2023 WICPA FINANCIAL INSTITUTIONS CONFERENCE

YOUR SOURCE FOR KEY UPDATES & INSIGHTS ON TIMELY ISSUES

HIGHLIGHTED TOPICS:

CURRENT ISSUES IN BUSINESS ETHICS

Get an update in business ethics based on real-world ethical violations, including attitudes of others and laws CPAs must follow and the consequences of not doing so

ACCOUNTING & TAX LEGISLATION UPDATE

Learn about the most recent tax law changes that impact you and your financial institution

INVESTING THROUGH THE NOISE

Find out about the outlooks for growth and inflation, assessments of interest rates and risks and opportunities in global stock and bond markets

WEDNESDAY, MAY 10 | WICPA OFFICE & WICPA CPE LIVESTREAM

MATERIALS AT A GLANCE

The following materials are from the morning sessions of the 2023 WICPA Financial Institutions Conference held on Wednesday, May 10, including:

- Investing Through the Noise
- Asset Liability Management in Volatile Times
- Accounting & Tax Legislation Update

SPECTRUM
INVESTMENT ADVISORS

18th Annual

Retirement Plan Investment Seminar

4 FREE CPE CREDITS

Details

Tues. June 13, 2023

8:15 am to 12:15 pm

Brookfield Conference Center
325 S Moorland Road
Brookfield, WI 53005

Speakers & Topics:

MANUEL ROSADO | President of Spectrum Investment Advisors

- Retirement Plan Trends - Secure Act 2.0 to Financial Wellness

MIKE LYNCH | Managing Director of Applied Insights

- 8,000 Days: Envisioning Retirement in a New Way

EMILY ROLAND, CIMA | Co-Chief Investment Strategist

- Economic & Financial Markets Review

CHARLIE PLUMB | Former Navy Fighter Pilot and Prisoner of War

- Tough Choices in Challenging Times

Register Today

RSVP online at
https://bit.ly/RP-Seminar-2023-WICPA

Spectrum Investment Advisors
(800) 242-4735 | www.spectruminvestor.com

FREE CONTINUING EDUCATION CREDIT

WICPA	SHRM Recertification Provider	HRCI
4 CPE Credits	**4 PDC Credits**	**4 HR (General) Credits**

WICPA, Hartford Funds, John Hancock Investment Management and Charlie Plumb are not affiliated with Spectrum Investment Advisors.

For CPE credits, please call the CPE Department at 800-772-6939 or register thru the WICPA Website. / PD Credit program is valid for the SHRM-CPSM or SHRM-SCPSM / The use of the official HRCI seal confirms that this activity has met HR Certification Institute's® criteria for recertification credit pre-approval.


Competition, regulatory pressures and shareholder expectations can create a volatile landscape. We help you create stability and growth. Visit **wipfli.com/fi**.
STRENGTH
Perspective changes everything.
WIPFLI

WICPA Career Center

Post Job Openings | Upload Your Resume | Apply For Jobs

Whether you're looking for a new career or a new employee, the WICPA's Career Center can help you make the most of your search.

Find or post a job today at wicpa.org/CareerCenter.

CONNECT

A GREAT WAY FOR WICPA MEMBERS TO COLLABORATE

WICPA Connect is your exclusive members-only networking and knowledge base designed to connect you with WICPA members and resources.

- **Network with peers** and grow your contact list using the member directory of more than 7,000 members.
- **Post questions** to find out from fellow members who have the expertise or may have been in the same situation.
- **Personalize your profile** by adding your interests, education, experience, honors and even your photo.
- **Contribute and download resources** such as documents, whitepapers, articles, reports, guides and more.
- **Share your knowledge and expertise** by answering questions and offering your insights and ideas to fellow members.
- **Customize your experience** with controls for profile visibility, discussion signatures, notifications and more.

As a WICPA member, you already have a profile on WICPA Connect.
Simply go to wicpa.org/connect and sign in using your existing website login information.

Connect with thousands of fellow members now at **wicpa.org/connect**

8:10 – 9:20 a.m.

Investing Through the Noise

Jack Manley, *Vice President & Global Market Strategist, J.P. Morgan Asset Management*

Market Insights

Guide to the Markets®

U.S. | 2Q 2023

As of April 11, 2023

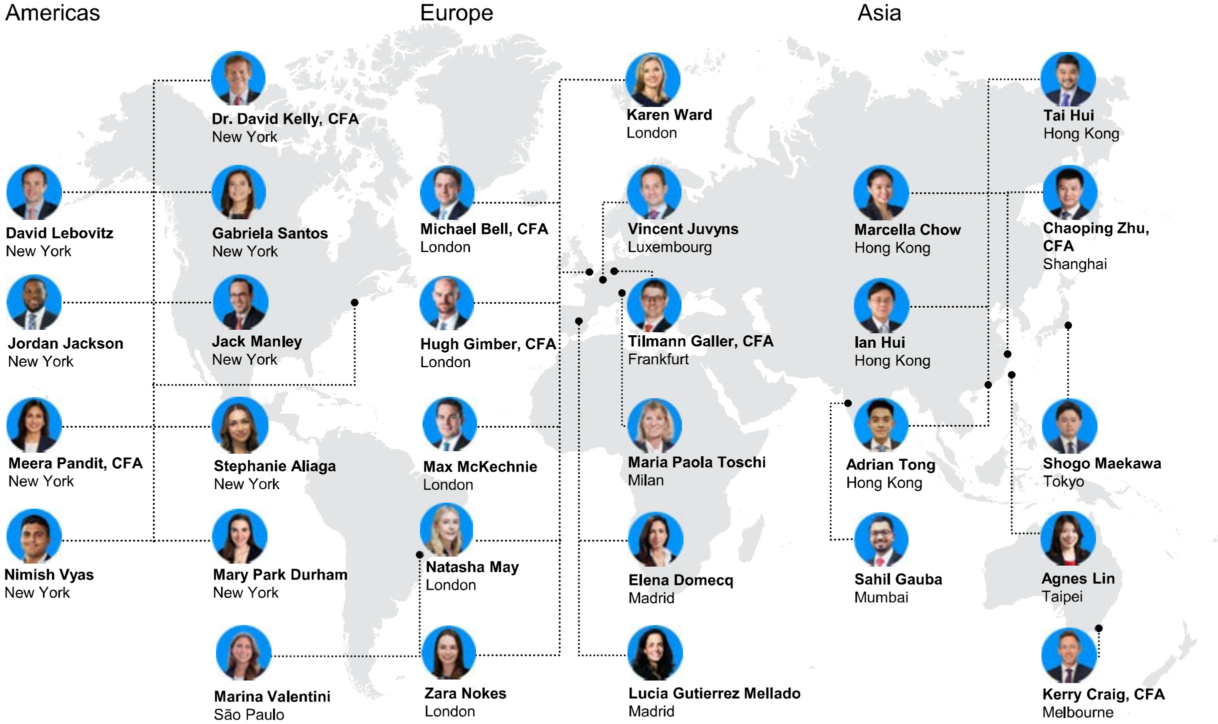
J.P.Morgan
ASSET MANAGEMENT

Global Market Insights Strategy team

Americas

Europe

Asia



J.P.Morgan
ASSET MANAGEMENT

Page reference

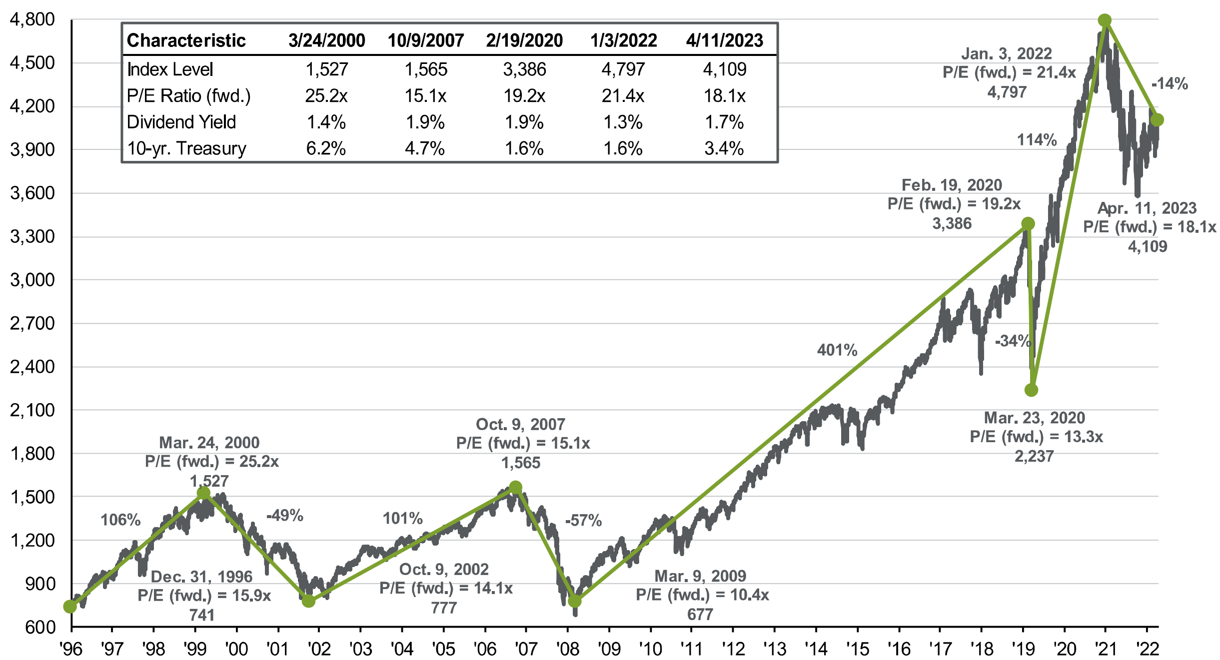
J.P.Morgan
ASSET MANAGEMENT

Equities

S&P 500 Index at inflection points

S&P 500 Price Index

Characteristic	3/24/2000	10/9/2007	2/19/2020	1/3/2022	4/11/2023
Index Level	1,527	1,565	3,386	4,797	4,109
P/E Ratio (fwd.)	25.2x	15.1x	19.2x	21.4x	18.1x
Dividend Yield	1.4%	1.9%	1.9%	1.3%	1.7%
10-yr. Treasury	6.2%	4.7%	1.6%	1.6%	3.4%



Source: Compustat, FactSet, Federal Reserve, Refinitiv Datastream, Standard & Poor's, J.P. Morgan Asset Management.
Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat. Forward price-to-earnings ratio is a bottom-up calculation based on IBES estimates and FactSet estimates since January 2022. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

S&P 500 valuation measures

Equities

S&P 500 Index: Forward P/E ratio

Valuation measure	Description	Latest	25-year avg.*	Std. dev. Over-/under-Valued
P/E	Forward P/E	18.05x	16.81x	0.37
CAPE	Shiller's P/E	29.72	27.87	0.29
Div. Yield	Dividend yield	1.72%	1.99%	0.82
P/B	Price to book	3.61	3.10	0.63
P/CF	Price to cash flow	13.41	11.22	1.00
EY Spread	EY minus Baa yield	0.04%	0.30%	0.14

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 April 1998 and by FactSet since January 2022. Current next 12-months consensus earnings estimates are $228. 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 April 11, 2023.

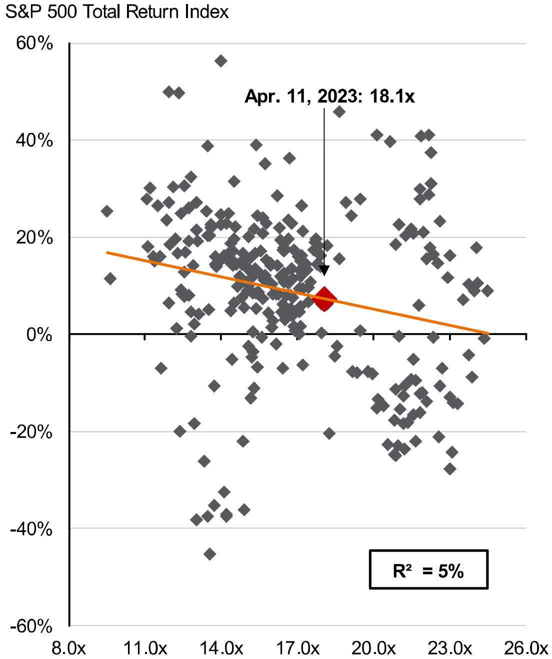
J.P.Morgan
ASSET MANAGEMENT

P/E ratios and equity returns

Equities

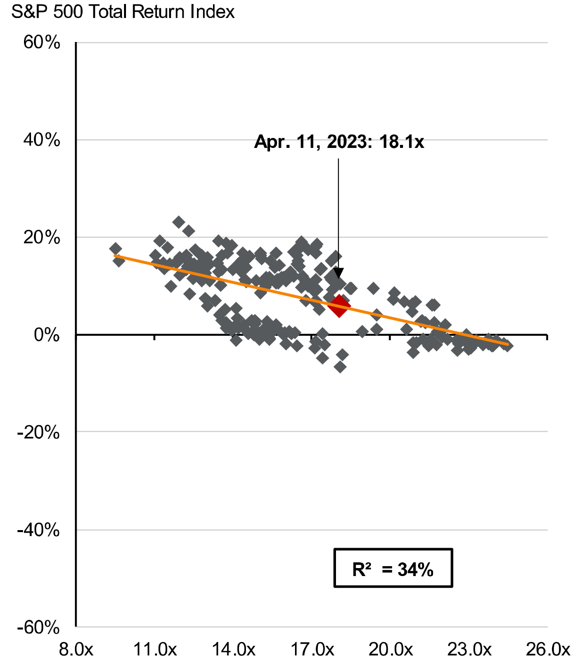
Forward P/E and subsequent 1-yr. returns

S&P 500 Total Return Index



Forward P/E and subsequent 5-yr. annualized returns

S&P 500 Total Return Index



Source: FactSet, Refinitiv Datastream, Standard & Poor's, Thomson Reuters, J.P. Morgan Asset Management.
Returns are 12-month and 60-month annualized total returns, measured monthly, beginning 3/31/98. R^2 represents the percent of total variation in total returns that can be explained by forward price-to-earnings ratios. Price-to-earnings is price divided by consensus analyst estimates of earnings per share for the next 12 months as provided by IBES since February 1998 and by FactSet since January 2022.
Guide to the Markets – U.S. Data are as of April 11, 2023.

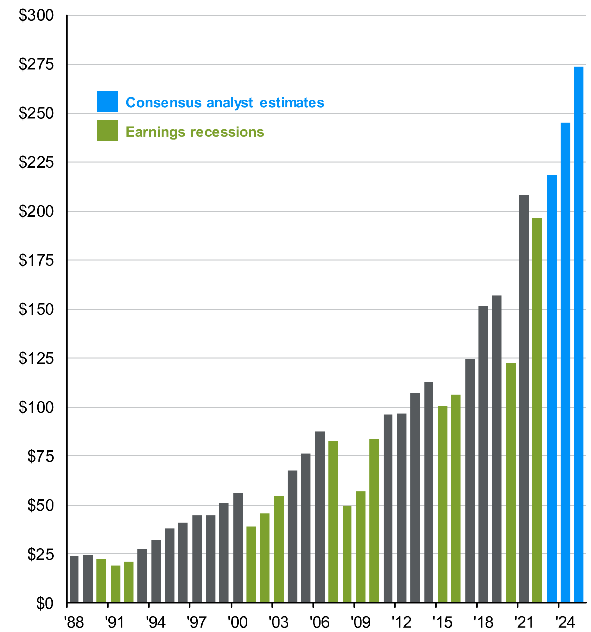
J.P.Morgan
ASSET MANAGEMENT

Corporate earnings and sources of earnings growth

Equities

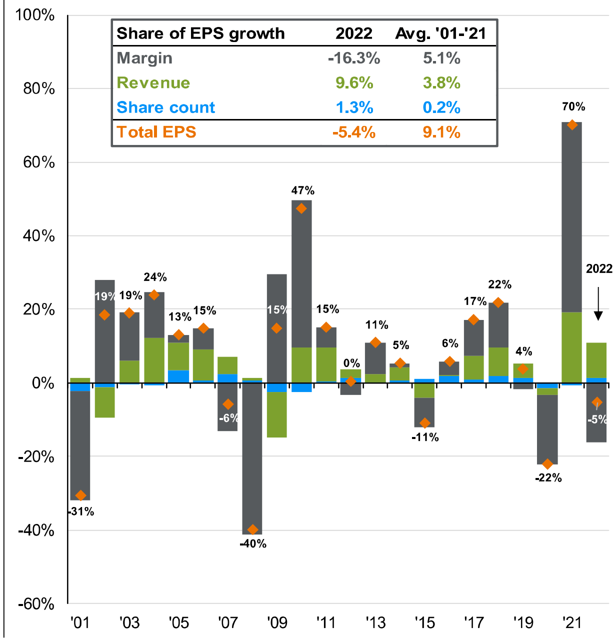
S&P 500 earnings per share

Index annual operating earnings, USD



S&P 500 year-over-year operating EPS growth

Annual growth broken into revenue, changes in profit margin & changes in share count



Share of EPS growth	2022	Avg. '01-'21
Margin	-16.3%	5.1%
Revenue	9.6%	3.8%
Share count	1.3%	0.2%
Total EPS	-5.4%	9.1%

Source: Compustat, FactSet, Standard & Poor's, J.P. Morgan Asset Management.
Historical EPS levels are based on annual operating earnings per share. Earnings estimates are based on estimates from Standard & Poor's and FactSet Market Aggregates. Percentages may not sum due to rounding. Past performance is not indicative of future returns.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Profit margins

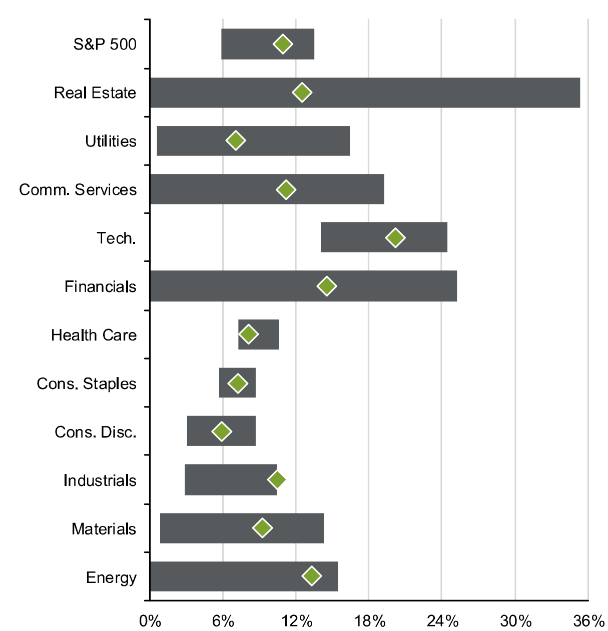
Equities

S&P 500 profit margins

Quarterly operating earnings/sales

S&P 500 operating margins by sector

Current operating margins versus historical range*

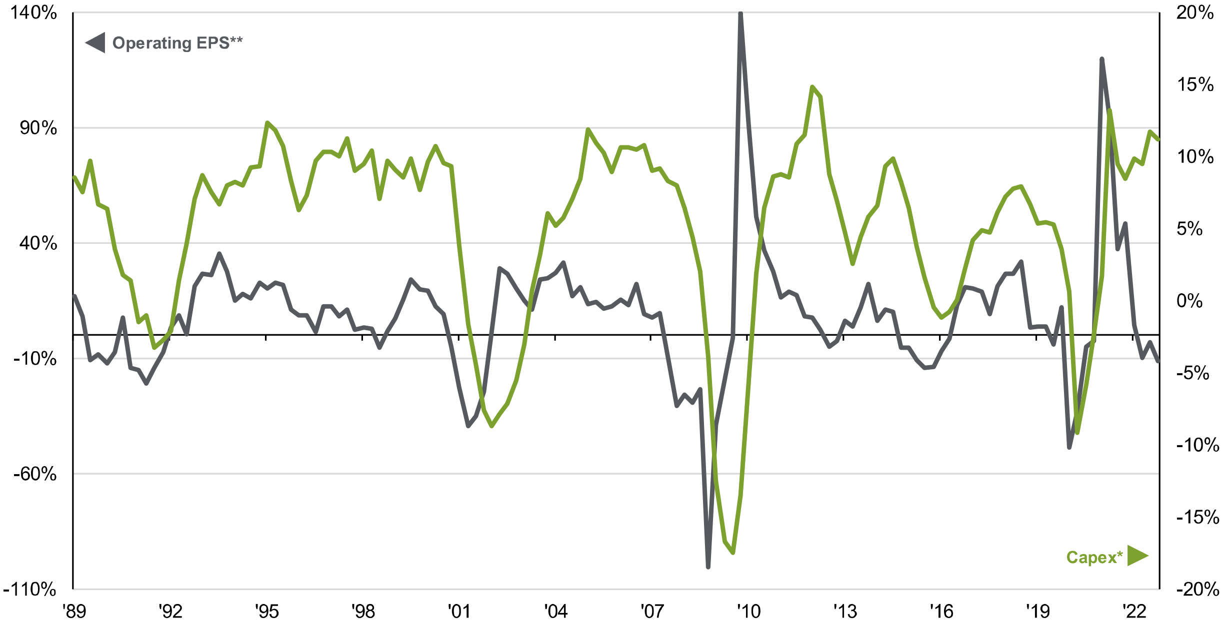


Source: Compustat, FactSet, NFIB, Standard & Poor's, J.P. Morgan Asset Management. Past performance is not indicative of future returns.
*Quarters with negative operating margins are not shown, with zero set as the lower bound for troughs.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Corporate profits and fixed business investment

Profit growth and capital expenditures
Year-over-year growth rates



Source: BEA, FactSet, Standard & Poor's, J.P. Morgan Asset Management. *Capital expenditures are estimated using seasonally adjusted nominal gross private domestic fixed investment (nonresidential) data from the BEA. **Historical operating EPS growth is adjusted to account for periods with outlier growth rates.
Guide to the Markets – U.S. Data are as of April 11, 2023.

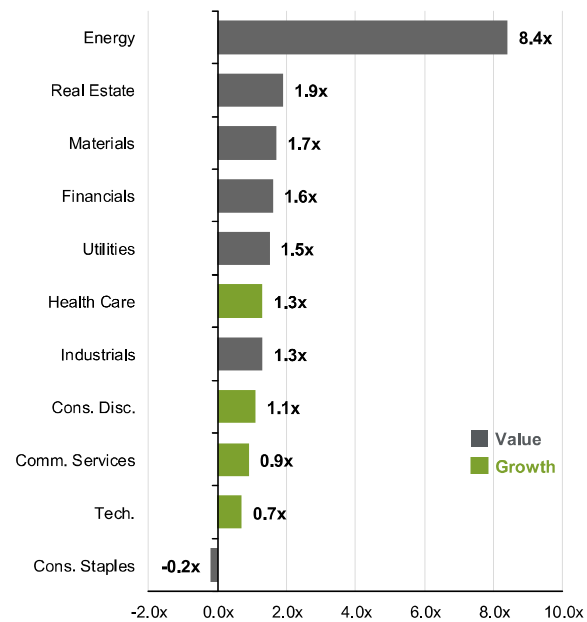
J.P.Morgan
ASSET MANAGEMENT

Value vs. Growth

Value vs. Growth relative valuations
Rel. fwd. P/E ratio of Value vs. Growth, 1997 - present

	Forward PE		Div. yield**	
Style	Current	Long-term avg.*	Current	Long-term avg.*
Value	14.46x	14.08x	2.35%	2.59%
Growth	23.86x	20.75x	1.05%	1.34%

S&P 500 operating leverage by sector
Impact on operating income from a 1% rise in revenues



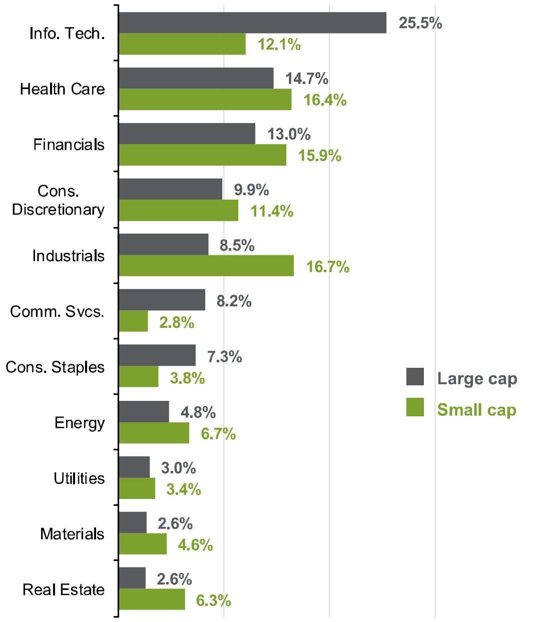
Source: FactSet, FTSE Russell, NBER, J.P. Morgan Asset Management.
(Left) Growth is represented by the Russell 1000 Growth Index and Value is represented by the Russell 1000 Value Index. *Long-term averages are calculated monthly since December 1997. **Dividend yield is calculated as the next 12-month consensus dividend divided by most recent price.
(Right) Operating leverage is a bottom-up calculation based on the 10-year compounded annual growth rate (CAGR) in EBIT divided by the 10-year CAGR in revenue at the constituent level within each sector. Sector level aggregates are computed using a weighted sum of each constituent's operating leverage. Weights are determined using market capitalization. Calculations use EBIT and revenue over the 10-year period from 2013 to 2022. The constituent level analysis accounts for outlier data points.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

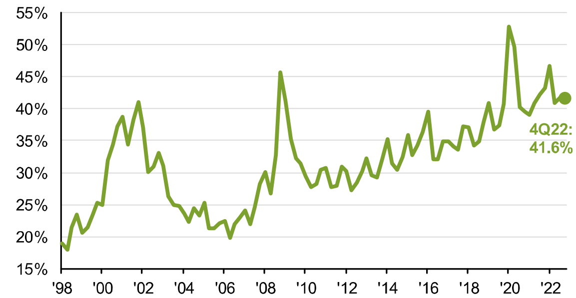
Small cap vs. large cap stocks

Equities

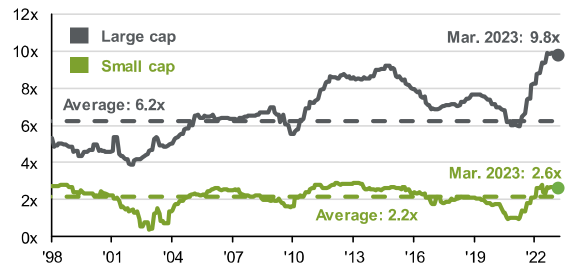
Sector composition
% of index market capitalization



Percent of unprofitable companies in the Russell 2000
1Q98 – 4Q22, pro-forma EPS



Interest rate coverage ratio
EBIT/interest expense on debt, monthly, LTM, 1998-present



Source: Compustat, FactSet, FTSE Russell, NBER, J.P. Morgan Asset Management.
The S&P 500 is used for large cap and the Russell 2000 is used for small cap.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Returns and valuations by style

Equities

10-year annualized

	Value	Blend	Growth
Large	9.0%	12.1%	14.3%
Mid	8.7%	9.9%	11.0%
Small	7.1%	8.0%	8.5%

YTD

	Value	Blend	Growth
Large	1.9%	7.5%	13.3%
Mid	1.4%	3.7%	8.1%
Small	-1.7%	1.9%	5.4%

Since market peak (February 2020)

	Value	Blend	Growth
Large	19.8%	27.7%	29.8%
Mid	18.0%	18.6%	13.1%
Small	15.2%	9.9%	2.2%

Since market low (March 2020)

	Value	Blend	Growth
Large	93.6%	92.9%	89.4%
Mid	108.7%	98.5%	76.0%
Small	102.6%	85.2%	66.1%

Current P/E vs. 20-year avg. P/E

	Value	Blend	Growth
Large	14.5 / 13.7	18.1 / 15.5	23.9 / 18.7
Mid	13.9 / 14.5	16.3 / 16.4	23.0 / 20.4
Small	15.8 / 16.8	20.6 / 21.4	28.3 / 31.3

Current P/E as % of 20-year avg. PE

	Value	Blend	Growth
Large	105.5%	116.4%	127.8%
Mid	96.2%	99.3%	112.6%
Small	93.9%	96.2%	90.4%

Source: FactSet, Refinitiv Datastream, Russell Investment Group, Standard & Poor's, J.P. Morgan Asset Management.
All calculations are cumulative total return, including dividends reinvested for the stated period. Since market peak represents period from 2/19/2020 to 3/31/2023. Since market low represents period from 3/23/2020 to 3/31/2023. Returns are cumulative returns, not annualized. For all time periods, total return is based on Russell style indices except for the large blend category, which is based on the S&P 500 Index. Past performance is not indicative of future returns. The price-to-earnings is a bottom-up calculation based on the most recent index price, divided by consensus estimates for earnings in the next 12 months (NTM) and is provided by FactSet Market Aggregates and J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Returns and valuations by sector

	Energy	Materials	Financials	Industrials	Cons. Disc.	Tech.	Comm. Services*	Real Estate	Health Care	Cons. Staples	Utilities	S&P 500 Index	
S&P weight	**4.8%**	**2.6%**	**13.0%**	**8.5%**	**9.9%**	**25.5%**	**8.2%**	**2.6%**	**14.7%**	**7.3%**	**3.0%**	**100.0%**	Weight
Russell Growth weight	1.4%	1.3%	6.8%	8.1%	14.0%	41.1%	7.3%	1.5%	12.2%	6.1%	0.0%	100.0%	
Russell Value weight	8.2%	4.4%	20.0%	10.6%	5.9%	7.7%	8.7%	4.5%	16.7%	7.7%	5.7%	100.0%	
Russell 2000 weight	6.7%	4.6%	15.9%	16.7%	11.4%	12.1%	2.8%	6.3%	16.4%	3.8%	3.4%	100.0%	
QTD	4.6	-0.1	0.6	-1.9	-2.5	-2.3	1.4	0.3	3.4	1.2	3.0	0.0	Return (%)
YTD	-0.3	4.2	-5.0	1.5	13.2	19.0	22.2	1.4	-1.1	2.0	-0.4	7.5	
Since market peak (February 2020)	86.1	42.6	11.5	25.0	11.1	47.6	3.6	-7.8	35.9	29.9	10.2	27.7	
Since market low (March 2020)	322.3	123.2	95.4	114.3	62.8	114.4	45.1	48.6	88.5	70.9	71.2	92.9	
Beta to S&P 500	1.3	1.1	1.1	1.1	1.2	1.1	1.0*	0.8	0.8	0.6	0.5	1.0	β
Correl. To Treas. Yields	0.0	-0.5	-0.3	-0.5	-0.6	-0.7	-0.8	-0.6	-0.4	-0.4	-0.4	-0.6	ρ
Foreign % of sales	37.8	55.2	21.3	32.3	34.4	57.6	42.8	15.9	35.7	43.1	1.8	39.6	%
NTM earnings growth	-16.8%	-10.1%	2.6%	11.8%	21.0%	3.9%	14.1%	1.1%	-4.5%	5.7%	6.9%	3.9%	EPS
20-yr. avg.	**100.6%**	**15.8%**	**20.9%**	**14.0%**	**16.9%**	**13.3%**	**10.2%***	**6.8%**	**8.2%**	**7.7%**	**4.3%**	**11.1%**	
Forward P/E ratio	10.7x	16.8x	13.0x	18.2x	24.3x	24.2x	16.5x	16.9x	17.6x	20.4x	18.4x	18.1x	P/E
20-yr. avg.	**13.7x**	**14.8x**	**12.4x**	**16.3x**	**19.3x**	**18.0x**	**18.7x***	**16.8x**	**15.1x**	**17.4x**	**15.5x**	**15.5x**	
Buyback yield	3.7%	2.5%	2.9%	2.5%	2.2%	2.6%	5.0%	-1.8%	1.9%	1.3%	-0.8%	2.5%	Bbk
20-yr. avg.	**1.6%**	**0.9%**	**0.4%**	**2.2%**	**2.4%**	**3.0%**	**1.6%**	**-1.3%**	**2.0%**	**1.8%**	**-0.9%**	**1.8%**	
Dividend yield	3.2%	2.1%	2.1%	1.9%	1.0%	1.0%	1.0%	3.9%	1.7%	2.6%	3.2%	1.7%	Div
20-yr. avg.	**2.8%**	**2.4%**	**2.3%**	**2.2%**	**1.4%**	**1.1%**	**1.2%**	**3.9%**	**1.9%**	**2.8%**	**3.9%**	**2.1%**	

Source: FactSet, Refinitiv Datastream, Russell Investment Group, Standard & Poor's, J.P. Morgan Asset Management. All calculations are cumulative total return, not annualized, including dividends for the stated period. Since market peak represents period from 2/19/2020 to 3/31/2023. Since market low represents period from 3/23/2020 to 3/31/2023. Correlation to Treasury yields are trailing 2-year monthly correlations between S&P 500 sector price returns and 10-year Treasury yield movements. Next 12 months (NTM) earnings growth is the percent change in next 12-months earnings estimates compared to last 12-months earnings provided by brokers. Forward P/E ratio is a bottom-up calculation based on the most recent S&P 500 Index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates and J.P. Morgan Asset Management. Buyback yield is net of share issuance and is calculated as last 12-months net buybacks divided by market cap. Dividend yield is calculated as the next 12-months consensus dividend divided by most recent price. Beta calculations are based on 10-years of monthly price returns for the S&P 500 and its sub-indices. *Communication Services (formerly Telecom) averages and beta are based on 5-years of backtested data by JPMAM. Past performance is not indicative of future returns.

Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Factor performance

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	YTD	2008 - 2022 Ann.	2008 - 2022 Vol.
Min. Vol. -25.7%	Value 38.8%	Small Cap 26.9%	High Div. 14.3%	Cyclical 20.1%	Value 43.2%	Value 17.7%	Momen. 9.3%	Small Cap 21.3%	Momen. 37.8%	Min. Vol. 1.5%	Cyclical 36.3%	Momen. 29.6%	Value 29.2%	Defens. 5.3%	Cyclical 11.2%	Min. Vol. 9.5%	Small Cap 23.2%
Defens. -26.7%	Cyclical 36.9%	Multi-Factor 18.3%	Min. Vol. 12.9%	Value 16.8%	Small Cap 38.8%	Min. Vol. 16.5%	Min. Vol. 5.6%	High Div. 16.3%	Cyclical 27.3%	Momen. -1.6%	Quality 34.4%	Cyclical 27.8%	Cyclical 27.6%	High Div. -3.8%	Quality 9.4%	Momen. 9.2%	Value 21.4%
High Div. -27.6%	Multi-Factor 29.8%	Momen. 18.2%	Defens. 10.1%	Small Cap 16.3%	Multi-Factor 37.4%	High Div. 14.9%	Quality 4.6%	Value 15.9%	Quality 22.5%	High Div. -2.3%	Momen. 28.1%	Small Cap 20.0%	Quality 27.2%	Min. Vol. -9.2%	Multi-Factor 5.3%	Quality 9.2%	Cyclical 20.9%
Quality -31.2%	Small Cap 27.2%	Cyclical 17.9%	Quality 7.5%	Multi-Factor 15.7%	Cyclical 35.0%	Multi-Factor 14.8%	Cyclical 2.6%	Cyclical 14.0%	Value 22.2%	Defens. -2.9%	Min. Vol. 28.0%	Quality 17.1%	Multi-Factor 25.1%	Value -14.0%	Value 3.4%	High Div. 9.1%	Momen. 19.0%
Small Cap -33.8%	Quality 24.9%	High Div. 15.9%	Multi-Factor 7.3%	Momen. 15.1%	Momen. 34.8%	Momen. 14.7%	High Div. 0.7%	Multi-Factor 13.7%	Multi-Factor 21.5%	Cyclical -5.3%	Value 27.7%	Multi-Factor 11.4%	Defens. 25.0%	Multi-Factor -15.5%	Min. Vol. 2.6%	Cyclical 8.9%	Multi-Factor 18.5%
Value -36.9%	High Div. 18.4%	Min. Vol. 14.7%	Momen. 6.1%	Quality 12.8%	Quality 34.3%	Cyclical 13.6%	Multi-Factor 0.4%	Min. Vol. 10.7%	High Div. 19.5%	Quality -5.6%	Multi-Factor 26.6%	Min. Vol. 5.8%	High Div. 21.9%	Momen. -17.4%	Small Cap 1.9%	Multi-Factor 8.5%	Quality 17.0%
Multi-Factor -39.3%	Min. Vol. 18.4%	Quality 14.2%	Value -2.7%	Min. Vol. 11.2%	High Div. 28.9%	Defens. 13.0%	Defens. -0.9%	Quality 9.4%	Min. Vol. 19.2%	Multi-Factor -9.7%	Small Cap 25.5%	Defens. 5.2%	Min. Vol. 21.0%	Quality -20.3%	High Div. -0.1%	Defens. 8.3%	High Div. 15.7%
Momen. -40.9%	Momen. 17.6%	Value 12.7%	Cyclical -3.4%	Defens. 10.7%	Defens. 28.9%	Quality 10.7%	Small Cap -4.4%	Defens. 7.7%	Small Cap 14.6%	Small Cap -11.0%	High Div. 22.5%	High Div. 1.7%	Small Cap 14.8%	Small Cap -20.4%	Defens. -0.2%	Value 8.0%	Defens. 14.5%
Cyclical -44.8%	Defens. 16.5%	Defens. 12.0%	Small Cap -4.2%	High Div. 10.6%	Min. Vol. 25.3%	Small Cap 4.9%	Value -6.4%	Momen. 5.1%	Defens. 12.3%	Value -11.1%	Defens. 21.4%	Value -0.2%	Momen. 12.9%	Cyclical -27.2%	Momen. -1.4%	Small Cap 7.2%	Min. Vol. 13.9%

Source: FactSet, MSCI, Russell, Standard & Poor's, J.P. Morgan Asset Management. The MSCI High Dividend Yield Index aims to offer a higher than average dividend yield relative to the parent index that passes dividend sustainability and persistence screens. The MSCI Minimum Volatility Index optimizes the MSCI USA Index using an estimated security co-variance matrix to produce low absolute volatility for a given set of constraints. The MSCI Defensive Sectors Index includes: Consumer Staples, Energy, Health Care and Utilities. The MSCI Cyclical Sectors Index contains: Consumer Discretionary, Communication Services, Financials, Industrials, Information Technology and Materials. Securities in the MSCI Momentum Index are selected based on a momentum value of 12-month and 6-month price performance. Constituents of the MSCI Sector Neutral Quality Index are selected based on stronger quality characteristics to their peers within the same GICS sector by using three main variables: high return-on-equity, low leverage and low earnings variability. Constituents of the MSCI Enhanced Value Index are based on three variables: price-to-book value, price-to-forward earnings and enterprise value-to-cash flow from operations. The Russell 2000 is used for small cap. The MSCI USA Diversified Multiple Factor Index aims to maximize exposure to four factors – Value, Momentum, Quality and Size. Annualized volatility is calculated as the standard deviation of quarterly returns multiplied by the square root of 4.

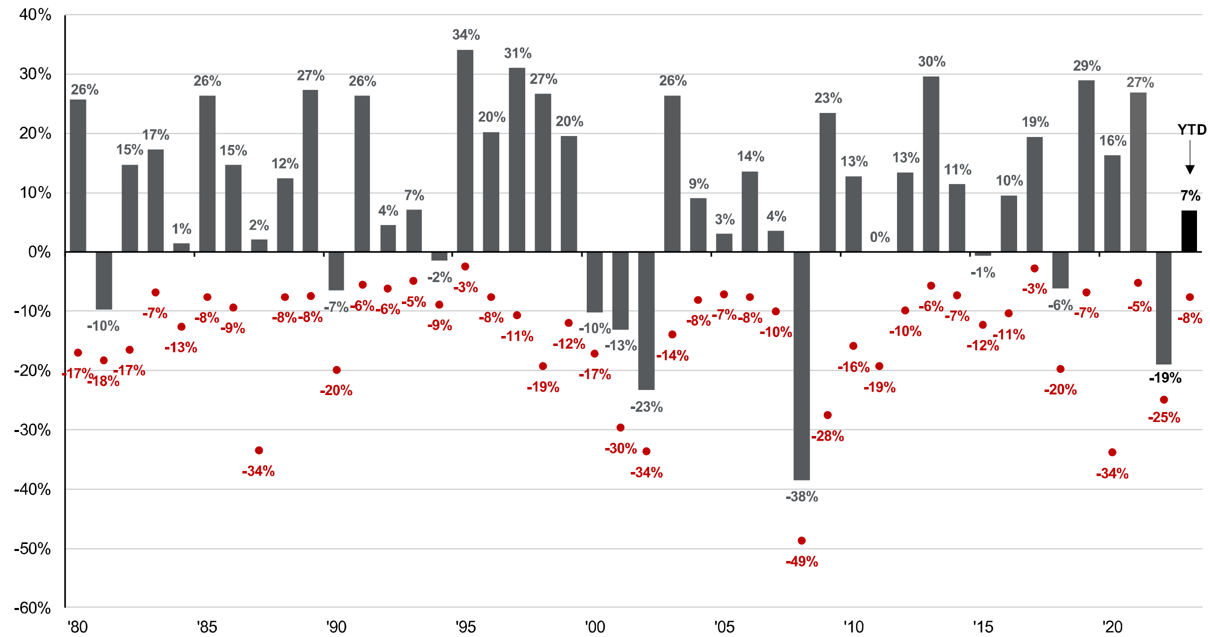
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Annual returns and intra-year declines

S&P intra-year declines vs. calendar year returns

Despite average intra-year drops of 14.3%, annual returns were positive in 32 of 43 years



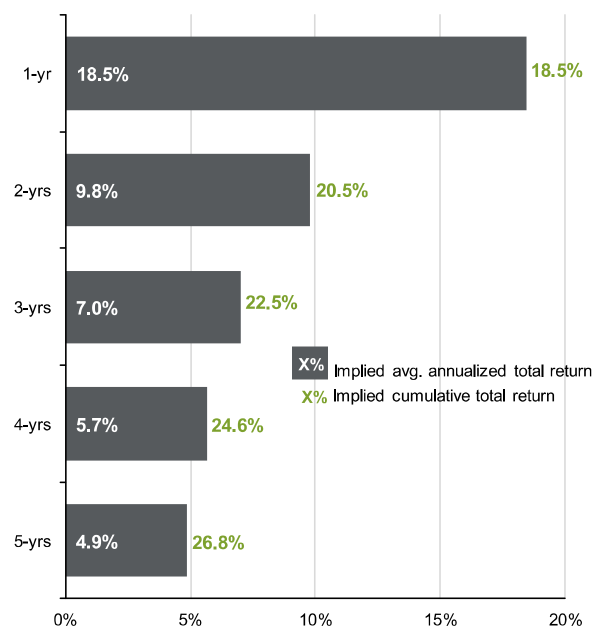
Source: FactSet, Standard & Poor's, J.P. Morgan Asset Management.
Returns are based on price index only and do not include dividends. Intra-year drops refers to the largest market drops from a peak to a trough during the year. For illustrative purposes only. Returns shown are calendar year returns from 1980 to 2022, over which time period the average annual return was 8.7%.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Equity scenarios: Bull, bear and in-between

Return needed to reach January 2022 peak of 4,797

S&P 500 level as of 4/11/2023 is 4,109



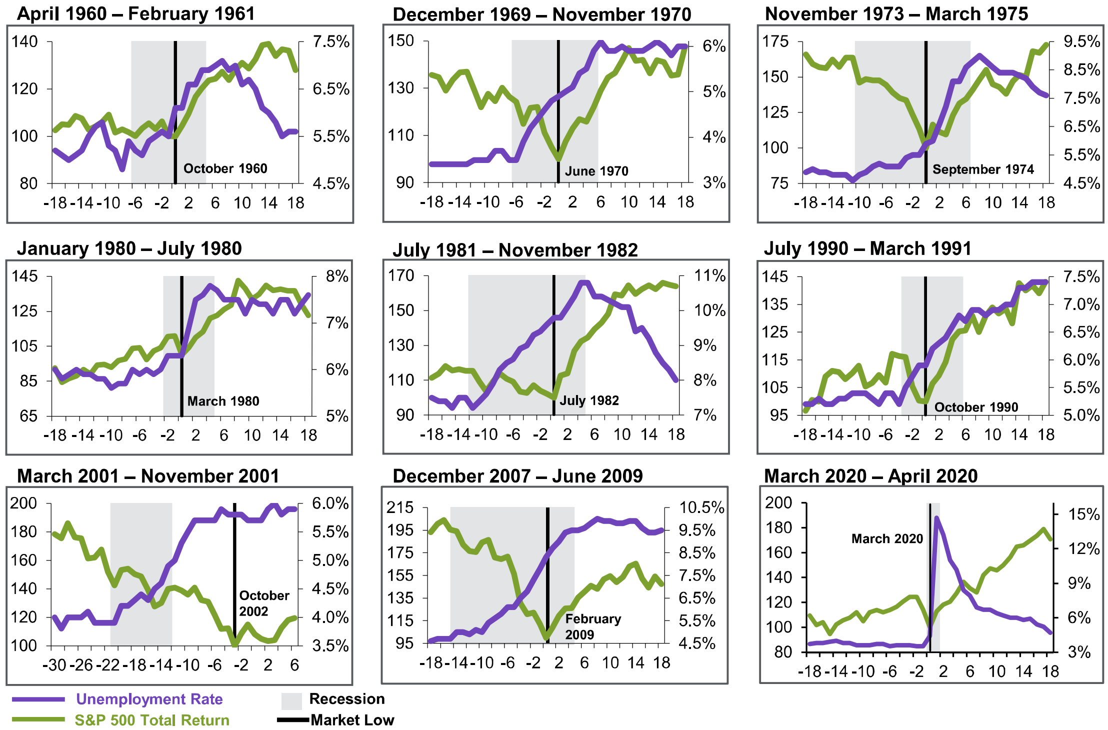
Bull and bear markets

Bull markets			Bear markets		
Bull begin date	Bull return	Duration (months)	Market peak	Bear return*	Duration (months)*
Jul 1926	152%	37	Sep 1929	-86%	32
Mar 1935	129%	23	Mar 1937	-60%	61
Apr 1942	158%	49	May 1946	-30%	36
Jun 1949	267%	85	Aug 1956	-22%	14
Oct 1960	39%	13	Dec 1961	-28%	6
Oct 1962	76%	39	Feb 1966	-22%	7
Oct 1966	48%	25	Nov 1968	-36%	17
May 1970	74%	31	Jan 1973	-48%	20
Mar 1978	62%	32	Nov 1980	-27%	20
Aug 1982	229%	60	Aug 1987	-34%	3
Oct 1990	417%	113	Mar 2000	-49%	30
Oct 2002	101%	60	Oct 2007	-57%	17
Mar 2009	401%	131	Feb 2020	-34%	1
Mar 2020	114%	21	Jan. 2022**	-25%	9
Averages	**162%**	**51**	**-**	**-41%**	**20**

Source: FactSet, NBER, Robert Shiller, Standard & Poor's, J.P. Morgan Asset Management. (Left) The current peak of 4,797 was observed on 1/3/2022. (Right) *A bear market is defined as a 20% or more decline from the previous market high. The related market return is the peak to trough return over the cycle. Bear and bull returns are price returns. **The bear market beginning in January 2022 is currently ongoing, with the "bear return" and duration for this period calculated from the January 2022 market peak through the current trough in October 2022. Averages for the bear market return and duration do not include figures from the current cycle.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Market inflection points, recessions and the unemployment rate



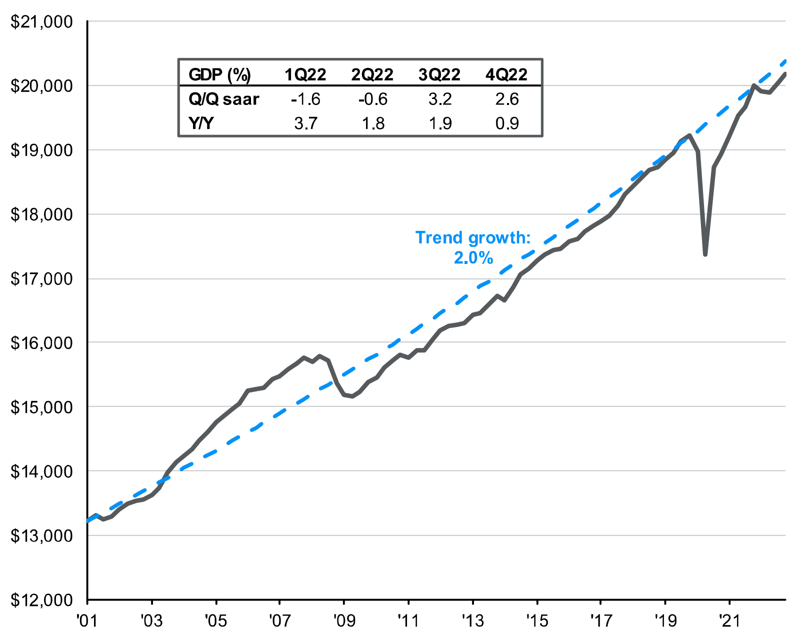
Source: BLS, Ibbotson, J.P. Morgan Asset Management. Time zero represents the numeric low of the S&P 500 Total Return Index associated with the recessionary period defined by the shaded gray area; data shown in months. S&P 500 Index is rebased to 100 at time zero.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Economic growth and the composition of GDP

Real GDP

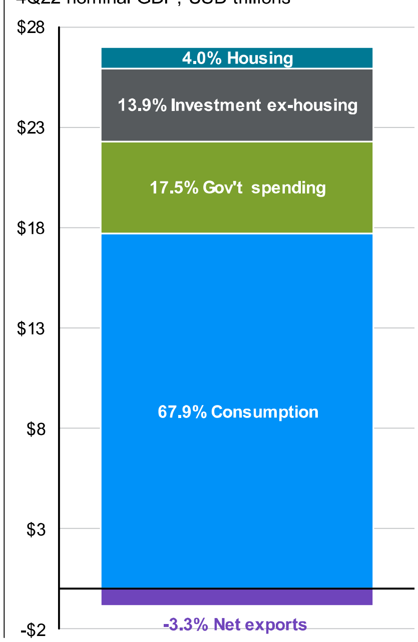
Billions of chained (2012) dollars, seasonally adjusted at annual rates



GDP (%)	1Q22	2Q22	3Q22	4Q22
Q/Q saar	-1.6	-0.6	3.2	2.6
Y/Y	3.7	1.8	1.9	0.9

Components of GDP

4Q22 nominal GDP, USD trillions



Source: BEA, FactSet, J.P. Morgan Asset Management. Values may not sum to 100% due to rounding. Trend growth is measured as the average annual growth rate from business cycle peak 1Q01 to business cycle peak 4Q19.
Guide to the Markets – U.S. Data are as of April 11, 2023.

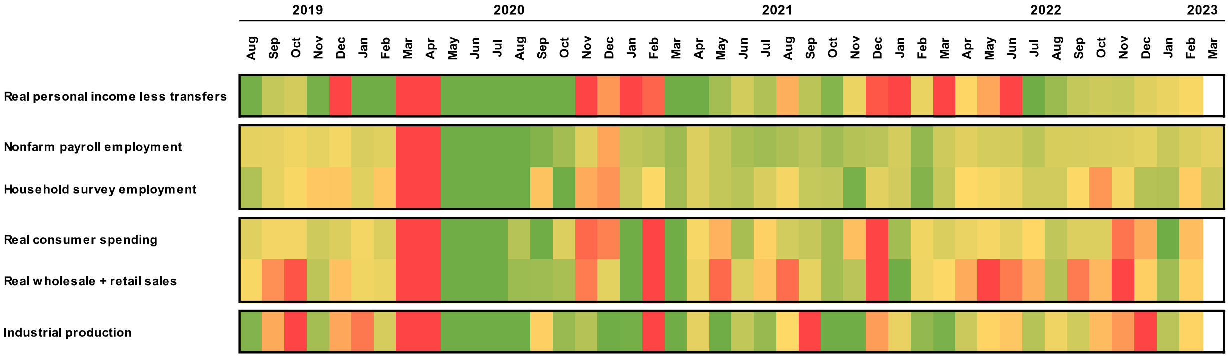
J.P.Morgan
ASSET MANAGEMENT

Recession determinants

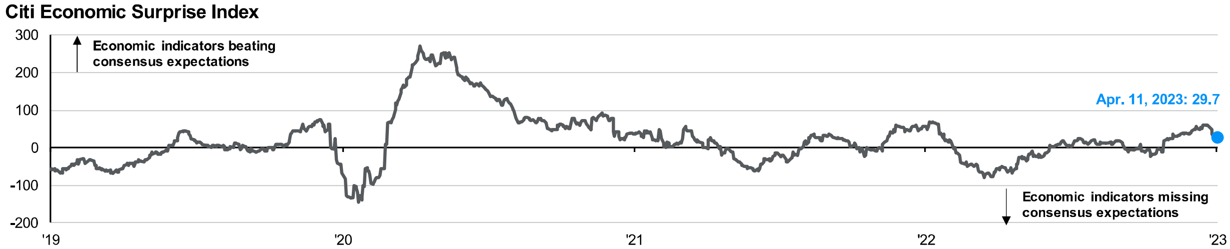
Economy

Variables used by the NBER in making recession determination*

% change month-over-month



Citi Economic Surprise Index



Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau, Citigroup, NBER, J.P. Morgan Asset Management. Heatmap shading reflects 10 years of data, with green and red reflecting a range of +/- 0.5 standard deviations from a baseline of 0% monthly growth. *The NBER's definition of a recession involves a significant decline in economic activity that is spread across the economy and lasts more than a few months. Specifically, they consider real personal income less transfers, nonfarm payroll employment, employment as measured by the household survey, real personal consumption expenditures, wholesale-retail sales adjusted for price changes and industrial production. There is no fixed rule about which measures contribute to the process or how they are weighted, but the committee notes that "in recent decades, the two measures we have put the most weight on are real personal income less transfers and nonfarm payroll employment." The Citi Economic Surprise Index is a 90-day weighted moving average of surprises in economic indicators relative to consensus. A positive reading means that the data releases have been stronger than expected and a negative reading means that the data releases have been worse than expected.

Guide to the Markets – U.S. Data are as of April 11, 2023.

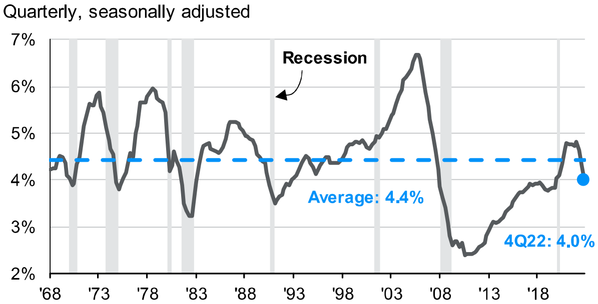
J.P.Morgan
ASSET MANAGEMENT

Cyclical sectors

Economy

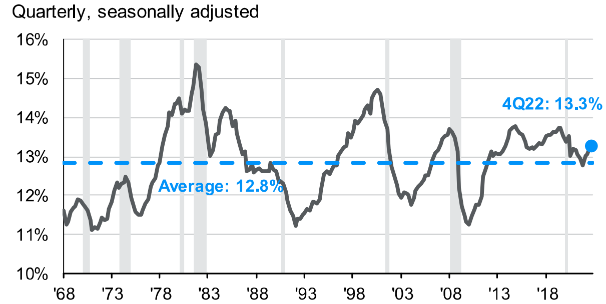
Residential investment as a % of GDP

Quarterly, seasonally adjusted



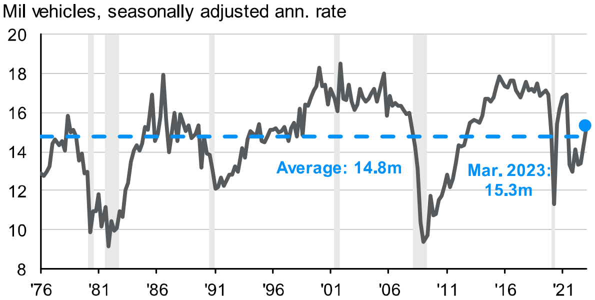
Business fixed investment as a % of GDP

Quarterly, seasonally adjusted



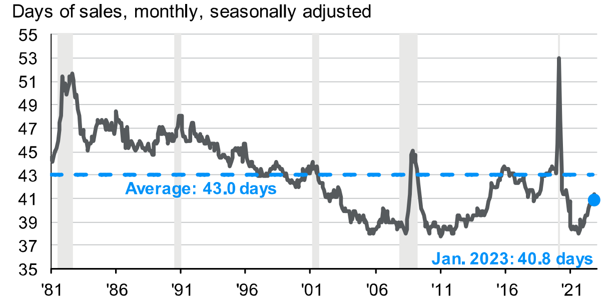
Light vehicle sales

Mil vehicles, seasonally adjusted ann. rate



Total business inventory/sales ratio

Days of sales, monthly, seasonally adjusted



Source: BEA, Census Bureau, FactSet, J.P. Morgan Asset Management. Data for light vehicle sales is quarterly apart from the latest monthly data point.

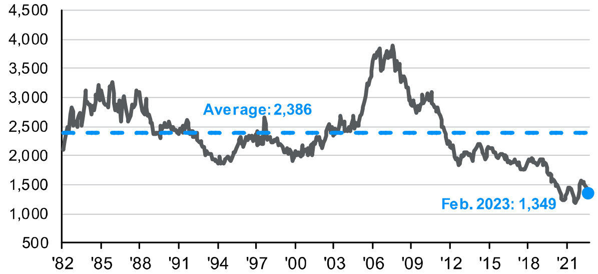
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Residential real estate

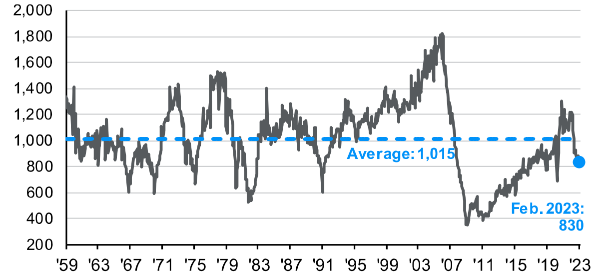
Housing inventories

Inventory of new and existing single family homes for sale, thous, SA*



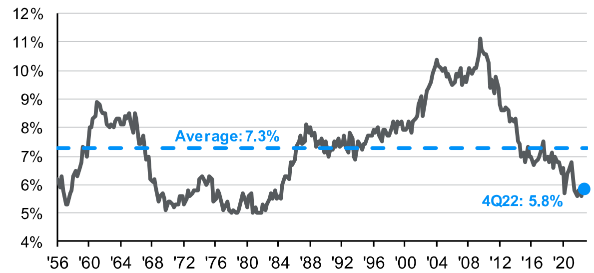
Single-family housing starts

Seasonally adjusted annual rate (SAAR), thous houses



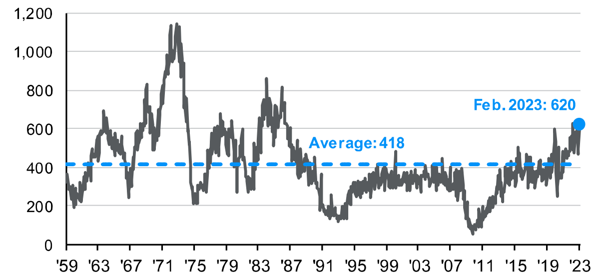
Rental vacancy rate

Percent



Multi-family housing starts

Total multi-family, SAAR, thous houses



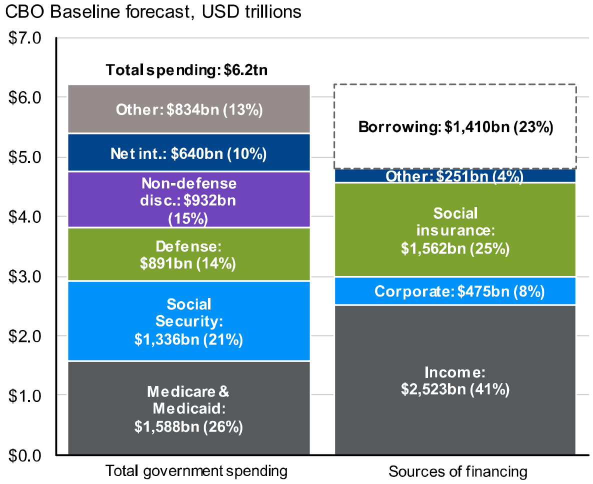
Source: U.S. Census Bureau, U.S. National Association of Realtors, J.P. Morgan Asset Management. *Inventory of new and existing single family homes for sale is seasonally adjusted by J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Federal finances

The 2023 federal budget

CBO Baseline forecast, USD trillions

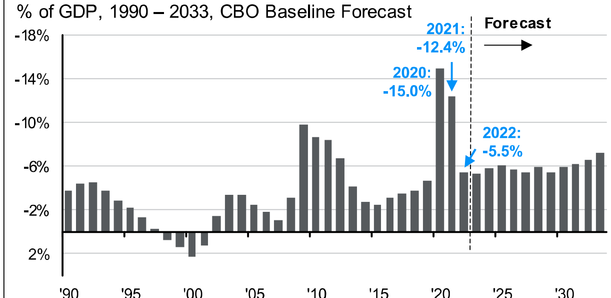


CBO's Baseline economic assumptions

	2023	'24-'25	'26-'27	'28-'33
Real GDP growth	0.3%	1.9%	2.4%	1.9%
10-year Treasury	3.8%	3.8%	3.8%	3.8%
Headline inflation (CPI)	5.7%	2.8%	2.1%	2.2%
Unemployment	4.3%	4.9%	4.5%	4.5%

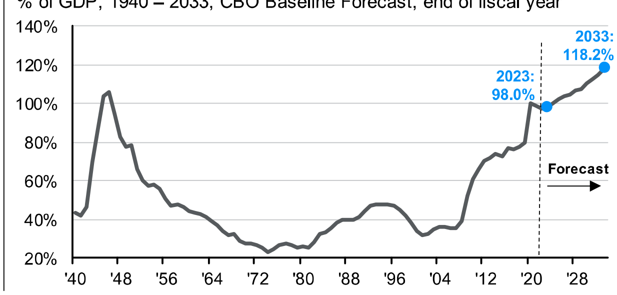
Federal budget surplus/deficit

% of GDP, 1990 – 2033, CBO Baseline Forecast



Federal net debt (accumulated deficits)

% of GDP, 1940 – 2033, CBO Baseline Forecast, end of fiscal year



Source: CBO, J.P. Morgan Asset Management; (Top and bottom right) BEA, Treasury Department.
Estimates are based on the Congressional Budget Office (CBO) February 2023 Update to the Budget and Economic Outlook. Other spending includes, but is not limited to, health insurance subsidies, income security and federal civilian and military retirement. Note: Years shown are fiscal years. Forecasts are not a reliable indicator of future performance. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.
Guide to the Markets – U.S. Data are as of April 11, 2023.

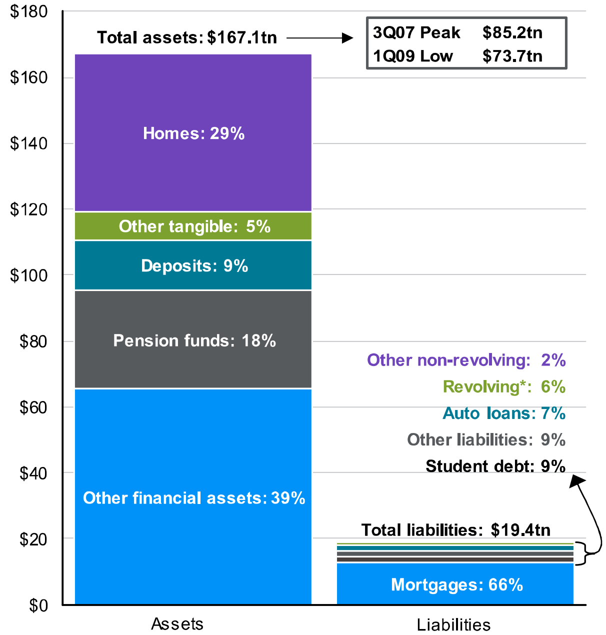
J.P.Morgan ASSET MANAGEMENT

Economy

Consumer finances

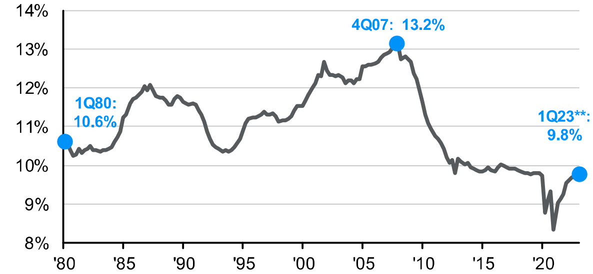
Consumer balance sheet

4Q22, USD trillions, not seasonally adjusted



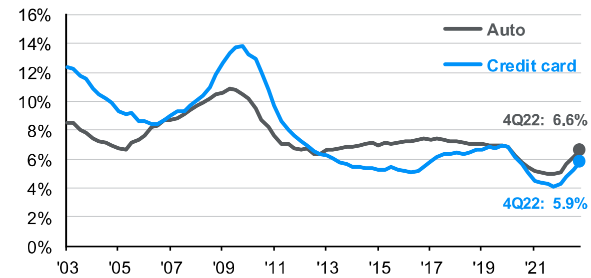
Household debt service ratio

Debt payments as % of disposable personal income, SA



Flows into early delinquencies, auto and credit card loans

% of balance delinquent 30+ days



Source: FactSet, FRB, J.P. Morgan Asset Management; (Top right) BEA; (Bottom right) Equifax, New York Fed.
Data include households and nonprofit organizations. SA – seasonally adjusted. *Revolving includes credit cards. Values may not sum to 100% due to rounding. **1Q23 figures for debt service ratio are J.P. Morgan Asset Management estimates.
Guide to the Markets – U.S. Data are as of April 11, 2023.

