Impacts of Increased Market Risks on Pension Plans

CEU Program

FPPTA Fall Trustee School October 3, 2023

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Outline

- Impacts on Returns
  - —Asset Allocation (Stocks vs. Bonds)
  - —Risk is Costly to Pension Fund Values
  - —Market risks have increased with wider volatility bands since the Global Financial Crisis
- Investing in Equities is Rarely Typical but often Feast and every now and then – Famine; yet equity investment is required to earn a 7% target rate of return
- Investment Manager Implementation Approaches Impact Pension Fund Risk – More Choices than Just Active or Passive
- How can you Reduce Equity Risk while Maintaining the Same Level of 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**.

Asset Allocation: Stocks & Bonds

Annualized Rates of Return and Risk in Percent
Averages of Rolling 5- & 10- Year Periods 1900-2022
Five US Stock and US Bond Simulated Portfolios

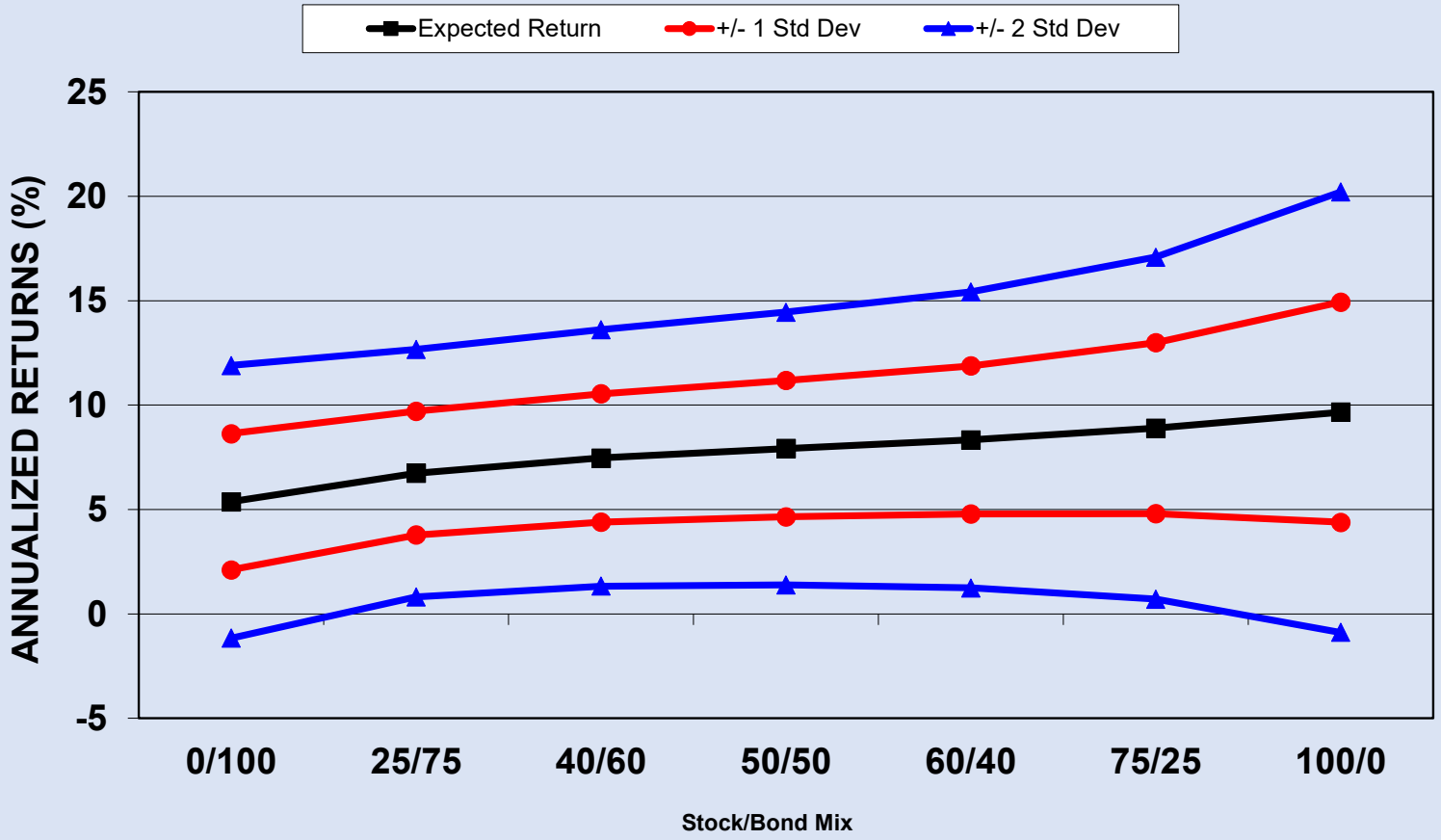
Simulated Portfolios * Stock/Bond	Five-Year Annualized Return	Five-Year Annualized Risk	Proportion of Return and Risk Compared to the Bond Index Return	Proportion of Return and Risk Compared to the Bond Index Risk	Proportion of Return and Risk Compared to the Stock Index Return	Proportion of Return and Risk Compared to the Stock Index Risk
100%/0%	9.9	8.0	186	205	--	--
75/25	9.0	6.1	169	158	91	77
60/40	8.4	5.2	158	133	85	65
50/50	7.9	4.6	149	119	80	58
40/60	7.5	4.2	140	108	76	52
25/75	6.7	3.8	126	97	68	47
0/100	5.3	3.9	--	--	54	49

Simulated Portfolios * Stock/Bond	Ten-Year Annualized Return	Ten-Year Annualized Risk	Proportion of Return and Risk Compared to the Bond Index Return	Proportion of Return and Risk Compared to the Bond Index Risk	Proportion of Return and Risk Compared to the Stock Index Return	Proportion of Return and Risk Compared to the Stock Index Risk
100%/0%	9.7	5.3	180	162	--	--
75/25	8.9	4.1	166	125	92	78
60/40	8.3	3.5	155	109	86	67
50/50	7.9	3.3	147	100	82	62
40/60	7.5	3.1	139	94	77	58
25/75	6.7	3.0	126	91	70	56
0/100	5.4	3.3	--	--	56	62

