

Caution: Heavy Fog



You never realized how thick your fog was until it lifted.

– New York Times Bestselling Author J.R. Ward



Sharmin Mossavar-Rahmani
Chief Investment Officer
Investment Strategy Group
Goldman Sachs



Brett Nelson
Head of Tactical Asset Allocation
Investment Strategy Group
Goldman Sachs

The co-authors give special thanks to:



Matheus Dibo
Vice President



Rob Hunter
Vice President



Kelly Han
Vice President



Harm Zebregs
Vice President

Additional contributors from the
Investment Strategy Group:

Matthew Weir
Managing Director

Venkatesh Balasubramanian
Managing Director

Oussama Fatri
Managing Director

Nicola Gifford
Vice President

Arjun Menon
Vice President

Michael Murdoch
Vice President

Daniel Toro
Vice President

Fabian Mertes
Associate

Yousra Zerouali
Associate

Dear Clients,

To say 2022 was a tumultuous year is an understatement.

Equity markets, which had peaked in January, dropped precipitously in less than two months as investors reacted to higher inflation and Russia's invasion of Ukraine. Inflation in turn triggered the tightening of monetary policy. Central bank policy rates and interest rates across maturities rose at the fastest pace in decades, driving bond prices down by unprecedented amounts. Oil and natural gas prices gyrated as the Nord Stream 2 project was halted and other energy export sanctions were imposed on Russia. Financial markets were further roiled by growing global geopolitical tensions following the invasion of Ukraine but also aggressive posturing by China, including toward Taiwan.

This year is likely to be less tumultuous for markets. Inflation is already trending lower. Central banks are expected to continue to tighten, but not to the extent seen in 2022. As a result, bonds will come under less pressure. Oil and natural gas prices are less likely to gyrate.

Still, we face great uncertainty. The US Federal Reserve may overtighten monetary policy and create a recession in the United States. A recession in the world's largest economy would reverberate globally. The US Congress may repeat the mistakes of 2011 in failing to raise the debt limit in a timely and orderly manner. China's disorderly abandonment of its "zero-COVID" policy may unleash another wave of COVID-19 infections, including new variants, globally. The geopolitical outlook for 2023, too, is foggy and fraught with risk. There is no face-saving off-ramp for Russia from Ukraine. China is unlikely to reverse its assertive and aggressive posture. North Korea is expected to continue, even step up, its ballistic missile tests. Iran may proceed to enrich its uranium to weapons-grade levels, which could elicit a military response by Israel.

We proceed with caution.

We start with a careful review of the turmoil in financial markets last year because this backdrop is important in understanding the fog of uncertainty still facing investors.

Among financial assets, none were spared in 2022. US equities, as measured by the S&P 500, had a maximum drawdown of 25% and ended the year with a total return of -18% (in line with the bad case scenario, to which we had assigned a 15% probability in last year's *Outlook*). The basket of FANGMANT stocks (Facebook/Meta, Apple, Netflix, Google/Alphabet, Microsoft, Amazon, Nvidia and Tesla), with a maximum aggregate drawdown of 44%, were among the worst-performing stocks in the S&P 500. Facebook/Meta and Tesla did particularly poorly, experiencing maximum drawdowns of over 70%.

Outside the US, Russian equities had the largest drop, at 51%; China came next, at 45%; they were followed by Italy at 28% and Germany at 26%—all in local currency terms.

Also in 2022, bonds, which typically hedge portfolios against equity drawdowns by rising in value, nose-dived in response to a steady stream of rising inflation and interest rate hikes in the advanced economies. The maximum drawdown in the price of 10-year US Treasuries was 22%. It seldom happens that 10-year Treasuries—which have half the volatility of US equities—drop nearly as much as these equities.

The maximum drawdown of 10-year German bunds was 21%, and that of 10-year UK gilts, 26%. This drop in the price of 10-year UK gilts stood in sharp contrast to the 5% total return of UK equities, as measured by the FTSE 100. The latter's positive return was driven primarily by the energy sector and the metals and mining sector.

Shorter-term bond benchmarks declined less but declined nonetheless: the maximum drop was 11% for 1- to 10- year US Treasuries, 12% for 1- to 10-year German bunds and 15% for UK gilts.

Oil and natural gas were thrown into turmoil with the invasion of Ukraine, and energy security has been thrust back into the forefront after a long hiatus. West Texas Intermediate (WTI) oil prices rose 62% between January and June 2022, only to fall 42% to their subsequent trough in early December; for the year, WTI rose 7%. Similarly, Brent oil prices rose 59%, then fell 38%, ending the year up 10%. Natural gas prices were even more volatile, with the biggest moves seen in Europe, where prices shot up nearly fivefold by August before

descending as storage facilities filled up given a milder start to the winter season. For the year, prices were up 8%. Prices in Europe are still over five times as high as those in the US, where natural gas prices were also volatile last year but much less so than in Europe. US natural gas prices increased by a cumulative 160% to peak in August before dropping, and now stand 20% above their levels at the start of 2022.

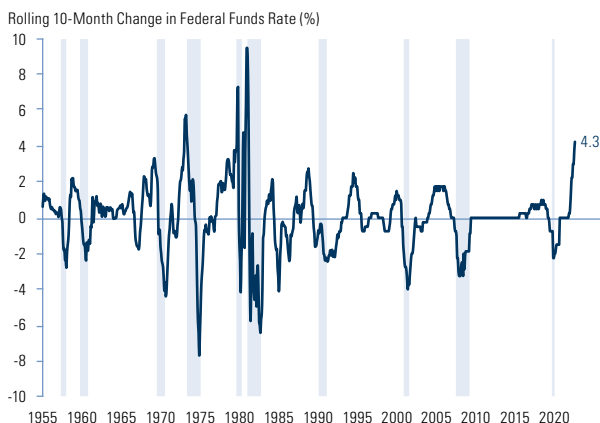
Global economic growth surprised to the downside; our forecast of 4.5% growth for 2022 made at the beginning of the year is now 3.0%, or 30% lower. US economic growth, forecast last year to be 3.9%, is now estimated to be 50% lower, at 2.0%.

The US Consumer Price Index (CPI) reached a peak of 9.1% in June 2022. Core CPI, which excludes food and energy prices, peaked at 6.6% in September 2022. The US Federal Reserve's preferred measure, the Personal Consumption Expenditures (PCE) price index, peaked at 7.0%, also in June, and the core PCE price index peaked at 5.4% in February. Eurozone and UK inflation rates likely peaked in October at 10.6% and 11.1%, respectively. We expect US inflation to decline to 3.7%, as measured by headline CPI, by the end of 2023.

In 2022, central banks raised rates at one of the fastest paces on record to combat inflation. As shown in Exhibit 1, such a pace has not been seen in the US since the early 1980s, when the country faced inflation that peaked at nearly 14.8% in March 1980. The pace has also never been seen in the history of the European Central Bank since its inception in 1998. Such a large and rapid increase in policy rates contributed to the turmoil in financial markets; we do not expect a repeat in 2023.

Exhibit 1: 10-Month Change in the Federal Funds Rate

The fast pace of Federal Reserve rate hikes in 2022 has not been seen since the early 1980s.



Data as of December 2022.

Note: Shaded periods denote recessions. Effective federal funds rate used before February 1994. Federal funds target rate used thereafter.

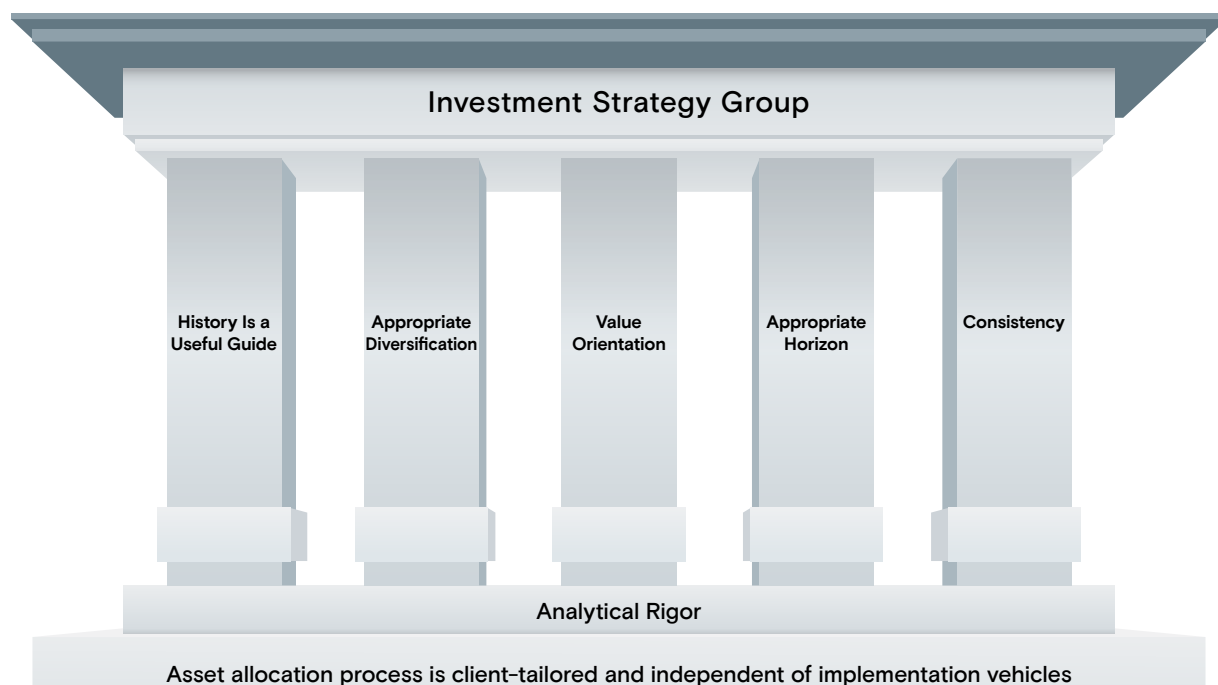
Source: Investment Strategy Group, Bloomberg, Haver Analytics.

Clients' portfolios experienced more volatility in 2022 than usual because equities and bonds declined at the same time in most markets. It is very rare to have equities and bonds drop over the same period in the US; since 1926, i.e., across 96 years of data, a decline in both equities and bonds over a rolling 12-month window has occurred only 5% of the time when using a 10-year benchmark for bonds, and only 2% of the time when using a 1- to 10-year benchmark.

60/40 Stock/Bond Model Portfolios

Notwithstanding such rarity, reports issued last year by several financial institutions challenged the 60/40 stock/bond model portfolios. Some recommended adding real assets such as commodities, infrastructure and real

Exhibit 2: Pillars of the Investment Strategy Group's Investment Philosophy



estate. Others recommended diversifying portfolios by allocating more assets to Asia ex-Japan. Still others recommended adding trading strategies, including hedge funds and momentum- and volatility-based strategies.

The proliferation of such recommendations prompted some of our clients to ask whether they should reevaluate their strategic asset allocation accordingly. Our response is twofold.

First, appropriate, customized diversification for both institutional and private wealth clients has been a key pillar of the Investment Strategy Group's (ISG's) investment philosophy since its inception more than 20 years ago in 2001 (see Exhibit 2). Such diversification around a core holding of equities and bonds already includes asset classes and investment strategies that enhance risk/return to preserve and then maximize risk-adjusted wealth, especially at times of heightened uncertainty.

Second, nearly a hundred years of data demonstrates that a mixture of stocks and bonds is an effective starting point for a portfolio, consistent with another pillar of ISG's investment philosophy that history is a useful guide. The 60/40 portfolio has generated positive returns on a rolling 12-month basis 80% of the time since 1926.

Geopolitical Tumult

On the geopolitical front, the warning of the late Ash Carter, former US secretary of defense, was realized. We regularly consulted with him on geopolitical issues, and as was outlined in our 2022 *Outlook: Piloting Through*, he had asserted that the Russian threat to Ukraine was “the most dangerous, dire, and imminent of all the geopolitical risks.”¹ So far, the Russia-Ukraine war has led to:

- About 100,000 casualties on each side, according to General Mark Milley, chairman of the US Joint Chiefs of Staff²
- The exodus of 7.8 million Ukrainian refugees to other countries, particularly in Europe, and another 6.5 million displaced from their homes within Ukraine³

-
- Over \$100 billion in global military, financial and humanitarian aid to Ukraine (about half from the US), with at least another \$45 billion expected in 2023⁴
 - A World Bank estimate of \$525 billion–\$630 billion of reconstruction in Ukraine as of December⁵

The war has also led to further deterioration in US-China relations, especially when coupled with the joint China-Russia statement on February 4, 2022, that the “friendship between the two States has no limits.”⁶ The US and its allies have been changing their national security strategies toward China and imposing import and export controls on a wide variety of products.

Turmoil in financial markets coupled with heightened geopolitical risks has raised the risks, though not the certainty, of a recession. Historically, rapid and extensive tightening by the Federal Reserve has led to recession in the US. Many economists expect it. Bill Dudley, who served as president and CEO of the Federal Reserve Bank of New York, vice chair of the Federal Reserve Open Market Committee (FOMC) and Goldman Sachs partner, assigns a 70% probability to a US recession in 2023—one of the highest probability forecasts in the industry.

At the other extreme, Jan Hatzius, currently Goldman Sachs’ chief economist and head of Global Investment Research, assigns a 35% probability to a US recession—one of the lowest in the industry. Incidentally, Dudley and Hatzius developed the Goldman Sachs Financial Conditions Index while they worked together at Goldman Sachs. The index measures the impact of Federal Reserve policy on the economy through the impact on the financial markets, specifically on short- and intermediate-maturity interest rates, equity markets, incremental yield of corporate bonds and the value of the trade-weighted dollar relative to other currencies. The wide difference between the forecasts of these two former colleagues is mirrored across the economic forecasting community.

Notably, in his latest press conference, on December 14, 2022, Jerome H. Powell, chair of the Federal Reserve, said “I don’t think anyone knows whether we’re going to have a recession or not ... It’s just not knowable.”⁷

Similarly, a week later, Lawrence H. Summers, Harvard University professor and former US Treasury secretary, wrote that “there is no basis for confident economic prediction. Some of the most stridently made arguments are also the silliest.”⁸

When Chair Powell says that “it’s just not knowable,” we take heed; we assign a range of 45–55% to the probability of a US recession in 2023. To provide context: over the last decade, the highest probability we assigned to a recession was 30%. That was in our 2012 *Outlook*, after the European sovereign debt crisis; the next-highest probability was 20–25%, in our 2020 *Outlook*.

Today, many leading indicators are pointing in opposite directions, and we believe it is important to convey this uncertainty to our clients unequivocally. In this uncertain environment, we believe portfolios should not be positioned for the certainty of recession nor for the certainty of modest economic growth. Instead, we recommend portfolios be positioned at their customized strategic asset allocation, where they are designed to ride out volatility and provide staying power in the event of geopolitical disruptions.

If a recession is averted, financial market returns in 2023 will be less volatile than in 2022; we expect a moderate-risk diversified portfolio of stocks and bonds to provide a total return of 9.0% for taxable clients and 9.8% for tax-exempt clients.

If a recession occurs early in the year, corporate earnings and equities will decline—possibly beyond the maximum drawdown of 2022—but bonds will hedge the portfolio by increasing in value, because the starting point of interest rates is much higher than it was at the beginning of 2022. However, by the end of 2023, as the recession recedes and the fog of uncertainty lifts, the equity market will most likely rally. We would expect high-single-digit returns for a moderate-risk diversified portfolio. If the recession lasts beyond year-end, the equity market will most likely end the year near the lows we saw in 2022, providing a total return of negative 4.4% from year-end 2022 and resulting in a low- to mid-single-digit negative return for a moderate-risk portfolio.

Facing the fog of uncertainty in financial markets, economic growth and geopolitics, we will on our side:

-
- Watch diligently for hazards and, if appropriate, pull into a safe location and wait for the fog to clear.
 - Use our fog lights to search for tactical strategies that can take advantage of market volatility as opportunities present themselves.

On our clients' side, we recommend that you:

- Avoid unnecessary lane changes; stay invested at your customized strategic asset allocation.
- Allow extra time to reach your destination, as US equity markets will resume their historical upward trajectory.

In Section I, we provide the rationale for assigning a 45–55% probability to the risk of a US recession in 2023. We compare this tightening cycle to past tightening cycles and explain that although a recession is possible, it is not inevitable. We explain why staying invested in such an uncertain environment is our recommended course of action. In a March 2009 *Sunday Night Insight* titled *Near-Term Pain, Long-Term Gain*, we quoted the highly respected investor Seth Klarman of Baupost, who wrote: “To maintain a truly long-term view, investors must be willing to experience significant short-term losses; without the possibility of near-term pain, there can be no long-term gain. The ability to remain an investor (and not become a day-trader or a bystander) confers an almost unprecedented advantage in this environment.”⁹

Next, we spell out our one- and five-year expected returns and review our opportunistic tactical tilts coming into 2023. We currently have the lowest level of risk allocated to tactical tilts of the last decade.

We conclude Section I with the key risks to our outlook beyond the recession risks, primarily focused on geopolitical flare-ups and possible new COVID-19 waves originating from China.

In Section II, we provide a detailed review of our economic outlook for key developed and emerging market countries. Section III details our financial market outlook for these countries.

We present our annual *Outlook* and our investment recommendations with a strong dose of humility, notwithstanding the considerable research that underpins these reports, including consultation with leading experts. As always, these and other insights and recommendations are based on rigorous analysis of a wealth of data which we share with our clients.

We also take this opportunity to wish you a healthy, happy, prosperous and calm 2023.

The Investment Strategy Group

Contents



SECTION I

12 Assessing the Risk of a US Recession

We have assigned a probability range of 45–55% to the risk of a US recession in 2023.

13 Key Arguments in Favor of a US Recession

17 Key Arguments Against US Recession

- 17 Balanced Economy
- 18 Shorter Lag of Policy Tightening
- 19 Declining Inflation
- 19 Less Tightening Than Expected

21 60/40 Stock/Bond Portfolios

- 22 Frequency of Negative Returns in Stocks and Bonds
- 23 The Last Decade Does Not Imply a Lost Decade
- 24 Diversified Model Portfolios Built Upon a Reference Portfolio of Stocks and Bonds

26 Our One- and Five-Year Expected Total Returns

32 Our Tactical Tilts

42 Additional Risks to Our Outlook

48 Key Takeaways

While we are facing a period of heightened uncertainty after a tumultuous 2022, we believe our two primary investment themes remain valid: US Preeminence and Staying Invested.



SECTION II: A DIFFICULT BALANCING ACT

50 2023 Global Economic Outlook

Risks of a misstep remain, but global growth should keep its stride this year.

- 52 **United States**
- 58 **Eurozone**
- 59 **United Kingdom**
- 60 **Japan**
- 61 **Emerging Markets**



SECTION III: LOOKING FOR TRACTION

66 2023 Financial Markets Outlook

After hitting an icy patch last year, we see financial markets regaining traction in 2023.

- 68 **US Equities**
- 74 **Non-US Developed Market Equities**
- 74 **Eurozone Equities**
- 75 **UK Equities**
- 76 **Japanese Equities**
- 77 **Emerging Market Equities**
- 78 **Global Currencies**
- 83 **Global Fixed Income**
- 94 **Global Commodities**

Assessing the Risk of a US Recession

WE HAVE ASSIGNED A PROBABILITY RANGE of 45–55% to the risk of a US recession in 2023. A midpoint of 50% and a 10-percentage-point range reflect the uncertainty of our forecast. A recession is not our base case, and our investment recommendations are based on this 45–55% probability. Since we at ISG started publishing recession probabilities, we have been quite unequivocal about our forecasts. As shown in

Exhibit 3: ISG US Recession Probabilities Since 2012

Prior to 2023, our recession probabilities for the US have ranged from 10% to 30%.



Data as of December 31, 2022.

Source: Investment Strategy Group.

* The ISG *Outlook* reports in 2015 and 2016 included descriptive assessments of recession probabilities ("few signs of recession" (2015) and "low probability" (2016)).

Exhibit 3, our probabilities have ranged from a low of 10% to a high of 30%. Our recession probability for 2022 was 10%. Since the global financial crisis (GFC), we have never forecast a recession, and except for the brief pandemic-induced recession, the US economy has not experienced one since then. When we have felt more uncertainty about our probabilities, we have used a five-percentage-point range, as we did in our 2019 and 2020 *Outlook* reports. A midpoint of 50% and a 10-percentage-point range, therefore, is unusual for us.

We have evaluated all our recession forecasting models, sought the input of best-in-class economists, and concluded that the tools and analyses that favor a recession in 2023 are as convincing as those that do not. We also have a wider probability range than usual because it has given us flexibility to adjust to incoming data. For example, favorable economic data such as declining inflation or declining job openings prompts us to lean toward the low end of our range, while less favorable data that points to an overheated economy and more aggressive Federal Reserve tightening prompts us to lean toward the high end of the range.

Despite finding ourselves in this difficult position, we are reassured by two observations.

First and foremost are Chair Powell's comments, noted earlier, indicating that

it is just not knowable at this point whether we will have a recession or not. He also mentioned that FOMC decisions will "depend on the totality of incoming data" and decisions will be made "meeting by meeting."¹⁰ As the FOMC members react to incoming data, their responses will increase or decrease the risks of recession.

Second is Canadian-American economist John Kenneth Galbraith's comment, "One of the greatest pieces of economic wisdom is to know what you do not know."

We have also incorporated additional noneconomic risks into our recession forecast. They include a new wave of COVID-19 spreading around the world as a result of China's reopening, heightened geopolitical risks emanating from Russia and debt ceiling negotiations in the US sometime in the second half of 2023. While each of these risks individually may not throw a well-balanced economy into recession, two or more in conjunction with continued Federal Reserve tightening of monetary policy are likely to do so. We review those risks later in this report.

Key Arguments in Favor of a US Recession

The most compelling and most frequently cited rationale for predicting a recession in 2023 is the speed of tightening conducted by the Federal Reserve and the subsequent tightening of financial conditions. As the Federal Reserve tightens monetary policy by raising the federal funds rate and reducing the size of its balance sheet, financial conditions are tightened as:

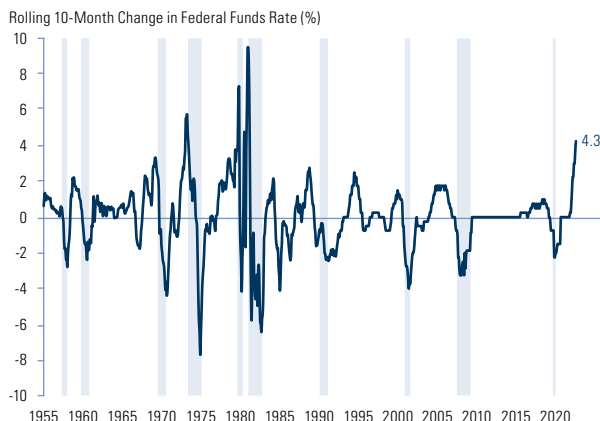
- Interest rates rise across the Treasury yield curve.
- The incremental cost of borrowing across businesses and households increases.
- Equity markets decline, creating a negative wealth effect in which consumers reduce consumption as they become less wealthy.

One of the greatest pieces of economic wisdom is to know what you do not know.

– John Kenneth Galbraith

Exhibit 4: 10-Month Change in the Federal Funds Rate

The fast pace of Federal Reserve rate hikes in 2022 has not been seen since the early 1980s.



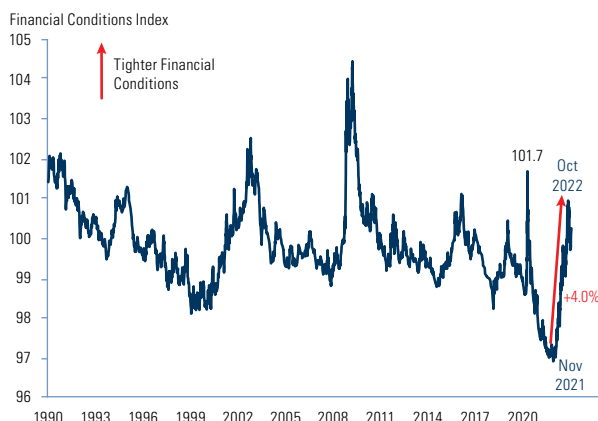
Data as of December 2022.

Note: Shaded periods denote recessions. Effective federal funds rate used before February 1994. Federal funds target rate used thereafter.

Source: Investment Strategy Group, Bloomberg, Haver Analytics.

Exhibit 5: Goldman Sachs US Financial Conditions Index

Financial conditions tightened by 4% between November 2021 and October 2022.



Data as of December 31, 2022.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research.

- The dollar appreciates relative to other currencies, lowering exports as the cost of US goods rises for non-US-dollar importers.

As we discussed in last year's *Outlook* report, *Piloting Through*, not every Federal Reserve hiking cycle and subsequent tightening of financial conditions has resulted in a recession. Of 15 hiking cycles in the post-WWII period, only nine, or 60% of the cycles, did so. The cycles that led to recessions can be differentiated from those that did not by some combination of the magnitude of tightening and the pace of tightening.

As shown in Exhibit 4, the magnitude of policy tightening over the past 10 months has been the greatest and the pace has been the fastest on record since the stagflation of the 1970s and early 1980s. That period was marked by a ninefold increase in the price of oil from about \$4 per barrel before the Arab oil embargo to about \$40 per barrel after the Iranian Revolution and Iran-Iraq War. CPI reached 14.8% in March 1980, and core CPI reached 13.6% in June of the same year.¹¹ In the current cycle, CPI peaked at 9.1%; core CPI peaked at 6.6%.

The tightening of financial conditions was equally severe in 2022. As shown in Exhibit 5, from its trough in November 2021, the Goldman Sachs US Financial Conditions Index increased by more than four percentage points. This was the biggest tightening in 11 months since the GFC. It

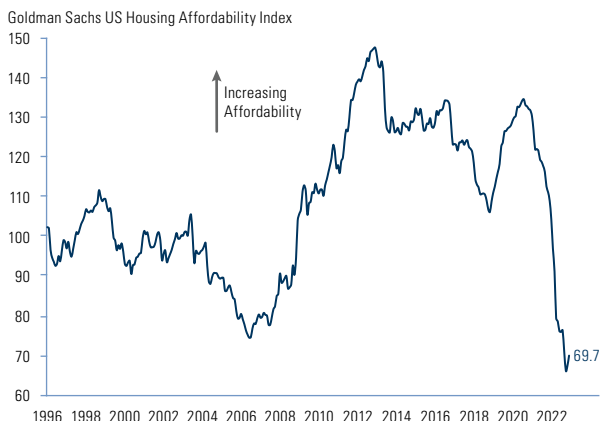
was driven by the rapid increase in interest rates, the increase in the incremental yield (also known as the spread) in corporate bonds, the drop in equity prices and the large appreciation of the dollar. The best example of the impact of tighter financial conditions is the change in residential mortgage rates. Mortgage rates increased from 3.11% at the beginning of the year to a peak of 7.08% in late October, reflecting the combined impact of an increase in Treasury interest rates and an increase in spreads. Such high mortgage rates lowered homeownership affordability to levels below those of the GFC (see Exhibit 6). A decline in home prices, as measured by the Case-Shiller national home price index, followed, as shown in Exhibit 7.

As we noted earlier, history is a useful guide. It shows that since WWII, such significant tightening in a short time has always led to a recession. History, however, is less helpful in telling us when a recession might unfold. The number of months from when a hiking cycle has begun to when a recession has begun has ranged from 11 to 43, with an average of 30 months and a median of 31.

The tightening in this cycle started in March 2022. Taking the historical experience at face value, that start date implies a recession could start as early as the first quarter of 2023 or as late as the fourth quarter of 2025. With such a wide range of potential recession start dates—and the fact that the historical average and median

Exhibit 6: Goldman Sachs US Housing Affordability Index

Homeownership affordability currently stands at levels below those of the GFC.

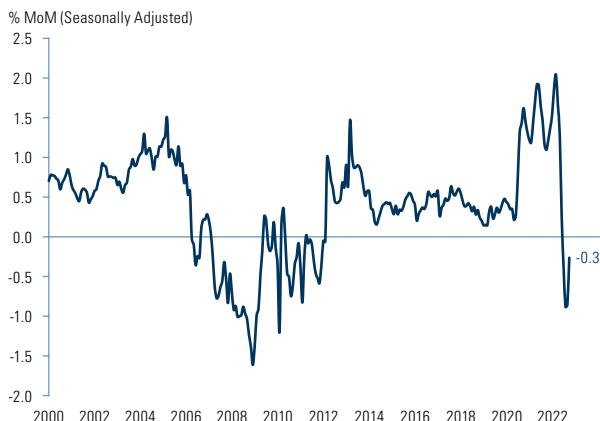


Data through December 2022.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research.

Exhibit 7: S&P CoreLogic Case-Shiller Home Price Index

Home price growth has slowed significantly.



Data through October 2022.

Source: Investment Strategy Group, Haver Analytics.

would imply a recession does not begin until sometime later in 2024—we recommend clients stay invested.

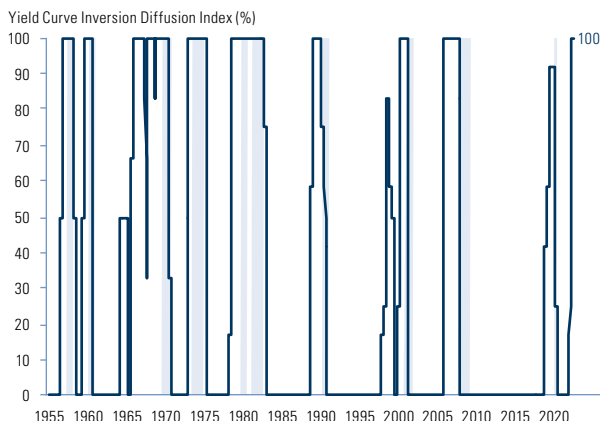
As we will discuss later in this section, our one- and five-year expected returns result in attractive portfolio returns. It is also not prudent to stay on the sidelines by being invested in cash for 30 months or longer and risk forgoing those attractive portfolio returns.

A model developed by Eric Engstrom and Steven Sharpe, two economists at the Board of Governors of the Federal Reserve System, referred to as the Engstrom-Sharpe model, supports the view that a recession is likely but not imminent. The model looks at the spread between the interest rate on a 3-month Treasury bill in 18 months as priced by the Treasury market, and the current interest rate for a 3-month Treasury bill. That model assigns a 70% probability to a recession unfolding in 12 months—so a recession is likely in 2024. The model assigned a 1% probability in early 2022.

Our ISG models also suggest a recession is likely. Our most reliable—but not foolproof—model is the ISG Yield Curve Inversion Diffusion Index, which looks at four yield curves over daily, weekly and monthly frequencies. When the index has reached 100%, meaning all the yield curve inversions have been triggered, a recession has followed all nine times except in 1965 (see Exhibit 8). This index triggered a recession signal when it reached 100% on July 25, 2022.

Exhibit 8: ISG Yield Curve Inversion Diffusion Index

Recent index readings imply a rising risk of recession.



Data through December 31, 2022.

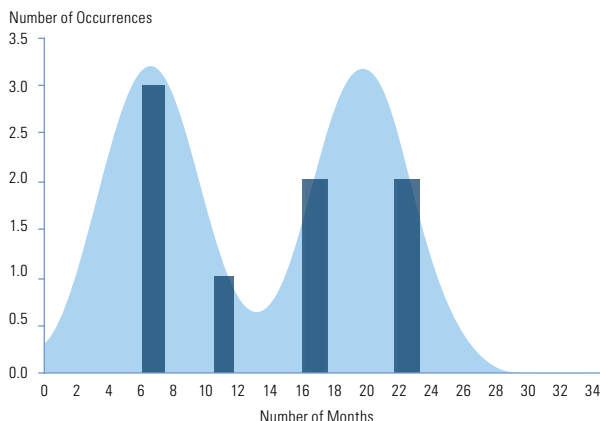
Note: Shaded periods denote recessions. The diffusion index is based on four yield curves selected across different maturities and measured on a daily, weekly and monthly basis. The index measures the percentage of yield curve measures inverted in the previous 6 months based on data available at each point in time. This index is tracked internally by ISG and is not publicly available.

Source: Investment Strategy Group, Bloomberg, Haver Analytics.

Although this index has a reliable 89% hit ratio (percentage of time it has been successful), the time to recession after the index was triggered has been bimodal. As shown in Exhibit 9, the recession has typically started either about seven months or 1.5 to two years after the trigger date. The likelihood of a recession within seven months of the trigger date, in this case by February 2023, is low. A more

Exhibit 9: ISG Yield Curve Inversion Diffusion Signal Time Length to Start of Recession

The time to recession after the diffusion index reached 100% in the past has been bimodal.



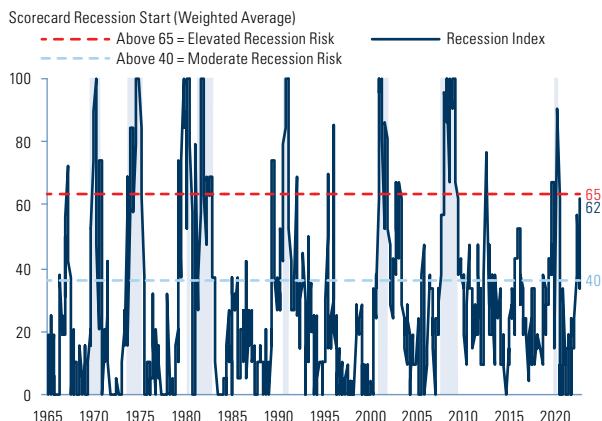
Data through December 31, 2022.

Note: The light blue area is stylized.

Source: Investment Strategy Group, Bloomberg, Haver Analytics, NBER.

Exhibit 10: ISG Recession Scorecard

Our scorecard stands at 62, close to the elevated recession risk threshold of 65.



Data as of December 2022.

Note: Shaded periods denote recessions.

Source: Investment Strategy Group, Haver Analytics.

likely scenario is a recession in 2024, according to this indicator.

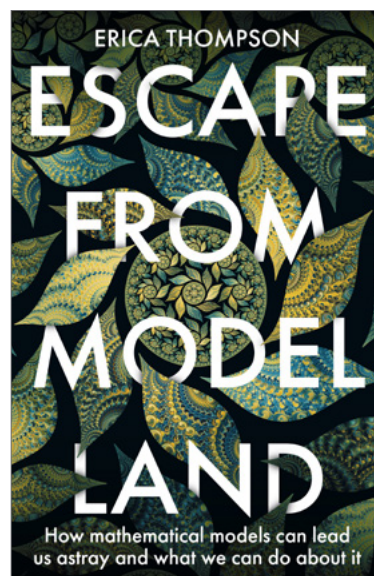
Another ISG model, the ISG Recession Scorecard, has not yet breached the elevated recession risk level of 65. As shown in Exhibit 10, the level stands at 62. The scorecard combines a series of leading indicators such as the Conference Board Leading Economic Index, the Institute for Supply Management (ISM) Manufacturing Index of new orders minus inventories, and initial jobless claims, as well as a series of National Bureau of Economic Research (NBER) recession indicators such as the average of payroll and household employment and industrial production. In other words, this scorecard follows many of the indicators that have prompted most economists to forecast a recession.

One important consideration when using such models is that no economic forecasting model has a perfect track record that can predict the occurrence and, more importantly, the timing of a recession.

In a recent book titled *Escape from Model Land: How Mathematical Models Can Lead Us Astray and What We Can Do About It*, Erica Thompson, senior policy fellow at the London School of Economics Data Science Institute and a fellow of the London Mathematical Laboratory, warns that too great a reliance on models “can have catastrophic effects because it invariably results in an underestimation of uncertainties

and exposure to greater-than-expected risk.”¹² She recommends incorporating some judgment into projections so that one can have “greater confidence that those projections will prove trustworthy.”

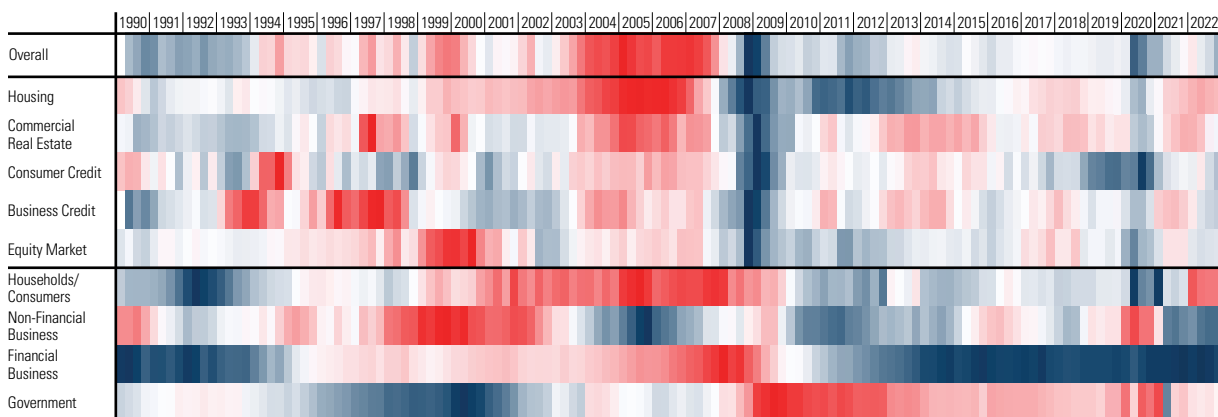
Hence, we examine other factors that, in our judgment, point to a lower likelihood of recession than that shown by the models.



Escape from Model Land: How Mathematical Models Can Lead Us Astray and What We Can Do About It by Erica Thompson (Basic Books 2022), Cover photograph @Shutterstock.com

Exhibit 11: Global Investment Research Financial Excess Monitor

The types of imbalances that preceded the dot-com bubble and GFC are notably absent today.



Data through Q4 2022.

Note: Red shading indicates periods of financial excess; blue shading indicates periods of benign conditions.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research.

Key Arguments Against a US Recession

We now consider four factors suggesting the US economy may be able to avoid a recession: a balanced economy, a shorter lag of policy tightening, declining inflation and the possibility of fewer Federal Reserve hikes than are currently expected.

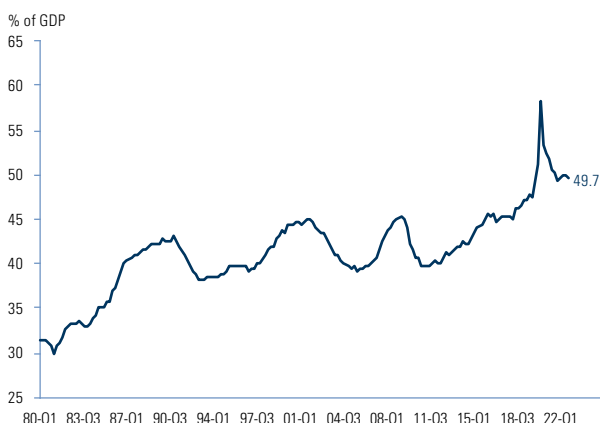
Balanced Economy

The US economy is even more balanced today than it was at the end of 2021. A more balanced economy is likely to absorb shocks much better than an imbalanced economy.

Exhibit 11 is a Financial Excess Monitor produced by our colleagues on the Goldman Sachs US Economics Research team. We have been using this tool since David Mericle, chief Goldman Sachs US economist, and the US Economics Research team created it in March 2018. It comprises 46 different measures, such as the housing-price-to-rent ratio, commercial real estate price index, credit card interest rates relative to the risk-free rate, incremental yield of corporate bonds, equity market valuations, personal savings rate, corporate debt-to-GDP growth rate, leverage in the financial sector, and federal and state government debt. The monitor highlights pockets of risks in the US economy and financial markets. Red signifies excesses; blue signifies a well-balanced sector or metric. The monitor shows that all sectors improved in 2022 except for households/consumers and housing, which showed a slight

Exhibit 12: Non-Financial Corporate Debt to GDP

Corporate debt stands at elevated levels.



Data through Q3 2022.

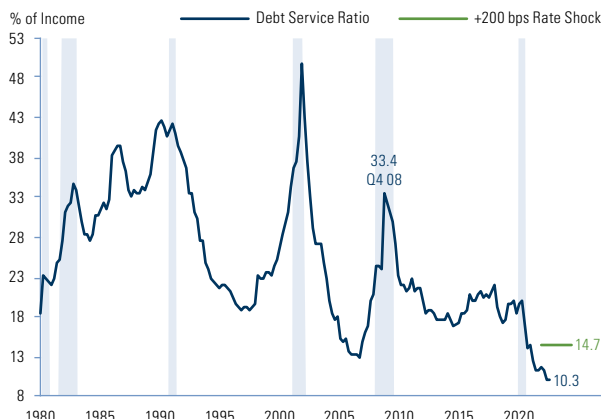
Source: Investment Strategy Group, Haver Analytics.

deterioration. In aggregate, the US economy is more balanced today than it was a year ago: the total line is a light shade of blue rather than white.

Importantly, both the financial sector and the non-financial business sector improved—captured by the darker shades of blue. Some observers have expressed concern about the increase in debt levels in the non-financial corporate sector. As shown in Exhibit 12, non-financial corporate debt as a share of GDP stands at 49.7%, the highest it's been since 1980 except for the pandemic-related spike. While this level may appear alarming, it does not seem

Exhibit 13: Non-Financial Corporate Debt Service Ratio

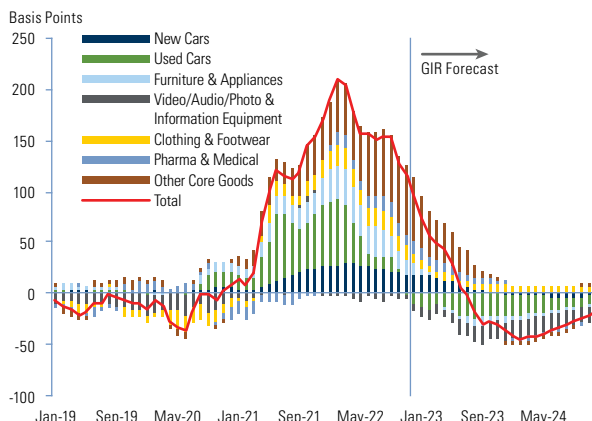
The cost of servicing debt as a share of income stands at its lowest since 1980.



Data as of Q3 2022.
Note: Shaded areas denote recessions.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 15: Contributions to Year-on-Year Core PCE Inflation from Core Goods Categories

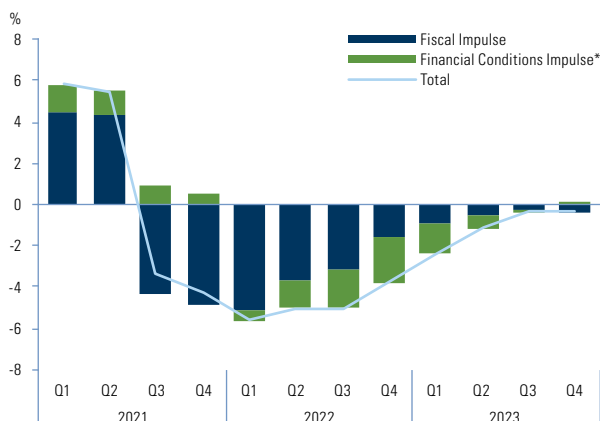
Core goods inflation is expected to turn negative in 2023.



Data through November 2022, Global Investment Research Estimates through December 2024.
Source: Investment Strategy Group, Goldman Sachs Global Investment Research.

Exhibit 14: Impulse to US GDP Growth from Fiscal Policy and Financial Conditions

The drag on GDP growth from monetary and fiscal policy tightening will abate in 2023.



Data through Q4 2022; Global Investment Research Estimates through Q4 2023.
Source: Investment Strategy Group, Goldman Sachs Global Investment Research.
* The impulse estimate assumes that financial conditions remain at their current level.

ratio (the ratio of earnings before interest and tax payments to interest expense) for investment grade borrowers is at 7.0x, which is the highest since 1999.

As shown in Exhibit 13, the cost of servicing the debt as a share of income is the lowest since 1980, at 10.3%. Because most of the debt is fixed-rate and generally of longer maturity, an increase in interest rates does not have a material impact on the cost of servicing the debt. An increase of two percentage points in interest rates raises the cost of servicing the debt to 14.7%, still very low by historical standards.

We should note that while the level of imbalance in the households/consumer sector has deteriorated relative to the end of 2021, households still have significant excess savings, estimated at over \$1.5 trillion. According to Bank of America data, households have savings and checking account balances that are still above pre-pandemic levels across all income cohorts, including lower-income and younger households.¹³

so upon further examination. Most of the increase was driven by high-quality investment grade bond issuers that issued debt in order to take advantage of the low level of interest rates. The average coupon level of investment grade corporate debt is 3.7%, which is close to the lowest level since 1973. The median level of the interest coverage

Shorter Lag of Policy Tightening

According to a Financial Conditions Index growth impulse model developed by Mericle and his team, the drag on GDP growth from tightening of financial conditions occurs sooner than is typically thought by most market participants.¹⁴ As a result, Mericle and his team estimate that the drag from

Exhibit 16: Goldman Sachs Supply Chain Congestion Scale

The scale has reached its lowest level since the start of the pandemic.



Data as of December 31, 2022.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research.

the tightening of financial conditions will abate in 2023, as shown in Exhibit 14.

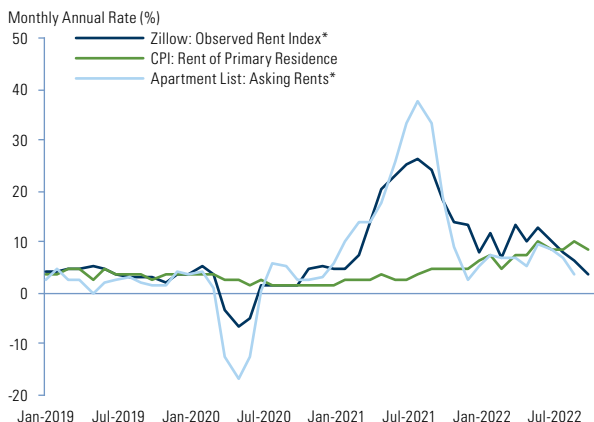
Declining Inflation

Inflation has peaked and is declining across many drivers:

- As shown in Exhibit 15, core goods inflation is expected to turn negative by the middle of 2023, and the GS Supply Chain Congestion Scale has reached its lowest level since the start of the pandemic (see Exhibit 16).
- With respect to shelter inflation, which is about 40% of core CPI, both the Case-Shiller national home price index and the alternative measures of rent inflation have been declining, as shown in Exhibits 7 (referenced earlier) and 17. Due to the mechanics of how housing inflation is calculated, the current decline impacts official shelter inflation with a lag of as long as a year. Since policymakers are aware of this mechanical delay, they are likely to incorporate these contemporaneous measures of shelter inflation into their decision-making process.
- Wages have been the most persistent source of inflation in 2022. However, we expect wage pressures to abate slowly as the number of job openings declines, the unemployment rate increases and lower headline inflation reduces the bargaining power for wage negotiations. Our colleagues in US Economics Research point to forward-looking indicators of wage growth such as monthly wage surveys and the

Exhibit 17: Rental Inflation Measures

The pace of rent increases has moderated since the spike in mid-2021.



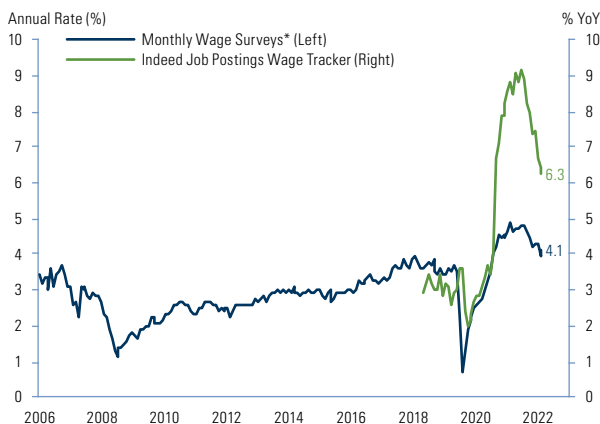
Data through October 2022.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, Apartment List, Haver Analytics, Oxford Economics.

* Seasonally adjusted.

Exhibit 18: Wage Growth Indicators

Forward-looking indicators of wage growth point to a meaningful deceleration in 2023.



Data through November 2022.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, Department of Labor, Indeed.

* Average of NFIB, Dallas Federal Reserve manufacturing, Dallas Federal Reserve services, Richmond Federal Reserve Manufacturing, Richmond Fed services, NY Federal Reserve services and Kansas City Federal Reserve services, scaled to 6-month annualized average hourly earnings.

Indeed Wage Tracker (for job postings)—shown in Exhibit 18—as support for diminishing wage pressures.

Less Tightening Than Expected

Although our base case scenario includes the expectation that the Federal Reserve will raise

Exhibit 19: 1-Year Treasury Bills 1 Year Forward (1y1y) and Policy Rate

Policy rates have typically peaked below the peak 1y1y rate priced by the market.



