Executive Summary

We see cash flow matching strategies gaining traction among US and UK defined benefit (DB) pension plans—particularly those that are cash flow negative—due to their ability to balance short-term liquidity needs with longer-term investment objectives such as return generation.

- **The rise of cash flow negative DB pension plans.** A growing number of DB pension plans in the US and UK have annual benefit payments that exceed contributions received (Exhibit 1). For mature pension plans, entering this cash flow negative state is a trend that will continue and even accelerate in the coming years. As a result, funded ratios for underfunded plans will face downward pressure and may require higher returns to narrow their funding deficit.

- **Plans are looking to make assets “work harder” irrespective of their cash flow status.** Plans are increasingly seeking out return-generating assets that can narrow funding deficits and fund future benefit accruals. This is particularly true for US public DB plans, 72% funded in aggregate on a reported basis. Often such potentially higher-return investments are illiquid, forcing pension plans to consider the balance between short-term liabilities and long-term needs.

- **Cash flow matching strategies can balance short-term liquidity needs with longer-term investment objectives.** A cash flow matching strategy aligns short-dated liabilities with high quality liquid fixed income assets. This alignment allows plans to allocate more of their remaining funds in longer-dated assets that may have lower liquidity but higher return potential.

- **Strict adherence to a pre-defined cash flow schedule.** A cash flow matching strategy seeks to generate predictable income and principal cash flows with limited portfolio turnover. In effect, a cash flow matching portfolio will adopt a “buy and maintain” approach adhering to a pre-defined cash flow schedule, rather than a less-constrained active approach.

Exhibit 1: A Growing Number of DB Pension Plans are Cash Flow Negative

US and UK pension plan contributions and benefit payments as a percentage of assets

<table>
<thead>
<tr>
<th>Contributions as % of Assets</th>
<th>Pension Plans</th>
<th>US Corporate</th>
<th>US Public</th>
<th>UK Corporate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>Cash Flow Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td>Cash Flow Negative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>Cash Flow Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15%</td>
<td>Cash Flow Negative</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: GSAM, Company Reports. Based on data available as of December 2019. Each dot represents one plan. Axes capped at 15%. For illustrative purposes.
Many DB pension plans have annual benefit payments that exceed the annual contributions they receive and are therefore characterized as being cash flow negative (or in a cash flow deficit). In addition, a number of plans remain underfunded, defined as an inadequate ratio of plan assets to reported pension liabilities. For example, US public and corporate DB plans are in aggregate 72% and 89% funded, respectively, albeit applying different regulatory standards.

To narrow funding deficits, management of pension plans has evolved in two key ways. First, plans increasingly seek out higher return-generating assets (the “Growth Portfolio”) venturing beyond traditional fixed income and public equity into alternative, less liquid assets such as private equity and credit, hedge funds and real estate. Second, many plans, in particular those in the corporate sector, increasingly adopt customized liability-driven investment allocations (the “Immunizing Portfolio”) with a goal of aligning asset and liability risks while seeking to make the most efficient use of the Immunizing Portfolio capital. In the US especially, where the pension liability discount rate is credit sensitive, the Immunizing Portfolio often includes an actively managed, typically long duration, credit sleeve.

In our view, cash flow matching is the next phase of this evolution. A cash flow matching strategy has two components: a dedicated sleeve within the Immunizing Portfolio of high quality, liquid fixed income assets that can meet benefit payments for a specified time period complementing the remaining Immunizing Portfolio investments and permitting the Growth Portfolio to pursue long-term return objectives through allocations to longer-dated, less liquid assets that may provide higher returns. Public plans that are open to new participants are especially dependent on future financial performance given the ongoing growth in liabilities. We think cash flow matching can be an effective strategy for several types of DB plans, including those with the following objectives:

1. **Optimal asset allocation.** High yields and diversification benefits have motivated public and private DB pension plan allocations to private assets; the prevailing low yield environment coupled with concerns around elevated public market valuations reinforces this demand. However, the higher a pension plan’s existing allocation to private assets, the lower its capacity is to allocate additional assets to illiquid assets. To address these liquidity constraints, plans could look to maintain a cash buffer, though this is an inefficient use of capital given low cash returns. We think a cash flow matching strategy—which seeks to maximize risk-adjusted returns while also meeting short-term liquidity needs—can serve as a more efficient option.

