BOARD OF TRUSTEES
Cobb County Government Employees' Pension Plan Trust
Other Post-Employment Benefits (OPEB) Trust
Meeting of June 8, 2022
2nd Floor BOC Meeting Room/WebEx, 9:00 am

Present:	Sheriff Craig Owens, Trustee	Absent:
	Glenda Valentine, Interim Trustee/Secretary	
	Virgil Moon, Vice-Chair	
	Roger Tutterow, Chair	
	Bill Volckmann, Trustee	

A scheduled meeting of the Board of Trustees of the Cobb County Employees Retirement Plan was called to order by Virgil Moon at 9:02 a.m. via In Person/WebEx. The following items of business were discussed:

I. Invitation for Public Comment
No comments

II. Approval of Minutes
A motion was made by Bill Volckmann and seconded by Sheriff Owens to approve the minutes for the meeting of May 3rd, 2022.

Vote: 5 – 0, in favor

III. Ratify Invoice Payments Approval
A motion was made by Bill Volckmann and seconded by Sheriff Owens to accept email approvals for three (3) invoices totaling $70,772.09 for OPEB and seven (7) invoices totaling $308,970.92 for the Employees Retirement Fund.

Vote: 5 – 0, in favor

IV. Managers' Report
a. Eagle Capital – John Johnson
b. Richmond Capital – Beth Baron
c. TCW – Brian McNamara

V. Actuary Report – Cavanaugh Macdonald – *Ben Mobley, Ed Koebel, and Nathaniel Hutchinson*

VI. Asset Allocation Study – UBS – *Earle Dodd, Austin Dodd, Van Price, and Allen Wright*

VII. New Business

VIII. Adjourn
Pension Meeting was adjourned at 11:00 a.m.

The next tentatively scheduled meeting date is Wednesday, September 7th, 2022 from 10:00 a.m.-11:00 a.m. to accommodate the Fund Manager presentations. Location set for 2nd Floor BOC Meeting Room, 100 Cherokee Street, Bldg. A., Marietta, Georgia

CERTIFIED CORRECT:

Glenda Valentine
Secretary

Roger Tutterow
Chair

PRINT | BOARD OF TRUSTEES- COBB COUNTY EMPLOYEES OPEB PLAN

REGULAR MEETING for June 8, 2022

PURPOSE

To seek authorization from the Board of Trustees of the Cobb County Employees Retirement Plan to ratify the following invoices which have already been processed for payment;

1	RICHMOND CAPITAL MANAGEMENT INC	$7,910.00
2	TCW INVESTMENT MANAGEMENT COMPANY	$23,444.06
3	EAGLE CAPITAL MANAGEMENT LLC	$39,418.03
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21		
22		
23		
24		
	TOTAL	$70,772.09

APPROVAL

Glenda Valenti

PRINT | BOARD OF TRUSTEES- COBB COUNTY EMPLOYEES RETIREMENT PLAN

REGULAR MEETING for June 8, 2022

PURPOSE

To seek authorization from the Board of Trustees of the Cobb County Employees Retirement Plan to ratify the following invoices which have already been processed for payment;

1	CAVANAUGH MACDONALD CONSULTING LLC	$12,755.50
2	EAGLE CAPITAL MANAGEMENT LLC	$201,800.73
3	GEORGIA ASSOCIATION OF PUBLIC PENSION TRUSTEES	$149.00
4	RICHMOND CAPITAL MANAGEMENT INC	$39,292.00
5	TROUTMAN PEPPER HAMILTON SANDERS LLP	$1,428.00
6	TROUTMAN PEPPER HAMILTON SANDERS LLP	$3,415.74
7	TRUIST BANK	$50,129.95
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23		
24		
	TOTAL	$308,970.92

APPROVAL

Glenda Valeet

Investment Solutions Portfolio Analysis

Cobb County Equilibrium

June 01, 2022

Prepared By : UBS Institutional Consulting

UBS Asset Allocation Study

IMPORTANT: The projections or other information generated by the Zephyr Asset Allocation Tool regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. Results will vary with each use and over time.

Results reflect the reinvestment of income, but not the impact of transaction costs, advisory fees, taxes and inflation (unless otherwise indicated). If these factors were included, the results shown would be lower.

Historic results are provided for illustrative purposes only and are based on the retroactive application of historic index data to the asset allocation(s) analyzed. The Zephyr tool calculates hypothetical portfolio performance results for the period shown using long-term performance of representative indices as proxies for the hypothetical performance of the asset classes included in the portfolio(s) analyzed. The calculation assumes that the portfolio was rebalanced monthly, which does not necessarily reflect how an actual portfolio would have been managed. Allocations were developed with the benefit of hindsight and results do not consider the impact that material economic and market factors might have had on investment decision-making during the time period. Actual results may be lower than the hypothetical returns and will vary depending on market conditions and the specific composition and implementation of the portfolio. Past performance or historic results provide no guarantee of future returns.

Please see Appendix for important information about this report.
The information herein is based on data and computations by Zephyr Associates and is believed to be reliable but UBS does not warrant its completeness or accuracy.

UBS Capital Market Assumptions

The asset class return, risk, and correlation results used and displayed in this report are based on UBS's estimated forward-looking return, riskas measured by standard deviationand correlation assumptions ("capital market assumptions") as vetted and approved by the Wealth Management Americas Asset Allocation Committee ("UBS WMA AAC"), which are based on UBS proprietary research. The development process includes a review of a variety of factors, including the return, risk, correlations and historical performance of various asset classes, inflation and risk premium.

UBS WMA AAC has developed two sets of return assumptions that are designed for different investment time horizons. The "strategic" returns in the UBS capital market assumptions reflect UBS WMA AAC's expectations for the average annual total return for various asset classes over one full business cycle. The "equilibrium" return assumptions reflect our expectations for average annual returns over multiple business cycles based on certain structural assumptions about the economy, including the long-term potential growth rate and the neutral rate of interest.

UBS WMA AAC's risk assumptions and asset class correlation assumptions remain the same when using strategic or equilibrium return assumptions.

This Analysis uses Equilibrium Return Assumptions

The strategic return assumptions are applicable for short- to long-term investment horizons over a full business cycle, such as when constructing strategic asset allocations or performing custom portfolio analysis or risk monitoring. In contrast, equilibrium return assumptions are appropriate for multi-cycle investment horizons that are typical of long-term planning. You have requested that this analysis use"equilibrium" return assumptions which are shown on the following "Scenario Analysis" page. Using equilibrium return assumptions may be appropriate in certain circumstances for multi-cycle investment horizons to help assess the potential success of a long-term financial plan or the funding status of an institutional pension plan; however, equilibrium return assumptions have limitations for portfolio construction because they do not consider cyclical developments or current economic or market conditions. We recommend using strategic return assumptions to construct and evaluate strategic asset allocations because strategic return assumptions reflect our current return expectations for the cycle.

You should review this analysis in conjunction with the analysis you received using UBS WMA AAC's strategic return assumptions. Please contact your UBS Consultant if you have not received a report using strategic return assumptions.

UBS capital market assumptions are not guarantees and are subject to change at any time at our discretion and without notice. UBS has changed its return, risk and correlation assumptions in the past and may do so in the future. Neither UBS nor your UBS Consultant is required to provide you with an updated analysis based upon changes to these or other underlying assumptions.

Capital market assumptions set by the UBS WMA AAC may differ or be contrary to those established by other business areas or divisions of UBS as a result of using different assumptions and/or criteria. In addition, UBS has a variety of analyses and services that provide portfolio review, including asset allocation strategies. The recommendations and types of analysis may vary depending on the asset allocation analysis used.

Since assumptions are subject to uncertainty, including market forces and factors outside of our control, you should also understand that the assumptions used are estimates, are not guarantees or projections of future results. There is no certainty that the assumptions for the model will accurately estimate asset class return rates going forward. Actual long-term results for each asset class may differ from our assumptions, with those for classes with limited histories potentially diverging more. As a result, UBS will not be responsible for omissions in the analysis, regardless of the source of such inaccuracies, errors, or omissions. In addition, capital market assumptions pertain to the asset or sub-asset class in general, not the performance of specific securities or investments. Particular investment products may have higher or lower returns than the range for the corresponding asset class used in this analysis. Your actual results may vary significantly from the results shown in this report.

Scenario Assumptions

				CONSTRAINTS	
NAME	PROXY	RETURN	STDEV	MIN	MAX
UNGROUPED					
US Fixed Income > Core	Bloomberg U.S. Aggregate	3.60%	3.52%	20.00%	30.00%
US Equity > Core	Russell 3000	8.30%	16.05%	40.00%	60.00%
Global Equity > Core	MSCI ACWI (Net)	8.49%	14.90%	0.00%	12.00%
International Equity > Core	MSCI ACWI ex USA (Net)	8.90%	16.42%	10.00%	20.00%

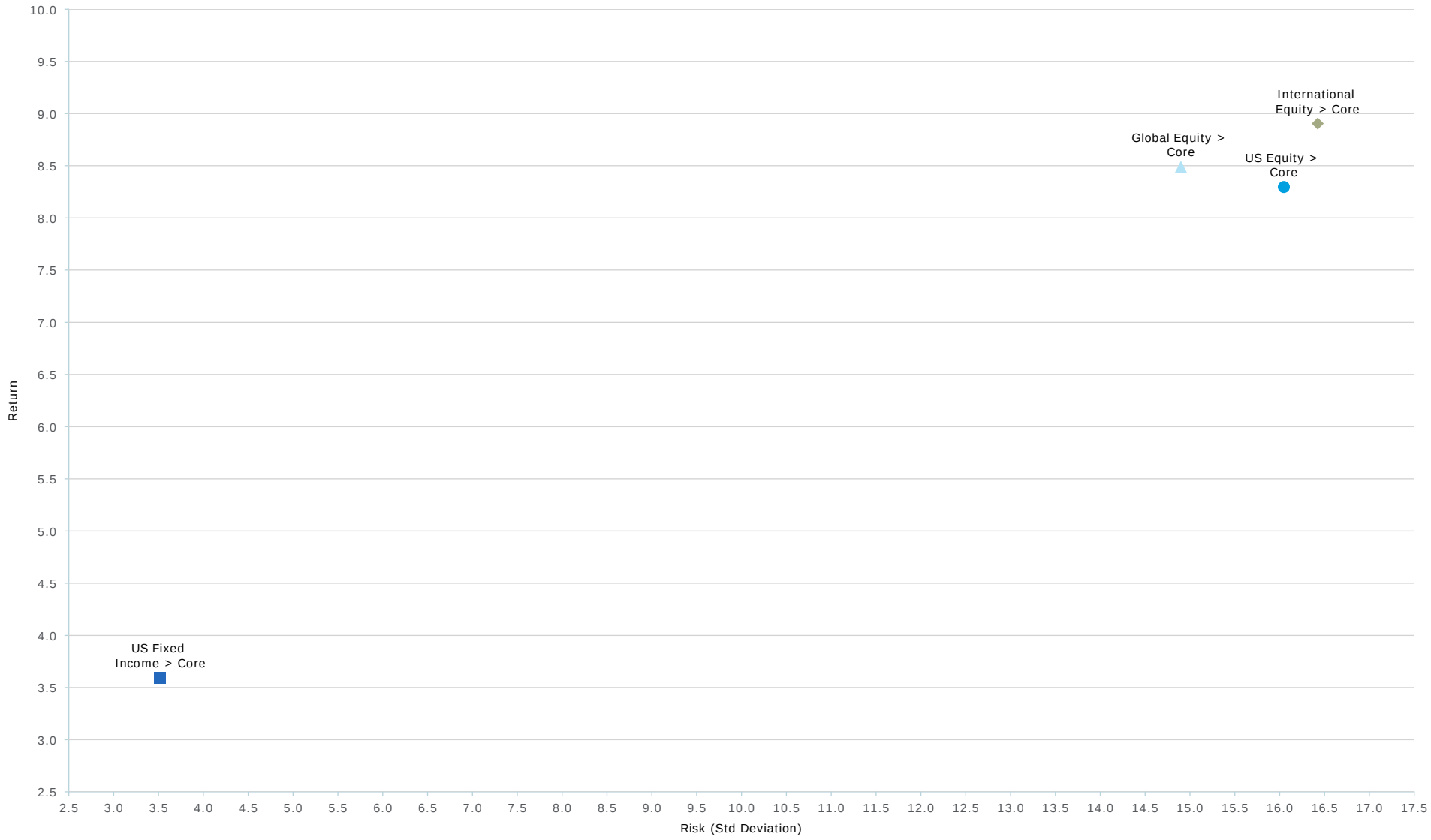
Allocation Case: Cobb County Equilibrium

Scenario Assumptions - Correlation Matrix

ASSETS	A	B	C	D
A. US Fixed Income > Core	1.00	0.05	0.04	0.03
B. US Equity > Core	0.05	1.00	0.95	0.84
C. Global Equity > Core	0.04	0.95	1.00	0.96
D. International Equity > Core	0.03	0.84	0.96	1.00

