expenditures Index

- Inflation worries are in the headlines, and the data are challenging the Fed's dual mandate to manage inflation and unemployment.
- Inflation had consistently undershot the Fed's 2% target, prompting the Fed to change its inflation framework.
- Fed's aim is to achieve an average of 2% inflation over the medium term, which is not specifically defined.
- Personal Consumption Expenditures (PCE) Index is the Fed's target, different from and typically lower than CPI-U, which had a year-over-year gain of 7.1% as of Nov. 30. Core PCE dropped from 5.4% in February to 4.7% in July, inched back up to 5.2% in September, and fell to 4.7% again in November.

PCE Excluding Food and Energy (Chain-Type Price Index) Year-Over-Year Change (Through 11/30/22)

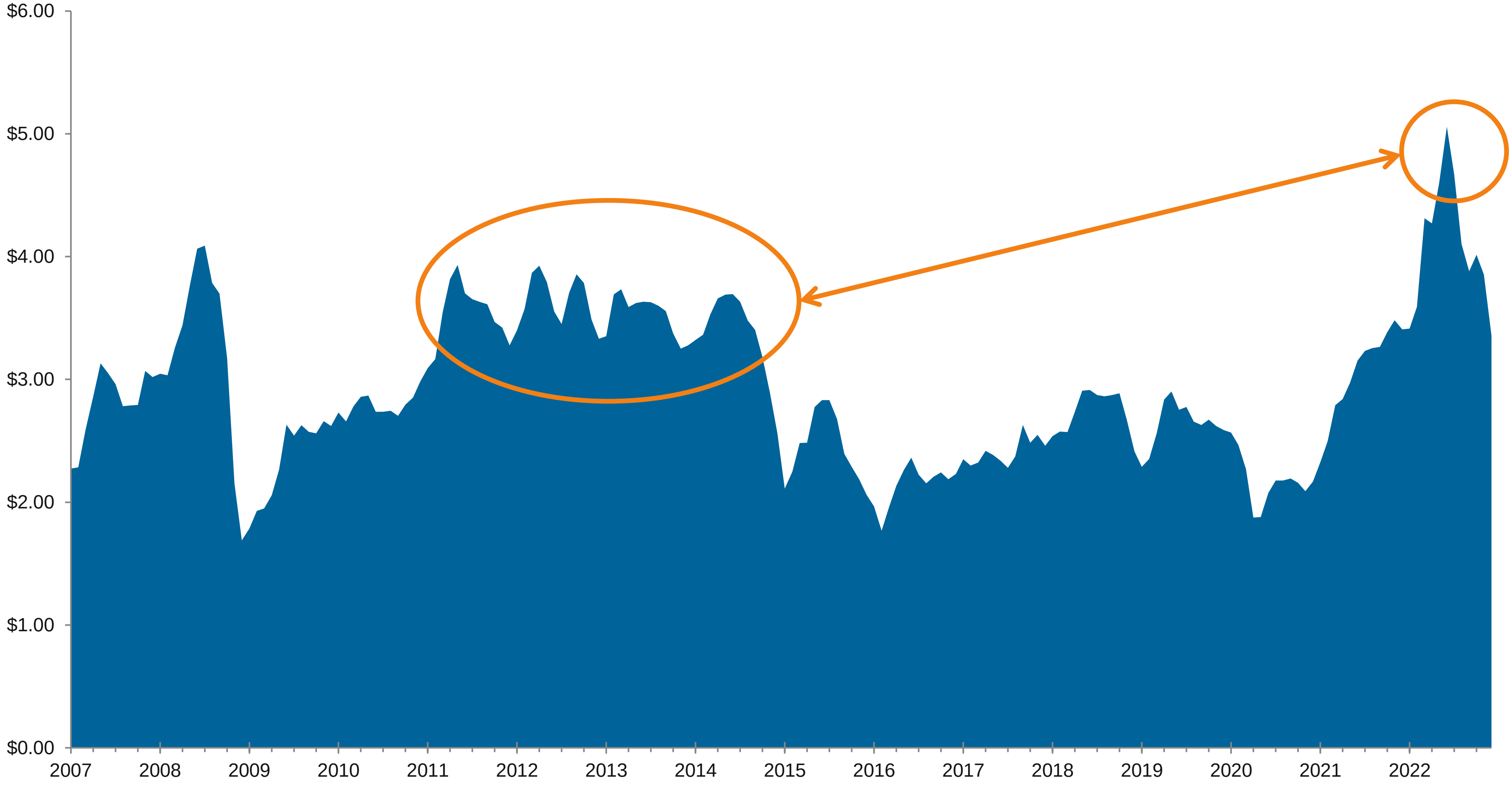


Sources: Federal Reserve Bank of St. Louis, U.S. Bureau of Economic Analysis

Gasoline Prices Are Top of Mind for Consumers, Now Far Above Early 2010s Peaks

A highly visible inflation measure; feeds expectations

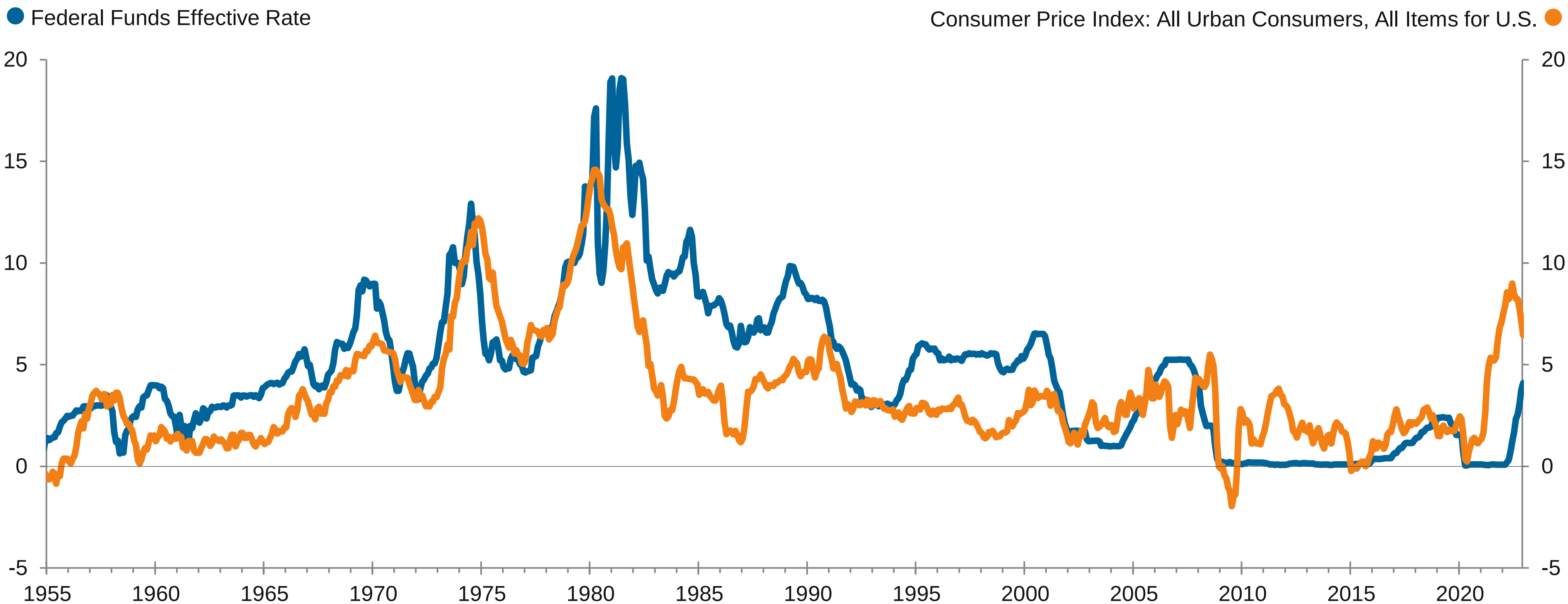
Average Price: Gasoline, Unleaded Regular (Cost per Gallon / 3.785 Liters) in U.S. City Average Through 12/31/22



Source: Federal Reserve Bank of St. Louis

Inflation vs. Interest Rates Over the Long Term

Federal Funds vs. Consumer Price Index



- We are now looking at an inflation spike that is above the last rise in inflation from 2005–08.
- The gap between inflation and the Fed Funds rate is larger than that seen just before the GFC.
  - Yield history suggests that the Fed Funds rate is typically above inflation, not below it.
- Recent gaps between CPI and the Fed Funds rate are unprecedented in the history of the CPI-U, going back to 1955
  - Resolution to the historical relationship requires the Fed Funds rate to rise and inflation to fall.