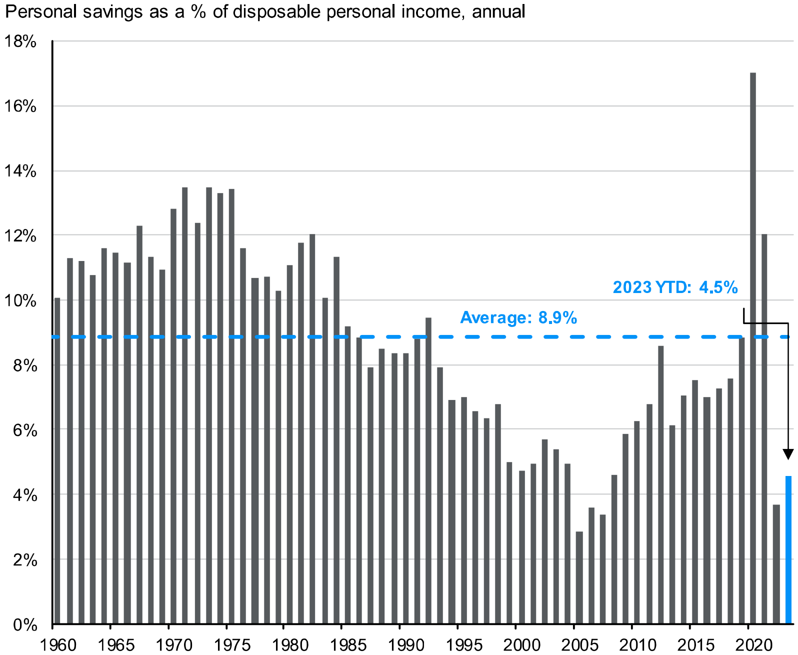
J.P.Morgan
ASSET MANAGEMENT

Economy

Consumer saving and borrowing

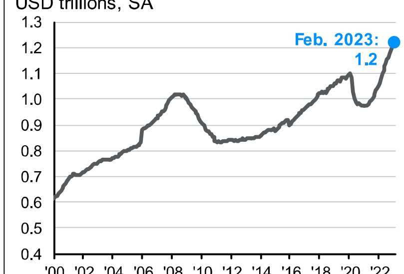
Personal saving rate

Personal savings as a % of disposable personal income, annual



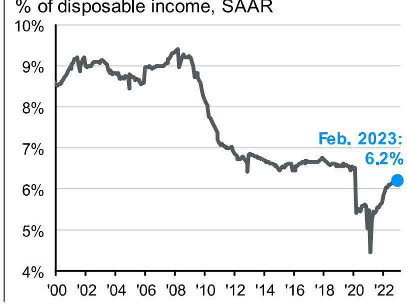
Revolving consumer credit outstanding

USD trillions, SA



Revolving consumer credit outstanding

% of disposable income, SAAR



Source: BEA, Federal Reserve, J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

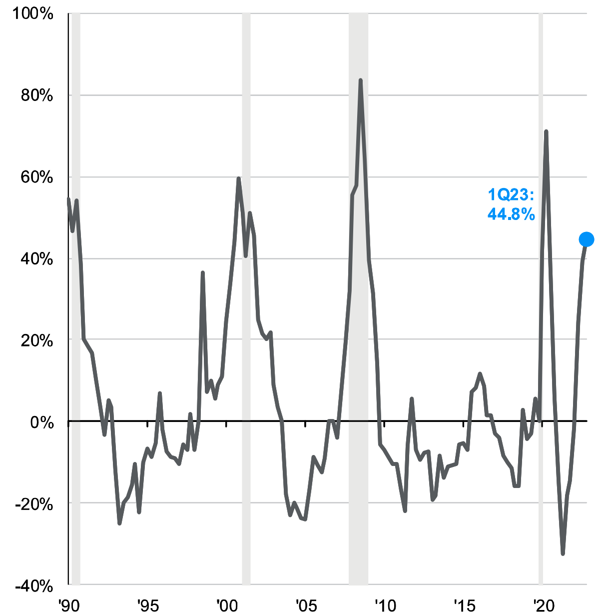
Bank capitalization and lending sentiment

U.S. bank tier 1 capital ratio

Tier 1 capital as a % of risk-weighted assets

Net percentage of banks tightening lending standards

Commercial and industrial loans for large and middle-market firms

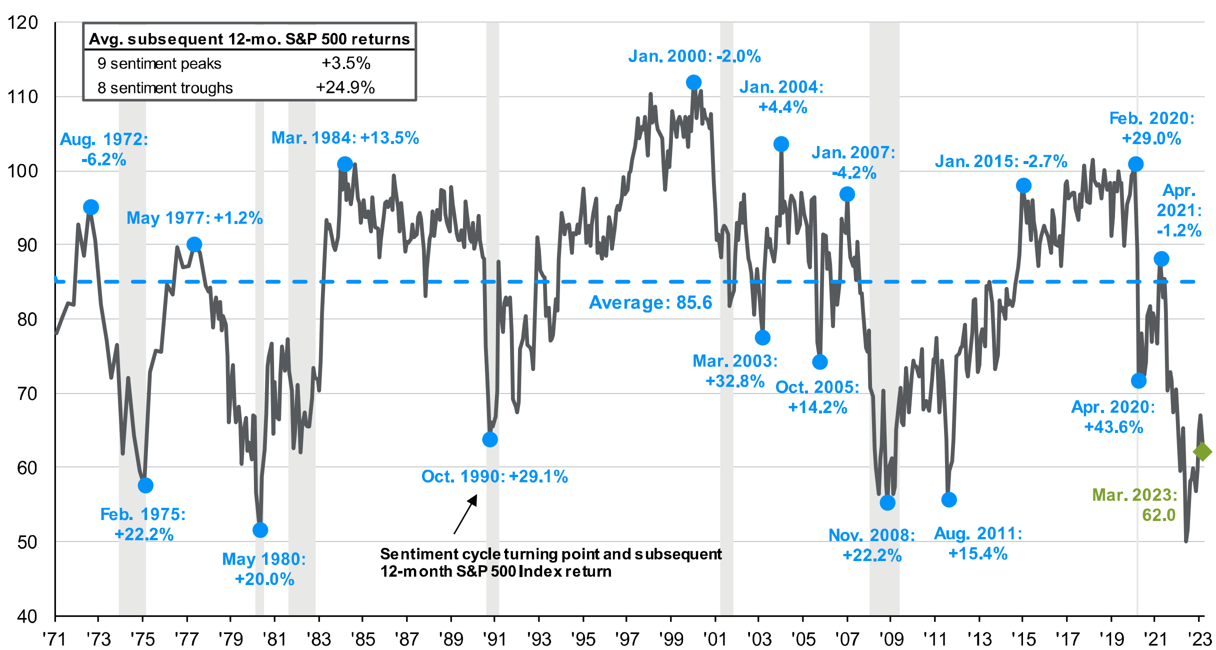


Source: Bloomberg, FDIC, Federal Reserve, J.P. Morgan Asset Management. The tier 1 capital ratio is the ratio of a bank's core tier 1 capital (equity capital and disclosed reserves) to its total risk-weighted assets. It is a key measure of a bank's financial strength that has been adopted as part of the Basel III Accord on bank regulation.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Consumer confidence and the stock market

Consumer Sentiment Index and subsequent 12-month S&P 500 returns

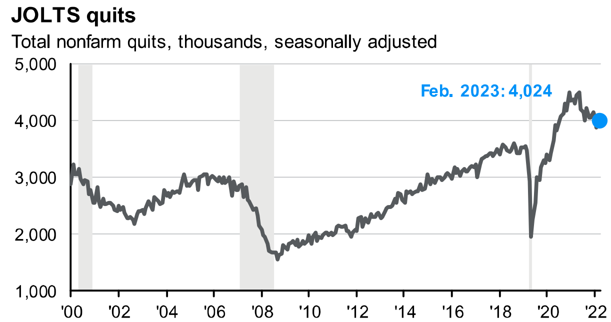


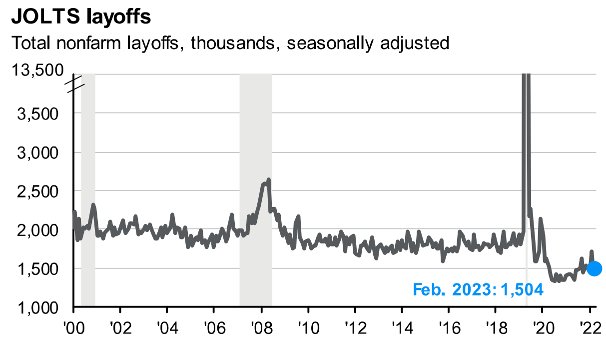
Source: FactSet, Standard & Poor's, University of Michigan, J.P. Morgan Asset Management.
Peak is defined as the highest index value before a series of lower lows, while a trough is defined as the lowest index value before a series of higher highs. Subsequent 12-month S&P 500 returns are price returns only, which excludes dividends. Past performance is not a reliable indicator of current and future results.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Economy

Labor demand



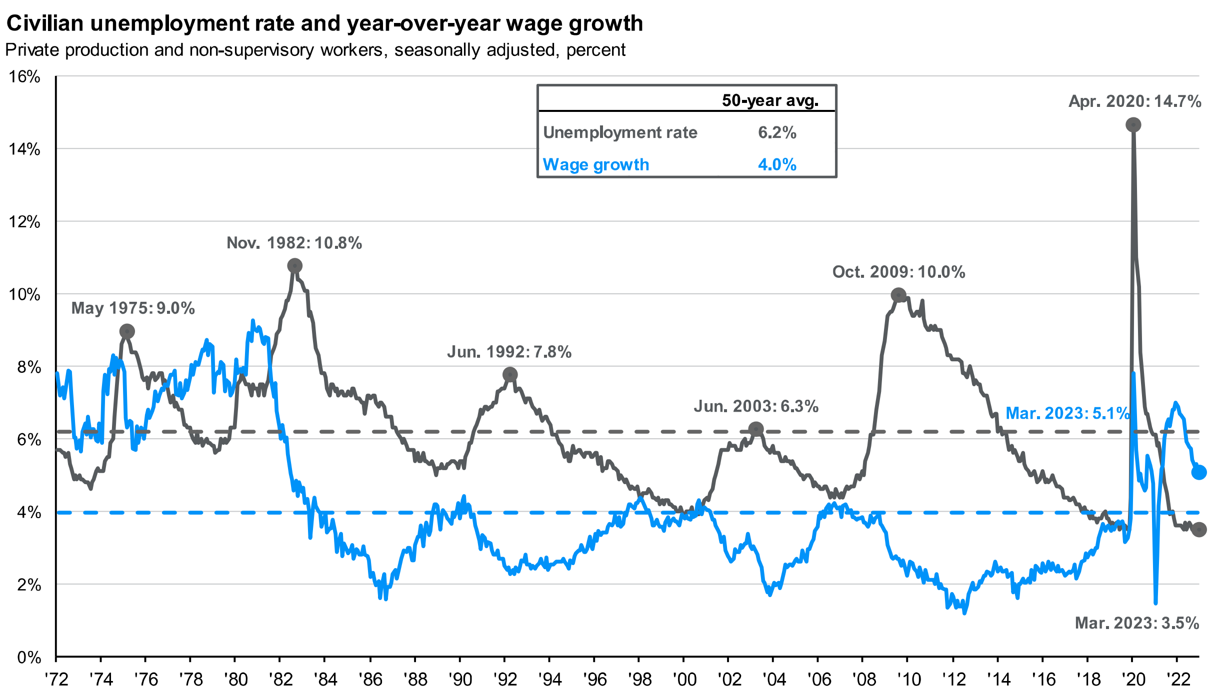


Source: U.S. Department of Labor, J.P. Morgan Asset Management. *JOLTS job openings from February 1974 to November 2000 are J.P. Morgan Asset Management estimates.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Economy

Unemployment and wages



Source: BLS, FactSet, J.P. Morgan Asset Management. Private production and non-supervisory workers represent 70% of the nonfarm workforce.
Guide to the Markets – U.S. Data are as of April 11, 2023.

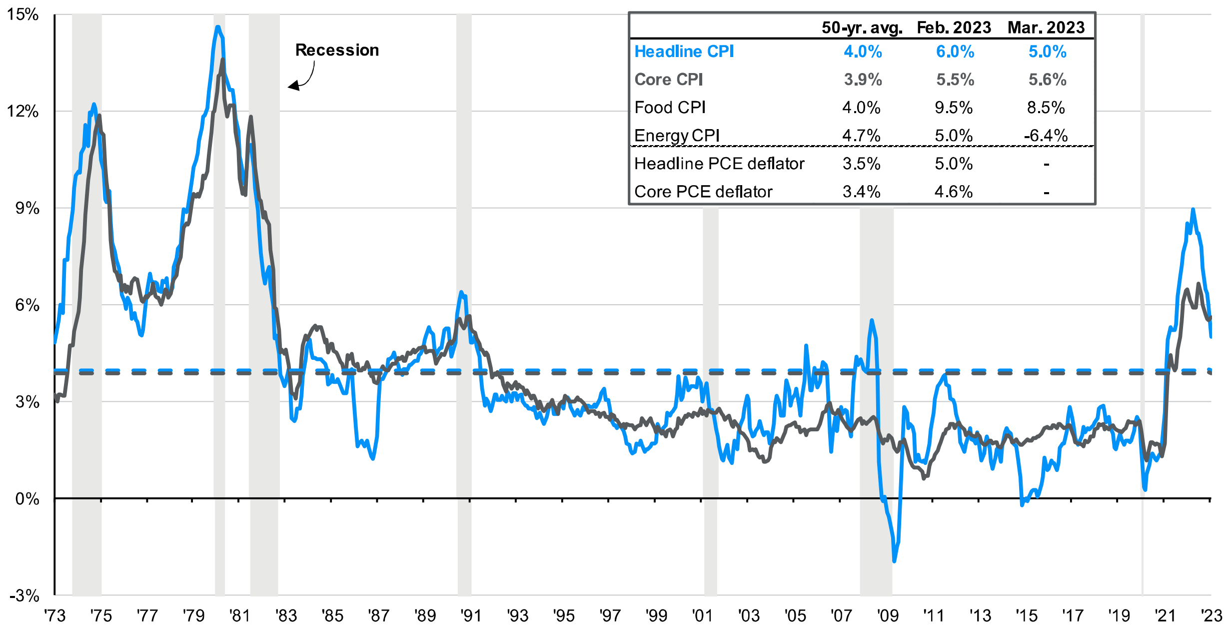
J.P.Morgan
ASSET MANAGEMENT

Inflation

Economy

CPI and core CPI

% change vs. prior year, seasonally adjusted



	50-yr. avg.	Feb. 2023	Mar. 2023
Headline CPI	4.0%	6.0%	5.0%
Core CPI	3.9%	5.5%	5.6%
Food CPI	4.0%	9.5%	8.5%
Energy CPI	4.7%	5.0%	-6.4%
Headline PCE deflator	3.5%	5.0%	-
Core PCE deflator	3.4%	4.6%	-

Source: BLS, FactSet, J.P. Morgan Asset Management.
CPI used is CPI-U and values shown are % change vs. one year ago. Core CPI is defined as CPI excluding food and energy prices. The Personal Consumption Expenditure (PCE) deflator employs an evolving chain-weighted basket of consumer expenditures instead of the fixed-weight basket used in CPI calculations.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Inflation heatmap

Economy

Consumer Price Index, components

m/m % change, seasonally adjusted

	Weight	2021 Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2022 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2023 Jan	Feb
Headline CPI, y/y	100.0	2.6%	4.1%	4.9%	5.3%	5.2%	5.2%	5.4%	6.2%	6.9%	7.2%	7.6%	8.0%	8.5%	8.2%	8.5%	8.9%	8.4%	8.2%	8.2%	7.8%	7.1%	6.4%	6.3%	6.0%
Core CPI, y/y	79.5	1.7%	3.0%	3.8%	4.4%	4.2%	3.9%	4.0%	4.6%	5.0%	5.5%	6.1%	6.4%	6.5%	6.1%	6.0%	5.9%	5.9%	6.3%	6.6%	6.3%	6.0%	5.7%	5.5%	5.5%
Core svcs. ex-housing PCE, y/y*	-	2.9%	4.3%	4.3%	4.2%	4.4%	4.4%	4.3%	4.4%	5.0%	5.0%	4.9%	4.8%	4.7%	4.5%	4.5%	4.6%	4.0%	4.2%	4.5%	4.7%	4.4%	4.3%	4.7%	4.7%
Headline CPI, m/m	100.0	0.5%	0.7%	0.7%	0.8%	0.4%	0.4%	0.4%	0.9%	0.8%	0.8%	0.6%	0.7%	1.0%	0.4%	0.9%	1.2%	0.0%	0.2%	0.4%	0.5%	0.2%	0.1%	0.5%	0.4%
Core CPI, m/m	79.5	0.3%	0.8%	0.7%	0.7%	0.3%	0.2%	0.3%	0.7%	0.6%	0.7%	0.6%	0.5%	0.3%	0.5%	0.6%	0.6%	0.3%	0.6%	0.6%	0.3%	0.3%	0.4%	0.4%	0.5%
Core svcs. ex-housing PCE, m/m*	-	0.6%	0.5%	0.4%	0.4%	0.5%	0.3%	0.2%	0.2%	0.6%	0.5%	0.2%	0.3%	0.5%	0.3%	0.3%	0.6%	-0.1%	0.5%	0.5%	0.4%	0.3%	0.4%	0.5%	0.3%
Energy	6.9	3.5%	0.2%	0.3%	1.5%	1.7%	2.8%	1.5%	3.6%	2.6%	2.4%	0.8%	2.7%	8.2%	-1.0%	3.4%	6.9%	-4.7%	-3.9%	-1.7%	1.7%	-1.4%	-3.1%	2.0%	-0.6%
Gasoline	3.2	6.3%	-0.6%	-0.1%	2.5%	2.5%	4.5%	1.5%	4.1%	4.2%	3.8%	-0.3%	4.7%	13.2%	-3.1%	3.2%	10.3%	-8.1%	-8.4%	-4.2%	3.4%	-2.3%	-7.0%	2.4%	1.0%
Electricity	2.5	-0.1%	0.9%	0.4%	0.0%	0.2%	0.7%	1.0%	1.6%	0.7%	0.9%	2.7%	-0.3%	1.7%	0.9%	1.3%	1.5%	1.5%	1.2%	0.8%	0.5%	0.5%	1.3%	0.5%	0.5%
Utility Gas	0.9	2.4%	1.6%	1.1%	1.2%	2.0%	1.6%	2.2%	6.7%	0.5%	0.1%	0.5%	2.0%	0.6%	2.5%	7.2%	7.5%	-3.8%	3.5%	2.2%	-3.7%	-3.4%	3.5%	6.7%	-8.0%
Food	13.5	0.1%	0.3%	0.4%	0.7%	0.6%	0.4%	0.9%	0.9%	0.8%	0.6%	0.8%	1.0%	0.9%	0.8%	1.1%	1.0%	1.1%	0.8%	0.8%	0.7%	0.6%	0.4%	0.5%	0.4%
Food at home	8.7	0.1%	0.3%	0.3%	0.8%	0.5%	0.4%	1.2%	1.0%	1.0%	0.6%	0.9%	1.3%	1.3%	0.9%	1.3%	1.0%	1.3%	0.8%	0.7%	0.5%	0.6%	0.5%	0.4%	0.3%
Food away from home	4.8	0.1%	0.3%	0.6%	0.7%	0.8%	0.4%	0.5%	0.8%	0.6%	0.6%	0.7%	0.4%	0.3%	0.6%	0.7%	0.9%	0.7%	0.9%	0.9%	0.9%	0.5%	0.4%	0.6%	0.6%
Core goods	21.4	0.1%	1.9%	1.7%	1.9%	0.3%	0.3%	0.3%	1.3%	1.1%	1.4%	0.9%	0.3%	-0.4%	0.1%	0.6%	0.6%	0.1%	0.4%	0.0%	-0.1%	-0.2%	-0.1%	0.1%	0.0%
Apparel	2.5	0.1%	1.0%	0.8%	0.6%	0.0%	0.3%	-0.5%	1.0%	0.7%	0.9%	0.7%	0.6%	0.3%	-0.1%	0.4%	0.7%	-0.1%	0.3%	0.0%	-0.2%	0.1%	0.2%	0.8%	0.8%
New vehicles	4.3	0.0%	-0.1%	1.1%	1.6%	1.4%	1.2%	1.3%	1.5%	1.6%	1.8%	0.3%	0.1%	0.1%	0.4%	0.6%	0.5%	0.5%	0.8%	0.7%	0.6%	0.5%	0.6%	0.2%	0.2%
Used cars	2.7	0.6%	9.6%	7.7%	9.1%	-0.4%	-1.3%	-0.5%	3.1%	3.2%	3.9%	1.4%	-0.6%	-3.6%	-0.7%	1.9%	0.5%	-0.8%	-0.2%	-1.1%	-1.7%	-2.0%	-2.0%	-1.9%	-2.8%
Medical care commod	1.5	0.1%	0.6%	0.0%	-0.4%	0.2%	-0.2%	0.3%	0.6%	0.1%	0.0%	0.9%	0.3%	0.2%	0.1%	0.3%	0.4%	0.6%	0.2%	-0.1%	0.0%	0.2%	0.1%	1.1%	0.1%
Core services	58.2	0.3%	0.4%	0.4%	0.3%	0.3%	0.1%	0.2%	0.4%	0.4%	0.4%	0.4%	0.5%	0.6%	0.6%	0.6%	0.6%	0.4%	0.6%	0.8%	0.5%	0.5%	0.6%	0.5%	0.6%
Shelter	34.4	0.3%	0.4%	0.3%	0.4%	0.5%	0.2%	0.4%	0.4%	0.5%	0.4%	0.3%	0.6%	0.5%	0.5%	0.6%	0.6%	0.6%	0.7%	0.7%	0.7%	0.6%	0.8%	0.7%	0.8%
Rent of primary res.	7.5	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.4%	0.4%	0.4%	0.4%	0.5%	0.6%	0.4%	0.6%	0.6%	0.8%	0.7%	0.7%	0.8%	0.7%	0.8%	0.8%	0.7%	0.8%
OER	25.4	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%	0.5%	0.6%	0.7%	0.6%	0.7%	0.8%	0.6%	0.7%	0.8%	0.7%	0.7%
Medical care services	6.7	0.1%	0.0%	-0.1%	-0.1%	0.1%	0.2%	0.0%	0.6%	0.5%	0.5%	0.5%	0.1%	0.6%	0.5%	0.4%	0.7%	0.4%	0.7%	0.8%	-0.4%	-0.5%	0.3%	-0.7%	-0.7%
Transportation services	5.8	1.1%	1.3%	1.9%	0.9%	-0.8%	-0.7%	-0.9%	0.0%	1.2%	0.5%	0.7%	1.1%	2.1%	2.2%	1.6%	1.8%	-0.4%	1.0%	1.9%	0.6%	0.3%	0.6%	0.9%	1.1%

Source: BLS, FactSet, J.P. Morgan Asset Management. Heatmap shading is relative to the two-year period shown. Component weights may not add to 100. OER refers to owner's equivalent rent. *Core services ex-housing is an approximation by J.P. Morgan Asset Management. It reflects the custom PCE index of services excluding energy and housing referenced in the U.S. Federal Reserve's Monetary Policy Report. Data for the custom PCE index is provided by the BEA and is distinct from the CPI data provided by the BLS. "Housing" is a PCE component that is measured separately from the CPI "shelter" component.
Guide to the Markets – U.S. Data are as of April 11, 2023.

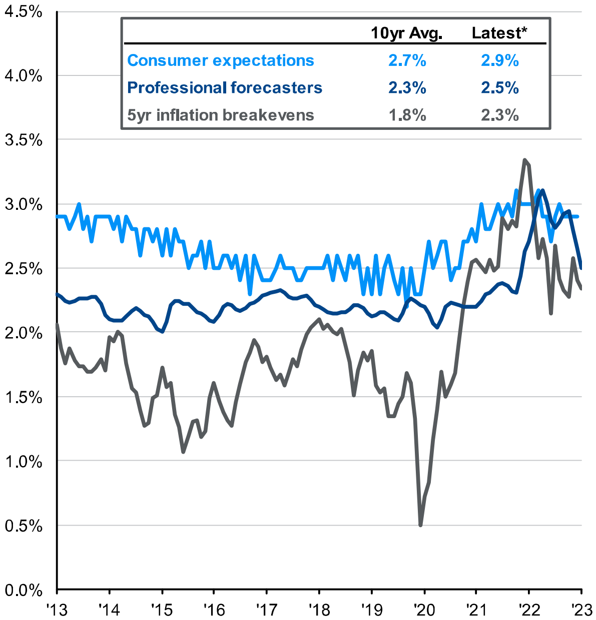
J.P.Morgan ASSET MANAGEMENT

Inflation expectations

Economy

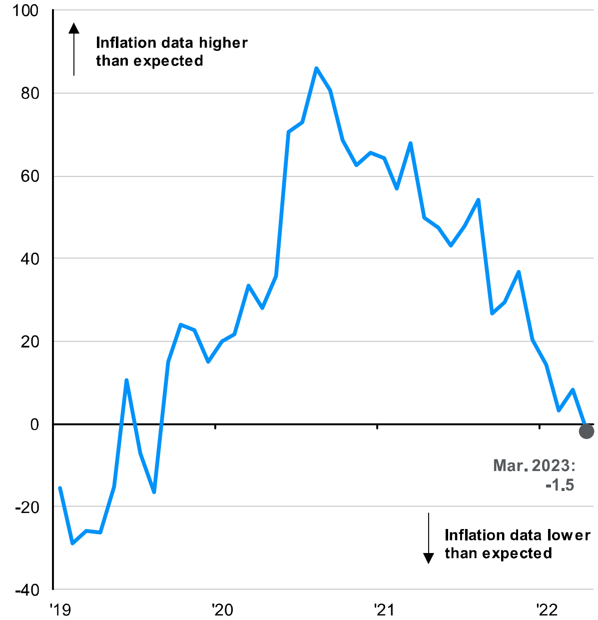
Inflation expectations, next 5 years

% change vs. prior year, non-seasonally adjusted



Citi Inflation Surprise Index

Monthly



Source: Bureau of Labor Statistics, Citi, FactSet, Federal Reserve Bank of Philadelphia, University of Michigan, J.P. Morgan Asset Management.
*Reflects the latest daily 5yr/5yr breakevens, preliminary or final Consumer Sentiment survey, and the quarterly Survey of Professional Forecasters interpolated to a monthly series. The Survey of Professional Forecasters reflects the median estimate by professional forecasters of average CPI inflation over the next 5 years. The series has been adjusted by J.P. Morgan Asset Management to exclude realized inflation readings within the forecast window. Citi Inflation Surprise Index: A reading above 0 means that data are on average coming in above consensus expectations.
Guide to the Markets – U.S. Data are as of April 11, 2023.

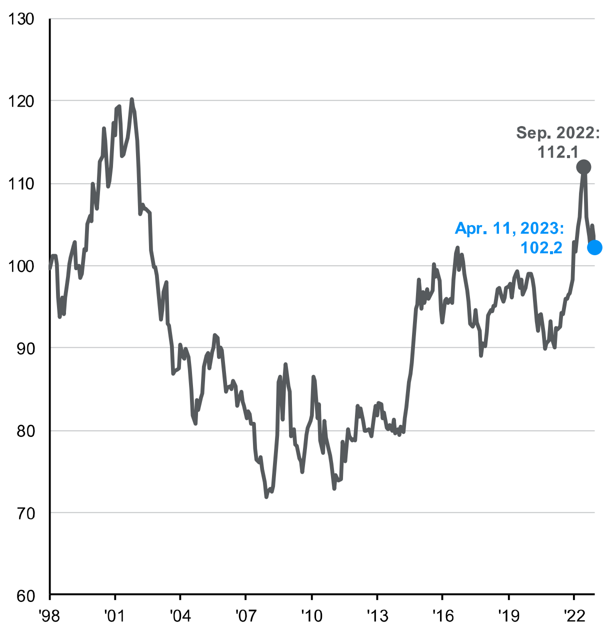
J.P.Morgan
ASSET MANAGEMENT

Dollar drivers

Economy

The U.S. dollar

U.S. Dollar Index

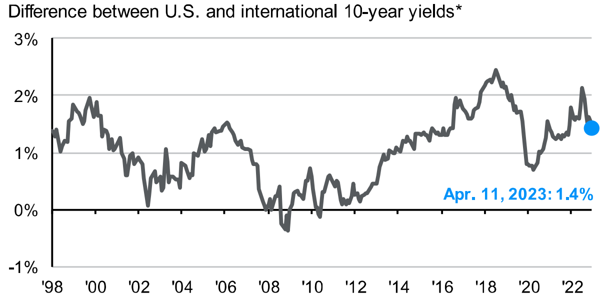


The U.S. trade balance

Current account balance, % of GDP

Developed markets interest rate differentials

Difference between U.S. and international 10-year yields*



Source: J.P. Morgan Asset Management; (Left) FactSet, ICE; (Top right) Bureau of Economic Analysis, FactSet; (Bottom right) Tullett Prebon. Currencies in the DXY Index are: British pound, Canadian dollar, euro, Japanese yen, Swedish krona and Swiss franc. *Interest rate differential is the difference between the 10-year U.S. Treasury yield and a basket of the 10-year yields of each major trading partner (Australia, Canada, Europe, Japan, Sweden, Switzerland and UK). Weights in the basket are calculated using the 10-year average of total government bonds outstanding in each region. Europe is defined as the 19 countries in the euro area.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Oil markets

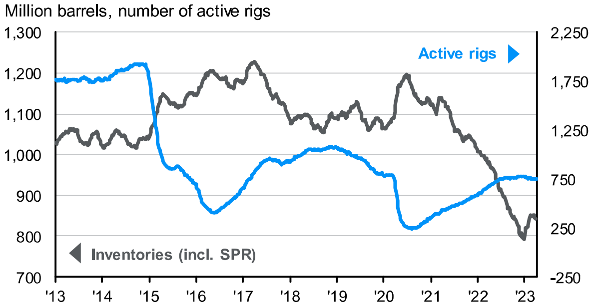
Change in production and consumption of liquid fuels

Production, consumption and inventories, millions of barrels per day

Production	2019	2020	2021	2022	2023*	Growth since '19
U.S.	19.5	18.6	19.0	20.2	21.1	7.9%
OPEC	34.6	30.7	31.7	34.2	34.1	-1.6%
Russia	11.5	10.5	10.8	10.9	10.3	-10.3%
Global	**100.3**	**93.9**	**95.7**	**99.9**	**101.5**	**1.2%**
Consumption						
U.S.	20.5	18.2	19.9	20.3	20.5	-0.4%
China	14.0	14.4	15.3	15.2	15.9	13.2%
Global	**100.9**	**91.6**	**97.1**	**99.4**	**100.9**	**0.0%**
Inventory Change	-0.6	2.3	-1.4	0.4	0.6	

U.S. crude oil inventories and rig count**

Million barrels, number of active rigs



Price of oil

WTI crude, nominal prices, USD/barrel

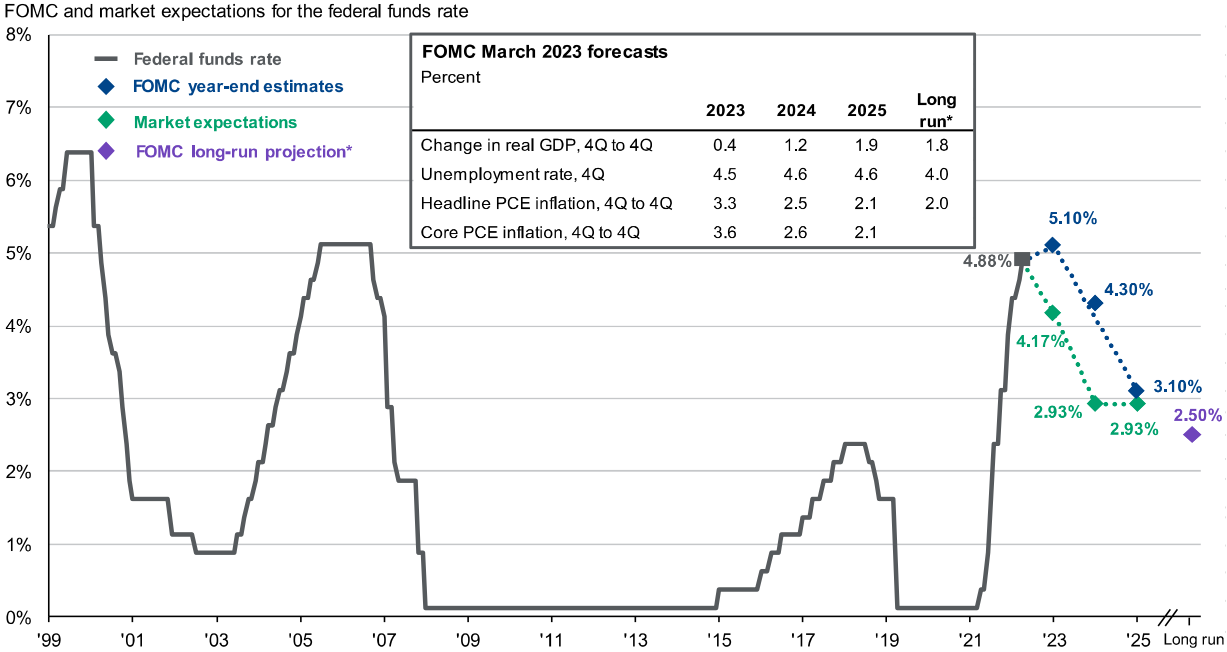
Source: J.P. Morgan Asset Management; (Top and bottom left) EIA; (Right) FactSet; (Bottom left) Baker Hughes.
*Forecasts are from the March 2023 EIA Short-Term Energy Outlook and start in 2023. **U.S. crude oil inventories include the Strategic Petroleum Reserve (SPR). Liquid fuels include crude oil, natural gas, biodiesel and fuel ethanol. Active rig count includes both natural gas and oil rigs. WTI crude prices are continuous contract NYM prices in USD.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

The Fed and interest rates

Federal funds rate expectations

FOMC and market expectations for the federal funds rate



FOMC March 2023 forecasts
Percent

	2023	2024	2025	Long run*
Change in real GDP, 4Q to 4Q	0.4	1.2	1.9	1.8
Unemployment rate, 4Q	4.5	4.6	4.6	4.0
Headline PCE inflation, 4Q to 4Q	3.3	2.5	2.1	2.0
Core PCE inflation, 4Q to 4Q	3.6	2.6	2.1	

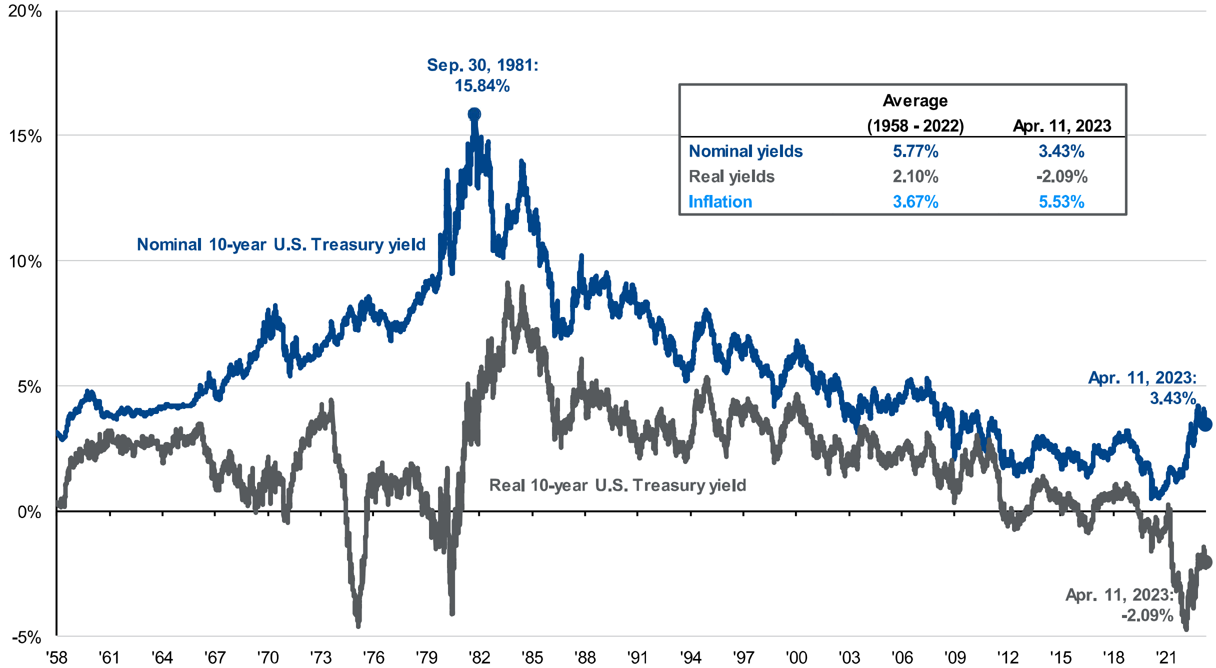
Source: Bloomberg, FactSet, Federal Reserve, J.P. Morgan Asset Management.
Market expectations are based off of the respective Federal Funds Futures contracts for December expiry. *Long-run projections are the rates of growth, unemployment and inflation to which a policymaker expects the economy to converge over the next five to six years in absence of further shocks and under appropriate monetary policy. Forecasts are not a reliable indicator of future performance. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Fixed Income

Interest rates and inflation

Nominal and real U.S. 10-year Treasury yields



Source: BLS, FactSet, Federal Reserve, J.P. Morgan Asset Management.
Real 10-year Treasury yields are calculated as the daily Treasury yield less year-over-year core CPI inflation for that month. For the current month, we use the prior month's core CPI figures until the latest data is available.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