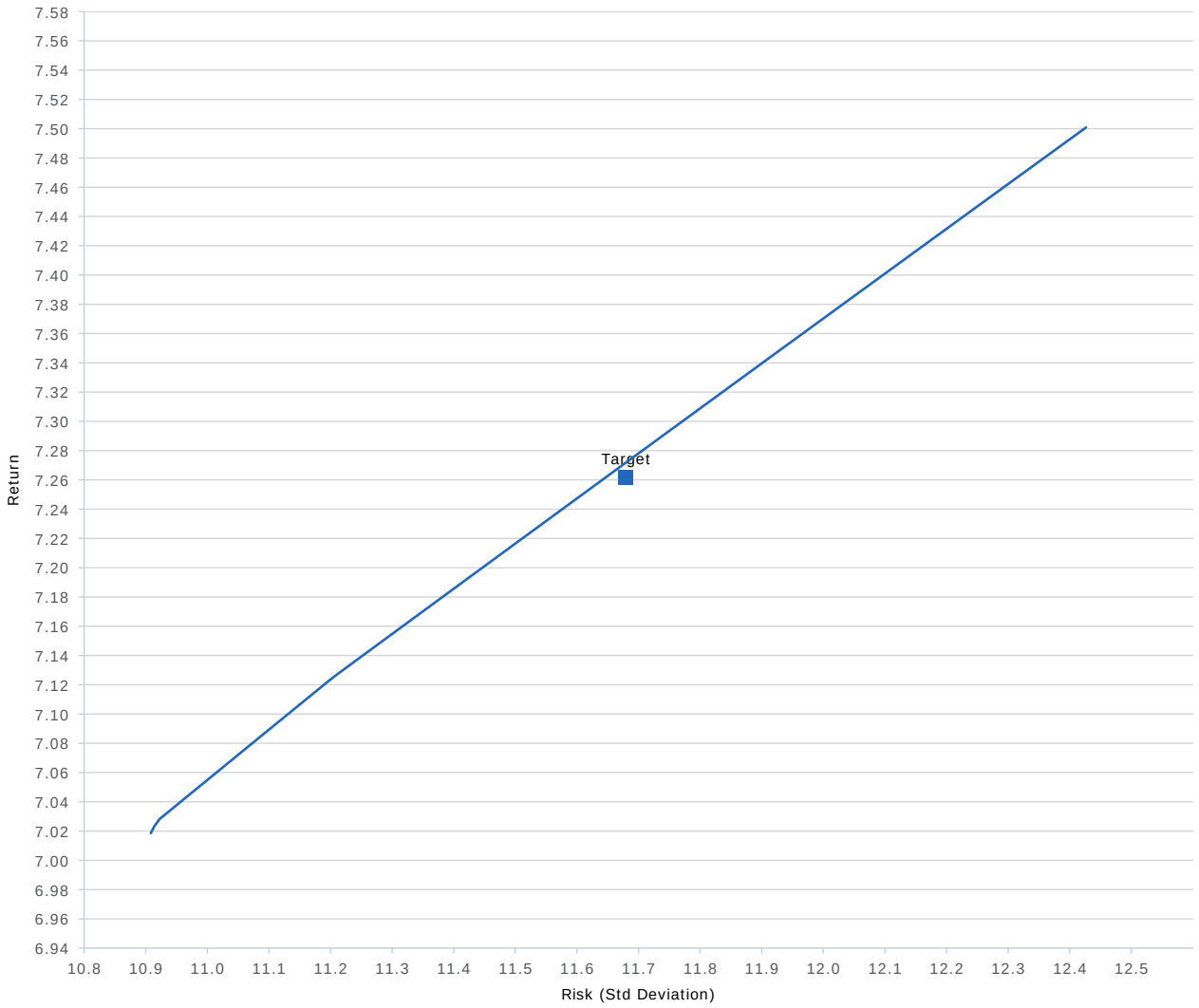
Allocation Case: Cobb County Equilibrium

Scenario Return & Risk Assumptions



Allocation Case: Cobb County Equilibrium

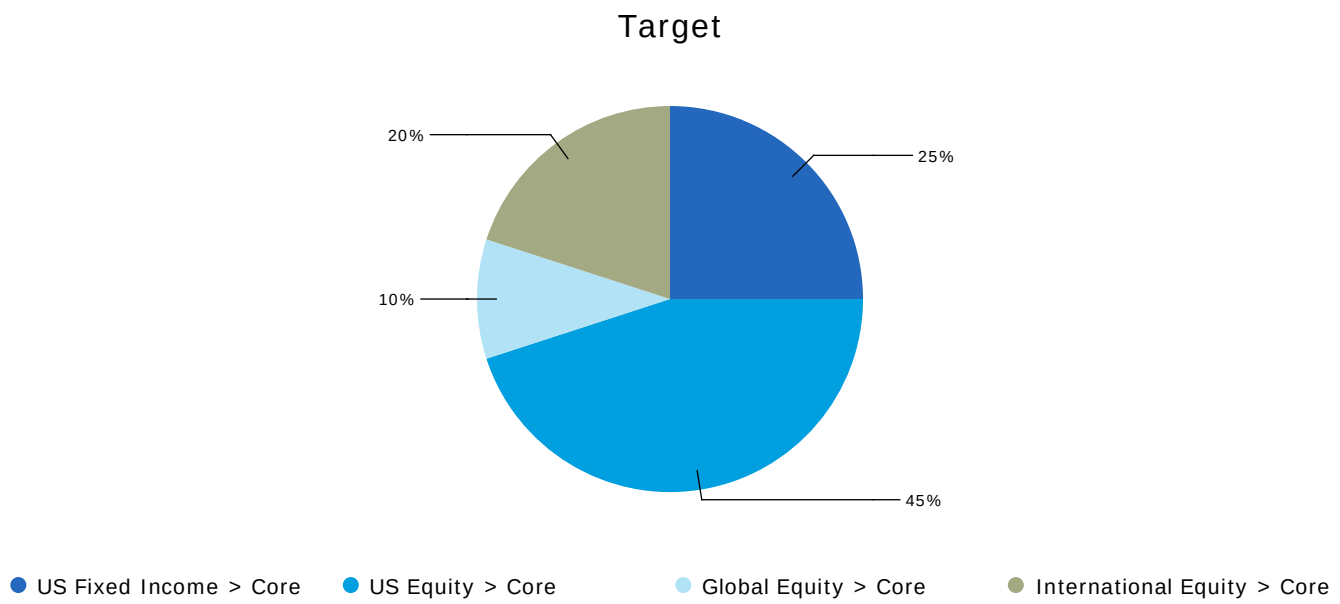
Efficient Frontier



PORTFOLIOS	RETURN	STDEV	SHARPE RATIO
Target	7.26%	11.68%	0.59

Allocation Case: Cobb County Equilibrium

Portfolio Allocations



	TARGET
Return	7.26%
Standard Deviation	11.68%
Sharpe Ratio	0.59

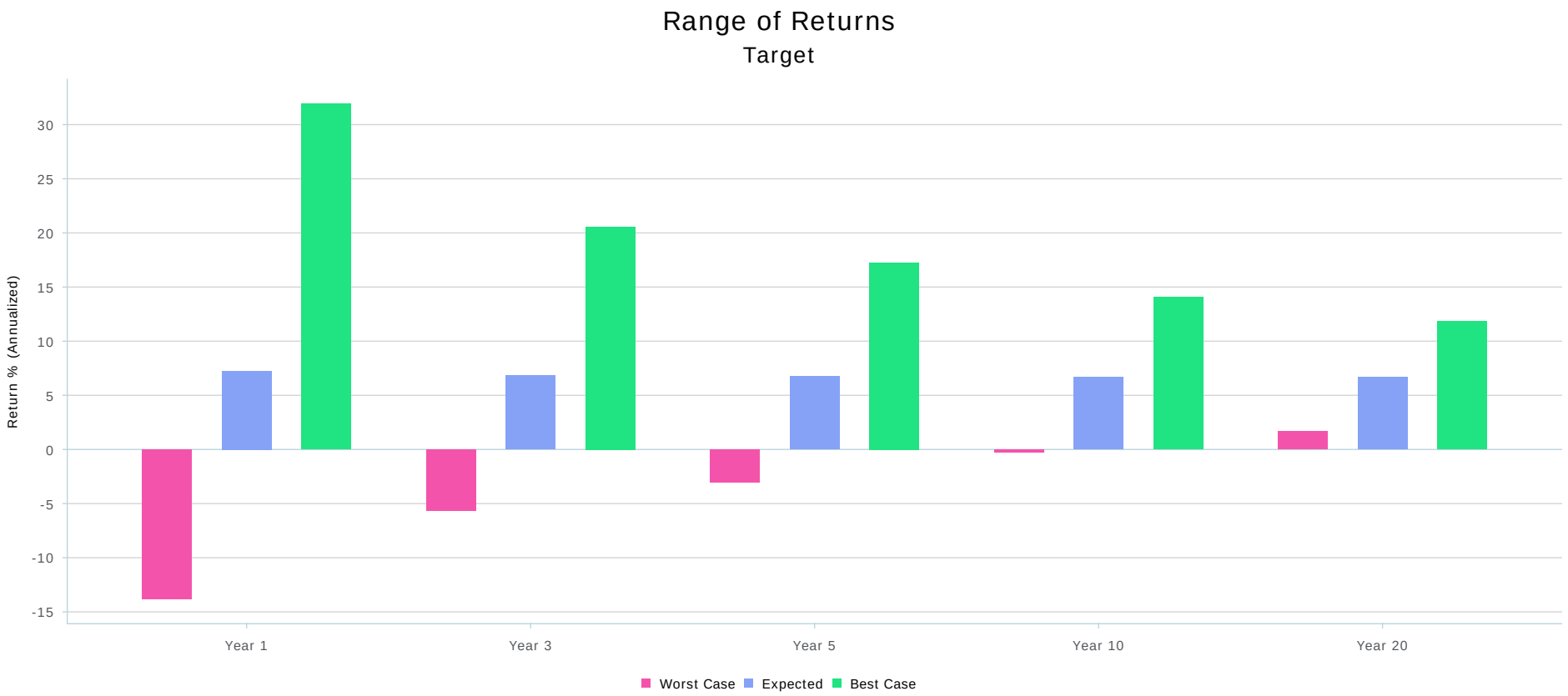
Allocation Case: Cobb County Equilibrium

Portfolio Allocations

ALLOCATIONS WEIGHTS	TARGET
US Fixed Income > Core	25.00
US Equity > Core	45.00
Global Equity > Core	10.00
International Equity > Core	20.00
Return	7.26
Standard Deviation	11.68
Sharpe Ratio	0.59

Allocation Case: Cobb County Equilibrium

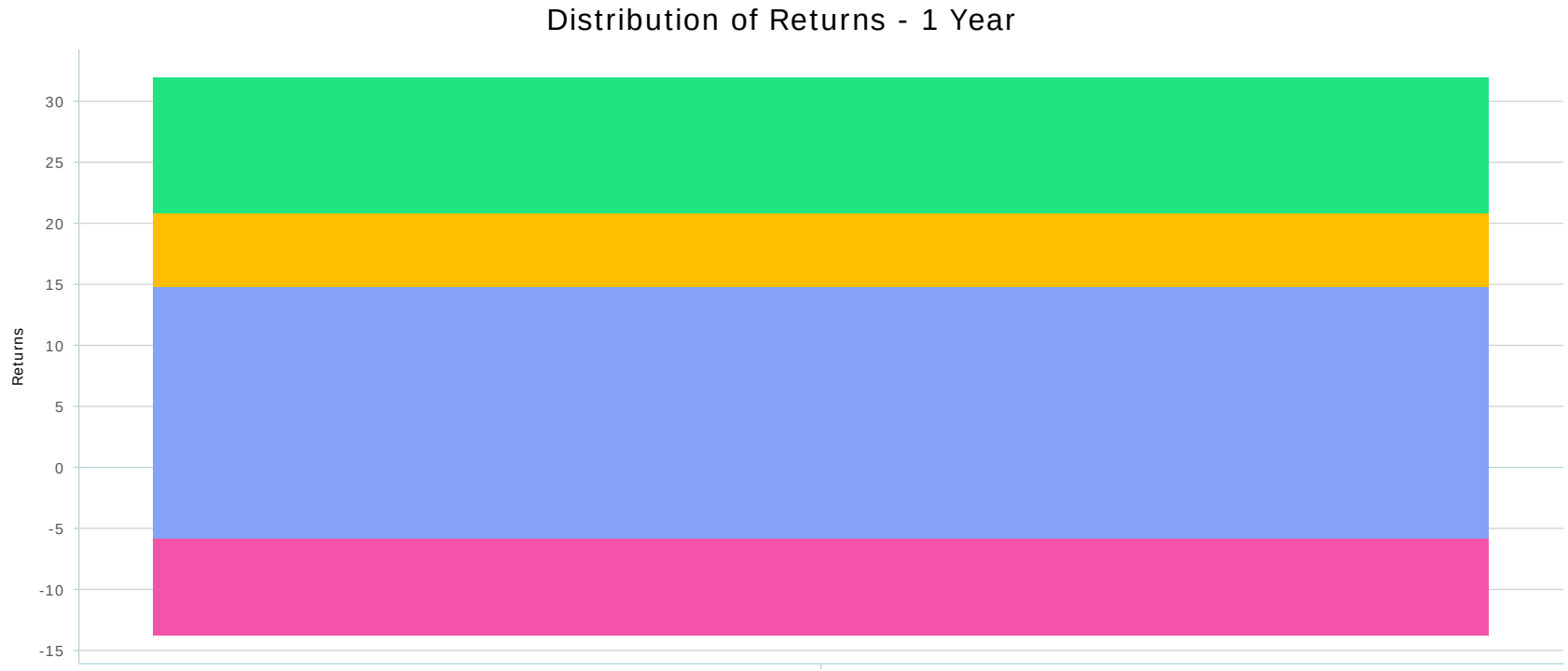
Portfolio Range of Returns



	ONE YEAR	THREE YEAR	FIVE YEAR	TEN YEAR	TWENTY YEAR
Best Case	31.92%	20.57%	17.28%	14.05%	11.83%
Expected	7.26%	6.84%	6.76%	6.69%	6.66%
Worst Case	(13.81%)	(5.70%)	(3.05%)	(0.31%)	1.68%
Expected Risk	11.68%	6.70%	5.19%	3.66%	2.59%

