Research Portfolios Update

Research Portfolios: The Risk Report

Portfolio Strategy

01 March 2024

United States

Research Portfolios
BofAS

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A market in reversal

2023 saw a reversal of 2022 in many areas of the market. The US economy avoided a recession, withstood a regional banking crisis, and enjoyed a sustained stock market rally powered by positive economic surprises, disinflation, and excitement around stock themes such as Artificial Intelligence (AI) and weight loss drugs. As the Fed paused its hiking cycle and the markets began to expect rate cuts, we saw several shifts in the market.

These reversals highlight the importance of a consistent risk management process to support the portfolios through shifting market dynamics. Despite changing volatilities and correlations, the team has been able to control portfolio exposures and deliver competitive risk-adjusted returns.

Sticking to portfolio objectives

First and foremost, the team has to prioritize meeting the objective of each portfolio. This leads to different performance and risk profiles, both in absolute and relative terms. In absolute terms, the objective may tilt a portfolio toward a particular investment style as compared to the broader market. This is the case for the Income portfolio, which is managed vs. the Russell 1000 Value. While the Income portfolio led the Growth portfolio in absolute terms in 2022 when value investing was more in favor, we saw this dynamic change in 2023 as growth investing outperformed.

Another example is our Large Cap Defensive portfolio. This portfolio maintains a lower risk profile than its Russell 1000 benchmark and this can generate more active risk, or tracking error, relative to the benchmark. As the goal of the portfolio is capital preservation, down capture is important and relative returns may lag in a risk-on market.

Managing factor tilts through market shifts

The themes of 2023 in the factor space have changed a fair amount relative to what we saw in 2022, and the team took steps to react to these shifts. While value-based factors outperformed in 2022, 2023 favored factors associated with growth such as high beta, profitability, and large size. Relationships between factor pairs also changed. One specific example is the correlation between size and momentum, which trended upward as large cap stocks outperformed. This shift carried through to sectors as well with large cap growth sectors gaining momentum.

Current environment aside, it is important to note that the team places emphasis on managing portfolio tilts to take advantage of longer-term trends, not shorter-term trends. By limiting exposure to factors, our goal is to pay more attention to the long-term fundamentals and express conviction through stock picking. We are always conscious of turnover and tax efficiency for the portfolios as well.

Exhibit 1: Research Portfolio Benchmarks
Benchmarks for each portfolio

Portfolio	Benchmark
Large Cap Defensive	Russell 1000
Income	Russell 1000 Value
Income & Growth	S&P 500
Growth	Russell 1000 Growth
Midcap	Russell Midcap
International	MSCI AC World ex-USA

Source: BofA Research Portfolios
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Refer to important disclosures on page 26 to 27. **12662251**

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Equity research portfolio models

The Research Portfolios Strategy team manages six equity portfolio models aligned to differing investment objectives.

Exhibit 2: Portfolio characteristics
As of 12/31/2023

	Large Cap Defensive	Income	Income & Growth	Growth	International	Midcap
Risk Profile	Conservative	Moderately Conservative	Moderate	Moderately Aggressive	Moderately Aggressive	Moderately Aggressive
Turnover Metrics						
Turnover- YTD	43%	51%	59%	47%	50%	99%
Turnover-1 yr rolling	43%	51%	59%	47%	50%	99%
Turnover-Full History (Annualized)	34%	42%	42%	48%	50%	84%
Change	9%	9%	17%	-1%	0%	14%
1 year Metrics						
Return	27.0%	9.3%	26.2%	42.4%	16.9%	13.5%
Active Return	0.7%	-2.0%	0.1%	-0.2%	0.9%	-3.5%
Standard Deviation	13.7%	15.6%	13.9%	14.6%	13.7%	17.6%
Sharpe	1.60	0.27	1.51	2.55	0.87	0.48
Tracking Error	2.5%	2.3%	2.4%	3.4%	3.3%	3.8%
Information Ratio	0.28	-0.85	0.03	-0.04	0.27	-0.94
3 year Metrics						
Annualized Return	11.0%	8.5%	7.4%	7.6%	2.8%	7.0%
Active Return	2.1%	-0.3%	-2.5%	-1.2%	0.7%	1.1%
Standard Deviation	17.2%	16.9%	17.4%	21.0%	16.3%	18.5%
Sharpe	0.51	0.37	0.30	0.26	0.03	0.26
Tracking Error	3.3%	2.4%	2.7%	2.6%	4.8%	4.2%
Information Ratio	0.66	-0.11	-0.93	-0.47	0.14	0.26
5 year Metrics						
Annualized Return	15.7%	9.4%	15.6%	18.6%	9.5%	14.6%
Active Return	0.5%	-1.3%	0.2%	-0.7%	1.9%	2.1%
Standard Deviation	17.3%	17.3%	18.1%	21.0%	17.4%	20.2%
Sharpe	0.80	0.44	0.76	0.79	0.44	0.63
Tracking Error	4.3%	3.9%	2.7%	2.6%	4.8%	4.6%
Information Ratio	0.11	-0.32	0.08	-0.27	0.40	0.46
10 year Metrics						
Annualized Return	11.4%	8.3%	11.7%	13.0%	3.7%	8.7%
Active Return	0.1%	0.2%	0.2%	-1.3%	-0.7%	-0.4%
Standard Deviation	13.9%	13.7%	15.0%	17.6%	15.6%	17.9%
Sharpe	0.73	0.51	0.69	0.67	0.16	0.42
Tracking Error	4.2%	4.7%	2.5%	3.4%	4.9%	5.2%
Information Ratio	0.03	0.05	0.09	-0.37	-0.14	-0.07

Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
Active return is defined as portfolio return minus benchmark return.

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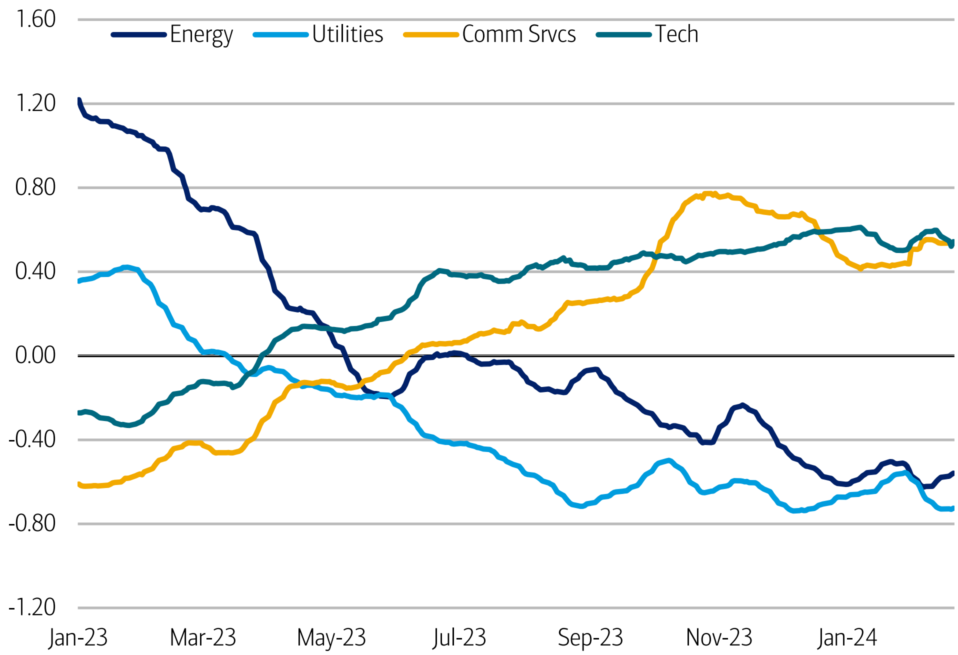
Thinking about risk management in 2023

The sharp reversal in January 2023 turned into a lasting trend for much of the year. Areas of the market that worked for much of 2022 retreated and those that had been beaten down rallied, as market sentiment turned risk-on. In particular, performance shifted dramatically from Energy and more defensive sectors to Technology (mega cap growth stocks especially) and stayed there most of the year. We saw this play through to changing momentum exposures for these sectors (exhibit 3) as well as other shifts in dynamics among the factors we track.

Exhibit 3: Energy/Utilities sectors lost momentum as Tech/Comm Srvcs gained over the year
Momentum factor exposures Jan 2023 – Feb 2024



Source: Qontigo, Omega point. Daily factor exposures from US risk model. Not portfolio data.

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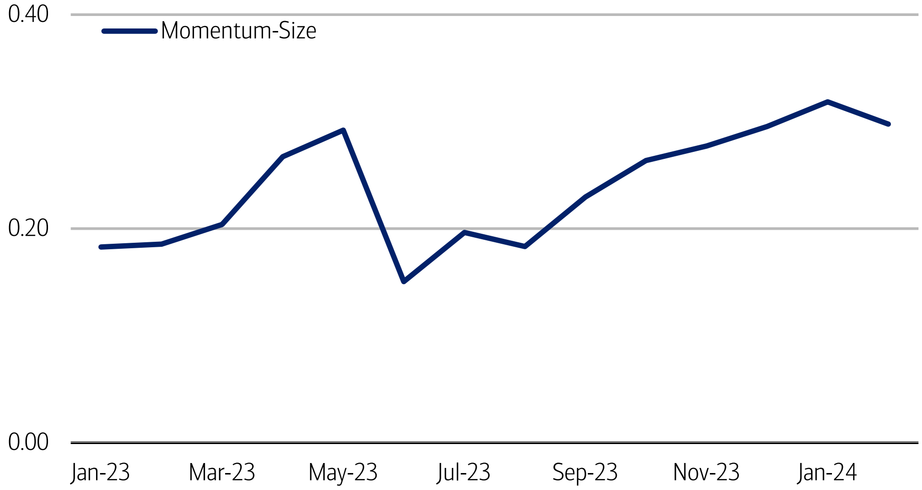
As Technology and Communication Services outperformed, led by mega caps dubbed "The Magnificent 7," this translated into an increased correlation between momentum and size factor exposures (exhibit 4). In other words, large stocks (with high exposure to size) gained momentum as they outperformed the broader market.

