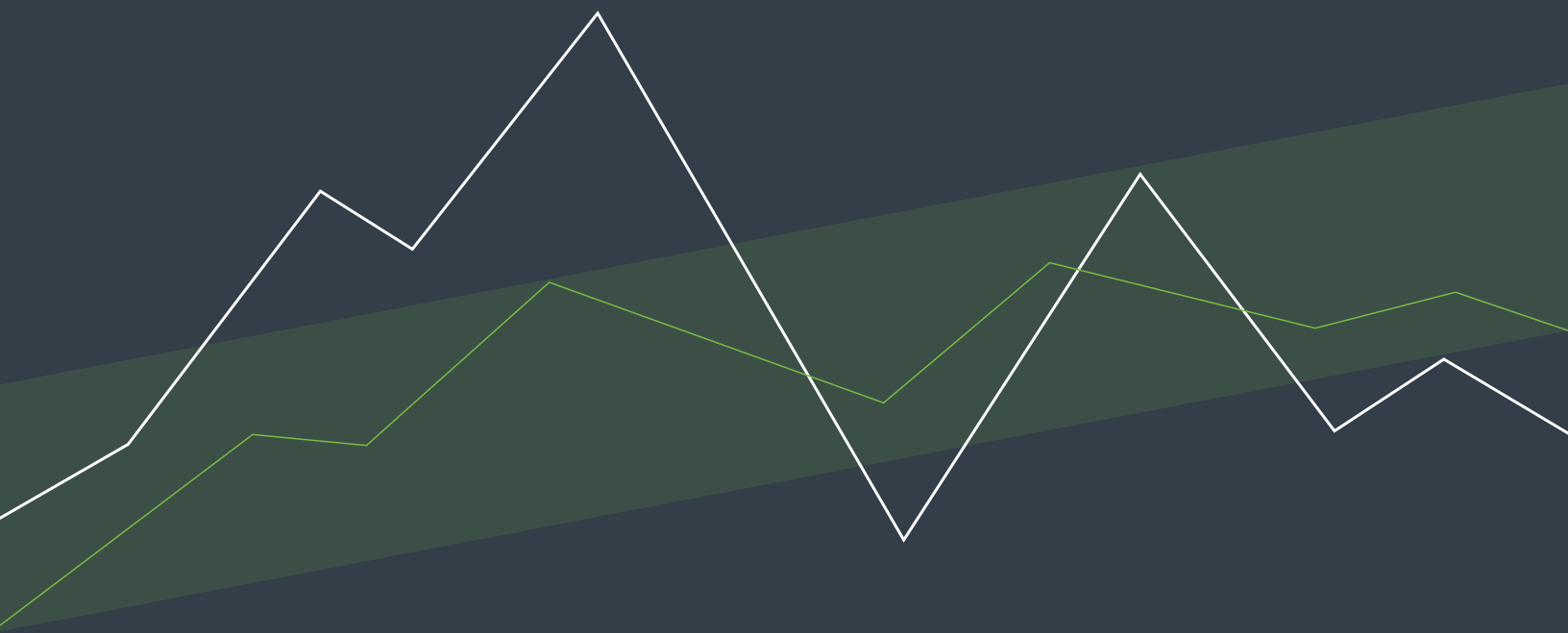
HORIZON INVESTMENTS®

RESEARCH

REAL SPEND

Retirement Planning:
Solving for the Major Risks in Retirement



ABSTRACT

Generating income throughout retirement is increasingly the focus of financial advisors and institutions. The shift in focus is due to an aging population and a three-decade-long bull market for bonds that is expected to end. This paper examines different potential asset allocation strategies in the context of retirement spending. Specifically, we want to understand how longevity risk (outliving one's money), sequence of return risk, inflation, and a potential desire for legacy (remaining wealth) might be affected by an individual's choice of retirement spending strategies. We examine the concept of "risk" as it pertains to an individual in the retirement (spending) phase of their investment life cycles versus "risk" as it pertains to individuals in the accumulation phase of their investment life cycles and the implications that these separate concepts have on investment strategy selection. We find that traditional methods of adding fixed income exposure to aging investor portfolios might not be the most appropriate way to generate durable income. On the contrary, we believe strategies that maintain broad exposure to risky assets tend to provide higher likelihoods of maintaining real spending levels while increasing expected legacy values. Finally, we introduce the Real Spend strategy that combines a risky asset pool (working pool) with a safer asset pool (spending pool) and overlays income sweep logic to minimize negative investor behavior. The result is a robust income-generating engine.

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The Baby Boomer generation is retiring. Roughly 75 million children were born in the United States between 1945 and 1964 and they control nearly 80% of the personal financial assets in the country. At the same time, interest rates have been steadily declining since 1981, causing bond prices to rise. The overlap in these two periods has led to the popularity of investment strategies such as "age-in-bonds" and "target date funds." Both strategies encourage an increased allocation to bonds as the investor ages.

What happens when bond prices fall? The purpose of this study is to evaluate the current methods used to generate income throughout the retirement phase of the investor lifecycle. First, we define the appropriate measures of risk for evaluating retirement strategies. Next, we examine the current literature and recent studies. Last, we introduce the Real Spend strategy and compare results.

I. Accumulation Risk versus Spending Risk

Portfolio volatility has been widely accepted as a reasonable proxy for "risk" in investment portfolios since Markowitz codified it as the relevant risk metric in his seminal 1952 paper, "Portfolio Selection." We will not spend time here debating the pros and cons of volatility-as-risk, but for an accumulation phase investor drawdown or downside capture certainly are relevant and the magnitude of these is related to volatility. Since a risk is something that can impede a goal, excessive volatility in this context could certainly impede the goal of the accumulation investor (accumulate wealth).