Allocation Case: Cobb County Equilibrium

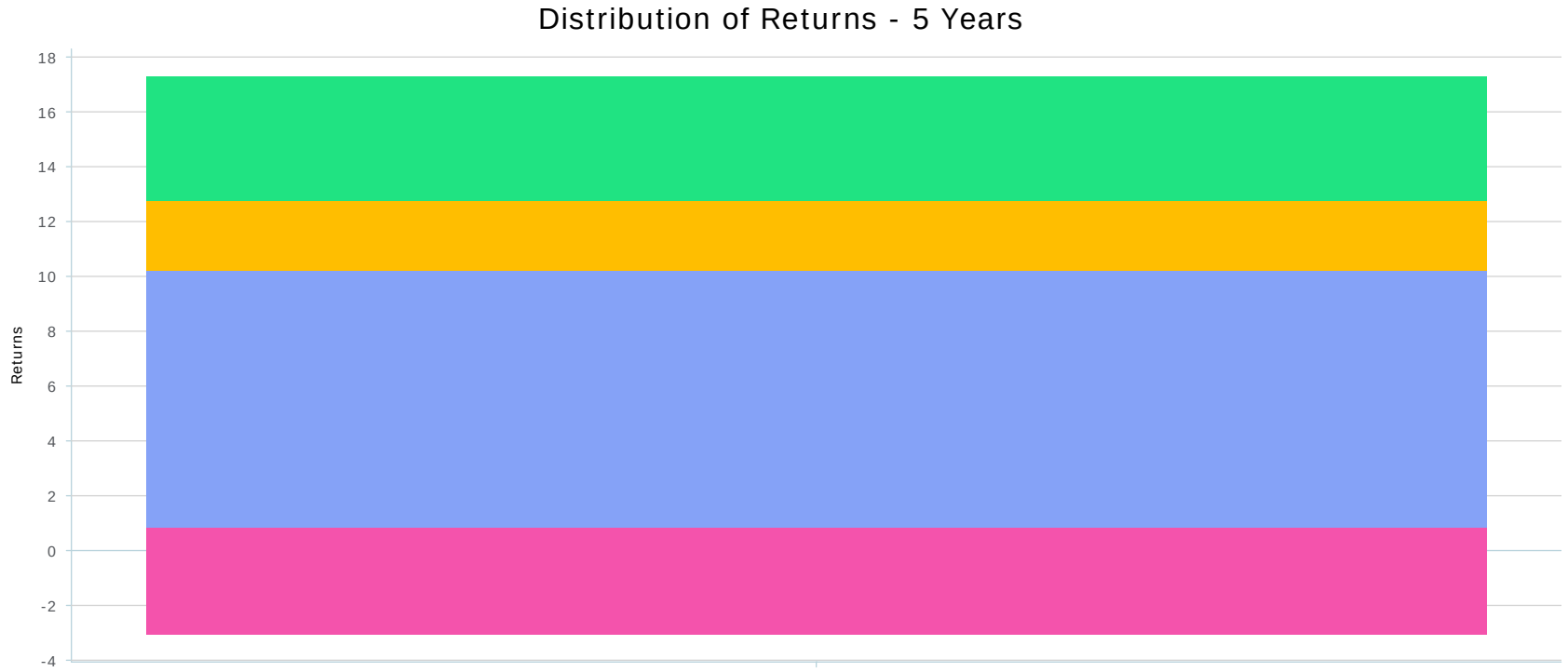
Portfolio Single Period Range of Returns



PERCENTILE	TARGET
Best Case	31.92
Expected	7.26
Worst Case	(13.81)

Allocation Case: Cobb County Equilibrium

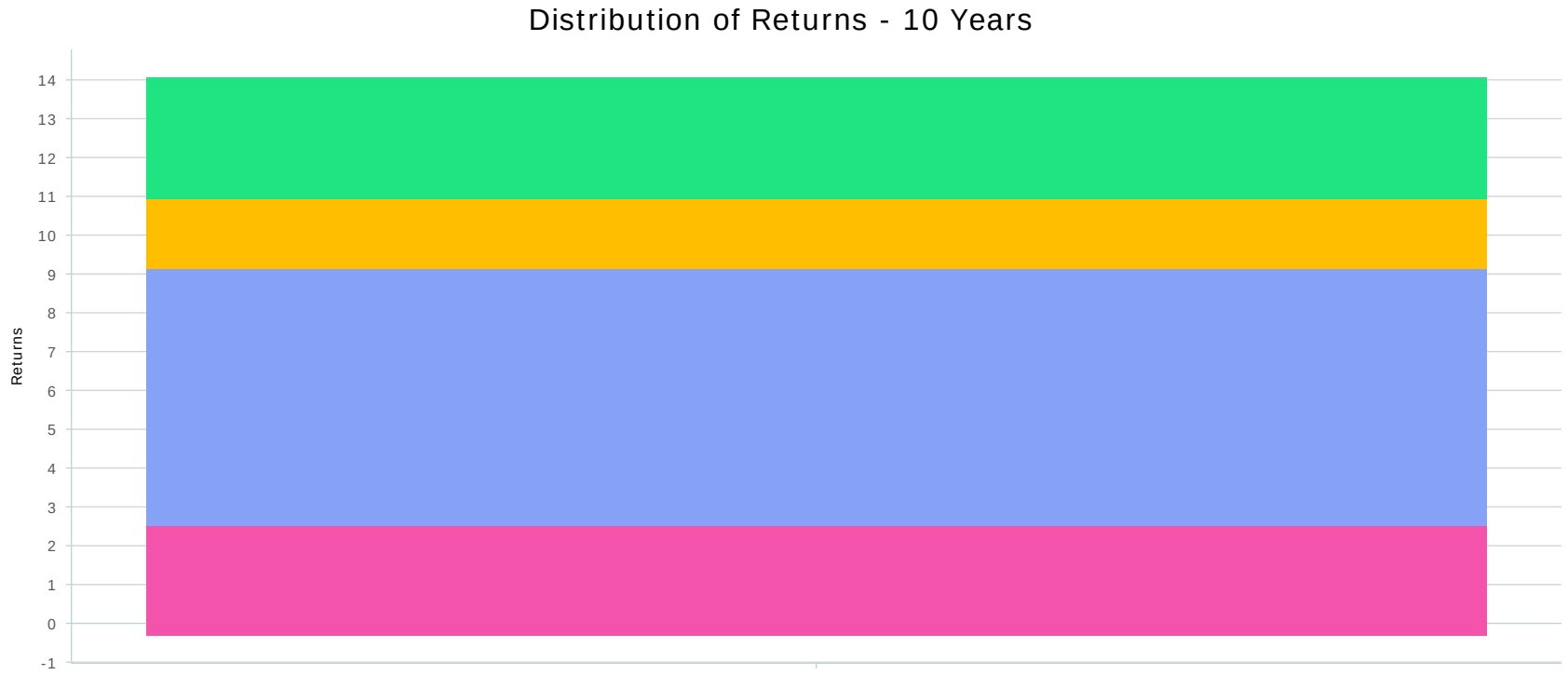
Portfolio Single Period Range of Returns



PERCENTILE	TARGET
Best Case	17.28
Expected	6.76
Worst Case	(3.05)

Allocation Case: Cobb County Equilibrium

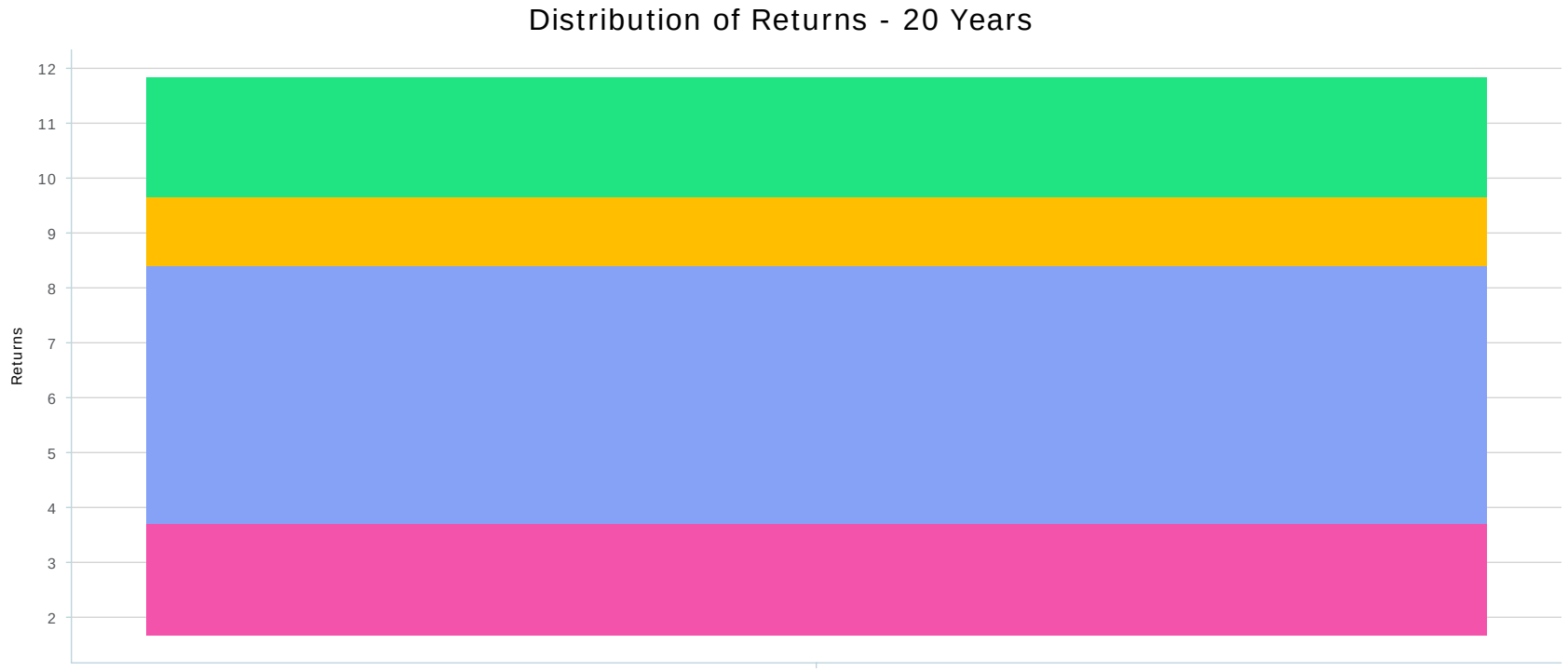
Portfolio Single Period Range of Returns



PERCENTILE	TARGET
Best Case	14.05
Expected	6.69
Worst Case	(0.31)

Allocation Case: Cobb County Equilibrium

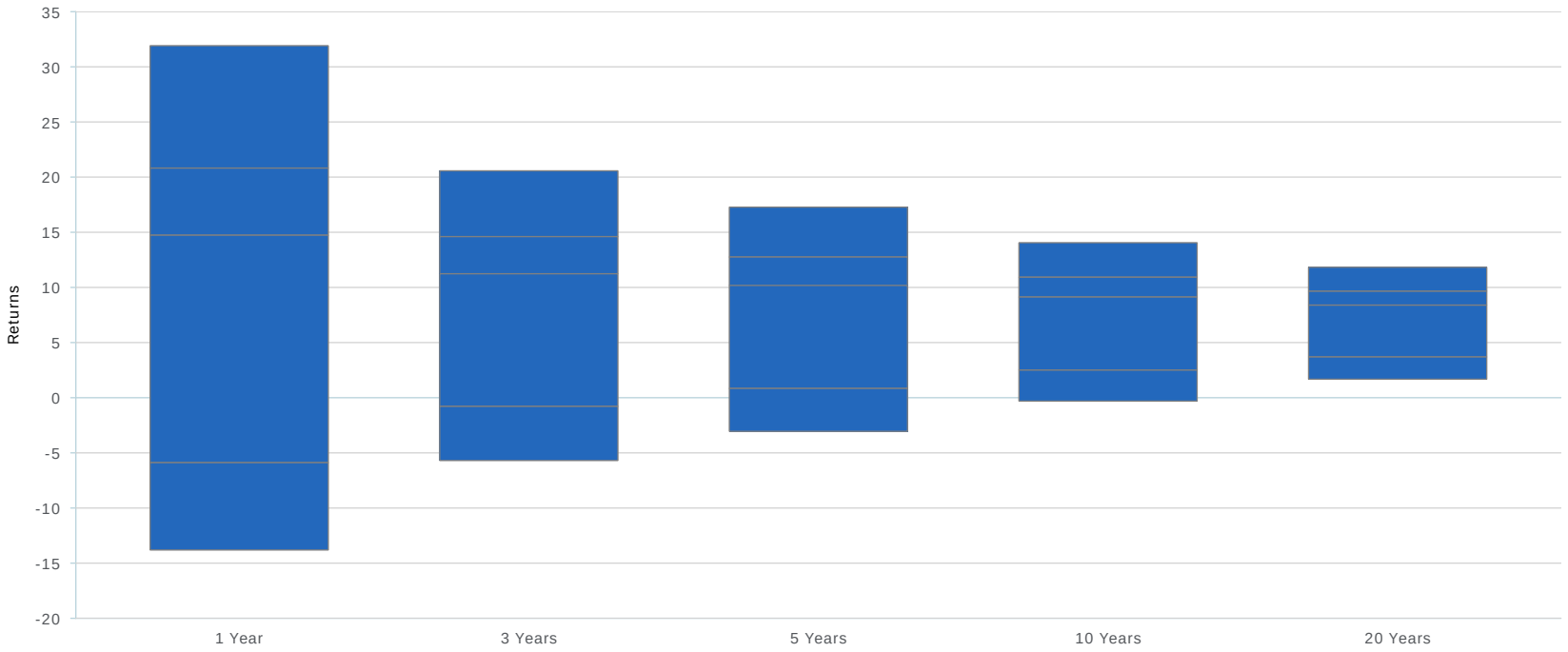
Portfolio Single Period Range of Returns



