Press Release

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EIOPA SETS OUT THE METHODOLOGY TO DERIVE THE ULTIMATE FORWARD RATE

- *A clearly specified methodology for deriving the Ultimate Forward Rate (UFR) is a legal requirement*
- *The principles of the methodology are defined in the Solvency II legislation*
- *The methodology will be applied for the first time at the beginning of 2018*
- *In line with the methodology, the calculated value of the UFR for the euro is 3.65%*
- *Annual changes to the Ultimate Forward Rate will not be higher than 15 basis points*
- *The Ultimate Forward Rate applied to the euro will therefore decrease in 2018 from 4.2% to 4.05%*

Frankfurt, 5 April 2017 – Today, the European Insurance and Occupational Pensions Authority (EIOPA) published the methodology to derive the Ultimate Forward Rate (UFR) and its implementation process.

The methodology follows the principles laid down in the Solvency II legislative framework, in particular to be stable over time and to be only changed as a result of changes in long-term expectations. EIOPA's methodology derives the UFR in a transparent, prudent, reliable and objective manner that is consistent over time. Furthermore, the UFR takes into account expectations of the long-term real interest rate and of expected inflation.

The UFR methodology will be applied for the first time in the calculation of the risk-free interest rates of January 2018 to be published in February 2018.

In line with the methodology, and reflecting the significant changes in the long-term expectations of interest rates in recent years, the calculated value of the UFR for the euro is 3.65%. Annual changes will not be higher than 15 basis points. In a first step of the phasing-in the current UFR of 4.2% will therefore be lowered in January 2018 to 4.05%.

Gabriel Bernardino, Chairman of EIOPA, said: *"This methodology strikes the right balance between a stable UFR and the need to adjust it in case of changes in long-term expectations about interest rates and inflation. The methodology ensures that the UFR moves gradually and in a predictable manner, allowing insurers to adjust to changes in the interest rate environment and ensuring policyholder protection."*

The methodology is a result of extensive work including a workshop with stakeholders, a public consultation and a detailed impact analysis. The specification of the methodology to derive the UFR, the calculation of the UFR for 2018 based on this methodology and the analysis of the impact of UFR changes can be obtained via EIOPA's Website. The consultation report including EIOPA's responses to the stakeholders' comments will be published by the beginning of May 2017.

Notes for Editors:

(Re)insurers need to set up provisions for their (re)insurance liabilities. These provisions are discounted with **risk-free interest rates (RFR)**. The RFR are derived from prices of interest rate swaps and government bonds that are traded in deep, liquid and transparent markets. For long maturities where such instruments are not available the RFR are derived by means of extrapolation towards the UFR.

According to the **methodology changes of the UFR are phased-in**. The calculated value of the UFR for the euro is 3.65%. Annual changes will not be higher than 15 basis points. In a first step of the phasing-in the current UFR of 4.2% for the euro will therefore be lowered to 4.05%.

The concept of the **ultimate forward rate (UFR)** is specified in **Article 77a of the Solvency II Directive**. EIOPA's work on the UFR methodology started in May 2015. This work included a workshop with stakeholders in July 2015 based on an issue paper on the UFR methodology and continued with a public consultation from 20 April 2016 to 18 July 2016 as well as a detailed impact analysis.

By specifying the methodology **EIOPA is fulfilling its mandate according to Article 47 of the Delegated Regulation on Solvency II**. That provision requires that the methodology to derive the UFR shall be clearly specified in order to ensure the performance of scenario calculations by insurance and reinsurance undertakings and that the UFR shall be determined in a transparent, prudent, reliable and objective manner that is consistent over time.

EIOPA-BoS-17/072
30 March 2017

Risk-free interest rate term structures

Specification of the methodology to derive the UFR

1. Introduction

This note sets out the methodology to derive the ultimate forward rate (UFR) and its implementation as decided by EIOPA at the end of March 2017. The UFR is applied in the calculation of EIOPA's relevant risk-free interest rate term structures for Solvency II.

The methodology is in accordance with Article 47 of the Delegated Regulation on Solvency II[1] which requires in particular that such a methodology shall be clearly specified in order to ensure the performance of scenario calculations by insurance and reinsurance undertakings.

2. Methodology to derive the UFR

Update of the UFRs

1. EIOPA will annually calculate the UFRs and, where they are sufficiently different according to the methodology from the then applicable UFRs, update them at the beginning of the next year. The updated UFRs will be announced every year by the end of March. Nine months after the announcement of the updated UFRs, EIOPA will use them to calculate the risk-free interest rate term structures for the term structures of 1 January of the following year.

[1] Commission Delegated Regulation (EU) No 2015/35 of 10 October 2014 supplementing Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) (OJ L 12, 17.01.2015, p. 1)

Calculation of the UFRs

2. For each currency the change of the UFR is limited in such a way that it increases or decreases by 15 bps or remains unchanged in accordance with the following rule:

$$UFR_t^L = \begin{cases} UFR_{t-1}^L + 15\ bps & if\ \ UFR_t \geq UFR_{t-1}^L + 15\ bps \\ UFR_{t-1}^L - 15\ bps & if\ \ UFR_t \leq UFR_{t-1}^L - 15\ bps \\ UFR_{t-1}^L & otherwise \end{cases}$$

where:

- UFR_t^L denotes the UFR of year *t*, after limitation of the annual change,
- UFR_{t-1}^L denotes the UFR of year *t*+1 , after limitation of the annual change,
- UFR_t denotes the UFR of year *t*, before limitation of the annual change.

3. For each currency the UFR before limitation of the annual change is the sum of an expected real rate and an expected inflation rate. The expected real rate is the same for each currency. The expected inflation rate is currency-specific.

Calculation of the expected real rate

4. The expected real rate is the simple arithmetic mean of annual real rates from 1961 to the year before the recalculation of the UFRs according to the following formula:

$$R = \frac{1}{n}\sum_{i=1}^{n} r_{1960+i}$$

where:

- *R* is the expected real rate,
- *n* is the number of years since end of 1960,
- r_i is the annual real rate for the year 1960+*i*,

5. For each of the years since 1961 the annual real rate is derived as the simple arithmetic mean of the annual real rates of Belgium, Germany, France, Italy, the Netherlands, the United Kingdom and the United States.

6. For each of those years and each country the annual real rate is calculated as follows:

real rate = (*short-term nominal rate – inflation rate*)/(1 + *inflation rate*).

7. The short-term nominal rates are taken from the annual macro-economic database of the European Commission (AMECO database).[2] The inflation rates are taken from the Main Economic Indicators database of the OECD.[3]

8. The expected real rate is rounded to full five basis points as follows:

   - When the unrounded rate is lower than the rounded rate of the previous year, the rate is rounded upwards.
   - When the unrounded rate is higher than the rounded rate of the previous year, the rate is rounded downwards.

Calculation of the expected inflation rate

9. For currencies where the central bank has announced an inflation target, the expected inflation is based on that inflation target according to the following rules:

   - The expected inflation rate is:
     - 1%, where the inflation target is lower than or equal to 1%,
     - 2%, where the inflation target is higher than 1% and lower than 3%,
     - 3%, where the inflation target is higher or equal to 3% and lower than 4%,
     - 4%, where the inflation target is 4% or higher.

   - Where a central bank is not targeting a specific inflation figure but tries to keep the inflation in a specified corridor, the midpoint of that corridor is relevant for the allocation to the four inflation rate buckets.

10. For currencies where the central bank has not announced an inflation target, the expected inflation rate is 2% by default. However, where past inflation experience and projection of inflations both clearly indicate that the inflation of a currency is expected in the long-term to be at least 1 percentage point higher or lower than 2%, the expected inflation rate will be chosen in accordance with those indications. The expected inflation rate will be rounded downwards to full percentage points.

11. The past inflation experience will be assessed against the average of 10 years annual inflation rates. The projection of inflation rates will be derived on the basis of an autoregressive–moving-average model.

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[2] Short-term nominal rates used for deriving the expected real rate can be found in the annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs, "AMECO". On AMECO online, select 13-Monetary variables, select Interest Rates and then tick the box Short-term nominal (ISN). (http://ec.europa.eu/economy_finance/ameco/user/serie/ResultSerie.cfm)

[3] Inflation rates used for deriving the expected real rate can be found on the website of the Organisation for Economic Co-operation and Development (OECD): go to the OECD Main Economic Indicators (MEI) and select consumer price indices. When accessing the database, choose consumer prices – all items for the subject, percentage change on the same period of the previous year for the measure and percentage for the unit. (http://stats.oecd.org/Index.aspx?DataSetCode=MEI_PRICES). OECD data used in this document were accessed in March 2016.

3. Implementation of the methodology

12. The methodology to derive the UFR should be implemented in 2018. The first UFRs calculated according to the methodology should be announced at the beginning of April 2017. Those UFRs should be applied for the first time to calculate the risk-free interest rate term structures for 1 January 2018.

13. The initial application of the methodology in 2018 should be based on the following additional specification:

    - The UFR of 2017, denoted UFR_{t-1}^{L} in paragraph 2, is:
        - 3.2% for the Swiss franc and the Japanese yen,
        - 5.2% for the Brazilian real, the Indian rupee, the Mexican peso, the Turkish lira and the South African rand,
        - 4.2% for all other relevant currencies.

    - The rounded expected real rate of the previous year referred to in paragraph 8 is equal to 2.2%.

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Risk-free interest rate term structures

Calculation of the UFR for 2018

Executive summary

EIOPA has calculated ultimate forward rate (UFR) for 2018 in accordance with the methodology to derive the UFR. For the euro the calculated UFR for 2018 is 3.65%. As the current UFR for the euro is 4.2% and the annual change of the UFR is limited to 15 basis points according to the methodology the applicable UFR is 4.05%. That UFR is for the first time applicable for the calculation of the risk-free interest rates of 1 January 2018.

1. Expected real rate

The UFR is the sum of an expected real rate and an expected inflation rate. The expected real rate is the same for all currencies. It is calculated as a simple average of the past real rates since 1961. For the calculation of the expected real rate for 2017, the observed real rate of 2016, which is -0.7%, newly enters the calculation. The resulting expected real rate is 1.65%. Annex 1 sets out intermediate results of the calculation.

2. Expected inflation rate

The expected inflation rate is currency-specific. It is based on the inflation target of central banks and can take the values 1%, 2%, 3% or 4%.

The expected inflation rate is unchanged for most currencies. The expected inflation rates for the South Korean won changed because of changes to the inflation target. The following table sets out the expected inflation rate per currency. Annexes 2 and 3 set out the underlying inflation targets and the determination of the expected inflation rate for currencies without inflation target.

	Currency	**Expected inflation rate**
EUR	Euro	2%
CZK	Czech koruna	2%
GBP	Pound sterling	2%
HRK	Kuna	2%
HUF	Forint	3%
PLN	Zloty	2%
RON	Leu	2%
SEK	Krona	2%
CHF	Swiss franc	1%
ISK	Króna	2%
NOK	Norwegian krone	2%
AUD	Australian dollar	2%
BRL	Real	4%
CAD	Canadian dollar	2%
CLP	Chilean peso	3%
CNY	Renminbi-yuan	3%
COP	Colombian peso	3%
HKD	Hong Kong dollar	2%
INR	Indian rupee	4%
JPY	Yen	2%
KRW	South Korean won	2%
MYR	Ringgit	2%
MXN	Mexican peso	3%
NZD	New Zealand dollar	2%
RUB	Russian rouble	4%
SGD	Singapore dollar	2%
THB	Baht	2%
TRY	Turkish lira	4%
TWD	New Taiwan dollar	2%

USD	US dollar	2%
ZAR	Rand	4%

3. Ultimate forward rate

The following table sets out the calculated UFRs and the UFRs applicable in 2018.

	Currency	Calculated UFR	UFR applicable in 2018
EUR	Euro	3.65%	4.05%
CZK	Czech koruna	3.65%	4.05%
GBP	Pound sterling	3.65%	4.05%
HRK	Kuna	3.65%	4.05%
HUF	Forint	4.65%	4.35%
PLN	Zloty	3.65%	4.05%
RON	Leu	3.65%	4.05%
SEK	Krona	3.65%	4.05%
CHF	Swiss franc	2.65%	3.05%
ISK	Króna	3.65%	4.05%
NOK	Norwegian krone	3.65%	4.05%
AUD	Australian dollar	3.65%	4.05%
BRL	Real	5.65%	5.35%
CAD	Canadian dollar	3.65%	4.05%
CLP	Chilean peso	4.65%	4.35%
CNY	Renminbi-yuan	4.65%	4.35%
COP	Colombian peso	4.65%	4.35%
HKD	Hong Kong dollar	3.65%	4.05%
INR	Indian rupee	5.65%	5.35%
JPY	Yen	3.65%	3.35%
KRW	South Korean won	3.65%	4.05%
MYR	Ringgit	3.65%	4.05%
MXN	Mexican peso	4.65%	4.35%
NZD	New Zealand dollar	3.65%	4.05%
RUB	Russian rouble	5.65%	4.35%
SGD	Singapore dollar	3.65%	4.05%
THB	Baht	3.65%	4.05%
TRY	Turkish lira	5.65%	5.35%

TWD	New Taiwan dollar	3.65%	4.05%
USD	US dollar	3.65%	4.05%
ZAR	Rand	5.65%	5.35%

4. Projection of the UFR

When projecting the UFR into the future on the basis of the UFR methodology, the uncertainty with regard to future real rates and with regard to changes of inflation targets should be taken into account.

In particular, it may be taken into account that the future real rates can differ from the last observed real rates, especially with regard to longer projection periods.

Annex 1 – Calculation of the expected real rate

The following table sets out the time series of real rates used for the calculation of the expected real rate. Real rates in the table are rounded to 3 digits for presentational reasons.

Year	Real rates
1961	1.57%
1962	0.11%
1963	0.02%
1964	0.46%
1965	1.08%
1966	1.65%
1967	1.89%
1968	1.81%
1969	2.08%
1970	2.49%
1971	-0.22%
1972	-0.91%
1973	0.80%
1974	-1.12%
1975	-4.82%
1976	-0.92%
1977	-1.65%
1978	0.77%
1979	1.45%
1980	1.06%
1981	3.72%
1982	3.35%
1983	3.48%
1984	4.35%
1985	4.48%
1986	5.83%
1987	5.02%
1988	4.76%
1989	5.73%
1990	5.75%
1991	4.88%
1992	5.56%
1993	3.90%
1994	3.12%
1995	3.58%
1996	2.33%
1997	2.80%
1998	3.15%

1999	2.28%
2000	2.81%
2001	1.82%
2002	1.24%
2003	0.48%
2004	0.50%
2005	0.57%
2006	1.62%
2007	2.59%
2008	1.18%
2009	0.56%
2010	-1.04%
2011	-1.70%
2012	-1.82%
2013	-1.32%
2014	-0.59%
2015	-0.09%
2016	-0.70%

Expected real rate before rounding:

= Average of real rates from 1961 to 2016

= 1.63903%

Expected real rate after rounding:

= **1.65%**

Annex 2 – Inflation targets

The following table sets out the inflation targets. The information was derived from the specified sources on 6 and 7 March 2017.