Exhibit 4: Size gained momentum throughout 2H23
Correlation of momentum and size exposures



Source: Qontigo, Omega point. Monthly factor exposure correlations from US risk model. Not portfolio data.
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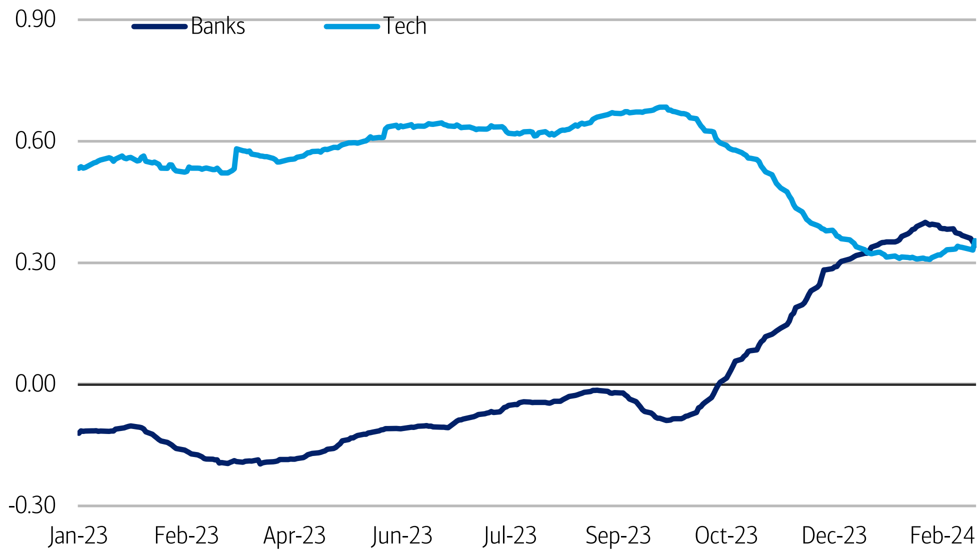
Key themes of 2023 included the regional banking crisis in March, the surge of stocks with exposure to Artificial Intelligence, and the building expectation around Fed pivots. In these episodes we saw sectors (such as banks and technology) as major drivers of market return. While most of the year saw concentrated returns in mega cap Technology stocks, the last quarter saw a broadening out in the year-end rally as the Fed paused rate hikes and the market began to expect cuts for 2024.

We saw these dynamics flow through to shifting beta exposures among sectors (exhibit 5). For example, we saw banks begin the year with lower beta exposure which increased throughout the year as a result of their underperformance during the banking crisis in March and their outperformance at the end of the year alongside other oversold areas of the market and rate cut beneficiaries. Technology on the other hand saw decreasing beta exposure into the end of the year, looking more defensive on a relative basis. This has begun to shift in early 2024 and is a dynamic we are watching.

Exhibit 5: Banks gained beta exposure in Q423 as Tech beta exposure fell
Beta exposures Jan 2023 – Feb 2024



Source: Qontigo, Omega point. Daily factor exposures from US risk model. Not portfolio data.

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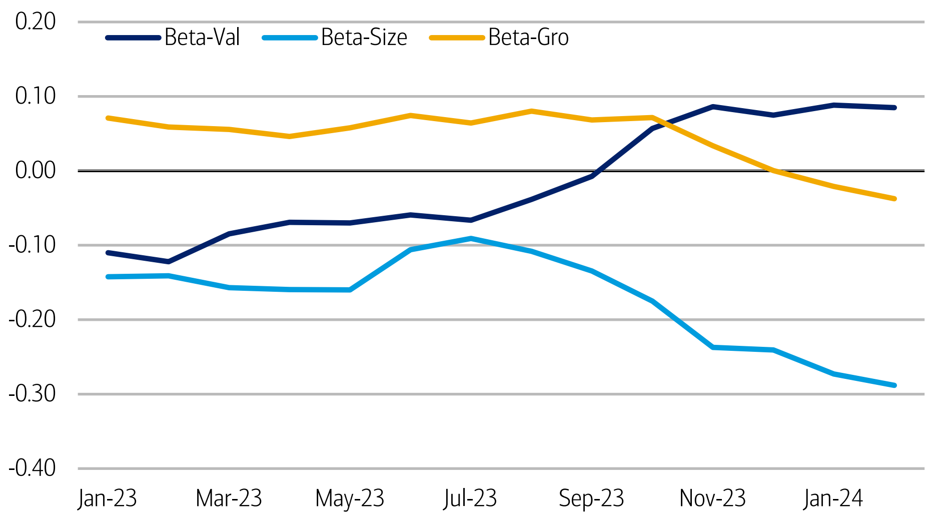
We can also observe the beta shift flow through to its relationship with other style factors. For one, as sectors such as banks which have high value exposure exhibited higher beta exposure, beta and value exposures became more correlated. On the flip side, Technology's decreasing beta exposure corresponded to a decreasing correlation between beta and both high growth and large size (two characteristics of the Technology sector).

Exhibit 6: Beta has become more correlated with value and less correlated with size/growth
Factor exposure correlations Jan 2023 – Feb 2024



Source: Qontigo, Omega point. Monthly factor exposure correlations from US risk model. Not portfolio data.

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We saw some of these shifts in the portfolios' exposures as well. For example, our Growth portfolio, which has a higher growth profile and is slightly larger cap than its Russell 1000 Growth benchmark, saw beta exposure decrease at times in the second half. As always, we sought to manage any externalities of these shifting factor correlations.

Thinking objectively

It is important to set clear expectations for portfolio risk and performance as determined by the portfolio objective.

Four of the portfolios have what could be thought of as a capital appreciation objective, which is essentially to outperform the benchmark over the long term. The Growth, Income & Growth, Midcap, and International portfolios fall into this bucket. Of course apart from capital appreciation, it is important to consider the need for each allocation as it pertains to each client. The Growth portfolio has a growth tilt, the Midcap has a size tilt, and the International portfolio is designed for someone who needs international exposure.

Then there are the Income and Large Cap Defensive (LCD) portfolios, which have different objectives. The Income portfolio is for investors who need a large, stable yield of 3+%. The LCD portfolio is an allocation for those who want to take less risk than the market. Due to their objectives, these portfolios can come with higher active risk due to the inherent factor tilts they are taking. The Income portfolio is overweight dividend yield, size, and high dividend paying sectors versus the Russell 1000 Value. The Large Cap Defensive portfolio attempts to maintain risk between 90-95% of the market's risk, as measured by standard deviation. In order to do that, it will be underweight market sensitivity (or beta). At times it will have an underweight to volatility ex-beta and a negative tilt to other factors that are often less defensive. It may have a slight tilt to factors that are generally more defensive like quality.

Depending on which investment styles are in favor, these two portfolios are at risk of underperforming to a higher degree (higher tracking error and more of it from factors) than the portfolios with a capital appreciation objective (with generally less tracking error and less of it from factors).

Exhibit 7: Projected portfolio risk from style factors
As of 01/31/2024

	LCD	Income	Income & Growth	Growth	International	Midcap
Predicted Tracking Error	2.6	3.0	2.2	1.7	3.1	3.2
% Specific Risk	60%	70%	67%	75%	66%	79%
% Factor Risk	40%	30%	33%	25%	34%	21%
Style Factor Risk	24%	7%	20%	15%	5%	5%
Industry Factor Risk	16%	23%	13%	10%	4%	16%

Source: Qontigo. Omega point. Figures are estimates of factor contribution & risk and are based on projections from a risk model. International % factor risk includes country & currency risk not pictured here.

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Managing market rotations

It is important to note that the team places emphasis on managing portfolio tilts to take advantage of longer-term trends, not shorter-term trends. We find some factors with shorter time horizons tougher to manage as their exposures can be more volatile. We are conscious of turnover and tax efficiency for the portfolios as well.

Below is a table that describes some of the factors that we look at to define risk and return. Some are fundamental in nature and some are price-based. The metrics that define these factors are computed over different time periods as well.

Exhibit 8: Style factors that we manage
Factors categorized by type and duration

Factor	Fundamental/Technical	ST/LT
Growth	Fundamental	LT
Market Sensitivity	Technical	ST
Size	Technical	LT
Value	Fundamental	LT
Volatility	Technical	ST
Medium-Term Momentum	Technical	ST
Profitability	Fundamental	LT
Liquidity	Technical	ST
Dividend Yield	Fundamental	LT
Earnings Yield	Fundamental	LT
Exchange Rate Sensitivity	Fundamental	LT
Leverage	Fundamental	LT

Source: BofA Global Research Portfolios

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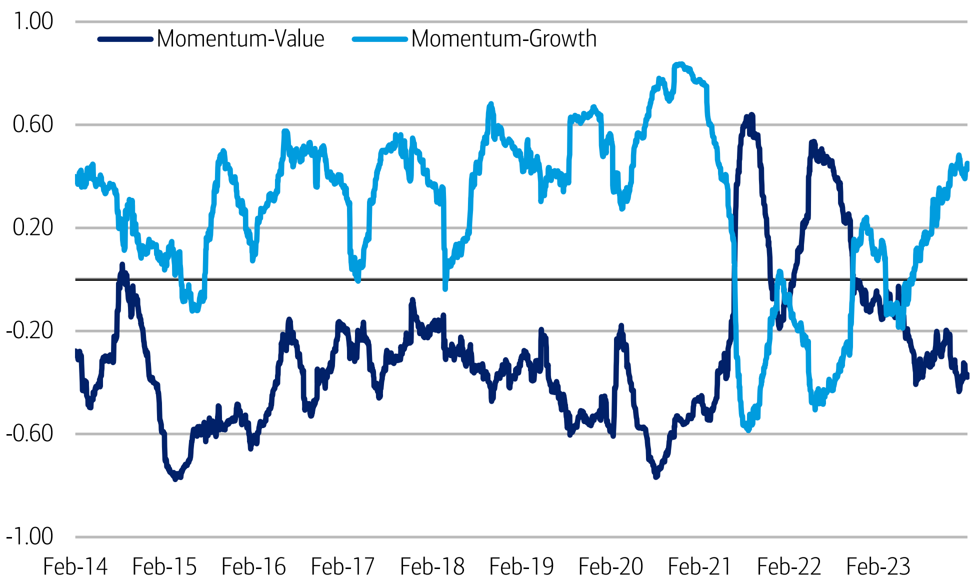
Market volatility fell over the year and tracking error has come down for most portfolios over the course of the year. Tracking error is not a bad thing – in fact a reasonable level of such risk is necessary. Properly budgeted tracking error is a sign that a manager is making informed, active decisions in an attempt to outperform the index. What is important is that the tracking error is intended and is at a reasonable level.

