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THE PENSION FUND PROBLEM

Stablecoin Infrastructure and the Duration Mismatch No One Is Pricing

ABSTRACT

This paper examines the structural incompatibility between the reserve architecture mandated for payment stablecoins under United States federal legislation and the duration obligations governing defined benefit pension funds. The argument proceeds from the liability side of the balance sheet, where existing analysis has been absent. The GENIUS Act of 2025 mandates that permitted payment stablecoin issuers hold reserves exclusively in short-duration instruments, with Treasury obligations limited to remaining maturities of 93 days or fewer. Defined benefit pension funds in the United States, the United Kingdom, the Netherlands, and Canada collectively manage obligations extending across liability horizons of fifteen to forty years, with modified duration in the range of 14 to 22 years for most major plans. The paper maps the reserve architecture of the two largest stablecoin issuers, analyses the structural yield curve effects of concentrating reserve demand at the short end of the sovereign debt market, and locates the specific points at which short-duration stablecoin reserve buying creates adverse structural conditions for long-duration liability matching. It further examines the failure of existing credit rating frameworks to price the interaction between stablecoin infrastructure and institutional long-duration capital. The stablecoin payment layer is a structurally significant development in monetary architecture. Pension funds are among the primary long-duration creditors in the global financial system. The pricing framework for their interaction does not exist.

INTRODUCTION

The structural debate over stablecoin infrastructure has been conducted almost entirely from the asset side. Reserve composition, issuer solvency, payment system integration, monetary aggregate implications: the literature frames the question from the perspective of what backs the instrument and who issues it. The liability side of the institutional balance sheet has been largely absent from the analysis.

This paper corrects that absence.

Defined benefit pension funds manage obligations whose duration extends fifteen to forty years. Their investment mandates are structured around liability-matching frameworks that require long-duration assets generating predictable returns across an obligation window that no 93-day Treasury bill can span. The GENIUS Act's reserve framework is built on a payment-instrument logic that requires immediate liquidity and restricts reserve assets to the short end of the yield curve.

These two architectures now occupy the same sovereign debt market. As total stablecoin reserve assets exceed $130 billion concentrated in short-duration sovereign instruments, and as legislative frameworks in the United States and the European Union under MiCA expand the reserve pool toward the $1 trillion range projected by analysts at Citi GPS and Standard Chartered, the structural effects on yield curve shape and long-duration asset availability become analytically significant for institutions managing pension liabilities at scale (Citi GPS, 2025; Standard Chartered, 2024).

The argument is structural: the stablecoin reserve architecture, operating at scale under a legally mandated short-duration constraint, reorganises the sovereign debt market in ways adverse to the liability-matching requirements of defined benefit institutions. The mismatch is not on the pension fund's balance sheet. It is in the market that the pension fund's balance sheet depends on.

What follows maps the structure of that dependency and identifies the specific points at which the pricing framework fails.

I. THE DURATION ARCHITECTURE OF DEFINED BENEFIT OBLIGATIONS

A defined benefit pension fund is a liability-matching machine. Its fundamental purpose is to accumulate assets whose duration, cash flow, and risk characteristics are sufficiently aligned with its long-term obligations that the fund can meet those obligations regardless of interim market conditions. This is not an investment philosophy; it is the actuarial constraint that governs every significant allocation decision.

The liability side of a defined benefit fund is characterised by three structural features. Duration is the primary variable: the present value of future benefit obligations, discounted at an appropriate rate, extends across obligation windows whose modified duration falls in the range of 14 to 22 years for most major plans in the United Kingdom, the United States, the Netherlands, and Canada (BlackRock Investment Institute, 2023; Legal & General Investment Management, 2024). Discount rate sensitivity compounds duration: a 100 basis point decline in long-duration government bond yields increases the present value of pension liabilities by approximately the duration multiple; for a plan with 18-year modified duration, that is an 18 percent increase in liability present value against unchanged assets. Inflation exposure introduces a third dimension: schemes with indexed benefit provisions carry additional sensitivity to breakeven inflation rates embedded in the long end of the real yield curve.

