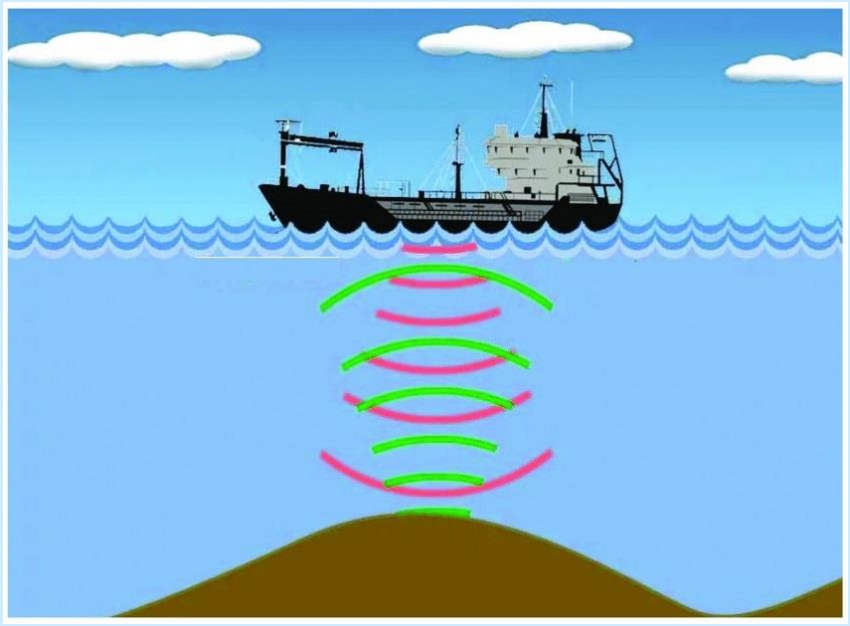
Solvency II Risk Margin

and Amendments



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Introduction

The European Union agreed a deal on Wednesday to ease its capital rules for insurers, a step the bloc's lawmakers said could free up tens of billions of euros for investing in green technology and infrastructure to boost growth.

Dec 14 2023 (Reuters)

- https://www.reuters.com/business/finance/eu-agrees-ease-capital-rules-insurers-boost-investment-2023-12-13/

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- Risk Margin - Cost of Capital
  - Recap, Implications, Discount Rate
- The 99.5% One Year Risk Measure
- Contingent Capital Perspective
- Recent amendments Solvency II legislation

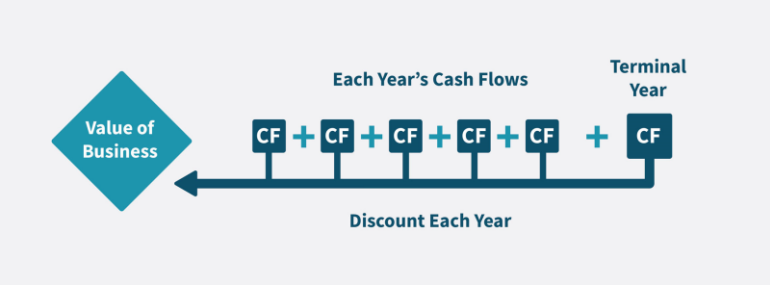
Cost of Capital - Recap

- In the absence of a true market, a mark-to-model approach is used.
- Existing liabilities are moved to a Reference Undertaking (RU) with no capital of its own.
- Investor provide capital to the RU and require a set return per annum in excess of risk free, e.g. 6% or 4.75%.
- Own Funds of the RU equal the Solvency Capital requirement (SCR).
- The Risk Margin is the Cost of Capital to the RU, i.e. the return required by investors.

Cost of Capital

Implications

- At the valuation date investors in the RU provide SCR_0 .
- At the end of each following year *t,* they expect to receive : *required rate of return* × SCR_{t-1} + (SCR_t –SCR_{t-1}).
- Investors are not required to provide additional capital after the initial date.
- Cost of Capital for the RU = Value to Investors.
- This is the classical Corporate Finance – Discounted Cash Flow approach to valuation:
- The value of an investment are the future cash flows discounted at *the required rate of return*.