Tracking error is a function of exposures, correlations, and volatility of those exposures. Factor correlation among various factor pairs changed in 2023. Notably, the return correlations of the momentum factor with value and growth shifted throughout the year. Specifically, momentum's correlation with growth rose steadily after falling into negative territory last year. In contrast, its correlation with value began to fall from recent highs. This reflects how growth stocks picked up return momentum.

Exhibit 9: Factor Correlations
Rolling correlations of Momentum with Value and Growth



Source: Qontigo, Omega point. 90-day trailing correlation of daily factor returns on a rolling basis from US risk model. Not portfolio data.

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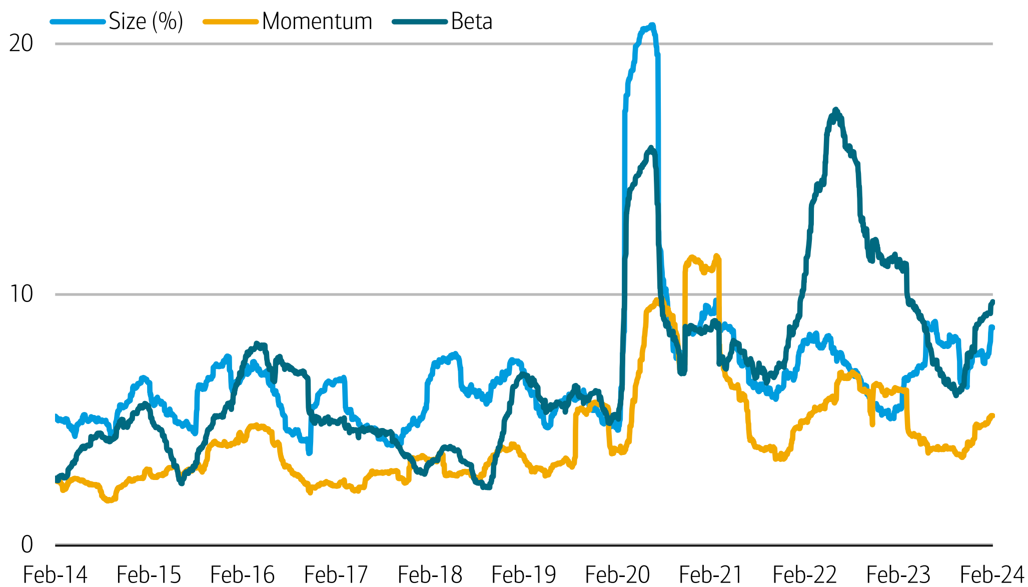
Overall market volatility fell most of the year with a slight uptick in Q4. Style factor volatilities largely followed the same pattern. The size factor's rise in volatility toward the end of the year (as small caps rallied) put it at the high end of its recent volatility range. Beta's volatility fell significantly from its mid-2022 peak and also ticked up in the fourth quarter. Factor volatility is a key component of portfolio risk and thus is imperative to monitor as it can change quickly.

Exhibit 10: Factor Volatility
Rolling volatility of selected factors



Source: Qontigo, Omega point. 90-day trailing standard deviation of daily factor returns on a rolling basis from US risk model. Not portfolio data.

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Research Portfolios Risk Management

Much of the content in this report remains the same as in prior versions. That is because the concepts used in the risk management process remain the same. The data in the tables have been updated to reflect the most current figures. We hope investors will find the information in the report a helpful reference to understanding the process.

Consistent approach regardless of market environment

In an environment where change is a key feature of the investment landscape, a good risk management approach is what should remain constant. We manage our portfolios based on a simple framework that remains in place no matter what the market environment presents. In managing active portfolios, we believe that providing outperformance versus a benchmark on a risk-adjusted basis is the key metric that defines whether or not we provided a good investor experience.

Overall, the portfolio objective determines overall risk level. For example, our Large Cap Defensive portfolio is designed to have a risk level that is consistently lower than the market.

Our team of portfolio strategists uses BofA Global Research in a bottom-up stock selection approach in order to generate alpha. As a team, we also take in inputs from our macro strategists. The proximity to our analysts provides a powerful knowledge base that is vital to our investment process.

The risk management framework should be such that the strategist has the freedom to overweight and underweight stocks based on his fundamental conviction. The risk framework is in place to ensure that the strategist keeps his risk within certain tolerance levels and diversifies his conviction across sectors and stocks. Apart from the risk tolerance specified by the objective, strategists are expected to keep their portfolios within certain risk tolerance levels. Below is a generalized outline of how we view risk management:

- Absolute risk should be in line with the objective of the portfolio;
- Active risk (tracking error) should be reasonable and commensurate with expected return;
- No sector should have outsized variation from the benchmark weight;
- Diversify tracking error across sectors, industries and stocks;
- Do not take outsized style factor risk, as the portfolios are designed to be bottom-up fundamental portfolios (not top-down factor portfolios).

Note that this is the framework for 'normal' market conditions. If the team believed a recession was imminent or that a particular sector was under extreme duress, it could take license to act accordingly. This could result in higher tracking error or wider sector variance during that period of time.

The risk management function views the portfolio under the lens of risk in volatility terms, like standard deviation. Apart from traditional risk metrics, we manage the portfolios keeping business risk and reputational risk of each company in mind. This is a fundamental analysis performed by the portfolio strategist, not the risk manager.

Managing active risk paramount for active managers

One of the team's key priorities as an active manager is to provide competitive performance versus other investment vehicles. We must also do so in a risk-efficient manner. The industry measures this variability in relative performance through a measure called active risk, or tracking error. Our team takes great care in assessing the amount of tracking error both at the portfolio level and from active risk contributed by individual stocks, sectors, and factors. Since we feel that our strength is in bottom-up fundamental active management, we choose to spend the majority of our active risk 'budget' on stocks.

We calculate historical tracking error as the annualized standard deviation of excess returns between a portfolio and its benchmark. Low tracking error indicates that a portfolio closely tracks its benchmark with low variability, while high tracking error means the opposite. In the case where a portfolio beats its benchmark, the portfolio manager should examine tracking error to see whether this excess return was obtained by taking on greater risk. Tracking error can also be thought of as an indication of a manager's skill and a reflection of how actively or passively a portfolio is managed.

One way to reduce tracking error is to narrow deviations in sector weightings between the portfolio and the benchmark, which the team did initially several years ago. The team continues to monitor active risk from exposure to sectors and attempts to keep the deviations minimal.

Active risk is also important at the single stock level. We closely monitor each stock's contribution to tracking error in order to diversify our active risk. As part of the portfolio construction process, we strive to make sure that our investments are being compensated with an appropriate return versus their contribution to active risk.

Exhibit 11: Tracking error metrics by portfolio
As of 12/31/2023

	Large Cap Defensive	Income	Income & Growth	Growth	International	Midcap
Tracking Error						
1 year	2.49%	2.33%	2.44%	3.40%	3.28%	3.77%
3 year	3.25%	2.44%	2.69%	2.56%	4.76%	4.16%
5 year	4.30%	3.94%	2.73%	2.56%	4.76%	4.57%
10 year	4.19%	4.74%	2.45%	3.43%	4.88%	5.16%

Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023

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It is important to note that since tracking error is a calculation of volatility, when volatility in market returns rises, one might expect that volatility of active returns will also rise. It is especially important during these times that when this happens that we make sure that the rise in tracking error is not excessive compared to the increase in market volatility.

The information ratio is simply active return divided by tracking error, and measures risk-adjusted return versus a benchmark (which could be considered as an alternative to investing in the portfolio).

Exhibit 12: Information ratio metrics by portfolio
As of 12/31/2023

	Large Cap Defensive	Income	Income & Growth	Growth	International	Midcap
Information Ratio						
1 year	0.28	-0.85	0.03	-0.04	0.27	-0.94
3 year	0.66	-0.11	-0.93	-0.47	0.14	0.26
5 year	0.11	-0.32	0.08	-0.27	0.40	0.46
10 year	0.03	0.05	0.09	-0.37	-0.14	-0.07

Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023

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Budgeting your risk

Once we have defined a level of acceptable tracking error, we then have to decide where to spend it. As the team has highlighted many times, we believe our expertise lies in the strength of BofA Global Research, and we leverage this edge to find alpha. We do not consider ourselves experts in market timing, and so we avoid taking large sector or style active weights. When thinking about a risk 'budget', we prefer to spend most of our tracking error in stock-specific risk.

In a concentrated portfolio, active managers will by nature hold larger weights in the stocks they own versus the weights of these stocks in the benchmark. To outperform, an active manager must pick the right stocks and weight them appropriately. We choose weights based on the stock's active risk and our expectation for the stock's future return.

Across our portfolios, most of the portfolio tracking error comes from specific risk, which is exactly what one should expect from a portfolio that is taking most of its risk from stocks.

Exhibit 13: Projected factor vs. specific risk
As of 1/31/2024

	LCD	Income	Income & Growth	Growth	International	Midcap
Predicted Tracking Error	2.6	3.0	2.2	1.7	3.1	3.2
% Specific Risk	60%	70%	67%	75%	66%	79%
% Factor Risk	40%	30%	33%	25%	34%	21%

Source: Qontigo, Omega point. Figures are estimates of factor contribution & risk and are based on projections from a risk model.

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In cases where there is a defined portfolio objective, the story will be a little different. In the case of Large Cap Defensive, the portfolio is designed to always have a lower risk level than the market. In order to achieve this objective, the portfolio has negative exposure to the market volatility (beta) factor. The magnitude of this exposure translates to relative performance that may be significant. However, the team has taken great care in keeping this 'risk' at a consistent level and importantly has picked quality companies with compelling investment stories.

While we don't provide attribution detail on the portfolios, below is a snapshot of what explained the Large Cap Defensive portfolio's performance in 2023 – an illustration of how we think about attribution of factors vs. sectors vs. stocks. The portfolio outperformed the Russell 1000 benchmark with the bulk of positive contribution coming from stock picking which outweighed the negative contribution from factors. This portfolio is more defensively positioned by design as mentioned above which has resulted in factor headwinds both style and sector. Overall, we aim to minimize exposures where we don't have a view or they aren't explicit in the objective so that the portfolios' performance is driven by intentional positioning in which we have conviction.

