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Demographics Demand a New Approach

By David I. Cohen and Matthew J. Patterson, JD

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Demographics Demand a New Approach

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There are 79 million baby boomers in the United States and, over the next 30 years, a staggering 10,000 of them will retire every day. The macroeconomic impact of this post-World War II generation's retirement will reshape the investment management industry because baby boomers are shifting their focus from wealth accumulation to finding solutions to manage the decumulation phase of their investment lives.

This demographic shift means that every day, more and more people need steady, dependable, and consistent distributions from their investment portfolios and that investor objectives are shifting systematically from capital appreciation to high current income. Unfortunately, in an era of low interest rates, few investors have sufficient retirement savings to fund future withdrawal requirements with a portfolio of government-guaranteed bank deposits or U.S. Treasuries,[1] let alone maintain any expectation of keeping pace with inflation. Investors can seek to address this shortfall by reaching down the scale of fixed-income credit quality (to aptly named junk bonds) or through exposure to other income-producing asset categories that carry high levels of idiosyncratic risk. These options may produce modestly higher levels of current income, but both come at the cost of significantly increased volatility and neither addresses the reality that retirees require high-distribution tools that minimize the risk of idiosyncratic market dislocations.

The average age of retirement in the United States is 63 and the average length of retirement is 18 years, thereby making retirement a long-term liability. We propose that this fundamental shift in investor objective requires a parallel shift in the approach to asset management. Because the 18-year average length of a retirement liability likely will experience multiple market cycles, fixing withdrawal rates and allowing the portfolio's net asset value to fluctuate can help meet an investor's cash-flow needs and still allow time to smooth over market volatility. We believe this is best executed by employing a well-diversified portfolio with the objective of seeking to maximize risk-adjusted returns over time.

Retirees need cash flows to address funding a lifestyle. Holding all else equal the spender may be indifferent to the source of cash flow, which could come from current income, capital gains, or even return of capital. However, all else isn't equal because each is taxed differently, or in the case of return of capital, isn't taxed at all. This being the case, we believe a proper drawdown strategy may incorporate return of capital as part of a distribution plan, particularly if underlying investments, such as exchange-traded funds (ETFs), allow for potential capital growth as they seek to minimize capital gains distributions.

MODERN PORTFOLIO THEORY MEETS RETIREMENT

If the question facing 10,000 new retirees every day is how best to fund an 18-year average liability, the logical next step is to study how these retirees would have fared over a long-term history with numerous market environments.

Three major asset classes serve as the foundation for any investment portfolio: cash, fixed income (or bonds), and equities (or stocks). Many investors also invest in high-yield corporate bonds, which make up a small portion of the fixed income asset class, to add additional income to their portfolios. Although the future performance of each asset class is unknown, historical monthly returns offer perspective regarding asset class performance over

Table 1

30-YEAR PERFORMANCE OF MAJOR ASSET CLASSES

Asset Class	Initial Balance	Final Balance	CAGR	St. Dev.	Best Year	Worst Year	Sharpe Ratio
Cash	$1,000,000	$2,590,497	3.22%	0.73%	8.38%	0.00%	N/A
Fixed Income	$1,000,000	$5,836,214	6.06%	3.88%	18.18%	-2.66%	0.73
Equities	$1,000,000	$17,499,810	10.01%	15.00%	37.45%	-37.02%	0.50
High-Yield Corporate Bonds	$1,000,000	$8,199,120	7.27%	7.10%	39.09%	-21.29%	0.57

Note: Returns are as follows: Cash = one-month Treasury Bills; Fixed Income = Vanguard Total Bond Market Index Fund (VBMFX); Equities = Vanguard 500 Index Fund (VFINX); High-Yield Corporate Bonds = Vanguard High Yield Corporate Bond Fund (VWEHX).
Source: www.portfoliovisualizer.com

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past investment cycles. For the 30-year period January 1987–December 2016, starting with a hypothetical $1 million and assuming reinvestment of all income, the three major asset classes and high-yield corporate bonds achieved the returns shown in table 1.[2]

Although these historical returns are helpful, they do not account for important factors that can impact investors in the decumulation phase of their investing lives. One such factor, inflation, eats into nominal investment returns by reducing the purchasing power of dollars over time. Another factor, the distribution strategy employed by an investor, can dramatically influence portfolio outcomes and, if it's too aggressive relative to investment performance, may lead to a complete drawdown of savings.