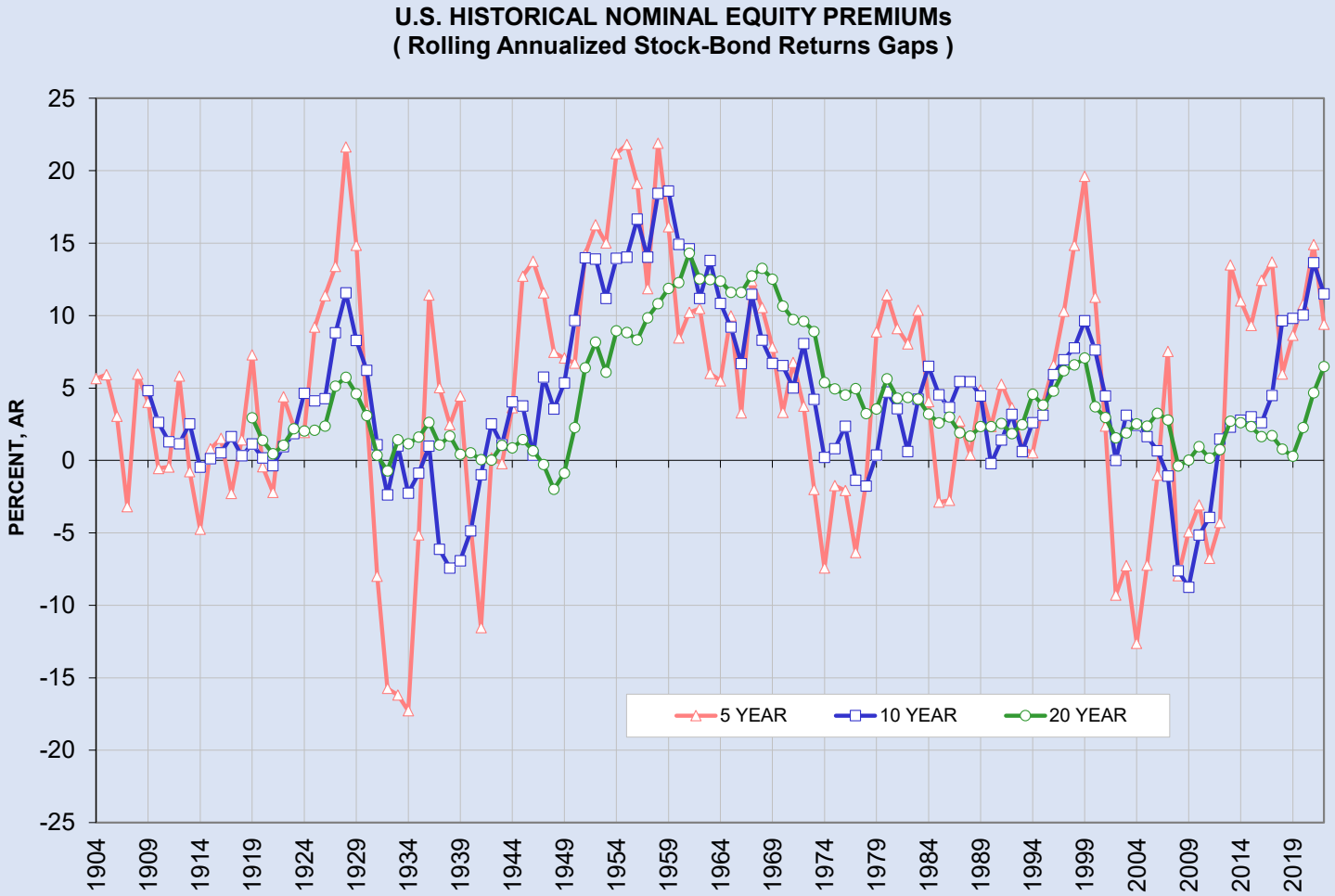
* Invested proportionally in US stocks and US bonds, rebalanced annually.

SOURCE: RUSSELL INVESTMENTS & TWIN CAPITAL

ASSET Allocation: Stocks & Bonds
Range of Returns for Various Mixes (10-Year Horizon)