Exhibit 14: Stock picking drives performance
2023 active performance

	LCD
Total	0.7%
Style Factors	-0.5%
Industries	-1.0%
Alpha (stock picking)	2.2%

Source: Qontigo. Omega point. Figures are based on attribution from a risk model.

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Competitive risk-adjusted returns

Once the decision has been made to allocate a portion of an investor's wealth to a portfolio, then one should compare the risk-adjusted performance of that strategy to its respective benchmark. This benchmark will often be a reflection of the particular style that toward which this portion of the investor's assets is tilted. Examples are value and growth.

We often discuss the portfolios' active performance against their respective benchmarks, but what is also important is adjusting for risk. In other words we aim for outperformance to be achieved without taking considerable excess risk.

Market volatility is always changing, so naturally when the risk of the broader market rises, so too will the risk of a portfolio. However, to normalize for this feature, it is helpful to compare Sharpe ratios between two investment alternatives. As an active manager, one way to exhibit skill is to show that a portfolio's Sharpe ratio was higher than its benchmark's Sharpe ratio.

Note that if either market return increases and/or risk decreases, Sharpe ratios by their nature will be higher. So what is important to see is an improving trend in risk-adjusted returns (Sharpe ratios) when compared to an investment alternative over time.

Below shows the three and ten year Sharpe ratios across the portfolios and their benchmarks. We look for stock selection to drive alpha (return above the benchmark), and the risk management framework and portfolio construction approach aids in making the risk-adjusted performance more competitive.

Exhibit 15: Risk-adjusted return vs. BM – trailing 3 year & trailing 10 year
As of 12/31/2023

3 yr	**Large Cap Defensive**	**Income**	**Income & Growth**	**Growth**	**International**	**Midcap**
Sharpe	0.51	0.37	0.30	0.26	0.03	0.26
BM Sharpe	0.39	0.40	0.45	0.32	-0.01	0.19
Difference	0.12	-0.03	-0.15	-0.07	0.05	0.07
10 yr						
Sharpe	0.73	0.51	0.69	0.67	0.16	0.42
BM Sharpe	0.69	0.47	0.72	0.79	0.19	0.54
Difference	0.04	0.05	-0.03	-0.12	-0.03	-0.12

Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023

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Risk Metrics Glossary

Absolute risk metrics

Relative measures measure risk versus the portfolio's benchmark while absolute measures illustrate the volatility of a portfolio on its own. These measures include standard deviation and the Sharpe ratio.

Standard deviation

Standard deviation is a statistical measure of the degree to which an individual value, such as stock performance, in a probability distribution tends to vary from the mean of the distribution. In modern portfolio theory, standard deviation is used as a volatility measure to estimate the range of possible future returns of a portfolio. This can provide investors with a good measure of how much of their invested capital is at risk of loss and the expected volatility of future returns.

The table below shows maximum and minimum monthly returns and standard deviation data for both the 5 year and 10 year horizon. Conservative portfolios generally had lower standard deviations and a narrower distribution of maximum and minimum monthly returns. Aggressive portfolios tended to have higher standard deviations and wider distributions of monthly returns.

Exhibit 16: Maximum and Minimum Monthly Returns and Standard Deviations
As of 12/31/2023

	Absolute Metrics					
	Large Cap Defensive	Income	Income & Growth	Growth	International	Midcap
5 year metrics						
Maximum Monthly Return	11.2%	11.1%	13.2%	15.6%	10.7%	13.3%
Minimum Monthly Return	-10.8%	-13.6%	-11.3%	-12.8%	-14.4%	-17.1%
Standard Deviation	17.3%	17.3%	18.1%	21.0%	17.4%	20.2%
10 year metrics						
Maximum Monthly Return	11.2%	11.1%	13.2%	15.6%	10.7%	13.3%
Minimum Monthly Return	-10.8%	-13.6%	-11.3%	-12.8%	-14.4%	-17.1%
Standard Deviation	13.9%	13.7%	15.0%	17.6%	15.6%	17.9%

Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023

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Sharpe ratio – risk-adjusted return

Generating returns is important to investors, but it is important that these returns are achieved by taking the appropriate amount of risk. Risk can be thought of as a cost, and must be matched with an appropriate level of return to make taking that risk worthwhile. Standard deviation alone tells you how much volatility has been seen in a particular investment, but without matching it with return one does not have the complete picture of the viability of the investment.

The Sharpe ratio measures the risk-adjusted performance of a portfolio. The ratio attempts to determine if greater returns are the result of taking excess risk or from investment decisions, such as better allocation or stock selection. The Sharpe ratio is essentially the "return per unit of risk."

The goal of our portfolio management process is to provide the best risk-adjusted returns while meeting the stated objective for each portfolio. So while the Growth portfolio may have higher risk and return than the Income portfolio, we strive to achieve the highest risk-adjusted return in both. The Sharpe ratio normalizes this concept across portfolios. The Sharpe ratios should be compared to a benchmark or to other portfolios with similar objectives.

Relative risk metrics

Relative risk metrics generally measure risk versus a benchmark. This is a helpful tool in the risk management process because it shows whether active portfolio management is providing value-add versus other investment choices. For portfolios with style-based objectives, relative risk is measured versus the portfolio's benchmark which will have the same style characteristics as the portfolio. Relative risk measures include upside-downside capture and tracking error.

Tracking Error

We calculate tracking error as the annualized standard deviation of excess returns between a portfolio and its benchmark. Low tracking error indicates that a portfolio closely tracks its benchmark with low variability, while high tracking error means the opposite. In the case where a portfolio beats its benchmark, the portfolio manager should examine tracking error to see whether this excess return was obtained by taking on greater risk. Tracking error can also be thought of as an indication of a manager's skill and a reflection of how actively or passively a portfolio is managed.

Information ratio

The information ratio is a relative measure of risk-adjusted return. It takes active return (return over a benchmark's return), and divides it by tracking error. Using this measure is similar to comparing Sharpe ratios between a portfolio and alternative investment choices.

Upside-downside capture

Upside-downside is a statistical measure of an investment manager's overall performance in both up and down markets. Upside-downside capture is measured in terms of the proportion of the upside or downside market moves that the portfolio captures. For instance, if the average up market return of a portfolio is 9% and the average up market return for the benchmark is 10%, then the up market capture would be 90%.

The table below shows the relationship among the portfolios with respect to upside-downside capture. An upside capture above 100% suggests the portfolio captures more than the market's upside, which is the objective of more aggressive portfolios. A downside capture higher than -100% suggests the portfolio provides some level of protection in down markets, which is the objective of more conservative portfolios.

The ratio between the upside and downside capture can also be used to measure portfolio performance (often termed "upside/downside capture ratio"). A ratio above 1.0 suggests that the portfolio has greater upside potential with less downside risk than its benchmark. We provide this ratio for each of the portfolios in below table.

Exhibit 17: Upside-downside capture vs. benchmark
As of 12/31/2023

	Relative Metrics					
	Large Cap Defensive	Income	Income & Growth	Growth	International	Midcap
5 year metrics						
Upside Capture	92.7	90.1	95.6	99.0	103.3	97.8
Downside Capture	-89.7	-94.1	-95.5	-101.3	-95.4	-91.0
Upside/Downside Ratio	103.3	95.8	100.1	97.7	108.3	107.5
10 year metrics						
Upside Capture	88.3	86.2	98.4	98.9	99.4	102.0
Downside Capture	-85.7	-83.5	-100.0	-106.0	-101.4	-105.0
Upside/Downside Ratio	103.1	103.3	98.4	93.3	98.0	97.1

Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023

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The use of rolling returns

When considering different investment options, investors typically look at recent periods of performance along with longer term trailing periods of 3, 5, and 10 years. While these time periods are easily comparable among investment alternatives, they are often lacking when assessing risk and the path taken to achieve those returns. Rolling returns can give investors a better sense of how a fund has performed over its history, especially during volatile periods when simply shifting the performance date one or two months in either direction can paint a very different picture. In order to provide the most accurate look at the risk and return of each of the Research Portfolios we look at historical annualized rolling returns over 1, 3, and 5 year time frames for each portfolio at the end of the report. In doing so, we have much more data which allows the investor to look at consistency of performance over time in both up and down markets alike.

Understanding correlation

The reason we use a sector framework as a component of our investment process is that sectors have differing characteristics and therefore do not generally move together in price; in fact, some have a long history of very different patterns of performance. Sectors that do not move in price with one another tend to have low price correlations. The table below shows the correlation among various market sectors.

For instance, let's say investor A owns a two stock portfolio consisting of one stock from the Financials sector and one from the Industrials sector. In this instance we have two sectors that are historically highly correlated to interest rates. This makes sense as Financials have traditionally benefitted from higher interest rates and higher interest rates often come on the heels of strong economic growth of which Industrials are a beneficiary. The result is a relatively high correlation coefficient of 0.88, as seen in the table below. Building a portfolio from just these two sectors would likely not lead to the greatest diversification benefits.

Exhibit 18: Dec 2010 – Dec 2023
Correlations between sectors

	Comm. Services	Cons. Discretionary	Cons. Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Real Estate	Utilities
Comm. Services	1.00										
Cons. Discretionary	0.64	1.00									
Cons. Staples	0.57	0.56	1.00								
Energy	0.42	0.50	0.40	1.00							
Financials	0.50	0.71	0.53	0.70	1.00						
Health Care	0.49	0.67	0.69	0.46	0.65	1.00					
Industrials	0.58	0.78	0.67	0.67	0.88	0.73	1.00				
Information Technology	0.59	0.85	0.54	0.45	0.67	0.62	0.75	1.00			
Materials	0.52	0.77	0.58	0.65	0.81	0.71	0.88	0.72	1.00		
Real Estate	0.55	0.68	0.65	0.41	0.60	0.64	0.67	0.61	0.65	1.00	
Utilities	0.41	0.32	0.64	0.20	0.27	0.44	0.38	0.31	0.33	0.65	1.00

Source: BofA Global Research Portfolios, FactSet. Based on US market. Not portfolio data.

