EIOPA-BoS-18/471
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Report on long-term guarantees measures and measures on equity risk

2018

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Executive summary

The Solvency II Directive requires a review of the long-term guarantees measures (LTG) and the measures on equity risk until 1 January 2021. As part of this review, EIOPA reports annually on the impact of the application of the LTG measures and the measures on equity risk to the European Parliament, the Council and the Commission. This report on the LTG measures and the measures on equity risk is the third annual report.

The LTG measures are the extrapolation of risk-free interest rates, the matching adjustment, the volatility adjustment, the extension of the recovery period in case of non-compliance with the Solvency Capital Requirement, the transitional measure on the risk-free interest rates and the transitional measure on technical provisions. The equity risk measures are the application of a symmetric adjustment mechanism to the equity risk charge and the duration-based equity risk sub-module.

The use of the matching adjustment, the volatility adjustment, the two transitional measures and the duration-based equity risk sub-module are not mandatory for undertakings. In the European Economic Area (EEA), 737 insurance and reinsurance undertakings in 23 countries were using at least one of these measures on 31 December 2017.

The aggregated amount of technical provisions for the undertakings using the matching adjustment, the volatility adjustment, the transitional measure on the risk-free interest rates, the transitional measure on technical provisions and the duration-based equity risk sub-module amounts to 74% of the technical provisions in the EEA insurance and reinsurance market. 696 undertakings representing 66% of the overall amount of technical provisions at EEA level are using the volatility adjustment. The transitional on technical provisions is the second most used measure, applied by 162 undertakings representing 24% of the overall amount of technical provisions at EEA level. The matching adjustment is used by 34 undertakings representing 15% of the overall amount of technical provisions in the EEA. The transitional on the risk-free interest rates is used by 7 undertakings and the duration-based equity risk sub-module by one undertaking with a negligible market share in technical provisions in both cases.

The impact of the measures on the financial position is reported to national supervisory authorities through the regular annual reporting. For the undertakings using these measures, removing the measures would result, on average, in a reduction to the Solvency Capital Requirement ratio of 59 percentage points; the weighted average ratio with the measures is 231% while the same ratio without the measures would be 172%. Insurance and reinsurance undertakings comply with the Solvency Capital Requirement if their Solvency Capital Requirement ratio is at least 100%. Removing these measures would decrease the amount of eligible own funds to cover the Solvency Capital Requirement by 126 billion euro and increase the Solvency Capital Requirement by 64 billion euro.

Where insurance or reinsurance undertakings depend on the transitional measures to comply with the Solvency Capital Requirement, national supervisory authorities are

generally confident that undertakings will be able to reduce the dependency on transitional measures, to the point of no dependency by 1 January 2032. National supervisory authorities reported that the measures planned by undertakings in their phasing-in plans have already provided an effective contribution to strengthening undertakings' solvency position under the low-rate environment. However, they also noted that it is still very early in the transitional period. The total number of undertakings not complying with the Solvency Capital Requirement without the transitional measures at EEA level decreased by 14 from 43 undertakings at the beginning of 2017, to 29 undertakings at the end of the year. The missing amount of eligible own funds to comply with the Solvency Capital Requirement without the transitional measures decreased by 2.08 billion euro, from 8.9 billion euro at the beginning of 2017 to 6.82 billion euro at the end of the year, with one jurisdiction (UK) accounting for 84% of this amount.

In order to assess the impact of the extrapolation of risk-free interest rates EIOPA carried out an information request to insurance and reinsurance undertakings. Undertakings assessed the impact of three scenarios to change parameters of the extrapolation. At EEA level, scenario 1 (increase of the last liquid point for the euro from 20 to 30 years) would result in an average reduction of the Solvency Capital Requirement ratio by 24 percentage points, scenario 2 (increase of the minimum convergence point from 60 to 90 years) would result in an average reduction by 5 percentage points and scenario 3 (decrease of the ultimate forward rate for all currencies by 100 basis points) would result in an average reduction by 13 percentage points. The average change in SCR ratios is the highest for undertakings in Germany and the Netherlands. Scenario 1, which turned out to be most severe, would cause a reduction in own funds of 28.3 billion euro and an increase of the Solvency Capital Requirement by 12.5 billion euro.

At the end of 2017, the symmetric adjustment to the equity capital charge, which can vary from -10 to +10 percentage points, was at 1.9 percentage points. At EEA level the estimated average impact of removing the symmetric adjustment on the SCR is -1%.

The feedback from national supervisory authorities indicates that there is no specific case yet where undue capital relief was observed for an undertaking due to the application of the LTG measures or measures on equity risk. No concrete observations of positive or negative impacts of the LTG measures and equity risk measures on policyholder protection were raised. Furthermore, no concrete cases were identified by national supervisory authorities in which the application of the measures prevented them from taking any supervisory measures that they would have considered desirable for policyholder protection.

With regards to the impact of the measures on investments, 21 of the national supervisory authorities reported that they did not observe any trend in their national market regarding the behaviour of undertakings as long-term investors. From the remaining national supervisory authorities, 2 observed a reallocation from government bonds to corporate bonds, 3 of them witnessed an increasing investment in illiquid assets like loans and mortgages and 2 noted an increase in bonds investment at the

expense of the allocation to cash and cash equivalents. In addition, one national supervisory authority reported an increase of indirect investments in collective investment undertakings. Another national supervisory authority reported a decrease in bail-in eligible assets (exposure to banks). Two national supervisory authorities reported an increase in the duration of the assets, whereas two other national supervisory authorities reported a decrease. In line with the reports in previous years, no national supervisory authority provided any factual evidence of significant links between the use of the matching adjustment, the volatility adjustment, the symmetric adjustment mechanism to the equity risk charge or the duration-based equity risk sub-module and the experienced trends/changes concerning the investment behaviour of undertakings as long-term investors.

The vast majority of products with long-term guarantees occur in life insurance. In order to enable a more detailed analysis, an information request to undertakings on product features was performed including questions on types of guarantees present and any changes that have been made to their products and the reasons for these changes. The proportion of products with guarantees differs by country. In 16 countries, products with at least one guarantee make up over 95% of the life insurance market. In other countries, the proportion of products with guarantees is much lower. In general, the countries with a low proportion of products with guarantees have significant volumes of unit-linked life insurance. When the data is split between products that are in run-off and those still commercialised, it can be seen that fewer products that are still commercialised contain guarantees than products in run-off. This trend for fewer guarantees in commercialised products can be seen for all types of guarantee except guaranteed annuity benefits. With regard to the impact of the LTG measures, almost all undertakings participating in the request that use the matching adjustment stated that they use this measure in the design and pricing of their products. For the volatility adjustment, this is the case for 17% of the volatility adjustment users participating in the request. Only very few undertakings in the request stated that the transitionals (on technical provisions or on the risk-free interest rates) have an impact on product pricing or design.

Consistent with the trends observed in the last two years, availability of long-term guarantee products is mainly stable or decreasing across EEA. Ten of the national supervisory authorities observed a decreasing trend because of the low yield environment and incentives given by undertakings for policyholders to switch to unit-linked products. Overall, national supervisory authorities have observed a decrease in the size of guarantees, in particular, interest rate guarantees.

With regard to the impact of the LTG measures and the measures on equity risk on competition and level playing field, the vast majority of national supervisory authorities did not report any observed impact. Different supervisory approaches to the measures were identified regarding the treatment of the volatility adjustment in internal models, the recalculation of the deduction related to the transitional measure on technical provisions and the approval of the transitional measures.

In the thematic focus of this year’s report, EIOPA includes an analysis on risk management aspects in view of the specific requirements on the LTG measures set

out in Article 44 and 45 of the Directive. Such requirements include the liquidity plan for undertakings applying the matching adjustment or the volatility adjustment, the assessment of sensitivity of technical provisions regarding the assumptions underlying the extrapolation, the matching adjustment and the volatility adjustment, the assessment of compliance with capital requirements with and without the measures and potential measures to restore compliance and analysis of LTG measures in the own risk and solvency assessment. An assessment was performed in relation to the regulatory reporting by undertakings of the LTG measures. National supervisory authorities identified room for improvement in relation to the level of detail of the regular supervisory reporting. In addition, case studies were performed by national supervisory authorities to explore further how insurers build-in the results of the assessments on asset-liability management into their overall ALM and risk management system. Practices observed vary across countries and measures.

I. Introduction

I.1 Review of the LTG measures and measures on equity risk

The long-term guarantees (LTG) measures were introduced in the Solvency II Directive[1] through the Omnibus II Directive[2] in order to ensure an appropriate treatment of insurance products that include long-term guarantees. The measures on equity risk should ensure an appropriate measure of equity risk in setting the capital requirement for insurance and reinsurance undertakings in relation to the risks arising from changes in the level of equity prices.

The Solvency II Directive requires a review of the LTG measures and the measures on equity risk by 1 January 2021. The review consists of the following elements:

EIOPA annually reports on the impact of the application of the LTG measures and the measures on equity risk to the European Parliament, the Council and the Commission.

EIOPA provides an opinion on the assessment of the application of the LTG measures and the measures on equity risk to the Commission.

Based on the opinion submitted by EIOPA the Commission submits a report on the impact of the LTG measures and the measures on equity risk to the European Parliament and to the Council. The report will be accompanied, if necessary, by legislative proposals.

The 2018 EIOPA report on the LTG measures and the measures on equity risk is the third annual report[3]. The 2018 report is structured in four main sections. The first section provides introductory information, among others on the legal background of the review of the LTG measures and measures on equity risk and on the data used for this report, and concludes with a short overview of the European insurance market. The second section captures the overall impact of the LTG measures and measures on equity risk on the financial position of the undertakings, the impact on policyholder protection, the impact on investments, the impact on consumer protection and availability of products, the impact on competition and level playing field in the EU insurance market and the impact on financial stability.

The third section of the report sets out in more detail the impact of each of the measures.

The fourth section contains information on the thematic focus, which this year is on risk management aspects in view of the specific requirements for LTG measures.

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[1] Directive 2009/138/EC of 25 November 2009 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 335, 17.12.2009, p.1.

[2] Directive 2014/51/EU of the European Parliament and of the Council of 16 April 2014 amending Directives 2003/71/EC and 2009/138/EC and Regulations (EC) No 1060/2009, (EU) No 1094/2010 and (EU) No 1095/2010 in respect of the powers of the European Supervisory Authority (European Insurance and Occupational Pensions Authority) and the European Supervisory Authority (European Securities and Markets Authority), OJ L153, 22.05.2014, p.1.

[3] The 2016 and 2017 reports can be found on EIOPA's website at the following links:
https://eiopa.europa.eu/Publications/Responses/EIOPA-BoS-16-279_LTG_REPORT_2016.pdf
https://eiopa.europa.eu/Publications/Reports/2017-12-20%20LTG%20Report%202017.pdf

EIOPA plans to submit the opinion on the assessment of the application of the LTG measures and the measures on equity risk to the Commission in 2020, based on the annual reports submitted by then.

I.2 Legal background

Article 77(f)(1) of the Solvency II Directive requires EIOPA on an annual basis and until 1 January 2021 to report to the European Parliament, the Council and the Commission about the impact of the application of Articles 77a to 77e and 106, Article 138(4) and Articles 304, 308c and 308d, including the delegated or implementing acts adopted pursuant thereto.

The table below summarises the LTG measures and the measures on equity risk subject to the review and the relevant articles of the Solvency II Directive.

Articles	Name of the measure	Abbreviation in this report
77a	Extrapolation of the risk-free interest rates	-
77b, 77c	Matching adjustment	MA
77d	Volatility adjustment	VA
106	Symmetric adjustment mechanism to the equity risk charge	SA
138(4)	Extension of the recovery period	-
304	Duration-based equity risk sub-module	DBER
308c	Transitional on the risk-free rate	TRFR
308d	Transitional on technical provisions	TTP

The review also covers Article 77e of the Solvency Directive on technical information on the risk-free interest rates produced by EIOPA.

Article 77(f)(1) also requires national supervisory authorities (NSAs) to provide the following information to EIOPA on an annual basis:

- the availability of long-term guarantees in insurance products in their national markets and the behaviour of insurance and reinsurance undertakings as long-term investors;
- the number of insurance and reinsurance undertakings applying the matching adjustment, the volatility adjustment, the extension of the recovery period in accordance with Article 138(4), the duration-based equity risk sub-module and the transitional measures set out in Articles 308c and 308d;
- the impact on the insurance and reinsurance undertakings' financial position of the matching adjustment, the volatility adjustment, the symmetric adjustment mechanism to the equity capital charge, the duration-based equity risk sub-module and the transitional measures set out in Articles 308c and 308d, at national level and in anonymised way for each undertaking;

- the effect of the matching adjustment, the volatility adjustment, the symmetric adjustment mechanism to the equity capital charge and the duration-based equity risk sub-module on the investment behaviour of insurance and reinsurance undertakings and whether they provide undue capital relief;

- the effect of any extension of the recovery period in accordance with Article 138(4) on the efforts of insurance and reinsurance undertakings to re-establish the level of eligible own funds covering the Solvency Capital Requirement or to reduce the risk profile in order to ensure compliance with the Solvency Capital Requirement;

- where insurance and reinsurance undertakings apply the transitional measures set out in Articles 308c and 308d, whether they comply with the phasing-in plans referred to in Article 308e of the Solvency II Directive and the prospects for a reduced dependency on these transitional measures, including measures that have been taken or are expected to be taken by the undertakings and supervisory authorities, taking into account the regulatory environment of the Member State concerned.

I.3 Data

The data used for this report are taken from the quantitative reporting templates (QRT) submitted by insurance and reinsurance undertakings to their NSAs with reference date 31 December 2017[4]. Additionally, EIOPA launched a specific request to insurance and reinsurance undertakings from the EEA and subject to Solvency II to provide the following information: impact of the extrapolation of risk-free interest rates on the financial position of undertakings; losses due to bond defaults and downgrades of bonds in matching adjustment portfolios, and information on European insurance products [5].

EIOPA also carried out a questionnaire to ascertain the experience of NSAs with regard to the impact of the LTG measures and the measures on equity risk and the application of the risk management provisions concerning the measures.

I.4 Introduction to Solvency II quantitative requirements

The main objective of Solvency II is to protect the insurance policyholders and beneficiaries. An essential aspect of policyholder protection is the ability of insurance and reinsurance undertakings to fulfil their insurance and reinsurance contracts, even under adverse circumstances, for example in a financial crisis or when a natural catastrophe occurs. Solvency II includes quantitative requirements on insurance and reinsurance undertakings to ensure that their financial position allows them to pay the

[4] Few undertakings with a reporting year different than the natural year reported data for a point in time earlier than 31 December 2017. Implausible figures affecting individual data submitted by 8 undertakings were disregarded in the analysis. This is not expected to have a material impact on the results presented in the report. Data from the QRT were extracted between 1 October and 5 November 2018.

[5] The detailed content of the information request (i.e. Excel template, technical specifications and technical information) can be consulted on EIOPA's website in the following link: https://eiopa.europa.eu/regulation-supervision/insurance/long-term-guarantees-review

expected insurance benefits and also to bear unexpected losses that they might incur under adverse circumstances.

The quantitative requirements include in particular:

- market-consistent valuation of assets and liabilities,
- economic determination of own funds,
- risk-based capital requirements.

Assets and liabilities

Solvency II introduced a valuation of assets and liabilities specifically for supervisory purposes. Assets and liabilities are valued at the amount for which they could be exchanged between knowledgeable willing parties in an arm's length transaction.

The assets of an insurance or reinsurance undertaking consist mainly of the investments that insurers make with the insurance premiums they receive. Typically these investments comprise bonds, equities and real estate, held directly or through investment funds.

The liabilities of an insurance or reinsurance undertaking consist mainly of technical provisions set up for the insurance and reinsurance obligations of the undertaking. Insurance and reinsurance obligations can be of long duration.

The long-term guarantee measures extrapolation, MA, VA, TRFR and TTP relate to the calculation of technical provisions, the first four of them specifically to the risk-free interest rates.

Own funds and capital requirements

Insurance and reinsurance undertakings have to hold own funds that cover their capital requirements. The own funds are based on the difference between assets and liabilities.

There are two capital requirements in Solvency II, the Solvency Capital Requirement (SCR) and the Minimum Capital Requirement (MCR).

The SCR is a risk-based capital requirement. The SCR corresponds to the amount of own funds needed to withstand the worst annual loss expected to occur over the next 200 years. If an insurance or reinsurance undertaking is not complying with the SCR, it has to take measures to meet the SCR again within six months, for example by increasing its capital or by reducing its risk.

The SCR can be calculated with a standard formula that is specified in the law or with an internal model that was approved by the NSA. It is also possible to calculate a part of the SCR with an internal model (partial internal model) and the remaining part with the standard formula.

The SCR standard formula consists of modules for the different risks that an insurance and reinsurance undertaking is exposed to (in particular market risks, underwriting risks, counterparty default risks, operational risks). The risk that relates to the change

of equity prices is captured in the equity risk sub-module of the standard formula. The measures on equity risk relate to the calculation of the equity risk sub-module.

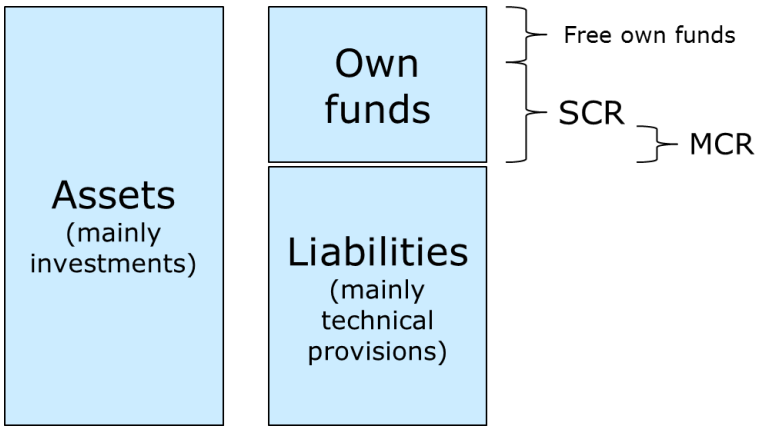
The MCR is usually lower than the SCR. It corresponds to the minimum level of security that is required under Solvency II. An insurance or reinsurance undertaking not complying with the MCR would expose policyholders and beneficiaries to an unacceptable level of risk. If an insurer does not cover the MCR with own funds, its authorisation will be withdrawn unless the MCR is covered again within 3 months.

Other than the SCR, the MCR is calculated in a simple manner. The MCR is usually between 25% and 45% of the SCR.

The existence of two capital requirements establishes a "ladder of supervisory intervention". It allows NSAs and undertakings to take early measures to ensure that the capital requirements are met.

The SCR ratio is the ratio of eligible own funds and SCR. If the SCR ratio is 100% or higher, then the SCR is complied with, otherwise not. The MCR ratio is the ratio of eligible own funds and MCR. If the MCR ratio is 100% or higher, then the MCR is complied with, otherwise not.

The following figure provides a stylised description of the quantitative requirements of Solvency II.



I.5 Overview of the European insurance market

In the EEA insurance market 2,912 insurance and reinsurance undertakings are under supervision according to Solvency II. The table below shows the number of undertakings split by type of undertakings and by the method of SCR calculation (standard formula, partial internal model or full internal model).

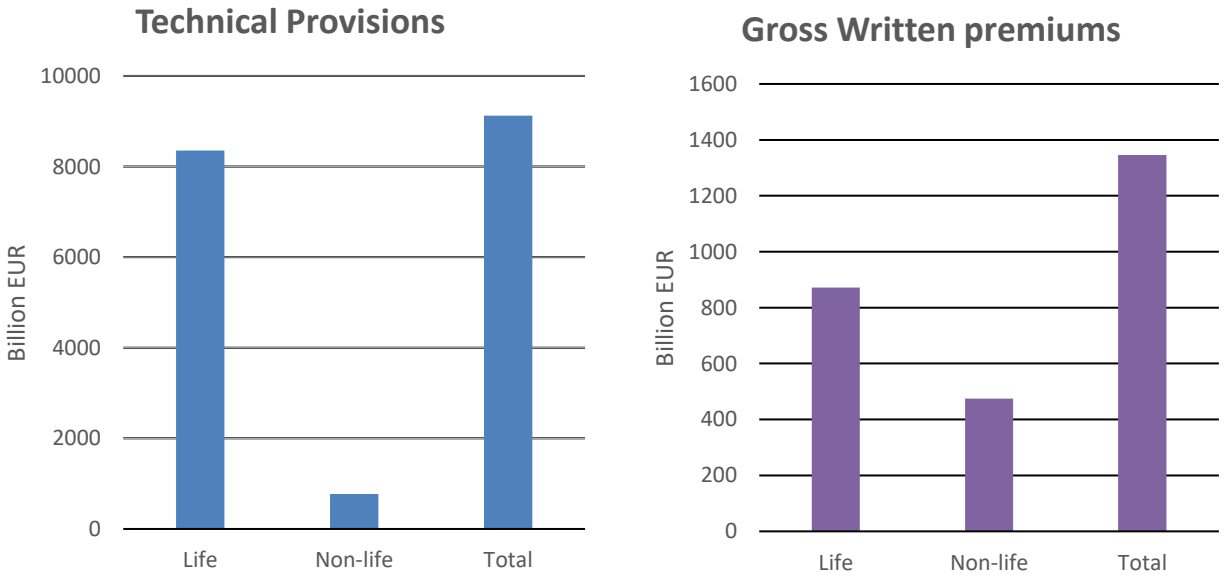
The total number of undertakings decreased by 33 compared with data at 31 December 2016. The number of undertakings using a partial or full internal model has increased somewhat.

Number of undertakings				
	Standard formula	Partial internal model	Full internal model	Total
Life undertakings	546	29	21	596
Non-life undertakings	1541	42	37	1620
Undertakings pursuing both life and non-life activities	365	29	8	402
Reinsurance undertakings	274	5	15	294
Total	2726	105	81	2912

In the EEA insurance market 363 groups are under supervision according to Solvency II. 322 groups use the standard formula, 33 groups use a partial internal model and 8 groups use a full internal model to calculate the SCR.

The following diagram provides an overview of the amount of technical provisions and gross written premiums of all insurance and reinsurance undertakings subject to Solvency II. The amounts are provided separately for life insurance and for non-life insurance obligations. Additional information with respect to the European insurance market is presented in Annex 1 of this report.

Technical provisions and gross written premiums of EEA undertakings



EEA undertakings	Life	Non-life	Total
Technical provisions (billion EUR)	8355	770	9125
Gross written premiums (billion EUR)	871	474	1346

II.1 Use of the measures

Some of the LTG measures and measures on equity risk are applied by insurance and reinsurance undertakings on an optional basis, while the use of other measures is mandatory.

The application of MA, VA, TRFR, TTP and DBER is optional for undertakings, subject to conditions laid down in the Solvency II Directive and Regulations.

All other measures are an integral part of the Solvency II framework and hence of mandatory application. In particular, the extrapolation of risk-free interest rates is applicable to all undertakings for the calculation of their technical provisions. The symmetric adjustment mechanism is applicable to all undertakings that use the standard formula to calculate the equity risk sub-module of the SCR, including all undertaking using a partial internal model not covering that sub-module.

Finally, the extension of the recovery period in exceptional adverse situations is only applicable to undertakings breaching the SCR after a declaration of such a situation by EIOPA. So far, EIOPA has not declared an exceptional adverse situation.

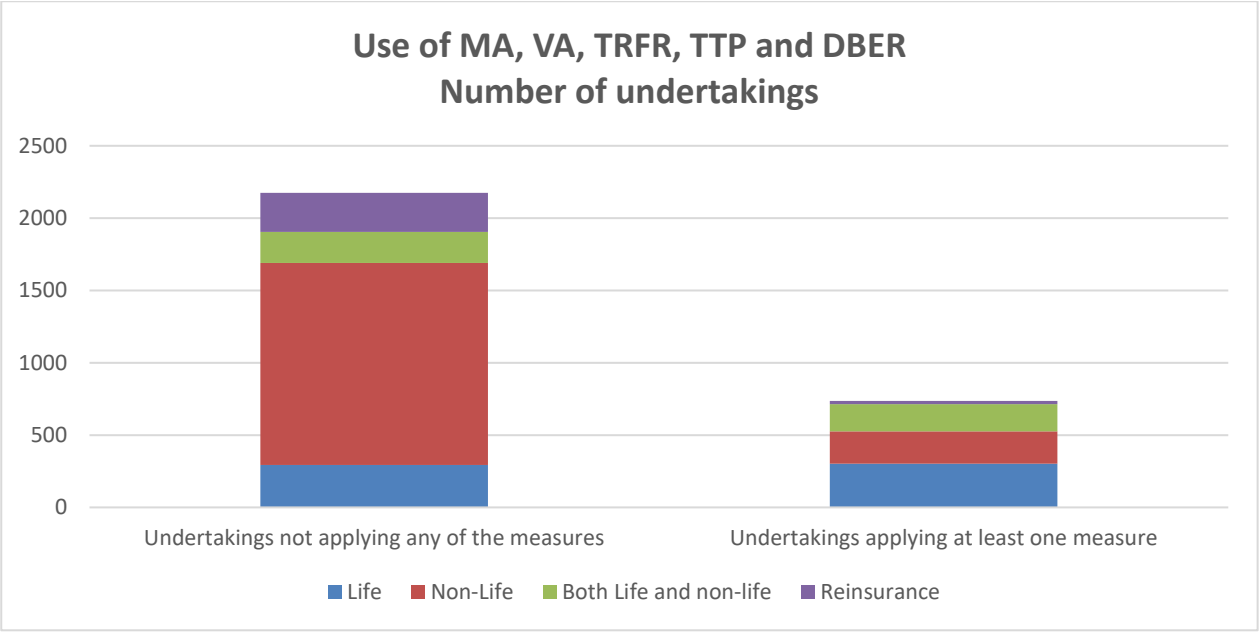
All information on the use of the measures set out in this section relates to the situation as known on 31 December 2017. The graphs and tables are predominantly based on QRT data. For a limited number of tables use has also been made of the information in the NSA questionnaires. This applies to the combination of measures and to the use of the symmetric adjustment on equity risk in case of (partial) internal models.

Use of MA, VA, TRFR, TTP and DBER by solo undertakings

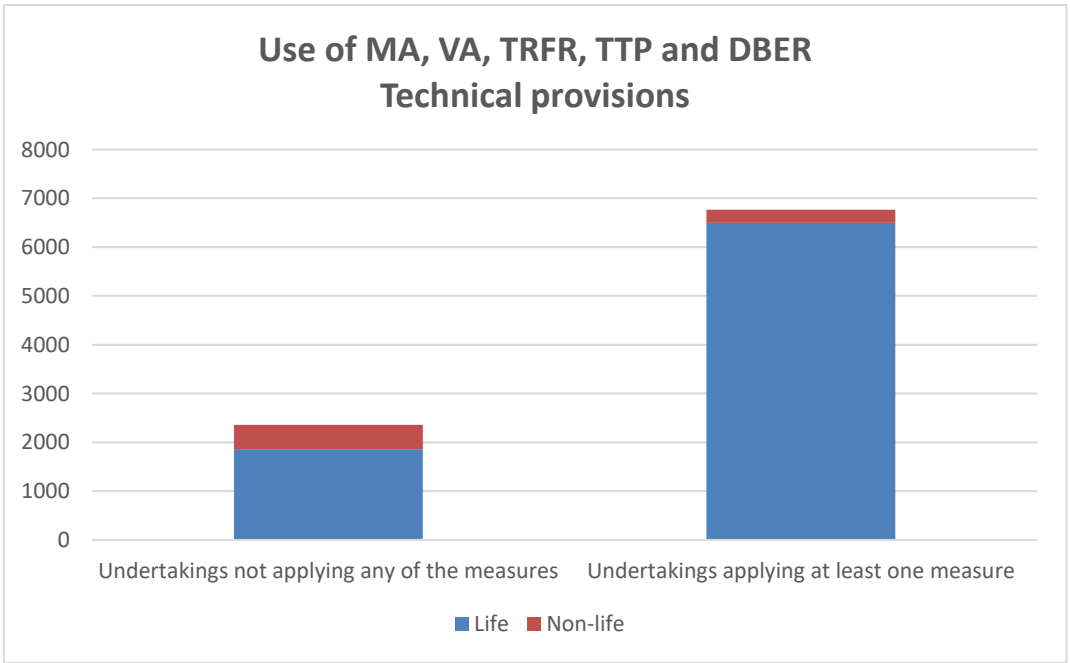
In the EEA, 737 insurance and reinsurance undertakings in 23 countries are using at least one of the optional LTG measures MA, VA, TRFR, TTP or DBER. The aggregated amount of technical provisions for those undertakings is 74% of the technical provisions in the European market.

Out of the total 2912 undertakings, 2175 undertakings, nearly three out of four are not using any of the LTG measures MA, VA, TRFR, TTP or DBER. The use of the measures differs between types of undertaking, as illustrated below. The undertakings not using any measures represent 26% of the technical provisions in the European market. There are 8 countries where none of these measures are applied by any of the national undertakings (EE, HR, IS, LT, LV, MT, PL and SI – please see section III for further detail).

The overall picture of the use of the measures is thus very similar to that of last year.



Number of undertakings			
	Undertakings not applying any of the measures	**Undertakings applying at least one measure**	**Total**
Life	293	303	596
Non-Life	1398	222	1620
Both Life and non-life	213	189	402
Reinsurance	271	23	294
Total	**2175**	**737**	**2912**



Technical provisions in EUR billions		
	Undertakings not applying any of the measures	**Undertakings applying at least one measure**
Life	1857 (22%)	6498 (78%)
Non-life	501 (65%)	269 (35%)
Total	**2358 (26%)**	**6767 (74%)**

696 undertakings located in 23 countries are using the VA. The TTP is used by 162 undertakings in 11 countries. The MA is used by 34 undertakings in Spain and the United Kingdom. The TRFR is used by 7 undertakings in 5 countries. Only 1 undertaking (in France) is using the DBER sub-module.

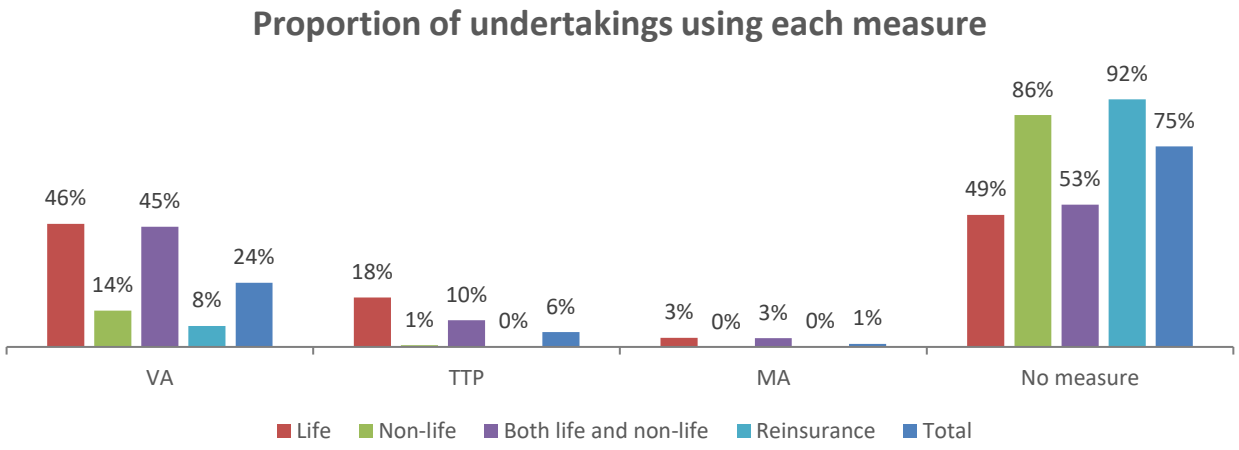
Undertakings may, and sometimes do, use more than one of the measures, as is also illustrated in this table: the total of users per measure and the number of undertakings not using any of the measures exceeds the total number of undertakings. The use of a combination of measures is addressed in more detail in a separate section below.

Number of undertakings using the measures							
Type of undertaking	Total number of undertakings	VA	TTP	MA	TRFR	DBER	No measure
Life	596	273	110	20	4	0	293
Non-life	1620	220	11	0	0	1	1398
Both life and non-life	402	179	40	13	2	0	213
Reinsurance	294	24	1	1	1	0	271
Total	**2912**	**696**	**162**	**34**	**7**	**1**	**2175**

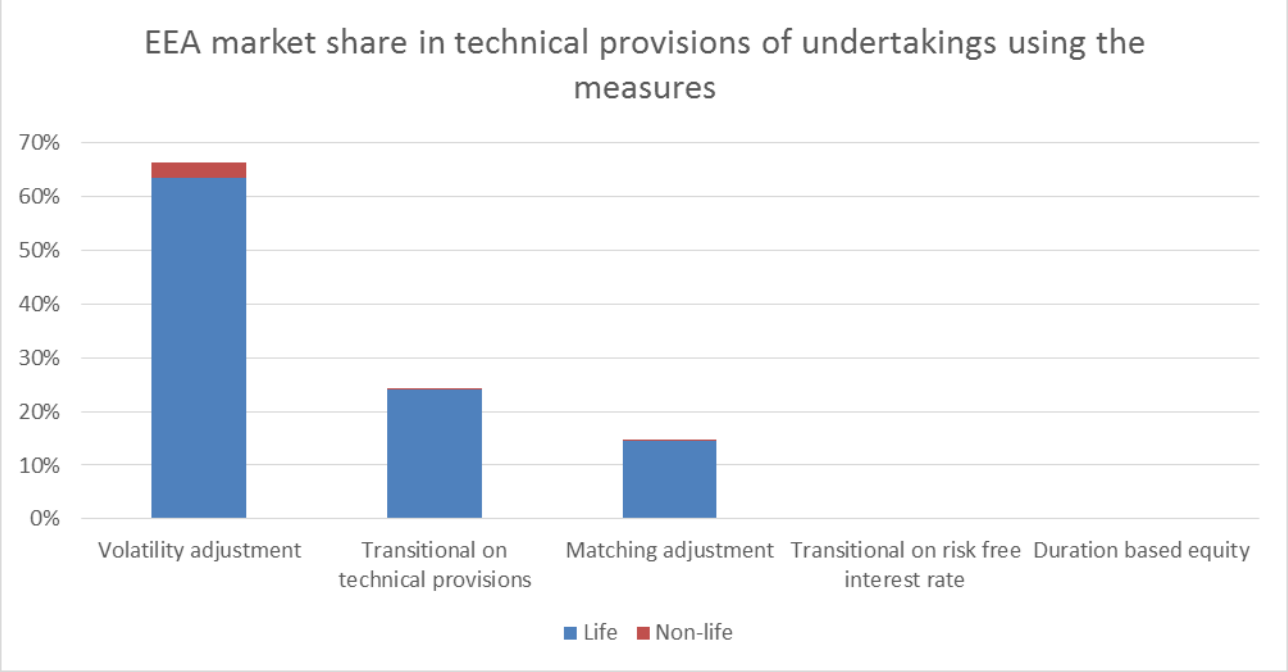
The number of undertakings using the VA decreased by 34 compared with the data as at 31 December 2016. Also, the total number of insurance undertakings as 31 December 2017 decreased compared with the number of insurance undertakings as at 31 December 2016. For the other measures, the number of undertakings using the TTP decreased by 1, the number of undertakings using the MA decreased by 4 and the number of undertakings using the TRFR increased by 1, all compared with the data as at 31 December 2016. The number of undertakings using the DBER did not change.

The following table and diagram provide an overview, by type of undertaking, of the proportion of undertakings using each measure. The table and diagram show that the use of the measures is in particular relevant for life undertakings, as well as for undertakings pursuing both life and non-life activities. Nearly half of all life insurance undertakings in the EEA (46%) are using the VA.

Proportion of undertakings using each measure							
Type of undertaking	Total number of undertakings	VA	TTP	MA	TRFR	DBER	No measure
Life	596	46%	18%	3%	1%	0%	49%
Non-life	1620	14%	1%	0%	0%	0%	86%
Both life and non-life	402	45%	10%	3%	0%	0%	53%
Reinsurance	294	8%	0%	0%	0%	0%	92%
Total	**2912**	**24%**	**6%**	**1%**	**0%**	**0%**	**75%**



The following diagram shows the market share of technical provisions of undertakings using one of the LTG measures. This further illustrates the widespread use of the VA in the European market (with undertakings using the VA holding 66% of all technical provisions in the EEA), followed by the TTP (market share of 24%) and the MA (market share of 15%). These technical provisions, to a very large extent, relate to life insurance obligations.



EEA market share in technical provisions using the measures					
	VA	**TTP**	**MA**	**TRFR**	**DBER**
Life	63%	24%	14%	0%	0%
Non-life	3%	0%	0%	0%	0%
Total	**66%**	**24%**	**15%**	**0%**	**0%**

The overall picture of the use of the LTG measures is thus very similar to that of last year. The measures are most important for life undertakings and undertakings with both life and non-life obligations. Nearly three quarters of the technical provisions in the EEA is calculated using at least one of the measures. This relates nearly exclusively to life obligations. The VA is used most widely, in terms of number of countries, number of undertakings and the amount of technical provisions. The TTP is also quite widely used. The MA is used less, but it is still applied to a substantial part of the technical provisions. The use of the TRFR is limited. However, please note that a measure may nevertheless be of importance in a specific EEA country. Please see chapter III for more detailed information.

Proportion of use of at least one measure			
	Countries	**Undertakings**	**Technical Provisions**
VA	74%	24%	66%
TTP	35%	6%	24%
MA	6%	1%	15%
TRFR	16%	0%	0%

Proportion of use of at least one measure (last year's report)			
	Countries	**Undertakings**	**Technical Provisions**
VA	74%	24%	66%
TTP	35%	6%	25%
MA	6%	1%	15%
TRFR	13%	0%	0%

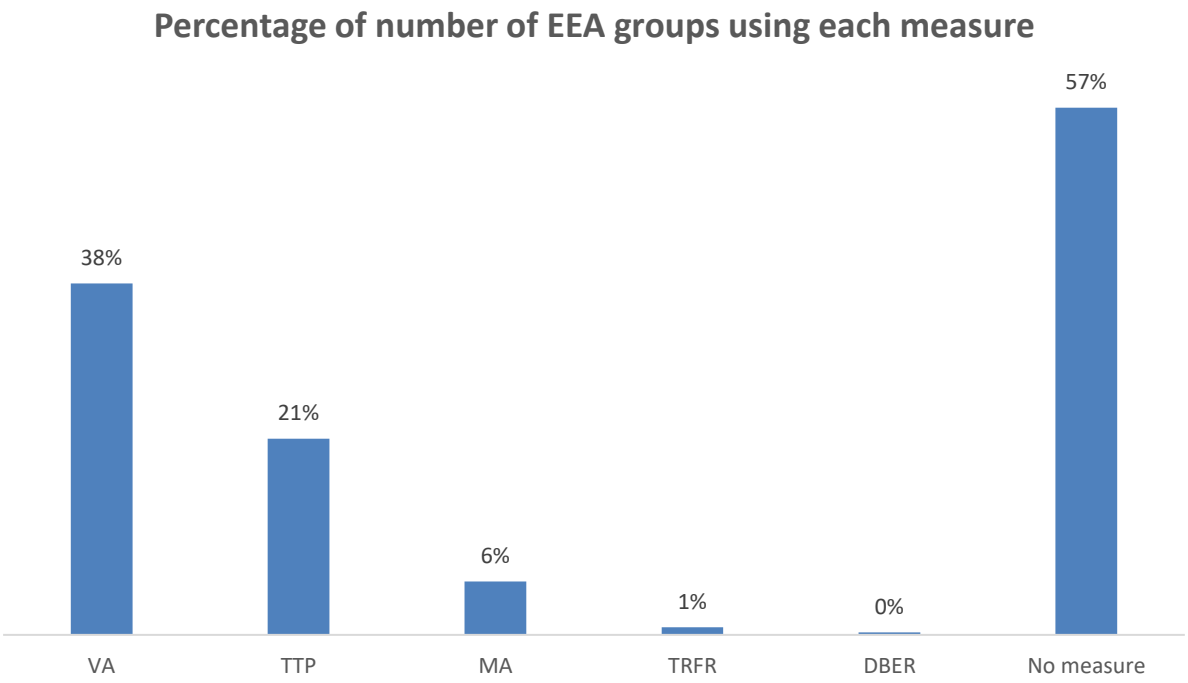
Use of MA, VA, TRFR, TTP and DBER by insurance groups[6]

Of the 363 EEA insurance groups subject to Solvency II, 138 groups use the VA, 77 groups use the TTP and 21 groups use the MA. The TRFR is used by 3, and the DBER by 1 insurance group. Note that, within a group, use can be made of more than one of the measures. This explains why the total of number of groups using the measures

[6] An EEA group using a measure means that at least one solo insurance or reinsurance undertaking part of the group uses the measure.

and the number of groups not using any of the measures, exceeds the total number of groups in the table and graph below.

Number of EEA Solvency II groups using the measures							
	Total Number of EEA groups	VA	TTP	MA	TRFR	DBER	No measure
EEA Groups	363	138	77	21	3	1	207



Use of a combination of the measures MA, VA, TRFR, TTP and DBER

According to the Solvency II Directive it is admissible for an insurance or reinsurance undertaking to apply several measures at the same time. Certain combinations of measures, however, are explicitly excluded:

- Undertakings that apply the TTP cannot apply the TRFR (see Articles 308c(4)(b) and 308d(5)(a) of the Solvency II Directive).
- Undertakings that apply the TRFR cannot apply the MA to the same insurance and reinsurance obligations (see Article 308c(3) of the Solvency II Directive).
- Undertakings that apply the MA to a portfolio of insurance or reinsurance obligations cannot apply the VA to those obligations (see Articles 77b(3) and 77d(5) of the Solvency II Directive).

The following table shows the simultaneous application of two measures with respect to the same liabilities, with the number and market share of undertakings at EEA level applying such combination:

Combination of measures	Number of undertakings	Market share (technical provisions)
Use of TTP and MA	28	13%
Use of TTP and VA	124	17%
Use of TRFR and VA	6	0%

Note that an undertaking may also use other combinations of measures, e.g. it may combine the use of the VA and the MA, but not to the same liabilities.

Use of Symmetric adjustment to the equity risk charge

The symmetric adjustment mechanism applies to the undertakings that use the standard formula to calculate the equity risk sub-module of the SCR, including all undertakings using a partial internal model not covering that submodule.

Type of undertakings	Number of undertakings	Market share (technical provisions)
Standard formula	2726	60%
Partial internal model not covering equity risk	40	3%
Total	**2766**	**63%**

II.2 Impact on the financial position of undertakings

Background on the impact of the measures MA, VA, TRFR and TTP

The LTG measures MA, VA, TRFR and TTP relate to the calculation of technical provisions. But the impact of these measures on the financial position of insurance and reinsurance undertakings is not restricted to a change in the amount of technical provisions. The change in technical provisions itself can also have an impact on other items of the balance sheet and on the capital requirements and own funds.

This section contains an explanation of how these LTG measures impact the financial position of insurance and reinsurance undertakings. The description is based on the typical effects and may not be applicable to all undertakings.

Impact on technical provisions

Removing MA, VA and TRFR usually decrease the relevant risk-free interest rates used to calculate the technical provisions[7] and consequently in most cases increase the technical provisions by means of higher discounting effects[8]. Apart from the discounting effect the measures may also impact some assumptions made in the calculation of technical provisions, for example about the amount of future discretionary benefits of insurance with profit participation.

The TTP directly impacts the amount of technical provisions. Removing it typically increases the amount of technical provisions.

Impact on assets and liabilities other than technical provisions

Where removing the measures increase the amount of technical provisions this increase in liabilities may often be accompanied by a decrease of net deferred tax liabilities.

Impact on SCR and MCR

The measures can impact parts of the SCR and MCR calculation in different directions. Some parts may not at all be affected by the use of the measures, for others an increase or a decrease of the capital requirements can occur. An increase of the capital requirement after removing the measures may in particular happen where the technical provisions are used as measure for the size of risk that the capital requirements aim to capture. The capital requirements may also be increased through a higher loss-absorbing capacity of technical provisions where the removal of the measures decreased the amount of future discretionary benefits in technical provisions. A similar effect is the increase of the capital requirements through a higher loss-absorbing capacity of deferred taxes where deferred taxes are decreased by the removal of the measures.

Typically removing the measures will increase SCR and MCR[9].

Impact on own funds

The increase in technical provisions leads to a decrease of own funds. A slight relative increase of technical provisions may lead to a significant relative reduction of own funds, in particular for life insurance undertakings. For a typical life insurance undertaking the ratio of own funds and technical provisions is 1/10. Therefore an increase of technical provisions by 1% would lead to a reduction of own funds of 10%. This comparison is only based on the direct impact of changes in technical provisions

[7] Removing MA, VA and TRFR will in most instances reduce the relevant risk-free term structures. However, under certain circumstances, the adjustments can turn negative. In that situation, removing the adjustment would increase the relevant risk-free interest rates.

[8] It is possible under Solvency II that the part of technical provisions to which the measures are applied is negative (for example when the value of expected insurance premiums exceeds the value of expected insurance payments). In that specific case, lower discount rates result in lower technical provisions.

[9] It should be noted that removing the MA can decrease the SCR due to the gain of the diversification effect between portfolios. This is developed in the MA section of this report.

on the amount of own funds. The impact may be mitigated by indirect effects, for example a reduction in deferred tax liabilities.

Also the changes to the SCR and MCR caused by the removal of the measures can have an impact on the eligible own funds to cover these capital requirements because there are limits to these own funds that depend on the capital requirements.

Typically removing the measures will reduce the amount of own funds.

Summary of the impacts on the financial position

The following table summarises the typical impact on different items of the financial position. The arrows are upward (resp. downward) if it is more likely than unlikely that the items concerned will increase (resp. decrease) when the measures are removed.

Items	Typical impact of removing MA, VA, TRFR and TTP
Technical provisions	↗
Net deferred tax liabilities	↘
Eligible own funds	↘
SCR and MCR	↗
Loss-absorbing capacity of future discretionary benefits and deferred tax liabilities	↘

Data availability and reliability for assessing the impact of the measures in 2018

Two approaches were used to collect the necessary data in order to produce this report.

EIOPA has collected information about the impact of the measures MA, VA, TRFR and TTP on 31 December 2017 through the dedicated Quantitative Reporting Templates that were sent to NSAs in 2018. The information collected allows a consistent analysis of the impact of these four measures. For the SA, whose impact is not directly reported by undertakings, an analysis has been made based on data extracted from the Quantitative Reporting Templates.

As regards to extrapolation, information was collected through an information request. The scope of the request was restricted to life and composite undertakings exceeding thresholds on cash-flows. Therefore the information available to EIOPA about the impact of extrapolation on the financial position of undertakings is limited but considered as representative for those undertakings whose solvency situation is significantly impacted by the measures.

Concerning the DBER, at 31 December 2017 only 1 insurance undertaking was using this measure. For this reason, the remainder of this section deals only with

extrapolation, MA, VA, TRFR and TTP. The presented results relate to the reference date of 31 December 2017.

Finally, the ERP has by definition no direct impact on the financial position of undertakings.

Impact of the measures MA, VA, TRFR and TTP

The absolute impact of the measures MA, VA, TRFR and TTP on the whole EEA market is set out in the following tables for all the solo undertakings and all the groups separately. For the whole market (groups and solos) removing the measures would increase the amount of technical provisions by 176 billion euro. Eligible own funds to cover the SCR would reduce by 127 billion euro. The SCR would increase by 64 billion euro.

In comparison with last year, the impacts of removing the measures have decreased. This is the case for all the measures but it is particularly true for the VA which is the main contributor to the reduction observed. It should be noted that at 31 December 2017 the VA was 4 bps whereas it was 13 bps at 31 December 2016.

Aggregation of the impact on all the insurance and reinsurance undertakings

	Amount with MA, VA, TRFR and TTP (billion euro)	Impact of removing the measures (billion euro)					Amount without MA, VA, TRFR, and TTP (billion euro)
		Impact of TTP	Impact of TRFR	Impact of VA	Impact of MA	Impact of all measures	
Technical provisions	9 125	119	1	13	43	176	9 301
Basic own Funds	1 601	-83	-1	-7	-35	-127	1 475
Excess of assets over liabilities	1 554	-91	-1	-8	-36	-137	1 417
Restricted own funds due to ring-fencing and matching portfolio	19	-6	0	-1	-2	-9	10
Eligible own funds to cover the SCR	1 614	-84	-1	-5	-36	-126	1 488
Tier 1	1 510	-86	-1	-7	-36	-130	1 380
Tier 2	96	1	0	1	-1	1	97
Tier 3	8	1	0	1	1	3	11
SCR	675	6	0	24	34	64	739
Eligible own funds to cover the MCR	1 530	-86	-1	-7	-36	-129	1 401
MCR	236	2	0	6	8	16	253

Aggregation of the impact on all groups

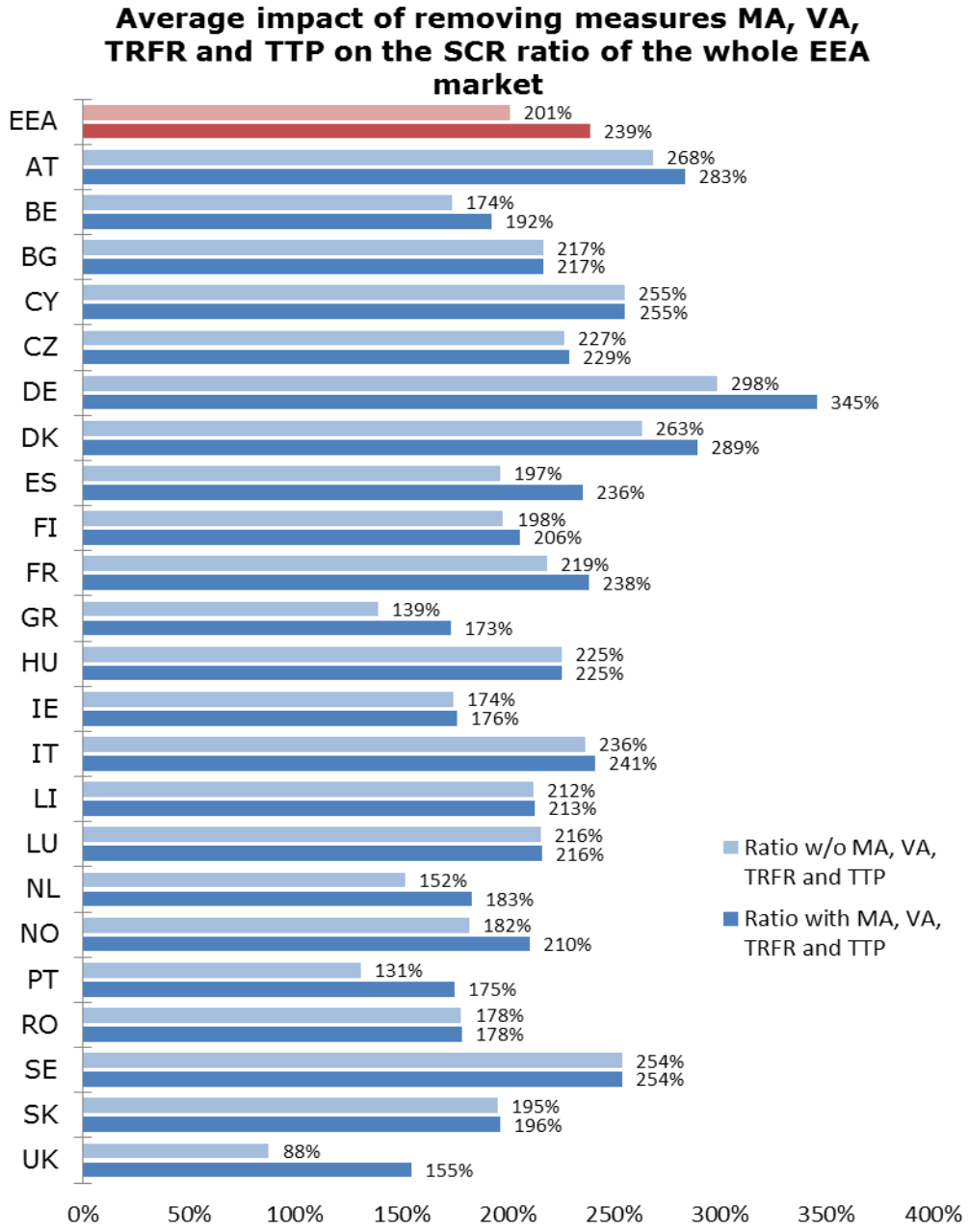
	Amount with MA, VA, TRFR and TTP (billion euro)	Impact of the measures (billion euro)					Amount without MA, VA, TRFR, and TTP (billion euro)
		Impact of TTP	Impact of TRFR	Impact of VA	Impact of MA	Impact of all measures	
Technical provisions	7 767	97	0	13	43	154	7 921
Basic own Funds	931	-69	0	-4	-36	-108	823
Excess of assets over liabilities	972	-72	0	-6	-37	-115	857
Restricted own funds due to ring-fencing and matching portfolio	13	-2	0	8	-2	4	17
Eligible own funds to cover the SCR	1 024	-69	0	-2	-37	-108	916
Tier 1	906	-70	0	-3	-38	-111	795
Tier 2	109	0	0	0	0	0	109
Tier 3	9	1	0	1	1	3	12
SCR	499	5	0	27	35	68	567

The following graph displays the overall impact of the use of the measures MA, VA, TRFR and TTP on the SCR ratio for the whole EEA market (including both undertakings using and not using the measures). The impact is shown at EEA and at country level. The graph shows the SCR ratio with (dark blue) and without (light blue) these measures. No results at country level are shown for EE, HR, IS, LT, LV, PL and SI because the undertakings from these countries do not apply any of the measures (MA, VA, TRFR and TTP).

At the EEA level, removing the measures would result on average[10] in a decrease of the SCR ratio by 38 percentage points. The largest impact at a country level is 67 percentage points. For one country the average solvency ratios without the use of the measures is below 100%. Throughout this report average ratios are weighted averages, where the denominator of the ratios was used as weights. For example, in the following graph, the average EEA SCR ratio with the measures of 239% is

[10] Figures at the EEA level are derived through the sum of eligible own funds and SCR of every country, including the ones where no measures are used.

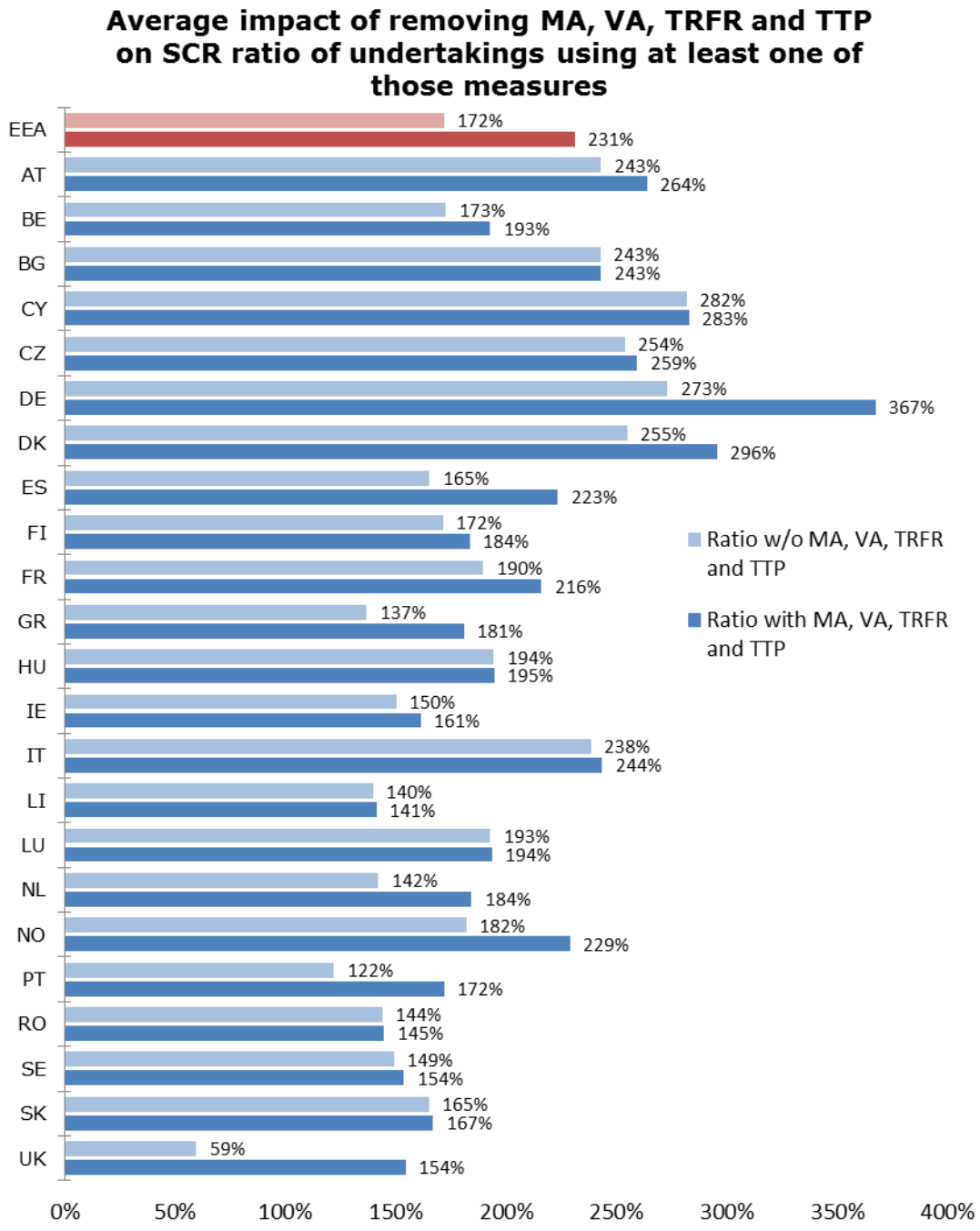
computed as : $\sum_{undertakings\ EEA} \frac{SCR_i}{\sum_{undertakings\ EEA} SCR_i} * \frac{EoF\ SCR_i}{SCR_i}$ where SCR and eligible of own funds to cover the SCR (EoF SCR) take into account the measures at undertaking level and where the sums include all undertakings in the EEA using at least one measure.

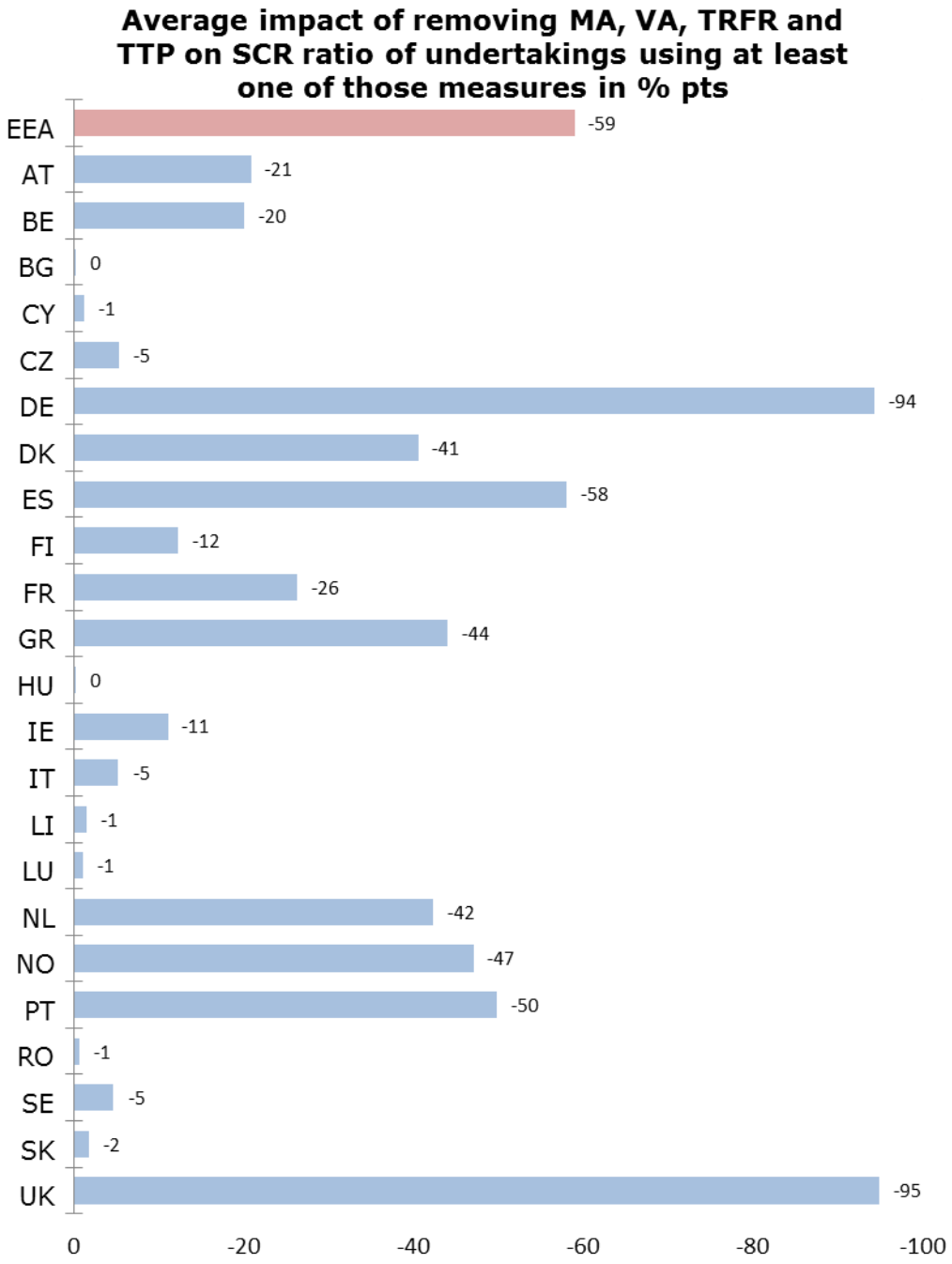


The following graphs display the overall impact of the use of the measures MA, VA, TRFR and TTP on the SCR ratio for undertakings that apply at least one of the measures. The impact is shown at EEA and at country level. The first graphs shows the SCR ratio with (dark blue) and without (light blue) these measures. The red bars are for the EEA level. The second graph shows the impact in percentage points.

At the EEA level, removing the measures result on average in a decrease of the SCR ratio by 59 percentage points. The largest impact at a country level is 95 percentage points. For one country the average solvency ratio without the use of the measures is

below 100%. In comparison with last year, average impacts on SCR ratio decreased for all countries.

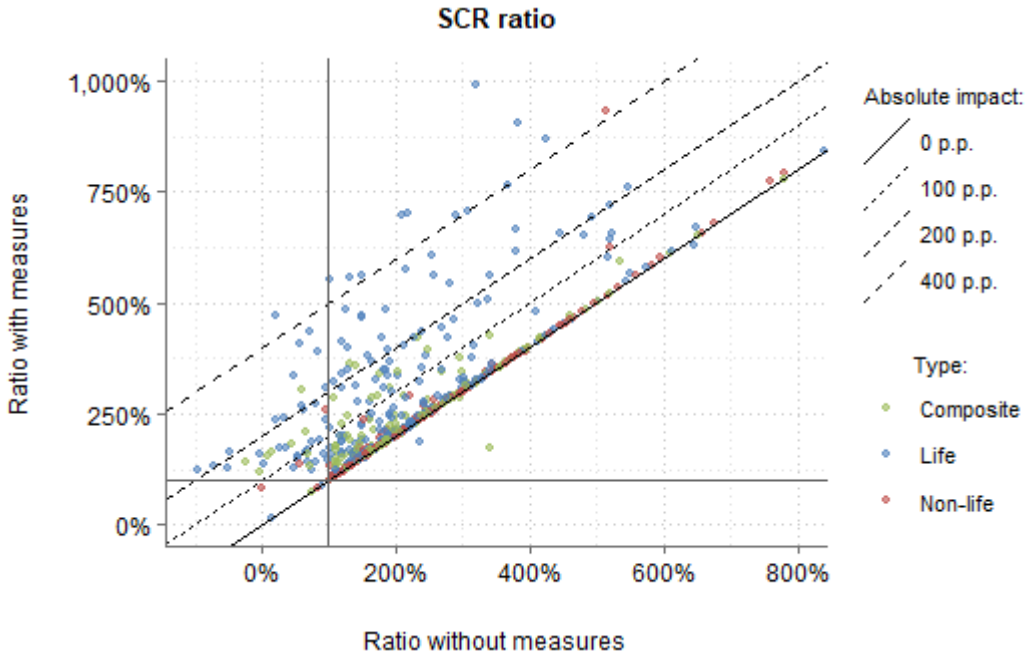




The following graphs display the impact of removing the measures MA, VA, TRFR and TTP on the SCR ratio of every undertaking using at least one of those measures. Each dot in the diagram represents one undertaking. The type of each undertaking is indicated by the colour of the dot.

The horizontal axis relates to the SCR ratio without the measures MA, VA, TRFR and TTP. The solvency ratios allowing for the impact of all measures (current SCR ratio) are shown on the vertical axis. The SCR ratio of 100% that undertakings are required to have under Solvency II is indicated by an additional vertical and horizontal line. The continuous diagonal line corresponds to undertakings without an impact of the measures. Undertakings located on this line have the same SCR ratios with and without measures. The more an undertaking is located away from the diagonal

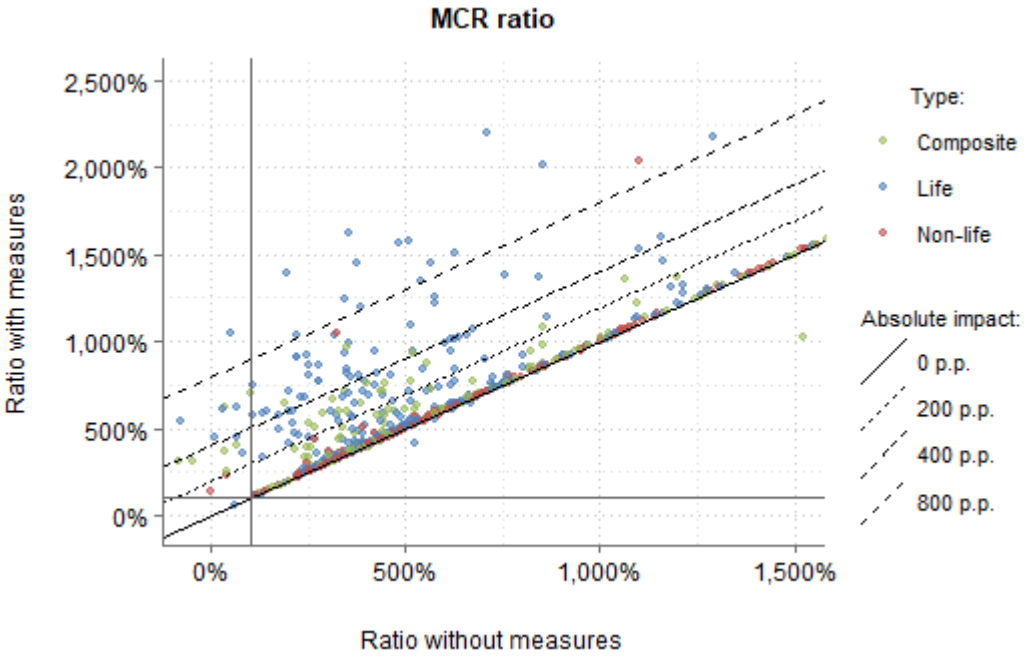
line, the bigger the impact of the measures. The broken diagonal lines corresponds to an impact of 100, 200 and 400 percentage points on the SCR ratio.



In terms of SCR ratio, 80% of undertakings using at least one measure reported an absolute impact between 0 and 100 percentage points.

7% of the undertakings using at least one measure reported an SCR ratio without measures below 100% (51 undertakings, with 13% of the total technical provisions in the EEA). 1% of undertakings using at least one measure reported negative eligible own funds to cover the SCR without measures (7 undertakings, with 1% of the total technical provisions in the EEA).

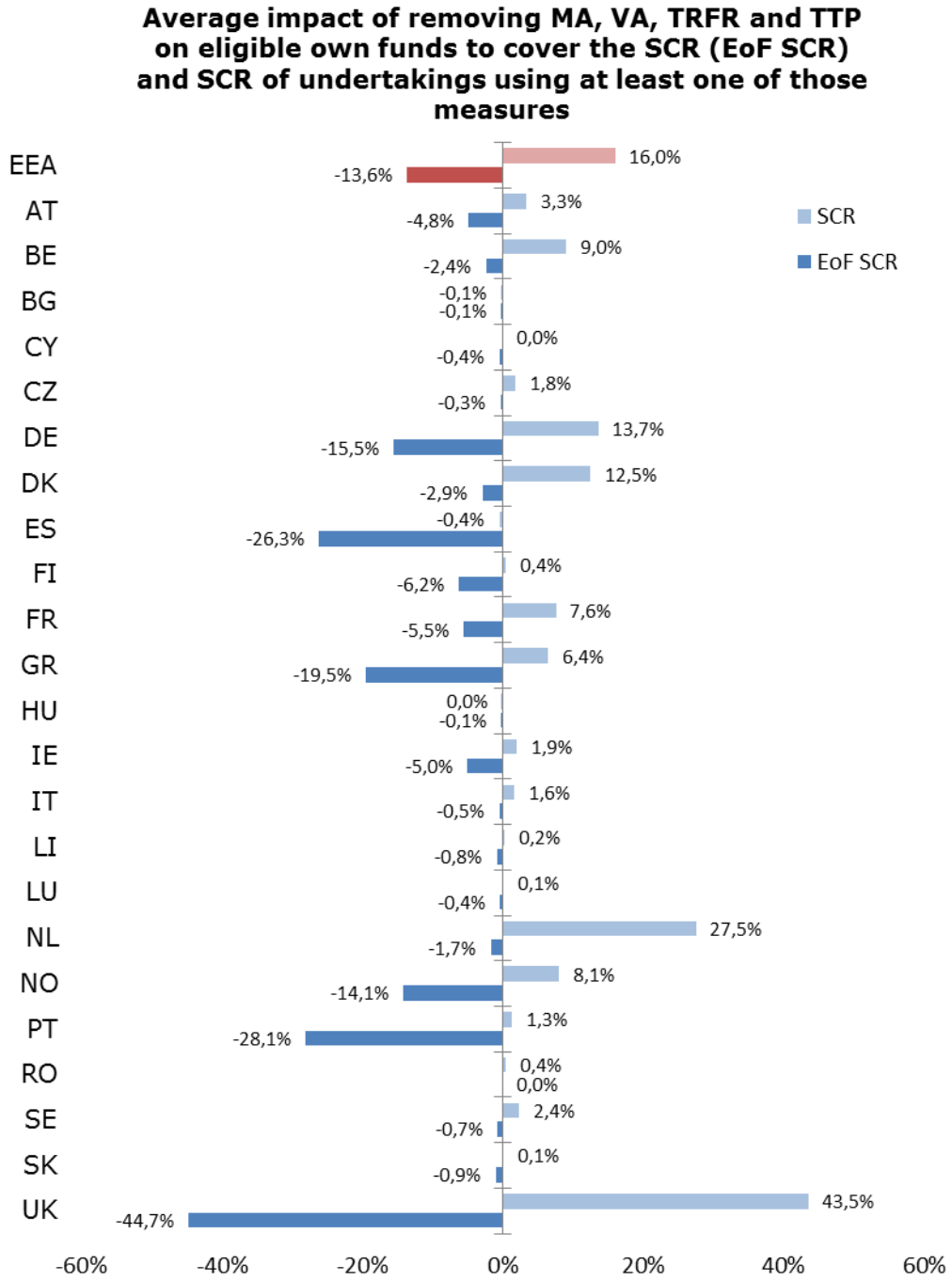
The following graphs display the impact of removing the measures MA, VA, TRFR and TTP on the MCR ratio of every undertaking using at least one of those measures.



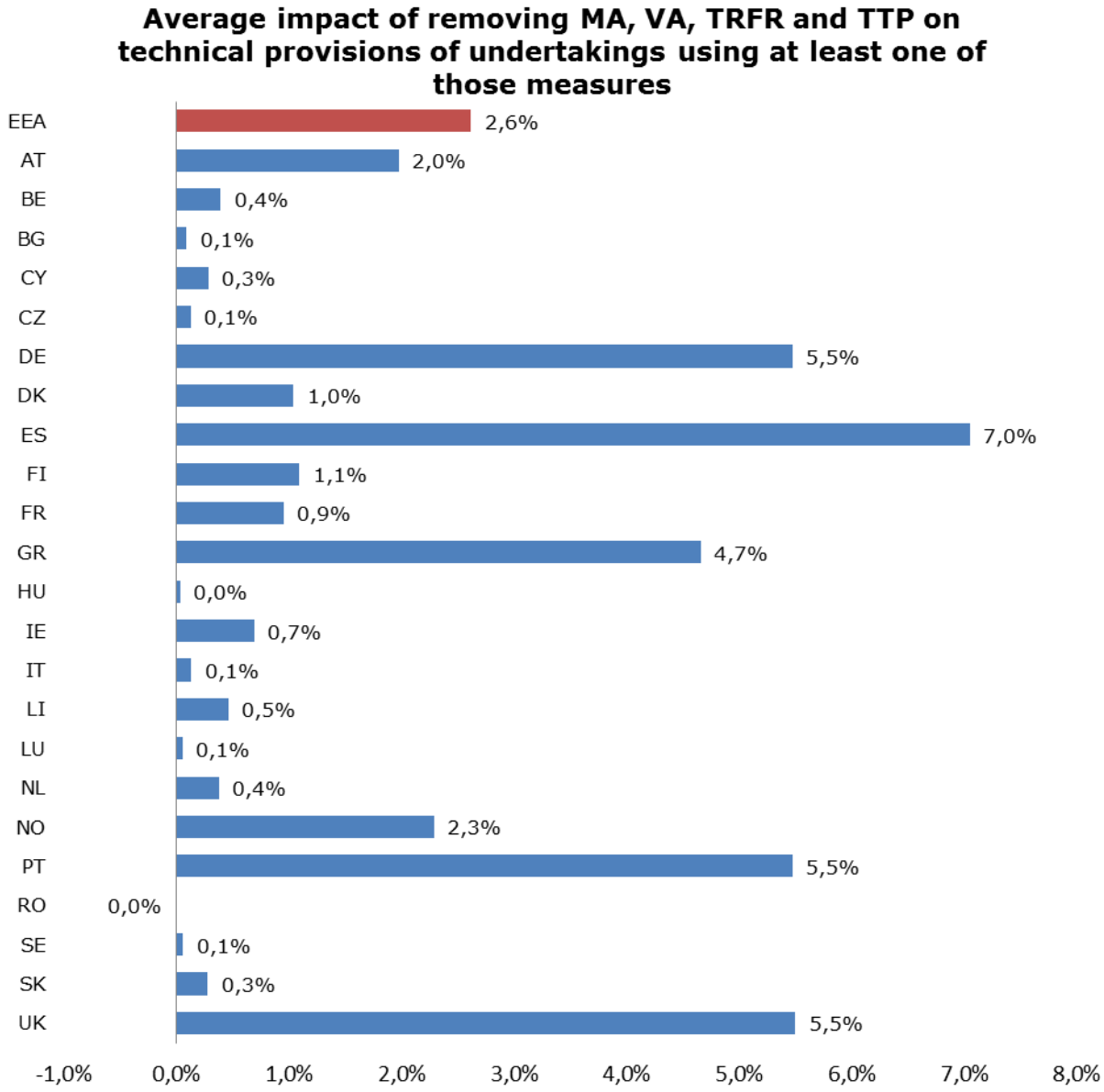
In terms of MCR ratio, 71% of undertakings using at least one measure reported an absolute impact between 0 and 100 percentage points.

3% of undertakings using at least one measure reported an MCR ratio without measures below 100% (25 undertakings, with 4% of the total technical provisions in the EEA). 1% of undertakings using at least one measure reported negative eligible own funds to cover the MCR without measures (7 undertakings, with 1% of the total technical provisions in the EEA).

The following graph shows the impact of removing the measures on the SCR (light blue) and on the eligible own funds to cover the SCR (dark blue). The red bars are for the EEA level. On average, eligible own funds to cover the SCR would decrease by 14%, while the SCR would increase by 16% if the measures were removed.



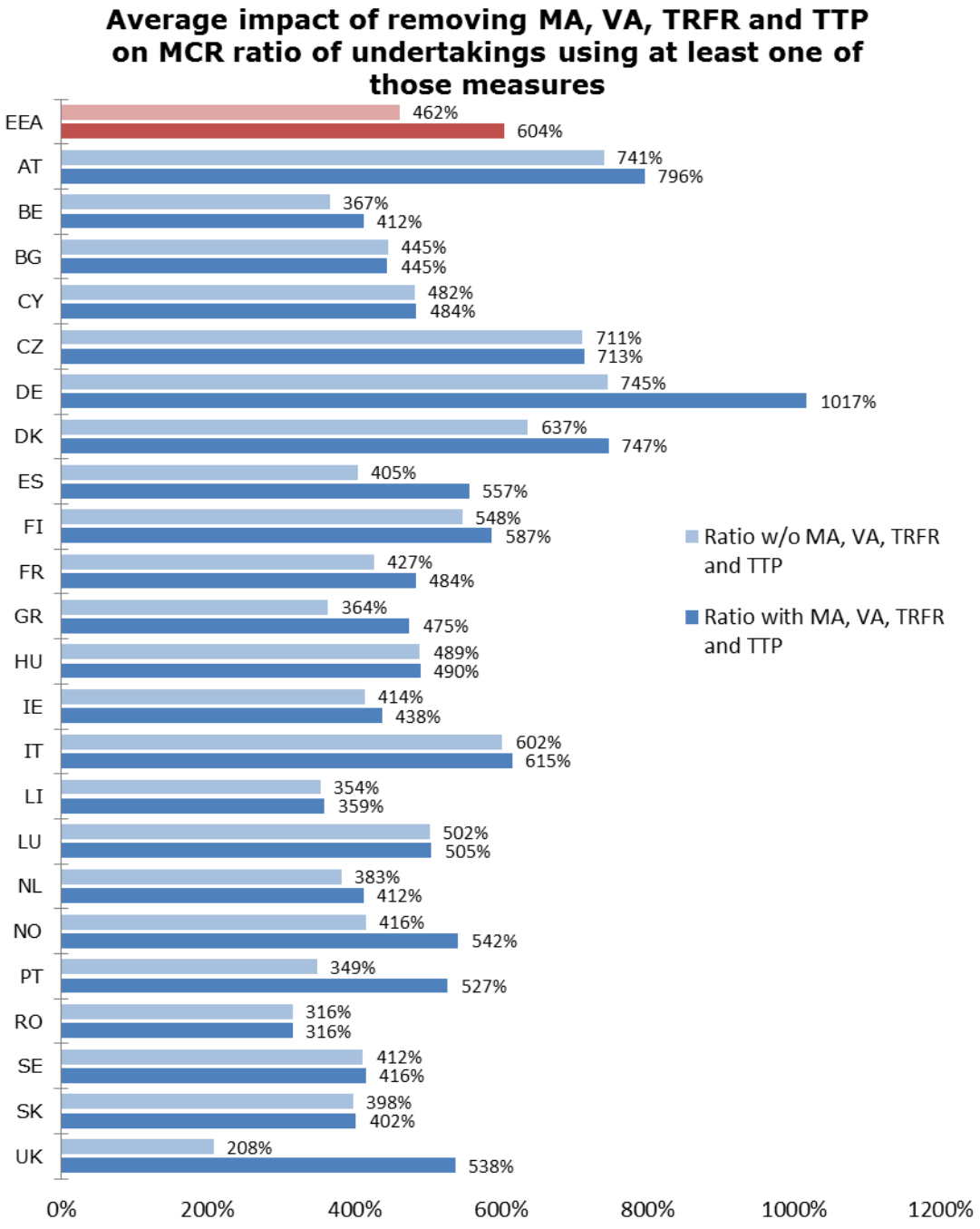
The following graph displays the impact of removing the measures on the value of technical provisions (TP) at EEA and national level. Removing the measures for those undertakings applying the measure would result in an average increase of technical provisions by 2.6% at EEA level. The impact goes up to 7% at country level. Concerning the impact in Romania, it is negative because as at year end 2017, the volatility adjustment for the Romanian leu was negative at -1 bp. Overall, in comparison with last year, average impacts on TP have decreased.