Volatility, however, might not be the most relevant risk metric for investors in the spending phase of their investment lifecycles. As a spending investor has a different goal (spending) than the accumulation investor, it follows that the risks associated with each investor might be different. Certainly, drawdown is a concern to a spending investor – but the reason is more due to its effect on longevity rather than wealth accumulation.

We posit that the primary risks to a spending investor are:

- Longevity (outliving one's money)
- Sequence-of-return (related to longevity risk)
- Inflation

A retirement spending strategy should have the capacity to address these risks, which are different than simply solving a mean-variance optimization problem.

II. Literature Review

We would refer the reader to Pfau (2012a) or Pfau and Kitces (2013) for a more detailed examination of the academic literature on sustainable withdrawal rates from a portfolio of volatile assets during some extended retirement period. An early paper on the impact of different allocation strategies, specifically glidepaths and fixed equity/debt allocations, is by Bengen (1996). He found that the highest sustainable withdrawal rate in the worst-case scenario from history became smaller as glidepath steepness increased; that is, as equity allocation decreased more quickly, safe withdrawal rates decreased. Blanchett (2007) used a Monte Carlo approach with a similar glidepath vs. fixed equity/debt allocation construct to demonstrate that fixed allocations outperformed decreasing equity glide paths.

Other papers address varying asset allocation over retirement for various purposes and under various conditions. Kitces (2009) and Pfau (2012b) examine adjusting allocation based on equity valuation metrics. Others such as Branning and Grubbs (2010) take a more institutional approach similar to liability-driven-investing (LDI) where assets are set aside to meet essential needs.

Fan, Murray, and Pittman (2013) develop a model that modifies equity exposure with respect to spending needs and shortfall risk. More important, as we will see later, they determine that starting retirement with a lower allocation to equity reduces sequence of return risk and that equity allocations might become higher as the retirement period progresses. Basu and Drew (2009) assert that reducing equity allocations as an investor nears retirement is suboptimal for most investors. They attribute this result to the portfolio size effect of Shiller (2005), which stipulates that most of the portfolio growth for an individual will occur later in the accumulation phase when they have more absolute dollars at work.

