Marketing communication. Capital at Risk

INDEPTH

Managing Interest Rate and Spread Through Overlay

September 2024

Why manage interest rate and credit spread risk?

Institutional clients, such as pension funds and insurers, have a vested interest in managing interest rate risk as well as credit spread risk due to its potential **impact on their financial assets and liabilities**, and overall profitability. By reducing their sensitivity to interest rate risk, they are able to mitigate potential negative effects on cash flows, investment returns, and balance sheet positions, while effectively **managing credit spread risk. This is important for maintaining the stability and creditworthiness of their balance sheets as well as ensuring their solvency and financial health.**

Managing interest rate and spread risk through overlay strategies allows institutional clients to **customise their exposure to interest rate and credit spread risks**. With the overlay mechanism, institutional clients can **maintain their physical portfolios without any potential accounting impact** (such as forced realised profits and losses) while mitigating drawdown risks.

Insurers face additional constraints due to regulatory requirements. Therefore, reducing exposure to these risks is not only risk management practice but also a regulatory need.

Overlay strategies involve adding a layer of delta one[1] and/or convex derivative[2] positions on top of the existing portfolio to manage specific risks, such as interest rate or credit spread risk.

Benefits and risks

Managing interest rate and credit spread risks could potentially offer **several benefits** for investors.

1 | Interest Rate Risk Management:

- Duration Matching:
  This strategy involves **adjusting the duration of assets to match the duration of liabilities**, and hence eliminating the sensitivity of the portfolio of both assets and liabilities to changes in interest rates. By aligning the durations, institutions could minimise **the impact of interest rate fluctuations on their net worth or balance sheet.**

- Hedging with Derivatives:
  Institutions can use various derivatives, such as futures, options, and interest rate caps or floors, to hedge against interest rate risk. These instruments aim to **protect against adverse rate movements, without having to restructure the underlying portfolio.**

- Yield Curve Strategies:
  These strategies involve adjusting the portfolio to capitalise on expectations regarding the level (parallel shift), the slope (steepening or flattening) or the shape (curvature) of the yield curve, to try to take advantage of specific forecasted interest rate movements.

2 | Credit Spread Risk Management:

- Hedging with Derivatives:
  Credit derivatives such as Credit Default Swaps (CDS) can be used to hedge credit spread risk. A CDS, for example, provides protection against the default of a particular issuer, allowing the institution to transfer credit risk to another party and protect against adverse credit spread movements, all without needing to restructure the underlying portfolio.

Other considerations:

- Cost of Hedging:
  Main associated costs are the costs of carrying options which is added to the premium paid, transaction costs, bid-ask spreads, and potential margin requirements to finance. They can also have a negative impact on the return as the exposure to risky assets may be lowered. Institutions must weigh these costs against the potential benefits of reducing risk.

- **Operational Capabilities:**
  Effective implementation of such overlays requires extended and robust operational capabilities, including a seamless integration of the various systems dedicated to risk measurement, monitoring and reporting, and compliance proto cols.

By conducting stress tests and scenario analyses, institutions can assess the potential impact of various interest rate and credit spread scenarios on their portfolios. This helps in identifying vulnerabilities and preparing appropriate risk mitigation strategies. The chosen risk management overlays should then be flexible enough to adapt to changing market conditions, specific portfolio changes, as well as internal policy or regulatory changes. The need to rebalance regularly the portfolio is key to maintaining alignment with the objectives and responding efficiently to changes in market conditions and regulations.

AXA IM's Key Rate Duration with Wedge scenarios hedging approach

A linear combination of interest rate futures or interest rate swaps (IRS) and CDS may be used to hedge a fixed income portfolio against changes in interest rates and credit spreads. The **standard hedging approach** ("Modified Duration" approach) involves determining within the linear combination the optimal weight of each hedging instrument, **based on their average duration** relative to that of the portfolio to hedge.

We use the **"Key Rate Duration"** approach that we apply for both interest rates and credit spreads. This method targets a **more precise assessment** of interest rate and credit spread risks by **measuring the sensitivity of a fixed income portfolio's value** to changes in specific interest rates or credit spreads **at given key maturity points along the yield curve** (also known as "Key Rates").