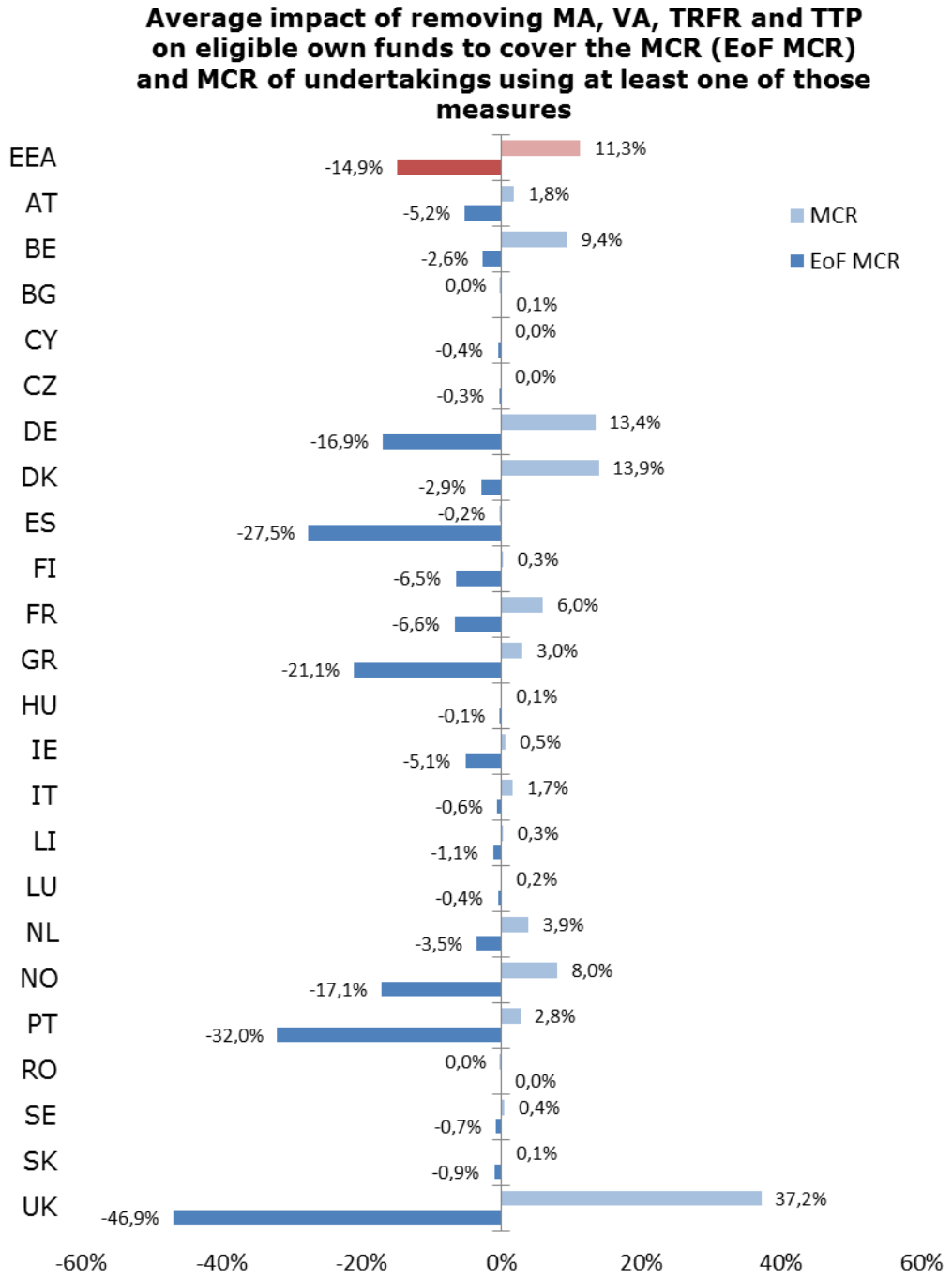


The following graphs show the impact on the MCR ratio, the MCR and the eligible own funds to cover the MCR for undertakings using at least one of the measures.

At the EEA level, removing the measures to these undertakings would result in an average loss of 142 percentage points with regard to the MCR ratio. The impact goes up to 330 points at country level.

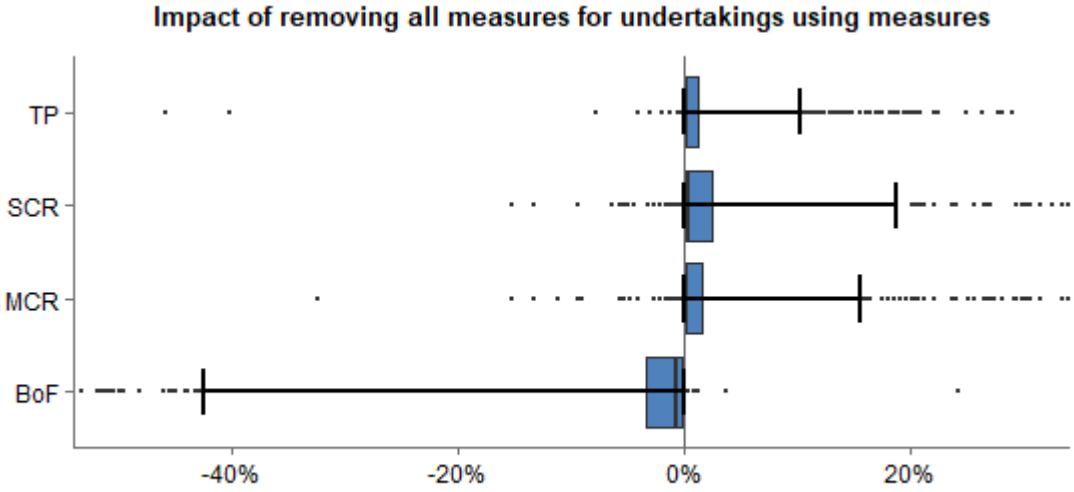
At EEA level, removing the measures decreases eligible own funds to cover the MCR 15%, while the MCR increases by 11%.


Average impact of removing MA, VA, TRFR and TTP on MCR ratio of undertakings using at least one of those measures
EEA 462% 604%
AT 741% 796%
BE 367% 412%
BG 445% 445%
CY 482% 484%
CZ 711% 713%
DE 745% 1017%
DK 637% 747%
ES 405% 557%
FI 548% 587%
FR 427% 484%
GR 364% 475%
HU 489% 490%
IE 414% 438%
IT 602% 615%
LI 354% 359%
LU 502% 505%
NL 383% 412%
NO 416% 542%
PT 349% 527%
RO 316% 316%
SE 412% 416%
SK 398% 402%
UK 208% 538%
0% 200% 400% 600% 800% 1000% 1200%
Ratio w/o MA, VA, TRFR and TTP
Ratio with MA, VA, TRFR and TTP



The box-plots bellow illustrate how the impact of removing the measures MA, VA, TTP and TRFR is distributed across undertakings. For example, in case the removal of the measures for an individual undertaking would lead to a decrease of basic own funds (BoF) from 100 to 35 units, the relative decrease of -65% is reflected in the box-plot. The bottom of the blue box represents the lower quartile (25th percentile) of the data set. The top of the blue box represents the higher quartile (75th percentile) of the data set. The black band inside the box is always the middle quartile (50th percentile or median). The end of the lines extending from the boxes represent the 10th and 90th percentiles, respectively. For example, with regard to the impact on BoF, in about 90% of cases, the removal of the measures would result in a decrease of BoF. In 75% of cases, the removal would lead to a decrease by at least 0.1%. In 50% of cases, the

removal would lead to a decrease by at least 0.7%. In 25% of cases, the removal of the measures would result in a decrease of BoF by at least 3.4%. Outliers (i.e. cases where the observed impact is higher than the 90th percentile, or lower than the 10th percentile) are plotted as individual points. We can observe that, in general, all relevant variables show skewed distributions and a significant number of outliers. In comparison with last year, the distribution of all variables are less dispersed.



Impact and relevance of extrapolation

As market information is only available for a limited amount of years, the risk-free interest rate term structure for the purpose of the valuation of technical provisions needs both, an interpolation between available maturities as well as an extrapolation beyond the existing maturities.

As insurance liabilities can be very long-term, the valuation of the technical provisions requires assumptions about interest rates for these maturities to arrive at a present value of insurance liabilities. Thus, the extrapolation of the risk-free interest rate term structure is a mandatory measure which cannot simply be switched off to quantify its impact on the size of technical provisions, own funds and SCR for undertakings.

It is however possible to vary key parameters of the extrapolation mechanism to assess the relevance of it. The extrapolation of the risk-free curve is performed via the Smith-Wilson approach, key input parameters are the starting point of the extrapolation (the so called last liquid point, LLP), the level of the ultimate forward rate (UFR) to which the interest rates are extrapolated to and the convergence speed.

For this years' LTG report, as for last year's report, an information request to undertakings was put forth including scenario calculations varying the UFR, the LLP and the convergence speed.

According to recital 30 of the Directive 2014/51/EU (the Omnibus II directive), the extrapolation should avoid artificial volatility of technical provisions and eligible own funds and provide an incentive for good risk management. The scenarios included in the request to undertakings intend to influence the stability of the long-term rates by increasing the influence of the observed market rates on those rates (LLP, convergence point) and move the UFR closer to the level of observed market rates.

The LLP for the euro is currently 20 years, in particular based on the explicit mentioning of that maturity in recital 30 of the Omnibus II Directive. The first scenario moves the current LLP for the euro to 30 years, which is the highest liquid maturity in the euro swap market according to the 2017 DLT assessment. The scenario is restricted to the euro because for all other currencies no DLT market information is available beyond the LLP.

The convergence point, being the maturity at which the forward rate has reached the UFR up to an immaterial amount, is currently calculated as the larger of 60 years and LLP+40 years. The second scenario increases the convergence point to the larger of 90 years and LLP+40 years. For the Swedish krona, where the convergence point is currently 20 years, a corresponding increase by 30 years to 50 years is applied.

Regarding the UFR a decrease by 100 basis points is analysed. The scenario is identical to last year's scenario.

To minimize the burden to the insurance industry for the purpose of the data request, only life, composite undertakings with liability cash-flows beyond the LLP of at least 10% of the overall undiscounted liability cash-flows were preselected to participate to the exercise.

The preselected undertakings were asked to calculate the impact of the following three scenarios on the financial position of the undertaking:

- Scenario 1: Increase of the LLP for the euro from 20 to 30 years. For currencies other than the euro the risk-free interest rates are unchanged.
- Scenario 2: Increase of the minimum convergence point from 60 to 90 years for all currencies except the Swedish krona. For the Swedish krona the convergence point changes from 20 years to 50 years
- Scenario 3: Decrease of the UFR for all currencies by 100 basis points

The analysis performed on the extrapolation and outlined in the following is based on the information received by undertakings via the information request. The analysis includes only the information for the preselected undertakings who have provided information on the individual scenarios.

The data sample for the analysis on the extrapolation is thus different to the analysis performed for the other LTG measures, which cover the whole market.

Information on the data sample

The following table summarizes the composition of the data sample on the extrapolation by type of undertaking. It reflects the number of preselected undertakings which were included in the analysis and the corresponding technical provisions for those undertakings:

	Number of undertakings		
Type of undertakings	**Preselected**	**Total**	**% of total**
Life	**225**	**596**	**38%**
Composite	**139**	**402**	**35%**
Total	**364**	**998**	**36%**

	Preselected	Total**	% of total
Technical provisions*	**4.686**	**8.094**	**58%**

**in billions euro*
***life and composite*

Country	Preselected	Life	Composite
EEA	364	62%	38%
AT	21	29%	71%
BE	23	30%	70%
BG	3	0%	100%
CY	0	0%	0%
CZ	11	0%	100%
DE	82	100%	0%
DK	7	43%	57%
EE	2	0%	100%
ES	20	30%	70%
FI	9	78%	22%
FR	35	51%	49%
GR	6	33%	67%
HR	12	25%	75%
HU	7	29%	71%
IC	0	0%	0%
IE	8	100%	0%
IT	19	47%	53%
LI	3	67%	33%
LT	3	67%	33%
LU	17	94%	6%
LV	0	0%	0%
MT	0	0%	0%
NL	22	100%	0%
NO	8	63%	38%
PL	13	100%	0%
PT	3	67%	33%
RO	7	43%	57%
SE	8	38%	63%
SI	6	0%	100%
SK	6	17%	83%
UK	3	100%	0%

Impact of the extrapolation

Information on the impact of the specified scenarios on the financial position by country is outlined in section III.1. Results by country are only provided for those countries where the calculation included more than three undertakings.

The following table outlines the absolute impact of the three specified scenarios based on the sample of 363 undertakings. For the whole sample considered, the scenarios impact the amount of technical provisions by 36, 9 and 21 billion euro. For scenario 1 the eligible own funds to cover the SCR decrease by 28 billion euro and the SCR increases by 12,5 billion euro. Scenario 1 is also the scenario with the highest impact for the whole sample, followed by scenario 3 and scenario 2.

	Amount* Base case	Impact Scenario 1	Impact Scenario 2	Impact Scenario 3
Technical provision	**4686**	**35,9**	**8,7**	**20,5**

Eligible own funds to cover the SCR	**556**	**-28,3**	**-6,9**	**-16,2**
SCR	**233**	**12,5**	**2,5**	**5,8**
Eligible own funds to cover the MCR	**522**	**-28,9**	**-7,1**	**-16,5**
MCR	**89**	**4,4**	**0,9**	**2,3**

*Amount with VA, MA and measures on equity risk and equity transitional (billion euro)

- *Scenario 1: Increase of the LLP for the euro from 20 to 30 years. For currencies other than the euro the risk-free interest rates are unchanged.*
- *Scenario 2: Increase of the minimum convergence point from 60 to 90 years for all currencies except the Swedish krona.13 For the Swedish krona the convergence point changes from 20 years to 50 years*
- *Scenario 3: Decrease of the UFR for all currencies by 100 basis points*

The increase in technical provisions in the different scenarios do not correspond to the change in eligible own funds to cover MCR and SCR. Reasons for that, among others, may be:

- *Deferred taxes:* increases in technical provisions may also increase DTA or decrease DTL corresponding to those technical provisions; decreasing DTL contribute positively to the eligible own funds, while DTA may also contribute to the eligible own funds as long as tier 3 eligibility allows for that.
- *Eligibility criteria:* the increases in MCR and SCR allow for a larger part of capital instruments to become eligible as own funds; an excess of own funds above the eligibility criteria for tier 1, tier 2 and tier 3 may become eligible when the MCR and SCR increases.

Compared to the LTG 2017 report with numbers as at 31 December 2016 the relative impact differs for the following reasons, among others:

- *Change in interest rates:* The interest rate term structure per year-end 2016 was below that of year-end 2017. The lower the interest rate term structure the larger the impact of the parametrization of the extrapolation. Changes in this report therefore may be relatively lower than in the LTG 2017 report.

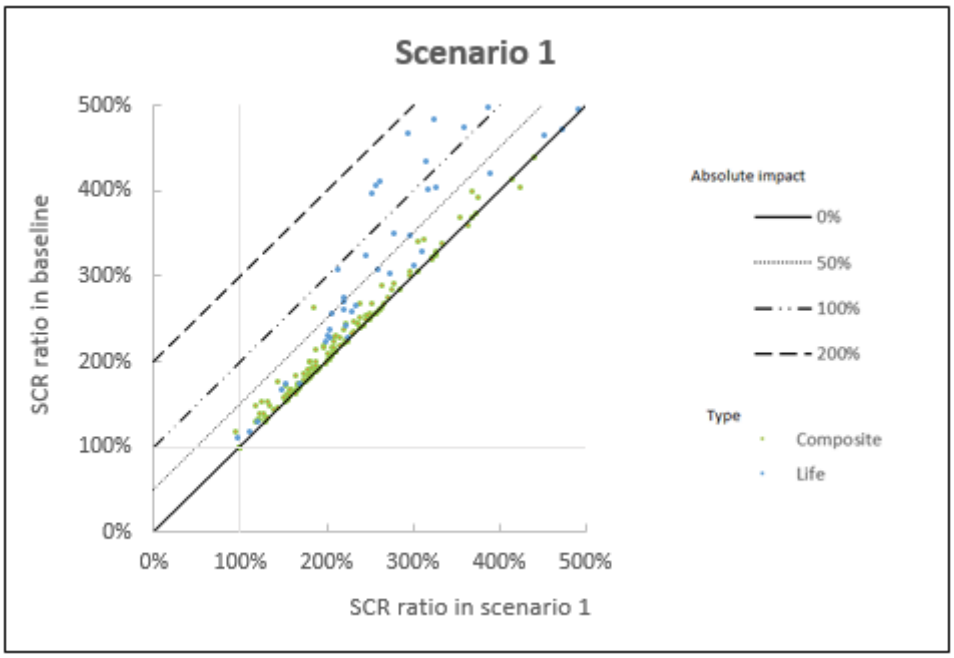
- *No inclusion of non-life insurance undertakings:* For this report EIOPA has made a different selection of undertakings: only life and composite undertakings with significant cash flows beyond 20 years were selected. For the 2017 report EIOPA had also selected a significant number of non-life undertakings exceeding the threshold but showing no significant impact of the different scenarios on their financial position. The tables on extrapolation of this year's

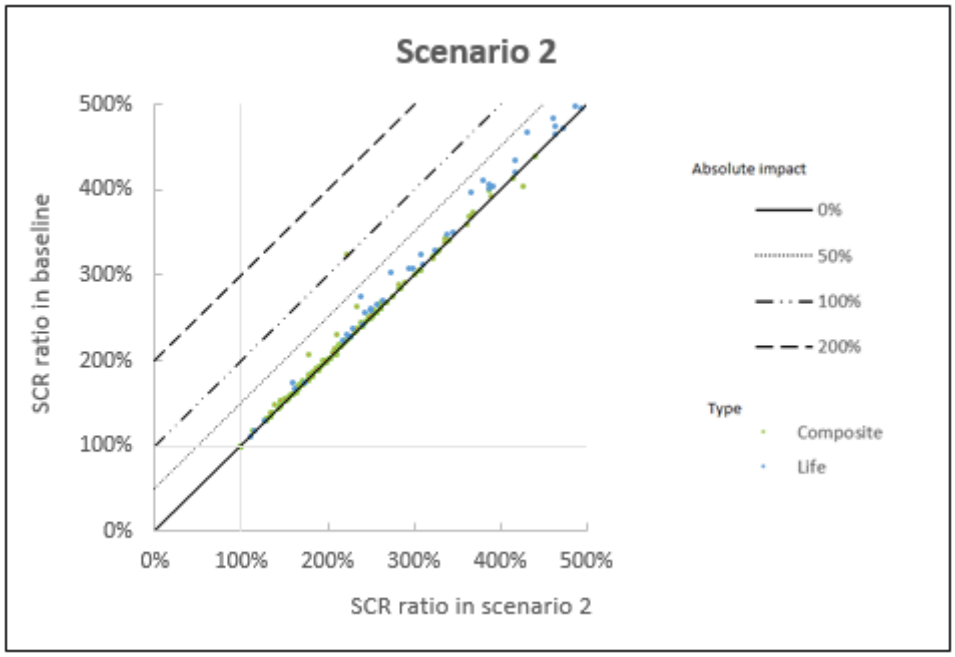
report are therefore only comparable with the tables of last year's report focusing on life and composite undertakings.

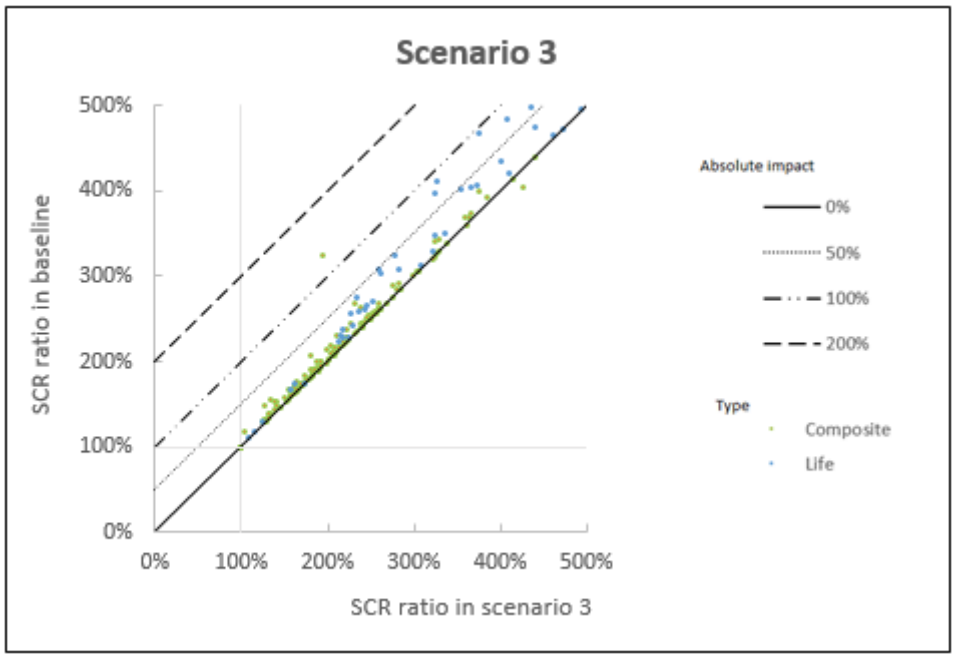
For each undertaking in the sample, the following graphs show the individual solvency ratios in the baseline (including all other LTG measures and measures on equity risk) against the solvency ratios in each of the three scenarios.

Each dot in the diagrams represents one undertaking. The type of each undertaking is indicated by the colour of the dot. The horizontal axis relates to the SCR ratio in the individual scenarios. The solvency ratios in the baseline are shown on the vertical axis. The SCR ratio of 100% that undertakings are required to have under Solvency II is indicated by an additional vertical and horizontal line. The more an undertaking is located away from the diagonal line, the bigger the impact of the measures. The broken diagonal lines correspond to an absolute impact of 50, 100 and 200 percentage points on the SCR ratio.

The graphs show that the impact is very diverse across undertakings. Note that only those undertakings are displayed in the graphs that do not exceed 500% of solvency ratio in the baseline or the scenario considered.







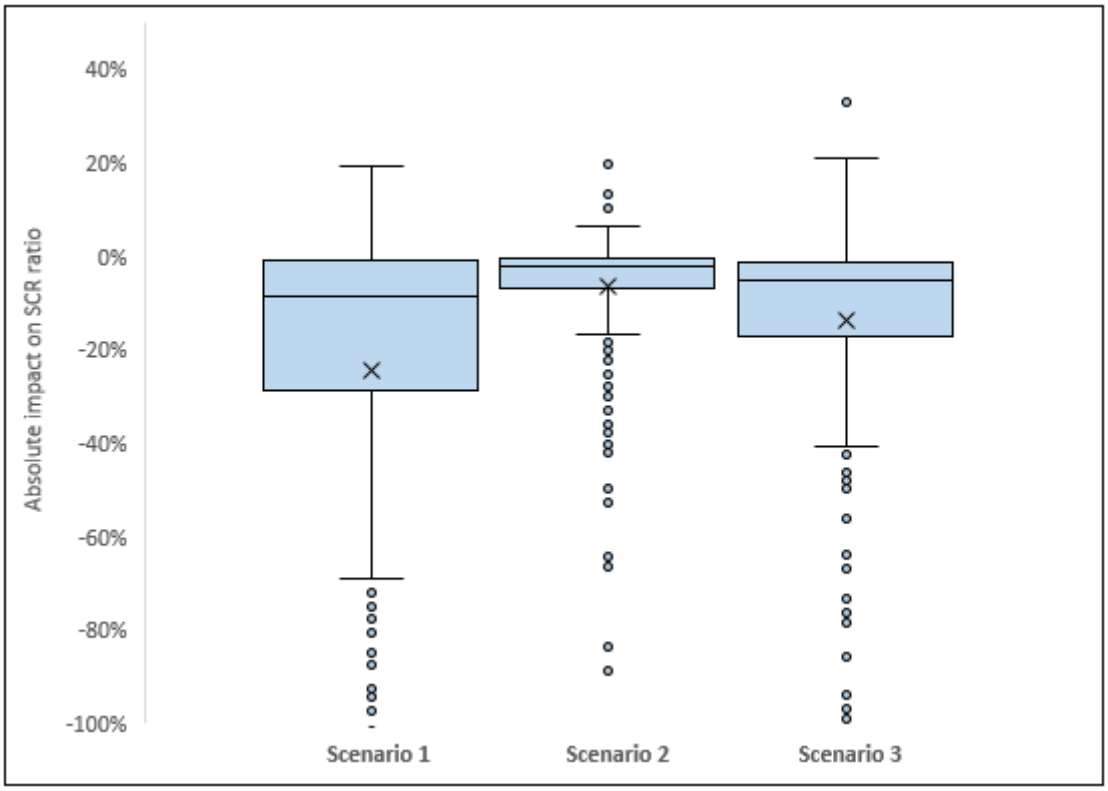
In terms of SCR ratio, 20 undertakings reported an absolute impact of more than 100 percentage points for scenario 1 (5.5% of the undertakings). For scenario 2 this was the case for 1 undertaking and for scenario 3 for 5 undertakings (1.4% of the undertakings). The vast majority thus reported an absolute impact lower than 100 percentage points for all scenarios.

10 undertakings in scenario 1 reported an SCR ratio below 100% (2.8% of the undertakings). This is not the case for any of the undertakings in scenario 2 and for 3 undertakings in scenario 3 (0.8% of the undertakings). For scenario 1 these undertakings make up 3.2% of technical provisions, whereas for scenario 3 these undertakings contain 0.8% of technical provisions. To cover the SCR again, those undertakings reporting an SCR ratio below 100% need to increase their eligible own

funds by 1.84 billion euro for scenario 1 and 0.06 billion euro for scenario 3. In terms of MCR ratio, 66 undertakings reported an absolute impact of more than 100 percentage points for scenario 1 (18.2% of the undertakings). For scenario 2 this was the case for 12 undertakings (3.3% of the undertakings) and for scenario 3 for 38 undertakings (10.5% of the undertakings). The vast majority thus reported an absolute impact lower than 100 percentage points for all scenarios.

Only one undertaking in scenario 1 reported an MCR ratio below 100%. This is not the case for any of the undertakings in scenarios 2 and 3. For scenario 1 this undertaking make up 0.81% of technical provisions. To cover the MCR again, it needs to increase its EoF by 0.42 billion euro.

The box-plots bellow illustrate how the impact of the scenarios compared to the baseline (including VA, MA and measures on equity risk and equity transitional) is distributed across undertakings, by showing the 1st and 3rd quartiles and the median of reported impacts in percentage points. In addition, the crosses represent the corresponding means. The widest distribution is observed for scenario 1, followed by scenario 3 and scenario 2. For scenario 1 and 3 a number of outliers are observable with impacts even below -100%, which lead to the observed differences between the median impact and the mean impact.



Impact of the symmetric adjustment mechanism

For the EIOPA LTG report 2018, the financial impact of the symmetric adjustment on the SCR was determined using QRT data.

Since the SA at 31 Dec 2017 was 1.90%, setting the SA to zero would decrease the stress on equity exposures applied to calculate the SCR. At EEA level the average impact of removing the SA on the SCR is -1%.

II.3 Impact on policyholder protection

The review analyses the effect of the LTG measures and measures on equity risk on policyholder protection. For this purpose, EIOPA has asked NSAs to report observations on the impact of the measures on policyholder protection and in particular on cases of revocation of the approval to apply one of the measures and cases of undue capital relief by the LTG measures or measures on equity risk.

Some NSAs commented on general observations but no concrete observations of positive or negative impacts of the LTG measures and equity risk measures on policyholder protection were raised. Furthermore, no concrete cases were identified in which the application of the LTG measures and equity risk measures prevented NSAs from taking any supervisory measures which they would have considered desirable for policyholder protection.

As in the LTG report 2016 and 2017 it was assessed whether cases of undue capital relief have occurred due to the application of the MA, the VA, the DBER or the SA. An undue capital relief would be an unduly low amount of technical provisions or capital requirement negatively impacting policyholder protection.

NSAs typically monitor the impact of the application of the LTG measures and equity risk measures on the undertaking's solvency position.

With respect to the VA, NSAs typically assess the impact of setting the VA to zero. Several NSAs reported that they monitor undertaking's investment portfolio considering the actual investment return, changes to the portfolio's composition and credit quality and their investment strategy. This includes a comparison to the "reference portfolio" used for the determination of the VA and undertaking's ability to maintain its assets (do they face the risk of a forced sale of assets). Some NSAs particularly outline that they focus on the question of whether undertakings are able to earn the VA in practice. For that purpose, a comparison of the rates actually earned by undertakings to the size of the VA or a retrospective check are suggested. These assessments are performed on a case by case basis, but no automatic checks are performed. The processes of NSAs thereby vary, depending on whether an approval process for the VA is foreseen.

With respect to the MA, one NSA assesses whether it is confident with the SCR calculation and Own Funds determination when assessing whether cases of undue capital relief occur. It is analyzed whether the SCR calculation is adequate considering the risks inherent in undertaking's asset portfolio (either because of non-adequacy of the Standard Formula or miss-calibration of the internal model) and whether Own Funds are overestimated due to an incorrect calibration of the fundamental spread

(either because of an under-calibration of the floors or incorrect mapping of assets by undertakings).

The feedback from NSAs indicates that there is no specific case yet, where undue capital relief was observed for an undertaking due to the application of the LTG measures or measures on equity risk. According to Article 37(1)(d) of the Solvency II Directive a capital-add on can be applied to undertakings applying the MA, the VA or the transitional measures where the supervisory authority concludes that the risk profile of that undertaking deviates significantly from the assumptions underlying those adjustments and transitional measures. Considering the observations made, consequently no NSA imposed yet a capital add-on based on observed cases of undue capital relief.

One NSA refused an application of TTP because the application of the transitional resulted in a reduction of the financial resource requirements in comparison to Solvency I requirements.

One NSA received an application for DBER, but the undertaking itself withdrew this application.

No NSA had to revoke an approval. No refusal or revocation was observed that was motivated by NSAs concerns on undue capital relief.

It was discussed on how best to systematically assess whether an undue capital relief occurs for undertakings applying the VA. A number of indicators has been identified.

As a first step, it was assessed to what extend an undertaking applying the VA is exposed to a fluctuation of credit spreads. As the VA intends to balance credit spread fluctuations on the asset side of insurers balance sheets, a low proportion of assets sensitive to credit spreads would be an indicator for an undue capital relief.

In a second step, other indicators were used such as whether undertakings have the potential to earn the VA and if they are actually earning the VA in practice. Insurers' potential to earn the VA can be assessed by comparing insurer's individual asset mix with the representative portfolio. In case this is not the case, still the average risk-corrected spread in insurer's asset portfolio may exceed the risk-corrected spread in the representative portfolio. Where this is however not the case, this would be an indicator of undue capital relief. Another aspect to consider when analysing insurers potential to earn the VA was identified to be related to insurer's liabilities and whether they were sufficiently illiquid so that the risk of forces sale of assets is low.

Even where undertakings have the potential to earn the VA, still it can be assessed whether insurers actually earn the VA. This can be assessed by analysing the actual asset returns.

Another aspect of the VA was also considered relevant in the debate of whether an undue capital relief is present or not. This is the question of whether the VA is over-effective in smoothing out asset spread fluctuations. The Stress Test 2016 already addressed that issue and it was considered whether it would be possible to test, whether the VA is "fit for purpose". Testing the impact of simple spread-up scenarios

on assets and liabilities assuming an increased VA could be a way forward. Based on the results of these scenarios it can be analysed whether the impact of the VA on the technical provisions exceeds the impact of the spread shocks on the assets of the undertakings.

Whereas these general considerations have been discussed and developed, a first analysis has been performed based on the quantitative information on the assets that undertakings provided.

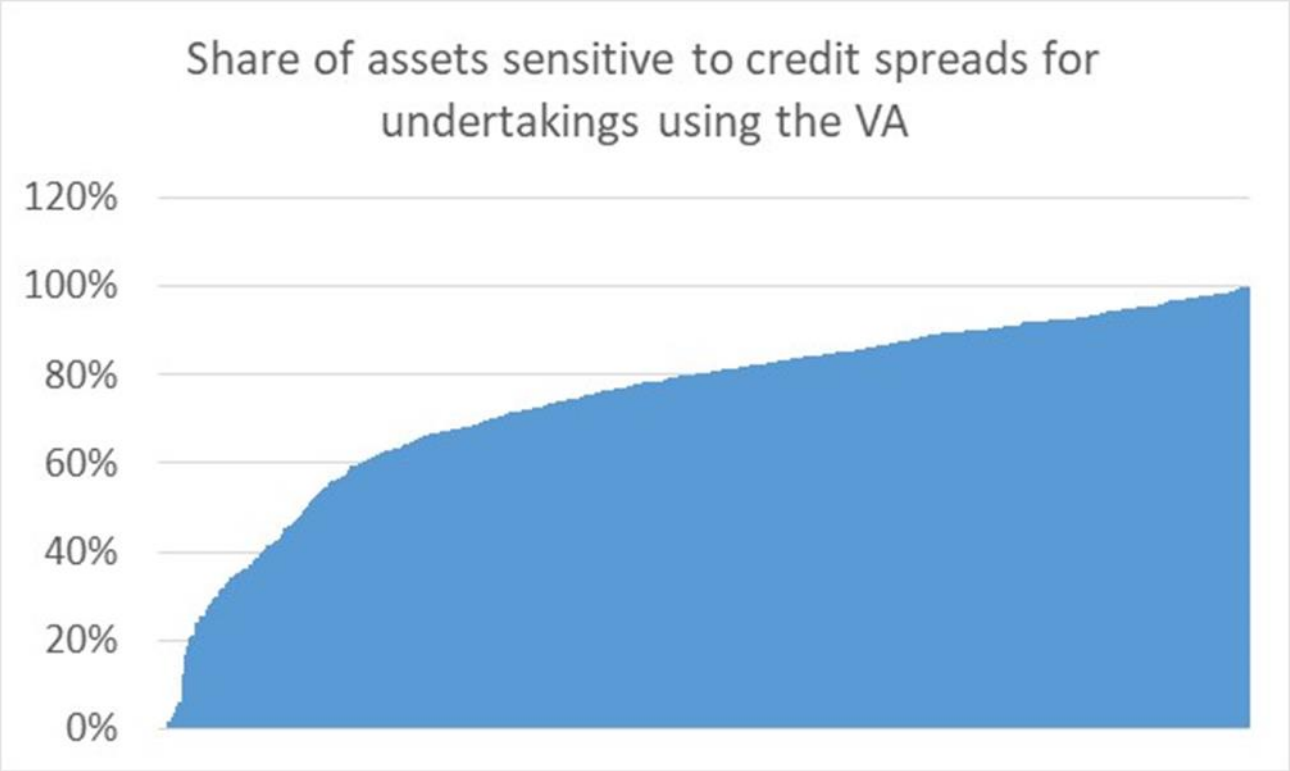
For this year's report, EIOPA specifically analysed on whether those undertakings applying the VA are actually exposed to fluctuation of credit spreads. For that purpose, the share of assets that are sensitive to a change in credit spreads on the total value of the asset for all undertakings applying the VA were calculated.

To facilitate the analysis, the market value of those asset classes, that are identified to be credit spread sensitive is compared with the market value of all assets of an undertaking. The asset classes that were identified to be credit spread sensitive include corporate and government bonds, structured notes, mortgages and loans and collateralised securities. As no look through information was available for the collective investment undertakings these were also taken into account in total as being credit spread sensitive.

With the data at hand, it was not possible to perform the analysis solely on the assets covering technical provisions to which the VA is applied. That said, for example the assets covering TP as a whole but also the assets that are included in an MA portfolio (for undertakings both using the MA and VA for different portfolios) could not be separately identified. To address the fact, that the assets in the MA portfolio could disturb the picture, the analysis was only performed for undertakings not applying the MA.

The final results are therefore just an approximation and are expected to give a broad overview of the shares of assets exposed to credit spread changes across the markets.

The following graph outlines the results of this analysis for each undertaking using the VA which does not apply the MA. The results are ordered by size. Each bar represents one undertaking. The analysis focusses on the euro.



As can be spotted, there is a high diversity of results: There is a high number of undertakings being nearly exclusively invested in credit spread sensitive assets but also undertakings with very low amounts of assets sensitive to credit spreads. The total sample included in this analysis includes 596 undertakings.

As said before, the analysis relies on some approximations. Any identification of an undue capital relief for a particular undertaking would necessitate additional analysis.

With this approach, the share of credit spread sensitive assets for all undertakings applying the VA (and not applying the MA) in the European market amounts to 78%.

Undue capital relief from MA could arise from the use of MA where the liabilities are not sufficiently illiquid and/or where the calibration of the fundamental spread (FS) does not provide adequate buffer against the risk of adverse credit events.

This analysis will focus on whether more adverse credit events are occurring in MA portfolios than has been anticipated by the calibration of FS.

Undertakings with approval to use MA were asked to provide information about the losses due to default and/or downgrade that had been experienced during 2017, alongside the fundamental spread that had been assumed during 2017.

27 responses were received (15 from ES, 12 from UK).

One undertaking reported a loss resulting from default within the matching adjustment portfolio. As a proportion of the portfolio, this loss was [5bps] compared to a fundamental spread for the portfolio of [50bps].

5 undertakings, comprising 5 MA portfolios, reported losses from downgrade – defined as being a loss incurred where the asset was removed from the portfolio in 2017, following any downgrade that had taken place prior to that removal. The reported losses were immaterial compared to the reserved allowance in the fundamental spread. For two of these undertakings the proportion of the portfolio loss was roughly 2 basis points, compared to fundamental spreads of between 25 basis points and 58 basis points on those portfolios. The other three portfolios incurred losses due to downgrade which were lower than 1 basis point, compared to fundamental spreads of between 48 basis points and 28 basis points on those portfolios.

We note that the wider market experienced upgrades and downgrades that were more widespread than might be inferred from the reported losses. One reason for the low level of reported losses might be that insurers retained downgraded assets within their portfolios. A further reason is that firms are incentivised by the MA cap on sub-investment grade assets to maintain a high quality portfolio of matching assets, and assets with deteriorating quality are replaced with higher quality assets from outside the MA portfolio.

The fundamental spread is designed to absorb the long-term average cost of default and downgrade (see Article 77c (2) of the Solvency II Directive). This is not expected to be directly comparable to a single time period. Continuing this comparison on an annual basis should help to identify periods where the fundamental spread is insufficient to absorb the costs of adverse credit events.

II.4 Impact on the investments of undertakings

Investment portfolios of undertakings using the measures MA, VA, TRFR or TTP

According to Article 77f(1)(a) and (3) of the Solvency II Directive, the review should analyse the effect of the long-term guarantees measures and measures on equity risk on long term investment strategies. To assess the impact of measures MA, VA, TRFR and TTP on the investments of insurance and reinsurance undertakings, EIOPA has analysed the investment allocation of undertakings as reported to NSAs under Solvency II.

The tables and graphs in this general section of the report consider the investments of undertakings from three perspectives:

- The investment allocation
- The credit quality of the bond portfolio, separately for government bonds and corporate bonds
- The duration of the bond portfolio, separately for government bonds and corporate bonds

These perspectives are considered both for the total EEA market and separately for undertakings using the measures MA, VA, TTP, TRFR or no measure, also

distinguishing between types of undertaking. Further detail is provided in the separate sections per measure in chapter III.

Please note that the information in this section does not address specific consequences for the investments resulting from the matching requirements when applying the MA. This issue is addressed in section III.2.

The following graph describes the investment allocation of insurance and reinsurance undertakings on the end of 2017. The graph shows the allocation to the main asset classes[11] at EEA level and for each country. In addition to the 2017 report, the current report also presents a number of graphs where the investments for UL/IL have been excluded, allowing for a further comparison.

A diversity of the allocations at country level can be observed. These country specificities should be taken into account when analysing the investments of undertakings that apply the LTG measures and equity risk measures, in particular where the use of a measure is not equally common in all countries[12]. Note that differences in the average asset allocation or in the characteristics of the bond portfolios between the different groups of undertakings as shown in tables and graphs below, are, to some extent, due to the high degree of variety of asset investments by insurers across different countries in the EEA, and the fact that the use of the measures is not evenly spread across different markets. This is in particular relevant for the MA, which is only used in two countries. As can be seen in the detailed analysis at country level the investments in those jurisdictions can be quite different even for firms that apply the MA. Therefore the overall observations relating to firms that apply this measure may simply reflect the specificities of insurance business in either or both of those countries rather than the use or not of MA. More detailed information on the investments of insurers using the MA, VA, TRFR or TTP at the level of individual countries is provided in the third section of this report.

[11] The tables and graphs in this year's report use a more granular grouping of asset classes than last year's report. For an overview of the grouping of the investments please refer to Annex 3. Please also note that for this year's report look-through has been applied to the data on collective investment undertakings, albeit limited to one level of look-through (i.e. if the collective investment undertaking itself holds another collective investment undertaking no further look-through has been applied).

12 Please refer to the section on use of the measures.

Investment allocation at EEA and country Level								
Country	Government bonds	Corporate bonds	Unit linked/index linked	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
EEA	22%	23%	26%	11%	6%	4%	4%	4%
AT	21%	26%	15%	18%	5%	3%	3%	7%
BE	44%	21%	12%	6%	1%	10%	3%	4%
BG	51%	17%	3%	11%	1%	2%	12%	4%
CY	12%	20%	37%	12%	4%	2%	9%	4%
CZ	41%	23%	18%	6%	5%	1%	5%	1%
DE	20%	30%	5%	18%	15%	5%	3%	4%
DK	10%	19%	36%	14%	15%	2%	2%	3%
EE	20%	33%	31%	1%	5%	0%	10%	0%
ES	52%	21%	6%	6%	1%	1%	8%	4%
FI	5%	18%	51%	6%	9%	2%	4%	4%
FR	28%	33%	14%	12%	3%	2%	3%	5%
GR	52%	19%	16%	4%	1%	1%	6%	2%
HR	62%	4%	5%	8%	1%	7%	6%	8%
HU	44%	2%	45%	3%	2%	0%	3%	0%
IE	9%	9%	70%	1%	1%	1%	7%	1%
IS	29%	16%	5%	38%	5%	2%	5%	0%
IT	43%	18%	18%	12%	2%	1%	2%	5%
LI	2%	5%	86%	1%	0%	1%	4%	1%
LT	41%	10%	40%	1%	0%	1%	5%	1%
LU	9%	11%	68%	3%	1%	3%	5%	1%
LV	52%	14%	10%	2%	0%	1%	19%	2%
MT	25%	16%	11%	6%	7%	10%	18%	6%
NL	28%	12%	21%	5%	5%	21%	4%	4%
NO	11%	34%	18%	18%	9%	7%	2%	1%
PL	37%	2%	30%	16%	9%	2%	3%	0%
PT	36%	22%	24%	7%	5%	0%	4%	2%
RO	55%	5%	22%	6%	1%	1%	9%	1%
SE	9%	17%	42%	20%	6%	2%	2%	2%
SI	30%	28%	22%	15%	0%	1%	3%	2%
SK	39%	28%	21%	5%	1%	1%	5%	1%
UK	9%	15%	55%	6%	5%	4%	4%	2%

Investment allocation at EEA and country Level (without assets held for IL & UL contracts)							
Country	Government bonds	Corporate bonds	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
EEA	30%	31%	15%	9%	5%	5%	5%
AT	25%	31%	21%	6%	4%	4%	8%
BE	50%	24%	7%	1%	11%	3%	5%
BG	52%	17%	12%	1%	2%	12%	4%
CY	19%	31%	19%	6%	3%	15%	7%
CZ	50%	28%	7%	6%	1%	7%	1%
DE	21%	32%	19%	16%	5%	3%	4%
DK	15%	30%	22%	24%	3%	2%	4%
EE	29%	48%	1%	7%	1%	14%	0%
ES	56%	23%	7%	1%	1%	9%	4%
FI	11%	37%	13%	18%	4%	8%	8%
FR	32%	38%	14%	4%	2%	4%	6%
GR	61%	23%	5%	1%	1%	7%	2%
HR	65%	4%	8%	1%	7%	6%	8%
HU	80%	4%	6%	4%	0%	6%	1%
IE	30%	31%	5%	3%	4%	23%	4%
IS	30%	17%	40%	5%	2%	6%	0%
IT	52%	22%	14%	2%	1%	3%	6%
LI	18%	35%	6%	2%	5%	30%	4%
LT	69%	16%	2%	0%	1%	9%	2%
LU	28%	34%	9%	2%	9%	15%	3%
LV	58%	15%	3%	0%	1%	21%	2%
MT	28%	18%	7%	8%	12%	20%	6%
NL	36%	15%	6%	6%	27%	6%	5%
NO	14%	41%	22%	11%	9%	2%	1%
PL	53%	3%	23%	13%	2%	5%	0%
PT	48%	29%	9%	6%	0%	6%	2%
RO	70%	6%	8%	1%	1%	12%	2%
SE	15%	30%	34%	10%	3%	4%	4%
SI	38%	35%	19%	0%	1%	4%	2%
SK	49%	35%	6%	1%	1%	6%	1%
UK	20%	33%	13%	12%	8%	9%	5%

The following tables illustrate the investment allocation at the end of 2017 of undertakings that apply the MA, VA, TRFR or TTP, or that do not apply one of these measures, in comparison with the investment allocation of all EEA undertakings. In these tables the unit-linked/index-linked investments have been excluded.

The first table shows the investments per measure for all undertakings. The following tables show the investments per measure for different types of undertakings.

The tables show that there are some differences in investment allocation.

Section I.5 Overview of the European insurance market, indicates that the vast majority of the technical provisions stems from life obligations. In this context, it is interesting to note that the table dedicated to life companies shows fairly limited differences in investment allocation between undertakings using a particular measure. The most notable difference concerns the investments by undertakings using the MA. As already observed, the MA is only used by undertakings in two countries[13].

Also, for life undertakings, the VA is the measure most widely used. The table dedicated to life undertakings indicates that the investment allocation by undertakings using the VA is rather similar to that of undertakings not using the VA.

With regard to these tables and graphs on investments great caution should be applied when wishing to analyse any correlation between the asset allocation or the characteristics of the bond portfolios and the use of the measures, as it is difficult to draw any conclusion from these graphs on any causal effect of the LTG measures on the investments of undertakings.

[13] Please also see section III.2 on the matching adjustment.

Total of undertakings							
	Government bonds	Corporate bonds	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
Total	30%	31%	15%	9%	5%	5%	5%
VA	33%	31%	12%	9%	5%	4%	5%
MA	26%	29%	11%	11%	9%	10%	4%
TTP & TRFR	25%	35%	11%	10%	7%	6%	5%
No measure	23%	31%	24%	7%	3%	8%	4%

Life undertakings							
	Government bonds	Corporate bonds	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
Total	29%	34%	10%	12%	7%	2%	5%
VA	30%	35%	9%	12%	7%	2%	5%
MA	21%	31%	14%	16%	12%	2%	5%
TTP & TRFR	25%	36%	11%	12%	8%	2%	6%
No measure	33%	32%	12%	9%	4%	4%	5%

Undertakings pursuing both Life and non-Life							
	Government bonds	Corporate bonds	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
Total	39%	30%	14%	5%	3%	4%	5%
VA	42%	28%	13%	5%	3%	4%	6%
MA	46%	34%	8%	1%	2%	7%	3%
TTP & TRFR	30%	39%	13%	5%	3%	6%	3%
No measure	25%	31%	25%	6%	2%	6%	5%

Bond portfolio of undertakings using the MA, VA, TRFR or TTP

Credit quality of bonds

The following graphs illustrate the credit quality of the bond portfolio of the undertakings applying the measures MA, VA, TRFR or TTP as at end 2017, separately for government bonds and corporate bonds. The credit quality is measured in credit quality steps (CQS), which vary from 0 to 6, with 0 denoting the highest credit quality and 6 denoting the lowest credit quality. Bonds considered as "investment grade" usually have a CQS between 0 and 3.

The tables on the CQS of government and corporate bonds indicate the following three main points[14]:

- Virtually all investments in bonds are investment grade (CQS0 -CQS3).
- On average, undertakings that apply the measures MA, VA, TRFR or TTP hold bonds of lower credit quality than undertakings that do not apply any of these measures.
- On average, undertakings applying the MA hold lower quality bonds than other undertakings. Please note again that the MA is only applied by undertakings in

[14] Please note that these tables only refer to rated bonds.

two countries, ES and UK. A comparison restricted to these two countries, showing less pronounced differences between undertakings using and not using the MA is provided in section III.2 on the matching adjustment.

Credit quality step of investments in government bonds (without assets held for IL & UL contracts)					
	CQS0	CQS1	CQS2	CQS3	CQS>3
All undertakings	**18%**	**44%**	**5%**	**31%**	**1%**
MA	5%	46%	1%	48%	0%
VA	15%	44%	4%	37%	1%
TTP&TRFR	17%	55%	4%	23%	1%
No measure	32%	43%	12%	11%	1%

Credit quality step of investments in corporate bonds (without assets held for IL & UL contracts)					
	CQS0	CQS1	CQS2	CQS3	CQS>3
All undertakings	**21%**	**16%**	**32%**	**28%**	**3%**
MA	7%	10%	40%	38%	4%
VA	17%	16%	33%	31%	3%
TTP&TRFR	25%	17%	31%	25%	3%
No measure	35%	17%	27%	19%	2%

The following graphs illustrate the credit quality of the bond portfolio of the undertakings applying at least one of the measures MA, VA, TRFR or TTP and of undertakings not applying any of these measures, as at end 2017 at EEA and at national level. Separate graphs are provided for government bonds[15] and corporate bonds. Please note that, due to confidentiality reasons, any cells that relate to less than three undertakings are denoted by (*).

[15] The Portuguese National Supervisory Authority has noted that the share of government bonds under CQS 3 for PT is partially attributable to a wrong classification of the Portuguese sovereign debt in the undertakings' reporting as CQS 4 instead of CQS 3 at 31 Dec 2017.

Credit quality of government bonds for undertakings using at least one of the measures, at EEA level and per country (without assets held for IL & UL contracts)					
Country	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**15%**	**45%**	**4%**	**36%**	**1%**
AT	19%	45%	25%	10%	1%
BE	13%	63%	10%	14%	1%
BG	3%	0%	4%	92%	1%
CY	(*)	(*)	(*)	(*)	(*)
CZ	5%	5%	82%	7%	0%
DE	34%	47%	9%	9%	0%
DK	81%	4%	1%	11%	2%
ES	2%	2%	1%	95%	1%
FI	35%	53%	3%	9%	1%
FR	8%	77%	2%	13%	0%
GR	13%	17%	4%	14%	52%
HU	1%	1%	0%	98%	0%
IE	45%	38%	14%	2%	1%
IT	2%	4%	2%	92%	1%
LI	54%	28%	8%	9%	0%
LU	20%	61%	6%	12%	1%
NL	56%	34%	3%	6%	0%
NO	54%	34%	10%	1%	1%
PT	4%	10%	4%	79%	4%
RO	(*)	(*)	(*)	(*)	(*)
SE	(*)	(*)	(*)	(*)	(*)
SK	8%	14%	77%	1%	0%
UK	8%	89%	2%	1%	0%

Credit quality of government bonds for undertakings not using any measure, at EEA level and per country (without assets held for IL & UL contracts)					
Country	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**32%**	**43%**	**12%**	**11%**	**1%**
AT	18%	63%	8%	10%	1%
BE	17%	60%	14%	8%	1%
BG	1%	1%	52%	45%	1%
CY	11%	45%	12%	12%	19%
CZ	2%	4%	94%	0%	0%
DE	48%	36%	9%	6%	1%
DK	75%	15%	0%	8%	1%
EE	28%	22%	36%	13%	1%
ES	11%	11%	3%	73%	2%
FI	56%	22%	6%	16%	1%
FR	8%	77%	2%	12%	0%
GR	23%	32%	8%	8%	29%
HR	3%	1%	4%	5%	87%
HU	0%	0%	1%	97%	2%
IE	29%	50%	14%	7%	0%
IS	0%	0%	46%	42%	12%
IT	2%	6%	1%	90%	1%
LI	60%	24%	3%	8%	4%
LT	10%	15%	49%	23%	3%
LU	40%	51%	5%	4%	0%
LV	4%	11%	72%	12%	1%
MT	29%	25%	30%	16%	0%
NL	51%	34%	5%	10%	0%
NO	61%	37%	1%	0%	0%
PL	2%	0%	95%	2%	1%
PT	4%	11%	0%	43%	41%
RO	1%	0%	0%	99%	0%
SE	93%	6%	1%	0%	0%
SI	19%	12%	45%	19%	5%
SK	8%	1%	85%	5%	1%
UK	26%	69%	3%	1%	1%

Credit quality of government bonds for undertakings not using a measure or using at least one measure, at EEA level and per country (without assets held for IL & UL contracts)						
Country	**Use of the measures**	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**No use of measures**	**32%**	**43%**	**12%**	**11%**	**1%**
	Use of at least one measure	**15%**	**45%**	**4%**	**36%**	**1%**
AT	No use of measures	18%	63%	8%	10%	1%
	Use of at least one measure	19%	45%	25%	10%	1%
BE	No use of measures	17%	60%	14%	8%	1%
	Use of at least one measure	13%	63%	10%	14%	1%
BG	No use of measures	1%	1%	52%	45%	1%
	Use of at least one measure	3%	0%	4%	92%	1%
CY	No use of measures	11%	45%	12%	12%	19%
	Use of at least one measure	(*)	(*)	(*)	(*)	(*)
CZ	No use of measures	2%	4%	94%	0%	0%
	Use of at least one measure	5%	5%	82%	7%	0%
DE	No use of measures	48%	36%	9%	6%	1%
	Use of at least one measure	34%	47%	9%	9%	0%
DK	No use of measures	75%	15%	0%	8%	1%
	Use of at least one measure	81%	4%	1%	11%	2%
EE	No use of measures	28%	22%	36%	13%	1%
	Use of at least one measure	0%	0%	0%	0%	0%
ES	No use of measures	11%	11%	3%	73%	2%
	Use of at least one measure	2%	2%	1%	95%	1%
FI	No use of measures	56%	22%	6%	16%	1%
	Use of at least one measure	35%	53%	3%	9%	1%
FR	No use of measures	8%	77%	2%	12%	0%
	Use of at least one measure	8%	77%	2%	13%	0%
GR	No use of measures	23%	32%	8%	8%	29%
	Use of at least one measure	13%	17%	4%	14%	52%
HR	No use of measures	3%	1%	4%	5%	87%
	Use of at least one measure	0%	0%	0%	0%	0%
HU	No use of measures	0%	0%	1%	97%	2%
	Use of at least one measure	1%	1%	0%	98%	0%
IE	No use of measures	29%	50%	14%	7%	0%
	Use of at least one measure	45%	38%	14%	2%	1%
IS	No use of measures	0%	0%	46%	42%	12%
	Use of at least one measure	0%	0%	0%	0%	0%
IT	No use of measures	2%	6%	1%	90%	1%
	Use of at least one measure	2%	4%	2%	92%	1%
LI	No use of measures	60%	24%	3%	8%	4%
	Use of at least one measure	54%	28%	8%	9%	0%
LT	No use of measures	10%	15%	49%	23%	3%
	Use of at least one measure	0%	0%	0%	0%	0%
LU	No use of measures	40%	51%	5%	4%	0%
	Use of at least one measure	20%	61%	6%	12%	1%
LV	No use of measures	4%	11%	72%	12%	1%
	Use of at least one measure	0%	0%	0%	0%	0%
MT	No use of measures	29%	25%	30%	16%	0%
	Use of at least one measure	0%	0%	0%	0%	0%
NL	No use of measures	51%	34%	5%	10%	0%
	Use of at least one measure	56%	34%	3%	6%	0%
NO	No use of measures	61%	37%	1%	0%	0%
	Use of at least one measure	54%	34%	10%	1%	1%
PL	No use of measures	2%	0%	95%	2%	1%
	Use of at least one measure	0%	0%	0%	0%	0%
PT	No use of measures	4%	11%	0%	43%	41%
	Use of at least one measure	4%	10%	4%	79%	4%
RO	No use of measures	1%	0%	0%	99%	0%
	Use of at least one measure	(*)	(*)	(*)	(*)	(*)
SE	No use of measures	93%	6%	1%	0%	0%
	Use of at least one measure	(*)	(*)	(*)	(*)	(*)
SL	No use of measures	19%	12%	45%	19%	5%
	Use of at least one measure	0%	0%	0%	0%	0%
SK	No use of measures	8%	1%	85%	5%	1%
	Use of at least one measure	8%	14%	77%	1%	0%
UK	No use of measures	26%	69%	3%	1%	1%
	Use of at least one measure	8%	89%	2%	1%	0%

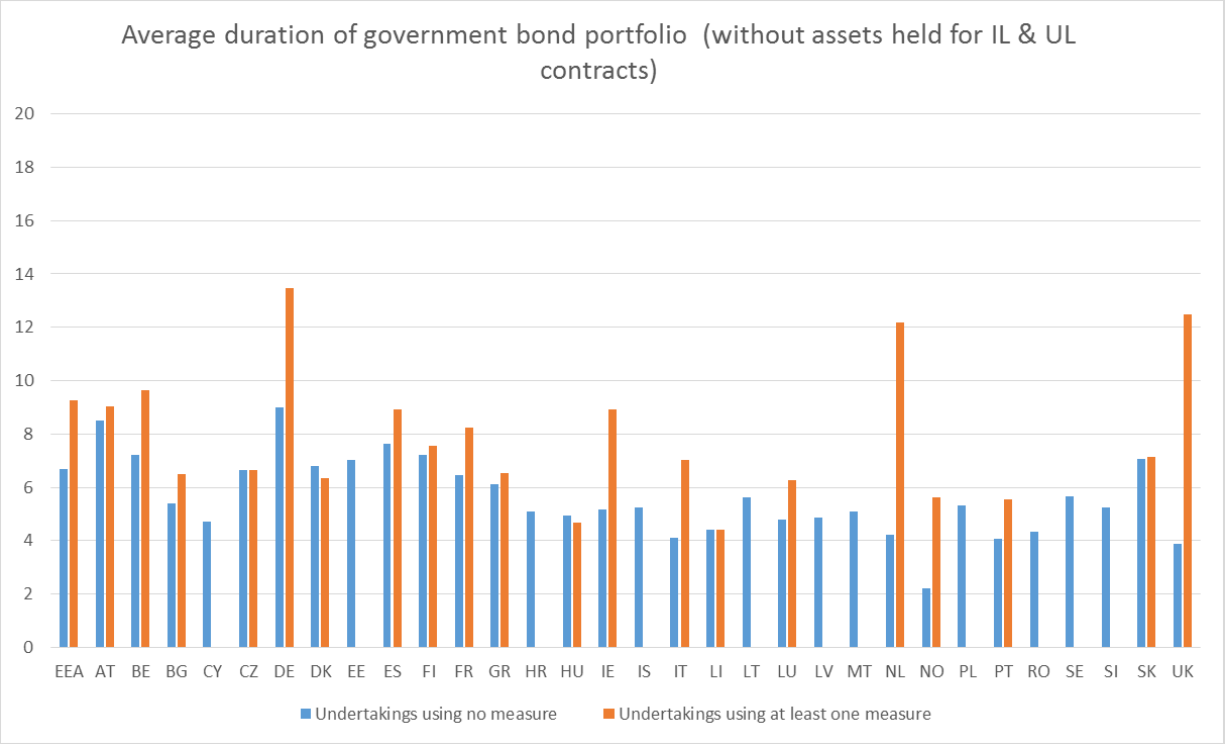
Credit quality of corporate bonds for undertakings using at least one of the measures, at EEA level and per country (without assets held for IL & UL contracts)					
Country	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**17%**	**16%**	**33%**	**31%**	**3%**
AT	23%	18%	35%	22%	2%
BE	11%	13%	35%	39%	2%
BG	0%	0%	0%	83%	17%
CY	(*)	(*)	(*)	(*)	(*)
CZ	0%	2%	45%	46%	7%
DE	36%	23%	21%	19%	1%
DK	86%	5%	3%	3%	3%
ES	2%	10%	35%	49%	4%
FI	18%	14%	30%	33%	5%
FR	9%	19%	40%	29%	3%
GR	1%	15%	37%	35%	12%
HU	0%	4%	19%	77%	0%
IE	25%	15%	37%	22%	0%
IT	2%	8%	23%	57%	10%
LI	33%	17%	28%	23%	0%
LU	5%	11%	47%	35%	2%
NL	7%	13%	38%	39%	3%
NO	37%	10%	38%	15%	0%
PT	2%	7%	35%	46%	10%
RO	(*)	(*)	(*)	(*)	(*)
SE	(*)	(*)	(*)	(*)	(*)
SK	2%	13%	21%	64%	0%
UK	8%	10%	41%	37%	5%

Credit quality of corporate bonds for undertakings not using any measure, at EEA level and per country (without assets held for IL & UL contracts)					
Country	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**35%**	**17%**	**27%**	**19%**	**2%**
AT	33%	13%	33%	16%	5%
BE	15%	17%	35%	29%	4%
BG	4%	6%	28%	51%	11%
CY	30%	13%	14%	21%	23%
CZ	2%	31%	34%	33%	0%
DE	40%	21%	23%	14%	1%
DK	91%	3%	3%	2%	1%
EE	13%	22%	31%	34%	1%
ES	6%	14%	39%	35%	5%
FI	10%	5%	21%	56%	8%
FR	12%	21%	38%	26%	2%
GR	52%	15%	12%	11%	11%
HR	5%	6%	26%	57%	5%
HU	0%	0%	18%	74%	8%
IE	9%	14%	42%	33%	2%
IS	0%	0%	0%	99%	1%
IT	16%	8%	34%	38%	4%
LI	48%	8%	26%	18%	0%
LT	18%	17%	19%	42%	4%
LU	10%	14%	31%	45%	0%
LV	24%	9%	34%	29%	3%
MT	10%	12%	37%	38%	3%
NL	7%	25%	37%	30%	1%
NO	54%	4%	31%	10%	1%
PL	0%	4%	42%	41%	13%
PT	3%	6%	34%	37%	20%
RO	0%	0%	43%	56%	2%
SE	78%	5%	8%	8%	1%
SI	11%	9%	27%	46%	7%
SK	0%	23%	38%	34%	4%
UK	8%	16%	46%	28%	2%

Credit quality of corporate bonds for undertakings not using a measure or using at least one measure, at EEA level and per country (without assets held for IL & UL contracts)						
Country	**Use of the measures**	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**No use of measures**	**35%**	**17%**	**27%**	**19%**	**2%**
	Use of at least one measure	**17%**	**16%**	**33%**	**31%**	**3%**
AT	No use of measures	33%	13%	33%	16%	5%
	Use of at least one measure	23%	18%	35%	22%	2%
BE	No use of measures	15%	17%	35%	29%	4%
	Use of at least one measure	11%	13%	35%	39%	2%
BG	No use of measures	4%	6%	28%	51%	11%
	Use of at least one measure	0%	0%	0%	83%	17%
CY	No use of measures	30%	13%	14%	21%	23%
	Use of at least one measure	(*)	(*)	(*)	(*)	(*)
CZ	No use of measures	2%	31%	34%	33%	0%
	Use of at least one measure	0%	2%	45%	46%	7%
DE	No use of measures	40%	21%	23%	14%	1%
	Use of at least one measure	36%	23%	21%	19%	1%
DK	No use of measures	91%	3%	3%	2%	1%
	Use of at least one measure	86%	5%	3%	3%	3%
EE	No use of measures	13%	22%	31%	34%	1%
	Use of at least one measure	0%	0%	0%	0%	0%
ES	No use of measures	6%	14%	39%	35%	5%
	Use of at least one measure	2%	10%	35%	49%	4%
FI	No use of measures	10%	5%	21%	56%	8%
	Use of at least one measure	18%	14%	30%	33%	5%
FR	No use of measures	12%	21%	38%	26%	2%
	Use of at least one measure	9%	19%	40%	29%	3%
GR	No use of measures	52%	15%	12%	11%	11%
	Use of at least one measure	1%	15%	37%	35%	12%
HR	No use of measures	5%	6%	26%	57%	5%
	Use of at least one measure	0%	0%	0%	0%	0%
HU	No use of measures	0%	0%	18%	74%	8%
	Use of at least one measure	0%	4%	19%	77%	0%
IE	No use of measures	9%	14%	42%	33%	2%
	Use of at least one measure	25%	15%	37%	22%	0%
IS	No use of measures	0%	0%	0%	99%	1%
	Use of at least one measure	0%	0%	0%	0%	0%
IT	No use of measures	16%	8%	34%	38%	4%
	Use of at least one measure	2%	8%	23%	57%	10%
LI	No use of measures	48%	8%	26%	18%	0%
	Use of at least one measure	33%	17%	28%	23%	0%
LT	No use of measures	18%	17%	19%	42%	4%
	Use of at least one measure	0%	0%	0%	0%	0%
LU	No use of measures	10%	14%	31%	45%	0%
	Use of at least one measure	5%	11%	47%	35%	2%
LV	No use of measures	24%	9%	34%	29%	3%
	Use of at least one measure	0%	0%	0%	0%	0%
MT	No use of measures	10%	12%	37%	38%	3%
	Use of at least one measure	0%	0%	0%	0%	0%
NL	No use of measures	7%	25%	37%	30%	1%
	Use of at least one measure	7%	13%	38%	39%	3%
NO	No use of measures	54%	4%	31%	10%	1%
	Use of at least one measure	37%	10%	38%	15%	0%
PL	No use of measures	0%	4%	42%	41%	13%
	Use of at least one measure	0%	0%	0%	0%	0%
PT	No use of measures	3%	6%	34%	37%	20%
	Use of at least one measure	2%	7%	35%	46%	10%
RO	No use of measures	0%	0%	43%	56%	2%
	Use of at least one measure	(*)	(*)	(*)	(*)	(*)
SE	No use of measures	78%	5%	8%	8%	1%
	Use of at least one measure	(*)	(*)	(*)	(*)	(*)
SL	No use of measures	11%	9%	27%	46%	7%
	Use of at least one measure	0%	0%	0%	0%	0%
SK	No use of measures	0%	23%	38%	34%	4%
	Use of at least one measure	2%	13%	21%	64%	0%
UK	No use of measures	8%	16%	46%	28%	2%
	Use of at least one measure	8%	10%	41%	37%	5%

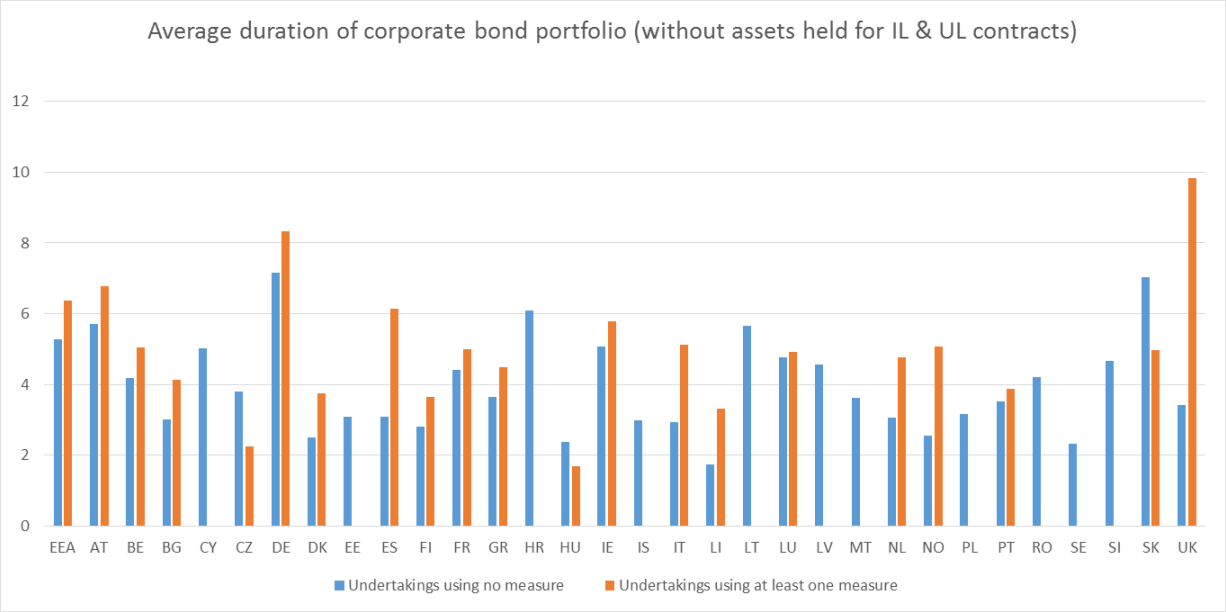
Duration of bonds

The following graphs show, for each of the countries, the average duration of the bond portfolios, separately for government bonds and corporate bonds[16]. A distinction has been made between undertakings using at least one measure and undertakings using no measure. When considering these graphs, it may be interesting to refer also to the section in this report on the sensitivity of the financial position of undertakings to the different extrapolation scenarios. The countries where undertakings are on average most sensitive to the extrapolation scenarios also show higher durations of their government bond portfolios[17]. Broadly, the duration of government bonds is higher for undertakings using at least one measure than for undertakings not using any of the measures. The duration of the corporate bonds tend to be lower than that of government bonds. Please note that the graphs on duration do not include unit-linked/index-linked-investments.



[16] For confidentiality reasons, no duration for undertakings using at least one measure is included for CY, RO and SE since the number of undertakings using at least one measure is smaller than 3.

[17] Please note that the sensitivity to the extrapolation scenarios depends more factors, such as duration of the liabilities and the extent of interest rate hedging and cash flow matching.



The tables below provide further detail, on a national level, on the duration of bond portfolios of undertakings, distinguishing between the use or not of any of the LTG measures.

Duration of government bonds per country and per measure (without assets held for IL & UL contracts)					
	Total	VA	MA	TRFR/TTP	No measure
EEA	**9**	**9**	**11**	**11**	**7**
AT	9	9		10	8
BE	10	10		(*)	7
BG	6	7			5
CY	5	(*)			5
CZ	7	7			7
DE	12	13		14	9
DK	6	6			7
EE	7				7
ES	9	9	10	8	8
FI	8	8		8	7
FR	8	8		9	6
GR	7	7		7	6
HR	5				5
HU	5	5			5
IE	6	9		(*)	5
IS	5				5
IT	7	7			4
LI	4	4		(*)	4
LT	6				6
LU	6	6			5
LV	5				5
MT	5				5
NL	12	12			4
NO	5	6		6	2
PL	5				5
PT	5	6		6	4
RO	4	(*)			4
SE	5	(*)			6
SI	5				5
SK	7	7			7
UK	10	11	12	13	4

Duration of corporate bonds per country and per measure (without assets held for IL & UL contracts)					
	Total	VA	MA	TRFR/TTP	No measure
EEA	**6**	**6**	**9**	**8**	**5**
AT	7	7		7	6
BE	5	5		(*)	4
BG	3	4			3
CY	5	(*)			5
CZ	2	2			4
DE	8	8		9	7
DK	3	4			3
EE	3				3
ES	6	6	5	5	3
FI	4	4		4	3
FR	5	5		6	4
GR	4	4		5	4
HR	6				6
HU	2	2			2
IE	5	6		(*)	5
IS	3				3
IT	5	5			3
LI	3	3		(*)	2
LT	6				6
LU	5	5			5
LV	5				5
MT	4				4
NL	5	5			3
NO	5	5		5	3
PL	3				3
PT	4	3		4	4
RO	4	(*)			4
SE	2	(*)			2
SI	5				5
SK	6	5			7
UK	9	9	10	10	3

Supervisory observations on the investment behaviour

To collect information about the impact of the LTG measures and measures on equity risk on the investment behaviour of undertakings, EIOPA asked NSAs about their observations regarding trends in the behaviour of undertakings as long-term investors, the drivers associated with those trends and their view on any connections between the measures and the trends observed.

Twenty-one of the NSAs reported that they did not observe any trend in their national market regarding the behaviour of undertakings as long-term investors. This is a bit more than the observations made in the 2016 and 2017 EIOPA LTG reports, where approximately half of the NSAs reported no trend in investment behaviour.

From the remaining 11 NSAs, two of them observed a reallocation from government bonds to corporate bonds, three of them witnessed an increasing investment in illiquid assets like loans and mortgages and two noted an increase in bonds at the expense of the allocation to cash and cash equivalents. Also, one NSA reported an increase of indirect investments in collective investment undertakings. Another NSA reported a decrease in bail-in eligible assets (exposure to banks). Four NSAs reported changes in the duration of the assets.

NSAs were also asked whether they had observed any trend in respect of the holding of equities. The majority of NSAs reported that they did not observe any such trend. One NSA reported an increase in the exposure to equities, not via direct investments, but rather via investment funds.

In relation to the duration of bond portfolios, four NSAs reported that they observed a trend in their national markets. Two NSAs reported a reduction in the duration of their investments for two different reasons: in one jurisdiction this was to profit from an expected increase in interest rates, while in another jurisdiction this decrease occurred to decrease the amount of cash flow matching of the liabilities to increase the alignment of the interest rate sensitivities of their investments with the Solvency II interest rate sensitivities of their liabilities. Conversely, two NSAs reported a trend for the duration of bond portfolios to increase: in one jurisdiction this was because of the issuance of two new longer term government bonds, while in the other jurisdiction this was because of asset liability management and a search for yield in the low-yield environment.

The main drivers for the trends and changes addressed by NSAs were the low-yield environment and the associated search for yield as well as asset-liability matching. In addition, a few NSAs indicated diversification, the de-risking of assets, uprisking (not related to the low-yield environment) and ESG as factors influencing changes.

It should be noted that, in line with the reports in previous years, no NSA provided factual evidence of significant links between the use of the MA, VA, SA or DBER and the experienced trends/changes concerning the investment behaviour of undertakings as long-term investors. One NSA pointed out that the current Solvency II

extrapolation of the basic risk free rate term structure incentivised the undertakings to reduce their amount of cash flow matching and observed that they actually did so. [18]

Asset returns

The quantitative reporting templates also contain information on asset returns (gains and losses) by asset category.[19] The information contained in the QRT differentiates between the following sources of gains and losses:[20]

- Interest (Amount of interest earned, i.e. interest received less accrued interest at the start of the period plus accrued interest at the end of the reporting period);
- Rent;
- Dividends;
- Net gains and losses (resulting from assets sold or matured during the reporting period); and
- Unrealised gains and losses (resulting from the change in the value of assets not sold nor matured during the reporting period).

By putting these (absolute) asset returns in relation to the value of assets in the respective category, relative asset returns can be derived.

The following table summarises this information at European level for the asset categories with CIC-codes 1 (government bonds), 2 (corporate bonds), 5 (structured noted), 6 (collateralised securities) and 8 (mortgages and loans):[21]

Asset category	Interest	Unrealised gains and losses	Net gains and losses	Total gains and losses
Government bonds	2,5%	-0,2%	-0,3%	2,0%
Corporate bonds	2,8%	-0,7%	0,0%	2,1%
Structured notes	2,3%	0,8%	0,1%	3,3%
Collateralised securities	2,1%	2,5%	-0,8%	3,8%
Mortgages and loans	3,1%	-0,1%	-0,4%	2,6%
Total	**2,7%**	**-0,3%**	**-0,2%**	**2,2%**

[18] Fully matching the cash flows beyond the last liquid point, or to a large extent, results in own fund volatility of these undertakings. Market interest rate changes affect the value of these long-term asset cash flows to a larger extent than that the value of the technical provisions given that interest rate change; the Smith-Wilson extrapolation technique dampens the interest rate changes beyond the last liquid point and thereby the changes in the value of the technical provisions, while the changes in long-term market interest rate and the corresponding changes in the value of long-term asset cash flows are not dampened.

[19] Cf. template S.09.01.01, specifying information on income, gains and losses in the reporting period

[20] For further information, cf. the LOG-file for template S.09.01

[21] Note that rent and dividend payments are not applicable to these asset categories and are hence not included

Note that the shown relative gains or losses are determined as the proportion of gains and losses incurred during 2017 of the asset values in the respective asset category at the start of 2017.[22] Unit-linked or index-linked assets have been excluded.

This shows that, across all of the five asset categories considered and at a European level, undertakings reported interest gains amounting to 2,7% of the asset values at the start of the period. Changes in the value of these investments during 2017 (where the respective assets were not sold nor did not mature) resulted in unrealised losses of 0,3%, whereas assets which were sold or matured in 2017 led to net losses of 0,2%.

When assessing these numbers, it should be considered that:

- The values above are aggregated at a European level; the corresponding values at the level of individual undertakings show a high dispersion and thus generally differ from values at European level;
- The asset returns shown above cannot be directly compared with the yield of the respective investments at a given point in time; for example, for a zero coupon bond, no interest gains before maturity are earned, whereas the yield of the bond would generally differ from zero.

II.5 Impact on consumers and products

High level summary of products

The vast majority of products with LTG's occur in the life line of business. In order to enable a more detailed analysis than last year, an information request to undertakings on Product features was performed. This was targeted at a representative sample of undertakings in each European Market. The aim of the information request was to supplement existing QRT data with further information on product features.

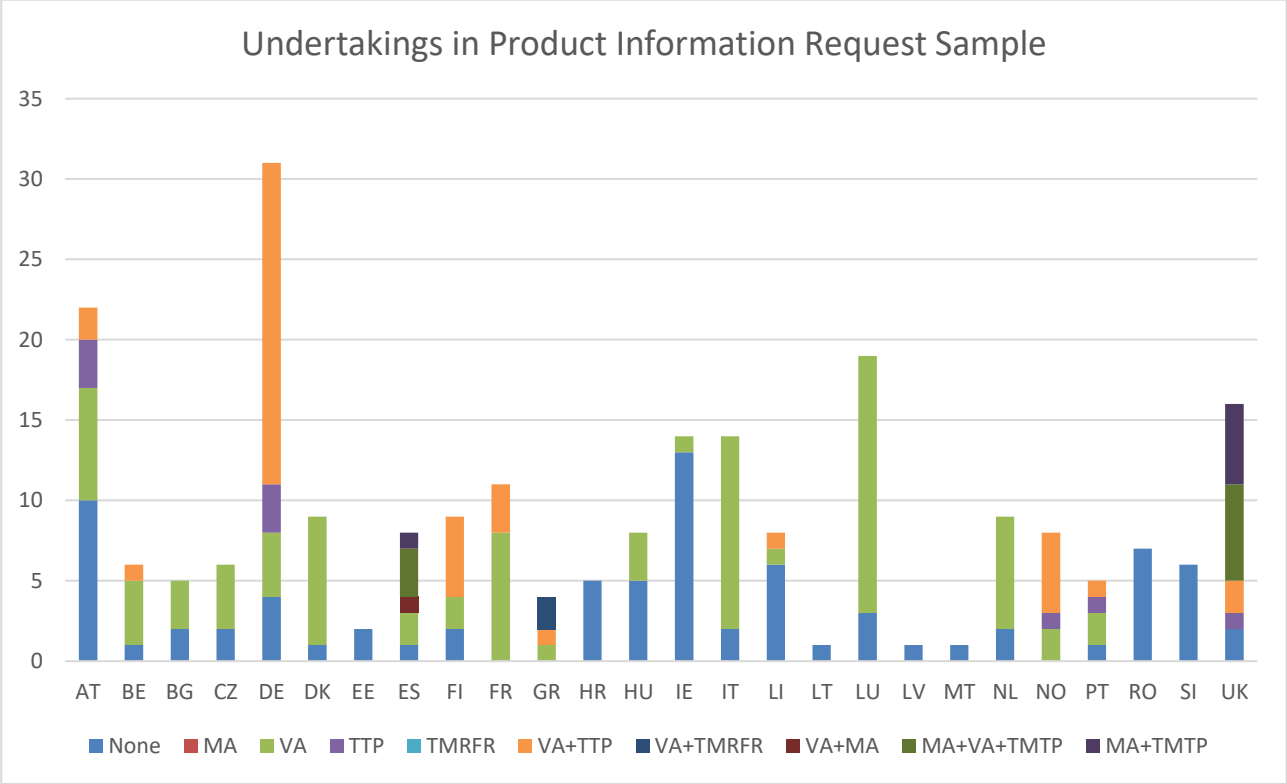
In the information request undertakings were asked for two items of information, both qualitative and quantitative. In the quantitative part undertakings were asked, for all active products as presented in QRT template S.14.01, if any of the following types of guarantees are present. These guarantee types were identified as the most common types of guarantees in previous LTG reports.

- Guaranteed interest rate where the rate is explicitly set in the contract
- Guaranteed sum assured on death
- Guaranteed sum assured paid on any cause other than death
- Guaranteed surrender value
- Guaranteed annuity benefit
- Guaranteed return of premium

[22] Specifically, the asset values in the respective asset category at 31st December 2016, as reported in the asset-by-asset template S.06.02.

In the second part of the information request undertakings were asked qualitative questions about any changes they have made to their products and the reasons behind these changes. To supplement this information, NSAs were asked to provide an overview of their national market and answer specific questions on the features and trends in products with guarantees.

Overall 235 undertakings participated in the information request across 26 countries. The following graph gives further detail on the composition of the undertakings in the sample, split by combinations of LTG measures used. Note the sample also includes undertakings that do not use any of the LTG measures in order for the sample to be representative of the market as a whole.



The most common types of products indicated by NSAs, can be split into three main categories. First are the Traditional life insurance savings or pension related products, which are normally presented in Solvency II line of business 30 (Insurance with-profit participation). Of the countries that responded to the LTG information request, 13 countries responded that these types of product represent one of the most material products in their market. While the specific features of these contract vary between different countries, and between individual undertakings and product offerings, some general features have been observed.

These products are generally long term in nature and provide a guaranteed fixed annual interest rate to the policyholder for the duration of the contract. Often, these products include the possibility for additional distributions to policyholders, in the form of profit sharing, based on actual investment returns. These profits are normally shared either at the discretion of the insurer, or by using a pre-determined formula and once the profits have been declared they become guaranteed. These products

normally include a guaranteed sum assured in the event of death, and possibly also on early surrender.

The second main product indicated by NSAs are Unit Linked products, which were mentioned by 15 NSAs as one of the main products in their market. These products typically don't have guarantees, and any risks with investments are borne by the policyholder. A majority of NSAs indicated that they are observing an increase in sales of Unit Linked products in preference to the traditional products, which are increasingly in run-off.

The final main product type indicated by NSAs are traditional life insurance protection products (e.g. Term life, endowment, whole life). These products generally have fixed premiums for the duration of the contract and have a sum assured that is payable on death or another event.

The following products are also significant in certain countries

- Variable Annuities (IE)
- Group Pensions (NL, FR)

High level summary of the availability of guarantees

The proportion of products with guarantees differs by country. In 16 countries, products with at least one guarantee make up over 95% of the market. In other countries the proportion of products with guarantees is much lower. In general the countries with a low proportion of products with guarantees have significant volumes of Unit Linked business. Further information on the percentage of products that have at least one guarantee in each country is contained in the table below.

Percentage of products with at least one guarantee	**Country**
Greater than 95%	BG, CZ, DE, EE, ES, HR, HU, LV, LI, LT, MT, PL, RO, SE, SI, SK
75% to 95%	AT, BE, DK, FR, NL, UK
50% to 75%	GR, IT, LU, NO, PT
Less than 50%	FI, IE

At a total European level 84% of products contain at least one guarantee. The most common types of guarantee are interest rate guarantee and guaranteed sum assured paid on death. 57% of all products have an interest rate guarantee (including where the interest rate guarantee is zero), and 49% of products pay out a guaranteed sum assured on death. For the purposes of this report we define an interest rate guarantee as one that is explicit in the contract.

