

# Active, Passive & In-Between Equity Strategies

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# Outline

- Investment terms and definition of risk
  - Protecting in down markets is more valuable than winning in up markets
- Active vs. Passive Debate
  - More active managers have underperformed than outperformed the market since 2010
  - While passive index managers have outperformed active managers on average since then, they do not protect in down markets and the index is the most concentrated it has ever been
- Investment Manager Implementation Approaches Impact Pension Fund Risk – More Choices than Just Active or Passive
- Enhanced Indexing and certain Rules-Based Strategies can Provide Downside Protection While Maintaining Equity Exposure

# Investment Terms

- **Annualized Risk**: The variation of a portfolio's returns around its average return over an annual basis (measured by standard deviation).
- **Value-Added**: The difference between the manager's annualized return and the benchmark's (S&P 500) annualized return.
- **Alpha**: Is a risk-adjusted measure of Value-Added
- **Tracking Error or Active Risk**: The annualized standard deviation of value-added, it measures the variation of a portfolio's returns relative to the benchmark. Managers with larger active bets tend to have return streams exhibiting higher tracking error.
  - **A manager with a 5% tracking error can be expected to produce positive & negative value-added in excess of 5% in 1 out of every 3 years.**

# Risk Does Matter

The Mathematics of Compounding

**It's Tougher to Get It Back**

**If You Lose**

10%

20%

55%

75%

*Actual peak to  
trough decline  
in S&P 500  
during 2008  
bear market.*

**Then You Need**

11%

25%

122%

300%

**Of an investment ...**

**To get back to where you started**

*The return to an investment is Asymmetric as losses have greater impact than gains - the more you lose, you more you must earn to get back your initial investment*

# Why Does Risk Matter?

A Simple Example

*Two investment programs produce the same annual average return but with different levels of risk*

| Year | Investment A<br>Annual Return | Investment B<br>Annual Return |
|------|-------------------------------|-------------------------------|
| 1    | -6.0                          | -20.0                         |
| 2    | 12.0                          | 16.0                          |
| 3    | 10.0                          | 12.0                          |
| 4    | -7.0                          | -22.0                         |
| 5    | 14.0                          | 20.0                          |
| 6    | 15.0                          | 22.0                          |
| 7    | 8.0                           | 8.0                           |
| 8    | 13.0                          | 18.0                          |
| 9    | 18.0                          | 28.0                          |
| 10   | 3.0                           | -2.0                          |
| 11   | 10.0                          | 12.0                          |
| 12   | 6.0                           | 4.0                           |
| 13   | -12.0                         | -32.0                         |
| 14   | 18.0                          | 28.0                          |
| 15   | -10.0                         | -28.0                         |
| 16   | 21.0                          | 34.0                          |
| 17   | 23.0                          | 38.0                          |
| 18   | 7.0                           | 6.0                           |
| 19   | 5.0                           | 2.0                           |
| 20   | 12.0                          | 16.0                          |

*Average Annual Return is 8% for both Investments (A and B). The Standard Deviation of B (20%) is twice the volatility of A (10%).*

*While the average annual return is the same for the two investments, the annualized (or geometric) return is quite different.*

# Volatility Matters Because It Reduces Wealth

|   | Investment A | Investment B | Investment C |
|---|--------------|--------------|--------------|
| Average Annual Return                           | 8.0%         | 8.0%         | 7.0%         |
| Standard Deviation of Annual Returns            | 10.1%        | 20.1%        | 10.1%        |
| Annualized (Geometric Average) Return           | 7.5%         | 6.0%         | 6.5%         |
| Value of Initial \$1,000,000 at End of 20 Years | \$ 4,273,985 | \$ 3,212,138 | \$ 3,542,465 |

**While the Average Annual Return is lower for Investment C compared to B, the Annualized Return is actually greater than Investment B's due to Investment C's lower standard deviation.**

## Relationship between Risk and Return

Geometric Annualized Return = Average Annual Return  
-  $\frac{1}{2}$  (Standard Deviation of Return)<sup>2</sup>

$$\text{Investment A: } 0.075 = 0.08 - \frac{1}{2} (.1)^2$$

$$\text{Investment B: } 0.06 = 0.08 - \frac{1}{2} (.2)^2$$

$$\text{Investment C: } 0.065 = 0.07 - \frac{1}{2} (.1)^2$$

***Less Annual Standard Deviation Means Higher Geometric or Compounded Annual Return and Ending Wealth Level***

## Worst & Second Best 12-Month Performance Highlights Negative Returns Impact

| 12-Month             | S&P 500 |
|----------------------|---------|
| Worst                |         |
| Mar 2008 - Feb 2009  | -43.32  |
| 2nd Best             |         |
| Mar 2009 - Feb 2010  | 53.62   |
| Annualized 24-Months |         |
| S&P 500              |         |
| Mar 2008 - Feb 2010  | -6.69   |

*Since January 1995, there have been 336 twelve-month rolling periods through the end of December 2023.*

