

Ardea and Solvency II

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INTRODUCTION

Ardea's Relative Value ("RV") strategy seeks to exploit structural inefficiencies in global fixed income markets. Investment returns have historically been uncorrelated with asset classes such as equities, traditional fixed income, and credit. The strategy is therefore a useful source of diversification (incl. volatility reduction) and used by asset owners, in particular insurers, to enhance risk-adjusted returns.

The Solvency Capital Requirement ("SCR") is intended to be a capital protection so that an insurance undertaking can meet their obligations with 99.5% certainty over the next 12 months. As such, it is designed to look at a 12-month window of potential losses.

Relevant to the SCR calculation, Ardea does not take an outright position in interest rate levels, curve steepening, curve twists or credit. Ardea's investment process is governed by an internal risk model with each trade evaluated for its marginal contribution to risk at the portfolio level. Ardea applies a risk balance and risk diversification framework incorporating scenario analysis to avoid concentration to any given risk factor.

Relevant risk statistics of AGAU include:

- 2.09%: ex-post volatility since inception.
- 2-3% ex-ante volatility target
- 0.7%: estimated 1-in-100 year monthly loss based on a third-party value at risk (VAR) model.

HOW ARE DERIVATIVES TREATED UNDER SII?

Derivatives within the framework of Solvency II can be classified into distinct categories, namely risk mitigating, efficient portfolio management, and speculative (described later). These categories are mutually exclusive, and the classification process is explained in the flow chart depicted in Figure 1. Failing to meet the risk mitigating of efficient portfolio management criteria will impose limitations on the utilisation of the derivative. For example, if a derivative

Based on the characteristics above, our interpretation of the relevant standards applicable to the calculation of the SCR suggest our usage of derivatives should be considered Efficient Portfolio Management (EPM) or Risk Mitigating. In particular:

1. Ardea's use of derivatives is designed to explicitly mitigate market risk with the goal of isolating only the mis pricing between securities. As such the return profile is negligibly correlated with market risk factors such as currency, duration, credit and equity market risk.
2. Derivatives are used to improve the efficiency of the portfolio. Specifically, liquidity and protection via optionality.
3. The strategy adheres to the Prudent Person Principle (PPP), being risk constrained with low volatility.
4. A robust risk framework is in place to manage portfolio market risk. Ardea has extensive expertise in the use of derivatives managing relative value portfolios for over a decade.
5. Leverage is subject to the constraints of the UCITS framework (in discussion with the CBI).
6. All derivatives are vanilla interest rate instruments which do not require complex models and are independently valued daily.
7. The fund's assets are limited to high quality, liquid government bonds and associated derivatives. A liquidity management framework is in place, as part of UCITS regulations, to monitor liquidity in various asset and liability scenarios.

satisfies PPP but is not 'risk mitigating' then it is classified under the banner of Efficient Portfolio Management.