The table below shows the proportion of total products, split by Solvency II line of business, that contain each type of guarantee. This shows that, as expected, guarantees are much less common in index-linked and unit-linked insurance than other types of life insurance.

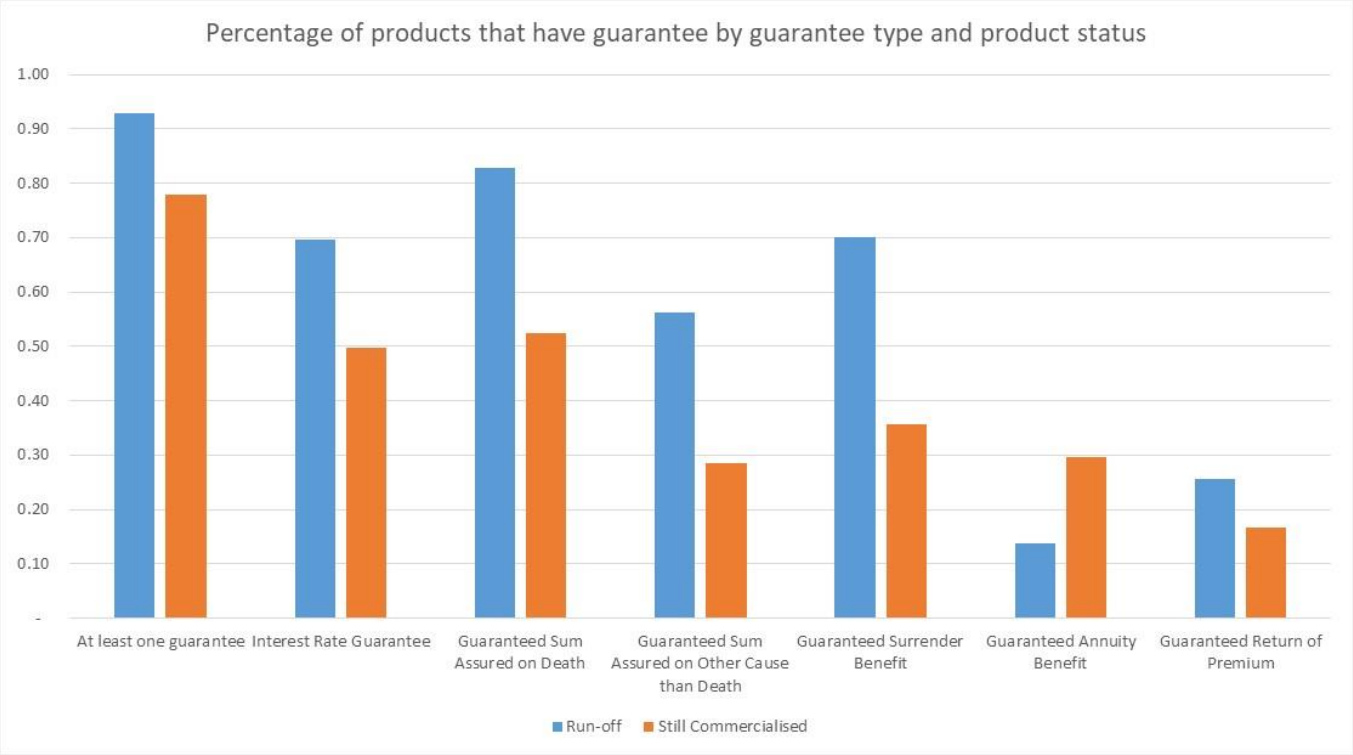
Type of Guarantee	30 – Life insurance with profit participation	31 – Index-linked and unit-linked insurance	32 – Other life insurance
Any guarantee	100%	57%	99%
Interest rate guarantee	89%	15%	49%
Guaranteed sum assured on death	54%	36%	70%
Guaranteed sum assured on other	33%	20%	28%
Guaranteed surrender value	49%	18%	30%
Guaranteed annuity benefit	26%	13%	36%
Guaranteed return of premium	22%	18%	13%

Insurance with profit participation is the largest source of guarantees in most European markets, however the split between which guarantees are most common within this line of business differs in each country. For this analysis a guarantee is defined as being common in the market if more than 50% of products within that line of business, by written premiums, have the guarantee.

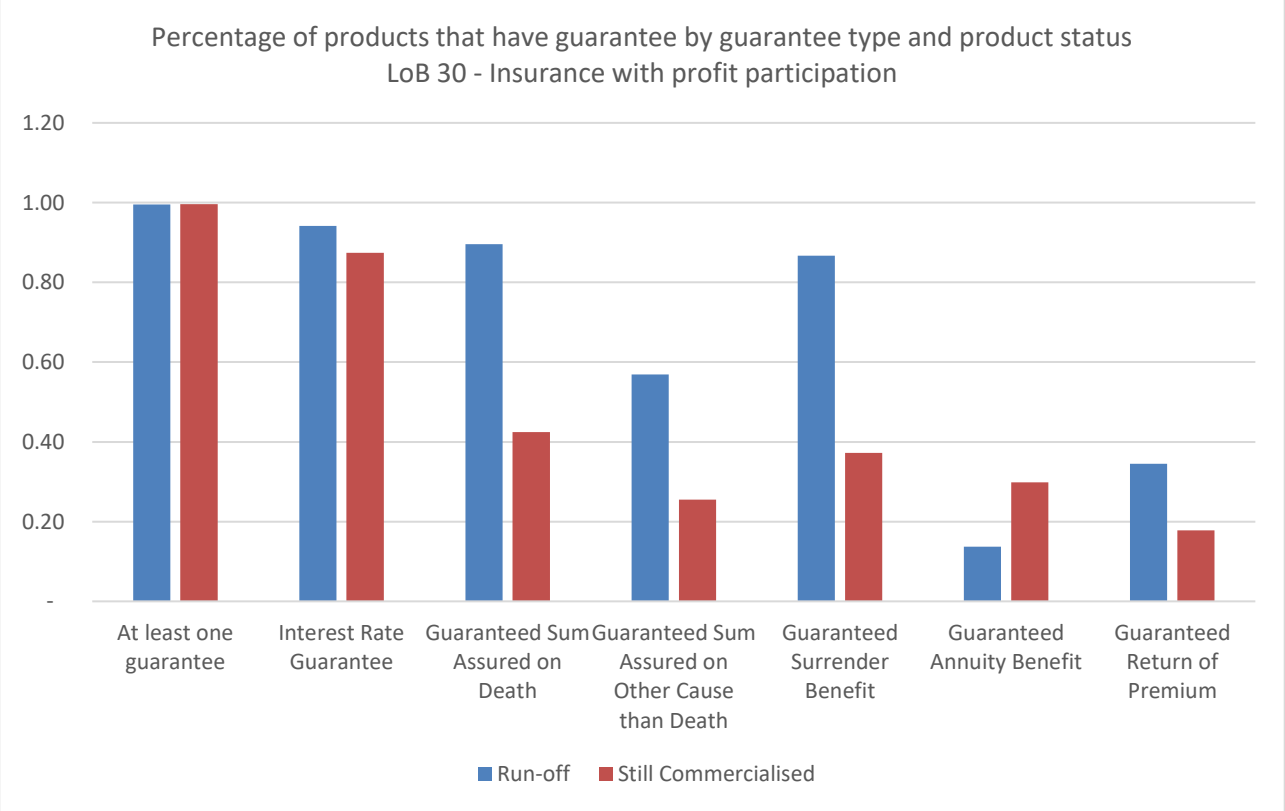
The following table provides some further information on which types of guarantee are common in the insurance with profit participation line of business in each market.

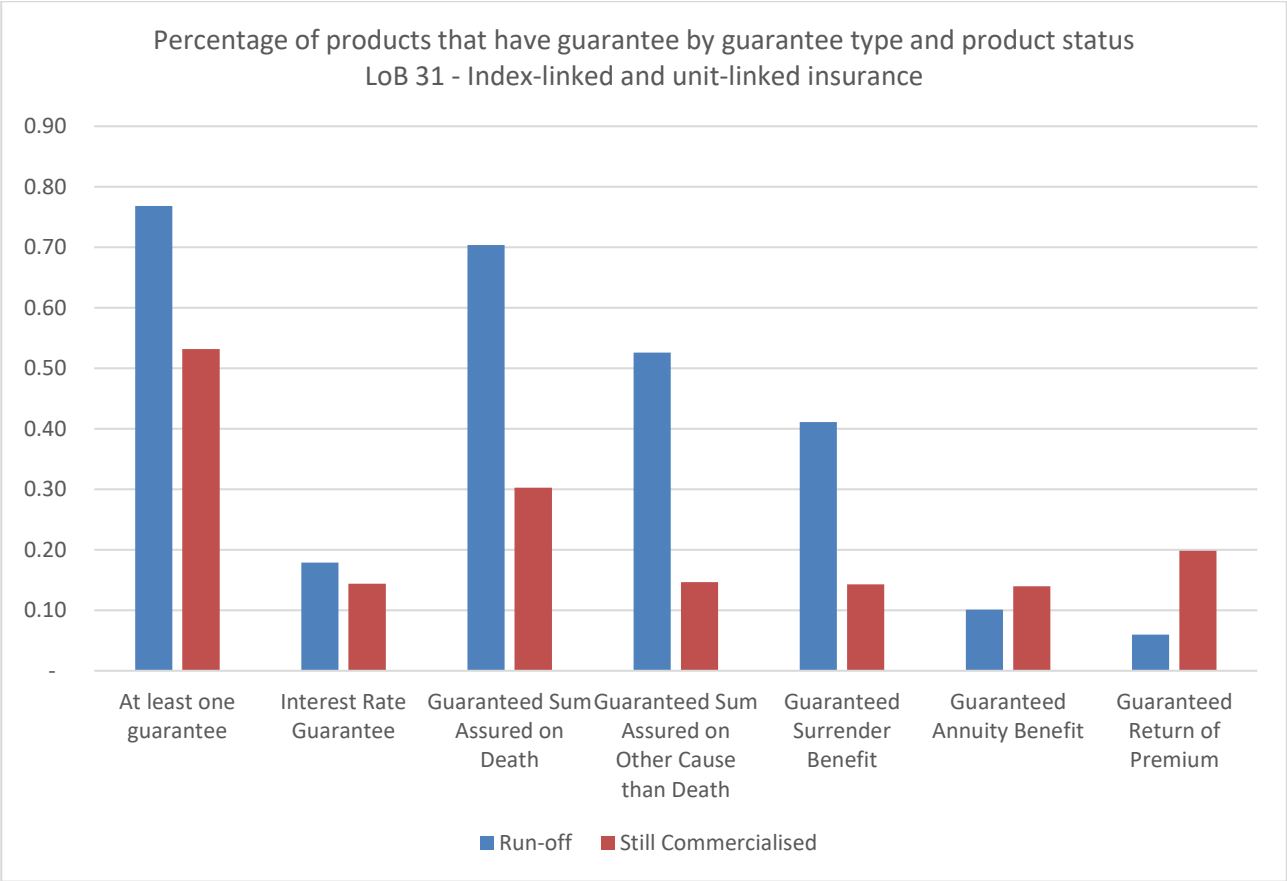
Country	Interest Rate Guarantee	Guaranteed sum assured on death	Guaranteed sum assured on other	Guaranteed surrender value	Guaranteed annuity benefit	Guaranteed return of premium
AT	Y	Y	N	Y	N	N
BE	Y	Y	Y	Y	N	N
BG	Y	Y	Y	Y	N	N
CZ	Y	Y	Y	N	N	N
DE	Y	Y	N	Y	Y	N
DK	N	N	N	Y	Y	N
EE	Y	Y	N	Y	N	Y
ES	Y	Y	N	Y	N	N
FI	Y	Y	N	N	N	N
FR	Y	N	N	N	N	N
GR	Y	Y	Y	Y	N	N
HR	Y	Y	Y	Y	N	N
HU	Y	Y	N	Y	N	N
IE	N	Y	Y	Y	N	N
IT	Y	Y	N	Y	N	Y
LI	Y	N	Y	Y	N	N
LT	Y	Y	Y	Y	N	N
LU	Y	N	N	Y	N	N
LV	Y	Y	Y	Y	N	N
MT	Y	Y	N	N	N	Y
NL	Y	Y	Y	Y	N	N
NO	Y	N	N	Y	Y	N
PO	Y	Y	Y	Y	N	N
PT	Y	Y	N	Y	N	Y
RO	Y	Y	Y	Y	N	N
SK	Y	Y	Y	Y	N	N
SI	Y	Y	Y	Y	N	N
SE	Y	N	N	N	N	N
UK	N	Y	Y	N	Y	N

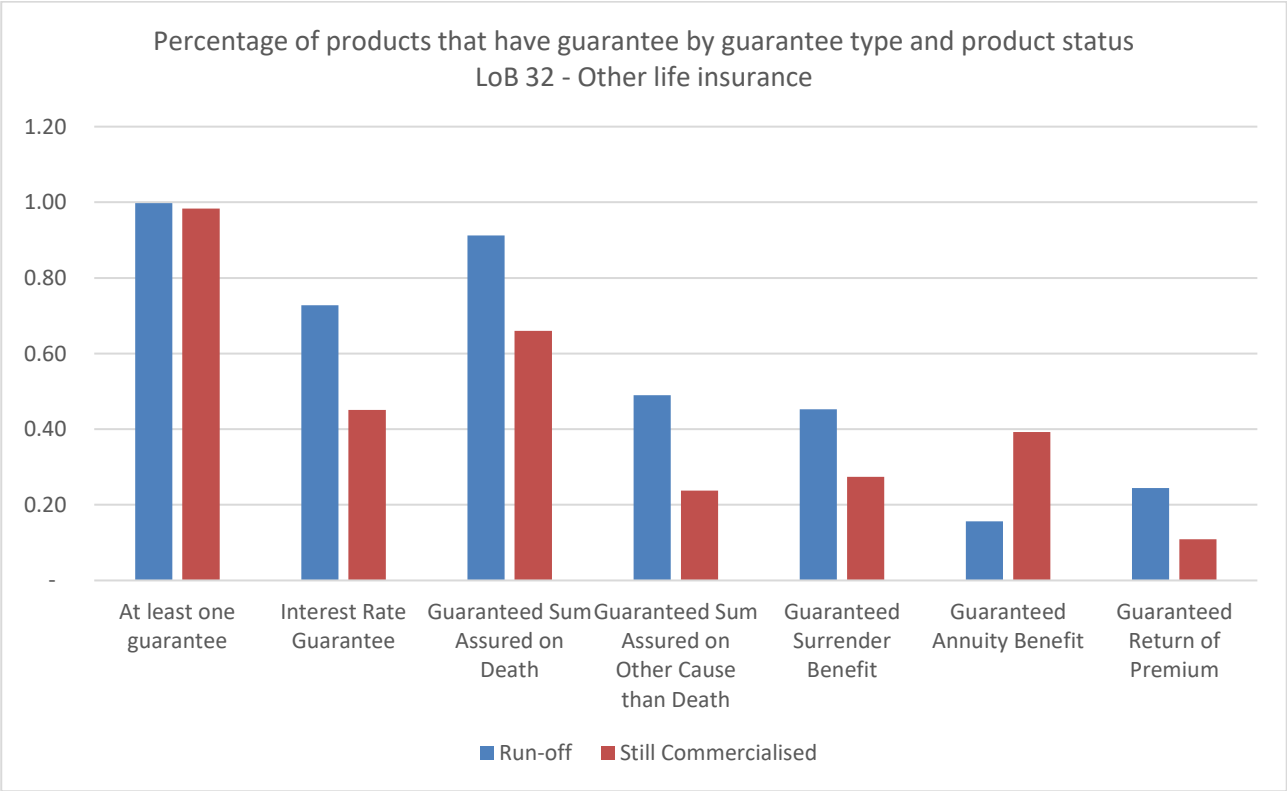
When the data is split between products that are in run-off and those still commercialised (i.e. products are available to be purchased by customers), it can be seen that fewer products that are still commercialised contain guarantees than products in run-off. 78% of products that are still commercialised contain at least one guarantee, compared to 93% of products in run-off. This trend for fewer guarantees in commercialised products can be seen for all types of guarantee except guaranteed annuity benefits, as presented in the following graph. The increase in commercialised products with guaranteed annuity benefits compared to run-off products can be explained by a shift by undertakings to sell more products with these features in some markets.



This trend can also be observed when looking at the data at a line of business level as seen in the following three graphs, which have the data for the main three life lines of business.







The trend for fewer commercialised products to have guarantees than products in run-off can be seen in the data for all national markets except for two countries (NL and

PT). In the NL this can in part be explained by a reduction in the sales of unit linked business which have lower levels of guarantees.

Overall the data provided in response to the information request on the availability of products with guarantees is consistent with information provided by NSAs in previous reports and in response to the questionnaire this year, where in both NSAs commented that the availability of guarantees is declining in their markets.

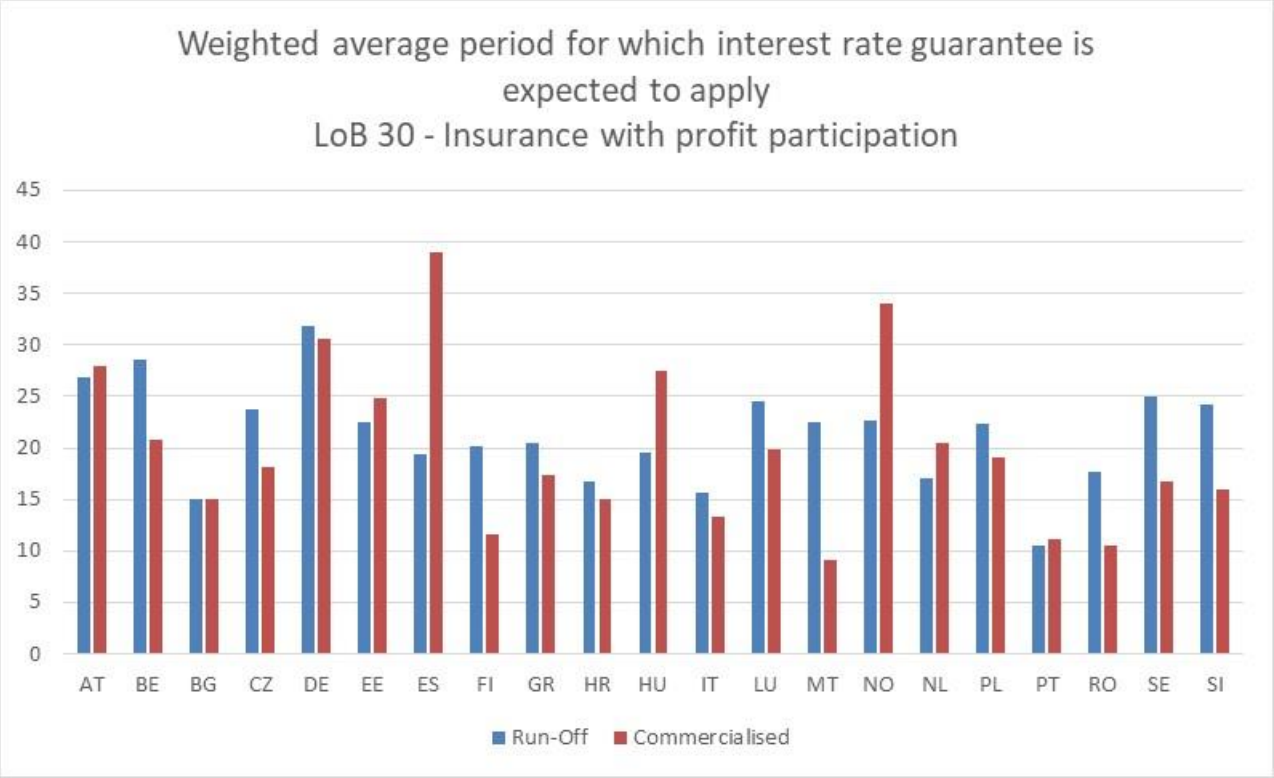
Further information on Interest Rate Guarantees

EIOPA requested further information on products that contain Interest Rate Guarantees, as these were deemed to be the most relevant for this report. For the purposes of this analysis an interest rate guarantee is one that is explicitly set in the contract. In the information request, undertakings were asked to provide detail on the average time period for which the interest rate guarantee is expected to apply, the size of interest rate guarantees, and whether the product has capacity for discretionary benefits to increase the guarantee.

The following graph shows the average time period for which the interest rate guarantee is expected to apply, for products in Line of Business 30 – Insurance With-profit participation, in each country. The average time period in this context is defined as the average of the total amount of time, from the start of the contract, over which the interest rate is applicable. This graph has been populated by asking undertakings to assign each of their products into a time period band. Where undertakings have selected "lifelong" as the period of the guarantee, this is assumed to be 50 years when combining with the other information in order to calculate an average time period per country.

Given the limitations in accuracy of using time period bands, and the understanding in there may be some differing interpretations on what is meant by time period in the responses to the information request, the graph should be read for the trend it shows, rather than for the specific values.

This data is split by products that are in Run-off and products that are still commercialised. For the majority of countries the time period for which interest rate guarantees apply is shorter for commercialised products than for products that are in run off. There are five exceptions where the time period for which the interest rate guarantee applies is longer for commercialised products. Both ES and NO have a very large proportion of commercialised products with lifelong interest rate guaratees, hence the long weighted average period in the chart below.



UK and FR data has been removed from the table. For both FR and UK, it is not possible to display a time period in years, as the responses to the information request indicated that the period for which the interest rate guarantee is expected to apply is lifelong. In addition some other countries have been removed as there is insufficient data in LoB 30.

The following table shows the proportion of products in each country that have an interest rate guarantee, where the interest rate guarantee is lifelong.

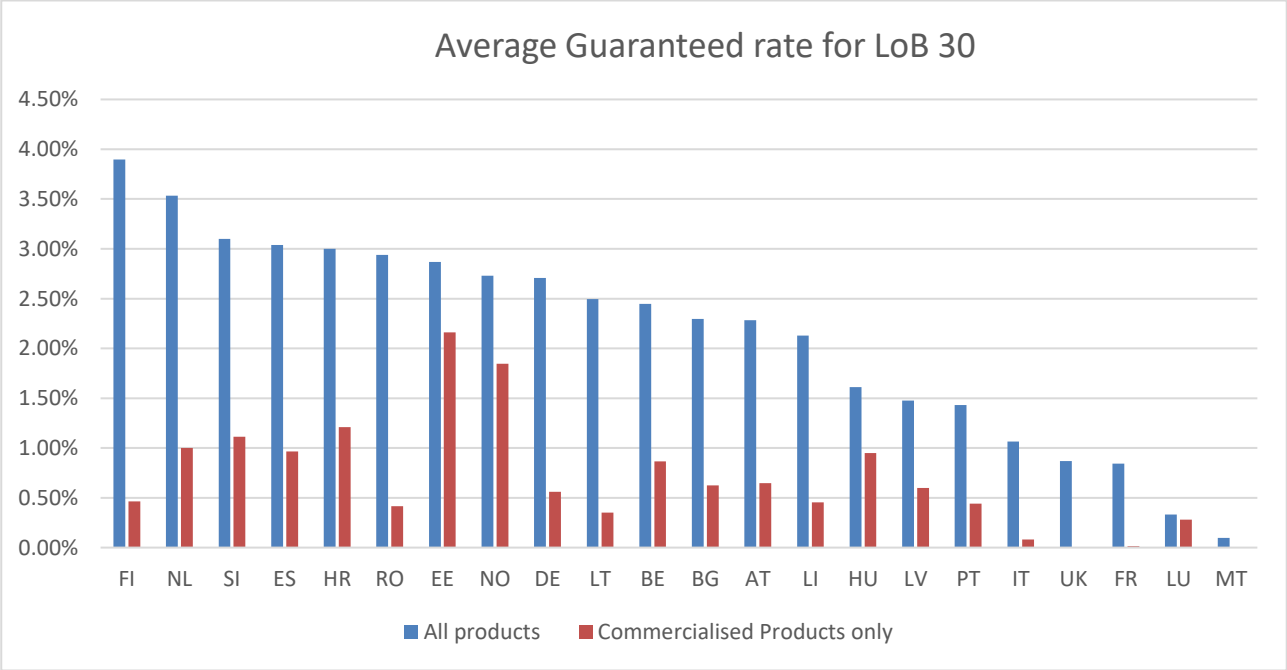
Percentage of products that have a lifelong interest rate guarantee	**Country**
Greater than 50%	ES, FR, LU, NO, UK
Greater than 20% but less than 50%	AT, DE, IT, NL, SE
Less than 20%	BE, BG, CZ, EE, FI, GR, HR, HU, MT, PL, PT, RO, SI

The information request also contained further questions in relation to interest rate guarantees in deferred annuity products during the accumulation and payment phases. Overall, around 68% of deferred annuity products contain an interest rate guarantee. Of these, 81% have an interest rate guarantee that is applicable for the full period of the contract, 12% have an interest rate guarantee that is just applicable

in the accumulation phase and 5% have an interest rate guarantee that is just applicable in the payment phase.

Information on Future Discretionary benefits (FDB) was also collected. The existence of FDB tends to coincide with products that also have an interest rate guarantee. The most common type of FDB, seen in approximately 50% of products, impacts the guaranteed sum assured. The remaining 50% of products with FDB are split evenly between products where the FDB impacts the guaranteed annuity benefits, and products where the FDB impacts both the guaranteed sum assured and guaranteed annuity benefits.

Data has also been collected on the size of interest rate guarantees. The information is only available for Line of Business 30 (Life insurance With-Profit participation) due to limitations in the availability of data in the QRTs, however this line of business represents the most material source of interest rate guarantees. The following graph displays the average size of guarantee for products in LoB 30 for each country, for all products and just for products that are still commercialised.



For all countries, the size of interest rate guarantees is lower for products that are still commercialised. In some countries the decrease is partially due to updates in legislation that limit the guaranteed rate that undertakings can offer (AT, DE, LU), however this is generally a minor factor and insurance undertakings are reducing the value of the guarantees in their products anyway. In other countries the trend appears to be consistent with observations from NSAs that the size of interest rate guarantees is decreasing. Some NSAs have observed a trend for interest rates to decrease to zero.

Impact of the measures on the design and pricing of products.

In the information request undertakings were asked any of the LTG measures have an impact on the design and pricing of products.

The following table shows the number of undertakings in the sample that use each measure, and out of those undertakings, the number that stated that they use the measure in the pricing and design of products.

LTG Measure	Number of undertakings in the sample using the measure	Number of undertakings using the measure in the pricing and design of products
VA	140	24
MA	16	15
TTP	66	3
TRFR	3	0

For undertakings that use the VA in their pricing the most common way is to allow for the VA in the discount rate used to price new products. Other undertakings allow for the VA when performing profit testing scenarios on new products. Two undertakings indicated that the VA has an impact on the cost of holding capital, which they take into account in product pricing, with one undertaking stating that as the VA reduces the cost of capital, and its volatility, they can charge lower prices. One undertaking stated that while they use the VA in their pricing, due to its current low size it does not have a material impact.

Out of the undertakings using the MA, all bar one use the MA when pricing products. Generally speaking, undertakings design the products in order the meet the requirements for the MA, specifically in relation to cashflow matching, asset availability and restrictions on surrender values. Some undertakings stated that allowing for the MA in their pricing allows them to offer more competitive prices.

The undertakings using the TTP in the pricing of products state that they factor in the reduction of the TTP each year, and so need to earn more from new products to offset this.

Trend regarding availability of products with long-term guarantees

Concerning Health products, no change in availability was observed in 27 out of 30 jurisdictions. An increase was observed in two jurisdictions (GR and CZ) as protection products become more strategic in a low yield environment. One jurisdiction (FR) reported an observed movement from mutual to larger insurers in terms of gross written premiums also because of the low yield environment and these products becoming more strategic for larger insurers.

Concerning insurance with profit participations, 16 jurisdictions (out of 30) observed no change in availability. One of those reported that the decrease observed last year was due to changes in product design and that as the adjustment had now occurred,

the trend is stable (PT). Still, 10 jurisdictions observed a decreasing trend because of the low yield environment and incentives given by undertakings for policyholders to switch to unit-linked products. One jurisdiction mentioned that there has been a strong shift from traditional products to new products with lower and more flexible guarantees that are only given for the whole term of the contract (DE). One jurisdiction also mentioned an observed change in product design and management that has proved popular (UK). Nevertheless in 3 other jurisdictions, an increase in gross written premiums was observed also because of the low yield environment and insurance with profits participation still being more attractive than other saving products. Finally, one jurisdiction reported firms had ceased to offer this kind of products (GR).

In relation to unit-linked insurance, and linked to the trend observed by NSAs that there is a switch away from with-profits products and an increase in unit linked, 15 jurisdictions observed an increase in the gross written premium on these contracts. 15 jurisdictions observed no change though.

Concerning the other life insurance products, 24 undertakings reported having observed no changes in the availability. 5 jurisdictions observed an increase mainly due to protection and mortgage loan insurance products. One of these jurisdiction (FR) reported that those products became more strategic in the low yield environment. Finally, one jurisdiction observed a shift in the way annuity business was originated. A significant proportion of new annuity business was attributed to the reorganisation in the defined benefit pension schemes sector as well as a trend in transfers to money purchase arrangements (UK).

Variable annuities are not material in many European jurisdictions but 2 two jurisdictions reported a decreasing trend for these products (GR and IE) with firms ceasing to provide them and one reported the market has closed (UK).

Trend in size of guarantee

Overall, NSAs have observed a decrease in the size of guarantees, in particular, interest rate guarantees.

For interest rate guarantees, 15 NSAs have observed a decreasing trend in the size of guarantees in the in-force business, with only one NSA (MT) observing an increasing trend. The remaining NSAs reported that there is either no trend (i.e. the size of interest rate guarantees is stable) or there is no overall trend, and picture is mixed depending on the product. There are similar trends for new business, however none of the NSAs observed an increasing trend. There is further specific information in interest rate guarantees in the following section.

The size of the other types of guarantees (guaranteed sum assured on death, guaranteed sum assured on other reason than death, guaranteed surrender value, guaranteed return of premium and guaranteed annuity benefit) are stable in most countries, with slightly more NSA observing a decrease in the size of guarantees than an increase. The trend in the size of these guarantees is not as significant as the trend observed in the size of interest rate guarantees.

In general, the following phenomena (already mentioned last year) have been observing by a number of NSAs:

- a shift to unit-linked, pure protection or hybrid products;
- a decreasing level of financial guarantee included in the contracts or a change in the way the guarantee is accounted for (not year by year but only at the end of the contract)
- a decreasing duration of the guarantees.

Similarly to what has been reported last year, the main drivers identified for the decreasing availability of LTG products are:

- the low interest rate environment (mentioned by 7 NSAs);
- the increased cost of guarantees caused by the low interest rate environment and the reflection of the cost in the Solvency II requirements, in particular in the calculation of the technical provisions and the SCR (mentioned by 3 NSAs).

The majority of NSAs have not observed that current trends regarding the availability of products with long-term guarantees raised consumer protection issues. Three countries reported consumer protection issues with regard to these trends. These issues related the provision of enough, fair and balanced information on the products, the comprehensibility of unit-linked insurance and the transfer towards lower guarantee products, and the absence of market competition.

The main supervisory activities and measures taken by NSAs were:

- survey and interviews across all life insurance undertakings;
- the improvement of regulation (especially on transparency and reporting requirements);
- ad hoc on-site inspection, of which inspection dedicated to market conduct;
- the transfer of products not in the consumer interest and active discussion with the undertakings about their selling practices;
- focus on the proper conduct of insurance brokers and intermediaries;
- communication towards constitution of reserves;
- development of a "consumer protection risk based system" of early warning.

II.6 Impact on competition and level playing field in the EU insurance market

The topic on competition and level playing field is included in the list of relevant items for the review of the LTG measures and measures on equity risk in Article 77f(3)(c) of the Solvency II Directive. It has been covered since the report 2017 (it was not

included in the first report because of the scarcity of data and limited experience on the topic at that time).

In response to the question of whether they had observed any impact of the LTG measures and measures on equity risk on competition, the vast majority of NSAs did not report any such observations

The focus of the analysis of competition and level playing field for this report was on national differences in the supervisory treatment of the measures.

With regard to the internal models to calculate the SCR, **two different treatments of the VA** can be observed, the modelling of a constant VA and the modelling of a dynamic VA. The approaches are further explained in section III.3. The modelling of a dynamic VA results in a significantly lower SCR for spread risk.

Nine NSAs commented that they would allow undertakings using internal models to apply the dynamic VA and reported the number of undertakings doing so as at year-end 2017:

Country	Solo	Groups
AT	2	0
BE	2	0
CZ	1	0
DE	24	2
FR	15	1
IE	0	0
IT	2	1
LU	0	0
NL	7	2
Total EEA	**53**	**6**

The majority of NSAs reported that they did not (yet) take a decision on whether they would allow for application of the dynamic VA, either because there is no undertaking applying an internal model in their country or because undertakings do not apply the VA. One NSA explicitly outlined to be reluctant to allow undertakings using internal models to apply the dynamic VA.

With respect to VA, the questionnaire investigated if NSAs require undertakings in their market to perform (regular) specific additional analysis as a consequence of applying the VA in addition to what is already foreseen by the regulation. Only one NSA refers to a particular case:

- this NSA issued a letter to insurance undertakings setting out its expectations regarding undertaking's internal policies on capital adequacy and addressing the expectation that undertakings take into account the impact of the LTG measures.

The majority of NSAs did not identify undertakings where the risk profile of the undertaking deviates significantly from the assumptions underlying the VA. However, individual cases were observed where the investment portfolio deviated significantly from the reference portfolio. In these cases, undertakings were requested to analyze the risks related to that separately as part of their ORSA process.

One NSA noted that there was not a common understanding as to whether a proximity to the reference portfolio should be seen as an underlying assumption for the VA. Thus any comparison with the reference can only be considered in the internal oversight activities, however applying a capital add-on would not be possible. A deviation of the own assets or investment policy with the reference portfolio was also considered a potential reason for a significant deviation in risk profile by other NSAs. For example because of a different geographical distribution of the undertaking government bond portfolio with respect to the one underlying the VA or because of a different investment strategy of the undertaking.

No capital add on was considered by NSAs so far. It was mentioned that the application of a capital add on is limited due to a lack in common understanding of which assumptions underlying the VA need to be considered and its relevance to the representative portfolio.

MA is a measure applied in two countries only: Spain and UK. Both countries set governance rules to ensure that the assigned portfolio of assets cannot be used to cover losses arising from other activities of the undertaking. In one country, undertakings are requested to identify in the investments book the assets assigned to the MA. Undertakings are then required to appoint someone responsible for the Asset and Liability management policy of the MA portfolio. Every change in the assets of the MA portfolio must be approved by the responsible persons (Actuarial function and Risk Management function) and be documented in a report which is raised to the Board. In the other country, firm applications are required to include the framework for the extraction of assets from the MA Portfolio, covering timings, reasons and governance for allowing this. Additionally firms are required to include details of collateral management processes which ensure that MA assets are not posted as collateral for non-MA business.

In both countries, investments are assessed asset by asset. These assets have to be fixed income assets and nominated in the currency of liabilities. These features can be intrinsic to the assets or be obtained through other assets (for instance, a suitable derivative which transforms the cashflows of the asset into fixed cash flows). In both countries, undertakings are expected to determine, for each asset, whether the issuer or a third party are permitted to change the cash flows. Where cash flows may be changed at the unfettered discretion by the issuer, there should be sufficient compensation paid such that reinvestment is possible to replicate the cashflows.

The assessment to identify any mismatch in one jurisdiction refers to cash flows and is requested to be run monthly. In the other jurisdiction, undertakings are required to adopt matching tests, and to report to their Supervisor any breaches of the adopted matching tests. This must come with a plan of action to remedy the breach of test thresholds.

None of the NSAs reported cases of where the risk profile of the undertaking deviates significantly from the assumptions underlying the MA

With respect to the TTP

Recalculation of the deduction referred to as the Transitional on TP measure (in 2017) occurred in 4 of the 10 countries where the TTP is applied:

- In one market the NSA considers a biennial recalculation as compulsory;
- In another market at the initiative of the NSA, all undertakings using the TTP applied for a recalculation at year end 2017, all of which have been approved. In this market also 8 other recalculations occurred, the reasons of which were varying (changes in assumptions, business transfer);
- In one country deductions need to be recalculated on an annual basis, and undertakings are allowed to recalculate on a quarterly basis. All undertakings applying the TTP, in that country, have applied for a regular quarterly recalculation of the deduction which was granted;
- In one country recalculation was initiated by the NSA in two cases because of a transfer of business or a decision of the undertaking to discontinue new business.

As for last year, different supervisory practices were observed concerning the possibility to apply a lower amount of transitional deduction to technical provisions than the maximum amount that has been approved by the NSA.

Again, responses show a mixed picture:

- Two NSAs indicated that undertakings in their jurisdiction always have to apply the maximum amount and argue with the reading of the SII Directive or the transposition into national law.

- Another six NSAs allow the application of a lower amount, but in most cases no reduction was applied by undertakings. Only one NSA allows the cancellation of the reduction of the deduction at a later date, with the pre-requisite that a consistent approach over the transitional period is followed. This NSA also expects undertakings to reflect on their approach in the risk management framework and the ORSA. One NSA explicitly stated that undertakings are not allowed to increase the deduction from one year to the next.

- For the remaining cases, the NSAs did not (yet) take a decision as either no undertaking applies the TTP in that country or because it was not yet observable that undertakings wanted to apply a lower amount of the transitional deduction than the maximum amount.

Another aspect that was assessed was if NSAs considered in their approval of the transitionals whether these were necessary to ensure a smooth transition to SII.

Varying approaches were observed. 5 NSAs stated that during the approval process they explicitly considered whether the transitional was necessary for the undertaking applying.

Other NSAs also assessed how necessary the use of the transitionals was for undertakings. One NSA mentioned an increased resilience against potentially adverse future situations as a motivation to apply the transitionals. Another NSA considers the measure to be a relevant and necessary tool to ensure a successful transition to Solvency II. Prior to the introduction of Solvency II, during the approval process, this jurisdiction did not focus on the solvency position of undertakings under the Solvency II regime. The NSA also observed a high number of undertakings who did not meet the solvency capital requirement without the transitional measures.

With regard to the start of the use of the transitional measures after 1 January 2016, the majority of NSAs allow for approval of the measures also after 1 January 2016. 5 NSAs do not allow it. Among the remaining NSAs, two specified that none of the undertakings requested the late application of the TTP in that country.

During 2017 the use of the transitional measures was granted to 7 undertakings from four countries. There was also another application which received the approval in 2018.

The reasons behind the late application were mainly due to:

- the extension to all the undertakings within a group. The application of a measure was initially requested only by few undertakings and moving to a homogeneous approach among the group to calculate the solvency ratio;
- the intent of having additional capital reserves, e.g. in case of higher interest rate volatility.

None of the NSAs reported cases of where the risk profile of the undertaking deviates significantly from the assumptions underlying the TTP/TRFR.

An unlevel playing field can stem from different application of the LTG measures and measures of equity risk as observed above. An unlevel playing field can also result where the measures themselves differentiate between national markets. That is naturally the case for transitionals from a minimum harmonisation system like Solvency I to a maximum harmonisation system like Solvency II. The transitional adjustments for the TTP and the TRFR are calculated with reference to the valuation rules of Solvency I. These rules were not harmonised and hence they may be different across Member States and result in different amounts of technical provisions and different discount rates across national markets. Two undertakings with the same liabilities and risks but located in different Member States may therefore have different technical provisions when they both apply the TTP or the TRFR.

None of NSAs outlined any impact due to LTG measures on portfolio transfers, mergers and acquisitions. One NSA clearly stated that transfers are driven by other factors such as EU withdrawal rather than LTG measures.

II.7 Impact on financial stability

EIOPA has asked NSAs about their experience with the LTG measures in relation to financial stability. 21 NSAs responded that they observed no impact at all of the LTG measures to financial stability.

VA and MA

6 NSAs stated that there was no impact of the MA and VA on financial stability in 2017, as expected, because of the stable market circumstances in which credit spreads did not significantly change with relatively low overall credit spreads. As such the MA and VA also did not change a lot in 2017 and had not a lot of impact.

Overshooting VA

One NSA commented that applying the VA has an overshooting impact on own funds for undertakings with relatively long-term liabilities and relatively little and relatively less risky fixed income investments. In case spreads increase, the application of the VA by those undertakings implies a larger decrease in the valuation of the technical provisions than the decrease of value in their investments; as such the own funds of those undertakings increase when credit spreads increase.

Behaviour of euro VA in case of a spread widening affecting a single Eurozone country

With regard to the VA of the Eurozone another NSA commented that, in case of a spread widening affecting a single country of the area, some undesirable effects could be observed in terms of volatility of technical provisions, own funds and solvency ratio[23] affecting all Euro zone countries.

In particular, in the country affected by the spread widening, the measure does not provide the stabilization expected by the national supervisor because the country-specific increase will not be activated. When the spread values are around the trigger point, the country component in the monthly VA calculation shows a cliff effect due to the binary mechanism of activation. This makes the total VA a non-linear function with a high (local) volatility because of switching between currency and country VA. Since that movement of the VA happened within a quarter, it was not reflected in the series of quarterly VA that became binding for the calculation of technical provisions.

In the other euro zone countries, the increase of the spreads of one single Member State implies an increase in the euro VA that is not necessarily correlated to a worsening of the financial conditions of all the Eurozone (overshooting effect). In this case, in the other Eurozone countries a reduction of TP will occur, not necessarily counterbalanced by a reduction of asset values or by an increase in the undertakings'

[23] The effects described were observed in 2018 due to the widening of the spreads of Italian government bonds.

return on assets. This situation could then lead to cases of unexpected undue capital relief.

TTP

2 NSAs replied to the questionnaire regarding the impact of the TTP on financial stability, pointing out that multiple undertakings would not have complied with their SCR if they would not apply the TTP. The NSAs from the other jurisdictions where undertakings applying the TTP do not all comply with their SCR did not indicate an impact on the financial stability.

Symmetric Adjustment for equity risk

One NSA observed that the index underlying the symmetric adjustment for equity risk did not move in line with the equity index their undertakings are exposed to.

Extrapolation

One NSA replied that the current parametrization of the extrapolation for the euro currency stabilizes the value of the technical provisions. Another NSA commented that whereas the valuation of technical provisions may be stabilized, the amount of own funds may become less stable because of the current parametrization. Whether or not the amounts of own funds are stabilized depends on the extent of interest rate hedging and cash flow matching. [24]

Financial Sector Assessment Program of the International Monetary Fund

The International Monetary Fund (IMF) has, as part of its assessment of the euro are under the Financial Sector Assessment Program analysed the LTG measures.[25] The IMF has made two recommendations on the LTG measures. Firstly that EIOPA explores methods for transforming the LTG measures into more symmetric measures in order to achieve that the measures do not only reduce liabilities of insurance undertakings in times of stress but could also be designed in a way to build up additional reserves in good times. Secondly the IMF recommends that public disclosures on the use of LTG measures should be improved by providing more detailed guidelines on how undertakings should also qualitatively discuss the use of LTG measures in the summary of the Solvency and Financial Condition Report.

[24] Undertakings that match their cash flows beyond the LLP to a large extent experience more volatility in own funds than undertakings that match the cash flows of their liabilities beyond the LLP to a lesser extent. This can be explained by the fact that current parametrization decreases the volatility of the rates beyond the LLP only for the purpose of the valuation of the technical provisions, while the value of the assets for which the market values are available remains fully sensitive to the volatility of market rates beyond the LLP. The amount of cash flow matching that would minimize the own fund volatility depends, among other aspects, on the relative amount of cash flows beyond the LLP and the level and shape of the risk-free interest rate term structure. Those undertaking that match to a large extent would have a lower volatility of own funds with a different parametrization, for example a 'later' LLP. Undertakings that match relatively less would experience more volatility in own funds in case of a 'later' LLP.

[25] IMF Country Report No. 18/230, https://www.imf.org/en/Publications/CR/Issues/2018/07/19/Euro-Area-Policies-Financial-Sector-Assessment-Program-Technical-Note-Insurance-Investment-46104

III. Specific analysis for each of the measures

III.1 Extrapolation of the risk-free interest rates

For maturities where the markets for the relevant financial instruments or for bonds are no longer deep, liquid and transparent, the relevant risk-free interest rate term structure shall be extrapolated. The extrapolated part of the relevant risk-free interest rate term structure shall be based on forward rates converging smoothly from one or a set of forward rates in relation to the longest maturities for which the relevant financial instrument and the bonds can be observed in a deep, liquid and transparent market to an ultimate forward rate (UFR).

The extrapolation of the risk-free interest rate term structure cannot simply be switched off to quantify its impact on the size of technical provisions, own funds and SCR for undertakings. It is however possible to assess the impact of variations in the assumptions underlying the applied extrapolation methodology, which are the starting point of the extrapolation (the so called last liquid point, LLP), the level of the ultimate forward rate (UFR) to which the interest rates are extrapolated to and the convergence speed.

As described in subsection II.2, the preselected undertakings were asked to calculate the impact of the following three scenarios on their financial position:

- Scenario 1: Increase of the LLP for the euro from 20 to 30 years. For currencies other than the euro the risk-free interest rates are unchanged.
- Scenario 2: Increase of the minimum convergence point from 60 to 90 years for all currencies except the Swedish krona. For the Swedish krona the convergence point changes from 20 years to 50 years
- Scenario 3: Decrease of the UFR for all currencies by 100 basis points

Impact on the financial position of undertakings

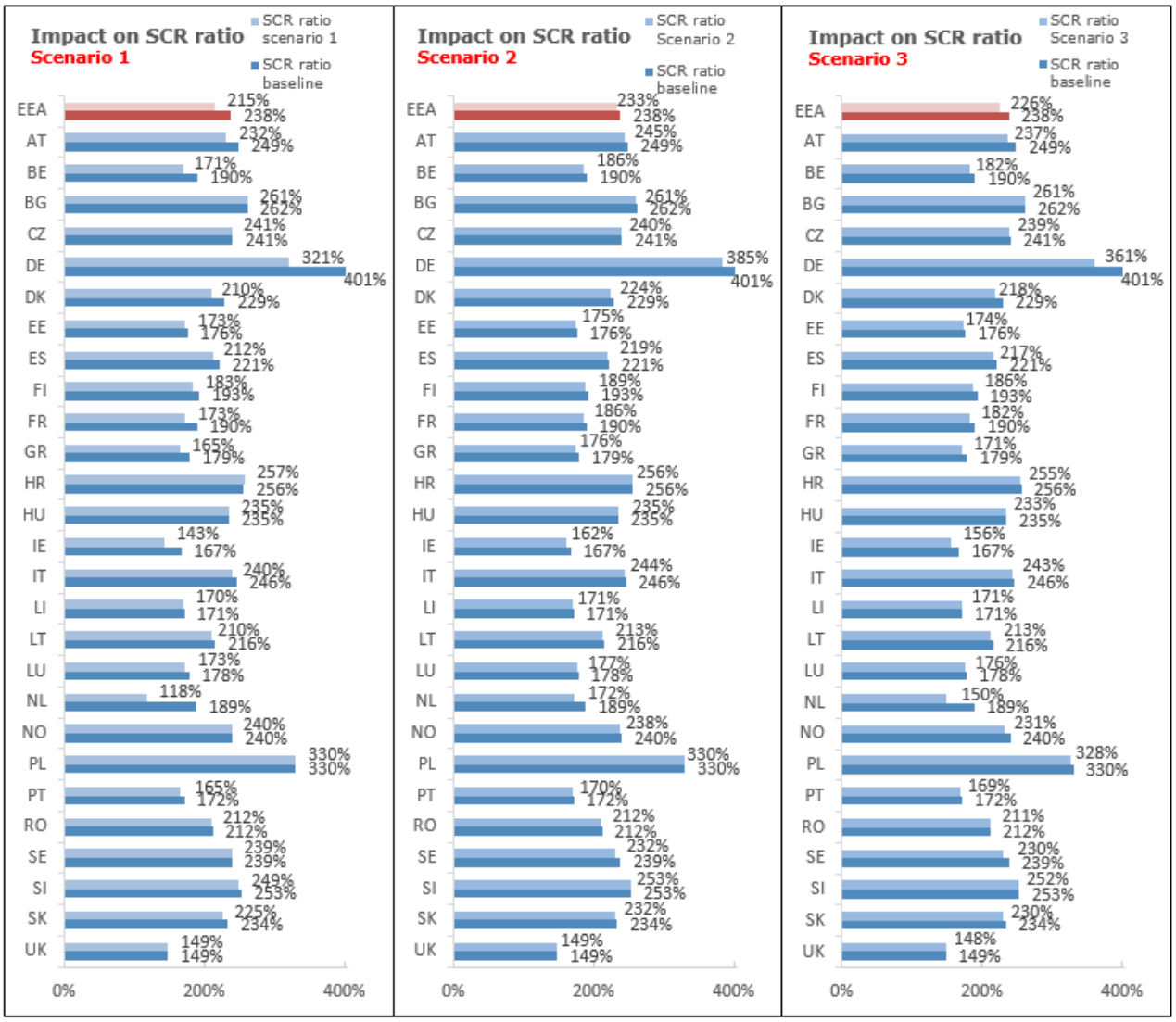
As for section II.2, the analysis performed on the extrapolation and outlined in the following is based on the information received by undertakings via the information request including scenario calculations varying the UFR, the LLP and the convergence speed. The analysis includes only the information for those preselected undertakings who have provided information on the individual scenarios.

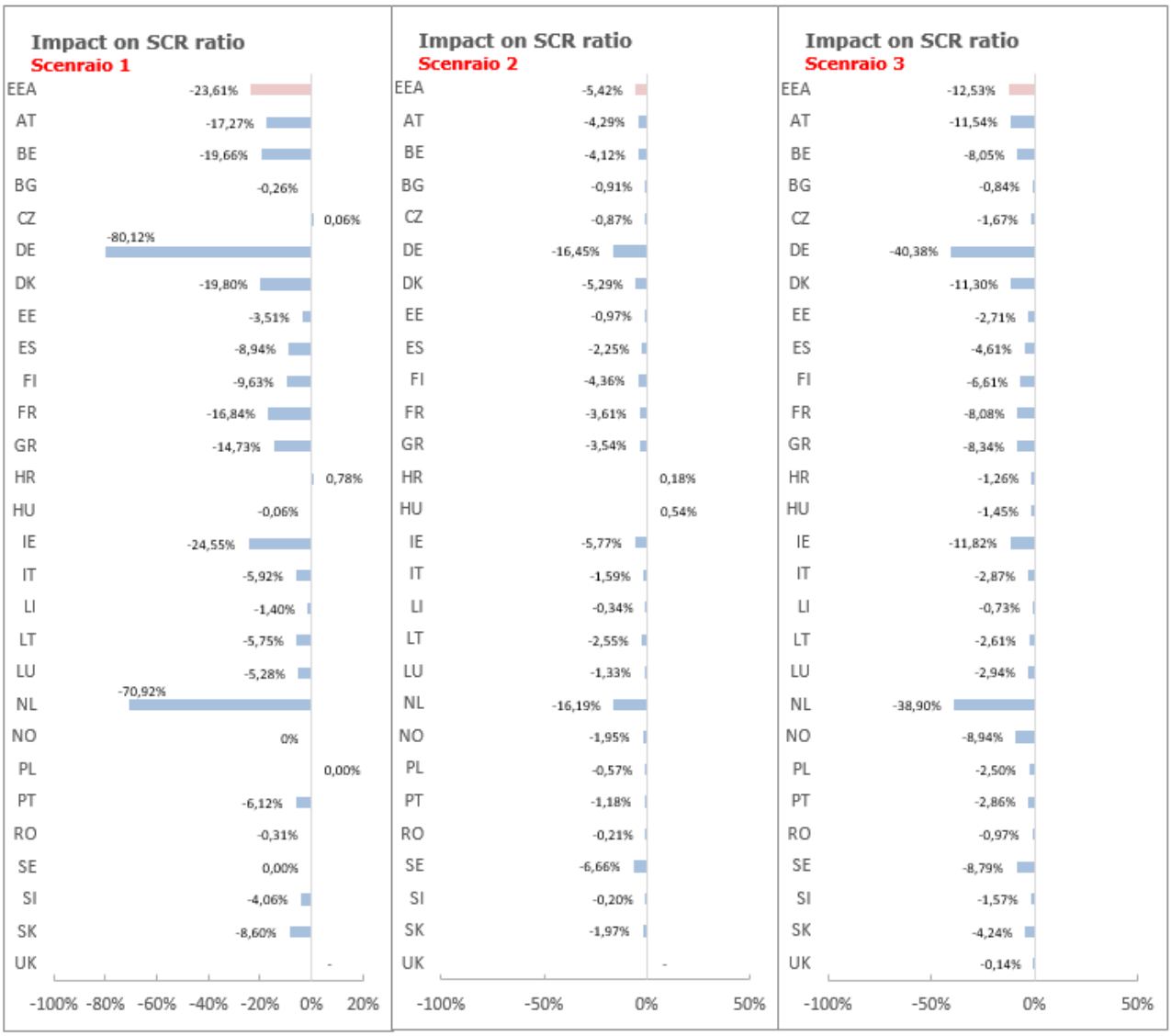
The data sample for the analysis on the extrapolation is thus different to the analysis performed for the other LTG measures, which cover the whole market.

Results by country are only provided for those countries where the calculation included more than three undertakings.

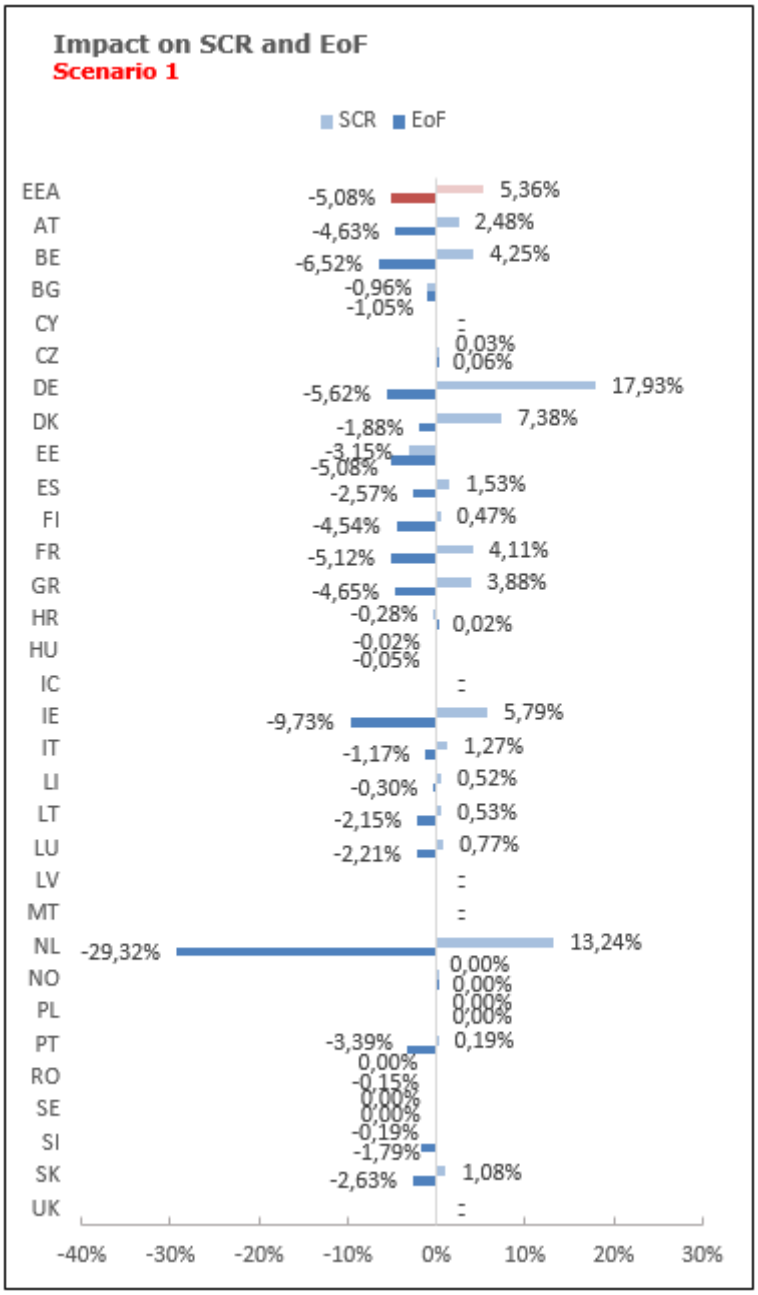
The following graphs show the average impact at EEA level and per country of each of the three specified scenarios on the SCR ratio, the SCR and the eligible own funds to cover the SCR.

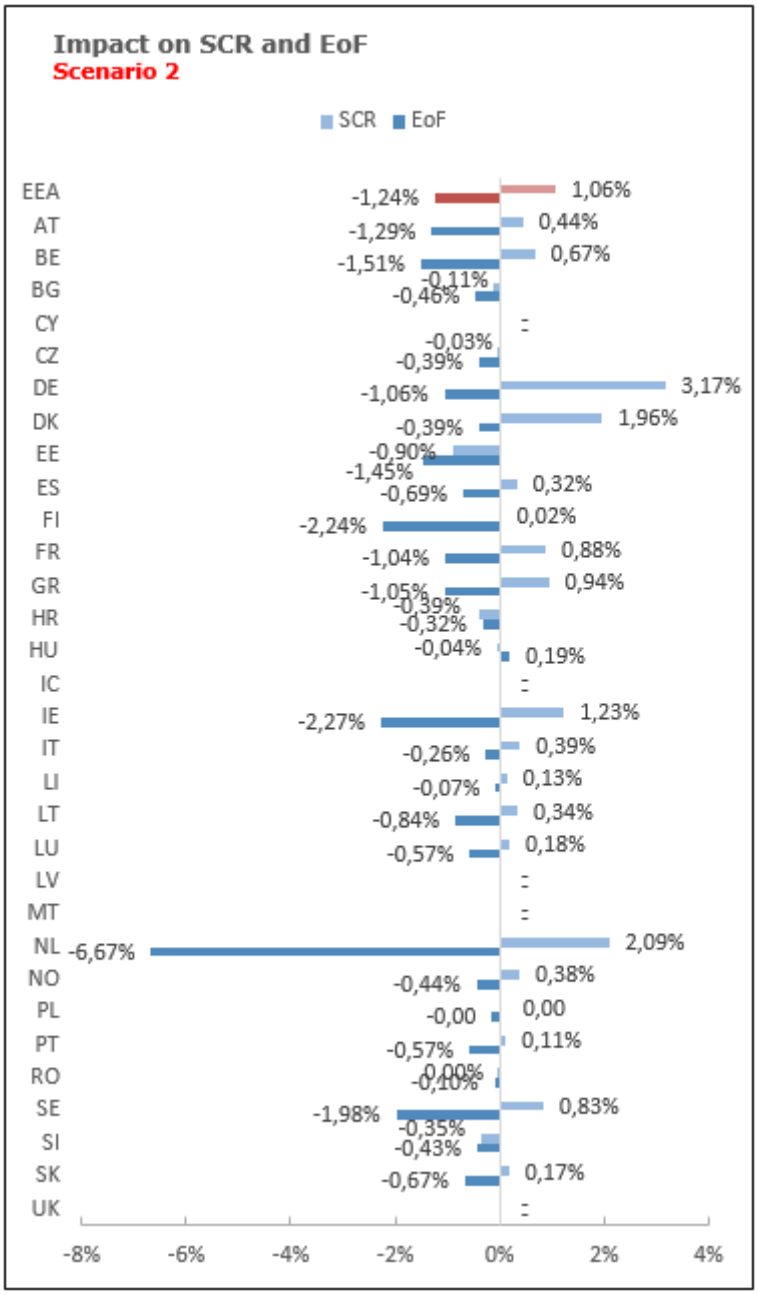
At EEA level, scenario 1 would result in a reduction of the SCR ratio by 24 percentage points, scenario 2 would result in a reduction of the SCR ratio by 5 percentage points and scenario 3 would result in a reduction of the SCR ratio by 13 percentage points. The average change in SCR ratios is the highest for undertakings in Germany, and Netherlands.

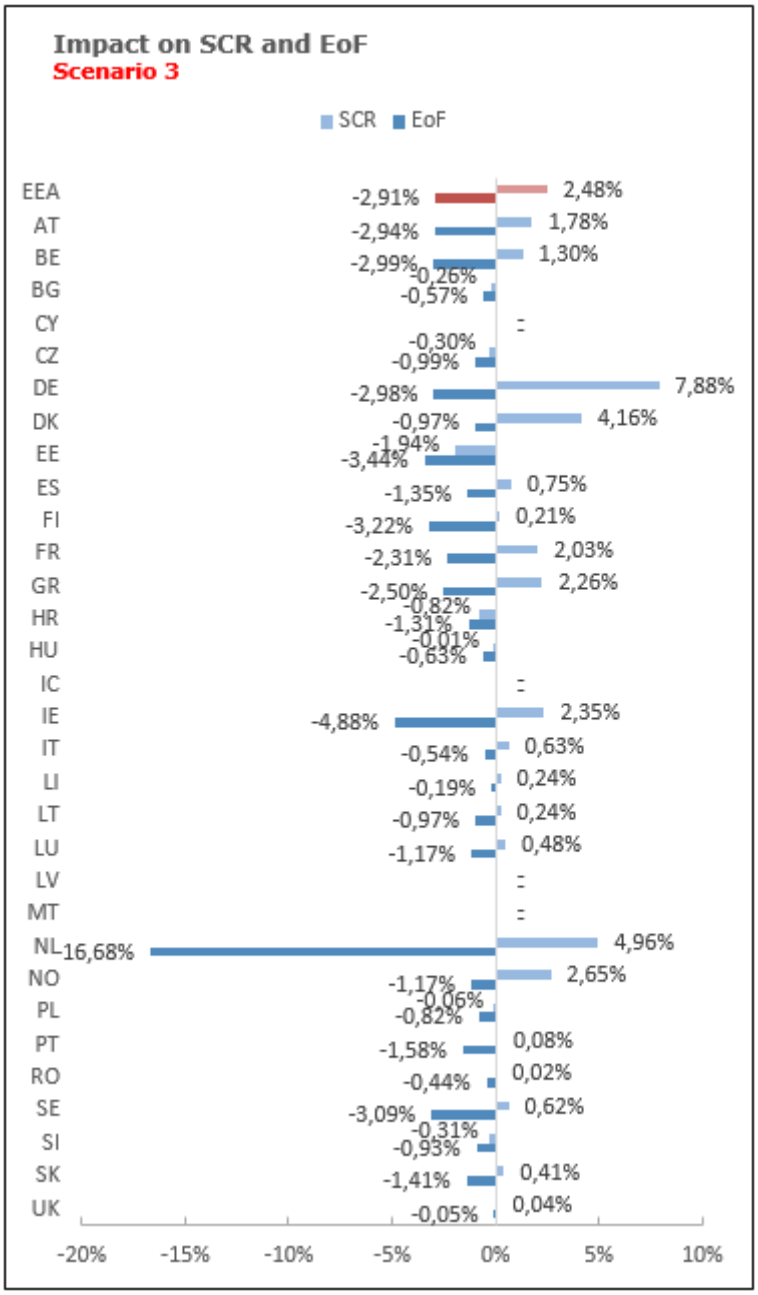




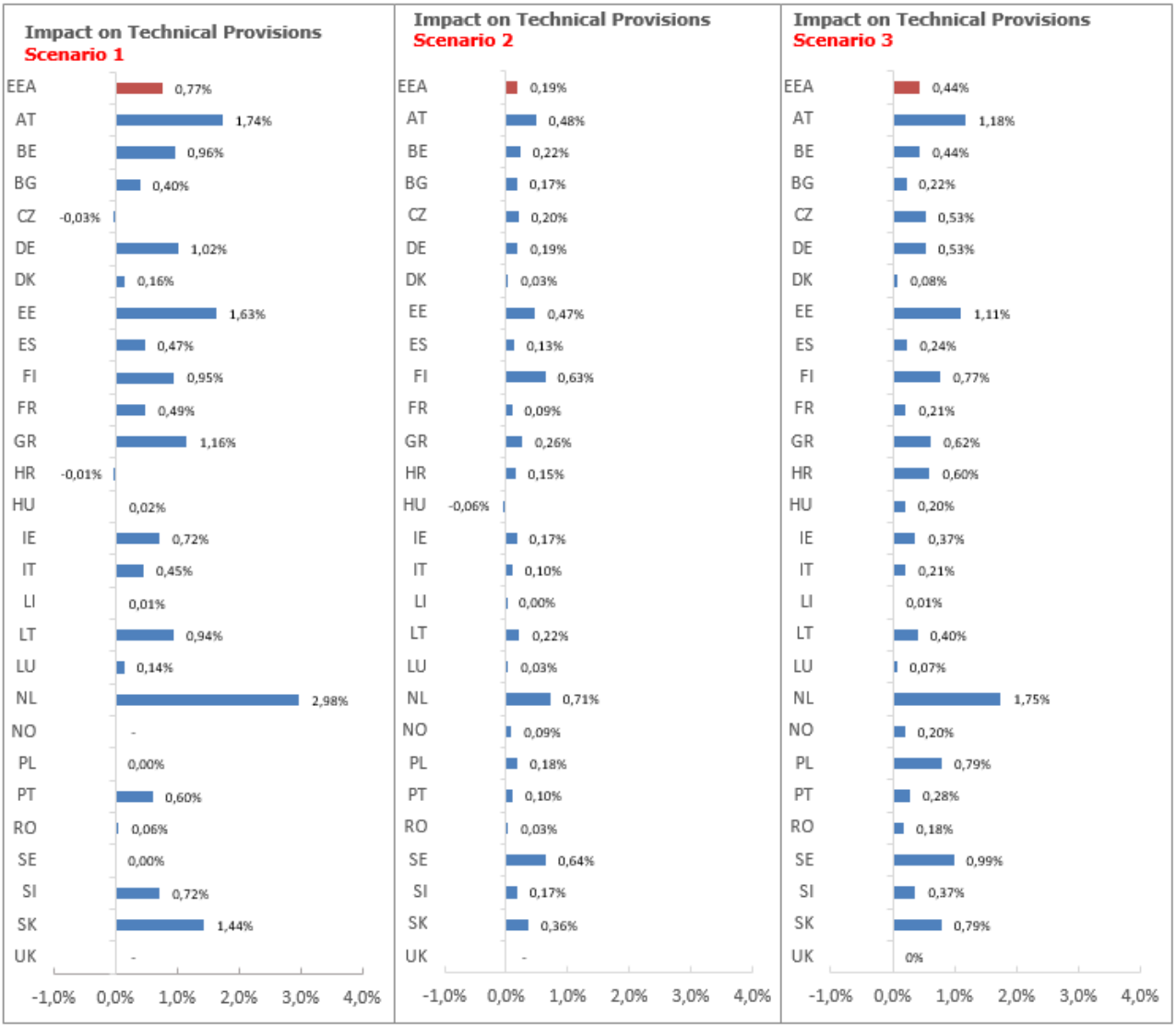
The following graphs outline the impact at EEA level and by country of the three specified scenarios on EoF and SCR.


Impact on SCR and EoF
Scenario 1
SCR
EoF
EEA
AT
BE
BG
CY
CZ
DE
DK
EE
ES
FI
FR
GR
HR
HU
IC
IE
IT
LI
LT
LU
LV
MT
NL
NO
PL
PT
RO
SE
SI
SK
UK
-5,08%
5,36%
-4,63%
2,48%
-6,52%
4,25%
-0,96%
-1,05%
-
0,03%
0,06%
-5,62%
17,93%
-1,88%
7,38%
-3,15%
-5,08%
-2,57%
1,53%
-4,54%
0,47%
-5,12%
4,11%
-4,65%
3,88%
-0,28%
0,02%
-0,02%
-0,05%
-
-9,73%
5,79%
-1,17%
1,27%
-0,30%
0,52%
-2,15%
0,53%
-2,21%
0,77%
-
-
-29,32%
13,24%
0,00%
0,00%
0,00%
0,00%
-3,39%
0,19%
0,00%
-0,15%
0,00%
0,00%
-0,19%
-1,79%
-2,63%
1,08%
-
-40%
-30%
-20%
-10%
0%
10%
20%
30%


Impact on SCR and EoF
Scenario 2
SCR
EoF
EEA -1,24% 1,06%
AT -1,29% 0,44%
BE -1,51% 0,67%
BG -0,11% -0,46%
CY :
CZ -0,03% -0,39%
DE -1,06% 3,17%
DK -0,39% 1,96%
EE -0,90% -1,45%
ES -0,69% 0,32%
FI -2,24% 0,02%
FR -1,04% 0,88%
GR -1,05% 0,94%
HR -0,39% -0,32%
HU -0,04% 0,19%
IC :
IE -2,27% 1,23%
IT -0,26% 0,39%
LI -0,07% 0,13%
LT -0,84% 0,34%
LU -0,57% 0,18%
LV :
MT :
NL -6,67% 2,09%
NO -0,44% 0,38%
PL -0,00 0,00
PT -0,57% 0,11%
RO -0,10% 0,00%
SE -1,98% 0,83%
SI -0,35% -0,43%
SK -0,67% 0,17%
UK :
-8% -6% -4% -2% 0% 2% 4%

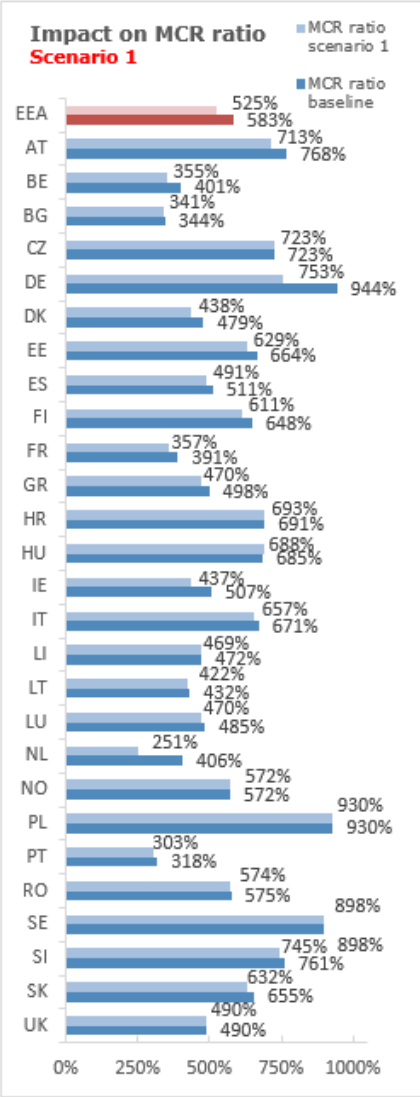


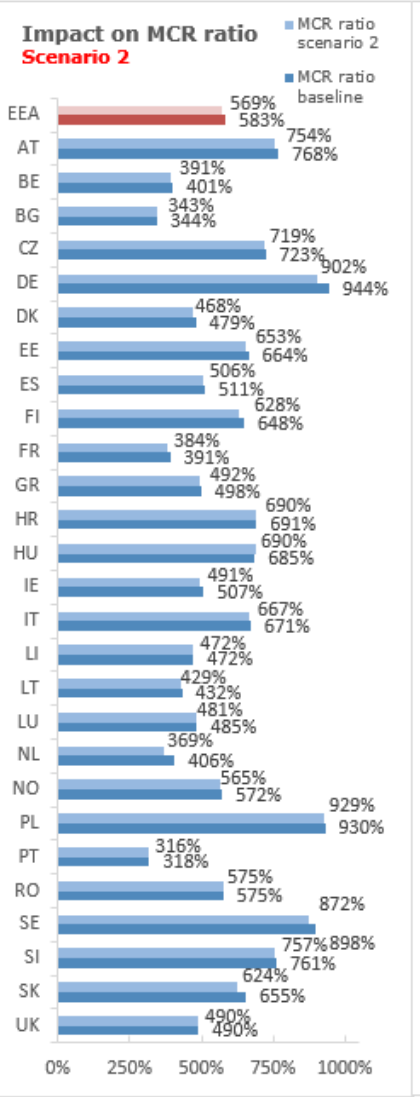
The following graph outlines the impact at EEA level and by country of the three specified scenarios on technical provisions. At the EEA level, scenario 1 would result in an increase of technical provisions by 0.77%, scenario 2 would result in an increase of technical provisions by 0.19% and scenario 3 would result in an increase of technical provisions by 0.44%.

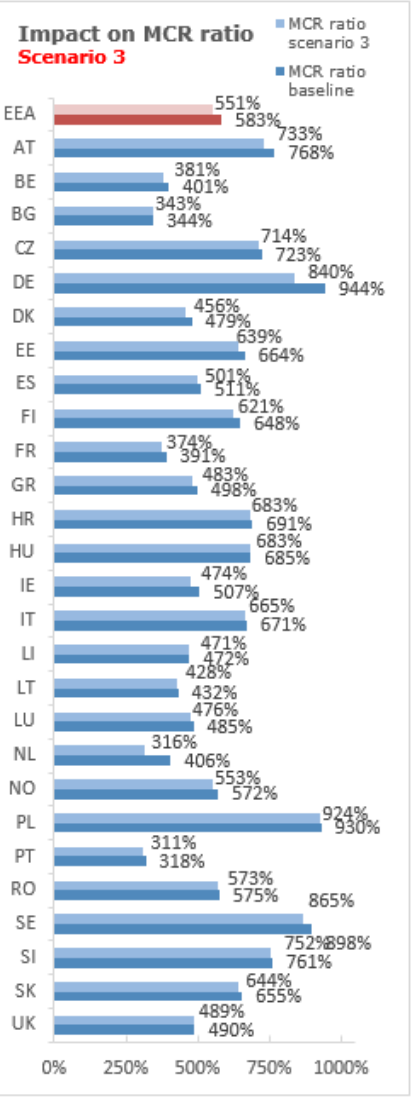


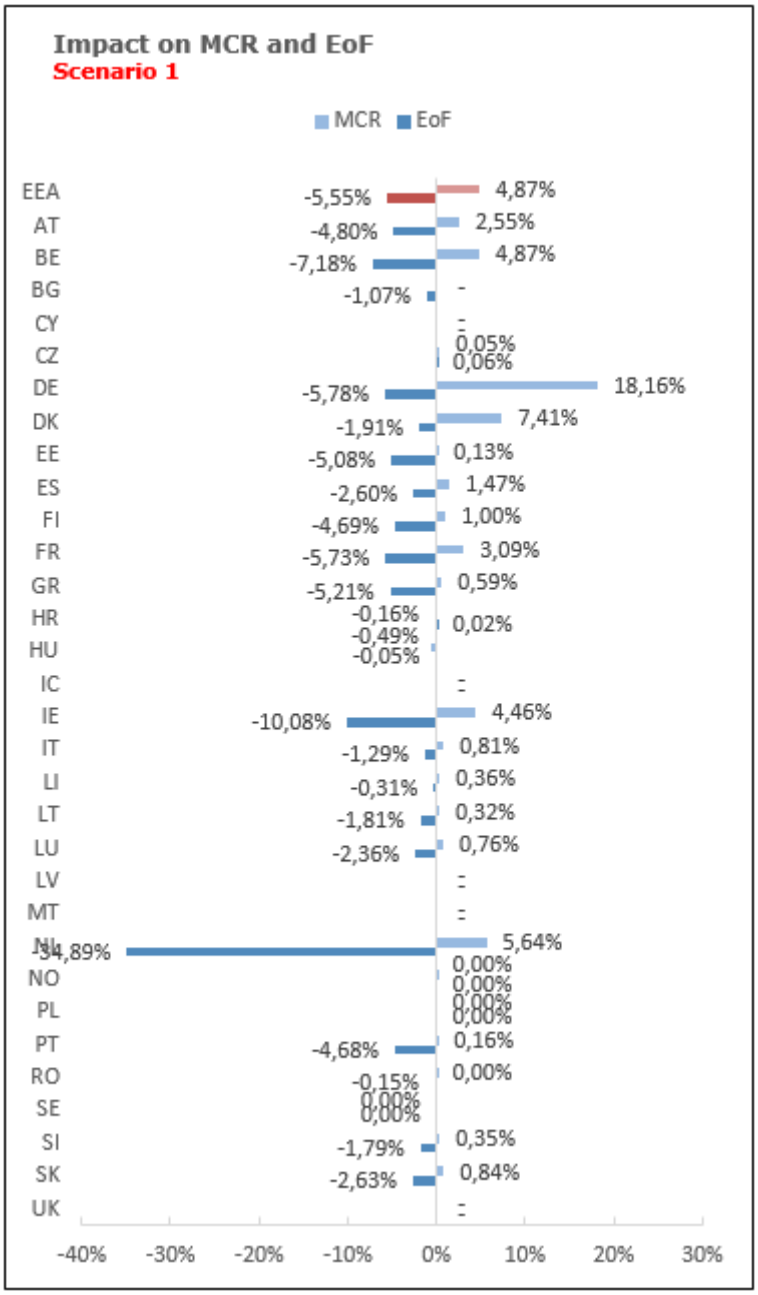
The following graphs show the average impact of the three specified scenarios on the MCR ratio, the MCR and the eligible own funds to cover the MCR, at country and at EEA level for undertakings in the data sample.

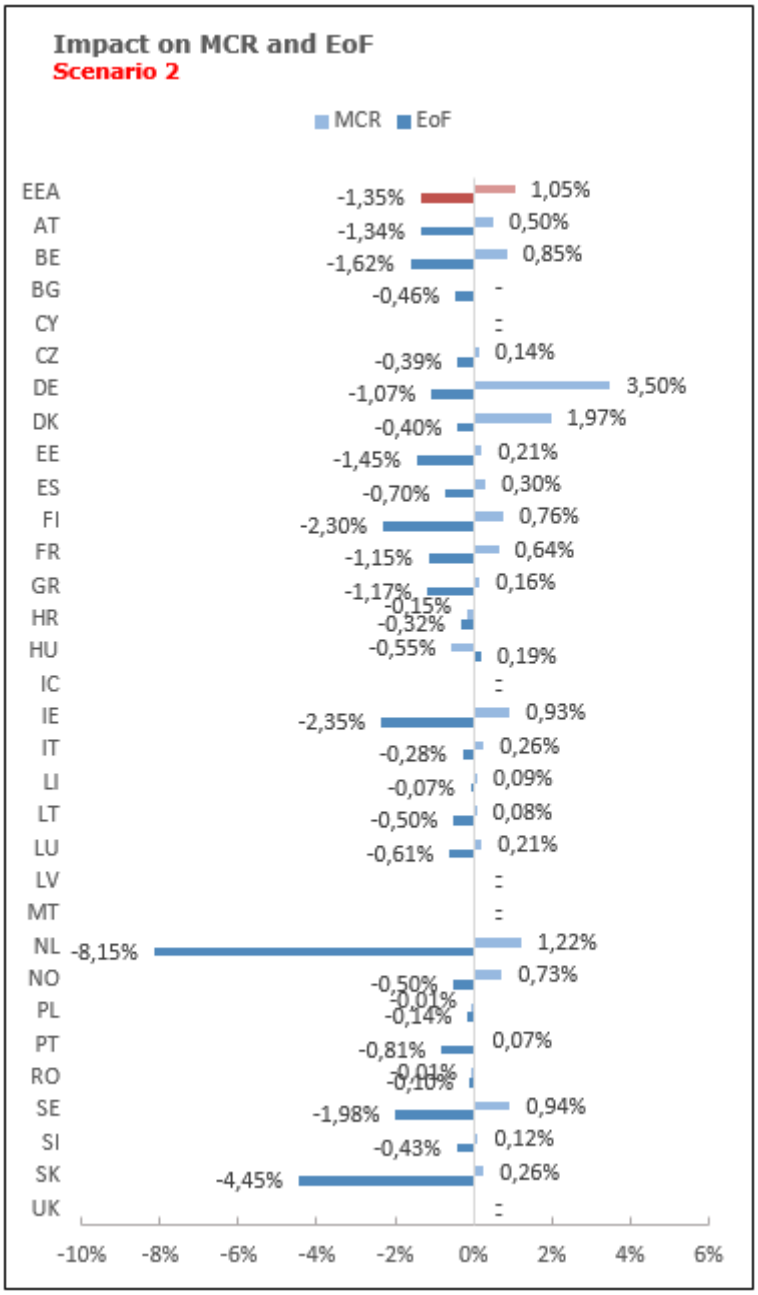
At the EEA level, scenario 1 would result in a reduction of the MCR ratio by 58 percentage points, scenario 2 would result in a reduction of the SCR ratio by 14 percentage points and scenario 3 would result in a reduction of the SCR ratio by 32 percentage points.

