

Second information request in context of the PHRSS framework

2023

Technical specifications

September 4th, 2023

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1. PURPOSE OF THE DOCUMENT

1. The aim of this document is to provide technical specifications for the insurance undertakings participating in the second phase of the EEA-wide information request carried out by EIOPA in context of the Prudent Harmonised Reduced Set of Scenarios (PHRSS) framework. It should be considered carefully before filling out the response templates.

2. CONTEXT OF THE INFORMATION REQUEST

2.1. VALUATION OF LIABILITIES WITH OPTIONS AND GUARANTEES – EIOPA’S PROPOSAL FOR A PHRSS FRAMEWORK

2. A stochastic valuation is the most accurate method for the valuation of contracts with options and guarantees and, indeed, deterministic valuation tends to underestimate the best estimate of such contracts since it does not consider the time value of options and guarantees (TVOG). However, a stochastic valuation is more complex and costly to implement since it requires an economic scenario generator (ESG) and an actuarial platform that allows for a stochastic valuation.
3. Before this background, as part of its opinion on the Solvency Review EIOPA has proposed a new valuation methodology as a proportionality measure for undertakings that have liabilities with options and guarantees but that currently don’t use stochastic valuation. This new methodology is intended to smooth the path between deterministic and stochastic valuation for small and less complex undertakings with limited resources. Under this methodology, undertakings assess the TVOG on basis of a Prudent, Harmonised, Reduced Set of Scenarios (PHRSS) published by EIOPA.

Extract from the advice:

8.28 EIOPA proposes to allow prudent deterministic valuation for contracts with options and guarantees if the four following conditions are satisfied:

- i. The undertaking complies with all the low risk profile undertaking (LRU) criteria.
- ii. The time value of options and guarantees (TVOG), measured based on the prudent harmonised reduced set of scenarios (PHRSS), of the contracts where the prudent deterministic valuation is applied is below 5% of the SCR.
- iii. The undertaking adds to its Best Estimate a stochastic supplement equal to 5% of the SCR. An undertaking may calibrate an ad-hoc stochastic supplement using prudent harmonised reduced set of scenarios in case it accurately reflects its risk profile.
- iv. The stochastic supplement is kept constant through the whole SCR calculation process. Therefore, the loss-absorbing capacity of technical provisions should never be affected by the stochastic supplement.

8.29 To facilitate the assessment of these criteria, EIOPA would publish a prudent harmonised reduced set of scenarios (PHRSS) to be used to estimate the TVOG mentioned in the second criterion. This PHRSS would consist of approximately 10 economic scenarios prudently calibrated.

8.30 The process for the application of the simplification should be the same than for any other proportionality measure, including ex-ante notification and ex-post reporting.

8.31 As for any other proportionality measure, supervisors should have the possibility to challenge the use of prudent deterministic valuation and/or the calibration of the ad-hoc stochastic supplement with the prudent harmonised reduced set of scenarios even if the ex-ante notification was not challenged. Supervisors should also have the possibility to allow the use of prudent deterministic valuation in case some of the criteria are not met in the same terms than for any other proportionality measure.

2.2. INFORMATION REQUESTS TO DEVELOP THE PHRSS FRAMEWORK

4. The EIOPA project group on Long Term Guarantees has started a work stream to set up a methodology that can be used to produce the reduced set of scenarios. In order to fine-tune this methodology, two information requests are scheduled.
5. A first information request has already been carried out. The goal of this first information request was to select a sample of undertakings that already perform a full stochastic valuation of their technical provisions (TP), and to assess the impact of a number of shortlisted PHRSS options on these entities. The comparison between the best estimate determined on basis of a full stochastic valuation and the best estimate determined on basis of the PHRSS approach allowed for improving the risk sensitivities of the scenarios and the correction technique aiming for a prudent reflection of the TVOG level. The first information request was restricted to liabilities denominated in the Euro currency.
6. These technical specifications deal with the second information request which involves undertakings that assess their TP on a deterministic basis. The aim of this step is to assess the feasibility of the calculations and the size of the resulting adjustments to deterministic technical provisions.
7. Note that the first information request was limited to insurance obligations denominated in the Euro currency, whereas the scope of the second information request has been broadened to also include obligations denominated in other relevant currencies. This second information request therefore also includes undertakings already using a stochastic valuation in case where these undertakings carry obligations in currencies other than the Euro. This means that the request comprises the following two categories of participants:

Category	Description
1	Undertakings which use a stochastic valuation of their technical provisions
2	Undertakings which use a deterministic valuation of their technical provisions

8. Some of the information that undertakings are asked to report in this request are the same for those two categories. However, for some aspects, the information that it asked for is specific to one of the above categories. In the following, the technical specifications will make transparent cases where required information is applicable to only one of the above categories.
9. Please note that in case an undertaking falls into both categories (part of its technical provisions are valued with a stochastic method and part with a deterministic method) it is requested to participate to the information request twice: one time for each type of calculation. Undertakings which apply a partial stochastic calculation for their best estimate calculation are expected to choose category 1 and to provide comments about their calculation method in the qualitative questionnaire.

3. OVERVIEW OF THE SECOND INFORMATION REQUEST

10. With respect to undertakings in category 1¹, the goal of the second information request is to compare the TVOG value calculated by the undertaking's own valuation model with the estimation of the TVOG value derived from applying the PHRSS scenarios. With respect to undertakings in category 2, the aim of the request is to assess the feasibility and practicability of the calculation of the TVOG estimate derived from using the PHRSS scenarios as an input to the undertaking's deterministic valuation. The information request comprises a quantitative and qualitative questionnaire.

¹ as described in para. 7

11. The qualitative questionnaire serves to accompany the quantitative part and to gain insight into the wider context of the undertaking's TP assessment (see subsection 6.6 below).
12. In the quantitative part of the request, the selected undertakings are requested (see further specifications in subsection 6) to provide:
 - quantitative information regarding the valuation of technical provisions in accordance with Solvency II regulatory reporting; and
 - quantitative information regarding the valuation of their technical provisions using the specified sets of PHRSS scenarios provided by EIOPA on basis of their current best estimate model.
13. In order to complete the information request, the undertaking should be in possession of the following files:
 - The reporting template containing the qualitative and quantitative questionnaires: PHRSS_Second_Information_Request_Template.xlsx
 - 10 currencies × 4 Excel files i.e. 40 Excel files with the shortlisted set of economic scenarios provided by EIOPA (see subsection 5 below)
 - The note describing the methodology applied by EIOPA to derive the PHRSS scenarios.

4. PARTICIPATION TO THIS IMPACT ASSESSMENT

Expectation on participation

14. Participants are individual undertakings of the EEA which belong to either one of the following three categories:
 - Undertakings which already perform their TP assessment with full stochastic scenarios and which have life insurance obligations with embedded options and guarantees denominated in currencies other than the Euro;
 - Undertakings which use deterministic valuation methods for their technical provisions;
 - Undertaking using deterministic valuation methods for assessing a part their technical provisions and stochastic valuation methods for assessing another part their technical provisions.

5. ECONOMIC SCENARIOS PROVIDED

15. There are 4 set of economic scenarios per currency provided in the Excel spreadsheets named as follows : **PHRSS_set_X_CURRENCY.xlsx**, where X is the number of the scenario set (from 1 to 4) depending on the methodological options, and CURRENCY is the currency (among the following countries : Euro, Bulgaria, Czech republic, Denmark, Hungary, Iceland, Norway, Poland, Romania, Sweden).
16. For convenience, an additional file is provided for each currency with the certainty equivalent (CE) scenario under the same format as the PHRSS scenarios.
17. Each file describes a set of 9 economic scenarios (+1 for the CE files). For each scenario, the following economic values in the relevant currency are simulated at each time step up to the time horizon (120 years):
 - Deflator
 - ZC prices for maturities 1 to 40 years
 - Equities indexes (base value at t=0 being 1)
 - Property indexes (base value at t=0 being 1)