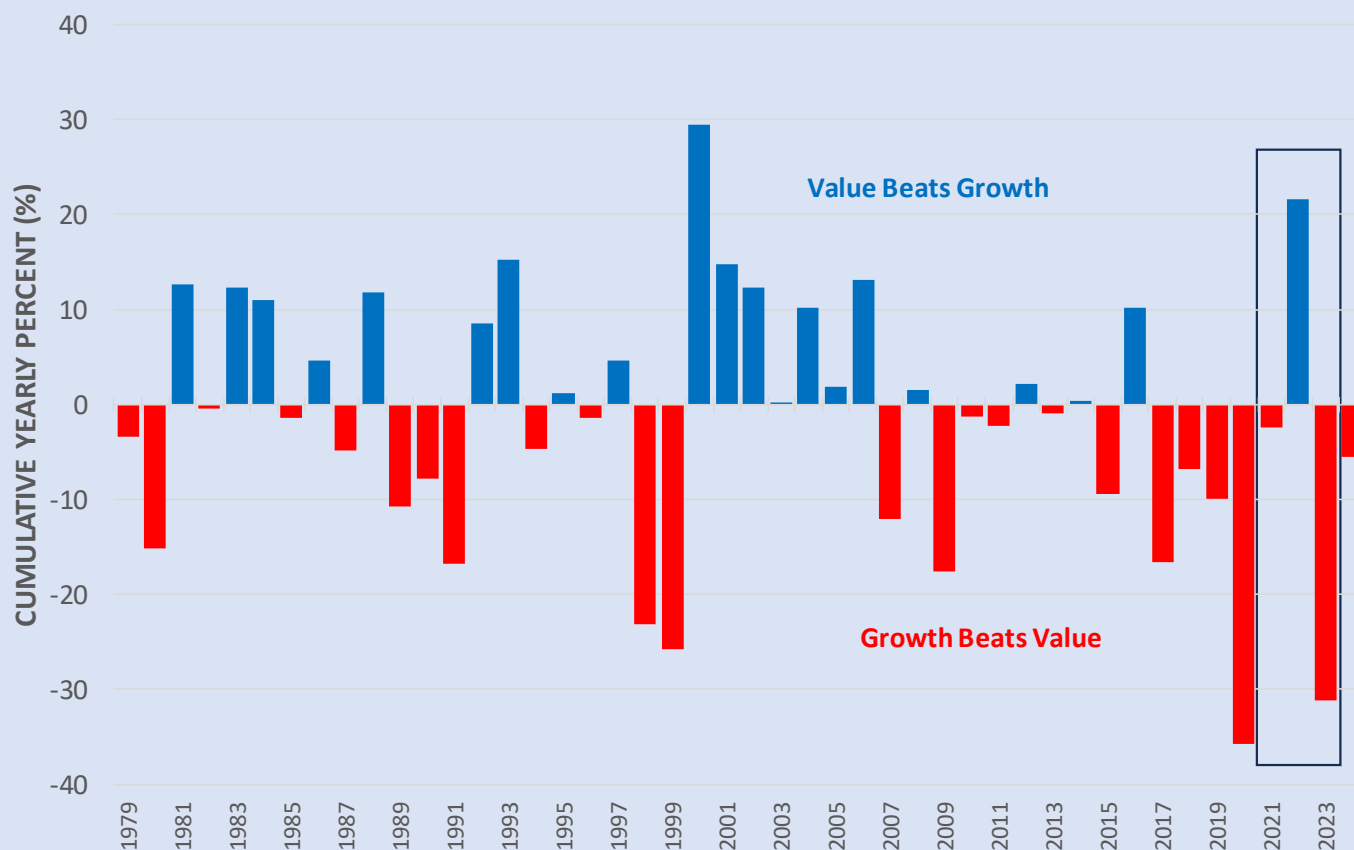
*The worst 12-month period (during the Global Financial Crisis/Recession) and the second best 12-month period for the S&P 500 were back-to-back.*

*While the S&P 500 advanced over 53% in its second best 12-month period and lost less than 44% over the prior 12-month period, the S&P 500 was still down MORE than 6.5% ANNUALIZED for the 24-month period.*



## Last 3 Calendar Years of Growth vs. Value Shows Importance of Protecting against Equity Declines

Value Minus Growth Style Return Differentials: 1979 - 2024  
Russell 1000® Index



*In 2021, Growth beats Value by 2.4% and it wins by 31.2% in 2023. Both were up years. Value won in 2022 by 21.6%, which was a negative market year.*

*By protecting against bigger market losses in 2022, Value has delivered the same 3-year annualized return for 2021-2023 as Growth (8.9%).*

# How Can You Protect Your Equity Portfolio?

- Think of the most recent 3-year Growth vs. Value returns where Growth wins in 2 of the 3 years by a total of 33.6% whereas Value wins in only 1 of the 3 years by a total of 21.6%
- But winning in a down year is more valuable than winning in an up year - so for the 3 years, their annualized return is the same
- Applying the same concept - going down less than the market in a down year/recessionary period is **CRITICAL!**

*Passive Index Funds have been a great investment during the longest-ever bull market rally but may disappoint in negative market environments*

# Active, Passive & In-Between

- Active vs. passive investment management:
  - Most active managers trail benchmarks over time—do they sufficiently address downside risk?  
Performance is often inconsistent
  - Passive managers provide 100% of all negative equity returns giving NO downside protection and they are the most concentrated ever
- Is there a “middle ground”?
  - Enhanced Indexing
  - Rules-Based (“Smart Beta”) Strategies

*The middle ground between active and passive strategies includes Rules-Based/“Smart Beta” and Enhanced Indexing Strategies*

# Passive Now Leads Active U.S. Equity Assets

## Active vs. passive U.S. equity assets

Assets in billions for the years ended Dec. 31



Pensions & Investments

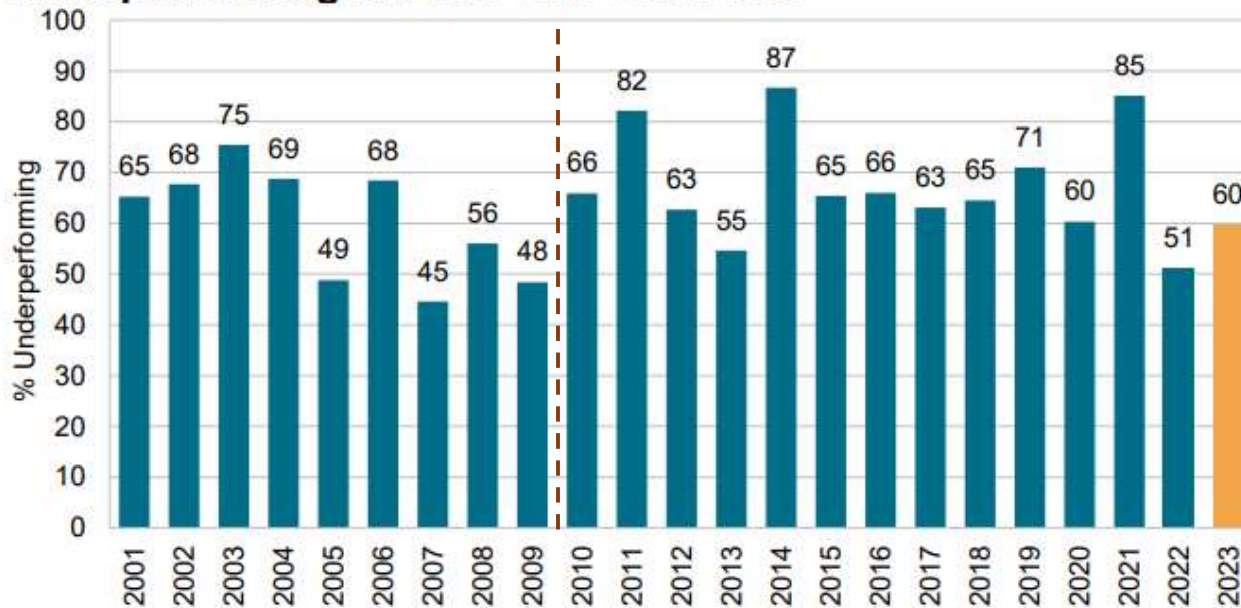
*In 2018, Active Equity assets were greater than Passive Equity assets.*