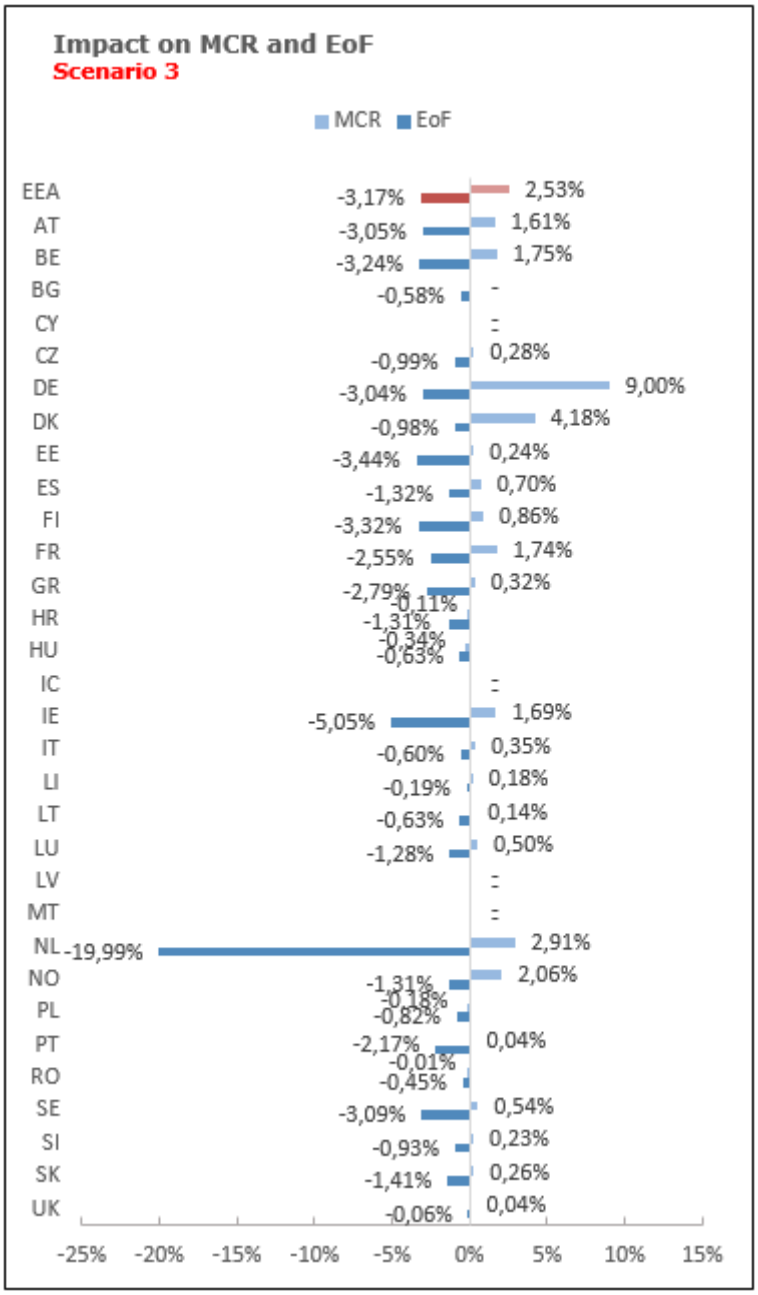

Impact on MCR ratio
Scenario 1
MCR ratio scenario 1
MCR ratio baseline
EEA 525% 583%
AT 713% 768%
BE 355% 401%
BG 341% 344%
CZ 723% 723%
DE 753% 944%
DK 438% 479%
EE 629% 664%
ES 491% 511%
FI 611% 648%
FR 357% 391%
GR 470% 498%
HR 693% 691%
HU 688% 685%
IE 437% 507%
IT 657% 671%
LI 469% 472%
LT 422% 432%
LU 470% 485%
NL 251% 406%
NO 572% 572%
PL 930% 930%
PT 303% 318%
RO 574% 575%
SE 898%
SI 745% 898% 761%
SK 632% 655%
UK 490% 490%
0% 250% 500% 750% 1000%


Impact on MCR ratio
Scenario 2
MCR ratio scenario 2
MCR ratio baseline
EEA 569% 583%
AT 754% 768%
BE 391% 401%
BG 343% 344%
CZ 719% 723%
DE 902% 944%
DK 468% 479%
EE 653% 664%
ES 506% 511%
FI 628% 648%
FR 384% 391%
GR 492% 498%
HR 690% 691%
HU 690% 685%
IE 491% 507%
IT 667% 671%
LI 472% 472%
LT 429% 432%
LU 481% 485%
NL 369% 406%
NO 565% 572%
PL 929% 930%
PT 316% 318%
RO 575% 575%
SE 872%
SI 757% 898% 761%
SK 624% 655%
UK 490% 490%
0% 250% 500% 750% 1000%


Impact on MCR ratio
Scenario 3
MCR ratio scenario 3
MCR ratio baseline
EEA 551% 583%
AT 733% 768%
BE 381% 401%
BG 343% 344%
CZ 714% 723%
DE 840% 944%
DK 456% 479%
EE 639% 664%
ES 501% 511%
FI 621% 648%
FR 374% 391%
GR 483% 498%
HR 683% 691%
HU 683% 685%
IE 474% 507%
IT 665% 671%
LI 471% 472%
LT 428% 432%
LU 476% 485%
NL 316% 406%
NO 553% 572%
PL 924% 930%
PT 311% 318%
RO 573% 575% 865%
SE
SI 752% 898% 761%
SK 644% 655%
UK 489% 490%
0% 250% 500% 750% 1000%


Impact on MCR and EoF
Scenario 1
MCR
EoF
EEA
AT
BE
BG
CY
CZ
DE
DK
EE
ES
FI
FR
GR
HR
HU
IC
IE
IT
LI
LT
LU
LV
MT
NL
NO
PL
PT
RO
SE
SI
SK
UK
-5,55%
4,87%
-4,80%
2,55%
-7,18%
4,87%
-1,07%
-
-
0,05%
0,06%
-5,78%
18,16%
-1,91%
7,41%
-5,08%
0,13%
-2,60%
1,47%
-4,69%
1,00%
-5,73%
3,09%
-5,21%
0,59%
-0,16%
-0,49%
-0,05%
0,02%
-
-10,08%
4,46%
-1,29%
0,81%
-0,31%
0,36%
-1,81%
0,32%
-2,36%
0,76%
-
-
-34,89%
5,64%
0,00%
0,00%
0,00%
0,00%
-4,68%
0,16%
-0,15%
0,00%
0,00%
0,00%
-1,79%
0,35%
-2,63%
0,84%
-
-40%
-30%
-20%
-10%
0%
10%
20%
30%


Impact on MCR and EoF
Scenario 2
MCR
EoF
EEA -1,35% 1,05%
AT -1,34% 0,50%
BE -1,62% 0,85%
BG -0,46% -
CY -
CZ -0,39% 0,14%
DE -1,07% 3,50%
DK -0,40% 1,97%
EE -1,45% 0,21%
ES -0,70% 0,30%
FI -2,30% 0,76%
FR -1,15% 0,64%
GR -1,17% 0,16%
HR -0,15% -0,32%
HU -0,55% 0,19%
IC -
IE -2,35% 0,93%
IT -0,28% 0,26%
LI -0,07% 0,09%
LT -0,50% 0,08%
LU -0,61% 0,21%
LV -
MT -
NL -8,15% 1,22%
NO -0,50% 0,73%
PL -0,01% -0,14%
PT -0,81% 0,07%
RO -0,01% -0,10%
SE -1,98% 0,94%
SI -0,43% 0,12%
SK -4,45% 0,26%
UK -
-10% -8% -6% -4% -2% 0% 2% 4% 6%


Impact on MCR and EoF
Scenario 3
MCR
EoF
EEA -3,17% 2,53%
AT -3,05% 1,61%
BE -3,24% 1,75%
BG -0,58% -
CY -
CZ -0,99% 0,28%
DE -3,04% 9,00%
DK -0,98% 4,18%
EE -3,44% 0,24%
ES -1,32% 0,70%
FI -3,32% 0,86%
FR -2,55% 1,74%
GR -2,79% 0,32%
HR -0,11%
HU -1,31% -0,34% -0,63%
IC -
IE -5,05% 1,69%
IT -0,60% 0,35%
LI -0,19% 0,18%
LT -0,63% 0,14%
LU -1,28% 0,50%
LV -
MT -
NL -19,99% 2,91%
NO -1,31% 2,06%
PL -0,18% -0,82%
PT -2,17% 0,04%
RO -0,01% -0,45%
SE -3,09% 0,54%
SI -0,93% 0,23%
SK -1,41% 0,26%
UK -0,06% 0,04%
-25% -20% -15% -10% -5% 0% 5% 10% 15%

Volatility of the relevant risk-free rate

The relevant risk-free interest rate term structure should avoid artificial volatility of technical provisions and eligible own funds and provide an incentive for good risk management (see recital 30 of Directive 2014/51/EU).

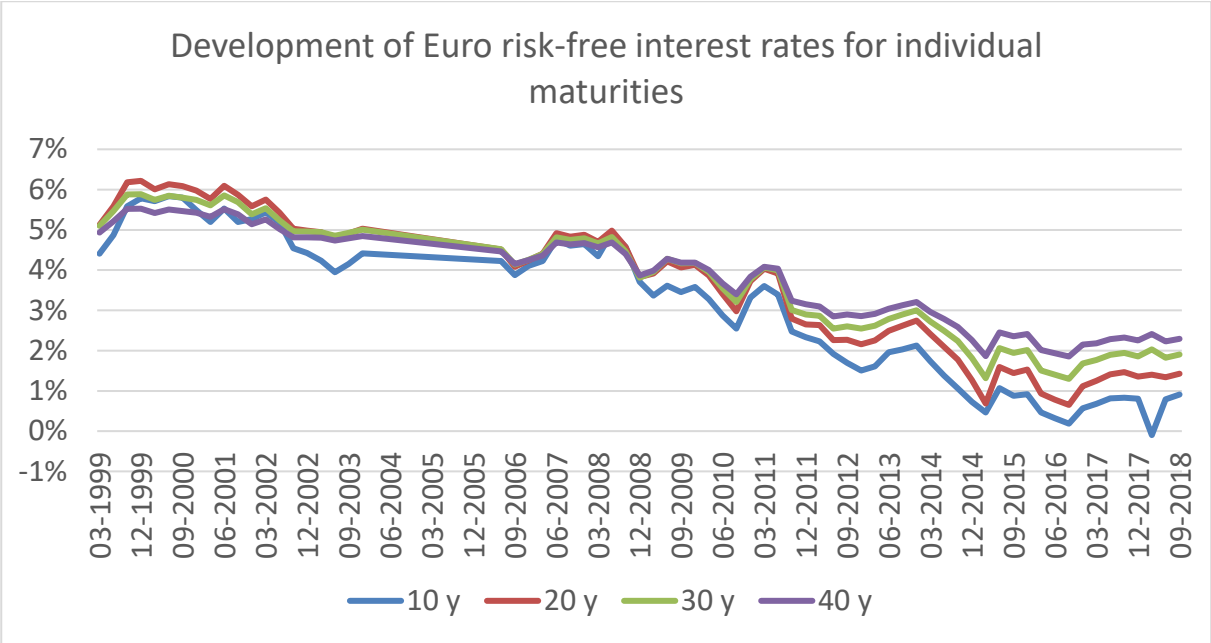
The extrapolation mechanism used (applying the Smith-Wilson methodology) ensures that forward rates for maturities beyond the last liquid point (LLP) converge to an ultimate forward rate (UFR) and thus aims to "stabilize" the extrapolated interest rates. For this report the impact of the extrapolation methodology and its parameterization on the volatility of the interest rates was analysed.

In a first step, the volatility of the interest rates itself, which are a core parameter for the valuation of technical provisions, was analysed. The extent to which the volatility of interest rates translates to a volatility of technical provisions and own funds will depend on the specifics of the risk profile of the undertaking concerned, in particular on the degree of matching between asset and liability cash flows and the risk hedging.

Analysis of the volatility of interest rates for the euro

The analysis outlined in the following focuses on the euro. The results are based on risk-free interest rates derived from swaps for the period from 1999 to 2018. These interest rates were extrapolated using the EIOPA extrapolation methodology based on the maturities currently applied to derive the risk-free interest rates (maturities 1-10, 12, 15 and 20).

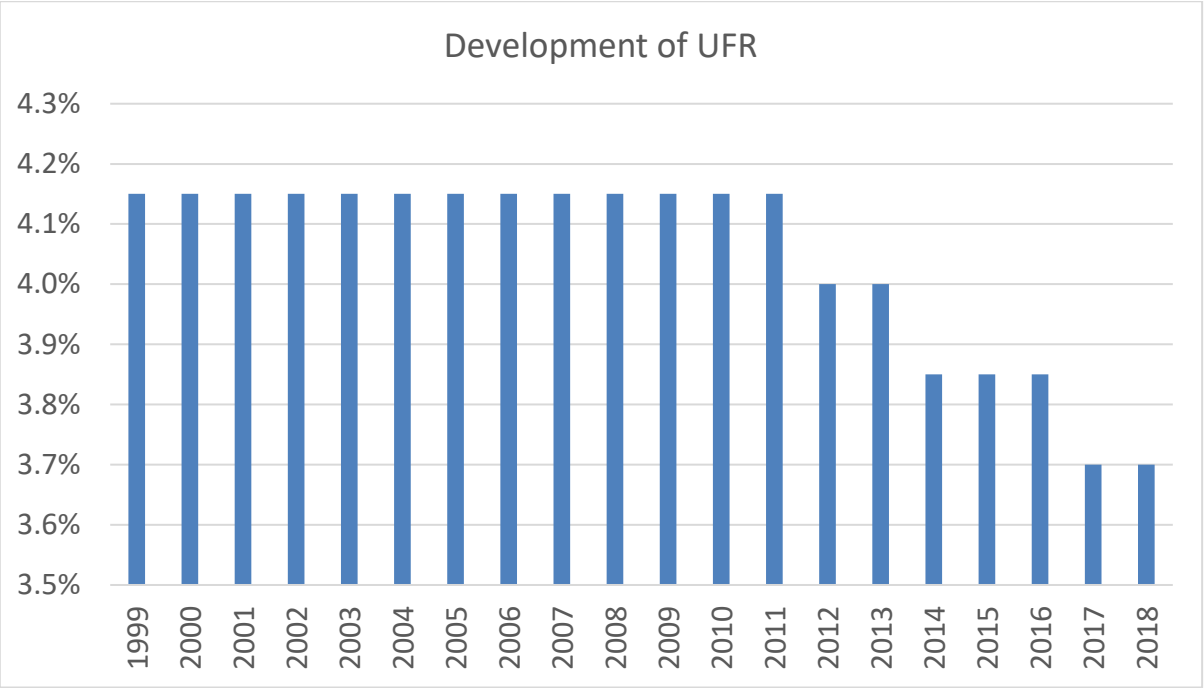
In order to assess the impact of the extrapolation on the volatility of the risk-free interest rates applied to value insurance liabilities, the quarterly euro risk-free interest rates from Q1 1999 to Q3 2018 were analysed. The following diagram displays the time series of the rates for the maturities 10, 20, 30 and 40 years. The rates for the maturities 10 and 20 years are based on swap rates as observed in the financial markets, the rates for the maturities 30 and 40 years are extrapolated.



The volatility of the interest rates is assessed by looking at the standard deviation of the spot rates per maturity and the distribution of quarterly changes of those spot rates per maturity.

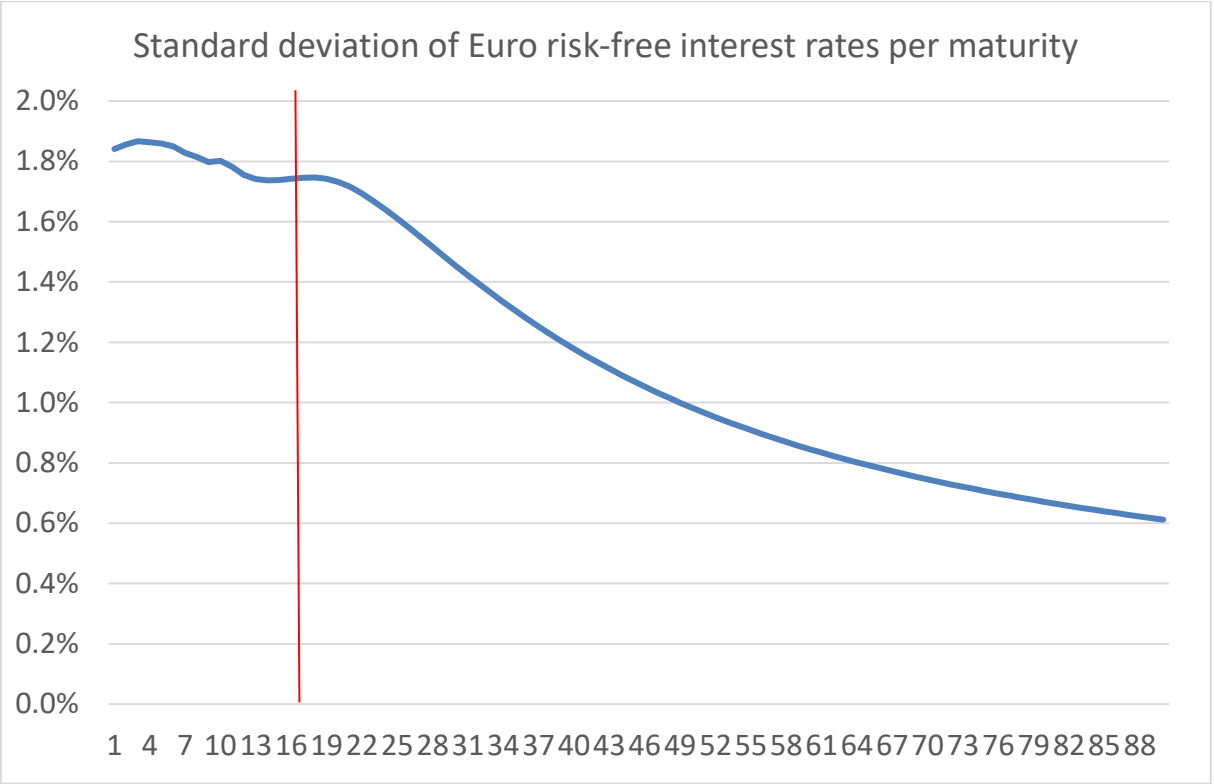
This analysis takes into account the effect of changes to the ultimate forward rate (UFR) on the extrapolated rates. As UFR changes are expected to increase the volatility of extrapolated rates compared to applying a constant UFR, changes to the UFR were taken into account to arrive at a holistic picture. For that purpose, the UFR is calculated retrospectively, assuming that the EIOPA methodology to derive the UFR had been applied from 1999 onwards.

The following diagram displays the historical development of the euro UFR according to EIOPA's methodology:



The UFR would have amounted to 4.15% until 2012 where it decreased for the first time to 4%. The changes observed until 2018 always amount to a reduction of the UFR by 15 bps.

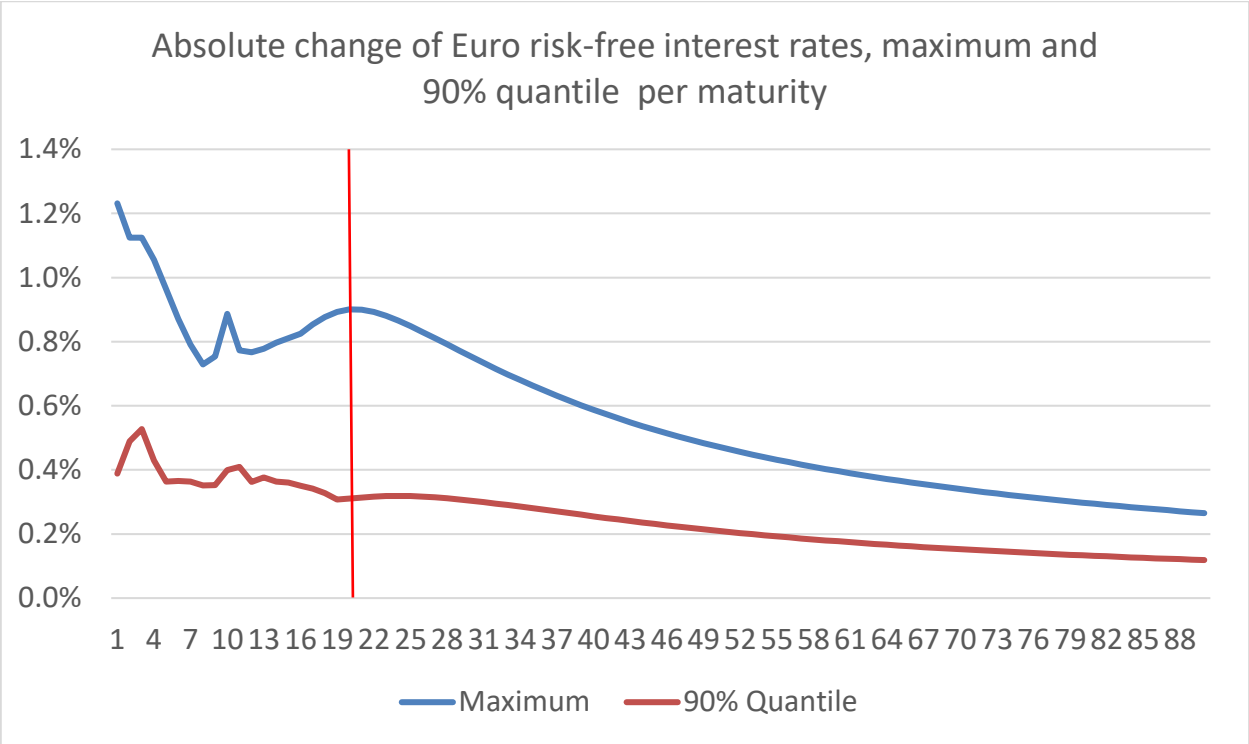
The following diagram shows the standard deviation of the spot rates per maturity. The standard deviation of the extrapolated rates is decreasing as the maturity increases. This is in line with expectations as the extrapolated risk-free interest rates are converging to a rather stable UFR. A part of the decrease of the standard deviation is because the extrapolation dampens the downward trend observable from 2001 to 2016 in the interest rates. While, for example, the 20-year rate fell from 6% in 2001 to 1.4% in 2017, the 40-year rate fell from 5.4% to 2.3% during that period. In the period from 2001 to mid-2011, when the 20-year rate was between 3% and 5%, the 20-year rate and the 40-year rate were moving in line (see first diagram).



The lower standard deviation of extrapolated rates does not imply that changes in the non-extrapolated rates are always dampened in the extrapolated rates. For example, in the first quarter of 2016 the non-extrapolated rates fell by up to 9 bps, while the extrapolated rates fell by up to 14 bps. In some situations the extrapolation can amplify the movement of non-extrapolated rates. However, these situations appear to be rare.

The extrapolation method used (Smith-Wilson) is also used for interpolation of the rates considered DLT. It therefore does not only influence the volatility of interest rates in the extrapolated part of the risk free term structure but also in the non-extrapolated part. Whereas the standard deviation of the extrapolated rates decreases continuously, it can be observed that there is a slight increase in the standard deviation for the maturities before the LLP. That observation is not specific to the choice of the LLP but depends on the methodology applied for inter- and extrapolation.

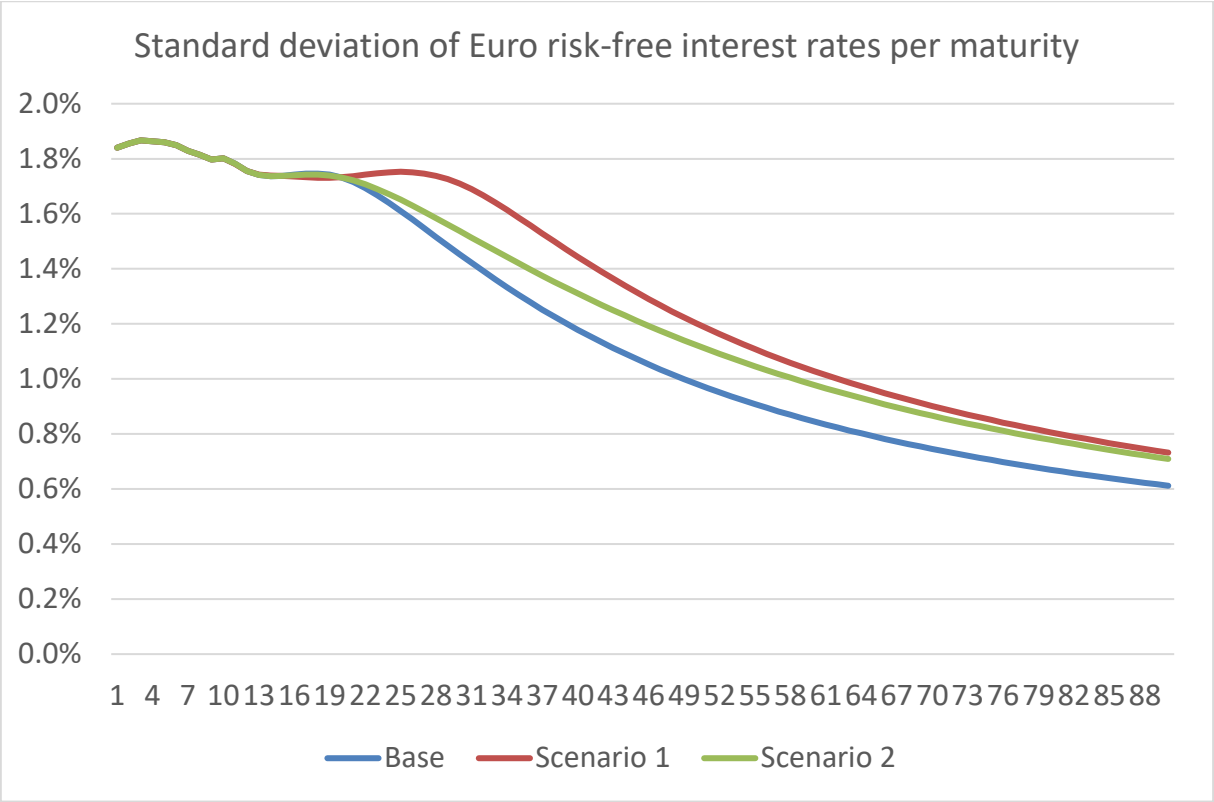
The following diagram shows the maximum quarterly change and the 90% quantile of the distribution of quarterly changes of the spot rates per maturity. The calculation is based on the absolute value of quarterly changes. The maximum change of the extrapolated rates is decreasing from maturity 20 years onwards. The 90% quantile changes are decreasing from maturity 25 years onwards.



Analysis of the impact of particular scenarios on the volatility of interest rates for the euro

The scenarios calculated by undertakings with respect to the extrapolation (as outlined in the beginning of the section) intend to increase the influence of the observed market rates on those rates (LLP, convergence point) and move the UFR closer to the level of observed market rates. It was therefore also assessed which impact those scenarios have on the volatility of the risk-free interest rate term structure.

Similar to the assessment outlined above, the empirical standard deviation of the rates per maturity are determined for scenario 1 (setting LLP to 30 years) and scenario 2 (setting the convergence point to 90 years) and scenario 3 (setting the UFR to 3.2%).



For further information, the empirical standard deviation of the spot rate for maturity 25 was calculated and amounts to 1.56%.

For both scenarios, a slight decrease in the standard deviation of interest rates between 16 and 19 years and a comparably much higher increase in the standard deviation for maturities beyond 20 years is observable compared to the base case.

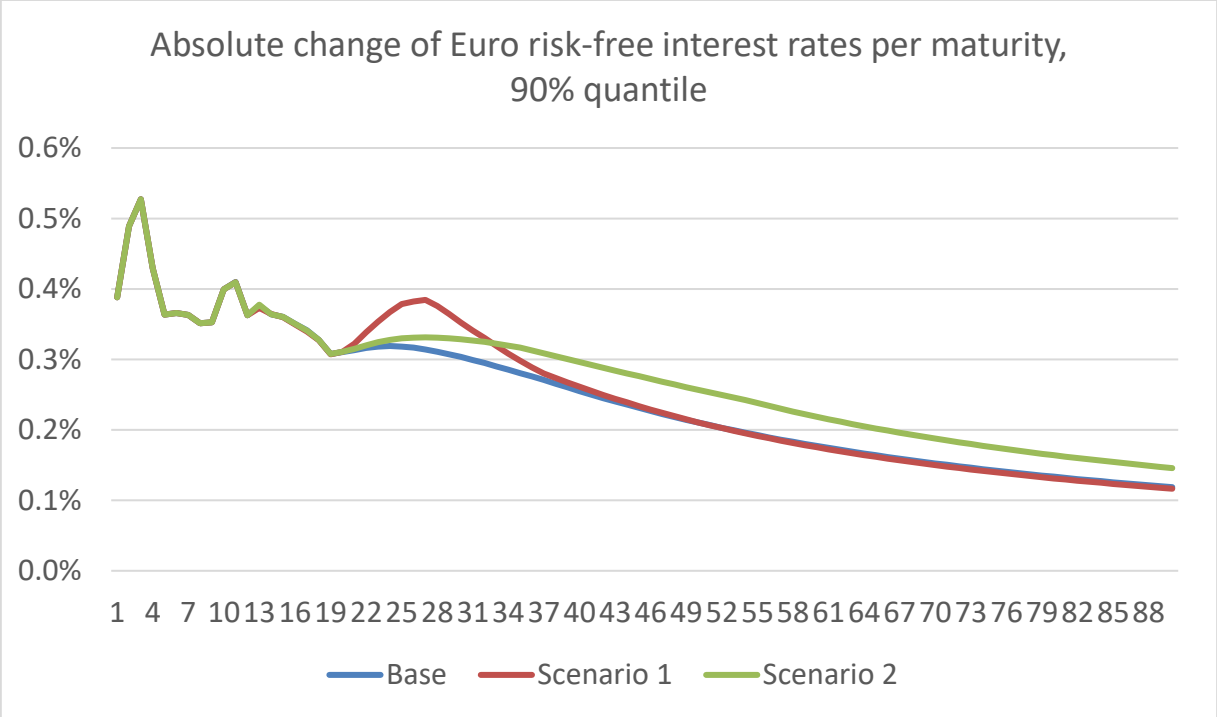
The decrease in the standard deviation between maturities 16 and 19 is due to the Smith-Wilson method. In scenario 1 (which assumes an LLP at 30 years) the rates between 15 and 20 years are less affected by the extrapolation. In scenario 2, the longer convergence period reduces the steepness of the increase or decrease after the LLP. Thus, the standard deviation of interest rates just before the LLP is reduced.

In both scenarios, increased standard deviation would not only apply to interest rates between 20 and 30 years (which, with an extension of the LLP to 30 years, would be based on market data), but also for higher maturities in the extrapolated part of the risk-free rate curve. In both scenarios, the standard deviation of the extrapolated interest rates would still usually be lower than that of the non-extrapolated rates.

The effect described above (that an increase in the standard deviation can be observed for maturities before the LLP) is also visible in the diagram above for scenario 1, where the LLP is set to 30 years.

In addition to the observation of quarterly changes in spot rates, the analysis also considered maximum and 90% quantile of quarterly changes of spot rates as a relevant metric to assess and compare volatility of interest rates (reflecting “jumps” in interest rates of one quarter to another).

The following graph outlines the empirical 90% quantile of quarterly changes in spot rates.



For scenario 2 it can be observed that the 90% quantile increases for the whole extrapolated part of the risk-free term structure compared to the base case. The increase is different for scenario 1 where a higher increase in results can be observed in particular for maturities 20 to 37. In both scenarios, the quantiles would still usually be lower than that of the not-extrapolated rates.

Regarding scenario 3 the standard deviation of spot rates with a constant UFR of 4.2% were compared to the standard deviation of spot rates with a constant UFR of 3.2%. The calculations did not reveal a material difference between the standard deviations under both approaches.

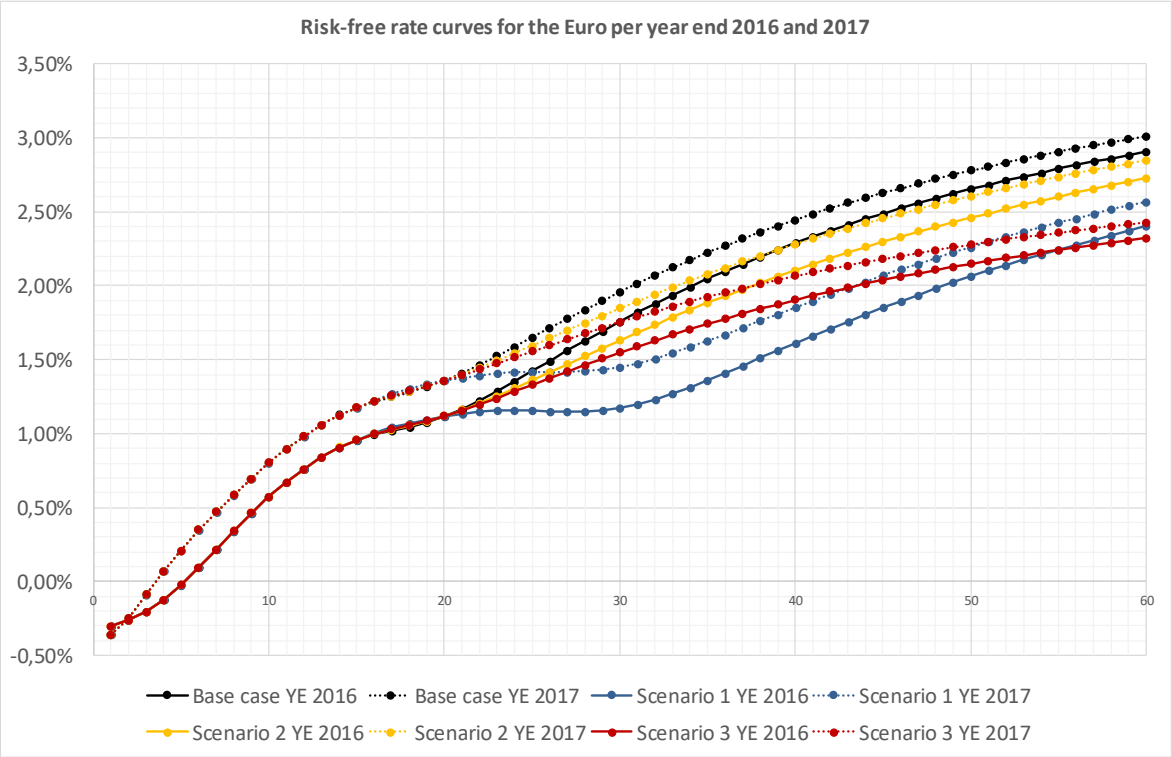
Analysis of change of the technical provisions and the eligible own funds in the base case and in the three tested scenarios

An analysis of the effectiveness of the relevant risk-free interest rate term structure to avoid artificial volatility of technical provisions and eligible own funds and to provide an incentive for good risk management ideally requires data of several relevant scenarios over a sufficient number of periods as well as information on the risk profile of the undertaking concerned.

To illustrate this effect for an exemplary period, EIOPA has analysed the annual changes in the value of technical provisions and own funds from year end 2016 to year end 2017. Specifically, EIOPA has analysed how the observed changes under the current regime (the base case) compare to the changes that would have occurred under one of the three scenarios that EIOPA has considered for assessing the financial impact of extrapolation (include reference). Note that these three scenarios lead to

different risk-free rate curves, and thereby to different changes of the risk-free rate curves through time.

The following diagram shows the respective risk-free rate curves for the Euro under the base case and the different scenarios:



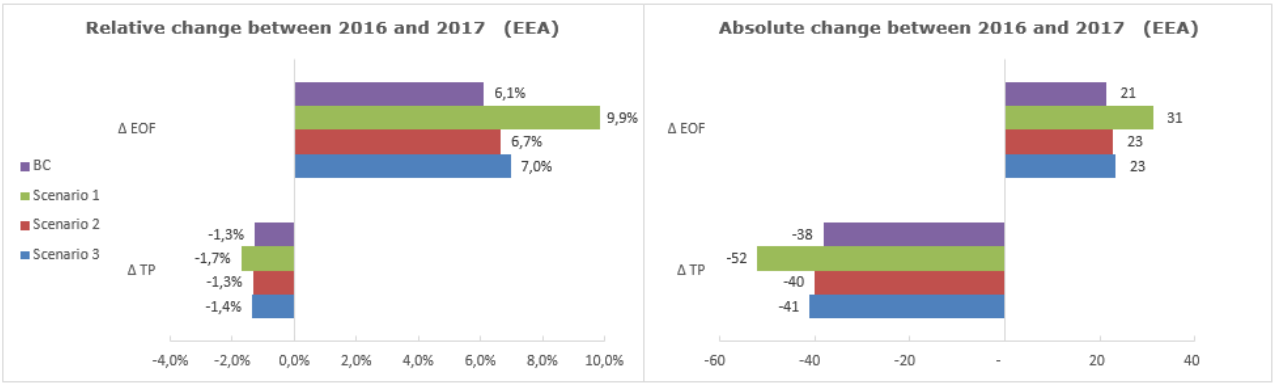
The solid lines refer to the risk-free rate curves at year end 2016, the dotted lines to the risk-free rate curves at year end 2017. Note that, in the base case and in each of the scenarios, risk-free rates increased between year end 2016 and year end 2017. The absolute increase in swap rates for maturities after maturity 20 is highest for scenario 1. This is due to the fact that scenario 1 takes into account market information on swap rates for maturity 30. The change of the 30 year market swap rate from 2016 to 2017 exceeded the change in the extrapolated basic risk free rates with a maturity of 30 years in the base case.

It should be underlined that these data do not allow to draw any systematic conclusion on the volatility of the rates and the extent to which this volatility is artificial. As mentioned previously, this would require data for a sufficiently large number of periods and additional information on the risk profile of each undertaking of the sample. Nevertheless, the observation of the changes from end 2016 to end 2017 can serve to illustrate the differences between the changes in the base case and in each of these scenarios for this particular time period.

The analysis that follows compares the situation of the base case at end 2016 with the situation of the base case at end 2017 and derives from this comparison the increase or decrease of the technical provisions and the eligible own funds that occurred in that period. The situation in scenario 1, 2 and 3 at end 2016 is respectively compared with the situation in scenario 1, 2 and 3 at end 2017, the increases or decreases were analogously derived for each of these scenarios. For this analysis, only undertakings

who participated in the two previous information requests on extrapolation and those who reported valid euro data each time were selected. In total there were 219 undertakings at EEA level.

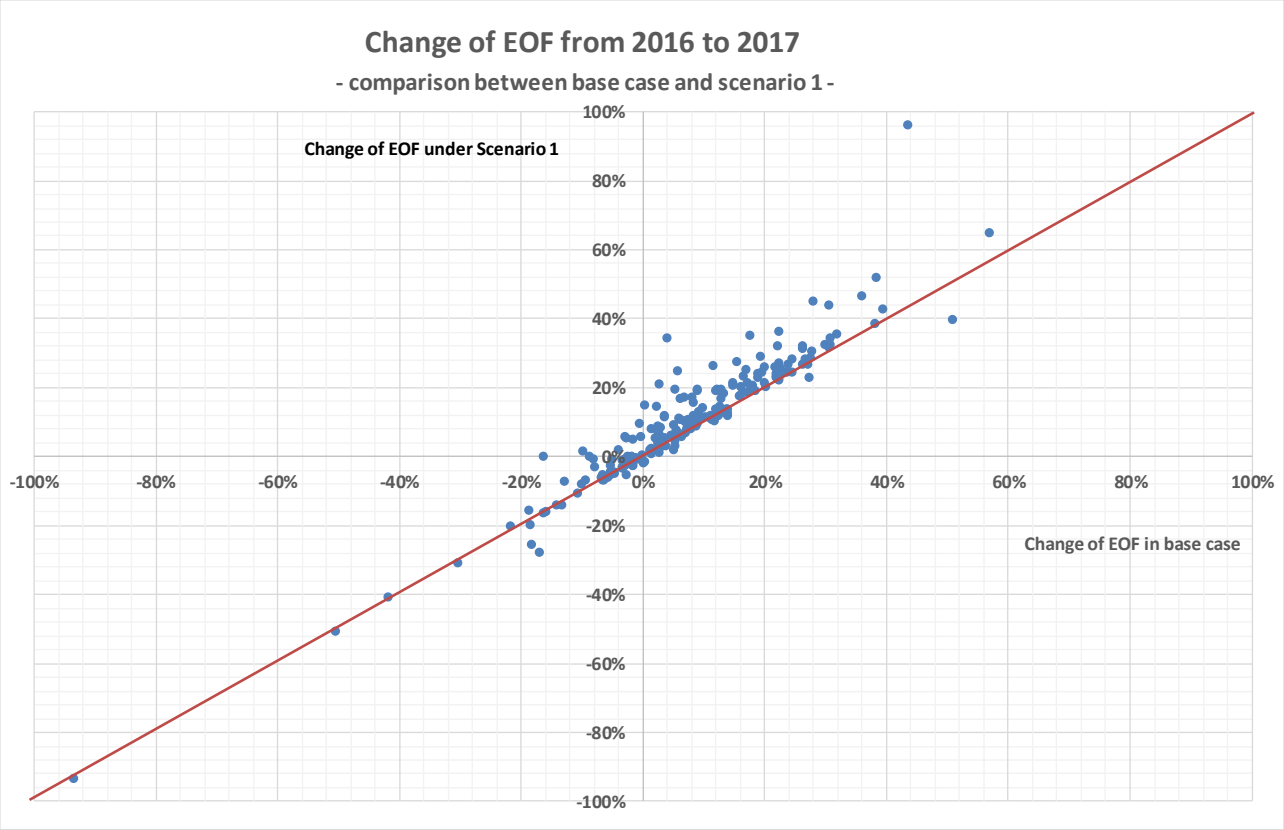
The following graphs summarize respectively the relative (in percentage) and the absolute (in billions) increase/decrease of the aggregated eligible own funds and technical provisions at EEA level for the base case and for each of the scenarios. It should be noted that the observed values in technical provisions and own funds between year end 2016 and year end 2017 are not only impacted by the change in risk-free rates in this period, but also by other factors such as e.g. new business written in this period or changes in the investments of the insurers. Therefore, the observed changes in technical provisions and own funds for the base case or for each of the scenarios individually cannot be directly linked to the changes in risk-free rates. Nonetheless, when comparing the base case with each of the scenarios, the *difference* between the observed changes can mainly be attributed to the differences in the changes of the risk-free rates.



This illustrates that the changes are the smallest in the base case, followed by scenario 2, 3 and finally scenario 1. The higher change in technical provisions for scenario 1 is consistent with the fact that, as observed above, the change in risk-free rates under scenario 1 is higher than the change in risk-free rates in the other scenarios and in the base case. Given that in neither the base case nor any of the 3 scenarios do the risk-free rate term structures have an incidence on the value of the assets for which a market value is available, the higher change in eligible own funds for scenario 1 indicates that the observed change in the risk-free rates term structure impacted the value of the liabilities more than the change in market rates impacted the market value of the assets. This is due to the inclusion of market information for maturity 30.

It should be noted that these observed changes also depend on the risk profile of the undertakings included in the sample. Crucial specificities such as the duration gap or hedging positions influence the volatility of the eligible own funds.

To illustrate these effects, the following scatter plot shows the individual relative changes for each undertaking in the sample. Specifically, it compares the changes in the base case with the changes in scenario 1 for the value of own funds (the bisector is drawn in red):



Each dot in this diagram represents the respective changes for an individual undertaking. 73% of the undertakings are above the red line (159 undertakings), which means that the change under scenario 1 is higher than in the base case, consistent with the observed higher change under scenario 1 at EEA level. Nonetheless, there is significant dispersion in the magnitude of the changes and in the difference between the changes in the base case and in scenario 1.

As can be seen in the graph, in individual cases also a lower change in EoF can be observed in scenario 1 compared to the base case. As outlined above, the changes depend on the individual risk profile of an undertaking. To illustrate this effect with the help of an example: An undertaking with liabilities beyond the LLP that has perfectly matched its liability cash flows (both before and after this LLP) will experience higher volatility in the base case than in any of the scenarios tested. This is because the variation in interest rates beyond the LLP which impacts the variation of technical provisions does not fully correspond to the variation in the market value of the asset matching the liabilities. Thus, interest rate movements lead to own fund volatility even though the undertaking is in fact matched. For such an undertaking, scenario 1 would reduce volatility in EoF compared to the base case.[26] Note that this would not be the case for undertakings applying MA as the operation of that measure would have eliminated the resulting own fund volatility.

[26] Which amount of cash flow matching would result in the minimum possible amount of own fund volatility depends on a number of factors such as the level and shape of the yield curve and the relative amount of liability cash flows beyond the last liquid point.

III.2 Matching adjustment

According to Recital 31 of the Omnibus Directive, where insurance and reinsurance undertakings hold bonds or other assets with similar cash-flow characteristics to maturity, they are not exposed to the risk of changing spreads on those assets. In order to avoid changes of asset spreads from impacting on the amount of own funds of those undertakings, they should be allowed to adjust the relevant risk-free interest rate term structure in line with the spread movements of their assets.

Insurance and reinsurance undertakings may therefore apply a matching adjustment (MA) to the relevant risk-free interest rate term structure when they value their life insurance or reinsurance obligations, including annuities stemming from non-life insurance.

The MA can only be applied where specific requirements on the insurance and reinsurance obligations, the assets covering the obligations and the management of these obligations and assets are met (Article 77c of the Solvency II Directive). In particular, the expected asset cash flows must replicate each of the expected cash flows of the insurance or reinsurance obligations (cash-flow matching, Article 77c(1)(c) of that Directive).

The use of the matching adjustment under the Solvency II regime is subject to prior supervisory approval.

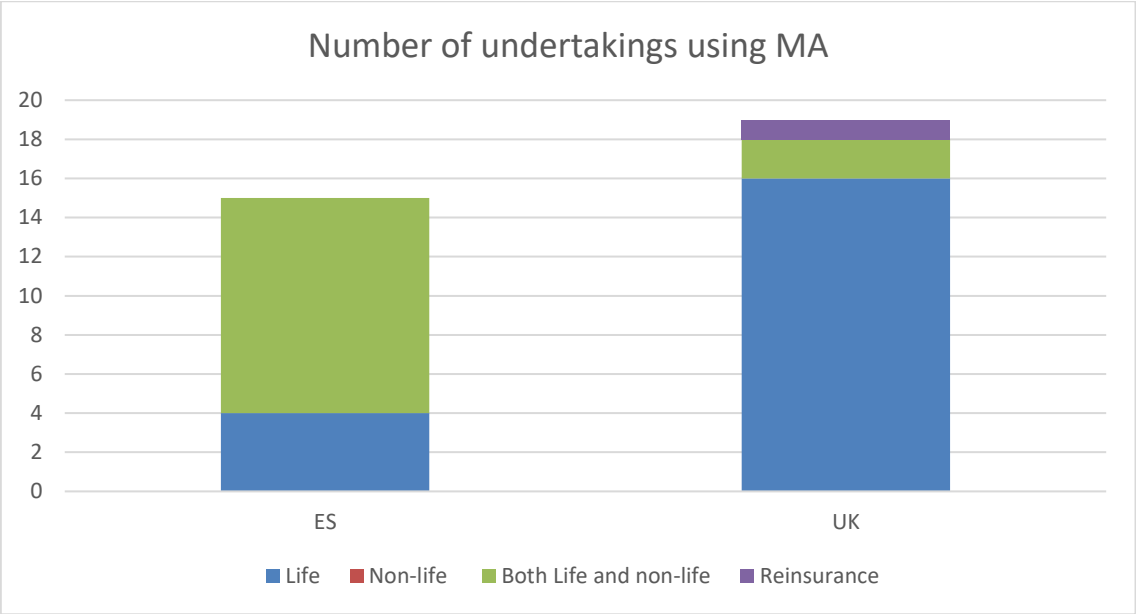
The matching adjustment is derived from the spreads between the interest rate that could be earned from the undertaking's assets and the basic risk-free interest rates. The matching adjustment is reduced by a fundamental spread that allows for expected loss from default and downgrade of the undertaking's assets.

Undertakings calculate the MA themselves, based on their own portfolios of assets. The fundamental spreads are specified in implementing acts.

The MA is applied in the same two European countries as at the implementation date of Solvency II. The 2016 EIOPA LTG report investigated the reasons why this was the case, at the time e.g. the majority of NSAs reported that no products matched the legal requirements for MA set out in Article 77b of the Solvency II Directive.

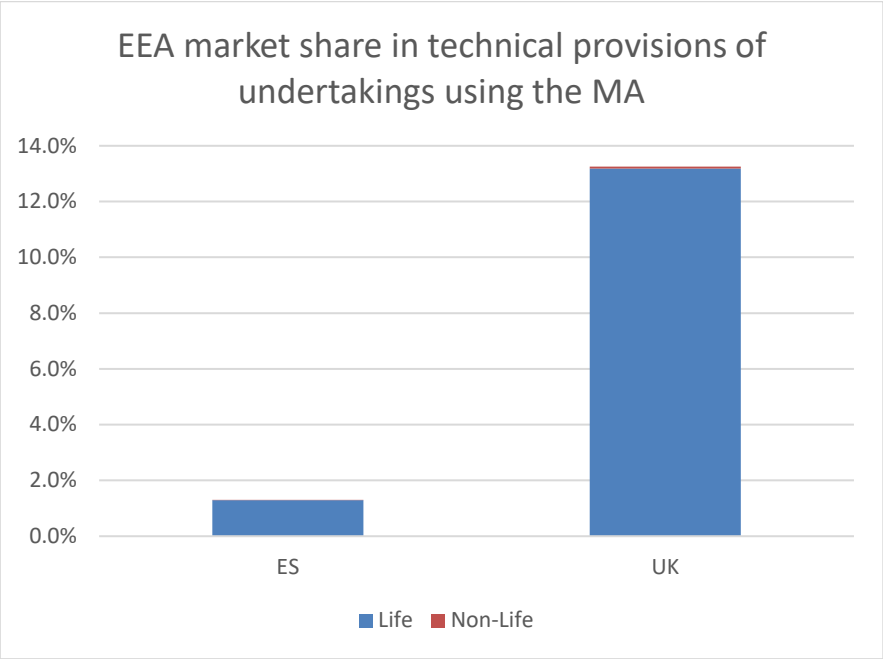
Use of the matching adjustment

34 insurance undertakings from Spain (15 undertakings) and the UK (19 undertakings) apply the MA. Undertakings are permitted to have more than one matching adjustment portfolio and each portfolio needs separate approval. The number of undertakings using the MA decreased by 4 compared to the data as at 31 December 2016.

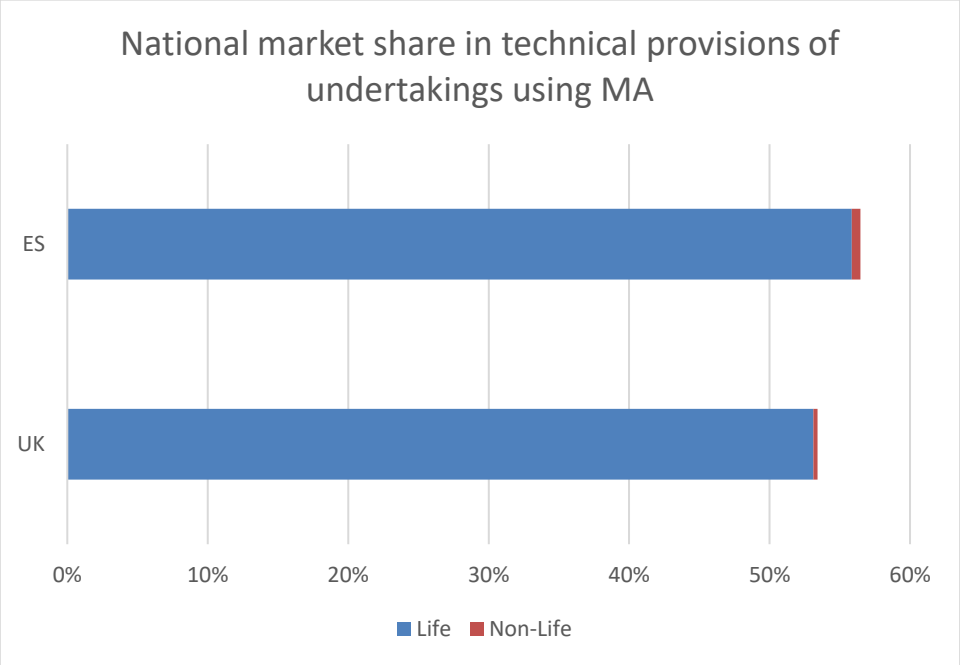


Number of undertakings using MA					
Country	Life	Non-life	Both Life and non-life	Reinsurance	Total
ES	4	0	11	0	15
UK	16	0	2	1	19
EEA	**20**	**0**	**13**	**1**	**34**

The technical provisions of undertakings applying the MA represent 15% of the total amount of technical provisions in the EEA. The technical provisions of undertakings applying the MA in Spain represent 1% and in the United Kingdom 13% of the overall technical provisions in the EEA.



The following graph displays the market share in terms of technical provisions at national level for undertakings using the MA. In the UK, undertakings representing 53% of the national market are using the MA. In Spain, undertakings representing 56% of the national market are using the MA.

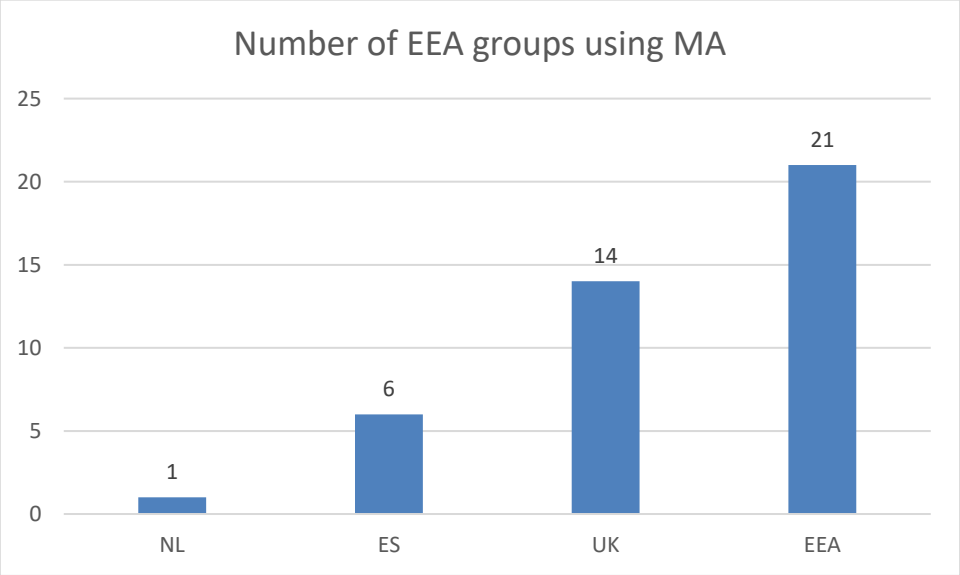


According to the Solvency II Directive it is possible to apply the TTP and the MA to the same liabilities simultaneously. 10 of the 15 undertakings in Spain are applying the

TTP and the MA to the same liabilities simultaneously. In UK, 15 of the 19 undertakings are applying both the TTP and the MA to the same liabilities.

Undertakings applying the TTP and MA to the same liabilities simultaneously			
Country	Number of undertakings	% EEA market share in TP	% National market share in TP
ES	10	1%	29%
UK	15	12%	57%
EEA	**25**	**13%**	**-**

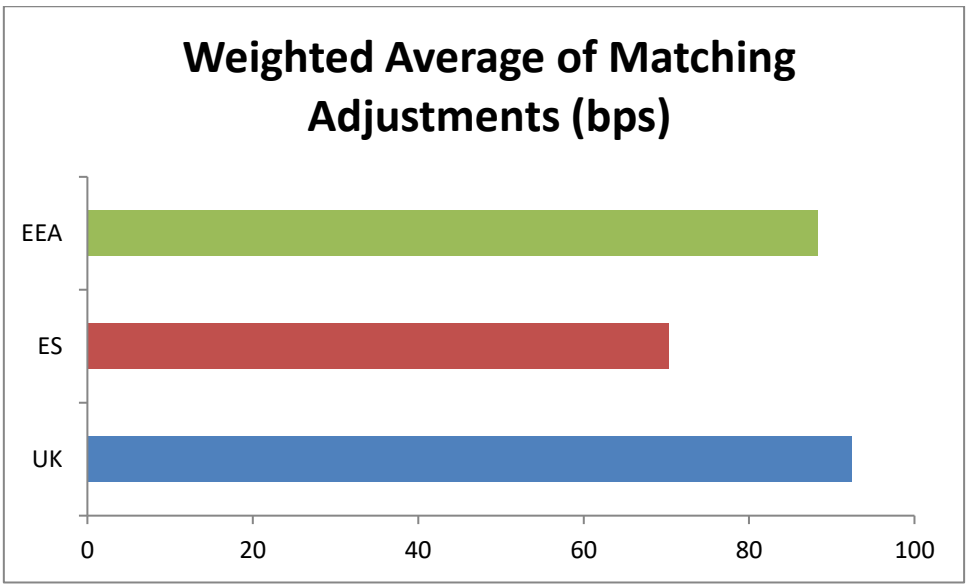
The following diagram provides a summary of the number of EEA groups using the matching adjustment.



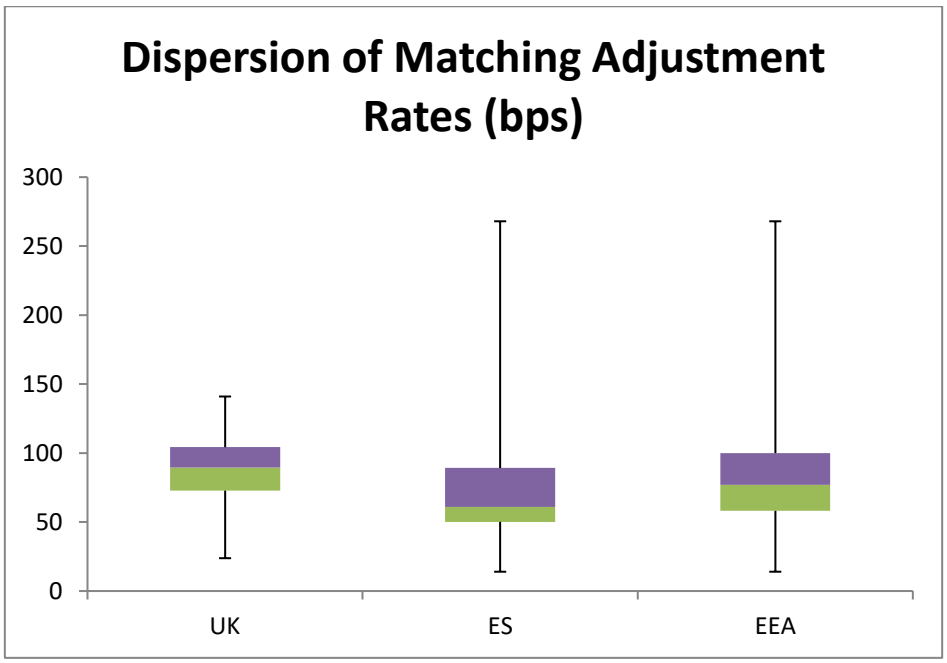
Impact on the financial position of undertakings

The results presented in this section are based on data from 2017 Quantitative Reporting Templates.

The following graph displays the average size of the MA for undertakings in countries where the MA is applied, as well as at EEA level.

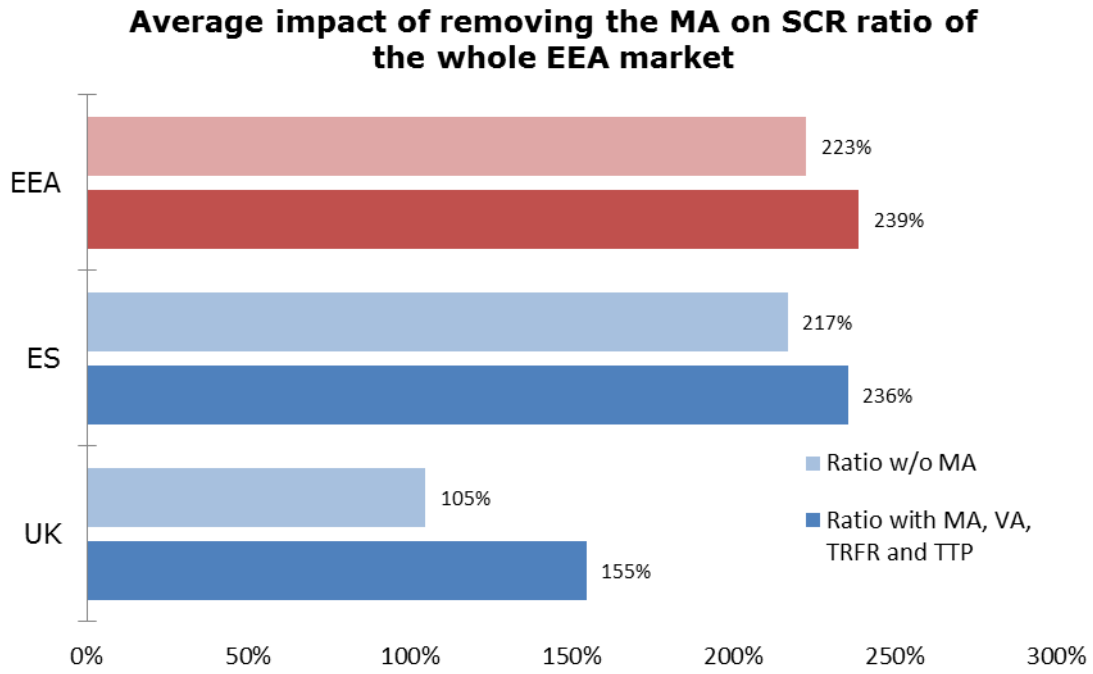


The following graph illustrates the dispersion of individual values for the MA in the different markets, and at EEA level. The box and whisker plots show the dispersion for MA in Spain, the UK and the EEA. The whiskers show the lowest and highest values recorded although one data point collected (from the UK) showed an MA of 0 so this point was omitted from the calculations. The box shows the 25th to 75th percentile with the change in colour representing the 50th percentile (or the median).



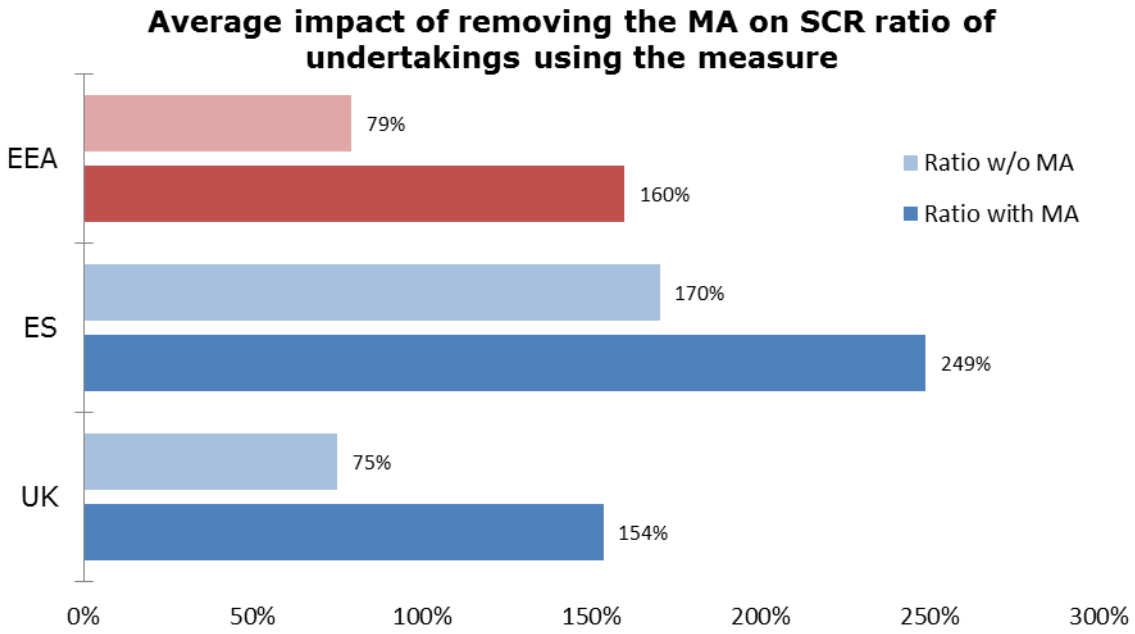
As the MA is used in two countries, Spain and United Kingdom, the impact at the EEA level is being driven by the impact in these two countries.

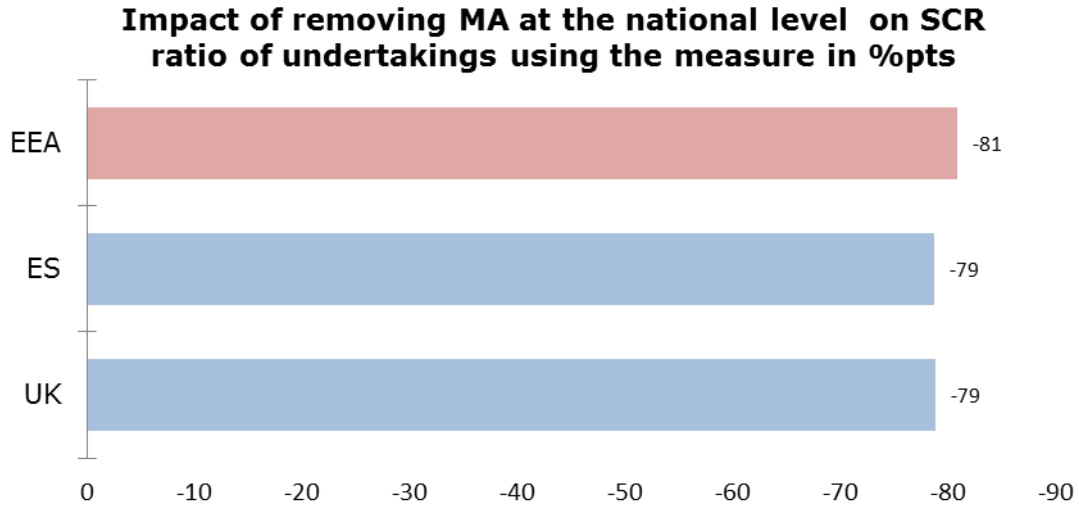
The following graph shows the overall impact of the use of the MA on the SCR ratio for the whole market of the countries where the MA is used. For those countries, it includes both undertakings using and not using the MA. For this sample, the MA results on average in an increase of the SCR ratio by 17 percentage points.



The following graphs display the overall impact of the use of the MA on the SCR ratio for undertakings that apply this measure. The impact is shown at EEA and at country level. The first graphs shows the SCR ratio with (dark blue) and without (light blue) the MA. The red bars are for the EEA level. The second graph shows the impact in percentage points.

At the EEA level, removing the MA result on average in a decrease of the SCR ratio by 81 percentage points. In comparison with last year, the average impacts have reduced but this is due to the reduction of the average impact in one of the two jurisdictions concerned. In this jurisdiction, undertakings using the MA are still on average very dependant of the measure. In the other jurisdiction, the average impact is stable and the average SCR ratio of undertakings using the MA has decreased.



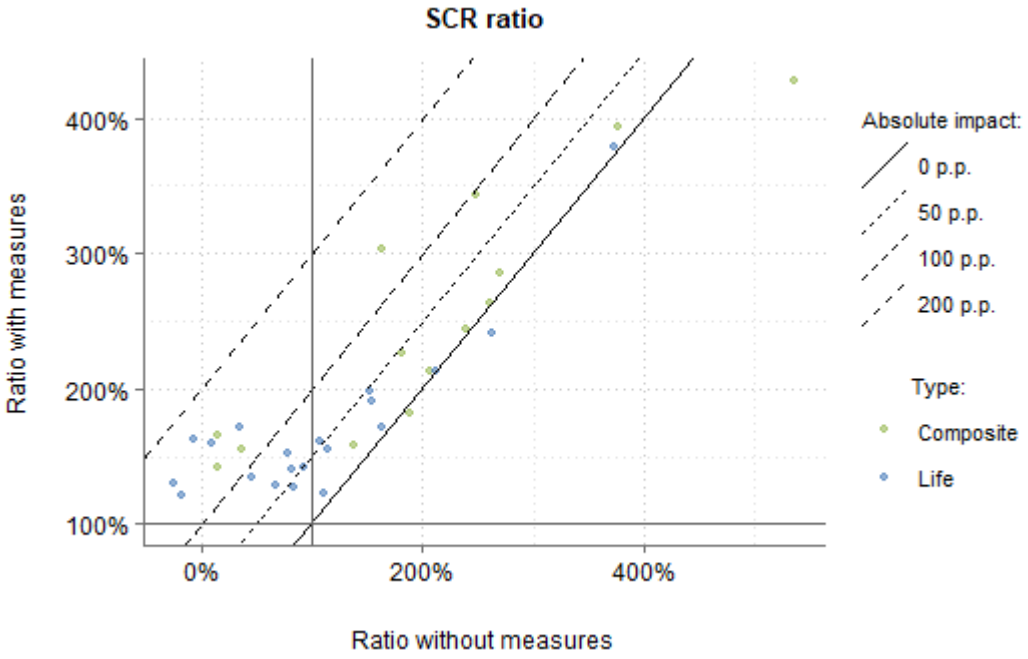


The following graph displays the impact of removing the MA on the SCR ratio of every undertaking using this measures. Each dot in the diagram represents one undertaking, comparing the individual SCR ratio against the estimated SCR ratio without the MA. The type of each undertaking is indicated by the colour of the dot.

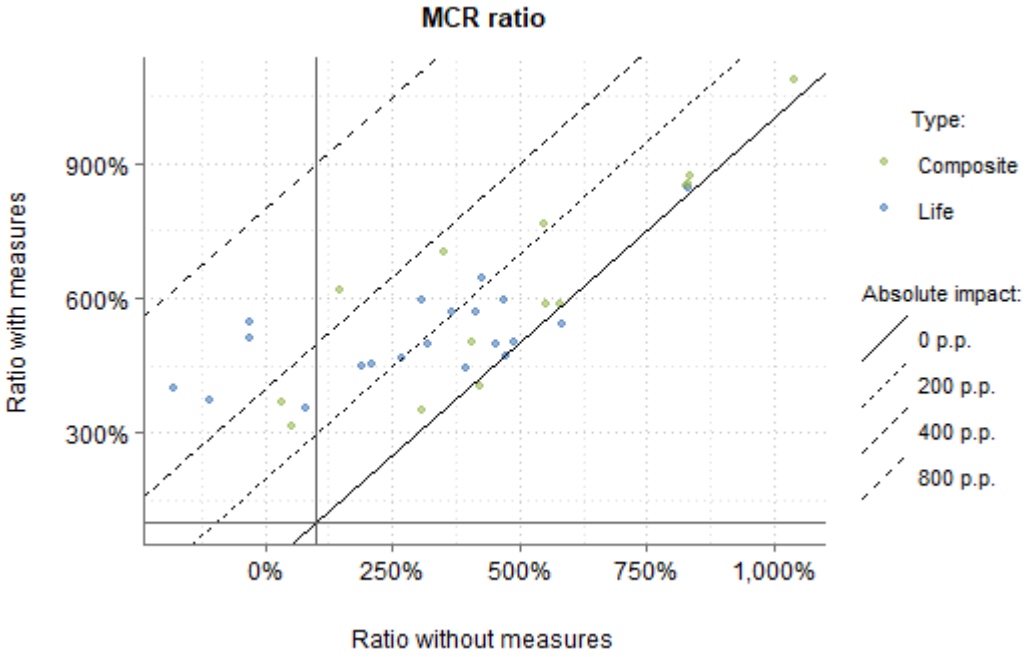
In terms of SCR ratio, 71% reported an absolute impact between 0% and 100%.

41% of undertakings using the measure reported an SCR ratio without MA below 100% (14 undertakings, with 10% of the total technical provisions in the EEA). 9% of the undertakings using the MA reported negative eligible own funds to cover the SCR without MA (3 undertakings, with 0.4% of the total technical provisions in the EEA).

For this measure, there are not clear differences between Life and Composite undertakings.



The following graph displays the impact of removing the MA on the MCR ratio of every undertaking using the MA, comparing the individual MCR ratio against the estimated MCR ratio without the MA.

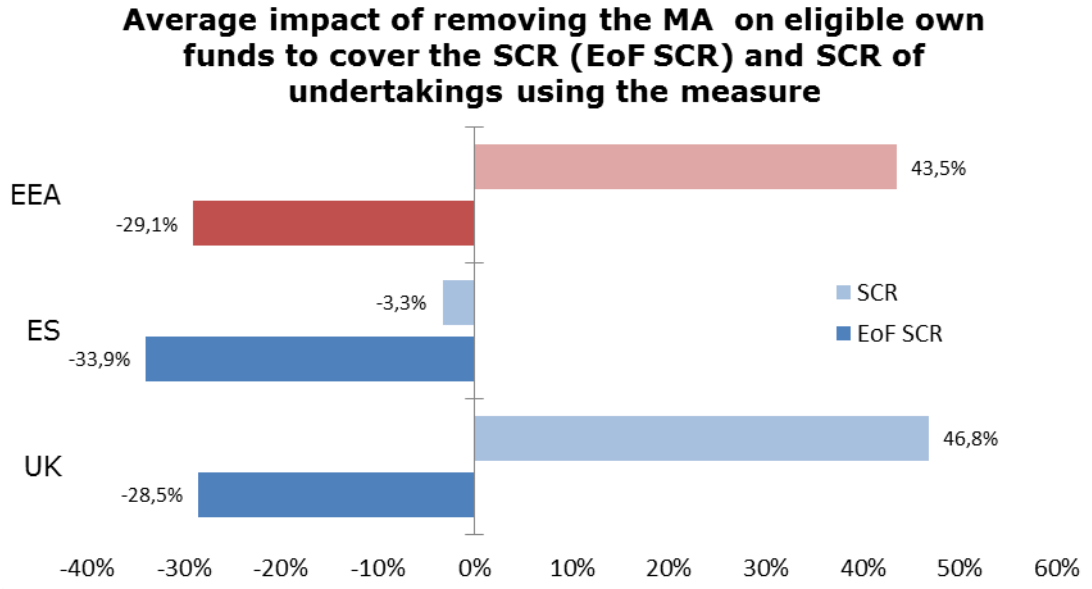


In terms of MCR ratio, 71% reported an absolute impact between 0% and 100%.

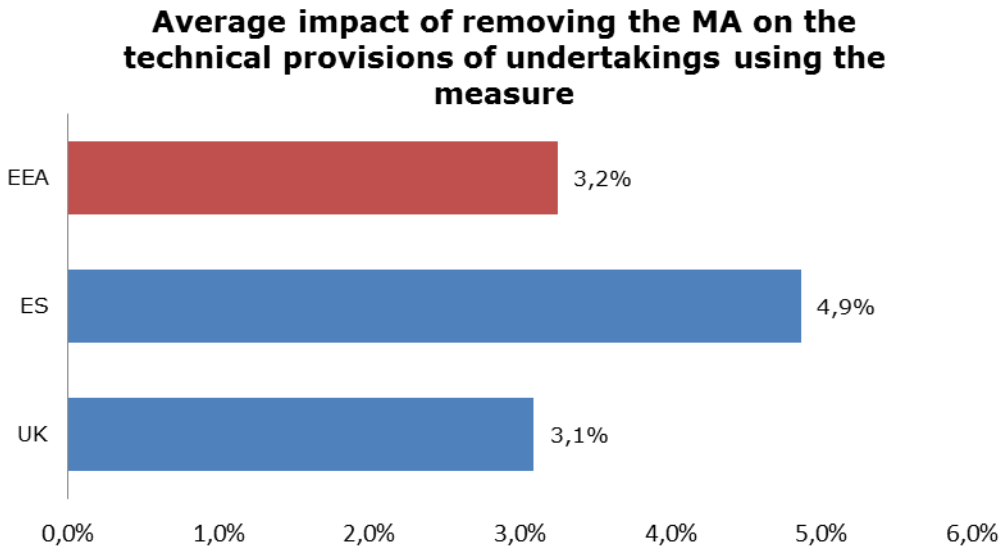
21% of undertakings using the measure reported an MCR ratio without MA below 100% (7 undertakings, with 2% of the total technical provisions in the EEA). 12% of undertakings using the MA reported negative eligible own funds to cover the MCR without MA (4 undertakings, with 0.7% of the total technical provisions in the EEA).

The following graph shows the impact of removing the MA on the SCR (light blue) and on the eligible own funds to cover the SCR (dark blue). The red bars are for the EEA level. On average, eligible own funds to cover the SCR would decrease by 29%, while the SCR would increase by 44% if the MA were removed. When compared to last year's results, we notice that there is a reduced impact of MA on the EoF available to cover the SCR. At EEA level, this is because of a reduction in one of the two MA jurisdictions and in this jurisdiction, the reduction comes from lower overall MA this year compared to last. This has already been illustrated in the 'Weighted Average of MA' graph above.

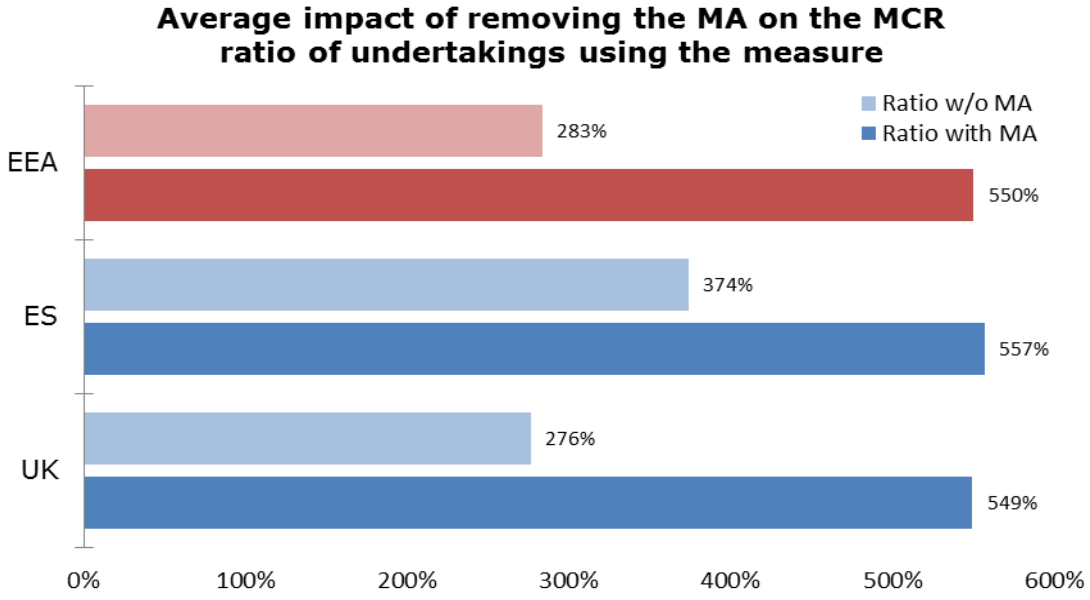
Regarding the impact of the MA on the SCR shown in the graph below, note that removing the MA typically increases the capital requirement for spread risk which leads to an increase in the SCR. At the same time, where the MA is applied, no diversification between the MA portfolio and the remaining part of the portfolio can be recognized according to articles 216 and 217 of the Solvency II Delegated Regulation. With the removal of the MA, such diversification effect can be taken into account which leads to a decrease in the SCR. For the Spanish undertakings the latter effect overweighs and thus the effect observed when removing this measure is a reduction of the SCR due to the recognition of diversification between the matching adjustment portfolio and the remaining part of the undertaking.

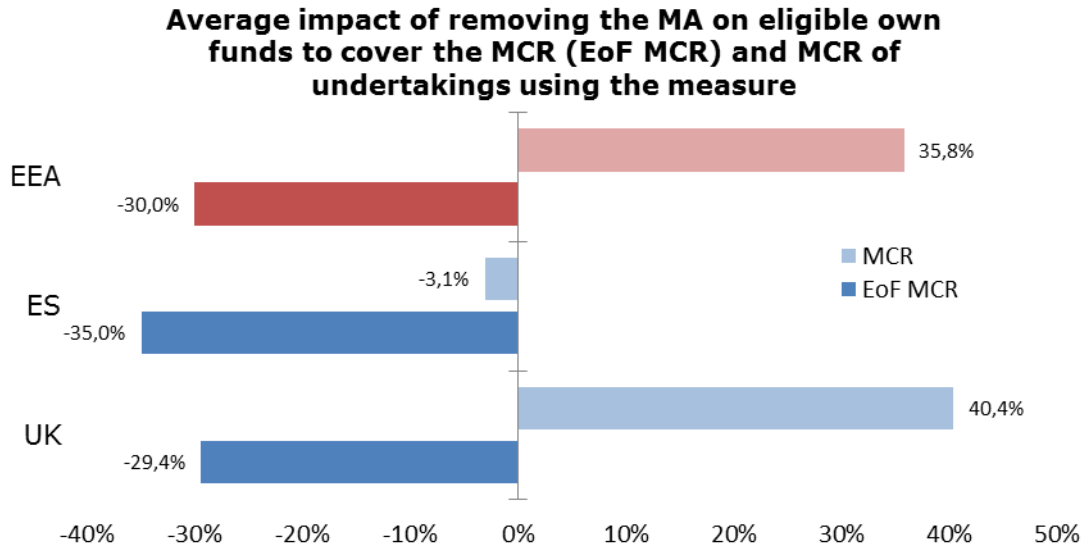


The following graph displays the impact of removing the MA on the value of technical provisions (TP) at EEA and national level. The average increase in technical provisions without the MA for those undertakings applying the measure would be around 3% at EEA level.

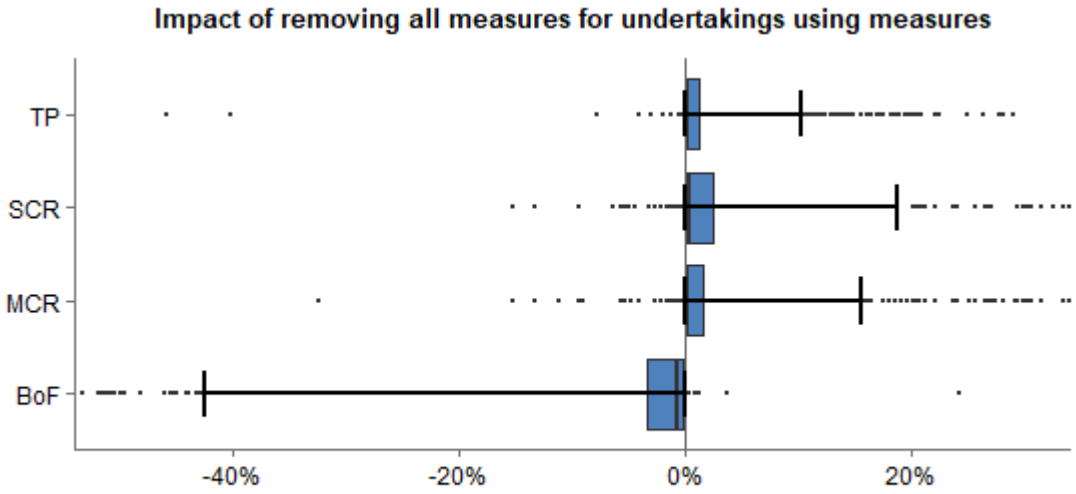


The following graph shows the impact of the MA on the MCR ratio at country and at EEA level for undertakings using that measure. Without the MA the MCR ratio would decrease on average by 267 percentage points.





