

Why asset allocation matters in uncertain times

How has asset allocation stood the test of time?

Deeper analysis of investment trends and topics

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Key takeaways

- The wide performance swings over the past several years demonstrated a key principle of asset allocation¹ — that asset returns and their rankings varied from year to year — but historically, over multiple-year time periods, asset-class performance has tended to smooth out.
- A diversified allocation is designed in an effort to help reduce volatility over multiple-year time periods, but it may also accomplish this goal over shorter periods of significant return fluctuations.
- Holding a concentrated portfolio of riskier assets could result in greater portfolio downturns when markets correct. Holding a diversified allocation with the potential to mitigate downside risk could be advantageous during times of market stress in our view. We believe investors should follow an asset allocation strategy through short-term dislocations.
- We believe that a well-defined strategy may help allow investors to avoid making emotionally driven financial decisions. Some common behavioral biases we acknowledge include: chasing past winners and losers and recency bias, or trading based on recent trends.

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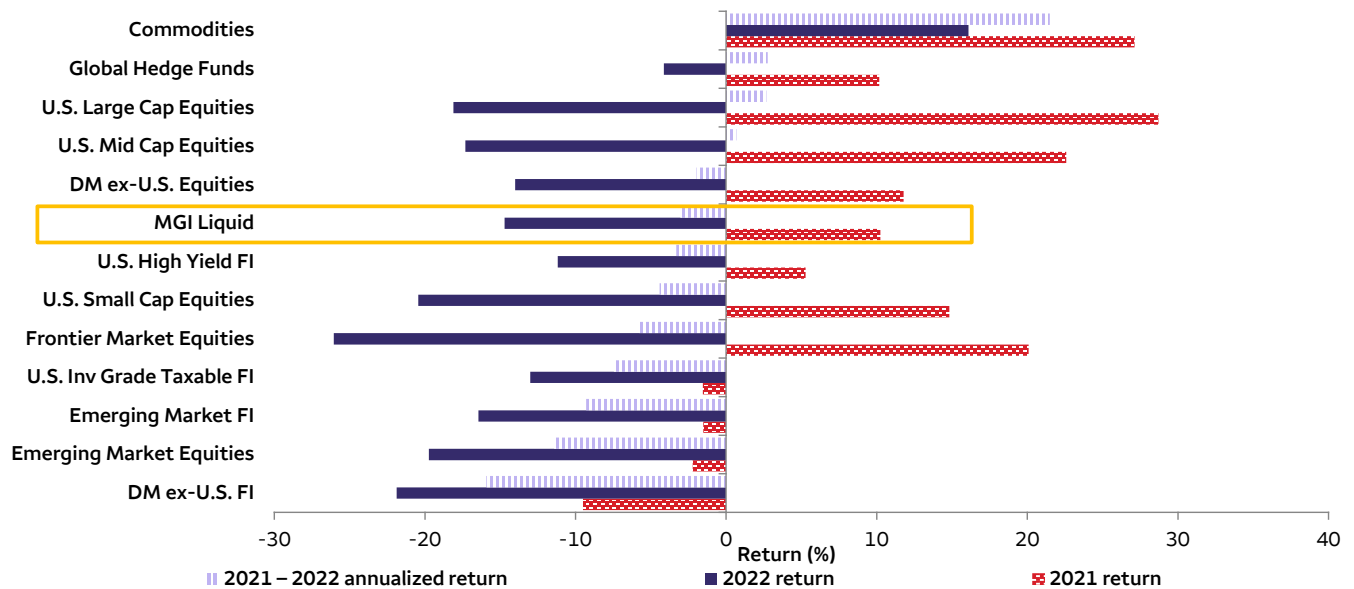
1. Asset allocation and diversification do not guarantee investment returns or eliminate risk of loss. They are investment methods used to help manage risk and volatility within a portfolio. There is no guarantee any asset class will perform in a similar manner in the future.

2022 was an extraordinary year for financial markets as investors grappled with inflation that soared to its highest level in 40 years and tightening monetary policy from the Federal Reserve (Fed) and other global central banks. Equities and fixed income broadly declined.

In 2022 U.S. Large and Mid Cap Equities fell less than U.S. Small Cap and Emerging Market Equities, and U.S. fixed income asset classes outperformed international fixed income. With unusually large declines in fixed income and losses in equities, there were few places to hide, with only Commodities and certain styles of hedge funds posting a positive return for the year 2022. With the Fed aggressively raising interest rates in 2022, the bond market took a sharp hit, and all fixed income asset classes suffered deep, negative returns last year. Commodities, as measured by the Bloomberg Commodity Index, acted as an inflation hedge in our view and was the top performer last year, extending 2021's positive performance as demand remained strong and supplies continued to be drawn down.

Since 2020, markets have experienced higher volatility as compared to the decade prior due to sharp downturns, like in 2022 and during the 2020 bear market. On the positive side, the market enjoyed a strong upswing from the March 2020 through 2021 bull market. Looking at the annualized 2021 – 2022 returns, many asset classes experienced negative returns, particularly in fixed income, as the historically low returns in 2022 more than erased the 2021 gains. But some equity asset classes were up on a two-year basis. This example demonstrates what we view as a key principle of asset allocation — asset-price returns and their rankings vary from year to year — but historically, over multiple-year time frames, asset-class performance has tended to smooth out. Also notice that during this volatile period beginning in 2020, a diversified allocation, represented by the Liquid Moderate Growth and Income allocation, outperformed most individual asset classes, generally with less fluctuation in returns than the individual asset classes.

Chart 1. A diversified allocation experienced a smoother ride than many individual asset classes



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Data from January 1, 2021, to December 31, 2022. Performance results for Moderate Growth and Income (MGI) Liquid are calculated using blended index returns. Index return information is provided for illustrative purposes only. Index returns do not represent investment performance or the results of actual trading. Index returns represent general market results; assume the reinvestment of dividends and other distributions; and do not reflect deductions for fees, expenses, or taxes applicable to an actual investment. Unlike most asset-class indexes, HFR Index returns reflect deductions for fees. Because the HFR indexes are calculated based on information that is voluntarily provided, actual returns may be lower than those reported. An index is unmanaged and not available for direct investment. **Past performance is no guarantee of future results.** Please see the end of the report for the MGI Liquid composition, the risks associated with the representative asset classes, and the definitions of the indexes. Indexes represented in this chart include the following: U.S. Inv Grade Taxable; FI: Bloomberg U.S. Aggregate Bond Index; U.S. High Yield FI: Bloomberg U.S. Corporate High Yield Index; DM ex-U.S. FI: JPMorgan GBI Global Ex-U.S. Index; EM FI: JPMorgan EMBI Global Index; U.S. Large Cap Equities: S&P 500 Index; U.S. Mid Cap Equities: Russell Midcap Index; U.S. Small Cap Equities: Russell 2000 Index, DM ex-U.S. Equities: MSCI EAFE Index; Emerging Market Equities: MSCI Emerging Markets Index; Frontier Market Equities: MSCI Frontier Markets Index; Commodities: Bloomberg Commodity Index; Global Hedge Funds: HFR1 Fund Weighted Composite Index. FI = Fixed Income. DM = Developed Markets. Inv Grade = Investment Grade.

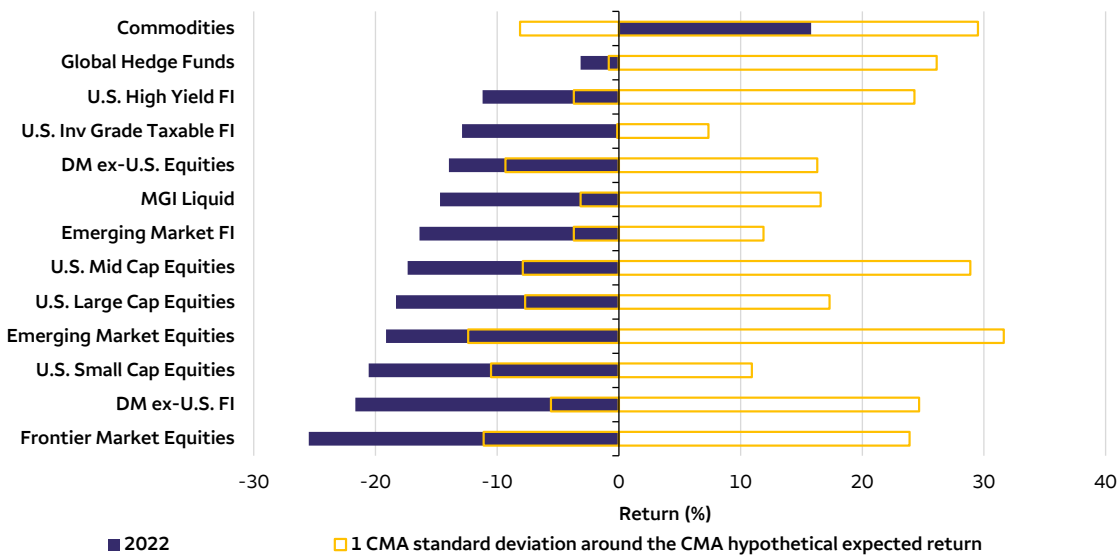
Deep, negative returns, like those we observed in 2022, are not what we expect in a typical year for markets based on historical performance, and are not what we would expect markets to average over a longer-term, strategic time frame. How extraordinary were market returns in 2022? Chart 2 shows that most of the major asset classes used in our strategic allocations fell outside of one standard deviation of our expected average return based on our capital market assumptions (CMAs)² — our forward-looking estimates of how asset classes and combinations of asset classes may respond over a long-term cycle.

Allocations that diversify across different asset classes (as evidenced in Chart 1 and 2) have historically achieved returns with less volatility and downside risk than many individual asset classes achieved, even in an extraordinary year for markets, like 2022. We believe that a disciplined asset allocation strategy provides diversification — and may potentially smooth out performance over time. We believe a

smoothing effect has the potential to promote compounding returns and, may motivate investors to stay committed to their longer-term investment plan. A diversified allocation is designed in an effort to help mitigate portfolio volatility over longer periods of time, but it may also accomplish this objective over shorter periods of significant return fluctuations.

Since 2020, there have been periods when portfolio performance exceeded expected returns, and other periods when performance fell short of expected returns. In this report, we explore historical performance looking to better understand how asset allocation has historically added value to our strategic allocation recommendations over periods of time. We begin with a quick review of asset allocation principles, and then examine actual asset-class performance versus our CMAs during various time periods. We then identify what we believe are key trends and conclude with our view on potential implications for investors.

Chart 2. 2022 declines fell far outside of expected return ranges for most asset classes



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Data from January 1, 2022, to December 31, 2022. FI = Fixed Income. DM = Developed Markets. Inv Grade = Investment Grade. For illustrative purposes only. Performance results for Moderate Growth and Income (MGI) Liquid are calculated using blended index returns. Please see Chart 1 on page 2 for the names of the indexes representing the asset classes and important information on index returns. An index is unmanaged and not available for direct investment. **Past performance is no guarantee of future results.** Standard Deviation is a statistical measure of the volatility of a portfolio's returns. The higher the standard deviation, the greater volatility has been. Please see the end of the report for the MGI Liquid composition, the risks associated with the representative asset classes, and the definitions of the indexes and Capital Market Assumptions.

CMAs are based on forecasts and are not promises of actual returns or performance that may be realized. They are based on estimates that may not be achieved and assumptions that may not occur. Consult your investment professional before taking any action based on this information.

2. Please see page 6 for important information on the application of CMAs and the end of this report for limitations on the use of CMA forecasts.