Source: Federal Reserve Bank of St. Louis

Inflation Is Currently a Problem: What Key Variables Should We Track?

The majority of the working-age and younger population has no experience with sustained inflation

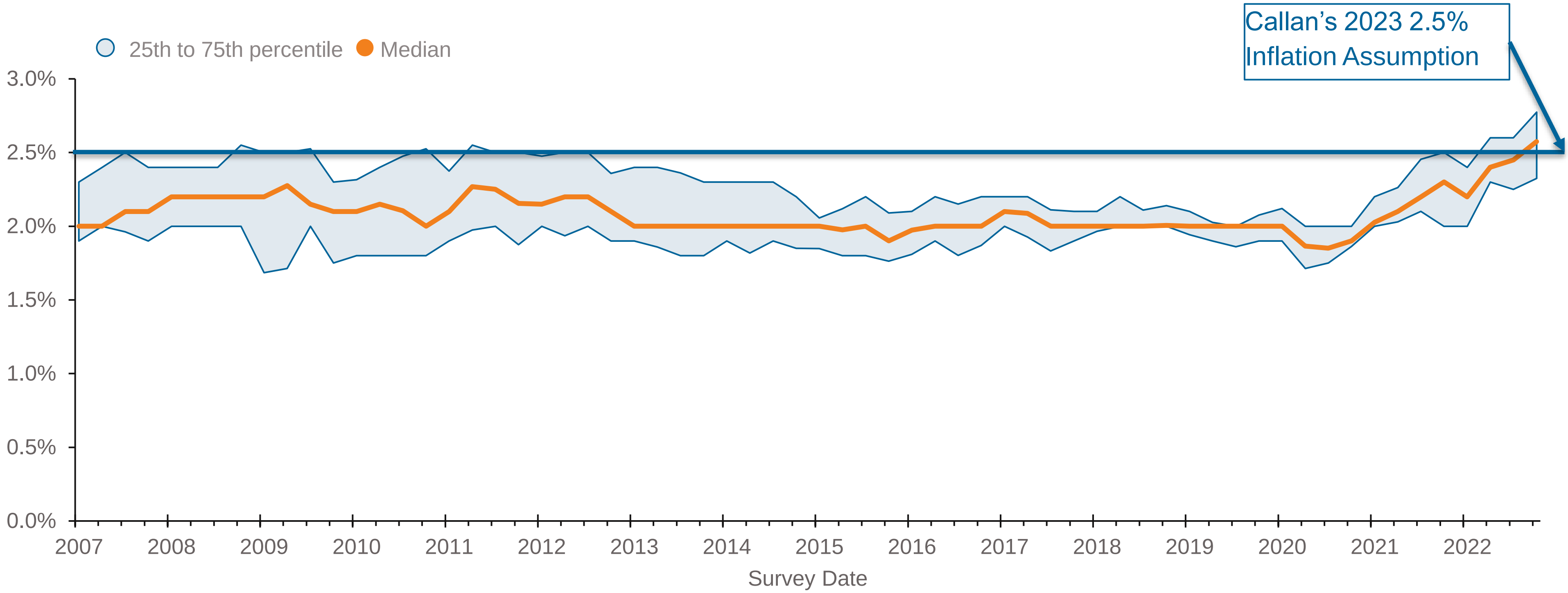
Key variables to track:

- Personal Consumption Expenditures Index—the Fed's preferred measure of inflation
  - Typically lower and less volatile than CPI-U
- Spread between inflation and the Fed Funds rate—at an extreme, suggesting some adjustment is coming in both variables
- Five-year, five-year forward rate, and 10-year breakeven rate
  - Bond market expectations
  - Long enough horizon to minimize short-term emotion and reaction to immediate events
- Philadelphia Fed survey of professional forecasters

Inflation Forecasts: Survey of Professional Forecasters, 10-Year Horizon

PCE inflation

Projections for the 10-Year Annual-Average Rate of PCE Inflation

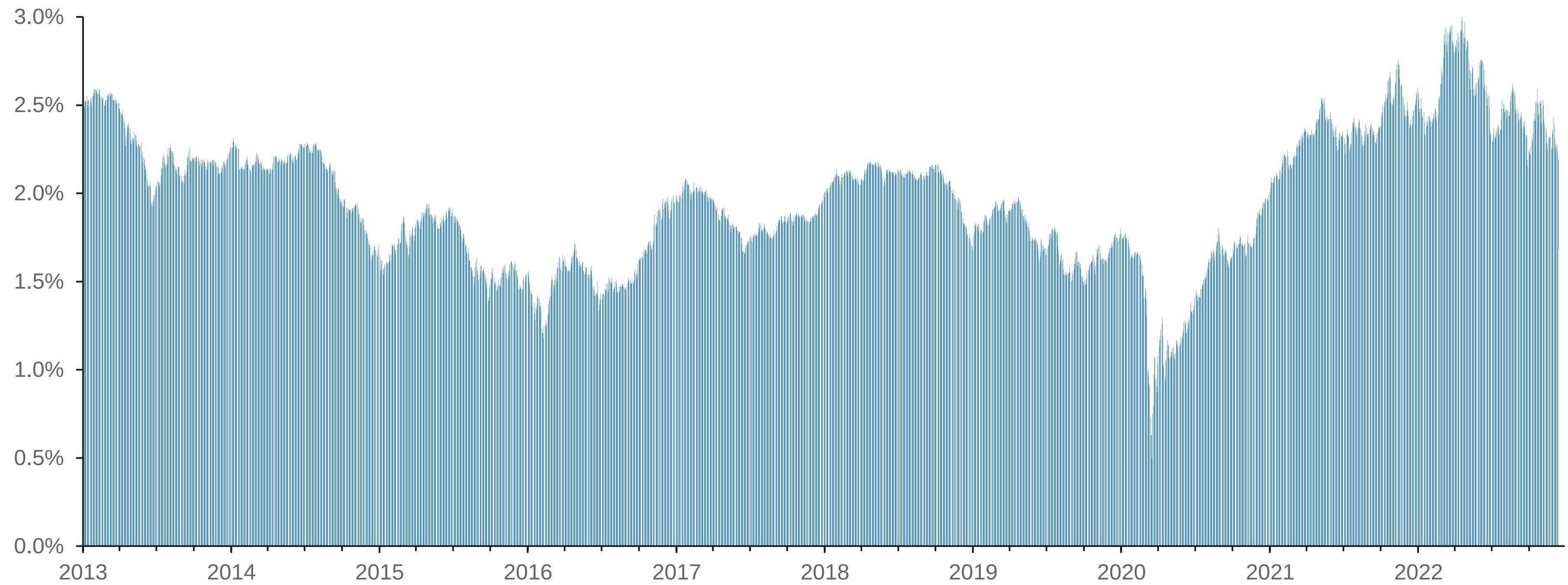


- Ten-year forecasts for inflation have risen since the start of 2021.
- In the most recent survey published in November, the 10-year forecast was 2.6%.

Source: Philadelphia Federal Reserve, *Fourth Quarter 2022 Survey of Professional Forecasters*

