



RVK 2021 Capital Market Assumptions Update & Asset Allocation Education

Vermont Pension Investment Committee
March 23, 2021



RVK 2021 Capital Market Assumptions Update



Capital Market Assumptions

Philosophy

- The asset class behaviors that we attempt to estimate in our CM assumptions – **risk**, **return** and **correlation** – are widely accepted as the most powerful drivers of the total fund return over the long run.
- We deploy a dedicated CMA team for initial research and data collection. Then, designated teams of RVK professionals focus on each asset class. We ensure that all of our consultants formally review, critique, and ultimately support our CM assumptions.
- The forecast horizon is for long-term periods, typically 10-20 years
- Return assumptions are generally index-based and assume no investment manager alpha.
- Annual updates are typically gradual and incorporate historical performance, current valuations, as well as the overall economic environment.

Approach: The sum of the building blocks equals expected return*



Expected Return Building Blocks

*For illustrative purposes only. While the above factors generally inform the direction and magnitude of the capital market assumptions, RVK also considers qualitative, triangulation, and other factors as needed, when arriving at final assumption values. Real Growth includes GDP and profit margin growth.

Themes for 2021 Capital Markets Assumptions

Inflation

Past and future inflation levels are studied and considered given market conditions, break-even indicators, sovereign intervention, and inflation component pricing behavior. *The 2021 inflation assumption remained the same at 2.0%, given ongoing debt and demographic issues – though new potentially inflationary policy considerations are being monitored closely.*

Mean-reversion

Mean reversion is considered for asset classes that demonstrated strong performance over the last year (or longer). *All equity return assumptions were decreased, given the historically elevated valuation levels and reduced dividend yields.*

Low yields

Yield history, current environment, and prospective environments are considered. *The majority of the fixed income return assumptions were decreased, given historically low starting yields and reduced spreads.*

What does it mean to get our Assumptions “*right*”?

Relative accuracy is most important...

- **Relative Accuracy:** Assumptions capture the relative relationships between asset classes, which are key to making trade-off decisions when modeling.
 - Having some assumptions that are spot on, and others that are far off, will produce unbalanced and poorly diversified portfolios.
 - A well-structured and executed investment program – specifically a well diversified asset allocation – will be best positioned to benefit from the available market returns regardless of the forecasts for total returns.

But “absolute” accuracy matters too – just not as much.

- **Absolute Accuracy:** Assumptions reflect the absolute values actually experienced in future long-term market environments.
 - Having assumptions that are too high or too low across the board can cause a Fund to believe it can distribute more than it can afford or restrict spending more than necessary.

RVK Capital Market Assumptions

- The table below outlines RVK's year-over-year CMA changes for each of the asset classes utilized in our Asset Allocation Study.

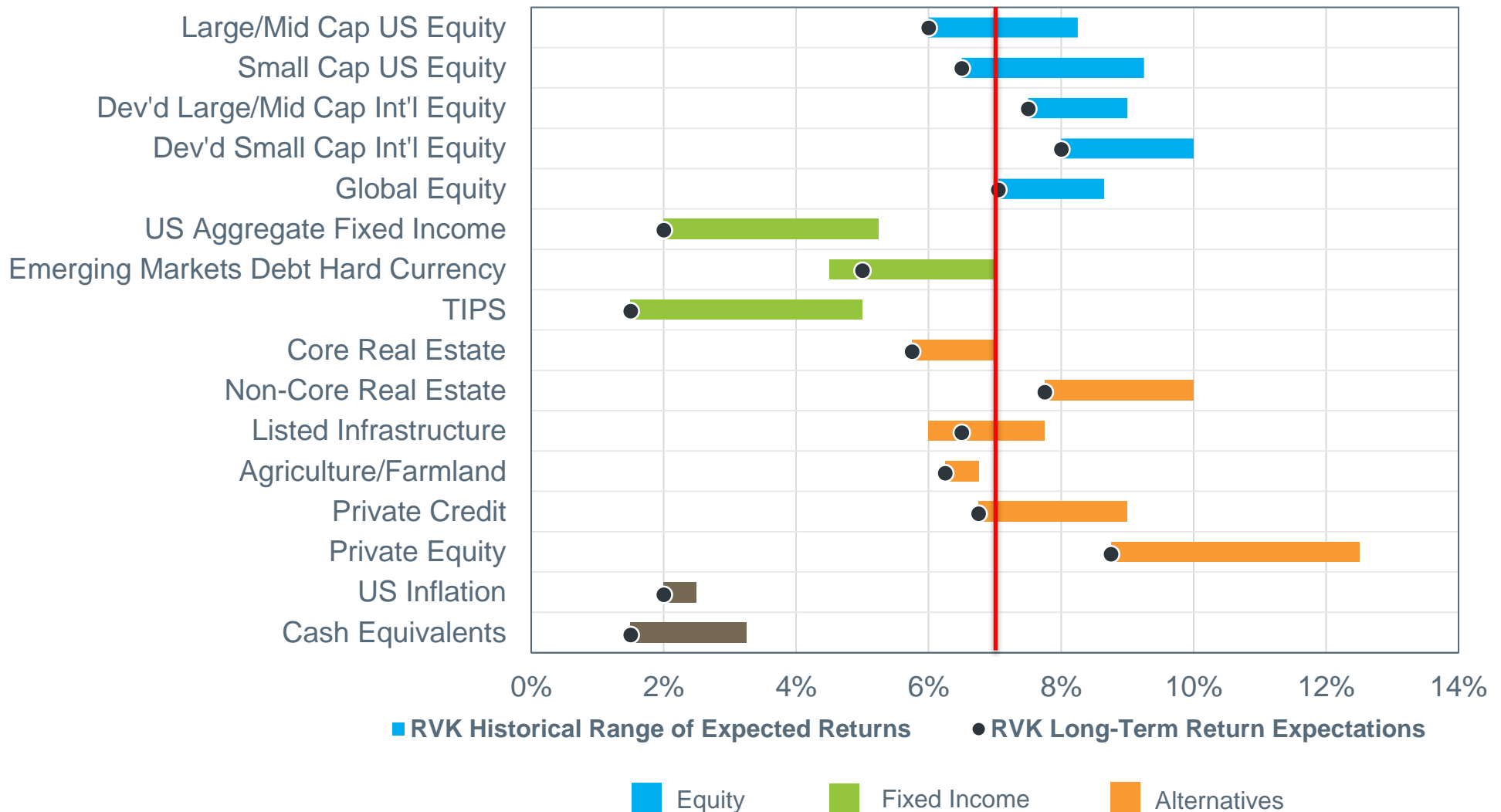
	2020 Q1		2021		Change (2020 Q1 - 2021)	
Asset Class	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Arith.)	Risk (St. Dev.)
Large/Mid Cap US Equity	7.25%	16.00%	6.00%	16.00%	-1.25%	0.00%
Small Cap US Equity	8.50%	19.00%	6.50%	19.00%	-2.00%	0.00%
Devd Large/Mid Cap Int'l Equity	9.00%	17.00%	7.50%	17.00%	-1.50%	0.00%
Devd Small Cap Int'l Equity	10.00%	20.00%	8.00%	20.00%	-2.00%	0.00%
Global Equity	8.35%	16.35%	7.05%	16.60%	-1.30%	0.25%
US Aggregate Fixed Income	2.50%	5.00%	2.00%	5.00%	-0.50%	0.00%
Emerging Markets Debt Hard Currency	7.00%	10.00%	5.00%	10.00%	-2.00%	0.00%
TIPS	2.50%	5.50%	1.50%	5.50%	-1.00%	0.00%
Core Real Estate	5.75%	12.50%	5.75%	12.50%	0.00%	0.00%
Non-Core Real Estate	7.75%	22.50%	7.75%	22.50%	0.00%	0.00%
Listed Infrastructure	7.75%	19.00%	6.50%	19.00%	-1.25%	0.00%
Agriculture/Farmland	6.25%	12.00%	6.25%	12.00%	0.00%	0.00%
Private Credit	9.00%	13.00%	6.75%	13.00%	-2.25%	0.00%
Private Equity	10.00%	22.00%	8.75%	22.00%	-1.25%	0.00%
US Inflation	2.00%	1.50%	2.00%	1.50%	0.00%	0.00%
Cash Equivalents	1.50%	2.00%	1.50%	2.00%	0.00%	0.00%