Using Monte Carlo simulations, we can study what might happen to investment portfolios in various hypothetical scenarios using historical monthly returns, taking into account historical inflation and a high monthly distribution strategy. A Monte Carlo simulation randomly samples historical monthly returns to produce a range of projected investment outcomes for a given asset class or investment portfolio. The range of projected investment outcomes produced by a Monte Carlo simulation can assist investors in determining the likelihood of an asset class or investment portfolio meeting a given investment objective.

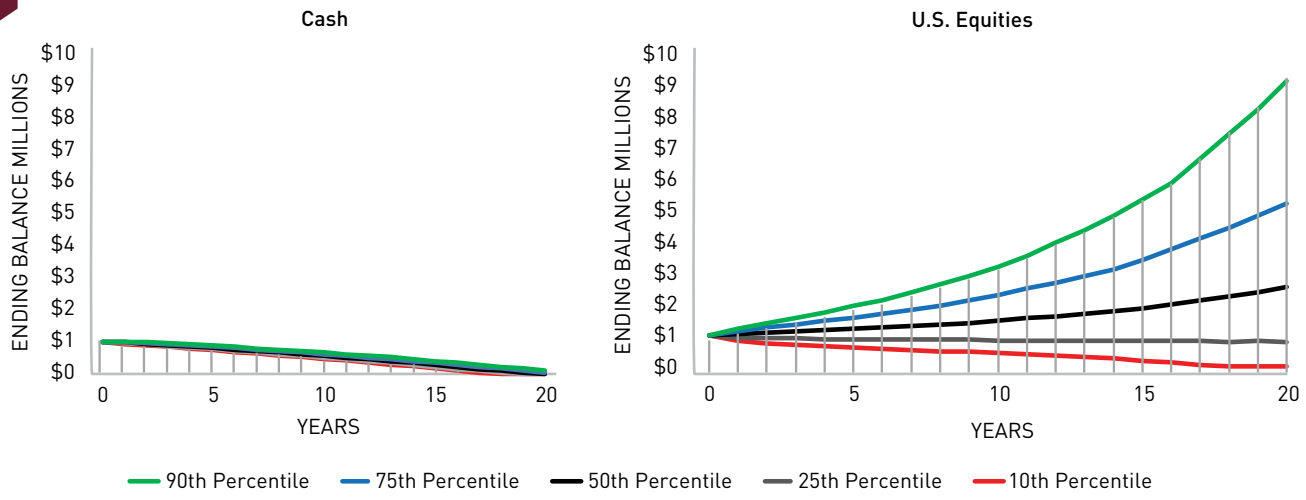
Although a Monte Carlo simulation can offer insight into how asset classes or investment portfolios may perform in a variety of scenarios, the process employs critical assumptions that should be taken into consideration. Most significantly, to the extent it employs actual past returns to simulate future returns, a Monte Carlo simulation implicitly assumes that future return distributions will be like past return distributions, which may not be the case. Sampling from a long period of historical data can help ensure a variety of market cycles are incorporated into historical return data, but there can be no assurance that markets will exhibit similar patterns of performance in the future as in the past.

Using a Monte Carlo simulation tool (available at www.portfoliovisualizer.com), we sought to simulate projected investment outcomes for the three major asset classes described above and a few combinations thereof using historical monthly returns for the 30-year period January 1987–December 2016, an era that encompasses both bull and bear market cycles and multiple periods of extreme market dislocation. The assumptions below are applied for each Monte Carlo simulation:

- $1 million initial portfolio
- $5,833 monthly distribution
- 20-year simulation
- Monthly historical returns
- Single-year model
- Historical inflation

Figure 1

MONTE CARLO SIMULATION COMPARISON CASH AND EQUITIES



Cash	10th Percentile	50th Percentile	90th Percentile
Portfolio End Balance (nominal)	$0.00	$0.00	$83,788
Portfolio End Balance (inflation-adjusted)	$0.00	$0.00	$47,379
Maximum Drawdown	–100.00%	–100.00%	–91.63%

2,843 portfolios out of 10,000 simulated portfolios (28.43%) survived all withdrawals.