10-Year Breakeven Rate: Bond Market Forecast of Inflation

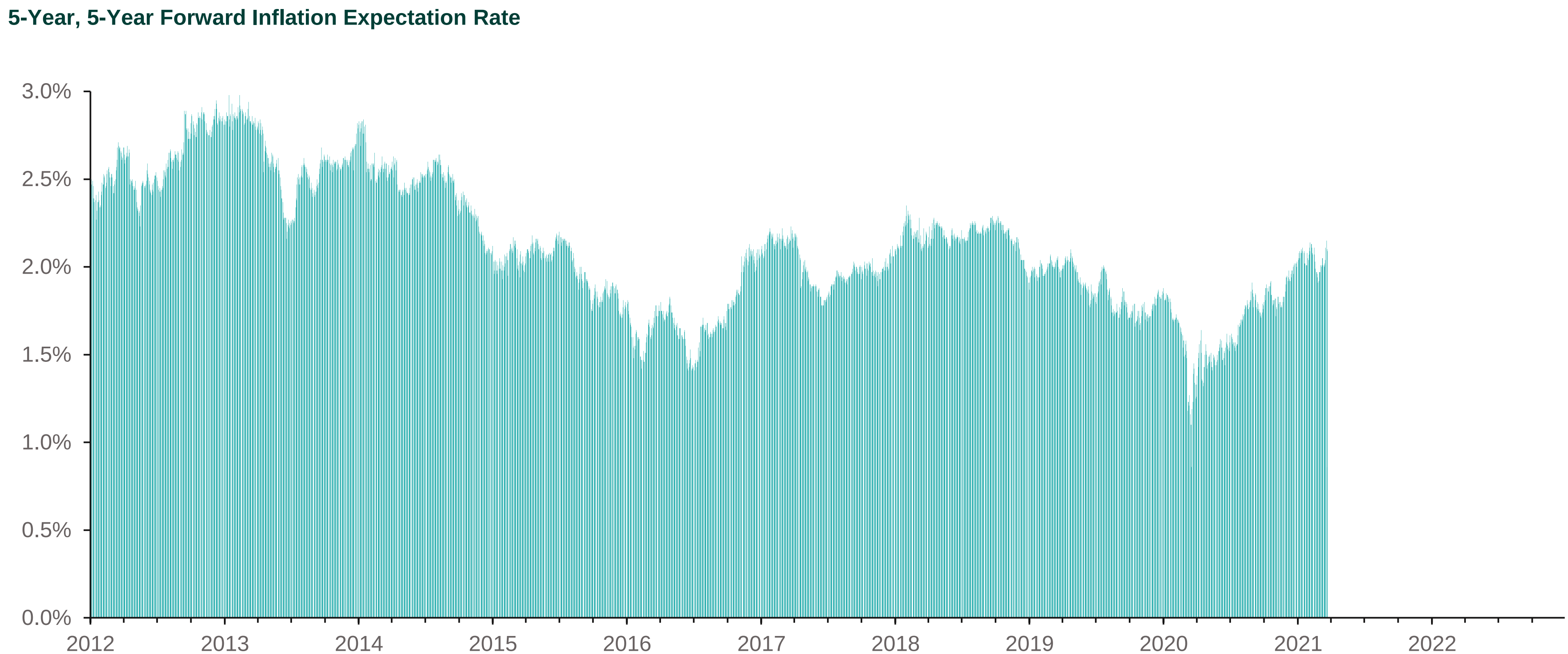
10-Year Breakeven Inflation Rate



- 10-year breakeven inflation rate is the difference in yield between the nominal 10-year Treasury and the 10-year Treasury Inflation-Protected Security (TIPS).
  - Extra yield nominal Treasury would have to earn to maintain the same purchasing power as a TIPS investment.
- Values of implied inflation reached 3% in April but have since declined below 2.5%.
  - Includes current high levels of inflation

Source: Federal Reserve Bank of St. Louis

5-Year, 5-Year Forward Rate: Bond Market Forecast of Inflation

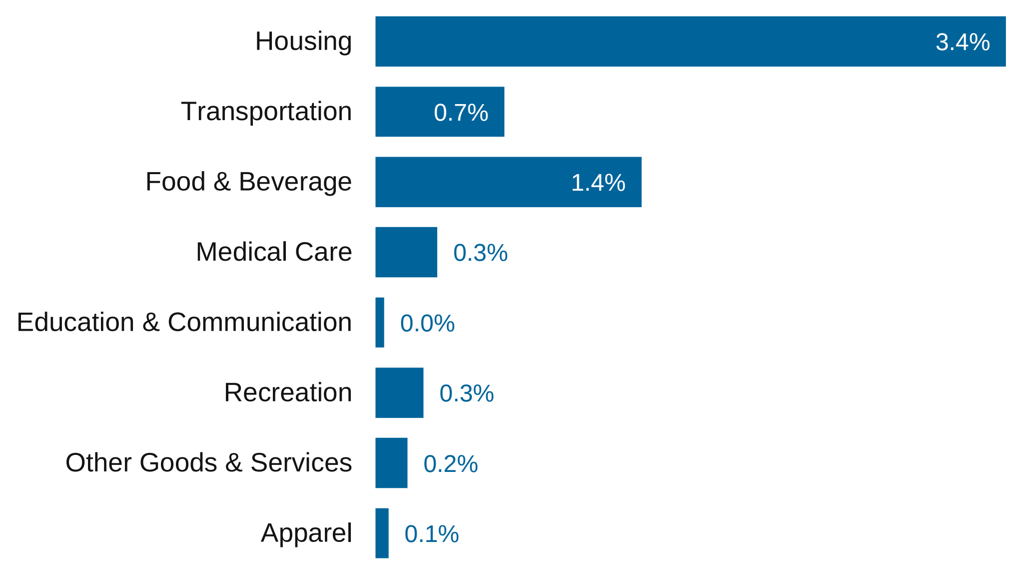


- ▶ The 5-year, 5-year forward rate is the bond market's estimate of the 5-year inflation rate 5 years from now.
  - – Excludes current high levels of inflation
- ▶ The market inflation expectation for the years 2027 through 2031 is approaching 2% after peaking at 2.7% in April.

Source: Federal Reserve Bank of St. Louis

Contributors to Recent Inflation: Primary Categories

- Transportation inflation has finally begun to trend downward.
- Housing took over as the biggest weighted contributor to headline inflation due to the category's high weight in the index (42.4%).
- Transportation's downward trend in inflation has been somewhat offset by an upward trend for Food & Beverage and Housing.



Primary Category	Primary Category Weight	Year-over-Year Change											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All Items	100.0%	7.5%	7.9%	8.5%	8.3%	8.6%	9.1%	8.5%	8.3%	8.2%	7.7%	7.1%	6.5%
Housing	42.4%	5.7%	5.9%	6.4%	6.5%	6.9%	7.3%	7.4%	7.8%	8.0%	7.9%	7.8%	8.1%
Transportation	18.2%	20.8%	21.1%	22.6%	19.9%	19.4%	19.7%	16.4%	13.4%	12.6%	11.2%	7.8%	3.9%
Food & Bev	14.3%	6.7%	7.6%	8.5%	9.0%	9.7%	10.0%	10.5%	10.9%	10.8%	10.6%	10.3%	10.1%
Medical Care	8.5%	2.5%	2.4%	2.9%	3.2%	3.7%	4.5%	4.8%	5.4%	6.0%	5.0%	4.2%	4.0%
Education & Communication	6.4%	1.6%	1.6%	1.5%	1.0%	0.8%	0.8%	0.5%	0.5%	0.2%	0.0%	0.7%	0.7%
Recreation	5.1%	4.7%	5.0%	4.8%	4.3%	4.5%	4.6%	4.4%	4.1%	4.1%	4.1%	4.7%	5.1%
Other Goods & Svcs	2.7%	4.9%	5.6%	5.5%	5.7%	6.3%	6.7%	6.3%	6.6%	6.9%	6.5%	7.0%	6.4%
Apparel	2.5%	5.3%	6.6%	6.8%	5.4%	5.0%	5.2%	5.1%	5.1%	5.5%	4.1%	3.6%	2.9%

Source: U.S. Bureau of Labor Statistics

Fixed Income

10-Year Expected Returns

	Income Return	+	Capital Gain/Loss	+	Credit Default	+	Roll Return	=	2023 Expected Return	Prelim 2023 Expected Return	Change vs 2023 Prelim	2022 Expected Return	Change vs 2022
Cash	**2.75%**		**0.00%**		**0.00%**		**0.00%**		**2.75%**	**2.40%**	**0.35%**	**1.20%**	**1.55%**
1-3 Year G/C	**3.45%**		**0.20%**		**-0.10%**		**0.25%**		**3.80%**	**3.20%**	**0.60%**	**1.50%**	**2.30%**
1-3 Year Government	3.15%		0.20%		0.00%		0.25%		3.60%	3.10%			
1-3 Year Credit	3.85%		0.10%		-0.20%		0.25%		4.00%	3.40%			
Intermediate Gov/Credit	**3.95%**		**0.00%**		**-0.10%**		**0.25%**		**4.10%**	**3.60%**	**0.50%**	**1.70%**	**2.40%**
Intermediate Gov	3.65%		0.10%		0.00%		0.25%		4.00%	3.40%			
Intermediate Credit	4.50%		-0.10%		-0.40%		0.25%		4.25%	3.90%			
Aggregate	**4.30%**		**-0.20%**		**-0.10%**		**0.25%**		**4.25%**	**3.90%**	**0.35%**	**1.75%**	**2.50%**
Government	3.80%		-0.10%		0.00%		0.25%		3.95%	3.60%			
Securitized	4.00%		0.00%		0.00%		0.25%		4.25%	3.90%			
Credit	5.25%		-0.40%		-0.40%		0.25%		4.70%	4.10%			
Long Duration Gov/Credit	**6.15%**		**-1.70%**		**-0.30%**		**0.60%**		**4.75%**	**4.00%**	**0.75%**	**1.80%**	**2.95%**
Long Government	4.90%		-1.80%		0.00%		0.60%		3.70%	3.30%			
Long Credit	6.50%		-1.50%		-0.40%		0.60%		5.20%	4.50%			
TIPS	**3.95%**		**-0.20%**		**0.00%**		**0.25%**		**4.00%**	**3.25%**	**0.75%**	**1.25%**	**2.75%**
Non-US Fixed (unhedged)	**2.40%**		**-0.20%**		**-0.20%**		**0.25%**		**2.25%**	**2.00%**	**0.25%**	**0.80%**	**1.45%**
High Yield	8.00%		0.20%		-2.20%		0.25%		6.25%	6.00%	0.25%	3.90%	2.35%
Emerging Market Debt	7.40%		0.20%		-2.00%		0.25%		5.85%	5.80%	0.05%	3.60%	2.25%
Bank Loans	7.40%		0.30%		-1.60%		0.00%		6.10%	6.10%	0.00%	4.60%	1.50%