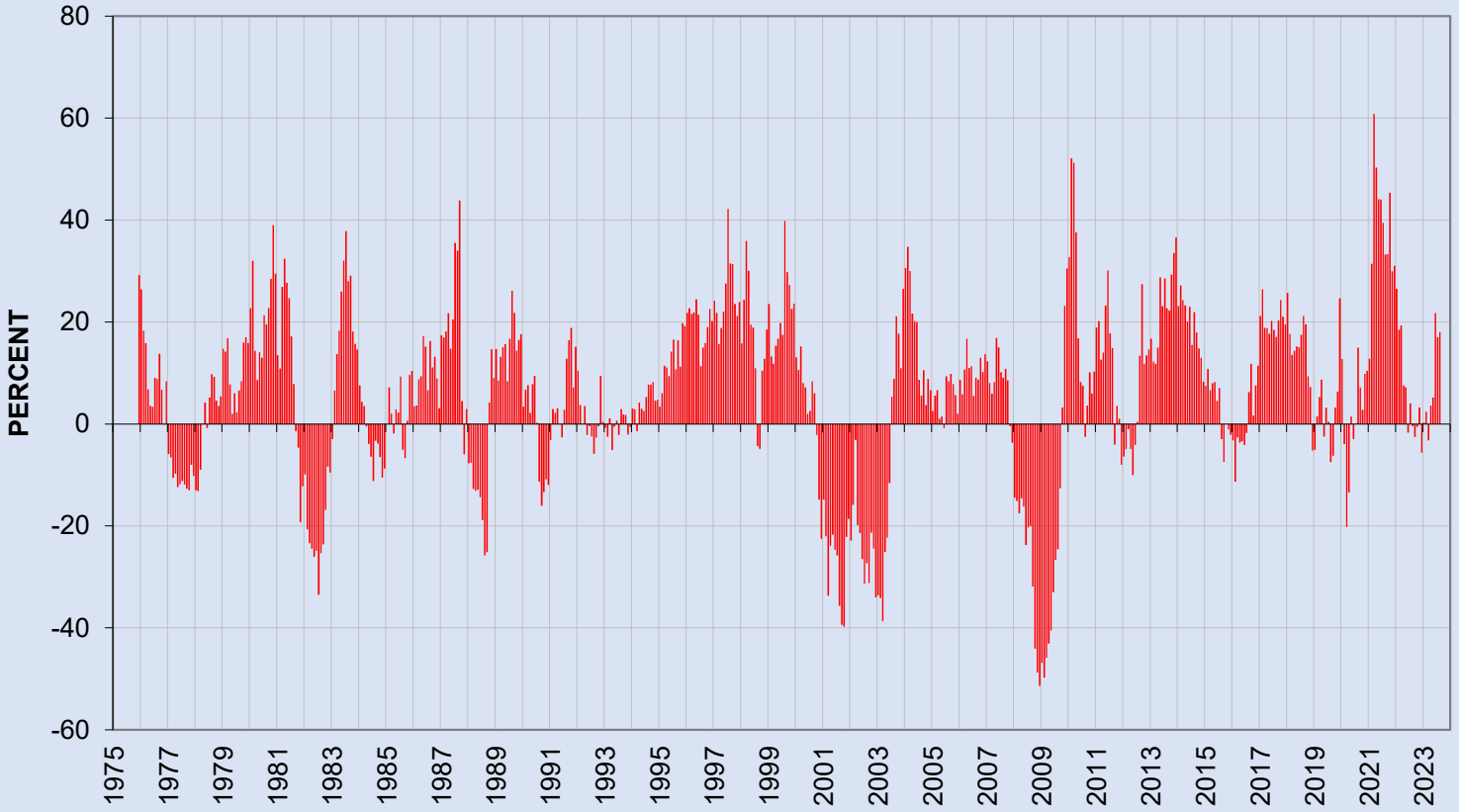
Holding Period Length Impacts Risk



At 20-year horizons, Stocks have rarely under-performed Bonds, even though the gap between Stock & Bond returns exhibits substantial variability in shorter-term periods.

Stock-Bond Return Gap

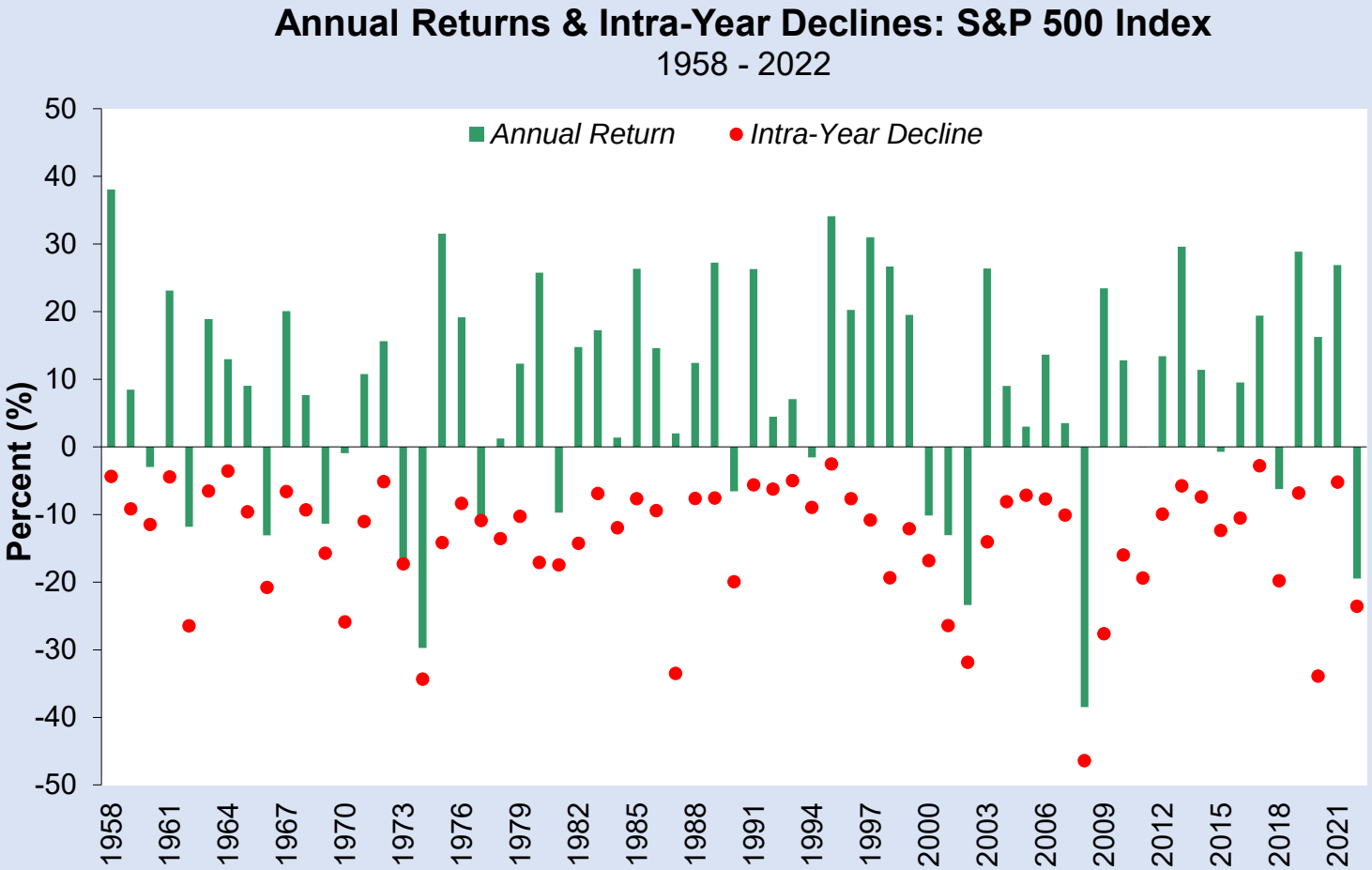
Rolling 12-Month Periods



While the 20-year Equity Premium has ranged from -2% to +15% (annualized), the rolling 12-month spread between stock and bond returns has ranged from -51% to +60%.

The rolling 12-month spread has widened since the Global Financial Crisis.