Unlike the "Modified Duration" approach, which assumes a parallel shift in the yield curve, the "Key Rate Duration" approach aims to provide a **more granular** and hence effective view of interest rate and credit risks. This is achieved by acknowledging that changes in interest rates or credit spreads **can occur independently at different maturity points**. To complete our approach, we consider **"wedge scenario"** as an appropriate approach. (see the box).

Advantages of the Key Rate Duration approach

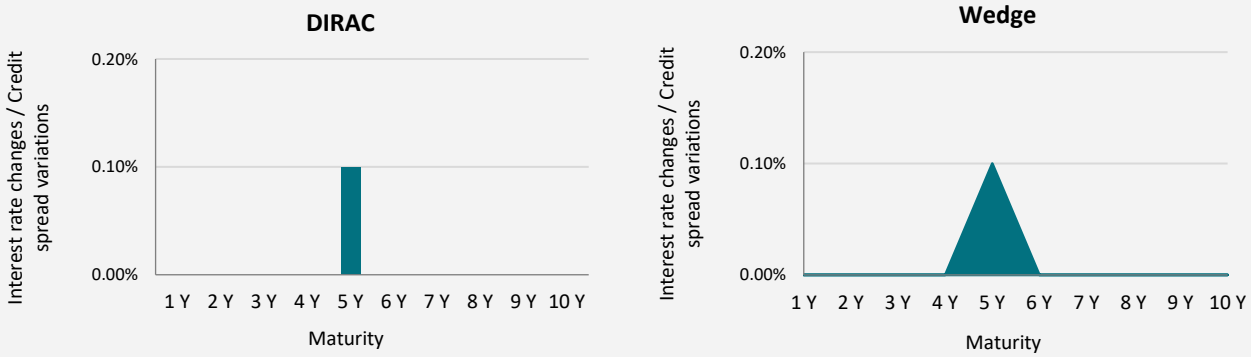
Precision:
This granular approach offers a clear quantification of the exposures across the curve, allowing for precise hedging by targeting specific points along the curve in question.

Reduction of Basis Risk:
Basis risk usually arises when there is a mismatch between the financial characteristics of a hedging instrument and a portfolio to hedge. The "Key Rate Duration" approach mitigates this risk by aligning the portfolio's specific interest rate/credit spread exposures with the key rate/credit spread sensitivities of the hedging instruments. This alignment aims to allow the hedging overlay to be more efficient in matching the portfolio's risk profile, thereby reducing potential basis risk.

Flexibility and adaptability:
The "Key Rate Duration" approach allows for flexible and dynamic adjustments to hedging based on changes in market conditions (curve inversion / steepening / flattening). As yield curve dynamics shift or the portfolio composition changes (such as because of restructuring or growth), the overlay constituents can be recalibrated to account for the new key rate sensitivities. This adaptability is crucial in volatile interest rate environments, especially when non-parallel yield curve moves are significant over a small period.

Dirac or Wedge

While the "Dirac" approach focuses on instantaneous and isolated shifts (interest rate or credit spread) at specific maturity points of the curve, the **"Wedge"** approach favoured by AXA IM **replicates realistic market movements by applying simultaneous changes at multiple points along the curve.**



Source: AXA IM as of September 2024. For illustration purpose only.

To illustrate the method's difference, the Dirac scenario (shown on the left) represents a sudden and significant movement of +0.10% increase in the 5Y rate (or spread), without affecting nearby tenors. In comparison, the same scenario under the wedge method (illustrated on the right) would reflect how changes in the 5 Y rate can impact the interest rates level of nearby tenors (from the 4Y rate to the 6Y rate).

Thanks to this combined methodology of Key Rate duration and wedge scenario, the overlay manager can customise the number and place of scenarios according to yield curve expectations and the overall structure of the portfolio, providing sophisticated modeling capabilities in a fully tailored risk management process.

Advantages of the "Wedge" approach

- **Realistic representation of interest rate movements:** Unlike the Dirac approach, which is based on instantaneous and isolated shocks, the wedge approach simulates interest rate movements that are more aligned with those observed under normal market conditions, which should make the analysis more relevant.

