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Collateral cash

Time for a rethink

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Alastair Sewell
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Main responsibilities

Alastair is responsible for developing and executing the firm's liquidity solutions business strategy, covering money market funds through to ultra-short duration bond funds. In this newly created role, he leads the strategy's external relationships, drives new product launches, produces research and content and supports portfolio managers in achieving performance targets.

Experience and qualifications

Alastair joined Aviva Investors from Fitch Ratings, where he was head of fund ratings, responsible for producing ratings and research on money market and short duration bond funds in EMEA and Asia Pacific. Prior to this, he was a CDO rating analyst in Fitch's structured credit group. Alastair started his career at a UK local authority in 2003.

He holds a BSc in Biology from the University of Bristol, an MBA from the University of Bath and a CFA Institute Certificate in ESG Investing. Alastair is a CFA charterholder.

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Introduction

The sharp sell-off in gilts in late September 2022 placed a significant liquidity strain on many investors, notably pension schemes and insurers, as they sought to raise cash to meet margin calls. The episode raises important questions about the size of collateral pools and the liquidity of assets in those pools during stressed market conditions.

We believe a re-think of collateral cash management practices and allocations is urgently needed.

In this paper, we set out why a carefully considered allocation to high credit-quality cash and cash-like mutual funds can provide investors with optimal all-weather liquidity, while providing stable returns above cash.

Market developments in September 2022

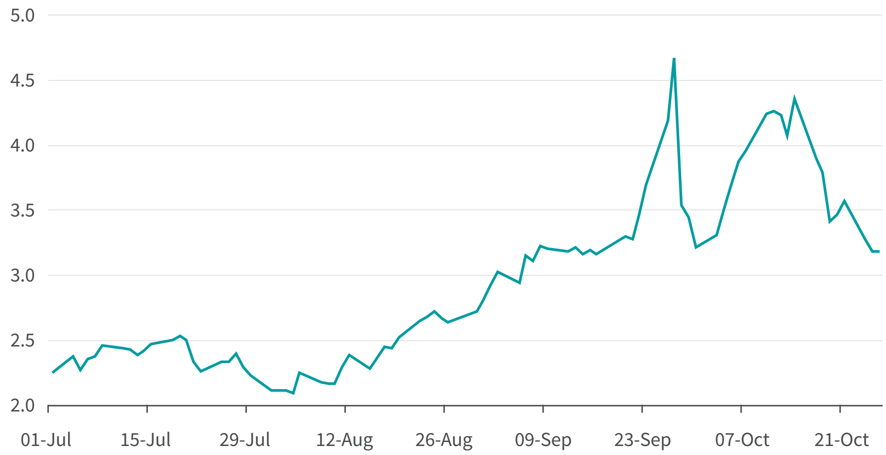
The UK gilt market experienced significant volatility in late September and early October 2022. Our recent article *When the numbers don't add up*[1] provides a deep-dive review of these events – and lessons to be learned.

In summary, and with specific reference to collateral portfolios, gilts sold off sharply, posting sequential one-day movements well in excess of prior stress periods. Investors – notably liability-driven investment schemes (LDI) — were forced to post increased collateral against their levered gilt exposures.

Following the Bank of England's intervention, the rally was as sharply positive as the preceding days' moves had been negative. Collateral cash duly flowed back to investors. In the Bank of England's words, once again the event highlighted a case of "poorly-managed leverage".[2]

The sharp sell-off in gilts in late September 2022 raises important questions about the size of collateral pools and liquidity during periods of market stress

Figure 1. **Volatility in 50-year gilts, 2022**



Source: Bloomberg; 50Y Gilt Index: GTGBP50YR Corp. Data as of October 26, 2022.

1. 'When the numbers don't add up: UK learns painful lesson not to buck the market', Aviva Investors, November 8, 2022.
2. 'Risks from leverage: how did a small corner of the pensions industry threaten financial stability? – speech by Sarah Breeden', Bank of England, November 7, 2022.

