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MANAGER INSIGHT

CASH FLOW GENERATION FOR PUBLIC DB PLANS:

A Long-Term Strategy for Near-Term Liquidity

WRITTEN BY

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The core objective of any public pension plan is to ensure it can make regular benefit payments. It's a straightforward objective, but the execution tends to be considerably harder.

Many public plans contend with generally lower funding ratios, high return targets and competing stakeholder interests—factors that have led many investment committees to focus on asset returns above liquidity considerations. Historically, plans have tended to sell appreciated liquid assets to service payments. But more recently, volatility and changing cross-asset

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correlations have increased the risk of having to sell depreciated assets and incur permanent losses. The liquidity challenge is compounded for public funds that implemented private investment programs and for maturing plans receiving reduced contributions. We believe cash flow generating strategies can help public pensions potentially improve their liquidity positioning and help meet their objectives in a range of environments. In our view, higher fixed income yields have created an interesting entry point for cash flow generating strategies and currently make them an attractive alternative to cash and other liquidity sources including core fixed income and passive equity.

Key Takeaways

- Liquidity risk is often underappreciated. Recent shifts to private investment programs and reduced contributions in mature public plans may exacerbate liquidity challenges.
- Cash flow generating allocations are designed to deliver coupon and maturity payments on a predictable schedule. This can help provide liquidity in a variety of market conditions and may reduce forced sales in volatile periods. They may also offer a yield advantage over other short-term liquidity strategies.
- The higher yields and inverted yield curve of current fixed income markets could potentially provide an interesting entry point for this type of strategy.

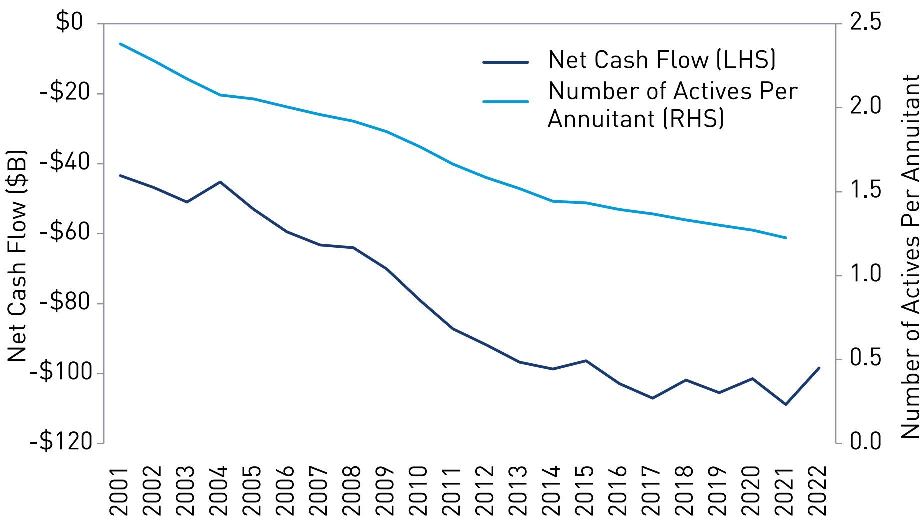
Public Plan Cash Flow Challenges

Public plan sponsors face a multitude of challenges as they seek to keep plans on a path toward fully funded status while continuing to pay benefits. Among these are the decreasing number of active participants per annuitant and the growing net negative cash flow trend.

The chart on the next page shows these two factors over time. First, public plans have been trending toward a ratio of 1 active participant to each annuitant, which is significantly below the 2.4 ratio reported in 2001. Second, the total dollar amount of net cash flows (i.e., incoming contributions less expected benefit payments) has grown increasingly negative, falling to approximately -$100 billion in 2022. Together, these factors have put more pressure on these types of investment portfolios to maintain sufficient liquidity. We believe these trends are likely to continue in the future.

