

Global Investment Committee | January 14, 2025

Confronting the Concentrated Equity Challenge and Measuring Drawdown Vulnerability

Concentrated equity positions pose a major challenge for investors by reducing their flexibility and potentially hindering forward risk-adjusted returns. Prior years of compounded investment returns can eventually transition from a blessing to a curse, as the concentrated positions' outsized risks may heighten the potential for sustained underperformance, elevated volatility and drawdowns. In this Special Report, we unpack the implications of concentrated equity holdings on prospective portfolio risk and return. Along with experiencing greater volatility, single-name equities typically underperform their reference indexes; as a result, most names deliver subpar risk-adjusted returns. Meanwhile, they are susceptible to material drawdowns. These realities raise the anxiety around concentrated equity positions.

As a means of identifying potential trouble, we also introduce the Equity Vulnerability Score, a quantitative factor-based ranking of US stocks' relative vulnerability to future drawdowns. As a risk management-focused indicator, this tool can offer insights for holders of concentrated equity positions. Moreover, it complements our existing [Tactical Equity Framework](#), which focuses on shorter-term drivers of risk-adjusted outperformance.

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Key Takeaways

- Many investors hold concentrated equity positions, which we define as any group of five or fewer holdings that collectively contribute more than 30% to portfolio-level risk. Concentrated equity positions can substantially increase portfolio risk while also hindering future returns relative to the diversified index.
- For stocks in the Russell 1000 Index since 2014, the average volatility has measured 37%, compared to just 15% for the index itself. Additionally, the average stock has suffered a maximum drawdown of approximately 50%, twice that of the index's 25% maximum drawdown.
- In addition to exhibiting above-market risk, most individual stocks also underperform the index on a five-year basis. Furthermore, of the minority of stocks that do outperform over a five-year trailing period, the great majority will underperform over the subsequent five years.
- Focusing on the relative vulnerability of US stocks to future drawdowns, we introduce a new quantitative factor-based ranking called the Equity Vulnerability Score.
- We constructed the Equity Vulnerability Score from a broad range of indicators, which we determined to be intuitively and empirically correlated with future drawdowns. We organize the chosen indicators into three categories: Financial Stability, Fundamental Momentum and Volatility and Tail Risk.
- The Equity Vulnerability Score can provide a quantitative gauge of a stocks' relative drawdown vulnerability in the context of an investor's concentrated position. Further, the Equity Vulnerability Score may enhance our existing equity factor screening capabilities by providing complementary risk-centric insights to bolster our existing Tactical Equity Framework.

Concentrated Equity: Unpacking the Implications

Most investors hold individual stocks in their portfolio, whether directly or through separately managed accounts or commingled vehicles like mutual funds and exchange-traded funds (ETFs). Equity holdings can help investors to generate income, but their capital appreciation typically contributes more substantially to their long-term total returns and can become a meaningful driver of wealth creation. We focus here on public equity positions, given the greater availability of data—and the availability of potential diversification strategies to address concentrated equity risk.

Either through high starting values or exceptional relative performance, positions in a single stock or group of stocks can become material drivers of investors' wealth, particularly in the case of large direct positions. In fact, many investors have become wealthy because of single-name positions that have appreciated in value and come to represent a substantial

portion of their overall wealth. Such holdings have become *concentrated equity positions*, typically resulting from entrepreneurial activity, executive compensation, gifts and inheritances, merger and acquisitions, private equity investing or simply the passage of time.

We define concentrated equity positions as any group of five or fewer holdings that collectively contributes more than 30% to portfolio-level risk, measurable through tools like Morgan Stanley's Portfolio Risk Platform. Since most single-name equity positions exhibit greater return volatility than an equity index like the S&P 500 or a diversified portfolio, their risk contribution to a portfolio tends to exceed their asset weight. As a result, a 15% or larger asset weight in these positions frequently tips the risk contribution scale toward concentration.

Concentrated equity positions pose a stiff challenge for investors, severely limiting their portfolios' prospective risk-adjusted returns. What may once have served as a blessing, given outsized returns, can become an anchor, as the concentrated positions' outsized risk potentially exposes investors to sustained underperformance, elevated volatility and material drawdowns.

Idiosyncratic, company-specific factors contribute materially to this outsized risk. Most stocks tend to underperform equity indexes, while also experiencing greater levels of volatility. Stocks that outperform their reference index over any one period typically fail to continue that outperformance over subsequent periods. This setup exacerbates the idiosyncratic risks inherent in holding concentrated equity positions in those names that have recently delivered outsized performance. On the surface, this mean-reversion behavior does not appear surprising. Still, a deeper study of the historical data reveals a striking level of market-relative underperformance and idiosyncratic risk among the cohort of individual stocks with the highest *trailing* outperformance.

Stocks Experience Greater Volatility and Drawdowns Than Their Respective Indexes

Most investors recognize that holding a concentrated equity position entails greater inherent risks than holding a diversified portfolio or a position in an S&P 500 Index-tracking ETF, for example. Diversification generally reduces portfolio-level volatility. In Exhibit 1, we display the differential between the risk levels for several major equity indexes and their underlying constituents. For the Russell 1000, the average constituent's volatility clocks in at 37% since 2014, compared to 15% for the index itself. Additionally, the average stock has suffered a maximum drawdown of approximately 50%—twice that of the index's 25% maximum drawdown. This data suggests that more than half of the Russell 1000's constituents have lost half their value at some point since 2014, a period of relative market calm. Moreover, 85% of stocks experienced a larger drawdown than the

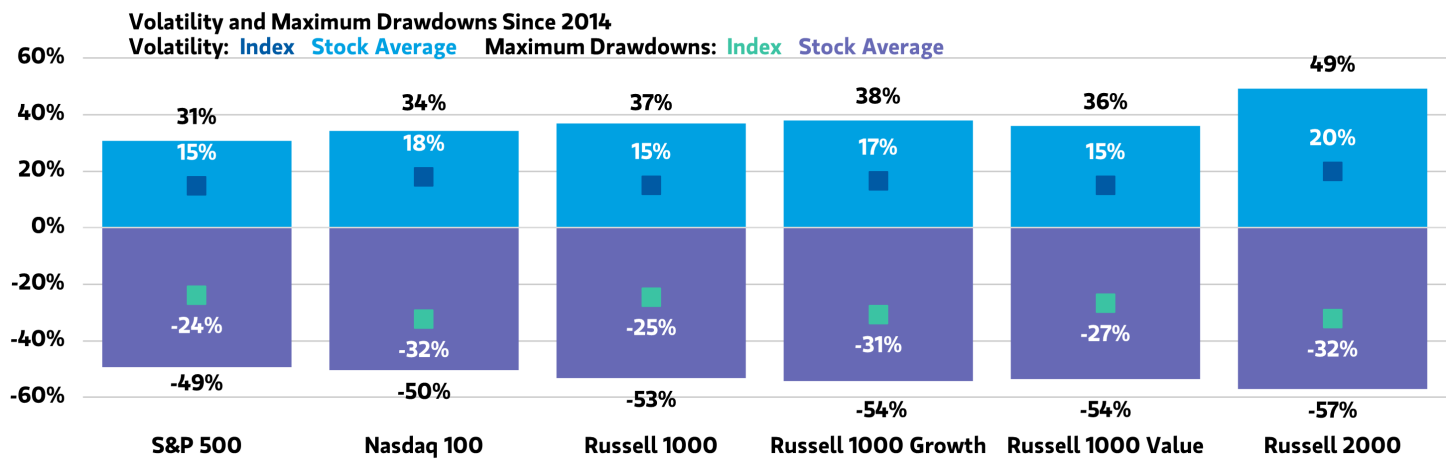
CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Russell 1000 itself over this period. We found consistent results across multiple indexes, including for large-cap (S&P 500 and Russell 1000), small-cap (Russell 2000), multi-cap (Russell 3000), technology-oriented (Nasdaq Composite) and style-centric indexes (Russell 1000 Growth and Value).

In Exhibit 2, we define a “catastrophic loss” as a 50% peak-to-trough decline. Nearly half of Russell 1000 stocks have suffered a catastrophic loss at some point over the past ten years. What’s more, of those stocks that suffered a catastrophic loss, close to 40% never fully recovered from their drawdowns. Such an adverse outcome could materially

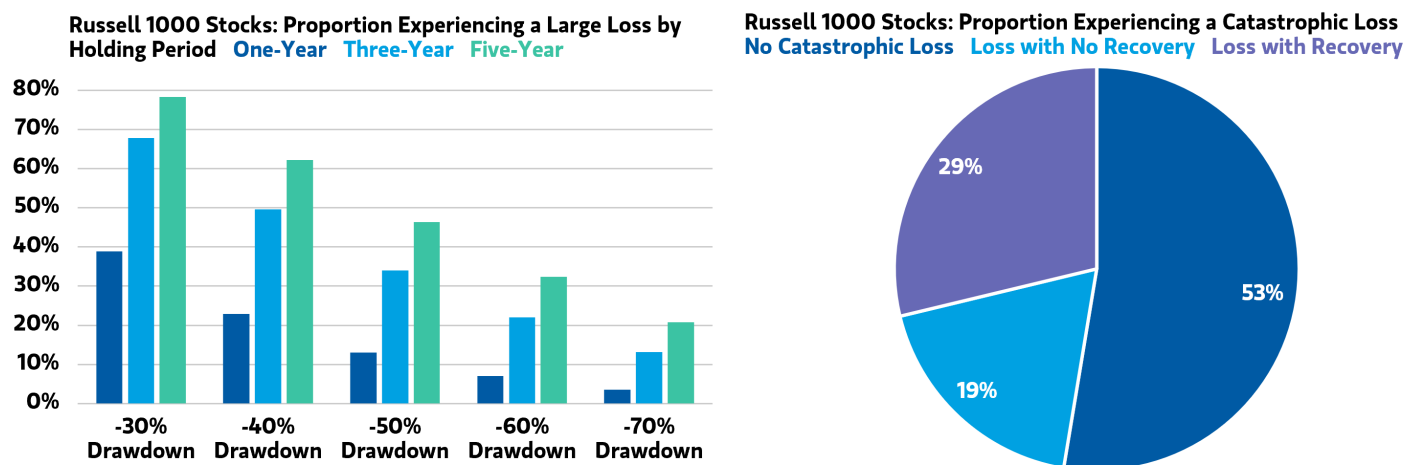
diminish an investor’s wealth, particularly in the case of concentrated equity positions. Over sufficiently long horizons, the probability that a stock experiences a catastrophic drawdown may be more significant than many investors realize. In any single year since 2014, the Russell 1000 constituents faced a roughly 13% chance of experiencing a drawdown of 50% or more, with the probability jumping to 34% and 46% over a three- and five-year period, respectively.

Exhibit 1: Individual Stocks Exhibit Greater Volatility and Drawdowns Than Their Associated Index



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024.

Exhibit 2: Individual Stocks Are Vulnerable to Catastrophic Losses, Particularly Over Longer Horizons



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024.