- **Consistency between modified duration of the portfolio and wedge scenarios:** When these wedge scenarios are considered together, the sum of their contribution allows for a result consistent with the overall duration of the portfolio: it reflects a parallel movement of the yield curve accurately. Our combined method (Key Rate Duration and Wedge scenario) aims to enable a granular approach while also encompassing the full spectrum of the yield curve changes, including parallel shifts. This approach would not be suitable with Dirac-type scenarios as those do not allow for an accurate aggregated reflection of a parallel movement of the yield curve.

Risks of the "Wedge" approach

- The interest rate movements of the yield curve may differ from the ones assumed by this approach, which could impact the efficiency of the hedging overlay.

AXA IM's approach to Fixed Income Hedging

Hedging a credit portfolio means **hedging both interest rate and credit spread risks**. Where **hedging interest rate risk is rather straightforward** in the sense that yield curve currencies help categorise bonds, **mitigating credit spread risk is more complex and challenging.**

Buying or selling protection on a specific bond can be challenging, primarily due to the lack of liquidity. Total Return Swaps on a selected bond index or portfolio is a possibility, although it carries a reduced, but still present, risk of limited liquidity. This can be a major issue depending on the size considered. **AXA IM has developed a unique approach that aims to match the specificities of any fixed income portfolio and manage important sizes when considering liquidity of the instruments.**

We first categorise the interest rate risk by currency, calculating the breakdown of the Portfolio by Sovereign Yield Curve Risk (generally USD, EUR, GBP, AUD, CAD and JPY), then selecting the associated hedging instruments.

The hedging portfolio is primarily calibrated using delta one fixed income derivatives (such as interest rate swap, fixed income futures). Subsequently, we analyse the portfolio by credit curve risk, and select the associated hedging instruments. Buying CDS indices allows for the construction of a credit hedge that aims to closely mirror the credit risk profile of the portfolio. The calibration of the hedging portfolio is carried out using CDS (generally EUR curve or USD curve), but it could be complemented with Total Return Swaps on a bond index. This process involves several steps.

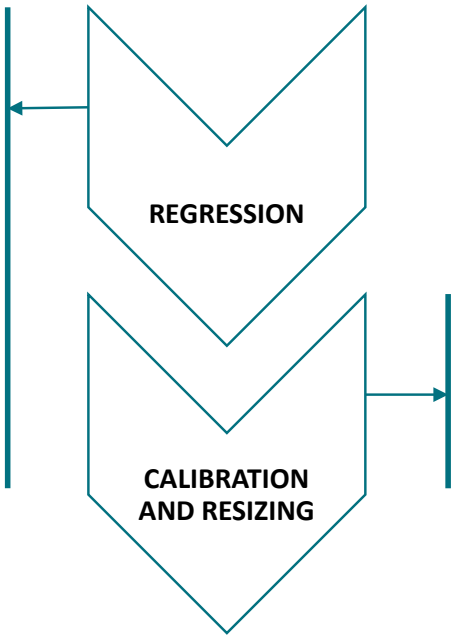
- **Selection of the underlying derivatives through correlation analysis:**

  We analyse the **correlation** between the performance of all the potential eligible underlying derivatives (mainly CDS spreads) and the asset swap spreads of the portfolio to be hedged, in both under **normal market conditions and under stressed market conditions** (such as during Covid 19). We select the ones exhibiting a substantial correlation.