Source: https://valutico.com/discounted-cash-flow-analysis-your-complete-guide-with-examples/

Cost of Capital

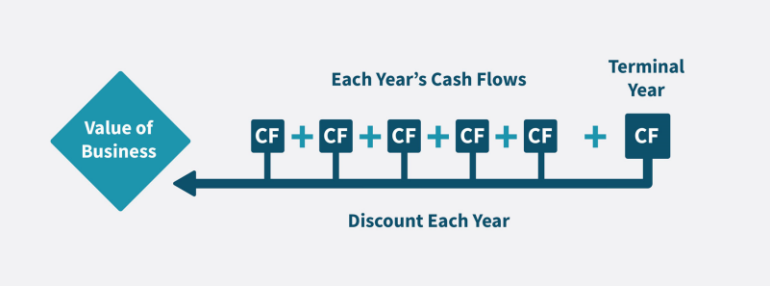
- In summary:
  - Cost of Capital is the Present Value of future returns to investors.
  - Using classic DCF, the discount rate used in the Present Value is the required rate of return e.g. 6%.
  - Investors exactly receive their required return hence cash flows to/from investors satisfy:

$$NPV@6\% = -SCR_0 + \frac{Cash\ Flow_1}{1+6\%} + \frac{Cash\ Flow_2}{(1+6\%)^2} + \ \ldots = 0$$

- However, in the Risk Margin, risk free discount rates are used instead of required rates of return.
- In my 2013 paper, I argued that a 6% discount rate should be used.
- So why use risk free rates?

Cost of Capital

- In a regular discounted cash flow valuation, returns are generated through corporate profits which emerge over time.



- However, in case of the RM future returns can only be generated from release of the RM which is already on the balance sheet at the initial date.

- While being held by the entity, the RM generates the risk free rate, not the required rate of return.

Cost of Capital

- This creates a conundrum: the RM to be provided at t=0 is discounted on risk free rates, but the value to investors is the future releases discounted at the required rate of return say 6%.

- Is there a loss of value in the system?

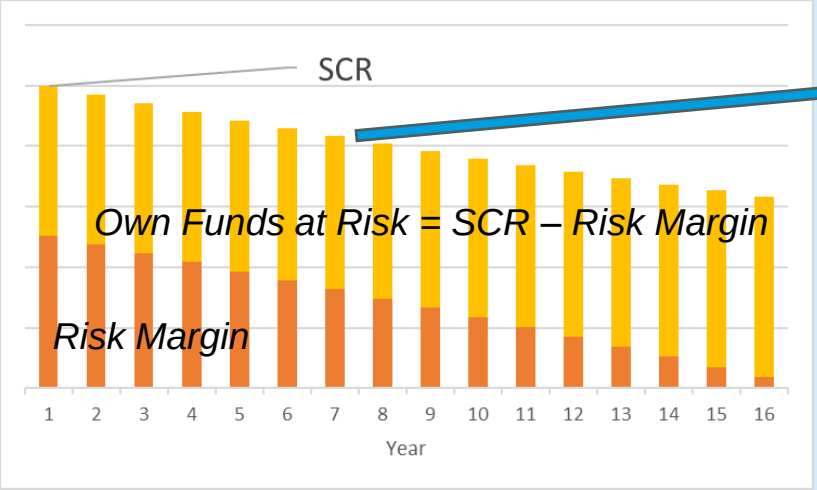
Cost of Capital

- No, the addition of the RM to the balance sheet provides an extra buffer over the entire run-off period, and thus reduces risk to investors.
- Nonetheless, investors receive a reward for risk taken over the full SCR/Own Funds provided.
- Hence the value to investors is actually higher than required.
- Can we quantify how much higher?
- SII legislation states that the Risk Margin is:

The cost of providing an amount of eligible own funds equal to the Solvency Capital Requirement necessary to support the insurance and reinsurance obligations over the lifetime thereof.

- If the maximum loss over the lifetime of the liabilities is deemed to be the SCR, then not the entire SCR is exposed to risk, but only Own Funds equal to *SCR – RM* are.

Cost of Capital



Only the yellow part is deemed risk exposed.

- Reducing the risk exposure to *SCR-RM* proves to be equivalent to discounting at required rate of return instead of risk free (*rf*).

$$RM_0 = 6\% \sum_{t=1}^{n} \frac{SCR_{t-1}}{(1+rf+6\%)^t} = 6\% \sum_{t=1}^{n} \frac{SCR_{t-1} - RM_{t-1}}{(1+rf)^t}$$

RM_0 = risk margin at time 0, using required rate of return as discount rate.

