

LIFETIME FUNDING WITH HORIZON RISK

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Asset allocation is the primary driver of portfolio return and risk. Our April 2014 research article, “Illuminating the Returns of Elite Investors,” showed this is true even for elite investors. Asset allocation traditionally falls into one of two camps: tactical or strategic. Tactical asset allocators believe short-term market returns are predictable, and they actively reweight their portfolios in the attempt to exploit perceived dislocations. Strategic asset allocators hold that diversified risk and return are related. They are focused on maintaining robust diversification and a consistent return-to- risk profile.

Goals-based asset allocation is an advancement in strategic asset allocation where risk is dynamically mapped based on time-varying changes in lifetime goals, funding status, risk tolerance and the mean- reverting properties of risky assets. In this research article, we extend concepts from our research paper, “Dynamic Asset Allocation With Horizon Risk,” published in the peer-reviewed *Journal of Wealth Management*.

We have shown that cash flow yields have some power in predicting future equity returns over the five-year investment horizon.¹ This suggests that there can be a higher expected return after a period of poor returns and a lower expected return after a period of high returns (i.e., mean-reverting properties). The five-year capital market assumptions that feed Northern Trust’s strategic asset allocation process are not constant, but time-varying, to capture this phenomenon.

The mean-reverting properties of risky assets also manifest as reduced risk over longer investment horizons. This can be exploited by long-term investors with discrete financial goals. Exhibit 1 compares the standard

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¹ See our May 2013 research article, “Are Equity Returns Predictable?”

deviation (volatility) and conditional value at risk (CVaR, or tail risk) of U.S. equity and fixed-income returns calculated from return distributions formed from rolling one- to 10-year inflation-adjusted returns from 1926 to 2013.² We are interested in real, inflation-adjusted returns because these are the consumable returns investors earn. The relative risk ratio in the top panel of Exhibit 1 is the standard deviation of real equity returns divided by the standard deviation of real, fixed-income returns. It scales the relative risk of equities to fixed income for each investment horizon.

Traditional approaches to asset allocation assume returns are independent (not mean-reverting) and therefore the relative risk ratio — and in turn, portfolio allocations — are the same regardless of the investment horizon.

EXHIBIT 1: REAL EQUITY AND FIXED INCOME RISK AT 1- TO 10-YEAR INVESTMENT HORIZONS

Standard Deviation	Investment Horizon (Years)									
	1	2	3	4	5	6	7	8	9	10
Equity	21.9%	14.9%	11.7%	9.8%	8.3%	7.2%	6.5%	6.1%	5.8%	5.6%
Fixed Income	6.6%	5.3%	4.7%	4.3%	4.0%	3.8%	3.6%	3.4%	3.3%	3.1%
Relative Risk Ratio	3.3	2.8	2.5	2.3	2.1	1.9	1.8	1.8	1.8	1.8

CVaR (5%)										
Equity	-35.4%	-25.2%	-18.1%	-11.7%	-8.9%	-6.6%	-4.6%	-3.9%	-4.3%	-3.5%
Fixed Income	10.8%	-8.9%	-7.3%	-6.0%	-5.0%	-4.9%	-4.7%	-4.3%	-4.0%	-3.7%

However, the top panel in Exhibit 1 shows that the relative risk ratio is not stationary but decreases with the investment horizon up to seven years before stabilizing. This demonstrates the diminishing risk of equities relative to fixed income with longer investment horizons. The bottom panel of Exhibit 1 shows the same results when measuring CVaR — the risk of extreme loss. CVaR as presented in Exhibit 1 is the weighted average of the lowest 5% of annualized return outcomes. Comparisons of CVaR offer a view of relative shortfall risk, which is the probability of not achieving a minimum investment value by the end of the investment horizon. CVaRs also converge at about the seven-year investment horizon.

Based on this empirical relationship, one interpretation may be that important financial goals requiring funding within the next seven years might be aligned with safe assets like cash and quality fixed income while goals further in the future could be funded with risky assets such as higher-returning equities. Clearly, to benefit from this phenomenon, investors must consider what their investment portfolios are intended to fund and when that funding will occur, which naturally leads to a goals-based asset allocation and wealth management framework.