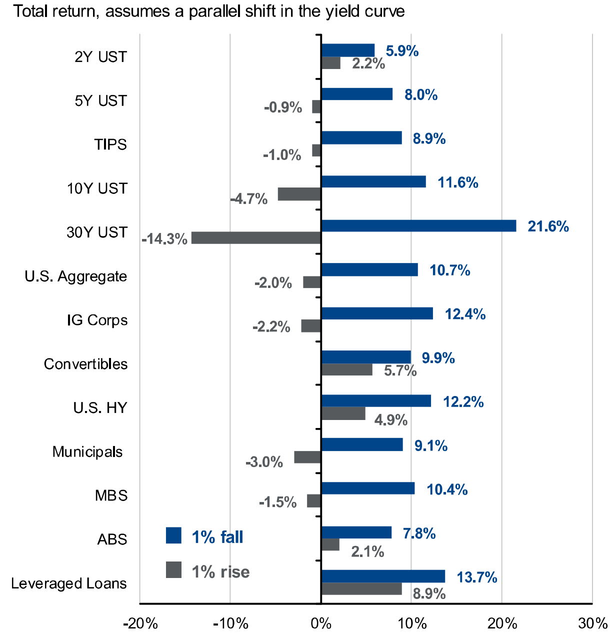
Fixed Income

Fixed income market dynamics

U.S. Treasuries	Yield 4/11/2023	Yield 12/31/2022	Return 2023 YTD	Avg. Maturity	Correlation to 10-year	Correlation to S&P 500
2-Year	4.03%	4.41%	1.58%	2 years	0.74	-0.15
5-Year	3.54%	3.99%	2.71%	5	0.93	-0.13
TIPS	1.14%	1.58%	3.83%	10	0.61	0.37
10-Year	3.43%	3.88%	4.31%	10	1.00	-0.14
30-Year	3.62%	3.97%	6.92%	30	0.93	-0.17
Sector						
U.S. Aggregate	4.35%	4.68%	3.43%	8.6	0.86	0.22
IG Corps	5.12%	5.42%	4.04%	11.1	0.54	0.47
Convertibles	7.42%	7.58%	3.90%	-	-0.14	0.87
U.S. HY	8.52%	8.96%	3.90%	5.3	-0.10	0.74
Municipals	3.09%	3.55%	3.82%	13.1	0.53	0.22
MBS	4.45%	4.71%	3.00%	7.5	0.78	0.15
ABS	5.59%	5.89%	2.07%	3.5	0.21	-0.01
Leveraged Loans	11.28%	11.41%	3.67%	2.4	-0.34	0.59

Impact of a 1% rise or fall in interest rates

Total return, assumes a parallel shift in the yield curve

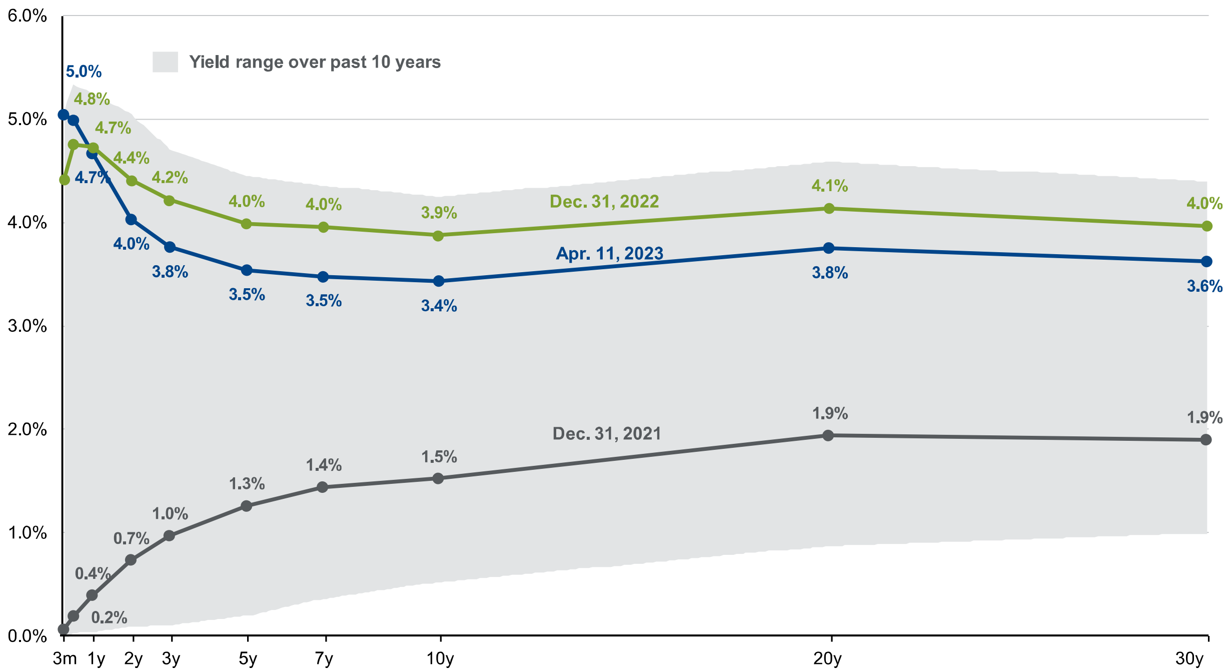


Source: Bloomberg, FactSet, Standard & Poor's, U.S. Treasury, J.P. Morgan Asset Management. Sectors shown above are provided by Bloomberg unless otherwise noted and are represented by – U.S. Aggregate: MBS: U.S. Aggregate Securitized - MBS; ABS: J.P. Morgan ABS Index; Corporates: U.S. Corporates; Municipals: Muni Bond; High Yield: Corporate High Yield; Leveraged Loans: J.P. Morgan Leveraged Loan Index; TIPS: Treasury Inflation-Protected Securities; Convertibles: U.S. Convertibles Composite. Convertibles yield is as of most recent month-end and is based on U.S. portion of Bloomberg Global Convertibles Index. Yield and return information based on bellwethers for Treasury securities. Sector yields reflect yield-to-worst. Convertibles yield is based on U.S. portion of Bloomberg Global Convertibles. Correlations are based on 15-years of monthly returns for all sectors. Past performance is not indicative of future results.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Yield curve

U.S. Treasury yield curve



Source: FactSet, Federal Reserve, J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of April 11, 2023.

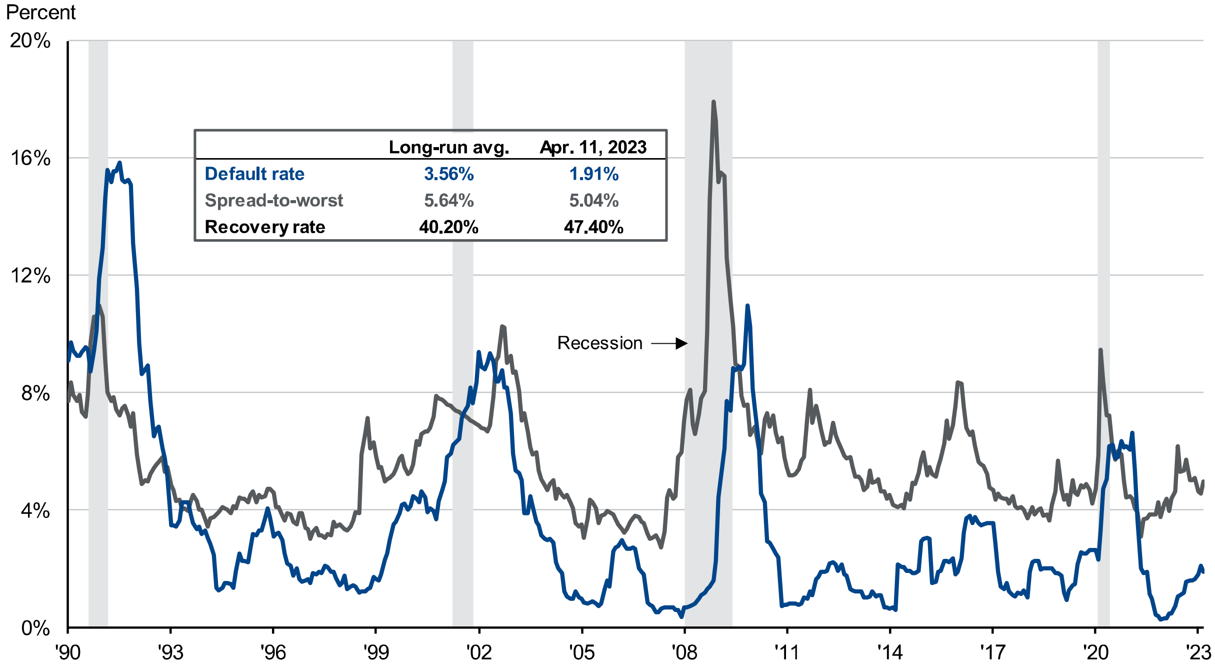
J.P.Morgan
ASSET MANAGEMENT

Fixed Income

High yield bonds

Default rate and spread-to-worst

Percent



	Long-run avg.	Apr. 11, 2023
Default rate	3.56%	1.91%
Spread-to-worst	5.64%	5.04%
Recovery rate	40.20%	47.40%

Source: J.P. Morgan Global Economic Research, J.P. Morgan Asset Management.
Long-run average is based on monthly historical data beginning in January 1990. Default rates are defined as the par value percentage of the total market trading at or below 50% of par value and include any Chapter 11 filing, prepackaged filing or missed interest payments. The default rate is an LTM figure (last 12 months) and tracks the % of defaults over the period. Recovery rates are based on the price of the defaulted bonds or loans 30 days post the default date. Default and recovery rates are as of most recent month-end. Spread-to-worst indicated are the difference between the yield-to-worst of a bond and yield-to-worst of a U.S. Treasury security with a similar duration. High yield is represented by the J.P. Morgan Domestic High Yield Index.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

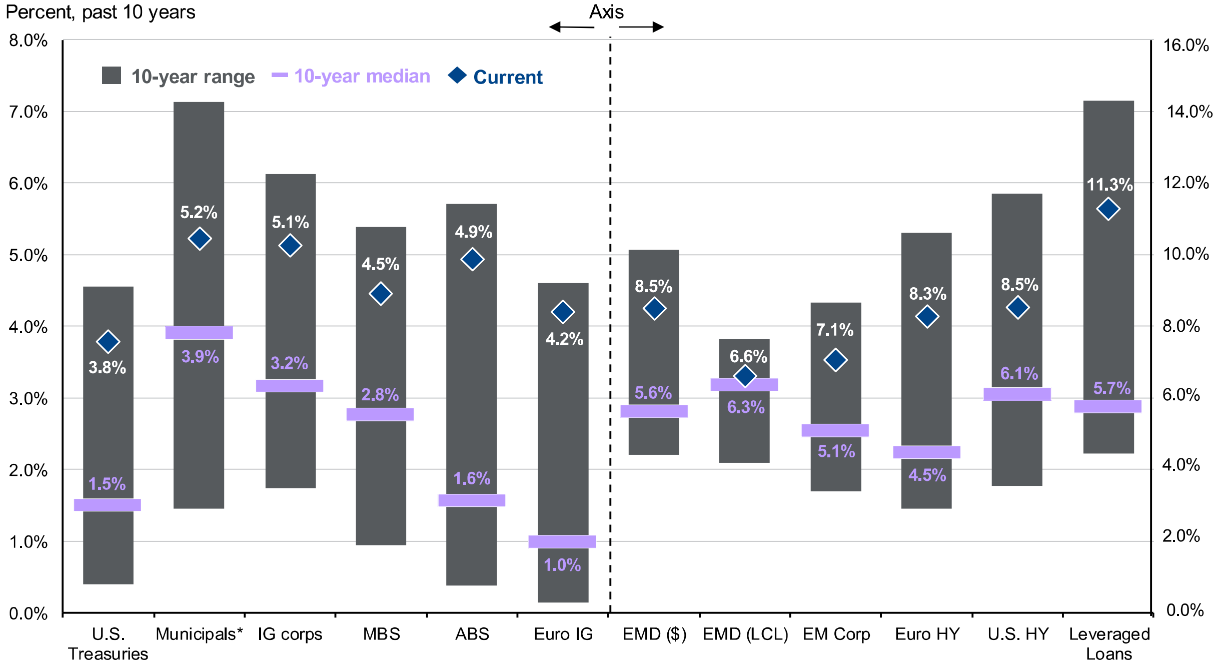
Fixed Income

Fixed Income

Fixed income valuations

Yield-to-worst across fixed income sectors

Percent, past 10 years



Source: Bloomberg, FactSet, J.P. Morgan Credit Research, J.P. Morgan Asset Management. Indices used are Bloomberg except for emerging market debt and leveraged loans: EMD (USD): J.P. Morgan EMIGLOBAL Diversified Index; EMD (LCL): J.P. Morgan GBI-EM Global Diversified Index; EM Corp.: J.P. Morgan CEMBI Broad Diversified; Leveraged Loans: JPM Leveraged Loan Index; Euro IG: Bloomberg Euro Aggregate Corporate Index; Euro HY: Bloomberg Pan-European High Yield Index. Yield-to-worst is the lowest possible yield that can be received on a bond apart from the company defaulting. All sectors shown are yield-to-worst except for Municipals, which is based on the tax-equivalent yield-to-worst assuming a top-income tax bracket rate of 37% plus a Medicare tax rate of 3.8%.

Guide to the Markets – U.S. Data are as of April 11, 2023.

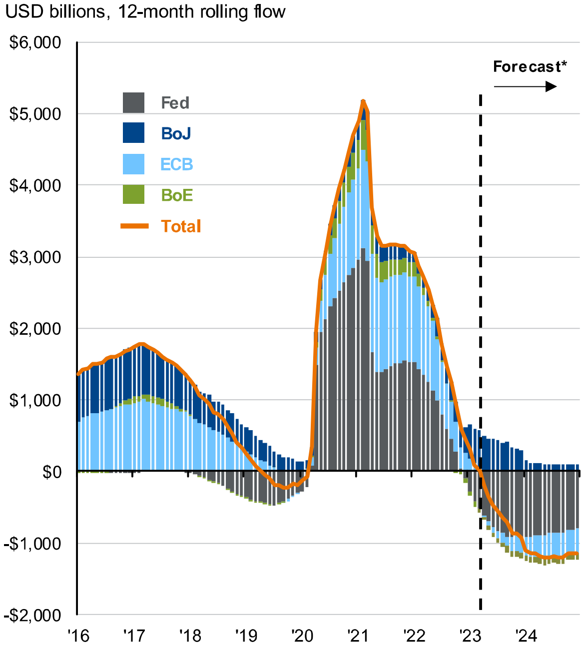
J.P.Morgan ASSET MANAGEMENT

Fixed Income

Developed market monetary policy

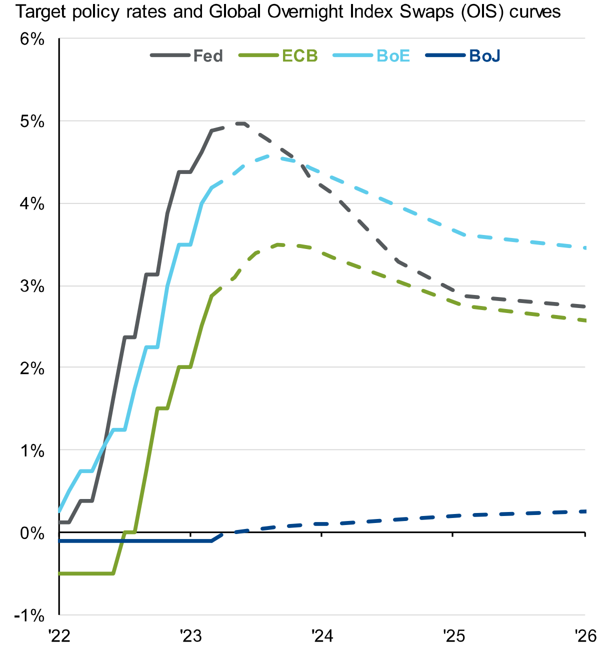
Developed market central bank bond purchases

USD billions, 12-month rolling flow



Historical policy rates and forward curves

Target policy rates and Global Overnight Index Swaps (OIS) curves



Source: BIS, Bloomberg, FactSet, J.P. Morgan Asset Management; (Left) Bank of England (BoE), Bank of Japan (BoJ), European Central Bank (ECB), Federal Reserve System (Fed), J.P. Morgan Global Economic Research. *DM bond purchase forecasts are internal assumptions based on government bond purchases as outlined in the most recent monetary policy announcements from the BoE, BoJ, ECB and Federal Reserve through December 2024. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and are not a reliable indicator of future performance. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.

Guide to the Markets – U.S. Data are as of April 11, 2023.

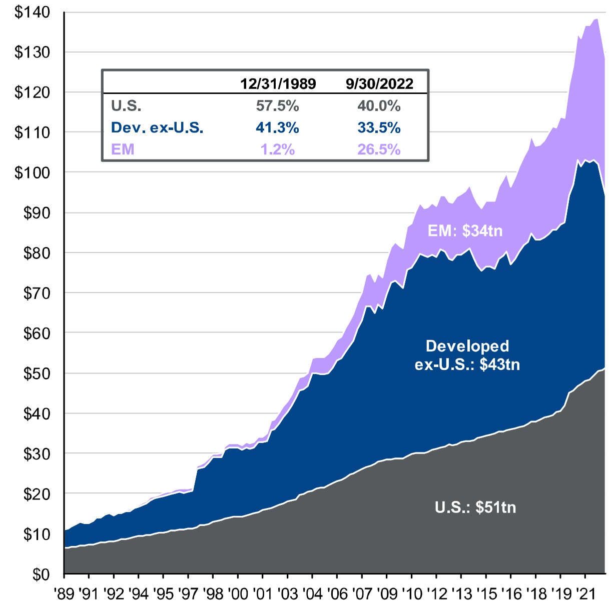
J.P.Morgan ASSET MANAGEMENT

Global fixed income

	Yield		2023 Return			
Aggregates	**4/11/2023**	**12/31/2022**	**Local**	**USD**	**Duration**	**Correlation to 10yr**
U.S.	4.35%	4.68%	3.43%	3.43%	6.4 years	0.91
Gbl. ex-U.S.	2.99%	3.13%	-	3.18%	7.20	0.60
Japan	0.62%	0.75%	1.93%	0.72%	9.40	0.60
Germany	3.07%	3.22%	1.79%	4.08%	6.30	0.51
UK	4.13%	4.29%	2.02%	5.45%	8.60	0.51
Italy	3.84%	4.10%	3.39%	5.72%	6.20	0.38
China	2.93%	2.94%	0.97%	1.94%	5.90	0.57
Sector						
Euro Corp.	4.19%	4.32%	2.06%	4.35%	4.5 years	0.43
Euro HY	8.27%	8.32%	3.07%	5.39%	3.10	0.04
EMD (USD)	8.49%	8.55%	-	2.19%	6.00	0.35
EMD (LCL)	6.61%	6.86%	2.96%	5.12%	4.90	0.24
EM Corp.	7.06%	7.28%	-	2.89%	5.00	0.26

Global bond market

USD trillions

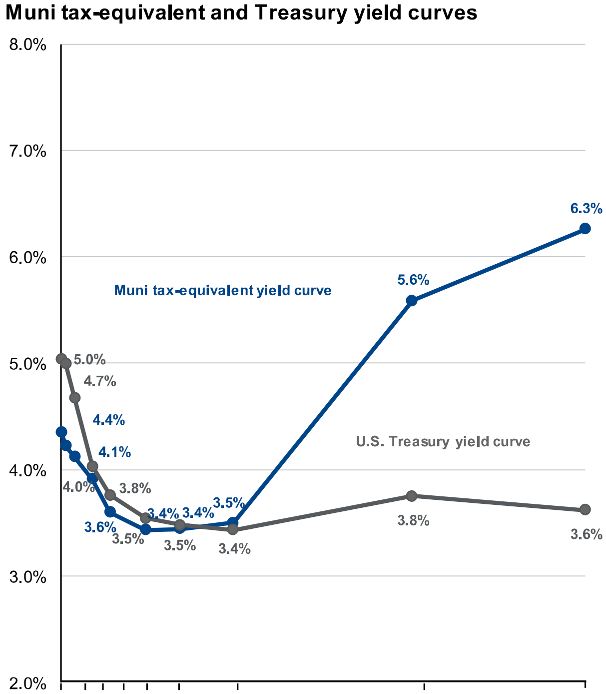


Source: J.P. Morgan Asset Management; (Left) Bloomberg, FactSet; (Right) BIS.
Fixed income sectors shown above are provided by Bloomberg and are represented by the global aggregate for each country except where noted. EMD sectors are represented by the J.P. Morgan EMBIG Diversified Index (USD), the J.P. Morgan GBI EM Global Diversified Index (LCL) and the J.P. Morgan CEMBI Broad Diversified Index (Corp). European Corporates are represented by the Bloomberg Euro Aggregate Corporate Index and the Bloomberg Pan-European High Yield Index. Sector yields reflect yield-to-worst. Correlations are based on 10-years of monthly returns for all sectors. Past performance is not indicative of future results. Global bond market regional breakdown may not sum to 100% due to rounding.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

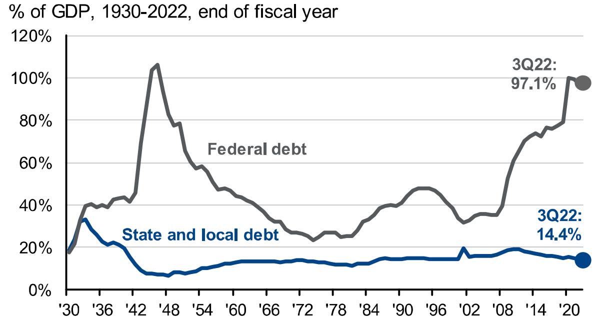
Municipal finance

Muni tax-equivalent and Treasury yield curves



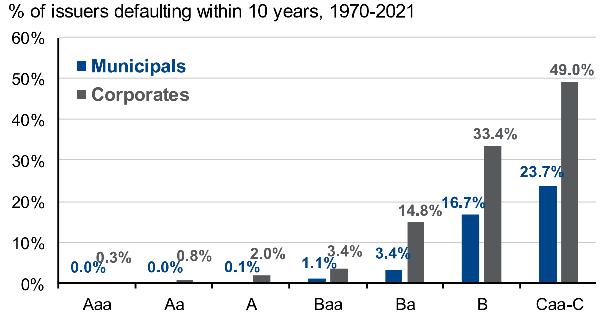
State and local and federal net debt

% of GDP, 1930-2022, end of fiscal year



Muni and corporate default rates

% of issuers defaulting within 10 years, 1970-2021



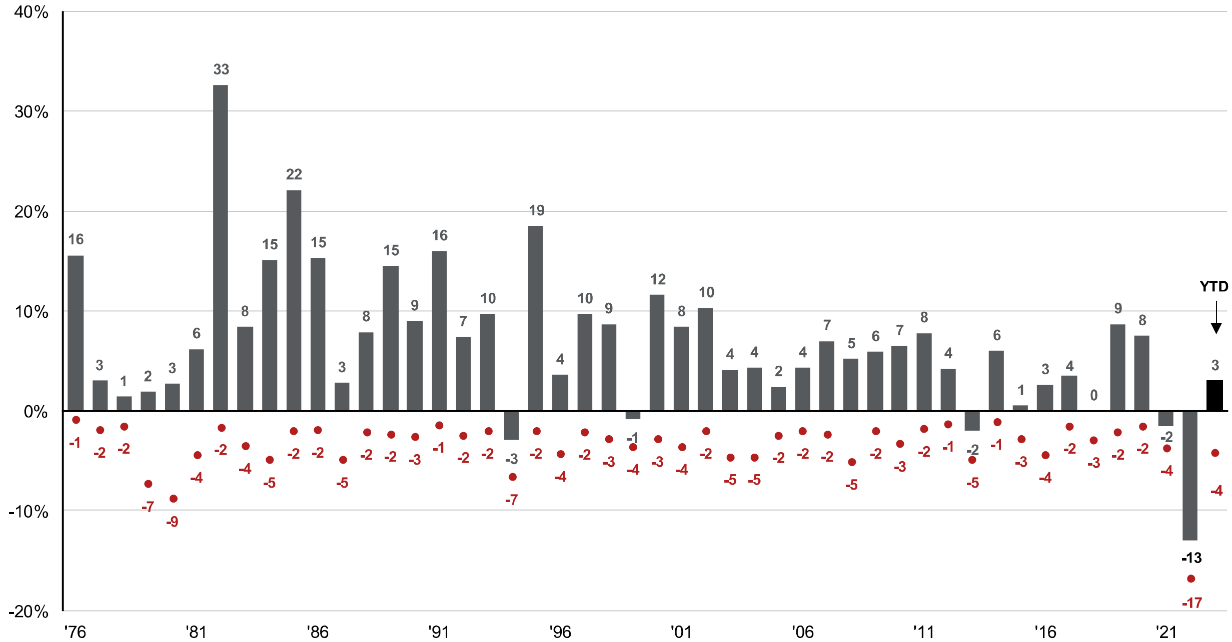
Source: J.P. Morgan Asset Management; (Left) Bloomberg, FactSet, Federal Reserve; (Top right) Census Bureau, Congressional Budget Office (CBO); (Bottom right) Moody's U.S. Public Finance; U.S. municipal bond defaults and recoveries, 1970 to 2021. State and local debt are based on the Census Bureau's Annual Survey of State and Local Government Finances. Municipal tax-equivalent yield assumes a top-income tax bracket rate of 37% plus a Medicare tax rate of 3.8% for a total tax rate of 40.8%. Municipal and corporate default rates are the average cumulative default rate over a 10-year horizon as calculated by Moody's.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Bloomberg U.S. Agg. annual returns and intra-year declines

Bloomberg U.S. Aggregate intra-year declines vs. calendar year returns

Despite average intra-year drops of 3.3%, annual returns positive in 42 of 47 years



Source: Bloomberg, FactSet, J.P. Morgan Asset Management.
Returns are based on total return. Intra-year drops refers to the largest market drops from a peak to a trough during the year. For illustrative purposes only. Returns shown are calendar year returns from 1976 to 2022, over which time period the average annual return was 6.6%. Returns from 1976 to 1989 are calculated on a monthly basis; daily data are used afterwards.
Guide to the Markets – U.S. Data are as of April 11, 2023.

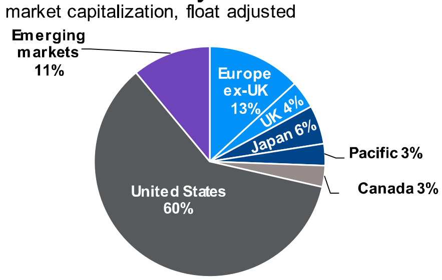
J.P.Morgan
ASSET MANAGEMENT

Global equity markets

Returns	2023		2022		15-years	
	Local	USD	Local	USD	Ann.	Beta
Regions						
U.S. (S&P 500)	-	7.5	-	-18.1	8.8	0.9
AC World ex-U.S.	7.2	8.0	-9.2	-15.6	2.0	1.0
EAFE	8.4	9.6	-6.5	-14.0	2.3	1.0
Europe ex-UK	11.2	13.4	-12.2	-17.3	2.4	1.2
Emerging markets	4.8	4.7	-15.2	-19.7	1.0	1.1
Selected Countries						
Japan	6.7	5.4	-4.1	-16.3	2.5	0.7
United Kingdom	5.6	9.1	7.2	-4.8	1.4	1.0
France	13.8	16.3	-6.9	-12.7	2.8	1.2
Canada	6.3	6.8	-5.8	-12.2	3.0	0.7
Germany	12.8	15.4	-16.5	-21.6	0.9	1.3
China	4.4	4.0	-20.6	-21.8	0.6	1.0
India	-5.2	-4.5	3.0	-7.5	2.4	1.2
Korea	16.6	11.6	-24.4	-28.9	1.6	1.3
Brazil	-3.0	2.3	8.6	14.6	-2.1	1.4

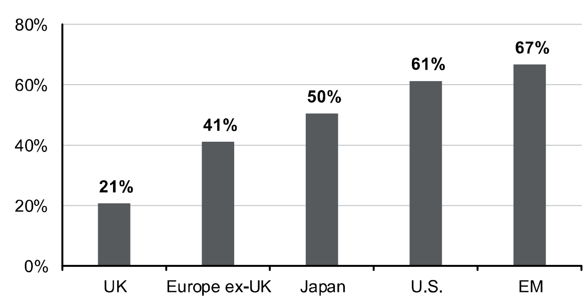
Weights in MSCI All Country World Index

% global market capitalization, float adjusted



Revenue exposure vs. country of listing

% of total revenue from home countries



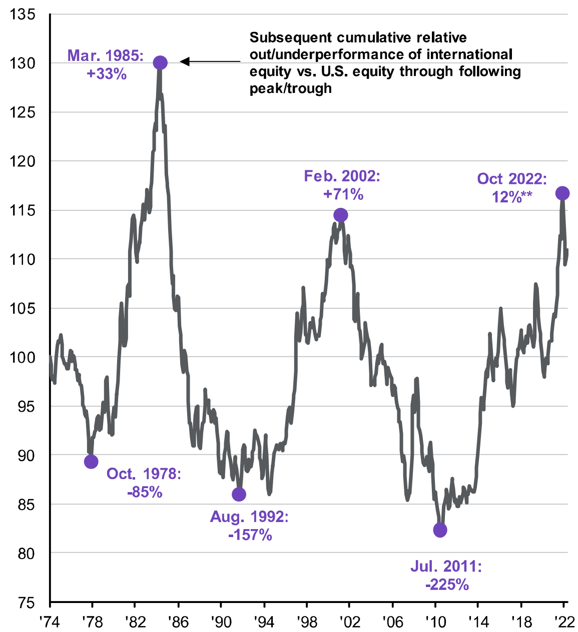
Source: FactSet, Federal Reserve, MSCI, Standard & Poor's, J.P. Morgan Asset Management. All return values are MSCI Gross Index data. 15-year history based on USD returns. 15-year return and beta figures are calculated for the time period 12/31/2007 to 12/31/2022. Beta is for monthly returns relative to the MSCI AC World Index. Annualized volatility is calculated as the standard deviation of quarterly returns multiplied by the square root of 4. Chart is for illustrative purposes only. Please see disclosure page for index definitions. Past performance is not a reliable indicator of current and future results. Revenue exposure vs. country of listing is as of 3/31/2023.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Currency and international equity returns

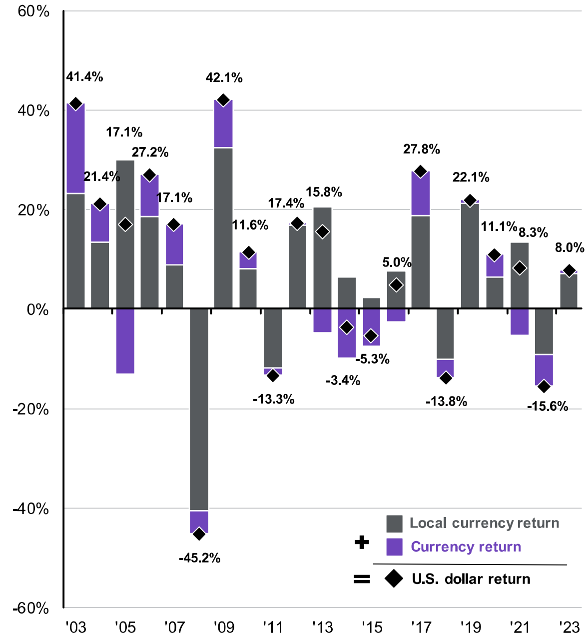
U.S. dollar and relative international equity returns

Real broad effective exchange rate, MSCI World ex-U.S. vs. S&P 500*



Currency impact on international returns

MSCI All Country World ex-U.S. Index, total return



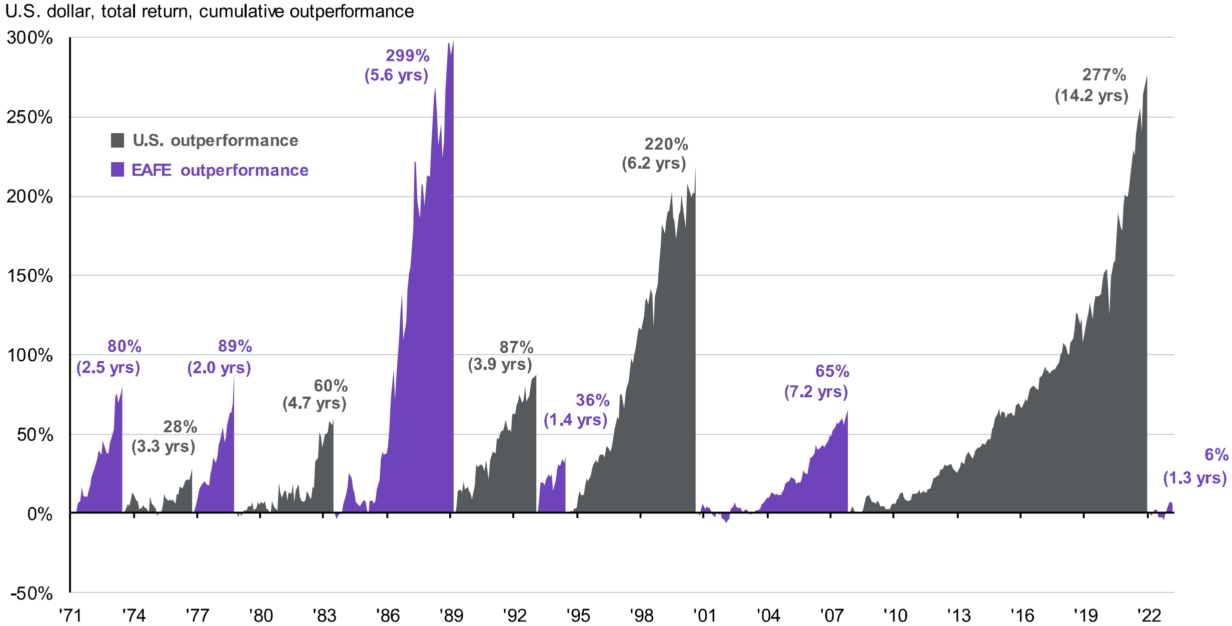
Source: J.P. Morgan Asset Management; (Left) J.P. Morgan Global Economic Research, MSCI; (Right) MSCI.
*U.S. dollar is the J.P. Morgan Global Economic Research real broad effective exchange rate (CPI) indexed to 100 in 1974. Relative international equity returns are cumulative, total returns in U.S. dollars and are calculated as MSCI World ex.-U.S. minus S&P 500 for each period of U.S. dollar peak/trough. **Data since Oct. 2022 represents the relative outperformance to the latest month end. Past performance is not a reliable indicator of current and future results.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Cycles of U.S. equity outperformance

MSCI EAFE and MSCI USA relative performance

U.S. dollar, total return, cumulative outperformance



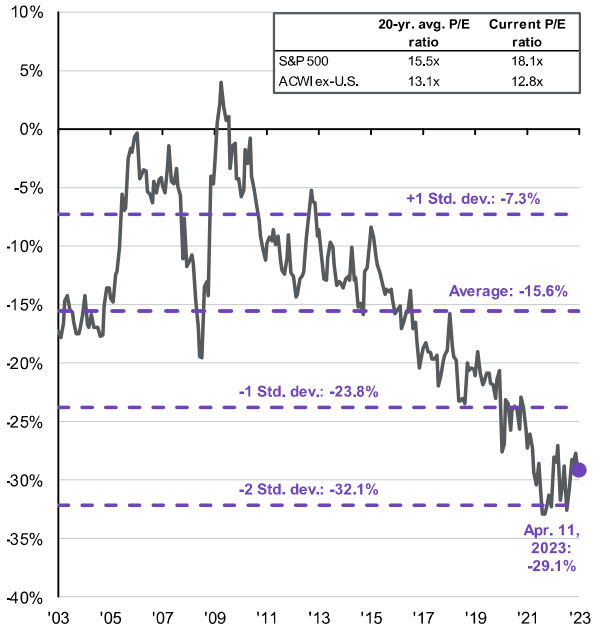
Source: FactSet, MSCI, J.P. Morgan Asset Management.
Regime change determined when cumulative outperformance peaks and is not reached again in the subsequent 12-month period.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

International valuations and dividend yields

International: Price-to-earnings discount vs. U.S.