Periodic volatility in recent years

Over the past several years, markets have experienced bouts of increased volatility as investors fretted over trade imbalances, tariffs, the pandemic, and COVID-19 variants. More recently, markets have grappled with the impacts of elevated inflation, aggressively tightening monetary policy, and an impending global economic slowdown. Even so, most annualized equity asset class returns for 2021 and 2022 fell within the expected ranges for standard deviation (or the variability in returns we expect on an annualized basis for the next 10 to 15 years).³ Meanwhile, annualized two-year fixed income returns fell outside of those expected ranges due to the outsized negative performance in 2022. Volatility has remained above its historical average since the 2020 bear market, and both the strong positive performance in 2021 and the sharp downturn in 2022 were far greater moves than our expectations for a normal year. Over longer time periods, we expect atypical performance like we observed in 2022 to even out as the market experiences both upswings and downswings.

When creating asset allocation models, we start with our assumptions for risk, return, and correlation that we believe investors might experience from each asset class. Risk assumptions are based on historical standard deviations, but they also may include estimates for risks that we believe may exist but have not happened yet.

Likewise, return assumptions are based on historical data and include our forward-looking estimates for inflation and risk premia. Correlations aim to measure how much asset classes have moved together and are based on historical observations.

Together, these assumptions (CMAs) reflect the asset-class return⁴ and risk trends that we believe investors are likely to experience during the next few market and economic cycles. They help us construct portfolio asset allocation and assist in longer-term financial planning.

CMAs are not promises of actual asset-class returns — nor are they assurances of performance that may be realized. Instead, they are based on our estimates that might not be achieved and on assumptions that may not occur. The actual rate of return on an asset will not necessarily follow these long-term average estimates in any single calendar year.

Rather, returns are more likely to fluctuate around the averages (we generally expect these to be within the standard deviation ranges). We believe that it is important for investors seeking to maintain a well-diversified asset allocation to manage market volatility and potentially capitalize upon evolving long-term opportunities. One size does not fit all, and comparing the risk and return characteristics of various asset allocation strategic mixes may allow investors to choose the investment profile that matches their individual financial objectives.

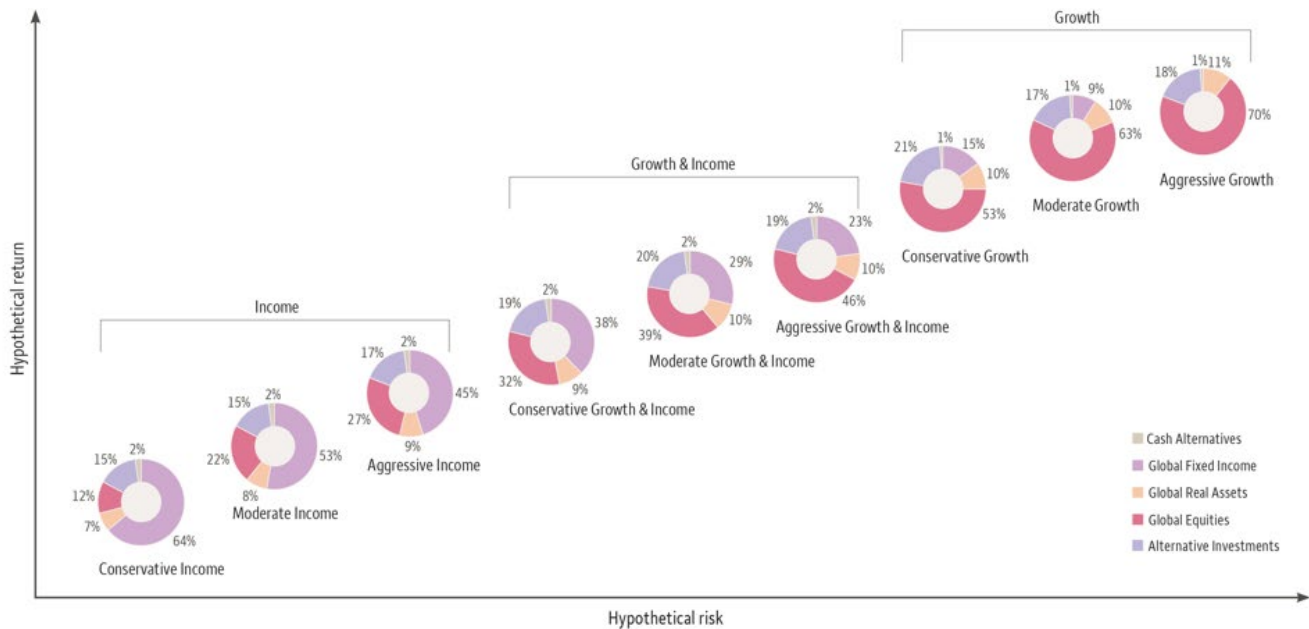
3. When a stock or portfolio has a higher standard deviation, the predicted range of performance is wide, implying greater volatility.

4. Asset allocation and diversification do not guarantee investment returns or eliminate risk of loss. They are investment methods used to help manage risk and volatility within a portfolio. There is no guarantee that any asset class will perform in a similar manner in the future.

Reviewing our key principles of asset allocation

- We believe a key ingredient for asset allocation is diversification.
- Key inputs to a strategic asset allocation model include return, risk, and correlation.⁵
- Time horizon matters: We focus on strategic (long-term), cyclical (3 to 5 years), and tactical (6 to 18 months) time horizons for asset allocation decisions.
- Market timing is not on your side, as a few great days of upside returns, or a handful of significant selloffs can determine a positive or negative return for any given year.

Chart 3. Different objectives result in different risk and return characteristics



Source: Wells Fargo Investment Institute, as of July 18, 2022. Chart is conceptual and does not reflect any actual returns or represent any specific asset classifications. **Past performance is no guarantee of future results.**

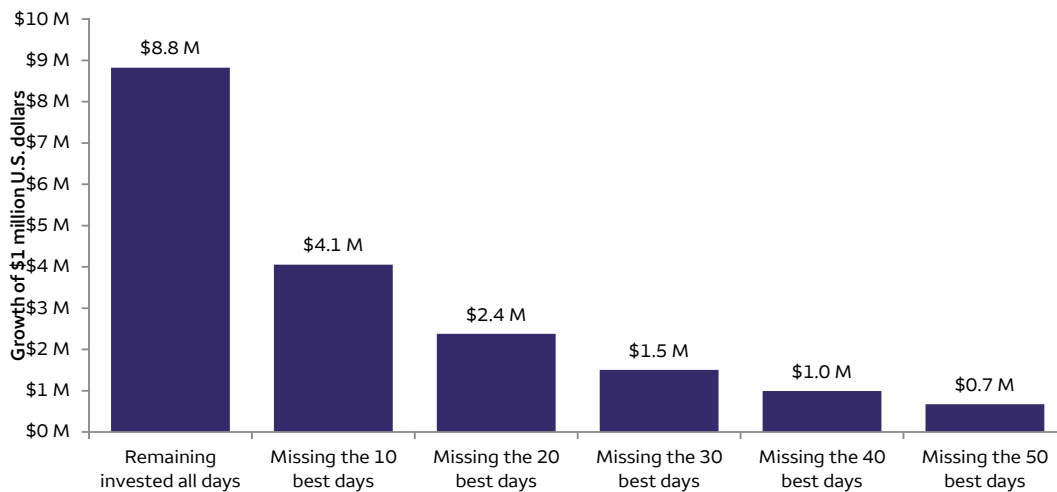
We believe investors should choose a portfolio allocation that they believe is appropriate for their financial goals, time horizon, and ability and willingness to withstand market fluctuations. Our strategic asset allocation models are constructed using our strategic CMAs and reflect the trends that we believe investors are likely to experience during the next full market cycle or two (barring any unforeseen economic or market disruptions). An investor with a short time horizon may call for a more conservative asset allocation, while an investor with a long time horizon may be able to tolerate potential market downturns.

5. Correlation measures how two asset classes or investments move in relation to each other. A positive correlation indicates the extent to which those asset classes increase or decrease together; a negative correlation indicates the extent to which one asset class increases as the other decreases.

In theory, we believe market timing — moving all or a very large portion of an investment portfolio into or out of stocks, bonds, cash alternatives, and other asset classes based on short-term performance expectations — may be a way to potentially achieve market gains and mitigate losses. However, this strategy is difficult to accomplish in practice. To effectively time the market, an investor must be right twice, correctly predicting when to move out of

and then when to move back into an asset class. Based on our research, over the 30-year period from 1993 to 2022, missing even a handful of the days when the stock market experienced its best gains (based on S&P 500 Index returns) can dramatically reduce returns (see Chart 4). Further, these best days have historically come in the wake of the market’s worst days — and sometimes during a bear market — making it even more difficult to time.

Chart 4. Missing the best days in the market (1993 to 2022) can reduce returns



Sources: Bloomberg and Wells Fargo Investment Institute. Daily data from January 1, 1993, to December 31, 2022. M = million. *For illustrative purposes only.* The chart shows a hypothetical \$1 million investment in the S&P 500 Index during the time period indicated. Dollar amounts calculated using a price return index is not a total return index and does not include the reinvestment of dividends. The S&P 500 Index is a market-capitalization-weighted index composed of 500 stocks generally considered to be representative of the U.S. stock market. Index returns do not represent investment performance or the results of actual trading and do not reflect deductions for fees, expenses, or taxes applicable to an actual investment. An index is unmanaged and not available for direct investment. Please see end of report for index definitions. **Past performance is no guarantee of future results.** Best days are defined as the days with the highest single day returns for the S&P 500 Index.

What investors may be able to do over shorter time periods is to assess market conditions relative to our longer-term assumptions. In an effort to potentially take advantage of intracycle conditions, we offer guidance at shorter time periods to attempt to account for our nearer-term market expectations. Cyclical allocations (3- to 5-year market outlook) are based on where we believe we are in the market cycle, while tactical allocations (6- to 18-month market outlook) strive to identify near-term differentials from our long-term outlook.

Performance of 2013 CMAs

Our recent analysis found that:

- The 2013 CMA estimates were generally higher than realized returns over the following 10-year period for fixed income, international assets, and