2. **Narrowing asset-liability deficits to maintain or improve funded ratios.** As noted, a growing number of maturing DB pension plans in the US (corporate, public and Taft-Hartley) and the UK are turning cash flow negative. This status is not necessarily an indicator of distress; it is a natural occurrence for a mature pension plan and we expect the rise in the number of cash flow negative plans to continue and even accelerate in the coming years. That said, a cash flow negative position can pose two potential challenges. First, a plan may be required to sell assets at an inopportune time to meet near-term benefit payments. Second, when a plan is less than 100% funded, a cash flow negative status lowers both a plans funded ratio (assets relative to liabilities) and its asset base. A lower asset base requires remaining assets to generate a higher return in order to maintain (or improve) the beginning period funded ratio as illustrated in the example in Exhibit 2. Again, we think a cash flow matching strategy is an efficient way to achieve this.
Cash Flow Matching: The Next Phase of Pension Plan Management

Exhibit 2: The Impact of Negative Cash Flow on Funded Levels and Required Returns

Being cash flow negative and less than 100% funded means that benefit payments will lower a plan’s funded ratio and require a higher rate of return on remaining plan assets to maintain or improve a funded ratio.

<table>
<thead>
<tr>
<th></th>
<th>Beginning Funded Level</th>
<th>Benefit Payments Over Time Period</th>
<th>End Funded Level</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>900</td>
<td>-100</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Liabilities</td>
<td>1,000</td>
<td>-100</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>Funded Status (US$)</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>Unchanged</td>
</tr>
<tr>
<td>Funded Ratio (%)</td>
<td>90%</td>
<td></td>
<td>88.9%</td>
<td>Lower</td>
</tr>
<tr>
<td>Annual Return Required for 100% Funded Ratio</td>
<td>11.1%</td>
<td></td>
<td>12.5%</td>
<td>Higher</td>
</tr>
</tbody>
</table>

Source: GSAM. For illustrative purposes only

Implementing a Cash Flow Matching Strategy

Cash flow matching strategies are an important part, and potentially even the largest part, of a highly customized liability-driven investment strategy and command unique considerations. In our view, there are five key elements that pension plans should consider for successful implementation of a cash flow matching strategy:

1. **Investment Universe.** Cash flow matching strategies typically invest in high quality, liquid corporate credit bonds from a pension plan’s home market that offer a conservative spread over government bonds. We believe accessing the global corporate credit universe can enhance return potential and provide diversification benefits, though any allocation should consider a suitable currency hedging strategy. Depending on a plan’s investment objectives and investment guidelines, the investment universe could be broadened further to include securitized credit as well as non-traditional sources of yield such as private credit.

2. **Investment Approach.** To ensure adequate compensation for credit risk, we believe cash flow matching portfolios should adopt a “buy and maintain” approach which seeks to: i) minimize trading costs through limited portfolio turnover and; ii) avoid potential losses due to defaults or downgrades. A buy and maintain portfolio differs from a ‘laddered’ portfolio of government bonds of various maturities in several important ways. First, the initial portfolio of credit assets is devised through tailored research and security selection. Second, bonds with low liquidity tend to be removed from the investment universe. And third, maximum exposure constraints—based on maturity, rating, sector, issuer or idiosyncratic factors—are often applied to limit exposure to adverse credit events.

3. **Cash Flow Optimization.** A pension plan’s cash flows—including the schedule over which benefits will be paid—must be carefully analyzed and well understood in order to align liabilities with the cash flow matching portfolio (which would be comprised of assets from the universe of eligible assets identified in step 1 above). Optimization of this alignment requires active engagement among plan sponsors, plan actuaries, and portfolio managers skilled in both investment management practices and actuarial concepts.

4. **Active Monitoring.** A buy and maintain approach requires active oversight and rigorous sell discipline due to the potential for adverse changes in credit fundamentals over the investment time horizon. The goal of ongoing oversight is to mitigate changes in the profile of a cash flow matching portfolio that would deviate from a pension plan’s liability schedule, rather than to generate alpha as would be the case with an actively managed, liability-driven strategy. In our view, this oversight requires innovative research systems and resources that are adept in the management of customized portfolios, with an ability to actively monitor downgrade risk, perform downgrade scenario analysis and exercise pre-emptive action if required. Cost-effective trading is also vital, with both the timing and cost of trading taken into consideration.
5. **Implementation Time Horizon.** The manner in which a cash flow matching portfolio is implemented over time depends on a pension plan’s goals. For active public and private plans, implementing a cash flow matching portfolio on an annual basis may be a more efficient and effective way to match cash flows over a three- to five-year time horizon (Exhibit 3). A private plan with a target “end game”—such as self-sufficiency or buy-out—may wish to adopt a cash flow matching portfolio that evolves over time. Under this evolutionary approach, gains from return-seeking assets may be used to build up the cash flow matching portfolio, leaving the rest of the Immunizing Portfolio to hedge interest rate risk and other risks associated with unmatched liabilities (Exhibit 4).