U.S. Equities	10th Percentile	50th Percentile	90th Percentile
Portfolio End Balance (nominal)	$0.00	$2,558,156	$9,145,418
Portfolio End Balance (inflation-adjusted)	$0.00	$1,516,106	$5,423,311
Maximum Drawdown	–100.00%	–45.00%	–28.86%

8,811 portfolios out of 10,000 simulated portfolios (88.11%) survived all withdrawals.

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It is important to understand that the projections or other information generated by these Monte Carlo simulations regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. The results of a Monte Carlo simulation may vary with each use and over time.

CASH AND EQUITIES: THE TWO EXTREMES

Cash may lose purchasing power, but it never loses its nominal value.[3] On the other extreme, equities have the highest historical return but may expose investors to significant risk of catastrophic loss. Figure 1 illustrates these potential outcomes in a side-by-side comparison of Monte Carlo simulations for either a 100-percent cash portfolio or a 100-percent equity portfolio where the investor has $1 million in assets and requires a drawdown of $70,000 per year ($5,833 per month).

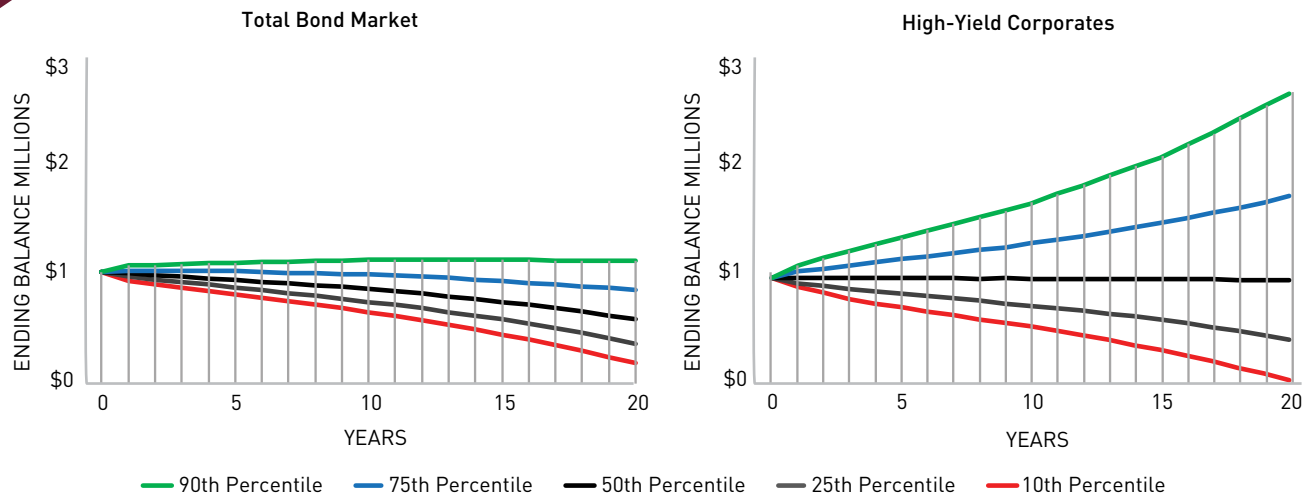
From the perspective of drawdown management, where a 100-percent maximum drawdown means that an investor has exhausted all savings through a combination of market performance and distributions, one can conclude that cash is by far riskier than stocks—even though cash has no risk of loss in nominal terms. For the 100-percent cash portfolio, more than 70 percent of all simulations failed to survive all withdrawals over a 20-year period, but on the equity side only 12 percent failed. To make matters worse, only 10 percent of the cash portfolios had enough residual value to cover drawdowns even into a 21st year. In terms of keeping pace with inflation on top of withdrawals, no cash simulations were able to come close, but the median portfolio of equities exceeded the inflation rate to have an ending inflation-adjusted balance of $1.5 million on top of 20 years of $70,000 annual cash flow. Historical returns suggest investors holding large cash balances will be less likely to take high distributions from savings over an extended period of time.