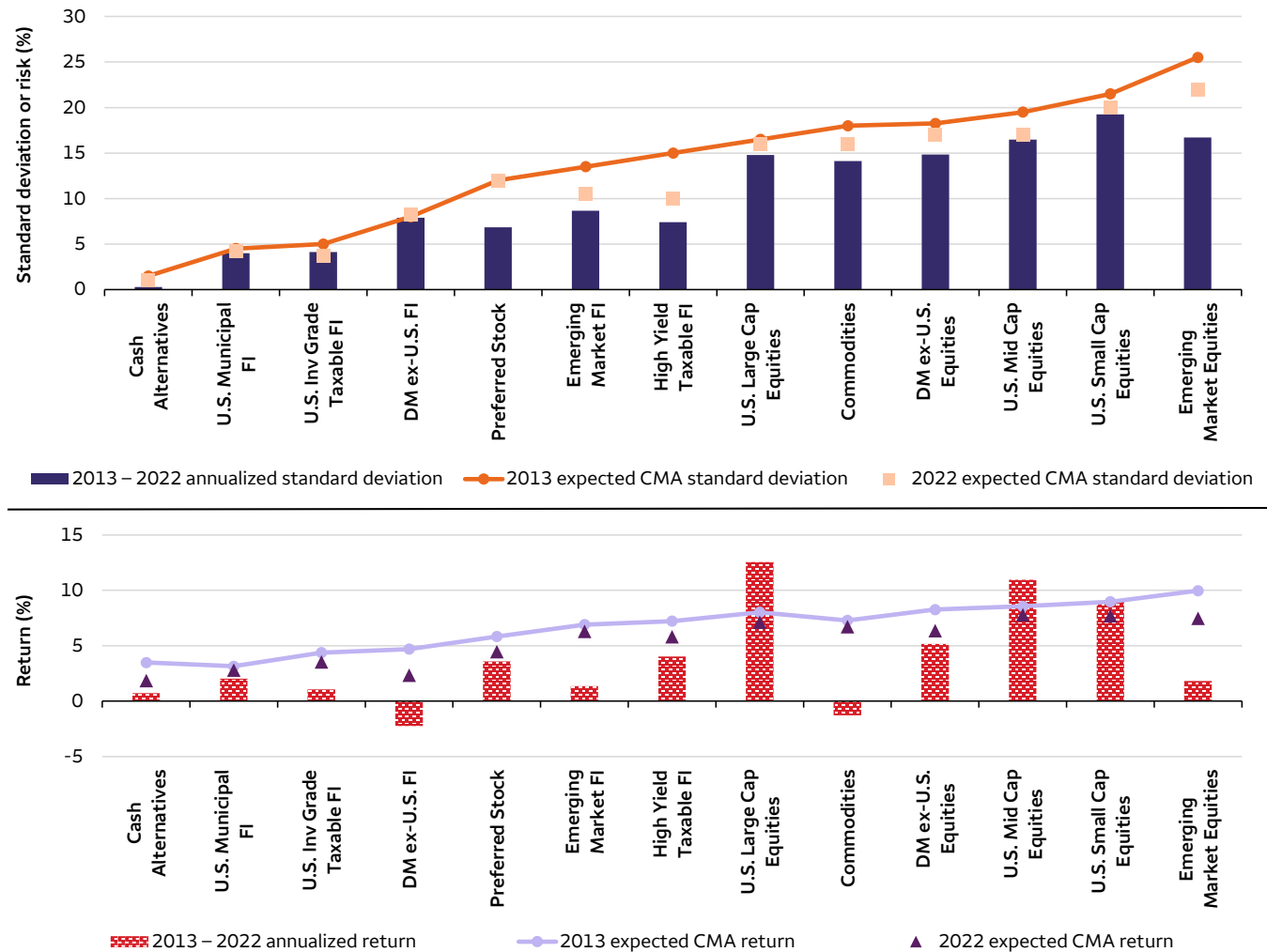
commodities, however, we underestimated the returns for U.S. large cap-equities (see Chart 5).

- We modestly overestimated expected risk in 2013, as the record-long bull market from 2009 to 2020 led to unexpected, historically low volatility during a large portion of the 10-year time frame. Recently, realized volatility has been closer in line with our risk expectations.
- We believe diversification has the potential to benefit portfolios throughout market cycles, including difficult market environments, and diversification may benefit risk-averse investors (that is, those in the income objectives). Keep in mind that diversification does not guarantee investment returns or eliminate risk of loss. It is an investment method used aiming to help mitigate risk and volatility within a portfolio.

We assessed the performance of our CMA from the start of 2013 through the subsequent 10-year period that ended December 31, 2022. This decade includes a large part of the 2009 – 2020 bull market, the brief 2020 bear market, the 2020 – 2021 bull market, and the 2022 bear market. The majority of that 10-year time frame was expansionary, with historically low

volatility for markets. However, the higher market volatility since 2020 has provided a better balance in returns and risk (as measured by standard deviation⁶). Historically low fixed-income returns in 2022 led to much lower 10-year annualized returns in most fixed-income asset classes compared to our 2013 expectations.

Chart 5. CMA volatility and return assumptions compared to subsequent historical asset-class returns



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Total returns from January 1, 2013, to December 31, 2022. FI = Fixed Income. DM = Developed Markets. Inv Grade = Investment Grade. Return and standard deviation are annualized. Expected returns represent our estimate of likely average returns over the time period shown above. They do not represent the returns that an investor should expect in any particular year. Expected returns for each asset class can be conditional on economic scenarios; in the event a particular scenario comes to pass, actual returns could be significantly higher or lower than forecasted. An index is unmanaged and not available for direct investing. **Past performance is no guarantee of future results.** Cash Alternatives: Bloomberg 1–3 Month U.S. Treasury Bill Index; U.S. Municipal FI: Bloomberg Municipal Index; Preferred Stock: S&P U.S. Preferred Stock Index. Please see Chart 1 on page 2 for the names of the indexes representing the remaining asset classes. Please see the end of this report for the definition of the indexes and a description of the asset-class risks.

6. A measure of volatility surrounding the outcome of an investment decision.
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U.S. equities experienced a record-long bull market from March 2009 to February 2020. Because the 10-year time frame we are assessing contains much of that record-long bull market, the returns in U.S. equities, particularly for U.S. large-cap, exceeded our expectations set in 2013. Additionally, when these CMAs were created, international equities had been underperforming U.S. equities for nearly five years. At that time, we did not expect international equities to continue to underperform equities in the U.S., but that is what occurred in the 10 years following.

We overestimated the return for Commodities⁷ by 8%, which — although large on an absolute basis — was less than one standard deviation away from its realized return over the 10-year time period. We believe that this was the result of a bear super cycle⁸ that took place in the period beginning in the 2010s (when China, the world's largest consumer of most commodities, continued to shift from a manufacturing-based economy to a services-and-technology-based economy). The long-standing bear market in Commodities (July 2, 2008 — March 18, 2020) lowered the actual risk-adjusted return relative to the historical returns that were expected in 2013.

Financial markets went through an unprecedented period of low volatility post-financial-crisis (March 2009 — February 2020), and we modestly overestimated the standard deviation for most asset classes. We have since reduced standard deviation expectations in an effort to better align with our expectations for financial markets, but we do not expect markets to experience extended low volatility as in the previous bull market. Our future

expectations for market volatility align more with long-term historical averages than with the volatility experienced during the 2009 – 2020 bull market.

Nevertheless, realized risk for 13 of the 15 asset classes ranked closely to what was anticipated in 2013 (that is, within two places in the ranking), and the remaining two asset classes fell only three places outside of actual ranking. The realized return for just over half of the asset-class CMAs ranked closely to what was anticipated in 2013. This is important because a central purpose for creating return and risk assumptions is to aim to use them for asset allocation optimization results. We believe that the relative ranking of asset-class returns and risk is essential to this optimization process, as it depends on the relationship between the asset classes as well as the expected returns and risk themselves.

Prior to 2022, long-term Sharpe ratios⁹ in many fixed-income asset classes were very high. This likely was the result of central banks intentionally maintaining low interest rates to offset low global economic growth and political and economic uncertainties. 2022's fixed-income performance brought Sharpe ratios more in line with our long-term expectations after yields were reset higher. Looking forward, we expect interest rates to move moderately lower and for inflation to begin trending back toward the Fed's 2% target. We expect the relatively low level of inflation and interest rates over the strategic time frame to keep fixed-income volatility near historical averages and below what our expectations were in 2013.

7. Commodities are represented by the Bloomberg Commodity Index.

8. Individual commodity prices have historically tended to move together over very long bull and bear cycles, called super cycles.

9. The Sharpe ratio measures the additional amount of return that an investor could expect to receive for taking on additional risk.

A diversified allocation has outperformed global equities and global bonds on a risk-adjusted basis over the long term. Yet, the rankings of asset class returns may fluctuate over shorter time frames.

In recent years, strong performance of U.S. assets compared with international equities and fixed income has generally contributed to better performance for allocations geared toward U.S. assets only. However, looking at longer time frames historically, the diversified allocations outperformed. This is because, historically, asset-class performance leadership changed throughout a full market cycle (bull and bear market), and a diversified allocation seeks exposure to what is believed to be the best-performing asset classes as leadership changes. When we construct strategic allocations, we use CMAs in an effort to assemble an efficient allocation — that is, one that we believe should deliver the highest expected return for a given level of risk. Additionally, diversified allocations can be tilted toward asset classes with what are believed to be the best expected risk and return profiles.

For example, our current recommended strategic allocations have a relative overweight to U.S. Equities at the expense of Developed Market ex-U.S. Equities compared with a global equity index, like the MSCI All Country World Index. If we were to expect the trend of U.S. strong performance to reverse, we could reverse part of this tilt in our strategic allocations but would likely retain a home-country bias.

Looking at the risk-adjusted returns, or Sharpe ratios, our recommended diversified allocations had better Sharpe ratios than global equities over most of the longer-term time frames shown. The strategic allocations are designed for a long-term time horizon, which means that global equities or global fixed income may outperform over a short time frame. Yet, over longer time periods, mixing these asset classes historically has resulted in more efficient portfolios than investing in a single asset class.

Table 1. A diversified allocation has outperformed over the 15- and 25-year periods shown

	1-year return (%)	3-year annualized return (%)	5-year annualized return (%)	10-year annualized return (%)	15-year annualized return (%)	20-year annualized return (%)	25-year annualized return (%)
Moderate Income Liquid	-14.05	0.03	2.19	3.36	4.33	5.33	5.35
Moderate Growth & Income Liquid	-14.71	2.56	4.19	5.78	5.36	7.04	6.29
Moderate Growth Liquid	-16.17	3.80	5.17	7.65	5.81	8.34	6.84
Global Equities	-17.96	4.49	5.75	8.54	5.40	8.60	6.41
Global Fixed Income	-16.01	-4.38	-1.57	-0.28	1.64	2.90	3.08

Table 2. Over longer time periods, diversification may offer better risk-adjusted returns than single-asset groups

	1-year Sharpe ratio	3-year Sharpe ratio	5-year Sharpe ratio	10-year Sharpe ratio	15-year Sharpe ratio	20-year Sharpe ratio	25-year Sharpe ratio
Moderate Income Liquid	-1.35	-0.03	0.16	0.47	0.60	0.72	0.61
Moderate Growth & Income Liquid	-1.08	0.20	0.30	0.58	0.49	0.63	0.49
Moderate Growth Liquid	-0.94	0.26	0.32	0.59	0.42	0.58	0.42
Global Equities	-0.91	0.28	0.33	0.59	0.36	0.53	0.36
Global Fixed Income	-1.78	-0.65	-0.41	-0.15	0.20	0.31	0.26

Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Data from January 1, 1998, to December 31, 2022. *For illustrative purposes only. Past performance is no guarantee of future results.* Global Equities represented by MSCI All Country World Index. Global Fixed Income represented by Bloomberg Multiverse Index. Shading on Table 1 represents the best-performing asset class or portfolio. Shading on Table 2 represents the best-performing asset class or portfolio on a risk-adjusted basis. *Performance results for Moderate Income Liquid, Moderate Growth and Income Liquid, and Moderate Growth Liquid are calculated using blended index returns. An index is unmanaged and not available for direct investment. Please see pages 20-23 for the composition of the allocations, the risks associated with the representative asset classes, and the definitions of the indexes.*

How do correlations between asset classes affect diversification?

Correlations (the tendency of asset classes to move up and down in relation to one another) have historically tended to increase in down markets. Asset-class convergence also has historically tended to increase in down markets.

Table 3. Correlations were higher on average over the past 10 years compared to the past 25 years.

Asset class	Average 25-year correlations	Average 10-year correlations
Cash Alternatives	-0.02	-0.05
U.S. Inv Grade FI	0.18	0.37
High Yield FI	0.48	0.61
DM ex-U.S. FI	0.27	0.47
Emerging Markets FI	0.49	0.60
U.S. Large Cap Equities	0.51	0.55
DM ex-U.S. Equities	0.56	0.60
Emerging Markets Equities	0.54	0.58
Commodities	0.34	0.32
Global Hedge Funds	0.53	0.54

Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Data from January 1, 1998, to December 31, 2022. Green shading represents higher average correlations. Red shading represents lower average correlations. Average correlation is calculated as the average of the correlation between an asset class and the other nine asset classes listed. *Table information is for illustrative purposes only.* Correlations represent past performance. **Past performance is no guarantee of future results.** An index is unmanaged and not available for direct investment. Please see Chart 1 and Chart 5 for the names of the indexes representing the asset classes. Please see the end of this report for the risks associated with the representative asset classes and for the definitions of the indexes.