18. A description of the methodology applied by EIOPA to derive these scenario sets is contained in a separate word document (PHRSS_Methodology.docx).
19. In case the undertaking uses risk factors not simulated by the PHRSS in order to calculate its Best Estimate, it should use hypotheses based on the risk-free rate return of the scenario as described below.
20. **Regarding bonds:** the PHRSS doesn't include the modelling of stochastic spreads and credit, the undertakings are therefore expected to value the bonds at each time step with a calculation based on the simulated risk-free interest rates with adjustments to ensure that the market value of the bonds at the reference date is equal to the discounted sum of cash flows based on risk free rates at t=0. These adjustments could for example be:
- Discounting the bonds cash flows using the simulated risk-free interest rates plus a deterministic spread. This deterministic spread is determined at reference date so that the discounted sum of cash flows equals the market value of the bonds.
 - Discounting the adjusted bonds cash flows using the simulated risk-free interest rates without spread. This adjustment of the bonds cash flows can for instance be performed using a proportional approach (i.e. adjust the nominal N with a factor α so that at the reference date $MV = \alpha N \left(\sum_{t=1, M} \frac{C}{(1+r_t)^t} + \frac{1}{(1+r_M)^M} \right)$ where r_t is the EIOPA risk free rate for maturity t , and C is the coupon rate of the bond).
21. **Regarding inflation:** the PHRSS includes neither the modelling of the real interest rate curve nor the modelling of the realized inflation rate. These can be determined at each time step given the real zero coupon bond prices at reference date ($P_r(t=0, m) = \frac{1}{(1+\text{real rate}_m)^m}$ for maturity m) by determining the forward real zero coupon bond prices seen at reference date ($P_r(t, M) = \frac{P_r(0, t+M)}{P_r(0, t)}$) and assuming that at each time step the real zero coupon bond prices are the forward real zero coupon bond prices seen at reference date. The real rates are assumed to evolve deterministically along the forward real rates. Undertakings can then obtain the realized inflation index at each time step for each scenario with the following relation: $I(t) = \frac{P_r(0, t)}{\text{Deflator}(t)} I(0)$ where $I(0)$ is the reference date value of the inflation index. This realized inflation index is therefore stochastic and ensures the martingale properties of the scenario set. The inflation rates can then be obtained as the relative change in the index value $I(t)$ between two time steps.
22. **Regarding other assets:** the "conditional certainty-equivalent" approach supposes the market value of the assets doesn't follow its own stochastic process but their value is assumed to evolve as the bank account (i.e. the inverse of the deflator). For a specific index that would not be provided in the PHRSS, the future value of the index at time t would therefore be $\text{Index}(t) = \text{Index}(0) / \text{Deflator}(t)$. In this fallback approach, the assets values evolve as their expected value conditionally to the scenario, i.e. their discounted value (with the deflator of the scenario) is assumed to be constant.
23. The time horizon is 120 years and the scenarios are provided with two time steps: annual time step or monthly time step.
24. The scenario set files are organized on the following pattern:
- Column A: number of the scenario
 - Column B: name of the variable
 - Column C: value at t=0
 - Column D: value at t=0 + time step (either 1 year or 1 month)
 - ...

6. SPECIFICATION OF THE REQUESTED INFORMATION

6.1. OUTLINE

25. The submissions to the impact assessment should be made by filling the provided excel file: PHRSS_second_information_request_template.xlsx. See below for an outline of the requested information in each tab of the file:

0. readme

General information on how to fill the template.

1. basic information

General information on the undertaking.

2. qualitative questionnaire

Insight in the wider context of the undertaking's BE assessment.

3. BE own calculations:

In this section, the undertaking is expected to provide quantitative information regarding its own BE calculations: technical provisions evaluated in accordance with the Solvency 2 regulatory reporting. The precise directions are explained in 6.4.

4. BE PHRSS results:

Valuation of the liabilities using PHRSS economic scenarios.

In this section, the undertaking is expected to provide quantitative information regarding the valuation of its liabilities in each of the scenarios provided for the different sets of scenarios. The precise directions are explained in 6.5.

6.2. CONVENTIONS AND ASSUMPTIONS TO BE USED FOR THE SUBMISSIONS

Reference date

26. The data as at year-end 2022 (i.e. 31 December 2022) are requested from the participants, using the year-end 2022 valuation methodology.

Currency

27. The data are requested in the reporting currency.

Sign conventions

28. Companies should use the convention that outflows are denoted by positive values of the economic amounts and inflows by negative values.

Number format

29. The economic quantities must be indicated in the unit of the currency used. Do not use data in thousands, millions, etc.

6.3. SCOPE

30. The scope of this information request comprises life obligations that include options and guarantees in the lines of businesses “with profit participation” and “index- and unit linked”.