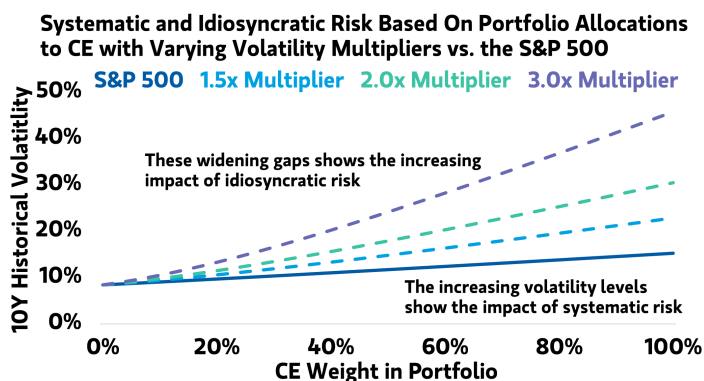
CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Concentrated Equity Positions Amplify Portfolio-Level Risk

The risks inherent in individual stocks become amplified for concentrated equity positions. As such, concentrated equity can hinder clients' ability to achieve their long-term goals.

While concentrated equity positions can contribute substantial gains during favorable periods, they can expose investors to heightened volatility and substantial downside risk amid market downturns or company-specific shocks. As illustrated in Exhibit 3, increasing weights in concentrated equity positions boosts an investor's idiosyncratic risk and downside exposure, in both absolute and relative terms. For more volatile names, the idiosyncratic risk gap widens more substantially. Moreover, we have observed that clients with concentrated equity positions (leading to greater idiosyncratic risk) tend to hold material overweight positions in equities overall (translating to increased systematic risk).

Exhibit 3: Concentrated Equity Positions Can Contribute to Both Systematic and Idiosyncratic Risk



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

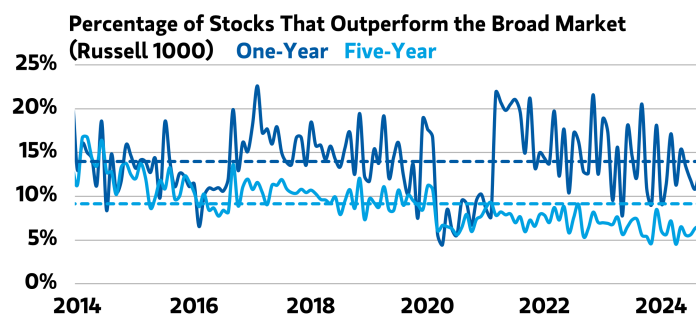
Beyond Fostering Increased Risk, Concentrated Positions Can Hinder Total Returns

From a return perspective, most stocks underperform the broad market over short and longer timeframes. Based on a historical study from 2014 to 2024, we found that just 48% of Russell 1000 constituents outperformed each month. On average, monthly outperformers experienced excess returns of 6.1%, while monthly laggards trailed by 6.1%. The imbalance between outperformers and laggards resulted in median excess returns of -0.35% per month. While this monthly performance drag does not appear significant at first, it compounds over time.

Extending the measurement horizon, individual positions' success rates and average degrees of underperformance both worsen. In fact, the proportion of stocks that outperformed over a one-year period ranged from 5% to 25%, averaging approximately 14%. Over three- and five-year periods, the average success rate declined to 10% and 9%, respectively.

Over a one-year holding period, a typical stock underperformed by an annualized 2.6%—and over two-, three- and five-year periods by an annualized 2.3%, 4.7% and 5.2%, respectively. This evidence suggests that most stocks trail their reference indexes over short- and longer-term holding periods. The results appear consistent across different timeframes and investment horizons, including both backward- and forward-looking periods.

Exhibit 4: A Stock's Likelihood of Outperforming Its Index Diminishes Over Longer Horizons



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Concentrated Equity Positions Typically Underperform Indexes in Risk-Adjusted Terms

Considering risk and return together, most stocks failed to measure up to reference indexes' risk-adjusted returns. As indicated in the previous two sections, most stocks either underperformed their respective indexes or experienced higher volatility—or both. As a result, investors did not receive due compensation, on average, for holding concentrated equity positions. This observation remains valid for multiple measures of risk, including volatility and drawdowns. While certain stocks may have generated superior risk-adjusted returns for a season, this success was typically rare and short-lived. These realities underscore the benefits of diversification for long-term investors.

The presence of smaller, lower-quality or riskier index constituents may potentially skew these findings. Some observers could argue that these names make a limited impact at the index level, owing to their generally lower market capitalizations. Still, certain investors may hold concentrated positions in these names, especially in the case of company founders, key executives and early investors. Moreover, by selecting the Russell 1000 as our primary study universe, we concentrated on larger-cap stocks, which typically exhibited higher-quality profiles. If we included members of the Russell 2000 Index, the risk characteristics would be even more dramatic.

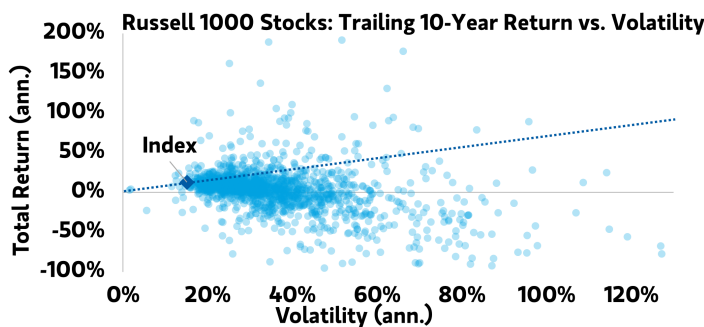
Furthermore, focusing our analysis on the 2014-2024 period led to implicitly conservative results, given the relatively

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

lower index-level volatility and limited bouts of market stress (late 2015, 2018, early 2020 and 2022) over this decade. Considering a longer history that included the major selloffs in 2000-2002 or 2007-2009 periods would have made the single-stock-versus-index results even less attractive from both risk and return perspectives.

Even with these nudges toward more favorable outcomes, the risk-adjusted returns of individual Russell 1000 constituents appear strikingly poor relative to the index overall.

Exhibit 5: The Russell 1000 Has Typically Delivered Better Risk-Adjusted Returns Than its Constituents



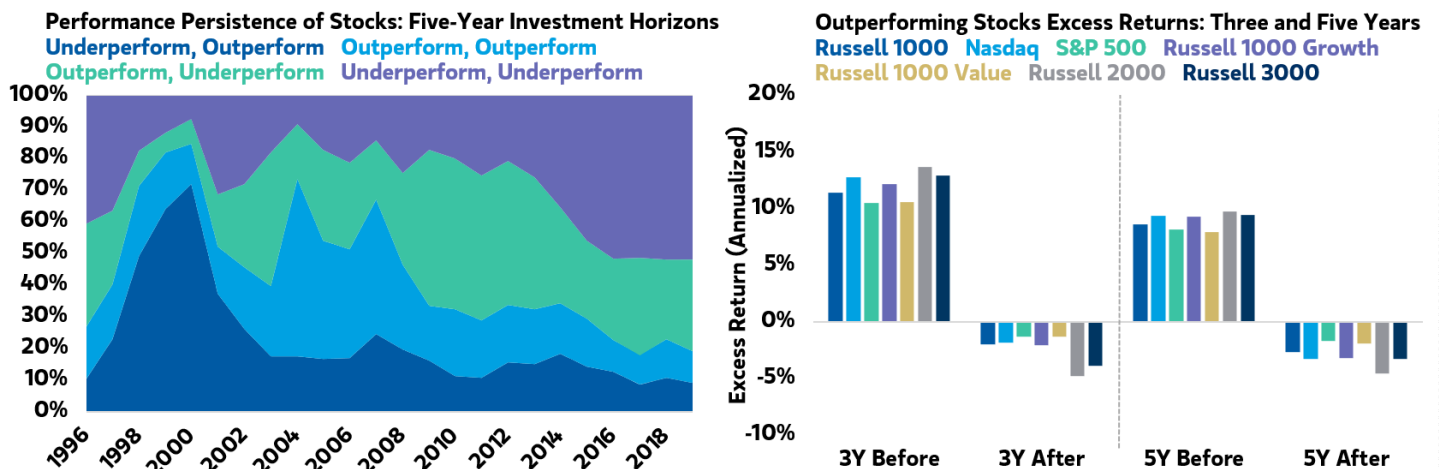
Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024. Each blue dot represents a Russell 1000 constituent, whereas the green diamond refers to the index itself. The dotted line illustrates the return and volatility combinations that would lead to an equivalent Sharpe ratio to that of the Russell 1000 Index. The high incidence of dots below that line highlights the relatively unattractive risk-adjusted returns of the great majority of the index constituents.

Persistent Investment Success Likely Proves More Illusive Than Our Psyches Like to Acknowledge

While the evidence suggests low success rates, on average, for any given period, we may ask: Have outperformers tended to continue onward? While empirical evidence supports the existence of short-term performance momentum, the data suggests that this momentum fades over time. In Exhibit 6, we investigated whether outperformers—stocks that have outperformed over a three- or five-year lookback period—delivered excess returns in look-forward periods of the same tenure. We believe this study offers several valuable conclusions:

1. Most stocks underperform on a five-year forward basis, becoming or staying underperformers relative to the index. Underperformers over the five-year lookback period are more likely to remain underperformers than become outperformers over the next five years.
2. On the flip side, the majority of outperformers (60%) in the five-year lookback period turn to underperformers over the five-year look-forward period.
3. Since 1990, the cohort of stocks that outperformed the index did so with a median excess return of 8% to 14% per year. Tracking the performance of these outperformers over the subsequent three and five years, however, reveals they subsequently underperformed by 2% to 5% per year on average.
4. The comparison between the index and its underlying constituents appears consistent across major US equity indexes
5. These results point to the evidence of mean-reversion and underscore how indexes benefit from the outperformance of a small, changing cohort of stocks that drive the bulk of returns.

Exhibit 6: Individual Stocks Exhibited Limited Persistence of Outperformance, With Most Turning Into or Remaining Underperformers Over Five-Year Look-Forward Periods



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

The post-Global Financial Crisis period has offered some anomalous examples of outperformers' persistence, including the Magnificent Seven—the subject of our January 2024 Special Report, "[Consequences of Concentration](#)." Megacap technology's success has prompted investors to question whether this dominant group has indeed defied the gravity of mean-reversion. Given that most companies fail to outperform their indexes, we observe that a small number of outsized outperformers can compensate for the greater number of underperformers at the index level. Still, history is rife with examples of once-successful companies that experienced profound declines. While these dramatic examples may be more prominent in investors' memories, the reality is that most stocks' experience will fall in between these two extremes.

We believe that valuations are another important consideration for investors with concentrated equity positions. As noted in our capital market assumptions, the starting level of valuations plays a significant role in determining price returns for periods beyond five years. Looking through the Russell 1000, we can identify many stocks with elevated valuations, particularly those that have experienced sharp rallies over a short period. Typically, such rallies rely on price/earnings (P/E) multiple expansion, which can make those names more vulnerable to subsequent pullbacks than price gains driven by positive earnings revisions.