BONDS AND HIGH YIELD: RISK-RETURN TRADEOFF

Using the same assumptions, a 100-percent bond portfolio was able to achieve the long-term funding goal in 97 percent of simulations, meaning it retained its ability to pay a $70,000 annual distribution over 20 years. However, only 10 percent of bond portfolios in the simulation maintained nominal value and nearly all failed to keep pace with inflation. One approach investors might take is to slide down the credit quality scale to high-yield corporates, or junk bonds, to enhance future returns. Although a 100-percent high-yield bond portfolio demonstrates the potential in simulations to significantly outperform a 100-percent bond portfolio, 10 percent of simulations for the 100-percent high-yield bond portfolio lost all value and failed to meet distribution requirements and only 25 percent

Figure 2

MONTE CARLO SIMULATION COMPARISON TOTAL BOND MARKET AND HIGH-YIELD CORPORATES



Total U.S. Bonds	10th Percentile	50th Percentile	90th Percentile
Portfolio End Balance (nominal)	$167,230	$570,921	$1,108,361
Portfolio End Balance (inflation-adjusted)	$99,914	$338,480	$651,817
Maximum Drawdown	–83.57%	–45.64%	–15.47%

9,743 portfolios out of 10,000 simulated portfolios (97.43%) survived all withdrawals.

High-Yield Corporate Bonds	10th Percentile	50th Percentile	90th Percentile
Portfolio End Balance (nominal)	$1,864	$973,964	$2,796,689
Portfolio End Balance (inflation-adjusted)	$1,103	$577,343	$1,655,048
Maximum Drawdown	–99.82%	–36.22%	–13.50%

9,004 portfolios out of 10,000 simulated portfolios (90.04%) survived all withdrawals.

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were able to maintain the drawdown and achieve an inflation-adjusted end balance equal to the initial $1 million (see figure 2).

A POTENTIALLY SUPERIOR APPROACH

One key insight of modern portfolio theory is that investors with a greater preference for risk historically have earned higher risk-adjusted returns by increasing exposure to a well-diversified portfolio than by investing in a portfolio of concentrated investments in riskier assets. This may be accomplished by increasing the exposure to a diversified portfolio to a multiple of the return using leverage. Investors can add leverage to their portfolios by using margin accounts or by investing in funds that employ leverage (by borrowing to invest in securities). Investors should be aware that leverage increases the expected return of a given portfolio and also increases expected volatility or risk.

BALANCED PORTFOLIOS = HIGHER RISK-ADJUSTED RETURNS

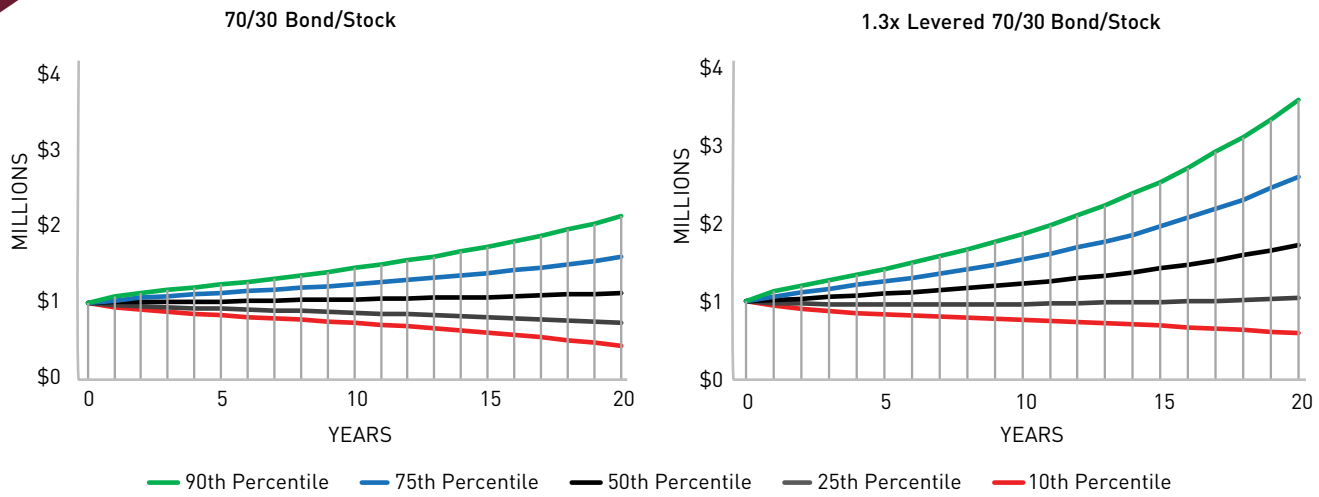
Figure 3 illustrates the performance of an unleveraged and a leveraged (at 1.3x) portfolio made up of 70-percent fixed income and 30-percent equities and shows that diversification provides investors a better overall mix of potential outcomes. Nearly 99 percent of both the 1.0x and 1.3x versions of the 70/30 fixed income/equity portfolio survived all distribution requirements and both experienced lower maximum drawdowns than any of the previous individual asset simulations.