Over an extended period of time, correlations typically have been lower, as several market cycles may be included. When comparing correlations over the past 10 years and the past 25 years, it is apparent that the longer-term correlations show a better mix of lower- and higher-correlated asset classes, while

the 10-year correlations were higher for most asset classes.

Looking at the most recent two years, correlations in 2022 (a year that included an equity bear market) were higher than in 2021 (a positive year for markets).

Table 4. Correlations increased during recent down markets

Asset Class	Average 2021 correlations	Average 2022 correlations
Cash Alternatives	-0.28	0.26
U.S. Inv Grade FI	0.07	0.64
High Yield FI	0.33	0.68
DM ex-U.S. FI	0.21	0.69
Emerging Markets FI	0.35	0.73
U.S. Large Cap Equities	0.28	0.65
DM ex-U.S. Equities	0.38	0.76
Emerging Markets Equities	0.30	0.64
Commodities	0.24	0.30
Global Hedge Funds	0.26	0.64

Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Data from January 1, 2021, to December 31, 2022. Green shading represents higher average correlations. Red shading represents lower average correlations. Average correlation is calculated as the average of the correlation between an asset class and the other nine asset classes listed. *Table information is for illustrative purposes only.* Please see Table 3 on page 10 for important information on correlation. An index is unmanaged and not available for direct investment. **Past performance is no guarantee of future results.** Please see Chart 1 and Chart 5 for the names of the indexes representing the asset classes. Please see the end of the report for the risks associated with the representative asset classes and the definitions of the indexes.

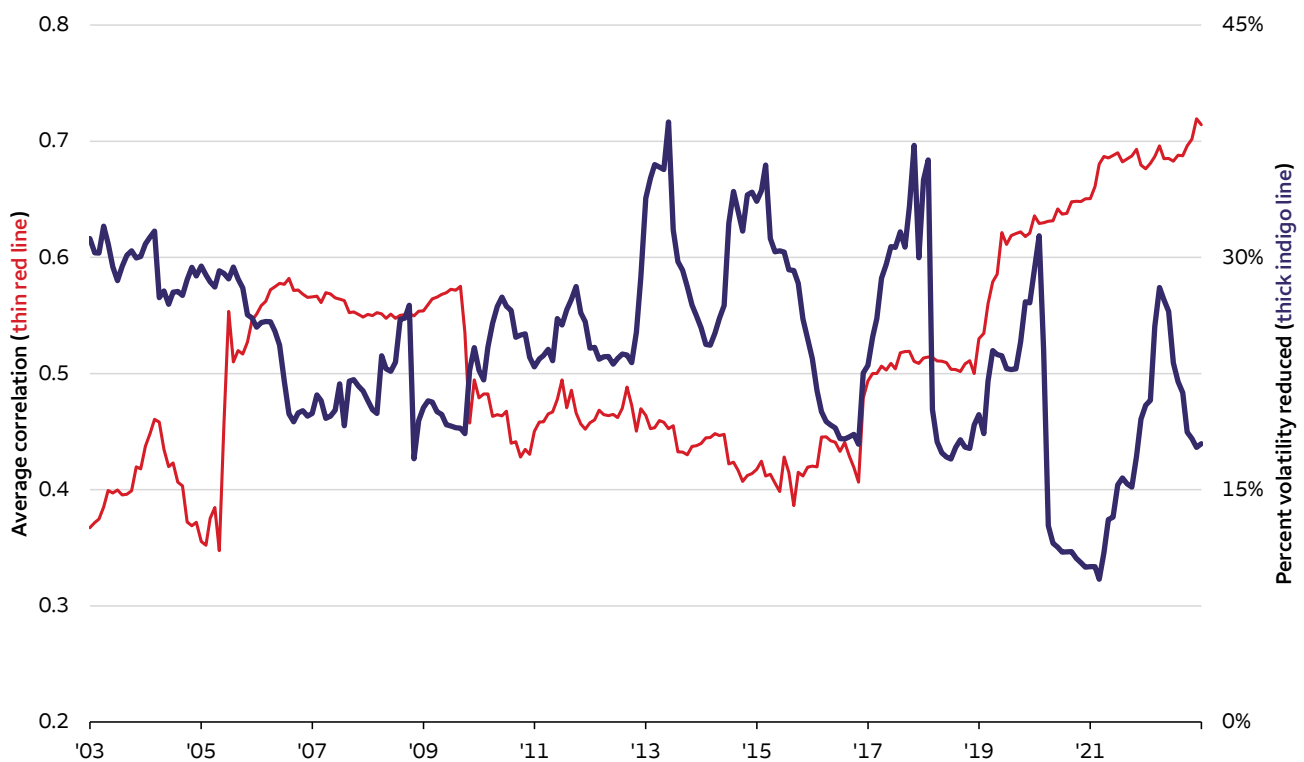
The spike in correlations last year is consistent with behavior typically observed during bear markets. However, 2022 was atypical in that correlations between fixed income and equity asset classes were so high, a phenomenon not usually observed during bear markets. Some asset classes, like Commodities and Hedge Funds, tended to have relatively lower

correlations, and thus we believe may be used as diversifiers to help in an effort to mitigate risk when many other asset classes are weak. We urge investors to keep in mind that investing in Commodities or Hedge Funds may not be appropriate for all investors.

Typically, in times of economic expansion and when equities are in a bull market, we would expect equities to outperform fixed income. This rang true for performance in years like 2019, 2020, and 2021, when most asset classes posted positive returns for the full year, led by equities. However, this was not the case in 2018, during the brief bear market of 2020, and most recently in 2022, when global equities corrected lower and fixed-income asset classes fell less than equities.

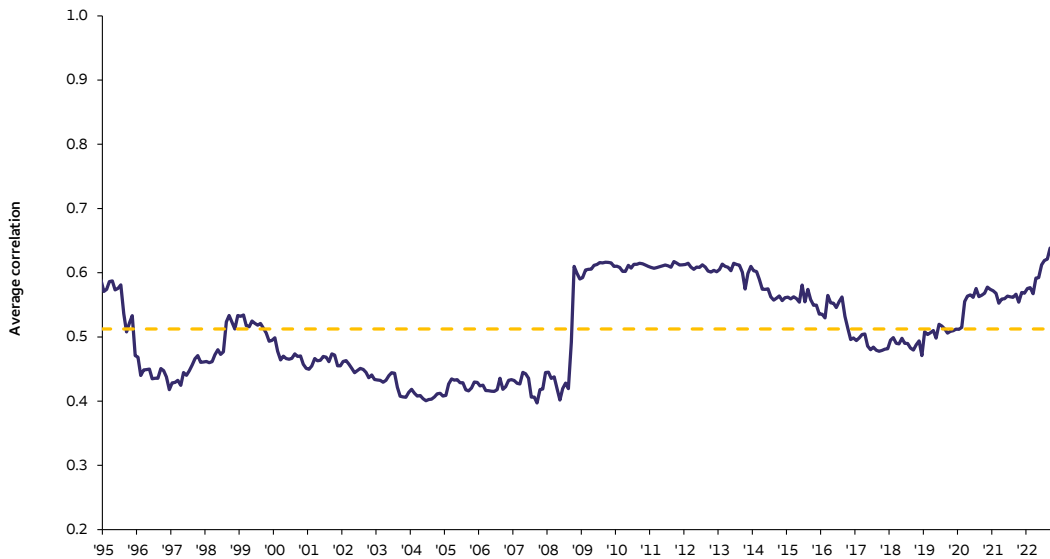
Recently, volatility has returned to more historically normal levels, following a period of below average market volatility for much of the decade prior to 2020. As volatility has risen, asset-class correlations also have trended higher, spiking throughout 2022 as fixed income and equity markets declined in unison. But despite higher correlations among asset classes, diversified allocations have still reduced volatility. We view low correlations as generally desirable because they may potentially limit portfolio volatility (Chart 6).

Chart 6. Lower correlations have reduced portfolio volatility over time



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Monthly data from January 1, 2003, to December 31, 2022. Volatility reduction and average correlation were calculated based on a rolling one-year period. The analysis shown was based on the Moderate Growth and Income (MGI) Liquid allocation. This chart and the results shown are for illustrative purposes only. The information does not constitute a recommendation to invest in any particular asset class or strategy and is not a promise of future performance or an estimate of actual returns an investor's portfolio may achieve. In addition, the performance results shown do not represent actual trading. **Past performance is no guarantee of future results.** Please see Table 3 on page 10 for important information on correlation. Volatility is measured by standard deviation. Please see the end of the report for the composition of MGI Liquid, the risks associated with the representative asset classes, and the definitions of the indexes.

Chart 7. Correlations continued moving higher in 2022



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Monthly data from January 1, 1995, to December 31, 2022. Average correlation is the average of the 60-month correlation of monthly changes in the S&P 500 Index with the monthly changes in 10 major asset classes. Dotted line is the average correlation. Major asset classes: Investment Grade Fixed Income: Bloomberg U.S. Aggregate Bond Index; Cash Alternatives: Bloomberg 1–3 Month Treasury Bill Index; High Yield Fixed Income: Bloomberg U.S. Corporate High Yield Index; Developed Markets ex-U.S. Fixed Income: JPMorgan GBI Global Ex-U.S. Index; Emerging Market Fixed Income: JPMorgan EMBI Global Index; U.S. Mid Cap Equities: Russell Midcap Index; U.S. Small Cap Equities: Russell 2000 Index; Developed Market ex-U.S. Equities: MSCI EAFE Index; Emerging Market Equities: MSCI Emerging Markets Index; Commodities: Bloomberg Commodity Index; Hedge Funds: HFRI Fund Weighted Composite Index. *For illustrative purposes only.* Please see Table 3 on page 10 for important information on correlation. An index is unmanaged and not available for direct investment. **Past performance is no guarantee of future results.** Please see the end of this report for the risks associated with the representative asset classes and for the definitions of the indexes.

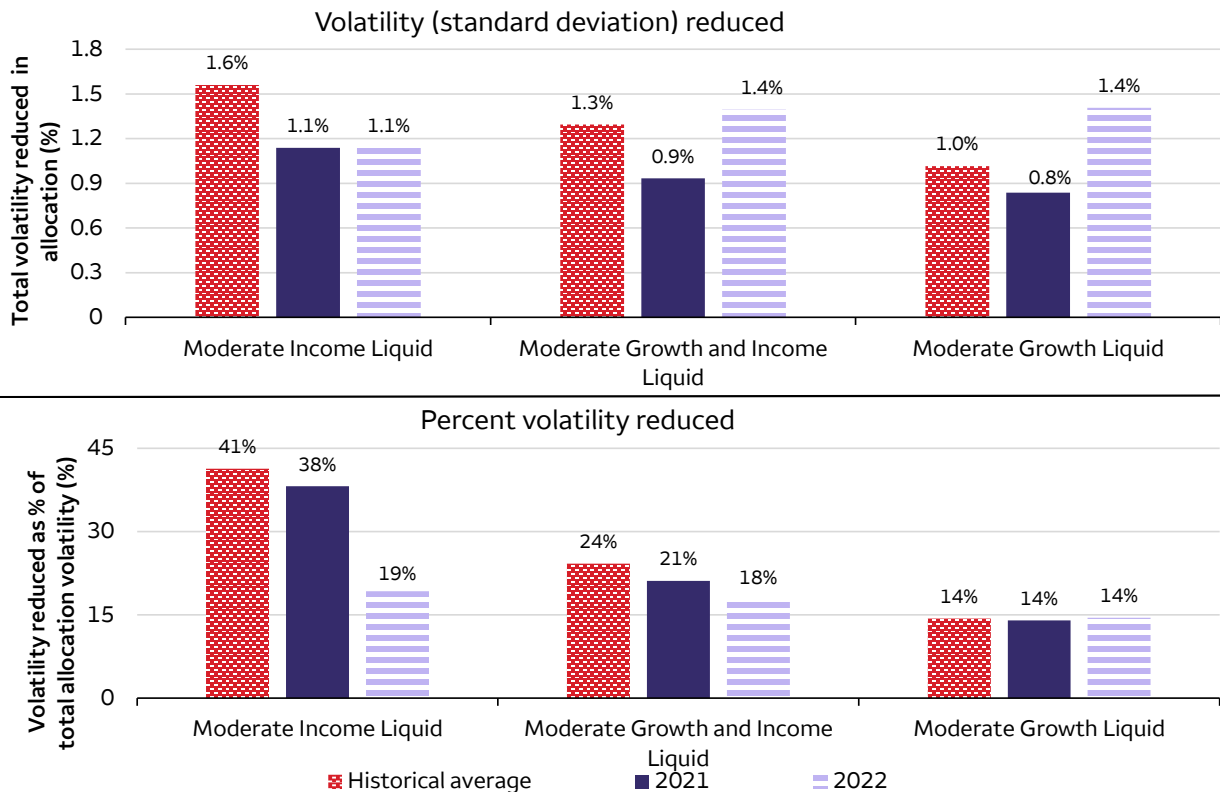
Asset-class correlations have been above average since the early part of 2020 and moved higher in 2022 as the market faced an aggressively hawkish Fed, interest rate hikes, and an equity bear market (Chart 7). It is interesting to note that even with the increase in correlations over the past 10 years, a broadly diversified allocation still outperformed both global equity and global fixed income on a risk-adjusted basis over that period (Table 2, page 9). We believe that correlations should return to normal levels throughout 2023, and this return to average correlations should likely further benefit diversified allocations.