PUBLIC PLAN DATA

Source: Public Plans Database (PPD), https://publicplansdata.org/quick-facts/national/. Number of Actives per Annuitant (RHS) data is as of 31 December 2021. Net Cash Flow (LHS) data is as of 31 December 2022.



Note: The most recent year of data contains virtually all the plans in the PPD. National data averages are weighted by plan size. This material is for informational purposes only and should not be construed as investment advice. Information obtained from outside sources is believed to be correct, but Loomis Sayles cannot guarantee its accuracy.

In Good Times and In Bad

Beyond contributions from employers and employees (which, as noted, have been in decline), most plan sponsors meet their monthly benefit payment needs in a variety of ways, which typically include:

1. Maintaining or replenishing a cash allocation
2. Ad-hoc rebalancing/selling from managers across the portfolio
3. Using cash generated from a maturing private investments allocation (if applicable)

While these methods are generally sufficient in normal market environments, sourcing cash is not always seamless during times of market stress. We only have to look back to the market volatility of March 2020 to see how difficult it can be for plans to find cash for benefit payments. As equities and credit sold off and US Treasurys—widely considered one of world's most liquid markets—became challenging to sell, plan sponsors scrambled to come up with cash. In 2022, as most asset classes experienced negative returns, some plans once again became forced sellers at an inopportune time. Fast forward to the present, and we are starting to see some cracks in US Treasury market liquidity compared to recent years.

A cash flow generating allocation could potentially ease some of the strain during similarly volatile periods by delivering coupon and maturity payments on a predictable schedule and reducing the magnitude of forced sales. As long as the bonds in the cash flow generating allocation remain "money good" and do not default, they can deliver much-needed cash flows to help meet benefit payments. We feel this highlights why deep credit research at the individual security level is pivotal in cash flow generation strategy outcomes.

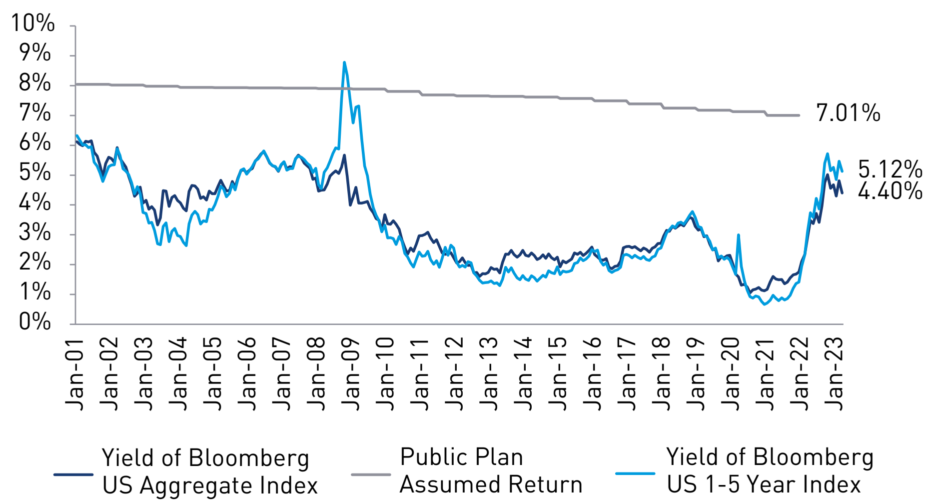
A Note on Terminology

The pension industry uses a wide range of terminology for this type of structure from cash flow driven investing (CDI) to cash flow matching (CFM) to cash flow generation and bond ladders. While there can be nuances in implementation, we view all of these approaches as fixed income allocations designed to help improve liquidity needs with periodic, targeted coupon and maturity payments.

In addition to stress scenarios, we believe a cash flow generating strategy can be a favorable approach in normal market environments. To the extent that the strategy can limit defaults, plan sponsors can theoretically view the initial yield at investment as a good proxy for the potential annual return of the portfolio in the future. In many cases, the use of BBB-rated credits and the inverted yield curve may enable yields on cash flow generating portfolios to surpass yields on typical core fixed income allocations. Further, as public defined benefit plans have lowered assumed rates of return and with market-available rates recently rising, the drag on the potential total portfolio return from a cash flow generating portfolio has declined significantly. The chart below shows that recent fixed income market yields, particularly at the front end of the curve, are competitive relative to the assumed return rate used by public funds.