*However, underperformance since 2010 caused pension funds to move away from Active Equity strategies, resulting in dramatic growth of Passive Equity assets.*

*This growth in Passive Equity Assets has led to even greater market concentration as the biggest stocks get the largest investment and continue to grow.*

# Trying to Beat the Market is Not Easy

**Exhibit 1: Percentage of Large-Cap Domestic Equity Funds Underperforming the S&P 500 Each Year**



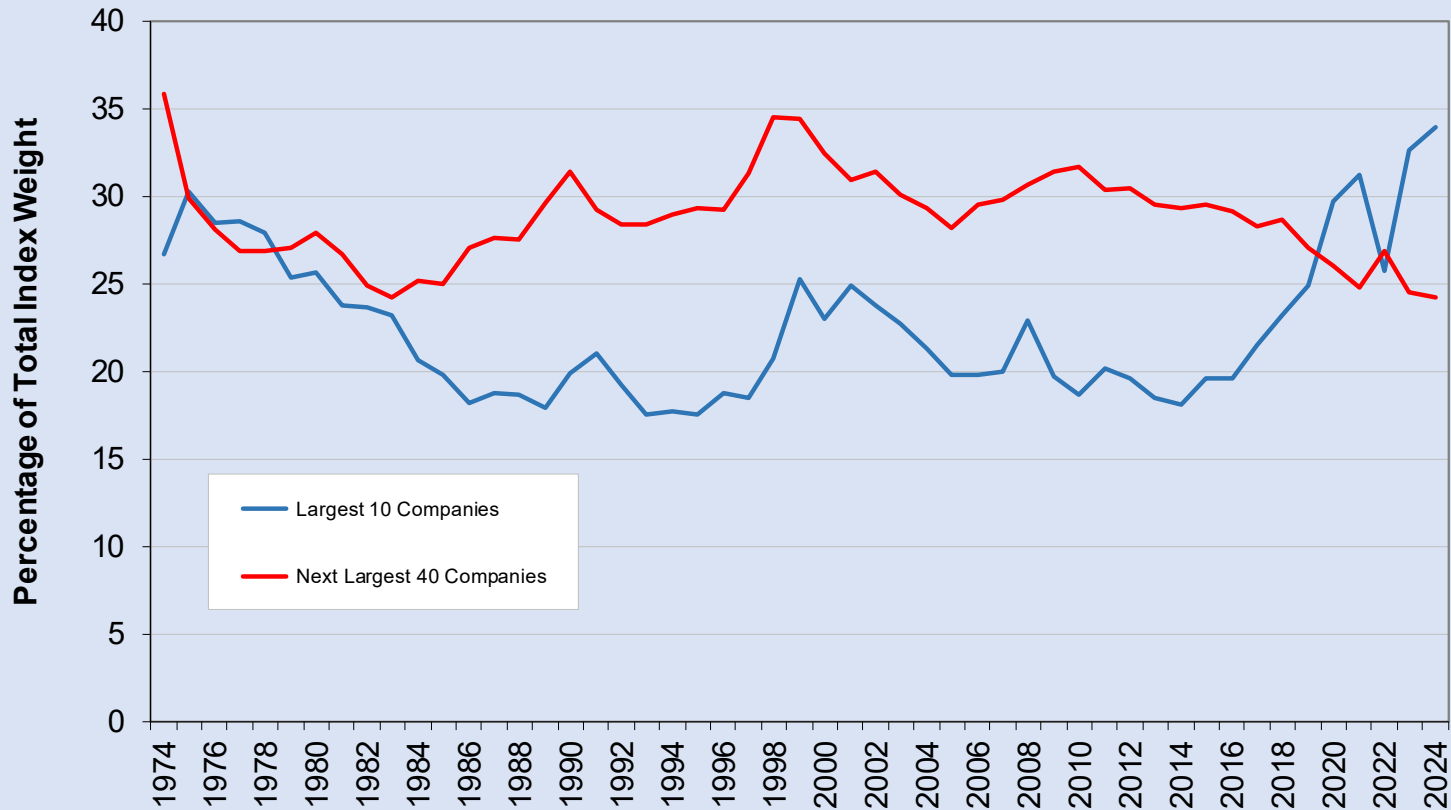
Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2023. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

*60% of all active large-cap U.S. equity funds underperformed the S&P 500 in 2023.*

*More than half of all active managers have underperformed since 2010.*

# The Passive Index is Very Concentrated

**S&P 500 Constituent Concentration**  
Weights of 50 Largest Companies (Year-End; 2024 3/28)



**The 10 largest stocks in the S&P 500 index represent their largest weight (34%) while the next 40 largest constitute the lowest (24%) weight over the past 50 years.**