The United Kingdom's Pension Protection Fund Purple Book 2023 reported aggregate defined benefit scheme assets of £1.47 trillion against liabilities of £1.29 trillion on an s179 basis, representing a funding ratio of 113.6 percent across the 5,131 schemes within the PPF's coverage universe (Pension Protection Fund, 2023). That aggregate surplus obscures significant dispersion: 1,048 schemes remained in deficit as of the reporting date. The Thinking Ahead Institute's 2024 Global Pension Assets Study estimates total global pension fund assets at approximately $55.7 trillion across 22 markets, with defined benefit structures retaining dominant positions in the United Kingdom, the Netherlands, Canada, and Japan (Thinking Ahead Institute, 2024).

The asset side of a defined benefit fund is structured in response to the liability. Liability-driven investment frameworks, which became standard practice across UK and European pension management in the decade following the 2004 Pensions Act, use long-duration government bonds, inflation-linked securities, and interest rate swaps to close the duration gap between assets and obligations. The typical UK defined benefit scheme allocates between 40 and 70 percent of its assets to liability-matching instruments; long gilts, index-linked gilts, and interest rate and inflation derivatives (Investment Association, 2023).

The September 2022 LDI crisis made the dependency of this architecture on the long-gilt market structurally visible. The simultaneous release of the September 23 fiscal statement and the resulting gilt yield spike triggered margin calls on leveraged LDI positions held by UK pension funds, requiring schemes to liquidate long-gilt holdings to meet collateral demands, which drove gilt yields higher and triggered further margin calls in a self-reinforcing spiral. The Bank of England's emergency intervention on September 28, 2022, committed to gilt purchases of up to £5 billion per day over a thirteen-trading-day window, with a total announced capacity of £65 billion, specifically to stabilise the long-gilt market on which UK defined benefit schemes depended for their liability-matching positions (Bank of England, 2022; Financial Policy Committee, 2023).

The mechanism is instructive. The long-duration sovereign debt market is not a backdrop to the pension fund; it is load-bearing infrastructure. Anything that reorganises demand, pricing, or availability at the short versus long ends of the sovereign yield curve has structural consequences for the liability-matching capacity of defined benefit institutions.

The architecture being established for stablecoin reserves is reorganising that demand distribution; and the institutional frameworks that govern defined benefit risk management have not been asked to account for it.

II. THE RESERVE ARCHITECTURE OF PAYMENT STABLECOIN INFRASTRUCTURE

The GENIUS Act's reserve framework reflects a coherent regulatory logic. Payment instruments must be immediately redeemable on demand; therefore their backing must

be immediately liquid. This is the narrow bank principle applied to non-bank issuers. It is internally defensible as payment regulation. It is indifferent to its structural effects on duration markets.

Section 4(a) of the GENIUS Act specifies the permitted reserve assets for payment stablecoin issuers: United States coins and currency; demand deposits at Federal Reserve Banks or insured depository institutions; Treasury bills, notes, or bonds with remaining maturities of 93 days or fewer; shares in Securities and Exchange Commission-registered government money market funds investing exclusively in the foregoing categories; and overnight repurchase agreements secured by United States government obligations (GENIUS Act, 2025, §4(a)). A permitted payment stablecoin issuer cannot hold a 10-year Treasury bond. It cannot hold an inflation-linked security. It cannot hold any instrument whose pricing is sensitive to the long end of the yield curve.

The current reserve position of the two largest stablecoin issuers reflects this architecture. Tether's third-quarter 2024 attestation, produced by BDO USA, reported total reserve assets of $125.5 billion, with $102.5 billion held in United States Treasury securities, concentrated in instruments with weighted average maturities consistent with the GENIUS Act's 93-day ceiling (BDO USA, 2024; Tether, 2024). Circle's USDC reserve portfolio, disclosed through BlackRock's Circle Reserve Fund filing, reported $28.7 billion in Treasury securities as of September 2024, held through a government money market vehicle (BlackRock, 2024). Combined Treasury holdings across these two issuers total approximately $131.2 billion, concentrated at the short end of the curve.