Core principles of collateral portfolios

Investors with levered[3] gilts exposure hold collateral against these exposures to meet potential movements in variation margin. The key principle of a collateral portfolio is that its realisable value should always be greater than variation margin requirements. While the concept is simple, like many things in life, the reality can be complex (we provide a technical approach to sizing collateral cash in *Technical approach to sizing collateral portfolios*).

The key principle of a collateral portfolio is that its realisable value should always be greater than variation margin requirements

When a variation margin call depletes collateral levels, investors need to sell potentially less-liquid assets to raise additional cash to restore collateral balances and meet potential future margin calls. This (perfectly rational) behaviour contributed to price pressures in September 2022, as investors sold securities *en masse* to raise cash to meet current and future variation-margin requirements. While investors had sufficient assets to meet margin calls, the issue was accessing those assets in a timely manner. It was a classic issue of (available) liquidity as opposed to solvency.

Collateral risks revealed

Investors were wrongfooted by two key risks in September: the behaviour of assets held for collateral purposes and the magnitude of the stress itself.

- **Wrong-way risk** is the risk of negative correlation between two linked exposures.[4] In September, banks were exposed to wrong-way risk as the ability of pension scheme counterparties to meet margin calls decreased at the same time as the collateral (gilts) posted against gilt swaps and repurchase agreements itself decreased in value. As margin calls increased, liquidity buffers were quickly exhausted and investors were forced to sell collateral securities, such as gilts, to raise cash, causing further price declines and additional margin requirements. A vicious cycle ensued.

  Another way of putting this is that the lack of diversification between the collateral and the levered asset exacerbated the price declines.

  These issues were further compounded by the fact margin is typically valued *daily* and required as *cash*. If variation margin requirements increase, securities need to be realised as cash to meet margin requirements, and potentially realised quickly. Selling securities will raise cash, although in stressed market conditions the price impact of selling securities may be material, particularly where securities are higher risk and/or less liquid. This process also takes time: bonds usually settle at T+2 (i.e., proceeds arrive two days after a sale has been agreed).

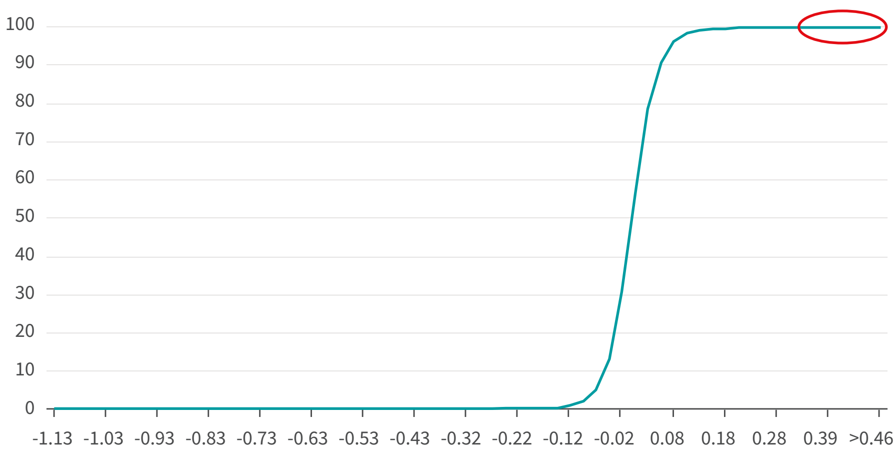
  Alternatively, securities can be lent out under a repurchase agreement by schemes with the relevant legal agreements. In stressed market conditions, only the highest-quality assets will be in demand in the repo market, and even these may be subject to significant haircuts, but, of course, the underlying economic exposure is retained.