Even in periods with higher-than-average correlations, diversifying a portfolio may provide risk mitigation benefits in our view. The correlations among asset classes within our allocations helped in an effort to reduce anywhere from 13% to 41% of an allocation’s volatility depending on investment objectives and timing (Chart 8, top panel).

The inclusion of diversifiers, like Commodities, was an effective tool in the reducing portfolio volatility in 2022. The reduction in volatility in 2021 was greater compared to 2022 due to the strong market performance in 2021 and the reduction in correlations from March 2020 through the end of 2021 (Chart 8, bottom panel). However, while correlations increased in 2022, we believe diversification was still effective in mitigating risk. The amount of volatility reduced in our recommended diversified allocations was still close to or above historical average levels (Chart 8, top panel).

In the Moderate Income allocation, from 2003 to 2022, portfolio volatility was reduced to 1.6% from 3.8% as a result of asset-class correlation — which translated to a 41% reduction in the allocation’s total volatility. Over the same period, this volatility reduction ratio was 24% for the Moderate Growth and Income allocation and 14% for the Moderate Growth allocation (Chart 8, bottom panel).

Chart 8. Diversification historically has been more beneficial to risk-averse objectives



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Monthly data from January 1, 2003, to December 31, 2022. For illustrative purposes. Performance results for Moderate Income Liquid, Moderate Growth and Income Liquid, and Moderate Growth Liquid are calculated using blended index returns. Risk reduction was calculated based on rolling one-year period. Historical average was from January 1, 2003 to December 31, 2022. An index is unmanaged and not available for direct investment. Results do not represent actual trading and do not reflect the impact of any fees, expenses, or taxes applicable to an actual investment. **Past performance is no guarantee of future results.** Please see the end of the report for the composition of the allocations, the risks associated with the representative asset classes, and the definitions of the indexes.

How can diversification potentially benefit a portfolio during recessions and market crises?

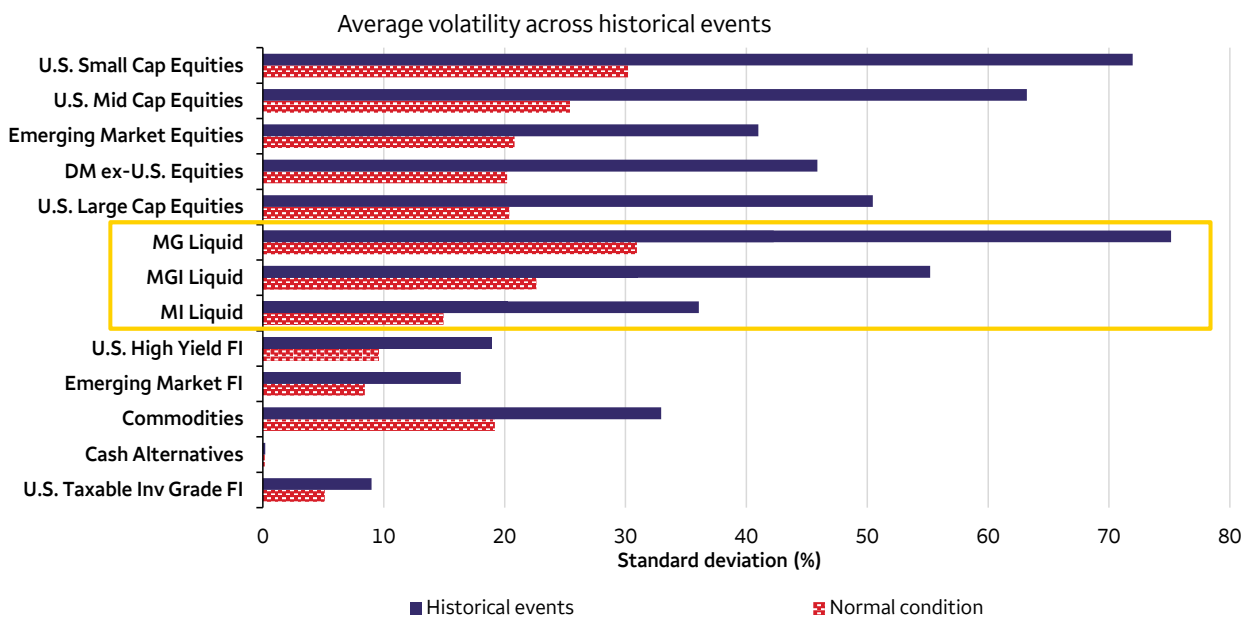
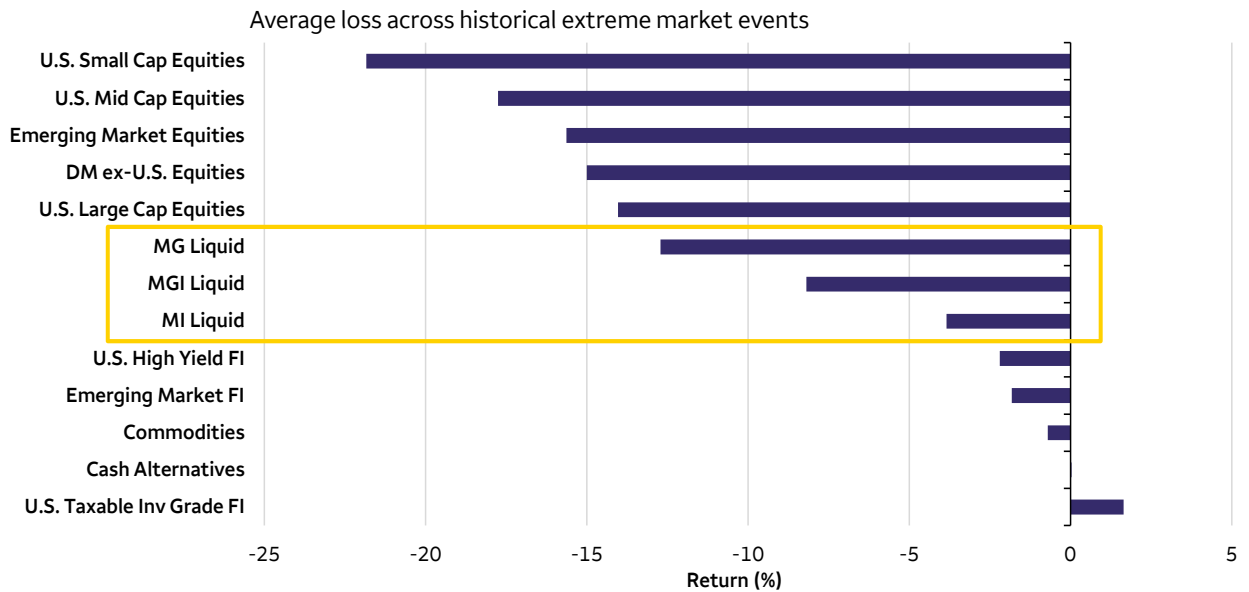
Investors frequently debate whether diversification works during a recession or a significant market event — when the same types of risk and fear propagate across markets and asset correlations increase significantly. Although we have seen correlations rise historically during periods of market stress, we also note that diversification across asset classes may have offered downside risk mitigation during such events.

To demonstrate why we believe diversification has historically worked well during crisis events, we examined our current strategic allocations’ performance during various historical exogenous events.¹⁰ We found that the diversified portfolio allocations consistently ranked near the middle of the individual asset classes in terms of loss and elevated volatility. In down markets, the losses and volatility levels of diversified allocations were more

subdued than those of the riskier asset classes. We believe one of the greatest benefits of holding a diversified portfolio may be potentially mitigating some of the sharp downside that may be experienced by the riskier asset classes while maintaining some exposure to them for long-term growth potential. In other words, holding a more concentrated portfolio in risky assets may result in greater portfolio downturns when markets correct. We believe that holding a diversified portfolio in an effort to mitigate downside risk could be advantageous despite higher correlations among the asset classes we have seen during times of market stress. Based on our findings, we continue to believe that investors should follow an asset allocation strategy based on investment objectives through these short-term dislocations.

10. Please see page 23 for complete list of events.

Chart 9. Diversification has helped in an effort to mitigate risk in extreme market events



Sources: FIS APT and Wells Fargo Investment Institute. Data as of December 31, 2022. APT historical scenarios are calculated with Baseline window of eight weeks and an Event window of six weeks. Please see the end of the report for the date of each extreme market event. MI = Moderate Income; MGI = Moderate Growth & Income; MG = Moderate Growth. *For illustrative purposes only. Performance results for Moderate Income Liquid, Moderate Growth and Income Liquid, and Moderate Growth Liquid are calculated using blended index returns.* There are difficulties in assessing asset-class performance during certain extreme market environments, in part, because these results do not represent actual trading and cannot completely account for the impact financial risk has on actual trading. Keep in mind that it might not be possible to replicate a historical event because instruments existing today did not exist in the time of the historical event and the event may not be representative for today's markets because of changes in regulation or market environment. An actual portfolio or account will invest in different economic conditions during periods with different volatility and in different securities than those incorporated in the index-based performance shown above. It is possible there are other scenarios, or crisis events that could have resulted in heavier losses than those that occurred during the time periods shown. Diversification does not guarantee investment returns or eliminate the risk of loss. There is no guarantee any asset class will perform in a similar manner in the future. An index is unmanaged and not available for direct investment. **Past performance is no guarantee of future results.** Please see Chart 1 on page 2 for the names of the indexes representing the asset classes. Please see the end of the report for the composition of the allocations, the risks associated with the representative asset classes, and the definitions of the indexes.

What impact can emotional decision-making have on achieving financial goals?