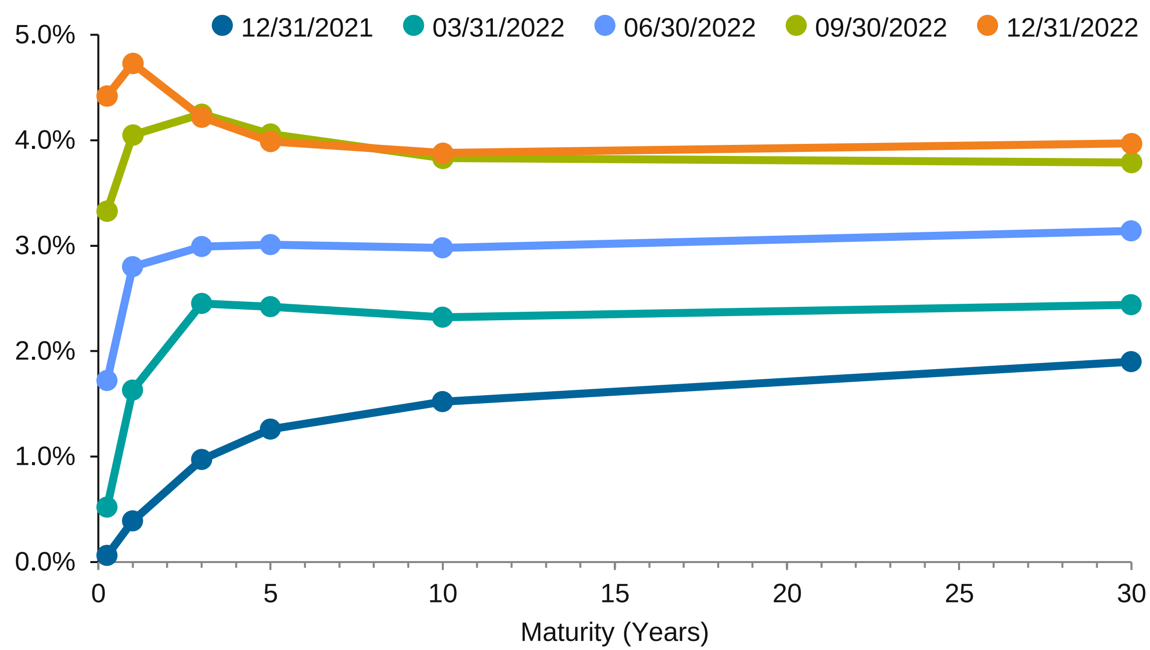
Source: Callan

Yield Curve Continued to Rise and Became Inverted in Second Half of 2022

Rising yields throughout 2022 brought capital losses across bond indices.

Higher yields would lead to higher future returns, especially if yields stay at elevated levels.

Treasury Yield Curve Change



	3 Month	1 Year	3 Year	5 Year	10 Year	30 Year
12/31/2021	0.06	0.39	0.97	1.26	1.52	1.90
03/31/2022	0.52	1.63	2.45	2.42	2.32	2.44
06/30/2022	1.72	2.80	2.99	3.01	2.98	3.14
09/30/2022	3.33	4.05	4.25	4.06	3.83	3.79
12/31/2022	4.42	4.73	4.22	3.99	3.88	3.97

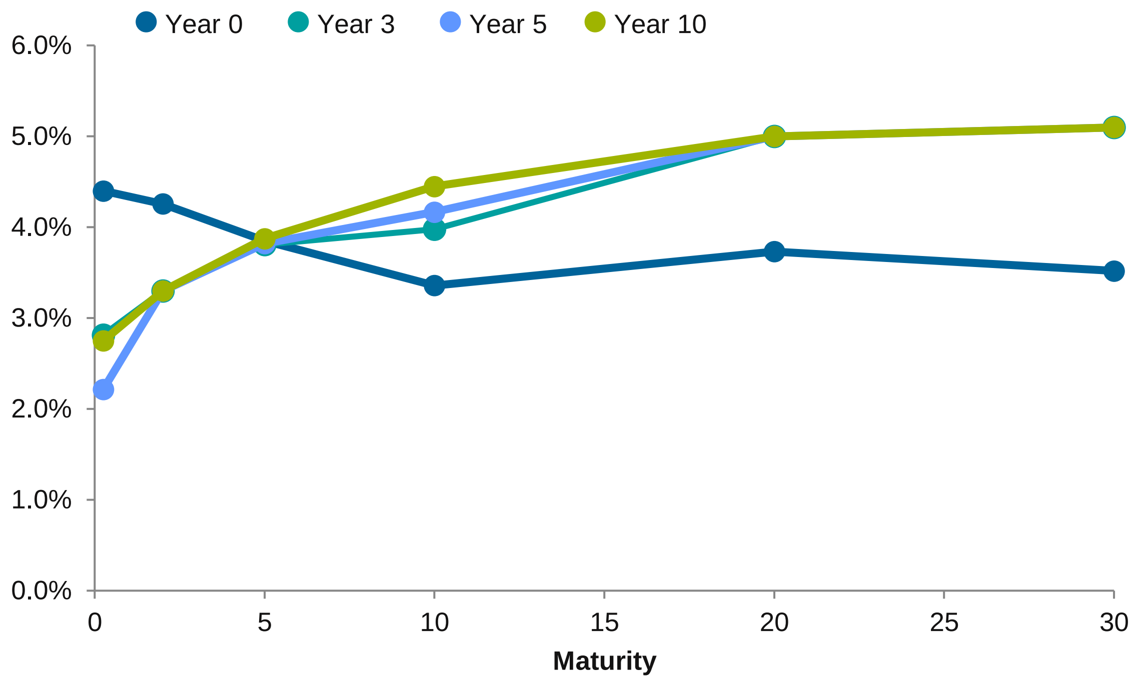
Source: Bloomberg

Shape of Yield Curve at Different Points in Forecast Horizon

Our forecast has the yield curve steepening within the first few years.

With yields already high, we expect yields to reach equilibrium by year 10 of our forecast (vs. year 30 in prior forecasts).

Yield Curve Forecast

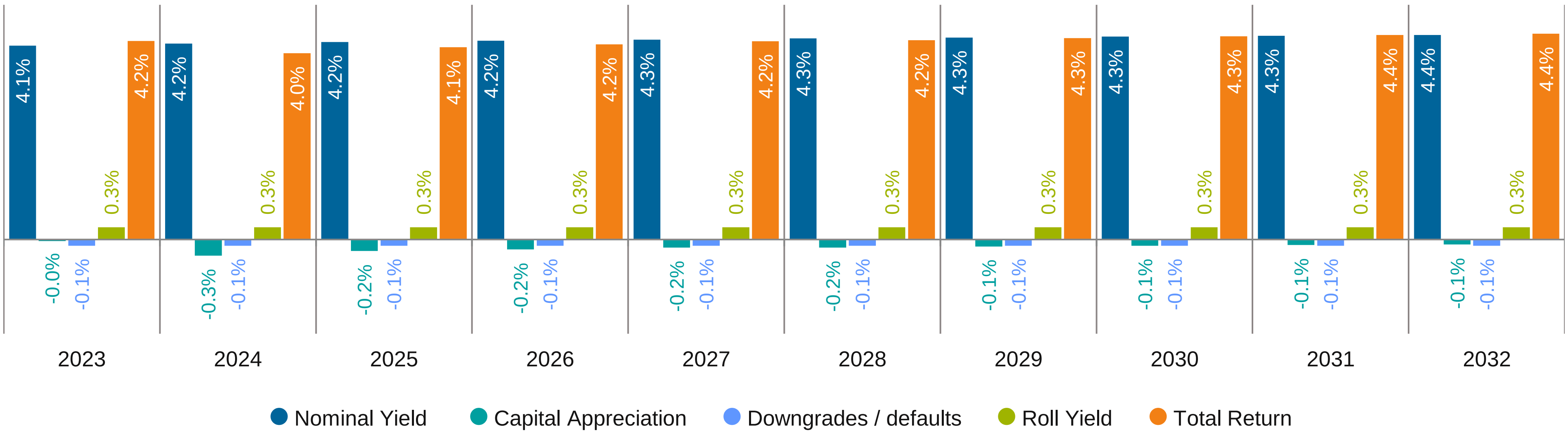


	3 Month	2 Year	5 Year	10 Year	20 Year	30 Year
Forecast Year 0	4.40	4.26	3.85	3.36	3.73	3.52
Forecast Year 3	2.82	3.30	3.81	3.98	5.00	5.10
Forecast Year 5	2.22	3.30	3.82	4.17	5.00	5.10
Forecast Year 10 (Equilibrium Reached)	2.75	3.30	3.88	4.45	5.00	5.10