PUBLIC PLAN ASSUMED RETURN VS. FIXED INCOME MARKET YIELDS

Source: Census of Governments; PENDAT; Public Plans Database, Bloomberg. Public Plan assumed return as of 31 December 2022. Bloomberg Index yields as of 31 March 2023. For public plan assumed return: national data averages are weighted by plan size.



The chart presented above is shown for illustrative purposes only. *Some or all of the information on this chart may be dated, and, therefore, should not be the basis to purchase or sell any securities. The information is not intended to represent any actual portfolio managed by Loomis Sayles. Indices are unmanaged and do not incur fees. It is not possible to invest directly in an index. Information obtained from outside sources is believed to be correct, but Loomis Sayles cannot guarantee its accuracy*

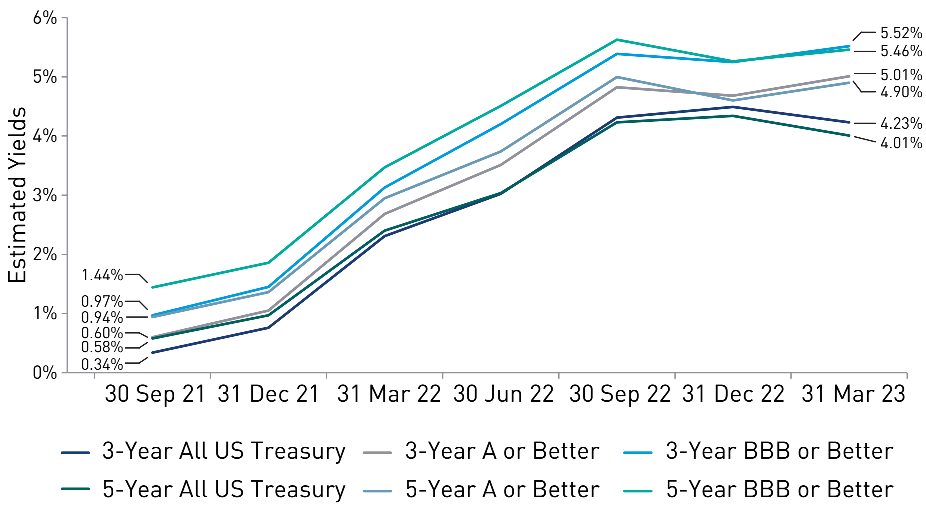
Past performance is no guarantee of future results.

Cash Flow Generating Strategies in Today's Market Environment

In our view, current fixed income markets provide a potentially interesting entry point for this type of strategy, particularly when compared to yields in the latter part of 2021. The chart below shows a sampling of hypothetical cash flow generating portfolio yields of varying quality since 30 September 2021. As of 31 March 2023, yields were estimated to be roughly 4.0%-4.3% for a hypothetical US Treasury-only cash flow generating portfolio and 4.9%-5.5% for hypothetical cash flow generating portfolios that include investment grade credit (rated A or better, or BBB or better). In general, these yields are approximately 3.5%-4.0% higher than they were 18 months ago.

HYPOTHETICAL PORTFOLIO CASH FLOW GENERATING YIELDS BASED ON A SAMPLE PLAN

Data and analysis from 30 September 2021 to 31 March 2023. Source: Bloomberg.



