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Assessment of EIOPA's analysis of the Cost of Capital used in the calculation of the Solvency II risk margin

This paper analyses the current calibration adopted by EIOPA for the Cost of Capital used to compute the risk margin under Solvency II. It lists the main issues identified in EIOPA's approach and quantifies them. It is a follow up from a meeting between the European Commission with representatives of the CFO forum and Insurance Europe in which the Cost of Capital issue was discussed. ***The analysis leads to the conclusion that the Cost of Capital should be calibrated at a level lower than the current 6%.***

1. Context

The Cost of Capital is an important parameter in the calculation of the risk margin, which is part of the technical provisions on the Solvency II balance sheet. The risk margin is an amount over and above funds needed to pay customer claims and benefits. Its prudential purpose is to ensure that, should an insurer fail, there are additional funds available above the best estimate of liabilities, to allow an orderly transfer, so as to provide further protection to customers. However, its design and calibration have led to a large amount of over euro 200bn[1], which reduces own funds and, therefore, the risk-taking capacity of the industry.

The specific requirements for this parameter are set out in article 77(5) of the Solvency II Directive, with further requirements on the risk margin set out in articles 37-39 of the Delegated Regulation[2].

As part of the 2018 Solvency II review, The European Commission asked EIOPA to assess if the methods and assumptions applied in the calculation of the risk margin continue to be appropriate, in view of a changed market environment. In particular, EIOPA was asked to review the Cost of Capital rate currently set at 6%[3].

While the CFO/CRO Forum and Insurance Europe already highlighted a range of problems with the design and calibration of the current risk margin in their submissions to EIOPA during the consultation process, this paper focuses only on the final advice and identifies a number of flaws in EIOPA's final assessment of the Cost of Capital calibration.

Correcting these flaws, while staying within the remits of EIOPA's analysis and data, would lead to a different advice and strongly supports lowering the Cost of Capital

[1] Source EIOPA.
[2] See appendix 2 for more details.
[3] EC request to EIOPA for technical advice on the review of specific items in the SII Delegated Regulation: https://eiopa.europa.eu/Publications/Requests%20for%20advice/CfA_annex.pdf.

2. Detailed assessment of EIOPA's analysis

The Cost of Capital in the Solvency II context does not refer to the traditional market cost of capital of an insurance company, but rather what cost of capital rate would a Reference Undertaking incur to support the insurance obligations as defined under Solvency II[4].

In their advice, EIOPA did not propose any change to the formula originally applied by CEIOPS to derive the Cost of Capital (CoC) rate:

CoC rate = Equity Risk Premium * β * adjustment factor

Where:

- Equity Risk Premium (ERP) is the difference between the return on the equity market and the risk-free rate. It represents the extra return that investors demand above risk-free to invest in equities.

- **β** reflects the volatility of the Reference Undertaking, as defined in the Solvency II regulations, compared to the total market; it is a factor that increases or decreases the risk premium level compared to the market average so as to reflect the risks specific to the Reference Undertaking[5].

- the **adjustment factor** was introduced by CEIOPS, and maintained by EIOPA, to allow for economic aspects not reflected in the capital asset pricing model (CAPM) estimation of the Cost of Capital (i.e. not already captured in the ERP or β); this is because of the specific provisions of the Solvency II regulations on Cost of Capital[6].

EIOPA's final advice was to **recommend no change** to the current 6% Cost of Capital, based on their findings which EIOPA summarized in the following table[7]:

	ERP	β	Adjustment	Cost of Capital
Advice	[7.02% -8.09%]	1.2	0.80	**[6.7%-7.8%]**

[4] Please see appendix 2 for the specific requirements for the Reference Undertaking in article 38 of the Delegated Regulations.
[5] In particular, the Reference Undertaking's minimal exposure to market risk needs to be taken into account.
[6] For example, a correction for franchise risk needs to be made to reflect that the Solvency II balance sheet does not include future new business.
[7] Please see EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation, EIOPA-BoS-18/075, 28 February 2018.

However, there **are a number of shortcomings in EIOPA's approach.** The table below summarizes the main ones, along with an estimation of the **cumulative** impact on the advice of correcting them. For each shortcoming, the modified parameter is highlighted in red.