² We use the Ibbotson U.S. Large Stock index for U.S. equity returns and Ibbotson Intermediate-Term Government Bonds index for fixed-income returns. Source: Morningstar.

The results in Exhibit 1 should affect portfolio selection, but are not considered in traditional asset allocation. Exhibit 2 compares three middle-risk portfolios along the historical efficient frontier (1926 to 2013). The benchmark 60/40 portfolio (one-year horizon) results from a conventional optimization that uses real risk and return inputs annualized from monthly return data. The five- and 10-year horizon portfolios result from optimizations that use risk and return inputs calculated from real return distributions formed over five- and 10-year rolling investment horizons. The portfolios show larger allocations to equity as the investment horizon increases.

Goals-based, lifecycle glide paths are fully customized to each investor's unique circumstances.

EXHIBIT 2: MEDIAN RISK PORTFOLIO AT DIFFERENT INVESTMENT HORIZONS

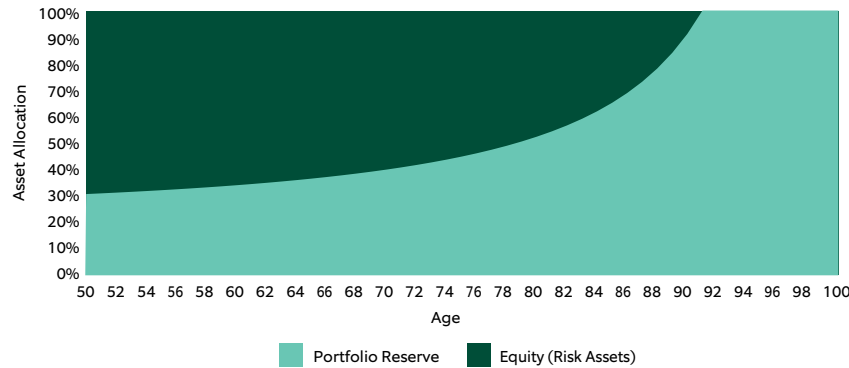
	1-Year Horizon	5-Year Horizon	10-Year Horizon
Equity	60%	69%	72%
Fixed Income	40%	31%	28%

We note, however, that the results in Exhibit 2 are based on maintaining constant allocations over the full investment horizon. Behaviorally, sustaining this heavier equity bias becomes increasingly less tenable for most investors as the funding date approaches. They pocket realized returns and refresh their views of risk based on the remaining shorter investment horizon.

Exhibits 1 and 2 both show that the largest reductions in the relative risk of equities versus fixed income occur in the earlier years, and the incremental benefit diminishes with each additional year. This presents the opportunity to develop dynamic asset allocation methods built on glide paths that exploit horizon risk to more optimally fund financial goals through time.

These glide paths can be customized to unique risk tolerances through intuitive expressions of risk preference, which have the added benefit of mitigating well-documented behavioral biases. For example, a designated reserve made up of safe (risk-control) assets, including cash, investment-grade and inflation-protected bonds can be used to protect core lifetime consumption through periods of capital market distress for a desired number of years. Exhibit 3 illustrates the dynamic asset allocation for a 50-year-old investor who wants to protect 10 years of core consumption with a dedicated reserve of safe assets. This example is based on a set of generic assumptions, whereas in practice these goals-based, lifecycle glide paths are fully customized to each investor's unique circumstances.

EXHIBIT 3: CUSTOMIZABLE GOALS-BASED, DYNAMIC ASSET ALLOCATION FOR PERSONAL CONSUMPTION



Assets should serve the purpose of funding discrete goals, and an intentional approach will do so more optimally.

Ultimately, private investors live finite lives and will allocate their wealth over the course of a lifetime to either personal consumption or as gifts to family and philanthropies. From this perspective, assets should serve the purpose of funding discrete goals, and an intentional approach will do so more optimally. Goals-based asset allocation is integral to Goals Driven Wealth Management at Northern Trust. It is built on custom glide paths tailored to each investor based on his or her unique set of time-varying lifetime goals, the funding status of those goals, risk tolerances around each goal and the benefits of reduced horizon risk with time. We think it is the future of wealth management.

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