**Market & credit risk modelling comparative study (‘MCRCS’),
year-end 2022 edition**

***Response template for part 04 (qualitative questionnaire)***

Prior to filling out your answers, please rename this file as ‘*firm-001\_part-04\_response\_template\_year-end\_2022\_mcrcs.docx*’, adapting the number ‘*001*’ in the file name according to what your (group) supervisor might have indicated.

Please note that all questions are literally taken from the previous study, with an addition to question 6, namely sub-questions c and d. In case your undertaking took part in this study please feel free to copy & paste and either explicitly confirm that answers are unchanged or indicate changes since then.

Your responses can be succinct but should be sufficiently understandable & comprehensive. You shall *not* mention the name of your undertaking.

**Questions on your model’s structure with respect to market & credit risk**

1. Please provide a very succinct specification of the model structure. As a reference, please use the rough classification given in the separate instructions document, section IV, under part 02 – and particularly: cases (A) to (E). If deemed necessary, you can provide some additional explanation.

Your answer can be put here:

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1. Which market & credit risk factors are covered by your model (but without going into overly detailed risk driver specifications)?

Please distinguish between the market and credit risk, if these correspond to two distinct modules of your model.

Your answer can be put here:

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1. Further to the previous question, which sub-risks of the “credit risk” (default risk, rating migration risk and/or ‘pure’ credit spread risk) are covered by your market and/or credit risk modules? Clarify also your definitions of the sub-risks covered.

In case your model covers several or all of the sub-risks given above: Is it technically and from a reporting perspective foreseen to split the model results into the sub-risks?

Beyond the above-mentioned coverage of your model in general terms, please specify whether you apply a specific treatment to certain asset classes – e.g., by excluding certain sub-risks of the “credit risk”. This might concern e.g. mortgages, sovereigns, (counterparty risk on) derivatives, etc.

Your answer can be put here:

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1. Concerning the concentration/accumulation of exposures: Does your model for market and/or credit risk encompass an explicit mark-up or penalisation of concentration effects? If so, briefly explain how. We are particularly interested in knowing of any mark-up/penalisation in case that e.g. your credit risk module – or aggregated ‘market & credit risk’ module – doesn’t consist of a Monte Carlo simulation.

Please distinguish between the market and credit risk modules, if relevant.

Your answer can be put here:

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1. Is *the impact of the simulated scenarios/shocks on the assets* implemented as ‘an instantaneous shock’ or does your risk model consider portfolio ageing effects over the time period corresponding to the ‘shock’? We are especially interested to know whether your model deviates from the assumption of: (i) an instantaneous shock, and/or (ii) a zero drift. If deemed necessary, a short but comprehensible description should be provided to clarify how your assumptions are reflected in your SCR definition/implementation.

Please distinguish between the market and credit risk modules, if relevant.

Your answer can be put here:

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1. Which definition of “Value-at-Risk” underlies your modelling approach? In particular:
2. Does it concern a quantile/percentile of the value distribution, or a quantile/percentile less an ‘expected value’? Please, briefly justify your approach, indicating also – if relevant – how the ‘expected value’ is possibly (re-)integrated in a later step of your total SCR calculation. Furthermore, this might also include other effects, like possibly a discounting step.
3. Specify the statistical estimator used for estimating this quantile/percentile. In particular, provide a concise but comprehensive description of any steps performed to obtain this 99.5 percentile on the basis of the calculated changes in value under the simulated scenarios. This could concern a rule to select one specific scenario – such as “the nth worst out of m scenarios” or “the median of a specific subset of the ordered scenarios” – or any interpolation or smoothing scheme that utilises e.g. multiple scenarios belonging to a subset of the sampled empirical distribution.
4. Explain any additional hypotheses you had to make when providing the “*Modelled* *Value-at-Risk (VaR)*” figures for each financial position (including the benchmark portfolios) within the response templates for parts 01 till 03. As specified for this data request, these hypothesises should also comprise the absence of liabilities and tax effects according to the definition of the modelled VaR.
5. Specify whether your model includes a drift assumption regarding interest rates (i.e. a parameter is capturing the growth over time of the interest rate).
6. Specify whether your model includes and ‘ageing effect’, i.e. valuation at time t=1 reflects elapsed time span of the risk horizon. (Example: A 2-year bond at t=0 effectively is a 1-year bond at t=1). For integrated approaches furthermore, over the risk horizon also migration and default takes place. (Example: For a 1-year bond at t=0 only default/full repayment is relevant at t=1 but migration events not).