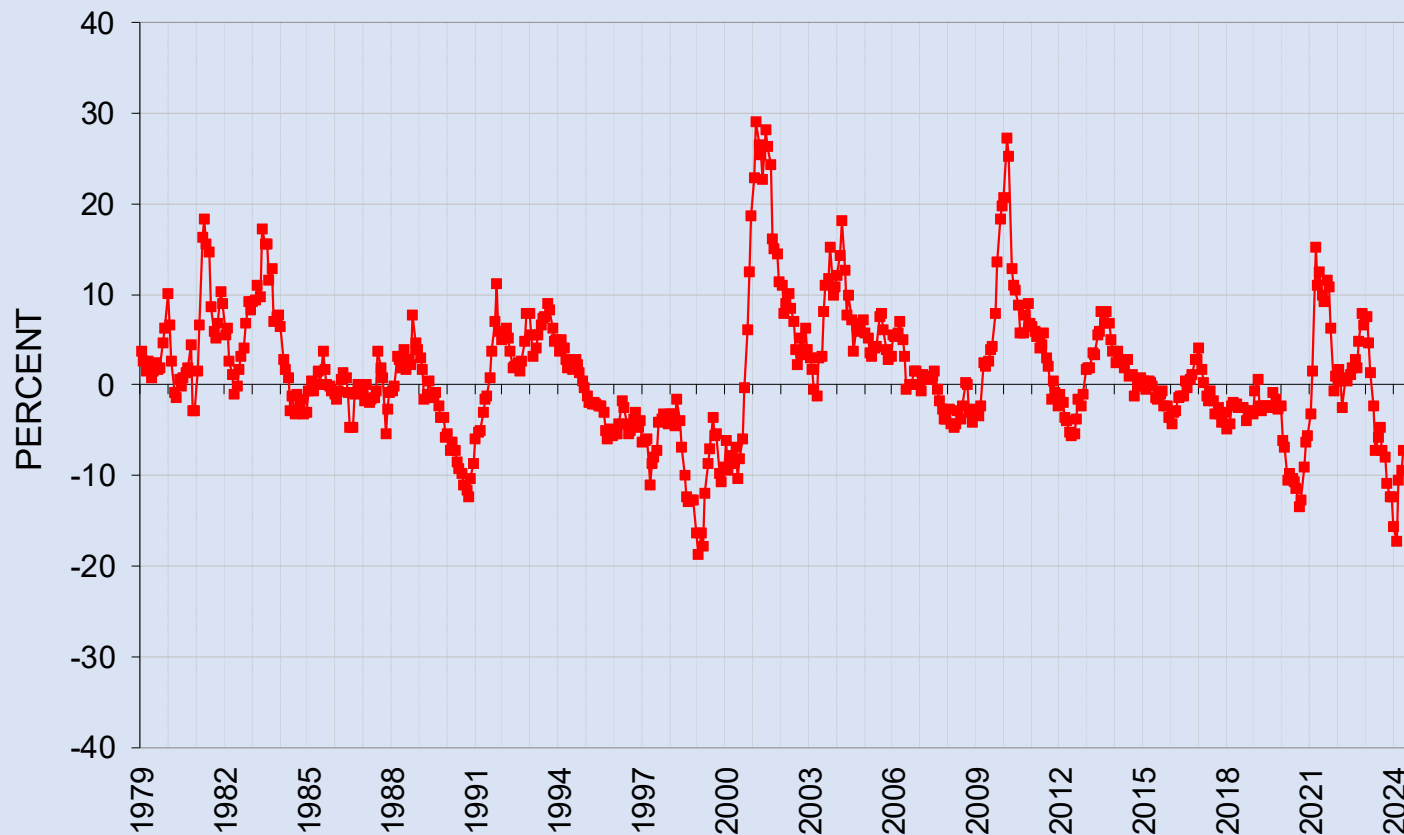
# Rules-Based or “Smart Beta” Strategies

- Rules-Based or “Smart Beta” strategies invest in segments of the market using different weighting schemes, but in a passive-manner (no active decisions)
  - The Rules-Based notion is more of a passive investment methodology
  - However, only purchasing a subset of stocks in the market or buying stocks using a different weighting scheme compared to the capitalization-weighted S&P 500 index is more of an active investment methodology with potentially high tracking error
- Examples of Rules-Based or “Smart Beta” strategies include:
  - The S&P 500 Equal-Weighted index invests in all 500 stocks with equal weights (RSP is the ETF Ticker)
  - The S&P 500 Low Volatility index invests in the 100 least volatile S&P 500 stocks with weights based on volatility
  - The S&P 500 Dividend Aristocrats index invests in the subset of S&P 500 stocks who have consistently grown their dividends over the past 25 years with equal weights

***Rules-Based Strategies charge lower fees compared to active strategies; however, they can provide significant tracking error relative to the S&P 500.***

# S&P 500 Equal Weight Index Relative Returns

Trailing 12-Month Equal-Weight Minus Cap-Weight Return  
S&P 500



*There are many 12-month periods in which the Equal-weighted S&P 500 beats or loses to the S&P 500 index by more than 5%. Recently, the Equal-Weighted underperformed by nearly 20%.*