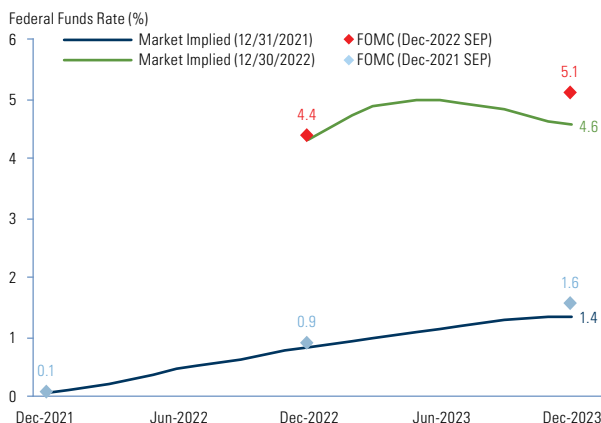
Data through December 31, 2022.

Note: Based on the 6m6m prior to 1976 and interpolating the 1y1y based on the 6-month and 2-year yields during the 2001–08 period when 52-week bills were discontinued.

Source: Investment Strategy Group, Bloomberg.

Exhibit 20: Federal Funds Rate Path Through December 2023

Forecasts for the path of policy rates have changed dramatically since the end of 2021.



Data as of December 31, 2022.

Note: Market implied path is based on federal funds futures.

Source: Investment Strategy Group, Bloomberg, Federal Reserve.

policy rates to 5–5.25%, we also recognize that there is a chance it will not raise rates as much as we expect. As shown in Exhibit 19, policy rates have typically peaked below the peak of where the market expects the yield on 1-year Treasury bills to be one year from now (1y1y). In the nine hiking cycles since 1972, there have been two exceptions:

Exhibit 21: US Recession Probabilities

Experts have differing views on the probability of recession in the US.

	Probability of Recession Within:	
	1 year	2 years
William C. Dudley	70%	90%
Jason Furman	55%	75%
Mark Zandi	50%	60%
Investment Strategy Group	45–55%	65–75%
GS Global Investment Research	35%	N/A
Jan Hatzius & David Mericle		

As of December 31, 2022.

Source: Investment Strategy Group, GS Global Investment Research, William C. Dudley, Mark Zandi, Jason Furman.

1974 and 1980. In all other cases, the Federal Reserve hiked rates to a peak below the peak market pricing of 1y1y. In this tightening cycle, the peak to date for the 1y1y was 4.7% in early November. It stood at 4.2% at year-end. If this historical pattern repeats itself, the Federal Reserve may hike only one more time. Given that most of the impact of tighter financial conditions has already occurred, as shown earlier in Exhibit 14, it is possible that a recession will be averted.

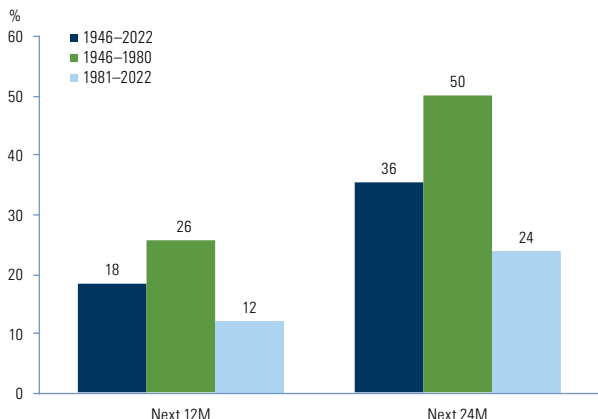
Of course, there is a chance of further tightening beyond our expectations. Note in Exhibit 20 that the FOMC's estimate for the federal funds rate in the December 2021 Summary of Economic Projections was materially below its most recent projections in December 2022. Even FOMC members do not have the proverbial crystal ball.

In summary, we think the probability of a recession in 2023 ranges from 45% to 55%. In Exhibit 21, we share the views of a panel of experts whom we have hosted on client calls; the lowest probability is from our colleagues on the GS US Economics Research team and the highest probability is from Bill Dudley. Jason Furman, professor of practice of economic policy jointly at Harvard Kennedy School and the Department of Economics at Harvard University and former chair of the Council of Economic Advisers, is at 55%, and Mark Zandi, chief economist at Moody's Analytics, is at 50%.

We have also provided probabilities for 2024. By definition, expanding the horizon to two years to estimate the probability of recession increases the probability. As shown in Exhibit 22, the cumulative probability of a recession if the economy is still in an expansion increases

Exhibit 22: Percentage of Time Recession Occured by End of Period

The cumulative probability of a recession from 1981 to 2022 has been 12% in one year and 24% in two years.



Data through December 2022.

Source: Investment Strategy Group, Haver Analytics.

from 12% in one year to 24% in two years, a 12-percentage-point increase. Given the tightening of policy rates to date and the expected increases in 2023, we believe the probability of recession will still be elevated in 2024, and we therefore expect the cumulative probability to rise by 20 percentage points from 2023 to 2024.

We now turn to our analysis of 60/40 portfolios. We show why a stock/bond portfolio is still a compelling starting point and how diversifying the portfolio by adding certain asset classes and strategies provides the optimal strategic asset allocation.

60/40 Stock/Bond Portfolios

Following the negative returns of both stocks and bonds in 2022, several institutions have questioned the viability of 60/40 stock/bond portfolios. We should note that the term “60/40 stock/bond portfolio” is used generically by the financial industry to mean a portfolio of stocks and bonds; it does not imply that a 60/40 mix is the right allocation for every client.

The *Financial Times* reports that “private capital titans insist that the traditional 60/40 investor allocation between listed stocks and bonds has been rendered useless by central bank

largesse correlating the entire market.”¹⁵ Some asset management firms have suggested rethinking traditional stock/bond portfolios or having a “makeover.” Quite a few firms warn of a lost decade for 60/40 portfolios. Most recommend adding asset classes such as commodities and hedge funds to hedge against the positive correlation between stocks and bonds seen in 2022. Others have recommended adding factor-based investment strategies and active equity managers to improve performance.

This range of suggestions has prompted some clients to ask us whether they should change their strategic asset allocation. We do recommend clients reevaluate their strategic asset allocation on a regular basis, especially after a tumultuous year, to make sure that their portfolios are tailored to their risk tolerance, tax status and preferences. However, clients should not alter their strategic asset allocation simply in response to the noise around 60/40 portfolios.

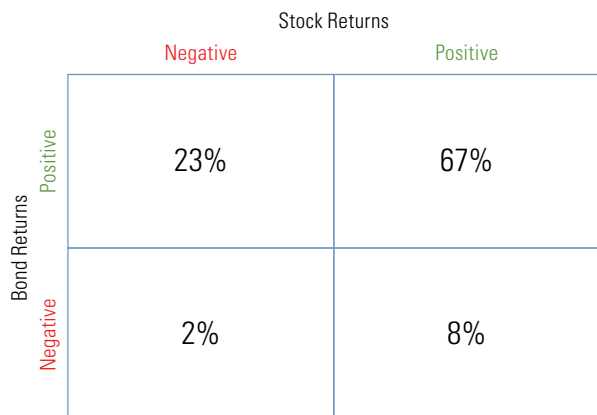
Our reasoning is twofold:

- What transpired in 2022 in terms of negative returns for both bonds and stocks is a rare occurrence, and clients should not adjust portfolios solely because of a rare occurrence. We also find that positive correlations between stocks and bonds are common, and such correlations alone do not invalidate the value of 60/40 portfolios. There is no need to change asset allocation because of market performance in 2022.
- ISG’s strategic asset allocation process uses a mix of stock/bond portfolios (60/40 or other mixes of stocks and bonds) as a launching pad. The 60/40 portfolio merely provides a reference benchmark: many asset classes are added to a client’s portfolio to improve the risk/return profile relative to a portfolio of only stocks and bonds. Of course, while we refer

What transpired in 2022 in terms of negative returns for both bonds and stocks is a rare occurrence, and clients should not adjust portfolios solely because of a rare occurrence.

Exhibit 23: Frequency of Observation of Positive/Negative Returns in US Stocks and Bonds

The occurrence of negative returns in both US stocks and bonds over any 12-month window is rare.



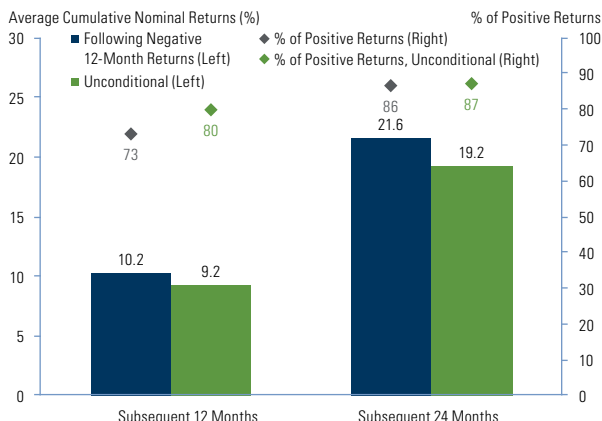
Data through December 2022.

Note: US intermediate bonds are modeled using Bloomberg Barclays US Intermediate Treasuries (with Ibbotson backfill). US equity is modeled by the S&P 500. Based on data since 1926.

Source: Investment Strategy Group, Datastream.

Exhibit 25: Returns for 60/40 Portfolio Since 1926

A 60/40 portfolio produced a positive 12-month return 80% of the time.



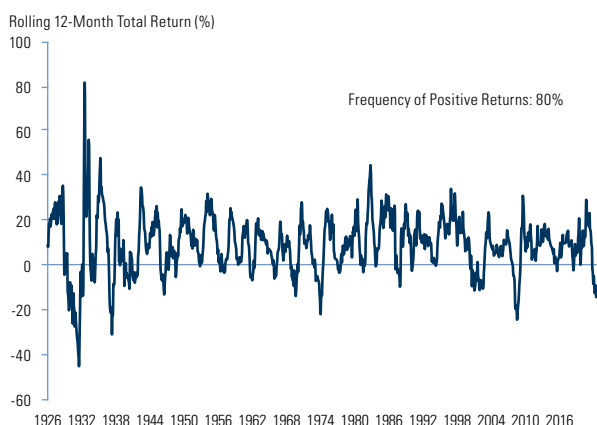
Data as of December 31, 2022.

Note: 60/40 portfolio refers to 60% US equity/40% US intermediate bonds. US intermediate bonds are modeled using Bloomberg Barclays US Intermediate Treasuries (with Ibbotson backfill). US equity is modeled by the S&P 500.

Source: Investment Strategy Group, Datastream, Ibbotson.

Exhibit 24: Rolling 12-Month Nominal Total Return for a 60/40 Portfolio

A 60/40 portfolio has produced a positive 12-month return 80% of the time since 1926.



Data through December 2022.

Note: 60/40 portfolio refers to 60% US equity/40% US intermediate bonds. US intermediate bonds are modeled using Bloomberg Barclays US Intermediate Treasuries (with Ibbotson backfill). US equity is modeled by the S&P 500.

Source: Investment Strategy Group, Datastream, Ibbotson.

Frequency of Negative Returns in Stocks and Bonds

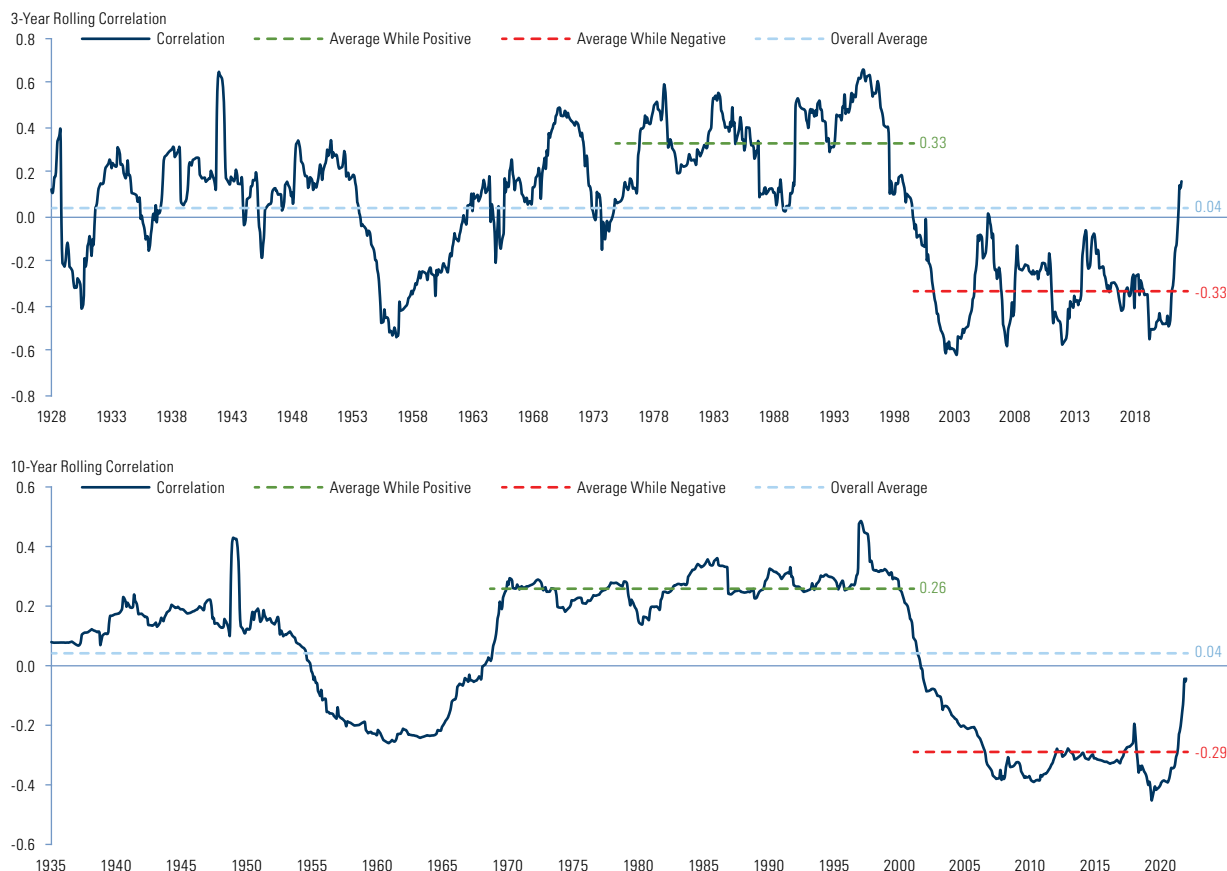
Negative returns in both stocks and bonds over any 12-month window have occurred only 2% of the time since 1926, as shown in Exhibit 23. We used the S&P 500 Index to represent stocks and the Bloomberg Barclays US intermediate 1- to 10-year Treasury index for bonds. About 67% of the time, both stocks and bonds provided positive returns; 23% of the time, stocks had a negative return partially offset by positive bond returns; and 8% of the time, stocks had a positive return partially offset by negative bond returns. In aggregate, the data covers 96 years of 12-month windows. A 60/40 portfolio produced a positive 12-month return 80% of the time, as shown in Exhibits 24 and 25.

Another challenge put forth by the naysayers to the viability of 60/40 portfolios has been the recent positive correlation between stocks and bonds. The correlation between stocks and bonds has been positive since August 2022. As shown in Exhibit 26, this correlation has varied over time. We have looked at both three-year and 10-year rolling windows. While the long-term average for both series is 0.04, there have been periods such as the 25-year window between 1975 and 2000 in which the average of three-year rolling correlations has been positive at 0.33, and periods such as the 22-year window between 2000 and 2022 when

to 60/40 portfolios generically, every reference benchmark and the corresponding diversified portfolio must be customized for each client.

Exhibit 26: Rolling 3-Year and 10-Year Correlation of Bonds and Equities

The correlation between stocks and bonds has varied over time.



Data through December 31, 2022.

Note: US intermediate bonds are modeled using Bloomberg Barclays US Intermediate Treasuries (with Ibbotson backfill). US equity is modeled by the S&P 500.

Source: Investment Strategy Group, Datastream, Ibbotson, Global Financial Data.

the average correlation has been negative at -0.33. The correlations over 10-year rolling windows exhibit the same pattern of positive and negative correlations.

The changing correlation between stocks and bonds, however, has no bearing on the viability of 60/40 portfolios.

Typically, investors expect bonds to provide some downside protection during large declines in equity prices. Bonds have done so even when the correlation between stocks and bonds has been positive. Exhibit 27 shows how bonds have had positive returns—albeit small returns at times—during equity market downdrafts, in effect partly hedging the returns of the portfolio even when the correlations were positive.

We conclude that negative returns for stocks and bonds and positive correlations between them

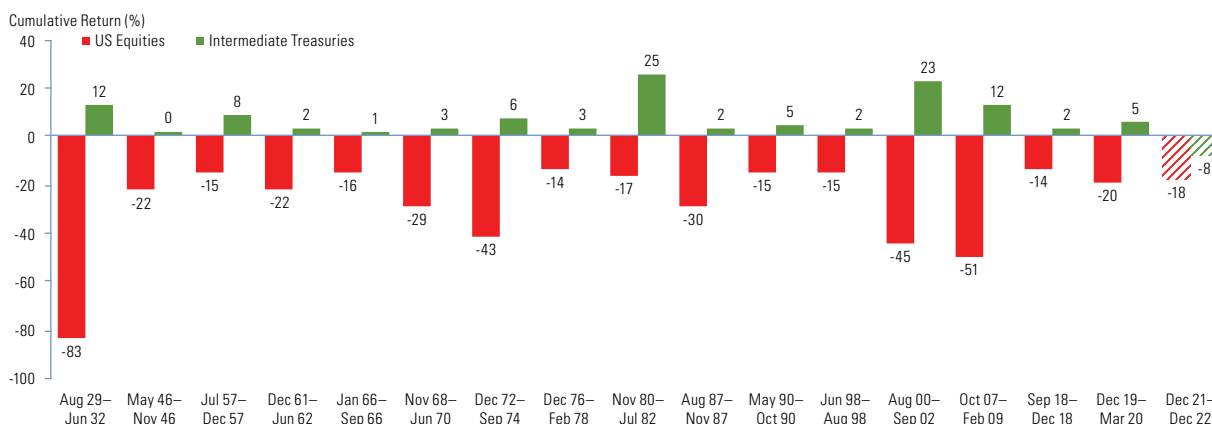
do not undermine the viability of 60/40 portfolios and should not deter clients from the use of stock/bond benchmarks as a launching pad for strategic asset allocation.

The Last Decade Does Not Imply a Lost Decade

A 60/40 portfolio comprising the S&P 500 and the Bloomberg Barclays Intermediate Treasury Index generated an annualized return of 8.0% on a nominal basis and 5.3% on a real basis (adjusted for inflation) over the decade ending in 2022. This compares to an annualized portfolio return of 8.8% in nominal terms and 5.4% in real terms since 1926. What differentiates the returns of the past decade is that they were produced with a low annualized volatility of 8.8%, compared to volatility of 10.1% since 1926. As a result, the Sharpe ratio (a measure of the excess return above

Exhibit 27: Performance of Bonds and Equities During US Equity Drawdowns

Bonds have typically provided downside protection during equity market downdrafts.



Data through December 2022.

Source: Investment Strategy Group, Datastream, Ibbotson, Global Financial Data.

Exhibit 28: 60/40 Portfolio Reference vs. Matched-Volatility Optimized Diversified Portfolio

An optimized diversified portfolio is expected to have higher return and Sharpe ratio than the 60/40 reference.

	60% Equities / 40% Bonds Allocations	
	Reference	Optimized Diversified
Investment Grade Fixed Income	40.0%	26.6%
Other Fixed Income	0.0%	5.0%
Public Equity	60.0%	42.1%
Hedge Funds	0.0%	2.3%
Private Equity	0.0%	17.9%
Other Private Assets	0.0%	6.1%
Total	100.0%	100.0%
After-Tax Estimated Mean Return Assuming 2.50% Risk-Free Rate	5.3%	6.0%
Sharpe Ratio	0.43	0.51
Volatility	8.9%	8.9%

Data of December 31, 2022.

Note: Equities are represented by the MSCI All Country World Index and bonds by Barclays Capital US Municipal 1-10 Index.

Source: Investment Strategy Group, Datastream.

a risk-free rate per unit of risk) was particularly attractive.

We expect benchmark returns to be lower over the next five and 10 years. ISG's Tactical Asset Allocation team expects, based on fundamental analysis, a 6.3% annualized total return for a 60/40 portfolio over the next five years. The team does not provide 10-year portfolio forecasts. The Strategic Asset Allocation team expects, based

on long-term returns driven by its multi-factor model, a 6.2% annualized total return over the next decade.

Building a diversified portfolio based on the reference portfolio is expected to add another 0.75 to 1.0 percentage point to returns, as we discuss below.

Diversified Model Portfolios Built Upon a Reference Portfolio of Stocks and Bonds

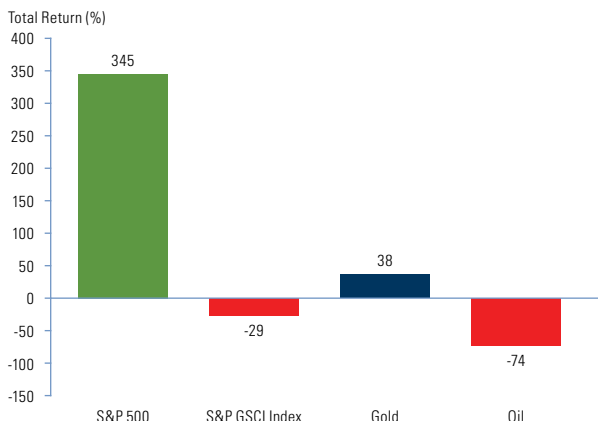
Appropriate diversification is another pillar of ISG's investment philosophy. We recommend diversifying assets away from generic stocks and bonds into other assets, but only if those assets improve the risk/return profile of a portfolio.

For example, one can improve the return and Sharpe ratio of a portfolio by adding high yield securities and illiquid assets such as private equity, real estate and infrastructure to it. We recommend a very limited allocation to hedge funds. As shown in Exhibit 28, diversification into these other assets is expected to add about 0.7 percentage point to annualized returns and improve the Sharpe ratio of an optimized portfolio from 0.43 to 0.51 relative to a 60/40 reference benchmark.

We believe that one can add value to portfolios by introducing certain long-term investment themes. For example, US Preeminence has been an investment theme since the inception of ISG. We recommend overweighting US equities and meaningfully underweighting emerging market assets. In a December 2022 *Insight* on China titled *Middle Kingdom: Middle Income*, we restated our

Exhibit 29: Total Return Since the ISG Commodities *Insight* Publication

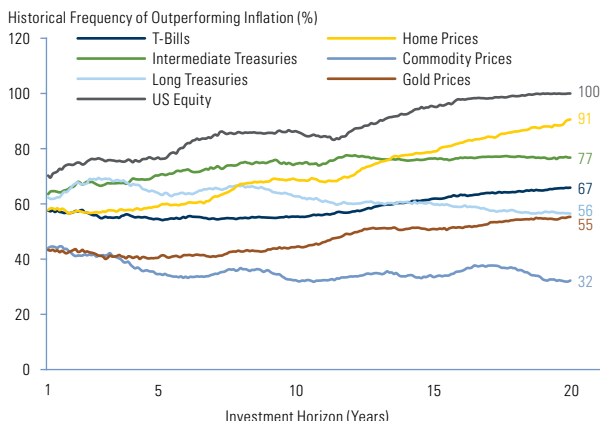
Commodities have meaningfully lagged US equities since January 2010.



Data through December 31, 2022.
Source: Investment Strategy Group, Bloomberg.

Exhibit 30: Frequency of Outperforming Inflation Over a Given Investment Horizon

Equities have consistently outperformed inflation compared to other asset classes.



Data as of Q3 2022.
Note: Calculated using headline inflation.
Source: Investment Strategy Group, Bureau of Labor Statistics, *The Economist*, Datastream, Bloomberg, Ibbotson, Robert Shiller (Yale University).

view that diversified portfolios should overweight US assets and underweight emerging market assets and assets with significant exposure to China. In the interest of brevity, we refer you to that [Insight](#) for details.

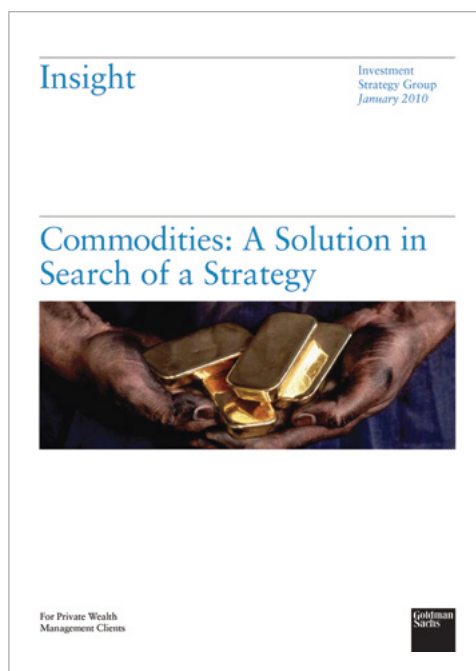
We also recommend avoiding certain asset classes that do not improve the risk/return profile of a portfolio. Among certain strategic asset allocation advisors, commodities—especially oil, natural gas and gold—have become a frequently recommended asset to add to a portfolio given the increase in inflation as well as the strong returns of the energy sector in 2022.

We strongly advise against such a strategic allocation. As explained in our January 2010 *Insight* report, *Commodities: A Solution in Search of a Strategy*, neither gold, nor oil, nor commodities in aggregate improve the risk/return profile of a portfolio. At the time, the prevailing recommendation was to add commodities to portfolios. We did not agree. As shown in Exhibit 29, US equities have outperformed all key commodities since we published that report. We still do not recommend commodities, because they do not improve the risk/return profile of a portfolio and, notably, they are among the worst asset classes in outperforming inflation, as shown in Exhibit 30.

It is important to note that we differentiate between strategic and tactical asset allocation.

While we do not recommend commodities as part of a client's strategic asset allocation, we have tactically allocated assets to commodities and commodity-related sectors and will continue to do so in the future.

US equities, in fact, are the most effective hedge against inflation relative to other asset classes. This asset class has had the highest frequency of



outperforming inflation over any period between one and 20 years, as shown in Exhibit 30.

We conclude that a 60/40 portfolio is still a good starting point upon which to build a fully diversified portfolio. A year of negative returns in both asset classes, positive correlations and lower forward returns compared to returns in the prior decade do not negate the benefits of a portfolio that is composed primarily of stocks and bonds and has been supplemented by other asset classes.

As Sir John Templeton, American-British investor, wrote, “the four most expensive words in the English language are ‘This time it’s different.’”¹⁶ When market participants say this time is different and suggest that we are entering a new regime in which 60/40 stock/bond portfolios no longer work, we are reminded of Templeton’s comment and remain confident that history is a useful guide: this time is not that different from past periods of underperformance of stock/bond portfolios and positive correlations.

Since we expect returns for the next one, five, and 10 years to be attractive, we recommend clients stay invested at a well-diversified strategic asset allocation that is in line with their risk tolerance. We now turn to our one- and five-year expected returns across publicly traded asset classes and make the case for staying invested despite the heavy fog ahead.

Our One- and Five-Year Expected Total Returns

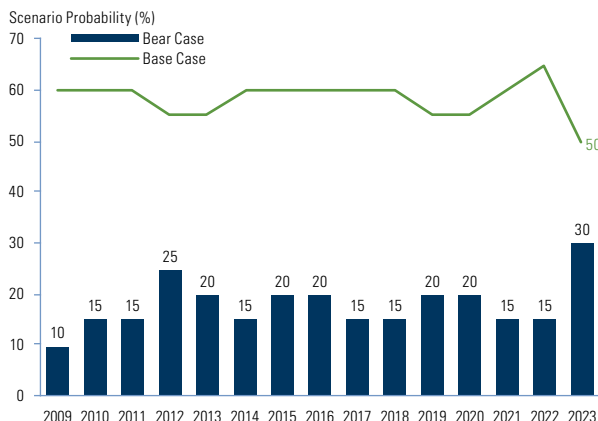
Given the probability of 45–55% that we have assigned to a US recession, with a midpoint at 50%, we are also assigning a 50% probability to the base case scenario of our expected returns across the major publicly traded asset classes. We are assigning a higher probability to the downside scenarios, given the combined risks of recession and geopolitical flare-ups around the world. This is the lowest probability we have given our base case scenario and the highest probability we have given our downside scenario since the GFC (see Exhibit 31).

Our expected returns are driven by our estimates of:

- Below-trend global growth of 2.4% in 2023, consisting of 1.2% growth in the US, mild recessions in the Eurozone and the UK, anemic growth in Brazil, below-trend growth in India

Exhibit 31: Base and Bear Case Probabilities for S&P 500 Year-End Price Scenarios in ISG Outlooks

Our base case probability for the S&P 500 is the lowest since the GFC while that of our bear case is the highest.



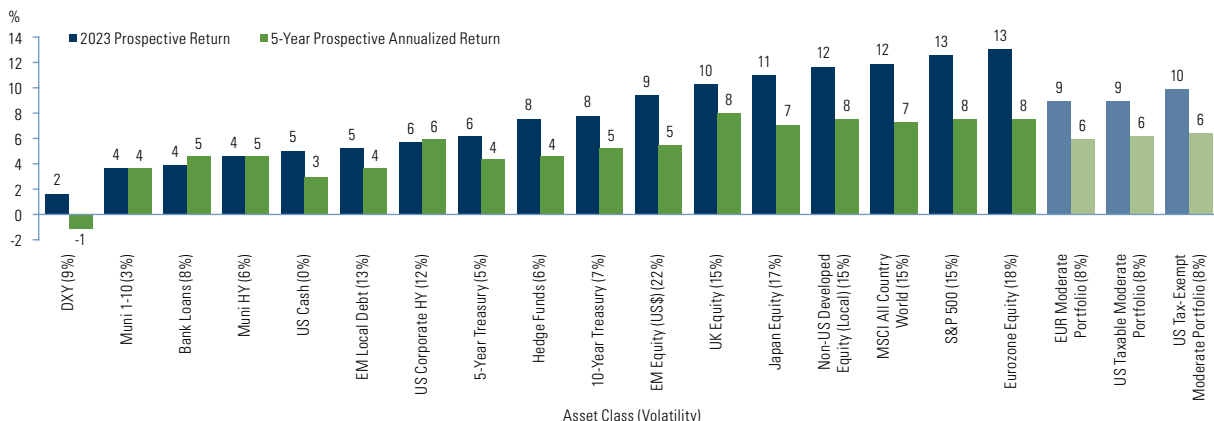
Data as of December 31, 2022.
Source: Investment Strategy Group.

and a recession in Russia because of the war in Ukraine. While our base case for China is a post-COVID economic recovery of 4.9%, the risks are tilted to the downside if the disorderly exit from COVID—which *The Economist* has referred to as “China’s COVID failure”—saps consumer and business confidence.

- Mid-single-digit earnings growth in the US; flat earnings in Japan; and declining earnings in the Eurozone, the UK and emerging markets.
- Slightly lower interest rates in the US, Europe and the UK; a modest increase in rates in Japan; and a very small decline in rates in emerging markets.



Exhibit 32: ISG Prospective Total Returns



Data as of December 31, 2022.

Source: Investment Strategy Group. See endnote 17 for list of indices used.

Note: Forecasts have been generated by ISG for informational purposes as of the date of this publication. There can be no assurance the forecasts will be achieved.

- A negligible increase in the US dollar of 1–2%, and modest decreases in emerging market currencies.

As shown in Exhibit 32, we expect US and Eurozone equities to be the best-performing asset classes in 2023, with total returns in local currency of about 13% in our base case scenario. We expect returns of 12% for the MSCI All Country World Index. Such strong equity returns, if realized, will result in moderate-risk model portfolio returns of 9.0% for taxable clients and 9.8% for tax-exempt clients. As mentioned earlier, we assign a probability of 50% to our base case scenario.

We assign a probability of 30%, much higher than usual, to our downside scenario across all equity markets. However, in the US, the full-year returns in our downside scenario are relatively muted, at -4%, because US equities already declined 18% in 2022. Valuations declined from 21.4x consensus earnings at the beginning of 2022 to 17.4x by the end of the year.

In our upside scenario, we expect equities to increase by as much as 27% due to lower inflation, above-trend growth in the US and higher multiples as investors are relieved that recession risks have abated. We assign a 20% probability to that case, as shown in Exhibit 33.

We estimate that our one- and five-year return expectations will be realized even if we have a mild US recession that ends this year.

Exhibit 33: ISG S&P 500 Total Return Forecast Scenarios—Year-End 2023

In our upside scenario, we expect US equities to increase as much as 27%.



Data as of December 31, 2022.

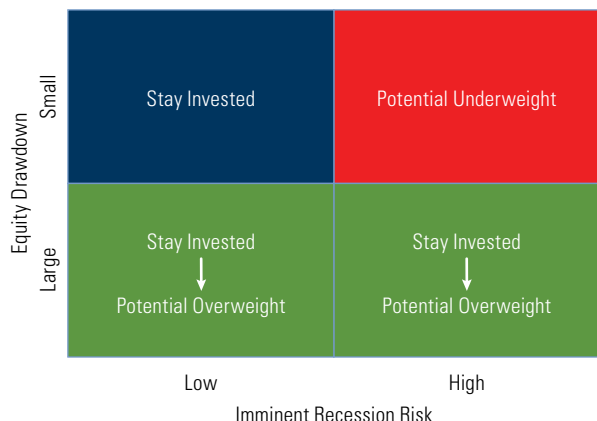
Source: Investment Strategy Group, Bloomberg.

Note: Forecasts are estimated, based on assumptions, are subject to revision and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved. Indices are gross of fees and returns can be significantly varied. Please see additional disclosures at the end of this *Outlook*.

The most important question to address for clients is why we recommend they stay invested at their strategic asset allocation given the 45–55% probability of recession and 30% probability of our downside scenario.

Exhibit 34: ISG Decision Matrix for Underweighting Equities

We believe investors are better off staying the course and even looking for opportunities to overweight stocks.



Data as of December 31, 2022.
Source: Investment Strategy Group.

First and foremost, while we have assigned a 30% probability to a muted -4% return for the full year, we have assigned a 70% probability of S&P 500 returns of 13% or higher. The skew of expected returns by the end of 2023 is to the upside, based on our analysis.

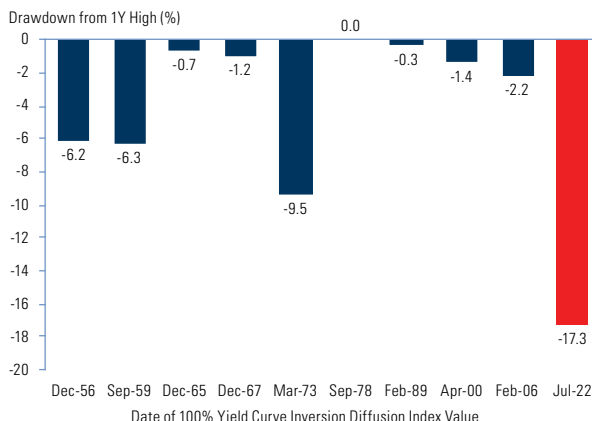
Second, ISG's framework for underweighting equities in the face of a high probability of recession requires that equity markets have not declined more than 10%. As shown in Exhibit 34, if the probability of recession is high—which it is currently—but the equity market has already declined significantly, it is too late to underweight equities; in fact, we look for opportunities to overweight equities, either directly or through options.

Our framework to underweight equities in anticipation of a recession is based on post-WWII history showing equity markets do not typically discount recessions more than six months in advance. What transpired in 2022 was unusual on multiple fronts—not just because having a year with negative returns for both stocks and bonds has occurred only 2% of the time since 1926.

Other rare occurrences also materialized last year. As mentioned earlier, our most historically reliable leading indicator for detecting a future recession, our Yield Curve Inversion Diffusion Index, triggered a recession signal on July 25, 2022. At that time, US equities had already declined 17% from peak levels earlier in the year. Typically,

Exhibit 35: S&P 500 Drawdown Prior to Yield Curve Diffusion Inversion Index Trigger

The equity market had already declined by 17% when the index triggered a recession signal last year.



Data as of July 2022.
Source: Investment Strategy Group, Bloomberg.

equities have declined by low- to mid-single digits at the time of past signals, allowing time for defensive portfolio adjustments (see Exhibit 35). The largest decline prior to 2022 was 9%. So underweighting equities after a decline of 18% in 2022 is not prudent given our view that a recession is not a certainty and the fact that a significant market decline preceded the recession signal in this cycle.

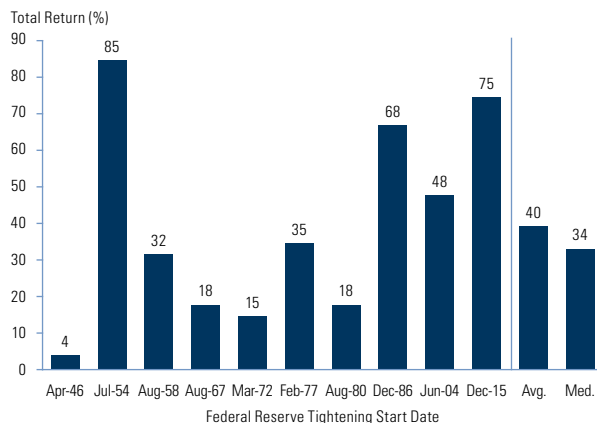
Similarly, the equity market has rallied after the start of every Federal Reserve tightening cycle that led to a recession. As shown in Exhibit 36, the S&P 500 has rallied after the beginning of all tightening cycles by anywhere from 4% to 85%, with an average of 40% and a median of 34%. (We have included the tightening cycle that started in 2015, even though the pandemic triggered the following recession.) Therefore, the beginning of a tightening cycle is not reason enough to underweight equities. In 2022, the equity market had already declined 10% by the time of the first hike by the Federal Reserve in March.

It is very unusual for financial conditions to tighten as much as they did in 2022 before the Federal Reserve raises rates.

The third reason we recommend clients stay invested at their strategic asset allocation is that portfolio returns after a year of negative returns—such as we had in 2022—tend to be higher than long-term averages in the following 12 and 24 months. We shared some of this analysis in defense of 60/40 portfolios. Here we examine the data for

Exhibit 36: S&P 500 Returns From Start of Federal Reserve Tightening to Market Peak

US equities have rallied after the beginning of all tightening cycles that led to recessions.

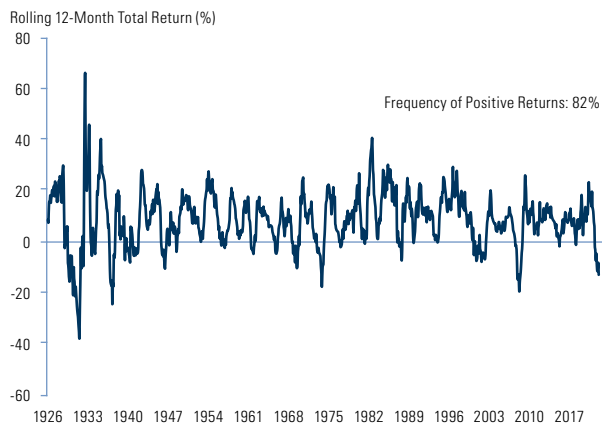


Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

Exhibit 37: Rolling 12-Month Nominal Total Return for the 50/50 Portfolio

A 50/50 portfolio produced a negative 12-month return only 18% of the time since 1926.



Data through December 2022.

Note: 50/50 portfolio refers to 50% US equity/50% US intermediate bonds. Bonds are represented by US intermediate treasuries and equities by the S&P 500 Index.

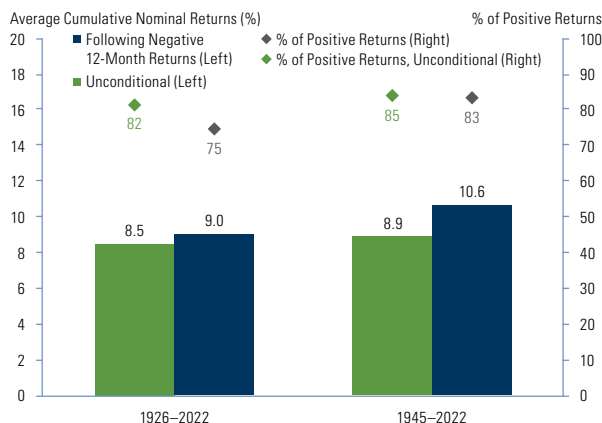
Source: Investment Strategy Group, Datastream, Ibbotson.

moderate-risk portfolios that are benchmarked against 50/50 stock/bond portfolios because that benchmark is more commonly used by our clients. We note the following:

- As shown in Exhibit 37, negative returns for a moderate-risk portfolio occur only 18% of the time.
- Typically, as shown in Exhibit 38, the market's subsequent returns outperform long-term averages after a big decline. For example, in the post-WWII period, the total return of a 50/50 portfolio was 10.6% in the 12 months following a negative return, compared to the average annual return of 8.9%. The returns are even more compelling over 24 months.
- Of course, positive returns do not always follow 12 or 24 months later. During the Great Depression, a moderate-risk portfolio would have experienced a cumulative drawdown of 53% for 2.8 years. A moderate-risk portfolio took 3.6 years to recover to prior peak levels, as shown in Exhibit 39.
- In the post-WWII period, there have been three periods in which above-average returns have not followed a year of negative returns in a moderate-risk portfolio: the 1973–74 Arab-Israeli War and Arab oil embargo, the dot-com bubble, and the GFC. We do not believe those periods are likely to be repeated:

Exhibit 38: Total 12-Month Returns for the 50/50 Portfolio Following Negative Returns

Typically, the markets outperform long-term averages after a big decline.



Data as of December 31, 2022.

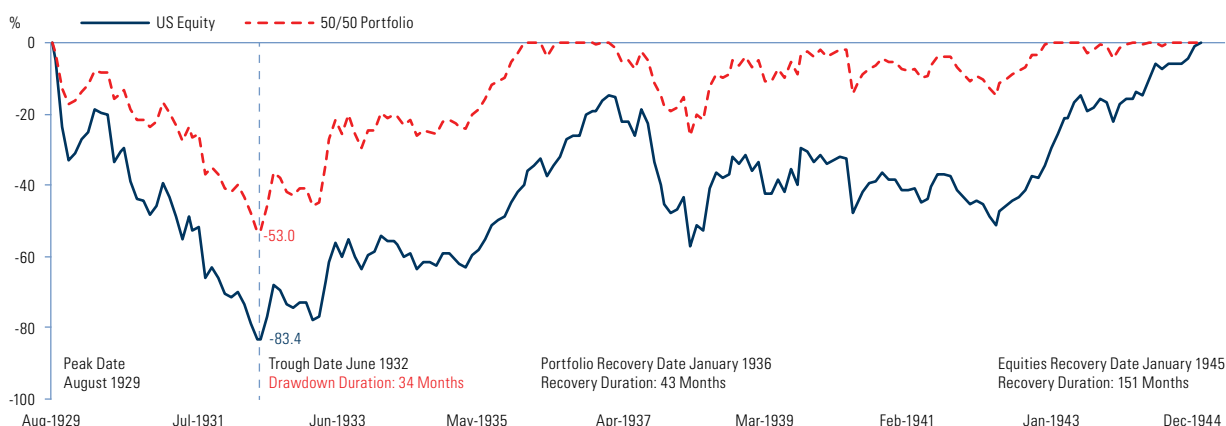
Note: 50/50 portfolio refers to 50% US equity/50% US intermediate bonds. Bonds are represented by US intermediate treasuries and equities by the S&P 500 Index.

Source: Investment Strategy Group, Datastream, Ibbotson.

- Monetary policy discipline was very different in the early 1970s, oil prices increased by nearly 2.5 times and inflation expectations became unanchored.
- In the dot-com bubble period, equity valuations were significantly higher. The red diamonds in Exhibit 40 indicate valuations at the peak

Exhibit 39: Peak-to-Trough Drawdowns and Recovery During the Great Depression

Downdrafts pass and portfolios recover.



Data through January 31, 1945.

Note: 50/50 portfolio refers to 50% US equity/50% US intermediate bonds. Bonds are represented by US intermediate treasuries and equities by the S&P 500 Index.

Source: Investment Strategy Group, Datastream, Ibbotson.

of the dot-com bubble. These valuation levels were higher than levels in December 2021 and December 2022. And as shown in Exhibit 41, the equity risk premium—the incremental premium investors earn to hold equities instead of bonds—was negative!

- During the GFC, aggregate leverage for households and non-financial corporations was 143% of GDP, as shown in Exhibit 42. It is now 123%, and the economy is very well balanced, as discussed earlier. Large, systematically important US banks have

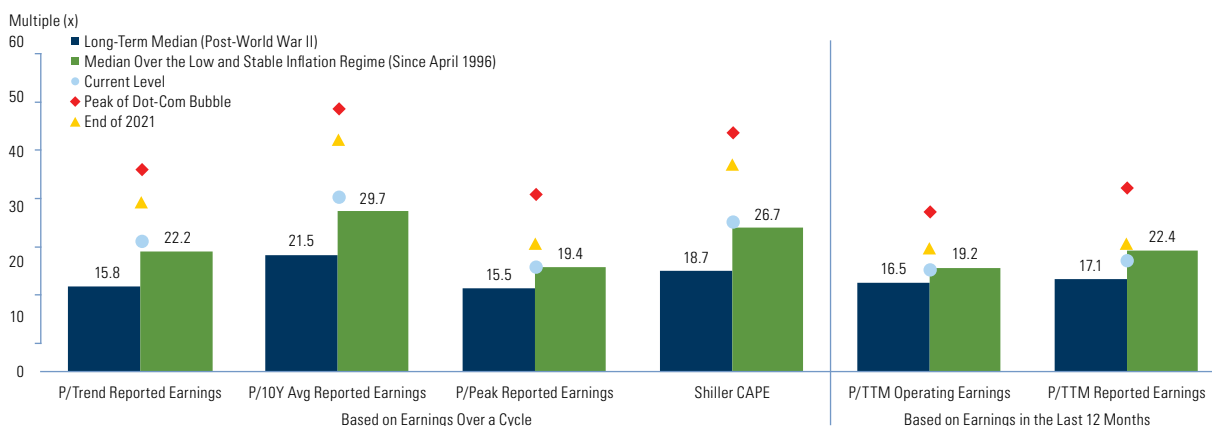
2.5x equity capital relative to risk-weighted assets compared to levels that existed during the GFC.

As shown in Exhibit 43, the 12-month returns of a moderate-risk portfolio have averaged 13.3% following a negative 12-month return if we remove the three episodes that we think are highly unlikely to be repeated in this environment.

There are some additional factors that support staying invested:

Exhibit 40: S&P 500 Valuation Multiples

Valuations were significantly higher in the dot-com bubble period than today.

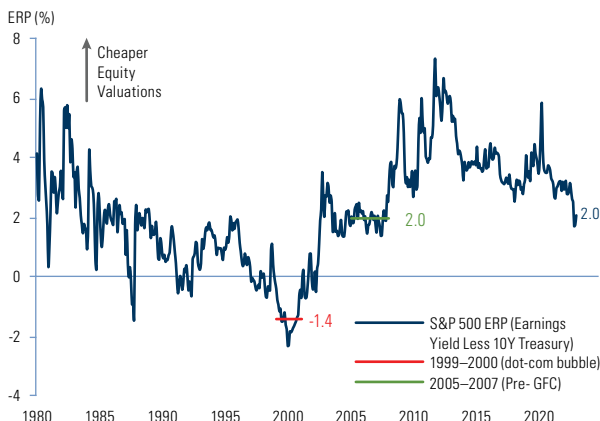


Data through December 31, 2022.

Source: Investment Strategy Group, Bloomberg, S&P Global, Robert Shiller.

Exhibit 41: S&P 500 Equity Risk Premium Proxy

During the dot-com bubble, the equity risk premium was negative.



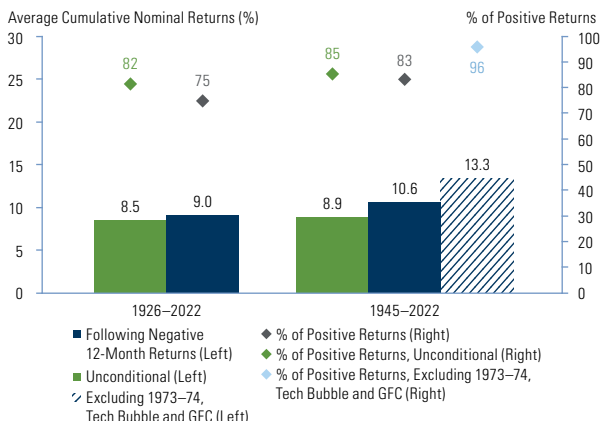
Data through December 31, 2022.

Note: Equity risk premium is approximated by forward earnings yield minus US 10-year Treasury yield.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, Bloomberg FactSet, Compustat.

Exhibit 43: Total Returns for the 50/50 Portfolio Following Negative 12-Month Returns

The 12-month returns have averaged 13.3% excluding 1973–74, the tech bubble and GFC.