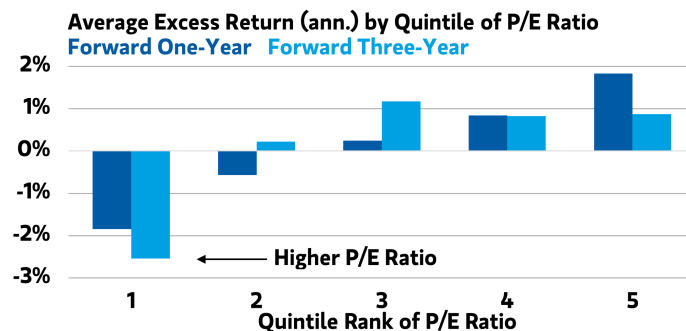
The Magnificent Seven stocks represent a high-quality, profitable group that has become deeply entrenched in the global economy and capital markets. Nonetheless, their inherent concentration, idiosyncratic risk and fair-to-full valuations may make them more vulnerable to drawdowns in the event of a shift in macroeconomic or market conditions.

Should outperformers experience "too much" success, it can lead to investor complacency and set the stage for the "Icarus Paradox," an allusion to the Greek fable where Icarus drowns after flying too close to the sun. Outperformers that experience rapid melt-ups can also become more susceptible to future meltdowns. Exhibit 7 shows how the forward excess returns are inversely correlated with starting valuation on average.

Diversification Strategies Can Mitigate Concentrated Equity Risk

The previous sections have highlighted the potential challenges associated with concentrated equity risk. Multiple diversification strategies can help to mitigate the systematic and idiosyncratic risks of concentrated equity positions; they may also provide benefits, such as deferring the realization of capital gains; generating income and liquidity; and helping to pursue charitable goals. We anticipate publishing accompanying Special Reports this year to review these diversification strategies and their implementation for clients.

Exhibit 7: Valuations Are Negatively Correlated With Forward Returns, Even on a One-Year Forward Basis



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Introducing the Equity Vulnerability Score

In the remainder of this report, we explore the Equity Vulnerability Score, a quantitative factor-based ranking of US stocks' relative vulnerability to future drawdowns. As a risk management-focused indicator, this tool can offer insights for holders of concentrated equity positions. Moreover, it complements our existing Tactical Equity Framework, which focuses on shorter-term drivers of risk-adjusted outperformance. Combining the two could support more risk-sensitive management for diversified US equity portfolios and identify potential vulnerability for holders of concentrated equity positions.

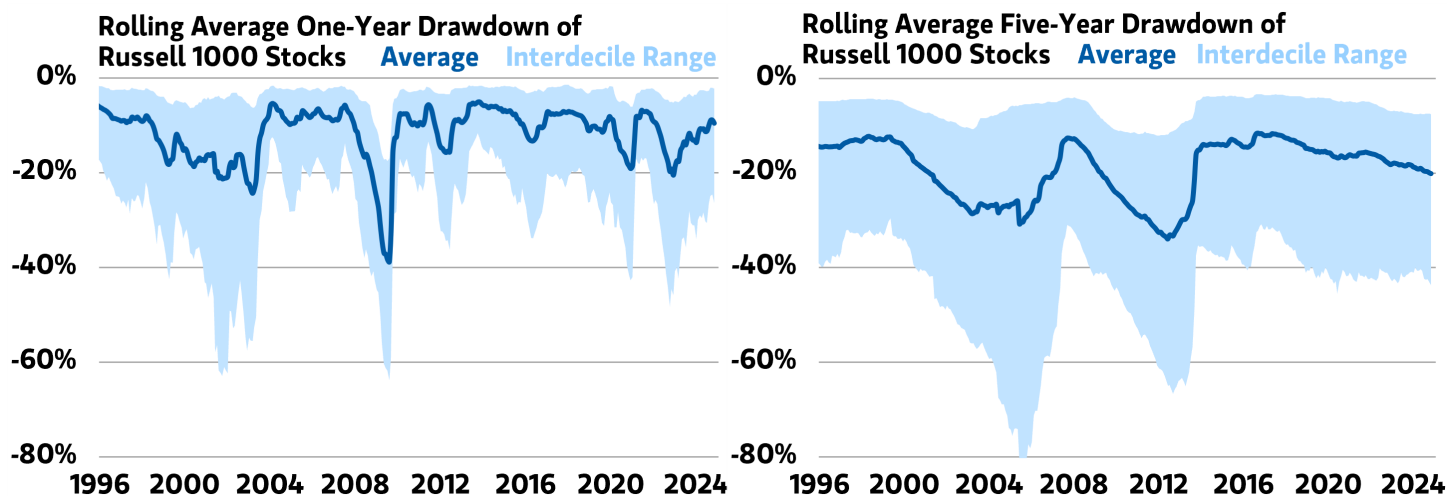
Why Have We Developed This Score?

To date, equity factor research has primarily focused on cross-sectional drivers of future returns, including shorter-term risk (often measured as volatility) as a secondary consideration. Our Tactical Equity Framework weighs eight single factors, such as Growth, Quality, Momentum and Value, and summarizes conclusions in a Multifactor Score. These elements concentrate on determining single stocks' relative attractiveness in terms of excess returns. While we studied risk-adjusted measures like the Sharpe ratio when designing the Tactical Equity Framework, the approach remains return-centric.

As we investigated the implications of concentrated equity positions, we began pondering an adjacent question: Can we construct a quantitative factor that can sort US equities by their vulnerability to future drawdowns? While the existing Quality and low Volatility factors approximate this objective, we were motivated to design a more comprehensive Equity Vulnerability Score, "fit to purpose" for assessing stocks' relative drawdown risk.

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Exhibit 8: Rolling One-Year and Five-Year Average Drawdowns for Russell 1000 Constituents



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Choosing Average Drawdown as the Target Metric

Given this objective, we next deliberated on how best to define equity vulnerability—and ultimately to select the primary objective variable to measure the effectiveness of the Equity Vulnerability Score. We soon surmised that drawdowns are the natural choice, as they more directly capture downside risk than more common measures like volatility. We define a maximum drawdown as the largest peak-to-trough loss from a specified high-water mark. The maximum drawdown could be considered in relation to a specific timeframe or on a since-inception basis. For the Equity Vulnerability Score, we chose to focus on the *average* drawdown over one- and five-year periods. We concluded that average drawdown could serve as a helpful summary of investors' stress while maintaining an equity position over a given period. It strikes a balance between capturing the acute pain of maximum drawdowns and the ongoing discomfort from sustained losses over the measurement period.

Drawdowns reflect a stock's downside and "left-tail" risk, requiring little abstraction and few assumptions. While volatility serves as the most universal approximation of risk, it falls short as a vulnerability metric, given that it ascribes equal treatment to fluctuations in return regardless of their direction. For real-world investors, the distinction between large upside and downside returns could not be more consequential.

For holders of concentrated equity positions, potential drawdowns resulting from suboptimal diversification likely represent the greatest investment concern. In such cases, investors may value capital preservation over the potential for greater capital appreciation.

To construct the Equity Vulnerability Score, we first studied the characteristics that have historically helped to predict individual stocks' average forward drawdowns. Exhibit 8 illustrates the average drawdown through time using rolling one- and five-year windows. Based on the wide interdecile range, we believe that any given stock's drawdown vulnerability holds material consequences for investors. While the depth of index-level drawdowns drives the interdecile range up and down, the spread between the smallest and largest drawdowns remains wide even in periods of market complacency, when stocks' idiosyncratic drivers matter more. Exhibit 9 provides four historical examples in which we calculate a stock's average drawdown, given the shape of its cumulative returns over a specified period.

Our analysis identified a modest opportunity for shifting the underlying indicators' weights for the one- and five-year horizons; we discuss this further in the "To Hedge or Diversify?" section below. Also, while we elected to focus on average drawdown as our objective variable, we found that the Equity Vulnerability Score effectively sorts individual stocks by maximum drawdown and drawdown duration.

Selecting Factors Through a Data-Centric Approach

Any quantitative tool that relies on historical analysis faces several data constraints: breadth, integrity and quality. Consistent with our Tactical Equity Framework, we rely primarily on FactSet's Quant Factor Library (QFL) dataset to develop the Equity Vulnerability Score. Instead of merely targeting attractive backtested results, we aim to uncover enduring insights that will bear fruit into the future. Robust historical studies require a breadth of data, covering a range of cross-sectional indicators across sufficient time periods encompassing multiple market cycles. Our starting dataset

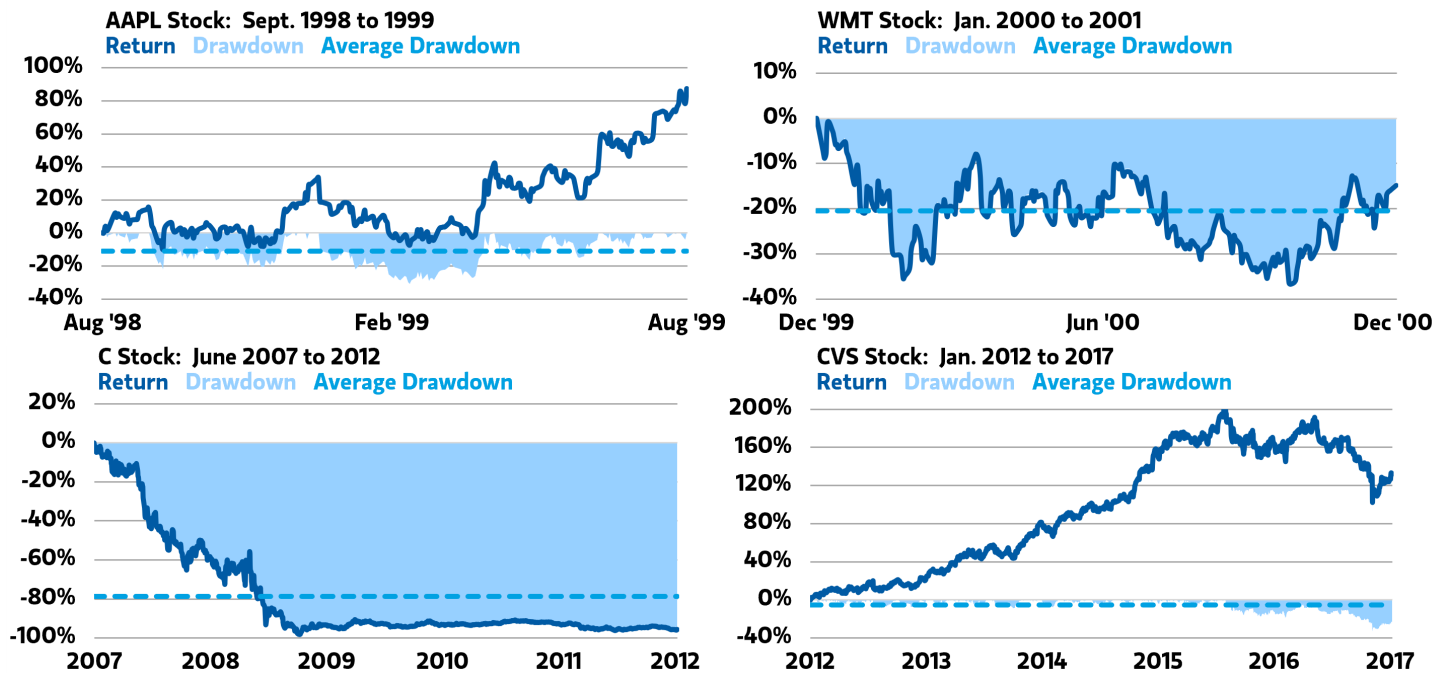
CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

includes hundreds of monthly stock-level indicators going back to the mid-1980s. Moreover, the dataset was constructed following leading practices to mitigate data integrity and quality concerns. The historical dataset reflects only “point-in-time” information to minimize the risk of overstating the effectiveness of historical simulations.