MSCI All Country World ex-U.S. vs. S&P 500, next 12 months



International: Difference in dividend yields vs. U.S.

MSCI All Country World ex-U.S. minus S&P 500, next 12 months

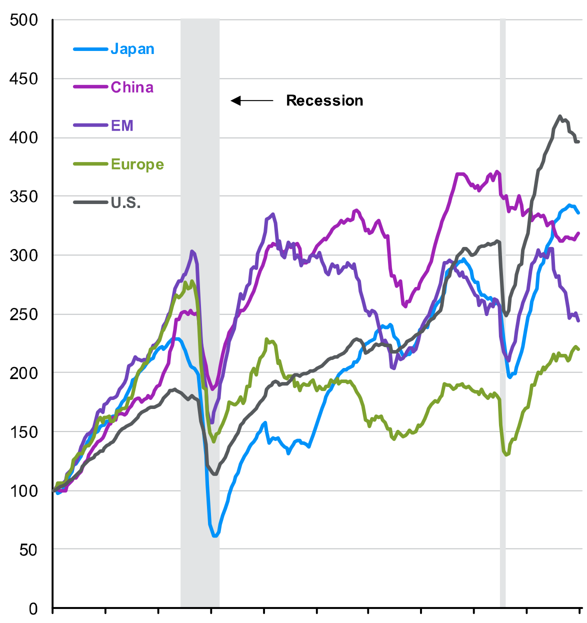
Source: FactSet, MSCI, Standard & Poor's, J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

International equity earnings and valuations

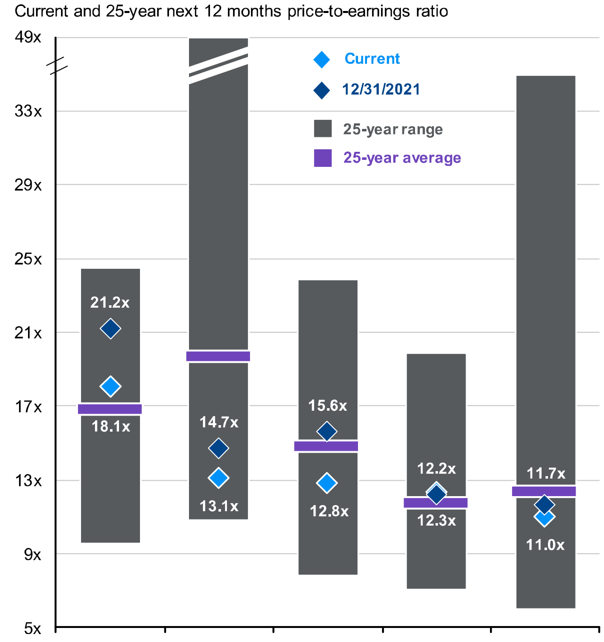
Global earnings estimates

Mar. 2003 = 100, next 12 months consensus estimates, U.S. dollars



Global valuations

Current and 25-year next 12 months price-to-earnings ratio



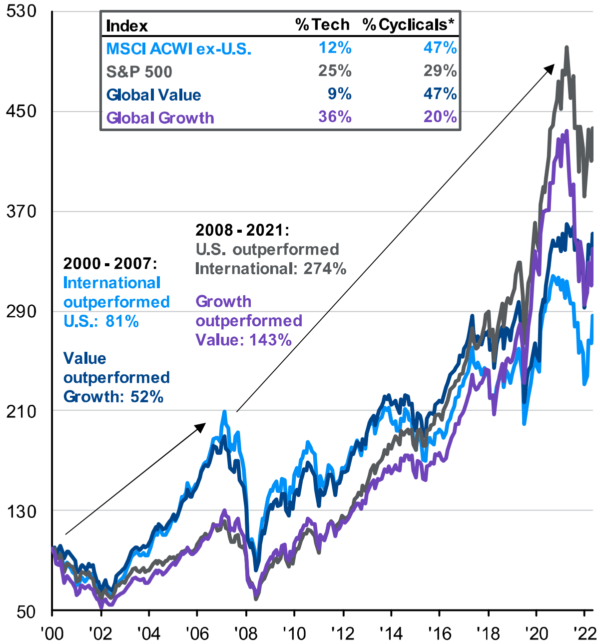
Source: FactSet, MSCI, Standard & Poor's, Thomson Reuters, J.P. Morgan Asset Management.
Next 12 months consensus estimates are based on pro-forma earnings and are in U.S. dollars. MSCI Europe includes the eurozone as well as countries not in the currency bloc, such as Norway, Sweden, Switzerland and the UK (which collectively make up 44% of the overall index). Past performance is not a reliable indicator of current and future results.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

International markets: Value vs. Growth

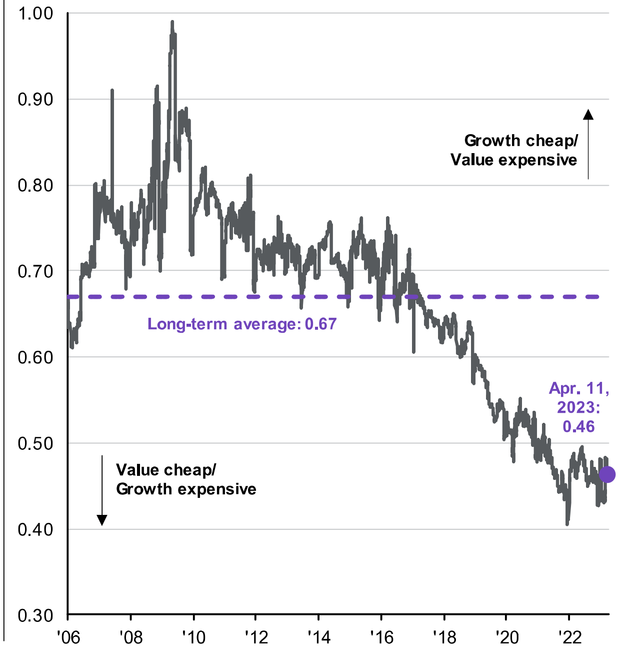
Regional and style leadership

Sep. 2000 = 100, total return, U.S. dollars



International Value vs. Growth relative valuations

Rel. fwd. P/E ratio of International Value vs. Growth

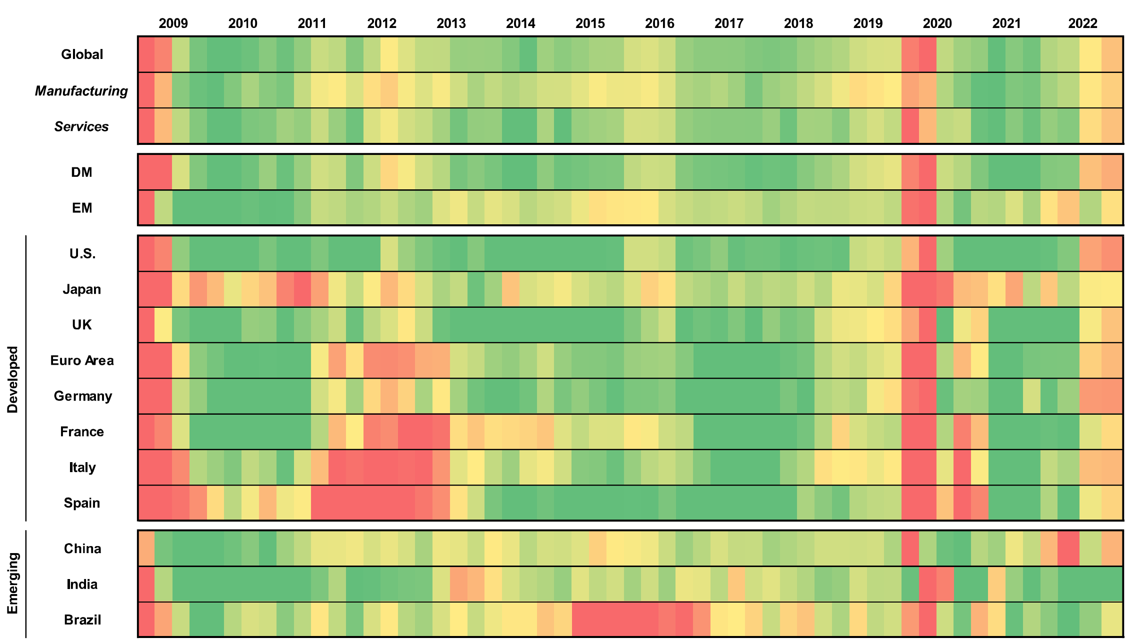


Source: Bloomberg, FactSet, MSCI, J.P. Morgan Asset Management.
*"Cyclicals" are defined as Energy, Financials, Industrials and Materials. Global Growth and Global Value are represented by the corresponding MSCI AC World indices. International Growth is represented by the MSCI ACWI ex-U.S. Growth Index and International Value is represented by the MSCI ACWI ex-U.S. Value Index.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Global economic activity momentum

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



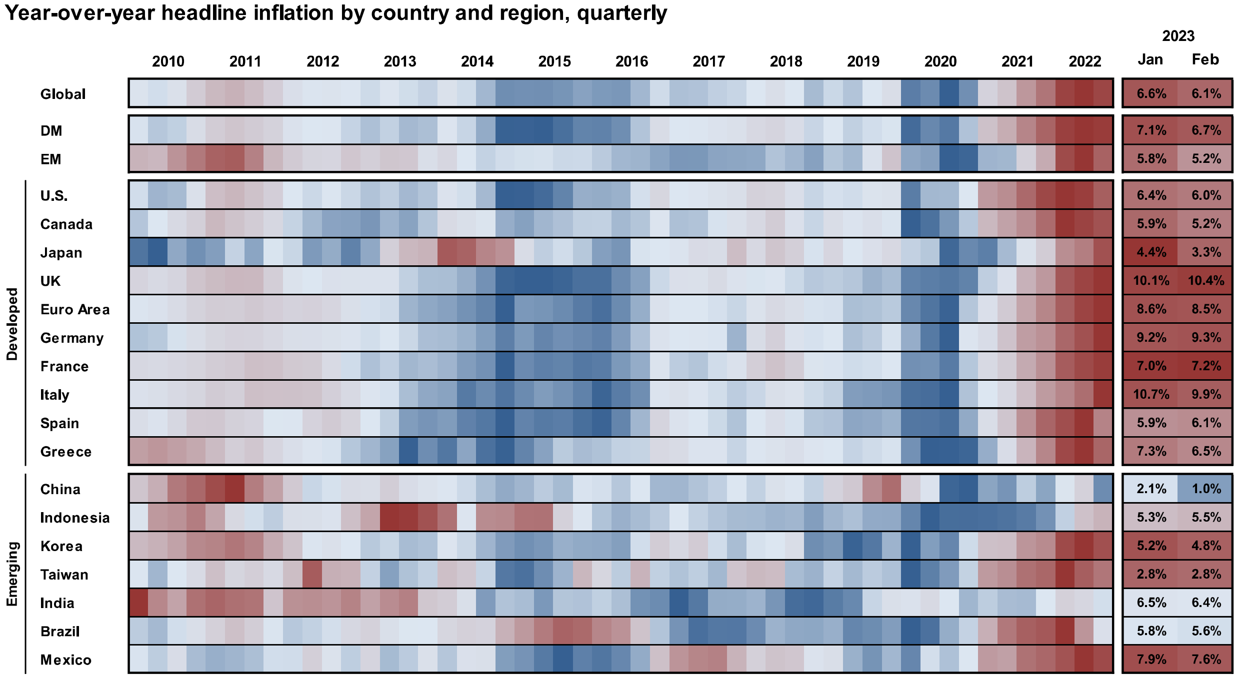
	2023 Feb	2023 Mar
Global	52.1	53.4
Manufacturing	49.9	49.6
Services	52.6	54.4
DM	51.1	52.6
EM	53.9	54.6
U.S.	50.1	52.3
Japan	51.1	52.9
UK	53.1	52.2
Euro Area	52.0	53.7
Germany	50.7	52.6
France	51.7	52.7
Italy	52.2	55.2
Spain	55.7	58.2
China	54.2	54.5
India	59.0	58.4
Brazil	49.7	50.7

Source: Standard & Poor's, J.P. Morgan Asset Management.
The Composite PMI includes both manufacturing and services sub-indices. Heatmap colors are based on PMI relative to the 50 level, which indicates acceleration or deceleration of the sector, for the time period shown. Heatmap is based on quarterly averages, except for the two most recent figures, which are single month readings. Data for the U.S. are back-tested and filled in for 2009. DM and EM represent developed markets and emerging markets, respectively.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Global inflation

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



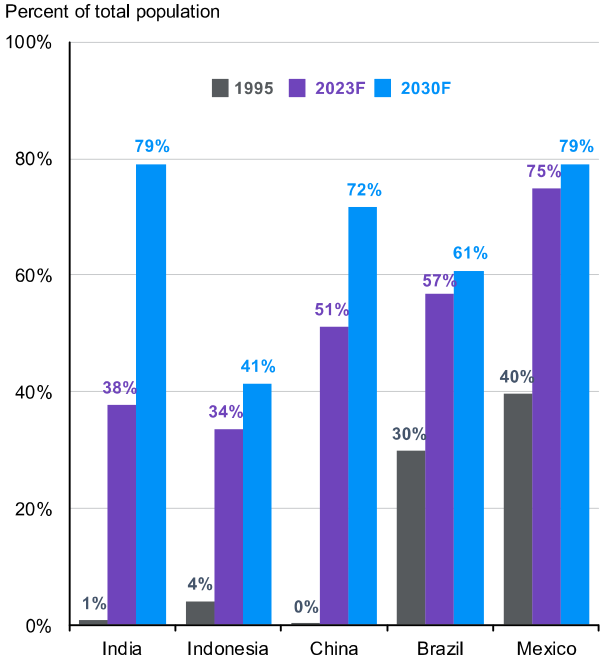
Source: Bank of Mexico, DGBAS, Eurostat, FactSet, Federal Reserve, IBGE, India Ministry of Statistics & Programme Implementation, Japan Ministry of Internal Affairs & Communications, Korean National Statistical Office, Melbourne Institute, National Bureau of Statistics China, Statistics Canada, Statistics Indonesia, UK Office for National Statistics (ONS), J.P. Morgan Asset Management. Heatmap is based on quarterly averages, with the exception of the two most recent figures, which are single month readings. Colors determined by percentiles of inflation values over the time period shown. Deep blue = lowest value, light blue = median, deep red = highest value. DM and EM represent developed markets and emerging markets, respectively.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

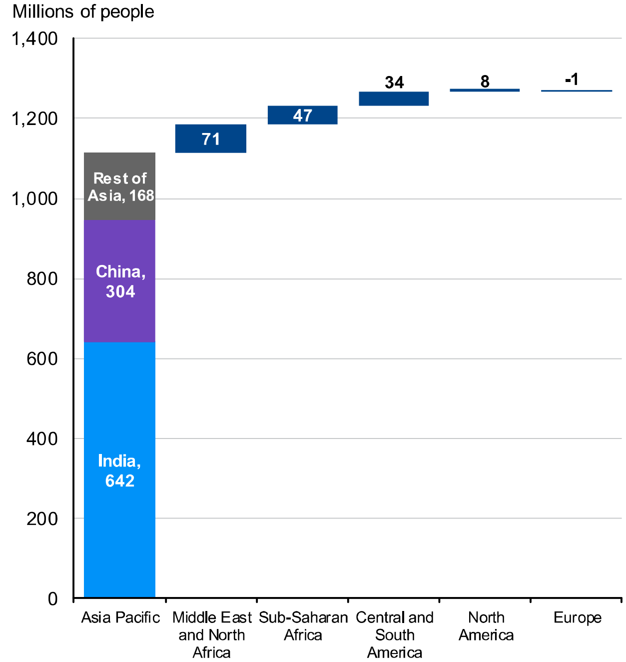
International

The emergence of the EM middle class

Growth of the middle class
Percent of total population



Regional contribution to middle class growth: 2023 to 2030
Millions of people



Source: Brookings Institution, J.P. Morgan Asset Management. Estimates for regional contribution are from Kharas, Homi, The Unprecedented Expansion of the Global Middle Class, An Update, Brookings Institution, 2017. Middle class is defined as households with per capita incomes between USD 11 and USD 110 per person per day in 2011 PPP terms. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.
Guide to the Markets – U.S. Data are as of April 11, 2023.

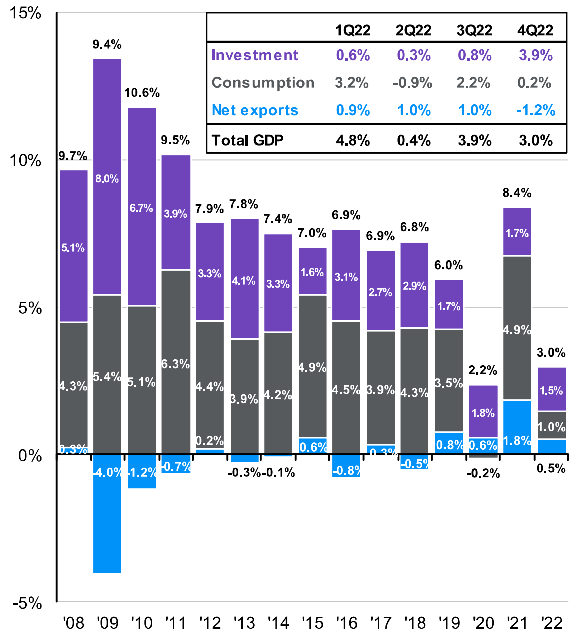
J.P.Morgan ASSET MANAGEMENT

International

China: Economic growth

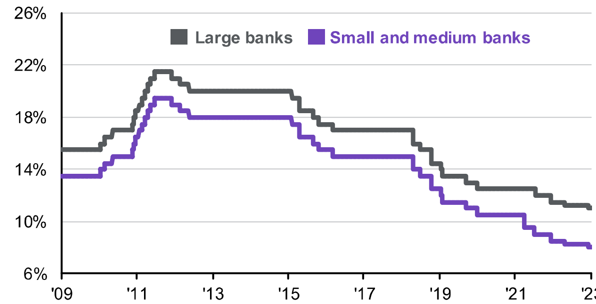
China real GDP contribution

Year-over-year % change for GDP, contribution to GDP for components



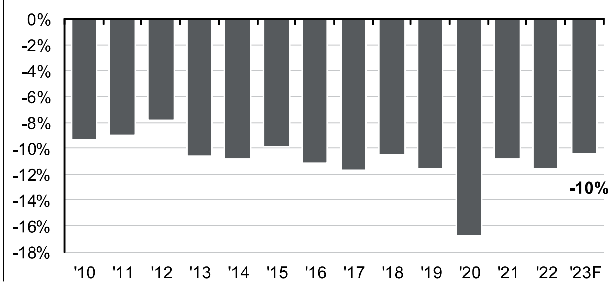
	1Q22	2Q22	3Q22	4Q22
Investment	0.6%	0.3%	0.8%	3.9%
Consumption	3.2%	-0.9%	2.2%	0.2%
Net exports	0.9%	1.0%	1.0%	-1.2%
Total GDP	4.8%	0.4%	3.9%	3.0%

Monetary stimulus: Reserve requirement ratio



Fiscal stimulus: Fiscal deficit*

% of GDP



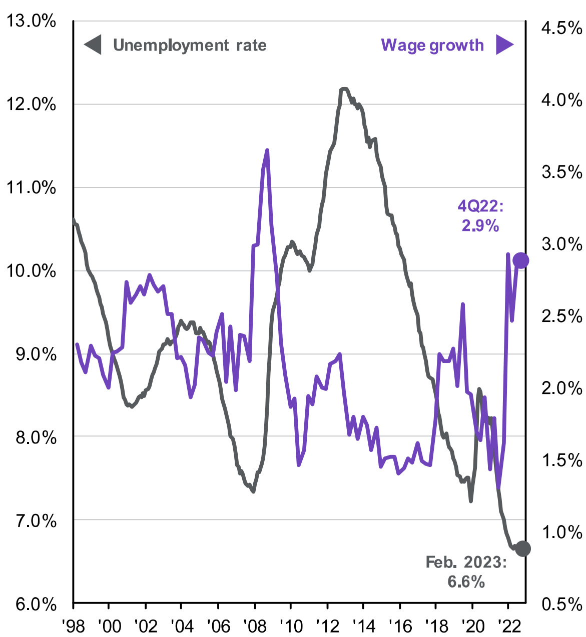
Source: FactSet, J.P. Morgan Asset Management; (Left) CEIC; (Top right) People's Bank of China; (Bottom right) China Agriculture Development Bank, China Development Bank, Ministry of Finance, People's Bank of China, Wind. *The fiscal deficit is a J.P. Morgan Global Economic Research estimate of the augmented fiscal deficit. It measures the aggregate resources controlled by the government and used to support economic growth. It consists of the official budgetary deficit of the central and local governments, and additional funding raised and spent by local governments through Local Government Financing Vehicles and various government-guided funds, whose activities are considered quasi-fiscal. Large banks are six major banks in China, including Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Bank of Communications, Postal Savings Bank of China. The other banks are categorized as small and medium-sized banks. PBoC sets favorable required reserve ratio (RRR) for banks that have met specific criteria, such as loans to small and medium-sized enterprises and agricultural sectors. These measures have significantly brought down the actual RRR for banks. According to the PBoC, when the latest RRR cut took effect on 12/5/2022, the realized weighted average RRR was 7.8% (4/25/2022: 8.1%). Forecasts are not a reliable indicator of future performance. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Eurozone economy

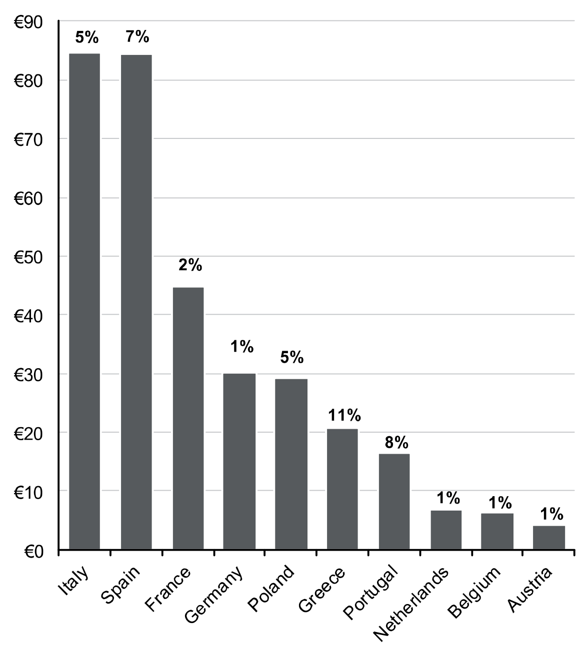
Eurozone unemployment rate and wage growth

%, year-over-year



EU recovery fund grants to select EU countries

EUR billions, % of EU27 2021 nominal GDP



Source: FactSet, J.P. Morgan Asset Management; (Left) ECB. Wage growth is based on negotiated wages. (Right) European Commission.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Correlations and volatility

	U.S. Large Cap	EAFE	EME	Bonds	Corp. HY	Munis	Currcy.	EMD	Cmdty.	REITs	Hedge funds	Private equity	Gold	Ann. Volatility
U.S. Large Cap	1.00	0.88	0.78	0.26	0.87	0.36	-0.42	0.70	0.41	0.77	0.85	0.80	0.10	0.15
EAFE		1.00	0.89	0.28	0.85	0.43	-0.61	0.76	0.44	0.62	0.81	0.83	0.23	0.15
EME			1.00	0.31	0.82	0.44	-0.69	0.80	0.48	0.53	0.75	0.77	0.40	0.18
Bonds				1.00	0.38	0.85	-0.35	0.67	-0.22	0.41	-0.02	0.13	0.58	0.04
Corp. HY					1.00	0.46	-0.48	0.86	0.49	0.69	0.79	0.74	0.28	0.08
Munis						1.00	-0.39	0.76	-0.15	0.54	0.12	0.27	0.51	0.04
Currencies							1.00	-0.59	-0.41	-0.21	-0.29	-0.59	-0.56	0.06
EMD								1.00	0.26	0.62	0.54	0.60	0.51	0.08
Commodities									1.00	0.33	0.62	0.58	0.27	0.17
REITs										1.00	0.61	0.61	0.18	0.16
Hedge funds											1.00	0.80	0.01	0.05
Private equity												1.00	0.10	0.08
Gold													1.00	0.15

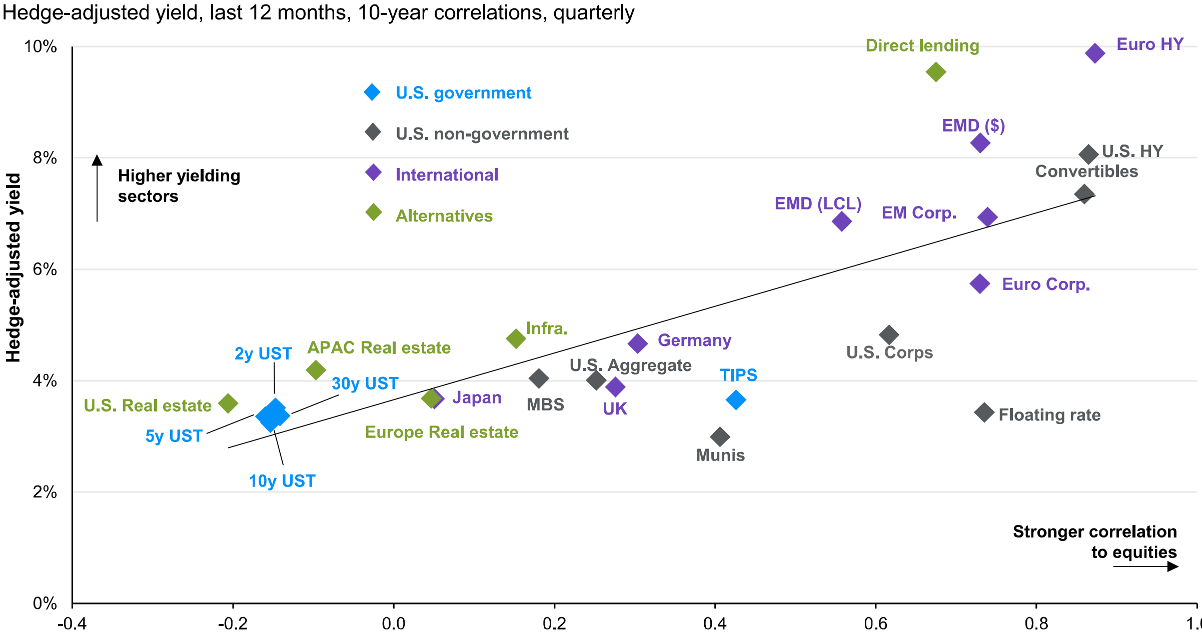
Source: Bloomberg, Burgiss, Credit Suisse/Tremont, FactSet, Federal Reserve, MSCI, Standard & Poor's, J.P. Morgan Asset Management.
Indices used – Large Cap: S&P 500 Index; Currencies: Federal Reserve Trade-Weighted Dollar; EAFE: MSCI EAFE; EME: MSCI Emerging Markets; Bonds: Bloomberg Aggregate; Corp HY: Bloomberg Corporate High Yield; EMD: Bloomberg Emerging Market; Cmdty.: Bloomberg Commodity Index; REITs: NAREIT All Equity Index; Hedge funds: CS/Tremont Hedge Fund Index; Private equity: Time weighted returns from Burgiss; Gold: Gold continuous contract ($/oz). Private equity data are reported on a one- to two-quarter lag. All correlation coefficients and annualized volatility are calculated based on quarterly total return data for period from 3/31/2013 to 3/31/2023, except for Private equity, which is based on the period from 9/30/2012 to 9/30/2022. This chart is for illustrative purposes only.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Alternatives

Equity market correlations and yields

Equity market correlations and yields
Hedge-adjusted yield, last 12 months, 10-year correlations, quarterly



Source: Bloomberg, NCREIF, MSCI, FactSet, ICE, J.P. Morgan Asset Management. Fixed income shown above are represented by Bloomberg indices except for EMD, MBS: U.S. Aggregate Securitized - MBS; U.S. corps: U.S. Corporates; Munis: Municipal Bond; U.S. HY: Corporate High Yield; TIPS: Treasury Inflation-Protected Securities (TIPS); Floating Rate: U.S. Floating Rate; Convertibles: U.S. Convertibles Composite; ABS: J.P. Morgan ABS Index; EMD ($): J.P. Morgan EMBIG Diversified Index; EMD (LCL): J.P. Morgan GBI EM Global Diversified Index; EM Corp: J.P. Morgan CEMBI Broad Diversified Index; Euro Corp.: Euro Aggregate Corporate Index; Euro HY: Pan-European High Yield Index; U.S. Real Estate: NCREIF Property Index – ODCE; Europe Real Estate: Market weighted avg. of MSCI Global Property Fund Indices - U.K. & Cont. Europe; APAC Real Estate: MSCI Global Property Index - Asia-Pacific; Global infra.: MSCI Global Quarterly Infrastructure Asset Index (equal weighted blend; U.S. Direct Lending: Cliffwater Direct Lending Index. Convertibles yield is based on the U.S. portion of the Bloomberg Global Convertibles. Country yields are represented by the global aggregate for each country. Yield and return information based on bellwethers for Treasury securities. U.S. Real Estate yield is calculated using the MSCI Global Property Fund Index – North America. Alternative correlations are based on quarterly returns over the past 10 years through 9/30/2022, except U.S. Real estate, which is through 12/31/2022. Stock and bond correlations are based on quarterly returns over the past 10 years through 12/31/2022. All non-alternative yields are as of 2/28/2023. Alternative yields are as of 9/30/2022. This slide comes from our Guide to Alternatives.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

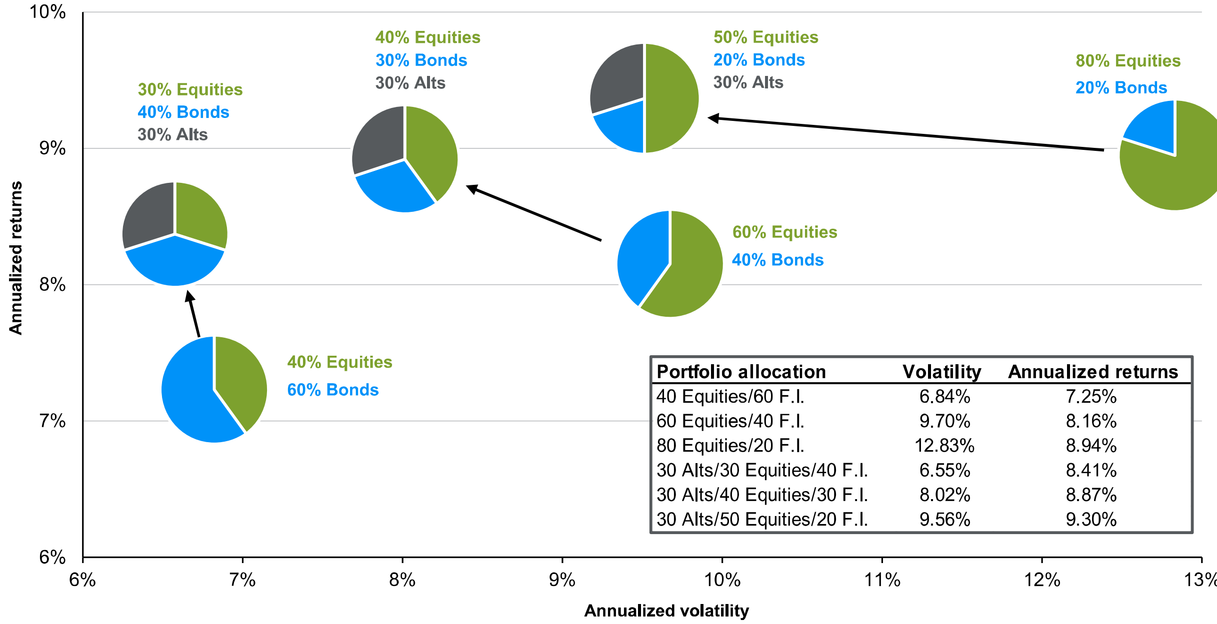
Alternatives

Portfolio diversification

Alternatives

Alternatives and portfolio risk/return

Annualized volatility and returns, 1989 – 3Q22



Portfolio allocation	Volatility	Annualized returns
40 Equities/60 F.I.	6.84%	7.25%
60 Equities/40 F.I.	9.70%	8.16%
80 Equities/20 F.I.	12.83%	8.94%
30 Alts/30 Equities/40 F.I.	6.55%	8.41%
30 Alts/40 Equities/30 F.I.	8.02%	8.87%
30 Alts/50 Equities/20 F.I.	9.56%	9.30%

Source: Bloomberg, Burgiss, FactSet, HFRI, NCREIF, Standard & Poor's, J.P. Morgan Asset Management. Alts include hedge funds, real estate and private equity, with each receiving an equal weight. Portfolios are rebalanced at the start of the year. This slide comes from our Guide to Alternatives.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Global commodities

Alternatives

Bloomberg Commodity Index

Since index inception, total returns

Commodity prices

Bloomberg Commodity Index constituents

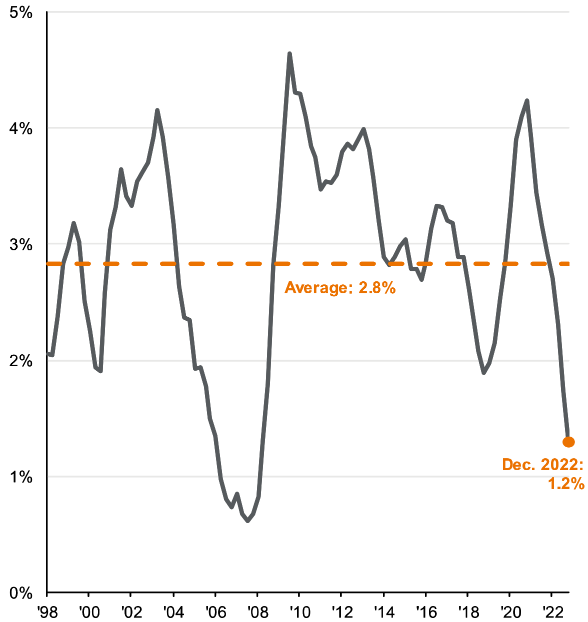
Bloomberg Commodity Index			
Constituents	Current price level	Change since 12/31/2021	Change since 6/9/2022*
Sub-indices			
Energy	**$34.69**	**12.3%**	**-44.0%**
WTI crude oil	$81.53	8.2%	-32.9%
Natural gas	$0.09	-43.5%	-77.1%
Brent crude	$487.82	39.1%	-19.6%
Low sulphur gas oil	$276.99	59.3%	-27.4%
RBOB gasoline	$509.29	57.0%	-16.8%
ULS diesel	$4.11	13.6%	-25.9%
Grains	**$46.32**	**10.1%**	**-17.7%**
Corn	$13.15	16.0%	-11.2%
Soybeans	$70.03	8.5%	-27.1%
Soybean meal	$924.96	28.9%	19.4%
Wheat	$33.22	-18.5%	-39.7%
Soybean oil	$82.13	9.4%	-26.4%
HRW wheat	$118.74	-2.0%	-29.0%
Industrial metals	**$154.70**	**-10.5%**	**-16.0%**
Copper	$359.20	-10.9%	-9.0%
Aluminum	$31.41	-21.1%	-19.2%
Zinc	$90.19	-18.3%	-23.6%
Nickel	$219.23	11.1%	-18.3%
Precious metals	**$583.92**	**10.0%**	**10.5%**
Gold	$212.64	5.6%	5.0%
Silver	$221.00	4.4%	12.3%
Softs	**$53.16**	**10.8%**	**-0.2%**
Sugar	$134.20	42.9%	36.2%
Coffee	$11.99	-12.8%	-15.9%
Cotton	$30.05	-10.0%	-32.4%
Livestock	**$22.15**	**-1.2%**	**0.1%**
Live cattle	$60.60	7.6%	11.1%
Lean hogs	$3.34	-15.6%	-18.5%

Source: Bloomberg, FactSet, J.P. Morgan Asset Management. All the Bloomberg subsectors and constituents are represented by the respective Bloomberg subindex except ULS Diesel, which is represented by the EIA composite for U.S. ULS diesel prices. *The Bloomberg Commodity Index peaked on June 9, 2022.
Guide to the Markets – U.S. Data are as of April 11, 2023.