The papers and findings mentioned here collectively suggest that:

1. Generally, a larger equity allocation outperforms a smaller equity allocation for retirement spending purposes.
2. Generally, a flexible asset allocation strategy outperforms a static strategy (where a glidepath is taken to be static as its allocation is pre-determined).
3. A spending-focused portfolio might also be able to benefit from a Shiller portfolio size effect since it is likely to be close to the largest absolute wealth portfolio that an investor has accumulated.
4. An equity-heavy portfolio at retirement-spending inception is subject to material sequence of return risk.

III. Strategy Descriptions

In this section we will introduce the Real Spend strategy and compare it to three popular retirement strategies already in the marketplace. The Constant Proportion strategy, as its name implies, maintains a static allocation to a risky pool and riskless pool. The other two strategies take a similar philosophical approach to income generation. Both the Linear Glidepath and Age-In-Bonds strategies systematically reduce exposure to risky assets as the retiree ages.

Real Spend

The Real Spend strategy allocates 3 years of spending to a reserve pool that is low risk in nature (cash, money markets or short-term treasuries). The remaining assets are allocated to a risky pool (consisting of both equity and debt assets) that corresponds in riskiness to the expected spending rate desired by the retiree. The use of a risky pool and riskless pool helps the retiree maintain discipline throughout retirement as the riskless pool is viewed as a spending reserve. To replenish the spending reserve, a sweep mechanism is implemented once a quarter. The amount of the sweep is determined by the return of the risky pool during the previous quarter.

- If the value of the risky pool drops, no assets are swept into the spending pool.
- If the value of the risky pool grows, one quarter's worth of the spending is swept from the risky pool and into the spending reserve.
- If the value of the risky pool grows by more than one quarter's worth of the spending, then two quarters' worth of spending is swept from the risky pool into the spending reserve.

Constant Proportion (CP)

The Constant Proportion strategy promotes a flat glidepath through retirement. The allocation to risky and riskless pools is maintained at a constant ratio through annual rebalancing back to the desired starting allocation. For instance, a newly retired individual would maintain a 40% allocation to equities and a 60% allocation to cash or short-term treasuries throughout retirement.

Linear Glidepath (LG)

Linear Glidepath strategies systematically move a fixed portion of the retiree's assets out of the risky pool and into the riskless pool as the retiree ages. For instance, if an investor retires at age 60 with a starting equity allocation of 60% and a 20-year planned horizon, the portfolio would move 2% per year out of the risky equity pool and into the riskless pool. The portfolio would then maintain a 20% allocation to equities after the planned horizon.

Age-In-Bonds (AIB)

The Age-In-Bonds strategy is a simplified case of a Liner Glidepath model that is popular due to its ease of explanation. The strategy simply puts a proportional percentage of the retiree's account into the riskless pool based on the retiree's age. For instance, at age 60, 60% of the allocation would be in bonds. 70% would be in bonds at age 70, and so on.

IV. Common Elements

Inflation Adjustment: Withdrawal amounts are adjusted for inflation once a year. Inflation adjustment is a non-trivial feature of this particular study as it more closely mirrors the practical expectations of retirees. Purchasing power is therefore maintained in this study and we would argue that any study ignoring inflation also lacks practical applicability.

Data: Our research utilizes data from the SBBI database from Ibbotson. Data begins in Q4 1926 and ends in Q4 2013.

PARAMETERS

Spending Rates: 4%, 5%, 6%, 7%

Spending Horizons: 20, 25 and 30 Years

Fee Rates: net of 1.65%

Inflation: Annual Adjustment

Tax Rate: 20%

SPECIFIC PARAMETERS:

Real Spend
Spending Reserve: 12 Quarters
Equity %: 100%, 80%, 60%

Constant Proportion
Equity %: 60%, 40%

Linear Glidepath
Starting Age: 55, 60, 65

Age-In-Bonds
Starting Age: 55, 60, 65

MEASURES OF SUCCESS

We define success using two metrics that accurately answer a retiree's concerns, namely, "Will I run out of money?" and "How much will be left for my children?"