Hypothetical portfolios created by Loomis Sayles based on a sample plan. Information is for illustrative purposes only and is subject to change. For more information on the hypothetical scenarios shown, please reference disclosure regarding "defining hypothetical portfolios" at the end of this paper. The use of hypothetical scenarios has inherent limitations. They are heavily dependent on the assumptions used and do not take into account actual trading or market conditions. The portfolios constructed were created by projecting cash flows from the universe of bonds available on the date of analysis, which includes assumptions about bonds cash flows that may not materialize in actual accounts. The hypothetical portfolios are intended to convey one measure of the characteristics of an asset class or combination of asset classes, and a different analysis may yield different results. Material market and economic factors may affect investment decisions differently when managers are investing actual client assets.

The sample plan was created using the Russell Cash Flow Generator, which produces a generic set of pension liabilities. Analysis was done using the assumptions of a plan size of $1 billion, discount rate of 5.29%, which is the discount rate for the calendar fiscal year end, using a 3-year and 5-year vintage cash flow generating scheme.

The ability of an actual portfolio to deliver the required cash flows is not guaranteed and is subject to a variety of factors including, but not limited to, the availability of bonds, active management, and trading, transaction costs, default risk, reinvestment risk, rebalancing risk and liquidity risk.

Any investment that has the possibility for profits also has the possibility of losses, including the loss of principal.

Please see the Disclosure Statement and Model Description at the end of this paper for additional important information.

The inverted yield curve is another aspect currently in favor of cash flow generating strategies. In general, a flatter or inverted yield curve means there is less incentive to invest in longer-duration securities when a similar yield can be obtained by staying shorter on the curve. A cash flow generating strategy will typically target fixed income securities on the front end of the curve, which would limit the duration exposure, particularly as compared to typical market benchmarks (e.g., the Bloomberg US Aggregate Index).

Factors for Constructing Cash Flow Generating Portfolios

We believe most public pension plans can benefit from considering a cash flow generating strategy as a part of their liquidity or fixed income bucket. In practice, how are these portfolios constructed? Below are a few of the key factors:

	TYPICAL STARTING POINT	COMMENT
TIME HORIZON	2 to 5 years	• Less than 2 years may mean more reliance on US Treasurys and more frequent replenishing of the structure • Longer than 5 years is doable but may present challenges in terms of the number of bonds available
SECTORS	Corporates and Treasurys	• Corporates provide cash flow certainty and potential spread return while Treasurys help provide liquidity for the first 6-12 months • Securitized assets can be considered if there is flexibility in the cash flow certainty objective
QUALITY	Investment Grade	• Use of BBB sector typically offers a reasonable tradeoff between yield and default risk • Incorporating high yield may provide incremental return but with the expense of higher default risk

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Any investment that has the possibility for profits also has the possibility of losses, including the loss of principal.

Fit Within Total Plan Strategy

As with any investment strategy, plan sponsors need to determine how a cash flow generating strategy could fit within the plan's overall asset allocation. This includes considerations like how the strategy will be funded, how it could impact potential returns and opportunity costs.

- If the cash flow generation strategy is funded from an existing cash portfolio, we believe it can add incremental return potential while maintaining the same liquidity benefits.

- If the strategy is funded from an equity allocation, there is likely to be an improvement in liquidity (in terms of reducing the likelihood of being a forced seller) but at the cost of potentially lower long-term return expectations. However, we believe current cash flow generating yields compare favorably with forward-looking equity return expectations, particularly if defaults are minimized and the cash flow yield is considered a proxy return on a forward-looking basis.

- If the strategy is funded from existing fixed income (e.g., core or core plus-type strategies), we believe the possible liquidity benefits are likely to improve while still offering a similar return potential. The below table shows how a hypothetical cash flow generating portfolio could provide a higher yield than the Bloomberg US Aggregate Index with less than half the duration risk.