Moreover, although the use of leverage in the 1.3x 70/30 fixed income/equity portfolio did not result in a significantly greater likelihood of the portfolio failing to survive all withdrawals, it did increase its performance compared to the unleveraged version of the portfolio. Not only was the median 1.3x 70/30 fixed income/equity portfolio able to fund the $70,000 annual drawdown while keeping pace with inflation, its inflation-adjusted ending balance of just slightly over the $1-million initial investment bested all but the $1.5-million inflation-adjusted ending balance of the median 100-percent equity portfolio.

The approach does carry uncertainty regarding future returns. Although the Monte Carlo simulation showed the median 1.3x 70/30 fixed income/equity portfolio was able to support the $70,000 distribution and keep pace with inflation, 50 percent of those outcomes were better and 50 percent were worse. Nevertheless, Monte Carlo simulations based on historical performance data suggest that, at least over long holding periods, the use of some leverage in a well-diversified portfolio has the potential to improve investor outcomes without significantly increasing the risk of a portfolio experiencing a complete drawdown even after accounting for a distribution rate of 7 percent on the initial investment.

Figure 3

MONTE CARLO SIMULATION COMPARISON 1X AND 1.3X BALANCED PORTFOLIOS



70/30 Bond/Stock	10th Percentile	50th Percentile	90th Percentile
Portfolio End Balance (nominal)	$433,940	$1,128,950	$2,137,490
Portfolio End Balance (inflation-adjusted)	$259,801	$670,104	$1,265,314
Maximum Drawdown	–58.67%	–20.92%	–10.66%

9,894 portfolios out of 10,000 simulated portfolios (98.94%) survived all withdrawals.

1.3x Levered 70/30 Bond/Stock	10th Percentile	50th Percentile	90th Percentile
Portfolio End Balance (nominal)	$582,381	$1,708,684	$3,577,267
Portfolio End Balance (inflation-adjusted)	$351,307	$1,009,272	$2,112,044
Maximum Drawdown	–50.45%	–20.96%	–11.43%

9,864 portfolios out of 10,000 simulated portfolios (98.64%) survived all withdrawals.

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IMPORTANCE OF LOW-COST LEVERAGE

Because the total return of a portfolio must exceed the cost of leverage to generate value, leveraged investment strategies require access to low-cost debt to maximize effectiveness. Individual investors can add leverage to their portfolios by using a margin account but borrowing costs for margin debt can range as high as 9 percent, making it difficult for individual investors to effectively implement leverage in personal accounts. In contrast to retail investors, institutional investors typically often have access to lower-cost forms of leverage—including swap agreements, bank lines of credit, and securities lending—that can reduce the cost of capital to a spread of 20–80 basis points over the London Interbank Offered Rate (approximately 1–1.5 percent).

Bridging the gap between low-cost institutional access to capital and the retail cost of margin are funds that employ leverage either by borrowing to invest in securities or entering swap agreements with counterparties. By employing leverage at the fund level, these investment funds offer individual investors access to lower-cost debt than could be obtained through retail margin accounts. Closed-end funds historically have been a popular means for individual investors to access leveraged investment strategies, but in recent years there has been a proliferation of mutual funds with labels such as "risk parity" that are variations of this concept. More recently, investors are seeking out leveraged income strategies in the exchange-traded fund (ETF) format, either by investing in leveraged ETFs or ETFs that invest in leveraged closed-end funds.