# Low Volatility with a Rules-Based Approach

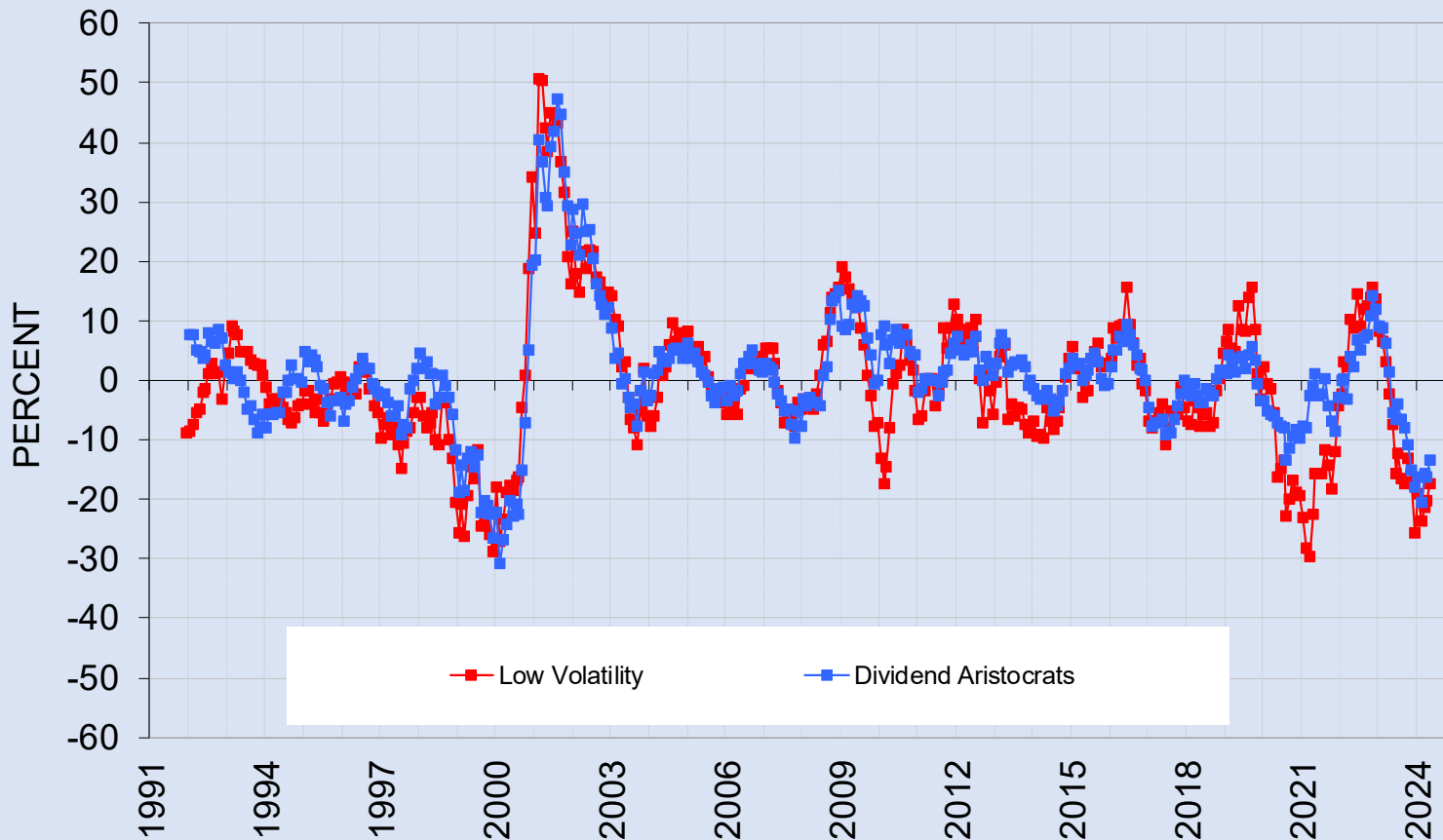
- Low Volatility is a strategy not based on a formal equity return factor (like Value, Momentum or Quality), rather it is defined as an anomaly that has been found empirically
- The Volatility anomaly is evident over the **very long-term** as portfolios of low volatility stocks (measured using market beta or historical returns variability) have out-performed portfolios of higher volatility stocks
- The **S&P 500 Low Volatility Index (SPLV is the ETF Ticker Symbol)** includes the 100 least volatile S&P 500 stocks weighted inversely to their level of risk (i.e., the riskiest stocks of the least risky 100 get the lowest weight in the index)
- A consequence of using Low Volatility as a strategy in order to reduce total risk, **a pension fund must increase its tracking error and accept underperformance in strong up markets (i.e., for the 12-months ending in December 2023, the S&P 500 Low Volatility Index underperformed the S&P 500 by 25.6%)**

# Dividend Growth Serves As a Proxy for Lower Volatility

- Rules-based strategies can also use consistent dividend growth as a proxy for less volatile and higher quality stocks or stocks with greater corporate governance
- The **S&P 500 Dividend Aristocrats (NOBL is the ETF Ticker Symbol)** is one example of a rules-based strategy that only purchases S&P 500 companies that have consistently raised their cash dividends over each of the most recent 25-years
- However, the S&P 500 Dividend Aristocrats index is an equally-weighted index, which means that **an investor is not only investing in consistent dividend growers thereby excluding some of the “Magnificent Seven” stocks, but they are investing in an equal-weighted portfolio compared to a cap-weighted market benchmark**

# S&P 500 Low Volatility & Dividend Aristocrats Returns

Trailing 12-Month Index Return Minus Market Return  
S&P 500



*There are many 12-month periods when the S&P 500 Low Volatility & Dividend Aristocrats win or lose by more than 5% relative to the S&P 500 index. Recently, they both underperformed by over 20%.*