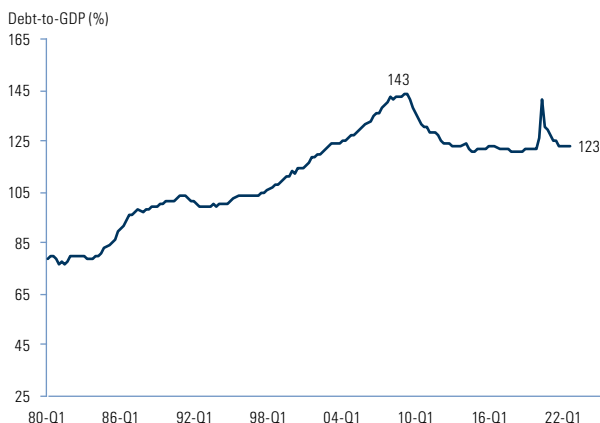
Data as of December 31, 2022.

Note: 50/50 portfolio refers to 50% US equity/50% US intermediate bonds. Bonds are represented by US intermediate treasuries and equities by the S&P 500 Index.

Source: Investment Strategy Group, Datastream, Ibbotson.

Exhibit 42: Debt-to-GDP for Households, Nonprofits and Non-Financial Corporates

Aggregate leverage was 143% of GDP during the GFC, compared to 123% at the end of 2022.



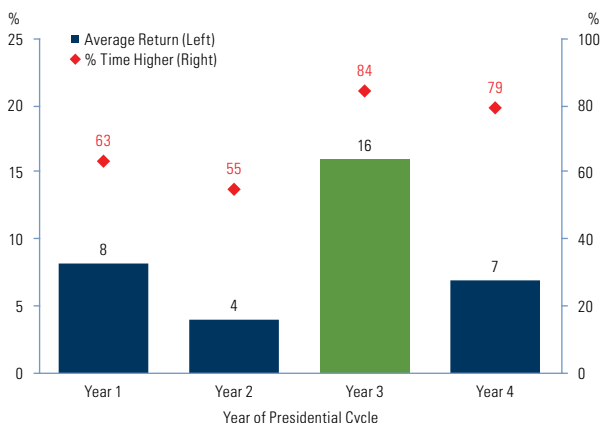
Data through Q3 2022.

Note: GDP is seasonally adjusted annual rate (SAAR).

Source: Investment Strategy Group, Haver Analytics.

Exhibit 44: S&P 500 Returns in Each Year of the Presidential Cycle

The third year in the presidential cycle has historically had the highest returns and 84% odds of a gain.



Data through December 31, 2022.

Note: Based on data since 1946.

Source: Investment Strategy Group, Bloomberg.

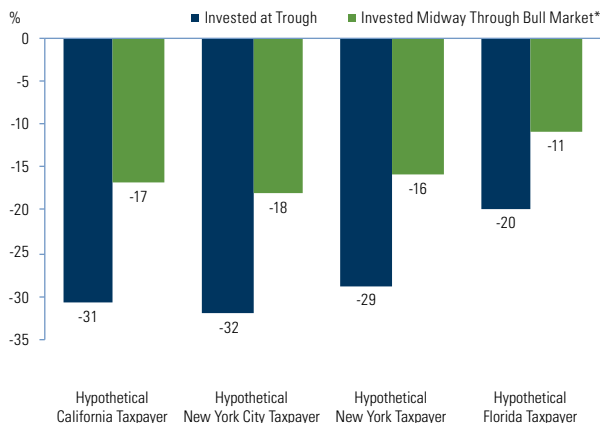
- Technical signals related to market breadth at various points last year, such as the number of S&P 500 companies above their 200- and 50-day moving averages, point to positive returns well above our base case target for the S&P 500.
- The third year of a presidential term has typically had the highest return and the highest

likelihood of a positive price return in the post-WWII period, as shown in Exhibit 44.

- For investors who pay taxes, it is important to factor in the cost of taxes incurred when realizing capital gains of assets. As shown in Exhibit 45, the market must decline significantly to make up for the cost of taxes, and the timing

Exhibit 45: Required Decline in US Equities to Offset Tax Consequences of Selling

Capital gains taxes increase the hurdle to exit the equity market for tax-paying investors.



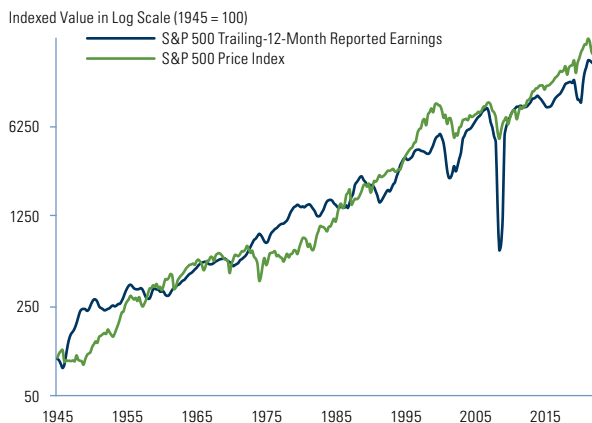
Data as of December 31, 2022.

Source: Investment Strategy Group, Datastream.

* Invested at an S&P 500 level of 2,031, which is the midpoint between the GFC trough level of 677 and the peak level of 3,386 before the COVID-19 drawdown.

Exhibit 46: S&P 500 Price Index vs. Earnings

Prices of US equities follow the path of corporate earnings in the long run.



Data through Q3 2022.

Source: Investment Strategy Group, Bloomberg, S&P Global.

for exiting and then reentering the market must be excellent. For example, if a hypothetical New York City taxpayer sold equities at the beginning of 2022 and remained out of the market, the taxes paid on a dollar invested in 2009 would necessitate a market decline of 32% from the beginning of 2022 just to break even. Taxes paid on a dollar invested midway between 2009 and the pre-COVID market peak would require a market decline of 18% just to break even.

Finally, our recommendation to stay invested is also driven by the general upward trend of US equities. As shown in Exhibit 46—an exhibit that is familiar to our long-standing clients—US equities are driven by earnings in the US economy, which are upward-trending except for recessions. Dwindrafts pass and portfolios recover. On average, it has taken 10 months for moderate-risk portfolios to recover; the median time to recovery is eight months, as shown in Exhibit 47. We recommend staying invested because the risk of missing out on an increase in equities is far greater than a short-term mark-to-market risk that will eventually dissipate.

We recommend clients stay invested at their full strategic asset allocation. We acknowledge that we made the same recommendation in our 2022 *Outlook* report, *Piloting Through*. We believe that if our 2023 expected returns are realized,

our recommendation to stay invested will have served our clients well. Interestingly, even if we had exited equities early in January 2022 and stayed in cash waiting for the fog of recession risk and other geopolitical risks to lift, our taxpaying clients might not have broken even. They would have paid more in taxes than they would have saved in the market decline.

We now turn to our tactical tilts, which provided some incremental portfolio return to clients that used them in 2022, and review our tilts in place at the beginning of 2023.

Our Tactical Tilts

A tumultuous year in financial and commodity markets presented the tactical asset allocation team with significant opportunities to add value to clients' portfolios. Volatility was nearly double that of 2021 as measured by the S&P 500, and about 80% higher as measured by the MSCI ACWI. At peak levels, we had 22 individual tactical tilts in 2022, compared to a long-term average of 10 tilts a year.

Typically, these tactical tilts have been funded from fixed income assets and driven by attractive valuations and market dislocations. Volatile markets tend to provide more market dislocations, which, in turn, provide more opportunities for tactical asset allocation.

Exhibit 47: Time to Recovery for 50/50 Portfolios During Past Equity Drawdowns

It has taken 10 months on average for moderate-risk portfolios to recover.

	S&P 500			50% Equities/50% Bonds	
	Peak-to-Trough Drawdown	Drawdown Duration (Months)	Time to Recovery (Months)	Portfolio Drawdown	Time to Recovery (Months)
May 1946–Nov 1946	-21.8%	6	35	-11.0%	18
Dec 1961–Jun 1962	-22.3%	6	10	-10.1%	7
Nov 1968–Jun 1970	-29.3%	19	9	-14.3%	6
Dec 1972–Sep 1974	-42.6%	21	21	-20.6%	8
Aug 1987–Nov 1987	-29.5%	3	18	-13.7%	14
Aug 2000–Sep 2002	-44.7%	25	49	-15.7%	15
Oct 2007–Feb 2009	-50.9%	16	37	-24.2%	19
Sep 20–Dec 24, 2018	-19.4%	3	4	-8.7%	2
Feb 19–Mar 23, 2020	-33.8%	1	5	-15.4%	3
Average	-32.7%	11	21	-14.9%	10
2022 Peak-to-Trough	-24.5%	-	-	-16.9%	-

Data as of December 31, 2022.

Note: 50/50 portfolio refers to 50% US equity/50% US intermediate bonds. Bonds are represented by US intermediate treasuries and equities by the S&P 500 Index. Episodes correspond to historical monthly drawdowns of more than -20% during the post-war era. Monthly data used with the exception of the Q4 2018 drawdown, COVID drawdown and 2022 peak-to-trough performance, which use daily data.

Source: Investment Strategy Group, Datastream, Ibbotson.

We estimate that these tilts added about 50 basis points to a taxable moderate-risk portfolio in 2022, outperforming intermediate Treasury and municipal bonds. The overall volatility of the tilts was 5.1%, and the beta to the S&P 500 was 0.18. Despite the positive beta to the S&P 500—which dropped about 18% for the year—the tilts produced a positive total return.

S&P 500 Option Strategies: One of the most effective strategies in 2022 for taking advantage of increased volatility was using options to augment the returns of a fully invested portfolio.

The strategy is based on two tenets:

- Volatility tends to revert to its long-term average over time. If volatility spikes because of events such as the GFC, the pandemic or the Russian invasion of Ukraine, it eventually comes back toward its long-term average of about 20 as measured by the VIX. During the early months of the pandemic, for example, volatility reached 85. In 2022, it peaked at 39 intraday and ended the year at 22, as shown in Exhibit 48. When volatility is high, options increase in value, and that may be an opportune time to sell options. When volatility is low, that may be an opportune time to buy options.
- We tend to use options to enhance the risk/return profile of a portfolio when we believe that buying or selling the underlying asset is

Exhibit 48: Daily Implied S&P 500 Volatility

Extreme levels of volatility increase attractiveness of option strategies.



Data through December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

a riskier strategy. For example, if volatility is high and we can collect an attractive premium by selling a put option, that may be more attractive than buying the asset outright. Sometimes, we use a combination of options, as we did in 2022.

In 2022, we had a total of nine put and call option tactical tilts on the S&P 500. In aggregate, they produced a total return of 3.2% net of transaction

costs, with a volatility of 6%, compared to the total return of the S&P 500 of -18%, total return of intermediate Treasuries of -8% and total return of intermediate municipal bonds of -5%.

While we do not have any such S&P 500 options as a tactical tilt in early 2023, we expect this to be an effective tactical asset allocation strategy this year, as spikes in volatility are likely given the uncertainty ahead with respect to the US economy and geopolitical tensions.

As of year-end 2022, we had six tactical tilts, which is below our average number of tilts and is the lowest level of risk allocated to such tilts over the last decade.

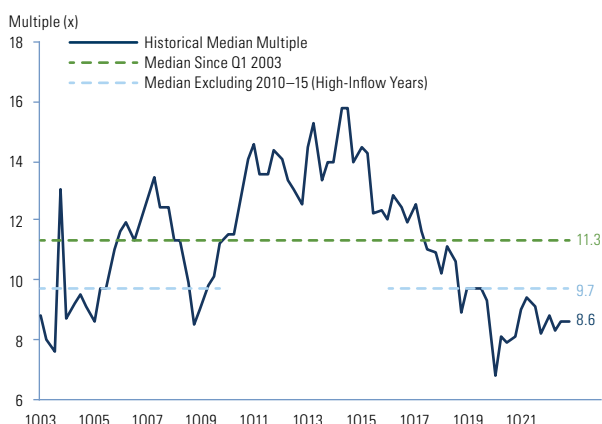
Overweight 2-Year Treasuries: We initiated a tactical tilt to a constant-maturity 2-year Treasury early in 2022. At the time, our view was that 2-year Treasury rates were already discounting Federal Reserve tightening to such an extent that the tilt was likely to provide a positive return. We still expect the tilt to provide a positive return, especially as 2-year Treasury rates ended 2022 at 4.4%. Given our view of economic growth at 1.2% and the federal funds rate peaking at 5–5.25%, we expect this tilt to provide a mid-single-digit return in 2023.¹⁸

Overweight US Energy Infrastructure Master Limited Partnerships: The allocation to master limited partnerships (MLPs) has been one of our longest-standing tactical tilts. It was initiated as an option tilt in 2015 and changed to a long sector position in January 2016. This tilt has an inception-to-date return of 37% and has been one of our most volatile tilts. The MLP sector was up nearly 30% in 2022, compared to the S&P 500 at -18%. While we have reduced the allocation to this tilt given its strong performance over the last two years, we still retain an allocation, for the following reasons:

- Valuations are still attractive even after such strong returns. Valuations as measured by the ratio of enterprise value to EBITDA are one standard deviation below their long-term average due to continued strong earnings (see Exhibit 49).
- Corporate management has continued to be disciplined about capital expenditures, with 2022 levels about 3.9% below 2021 levels. 2023 levels are expected to be flat to slightly lower.

Exhibit 49: MLP Enterprise Value to EBITDA

MLP valuations are still attractive even after strong returns over the last 2 years.



Data through Q4 2022.

Source: Investment Strategy Group, Bloomberg.

- The tax-advantaged distribution yield of 8% is attractive compared to fixed income and high yield rates. The companies in the Alerian MLP Infrastructure Index generate 1.8x free cash flow relative to distributions, so the distribution yield appears secure.
- We expect returns in the low 20s in 2023.

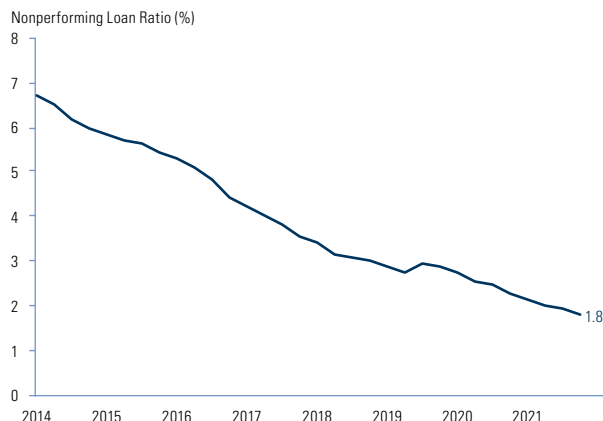
We note that we removed our S&P 500 energy sector tilt in October 2022 as the sector had rallied 63%, following a 55% total return in 2021. The energy sector had outperformed the S&P 500 by 83 percentage points when we removed the tilt. We removed the tilt because it had reached fair value on a normalized price-to-earnings basis, given oil prices in the futures market.

Overweight Eurozone Banks: We have maintained our tactical tilt to Eurozone banks at a reduced allocation. This is also among our longest-standing tilts, initiated in June 2018. And very much like our MLP tilt, it has been very volatile. It outperformed the European markets in both 2021, with a total return of 42%, and 2022, with a total return of 2%. We retain this allocation for the following reasons:

- Rising rates will improve the banks' net interest margins and overall profitability.
- We expect only a moderate rise in provisions despite our recession forecast for the Eurozone. Leverage has remained low, and two-thirds of the post-COVID increase in lending is covered

Exhibit 50: Eurozone Banks' Nonperforming Loan Ratio

There are no signs of deterioration in asset quality.

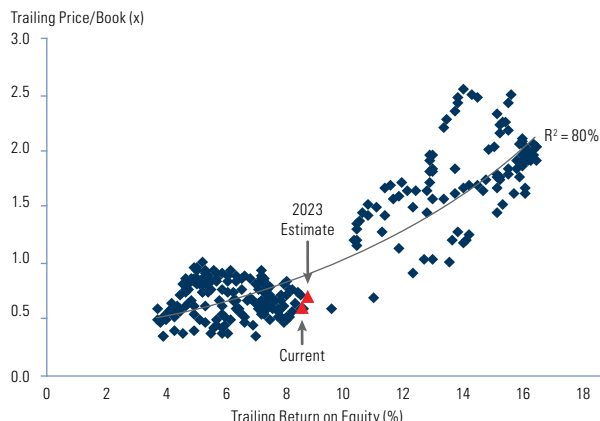


Data through Q2 2022.

Source: Investment Strategy Group, European Central Bank.

Exhibit 51: Eurozone Banks' Return on Equity vs. Price/Book Ratio

Eurozone banks' valuation is lower than what is implied by their profitability.



Data through December 31, 2022.

Source: Investment Strategy Group, Datastream.

by government guarantees. There are currently no signs of deterioration in asset quality, as shown in Exhibit 50.

- The banks' capital ratio is near record highs.
- We expect a total return in the low 20s, composed of 6% dividend yield and multiple expansion as the price-to-book ratio increases from its current low level of 0.60x to 0.69x. As shown by the red triangle in Exhibit 51, that increase in price-to-book is a reasonable assumption.

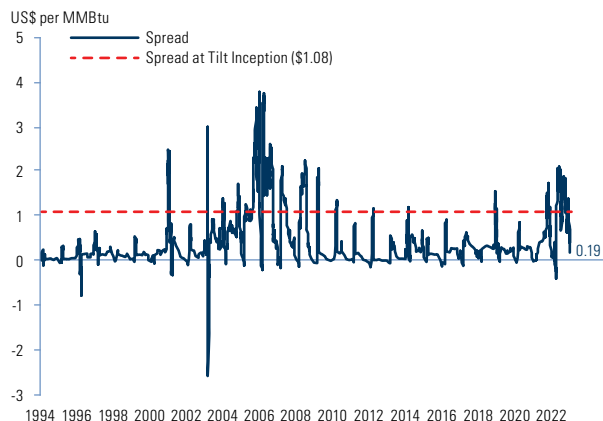
Allocation to US Natural Gas Calendar Spread:

As noted earlier, both European and US natural gas prices gyrated following the halting of the Nord Stream 2 pipeline and the Russian invasion of Ukraine. Fears of winter shortages of natural gas led US March 2023 contracts to become very expensive relative to April and trade at a historically high premium of over \$1 per million BTU (see Exhibit 52)—a spread that had been wider only 9% of the time. This spread has typically contracted to \$0.5 or less 95% of the time as the winter ends. The base case expected return on this trade was in the mid- to high teens, and we are rapidly approaching those levels.

Allocation to Physical Uranium: We initiated a small allocation to physical uranium in 2022. Nuclear energy is becoming an increasingly attractive source of electricity as countries seek

Exhibit 52: Rolling March-April Henry Hub Natural Gas Spread

March 2023 contracts became very expensive relative to April and traded at a historically high premium.



Data through December 31, 2022.

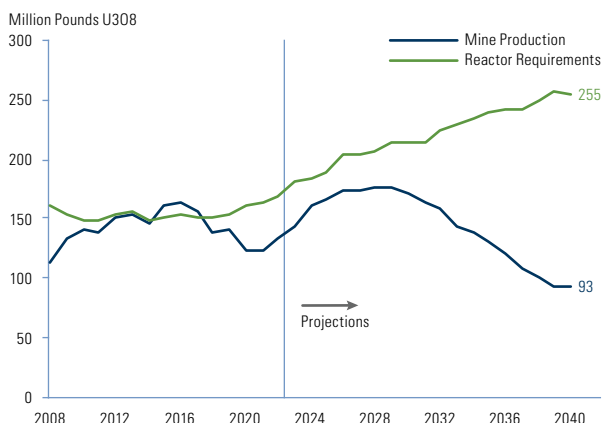
Source: Investment Strategy Group, Bloomberg.

reliable, carbon-free and secure sources of energy. Some view nuclear energy as a permanent solution and others as a transition source of energy away from hydrocarbons while waiting for the development of more renewable energy sources.

Nuclear energy has supplied about 20% of total annual US electricity since 1990. In 2020, nuclear energy supplied 69% of France's electricity generation.

Exhibit 53: Annual Uranium Mine Production and Nuclear Reactor Requirements

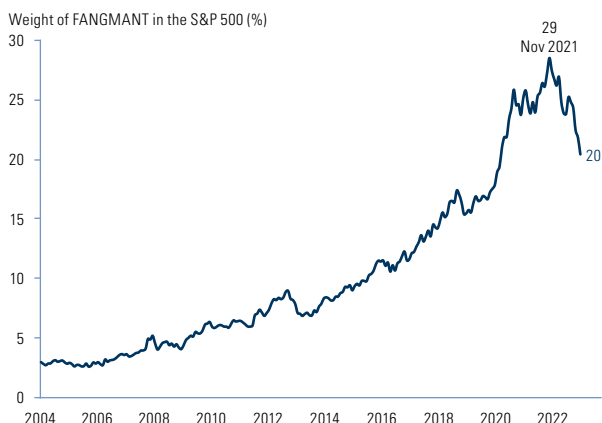
The current trajectory of mine production is projected to remain below annual reactor requirements.



Data through 2022; projected through 2040.
Source: Investment Strategy Group, UxC LLC.

Exhibit 54: FANGMANT Weight Over Time

The FANGMANT stocks represent 20% of the overall S&P 500.



Data through December 31, 2022.
Note: FANGMANT = Facebook/Meta, Apple, Netflix, Google/Alphabet, Microsoft, Amazon, Nvidia and Tesla.
Source: Investment Strategy Group, Bloomberg.

There has been a sharp decrease in uranium exploration activity and in production from existing mines. Since 2018, mined supply has been insufficient to meet annual reactor requirements (see Exhibit 53), and utilities have accessed inventories and extended the enrichment process to extract more yield per unit of raw uranium.

As of December 31, 2022, the price for uranium was \$48/lb. We estimate that prices need to reach \$70 or higher to incentivize adequate future production. While we do not anticipate those levels in the near term, we think this tilt will have long-term attractive returns.

Allocation to Systematic Strategies: We deploy three systematic strategies to provide uncorrelated sources of incremental return to a portfolio: Systematic Upside Improvement Tilt (SUIT); Systematic Downside Mitigation Tilt (SDMT); and Trend-Based Rotation (TBR).

All three strategies were deployed at the beginning of 2022. We removed the first two strategies after high-single-digit returns but have left the TBR strategy as a tactical tilt for 2023. This strategy was introduced in 2021. The goal is to rotate among 10 asset classes: US and non-US equity indices, gold, US corporate bonds, US Treasury bonds and US cash. The strategy is driven by the trend in each asset class, its volatility and the likelihood the trend will reverse course once

it has become extended. The strategy is based on the momentum factor and is a diversified strategy for ISG's more value-oriented tactical tilts. We generally expect the strategy to deliver a high-single-digit return.

Role of Growth Stocks in Driving Equity Returns:

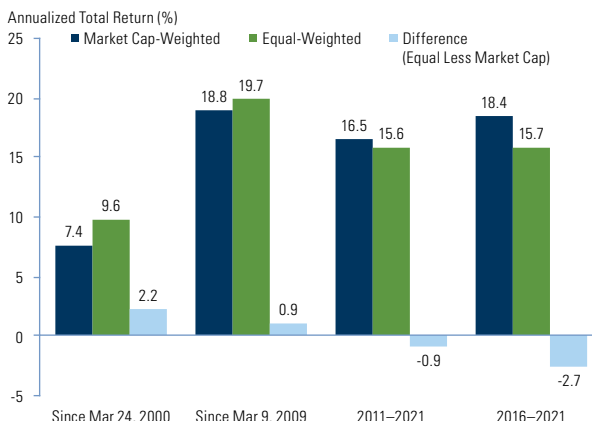
Our tactical tilts generally have had a value orientation. Since the inception of ISG, we have had only a handful of growth-oriented tactical tilts. In total, our tactical tilts have provided incremental return to the strategic asset allocation process. Avoiding growth-oriented sectors did not hamper our performance, or that of the S&P 500.

One of the questions clients most frequently ask us concerns the role of a limited basket of stocks like the FANGMANT stocks, or the technology or communication sector stocks, in driving equity returns since the GFC. When we share our view that the return of the S&P 500 has been broad-based, clients are often surprised. As shown in Exhibit 54, the FANGMANT stocks represent 20% of the weight in the S&P 500 Index, down from a peak of 29% in November 2021.

The most straightforward way to show that a handful of growth stocks with large weights in the S&P 500 have not driven the index returns is to compare these returns using market capitalization weights to those of an equal-weighted index of stocks, where value stocks like Exxon, with

Exhibit 55: Performance of Equal- and Market Cap-Weighted S&P 500

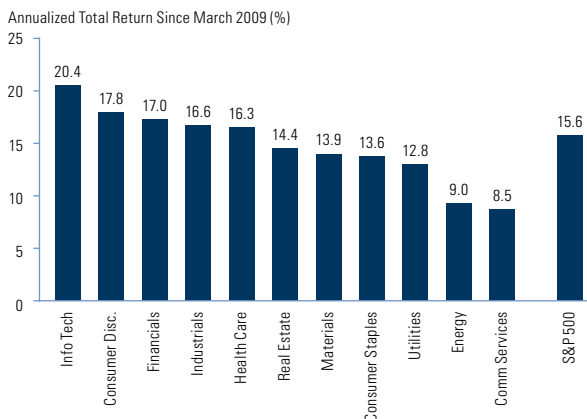
The equal-weighted S&P 500 index has outperformed the market cap-weighted index across prior historical windows.



Data through December 31, 2021.
Source: Investment Strategy Group, Bloomberg.

Exhibit 56: Performance of S&P 500 Sectors

Financials and industrials are among the sectors that outperformed the S&P 500 since the trough of the GFC.



Data through December 31, 2022.
Source: Investment Strategy Group, Bloomberg.

a 1.4% weight, and Coca-Cola, with a 0.8% weight, are given the same weight as Apple Inc., which has a 6.0% weight, and Microsoft, which has a 5.6% weight in the market capitalization-weighted index.

We have analyzed the data through the end of 2021 and end of 2022. We present below the returns of the two benchmarks for four periods: since March 2000, the peak of the dot-com bubble; since the trough of the GFC; and over the last five and the last 10 years. We focus on the data ending in 2021 because these stocks did extremely poorly in 2022 and we do not want clients to discount the analysis because of that poor performance. Late 2021 also marks the peak weight of the basket of FANGMANT stocks in the S&P 500 Index. This basket of stocks declined 40% in 2022.

Since 2000 and since the trough of the GFC, the equal-weighted index outperformed the market capitalization index by 2.21 and 0.94 percentage points, respectively, on an annualized basis. Over the decade ending in 2021, the market capitalization-weighted index outperformed by 0.92 percentage point. The outperformance increased to 2.75 percentage points over the five years ending in 2021, and that includes the strong outperformance during the pandemic (see Exhibit 55).

If the returns had been driven by a basket of growth-oriented stocks alone,

the equal-weighted index would have lagged the market capitalization-weighted index significantly over all periods.

An alternative approach is to look at the total return across all S&P 500 Index sectors. As shown in Exhibit 56, the information technology sector outperformed after the trough of the GFC. However, financials, industrials and health care all outperformed the broader market.

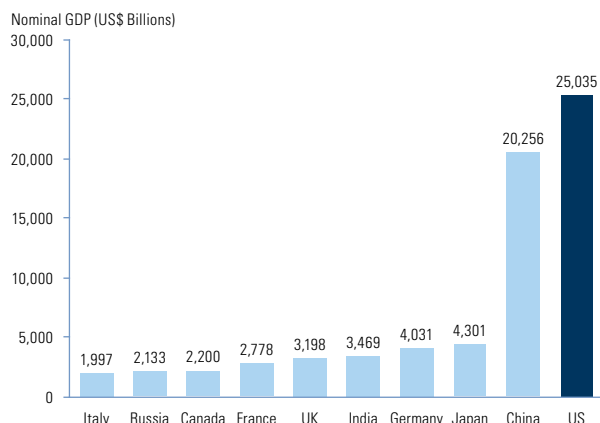
While our US Preeminence theme is not reflected in a tactical asset allocation tilt, it is a strategic asset allocation overweight. As shown in Exhibits 57–72, the US is preeminent across most metrics that underpin economic growth, superior earnings growth and greater resilience. Should some of the risks other than recession that we have outlined in the next section materialize, this resilience will be paramount. Even so, these risks could derail our 2023 outlook.

The US is preeminent across most metrics that underpin economic growth, superior earnings growth and greater resilience.

US Preeminence by the Data

Exhibit 57: Nominal GDP per Country

The US has the highest GDP in the world.

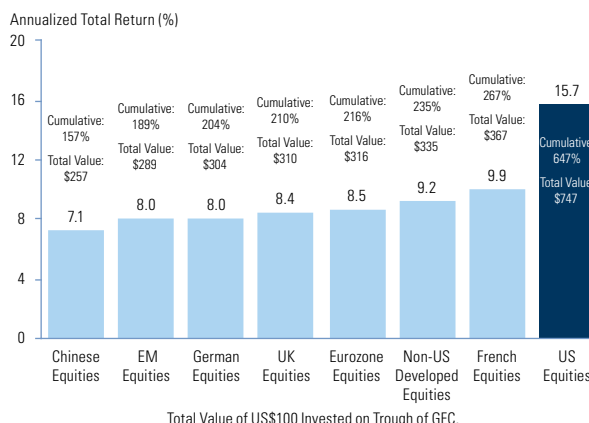


Data as of 2022.

Source: Investment Strategy Group, IMF World Economic Outlook.

Exhibit 59: Annualized and Cumulative Equity Returns Since the Trough of the GFC

US equities have outperformed equities in other regions over the past 13 years.



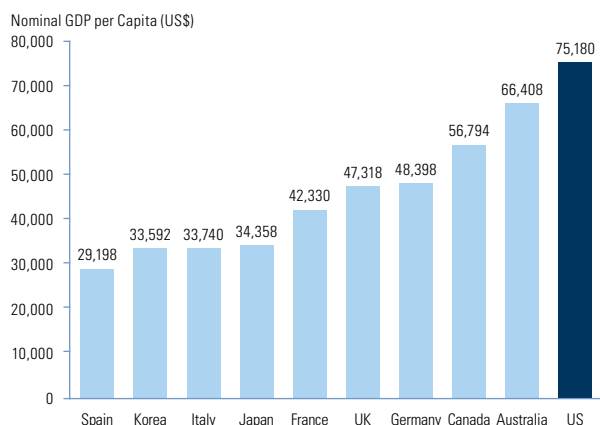
Data as of December 31, 2022.

Note: All non-US equities returns are calculated in US\$.

Source: Investment Strategy Group, Datastream, Bloomberg.

Exhibit 58: Nominal GDP per Capita

The US also has the highest GDP per capita in the world.*



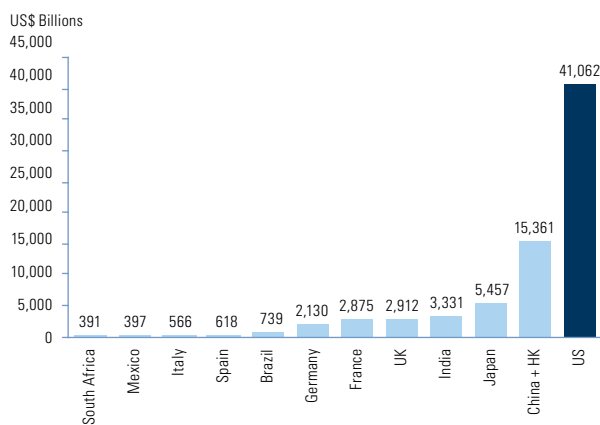
Data as of 2022.

Source: Investment Strategy Group, IMF World Economic Outlook.

* The US has the largest GDP per capita among countries with populations over 25 million.

Exhibit 60: Total Equity Market Capitalization per Country

US market capitalization is the largest in the world.

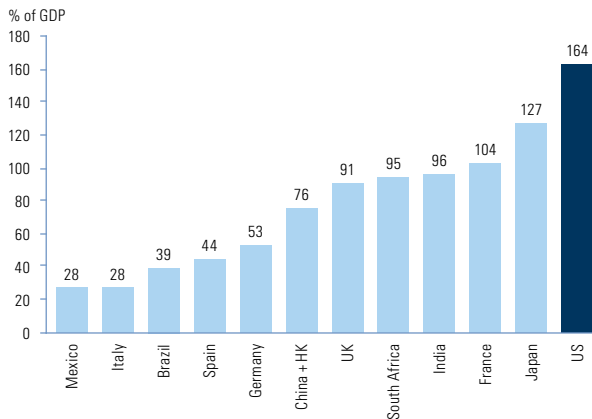


Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

Exhibit 61: Equity Market Capitalization as a Share of GDP per Country

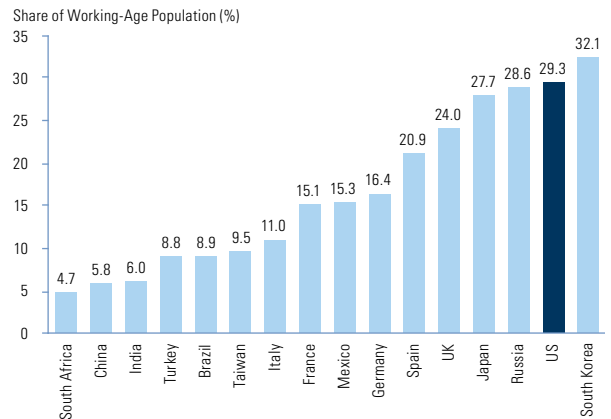
The US equity market stands at 164% of GDP.



Data as of December 31, 2022.
Source: Investment Strategy Group, Bloomberg.

Exhibit 63: Share of Working-Age Population With Completed Tertiary Education

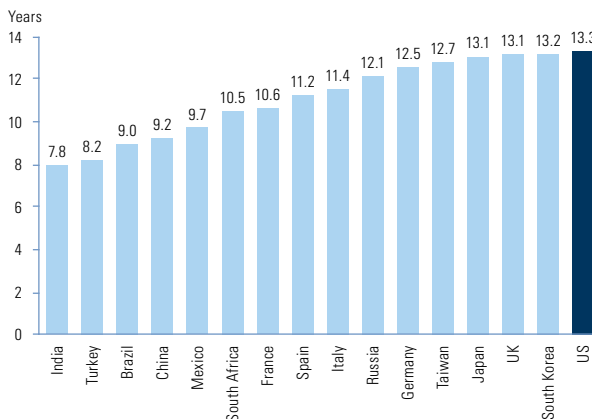
The working-age population in the US has a high level of completed tertiary education relative to other regions.



Data as of 2020.
Note: Fraction of population that has completed tertiary education is estimated using original growth assumptions between 2015 and 2020 from Barro-Lee (2015) and the most recent completion rate data for 2015 as reported by Barro-Lee (2021).
Source: Investment Strategy Group, UNESCO, United Nations World, Barro-Lee.

Exhibit 62: Average Years of Schooling

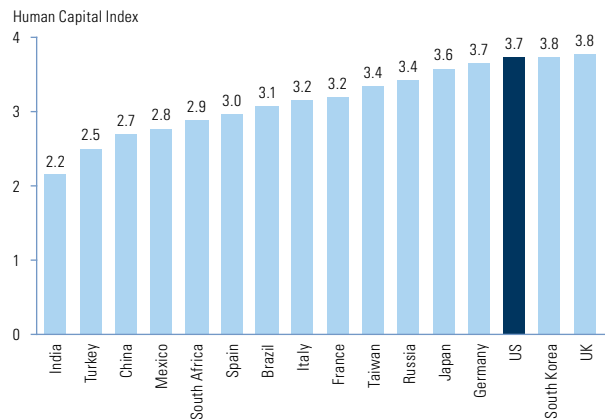
The US has the highest average years of schooling among comparable countries.



Data as of 2020.
Note: Average years of schooling data is estimated using original growth assumptions between 2015 and 2020 from Barro-Lee (2015) and the most recent years of schooling data for 2015 as reported by Barro-Lee (2021).
Source: Investment Strategy Group, Barro-Lee.

Exhibit 64: Human Capital Index

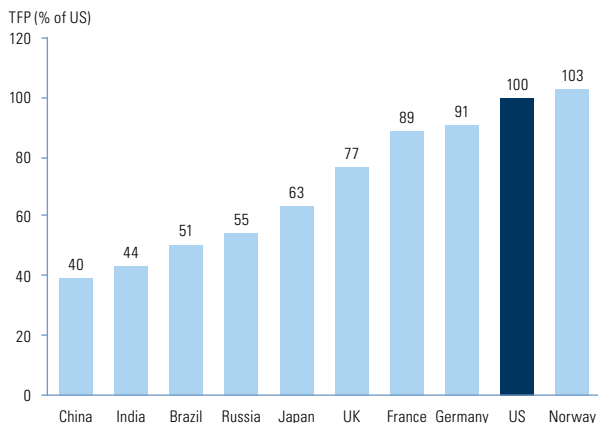
The quality of the US labor force is higher than that in most peer countries.



Data as of 2019.
Source: Investment Strategy Group, Penn World Table 10.0.

Exhibit 65: Total Factor Productivity (TFP) Relative to US levels

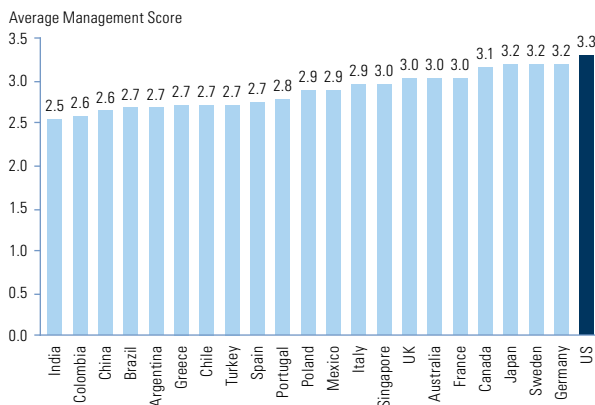
There are not many countries that exceed US total factor productivity.



Data as of 2019.
Source: Investment Strategy Group, Penn World Table.

Exhibit 67: Average Management Scores

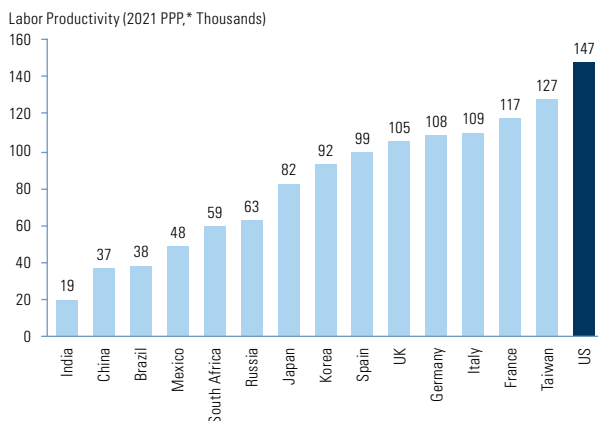
The US has the highest rank.



Data as of 2015.
Source: Investment Strategy Group, World Management Survey.

Exhibit 66: Labor Productivity

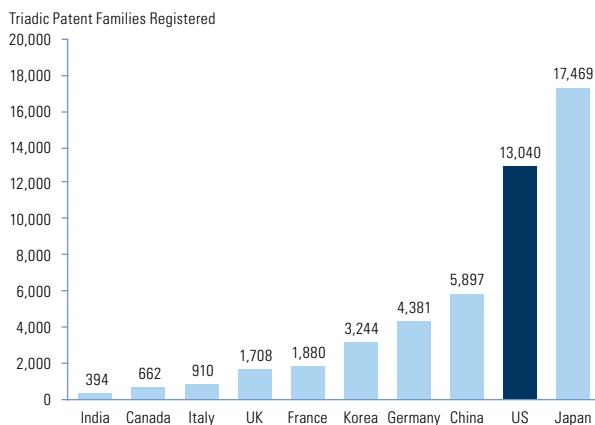
The US has high levels of labor productivity.



Data as of 2021.
Source: Investment Strategy Group, Conference Board.
* Purchasing power parity.

Exhibit 68: Triadic Patent Families Registered

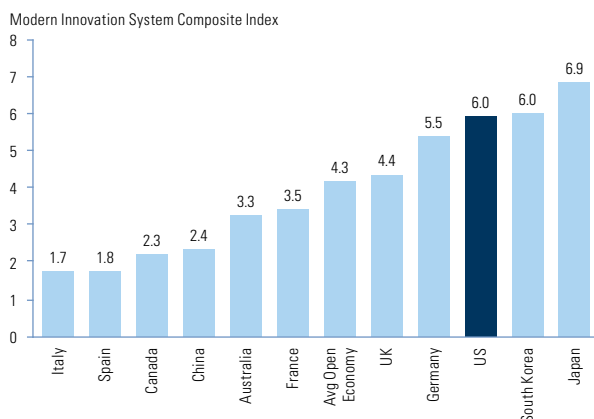
The US ranks high in terms of the number of triadic patent families filed.



Data as of 2020.
Note: Measures the number of patents filed at the European Patent Office, the United States Patent and Trademark Office, and the Japan Patent Office.
Source: Investment Strategy Group, OECD.

Exhibit 69: Modern Innovation System Composite Index

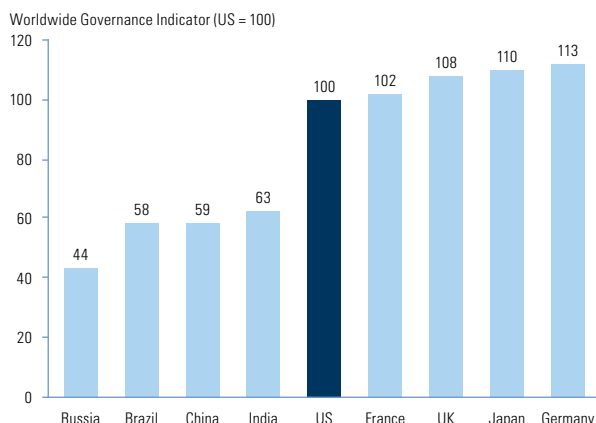
The US has a higher ranking than the average open economy.



Data as of 2021.
Source: Investment Strategy Group, China Pathfinder, Atlantic Council, Rhodium Group.

Exhibit 71: Worldwide Governance Indicators

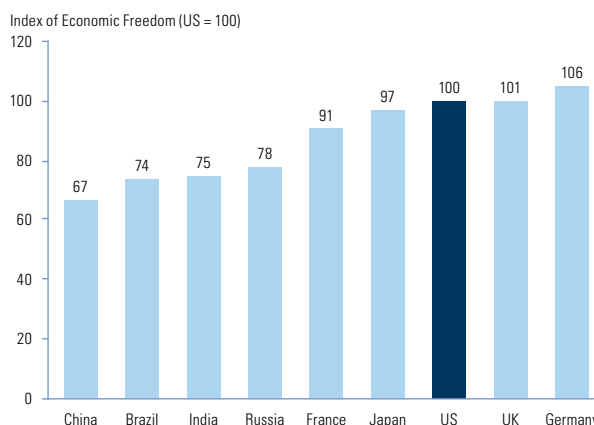
The US ranks highly among major economies on worldwide governance.



Data as of 2021.
Source: Investment Strategy Group, World Bank.

Exhibit 70: Index of Economic Freedom

There are not many large economies that surpass the US.



Data as of 2022.
Source: Investment Strategy Group, The Heritage Foundation.

Exhibit 72: GDP, Nobel Laureates and Universities in Top 50

The US is stronger because of its alliances.

	GDP (US\$billion)	GDP per Capita (US\$)	Nobel Laureates	Universities in Top 50
United States	22,996	69,227	403	23
Europe	22,044	37,060	579	15
France	2,957	45,188	72	1
Germany	4,263	51,238	113	3
Italy	2,101	35,473	21	0
Spain	1,426	30,090	8	0
United Kingdom	3,188	47,329	137	7
Australia	1,635	63,464	12	2
Canada	1,988	52,015	28	3
Japan	4,933	39,301	29	1
Korea	1,811	35,004	1	0
New Zealand	247	48,317	3	0
West & Allies	55,654	47,432	1,055	44
China	17,745	12,562	10	4
Russia	1,779	12,219	32	0
East	19,523	12,530	42	4

Data as 2021.
Source: Investment Strategy Group, IMF, Nobel Prize website, Times Higher Education.

Additional Risks to Our Outlook

We face significantly greater risks in 2023 than we did in 2022:

- In 2022, we assigned a 10% probability of recession in the US; we have increased that probability to 45–55% for 2023.
- We wrote that the late Ash Carter, former US secretary of defense, had assigned a 50% probability to the risk of a Russian invasion of Ukraine in 2022. Now, not only has that happened, but we are facing risk of escalation, including attacks on infrastructure beyond Ukraine's borders and a nonzero probability of tactical nuclear weapon deployment.
- We wrote that US-China relations were going to be a source of uncertainty and volatility for the indefinite future; China became more aggressive in both its policy statements and its military activities in 2022.
- With respect to North Korea, we wrote that we were least worried about rising tensions in 2022, but now we are worried about Kim Jong Un's more aggressive posture toward missile testing and North Korea's nuclear capabilities.
- We wrote about two risks with respect to Iran: continued development of its nuclear program and its extensive missile program. The risks are even greater now given Iran's further enrichment of its uranium and its new military partnership with Russia.
- On COVID, we highlighted the risks of a more transmissible variant and risks to supply chains from China's "zero-COVID" policy. The risks from COVID are unchanged. The new XBB.1.5 omicron subvariant has become the dominant variant in parts of the US, and China's disorderly abandonment of its "zero-COVID" policy may create another surge of infections in other parts of the world.
- We did not cite US midterm elections as a risk in 2022. However, the US will be a source of volatility in the second half of 2023: US debt ceiling negotiations are likely to be contentious and lead to market volatility, as they have in the past.

In aggregate, we think the risks to our economic and financial market outlook are greater than in 2022.

We begin with the geopolitical risks, since the recession risks were discussed earlier. We have



The geopolitical advisors we have consulted with expect the Ukraine-Russia war to last well beyond 2023.

consulted on these risks with Andrew Bishop, senior partner and global head of policy research at Signum Global Advisors; Ian Bremmer, president and founder of Eurasia Group; General Sir Nick Carter, former chief of the Defence Staff in the UK; Bernie Haykel, professor of Near Eastern studies at Princeton University; and Sir Alex Younger, former chief of the Secret Intelligence Service in the UK and regional advisor at Goldman Sachs.

Ukraine-Russia War

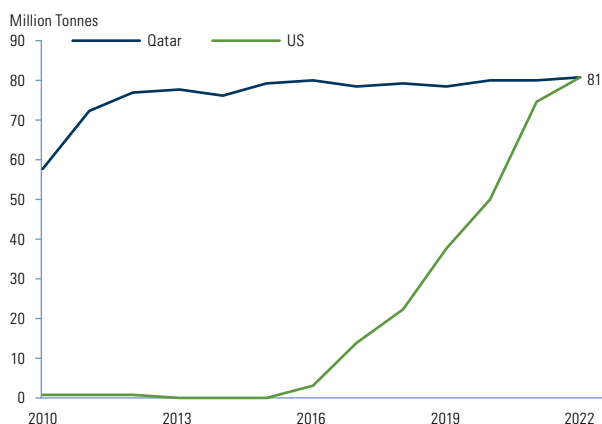
The base case for most of the geopolitical advisors we have consulted with is a war that will last well beyond 2023. There is no face-saving off-ramp for President Vladimir Putin, and Ukraine cannot readily come to the negotiating table after the war crimes committed by the Russians against men, women and children, and the extensive damage to civilian structures and infrastructure.

The greatest risk is escalation by the Russians:

- Russian could become more aggressive, targeting infrastructure such as undersea cables and pipelines outside Ukraine.
- Russia could launch cyberattacks globally.
- Russia, most importantly, could use its nuclear capabilities.
 - Russia has the ability to use the ruse of a “dirty bomb” as a false flag somewhere near the Russian border to undermine Ukraine's position, according to General Sir Nick Carter.¹⁹
 - It could use a small-scale tactical nuclear weapon with limited explosive yield in Ukraine.
 - It could use a nuclear weapon to generate a high-altitude electromagnetic pulse that would damage electronics and communication systems.

Exhibit 73: Annual LNG Shipments

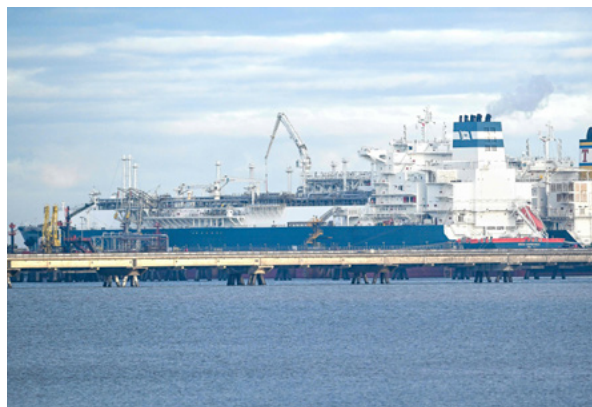
The US is fast becoming the largest exporter of LNG.



Data through 2022.

Note: 2022 figures are according to ship-tracking data compiled by Bloomberg.

Source: Investment Strategy Group, Bloomberg New Energy Finance.