ILLUSTRATING MODERN PORTFOLIO THEORY

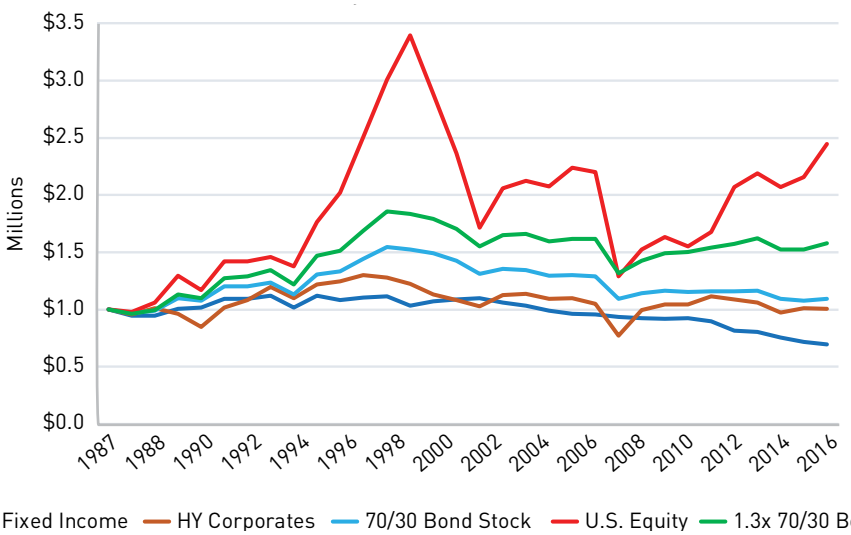
To support the claim that taking a 1.3x position in a well-diversified portfolio is superior to concentrating investments in high-yielding assets with more idiosyncratic risk, we provide a side-by-side comparison of the historical performance of a 1.3x 70/30 fixed income/equity portfolio compared to the to the 100-percent high-yield bond portfolio during January 1987–December 2017 (see figure 4). In exchange for roughly the same experienced volatility, the 1.3x 70/30 total fixed income/equity portfolio earned an average annual internal rate of return 226 basis points greater than the 100-percent high-yield bond portfolio.

In a side-by-side comparison of Monte Carlo simulations of the two portfolios, the dispersion of probable returns appears more attractive (both higher lows and higher highs) for the 1.3x 70/30 fixed income/equity portfolio than for high-yield corporate bonds (see figure 5).

The 50th percentile is also called the median and can be compared across the

Figure 4

PRICE RETURN ASSUMING 7-PERCENT ANNUAL WITHDRAWAL RATE, JANUARY 1987–DECEMBER 2017



Portfolio	Initial	Final	Inflation Adjusted	IRR	Standard Deviation	Best Year	Worst year	Max. Drawdown	Sharpe Ratio
U.S. Fixed Income	$1,000,000	$693,699	$310,925	7.02%	3.83%	18.18%	–2.66%	–39.26%	0.74
HY Corp Bonds	$1,000,000	$1,008,077	$451,852	7.80%	6.99%	39.09%	–21.29%	–45.79%	0.59
70/30 Bond/Stock	$1,000,000	$1,090,475	$488,786	8.80%	5.39%	23.72%	–9.31%	–35.54%	0.81
U.S. Equities	$1,000,000	$2,445,844	$1,096,306	12.31%	14.78%	37.45%	–37.02%	–69.39%	0.54
1.3x 70/30 Bond/Stock	$1,000,000	$1,577,341	$707,015	10.06%	6.98%	29.67%	–12.49%	–36.82%	0.81

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various investment options. Except for the 100-percent equity portfolio, the 1.3x 70/30 fixed income/equity portfolio was the only median portfolio to offer the potential to maintain its inflation-adjusted value while paying out a 7-percent annual distribution on a monthly basis (see table 2).