Flaws	Equity Risk Premium	β	Adjustment	Difference vs EIOPA *(per parameter)*	Corrected Cost of Capital *(cumulative)*	Explanation
Technical error – **inconsistent assumptions behind parameters**	*[7.02%-8.09%]*	*0.90*	*0.80*	(1.68%-1.94%)	**5.05%-5.82%**	Using an industry β without a deleverage adjustment is incompatible with EIOPA's 100% equity funding assumption for reference undertaking (*see 2.1 below*)
Incompatible with SII Delegated Regulations - **no correction to β for minimal market risk**	*[7.02%-8.09%]*	*0.81*	*0.80*	(2.19%-2.52%)	**4.55%-5.24%**	Using an industry β without an adjustment to reflect minimal market risk is incompatible with the requirement to minimise market risk within the Reference Undertaking as set out in Solvency II Delegated Regulations article 38(h) (*see 2.2 below*)
ERP that is inconsistent with S2 regulation and ignores assessment from a range of expert studies	*[4%-6%]*	*0.81*	*0.80*	(4.15%-3.88%)	**2.59%-3.89%**	ERP selected by EIOPA is backward looking, which is inconsistent with art. 77.5[8] and is materially higher than the recommendation by expert studies due to a range of issues[9] (*see 2.3 below*)

The resulting impacts of these corrections are reductions in the Cost of Capital with each of them being material to consider. Consequently, a downward adjustment to the Cost of Capital as part of the 2018 review is justified.

The various shortcomings identified are discussed in more detail in the sections below.

[8] Art. 77.5 of the Solvency 2 Directive reads "the Cost-of-Capital rate used shall be equal to the additional rate, above the relevant risk-free interest rate, that an insurance or reinsurance undertaking would incur holding an amount of eligible own funds … necessary to support insurance and reinsurance obligations over the lifetime of those obligations" which implies a forward-looking dimension.

[9] Please see section 2.3 for more details and references

2.1 Use of inconsistent assumptions

The first shortcoming in EIOPA's analysis is to use different underlying assumptions on the capital structure of an insurer depending on the parameter. Assumptions underlying parameters should be homogeneous. This technical error of inconsistency significantly distorts the outcome of the analysis.

The Solvency II directive[10] requires that "*the Cost-of-Capital rate used shall be equal to the additional rate, above the relevant risk-free interest rate, that an insurance or reinsurance undertaking would incur holding an amount of eligible own funds…equal to the Solvency Capital Requirement".* In their analysis, EIOPA start from a traditional Weighted Average Cost of Capital (WACC) reasoning, but then assume a zero weight for the debt financing considering that this type of funding is minimal and can be ignored[11]. However, for the beta parameter, EIOPA simply uses a *levered* beta reflecting the actual capital structure of insurance companies using Solvency II eligible equity *and* debt. EIOPA's own data shows that debt capital is a substantial part (23.5%) of the *total* eligible own funds of insurers. The *levered* beta therefore reflects the use of debt by insurers and as such its use is inconsistent with their assumption of a capital structure with no debt. An *unlevered* beta should be used for the analysis instead.

EIOPA has identified 0.9 as an unlevered beta in its technical advice[12]. Using this unlevered beta parameter[13] to correct the analysis, materially impacts the outcome of the formula. It reduces the suggested Cost of Capital by **1.7% - 2%** to a range **below 6%**.

2.2 No asset risk related correction in beta factor is incompatible with Solvency II Delegated Regulations

Article 38 of the Delegated Regulations sets out the assumptions that must be used for the Reference Undertaking when determining the Solvency II risk margin. In sub (h) of this article, it is stated that it should be assumed that the Reference Undertaking selects its assets '*in such a way that they minimise the Solvency Capital Requirement for market risk that the reference undertaking is exposed to*'.

The result of this requirement is that the Solvency II risk margin should cover predominantly underwriting risk, which is considered a non-hedgeable risk. Such risks are generally considered to have a low correlation (beta) with the market. EIOPA applies no correction to the beta parameter for the fact that it is sourced from insurers which hold assets with market risk and therefore they are using a beta that will reflect that insurers are more correlated to the rest of the market than the Reference Undertaking would be. Therefore, the unlevered beta for insurers requires a further downward adjustment in order to be an appropriate beta for the Solvency II Reference Undertaking.

The adjustment of removing the asset risk from the beta parameter would have a material impact. For the analysis presented in the table above, a simple but limited downward shift of 10% in the beta is

[10] See appendix 2 art. 77.5.
[11] See EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation, Feb. 28, 2018, p. 344.
[12] P. 368, EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation, EIOPA-BoS-18/075, 28 February 2018. "A. Damodaran derives an unlevered beta of 0.9".
[13] The 0.9 for the beta is a prudent number; in the CFOF/CROF and IE responses, a level of 0.65-0.8 was suggested as a more appropriate level for the beta in the context of the Solvency II risk margin.

used to correct for this[14]. This is a conservative, high-level estimate as asset risk presents a material part of insurance companies Solvency II risk profiles[15] and unlevered betas of actual insurance companies as reported by Damodaran[16] are still around or lower than the resulting 0.81 after the 10% adjustment. After this suggested correction, the Cost of Capital rate would be reduced by a half a percent point to a range of **4.55% to 5.24%.**

Therefore, correcting a technical error and ensuring the calculation is in line with the Solvency II regulations, while still relying on EIOPA's own data and analysis, signals a Cost of Capital rate of around 5%.