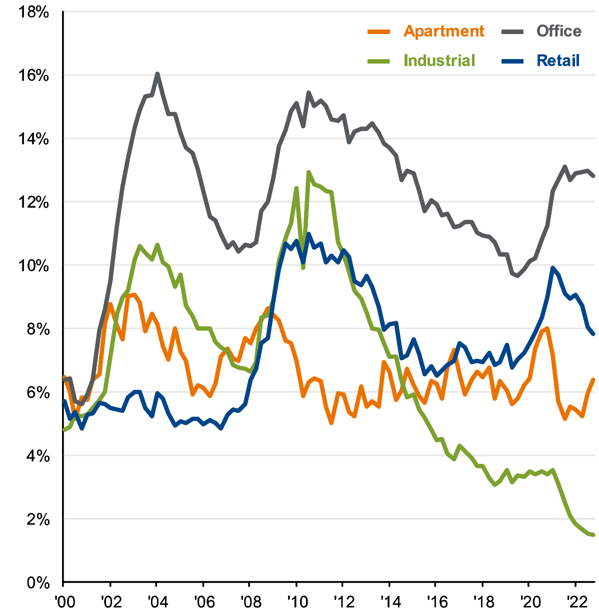
J.P.Morgan
ASSET MANAGEMENT

U.S. real estate dynamics

U.S. real estate cap rate spreads
Transaction based, spread to 10y UST, 4-quarter rolling average



U.S. vacancy rates by property type
Percent

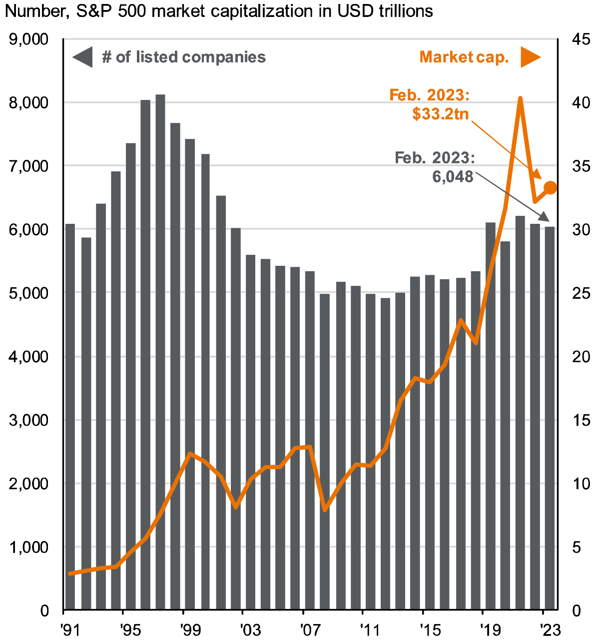


Source: NAREIT, NCREIF, Statista, J.P. Morgan Asset Management.
The cap rate, which is computed as the net operating income over sales price, is the rate of return on a real estate investment property. Vacancy rate data is as of 12/31/2022. This slide comes from our Guide to Alternatives.
Guide to the Markets – U.S. Data are as of April 11, 2023.

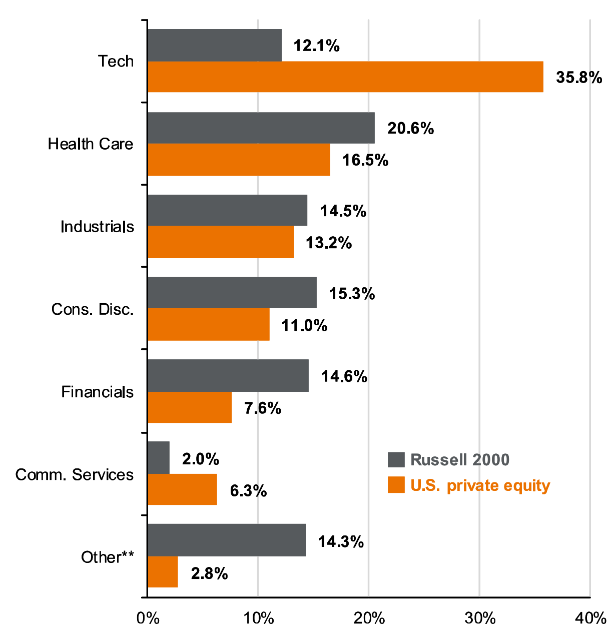
J.P.Morgan
ASSET MANAGEMENT

U.S. public vs. private equity

Number of listed U.S. companies* and market cap.
Number, S&P 500 market capitalization in USD trillions



Private vs. public equity sector weights



Sources: Cambridge Associates, Russell, World Federation of Exchanges, J.P. Morgan Asset Management.
*Number of listed U.S. companies is represented by the sum of number of companies listed on the NYSE and the NASDAQ. **Other includes real estate, utilities and energy. Percentages may not sum due to rounding. Sector weights are as of 6/30/2021. This slide comes from our Guide to Alternatives.
Guide to the Markets – U.S. Data are as of April 11, 2023.

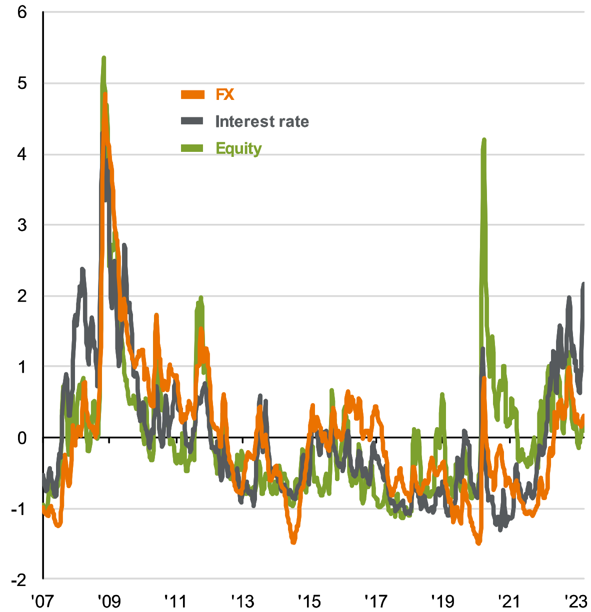
J.P.Morgan
ASSET MANAGEMENT

Market volatility and hedge funds

Alternatives

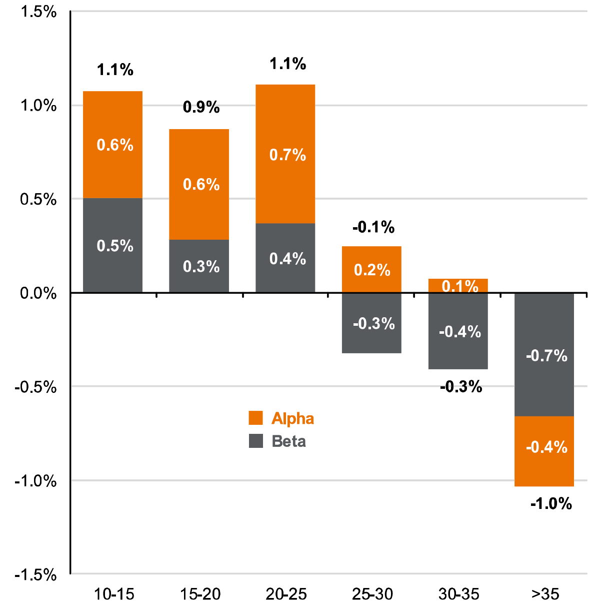
Equity, interest rate and foreign exchange volatility

Z-score, 4-week moving average, 2007 - present



Hedge funds and volatility

Average monthly hedge fund returns by VIX level, 1990 - present



Source: CBOE, FactSet, HFRI, ICE BofA, J.P. Morgan Index Research, MSCI, J.P. Morgan Asset Management. (Left) Equity volatility is represented by the VIX Index, interest rate volatility is represented by the MOVE Index and foreign exchange volatility is represented by the J.P. Morgan Global FX Volatility Index. (Right) Historical beta is based on regression analysis, where the HFRI is the dependent variable and the MSCI AC World Index is the independent variable. Monthly VIX reading is an average. Numbers may not sum to 100% due to rounding. This slide comes from our Guide to Alternatives.

Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Asset class returns

Investing Principles

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	YTD	2008 - 2022 Ann.	2008 - 2022 Vol.
Fixed Income 5.2%	EM Equity 79.0%	REITs 27.9%	REITs 8.3%	REITs 19.7%	Small Cap 38.8%	REITs 28.0%	REITs 2.8%	Small Cap 21.3%	EM Equity 37.8%	Cash 1.8%	Large Cap 31.5%	Small Cap 20.0%	REITs 41.3%	Comdty. 16.1%	DM Equity 9.6%	Large Cap 8.8%	REITs 23.4%
Cash 1.8%	High Yield 59.4%	Small Cap 26.9%	Fixed Income 7.8%	High Yield 19.6%	Large Cap 32.4%	Large Cap 13.7%	Large Cap 1.4%	High Yield 14.3%	DM Equity 25.6%	Fixed Income 0.0%	REITs 28.7%	EM Equity 18.7%	Large Cap 28.7%	Cash 1.5%	Large Cap 7.5%	Small Cap 7.2%	Small Cap 23.2%
Asset Alloc. -25.4%	DM Equity 32.5%	EM Equity 19.2%	High Yield 3.1%	EM Equity 18.6%	DM Equity 23.3%	Fixed Income 6.0%	Fixed Income 0.5%	Large Cap 12.0%	Large Cap 21.8%	REITs -4.0%	Small Cap 25.5%	Large Cap 18.4%	Comdty. 27.1%	High Yield -12.7%	Asset Alloc. 4.7%	REITs 6.6%	EM Equity 23.0%
High Yield -26.9%	REITs 28.0%	Comdty. 16.8%	Large Cap 2.1%	DM Equity 17.9%	Asset Alloc. 14.9%	Asset Alloc. 5.2%	Cash 0.0%	Comdty. 11.8%	Small Cap 14.6%	High Yield -4.1%	DM Equity 22.7%	Asset Alloc. 10.6%	Small Cap 14.8%	Fixed Income -13.0%	EM Equity 4.7%	Asset Alloc. 6.1%	Comdty. 20.2%
Small Cap -33.8%	Small Cap 27.2%	Large Cap 15.1%	Cash 0.1%	Small Cap 16.3%	High Yield 7.3%	Small Cap 4.9%	DM Equity -0.4%	EM Equity 11.6%	Asset Alloc. 14.6%	Large Cap -4.4%	Asset Alloc. 19.5%	DM Equity 8.3%	Asset Alloc. 13.5%	Asset Alloc. -13.9%	Fixed Income 3.4%	High Yield 5.4%	DM Equity 20.0%
Comdty. -35.6%	Large Cap 26.5%	High Yield 14.8%	Asset Alloc. -0.7%	Large Cap 16.0%	REITs 2.9%	Cash 0.0%	Asset Alloc. -2.0%	REITs 8.6%	High Yield 10.4%	Asset Alloc. -5.8%	EM Equity 18.9%	Fixed Income 7.5%	DM Equity 11.8%	DM Equity -14.0%	High Yield 3.3%	Fixed Income 2.7%	Large Cap 17.7%
Large Cap -37.0%	Asset Alloc. 25.0%	Asset Alloc. 13.3%	Small Cap -4.2%	Asset Alloc. 12.2%	Cash 0.0%	High Yield 0.0%	High Yield -2.7%	Asset Alloc. 8.3%	REITs 8.7%	Small Cap -11.0%	High Yield 12.6%	High Yield 7.0%	High Yield 1.0%	Large Cap -18.1%	REITs 1.9%	DM Equity 2.3%	High Yield 13.0%
REITs -37.7%	Comdty. 18.9%	DM Equity 8.2%	DM Equity -11.7%	Fixed Income 4.2%	Fixed Income -2.0%	EM Equity -1.8%	Small Cap -4.4%	Fixed Income 2.6%	Fixed Income 3.5%	Comdty. -11.2%	Fixed Income 8.7%	Cash 0.5%	Cash 0.0%	EM Equity -19.7%	Small Cap 1.9%	EM Equity 1.0%	Asset Alloc. 12.4%
DM Equity -43.1%	Fixed Income 5.9%	Fixed Income 6.5%	Comdty. -13.3%	Cash 0.1%	EM Equity -2.3%	DM Equity -4.5%	EM Equity -14.6%	DM Equity 1.5%	Comdty. 1.7%	DM Equity -13.4%	Comdty. 7.7%	Comdty. -3.1%	Fixed Income -1.5%	Small Cap -20.4%	Cash 1.2%	Cash 0.6%	Fixed Income 4.2%
EM Equity -53.2%	Cash 0.1%	Cash 0.1%	EM Equity -18.2%	Comdty. -1.1%	Comdty. -9.5%	Comdty. -17.0%	Comdty. -24.7%	Cash 0.3%	Cash 0.8%	EM Equity -14.2%	Cash 2.2%	REITs -5.1%	EM Equity -2.2%	REITs -24.9%	Comdty. -3.8%	Comdty. -2.6%	Cash 0.4%

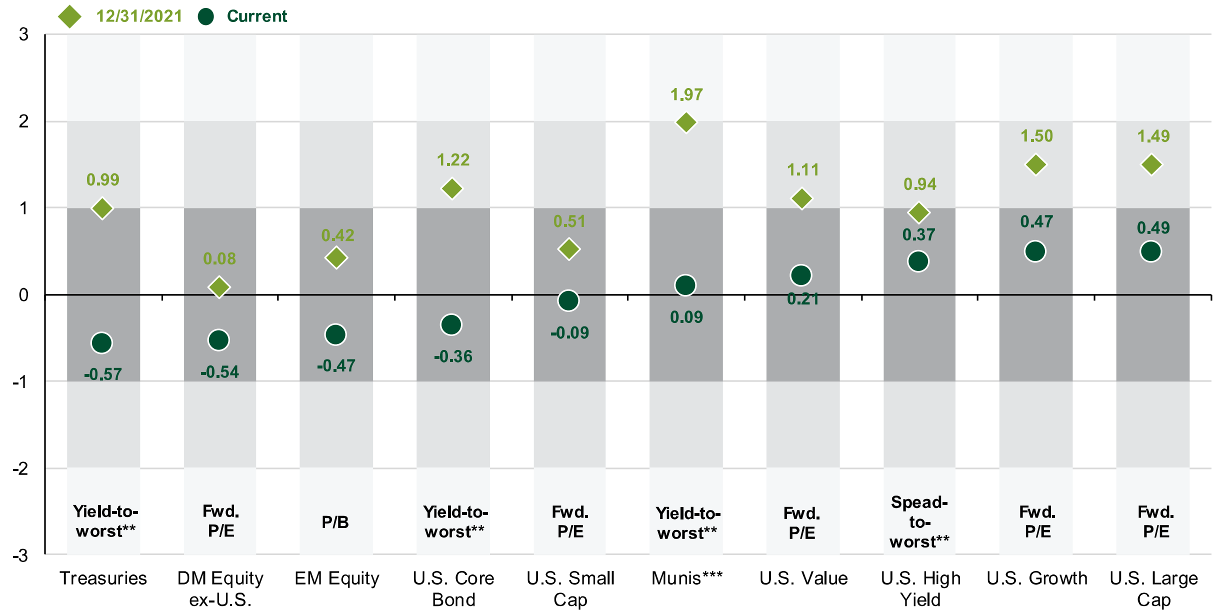
Source: Bloomberg, FactSet, MSCI, NAREIT, Russell, Standard & Poor's, J.P. Morgan Asset Management.
Large cap: S&P 500, Small cap: Russell 2000, EM Equity: MSCI EME, DM Equity: MSCI EAFE, Comdty: Bloomberg Commodity Index, High Yield: Bloomberg Global HY Index, Fixed Income: Bloomberg US Aggregate, REITs: NAREIT Equity REIT Index, Cash: Bloomberg 1-3m Treasury. The "Asset Allocation" portfolio assumes the following weights: 25% in the S&P 500, 10% in the Russell 2000, 15% in the MSCI EAFE, 5% in the MSCI EME, 25% in the Bloomberg US Aggregate, 5% in the Bloomberg 1-3m Treasury, 5% in the Bloomberg Global High Yield Index, 5% in the Bloomberg Commodity Index and 5% in the NAREIT Equity REIT Index. Balanced portfolio assumes annual rebalancing. Annualized (Ann.) return and volatility (Vol.) represents period from 12/31/2007 to 12/31/2022. Please see disclosure page at end for index definitions. All data represents total return for stated period. The "Asset Allocation" portfolio is for illustrative purposes only. Past performance is not indicative of future returns.

Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Valuations monitor

Asset class valuations
Z-scores based on 25-year average valuation measures*



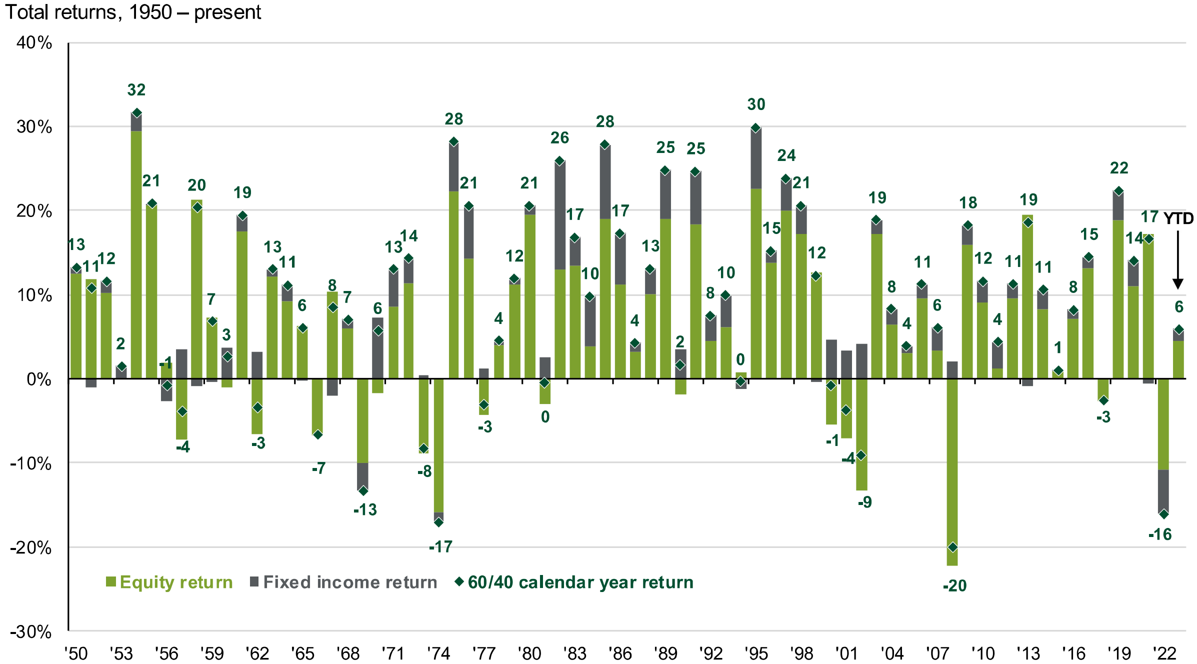
Source: Bloomberg, BLS, CME, FactSet, MSCI, Russell, Standard & Poor's, J.P. Morgan Asset Management.
U.S. Large Cap: S&P 500, U.S. Small Cap: Russell 2000, EM Equity: MSCI EME, DM Equity: MSCI EAFE, U.S. Value: Russell 1000 Value, U.S. Growth: Russell 1000 Growth, U.S. High Yield: J.P. Morgan Domestic High Yield Index, U.S. Core Bond: Bloomberg US Aggregate, Treasuries: Bloomberg U.S. Aggregate Government – Treasury, Munis: Bloomberg Municipal Bond. *Averages for U.S. High Yield and U.S. Small Cap are since January 1999 and November 1998, respectively, due to limited data availability. **Yield-to-worst and spread-to-worst are inversely related to fixed income prices. ***Munis yield-to-worst is based on the tax-equivalent yield-to-worst assuming a top-income tax bracket rate of 37% plus a Medicare tax rate of 3.8%.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan
ASSET MANAGEMENT

Investing Principles

60/40 annual returns

60/40 annual return decomposition
Total returns, 1950 – present



Source: Bloomberg, FactSet, Ibbotson/Strategas, Robert Shiller, Standard & Poor's, Yale University, J.P. Morgan Asset Management.
The 60/40 portfolio is 60% invested in S&P 500 Total Return Index and 40% invested in Bloomberg U.S. Aggregate Total Return Index. S&P 500 returns from 1950 to 1970 are estimated using the Shiller S&P Composite. U.S. fixed income total returns from 1950 to 1975 are estimated using data from Strategas/Ibbotson. The portfolio is rebalanced annually.
Guide to the Markets – U.S. Data are as of April 11, 2023.

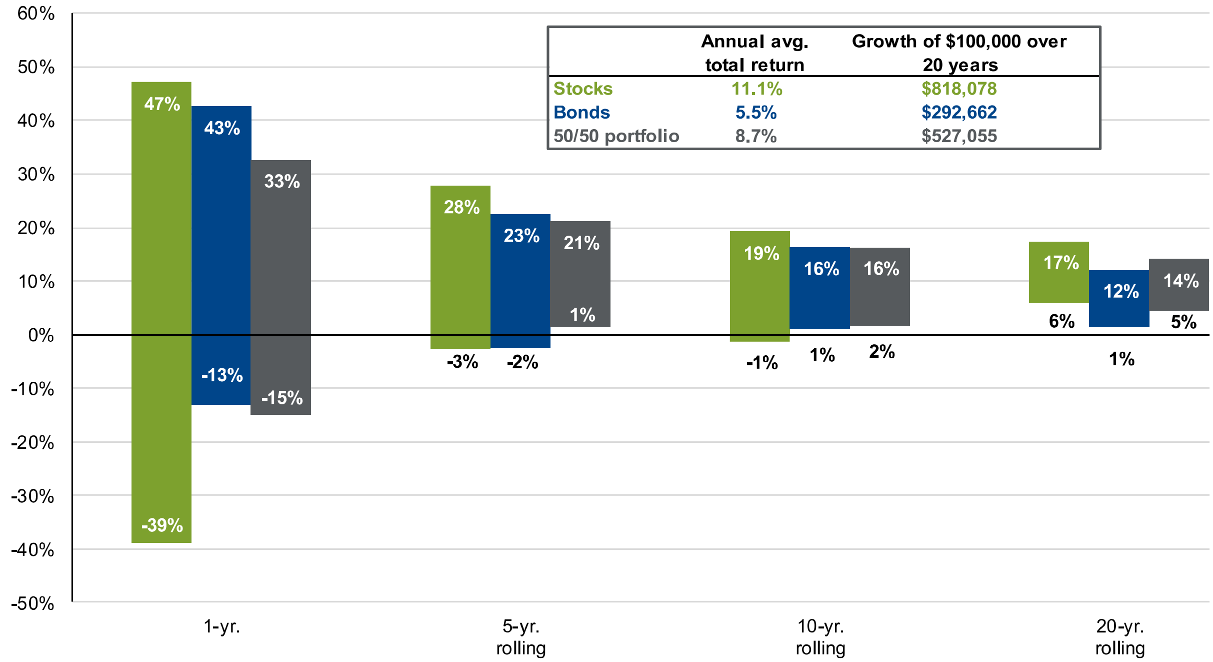
J.P.Morgan
ASSET MANAGEMENT

Investing Principles

Time, diversification and the volatility of returns

Range of stock, bond and blended total returns

Annual total returns, 1950-2022



	Annual avg. total return	Growth of $100,000 over 20 years
Stocks	11.1%	$818,078
Bonds	5.5%	$292,662
50/50 portfolio	8.7%	$527,055

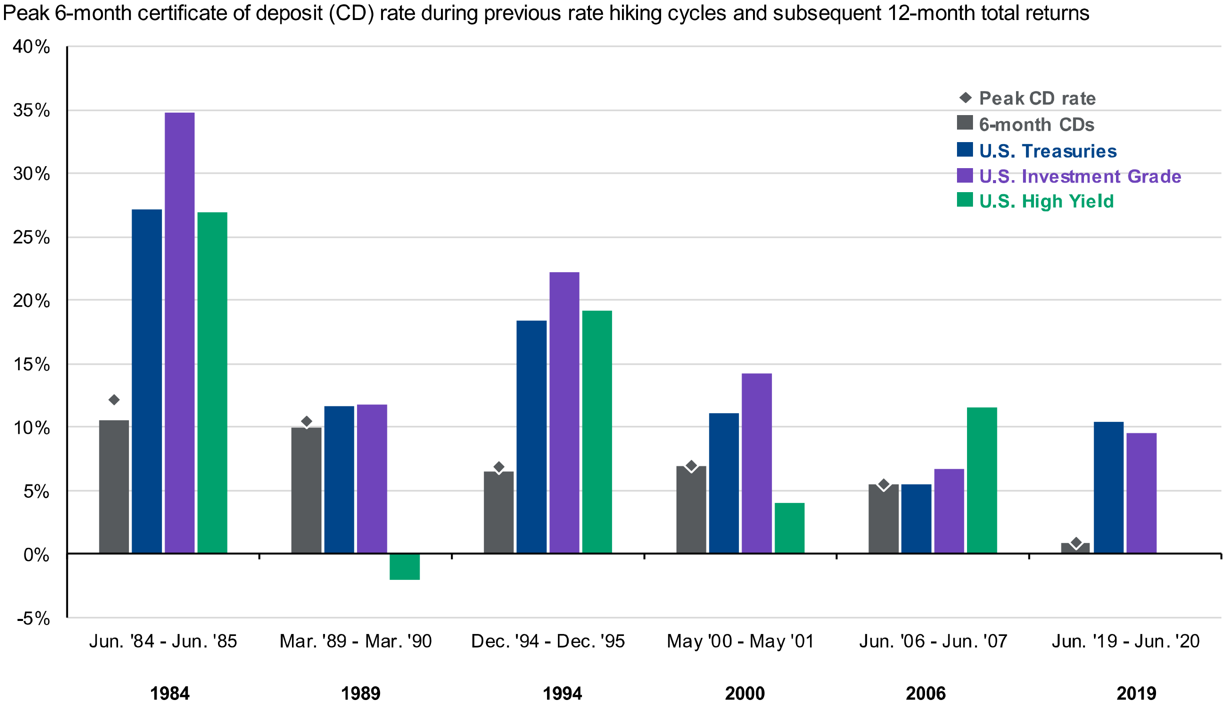
Source: Bloomberg, FactSet, Federal Reserve, Robert Shiller, Strategas/Ibbotson, J.P. Morgan Asset Management.
Returns shown are based on calendar year returns from 1950 to 2021. Stocks represent the S&P 500 Shiller Composite and Bonds represent Strategas/Ibbotson for periods from 1950 to 2010 and Bloomberg Aggregate thereafter. Growth of $100,000 is based on annual average total returns from 1950 to 2022.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

CD rates and fixed income opportunities

Fixed income opportunities outside of CDs

Peak 6-month certificate of deposit (CD) rate during previous rate hiking cycles and subsequent 12-month total returns



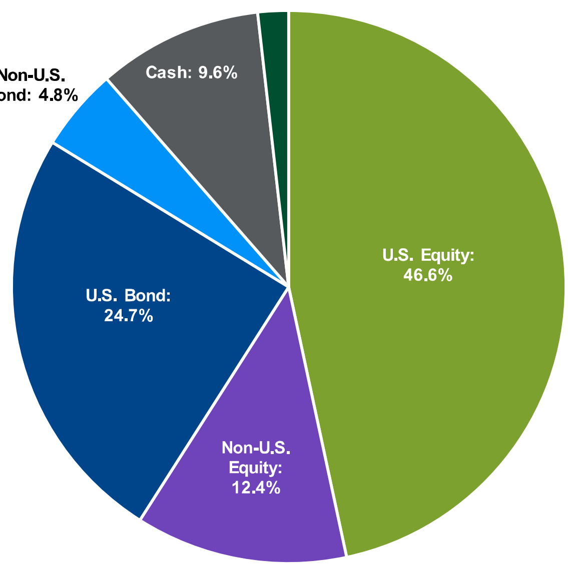
Source: Bankrate, Bloomberg, FactSet, Federal Reserve, J.P. Morgan Asset Management.
U.S. Treasuries: Bloomberg US Treasury Index, U.S. Investment Grade: Bloomberg US Corporate Bond Index, U.S. High Yield: Bloomberg US Corporate High Yield Bond Index. The analysis references the month in which the 6-month average CD rate peaked during previous rate hiking cycles. CD rate data prior to 2013 are sourced from the Federal Reserve whereas data from 2013 to 2023 are sourced from Bankrate. CD subsequent 12-month return calculation assumes reinvestment at the prevailing 6-month rate when the initial CD matures.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

Individual investor asset allocation

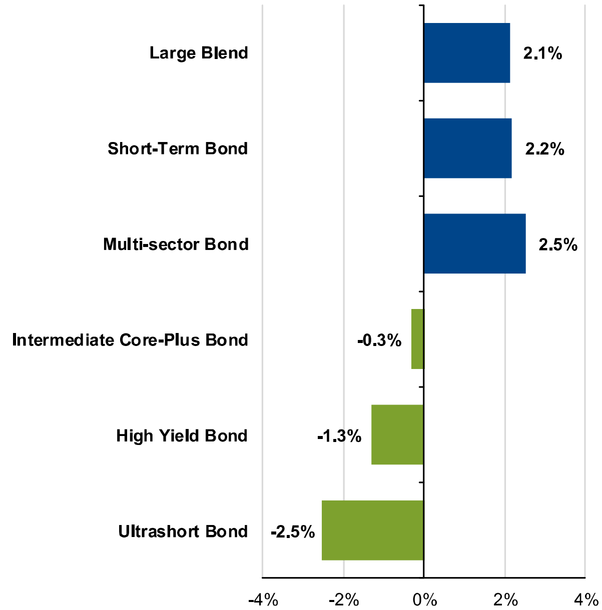
Asset allocation: Current portfolio positioning

Average moderate (60/40) allocation as of February 2023



Biggest portfolio shifts

Largest % allocation changes by Morningstar category, Feb. 2023**

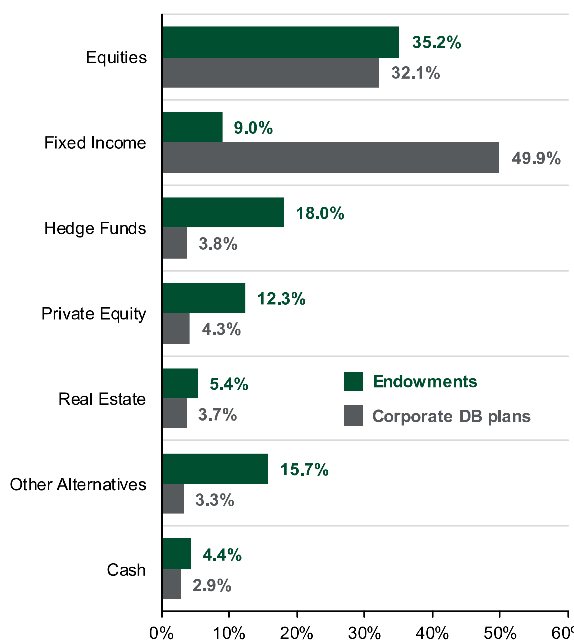


Source: J.P. Morgan Portfolio Insights, J.P. Morgan Asset Management. Data is aggregated from 5,501 portfolios analyzed through the Portfolio Insights tools over trailing 12 months. The current portfolio positioning chart represents the average overall asset allocation for all portfolios benchmarked relative to the JPMorgan 60/40 Benchmark. Other includes preferred stocks, warrants, options and other miscellaneous securities. **The biggest portfolio shifts show the largest average % changes in moderate portfolios within the most used Morningstar categories from November 2022 to February 2023. The most used Morningstar categories is defined as those that appear with the greatest frequency in portfolio analysis. All information is shown for illustrative purposes only.
Guide to the Markets – U.S. Data are as of April 11, 2023.