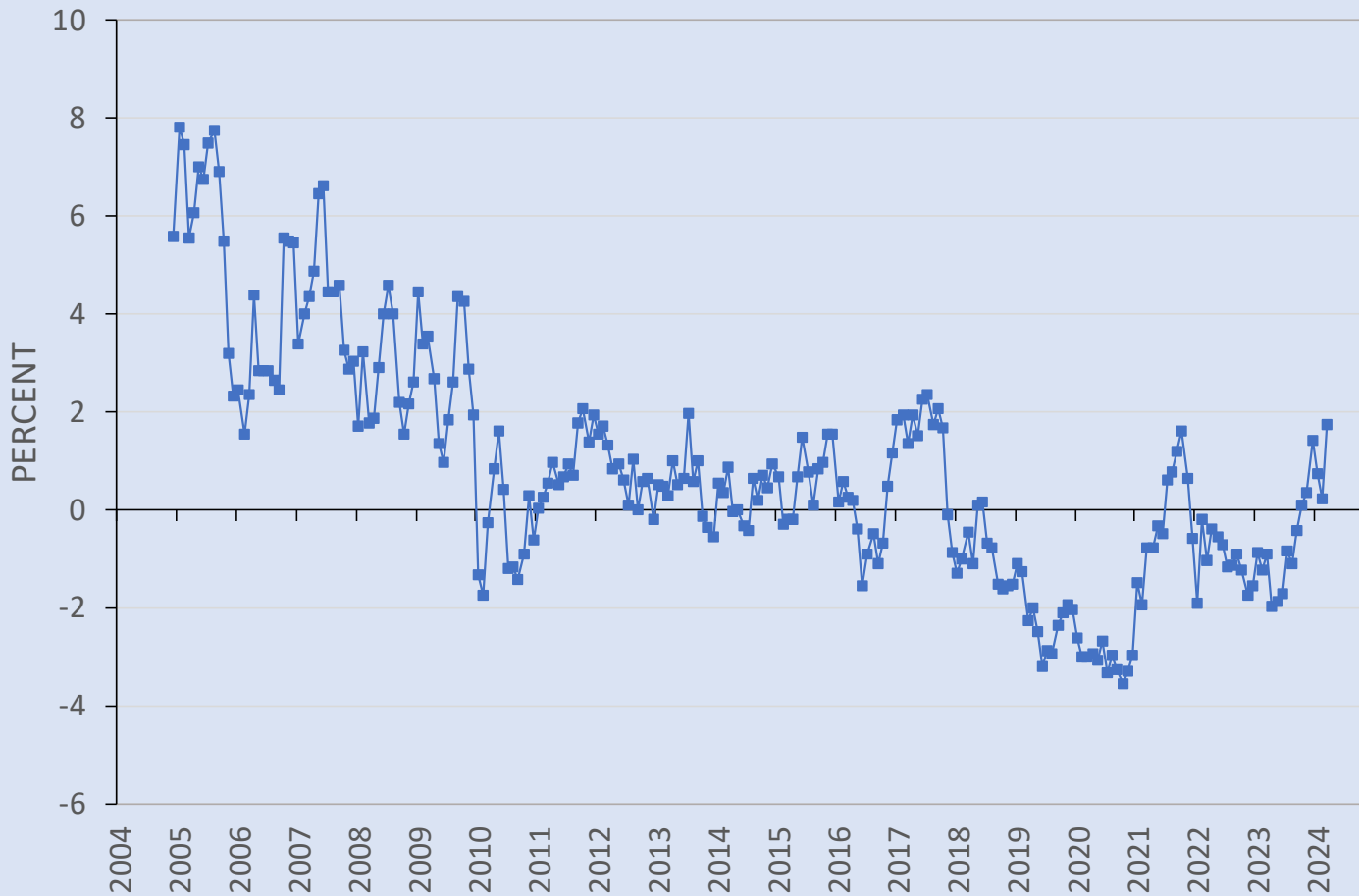
# Enhanced Indexing

- An Enhanced Index portfolio aims to “track” an index, but also attempts to modestly outperform it with similar or less risk
- Enhanced Index approaches may include common stock-only variants, synthetic elements (financial futures & options) and cash/leverage components - with potential to mix some of these
- **Enhanced Indexing can increase the odds of success, and can reduce the odds of a large surprise**
  - Due to lower tracking error relative to passive market indices, Enhanced Index strategies can generate more consistent value-added relative to Active Strategies (which tend to go in and out of favor)

***Enhanced Indexing seeks to outperform passive indices while maintaining sector & risk exposures like the indices.***

# Sample Enhanced Index Strategy Performance

Trailing 12-Month Enhanced Index Return (Net of Fees)  
Minus S&P 500 Return



**There are very few 12-month periods when this purely stock-based Sample Enhanced Index strategy wins or loses by more than 5% relative to the S&P 500 index.**

*Please see IMPORTANT DISCLOSURES for full description of Sample Enhanced Index strategy.*

# Enhanced Index, S&P 500 & Rules-Based Exposures

| GICS SECTOR  | Sample Enhanced    | S&P<br>500® | S&P<br>500® EW | S&P<br>500® Div | S&P<br>Aris | S&P<br>500® LV |
|--|--------------------|-------------|----------------|-----------------|-------------|----------------|
|  | Index<br>Portfolio |             |                |                 |             |                |
| Communication Services                             | 8.98               | 9.32        | 3.92           | 0.00            | 2.25        |                |
| Consumer Discretionary                             | 9.97               | 9.87        | 10.13          | 4.18            | 6.14        |                |
| Consumer Staples                                   | 5.84               | 5.97        | 7.46           | 23.75           | 18.58       |                |
| Energy   | 3.63               | 3.68        | 4.51           | 2.88            | 2.01        |                |
| Financials   | 13.35              | 12.68       | 14.16          | 10.90           | 18.57       |                |
| Health Care  | 12.04              | 12.05       | 12.40          | 10.37           | 9.91        |                |
| Industrials  | 9.21               | 8.35        | 15.58          | 22.64           | 17.71       |                |
| Information Technology                             | 30.10              | 31.34       | 13.08          | 2.98            | 7.04        |                |
| Materials  | 2.35               | 2.24        | 5.74           | 12.58           | 2.92        |                |
| Real Estate  | 2.30               | 2.15        | 6.04           | 4.71            | 0.85        |                |
| Utilities  | 2.22               | 2.35        | 6.66           | 4.73            | 13.76       |                |
| <b>CHARACTERISTIC</b>                              |                    |             |                |                 |             |                |
| Weighted Avg Mkt Cap (\$ Mil)                      | 811,088            | 890,544     | 96,652         | 93,617          | 138,408     |                |
| Holdings Count (#)                                 | 164                | 503         | 503            | 66              | 100         |                |
| Dividend Yield (%)                                 | 1.39               | 1.37        | 1.91           | 2.46            | 2.19        |                |
| MSCI-BARRA S&P 500 Beta                            | 1.01               | 1.00        | 0.92           | 0.71            | 0.58        |                |
| MSCI-BARRA S&P 500<br>Predicted Tracking Error (%) | 1.20               |             | 6.20           | 8.47            | 9.96        |                |