Represents an increase year-over-year.

Represents a decrease year-over-year.

Historical Perspective of Expected Returns

2021 Expected Returns vs. RVK Historical Range of Expected Returns (Since 2009)



Data shown includes 2009 through 2021 Capital Market Assumptions for selected VPIC asset classes.

Assumption for EMD Hard Currency was developed starting in 2012.

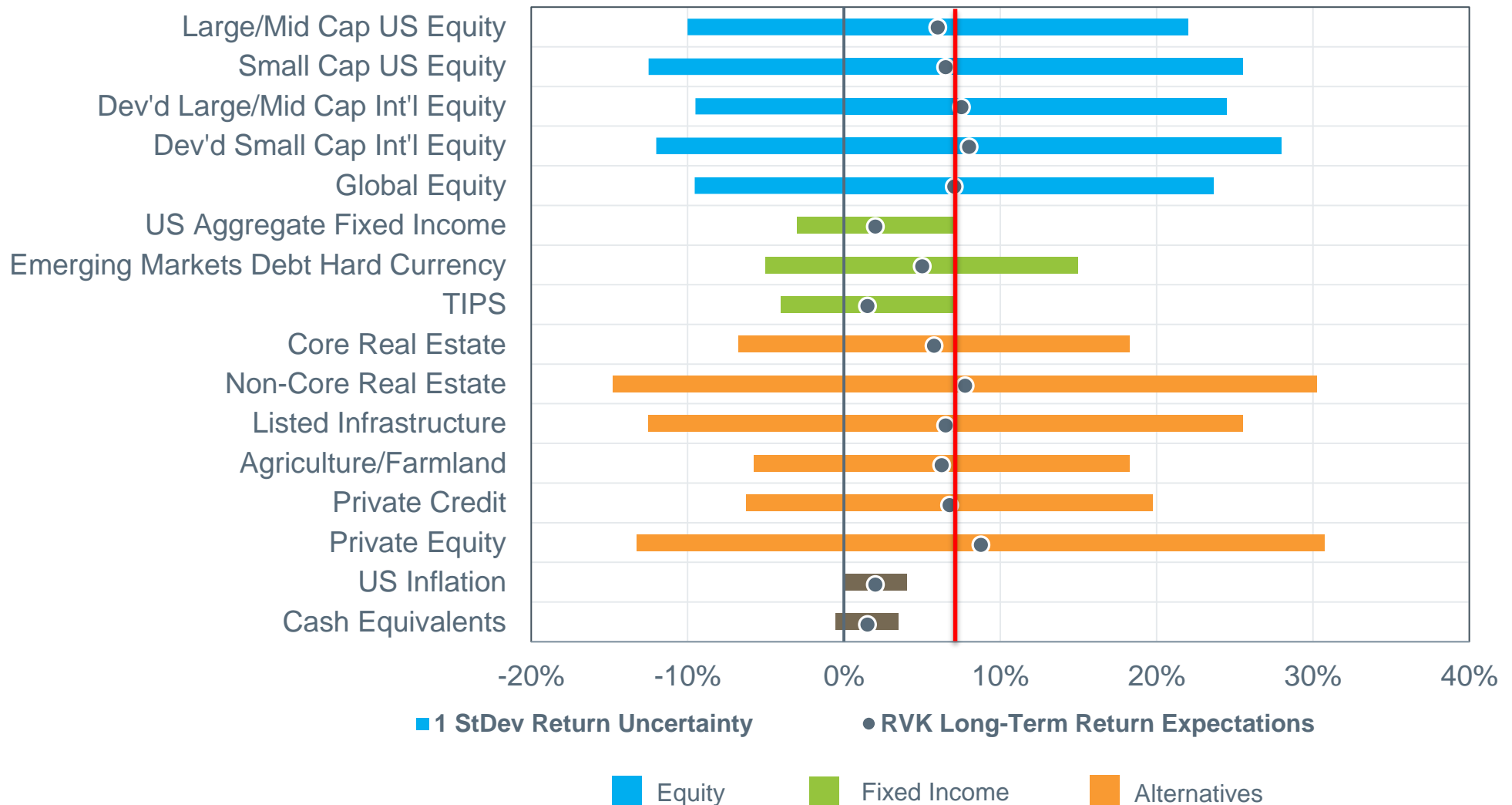
Assumption for Private Credit was developed starting in 2017.