	Currency	Inflation target	Source
EUR	Euro	Below, but close to 2%	https://www.ecb.europa.eu/mopo/html/index.en.html
CZK	Czech koruna	2% ± 100bps	https://www.cnb.cz/en/monetary_policy/inflation_targeting.html#c2 https://www.cnb.cz/miranda2/export/sites/www.cnb.cz/en/monetary_policy/strategic_documents/download/inflacni_cil_cnb_en_2010.pdf
GBP	Pound sterling	2%	http://www.bankofengland.co.uk/monetarypolicy/Pages/framework/framework.aspx http://www.bankofengland.co.uk/monetarypolicy/Documents/pdf/chancellorletter160316.pdf
HRK	Kuna	No IT	
HUF	Forint	3% ± 100bps	http://www.mnb.hu/en/monetary-policy/monetary-policy-framework/inflation-targeting
PLN	Zloty	2.5% ± 100bps	http://www.nbp.pl/homen.aspx?f=/en/onbp/informacje/polityka_pieniezna.html
RON	Leu	2.5% ± 100bps	http://bnr.ro/Inflation-Targets-3241.aspx
SEK	Krona	2%	http://www.riksbank.se/en/Monetary-policy/Inflation/Adoption-of-the-inflation-target/
CHF	Swiss franc	Less than 2 %	https://www.snb.ch/en/ifor/public/qas/id/qas_gp_strat#t6
ISK	Króna	2.50% ± 150bps	http://www.cb.is/monetary-policy/inflation-target/, in addition also: http://www.cb.is/library/Skraarsafn---EN/Monetary-Policy-Committee/Declaration%20inflation.pdf
NOK	Norwegian krone	2.5%	http://www.norges-bank.no/en/Statistics/Inflation/

AUD	Australian dollar	2% - 3%	http://www.rba.gov.au/inflation/inflation-target.html
BRL	Real	4.5% ± 150bps	http://www.bcb.gov.br/pt-br/#!/n/inflation with further link to http://www.bcb.gov.br/pec/metas/InflationTargetingTable.pdf and to http://www.bcb.gov.br/ingles/copom/a-hist.asp
CAD	Canadian dollar	2% ± 100bps	http://www.bankofcanada.ca/rates/indicators/key-variables/inflation-control-target/
CLP	Chilean peso	3% ± 100bps	http://www.bcentral.cl/en/faces/bcentral/publicaciones/fichapublicacion?id=BCCH_PUBLICACI_170521_EN&_afrLoop=442337950175586&_afrWindowMode=0&_afrWindowId=2flczls95_61#!%40%40%3F_afrWindowId%3D2flczls95_61%26_afrLoop%3D442337950175586%26id%3DBCCH_PUBLICACI_170521_EN%26_afrWindowMode%3D0%26_adf.ctrl-state%3D2flczls95_101 http://www.bcentral.cl/en/DownloadBinaryServlet?nodeId=%2FUCM%2FBCCH_ARCHIVO_102141_EN&propertyId=%2FUCM%2FBCCH_ARCHIVO_102141_EN%2Fprimary&fileName=StrategicPlanning28122016.pdf
CNY	Renminbi-yuan	3%	http://www.chinadaily.com.cn/china/2017twosession/2017-03/06/content_28446701.htm
COP	Colombian peso	3% ± 100bps	http://banrep.gov.co/en/press-release-25-11-2016
HKD	Hong Kong dollar	No IT	
INR	Indian rupee	4% ± 200bps	https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=17385
JPY	Yen	2%	https://www.boj.or.jp/en/mopo/outline/qqe.htm/#p01
KRW	South Korean won	2% ± 50bps	http://eng.bok.or.kr/broadcast.action?menuNaviId=1612
MYR	Ringgit	No IT	
MXN	Mexican peso	3%	http://www.banxico.org.mx/politica-monetaria-e-inflacion/material-de-referencia/basico/preguntas-frecuentes-de-politica-monetaria-e-infla/monetary-policy-and-inflation.html http://www.banxico.org.mx/publicaciones-y-discursos/publicaciones/informes-periodicos/trimestral-inflacion/%7B806A8529-A0EC-A4AC-EFFF-169CBF11440A%7D.pdf

NZD	New Zealand dollar	2% ± 100bps	http://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Monetary%20policy%20statements/2017/mpsfeb17.pdf http://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Policy%20targets%20agreements/4944826.pdf
RUB	Russian rouble	4%	https://www.cbr.ru/eng/press/pr.aspx?file=03022017_133002eng_keyrate2017-02-03T13_18_14.htm
SGD	Singapore dollar	2%	http://www.mas.gov.sg/News-and-Publications/Speeches-and-Monetary-Policy-Statements/Monetary-Policy-Statements/2016/MAS-Monetary-Policy-Statement-14Oct16.aspx
THB	Baht	2.50% ± 150bps	https://www.bot.or.th/English/MonetaryPolicy/MonetPolicyKnowledge/Pages/Target.aspx
TRY	Turkish lira	5%	http://www.tcmb.gov.tr/wps/wcm/connect/tcmb+en/tcmb+en/main+menu/monetary+policy/price+stability/inflation+targets
TWD	New Taiwan dollar	No IT	
USD	US dollar	2%	https://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf
ZAR	Rand	3%-6%	https://www.resbank.co.za/MonetaryPolicy/DecisionMaking/Pages/InflationMeasures.aspx

Annex 3 – Derivation of the expected real rate for currencies without inflation target

For currencies without inflation target the expected inflation rate is derived from the past inflation rates and their projection to the future. The following table sets out for the affected currencies the average inflation over the last 10 years and the projected inflation rate in 2051 (in 35 years) according to an ARMA model.

Currency	Average inflation rate over the last 10 years	Projection
Croatian kuna	1.86%	2.4%
Malaysian ringgit	2.41%	2.4%
Hong Kong dollar	3.27%	2.6%
New Taiwan dollar	1.18%	1.7%
Singapore dollar	2.43%	2.5%

According to the UFR methodology the expected inflation rate for currencies without inflation target is 2%, unless both the 10-year average and the projection clearly indicate that the inflation is expected to be at least one percentage point different from 2%. All currencies therefore fall in the 2% bucket. For the Hong Kong dollar the average is above 3%, but the trend is downwards.

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Risk-free interest rate term structures

Results of the impact analysis of changes to the UFR

Introduction

1. In order to complement the impact analysis provided for the public consultation on the UFR methodology[1], EIOPA has carried out an information request to insurance and reinsurance undertakings on the impact of UFR changes. The information request was carried out at the end of 2016. 336 insurance and reinsurance undertakings assessed the impact of changing the UFRs by 20 bps and by 50 bps on their prudential balance sheet and on their solvency position. The information request showed that the impact of these changes is very small. On average the SCR ratio decreases from 203% to 201% if the UFRs are changed by 20 bps and to 198% if the UFRs are changed by 50 bps.

2. This note is structured as follows:

    - Information request
    - Sample of undertakings
    - Overview of the results
    - Impact on technical provisions
    - Mitigating effect of the recalculation of the TP transitional
    - Impact on deferred taxes
    - Impact on own funds
    - Impact on the SCR
    - Impact on the SCR ratio

[1] See https://eiopa.europa.eu/Pages/Consultations/EIOPA-CP-16-003-Consultation-Paper-on-the-methodology-to-derive-the-UFR-and-its-implementation-.aspx.

- Movement analysis for the SCR ratios

Information request

3. The information request was addressed to a European sample of insurance and reinsurance undertakings. Participants were requested to report assets, liabilities, own funds and capital requirements according to a baseline and under two scenarios in which the level of the UFRs is changed.

4. The baseline coincides with the reporting of opening information under Solvency II (day-1 reporting), usually with a reference date of 1 January 2016. In particular, valuations according to the baseline are carried out with the relevant risk-free interest rate term structures based on the current UFRs.

5. **Scenario 1** consists of:

   - a reduction of the UFR by 20 basis points for all currencies for which EIOPA provides risk-free interest rate term structures other than the currencies mentioned in the following bullet point,
   - an increase of the UFR by 20 bps for the Hungarian forint, the Chilean peso, the yuan-renminbi, the Colombian peso, the yen and the Russian rouble.

6. **Scenario 2** consists of:

   - a reduction of the UFR by 50 basis points for all currencies for which EIOPA provides risk-free interest rate term structures other than the currencies mentioned in the following bullet point,
   - an increase of the UFR by 50 bps for the Hungarian forint, the Chilean peso, the yuan-renminbi, the Colombian peso, the yen and the Russian rouble.

7. For the Hungarian forint, the Chilean peso, the yuan-renminbi, the Colombian peso, the yen and the Russian rouble the UFR increases in both scenarios. This is based on EIOPA's consultation proposal that suggests increasing the UFR for these currencies in view of the higher inflation targets of their central banks.

8. For the baseline and the two scenarios participants had to provide the amount of the following items:

   - Liabilities:
     - Best estimate (by line of business, with and without future discretionary benefits)
     - Risk margin (by line of business)
     - Technical provisions valued as a whole (by line of business)
     - Deferred tax liabilities
     - Other liabilities

- Assets:
    - Deferred tax assets
    - Other assets

- Own funds and capital requirements:
    - SCR
    - Own funds eligible to cover the SCR
    - MCR
    - Own funds eligible to cover the MCR

9. Participants could take a proportionate approach to the recalculation of assets, liabilities, own funds and capital requirements under scenario 1 and scenario 2. Where participants expected that the difference between the baseline and the recalculated item was not material, they could choose not to make the recalculation.

10. Where participants have received supervisory approval for the use of internal models, undertaking-specific parameters, matching adjustments, or volatility adjustments, they made all calculations on that basis. In jurisdictions where the use of the volatility adjustment was not subject to approval, participants should apply the volatility adjustment in the calculations if they did so for day-1 reporting.

11. Where participants had received approval to use the transitional measure on the risk-free interest rate or the transitional measure on technical provisions, the impact of the transitional on the amount of technical provisions was taken into account. The transitional deduction of the transitional measure on technical provisions was kept constant in the scenarios.

12. The information request was carried out during November and December 2016.

Sample of undertakings

13. The information was requested from a representative sample of 336 insurance and reinsurance undertakings from 29 countries of the EEA. The sample consists of 198 life insurance undertakings, 95 composite insurance undertakings, 33 non-life insurance undertakings and 10 reinsurance undertakings.

14. For each country the sample was selected by the national supervisory authority. The objective of the sample was as follows:

    - Life insurance: for each country a representative sample of life and composite insurance undertakings covering at least 75% of life

insurance other than unit and index-linked business in terms of technical provisions.

- Non-life insurance: for each country a representative sample of non-life and composite insurance undertakings covering at least 20% of the market in terms of technical provisions that in particular captures non-life obligations most affected by a change of the UFR, including annuities stemming from non-life insurance business (e.g. workers' compensation) and health insurance similar to life insurance business. The sample should cover in particular at least 20% of the technical provisions for non-life annuities.
- Reinsurance: for each country a representative sample of non-life insurance undertakings covering at least 20% of the market in terms of technical provisions that in particular captures reinsurance obligations most affected by a change of the UFR.

15. The following figure 1 and tables 1 and 2 sets out the number and the market share (measured by amount of technical provision) of the sample by country.

Figure 1. Number and type of undertakings by country

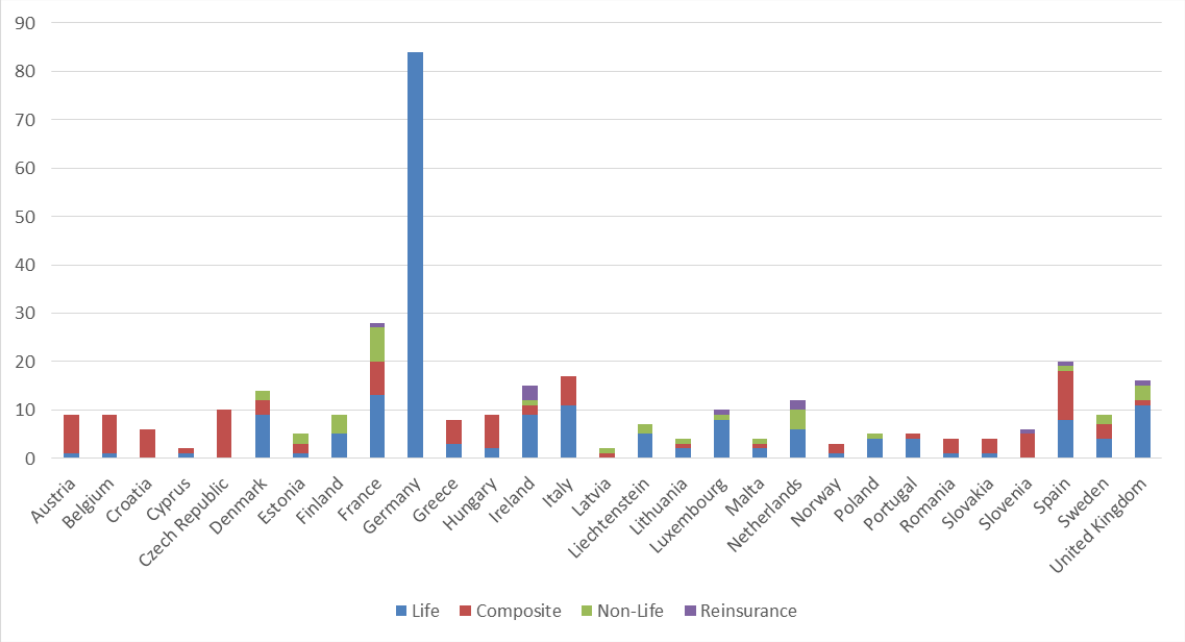


Table 1. Number and type of undertakings by country

Country	Life insurers	Com-posite insurers[2]	Non-life insurers	Re-insurers	Total
Austria	1	8	0	0	**9**
Belgium	1	8	0	0	**9**
Croatia	0	6	0	0	**6**
Cyprus	1	1	0	0	**2**
Czech Republic	0	10	0	0	**10**
Denmark	9	3	2	0	**14**
Estonia	1	2	2	0	**5**
Finland	5	0	4	0	**9**
France	13	7	7	1	**28**
Germany	84	0	0	0	**84**
Greece	3	5	0	0	**8**
Hungary	2	7	0	0	**9**
Ireland	9	2	1	3	**15**
Italy	12	5	0	0	**17**
Latvia	0	1	1	0	**2**
Liechtenstein	5	0	2	0	**7**
Lithuania	2	1	1	0	**4**
Luxembourg	8	0	1	1	**10**
Malta	2	1	1	0	**4**
Netherlands	6	0	4	2	**12**
Norway	1	2	0	0	**3**
Poland	4	0	1	0	**5**
Portugal	4	1	0	0	**5**
Romania	1	3	0	0	**4**
Slovakia	1	3	0	0	**4**
Slovenia	0	5	0	1	**6**
Spain	8	10	1	1	**20**
Sweden	4	3	2	0	**9**
United Kingdom	11	1	3	1	**16**
Total	**199**	**94**	**33**	**10**	**336**

[2] In this report the terms composite insurer and composite insurance undertaking denote insurance undertakings pursuing life and non-life insurance activities.

