Expert Views

Optimizing the Solvency Ratio

Subordinated Debt versus Reinsurance as a Capital Management tool

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INTRODUCTION

The global adoption of economic value-based solvency regimes within the life insurance industry has impacted the decision-making process used by CFOs when trying to optimize their solvency ratio. Making the right choice requires a complex analysis of the different capital solutions available, and a solid understanding of their associated balance-sheet impacts.

This analysis can be simplified using a “decision tree” approach to identify the most optimal solution. The optimization process starts with basic questions on how to address important capital management decisions. These include:

- How can I achieve an adequate solvency ratio within a certain corridor level and ensure that my target dividend payments are met?
- How should I improve my solvency ratio if it falls below this corridor level?
- How can I increase solvency ratio as efficiently as possible – by increasing available capital using subordinated debt, or by reducing required capital using reinsurance?

The decision tree then branches into a subset of different factors steering the user toward the most optimal choice.

This paper provides some guidance for CFOs on how to choose between subordinated debt and reinsurance to optimize the solvency ratio. Both are efficient tools, but there are material differences in terms of how they impact the balance sheets of life insurers.

Subordinated Debt vs. Reinsurance

Financial instruments such as subordinated debt have been traditionally used to increase available capital. They have a lower capital tiering, referred to as Tier 2 debt, because unlike common equity or retained earnings, they lack permanency and only provide capital support under stressed market events.

Similarly, reinsurance can be used as a capital management tool to protect the balance sheet of insurers against adverse claims or loss events, and is effective at reducing required capital.

The formula in Figure 1 below shows how subordinated debt and reinsurance can improve solvency ratio. The solvency ratio is defined as the ratio of Available Capital to Required Capital. It can be improved either by:

(1) issuing subordinated debt, which will increase the amount of Available Capital
(2) purchasing reinsurance, which will decrease the amount of Required Capital

Figure 1: How subordinated debt and reinsurance can improve solvency ratio

$$\frac{\text{Available Capital} \uparrow \ \text{+Subordinated Debt}}{\text{Required Capital} \downarrow \ \text{-Reinsurance Cover}} \uparrow = \text{Improvement to Solvency Ratio}$$

The key factors affecting the choice between subordinated debt and reinsurance will include:

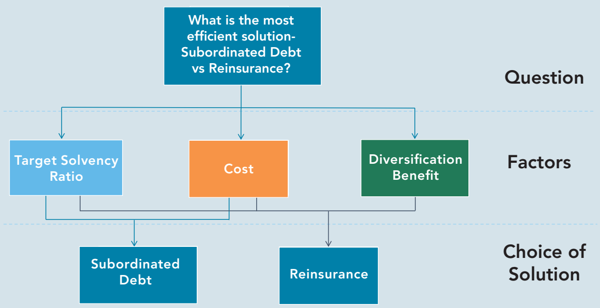
- **Target solvency ratio:** The relation between available and required capital is generally not one-to-one, as insurance regulators require insurers to hold more available capital than required capital. For a target solvency ratio of 150-200%, an insurer would need to hold 1.5-2.0 times the amount of subordinated debt relative to the amount of reinsurance to achieve the same level of improvement in solvency ratio.
- **Diversification benefit:** Because reinsurance indemnifies against certain risks at a portfolio level, the impact of diversification benefit across other risks — which are not covered by the reinsurance contract — can dilute the effectiveness of reinsurance in terms of capital relief. The higher the diversification benefit, the less effective the reinsurance solution will be at improving the solvency ratio. The only exception to this would be whole-account stop-loss reinsurance designed to cover the entire balance sheet of an insurer, where the capital impact is net of diversification benefit.
- **Limits:** Subordinated debt is often subject to a maximum prescribed amount by the regulator. Under Solvency II, it can't exceed 50% of available capital.
- **Costs:** The total cost of subordinated debt can be broken down into several components, including liquidity, issuer's credit risk, and operational costs. The cost of reinsurance is affected by the volatility of claims, operational costs, and the level of risk transfer provided. For both instruments, the present value of future costs will reduce the amount of available capital. The investment returns from the cash proceeds of subordinated debt or the capital freed up from reinsurance can partly offset this cost, and would be expected to yield risk-free rate at a minimum.
- **Refinancing risk:** Subordinated debt holders are incentivized to redeem after 10 years through a step-up in interest rates. Reinsurance usually provides more flexibility, including a range of shorter or longer term guarantees, depending on the capital needs of an insurer.
- **Counterparty exposure:** The lower capital requirement linked to reinsurance will be partly offset based on the credit quality of the reinsurers, but the impact should be marginal for reinsurers with good credit ratings.
- **Second-order impact:** Other factors will have a second-order impact that can influence the decision-making process. For example, the issuance of subordinated debt could increase market risk and default risk, depending on how the cash proceeds are invested. Reinsurance can also provide material risk margin relief on available capital under Solvency II (or equivalent regimes).