2.3 EIOPA's derivation of the ERP presents several shortcomings

The ERP selected by EIOPA is backward-looking. As such, it is inconsistent with the Solvency II Directive which implies that the cost of capital should be determined on a forward-looking basis. This introduces an upward bias in the ERP, of around 2%. Furthermore, the historical ERP selected by EIOPA is higher than the recommendation by various expert studies that are available for external reference (see table below). These independent, academic studies make their recommendations based on careful analysis taking into account the range of methods and their strengths and weaknesses to arrive at an appropriate ERP.

The following shortcomings in EIOPA's derivation of the ERP are identified as sources of the upward bias in EIOPA's findings:

1. **EIOPA used backward-looking ERP, which is inconsistent with the Solvency II Directive and leads to an upward bias. Correcting this would reduce the ERP by up to 2%.**
   EIOPA's use of a backward-looking approach is inconsistent with the requirements of sub-paragraph 3 of Article 77(5) in the Solvency II Directive which imply that the Cost of Capital rate should be determined on a forward-looking basis, as the risk margin covers cost of the capital to manage the future risk of the existing insurance liabilities over the lifetime of these liabilities. This paragraph reads: "the Cost-of-Capital rate used shall be equal to the additional rate, above the relevant risk-free interest rate, that an insurance or reinsurance undertaking would incur holding an amount of eligible own funds, as set out in Section 3, equal to the Solvency Capital Requirement necessary to support insurance and reinsurance obligations over the lifetime of those obligations."

   In addition, according to external sources, a forward-looking ERP is more suitable than a backward-looking one, as backward-looking returns are inflated. This is because they do not reflect the impact of defaulting firms ('survivorship bias'). Indeed, bankrupt companies generate negative equity returns. As, by construction, they are excluded from the computation of the backward-looking total equity return, an upward bias is introduced in the computation of the equity risk premium. Separate studies have indicated that changing from a backward-looking approach to a forward-looking approach has an impact of around -2% and is therefore too important to ignore. EIOPA rejected forward-looking methods considering them too volatile. The ERP based on

[14] Alternatively, as in the CRO/CFO Forum response to EIOPA during the consultation phase it is possible to adjust for this via a change to the adjustment factor, which for the final outcome of the calculation has a similar effect.
[15] Please see e.g. p.43 EIOPA's Financial Stability Report (December 2017): https://eiopa.europa.eu/Publications/Reports/Financial_Stability_Report_December2017.pdf
[16] Please see e.g. average global betas for insurance http://pages.stern.nyu.edu/~adamodar/

historical return models requires certainly fewer assumptions to be calculated. However, if using an historical return ERP, it is essential to address its upward bias, by making a correction.

2. **EIOPA mixed their basis for risk free rates** – using 30-day for data points until 2006, whilst using 1-year rates from 2007 onwards[17]. To be consistent, for example 1-year rates should have been used for all data points. However, the literature on risk premium research highlights the need to decide the appropriate investment horizon and often provides ERP estimates for long-term (e.g. based on 10-year rates) which are lower than the short-term ERPs. For a reference undertaking investing long-term in a run-off portfolio it is reasonable to at least consider if the longer- term ERP is in fact the more appropriate reference point.

3. **Ignored geometric mean.** The literature on risk premiums also highlights the important difference between arithmetic and geometric means when attempting to determine an appropriate ERP and many studies provide historic ERPs using both methods. In these studies, the geometric mean is often cited as the most appropriate for investment purposes. Use of a geometric mean would result in a lower ERP. EIOPA made no mention of this issue or justification for not using a geometric mean.

As a result, EIOPA's final ERP, within a range of 7 and 8.1%, seems unrealistically high compared to other relevant studies, which indicate that an appropriate ERP would be in the range of 4% to 6%. Important in the light of the specific request from the European Commission to EIOPA in the review of the Cost of Capital, is the observation that expected premiums as estimated have declined significantly since the end of the Global Financial Crisis[18].