Assumption for Non-Core Real Estate was developed starting in 2011.

Assumption for Listed Infrastructure was developed starting in 2013.

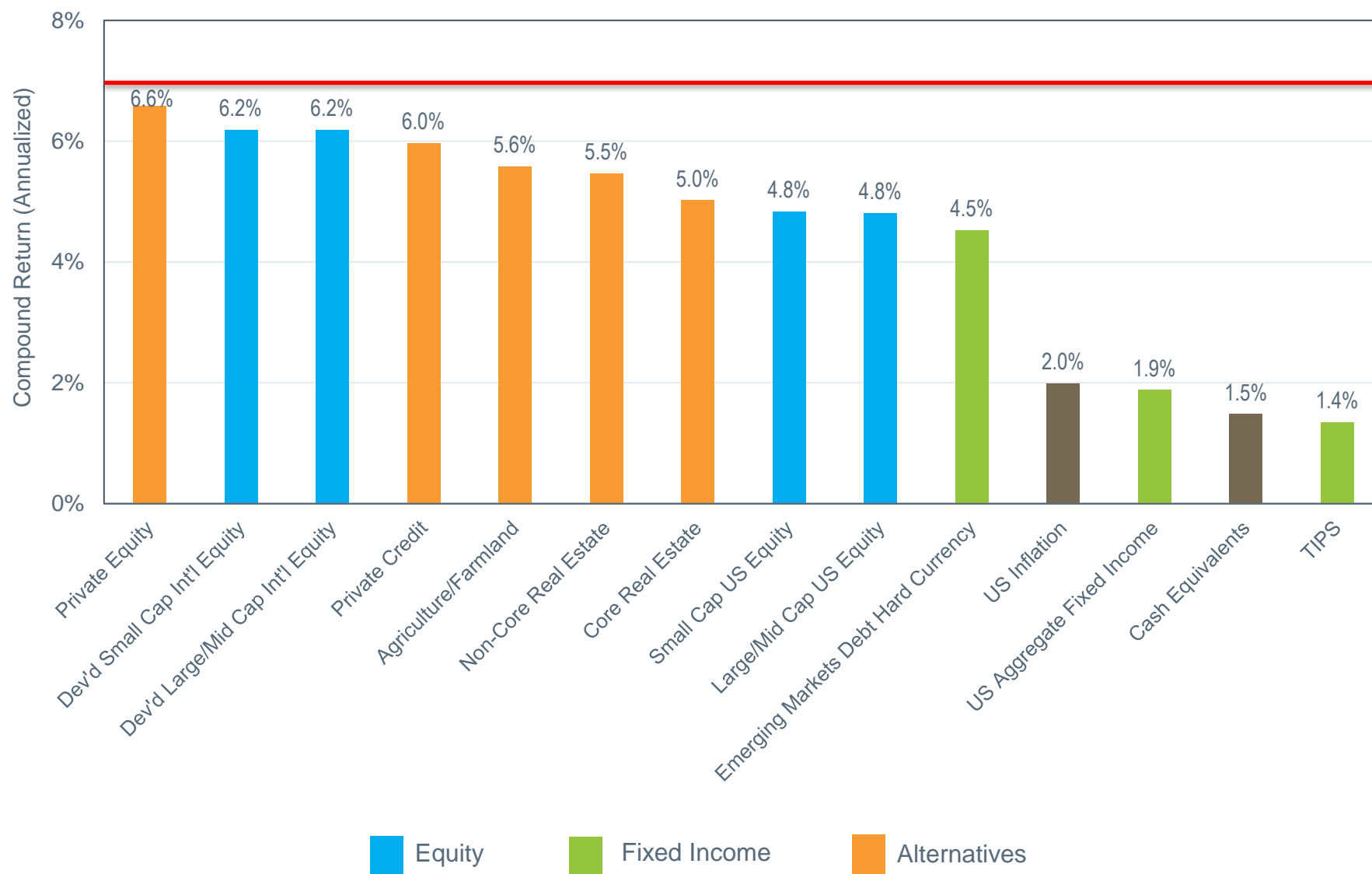
Asset Return Expectations and Uncertainty