Probability of Success: The percentage rolling investment windows where the account maintains a positive total portfolio value throughout the full spending horizon.

Legacy: The ratio of remaining portfolio value to the beginning portfolio value.

TEST RESULTS

Figure 1:
What Is an Appropriate Spending Level?

High levels of success are achieved at low levels of spending, regardless of the strategy employed. At the 4% level of spend, greater than 50% success is common. However, as spending increases, the Real Spend strategy clearly improves the probability of success.

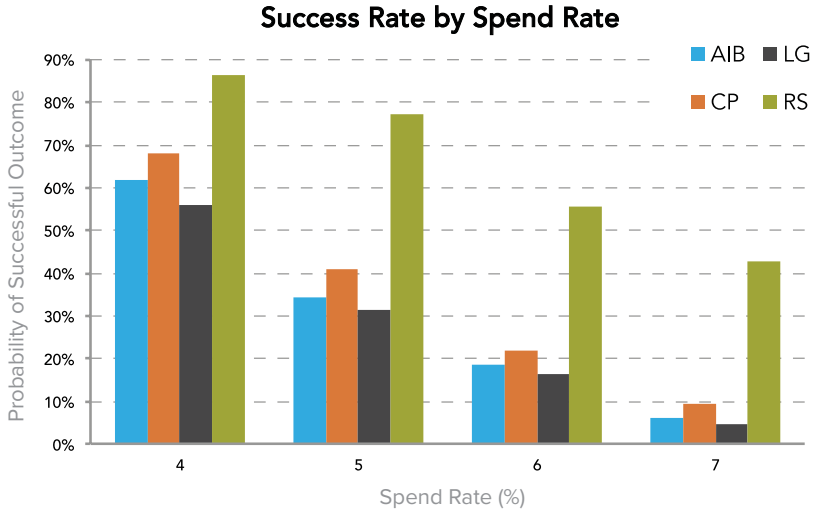


Figure 2:
How Does My Spending Affect My Legacy Assets?

At the 4% spend rate, the legacy percentage is significant regardless of strategy. However, it is noteworthy to mention that at a 4% spend rate the average legacy when using the Real Spend strategy is larger than the starting wealth value. As spending increases, legacy percentages decline with the Real Spend strategy maintaining wealth better than competing strategies. The Linear Glidepath model performs the poorest; a significant note given its popularity.

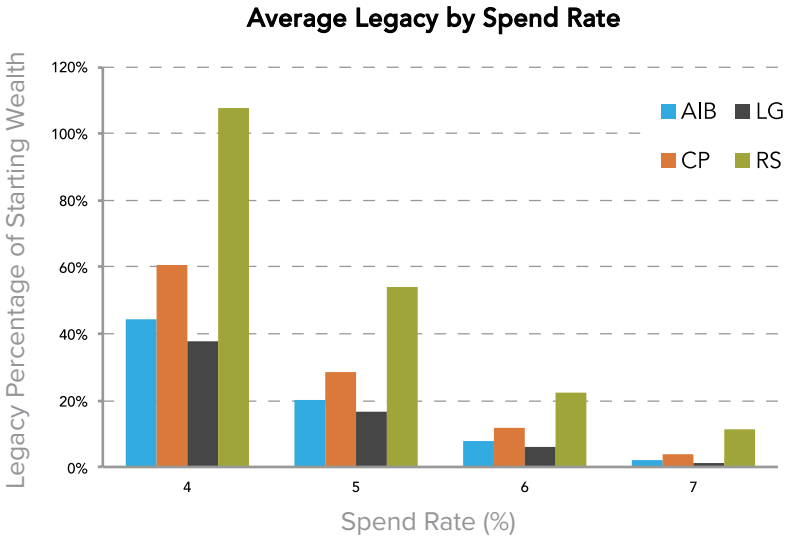


Figure 3:

Will I Sustain My Current Spending Level?