Decision Tree and Optimization

Figure 2 illustrates the decision tree process we use to find the most optimal allocation between subordinated debt and reinsurance when looking at three of the key factors set out above: target solvency ratio, diversification benefit, and present value of cost.[1]

The choice between subordinated debt and reinsurance is also kept binary, meaning the allocation made is either reinsurance or subordinated debt, but not both. In practice, a mixture of both solutions could lead to a more optimal choice, but this would require a more complex optimization process.

Figure 2: Optimal allocation using a decision tree



Optimization process

We can then define an optimization formula to find the most efficient allocation between subordinated debt and reinsurance for a given target solvency ratio, based on the three selected factors in our decision tree.

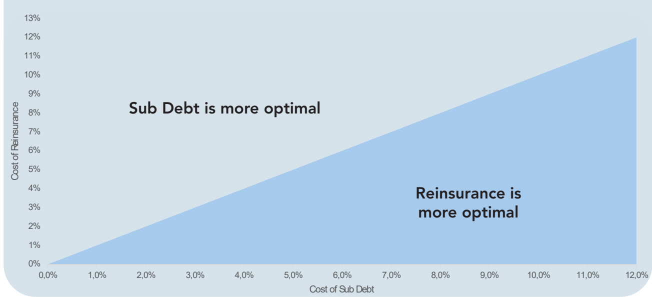
Figure 3: Optimization formula

$$\underset{1}{\text{Solvency Ratio}} = \overbrace{\frac{\text{Available Capital} + \text{Sub Notional} - \underset{2}{\text{PV Cost}_{\text{sub debt}}}}{\text{Required Capital}}}^{\text{Subordinated Debt}} = \overbrace{\frac{\text{Available Capital} - \underset{2}{\text{PV Cost}_{\text{reins}}}}{\text{Required Capital} - \text{Rein Notional} \times \underset{3}{\text{Diversification}}}}^{\text{Reinsurance}}$$

The notional in the equation shown in Figure 3 represents the amount of subordinated debt (Sub Notional) or amount of reinsurance provided (Rein Notional). For each factor shown in Figure 3, we can create an efficiency curve where the impact on the solvency ratio of subordinated debt or reinsurance will be the same.

Figure 4 shows the efficiency area at a target solvency ratio of 200% and a diversification benefit of 50%. This simple illustration demonstrates that the choice between reinsurance and subordinated debt would be the same for a given notional amount, as long as the cost of subordinated debt remains the same as the cost of reinsurance.[2]

Figure 4: Efficiency Area at a Target SCR Ratio of 200% and Diversification Factor of 50%

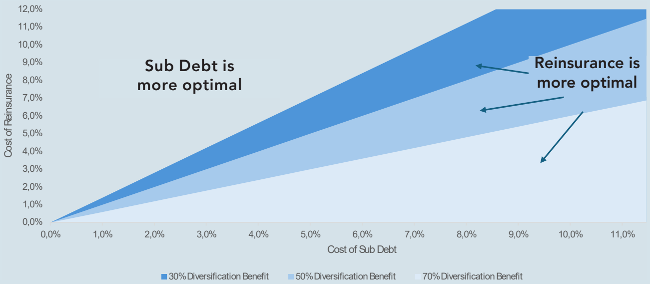


The efficiency curve is, however, more dynamic where the costs of capital instruments, the target solvency ratio, and diversification benefit vary, based on market conditions, capital management strategy, and a given business mix.

Changes in diversification benefit will impact the efficiency area between the choice of reinsurance over subordinated debt, as shown in Figure 5. The lower the diversification benefit, the more optimal and affordable reinsurance becomes compared to subordinated debt to achieve the same target solvency ratio. A higher diversification benefit will have the opposite impact.

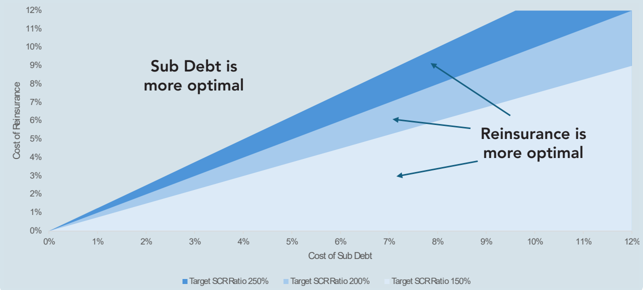
[1]For subordinated debt, the cost is expressed in terms of financing spread above the risk-free rate.
[2]The cost of subordinated debt and reinsurance has been represented for only one year, ignoring the present value (PV) impact to make the illustration simpler. The cost of each instrument should however be reflected over their lifetimes.