- **Combination of different underlying derivatives:**

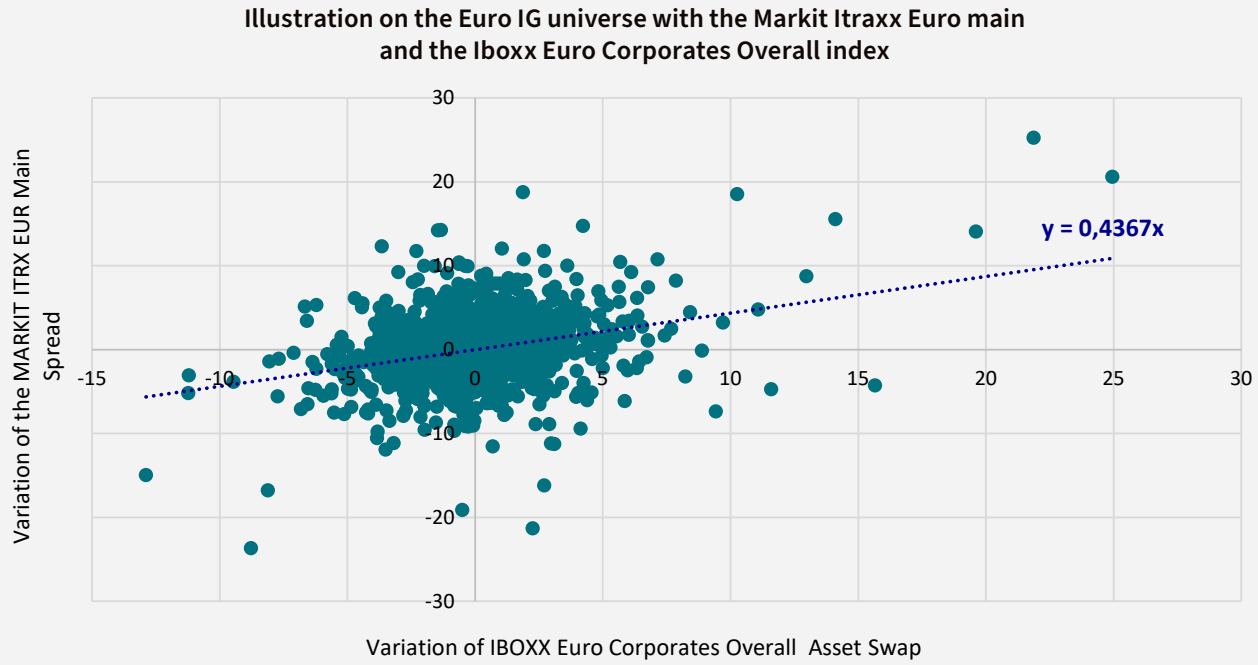
  Express the asset swap spread of the bond portfolio to be hedged as a **linear function of the underlying derivatives trough regression analysis.** As an example, utilise a basket of CDS on various indices, whether investment grade or high yield, to hedge an investment-grade bond portfolio. For a Euro Credit Portfolio: Europe 5-year Main and Europe 5-year Xover:

  $$\Delta ASW_t \approx \boldsymbol{\alpha}.\Delta MAIN_t + \boldsymbol{\beta}.\Delta XOVER_t$$



Calculate the **target notional** amounts of the selected CDS indices to hedge the bond portfolio, based on the previous calculations.

The impact of differences in composition between the hedging instrument and a portfolio to be hedged.