Analysis and views from Academic experts

Academic evidence	ERP	Remarks	Link
Dimson, Marsh and Staunton (2011)	3%-3.5%	• Based on a geometric mean. • Arithmetic mean for the world index indicates 4.5 – 5%.	link[i]
Norges bank (2016) – The equity risk premium	3%-6%.	• Estimate that the expected World ERP is around 6 percent as at January 2016, but if accounted for the effect of the current low interest rates or put less emphasis on recent cash flow growth data, the estimate for a World ERP is 3 to 4 percent. • ''The expected premium as estimated by these models has declined significantly since the end of the Global Financial Crisis.''	link[ii]
Damodaran (2016)	2.80%-5.87%	• ERP can vary depending on e.g. time period chosen and using arithmetic instead of geometric averages. • Suggested range of 2.8% to 5.87%. • Concludes, however, that it is possible to arrive at ''outlandishly high or low premiums,	link[iii]

[17] Please see p.357-359 in EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation

[18] https://eiopa.europa.eu/Publications/Requests%20for%20advice/CfA_annex.pdf

		but only if estimation approaches are used that do not hold up to scrutiny''.	
Ibbotson and Chen (2003)	3.97% - 5.90%	• 3.97% based on geometric, 5.90% based on arithmetic.	link[iv]
Fama and French (2002)	2.55% - 4.32%	• Based on dividend and earnings growth models. • The backward-looking ERP over 1951 and 2002 was 2% higher than the forward looking one.	link[v]

Using a forward-looking assumption consistent with the Solvency II directive and reflecting a more realistic approach will lead to a lower ERP, more likely ranging from 4% to 6%. This will drive further down the range for a realistic Cost of Capital rate that is suitable for the specific purpose of the Solvency II risk margin calculation.

3. Final assessment and conclusion

The CFOF-CROF and Insurance Europe submissions to EIOPA's consultation on the 2018 review already highlighted a series of flaws in EIOPA's overall approach to assessing the Cost of Capital, as well as wider concerns over the Risk Margin formula.

As it has been demonstrated in this paper, a correct application of EIOPA's chosen approach for setting the Cost of Capital requires the correction of a number of flaws in order to arrive at a figure that is appropriate from both a theoretical and a regulation point of view. As shown, after such corrections, the reference rate would be lower than the level proposed by EIOPA.

As a consequence, we urge the Commission to ensure such corrections are applied to lower the cost of capital rate from 6%, as part of the on-going review of the Standard Formula under Solvency II. This would move the Risk Margin to a more appropriate calibration and, in doing so, bring the insurance industry closer to its actual capacity to take risks on behalf of customers and to invest in the productive economy in line with the political objectives of the EU growth program.

Appendix 1: European Problem – Especially Impacting Long-Term Life Business.

Country – level analysis

	Total Risk Margin (€bn)	Total RM as % of SCR	RM as % of SCR (life undertakings only)
Norway	4.3	40%	107%
Netherlands	17.6	51%	76%
Czech Republic	0.7	35%	60%
Germany	45.5	32%	52%
United Kingdom	58.9	42%	50%
Estonia	0.1	31%	48%
Ireland	9.1	39%	48%
Liechtenstein	0.3	35%	47%
Lithuania	0.1	31%	47%
Slovakia	0.3	40%	47%
Luxembourg	2.5	34%	45%
Spain	6.4	31%	45%
Greece	0.5	30%	43%
Poland	1.4	26%	42%
Hungary	0.2	28%	38%
Slovenia	0.2	20%	37%
Finland	2.0	32%	36%
France	34.0	26%	28%
Romania	0.1	12%	28%
Denmark	3.5	25%	27%
Bulgaria	0.1	12%	25%
Cyprus	0.1	18%	25%
Austria	3.4	25%	23%
Belgium	5.4	28%	23%
Italy	7.6	15%	23%
Portugal	0.8	21%	21%
Sweden	4.7	18%	20%
Croatia	0.1	19%	14%
Latvia	0.0	10%	-
Total	**209.6**		

Data as at Q3 2016, Source: EIOPA

Company specific examples for the Netherlands showing how large the Risk Margin can be.

Dutch life insurance legal entities of:	Risk Margin	Total RM as % of SCR
AEGON	2.26	70.4%
Achmea	1.58	66.0%
ASR	1.66	62.6%
NN	3.65	96.9%
DL	1.92	101.8%
Vivat	1.79	78.1%
Monuta	0.25	67.4%
DELA	0.68	83.1%
Yarden	0.19	116.1%

2016 data, source DNB.nl

Appendix 2: Solvency II regulatory texts

Directive: Article 77 Calculation of technical provisions

5. Where insurance and reinsurance undertakings value the best estimate and the risk margin separately, the risk margin shall be calculated by determining 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.