3. Typically created through the use of swaps or repurchase agreements.
4. Normally associated with repurchase agreements: the risk that an adverse credit event affects both the counterparty and the collateral simultaneously. A repurchase agreement is where one party lends securities to another party for a pre-defined periods of time in exchange for cash. The amount of securities provided will typically exceed the amount of cash lent, with the difference being the repo rate (or haircut).

- **The size of the stress** meant actual margin calls severely depleted, or potentially even exceeded, available collateral levels. This is because the risk models used to determine collateral requirements are typically calibrated to historical distributions and/or to specified prior stress scenarios, such as the 2008 global financial crisis.

The moves in gilt prices in late September 2022 broke prior records. In fact, four of the five largest ever one-day gilt-yield movements occurred in short succession in late September and early October (the other occurred at the onset of COVID-19 in March 2020).

Figure 2. **Most extreme one-day yield increases in 50-year gilts concentrated in September 2022 (per cent)**



Source: Bloomberg; 50Y Gilt Index: GTGBP50YR Corp. Data as of October 26, 2022.

Risk models used to determine variation margin values will now be updated to factor in this latest period of stress. These models will show higher levels of collateral are needed in extreme scenarios. Scheme advisers and trustees may respond to the event itself and higher variation margin outputs from risk models by *increasing* absolute levels of collateral, to ensure they have sufficient collateral to accommodate a similarly stressful event in future.

This approach would lead to schemes holding *very high* levels of collateral, which will inevitably be factored into the overall scheme asset allocation and, ultimately, performance.

An alternative approach: Cashflow-driven investing

Liability-driven investment schemes are typically split between (levered) liability matching assets and growth assets, therefore requiring a basket of collateral assets. We believe there is an alternative: starting with the future cashflow needs of the scheme and working back to the optimal portfolio.

Such an approach will tend to favour the certainty (subject to probability of default) of fixed-income securities.

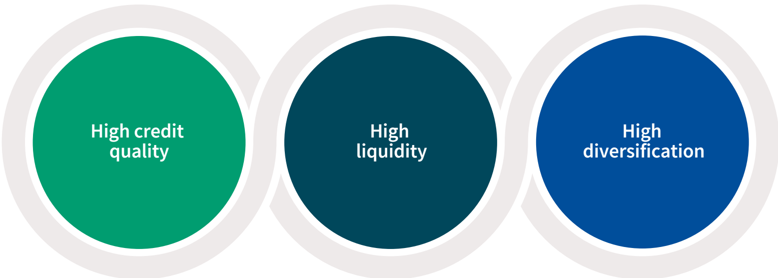
The standard approach to collateral portfolio construction is flawed

Recent events have shown standard collateral portfolios are not fit for purpose. A standard collateral portfolio will typically comprise a relatively modest liquidity buffer in combination with a larger basket of securities, typically gilts in the case of UK pension schemes. We know liquidity buffers were insufficient to cope with variation margin requirements, while collateral securities fell in price at the same time as the assets they were collateralising.

We believe investors can create a better structured collateral portfolio by using high credit-quality, liquid and diversified mutual funds.

Idealised collateral portfolio allocation

To create an idealised collateral portfolio, we need to solve for the following factors:



We believe the best way to solve these for these parameters is with mutual funds, money market funds (MMFs) in particular, complemented by related funds offering incrementally higher risk-adjusted yields.

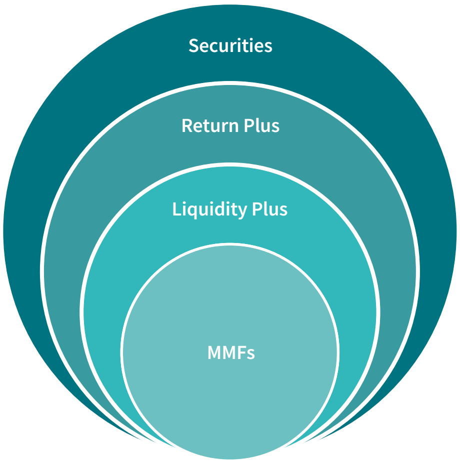
Mutual funds in LDI schemes

Mutual funds can be used effectively as part of an LDI strategy. Mutual funds, particularly MMFs, provide extremely high levels of transparency, allowing LDI managers to manage risks effectively, and offer high frequency redemption and short settlement times (typically T0).