	BLOOMBERG US AGGREGATE INDEX	SAMPLE 5-YEAR BBB OR BETTER CASH FLOW GENERATING PORTFOLIO
DURATION (YEARS)	6.3	2.5
YIELD	4.41%	5.46%
SPREAD (BPS)	57	141
AVERAGE QUALITY	AA2	A3

Data and analysis as of 31 March 2023. Source: Bloomberg. Hypothetical portfolios created by Loomis Sayles based on a sample plan. Information is shown for illustrative purposes only and is subject to change.
The use of model or hypothetical portfolios has inherent limitations. They are heavily dependent on the assumptions used and do not take into account actual trading or market conditions. The portfolios constructed were created by projecting cash flows from the universe of bonds available on the date of analysis, which includes assumptions about bonds cash flows that may not materialize in actual accounts. The hypothetical portfolios are intended to convey one measure of the characteristics of an asset class or combination of asset classes, and a different analysis may yield different results. Material market and economic factors may affect investment decisions differently when managers are investing actual client assets.
The sample plan was created using the Russell Cash Flow Generator, which produces a generic set of pension liabilities. Analysis was done using the assumptions of a plan size of $1 billion, discount rate of 5.29%, which is the discount rate for the calendar fiscal year end, using a 5-year vintage cash flow generating scheme.
Indices are unmanaged and do not incur fees. It is not possible to invest directly in an index.
The ability of an actual portfolio to deliver the required cash flows is not guaranteed and is subject to a variety of factors including, but not limited to, the availability of bonds, transaction costs, default risk, rebalancing risk, liquidity risk and management risk.
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In our view, implementation of a cash flow generating portfolio requires a thoughtful approach to help ensure that overall plan risk and return metrics remain within plan objectives. We believe that adopting a cash flow generating strategy into a portfolio with existing illiquid/private assets, public risk assets and dedicated long duration or risk mitigation strategies can help plans effectively balance liquidity, return potential and volatility from a total portfolio perspective.

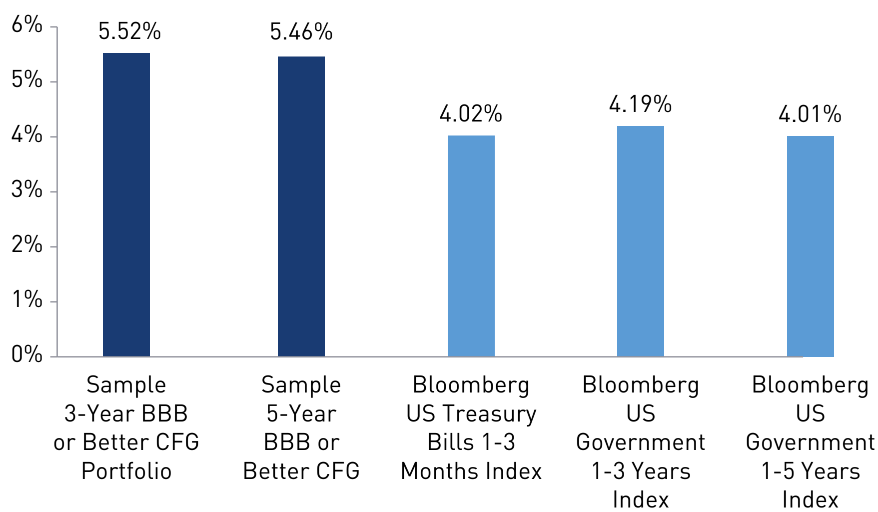
Comparison to Other Short-Term Liquidity Strategies

Many plan sponsors may opt for a short-term investment fund or vehicle with daily liquidity to help satisfy monthly benefit payment needs. These vehicles can play a key role in managing day-to-day cash needs. However, yields of these vehicles tend to be materially lower than a typical cash flow generating strategy (see below table with a sample of relevant short-term benchmark yields) and can become a cash drag over longer periods. It's also important to note that these vehicles require securities to be sold (or cash to be maintained) in order to meet redemption requests, which can become challenging in periods of market stress.[1] While the likelihood of corporate defaults typically increases in these periods of stress, cash flow generating strategies typically do not have to actively sell securities because they instead rely upon coupon and maturity payments.

SAMPLE HYPOTHETICAL CASH FLOW GENERATING (CFG) STRATEGIES VS. SHORT-TERM INDICES

Estimated Yields as of 31 March 2023

Source: Bloomberg. Data and analysis as of 31 March 2023.