Public Equity Annual Drawdowns



Despite the fact the S&P 500® Index is up 71% of all calendar years, the index still declines on average 13.5% every calendar year

S&P 500® Extreme Days Have Become More Common since the Global Financial Crisis

31-Aug-2023 <END DATE
2-Jan-1957 <START DATE
16781 <DAYS (#)

S&P 500 Index - Daily Performance (Dividends Omitted)

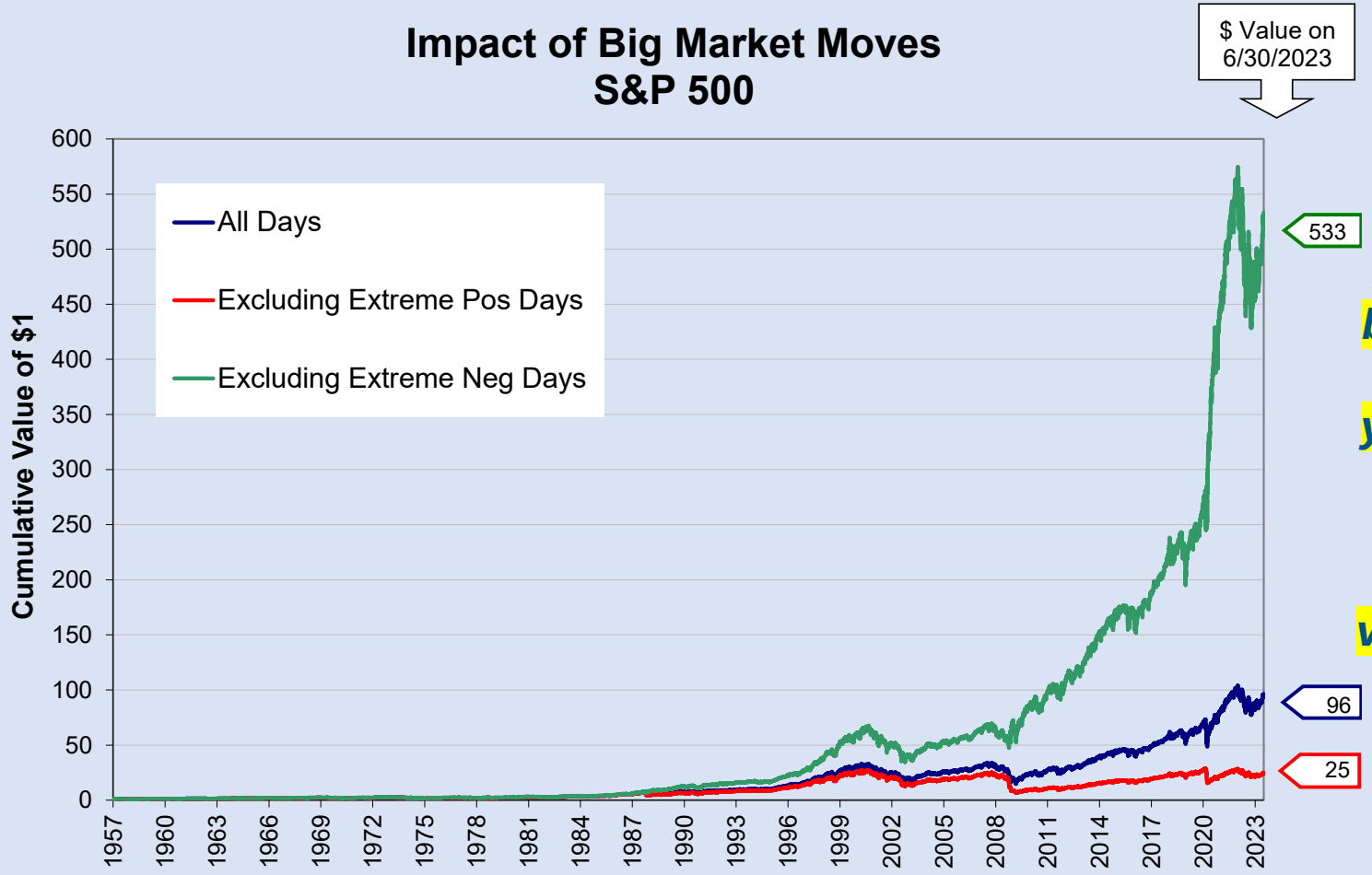
	Best Days				Worst Days		
Rank	Date	Level	Change (%)	Rank	Date	Level	Change (%)
1	13-Oct-2008	1003.4	11.6	1	19-Oct-1987	224.8	-20.5
2	28-Oct-2008	940.5	10.8	2	16-Mar-2020	2386.1	-12.0
3	24-Mar-2020	2447.3	9.4	3	12-Mar-2020	2480.6	-9.5
4	13-Mar-2020	2711.0	9.3	4	15-Oct-2008	907.8	-9.0
5	21-Oct-1987	258.4	9.1	5	1-Dec-2008	816.2	-8.9
6	23-Mar-2009	822.9	7.1	6	29-Sep-2008	1106.4	-8.8
7	6-Apr-2020	2663.7	7.0	7	26-Oct-1987	227.7	-8.3
8	13-Nov-2008	911.3	6.9	8	9-Oct-2008	909.9	-7.6
9	24-Nov-2008	851.8	6.5	9	9-Mar-2020	2746.6	-7.6
10	10-Mar-2009	719.6	6.4	10	27-Oct-1997	877.0	-6.9
11	21-Nov-2008	800.0	6.3	11	31-Aug-1998	957.3	-6.8
12	26-Mar-2020	2630.1	6.2	12	8-Jan-1988	243.4	-6.8
13	17-Mar-2020	2529.2	6.0	13	20-Nov-2008	752.4	-6.7
14	24-Jul-2002	843.4	5.7	14	28-May-1962	55.5	-6.7
15	10-Nov-2022	3956.4	5.5	15	8-Aug-2011	1119.5	-6.7
16	30-Sep-2008	1166.4	5.4	16	13-Oct-1989	333.6	-6.1
17	29-Jul-2002	899.0	5.4	17	19-Nov-2008	806.6	-6.1
18	20-Oct-1987	236.8	5.3	18	22-Oct-2008	896.8	-6.1
19	16-Dec-2008	913.2	5.1	19	11-Jun-2020	3002.1	-5.9
20	28-Oct-1997	921.9	5.1	20	14-Apr-2000	1356.6	-5.8
		AVERAGE>	7.0				-8.1

Big daily declines & advances tend to be clustered together in time.

This historical fact is part of what makes market-timing (buying at lows and selling at highs) difficult.

15 of the 20 Best Days and 11 of the 20 Worst Days have occurred since the Global Financial Crisis.