CHARTING A COURSE IN UNPREDICTABLE MARKETS

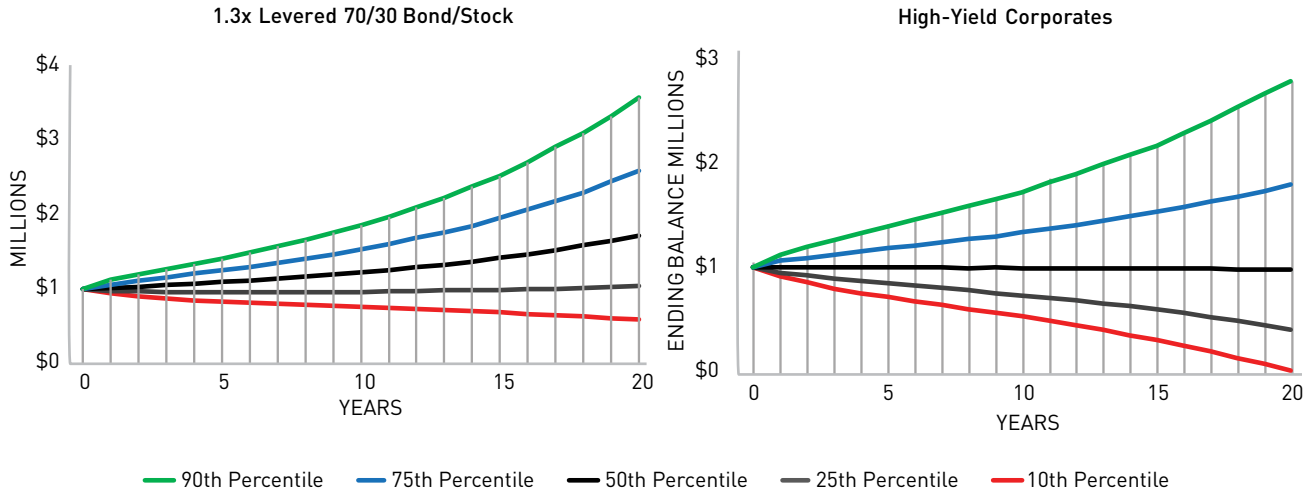
The 1.3x 70/30 fixed income/equity portfolio does have risk, meaning the future value is uncertain, but investors need some risk to have any possibility of generating sufficient future returns to support a portfolio that pays out high distributions. The alternative to not having risk is the 90-day Treasury bill, which currently earns 1.68 percent and would provide an investor experience similar to the 100-percent cash portfolio previously modeled.

Figure 6 illustrates the actual historical performance (as opposed to a Monte Carlo simulation) of a 1.3x 70/30 fixed income/equity portfolio during January 1987–December 2017. The analysis assumes a $500,000 starting value and a 7-percent annual distribution paid monthly (in this case, the distribution rate fluctuates with the monthly value of the portfolio). The vertical axis shows the portfolio's net asset value (NAV) and cumulative distributions.

Clearly an investor's experience is path-dependent. An investor

Figure 5

MONTE CARLO SIMULATION COMPARISON 1.3X BALANCED PORTFOLIO AND HIGH-YIELD CORPORATE BONDS



1.3x Levered 70/30 Bond/Stock	10th Percentile	50th Percentile	90th Percentile
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Portfolio End Balance (inflation-adjusted)	$351,307	$1,009,272	$2,112,044
Maximum Drawdown	–50.45%	–20.96%	–11.43%

9,864 portfolios out of 10,000 simulated portfolios (98.64%) survived all withdrawals.

High-Yield Corporate Bonds	10th Percentile	50th Percentile	90th Percentile
Portfolio End Balance (nominal)	$1,864	$973,964	$2,796,689
Portfolio End Balance (inflation-adjusted)	$1,103	$577,343	$1,655,048
Maximum Drawdown	–99.82%	–36.22%	–13.50%

9,004 portfolios out of 10,000 simulated portfolios (90.04%) survived all withdrawals.

Source: www.portfoliovisualizer.com

Table 2

50TH-PERCENTILE MONTE CARLO SIMULATION SUMMARY STATISTICS

	Portfolio End Balance (nominal)	Portfolio End Balance (inflation-adjusted)	Maximum Drawdown	Maximum Drawdown excluding Withdrawals	% of Portfolios Surviving Withdrawals
Cash	$0.00	$0.00	-100.0%	0.0%	28%
Bonds	$570,921	$388,480	-45.6%	-5.9%	97%
High-Yield Corporate Bonds	$973,964	$577,343	-36.2%	-17.6%	90%
Equities	$2,558,156	$1,516,106	-45.0%	-38.2%	88%
70/30 Fixed Income/Stock	$1,128,950	$670,104	-20.9%	-10.2%	99%
1.3x 70/30 Fixed Income/Stock	$1,708,684	$1,009,272	-21.0%	-14.7%	99%