Cost of Capital

- One may argue that the assumption that the SCR is sufficient over the lifetime of liabilities is inaccurate, as each year the full SCR may be lost and needs replacement (EIOPA, UK Risk Margin Working Party).

- Every time the SCR is lost, the Risk Margin enables the RU to attract new capital, at least in theory.

- But this approach does not reflect the risk reduction for investors due to the addition of the RM to the balance sheet, even if losses beyond the level of the SCR are deemed possible.

- It does not reflect the (extremely) low likelihood of having to raise additional capital repeatedly, or diversification over time.

- DCF approaches in general do not allow for specification of multiple scenarios. There is only the expected cash flow.

The 99.5% One Year Risk Measure

- The 99.5% one year confidence level was originally derived from a target BBB-credit quality.
- But regular BBB-rated debt issuers are not required to replenish capital in case the rating deteriorates at a future date. It is common for ratings to change/ deteriorate over time.
- Suppose a regular BBB-rated received a capital injection after a downgrade to restore its BBB rating, except in case of default. That would significantly improve its credit quality and lower the likelihood of default.
- In this case: default rate over n years $\approx n \times$ default rate over 1 year.
- But in reality, multiyear default rates are materially higher:

The 99.5% One Year Risk Measure

Global corporate average cumulative default rates (1981 to 2023) (%)

	--Time horizon (years)--														
Rating	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
AAA	0.00	0.03	0.13	0.23	0.34	0.44	0.49	0.57	0.62	0.68	0.70	0.73	0.75	0.81	0.8
AA	0.02	0.05	0.11	0.19	0.28	0.38	0.46	0.53	0.60	0.67	0.73	0.78	0.83	0.88	0.9
A	0.05	0.12	0.20	0.30	0.41	0.53	0.66	0.80	0.93	1.07	1.19	1.30	1.41	1.51	1.6
BBB	0.14	0.39	0.68	1.02	1.38	1.73	2.03	2.33	2.63	2.90	3.18	3.40	3.61	3.84	4.0
BB	0.57	1.79	3.19	4.57	5.88	7.08	8.12	9.07	9.93	10.69	11.32	11.91	12.43	12.86	13.
B	2.98	6.99	10.55	13.44	15.75	17.66	19.04	20.20	21.22	22.18	23.01	23.64	24.24	24.81	25.
CCC/C	25.98	35.95	41.42	44.49	46.65	47.69	48.78	49.47	50.07	50.64	51.10	51.60	52.17	52.59	52.
Investment grade	0.08	0.22	0.38	0.58	0.78	0.99	1.18	1.37	1.54	1.72	1.88	2.01	2.15	2.28	2.4
Speculative grade	3.52	6.77	9.56	11.83	13.70	15.22	16.46	17.50	18.42	19.27	19.98	20.58	21.14	21.64	22.
All rated	1.49	2.89	4.11	5.13	5.99	6.70	7.30	7.80	8.25	8.66	9.01	9.31	9.58	9.84	10.

Sources: S&P Global Ratings Credit Research & Insights. S&P Global Market Intelligence's CreditPro®.

Conclusion: restoring capital to one year/ 99.5% confidence level each year if no default, significantly improves credit quality above the targeted BBB-level.

The Contingent Capital Perspective

- There is an assumption that liabilities can be transferred to another investors who will then replenish lost capital.
- But all investors trade on market terms - or they do not trade at all.
- Therefore it makes no difference to the RU whether the original or other investors replace lost capital.
- So we may as well assume that the original investor(s) will continue to provide capital when and if required.

- This provides another perspective: what is the reward investors require at the valuation date for:
  - Putting up the know amount SCR_0 at the valuation date.
  - Paying/receiving amounts equal to the loss -max SCR- or profit due to unhedgeable risk at the end of each year.

To summarize:

- One may take different perspectives on the purpose of the Risk Margin:

  1. *The initial investors' perspective, reflecting only the cost of capital provided at time 0.*
  2. *The regulatory perspective: the RM should allow to attract new capital each year after loss of SCR (current RM) from the market.*
  3. *The 'contingent capital' perspective: the RM should represent the cost of providing SCR_0 as well as the market value of uncertain future capital raisings.*

- Depending on which perspective one chooses, the resuts are very different.

- Or not?