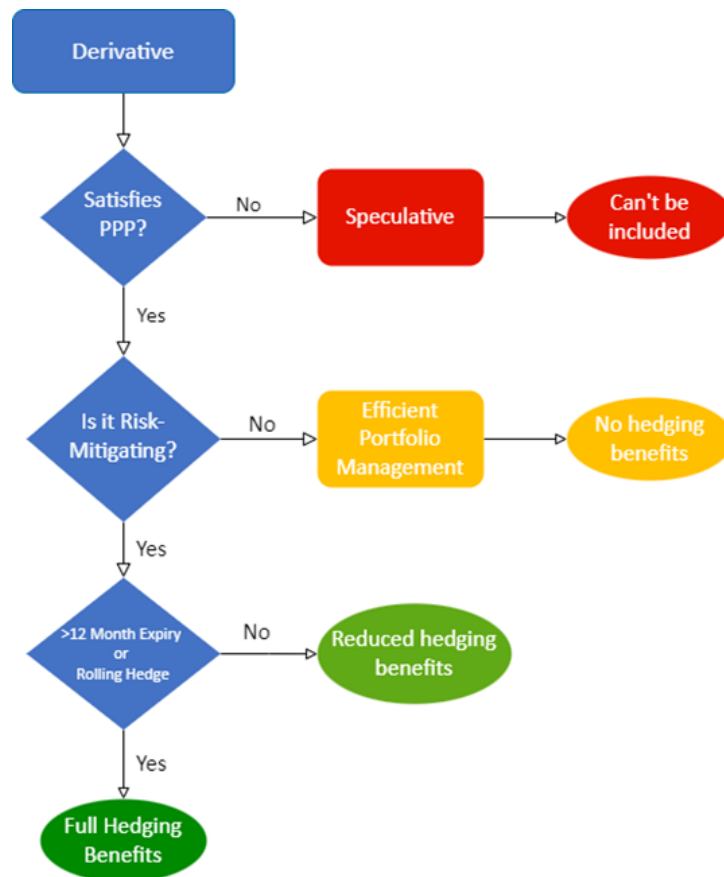


Figure 1 - Derivative classification under SII

PRUDENTIAL PERSON PRINCIPLE

Use of derivatives in a Solvency II portfolio must first be guided by the Prudent Person Principle [PPP]. PPP dictates that "All assets ... shall be invested in such a manner as to ensure the security, quality, liquidity and profitability of the portfolio as a whole."¹ This means derivatives are permitted to be used in portfolios if they "contribute to a reduction of risks or facilitate efficient portfolio management". The European Insurance and Occupational Pensions Authority ("EIOPA") explicitly excludes derivatives that assign risk exposures different to the investment policy as well as naked short-sales, excessive leverage, and arbitrage products.

While Solvency II allows the use of derivatives for risk mitigation and efficient portfolio management, there are restrictions on the speculative use of derivatives. An example of a speculative trade might be a short position in interest rate futures contracts in anticipation of interest rate falls.

Corresponding treatment under Solvency II

Not permitted under standard formula. Any derivative deemed as not satisfying the Prudent Person Principle is considered speculative and not

permitted to be part of a regulatory capital portfolio.

Ardea's Strategy

Given the context above, the key points regarding the strategy are:

1. Maintenance of a risk-constrained approach with a focus on low volatility. Since inception the volatility of the AGAU strategy has been 2.09% since inception, and the vol of the longer running ARO strategy is 2.4%.
2. Implementation of a robust risk framework dedicated to managing market risk within the portfolio, drawing upon extensive expertise in derivative usage for relative value portfolios spanning over a decade.
3. Carefully managed leverage within the confines of the UCITS framework, and ongoing discussions with the CBI ensure compliance with regulatory constraints.

¹388 EIOPA Q&A

EFFICIENT PORTFOLIO MANAGEMENT

Efficient Portfolio Management is any use of derivatives that are not to cover risks but are “used to create exposures in a more efficient way, including cost reduction, anticipate re-investments or income enhancement.”

Corresponding treatment under Solvency II

Derivatives are deemed to be adding efficiency but no risk-mitigating capabilities. In this case, the instrument will not receive any negative shock which would overall reduce the capital charge. For example, in the case of a long bond futures position, an upwards shock of interest rates would lead to a decrease in value and thus receive a positive contribution to capital charge.² Naturally in the corresponding downwards shock one would expect this position to increase in value and thus reduce the capital charge, but if the position is deemed as efficient portfolio management rather than risk mitigating then it will receive zero charge. In short, a position will only contribute to the charge under scenarios where it would lose value and increase the charge. In this case there is no risk mitigating capacity of derivatives.

Ardea's Strategy

Given the context above, many of the derivatives that the strategy employs are implemented for both risk mitigating and EPM purposes. Under the rules they cannot be both however. Focussing on EPM, many of the derivatives utilised as part of Ardea's strategies are used to enhance portfolio efficiency. For example, the fund often invests in bond options rather than bonds where the relative value metrics are comparable so as to efficiently gain exposure to both RV and optionality (gamma) at the same time. Further the additional liquidity that the derivatives market provides over and above the physical market is considered “efficient portfolio management”. Trading more liquid assets contributes to a reduction in transaction costs relative to less liquid assets.