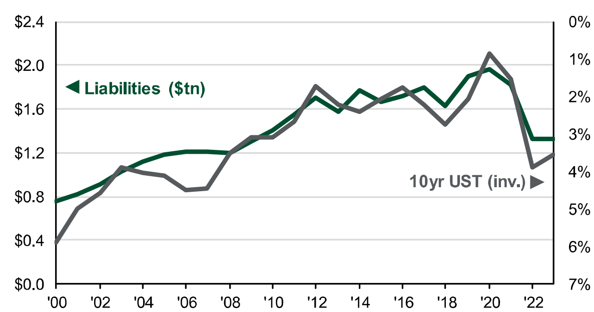
J.P.Morgan ASSET MANAGEMENT

Institutional investor behavior

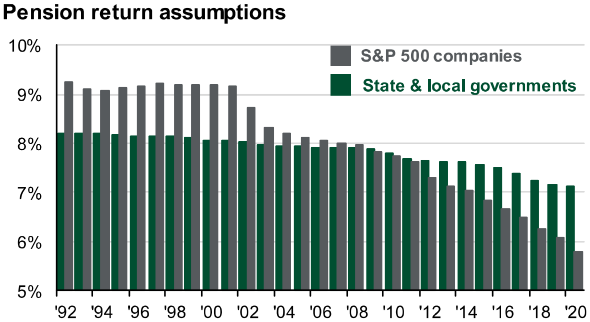
Asset allocation: Corporate DB plans vs. endowments



Corporate pension liabilities and 10-year UST yield



Pension return assumptions



Source: J.P. Morgan Asset Management; (Left) NACUBO (National Association of College and University Business Officers), Towers Watson; (Top right) Milliman Pension Funding Index; (Bottom right) Census for Governments, Compustat, FactSet, S&P 500 corporate 10-Ks. Endowment asset allocation is as of 2019. Corporate DB plan asset allocation as of 2018. Endowments represents dollar-weighted average data of 749 colleges and universities. Corporate DB plans represents aggregate asset as of 12/31/2020 for Fortune 1000 pension plans. Pension return assumptions based on all available and reported data from S&P 500 Index companies and are as of 12/31/2019. State and local pension return assumptions are weighted by plan size. Pension assets, liabilities and funded status based on Milliman 100 companies reporting pension data as of December 2022. All information is shown for illustrative purposes only.
Guide to the Markets – U.S. Data are as of April 11, 2023.

J.P.Morgan ASSET MANAGEMENT

J.P. Morgan Asset Management – Index definitions

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

Equities:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Fixed income:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

J.P.Morgan
ASSET MANAGEMENT

J.P. Morgan Asset Management – Definitions

Other asset classes:

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

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

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

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

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

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

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

Definitions:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

J.P.Morgan
ASSET MANAGEMENT

J.P. Morgan Asset Management – Risks & disclosures

The Market Insights program provides comprehensive data and commentary on global markets without reference to products. Designed as a tool to help clients understand the markets and support investment decision-making, the program explores the implications of current economic data and changing market conditions.

For the purposes of MiFID II, the JPM Market Insights and Portfolio Insights programs are marketing communications and are not in scope for any MiFID II / MiFIR requirements specifically related to investment research. Furthermore, the J.P. Morgan Asset Management Market Insights and Portfolio Insights programs, as non-independent research, have not been prepared in accordance with legal requirements designed to promote the independence of investment research, nor are they subject to any prohibition on dealing ahead of the dissemination of investment research.

This document is a general communication being provided for informational purposes only. It is educational in nature and not designed to be taken as advice or a recommendation for any specific investment product, strategy, plan feature or other purpose in any jurisdiction, nor is it a commitment from J.P. Morgan Asset Management or any of its subsidiaries to participate in any of the transactions mentioned herein. Any examples used are generic, hypothetical and for illustration purposes only. This material does not contain sufficient information to support an investment decision and it should not be relied upon by you in evaluating the merits of investing in any securities or products. In addition, users should make an independent assessment of the legal, regulatory, tax, credit, and accounting implications and determine, together with their own financial professional, if any investment mentioned herein is believed to be appropriate to their personal goals. Investors should ensure that they obtain all available relevant information before making any investment. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only, based on certain assumptions and current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of production, but no warranty of accuracy is given and no liability in respect of any error or omission is accepted. It should be noted that investment involves risks, the value of investments and the income from them may fluctuate in accordance with market conditions and taxation agreements and investors may not get back the full amount invested. Both past performance and yields are not reliable indicators of current and future results.

J.P. Morgan Asset Management is the brand for the asset management business of JPMorgan Chase & Co. and its affiliates worldwide.

To the extent permitted by applicable law, we may record telephone calls and monitor electronic communications to comply with our legal and regulatory obligations and internal policies. Personal data will be collected, stored and processed by J.P. Morgan Asset Management in accordance with our privacy policies at https://am.jpmorgan.com/global/privacy.

This communication is issued by the following entities:

In the United States, by J.P. Morgan Investment Management Inc. or J.P. Morgan Alternative Asset Management, Inc., both regulated by the Securities and Exchange Commission; in Latin America, for intended recipients' use only, by local J.P. Morgan entities, as the case may be. In Canada, for institutional clients' use only, by JPMorgan Asset Management (Canada) Inc., which is a registered Portfolio Manager and Exempt Market Dealer in all Canadian provinces and territories except the Yukon and is also registered as an Investment Fund Manager in British Columbia, Ontario, Quebec and Newfoundland and Labrador. In the United Kingdom, by JPMorgan Asset Management (UK) Limited, which is authorized and regulated by the Financial Conduct Authority; in other European jurisdictions, by JPMorgan Asset Management (Europe) S.à r.l. In Asia Pacific ("APAC"), by the following issuing entities and in the respective jurisdictions in which they are primarily regulated: JPMorgan Asset Management (Asia Pacific) Limited, or JPMorgan Funds (Asia) Limited, or JPMorgan Asset Management Real Assets (Asia) Limited, each of which is regulated by the Securities and Futures Commission of Hong Kong; JPMorgan Asset Management (Singapore) Limited (Co. Reg. No. 197601586K), this advertisement or publication has not been reviewed by the Monetary Authority of Singapore; JPMorgan Asset Management (Taiwan) Limited; JPMorgan Asset Management (Japan) Limited, which is a member of the Investment Trusts Association, Japan, the Japan Investment Advisers Association, Type II Financial Instruments Firms Association and the Japan Securities Dealers Association and is regulated by the Financial Services Agency (registration number "Kanto Local Finance Bureau (Financial Instruments Firm) No. 330"); in Australia, to wholesale clients only as defined in section 761A and 761G of the Corporations Act 2001 (Commonwealth), by JPMorgan Asset Management (Australia) Limited (ABN 55143832080) (AFSL 376919). For all other markets in APAC, to intended recipients only.

For U.S. only: If you are a person with a disability and need additional support in viewing the material, please call us at 1-800-343-1113 for assistance.

Prepared by: David P. Kelly, Jordan K. Jackson, David M. Lebovitz, John C. Manley, Meera Pandit, Gabriela D. Santos, Stephanie Aliaga, Sahil Gauba, Nimish Vyas, Mary Park Durham, and Brandon Hall.

Unless otherwise stated, all data are as of April 11, 2023 or most recently available.

Guide to the Markets – U.S.

JP-LITTLEBOOK | 0903c02a82565a44

J.P.Morgan
ASSET MANAGEMENT

9:30 – 10:40 a.m.

Asset Liability Management in Volatile Times

Marc Gall, *Vice President, BOK Financial Institutions Group*

FOR INSTITUTIONAL USE ONLY

Asset Liability Management in Volatile Times

WICPA / Financial Institutions Conference

May 2023

BOK FINANCIAL CAPITAL MARKETS

Marc Gall
Vice President
mgall@bokf.com / 866-440-6515

Disclosures

The opinions and estimates expressed herein reflect the judgment of the author(s) at this date, are subject to change without notice, and are not a complete analysis of any sector, industry, or security. BOK Financial Capital Markets and/or its affiliates, including, but not limited to, BOK Financial Securities, Inc. may make a market and / or trade as principal in securities, other financial products, and other asset classes that may be discussed in this communication. Certain information displayed herein was obtained from sources we believe to be reliable, but we are unable to offer any guarantees as to its accuracy or completeness. The content provided herein does not take into account individual client circumstances, objectives, or needs and does not constitute advice or a recommendation or offer to sell or a solicitation to deal in any security or financial product. It is provided for informational purposes only and on the understanding that the recipient has sufficient knowledge and experience to be able to understand and make their own evaluation of the proposals and services described herein, any risks associated therewith, and any related legal, tax, accounting, or other material considerations. Recipients should not rely on this material in making any future investment decision. To the extent that the reader has any questions regarding the applicability of any specific issues discussed above to their specific portfolio or situation, you are encouraged to consult with a qualified lawyer, accountant, or financial professional. This material may not be redistributed or retransmitted, in whole or in part, or in any form or manner, without the express written consent of the author(s).

Certain scenarios depicted in this presentation are hypothetical and do not represent the investment performance or actual accounts of any investors. Performance of these hypothetical scenarios should be considered hypothetical results. Hypothetical scenarios and results do not reflect actual trading or performance by an investor nor do they guarantee past or future investment results. Hypothetical scenarios and results are based on assumptions. Differences between the hypothetical assumptions and an actual investment may be material and substantially decrease the illustrative value or any hypothetical scenario or result.

Certain information displayed herein was obtained from sources we believe to be reliable, but we are unable to offer any guarantees as to its accuracy or completeness.

BOK Financial® is a trademark of BOKF, NA. Member FDIC. Bank dealer services offered through BOK Financial Capital Markets, which operates as a separately identifiable department of BOKF, NA. BOKF, NA is the bank subsidiary of BOK Financial Corporation. Investment products are:
NOT FDIC INSURED | NO BANK GUARANTEE | MAY LOSE VALUE

About BOK Financial

BOKFinancial.com/Institutions

BOKF, NA is the bank subsidiary of BOK Financial Corporation (BOKF), a $45 billion regional financial services holding company based in Tulsa, Oklahoma (NASDAQ:BOKF). BOKF offers trust and wealth management services through its subsidiaries including BOKF, NA (and its banking divisions Bank of Oklahoma, Bank of Texas, Bank of Albuquerque, and BOK Financial) and investment advisory services through its non-bank subsidiaries, Cavanal Hill Investment Management, Inc., and BOK Financial Private Wealth, Inc., each an SEC registered investment adviser, and BOK Financial Securities, Inc., also an SEC registered investment adviser and registered broker/dealer, member FINRA/SIPC.

BOK Financial Capital Markets is a separately identifiable department ("Bank Dealer") of BOKF, NA, the national banking subsidiary of BOK Financial. Our Financial Institutions Group, primarily based in Milwaukee, WI, specializes in financial institution management, assisting clients with a variety of services including:

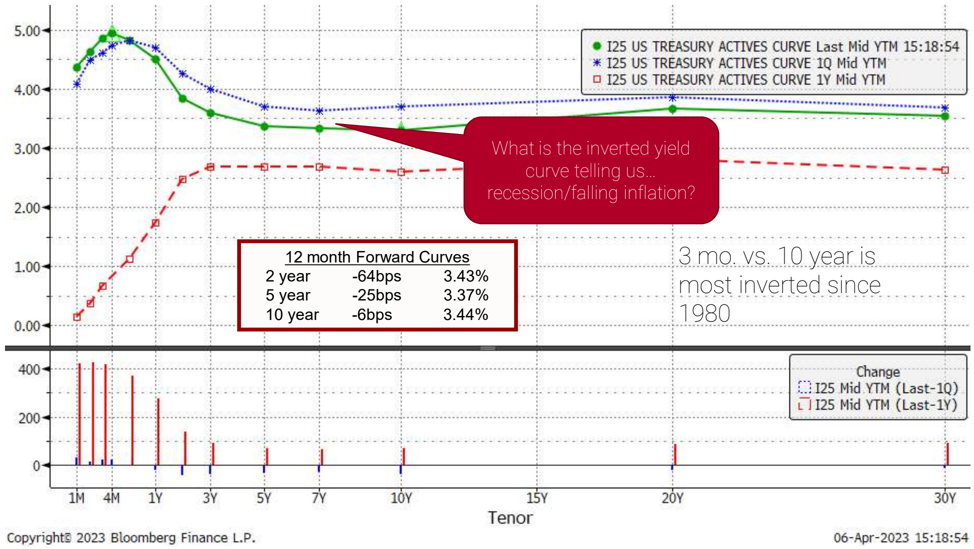
- Interest Rate Risk Management
- Independent Model Validations
- Deposit/Decay Studies
- Investment Portfolio Management
- Asset / Liability Management (ALCO) Consulting

Session topics

1. Current market and potential path of rates
2. IRR assumptions and interpreting current model results
3. Liquidity management, deposit trends and strategies for retention of core funding
4. Loan portfolio considerations
5. Securities portfolio – investment allocation, possible sales / restructuring

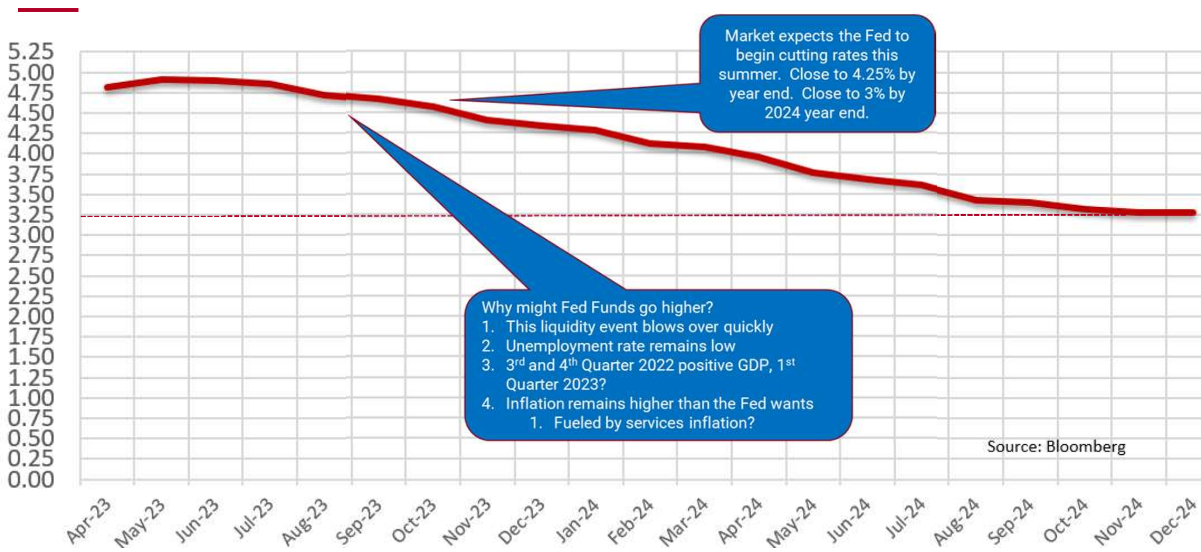
FOR INSTITUTIONAL USE ONLY

What is the yield curve telling us?



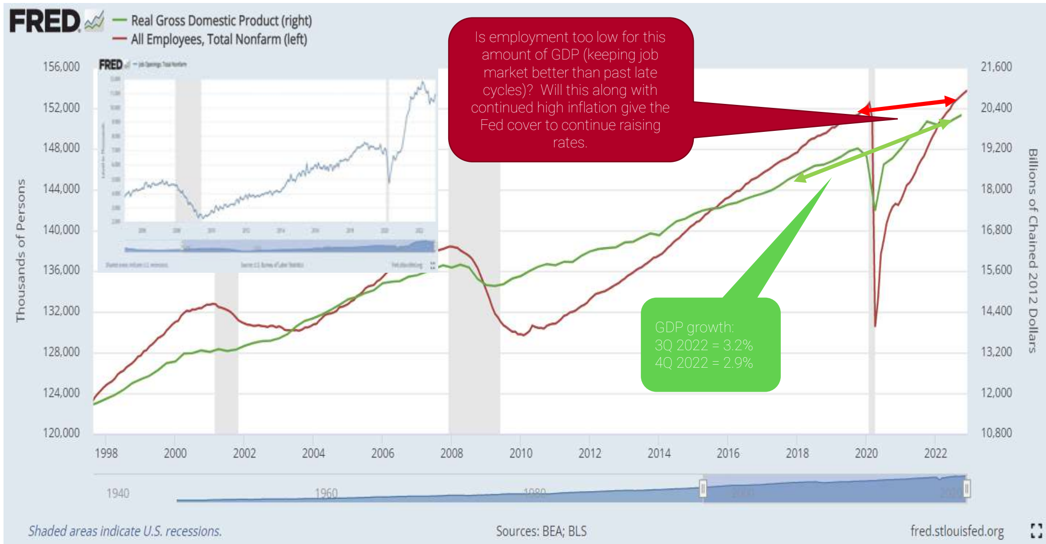
FOR INSTITUTIONAL USE ONLY

Fed funds outlook



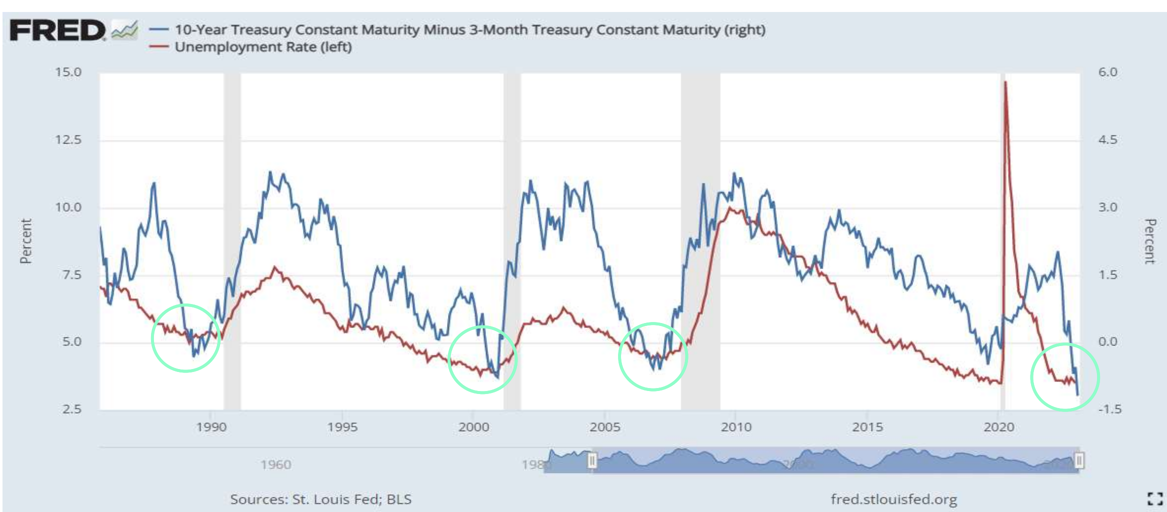
FOR INSTITUTIONAL USE ONLY

Why fed funds might go higher than 5%...



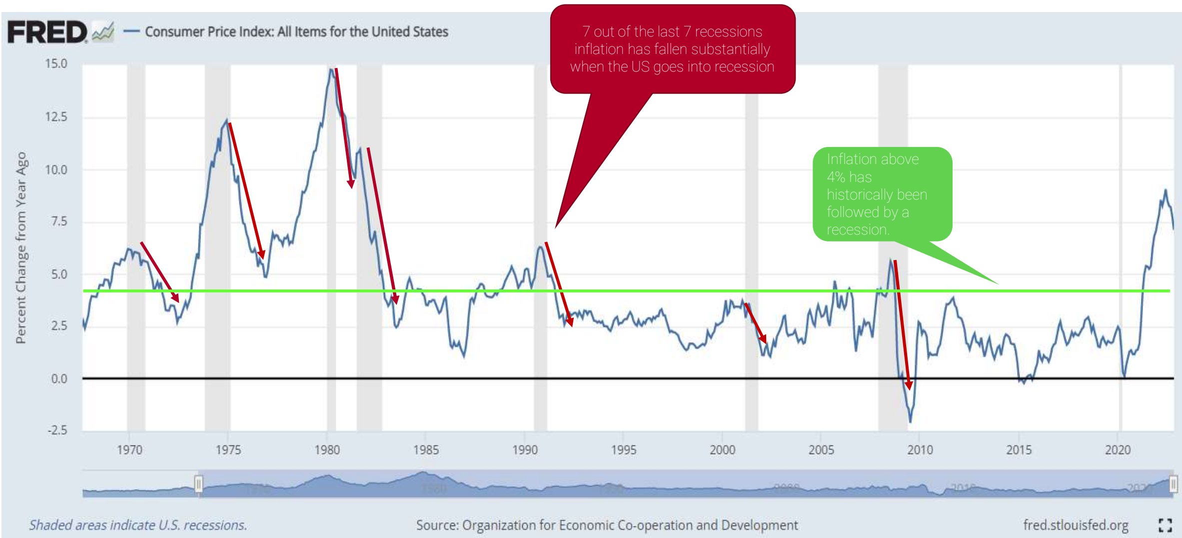
FOR INSTITUTIONAL USE ONLY

Why the yield curve might be correct...employment/inversion



FOR INSTITUTIONAL USE ONLY

Why the yield curve might be correct…inflation



FOR INSTITUTIONAL USE ONLY

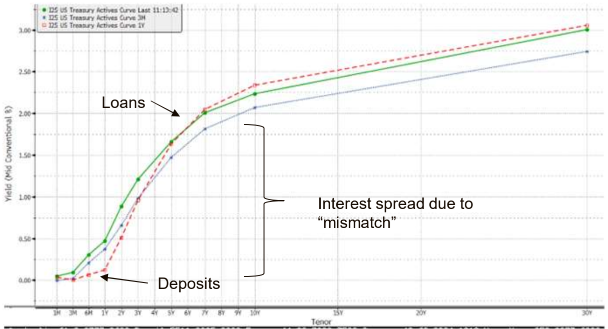
Current balance sheet issues

- Inverted yield curve
  - Margin pressure increasing
- Liquidity
  - Deposit retention/ growth
  - Insurance coverage / deposit safety concerns
- Loan portfolio
  - Credit quality, terms, and types of loans filling balance sheet
- Investment portfolio
  - Unrealized losses, need for funds

FOR INSTITUTIONAL USE ONLY

Interest rate risk

How and why does this occur on balance sheets?

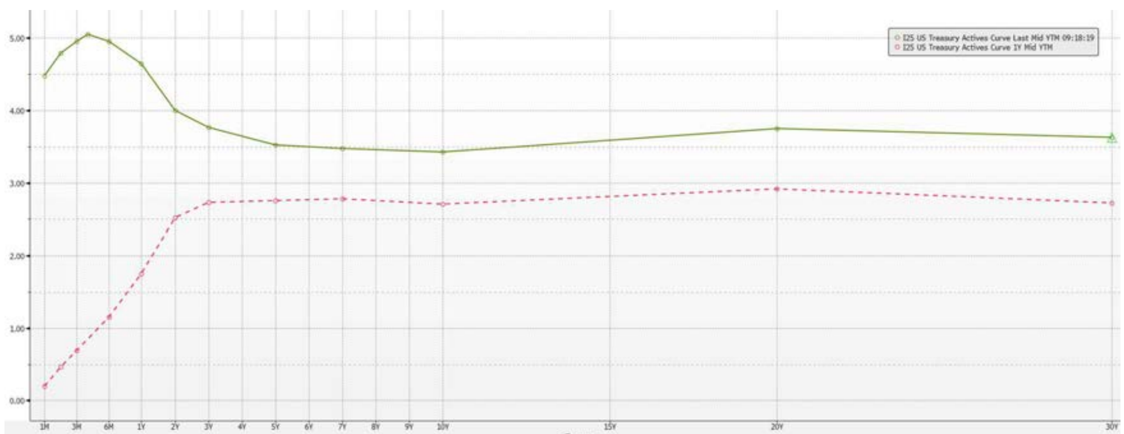


Hypothetical illustration

- Bank deposits are maturing or non-maturing
  - Retail depositors typically looking for 3 mo – 2 year maturities
  - Non-maturing deposit accounts can be withdrawn at any time
- Loans and Investments are generally termed out
  - Most demand in 3-5 year sector for fixed rate loans

FOR INSTITUTIONAL USE ONLY

Inverted curve eliminates mismatch spread



- 1 year ago, spread between 3 mo UST and 5 year UST was +2.07%
- As of 4/10/23, spread sits at -1.30%
  - Year over year spread change of -3.37%

FOR INSTITUTIONAL USE ONLY

Source: Bloomberg

Interest rate risk - assumption review

Deposit beta calculation, supporting data

Figure 1 – Example Rate Data

	2003 Q4	2004 Q1	2004 Q2	2004 Q3	2004 Q4	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3
Periodic Quarterly Average Deposit Cost												
NOW	0.62%	0.61%	0.61%	0.67%	0.75%	0.87%	1.00%	1.16%	1.32%	1.47%	1.61%	1.74%
Savings/MMDA Cost of Funds	1.53%	1.50%	1.48%	1.49%	1.49%	1.50%	2.00%	2.33%	2.55%	2.68%	3.10%	3.30%
Periodic Market Rate Indexes												
Federal Funds Rate	0.94%	1.05%	1.38%	1.94%	1.97%	2.96%	3.35%	3.93%	4.09%	5.00%	5.05%	5.34%
3-Month US Treasury Bill Yield	0.92%	0.94%	1.27%	1.71%	2.22%	2.77%	3.06%	3.53%	4.20%	4.62%	5.02%	4.95%

Analysis of the data in Figure 1 might produce results such as those displayed in Figure 2. In this example, the results indicate that interest rates on the bank's NOW and Savings/MMDA accounts are driven by changes in the federal funds rate and 3-month Treasury bill rate, with deposit betas in the range of 25 percent to 42 percent.

Figure 2 – Example Estimates of Deposit Betas

	Federal Funds Rate		3-Month US T-Bill		
Regression Analysis					Average Beta
	Beta	R-squared	Beta	R-squared	
NOW	0.251	95.04%	0.264	95.39%	0.257
Savings/MMDA	0.396	86.47%	0.415	86.42%	0.405

Example summary of results:

Jan 2016 - Jun 2019 (Rising Beta)	**Beta**
NOW Accounts	-0.01
HSA Checking	0.01
Money Market Accounts	0.43
Savings Accounts	0.07

Jul 2019 - Mar 2021 (Falling Beta)	**Beta**
NOW Accounts	0.02
HSA Checking	0.07
Money Market Accounts	0.52
Savings Accounts	0.14

FOR INSTITUTIONAL USE ONLY

Source: FDIC

Deposit betas

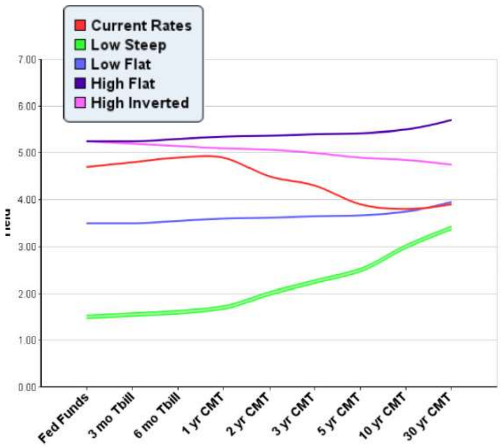
Other factors to consider?

- Review of deposit betas may not tell whole story
- Consider how to document/incorporate migration from low cost to higher cost accounts
- Did the institution experience runoff that was replaced with higher cost wholesale funding?
- Cost of funds review vs. FF could provide more context to deposit stability and rate sensitivity
- Consider updated bank specific decay analysis or review of overall duration of deposits

FOR INSTITUTIONAL USE ONLY

Non-parallel curve simulations

What could yield curve do from here?

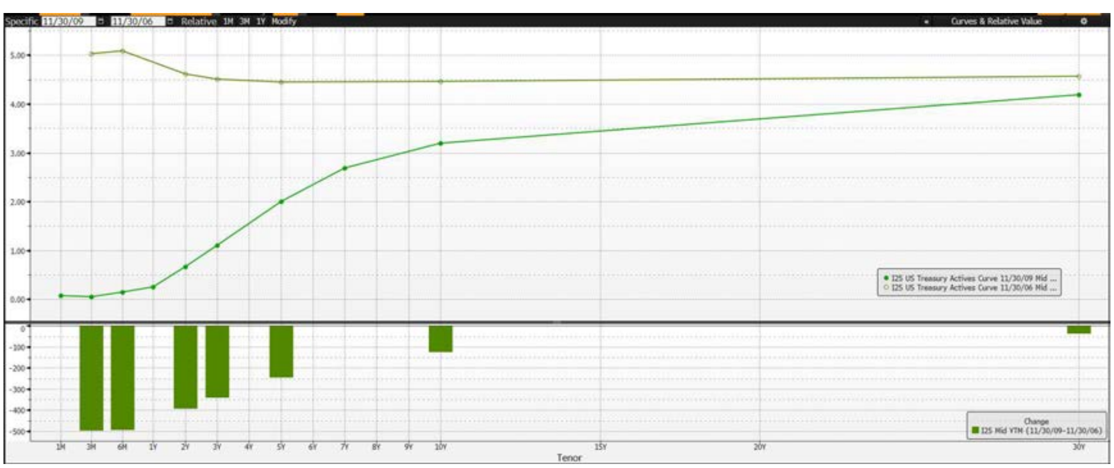


- While parallel +/- yield curve simulations are standard runs in IRR models, is an inverted yield curve likely to persist?

FOR INSTITUTIONAL USE ONLY

Historical reference

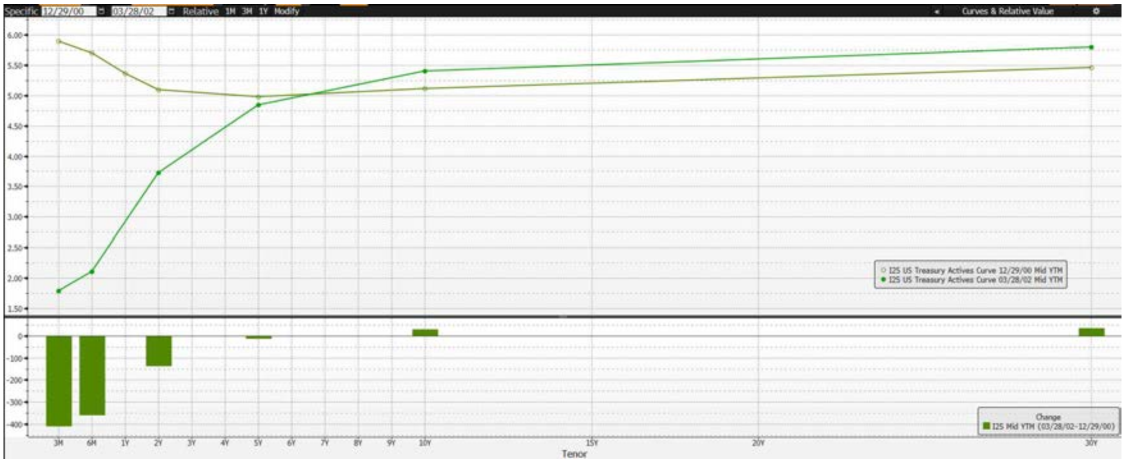
2006 vs. 2009



FOR INSTITUTIONAL USE ONLY

Historical reference

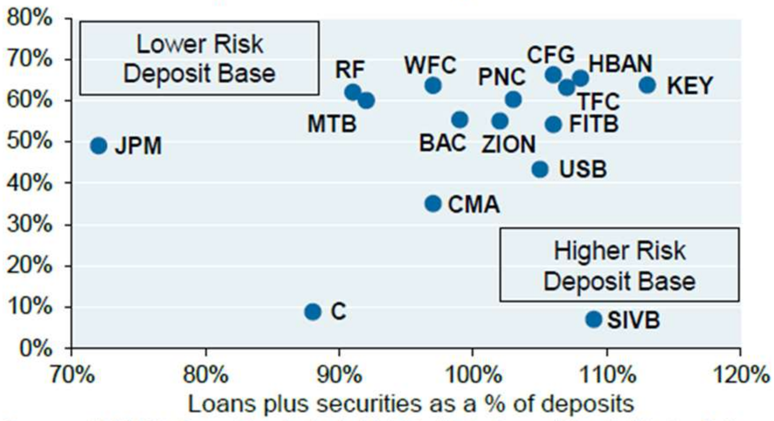
2000 vs. 2002



FOR INSTITUTIONAL USE ONLY

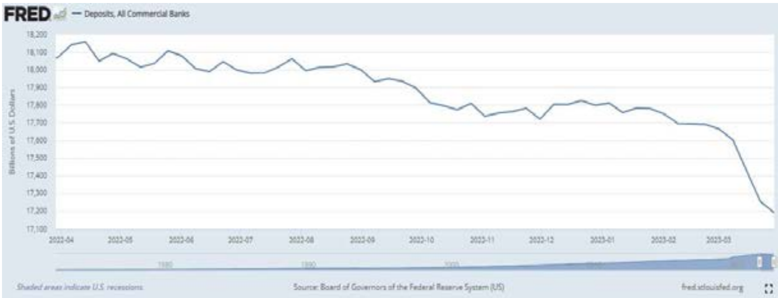
Liquidity risk – in focus

US bank loan-to-deposit ratios
Estimated retail deposit share of total deposits

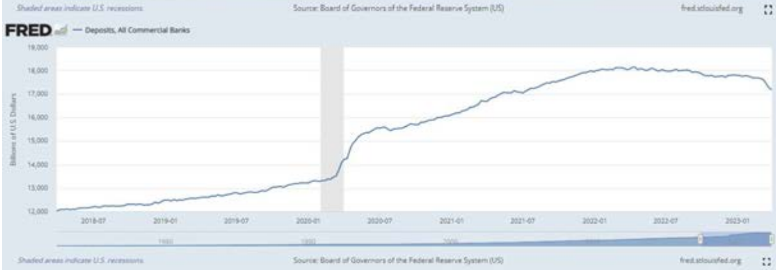


Source: JPMAM. Securities include Hold to Maturity and Available for Sale categories. Q3 2022.

Commercial bank deposits



One year trend



Five year trend

FOR INSTITUTIONAL USE ONLY

Liquidity management

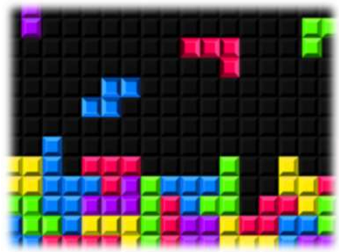
Action steps to consider in the current environment

- Communication with depositors – consider pros/cons of being proactive vs. reactive
- Evaluate backup liquidity/borrowing lines
  - Are loans pledged to Fed or FHLB for borrowing?
  - Securities could be used for Federal Reserve Bank Term Funding Program
    - Collateral value at par vs. market value
    - https://www.federalreserve.gov/newsevents/pressreleases/monetary20230312a.htm
  - If currently borrowing from FHLB/Fed/Fed funds, consider benefit to diversifying by using brokered CD market to leave other borrowing lines open
  - Consider adding additional backup sources, ex. Fed Discount Window
- Some institutions have used IntraFi / ICS network to manage large depositors looking for insurance

FOR INSTITUTIONAL USE ONLY

Maximizing collateral value

- Brokered / internet deposits – does not require collateral
- Municipal, large deposits – may require collateral, but some are not specific as to what type of collateral
  - Consider municipal securities for pledging, unless they can be used elsewhere
  - FHLB letter of credit for municipal deposits
- FHLB, Fed Discount Window may accept many types of loans as collateral (may take time to set up)
- Bank Term Funding Program (BTFP) accepts Fed eligible collateral and valued at 100% of par, without haircuts
  - [Bank Term Funding Program - Frequently Asked Questions (federalreserve.gov)]



Liquidity management

Action steps to consider in the current environment

- With yield curve falling, increasing credit spreads or tightening lending standards to balance need for earnings vs. need for liquidity
- Investment sales could be an option to raise cash
- Review loan offerings, particularly residential ARM products
  - Can any balance sheet loans be refinanced into secondary market?
  - Review pricing for possible increase in rate
    - Are these loans sticky or just "renting" space on your balance sheet?
- Complete liquidity stress testing more frequently or update a stale run given recent events

Deposit environment

What are we hearing from clients?