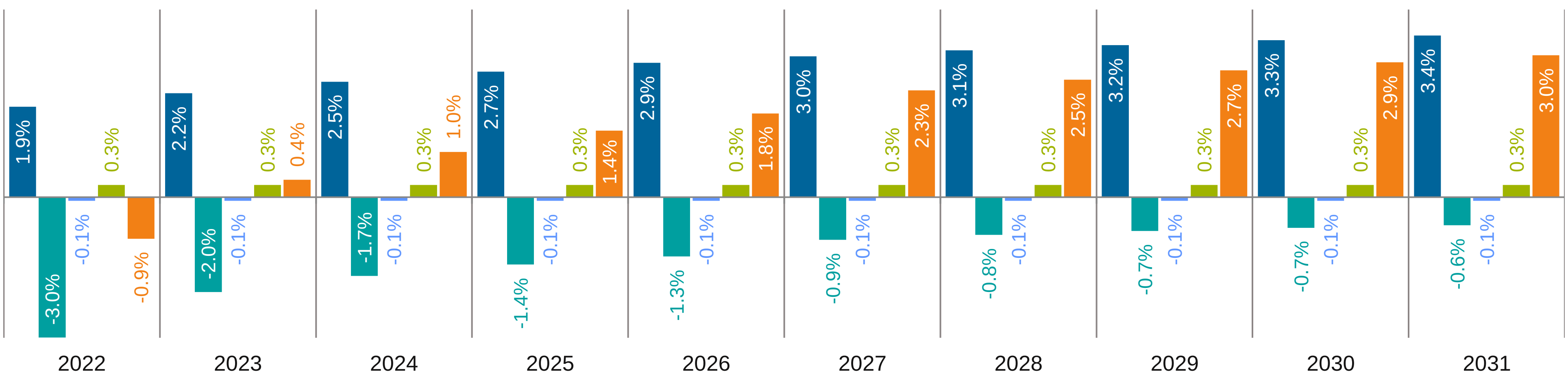
Source: Callan

Comparison of Core Fixed Income Return Components

Total Return Attribution: Callan 2023 Projection



Total Return Attribution: Callan 2022 Projection



Source: Callan

Equity

U.S. Equity Market: Key Metrics

S&P 500 valuation measures

Valuation Measure	Latest	25-year Average	Std Dev Over- / Under-valued
Forward P/E	16.65x	16.82x	-0.05
Shiller’s P/E	27.96x	27.93x	0.01
Dividend yield	1.81%	1.99%	0.53
Price to book	3.42x	3.10x	0.40
Price to cash flow	12.42x	11.19x*	0.56
EY minus Baa yield	0.17%	0.27%	0.05

S&P 500 Index: Forward P/E Ratio

- ► All valuation measures are now within +/- one standard deviation of 25-year averages.
- ► Forward P/E is near the long-term average, but if we enter a recession both prices and earnings are likely to decline.

Source: FactSet, FRB, Refinitiv Datastream, Robert Shiller, Standard & Poor’s, Thomson Reuters, J.P. Morgan Asset Management.
Price-to-earnings is price divided by consensus analyst estimates of earnings per share for the next 12 months as provided by IBES since December 1997 and by FactSet since January 2022. Current next 12 months consensus earnings estimates are $231. Average P/E and standard deviations are calculated using 25 years of history. Shiller’s P/E uses trailing 10 years of inflation-adjusted earnings as reported by companies. Dividend yield is calculated as the next 12 months consensus dividend divided by most recent price. Price-to-book ratio is the price divided by book value per share. Price-to-cash flow is price divided by NTM cash flow. EY minus Baa yield is the forward earnings yield (consensus analyst estimates of EPS over the next 12 months divided by price) minus the Moody’s Baa seasoned corporate bond yield. Std. dev. over-/under-valued is calculated using the average and standard deviation over 25 years for each measure. *P/CF is a 20-year average due to cash flow availability. Guide to the Markets – U.S. Data are as of Dec. 31, 2022

Equity Forecasts

Building blocks

Index	Current Dividend Yield*	Forecast Dividend Yield	Net Buyback Yield	Inflation	Real Earnings Growth**	Valuation Adjustment	Total Geometric Return
S&P 500	1.77%	2.00%	0.50%	2.50%	2.25%	0.00%	7.25%
Russell 2500	1.61%	1.75%	0.00%	2.50%	3.20%	0.00%	7.45%
Russell 3000	1.72%	1.95%	0.45%	2.50%	2.45%	0.00%	7.35%
MSCI World ex USA	3.21%	3.75%	0.00%	1.75%	1.75%	0.00%	7.25%
MSCI Emerging Markets	3.27%	3.55%	-2.90%	3.00%	3.80%	0.00%	7.45%
Aggregate							4.25%
Cash							2.75%

Index	Forecast ERP Cash	Historical ERP Cash^	Delta ERP Cash	Forecast ERP Bonds	Historical ERP Bonds^^	Delta ERP Aggregate
S&P 500	4.50%	7.56%	-3.06%	3.00%	4.95%	-1.95%
Russell 2500	4.70%	7.22%	-2.52%	3.20%	4.61%	-1.41%

* Index yields as of Dec. 31, 2022
** S&P 500 real earnings growth is forecast real GDP growth. R 2500 real earnings growth is 100 bps spread over S&P 500. Developed and emerging markets earnings growth in line with their respective GDP assumptions.
^ Return relative to 90-day T-bills for 40 years ended Dec. 31, 2022
^^ Return relative to the Bloomberg Aggregate for 40 years ended Dec. 31, 2022