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Now let's say investor B builds a two-stock portfolio with one stock from Utilities and one from Technology. In this case, investor B should benefit by owning stocks from two sectors with a low correlation. Companies in the Utilities sector tend to exhibit characteristics of defensive businesses with fairly consistent revenue streams. They are not typically subject to the product cycles and economic effects which tend to be characteristics of the Information Technology sector. As seen in the table, Utilities and Tech stocks have a correlation coefficient of just 0.31. This means that, while the two sectors generally move in the same direction over time, as do equity markets in general, their performances can be sharply different and an investor can benefit from this diversification.

We also look to diversify across various industries when building portfolio models as there are benefits to be achieved from including different industries within a sector. One such example of an industry with lower correlation with the rest of its sector is the Environmental & Facilities Services (waste) industry. Its constituents tend to be less cyclical in nature than the rest of the Industrials sector.

A word of caution is that correlations can and do change over time, so the portfolio manager must always review prior assumptions about the diversification benefits a sector provides. We previously highlighted how Utilities have not provided much downside protection when compared to history.

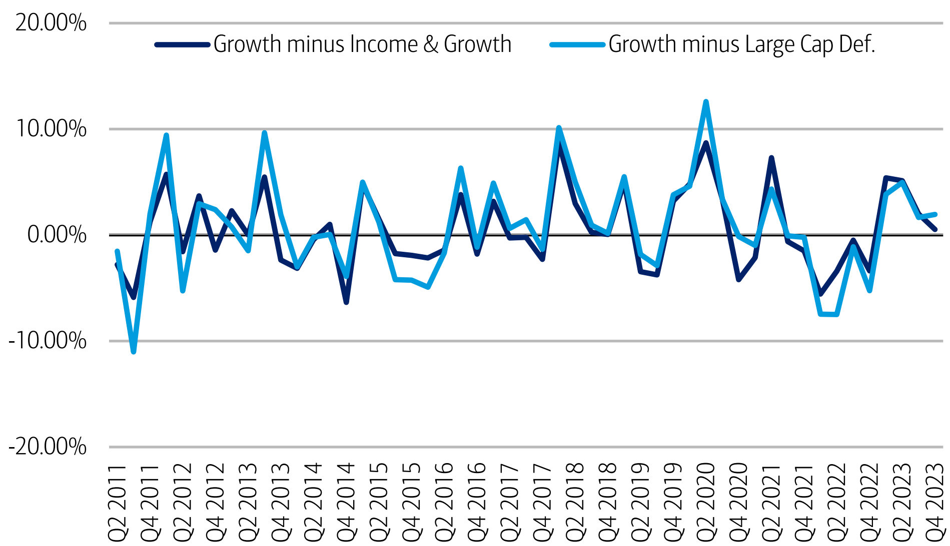
Diversification of economic risks

Portfolios with higher risk profiles tend to have greater exposure to economic cycles due to the larger allocations to sectors that tend to be related to economic growth, whereas more conservative portfolios are generally less vulnerable to economic risks.

This diversification of economic risks provides some level of protection in economic downturns and sufficient upside when the economy is growing. The low correlations between conservative and more aggressive portfolios are partly attributed to differences in economic exposure.

The chart below shows a greater difference in returns between Growth and Large Cap Defensive than between Growth and Income and Growth. These differences tended to be the greatest during favorable markets, where the Growth portfolio's performance exceeded LCD's performance more than it exceeded Income & Growth's performance. It was also true in down markets (2011, 2015, 2022) when LCD provided good downside protection as compared to the other portfolios. Interestingly, the Growth portfolio held up well in 2020, particularly when the market rebounded sharply from the lows. This highlights that while more aggressive portfolios often have higher returns, they often exhibit larger drawdowns due to their riskier nature. In the context of asset allocation, combining a conservative portfolio with a more aggressive portfolio provides diversification.

Exhibit 19: Performance dispersion across portfolios of different risk levels
As of 12/31/2023



Source: BofA Global Research Portfolios

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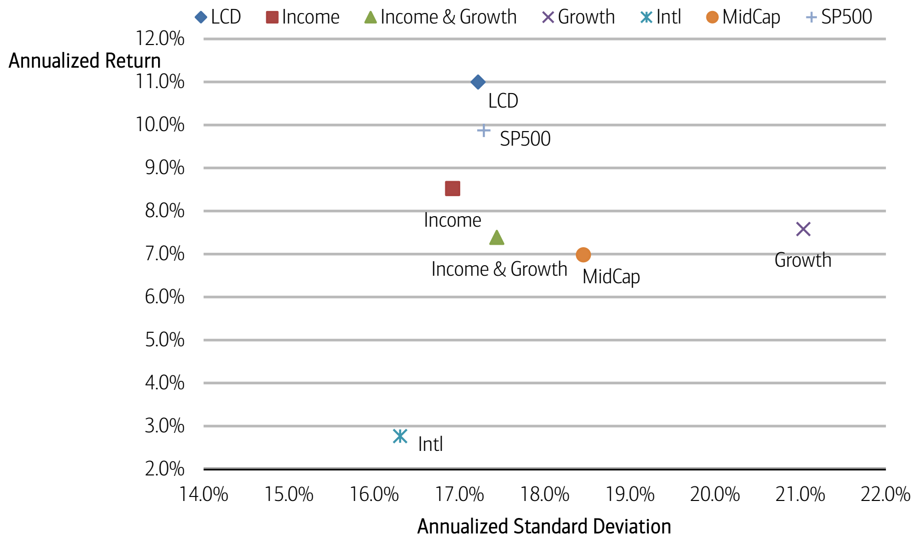
Below we show how the portfolios compare with each other and the S&P 500 on trailing 3Y risk and return metrics.

Exhibit 20: 3Y Risk/Return profile across portfolios
As of 12/31/2023



Source: BofA Global Research Portfolios , Annualized 3 year return and standard deviation. Based on monthly returns as of 12/31/2023
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Large Cap Defensive Portfolio

Risk Profile: Conservative

The investor is relatively averse to risk and will accept a lower-than-average return to minimize the risk of principal loss or price volatility.

Exhibit 21: Sector Weightings vs. Benchmark
As of 12/31/2023

Sector	Large Cap Def.	Russell 1000	Difference
Communication Services	6.0%	8.3%	-2.3%
Consumer Discretionary	11.9%	10.9%	1.0%
Consumer Staples	5.0%	5.8%	-0.9%
Energy	5.1%	3.8%	1.3%
Financials	17.2%	13.5%	3.7%
Health Care	11.8%	12.5%	-0.6%
Industrials	8.5%	9.6%	-1.0%
Information Technology	26.9%	27.9%	-1.0%
Materials	0.0%	2.6%	-2.6%
Real Estate	4.6%	2.8%	1.7%
Utilities	3.0%	2.2%	0.7%

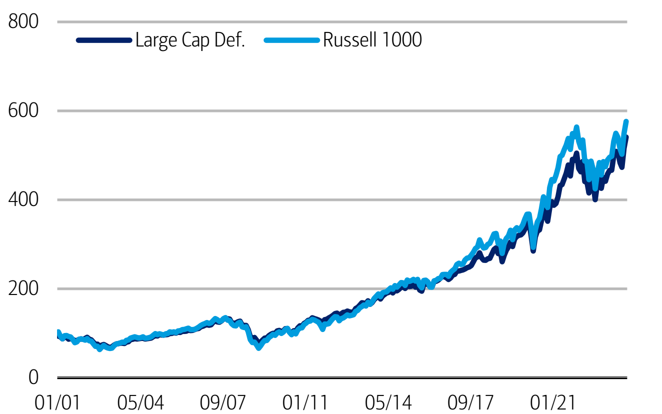
Source: FactSet, BofA Global Research Portfolios
BofA GLOBAL RESEARCH

Exhibit 22: Risk Metrics
As of 12/31/2023

	12 Months	3 year	5 year	10 year
	Absolute Metrics			
Return	27.0%	11.0%	15.7%	11.4%
Standard Deviation	13.7%	17.2%	17.3%	13.9%
Sharpe	1.6	0.5	0.8	0.7
	Relative Metrics			
Active Return	0.7%	2.1%	0.5%	0.1%
Tracking Error	2.5%	3.3%	4.3%	4.2%
Information Ratio	0.3	0.7	0.1	0.0
Up/Down Capture	114.5	108.2	103.3	103.1

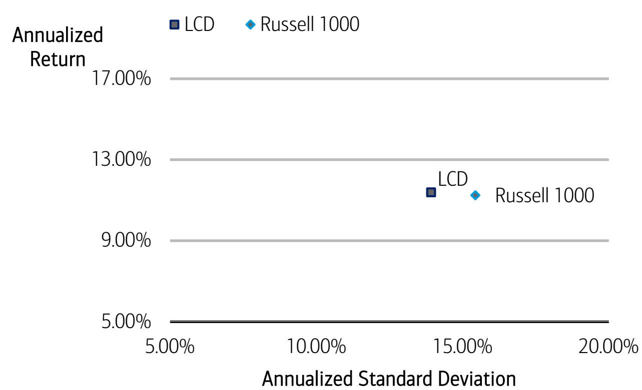
Source: BofA Global Research Portfolios
Annualized return and standard deviation. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 23: Cumulative Performance since inception
As of 12/31/2023



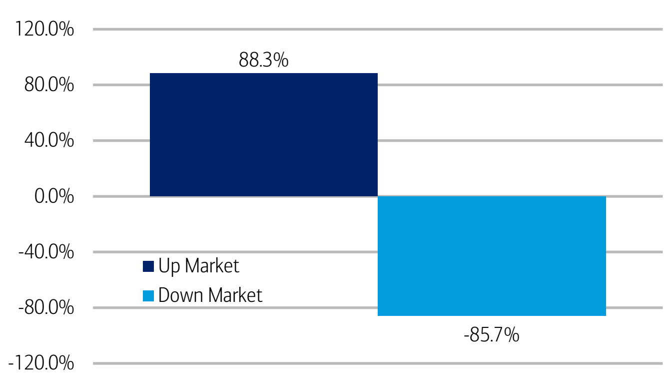
Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 24: 10 Year Risk/Return Profile
As of 12/31/2023



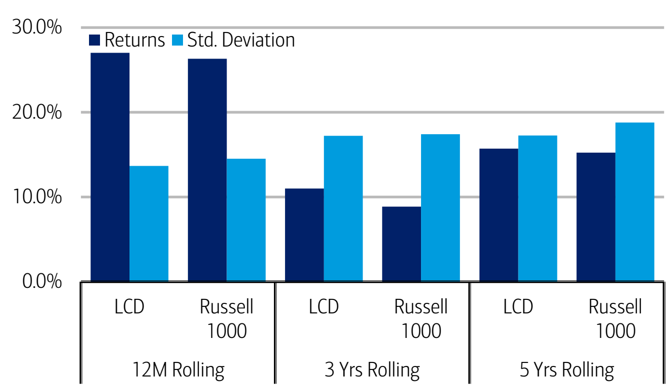
Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 25: Up Market & Down Market Capture – 10 Year
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 26: Annualized Rolling Returns
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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Income Portfolio

Risk Profile: Moderately Conservative

Moderate risk of principal and volatility associated with changing interest rate conditions will be accepted to satisfy yield requirements.