Shorter Spending Horizons lead to better outcomes. Outside of the Real Spend strategy, Success Rates quickly drop below 50% the Spending Horizon exceeds 20 years.

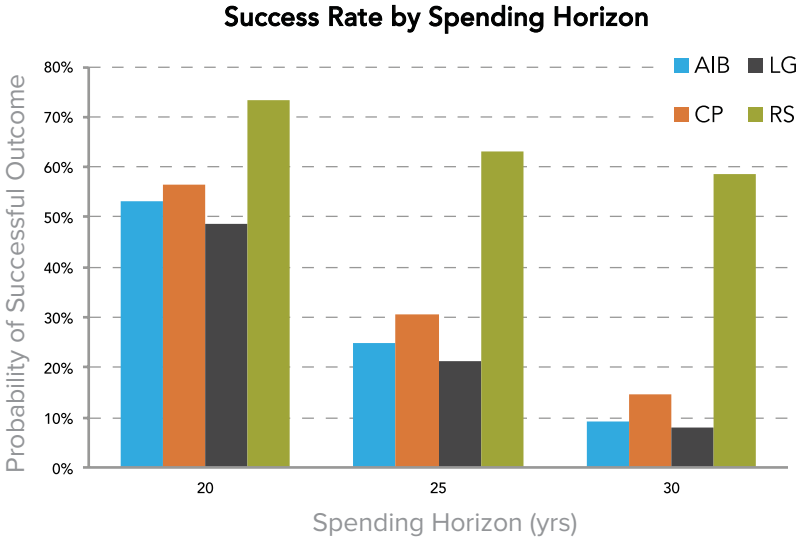
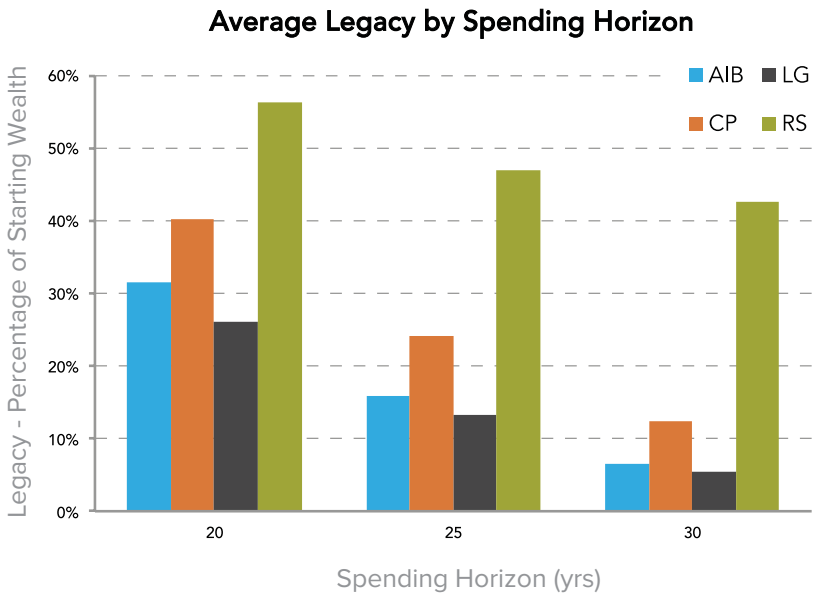


Figure 4:
What Will My Legacy Assets Be?

The challenge of a long spending horizon forces the underlying risk assets to yield higher returns in order to maintain wealth. Across all spending horizons, the Real Spend strategy preserves wealth better than the competing strategies.