PERCENTILE	TARGET
Best Case	11.83
Expected	6.66
Worst Case	1.68

Allocation Case: Cobb County Equilibrium

Multiple Portfolio Range of Returns

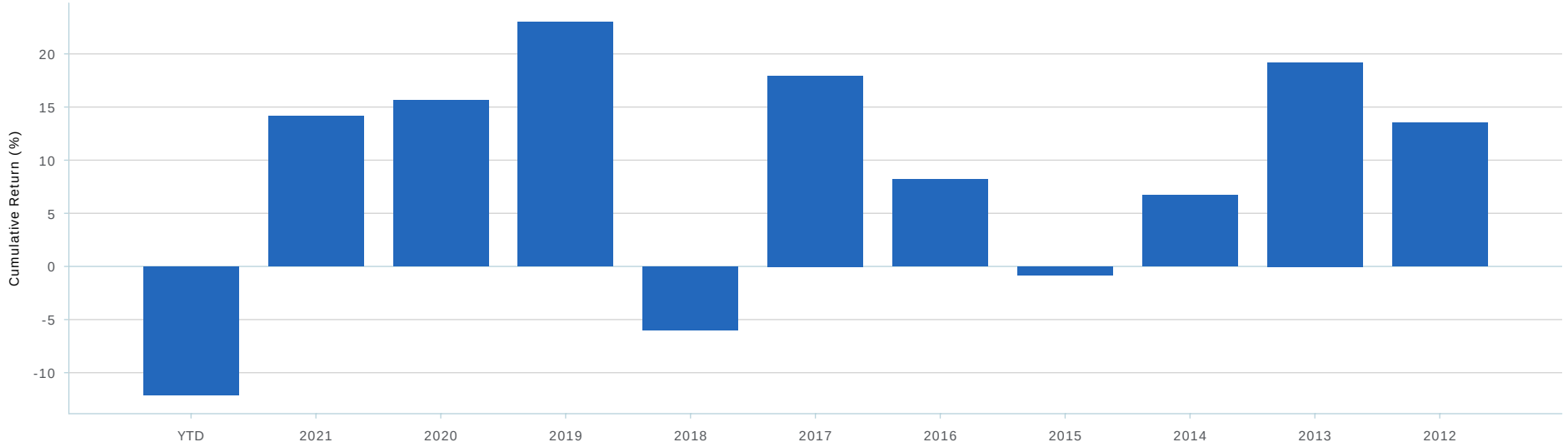


	1 Year	3 Years	5 Years	10 Years	20 Years	
Target	31.92	20.57	17.28	14.05	11.83	Best Case
	7.26	6.84	6.76	6.69	6.66	Expected
	(13.81)	(5.70)	(3.05)	(0.31)	1.68	Worst Case

Allocation Case: Cobb County Equilibrium

Calendar Year Cumulative Return

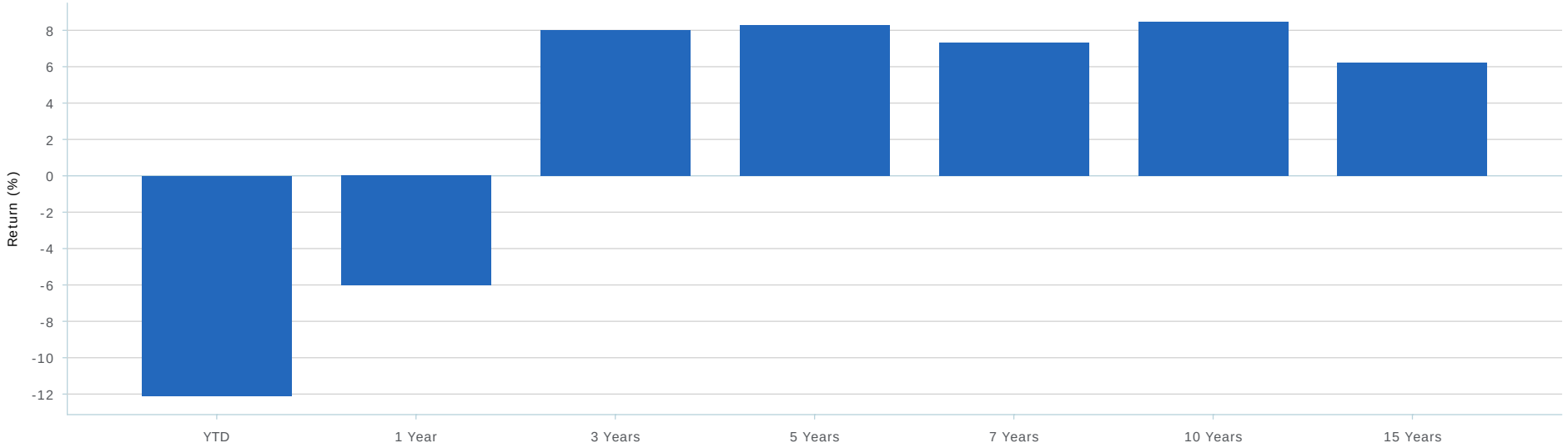
As of April 2022



	YTD	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Target	(12.10)	14.18	15.62	23.03	(6.01)	17.95	8.18	(0.83)	6.71	19.20	13.54

Trailing Year Returns

As of April 2022



	YTD	1 YEAR	3 YEARS	5 YEARS	7 YEARS	10 YEARS	15 YEARS
Target	(12.10)	(6.02)	8.03	8.27	7.31	8.47	6.24

Manager Performance

January 2001 - April 2022

	RETURN	CUMULATIVE RETURN	STANDARD DEVIATION POPULATION	EXCESS RETURN	CUMULATIVE EXCESS RETURN	INFORMATION RATIO	R SQUARED	TRACKING ERROR
Target	6.19	257.98	11.68	(1.23)	(99.13)	(0.27)	95.13	4.48

Index relative statistics vs S&P 500

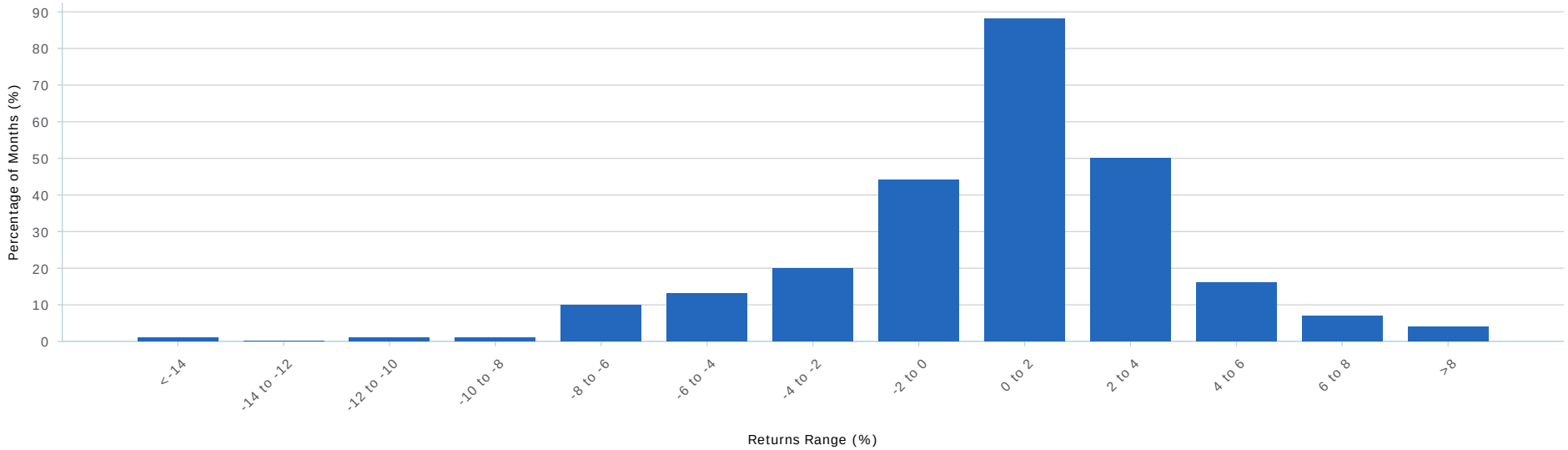
Periodic Returns

As of April 2022

		JAN	FEB	MAR	Q1	APR	MAY	JUN	Q2	JUL	AUG	SEP	Q3	OCT	NOV	DEC	Q4	YEAR
Target	2022	(4.41)	(2.07)	1.01	(5.44)	(7.04)	--	--	(7.04)	--	--	--	--	--	--	--	--	(12.10)
	2021	(0.38)	1.67	1.82	3.13	3.54	1.07	1.29	6.00	0.78	1.87	(3.29)	(0.72)	4.02	(1.75)	2.93	5.20	14.18
	2020	(0.22)	(5.62)	(10.58)	(15.79)	8.99	3.61	2.41	15.65	4.35	4.53	(2.47)	6.38	(1.76)	9.64	3.60	11.60	15.62
	2019	6.43	2.23	1.38	10.30	2.67	(4.13)	5.33	3.67	0.51	(1.12)	1.38	0.75	2.02	2.12	2.50	6.78	23.03
	2018	3.76	(3.26)	(1.31)	(0.93)	0.40	1.00	(0.17)	1.23	2.28	1.40	0.05	3.76	(5.89)	1.39	(5.34)	(9.68)	(6.01)

Histogram of Returns

January 2001 - April 2022



	SKEWNESS	KURTOSIS	NUMBER OF DOWN PERIODS	AVERAGE NEGATIVE RETURN	DOWNSIDE DEVIATION (MAR = 0.00%)	NUMBER OF UP PERIODS	AVERAGE POSITIVE RETURN	UPSIDE DEVIATION (MAR = 0.00%)
Target	(0.70)	2.01	90	(2.90)	8.06	165	2.44	8.67

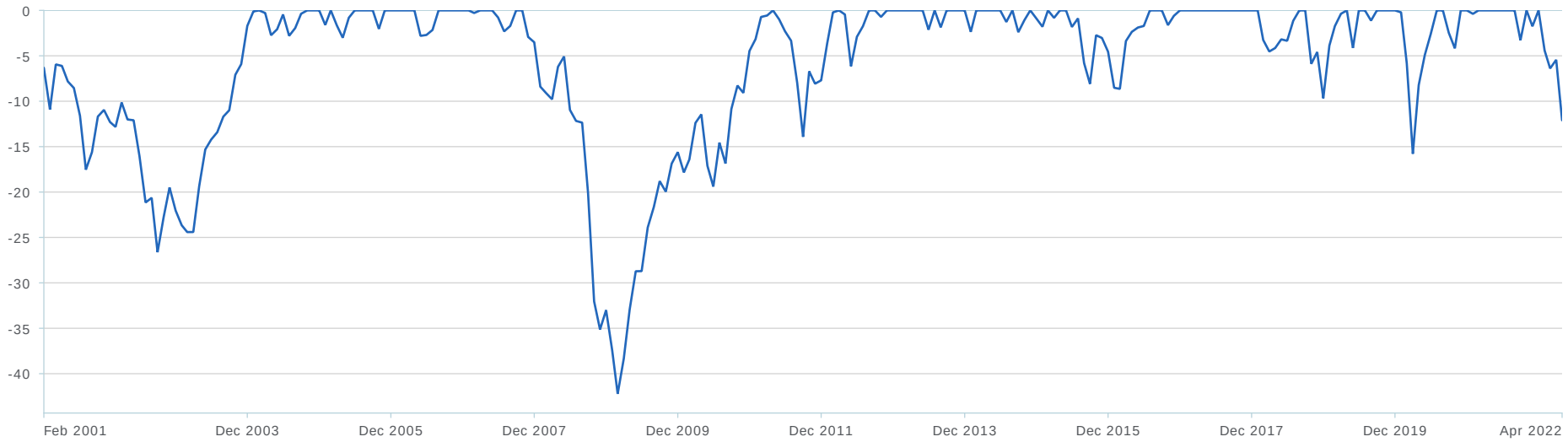
Historical Index Performance Comparison

As of April 2022

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	YTD
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
26.07	12.12	7.80	15.43	8.62	(30.56)	25.96	13.20	(1.01)	13.54	19.20	6.71	(0.83)	8.18	17.95	(6.01)	23.03	15.62	14.18	(12.10)