Exhibit 27: Sector Weightings vs. Benchmark
As of 12/31/2023

Sector	Income	Russell 1000V	Difference
Communication Services	5.4%	4.7%	0.8%
Consumer Discretionary	8.1%	5.2%	2.9%
Consumer Staples	5.2%	7.9%	-2.6%
Energy	11.0%	7.8%	3.3%
Financials	22.3%	21.8%	0.5%
Health Care	12.5%	14.6%	-2.1%
Industrials	10.8%	13.9%	-3.1%
Information Technology	14.0%	9.5%	4.4%
Materials	0.0%	4.9%	-4.9%
Real Estate	8.8%	5.0%	3.7%
Utilities	1.8%	4.8%	-3.0%

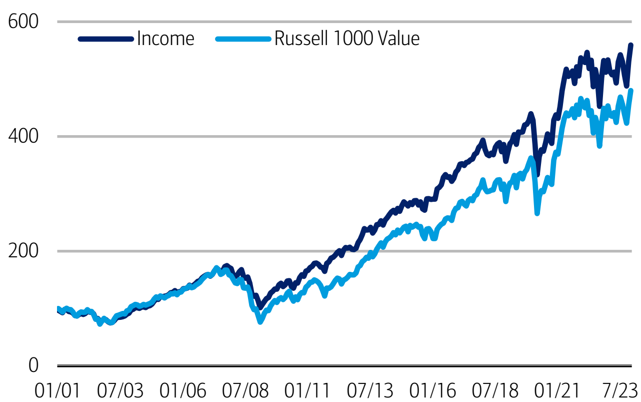
Source: FactSet, BofA Global Research Portfolios
BofA GLOBAL RESEARCH

Exhibit 28: Risk Metrics
As of 12/31/2023

	12 Months	3 year	5 year	10 year
	Absolute Metrics			
Return	9.3%	8.5%	9.4%	8.3%
Standard Deviation	15.6%	16.9%	17.3%	13.7%
Sharpe	0.3	0.4	0.4	0.5
	Relative Metrics			
Active Return	-2.0%	-0.3%	-1.3%	0.2%
Tracking Error	2.3%	2.4%	3.9%	4.7%
Information Ratio	-0.9	-0.1	-0.3	0.1
Up/Down Capture	91.8	98.8	95.8	103.3

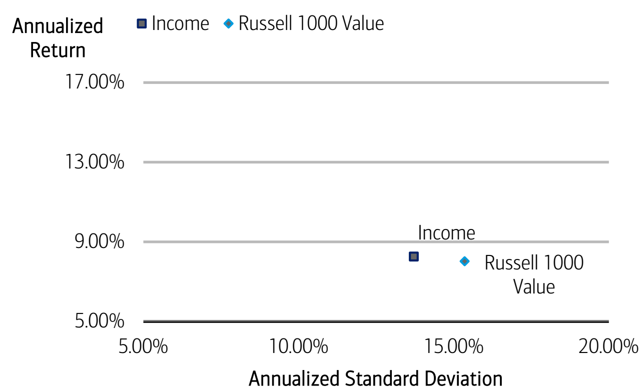
Source: BofA Global Research Portfolios
Annualized return and standard deviation. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 29: Cumulative Performance since inception
As of 12/31/2023



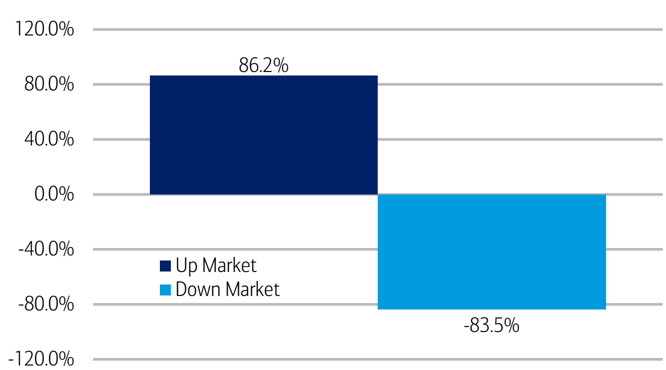
Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 30: 10 Year Risk/Return Profile
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 31: Up Market & Down Market Capture – 10 Year
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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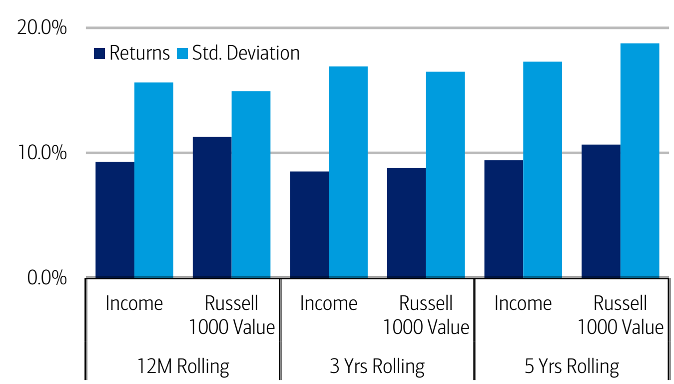
Exhibit 32: Annualized Rolling Returns
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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Income & Growth Portfolio

Risk Profile: Moderate

Despite the balanced nature of the objective, some measure of risk will be assumed to achieve returns, while providing some level of income.

Exhibit 33: Sector Weightings vs. Benchmark
As of 12/31/2023

Sector	Income & Growth	S&P 500	Difference
Communication Services	5.6%	8.6%	-3.0%
Consumer Discretionary	14.6%	10.9%	3.8%
Consumer Staples	9.1%	6.2%	2.9%
Energy	5.0%	3.9%	1.1%
Financials	14.7%	13.0%	1.7%
Health Care	10.7%	12.6%	-1.9%
Industrials	10.9%	8.8%	2.1%
Information Technology	25.3%	28.9%	-3.6%
Materials	0.0%	2.4%	-2.4%
Real Estate	4.1%	2.5%	1.6%
Utilities	0.0%	2.3%	-2.3%

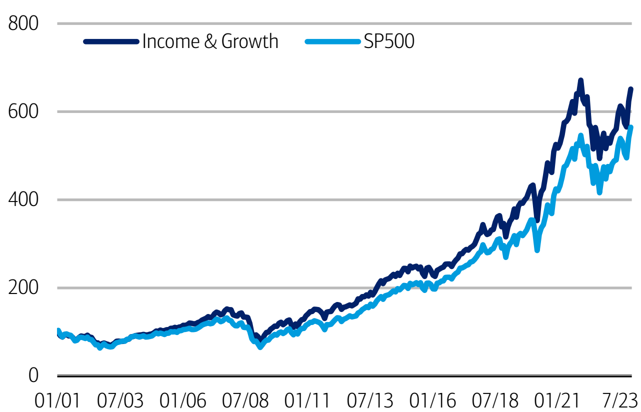
Source: FactSet, BofA Global Research Portfolios
BofA GLOBAL RESEARCH

Exhibit 34: Risk Metrics
As of 12/31/2023

	12 Months	3 year	5 year	10 year
	Absolute Metrics			
Return	26.2%	7.4%	15.6%	11.7%
Standard Deviation	13.9%	17.4%	18.1%	15.0%
Sharpe	1.5	0.3	0.8	0.7
	Relative Metrics			
Active Return	0.1%	-2.5%	0.2%	0.2%
Tracking Error	2.4%	2.7%	2.7%	2.5%
Information Ratio	0.0	-0.9	0.1	0.1
Up/Down Capture	105.0	91.1	100.1	98.4

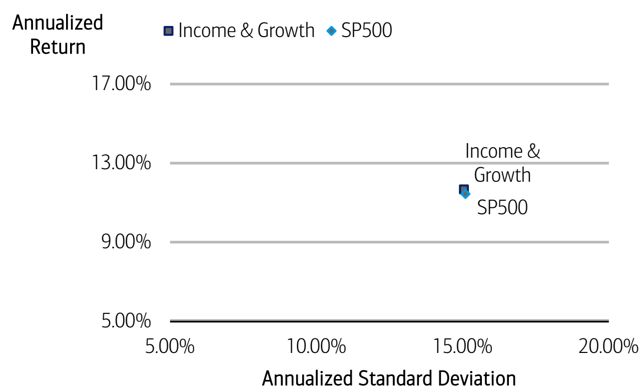
Source: BofA Global Research Portfolios
Annualized return and standard deviation. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 35: Cumulative Performance since inception
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 36: 10 Year Risk/Return Profile
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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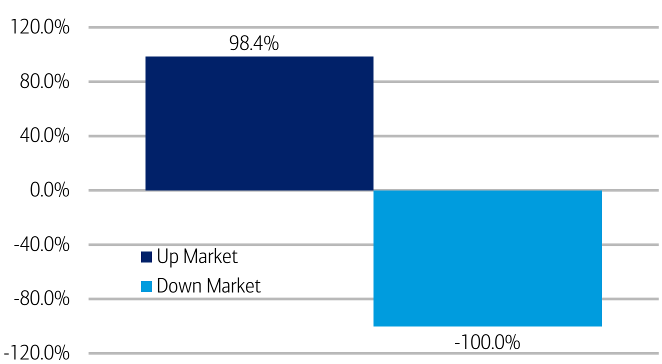
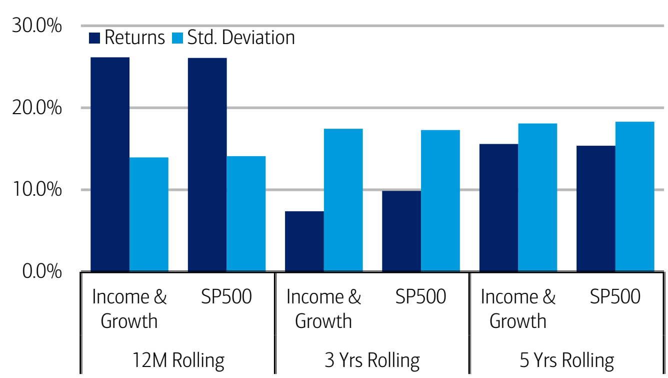
Exhibit 37: Up Market & Down Market Capture – 10 Year
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 38: Annualized Rolling Returns
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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Growth Portfolio

Risk Profile: Moderately Aggressive

A relatively high level of price volatility and risk of principal loss may be necessary in order to achieve potentially above-average returns.