Delegating authority for external fund use is simple, providing clarity on the accessibility and timing of proceeds from the use of mutual funds.

In contrast, dedicated securities portfolios will face time delays in liquidation and require additional management oversight.

Figure 3. **Optimal collateral portfolio composition**



Note: indicative only.
Source: Aviva Investors, November 2022.

Money market funds

We believe MMFs also known as liquidity funds, should be at the core of collateral portfolios. MMFs provide diversified exposure to the highest credit-quality and shortest-dated securities issued by governments and/or financial institutions.

Strict regulation means they must maintain very high levels of naturally liquid securities (i.e., securities with near-term maturities, thus reducing the reliance on secondary sales). Funds will typically be diversified, mitigating adverse developments at any one issuer or geography. We provide more details on MMFs in *Types of MMFs*.

Being high credit quality and liquid means MMFs are actively used by investors for cash management. MMFs settle same-day (T0), meaning investors can redeem and receive cash *on demand*.

MMFs will typically be diversified, mitigating adverse developments at any one issuer or geography

Types of bank deposits

Bank deposits come in many different formats, with the result that cash may not necessarily be instantaneously available. From an accounting perspective, it is worth noting cash deposited with banks for up to 90 days may be considered "cash". However, in practical terms, if held as a time deposit, this cash may not be accessible on demand.

- **Current account:** Liquidity available on demand.
- **Call account:** Liquidity available on demand, typically with a pre-agreed notice period.
- **Certificate of deposit (CD):** Typically available to large institutional investors only. A certificate of deposit is a tradeable instrument so can, in theory, be readily liquidated, typically via the issuing bank buying its paper back. However, practical experience shows liquidity in these instruments can be patchy for both calendar (notably at quarter-ends) and market volatility reasons.
- **Time deposits (TD):** These can typically not be redeemed before maturity, locking the investor in until that date.

Source: Aviva Investors, November 2022.

Sterling MMFs provided liquidity as intended during the recent market stress, confirming their role as the core of a collateral portfolio

Sterling MMFs performed well during the September 2022 market stress. Sterling MMF assets in aggregate declined by around ten per cent, from around £202 billion on September 23 (the date of the mini budget) to a trough of around £191 billion on September 28.

This fall was well within historic norms, and, perhaps more importantly, well within the minimum *daily* regulatory liquidity requirements for MMFs. Regulatory rules mean MMFs *must* hold at least ten per cent daily and 30 per cent weekly liquid assets (depending on the precise type – see *Types of MMFs*) and fund managers will typically hold a buffer above this threshold. In other words, the liquidity demand on MMFs was easily met.

Sterling government MMFs also held up well. These funds typically hold short-dated (under one year) gilts and overnight gilt-backed reverse repos. These securities – bills in particular – experienced negligible volatility during the stress period, reflecting the fact the market stress was primarily in longer-dated conventional and inflation-linked bonds.

Compared with the potential for cash being trapped in bank time deposits and the loss realised on sales of long-dated gilts, MMFs provided liquidity as intended, confirming their role as the core of a collateral portfolio.

Liquidity Plus and Return Plus

The Aviva Investors Sterling Liquidity Plus and Return Plus Funds provide “step-out” exposures to complement core MMF exposure. Step-out exposures such as these invest in a mixture of bonds and money market instruments and benefit from an array of tools to **diversify liquidity effectively**, generating stable returns above cash.

These funds settle at T+2 and T+3 respectively, allowing them to be factored into a liquidity ladder, compared with T0 settlement for MMFs.