The box-plots below illustrate how the impact of removing the MA is distributed across undertakings.[27] In comparison with last year, the distributions are much less dispersed for all variables.



Impact on the investments of undertakings

The following graphs compare the average asset portfolio of undertakings applying the MA. Please note that the information in this section does not address specific consequences for the investments resulting from the matching requirements when applying the MA. This issue is addressed in the section below titled MA analysis of matching.

[27] The bottom (respectively, top) of the blue box represents the lower quartile (respectively, higher quartile) of the data set. The black band inside the box is always the middle quartile (50th percentile or median). The end of the lines extending from the boxes (called whiskers) represent the 10th and 90th percentiles, respectively. Outliers are plotted as individual points.

The tables below show the average investment allocation of undertakings using the MA in the two countries using the MA, ES and UK.

Investment allocation at EEA and country level of undertakings applying the MA								
Country	Government bonds	Corporate bonds	Unit linked/index linked	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
ES	66%	16%	6%	2%	0%	0%	8%	1%
UK	11%	20%	38%	8%	8%	6%	6%	3%

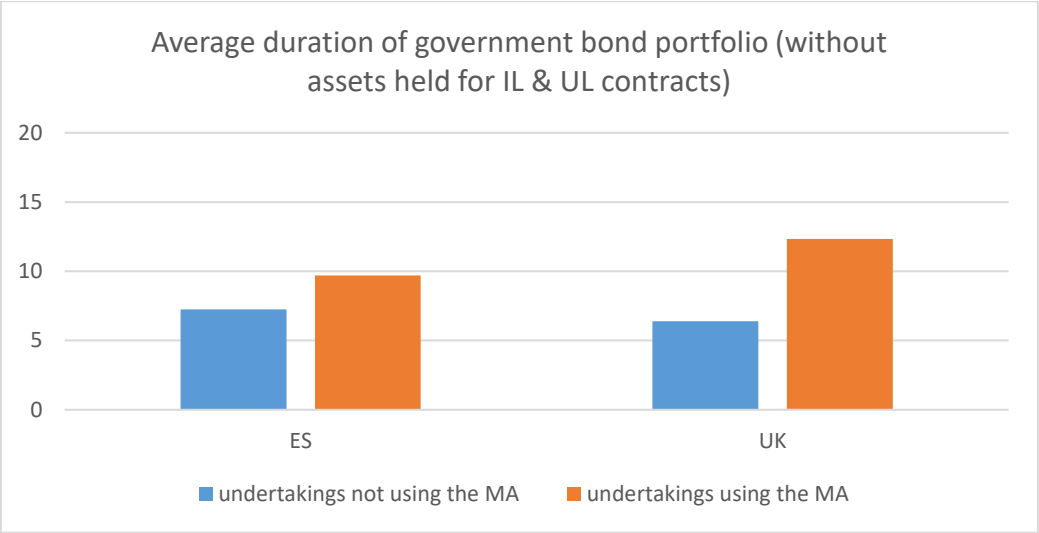
Investment allocation at EEA and country level (without assets held for IL & UL contracts) of undertakings applying the MA							
Country	Government bonds	Corporate bonds	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
ES	70%	17%	3%	0%	0%	9%	2%
UK	18%	31%	13%	13%	10%	10%	5%

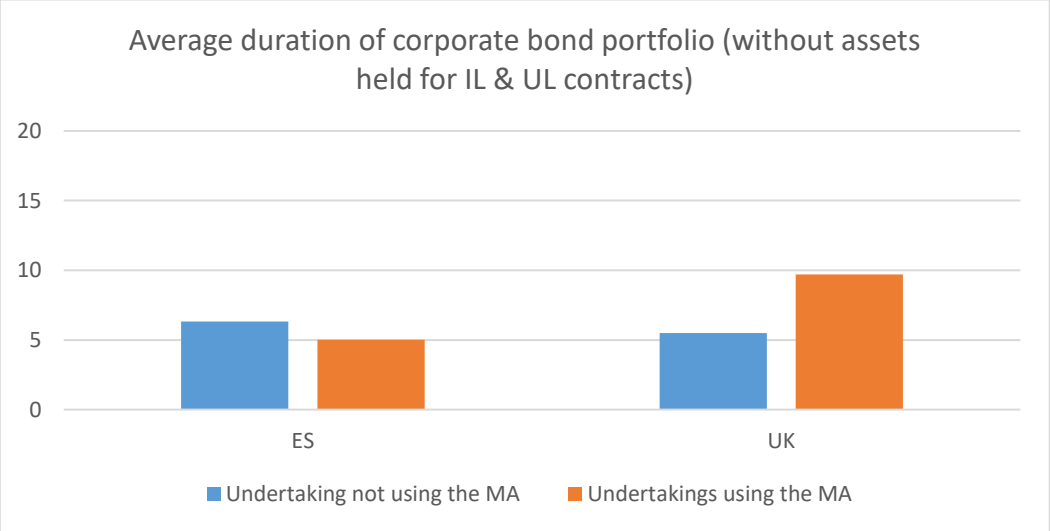
The tables below show the credit quality of the portfolio of government and corporate bonds. This is shown separately for undertakings applying the MA and the undertakings not applying the MA respectively, for each of the countries ES and UK separately. These tables indicate that for each of these two countries there are some differences in credit quality of bonds, between undertakings applying the MA or not applying the MA. However, when comparing these data with the differences in the credit quality of bonds between countries, as presented in section II.4 of the report, the differences within both countries ES and UK between undertakings applying the MA or not applying the MA are relatively limited. In other words, the "country effect" is considerably larger than the effect of using the MA or not using the MA.

Credit quality of government bonds for undertakings not using the MA or using the MA, for ES and UK (without assets held for IL & UL contracts)						
Country	Use of the measures	CQS0	CQS1	CQS2	CQS3	CQS>3
ES	No use of MA	5%	6%	2%	85%	1%
	Use of the MA	1%	1%	0%	98%	0%
UK	No use of MA	20%	76%	2%	1%	0%
	Use of the MA	8%	89%	2%	1%	0%

Credit quality of corporate bonds for undertakings not using the MA or using the MA, for ES and UK (without assets held for IL & UL contracts)						
Country	Use of the measures	CQS0	CQS1	CQS2	CQS3	CQS>3
ES	No use of MA	3%	12%	32%	48%	4%
	Use of the MA	2%	8%	41%	46%	4%
UK	No use of MA	8%	14%	45%	30%	3%
	Use of the MA	8%	11%	40%	37%	5%

The graphs below show the duration of investments in government bonds and corporate bonds for undertakings using the MA and undertakings not using the MA in ES and UK.

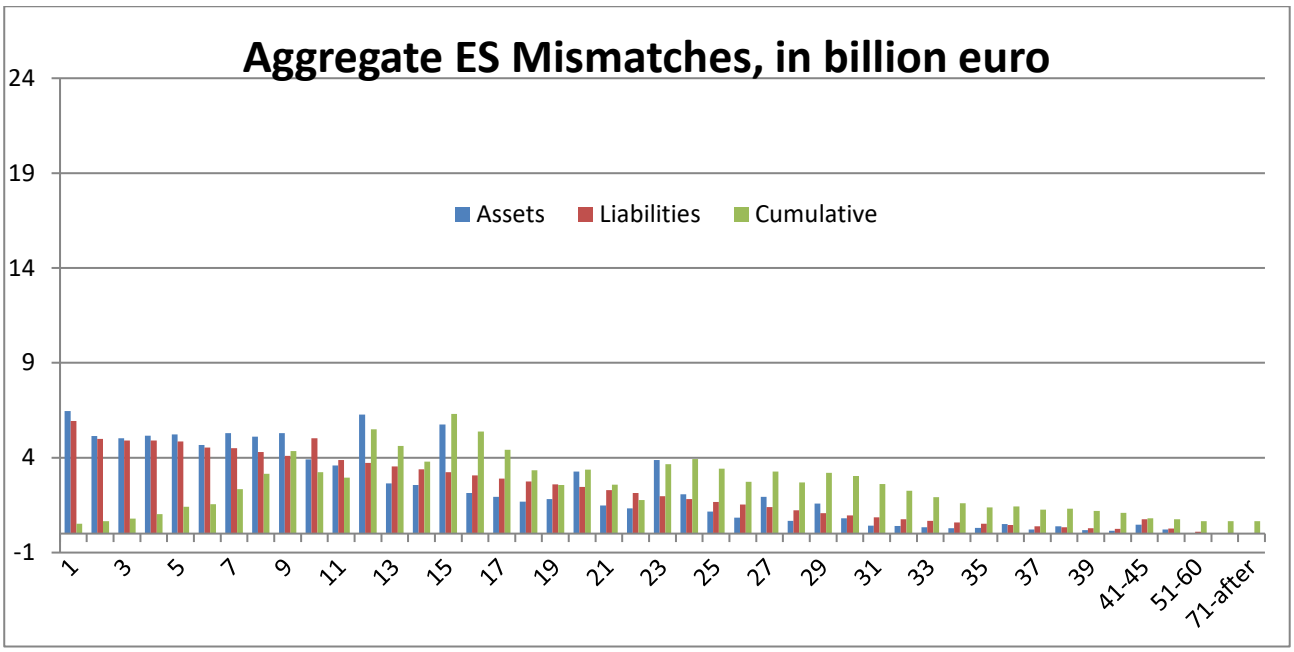


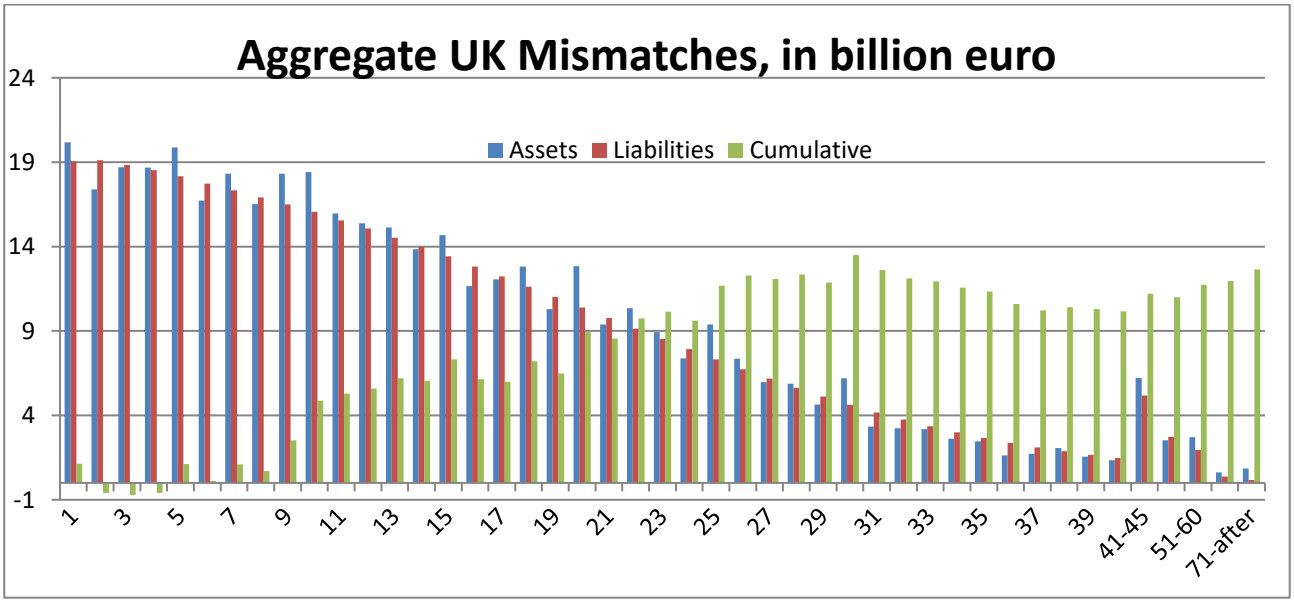


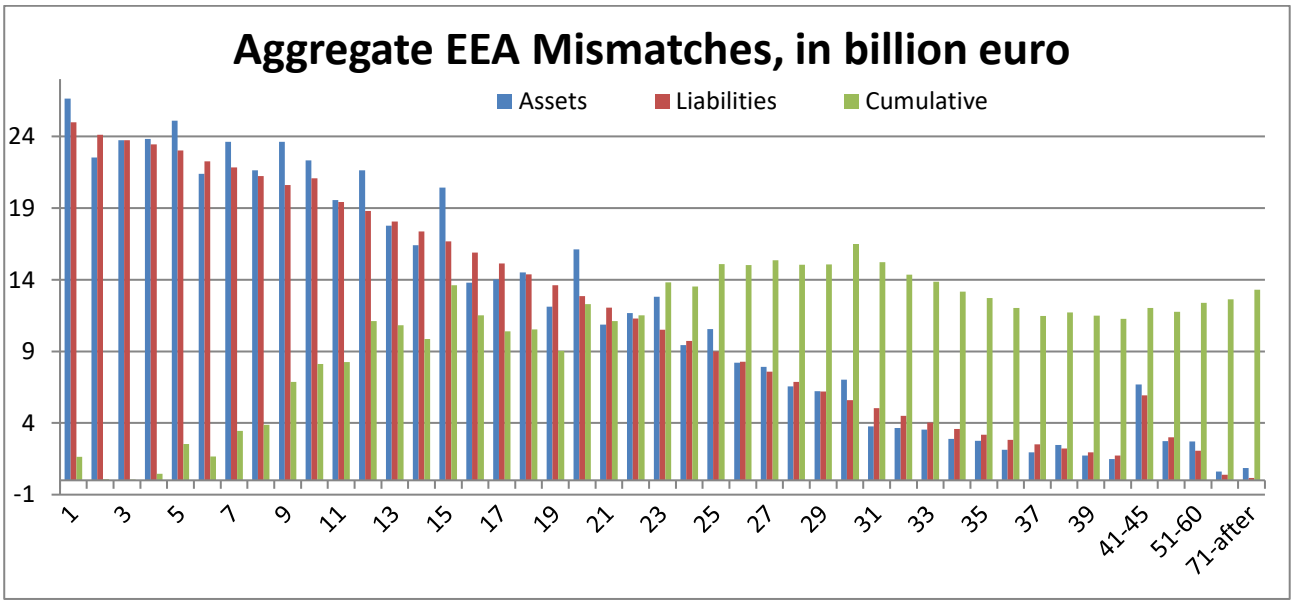
MA Analysis of matching

Use of MA requires that firms assign a portfolio of assets to replicate the expected cash flows of the liabilities. In particular, Art. 77b.1.c of the Solvency II Directive states that the expected cash flows of the assigned portfolio of assets replicate each of the expected cash flows of the portfolio of insurance or reinsurance obligations in the same currency. Any mismatch between the cash flows should not give rise to risks which are material in relation to the risks inherent in the insurance or reinsurance business to which the matching adjustment is applied.

As a first snapshot of the overall extent to which assets and liabilities are matched, the following 3 graphs show the cash-flows at market level in ES, UK and EEA (figures in billion euro). Please note that these graphs only show the aggregate cash-flows for each time period. The 'Cumulative' columns have been calculated by accumulating the mismatches for all prior time-periods.


Aggregate ES Mismatches, in billion euro
Assets
Liabilities
Cumulative
24
19
14
9
4
-1
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41-45
51-60
71-after


Aggregate UK Mismatches, in billion euro
Assets
Liabilities
Cumulative
24
19
14
9
4
-1
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41-45
51-60
71-after


Aggregate EEA Mismatches, in billion euro
Assets
Liabilities
Cumulative
24
19
14
9
4
-1
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41-45
51-60
71-after

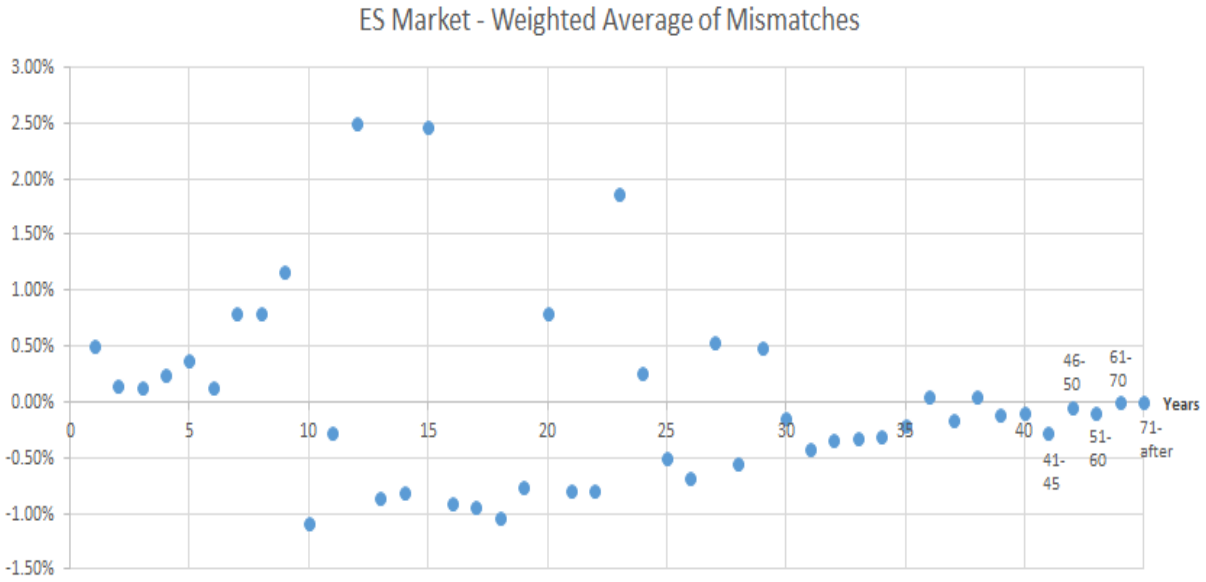
Beyond the view of aggregate, market-wide mismatches, it is necessary to consider the level of matching at individual portfolio level. As noted above, it is a requirement that at this level any mismatch does not represent risks that are material in the context of the business.

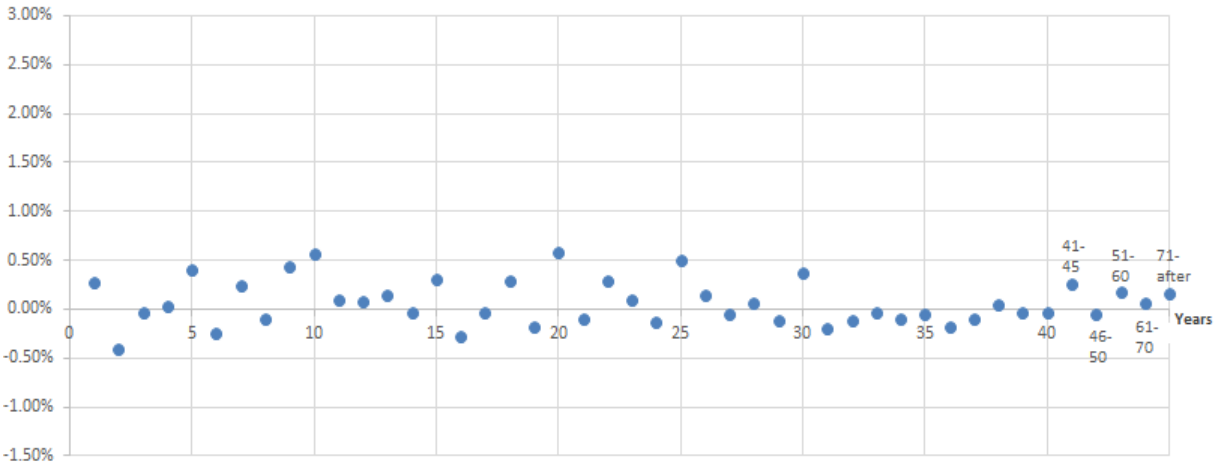
Therefore in this section we analyze the extent of mismatches regarding cash-inflows and cash-outflows in individual matching adjustment portfolios and give an indication of their materiality. In order to carry out this analysis we have faced limitations derived from the information contained in the QRTs which is significantly less granular than that commonly used by NSAs. Consequently, the analysis in this section is more high level than that used by national supervisors. This is carried out with more granular data provided by the undertakings, for example following Article 4(a) of the Commission Implementing Regulation 2015/500 which requires firms to provide quantitative evidence that any mismatch does not give rise to material risks when applying to use a matching adjustment. NSAs generally manage a much larger volume of data which allows them to analyze mismatches in a more sophisticated and detailed basis, e.g. based on monthly cash flow analyses. However, in this report we have instead relied on the coarser QRT data, which has meant that mismatches are analyzed on a yearly basis and the techniques used are necessarily simpler than those used by NSAs. However, we consider that the methodology and data used below still allow for a reasonable insight into matching of cash flows at market level.

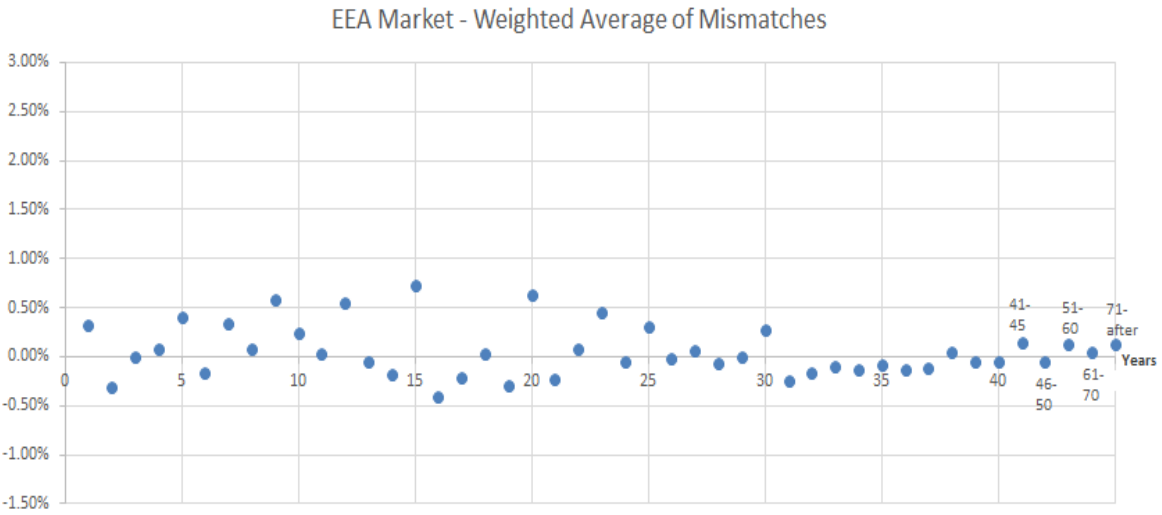
In order to overcome the data limitations noted above we have presented the analysis in two different ways: firstly assessing purely year-by-year mismatches, and secondly considering accumulated mismatches. The former ignores the context of other potential surpluses or deficits arising for any given firm. Therefore, we have also presented a second analysis which considers mismatches in each firm's context of surpluses and shortfalls. That analysis does however not allow to assess the interest rate risk that mismatches would give rise to. It should be noted that there are other ways to assess mismatching which could be implemented with access to more granular and detailed data.

In the graphs below it is important to note that all of the entries refer to market-wide statistics, and not individual firms. For example, where a graph shows a deficit on two consecutive years, this does not correspond with the same firm having a deficit in both years. It could well be (and in the MA context it is likely to be) different firms having deficits in each year.

The following set of graphs below illustrates the extent of annual mismatching, ignoring the firm specific context in which they arise as noted above. Specifically, for each year the graphs show the weighted average of the undiscounted positive and negative mismatches for each of the future cashflow years, as a ratio of the total size of undiscounted cash flows. Each point represents an average over all the matching portfolios in that year. A positive mismatch occurs in a year in where cash-inflows in are larger than cash-outflows therefore, a cash surplus is produced for that year. A negative mismatch will occur in a year in where cash-outflows are larger than cash-inflows. This leads to a deficit for that year.

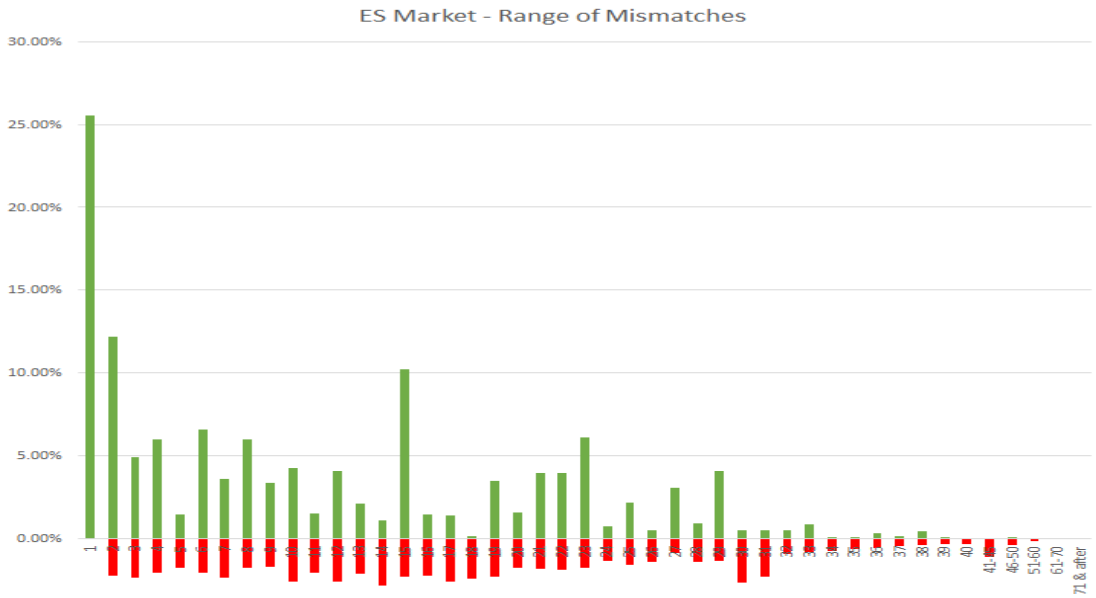

ES Market - Weighted Average of Mismatches
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
-0.50%
-1.00%
-1.50%
0
5
10
15
20
25
30
35
40
41-45
46-50
51-60
61-70
71-after
Years

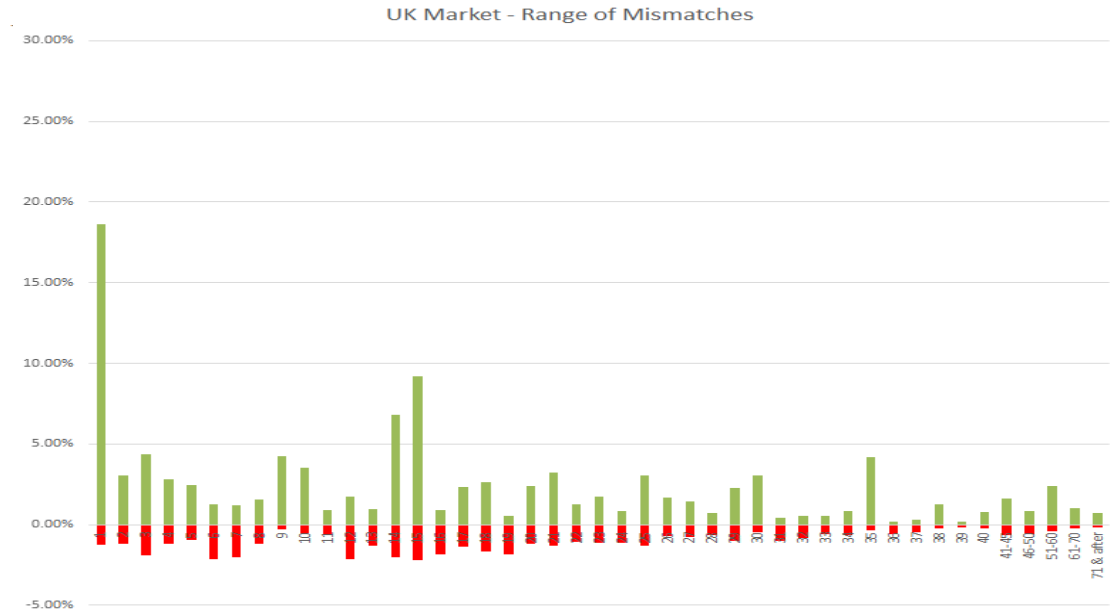

UK Market - Weighted Average of Mismatches
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
-0.50%
-1.00%
-1.50%
0
5
10
15
20
25
30
35
40
41-45
46-50
51-60
61-70
71-after
Years

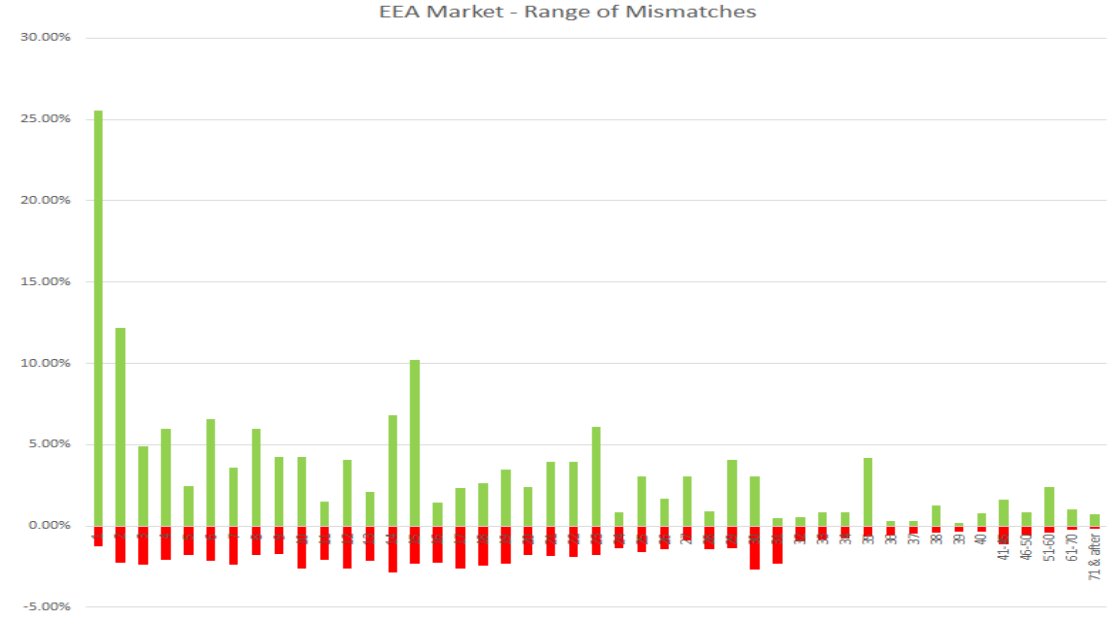

EEA Market - Weighted Average of Mismatches
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
-0.50%
-1.00%
-1.50%
0
5
10
15
20
25
30
35
40
41-45
46-50
51-60
61-70
71-after
Years

As noted above, these graphs are at a market, not undertaking, level.

The following graph shows the range of mismatches (both positive and negative). Each bar represents the range of results for each portfolio across the market for each future cashflow year.



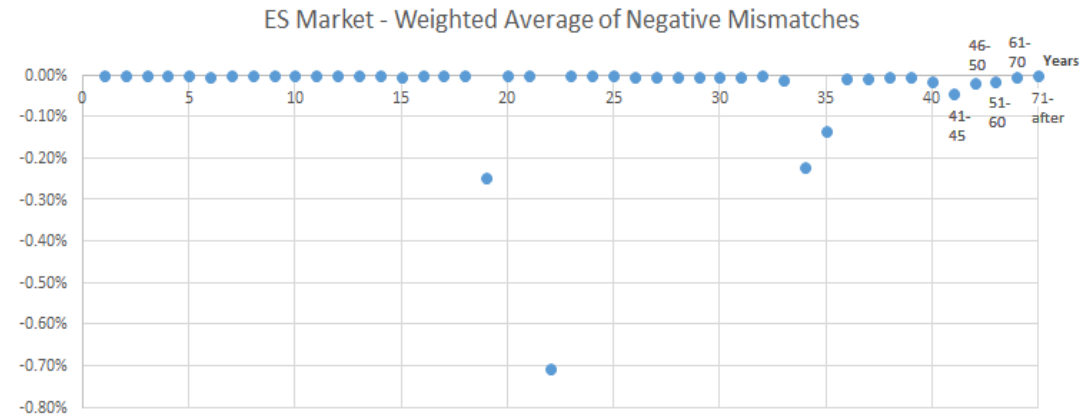


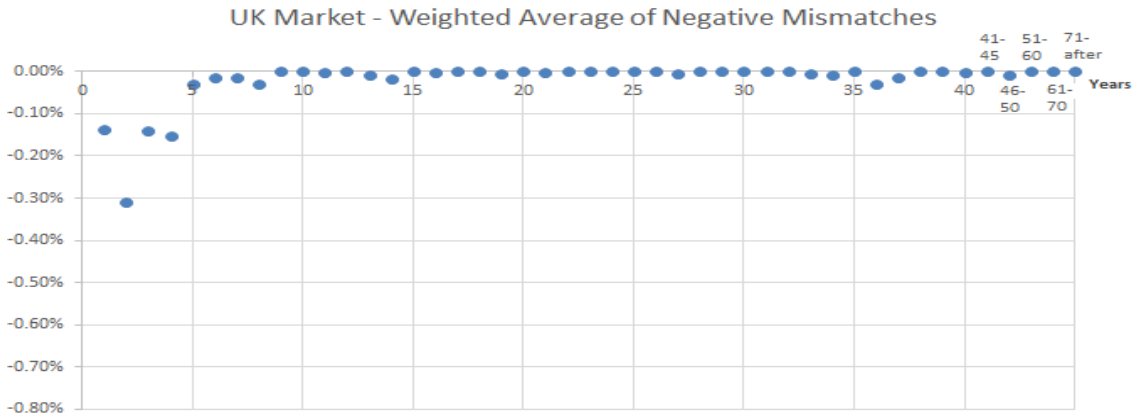


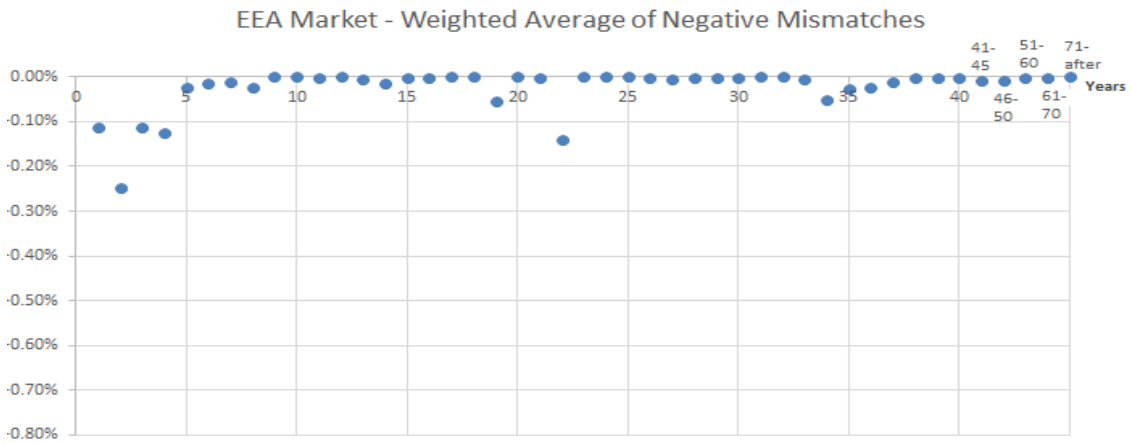
These graphs show that positive mismatches are more common and larger in size than negative mismatches.

The cumulative analysis pays specific regard to negative mismatches, given difficulties they can create when meeting liabilities. On the other hand, cash surpluses generated in previous years can be used to make payments in the future years. Cash can be used within the MA portfolio to meet liabilities. Indeed in the early years of the projection firms often rely, to a relatively larger extent, on cash on hand in order to be able to make timely payments to policyholders on a month-by-month basis. This is a finding that links back to the risk management focus of this report, and would be reflected in the liquidity plan required by Article 44(2) of the Solvency II Directive. Nevertheless, undertakings are unlikely to use a large amount of cash in the matching adjustment portfolio given that cash has the effect of reducing the matching adjustment. Furthermore the resulting mismatch may give rise to material interest rate risk.

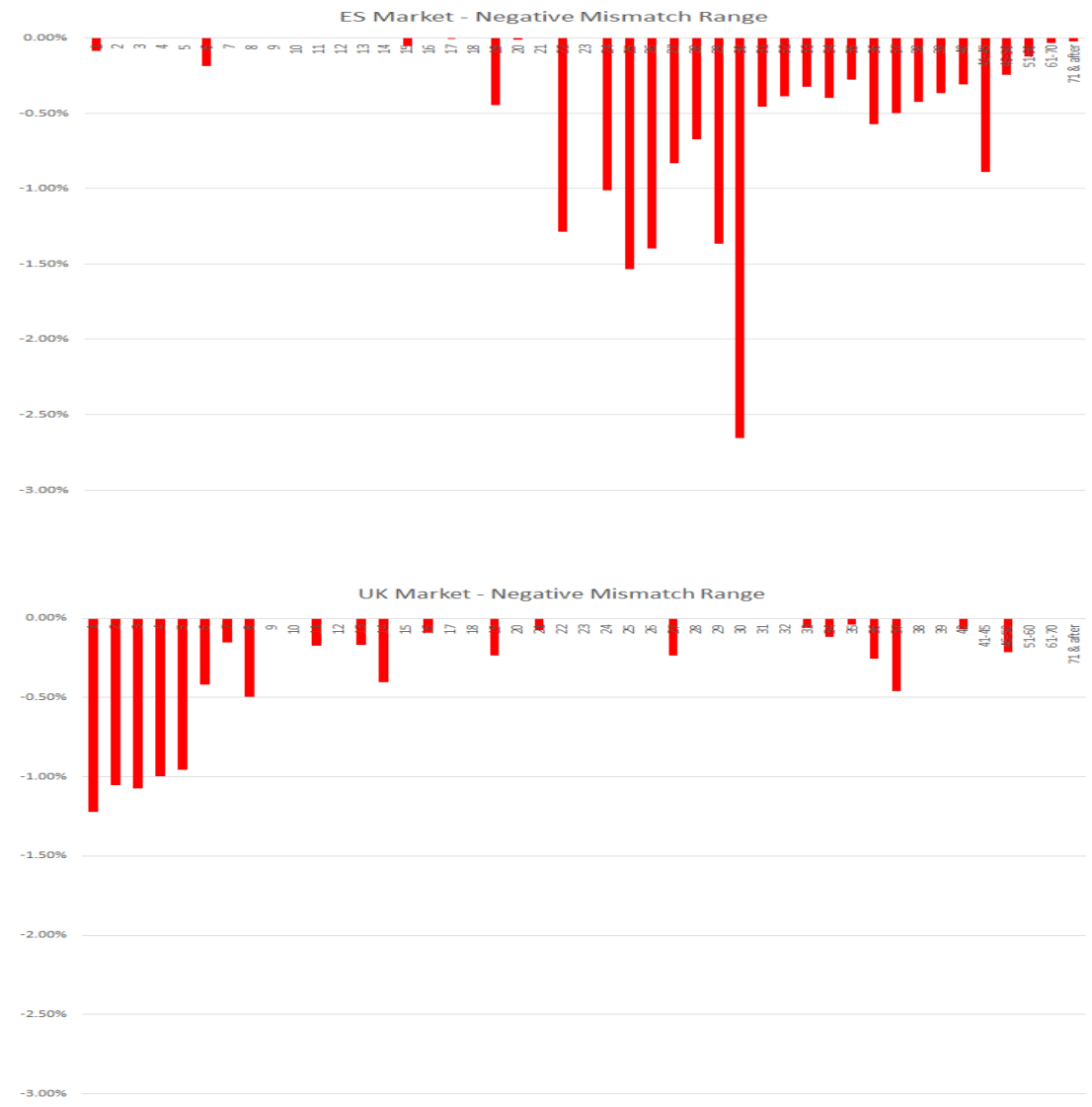
For these reasons, the following graphs show only the negative mismatches (per year) and allow the accumulation in the MA portfolio of prior surpluses when calculating the mismatches, which are then presented as a percentage of the best estimate liability. Annex 4 contains an explanation on the methodology used in this part of the analysis.

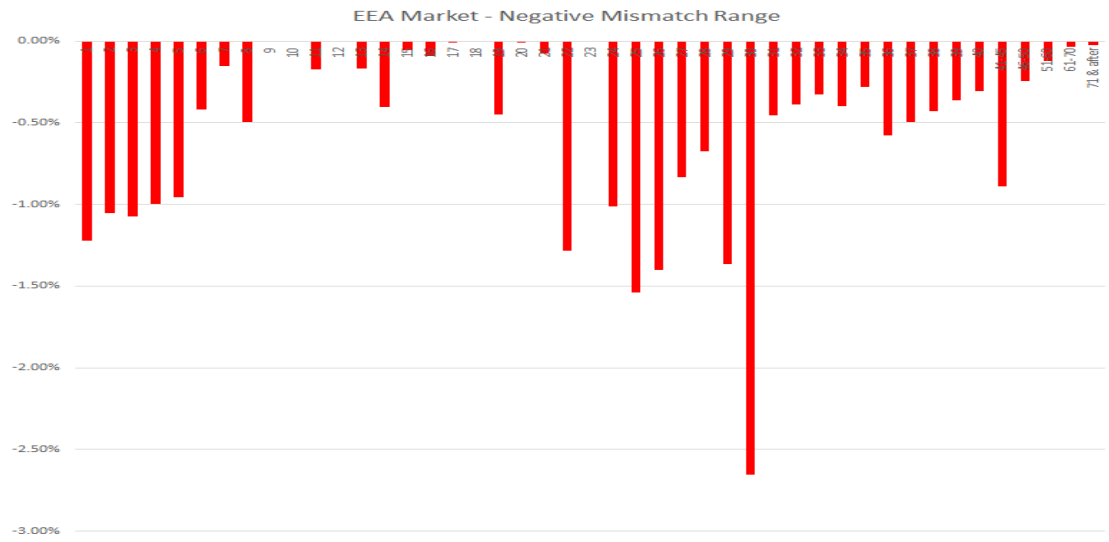






The market range is shown is the following graphs:





Negative mismatches are, in general, lower than 1.50%. When considering these graphs it is important to recall that these represent different firms in each time period: firms usually do not have large negative cashflows in consecutive periods. Rather it is normally the case that if a negative cashflow should occur then a positive one will precede it. The graphs show the lowest ebb that any individual firm might attain.

Earlier mismatches will generally be considered in more detail in undertaking's liquidity plans, e.g. analyzing the amount of cash in the portfolio that can be used to cover them. For mismatches in later years could be rectified through timely rebalancing of the portfolios or using surplus cash from prior years – the specificities of each firm's situation would be assessed by national supervisors to verify the lack of material mismatch risk remaining in relation to the risks in the business to which MA is applied.

MA-Additional QRT info

It has also been analyzed compliance with the requirement of Article 77b.1.g of the Solvency II Directive. This article sets out that contracts in an MA portfolio that include surrender options must have a surrender value that does not exceed the value of the assets covering the insurance or reinsurance obligations at the time the surrender option is exercised. For this purpose the market value of assets covering surrendered contracts have been compared with the amount paid to policyholders, being in every case this last amount equal to or lower that the mentioned market value, for all undertaking applying MA.

Impact on consumers and products

The following table sets out the share of gross written premiums of undertakings using the MA compared to the total gross premiums written by all undertakings, for each line of business (columns 1 to 6) the total life insurance and life reinsurance business (column 7), and the total for non-life insurance and reinsurance business (column 8). The table is based on data reported by undertakings in the annual QRTs for 2017.

Country	1. Health insurance	2. Insurance with profit participation	3. Index linked and unit linked insurance	4. Other life insurance	5. Health reinsurance	6. Life reinsurance	7. Total life insurance and reinsurance	8. Total non-life insurance and reinsurance
ES	0.0%	19.1%	62.2%	70.9%	0.0%	1.7%	54.4%	6.5%
UK	34.6%	92.6%	28.2%	88.9%	20.6%	38.0%	41.5%	0.0%
EEA	**1.1%**	**6.1%**	**13.5%**	**43.8%**	**0.0%**	**0.0%**	**0.5%**	**14.6%**

With respect to the insurance products offered by insurance undertakings applying the MA in Spain, the following characteristics have been reported by the NSA:

- the purpose of the products is saving for retirement,
- the insurance obligations for the products fall in the Solvency II line of business "other life insurance",
- the products guarantee life annuities or a lump sum payment,
- the products offer a guaranteed interest rate.

In the United Kingdom, MA-eligible liabilities primarily consist of 'individual' annuities and 'bulk-purchase' annuities. At a basic level an annuity is a contract that pays an income to the policyholder in return for an upfront premium, although as with any contract there are variants on this core theme (for example, in some cases the income stream increases in line with an inflation index). An 'individual' annuity is sold to individual policyholders, usually at retirement. 'Bulk-purchase' annuities are products that are generally sold to pension funds, which purchase an annuity-style asset to cover some or all of the liabilities of the pension fund. These products fall under the Solvency II line of business "other life insurance".

III.3 Volatility adjustment

Recital 32 of the Omnibus II Directive states that in order to prevent pro-cyclical investment behaviour, insurance and reinsurance undertakings should be allowed to adjust the relevant risk-free interest rate term structure to mitigate the effect of exaggerations of bond spreads.

For that purpose insurance and reinsurance undertakings can apply a volatility adjustment (VA) to the risk-free interest rate term structure. The VA is based on 65%

of the risk-corrected spread between the interest rate that could be earned from a reference portfolio of assets and the risk-free interest rates without any adjustment. The reference portfolio is representative for the assets which insurance and reinsurance undertakings are invested in to cover their insurance and reinsurance obligations.

Member States may require prior approval by supervisory authorities for insurance and reinsurance undertakings to apply a VA.

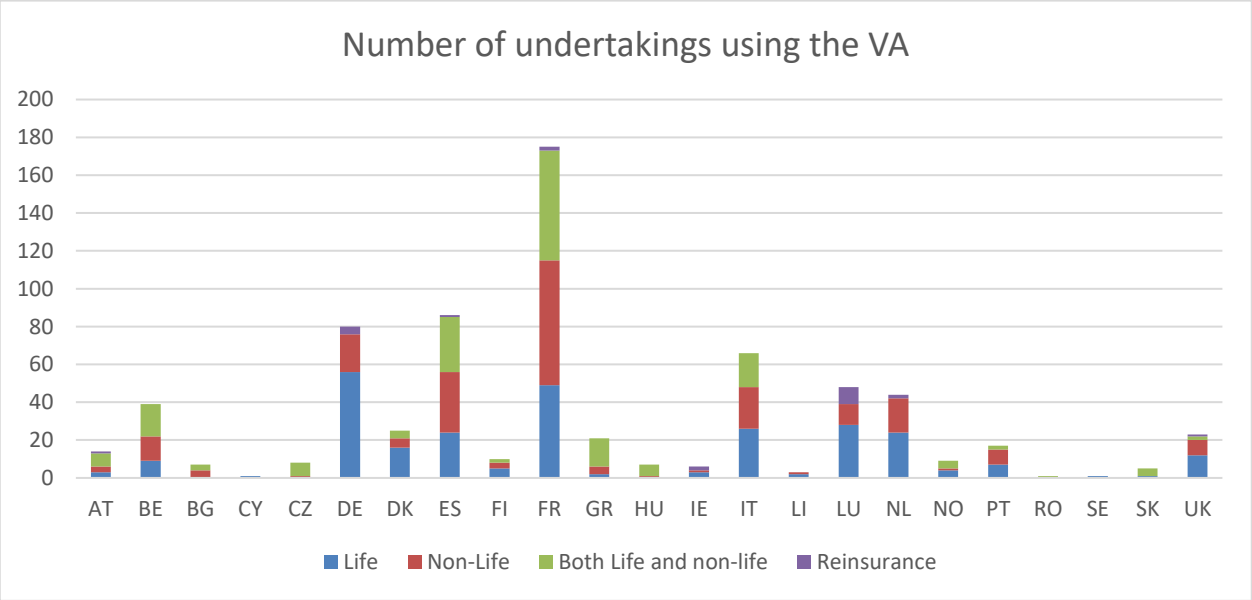
The VA is derived per currency. It is the same for all insurance and reinsurance obligations of a currency unless a country specific increase applies.

Undertakings that apply a VA to a portfolio of insurance or reinsurance obligations shall not apply a MA to those obligations.

Article 77d(6) of the Solvency Directive states that by way of derogation from Article 101, the SCR shall not cover the risk of loss of basic own funds resulting from changes of the VA.

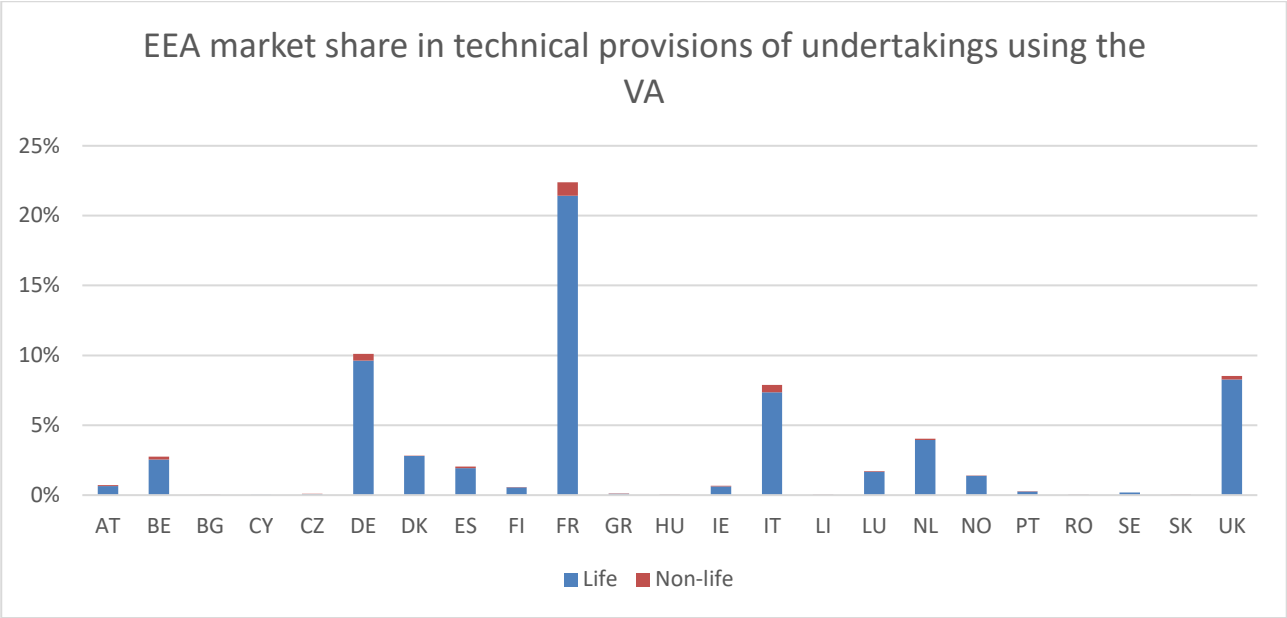
Use of the volatility adjustment

The VA is used by 696 undertakings in 23 countries.



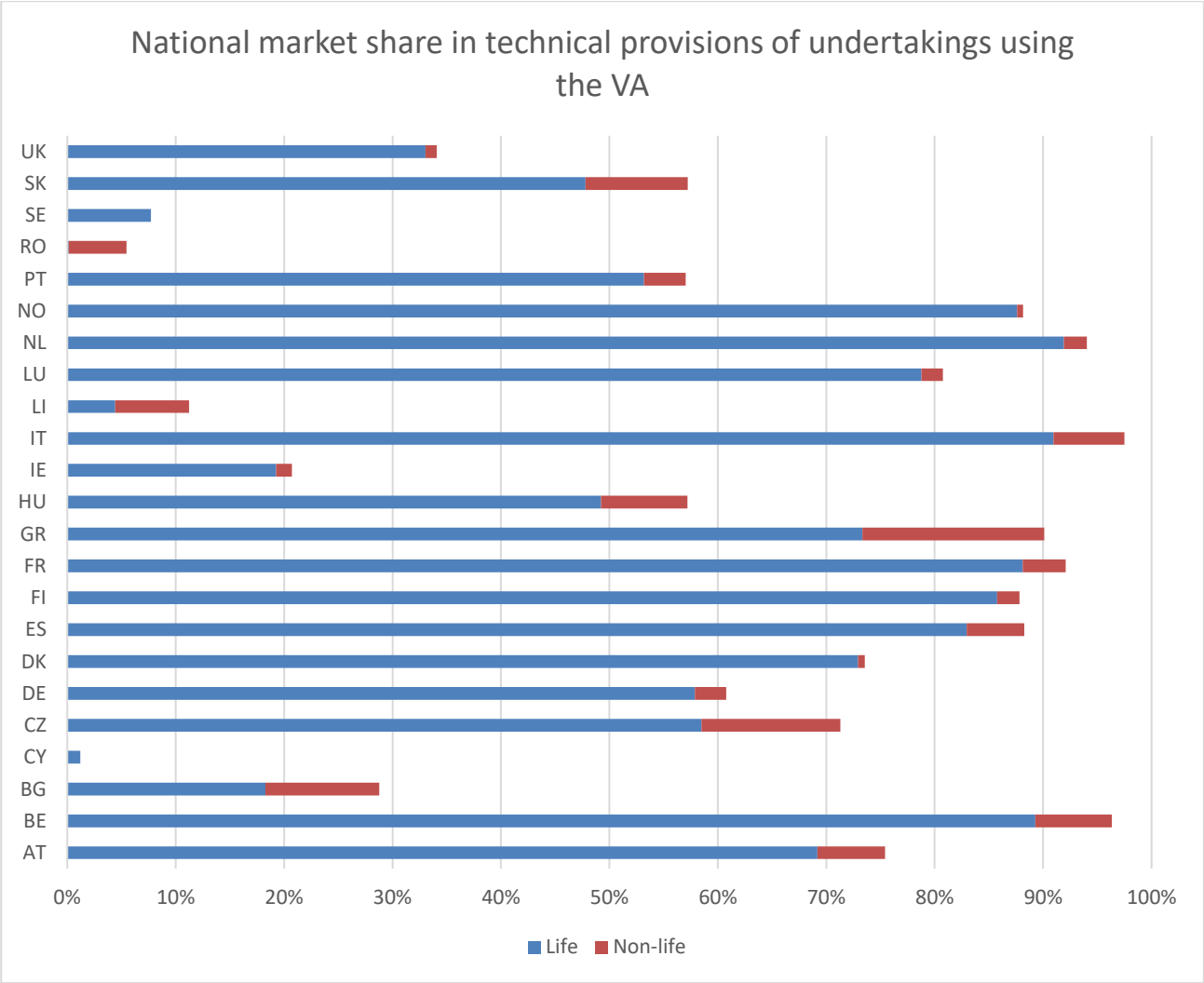
Number of undertakings using the VA							
Country	Life	Non-Life	Both Life and non-life	Reinsurance	Total	Last year	Variation from last year
AT	3	3	7	1	14	15	-1
BE	9	13	17	0	39	37	2
BG	0	3	4	0	7	7	0
CY	1	0	0	0	1	1	0
CZ	0	1	7	0	8	8	0
DE	56	20	0	4	80	82	-2
DK	16	5	4	0	25	26	-1
ES	24	32	29	1	86	87	-1
FI	5	3	2	0	10	10	0
FR	49	66	58	2	175	189	-14
GR	2	4	15	0	21	23	-2
HU	0	1	6	0	7	7	0
IE	3	1	0	2	6	7	-1
IT	26	22	18	0	66	74	-8
LI	2	1	0	0	3	2	1
LU	28	11	0	9	48	48	0
NL	24	18	0	2	44	44	0
NO	4	1	4	0	9	10	-1
PT	7	8	2	0	17	16	1
RO	0	0	1	0	1	1	0
SE	1	0	0	0	1	3	-2
SK	1	0	4	0	5	5	0
UK	12	8	2	1	23	28	-5
EEA	**273**	**220**	**179**	**24**	**696**	**730**	**-34**

The total number of undertakings using the VA in the EEA decreased by 34 in comparison to last year's report.



Insurance and reinsurance undertakings using the VA represent 66% of the overall amount of technical provisions at EEA level.

The following graph shows how widespread the use of the VA is for each country. It gives the technical provisions of undertakings that use the VA as a percentage of their market share. The graph clearly shows the importance of the VA in many countries, where undertakings using the VA together hold more than 75% of the national amount of technical provisions. Most of the technical provisions for life insurance liabilities are held by undertakings using the VA.



According to the Solvency II Directive it is possible to apply simultaneously the TTP or the TRFR and the VA to the same liabilities.

At EEA level, undertakings with 17% of the overall amount of technical provisions are applying the VA and the TTP to the same liabilities.

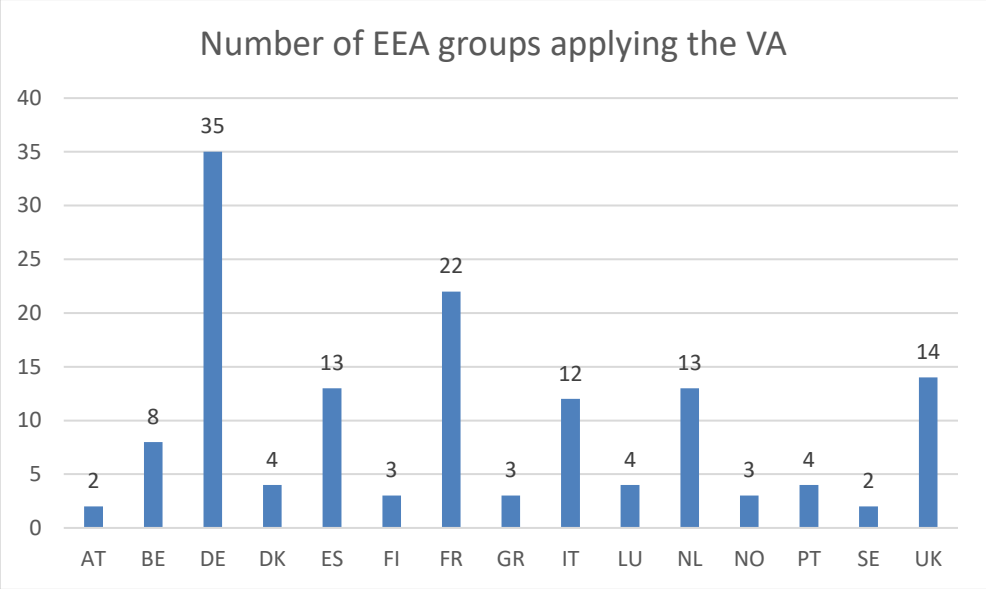
Undertakings applying simultaneously TTP and VA to the same liabilities			
Country	Number of undertakings	% EEA market share in TP	% National market share in TP
AT	2	(*)	(*)
BE	1	(*)	(*)
DE	46	4%	23%
ES	22	1%	38%
FI	7	0%	58%
FR	16	2%	9%
GR	1	(*)	(*)

LI	1	(*)	(*)
NO	5	1%	87%
PT	9	0%	42%
UK	14	8%	30%
EEA	**124**	**17%**	**-**

(*) Data from these countries are not disclosed for confidentiality reasons because the number of undertakings concerned is lower than 3.

It may be insightful to compare the table above with the tables on undertakings and the market share of their technical provisions with the tables on the use of only the VA or only the TTP. A comparison shows that for some jurisdictions, e.g. NO, FI and ES, there is a large overlap between the use of the TTP and the use of the VA.

The following diagram shows the number of EEA groups using VA.

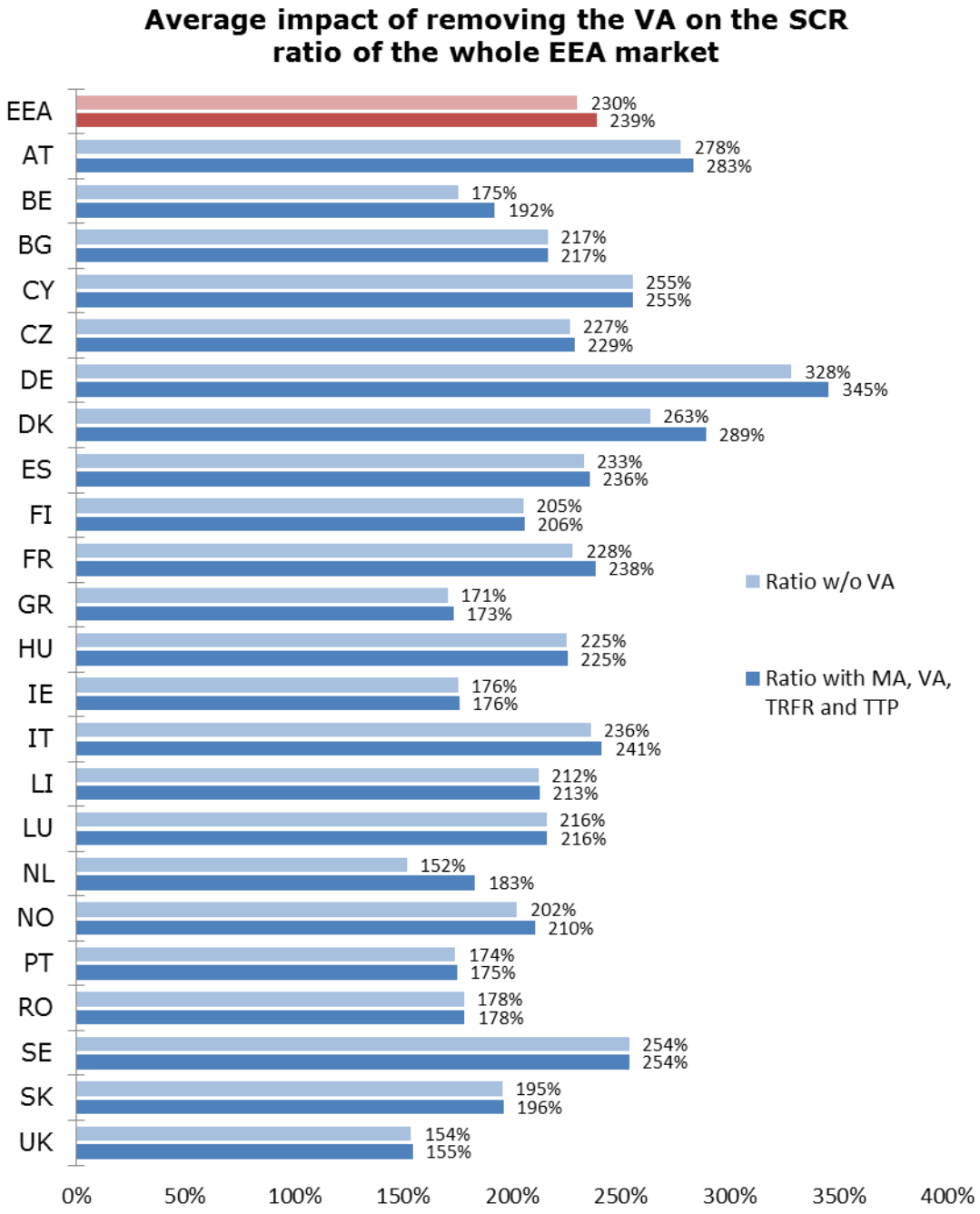


Impact on the financial position of undertakings

The impact results presented in this section are based on data from 2018 Quantitative Reporting Templates.

The impact of the VA should be interpreted in the light of the level of the observed spreads in the financial markets.

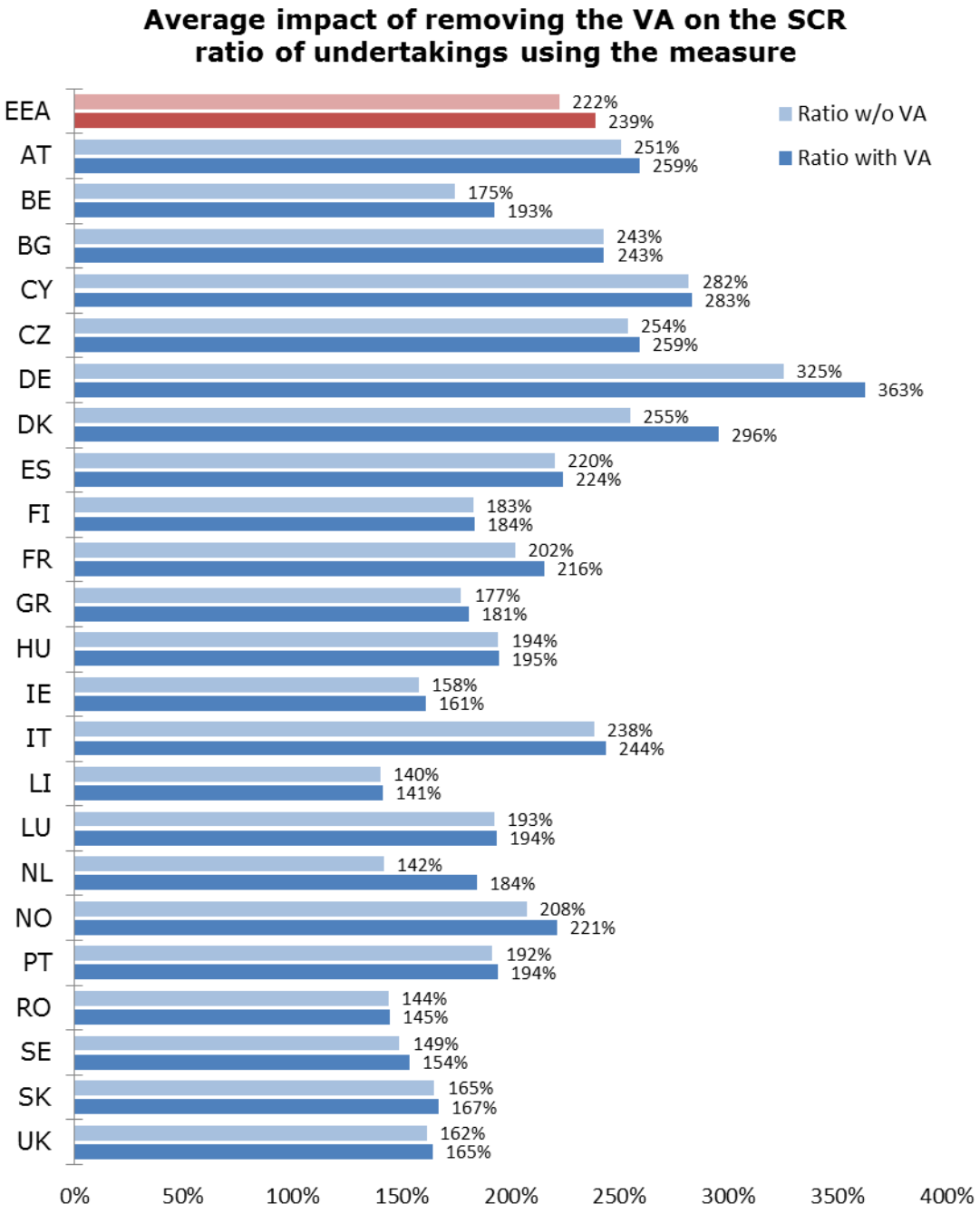
The following graph display the overall impact of the use of the VA on the SCR ratio for the whole EEA market (including both undertakings using or not using the measure). At the EEA level, the removal of the VA would result on average in a reduction of the SCR ratio by 9 percentage points.

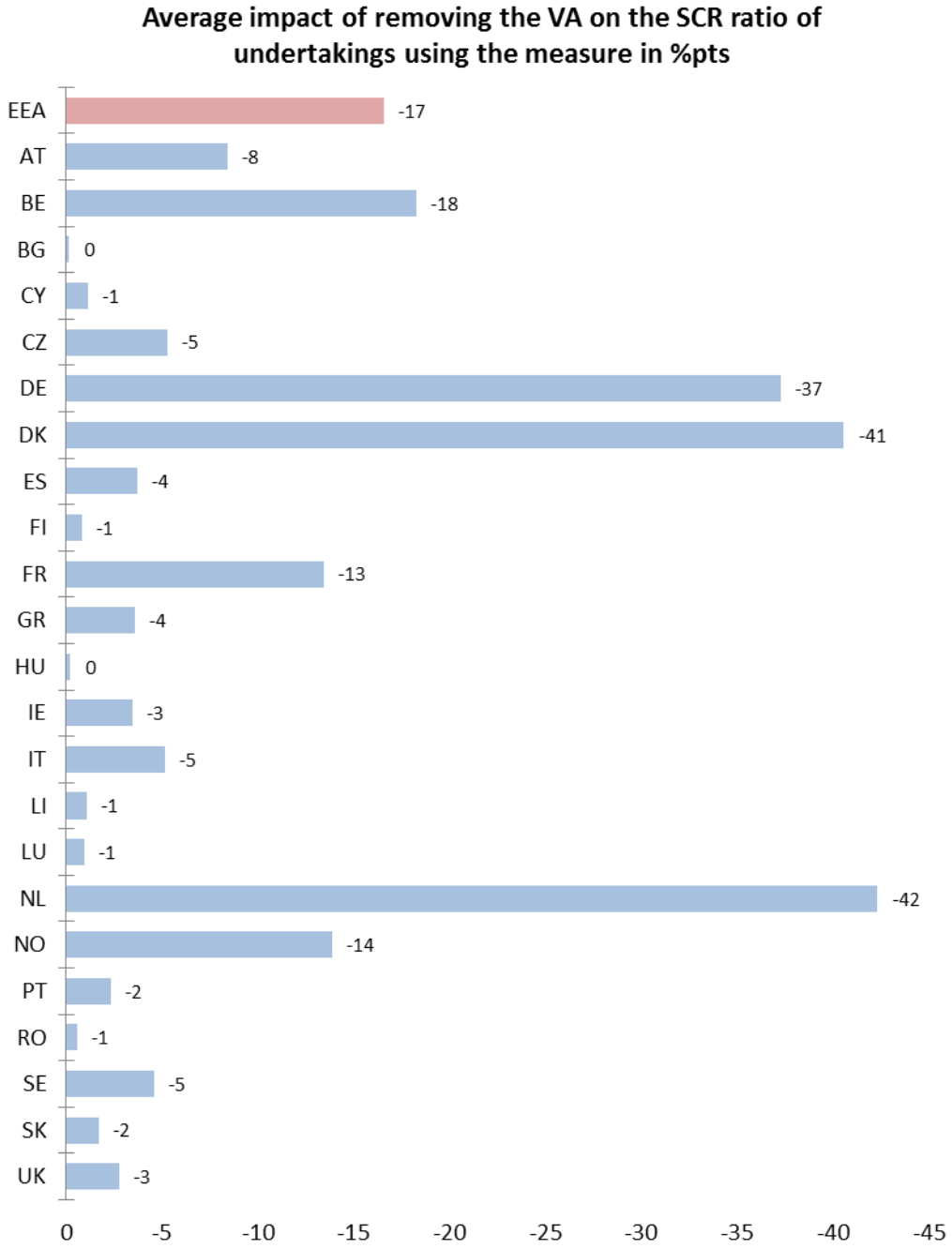


The following graphs show the average impact at EEA level and per country of the VA on the SCR ratio. The graphs are based on impact of the VA for the undertakings that apply the VA.

At EEA level removing the VA results in an average reduction of the SCR ratio of 17 percentage points. The average change in SCR ratios is the highest for undertakings in Germany, Denmark, and Netherlands. This comes from the fact that the impacts on SCR are significantly higher for those countries.

In comparison with last year, the average impact of removing the VA has overall decreased.


Average impact of removing the VA on the SCR ratio of undertakings using the measure
Ratio w/o VA
Ratio with VA
EEA 222% 239%
AT 251% 259%
BE 175% 193%
BG 243% 243%
CY 282% 283%
CZ 254% 259%
DE 325% 363%
DK 255% 296%
ES 220% 224%
FI 183% 184%
FR 202% 216%
GR 177% 181%
HU 194% 195%
IE 158% 161%
IT 238% 244%
LI 140% 141%
LU 193% 194%
NL 142% 184%
NO 208% 221%
PT 192% 194%
RO 144% 145%
SE 149% 154%
SK 165% 167%
UK 162% 165%
0% 50% 100% 150% 200% 250% 300% 350% 400%

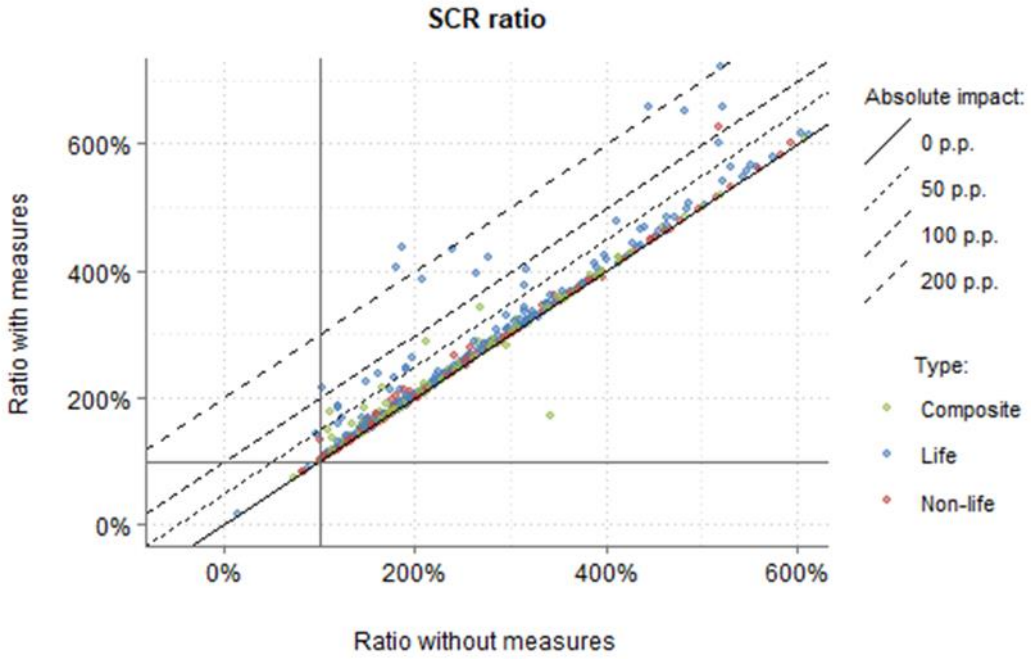


The following graph displays the impact of removing the VA on the SCR ratio of every undertaking using this measures. Each dot in the diagram represents one undertaking, comparing the individual SCR ratio against the estimated SCR ratio without the VA. The type of each undertaking is indicated by the colour of the dot.

In terms of SCR ratio, 96% of undertakings that use the VA reported an absolute impact between 0% and 50%.

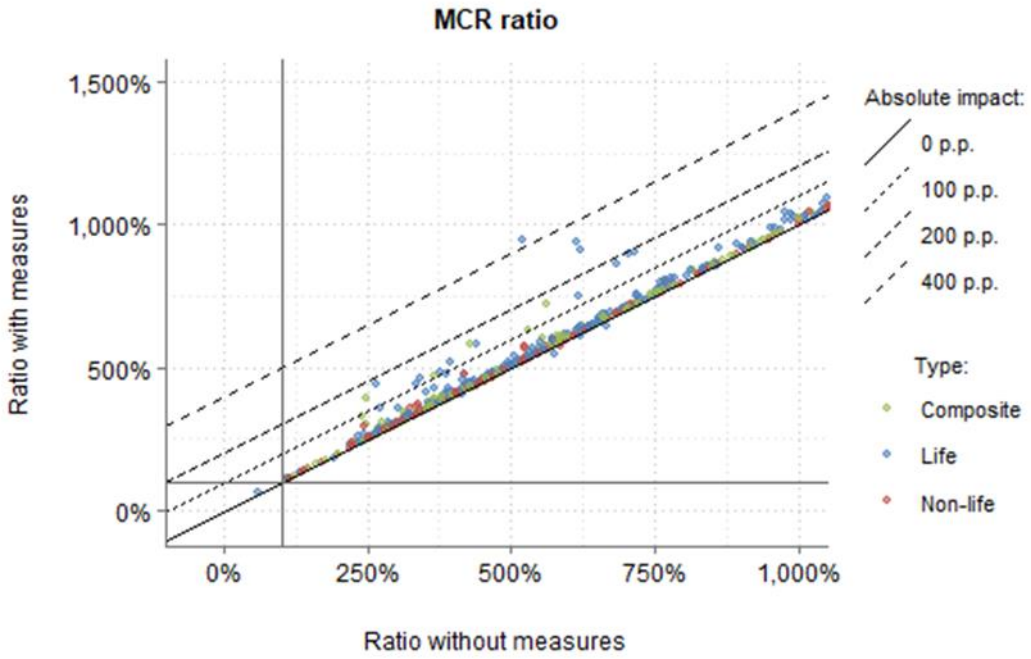
1% of undertakings using the measure reported an SCR ratio without VA below 100% (8 undertakings, with 0.6% of the total technical provisions in the EEA). No undertaking using the measure reported negative eligible own funds to cover the SCR without VA.

Also note that the Life and Composite undertakings show, in general, slightly higher impacts on this level than Non-life undertakings.



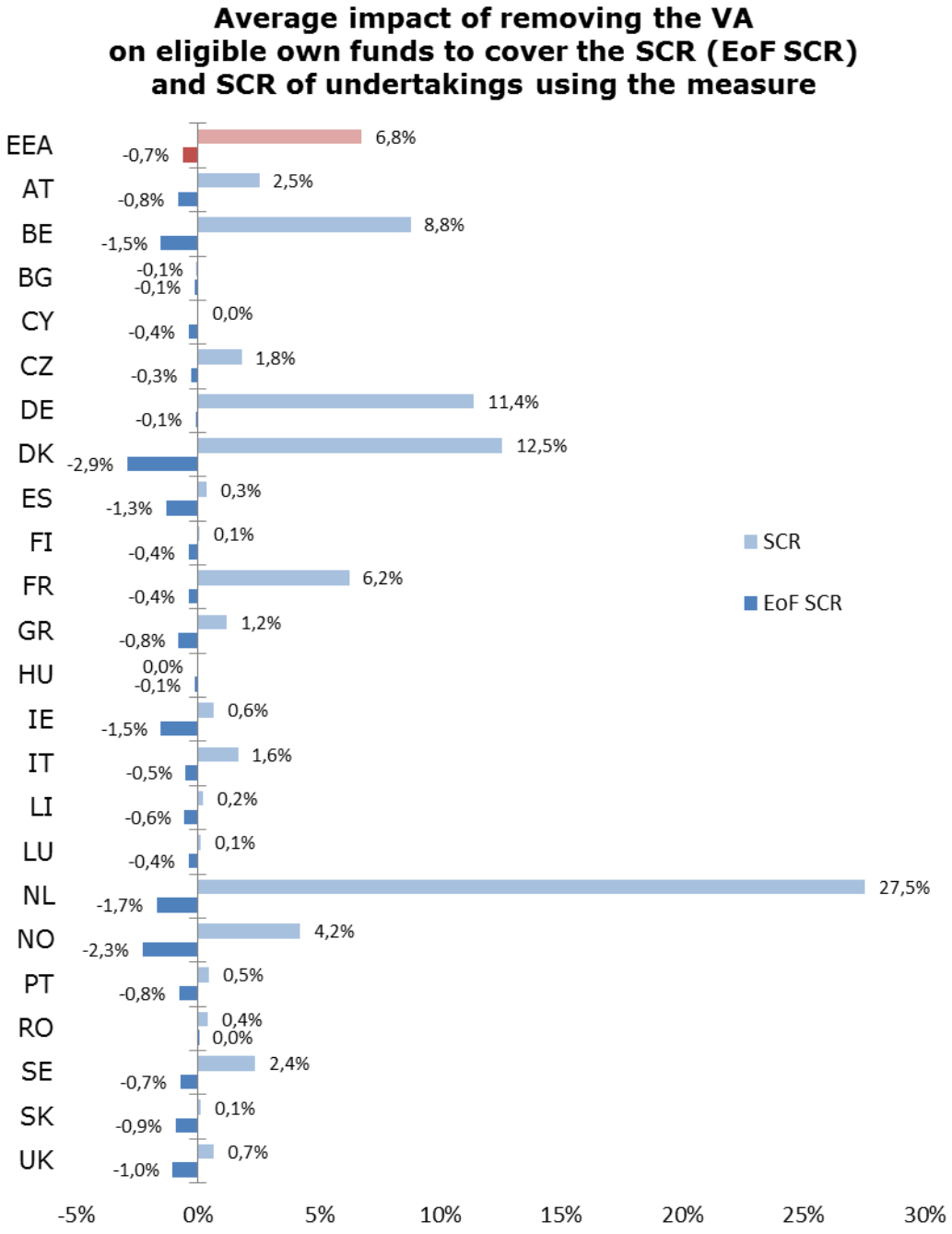
The following graph displays the impact of removing the MA on the MCR ratio of every undertaking using the MA, comparing the individual MCR ratio against the estimated MCR ratio without the MA. In terms of MCR ratio, 96% of undertakings that use the VA reported an absolute impact between 0% and 100%.