Table 2. Market share of the sample of participants

Country	Life insurance	Non-life insurance	Re-insurance
Austria	79%	44%	-
Belgium	83%	81%	100%
Croatia	81%	58%	-
Cyprus	85%	4%	-
Czech Republic	99%	95%	-
Denmark	74%	44%	-
Estonia	85%	77%	-
Finland	89%	92%	-
France	78%	37%	31%
Germany	100%	0%	0%
Greece	88%	32%	-
Hungary	74%	74%	-
Ireland	70%	61%	49%
Italy	77%	59%	-
Latvia	80%	34%	-
Liechtenstein	68%	38%	-
Lithuania	98%	54%	-
Luxembourg	76%	24%	61%
Malta	93%	30%	-
Netherlands	88%	29%	99%
Norway	84%	0%	-
Poland	80%	36%	33%
Portugal	81%	32%	-
Romania	77%	28%	-
Slovakia	77%	74%	-
Slovenia	83%	64%	66%
Spain	82%	23%	73%
Sweden	71%	56%	44%
United Kingdom	74%	42%	23%

16. Undertakings from Iceland are not included in the sample because there are no material long-term insurance liabilities in Iceland. The Icelandic insurance market did also not participate in EIOPA's 2016 insurance stress test.

17. The sample does not include undertakings from Bulgaria because of the balance sheet review of the Bulgarian insurance sector that was carried out in parallel to the information request. Bulgarian life insurers participated in EIOPA's 2016 insurance stress test. According to the results of the stress

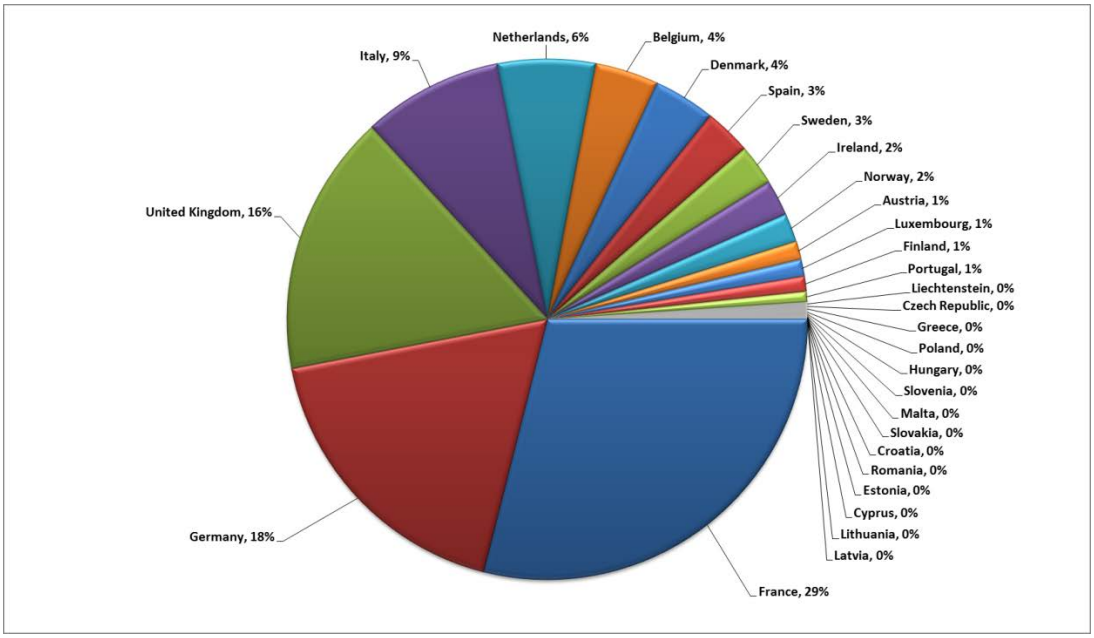
test the Bulgarian life insurance market is less exposed to changes in long-term interest rates.[3]

18. The German supervisory authority decided to include all German life insurance undertakings in the information request. The German sample does not include non-life insurance undertakings or reinsurance undertakings. According to the assessment of the German supervisory authority these undertakings are not materially exposed to changes of the UFR because of the lower duration of their liabilities.

19. For many countries no reinsurer was included in the sample because there is no relevant national reinsurance market.

20. Figure 2 shows the composition of the sample by country. The share of each country is measured in the amount of technical provisions. The main markets are France (29% of the overall technical provisions of the sample), Germany (18%), the United Kingdom (16%), Italy (9%) and the Netherlands (6%).

Figure 2. Composition of the sample by country (as share of overall technical provisions)



[3] See figure 31 on page 29 of the 2016 EIOPA insurance stress test report (https://eiopa.europa.eu/Publications/Surveys/EIOPA-BOS-16-302%20Insurance%20stress%20test%202016%20report.pdf).

21. From the 336 undertakings that participated in the information request 267 derive their solvency capital requirement (SCR) by means of the standard formula, 43 by means of a partial internal model and 26 with a full internal model.

Overview of the results

22. A change of the UFR modifies the risk-free interest rate term structure used to calculate the technical provisions for obligations with longer maturities. Consequently there is a direct effect of a UFR change on the amount of these technical provisions. The change of the amount of technical provisions can also affect other elements of the prudential balance sheet of Solvency II.

23. Typical indirect effects are:

- The change in technical provisions results in a change in deferred taxes. In that case, an increase of technical provisions would result in an increase of deferred tax assets or a reduction of deferred tax liabilities.
- The change in technical provisions results in a change of eligible own funds. An increase of technical provisions would usually result in a decrease of eligible own funds. The increase can be mitigated by the change of deferred taxes (see first bullet point).
- The change in technical provisions results in a change of the SCR and MCR. An increase of technical provisions would usually lead to an increase in the SCR and the MCR.

24. Table 3 sets out the average[4] relative change of the balance sheet items, eligible own funds and the capital requirements in scenario 1 and 2.

Table 3. Average relative change of balance sheet items, own funds and capital requirements

	Average relative change in scenario 1	Average relative change in scenario 2
Assets		
Deferred tax assets	+1.1%	+2.8%
Other assets	0.0%	0.0%

[4] All averages of ratios provided in this section are weighted averages. The denominators of the ratios are used as weights.

	Average relative change in scenario 1	Average relative change in scenario 2
Liabilities		
Technical provisions	+0.10%	+0.24%
Deferred tax liabilities	-0.6%	-1.4%
Other liabilities	0.0%	0.0%
Own funds		
Eligible own funds to cover the SCR	-0.6%	-1.5%
Eligible own funds to cover the MCR	-0.7%	-1.6%
Capital requirements		
SCR	+0.3%	+0.7%
MCR	+0.4%	+0.9%

25. The change of eligible own funds and SCR leads to a change of the SCR ratio. The SCR ratio is the ratio of eligible own funds to cover the SCR and the SCR. In order to comply with the SCR, the SCR ratio needs to be at least 100%. Figure 3 sets out the average SCR ratios under the baseline and under scenarios 1 and 2. Figure 4 shows the average MCR ratios, being the ratio of eligible own funds to cover the MCR and the MCR. In order to comply with the MCR, the MCR ratio needs to be at least 100%.

Figure 3: Average SCR ratios

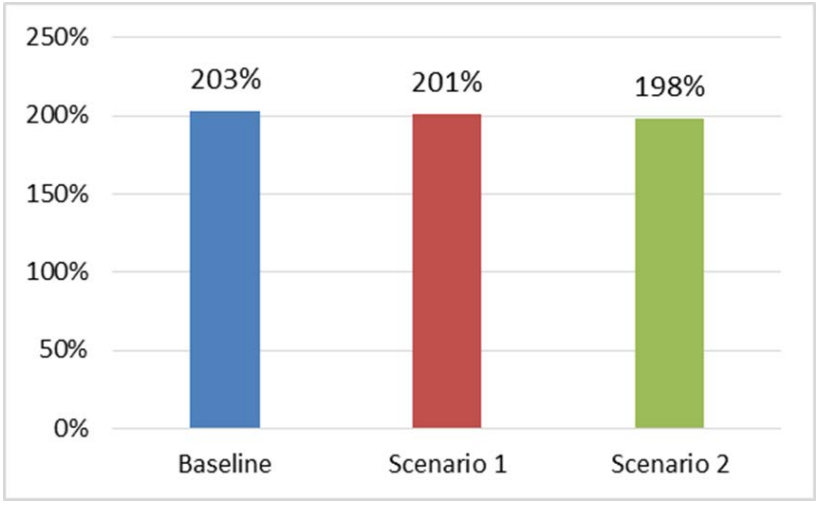
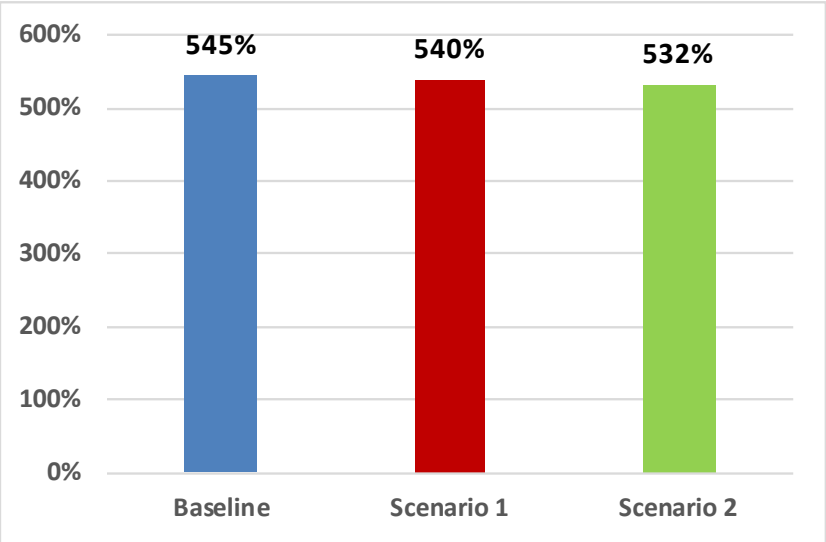


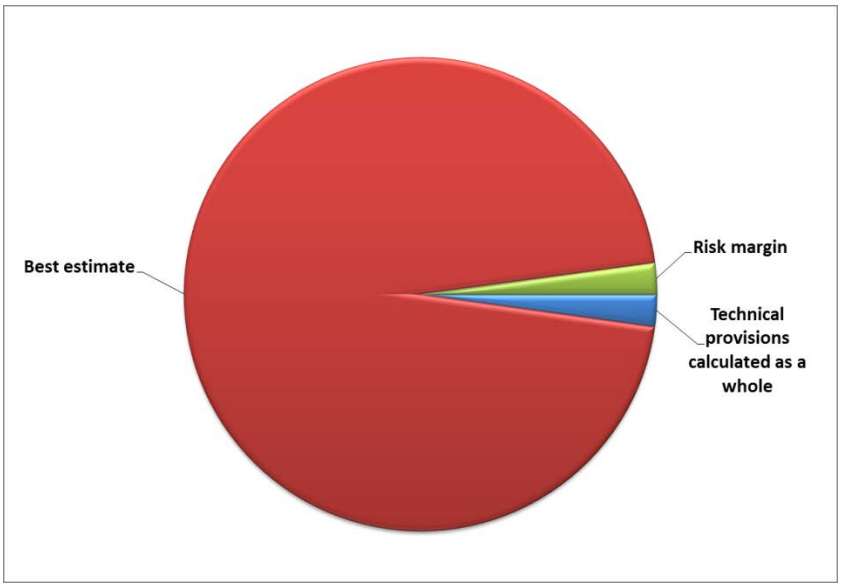
Figure 4: Average MCR ratios



Impact on technical provisions

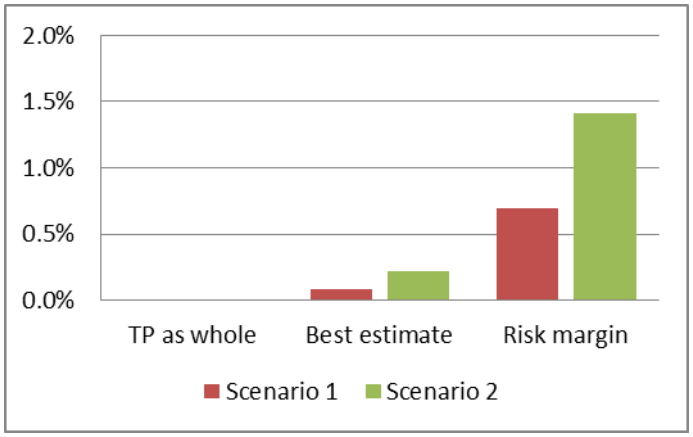
26. Technical provisions under Solvency II can consist of three components: the best estimate, the risk margin and technical provisions calculated as a whole. The best estimate constitutes the main part of the technical provisions in the sample (96%). The risk margin accounts for 2% of technical provisions. 2% of technical provisions were valued as a whole (see figure 5).

Figure 5. Composition of technical provisions



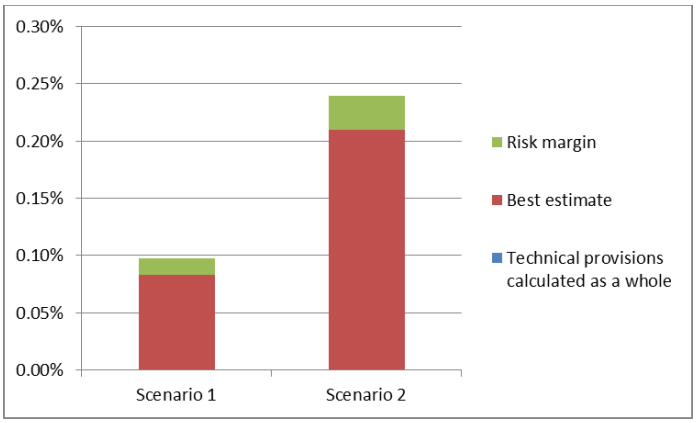
27. The impact of UFR changes on the components of technical provisions differs, as illustrated by figure 6. On average the relative change of the risk margin is higher than for the best estimate. The risk margin is discounted with the risk-free interest rates and its size depends on the SCR. When the discount rates decrease and the SCR then typically increases, the risk margin is affected by both changes. The technical provisions calculated as a whole are not discounted and therefore not affected by a change of the UFR.

Figure 6. Average relative change of components of technical provisions



28. The overall increase of technical provisions is driven by the increase of the best estimate because the risk margin is only a small part of the technical provisions. This is illustrated in figure 7 that shows the average relative increase of the technical provisions split into the contributions from the three components of technical provisions. (The component for technical provisions calculated as a whole is not visible because it does not contribute to the overall change.)