The derivatives employed are vanilla interest rate instruments, characterised by simplicity and independence. As such they do not necessitate complex models. Moreover, these instruments undergo daily independent valuation. The fund's asset composition is limited to high-quality, liquid government bonds and their associated derivatives. A liquidity management framework, aligned with UCITS regulations, is in place to monitor liquidity across various asset and liability scenarios. The fund maintains daily liquidity.

Given Ardea uses derivatives for risk reducing benefits, and are not speculative, we cannot see many instances where a derivative will be classified under EPM.

Risk Mitigating

From here we then look to what defines a derivative strategy or instrument as Risk Mitigating as opposed to contributing to Efficient Portfolio Management. Any security that transfers risk (whether that be interest rate risk, spread risk, currency risk etc.) away from the insurance undertaking is considered a ‘risk mitigating technique’. Any instrument looking to reduce risk in some way in the portfolio can be considered risk mitigating, (i.e. the derivatives that haven't already been classified as Speculative). From here there is specific Solvency II treatment that dictates the permitted hedging capacity of these risk mitigating techniques depending on their expiry.

The Solvency Capital Requirement serves as a safeguard for capital, ensuring that an insurance company can fulfill its obligations with a 99.5% certainty over the upcoming 12 months. It is specifically structured to assess potential losses within this 12-month timeframe. What follows is that securities that have an expiry less than 12 months in the future have more complex treatment of their hedging capacity.

Expiry over 12 months away

If a derivative has an expiry of more than 12 months in the future, then the full impact of any hedging benefits will apply. For example, consider a long bond future position with expiry 2 years in the future. Under the interest rates market risk module, the option will experience upwards and downwards interest rate shocks. In the upwards shock case, the option will lose value and thus contribute to increase the Solvency Capital Ratio (SCR). Naturally then in the downwards shock case the option will gain value and thus reduce the overall SCR to its full capacity.

Let's say for the sake of simplicity that the option loses 1% of value in the case of an increase in rates and gains 1% of value in the case of a decrease in rates. This will contribute +1% SCR and -1% SCR respectively.

Expiry within the next 12 months

If a risk mitigation technique (derivative strategy) covers a period of less than 12 months, then there are certain requirements that it must meet to account for its complete risk mitigation capacity in the calculation of the Solvency Capital Ratio.

²Note here the inverse relationship between portfolio value and capital charge. Decrease in value means an increase in charge and vice versa.

Rolling Hedges

Any derivative that 'isn't in force for at least 12 months' must adhere to some qualitative criteria to deem it as a rolling hedge and thus account for its full hedging capacity. The criteria are as follows:

1. There must be an intent to replace the technique with 'a similar arrangement'
2. There's a written policy on replacing the 'technique'
3. Replacement of the 'technique' is not more often than every 3 months
4. Replacement is not conditional on future events i.e. liquidity problems
5. Changes to the cost of replacing the 'technique' is accounted for

We assume 'technique' is referencing a singular derivative position and 'similar arrangement' means rolling the derivative hedge into a new position mitigating the same risks. We also assume any distinct rolling hedge program where each hedge is held for at least 3 months as deemed to be "risk mitigating". The legitimacy and impact of these assumptions will be discussed later in this piece.

CAPS AND FLOOR

Another nuance to the Solvency II regulations is the delegation that derivative losses and gains are to be capped at the market value of the instrument. Ardea's Solvency II model takes a first order approximation to the interest rate sensitivity of our derivatives (i.e. they ignore the second order non-linear approximation of gamma/convexity). This means the up and down rate charges should be approximately symmetrical and reflective of our duration profile over a 12 month period.