0.6% of undertakings using the measure reported an MCR ratio without VA below 100% (4 undertakings, with 0.05% of the total technical provisions in the EEA). No undertaking reported negative eligible own funds to cover the MCR without VA.

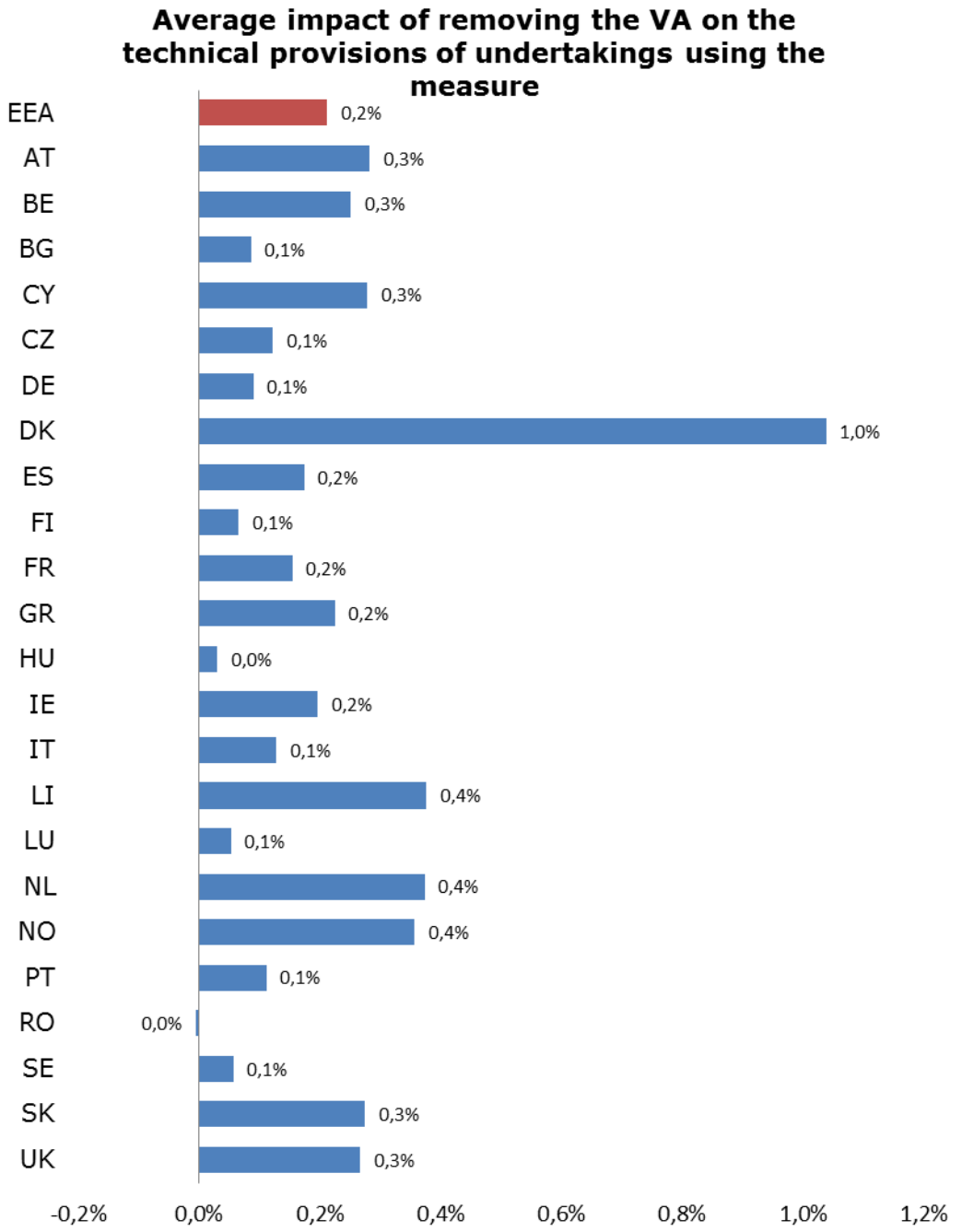


The following graph shows the impact of removing the VA on the SCR (light blue) and on the eligible own funds to cover the SCR (dark blue). The red bars are for the EEA

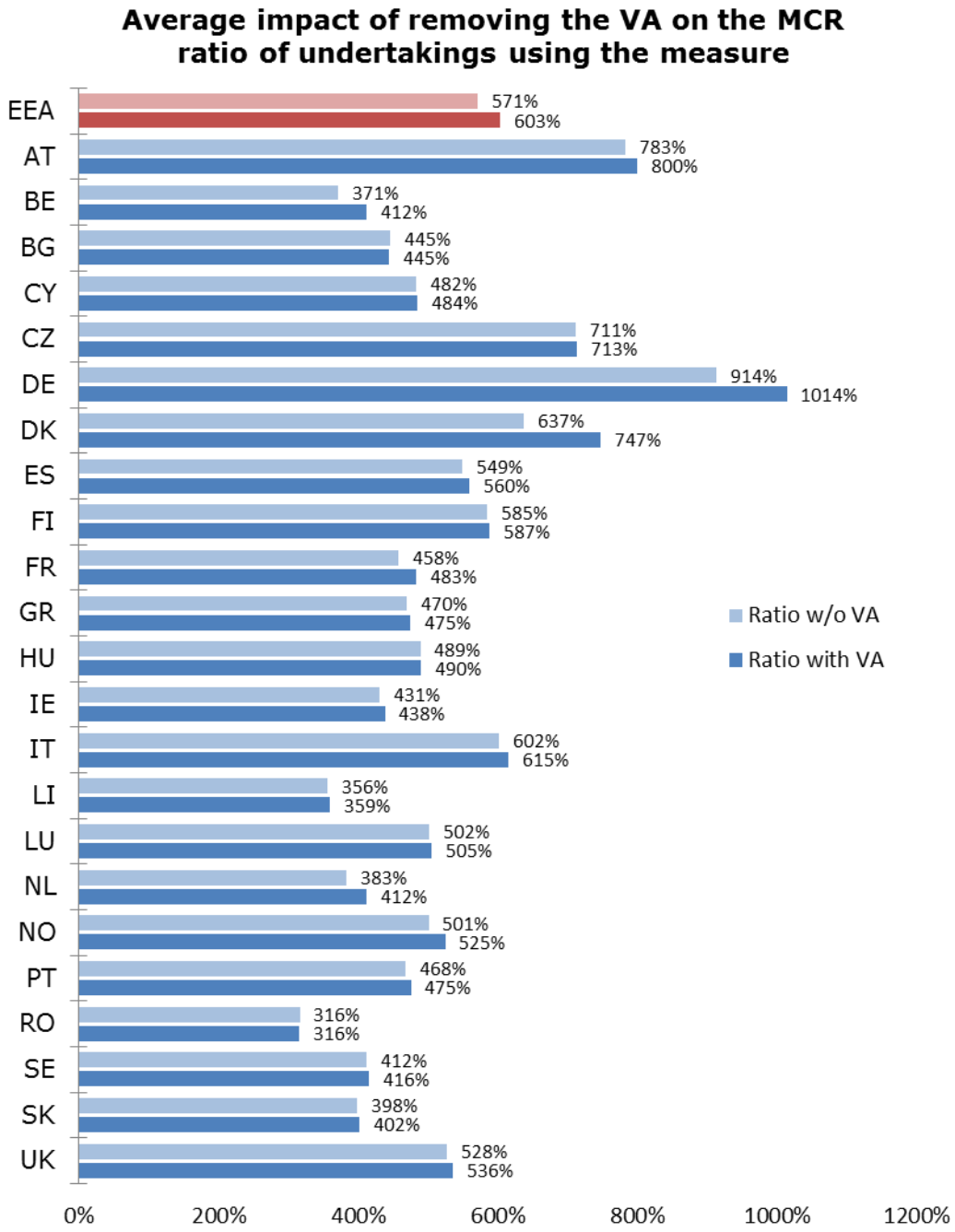
level. On average, eligible own funds to cover the SCR would decrease by 1%, while the SCR would increase by 7% if the VA were removed. In comparison with last year, impacts have overall decreased for both SCR and eligible own funds to cover the SCR.

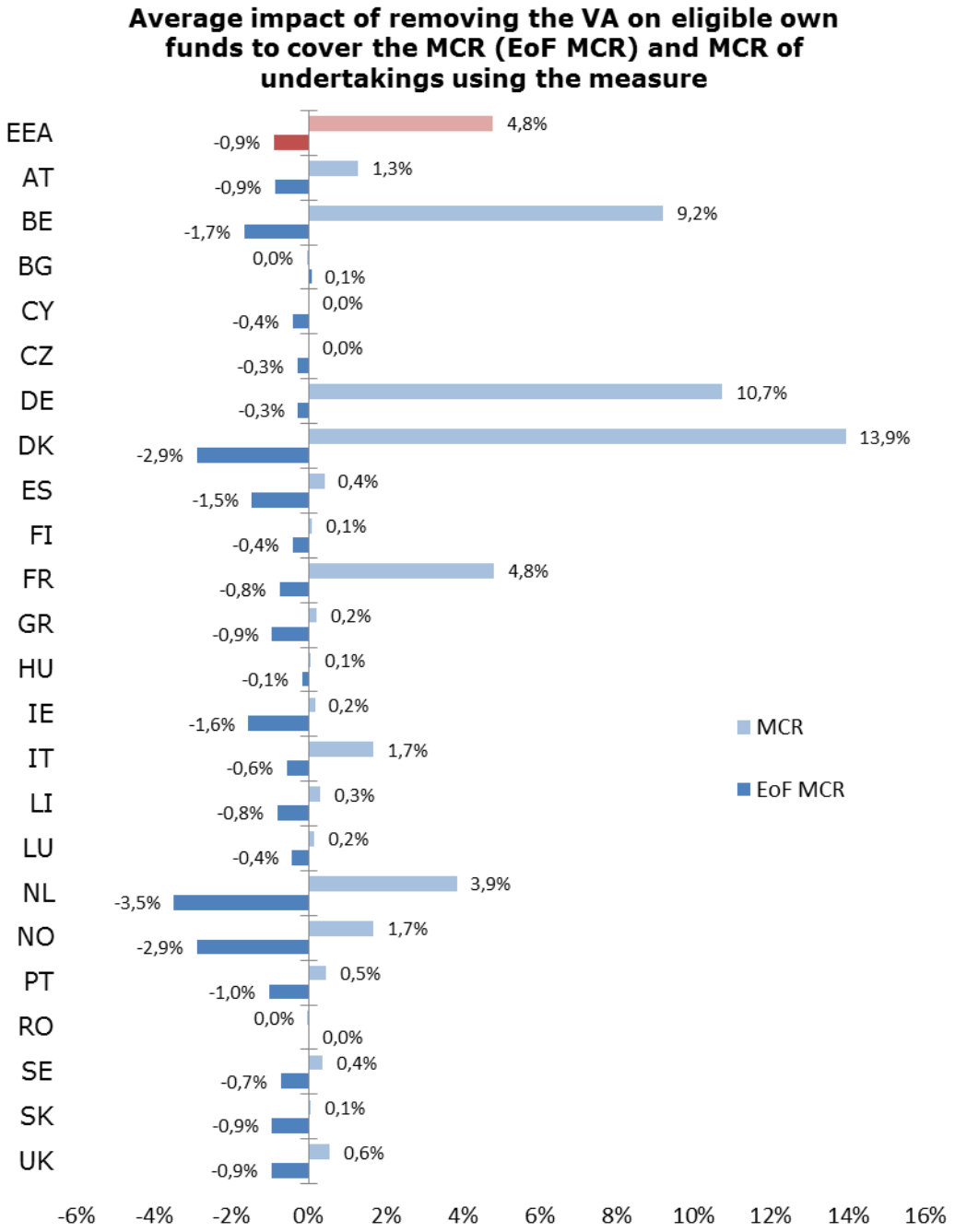


The following graph displays the impact of removing the VA on the value of technical provisions (TP) at EEA and national level. Removing the VA for those undertakings applying the measure would result in an average increase of technical provisions by 0.2% at EEA level.



The following graphs show the average impact of the VA on the MCR ratio, the MCR and the eligible own funds to cover the MCR, at country and at EEA level for undertakings using that measure. At the EEA level, the removal of the VA would result on average in a reduction of the MCR ratio by 33 percentage points.

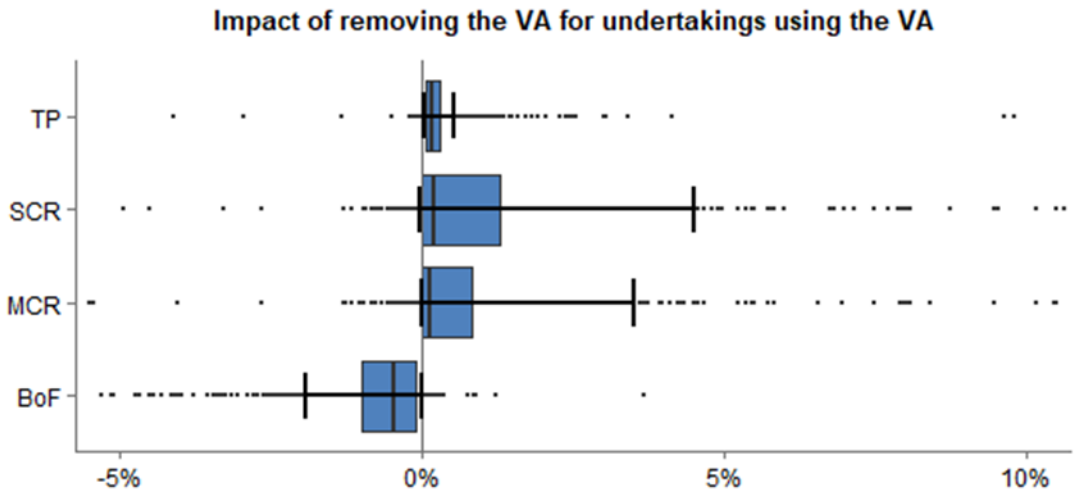

Average impact of removing the VA on the MCR ratio of undertakings using the measure
EEA
AT
BE
BG
CY
CZ
DE
DK
ES
FI
FR
GR
HU
IE
IT
LI
LU
NL
NO
PT
RO
SE
SK
UK
571%
603%
783%
800%
371%
412%
445%
445%
482%
484%
711%
713%
914%
1014%
637%
747%
549%
560%
585%
587%
458%
483%
470%
475%
489%
490%
431%
438%
602%
615%
356%
359%
502%
505%
383%
412%
501%
525%
468%
475%
316%
316%
412%
416%
398%
402%
528%
536%
Ratio w/o VA
Ratio with VA
0%
200%
400%
600%
800%
1000%
1200%



The box-plots below illustrate how the impact of removing the VA is distributed across undertakings.[28]

In terms of how the impact of measures is distributed across undertakings, VA users present slightly skewed distributions.

[28] The bottom (respectively, top) of the blue box represents the lower quartile (respectively, higher quartile) of the data set. The black band inside the box is always the middle quartile (50th percentile or median). The end of the lines extending from the boxes (called whiskers) represent the 10th and 90th percentiles, respectively. Outliers are plotted as individual points.



The size of the VA as at year end 2017 for the Euro is 4 bps and has thus decreased from year end 2016 where it was 13bps. The graphs presented in this section show that the impact of a removal of the VA on the solvency position is considerable for a number of countries. This was already observed in the LTG reports 2016 and 2017. Although the size of the European VA has decreased by 70% in 2017 compared to 2016, the impact of a removal of the VA has not mirrored that decrease for a number of countries. Nevertheless, the magnitude of the impact differs from one country to another. One should keep in mind that the comparisons of the figures are affected by the dynamic modelling of the VA of some internal model users that are embedded in the analysis.

Treatment of the VA in internal models

Two different treatments of the VA can be observed where internal models are used to calculate the SCR. In some internal models the VA is considered to remain unchanged during the following 12 months (constant VA). This approach is the same as the treatment of the VA in the standard formula for the calculation of the SCR. Other internal models take account of the possible change of the VA during the following 12 months (dynamic VA). The VA can change over time because the spreads of the market indices that the VA calculation is based on change or because the risk correction to the VA changes. Another reason for change to the VA can be changes in the investment behaviour of insurance and reinsurance undertakings as reflected in the annual updates of the representative portfolio of assets that are applied in the VA calculation.

Where the VA moves in line with the spreads on the assets of the undertaking, the modelling of a dynamic VA reduces the effect of spread widening and spread narrowing on the own funds of the insurer: decreases in asset value caused by the spread widening are partially or fully compensated by decreases of technical provisions caused by the change of the VA. In the same way increases in asset values caused by narrower spreads are compensated. As a result the capital requirements for the risk of spread widening are usually lower if a dynamic VA is modelled than if a constant VA is being used.

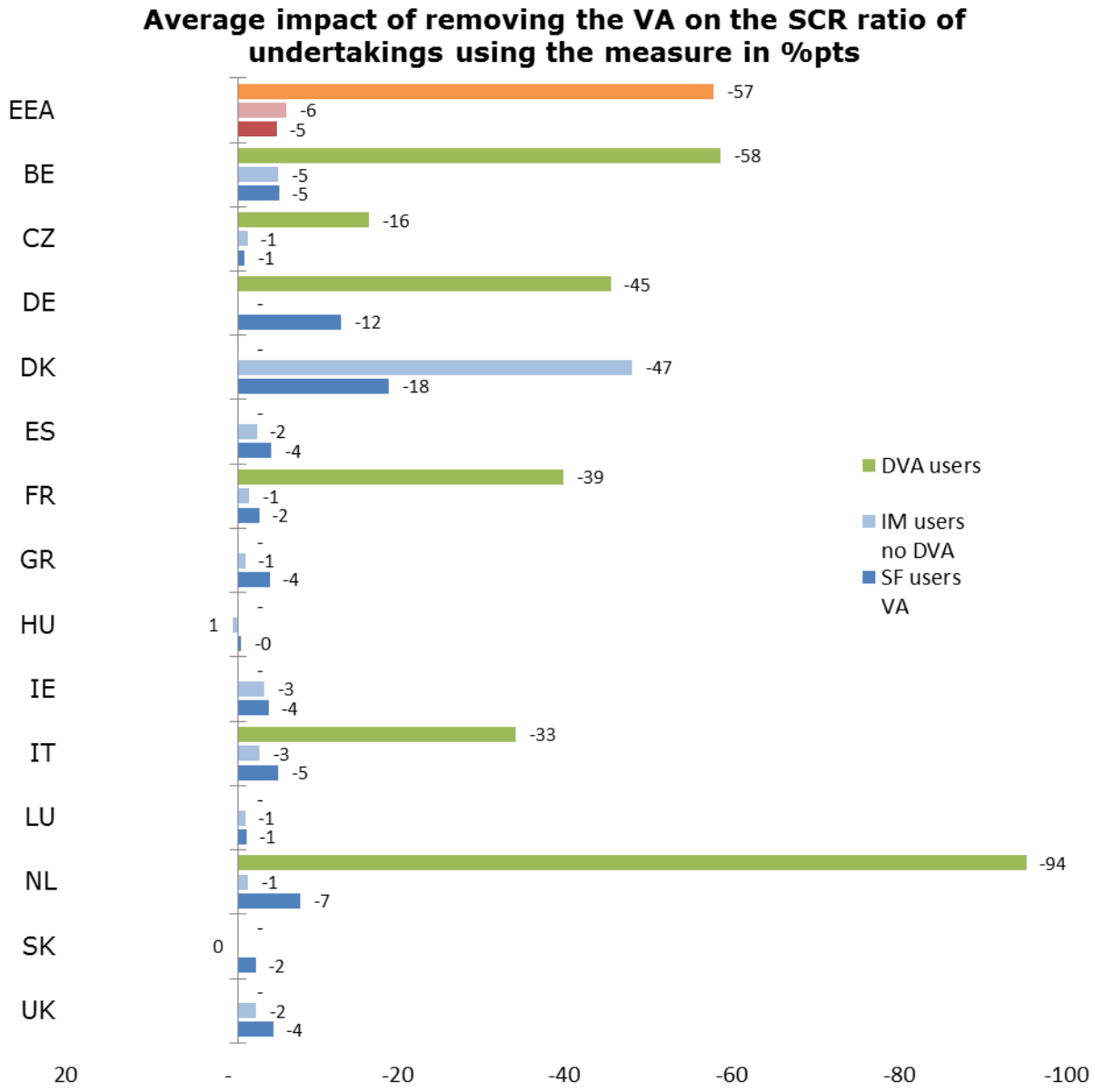
The table below displays the number of undertakings using a dynamic modelling of the VA per country and type of undertakings.

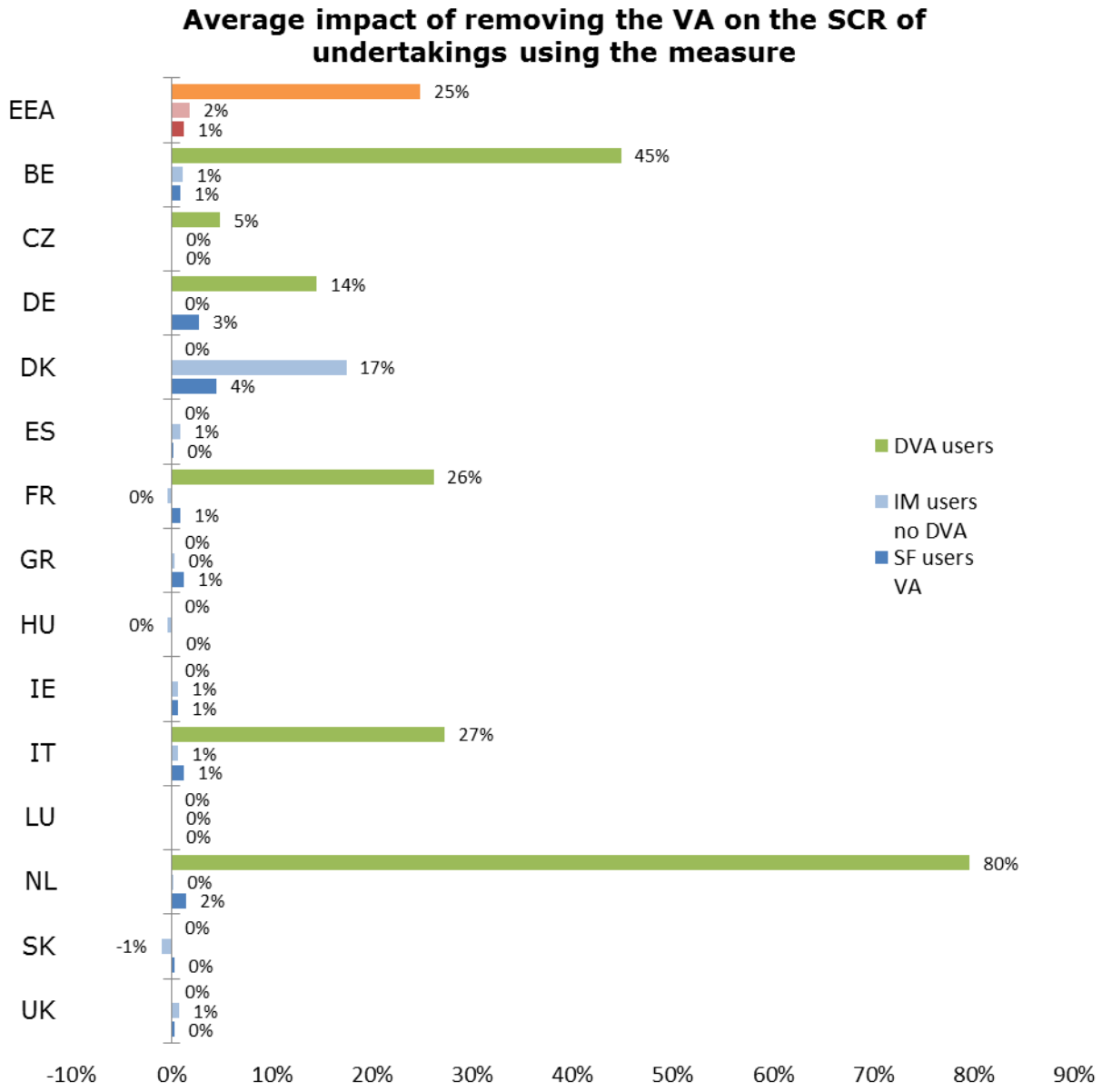
Number of undertakings using the Dynamic VA					
Country	Life	Non-Life	Both Life and non-life	Reinsurance	Total
AT	1	1	0	0	2
BE	0	1	1	0	2
CZ	0	0	1	0	1
DE	11	11	1	1	24
FR	5	7	2	1	15
IT	1	0	1	0	2
NL	4	2	0	1	7
EEA	**22**	**22**	**7**	**3**	**53**

The following graphs display the impacts of removing the VA on SCR ratio and the SCR of undertakings using the measure. They are broken down between undertakings using the Standard Formula; undertakings using an internal model but not using a dynamic VA; and undertakings using an Internal model and using a dynamic VA. These impacts are displayed at EEA level and country level for countries where there are Internal model users. Impacts on SCR ratio are shown in percentage points whereas impacts on SCR are shown in percentages. Impacts of the dynamic VA is based on QRT data of 52 undertakings using it[29]. One non-life undertaking from France was not included in the analysis.

The graphs show that impacts are comparable between undertakings using the standard formula and undertakings using an internal model but not using a dynamic VA. It also shows that the use of dynamic VA has a considerable effect on both SCR and SCR ratio of undertakings using it. It should be noted that the size of the three samples (standard formula users, undertakings using an internal model but not using a dynamic VA and undertakings using an Internal model and using a dynamic VA) varies from one country to another. For example, undertakings using an internal model and using a dynamic VA represents 3% to 53% of the technical provisions in the concerned jurisdictions.

[29] No impact is shown for Austria due to confidentiality reasons

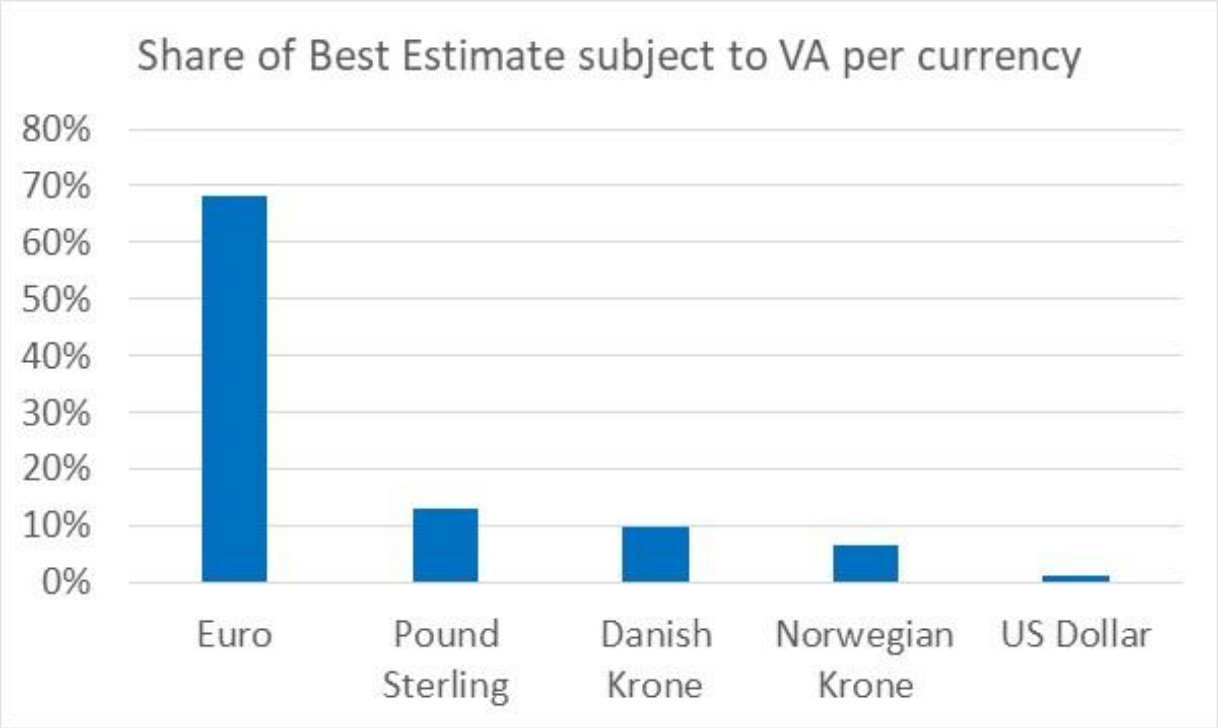

Average impact of removing the VA on the SCR ratio of undertakings using the measure in %pts
EEA
BE
CZ
DE
DK
ES
FR
GR
HU
IE
IT
LU
NL
SK
UK
-57
-6
-5
-58
-5
-5
-16
-1
-1
-45
-
-12
-
-47
-18
-
-2
-4
-39
-1
-2
-
-1
-4
-
1
-0
-
-3
-4
-33
-3
-5
-
-1
-1
-94
-1
-7
-
0
-2
-
-2
-4
DVA users
IM users no DVA
SF users VA
20
-
-20
-40
-60
-80
-100



Additional information on the VA based on the QRT information

Based on the quantitative information that undertakings regularly provide to supervisory authorities further analysis was performed.

The following graph outlines the split of Best Estimate subject to VA that is written in different currencies as at year end 2017. Only the most material currencies are considered in this graph.



Application of a country-specific increase to the VA

Background information on the calculation of the VA

For each currency the VA is calculated as 65% of a risk-corrected spread ($S\_RC_{currency}$). The relevant spread is the difference between the interest rate that could be earned from assets included in a reference portfolio for assets in that currency and the basic risk-free interest rates for that currency.

A country-specific increase to the VA may apply, depending on the spread on the assets of a country-specific reference portfolio. That increase is calculated as 65% of the difference between the risk-corrected spread of that country reference portfolio ($S\_RC_{country}$) and twice the risk-corrected currency spread $S\_RC_{currency}$. The country-specific increase applies whenever that difference is positive (i.e. when $S\_RC_{country} > 2 * S\_RC_{currency}$) and the risk-corrected country spread is higher than 100 basis points. This implies that the country-specific increase cannot be negative while the VA before increase can assume both positive and negative values.

The VA with country-specific increase is given by the following equation:

$$VA = 65\% * [S\_RC_{currency} + max (S\_RC_{country} - 2 * S\_RC_{currency}, 0)] ,$$

where $S\_RC_{country} > 100$ bps.

$S\_RC_{currency}$ and $S\_RC_{country}$ are calculated as the difference between the spread at portfolio level ($S_{currency}$ and $S_{country}$) and the related risk correction ($RC_{currency}$ and $RC_{country}$):

$$S\_RC_{currency} = S_{currency} - RC_{currency} \text{ and } S\_RC_{country} = S_{country} - RC_{country}$$

The reference portfolio comprises two asset classes that contribute to the spread: government bonds and corporate bonds. For each class the average spreads (S_{gov} and S_{corp}) and the risk corrections (RC_{gov} and RC_{corp}) are derived.

The portfolio spreads ($S_{currency}$ and $S_{country}$) and portfolio risk corrections ($RC_{currency}$ and $RC_{country}$) are calculated by applying portfolio weights (w_{gov}, w_{corp}) to the government and corporate components:

$S_{currency} = w_{gov} * max(S_{gov};0) + w_{corp} * max(S_{corp}; 0)$

$RC_{currency} = w_{gov} * max(RC_{gov};0) + w_{corp} * max(0;RC_{corp})$

$S_{country}$ and $RC_{currency}$ are calculated in the same way, but based on the reference portfolio per country.

In case

*The **reference portfolios** are representative of assets held by European insurance and reinsurance undertakings to cover:*

- the best estimate for (re)insurance obligations denominated in that currency (reference portfolio per currency)

- the best estimate for (re)insurance obligations of products sold in the insurance market of that country and denominated in the currency of that country (reference portfolio per country).

In particular the reference portfolios considers:

a. Data from the relevant government bonds yield market indices, required to determine the interest rates of government bonds including in the representative portfolio, by duration and country of issuance (those interest rates are then used to compute the spread S and the risk correction RC for those government bonds).

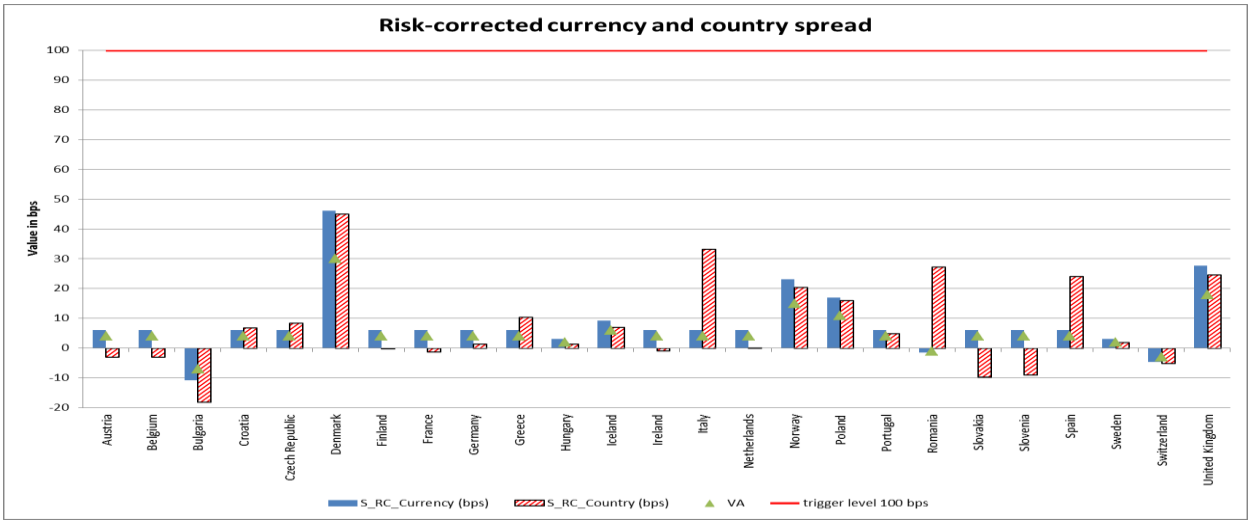
For countries of the euro area not having a government yield curve, there is no country-specific increase and the spread of government bond is approximated considering a peer country[30].

b. Data from the relevant corporate bonds yield market indices, required to determine the interest rates of corporate bonds including in the representative portfolio, by duration, sector and credit quality step (those interest rates are then used to compute the spread S and the risk correction RC for corporate bonds).

The reference portfolios are updated on an annual basis.

[30] Countries without government yield curves are Cyprus, Estonia, Latvia, Liechtenstein, Lithuania and Malta.

1) Analysis of the amount of the currency and country risk-corrected spread for the calculation of the VA (*S_RC$_{country}$ and S_RC$_{currency}$)*



The graph shows the *risk-corrected currency spread* (blue bar), the *risk-corrected country spread* (red bar) and the final value of the VA (green triangle), for each country relevant in reference portfolios[31]. It also shows the trigger level of the country-specific increase of 100 bps (red line). When applying 65% to the blue bar, the final value of the VA (represented by the green triangle) results. The reference date for the data is the 31 December 2017.

It can be observed that the *risk-corrected currency spread* is considerably lower than at 2016 year-end, and even negative in Bulgaria, Switzerland and Romania. The level of the *risk-corrected currency spread is highest for* Denmark, the UK and Norway.

A considerable heterogeneity among countries with regard to the *risk-corrected country spread* persists, also among the countries of the euro area that apply the same amount of VA: for some countries the country spread is much higher than the currency one, (i.e. Italy, Spain, Greece), whilst for other countries it is much lower (i.e. Germany, Netherlands) or even negative (i.e. Austria, Belgium, France, Estonia, Finland, Ireland, Slovakia, Slovenia). This means that, at country level, the spread deriving from assets held by the national undertakings can be significantly different (higher or lower) that the level of spread of the assets included in the representative portfolio defined at currency level. An interesting element to note is the change of the level of the *risk-corrected country spread* of Portugal (at the end of 2016 it was more than twice the *risk-corrected currency spread*). This is due the strong decrease, from year-end 2016 to year-end 2017, of the spread of Portuguese government bonds considered in the representative portfolio.

[31] Please note that, even if not relevant to the context, the graph referred to 2016 year-end, included 2017 LTG report, provided figures also for countries for which a peer country is applied.

For Romania, it can be observed that, as at 2016 year-end, the currency VA is negative even if the *risk corrected country spread* is much higher than both the currency spread in absolute terms and the majority of the country spreads of other countries that apply a positive VA. The graph shows that, also in 2017, for some countries the condition that the country spread has to be higher than twice the currency spread is met (i.e. Italy, Spain), but the second condition that the risk-corrected country spread to be higher than 100 bps is not met. At the reference date of the graph (31 December 2017), the condition that prevents the country-specific increase to apply is the threshold of 100 bps for the risk-corrected country spread.

2) Analysis of the amount of the government and corporate risk-corrected spread for the calculation of the country VA (S_RC_gov_country, S_RC_corp_country and S_RC_country)

Background information on the calculation of the risk correction

*The **risk correction** is intended to account for expected losses, unexpected credit risk, and any other relevant risks of the assets. It is calculated as follows:*

☐ *For the spread on government bonds:*

RC= 30% LTAS for exposures to governments of EEA countries

RC= 35% LTAS for exposures to other governments

where LTAS is the long-term average of the spread over the risk-free interest rate of assets of the same duration, credit quality and asset class. The average relates to the last 30 years.

☐ *For the spread on corporate bonds:*

RC = MAX (PD + CoD, 35% LTAS), where

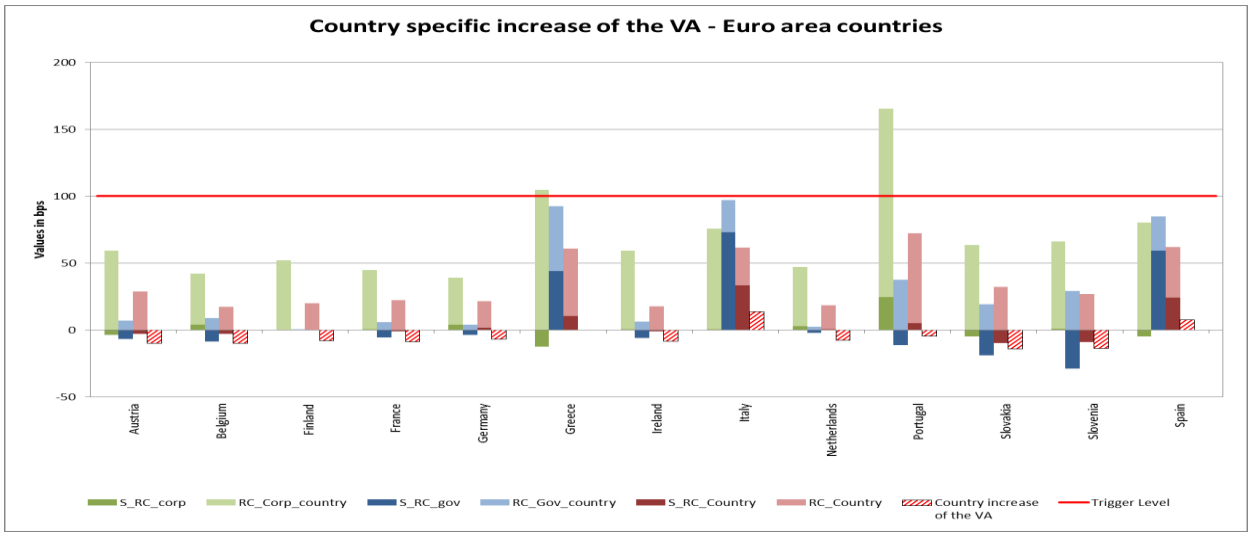
PD = the credit spread corresponding to the probability of default on the assets;

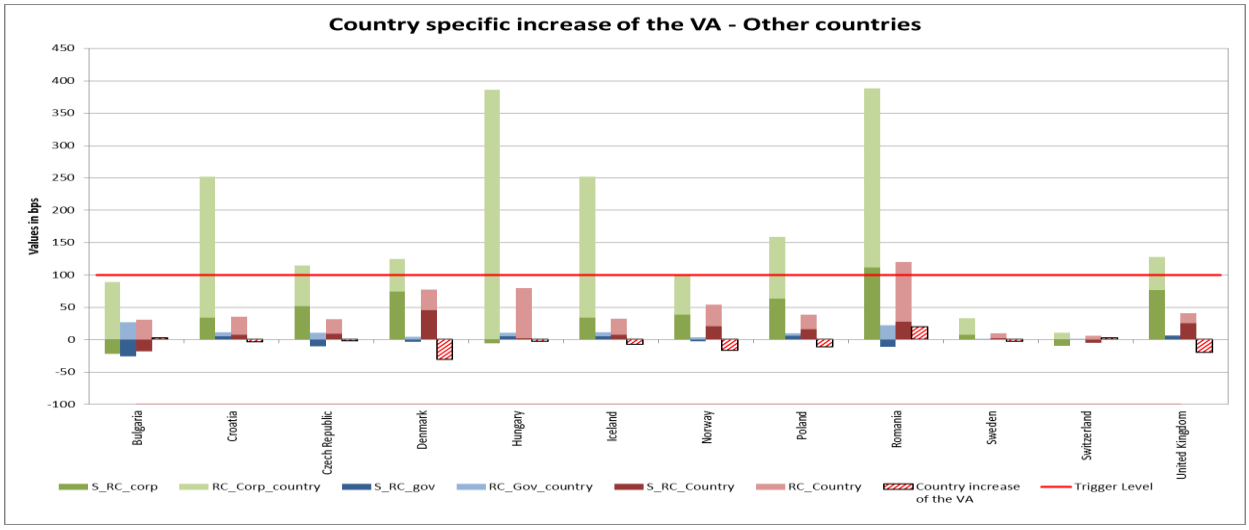
CoD = the credit spread corresponding to the expected loss resulting from downgrading of the assets;

LTAS = as above

Where no reliable credit spreads can be derived from long-term default statistics, the risk correction can be expressed as:

RC= 35% LTAS.





These graphs look at the national component of the VA only (the first graph relates to the countries of the euro area, and the second graph relates to the countries with other currencies[32]). The reference date for the data is the 31 December 2017.

With respect to the national representative portfolio, the graphs show a comparison between the level of the market spreads for corporate bonds (S_{corp} – green bar), for government bonds (S_{gov} – blue bar) and the corresponding level of the spread at country portfolio level ($S_{country}$ - burgundy bar): for each category of spread, the total value is decomposed into the amount attributed to the risk-correction (in lighter colour) and the risk-corrected spread (in darker colour).

[32] Please note that, even if not relevant to the context, the graphs referred to 2016 year-end, included in 2017 LTG report, provided figures also for countries for which a peer country is applied.

Also the level of the potential country-specific increase of the VA is shown (red bar), irrespectively of whether it is triggered or not. This level represents 65% of the difference between the risk-corrected country spread and twice the risk-corrected currency spread. Graphs show that in a few countries (i.e. Italy, Spain and Romania) this difference is positive.

The triggering of the national component of the VA requires that two conditions occur: the above mentioned difference is positive and the risk-corrected country spread (dark burgundy bar) is higher than 100 basis points. Given that such two conditions are not met for any of the countries in the graphs (in particular no cases of risk-corrected country spread higher of 100 bps occurred), no country-specific increase of the VA is applied.

For most countries, corporate spreads are largely higher than government ones (at year-end 2017 exceptions refer to Italy and Spain). The spread at portfolio level, due to the weighting, is, for most of the countries, significantly lower than the one related to the two components. Only in Romania the total spread at portfolio level is higher than the threshold of 100 bps (red line), but the risk corrected spread is not.

The risk correction represents a large part of the total spread, higher than in 2016 (nearly 84% on average for the corporate bonds, 85% for government, 81% at country-portfolio level, in 2016 corresponding figures[33] were 61%, 50% and 58% respectively).

In 2017 the observation made last year persists that, for government bonds, the size of the weight of the risk correction, defined as the 35% of the long-term average spread (over the last 30 years), is due to the higher level of spreads observed in the past years (that contributes to the LTAS), compared to the current (lower) level of the spreads.

More generally, in 2017 an increase of the weight of the overall risk correction (from about 60% to more than 80%) was observed, which is consistent with the reduction of more than 30% of the spread of the overall country portfolios.

Historical development of VA

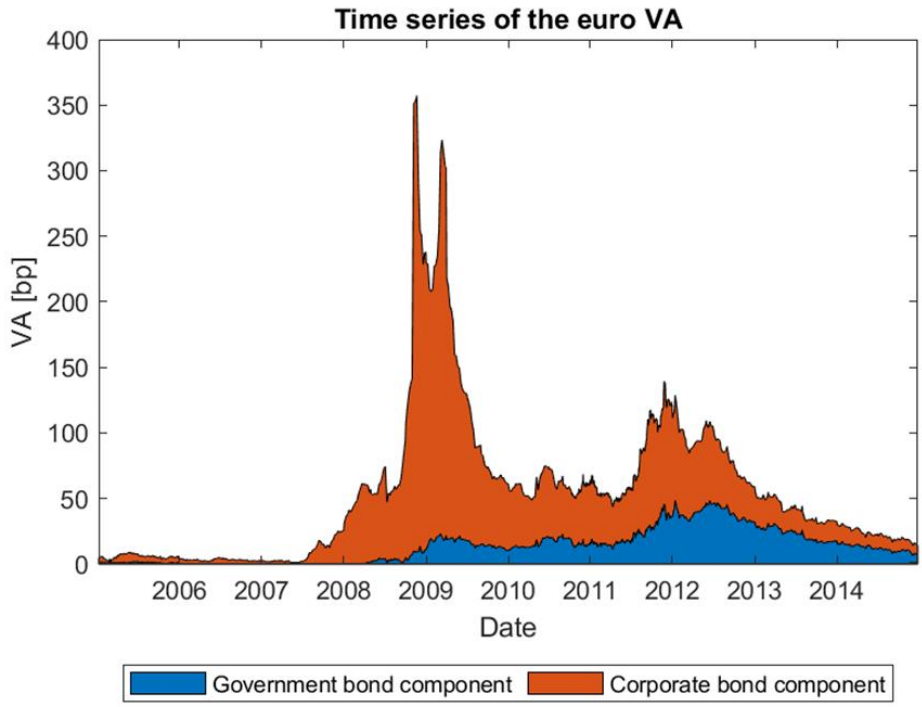
EIOPA has backtested the methodology to derive the VA by applying it to market data from 2005 to 2014.[34] The calculations were done on the basis of the representative portfolio applicable at the end of Q3 2018 because appropriate historical data on the asset allocation from 2006 to 2014 is not available. The calculated VAs may therefore deviate from the VAs that would have been derived during that period on the basis of the historical representative portfolios. Rather, the calculations show what the VA would be if the market situation during that period were replicated. The period includes in particular the banking crisis 2008/2009 and the end of the boom period

[33] Figures are recalculated with 2016 data not considering countries for which a peer country is applied.

[34] The yields for financial corporate bonds of CQS5 for the year 2005 were approximated based on the assumption of an equal spread between financial and non-financial bonds.

preceding it. The period also includes the extreme spread widening for some euro area government bonds in 2012 and 2013.

The following graph shows the development of the VA for the euro for the market conditions from 2005 to 2014 and its decomposition into a component for government bond spreads and for corporate bonds spreads. The calculation was done on a weekly basis and does not take into account any country-specific increase. During the years 2005 and 2006 the VA is close or equal to zero, but without turning negative. In 2008 and 2009 the VA reflects the unfolding of the banking crisis by increasing to a maximum value of about 350 bps. The reason for the high VA are high corporate bond spreads. In 2010 the VA returns to a level shortly above 50 bps. In 2011 the VA increases again up to a local maximum of about 150 bps at the end of that year, at the peak of the sovereign debt crisis. Since then the VA has fallen to a level of about 20 bps at the end of 2014.



EIOPA has calculated the VAs for all other relevant currencies and the applicable national increases. The calculations show that for some currencies and countries, in particular with an exposure to corporate bonds of CQS4 and 5 and long durations, the VA reaches a level of 1000 bps and higher during the banking crisis. The results will be further analysed in the LTG review.

Impact on investments of undertakings

The following tables and graphs illustrate some characteristics of the investments held by undertakings using the VA.

Similar to the tables and graphs in the general section II.4 of the report, the tables and graphs below consider the investments of undertakings from three perspectives:

- The investment allocation
- The credit quality of the bond portfolio, separately for government bonds and corporate bonds
- The duration of the bond portfolio, separately for government bonds and corporate bonds

The following tables show the investment allocation of undertakings applying the VA. Please note that, due to confidentiality reasons, any cells that relate to less than three undertakings are denoted by (*).

Investment allocation at EEA and country level of undertakings applying the VA								
Country	Government bonds	Corporate bonds	Unit linked/index linked	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
EEA	26%	25%	21%	10%	7%	4%	3%	4%
AT	23%	27%	16%	15%	7%	4%	3%	5%
BE	45%	21%	11%	6%	1%	10%	3%	4%
BG	62%	6%	9%	9%	0%	0%	12%	2%
CY	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
CZ	35%	30%	22%	5%	4%	1%	3%	1%
DE	18%	28%	6%	15%	21%	6%	2%	4%
DK	11%	20%	31%	15%	16%	2%	2%	3%
ES	56%	21%	7%	5%	1%	1%	7%	4%
FI	6%	17%	58%	4%	7%	2%	4%	3%
FR	28%	34%	15%	10%	3%	1%	2%	5%
GR	53%	18%	17%	4%	1%	1%	4%	2%
HU	39%	1%	53%	1%	2%	0%	3%	0%
IE	10%	8%	69%	0%	0%	0%	12%	0%
IT	43%	18%	17%	12%	2%	1%	2%	5%
LI	17%	33%	24%	7%	1%	5%	13%	0%
LU	8%	8%	79%	2%	0%	0%	2%	1%
NL	29%	11%	22%	3%	5%	22%	4%	4%
NO	11%	33%	20%	18%	8%	8%	2%	0%
PT	36%	21%	32%	1%	6%	0%	2%	1%
RO	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
SE	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
SK	45%	24%	20%	4%	0%	2%	5%	1%
UK	11%	15%	46%	5%	8%	5%	9%	2%

Investment allocation at EEA and country Level (without assets held for IL & UL contracts) of undertakings applying the VA							
Country	Government bonds	Corporate bonds	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
EEA	33%	31%	12%	9%	5%	4%	5%
AT	27%	33%	18%	8%	4%	3%	6%
BE	50%	23%	7%	1%	11%	3%	5%
BG	68%	6%	10%	0%	0%	13%	3%
CY	(*)	(*)	(*)	(*)	(*)	(*)	(*)
CZ	44%	38%	7%	5%	1%	4%	1%
DE	20%	30%	16%	22%	6%	2%	4%
DK	16%	29%	22%	23%	3%	2%	4%
ES	60%	22%	5%	1%	1%	8%	4%
FI	13%	41%	9%	16%	4%	9%	7%
FR	33%	40%	11%	4%	2%	3%	6%
GR	64%	22%	5%	1%	1%	5%	2%
HU	84%	1%	2%	5%	0%	7%	0%
IE	32%	27%	1%	1%	1%	38%	1%
IT	52%	22%	14%	2%	1%	3%	6%
LI	22%	44%	9%	1%	7%	17%	0%
LU	37%	40%	7%	2%	2%	8%	3%
NL	37%	14%	4%	6%	29%	5%	6%
NO	14%	42%	22%	10%	10%	2%	0%
PT	53%	31%	2%	9%	0%	3%	2%
RO	(*)	(*)	(*)	(*)	(*)	(*)	(*)
SE	(*)	(*)	(*)	(*)	(*)	(*)	(*)
SK	56%	30%	5%	0%	2%	6%	1%
UK	20%	27%	9%	16%	9%	16%	3%

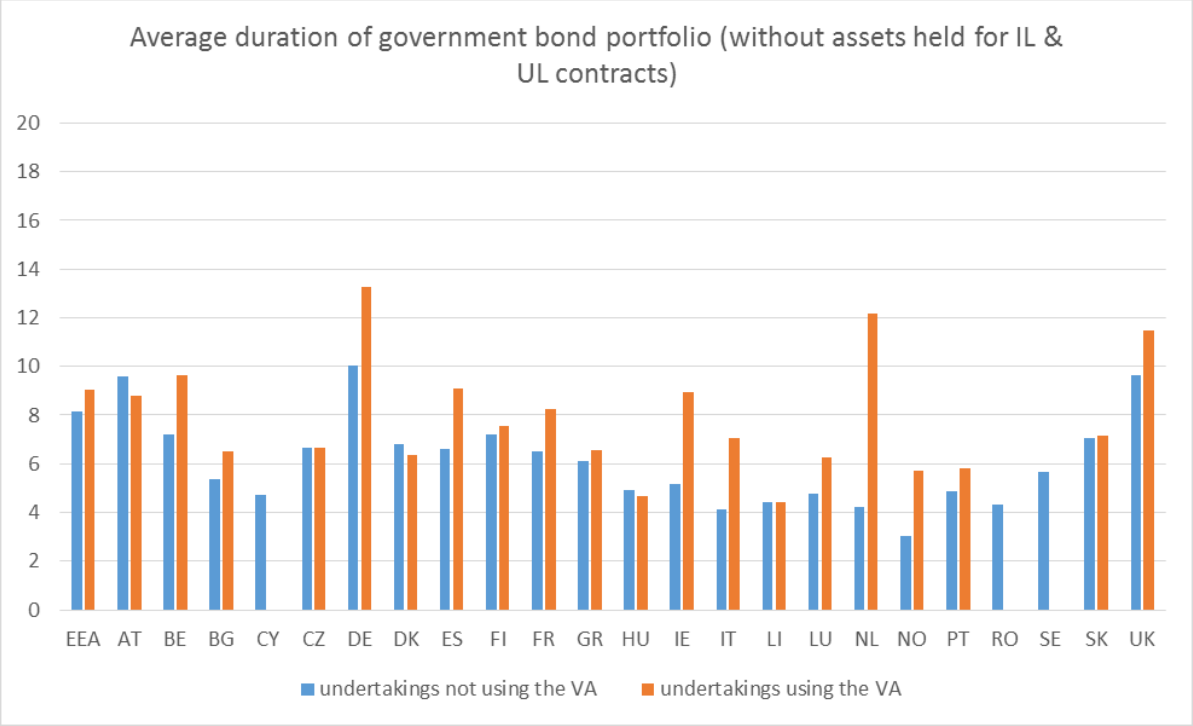
The following table shows the credit quality of government bonds. Please note that the data at EEA level for undertakings not using the VA includes data from countries where the VA is not used at all.

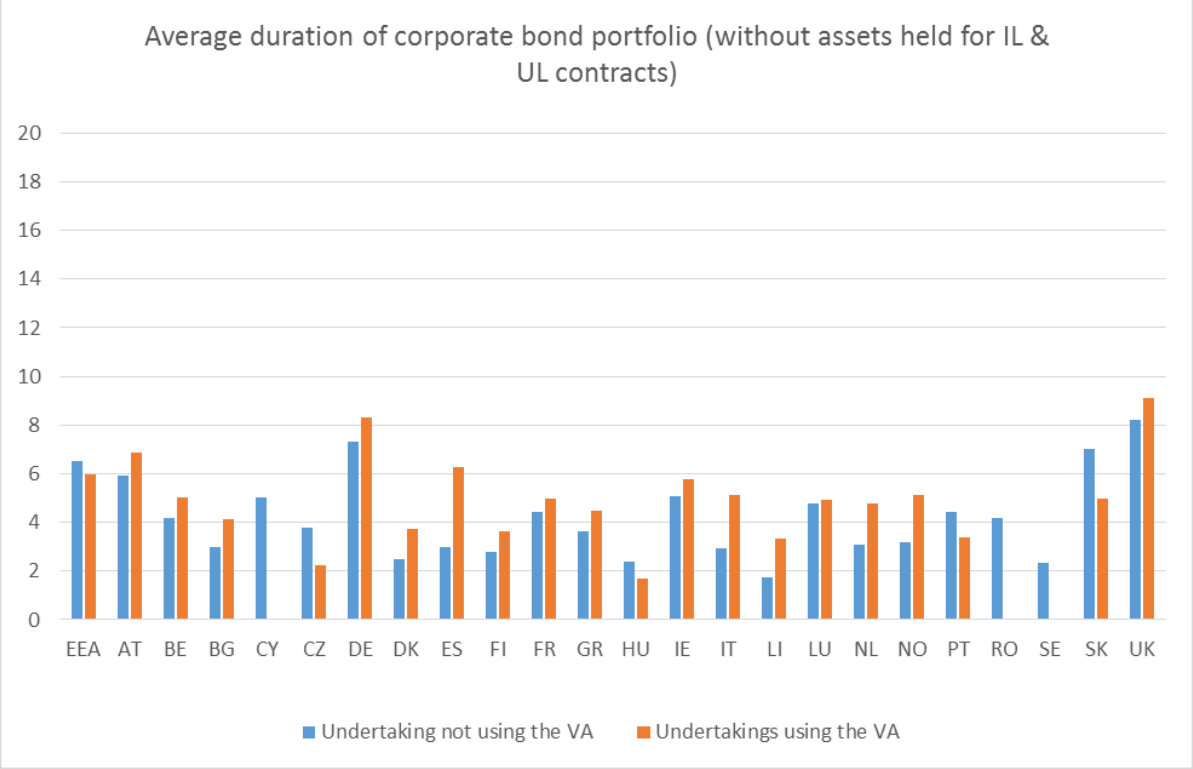
Credit quality of government bonds for undertakings not using the VA or using the VA, per country (without assets held for IL & UL contracts)						
Country	**Use of the measures**	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**No use of VA**	**29%**	**47%**	**11%**	**12%**	**2%**
	Use of the VA	**15%**	**44%**	**4%**	**37%**	**1%**
AT	No use of VA	16%	54%	17%	12%	1%
	Use of the VA	0%	56%	31%	12%	1%
BE	No use of VA	17%	60%	14%	8%	1%
	Use of the VA	13%	63%	10%	14%	1%
BG	No use of VA	1%	1%	52%	45%	1%
	Use of the VA	3%	0%	4%	92%	1%
CY	No use of VA	11%	45%	12%	12%	19%
	Use of the VA	(*)	(*)	(*)	(*)	(*)
CZ	No use of VA	2%	4%	94%	0%	0%
	Use of the VA	5%	5%	82%	7%	0%
DE	No use of VA	46%	36%	10%	7%	1%
	Use of the VA	34%	48%	8%	9%	0%
DK	No use of VA	75%	15%	0%	8%	1%
	Use of the VA	81%	4%	1%	11%	2%
EE	No use of VA	28%	22%	36%	13%	1%
	Use of the VA	0%	0%	0%	0%	0%
ES	No use of VA	6%	6%	2%	83%	2%
	Use of the VA	2%	2%	1%	95%	1%
FI	No use of VA	56%	22%	6%	16%	1%
	Use of the VA	35%	53%	3%	9%	1%
FR	No use of VA	9%	77%	2%	12%	0%
	Use of the VA	8%	77%	2%	13%	0%
GR	No use of VA	23%	32%	8%	8%	29%
	Use of the VA	13%	17%	4%	14%	52%
HR	No use of VA	3%	1%	4%	5%	87%
	Use of the VA	0%	0%	0%	0%	0%
HU	No use of VA	0%	0%	1%	97%	2%
	Use of the VA	1%	1%	0%	98%	0%
IE	No use of VA	29%	50%	14%	7%	0%
	Use of the VA	45%	38%	14%	2%	1%
IT	No use of VA	2%	6%	1%	90%	1%
	Use of the VA	2%	4%	2%	92%	1%
LI	No use of VA	60%	24%	3%	8%	4%
	Use of the VA	54%	28%	8%	9%	0%
LU	No use of VA	40%	51%	5%	4%	0%
	Use of the VA	20%	61%	6%	12%	1%
NL	No use of VA	51%	34%	5%	10%	0%
	Use of the VA	56%	34%	3%	6%	0%
NO	No use of VA	61%	28%	9%	1%	0%
	Use of the VA	54%	35%	9%	1%	1%
PT	No use of VA	2%	5%	0%	34%	59%
	Use of the VA	6%	14%	5%	71%	4%
RO	No use of VA	1%	0%	0%	99%	0%
	Use of the VA	(*)	(*)	(*)	(*)	(*)
SE	No use of VA	93%	6%	1%	0%	0%
	Use of the VA	(*)	(*)	(*)	(*)	(*)
SK	No use of VA	8%	1%	85%	5%	1%
	Use of the VA	8%	14%	77%	1%	0%
UK	No use of VA	16%	81%	2%	1%	0%
	Use of the VA	8%	88%	2%	1%	0%

The following table shows the credit quality of corporate bonds. Please note that the data at EEA level for undertakings not using the VA includes data from countries where the VA is not used at all.

Credit quality of corporate bonds for undertakings not using the VA or using the VA per country (without assets held for IL & UL contracts)						
Country	**Use of the measures**	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**No use of VA**	**32%**	**17%**	**28%**	**20%**	**2%**
	Use of the VA	**17%**	**16%**	**33%**	**31%**	**3%**
AT	No use of VA	31%	14%	31%	20%	4%
	Use of the VA	22%	19%	36%	22%	2%
BE	No use of VA	15%	17%	35%	29%	4%
	Use of the VA	11%	13%	35%	39%	2%
BG	No use of VA	4%	6%	28%	51%	11%
	Use of the VA	0%	0%	0%	83%	17%
CY	No use of VA	30%	13%	14%	21%	23%
	Use of the VA	(*)	(*)	(*)	(*)	(*)
CZ	No use of VA	2%	31%	34%	33%	0%
	Use of the VA	0%	2%	45%	46%	7%
DE	No use of VA	42%	22%	21%	13%	1%
	Use of the VA	34%	22%	22%	21%	1%
DK	No use of VA	91%	3%	3%	2%	1%
	Use of the VA	86%	5%	3%	3%	3%
EE	No use of VA	13%	22%	31%	34%	1%
	Use of the VA	0%	0%	0%	0%	0%
ES	No use of VA	5%	12%	36%	43%	4%
	Use of the VA	2%	10%	36%	48%	4%
FI	No use of VA	10%	5%	21%	56%	8%
	Use of the VA	18%	14%	30%	33%	5%
FR	No use of VA	12%	21%	38%	27%	2%
	Use of the VA	10%	19%	40%	29%	3%
GR	No use of VA	52%	15%	12%	11%	11%
	Use of the VA	1%	15%	37%	35%	12%
HR	No use of VA	5%	6%	26%	57%	5%
	Use of the VA	0%	0%	0%	0%	0%
HU	No use of VA	0%	0%	18%	74%	8%
	Use of the VA	0%	4%	19%	77%	0%
IE	No use of VA	9%	14%	42%	33%	2%
	Use of the VA	25%	15%	37%	22%	0%
IT	No use of VA	16%	8%	34%	38%	4%
	Use of the VA	2%	8%	23%	57%	10%
LI	No use of VA	48%	8%	26%	18%	0%
	Use of the VA	33%	17%	28%	23%	0%
LU	No use of VA	10%	14%	31%	45%	0%
	Use of the VA	5%	11%	47%	35%	2%
NL	No use of VA	7%	25%	37%	30%	1%
	Use of the VA	7%	13%	38%	39%	3%
NO	No use of VA	50%	7%	29%	13%	1%
	Use of the VA	37%	10%	38%	15%	0%
PT	No use of VA	1%	4%	41%	38%	16%
	Use of the VA	2%	10%	30%	52%	6%
RO	No use of VA	0%	0%	43%	56%	2%
	Use of the VA	(*)	(*)	(*)	(*)	(*)
SE	No use of VA	78%	5%	8%	8%	1%
	Use of the VA	(*)	(*)	(*)	(*)	(*)
SK	No use of VA	0%	23%	38%	34%	4%
	Use of the VA	2%	13%	21%	64%	0%
UK	No use of VA	7%	13%	44%	32%	4%
	Use of the VA	10%	10%	40%	37%	3%

The following graph shows the average duration of government bonds and corporate bonds for undertakings using the VA and not using the VA. Please note that the data at EEA level for undertakings not using the VA includes data from countries where the VA is not used at all. When considering these graphs, it may be worthwhile also referring to the earlier section on the use of the VA at the beginning of this chapter. The VA is used relatively more often by life undertakings than by non-life undertakings.





Impact on consumers and products

The following table sets out the share of gross written premiums of undertakings using the VA compared to the total gross written premiums by all undertakings in that country, for each line of business (columns 1 to 6) the total life insurance and life reinsurance business (column 7), and the total for non-life insurance and reinsurance business (column 8). The table is based on data reported by undertakings in the annual QRTs for 2017.

For instance, in Austria 76.8% of the total life insurance and life reinsurance premiums and 82.7% of health insurance premiums are written by undertakings applying the VA.

Country	1. Health insurance	2. Insurance with profit participation	3. Index linked and unit linked insurance	4. Other life insurance	5. Health reinsurance	6. Life reinsurance	7. Total life insurance and reinsurance	8. Total non-life insurance and reinsurance
AT	82.7%	74.9%	72.4%	83.6%	4.3%	88.6%	76.8%	69.3%
BE	42.6%	97.5%	82.0%	89.5%	0.0%	100.0%	91.7%	84.6%
BG	10.8%	63.0%	76.4%	28.6%	0.0%	56.7%	54.1%	22.8%
CY	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
CZ	47.6%	45.1%	68.0%	86.6%	0.0%	0.2%	61.0%	56.1%
DE	32.2%	78.5%	80.2%	86.6%	1.1%	11.5%	55.0%	27.1%
DK	57.0%	82.8%	81.5%	75.9%	100.0%	100.0%	81.1%	22.1%
ES	99.9%	97.3%	99.0%	88.2%	100.0%	5.2%	90.3%	45.2%
FI	100.0%	94.1%	88.5%	77.9%	0.0%	99.9%	88.9%	34.0%
FR	96.4%	94.2%	97.2%	91.2%	60.8%	77.3%	92.2%	55.7%
GR	100.0%	98.0%	99.8%	99.7%	100.0%	100.0%	99.2%	70.0%
HU	84.9%	30.9%	60.4%	61.4%	0.0%	0.0%	51.9%	50.9%
IE	14.8%	0.6%	20.3%	30.4%	0.0%	6.7%	17.8%	4.1%
IT	99.5%	98.9%	93.9%	92.4%	100.0%	99.5%	97.2%	89.5%
LE	0.0%	3.0%	5.5%	0.0%	0.0%	0.0%	4.4%	11.9%
LU	14.6%	97.8%	88.3%	37.2%	0.0%	2.5%	77.4%	35.7%
NL	93.4%	99.9%	96.9%	98.3%	86.4%	80.7%	96.7%	16.4%
NO	52.5%	91.1%	93.0%	98.8%	0.0%	0.0%	89.8%	13.6%
PT	0.0%	47.5%	66.7%	11.9%	0.0%	68.5%	31.2%	47.9%
RO	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
SE	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
SK	39.6%	26.5%	50.0%	48.2%	0.0%	0.0%	37.4%	50.5%
UK	43.5%	16.7%	24.4%	45.5%	57.4%	21.3%	26.3%	17.6%
EEA	**44.5%**	**84.0%**	**50.4%**	**63.9%**	**68.1%**	**32.0%**	**60.4%**	**36.1%**

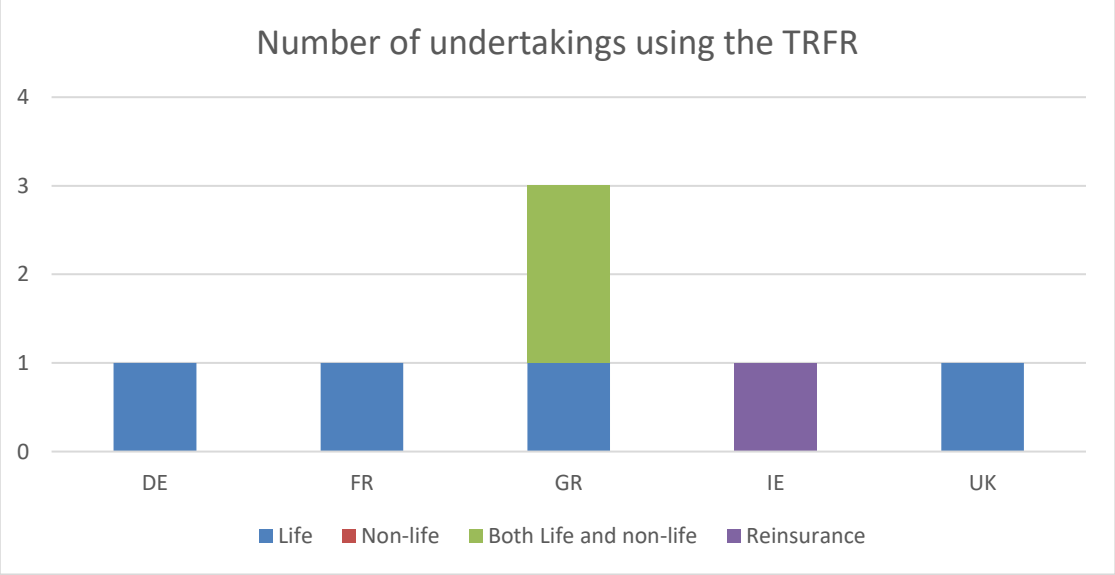
III.4 Transitional measure on the risk-free interest rates

For a period of 16 years after the start of Solvency II, insurance and reinsurance undertakings may apply the transitional measure on the risk-free interest rate. Under the transitional measure undertakings apply a transitional adjustment to the risk-free interest rate for the valuation of insurance and reinsurance obligations. The transitional adjustment is based on the difference between the discount rates of Solvency I and the risk-free interest rates. At the beginning of Solvency II, the transitional adjustment is 100% of that difference. Over the transition period of 16 years, the transitional adjustment is linearly reduced to zero. The transitional measure applies only to insurance and reinsurance obligations from contracts in force before the start of Solvency II.

The use of the transitional measure is subject to supervisory approval.

Use of the transitional measure on the risk-free interest rates

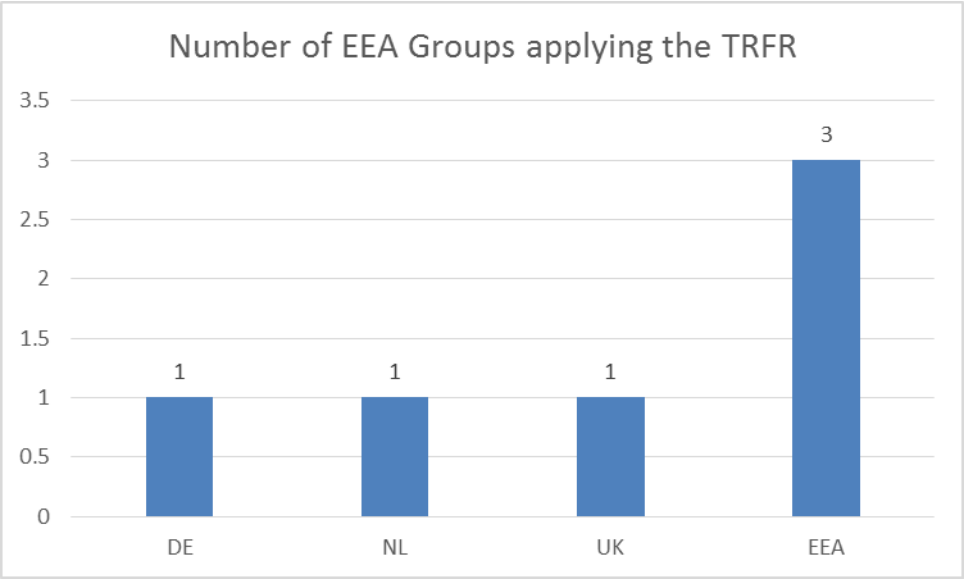
Only 7 undertakings, in 5 countries, are using the TRFR.



The market share in technical provisions of undertakings using the TRFR is negligible at both EEA and national level, except in Greece where the aggregated market share of the three undertakings using the TRFR is approximately 20% of the national market.

According to the Solvency II Directive, it is possible to apply simultaneously the TRFR and the VA to the same liabilities. Among the 7 European undertakings applying TRFR, 6 also apply the VA.

Three EEA groups are using the TRFR.

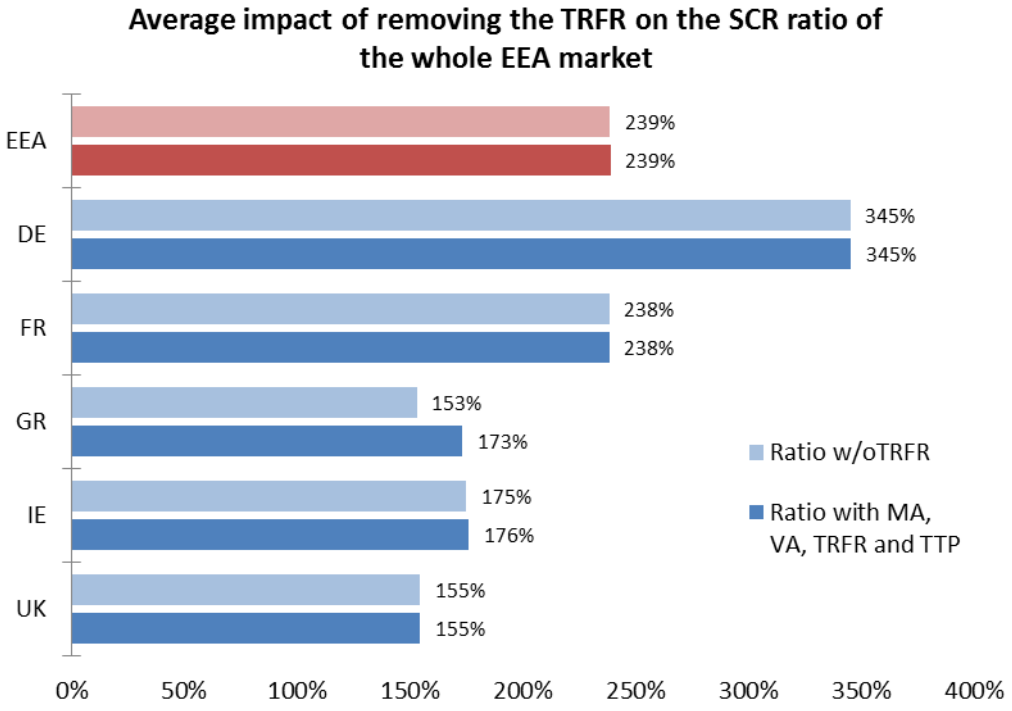


Impact on the financial position of undertakings

The impact results presented in this section are based on data from 2018 Quantitative Reporting Templates.

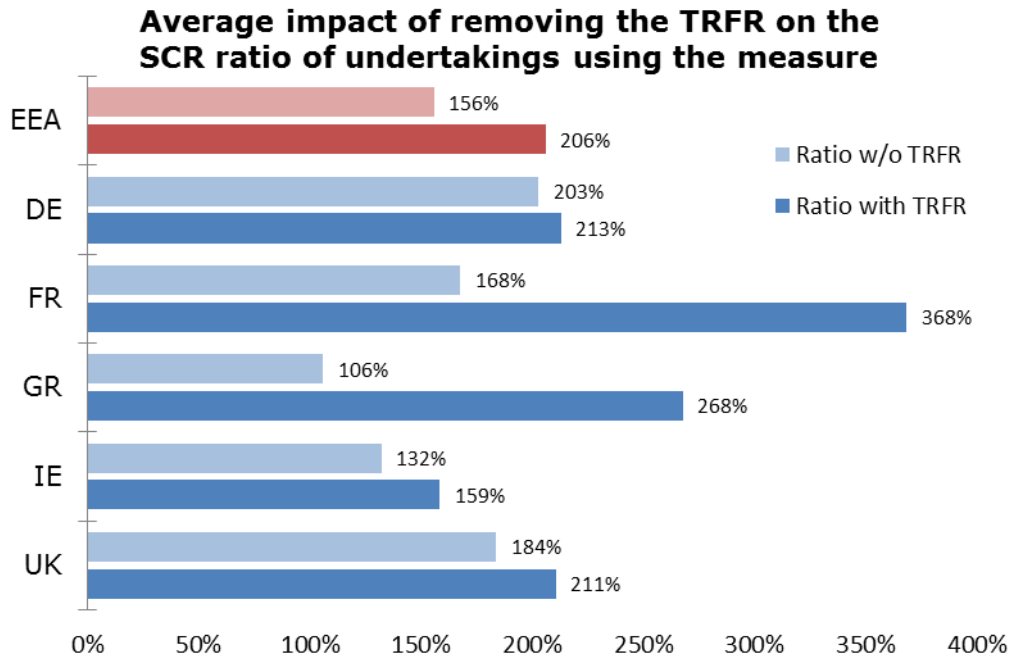
The number of TRFR users is limited (only 7 undertakings). In each country, the average impact of the TRFR mirrors, to a large extent, the specifics of the individual undertakings in that market, rather than the countries' specificities.

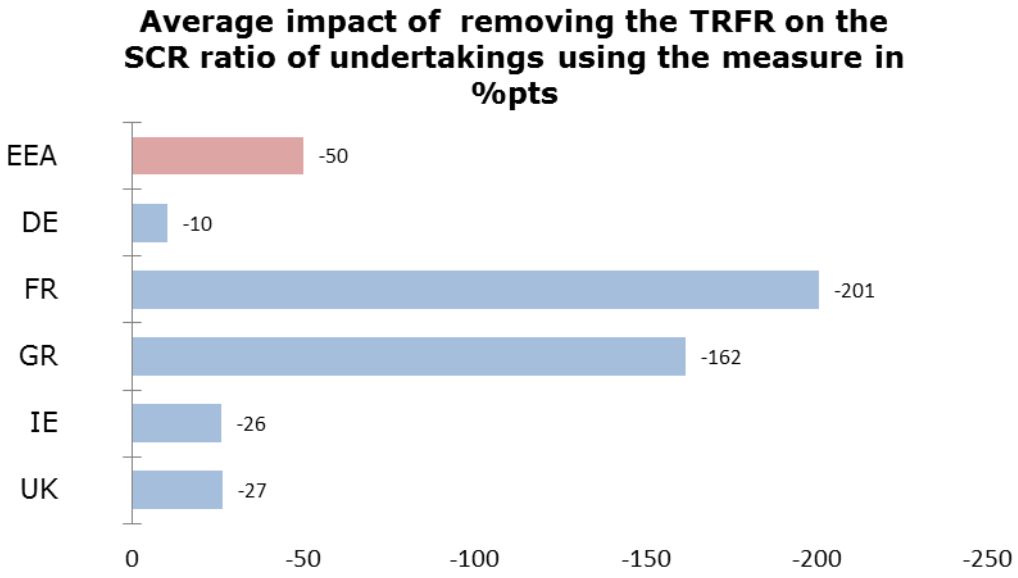
The following graph shows the overall impact of the use of the TRFR on the SCR ratio for the whole market of the countries where the TRFR is used. For those countries, it includes both undertakings using and not using the TRFR. This shows that removing the TRFR has merely no impact on the average SCR ratio for the whole market, except for Greece.



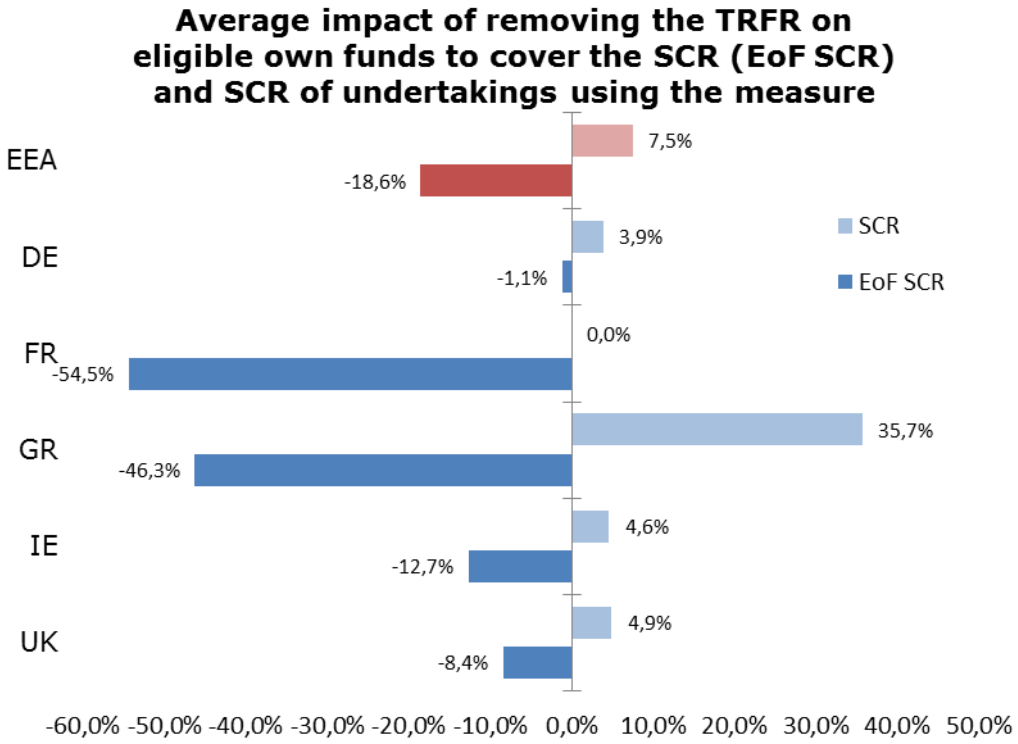
The following graphs display the overall impact of the use of the TRFR on the SCR ratio for undertakings that apply this measure. The impact is shown at EEA and at country level. The first graphs shows the SCR ratio with (dark blue) and without (light blue) the TRFR. The red bars are for the EEA level. The second graph shows the impact in percentage points.

The impact of the TRFR on the SCR ratio for undertakings applying the measure is 50 percentage points. The average SCR ratio with the TRFR is 206% and 156% without the measure. This effect on the SCR ratio is due to an average increase of 8% in the SCR and an average decrease of 19% in the eligible own funds when the measure is not used.