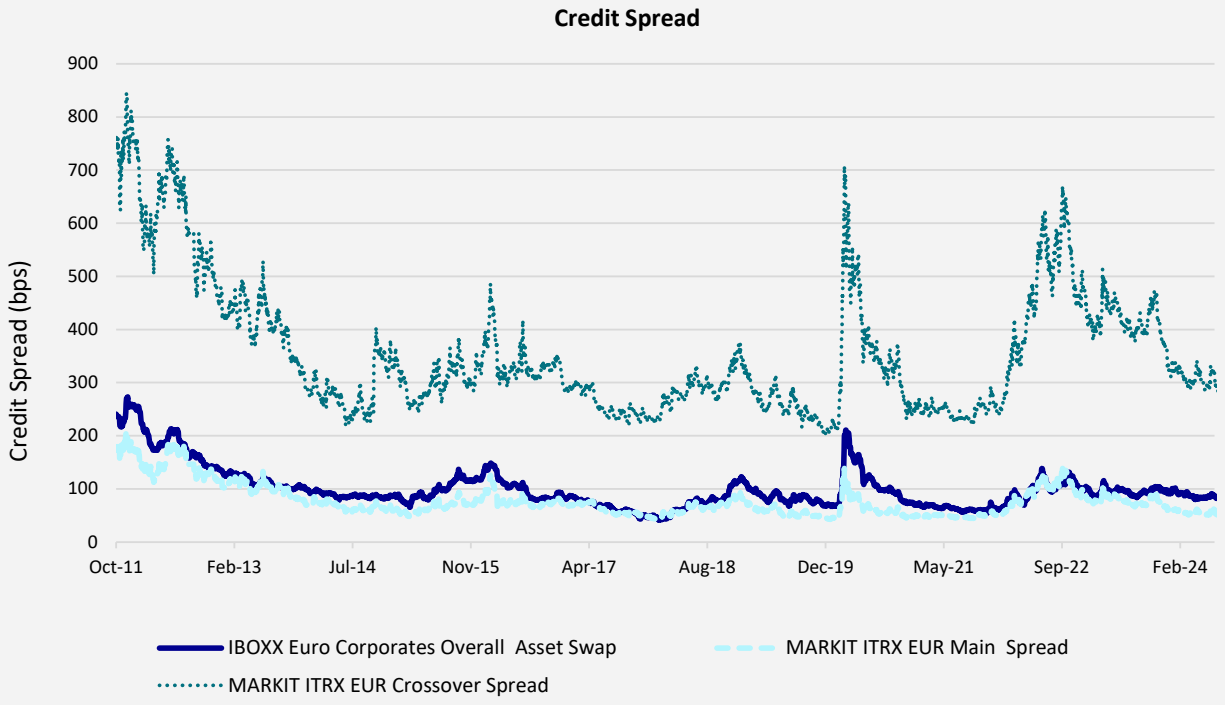


Source Bloomberg, AXA IM. Period from October 11, 2011, to September 4, 2024. For illustrative purposes only.

The logic would be to use the Markit Itraxx Euro Main index to hedge the Iboxx Euro Corporates Overall index. However, as the graph illustrates, this strategy is not ideal. This is because **when the asset swap spread of the Iboxx Euro Corporates Overall index shifts by 1 basis point, the Markit Itraxx Euro Main spread typically moves by only half of a basis point.** This difference is due to the difference in composition of the underlying: over 3,500 for the Iboxx Euro Corporates Overall, compared to just 125 for the Markit Itraxx Euro Main. Additionally, the asset swap spread of the Iboxx Euro Corporates Overall index reflects an illiquidity premium, whereas the constituents of the Markit Itraxx Euro Main index are selected for their higher liquidity.

Correlation Analysis

We analyse the correlation between the CDS spreads and the asset swap spreads of the portfolio to be hedged. The graph illustrated that the asset swap spread of the bond index behaves similarly to the Main index spread under a normal market scenario, but not under stressed market conditions.



Source: Bloomberg, AXA IM. Period from October 11, 2011, to September 4, 2024. For illustrative purposes only.

Our conclusion is that including exposure to the Markit Itraxx Euro Crossover Spread could enhance the responsiveness of the hedge, particularly in stressed market conditions.

We prefer this innovative methodology for effectively hedging systemic credit spread risk using liquid and efficient hedging, such as CDS indices.

As an overlay manager, we believe we can provide a unique perspective that sets us apart from other managers, particularly in managing overlays. With visibility into the entire portfolio, including every manager in the lineup, AXA IM receives daily custodial information, enabling adjustments to the client's portfolio based on their asset allocation and investment parameters. This comprehensive understanding of portfolio exposures relative to targets offers valuable insights for clients in managing their top-level exposures.

We aim to offer flexibility throughout the product's lifespan and maintain a collaborative mindset, ensuring customised reporting to meet client needs.

