

# A NOTE ON SECURING HIGH-PRIORITY GOALS

Securing high-priority goals requires a goal-aligned portfolio that has adequate liquidity, sufficient inflation protection and similar average maturity (or duration) to that of planned goals. Over many years, the risk of the portfolio to securely fund goals can be measured by the dispersion of the portfolio's future surplus or shortfall, after all goals have been funded. We can measure this amount by estimating the present value of goals based on initial yields and then measuring the dollars of surplus or shortfall in the portfolio after funding goals with realized returns.

Our prior analysis on "[Securing High-Priority Goals](#)" tested for the optimal mix of TIPS and Municipal bonds, using expected risk and return based on IPC Capital Market Assumptions for 1-10 year TIPS and 1-10 year Munis. We selected the 10-year maturity indices because their average maturities match the ten-year average Reserve-aligned lifestyle goal across GDWM clients.

In this follow-on note, we illustrate the minimum variance concept of goal funding with the initial yields and subsequent realized returns of various risk-control benchmarks. This provides a measure of their historical dependability for funding a 10-year lifestyle annuity goal. We use various Bloomberg Barclays bond indices which differ based on average maturity (1-3 Month T-bills, 1-10 Year Muni and 22+ Year Muni) and average credit quality (High-Grade, Low Investment-Grade and Below Investment-Grade).

In our test, the value of the portfolio is equal to the present value of the 10-year annuity discounted by the yield of a bond index one year prior to the first annuity distribution (Equation 1). For each year of the annuity, the portfolio realizes that year's index return and then makes a distribution at the end of the year to fund consumption (Equation 2). After completing this process 10 times for each annuity payment, we measure the remaining portfolio value for each dollar of the annual annuity. We run the analysis for all 10-year periods beginning with the common

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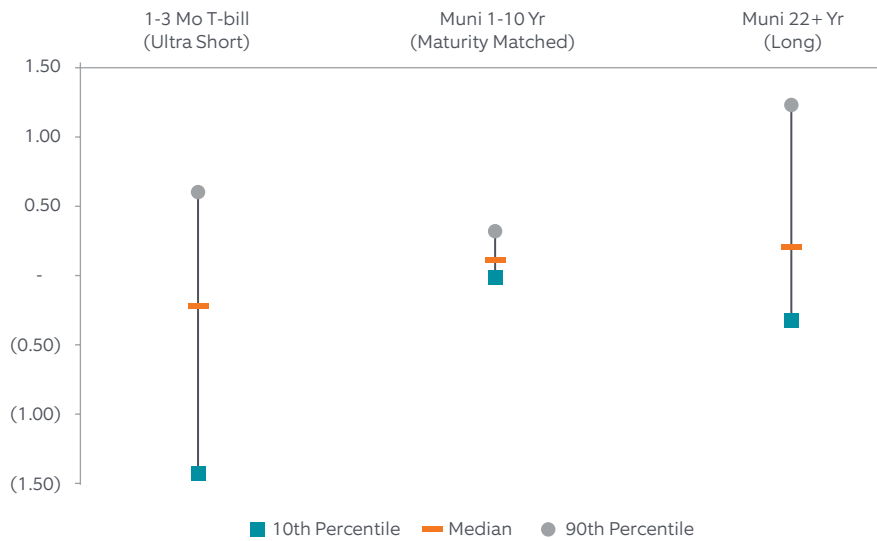
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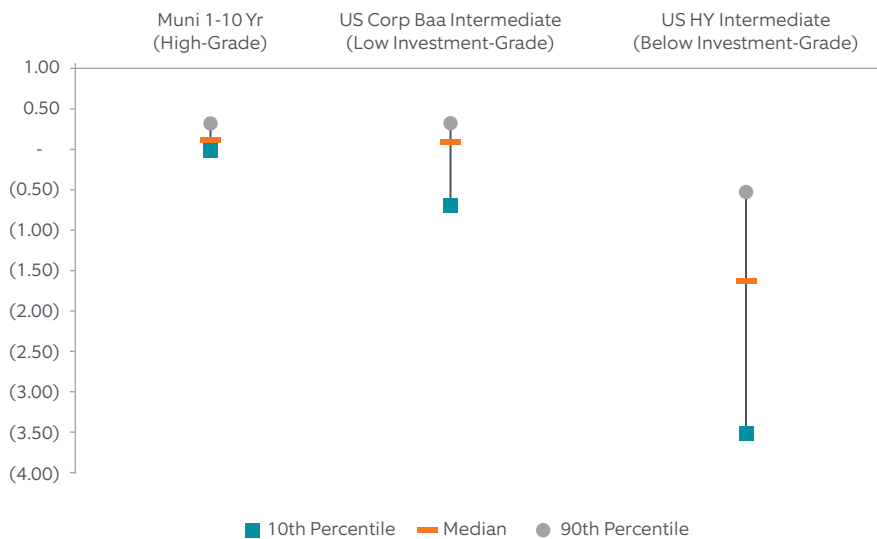
inception for the indices in 1994 (1994-2003) and continue until the final 10-year period ending in 2020 (2011-2020). For these eighteen 10-year annuities, we provide the median and the top and bottom 10% of outcomes in the below exhibit.