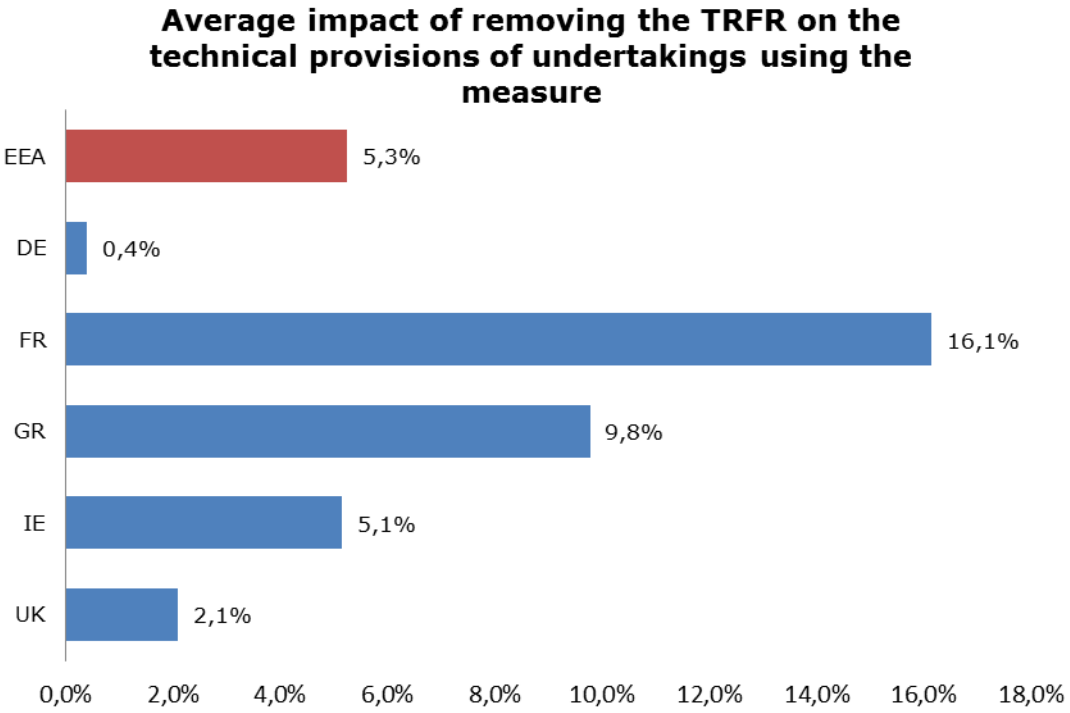




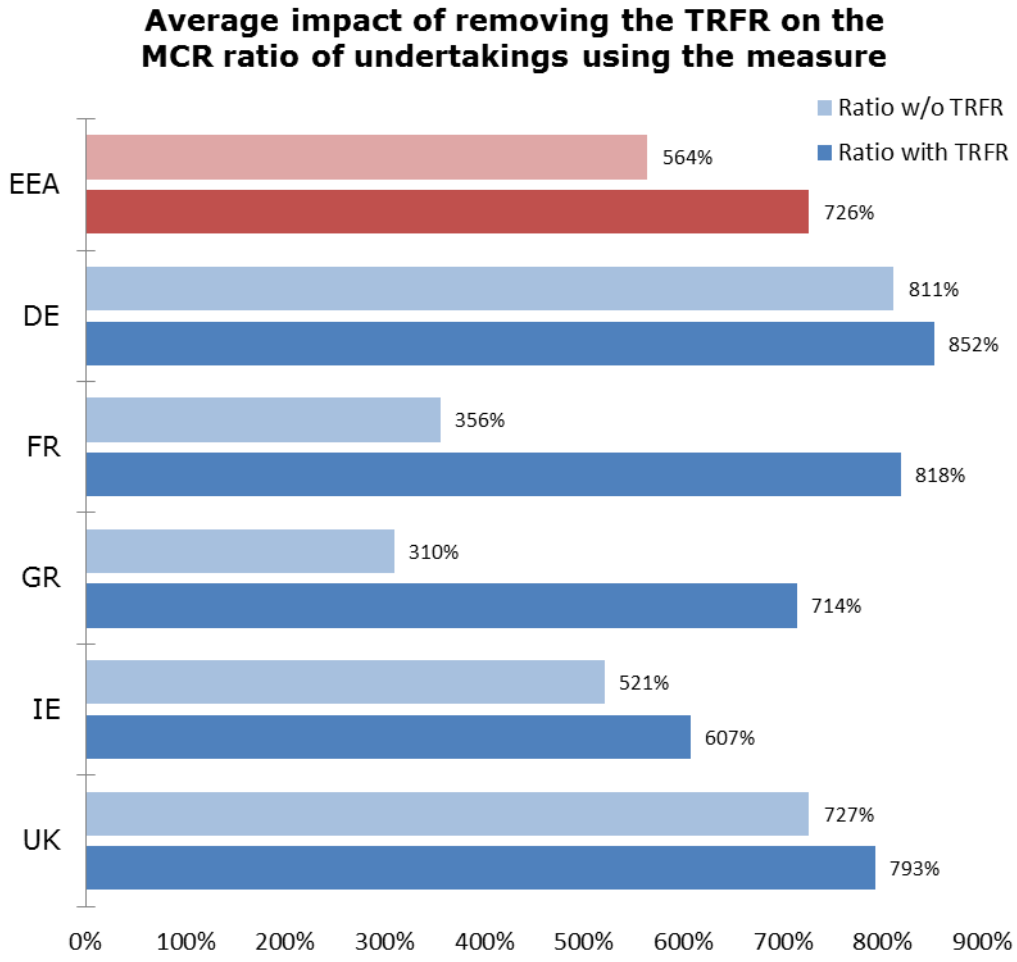
The following graph shows the impact of removing the TRFR on the SCR (light blue) and on the eligible own funds to cover the SCR (dark blue). The red bars are for the EEA level. On average, eligible own funds to cover the SCR would decrease by 19%, while the SCR would increase by 8% if the TRFR were removed.

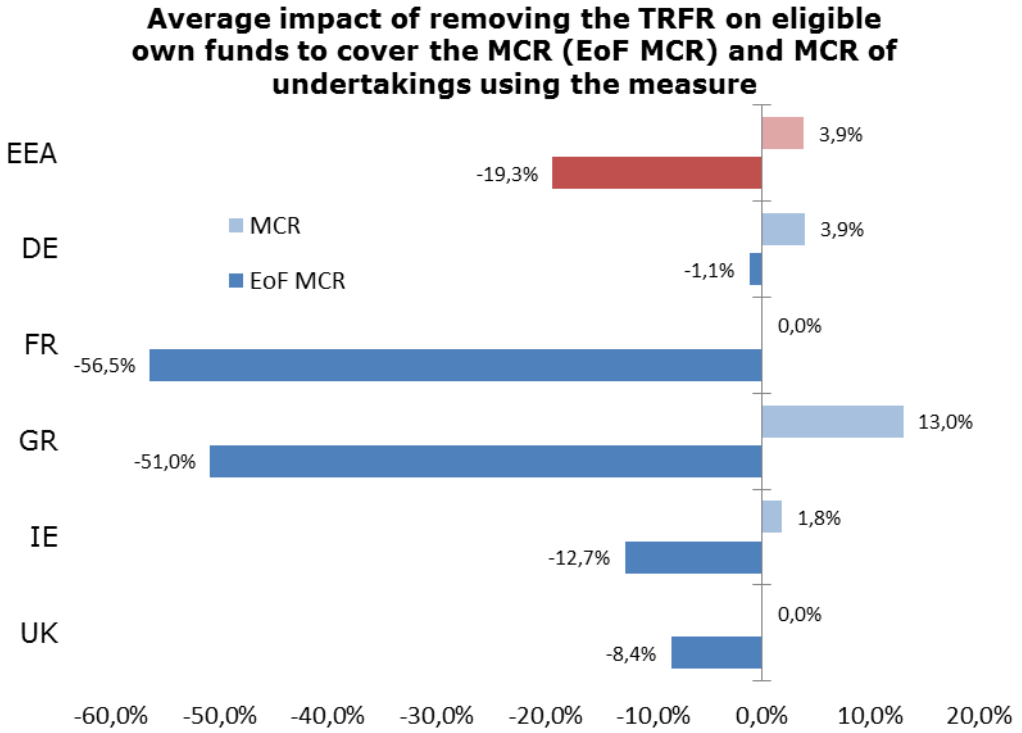


The following graph displays the impact of removing the TRFR on the value of technical provisions (TPs) at EEA and national level. The average impact of the TRFR on the technical provisions for undertakings applying the measure is an increase of 5% when the measure is removed.



The impact of removing the TRFR on the MCR ratio for undertakings applying the measure is 162 percentage points. The average MCR ratio with the TRFR is 726% and 564% without the measure.



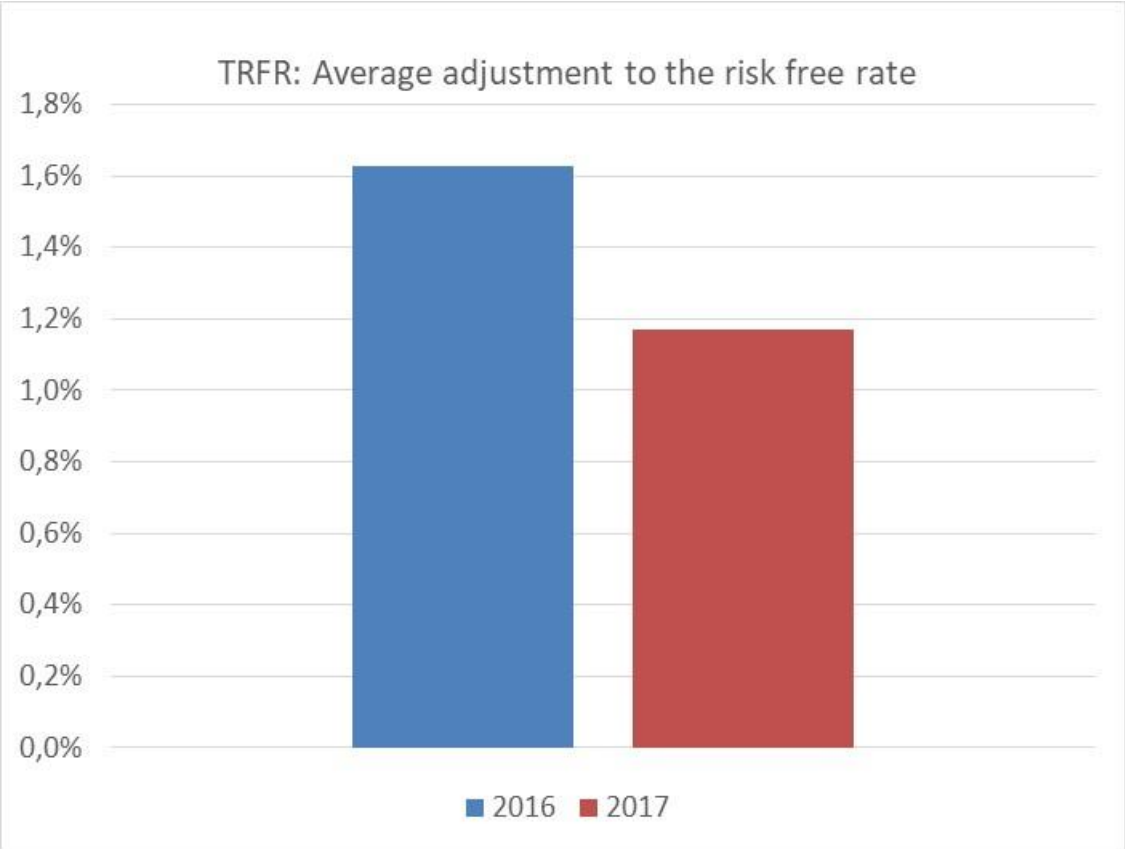


Information on the phasing-in plans for the TRFR and the prospects for a reduced dependency on the measures can be found in Section III.5.

Additional information on the TRFR based on the QRT information

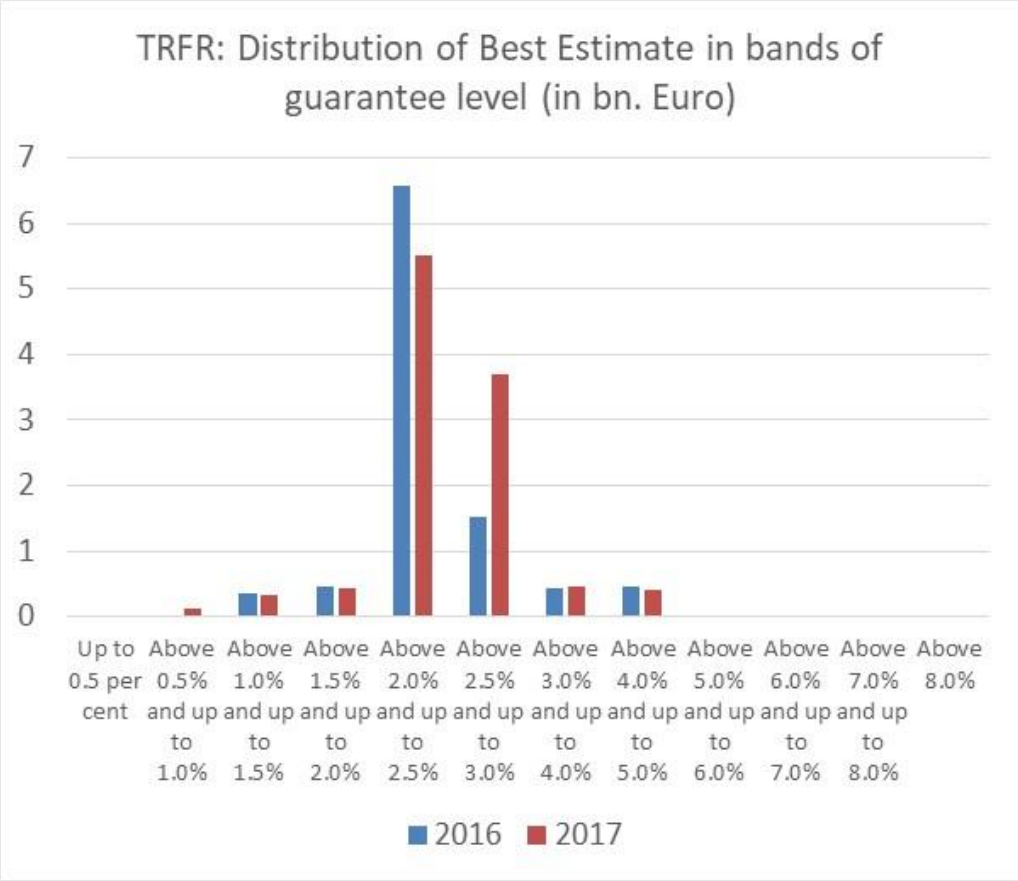
Based on the quantitative information that undertaking regularly provide to supervisory authorities further analysis could be performed for this year's report.

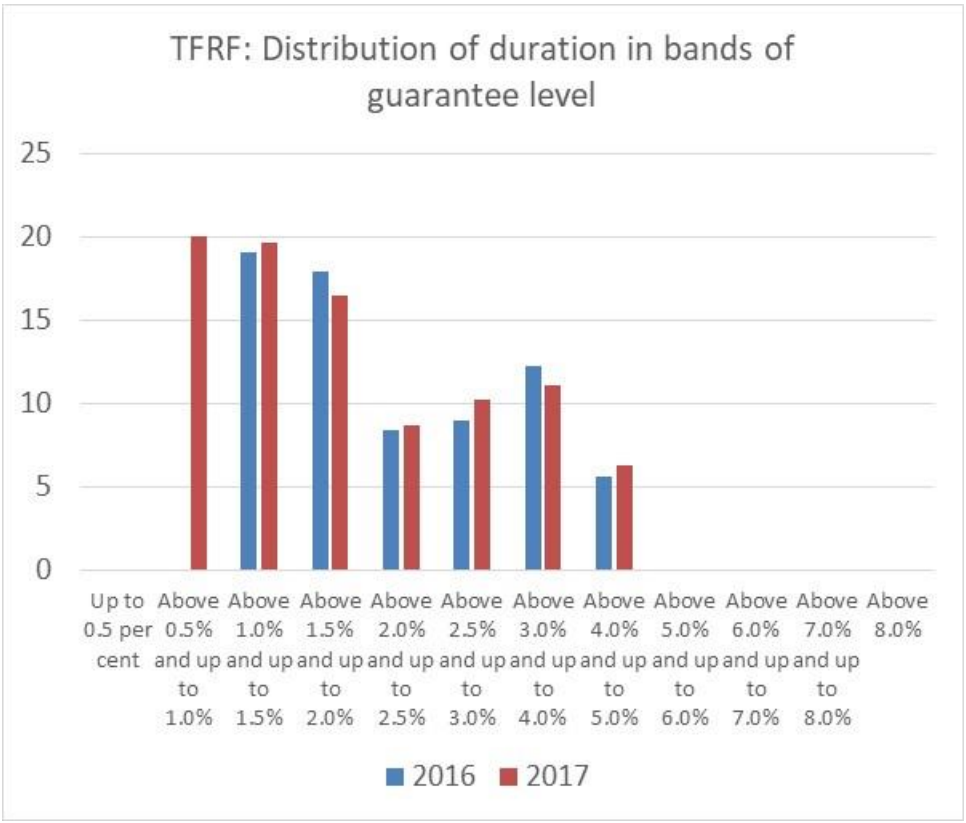
The following graph outlines the average adjustment to the risk free rate for year-end 2016 as well as year-end 2017:



The information provided in the regular quantitative reporting also allows NSAs to assess the share of best estimate in bands of guarantee level. The following graph provides an overview based on all undertakings applying the TRFR:[35]

[35] Note that changes between 2016 and 2017 are mainly due to changes in the set of undertakings using the TRFR, which can have a material effect on the average since the overall number of undertakings using the TRFR is small.


TRFR: Distribution of Best Estimate in bands of guarantee level (in bn. Euro)
7
6
5
4
3
2
1
0
Up to 0.5 per cent
Above 0.5% and up to 1.0%
Above 1.0% and up to 1.5%
Above 1.5% and up to 2.0%
Above 2.0% and up to 2.5%
Above 2.5% and up to 3.0%
Above 3.0% and up to 4.0%
Above 4.0% and up to 5.0%
Above 5.0% and up to 6.0%
Above 6.0% and up to 7.0%
Above 7.0% and up to 8.0%
Above 8.0%
2016
2017


TFRF: Distribution of duration in bands of guarantee level
25
20
15
10
5
0
Up to 0.5 per cent
Above 0.5% and up to 1.0%
Above 1.0% and up to 1.5%
Above 1.5% and up to 2.0%
Above 2.0% and up to 2.5%
Above 2.5% and up to 3.0%
Above 3.0% and up to 4.0%
Above 4.0% and up to 5.0%
Above 5.0% and up to 6.0%
Above 6.0% and up to 7.0%
Above 7.0% and up to 8.0%
Above 8.0%
2016
2017

Impact on investments of undertakings, consumers and products

As only 7 insurers are applying the TRFR, it is not possible to disclose more detailed data on the impact of this measure on investments of undertakings, consumers and products per country. This data has been combined with the data for the TTPs and is presented in subsection III.5.

The following table sets out the share of gross written premiums for undertakings using the TRFR compared to the total gross premiums written by all undertakings. It also shows each line of business (columns 1 to 6), the total life insurance and life reinsurance business (column 7) and the total for non-life insurance and reinsurance business (column 8). The table is based on data reported by undertakings in the annual QRTs for 2017. Please note that due to the small number of undertakings in individual markets using this transitional measure, results have been presented at EEA level, and not been split by individual country.

Country	1. Health insurance	2. Insurance with profit participation	3. Index linked and unit linked insurance	4. Other life insurance	5. Health reinsurance	6. Life reinsurance	7. Total life insurance and reinsurance	8. Total non-life insurance and reinsurance
EEA	**0.5%**	**0.2%**	**0.2%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.8%**

III.5 Transitional measure on technical provisions

For a period of 16 years after the start of Solvency II, insurance and reinsurance undertakings may apply the transitional measure on technical provisions (TTP). Under the transitional measure, undertakings apply a transitional deduction to the technical provisions for their insurance and reinsurance obligations.

The transitional deduction is based on the difference between the technical provisions under Solvency I and the technical provisions under Solvency II. At the beginning of Solvency II the transitional adjustment is 100% of that difference, i.e. the technical provisions are equal to the technical provisions under Solvency I. Over the transitional period of 16 years the transitional deduction is reduced to zero. The transitional measure applies only to insurance and reinsurance obligations from contracts concluded before the start of Solvency II.

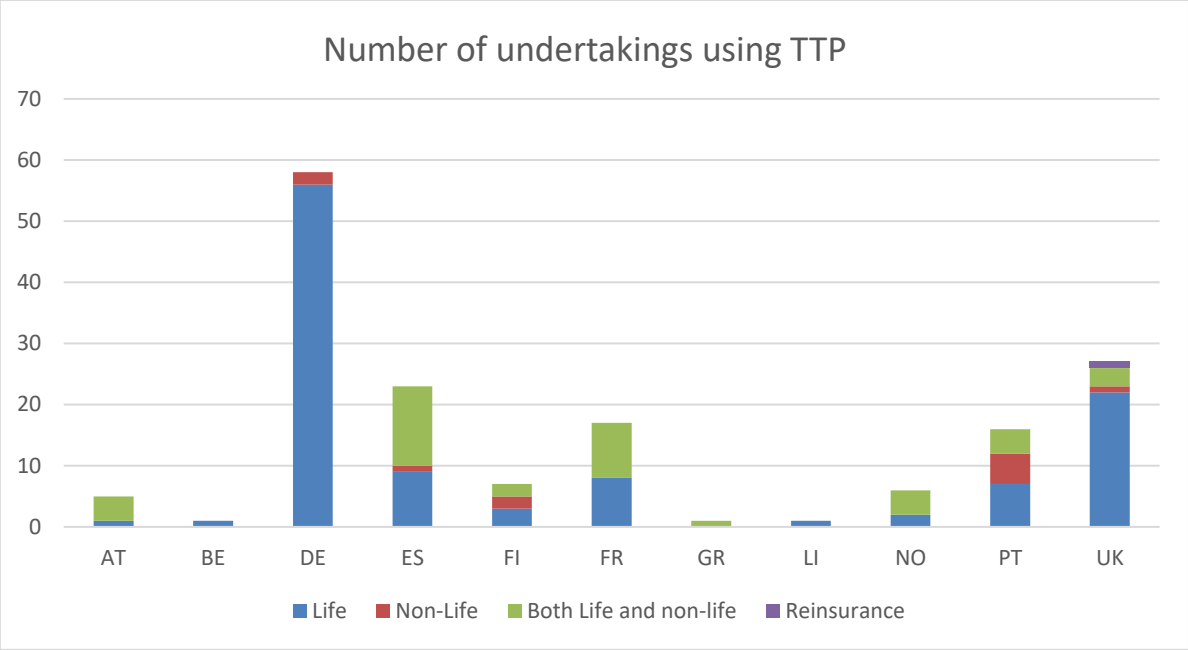
The use of the transitional measure is subject to supervisory approval.

Use of the transitional measure on technical provisions

The TTP is applied by 162 undertakings from 11 countries.

The technical provisions of undertakings applying the TTP represent 24% of the total amount of technical provisions in the EEA. The technical provisions of undertakings

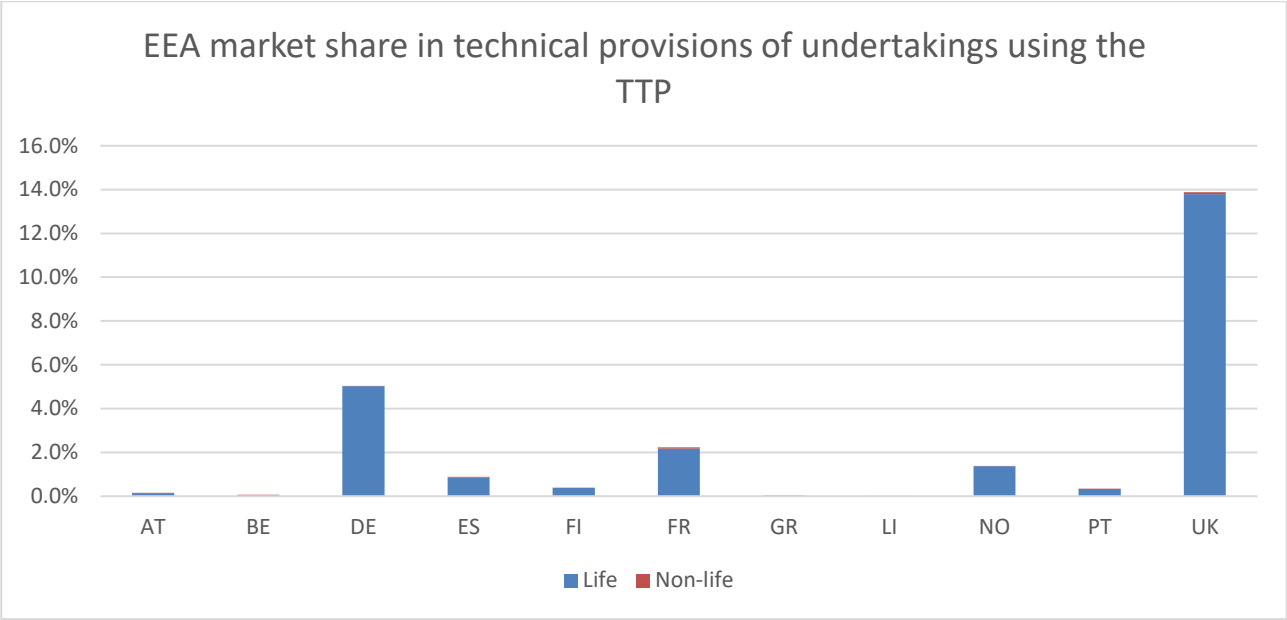
applying the TTP in the UK represents 14% of the overall technical provisions in the EEA whereas in Germany this figure is 5%.



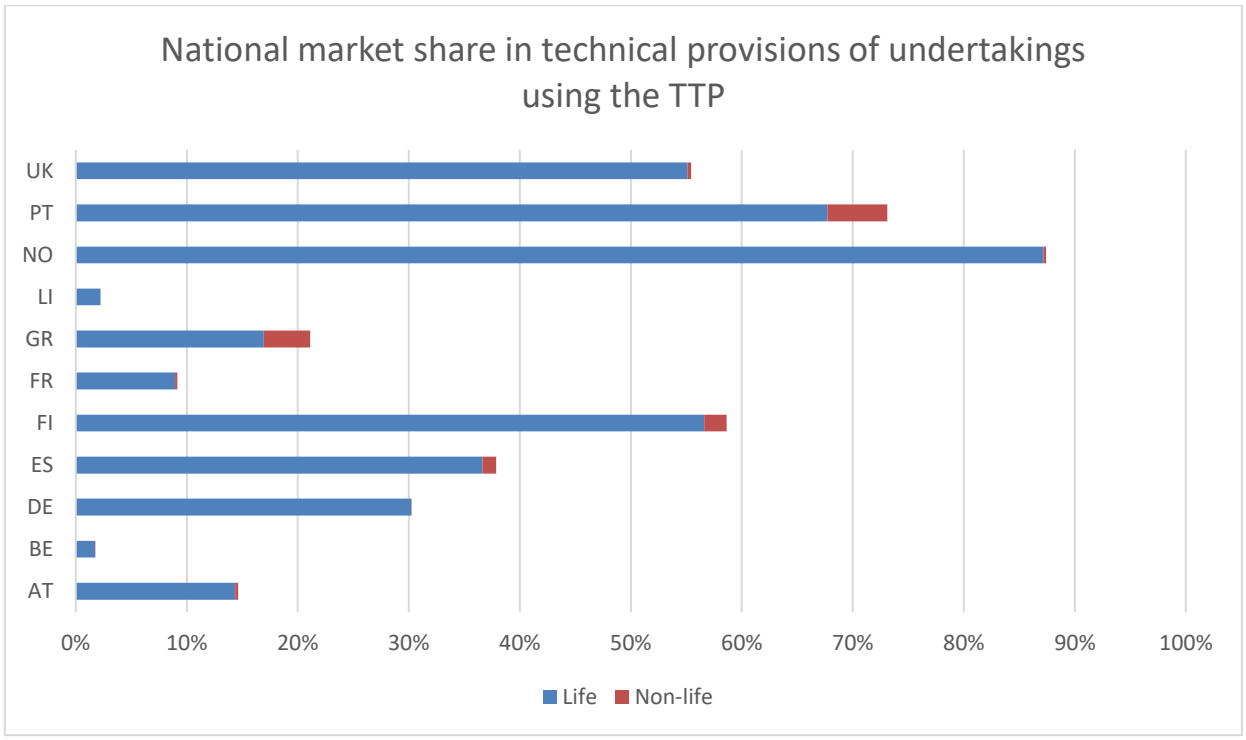
Number of undertakings using TTP							
Country	Life	Non-Life	Both Life and non-life	Reinsurance	Total	Last year	Variation from last year
AT	1	0	4	0	5	4	1
BE	1	0	0	0	1	1	0
DE	56	2	0	0	58	63	-5
ES	9	1	13	0	23	22	1
FI	3	2	2	0	7	7	0
FR	8	0	9	0	17	13	4
GR	0	0	1	0	1	1	0
LI	1	0	0	0	1	1	0
NO	2	0	4	0	6	6	0
PT	7	5	4	0	16	16	0
UK	22	1	3	1	27	29	-2
EEA	**110**	**11**	**40**	**1**	**162**	**163**	**-1**

The total number of undertakings using the TTP in the EEA is largely unchanged since last year's report.

The market share in technical provisions of undertakings using the TTP is shown in the graph below. This illustrates that among undertakings using the TTP, undertakings in the UK have the highest EEA market share, followed by undertakings in DE and FR.



The following graph displays the market share in terms of technical provisions at national level for undertakings using the TTP. In Norway, undertakings representing 87% of the national market share use the TTP. In the United Kingdom, Finland and Portugal, undertakings representing more than 50% of the national market are using TTP.



According to the Solvency II Directive it is possible to apply simultaneously the TTP and the MA or the VA to the same liabilities.

Undertakings applying simultaneously TTP and VA to the same liabilities			
Country	Number of undertakings	% EEA market share in TP	% National market share in TP
AT	2	(*)	(*)
BE	1	(*)	(*)
DE	46	4%	23%
ES	22	1%	38%
FI	7	0%	58%
FR	16	2%	9%
GR	1	(*)	(*)
LI	1	(*)	(*)
NO	5	1%	87%
PT	9	0%	42%
UK	14	8%	30%
EEA	**124**	**17%**	**-**

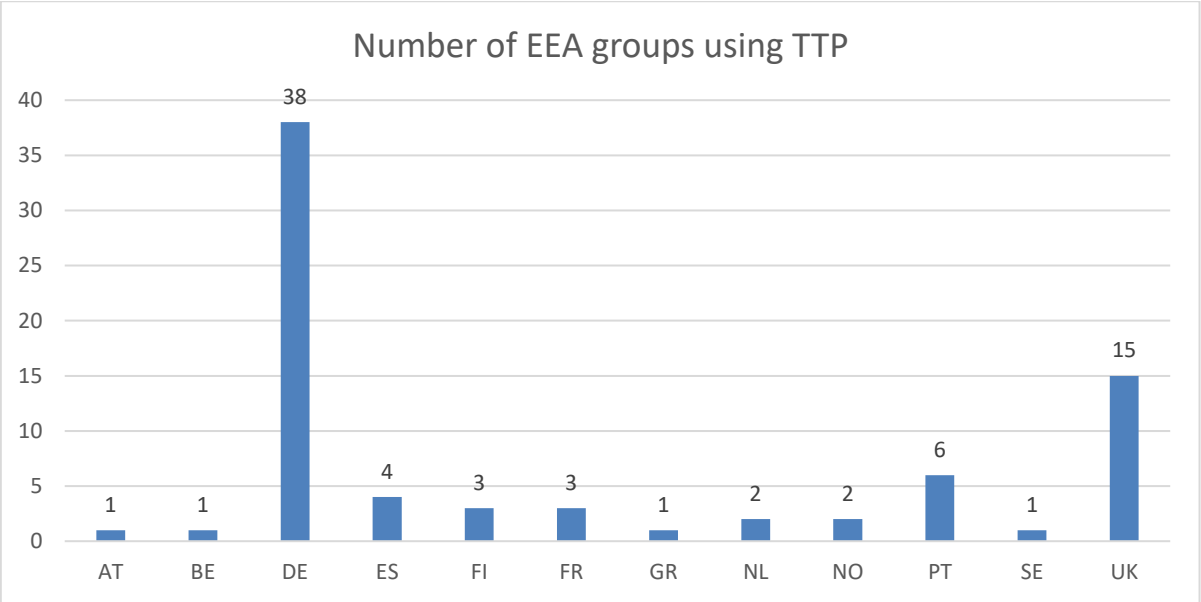
(*)Data from these countries are not disclosed for confidentiality reasons because the number of undertakings concerned is lower than 3.

It may be insightful to compare the table above with the table on undertakings and the market share of their technical provisions and the tables on the use of only the VA or only the TTP. A comparison shows that for some jurisdictions, e.g. NO, FI and PT, there is a large overlap between the use of the TTP and the use of the VA.

Undertakings applying the TTP and MA to the same liabilities simultaneously			
	Number of undertakings	% EEA market share in TP	% National market share in TP
ES	10	1%	29%
UK	15	12%	50%
EEA	**25**	**13%**	**-**

Similarly, it may be insightful to compare the table above with the table on undertakings and the market share of their technical provisions and the tables on the use of only the MA or only the TTP. A comparison shows that there is a fairly large overlap between the use of the MA and the use of the TTP.

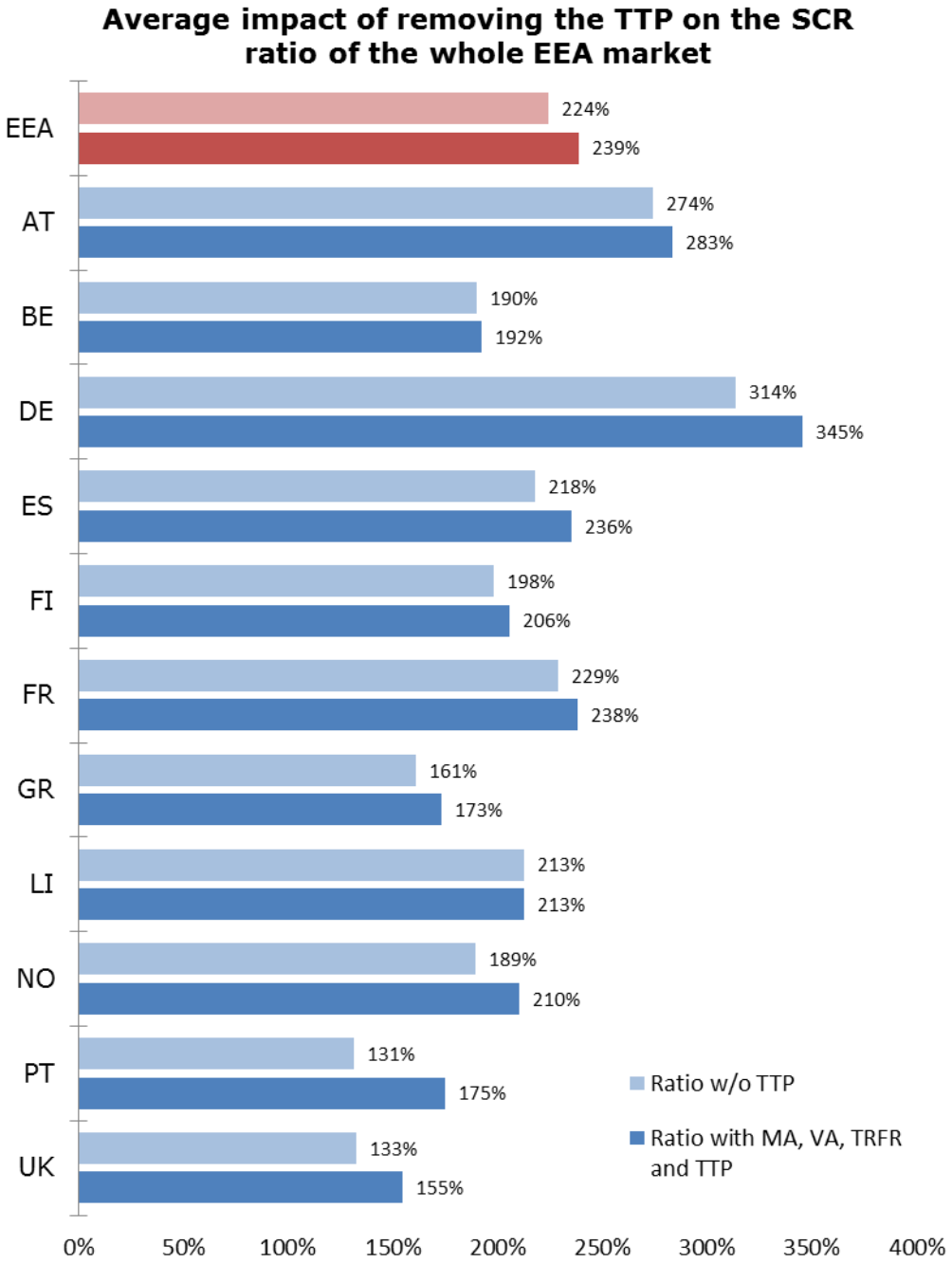
The following diagram shows the number of EEA groups using the TTP.



Impact on the financial position of undertakings

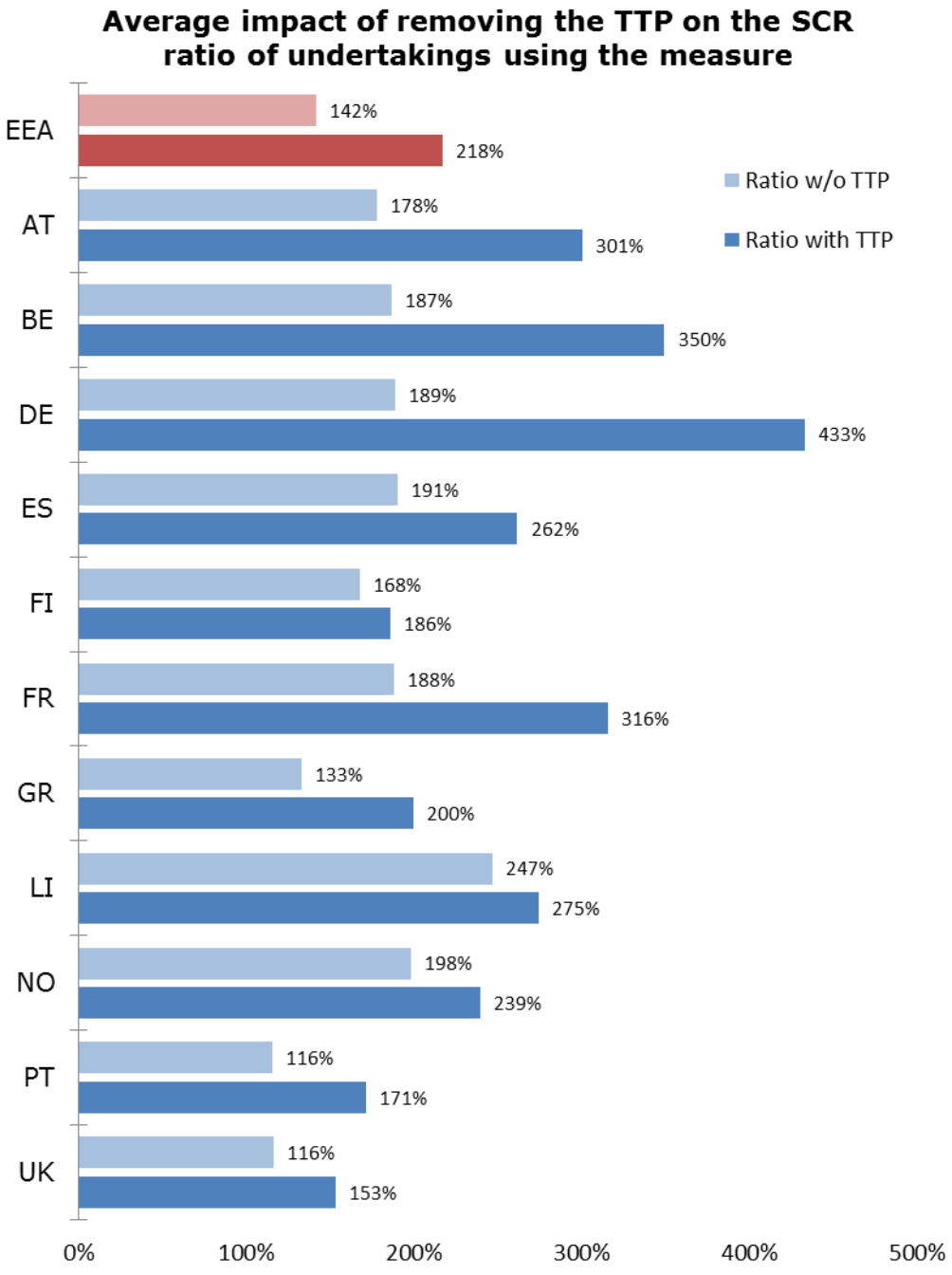
The impact results presented in this section are based on data from 2018 Quantitative Reporting Templates.

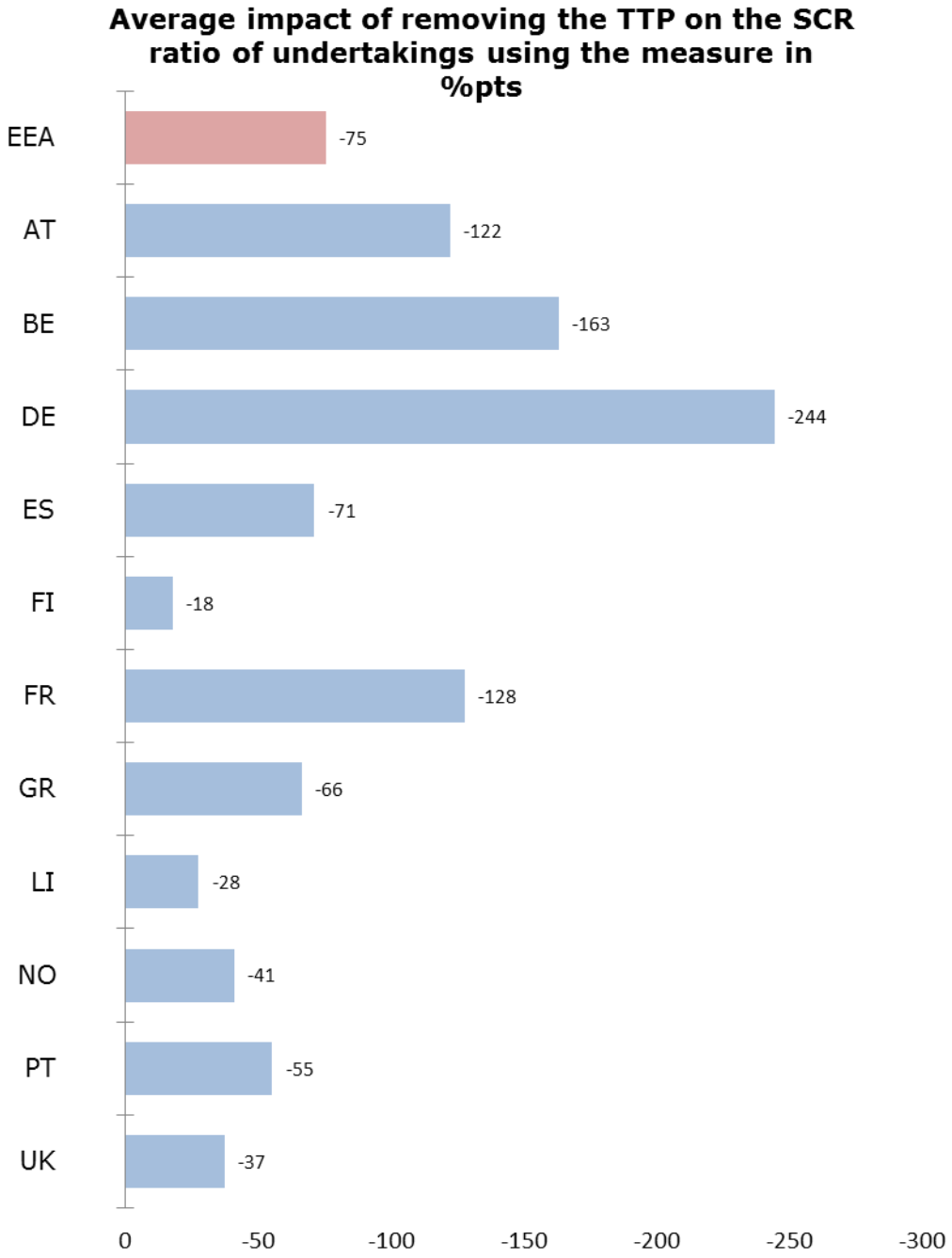
The following graph displays the overall impact of the TTP on the SCR ratio for the whole EEA sample (including both undertakings using or not using the measure). At the EEA level, removing the TTP would result, on average, in a decrease of the SCR ratio by 15 percentage points.



The following graphs show the overall impact of TTP on the SCR ratio for undertakings that apply the measure. At EEA level, by removing the TTP the financial position of the insurance and reinsurance undertakings using that measure would decrease the SCR ratio from 218% to 142%. Without TTP, the eligible amount of own funds to cover the SCR would decrease by 31% while SCR would increase by 5% upon recalculation of the SCR.

The average change in SCR ratios is the highest for undertakings in Germany, Belgium, and France. Usually both components of the SCR ratio (SCR and eligible own funds) are affected by the use of the TTP, but in opposite direction. Typically eligible own funds decrease when the TTP is removed whereas the SCR increases. Germany has the largest decrease of eligible own funds and Belgium has the largest increase in the SCR.


Average impact of removing the TTP on the SCR ratio of undertakings using the measure
EEA
AT
BE
DE
ES
FI
FR
GR
LI
NO
PT
UK
142%
218%
178%
301%
187%
350%
189%
433%
191%
262%
168%
186%
188%
316%
133%
200%
247%
275%
198%
239%
116%
171%
116%
153%
Ratio w/o TTP
Ratio with TTP
0%
100%
200%
300%
400%
500%

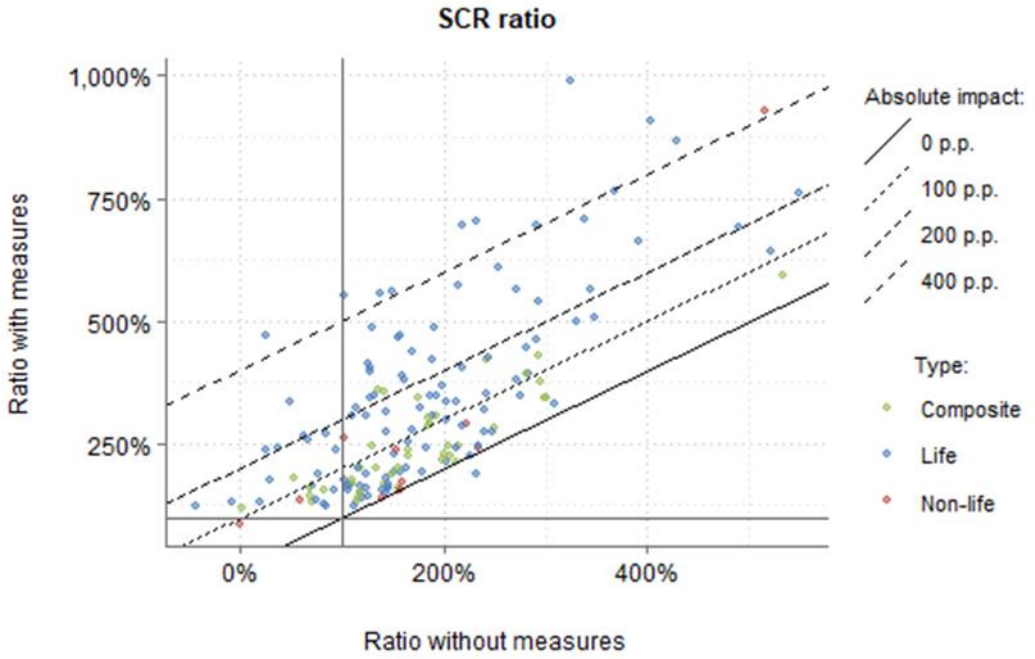


The following graph displays the impact of removing the TTP on the SCR ratio of every undertaking using the measure. Each dot in the diagram represents one undertaking, comparing the individual SCR ratio against the estimated SCR ratio without the TTP. The type of each undertaking is indicated by the colour of the dot.

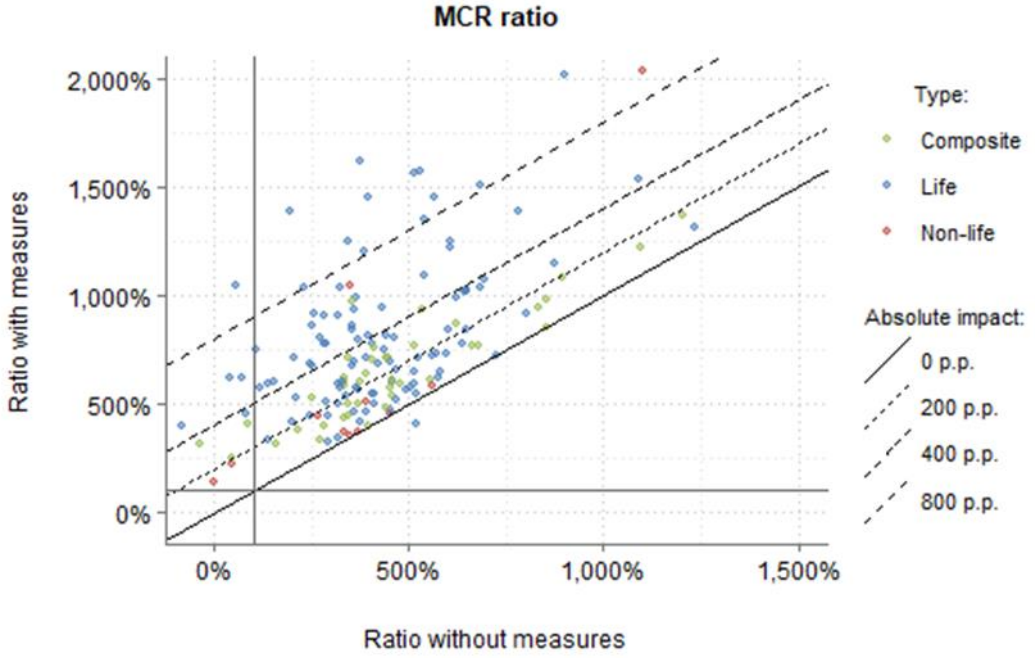
In terms of SCR ratio, 73% reported an absolute impact between 0% and 200%.

16% of undertakings using the TTP reported an SCR ratio without the measure below 100% (26 undertakings with 4% of the total technical provisions in the EEA). 1% of the undertakings using the measure reported negative eligible own funds to cover the SCR without TTP (2 undertakings, with 0.1% of the total technical provisions in the EEA).

Also note that there are not clear differences between Life, Non-life and Composite undertakings.



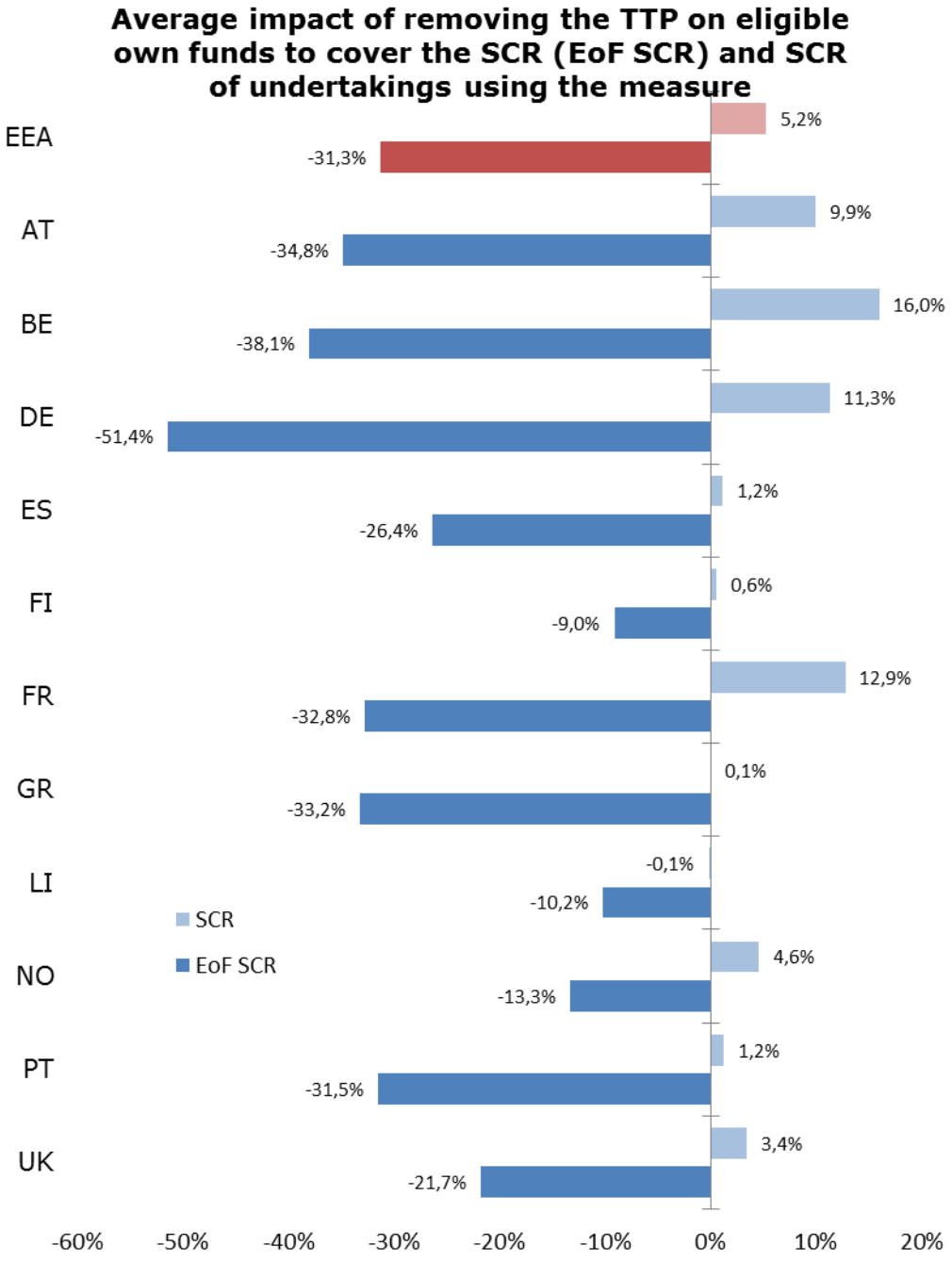
The following graph displays the impact of removing the TTP on the MCR ratio of every undertaking using TTP, comparing the individual MCR ratio against the estimated MCR ratio without TTP.



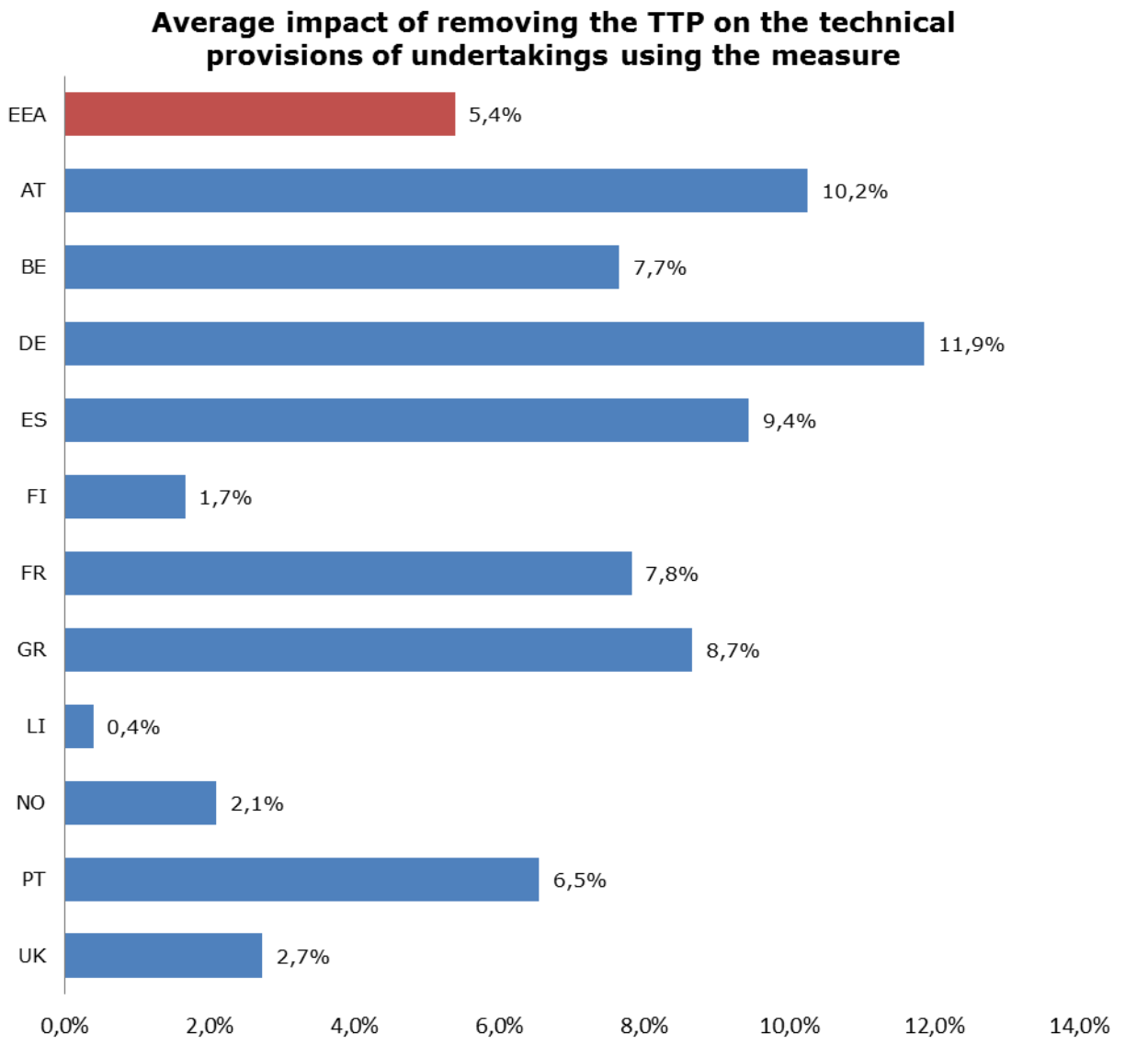
In terms of the MCR ratio, 65% reported an absolute impact between 0% and 400%.

8% of undertakings using the TTP reported an MCR ratio without the measure below 100% (12 undertakings, with 0.3% of the total technical provisions in the EEA). 3% of the undertakings using the measure reported negative eligible own funds to cover the MCR without TTP (4 undertakings, with 0.2% of the total technical provisions in the EEA).

The following graph shows the impact of removing the TTP on the SCR (light blue) and on the eligible own funds to cover the SCR (dark blue). The red bars are for the EEA level. On average, eligible own funds to cover the SCR would decrease by 31%, while the SCR would increase by 5% if the TTP were removed.

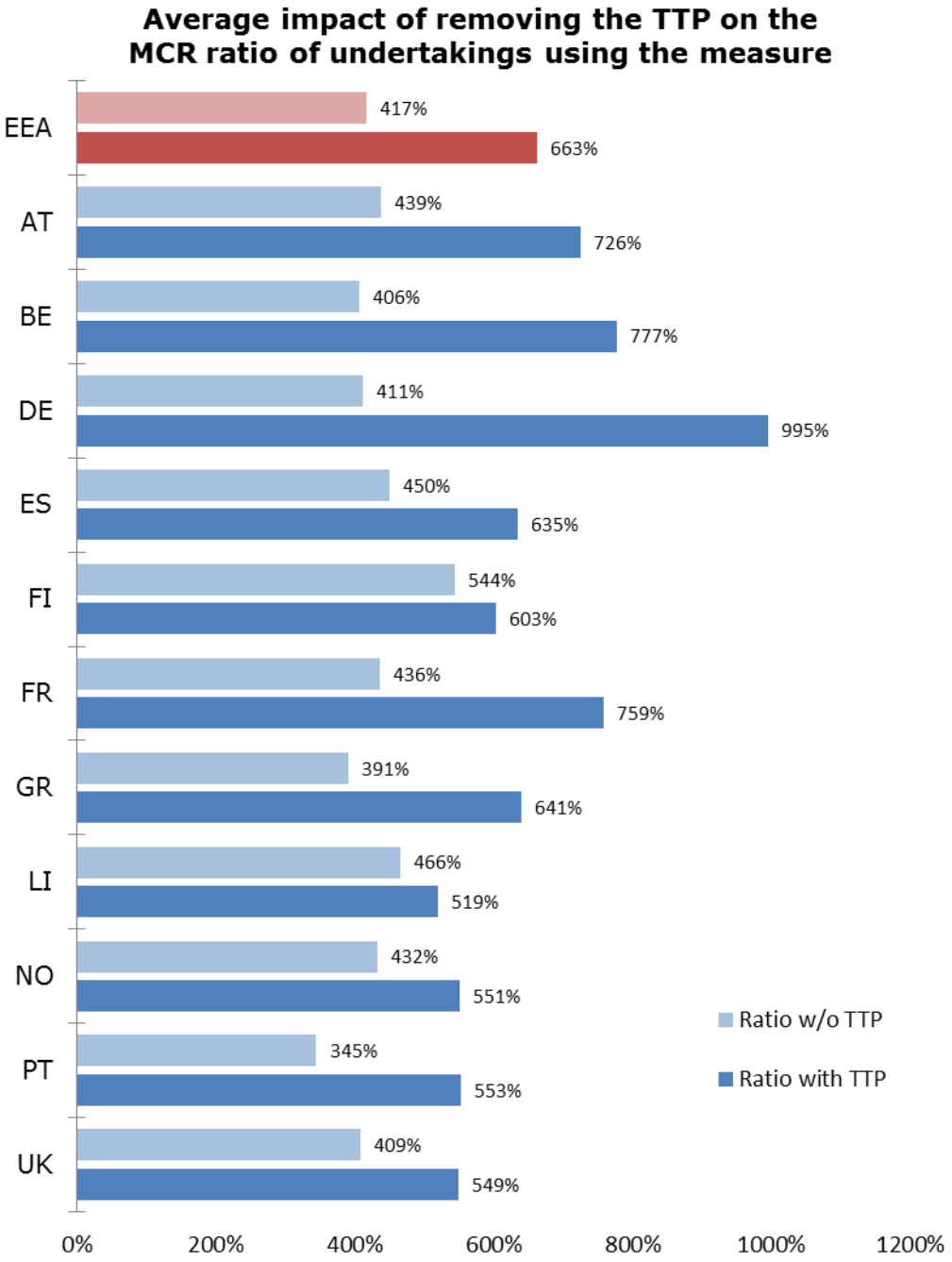


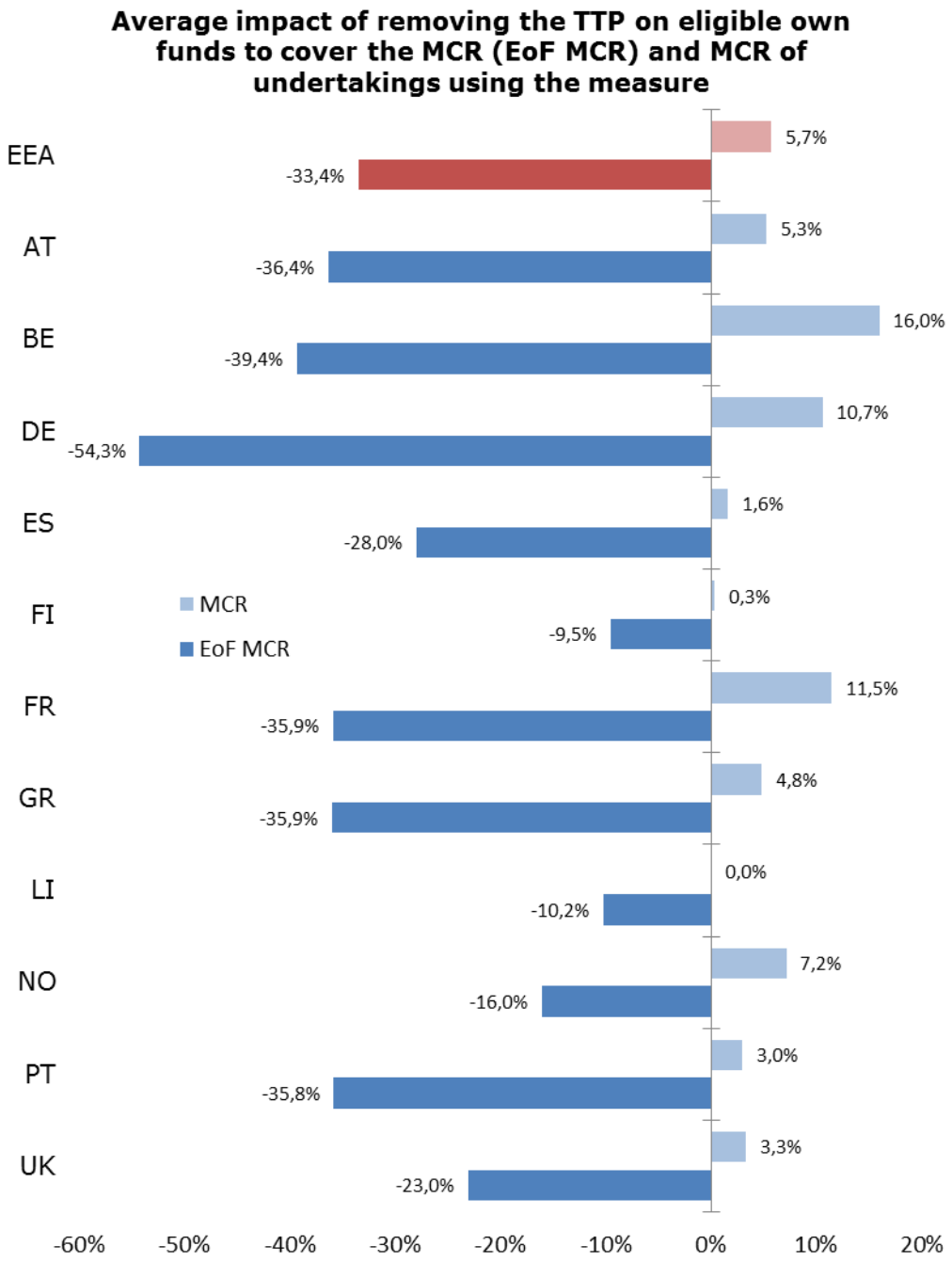
The following graph displays the impact of removing the TTP on the value of the technical provisions (TPs) at EEA and national level. The average increase in technical provisions without the TTP would be around 5% at EEA level. At country level, undertakings from Germany would have the highest average increase due of the application of the TTP.



The following graph shows the impact of the TTP on the MCR ratio at country and EEA level for undertakings using that measure. Without TTP, the MCR ratio decreases on average by 245 percentage points.

At country level, average MCR solvency ratios are not below 100% without applying the TTP. The effects noted on the SCR are similar to the MCR and the analysis shows that undertakings from Germany, Belgium and France have the highest average impact.

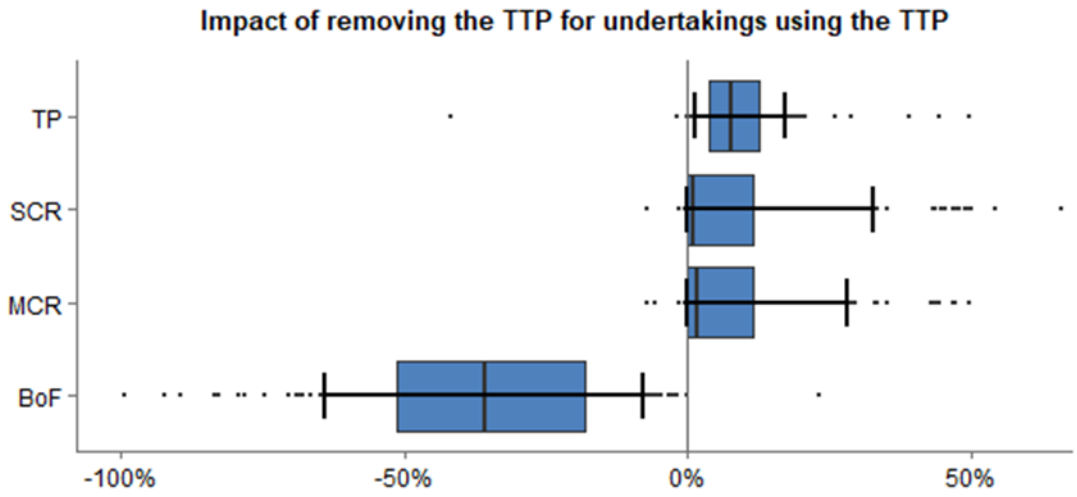

Average impact of removing the TTP on the MCR ratio of undertakings using the measure
EEA
AT
BE
DE
ES
FI
FR
GR
LI
NO
PT
UK
417%
663%
439%
726%
406%
777%
411%
995%
450%
635%
544%
603%
436%
759%
391%
641%
466%
519%
432%
551%
345%
553%
409%
549%
0%
200%
400%
600%
800%
1000%
1200%
Ratio w/o TTP
Ratio with TTP



The box-plots below illustrate how the impact of removing the TTP is distributed across undertakings.[36]

In general, the TTP is the measure that shows higher impacts in both TPs and capital requirements when compared with the VA and MA. This leads to higher impacts in the solvency ratios.

[36] The bottom (respectively, top) of the blue box represents the lower quartile (respectively, higher quartile) of the data set. The black band inside the box is always the middle quartile (50th percentile or median). The end of the lines extending from the boxes (called whiskers) represent the 10th and 90th percentiles, respectively. Outliers are plotted as individual points.



Additional information on the TTP based on the QRT information

Based on the quantitative information that undertakings regularly provide to supervisory authorities, further analysis could be performed for this year's report.

The quantitative information identifies the number of limitations applied by NSAs. The following table outlines the number of limitations applied:

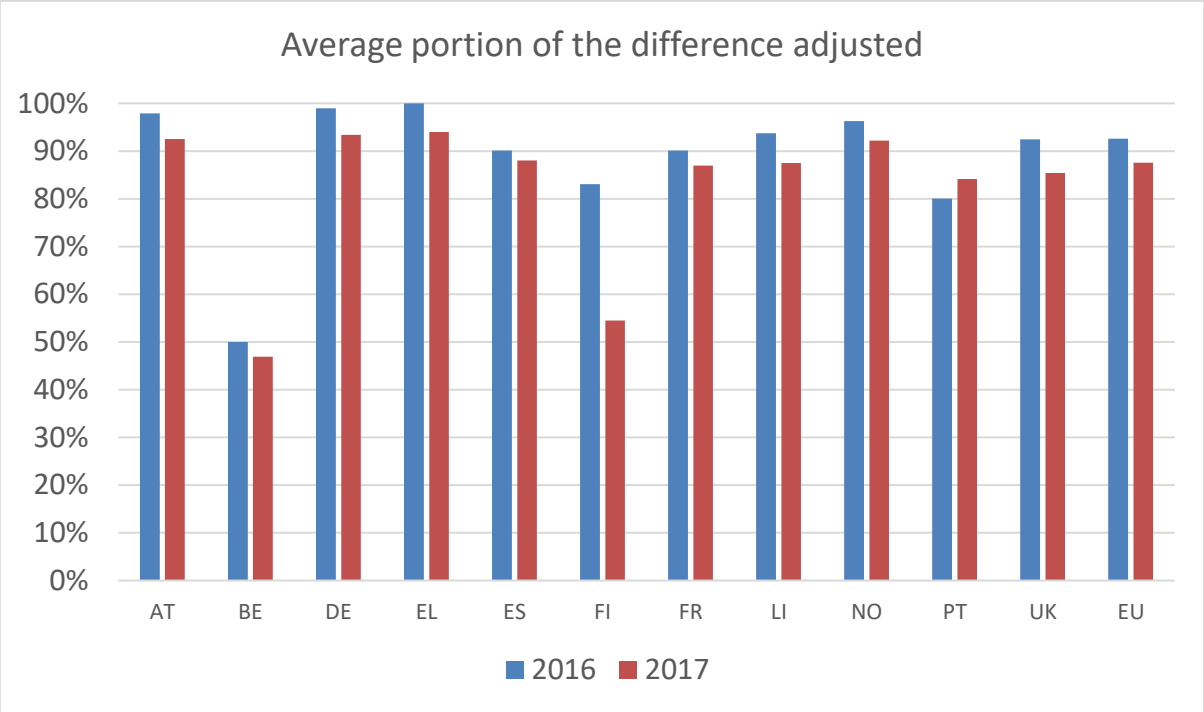
Country	2016	2017
AT		5
BE	1	1
DE	4	26
GR		1
ES	8	8
FI	2	3
FR	0	0
NO	2	4
PT	5	10
UK	18	24
Total EEA	**40**	**89**

The maximum portion of the adjustment that can be applied is decreasing linearly during the 16 years of the transitional period. At year end 2016 the maximum portion that could be applied was 100% whereas at year end 2017 the maximum portion amounts to 93.75%. In 2016 56 undertakings applied a lower portion than the maximum portion compared to 43 undertakings in 2017. The following table outlines the average portion applied for all undertakings applying the TTP:

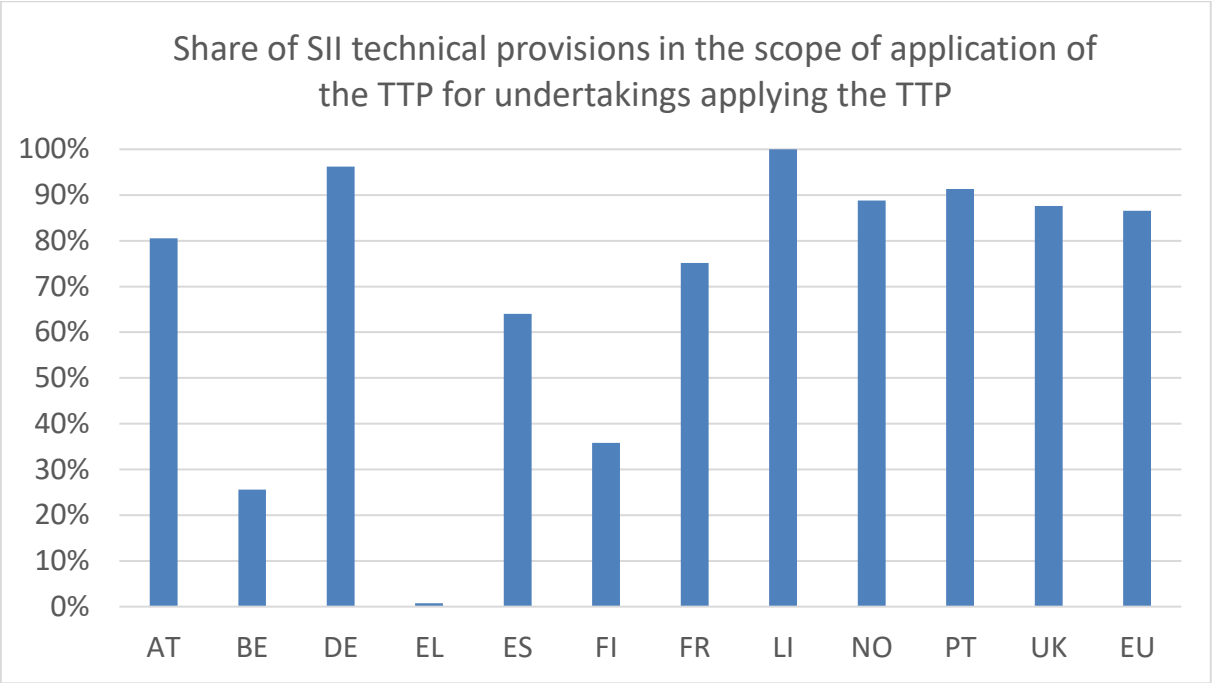
	2016	2017
Portion of	93%	88%

the difference adjusted		

The following graph outlines the differences across countries in the portion of the adjustment that is applied to SII technical provisions:



The figures provided by undertakings also allow assessment of the portion of SII technical provisions that is in the scope of the TTP. For that purpose, the SII technical provisions to which the adjustment is applied to can be compared to the total technical provisions for each undertaking. For 2017 in the EU, 87% of the technical provisions of undertakings applying the TTP are in scope for application of the transitional. However, the results vary by country:



Reliance on transitional measures (TTP and TRFR)

The table below shows the overall number of undertakings using either the TTP or TRFR and for these undertakings the table also show the number required to submit a phasing-in plan ("PIP") in 2017.

Country	Number of undertakings using TTP/TRFR	Number of undertakings for which a PIP was requested
AT	5	0
BE	1	0
DE	59	26
ES	23	8
FI	6	0
FR	18	1
GR	4	1
IE	1	0
LI	1	0
NO	6	0
PT	16	5
UK	28	10
EEA	**168**	**51**

There are 168 undertakings that use the TTP or TRFR and of these, 51 were required to submit a phasing-in plan in 2017. This is because they were reliant on the TTP or the TRFR to have full SCR coverage at some point during 2017. At the end of 2017 some of these undertakings were already not reliant on the TTP/TRFR to comply with the SCR. In 2016, 60 undertakings were required to submit a phasing-in plan. The reasons for the difference in comparison with 2017 are portfolio transfer, merger and restoration of compliance with SCR.

Review of phasing-in plans

9 undertakings in 2 jurisdictions were required to submit a phasing in plan for the first time in 2017. These phasing in plans set up measures such as retention of profits or earnings, change of product design (e.g. increase of premiums), reduction of expenses and other measures such as the merger with another undertaking in the same group.

More details on the phasing-in plans received in 2016 by NSAs can be found in section III.5 of last year report.

Update of phasing-in plans

Firms have revised existing plans in 3 jurisdictions, either upon supervisor's request or at the undertaking's own initiative. Amendments include a range of options such as: retaining profits; ceasing or reducing the amount of new business written; derisking to reduce capital requirements; reducing expenses; and raising additional capital. One undertaking also adjusted the hypothesis used in the original plan in order for them to be more realistic, in particular about expenses.

One NSA has required life insurance undertakings to amend and enhance their first phasing-in plan where it was found to be insufficient. For example, this was the case where the description of the planned measures was not concise, or their expected impact was not quantified in a sufficient manner.

Review of progress reports

Undertakings that are reliant on transitional measures to fully cover the SCR are expected to submit progress reports on an annual basis. NSAs generally reported that the progress reports are considered sufficient and illustrate the progress of undertakings in complying with the SCR without the transitional measures. It was noted in most cases that undertakings showed continuous progress in complying with the solvency capital requirement without transitional measures. It was also mentioned that the review of the progress report led to the update of the phasing-in plan.

Views of NSAs

As in 2016, NSAs are generally confident that undertakings will be able to reduce the dependency on transitional measures, to the point of no dependency by 1 January 2032. This is confidence has been strengthened this year with progress made. It was reported that the measures planned by undertakings in their PIP have already

provided an effective contribution to strengthening undertaking's solvency position under the low-rate environment. However, it was also noted that the situation is still very early in the transitional period.

The following table provides an overview of the number of undertakings who do not comply with the SCR without the transitional measures at year end 2017. It also shows the missing amount of eligible own funds to comply with the SCR without the transitional measures on 1st January and 31st December 2016 but also on 31st December 2017.

	Undertakings not complying with the SCR without the transitional measures			Missing amount of eligible own funds to comply with the SCR without the transitional measures (billion euro)		
Country	**Day one 2016**	**Year end 2016**	**Year end 2017**	**Day one 2016**	**Year end 2016**	**Year end 2017**
FR	0	1	1	0	0.13	0.06
DE	16	13	8	3.46	1.59	0.53
ES	4	3	2	0.14	0.23	0.14
GR	3	2	1	0.27	0.06	0.04
NO	0	1	0	0	0.01	0
PT	12	10	8	1.39	0.76	0.33
UK	N/A	13	9	N/A	6.12	5.71
Total	**N/A**	**43**	**29**	**N/A**	**8.9**	**6.82**

In comparison with last year, the total number of undertakings who do not comply with the SCR without the transitional measures at EEA level decreased by 14.This went from 43 undertakings at year end 2016, to 29 undertakings at the end of 2017. The missing amount of eligible own funds to comply with the SCR without the transitional measures decreased by 2.08 billion euro, from 8.9 billion euro at year end 2016 to 6.82 billion euro at the end of year[37], with one jurisdiction accounting for 84% of this amount.

Supervisory measures taken or expected to be taken by NSAs

NSAs were asked to report about the measures that they have taken or that they expect to take with respect to undertakings depending on these transitional measures to comply with the SCR. NSAs reported a variety of approaches.

One NSA noted that they consider the solvency position of undertakings both with TTP and without TTP when assessing the riskiness of undertakings.

[37] It should be noted that during the observed time period (i.e. between 1st January 2016 and year end 2017), the set of undertakings not complying with the SCR without the transitionals might have changed

Two NSAs measure the riskiness of undertakings without the effect of transitional measures when constructing a work plan, and will prioritise reviews of undertakings using TTP or TRFR – particularly if they are reliant on transitional measures to fully cover the SCR. The NSAs expect companies to use appropriate metrics to measure their risks, define their risk appetite (i.e. without transitional measures), take into account in their strategies the fact that they comply with their SCR only through the use of transitional measures, present clear and relevant information to their AMSB regarding solvency issues and provide the relevant information in their SFCR.