Please distinguish between the market and credit risk modules, if relevant.

Your answer can be put here:

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1. How many Monte Carlo scenarios are used in your simulation model? Furthermore, please provide a concise description of any ‘variance reduction technique’ employed.

Please distinguish between the market and credit risk modules, if relevant.

Your answer can be put here:

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1. Consider the synthetic ‘zero-coupon bonds free from credit risk’ within part 01. As indicated, these intend to capture the simulated Solvency II interest rate curves.

In order to elucidate the connection to your actual asset simulation, please specify succinctly the steps linking the effectively simulated interest rate curves to the actual asset revaluations under the simulated scenarios (indicating also any relevant curves generated in the intermediate steps).

Please specify your approach to extrapolating the risk free yield curve **at t=0** for assets. What is the highest maturity used before extrapolation takes place? What is your extrapolation approach?

Please also specify your approach to the simulated risk free yield curve used for assets, i.e. **at t=1**.

Please distinguish between different currencies, if relevant.

Your answer can be put here:

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Please additionally provide the following information for the following synthetic instruments, for the **figures per key date of the study i.e. 31.12.2022**:

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| --- | --- | --- | --- | --- | --- |
| INSTRUMENT | Name of IR-related base valuation curve\* (e.g. swap, AAA-government etc.) | Level (in %) of IR-related base valuation spot rate (t=0) | 99.5% level (in %) of IR-related base valuation spot rate (t=1) | 0.5% level (in %) of IR-related base valuation spot rate (t=1) | mean level (in %) of IR-related base valuation spot rate (t=1) |
| EUR RFR ZCB without VA, maturity 30 years (same synth. instrument like in quant. questionnaire: FI-EUR-RFR-NA-NA-NA-NA-30) |  |  |  |  |  |
| German Government bond, maturity 30 years |  |  |  |  |  |

\*In this context „IR-related“ means valuation component for the fixed income asset that is not related to credit risk related aspects, i.e. the ‘pure’ interest rate risk.”

Please note: the German government bond is used as a proxy for a (nearly) credit risk free instrument. In case you consider something else as a relevant proxy for a risk free asset, please use this and provide some details.

1. Please specify succinctly the allowance of the Volatility Adjustment (‘VA’) in the simulation of the Solvency II risk-free curve *to shock the* *liabilities* within your market risk module; and particularly:
2. Do you use: (i) no VA, (ii) solely the initial VA as officially specified by EIOPA for the calculation of the Best Estimate of Liabilities, (iii) a dynamic Volatility Adjustment (i.e., there’s a potentially different value for the VA in each simulated scenario);
3. In case a dynamic VA is used, explain any additional hypotheses you had to make when providing the VA for each simulated scenario (within parts 01 till 03). This might include any influences from your simulation of a country-specific VA in part 03, if you’re unable to omit these from the scenario-by-scenario VA values.

If necessary, distinguish between the ‘initial VA’ and the (changes to the) VA in each scenario.

Please distinguish between different currencies, if relevant.

Your answer can be put here:

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1. Treatment of corporate bonds
2. With reference to the synthetic corporate bonds, if the “issuer country” is a relevant criterion in your undertaking’s model, please specify which issuer country you have chosen among those proposed and explain the reason.
3. Regardless of the synthetic corporate bonds, if your internal model employs differing assumptions for bonds issued within your insurance group, please explain the approach.

 Your answer can be put here:

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1. Concerning the treatment of sovereign bonds: in the case of an insurance group, please specify if all the entities encompassed in your internal model apply the same approach. Alternatively, we are particularly interested in knowing of any different calibration of market and credit risk modules allowed in your group internal model (e.g. depending on the country where a particular legal entity is located).

Please distinguish between the market and credit risk modules and sub-modules, if relevant.