RVK 2021 Long-Term Return Expectations and Estimated Distribution of Returns



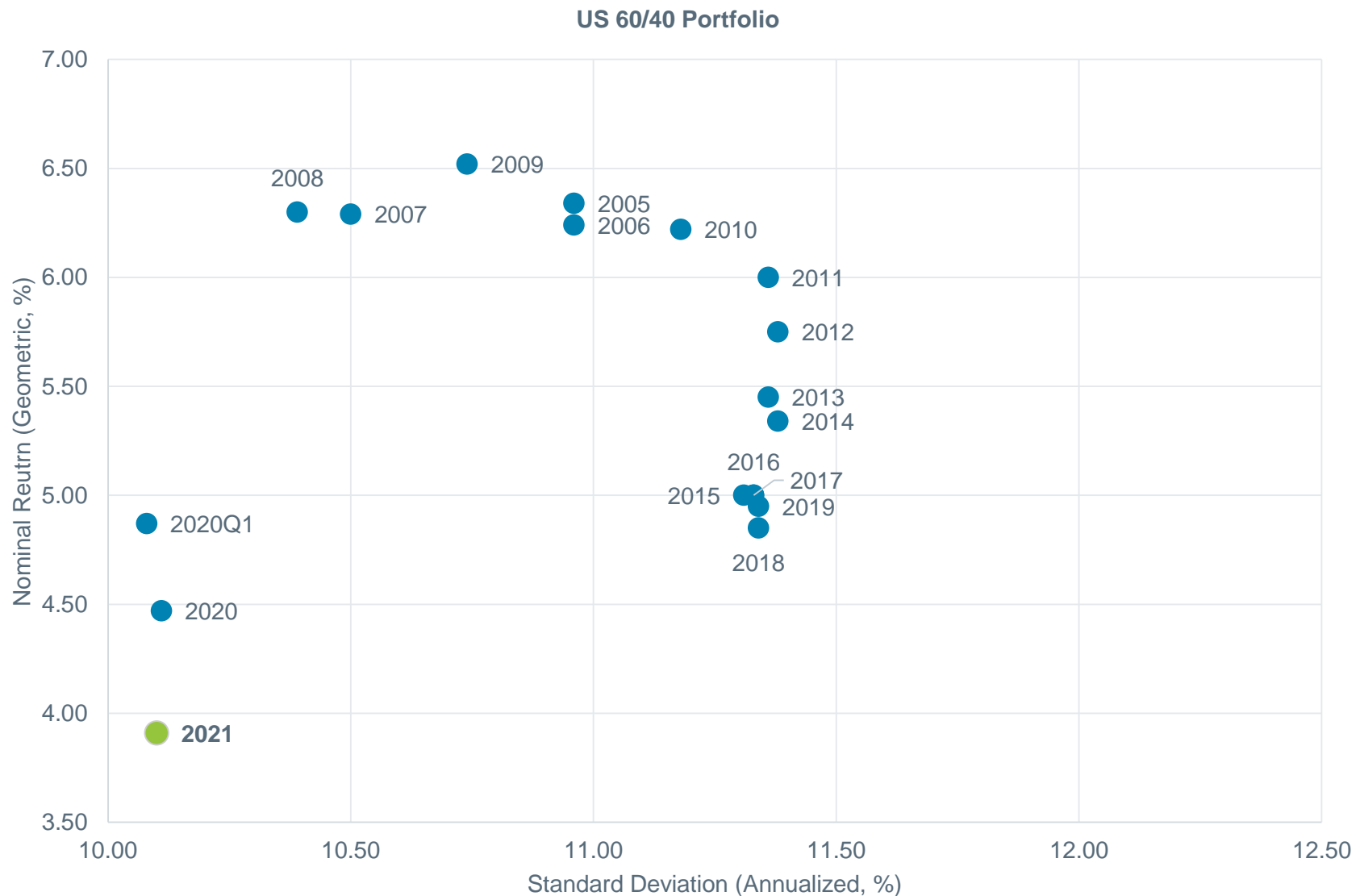
StDev is based on RVK 2021 CMA risk assumption for each asset class.

RVK 2021 Compound Return Assumptions



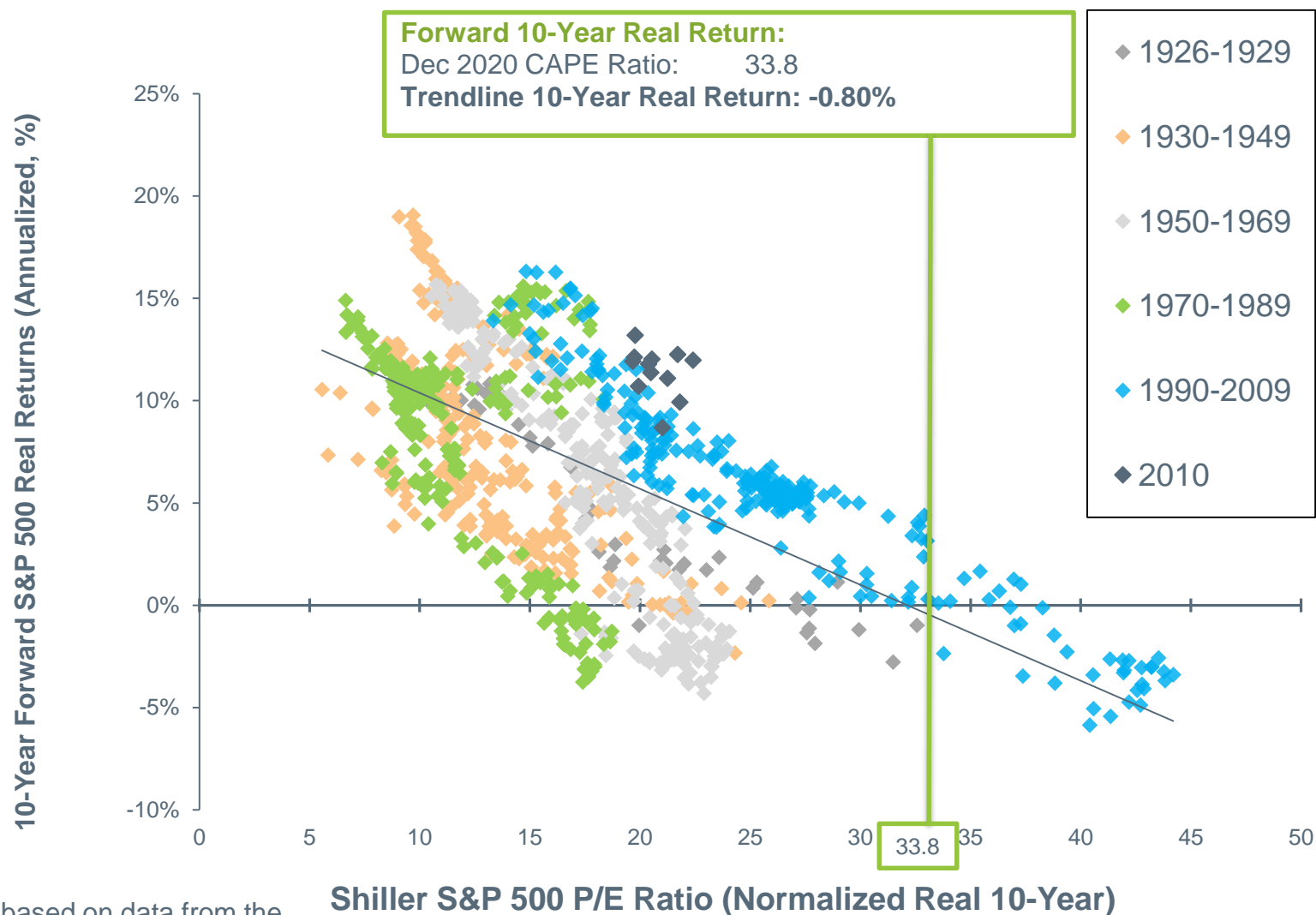
Historical Perspective of Expected Returns

- Long-term return expectations for a traditional US 60/40 portfolio remain muted relative to prior years.