One NSA noted that they would disagree to dividend payments if those payments were considered likely to endanger the future solvency situation.

One NSA explicitly informs the market on a regular basis about the number of undertakings depending on transitional measures and the extent to which transitional measures are necessary to comply with the SCR.

Two NSAs have communicated supervisory statements setting expectations regarding the use of transitional measures. One includes the expectation that undertakings should be able to demonstrate that their capital position is sustainable under a range of operating conditions after allowing for any capital distributions and the TTP run-off.

One NSA reported that on-site inspections have been made with respect to undertakings depending on transitional measures on technical provisions to comply with their SCR.

One NSA responded that they will request the recalculation of the TTP deduction at the end of 2018.

NSAs generally reported that they expect companies to implement the measures they have committed to in phasing-in plans, and intend to monitor the progress made during the transitional period by reviewing the progress reports. Where necessary, a regulatory meeting for an in-depth discussion with the undertaking's representatives is arranged. NSAs reported that in the event that the phasing-in plans or progress reports are inadequate and this inadequacy is not remediated by an amended plan, revocation of the transitional measure will be considered.

Impact on the investments of undertakings

The following tables and graphs illustrate some characteristics of the investments held by undertakings using the TTP or the TRFR. In total this relates to 12 countries[38].

Similar to the tables and graphs in the general section II.4 of the report, the tables and graphs below consider the investments of undertakings from three perspectives:

- The investment allocation
- The credit quality of the bond portfolio, separately for government bonds and corporate bonds

[38] The TTP is used by undertakings in 11 countries; the TRFR is used in 5 countries. In IE the TRFR is used, but not TTP. In the other 4 countries where TRFR is used, the TTP is also used. Due to lack of data, LI is not included in the tables on investments in this section.

- The duration of the bond portfolio, separately for government bonds and corporate bonds

The following tables show the investment allocation of undertakings applying the TTP or the TRFR. Please note that, due to confidentiality reasons, any cells that relate to less than three undertakings are denoted by (*).

Investment allocation at EEA and country Level of undertakings applying the TTP or the TRFR								
Country	Government bonds	Corporate bonds	Unit linked/index linked	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
EEA	19%	26%	26%	8%	8%	5%	5%	4%
AT	27%	31%	18%	5%	2%	4%	2%	11%
BE	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
DE	25%	40%	8%	5%	9%	5%	1%	6%
ES	51%	21%	8%	6%	0%	0%	11%	3%
FI	7%	22%	49%	5%	7%	3%	5%	4%
FR	32%	32%	14%	9%	3%	1%	4%	5%
GR	47%	20%	26%	2%	0%	1%	2%	1%
IE	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
NO	11%	34%	16%	20%	9%	8%	2%	1%
PT	37%	24%	18%	9%	6%	0%	4%	2%
UK	12%	20%	37%	8%	9%	6%	6%	3%

Investment allocation at EEA and country Level (without assets held for IL & UL contracts) of undertakings applying the TTP or the TRFR							
Country	Government bonds	Corporate bonds	Equity	Collective Investment Undertakings	Mortgages and loans	Cash and deposits	Other
EEA	25%	35%	11%	10%	7%	6%	5%
AT	33%	38%	7%	2%	5%	3%	13%
BE	(*)	(*)	(*)	(*)	(*)	(*)	(*)
DE	28%	43%	5%	10%	6%	2%	7%
ES	56%	23%	6%	0%	1%	12%	3%
FI	13%	43%	9%	13%	5%	9%	7%
FR	38%	37%	11%	4%	1%	5%	6%
GR	64%	27%	3%	0%	1%	3%	2%
IE	(*)	(*)	(*)	(*)	(*)	(*)	(*)
NO	13%	40%	23%	11%	10%	2%	1%
PT	45%	30%	11%	7%	0%	5%	2%
UK	18%	31%	13%	14%	9%	9%	5%

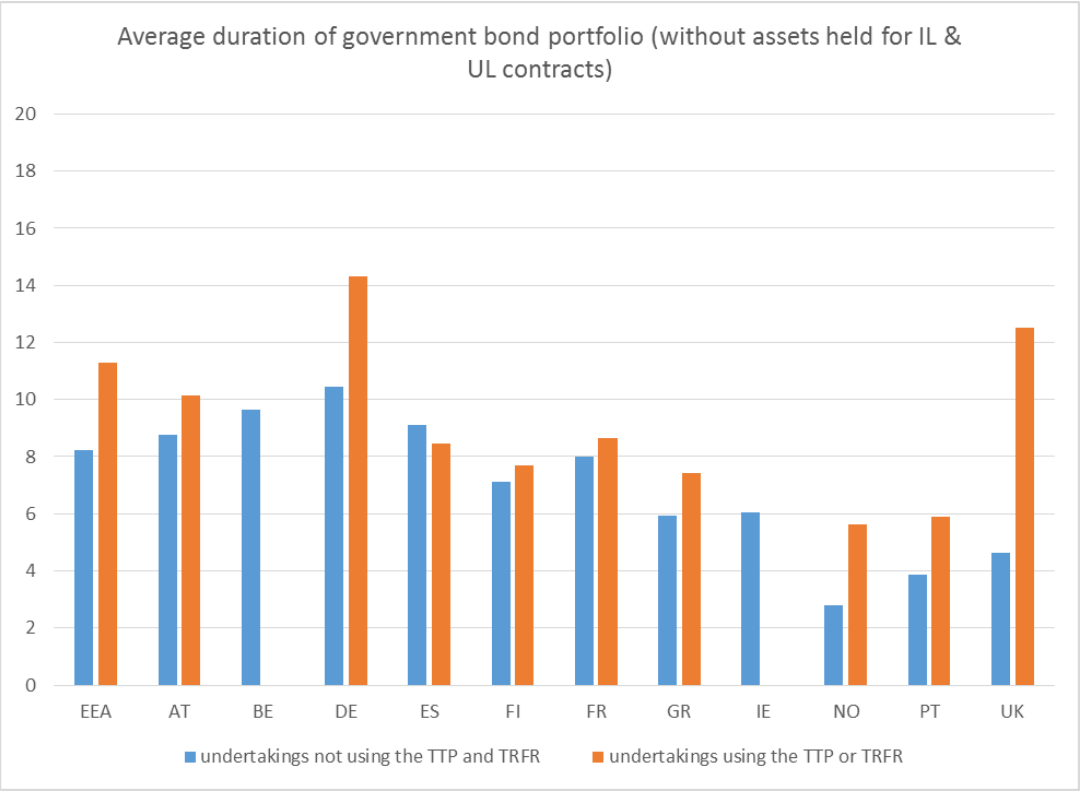
The following table shows the credit quality of government bonds. Please note that the data at EEA level for undertakings not using the TTP or TRFR includes data from countries where the TTP or TRFR is not used at all.

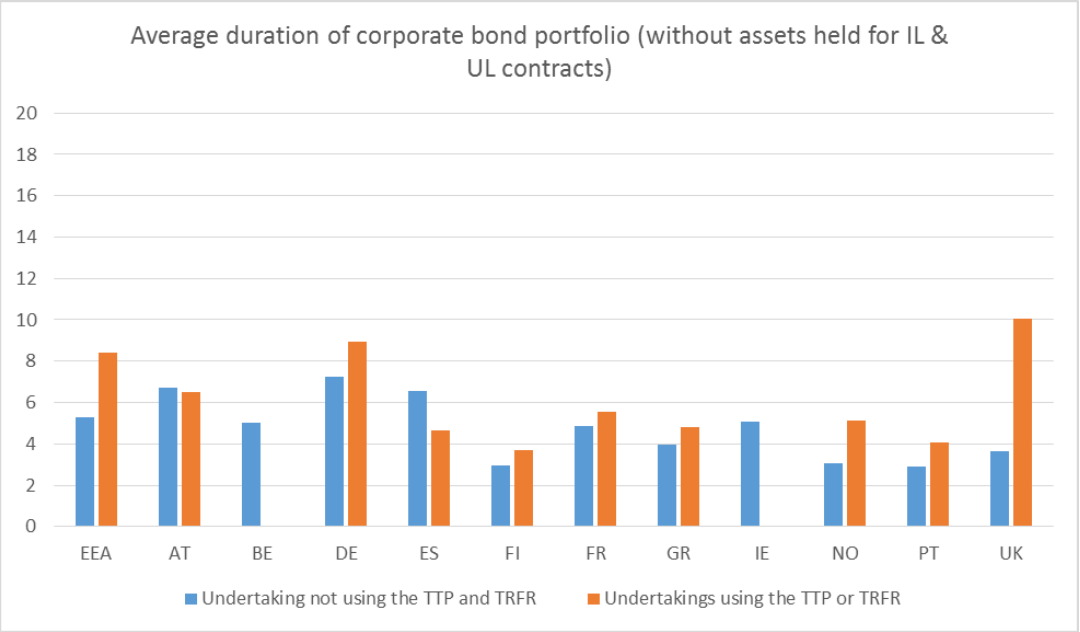
Credit quality of government bonds for undertakings not using the TTP or TRFR or using the TTP or TRFR, per country (without assets held for IL & UL contracts)						
Country	**Use of the measures**	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**No use of TTP and TRFR**	**18%**	**42%**	**6%**	**33%**	**1%**
	Use of the TTP or TRFR	**17%**	**55%**	**4%**	**23%**	**1%**
AT	No use of TTP and TRFR	20%	46%	23%	9%	1%
	Use of the TTP or TRFR	0%	59%	27%	13%	1%
BE	No use of TTP and TRFR	13%	62%	10%	14%	1%
	Use of the TTP or TRFR	(*)	(*)	(*)	(*)	(*)
DE	No use of TTP and TRFR	41%	40%	10%	8%	0%
	Use of the TTP or TRFR	37%	46%	8%	8%	1%
ES	No use of TTP and TRFR	3%	2%	1%	93%	1%
	Use of the TTP or TRFR	2%	2%	1%	95%	1%
FI	No use of TTP and TRFR	47%	46%	3%	5%	0%
	Use of the TTP or TRFR	32%	53%	3%	11%	1%
FR	No use of TTP and TRFR	8%	78%	2%	11%	0%
	Use of the TTP or TRFR	4%	69%	2%	24%	1%
GR	No use of TTP and TRFR	19%	17%	3%	11%	49%
	Use of the TTP or TRFR	5%	21%	6%	16%	51%
IE	No use of TTP and TRFR	33%	46%	14%	6%	0%
	Use of the TTP or TRFR	(*)	(*)	(*)	(*)	(*)
NO	No use of TTP and TRFR	60%	36%	2%	1%	1%
	Use of the TTP or TRFR	54%	34%	10%	1%	1%
PT	No use of TTP and TRFR	5%	10%	7%	58%	21%
	Use of the TTP or TRFR	4%	9%	2%	81%	3%
UK	No use of TTP and TRFR	25%	71%	3%	1%	1%
	Use of the TTP or TRFR	8%	89%	2%	1%	0%

The following table shows the credit quality of corporate bonds. Please note that the data at EEA level for undertakings not using the TTP or TRFR includes data from countries where the TTP or TRFR is not used at all.

Credit quality of corporate bonds for undertakings not using the TTP or TRFR or using the TTP or TRFR, per country (without assets held for IL & UL contracts)						
Country	**Use of the measures**	**CQS0**	**CQS1**	**CQS2**	**CQS3**	**CQS>3**
EEA	**No use of TTP and TRFR**	**20%**	**16%**	**32%**	**29%**	**3%**
	Use of the TTP or TRFR	**25%**	**17%**	**31%**	**25%**	**3%**
AT	No use of TTP and TRFR	23%	18%	35%	21%	2%
	Use of the TTP or TRFR	27%	14%	31%	23%	4%
BE	No use of TTP and TRFR	11%	14%	35%	38%	2%
	Use of the TTP or TRFR	(*)	(*)	(*)	(*)	(*)
DE	No use of TTP and TRFR	34%	20%	25%	20%	1%
	Use of the TTP or TRFR	44%	25%	18%	12%	1%
ES	No use of TTP and TRFR	3%	12%	33%	48%	4%
	Use of the TTP or TRFR	2%	9%	40%	45%	4%
FI	No use of TTP and TRFR	14%	11%	27%	42%	6%
	Use of the TTP or TRFR	18%	14%	29%	33%	5%
FR	No use of TTP and TRFR	10%	19%	40%	29%	3%
	Use of the TTP or TRFR	9%	14%	41%	33%	4%
GR	No use of TTP and TRFR	16%	16%	34%	27%	8%
	Use of the TTP or TRFR	1%	14%	32%	36%	17%
IE	No use of TTP and TRFR	13%	14%	40%	31%	2%
	Use of the TTP or TRFR	(*)	(*)	(*)	(*)	(*)
NO	No use of TTP and TRFR	48%	7%	32%	12%	1%
	Use of the TTP or TRFR	37%	10%	38%	15%	0%
PT	No use of TTP and TRFR	2%	12%	24%	56%	6%
	Use of the TTP or TRFR	1%	6%	37%	43%	12%
UK	No use of TTP and TRFR	8%	15%	46%	28%	3%
	Use of the TTP or TRFR	8%	10%	40%	37%	4%

The following graph shows the average duration of investments in government bonds and corporate bonds of undertakings using the TTP or TRFR and of undertakings not using the TTP and TRFR.





Impact on consumers and products

The following table sets out the share of gross written premiums of undertakings using the TTP compared to the total gross premiums written by all undertakings in that country. It also shows each line of business (columns 1 to 6), the total life insurance and life reinsurance business (column 7) and the total for non-life insurance and reinsurance business (column 8). The table is based on data reported by undertakings in the annual QRTs for 2017.

For instance in Austria, 12.9% of the total life insurance and life reinsurance premiums and 13.3% of premiums for index-linked and unit-linked business are written by undertakings applying the TTP.

Country	1. Health insurance	2. Insurance with profit participation	3. Index linked and unit linked insurance	4. Other life insurance	5. Health re-insurance	6. Life re-insurance	7. Total life insurance and re-insurance	8. Total non-life insurance and reinsurance
AT	0.3%	19.0%	13.3%	20.6%	0.0%	3.0%	12.9%	4.5%
BE	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
DE	10.4%	42.7%	38.7%	17.1%	0.1%	0.5%	25.9%	0.0%
ES	0.0%	32.2%	41.8%	32.1%	0.0%	1.5%	32.4%	11.6%
FI	100.0%	77.6%	54.5%	40.1%	0.0%	99.9%	57.2%	32.4%
FR	2.6%	5.8%	6.0%	7.4%	0.0%	24.9%	7.3%	3.9%
GR	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
LI	0.0%	1.9%	2.7%	0.0%	0.0%	0.0%	2.1%	0.0%
NO	37.2%	98.7%	80.7%	63.3%	0.0%	0.0%	86.2%	3.2%
PT	100.0%	69.3%	44.8%	90.7%	0.0%	31.5%	76.4%	77.9%
UK	54.2%	95.4%	31.8%	91.7%	57.4%	41.1%	45.0%	2.1%
EEA	**10.0%**	**20.1%**	**19.0%**	**45.0%**	**1.4%**	**21.6%**	**21.1%**	**3.3%**

(*) Data from this country is not disclosed for confidentiality reasons because the number of undertakings applying the measure is lower than 3.

III.6 Duration-based equity risk sub-module

The standard formula for the SCR includes an equity risk sub-module that captures the risk stemming from changes in the level of equity market prices. The equity risk sub-module is based on risk scenarios that envisage a fall in equity market prices of 39% or 49%, depending on the type of equity.

Instead of that equity risk sub-module, undertakings can use a duration-based equity risk sub-module that is, with regard to certain equity investments, based on a risk scenario that envisages a fall in equity market prices of 22%. The duration-based equity risk sub-module can only be applied by life insurance undertakings that provide certain occupational retirement provisions, or retirement benefits, and meet further requirements – in particular that the average duration of the undertaking's liabilities exceeds an average of 12 years and that the undertaking is able to hold equity investments at least for 12 years.

The possibility to apply the DBER is a Member State option of the Solvency II Directive (Article 304(1)). The application of the DBER by an insurance undertaking is subject to supervisory approval.

Only one undertaking in France is using the DBER as at 31 December 2017.

According to the information disclosed by the undertaking in its Solvency and Financial Condition Report, removing the DBER would reduce the SCR ratio by 20 points from a ratio of 159% with the DBER (but without TTP and VA) to a ratio of 139% without the DBER. Removing the measure would reduce the MCR ratio by 41 points from a ratio of 350% with the DBER (but without TTP and VA) to a ratio of 309% without the measure. However, it should be noted that the impact of removing the DBER in the SCR could be compensated if the undertaking used the transitional on equity risk.

As only one undertaking in France was using the DBER as at 31 December 2017, no impact on investments and consumers and products is shown for the DBER due to confidentiality reasons.

III.7 Symmetric adjustment to the equity risk charge

Recital 61 of the Solvency II Directive states that in order to mitigate undue potential pro-cyclical effects of the financial system and to avoid a situation in which insurance and reinsurance undertakings are unduly forced to raise additional capital or sell their investments as a result of unsustained adverse movements in financial markets, the market risk module of the standard formula for the SCR should include a symmetric adjustment mechanism with respect to changes in the level of equity prices.

The symmetric adjustment is expected to be positive (i.e. the capital requirement is higher) when markets have risen recently, and negative (i.e. the capital requirement is lower) when equity markets have dropped in the previous months.

Impact on the financial position of undertaking

For the 2018 report, there were no information requests to undertakings concerning the impact of the symmetric adjustment on their financial position. Indeed, given the low impact observed in the 2017 report[39], it was considered that such a request would not be proportionate.

Instead, the financial impact of the symmetric adjustment on the SCR was determined using QRT data. Note that the QRT data does not allow for a distinction between undertakings which apply the transitional measure on equity risk according to Article 308b(13) of the Solvency II Directive and undertakings which do not apply that measure.[40] Moreover, this estimation is also not restricted to undertakings exceeding a materiality threshold on equity risk.

In total, data from 1101 undertakings were retained in order to produce this estimation.

[39] As per year end 2016, the EIOPA LTG report for 2017 noted that at EEA level the average impact of removing the SA on the SCR for undertakings not applying the equity transitional amounts to 0.9%. Note that, at year end 2016, the SA was -1.44%, so setting the SA to zero would increase the stress on equity exposures applied to calculate the SCR.

[40] Such a distinction was made in the EIOPA LTG report for 2017

Since the SA at 31 Dec 2017 was 1.90%, setting the SA to zero would decrease the stress on equity exposures applied to calculate the SCR. At EEA level the average impact of removing the SA on the SCR is -1%.

III.8 Extension of the recovery period

Under Solvency II, insurance and reinsurance undertakings are required to hold eligible own funds that cover their SCR. When an undertaking is not covering its SCR, the national supervisory authority shall require it to take the necessary measures to achieve, within six months from the observation of non-compliance with the SCR, the re-establishment of the level of eligible own funds covering the SCR or the reduction of its risk profile to ensure compliance with the SCR. The supervisor may, if appropriate, extend that period by three months.

Article 138(4) of the Solvency II Directive states that supervisory authorities may, under certain circumstances, further extend the recovery period for the re-establishment of compliance with the SCR as set out in Article 138(2) of that Directive by a maximum period of 7 years.

This power applies in the event of exceptional adverse situations affecting insurance and reinsurance undertakings that represent a significant share of the market or of the affected lines of business. The condition for an exceptional adverse situation are one or more of the following:

- A sharp, steep and unforeseen fall in financial markets ,;
- A persistent low interest rate environment;
- A high-impact catastrophic event.

This extension of the recovery period can only be granted after EIOPA has declared the existence of an exceptional adverse situation. A necessary condition for the declaration is a request by a national supervisory authority. Article 288 of the Solvency II Delegated Regulation further states several factors and criteria that EIOPA shall take into account when assessing the existence of an exceptional adverse situation. Where appropriate, EIOPA could consult the European Systemic Risk Board (ESRB) before deciding on the existence of an exceptional adverse situation.

Once EIOPA has declared the existence of an exceptional adverse situation, the national supervisory authorities can decide on an extension of the period and determine its length for individual insurance and reinsurance undertakings. For that purpose, the supervisors shall take into account the factors and criteria set out in Article 289 of the Solvency II Delegated Regulation. To ensure a consistent approach in the extension of the recovery period, on 14 September 2015 EIOPA issued Guidelines on the extension of the recovery period in exceptional adverse situations. In particular the guidelines relate to the decision to grant an extension, the duration of the extension and the withdrawal and revocation of the extension.

During the extended recovery period, the undertakings affected are required to submit a progress report every three months to their NSA setting out the measures

taken and the progress made to meet the SCR. In case of no significant progress, the extension of the recovery period will be withdrawn.

To date EIOPA has not received a request to declare an exceptional adverse situation.

It should be noted that the transitional measure of Article 308b(14) of the Solvency II Directive ceased to apply by the end of 2017. According to that transitional provision, the recovery period for undertakings who complied with Solvency I capital requirements at the end of 2015 but did not comply with the SCR in the first year of application of Solvency II, could last until 31 December 2017.

The ESRB has recently developed an internal procedure related to its consultative role under Article 138 of the Solvency II Directive. In this internal procedure, the ESRB has foreseen the possibility of a request for consultation either from EIOPA or from national supervisory authorities[41].

The following table shows the number of undertakings breaching the SCR (taking into account all LTG measures and equity measures applied) on 31 December 2017 and their market share (national market share for undertakings in each country and EEA market share for all undertakings). For countries not listed in the table all undertakings meet the SCR.

Country	Undertakings breaching the SCR	Market share in non-life **gross written premiums**	**Market share in life technical provisions**
BU	1	5.86%	0.00%
CY	1	6.15%	0.00%
CZ	1	1.27%	0.00%
GR	1	2.89%	1.77%
IE	1	0.94%	0.00%
LU	6	1.83%	0.04%
NL	1	0.00%	0.00%
NO	1	1.17%	0.00%
PT	2	5.25%	0.34%
UK	10	0.32%	0.00%
Total EEA	**25**	**0.39%**	**0.01%**

The total number of undertakings breaching the SCR has decreased by19 during the last year – from 44 on 31 December 2016 to 25 on 31 December 2017. The total number of undertakings breaching the SCR can be split according to their type as follows: 20 non-life insurance undertakings, 2 life insurance undertakings, 1

[41] See page 39 ESRB Annual report 2017, https://www.esrb.europa.eu/pub/pdf/ar/2018/esrb.ar2017.en.pdf

undertaking pursuing both life and non-life insurance activity and 2 reinsurance undertakings.

IV. Thematic focus on risk management

1. Introduction

This section focusses on risk management aspects firms undertake in view of the specific requirements on the LTG measures and with respect to Articles 44 and 45 of the Directive. Such requirements include:

- the liquidity plan for undertakings applying the MA or the VA
- the assessment of the sensitivity of technical provisions regarding the assumptions underlying extrapolation, VA and MA
- the assessment of compliance with capital requirements with and without the measures and in the case of non-compliance, the potential measures to restore compliance
- analysis of LTG measures in the ORSA

The thematic focus intends to describe transversal analyses of NSAs on the approaches undertakings use to comply with the legal provisions. For that purpose, a detailed questionnaire was provided to NSAs to capture the information that undertakings have provided in the regular supervisory reporting.

It will also explore how insurers build-in the results of the assessments on asset-liability management (ALM), according to Article 44(2a) of the Directive, into their overall ALM and risk management system. For that purpose, NSAs were invited to share a description of cases where they have observed specific practices that are considered helpful for illustrating the interlink of the LTG measures with the risk management of undertakings. To support the process, NSAs were encouraged to, on a voluntary basis, contact undertakings and perform interviews with those undertakings on risk management topics. The selection of undertakings was decided by the NSAs concerned.

Section 2 outlines the results from the questionnaire that was sent to NSAs on the information that undertakings have provided in the Regular Supervisory Report. Section 3 then outlines the feedback received from NSAs on the case studies performed with respect to the interlink of LTG measures and ALM.

2. Results from the questionnaire to NSAs

EIOPA provided a detailed questionnaire to NSAs on their experience with respect to the information on LTG measures in the supervisory reporting. For the purpose of this questionnaire, NSAs were not expected to have performed an analysis of information reported by all undertakings but the responses were derived on the basis of a representative sample. The sample included not only large, but also small and medium-sized undertakings. Considering the information gathered to be

representative for the particular markets, this information was used to form a view on the situation of national markets as well as across Europe

The following table outlines the sample size considered in the different markets:

MEMBER STATE	SAMPLE SIZE UNDERTAKINGS	TTP SAMPLE SIZE	TRFR SAMPLE SIZE	VA SAMPLE SIZE	MA SAMPLE SIZE
EEA	**365**	**102**	**6**	**247**	**18**
AT	*0*				
BE	*13*	*1*	*0*	*13*	*0*
BG	*5*	*0*	*0*	*3*	*0*
CZ	*8*	*0*	*0*	*8*	*0*
DE	*103*	*55*	*1*	*77*	*0*
DK	*8*	*0*	*0*	*8*	*0*
EE	*0*				
ES	*5*	*2*	*0*	*4*	*3*
FI	*10*	*5*	*0*	*7*	*0*
FR	*24*	*8*	*1*	*21*	*0*
GR	*19*	*1*	*3*	*18*	*0*
HR	*19*	*0*	*0*	*0*	*0*
HU	*25*	*0*	*0*	*7*	*0*
IE	*7*	*0*	*1*	*6*	*0*
IS	*4*	*0*	*0*	*0*	*0*
IT	*20*	*0*	*0*	*20*	*0*
LI	*3*	*1*	*0*	*3*	*0*
LT	*0*				
LU	*10*	*0*	*0*	*10*	*0*
LV	*0*				
MT	*0*				
NL	*18*	*0*	*0*	*18*	*0*
NO	*4*	*4*	*0*	*4*	*0*
PT	*4*	*3*	*0*	*1*	*0*
RO	*1*	*0*	*0*	*1*	*0*
SE	*8*	*0*	*0*	*1*	*0*
SI	*15*	*0*	*0*	*0*	*0*
SK	*8*	*0*	*0*	*2*	*0*

MEMBER STATE	SAMPLE SIZE UNDERTAKINGS	TTP SAMPLE SIZE	TRFR SAMPLE SIZE	VA SAMPLE SIZE	MA SAMPLE SIZE
UK	*24*	*22*	*0*	*14*	*15*

2.1. Risk management requirements: Liquidity plan (Art. 44.2 of the Directive)

Where the VA or MA are applied, undertakings have to set up a liquidity plan according to Art. 44 2. Of the Directive. Guideline 26 of the guidelines on the system of governance further outline what information regarding liquidity risk is to be included in undertaking's risk management policy.

With respect to undertakings' liquidity plans, 10 NSAs reported already having gathered supervisory experience on undertakings' liquidity plans. The projection horizon of the liquidity plans varies significantly, e.g. depending on the insurance business considered. Some plans only considered a single year whereas it was observed that liquidity plans can be very long-term and include the full run-off period of the liabilities. Most NSAs mentioned that the typical granularity of the liquidity plan was found to be years whereas more detailed planning for shorter periods was also observed (e.g. in months or quarters). For MA users in ES, it is required to provide a liquidity plan based on at least monthly cash flows.

In most cases, undertakings considered the whole business jointly in the liquidity planning whereas some cases were identified where the planning was performed on a more granular level, e.g. for distinct homogeneous sub-portfolios. The level of mismatch in timing and amount of cashflows is reported to be typically determined by directly comparing asset and liability cashflows. It was also observed that an accumulation of identified shortfalls or surpluses was analysed. Some undertakings also define specific indicators (e.g. ratio between the maximum cumulated shortfall observed in the projection horizon and the total amount of technical provisions).

Most NSAs that reported to have gathered experience on liquidity plans also observed undertakings analysed adverse business conditions as well as the risk of a forced sale of assets. Changes in interest rates, increased market spreads, downgrades of particular assets, increase in expected claims payments, increase in lapse rates, catastrophe risk and counterparty failure as well as inflation or currency risk are mentioned as adverse business conditions. Most NSAs observe that the liquidity planning does not reveal any material mismatches between cash in and out-flows. However, where these cases are identified, undertakings increase their liquid assets or consider alternative means depending on the causes of the problems identified.

2.2. Risk management requirements: ALM management (Art. 44.2a of the Directive)

According to Art. 44 2a. undertakings are required to perform sensitivity analysis with respect to the assumptions underlying the extrapolation, VA and MA. According to Art. 35 of the SII Directive, undertakings have to report on these analyses annually as part of their regular supervisory reporting. The following results are based on the information that undertakings have reported:

The following table outlines the share of undertakings in the sample that provided information on the sensitivity analysis.

Measure	*Share*
Extrapolation	*41%*
VA	*51%*
MA	*100%*

Even in cases where the sensitivity analysis was mentioned, not all undertakings gave more detail on the assumptions underlying the measures were considered in the sensitivity analysis. The following table illustrates the share of undertakings in the sample that further outlined the assumptions considered.

Measure/Type of undertaking	*Life and composite*	*Other*
Extrapolation	*36%*	*19%*
VA	*30%*	*23%*
MA	*89%*	*-*

How many undertakings explicitly quantified the impact of the sensitivities on the value of technical provisions and eligible own funds was also assessed. The following table outlines the share of undertakings that did so:

Measure	*Share*
Extrapolation	*26%*
VA	*33%*
MA	*94%*

The following paragraphs further outline the assumptions considered by undertakings differentiating by measure.

Extrapolation

Those undertakings that gave further detail on the assumptions **underlying the extrapolation,** typically considered the sensitivity with respect to the parameterization of the extrapolation mechanism including the UFR, LLP and speed of convergence (mentioned by 15, 13 and 8 NSAs). The extrapolation mechanism (Smith-Wilson) itself was also mentioned by 7 NSAs and further sensitivities with respect to a variation of the interest rate term structure (interest rate up/down, low yield scenario etc.) were observed.

The following table shows the percentage share of undertakings who considered the individual assumptions out of all the undertakings who provided further detail on the assumptions underlying the extrapolation:

	Share of undertakings
Extrapolation mechanism (Smith-Wilson)	***10%***
Parametrization of extrapolation mechanism -LLP	***27%***
Parametrization of extrapolation mechanism -UFR	***51%***
Parametrization of extrapolation mechanism -Speed of convergence	***19%***
Others	***11%***

NSAs were also asked to give feedback on which of the assumptions were reported to have a material impact on the size of the technical provisions or own funds. The picture was mixed here. Most NSAs did not observe undertakings giving further details on the materiality of assumptions underlying the extrapolation. Some NSAs observed that the assumptions considered did not have a material impact, while other NSAs observed that material impacts reported were typically for the LLP and level of the UFR but other assumptions were also considered.

VA

Most NSAs did not observed undertakings giving further details on the assumptions underlying the VA. The undertakings that gave further detail typically considered the composition of the representative portfolio (mentioned by 7 NSAs). A number of NSAs also observed that the application ratio of 65%, the calculation of the fundamental spread and an undertaking specific VA were considered by undertakings for the sensitivity analysis (in 3 or 4 cases). Further sensitivities were also calculated with respect to a variation in spreads (corporate, sovereign) or a variation in the duration of bonds in the representative portfolio.

The following table shows the percentage share of undertakings who considered the individual assumptions out of all the undertakings who provided further detail on the assumptions underlying the VA:

	Share of undertakings
Composition of representative portfolio	***28%***
65% factor	***23%***
Calculation of fundamental spread	***32%***
Undertaking specific volatility adjustment (this is a special case of the first assumption "composition of representative portfolio")	***5%***
Others	***14%***

NSAs were also asked to give a feedback on which assumptions were reported to have a material impact on the size of the technical provisions or own funds. The majority of

NSAs observed that the assumptions considered did not have a material impact because of the currently low level of the VA. However, three NSAs observed that material impacts were reported. In these cases typically a variation in credit spreads as well as the undertaking specific VA were reported to have a material impact on TP and own funds.

NSAs were also asked on whether undertakings using internal models and applying a dynamic VA reported particular sensitivity analysis regarding the assumptions underlying their modelling of the dynamic VA in their internal models. No NSA observed undertakings reporting on that issue.

MA

In those markets where the MA is applied, the calculation of the fundamental spread, the composition of the assigned portfolio of assets, the credit rating of assets, the percentage to be applied to the long term average spread and further assumptions were reported by those NSAs to be considered by undertakings in their sensitivity calculations. Further assumptions that were considered in the sensitivity calculations were identified to be a variation in the risk of default or downgrade, or a drop in lapse rates.

The following table shows the percentage share of undertakings who considered the individual assumptions out of all the undertakings who provided further detail on the assumptions underlying the MA:

	Share of undertakings
Calculation of fundamental spread (FS)	***78%***
Changes in the composition of the assigned portfolio of assets	***61%***
Credit rating of assets	***78%***
% to be applied to the LTAS (floor of the FS)	***22%***
Others	***39%***

Again, NSAs were asked to give feedback on which of the assumptions were reported to have a material impact on the size of the technical provisions or own funds. The picture varies. In ES, undertakings did not report any material impact of a variation in assumptions whereas the majority of undertakings in the UK reported a material impact of the a variation in the calculation of the fundamental spread and changes to the composition of the assigned portfolio of assets.

Impact of forced sale of assets

Where the VA or MA is applied, undertakings may also consider the effect of a forced sale of assets in their ALM management.

With respect to the VA, 12% of undertakings reported on the possible effect of a forced sale of assets on their own funds. Only 5 NSAs observed that undertakings reported on that particular scenario. Where undertakings provided further detail on how the scenarios were applied it was reported that a variety of scenarios were considered including a pandemic or liquidity crisis, a situation of a mass lapse or an economic downturn. A number of NSAs mentioned a particular focus on liquidity analysis addressing the proportion of investment assets which can be sold within a short timeframe without losses. The majority of undertakings providing further details did not identify any material impact on own funds from the scenarios considered. However, in individual cases a decrease in own funds was observed.

With respect to the MA, in ES, all undertakings reported on these considerations to their NSA whereas in the UK, 87% of undertakings did so. The analysis, however, varied but generally considered the situation of selling or downgrading a portion of the portfolio. Where a change in the composition of the assigned portfolio of assets was considered, undertakings typically considered a variation in credit quality. In ES, no material impact was reported due to the consideration of the effect of a forced sale of assets whereas in the UK a material impact on own funds was observed to be reported.

Further details on impact of LTG measures on ALM

EIOPA was also interested how the analyses performed are interlinked with the ALM in practice so therefore also assessed whether undertakings reported on that in the supervisory reporting. Although, this is only the case for around 5% of the undertakings, the picture varies. In some countries, undertakings specifically addressed ALM in the context of LTG measures however the majority of NSAs did not, or only in a small number of cases, identify such contents in the supervisory reporting.

In the cases observed, NSAs gave feedback on the implications/consequences that undertakings reported as a result of the assessments in their ALM management. Few examples were mentioned but one case that was mentioned was where the sensitivity analysis on VA displayed the impact of a local sovereign spread crisis triggering the sale of assets or triggering an intensified monitoring process.

Finally, NSAs were asked whether they considered the reporting of undertakings on their assessments regarding asset-liability management in the supervisory reporting as appropriate. Half of the NSAs have not formed a view on this issue yet. However, where NSAs have formed a view already, they see room for improvement. No NSA considered the reporting to be highly satisfactory. 9 NSAs reported to be satisfied but explained that further improvements could be made. 6 NSAs stated that they are not satisfied with the reporting on this particular matter yet. In particular, a number of insufficiencies were mentioned:

- It is not yet sufficiently clear what is addressed with "underlying assumptions" as undertakings did sensitivities on the interest rate or spread level but not on the key parameters of the interest rate term structure or on the building blocks of the VA.

- Information is rather general, more detailed and quantitative information would be useful.
- Where information is provided, judgement on the relevance of assumptions or the sensitivities calculated is often missing.
- No details are reported on how ALM management is performed.

2.3. Risk management requirements: Analysis of measures (Art. 44.2a of the Directive)

Where the VA or MA are applied, undertakings are required to analyse whether a reduction of the MA or VA to zero would result in non-compliance with the SCR. This assumes that the TTP or TRFR – if applied by the undertaking – still applies.

The following table outlines the number of undertakings that would result in non-compliance with the SCR in case the MA or VA are reduced to zero:

Measure	***Number of undertakings***
VA	***3***
MA	***13***

In the case where the reduction of the MA or VA results in non-compliance with the SCR, undertakings are required to provide an analysis of the measures they could apply in such situation to re-establish the level of eligible own funds covering the SCR, or to reduce the risk profile to restore compliance. However, in the cases identified only 2 undertakings delivered that analysis of measures with respect to the VA and 3 undertakings with respect to the MA. Those 5 undertakings delivered an analysis of measures which included:

- A retention of profits or earnings, no payment of dividends
- Raising of new capital and
- Reduction of future discretionary benefits

Regarding the firms that did not provide an analysis of the measures, it should be noted that:

- The undertaking applying the VA but not providing an analysis of measures also does not comply with SCR when the application of the VA is taken into account
- Most of the MA undertakings stated that the actions they would take would depend on the circumstances as to why MA had been removed as this context would affect the specific measures they would implement

2.4. Risk management requirements: written policy on risk management (Art. 44.2a of the Directive)

Another issue considered in the questionnaire to NSAs was undertakings' written policy on risk management which shall comprise a policy on the criteria for the application of the VA.

NSAs' experience on this point is still limited. However, where NSAs have already gathered supervisory experience on undertakings' written policy on risk management, they observed the following contents of the policy on the criteria for the application of the VA:

- Undertakings who reported application of the VA with the intention to mitigate temporary movements in market spreads that are not caused by downgrade or default risk. In these cases, they reported that application of the VA reduces the volatility of the solvency position and they intend to only apply the VA in case they are able to earn the VA.
- Undertakings mentioned that they compare the VA with an undertaking specific VA reflecting their own asset mix and decide on this basis whether to apply the VA.
- A number of undertakings outlined that to apply the VA depends on a certain pre-defined risk appetite or liquidity risk indicator.
- Other undertakings reported to only apply the VA where it has sufficient liquid assets to meet its obligations, including the consideration of stressed conditions.
- The duration of the insurance liabilities is considered relevant for the application of the VA by other undertakings. The VA is only used where the duration exceeds a predefined limit or where the duration of the insurance liabilities is similar to the duration of the assets.
- It was also observed that undertakings included in their written policy, measures that are intended to be taken in case of non-compliance with the SCR.

From what was observed so far, undertakings typically did not address how they apply the VA in the case where VA turns out to be negative in their written policy on the criteria for the application of the VA.

Similarly, based on current experience, NSAs' feedback indicates that undertakings do not typically reflect explicitly on the use of the LTG measures in their written policies on investment management.

2.5. Risk management requirements: ORSA (Art. 45.2a of the Directive)

The questionnaire furthermore addressed the consideration of the LTG measures in the ORSA. The following table shows the share of undertakings giving further detail on how the measures affect the assessments of compliance with capital requirement.

Measure	*Share*
TRFR	*50%*
TTP	*78%*
VA	*68%*
MA	*78%*

Where further details were provided, information on the value of technical provisions, own funds and SCR/MCR with and without the LTG measure were reported. On top of this, a consideration on how the solvency position and solvency ratio develop over the next couple of years was also mentioned. Particular focus is put on whether the undertaking is always able to cover the SCR/MCR. In this respect, the impact of applying the LTG measures is also analysed. Due to the small size of the VA as at year end 2017, the VA is often reported to have only a small impact on the assessment.

NSAs observed that undertakings considered how the capital requirements would develop in the future without the application of the measures. For the TRFR, TTP and MA, NSAs observed that undertakings always, or at least in most cases, considered the development of the capital requirements. The picture was, however, more heterogeneous for the VA. Half of the NSAs observed undertakings to report on this issue in most cases or always, but the other half of the NSAs observed this less.

NSAs were also asked on whether undertakings reported on any implications or consequences as a result of the assessments. A majority of NSAs gave the feedback that the undertakings did not report on any explicit implications or consequences due to the application of the measures or that they did not yet have sufficient insight.

With respect to the VA, a number of undertakings noted that they are not reliant on the application of the VA to ensure compliance with the SCR – acknowledging that the VA has only limited impact (considering the small size of the VA as at year end 2017). No specific consequences due to the application of the VA were observed to be reported in the ORSA.

The relevance of the MA for the purpose of ensuring compliance with the SCR was acknowledged by a number of undertakings.

With respect to the transitional measures, it was observed that undertakings compare their expected solvency position with internal target levels to identify the need to further strengthen the solvency position. Undertakings under a phasing in plan also outlined the need to apply specific measures to improve the solvency position (as also reflected in the phasing in plans). Some undertakings also explicitly reported on the need to apply the transitional measures considering the impact of stressed situations on the solvency position.

3. Summary on case studies

As outlined above, the thematic focus on risk management also intends to explore how insurers build-in the results of the assessments on ALM related to the LTG measures into their overall ALM and risk management system.

3.1. Description of the sample provided

Specific insights from the interviews were reported by 6 NSAs.

The following table outlines the number of undertakings interviewed in these countries:

Country	Number of undertakings interviewed – Life/Composite	Number of undertakings interviewed – Others
BG	3	0
DE	6	0
GR	2	1
LI	2	0
SK	5	0
NL	5[42]	0[42]

Another NSA (UK) provided insights based on their findings from on-site reviews of liquidity risk, reviews of MA applications and findings from supervisory reviews on ALM.

3.2. Summary of findings

The NSAs that participated in this exercise reported the following findings:

3.2.1. Interlink between the use of the VA or MA and the liquidity plan

With respect to the VA, the NSAs reported that they found that the VA does not have a significant impact on the liquidity planning of the insurers. One NSA reported that undertakings mentioned that they already had liquidity plans and liquidity policies in place before the introduction of Solvency II and/or the application of the VA.

The MA is applied in one of the countries where NSAs carried out risk management case studies. This NSA reported that the MA does have an impact on the liquidity planning of the insurers that apply this measure. These undertakings need to monitor the MA portfolio for the cash flow matching requirement and have short term liquidity plans that reflect the requirements to manage the assets of the matching portfolio separately, notwithstanding that there is no legal separation.

Three NSAs (DE, NL and UK) provided more detailed answers on the interlink between the use of the VA or MA and the liquidity plan. These answers are summarised below.

3.2.1.1. Influence of the VA or MA on the planning horizon or on the granularity of the liquidity plan

[42] Next to 5 interviews with the heads of risk management of five life undertakings the NSA in the Netherlands also discussed the questions during a regular stakeholder meeting in which representatives from the national insurance association and several life and non-life undertakings were present.

As to the MA, the NSA concerned noted that the MA is a long-term measure, whereas liquidity plans are commonly focused on short-term liquidity risk. Long-term liquidity plans, as required by Art.44(2) and included in MA applications, generally consider the overall ALM position in more detail at shorter durations, and coarser steps at longer duration. The MA requires firms to have matched assets and liabilities, and undertakings using the MA have implemented a variety of tests to assess the adequacy of the matching[43]. The MA caculations (see Art.53 of Commission Delegated Regulation 2015/35) additionally penalises 'over-matching' (having additional assets in excess of expected liability cash flows at any future time) which generally results in closely matched portfolios as discussed elsewhere in the report. Where cash flows arising from assets and liabilities are in balance, liquidity risk is reduced; in particular, since lapse and mortality risk are absent or immaterial because of the requirements to apply the MA. Any remaining potential liquidity problems can only manifest as short-term mismatches rather than major imbalances. The general approach to mitigating these potential short-term imbalances is for undertakings to maintain a short-term liquidity buffer, sized to meet shock requirements, that will absorb mismatches or defaults to a certain level.

As to the VA, the NSA concerned (DE) noted that undertakings in their market do not typically use one single liquidity plan, but several liquidity plans in parallel with varying time horizons and granularity. These plans are tailored to specific purposes. Usually for steering the asset allocation in the short term, a liquidity plan with a short time horizon is used. This short-term plan would typically be rather granular (i.e. on at least a monthly basis). For planning purposes, less granular liquidity plans with a medium planning horizon (between 5 and 10 years) are used. In addition, some undertakings use long-term liquidity plans to assess the long-term viability of their business. All undertakings explained that the use of the VA does not impact the choice of the planning horizon or the granularity of the liquidity plan.

The other NSA (NL) reported that undertakings have short term liquidity plans and policies in place to monitor and manage their liquidity risk. One undertaking applying the VA in this jurisdiction considered a much longer horizon with a projection of their cash in- and outflows. None of the undertakings considered the application of the VA to be of any influence on the granularity or planning horizon of their liquidity plan.

3.2.1.2. Influence of the VA or MA on the situations considered in the liquidity plan

For the MA, the NSA concerned noted that the complexity of the MA requiring segregation of the MA portfolio from other assets is managed within the scope of liquidity plans. Undertakings check to ensure that any stressed liquidity requirements can be met from the portfolio on demand[44]. The location of rates swaps is key for this.

[43] See e.g. as per the tests publicised by the Bank of England in SS7/18, https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/supervisory-statement/2018/ss718.pdf

[44] Note that there is no legal segregation of the matching adjustment portfolio so this monitoring is to demonstrate compliance with the MA rules.

As to the VA, one NSA noted that in their market, the liquidity plan would typically be used to check the viability of a certain strategic asset allocation (SAA) given the expected business development. The scenarios considered in the liquidity planning include scenarios with varying interest rates and spread movements. These scenarios would be used to assess whether there is sufficient liquidity to ensure that expected outgoing insurance cash flows can be met, even under stressed conditions. The choice of these scenarios would not be driven by the VA, but rather by real-world expectations on the future development of financial markets.

The other NSA noted that in their market, the liquidity plan is typically used to manage and monitor liquidity risk: are sufficient and sufficiently liquid assets available to cover margin requirements on derivatives, sever mortality shocks as well as mass lapses over different short-term horizons. As such, the application of the VA does not affect the situations considered in the liquidity plan.

3.2.1.3. Influence of the VA or MA on the assumptions of the liquidity plan

With regard to the MA, the NSA concerned noted that an underlying assumption in plans is the continuing liquidity of the Gilts market. At the same time, many undertakings assume derivatives market lockout for short periods, typically 7 days. This market lockout means an inability to trade rates swaps and foreign exchange (FX) forwards rather than Gilts. These assumptions are relevant to the use of the MA since a liquidity stress in the financial markets can lead to a situation where the insurers needs to rebalance their MA asset portfolios to restore compliance with the legal requirements on the use of the MA. The NSA noted that the duration to rebalance is very long compared to the typical time scale over which liquidity stresses occur.

With regard to the VA, the NSA concerned noted that the undertakings in their market saw the VA as an integral part of the risk-free rates used to discount technical provisions. This means that for the projection of cash flows from the insurance liabilities, as well as for the projection of asset returns that flow into discretionary insurance benefits, the VA is "factored in". The other NSA understood from its undertakings that the VA itself does not affect the assumptions of the liquidity plan. Both NSAs concerned noted that the VA typically does not, however, impact other assumptions that are relevant in the liquidity planning. In particular, the VA typically has no direct impact on the choice of the strategic asset allocation.

3.2.1.4. Influence of the use of the VA or MA on the conclusions taken from the liquidity plan

One of the NSAs noted that some of the undertakings in its market would conclude that if sufficiently liquid assets are available to cover the liquidity stresses in the liquidity plans, and no illiquid assets have to be sold, the application of the VA would be justified as it could hold on to these illiquid assets in times of stress. Most of the undertakings, however, did not draw any conclusions from its liquidity plan with respect the VA.

3.2.2. Interlink between the use of the VA or MA and design of extrapolation and ALM

Overall, several NSAs noted that the impact of the VA in their market, in the current financial markets environment, is very small, so that it does not affect undertakings' business planning and ALM. Another NSA noted that, despite this small value and impact of the VA, it does affect the ALM of its undertakings. Another NSA noted that, in its market, major parts of the portfolios are unit-linked business, where classical ALM is not performed. One NSA also noted that the current Solvency II extrapolation affects the ALM of its undertakings.

3.2.2.1. Choice of sensitivities and assumptions with respect to the VA, MA or extrapolation

Regarding the MA, the NSA concerned noted that, when making MA applications, undertakings are requested to state key sensitivities. As portfolios are generally well matched (in cash-flow terms), the key sensitivities are to non cash-flow parameters such as credit ratings and the mapping of these to credit quality steps (CQS). Undertakings have generally adopted three matching adjustment cash flow tests set out by the NSA. These consider timings of cash flows, interest rates, FX and inflation risks.[45] Some undertakings may have elected to put in place additional tests. Mortality sensitivities are also considered in order to satisfy the relevant mortality requirements for MA.

For the extrapolation, several NSAs noted that undertakings considered sensitivities with respect to the choice of the ultimate forward rate (UFR) and with respect to the choice of the last liquid point (LLP). One NSA reported that in its market, undertakings use own economic term structures that rely to a larger extent on market interest rates, i.e. last liquid point of 30 or 50 years. This has flat or smoother extrapolations and without a VA or a VA different from the Solvency II VA. These economic term structures are well below the Solvency II term structures and imply a higher valuation of their technical provisions which would better reflect the transfer values of the liabilities.

With regards to the VA, several NSAs pointed out that undertakings assess the impact of a reduction of the VA to zero, as is required by the regulation. One NSA noted that in addition to this, most undertakings in their market also test the sensitivity of the level of the VA on their solvency position (i.e. test one or several different levels of the VA). Several NSAs noted that the effect of the VA on own funds is relatively small under current market conditions.

3.2.2.2. Reflection of the findings of the calculated sensitivities in undertakings' ALM

For the MA, the NSA concerned noted that the information from undertakings concerning the requirements in Art. 44 (2a)(b) of the Solvency II Directive has been

[45] See PRA supervisory statement SS7/18, https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/supervisory-statement/2018/ss718.pdf.

limited. Although the NSA has not carried out a thematic review of this information (which features in undertakings' ORSAs/SFCRs), there is relevant work being undertaken for firms that model changes to MA in internal models, where sensitivities to the MA assumptions are assessed quantitatively. The NSA further noted that as MA portfolios are well matched, the particular ALM risks relate to market risks and not credit risks (where it is broadly assumed that all credit risks are captured in the rating and the valuation). These are covered in the matching tests that the NSA has publicised, although a number of undertakings have developed other tests for themselves.

With regard to the VA, NSAs noted that the findings of sensitivities of the VA or extrapolation have no significant effect on the undertakings' ALM. One NSA noted that these findings would not change the economic situation. In a similar vein, one NSA noted that sensitivities are relevant as a regulatory risk for reporting to the management board but do not lead to the identification of a direct economic effect.

One NSA noted that undertakings in their market, within their ALM, typically seek to maximize a certain target function or ratio for a given strategic asset allocation (SAA), given a number of restrictions (such as regulatory and other legal requirements). The NSA pointed out that in their market, the statutory balance sheet plays a central role for the strategy of the undertaking since it is within the statutory balance sheet where profits or losses attributable to shareholders, as well as profits which feed into discretionary benefits to policyholders, are determined. Profits and losses in the statutory balance sheet are also the main "driver" for tax payments. Therefore, target functions or ratios set within the ALM are typically based on expected profits resulting in the P&L of the local statutory balance sheet. Since the statutory balance sheet uses book values instead of market values, the interlink between the target values and the Solvency II ratios is typically not very strong. The sensitivities calculated with respect to the VA or the extrapolation, therefore, typically only have a limited and more indirect influence on the ALM in that they lead to different levels of regulatory constraints.

The NSA where undertakings in its market use an own economic term structure to have a separate valuation of their technical provisions noted that these undertakings will initiate measures when the SCR ratio, based on this own economic term structure, falls below specific thresholds. On this basis undertakings also take account of this SCR ratio when deciding on dividend payments. For these undertakings, the Solvency II SCR ratio is still important for their ALM decisions; their own economic solvency adds some boundaries to the ALM issues at hand.

3.2.2.3. Influence of the use of the VA, MA or the design of the extrapolation on undertaking's ALM

For the MA, the NSA concerned noted that, in order meet MA requirements, undertakings are required to demonstrate that they are well matched. Therefore, the use of the MA has had a positive effect on ALM (in cash flow terms), although in a historical context the annuity writers in this market have for many years already operated under a close matching approach.

Regarding the VA or extrapolation, NSAs stated that the influence of these measures on undertakings' ALM is not significant.

One NSA explained that in the interviews, undertakings pointed out that in a financial environment where the VA is rather small, the influence of the VA in Solvency II projections is likewise more limited. Thus, undertakings considered the VA to not materially impact ALM. With regards to the extrapolation, the undertakings in this market explained that changing parameters in the extrapolation of the risk-free curve, such as the choice of the last liquid point (LLP), can have a huge effect on the solvency position of the undertaking. Within the ALM, most undertakings explained that they would take into account the expected decrease of the level of the UFR over time, given the new UFR methodology implemented by EIOPA. As to the choice of the LLP, the ALM is typically based on the current regulatory framework. Overall, these undertakings stated that there is not a direct influence of the extrapolation, or the VA, on the ALM.

Another NSA pointed out that the application of the VA by its undertakings make spread risk exposed assets relatively more attractive as the VA dampens the own fund volatility due to these investments. In their SAA, some of the undertakings model the Solvency II VA, while others adjust, i.e. decrease, the volatility of credit spread assets.

In this jurisdiction undertakings also take account of the so-called 'UFR and VA' drag; the phenomenon that undertakings with liabilities beyond the last liquid point will experience decreasing own funds from year to year if they do not generate sufficient returns above market risk-free rates. On top of that, one undertaking also takes account of such drag due to investments that have yields below the swap rates used as input for the Solvency II basic interest rate term structure. This is the case for several government bonds at the moment.

3.2.2.4. Incentives from the use of the VA, MA or the design of the extrapolation to move to riskier ALM positions

With regard to the MA, the NSA concerned noted that it has not identified a move to riskier ALM positions. It explained that the MA matching requirements promote undertakings to monitor ALM and ensure asset and liability cash flows are closely matched. Where undertakings have moved to higher spread assets, they have been careful to do so only where the credit rating indicates a lower risk investment. The NSA noted that the use of internal ratings has been subject to supervisory review and scrutiny, both in terms of MA and in the allowance for MA in internal models.

With regard to the VA and the extrapolation, the NSAs noted they did not observe incentives to move to riskier asset positions (in case of the VA) or to increase the duration mismatch (in case of extrapolation). One other NSA noted that its undertakings do see incentives to move towards the VA reference portfolio, which is riskier for them. This would result in less own fund volatility. However in their ALM and risk management, those undertakings have safeguards in place to prevent changes towards less creditworthy and riskier investments only for the benefit of a

reduction of own fund volatility (although the undertakings acknowledge the incentives they do not steer on those).

One NSA noted that, in their market, many undertakings in the sample have very long-term insurance guarantees, which they seek to match with long-term assets to limit a duration mismatch which would expose the insurers' balance sheet to fluctuations in the level of risk-free rates. At the same time, the insurer needs to ensure sufficient gains from its investments for the policyholders (which benefit from discretionary participations) and, where applicable, for shareholders. This means that undertakings invest in long-term assets which carry a certain amount of spread, with the assumption that this spread (without the portion of the spread attributable to default risks) can be earned since the insurer is only exposed to a limited risk of forced sales. Although the use of the VA may facilitate such an approach, the ALM position of the undertaking would not be fundamentally different without the use of a VA. The use of the VA therefore does not create additional incentives to move to riskier ALM positions. The undertakings in this market explained that the same applies to the design of the extrapolation.

With respect to the design of the extrapolation, some undertakings pointed out that from a risk management/ALM perspective, they would ideally fully match the cash flows of their liabilities. However this results in own funds and Solvency II SCR ratio volatility[46] so these undertakings match the cash flows of their liabilities to a lesser extent in order to reduce the Solvency II SCR ratio volatility. Some of the undertakings stated that they would perhaps accept this volatility in the SCR ratio if they had a higher SCR ratio as at higher SCR ratio they would increase the extent of cash flow matching.

3.2.2.5. Influence of any deviation between undertakings' individual asset portfolio and the EIOPA reference portfolio for calculating the VA on undertakings' ALM

One NSA noted that undertakings in their sample that use the VA do not observe any deviations from the EIOPA reference portfolios.

One NSA noted that most undertakings in the sample do observe "their" individual VA, i.e. the VA that would result from the undertaking's specific asset mix. However, all undertakings explained that deviations of this "individual VA" from the EIOPA VA are not a "driver" for the strategic asset allocation (SAA) of the undertaking. In particular, the undertaking would not use the SAA to try and minimise such a deviation. Notwithstanding, this information was considered relevant for assessing whether the undertaking is able to earn the VA in practice.

One NSA noted that it has set an expectation that the actual assets undertakings hold generate sufficient yield in order to justify the application of the EIOPA prescribed VA

[46] Undertakings fully matching their liability cash flows or matching their cash flows to a large extent experience more volatility in own funds with the current calibration of the extrapolation than when the interest rate term structure would mimic market interest rates closer. Undertakings that match the cash flows of their liabilities to a lesser extent may experience less or even no own fund volatility with the current calibration of the extrapolation; these undertakings would experience an increase in their own fund volatility if the interest rate term structure would mimic market interest rates closer.

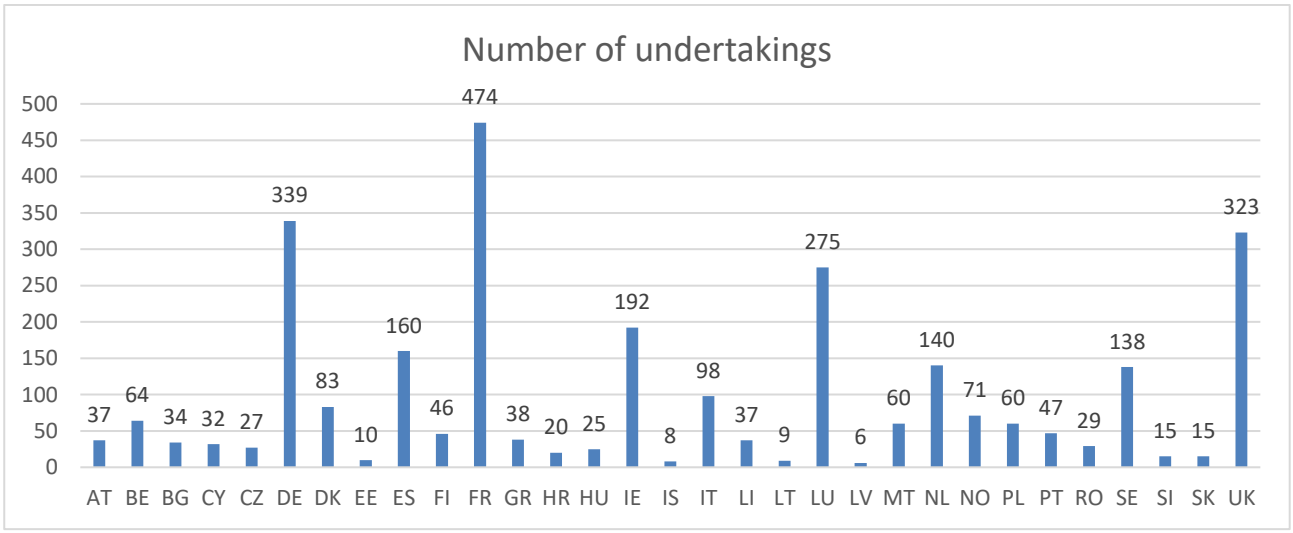
benefit. This NSA is yet to conduct a thorough investigation on how undertakings monitor this on a regular and ongoing basis.

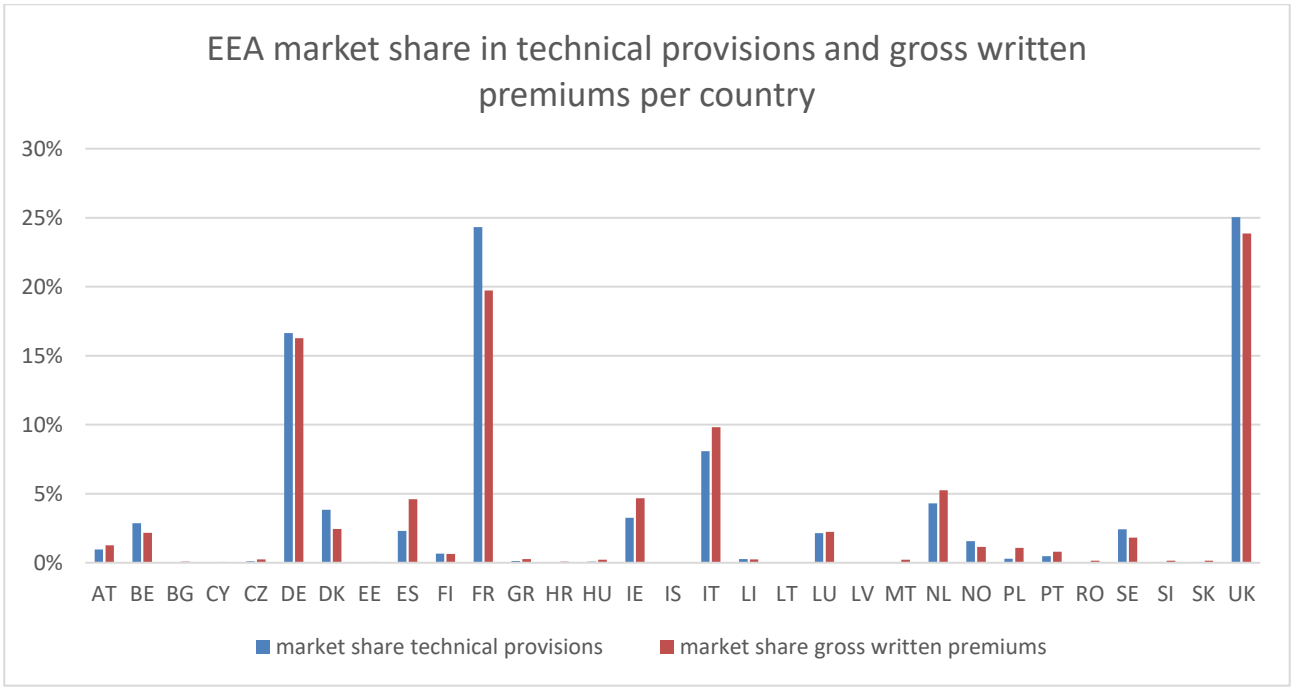
Another NSA noted that the undertakings monitored the deviation between their asset portfolio and the VA reference portfolio. These undertakings have reports on their exposure to the government and corporate bonds in which they do not invest in, but are exposed to via the application of the VA. None of the undertakings reported that the deviation affects their ALM.

Annexes

Annex 1: Overview of the European insurance market

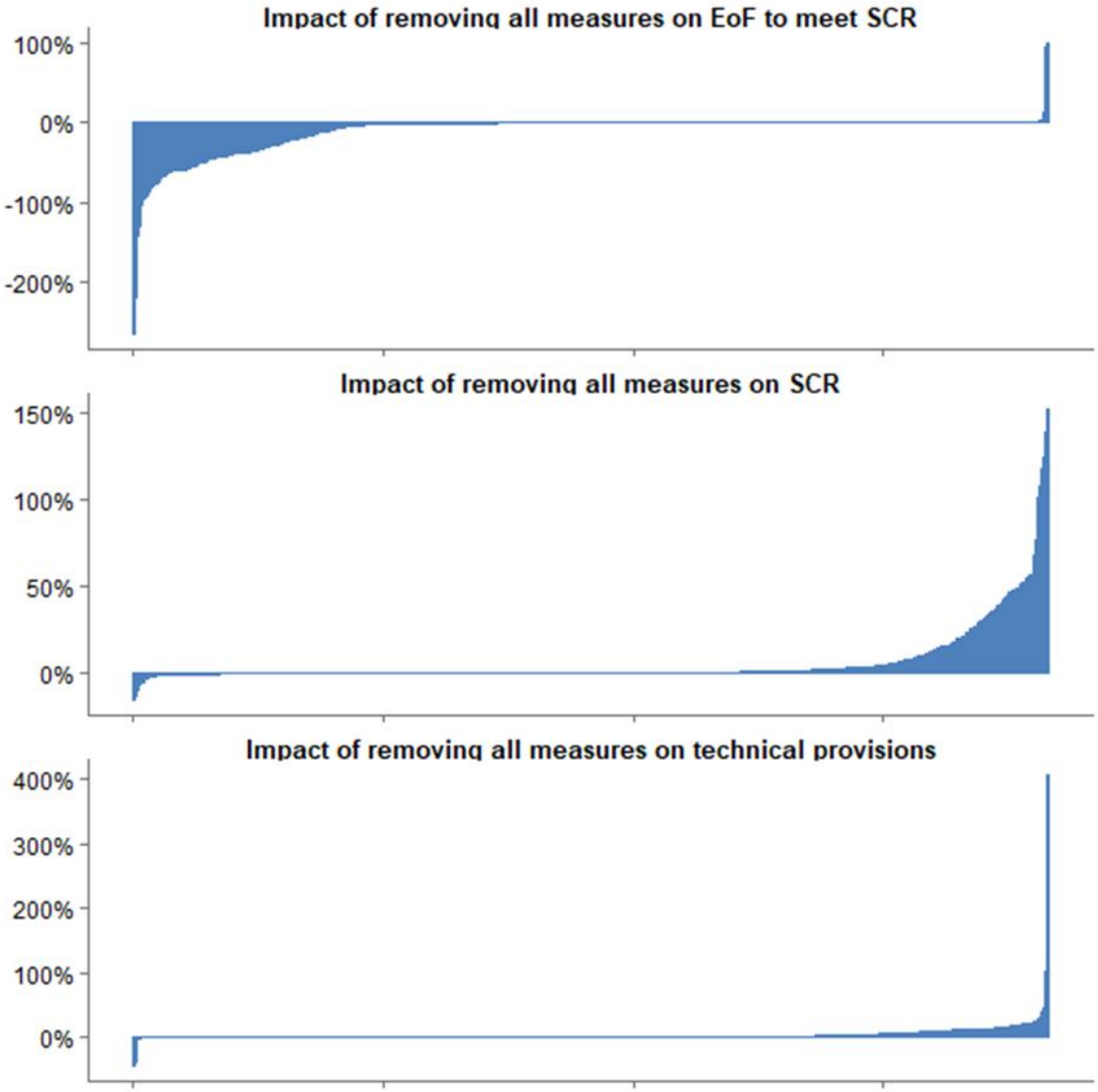
The following charts show for each EEA country the number of insurance and reinsurance undertakings and their share of the EEA insurance market expressed as percentage of technical provisions and of gross written premiums.

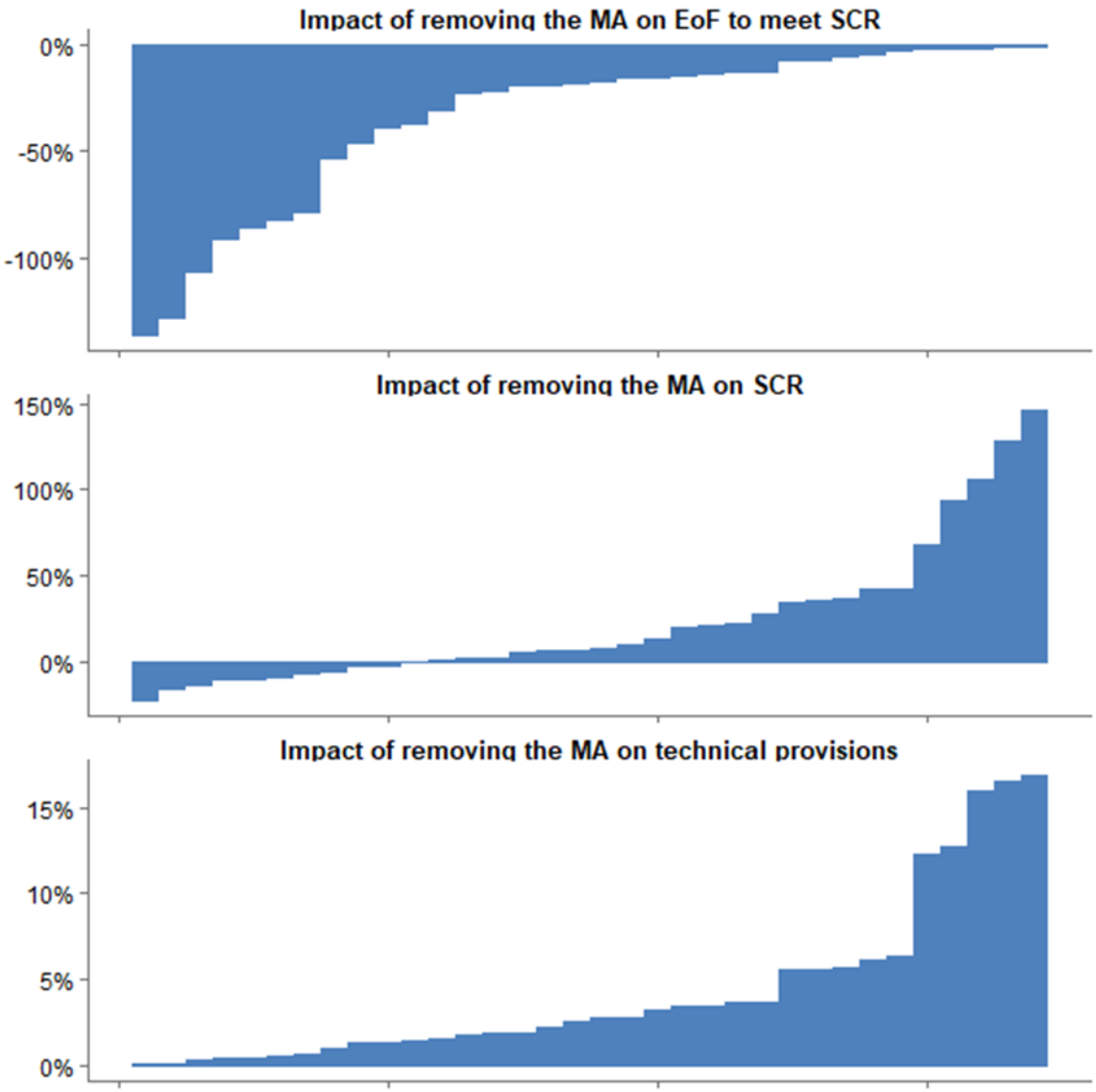


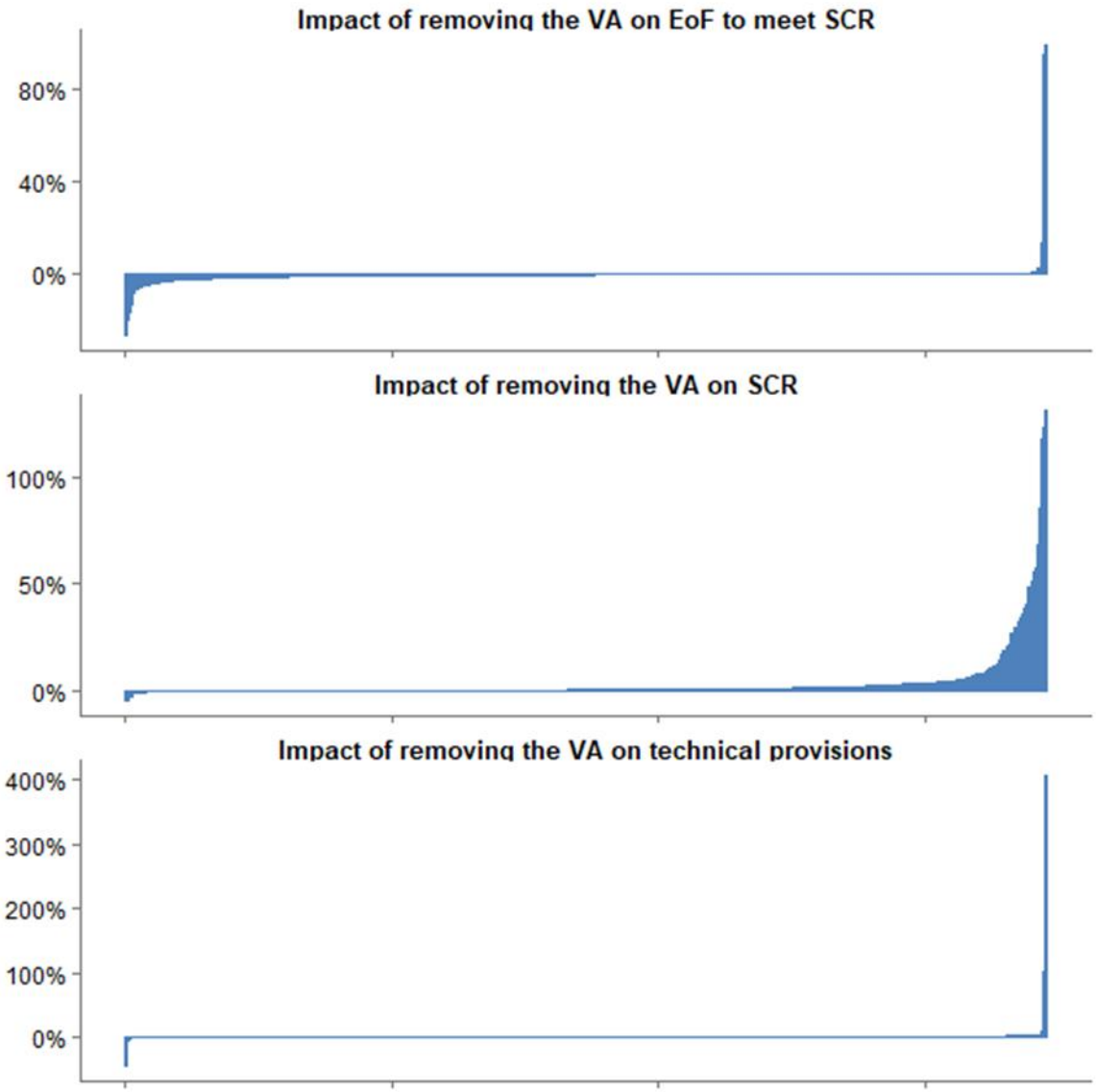


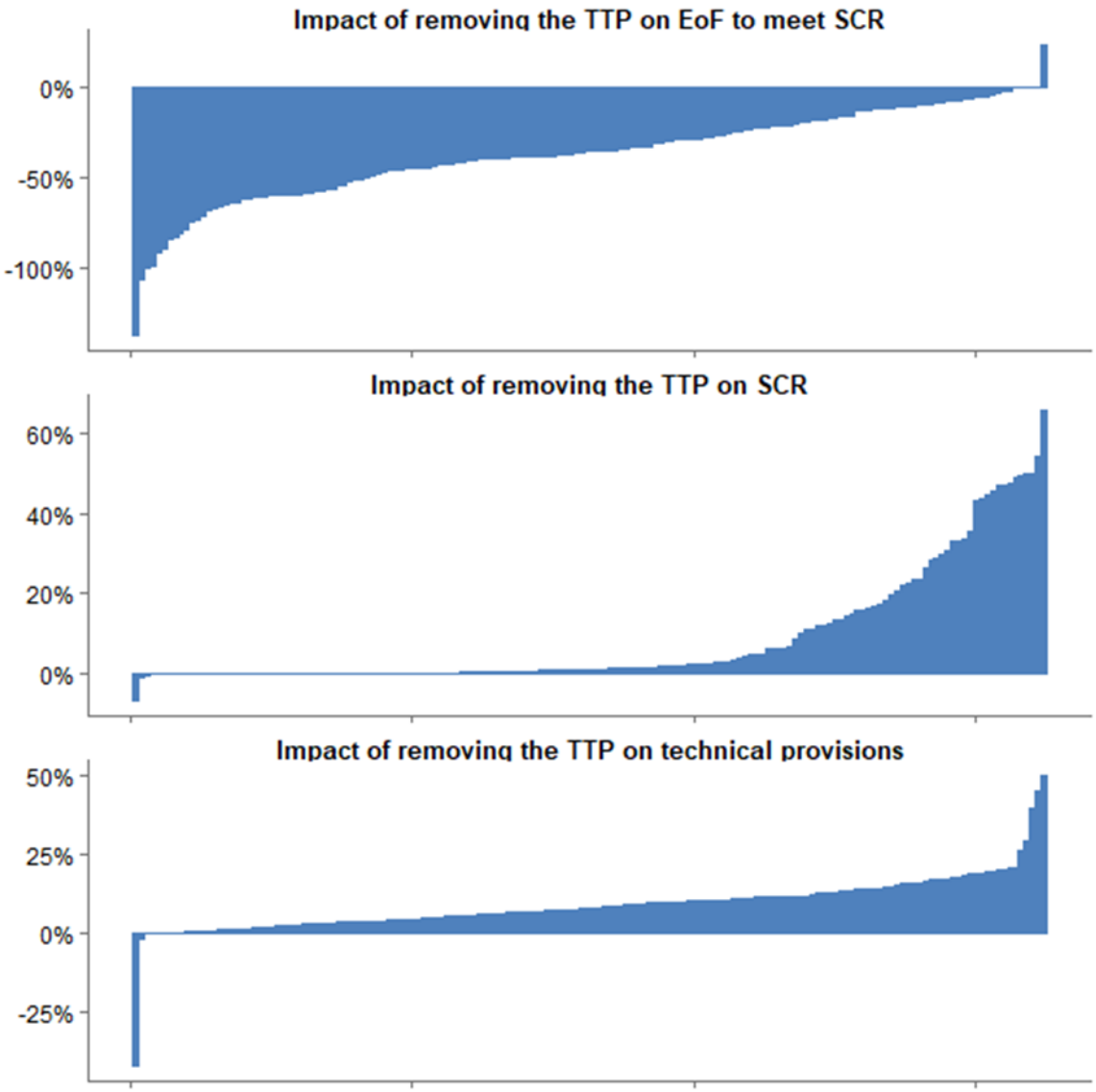
Annex 2: Impact of the measures on the financial position of undertakings

The following graphs show the impact of removing the measures MA, VA, TRFR and TTP on technical provisions, eligible own funds to cover the SCR and the SCR per undertaking. The impact is measured relative to the amount with the measures. Each bar corresponds to one undertaking. The bars are ordered by size in each graph. The graphs demonstrate that there is a wide disparity of the impact.




Impact of removing the MA on EoF to meet SCR
0%
-50%
-100%
Impact of removing the MA on SCR
150%
100%
50%
0%
Impact of removing the MA on technical provisions
15%
10%
5%
0%


Impact of removing the VA on EoF to meet SCR
80%
40%
0%
Impact of removing the VA on SCR
100%
50%
0%
Impact of removing the VA on technical provisions
400%
300%
200%
100%
0%


Impact of removing the TTP on EoF to meet SCR
0%
-50%
-100%
Impact of removing the TTP on SCR
60%
40%
20%
0%
Impact of removing the TTP on technical provisions
50%
25%
0%
-25%

Annex 3: Asset classes

The statistics on investments of insurance and reinsurance undertakings presented in this report are based on the following asset classification. Please also note that for this year's report, a look-through has been applied to the data on collective investment undertaking, albeit limited to one level of look-through (i.e. if the collective investment undertaking itself holds another collective investment undertaking no further look-through has been applied).

Asset category	Grouping
Government bonds	Government bonds
Corporate bonds	Corporate bonds
Unlisted equity	Equity
Listed equity	Equity
Collective Investment Undertakings	Collective Investment Undertakings
Mortgages and loans	Mortgages and loans
Cash and deposits	Cash and deposits
Blank	Other
Call Options	Other
Collateralised securities	Other
Credit derivatives	Other
Forwards	Other
Futures	Other
Liabilities	Other
Other investments	Other
Property	Other
Put Options	Other
Structured notes	Other
Swaps	Other

Annex 4: Example of the methodology to analyse mismatches in section III.2

In Section III.2 (Matching Adjustment), under the heading "MA Analysis of Matching", we undertook an analysis of how well matched MA portfolios were. This Annex shows the approach that was taken when calculating the distribution of negative mismatches and uses the below table as an example. The numbers have been selected for illustration purposes only and are not relevant to any firm.

Year (projection of undiscounted expected cash-flows)	Cash outflows	Cash inflows	Mismatch per year	Accumulated mismatch per year	Negative accumulated mismatches	Distribution
1	79	80	1	1	0	
2	40	39	-1	0	0	
3	89	90	1	1	0	
4	39	39	0	1	0	
5	41	40.5	-0.5	0.5	0	
6	79	80	1	1.5	0	
7	32	30.5	-1.5	0	0	
8	80	78	-2	-2	2	0.002
9	71	72	1	-1	1	0.001
10	89	90	1	0	0	

In this example we have considered an undertaking that projects its future cash-flows for the next 10 years. The cash outflows are the sum of expected claims and expenses for each year and the cash inflows are the de-risked assets cash-flows from the MA portfolio for each year.

The 4th column in the table, "Mismatch per year", shows the difference between the cash-flows for each year. The 5th column, "Accumulated mismatch per year", is the running sum of the yearly mismatches e.g. for year 6, the accumulated mismatches value would equal the sum of the mismatches for years 1-6 inclusive.

This approach is taken because one the requirements for use of the MA is that assets, and their cash-flows, are kept in the MA portfolio and cannot be used outside of it. This means that a positive mismatch in an earlier year can in principle offset a negative mismatch in a later year so long as this does not give rise to material additional risks (e.g. interest rate risk). For instance, in year 2 there is a negative

mismatch of -1 but in year 1, there was a positive mismatch of 1. As this positive cash-flow is kept in the MA portfolio, we can use it to offset the negative mismatch in year 2 which gives an accumulated mismatch of 0.

The penultimate column, “Negative accumulated mismatches”, only records an entry when the accumulated mismatches are less than 0. In effect this means there is a cap of 0 so when there is a surplus (years 1-7), a value of 0 is recorded, and when there is a deficit (years 8-9), the amount that is short is recorded.

Finally, in the last column, we compare the negative accumulated mismatches with the best estimate by dividing them by the BEL. In this example, the firm has a BEL of 1000.