RESEARCH

Researching Retirement: The Impact of Inflation, Interest Rates, and Market Risks

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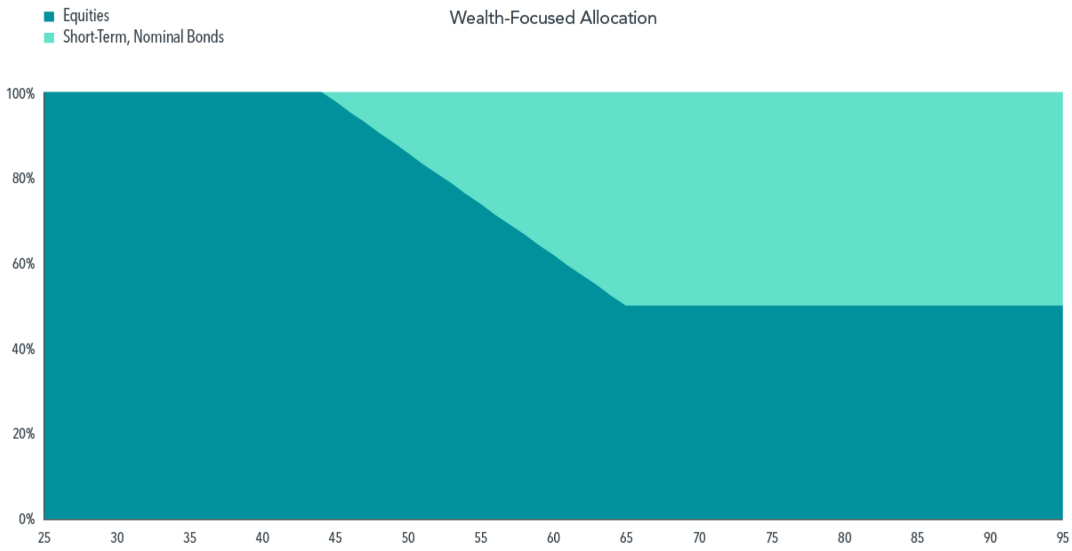
KEY TAKEAWAYS

- Retirees investing in short-term, nominal fixed income are more vulnerable to inflation increases or interest rate drops.
- An income-focused allocation can provide more-predictable retirement consumption by addressing both risks.
- Poor stock market returns early in retirement drastically increase the probability of running out of assets later in life, especially for retirement glide paths with a high equity landing point.

How can retirees allocate assets to support their consumption, even in challenging times? A previous post, based on our recent research paper, discussed how an income-focused asset allocation can generate similar retirement income to a wealth-focused allocation while offering better risk management. Those results were based on simulations including both good and bad scenarios.[1] We now focus on performance in three bad scenarios: poor stock market returns, increases in inflation, and decreases in interest rates.

We consider an investor who starts making regular contributions to a retirement account at age 25 and who retires at age 65. At 65, the investor plans for a 30-year retirement and spends the same amount (adjusted for inflation) every year. We look at two allocations: a wealth-focused allocation with a high equity landing point (50%) and an income-focused allocation with a moderate equity landing point (25%).[2] **Exhibit 1** shows the equity percentage for the allocations at different ages. The wealth-focused allocation invests the remaining assets in short-term, nominal bonds, while the income-focused strategy invests in a liability-driven investment (LDI) portfolio of inflation-indexed bonds.

Exhibit 1
To Retirement and Beyond: Asset Allocations Over the Life Cycle



Our results are based on 100,000 simulations. Bad scenarios are defined as the worst 10% of these simulations, based on the economic environment in the first five years of retirement, as defined below. Each condition leads to a different set of 10,000 simulations.

- **Lowest average stock market returns.** Poor stock market returns, especially when combined with fixed withdrawals, can cause the investor to run out of assets early.
- **Largest unexpected increase in inflation.** An unexpected increase in inflation

reduces the real returns on nominal bonds.

- **Largest unexpected decrease in interest rates**, defined as a parallel shift of the yield curve. A drop in interest rates leads to a capital gain on existing bond positions, while reducing expected returns. Lower expected returns can reduce the ability of the portfolio to meet future liabilities.