**Exhibit 3: Cash Flow Matching in Practice**

![Illustrative Cash Flows ($mm)](image1)

Source: GSAM. For illustrative purposes only.

**Exhibit 4: Cash Flow Matching As An Evolutionary Process**

<table>
<thead>
<tr>
<th>Asset Allocation (%)</th>
<th>Growth Portfolio Investments</th>
<th>Cash Flow Matching Sleeve Building Up Over Time</th>
<th>Remaining Immunizing Portfolio Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>Maximize risk-adjusted returns</td>
<td>Deliver stable cash flows to meet liabilities for a specified time period</td>
<td>Hedge interest rate and inflation risks associated with unmatched liabilities</td>
</tr>
<tr>
<td>Evolutionary Strategy</td>
<td>Gradually reducing the asset allocation weight as funding position improves</td>
<td>Rising allocation as the plan becomes increasingly cash flow negative</td>
<td></td>
</tr>
</tbody>
</table>

Source: GSAM. For illustrative purposes only.
Conclusion

The proportion of US and UK DB pension plans entering a cash flow negative state is set to rise given their natural progression to a more mature phase. In addition, a low yield and low return environment challenges pension plan assets to “work harder” in order to meet projected pension benefit payment liabilities. We believe a cash flow matching strategy can be a suitable investment approach for DB pension plans in all these environments. Under this strategy, a cash flow matching sleeve of high quality, liquid assets enables a plan to meet short-term liability requirements while simultaneously enabling a larger portion of remaining plan assets to be allocated to potentially illiquid investments that may generate higher returns.

In our view, dedicating a portion – even a large portion – of the Immunizing Portfolio investments to a cash flow matching sleeve can be best implemented through a buy and maintain approach that seeks to minimize portfolio turnover and avoid exposure to adverse credit events. Achieving the latter requires portfolio managers to select investments from a carefully curated investment universe that takes into consideration liquidity profiles, diversification benefits, maximum exposure constraints based on factors such as maturity or credit rating and, especially, the pension plan’s near-term liability payment profile. Aided by innovative research and risk management systems, we believe an experienced team steeped in actuarial concepts and adept at managing highly customized portfolios is best placed to facilitate optimal implementation of a cash flow matching strategy.
General Disclosures

These materials are provided solely on the basis that they will not constitute investment advice and will not form a primary basis for any person's or plan's investment decisions. Goldman Sachs is not a fiduciary with respect to any person or plan by reason of providing the material or content herein. Plan fiduciaries should consider their own circumstances in assessing any potential investment course of action.

Economic and market forecasts presented herein reflect a series of assumptions and judgments as of the date of this presentation and are subject to change without notice. These forecasts do not take into account the specific investment objectives, restrictions, tax and financial situation or other needs of any specific client. Actual data will vary and may not be reflected here. These forecasts are subject to high levels of uncertainty that may affect actual performance. Accordingly, these forecasts should be viewed as merely representative of a broad range of possible outcomes. These forecasts are estimated, based on assumptions, and are subject to significant revision and may change materially as economic and market conditions change. Goldman Sachs has no obligation to provide updates or changes to these forecasts. Case studies and examples are for illustrative purposes only.

This material does not constitute an offer or solicitation in any jurisdiction where or to any person to whom it would be unauthorized or unlawful to do so.

Prospective investors should inform themselves as to any applicable legal requirements and taxation and exchange control regulations in the countries of their citizenship, residence or domicile which might be relevant.

Views and opinions expressed are for informational purposes only and do not constitute a recommendation by GSAM to buy, sell, or hold any security. Views and opinions are current as of the date of this presentation and may be subject to change, they should not be construed as investment advice. Although certain information has been obtained from sources believed to be reliable, we do not guarantee its accuracy, completeness or fairness. We have relied upon and assumed without independent verification, the accuracy and completeness of all information available from public sources.

Past performance does not guarantee future results, which may vary. The value of investments and the income derived from investments will fluctuate and can go down as well as up. A loss of principal may occur.

This information discusses general market activity, industry or sector trends, or other broad-based economic, market or political conditions and should not be construed as research or investment advice. This material has been prepared by GSAM and is not financial research nor a product of Goldman Sachs Global Investment Research (GIR). It was not prepared in compliance with applicable provisions of law designed to promote the independence of financial analysis and is not subject to a prohibition on trading following the distribution of financial research. The views and opinions expressed may differ from those of Goldman Sachs Global Investment Research or other departments or divisions of Goldman Sachs and its affiliates. Investors are urged to consult with their financial advisors before buying or selling any securities. This information may not be current and GSAM has no obligation to provide any updates or changes.