Total stablecoin market capitalisation reached approximately $205 billion as of January 2025, according to CoinGecko and DefiLlama aggregate data cited in the Citi GPS stablecoin report published in March 2025 (Citi GPS, 2025). That report projects total stablecoin market capitalisation reaching between $1.6 trillion and $3.7 trillion by 2030 under base and optimistic adoption scenarios respectively, with reserve asset demand driven primarily by legislative compliance requirements in the United States and analogous frameworks developing under MiCA in the European Union. Standard Chartered's digital assets research published a comparable estimate of $2 trillion in total stablecoin market capitalisation by 2028 (Standard Chartered, 2024).

At $205 billion in current market capitalisation, stablecoin reserve assets represent approximately 1.8 percent of the $11.1 trillion in Treasury bills and short-maturity coupon securities outstanding as of Q3 2024 (US Treasury Fiscal Data, 2024). The current share is not market-moving at the margin. The trajectory is the analytical variable. At $1 trillion in total stablecoin reserves, with composition consistent with the GENIUS Act framework, stablecoin issuers would represent approximately 9 percent of short-duration Treasury demand; a structural buyer presence comparable in scale to the foreign official sector's holdings of short-dated US government obligations.

The reserve architecture produces a specific yield curve effect. Concentrated demand at the 90-day and shorter maturity range compresses short-duration yields relative to long-duration yields, steepening the yield curve at the margin. For defined benefit funds extending duration by purchasing long-dated government bonds, a steeper curve increases the relative cost of acquiring the long-duration assets their liability-matching mandates require. The mechanism is the arithmetic of supply and demand applied to specific points on the yield curve.

Whether the analytical frameworks used to manage duration exposure in the defined benefit sector have been updated to account for a structural change in the composition of short-duration sovereign debt demand of this magnitude is a question that the absence of published guidance from pension supervisory bodies does not yet resolve.

III. THE STRUCTURAL MISMATCH: WHERE TWO ARCHITECTURES OCCUPY THE SAME CAPITAL STOCK

The interaction between stablecoin reserve architecture and pension fund liability-matching frameworks operates across three distinct structural layers. Each layer represents a separate but connected source of pricing risk that existing frameworks do not capture.

The first layer is the yield curve shape effect established in Section II. Long-duration pension obligations require long-duration assets. A structural increase in short-duration sovereign debt demand, holding total Treasury issuance composition constant, steepens the yield curve by compressing short yields relative to long yields. The steepening reduces

the relative return on long-duration Treasuries against short-duration instruments, creating a structurally adverse environment for liability-driven investment strategies dependent on competitive long-duration yields. The United States Treasury's Quarterly Refunding presentations have noted the compositional shift in domestic demand for short-duration instruments across 2023 and 2024; the stablecoin reserve complex is one of several contributing factors, operating alongside money market fund expansion and commercial bank reserve management (US Treasury, 2024).

The second layer is collateral availability. Liability-driven investment frameworks use long-duration government bonds as both return-generating assets and collateral supporting derivative positions used to close remaining duration gaps. The 2022 UK LDI crisis demonstrated the systemic consequences of collateral demand concentrating in a thin long-gilt market under stress conditions. A structural increase in demand for short-duration Treasuries that redirects issuance capacity toward the short end of the curve tightens the supply of long-duration sovereign paper available for pension fund LDI collateral. This effect is not visible in current conditions; US Treasury issuance across the full maturity spectrum remains adequate and long-duration supply has not been constrained by stablecoin reserve demand at its present scale. Conditions change under fiscal stress, when Treasury management must balance issuance composition against the revenue requirements of deficit financing at elevated rates. In that environment, competition between stablecoin reserve demand at the short end and pension fund LDI demand at the long end is a foreseeable allocation problem with pricing consequences that present frameworks do not model.