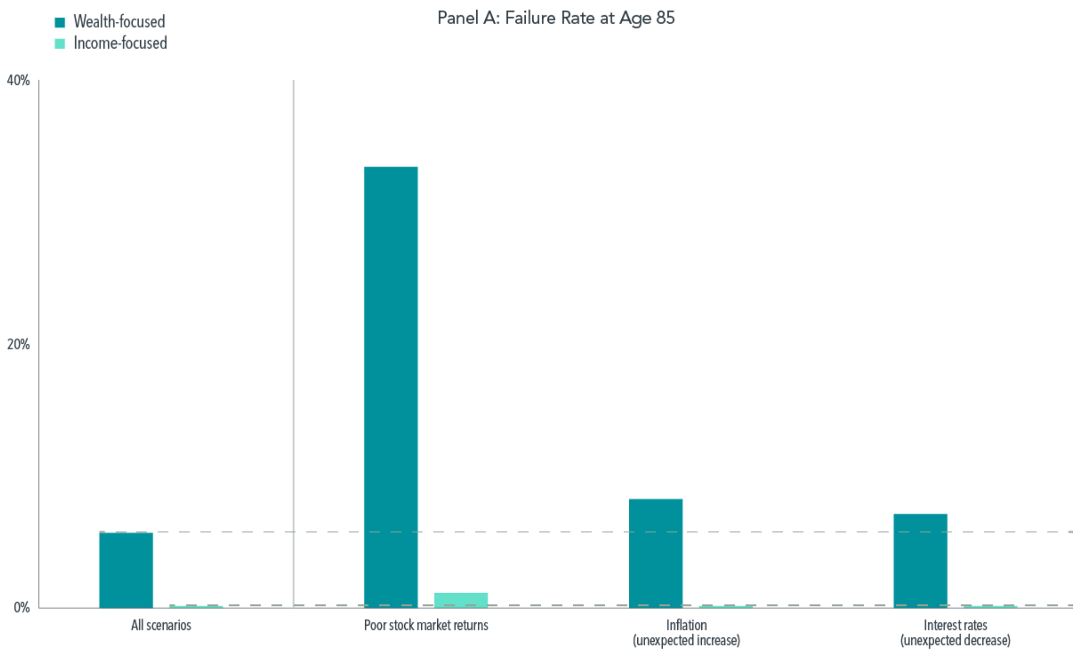
Exhibit 2 shows the probability of running out of assets by age 85 and 95 under the two allocations. In Panel A, the failure rate at 85 is 5.7% for the wealth-focused allocation, compared to 0.1% for the income-focused allocation. When stock market returns are poor early in retirement, the failure rate for the wealth-focused allocation is a much higher 33.7%. Our hypothetical investor now has a one-third probability of running out of assets 20 years into retirement, even though she initially planned for a 30-year stream of income. By contrast, the failure rate on the income-focused allocation would be a mere 1.2%, even amid those low stock market returns.

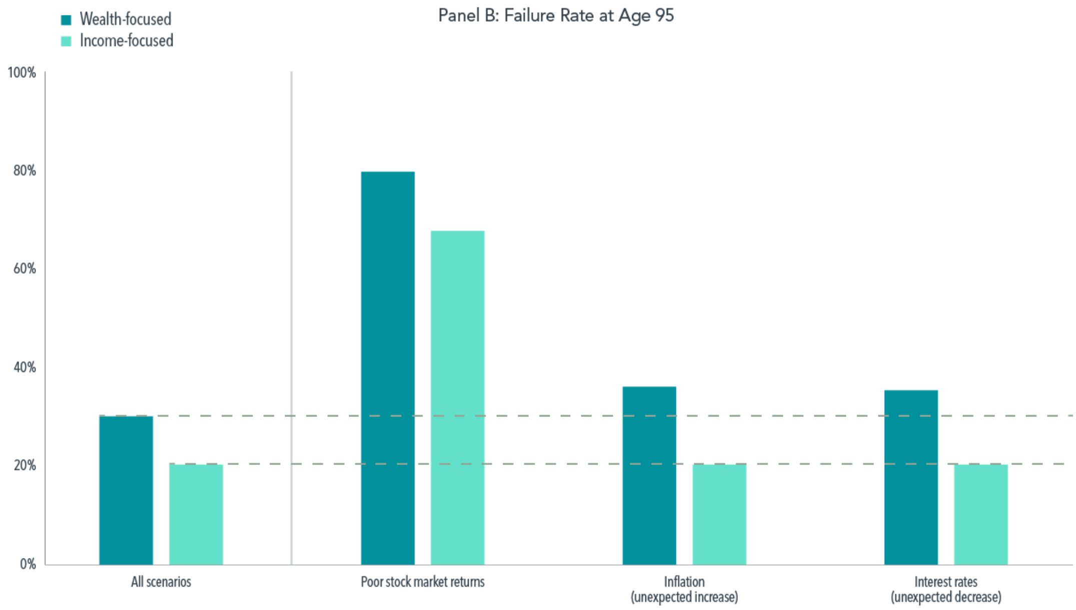
Inflation and interest-rate surprises matter too. While the failure rate is 5.7% in all simulations, it is 8.4% in simulations with a large inflation increase and 7.2% in simulations with a large interest rate drop. The failure rate of the income-focused allocation remains 0.1% in both of these "bad" scenarios. This is a direct benefit of the liability-driven approach to fixed income, which seeks to immunize the income that the portfolio can support from changes in interest rates and inflation.