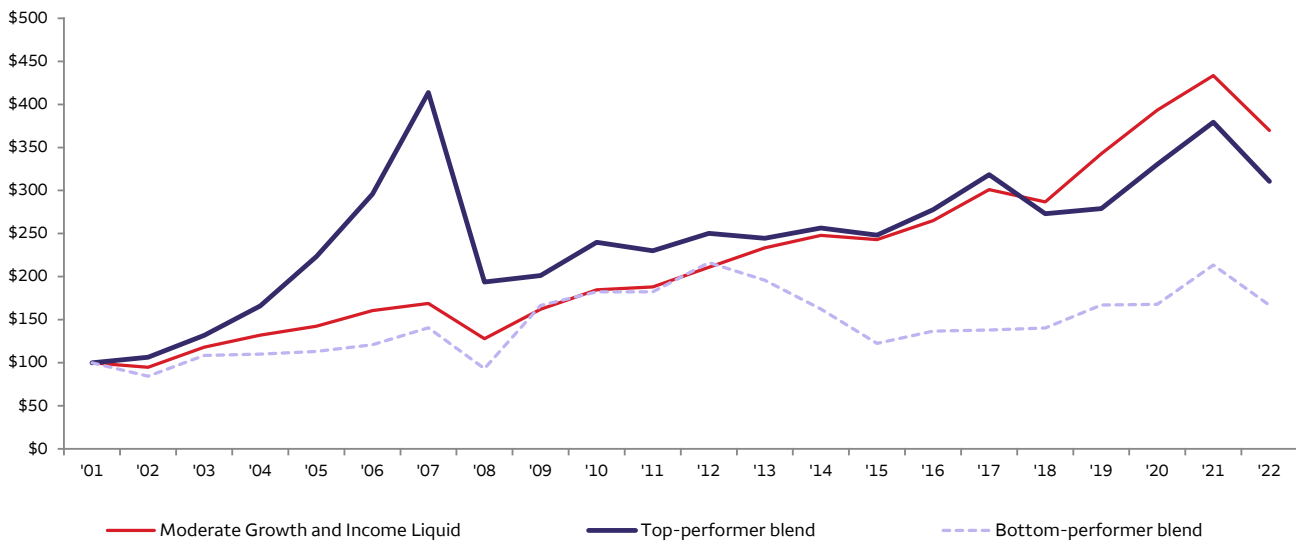
Behavioral finance considers the role that psychology and emotions play in investment decision-making. It recognizes that individuals are not always rational when making investment decisions — and that all investors are not equally informed. Some common biases that are related to asset allocation strategy include:

Chasing winners and losers: Chasing the previous year’s top-performing asset class or worst-performing investment is a strategy that some investors have tended to follow. We have found that, historically, following the best-performing asset class (hot-hand fallacy) and worst-performing investment (gambler’s fallacy) has not yet resulted in performance that has exceeded the return of the Moderate Growth and Income allocation since 2001.

Recency bias: Investors tend to use recent experience as a baseline for risk and return expectations. As a bull market charges ahead, some investors forget about the times when it declined. Recent memory could suggest that the equity market

should continue increasing. Consequently, research has shown such investors continue to purchase assets at high prices; then, suddenly, the stock market drops. These investors may then wonder how they missed the peak. Investors experience a similar situation in down-trending markets — assuming that the market should continue to decline when it may be reaching a bottom. Instead of considering a long-term view in which the market fluctuates, investors may behave as though current trends will not change. Humans, in general, tend to have short memories, particularly, it appears, when it comes to investing and market cycles. Research suggests recency bias tends to be exacerbated during large market swings, up or down. Timing the market typically is a futile exercise. Instead, in our view, investors should consider both possibilities (market rallies and downturns) as potential outcomes and plan accordingly.

Chart 10. Chasing past asset class winners or losers have not been successful strategies



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Annual data from January 1, 2001, to December 31, 2022. Indexed to 100 as of December 31, 2001. The top-performer blend allocates 100% in the current year to the top performing asset class of the previous year. The bottom-performer blend allocates 100% in the current year to the bottom performing asset class of the previous year. Performance results for Moderate Growth and Income Liquid and the top and bottom performer blends are calculated using blended index returns. Index return information is provided for illustrative purposes only. Index returns do not represent investment performance or the results of actual trading. Index returns represent general market results; assume the reinvestment of dividends and other distributions; and do not reflect deductions for fees, expenses, or taxes applicable to an actual investment. An index is unmanaged and not available for direct investment. **Past performance is no guarantee of future results.** Please see the end of the report for the composition of MGI Liquid, top-performer blend, and bottom-performer blend, the risks associated with the representative asset classes, and the definitions of the indexes.

Investor implications

- We believe diversification can add value over the long term.
- It can be important to select the strategic asset allocation based on an investor’s goals and risk tolerance.
- Conditions change over time, so we believe it is essential to revisit, review, and rebalance.

We advise investors to build a globally diversified portfolio and then review and rebalance their holdings regularly, as we believe rebalancing may reduce risk while potentially offering a favorable return. We believe it may also make an effort to ensure that the portfolio maintains the desired risk and return profile when keeping the portfolio aligned to the desired allocation. Table 5 shows that, by rebalancing annually, a 60% U.S. equity and 40% U.S. bond allocation experienced 19% less volatility in this scenario while achieving a similar return to that of an allocation that was not rebalanced.

Additionally, we expect that an allocation mix with exposure to a wide variety of asset classes may smooth out performance over time. With that in mind, we believe that it is important for investors to:

- Select an asset allocation strategy that addresses short- and long-term investment needs.
- Recognize their ability and willingness to assume risk.
- Maintain appropriate levels of liquidity to deal with periods of volatility.
- Align the time horizon of their investment strategy with the time horizon of their financial goals — developing plans (and investments) for short-, mid-, and long-term goals.

Over time, specific assets in a portfolio may become overvalued or undervalued. We believe rebalancing the portfolio back to strategic target weights can help enforce the discipline of buying risk assets when they appear undervalued (inexpensive) and selling risk assets when they appear overvalued (expensive). In other words, we believe this discipline aims to facilitate the potential for buying low and selling high. Moreover, investors should not let emotional reactions to headline hyperbole or unfounded market fears derail a disciplined investment strategy. In our view, investors who attempt to time the market — or react to a single market event or an overstated headline — may get caught on the wrong side of a market move.

Table 5. The importance of rebalancing

Rebalancing frequency	Weighting as of 12/31/2022	Jan. 1990 – Dec. 2022 return (%)	Jan. 1990 – Dec. 2022 standard deviation (%)	Jan. 1990 – Dec. 2022 Sharpe ratio
Annual rebalancing	60% S&P 500 Index 40% Bloomberg U.S. Aggregate Bond Index	8.27	9.23	0.62
No rebalancing	86% S&P 500 Index 14% Bloomberg U.S. Aggregate Bond Index	8.55	10.96	0.57

Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Monthly data from January 1, 1990, to December 31, 2022. **Index return information is provided for illustrative purposes only.** Index returns do not represent investment performance or the results of actual trading. Index returns reflect general market results; assume the reinvestment of dividends and other distributions; and generally do not reflect deductions for fees, expenses, or taxes applicable to an actual investment. The S&P 500 Index is a market-capitalization-weighted index composed of 500 stocks generally considered representative of the U.S. stock market. The Bloomberg U.S. Aggregate Bond Index is a broad-based index that measures the investment-grade, U.S.-dollar-denominated, fixed-rate taxable bond market. An index is unmanaged and not available for direct investment. **Past performance does not guarantee future results.**

It is important to note that, in any given period of time, one asset class will outperform all others. The top-performing and worst-performing asset classes change from year to year. With this in mind, we still believe that does not mean that investors should scrap a diversification strategy. We expect that a diversified allocation, such as Moderate Growth and

Income, may potentially limit drawdowns. This suggests that a diversified allocation does not have to work as hard to recover from significant losses. Our findings suggest that using diversification may promote compounding through more consistent returns over time.