The third layer carries structural consequences that have attracted the least analytical attention. Stablecoin infrastructure is being positioned as systemic payment plumbing. The GENIUS Act creates the legal foundation for stablecoin issuers to operate as federally regulated payment intermediaries. The Federal Reserve's FedNow service and the legacy correspondent banking system are the existing settlement alternatives. As stablecoin payment infrastructure scales to handle institutional transaction volumes, pension funds will encounter it as counterparty infrastructure; as the settlement mechanism for securities transactions, as the payment rail for benefit disbursements, and potentially as a transition-period reserve instrument in cross-border allocation flows.

At each of those contact points, the pension fund encounters an instrument whose reserve architecture is structurally misaligned with its own liability horizon. A pension fund that uses a stablecoin payment rail to settle a long-duration bond purchase is using an instrument backed by 90-day T-bills to facilitate the acquisition of a 30-year asset. The nominal function is settlement. The structural position is a daily rollover of short-duration credit exposure sitting beneath a long-duration obligation. This does not appear on the pension fund's balance sheet under current accounting standards. It appears when the settlement infrastructure fails under conditions that short-duration reserve assets are not calibrated to survive.

The 2022 LDI crisis provides the instructive analogy. The leveraged LDI positions that initiated the spiral were not classified as credit risk in the schemes' risk registers; they were liability-matching instruments. The leverage was in the mechanism, not in the label. The stablecoin payment layer is not leverage in the same structural sense, but the analytical logic applies: an instrument that performs a defined function is not routinely examined for the risks embedded in its underlying asset architecture.

The pricing gap is not in what the pension fund holds; it is in what the pension fund uses, and the instruments used to manage and settle long-duration obligations are now increasingly built on an asset architecture whose duration profile has not been examined against the obligations they serve.

IV. THE REGULATORY AND CREDIT FRAMEWORK FAILURE

The credit rating agencies have not rated the stablecoin infrastructure. Tether's $125.5 billion reserve base exceeds the total assets of every rated government money market fund in the United Kingdom and is comparable in scale to the balance sheets of mid-tier European commercial banks operating under full Basel III capital requirements. The absence of a credit rating is not a size consideration; it is a regulatory classification consequence.

Under the GENIUS Act framework, a permitted payment stablecoin is defined as a payment instrument; not a security, not a bank deposit, and not a structured product. This classification has direct consequences for the credit assessment universe. Moody's

Investors Service, S&P Global Ratings, and Fitch Ratings apply their rating methodologies to instruments within established definitional categories; securities, deposit obligations, structured products, and sovereign instruments. A payment instrument explicitly classified outside those categories does not attract a rating under existing analytical frameworks. As of the first quarter of 2026, none of the three major agencies has published a methodology for assessing stablecoin issuer credit quality against the specific risk dimensions relevant to institutional holders (S&P Global Ratings, 2024; Moody's Investors Service, 2024).

The risk dimensions that a credit methodology for stablecoin infrastructure would need to address are not trivial. Reserve composition verification risk arises from the attestation model used by Tether and Circle, which relies on periodic point-in-time reviews by external accountants rather than continuous audit coverage; BDO USA's Q3 2024 attestation for Tether covers a snapshot position rather than the full quarter's reserve management activity (BDO USA, 2024). Operational risk derives from the concentration of reserve management in a small number of custodians and money market vehicles; the Circle Reserve Fund's $28.7 billion Treasury position is managed through a single BlackRock government money market vehicle, creating a concentration within a concentration (BlackRock, 2024). Redemption risk under stress conditions involves the liquidation of T-bill positions at a scale that could move the short-duration market; simultaneous large-scale redemption demands on the two largest issuers would require the sale of over $130 billion in short-duration Treasuries and money market instruments under time pressure. Legal enforceability risk in cross-border payment contexts remains unresolved; the jurisdictional status of stablecoin redemption claims outside the United States domestic framework has not been tested under stress at institutional scale.

The Basel Committee on Banking Supervision's 2022 cryptoasset standard classified certain stablecoins meeting specific criteria as Group 1b assets eligible for preferential capital treatment under bank capital frameworks (BCBS, 2022). This addresses the bank-side exposure question. It does not address the structural position of the stablecoin reserve complex within sovereign debt markets, which is the variable relevant to defined benefit liability management.