Equity Assumptions: Valuation Focused

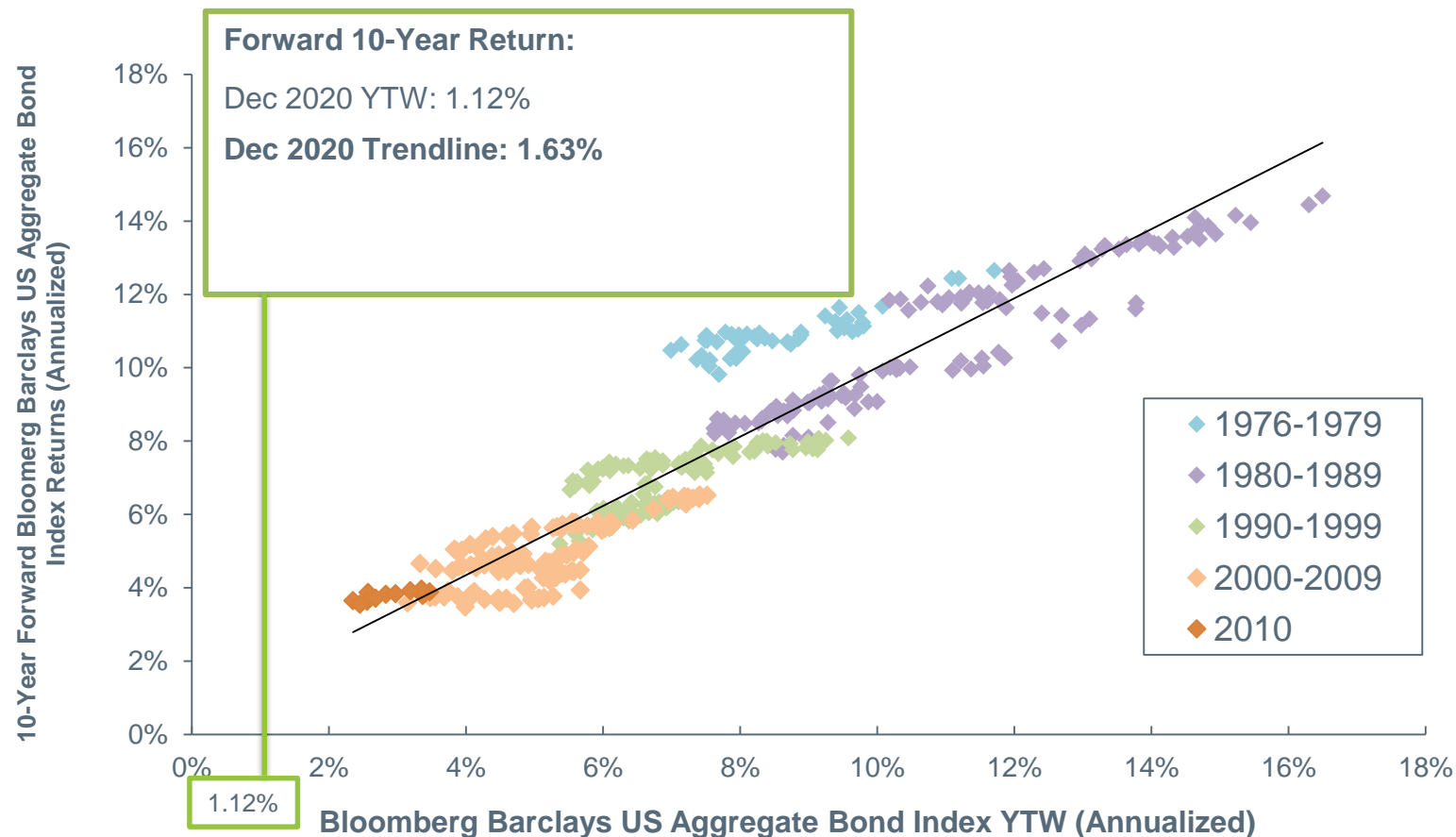
- One of several metrics influencing RVK's equity assumptions is the *Cyclically-Adjusted Price/Earnings Ratio* (or "CAPE") – a measure of stock price relative to company earnings.
- We have observed that, dating back to 1926, the *higher* the CAPE Ratio, the *lower* the subsequent 10-year return for the S&P 500 Index.



Source: RVK, based on data from the Robert Shiller Database.