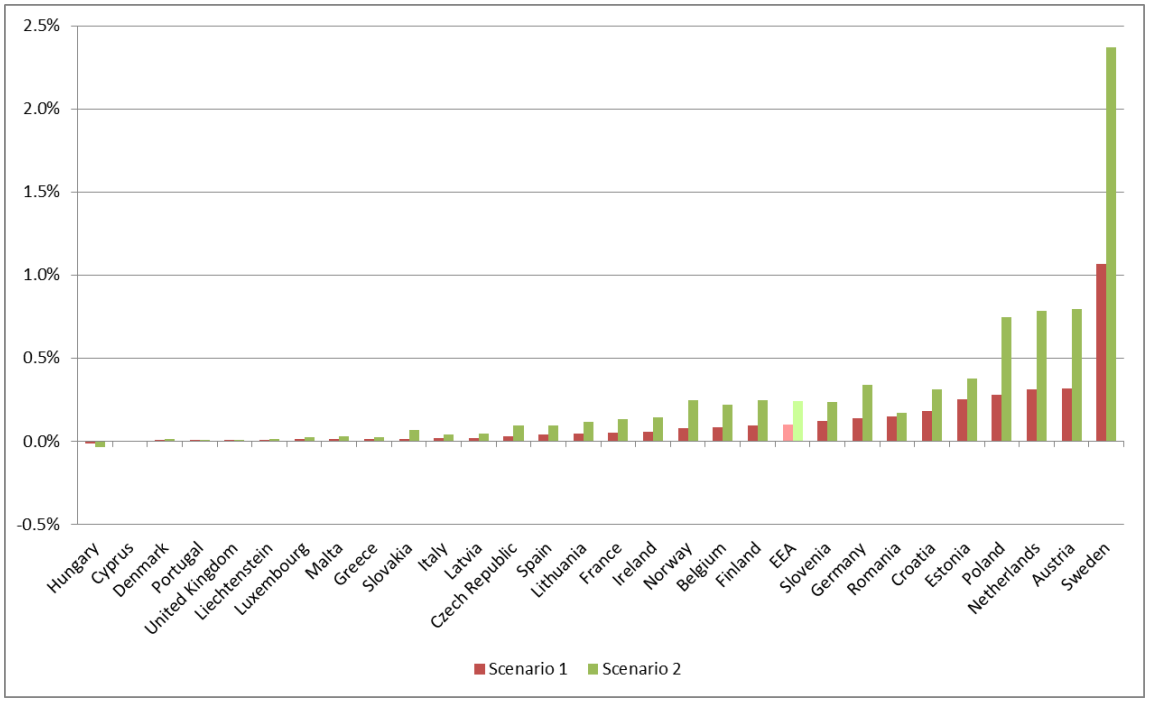
Figure 7. Average relative change of technical provisions split into changes by components



29. The impact of UFR changes on the amount of technical provisions differs across countries. Figure 7 shows the average relative increase of technical provisions by countries. The size of the impact depends in particular on the extrapolation parameters for the currencies of the countries and on the nature and duration of the insurance business done in the national markets. With regard to the extrapolation parameters see also section 4.2 of the consultation paper. For example, for the risk-free interest rates of the Swedish krona the extrapolation starts after maturity 10 years and forward rates approximately reach the UFR at maturity 20 years. In contrast, for the pound sterling the extrapolation starts at maturity 50 years and forward rates approximately reach the UFR at the maturity of 90 years. Consequently, only pound sterling insurance liabilities of maturities over 50 years are affected by UFR changes, while Swedish krona insurance liabilities with maturities over 10 years are affected.

30. For some currencies scenarios 1 and 2 envisage an increase of the UFR. The Hungarian forint is the only EEA currency for which such an UFR increase is provided. Consequently, the technical provisions of Hungarian insurance undertakings decrease on average.

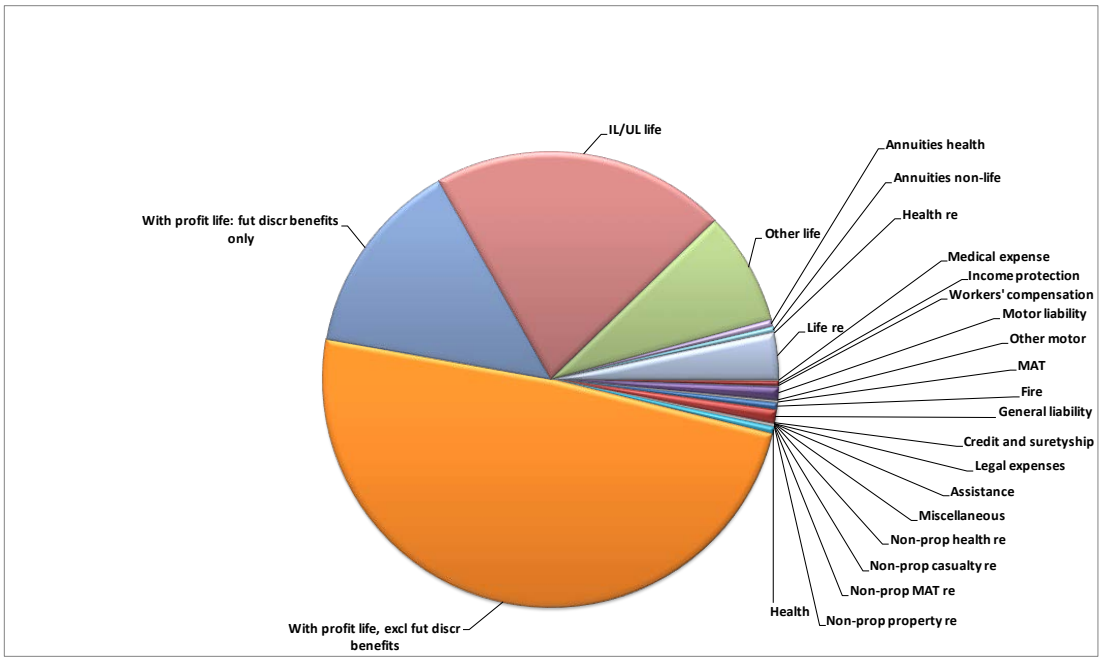
Figure 8. Average relative change of technical provisions by country



31. Figure 9 shows the composition of technical provisions by line of business. The main line of business is with-profit life insurance (63%). In the figure, the technical provisions for that line of business are provided separately for future discretionary benefits and other benefits. Index and unit-linked life

insurance (21%) and other life insurance (8%) are also important lines of business. The lines of business of non-life insurance constitute only a very small part of the overall technical provisions.

Figure 9. Composition of technical provisions by line of business



32. Technical provisions for different lines of business are affected differently by UFR changes. Figure 10 sets out the average relative increase of technical provisions by line of business. The differences can be explained in particular by different durations of the insurance business. Information on the distribution of durations by line of business can be found in the Annex. The lines of business most affected are health insurance that is pursued on a similar technical basis to that of life insurance, with-profit life insurance and annuities stemming from health insurance and from non-life insurance contract. The figure also shows that the value of future discretionary benefits included in the technical provisions of with-profit insurance decreases in the scenarios. This has a mitigating effect on the overall increase of technical provisions.

Figure 10. Average relative increase of technical provisions by line of business

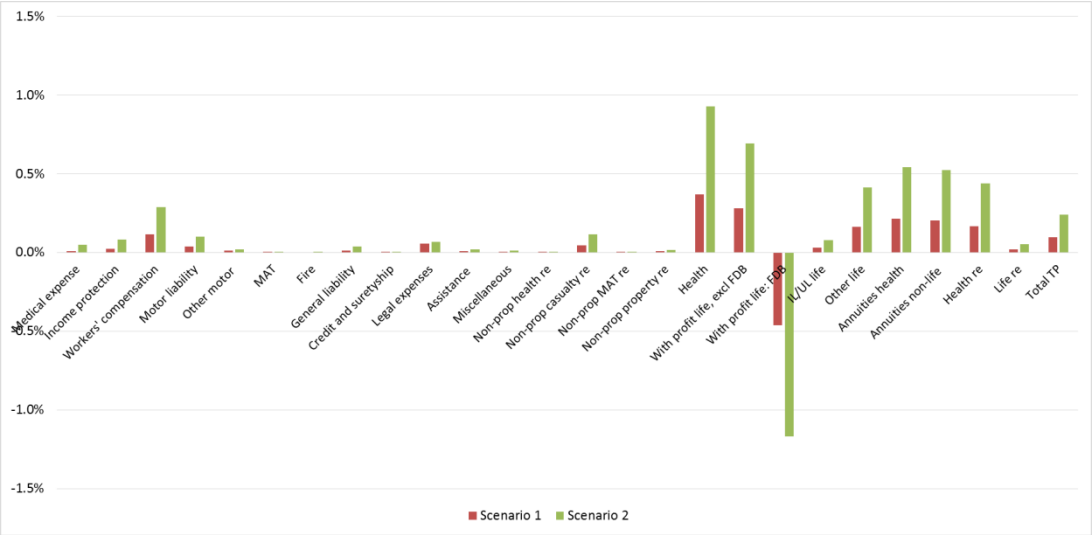
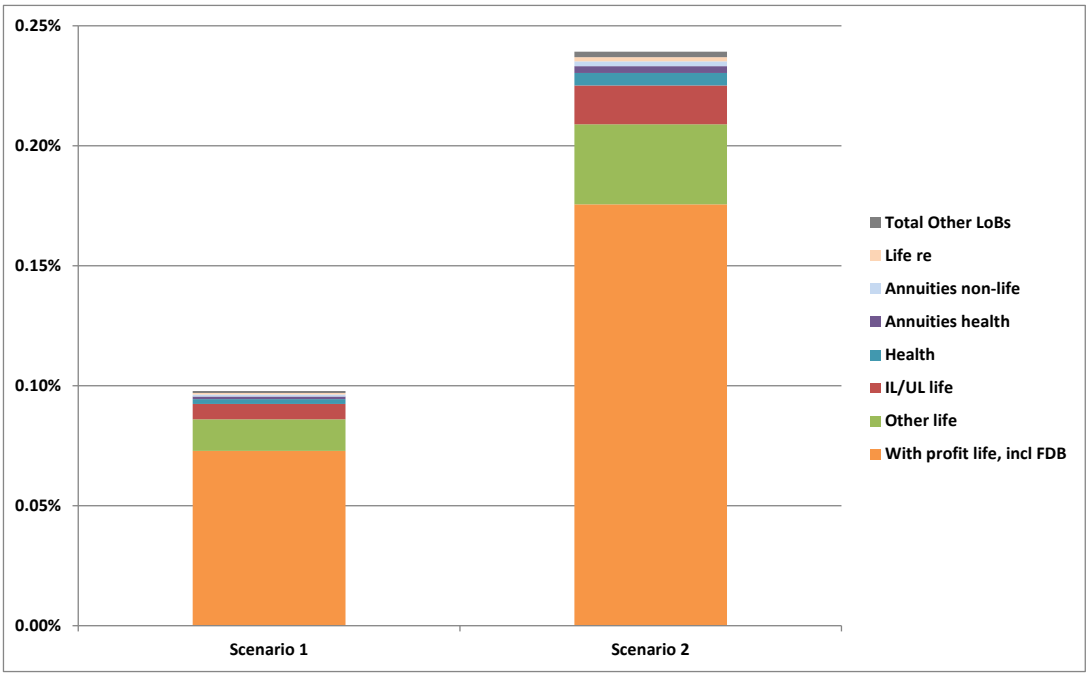


Figure 11. Average relative change of technical provisions split into changes by lines of business



33. Figures 12 and 13 show the average relative increase of the best estimate and the risk margin by line of business. The increase patterns observed at the level of the best estimate and at the level of the risk are similar to the pattern for the overall technical provisions. The relative increases of the risk margins are more pronounced than the relative increases of the best estimate.

Figure 12. Average relative increase of the best estimate by line of business

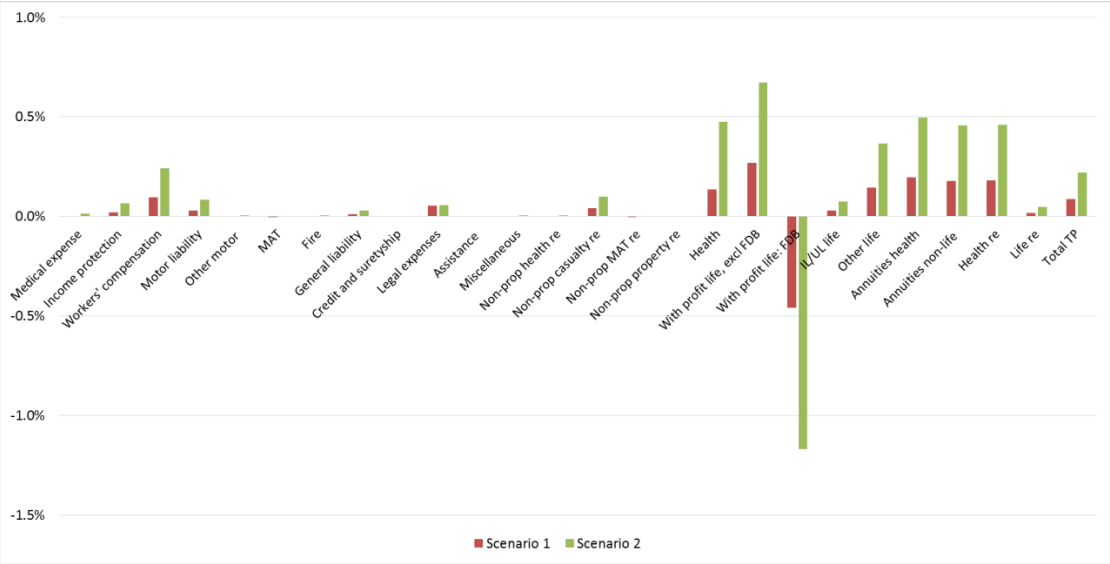
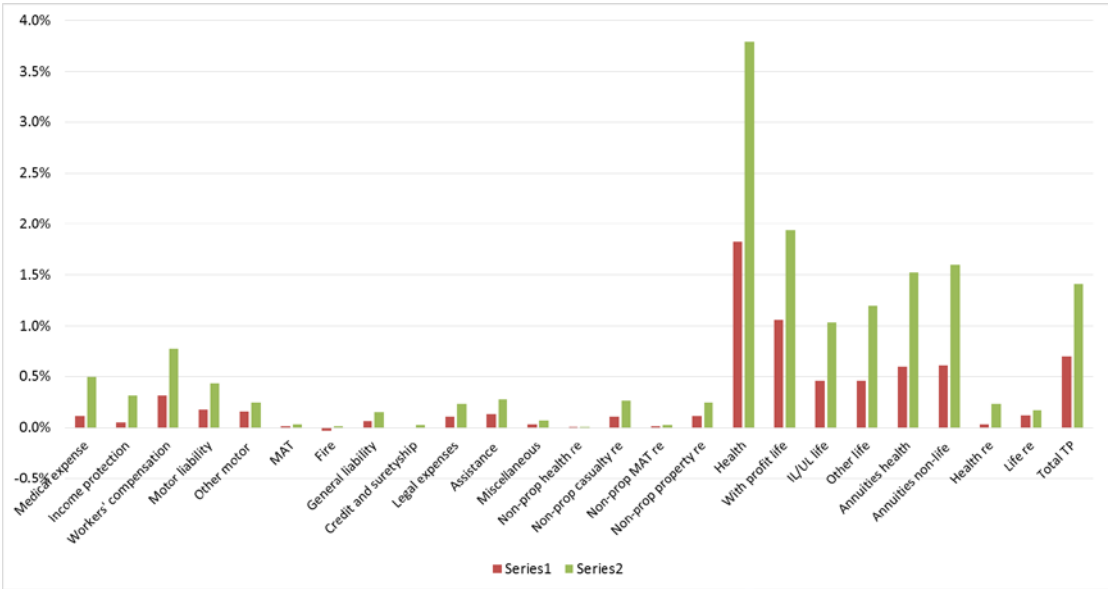