Exhibit 39: Sector Weightings vs. Benchmark
As of 12/31/2023

Sector	Growth	Russell 1000G	Difference
Communication Services	11.8%	11.4%	0.4%
Consumer Discretionary	15.2%	15.8%	-0.6%
Consumer Staples	2.8%	4.1%	-1.3%
Energy	1.8%	0.5%	1.2%
Financials	6.1%	6.4%	-0.3%
Health Care	11.7%	10.6%	1.1%
Industrials	5.3%	5.9%	-0.6%
Information Technology	44.3%	43.5%	0.8%
Materials	0.9%	0.7%	0.2%
Real Estate	0.0%	0.9%	-0.9%
Utilities	0.0%	0.0%	0.0%

Source: FactSet, BofA Global Research Portfolios
BofA GLOBAL RESEARCH

Exhibit 40: Risk Metrics
As of 12/31/2023

	12 Months	3 year	5 year	10 year
	Absolute Metrics			
Return	42.4%	7.6%	18.6%	13.0%
Standard Deviation	14.6%	21.0%	21.0%	17.6%
Sharpe	2.6	0.3	0.8	0.7
	Relative Metrics			
Active Return	-0.2%	-1.2%	-0.7%	-1.3%
Tracking Error	3.4%	2.6%	2.6%	3.4%
Information Ratio	0.0	-0.5	-0.3	-0.4
Up/Down Capture	120.1	96.1	97.7	93.3

Source: BofA Global Research Portfolios
Annualized return and standard deviation. Based on monthly returns as of 12/31/2023
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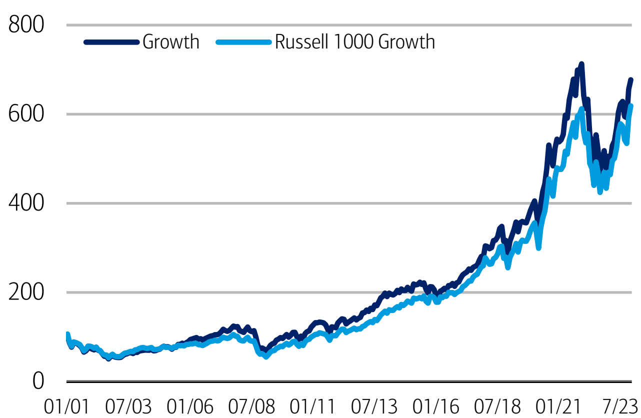
Exhibit 41: Cumulative Performance since inception
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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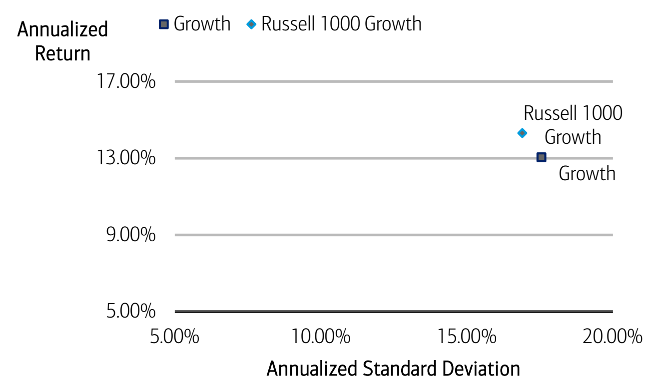
Exhibit 42: 10 Year Risk/Return Profile
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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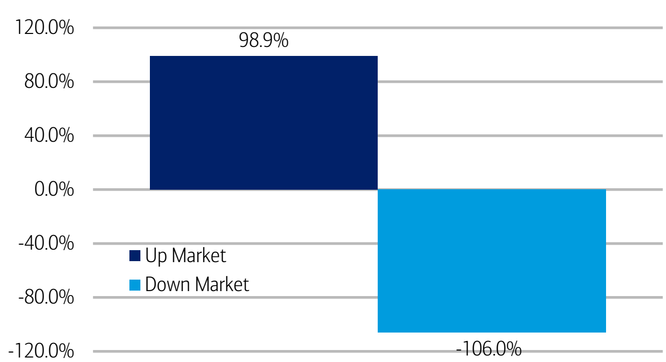
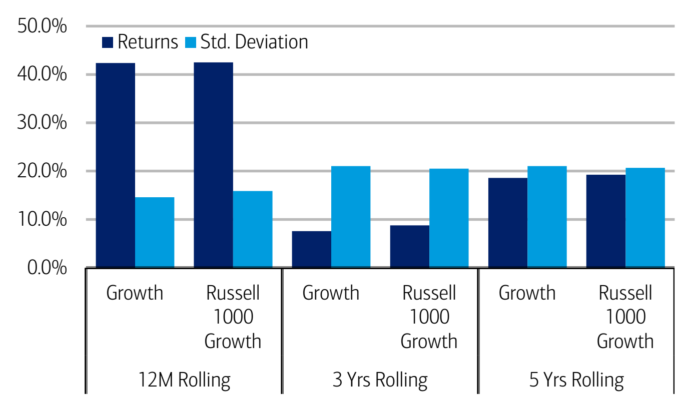
Exhibit 43: Up Market & Down Market Capture – 10 Year
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 44: Annualized Rolling Returns
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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International Portfolio

Risk Profile: Moderately Aggressive

Although the portfolio mainly holds ADRs, it is exposed to FX and geopolitical risks. Furthermore, the tax withholding policies of various countries can affect the receipt of dividend income. Many stocks, especially in the emerging markets, tend to be highly volatile—therefore, this portfolio's risk profile is considered Aggressive.

Exhibit 45: Sector Weightings vs. Benchmark
As of 12/31/2023

Sector	Intl	MXWDU	Difference
Communication Services	2.4%	5.2%	-2.9%
Consumer Discretionary	14.5%	11.5%	3.0%
Consumer Staples	6.9%	8.0%	-1.1%
Energy	6.5%	5.6%	1.0%
Financials	18.3%	21.2%	-2.9%
Health Care	11.1%	9.3%	1.9%
Industrials	11.7%	13.5%	-1.7%
Information Technology	16.8%	12.5%	4.4%
Materials	7.6%	8.0%	-0.4%
Real Estate	0.2%	2.1%	-1.9%
Utilities	3.8%	3.2%	0.5%

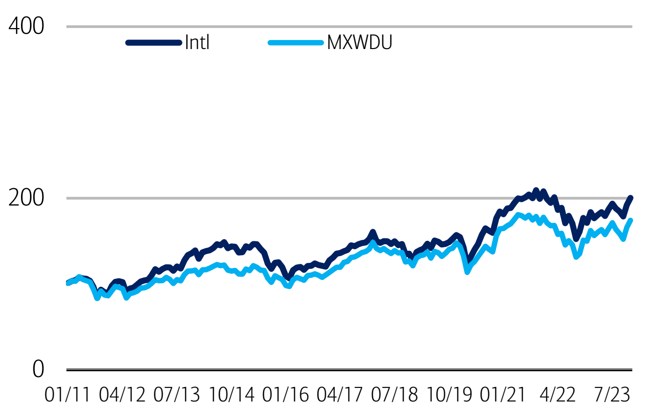
Source: FactSet, BofA Global Research Portfolios
BofA GLOBAL RESEARCH

Exhibit 46: Risk Metrics
As of 12/31/2023

	12 Months	3 year	5 year	10 year
	Absolute Metrics			
Return	16.9%	2.8%	9.5%	3.7%
Standard Deviation	13.7%	16.3%	17.4%	15.6%
Sharpe	0.9	0.0	0.4	0.2
	Relative Metrics			
Active Return	0.9%	0.7%	1.9%	-0.7%
Tracking Error	3.3%	4.8%	4.8%	4.9%
Information Ratio	0.3	0.1	0.4	-0.1
Up/Down Capture	111.8	103.8	108.3	98.0

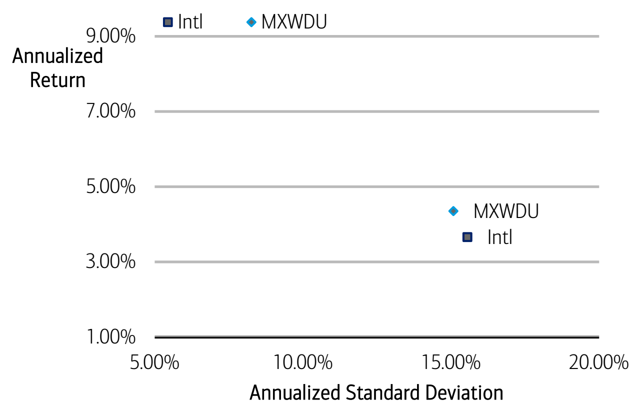
Source: BofA Global Research Portfolios
Annualized return and standard deviation. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 47: Cumulative Performance since inception
As of 12/31/2023



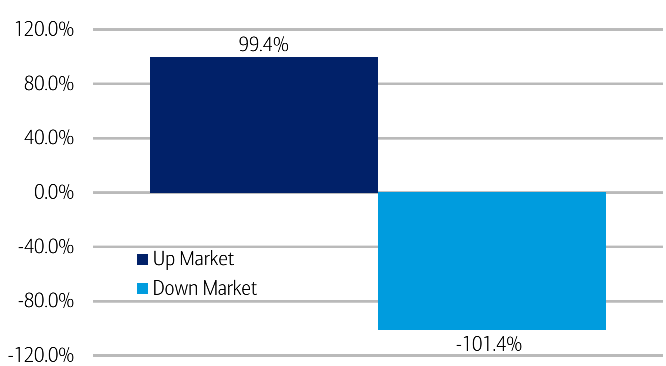
Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 48: 10 Year Risk/Return Profile
As of 12/31/2023



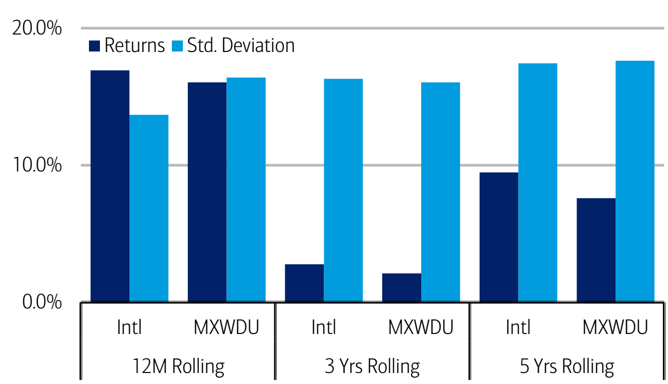
Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 49: Up Market & Down Market Capture – 10 Year
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 50: Annualized Rolling Returns
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Midcap Portfolio

Risk Profile: Moderately Aggressive

Given the higher volatility of mid-cap stocks and potential for a number of changes, this portfolio should be considered for moderately aggressive or aggressive investors who can tolerate a higher degree of turnover.