**EXHIBIT 1: FUTURE SURPLUS/SHORTFALL OF A 10-YEAR ANNUITY (Per Dollar of Goals)**

*Average Maturity Scenarios*



*Average Credit Quality Scenarios*



From an asset-only perspective, 1-3 Month T-bills do indeed have lowest total risk and return. As a result, in a goals-based approach funding annuities based on the returns of this index requires the highest present value. Even with the highest starting value and the lowest total risk, the average maturity chart shows this scenario has the largest dispersion and drawdown (-\$1.43 10% outcome) due to reinvestment risk. Cash is not the lowest risk asset when funding multi-year goals.

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The 1-10 year Muni index shows that beginning of period yield is a good predictor of total returns and thus the benchmark has near-zero surplus or shortfall on average without much dispersion. Maturity alignment with high-grade bonds is the lowest risk goal-funding asset. Reaching for yield by extending to longer maturities of the 22+ year Muni index failed to successfully fund all goals in 40% of the scenarios, even in a period of falling interest rates, which benefited its upside dispersion in this illustration.

While current yields predict future returns for high-grade bonds, they are less predictive for indices with lower-rated bonds which carry higher credit, or default risk. Each of the indices in the Average Credit Quality chart has an average maturity that is comparable to the average maturity of the goals. As credit quality decreases, however, the dependability of the beginning portfolio value to sufficiently fund the 10-year annuity decreases. The downside scenarios are particularly problematic for goals-based investors who reached for return but were left with insufficient funds and in some instances were unable to fund multiple years of goals.

For goals-based investors, the purpose of assets is to successfully fund goals. These investors should align the attributes of their risk-control assets with those of the goals they are intended to fund. The most dependable assets for funding high-priority goals is a portfolio of high-quality bonds with an average maturity (or duration) that matches the average timing of the goals.

APPENDIX

EQUATION 1: PRESENT VALUE OF LIFESTYLE ANNUITY

$$PV_{LA} = \sum_{P=1}^{10} CF_P / (1 + i_{BM})^P$$

$PV_{LA}$  is the present value of the lifestyle annuity;

$CF_P$  is the cash outflow associated with period P;

$i_{BM}$  is the yield on the benchmark index at time  $P_0$

EQUATION 2: VALUE OF TERMINAL SURPLUS/SHORTFALL

$$V_{TS} = PV_{LA1} (1 + r_{BM1}) - CF_1 \dots PV_{LA10} (1 + r_{BM10}) - CF_{10}$$

$PV_{LAP}$  is the present value of the lifestyle annuity at time P;

$r_{BMP}$  is the return on the benchmark index at time P

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