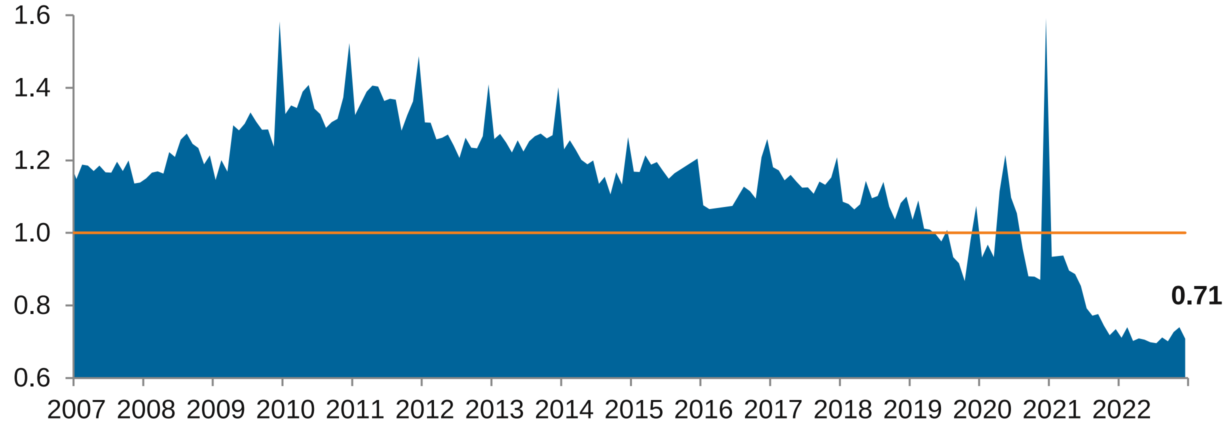
Source: Callan

U.S. Equity Assumptions

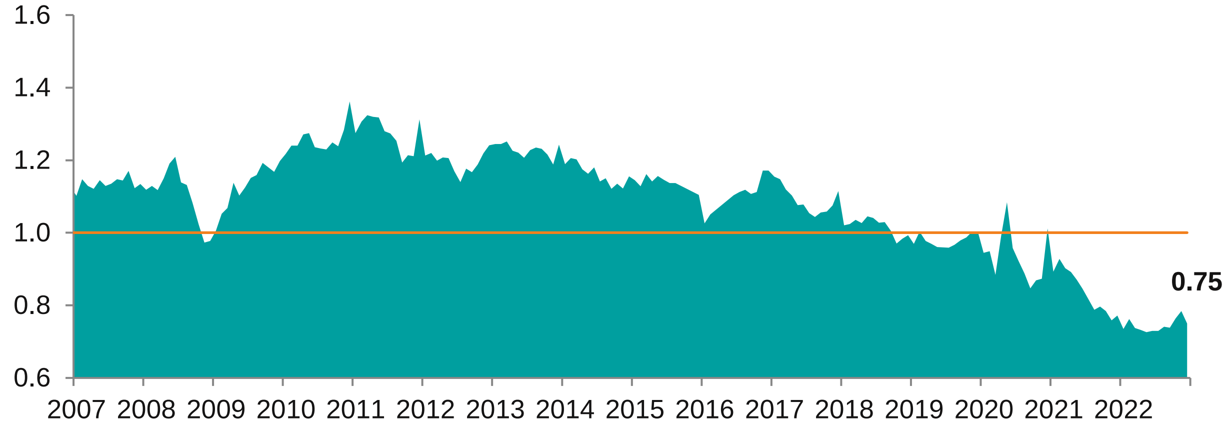
Mid and small cap relative valuations

- Large capitalization stocks still have relatively high valuations.
- Historically, smaller cap stocks have had higher valuations than large caps.
  - Investors buying future rather than historical earnings
- The small cap S&P 600 P/E is only 71% of the S&P 500 P/E.
- The mid cap S&P 400 P/E is only 75% of the S&P 500 P/E.
- Lower valuations improve the potential for higher returns relative to large cap going forward.

S&P 600/S&P 500 Relative Forward P/E Ratios



S&P 400/S&P 500 Relative Forward P/E Ratios

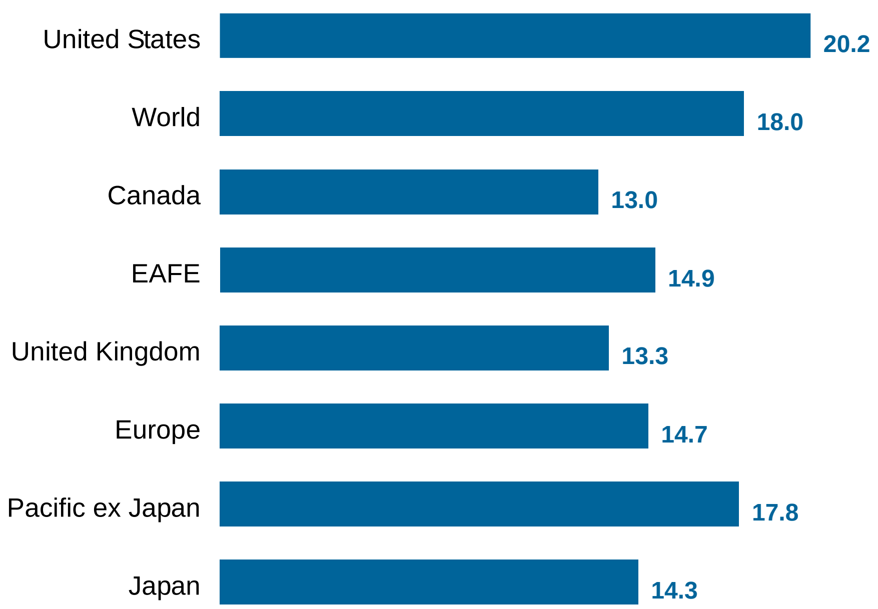


Source: S&P Dow Jones Indices

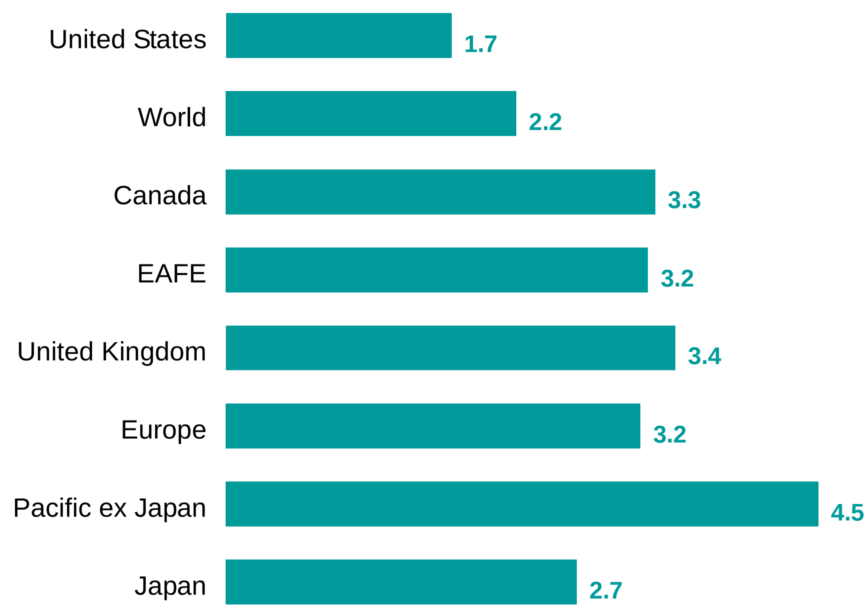
Global ex-U.S. Equity Assumptions

Developed market valuations and dividend yield

Price Earnings Ratio



Dividend Yield



Valuations have come down over the past year across each of these developed market indices.

- U.S. continues to have the highest valuations.

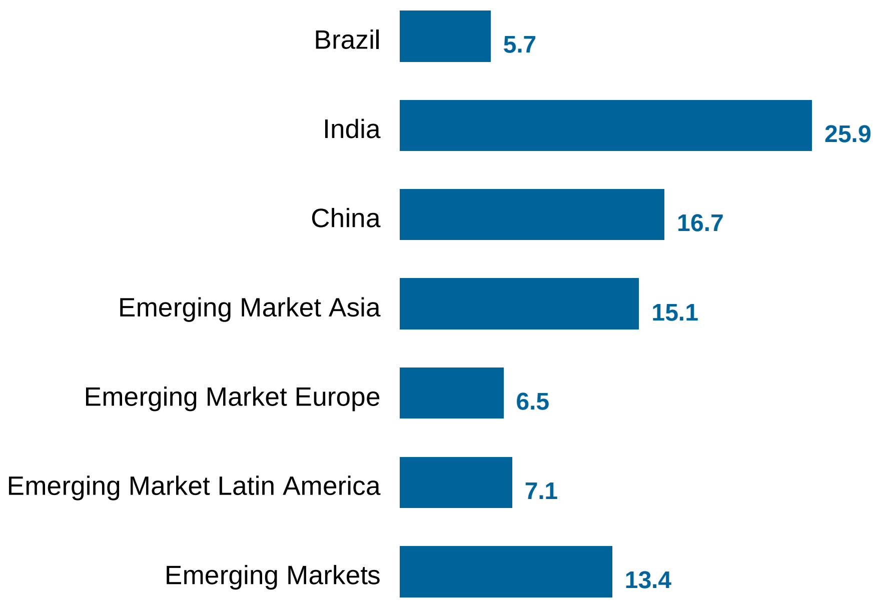
Dividend yields have risen since last year for all indices shown except the U.K.

Source: MSCI (Dec. 31, 2022)

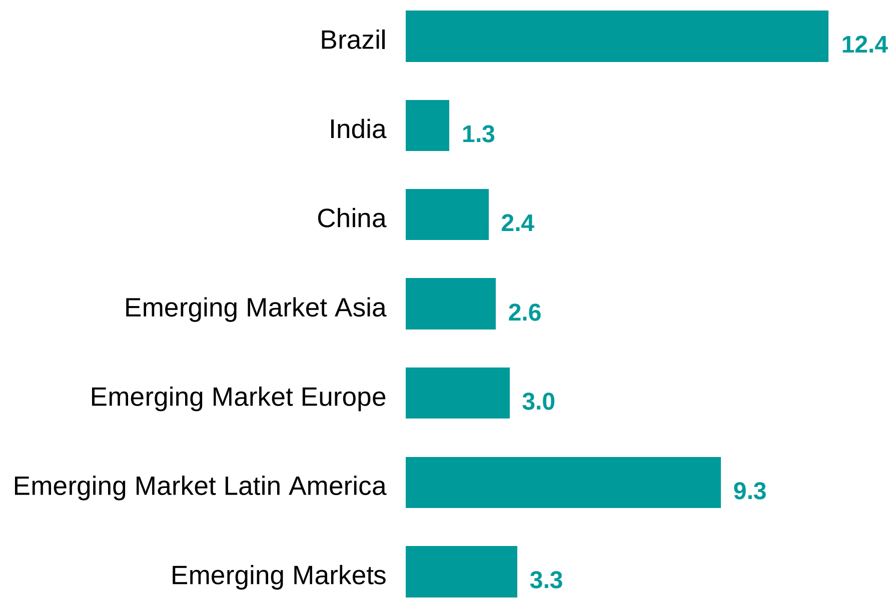
Global ex-U.S. Equity Assumptions

Emerging market valuations and dividend yield

Price Earnings Ratio



Dividend Yield



Emerging market valuations have also come down over the last year, but moderately compared to developed market valuations.