The 3-year and 5-year cash flow strategies shown above are hypothetical portfolios created by Loomis Sayles based on a sample plan. Information is for illustrative purposes only and is subject to change. The use of hypothetical scenarios has inherent limitations. They are heavily dependent on the assumptions used and do not take into account actual trading or market conditions. The portfolios constructed were created by projecting cash flows from the universe of bonds available on the date of analysis which includes assumptions about bonds cash flows that may not materialize in actual accounts. The hypothetical portfolios are intended to convey one measure of the characteristics of an asset class or combination of asset classes, and a different analysis may yield different results. Material market and economic factors may affect investment decisions differently when managers are investing actual client assets.
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[1] *Source: https://www.iosco.org/library/pubdocs/pdf/IOSCOPD666.pdf, page 5.*

Overall, we believe plan sponsors could consider a tiered cash management system that combines short-term investment funds with a cash flow generating strategy to help provide a reasonable balance between yield and liquidity.

Implementation Considerations

Implementing a cash flow generating strategy follows a similar process as most fixed income mandates. A natural first step is to consider how much to allocate to this type of structure. We stress that the cash flow strategy does not necessarily need to satisfy 100% of the plan's expected benefit payments over the specified period. Private market pacing schedules may also be considered and incorporated into cash flow projections. The main objective is to incrementally reduce the magnitude of sourcing cash (particularly during difficult market environments) by providing a reliable source of cash flows. The strategy can pursue this by targeting a portion of expected benefit payments as in the following examples:

- 100% of each of the next 2 years
- 50% of each of the next 3 years
- 25% of each of the next 5 years

Finally, flexibility and benchmarking are two important considerations.

In terms of **flexibility**, many investors may be concerned that they will be locked into a cash flow generating strategy for the entire specified time horizon. However, there is significant flexibility. For example, if the initial structure targets three years of expected monthly benefit payments, it will naturally shorten as it rolls down over time. Plan sponsors invested in this type of strategy can revisit it periodically with the manager (every 6 or 12 months, for example) to determine whether to replenish it back to three years or let it naturally shorten to pursue potentially better market opportunities elsewhere. In addition, while these strategies are typically invested with the goal of holding bonds to maturity, it is possible to redeem more than expected. In the rare event that the entire portfolio must be liquidated, this is feasible since these types of portfolios typically consist primarily of publicly traded fixed income securities.

Cash flow generating strategies do require a different **benchmarking** approach than traditional fixed income. Standard third-party benchmarks are not always optimal due to frequent rebalancing (e.g., new issues, rating changes, tenders). However, we believe there are a few reasonable options that can help meet a range of individual client needs:

	DESCRIPTION	ADVANTAGES	DISADVANTAGES
CASH FLOW BENCHMARK	Yes/no determination of "did the manager meet the targeted cash flows?"	Typically simplest	Limited ability to do attribution analysis
MARKET-BASED BENCHMARK	Blend of standard third-party benchmarks with similar duration and credit profile	Reasonably easy to implement	Increasing differences in evolution of benchmark versus portfolio as time goes on
SNAPPED BENCHMARK	"Snap" a list of available securities at initial investment and on flow dates	Allows for more detailed attribution	Most complex; typically manager-provided

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Any investment that has the possibility for profits also has the possibility of losses, including the loss of principal.

Conclusion

We believe public defined benefit plan sponsors should consider a cash flow generating strategy to help ease liquidity strains. Recent concerns about total portfolio liquidity along with attractive current yields and the convergence with discount rates may offer an opportunity for plans to limit forced selling at inopportune times. We believe this is critical for plans that continue to mature and pay higher benefit payments out of assets each month. Plans that have newer private investment programs may also benefit from this approach.

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Disclosure

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Any investment that has the possibility for profits also has the possibility of losses, including the loss of principal.

Market conditions are extremely fluid and change frequently.