Figure 5: Efficiency Area at a Target SCR Ratio of 200% for different levels of diversification factors



The desired target solvency ratio will also impact the overall efficiency area. Figure 6 shows the impact at different target solvency ratios of 150%, 200%, and 250% respectively. The higher the target solvency ratio, the more efficient the reinsurance solution cost-wise compared to subordinated debt. This is due to a levered capital effect from targeting a higher solvency ratio, where reinsurance can have the same impact on solvency ratio but using a proportionally lesser amount of notional relative to subordinated debt.

Figure 6: Efficiency Area at different target SCR ratios for a diversification factor of 50%



The interplay between the target solvency ratio and the diversification benefit is an important factor to consider when deciding which instrument provides the most benefit in capital management.

Application of Efficiency Curve for Mass Lapse Reinsurance

Mass lapse reinsurance has been an effective capital management tool to optimize the solvency capital requirement for lapse risk under Solvency II. For many life insurers; this solution often complements the use of subordinated debt in the management of solvency ratios.

We performed an analysis of the optimal allocation between mass lapse reinsurance and subordinated debt. The optimal allocation between the two instruments will change depending on the credit spread cost of subordinated debt or how well the required capital for mass lapse diversifies with other life and non-life risks.

The following tables show the optimal allocation matrix, assuming a credit spread cost of subordinated debt ranging from 2 to 4%, against a fixed mass lapse reinsurance cost of 2% for the same notional amount, and with a starting target SCR ratio of between 150 and 220%.

For simplicity, we have ignored the impact of the future cost of each solution, where for subordinated debt the PV of future cost over a minimum of 10 years and for mass lapse reinsurance the PV of future cost over 3 years would reduce available capital.

Figure 7: Allocation Matrix Reinsurance vs. Sub Debt (Cost of Sub Debt: 2%, Cost of Reinsurance 2%)

Figure 8: Allocation Matrix Reinsurance vs. Sub Debt (Cost of Sub Debt: 3%, Cost of Reinsurance 2%)

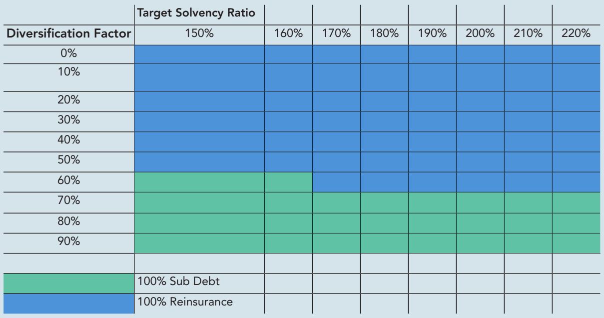
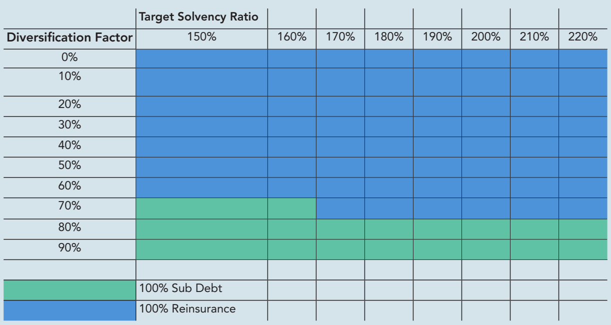


Figure 9: Allocation Matrix Reinsurance vs. Sub Debt (Cost of Sub Debt: 4%, Cost of Reinsurance 2%)



The optimal choice between subordinated debt and reinsurance varies significantly depending on the cost of subordinated debt relative to the cost of mass lapse reinsurance. This degree of differentiation in choice is even greater at higher targeted solvency ratio levels, considering the levered capital effect of reinsurance.

The same optimization technique could also be applied for other types of reinsurance solutions beyond mass lapse reinsurance, such as loss portfolio transfers or whole-account stop-loss solutions, which have become popular reinsurance capital solutions.

In practice, the cost of subordinated debt tends to be higher than mass lapse reinsurance based on the implied spread of recent subordinated debt issuances, where mass lapse tends to trade at the 100-150 bps level. The optimization process would infer a higher allocation towards mass lapse reinsurance based on the latest pricing benchmarks for subordinated debt instruments as shown in Figure 10.

Figure 10: Recent Issuance Spread Costs of Subordinated Debt

Issuer	Issue Date	Amounts (m)	Spread
Allianz	03/2025	€1250	175 bps
Groupama	05/2025	€500	190 bps
AXA	06/2025	€500	190 bps
Malakoff Humanis	06/2025	€1000	210 bps
Legal and General	04/2025	£650	200 bps

CONCLUSION

Capital optimization is a complex exercise for life insurers, requiring careful balancing when trying to choose between various potential capital solutions at the most optimal cost. Some techniques, such as the decision tree approach discussed in this paper, can greatly simplify this process and provide a more structured way for CFOs to make an informed decision on the optimization of their solvency ratio.

Given its significant solvency benefits for required capital and risk margins, reinsurance can be viewed as a great alternative to more traditional debt instruments.

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