*Sector exposures of Rules-Based Strategies are quite different and their weighted market capitalizations are much lower compared to the market -- leading to significantly higher tracking error relative to the Sample Enhanced Index Strategy, which mirrors the market's exposures (both sector & capitalization).*

*Please see IMPORTANT DISCLOSURES for full description of Sample Enhanced Index strategy.*

# Enhanced Indexing Can Provide Downside Protection with Upside Potential

- Low volatility strategies have a lower beta than the market to reduce total risk at the cost of higher active risk (i.e., tracking error)
  - Low volatility strategies provide downside protection at the cost of upside returns
  - Downside capture less than 100% but upside capture also less than 100%
  - Low Volatility strategies typically have much less risk than the overall market
- Enhanced index strategies have a beta equal to the market so they can fully participate in up markets while still protecting in down markets
  - Enhanced equity strategies typically have downside protection without giving up upside returns
  - Downside capture less than 100% but upside capture can be equal to or above 100%
  - Enhanced index strategies typically have slightly less risk than the overall market

# Performance Across Market Environments

## Returns & Batting Averages

### Monthly Returns Analysis

January 2004 - March 2024

|  | Biggest Negative<br>Months<br>"Down" Markets | Mixed Smaller<br>Months<br>"Sideways" Markets | Biggest Positive<br>Months<br>"Up" Markets | All<br>Months |
|--|--|---|--|---------------|
| <i>Return Ranges (%)</i>               | -17 to -2.5                                  | -2.5 to 2.0                                   | 2 to 13                                    | -17 to 13     |
| <i>Counts (#)</i>                      | 39   | 122   | 82   | 243           |
| <i>Average Returns (%)</i>             |  |   |  |               |
| S&P 500®                               | -6.26  | 0.40  | 5.04                                       | 0.90          |
| S&P 500® Eq-Wt                         | -6.65  | 0.31  | 5.54                                       | 0.95          |
| S&P 500® Div Aris                      | -5.13  | 0.38  | 4.67                                       | 0.94          |
| S&P 500® Low-Vol Index                 | -4.01  | 0.63  | 3.35                                       | 0.80          |
| Sample Enhanced Index                  | -6.15  | 0.47  | 5.10                                       | 0.97          |
| <i>Out-Performance Batting Average</i> |  |   |  |               |
| S&P 500® Eq-Wt                         | 0.38   | 0.44  | 0.61                                       | 0.49          |
| S&P 500® Div Aris                      | 0.67   | 0.55  | 0.41                                       | 0.52          |
| S&P 500® Low-Vol Index                 | 0.85   | 0.55  | 0.15                                       | 0.46          |
| Sample Enhanced Index                  | 0.54   | 0.55  | 0.51                                       | 0.53          |

**Equal-weighted S&P 500 wins in strong up months while Low Volatility & Dividend Aristocrats win in big down months.**

**Sample Enhanced Index strategy offers out-performance in all three market environments with consistent batting averages.**

*Please see IMPORTANT DISCLOSURES for full description of Sample Enhanced Index strategy.*



# Investment Mandates – Risks & Fees

| Equity Manager Mandate | Total Volatility         | Active Risk | Fees         |
|------------------------|--------------------------|-------------|--------------|
| Active                 | At or above Market       | 2% - 8%     | 25 - 100 bps |
| Passive Index          | Equal to Market          | 0.1% - 0.5% | 1 - 10 bps   |
| Enhanced Index         | Below or Equal to Market | 1% - 2%     | 10 - 30 bps  |
| Rules-Based            | Below or Above Market    | 3% - 7%     | 15 - 50 bps  |

***Enhanced Index strategies are often viewed as the sweet-spot between trying to still beat the market but taking less active risk with less fees***

# What is Right (Active vs. Passive) for Your Pension Plan?

Should your plan invest with Active strategies versus Enhanced Index, Rules-Based (Smart-Beta) or Passive index strategies? It depends on the following considerations:

- Your pension plan's funded status and investment policy statement's target rate of return and acceptable risk levels
- Your desire to reduce total investment management fees relative to a strictly active manager platform (active manager fees are higher relative to enhanced index, smart-beta rules-based or passive index managers)
- The ability of active managers to add value on a consistent basis relative to their benchmarks relative to their active risk
- The pension trustees' level of patience as Active manager's outperformance or underperformance typically occurs in cycles

***Pension plans can combine large-cap equity active strategies with enhanced index, rules-based or passive index strategies to reduce fees and active risk***

# Other Considerations in Selecting Investment Vehicles and Managers

- Passive index and smart-beta mutual funds/ETF's do not provide customized proxy voting whereas a separately managed account (whether it be an active or enhanced index strategy) can vote proxies in accordance with sponsors' policies or other issues that are important to public pension plans.
- Investment guidelines stipulating a maximum (for example 5%) holding on any security in a portfolio would currently be violated with an S&P 500 index fund positions in Apple, Microsoft & Nvidia
- If securities lending is important, separately managed accounts are preferable to mutual funds/ETF's
- Passive index funds do not protect against downside risk - you bear 100% of the market decline whereas some Active, Smart Beta strategies (like lower volatility), and Enhanced Index strategies can provide some downside protection

*You choose active, rules-based/smart-beta, enhanced index or passive managers and then select the appropriate vehicle (MF, ETF, SMA)*

# Key Takeaways

- Investing risk is asymmetric with losses more costly than gains which makes protection on the downside critical
- Active managers often take too much active risk and there are long cycles of underperformance (since 2010)
- The problems with passive index funds is that they do not provide downside protection and the market is more concentrated today than it has ever been
- There are in-between solutions of Rules-Based Strategies (such as the S&P 500 Low-Volatility index, the S&P 500 Dividend Aristocrats index or the S&P 500 Equal-Weighted index) that are less costly compared to active managers but still bear active risk or tracking error to the market
- Another in-between solution is Enhanced Indexing, which is often viewed as the sweet spot as it is designed to protect pension plans on the downside but have more participation in up markets compared to those Rules-Based Strategies focusing on lower volatility or dividend growth themes

# Important Disclosures

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INVESTMENTS ARE NOT GUARANTEED AND MAY LOSE VALUE.