The prudential regulatory gap extends further. In the United States, the GENIUS Act establishes the Office of the Comptroller of the Currency as the primary federal supervisor

for nationally chartered stablecoin issuers, with state regulators retaining oversight of state-chartered issuers meeting the relevant thresholds. Neither supervisory framework has published prudential standards for assessing the aggregate yield curve effects of stablecoin reserve composition at scale. The Financial Stability Oversight Council has not designated any stablecoin issuer as a systemically important financial institution; a designation that would trigger enhanced prudential supervision under Title I of Dodd-Frank and, more relevantly for this analysis, would require systemic risk assessment incorporating the issuer's structural position in short-duration sovereign debt markets (FSOC, 2024).

The defined benefit supervisory bodies; the Pension Protection Fund and The Pensions Regulator in the United Kingdom, the Pension Benefit Guaranty Corporation in the United States, De Nederlandsche Bank in the Netherlands; have likewise produced no guidance on the interaction between stablecoin payment infrastructure and defined benefit liability-matching frameworks. The Investment Association's annual survey of UK investment management practice makes no reference to stablecoin infrastructure as a structural variable in liability-driven investment frameworks (Investment Association, 2023).

The absence of analytical framework is institutional, not incidental; the distance between the supervisory categories that currently exist to identify structural risk and the categories that would be required to price the interaction this paper describes represents the specific gap that the next iteration of regulatory review will need to close.

CONCLUSION

The GENIUS Act's reserve framework and the defined benefit sector's liability-matching framework have not been designed to interact. They interact regardless.

The argument developed in this paper is not that pension funds are directly exposed to stablecoin credit failure. Direct holdings of stablecoin instruments by defined benefit funds remain negligible, and fiduciary frameworks in most jurisdictions would constrain such holdings even as the regulatory classification of stablecoins evolves. The argument is structural and operates at the level of markets rather than portfolios.

A payment stablecoin reserve pool that is legally mandated to concentrate at the short end of the sovereign yield curve is a structural buyer whose existence compresses short yields relative to long yields, steepening the curve at the margin and, at projected scales of $1 trillion or above, creating conditions that are measurably adverse for long-duration liability matching. The direction of the effect is deterministic given the architecture. The magnitude is a function of scale, and the scale trajectory is established by legislation rather than by market choice.

The credit and prudential frameworks that protect defined benefit beneficiaries are not calibrated for this dynamic. The rating agencies have no methodology for the instruments. The systemic risk framework has produced no designation. The pension supervisory bodies have produced no guidance. These are not temporary gaps pending normal regulatory catch-up; they reflect a classification problem in which the stablecoin infrastructure sits outside the definitional categories that existing risk frameworks use to assign analytical responsibility.

The fiduciary consequence for defined benefit trustees is specific. The duty of care governing long-duration liability management requires that trustees understand the structural conditions of the markets their liability-matching strategies depend on. A structural change in the composition of short-duration sovereign debt demand at the scale the GENIUS Act architecture is designed to produce is a material variable in the yield curve environment those strategies operate within. The absence of published guidance from credit agencies, prudential supervisors, and actuarial bodies does not relieve the fiduciary obligation to account for it; it makes the obligation harder to discharge, because the analytical tools required have not been built.

The task ahead is not to reverse the stablecoin payment infrastructure or to resist the integration of digital monetary instruments into institutional settlement systems. Both developments are further along than any supervisory intervention could arrest. The task is to build the pricing framework that currently does not exist; aggregate yield curve impact modelling for stablecoin reserve composition, credit assessment methodologies for stablecoin issuer risk dimensions relevant to institutional holders, and integration of stablecoin settlement infrastructure exposure into defined benefit prudential standards.

The actuarial frameworks governing defined benefit liability management were built for a world in which the primary structural participants in sovereign debt markets were central banks, sovereign wealth funds, primary dealers, and the money market fund complex. That world now includes a payment infrastructure layer whose reserve architecture is legally designed to operate at the short end of the yield curve at a scale that the existing pricing frameworks were not built to accommodate; and the calibration gap between what those frameworks model and what the market now contains is the structural risk that no existing institution has yet been assigned to close.

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