Exhibit 2

Stress Test

Failure rates for the two allocations in different scenarios





Hypothetical performance is no guarantee of future results.

For illustrative purposes only. All simulations are based on a hypothetical probability distribution, not historical data. "All scenarios" measures the failure rate in 100,000 simulations. "Poor stock returns," "Inflation," and "Interest rates" measure the failure rate in the 10,000 simulations with the worst stock market returns, inflation increase, and interest rate decrease, respectively, based on the first five years of retirement. See Appendix for details.

Turning our attention to the high-longevity scenario in Panel B, we see that the baseline failure rates at age 95 for the wealth-focused and income-focused allocations are 30.1% and 20.2%, respectively. Narrowing to the worst 10% of outcomes, the failure rate for the wealth-focused allocation is 36.3% in the subset tied to inflation increases and 35.3% in the subset linked to interest rate drops. Again, failure rates for the income-focused allocation are not higher in bad inflation or interest-rate scenarios. Finally, the failure rate for both allocations is very high when stock market returns in the first five years of retirement are in the worst 10% of possible outcomes. Yet when the income-focused allocation runs out of assets, it is more likely to do so near the end of retirement, while the wealth-focused allocation has a significant chance of failing within 20 years (as shown in Panel A).

Our results suggest that, while not bulletproof, an income-focused allocation offers strong risk management even under adverse economic conditions. This downside protection can be attractive to retirees in its own right, but it is especially valuable to workers who are forced to retire early. Workers may have to retire early for both personal reasons (such as health issues) or because of poor economic conditions (if mass layoffs occur, for instance). In these circumstances, downside risk management is especially important: having one's retirement readiness derailed right after being laid off can have life-altering consequences. An income-focused allocation can help retirees stay on a sound financial footing in challenging times—and have greater confidence when times are good.

Stay tuned for the next and final blog post of the series, which will look at the *performance of different retirement spending rules. Click here to view the previous blog post in this series.*

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1. See Appendix for details.
2. We omit the wealth-focused allocation with a moderate equity landing point because it underperforms the income-focused allocation on all metrics.

APPENDIX

All returns are based on computer-generated random numbers.

A hypothetical investor makes $12,500 deposits adjusted for inflation at the beginning of each year, from age 25 to 64 inclusively. Assets are invested according to the glide paths shown in Exhibit 1. Allocations are rebalanced annually. The balance evolves based on returns drawn from a simulated probability distribution. At retirement, the investor divides her current balance by the present value of 30 inflation-indexed payments to determine her initial spending. The present value is based on inflation-indexed yields from a simulated yield curve.

Real (net of inflation) stock returns are 5% on average with a standard deviation of 20%. Inflation follows an AR(1) process with a mean of 2% and a 1.5% standard deviation. Real yields are modeled according to a three-factor dynamic Nelson-Siegel model (see Appendix A in the paper for details). Instantaneous real yields are 1% on average with a standard deviation of 1.5%, while long-term real yields have a 2% mean and 1% standard deviation. Nominal yields are derived from real yields and the expected inflation implied by the model. All bond returns are derived from the evolution of the corresponding yields.

The results presented in this post are sensitive both to modeling assumptions and the parameter values chosen to calibrate the model. Section 2 and Appendix A in the paper provide a more complete description of the simulation methodology.

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