Germany inaugurated its first floating LNG terminal in December 2022.

According to Bremmer, the US has told Russia that if it were to deploy a nuclear weapon, the US would directly target Russian forces.²⁰ Theoretically, that warning should be a sufficient deterrent to President Putin. However, Sir Alex warns that “we cannot rely on Putin to act rationally. He has a higher readiness to accept risk.”²¹ Bremmer has assigned a 5% probability to use of nuclear weapons.

Financially, Russia can afford to prolong this war through 2023 and possibly through 2024. We base this assessment on a series of assumptions, such as:

- A modest GDP decline in Russia of 3% in 2022 relative to high-single-digit drop expectations
- Equally modest GDP decline of 2.6% in 2023
- Oil and gas exports continuing at year-end 2022 levels
- China and India continuing to import 24% and 11%, respectively, of Russia’s export of crude oil and refined products
- Russia’s ability to issue bonds domestically and tap oligarchs, their companies and the sovereign wealth fund, which has an estimated \$186 billion in assets

One factor constraining how long Russia can continue the war is its supply of artillery ammunition. Admiral Sir Tony Radakin has said that “Russia faces critical shortages of artillery

munitions,”²² and US officials have made similar statements. The Wagner Group, a Russian mercenary company, has also complained about the lack of ammunition.²³ Others have countered that Russia can tap into Soviet-era stockpiles and import ammunition from North Korea.

Finally, a cutoff of the West’s military, financial and humanitarian support to Ukraine would increase the likelihood that Ukraine would be forced to negotiate a settlement of some kind. While some have questioned the resolve of the US and Europe, it appears that their resolve has only strengthened. Ukraine has received increasing funds, more sophisticated military equipment and stronger statements of support from most Western leaders.

Europe is also under limited pressure to resume imports of natural gas from Russia. Germany, in less than a year from the start of construction, inaugurated its first floating liquefied natural gas (LNG) terminal in Wilhelmshaven, and accepted its first shipment of LNG from the US. The terminal can process close to 6% of Germany’s 2021 consumption level. Coincidentally, the US is fast becoming the largest exporter of LNG, as shown in Exhibit 73. In 2022, it matched Qatar’s exports, and it is expected to exceed Qatar’s level once the Freeport export plant in Texas returns to full production after a June 2022 fire.

In aggregate, we think the risks to our economic and financial market outlook are greater than in 2022.

The Ukraine-Russia war is likely to continue, and risks of escalation will contribute to market volatility.

US-China Tensions

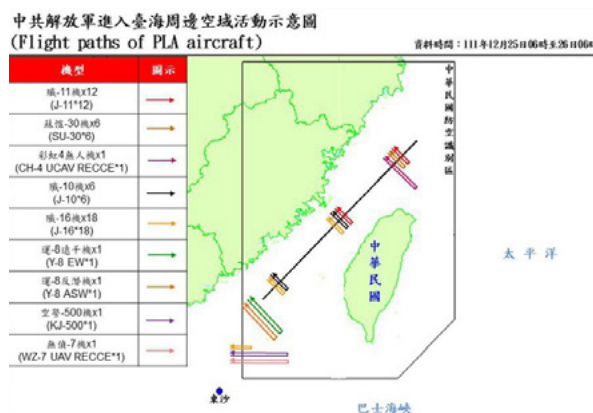
As discussed extensively in our China *Insight* report, *Middle Kingdom: Middle Income*, China has become more aggressive and assertive in its foreign policy toward the West. The US and its allies have responded by changing their national security strategies; they have introduced export and import controls such as the US Bureau of Industry and Security's revision of export controls of high-end semiconductors and enhanced cybersecurity measures. Please see [the report](#) for a detailed discussion on this topic.

We think financial market volatility emanating from US-China tensions will ebb and flow. The meeting between Presidents Biden and Xi on November 14, 2022, in Bali, Indonesia, and the appointment of the Chinese ambassador to the US as foreign minister on December 30, 2022, have been interpreted as an improvement in US-China relations. On the other hand, a series of military activities in December 2022 have been interpreted as a more aggressive approach:

- The Japanese Ministry of Defense reported that between December 17 and December 27, the Chinese aircraft carrier *Liaoning* and its accompanying vessels sailed near the southernmost part of Japan and that there were numerous aircraft takeoffs that prompted Japan to scramble military aircraft and vessels.²⁴ The *Liaoning* and its task force also proceeded to within 400 miles of the US territory of Guam during this period, and Chinese media highlighted that Guam would be a target in a conflict scenario.
- On December 21, the US Indo-Pacific Command reported that a People's Liberation Army Navy fighter pilot "performed an unsafe maneuver during an intercept of a U.S. Air Force RC-135 aircraft ... in international airspace ... forcing the RC-135 to take evasive maneuvers to avoid a collision."²⁵
- On December 25, China sent 71 warplanes into the vicinity of Taiwan, of which 47 crossed into Taiwan's southwest air defense identification zone, prompting Taiwan's military to respond with aircraft and navy vessels. The level of such incursions doubled in 2022 relative to 2021.²⁶



The Chinese aircraft carrier *Liaoning* sailed to within 400 miles of the US territory of Guam in December 2022.



Taiwan reported that several Chinese aircraft crossed into its air defense identification zone in December 2022. (Credit: Taiwan Ministry of National Defense)

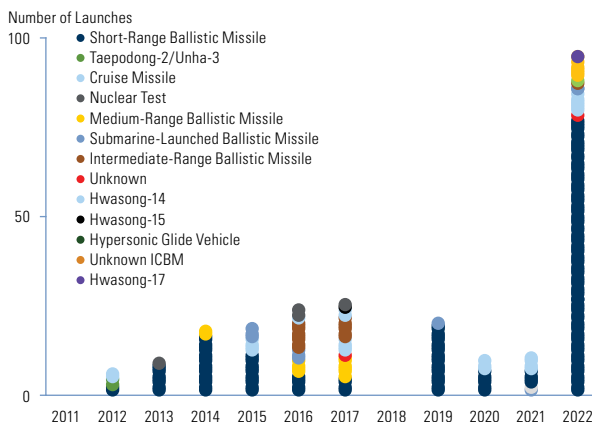


The US military said a Chinese Navy J-11 fighter jet flew close to a U.S. Air Force RC-135 aircraft in December 2022.

While US-China tensions and increased risks of military accidents in the air and the seas may contribute to market volatility, our panel of geopolitical advisors believe that the risk of a Chinese invasion of Taiwan is low in 2023. Most think it is unlikely over the next five years. However, Bishop from Signum Global Advisors

Exhibit 74: North Korean Missile Launches

North Korea has launched more missiles in 2022 than in the prior five years combined.



Data as of 2022.

Source: Investment Strategy Group, Center for Strategic and International Studies.

assigns a 35% probability of a Chinese attack on Taiwan over the next two years.

North Korea

While we were not worried about North Korea's activities spilling into financial markets in 2022, we think North Korea poses greater risks in 2023. As shown in Exhibit 74, North Korea has launched more missiles in 2022 than in the prior five years combined. The missiles have varied from short-range ballistic missiles to intercontinental ones. CIA Director William Burns has referred to it as "quite troubling," and Bremmer has warned that "they're going to test a nuke."²⁷

Eurasia Group has also written that "the chances of conflict on the Korean peninsula are at their highest level since at least 2017 with fewer guardrails in place to promote de-escalation."²⁸



Missile tests by North Korea could lead to interim market volatility.

China and Russia would have been the countries to place some guardrails on North Korea, but given the Ukraine-Russia war and rising geopolitical tensions between the US and China, those guardrails have been removed.

While risks of incidents between South Korea and North Korea are non-negligible in 2023, and missile tests could lead to interim volatility in the financial markets, the risk of serious military engagement with North Korea is low in the near term.

Iran

Iran poses two threats in 2023: producing weapons-grade uranium and making other irreversible advances in its nuclear program and expanding its weapons sales to Russia from drones to missiles.

Nuclear Concerns. According to data from the International Atomic Energy Agency and the analysis from the Institute for Science and International Security (ISIS), Iran already has highly enriched uranium (HEU) at 60% sufficient to be used for a nuclear weapon.²⁹ However, ISIS thinks Iran may prefer to enrich its 60% HEU to 90%, which is considered weapons-grade and more suited to Iran's nuclear weapons designs.

General Sir Nick has suggested Iran will very likely have reinforced its view from observing the Ukraine war that there is merit in possessing a nuclear deterrent.³⁰ Sir Alex suggests that Iran's leaders will not weaponize because their progress on enrichment "gives them enough leverage."³¹

Eurasia Group writes that Iran might decide to enrich to 90% when the Joint Comprehensive Plan of Action (JCPOA) restrictions on Iran's development program of ballistic missiles designed to carry nuclear weapons expire in October 2023.³²



Headlines from Iran on its nuclear program will be a source of volatility in 2023.

Headlines from Iran on its nuclear program and responses from Israel will be a source of volatility in 2023.

Transferring Drones and Missiles to Russia. The new military relationship between Russia and Iran has been troubling to the West. Burns has said that “what’s beginning to emerge is at least the beginning of a full-fledged defense partnership between Russia and Iran, with the Iranians supplying drones to the Russians, which are killing Ukrainian civilians.”³³ In a joint statement after a United Nations Security Council meeting, France, Germany and the UK warned Iran “against any further deliveries of weapons to Russia, in particular of any short-range ballistic missiles, which would constitute a serious escalation.”³⁴

In our 2022 *Outlook*, we quoted Kenneth “Frank” McKenzie Jr., Marine general and commander of the US Central Command covering the Middle East and South Asia; he said that Iran had reached “overmatch” where its “strategic capacity is now enormous” and it has “the ability to overwhelm.” Its missiles “can strike effectively across the breadth and depth of the Middle East ... with accuracy and volume.”³⁵ The joint statement warned that transferring such missiles to Russia would constitute an escalation. Escalation would lead to market volatility.

Cybersecurity

Cyberattacks remain a major threat from state and non-state actors, with the biggest threats emanating from China, Russia, Iran and North Korea.

US intelligence and national security agencies assess China’s state-sponsored cyber activities as presenting one of the largest and most dynamic threats to US government and civilian networks.



Cyberattacks remain a major threat from state and non-state actors.

The Office of the Director of National Intelligence considers Russia a significant threat given its focus on critical infrastructure, including underwater cables and industrial control systems, in the US and in allies and partner countries.³⁶

Use of ransomware is on the rise as well and will continue increasing in 2023. Australia will lead a global ransomware task force starting in January 2023 to develop safeguards for advanced economies, but the benefits of such a task force will not be immediate.

Terrorism

Our panel of experts believe that the risk of terrorism is unchanged from 2022. They cite the absence of charismatic leaders and the lack of command and control under which terror groups could operate from the Middle East, including in Afghanistan. With limited state sponsorship, terror groups cannot get adequate funding to organize and pull off major terrorist acts in the West.

General Sir Nick has warned that there is a real possibility of terrorism being exported on the back of migration from Africa. The assessment of the Combating Terrorism Center at West Point is that the threat of terrorism from Africa and the Middle East is more local and cross-border within the region than global, with “Africa emerging as the world’s leading terrorism hotspot.”³⁷

COVID-19

COVID-19 risks in advanced economies are unchanged from last year. A new omicron subvariant, XBB1.5, has become the dominant variant in the US Northeast and could be responsible for the current surge. However, holiday travel and the winter may also be contributing to the surge. This variant appeared in Singapore in the fall.

The new variant has been described as immune-evasive: the virus is less likely to be neutralized by antibodies from prior infection or vaccines. According to Dr. David Ho, professor of microbiology and immunology at Columbia University, the level of immune evasion is “alarming.”³⁸ Our COVID-19 advisor, Dr. Luciana Borio, former director for medical and biodefense preparedness at the US National Security Council, believes that the new variant will cause many more infections, but that T cells from prior infections and vaccinations will limit serious disease and hospitalizations for most people.



China is going through its massive first wave of COVID since the initial controlled surge in Wuhan in 2020.

China is going through its massive first wave of COVID since the initial controlled surge in Wuhan in 2020. According to reports in the *Financial Times*, Sun Yang, a deputy director at the Chinese Center for Disease Control and Prevention (CDC), estimated that about 250 million people—or 18% of China’s population—were infected by COVID-19 in the first 20 days of December 2022.³⁹

Wu Zunyou, chief epidemiologist at the Chinese CDC, has suggested China will face three waves: the present one, a second one following the travel of hundreds of millions of people for the Lunar New Year starting on January 21, 2023, and a third one from late February to mid-March when people return to work from the New Year holidays.⁴⁰ The University of Washington’s Institute for Health Metrics and Evaluation has estimated that China could see as many as 1 million COVID-related deaths.⁴¹

Dr. Borio believes that the focus on variants emerging from China’s abandonment of its “zero-COVID” policy is understandable but not fully justified. While China’s removal of all COVID restrictions, including travel restrictions inside and outside China, may increase COVID infections outside China, we do not expect the risks to meaningfully affect the financial markets.

US Debt Ceiling

David Mericle and Alec Phillips, our colleagues in Goldman Sachs Global Investment Research, have highlighted raising the debt ceiling in 2023 as a significant risk to equity and bond markets. The debt ceiling limits how much debt the Treasury can issue to fund the US government and meet its coupon and principal payment obligations. The US is expected to reach its debt limit by August 2023, but it may be as late as October.

Mericle and Phillips suggest that the political and fiscal conditions this year will be similar to the conditions in 1995 and 2011, when the US had to raise the debt limit and the process was “extremely disruptive.”⁴² In both those periods, a sitting Democratic president faced a Republican House which had won the majority after the midterm election, and federal debt as a share of GDP had increased at a more rapid pace. The “debt limit standoffs” between Republicans and Democrats led to increased market volatility in both periods. Prices of Treasury securities with maturities around the date of the debt ceiling dropped, and worries about a default increased.

Mericle and Phillips point out that the process to elect a speaker of the House provides some insight into how the debt ceiling negotiations may transpire.

We conclude that there is no shortage of risks that could derail our economic and financial market outlook.

Key Takeaways

While we are facing a period of heightened uncertainty after a tumultuous 2022, we believe our two primary investment themes remain valid: US Preeminence and Staying Invested. US Preeminence leads us to overweight US assets in our strategic asset allocation. Staying Invested drives our recommendation that clients maintain their strategic asset allocation; that recommendation will change if we develop high conviction that a recession is imminent and not already discounted by the market. Currently, we do not have high conviction that a recession is imminent and one has already been partially discounted by the equity market decline.

The key takeaways from our 2023 *Outlook* are as follows:

- **Below-Trend Growth:** We expect global economic growth to slow to below-trend levels. We believe the US will have modest growth; the Eurozone, the UK and Russia will be in recession; and that Japan will be an exception with above-trend growth. Large emerging market countries will grow below trend at mid-single-digit growth levels, in our view. We estimate China's post-COVID recovery will reach 4.9%, just above trend levels of 4–4.5%.
- **Monetary Policy Tightening:** We believe that most major central banks will continue tightening monetary policy but at a more modest pace than in 2022. China will be a key exception as the leadership tries to stem the declines in the property sector.
- **Recession Risk in the US:** We have assigned a 45–55% range to the risk of recession in 2023. We believe the fog of uncertainty is too great to have much conviction on the direction of the US economy, and we therefore recommend clients position their portfolios neither for the certainty

of recession nor for the certainty of modest growth in the US. The framework for staying invested is best captured by Exhibit 75. If the equity market has already largely discounted a recession, history has repeatedly shown that investors are better off staying the course given forward returns have typically been attractive.

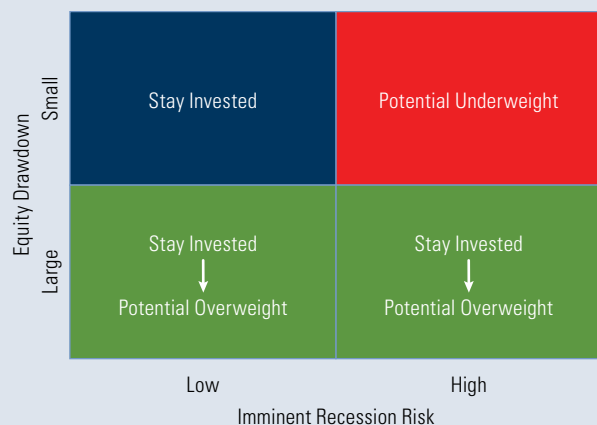
- **Attractive High-Single-Digit Portfolio Returns:** We expect high-single-digit returns on a well-diversified moderate-risk portfolio.

The returns are driven by equity returns of over 10% in developed markets and 9% in emerging markets. We expect mid-single-digit returns in fixed income assets.

- **Significant Geopolitical Risks:** We face a much longer litany of geopolitical risks this year, including an escalation of the Russia-Ukraine war, high US-China tensions, more ballistic missile testing by North Korea, a growing partnership between Iran and Russia, continued nuclear enrichment in Iran and debt ceiling negotiations in the US.
- **Vigilance:** In the face of fog, we diligently watch for hazards and will remain tactical to take advantage of market opportunities.

Exhibit 75: ISG Decision Matrix for Underweighting Equities

We believe investors are better off staying the course and even looking for opportunities to overweight stocks.



Data as of December 31, 2022.
Source: Investment Strategy Group.

2023 Global Economic Outlook: A Difficult Balancing Act

AROUND THE WORLD, POLICYMAKERS ARE ATTEMPTING TO CROSS a tightrope. For global central banks, the challenge is to lift interest rates high enough to dampen growth and bring down inflation, but not so high that they cause undue economic fallout. Similarly, governments are seeking to administer enough fiscal stimulus to help consumers cope with high prices but not so much that they stoke even worse inflation in the process. In both cases, leaning too far in either direction could be harmful.

To be sure, the risk of a misstep is high. Global central banks collectively delivered more than 280 interest rate hikes last year in response to inflation that was both higher and more persistent than expected.⁴³ Such forceful tightening of monetary policy clearly raises the risk of recession. At the same time, already stretched fiscal finances and fragile bond markets limit



the scope for additional fiscal stimulus, as the negative reaction of the UK gilt market to the government's expansionary budget last year reminds us. Additional stimulus is particularly constrained today because countries representing almost three-quarters of the world's GDP have annual budget deficits greater than 4%. Europe and the UK alone have deployed more than \$750 billion of fiscal stimulus to offset the impacts of the war in Ukraine.⁴⁴

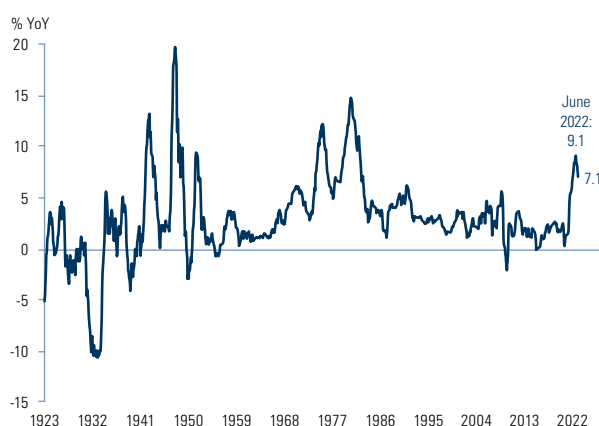
Still, a sure-footed crossing can't be ruled out. We place even odds on the US avoiding a recession this year, as households still have a savings cushion, and the US economy lacks the obvious cyclical excesses seen on the eve of past economic downturns. In Japan, the economy should continue to expand at an above-trend pace given still-accommodative policy, as well as considerable excess savings. Meanwhile, emerging markets as a group are likely to grow slightly faster than they did in 2022 as they benefit from China's uneven reopening.

The Eurozone's outlook, on the other hand, is shaky. Russia's invasion of Ukraine put acute pressure on the region's energy supplies and growth last year, likely causing a recession in the final months of 2022. The same could be said for the UK. But we expect relatively shallow recessions in both regions, as the economic slowdown thus far has been better than expected and a mild winter has helped cool energy prices.

Taken together, these factors support our forecast for a year of below-trend yet still positive global GDP growth (see Exhibit 76).

Exhibit 77: Headline CPI Inflation

Headline inflation exceeded 9% at its apex last year, the highest reading in four decades.



Data through November 2022.

Source: Investment Strategy Group, Haver Analytics.

United States: A Thorny Problem, Year Two

Inflation remains a thorn in the side of the US economy. As seen in Exhibit 77, headline CPI exceeded 9% at its apex last year, the highest level in four decades. That increase surpassed consensus forecasts by a wide margin for a second year in a row. But unlike 2021's spike in goods prices, last year saw inflation expand to services as well (see Exhibit 78).

While external factors like the war in Ukraine and ongoing supply disruptions from China's "zero-COVID" policy have put upward pressure

Exhibit 76: ISG Outlook for Developed Economies

	Real GDP Growth Annual Average (%)				Headline Inflation* Annual Average (%)		Core Inflation* Annual Average (%)		Policy Rate** End of Year (%)		10-Year Bond Yield*** End of Year (%)	
	2022	2023 Base Case	2023 Good Case	2023 Bad Case	2022	2023	2022	2023	2022	2023	2022	2023
United States	2.0	0.9–1.5	2.6	-0.3	8.0	3.9–4.5	6.1	4.3–4.7	4.375	5.1	3.9	3.15–3.65
Eurozone	3.3	-0.6–0.0	0.6	-1.2	8.6	6.7–7.3	4.0	4.0–4.4	2.0	3.5	2.6	1.75–2.25
United Kingdom	4.4	-1.3–-0.7	0.0	-2.0	9.0	7.2–7.8	6.0	4.3–4.7	3.5	4.5	3.7	3.0–3.5
Japan	1.5	1.0–1.6	2.0	0.3	2.4	1.6–2.0	2.2	1.7–2.1	-0.1	0.0	0.4	0.5–1.0

Data as of December 31, 2022.

Source: Investment Strategy Group, Haver Analytics, Bloomberg.

* Inflation refers to CPI inflation. Japan core inflation excludes fresh food, but includes energy.

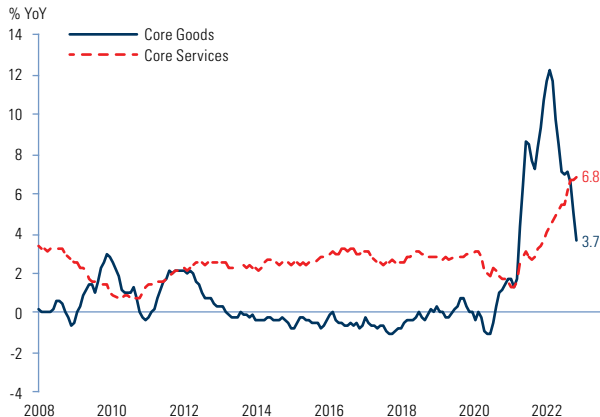
** The US policy rate refers to the midpoint of the Federal Reserve's target range. The Eurozone policy rate refers to the ECB deposit facility. The Japan policy rate refers to the BOJ deposit rate.

*** For Eurozone bond yield, we show the 10-year German bund yield.

Note: Forecasts are estimated, are based on assumptions, are subject to revision, and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved.

Exhibit 78: Core CPI Inflation

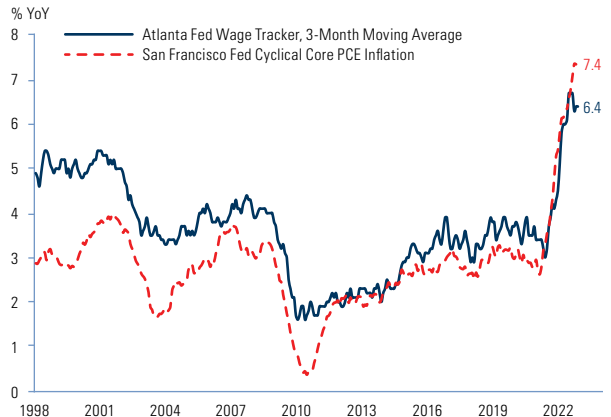
In contrast to 2021's spike in goods prices, last year saw inflation expand to services as well.



Data through November 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 80: Atlanta Fed Wage Tracker and San Francisco Fed Cyclical Core PCE Inflation

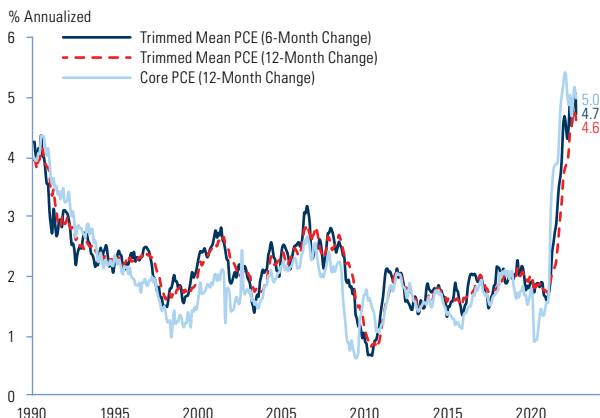
Labor demand and a shrinking labor force have pushed wage growth above levels consistent with 2% inflation.



Data through November 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 79: Core and Trimmed Mean PCE Inflation

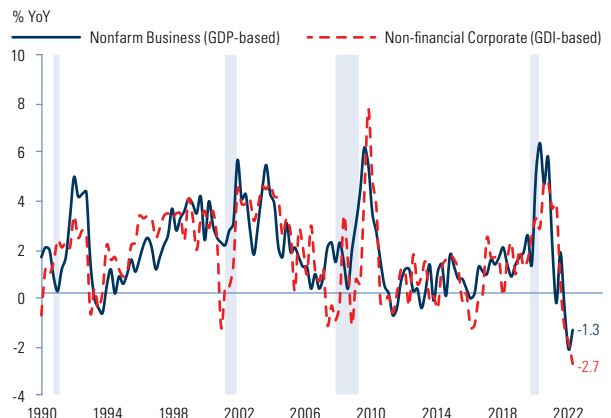
Various measures of the underlying trend of inflation remain well above the Federal Reserve's 2% target.



Data through November 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 81: Labor Productivity Growth

Productivity gains have been insufficient to counter strong labor demand.



Data through Q3 2022.
Note: Shaded periods denote recessions. Gross domestic income (GDI) is a measure of the incomes earned and the costs incurred in the production of gross domestic product. It's another way of measuring US economic activity.
Source: Investment Strategy Group, Federal Reserve, Haver Analytics.

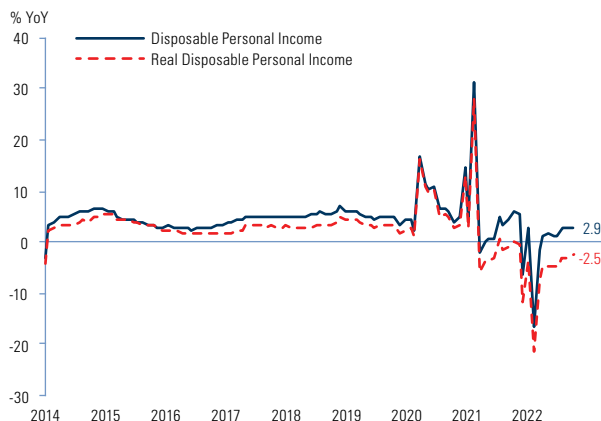
on prices, inflation has emanated from within the US economy as well. As seen in Exhibit 79, various measures of the underlying trend of inflation remain well above the Federal Reserve's 2% target. The same is true for wages, where demand for workers and a sluggish recovery in the labor force are stoking pay increases that are far outpacing productivity gains. As a result, there is much

greater risk that wage gains are directly fueling inflation in shelter and other cyclically sensitive sectors (see Exhibits 80 and 81).

Such persistently high inflation is a significant headwind to the US economy in at least three ways. First, it acts as a tax on consumers and erodes their real earnings. Second, it raises the hurdle for capital investment given a more uncertain future and higher

Exhibit 82: Real and Nominal Disposable Personal Income (DPI)

Real DPI was reduced by elevated inflation, the withdrawal of COVID-19 stimulus payments and higher taxes.



Data through November 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 84: Regular US Gasoline Prices

The drag on disposable income from high gas prices should abate this year.



Data through December 31, 2022.
Source: Investment Strategy Group, American Automobile Association (AAA), Bloomberg.

Exhibit 83: Goldman Sachs US Financial Conditions Index

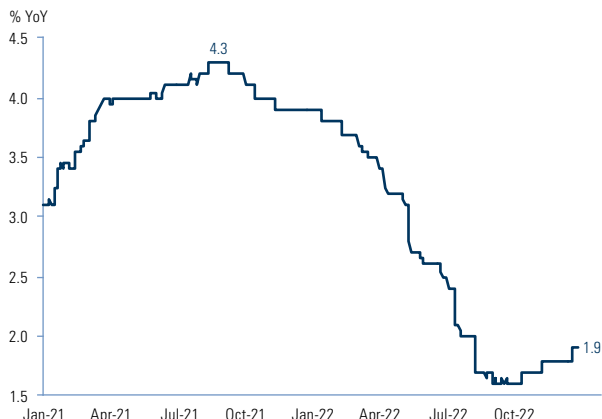
Financial conditions tightened substantially last year.



Data through December 31, 2022.
Source: Investment Strategy Group, Goldman Sachs Global Investment Research.

Exhibit 85: Consensus US Real GDP Growth in 2022

Tighter financial conditions and higher energy prices weighed on expected 2022 US GDP growth.



Data through December 31, 2022.
Source: Investment Strategy Group, Bloomberg.

funding costs. Lastly, it is incompatible with the Federal Reserve's price stability mandate, obliging the bank to tighten monetary policy to dampen demand. Taken together, these effects slow economic growth and raise the risk of a recession.

These effects were clearly visible last year. As seen in Exhibit 82, real disposable personal income (DPI) was reduced by elevated inflation as well as the withdrawal of COVID stimulus

payments and higher taxes. At the same time, financial conditions tightened substantially (see Exhibit 83) in response to the Federal Reserve's steepest hiking cycle since the early 1980s. The war-driven spike in energy prices only exacerbated these economic drags, which collectively took expected 2022 US GDP growth from around 4% at the start of the year to less than 2% by year-end (see Exhibits 84 and 85).

Exhibit 86: Net Worth of US Households and Nonprofit Organizations

We expect last year's drop in net worth to dampen household spending in 2023.



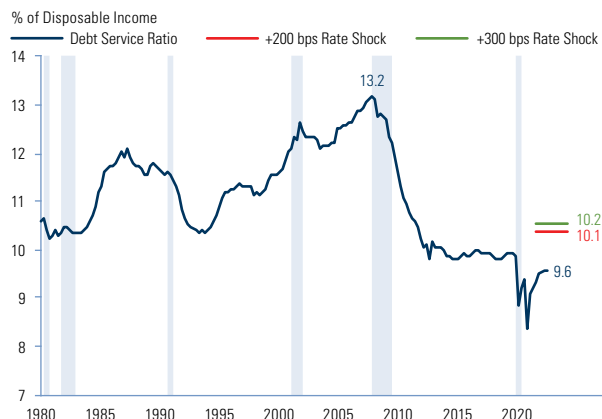
Data through Q3 2022.
Source: Investment Strategy Group, Haver Analytics.

This abrupt economic slowdown comports with the Federal Reserve's desire to bring inflation back to its target by engineering a period of below-trend growth. Our 2023 forecast of 1.2% real GDP growth—below the 1.5–2.0% estimates of trend growth—is consistent with that objective. We expect last year's drop in net worth will dampen household spending (see Exhibit 86), as will a modest rise in unemployment. The same could be said for higher debt service payments, but still-healthy household balance sheets and the high proportion of fixed-rate debt are likely to keep those costs below their pre-pandemic levels (see Exhibit 87). Slower consumer spending is also expected to weigh on nonresidential business investment, while last year's surge in mortgage rates should further reduce residential investment despite low homeowner vacancy rates (see Exhibit 88).

Although inflation has likely peaked, the pace of its descent remains a key source of debate. Of the three component categories on which the Federal Reserve focuses—goods, housing and services other than housing—we expect goods to exert the largest drag on core inflation this year, given already visible progress and improvements in supply chain bottlenecks (see Exhibits 89 and 90). Housing will take longer to adjust given the slow rate at which the stock of rental leases turns over. Yet the Federal Reserve is aware of these lags and

Exhibit 87: US Household Sector Debt Service Ratio

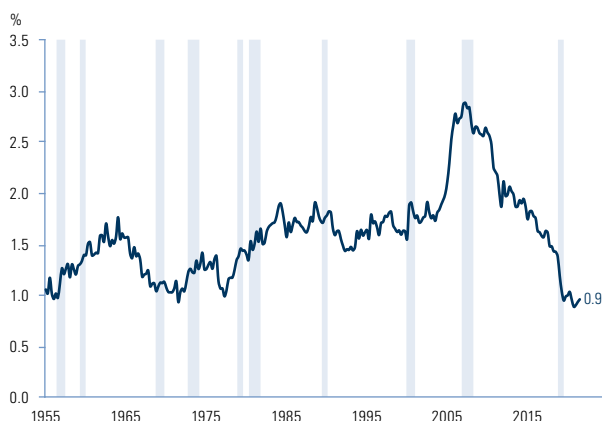
Households' debt service ratio would remain low even with higher rates.



Data through Q3 2022.
Note: Shaded periods denote recessions.
Source: Investment Strategy Group, Federal Reserve, Haver Analytics.

Exhibit 88: US Homeowner Vacancy Rate

Residential investment will likely decline this year despite low homeowner vacancy rates.



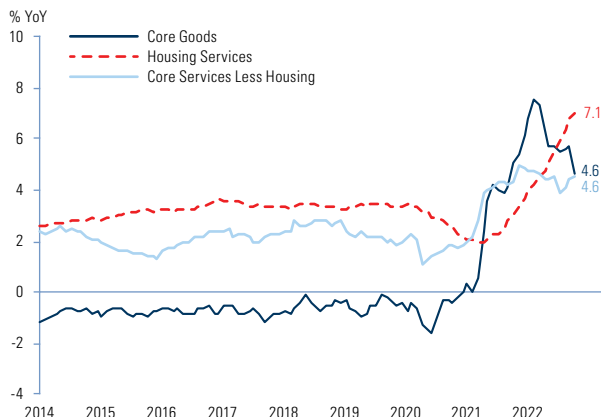
Data through Q3 2022.
Note: Shaded periods denote recessions.
Source: Investment Strategy Group, Haver Analytics.

likely to look through them, especially since recent weakness in house prices and lease rates on new rentals imply a decline in housing inflation later this year (see Exhibit 91).

The trajectory of the third and largest category—services other than housing, which represent more than half of the core PCE index—is also the most uncertain. Wages represent the

Exhibit 89: Components of US Core PCE Inflation

We expect a continued moderation in core goods inflation this year.



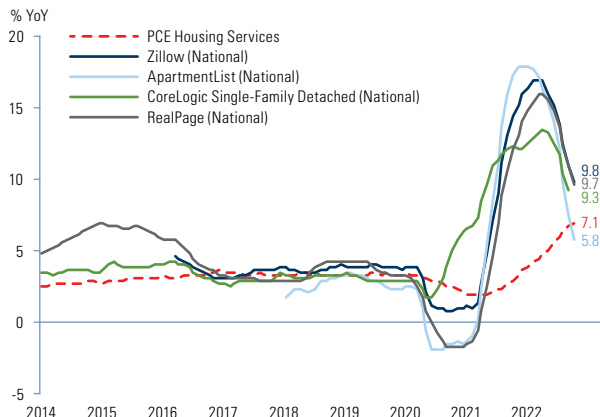
Data through October 2022.

Note: October data is estimated based on October data from the Consumer Price Index and the Producer Price Index.

Source: Investment Strategy Group, Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve staff estimates.

Exhibit 91: US Market Rents and PCE Housing Services Inflation

Recent weakness in lease rates on new rentals suggests housing inflation should moderate later this year.



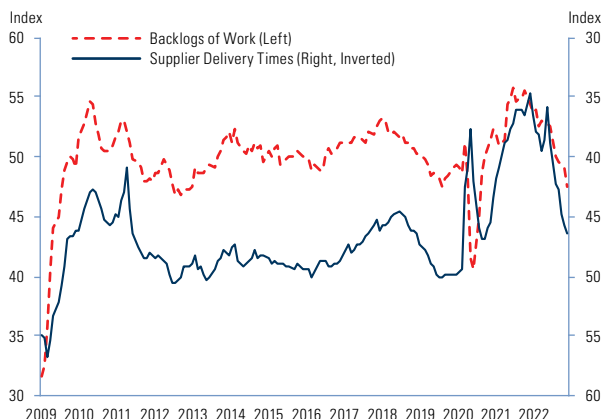
Data through October 2022.

Note: ApartmentList, CoreLogic, RealPage and Zillow measure rents for a new lease by a new tenant. October PCE (Personal Consumption Expenditures) data is estimated on the basis of October data from the Consumer Price Index and the Producer Price Index.

Source: Investment Strategy Group, ApartmentList, Bureau of Economic Analysis, Bureau of Labor Statistics, CoreLogic, RealPage, Zillow, Federal Reserve staff estimates.

Exhibit 90: Markit Global Purchasing Managers' Indices (PMIs)

PMIs reflect improvements in supply chain bottlenecks.

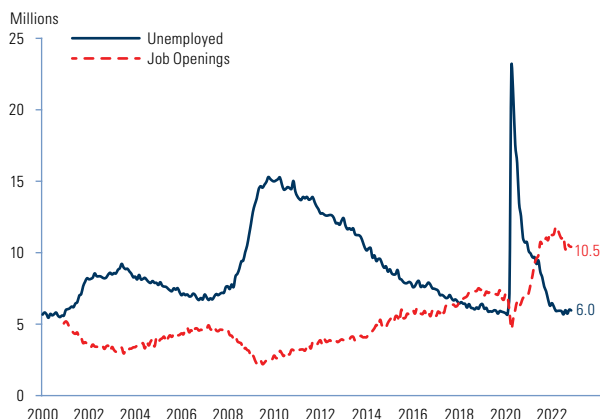


Data through November 2022.

Source: Investment Strategy Group, Haver Analytics.

Exhibit 92: US Job Openings and Unemployed Individuals

Total job vacancies still far exceed the number of unemployed workers.



Data through November 2022.

Source: Investment Strategy Group, Haver Analytics.

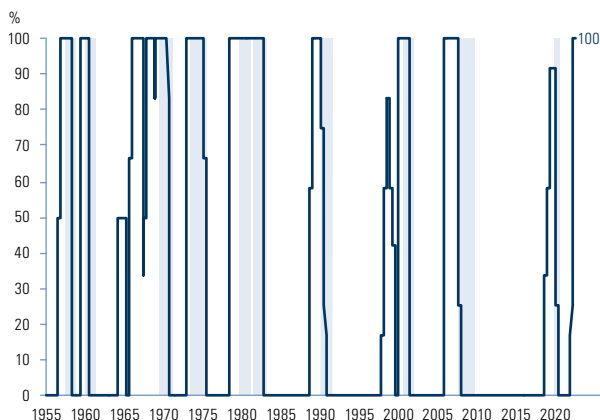
largest costs in delivering these services, and the labor market remains tight, with about 1.7 job openings for every person looking for work (see Exhibit 92). We expect only a modest increase in the unemployment rate, from 3.7% to 4.1%; hence we also forecast a more measured decline in core PCE inflation, to 3.6% by year-end. This is still far

enough above the Federal Reserve's target to keep policy rates within 0.25% of 5% throughout 2023.

Of course, the tighter monetary policy and below-trend growth necessary to bring inflation down also raise the risk of recession. That is particularly true today, given many of the most reliable long-leading recession indicators—

Exhibit 93: ISG Yield Curve Inversion Diffusion Index

Recent index readings imply a rising risk of recession.



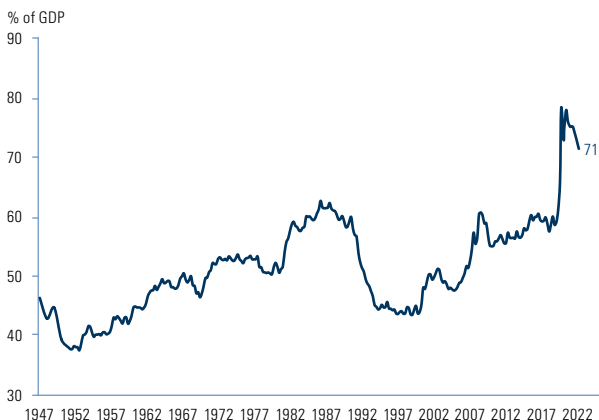
Data through December 31, 2022.

Note: Shaded periods denote recessions. The diffusion index is based on four yield curves selected across different maturities and measured on a daily, weekly and monthly basis. The index measures the percentage of yield curve measures inverted in the previous 6 months based on data available at each point in time. This index is tracked internally by ISG and is not publicly available.

Source: Investment Strategy Group, Bloomberg, Haver Analytics.

Exhibit 94: Household Sector Cash and Equivalents

Households still have substantial excess savings.



Data through Q3 2022.

Note: Includes currency, checkable, time and savings deposits, and money market shares.

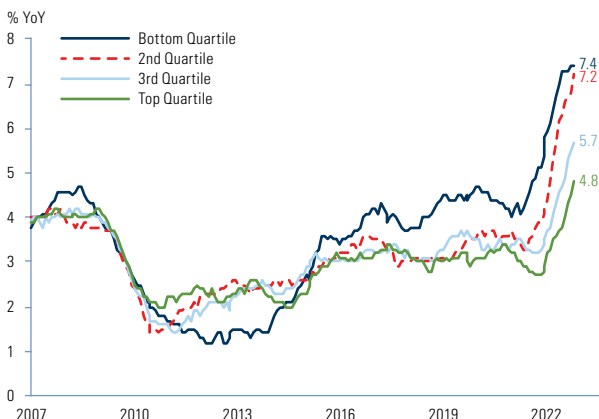
Source: Investment Strategy Group, Haver Analytics.

including our own Yield Curve Inversion Diffusion Index—have already triggered (see Exhibit 93). Moreover, most economists surveyed by Bloomberg expect a recession in 2023.⁴⁵

We certainly acknowledge this risk and place elevated 45–55% odds on a recession this year. But there are several reasons that recession is not our base case. First, we estimate households have around \$1.5 trillion in excess savings after the largest increase in their holdings of cash and cash equivalents on record (see Exhibit 94). Even households in the bottom of the income distribution—which tend to be the most economically vulnerable—are benefiting from disproportionately strong wage gains (see Exhibit 95) that have enabled them to amass a savings buffer. As recent Federal Reserve research highlights, these “households in the bottom half of the income distribution still held (as of mid-2022) roughly \$350 billion in excess savings—about \$5,500 per household on average,” which is sufficient to fully pay off “their ‘liquid debt’ with room to spare.”⁴⁶ Second, real DPI is set to rebound this year as many of the drags from 2022—including higher gas prices, higher capital gains tax payments and lower transfer payments—abate (see Exhibit 96). Our GIR colleagues forecast real DPI will rise a solid 3.5% in 2023. Finally, as noted earlier, we expect only a modest rise in

Exhibit 95: Atlanta Federal Reserve Wage Tracker by Wage Quartile

Broad-based wage gains enabled even the most economically vulnerable to amass a savings buffer.



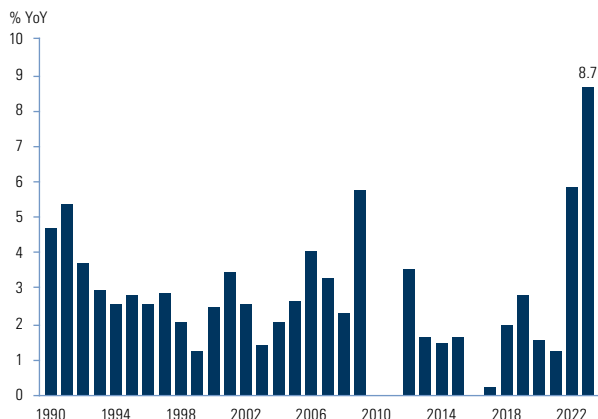
Data through November 2022.

Source: Investment Strategy Group, Haver Analytics.

unemployment, reflecting the still large number of job vacancies per unemployed worker. Without a strong negative feedback loop between job losses and reduced spending, it will be difficult for recession dynamics to take hold. However, recession risk may rise as we move through 2023, since these buffers are likely to erode over time.

Exhibit 96: Social Security Cost-of-Living Adjustments (COLAs)

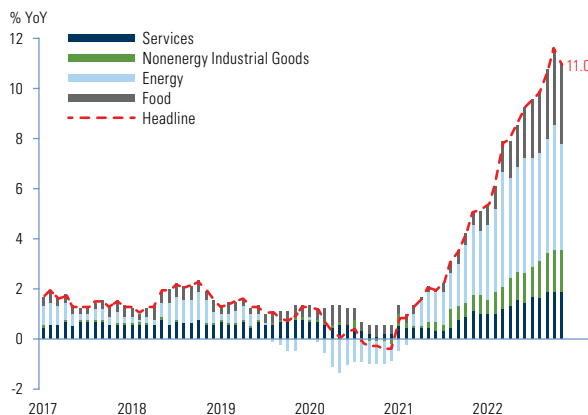
Increased payments to Social Security beneficiaries should support overall US real disposable income this year.



Data through 2023.
Source: Investment Strategy Group, Social Security Administration.

Exhibit 98: Eurozone Headline Inflation by Major Price Categories

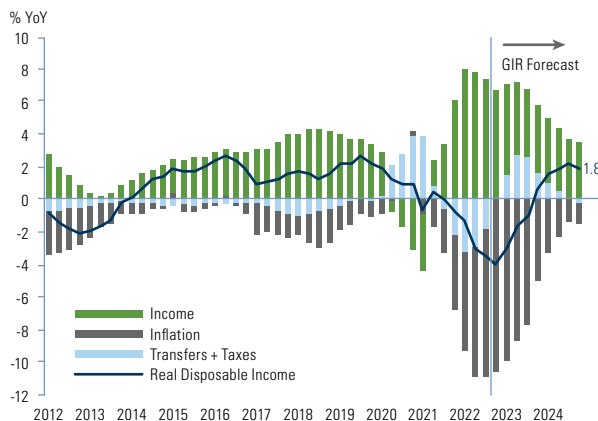
Headline inflation reached a record high in 2022.



Data through November 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 97: Eurozone Household Real Disposable Income Growth

Energy prices caused a sharp drop in household real disposable income last year.



Data through Q4 2024.
Source: Investment Strategy Group, Goldman Sachs Global Investment Research.
Note: Forecasts are estimated, are based on assumptions, are subject to revision, and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved.

The Eurozone: About-Face

Russia's invasion of Ukraine caused an abrupt decline in the Eurozone's expected growth last year. Not only did the resulting surge in energy prices cause a sharp drop in real household disposable income (see Exhibit 97), but it also forced production cutbacks in energy-intensive industries, which hurt output. Although fiscal support helped to mitigate the economic impact of spiraling energy prices, central bank policy eroded that cushion as the ECB accelerated its hiking cycle to contain record-high inflation (see Exhibit 98).

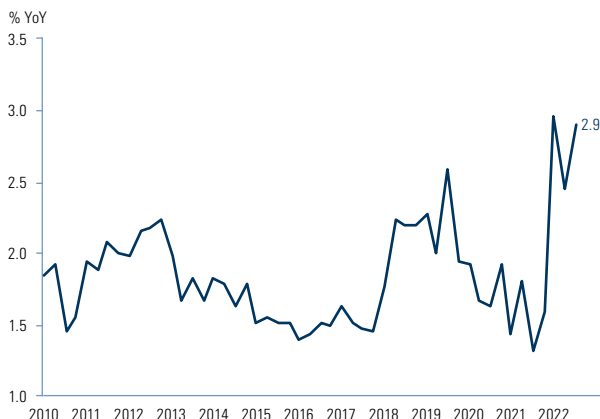
While the economy held up better than feared, we think the combination of these headwinds likely pushed the Eurozone into recession in the final months of 2022. We expect a relatively shallow economic contraction barring a colder than normal winter, with a peak-to-trough real GDP decline of about 0.8%, but the recovery is likely to be sluggish. Several headwinds—including weak external demand, elevated energy prices and tight financial conditions—are set to constrain growth in the second half of this year. The same can be said for fiscal policy, which is expected to flip to a slight drag this year as COVID-related programs expire. All told, we expect the Eurozone economy to contract by 0.3% in 2023.

While this slowdown in economic activity—along with the easing of supply constraints and some moderation in food and energy prices—will

As was the case in 2022, the interplays between inflation, Federal Reserve policy and economic growth will remain the key macroeconomic influences in the year ahead.

Exhibit 99: Eurozone Negotiated Wage Growth

Wage growth in the Eurozone remains elevated, exerting upward pressure on services inflation.

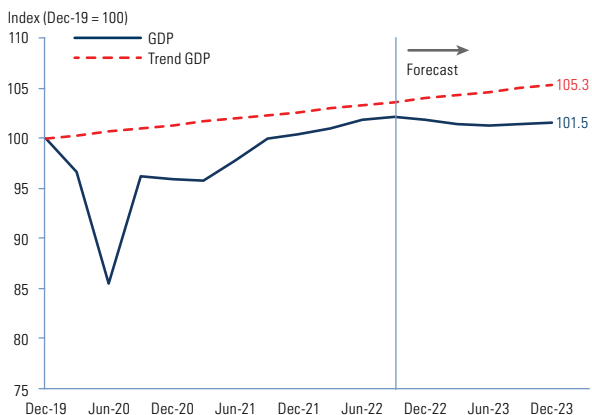


Data through Q3 2022.