Past performance is no guarantee of, and not necessarily indicative of, future results.

Defining Hypothetical Portfolios

We have defined three hypothetical portfolios based on credit quality^ (in descending order, highest quality to lowest):

1. All US Treasury: invests only in US Treasurys

2. A or better: consists of bonds rated A or better

3. BBB or better: allows only fixed income securities rated BBB or better

Our optimization process determines the weights within each portfolio. Allowing for lower-quality credits can potentially achieve a higher yield to cover more benefit payments. However, lower-quality credits may increase downward credit migration, which increases risk of loss.

^Credit Quality reflects the highest credit rating assigned to individual holdings of the portfolio among S&P, Moody's or Fitch; ratings are subject to change.

Hypothetical portfolios are shown for illustrative purposes only. The use of model or hypothetical portfolios has inherent limitations. They are heavily dependent on the assumptions used and do not take into account actual trading or market conditions. The portfolios constructed were created by projecting cash flows from the universe of bonds available on the date of analysis which includes assumptions about bonds cash flows that may not materialize in actual accounts. The hypothetical portfolios are intended to convey one measure of the characteristics of an asset class or combination of asset classes, and a different analysis may yield different results. Material market and economic factors may affect investment decisions differently when managers are investing actual client assets.

Disclosure Statement

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Market scenarios have inherent limitations, including but not limited to, their inability to reflect the impact of actual trading on a portfolio or economic and market factors on investment decisions. The scenarios rely on assumptions that may not occur or opinions that may be wrong. These opinions and assumptions are often based on past events and do not consider unforeseen events or developments. The scenarios utilize hypothetical portfolios of bonds with particular characteristics. They assume that bonds are purchased at current valuations and held throughout the period rather than traded, which would not be the case with an actual portfolio. Scenarios rely on mathematical models that do not take into account all potential factors that could impact actual results and can be wrong even in cases where the assumptions used turn out to be valid. Actual market events or results could be much worse.

The use of hypothetical portfolios has inherent limitations. They are heavily dependent on the assumptions used in construction and do not reflect actual portfolios that could have been implemented during the time periods shown. The portfolios constructed were created by projecting cash flows from the universe of bonds available on the date of analysis which includes assumptions about bond's cash flows that may not materialize in actual accounts. The hypothetical portfolios are intended to convey one measure of the characteristics of an asset class or combination of asset classes, and a different analysis may yield different results. Material market and economic factors may affect investment decisions differently when managers are investing actual client assets. The construction of model portfolios does not reflect the impact of actual portfolio trading which may impact the price and availability of securities. An actual portfolio will be impacted by the market conditions at the time of funding and other factors. Past experience is not indicative of future results. The analysis does not take into account the deduction of any advisory fees, brokerage or other commissions or other expenses that would apply to actual accounts.

Scenarios do not deduct trading costs and other fees and expenses.

Certain information uses comparisons to one or more market indexes which are unmanaged and are generally unavailable for investment. Individual accounts are actively managed, will have different investment guidelines, and carry expenses and fees, all of which would negatively impact results.

This does not represent the expected or future performance of any investment product.

The ability of an actual portfolio to deliver the required cash flows is not guaranteed and is subject to a variety of factors including, but not limited to, the availability of bonds, transaction costs, default risk, rebalancing risk, liquidity risk and management risk.

The analysis reflected in this presentation is limited to certain recent periods for which data is available. We make no representation that the experience of any other periods is comparable.

Past performance and experience are no guarantee of future results.

Please see model description and portfolio construction assumptions which follows for additional important information.