Fixed Income Assumptions: Yield Focused

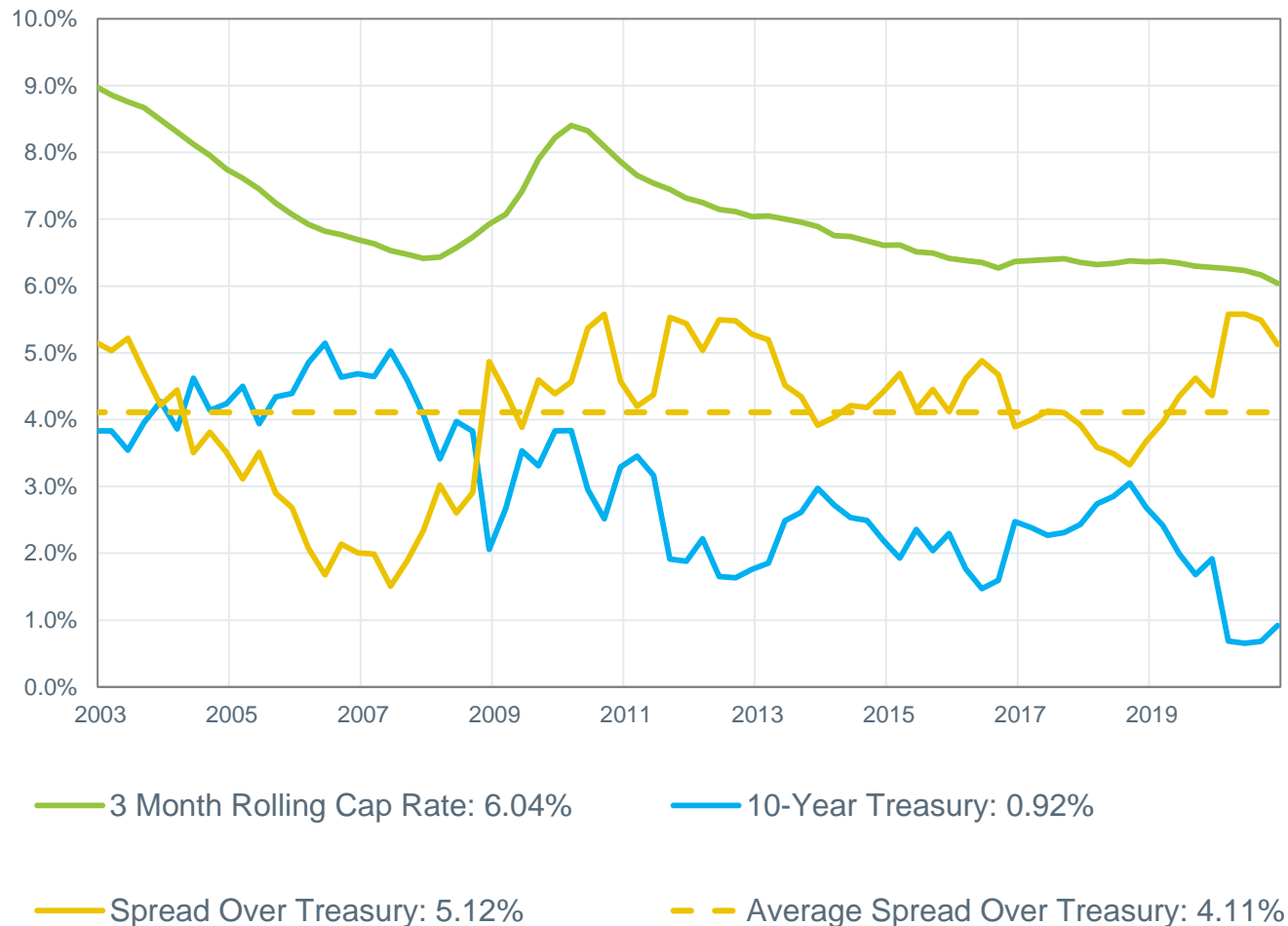
- In fixed income, current yields are a reliable predictor of future performance.
- The lower the yield, the lower the subsequent 10-year return.



Source: FactSet.

Real Estate Assumptions: Cap Rates Focused

- Cap rates (in **green**) are a common indicator of real estate expected returns.
- While cap rates are historically low, the yield relative to US Treasuries (in **blue**) remain especially attractive.



Asset Allocation Education

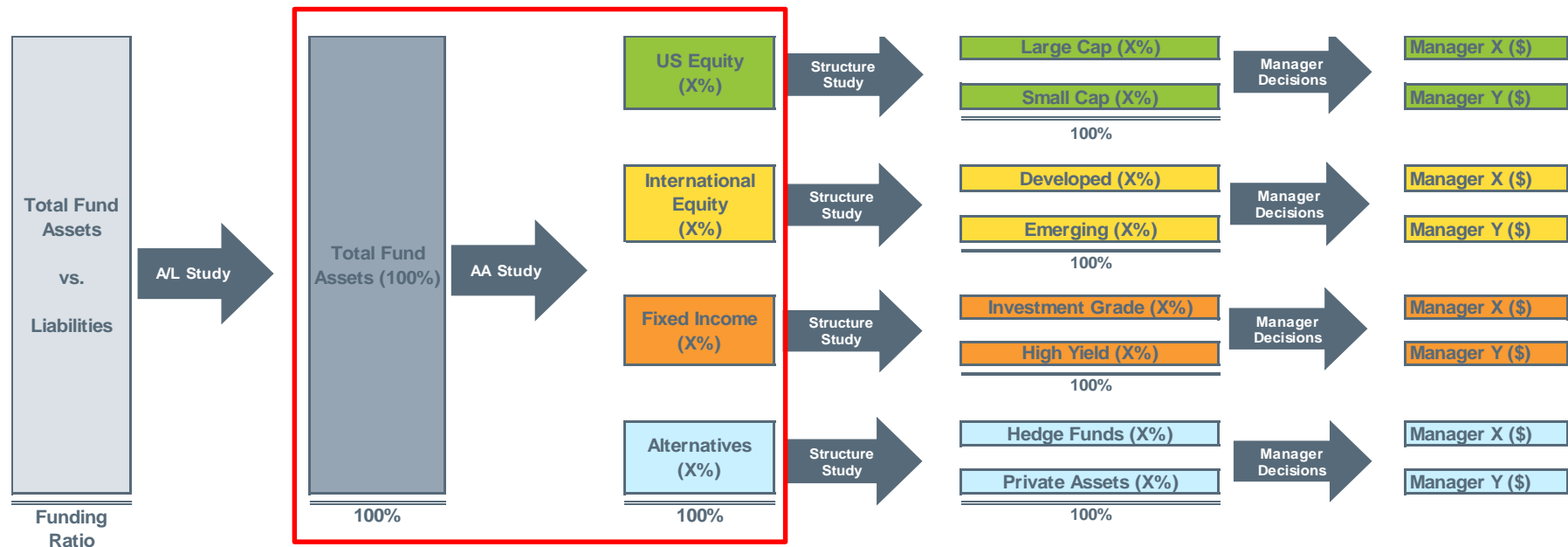


Overview

- The purpose of this section is to provide a refresher on the purpose and use of an Asset Allocation Study.
- VPIC's current Investment Policy Statement tasks the Committee with undertaking a formal Asset / Liability Study at least every five years, in addition to an Asset Allocation Study every year.
- It is common practice to update the Asset Allocation Study more frequently than an Asset Liability Study, as capital markets may change, and this may impact future capital market expectations, which are reflected in the capital market assumptions used as inputs into the updated Asset Allocation Study.
- It is RVK and Staff's goal to present the Committee with the most recent Asset Allocation Study results at this upcoming VPIC meeting in April 2021.