Drawdown of Cumulative Return

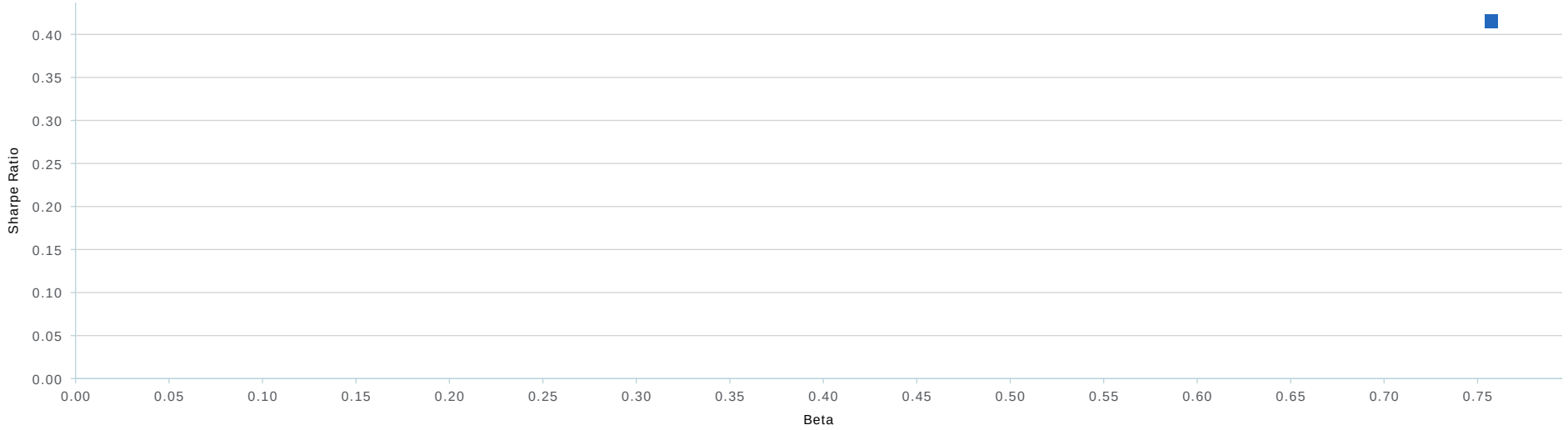
January 2001 - April 2022



	MAXIMUM DRAWDOWN LOSS VALUE	MAXIMUM DRAWDOWN START DATE	MAXIMUM DRAWDOWN END DATE	MAXIMUM DRAWDOWN LENGTH	MAXIMUM DRAWDOWN RECOVERY DATE	HIGH WATER MARK DATE	HIGH WATER MARK	PAIN INDEX	PAIN RATIO
Target	(42.22)	Oct 2007	Feb 2009	16	Apr 2011	Dec 2021	13.77	5.81	0.84

Sharpe Ratio / Beta vs Benchmark

January 2001 - April 2022

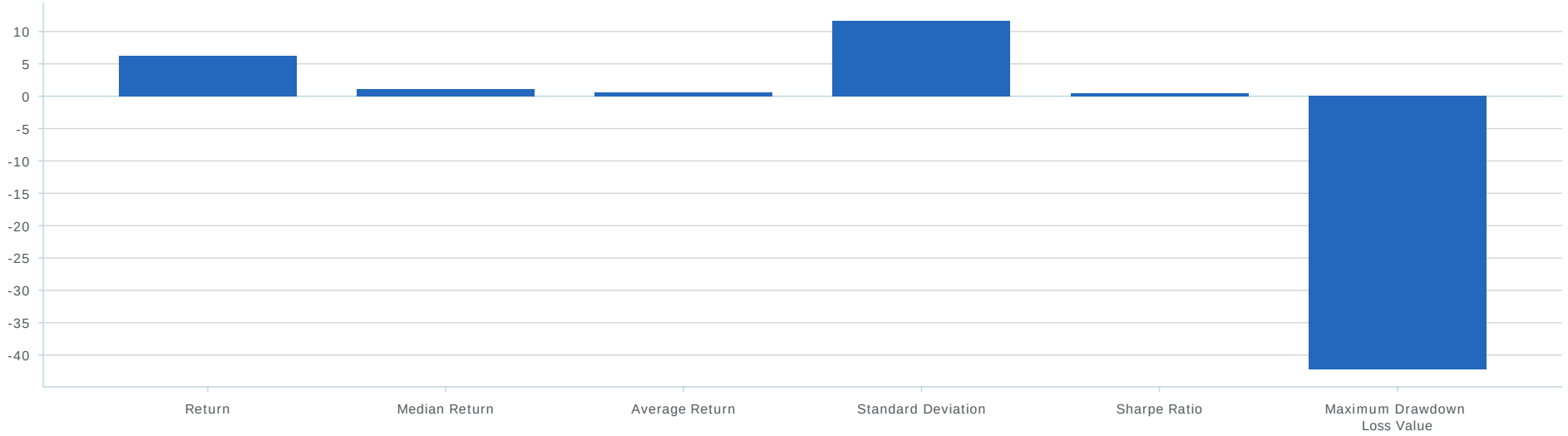


	RETURN	STANDARD DEVIATION	ALPHA	BETA	EXCESS RETURN	SHARPE RATIO	TRACKING ERROR	R SQUARED
Target	6.19	11.70	0.41	0.76	(1.23)	0.42	4.48	95.13

Benchmark = S&P 500
Index relative statistics vs S&P 500

Multi-Statistic

January 2001 - April 2022

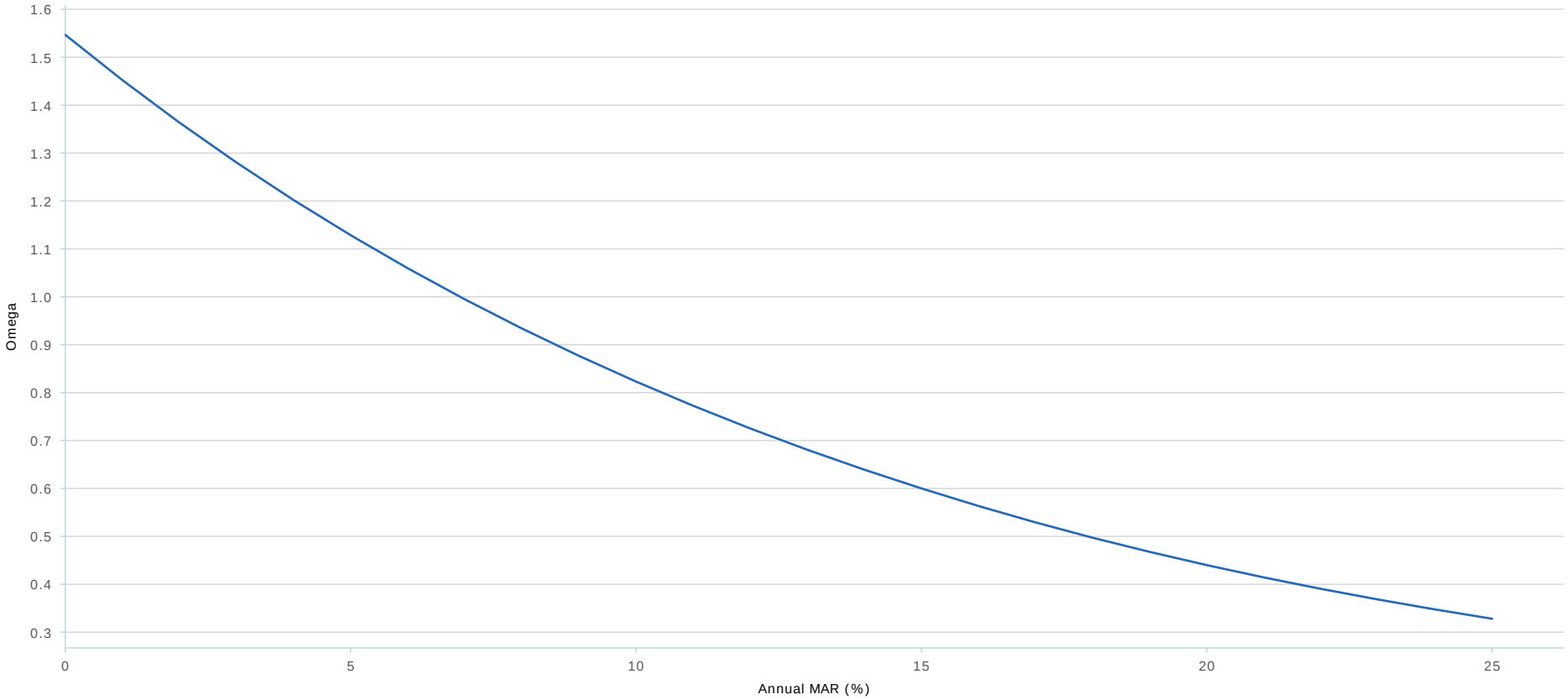


	RETURN	MEDIAN RETURN	AVERAGE RETURN	STANDARD DEVIATION	SHARPE RATIO	MAXIMUM DRAWDOWN LOSS VALUE
Target	6.19	1.04	0.56	11.70	0.42	(42.22)

Index relative statistics vs S&P 500

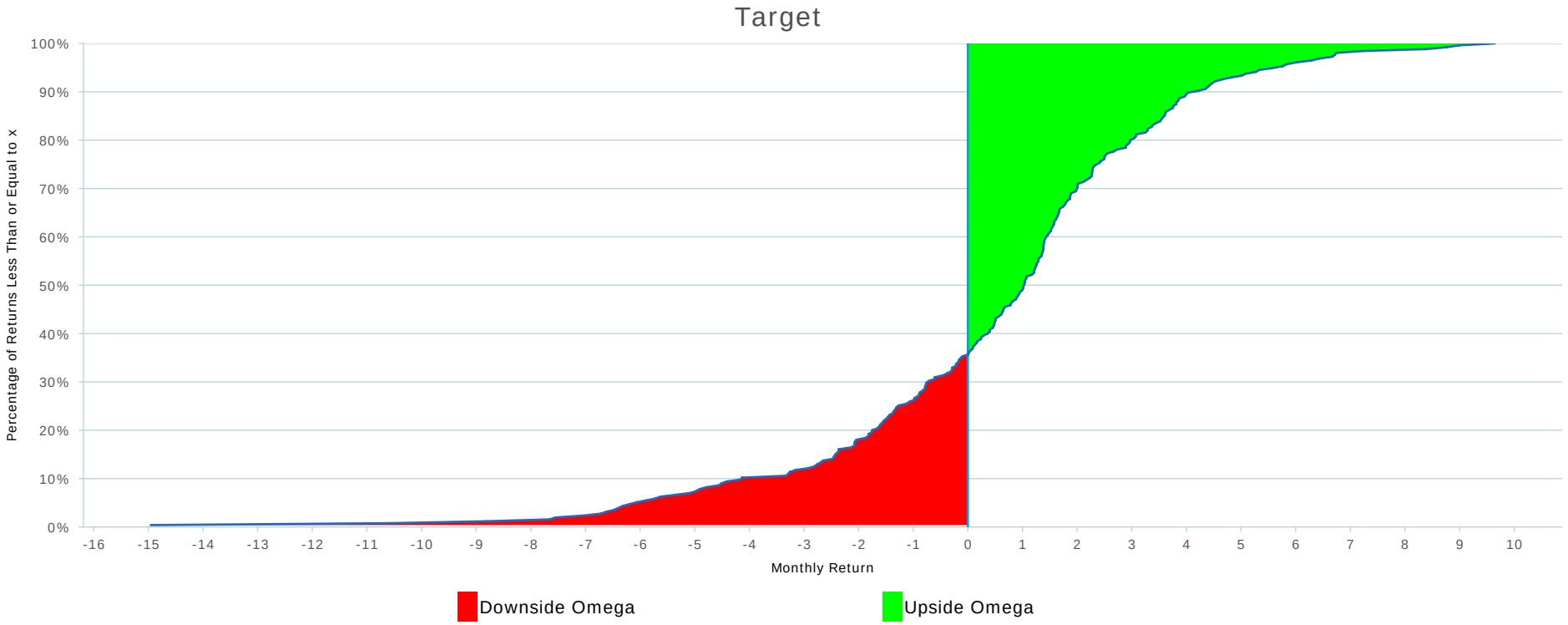
Omega

January 2001 - April 2022



Cumulative Distribution of Returns

January 2001 - April 2022



	OMEGA (MAR = 0.00%)	UPSIDE OMEGA (MAR = 0.00%)	DOWNSIDE OMEGA (MAR = 0.00%)
Target	1.55	1.58	1.02

Performance Risk Summary

January 2001 - April 2022

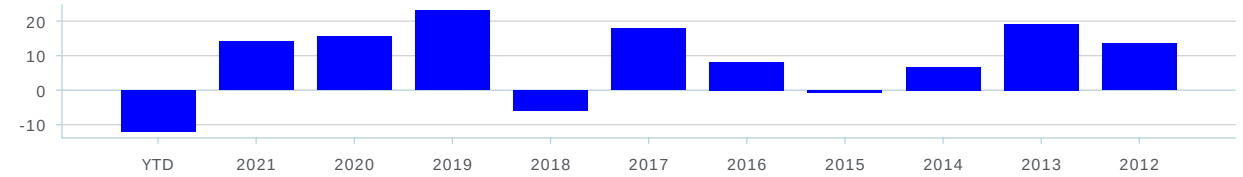
Target S&P 500

Growth of $100

Annualized Return

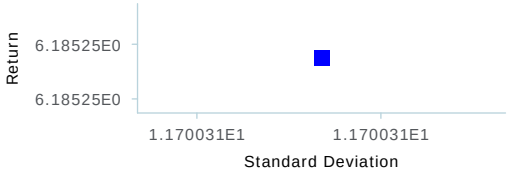
	1 YEAR	2 YEARS	3 YEARS	4 YEARS	5 YEARS	10 YEARS
Target	(6.02)	12.44	8.03	7.77	8.27	8.47