6.4. DIRECTIONS FOR THE « BE OWN CALCULATIONS » TAB

31. This tab should be filled using calculation that was used for the Solvency II regulatory reporting as at year-end 2022 with the same parameters. The answers should coincide with QRT numbers, unless the undertaking provides several answer templates: in this case the sum of the BE figures in the different template should coincide with the QRT figures.

32. All BE values should refer to the best estimate gross of reinsurance and without the use of transitional measures on technical provisions and, where applicable, without use of a volatility adjustment.

33. For category 1 undertakings: For each LoB as specified below, the participant is also asked to specify the BE value (also gross of reinsurance) under the certainty equivalent scenario.

34. In this “certainty-equivalent” scenario, the market value of the assets doesn’t follow a stochastic process but their value is assumed to evolve deterministically following the forward rates implied by the initial EIOPA risk free interest rate term structure. For instance, given the ZC bonds prices of the EIOPA risk free rate $ZC(t = 0, m)$ for all maturities m at time $t = 0$, the forward zero-coupon bonds prices of the certainty equivalent scenario at time t for maturity m are calculated with $ZC(t, m) = ZC(0, m+t) / ZC(0, m)$. For an index-linked asset, the future value of the index at time t would be $Index(t) = Index(0) / ZC(0, t)$.

35. In other words, in the certainty equivalent scenario, the assets value is expected to evolve as their expected value (based to the EIOPA risk free rate), i.e. their discounted value is assumed to be constant. EIOPA will determine the time value of options and guarantees (TVOG) as the difference between these two values.

36. This tab should be filled at the granularity of the following LoB:

- With profit business with options and guarantees
- Unit-linked or index-linked business with options and guarantees

37. Where the volume of business in one of these LoBs is less than 10% of the overall business (measured in terms of the volume of technical provisions), the undertaking may avoid calculating the PHRSS sensitivities.

38. The participant is also asked to specify the Solvency Capital Requirement (SCR) in this section.

6.5. DIRECTIONS FOR THE « 4. BE PHRSS RESULTS » TAB

39. This tab concerns quantitative information on the PHRSS valuation. It should be filled for the required lines of business as specified on the tab.

40. All PHRSS values should be specified on basis of the same actuarial setting (e.g. model points, technical hypothesis, assumptions on future management actions) as used in the supervisory reporting per year-end 2022.

41. Undertakings which perform Best Estimate calculations with stochastic scenarios, have to compute quantitative information required by using PHRSS scenarios instead of their own risk-neutral simulations. Such a process needs to potentially adapt PHRSS scenarios in coherence with the risk-

neutral simulations template to adequately feed the Best Estimate projection tool.

- 42. Some undertakings evaluate their Best Estimate with a deterministic calculation based on a unique central scenario cash-flows projection. These undertakings have to perform such a projection for each PHRSS scenario (overall 36 scenarios embedded in 4 sets of 9 scenarios for each currency the undertaking is exposed to). As mentioned in para. 41, PHRSS scenarios need to be adjusted according to the template required by the undertaking projection tool.
- 43. For undertakings which evaluate their Best Estimate with a deterministic calculation and which do not perform central scenario cash-flows projections, PHRSS scenarios cannot directly be used as detailed in paras. 41 and 42. In such a case the undertaking should, on a best effort basis, derive a best estimate valuation under its current valuation method using the individual PHRSS scenarios as input information. In this case, the participant should provide a description of the approach used in the qualitative part of the reporting template (in the “Overall comments and precisions” cell of the reporting template).

6.6. DIRECTIONS FOR QUALITATIVE QUESTIONNAIRE

- 44. The qualitative questionnaire comprises questions for undertakings in category 1 regarding the scope of the risk factors that are modelled stochastically within the ESG as well as some basic information (number of scenarios used, timestep, and time horizon of the projection).

Qualitative questionnaire

Overall comments and precisions (optional)

Information in the following two tables only applies to undertakings in category 1

Description of the risk factors modelled

Output of the ESG	Modelled (yes/no) ?	How is the modelled ESG risk factor mapped to a PHRSS risk factor?	Remarks
Nominal IR		(free text answer)	(free text answer)
Real rates / inflation		(free text answer)	(free text answer)

Equity Index: Large cap e.g. Eurostoxx 50		(free text answer)	(free text answer)
Equity index: Private Equity		(free text answer)	(free text answer)
Equity index: Hedge Funds		(free text answer)	(free text answer)
Equity index: Infrastructure		(free text answer)	(free text answer)
Equity index: Other (precise)		(free text answer)	(free text answer)
Bonds index		(free text answer)	(free text answer)
Property index		(free text answer)	(free text answer)
Sovereign spreads		(free text answer)	(free text answer)
Corporate spreads		(free text answer)	(free text answer)
FX		(free text answer)	(free text answer)
Others (precise)		(free text answer)	(free text answer)

Miscellaneous

Number of scenarios used	e.g. 5000
Time horizon	E.g. 50
Timestep	e.g. annual, monthly, ...