Chart 11. Asset-class-performance quilt chart (2008 to 2022)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	'08 - '22 average
Devex US Fixed Inc 11.4%	Emg-Mkt Equity 79.0%	US Small Cap Equity 26.9%	Emg-Mkt Fixed Inc 8.5%	Emg-Mkt Equity 18.6%	US Small Cap Equity 38.8%	US Large Cap Equity 13.7%	US Large Cap Equity 1.4%	US Small Cap Equity 21.3%	Emg-Mkt Equity 37.8%	CPI 1.9%	US Large Cap Equity 31.5%	US Small Cap Equity 20.0%	US Large Cap Equity 28.7%	Commod 16.1%	US Large Cap Equity 8.8%
Inv-Grade Fixed Inc 5.2%	High Yield Fixed Inc 58.2%	US Mid Cap Equity 25.5%	Inv-Grade Fixed Inc 7.8%	Emg-Mkt Fixed Inc 18.5%	US Mid Cap Equity 34.8%	US Mid Cap Equity 13.2%	Emg-Mkt Fixed Inc 1.2%	High Yield Fixed Inc 17.1%	Devex US Equity 25.6%	Cash Alternative 1.8%	US Mid Cap Equity 30.5%	Emg-Mkt Equity 18.7%	Commod 27.1%	CPI 6.8%	US Mid Cap Equity 8.4%
Cash Alternative 1.8%	US Mid Cap Equity 40.5%	Emg-Mkt Equity 19.2%	Devex US Fixed Inc 5.9%	Devex US Equity 17.9%	US Large Cap Equity 32.4%	60%,40% Blend 10.6%	60%,40% Blend 1.2%	US Mid Cap Equity 13.8%	US Large Cap Equity 21.8%	Inv-Grade Fixed Inc 0.0%	US Small Cap Equity 25.5%	US Large Cap Equity 18.4%	US Mid Cap Equity 22.6%	Cash Alternative 1.5%	US Small Cap Equity 7.2%
CPI 0.1%	Devex US Equity 32.5%	Commod 16.8%	High Yield Fixed Inc 5.0%	US Mid Cap Equity 17.3%	Devex US Equity 23.3%	Mod Grwth Inc 6.2%	CPI 0.7%	US Large Cap Equity 12.0%	US Mid Cap Equity 18.5%	Devex US Fixed Inc -1.7%	Devex US Equity 22.7%	US Mid Cap Equity 17.1%	60%,40% Blend 16.0%	Hedge Funds -4.3%	60%,40% Blend 6.7%
Emg-Mkt Fixed Inc -10.9%	Emg-Mkt Fixed Inc 28.2%	High Yield Fixed Inc 15.1%	60%,40% Blend 5.0%	US Small Cap Equity 16.3%	60%,40% Blend 17.7%	Inv-Grade Fixed Inc 6.0%	Inv-Grade Fixed Inc 0.5%	Commod 11.8%	US Small Cap Equity 14.6%	High Yield Fixed Inc -2.1%	60%,40% Blend 22.1%	60%,40% Blend 15.4%	US Small Cap Equity 14.8%	High Yield Fixed Inc -11.2%	High Yield Fixed Inc 6.1%
Hedge Funds -19.0%	US Small Cap Equity 27.2%	US Large Cap Equity 15.1%	CPI 3.0%	US Large Cap Equity 16.0%	Mod Grwth Inc 10.7%	Emg-Mkt Fixed Inc 5.5%	Cash Alternative 0.0%	Emg-Mkt Fixed Inc 11.6%	60%,40% Blend 14.3%	60%,40% Blend -2.3%	Mod Grwth Inc 19.5%	Mod Grwth Inc 14.8%	Devex US Equity 11.8%	Inv-Grade Fixed Inc -13.0%	Mod Grwth Inc 5.4%
60%,40% Blend -21.6%	Mod Grwth Inc 26.6%	Mod Grwth Inc 14.0%	US Large Cap Equity 2.1%	High Yield Fixed Inc 15.8%	Hedge Funds 9.1%	US Small Cap Equity 4.9%	Devex US Equity -0.4%	Emg-Mkt Fixed Inc 10.2%	Mod Grwth Inc 13.6%	US Large Cap Equity -4.4%	Emg-Mkt Equity 18.9%	Hedge Funds 11.8%	Mod Grwth Inc 10.2%	Devex US Equity -14.0%	Emg-Mkt Fixed Inc 4.3%
Mod Grwth Inc -24.2%	US Large Cap Equity 26.5%	60%,40% Blend 12.2%	Mod Grwth Inc 1.7%	Mod Grwth Inc 12.2%	High Yield Fixed Inc 7.4%	Hedge Funds 3.0%	Hedge Funds -1.1%	Mod Grwth Inc 9.1%	Devex US Fixed Inc 9.9%	Emg-Mkt Fixed Inc -4.6%	Emg-Mkt Fixed Inc 14.4%	Devex US Fixed Inc 10.5%	Hedge Funds 10.2%	Mod Grwth Inc -14.7%	Hedge Funds 3.6%
High Yield Fixed Inc -26.2%	Hedge Funds 20.0%	Emg-Mkt Fixed Inc 12.0%	Cash Alternative 0.1%	60%,40% Blend 11.4%	CPI 1.5%	High Yield Fixed Inc 2.5%	Mod Grwth Inc -2.0%	60%,40% Blend 8.2%	Emg-Mkt Fixed Inc 9.3%	Hedge Funds -4.7%	High Yield Fixed Inc 14.3%	Devex US Equity 8.3%	CPI 7.0%	60%,40% Blend -15.9%	Inv-Grade Fixed Inc 2.7%
US Small Cap Equity -33.8%	Commod 18.9%	Hedge Funds 10.2%	US Mid Cap Equity -1.5%	Hedge Funds 6.4%	Cash Alternative 0.0%	CPI 0.8%	US Mid Cap Equity -2.4%	Hedge Funds 5.4%	Hedge Funds 8.6%	Mod Grwth Inc -4.8%	Hedge Funds 10.4%	Inv-Grade Fixed Inc 7.5%	High Yield Fixed Inc 5.3%	Emg-Mkt Fixed Inc -16.5%	CPI 2.4%
Commod -35.6%	60%,40% Blend 18.5%	Devex US Equity 8.2%	US Small Cap Equity -4.2%	Inv-Grade Fixed Inc 4.2%	Inv-Grade Fixed Inc -2.0%	Cash Alternative 0.0%	US Small Cap Equity -4.4%	Inv-Grade Fixed Inc 2.6%	High Yield Fixed Inc 7.5%	US Mid Cap Equity -9.1%	Inv-Grade Fixed Inc 8.7%	High Yield Fixed Inc 7.1%	Cash Alternative 0.0%	US Mid Cap Equity -17.3%	Devex US Equity 2.3%
US Large Cap Equity -37.0%	Inv-Grade Fixed Inc 5.9%	Devex US Fixed Inc 6.8%	Hedge Funds -5.3%	CPI 1.7%	Emg-Mkt Equity -2.3%	Emg-Mkt Equity -1.8%	High Yield Fixed Inc -4.5%	CPI 2.1%	Inv-Grade Fixed Inc 3.5%	US Small Cap Equity -11.0%	Commod 7.7%	Emg-Mkt Fixed Inc 5.9%	Emg-Mkt Fixed Inc -1.5%	US Large Cap Equity -18.1%	Emg-Mkt Equity 1.0%
US Mid Cap Equity -41.5%	Devex US Fixed Inc 3.9%	Inv-Grade Fixed Inc 6.5%	Devex US Equity -11.7%	Devex US Fixed Inc 0.8%	Devex US Fixed Inc -5.1%	Devex US Fixed Inc -2.5%	Devex US Fixed Inc -4.8%	Devex US Fixed Inc 1.9%	CPI 2.1%	Commod -11.2%	Devex US Fixed Inc 5.2%	CPI 1.4%	Inv-Grade Fixed Inc -1.5%	Emg-Mkt Equity -19.7%	Cash Alternative 0.6%
Devex US Equity -43.1%	CPI 2.7%	CPI 1.5%	Commod -13.3%	Cash Alternative 0.1%	Emg-Mkt Fixed Inc -6.6%	Devex US Equity -4.5%	Emg-Mkt Equity -14.6%	Devex US Equity 1.5%	Commod 1.7%	Devex US Equity -13.4%	CPI 2.3%	Cash Alternative 0.5%	Emg-Mkt Equity -2.2%	US Small Cap Equity -20.4%	Devex US Fixed Inc 0.3%
Emg-Mkt Equity -53.2%	Cash Alternative 0.1%	Cash Alternative 0.1%	Emg-Mkt Equity -18.2%	Commod -1.1%	Commod -9.5%	Commod -17.0%	Commod -24.7%	Cash Alternative 0.3%	Cash Alternative 0.8%	Emg-Mkt Equity -14.2%	Cash Alternative 2.2%	Commod -3.1%	Devex US Fixed Inc -9.5%	Devex US Fixed Inc -21.9%	Commod -2.6%



Sources: © 2023 Morningstar Direct⁽¹⁾ and Wells Fargo Investment Institute. Annual data from January 1, 2008, to December 31, 2022. Average is calculated as a geometric mean. Average is calculated as 15 years from 2008 to 2022. Blends are rebalanced quarterly. Performance results for Moderate Growth and Income Liquid and the 60/40 blend are calculated using blended index returns. An index is unmanaged and not available for direct investment. **Past performance is no guarantee of future results.** Please see the end of the report for the composition of the portfolios, the risks associated with the representative asset classes, and the definitions of the indexes.

Tracie McMillion, CFA

Head of Global Asset Allocation Strategy

Tracie McMillion is the head of global asset allocation strategy and leads the development of global investment strategy. In her current role, she oversees the creation of asset allocation recommendations and writes economic and market commentary and analysis. McMillion has more than 20 years of experience in financial services. She earned a Bachelor of Arts in economics and a Master of Business Administration from the College of William and Mary in Virginia. McMillion is located in Winston-Salem, North Carolina.

Douglas Beath

Global Investment Strategist

Douglas Beath is a member of the asset allocation team that develops capital market assumptions and asset allocation recommendations. He also writes market commentary and analysis on global macro and asset allocation subjects. Prior to his current role, he served as head of the Private Wealth Management Asset Allocation Working Group for Wells Fargo. Earlier in his career, he was a senior economist for H.C. Wainwright & Company, an economic and asset allocation research firm in Boston. Beath earned a Bachelor of Arts in education from the University of Michigan and a Master of Business Administration from Fordham University. Beath is located in Boston, Massachusetts.

Chao Ma, Ph.D., CFA, FRM

Global Portfolio and Investment Strategist

In his role, Dr. Chao Ma leads the research, development, and implementation of Wells Fargo Investment Institute's top-down and systematic strategy and framework for asset allocation, investment strategy, portfolio construction, and risk management practice. Dr. Ma develops methodology for capital market assumptions and designs the systematic optimization approach for strategic, cyclical, and tactical asset allocation as well as portfolio construction. Dr. Ma earned his Doctor of Philosophy and Master of Science from California Institute of Technology (Caltech), as well as a Bachelor of Science — with Honors — from Beijing Institute of Technology. Dr. Ma is located in Saint Louis, Missouri.

Michael Taylor, CFA

Investment Strategy Analyst

Michael Taylor's role focuses on global asset allocation strategy and economic and market analysis. Taylor has more than 20 years of experience in financial services and has spent the past 16 years at Wells Fargo in various roles within wealth and brokerage. Taylor earned a Bachelor of Science in chemistry from the University of Minnesota Institute of Technology, a Bachelor of Arts in Chinese and a Bachelor of Arts in Russian from the University of Minnesota College of Liberal Arts, and a Master of Business Administration from the University of Minnesota Carlson School of Management. He is based in Houston, Texas.

Michelle Wan, CFA

Investment Strategy Analyst

In her current role, Michelle Wan researches and writes on investment topics and focuses on global asset allocation. She previously served as a client-facing investment strategist managing investment portfolios and recommending investment strategies based on clients' specific situations. Wan has more than 15 years of experience working with wealth management clients and commercial companies in the U.S. and overseas. She earned a Bachelor of Science in business from the Carlson School of Management at the University of Minnesota. She has a double major in finance and accounting and a minor in economics. Wan is also a CFA® charterholder.

Veronica Willis

Global Investment Strategist

In her role, Veronica Willis takes part in the development of long-term capital market assumptions and asset allocation recommendations. She also researches and provides analysis of the economy and financial markets. Prior to her current role, she served as a research analyst for strategy around developed and emerging countries, commodities, and currencies. She began her career at Wells Fargo in 2012. Willis earned a Bachelor of Arts in mathematics with a concentration in statistics and a Bachelor of Arts in Spanish with a minor in economics from Washington University in St. Louis. She is based in St. Louis, Missouri.

Capital market assumptions (CMAs): It is important to note that indexes have limitations because they have volatility and other material characteristics that may differ from those of an investor's portfolio. They are unmanaged and not available for direct investment. Hedge fund indexes have limitations that are typical of other widely used market indexes, but these indexes are also subject to survivorship bias and limited data. Keep in mind that the securities included in an investment portfolio may differ significantly from the holdings, weightings, and asset allocation of an index, and unlike an index, an investment portfolio is subject to fees, expenses, taxes, transaction costs, and other charges typically associated with an investment account. The performance and volatility of an individual portfolio may be materially different from the performance of an index and should not be relied upon as a measure of the performance a portfolio may achieve. CMA forecasts are not promises of actual returns or performance that may be realized. They are based on estimates and assumptions that may not occur. There is no guarantee any investment will be profitable and not sustain a loss. Investors should consider the limitations of CMA data as it is applied to their own portfolio.

Risk considerations

All investing involve risks, including the possible loss of principal. There can be no assurance that any investment strategy will be successful. Investments fluctuate with changes in market and economic conditions and in different environments due to numerous factors, some of which may be unpredictable. Each asset class has its own risk and return characteristics, which should be evaluated carefully before making any investment decision. The level of risk associated with a particular investment or asset class generally correlates with the level of return the investment or asset class might achieve. The risks associated with the representative asset classes discussed in this report include:

Forecasts are not guaranteed and based on certain assumptions and on views of market and economic conditions which are subject to change.

Alternative investments: Alternative investments, such as hedge funds, are not appropriate for all investors and are only open to “accredited” or “qualified” investors within the meaning of the U.S. securities laws. They are speculative and involve a high degree of risk that is appropriate only for those investors who have the financial sophistication and expertise to evaluate the merits and risks of an investment in a fund and for which the fund does not represent a complete investment program. While investors may potentially benefit from the ability of alternative investments to potentially improve the risk/reward profiles of their portfolios, the investments themselves can carry significant risks. There may be no secondary market for alternative investment interests, and transferability may be limited or even prohibited. Hedge fund strategies, such as Equity Hedge, Event Driven, Macro, and Relative Value, may expose investors to risks such as short selling, leverage, counterparty, liquidity, volatility, the use of derivative instruments, and other significant risks.

Commodities: The commodities markets are considered speculative, carry substantial risks, and have experienced periods of extreme volatility. Commodities may be affected by changes in overall market movements, commodity index volatility, changes in interest rates, or other factors affecting a particular industry or commodity.

Equity securities: Stocks are subject to market risk, which means their value may fluctuate in response to general economic and market conditions, the prospects of individual companies, and industry sectors. The prices of **small/mid-company** stocks are generally more volatile than large-company stocks. They often involve higher risks because smaller and midsize companies may lack the management expertise, financial resources, product diversification, and competitive strengths to endure adverse economic conditions. **Growth stocks** tend to fluctuate more than the overall market and growth may not be realized. The growth style of investing tends to shift in and out of favor.