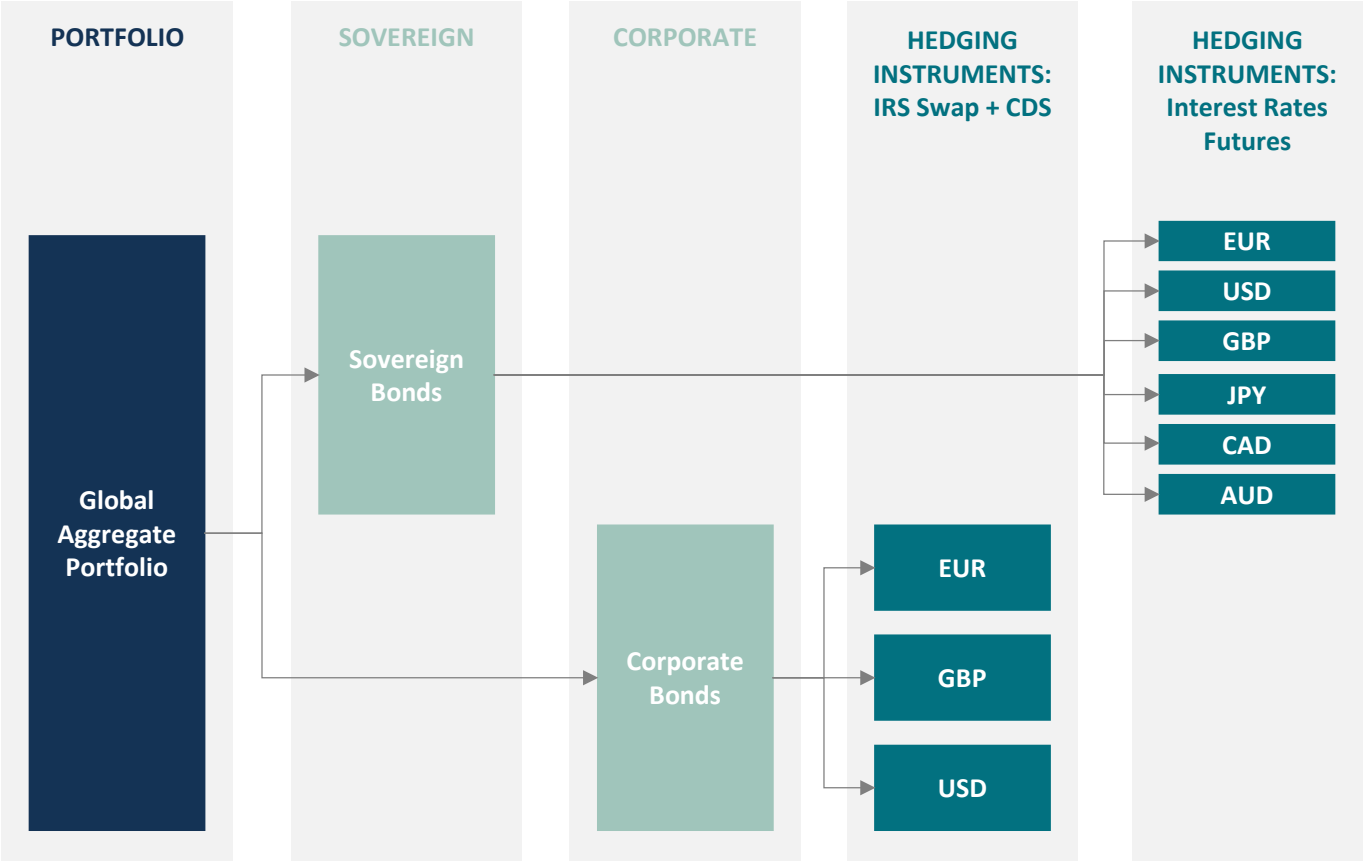
To gain further insight into our credit hedging method, you can refer to the publication "Managing drawdown risks in credit portfolios", detailing the strategy in place which aims to reduce the likelihood of incurring losses in credit portfolios.

APPENDIX

Case Study: Hedging a Global Aggregate Bond Portfolio

Implementation of a Hedging Strategy based on AXA IM's unique approach for a Pool of two Global Aggregate Mandates with Assets Under Management of Approximately €1.3 Billion