Investment Decision Process

- Strategic asset allocation is one of the most important investment decisions a fiduciary can make and is the most powerful determinant of total plan performance (return and risk) in the long run.
 - While good manager evaluation decisions will unquestionably add to performance, they cannot make up for a poorly diversified, inefficient asset allocation.
 - Further, after the completion of an Asset Allocation Study, asset class structure studies are often completed to determine the optimal sub-asset class structure mix.
- Asset Allocation Studies help us to examine how well alternative investment strategies (i.e., differing asset allocations) address the investment objectives served by the plan.



Asset Allocation

Process

- The **goal** of an Asset Allocation Study is to identify alternative portfolios that satisfy the return objectives and unique risk tolerances of a given institution.
- Inputs:
 - Allowable asset classes (cash, bonds, stocks, private equity, real estate, etc.)
 - **Capital Market Assumptions** for each individual asset class:
 - Expected Return
 - Expected Risk
 - Correlations
 - Constraints:
 - For each asset class (minimums, maximums)
 - Global constraints for “groups” of asset classes
- When conducting an asset allocation review, RVK employs a modelling process called **Mean Variance Optimization**, which produces a set of optimal (aka “efficient”) portfolios providing the highest level of expected return for a given level of risk. This set of optimal portfolios is called the **Efficient Frontier**.
- The Efficient Frontier is then referenced when identifying alternative portfolios; additional adjustments are typically necessary to take into account the **qualitative factors that the model simply cannot account for** (e.g. a Committee’s desire for a certain allocation cap on illiquid assets).
- Finally, a **Monte Carlo analysis** is incorporated, which allows us to ascertain the real-world probability of achieving various return targets over time as well as the associated risks.

Asset Allocation

Key Elements

1. **Mean Variance Optimization (MVO) Framework** – RVK uses an MVO analysis as a framework for discussing the asset allocation decision. While the model has important limitations, it provides a useful framework for discussing the risk/return trade off of different portfolio allocations.
2. **Monte Carlo Simulation** – For each potential portfolio allocation, we use Monte Carlo simulations to show different potential outcomes ranging from worst case to best case over various time periods. The simulations can be combined with spending rate projections to inform the decision on spending rate sustainability.
3. **Downside Analysis** – Understanding the downside risk is critical when determining an optimal target allocation. Committees must truly understand the risk of a major downside event and be prepared to take action during these periods (i.e., adding to equities) when one's instincts usually encourages the opposite.
4. **Rebalancing Policy** – We believe that having a rebalancing policy incorporated into the investment policy statement is best practice. This is most useful when extreme market events occur, as it can help mitigate counterproductive instincts.

RVK Perspective on Asset Allocation

Common Allocation Errors

1. **Overconfidence in Tactical Abilities** – Many investors overestimate their ability to navigate the ebbs and flows of markets over short time periods. While it is highly probable that risk seeking assets (e.g., equities) will outperform capital preservation assets (e.g., fixed income) over a long period of time, it is extraordinarily difficult to predict relative performance over short periods of time.
2. **Overestimation of Risk Tolerance** – The stated risk tolerance of investors often differs from their actual risk tolerance when faced with a major market dislocation. It is one thing to say that you can tolerate a 50% decline in equities; it is another thing to sell fixed income and buy equities when it actually happens.
3. **Failure to Exercise Patience and Discipline** – Building on the previous point, sticking to a long term allocation (and rebalancing as needed) requires patience and discipline. This is most important in distressed markets when fear of loss is high, as well as exuberant markets when fear of regret tempts one to engage in imprudent risk taking.