Calendar Year Return

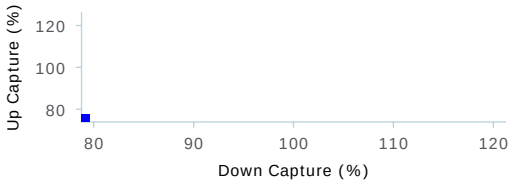


Drawdown

Return / Risk



Upside / Downside



Summary Statistics

	MANAGER
Return	6.19
Standard Deviation	11.70
Sharpe Ratio	0.42
Excess Return	(1.23)
Tracking Error	4.48
Information Ratio	(0.27)
Alpha	0.41
Beta	0.76
Up Capture	73.86
Down Capture Ratio	78.78
Maximum Drawdown Loss Value	(42.22)
Pain Index	5.81
Pain Ratio	0.84

Index relative statistics vs S&P 500

Important Information About Your Report

The projections and other information contained in this report have been generated by a digital asset allocation analysis tool developed by Zephyr Associates (the "Zephyr Asset Allocation Tool" or "Zephyr tool"). The goal of the tool is to aid and educate our UBS Consultants, clients and prospective clients in understanding the scope of our service offerings, the issues that should be considered before engaging in an investment strategy or transaction, the basic tenants of investing (particularly with a view towards long-term investing), our views of long-term economic trends and projections and, subject to certain assumptions, the potential effects that a particular strategy, investment program or product or series of transactions may have on a portfolio. You and your UBS Consultant can use this tool to analyze the composition and hypothetical growth of an asset allocation or series of several asset allocations (e.g., your current allocation, a UBS strategic asset allocation model, a custom allocation develop by you and your UBS Consultant based on your individual investment policy, etc.).

The information in this report is based on data and computations provided by Zephyr Associates and other third parties. UBS believes this information to be reliable but we have not independently verified and do not guarantee the accuracy or completeness of the data and computations.

IMPORTANT: The projections or other information generated by the Zephyr Asset Allocation Tool regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results.

Actual results may vary with each use and over time depending on the specific composition of the investor's portfolio, when the portfolio is implemented, and with changing market conditions. All results reflect realized and unrealized gains and losses and the reinvestment of income. Unless otherwise indicated, results do not include the impact of transaction costs (e.g., commissions, mark-ups, mark-downs, fees), advisory fees, or taxes. If these factors were included, the results shown would be lower. Assets are classified based on UBS' proprietary classification methodology (assets held at UBS) or as identified by you (assets held at other financial institutions). Rebalancing to the asset allocation shown is assumed to have occurred at the beginning of each month for the period shown.

Scope of our Services

UBS Financial Services Inc. ("UBS") makes the interactive Zephyr Asset Allocation Tool available to certain UBS Consultants, clients and prospective clients to conduct certain asset allocation analyses. This Zephyr Asset Allocation Tool report is provided for informational purpose only and is not an offer to buy or sell any security or investment strategy, is not meant to be a comprehensive financial plan, and does not create an investment advisory relationship between you and UBS or your UBS Consultant.

This report is intended to aid (and be used by) your UBS Consultant in providing you with actual individualized investment advice. Therefore, the report should only be considered in conjunction with the actual recommendations and advice of your UBS Consultant, our standard account documents, agreements and disclosures and the additional factors that warrant consideration for your particular financial situation, including costs.

If this output is provided as part of a proposal, it is marketing material. You must make independent decisions with respect to any proposals contained within this report. In making those decisions you have reviewed the terms of any Plan with respect to which you are a fiduciary and your obligations to any such Plan under ERISA. This report should be used solely for the purposes of discussion with your prospective UBS Consultant and your independent consideration. UBS does not intend this to be fiduciary or best interest investment advice or a recommendation that you take a particular course of action. If you would like more details about any of the information provided, or personalized recommendations or advice, please contact your UBS Financial Advisor.

Conflicts of Interest. UBS Financial Services Inc. is in the business of establishing and maintaining investment accounts and we will receive compensation from you in connection with investments that you make, as well as additional compensation from third parties whose investments we distribute. This presents a conflict of interest when we recommend that you move your assets to UBS from another financial institution, and also when we make investment recommendations for assets you hold at, or purchase through, UBS. For more information on how we are compensated by clients and third parties, conflicts of interest and investments available at UBS please refer to the 'Your relationship with UBS' booklet provided at ubs.com/relationshipwithubs, or ask your UBS Financial Advisor for a copy.

Neither UBS Financial Services nor any of its employees provide tax or legal advice. You must consult with your legal or tax advisors regarding your personal circumstances.

You are not required to implement any of the asset allocation strategies modeled in this report. If you would like UBS to assist you in making any changes to your current asset allocation strategy, the capacity in which we act will depend on, and vary by, the nature of the product, service or account that you select for implementation (i.e., brokerage or advisory). Understanding the ways in which we can conduct business under applicable laws and regulations is essential to the relationship between You and Us.

As a firm providing wealth management services to clients in the U.S., UBS Financial Services Inc. is registered with the U.S. Securities and Exchange Commission as an investment adviser and a broker-dealer, offering both investment advisory and brokerage services. Investment advisory services and brokerage services are separate and distinct, differ in material ways and are governed by different laws and separate arrangements. At the end of this report you will find a detailed explanation regarding the distinctions between investment advisory programs and brokerage service, including how we charge for these services and our respective responsibilities to you. See Conducting Business with UBS: Investment Advisory and Broker-Dealer Services. **It is important that you review and understand the agreements and disclosures we provide to you about the products or services offered. If at any time you would like clarification on the nature of your accounts or the services you are receiving, please speak with your UBS Consultant or visit our website at http://www.ubs.com/workingwithus.**

Overview

This report is presented for illustrative purposes as a general assessment of the asset allocation strategies displayed. The asset allocations analyzed may include a number of your existing accounts, each with a potentially different investment objective and risk parameter. Where applicable, these accounts have been considered as a whole in helping you develop an overall asset allocation strategy. When considering whether or not to implement any of the asset allocation strategies presented, to buy or sell securities, or to participate in any UBS program, you should carefully review the impact of such changes on each account involved and the impact on the overall portfolio.

Please note that it is your responsibility to determine whether to implement any of the allocation strategies identified in this report and how such implementation would be accomplished. UBS will not track or monitor specific investments you make to determine whether they complement your existing investment objectives, investment policy or any asset allocation strategy you may adopt, unless you have specifically engaged us to provide such monitoring. In addition, this report will not be updated to reflect any changes in your investment strategies, risk tolerances or market conditions.

If your assets are held at UBS Financial Services Inc., your UBS Financial Services Inc. account statements are the only official record of your UBS holdings and account and are not replaced, amended or superseded by any of the information presented in this report.

This report is not intended to provide you with consolidated information or reporting regarding your holdings at other firms. However, at your request, this report may include information regarding assets that you hold at other financial institutions so that we may review your asset allocation and/or investment strategy in the context of your overall holdings. If your assets are held at other financial institutions, this report will be based on information regarding holdings, balances and values of assets you provided to us. We have not verified, and are not responsible for, the accuracy or completeness of this information. If the information you provided is not current, inclusion of these assets will impact the accuracy of the current asset allocation and other analysis presented. You should review the account statements and other documentation you receive from your third party custodian for their record of the assets and asset values held in your accounts. The account statements you receive from your third party custodian regarding the assets you hold with them are the official record of your holdings and accounts and are not impacted or superseded by the information in this report.

UBS's SIPC coverage only applies to assets held at UBS. If you maintain assets at other firms that may be SIPC members, you should contact their financial representative or the other entity or refer to the other entity's statement regarding SIPC membership.

Asset Allocation Presented and Analysis Assumptions:

The results in this report are based on information regarding your investment objectives (as reflected by your allocation criteria), risk tolerance, cash flow requirements, time horizon and other views and requirements. We rely on the accuracy of the information you provide to us in developing this report. Please review the client inputs described in this report carefully as inaccuracies can materially impact the analysis, and advise your UBS Consultant if any change is necessary.

The asset allocation(s) analyzed can be your current asset allocation, a UBS strategic asset allocation or a customized asset allocation developed by you and your UBS Consultant based on your investment policy and risk profile. All asset allocations analyzed were identified by you and/or your UBS Consultant. You should understand that the asset allocation can be modeled at the asset class (e.g., equities, fixed income, etc.) or the sub-asset class (e.g., large-cap equities, emerging market equities) and that there may be asset or sub-asset classes not presented that have characteristics similar or superior to those analyzed in this report. Your UBS Consultant can provide additional information regarding the allocation model(s) analyzed in this report.

UBS strategic asset allocation models are developed using a proprietary process based on UBS capital market assumptions (see Return, Risk, and Correlation Assumptions). UBS has changed its asset allocation models in the past and may do so in the future as circumstances warrant. If UBS strategic asset allocations are used in this report, neither UBS nor your UBS Consultant is required to provide you with an updated analysis based upon changes to asset allocation or other underlying assumptions.

Asset allocation does not assure a profit or eliminate the risk of a loss.

Efficient Frontier Analysis:

Mean-Variance Optimization tools may be used to help determine optimal allocations to different asset classes within a portfolio given a certain level of acceptable risk. The Efficient Frontier analysis is a mean-variance optimization methodology that calculates a series of optimal portfolios that offer the highest expected return for a given level of risk or the lowest risk for a given level of expected return. The Efficient Frontier is determined based on estimated forward-looking risk, return, and correlation of assets assumptions established by UBS (see Return, Risk, and Correlation Assumptions section) and your specific guidelines regarding time horizon and investment objective/ risk tolerance (as reflected in allocation constraints). Each point on the frontier is theoretically efficient based on the given assumptions. An "inefficient portfolio" does not lie on the frontier because alternate portfolios can be found that offers more return for the same amount of risk or the same expected return with a less risk. "Efficient" portfolios on the frontier line are more desirable to investors trying to maximize return and minimize risk. The selection of a proper portfolio depends upon the investor's goals and risk tolerance.

Mean-variance optimization is very sensitive to changes in the forward-looking capital market assumptions and may result in asset allocations and portfolios that are highly concentrated. Your UBS Consultant can provide additional information regarding the Efficient Frontier analysis in this report.

Deterministic Analysis:

Except for any probabilistic analysis sections of this report, a deterministic analysis is used to illustrate the hypothetical growth of the asset allocation strategies presented based on an assumed rate of return, risk and correlation for each asset or sub-asset class identified within the strategy. The rate of return, risk and correlations used are based on estimated forward-looking assumptions established by UBS (see Return, Risk, and Correlation Assumptions section below).

In order to create the analysis presented, the rates of return for each asset or sub-asset class are combined in the same proportion as the asset allocation(s) illustrated (e.g., if the asset allocation indicates 40% equities, then 40% of the results shown for the allocation will be based on the estimated forward-looking risk, return, and correlation assumptions for equities based on UBS proprietary research).

Simulated Portfolio Value Probability Analysis:

Simulated Portfolio Value Probability Analysis (frequently referred to as "Monte Carlo" simulations), is another tool for evaluating the potential future performance of the asset allocation strategies presented. Monte Carlo analyses incorporate future uncertainty by simulating possible return scenarios for a portfolio under variable market conditions. Monte Carlo analysis generally performs several thousand simulations, each simulating the growth of the modeled asset allocation over a specified period of time and assuming certain client inputs and a variety of returns and scenarios, all of which are subject to change as a result of market volatility, economic factors and world events. Monte Carlo results present the probability of achieving certain targets based on the results of the simulations.

IMPORTANT: The projections or other information in this report regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investments results and are not guarantees of future results.

Monte Carlo simulations are based on estimated forward-looking return, risk and correlation assumptions established by UBS (see Return, Risk and Correlation Assumptions section).

Unless noted otherwise, the analysis assumes a constant rate of inflation and does not account for variations in inflation rate over time. Monte Carlo simulations also account for certain client inputs and assumptions regarding inflation and cash flows, the accuracy of which will materially impact the results of the analysis. Please review the client inputs described and advise your UBS Consultant if any change is necessary. Unless specifically included as an outflow, the analysis will not account for investment advisory fees, transaction fees or taxes.

Monte Carlo results are intended to represent a spectrum of possible return outcomes for the modeled asset classes based on the established assumptions. The portfolio value at the end of each scenario is recorded and compared against the established portfolio target. The probability of achieving a target is calculated by dividing the number of scenarios where the portfolio value equaled or exceeded the target by the total number of scenarios. Note that the highest likelihood of success is 99% because there is never a guarantee that a particular result will be actualized. Results should only be viewed as reasonable estimates of possible outcomes and not as a guarantee, prediction or projection. The results shown may vary with each use and over time and if any of the underlying assumptions change. Your actual results can vary materially from the results shown in this analysis.

Monte Carlo analysis does not take into account actual market conditions that may severely affect your portfolio results over the long-term. It does not reflect the average periods of bull and bear markets, which can be longer than those modeled.