A key challenge for investors in considering step-out strategies in collateral pools is that they can be hard to identify correctly. Many investors will look to short-term bond funds as their primary tool for stepping out from core MMF allocations. However, short-term bond funds are a large and disparate group, encompassing materially different risk profiles.

While traditional short-term bond/credit strategies can provide the potential for greater returns through higher yields and spread duration compared with funds like Liquidity Plus and Return Plus, they do not offer the combination of liquidity and stable returns above cash. Investors may consider looking for the following features in selecting step-out strategies to complement MMFs in their collateral portfolios:

- **High credit quality:** Cash optimisation funds will allocate to high credit-quality issuers only. Unfortunately, however, numerous short-term bond funds have high exposure to either high yield (HY, rated BB+ or lower) or “crossover” (BBB-BB category range) bonds because these typically have low duration. In our view, the default and market risk inherent in these securities renders them unsuitable for collateral portfolios.
- **Meaningful liquid asset allocations:** Any fund used in a collateral portfolio must have high liquidity. Liquidity buffers should comprise money market instruments, cash at hand and selective government bond exposures (more on this below). This allows funds to meet normal redemptions and reduce the need to sell securities in extreme scenarios, contributing to pricing stability.

- **Novel diversification:** Mutual funds must adhere to diversification rule sets, establishing minimum standards. Fund managers will go further, building large portfolios with many different issuers, industries and securities. Unfortunately, there can still be concentrations affecting the availability of liquidity. We identified two important features of the recent stress period:

  a. **It was a sterling event.** Liquidity in other markets remained largely unaffected by issues in the sterling market. Funds with (hedged) exposure to Japanese government bonds, such as Return Plus, were readily able to sell those bonds and unwind the FX hedge, thus realising unimpaired sterling liquidity.

  b. **Not all asset classes were affected in the same way:** The event was concentrated in the gilt market, with spill-over effects to sterling corporate bonds. We found, however, certain areas of the sterling asset-backed securities (ABS) market remained liquid. This is consistent with broader industry analysis and trends – a recent report from AFME found meaningful differences in liquidity between corporate bonds, covered bonds and ABS, with the latter two demonstrating more liquidity.[5]

     Our allocations to high-quality securitisations in Liquidity Plus therefore presented a novel source of liquidity. While perhaps counterintuitive, this was driven by the concept of diversification. Bank treasuries have played an important role in the ABS market, notably after the implementation of the Simple Transparent Securitisation (STS) regulation. Bank treasuries were largely unaffected by the pressures affecting pension funds and insurers and, as such, remained willing and able to buy securities if needed. Superior liquidity is not simply a matter of asset class or issuer: it extends to the investor base.

- **Cash benchmark:** Liquidity Plus and Return Plus are benchmarked to cash. While this may be stating the obvious, it is also critical because many short-term bond funds will be benchmarked to a government or corporate bond index.

  This distinction is important, because index-benchmarked funds will typically position relative to the index, meaning that if index duration is long, so too will be the fund's duration relative to it. Or, in other words, the vagaries of index movements and position will feed through to the fund, potentially causing an unintended long-duration exposure. In a rising rate environment, increased duration will be negative for pricing, negatively affecting realisable value (i.e. liquidity) in non-cash benchmarked funds.

  By benchmarking to cash, these funds also match well to investors with a cash benchmark for their liabilities. For insurance investors, Return Plus also benefits from a low Supplemental Capital Ratio due to its high credit quality and low duration focus.

Superior liquidity is not simply a matter of asset class or issuer: it extends to the investor base

5. Comparing CB, ABS and Corporate Bond Liquidity', AFME, November 8, 2022. "Corporate bonds are clearly less liquid than covered bonds over the whole sample period of March 2012 to June 2021. Corporate bonds are more liquid than ABS in 2013 but, thereafter, ABS are more liquid."