Without such precautions, revisions to historical data, such as financial data restatements, could bias conclusions by embedding as-yet-unknown information. We believe that

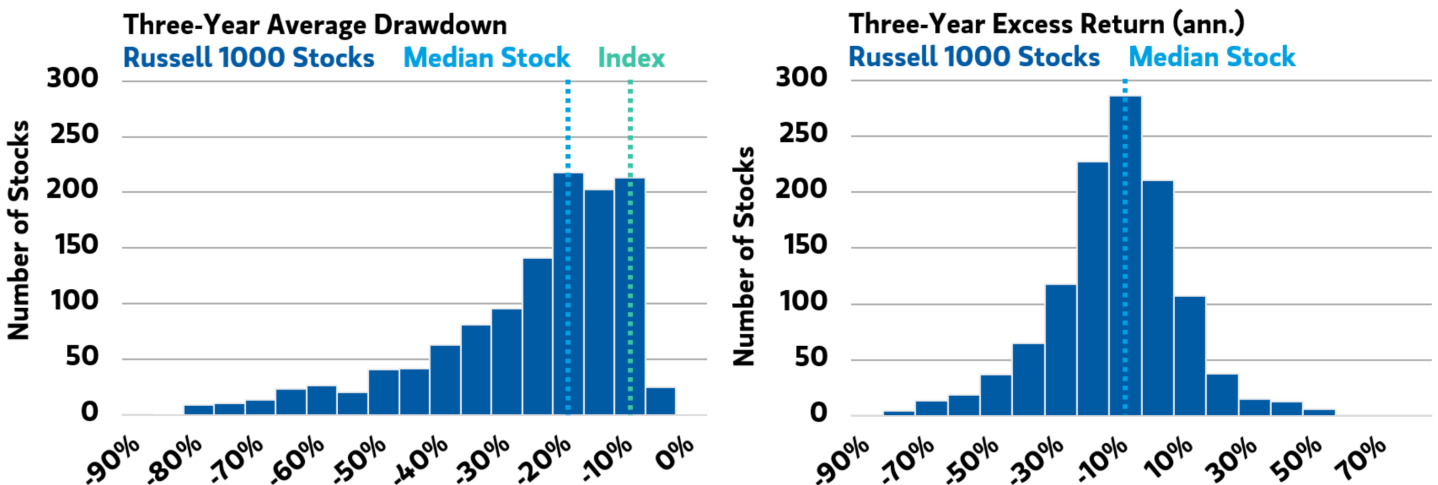
focusing on US large-cap stocks, using the Russell 1000’s constituents, further reduces data availability and quality concerns, which are more prevalent among smaller-cap and non-US securities. Exhibit 10 describes the Russell 1000’s constituent-level performance characteristics over the most recent three-year period. These charts highlight the dramatic dispersion in drawdowns and excess returns beneath the index level.

Exhibit 9: Comparing Stocks’ Cumulative Returns and Drawdowns With Their Average Drawdowns



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Exhibit 10: Russell 1000 Constituents Have Experienced a Wide Distribution in Drawdowns and Excess Returns



Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Constructing the Equity Vulnerability Score

To compute the Equity Vulnerability Score, we selected a broad and comprehensive set of drivers and organized them into three differentiated factor-categories, based on their underlying intuition. We included multiple underlying indicators in each category, based on their representativeness and effectiveness in sizing stocks' forward average drawdown.

The Financial Stability category blends six complementary measures of fundamental quality. These stability indicators are computed as the median value of a key financial metric, such as earnings per share or revenue, divided by the standard deviation of that metric for the same period. For these metrics, higher values appear to be more favorable, reflecting greater consistency in financial performance. The Financial Stability category most closely relates to the

Tactical Equity Framework's existing Quality and Profitability scores, which are similarly intended to represent a company's financial strength.

The Fundamental Momentum category measures the degree to which a company's key fundamentals are trending as well as their direction. The underlying fundamental metrics comprise well-known profitability, quality and valuation gauges. Consistent with previous studies, we found that the trends in these fundamentals can be more effective leading indicators than their levels. We capture momentum through the changes in trailing three-month moving averages versus 12-month moving averages.

The Volatility and Tail Risk category measures the variability of stocks' recent performance, which can be indicative of large forthcoming price changes. Indicators include measures of return dispersion, with a focus on left-tail returns and trading volume.

Exhibit 11: The Equity Vulnerability Score Organizes the Drivers of Stock Drawdowns Into Three Categories

Category	What It Measures
Financial Stability	The stability in key fundamental characteristics, which may suggest greater resilience to subsequent drawdowns. Indicators include growth in cash flows, earnings, and margins, scaled by the historical deviation of these values.
Fundamental Momentum	The recent trend in fundamentals by comparing the three- vs. 12-month moving averages in core fundamental characteristics, including measures of profitability, quality and valuation
Volatility and Tail Risk	The strength in recent price performance that may be predictive of large price changes in the future. Indicators include "left-tail" returns, returns dispersion and trading volume.

Source: Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Exhibit 12: The Equity Vulnerability Score Combines Multiple Metrics Across Three Categories

Financial Stability	Fundamental Momentum	Volatility and Tail Risk
EBIT Margin Stability	Altman Z-Score	Avg. Traded Value Ratio (1Y)
EBIT Stability	Book-to-Price Ratio	Avg. True Range (3M, 1Y, 3Y, and 5Y)
EPS Stability	Earnings Yield	Percentile of Drawdown (1Y)
Free Cash Flow Margin Stability	EBIT Margin	Residual Volatility (3M, 1Y, 3Y, and 5Y)
Free Cash Flow Stability	EBIT-to-EV Ratio	Semivariance (3M, 1Y, 3Y, and 5Y)
Revenue Stability	Free Cash Flow Yield	Ulcer Index (1Y)
	Market Value	
	Return on Total Capital	

Source: Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

As summarized in Exhibit 12, the Vulnerability Score's three categories each integrate six to 12 quantitative metrics. Blending multiple related but distinct indicators can improve the stability of the category-level signals, capitalizing on "information diversification." It can also enhance overall coverage by limiting the potential disruption from occasional missing data. We provide descriptions of each underlying indicator in the Appendix. We decided on these specific indicators after following a holistic process that jointly integrated both the quantitative and qualitative merits of each metric. We considered each indicator's 1) intuitive relationship to forward drawdowns; 2) representativeness within its category; and 3) historical efficacy using our long-term, multidecade dataset. In conjunction, we considered the interaction or correlation of the metrics within and across each category to ensure their complementarity, which boosts the diversification and stability of the aggregate signals and mitigates redundancy. These criteria help us to avoid potentially spurious signals. For example, we wish to exclude metrics that lack meaningful economic intuition as to how they relate to future drawdown risk.

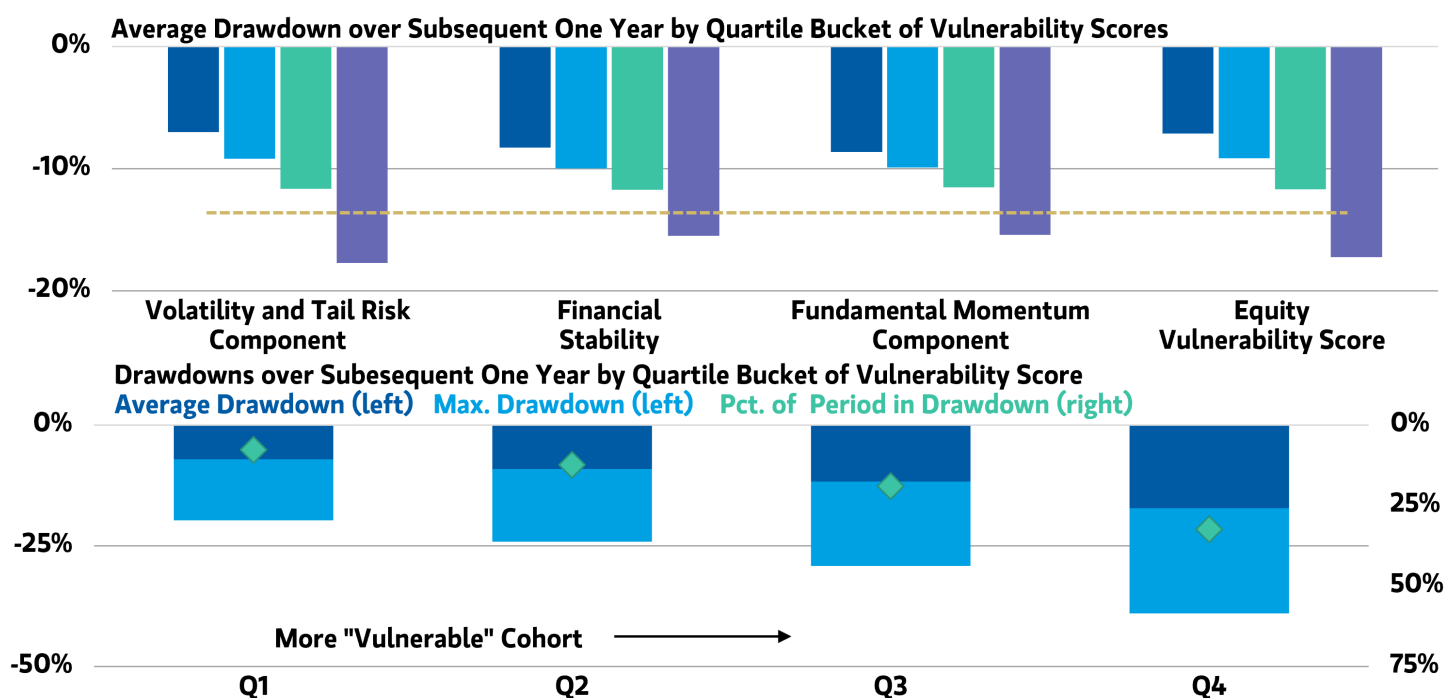
We believe that this process improves the Equity Vulnerability Score's capacity to identify stocks' vulnerability to future drawdowns, owing to our emphasis on intuitive relationships and rigorous historical testing. With any security-level model, slicing the universe into ever-finer increments can limit the perceived clarity of its conclusions.

To avoid the appearance of false precision, we prefer to present the score in less granular categories—that is, four categories ranging from least to most vulnerable. Moreover, even if the Equity Vulnerability Score fully captured all quantifiable information, it could never incorporate all the relevant qualitative information. Therefore, we recommend interpreting the score's output at a reasonable level of granularity—and weighing its conclusions in concert with a qualitative evaluation of any single stock.