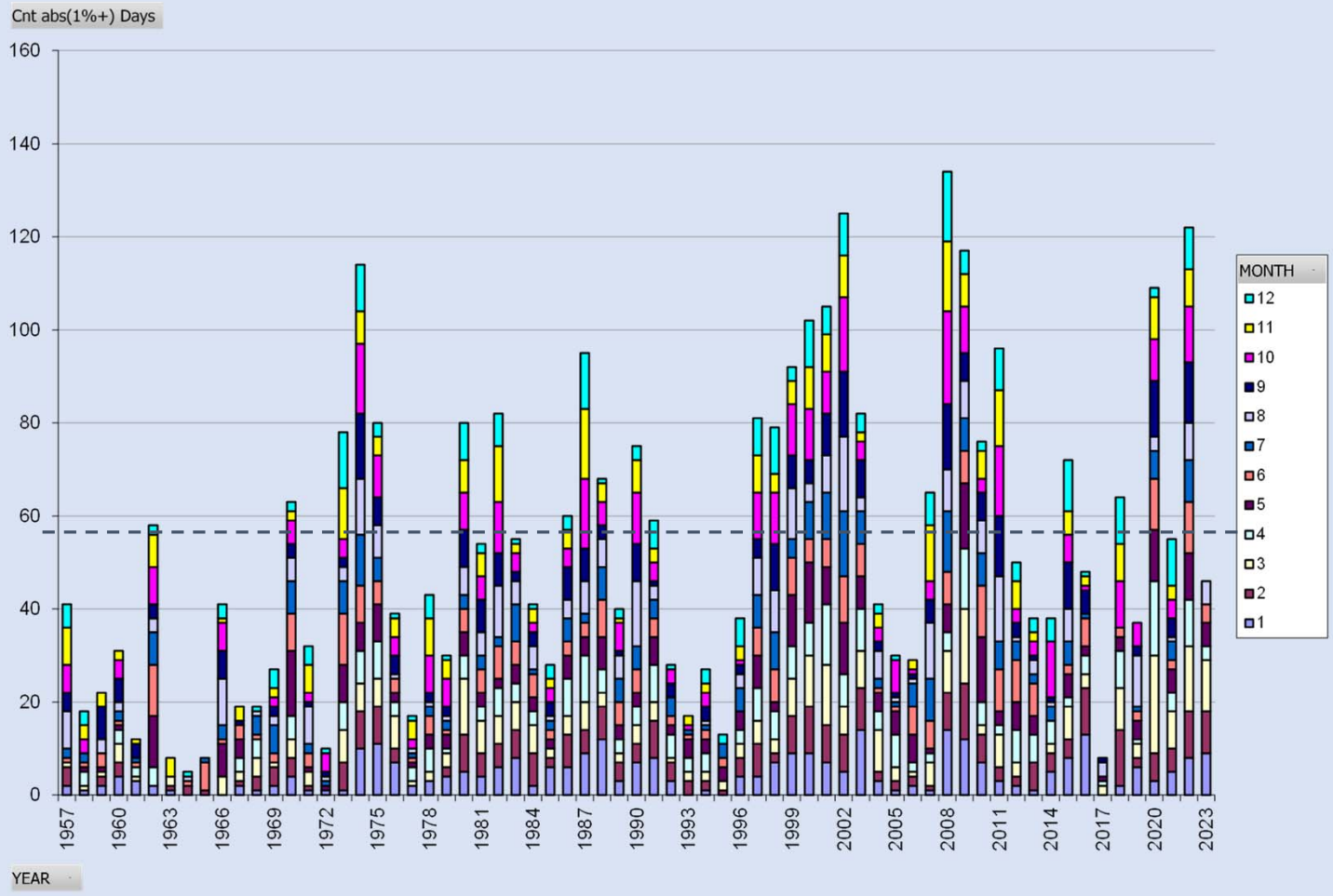
Ending Investment Value Influenced By Select Days



If you miss the 20 best days over the past 65 years, your investment in the stock market would be about a quarter of its value ($25 vs. $96) if you were invested for all days.

Daily 1%+ Up/Down S&P 500® Moves – Monthly Counts

January 1957 – August 31 2023



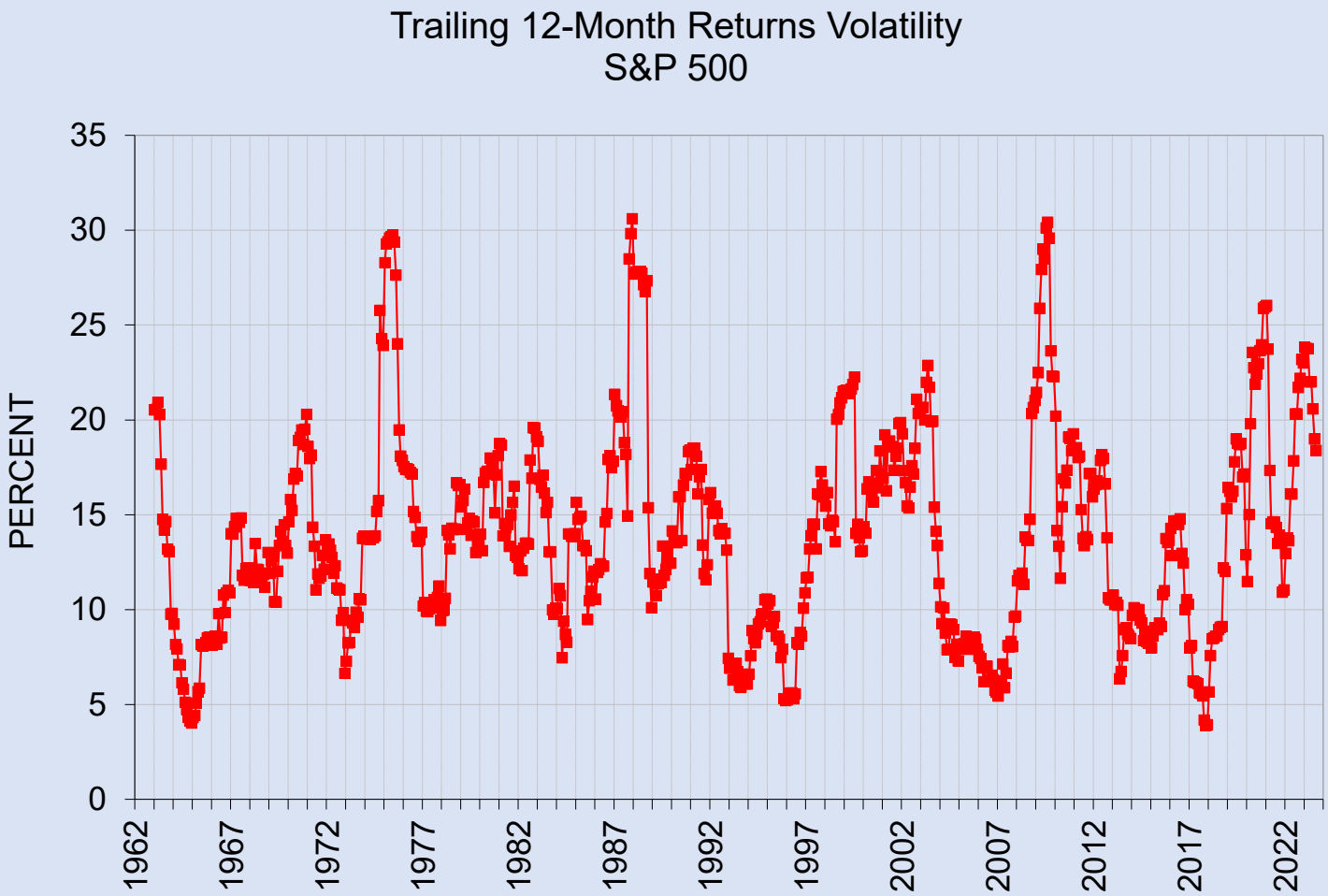
In 2022, 49% of days had 1% moves.