The rate used in the determination of the cost of providing that amount of eligible own funds (Cost-of-Capital rate) shall be the same for all insurance and reinsurance undertakings and shall be reviewed periodically.

The Cost-of-Capital rate used shall be equal to the additional rate, above the relevant risk-free interest rate, that an insurance or reinsurance undertaking would incur holding an amount of eligible own funds, as set out in Section 3, equal to the Solvency Capital Requirement necessary to support insurance and reinsurance obligations over the lifetime of those obligations.

Delegated Regulations: Article 38 Reference undertaking

1. The calculation of the risk margin shall be based on all of the following assumptions:
(a) the whole portfolio of insurance and reinsurance obligations of the insurance or reinsurance undertaking that calculates the risk margin (the original undertaking) is taken over by another insurance or reinsurance undertaking (the reference undertaking);
(b) notwithstanding point (a), where the original undertaking simultaneously pursues both life and non-life insurance activities according to Article 73(5) of Directive 2009/138/EC, the portfolio of insurance obligations relating to life insurance activities and life reinsurance obligations and the portfolio of insurance obligations relating to non-life insurance activities and non-life reinsurance obligations are taken over separately by two different reference undertakings;
(c) the transfer of insurance and reinsurance obligations includes any reinsurance contracts and arrangements with special purpose vehicles relating to these obligations;
(d) the reference undertaking does not have any insurance or reinsurance obligations or own funds before the transfer takes place;
(e) after the transfer, the reference undertaking does not assume any new insurance or reinsurance obligations;
(f) after the transfer, the reference undertaking raises eligible own funds equal to the Solvency Capital Requirement necessary to support the insurance and reinsurance obligations over the lifetime thereof;
(g) after the transfer, the reference undertaking has assets which amount to the sum of its Solvency Capital Requirement and of the technical provisions net of the amounts recoverable from reinsurance contracts and special purpose vehicles;
(h) the assets are selected in such a way that they minimise the Solvency Capital Requirement for market risk that the reference undertaking is exposed to;
(i) the Solvency Capital Requirement of the reference undertaking captures all of the following risks:

(i) underwriting risk with respect to the transferred business,

(ii) where it is material, the market risk referred to in point (h), other than interest rate risk,

(iii) credit risk with respect to reinsurance contracts, arrangements with special purpose vehicles, intermediaries, policyholders and any other material exposures which are closely related to the insurance and reinsurance obligations,

(iv) operational risk;

(j) the loss-absorbing capacity of technical provisions, referred to in Article 108 of Directive 2009/138/EC, in the reference undertaking corresponds for each risk to the loss-absorbing capacity of technical provisions in the original undertaking;

(k) there is no loss-absorbing capacity of deferred taxes as referred to in Article 108 of Directive 2009/138/EC for the reference undertaking;

(l) the reference undertaking will, subject to points (e) and (f), adopt future management actions that are consistent with the assumed future management actions, as referred to in Article 23, of the original undertaking.

2. Over the lifetime of the insurance and reinsurance obligations, the Solvency Capital Requirement necessary to support the insurance and reinsurance obligations referred to in the first subparagraph of Article 77(5) of Directive 2009/138/EC shall be assumed to be equal to the Solvency Capital Requirement of the reference undertaking under the assumptions set out in paragraph 1.

3. For the purposes of point (i) of paragraph 1, a risk shall be considered to be material where its impact on the calculation of the risk margin could influence the decision-making or the judgment of the users of that information, including supervisory authorities.

URLs for links to papers with analysis and views from Academic experts

[i] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1940165

[ii] https://www.nbim.no/contentassets/2b92009ffa9440f98eec8f32a0996ca2/discussion-note-1-16---equity-risk-premium.pdf

[iii] https://poseidon01.ssrn.com/delivery.php?ID=595118123002083088018093122070081068052035058029030050009003085102005025011115065076118021122027111056019100018001086099021108015080078007034119100107120065080031073081071093113096007087080027125123024122119016120080114110028030090079002101126091&EXT=pdf

[iv] https://psc.ky.gov/PSCSCF/2005 cases/2005-00057/Documents on CD/Articles/Ibbotson - Participating in the Real Economy - FAJ 2003.pdf

[v] https://psc.ky.gov/pscecf/2012-00221/rateintervention@ag.ky.gov/10252012c/Fama_French_--_Equity_Premium.pdf