Combining Insights Into a Single Vulnerability Score

After combining the scores for the underlying indicators shown in Exhibit 12 to derive the three categories-level scores, we then blend the categories' conclusions into the overall Equity Vulnerability Score. As such, the Equity Vulnerability Score is intended to provide a single distilled measure of a stock's prospective vulnerability to future drawdowns. Exhibit 13 summarizes the historical average effectiveness of the (five-year) Equity Vulnerability Score. The top panel shows that the three category scores individually and the overall score have each proved historically effective in monotonically sorting the quartile baskets by their five-year forward average drawdowns; the bottom panel shows that the Equity Vulnerability Score also corresponds closely to stocks' maximum drawdowns over the next five years, or over the percent of those five years that the stocks spend in a drawdown—a measure of drawdown persistence.

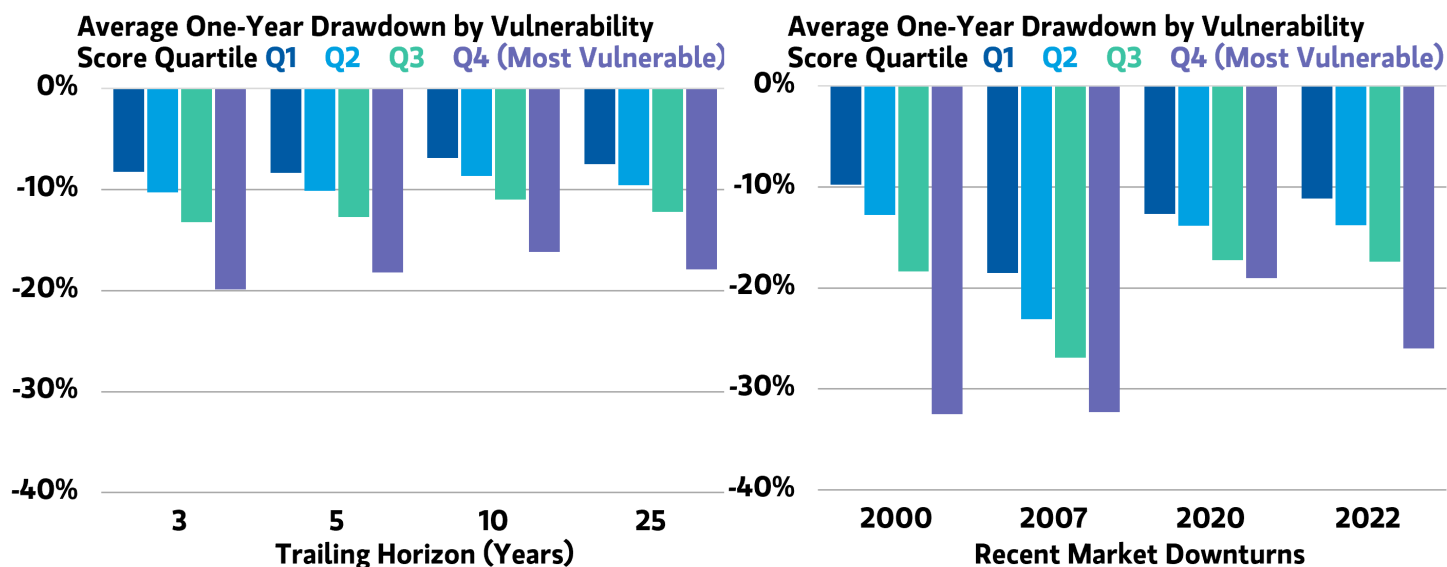
Exhibit 13: The Five-Year Equity Vulnerability Score Has Historically Sorted Stocks by Their Future Drawdowns



Note: We sorted the universe of Russell 1000 constituents according to the specified score and categorized the stocks into four equal-sized quartile baskets. We computed each basket's average and maximum drawdown on an equal-weighted basis and reconstituted each group monthly, starting with Dec. 31, 1990. We calculated the "Pct. of Period in Drawdown" metric as the average percent of the period that the group's constituents experienced a drawdown greater than 20%. Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Exhibit 14: The One-Year Vulnerability Score Has Demonstrated Its Usefulness Over Multiple Trailing Periods and During Periods of Elevated Market Stress



Note: We sorted the universe of Russell 1000 constituents according to the Equity Vulnerability Score and categorized the stocks into four equal-sized quartile baskets. We computed each basket's average and maximum drawdown on an equal-weighted basis and reconstituted each group monthly, starting with Dec. 31, 1990. The time ranges of the "Recent Market Downturns" cover the peak-to-trough decline beginning in the year specified for the Russell 1000 Index, shifted backward by six months to better align with the forward one-year orientation of the Vulnerability Score. Please refer to the "Key Terms" section in the Appendix for more information.

Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

We further corroborated the results for our entire historical dataset shown above by segmenting our data for shorter, more recent periods. We also did so by isolating periods characterized by acute market stress. The results (see Exhibit 14 below) highlight the Equity Vulnerability Score's robustness and relevance through a variety of potential future market environments.

To Hedge or Diversify? Applying the Vulnerability Score to Different Horizons

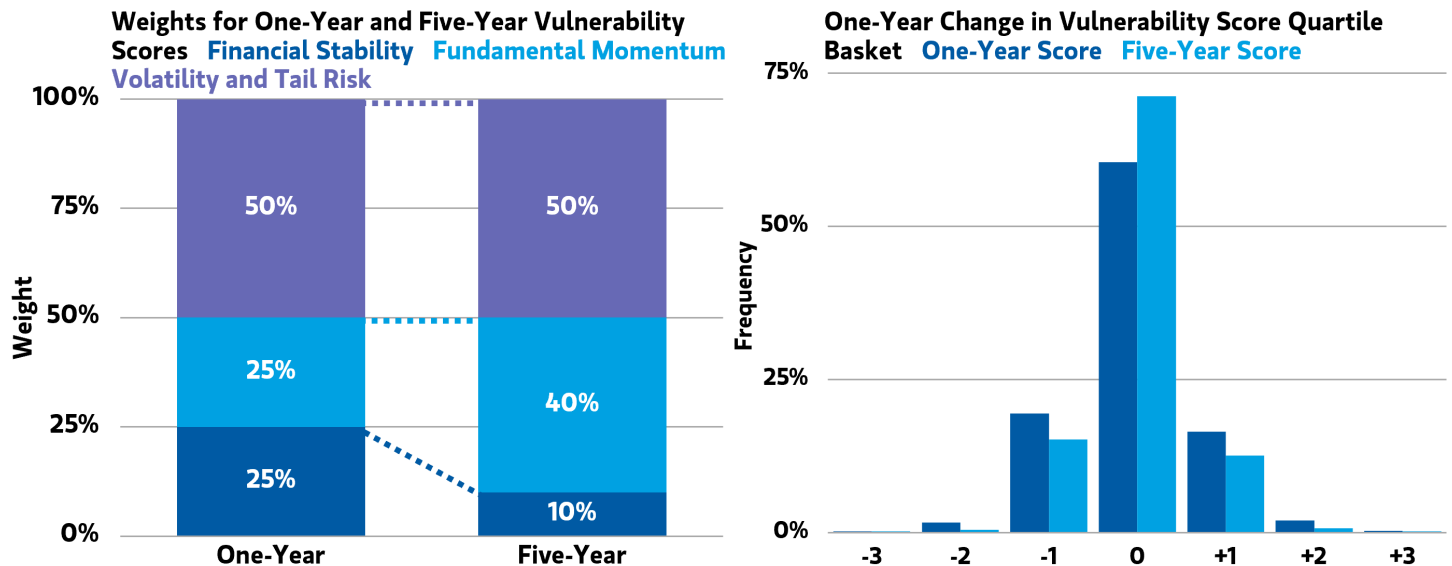
As noted above, we evaluated both one- and five-year forward drawdowns, developing similar but slightly modified Equity Vulnerability Scores for the two timeframes. For the one-year horizon, investors might more commonly wish to maintain their exposure to a specific stock while considering steps to hedge against the risk of a drawdown. By contrast, the five-year Equity Vulnerability Score could provide insight regarding the decision of whether to diversify away from an existing position.

While we found the effective variables to be mostly equivalent, we made slight alterations to tailor the one- and

five-year scores to their respective time horizons. The left panel of Exhibit 15 shows the adjustments to the category-level weightings for the five-year version, which reduces the weight of the Fundamental Momentum category in favor of Financial Stability. This change results in a more stable score through time, as evidenced by the right panel of Exhibit 15, which displays the average frequency of stocks' transition from one score quartile to another over a one-year horizon. The five-year version also includes a greater incidence of longer-term indicators, particularly in the Volatility and Tail Risk category. There, we exclude the three-month windows for the Average True Range, Residual Volatility and Semivariance indicators and replace them with their respective five-year windows. Exhibit 16 compares the high-level historical effectiveness of the one- and five-year Equity Vulnerability Score values in ranking forward one-year and five-year average drawdowns. After accounting for the greater magnitude of average drawdowns in the five-year forward period, their aggregate performance appears highly consistent.

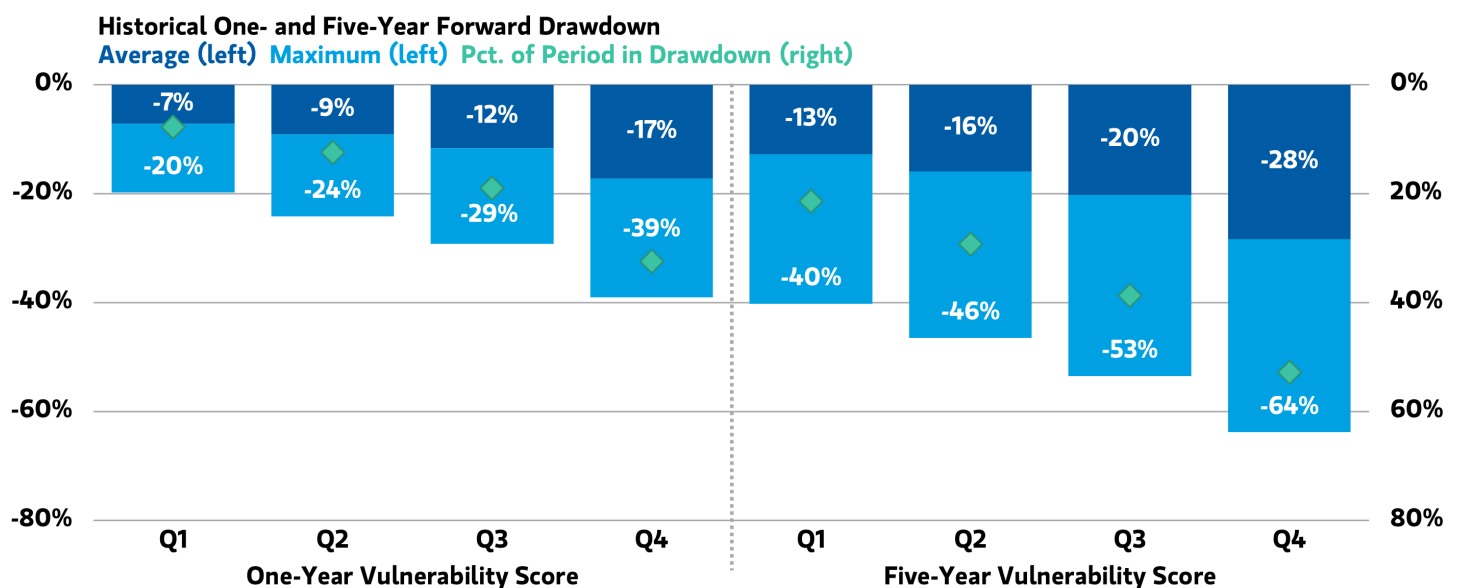
CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Exhibit 15: We Modestly Adjust the Category Weights To Tailor the Vulnerability Score to One- and Five-Year Horizons