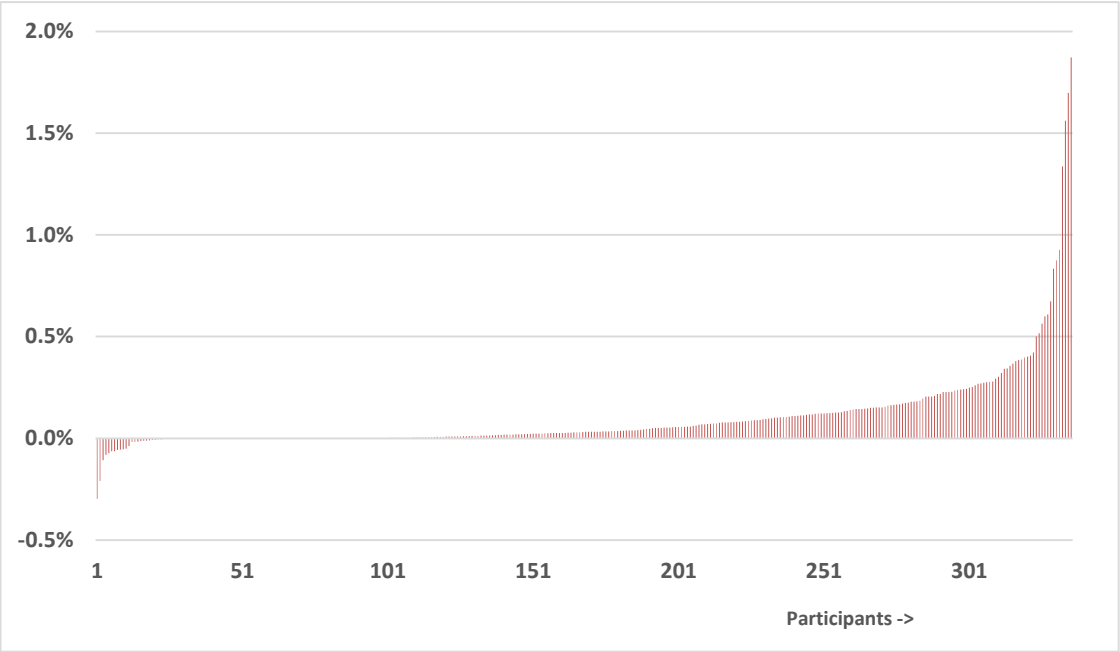
Figure 13. Average relative increase of the risk margin by line of business



34. The relative increase of technical provisions per undertaking is shown in figure 14. The participants are ordered by the size of the increase. For half of the participants the increase is below or equal 0.03% and for 75% of the participants below or equal 0.12%. 3.9% of the participants reported an increase above 0.5%, the maximum increase is 1.87%. Decreases of technical provisions were mainly reported by Hungarian participants. For the Hungarian forint the scenarios envisage an increase of the UFR. Another reason for decreasing technical provisions of some participants is that the

lines of business mainly affected by UFR changes have negative technical provisions which decrease when the UFR is decreased.

Figure 14. Relative change of technical provisions by participant (scenario 1)



Mitigating effect of the recalculation of the TP transitional

35. The impact of UFR changes measured in the information request does not take into account mitigating effects of the recalculation of the transitional measure on technical provisions (TP transitional). 88 of the 336 participating undertakings apply the TP transitional.

36. According to Article 308d of the Solvency II Directive insurance and reinsurance undertakings may apply the TP transitional. The TP transitional allows the undertakings to deduct a certain amount (transitional deduction) from their technical provisions during a transitional period of 16 years, from 2016 (start of Solvency II) to 2031. The transitional deduction is calculated as the difference between the technical provisions according to Solvency I and the technical provisions according to Solvency II. At the beginning of Solvency II, the effect of the transitional deduction is that the amount of technical provisions coincides with that of Solvency I. The amount of the transitional deduction is phased out during the transitional period.

37. The application of the TP transitional is subject to prior approval by the national supervisory authority. The supervisory authority may allow or require that the amounts of technical provisions used to calculate the transitional deduction are recalculated every 24 months, or more frequently where the risk profile of the undertaking has materially changed.

38. The recalculation of the transitional deduction may mitigate the impact of UFR changes on the amount of technical provisions. Where a change of the UFR results in an increase of the technical provisions according to Solvency II, the recalculation may lead to an increase of the transitional deduction that partly compensates the increase of technical provisions. This mitigating effect could completely offset the impact of UFR changes at the beginning of the transitional period. Over the transitional period the mitigating effect would be phased out.

39. Whether there is a mitigating effect depends on the national approach to the recalculation. EIOPA has therefore asked the national supervisor authorities (NSAs) that have approved the use of the TP transitional about their supervisory practice. NSAs from 11 countries (AT, BE, DE, ES, FI, FR, GR, LI, NO, PT, UK) have described their approach to the recalculation.

40. Most NSAs consider that the recalculation would in principle have a mitigating effect on the impact of UFR changes. However, some NSAs report reasons why the mitigating effect is impaired in their jurisdiction.

41. NSAs usually allow for the recalculation every 24 months or in case of a material change of the risk profile (DE, ES, FR, GR, LI, PT) or even expect such a recalculation every 24 months (BE, FI, UK) or annually (NO). One NSA is sceptical about allowing for the recalculation (AT).

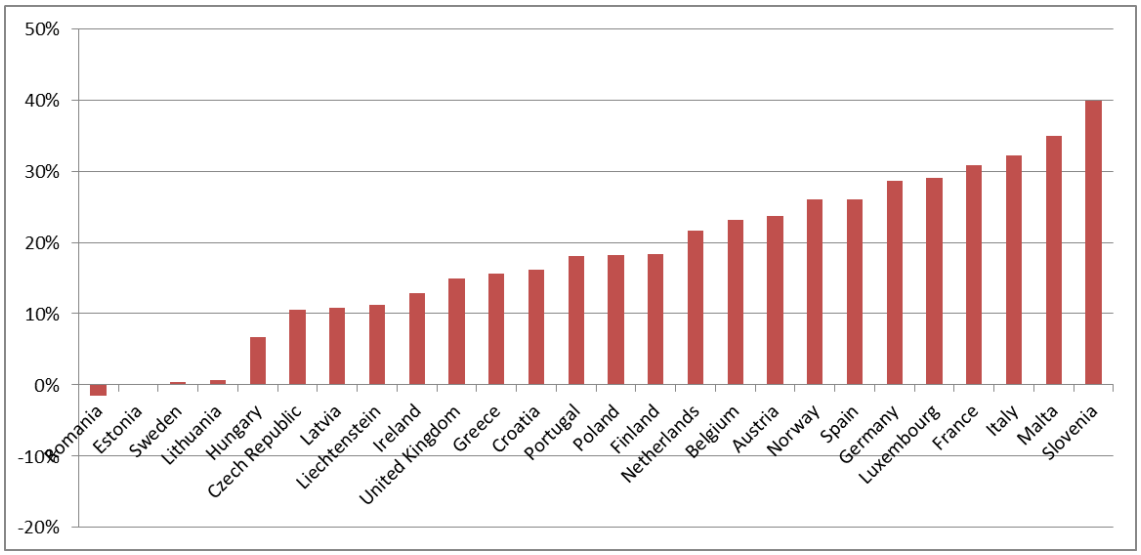
42. Several NSAs mention the negligible effects of UFR changes to Solvency II technical provisions (AT, GR, LI, PT, UK). Thus the overall effect (impact of UFR change after TP transitional mitigation) was also claimed to be minor. Three NSAs therefore conclude that the UFR changes cannot cause a material change in the risk profile of their undertakings (GR, PT, UK). Several NSAs reported, that it is not clear whether an adapted UFR alone would render a material change to an undertaking's risk profile (BE, DE, LI). Two NSA reject the idea that a change of the UFR can constitute a change of an undertaking's risk profile (FI, FR). This might nevertheless be subject to case-by-case assessment. Where the change of the UFR does not result in a material change of the undertaking's risk profile there may be a time gap between the UFR change and the recalculation of the transitional deduction that would delay the mitigating effect.

43. Due to national specificities four NSAs report that technical provisions according to Solvency I are expected to increase (AT, DE, LI, UK) over the next years. In one country (DE) the increase of Solvency I technical provisions is expected to outweigh the impact of the proposed UFR changes on Solvency II technical provisions. As a consequence the recalculation of the transitional deduction would in this particular case not have a mitigating effect on the impact of UFR decreases.

Impact on deferred taxes

44. Figure 15 illustrates the loss-absorbing effect of deferred taxes in scenario 1 by country. The increase of technical provisions is partly mitigated by an increase of deferred tax assets or a reduction of deferred tax liabilities. The figure shows the ratio of the increase in deferred taxes (deferred tax assets minus deferred tax liabilities) and the decrease of technical provisions. For example, a ratio of about 30% for France means that on average 30% of the increase of technical provisions of French participants was compensated by an increase in deferred taxes. Markets with very small average changes in technical provisions are not included in the diagram to avoid spurious numerical results.

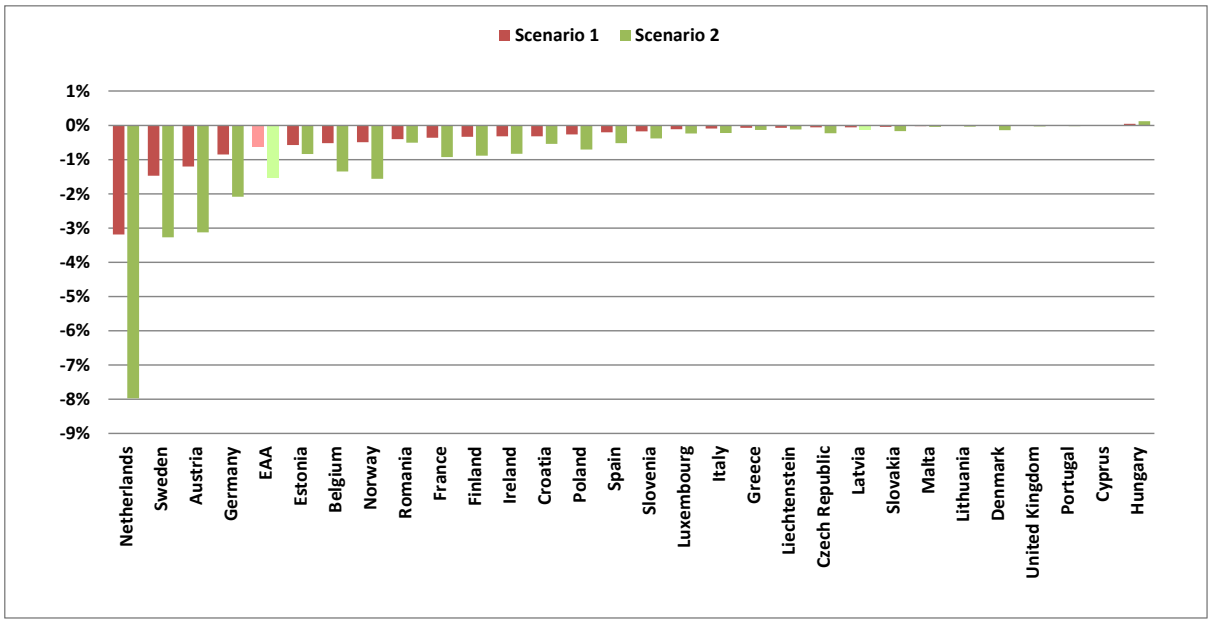
Figure 15. Loss-absorbing effect of deferred taxes (Increase of deferred taxes by increase of technical provisions in scenario 1)



Impact on own funds

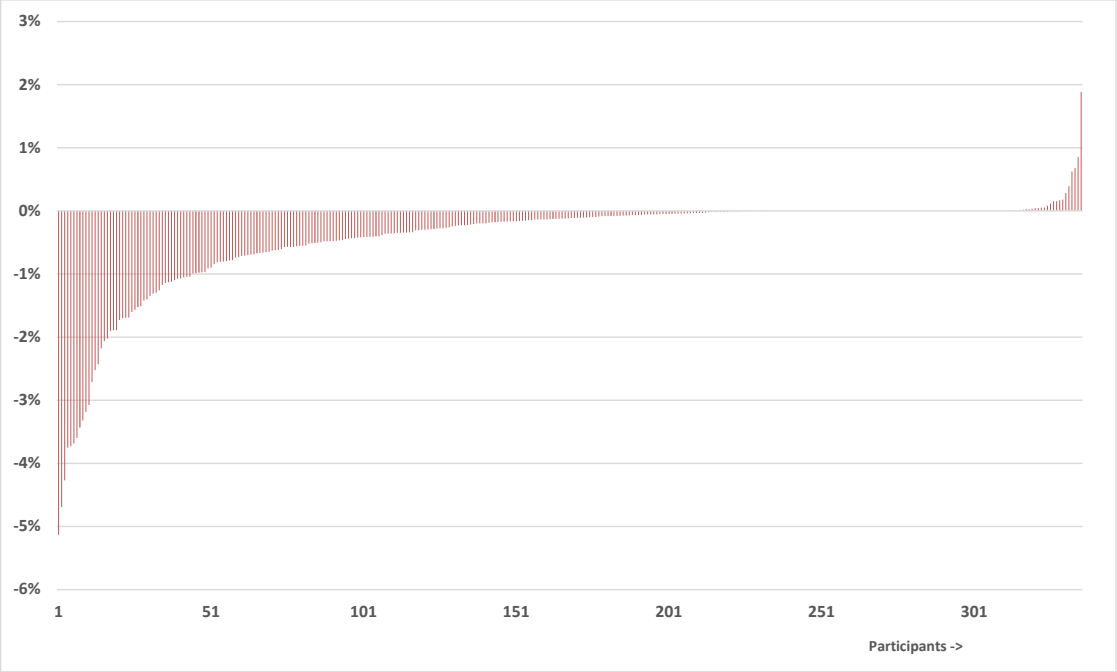
45. Figure 16 shows the average relative decrease of eligible own funds by country. The markets most affected are the Netherlands, Sweden, Austria and Germany. The differences between the countries can be traced back to differences in the increase of technical provisions in the scenarios, the loss absorbing capacity of deferred taxes and the overall amount of own funds. For example, Swedish insurers reported the highest relative increase of technical provisions (see figure 8), but this does not translate into the highest relative loss of own funds because of a comparably high level of own funds in the baseline.