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## MARKET DATA

Where market and/or index data is presented, it has been obtained from a variety of sources deemed reliable. These sources may include some or all of the following: FTSE/Russell, FactSet Research Systems, and Ford Equity Research. Estimates of predicted tracking error are from the MSCI-Barra US Total Market US Model (US-SLOWL); fundamental beta values and S&P GICS sector assignments are also supplied by MSCI-Barra. TCM assumes no responsibility for the accuracy of this data. Standard & Poor's, S&P and S&P 500 are registered trademarks of Standard & Poor's Financial Services LLC, a division of S&P Global (S&P"). These trademarks have been licensed to S&P Dow Jones Indices LLC. Frank Russell Company ("Russell") is the source & owner of the trademarks, service marks and copyrights related to the Russell Indexes. Russell is a trademark of Frank Russell Company. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property and a trademark of Standard & Poor's and MSCI. None of the owners or suppliers of data featured in this report promote, sponsor or endorse the content of this communication, nor accept responsibility for errors or omissions in the underlying data. Further distribution of the index data contained in this report is prohibited.

## INDEX INFORMATION

The S&P 500 Index is a representative measure of 500 leading companies from leading industries; the index is a benchmark for the large-cap segment of U.S. equity market. Company weights in the index are proportional to firms' available market capitalization (price times available shares outstanding). A Committee at Standard and Poor's maintains the index with a focus on liquidity and investability. Instead of weights proportional to available market cap, the Equal-Weight S&P 500® Index weights all index constituents equally at reconstitution intervals. The S&P 500® Low-Volatility Index consists of the 100 least-volatile stocks in the S&P 500® at each quarterly reconstitution date as measured by daily realized returns variability over the 12 months prior to reconstitution, weighted in proportion to the inverse of the realized volatility score. The S&P 500® Dividend Aristocrats® index measures the performance of S&P 500 companies that have increased dividends every year for the last 25 consecutive years. Constituents are equally-weighted. FTSE/Russell produces and maintains a family of U.S. equity indexes. In the determination of index membership, Russell calculates capitalization and other category breakpoint values based on ranks of U.S. common stocks at each annual reconstitution period using market value of freely-available outstanding shares (as of the last day of May each year). Stocks exceeding the breakpoint established for the largest 3,000 stocks become constituents in the Russell 3000® Index (with some adjustments to the constituent list to reduce category changes). Similarly, the largest approximately 1,000 stocks become the Russell 1000® Index. Style category breakpoints based on an objective scoring algorithm are used to assign fractions of Russell Index constituents' capitalization to value & growth sub-indices.

# Important Disclosures

## **PORTFOLIO INFORMATION**

Sample Enhanced Index Portfolio returns & characteristics are those of the TWIN Prime Portfolio (Net Composite), a purely stock-based enhanced-index strategy managed by TWIN Capital since 2004 using the TWIN EQUITY Model™. The primary objective of the strategy is to outperform, on a total return basis net of fees, the Russell 1000® Index. These returns are included as an example of an Enhanced Index strategy and should not be interpreted as necessarily representative of the broad class of investments in this product space.

## **TWIN EQUITY Model™**

The TWIN EQUITY Model (the "Model") is a quantitative, multiple element model developed by the Investment Manager to predict expected future returns of large & mid-cap US Common stocks. The Model currently combine proprietary sets of value, growth and earnings quality characteristics into a composite score for a measure of investment attractiveness. Financial statement data, analysts' earnings forecasts, trends in reported operating earnings, price and returns data, plus data on earnings sustainability are obtained from several sources believed to be accurate. The elements of the models and the specific data items incorporated into the composite scores have changed materially over time. There is no guarantee the predictions of the models will be realized. In the event that security returns deviate substantially from the expectations of the models, losses may result. Where the model performance and returns to specific model rank groups or individual model elements are presented, it should be understood that these results do not represent actual trading and that they may not reflect the impact that material economic and market conditions may have had on TCM decision-making. Unless explicitly noted, results omit the impact of trading costs and were not necessarily constructed in real-time over the entire horizon presented. Risks are associated with the data and quantitative tools underlying TCM's investment process. Errors may exist in data obtained from third-party sources, in coding used in the stock selection process and in the construction of model portfolios and hypothetical returns. Although TCM takes steps to identify errors so as to minimize the potential impact on the investment process and performance, there is no guarantee that such errors will not occur.

## **DEFINITIONS & CALCULATIONS**

Annualized Returns are calculated as the compound geometric average monthly returns. The geometric average is the monthly average return that assumes the same rate of return every period to arrive at the equivalent compound growth rate reflected in the actual return data. The results are annualized by raising the sum of one plus the compound geometric average monthly return to the twelfth power and then subtracting one. Standard Deviation measures the dispersion of uncertainty in a random variable (in this case, investment returns). The higher the volatility of investment returns, the higher the standard deviation will be in any given case. For this reason, standard deviation is often used as a measure of investment risk. Values are calculated by applying the traditional sample deviation formula to monthly return data, and then annualized by multiplying the result by the square root of twelve. Batting Average: Measure of the frequency of success. This ratio is calculated by taking the number of monthly periods where the manager equals or outperforms the selected benchmark, divided by the total number of periods. This measure indicates a manager's frequency of success, without regard to degree of outperformance. Tracking Error: The annualized standard deviation of value-added, it measures the variation of a portfolio's returns relative to the benchmark. Managers with larger bets relative to benchmark tend to have return streams exhibiting higher tracking error. A manager with a 5% tracking error can be expected to produce positive & negative value-added in excess of 5% in 1 out of every 3 years. Beta: Captures the tendency of a stock's returns to respond to changes in a market index or benchmark over time; it is a statistical measure of a variability. For a specific period, an individual stock's beta is the covariance of the return of the stock with the return of a market index, divided by the variance of the return of the index for the period. The beta of the market index is 1.0. A stock with a beta above 1.0 tends to swing more than the market over time, while a stock with a beta less than 1.0 typically swings less than changes in the market index.