Note: We sorted the universe of Russell 1000 constituents according to the Equity Vulnerability Score into four quartile baskets. We reconstituted the quartile baskets each year according to their updated Vulnerability Score and then calculated the percent of stocks that remained in the same quartile basket or moved into a different basket four quarters later, averaging the results over each rolling annual period since Dec. 31, 1990.
 Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Exhibit 16: One-Year and Five-Year Vulnerability Scores Have Both Proved Historically Effective in Sorting Stocks by Forward Drawdowns Over Their Respective Horizons



Note: We sorted the US stock universe according to the Equity Vulnerability Score and categorized the stocks into four equal-sized quartile baskets. We computed each basket's average drawdown on an equal-weighted basis and reconstituted each group monthly, starting with Dec. 31, 1990. We calculate the "Pct. of Period in Drawdown" metric as the average percent of the period that the group's constituents experienced a drawdown greater than 20%. Please refer to the "Key Terms" section in the Appendix for more information.
 Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Applying the Vulnerability Score

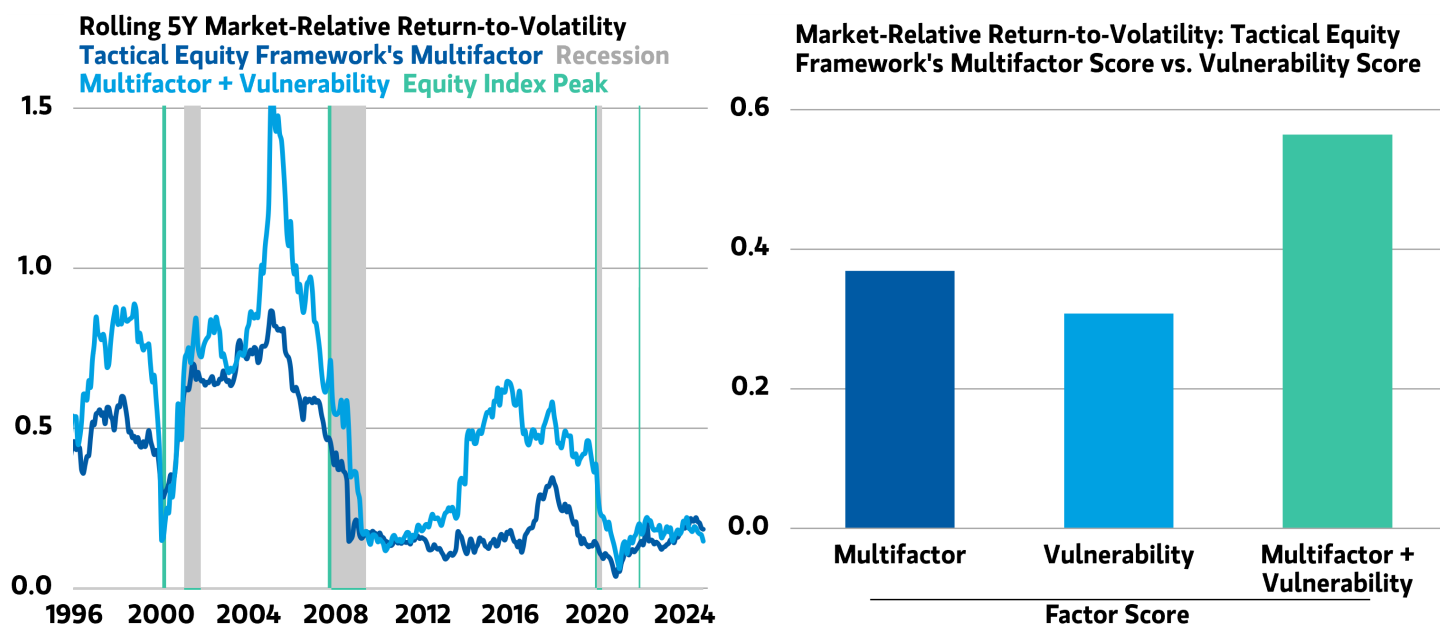
Complementing the Tactical Equity Framework by Helping to Identify Attractive Risk-Adjusted Exposures. The Equity Vulnerability Score may enhance our existing equity factor screening capabilities by providing complementary risk-centric insights to bolster our existing Tactical Equity Framework. The Tactical Equity Framework dynamically blends eight factor-categories—including Value, Growth, Quality, Profitability, Sentiment and Momentum—associated with attractive excess and risk-adjusted returns over a tactical three- to 12-month horizon. By overlaying our Equity Vulnerability Score with the Multifactor Score from the Tactical Equity Framework in simple fashion, we found a significant pickup in the market-relative return per volatility, as shown in Exhibit 17 below.

Equity Screening and Portfolio Monitoring. We believe that the Equity Vulnerability Score is a helpful addition to our toolkit for evaluating individual securities. We anticipate incorporating the Equity Vulnerability Score, alongside our existing Tactical Equity Framework, as an input to the portfolio strategy and tactical investment advice highlighted in “Topics in Portfolio Construction” and “Daily Positioning,” where we regularly discuss equity opportunities with potentially attractive factor exposures. We will also integrate the Vulnerability Score into the “Equity and ETF Screening

Tool,” made available to Financial Advisors. This tool provides customizable screening functionality and the capacity to review the characteristics of a client’s existing equity holdings, both on a stand-alone basis and as a portfolio.

Providing Insights Into Potential Index-Level Returns. As strategists, we regularly examine the relative performance of key equity style pairs, such as the Growth factor relative to Value or the high basket versus the low basket of the Quality or Momentum factor. The relative performance of these factor pairs can provide real-time insights into equity market conditions and aggregate investor preferences. In a similar fashion, the Equity Vulnerability Score may allow us to track the relative performance between the most and least Vulnerable—that is, “Vulnerable” and “Resilient”—stock baskets through time that may correlate with risk sentiment and “animal spirits.” We test this concept in Exhibit 18 using the trailing spread in performance between our most and least Vulnerable baskets as an indicator of future index-level performance. In the left panel, we observe that peaks in the trailing relative performance of Vulnerable versus Resilient stocks have corresponded with market peaks that ultimately precede selloffs. We further distill this relationship in the right panel, where we observe a significant inverse relationship between forward index-level returns and the performance spread between the Vulnerable and Resilient baskets.

Exhibit 17: Combining the Signals From the Tactical Equity Framework’s Multifactor Score and the Equity Vulnerability Score Has Historically Enhanced Risk-Adjusted Performance



Note: We sorted the US stock universe according to the Equity Vulnerability Score and Tactical Equity Framework’s Multifactor Score to construct four equal-sized quartile baskets for each score. Additionally, we constructed a “Multifactor + Vulnerability” basket that comprises the top quartile of stocks based on a combination of both scores. For the top-quartile basket for the Multifactor Score, Equity Vulnerability Score and the joint score, we calculated the rolling five-year market-relative return to volatility (left panel) and the average annual market-relative return to volatility (right panel) since Dec. 31, 1990. Please refer to the “Key Terms” section in the Appendix for more information.

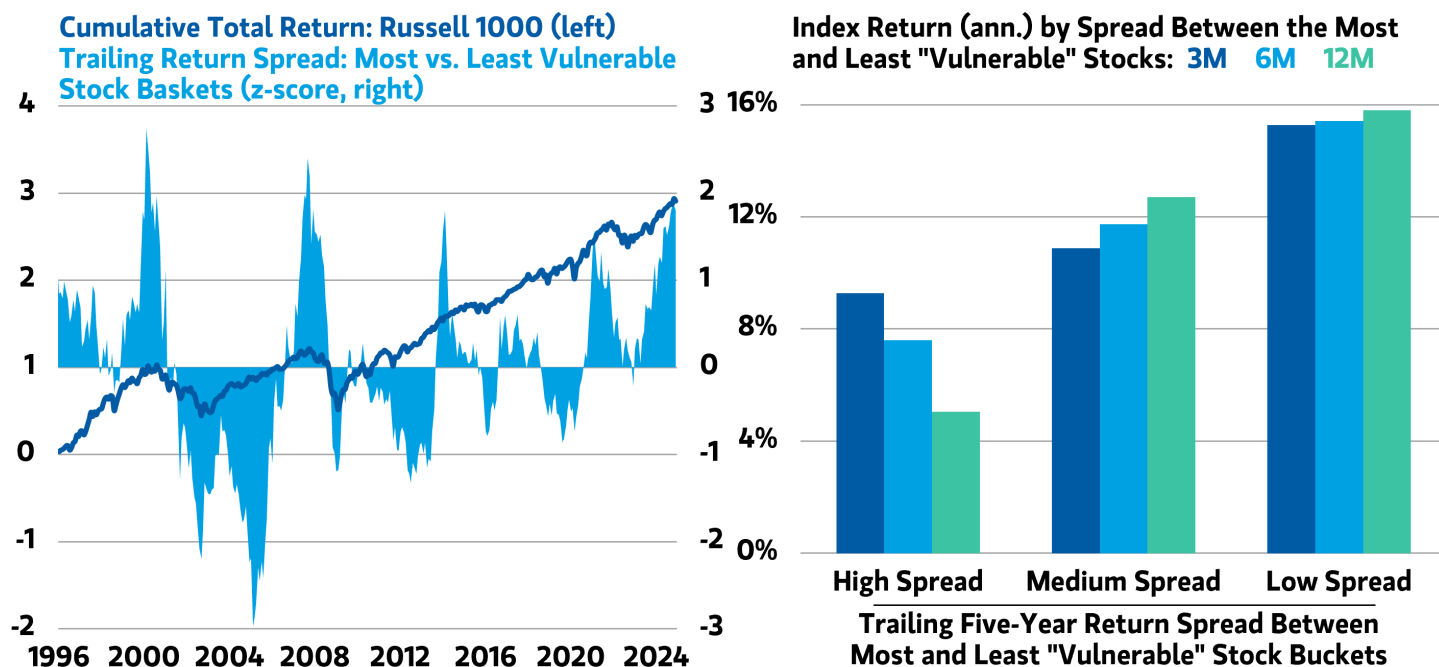
Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Providing Risk Insights for Investors With Concentrated Equity Positions. The Equity Vulnerability Score complements our ongoing research into a holistic analytical process for guiding investors with concentrated equity holdings. The Vulnerability Score may provide an additional data-driven input into the relative vulnerability of equity holdings,

empowering informed decision-making related to potential diversification strategies. We plan to review available diversification strategies for managing concentrated equity in a holistic and comprehensive manner in a future special report.