Source: Investment Strategy Group, European Commission.

Exhibit 100: Eurozone Real GDP—Realized and ISG Baseline Forecast

We expect Eurozone GDP to remain below its pre-pandemic growth path.



Data through Q3 2022, forecasts through Q4 2023.

Source: Investment Strategy Group, Haver Analytics.

Note: Trend GDP is based on an estimated pre-pandemic trend.

Forecasts are estimated, are based on assumptions, are subject to revision, and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved.

reduce pricing pressures, we see several reasons inflation is likely to remain above the ECB's 2% target this year. First, last year's spike in energy prices will lift 2023 goods and services inflation, given the typical lags. Second, euro weakness implies higher costs for imported products. Lastly, the still tight labor market increases the risk that higher wage growth will be sustained long enough to foster persistent services inflation (see Exhibit 99). Against this backdrop, we expect headline and core inflation to rise by 7.0% and 4.2%, respectively, in 2023.

In turn, we see the ECB hiking its policy rate to 3.5% and beginning quantitative tightening through passive runoff of its asset purchase program in the first half of 2023. Although we do not expect policy rates to remain at peak levels for an extended period given that supply disruptions are the main driver of the region's inflation, we also think rate cuts are unlikely this year absent a significantly deeper recession.

Clearly, the events of last year have revealed vulnerabilities in the Eurozone's energy supply, which adds tremendous uncertainty to the economic outlook. The energy crisis could even resurface next winter if gas storage is not adequately

replenished over the course of the summer and fall. Significant investment is needed to hasten the region's energy transition, as failure to do so could leave the Eurozone economy permanently below its pre-COVID growth path (see Exhibit 100).

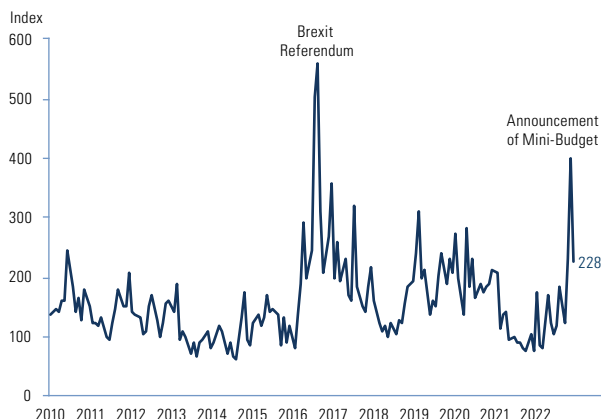
United Kingdom: Mind the Gap

A cursory glance at the UK's 4.4% growth last year would imply a booming economy. But the full year result belies a sharp deceleration in activity over the course of 2022 that culminated in a recession starting in the third quarter. While surging energy prices were a key driver of the slowdown, heightened policy uncertainty also had a material impact (see Exhibit 101).

As was the case in 2022, the interplays between inflation, Federal Reserve policy and economic growth will remain the key macroeconomic influences in the year ahead.

Exhibit 101: UK Economic Policy Uncertainty Index

Heightened policy uncertainty was a key driver of the recent slowdown in UK economic growth.



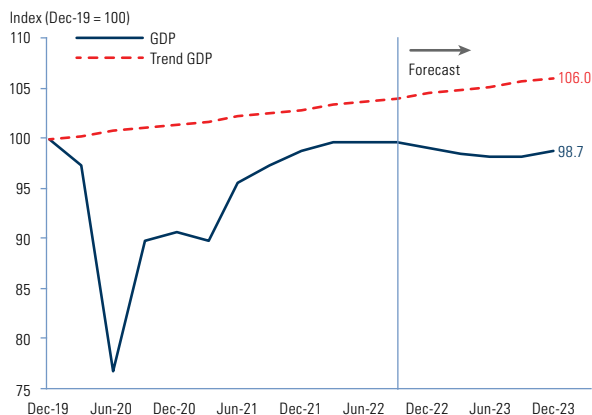
Data through November 2022.

Source: Investment Strategy Group, PolicyUncertainty, Haver Analytics.

Exhibit 102: UK Real GDP—Realized and ISG

Baseline Forecast

The gap between the UK's current and pre-pandemic growth path is widening.



Data through Q3 2022, forecasts through Q4 2023.

Source: Investment Strategy Group, Haver Analytics.

Note: Trend GDP is based on an estimated pre-pandemic trend.

Forecasts are estimated, are based on assumptions, are subject to revision, and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved.

We expect the downturn to be relatively shallow, with a 1.5% peak-to-trough decline in real GDP and a recovery beginning in the summer. But that recovery is likely to be feeble given the continued squeeze on household budgets from higher energy costs and elevated mortgage interest rates. Similarly, business confidence and fixed investment will remain fragile in the face of higher corporate taxes and tight financial conditions. As a result, we see the economy contracting 1% for the full year.

Unfortunately, it will be difficult for policymakers to lend support. The limits of deficit spending came sharply into focus when the gilt market revolted in reaction to the Liz Truss government's so-called mini-budget, which proposed large unfunded tax cuts to boost growth. To regain credibility with the financial markets, the Rishi Sunak government was forced to propose a new budget that was the exact opposite of its predecessor, featuring tax increases and spending cuts. In fact, this new plan is set to improve public finances by around 2.5% of GDP by 2027. Although many of these measures are backloaded, they nonetheless leave less room for fiscal stimulus in 2023.

Monetary policy is equally constrained considering inflation stands at 40-year highs.

Although price pressures are likely to moderate this year, several factors are apt to keep inflation well above the BOE's 2% inflation target, including sustained wage pressures, the lagged pass-through from higher energy prices and the depreciation of sterling. As a result, the BOE will hike rates further into restrictive territory and continue reducing its balance sheet. We project rates reaching a terminal level of 4.5% in the first half of this year.

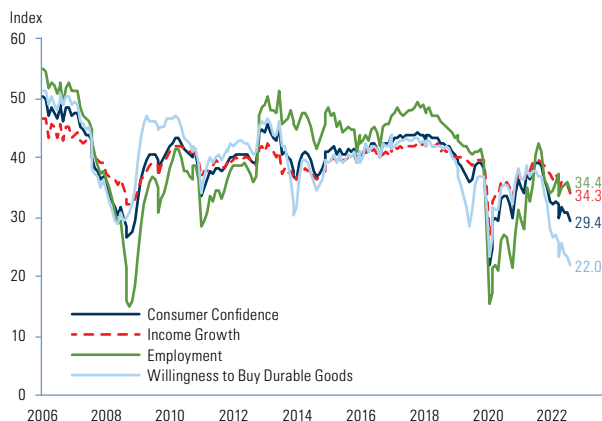
More broadly, we think the medium-term economic outlook for the UK has weakened significantly. Aside from the current recession, the economy continues to face important structural challenges arising from Brexit and the need to put public finances on a sustainable path. These issues are not only aggravating the current economic backdrop, but also widening the gap between the UK's current and pre-COVID growth path. As seen in Exhibit 102, that gap is set to widen from 5.1% to 6.9% of GDP by the end of this year.

Japan: Surprisingly Resilient

Japan's economic recovery slowed in 2022 in the face of new waves of COVID and rising energy prices. Even so, we estimate the economy expanded

Exhibit 103: Japanese Consumer Confidence Across Categories

Japanese household sentiment has weakened amid declining real disposable incomes.



Data through November 2022.

Source: Investment Strategy Group, Haver Analytics.

1.5% last year, well above trend growth of around 0.8%.

The outlook for 2023 is more nuanced. On the one hand, several factors support a further recovery, including households' considerable excess savings, improved business sentiment, robust profit growth and the reopening of the economy to foreign tourists. On the other hand, new headwinds have arisen. As seen in Exhibit 103, household sentiment has weakened amid declining real disposable incomes. At the same time, rising cost pressures and the weaker global economic outlook cast a cloud over firms' capital spending plans. Yet despite these challenges, we anticipate the Japanese economy will expand 1.3% this year—its third consecutive year of above-trend growth.

It is tempting to blame this string of stronger economic reports for Japan's surging headline inflation, which at 3.8% late last year stood near the highest level in three decades. But the rise in inflation has largely been driven by higher energy prices and the sharp depreciation of the yen. Wage pressures, in contrast, have been limited thus far. Given this mix of factors and the forthcoming government subsidies on electricity and gas, we expect both headline and core inflation to moderate this year, reaching 1.8% and 1.9%, respectively.

With inflation expected to finish this year below the BOJ's 2% target, markets were caught off guard by the timing of the bank's hawkish decision to widen the band around its 10-year JGB target from ± 25 bps to ± 50 bps. Governor Haruhiko Kuroda had dismissed a wider band on several occasions, while research by BOJ staff found that a wider band could be detrimental to capital spending. Kuroda explained the move as a necessary technical adjustment to the yield curve control (YCC) policy that would improve bond market functioning and the transmission of monetary policy to the real economy. We interpret the move as a small first step toward normalizing the bank's highly accommodative policy stance. Additional steps in that direction are likely this year, ultimately culminating in the removal of the YCC policy and possible exit from the bank's negative interest rate policy (NIRP). Several factors will determine the timing of these steps, including the path of inflation, the outcome of the *shunto* wage negotiations in March-April, and the views of the yet-to-be-selected next governor who will succeed Kuroda in April. Even with these potential adjustments, however, the BOJ will remain among the most accommodative large central banks.

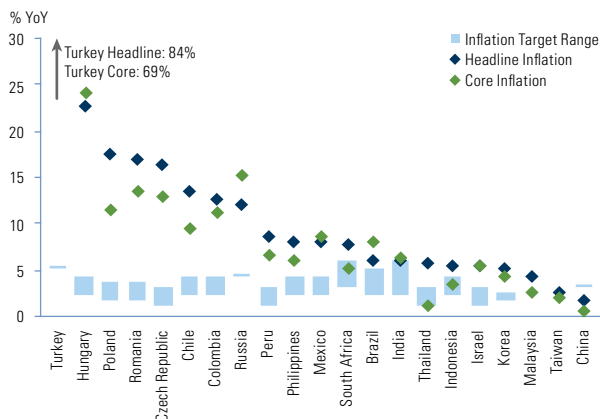
Emerging Markets: Reversal of Fortune

Emerging market economies were hard hit by last year's macroeconomic developments. Not only did Russia's invasion of Ukraine result in surging food and energy prices, but it also tightened global financial conditions, significantly raising the cost of borrowing for these countries. The resulting slowdown in both domestic consumption and external demand was made worse by multiple COVID lockdowns in China, which further disrupted already fragile supply chains and hampered commodity demand from Chinese importers.

We anticipate the Japanese economy will expand 1.3% this year—its third consecutive year of above-trend growth.

Exhibit 104: Emerging Markets Headline and Core Inflation

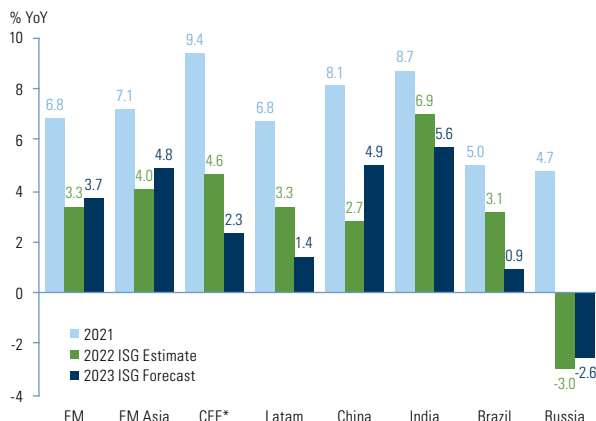
Inflation in emerging markets has surged and is well above central bank target ranges in many countries.



Data through November 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 106: Emerging Markets Real GDP Growth

We expect growth in most EM countries to slow in 2023, except in China.

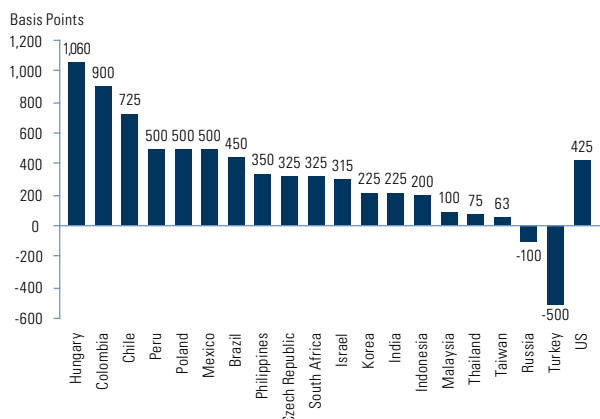


Data through Q3 2022, forecasts through 2023.
Source: Investment Strategy Group, International Monetary Fund.
* Excludes Russia and Ukraine

Note: Forecasts are estimated, are based on assumptions, are subject to revision, and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved.

Exhibit 105: Policy Rate Changes During 2022

Many emerging market central banks aggressively tightened monetary policy in 2022.



Data through December 31, 2022.
Source: Investment Strategy Group, Bloomberg.

Although such an abrupt decline in economic activity would typically lead to supportive monetary policy, higher-than-expected inflation and the sharp depreciation of most EM currencies instead forced central banks to hike policy rates aggressively (see Exhibits 104 and 105). Fiscal policy provided some economic relief, but at the

cost of further increases in already elevated public debt-to-GDP ratios. In sum, these crosscurrents led to EM GDP growth of 3.3% last year, well below the 4% trend and less than half the 6.8% pace registered in 2021 (see Exhibit 106).

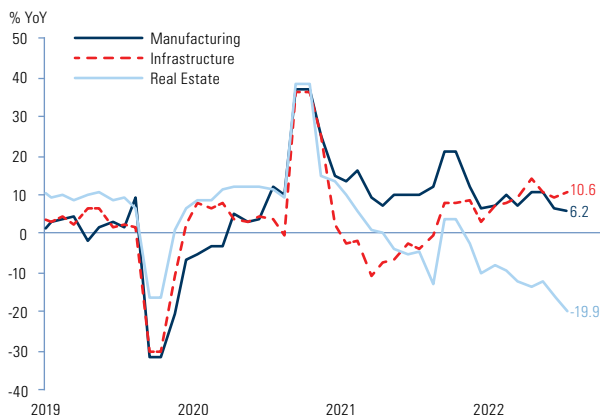
Many of last year's challenges are likely to persist in 2023. While food and energy prices are not expected to surge again this year, they remain well above pre-pandemic levels and will continue to weigh on household budgets. Lingering inflation also makes rate cuts by global central banks less likely, implying a continuation of tight financial conditions. On the external front, slower growth in major developed market countries will be a headwind to EM exports, while the reopening of China's economy this year should benefit EMs more broadly. All things considered, we expect 3.7% EM GDP growth in 2023, a modest pickup from last year but still below trend.

Asia

Growth prospects in Asia look stronger than in other EM regions, but they hinge on China's exit from its "zero-COVID" policy. Initially, growth is likely to slow in East Asian countries as the surge in China's COVID cases dampens economic activity. But by the second quarter, we expect a pickup in exports to China as the initial infection

Exhibit 107: China's Fixed Investment by Sector

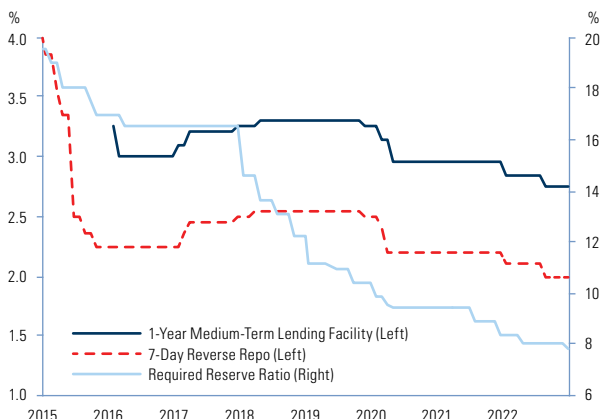
The Chinese government increased infrastructure investment to support the economy.



Data through November 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 108: China's Benchmark Interest Rate and Required Reserve Ratio

The People's Bank of China cut interest rates and the required reserve ratio to boost credit growth.



Data through December 2022.
Source: Investment Strategy Group, Haver Analytics.

wave recedes. The region should also benefit from an influx of Chinese tourists as travel restrictions are lifted. Hong Kong is set to be a prime beneficiary, having been the main destination for Chinese tourists prior to the pandemic.

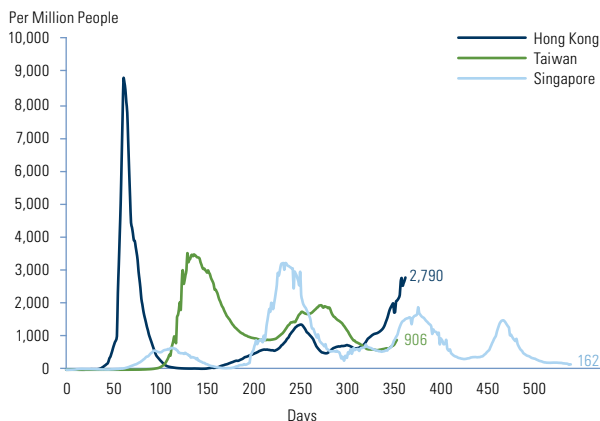
But even here the outlook is not uniform. Slower growth in the US and Europe, along with a global shift from goods to services, will weigh on the recovery in both Korea and Taiwan. As a result, we expect GDP growth in these countries to slow to around 2% this year from closer to 3% in 2022. In contrast, India is expected to maintain a solid pace of growth at around 5.6%. In fact, India is among several countries in Asia that may benefit from the global relocation of supply chains over time.

China

China spent much of last year enduring the deleterious effects of its “zero-COVID” policy, including frequent lockdowns and broad mobility restrictions in response to virus outbreaks. The result was a significant decline in economic activity, made worse by a slump in the property sector and various regulatory crackdowns on private industries. Although the government tried to cushion the blow with more infrastructure spending and rate cuts (see Exhibits 107 and 108), GDP growth nonetheless fell from more than 8% in 2021 to an estimated 2.7% last year. That represents the slowest pace of growth since 1976—outside of the initial pandemic shock in 2020—and

Exhibit 109: Daily New Symptomatic COVID-19 Cases

Countries have experienced a surge in infections after they relaxed their COVID-19 controls.



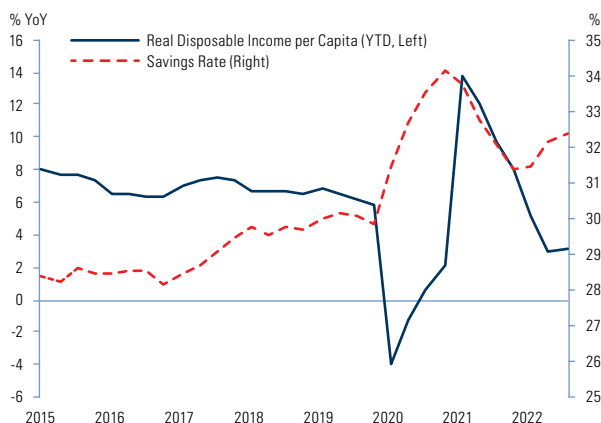
Data through December 31, 2022.
Note: Day count starts after the symptomatic cases 7-day moving average exceeds 2 per million people.
Source: Investment Strategy Group, Wind.

one well below both initial consensus expectations of 5.2% and the government's own growth target of around 5.5%.

China's decision to begin easing COVID restrictions late last year in response to widespread lockdown protests will have a significant impact on 2023's growth outlook. As we have seen repeatedly

Exhibit 110: China's Real Disposable Income Growth per Capita vs. Savings Rate

Household savings remain elevated even as disposable income growth has slowed.



Data through Q3 2022.

Source: Investment Strategy Group, Haver Analytics.

in other countries that relaxed COVID controls, there is almost certain to be an initial surge in infections. It took four months for the initial wave in Hong Kong to subside, while Singapore and Taiwan saw multiple smaller waves after the first surge (see Exhibit 109). China's wave could be even more protracted than those in these countries, as its population has less natural immunity from prior infection and comparatively lower vaccination rates, and its vaccines are considered less effective. At the same time, China's health-care system is not well prepared to handle the surge in patients. Against this backdrop, we expect economic activity to remain subdued through the first quarter of this year, as people avoid public spaces and factories struggle to find enough healthy workers to run at full capacity.

The economy should start to recover by the second quarter of this year as the virus wave recedes. We expect consumption to drive the rebound on the back of pent-up demand, considerable excess savings (see Exhibit 110) and an improving labor market. Fixed investment should also see a modest lift thanks to the pickup in consumer demand and continued policy support. But these tailwinds will likely be tempered by slower growth abroad, which will weigh on China's exports and depress capital spending in the manufacturing sector. The property sector also remains an important risk to the outlook, but we believe it will be a smaller drag on GDP than it

was last year, particularly given the government's 16-point support plan announced last November.

Overall, we expect the Chinese economy to expand by 4.9% in 2023. Despite the pickup in growth, inflation pressures should remain muted with headline and core inflation of 2.1% and 1.1%, respectively, both well below the central bank's tolerance level of 3%. For a more complete examination of our China views, please see our recently published *Insight on China, Middle Kingdom: Middle Income*.

Central and Eastern Europe

Economies in Central and Eastern Europe have been severely impacted by the war in Ukraine, due to both their proximity to the conflict and their economic ties with Russia, especially through energy imports. These effects were visible in the region's negative trade shock last year following sanctions and embargos on Russian energy, which precipitated surging inflation, widened current account deficits and depleted foreign currency reserves. Responding to these pressures, the regions' central banks exacerbated the economic malaise by aggressively tightening monetary policy. In the case of Hungary, that amounted to more than a 10-percentage-point increase in the policy rate, while the Czech central bank eroded nearly a quarter of its FX reserves defending the nation's currency.

Although growth in the region already slowed sharply last year and current account balances are likely to improve in 2023, risks to the economic outlook remain high, especially if a cold winter intensifies gas shortages. Even with fiscal support measures, the region is likely to enter a recession early this year. While this should help bring down inflation, it is likely to remain far enough above central banks' targets to limit the scope for rate cuts.

Within the region, the outlook for Russia remains skewed to the downside. While its economy shrank by 3.0% last year—a smaller-than-expected decline given the benefit from selling energy at high prices—we expect it to contract by an additional 2.6% in 2023.

Latin America

Although Latin American growth was hurt by the broader global slowdown last year, several local drivers also affected activity. For example, the region's central banks were among the first to tighten monetary policy in response to rising inflation in 2021, leading to a longer period of

tight financial conditions that has weighed on growth. Commodity price volatility has also had an impact, albeit a less uniform one. In the case of Colombia, Mexico and Brazil, higher oil prices provided a boost to growth, while in the case of Chile, disappointing Chinese copper demand was a significant drag. Growth in the region is likely to remain subdued in 2023, but the end of central bank tightening and China's reopening may offer some reprieve later in the year.

Within the region, Brazil's economy grew 3.1% last year, led by a strong recovery in the services sector. Fiscal spending in the run-up to the presidential election and strong commodity prices also helped. But with its central bank having now taken real policy rates deeply into restrictive territory at nearly 8%, we expect economic growth to slow to just 0.9% this year. While the further fiscal support proposed by the new administration poses upside risk to this forecast, it would also delay much-needed debt reduction and therefore result in higher borrowing costs.

2023 Financial Markets Outlook: Looking for Traction

ON THE ROAD TO RECOVERY FROM THE global pandemic, financial markets hit an icy patch last year. The S&P 500 slid 18%, its largest annual decline since 2008. The wreckage was not limited to US stocks. At the worst of the downdraft last October, 85% of the primary equity indices tracked by Bloomberg showed a loss for the year.⁴⁷ Collectively, those declines amounted to nearly \$32 trillion in market value at the time.⁴⁸ Even bonds—which typically act as a defensive portfolio asset—were not spared, with the Bloomberg Global Aggregate Bond Index slipping 16%. This unusual decline in both stocks and bonds, which has occurred less than 2% of the time since 1926,⁴⁹ resulted in the fourth-worst loss for a balanced portfolio on record.



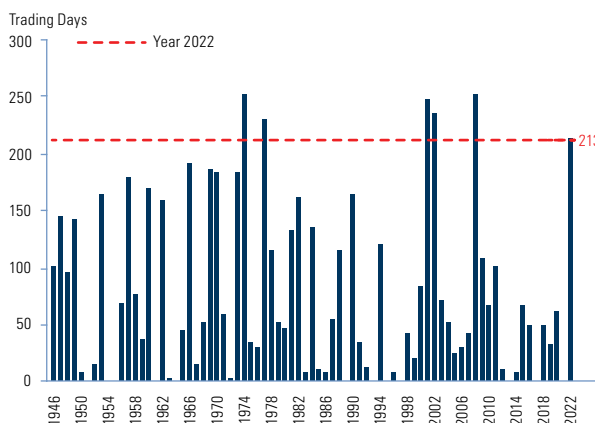
To be sure, many of the key uncertainties from last year remain, including elevated inflation, ongoing geopolitical tensions, and the murky trajectory of the Chinese economy. The risk of a US recession is also top of mind, especially with central banks continuing to hike policy rates and many recession indicators already flashing red. These are legitimate concerns, and we accordingly give a US recession this year even odds.

But we also should not lose sight of the fact that markets are forward-looking, meaning they typically fall in anticipation of bad news but begin recovering even as the headlines of the day remain ominous. This has two important implications for 2023. First, risk assets are likely to deliver attractive returns if a US recession is avoided, given the extent of last year's losses. Second, even in the event of a mild US recession that ends this year, stocks could still deliver positive returns, considering the sizable rallies seen in the final months of past economic downturns. Since not all paths in a recession lead to stock market losses at the end of 2023, we believe the odds of positive US equity returns exceed those of a recession this year. This also explains why we expect gains in Eurozone and UK equities even though we believe these regions are already in recession (see Exhibit 111).

Our base case implies financial markets can regain traction in 2023. In equities, we see more paths to gains than losses by year-end. Bonds are also expected to rise, as today's higher yields provide an ample cushion to absorb any further increase in interest rates. But there will no doubt be curves along the road ahead.

Exhibit 112: Annual Number of Days in a Downtrend for S&P 500

Last year ranked among the most persistent downtrends in history.



Data through December 31, 2022.

Note: Downtrend is defined as S&P 500 price below its 200-day moving average.

Source: Investment Strategy Group, Bloomberg.

US Equities: Down but Not Out

Few investors will lament the passing of 2022. US equities lost nearly \$13 trillion in market capitalization last year, roughly equivalent to the combined GDP of Japan, Germany and the UK. Last year's rout was also the second equity bear market in the last three years. But unlike 2020, there was no speedy recovery last year. Instead, US equities spent nearly the entirety of the year mired in a double-digit drawdown that ranked among the most persistent downtrends in history (see Exhibit 112).

The decline in stocks is understandable considering the bounty of concerns today. Recession is chief among these, as investors worry that the

Exhibit 111: ISG Global Equity Forecasts—Year-End 2023

	2022 YE	End 2023 Central Case Target Range	Implied Upside from End 2022 Levels	Current Dividend Yield	Implied Total Return
S&P 500 (US)	3,840	4,200–4,300	9–12%	1.8%	11–14%
Euro Stoxx 50 (Eurozone)	3,794	4,000–4,300	5–13%	3.6%	9–17%
FTSE 100 (UK)	7,452	7,800–8,000	5–7%	3.9%	9–11%
TOPIX (Japan)	1,892	2,000–2,100	6–11%	2.6%	8–14%
MSCI EM (Emerging Markets)	956	990–1,040	4–9%	3.0%	7–12%

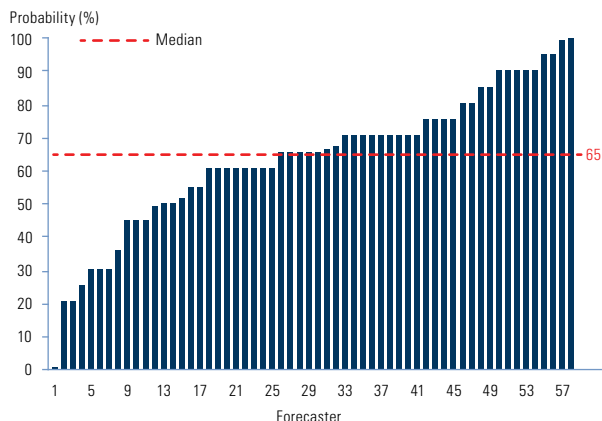
Data as of December 31, 2022.

Source: Investment Strategy Group, Datastream, Bloomberg.

Note: Forecasts are estimated, based on assumptions, are subject to revision and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved. Indices are gross of fees and returns can be significantly varied. Please see additional disclosures at the end of this *Outlook*.

Exhibit 113: Economists' Probability of a US Recession in the Next 12 Months

There is an unusual consensus among economists that a recession is likely.



Data as of October 2022.

Source: Investment Strategy Group, Wall Street Journal Economic Forecasting Survey.

Exhibit 114: ISG Total Return Forecast Scenarios for S&P 500—Year-End 2023

We assign a combined 70% probability to favorable equity outcomes.



Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

Note: Forecasts are estimated, based on assumptions, are subject to revision and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved. Indices are gross of fees and returns can be significantly varied. Please see additional disclosures at the end of this *Outlook*.

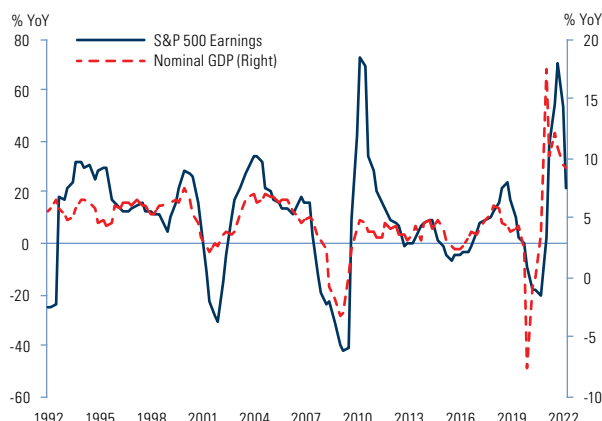
combination of tighter monetary policy and below-trend growth necessary to bring down inflation will also tip the US economy into contraction. That fear is reinforced by the cautionary signals emanating from a host of leading indicators, such as widespread yield curve inversions and the abrupt downturn in the housing market. There is also an unusual consensus among economists that a recession is likely (see Exhibit 113).

Given this backdrop, our expectation for positive equity returns in 2023 may seem counterintuitive (see Exhibit 114). After all, how can we assign a combined 70% probability to favorable equity outcomes while also placing even odds to a recession this year? To understand, it is helpful to look at both the soft landing and hard landing scenarios.

If recession is avoided, we expect mid-single-digit nominal GDP growth to lift earnings by 4–6% this year, providing support for higher equity prices. Exhibit 115 shows that earnings tend to track nominal GDP growth closely over time, as corporations are paid in nominal dollars. As a result, it is very rare for earnings to decline when the economy is still expanding—a fact that repeatedly confounded bearish calls for a collapse in earnings last year.

Exhibit 115: S&P 500 Earnings Growth vs. Yearly Nominal US GDP Growth

Earnings tend to track nominal GDP growth closely over time.



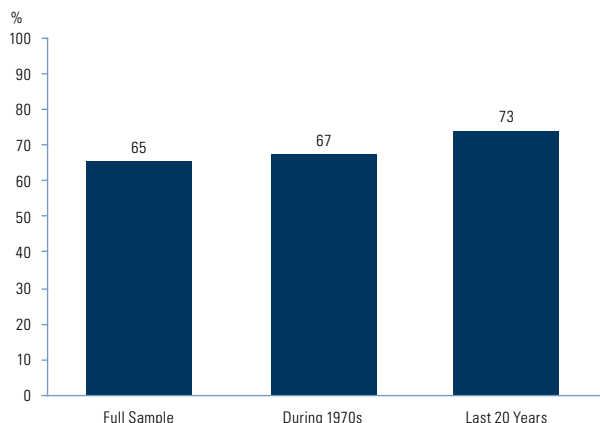
Data through Q3 2022.

Source: Investment Strategy Group, FactSet, Haver Analytics.

Our expectations for a slower pace of US dollar appreciation in 2023 could also help ease some of last year's pressure on corporate revenues. At the same time, we do not consider rising interest expense a key concern this year, as more than

Exhibit 116: Percentage of Time Profit Margins Expanded When S&P 500 Sales Grew

Periods with positive sales growth saw margins remain flat or expand about two-thirds of the time.



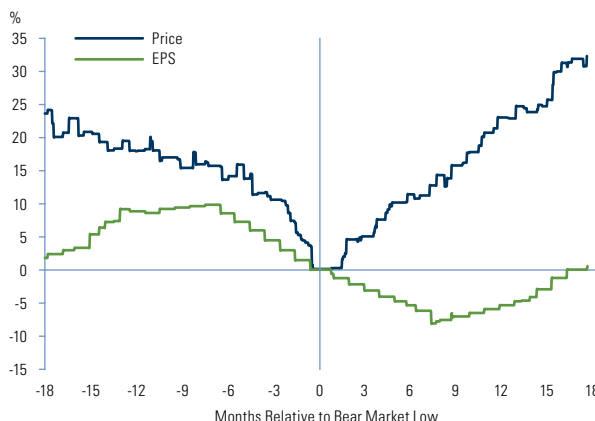
Data as of Q3 2022.

Note: Based on data since 1970.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, FactSet, Compustat.

Exhibit 118: Indexed Price and EPS During US Bear Markets

Equities have typically troughed 6–9 months before earnings reach their low in past bear markets.



Data through 2022.

Note: Based on US bear markets since 1903.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, Robert Shiller.

Exhibit 117: GIR Supply Chain Congestion Scale

The congestion scale dropped to 2 from 10 in January 2022.



Data as of December 27, 2022.

Note: Scale is based solely on weekly metrics to give more granularity on high-frequency data indications.

Source: Goldman Sachs Global Investment Research.

90% of S&P 500 firms' debt is fixed, its average duration is long (at about 12 years) and only 7% of it matures this year.⁵⁰ Interest expense must also be netted against the interest income now being earned on nearly \$2 trillion of cash on corporate balance sheets.

We also draw comfort from the strong historical correlation between sales growth and profit margins. Past periods with positive sales growth—which we also expect this year—saw margins remain flat or expand about two-thirds of the time, even during

the inflationary 1970s (see Exhibit 116). Moreover, the significant improvement in global supply chains in recent quarters should help ease the pressure on profit margins this year (see Exhibit 117). Consistent with this analysis, our base case assumes relatively flat margins.

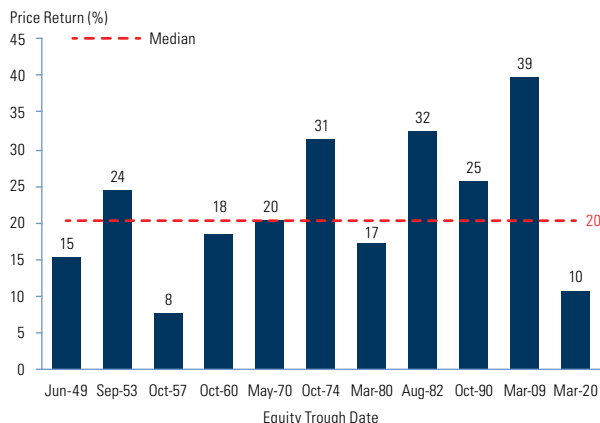
If the economy instead enters a recession, earnings will likely decline from their 2022 level. But whether that results in lower or higher stock prices at the end of 2023 depends critically on when the recession ends. As a rule, the market has more time to recover the earlier in the year a recession occurs.

Two factors explain this dynamic. First, stocks are forward-looking, meaning they typically fall in anticipation of a deteriorating economic environment but begin recovering even as earnings are still being downgraded. During past bear markets, equities have typically troughed six to nine months before earnings reach their low (see Exhibit 118). Equities have also typically bottomed about three months before the end of recessions. Put simply, markets bottom when the news is still bad.

Second, the recovery from past recessionary lows has been rapid, with the S&P 500 rallying about 20% over the span of a few months (see Exhibit 119). The combination of these two factors suggests that even a recession ending late this year would still be consistent with our base case S&P

Exhibit 119: S&P 500 Return from Market Bottom to End of Recession

Equity recovery from past recessionary lows has been rapid.



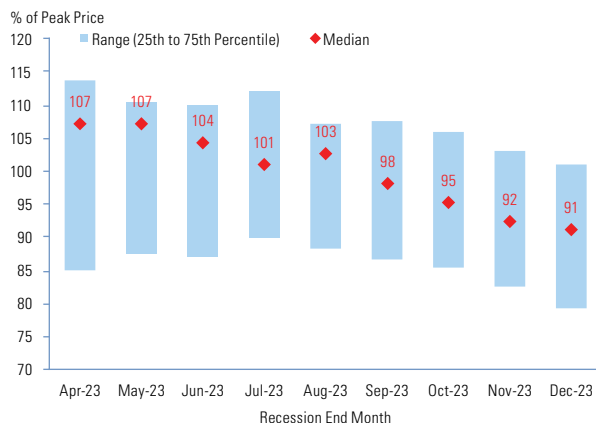
Data as of December 31, 2022.

Note: Based on recessions post-WWII, excluding the 2001 recession, which was the only recession where equities bottomed after the end of recession. The time from market bottom to end of recession ranged from less than one month to eight months and had a median of about three months. Recession end date is defined as the first date of the NBER business cycle trough month.

Source: Investment Strategy Group, Bloomberg, NBER.

Exhibit 120: Implied Year-End 2023 Price as a Percentage of Peak Price vs. Recession End Time

Even a recession ending late this year would still be consistent with our base case S&P 500 target.



Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg, NBER.

Note: Based on 12 recessions since WWII. For example, if a recession ends in December 2023, the historical median episode implies that the S&P 500 would have recovered to 91% of the January 2022 peak of 4,797 (that is, a price level of 4,377) at year-end 2023.

Forecasts are estimated, based on assumptions, are subject to revision and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved. Indices are gross of fees and returns can be significantly varied. Please see additional disclosures at the end of this *Outlook*.

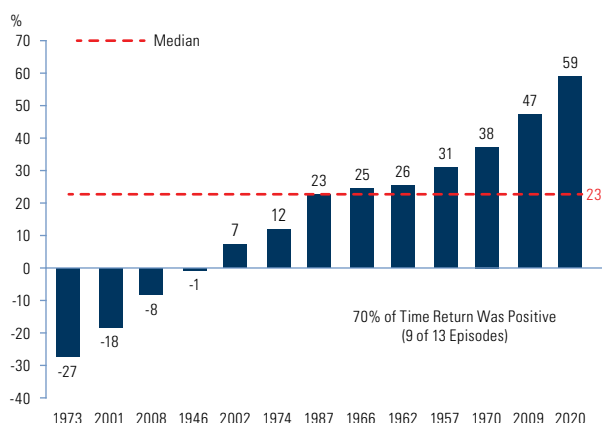
500 target (see Exhibit 120). Because not all paths in a recession lead to lower equity prices at the end of this year, we believe the odds of positive equity returns exceed those of a recession in 2023.

Other factors also support this conclusion. Once the market has fallen into bear-market territory—which happened last year around 3800 on the S&P 500—the median equity gain in the following year was 23% (see Exhibit 121). Similarly, history suggests 83% odds of a gain in 2023 given the rarity of two consecutive down years for the S&P 500. This year is also the third in the presidential cycle, which has historically had the highest returns of the four-year cycle and 84% odds of a gain (see Exhibit 122).

It is also worth mentioning that past years that saw a similarly large decline in the S&P 500 P/E ratio have typically been followed by strong equity returns (see Exhibit 123). While some have attributed last year's P/E de-rating to higher real interest rates alone, we think it also reflects genuine recessionary concerns. That connection is apparent in Exhibit 124, which shows that real interest rates and Bloomberg stories about recession rose in tandem last year in response to the Federal Reserve's

Exhibit 121: S&P 500 Return in 12 Months After a 20% Pullback Within a Calendar Year

Once the market has fallen into bear-market territory, the median equity gain in the following year was 23%.



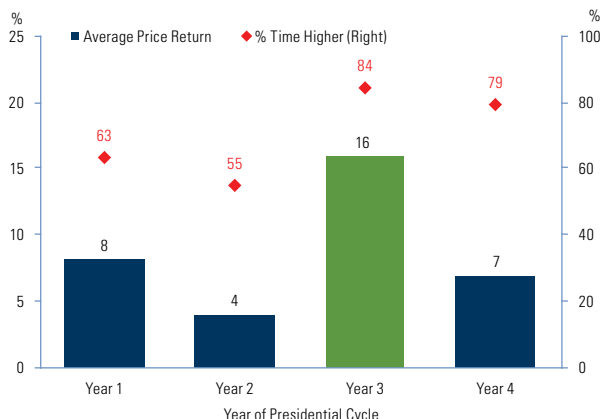
Data through 2022.

Source: Investment Strategy Group, Bloomberg.

aggressive rate hiking cycle. In fact, 2022 featured as many Bloomberg stories on recession as 2020, a year when the US economy was actually in recession.

Exhibit 122: S&P 500 Returns in Each Year of the Presidential Cycle

The third year in the presidential cycle has historically had the highest returns and 84% odds of a gain.



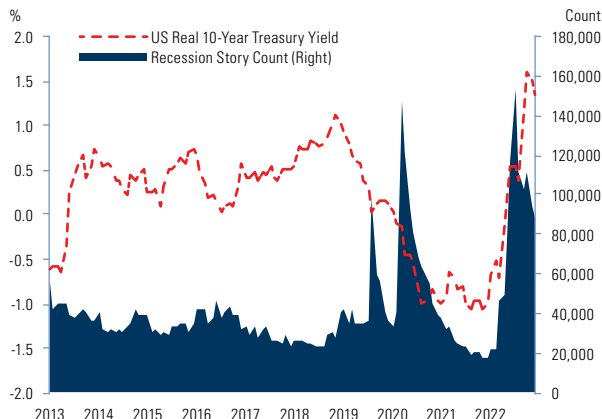
Data through 2022.

Note: Based on data since 1946.

Source: Investment Strategy Group, Bloomberg.

Exhibit 124: Recession Story Count vs. US Real 10-Year Treasury Yield

Both real interest rates and recession stories rose in tandem last year.

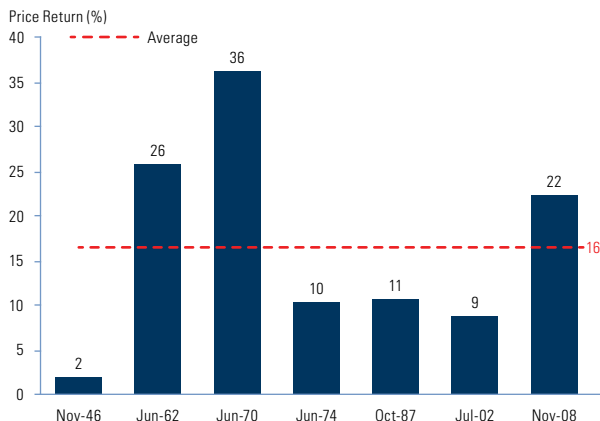


Data through December 2022.

Source: Investment Strategy Group, Bloomberg.

Exhibit 123: S&P 500 Returns in the Years Following 20% Declines in Trailing P/E Ratios

Subsequent equity returns were strong when P/E ratios declined as much as they did last year.



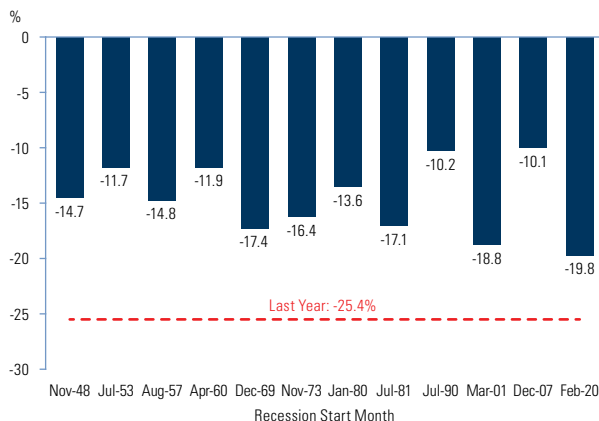
Data as of December 31, 2022.

Note: The analysis looks for historical instances when the P/E ratio declined by more than 20% from a 9-month high and the corresponding price decline was also more than 20%, a case that occurred last year. This implies that the multiple compression was driven by price decline rather than earnings growth.

Source: Investment Strategy Group, Bloomberg, S&P Global.

Exhibit 125: S&P 500 Peak-to-Trough Drawdown Within Two Years Before Start of Recessions

Last year's 25% peak-to-trough equity drawdown was the largest in advance of a recession in history.



Data as of December 31, 2022.

Note: Recession start date is defined as the first date of the NBER business cycle peak month.

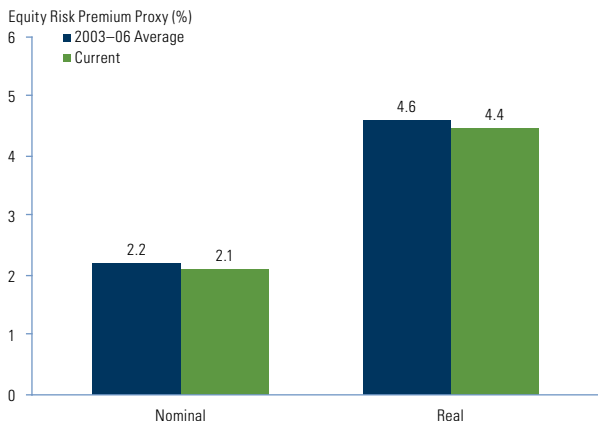
Source: Investment Strategy Group, Bloomberg, NBER.

To be clear, we are not arguing that today's valuations fully discount a recession. But considering last year's 25% peak-to-trough equity drawdown—which would be the largest in advance of a recession in history (see Exhibit 125)—we do

think a significant part of any valuation reset has already occurred. Current US equity valuations also seem reasonable compared to past periods with similar interest rates (see Exhibits 126 and 127).

Exhibit 126: Equity Risk Premium Proxy—Current vs. 2003–06

Current US equity valuations are in line with the levels seen in 2003–06 when interest rates were similar.



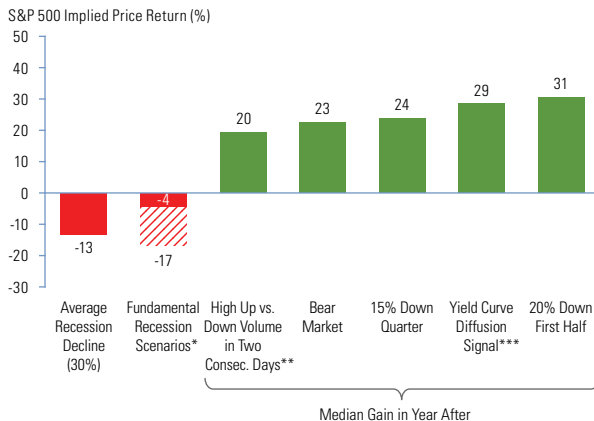
Data as of December 31, 2022.

Note: Nominal or real equity risk premium is approximated by forward earnings yield minus US Treasury 10-year nominal or real yield.

Source: Investment Strategy Group, FactSet, Bloomberg.

Exhibit 128: Implied Change in S&P 500 Level Under Different Scenarios

There is a positive skew between upside and downside risks from current levels.



Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg, Datastream, FactSet, I/B/E/S, SentimentTrader.

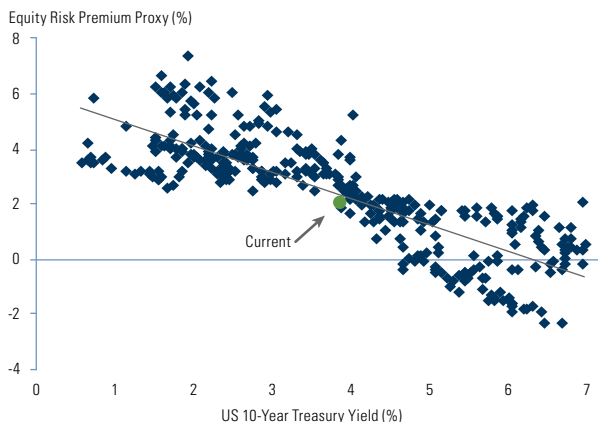
* Fundamental recession scenarios are based on a 35–40% peak-to-trough forward P/E contraction and on a 15% peak-to-trough forward EPS contraction.

** Defined as back-to-back days with 10-to-1 NYSE up volume/down volume.

*** Based on the 103% median ratio of highest S&P 500 price in year following yield curve diffusion signal relative to its peak price before the signal.

Exhibit 127: Equity Risk Premium Proxy vs. US 10-Year Treasury Yield

Current US equity valuations seem reasonable compared to past periods with similar interest rates.