- Asia has the highest regional valuations, Emerging Europe the lowest.

Dividend yields have risen meaningfully across emerging market indices.

Significant dilution is realized as growing companies issue more shares.

Source: MSCI (Dec. 31, 2022)

Callan

Detailed 2023 Expectations and Resulting Portfolio Returns and Risks

So What Should We Expect After All This Mayhem?

Painful losses across the board for most investors in 2022

Lower asset values but higher returns expected going forward

- Stocks are more reasonably priced
- Higher bond yields mean investors now get paid to hold fixed income
- Private markets have yet to fully price in the market changes, but they will
  - Private equity, real estate, private debt

U.S. economy remained strong through most of this mayhem in 2022

- Job market finally reached pre-pandemic level of employment this past summer
- Headline layoffs have been concentrated in tech and finance
- Strong income growth, but not enough to offset inflation
- Housing market taking a big hit from much higher mortgage rates
  - Risks
- Recession
  - Jobs and income
  - Sales and earnings growth
  - Fed reverses course
- Inflation remains elevated
- Housing market
- Geopolitical strife

2023 vs. 2022 Risk and Returns Assumptions

Summary of Callan's Long-Term Capital Markets Assumptions (2023–2032)

		Projected Return			Projected Risk	2022–2031			vs. 2022	
Asset Class	**Index**	1-Year Arithmetic	10-Year Geometric*	**Real**	Standard Deviation	1-Year Arithmetic	10-Year Geometric*	Standard Deviation	Geometric* Delta	Std Dev Delta
Equities										
Broad U.S. Equity	Russell 3000	8.75%	7.35%	4.85%	18.05%	8.00%	6.60%	17.95%	0.75%	0.10%
Large Cap U.S. Equity	S&P 500	8.60%	7.25%	4.75%	17.75%	7.85%	6.50%	17.70%	0.75%	0.05%
Smid Cap U.S. Equity	Russell 2500	9.60%	7.45%	4.95%	22.15%	8.75%	6.70%	21.30%	0.75%	0.85%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.45%	7.45%	4.95%	21.25%	8.70%	6.80%	20.70%	0.65%	0.55%
Developed ex-U.S. Equity	MSCI World ex USA	9.00%	7.25%	4.75%	20.15%	8.25%	6.50%	19.90%	0.75%	0.25%
Emerging Market Equity	MSCI Emerging Markets	10.45%	7.45%	4.95%	25.70%	9.80%	6.90%	25.15%	0.55%	0.55%
Fixed Income										
Short Duration Gov/Credit	Bloomberg 1-3 Year Gov/Credit	3.75%	3.80%	1.30%	2.30%	1.50%	1.50%	2.00%	2.30%	0.30%
Core U.S. Fixed	Bloomberg Aggregate	4.25%	4.25%	1.75%	4.10%	1.80%	1.75%	3.75%	2.50%	0.35%
Long Government	Bloomberg Long Gov	4.55%	3.70%	1.20%	13.50%	1.85%	1.10%	12.50%	2.60%	1.00%
Long Credit	Bloomberg Long Credit	5.75%	5.20%	2.70%	11.75%	2.60%	2.10%	10.50%	3.10%	1.25%
Long Government/Credit	Bloomberg Long Gov/Credit	5.25%	4.75%	2.25%	11.35%	2.30%	1.80%	10.40%	2.95%	0.95%
TIPS	Bloomberg TIPS	4.10%	4.00%	1.50%	5.30%	1.35%	1.25%	5.05%	2.75%	0.25%
High Yield	Bloomberg High Yield	6.75%	6.25%	3.75%	11.75%	4.40%	3.90%	10.75%	2.35%	1.00%
Global ex-U.S. Fixed	Bloomberg Global Agg ex US	2.70%	2.25%	-0.25%	9.80%	1.20%	0.80%	9.20%	1.45%	0.60%
Emerging Market Sov Debt	EMBI Global Diversified	6.25%	5.85%	3.35%	10.65%	4.00%	3.60%	9.50%	2.25%	1.15%
Alternatives										
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.25%	14.20%	6.60%	5.75%	14.20%	0.00%	0.00%
Private Infrastructure	MSCI GI Infra/FTSE Dev Core 50/50	7.15%	6.15%	3.65%	15.45%	7.10%	6.10%	15.45%	0.05%	0.00%
Private Equity	Cambridge Private Equity	11.95%	8.50%	6.00%	27.60%	11.45%	8.00%	27.60%	0.50%	0.00%
Private Credit	N/A	8.00%	7.00%	4.50%	15.50%	6.40%	5.50%	14.60%	1.50%	0.90%
Hedge Funds	Callan Hedge FOF Database	5.80%	5.55%	3.05%	8.45%	4.35%	4.10%	8.20%	1.45%	0.25%
Commodities	Bloomberg Commodity	5.05%	3.50%	1.00%	18.00%	4.05%	2.50%	18.00%	1.00%	0.00%
Cash Equivalents	90-Day T-Bill	2.75%	2.75%	0.25%	0.90%	1.20%	1.20%	0.90%	1.55%	0.00%
Inflation	CPI-U		2.50%		1.60%		2.25%	1.60%	0.25%	0.00%

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Source: Callan

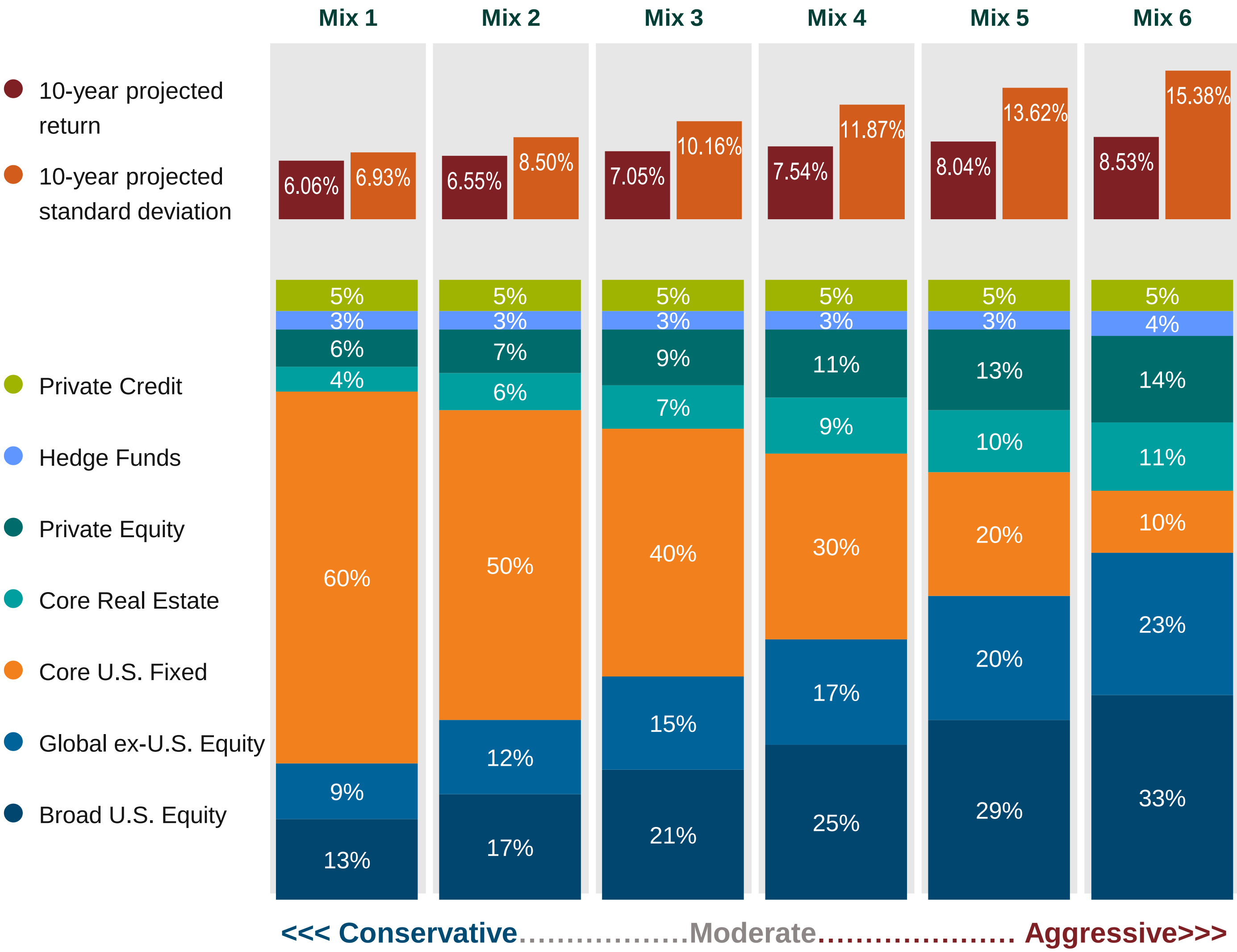
2023–2032 Callan Capital Markets Assumptions Correlations