Fixed income: Investments in fixed-income securities are subject to interest rate, credit/default, liquidity, inflation, and other risks. Bond prices fluctuate inversely to changes in interest rates. Therefore, a general rise in interest rates can result in a decline in the bond's price. Credit risk is the risk that an issuer will default on payments of interest and/or principal. This risk is heightened in lower-rated bonds. If sold prior to maturity, fixed-income securities are subject to market risk. All fixed-income investments may be worth less than their original cost upon redemption or maturity. **High-yield** fixed-income securities are considered speculative, involve greater risk of default, and tend to be more volatile than investment-grade fixed-income securities. **Municipal bonds** offer interest payments exempt from federal taxes, and potentially state and local income taxes. Municipal bonds are subject to credit risk and potentially the alternative minimum tax (AMT). Quality varies widely depending on the specific issuer. **U.S. government securities** are backed by the full faith and credit of the federal government as to payment of principal and interest if held to maturity. Although free from credit risk, they are subject to interest rate risk. **Preferred securities** have special risks associated with investing. Preferred securities are subject to interest rate and credit risks. Preferred securities are generally subordinated to bonds or other debt instruments in an issuer's capital structure, subjecting them to a greater risk of non-payment than more senior securities. In addition, the issue may be callable which may negatively impact the return of the security.

Foreign/emerging/frontier markets: Investing in foreign securities presents certain risks not associated with domestic investments, such as currency fluctuation, political and economic instability, and different accounting standards. This may result in greater share price volatility. These risks are heightened in emerging and frontier markets.

Compositions

Liquid allocations:

Moderate Income:

2% Bloomberg U.S. Treasury Bills (1–3 Month) Index, 58% Bloomberg U.S. Aggregate Bond Index, 4% Bloomberg U.S. Corporate High Yield Bond Index, 5% JPM EMBI Global Index, 16% S&P 500 Index, 5% Russell Midcap Index, 4% Russell 2000 Index, 4% MSCI EAFE Index, 2% Bloomberg Commodity Index.

Moderate Growth and Income:

2% Bloomberg U.S. Treasury Bills (1–3 Month) Index, 30% Bloomberg U.S. Aggregate Bond Index, 6% Bloomberg U.S. Corporate High Yield Bond Index, 5% JPM EMBI Global Index, 24% S&P 500 Index, 10% Russell Midcap Index, 6% Russell 2000 Index, 8% MSCI EAFE Index, 5% MSCI Emerging Markets Index, 4% Bloomberg Commodity Index.

Moderate Growth:

2% Bloomberg U.S. Treasury Bills (1–3 Month) Index, 8% Bloomberg U.S. Aggregate Bond Index, 3% Bloomberg U.S. Corporate High Yield Bond Index, 3% JPM EMBI Global Index, 31% S&P 500 Index, 14% Russell Midcap Index, 10% Russell 2000 Index, 12% MSCI EAFE Index, 12% MSCI Emerging Markets Index, 5% Bloomberg Commodity Index.

Top-performer blend:

2002: 100% Bloomberg U.S. Aggregate Bond Index (1–3 year); 2003: 100% Bloomberg Commodity Index; 2004: 100% MSCI Emerging Markets Index; 2005: 100% MSCI Emerging Markets Index; 2006: 100% MSCI Emerging Markets Index; 2007: 100% MSCI Emerging Markets Index; 2008: 100% MSCI Emerging Markets Index; 2009: 100% J.P. Morgan GBI Global ex-U.S. Index; 2010: 100% MSCI Emerging Markets Index; 2011: 100% Russell 2000 Index; 2012: 100% Bloomberg U.S. Aggregate Bond Index (10+ year); 2013: 100% MSCI Emerging Markets Index; 2014: 100% Russell 2000 Index; 2015: 100% Bloomberg U.S. Aggregate Bond Index (10+ year); 2016: 100% S&P 500 Index; 2017: 100% Russell 2000 Index; 2018: 100% MSCI Emerging Markets Index; 2019: 100% Bloomberg U.S. Treasury Bill 1–3 Month Index, 2020: 100% S&P 500 Index; 2021: 100% Russell 2000 Index; and 2022: 100% S&P 500 Index.

Bottom-performer blend:

2002: 100% MSCI EAFE Index; 2003: 100% S&P 500 Index; 2004: 100% Bloomberg U.S. Treasury Bill 1–3 Month Index; 2005: 100% Bloomberg U.S. Treasury Bill 1–3 Month Index; 2006: 100% J.P. Morgan GBI Global ex-U.S. Index; 2007: 100% Bloomberg Commodity Index; 2008: 100% Russell 2000 Index; 2009: 100% MSCI Emerging Markets Index; 2010: 100% Bloomberg U.S. Aggregate Bond Index (10+ year); 2011: 100% Bloomberg U.S. Treasury Bill 1–3 Month Index; 2012: 100% MSCI Emerging Markets Index; 2013: 100% Bloomberg Commodity Index; 2014: 100% Bloomberg Commodity Index; 2015: 100% Bloomberg Commodity Index; 2016: 100% Bloomberg Commodity Index; 2017: 100% Bloomberg U.S. Treasury Bill 1–3 Month Index; 2018: 100% Bloomberg U.S. Treasury Bill 1–3 Month Index, 2019: 100% MSCI Emerging Markets Index, 2020: 100% Bloomberg U.S. Treasury Bill 1–3 Month Index; 2021: 100% Bloomberg Commodity Index; and 2022: 100% J.P. Morgan GBI Global ex-U.S. Index.

60/40 blend:

U.S. 60/40 blend: 60% S&P 500 Index; 40% Bloomberg U.S. Aggregate Bond Index

Index definitions

Inflation-CPI: IA SBBI U.S. Inflation Index: IA SBBI U.S. Inflation Index is a custom unmanaged index designed to track the U.S. inflation rate.

Investment Grade Fixed Income: Bloomberg U.S. Aggregate Bond Index is composed of the Bloomberg U.S. Government/Credit Index and the Bloomberg U.S. Mortgage-Backed Securities Index and includes Treasury issues, agency issues, corporate bond issues, and mortgage-backed securities.

High Yield Fixed Income: Bloomberg U.S. Corporate High Yield Bond Index covers the U.S.-dollar-denominated, non-investment-grade, fixed-rate, taxable corporate bond market. Securities are classified as high yield if the middle rating of Moody's, Fitch, and S&P is Ba1/BB+/BB= or below. Included issues must have at least one year until final maturity.

Bloomberg U.S. Aggregate 1–3 Year Bond Index is unmanaged and is composed of the Bloomberg U.S. Government/Credit Index and the Bloomberg U.S. Mortgage-Backed Securities Index and includes Treasury issues, agency issues, corporate bond issues, and mortgage-backed securities with maturities of one to three years.

Bloomberg U.S. Aggregate 10+ Year Bond Index is unmanaged and is composed of the Bloomberg U.S. Government/Credit Index and the Bloomberg U.S. Mortgage-Backed Securities Index and includes Treasury issues, agency issues, corporate bond issues, and mortgage-backed securities with maturities of 10 years or more.

Bloomberg Multiverse Index provides a broad-based measure of the global fixed-income (bond) market.

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

Commodities: Bloomberg Commodity Index is a broadly diversified index of commodity futures on 20 physical commodities, subdivided into energy, U.S. agriculture, livestock, precious metals, and industrial metals sectors. Commodity weights are derived in a manner that attempts to fairly represent the importance of a diversified group of commodities to the world economy.

Developed Market ex-U.S. Fixed Income: JP Morgan Government Bond Index Global Ex U.S. Index (JPM GBI Global Ex-U.S.) is a total return, market-capitalization-weighted index, rebalanced monthly, consisting of the following countries: Australia, Germany, Spain, Belgium, Italy, Sweden, Canada, Japan, the United Kingdom, Denmark, the Netherlands, and France.

Emerging Market Fixed Income: JPM EMBI Global Index is a U.S.-dollar-denominated, investible, market-capitalization-weighted index representing a broad universe of emerging market sovereign and quasi-sovereign debt. While products in the asset class have become more diverse, focusing on both local currency and corporate issuance, there is currently no widely accepted aggregate index reflecting the broader opportunity set available, although the asset class is evolving. By using the same index provider as the one used in the developed market bonds asset class, there is consistent categorization of countries among developed international bonds (ex. U.S.) and emerging market bonds.

Developed Market ex-U.S. Equities: MSCI EAFE Index (Europe, Australasia, Far East) Index is a free-float-adjusted market-capitalization-weighted index designed to measure the equity market performance of developed markets, excluding the U.S. and Canada.

Emerging Market Equities: MSCI Emerging Markets Index is a free-float-adjusted market-capitalization-weighted index designed to measure equity market performance of emerging markets.

Frontier Market Equities: MSCI Frontier Markets Index is a free float-adjusted market capitalization index that is designed to measure equity market performance of frontier markets. The MSCI Frontier Markets Index consists of 24 frontier market country indexes.

JPMorgan Emerging Markets Bond Index Global (EMBI Global), which currently covers 27 emerging market countries. Included in the EMBI Global are U.S.-dollar-denominated Brady bonds, Eurobonds, traded loans, and local market debt instruments issued by sovereign and quasi-sovereign entities.

MSCI All Country World Index (ACWI) is a market-capitalization-weighted index that captures large- and mid-cap representation across 23 developed markets and 24 emerging market countries.

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U.S. Municipal Fixed Income: Bloomberg Municipal Index is considered representative of the broad market for investment grade, tax-exempt bonds with a maturity of at least one year.

Preferred Stock: S&P U.S. Preferred Stock Index is designed to measure the performance of the U.S. preferred stock market. Preferred stocks pay dividends at a specified rate and receive preference over common stocks in terms of dividend payments and liquidation of assets.

U.S. Small Cap Equities: Russell 2000® Index measures the performance of the 2,000 smallest companies in the Russell 3000® Index, which represents approximately 8% of the total market capitalization of the Russell 3000 Index.

U.S. Mid Cap Equities: Russell Midcap® Index measures the performance of the 800 smallest companies in the Russell 1000® Index, which represent approximately 25% of the total market capitalization of the Russell 1000 Index.

U.S. Large Cap Equities: S&P 500 Index consists of 500 stocks chosen for market size, liquidity, and industry group representation. It is a market-value-weighted index with each stock's weight in the index proportionate to its market value.

HFRI Fund Weighted Composite Index is a fund-weighted (equal-weighted) index designed to measure the total returns (net of fees) of the approximately 2,000 hedge funds that comprise the Index. Constituent funds must have either \$50 million under management or a track record of greater than 12 months. Substrategies include HFRI Event-Driven, Distressed/Restructuring Index, and HFRI Event-Driven (Total) Index.

Note: While the HFRI indexes are frequently used, they have limitations (some of which are typical of other widely used indexes). These limitations include survivorship bias (the returns of the indexes may not be representative of all the hedge funds in the universe because of the tendency of lower performing funds to leave the index); heterogeneity (not all hedge funds are alike or comparable to one another, and the index may not accurately reflect the performance of a described style); and limited data (many hedge funds do not report to indexes, and, therefore, the index may omit funds, the inclusion of which might significantly affect the

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performance shown. The HFRI indexes are based on information self-reported by hedge fund managers that decide on their own, at any time, whether or not they want to provide, or continue to provide, information to HFR Asset Management, L.L.C. Results for funds that go out of business are included in the index until the date that they cease operations. Therefore, these indexes may not be complete or accurate representations of the hedge fund universe, and may be biased in several ways. Returns of the underlying hedge funds are net of fees and are denominated in USD.

An index is unmanaged and not available for direct investment.

Dates for historical scenarios in Chart 9

Asian Crisis: 10/22/1997

Russian Default: 8/25/1998

Long-Term Capital Management Collapse: 9/23/1998

September 11 terrorist attack: 9/11/2001

WorldCom Crisis: 6/23/2002

Mortgage Crisis: 7/25/2007

2008 Financial Crisis: 9/15/2008

2010 euro sovereign crisis: 4/28/2010

2011 Japanese earthquake: 3/9/2011

Sovereign downgrade crisis: 7/20/2011

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