Your answer can be put here:

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1. Each corporate and sovereign instrument should correspond to one single issuer, i.e. no diversification assumptions should be taken per instrument (neither from the single instrument nor from the BMP perspective). Also the different maturities should be considered to be issued from the same issuer. Please confirm that your model can comply with this expectation. In case not, please explain the assumptions followed.

Your answer can be put here:

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1. The balance sheet of a (re)insurance undertaking is typically sensitive to movements in inflation. However different cash-flows might be sensitive to different kinds of inflation which can require multiple treatments within the internal model.
2. Please explain if the modelling of Consumer Price Index (CPI) inflation is captured in your market and credit risk model.
3. Please clarify what cash-flows of your Best Estimate of Liabilities are impacted by CPI inflation. Please make a distinction between different products (Life Retail, Life Group, P&C, and Health) and between different cash flows (Future Benefits, Future Expenses and other cash out-flows, Future premiums, Other cash in-flows, Total recoverable from reinsurance (after the adjustment)).

Please clarify further which of these products and cash-flows are most material for your risk profile in the context of market and inflation risks.

Your answer can be put here:

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1. Please additionally provide the following information for your Best Estimate, for the reference date of the study:

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|  | Base Case(as in Market Value Balance Sheet) | Interest Rate Stress:parallel shock of +0.5% incl. after LLP | Interest Rate Stress:parallel shock of +1.0% incl. after LLP | Inflation Rate Stress:parallel shock of +0.5% | Inflation Rate Stress:parallel shock of +1.0% |
| Total Best Estimate |  |  |  |  |  |
| Delta with Base Case Best Estimate |  |  |  |  |  |

**Questions on your asset portfolio**

1. Please provide the following information regarding the duration of the asset portfolio:
2. The duration of the entire asset portfolio
3. The duration of the following components of the asset portfolio:

                                 i.            Government bonds

                               ii.            Corporate bonds

                              iii.            All fixed income instruments

1. The type of duration measure used.

Your answer can be put here:

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1. Please explain the relationship between the year-end Total SCR and the underlying IR-risk drivers:
2. Please explain which type of IR-movement drives your Total SCR: a general increase and/or a general decrease in risk-free interest rates?
3. In case these are non-parallel IR-movements (e.g. twists): please explain the type of twist incl. the point on the IR term structure where the twist occurs (e.g. “the SCR is driven by a general increase in rates up to the 10Y duration, and a decrease in rates beyond the 10Y duration”).

Please provide this information from a Group perspective and for the three most material entities in terms of market risk. Please take into account whether differences in IR risk profiles suggest to instead considering certain other entities.

Your answer can be put here:

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**Questions on the consideration of sustainability in your internal model:**

1. Classification of sustainable actions:
2. Do you use a taxonomy of sustainable economic activities to classify your assets in your internal model regarding market & credit risks? If so, please elaborate on the taxonomy you use (internal/external, which one).
3. Do you use a rating methodology to assess the sustainability nature of your assets? If so, please elaborate on the methodology you use (internal/external, which one).
4. Do you observe differences in terms of return/risk profile of assets with respect to the taxonomy or rating methodology you use? If yes, is a different risk charge applied to sustainable assets? Please elaborate.
5. Do you account for physical risks from climate change[[1]](#footnote-2) in your modelling of real estate for investments? Do you take it into account for other asset classes as well?

 Your answer can be put here:

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**Any suggestion for improvements?**

1. We appreciate your feedback to continue improving the quality of this type of studies. This can be about the timeline, the process or the content of the study (e.g. on content: would you have any recommendation regarding the coverage of synthetic instruments and their maturities? or regarding the composition of benchmark portfolios?)

You can provide your suggestions here:

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1. Physical risks from climate change arise from a number of factors, and relate to specific weather events (such as heatwaves, floods, wildfires and storms) and longer-term shifts in the climate (such as changes in precipitation, extreme weather variability, sea level rise, and rising mean temperatures). Some examples of physical risks crystallising include: increased frequency, severity or volatility of extreme weather events impacting property and casualty insurance; and increased frequency and severity of flooding leading to physical damage to the value of financial assets or collateral held by banks, such as household and commercial property. [↑](#footnote-ref-2)