V. Conclusion

Strategies with growing fixed income allocations do not preserve wealth as well as strategies that maintain a more substantial allocation to risk assets. The increased diversification and return benefits of the broader allocation allow for more flexible spending and help diminish longevity risk. In fact, the popular Linear Glidepath strategy performs poorly across all measures and examples due to its increasing fixed income allocation through time. The Real Spend strategy's dynamic nature, use of risky assets and improved behavioral effects can help maintain wealth levels and increase average longevity.

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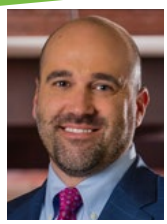

ROBBIE CANNON
President & CEO

During Mr. Cannon's tenure, which began in 1999, Horizon has grown from a small retail RIA firm to a multi-billion dollar third party investment management group with a national footprint of independent broker dealers and institutional clients. His career in finance began in 1994, and has encompassed various aspects of portfolio management including asset allocation, equity analysis and risk management. He graduated from Furman University and lives in Charlotte, NC.

He is a national speaker on topics from asset allocation and risk management to market dynamics. He has led his firm to be nationally recognized for revenue growth.

KEVIN BLOCKER, CAIA
Portfolio Manager

One of the original developers of the firm's investment process, Mr. Blocker specializes in quantitative analysis and portfolio construction using traditional and alternative investment strategies. As a member of the firm's Investment Committee, Mr. Blocker is responsible for screening investment opportunities and portfolio optimization. Mr. Blocker also consults with the firm's DB and DC clients on asset allocation and manager selection.

Mr. Blocker received a BA and BS in mathematics, computer science, and Spanish at Wofford College. Mr. Blocker also holds the CAIA designation. Before Horizon, Mr. Blocker played shortstop for the Colorado Rockies organization.

RON SABA, CFA
Senior Managing Director of Investment Management

With three decades of investment management experience, Mr. Saba is responsible for the management of all investment products at Horizon.

Prior to joining Horizon in 2009, Mr. Saba was Managing Partner and Chief Investment Officer of Charlotte Capital, LLC where he was lead portfolio manager for the firm's two institutional investment products. Prior to Charlotte Capital, Mr. Saba was a Portfolio Manager with Pioneer Investments. Before Pioneer he served as a Portfolio Manager and Analyst with Heartland Advisors.

Mr. Saba regularly contributes to the financial media. He has appeared on CNBC and has been featured in Barron's magazine. Mr. Saba holds an MBA from the University of Chicago Graduate School of Business and a BS in Business Administration from The Ohio State University.

STEVEN CLARK, Ph.D.
Head of Structured Financial Solutions

Dr. Clark oversees all of Horizon's spending and risk mitigation strategies. He also focuses on volatility forecasting models, dynamic factor models, and other quantitative methods for the firm. Dr. Clark is also an Associate Professor of Finance at UNC Charlotte where he conducts research in the areas of mathematical finance, derivative securities, asset pricing, and financial econometrics. He has a Ph.D. in Mathematical Sciences (with a concentration in applied probability and stochastic modeling) and a Ph.D. in Applied Economics (with a concentration in financial economics), both from Clemson University.

He has been published in numerous scholarly journals including *Review of Derivatives Research, Review of Futures Markets, Journal of Risk and Insurance,* and *Journal of Asset Management*.

SCOTT LADNER
Head of Investments

Mr. Ladner serves as Head of Investment Management and is the Chair of the Investment Committee for Horizon. In these capacities, he oversees all aspects of the Investment Management division for the firm. He also provides the Investment Management division with Macro analysis and interpretation of global derivatives, credit, foreign exchange, equity, and funding markets. His previous roles at Horizon included Head of Risk and Director of Quantitative & Alternative Strategies.

Prior to Horizon, Mr. Ladner was a founder of Charlotte Global Advisors and Principal Guard, LLC. Mr. Ladner helped to launch an equity index volatility and dispersion trading unit at PEAK6 Investments in Chicago, a proprietary listed option trading firm. Previously at First Union/Wachovia, Mr. Ladner founded and ran the $4 billion equity swap and forwards portfolio while also managing equity option and volatility portfolios. Mr. Ladner received his BA in Economics and Russian Language & Literature from the University of North Carolina at Chapel Hill.