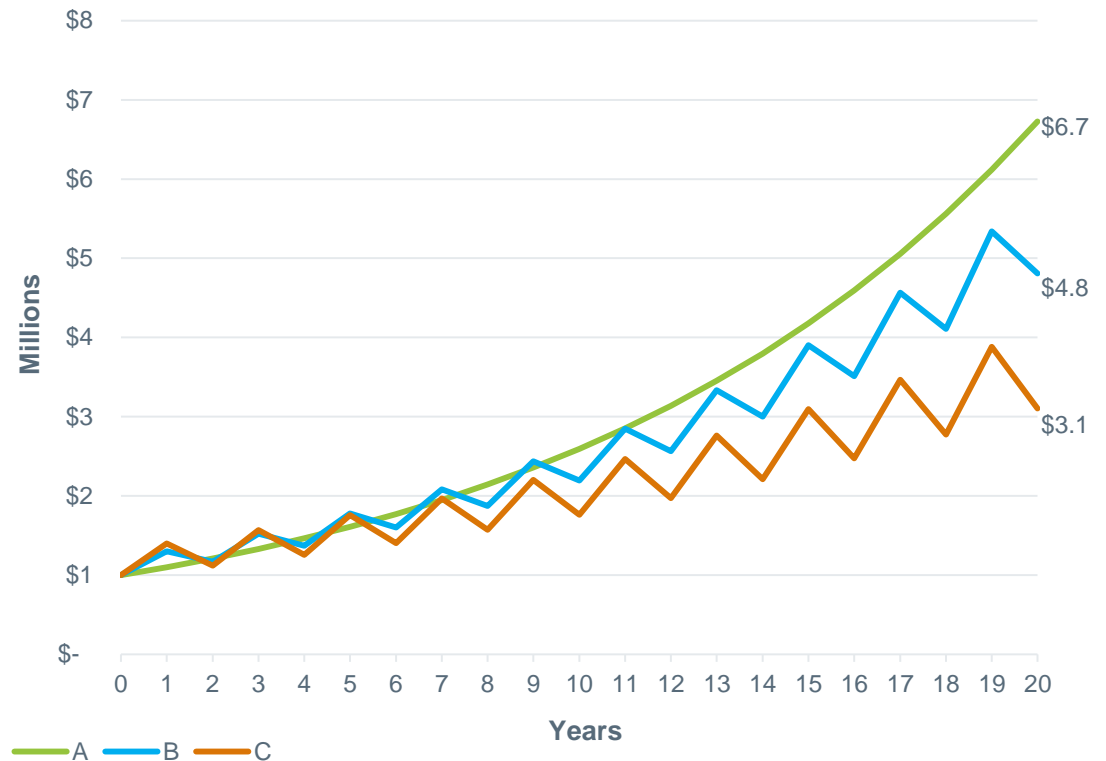
Asset Allocation

Impact of Risk on Return

Years	A	B	C
1	10%	30%	40%
2	10%	-10%	-20%
3	10%	30%	40%
4	10%	-10%	-20%
5	10%	30%	40%
6	10%	-10%	-20%
7	10%	30%	40%
8	10%	-10%	-20%
9	10%	30%	40%
10	10%	-10%	-20%
11	10%	30%	40%
12	10%	-10%	-20%
13	10%	30%	40%
14	10%	-10%	-20%
15	10%	30%	40%
16	10%	-10%	-20%
17	10%	30%	40%
18	10%	-10%	-20%
19	10%	30%	40%
20	10%	-10%	-20%
Arithmetic Return	10.0%	10.0%	10.0%
Compound Return	10.0%	8.2%	5.8%
Standard Deviation	0.0%	20.5%	30.8%

*Please note, compound return refers to a geometric average return.

Growth of \$1M Over Time



- Example assumes all portfolios start with \$1 million and are projected over a 20 year period.
- While the average arithmetic return may be the same for all three portfolios, the calculation of the geometric return, highlights the effects that compounding and significant return volatility can have on a portfolio's outcome over time.
- After 20 years, the difference in standard deviation or "risk" between Portfolio A and Portfolio C equals 30.8%, which translates to a \$3.6 million dollar difference in ending market value.

Appendix



Appendix: 2021 Capital Markets Assumptions

Asset Class	2020 Q1			2021			Change (2020 Q1 - 2021)		
	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)
Large/Mid Cap US Equity	7.25%	16.00%	6.08%	6.00%	16.00%	4.81%	-1.25%	0.00%	-1.26%
Small Cap US Equity	8.50%	19.00%	6.87%	6.50%	19.00%	4.84%	-2.00%	0.00%	-2.03%
Broad US Equity	7.30%	16.00%	6.13%	6.05%	16.05%	4.86%	-1.25%	0.05%	-1.27%
Dev'd Large/Mid Cap Int'l Equity	9.00%	17.00%	7.70%	7.50%	17.00%	6.18%	-1.50%	0.00%	-1.52%
Dev'd Small Cap Int'l Equity	10.00%	20.00%	8.23%	8.00%	20.00%	6.19%	-2.00%	0.00%	-2.03%
Emerging Markets Equity	11.25%	25.00%	8.54%	10.00%	25.00%	7.26%	-1.25%	0.00%	-1.28%
Broad International Equity	9.70%	18.30%	8.20%	8.30%	18.80%	6.70%	-1.40%	0.50%	-1.50%
Global Equity	8.35%	16.35%	7.14%	7.05%	16.60%	5.79%	-1.30%	0.25%	-1.35%
US Aggregate Fixed Income	2.50%	5.00%	2.38%	2.00%	5.00%	1.88%	-0.50%	0.00%	-0.50%
Non-US Dev'd Sovereign Fixed Income UH	1.25%	8.50%	0.90%	1.00%	8.50%	0.64%	-0.25%	0.00%	-0.25%
Emerging Markets Debt Hard Currency	7.00%	10.00%	6.54%	5.00%	10.00%	4.53%	-2.00%	0.00%	-2.01%
Emerging Markets Debt Local Currency	5.75%	11.50%	5.13%	5.00%	11.50%	4.38%	-0.75%	0.00%	-0.75%
TIPS	2.50%	5.50%	2.35%	1.50%	5.50%	1.35%	-1.00%	0.00%	-1.00%
Low Duration Fixed Income	2.00%	2.50%	1.97%	1.50%	2.50%	1.47%	-0.50%	0.00%	-0.50%
Long Duration Fixed Income	3.00%	10.00%	2.52%	2.50%	10.00%	2.02%	-0.50%	0.00%	-0.50%
High Yield	7.50%	10.00%	7.04%	4.75%	10.00%	4.28%	-2.75%	0.00%	-2.76%
Bank Loans	7.00%	8.00%	6.70%	4.75%	8.00%	4.45%	-2.25%	0.00%	-2.26%
Core Real Estate	5.75%	12.50%	5.02%	5.75%	12.50%	5.02%	0.00%	0.00%	0.00%
Global REITs	7.50%	21.00%	5.51%	6.75%	21.00%	4.74%	-0.75%	0.00%	-0.76%
MLPs	11.75%	23.00%	9.46%	9.25%	23.00%	6.91%	-2.50%	0.00%	-2.55%
Funds of Hedge Funds	4.75%	9.50%	4.32%	4.25%	9.50%	3.82%	-0.50%	0.00%	-0.50%
Multi-Strategy Hedge Funds	5.50%	8.50%	5.16%	5.00%	8.50%	4.66%	-0.50%	0.00%	-0.50%
GTAA	5.50%	9.00%	5.12%	5.00%	9.00%	4.62%	-0.50%	0.00%	-0.50%
Private Credit	9.00%	13.00%	8.23%	6.75%	13.00%	5.97%	-2.25%	0.00%	-2.27%
Senior Secured Direct Lending	8.00%	9.00%	7.63%	5.75%	9.00%	5.37%	-2.25%	0.00%	-2.26%
Private Equity	10.00%	22.00%	7.86%	8.75%	22.00%	6.59%	-1.25%	0.00%	-1.27%
Commodities	5.00%	17.50%	3.57%	5.00%	17.50%	3.57%	0.00%	0.00%	0.00%
Diversified Inflation Strategies	5.00%	11.50%	4.38%	4.42%	11.55%	3.78%	-0.58%	0.05%	-0.59%
US Inflation	2.00%	1.50%	1.99%	2.00%	1.50%	1.99%	0.00%	0.00%	0.00%
Cash Equivalents	1.50%	2.00%	1.48%	1.50%	2.00%	1.48%	0.00%	0.00%	0.00%

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