Figure 16. Average relative change of eligible own funds to cover the SCR by country



46. The relative change of eligible own funds to cover the SCR per undertaking is shown in figure 17. The participants are ordered by the size of the change. For 75% of the participants the change is below or equal 0%, while for half of the participants the change is below or equal -0.12%. 5.1% of the participants reported a change below -2%, the maximum decrease is -5.13%.

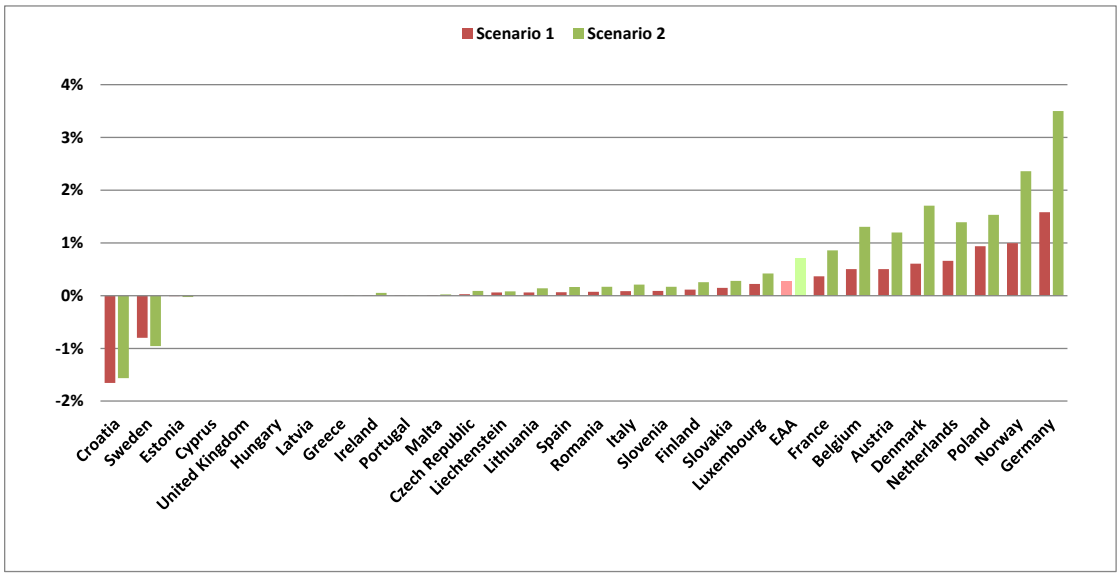
Figure 17. Relative change of eligible own funds to cover the SCR by participant (scenario 1)



Impact on the SCR

47. Figure 18 shows the average relative change of the SCR by country. A wide dispersion of the impact can be observed. The highest average impact was reported for Germany with increases of the capital requirement by about 1.6% in scenario 1 and 3.5% in scenario 2. For some countries an average reduction of the SCR can be observed. Reasons for a reduction of the SCR in the scenarios are reductions in lapse risk (the increase of technical provisions reduces the gap to the surrender values), reductions in currency risk (the increase of technical provisions improves the currency matching of assets and liabilities), reductions in interest rate risk (because of the relative shocks to the interest rates in the SCR standard formula) and an increased loss-absorbing capacity of deferred taxes.

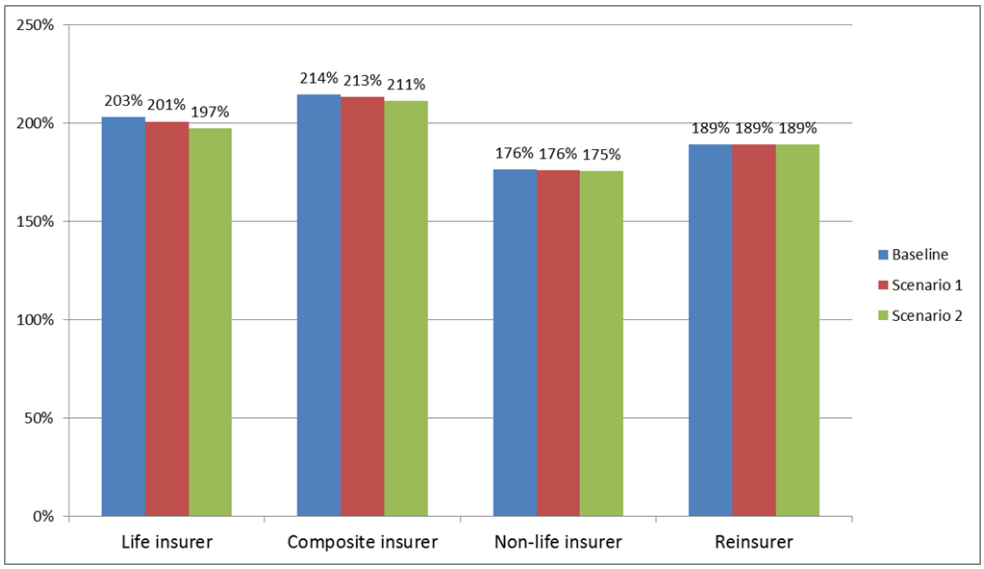
Figure 18. Average relative change of the SCR by country



Impact on the SCR ratio

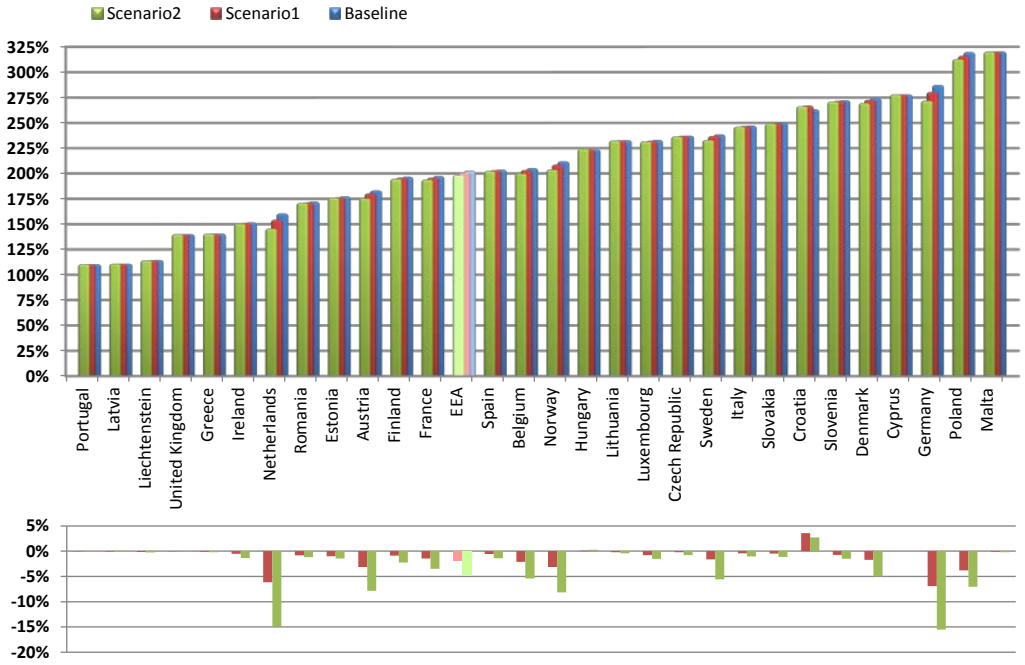
48. The impact of UFR changes depends on the type of undertaking. Figure 19 shows the average SCR ratios for life insurance, composite insurance, non-life and reinsurance undertakings. The impact of the two scenarios is most pronounced for life and composite insurance undertakings while non-life and reinsurance undertakings are less affected.

Figure 19. Average SCR ratios by type of undertaking



49. Figure 20 shows the average SCR ratios by country and, at the bottom, the change of the SCR ratio in the two scenarios. The countries are ordered by the size of their baseline SCR ratio. The strongest impact on the SCR ratio can be observed for Germany and the Netherlands. Also Norway, Austria, Poland and Sweden yield a higher impact. Compared to the level of the average SCR ratio the impact is small for all countries.

Figure 20. Average SCR ratios by country



50. Table 4 sets out the average SCR ratios in the base line and in the two scenarios by country.

Table 4. Average SCR ratios per country

Country	SCR ratio baseline	SCR ratio scenario 1	SCR ratio scenario 2
Austria	184%	181%	176%
Belgium	206%	204%	200%
Croatia	264%	267%	267%
Cyprus	278%	278%	278%
Czech Republic	238%	237%	237%
Denmark	275%	273%	270%
Estonia	178%	177%	176%
Finland	197%	196%	195%
France	198%	196%	194%
Germany	288%	281%	272%
Greece	141%	141%	141%
Hungary	224%	224%	225%
Ireland	152%	152%	151%
Italy	248%	247%	247%
Latvia	111%	111%	111%
Liechtenstein	115%	115%	115%
Lithuania	233%	233%	233%
Luxembourg	233%	233%	232%
Malta	321%	321%	320%
Netherlands	161%	155%	146%
Norway	212%	209%	204%
Poland	320%	316%	313%
Portugal	111%	111%	111%
Romania	172%	173%	172%
Slovakia	251%	250%	250%
Slovenia	273%	272%	271%
Spain	204%	203%	203%
Sweden	239%	237%	233%
United Kingdom	140%	140%	140%
EEA	**203%**	**201%**	**198%**

51. Figure 21 shows the average SCR ratios in the baseline and in scenario 1. It is the same information as in figure 20, but presented differently. Each country is placed in the figure according to its average SCR ratio in the baseline (horizontal position) and its average SCR ratio in scenario 1 (vertical position). For countries on the green diagonal the average SCR ratio in the baseline and in scenario 1 coincide. For countries below the diagonal the average SCR ratio in scenario 1 is lower than in the baseline. This way of presentation also allows to show the SCR ratios for many individual participants in one picture, see figure 22. Each dot represents one undertaking. For presentational purposes only participants with an SCR ratio up to 700% are shown. The SCR ratio is quite resilient to the changes of the UFR in scenario 1 (the dots are all close to the diagonal). Only for few undertakings a stronger impact can be observed (their points are further away from the diagonal). These undertakings all have SCR ratios that are high compared to the changes incurred.

Figure 21. Average SCR ratios by country in the baseline and scenario 1

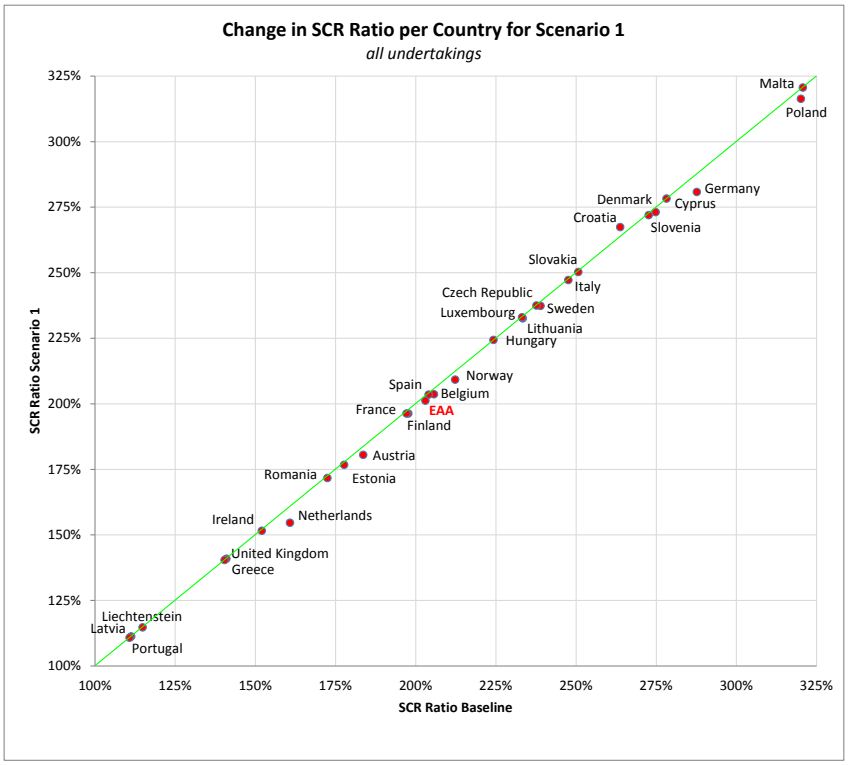
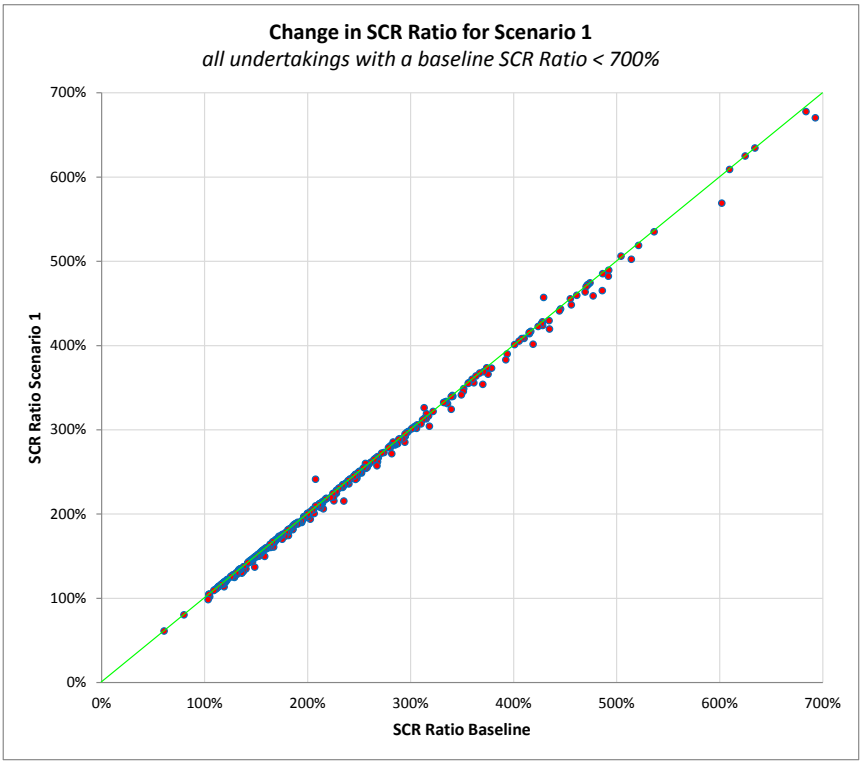


Figure 22. Average SCR ratios by participant in the baseline and scenario 1



52. Figures 23 and 24 overleaf present the impact of scenario 2 on the SCR ratios. The impact is stronger than under scenario 1, but is still quite small.