Only two other years (2002 and 2008) had more 1% moves.

In 2023, 28% of days have had 1% moves.

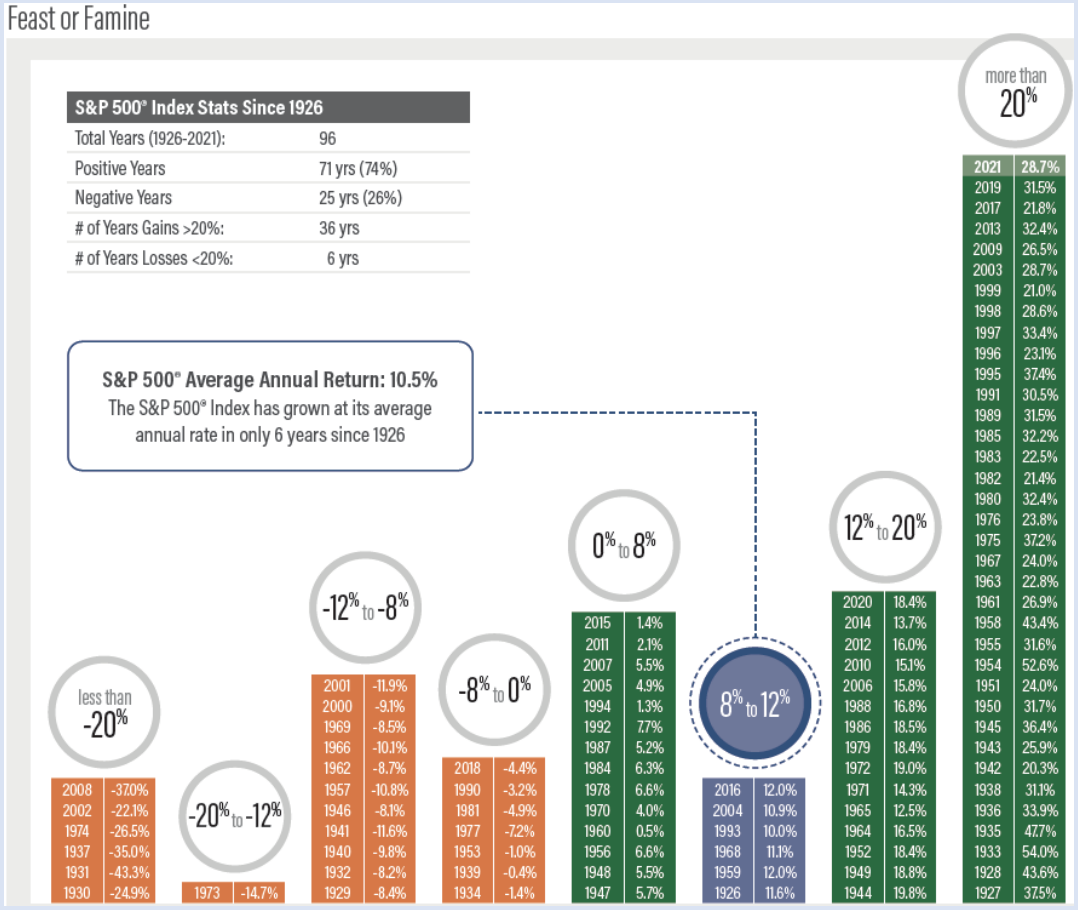
Annual average is 54 days (21%) where S&P 500 ® moves by more than +/-1% Up/Down

Market Environment - Volatility



Measures of the time-series volatility of monthly equity market segment returns rebounded from record-low levels in late 2017 throughout 2018, 2019 and 2020. Volatility dropped significantly during the first three quarters of 2021, only to jump back up ahead of the Federal Reserve raising Fed Funds rate in March 2022. Volatility has remained elevated throughout 2022 and the first quarter of 2023.

Typical Market Performance is Not Typical



Source: FactSet, S&P Dow Jones Indices. Data calculated from 1926-2021 using total return.

Source: AMG – Principles of Investment Success, 4Q 2021.

There are a greater number of big positive years compared to big negative years. Both big positive (12% or higher) and big negative (-12% or lower) years are more frequent than typical or average years (when the market rises between 8% and 12%).

The key is to stay invested to earn the average 10.5% annual return, even though it is often Feast or Famine.

Risk Does Matter

The Mathematics of Compounding

It's Tougher to Get It Back

If You Lose	Then You Need
10%	11%
20%	25%
55%	122%
75%	300%

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

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 Annual Return	Investment B 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)^2

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

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

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

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 struggle to match the benchmark, due to fees, transaction costs
- Is there a "middle ground"?
  - Enhanced Indexing
  - Smart Beta Strategies or Rules-Based Strategies

There is a middle ground between active and passive strategies for those investors who do not want to "punt" with purely passive investments

Enhanced Indexing

- An enhanced index portfolio aims to "track" an index, but also attempts to modestly outperform it with similar or less risk
- Active managers either ignore or accept higher tracking error while enhanced index managers look to maintain low tracking error relative to the market index
- Enhanced indexing can increase the odds of success, and can reduce the odds of a large surprise
  - Due to its lower tracking error relative to the passive market index, Enhanced Index strategies generate more consistent value-added relative to Active Strategies (which tend to go in and out of favor)

Enhanced indexing seeks to outperform the passive index while maintaining sector and risk exposures like the index

"Smart Beta"