The analysis also does not consider short-term correlations among asset class returns and does not consider the results that could occur from an extreme market event, either positive or negative, due to the low probability of such an occurrence. A market crises can cause asset classes to perform similarly, lowering the accuracy of our return assumptions and diminishing the benefits of diversification in ways not captured by the analysis. As a result, returns actually experienced by the investor may be more volatile than those used in our analysis.

Your UBS Consultant can provide additional information regarding the Monte Carlo/Simulated Portfolio Value Probability analysis reflected in this report.

Historic Asset Allocation Backtest:

If the historical performance of an asset allocation is provided, the historical performance does not reflect your actual performance but, rather, was calculated by the retroactive application of historic index results to the asset allocation(s) analyzed. This performance is based on the long-term performance of certain indexes that have been selected by UBS (or as requested by the Client) as a representative proxy for the asset classes in the asset allocation(s) or portfolio(s) analyzed. See the Scenario Assumptions section for a description of the index proxies used for each asset class in this analysis. UBS selects proxy indices based on our research and understanding of the asset class or the allocation and strategy of the investments in your portfolio, or as requested by the client. Because the asset allocations were structured with the benefit of knowing how each asset class and benchmark performed during the period shown, the hypothetical returns may be higher than the returns of a portfolio that would have been recommended during the time period shown. In addition, backtested performance does not reflect the impact that past economic and market factors might have had on investment decision-making. The results shown reflect realized and unrealized gains and losses and the reinvestment of income, but do not include the impact of transaction costs, advisory fees, taxes and inflation. If these were included, the results shown would be lower. Please note that the historical backtest analysis considers data over the period shown and assumes that the asset allocation was rebalanced at the beginning of each month back to the initial asset allocation. This rebalancing frequency does not necessarily reflect how an actual portfolio would have been managed. There is no guarantee that these backtested results could, or would, have been achieved had this asset allocation been used during the years presented.

Past performance or historic results provide no guarantee of future returns.

Return, Risk and Correlation – Assumptions Forward-Looking Estimates:

The asset class risk and return results used and displayed in this report, as well as the asset class correlations, are based on estimated forward-looking return, risk?as measured by standard deviation?and correlation assumptions ("capital market assumptions"), which are based on UBS proprietary research. The development process includes a review of a variety of factors, including the return, risk, correlations and historical performance of various asset classes, inflation and risk premium.

The strategic returns in the UBS capital market assumptions consider returns over a full business cycle. The capital market assumptions are subject to change at any time at our discretion and without notice. UBS has changed its return, risk and correlation assumptions in the past and may do so in the future. Neither UBS nor your UBS Consultant is required to provide you with an updated analysis based upon changes to these or other underlying assumptions.

Since assumptions are subject to uncertainty, including market forces and factors outside of our control, you should also understand that the assumptions used are estimates, are not guarantees or projections of future results. There is no certainty that the assumptions for the model will accurately estimate asset class return rates going forward. Actual long-term results for each asset class may differ from our assumptions, with those for classes with limited histories potentially diverging more. As a result, UBS will not be responsible for omissions in the analysis, regardless of the source of such inaccuracies, errors, or omissions. In addition, capital market assumptions pertain to the asset or sub-asset class in general, not the performance of specific securities or investments. Particular investment products may have higher or lower returns than the range for the corresponding asset class used in this analysis.

Your actual results may vary significantly from the results shown in this report.

Periodic Reviews:

This report is based on information you have provided as of the date indicated. Over time, your financial circumstances or the other assumptions and estimates that underlie this report may change. For this reason, you should periodically meet with your UBS Consultant to re-evaluate your financial situation, reassess your asset allocation strategy, and review the assumptions upon which this information is based.

Asset Class Risk Considerations:

Some of the general risk considerations associated with the asset classes included in this report are described below. The descriptions are not meant to be a complete list of all investment risks. Individual funds and investments will have specific risks related to their investment programs that will vary from fund to fund. Clients should familiarize themselves with the particular market risks and the other risks associated with the specific investment. All investments contain risk and may lose value.

Alternative Investment Strategies **–Alternative investment strategies are investment vehicles that are formed by professional money managers to afford them greater flexibility to manage money in any market environment. These strategies typically have flexibility regarding the types of securities in which they can invest (e.g., options and futures contracts), the types of positions they can take (e.g., long and short positions) and the amount of leverage they are permitted to employ. A professional money manager can use these and other techniques to modify market exposure and create portfolio characteristics that may be desirable for certain clients (e.g., reduced correlation to financial markets, potential lower volatility, and better performance in "down" markets). This flexibility can add value when used skillfully. This flexibility does, however, add additional elements of risk and complexity, including that alternative investments are often long-term, illiquid investments that are subject to restrictions on transfer and not easily valued. Note that due to the nature of alternative investments, the risk and return assumptions used in this analysis may tend to overstate potential benefits but not fully reflect potential risks.**

Interests of Non-Traditional Investment Strategies are sold only to qualified investors, and only by means of offering documents that include information about the risks, performance and expenses of the funds, and which Clients are urged to read carefully before subscribing and retain. An investment in a fund is speculative and involves significant risks. The funds' performance may be volatile, and investors may lose all or a substantial amount of their investment in a fund. The funds may engage in leveraging and other speculative investment practices that may increase the risk of investment loss. The funds are subject to high fees, including management fees and other fees and expenses, all of which will reduce profits. Prospective investors should understand these risks and have the financial ability and willingness to accept them for an extended period of time before making an investment in a fund. Investors should consider a fund as a supplement to an overall investment program.

Investing in the fixed income market **is subject to risks including market, interest rate, issuer, credit, default and inflation risk. An investment in a portfolio may be worth more or less than its original cost when redeemed. Derivatives may involve certain costs and risks such as liquidity, interest rate, market, credit, management, default risk, and the risk that the position could not be closed when most advantageous. Investing in derivatives could lose more than the amount invested.**

Equity investments **represent ownership interest in a company. Historically, equities are more risky than fixed income or cash investments as they experience greater volatility risk, which is the risk that the value of your investment may fluctuate over time. The value of investments in equity securities will fluctuate in response to general economic conditions and to changes in the prospects of particular companies and/or sectors in the economy. The risk of equity investments can vary based on the market capitalization (market value) of the company, for example, Large, Mid, and Smid. Investments in small cap and medium company stocks can be more volatile over the short term than investments in large company stocks.**

Non-U.S. Equity and Fixed Income represent ownership interests and debt, respectively, of foreign governments and corporations that can be sub-divided into those from countries that have "Developed Markets" or "Emerging Markets." Foreign investing involves risks, including, but not limited to, risks related to foreign currency, limited liquidity, less government regulation and the possibility of substantial volatility due to adverse political, economic or other developments. Investors in securities of issuers located outside of the United States should be aware that even for securities denominated in U.S. dollars, changes in the exchange rate between the U.S. dollar and the issuer's "home" currency can have unexpected effects on the market value and liquidity of those securities. Those securities may also be affected by other risks.

Calculation Definitions

This section includes descriptions for the terms and calculations used within this report. Your UBS Consultant can provide additional information regarding the terms, calculations, and results contained within this report.

Alpha: Alpha is a measure of risk-adjusted return. It measures the difference between a portfolio's returns and the returns the portfolio might be expected to deliver based on the portfolio's level of risk (beta) and a benchmark index over the date range shown. Unless otherwise described, the Zephyr tool uses the S&P 500 as the market benchmark for calculating alpha. A positive alpha means the portfolio outperformed expectations for the period shown, while a negative alpha indicates that the portfolio underperformed expectations during the period shown. If two portfolios have the same return, but one has a lower beta, that portfolio would have a higher alpha.

Annualized Returns: An annualized return is the geometric average return of a portfolio for each year over the time period shown. Annualized returns take into account compounding returns by considering the portfolio's cumulative return (the total compounded portfolio return over the time period) and expressing that as a per year figure. Annualized returns only provide a snapshot of investment performance as of a given date and do not indicate volatility over the time period analyzed.

Average Positive Return/Average Positive Return: To calculate the average positive return and average negative return for a portfolio over a given date range, the Zephyr Asset Allocation Tool partitions the portfolio's series of returns into two parts, one made up of the positive periods of returns (up periods), the other of the zero and negative periods of returns (down periods). The average positive/up and negative /down returns are the respective averages of these two series.

Batting Average: The batting average of a portfolio is the ratio between the number of periods where the portfolio outperforms a benchmark and the total number of periods. Unless otherwise described, the Zephyr tool uses the S&P 500 as the market benchmark for calculating batting average.

Best Case/Worse Case: See Range of Returns.

Best Month Return/Worse Month Return: The best month return is simply the maximum of the monthly returns inside the given date range. Similarly, the worst month return is the minimum of the monthly returns inside the date range.

Best Quarter Return/Worse Quarter Return: The best quarter return is simply the maximum of the quarterly returns inside the given date range. Similarly, the worst month return is the minimum of the quarter returns inside the date range.

Best Year Return/Worse Year Return: To calculate the best one-year return for a given portfolio, the Zephyr Asset Allocation moves a one-year time window along the series and calculates the compound return for each of these windows. The best one-year return is the maximum of the returns thus found. Similarly, the worst one-year return is the minimum of the returns thus found. Note that best and worst one-year returns do not refer to calendar years. Rather, they refer to arbitrarily placed one-year periods.

Beta: Beta represents the systematic risk of an analyzed portfolio. Beta measures how the analyzed portfolio performed in relation to the performance of a benchmark index during the time period shown. Unless otherwise described, the Zephyr tool uses the S&P 500 as the benchmark index for calculating beta. A portfolio with a beta of one is considered to be as volatile (risky) as the benchmark and would therefore have provided returns equal to those of the market benchmark during both up and down periods over the date range analyzed. A portfolio with a beta of two would have moved approximately twice as much as the benchmark.

Conditional Value at Risk: See Value at Risk.

Constraints, Min and Max: Portfolio asset class constraints established by the Client to force minimum or maximum allocations to selected asset classes when generating an Efficient Frontier.

Correlation (R): Correlation represents the degree to which an investment's return moves in tandem with another and is a critical component of diversified portfolio construction. The Correlation of assets varies between a minimum of -1 (move in opposite direction) and a maximum of 1 (completely correlated). A correlation of 0 indicates no relationship between the investments. When included within a portfolio, assets with lower Correlations to the other assets in the portfolio enhance diversification and result in better risk-adjusted expected returns for the portfolios. An R of less than 0.3 is often considered low Correlation. Correlation may also be used to represent the degree to which a portfolio's return moves in tandem with a benchmark or an asset class moves in tandem with another asset class.

Cumulative Distribution of Return: See Omega.

Cumulative Excess Return: See Excess Return.

Distribution of Returns: The range of possible outcomes that may be expected for a portfolio compounded over the time period(s) shown based on the asset class return, risk (standard deviation), and correlation assumptions set by UBS (and accounting for any Constraints imposed by the Client). The distribution of returns presents the annualized returns after the period(s) shown and displays various percentiles which represent the percentage of possible return outcomes that may be expected to be equal to or lower than the stated return. The percentiles displayed include the 5th percentile, 25th percentile, 50th percentile (which is a median return), 75th percentile, and 95th percentile.

Down Capture: See Up Capture/Down Capture.

Drawdown: Any sub-period of time during the date range analyzed where the portfolio had a negative loss percentage starting from the date of the loss began (drawdown start date) and ending on the date of the lowest value before the portfolio recovered to its value before the loss began (drawdown end date). Conceptually, this is the "peak to trough" of the drawdown when displayed on a graph. Drawdown measures the loss percentage (compounded, not annualized) that a portfolio incurred during any sub-period of the date range analyzed. See Maximum Drawdown.

Drawdown Average: The arithmetic average of all returns during all drawdowns over the date range analyzed. The drawdown average is based on drawdowns that begin with a drawdown start date and end with a drawdown end date. Compare to Average Negative Return which is the arithmetic return of all periods (e.g., calendar months) that had a negative return during that period.

Efficient Frontier: Nobel Laureate Harry Markowitz developed mean-variance optimization as a way to create optimal portfolios based on risk-return trade-offs. The optimization, which results in an Efficient Frontier, uses three inputs – returns, standard deviations (risk), and correlations – to combine assets into portfolios that maximize return for any given level of risk.

Excess Return: Excess return represents the difference between the return of the analyzed portfolio and the return of a benchmark. Unless otherwise described, the Zephyr tool uses the S&P 500 as the market benchmark for calculating excess return. A positive excess return implies that the portfolio outperformed the benchmark. Cumulative excess returns represent the difference between the total returns in the portfolio and the total returns for the benchmark during a given date range and annualized excess returns represent the difference between the annualized returns of the portfolio series and the annualized returns of the benchmark during a given date range.

Expected Return:See Range of Returns.

Expected Risk: See Range of Returns.

Information Ratio: Information Ratio measures the consistency of excess returns of a portfolio compared to a benchmark. The information ratio is the portfolio's annualized excess return over a benchmark divided by the portfolio's annualized standard deviation of excess return over the benchmark (i.e. tracking error). Unless otherwise described, the Zephyr tool uses the S&P 500 as the market benchmark for calculating the information ratio.

Inflation: The Monte Carlo simulation projections can include an inflation rate that would be applied to each year being simulated.

Interpolate: The Monte Carlo Simulation allows Clients to use multiple expected return distributions using the interpolate option. Clients can enter supplementary mean and standard deviation values in addition to the mean and standard deviation values established by the UBS capital market assumptions. The mean and standard deviation define a distribution that represents possible future returns. Clients can also choose the distribution type as either normal or log-normal. Log-normal distribution intends to account for observations that returns are never less than -100% and that over longer time periods (such as a year) returns are positively skewed. Please speak with your UBS Consultant for more information regarding additional mean and standard deviation values and log-normal distribution.