Amendments to the Risk Margin

- Recent amendments to the Risk Margin:
  - Cost of Capital adjusted from 6% to 4.75%.
  - Introduction of tapering factor: tapering factor year $t = \lambda^t$
  - λ to be determined but λ =0.975 in EIOPA proposal.

$$RM_0 = CoCr \sum_{t=0}^{n} \frac{SCR_t}{(1+r_t)^{t+1}} \times \lambda^t$$

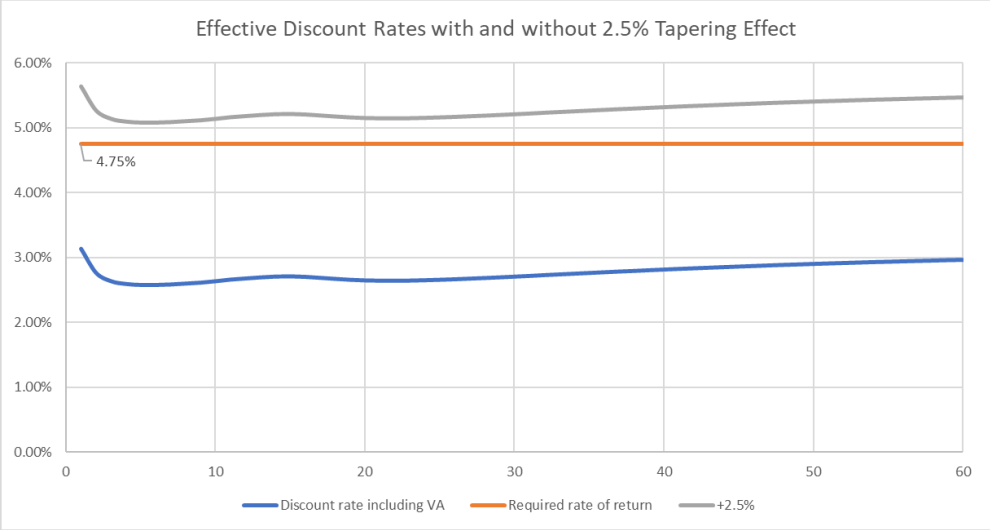
- The tapering factor was introduced to reflect 'dependence of risk over time':
- After a large loss, the risk of another large loss is smaller as some risks are non-repeatable.
- So the cost of capital in later years is reduced with the tapering factor.

- Using the required rate as discount rate was based on the same idea: the SCR is the capital required to support liabilities over their lifetime, so after a large loss less SCR is needed.

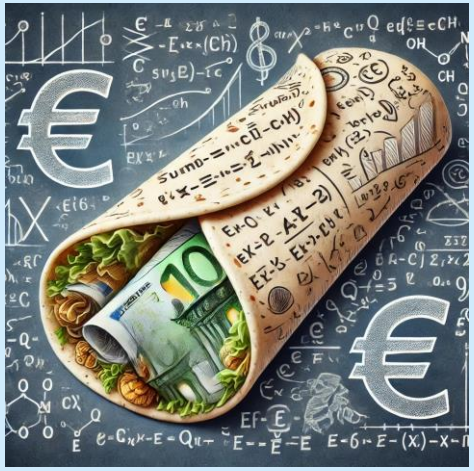
- Moreover, the tapering factor is equivalent to increasing the discount rate. Using λ =0.975 is roughly equivalent to increasing risk free discount rates by 2.5% percentage points.

Amendments to the Risk Margin

- As a result, the amended ‘regulatory’ Risk Margin formula may end up using a higher effective discount rate than the required rate of return!
- In the amended formula, future capital requirements are reduced with the tapering factor, regardless of whether a large loss will have happened in preceding years.
- But if no losses occur, there is no reason to assume lower SCRs in future years.



Wrap-up



- Different perspectives can be taken on the function of the Risk Margin: initial investor, regulatory, contingent capital.
- In essence, Cost of Capital is a discounted cash flow approach using only BE cash flow, not multiple distinct scenarios.
- The amendment adopted by the EU is a pragmatic adjustment which addresses main issues such as excessive amount and volatility of the Risk Margin.
- Impact will largely depend on the tapering parameter.
- See the paper 'Comments on the Solvency II Risk Margin and proposed Amendments' , British Actuarial Journal. https://doi.org/10.1017/S1357321724000047