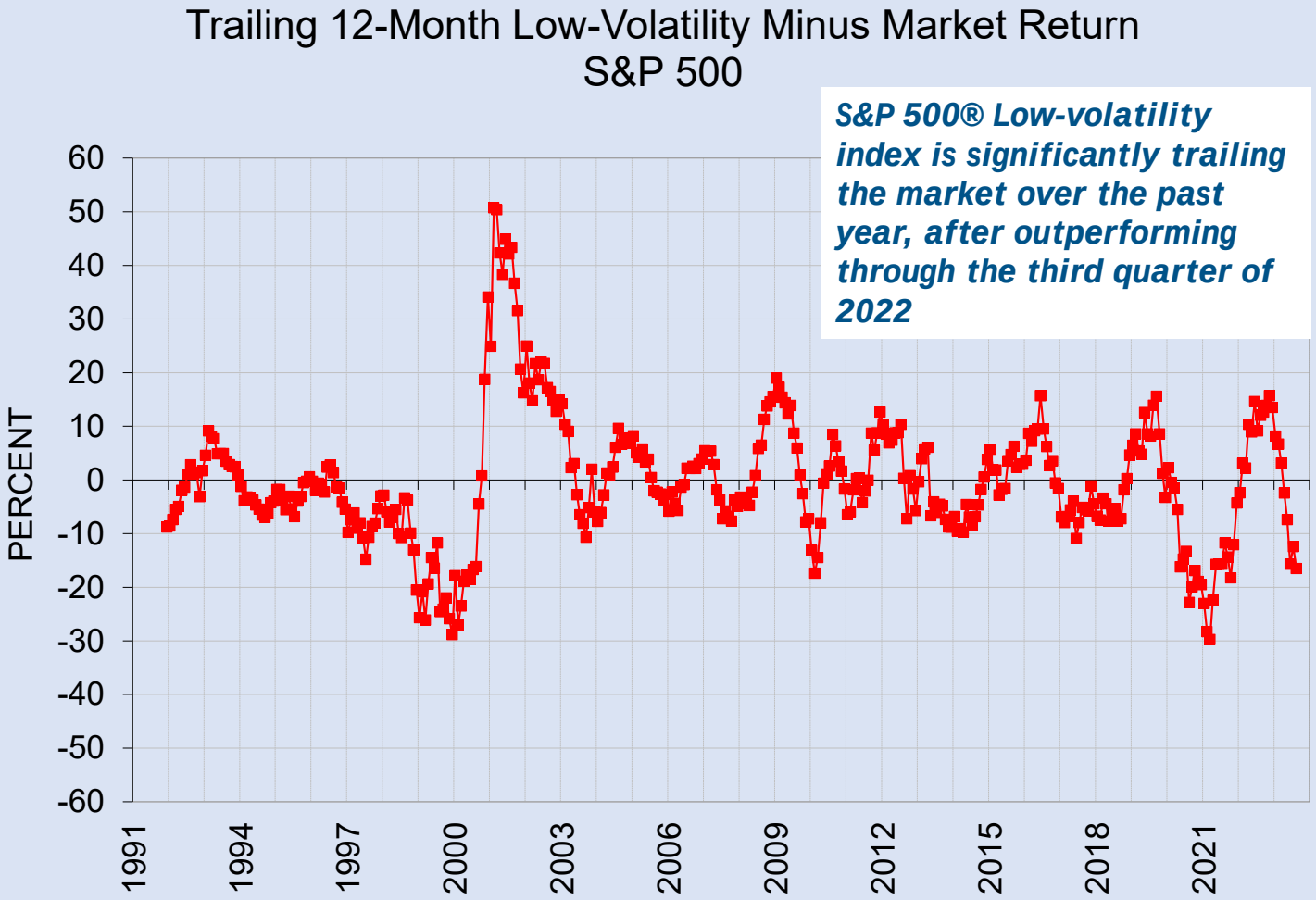
- Market beta provided by market capitalization-weighted indices like the S&P 500 or Russell 1000 is not the only source of equity risk premia available when purchasing a stock portfolio
- There are additional "factors" or fundamental characteristics that provide investors with attractive return-risk trade-offs that can complement and, in some cases, compete with the traditional market capitalization-weighted benchmark indices
  - "Smart Beta" or Rules-Based strategies break up the traditional market index into segments based on these fundamental characteristics
- Well-known "factors" or fundamental characteristics include Value, Momentum, Size, Quality & Low-Volatility

Smart Beta: Factor-based investing provides passive/rules-based exposure to alternative risk premia or return factors in the equity market

Low Volatility

- Low Volatility is a smart beta 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 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 problem with Low Volatility as a strategy is that **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 August 2023, the S&P 500 Low Volatility Index has underperformed the S&P 500 by 16.5%)**

Volatility Cycles



How to Invest in Less Volatile Stocks?

- Two contrasting approaches to building less volatile equity portfolios:
  - Focus on the least volatile stocks as measured by the standard deviation of stock returns
  - Focus on those stocks who have exhibited consistent dividend growth over time

- Stock risk as measured by standard deviation of returns is non-stationary, meaning that it moves around
  - Financial stocks were less risky prior to the financial crisis in 2007-2009
  - Many financial stocks had to cut their dividends during the financial crisis
  - Financial stocks became more risky following the financial crisis and dividend cuts, and again following March 2023 bank failures

Dividend-Focused Lower-Volatility Investing Research

- Certain dividend patterns provide opportunity to exploit benefits of lower risk stocks, producing a smoother stream of returns

- Large-cap US stocks with a moderately long history of dividend ***payment & growth*** are associated with a reduced volatility profile
  - Stocks capable of ***growing*** dividends typically provide more stable earnings growth rates

- Subset of dividend-paying stocks created using a custom set of screens chosen to identify companies with a rising dividend stream thought to be less at-risk than the stream from typical dividend-paying stocks

Dividends and Stock Research Analysis

- Assign every stock in the S&P 500 Index into one of three non-overlapping subset groups:
  1. Companies that are consistent dividend payers ("Strong Payers")
  2. Companies that currently pay dividends but not consistently ("Weak Payers")
  3. Companies that do not currently pay dividends ("Non-Payers")

- Reconstitute each group on a quarterly basis; calculate monthly returns for the three portfolio groups starting in 1981

Key Research Finding:
While there are different excess return patterns (relative to the S&P 500®), the "Strong Payers" have consistently displayed the lowest returns variability (i.e., the least risk) among the three groups.