Kurtosis: Kurtosis characterizes the relative peakedness or flatness of a distribution of returns compared with a normal distribution. Positive kurtosis indicates a relatively peaked distribution. Negative kurtosis indicates a relatively flat distribution.

MAR (minimal acceptable return): A minimal return figure established to assess a portfolio's ability to achieve a certain target. See Sortino Ratio and Omega.

Maximum Drawdown: **Maximum drawdown is the maximum loss percentage (compounded, not annualized) that a portfolio incurred during any sub-period of the date range analyzed. Conceptually, this is the biggest "peak to trough" loss, beginning with the** maximum drawdown start date **(the date the maximum loss percentage started) and ending with the** maximum drawdown end date **(the date that the portfolio hit its lowest point before recovering to the peak level reached before the maximum drawdown). The calculation looks at all sub-periods of the entire time period analyzed and calculates the compounded return of the portfolio or index over that period. The** maximum drawdown loss value **is the largest negative value of all these compounded return periods (or zero if there were no drawdowns during the period analyzed). The** maximum drawdown length **is the number of periods (days, months, or quarters depending on the periodicity of the data) between the maximum drawdown start date and the maximum drawdown end date. The** maximum drawdown recovery date **is the date that the portfolio returns to the drawdown start date (the date at which the compounded returns regain the peak level that was reached before the maximum drawdown began). The** maximum drawdown recovery length **is the number of periods it takes to reach the recovery level from maximum drawdown end date.**

Monte Carlo Percentiles: **Probability distributions of asset value outcomes generated from the Monte Carlo Simulations.**

Monte Carlo Probabilities: **The probability of the wealth goal (or target) is the number of simulation trials that meet or exceed the wealth goal (or target) divided by the total number of trials.**

Omega: **Omega relative to a given minimal acceptable return (MAR) is the ratio between the price of a European call option written against the investment and the price of a European put option written against the investment, with the strike price being equal to the MAR in both cases. Omega is represented graphically as a** cumulative distribution of returns **function where the x-axis (horizontal axis) of the graph displays returns and the y-axis (vertical axis) of the graph displays the probability that a given portfolio will achieve or exceed that return figure.** Upside Omega **is the area on a cumulative distribution between the vertical minimum acceptable return (MAR) line and the distribution above the MAR. This is highlighted in green on the Cumulative Distribution of Returns slide(s). It is the numerator in the omega calculation.** Downside Omega **is the area on a cumulative distribution between the vertical minimum acceptable return line (MAR) and the distribution below the MAR. This is highlighted in red on the Cumulative Distribution of Returns slide(s). It is the numerator in the omega calculation.**

Pain Index: **The Pain Index is a statistic developed by Zephyr exclusively for use within the Zephyr Asset Allocation tool. It represents the frequency, the depth, and the width of the portfolio's drawdowns by calculating the area enclosed by the downward drawdown graph and the zero drawdown line, divided by the length of the time interval. The pain index is an attempt to capture in one single number as much of the information that is contained in the drawdown graph as possible, rather than just the maximum drawdown number. This number increases as the spikes grow more frequent, deeper, or wider during the same time period.**

Pain Ratio: **The Pain Ratio indicates the excess return per unit of total risk as measured by the pain index of the portfolio. It is a ratio of the portfolio's annualized excess returns over the risk-free rate to the portfolio's pain index. The pain ratio is a measure of the premium earned for the risk incurred by the portfolio.**

Range of Returns: **A Range of Returns indicates the range of possible outcomes calculated by the cumulative returns compounded over the period(s) shown for a given portfolio based on UBS return, risk, and correlation assumptions (and Client Constraints). The** expected return **is the annualized return after the period(s) shown under a base case scenario. The** best/worst **case return is the annualized return after the period(s) shown under a best/worst case scenario, and the** expected risk **is the standard deviation of the expected return. As the time horizon increases, the expected risk moves towards zero. For any given portfolio, the expected return for a time period is represented by the 50th percentile (which is a mean return) and the expected best case scenario by the 95th percentile and the expected worst case scenario by the 5th percentile. The likelihood of obtaining a total portfolio value that is more extreme than the best/worst case cumulative value (given the capital market assumptions and Constraints) is approximately 2.5%.**

R-Squared: **The R-Squared (R2) of a portfolio measures the variance of the portfolio's returns compared to the variance of a benchmark's returns in order to determine how closely the portfolio tracks the benchmark. R2 ranges between zero and 100%. An R2 of 100% indicates perfect tracking, while an R2 of zero indicates no tracking at all. Unless otherwise described, the Zephyr tool uses the S&P 500 as the benchmark for calculating R2.**

Relative Constraints: **These are portfolio asset allocation constraints established by the Client indicating the allocation to an asset class or asset class group has to be less than, greater than or equal to another asset class or asset class group.**

Return, Risk, and Correlation assumptions: **Mean-Variance optimization uses three inputs to generate the Efficient Frontier: Returns, Standard Deviations (Risk) and Correlations. These are commonly referred to as the Capital Market Assumptions for generating the Efficient Frontier. These values are based on UBS estimated forward-looking assumptions based on UBS proprietary research (see the Return, Risk, and Correlation Assumptions – Forward-looking Estimates section for more information).**

Sharpe Ratio: **The Sharpe Ratio indicates the excess return per unit of total risk as measured by standard deviation. It is a ratio of the portfolio's arithmetic average of excess returns over the risk-free rate to the portfolio's standard deviation. The Sharpe Ratio is a measure of the premium earned for the risk incurred by the portfolio. The Sharpe Ratio – Internal is similar to the Sharpe Ratio, but the denominator is the standard deviation of the portfolio's excess returns over the risk-free rate (i.e. tracking error). This captures the risk associated with the excess returns instead of the risk solely associated with the portfolio.**

Skewness: **Skewness characterizes the degree of asymmetry of a distribution around its mean. Positive skewness indicates a distribution with an asymmetric tail extending toward more positive values. Negative skewness indicates a distribution with an asymmetric tail extending toward more negative values.**

Sortino Ratio: The Sortino Ratio indicates the excess return per unit of total risk as measured by downside deviation. It is a ratio of the portfolio's arithmetic average of excess returns over a minimum acceptable return (MAR) to the portfolio's downside deviation. The Sortino ratio uses the downside deviation with a constant MAR indicated. Downside deviation measures the deviation between returns that are less than the MAR and the MAR.

Standard Deviation: A measure of the extent to which observations in a series vary from the mean of the series. The standard deviation of a series of asset returns is a measure of volatility or risk of the asset. A large standard deviation implies that there have been large swings in the return series. The standard deviation calculation assumes that the return series is a sample of possible returns, while the population standard deviation assumes that the series has all of the returns in the population.

Tracking Error: Tracking Error measures the difference between the returns of the analyzed portfolio and those of a benchmark. Tracking error is calculated as the annualized standard deviation of the excess return of the portfolio compared to the benchmark return. The lower the tracking error, the more closely the portfolio's returns tracked those of the benchmark. Unless otherwise described, the Zephyr tool uses the S&P 500 as the market benchmark for calculating tracking error.

Trailing Year Returns: Returns trailing from the date analyzed. All returns over one year are annualized.

Treynor Ratio: The Treynor Ratio is a risk-adjusted measure of return which uses beta to represent risk. It is the portfolio's excess return over the risk-free rate divided by the portfolio's beta to the selected benchmark. The Treynor Ratio differs from the Sharpe Ratio insofar as the beta to the market benchmark is used as the measure of risk rather than the standard deviation of the portfolio series.

Up Capture/Down Capture: The up and down capture measure how well the portfolio was able to replicate or improve on phases of positive benchmark returns and how badly the portfolio was affected by phases of negative benchmark returns. To calculate the up capture, we first form a new return series from the portfolio and benchmark return series by dropping all time periods where the benchmark return is zero or negative. The up capture is then the ratio of the annualized return of the resulting portfolio series to the annualized return of the resulting benchmark series. The down capture is calculated analogously. Unless otherwise described, the Zephyr tool uses the S&P 500 as the benchmark for calculating the up capture and down capture.

Upside/Downside Deviation: Downside deviation measures the deviation between returns that are less than a target return and the target return. Upside deviation measures the deviation between returns that are more than a target return and the target return. Target returns may be referred to as a minimal acceptable return (MAR).

Value at Risk: Nonparametric Value at Risk (VaR) attempts to evaluate risk by applying historical returns for a portfolio and determining a VaR value where a certain percentage (called the confidence level) of the rest of the portfolio's returns exceeded that VaR value. For example, if the confidence level is 95%, that means that 95% of the portfolio's historical returns over the given date range were more than the VaR and analogously that 5% of the portfolio's historical returns over the given time frame were less than the VaR. If the confidence level is 99%, that means that 99% of the portfolio's historical returns exceeded the VaR and 1% of the portfolio's returns were less than the VaR. Conditional Value at Risk (CVaR) quantifies the amount of tail risk for an investment portfolio by calculating the average return of the portion of the portfolio's historical returns that exceeded a given confidence level. For example, if the confidence level is 95%, the CVaR calculates the average return of the worst 5% of historical returns over the given time frame. CVaR provides an average historical loss whereas VaR provides a range of the historical losses.

Worst Month Return/Worst Quarter Return: See Upside/Downside.

Conducting Business with UBS: Investment Advisory and Broker Dealer Services:

As a wealth management firm providing services to clients in the United States, UBS Financial Services Inc. is registered with the U.S. Securities and Exchange Commission (SEC) as a broker-dealer and an investment adviser, offering both brokerage and investment advisory services.

Our clients work with their UBS Consultants to determine the services that are most appropriate given their financial goals and circumstances. Based on the services you request, we can fulfill your wealth management needs in our capacity as a broker-dealer, as an investment adviser, or as both. Most of our UBS Consultants are qualified and licensed to provide both brokerage and investment advisory services depending on the services requested by their clients.

In addition, some of our UBS Consultants hold educational or professional credentials, such as the Certified Financial Planner™ (CFP®) designation (Certified Financial Planner Board of Standards Inc. owns these certification marks in the U.S., which it awards to individuals who successfully complete CFP Board's initial and ongoing certification requirements). Holding a professional designation typically indicates that the UBS Consultant has completed certain courses or continuing education. However, a UBS Consultant's professional designation does not change the obligation of UBS or the UBS Consultant to you in providing investment advisory or brokerage services to you.

It is important to understand that brokerage and investment advisory services are separate and distinct and each is governed by different laws and separate arrangements that we may have with you. While there are similarities between the brokerage and investment advisory services we provide, depending on the capacity in which we act, our relationship and legal duties to you are subject to a number of important differences as described in our applicable contracts with you.

This document is intended to inform you about the key distinctions between brokerage and investment advisory services and our respective duties and obligations. We encourage you to review this document carefully and discuss it with your UBS Consultant.

Our Services as a Broker-Dealer and Relationship with You:

As a full-service broker-dealer, our services are not limited to taking customer orders and executing securities transactions. In our capacity as broker-dealer, we may provide a variety of services relating to investments in securities, including investment research, trade execution and custody services. In a brokerage account, you pay us commissions and applicable fees each time we execute a transaction in your account.

We also may make recommendations to our brokerage clients about whether to buy, sell or hold securities. We consider this to be part of our brokerage services and do not charge a separate fee for this advice. Our recommendations must be suitable for you in light of your particular financial circumstances, goals and tolerance for risk. When we provide recommendations with respect to a retirement account such as an IRA, we do so pursuant to the laws, regulations and exemptions that apply to these accounts.

When we work with you in our capacity as broker-dealer, we do not make investment decisions for you or manage your accounts on a discretionary basis. We will only buy or sell securities for brokerage clients based on specific directions from you.

Our Responsibilities to You as a Broker-Dealer:

When we act as your broker, we are subject to the Securities Exchange Act of 1934, the Securities Act of1933, the rules of self-regulatory organizations such as the Financial Industry Regulatory Authority (FINRA), the rules of the New York Stock Exchange and applicable state laws.

The standards for broker-dealers under these rules and regulations include the following:

- As your broker-dealer, we have a duty to deal fairly with you. Consistent with our duty of fairness, we are obligated to make sure that the prices you receive when we execute transactions for you are reasonable and fair in light of prevailing market conditions and that the commissions and other fees we charge you are not excessive.
- We must have a reasonable basis for believing that any securities recommendations we make to you are suitable and appropriate for you, given your individual financial circumstances, needs and goals.
- We are permitted to trade with you for our own account ("principal trading") or for an affiliate or another client and may earn a profit on those trades. When we engage in these trades, we disclose the capacity in which we acted on your confirmation, though we are not required to communicate this or obtain your consent in advance or to inform you of the profit earned on the trades.
- When we act as your broker-dealer, we do not generally enter into a fiduciary relationship with you; however, special rules apply to our activities, obligations and fiduciary status when we provide recommendations with respect to a retirement account. Absent special circumstances (which would include the special rules applicable to recommendations with respect to retirement accounts) we are not held to the same legal standards that apply when providing investment advisory services to you. Our legal obligations to disclose detailed information to you about the nature and scope of our business, personnel, fees, conflicts between our interests and your interests and other matters are more limited than when we are providing investment advisory services to you. Nevertheless, when we provide recommendations with respect to a retirement account, we do so pursuant to the laws, regulations and exemptions applicable to those retirement accounts.

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