Unintended risks

Institutional funds investing in trade and supply chain receivables have grown in prominence recently and, in some cases, are presented as potential components of a cash optimisation strategy.

We do not think these funds should form a material part of any collateral portfolio or broader cash optimisation strategy. While trade receivables are typically short-term instruments and, as such, may appear suitable for short-term funds, they are also, by definition, illiquid until maturity.

Furthermore, they may have structural complexities affecting their risk-return profiles. While they may be appropriate for some investors, the structural illiquidity makes them ill-suited to a collateral cash portfolio.

Securities

Direct holdings of securities can of course be an important part of a collateral portfolio, but we would argue they should not be the mainstay of the portfolio given the issues encountered in the recent market stress.

Key takeaways

The economist and Nobel Prize winner Harry Markowitz famously described diversification as the only free lunch in investment.

Typically, diversification is thought of in terms of returns, but is equally applicable to liquidity. Multi-faceted diversification of liquidity sources is key to a well-balanced collateral portfolio.

We believe investors may consider an allocation to our MMFs, Liquidity Plus and Return Plus fund, not only as a means for improved liquidity, but also to generate attractive, stable returns above cash.

The time to act is now: an interim allocation to MMFs while implementing a revised strategic asset allocation framework, integrating laddered liquidity solutions, would be a prudent step for investors.

Multi-faceted diversification of liquidity sources is key to a well-balanced collateral portfolio

Appendix

Technical approach to sizing collateral portfolios

The size of collateral portfolios can be determined formulaically by solving for a required level of variation margin. This can be stated with the following *inequality*.[6]

$$\textit{Required Variation Margin}_t \leq \sum_t W_k \; x \; S_{t,k}$$

Where *t* is the time period in which the variation margin is needed, *w* is the liquidity weight of instrument *k* in the overall asset allocation, and *s* is share of the security in the portfolio at time *t*.

It is worth bearing the *t* in mind in relation to the risk of sequential increases in margin requirements, or, conversely, in planning a liquidity ladder with known fund or security settlement times.

In formulaic terms, *w* in the formula above was negatively correlated with variation margin in September 2022 because many collateral pools had a high allocation to gilts, the very asset under stress. As investors sold gilts to raise variation margin, gilt prices (i.e. the liquidity weight) fell further, increasing variation margin requirements.

Clearly the concentration of risk exposure was negative. The resulting wrong-way risk could have been mitigated with improved diversification (itself a core concept under the Basel III High Quality Liquid Asset (HQLA) requirements). We would suggest the inequality presented above could be enhanced through the addition of a correlation factor to consider how portfolio diversification will factor into variation margin availability.

The liquidity weight, then, is the key complexity – as the recent market stress showed, liquidity did not behave as expected, at least from a regulatory perspective. The UK (AA-/Aa3/AA[7]) would have a 100 per cent liquidity weight in the table presented by the International Monetary Fund (IMF) below. Similarly, under the Basel III Liquidity Coverage Ratio, sovereign exposures like the UK would have a zero per cent haircut for HQLA purposes and be eligible to constitute 100 per cent of a HQLA portfolio by virtue of being a Level 1 asset.

In practical terms, liquidity is a spectrum, comprising assets of higher or lower liquidity. Currency, geography, industry and many other factors influence an issuer's liquidity and, indeed, a given security's liquidity. Furthermore, liquidity is temporal: it will vary over time, with potentially novel sources of liquidity arising where conventionally assumed liquidity becomes parched. In September 2022, STS assets proved liquid, where gilts suffered material liquidity issues.

6. Antoine Bouveret, 'Liquidity stress tests for investment funds: A practical guide', International Monetary Fund, October 31, 2017.
7. AA-/Aa3/AA from Fitch/Moodys/S&P. Data as of November 8, 2022. Outlooks Negative in all cases.