Figure 23. Average SCR ratios by country in the baseline and scenario 2

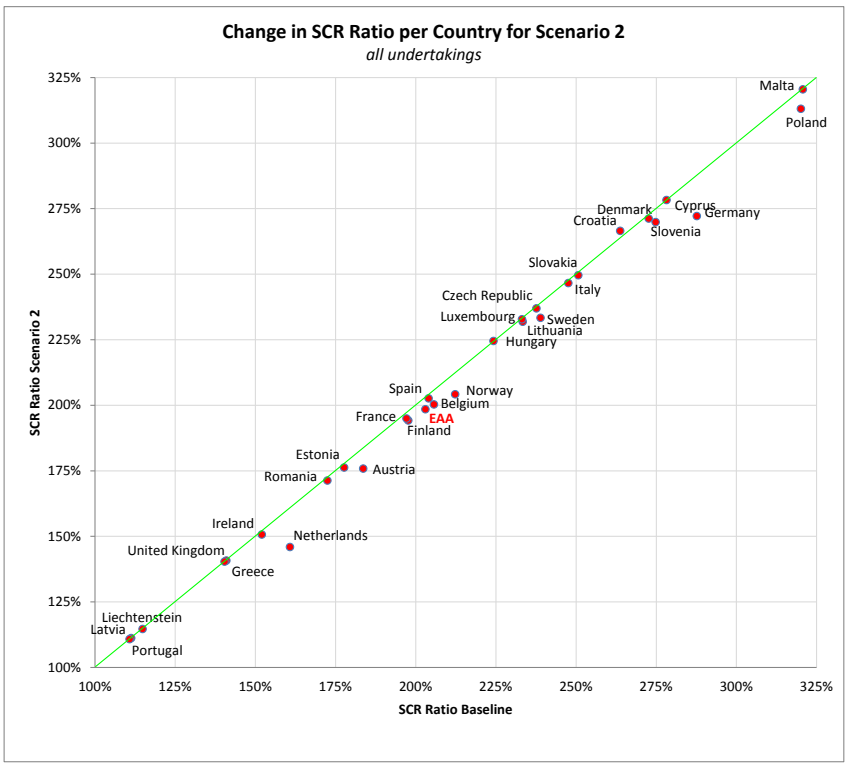
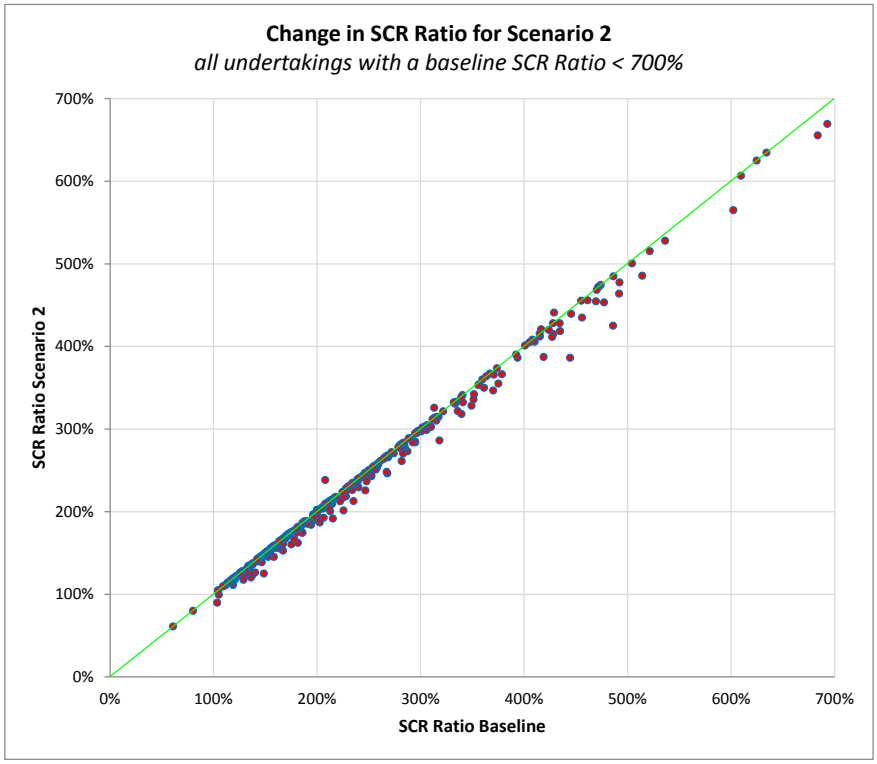


Figure 24. Average SCR ratios by participant in the baseline and scenario 2



53. The solvency position of almost all participants remains unchanged in scenarios 1 and 2. In the baseline, 334 undertakings comply with the SCR while 2 undertakings do not. In scenarios 1 and 2 two additional undertakings fail to comply with the SCR. These undertakings were already close to a breach of the SCR in the baseline with SCR ratios of 103% and 105%. For all other participants the tested changes of the UFR have no impact on their solvency position.

Table 5. SCR compliance

	Baseline	Scenario 1	Scenario 2
Participants complying with the SCR	334	332	332
Participants not complying with the SCR	2	4	4
Total	336	336	336

Movement analysis for the SCR ratios

54. This section sets out a conceptual framework for analysing the drivers of the change in SCR ratio in the scenarios. For that purpose the change of SCR ratio (in percentage points) is allocated to the changes in assets, liabilities, own funds and the SCR. This decomposition allows comparing the underlying drivers of the SCR ratio change and their contribution to the amount of the change.

55. The analysis shows in particular that the average change of the SCR ratio in scenario 1 of 1.83 percentage points stems mainly from an increase of technical provisions (accounting for 1.55 percentage points change of the SCR ratio) and an increase of the SCR (0.54 percentage points). The reduction of deferred tax liabilities and the increase of deferred tax assets mitigate the change by 0.16 and 0.13 percentage points respectively. Other drivers have a negligible impact.

56. The contribution to the SCR ratio change of 1.55 percentage points that stems from the increase of technical provisions can be further decomposed. The change can be traced back to the increase of the best estimate for life insurance (2.33 percentage points) and the increase of the risk margin for life insurance (0.23 percentage points). The decrease of future discretionary benefits reduces the increase of technical provisions. That effect reduces the increase of the SCR ratio by 1.00 percentage points. Other drivers have a negligible impact.

57. The SCR ratio for scenario *i* is denoted by SR_i according to the following definition:

$$SR_i = \frac{EOF_i}{SCR_i} \times 100\% \quad (1)$$

where:

i : b (baseline scenario), 1 (scenario 1) or 2 (scenario 2)

EOF_i : Eligible Own Funds for scenario *i*

SCR_i : SCR for scenario *i*

58. In addition to these variables the following variables for items of the balance sheet can be defined:

Table 5. Definition of variables

Liabilities	Baseline	Scenario 1	Scenario 2
Technical provisions (net of reinsurance)	TP_b	TP_1	TP_2
Deferred tax liabilities	DTL_b	DTL_1	DTL_2
Liabilities other than technical provisions and deferred tax liabilities	OL_b	OL_1	OL_2

Assets	Baseline	Scenario 1	Scenario 2
Deferred tax assets	DTA_b	DTA_1	DTA_2
Assets other than reinsurance recoverables and deferred tax assets	OA_b	OA_1	OA_2

Own funds and capital requirements	Baseline	Scenario 1	Scenario 2
SCR	SCR_b	SCR_1	SCR_2
Total eligible own funds to meet the SCR	EOF_b	EOF_1	EOF_2
SCR Ratio	$EOF_b/SCR_b \times 100\%$	$EOF_1/SCR_1 \times 100\%$	$EOF_2/SCR_2 \times 100\%$

59. The following equation for scenario *i* can be defined:

$$OA_i + DTA_i - (TP_i + OL_i + DTL_i) = EOF_i + NOOF_i \quad (2)$$

where:

$NOOF_i$: Net Other Own Funds for scenario *i.*

60. The left hand side of equation (2) equals the excess of assets over liabilities. However not all of the excess of assets over liabilities may be eligible, where at the same time there may be "*other available own funds*" like for instance ancillary own funds. Therefore the balancing item "*Net Other Own Funds*" to arrive at equation (2) is introduced. The net other own funds for scenario *i* can be seen as the difference of non-eligible own

funds for scenario *i* ($NEOF_i$) and other available own funds for scenario *i* ($OAOF_i$). To explain this approach the eligible own funds are written in terms of the excess of assets over liabilities, non-eligible own funds plus other available own funds, i.e.:

$$EOF_i = OA_i + DTA_i - (TP_i + OL_i + DTL_i) - NEOF_i + OAOF_i \quad (3)$$

61. Combining equations (2) and (3) it follows immediately that:

$$NOOF_i = NEOF_i - OAOF_i \quad (3)$$

62. For the rest of this section the focus is on the analysis of the change in SCR ratio from the baseline scenario to scenario 1, i.e.:

$$\Delta SR = SR_1 - SR_b = \frac{EOF_1}{SCR_1} - \frac{EOF_b}{SCR_b} \quad (4)$$

Note: for ease of notation the multiplication with 100% is left out the left hand side of equation (4), however it should be kept in mind that ΔSR is measured in terms of %-points SCR ratio.

63. Now equation (4) could equally be written as:

$$\Delta SR = \frac{EOF_1}{SCR_1} - \frac{EOF_b}{SCR_b} + \frac{EOF_1}{SCR_b} - \frac{EOF_1}{SCR_b} \quad (5)$$

64. As the last two terms at the right hand side of equation (5) are equal, the net effect of adding and subtracting the same term is zero.

Rearranging terms the following equation can be derived:

$$\Delta SR = \frac{EOF_1 - EOF_b}{SCR_b} + EOF_1 \cdot \left(\frac{1}{SCR_1} - \frac{1}{SCR_b}\right) \quad (6)$$

65. The first term of the right hand side of equation (6) can be seen as the part of the change in the SCR ratio (under the baseline required solvency capital) due to a change in eligible own funds, while the second term can be seen as the part of the change in the SCR ratio, based on the eligible own funds for scenario 1, due to a change in the SCR.

66. Using equation (2) to substitute for the EOF_b- and EOF_1- terms in the left term of the right hand side of equation (6) and rearranging terms yields the following:

$\Delta SR =$

(7)

$$\frac{OA_1 - OA_b}{SCR_b} + \frac{DTA_1 - DTA_b}{SCR_b} - \frac{TP_1 - TP_b}{SCR_b} - \frac{OL_1 - OL_b}{SCR_b} - \frac{DTL_1 - DTL_b}{SCR_b} - \frac{NOOF_1 - NOOF_b}{SCR_b}$$

$$+ EOF_1 \cdot \left(\frac{1}{SCR_1} - \frac{1}{SCR_b}\right)$$

Equation (7) shows how the change in SCR ratio is driven by changes in respective balance sheet items.

67. Based on the submitted data EIOPA has implemented equation (7) both on the individual undertaking level as well as on the grouped country level. For the grouped country level the results are presented in the following table.

Analysis of Change in SCR Ratio for Scenario1	ΔScrRatio1 (in %-pts)	ΔScrRatio1 DTA (in %-pts)	ΔScrRatio1 OA (in %-pts)	ΔScrRatio1 TP (in %-pts)	ΔScrRatio1 DTL (in %-pts)	ΔScrRatio1 OL (in %-pts)	ΔScrRatio1 NOOF (in %-pts)	ΔScrRatio1 SCR (in %-pts)
Germany	-6.89%	0.41%	-0.03%	-3.45%	0.58%	0.00%	0.05%	-4.44%
Netherlands	-6.15%	1.16%	-0.03%	-5.40%	0.00%	0.00%	-0.86%	-1.02%
Poland	-3.81%			-1.03%	0.19%		0.00%	-2.97%
Norway	-3.12%	0.21%		-1.34%	0.13%		-0.05%	-2.08%
Austria	-3.12%	0.29%	0.15%	-3.09%	0.44%		0.00%	-0.91%
Belgium	-2.09%		0.00%	-1.46%	0.34%	0.00%	0.05%	-1.02%
Denmark	-1.70%			-0.02%	-0.03%	0.01%	-0.01%	-1.66%
Sweden	-1.61%			-3.52%	0.01%	0.00%	0.00%	1.90%
France	-1.43%	0.05%	0.05%	-1.10%	0.29%	0.00%	0.00%	-0.72%
Estonia	-1.00%			-1.07%			0.05%	0.02%
Finland	-0.88%		-0.02%	-0.94%	0.17%	0.00%	0.14%	-0.23%
Romania	-0.81%	0.00%		-0.68%	-0.01%		0.00%	-0.12%
Luxembourg	-0.78%	0.03%	0.05%	-0.21%	0.08%	-0.02%	-0.18%	-0.51%
Slovenia	-0.73%	0.00%	-0.06%	-0.71%	0.28%	0.00%	0.00%	-0.25%
Spain	-0.54%	0.12%		-0.54%	0.02%		-0.01%	-0.13%
Ireland	-0.50%	0.00%	0.01%	-0.57%	0.07%	0.00%	0.00%	-0.01%
Slovakia	-0.48%		0.00%	-0.10%	-0.01%		0.01%	-0.37%
Italy	-0.44%	0.02%	-0.01%	-0.32%	0.08%	0.00%	0.00%	-0.21%
Czech Republic	-0.21%			-0.16%	0.02%		0.00%	-0.06%
Lithuania	-0.19%	0.00%	0.07%	-0.24%			0.12%	-0.15%
Liechtenstein	-0.15%	0.01%		-0.16%	0.01%		0.06%	-0.07%
Malta	-0.11%			-0.13%	0.05%		0.00%	-0.03%
Greece	-0.11%	0.02%	0.00%	-0.10%	0.00%		-0.02%	-0.01%
Latvia	-0.07%			-0.09%	0.01%		0.01%	0.00%
Portugal	-0.02%	0.00%		-0.02%			0.00%	-0.01%
United Kingdom	-0.02%	0.00%	0.00%	-0.02%	0.00%	0.00%	0.00%	0.00%
Cyprus								
Hungary	0.11%			0.16%	-0.01%		-0.04%	0.00%
Croatia	3.58%	0.11%	-0.01%	-1.01%	0.05%	0.44%	-0.42%	4.42%
EEA	-1.83%	0.13%	0.01%	-1.55%	0.16%	0.00%	-0.04%	-0.54%

68. One of the main drivers of the decrease in the solvency ratio is the change in technical provisions (TP). For most countries scenario 1 is a decrease of the level of the UFR of 20 basis points. As a result the technical provisions are expected to increase resulting in a decrease (ceteris paribus) of the eligible own funds.