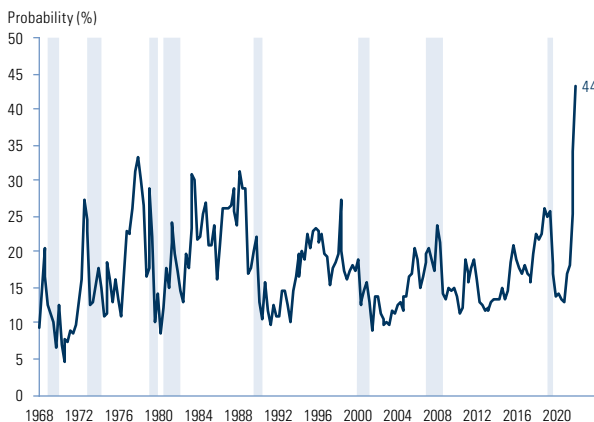
Data as of December 31, 2022.

Note: Equity risk premium is approximated by forward earnings yield minus US 10-year Treasury yield. All values are nominal.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, Bloomberg, FactSet, Compustat.

Exhibit 129: Professional Forecasters' Probability of a Quarterly Decline in Real GDP in 1 Year

This is arguably the most widely anticipated recession in history.



Data as of Q4 2022.

Note: Data shown is based on the average responses from the Federal Reserve Bank of Philadelphia Survey of Professional Forecasters. Shaded periods denote recessions.

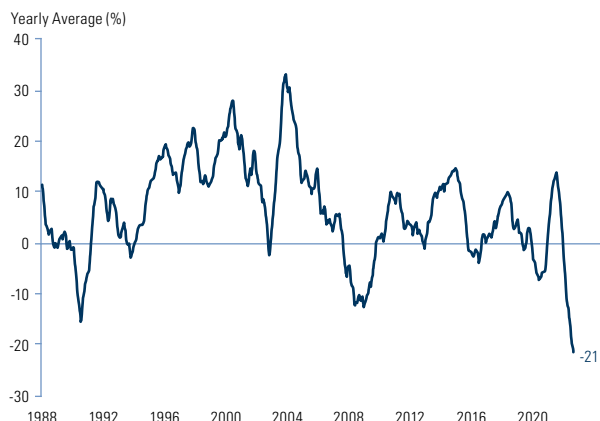
Source: Investment Strategy Group, Federal Reserve Bank of Philadelphia, NBER.

Exhibit 128 summarizes the dilemma facing investors today. The favorable equity outcomes we discussed previously for year-end 2023 do not preclude lower prices during the year, especially

in the event of a recession. But that risk must be weighed against the attractive returns that could follow a variety of soft and hard landing scenarios. Furthermore, it is difficult to imagine

Exhibit 130: Net Percentage of Bullish vs. Bearish Investors Over Time

The average investor sentiment last year was the most depressed on record.



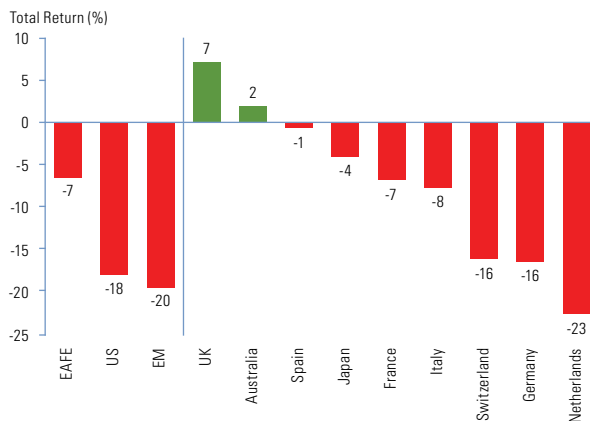
Data through December 29, 2022.

Note: Calculated as 52-week average of percentage of bullish investors minus percentage of bearish investors.

Source: Investment Strategy Group, American Association of Individual Investors Sentiment Survey.

Exhibit 131: 2022 Public Equity Returns

Non-US developed equities fared well relative to the US and EM in 2022.



Data through December 31, 2022.

Note: All returns are in local currencies except for the Emerging Market return, which is in US dollars. The US return is based on the S&P 500 index. The returns for non-US equities are based on MSCI indices.

Source: Investment Strategy Group, Datastream.

that the market would be completely surprised by a recession at this point, which could temper the resulting downdraft. As seen in Exhibit 129, this is arguably the most widely anticipated recession in history and has already been preceded by one of the most depressed investor sentiment readings on record (see Exhibit 130).

Given the uncertainties above, investors should first ensure that their strategic asset allocation accurately reflects their risk tolerance. But provided that is the case, history suggests investors are better off staying the course and even looking for opportunities to overweight stocks if they weaken further, given the positive skew between upside and downside risks from current levels.

Non-US Developed Market Equities: A Rocky Road to Recovery

The relative performance of non-US developed equities was a bright spot last year. As seen in Exhibit 131, the 7% decline in the MSCI EAFE (Europe, Australasia, and the Far East) index in local currency terms significantly outperformed the declines seen in both US and emerging market stocks, which were closer to 20%. Some developed equity markets, such as the UK and Australia, even finished 2022 with gains.

Although we expect more uniformly positive equity returns across EAFE countries in 2023, the path is unlikely to be smooth. This year likely begins with recessions in two of the largest developed equity markets outside the US, the Eurozone and the UK, which together represent around half of EAFE market capitalization. At the same time, ongoing geopolitical uncertainty in many countries likely sets a practical limit on how much of last year's equity decline can be recouped.

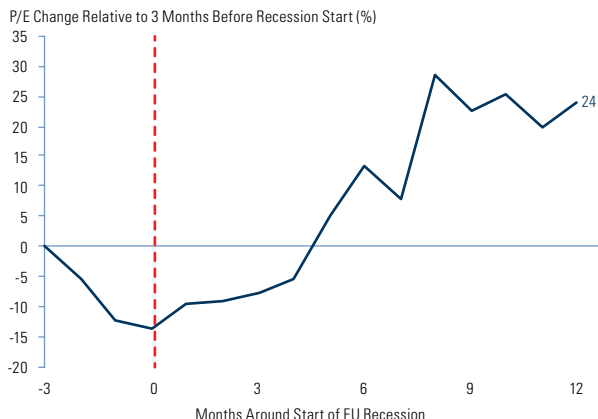
Despite these headwinds, we think forward-looking investors will push valuation multiples higher this year as they anticipate an eventual recovery in earnings. For EAFE, that implies a low-double-digit total return in local currency terms. We also forecast positive gains for European markets this year, but we expect only the UK to recapture its previous peak.

Eurozone Equities: Continued Resilience

Eurozone equities bested their global peers last year (see Exhibit 131), a notable departure from their tendency to lag in down markets. This surprising outcome was rooted in a more than 20% increase in earnings, which reached their highest level in more than a decade. Considering the Eurozone's proximity to Ukraine and its

Exhibit 132: Eurozone P/E Change Around Prior Recessions

Multiple expansion has been usual following the start of prior recessions.



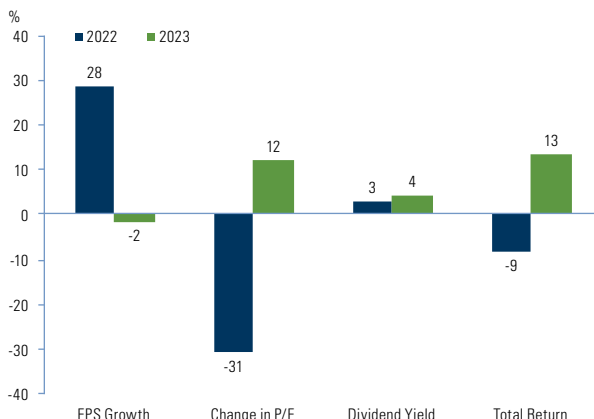
Data through 2022.

Note: Based on data since 1990.

Source: Investment Strategy Group, Datastream.

Exhibit 133: Decomposition of Eurozone Equity Return in 2022 and 2023

We expect multiple expansion will offset the decline in earnings in 2023.



Data through December 31, 2022.

Note: The returns and decomposition are based on the midpoint of ISG's central case forecast range. Total return includes the compounding effect between earnings and valuation multiple.

Source: Investment Strategy Group, Datastream, I/B/E/S.

reliance on Russian energy, the resilience of its companies last year was remarkable.

This resilience is likely to give way to lower earnings in 2023, as Europe begins the year in a recession amid a global growth slowdown. Even so, we expect investors to push P/E ratios higher as the region emerges from a short-lived and relatively shallow economic downturn this year, just as they have during prior recessions (see Exhibit 132). That view is supported by the area's relatively attractive valuations. At just 11.3x, the Eurozone's P/E ratio stands in the bottom 30% of the post-GFC distribution and below its pre-pandemic value. The net result of falling earnings amid rising valuations should be a low-double-digit total return for Eurozone equities this year; many elements of our forecast are the mirror image of their values last year (see Exhibit 133).

As discussed in Section I, we remain overweight the Eurozone banks. Not only did the sector outperform broader Eurozone equities once again last year, but it also generated a positive return despite a global bear market. Several factors underpin this resilience. First, the ongoing increase in global interest rates directly benefits the banks' net interest income. Second, the banks have spent the last decade improving their balance sheets, resulting in higher capital ratios and fewer

losses in their loan books. Finally, the sector is attractively valued, particularly relative to what investors have historically paid for the level of profitability it currently has. Against this backdrop, we continue to recommend an overweight to Eurozone banks given their improving profitability, scope for higher valuations and attractive 6% dividend yield.

UK Equities: Still Playing Catchup

The gain in UK equities last year in local currency terms stood in sharp contrast to the significant losses seen in almost all other major equity markets. Last year was also the first time since 2016 that UK equities had outpaced the MSCI World Index. This outperformance can be traced to a few factors, including the FTSE 100's high concentration of value stocks and commodity-

Considering the Eurozone's proximity to Ukraine and its reliance on Russian energy, the resilience of its companies last year was remarkable.

Exhibit 134: FTSE 100 and MSCI World Total Returns Since 2020

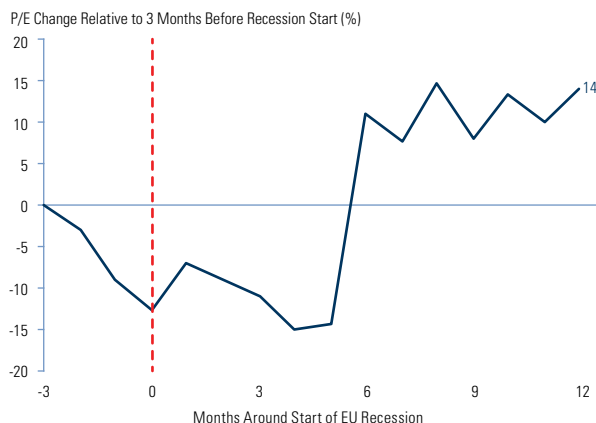
UK equities have not yet closed the performance gap with other developed equities.



Data through December 31, 2022.
Note: Total returns in local currency terms.
Source: Investment Strategy Group, Datastream.

Exhibit 135: UK P/E Change Around Prior Recessions

Multiple expansion has been usual following the start of prior recessions.



Data through 2022.
Note: Based on data since 1990.
Source: Investment Strategy Group, Datastream.

exposed stocks, its record-low relative valuations at the start of 2022 and the depreciation of the currency. Yet despite last year's strength, UK equities have still not closed the performance gap that emerged relative to other global equities after the start of the pandemic (see Exhibit 134).

That gap is likely to extend into 2023, as UK earnings decline in response to a domestic recession and slowing global growth, as well as a waning tailwind from commodity prices and past sterling depreciation. But as was the case in the Eurozone, we expect investors' willingness to pay higher valuations as the UK economy exits its recession to fully offset the decline in profits this year (see Exhibit 135).

Japan's overseas earnings benefited from the limited rise in the country's interest rates and the sharp depreciation in its currency, both the result of the BOJ's unwillingness to follow other central banks in tightening policy.

The combination of declining profits and a modestly higher P/E ratio—along with the FTSE 100's 3.9% dividend yield—supports a low-double-digit total return in our base case (see Exhibit 111). The currently depressed levels of investor sentiment also imply similar total returns to our baseline forecast in 2023, as this has been a contrarian indicator of future equity returns in the past.

Japanese Equities: Encore Unlikely

Japan also outperformed global equities last year. Three main factors drove this achievement. First, Japan's overseas earnings benefited from the limited rise in the country's interest rates and the sharp depreciation in its currency, both the result of the BOJ's unwillingness to follow other central banks in tightening policy. Second, the Japanese economy was able to sustain above-trend growth. Lastly, the underweight position of foreign investors at the start of last year left little for them to sell (see Exhibit 136). Because these investors are typically the marginal buyers or sellers of Japanese equities, their underweight positioning indirectly supported the stocks.

We forecast a low-double-digit total return for Japan in 2023 (see Exhibit

Exhibit 136: Cumulative Net Purchases of Japanese Equities by Foreign Investors Since 2010

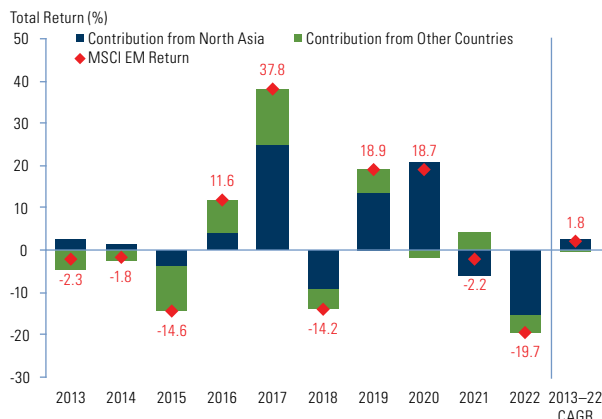
Equity inflows from foreign investors remain well below their Abenomics peak.



Data through December 23, 2022.
Source: Investment Strategy Group, Haver Analytics.

Exhibit 137: Contributions to MSCI EM Annual Returns

China, Korea and Taiwan were a large drag on returns last year.



Data through December 31, 2022.
Source: Investment Strategy Group, Datastream, MSCI.

111). As with our views on other EAFE markets, we expect higher valuations to be the key driver of equity prices this year, offsetting flat earnings growth. But we expect a smaller rise in Japan's P/E ratio than in other markets, as the BOJ seems poised to tighten monetary policy just as other central banks reach the end of their hiking cycles. In fact, a more rapid or forceful tightening of monetary policy represents a key downside risk to our forecast. Given this balance of risks, an encore of last year's outperformance is unlikely.

Emerging Market Equities: Fading Headwinds from the North

Emerging market equities had another challenging year in 2022. Their 20% decline capped the sixth year of losses—and eighth year of underperformance relative to the S&P 500—in the last decade. While 16 of the 24 countries in the MSCI EM Index had negative returns in 2022, North Asia was the largest headwind to the index's performance (see Exhibit 137). Indeed, China, Korea and Taiwan—which together account for 58% of MSCI EM market capitalization—collectively lost 25% last year, more than twice the 11% decline for the rest of the index.

We expect calmer winds from North Asia in 2023. Not only will conditions look more favorable with China's reopening, but the region should

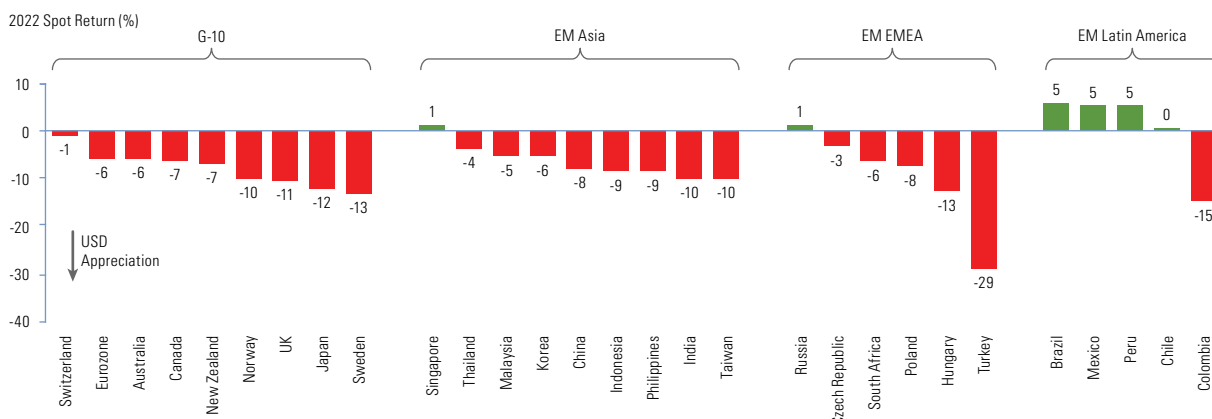
also benefit from abating declines in chip prices, less regulatory pressure on China's internet sector and less of a drag on profit margins from spiraling commodities prices. As a result, we expect MSCI EM forward earnings to rise by 10% in 2023, to \$90 per share. At the same time, valuation multiples should decline modestly to 11.4x, as slightly lower interest rates are offset by a moderate increase in the equity risk premium. Combined with EM equities' 3% dividend yield, these elements imply a high-single-digit total return in 2023 (see Exhibit 111).

Despite these projected equity gains, we still see four dark clouds on the horizon. First, the outlook for China remains foggy given its rising economic, social and geopolitical risks, discussed in greater detail in our December 2022 *Insight* report, *Middle Kingdom: Middle Income*. Second, slower global growth will weigh heavily on export-dependent North Asia. Third, outflows from global investors could gain speed due to EM equities' continued underperformance. Finally, tightening in monetary policy last year—which saw the median policy rate among the 17 countries in the MSCI EM Index with inflation-targeting central banks increase from 3% to 7%⁵¹ after 101 collective rate hikes—was dramatic, and its ultimate impact remains highly uncertain.

Although the gale-force headwinds of last year are likely to subside, we still expect some gusts ahead. For this reason, we continue to recommend a tactically neutral allocation to EM equities.

Exhibit 138: 2022 Currency Performance (vs. US Dollar)

Most major currencies depreciated against the US dollar last year.



Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

Note: Past performance is not indicative of future results.

2023 Global Currency Outlook

The US dollar enjoyed a banner year in 2022, posting its second consecutive year of broad gains and surpassing every other developed market currency, as well as all but a handful of those in emerging markets (see Exhibit 138). Several factors underpinned this outperformance, including the most aggressive Federal Reserve hiking cycle in decades, along with a global energy shock and flagging risk sentiment that prompted investors to turn to the dollar as a safe haven.

The yen endured the worst of the US dollar's strength and stood out as the worst-performing currency among developed market peers after the Swedish krona. Surging import prices and an exceptionally accommodative Bank of Japan sent the yen 12% lower versus the dollar. The British pound also suffered a double-digit downdraft against the backdrop of a mini-budget crisis and resignation of two prime ministers. Its 11% decline was the pound's worst annual showing since 2016, when the UK voted to leave the European Union.

EM currency performance was slightly less uniform. While most Asian and European currencies fell against the greenback, several Latin American currencies—including the Mexican peso, Brazilian real and Peruvian sol—posted moderate gains.

We expect the interplay of global growth and central bank policy to remain a critical driver of the US dollar's path. With real interest rate differentials

between the US and its developed market peers still wide against an uncertain global backdrop, our forecast calls for the US dollar to rise in 2023. But compared with last year, we expect a smaller low-single-digit pace of appreciation and more dispersion in the US dollar's relative performance.

Regardless of our tactical views, we continue to recommend that clients fully hedge their offshore fixed income. We also recommend that US and non-US clients hedge 50% and 70%, respectively, of their non-local developed market equity holdings to reduce portfolio volatility and provide diversification.

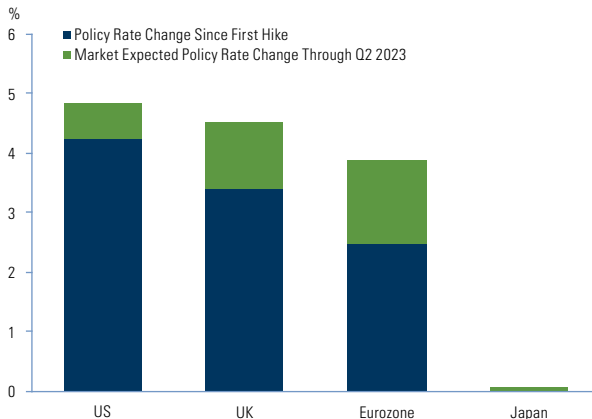
US Dollar

It is hard to find fault with the US dollar's performance over the past decade. Not only has the greenback posted eight winning years over this period, but it has also advanced 46% since the lows of the financial crisis, including an 8% gain in 2022 alone. The dollar's outperformance against every other developed market currency last year was yet another reminder of its hegemony.

Although the dollar index recently traded at its highest level in 20 years, we think several factors continue to support dollar outperformance. For one, US growth is likely to outpace that in most other major developed markets this year, supporting the positive policy rate differential with developed market peers (see Exhibit 139). In turn, these policy and growth differentials should entice foreign investors to favor US-dollar assets at the

Exhibit 139: Past and Expected Policy Rate Hikes by Major Central Banks

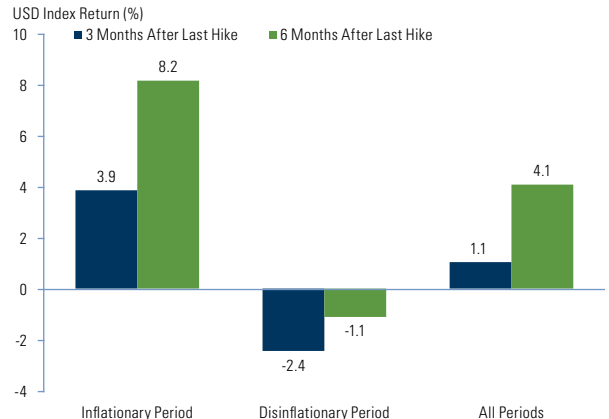
US policy rates will likely settle at a higher level than in other major developed markets.



Data through December 31, 2022.
Source: Investment Strategy Group, Bloomberg.

Exhibit 140: US Dollar Returns After the End of a Federal Reserve Hiking Cycle

The end of Federal Reserve hiking cycles has typically given the US dollar a boost over the following six months.



Data through 2022.
Source: Investment Strategy Group, Bloomberg.
Note: Inflationary period includes last Federal Reserve hikes that occurred when core inflation was above 4%: 1974, March 1980, December 1980, 1984, 1989. Disinflationary period includes last Federal Reserve hikes that occurred when core inflation was below 4%: 1995, 2000, 2006, 2018. Past performance is not indicative of future results.

expense of lower-yielding alternatives, providing a tailwind to the greenback. Moreover, the end of a Federal Reserve hiking cycle—such as is expected this year—has typically seen the dollar rise over the following six months (see Exhibit 140). Finally, noncommercial investors begin the year with light US dollar positioning, providing scope for them to increase exposure.

That said, there are downside risks as well. The dollar's valuation now stands well above its long-term average, making the greenback more vulnerable (see Exhibit 141). Such disappointments could come from abroad—such as materially stronger foreign growth or tighter monetary policy outside the US—or domestically, if the Federal Reserve is forced to abruptly cut rates. While it is not our base case, a convergence in global monetary policy would potentially erode the yield advantage of US assets and thereby weigh on the dollar.

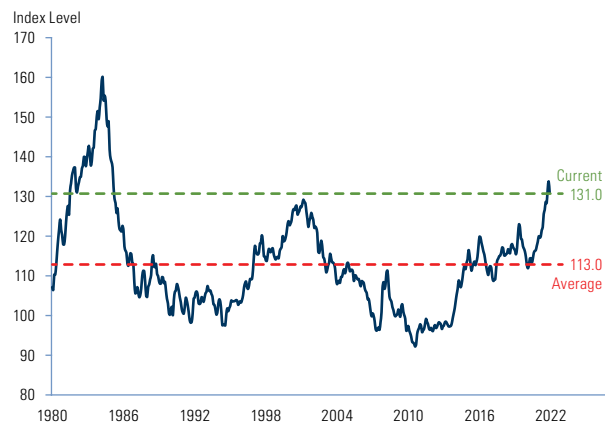
Although we still think this balance of risks favors a stronger dollar, that appreciation is likely to be more modest and more diffuse against other global currencies than was the case last year.

Euro

For the second consecutive year, the euro was a casualty of the US dollar's strength. In fact, the

Exhibit 141: US Dollar Real Effective Exchange Rate

The dollar's valuation now stands well above its long-term average, making the greenback more vulnerable.

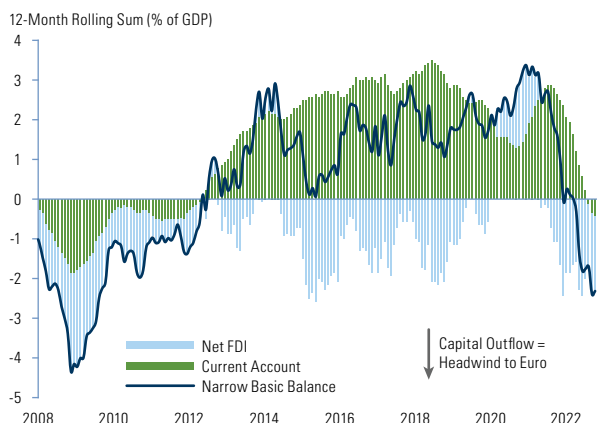


Data through November 2022.
Source: Investment Strategy Group, Haver Analytics, IMF.

euro was down 16% at its worst point before recovering to a still sizable 6% loss for 2022. Although softer economic growth and Russia's invasion of Ukraine were key drivers, last year's weakness continued a string of losses—in seven of the last nine years—that began when the ECB

Exhibit 142: Eurozone Narrow Basic Balance

A deficit has emerged in both the current account and the net foreign direct investment for the first time since 2012.



Data through October 2022.

Note: The narrow basic balance reflects the sum of the current account and net foreign direct investment.

Source: Investment Strategy Group, Haver Analytics.

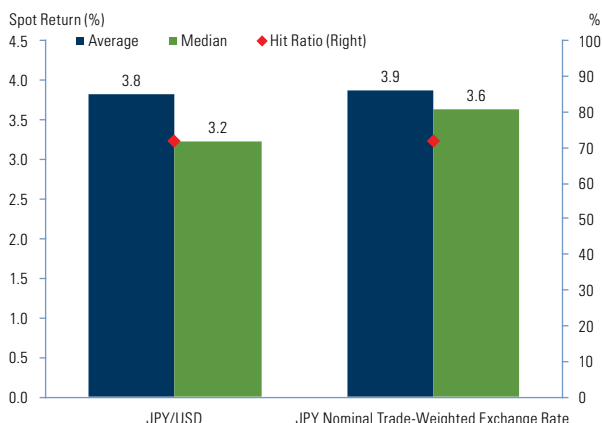
announced plans to cut its deposit rate to below zero for the first time in history.

With the euro now nearly 25% below its 2014 peak, it may appear undervalued relative to its history. But this discount may be warranted given the many fault lines running through the Eurozone, not the least of which is the region's lack of energy security. Structurally higher gas prices resulting from a lack of low-cost alternatives to Russian energy make the continent's energy-intensive industrial sector less competitive, potentially justifying a lower exchange rate relative to history. The Eurozone's capital flow profile represents another source of vulnerability for the euro. Demand for euro-denominated assets has plunged, falling even below levels seen in the sovereign debt crisis. Moreover, both the current account and net foreign direct investment are in deficit for the first time in a decade (see Exhibit 142).

Even so, there are several factors that could potentially limit the extent of any further euro weakness. First, there is a low hurdle for euro-friendly surprises given that most investors already expect a mild recession in the region. Second, the euro could benefit from both stronger economic activity and a stronger narrow basic balance if a warmer winter ends up limiting the need for energy rationing and dampening energy prices. Finally, the yield advantage of euro-denominated assets could improve relative to other developed markets—

Exhibit 143: Yen Performance 6 Months After the Beginning of a US Recession

Global growth headwinds that boost risk aversion could lead investors into the yen as a liquid hedge.



Data through 2022.

Source: Investment Strategy Group, Bloomberg, Haver Analytics.

Note: Based on data since 1973.

Past performance is not indicative of future results.

thereby supporting the euro—if the ECB needs to tighten monetary policy more than expected given historically high inflation.

We give a slight edge to the negative factors discussed and expect low-single-digit losses for the euro relative to the dollar.

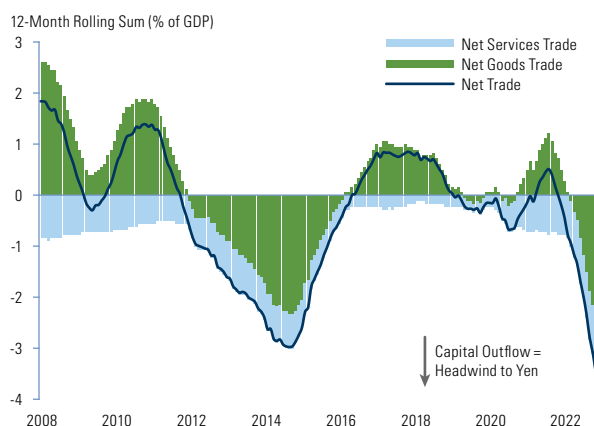
Yen

Yen investors are forgiven for feeling whiplashed last year. After depreciating close to 25% against the US dollar by October—reaching its weakest relative level in more than three decades—the yen surprised traders with a powerful 15% rally into year-end. Despite these wild gyrations, the yen's 12% loss in 2022 still ranked as its worst since 2013 and left it among the worst-performing developed market currencies for the second consecutive year.

With the yen having now lost nearly a quarter of its value since the onset of the pandemic, there is certainly scope for last year's depreciation to reverse. Core Japanese inflation is running at its highest level in a decade and above the Bank of Japan's 2% target. The BOJ is unlikely to duplicate the degree of monetary policy tightening seen by other major central banks, not least because inflation is expected to fall to near 2% this year. But with new BOJ leadership appointments later this year, the odds are rising that it will soon articulate an endpoint to its near-zero interest rate

Exhibit 144: Japanese Trade Balance

Japan's trade balance shows its largest deficit ever.

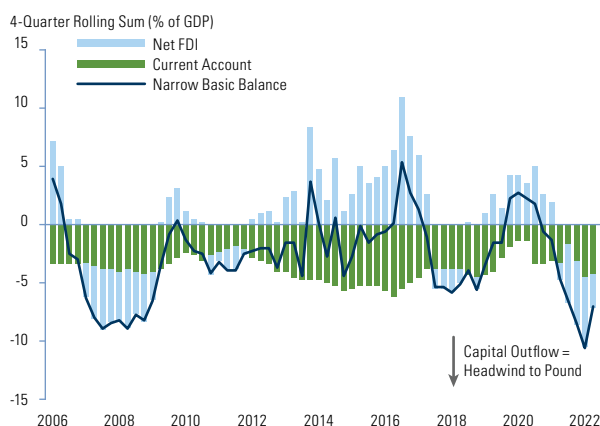


Data through October 2022.

Source: Investment Strategy Group, Haver Analytics.

Exhibit 145: UK Narrow Basic Balance

The UK's current account has deteriorated and net FDI stands near its weakest level since the GFC.



Data through Q3 2022.

Note: The narrow basic balance reflects the sum of the current account and net foreign direct investment.

Source: Investment Strategy Group, Haver Analytics.

policy. Such a development would help narrow Japan's cross-border interest rate differential and reduce a recent source of yen weakness.

Also consider that the yen has historically performed well during economic slowdowns. While a US recession is not our base case, the possibility has risen markedly over the past year. Any additional global growth headwinds that boost risk aversion could lead investors into the yen as a liquid hedge, as we saw after the onset of previous recessions (see Exhibit 143).

Of course, the yen also still faces several obstacles. Japan's current account surplus has halved over the last year given higher import prices. In turn, the trade balance shows its largest deficit ever (see Exhibit 144). This implies marginally less structural demand for the yen and may limit its ability to recover to pre-pandemic levels. Japanese corporations are also likely to generate sustained pressure on the currency, as they continue to sell yen to invest in foreign ventures with better long-term growth prospects and higher yields. Although these outflows slowed during the initial stages of the pandemic, they have quickened more recently and now stand at about 3.5% of GDP, a historically large share.

Taking these factors together, we see scope for a mid-single-digit rise in the yen, with the possibility of both long and short tactical trading opportunities throughout 2023.

Pound

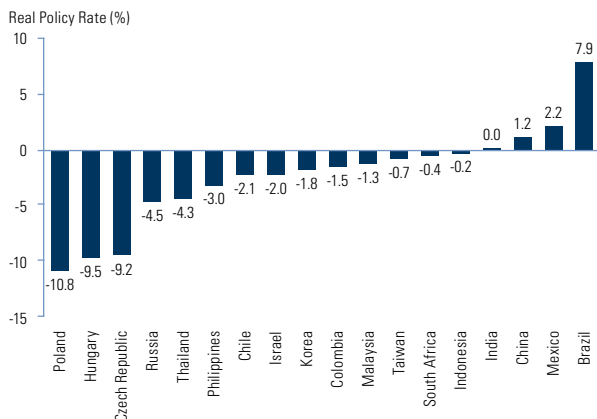
Along with most other currencies in 2022, the pound fell in relation to the US dollar—its second consecutive year of underperformance. Last year's 11% loss masked a more dramatic 25% peak-to-trough drawdown in the currency through September following a budget crisis and the resignation of two prime ministers. This continued the currency's volatile return profile, which dates back to 2016 and the United Kingdom's decision to leave the European Union.

We expect further weakness in the pound in 2023. The UK economy is forecast to contract this year, which may limit how much further the Bank of England can tighten and opens the door for rate cuts in late 2023 or 2024. A less favorable absolute policy rate differential with the US could also diminish the appeal of the pound to yield-seeking investors. Moreover, the UK's position as a net energy importer has pushed its current account deficit to 4.2% of GDP (see Exhibit 145). This too will be a drag on the pound unless the energy shock recedes rapidly.

Still, the risks to the pound are not completely to the downside. Any combination of better global growth or optimism for a faster-than-expected UK economic recovery could generate foreign demand for UK assets, which would benefit the pound. There is certainly scope for better foreign direct investment, which currently stands near its weakest level since the GFC (see Exhibit 145). In addition,

Exhibit 146: Ex Post Real Rates in Emerging Markets

Positive real rates in Mexico and Brazil offer investors attractive incremental yield.

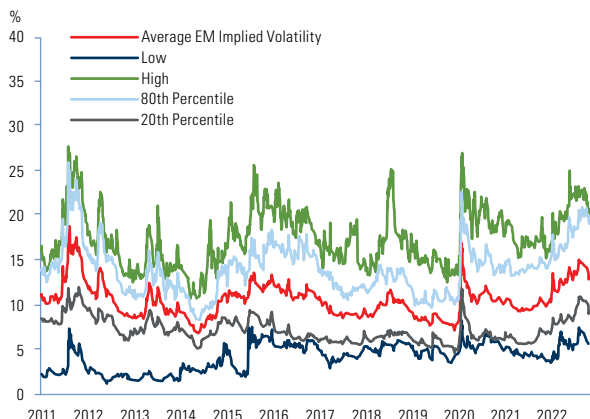


Data as of November 2022.

Source: Investment Strategy Group, Macrobond, Bloomberg.

Exhibit 147: 3-Month Implied Currency Volatility in Emerging Markets

Investors will want volatility to subside before overweighting EM currencies.



Data through December 31, 2022.

Source: Investment Strategy Group, Macrobond, Bloomberg.

the political turbulence that has undermined the pound may recede in 2023 for a few reasons, including last year's fiscal policy U-turn and the lack of any major election or referendum votes this year.

On balance, we expect the pound to depreciate by modest single digits versus the US dollar this year.

Emerging Market Currencies

EM currencies disappointed again last year. Their 6.1% decline against the US dollar marked the ninth annual loss for the asset class in the past decade.⁵² Over this same period, the asset class has cumulatively lost half its nominal value against the US dollar.

While many factors have contributed to this underwhelming decade, Russia's invasion of Ukraine was one of the key drivers of these currencies' weakness last year. Surging commodity prices in the wake of the invasion fueled inflation across EM, pushing real interest rates into negative territory despite an early start to the hiking cycle by most EM central banks. Higher energy prices were particularly hard on European emerging market currencies, which depreciated 10–25% into last fall.

The hostilities were also accompanied by a fast-paced hiking cycle in the US and a broad-based selloff in risk assets, leading to tighter global financial conditions that weighed on EM

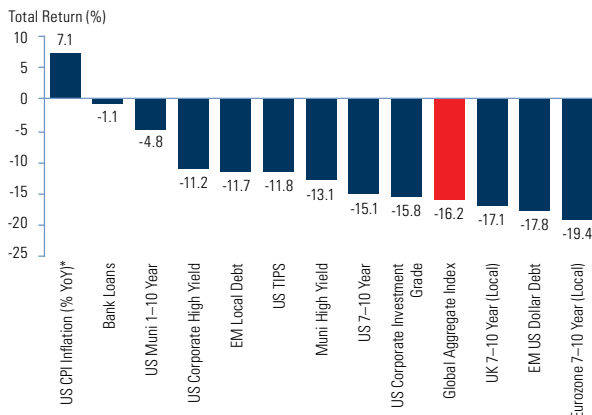
currencies. In Asia, China's "zero-COVID" policy, its multiple lockdowns, and the renminbi's 15% peak-to-trough decline led the rest of that bloc into weakness. The one bright spot was Latin America, as the currencies of Mexico and Brazil ended the year with positive real rates that boosted the credibility of their central banks and offered investors attractive incremental yields (see Exhibit 146).

The outlook for 2023 is mixed. On the one hand, EM currencies should benefit if the Federal Reserve signals an end to its hiking cycle, as interest rate differentials favor these currencies. On the other hand, investors will want volatility to subside before overweighting EM currencies (see Exhibit 147). But that stability may prove elusive given looming risks, such as a US recession.

In this environment, we expect investors to become more selective and favor higher yielding currencies with improving macro fundamentals. The Chinese renminbi does not cleanly match either of these criteria, and we see two key reasons it could weaken this year. First, Chinese bonds offer less attractive yields, which stand two percentage points below US Treasuries. Second, the end of "zero-COVID" is likely to put pressure on China's current account as its service deficit widens. At a time when other countries' current accounts are set to improve, this will also weigh on the renminbi.

Exhibit 148: 2022 Fixed Income Returns by Asset Class

Global fixed income delivered negative returns, significantly underperforming inflation.



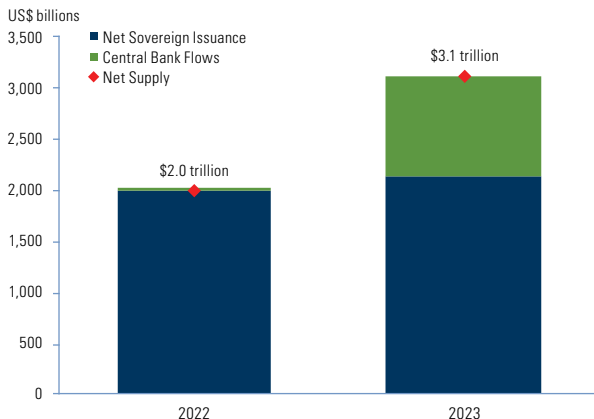
Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

* Inflation data as of November 2022.

Exhibit 149: Expected Net Supply to the Private Sector Across G3 Economies

As central banks reduce their balance sheets, private markets will need to absorb record net issuance.



Data as of December 31, 2022.

Note: Based on estimates from Goldman Sachs Global Investment Research, converted to US dollars using year-end 2022 exchange rate.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, US Treasury, European Commission, UK Office for Budget Responsibility.

Global Fixed Income Outlook

Most bond investors will be glad to turn the page on 2022. A combination of aggressive interest rate hikes by global central banks and historically low bond yields at the start of the year resulted in deep losses for fixed income portfolios last year. The Bloomberg Global Aggregate Bond Index fell 16%, a decline three times larger than the previous worst reading since the benchmark's inception in 1990. While credit fared better than duration—with spreads supported by robust nominal growth—all fixed income categories suffered losses last year (see Exhibit 148).

Fortunately for bondholders, an encore is unlikely for several reasons. The higher starting level of today's yields provides bond investors with a buffer to absorb any further increases in interest rates. Moreover, the upward pressure on rates from central bank hikes should ease given our expectation that the Federal Reserve will conclude its tightening cycle in the first half of 2023, and that the ECB and BOE will do the same shortly thereafter. Lastly, our forecast of below-trend growth implies easing inflationary pressures and higher risk of recession, both of which increase the odds of

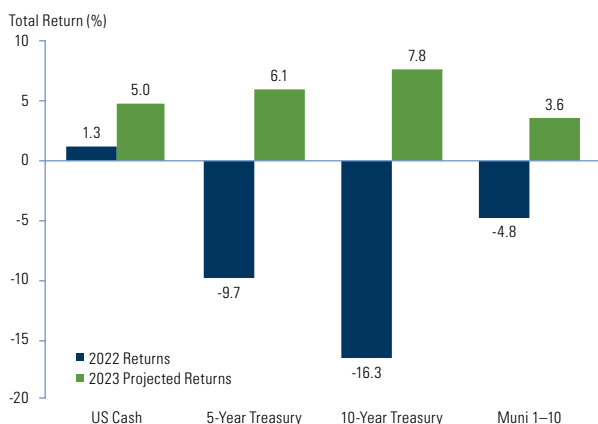
eventual Federal Reserve rate cuts. Against this backdrop, we expect lower 10-year yields across most advanced and emerging economies this year.

Of course, our constructive view on bonds does not imply the absence of risks. Across the US, Eurozone and United Kingdom, private markets will need to absorb a record \$3 trillion in estimated net bond supply this year (see Exhibit 149), composed of around \$2 trillion in net new sovereign debt and \$1 trillion fewer bond purchases by central banks (i.e., quantitative tightening). With central banks withdrawing the largest source of demand in recent years, there is risk that private investors will require higher risk premiums to accommodate the elevated funding needs of advanced economies. Continued

The upward pressure on rates from central bank hikes should ease given our expectation that the Federal Reserve will conclude its tightening cycle in the first half of 2023, and that the ECB and BOE will do the same shortly thereafter.

Exhibit 150: 2023 US Treasury and Municipal Bond Return Projections

We expect intermediate Treasuries will outperform cash.



Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

Note: Past performance is not indicative of future results. Forecasts are estimated, based on assumptions, are subject to revision and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved. Indices are gross of fees and returns can be significantly varied. Please see additional disclosures at the end of this *Outlook*.

uncertainty around the path of inflation could also weigh on bond demand.

Still, we think the balance of risks supports positive total returns for intermediate fixed income in our base case (see Exhibit 150). While cash offers attractive returns, unexpected rate cuts by the Federal Reserve in response to a growth shock could quickly erode its yield. In contrast, high-quality fixed income is the only asset that has effectively hedged against past deflationary shocks.

In the sections that follow, we will review the specifics of each major fixed income market.

US Treasuries

Our 2022 *Outlook* featured the most negative expected returns for US Treasuries that we have ever published. Yet the actual losses last year

exceeded even our pessimistic forecasts. In the case of the 10-year Treasury, investors were left with a historic 16% loss after its yield registered the largest increase in a calendar year on record.

The prospects for 10-year Treasuries are brighter now, with the midpoint of our year-end 3.15–3.65% yield target range implying positive high-single-digit returns in 2023. We expect the Federal Reserve to conclude its hiking cycle before the middle of the year, as its focus shifts from curtailin inflation to avoiding a hard landing of the economy. The combination of still-restrictive policy rates and the market's expectation of eventual rate cuts in response to slowing growth is likely to keep the yield curve inverted.

Investors are focused on when policy rates and bond yields will peak. While history is not a perfect guide, it does show that in nearly every hiking cycle over the last 40 years, the 10-year Treasury yield reached its high before or around the time when policy rates peaked. Only twice—in May 1974 and December 1980—did the 10-year yield peak after the policy rate did. Both exceptions occurred in a decade of “stop-go” monetary policy shifts that ultimately allowed inflation expectations to become unanchored.

Yet in contrast with that period, market-based inflation expectations now remain well anchored following the fastest hiking cycle in decades. History suggests that 10-year yields could peak before or around the second quarter of this year as the Federal Reserve concludes its hiking cycle. In fact, yields may have already peaked last year.

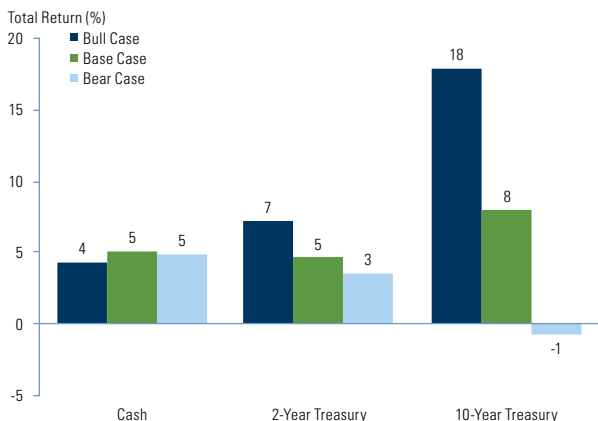
Prior peaks in the policy rate have been followed by large declines in 10-year yields over the subsequent year, ranging from 80 basis points to 330 basis points. The 3.4% midpoint of our forecast range implies a more gradual decline in yields than is suggested by history, but we anticipate this slower decline for three reasons. First, positive economic growth in our base case should support yields. Second, we expect inflation to moderate but remain above the Federal Reserve's target this year. Finally, the bond market will have to absorb around \$2 trillion of net Treasury supply this year—up from \$1.6 trillion in 2022—as US funding needs remain elevated at a time when the Federal Reserve is winding down its balance sheet.⁵³

Investors might ask whether mid-single-digit returns for intermediate

In nearly every hiking cycle over the last 40 years, the 10-year Treasury yield reached its high before or around the time when policy rates peaked.

Exhibit 151: ISG Prospective 2023 US Fixed Income Scenarios

The distribution of risks for intermediate Treasuries has become attractive.



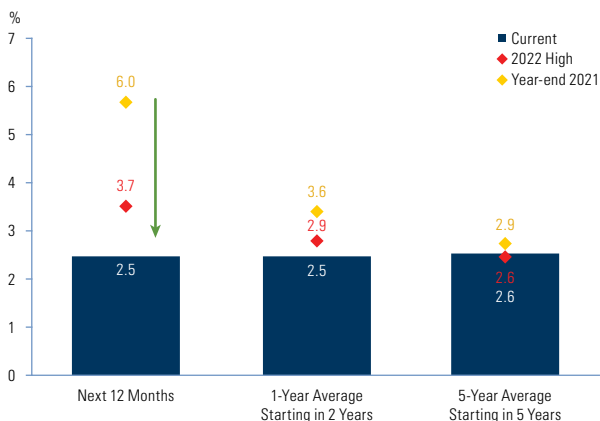
As of December 31, 2022.

Source: Investment Strategy Group.

Note: Forecasts are estimated, based on assumptions, are subject to revision and may change as economic and market conditions change. There can be no assurance the forecasts will be achieved. Indices are gross of fees and returns can be significantly varied. Please see additional disclosures at the end of this *Outlook*.

Exhibit 152: US Market-Implied Inflation Expectations

Inflation expectations fell sharply from their highs and remain well anchored.



Data as of December 31, 2022.

Note: Inflation swaps track CPI inflation, which has historically run above PCE inflation, the Federal Reserve's preferred metric.

Source: Investment Strategy Group, Bloomberg.

Treasuries are sufficiently compelling given similar returns from cash and lingering inflation uncertainty. We believe so, since unexpected rate cuts by the Federal Reserve in response to a growth shock could quickly erode the yield on cash. At the same time, such a scenario could see 10-year Treasuries deliver double-digit total returns, roughly four times larger than those of cash (see Exhibit 151). As we often highlight, Treasuries are the only asset class that has effectively hedged against deflationary shocks in the past.

Treasury Inflation-Protected Securities (TIPS)

After the fastest Federal Reserve hiking cycle in four decades, market-based inflation expectations fell sharply from their highs last year and remain well anchored near the bank's 2% inflation target (see Exhibit 152). Rising nominal interest rates coupled with lower inflation expectations drove 10-year real rates higher by a staggering 268 basis points. The resulting 12% loss in TIPS last year underperformed similar-duration nominal bonds despite the sharpest increase in inflation since the 1980s.

We think the outlook for TIPS is brighter in 2023. With 10-year breakeven inflation rates already near the Federal Reserve's 2% inflation target, the scope for further declines is more

limited. Moreover, TIPS should benefit from some retracement in real rates after last year's surge, as we expect stable inflation breakeven rates and declining nominal 10-year Treasury yields.

Still, TIPS investors face several familiar headwinds. For one, TIPS lack the hedging qualities of traditional bonds since breakeven inflation rates tend to fall during cyclical downturns. TIPS are also less liquid than nominal Treasuries and hence an inferior source of liquidity during market turbulence.⁵⁴ Additionally, TIPS are not tax efficient for taxable clients. For all these reasons, we continue to advise US clients with taxable accounts to use municipal bonds for their strategic allocation.