	Large Cap	Smid Cap	Dev	Em Mkts	Short Dur	Core Fixed	Long Gov	Long Credit	TIPS	High Yield	Global ex-US Fixed	EM	Core Real Estate	Private Infra	Private Equity	Private Credit	Hedge Funds	Comm	Cash Equiv	Inflation
Large Cap U.S. Equity	1.00																			
Smid Cap U.S. Equity	0.88	1.00																		
Dev ex-U.S. Equity	0.73	0.79	1.00																	
Em Market Equity	0.79	0.83	0.89	1.00																
Short Dur Gov/Credit	0.05	0.01	0.04	-0.01	1.00															
Core U.S. Fixed	0.02	-0.02	0.00	-0.04	0.80	1.00														
Long Government	-0.05	-0.06	-0.03	-0.06	0.67	0.83	1.00													
Long Credit	0.45	0.40	0.40	0.40	0.64	0.80	0.65	1.00												
TIPS	-0.07	-0.08	-0.09	-0.11	0.56	0.70	0.50	0.52	1.00											
High Yield	0.75	0.74	0.73	0.75	0.10	0.09	0.00	0.45	0.02	1.00										
Global ex-U.S. Fixed	0.10	0.07	0.13	0.12	0.50	0.60	0.50	0.55	0.45	0.18	1.00									
EM Sovereign Debt	0.65	0.65	0.65	0.69	0.16	0.19	0.10	0.47	0.08	0.62	0.21	1.00								
Core Real Estate	0.44	0.42	0.42	0.41	0.16	0.14	0.05	0.30	0.09	0.31	0.16	0.29	1.00							
Private Infrastructure	0.48	0.47	0.46	0.46	0.14	0.15	0.10	0.33	0.08	0.34	0.18	0.32	0.76	1.00						
Private Equity	0.79	0.77	0.76	0.75	-0.01	-0.09	-0.13	0.30	-0.11	0.61	0.08	0.51	0.55	0.60	1.00					
Private Credit	0.69	0.68	0.65	0.68	0.11	0.00	-0.05	0.33	-0.12	0.63	0.12	0.50	0.25	0.27	0.67	1.00				
Hedge Funds	0.67	0.63	0.63	0.63	0.23	0.29	0.20	0.55	0.20	0.60	0.25	0.54	0.28	0.30	0.48	0.51	1.00			
Commodities	0.20	0.20	0.20	0.20	-0.05	-0.04	-0.10	0.05	0.00	0.20	0.10	0.15	0.18	0.15	0.20	0.17	0.23	1.00		
Cash Equivalents	-0.06	-0.08	-0.10	-0.10	0.30	0.15	0.12	0.00	0.12	-0.09	0.05	-0.06	0.00	-0.04	0.00	-0.04	-0.04	-0.02	1.00	
Inflation	-0.02	0.02	0.00	0.03	-0.21	-0.23	-0.30	-0.20	0.25	0.00	-0.15	-0.04	0.20	0.10	0.06	-0.05	0.05	0.35	0.05	1.00

Source: Callan

Optimization Set – Public Stocks and Bonds Plus Alternatives

Asset mix alternatives



Private Credit:

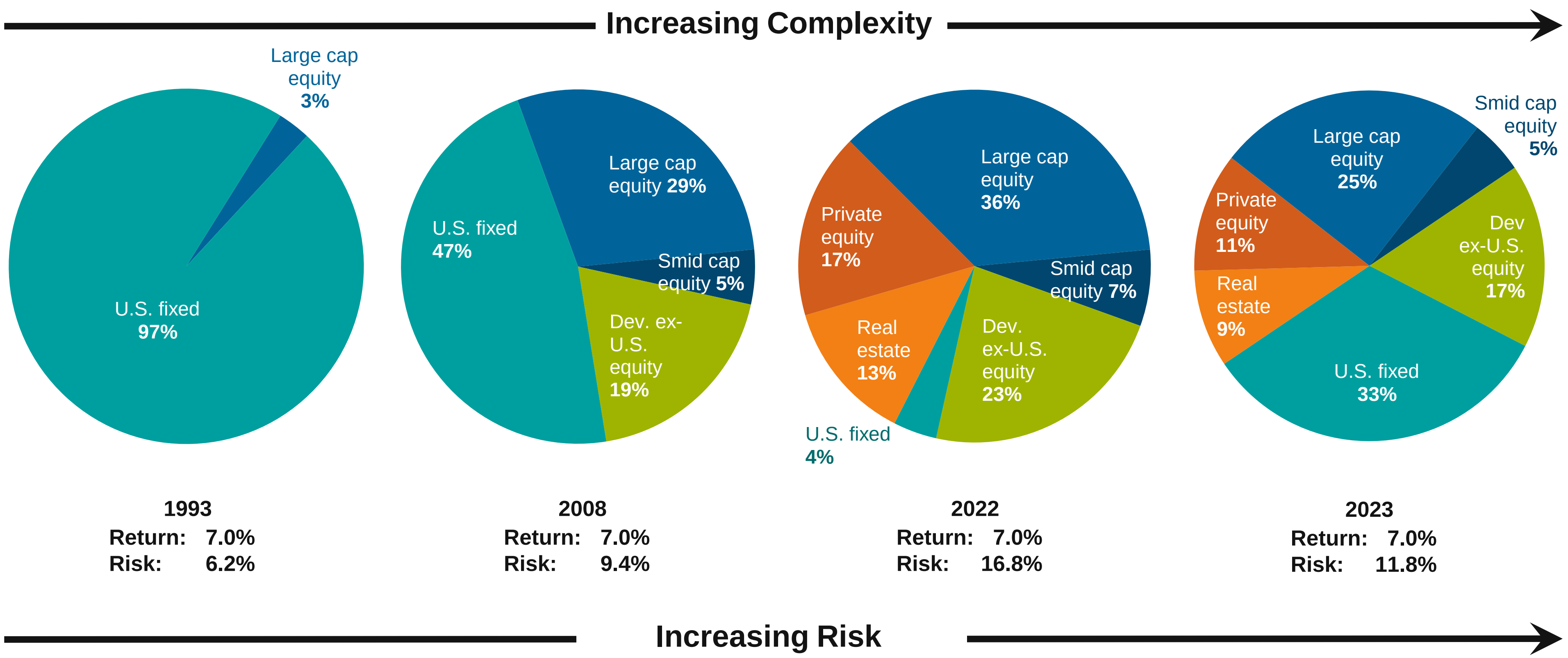
Absolute constraint: <5%

Note on public equity:

We tune large cap, small cap, developed ex-U.S. and emerging separately.

Prefer to optimize portfolios with broad U.S. and broad global ex-U.S. equity

7% Expected Returns Over Past 30 Years



In 1993, our return expectation for broad U.S. fixed income was 6.85%.

Just 3% in return-seeking assets was required to earn a 7% projected return.

15 years later, an investor would have needed over half of the portfolio in public equities to achieve a 7% projected return.

In 2022 an investor was required to include 96% in return-seeking assets (including 30% in private market investments) to earn a 7% projected return at almost 3x the volatility compared to 1993.

Today's 7% expected return portfolio is much more reasonable than it was just a year ago, with a third in fixed income and a correspondingly lower level of risk.

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