Ardea's Strategy

Most of our bond option positions are long call/short put pairings which effectively have the same risk profile (linearity) as the underlying fixed income instrument - effectively these long call/short put positions have the same payoff as a long bond. We call these trades "synthetic repos". If we take an interest rate "up shock" as defined under Solvency II for example, one leg may hit its cap or floor and thus not interact with its paired leg to capture the full risk profile of the position. This overestimates the risk of the position.

Consider a long bond future with an expiry of 6 months. If qualifying as a rolling hedge, then say the option loses 1% of value in the case of an increase in rates and gains 1% of value in the case of a decrease in rates. This will contribute +1% SCR and -1% SCR respectively.

Other Hedges – not classified as rolling

Naturally then, any risk-mitigating techniques with an expiry less than 12 months away that do not fall under this rolling hedge classification will then have their risk mitigating impact reduced. This reduction is on a pro rata temporis basis, reducing by whatever fraction of the next 12 months the position is held for.

Again, let us take the same long bond future position with an expiry only 6 months away. If qualifying as a rolling hedge, then again say the option loses 1% of value in the case of an increase in rates and gains 1% of value in the case of a decrease in rates. The increase in value i.e. the SCR reducing component of the shock will be reduced by a factor of 0.5 as this security is only active for half of the next 12-month period. Thus, this will contribute +1% SCR and -0.5% SCR respectively.

For a better understanding we can look at an example single synthetic repo pair simplified from an actual example in the AGAU portfolio. Let's create a long call/short put pair with the same 1% exposure. For simplicity sake let's say they both receive a 1% shock in the upwards scenario.³ We will also assume linear approximations to the option value (ignoring gamma/convexity benefits, which is conservative). The duration of the call and put will differ slightly, let's say 2 and -1 respectively. Let's also assign a value of 1 basis point as a percentage of NAV to each of these securities. Revaluing these portfolios based on this scenario you can see in Table 1 the differences in the impact with and without caps and floors.

³ The actual shocks actually slightly differ in the up and down directions

Table 1 – Revaluing with and without caps and floors

	Value	A. Exposure	B. Duration	C. Shock Up	Impact without caps/floors (A*B*C)	Impact with caps/floors
Long Call	1 bp	1%	2	1%	2 bp	1bp
Short Put	1 bp	-1%	-1	-1%	-1 bp	-1bp
				Net Impact	1 bp	0 bp

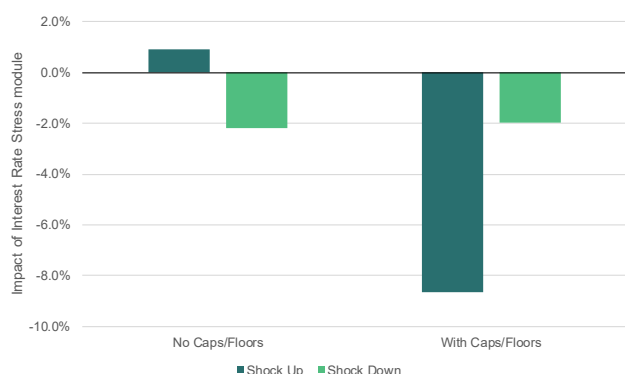
Table 2 – Equivalent long bond position

	Value	A. Exposure	B. Duration	C. Shock Up	Impact (A*B*C)
Long Bond	1 bp	1%	1	1%	1 bp

Now the net position of this pair with no caps and floors is 1 basis point, which would be equivalent to holding the long bond in table 2, however with the cap on the long call included then the impact of this synthetic long position is mitigated. Ultimately, the caps and floors negate the complex hedging interactions stemming from these synthetic repos which results in skewed interest rate stresses on the portfolio. This is not reflective of the true interest rate exposure of the trade. In this example, the risk has been underestimated.

Here you can see the (roughly) symmetrical impact of the shocks. This is expected, as in a simple example where a portfolio has a total modified duration of 10, then when rates go up 1 percent the portfolio will lose 10% of its value, and if rates decrease by 1 percent the portfolio will gain 10% of its value. In reality it is more complex than that, but the overall principle applies, the impact of the interest rate stresses should be roughly symmetrical.