45. The qualitative questionnaire also comprises questions specifically dedicated to undertakings in category 2 regarding a possible use of deterministic method to value the time value of financial options and guarantees.

Is the time value of financial options and guarantees taken into account in any way in the BE with a deterministic method? (yes/no)	
If yes, how (closed formula, sensitivities, ...) ?	(free text answer)

46. The qualitative questionnaire also comprises questions for all undertakings dedicated to understanding the general setting of the BE calculation and how it was adapted to PHRSS calculation.

Order of magnitude of computational time (in minutes) for Certainty Equivalent calculation (deterministic Best Estimate) (e.g 2 minutes...)	
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Financial risk factors influencing the insurance payout (even if not modelled for BE calculation)	yes / no	remarks
Nominal IR		(free text answer)
Real rates / inflation		(free text answer)
Equity Index: Large cap e.g. Eurostoxx 50		(free text answer)
Equity index: Private Equity		(free text answer)
Equity index: Hedge Funds		(free text answer)
Equity index: Infrastructure		(free text answer)
Equity index: Other (precise)		(free text answer)
Bonds index		(free text answer)
Property index		(free text answer)
Sovereign spreads		(free text answer)
Corporate spreads		(free text answer)
FX		(free text answer)
Others (precise)		(free text answer)

Scope of the PHRSS by LoB	Insurance with profit participation	Index-linked and unit-linked insurance (only contracts with options & guarantees)
Is the undertaking able to apply the PHRSS methodology to provide answers in the "BE PHRSS results" tab on all the liabilities of each LoB? (yes/no)		
If the answer is no to the question above: please explain which liabilities needed to be excluded and why.	(free text answer)	(free text answer)
If the answer is no to the question above: what is the amount of liabilities left out? (expressed in unit of main currency)	(unit of reporting currency)	(unit of reporting currency)

What is the split of currencies by LoB	Insurance with profit participation	Index-linked and unit-linked insurance (only contracts with options & guarantees)
in the liabilities (e.g. 80% EUR, 10% CHF, 10% DKK) by LoB	(e.g. 80% EUR, 10% CHF, 10% DKK)	(e.g. 80% EUR, 10% CHF, 10% DKK)
in the assets (e.g. 80% EUR, 10% CHF, 10% DKK) by LoB	(e.g. 80% EUR, 10% USD, 10% DKK)	(e.g. 80% EUR, 10% USD, 10% DKK)
If the PHRSS scenarios are only applied to a subset of the liabilities in a LoB (for example if the undertaking provides separate answers for the liabilities assessed with stochastic method and the liabilities assessed with deterministic method): how is the currency split in this subset of the liabilities different from the one reported above?	(free text answer)	(free text answer)

What is the amount of Best Estimate (Gross of reinsurance) by LoB assessed with a stochastic or a deterministic valuation	Insurance with profit participation	Index-linked and unit-linked insurance (only contracts with options & guarantees)
assessed with a stochastic valuation (expressed in unit of reporting currency)	(unit of reporting currency)	(unit of reporting currency)
assessed with a deterministic valuation (expressed in unit of reporting currency)	(unit of reporting currency)	(unit of reporting currency)
If the PHRSS scenarios are only applied to a subset of the liabilities in a LoB: how is the valuation method split in this subset of the liabilities different from the one reported above?	(free text answer)	(free text answer)

Calculation of the insurance payout	Insurance with profit participation	Index-linked and unit-linked insurance (only contracts with options & guarantees)

Does the value of the insurance payout depend only on the terminal value of underlying financial instruments at maturity or is it path dependent? (terminal value / path dependent)		
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6.7. DEADLINE AND PRACTICAL ASPECTS OF FILLING OUT THE DATA REQUEST

47. Participants should submit their response to the information request to the national supervisory authority until **the 15th of December 2023**.