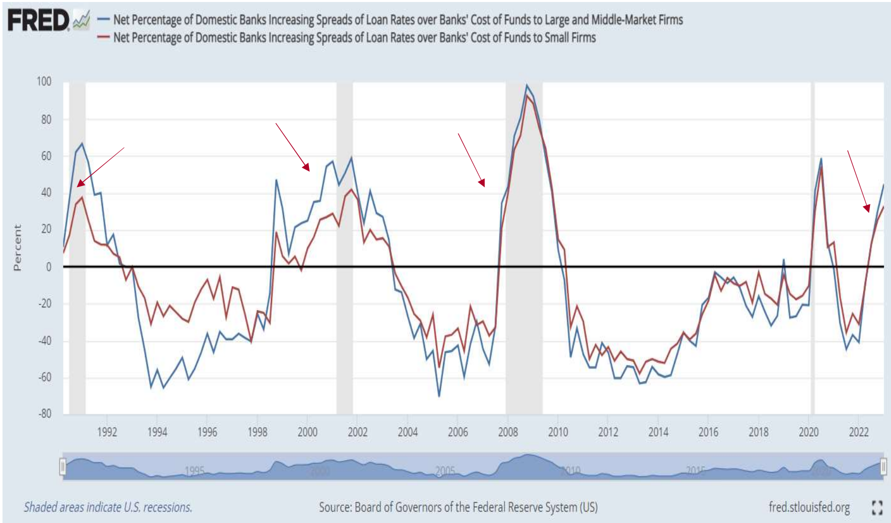
- Edward Jones / competition from brokers for CD balances
- Higher rate savings/ money market options from online banks/ money market mutual funds
- Some migration from DDA to IB accounts (more limited, so far)
- Migration from savings/money market into CDs
- Higher rate CD specials are less effective at gaining new balances vs. last year
- Customers paying penalty to refinance CDs

Discussion on deposit products

1. Review your deposit account lineup
2. Examine how customers use your accounts (what is the purpose/utility for each?)
3. Differentiate rate on account based on #2
4. Consider your cost to offer "free accounts"
5. Before raising rates on non-maturity account types, ask what are you trying to achieve?
    - If retention of balances, will the rate increase matter to a rate sensitive customer?
6. Will your institution selectively match rates (individually by customer?)
7. Begin to prepare strategies for falling rate environment

Net percentage of banks increasing credit spreads

- Fed's senior loan officer survey suggests banks are increasing credit spreads

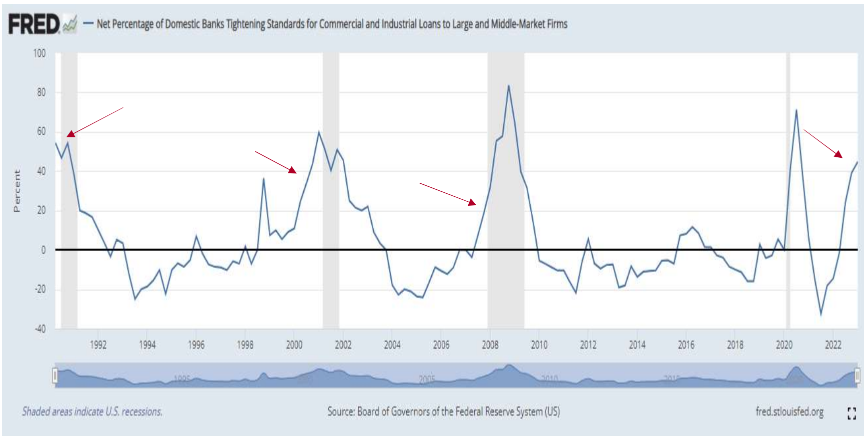


FOR INSTITUTIONAL USE ONLY

Source: Board of Governors of the Federal Reserve System (US)

Net percentage of banks tightening credit standards

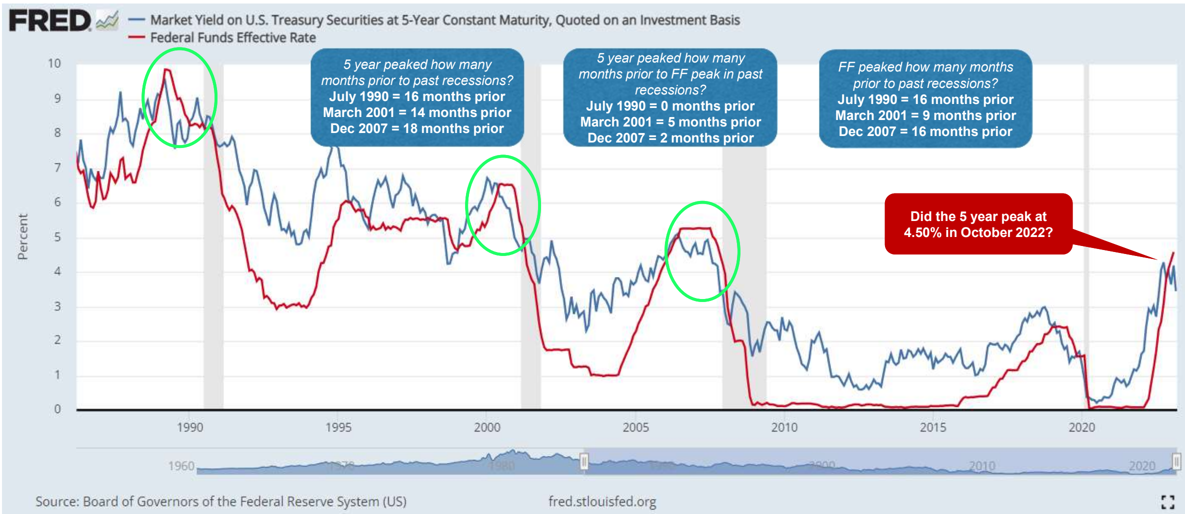
- Fed's senior loan officer survey suggests banks are increasing credit standards for C&I, CRE, and Multi-family
- Historically, tightening credit standards has had an impact on economic growth



FOR INSTITUTIONAL USE ONLY

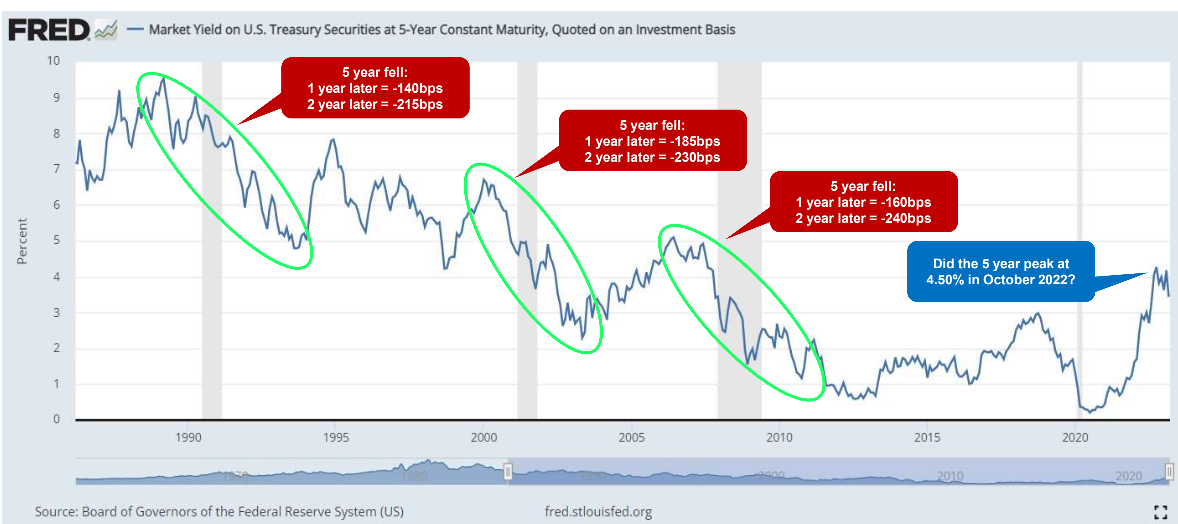
Source: Board of Governors of the Federal Reserve System (US)g

Late cycle peak in the 5 year treasury vs. FF vs. recessions



FOR INSTITUTIONAL USE ONLY

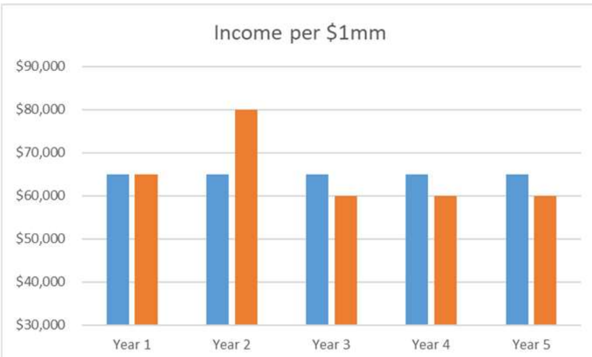
Late cycle peak in the 5 year treasury…what next?



FOR INSTITUTIONAL USE ONLY

Prepayment penalty in practice

- Does your institution enforce a prepayment penalty if refinanced at your institution?
- If your penalty is 2%, how much of an impediment to refinance is that?

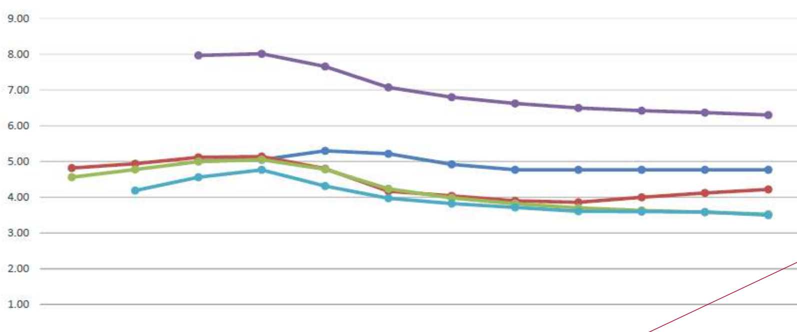


Hypothetical Example:

- Make a loan at 6.50%
- Solving for breakeven with a 2% penalty, after year 1…
- 2% penalty / 4 remaining years = 50 bps per year of savings to breakeven. (3%/4 years = 75 bps lower rate to breakeven)
- If customer can refinance at 6.00% or lower ***and*** the bank actually charges the 2% penalty ($20,000), the customer would be in the money to refinance

FOR INSTITUTIONAL USE ONLY

Pricing loans – inverted curve



	Overnight	1 month	3 month	6 month	1 year	2 year	3 year	4 year	5 year	6 year	7 year	10 year
Brokered CD			5.02	5.05	5.30	5.22	4.92	4.77	4.77	4.77	4.77	4.77
FHLB	4.82	4.94	5.12	5.14	4.80	4.17	4.04	3.90	3.86	4.00	4.12	4.22
LIBOR/Swap	4.56	4.78	5.00	5.05	4.78	4.24	3.98	3.82	3.70	3.63	3.58	3.53
Prime Swap			7.97	8.01	7.66	7.07	6.80	6.63	6.50	6.42	6.37	6.30
Treasuries		4.19	4.56	4.77	4.32	3.97	3.83	3.72	3.61	3.60	3.59	3.50
Duration		0.06	0.25	0.50	0.96	1.98	2.92	3.93	4.87	5.92	6.66	9.19
Fed Target	4.75											
Fed Effective Rate	4.75											
ICE IBA SOFR SWAP		4.75	4.83	4.75	4.47	3.96	3.67	3.48	3.35	3.27	3.22	3.17
Overnight SOFR	4.55											
SOFR Trailing 30-Day Avg	4.56											

Hypothetical example:

Price 5 year fixed rate loan at FHLB +275

- Current rate: 6.61%

Question: will your bank match fund the loan?

If loan does not have prepayment penalty and you lock in FHLB 5 year advance, what happens if loan refinances?

Given shape of yield curve, many are keeping wholesale funding shorter to hopefully reprice funding lower

Use FHLB 1 year to fund loan, now spread = +181 (assuming 6.61% loan rate)

FOR INSTITUTIONAL USE ONLY

Pricing Loans – Lack of prepayment penalties

Yield Matrix

	Treasuries	Agy Bullets	1yrnc Agy**	Brokered CDs	AA Corp
6M	1.55%	1.62%	-	1.55%	1.80%
1Y	1.52%	1.61%	-	1.60%	1.77%
2Y	1.58%	1.57%	1.62%	1.70%	1.72%
3Y	1.60%	1.59%	1.67%	1.80%	1.77%
4Y	1.62%	1.63%	1.75%	1.85%	1.86%
5Y	1.65%	1.69%	1.85%	1.95%	1.96%
7Y	1.76%	1.84%	2.15%	-	2.17%
10Y	1.85%	2.05%	2.55%	-	2.42%
15Y	1.96%	2.28%	2.90%	-	2.71%
20Y	2.08%	2.56%	3.00%	-	3.00%

Spread to Treasuries (bps)

	Treasuries	Agy Bullets	1yrnc Agy**	Brokered CDs	AA Corp
6M	-	7	-	0	25
1Y	-	10	-	8	25
2Y	-	-1	4	12	14
3Y	-	-1	7	20	18
4Y	-	0	13	23	24
5Y	-	4	20	30	[illegible]
7Y	-	7	38	-	[illegible]
10Y	-	20	70	-	[illegible]
15Y	-	32	94	-	74
20Y	-	48	92	-	92

January 13, 2020

*Tax-equivalent yields using 21% tax rate and 0bps TEFRA adjustment
**Yields & spreads calculated to Maturity
Yields are indicative and subject to change

Yield Matrix

	Treasuries	Agy Bullets	1yrnc Agy**	Brokered CDs	AA Corp
6M	4.76%	4.75%	-	5.05%	4.69%
1Y	4.31%	4.55%	-	5.25%	4.64%
2Y	3.98%	4.12%	5.00%	4.65%	4.45%
3Y	3.81%	3.89%	5.05%	4.75%	4.32%
4Y	3.70%	3.78%	5.10%	4.55%	4.26%
5Y	3.59%	3.72%	5.38%	4.25%	4.26%
7Y	3.56%	3.73%	5.70%	-	4.28%
10Y	3.49%	3.82%	5.93%	-	4.38%
15Y	3.67%	4.00%	6.05%	-	4.66%
20Y	3.84%	4.15%	6.30%	-	4.82%

Spread to Treasuries (bps)

	Treasuries	Agy Bullets	1yrnc Agy**	Brokered CDs	AA Corp
6M	-	-1	-	29	-6
1Y	-	24	-	94	33
[illegible]	[illegible]	15	103	67	48
[illegible]	[illegible]	8	124	94	51
4Y	-	8	140	85	57
5Y	-	13	179	66	67
7Y	-	16	214	-	72
10Y	-	33	244	-	90
15Y	-	34	238	-	99
20Y	-	31	246	-	98

March 20, 2023

*Tax-equivalent yields using 21% tax rate and 0bps TEFRA adjustment
**Yields & spreads calculated to Maturity
Yields are indicative and subject to change

Source: Bloomberg, BOKF

Hypothetical example:

Jan 2020 5 year loan priced at 5 year Treasury +300bps = 4.65%

Vs.

Mar 2023 5 year loan priced at 5 year Treasury +300bps = 6.59%

Are they equivalent spreads?

No, because the wholesale market spread for something refinanceable went from +20 to +179

FOR INSTITUTIONAL USE ONLY

Value of positive convexity in this rate environment…

What type of assets have banks booked now that rates are higher?

- Residential ARM loans that are very easily refinanced
  - If rates fall many will be refinanced into the secondary market and the community bank will be left to invest cash at lower rates
- Commercial Real Estate loans with typically weak prepayment penalties
  - If rates fall they can relatively easily be refinanced at lower rates or at a different institution
    - Leaving the institution with cash to invest in a lower rate environment or a lower yielding loan

What types of assets should you consider booking in this higher rate environment?

- Loans with make whole prepayment penalties or very strong prepayment penalties
  - Not typical for community banks
- Investments with more neutral to positive convexity
  - Treasuries, Agency Bullets, CMBS, Some SBAs, Munis, Some Discounted MBS

FOR INSTITUTIONAL USE ONLY

Role of the investment portfolio

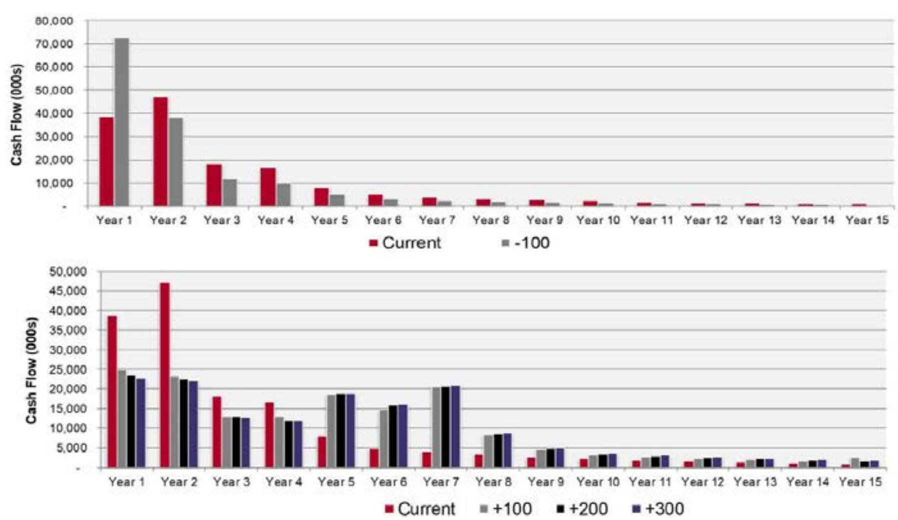
- Liquidity source
  - Place to earn on excess liquidity while waiting for loan demand to materialize
  - On – balance sheet store of liquidity
    - Unlike borrowing sources, bank's ability to use portfolio for funding is not contingent on the bank's credit position
  - When viewing portfolio within liquidity context, understand:
    - Cash flows
    - Extension/contraction risk

- Earning asset
  - Lower yield than loan portfolio, but higher liquidity and lower risk
  - View earnings/yield relative to holding cash vs. comparing to loan alternatives

- Other Benefits
  - Collateral for deposits or borrowing
  - Portfolio is a tool for managing interest rate risk

FOR INSTITUTIONAL USE ONLY

Add structure in portfolio – hypothetical example



- Callable agency securities have very wide spreads and high relative yields… Why?

- At the money mortgages offer higher yields and spreads as well… Why?

- If interest rates fall from here, limiting optionality in bond purchases will help lock in these higher yields

- When do you want to receive cash back?

FOR INSTITUTIONAL USE ONLY

Now what?

Hypothetical investment sale for funding

Analysis of current holdings

Bank owns $5 million of Treasury maturing Oct 2025

Current book yield = 1.44%

Book price = $103.98

Sell in the current market at $98.15

Sale yield/market yield/give up yield = 3.75%

Loss on sale: $291,500

Review of alternatives

2.5 year funding cost at FHLB (Chicago) = 4.07%

2.5 year brokered CD cost = 5.00%

Over next 2.5 years, the interest cost on new funding is more than expense of selling investment (loss + foregone income)

However, taking loss could be unappealing for budget reasons.

Year 1: Loss on sale $291,500

Year 1 interest cost on new CD: $250,000

FOR INSTITUTIONAL USE ONLY

Now what?

Hypothetical loan funding example

Sale option

Bank owns $5 million of Treasury maturing Oct 2025

Current book yield = 1.44%

Book price = $103.98

Sell in the current market at $98.15

Sale yield/market yield/give up yield = 3.75%

Loss on sale: $291,500

Reinvestment option

5 year loan = 7.00% reinvestment yield

Time to "recapture loss":

$$\frac{\$291{,}500 \text{ (loss on sale)}}{7.00\% \text{ (reinvestment yield)} - 1.44\% \text{ (book yield)} * \text{par value}}$$

= 1.04 years to recapture loss

FOR INSTITUTIONAL USE ONLY

Income management - 2023

- Liquidity / deposits are at a premium in current environment
- Discuss with management team how to manage through higher rates, but prepare for falling rates
  - What is risk to asset income change vs. potential expense savings?
- Are you reaching for income in 2023 by adding assets with optionality but may regret that if rates fall and assets reprice lower?

Interest rate risk checklist

1. Interest rate risk reporting with comparison to policy limits
   - Include 1 year and 2 year rate shock of income, EVE
   - *Is a non-parallel now most likely? Are our assumptions reasonable?*
2. Listing of key assumptions used in the model and supporting documentation
   - Pricing assumptions, deposit decay rates, prepayment assumptions
   - With the recent sharp rise in rates confirm and update assumptions
   - Need to be reviewed/approved by the board
3. Stress testing of key assumptions
   - How sensitive are model results to the assumptions used (input different assumptions and compare results)
4. Liquidity stress testing
   - Include sufficiently severe scenarios restricting use of brokered deposits, FF lines
   - Review contingency funding plan, including any early warning indicators
5. Independent Model Validation
   - Completed by a party independent of the ALCO meeting
   - Report with findings provided to the board

Key takeaways

- Review opportunities to lock in yield on assets while rates are high
- Be strategic with what "fills up" your balance sheet
- Monitor and discuss deposit trends regularly
- Examine deposit strategy for retention and cost of funds management
- Consider taking losses in the portfolio as a funding option or to reposition for higher income in 2023 and beyond
- Ensure completion and documentation of expected interest rate risk and liquidity management process

BOK FINANCIAL CAPITAL MARKETS

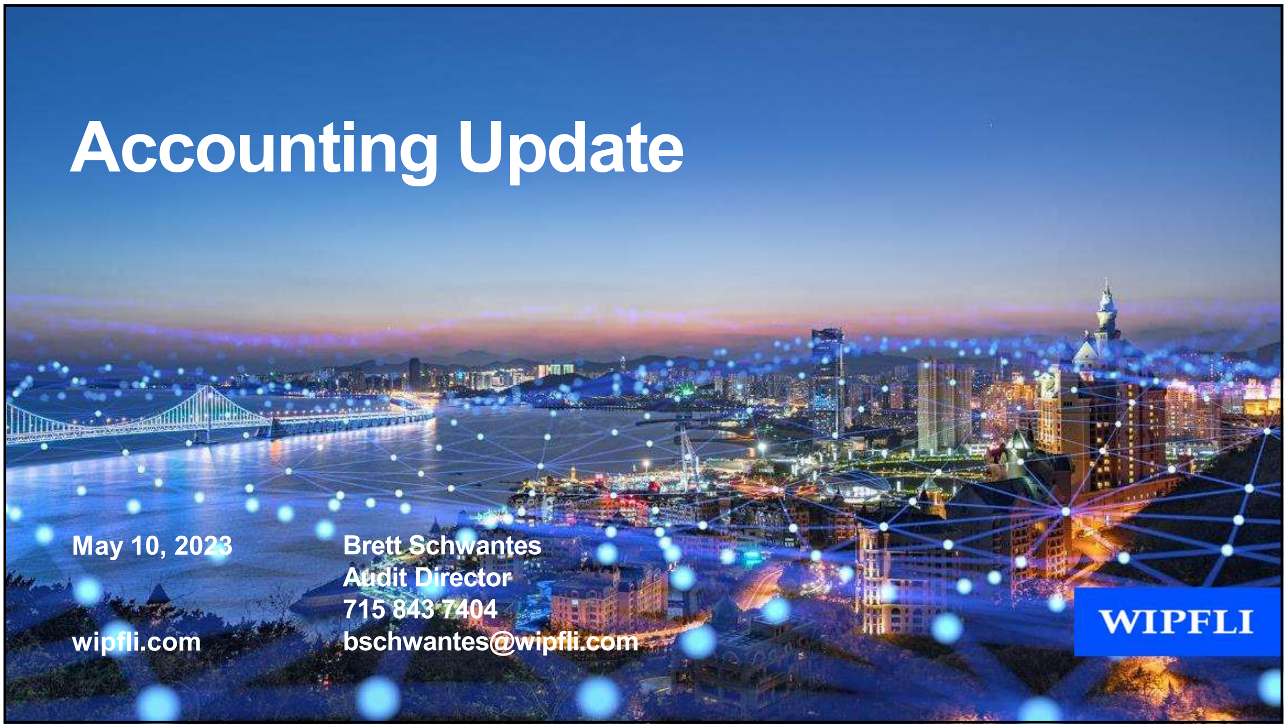
Marc Gall
Vice President
mgall@bokf.com / 866-440-6515

10:50 – 11:50 a.m.

Accounting & Tax Legislation Update

Brett Schwantes, *CPA, Senior Manager, Wipfli LLP*

Jessica Schwantes, *CPA, Partner, Wipfli LLP*



Overview

- CECL Adoption Considerations
- Troubled Loan Modifications
- Other Accounting Standards Updates
- Update on FASB Projects

CECL Overview

What is in scope for CECL?

What is in scope?

Financial assets measured at amortized cost basis

- Loans held for investment
- Debt securities held to maturity
- Receivables related to repurchase agreements and securities lending transactions in scope of Topic 860
- Certain lessor receivables
- Off-balance sheet exposures / unfunded commitments

What is not in scope?

Financial assets measured at fair value

- Loans held for sale
- Equity securities
- Debt securities available for sale
  - ASU 2016-13 modifies the OTTI model prescribed in legacy GAAP
- Other financial assets measured at fair value

CECL Adoption

Adoption Date Journal Entries

Non-PCD assets

- Adoption is as of the beginning of your institution's fiscal year (e.g., 1/1/2023)

- Dr Beginning retained earnings
- Dr Deferred taxes (if applicable)
- Cr Allowance for credit losses

Off balance sheet commitments

- Reserve on unfunded commitments is an other liability

- Dr Beginning retained earnings
- Dr Deferred taxes (if applicable)
- Cr Reserve for unfunded commitments

CECL Adoption

Adoption Date Journal Entries

PCD assets

- Accounted for on prospective basis through an adjustment for the addition of the allowance for credit losses on PCD loans upon adoption
- "Gross up" method that adds allowance for credit losses to purchase price to set a new amortized cost; no initial income statement impact

- Dr Loans (for acquired loan credit discount)
- Cr Allowance for credit losses

CECL Disclosures

What does not change with disclosure requirements under CECL?

The following disclosures do not significantly change:

- Loans by type
- Allowance rollforward by type
- Past due loans by type
- Nonaccrual loans by type
  - One small change – required to disclose nonaccruals with no recorded ALL
- Non-PBEs/SEC only – credit quality disclosures
  - More detailed disclosures are required for PBEs/SEC

CECL Disclosures

What changes with disclosure requirements under CECL?

Qualitative information about the CECL methodology(ies)

- Description of how expected loss estimates are developed and any changes
- Discussion of the reversion method applied

Impaired loans disclosures

- No longer disclosed because concept is removed under CECL
- Nonaccruals with no recorded ACL require disclosure

Collateral dependent loans

- Include description of type of collateral
- Qualitative description of the extent of the collateral
- Significant changes in collateral coverage

Certain accounting policies & elections re: accrued interest

CECL Disclosures

What changes with disclosure requirements under CECL?

PBEs/SEC only – credit quality disclosures

- Still include loans by risk rating (Pass, Special Mention, Watch, Substandard, Doubtful) and by loan type (commercial, consumer, etc)
- Now further disaggregates by loan origination year
- Credit quality disclosures do NOT change for non-PBEs/SEC

PBEs/SEC only – gross charge-offs (ASU 2022-02)

- Must disclose gross charge-offs YTD by loan type and loan origination year
- Effective for PBEs/SEC entities in reporting periods beginning after 12/15/22

PCD asset disclosures

- Previous PCI disclosures no longer applicable
- Reconciliation between purchase price and par value now required

ASU 2022-02

Troubled Debt Restructurings and Vintage Disclosures

Issued in March 2022

Eliminates TDR accounting model

- Effective for reporting periods beginning after 12/15/22
- All loan modifications now accounted for under general loan modifications guidance, including modifications made to borrowers experiencing financial difficult

New disclosure requirements for loan modifications

- Required only for modifications in the form of an interest-rate concession, principal forgiveness, other-than-insignificant payment delay, or term extension to borrowers experiencing financial difficulty

Transition Methods for Adoption of ASU 2022-02

Prospective Transition Method

For TDRs existing at the date of adoption:

- Continue to account for under legacy TDR accounting model
- ACL is determined using discounted cash flow approach

Modified Retrospective Transition Method

For TDRs existing at the date of adoption:

- Apply CECL model to determine ACL
- Difference, if any, between the legacy ALL and the CECL ACL is recorded as a cumulative effective adjustment to beginning retained earnings

ASU 2022-02

Example Disclosures

By class, types of modifications used, amortized cost basis, and %:

	Interest Rate Reduction		
	Amortized Cost Basis at 12/31/20X1		% of Total Class of Financing Receivable
Loan Type			
Real Estate—Commercial	$	40,000	2.0%
Real Estate—Residential		-	0.0
Consumer		10,000	0.2
Total	**$**	**50,000**	

ASU 2022-02

Example Disclosures

May have different combinations of modifications disclosed separately:

	Combination—Term Extension and Interest Rate Reduction		
	Amortized Cost Basis at 12/31/20X1		% of Total Class of Financing Receivable
Loan Type			
Real Estate—Commercial	$	-	0.0%
Real Estate—Residential		5,000	0.8
Consumer		-	0.0
Total	**$**	**5,000**	

ASU 2022-02

Example Disclosures

By class, the financial effect by type of modification:

Interest Rate Reduction	
Loan Type	**Financial Effect**
Real Estate—Commercial	Reduced weighted-average contractual interest rate from 6% to 3%.
Real Estate—Residential	Reduced weighted-average contractual interest rate from 8% to 5%.
Consumer	Reduced weighted-average contractual interest rate from 4% to 1.5%.

ASU 2022-02

Example Disclosures

By class, receivable performance in 12 months after modification date:

	Payment Status (Amortized Cost Basis)		
	Current	**30–89 Days Past Due**	**90+ Days Past Due**
Loan Type			
Real Estate—Commercial	$ 55,000	$ 3,500	$ 1,500
Real Estate—Residential	6,000	4,000	-
Consumer	29,000	1,500	1,500
Total	**$ 90,000**	**$ 9,000**	**$ 3,000**

ASU 2022-02

Other Disclosures

Other disclosure requirements:

- Loan modifications made to debtors experiencing financial difficulty:
  - By portfolio segment, qualitative information about how those modifications and the debtors' subsequent performance are factored into determining the allowance for credit losses
- Loan modifications with a payment default in the last 12 months:
  - By class, the type of contractual change that the modification provided
  - By class, the amount defaulted
  - By portfolio segment, qualitative information about how those defaults are factored into determining the allowance for credit losses

ASU 2023-02

PBEs: Years beginning after December 15, 2023

Non-PBEs: Years beginning after December 15, 2024

Early adoption is permitted

Accounting for Investments in Tax Credit Structures

- Permit entities to account for tax equity investments, regardless of the tax credit program, using the proportional amortization method if certain conditions are met
  - Would include traditional New Markets Tax Credit investments
  - May include other tax equity investments if they meet the criteria

Effective Dates

Standard	SEC filers	PBEs	Non PBEs
ASU 2016-13 *Measurement of Credit Losses on Financial Instruments*		**Years beginning after December 15, 2022**	**Years beginning after December 15, 2022**
ASU 2017-04 *Simplifying the Test for Goodwill Impairment*		**Years beginning after December 15, 2022**	**Years beginning after December 15, 2022**
ASU 2020-04 *Reference rate reform (and ASU 2022-06)*	**Contract changes from March 12, 2020 through 2024**	**Contract changes from March 12, 2020 through 2024**	**Contract changes from March 12, 2020 through 2024**
ASU 2020-06 *Accounting for Convertible Instruments and Contracts in an Entity's Own Equity*		Years beginning after December 15, 2023	Years beginning after December 15, 2023
ASU 2022-01 *Fair Value Hedging—Portfolio Value Method*	**Years beginning after December 15, 2022**	**Years beginning after December 15, 2022**	Years beginning after December 15, 2023

Effective Dates

Standard	SEC filers	PBEs	Non PBEs
ASU 2022-02 *Troubled Debt Restructurings and Vintage Disclosures*	**Years beginning after December 15, 2022**	**Years beginning after December 15, 2022**	**Years beginning after December 15, 2022**
ASU 2023-02 *Investments in Tax Credit Structures*	Years beginning after December 15, 2023	Years beginning after December 15, 2023	Years beginning after December 15, 2024

FASB Project

Acquired Loans

Existing GAAP

- Acquired loans (non-PCD) are measured at fair value
  - Fair value measurement includes a discount for credit losses
- After acquisition, must recognize allowance for credit losses
  - Charge to earnings (provision for loan losses)
- Drawbacks to this accounting method:
  - "Double counting" of credit losses
  - Skewed effective interest yields

FASB Project

Acquired Loans

Tentative Changes

- Acquired loans are measured at fair value
  - Fair value component related to discount for credit losses would be recognized as an allowance for credit losses
  - No charge to earnings would be necessary upon acquisition
- Drawbacks to this accounting method:
  - No recognition of credit losses in the income statement
  - Potentially skewed loan loss ratios
- Tentatively would only apply to "seasoned" loans
  - Would consider the acquirer's involvement with the loans
  - Bright-line period of 90 days
  - All loans that are part of a business combination

FASB Project

Digital Assets

Existing GAAP

- Most digital assets are considered intangible assets
  - Some digital assets may be considered financial assets (e.g., certain stablecoins)
- Accounting for intangible assets is at cost with recognition of impairment when a triggering event occurs
  - Results in a lower of cost or market treatment without any subsequent write ups if the market recovers

FASB Project

Digital Assets

Tentative Changes

- Crypto assets that meet the following criteria would be recognized at fair value with changes in fair value recognized in AOCI
  - Meet the definition of an intangible asset
  - Do not provide rights to underlying goods or services
  - Created or reside on a distributed ledger or "blockchain"
  - Secured through crypotography
  - Fungible

Contact Information

Brett Schwantes

Audit Director

bschwantes@wipfli.com
715 843 7404

wipfli.com