Exhibit 51: Sector Weightings vs. Benchmark
As of 12/31/2023

Sector	MidCap	Russell Mid Cap	Difference
Communication Services	1.0%	3.5%	-2.5%
Consumer Discretionary	8.4%	10.6%	-2.2%
Consumer Staples	4.8%	3.5%	1.4%
Energy	3.9%	4.8%	-0.9%
Financials	17.2%	15.5%	1.7%
Health Care	9.9%	10.3%	-0.4%
Industrials	17.1%	19.3%	-2.2%
Information Technology	17.3%	13.6%	3.7%
Materials	8.2%	5.7%	2.5%
Real Estate	6.3%	8.0%	-1.7%
Utilities	5.9%	5.2%	0.7%

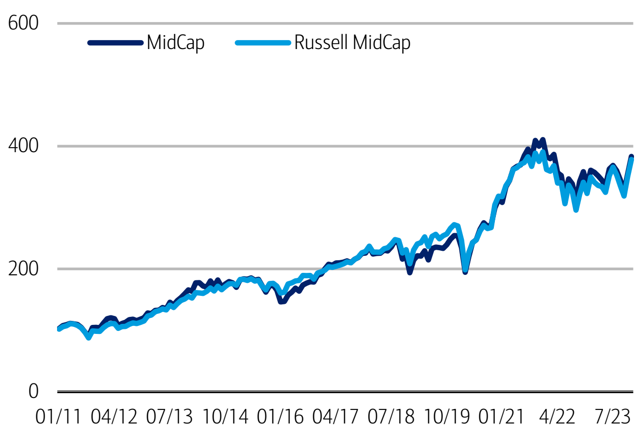
Source: FactSet, BofA Global Research Portfolios
BofA GLOBAL RESEARCH

Exhibit 52: Risk Metrics
As of 12/31/2023

	12 Months	3 year	5 year	10 year
	Absolute Metrics			
Return	13.5%	7.0%	14.6%	8.7%
Standard Deviation	17.6%	18.5%	20.2%	17.9%
Sharpe	0.5	0.3	0.6	0.4
	Relative Metrics			
Active Return	-3.5%	1.1%	2.1%	-0.4%
Tracking Error	3.8%	4.2%	4.6%	5.2%
Information Ratio	-0.9	0.3	0.5	-0.1
Up/Down Capture	91.1	103.7	107.5	97.1

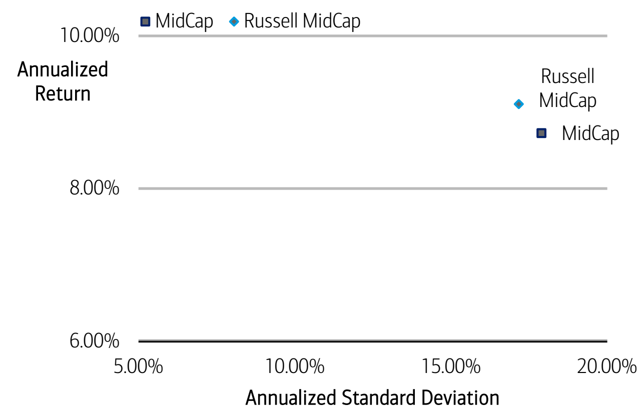
Source: BofA Global Research Portfolios
Annualized return and standard deviation. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 53: Cumulative Performance since inception
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Exhibit 54: 10 Year Risk/Return Profile
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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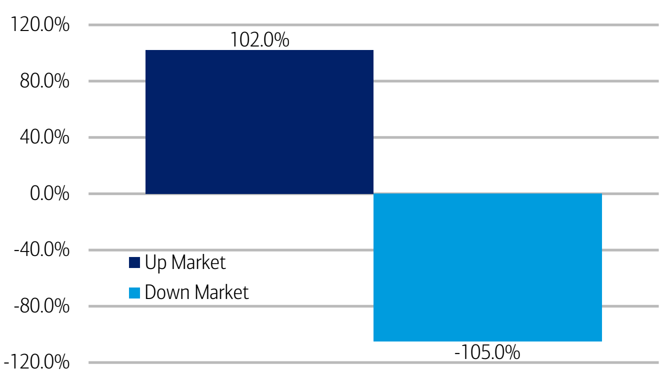
Exhibit 55: Up Market & Down Market Capture – 10 Year
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
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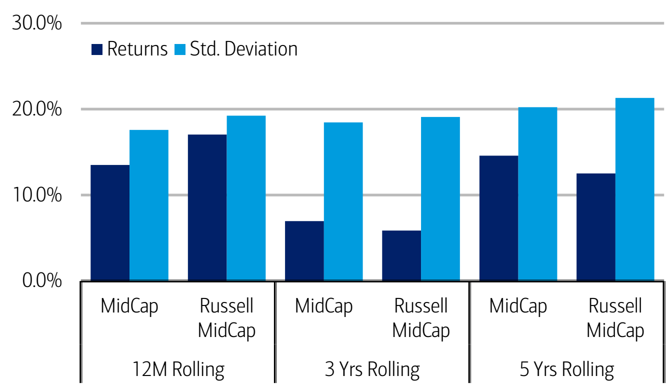
Exhibit 56: Annualized Rolling Returns
As of 12/31/2023



Source: BofA Global Research Portfolios. Based on monthly returns as of 12/31/2023
BofA GLOBAL RESEARCH

Performance and Risk Metrics Calculation Methodology

The performance of each of the Research Portfolios is computed on the basis of total return – price change plus dividend – and reflects all recommendations and rebalancing adjustments. For the purposes of calculation of performance, additions and deletions to the portfolios (including those resulting from rebalancing changes) were priced as of the market close on the date the change was published in a BofA Global Research report (or as of the market close on the next trading day if the relevant report either (1) was not published on a trading day or (2) was published after 1pm ET on the date of publication). The performance results do not reflect transaction costs, tax withholdings or any investment advisory fees.

The performance calculation assumes that dividends paid on securities in a portfolio are deposited in a cash account on the ex-dividend date. Stock spin-offs are credited as shares of the spun-off entity on ex-date; cash is received in lieu of fractional shares. The performance of the cash account of the Research Portfolios is based on an assumed investment in US Treasury Bills and is based on the total return of the 90-day Secondary Treasury Bill rate in the secondary market as of the last business day of the month prior to the performance calculation date as published by the Federal Reserve. As such, the cash component of the Research Portfolios total return does not reflect the returns of an investment in actual trading instruments.

The performance of each portfolio is shown in relation to an Index that is designed to provide a benchmark for the relevant portfolio's investment objective.

The performance of the Research Growth Portfolio is presented in relation to the Russell 1000 Growth Index solely to provide a benchmark for the relevant portfolios' investment objective.

The performance of the Research Income & Growth Portfolio is presented in relation to the S&P 500 solely to provide a benchmark for the relevant portfolios' investment objective.

The performance of the Research Income Portfolio is presented in relation to the Russell 1000 Value Index solely to provide a benchmark for the relevant portfolio's investment objective.

The performance of the Research Large Cap Defensive Portfolio is presented in relation to the Russell 1000 solely to provide a benchmark for the relevant portfolio's investment objective.

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The performance results of individuals following the Research Portfolios will differ from the performance contained in this report for a variety of reasons, including differences related to incurring transactions costs and/or investment advisory fees, as well as differences in the time and price at which securities were acquired and disposed of, and differences in the weighting of such securities. The performance results of individuals following the portfolios will also differ based on differences in treatment of dividends received, including the amount received and whether and when such dividends were reinvested.

Turnover for each of the Research Portfolios is calculated by taking the value of shares sold during the month divided by the starting portfolio value. These individual months are then summed for the longer periods.

Certain risk metrics are provided to further evaluate the appropriate portfolio for each investor. We have provided the 1, 3, 5, and 10 year annualized standard deviations of each of the Research Portfolios' total returns as a measure of absolute portfolio risk as well as 1, 3, 5, and 10 year annualized tracking errors as a measure of active risk relative to each portfolio's benchmark.

As a measure of risk-adjusted returns, the 1, 3, 5, and 10 year Sharpe and Information Ratios are provided for each of the Research Portfolios. A higher Sharpe or Information Ratio is preferred as it indicates a higher return per unit of risk. The Sharpe Ratio measures the portfolio's return in excess of that of a risk-free security and divides this return by the portfolio's standard deviation. The return of the 90-day Treasury Bill rate in the secondary market as of the last business day of the month prior to the performance calculation date as published by the Federal Reserve is used as the risk-free rate in this calculation. The Information Ratio measures the portfolio's active return in excess of its benchmark and divides this return by the portfolio's tracking error to the same benchmark.

The performance and appropriate risk metrics of the Research Portfolios are calculated by the BofA Research Portfolios Group. S&P Compustat also calculates the performance of the Research Portfolios serving to verify those of the BofA Research Portfolios Group. Performance figures and risk metrics are updated quarterly. *Past performance is no guarantee of future results. A complete performance record is available upon request.*

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