Goldman Sachs does not provide legal, tax or accounting advice, unless explicitly agreed between you and Goldman Sachs (generally through certain services offered only to clients of Private Wealth Management). Any statement contained in this presentation concerning U.S. tax matters is not intended or written to be used and cannot be used for the purpose of avoiding penalties imposed on the relevant taxpayer. Notwithstanding anything in this document to the contrary, and except as required to enable compliance with applicable securities law, you may disclose to any person the U.S. federal and state income tax treatment and tax structure of the transaction and all materials of any kind (including tax opinions and other tax analyses) that are provided to you relating to such tax treatment and tax structure, without Goldman Sachs imposing any limitation of any kind. Investors should be aware that a determination of the tax consequences to them should take into account their specific circumstances and that the tax law is subject to change in the future or retroactively and investors are strongly urged to consult with their own tax advisor regarding any potential strategy, investment or transaction.

United Kingdom and European Economic Area (EEA): In the United Kingdom, this material is a financial promotion and has been approved by Goldman Sachs Asset Management International, which is authorized and regulated in the United Kingdom by the Financial Conduct Authority.

Switzerland: For Qualified Investor use only – Not for distribution to general public. This document is provided to you by Goldman Sachs Bank AG, Zürich. Any future contractual relationships will be entered into with affiliates of Goldman Sachs Bank AG, which are domiciled outside of Switzerland. We would like to remind you that foreign (Non-Swiss) legal and regulatory systems may not provide the same level of protection in relation to client confidentiality and data protection as offered to you by Swiss law.

Asia Pacific: Please note that neither Goldman Sachs Asset Management International nor any other entities involved in the Goldman Sachs Asset Management (GSAM) business maintain any licenses, authorizations or registrations in Asia (other than Japan), except that it conducts businesses (subject to applicable local regulations) in and from the following jurisdictions: Hong Kong, Singapore and Malaysia. This material has been issued for use in or from Hong Kong by Goldman Sachs Asset Management (Hong Kong) Limited, in or from Singapore by Goldman Sachs Asset Management (Singapore) Pte. Ltd. (Company Number: 201329851H) and in or from Malaysia by Goldman Sachs (Malaysia) Sdn Bhd (880767W).

Australia: This material is distributed in Australia and New Zealand by Goldman Sachs Asset Management Australia Pty Ltd ABN 41 006 099 681, AFSL 228948 (“GSAMA”) and is intended for viewing only by wholesale clients in Australia for the purposes of section 761G of the Corporations Act 2001 (Cth) and to clients who either fall within any or all of the categories of investors set out in section 3(2) or sub-section 5(2CC) of the Securities Act 1978, fall within the definition of a wholesale client for the purposes of the Financial Service Providers (Registration and Dispute Resolution) Act 2008 (FSPR) and the Financial Advisers Act 2008 (FAA), and fall within the definition of a wholesale investor under one of clause 37, clause 38, clause 39 or clause 40 of Schedule 1 of the Financial Markets Conduct Act 2013 (FMCA) of New Zealand (collectively, a “NZ Wholesale Investor”). GSAMA is not a registered financial service provider under the FSPR. GSAMA does not have a place of business in New Zealand. In New Zealand, this document, and any access to it, is intended only for a person who has first satisfied GSAMA that the person is a NZ Wholesale Investor. This document is intended for viewing only by the intended recipient. This document may not be reproduced or distributed to any person in whole or in part without the prior written consent of GSAMA. This information discusses general market activity, industry or sector trends, or other broad based economic, market or political conditions and should not be construed as research or investment advice. The material provided herein is for informational purposes only. This presentation does not constitute an offer or solicitation to any person in any jurisdiction in which such offer or solicitation is not authorized or to any person to whom it would be unlawful to make such offer or solicitation.
Canada: This presentation has been communicated in Canada by GSAM LP, which is registered as a portfolio manager under securities legislation in all provinces of Canada and as a commodity trading manager under the commodity futures legislation of Ontario and as a derivatives adviser under the derivatives legislation of Quebec. GSAM LP is not registered to provide investment advisory or portfolio management services in respect of exchange-traded futures or options contracts in Manitoba and is not offering to provide such investment advisory or portfolio management services in Manitoba by delivery of this material.

Japan: This material has been issued or approved in Japan for the use of professional investors defined in Article 2 paragraph (31) of the Financial Instruments and Exchange Law by Goldman Sachs Asset Management Co., Ltd.

Confidentiality
No part of this material may, without GSAM’s prior written consent, be (i) copied, photocopied or duplicated in any form, by any means, or (ii) distributed to any person that is not an employee, officer, director, or authorized agent of the recipient.

© 2020 Goldman Sachs. All rights reserved. Date of first use: 2/24/2020. 194278-OTU-1138564.