Exhibit 18: The Vulnerability Score as a Gauge of Market Conditions and Investor Sentiment



Note: We sorted the universe of Russell 1000 constituents according to the Equity Vulnerability Score into four quartile baskets. We reconstituted the quartile baskets each year according to their updated Vulnerability Score and then calculated the percent of stocks that remained in the same quartile basket or moved into a different basket four quarters later, averaging the results over each rolling annual period since Dec. 31, 1990.

Source: FactSet, Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Conclusion

Concentrated equity positions pose a major challenge for investors—and particularly Morgan Stanley Wealth Management clients. We believe that investors will benefit from a sober recognition of the full implications of concentrated equity positions' impact on their portfolio's prospective risk and return. Often, an investor's concentrated equity positions have emerged from exceptional compounded outperformance over time. This past investment success can fuel certain behavioral biases, which lead to attachment to the position and overconfidence in its outlook.

Our study of the historical data confirms the adage that "portfolio diversification offers the only free lunch in

investing." Relative to the overall index, the median stock has typically experienced higher volatility and larger drawdowns and had negative excess return. Furthermore, stocks that have recently outperformed or increased in valuation have fared worse than average over forward horizons.

As we focus on providing holistic advice and solutions to Morgan Stanley Wealth Management clients with concentrated equity holdings, we believe our new Equity Vulnerability Score may prove useful in evaluating the relative vulnerability of individual US equities. Furthermore, the risk-centric Equity Vulnerability Score will enhance our quantitative equity screening capabilities as a complement to our Tactical Equity Framework, which focuses on near-term excess and risk-adjusted returns.

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Appendix

Below, we present the underlying indicators in the Equity Vulnerability Score, including how to compute them and their expected directional relationship with a more favorable score—that is, a lower susceptibility to drawdowns.

Exhibit 19: The Equity Vulnerability Score’s Underlying Indicators Fall Into Three Categories

Category	Indicator	What It Measures	Direction
Financial Stability	EBIT Margin Stability	The company’s median earnings before interest taxes (EBIT) margin (EBIT Margin) over a historical timeframe, divided by the standard deviation of its EBIT Margin for the same period	(+)
Financial Stability	EBIT Stability	The company’s median EBIT over a historical timeframe, divided by the standard deviation of its EBIT for the same period	(+)
Financial Stability	EPS Stability	The company’s median earnings per share (EPS) over a historical timeframe, divided by the standard deviation of its EPS for the same period	(+)
Financial Stability	FCF Margin Stability	The company’s median free cash flow (FCF) margin (FCF Margin) over a historical timeframe, divided by the standard deviation of its FCF Margin for the same period	(+)
Financial Stability	FCF Stability	The company’s median FCF over a historical timeframe, divided by the standard deviation of its FCF for the same period	(+)
Financial Stability	Revenue Stability	The company’s median revenue over a historical timeframe, divided by the standard deviation of its revenues for the same period	(+)
Fundamental Momentum	Altman Z-Score	The trend in the Altman Z-Score, captured by the three-month less the 12-month average. The Altman Z-Score aims to assess a company’s level of financial distress and its probability of a near-term bankruptcy.	(+)
Fundamental Momentum	Book-to-Price Ratio	The trend in the Book-to-Price Ratio, captured by the three-month <i>less the</i> 12-month average	(-)
Fundamental Momentum	Earnings Yield	The trend in the Earnings Yield, captured by the three-month less the 12-month average	(-)
Fundamental Momentum	EBIT Margin	The trend in the EBIT Margin, captured by the three-month less the 12-month average	(+)
Fundamental Momentum	EBIT-to-EV Ratio	The trend in the EBIT-to-Enterprise Value Ratio (EBIT-to-EV), captured by the three-month less the 12-month average	(-)
Fundamental Momentum	FCF Yield	The trend in FCF Yield as the three-month vs. 12-month percentage change, captured by the three-month less the 12-month average	(-)
Fundamental Momentum	Market Value	The trend in Market Value, captured by the three-month vs. the 12-month percentage change	(+)
Fundamental Momentum	Return on Total Capital	The trend in Return on Total Capital, captured by the three-month vs. the 12-month percentage change	(+)
Volatility and Tail Risk	Average Traded Value Ratio	The liquidity of a security by measuring the average shares traded relative to shares outstanding over a specified time horizon. Higher values indicate that a security has shown greater liquidity and will likely be more easily traded, whereas lower values indicate an investor may find it harder to trade.	(-)
Volatility and Tail Risk	Average True Range	The volatility of a security using its true range in prices. For any given day, the true range captures the difference between the intraday high and intraday low price, while also considering the prior period’s close price. This metric takes the average of a security’s true range values across a specified horizon.	(-)
Volatility and Tail Risk	Drawdown	The peak-to-trough distance for a given security over a specified time horizon	(-)
Volatility and Tail Risk	Residual Volatility	The standard deviation of market risk-adjusted security returns over a given time horizon and frequency	(-)
Volatility and Tail Risk	Semivariance	The downside variance of an equity’s returns over a given time horizon and frequency. In other words, it captures the variance of only the negative returns over the specified horizon.	(-)
Volatility and Tail Risk	Ulcer Index	The downside risk of a security in terms of both the depth and duration of price declines. Higher values indicate that a security has experienced more significant drawdowns over the specified horizon.	(-)

Source: Morgan Stanley Wealth Management Global Investment Committee as of Dec. 31, 2024

Key Terms

Average drawdown measures the average peak-to-trough percent decline of a security over a specified time range. There could be one or more individual drawdowns over the given period.

A *factor-category*—also referred to as a factor “basket,” “bucket,” “cohort” or “grouping”—allows us to capture the returns and risk characteristics of quantitatively similar securities. We may estimate factor performance by first ranking an asset universe ordinarily according to the factor. From these rankings, we may categorize constituents into equal-sized groupings, such as into terciles or quintiles. We may then measure the factor baskets’ returns over time with a prespecified rebalancing frequency, such as monthly or annually, at which point the process reconstructs the groupings based on updated factor rankings. Practitioners typically weight each grouping’s constituents either equally or according to another quantitative measure, such as market value. To measure factor efficacy, we may then compare each basket’s return stream with others and with the universe average.

Factor scores, or rankings, typically measure the degree to which an individual bond exhibits a specific quantitative characteristic, based on its percentile ranking among peers. In this report, factor scores range from 0.00 to 1.00, with 1.00 indicating the most attractive level. Further, we use the term “characteristic” interchangeably with “indicator” and “metric.” We combine the insights from multiple characteristics by weighting the scores of related metrics to compute a final score for the Equity Vulnerability Score.

Maximum drawdown measures the maximum peak-to-trough percent decline of a security, either within a given time range or over a full period.

The *percentage-of-period-in-drawdown* reading measures the proportion of time that a stock remains more than 20% below its peak value over a specified time range.

A *quantile* is the general term for dividing a set of ordered data into equal-sized groups. Common, specific quantiles include quartiles, quintiles, and deciles, which segment data into four, five or 10 groups, respectively. An *interquantile range* is a related statistical concept which measures the dispersion or spread in the data based on quantile values. For instance, the *interquartile range* measures spread of the middle half of the data from the 75th percentile to the 25th percentile value, while the *interdecile range* measures the spread between the 90th percentile to the 10th percentile value.

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Note: This strategy is not provided as part of an investment advisory service offered by Morgan Stanley, is not available to be directly implemented as part of an investment advisory service and should not be regarded as a recommendation of any Morgan Stanley investment advisory service. All returns displayed are gross figures and as such, do not take into account fees and other expenses, including advisory fees, the deduction of which, when compounded over a period of years, would decrease returns. Information regarding Morgan Stanley standard advisory fees is available in the Form ADV Part 2, at www.morganstanley.com/adv.

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Disclosure Section

The **Global Investment Committee (GIC)** is a group of seasoned investment professionals from Morgan Stanley & Co. and Morgan Stanley Wealth Management who meet regularly to discuss the global economy and markets. The committee determines the investment outlook that guides our advice to clients. They continually monitor developing economic and market conditions, review tactical outlooks and recommend asset allocation model weightings, as well as produce a suite of strategy, analysis, commentary, portfolio positioning suggestions and other reports and broadcasts.

Spencer Cavallo, Lisha Ge, Van G. Hoang, Jason Traum and Matt Armstrong are not members of the Global Investment Committee, and any implementation strategies suggested have not been reviewed or approved by the Global Investment Committee.

Index Definitions

For other index, indicator and survey definitions referenced in this report please visit the following: <https://www.morganstanley.com/wealth-investmentsolutions/wmir-definitions>

Definitions

Drawdown refers to the largest cumulative percentage decline in net asset value or the percentage decline from the highest value or net asset value (peak) to the lowest value net asset value (trough) after the peak.

Term premium is the excess yield that investors require to commit to holding a long-term bond instead of a series of shorter-term bonds.

Mean reversion is the theory suggesting that prices and returns eventually move back toward the mean or average. This mean or average can be the historical average of the price or return, or another relevant average such as the growth in the economy or the average return of an industry.

Sharpe Ratio This statistic measures a portfolio's rate of return based on the risk it assumed and is often referred to as its risk-adjusted performance. Using standard deviation and returns in excess of the returns of T-bills, it determines reward per unit of risk. This measurement can help determine if the portfolio is reaching its goal of increasing returns while managing risk.

Adverse Active Alpha (AAA), Risk Score and Value Score

Adverse Active Alpha (AAA)

Adverse refers to the demonstrated ability to outperform in a variety of market environments and when conditions were difficult for active manager relative performance. "Difficult" periods were times when active management did not perform well relative to the index, as opposed to down market periods. At various times, active management has experienced difficult relative performance periods in up, down, and flat markets. We developed a set of factors to help discern which periods were more difficult for active managers that we utilize to identify managers that were able to overcome these headwinds and outperformed in the face of adversity.

Active refers to managers with portfolios that looked different from the index and had moderate to low tracking error. For all products, r_2 is used to measure the degree of differentiation from the benchmark in conjunction with tracking error. The ranking seeks to find managers that were active, but not taking **outsized** bets, and that had some degree of style consistency. The combination of r_2 and low tracking error is fairly uncommon among active managers, but we believe these traits may point toward managers with strong stock picking skills.

Alpha refers to the demonstrated ability to add value relative to an index and/or peers. Back tests indicate that highly ranked managers as a group outperformed the index and style peer group over subsequent periods and relative to active share alone. By combining the "adverse" component with the "active" component, we believe we increase the odds of finding some of the most proficient stock pickers.

Morgan Stanley's proprietary Risk Score methodology gauges managers' effectiveness in risk management. Based on extensive historical analysis, we evaluate over 18,000 strategies across 54 categories by ranking them according to several quantitative markers. We take a weighted average of these individual rankings to compute each manager's Risk Score, having found that managers with higher Risk Scores have historically produced more attractive subsequent risk adjusted returns, particularly under adverse conditions. For more information on Risk Score, please see the Risk Score whitepaper.