Source: www.portfoliovisualizer.com

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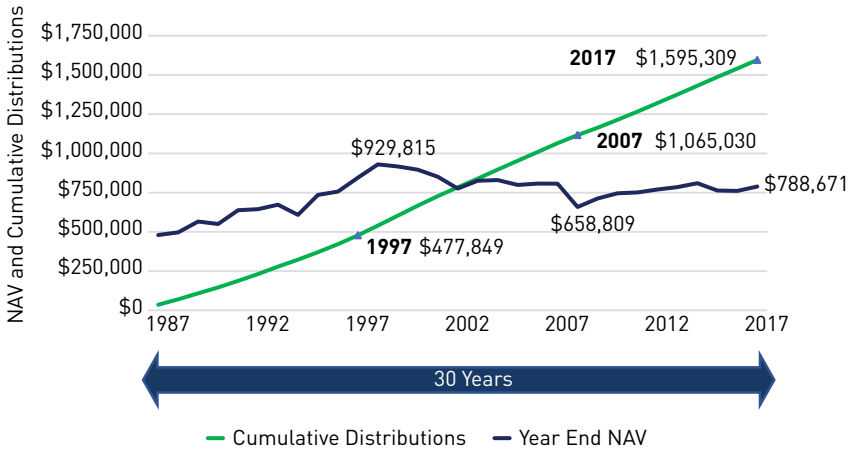
Figure 6

1.3X 70/30 U.S. TOTAL FIXED INCOME/U.S. EQUITY ALLOCATION
WITH 7% ANNUAL DISTRIBUTION (MONTHLY) $500,000 INITIAL INVESTMENT
JANUARY 1987–DECEMBER 2017



Source: www.portfoliovisualizer.com

undertaking this strategy in January 1987 started with $500,000. Over the next 10 years, the portfolio grew to $844,969 (NAV) and the investor received $477,849 of distributions (nearly all the initial investment received in just 10 years). However, an investor entering with $844,969 in 1997 over the next 20 years received just a little more than $1.1 million in distributions but had an ending balance or NAV of only $788,671. The most ill-timed investor bought in 1998 and held until 2008. In that case the investor bought at $930,000, had an ending NAV of $658,809, and received $587,000 in distributions. Although a difficult market led to $271,000 in principal degradation, the balanced approach fared far better than the 100-percent equity portfolio, which lost $432,000 over the same period. In this scenario, buying at the absolute high, it took 17 years to recapture the initial $930,000 investment purely from distributions.

CONCLUSION

The teachings of modern portfolio theory can be effectively deployed to help manage withdrawal requirements for retirees. Research suggests that enhancing risk-adjusted returns may be achieved by modestly increasing the exposure to a well-diversified, balanced portfolio while minimizing the idiosyncratic risk posed by concentrated investments. Combining these principles with a high managed distribution provides an additional potential benefit to investors—minimizing the need to maintain an excessive amount of cash reserves, which is an asset class virtually guaranteed to not keep pace with inflation. By building well-diversified, balanced portfolios of low-cost ETFs and enhancing potential returns, investors seeking high monthly cash flow can minimize idiosyncratic risk posed by concentrated investments and earn higher risk-adjusted returns.

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ENDNOTES

1. The United States government guarantees certain deposits at FDIC-regulated banks, subject to various restrictions, and U.S. Treasuries are backed by the full faith and credit of the United States government.
2. Source for all historical performance data: www. portfoliovisualizer.com.
3. "Nominal value" refers to the face value of cash without considering any loss of value due to inflation.

Notes on simulations and results: Past performance is not a guarantee of future returns and data and other errors may exist. CAGR = Compound Annual Growth Rate. IRR = Internal Rate of Return taking into account the periodic contributions/withdrawals. St Dev is a number used to tell how measurements for a group are spread out from the average (mean) or expected value. A low standard deviation means that most of the numbers are very close to the average. A high standard deviation means that the numbers are spread out. Figures presented herein are the annualized standard deviation of monthly returns. Sharpe ratio is a risk-adjusted measure of performance that considers the volatility of an investment's returns. A higher Sharpe ratio indicates a greater return per unit of volatility. It is calculated and annualized from monthly excess returns over the risk-free rate (1-month T-bills). Drawdowns are calculated based on monthly returns. Monthly return series of the selected benchmark is used for results comparisons. The results include monthly rebalancing of portfolio assets to match the specified allocation. The results use total return and assume that all dividends and distributions are reinvested. Taxes and transaction fees are not included. Source: PortfolioVisualizer © Silicon Cloud Technologies LLC 2013-2017.

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