Figure 2 – Impact of caps/floors on the isolated interest rate stress module



In Figure 2 we isolated an instance of the interest rate shock on the Ardea Global Alpha Fund ("AGAU") to highlight the impact of the caps/floors on the overall portfolio. Here the interest rate stresses only are applied to the portfolio. The first pair of columns is the interest rate stresses applied, but with the caps and floors removed on the synthetic repos, effectively collapsing them into a single long bond position.

The second two columns show the impact of the upwards and downwards interest rates stress on the portfolio, with the gains and losses on all derivatives capped at market value. Note the lack of symmetry here, both situations result in a negative charge (gain in portfolio value), this is implying that in both upwards and downwards interest rate moves the portfolio will gain value, which is not the case. The significant difference between the two cases is difficult to boil down to a simple interaction, but it comes about due many of the synthetic repo legs hitting their cap or floor and all these differences from the uncapped results compounding.

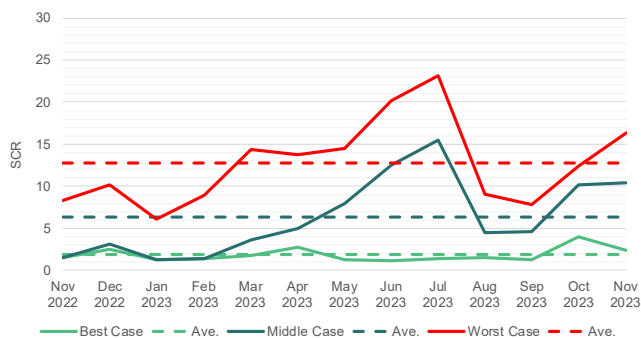
Hence, our models as verified by an external provider, takes the positions that should be paired as synthetic repos and removes the caps and floors, resulting in a risk profile that best reflects these positions, i.e. replicating the risk profile of the underlying long bond.

THE IMPACT OF DERIVATIVE CLASSIFICATION

Figure 3 below shows the comparison of possible capital charges on some of Ardea's funds.

The 'worst case' is when all derivatives fall under the 'other hedges – non rolling' classification above. Here, ALL the short-dated derivatives have their hedging impact reduced on a pro rata basis. Note the significant variation in charge from as low as two percent to as high as 23 percent. This is counter intuitive to our strategy and solely depends on where the snapshot is taken as to when we have rolled our derivatives. The 'worst case' average sits around 10-15% which, looking at Figure 4 is only slightly higher than investment grade credit or long duration sovereign bonds. Note here 'bad month' refers to the peak of the red line in Figure 3, so July 2023 and 'good month' refers to September 2023.

Figure 3 - AGAU Comparison

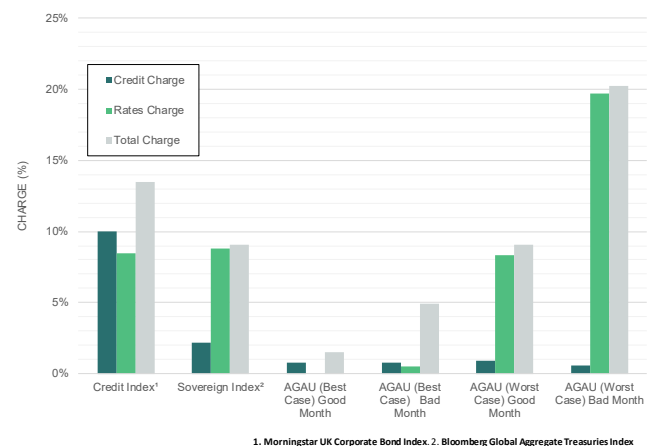


The 'middle case' is where our synthetic repo positions are collapsed down to a single position to strip away the impact of caps/floors on these positions. They are still treated as 'other hedges – non rolling' so again if the time to maturity is less than 12 months then the hedging capacity is reduced. Here you can see an overall reduction in the level of the charge, but it is still exhibiting some volatility again just

based on when the snapshot of the portfolio is. The average charge sits consistently around 5-6%, looking at Figure 4, this will put the funds at a capital charge slightly less than a government bond index.