Model Description

Cashflow sufficiency study involves modeling the cheapest model or hypothetical portfolios (based on bond prices) for six different lower rating cutoffs where liability cash flows past 30yrs, if any, are rolled up to the 30yr point based on an assumed discount rate. Investable universe includes Bloomberg's Treasury Strips and IG corporate. Detailed constraints used for the construction are as follows:

Securities Universe: *IG corporate bonds, Universal, Treasury securities*

Liquidity: *Average traded volume over past month: > $15 M, Amount Outstanding > 250M*

Diversification: *Max Entity Wt(Mkt Value)*

Corporate : 2%

Max Ticker Wt(Mkt Value)

Corporate : 2%

Max Industry Wt(Mkt Value)

Bloomberg's level 3: 15%

Bloomberg's level 4: 15%

Eliminations: *Loomis Sayles Credit Trend : Limited Coverage, Negative Trend and Negative Trend with event risk*

Loomis Sayles risk rating : Speculative

Loomis Sayles research recommendation : 4

Callable (call filter), Sinkable, Putable

Bond proceeds between cash flow payment dates were re-invested at 0% and residual cash flows (post liability cash flow payments)were reinvested at 0%. Once the portfolios were constructed based on nominal projected cash flows, the portfolio cash flows were recomputed based on a scenario of "Mean Defaults", "3x Max Defaults". Recovery rate has been assumed at 40%. We assumed all securities are available and can be purchased at the Bloomberg's index price. The model assumes bonds are held throughout the period without being traded which would not be the case with an actively managed portfolio. As such, the model does not take into account the impact of market liquidity of actual trading, among other things. Actual default experience including recovery rates will differ and would impact the analysis.

Default-Adjusted Cash Flows:

Individual bond cash flows based on historically observed default cohorts as provided by Moody's. For cash flows extending beyond 20 yrs, the annualized default rate from year 15 to year 20 was used to extend the cumulative default cohorts. For the "mean" default scenarios, the average cohorts from 1983 to 2022 (Average Cumulative Issuer-Weighted Global Default Rates By Letter Rating, 1983-2022 from Moody's Annual Default Study) were used. For the "3x mean" default scenarios, the average cohorts from 1983 to 2022 were used (Average Cumulative Issuer-Weighted Global Default Rates By Letter Rating, 1983-2022 from Moody's Annual Default Study), where the implied annualized default rates were multiplied by 3 so as to construct a "3x" mean default cohort. On each coupon / principal pay date, a bond could either default and pay recovery or pay the coupon and be revisited on the next coupon date. Actual default experience, including recovery assumptions and timing of payments, could be worse which would impact the analysis.

Portfolio Construction Assumptions

Cash flows and payment dates have been calculated based on a sample plan created by Loomis Sayles.

The universe of securities used in constructing the example portfolio includes securities that are available for purchase.

All securities are available at the Bloomberg index's price.

There is no market impact assumed as a result of transactions in these securities.

Analytics for all securities, including but not limited to, key rate duration, yield, convexity, option-adjusted duration, option-adjusted spread, rating, maturity and coupon is provided by Bloomberg.

The example portfolios are constructed using a standard search algorithm, which iterates the weight distribution in the universe of available securities to achieve an objective function within the specified set of constraints.

As indicated above, the example portfolios assume that portfolio securities are purchased at the current benchmark price and held for the period, whereas an actual portfolio would be actively managed according to its own guidelines and expected liabilities. As a result, an actual portfolio would be impacted by additional factors which could negatively impact the portfolio, including the costs and pricing impact of actual trading, the risk that replacement securities with comparable yields and characteristics are not available and the impact of market liquidity.

The example portfolios are constructed based on assumptions about the expected liquidity and availability of securities, which is dependent upon market conditions and other factors. There is no guarantee that a portfolio with similar characteristics can be created or that securities could be purchased at the expected price.

Analysis comparing cash flow match to the Bloomberg US Aggregate Index uses a hypothetical liability of $10 million per month. Hypothetical cash flow match portfolios are constructed using historical yield data of the Bloomberg US Corporate Index. For each cash flow match structure, both portfolios are projected forward with returns (using the yield of the cash flow match portfolio and actual return of Bloomberg US Aggregate Index) while also taking out $10 million cash flow each month. If the Bloomberg US Aggregate Index becomes depleted during the period, it is classified as a failure.

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