IMF liquidity weights

Figure 4. **Liquidity weights (per cent)**

Credit quality	Cash	Sovereign bonds	Corporate bonds	Asset-backed securities	Equities
AAA to AA-	100	100	85	85	50
A+ to A-	100	85	50	50	50
BBB+ to BBB-	100	50	50	0	50
Below BBB-	100	0	0	0	50

Source: IMF, 2017.

Ultimately, investors need to actively factor liquidity considerations into their overall asset allocation, ensuring they have readily liquid assets in sufficient size to meet a variation margin call resulting from stressed market conditions.

However, the increasing focus on liquidity does not have to mean forgoing high-quality, stable returns above cash. Just as liquidity can be optimised in collateral portfolios, so too can returns.

Types of MMFs

There are four different type of MMFs available under applicable European regulation. Of these, three classify as "short-term" MMFs and the fourth is known as the "standard" type.

Short-term MMFs

The three short-term MMF types are as follows:

1. **Public debt constant net asset value:** Holds government debt only. Can offer a stable value per share.

2. **Low volatility net asset value (LVNAV):** Holds government and bank paper. Can offer a stable value per share. Must hold at least ten per cent overnight liquidity and 30 per cent weekly liquidity. In practical terms, funds tend to hold buffers of liquidity above regulatory minima.

3. **Variable net asset value (VNAV):** Holds government and bank paper. Offers a variable value per share only. Lower minimum liquidity requirements than LVNAV per the regulation (7.5 per cent overnight and 15 per cent weekly, but again, typically with a buffer over and above regulatory minima).

Standard MMFs

The primary difference between standard MMFs and short-term MMFs is the maturity profile. Where short-term MMFs can only buy securities with maturities of up to one year, standard MMFs can buy securities of up to two years. Following from this, standard MMFs can operate with interest rate duration up to 180 days compared with 60 days in short-term MMFs and spread duration (i.e. to final maturity) of 365 days compared with 120 days for short-term MMFs.

In practical terms, standard MMFs can offer a credit profile highly comparable to that of short-term MMFs but with incrementally higher maturity exposure. Just like short-term VNAV MMFs, standard MMFs must maintain at least 7.5 per cent overnight and 15 per cent weekly liquid assets.

The Aviva Investors liquidity solutions range

Figure 5. **Aviva Investors liquidity solutions fund range**

Type	Aviva Investors Sterling Government Liquidity Fund	Aviva Investors Sterling Liquidity Fund	Aviva Investors Sterling Liquidity Plus Fund	Aviva Investors Return Plus Fund
Indicative yield	SONIA	SONIA	SONIA + 25	SONIA + 75
Fund rating	AAA	AAA	AAA	N/A
Minimum credit quality	A1/P1/F1	A1/P1/F1	A/A2/A	Corp: AA- Sov: A-
Interest rate duration	<60 days	<60 days	<1 year	Negligible
Minimum weekly liquidity*	30%	30%	N/A	N/A
Settlement	T0	T0	T+2	T+3

Note: *Per applicable regulation – actual significantly higher.
Source: Aviva Investors. Data as of November 14, 2022.

Key risks

The value of an investment and any income from it can go down as well as up and can fluctuate in response to changes in currency and exchange rates. Investors may not get back the original amount invested.

Bond values are affected by changes in interest rates and the bond issuer's creditworthiness. Bonds that offer the potential for a higher income typically have a greater risk of default.

Some investments could be hard to value or to sell at a desired time, or at a price considered to be fair (especially in large quantities), and as a result their prices can be volatile.

Investments in money market instruments such as short-term bank debt the market prices/value can rise as well as fall on a daily basis. Their values are affected by changes in interest rates, inflation and any decline in creditworthiness of the issuer.

Investments are not guaranteed, an investment in a Money Market Fund is different from an investment in deposits and can fluctuate in price meaning you may not get back the original amount you invested. This investment does not rely on external support for guaranteeing liquidity or stabilising the NAV per unit or share. The risk of loss of the principal is to be borne by the investor.

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