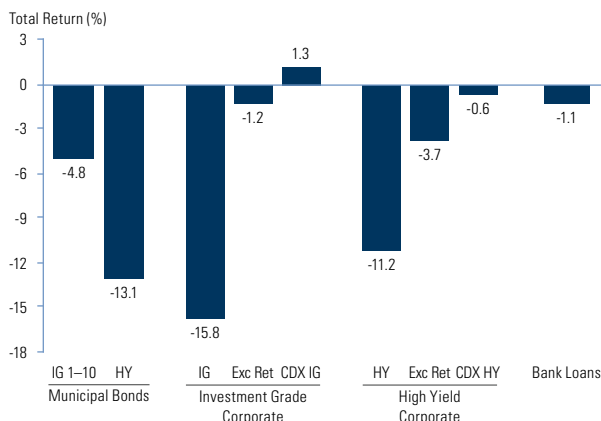
US Municipal Bonds

There was little to celebrate for municipal bond investors last year. The Bloomberg Municipal Bond Index fell 8.5%, its worst decline since 1982. Similarly, the 4.8% loss in the shorter duration 1- to 10-year municipal bond index was its worst performance since the inception of the index in 1993. Municipal high yield bonds were not spared either, losing 13.1% for the year (see Exhibit 153).

Several factors contributed to this poor performance. Chief among these was the nearly

Exhibit 153: Total Returns of US Municipal and Corporate Credit Indices During 2022

Rates, rather than credit spreads, were the key drivers of credit index returns during 2022.



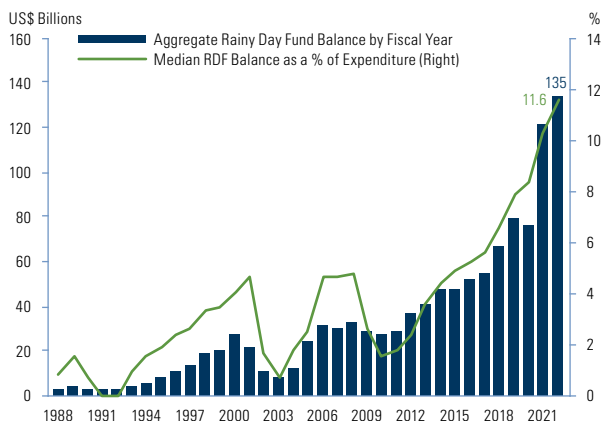
Data as of December 31, 2022.

Note: IG: Investment Grade; HY: High Yield; Exc Ret: Excess Return; CDX IG: Credit Default Swap Index Investment Grade; CDX HY: Credit Default Swap Index High Yield.

Source: Investment Strategy Group, Bloomberg, Barclays, Credit Suisse.

Exhibit 155: Aggregate Rainy Day Fund Balances Among US State Governments

Rainy day fund balances among state governments stood at all-time highs in Q3 last year.



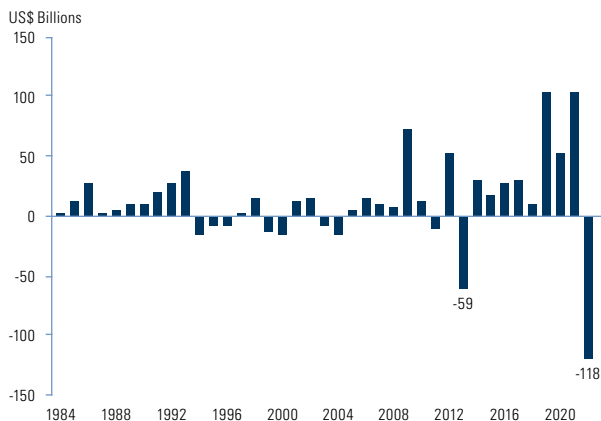
Data through Q3 2022.

Note: Rainy day funds are budget stabilization funds that may be used to supplement general fund spending during an economic downturn or other events triggering a shortfall.

Source: Investment Strategy Group, National Association of State Budget Officers.

Exhibit 154: Annual Flows into US Municipal Bond Mutual Funds and ETFs

Last year saw the worst outflows on record since 1984.



Data through December 28, 2022.

Note: Data prior to 2006 is only composed of mutual funds.

Source: Investment Strategy Group, Haver Analytics, Investment Company Institute (ICI).

250 basis point increase in the yield on the broader municipal bond index last year. This drag was made worse by the historically low level of municipal bond yields and spreads at the start of 2022, which provided little buffer to absorb higher rates. The largest exodus from the asset class since 1984 was also a material headwind to performance. As seen in Exhibit 154, municipal

bonds registered \$118 billion of outflows from mutual funds and ETFs in 2022, around twice the amount seen during the 2013 “taper tantrum.”

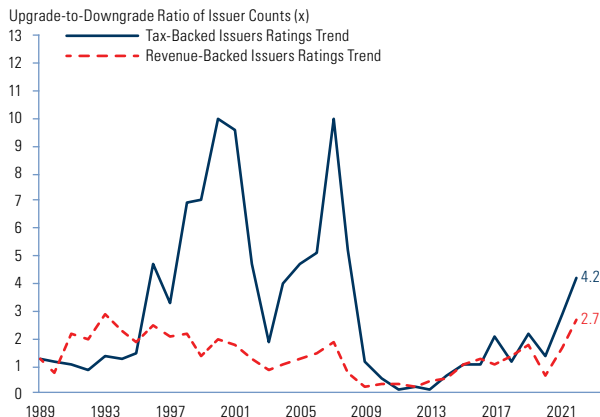
Last year’s poor performance stands in contrast to municipal fundamentals, which remain healthy. General fund revenue for states grew 14.5% year-over-year to \$1.17 trillion in fiscal 2022, following a 16.6% increase in fiscal 2021. Although spending rose by 18.3% year-over-year in response to a variety of factors, including higher inflation and lingering pandemic costs, no state made a budget cut due to a revenue shortfall last year. As shown in Exhibit 155, the states’ general fund rainy day balances grew to an all-time high of \$134.5 billion in 2022, with the median balance as a share of annual spending also reaching an all-time high of 11.6%.⁵⁵

Looking ahead, we expect mid-single-digit nominal consumption growth in 2023 to underpin healthy sales tax collections. Moreover, our expectation for only a modest rise in the unemployment rate to 4.1% implies that personal income tax revenues should remain resilient. The same could be said for property taxes, an area in which it will take a few years for recent housing weakness to have an impact.

Consistent with the above, broad credit trends remain positive. Consider that credit agency upgrades outpaced downgrades by 4.2 times for tax-backed issuers and by 2.7 times for revenue-backed issuers (see Exhibit 156). Based on dollars of bond par value, upgrades outpaced downgrades

Exhibit 156: Upgrade-to-Downgrade Ratios for US Municipal Bond Issuers

The number of upgrades outpaced downgrades by a factor of 2.7–4.2x among municipal bond issuers.

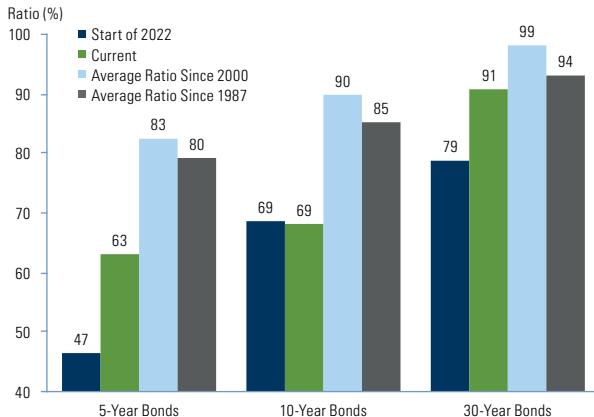


Data through Q3 2022.

Source: Investment Strategy Group, Moody's Investors Service.

Exhibit 158: Ratio of AAA US Municipal Bond Yields to Treasury Yields

Municipal bond yield ratios have improved, but remain below long-run averages.

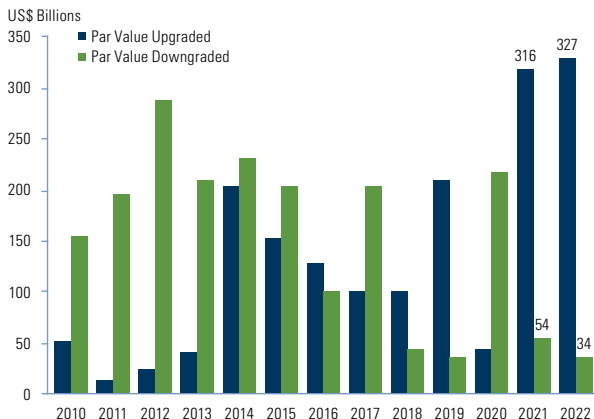


Data as of December 31, 2022.

Source: Investment Strategy Group, Municipal Market Data, Bloomberg.

Exhibit 157: US Municipal Bond Upgrades vs. Downgrades

Upgrades outpaced downgrades by a factor of nearly 10 on a par value basis in 2022.

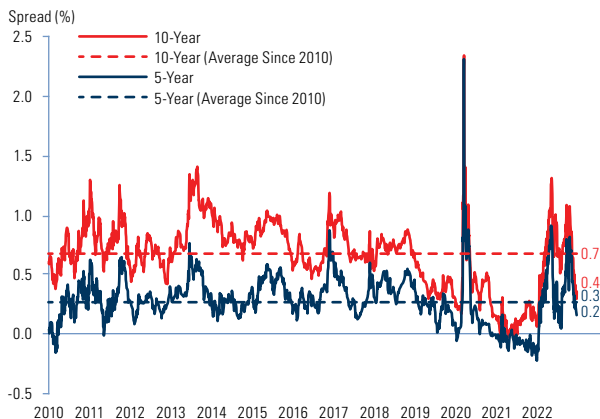


Data through Q3 2022.

Source: Investment Strategy Group, Moody's Investor Service.

Exhibit 159: Incremental Yield of AAA Municipal Bonds Over Treasuries

Incremental yields of municipal bonds have improved since the start of 2022, but remain below long-term averages.



Data through December 31, 2022.

Source: Investment Strategy Group, Municipal Market Data, Bloomberg.

Note: Past performance is not indicative of future results.

by a factor of nearly 10 last year, with \$327 billion of upgrades but just \$34 billion of downgrades (see Exhibit 157).

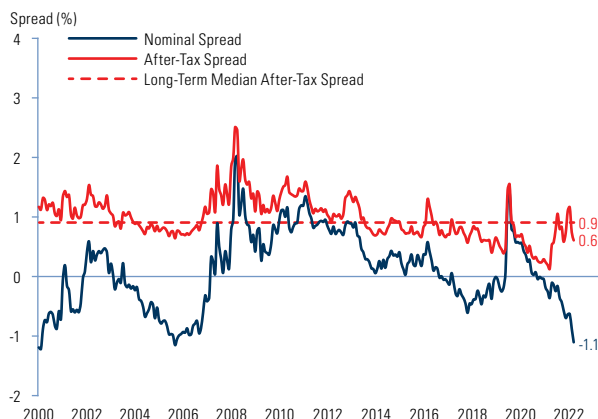
While municipal issuer fundamentals are sound, valuations in the sector are less appealing. As seen in Exhibit 158, the ratio of municipal yields to Treasury yields remains below its long-term average despite last year's selloff. Similarly,

the incremental after-tax yield investors earn for owning municipal bonds instead of matched-duration Treasuries also stands well below average for both 5-year and 10-year maturities (see Exhibit 159). The same is true for spreads on the Muni 1-10 index (see Exhibit 160).

Against this backdrop, we expect US municipal bonds to generate a low-single-digit gain this year

Exhibit 160: Nominal and After-Tax Spread of 1- to 10-Year US Municipal Bond Yields to Treasuries

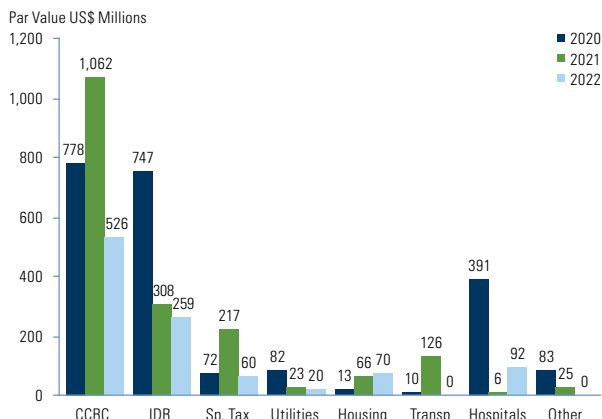
Nominal and after-tax spreads are low relative to history.



Data through December 31, 2022.
Source: Investment Strategy Group, Bloomberg.

Exhibit 162: Defaults in the US High Yield Municipal Bond Universe by Sector

Defaults declined across most sectors in 2022 versus 2021, concentrated in CCRCs and IDR bonds.



Data as of November 2022.
Note: CCRCs: Continuing Care Retirement Communities; IDRs: Industrial Development Revenue Bonds; Sp. Tax: Special Tax Issuers.
Source: Investment Strategy Group, Barclays.

Exhibit 161: US High Yield Municipal Bond Spread

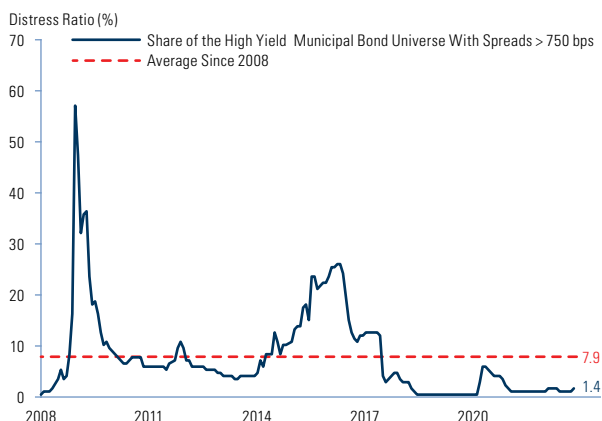
The incremental yield above that of Treasuries is still below the long-term average.



Data through December 31, 2022.
Source: Investment Strategy Group, Bloomberg.
Note: Past performance is not indicative of future results.

Exhibit 163: Distress Rate in the US High Yield Municipal Bond Universe

The share of bonds with spreads above 750 bps in the high yield municipal bond universe is low.



Data through November 2022.
Source: Investment Strategy Group, Bloomberg, Barclays.

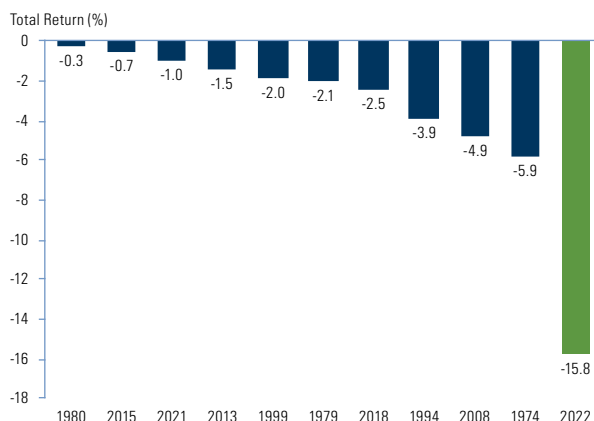
that is roughly in line with their current 2.9% yield, as a decline in Treasury yields is partially offset by some widening in municipal spreads.

US High Yield Municipal Bonds

High yield municipal bonds were not immune to last year's fixed income weakness. Their relatively long duration—roughly eight years—was particularly costly given sharply higher interest rates last year, driving the sector's 13.1% loss. There was considerable dispersion beneath this

Exhibit 164: Years with Negative US Investment Grade Total Returns (1973–Present)

2022 represented the worst annual total returns for investment grade fixed income since 1973.



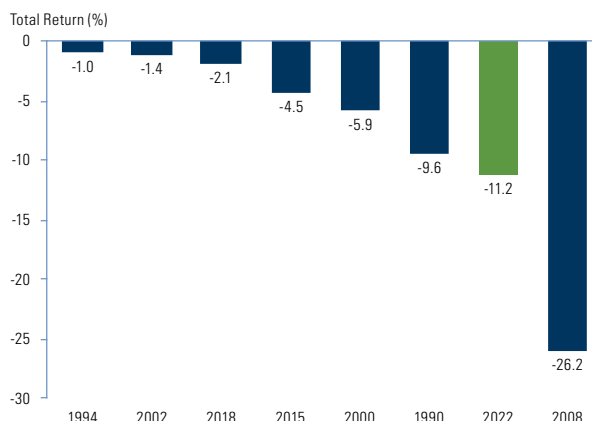
Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg, Barclays.

Note: Past performance is not indicative of future results.

Exhibit 165: Years with Negative US High Yield Total Returns (1983–Present)

US high yield posted its second-worst return on record in 2022.



Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg, Barclays.

Note: Past performance is not indicative of future results.

headline return, however, with sectors such as utilities, transportation and airlines outperforming housing, tobacco and hospitals.

Like broader municipal bonds, the high yield subsector features resilient fundamentals that are reflected in tighter than normal spreads. As seen in Exhibit 161, the 195 basis points of incremental yield these bonds offer relative to 10-year Treasuries is 60 basis points lower than the long-run average spread. This difference is explained by solid credit fundamentals; last year's defaults were 41% lower than in 2021 (see Exhibit 162). Moreover, only 1.4% of these bonds trade at distressed spreads, well below the 7.9% average since 2008 (see Exhibit 163).

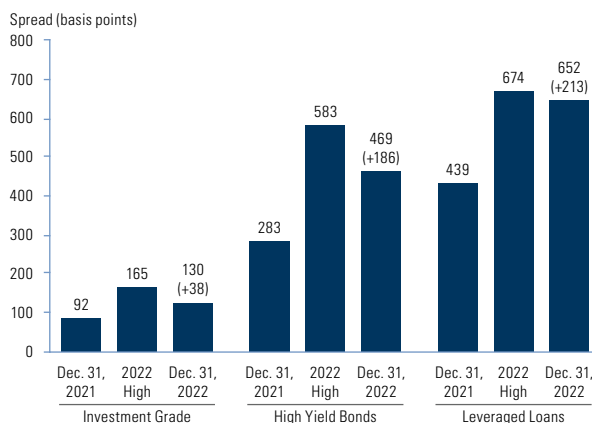
With spreads already tight relative to history and with economic growth slowing, we expect wider spreads to erode part of the benefit of lower Treasury yields and the sector's current 5.9% yield. The result would be positive mid-single-digit returns in 2023, which in our view argues for clients staying invested at their customized strategic weight.

US Corporate High Yield Credit

Last year was a tumultuous one for corporate credit. The 15.8% decline in investment grade bonds was the worst since 1973, while the 11.2% loss in corporate high yield was its second-worst since 1983 (see Exhibits 164 and 165). Although bank loans declined as well, their modest 1.14%

Exhibit 166: Changes in Spreads During 2022

Investment grade and high yield spreads were orderly, but leveraged loan spreads ended the year close to 2022 highs.



Data as of December 31, 2022.

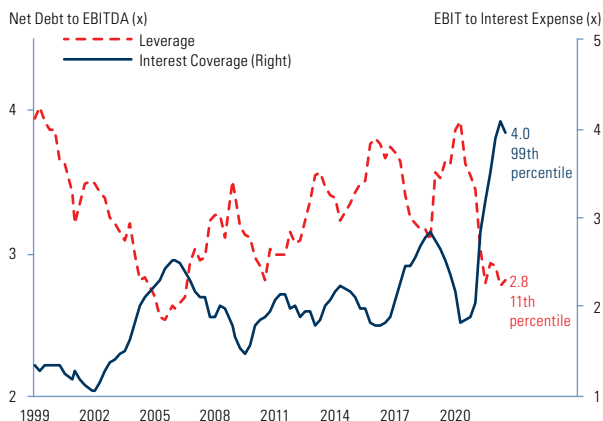
Source: Investment Strategy Group, Bloomberg, Barclays, Credit Suisse.

loss was a relative bright spot (see Exhibit 153 in the US Municipal Bond section).

The bulk of these losses came from sharply higher interest rates rather than credit. In fact, the trailing high yield default rate, including distressed exchanges, stood at just 1.6% at the end of November last year, about half of its long-run average. In turn, high yield bond spreads—which represent investors' compensation for taking

Exhibit 167: Median Interest Coverage and Leverage for US High Yield Borrowers

Low leverage and high interest coverage helped keep high yield spreads well-behaved in 2022.

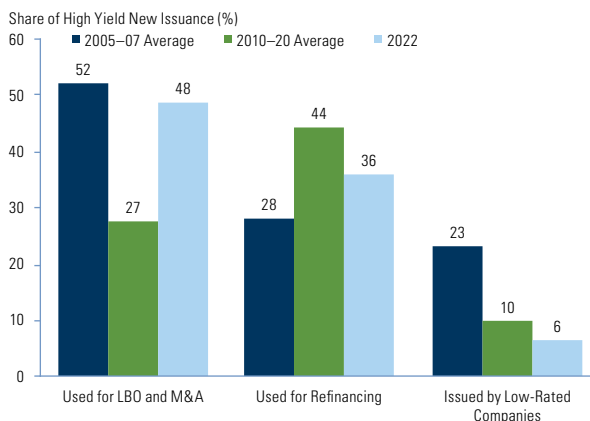


Data through Q3 2022.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research.

Exhibit 169: Share of US High Yield New Issuance—Use of Proceeds

Issuance of low-rated companies remained low relative to history.

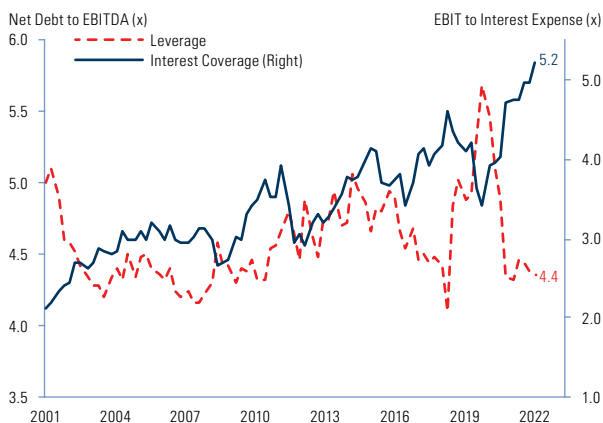


Data as of November 2022

Source: Investment Strategy Group, JP Morgan.

Exhibit 168: Median Leverage and Interest Coverage for US Leveraged Loan Issuers

Fundamentals for the median leveraged loan issuer remained healthy during 2022.



Data through Q3 2022.

Source: Investment Strategy Group, S&P LCD.

default risk—rose 186 basis points during 2022 but remain well below average (see Exhibit 166). The result was that only 3.7% of high yield's total 11.2% loss was attributable to wider spreads and actual default losses. Similarly, the corporate high yield credit default swap index—which reflects just the default risk of the underlying bonds—suffered a loss of less than 1% last year (see Exhibit 153 in the US Municipal Bond section).

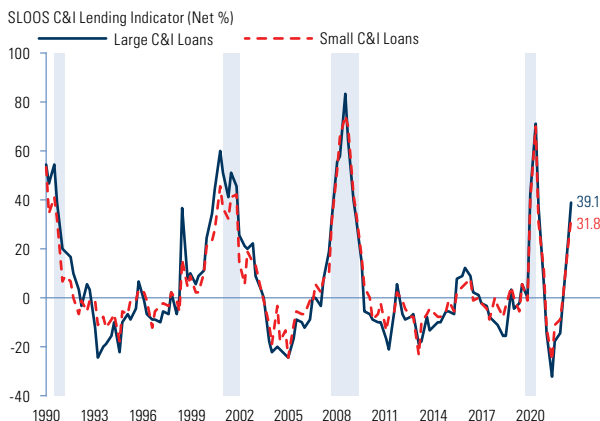
Healthy corporate fundamentals help explain why high yield bond spreads have remained so well-behaved. As seen in Exhibit 167, median leverage among high yield issuers has been lower only 11% of the time since 1999. At the same time, the earnings of the median issuer are four times larger than their interest expense, close to the highest coverage ratios on record. These figures are equally sturdy for leveraged loan borrowers (see Exhibit 168).

The underlying credit quality of the high yield universe has also improved, with BB-rated bonds representing nearly half the index today compared to about a third of it historically. Similarly, the share of bonds rated CCC and lower—which are at higher risk of default—stands below its historical average. Issuance by these lower-rated companies is also still low relative to history (see Exhibit 169). The same could be said for the share of LBO and M&A-related issuance, which is below its pre-GFC average. Consistent with this backdrop, credit rating agency upgrades of high yield bonds outpaced downgrades by 1.8 times last year based on dollar par value, and recovery rates on defaulted securities were well above average.

Whether fundamentals remain resilient in the face of slower economic growth this year is a critical question facing investors. To be sure, several factors point to higher default risk, including tightening lending standards for commercial and industrial loans, a rising share of securities trading

Exhibit 170: Net Share of Lending Officers Tightening Conditions for C&I Borrowers

Lending standards for commercial and industrial loans tightened significantly during 2022.



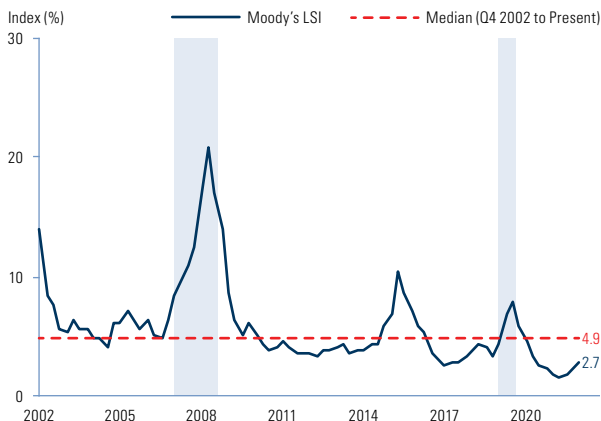
Data through Q3 2022.

Note: Shaded periods denote recessions.

Source: Investment Strategy Group, Federal Reserve SLOOS.

Exhibit 172: Moody's Liquidity Stress Indicator (LSI)

Liquidity stress is low, but has risen in recent months.



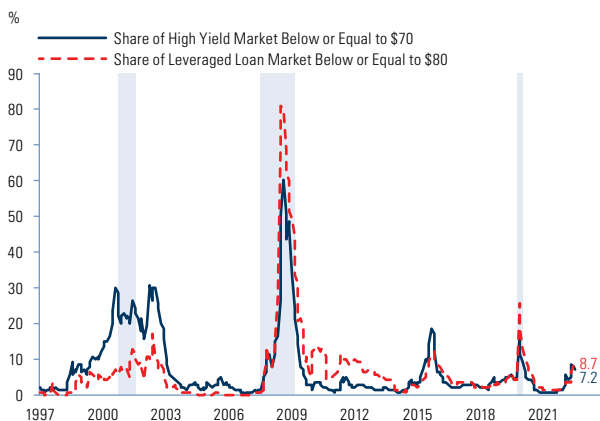
Data through November 2022.

Note: Shaded periods denote recessions.

Source: Investment Strategy Group, Moody's Investors Services.

Exhibit 171: Share of Distress in the US High Yield Bond and Leveraged Loan Universe

The share of distress among both high yield bonds and leveraged loans has risen.



Data through November 2022.

Note: Shaded periods denote recessions. We define high yield bonds trading below \$70, and leveraged loans below \$80 as distressed.

Source: Investment Strategy Group, JP Morgan.

Exhibit 173: Share of the US High Yield and Leveraged Loan Markets Maturing by Year

The share of high yield bonds and leveraged loans maturing in the next two years is low.



Data through November 2022.

Source: Investment Strategy Group, JP Morgan.

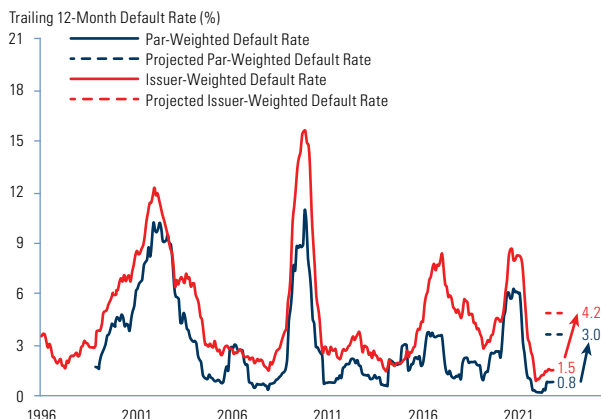
at distressed spread levels and recent deterioration in our preferred leading indicator of defaults (see Exhibits 170, 171 and 172).

There is also some credit deterioration already evident in the leveraged loan market. Downgraded bank loan issuers outnumbered upgraded issuers

by 1.4 times last year, and the share of the universe rated BB has fallen below its long-run average. These borrowers—in aggregate—have also not adequately hedged their interest rate exposure, which becomes a larger drag on their earnings the longer rates stay at current levels.

Exhibit 174: Trailing 12-Month and Projected 12-Month Default Rates for US High Yield Bonds

We project default rates to rise during 2023.



Data through November 2022.

Source: Investment Strategy Group, JP Morgan.

Still, rising defaults should not be equated to soaring ones. The default rate ended last year in the bottom 15% of its historical distribution, making some increase in 2023 very likely. In addition, the risk of refinancing-related defaults is low in the next two years, with less than 10% of the securities in the high yield market maturing (see Exhibit 173). Higher interest rates are also likely to continue constraining high yield bond issuance after it decreased by more than 60% last year.

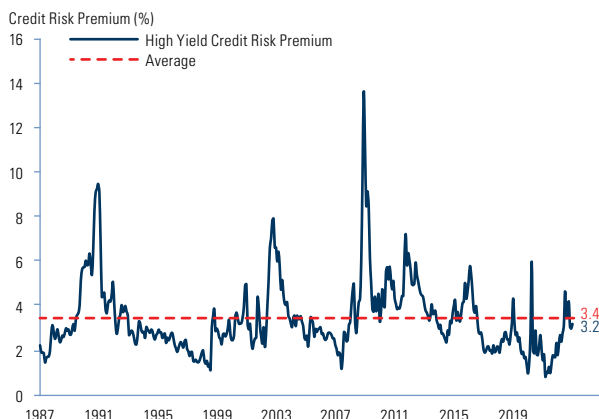
Against this backdrop, our model implies a 3% par-weighted default rate for high yield bonds this year, roughly in line with their long-term average (see Exhibit 174). The rate is a slightly higher 3.5% for leveraged loans, given the idiosyncratic factors discussed earlier. With default rates normalizing higher, we expect high yield spreads will widen to around 550 basis points. Such a spread would be sufficient to offer investors an incremental risk premium above expected default losses consistent with the historical average (see Exhibit 175). Given the current level of spreads—including higher spreads for leveraged loans, which have a weaker credit profile—our forecasts imply mid-single-digit total returns for both high yield bonds and bank loans this year.

European Bonds

As energy shocks roiled the continent and inflation climbed to 40-year highs, European policymakers faced an uncomfortable trade-off: sacrifice economic

Exhibit 175: Incremental Risk Premiums of High Yield Spreads in Excess of Default Cost

Incremental risk premiums could rise toward the long-run average in 2023.



Data through December 2022.

Source: Investment Strategy Group, Haver Analytics, Federal Reserve.

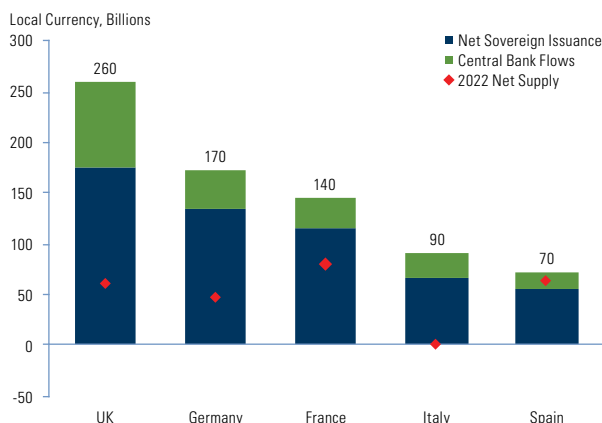
growth by confronting inflation through tighter monetary policy or dampen the energy shock by instituting fiscal stimulus that risked pushing prices even higher. UK policymakers decided to try both at once, upsetting an already fragile European bond complex. Fortunately, subsequent BOE intervention and a tighter fiscal budget in the UK ultimately prevented broader contagion and stabilized European bond markets. Even so, yields rose sharply in 2022 and European bonds fell nearly 20%, underperforming US Treasuries.

Europe faces the same uncomfortable trade-off in 2023. With inflation pressures still elevated, energy supply impaired and the region likely in recession, policymakers must tread carefully. Our base case calls for the ECB and BOE to extend their hiking cycles to a range of 3.25–3.75% and 4.25–4.75%, respectively. Restrictive monetary policy—combined with the hit to disposable income from higher energy prices—is likely to weigh on growth significantly. Put simply, the longer rates stay in restrictive territory, the greater the odds the market will price in a deeper-cutting cycle by the end of this year. We therefore expect German and UK 10-year yields will respectively stand about 150 basis points and 125 basis points below their policy rate by year-end.

While the outlook for their prices is improving, our enthusiasm for European bonds is tempered by the elevated volatility that we expect. Inflation is likely to decrease even more

Exhibit 176: Expected Government Bond Net Supply to the Private Sector

Increased net supply from fiscal deficits and balance sheet runoff put upward pressure on the term premium.



Data as of December 31, 2022.

Note: Based on estimates from Goldman Sachs Global Investment Research.

Source: Investment Strategy Group, Goldman Sachs Global Investment Research, European Commission, UK Office for Budget Responsibility.

gradually in Europe and the UK than in the US, increasing the uncertainty this year about whether inflation expectations will become unanchored. Additionally, weaker economic activity may test central bankers' resolve and lead to more opaque forward guidance. Furthermore, both the ECB and BOE are attempting to reduce their balance sheets at a time when government issuance remains elevated, forcing the private sector to absorb record net supply in 2023 (see Exhibit 176).

Our expectation that the ECB will extend its hiking cycle—a remarkable feat following nearly a decade of negative policy rates—comes with another unique challenge. The heterogeneous nature of the currency bloc means ECB policy impacts countries differently. Consider that real rates in Italy stand more than two percentage points above those in Germany despite substantially lower potential growth. Higher funding costs in the economies least able to bear them are likely to ignite concerns around debt sustainability, putting pressure on peripheral spreads. Against this backdrop, and despite expecting German 10-year yields to fall toward our 1.75–2.25% forecast range, we recommend a neutral stance to peripheral bonds.

The BOE also faces several hurdles. First, the policy debacle last September remains fresh in investors' minds,

meaning tolerance for negative surprises will be more limited and the risk premium priced into the bonds by investors more persistent. Second, the nature of the UK mortgage market results in rapid transmission of monetary policy. With around half the stock of mortgages repricing this year to much higher rates, many households will see their monthly mortgage payments double, denting disposable income.⁵⁶ Third, net supply of gilts the private sector must absorb is estimated to quadruple to £260 billion. Based on the foregoing, we expect term premium in the UK gilt market will remain elevated through 2023, supporting our 3.0–3.5% target range for 10-year gilt yields.

Emerging Market Local Debt

Investors fled from emerging market local debt (EMLD) in 2022. The asset class saw \$44.1 billion in outflows last year, which pushed foreign holdings of domestic government securities to below the 15-year average.⁵⁷ The 11.7% loss in EMLD last year represented its second consecutive annual decline.

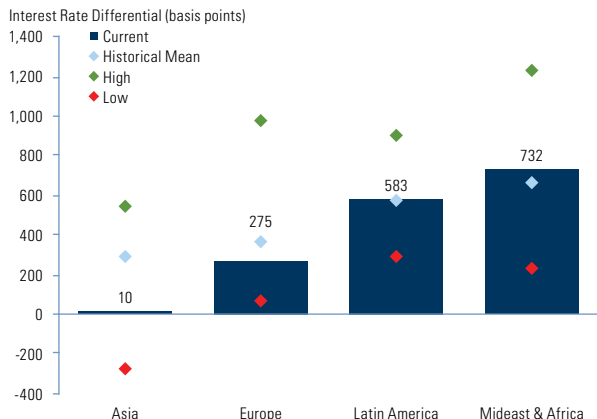
We think divergences across regions will be critical to the EMLD outlook in 2023. While monetary policy tightening cycles are close to ending in most EM countries, the dispersion of terminal rates is wide. Brazil and Hungary, for instance, will potentially end their cycles with policy rates near 14%, compared with near 2% in Korea and Thailand. Similarly, interest rate differentials between domestic yields and US yields are much narrower in Asia than in Latin America, Central and Eastern Europe, the Middle East and Africa (see Exhibit 177). These divergences should precipitate tactical opportunities during the year.

More broadly, we think EMLD could benefit this year as inflation moderates, especially if central banks begin easing cycles and fiscal policies remain prudent, keeping yield curves anchored.

We think divergences across regions will be critical to the EMLD outlook in 2023. While monetary policy tightening cycles are close to ending in most EM countries, the dispersion of terminal rates is wide.

Exhibit 177: Interest Rate Differentials Between EM and US

Asia stands out as having a particularly low interest rate differential.



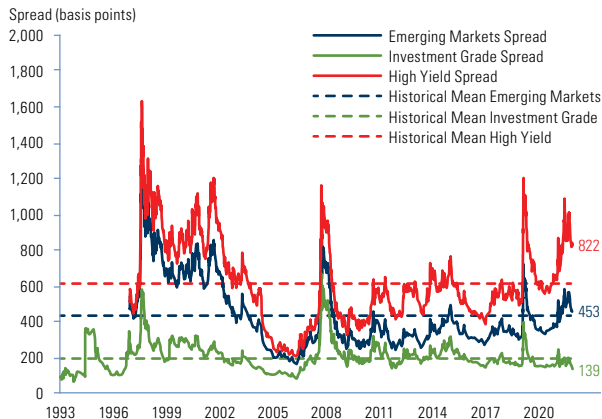
Data as of December 31, 2022.

Note: Based on data since 2004.

Source: Investment Strategy Group, Macrobond, Bloomberg, JP Morgan.

Exhibit 179: EM Credit Spreads

EM spreads remain well-behaved and stand near long-run averages.



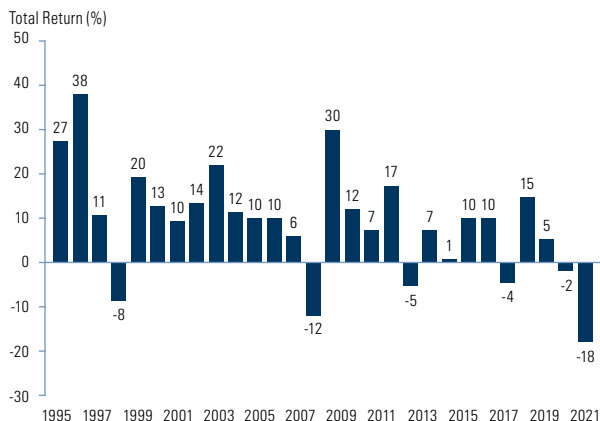
Data through December 31, 2022.

Source: Investment Strategy Group, Macrobond, Bloomberg, JP Morgan.

Note: Past performance is not indicative of future results.

Exhibit 178: EM External Debt Total Returns

Last year's return for EM external debt was the worst since its inception.



Data through December 31, 2022.

Source: Investment Strategy Group, Macrobond, Bloomberg, JP Morgan.

Note: Past performance is not indicative of future results.

Our cautious optimism on EMLD is reflected in our mid-single-digit EMLD total return forecast for 2023, which also reflects EMLD's 6.8% yield net of the 1.5% drag we expect from currency depreciation and 0.4% positive contribution arising from duration.

Emerging Market Dollar Debt

Emerging market dollar debt (EMD) was held hostage by higher US Treasury yields in 2022. As seen in Exhibit 178, EMD's 18% loss last year represented the worst annual return since its inception in 1993. The bulk of this loss resulted from the sharp increase in US Treasury yields, as EMD spreads ended the year around their 10-year average, despite significant widening in countries such as Pakistan and Sri Lanka (see Exhibit 179).

As the market shifts its focus from high inflation to slower growth in 2023, we believe that spreads are likely to face more pressure than they did last year. History corroborates this view, as EMD spreads have typically widened by 250 basis points during mild recessions and 650 basis points during deeper global downturns. Even so, the drag from wider spreads this year should be more than offset by EMD's yield and the benefit from its longer, nearly seven-year duration given the lower US Treasury yields we expect. Taking all these factors into account, we forecast positive low-single-digit EMD returns in 2023.

2023 Global Commodity Outlook

Commodities were a bright spot for markets last year (see Exhibit 180). The S&P GSCI returned 23%, topping all other major asset classes for a

Exhibit 180: Commodity Returns in 2022

Commodities topped all other major asset classes for a second consecutive year in 2022.

	S&P GSCI	Energy	Agriculture	Industrial Metals	Precious Metals	Livestock
Spot Price Average, 2022 vs. 2021	31%	46%	20%	5%	-1%	12%
Spot Price Return	9%	14%	6%	-10%	0%	11%
Investor ("Excess") Return*	23%	39%	10%	-10%	-2%	3%

Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

* Investor (or "excess") return corresponds to the actual return from being invested in the front-month contract and differs from spot price return, depending on the shape of the forward curve. An upward-sloping curve (contango) is negative for returns, while a downward-sloping curve (backwardation) is positive.

Past performance is not indicative of future results. Investing in commodities involves substantial risk and is not suitable for all investors.

second consecutive year. But this impressive gain belied a more nuanced reality, as returns reached 54% by early June, only to be halved in the second half of the year. Investors also faced a wide dispersion among individual commodities and their source of returns. In contrast to the index's overall strength, both industrial metals and precious metals suffered losses last year. And while the energy subindex outperformed with a 39% gain, the bulk of this came from positive carry, or the additional return holders of a commodity get when the futures curve is strongly downward sloping, called "backwardation." The appreciation in spot energy prices was a much smaller 14%.

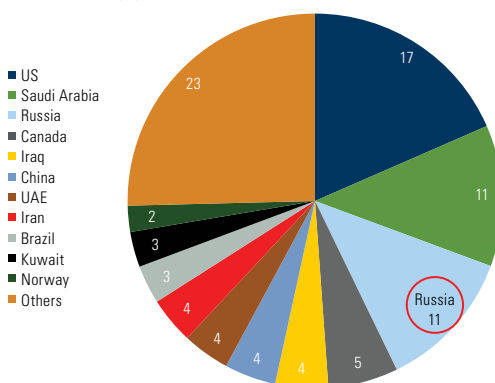
The disjointed nature of these returns reflects the tug-of-war between bullish supply-side pressures and bearish demand-side concerns that is likely to continue in the year ahead. Although years of underinvestment are an underlying support for many commodity prices, a deeper global economic slowdown could quickly undermine demand, especially given the still-uncertain trajectory of China's economy amid its shifting COVID policies.

Against these risks, we note that global inventories have remained low across most commodities despite months of weak Chinese demand—a sign of equally weak supply trends. A thinner inventory buffer also leaves prices sensitive to potential supply disruptions in politically unstable areas, such as South America for base metals, or—discussed further below—Russia and the Middle East for oil. Given these crosscurrents, we believe that risks around our base case are roughly balanced for industrial metals and oil prices this year. As for gold, we remain doubtful about its ability to provide investors with a reliable hedge against inflation or political risk given its notable failure to do so in the past year.

Exhibit 181: Global Oil Production by Country

Russia accounts for a large portion of global oil production.

Global Production (%)



Data as of 2021.

Source: Investment Strategy Group, BP Statistical Review of Energy.

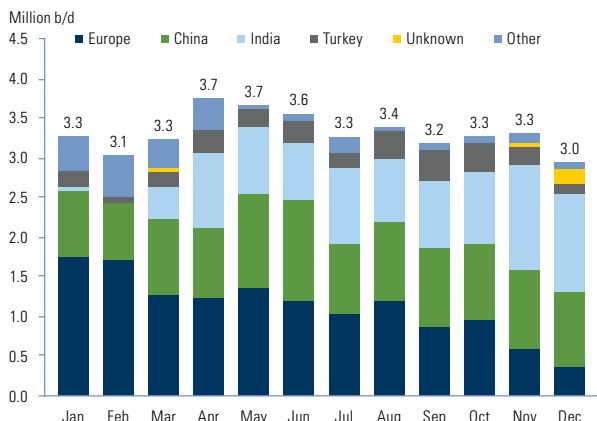
Oil: High Risks, Low Inventories

Oil prices last year were driven by geopolitical developments to a degree not seen since the turbulent 1970s. As seen in Exhibit 181, close to 10% of global oil production found itself at risk of disruption virtually overnight in the wake of Russia's invasion of Ukraine and the ensuing rollout of Western sanctions. Given already low global oil inventories and thin spare capacity, oil prices understandably spiked higher, reaching \$124 at their peak closing level last March.

Prices have since fallen back below pre-war levels. This surprising retracement reflects not only the failure of supply risks to materialize, but also a combination of bearish developments, including an unprecedented 200-million-barrel release from the US Strategic Petroleum Reserve, a COVID-driven slump in Chinese oil demand and fears of an impending recession.

Exhibit 182: 2022 Russian Waterborne Crude Oil Exports

The bulk of the Russian exports to Europe were redirected to India and China.



Data through December 2022.
Source: Investment Strategy Group, Kpler.

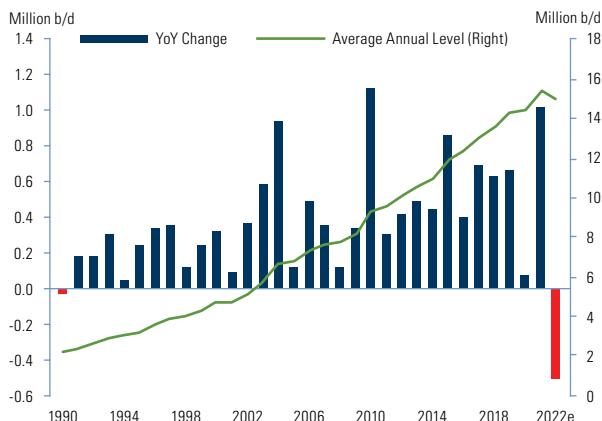
Although oil prices have receded, the bullish risks that underpinned their initial spike higher have not disappeared. The full effect of European sanctions on Russia will not be visible in energy markets until the first quarter of this year. These curbs directly impact 0.5 million b/d of seaborne crude oil and 1.1 million b/d of refined products. While Russia has so far been successful at redirecting crude exports to India and China, this strategy is starting to show some limits (see Exhibit 182). Moreover, it will be difficult for Russia to replicate this strategy in refined products, as both China and India were net exporters in this category last year.

As a result, close to 2 million b/d of Russian supplies to Europe remain at risk. Consensus currently expects a net loss of less than half that amount, increasing the risk of an upside surprise. Upward pressure on energy prices could also arise from supply disruptions in other countries, given geopolitical tensions in the Middle East and domestic instability in Libya and other exporting countries.

To be sure, the demand for oil faces an equally high degree of risk amid a potential US recession and the still-uncertain trajectory of China's economy. We estimate that Chinese demand fell by 0.5 million b/d on average last year, marking the first annual decline since 1990 (see Exhibit 183). While a successful reopening of China's economy could help offset weaker oil demand elsewhere, a more protracted

Exhibit 183: Chinese Oil Demand

2022 saw a rare and large decline in Chinese oil demand due to COVID.



Data through 2022.
Source: Investment Strategy Group, BP Statistical Review of Energy.

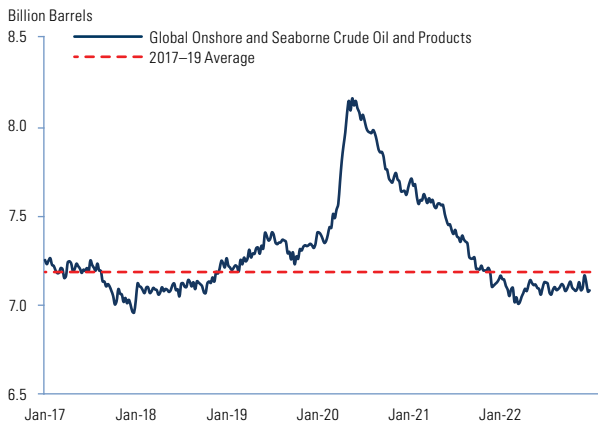
COVID wave could exacerbate demand concerns. For now, we expect global demand to remain on an upward trajectory in our base case, exceeding pre-COVID levels by year-end.

Meeting this demand will require continuing growth from US producers, as OPEC has already ramped its output back to pre-COVID levels and has limited spare capacity. But to incentivize additional drilling, oil prices must remain high enough to overcome the cost inflation and self-imposed capital discipline now holding back US production. In contrast, lower prices and disappointing demand would likely restrain production growth. Tellingly, the November and December oil price slump was rapidly followed by a decline in US drilling and completion activity, while OPEC immediately announced a production cut to rescue prices.