WILLIAM BREEN, Ph.D.
Senior Investment Strategist

Dr. Breen brings the firm decades of fundamental, economic, and quantitative research with the ability to innovate his experiences with today's current investment problems. Before Horizon, Dr. Breen was chairman and a founding director of Disciplined Investment Advisors, an equity manager with over $2 billion under management.

Dr. Breen is Emeritus Professor of Finance at the Kellogg Graduate School of Management at Northwestern University, where he was also chairman of the Finance Department and head of Doctoral Studies. He has published more than 40 articles and academic papers and has coauthored several books on investment strategy, corporate finance, asset pricing, and econometric theory. He has served on the boards of The LaSalle Trust Company, Barton-Ashmann, X10ion Inc., and the Evanston Community Foundation. Dr. Breen received a BA in economics and mathematics from Ripon College, completed graduate work at the London School of Economics as a Rotary International Fellow, and received a Ph.D. in economics from Cornell University.

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Director of Structured Financial Solutions

Dr. Dickson joined Horizon Investments in March 2015. He focuses on new product development and innovation, with an emphasis on retirement income strategies. He also supports Horizon's investment process through the development of quantitative methods and strategies.

Dr. Dickson specializes in the areas of return predictability, portfolio optimization, and factor models. Previously, he taught undergraduate finance at UNC Charlotte and worked in financial analysis support roles at Premier, Inc., and Global Compliance. Dr. Dickson received his BS in Chemistry from Winthrop University and both an MS in Economics and Ph.D. in Finance from UNC Charlotte.

STEVEN AVERITT
Quantitative Strategist

Mr. Averitt joined Horizon Investments in April 2012. He supports the firm's quantitative research efforts including model development, testing, and validation. Previously, Mr. Averitt worked as a senior consultant and lead software engineer for Kalsi Engineering, a high technology engineering consulting firm. His expertise is in the development of proprietary engineering software products. His experience includes a broad range of software development skills including mathematical modeling, interface design, programming, integration, testing, and marketing. Mr. Averitt received his BS in Mechanical Engineering from Texas A&M University and his MS in Mathematical Finance from the University of North Carolina at Charlotte.

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Mr. Fitch joined Horizon Investments, LLC in January 2011. He focuses on fundamental equity research and supports the firm in its trading operations. He also works on product development for the firm's retirement portfolios. Mr. Fitch holds a BS in Mathematics and a BA in Finance from Wofford and an MBA with a concentration in Finance from the University of Tennessee. As a student, Mr. Fitch was a Managing Partner of the R. Michael James Student-Managed Investment Fund at Wofford College and a Fund Manager of the Haslam Torch Fund at the University of Tennessee. Mr. Fitch is a CFA Level III candidate.

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The Real Spend retirement income strategy is NOT A GUARANTEE against market loss. Real Spend is an integrated asset allocation strategy that uses an investment model to (i) plan savings amounts and overall asset allocation during the distribution phase of retirement planning, (ii) compute target retirement wealth, assuming a retirement budget and a spending-investment strategy after retirement, (iii) compute the transition from the accumulation phase to the retirement phase and (iv) generate the spending-investment strategy after retirement. Our retirement spending-investment strategy uses an allocation model that replenishes cash needed for withdrawals. Before investing, consider the investment objectives, risks, charges and expenses of the strategy. Keep in mind investing involves risk. The value of your investment will fluctuate over time and you might gain or lose money. This strategy is not an insurance product with payments guaranteed. It is an investment strategy utilizing various products. These products will fluctuate in value. There is a possibility of outliving the assets if market performance is lower than forecasts used in planning, or if longevity is longer than anticipated. Calculations are estimates based on historical market behaviors, and there is no assurance that these behaviors will be repeated in the future.