The 'best case' is where all of Ardea's derivative positions are treated as risk mitigating and have an expiry of less than 12 months then they are treated as 'rolling hedges', such that each instrument receives its full mitigation potential. It is unlikely that all the short dated derivative positions qualify under the strict EIOPA definition of a rolling hedge. It is our opinion that that Ardea capital charge lies somewhere in between the middle and best cases. The average of the best case lies around 2-3%, with far less volatility in the charge as it is independent on when these short-dated derivative positions are rolled.

Figure 4 – Broad SCR Comparison



1. Morningstar UK Corporate Bond Index. 2. Bloomberg Global Aggregate Treasuries Index

INDUSTRY DISCUSSION ON SHORT-DATED DERIVATIVES

Our research has also indicated that Ardea is not alone in querying the treatment of short-dated derivatives, with it being a regular point of discussion. In correspondence with EIOPA during a Solvency II call for advice on regulatory alterations, the Actuarial Association of Europe echoed concerns akin to ours regarding the treatment of short-dated derivatives. Emphasising potential discrepancies in treatment, they cautioned against penalising strategies that, despite utilising short-dated derivatives, effectively mitigate risks more comprehensively than alternative methods. They remarked, "The current approach risks undermining

strategies that could better hedge risks while adhering to shorter-term derivative instruments."⁴ Additionally, their emphasis on the treatment of these derivatives resonates with our apprehensions, as they noted, "There is a need for a more nuanced approach, recognising the efficacy of short-dated derivatives in holistic risk mitigation strategies." These insights reflect that other actuarial bodies are also concerned about the regulatory framework's potential limitations in accommodating strategies that may provide more robust risk mitigation measures.

⁴ The actual shocks actually slightly differ in the up and down directions

Ardea and Solvency II

EIOPA Response

In response, EIOPA suggested measured reasons for limiting the risk mitigation impact of short-dated instruments. They suggested that it provides advantages of 'reducing the renewal risk' of rolling contracts as well as highlighting that the regulatory assessment of whether the new arrangements are sufficiently like the old, but they also acknowledged that restrictions "may prevent insurers from adjusting their risk mitigation to changes in their risk position on a timely basis."²

They then go on to specifically mention the allowable exposure adjustments on a weekly basis to avoid the build-up of large unhedged positions as the market moves. They also delegate that any derivative position taken must have a contract length of over 1 month at inception and allow changes to contracts with different maturities. The example they give is allowing a shift from one month to three-month futures and back again.

Finally, they state "dynamic hedging strategies where a constant adjustment of the portfolio is necessary can be highly risky."² The response specifically mentions that dynamic hedging strategies (e.g. dynamic replication of a put option) would not meet the "similarity" requirement, since the impact of an instantaneous shock would differentiate substantially from the actual risk mitigation over 12 months.

Finally, they state "dynamic hedging strategies where a constant adjustment of the portfolio is necessary can be highly risky."² The response specifically mentions that dynamic hedging strategies (e.g. dynamic replication of a put option) would not meet the "similarity" requirement, since the impact of an instantaneous shock would differentiate substantially from the actual risk mitigation over 12 months.

CONCLUSION

Solvency II classifies derivatives into three distinct categories: Risk Mitigating, Efficient Portfolio Management, and Speculative. While these classifications provide a regulatory framework for insurers, challenges arise when dealing with short-dated derivatives, leading to varying interpretations and treatment within the Solvency II framework. The impact of these classifications on capital charges can significantly vary, posing challenges for insurers and asset managers alike.

Ardea's perspective aligns with ongoing industry discussions that emphasise the need for a more nuanced approach, recognising the efficacy of short-dated derivatives in holistic risk mitigation strategies. Ultimately, the strategy's risk-constrained approach, and extensive expertise in derivative usage should qualify all Ardea's securities as either risk mitigating or efficient portfolio management.

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