Given these moving pieces, we expect WTI prices to trade in a \$70–100 range by year-end, which would imply upside from current levels. But we are mindful of the many risks that could undermine this forecast—including a US recession, another wave of global COVID infections or a quick resolution to the conflict in Ukraine—any one of which could push prices down to cost support near \$60. That said, we would not expect these lower prices to be sustained for an extended period, given producers' likely reaction. There are also upside risks. Any additional supply disruptions would be magnified by still-low inventories (see

Exhibit 184: Observable Global Petroleum Inventories

Inventories failed to rebuild in 2022, with still-low levels a cause for both volatility and upside risks to prices in 2023.



Data through December 31, 2022.

Source: Investment Strategy Group, Kpler, S&P Global Platts, IEA, EIA, PJK, PAJ, International Enterprise Singapore.

Exhibit 184), which could push prices above our forecast range, as happened last year.

Although we do not have an active tactical allocation to oil, we do continue to recommend a small overweight to the US midstream sector, which benefits from strong cash flows and less direct exposure to oil price volatility.

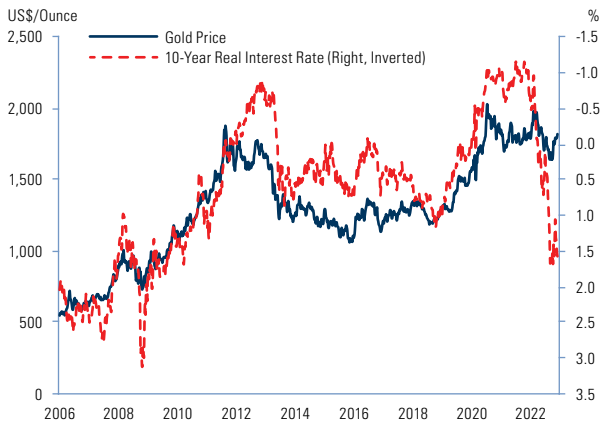
Gold: Not as Advertised

Since its meteoric rise in the 1970s, gold has been hailed as an effective hedge against inflation. But that reputation was tarnished in 2022, as gold prices spent most of the year trading in negative territory despite the highest inflation in four decades. This disappointing performance was yet another reminder that gold is subject to a multitude of often opposing factors. Case in point: the impact of last year's inflation surprise was largely offset by the combination of higher interest rates and the surge in the US dollar, with which gold tends to be negatively correlated.

These types of crosscurrents leave us tactically neutral on gold again this year. As seen in Exhibit 185, our expectation for softer nominal and real interest rates removes one of last year's key headwinds to gold. Yet real rates are still likely to remain in positive territory, which historically has resulted in lower-than-average gold returns (see Exhibit 186). After all, positive interest rates create an opportunity cost of holding gold, which

Exhibit 185: Gold Price and US 10-Year Real Interest Rates

The spike in real rates last year was a strong headwind to gold prices.

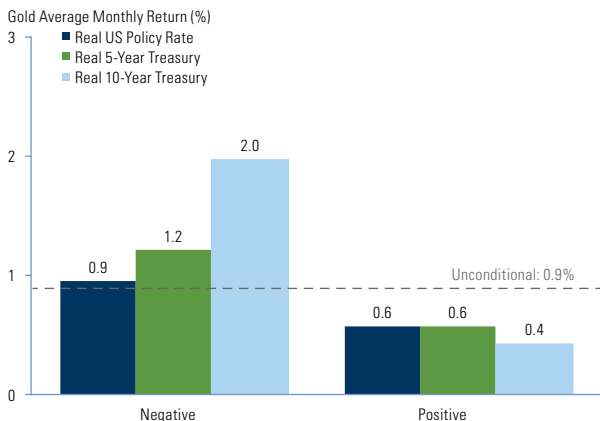


Data through December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

Exhibit 186: Average Gold Returns by Interest Rate Regime

Positive real rates have historically led to lower-than-average gold returns.



Data as of December 31, 2022.

Source: Investment Strategy Group, Bloomberg.

Note: Past performance is not indicative of future results.

generates no cash flow or yield income and must be physically stored, often at a cost.

We also do not see a compelling argument for investors to replace their US dollar holdings with gold this year, given our still constructive view on the currency. Consider that since 1971, there has been only a 24% chance of a meaningful gold

rally of more than 10% in periods when the dollar was stable or rising. In fact, most meaningful gold rallies have happened when the US dollar was depreciating. Put simply, when the dollar is appreciating—a situation we expect this year—the low probability of strong gold returns has not historically justified the risk and volatility of holding the yellow metal.

Still, there are a few factors that could buoy gold, not the least of which is a US recession that might rekindle demand for gold as a safe-haven asset. Gold also stands to benefit if currently underweight investors increase their positions (see Exhibit 187), which now stand 28% below their recent peak in early 2022 and back at levels last seen in early 2020. Demand from EM central banks looking to diversify their FX reserves into gold is another source of upside risk. The latest data from the World Gold Council already points to record-high purchases in the most recent quarter, with countries such as Turkey, China and India leading the pack. Further geopolitical strife could even accelerate this trend.

Given these contradictory factors, we remain neutral on gold until a clearer opportunity presents itself.

Exhibit 187: Investor Positioning in Gold

While still historically elevated, investor length in gold is well off its peak.



Data through December 31, 2022.

Note: Includes ETF holdings, futures and options.

Source: Investment Strategy Group, Bloomberg.

Abbreviations Glossary

AAA: American Automobile Association

b/d: barrels per day

BOE: Bank of England

BOJ: Bank of Japan

bps: basis points

CAPE: cyclically adjusted price-to-earnings

CAGR: Compound Annual Growth Rate

CDX: credit default swap index

CEE: Central and Eastern Europe

COLA: cost-of-living adjustment

CPI: Consumer Price Index

DPI: disposable personal income

DXY: Dollar Index

EAFE: Europe, Australasia, and the Far East

EBITDA: earnings before interest, taxes, depreciation and amortization

ECB: European Central Bank

EM: emerging market

EMCI: Emerging Market Currency Index

EMD: emerging market dollar debt

EMEA: Europe, Middle East and Africa

EMLD: emerging market local debt

EPS: earnings per share

ERP: equity risk premium

ETF: exchange-traded fund

FANGMANT: Facebook/Meta, Apple, Netflix, Google/Alphabet, Microsoft, Amazon, Nvidia and Tesla

FDI: foreign direct investment

FOMC: Federal Open Market Committee

FTSE 100: Financial Times Stock Exchange 100

FX: foreign exchange

GDI: gross domestic income

GDP: gross domestic product

GIR: [Goldman Sachs] Global Investment Research

GFC: global financial crisis

GSCI: Goldman Sachs Commodity Index

HY: high yield

I/B/E/S: Institutional Brokers' Estimate System

IMF: International Monetary Fund

ISG: Investment Strategy Group

JCPOA: Joint Comprehensive Plan of Action

JGB: Japanese government bond

JPY: Japanese yen

Latam: Latin America

M&A: mergers and acquisitions

MLP: master limited partnership

MLF: medium-term lending facility

MMBtu: Million British thermal units

MSCI: Morgan Stanley Capital International

MSCI ACWI: MSCI All Country World Index

NBER: National Bureau of Economic Research

NIRP: negative interest rate policy

NYSE: New York Stock Exchange

OPEC: Organization of the Petroleum Exporting Countries

PCE: Personal Consumption Expenditures [price index]

P/E ratio: price-to-earnings ratio

PMI: Purchasing Managers' Index

SDMT: Systematic Downside Mitigation Tilt

SUIT: Systematic Upside Improvement Tilt

TBR: Trend-Based Rotation

TIPS: Treasury Inflation-Protected Securities

TOPIX: Tokyo Price Index

TTM: trailing 12 months

UN: United Nations

US: United States

WTI: West Texas Intermediate [oil price]

YCC: yield curve control

YE: year-end

YoY: year over year

YTD: year to date

Notes

1. Ashton Carter, conference call with the Investment Strategy Group, December 17, 2021.
2. General Mark A. Milley, transcript from the Economic Club of New York 683rd meeting, moderated by David Westin, November 9, 2022.
3. UN Refugee Agency, "Ukraine Emergency," December 27, 2022.
4. Kiel Institute, "Ukraine Support Tracker," December 7, 2022.
5. Anna Bjerde (World Bank vice president), interview with *Die Press*, December 3, 2022.
6. "Joint Statement of the Russian Federation and the People's Republic of China on the International Relations Entering a New Era and the Global Sustainable Development," February 4, 2022.
7. Federal Reserve Chair Jerome Powell, transcript from press conference, Federal Reserve, December 14, 2022.
8. Lawrence H. Summers, "What the Fed Should Do Next on Inflation," *Washington Post*, December 19, 2022.
9. Seth Klarman, "The Value of Not Being Sure," *Value Investor Insight*, February 23, 2009.
10. Federal Reserve Chair Jerome Powell, transcript from press conference, Federal Reserve, December 14, 2022.
11. The R-CPI-U-RS retroactive series, which tries to correct for changes in methodology, has peaks of 11.8% for headline and 9.9% for core.
12. Erica Thompson, *Escape from Model Land: How Mathematical Models Can Lead Us Astray and What We Can Do About It*, Basic Books, 2022.
13. "Consumer Checkpoint: End of year health check," Bank of America Institute, December 8, 2022.
14. Joseph Briggs, "US Economics Analyst: Monetary Policy Affects Growth with a Short Lag," Goldman Sachs Global Investment Research, December 18, 2022.
15. Sujeet Indap, "Apollo Defends Push to Retail Investors Amid Blackstone Storm," *Financial Times*, December 13, 2022.
16. Sir John Templeton is credited with saying, by at least 1993, "The four most expensive words in the English language are 'This time it's different.'" It is quoted in *The Four Pillars of Investing: Lessons for Building a Winning Portfolio* (2002), by William Bernstein.
17. These forecasts have been generated by ISG for informational purposes as of the date of this publication. Total return targets are based on ISG's framework, which incorporates historical valuation, fundamental and technical analysis. They are based on proprietary models and there can be no assurance that the forecasts will be achieved. The following indices were used for each asset class: Barclays Municipal 1-10Y Blend (Muni 1-10); BAML US T-Bills 0-3M Index (Cash); JPM Government Bond Index; Emerging Markets Global Diversified (Emerging Market Local Debt); Barclays High Yield Municipal Bond Index (Muni High Yield); HFRI Fund of Funds Composite (Hedge Funds); Barclays US Corporate High Yield (US High Yield); MSCI EM US\$ Index (Emerging Market Equity); FTSE 100 (UK Equities); MSCI EAFE Local Index (EAFE Equity); Euro Stoxx 50 (Eurozone Equity); TOPIX Index (Japan Equity); S&P 500 (US Equity). A moderate risk portfolio is allocated among equities, fixed income and additional asset classes and designed to track 8% volatility.
18. We have applied the fees associated with a fund that implements the tactical tilts. Returns are subject to change based upon client circumstances and how tilts are executed.
19. General Sir Nick Carter, conference call with the Investment Strategy Group, December 7, 2022.
20. Ian Bremmer, conference call with the Investment Strategy Group, December 19, 2022.
21. Sir Alex Younger, conference call with the Investment Strategy Group, December 9, 2022.
22. "Is Russia Running Out of Ammunition?," *The Economist*, December 20, 2022.
23. Aleksei Aleksandrov, "Russian Mercenary Leader's War of Words With Moscow's Military Brass Deepens Amid Fighting In Bakhmut," RFE/RL, December 31, 2022.
24. "Chinese Aircraft Carrier Nears US Territory of Guam," *Radio Free Asia*, December 30, 2022.
25. US Indo-Pacific Command Public Affairs, "USINDOPACOM Statement on Unsafe Intercept of U.S. Aircraft Over South China Sea," United States government, December 29, 2022.
26. Agence France-Presse, "China's Warplane Incursions Into Taiwan Air Defence Zone Doubled in 2022," *The Guardian*, January 2, 2023.
27. "CIA Director William Burns on War in Ukraine, Intelligence Challenges Posed by China," PBS NewsHour, December 16, 2022 and Ian Bremmer, conference call with the Investment Strategy Group, December 19, 2022.
28. "With Fewer Guardrails, the Risk of Conflict on the Korean Peninsula Will Continue to Grow," Eurasia Group, November 17, 2022.
29. David Albright, "Iran Building Nuclear Weapons," Institute for Science and International Security, December 5, 2022.
30. General Sir Nick Carter, in a conference call with the Investment Strategy Group, December 7, 2022.
31. Sir Alex Younger, in a conference call with the Investment Strategy Group, December 9, 2022.
32. "Conference Call Notes: Iran outlook for 2023," Eurasia Group, December 12, 2022.
33. "CIA Director William Burns on War in Ukraine, Intelligence Challenges Posed by China," PBS NewsHour, December 16, 2022.
34. The governments of France, Germany and the United Kingdom joint statement on the JCPOA, Transcript: "E3 Statement After UN Security Council Meeting on Iran," December 19, 2022.
35. Robin Wright, "The Looming Threat of a Nuclear Crisis with Iran," *New Yorker*, December 27, 2021.
36. "Annual Threat Assessment of the U.S. Intelligence Community," Office of the Director of National Intelligence, March 8, 2022.
37. "The Terrorist Threats and Trends to Watch Out for in 2023 and Beyond," Combating Terrorism Center at West Point, November/December 2022.
38. Omicron Offshoot XBB.1.5 Could Drive New COVID Surge in the US," CNN, January 3, 2023.
39. Qianer Lui, Cheng Leng, Sun Yu and Ryan McMorrow, "China Estimates 250mn People Have Caught COVID in 20 Days," *Financial Times*, December 25, 2022.
40. Helen Davidson, "China's Cities Fall Quiet Amid Warning of Three COVID Waves Over Winter," *Guardian*, December 19, 2022.
41. Erin Prater, "The Public Health Organization That Forecast 1 Million COVID Deaths in China Says a 'Tripledeemic' Could Push the Death Toll Even Higher: 'They Never Had a Plan B'," *Fortune*, December 20, 2022.
42. Jan Hatzius et al., "10 Questions for 2023 (Mericle/Phillips)," Goldman Sachs Global Investment Research, December 26, 2022.
43. Michael Hartnett, "The Thundering Word Year Ahead 2023," Bank of America Global Research, November 22, 2022.
44. Ibid.
45. Vince Golle and Kyungjin Yoo, "Economists Place 70% Chance for US Recession in 2023," *Bloomberg*, December 20, 2022.
46. Aditya Aladangady et al., "Excess Savings During the COVID-19 Pandemic," *FEDS Notes*, October 21, 2022.
47. Based on global indices shown under the WEIS function in Bloomberg.
48. Based on the decline in the Bloomberg World Exchange Market Capitalization index from December 31, 2021, to October 12, 2022.
49. That is, over rolling 12-month windows since 1926.
50. JP Morgan 2023 Global Equity Outlook, December 1, 2022.
51. Based on data for Brazil, Chile, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, South Africa, Thailand and Turkey.
52. Measured through JP Morgan's EMCI spot currency index from December 31, 2021, to December 30, 2022.
53. Based on Goldman Sachs Global Investment Research estimates.
54. Martin M. Andreasen, Jens H. E. Christensen and Simon Riddell, "The TIPS Liquidity Premium," Federal Reserve Bank of San Francisco Working Paper 2017-11, July 2020.
55. National Association of State Budget Officers, Fall Fiscal Survey of States. Rainy day funds, also known as budget stabilization funds, serve as states' "savings accounts" and may be used to supplement general fund spending during an economic downturn or other events triggering a shortfall, if the specific restrictions on the use of the fund(s) are met.
56. Bank of England, "Financial Policy Summary and Record—December 2022," December 13, 2022.
57. JP Morgan EM local flow data as of mid-December 2022.

Important Information

Our Relationship with Clients. Goldman Sachs & Co. LLC (“we,” “us,” and “GS&Co.,” and together with its affiliates, “Goldman Sachs” or “GS”) is registered with the Securities and Exchange Commission (“SEC”) as both a broker-dealer and an investment adviser and is a member of the Financial Industry Regulatory Authority (“FINRA”) and the Securities Investor Protection Corporation (“SIPC”). We predominantly offer investment advisory and brokerage services to retail investors through our Wealth Management business unit, which includes Private Wealth Management (“PWM”). How we are compensated by you may change over time and will depend on various factors. Please ask questions and review the GS&Co. Form CRS and GS&Co. Relationship Guide/Regulation Best Interest disclosures (available at: <https://www.goldmansachs.com/disclosures/customer-relationship-summary-form-crs/index.html>) for important information, including the difference between advisory and brokerage accounts, compensation, fees, conflicts of interest, and our obligations to you. We are part of a full-service, integrated investment banking, investment management, and brokerage firm. Other firm businesses may implement investment strategies that are different from the strategies used or recommended for your portfolio.

Intended Audience. This material is generally intended for clients of PWM and/or prospective clients who would meet the eligibility requirements to be clients of PWM. If you have any questions on whether this material is intended for you, please contact your PWM Team. Materials that discuss advisory services are generally intended for individuals who are Qualified Clients as defined under Rule 305-3 of the Investment Advisers Act of 1940. Materials that discuss alternative investment products are generally intended for recipients who qualify as Accredited Investors as defined in the Securities Act of 1933. GS&Co. considers client suitability, eligibility, and sophistication when distributing marketing materials; not all materials are appropriate for all GS clients. Distribution is premised on the reasonable belief that the recipient has sufficient financial expertise and/or access to resources to independently analyze the information presented. If you do not believe you meet these criteria, please disregard and contact your PWM Team.

Entities Providing Services.

Investment advisory and/or financial counseling services may be provided by GS&Co., an affiliate, or an external manager under the wrap program sponsored by GS&Co. Affiliates may include but are not limited to The Ayco Company, L.P. d/b/a Goldman Sachs Ayco Personal Financial Management

(“Ayco”) (a wholly-owned subsidiary of The Goldman Sachs Group, Inc. or “GS Group”); United Capital Financial Advisers, LLC d/b/a Goldman Sachs Personal Financial Management (“GS PFM”); or another affiliate. Brokerage services are provided by GS&Co. Banking and payment services (including check-writing, ACH, direct debit, and margin loans) are provided or facilitated by GS&Co. Over-The-Counter (“OTC”) derivatives, foreign exchange forwards, and related financing are offered by GS&Co. Trust services are provided by The Goldman Sachs Trust Company, N.A. or The Goldman Sachs Trust Company of Delaware. Deposit products, mortgages, and bank loans are offered by Goldman Sachs Bank USA, member Federal Deposit Insurance Corporation (“FDIC”) and an Equal Housing Lender. GS&Co. and its present and future affiliates may offer and provide through the GS Family Office (“GSFO”) offering—or through a client referral to third parties—a suite of personal family office services (“GSFO Services”) specifically designed for certain Wealth Management (“WM”) clients of GS. As part of GSFO Services, GSFO may discuss with you various aspects of financial planning, including but not necessarily limited to the potential income tax consequences of your investments, estate planning, philanthropic endeavors, and certain other activities that may affect your income tax, gift tax and estate tax. GSFO Services vary among clients, are provided based on individual client needs and preferences, and are generally limited to educational consultations that should not be viewed as tax or legal advice. GSFO does not provide investment advice, investment management services, or advise on or offer the sale of insurance products. GSFO Services are offered in the United States through GS&Co. but may also be provided in part by Ayco. Ayco may, separately and distinctly from GSFO Services, provide tax and insurance advice in addition to personal family office services (“Ayco Family Office Services”). We encourage you to clearly establish your set of services with your advisory team.

Investment Strategy Group (“ISG”).

The Investment Strategy Group, part of the Asset & Wealth Management business (“AWM”) of GS, focuses on asset allocation strategy formation and market analysis for GS Wealth Management. Any information that references ISG, including their model portfolios, represents the views of ISG, is not financial research and is not a product of GS Global Investment Research and may vary significantly from views expressed by individual portfolio management teams within AWM, or other groups at GS. ISG Model Portfolios are provided for illustrative purposes only. Your actual asset allocation may look significantly different based on your particular

circumstances and risk tolerance. Model performance calculations assume that (1) each asset class was owned in accordance with the recommended weight; (2) all tactical tilts were tracked at the time the recommendation was made; and (3) the portfolios are rebalanced at the end of every quarter. Model performance is calculated using the daily returns (actual or interpolated) of indices that ISG believes are representative of the asset classes included in the model. Results shown reflect the total return but generally do not consider any investment management fees, commissions or other transaction expenses, which would reduce returns. Hedge fund indices and data from Cambridge Associates are net of manager fees. The results shown reflect the reinvestment of dividends and other earnings. All returns are pre-tax and are not adjusted for inflation. Additional information about the model portfolio performance calculations is available upon request.

Investment Risks and Information.

GS&Co. offers a range of products that you should carefully consider for their unique terms and risks prior to investing to ensure they are appropriate for your individual circumstances. Below are descriptions of major risks for our more complex products; please review the offering documents and product prospectuses for particular products, as well as additional information about the nature and risks of these and other products in GS&Co.’s ADV Part 2A Brochure and PWM Relationship Guide. Investing involves the risk of loss.

Alternative Investments (“AI”). AIs may involve a substantial degree of risk, including the risk of total loss of capital, use of leverage, lack of liquidity, and volatility of returns. Private equity, private credit, private real estate, hedge funds, and AI investments structured as private investment funds are subject to less regulation than other types of pooled vehicles. Review the Offering Memorandum, Subscription Agreement, and any other applicable offering documents for risks, potential conflicts of interest, terms and conditions and other disclosures.

Commodities. The risk of loss in trading commodities can be substantial due, but not limited, to lack of liquidity, volatile political, market, and economic conditions, and abrupt changes in price which may result from unpredictable factors including weather, labor strikes, inflation, foreign exchange rates, etc. Due to the use of leverage, a small move against your position may result in a loss that may be larger than your initial deposit.

Currencies. Currency exchange rates can be extremely volatile, particularly during times of political or economic uncertainty. There is a risk of loss when

an investor has exposure to foreign currency or holds foreign currency traded investments.

Digital Assets/Cryptocurrency.

Digital assets regulation is still developing across all jurisdictions and governments may in the future restrict the use and exchange of any or all digital assets. Digital assets are generally not backed nor supported by any government or central bank, are not FDIC insured and do not have the same protections that U.S. or other countries’ bank deposits may have and are more volatile than traditional currencies. Transacting in digital assets carries the risk of market manipulation and cybersecurity failures such as the risk of hacking, theft, programming bugs, and accidental loss. Differing forms of digital assets may carry different risks. The volatility and unpredictability of the price of digital assets may lead to significant and immediate losses.

Over-the-Counter (“OTC”) Derivatives.

OTC derivatives are illiquid as there is no public market. The price or valuation of each OTC derivative transaction is individually negotiated between GS&Co. and each counterparty, and GS&Co. does not represent or warrant that the prices for which it offers OTC derivative transactions are the best prices available. You may therefore have trouble establishing whether the price you have been offered for a particular OTC derivative transaction is fair. OTC derivatives may trade at a value that is different from the level inferred from interest rates, dividends, and the underlier due to factors including expectations of future levels of interest rates and dividends, and the volatility of the underlier prior to maturity. The market price of the OTC derivative transaction may be influenced by many unpredictable factors, including economic conditions, GS creditworthiness, the value of any underliers, and certain actions taken by GS. Because GS may be obligated to make substantial payments to you as a condition of an OTC derivative transaction, you must evaluate the credit risk of doing business with GS. Depending on the type of transaction, your counterparty may be GS&Co. or another GS affiliate. Counterparties may be subject to different rules depending on whether they are a registered U.S. broker dealer. OTC derivative transactions with GS affiliates cannot be assigned or transferred without GS’s prior written consent. The provisions of an OTC derivative transaction may allow for early termination and, in such cases, either you or GS may be required to make a potentially significant termination payment depending upon whether the OTC derivative transaction is in-the-money at the time of termination. You should carefully review the Master Agreement, including any related schedules, credit

support documents, addenda, and exhibits. You may be requested to post margin or collateral at levels consistent with the internal policies of GS to support written OTC derivatives

Emerging Markets and Growth Markets.

Emerging markets and growth markets investments involve certain considerations, including political and economic conditions, the potential difficulty of repatriating funds or enforcing contractual or other legal rights, and the small size of the securities markets in such countries coupled with a low volume of trading, resulting in potential lack of liquidity and price volatility.

Non-US Securities. Non-US securities investments are subject to differing regulations, less public information, less liquidity, and greater volatility in the countries of domicile of the security issuers and/or the jurisdiction in which these securities are traded. In addition, investors in securities such as ADRs/ GDRs, whose values are influenced by foreign currencies, effectively assume currency risk.

Options. The purchase of options can result in the loss of an entire investment and the risk of uncovered options is potentially unlimited. You must read and understand the current Options Disclosure Document before entering into any options transactions. The booklet entitled Characteristics and Risk of Standardized Options can be obtained from your PWM team or at <http://www.theocc.com/components/docs/riskstoc.pdf>. A secondary market may not be available for all options. Transaction costs may be significant in option strategies that require multiple purchases and sales of options, such as spreads. Supporting documentation for any comparisons, recommendations, statistics, technical data, or other information will be supplied upon request.

Real Estate. Real estate investments, including real estate investments trusts ("REITS") and non-traded REITS, involve additional risks not typically associated with other asset classes. Such investments (both through public and private markets) may be subject to changes in broader macroeconomic conditions, such as interest rates, and sensitivities to temporary or permanent reductions in property values for the geographic region(s) represented. Non-traded REITS may carry a higher risk of illiquidity, incomplete or nontransparent valuations, dilution of shares, and conflicts of interest.

Structured Investments. Structured investments are complex and investors assume the credit risk of the issuer or guarantor. If the issuer or guarantor defaults, you may lose your entire investment, even if you hold the product to maturity. Structured

investments often perform differently from the asset(s) they reference. Credit ratings may pertain to the credit rating of the issuer and are not indicative of the market risk associated with the structured investment or the reference asset. Each structured investment is different, and for each investment you should consider 1) the possibility that at expiration you may be forced to own the reference asset at a depressed price; 2) limits on the ability to share in upside appreciation; 3) the potential for increased losses if the reference asset declines; and 4) potential inability to sell given the lack of a public trading market.

Tactical Tilts. Tactical tilts may involve a high degree of risk. No assurance can be made that profits will be achieved or that substantial losses will not be incurred. For various reasons, GS may implement a tactical tilt, invest in an affiliated fund that may invest in tactical tilts, or unwind a position for its client advisory accounts or on its own behalf before your advisor does on behalf of your account, or may implement a tactical tilt that is different from the tactical tilt implemented by advisors on client accounts, which could have an adverse effect on your account and may result in poorer performance by your account than by GS or other client accounts.

U.S. Registered Mutual Funds / Exchange Traded Funds ("ETFs") or Exchange Traded Notes ("ETNs"). You should consider a fund's investment objectives, risks, and costs, and read the summary prospectus and/or the Prospectus (which may be obtained from your PWM Team) carefully before investing. You may obtain documents for ETFs or ETNs for free by 1) visiting EDGAR on the SEC website at <http://www.sec.gov/>; 2) contacting your PWM Team; or 3) calling toll-free at 1-866-471-2526. Unlike traditional mutual funds, ETFs can trade at a discount or premium to the net asset value and are not directly redeemable by the fund. Leveraged or inverse ETFs, ETNs, or commodities futures-linked ETFs may experience greater price movements than traditional ETFs and may not be appropriate for all investors. Most leveraged and inverse ETFs or ETNs seek to deliver multiples of the performance (or the inverse of the performance) of the underlying index or benchmark on a daily basis. Their performance over a longer period of time can vary significantly from the stated daily performance objectives or the underlying benchmark or index due to the effects of compounding. Performance differences may be magnified in a volatile market. Commodities futures-linked ETFs may perform differently than the spot price for the commodity itself, including due to the entering into and liquidating of futures or swap contracts on a continuous basis to maintain exposure

(i.e., "rolling") and disparities between near term future prices and long term future prices for the underlying commodity. You should not assume that a commodity-futures linked ETF will provide an effective hedge against other risks in your portfolio.

Security-Specific References.

References to a specific company or security are intended solely as examples or for context and are not research or investment advice; do not rely upon them in making an investment decision. GS may have a relationship with such companies and/or its securities that may present conflicts of interest. Contact your PWM Team for further information on any securities mentioned.

Off-Platform Investments. If you ask us for guidance on external investment opportunities not offered by GS, any information we may provide is as an accommodation only and we will not be acting as your advisor. We assume no obligation to determine whether the opportunity is suitable for you in connection with such investment decisions and will not assume any liability for such investment decisions. Our Form ADV has information on conflicts of interest we may have in connection with any such requests. ISG/GIR Forecasts. Economic and market forecasts presented ("forecasts") generally reflect either ISG's or Goldman Sachs Global Investment Research's ("GIR") views and are subject to change without notice. Forecasts do not consider investment objectives, restrictions, tax and financial situations or other needs of any specific client. Forecasts are subject to high levels of uncertainty that may affect actual performance and represents only one of a broad range of possible outcomes. Forecasts and any return expectations are as of the date of this material, and do not project returns of any given investment or strategy. Forecasts are estimated, based on capital market assumptions, and are subject to significant revision and may change materially as economic and market conditions change. Any case studies and examples are for illustrative purposes only. If applicable, a copy of the GIR Report used for GIR forecasts is available upon request. Forecasts do not reflect advisory fees, transaction costs, and other expenses a client would have paid, which would reduce return.

Client Specific Markets.

Investments held in your name with a subcustodian in the local market where traded in order to comply with local law will be indicated on your statements.

Performance / Estimated Income / Estimated Cash Flow. Past performance is not a guide of future results and may include investments no longer owned in current or closed

accounts. Current performance may be lower or higher than the performance data quoted. Where not relevant or representative, outliers may be excluded. To request the most current or historical performance data, or asset classification schema information, please contact your PWM team at the number provided on your monthly statement or toll-free in the U.S. at 1-800-323-5678.

Performance reports, where shown, generally present the relevant time weighted performance, which is a combination of daily returns compounded over a specified time period with the removal of the deposit and withdrawal impacts, and may show internal rate of return calculations where requested. Aggregate performance may not equal the sum of returns at an investment level. Where performance is shown net of fees, actual fees may differ. Net performance for advisory accounts is calculated net of fees and expenses that were or would have been paid in connection with GS's services, including management fees, and might include investments for which actual market prices are not currently available. If included, estimated income figures and estimated private equity future cash flows are estimates of future activity, and actual results may vary substantially. GS&Co. has adjusted performance calculations for certain asset classes or strategies and may do so in the future. Performance of net cash (i.e., cash less margin debit) is generally included in the total performance calculation but not displayed separately. Option performance is included in the performance of the asset class of the underlier.

Offer to Provide Additional Performance Information.

Where GS provides you with the results of a subset of investments extracted from a portfolio ("extracted performance"), you may request the performance results of the total portfolio. Where GS provides you with illustrative performance regarding private fund investments that was not actually achieved by GS ("hypothetical performance"), you may request additional information regarding the risks and limitations of using such performance.

Indices/Benchmarks.

References to indices, benchmarks, or other measures of relative market performance over a specified period are informational only and are not predictions or guarantees of performance. In addition to the benchmark assigned to a specific investment strategy, other benchmarks ("Comparative Benchmarks") may be displayed, including ones displayed at your request. Managers may not review the performance of your

account against the performance of Comparative Benchmarks. Where a benchmark for a strategy has changed, the historical benchmark(s) are available upon request. Inception to date ("ITD") returns and benchmark/reference portfolio returns may reflect different periods. ITD returns for accounts or asset classes only reflect performance during periods in which your account(s) held assets and/or were invested in the asset class. The benchmark or reference portfolio returns shown reflect the benchmark / portfolio performance from the date of inception of your account or your initial investment in the asset class. If displayed, estimated income figures are estimates of future activity obtained from third party sources. Indices are unmanaged and investors cannot directly invest in them. The figures for the index reflect the reinvestment of all income or dividends, as applicable, but may not always reflect the deduction of any fees or expenses which would reduce returns. Where appropriate, relevant index trademarks or index information has been licensed or sub-licensed for use. Inclusion of index information does not mean the relevant index or its affiliated entities sponsor, endorse, sell, or promote the referenced securities, or that they make any representation or warranty regarding either the advisability of investing in securities or the ability of the index to track market performance.

Pricing and Valuations.

Prices do not necessarily reflect realizable values and are based on information considered to be reliable but are not guaranteed for accuracy, currency, or as realizable values. Certain positions may be provided by third parties or may appear without a price if GS is unable to obtain a price and/or the security is not actively traded for a certain amount of time. Pricing sources and methods are available upon request and are subject to change.

Consolidated Reporting and Third Party Investments.

Where GS provides a consolidated report or references information regarding your non-GS investments held by third party custodians, such information provided as a courtesy for informational purposes only; it is not your official statement. Such information (including valuations) materials/information provided to us. GS does not perform review or diligence on, independently verify the accuracy of information regarding, or provide advice on such non-GS investments; GS assumes no responsibility for the accuracy of the source information and such assets may not be included on GS's books and records. Unless otherwise agreed in writing, we have not assessed whether those investments fit within your investment objective and the asset classification shown may not be accurate and/or may differ from your custodian

or external adviser's classification. You should maintain the original source documents (including third party financial statements) and review them for any notices or relevant disclosures. Assets held away may not be covered by SIPC.

Tax Information.

GS does not provide legal, tax or accounting advice, unless explicitly agreed in writing between you and GS, and does not offer the sale of insurance products. You should obtain your own independent tax advice based on your circumstances. The information included in this presentation, including, if shown, in the Tax Summary section, does not constitute tax advice, has not been audited, should not be used for tax reporting, and is not a substitute for the applicable tax documents, including your Form 1099, Schedule K-1 for private investments, which we will provide to you annually, or your monthly GS account statement(s). The cost basis included in this presentation may differ from your cost basis for tax purposes. Information regarding your Als and transactions for retirement accounts are not included in the Tax Summary section.

Notice to ERISA / Qualified Retirement Plan / IRA / Coverdell Education Savings Account (collectively, "Retirement Account") Clients:

Information regarding your Retirement Account(s) included in this presentation is for informational purposes only and does not constitute investment or other advice or a recommendation relating to any investment or other decisions, and GS is not a fiduciary or advisor with respect to any person or plan by reason of providing the presentation including under the Employee Retirement Income Security Act of 1974 or Department of Labor Regulations. Unless GS agrees otherwise, any target allocation shown for such Retirement Account represents decisions you have communicated to GS regarding such asset allocation, without any advice or recommendations from GS, after considering your financial circumstances, objectives, risk tolerance and goals.

GSFO Services. Where GS&Co. provides or refers GSFO Services, it does so based on individual client needs. Not all clients will receive all services and certain activities may fall beyond the scope of the GSFO Services. Any asset management services provided are governed by a separate investment management agreement (as may be applicable). Personnel providing GSFO Services do not provide discretionary management over client investments. Where GSFO provides art or collectibles advisory services, such services are generally limited to education; GS does not recommend purchasing art or collectibles as an investment strategy, provide formal or informal appraisals of the value

of, or opine on the future investment potential of, any specific artwork or collectible. Any discussions of pending legislation, or hypothetical projections based on same, are educational and should not be construed as or relied upon as investment, tax, or legal advice. Upon your request, the Family Office team may discuss with you various aspects of financial planning; the scope of such planning services will vary among clients and may only include episodic and educational consultations that should not be viewed as tax advice. GS&Co. assumes no duty to take action pursuant to any recommendations, advice, or financial planning strategies discussed with you as part of GSFO Services. It is your responsibility to determine if and how any such recommendations, advice, or financial planning strategies should be implemented or otherwise followed, and you are encouraged to consult with your own tax advisor and other professionals regarding your specific circumstances. GS is not liable for any services received from your independent advisors or the results of any incident arising from any such services or advice. Cybersecurity consultations provided by GS&Co. are intended to provide a general overview of cyber and physical security threats, but are not comprehensive; GS is not liable for any incident following such consultations. GS&Co. is not liable for clients' ultimate selection and utilization of any Third Party Vendor for any GSFO Services, or the results of any incident arising from any such referral. GS&Co. is not responsible for the supervision, monitoring, management, or performance of such Third Party Vendors and is not liable for any failure of Third Party Vendors to render services or any losses incurred as a result of such services. Ayco Family Office Services may also be offered through Ayco. These services are separate and distinct from those services provided by GSFO, and may vary substantially.

Other Services. Any provided financial planning services, including cash flow analyses based on information you provide, are hypothetical illustrations of mathematical principles and are not a prediction or projection of performance of an investment or investment strategy. Certain illustrations may be predicated on an Investment Analysis tool, an interactive technological tool that produces simulations and statistical analyses that present the likelihood of various investment outcomes based on client input. Such services may not address every aspect of a client's financial life; topics that were not discussed with you may still be relevant to your financial situation. In providing financial services, GS relies on information provided by you and is not responsible for the accuracy or completeness of any such information,

nor for any consequences related to the use of any inaccurate or incomplete information. Where materials and/or analyses are provided to you, they are based on the assumptions stated therein, which are likely to vary substantially from the examples shown if they do not prove to be true. These examples are for illustrative purposes only and do not guarantee that any client will or is likely to achieve the results shown. Assumed growth rates are subject to high levels of uncertainty and do not represent actual trading and may not reflect material economic and market factors that may have an impact on actual performance. GS has no obligation to provide updates to these rates.

Not a Municipal Advisor. Except where GS expressly agrees otherwise, GS is not acting as a municipal advisor and the opinions or views contained in this presentation are not intended to be, and do not constitute, advice, including within the meaning of Section 15B of the Securities Exchange Act of 1934. Additional Information for Ayco Clients. Your GS team may include individuals from your Ayco team. Ayco may provide tax advice or other Ayco Family Office Services to certain clients. Ayco does not provide brokerage services. As part of its financial counseling services, Ayco may provide you with certain reports where similar information contained herein is presented differently. You should view each report independently and raise any questions with your Ayco team.

No Distribution; No Offer or Solicitation.

This material may not, without GS' prior written consent, be (i) duplicated by any means, or (ii) distributed to any person that is not an employee, officer, director, or authorized agent of the recipient. This material is not an offer or solicitation with respect to the purchase or sale of any security in any jurisdiction in which such offer or solicitation is not authorized, or to any person to whom it would be unlawful to make such offer or solicitation. We have no obligation to provide any updates or changes to this material.

Argentina: The information has been provided at your request.

Australia: This material is being disseminated in Australia by Goldman Sachs & Co ("GSCo"); Goldman Sachs International ("GSI"); Goldman Sachs (Singapore) Pte ("GSSP") and/or Goldman Sachs (Asia) LLC ("GSALLC"). In Australia, this document, and any access to it, is intended only for a person that has first satisfied Goldman Sachs that:

- The person is a Sophisticated or Professional Investor for the purposes of section 708 of the Corporations Act 2001 (Cth) ("Corporations Act"); or
- The person is a wholesale client for

the purposes of section 761G of the Corporations Act.

No offer to acquire any financial product or interest in any securities or interests of any kind is being made to you in this document. If financial products or interests in any securities or interests of any kind do become available in the future, the offer may be arranged by an appropriately licensed Goldman Sachs entity in Australia in accordance with section 911A(2) (b) of the Corporations Act. Any offer will only be made in circumstances where disclosures and/or disclosure statements are not required under Part 6D.2 or Part 7.9 of the Corporations Act (as relevant).

To the extent that any financial service is provided in Australia by GSCo, GSI, GSSP and/or GSALLC, those services are provided on the basis that they are provided only to "wholesale clients", as defined for the purposes of the Corporations Act. GSCo, GSI, GSSP and GSALLC are exempt from the requirement to hold an Australian Financial Services Licence under the Corporations Act and do not therefore hold an Australian Financial Services Licence. GSCo is regulated by the Securities and Exchange Commission under US laws; GSI is regulated by the Financial Conduct Authority and the Prudential Regulation Authority under laws in the United Kingdom; GSSP is regulated by the Monetary Authority of Singapore under Singaporean laws; and GSALLC is regulated by the Securities and Futures Commission under Hong Kong laws; all of which differ from Australian laws. Any financial services given to any person by GSCo, GSI, and/or GSSP in Australia are provided pursuant to ASIC Class Orders 03/1100; 03/1099; and 03/1102 respectively.

Bahrain: GSI represents and warrants that it has not made and will not make any invitation to the public in the Kingdom of Bahrain to subscribe for the fund. This presentation has not been reviewed by the Central Bank of Bahrain (CBB) and the CBB takes no responsibility for the accuracy of the statements or the information contained herein, or for the performance of the securities or related investment, nor shall the CBB have any liability to any person for damage or loss resulting from reliance on any statement or information contained herein. This presentation will not be issued, passed to, or made available to the public generally.

Brazil: These materials are provided at your request and solely for your information, and in no way constitutes an offer, solicitation, advertisement or advice of, or in relation to, any securities, funds, or products by any of Goldman Sachs affiliates in Brazil or in any jurisdiction in which such activity is unlawful or unauthorized, or to any person to whom it is unlawful

or unauthorized. This document has not been delivered for registration to the relevant regulators or financial supervisory bodies in Brazil, such as the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários – CVM) nor has its content been reviewed or approved by any such regulators or financial supervisory bodies. The securities, funds, or products described in this document have not been registered with the relevant regulators or financial supervisory bodies in Brazil, such as the CVM, nor have been submitted for approval by any such regulators or financial supervisory bodies. The recipient undertakes to keep these materials as well as the information contained herein as confidential and not to circulate them to any third party.

Chile: Fecha de inicio de la oferta:

(i) La presente oferta se acoge a la Norma de Carácter General N° 336 de la Superintendencia de Valores y Seguros de Chile; (ii) La presente oferta versa sobre valores no inscritos en el Registro de Valores o en el Registro de Valores Extranjeros que lleva la Superintendencia de Valores y Seguros, por lo que los valores sobre los cuales ésta versa, no están sujetos a su fiscalización; (iii) Que por tratarse de valores no inscritos, no existe la obligación por parte del emisor de entregar en Chile información pública respecto de estos valores; y (iv) Estos valores no podrán ser objeto de oferta pública mientras no sean inscritos en el Registro de Valores correspondiente.

Dubai: Goldman Sachs International ("GSI") is authorised and regulated by the Dubai Financial Services Authority ("DFSA") in the DIFC and the Financial Services Authority ("FSA") authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and Prudential Regulation Authority in the UK. Registered address of the DIFC branch is Level 5, Gate Precinct Building 1, Dubai International Financial Centre, PO Box 506588, Dubai, UAE and registered office of GSI in the UK is Plumtree Court, 25 Shoe Lane, London, EC4A 4AU, United Kingdom. This material is only intended for use by market counterparties and professional clients, and not retail clients, as defined by the DFSA Rulebook. Any products that are referred to in this material will only be made available to those clients falling within the definition of market counterparties and professional clients.

Israel: Goldman Sachs is not licensed to provide investment advice or investment management services under Israeli law.

Korea: No Goldman Sachs entity, other than Goldman Sachs (Asia) L.L.C., Goldman Sachs Asset Management International and Goldman Sachs Asset Management Korea Co., Ltd.,

is currently licensed to provide discretionary investment management services and advisory services to clients in Korea and nothing in this material should be construed as an offer to provide such services except as otherwise permitted under relevant laws and regulations. Goldman Sachs (Asia) L.L.C. is registered as a Cross-Border Discretionary Investment Management Company and a Cross-Border Investment Advisory Company with the Korean Financial Supervisory Commission, and as a licensed corporation for, amongst other regulated activities, advising on securities and asset management with the Hong Kong Securities & Futures Commission. Goldman Sachs Asset Management International is licensed as a Cross-Border Discretionary Investment Management Company and a Cross-Border Investment Advisory Company with the Korean Financial Supervisory Commission, as an investment adviser with the Securities and Exchange Commission of the United States and for Managing Investments with the Financial Services Authority of the United Kingdom. Goldman Sachs Asset Management Korea Co., Ltd. is licensed as an Asset Management Company in Korea and is also registered as an Investment Advisory Company and Discretionary Investment Management Company with the Korean Financial Supervisory Commission. Details of their respective officers and major shareholders can be provided upon request.

Oman: The information contained in these materials neither constitutes a public offer of securities in the Sultanate of Oman as contemplated by the Commercial Companies Law of Oman (Sultani Decree 4/74) or the Capital Market Law of Oman (Sultani Decree 80/98) nor does it constitute an offer to sell, or the solicitation of any offer to buy Non-Omani securities in the Sultanate of Oman as contemplated by Article 6 of the Executive Regulations to the Capital Market Law (issued vide Ministerial Decision No. 4/2001). Additionally, these materials are not intended to lead to the conclusion of any contract of whatsoever nature within the territory of the Sultanate of Oman.

Panama: These Securities have not been and will not be registered with the national Securities Commission of the Republic of Panama under Decree Law No. 1 of July 8, 1999 (the "Panamanian Securities Act") and may not be offered or sold within Panama except in certain limited transactions exempt from the registration requirements of the Panamanian Securities Act. These Securities do not benefit from the tax incentives provided by the Panamanian Securities Act and are not subject to regulation or supervision by the National Securities Commission of the Republic of Panama. This material constitutes

generic information regarding Goldman Sachs and the products and services that it provides and should not be construed as an offer or provision of any specific services or products of Goldman Sachs for which a prior authorization or license is required by Panamanian regulators.

Peru: The products or securities referred to herein have not been registered before the Superintendencia del Mercado de Valores (SMV) and are being placed by means of a private offer. SMV has not reviewed the information provided to the investor.

Qatar: The investments described in this document have not been, and will not be, offered, sold or delivered, at any time, directly or indirectly in the State of Qatar in a manner that would constitute a public offering. This document has not been, and will not be, registered with or reviewed or approved by the Qatar Financial Markets Authority, the Qatar Financial Centre Regulatory Authority or Qatar Central Bank and may not be publicly distributed. This document is intended for the original recipient only and must not be provided to any other person. It is not for general circulation in the State of Qatar and may not be reproduced or used for any other purpose.

Singapore: This document has not been delivered for registration to the relevant regulators or financial supervisory bodies in Hong Kong or Singapore, nor has its content been reviewed or approved by any financial supervisory body or regulatory authority. The information contained in this document is provided at your request and for your information only. It does not constitute an offer or invitation to subscribe for securities or interests of any kind. Accordingly, unless permitted by the securities laws of Hong Kong or Singapore, (i) no person may issue or cause to be issued this document, directly or indirectly, other than to persons who are professional investors, institutional investors, accredited investors or other approved recipients under the relevant laws or regulations (ii) no person may issue or have in its possession for the purposes of issue, this document, or any advertisement, invitation or document relating to it, whether in Hong Kong, Singapore or elsewhere, which is directed at, or the contents of which are likely to be accessed by, the public in Hong Kong or Singapore and (iii) the placement of securities or interests to the public in Hong Kong and Singapore is prohibited. Before investing in securities or interests of any kind, you should consider whether the products are suitable for you.

South Africa: Goldman Sachs does not provide tax, accounting, investment or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is

for discussion purposes only, and does not purport to contain a comprehensive analysis of the risk/ rewards of any idea or strategy herein. Any potential investment/transaction described within is subject to change and Goldman Sachs Internal approvals. Goldman Sachs International is an authorised financial services provider in South Africa under the Financial Advisory and Intermediary Services Act, 2002.

Ukraine: Goldman Sachs & Co. LLC is not registered in Ukraine and carries out its activity and provides services to its clients on a purely cross-border basis and has not established any permanent establishment under Ukrainian law. The information contained in this document shall not be treated as an advertisement under Ukrainian law.

United Arab Emirates: The information contained in this document does not constitute, and is not intended to constitute, a public offer of securities in the United Arab Emirates in accordance with the Commercial Companies Law (Federal Law No. 8 of 1984, as amended) or otherwise under the laws of the United Arab Emirates. This document has not been approved by, or filed with the Central Bank of the United Arab Emirates or the Securities and Commodities Authority. If you do not understand the contents of this document, you should consult with a financial advisor. This document is provided to the recipient only and should not be provided to or relied on by any other person.

United Kingdom: This material has been approved for issue in the United Kingdom solely for the purposes of Section 21 of the Financial Services and Markets Act 2000 by GSI, Plumtree Court, 25 Shoe Lane, London, EC4A 4AU, United Kingdom. Authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority.

© 2023 Goldman Sachs. All rights reserved.

Other contributors from the
Investment Strategy Group include:

Thomas Devos

Managing Director

Shantall Tegho

Managing Director

Anais Boussie

Vice President

Jeremy Nalewaik

Vice President

Howard Spector

Vice President

Matthieu Walterspiler

Vice President

Olivia Xia

Vice President

Grant Nelson

Analyst

Jonas Schmitten

Analyst

Tia Sparks

Analyst

Goldman Sachs

Amsterdam
Atlanta
Austin
Beijing
Boston
Chicago
Dallas
Denver
Dubai
Dublin

Frankfurt
Geneva
Hong Kong
Houston
London
Los Angeles
Madrid
Melbourne
Miami
Milan

Monaco
New York
Paris
Philadelphia
San Francisco
Seattle
Shanghai
Shenzhen
Singapore
Stockholm

Sydney
Tel Aviv
Washington, D.C.
West Palm Beach
Zurich

www.gs.com