Morgan Stanley's proprietary Value Score methodology considers active investment strategies' value proposition relative to their costs. We measure perceived benefit from several quantitative markers and compute (1) "fair value" expense ratios for over 10,000 managers across 40 categories and (2) managers' perceived "excess value" by comparing the fair value expenses ratios to actual expense ratios. We then rank managers within each category by their excess value to assign a Value Score, having found that greater levels of excess value have historically corresponded to attractive subsequent performance. For more information on Value Score, please see the Value Score whitepaper.

Important Considerations Regarding the Adverse Active Alpha (AAA), Risk Score and Value Score ranking models:

In our view, the Adverse Active Alpha, Risk Score and Value Score manager rankings are an important part of evaluating managers for consideration. However, we do recognize that these ranking models cannot, in and of themselves, tell us which managers' strategies to invest in or when to buy or sell the strategies. While highly ranked managers historically performed well as a group in our analysis, past performance is not a guarantee of future results for any manager or strategy. Index returns assume reinvestment of dividends and, unlike fund or strategy returns, do not reflect any fees or expenses.

Indices are unmanaged and not available for direct investment.

Global Investment Manager Analysis (GIMA) strives to evaluate other material and forward-looking factors as part of the overall manager

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

evaluation process. Factors such as but not limited to manager turnover and changes to investment process can partially or fully negate a positive Adverse Active Alpha, Risk Score or Value Score ranking. Additionally, highly ranked managers can have differing risk profiles that might not be appropriate for all investors.

ADVERSE ACTIVE ALPHA is a registered service mark of Morgan Stanley and/or its affiliates. U.S. Pat. No. 8,756,098 applies to the Adverse Active Alpha system and/or methodology.

Survivorship Bias

Survivorship bias results when certain constituents are removed from an index. This often results from the closure of funds due to poor performance, “blow ups,” or other such events. As such, this bias typically results in performance being skewed higher. As noted, hedge fund index performance biases can result in positive or negative skew. However, it would appear that the skew is more often positive. While it is difficult to quantify the effects precisely, investors should be aware that idiosyncratic factors may be giving hedge fund index returns an artificial “lift” or upwards bias.

Asset Class and Other Risk Considerations

Equity securities may fluctuate in response to news on companies, industries, market conditions and general economic environment.

Bonds are subject to interest rate risk. When interest rates rise, bond prices fall; generally the longer a bond's maturity, the more sensitive it is to this risk. Bonds may also be subject to call risk, which allows the issuer to retain the right to redeem the debt, fully or partially, before the scheduled maturity date. Proceeds from sales prior to maturity may be more or less than originally invested due to changes in market conditions or changes in the credit quality of the issuer.

High yield bonds are subject to additional risks such as increased risk of default and greater volatility because of the lower credit quality of the issues.

Duration, the most commonly used measure of bond risk, quantifies the effect of changes in interest rates on the price of a bond or bond portfolio. The longer the duration, the more sensitive the bond or portfolio would be to changes in interest rates. Generally, if interest rates rise, bond prices fall and vice versa. Longer-term bonds carry a longer or higher duration than shorter-term bonds; as such, they would be affected by changing interest rates for a greater period of time if interest rates were to increase. Consequently, the price of a long-term bond would drop significantly as compared to the price of a short-term bond.

An investment in an **exchange-traded fund involves** risks similar to those of investing in a broadly based portfolio of equity securities traded on an exchange in the relevant securities market, such as market fluctuations caused by such factors as economic and political developments, changes in interest rates and perceived trends in stock and bond prices. Investing in an international ETF also involves certain risks and considerations not typically associated with investing in an ETF that invests in the securities of U.S. issues, such as political, currency, economic and market risks. These risks are magnified in countries with emerging markets, since these countries may have relatively unstable governments and less established markets and economics. ETFs investing in physical commodities and commodity or currency futures have special tax considerations. Physical commodities may be treated as collectibles subject to a maximum 28% long-term capital gains rates, while futures are marked-to-market and may be subject to a blended 60% long- and 40% short-term capital gains tax rate. Rolling futures positions may create taxable events. For specifics and a greater explanation of possible risks with ETFs, along with the ETF's investment objectives, charges and expenses, please consult a copy of the ETF's prospectus. Investing in sectors may be more volatile than diversifying across many industries. The investment return and principal value of ETF investments will fluctuate, so an investor's ETF shares (Creation Units), if or when sold, may be worth more or less than the original cost. ETFs are redeemable only in Creation Unit size through an Authorized Participant and are not individually redeemable from an ETF.

Please consider the investment objectives, risks, charges and expenses of the fund(s) carefully before investing. The prospectus contains this and other information about the fund(s). To obtain a prospectus, contact your financial advisor. Please read the prospectus carefully before investing.

Alternative investments may be either traditional alternative investment vehicles, such as hedge funds, fund of hedge funds, private equity, private real estate and managed futures or, non-traditional products such as mutual funds and exchange-traded funds that also seek alternative-like exposure but have significant differences from traditional alternative investments. Alternative investments often are speculative and include a high degree of risk. Investors could lose all or a substantial amount of their investment. Alternative investments are appropriate only for eligible, long-term investors who are willing to forgo liquidity and put capital at risk for an indefinite period of time. They may be highly illiquid and can engage in leverage and other speculative practices that may increase the volatility and risk of loss. Alternative Investments typically have higher fees than traditional investments. Investors should carefully review and consider potential risks before investing. Certain of these risks may include but are not limited to: Loss of all or a substantial portion of the investment due to leveraging, short-selling, or other speculative practices; Lack of liquidity in that there may be no secondary market for a fund; Volatility of returns; Restrictions on transferring interests in a fund; Potential lack of diversification and resulting higher risk due to concentration of trading authority when a single advisor is utilized; Absence of information regarding valuations and pricing; Complex tax structures and delays in tax reporting; Less regulation and higher fees than mutual funds; and Risks associated with the operations, personnel, and processes of the manager. Further, opinions regarding Alternative Investments expressed herein may differ from the opinions expressed by Morgan Stanley Wealth Management and/or other businesses/affiliates of Morgan Stanley Wealth Management.

Certain information contained herein may constitute forward-looking statements. Due to various risks and uncertainties, actual events, results or the performance of a fund may differ materially from those reflected or contemplated in such forward-looking statements. Clients should carefully consider the investment objectives, risks, charges, and expenses of a fund before investing.

Alternative investments involve complex tax structures, tax inefficient investing, and delays in distributing important tax information. Individual funds have specific risks related to their investment programs that will vary from fund to fund. Clients should consult their own tax and legal advisors as Morgan Stanley Wealth Management does not provide tax or legal advice.

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

Interests in alternative investment products are offered pursuant to the terms of the applicable offering memorandum, are distributed by Morgan Stanley Smith Barney LLC and certain of its affiliates, and (1) are not FDIC-insured, (2) are not deposits or other obligations of Morgan Stanley or any of its affiliates, (3) are not guaranteed by Morgan Stanley and its affiliates, and (4) involve investment risks, including possible loss of principal. Morgan Stanley Smith Barney LLC is a registered broker-dealer, not a bank.

Because of their narrow focus, **sector investments** tend to be more volatile than investments that diversify across many sectors and companies. **Technology stocks** may be especially volatile. Risks applicable to companies in the **energy and natural resources sectors** include commodity pricing risk, supply and demand risk, depletion risk and exploration risk. **Health care sector** stocks are subject to government regulation, as well as government approval of products and services, which can significantly impact price and availability, and which can also be significantly affected by rapid obsolescence and patent expirations.

Environmental, Social and Governance ("ESG") investments in a portfolio may experience performance that is lower or higher than a portfolio not employing such practices. Portfolios with ESG restrictions and strategies as well as ESG investments may not be able to take advantage of the same opportunities or market trends as portfolios where ESG criteria is not applied. There are inconsistent ESG definitions and criteria within the industry, as well as multiple ESG ratings providers that provide ESG ratings of the same subject companies and/or securities that vary among the providers. Certain issuers of investments may have differing and inconsistent views concerning ESG criteria where the ESG claims made in offering documents or other literature may overstate ESG impact. ESG designations are as of the date of this material, and no assurance is provided that the underlying assets have maintained or will maintain and such designation or any stated ESG compliance. As a result, it is difficult to compare ESG investment products or to evaluate an ESG investment product in comparison to one that does not focus on ESG. Investors should also independently consider whether the ESG investment product meets their own ESG objectives or criteria. There is no assurance that an ESG investing strategy or techniques employed will be successful. Past performance is not a guarantee or a dependable measure of future results.

Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets.

Nondiversification: For a portfolio that holds a concentrated or limited number of securities, a decline in the value of these investments would cause the portfolio's overall value to decline to a greater degree than a less concentrated portfolio. Portfolios that invest a large percentage of assets in only one industry sector (or in only a few sectors) are more vulnerable to price fluctuation than those that diversify among a broad range of sectors.

Growth investing does not guarantee a profit or eliminate risk. The stocks of these companies can have relatively high valuations. Because of these high valuations, an investment in a growth stock can be more risky than an investment in a company with more modest growth expectations.

Value investing does not guarantee a profit or eliminate risk. Not all companies whose stocks are considered to be value stocks are able to turn their business around or successfully employ corrective strategies which would result in stock prices that do not rise as initially expected.

Rebalancing does not protect against a loss in declining financial markets. There may be a potential tax implication with a rebalancing strategy. Investors should consult with their tax advisor before implementing such a strategy.

Credit ratings are subject to change.

Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets.

The **indices** are unmanaged. An investor cannot invest directly in an index. They are shown for illustrative purposes only and do not represent the performance of any specific investment.

The **indices selected by Morgan Stanley Wealth Management** to measure performance are representative of broad asset classes. Morgan Stanley Wealth Management retains the right to change representative indices at any time.

Yields are subject to change with economic conditions. Yield is only one factor that should be considered when making an investment decision.

Hypothetical Performance

General: Hypothetical performance should not be considered a guarantee of future performance or a guarantee of achieving overall financial objectives. Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets.

Hypothetical performance results have inherent limitations. The past performance shown here is simulated performance based on benchmark indices, not investment results from an actual portfolio or actual trading. There can be large differences between hypothetical and actual performance results achieved by a particular asset allocation. Actual performance results of accounts vary due to, for example, market factors (such as liquidity) and client-specific factors (such as investment vehicle selection, timing of contributions and withdrawals, restrictions and rebalancing schedules). Clients would not necessarily have obtained the performance results shown here if they had invested in accordance with any GIC asset allocation, idea or strategy for the periods indicated.

Despite the limitations of hypothetical performance, these hypothetical performance results may allow clients and Financial Advisors to obtain a sense of the risk / return trade-off of different asset allocation constructs.

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Indices are unmanaged. They do not reflect any management, custody, transaction or other expenses, and generally assume reinvestment of dividends, accrued income and capital gains. Past performance of indices does not guarantee future results. Investors cannot invest directly in an index.

CONFRONTING THE CONCENTRATED EQUITY CHALLENGE AND MEASURING DRAWDOWN VULNERABILITY

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