69. As one of the reporting templates provides information about the changes in technical provisions per line of business it is possible to extent the analysis from the table above by extending equation (7) accordingly. The third term on the right hand side of equation (7) reads:

$$-\frac{TP_1 - TP_b}{SCR_b} \tag{8}$$

70. The technical provisions in their contributing parts over all line of businesses can be split as follows:

$$TP_i = \sum_{k \in \{LoBs\}} TPW_i^k + TPBE_i^k + TPRM_i^k \tag{9}$$

where:

TPW_i^k : Technical Provisions calculated as a Whole for line of business *k* in scenario *i*

$TPBE_i^k$: Technical Provisions on Best Estimate basis for line of business *k* in scenario *i*

$TPRM_i^k$: Technical Provisions Risk Margin for line of business *k* in scenario *i*

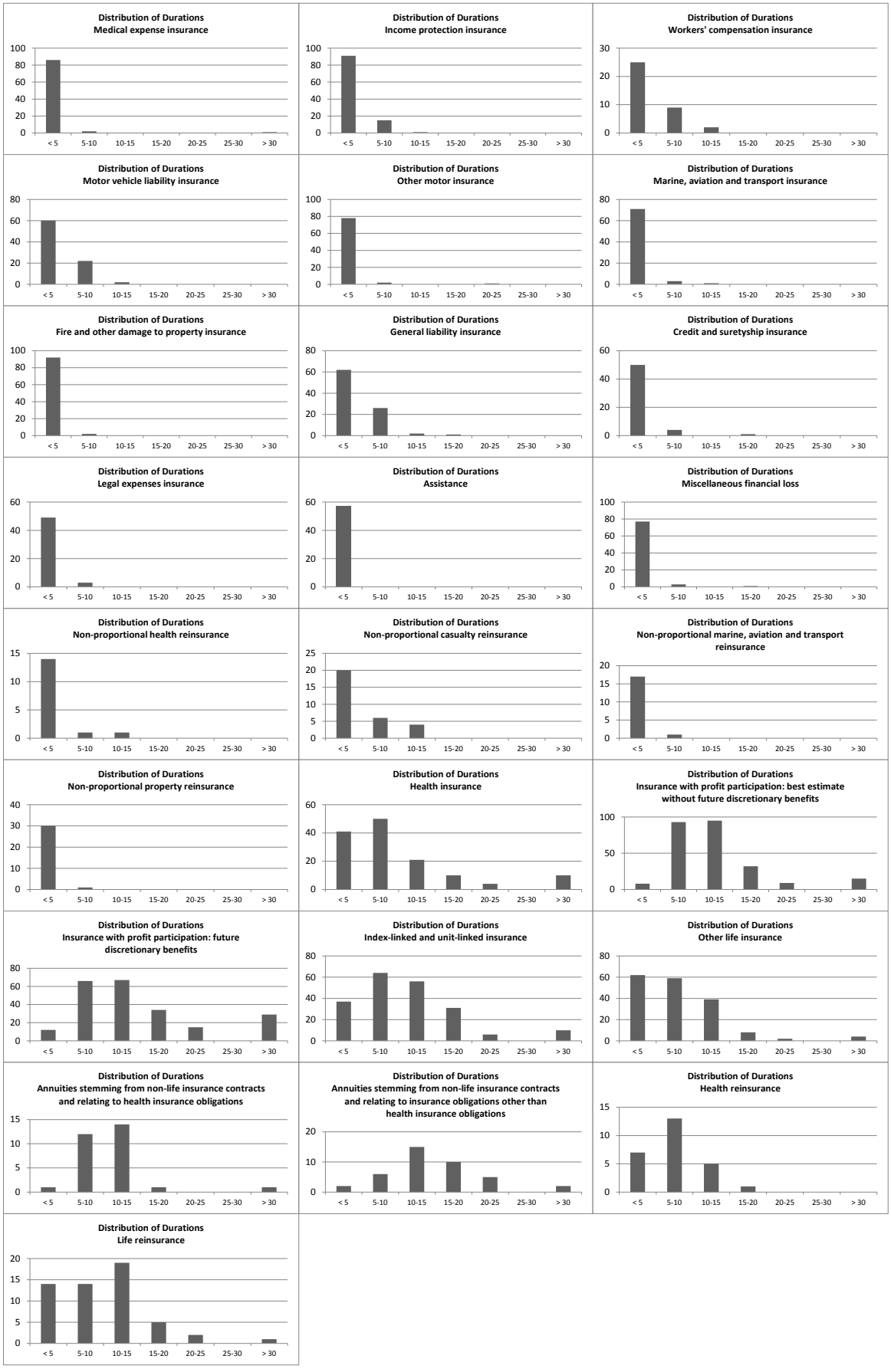
71. The technical provisions calculated as a whole are expected (by definition) not to be sensitive to changes in the level of the UFR. As the submitted data confirmed this expectation we have excluded this part of the provisions from the extended movement analysis hereafter.

72. As expected the submitted templates showed the highest sensitivity to changes in the UFR for the life lines of business. A special type of business within these lines is the profit participating policies with discretionary future benefits. By their nature future discretionary benefits have loss absorbing capacity, i.e. where expected future profits decrease these benefits can also be reduced because of their discretionary nature. However a decrease in the level of the UFR results in an increase of the best estimate technical provisions for most life lines of business. Such an increase could be compensated for by lowering the corresponding future discretionary benefits.

73. Based on this and using equation (9) EIOPA has extended the movement analysis accordingly which is shown in the following table.

Analysis of Change in SCR Ratio due to Changes in TP BE + RM for Scenario1	ΔScrRatio 1 TP (in %-pts)	ΔScrRatio1 TP TM RFR (in %-pts)	ΔScrRatio1 TP BE NonLife DirBusPropRe (in %-pts)	ΔScrRatio1 TP BE NonLife NonPropRe (in %-pts)	ΔScrRatio1 TP BE Life DirBus ex FutDiscrBen (in %-pts)	ΔScrRatio1 TP BE Life FutDiscrBen (in %-pts)	ΔScrRatio1 TP BE Life Re (in %-pts)	ΔScrRatio1 TP RM NonLife DirBusPropRe (in %-pts)	ΔScrRatio1 TP RM NonLife NonPropRe (in %-pts)	ΔScrRatio1 TP RM Life DirBus (in %-pts)	ΔScrRatio1 TP RM Life Re (in %-pts)
Germany	-3.45%	-0.01%			-8.89%	6.53%	0.00%			-1.08%	-0.01%
Netherlands	-5.40%		0.00%	0.00%	-4.46%	0.00%	0.00%			-0.93%	
Poland	-1.03%		-0.04%	0.00%	-0.75%	0.01%		0.00%	0.00%	-0.23%	
Norway	-1.34%				-6.82%	5.47%				-0.04%	
Austria	-3.09%		0.00%		-3.19%	0.62%		0.00%	0.00%	-0.52%	
Belgium	-1.46%		-0.01%	0.00%	-1.51%	0.28%	-0.03%	0.00%	0.00%	-0.17%	-0.01%
Denmark	-0.02%				-3.89%	3.70%				0.16%	
Sweden	-3.52%		-0.02%		-3.36%					-0.13%	
France	-1.10%		-0.01%	0.00%	-1.37%	0.37%	-0.03%	0.00%	0.00%	-0.06%	-0.01%
Estonia	-1.07%		0.00%		-0.54%					-0.53%	
Finland	-0.94%		-0.09%	0.00%	-0.78%	0.11%	0.00%	0.00%	0.00%	-0.12%	0.00%
Romania	-0.68%		0.00%		-0.66%	-0.03%				0.02%	
Luxembourg	-0.21%		-0.01%	-0.07%	-0.64%	0.80%	-0.05%	-0.02%	-0.02%	-0.17%	-0.05%
Slovenia	-0.71%		-0.01%		-0.66%	0.06%				-0.06%	
Spain	-0.54%		0.00%	0.00%	-0.47%	-0.04%	0.00%	0.00%	0.00%	-0.07%	0.00%
Ireland	-0.57%				-0.31%	0.00%	-0.02%			-0.23%	-0.01%
Slovakia	-0.10%		0.15%		-0.43%	0.19%				0.01%	
Italy	-0.32%	-0.01%	0.00%	0.00%	-0.44%	0.16%	0.00%	0.00%	0.00%	-0.02%	0.00%
Czech Republic	-0.16%		-0.02%	0.00%	-0.14%	0.02%		0.00%	0.00%	0.00%	
Lithuania	-0.24%		0.00%		-0.20%	0.01%				-0.04%	
Liechtenstein	-0.16%				-0.17%	0.01%					
Malta	-0.13%				-0.22%	0.13%				-0.04%	
Greece	-0.10%	0.02%			-0.18%	0.07%				-0.01%	
Latvia	-0.09%		0.00%		-0.07%			0.00%	0.00%	0.00%	
Portugal	-0.02%				-0.15%	0.14%				0.00%	
United Kingdom	-0.02%		-0.01%	0.00%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cyprus											
Hungary	0.16%		0.10%		0.06%	0.00%				0.00%	
Croatia	-1.01%		-0.06%		-0.86%	-0.03%				-0.05%	
EEA	-1.55%	0.00%	-0.01%	0.00%	-2.33%	1.03%	-0.01%	0.00%	0.00%	-0.23%	0.00%

Annex – Distribution of durations by line of business



05 April 2017

Frequently Asked Questions & Answers

THE ULTIMATE FORWARD RATE

Legislation requires the Ultimate Forward Rate (UFR) to be stable over time. Why is EIOPA suggesting changing it?

- ✓ Legislation also requires the UFR to be derived using a clearly specified methodology. That is what EIOPA has provided.
- ✓ Change to the UFR is prudent if long-term expectations change.
- ✓ And long-term expectations have changed significantly in recent years.
- ✓ Moreover, the European Systemic Risk Board analysed the derivation of the UFR from a macro-prudential perspective and supported the review of the UFR methodology.

The UFR of 4.2% was part of the political settlement which finalised Solvency II. Why is EIOPA reopening this?

- ✓ The legislators specified the need for a UFR methodology in the Solvency II legislation.
- ✓ The legislators specified conditions for the methodology which include that it should change as a result of changes in long-term expectations.

What were the steps EIOPA took to derive the methodology?

- ✓ EIOPA followed a rigorous process for the development of the UFR methodology.
- ✓ EIOPA's work started in May 2015.

- ✓ A workshop was organised with stakeholders in July 2015.
- ✓ A public consultation on a proposal for the UFR methodology from April 2016 to July 2016 was conducted.
- ✓ On 31 August 2016 EIOPA reported about its work on the UFR methodology at the meeting of the European Parliament's Committee on Economic and Monetary Affairs.

What are the results of EIOPA's full impact assessment?

- ✓ EIOPA collected information from 336 European insurance and reinsurance undertakings on the impact of changes of the UFR on their solvency position.
- ✓ The impact of UFR changes is small.
- ✓ The average Solvency Capital Ratio changes from 203% to 201% if the UFR is changed by 20 basis points.
- ✓ Insurance and reinsurance undertakings comply with the capital requirements when their Solvency Capital Ratio is above 100%.

Why conducting the review of the Ultimate Forward Rate methodology now and why not waiting for the review of the Solvency Capital Requirement in 2018?

- ✓ The legal requirement for a clearly specified methodology applies now.
- ✓ The implementation of the review of the Solvency Capital Requirement (SCR) will be unlikely to materialise before 2019.
- ✓ It would not be sound and prudent to wait especially when the changes in long-term expectations are significant.
- ✓ The SCR determines capital needs of an insurer based on the risks it faces in the next year. The UFR is one component in the valuation of liabilities.

If the justification for changing the Ultimate Forward Rate is that expectations of long-term interest rates have fallen, why are you not prepared to change the cost of capital of 6% for calculation of technical provisions, which likewise was set when rates were higher?

- ✓ Unlike the Ultimate Forward Rate, the 6% value for the cost of capital is fixed in legislation.
- ✓ The 6% cost-of-capital rate is not an interest rate. It is a spread above the risk-free interest rate measuring in particular the credit risk of counterparties.
- ✓ The European Commission has asked EIOPA to include the risk margin in its advice on the review of the Solvency Capital Requirement.

What are the next steps?

- ✓ EIOPA will publish the consultation report including responses to the stakeholder comments by the beginning of May 2017.
- ✓ The first change of the UFR, for the euro from 4.2% to 4.05%, will be implemented at the beginning of 2018, in the calculation of the risk-free interest rates for January 2018, which will be published in February 2018.
- ✓ The European Commission may adopt and consequently publish implementing acts which set out the technical information for each relevant currency.

Why did EIOPA propose the Ultimate Forward Rate of 4.05% for the euro and on which basis?

- ✓ EIOPA decided **not** on a value for the UFR, but on a methodology to derive the UFR on an ongoing basis.
- ✓ According to the methodology changes of the UFR are phased-in.
- ✓ In line with the methodology, and reflecting the significant changes in the long-term expectations of interest rates in recent years, the calculated value of the UFR for the euro is 3.65%.
- ✓ Annual changes to the UFR will not be higher than 15 basis points.

- ✓ In a first step of the phasing-in the current UFR of 4.2% for the euro will be lowered in January 2018 to 4.05%.

How is the calculated UFR of 3.65% derived?

- ✓ The calculated UFR is the sum of an expected real rate and an expected inflation rate.
- ✓ The expected real rate is derived as a long-term average of past real rates since 1961. Currently that average is 1.65%.
- ✓ The expected inflation rate is derived from the inflation targets of central banks. For the euro the expected inflation rate is currently 2%.
- ✓ Both components sum up to 3.65%.

How does the new rate impact the European insurers? Could you provide details according to countries?

- ✓ EIOPA collected information from 336 European insurance and reinsurance undertakings on the impact of changes of the UFR on their solvency position.
- ✓ The impact of UFR changes is small.
- ✓ The average Solvency Capital Ratio changes from 203% to 201% if the UFR is changed by 20 basis points.
- ✓ Insurance and reinsurance undertakings comply with the capital requirements when their Solvency Capital Ratio is above 100%.
- ✓ The analysis shows that impact of the UFR changes is manageable in all national markets.
- ✓ EIOPA published the results of the impact analysis together with the UFR methodology.

When will the new rate be applied?

- ✓ The first change of the UFR, for the euro from 4.2% to 4.05%, will be implemented at the beginning of 2018, in the calculation of the risk-free interest rates for January 2018, which will be published in February 2018.

How often does EIOPA plan to review the rate, regularly or according to the development of the economic and financial cycle?

- ✓ EIOPA will apply the methodology on an annual basis.
- ✓ Changes to the UFR will only be made if the calculated UFR differs from the currently applied UFR by at least 15 basis points.
- ✓ Not every recalculation will therefore result in a change of the UFR.
- ✓ EIOPA will also not change the UFR by more than 15 basis points per year.

What are the changes that EIOPA made to the consultation proposal?

- ✓ EIOPA made three changes to the consultation proposal in order to improve the stability of the UFR:
    1. The limit to annual changes to the UFR was changed from 20 basis points to 15 basis points. As a result the UFR will change more slowly.
    2. The UFR will not change if the difference between calculated UFR and currently applied UFR is less than 15 basis points. That implies in particular that the UFR will change less often.
    3. The expected real interest rate is derived from a simple average of past real interest rates instead of a weighted average. This will make the calculated UFR more stable over time.
- ✓ The first application of the UFR methodology was set for the beginning of 2018 in order to provide insurance and reinsurance undertakings sufficient time to prepare.