Portfolio composition

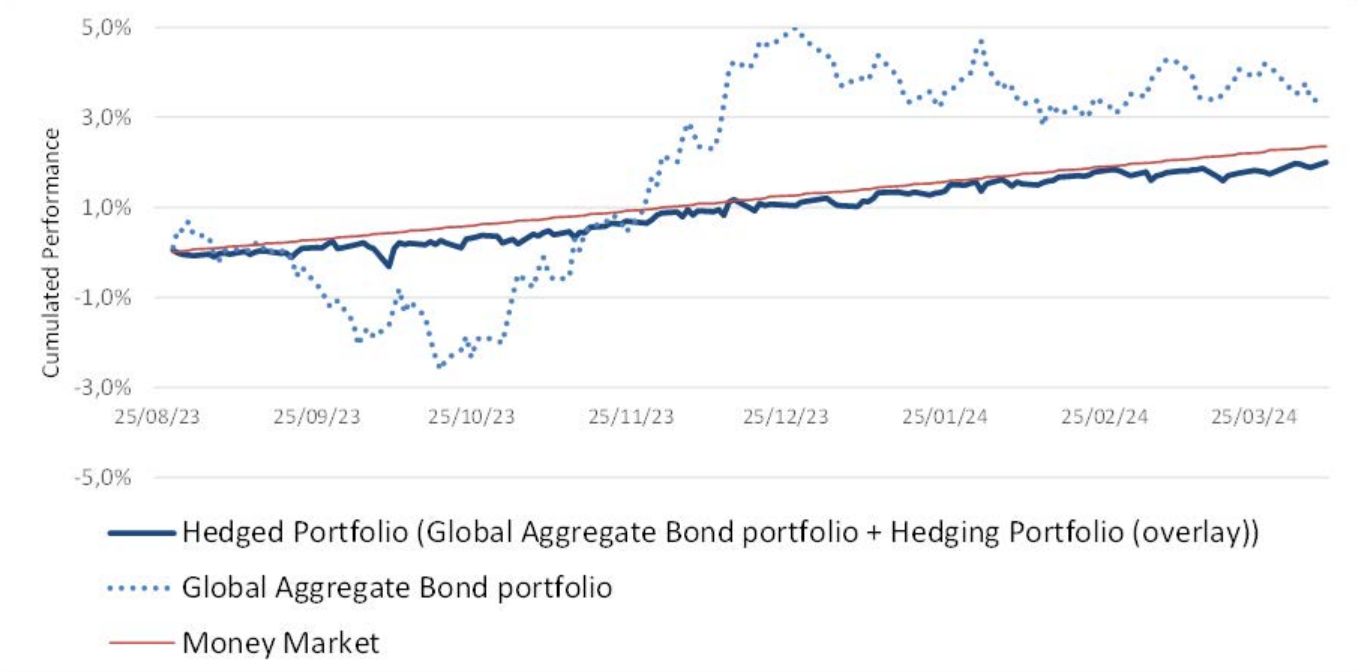


Breakdown of the Portfolio by Sovereign Yield Curve Risk, Selection of Associated Hedging Instruments, and Calibration of the Hedging Portfolio:

- **USD Curve:** US 2Y, 5Y, 10Y and 30Y Futures
- **EUR Curve:** Schatz (2Y), Bobl (5Y), Bund (10Y) and Buxl (30Y) Futures
- **GBP Curve:** UK Gilt 10Y Futures
- **AUD Curve:** AUS 3Y, 10Y Futures
- **CAD Curve:** CAN 2Y, 5Y and 10Y Futures
- **JPY Curve:** JGB 10Y Futures

Breakdown of the Portfolio by Credit Curve Risk, Selection of Corresponding Hedging Instruments and Calibration of the Hedging Portfolio:

- **EUR Curve:** Interest Rate Swap and CDS Itraxx Main & Crossover 5Y
- **USD Curve:** Interest Rate Swap, CDX Main 5Y & 10Y and CDX Crossover 5Y (high Yield)
- **GBP Curve:** Interest Rate Swap



Deployment of the Hedging Strategy (Hedging Portfolio overlay) from 25/08/2023 to 08/04/2024

- The hedged strategy's performance (Global Aggregate Bond portfolio + Hedging Portfolio (overlay)) is close to that of a synthetic money market asset (2% vs 2.34%).
- Controlled risk ratios (Max Drawdown: -0.56%, Volatility: 1.49%) in a context of high interest rate volatility, characterised by a significant repricing of central bank policies.

Sources : Bloomberg, AXA IM as of 8th April 2024 The figures provided are unaudited and are not indicative of future performance. Performance is gross of fees. The performance of the Money Market represents the average performance of money market denominated in Euro.

FOR DEFINITIONS OF INVESTMENT TERMS PLEASE CLICK HERE TO REFER TO *THE GLOSSARY*

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