Top Holdings Comparison
Alternative Dividend Groups v. S&P 500®

TOP 10 COMPANIES

Strong Payers	Weak Payers	Non-Payers	S&P 500
APPLE	NVIDIA CORP	ALPHABET	APPLE
MICROSOFT	WELLS FARGO & CO	AMAZON.COM	MICROSOFT
VISA	RTX	TESLA	ALPHABET
UNITEDHEALTH GRP	INTEL	META PLATFORMS	AMAZON.COM
LILLY ELI	CONOCOPHILLIPS	BERKSHIRE HATHAW	NVIDIA CORP
EXXON MOBIL	GEN ELECTRIC	ADOBE	TESLA
JOHNSON JOHNSON	AT&T INC	SALESFORCE	META PLATFORMS
J P MORGAN CHASE	PROLOGIS	NETFLIX	BERKSHIRE HATHAW
WALMART	TJX	ADVANCED MICRO	VISA
MASTERCARD	GILEAD SCIENCES	T-MOBILE US	UNITEDHEALTH GRP

Largest 10 Companies in S&P 500 Index (Ranked by Capitalization) Appear in Black

As of June 30, 2023, the Strong Payers grouping includes 4 of the largest 10 companies as ranked by market capitalization in the S&P 500®. The securities identified and described do not represent all of the securities in the respective groups. The list was compiled based solely on portfolio weight. The reader should not assume that an investment was or will be profitable.

Impact of Dividend Status S&P 500® Sub-Group Risk & Return (%)
Periods Ending July 2023

	Consistent Dividend-Paying Stocks	Other Dividend-Paying Stocks	Non-Dividend-Paying Stocks	S&P 500 Stocks
Annualized Returns Through Latest Period				
Jan-1981 --	11.73	10.96	10.78	11.42
Annualized Risk Through Latest Period				
Jan-1981 --	13.92	16.17	22.14	15.09
Annualized Returns Selected Periods				
1-YR	10.18	14.66	18.64	13.03
3-YR	13.10	19.30	9.27	13.58
5-YR	11.43	11.76	12.12	12.19
10-YR	11.56	12.03	14.28	12.67
Annualized Risk Selected Periods				
1-YR	18.32	22.27	23.61	18.94
3-YR	16.11	19.15	22.95	18.04
5-YR	16.90	20.73	22.51	18.76
10-YR	13.53	16.31	18.17	14.86

Breaking the S&P 500® into 3 non-overlapping groups according to dividend status (Consistent Dividend-Paying Stocks, Other Dividend-Paying Stocks & Non-Dividend Paying Stocks) shows dramatically different performance.

The portfolio of Consistent Dividend-Paying stocks has had lower risk over longer-term horizons than portfolios built from the other groups and the S&P 500® as a whole.

Returns are hypothetical. See "HYPOTHETICAL RETURNS & PERFORMANCE" in the Disclosures for details.

Performance of Stock Groups Depends on Market Environment

S&P 500® Sub-Groups Monthly Returns Analysis

January 1981 - December 2022

	Biggest Negative Months	Smaller Negative Months	Smaller Positive Months	Biggest Positive Months	All Months
Counts (#)	90	90	162	162	504
Averages (%)					
S&P 500®	-5.73	-1.21	1.44	5.44	0.98
Consistent Dividend-Paying Stocks	-4.76	-0.94	1.36	4.93	1.00
Other Dividend-Paying Stocks	-6.00	-1.25	1.44	5.59	0.96
Non-Dividend-Paying Stocks	-7.39	-2.04	1.49	6.89	1.01
Hit Rates					
Consistent Dividend-Paying Stocks	0.72	0.61	0.44	0.29	0.47
Other Dividend-Paying Stocks	0.49	0.46	0.51	0.54	0.51
Non-Dividend-Paying Stocks	0.31	0.28	0.49	0.66	0.48

Consistent dividend-paying stocks have historically performed better than the S&P 500 index in negative markets. The non-dividend-paying stocks really shine in only the biggest up-market months.

Returns are hypothetical. See "HYPOTHETICAL RETURNS & PERFORMANCE" in the Disclosures for details.

Investment Mandates – Risks

Manager Mandate	Total Volatility	Active Risk
Passive	Equals Market	0.1% - 0.5%
Enhanced Index	Close to Market	1% - 2%
Active	At or Above Market	2% - 8%
Low-Volatility	Below Market	4% - 7%

While adding a Smart Beta, lower-volatility strategy will likely reduce total plan risk, the trade-off is that the plan will have to accept the higher active risk (tracking error) of the lower-volatility strategy, and likely underperformance in strongly-upward markets.

Enhanced Index strategies are often viewed as the sweet-spot between higher-fee active strategies aiming to beat the market and lower-fee passive products content to match the market's risk, return before fees.

Key Takeaways

- There are 2 ways to increase the value of your pension plan – increase return or reduce risk (**Remember Risk is Costly!)**
- There are more choices when hiring managers than just Active or Passive – Enhanced Indexing and Smart Beta (e.g., lower volatility strategies focusing on dividend growth)
- Research suggests focusing on consistent dividend growth may allow a pension plan to reduce their overall equity risk while receiving more dividend income compared to the market – at the cost of higher tracking error
- Enhanced Indexing is often viewed as the sweet spot as it is designed to protect pension plans on the downside but have more participation in the upside compared to Smart Beta strategies
- There is a trade-off between lowering overall risk while raising tracking error (using a Smart Beta, reduced volatility strategy) vs lowering overall risk a little bit with little to no increase in tracking error (Enhanced Index strategy).

Important Disclosures

PAST PERFORMANCE IS NOT NECESSARILY INDICATIVE OF FUTURE RESULTS.
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. 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. 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. 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.

HYPOTHETICAL RETURNS & PERFORMANCE
The long-run performance presented by TCM for dividend-related groupings of stocks and other custom benchmarks is hypothetical. Prospective investors are advised to consider a number of important factors. When reviewing this type of back-tested information. The reported performance was derived from the retroactive application of sets of rules with the benefit of hindsight. There are inherent limitations with this type of data (e.g., performance results do not represent actual trading) and results are sensitive to the period of analysis chosen. TCM did not offer the trading strategies throughout the entire periods presented and different economic conditions might have impacted the adviser's decision-making when using the rules to manage actual client accounts. While the sets of rules have been applied consistently to generate the latest results, these rules and associated trading strategies have evolved over time. The performance presented does not reflect the deduction of advisory fees, brokerage or other commissions, mutual fund exchange fees, and other expenses a client would have paid. Investors are reminded of the potential for loss as well as profit.

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.