EUROPEAN INSURANCE
AND OCCUPATIONAL PENSIONS AUTHORITY

Solvency II tools with macroprudential impact

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Executive summary

The European Insurance and Occupational Pensions Authority (EIOPA) initiated the publication of a series of papers on systemic risk and macroprudential policy in insurance. So far, most of the discussions concerning macroprudential policy have focused on the banking sector. The aim of EIOPA is contributing to the debate, whilst taking into consideration the specific nature of the insurance business.

The purpose of the present paper is to identify, classify and provide a preliminary assessment of the tools or measures already existing within the Solvency II framework, which could mitigate any of the systemic risk sources that were identified in the EIOPA's paper *'Systemic risk and macroprudential policy in insurance'* (EIOPA, 2018).

Although Solvency II is not a macroprudential framework, it contains several elements that may have financial stability impact. The impact of these elements should be taken into account when determining whether additional tools, or changes to the existing ones, are warranted for macroprudential purposes (EIOPA 2016b).

Solvency II is a comprehensive microprudential regime for the EU insurance sector. Capital is held against market risk, credit risk, underwriting risk and operational risk. In itself, this regime is designed to ensure sufficient loss absorbency capacity and reserving, one of the operational objectives identified as relevant for insurance[1]. Furthermore, significant emphasis in Solvency II is also put on the identification, measurement and proactive management of risks, providing ground also on the operational objectives linked to discouraging risky behaviour and discouraging excessive levels of direct and indirect exposure concentrations.

The tools with macroprudential impact that are identified and further analysed in this paper are essentially the long-term guarantees measures and measures on equity risk introduced in the Solvency II directive, the design of which has a direct macroprudential impact. In short, these tools are the following[2]:

- Symmetric adjustment in the equity risk module.
- Volatility adjustment.
- Matching adjustment.
- Extension of the recovery period.
- Transitional measure on technical provisions.

In addition to that, another measure allowing authorities to prohibit or restrict certain types of financial activities is also considered. This measure, which is not part of Solvency II, is however included because it pursues similar objectives and also applies EU-wide.

The preliminary assessment carried out in this paper shows that, in addition to ensuring sufficient loss absorbency capacity and reserving, the Solvency II tools identified contribute to another operational objective, namely, limiting procyclicality. Indeed, these tools seek to address the risk of collective behaviour by insurers that may exacerbate market price movements. It should be mentioned that the tools may have limitations from a macroprudential perspective as well.

In addition, Solvency II has other elements with indirect macroprudential impact that should not be ignored. These instruments, which were not primarily designed as instruments to mitigate systemic risk, could nevertheless contribute to a certain extent to other operational objectives when considered at an aggregated level. The main ones are the prudent person principle, the own risk and solvency assessment and the capital add-on under specific circumstances. These tools will not be analysed in this paper. They will however be taken into account when analysing potential new tools in the next paper.

1 See EIOPA (2018). The operational objectives identified for the insurance sector are the following: ensure sufficient loss-absorbency capacity and reserving; discourage excessive involvement in certain products and activities; discourage excessive level of direct and indirect exposure concentrations; limit procyclicality; and discourage risky behaviour.

2 Given that Solvency II entered into force in 2016, there is not an extensive amount of experience. This analysis should only be considered as a first step. Further work might be needed at a later stage, once more information and data are available.

1. Introduction

This paper provides an overview of the main elements of Solvency II[3] that have or may have macroprudential impact, i.e. that may contribute to mitigating systemic risk. For this purpose, the following steps are followed:

(1) identification of the most relevant instruments/measures in Solvency II;
(2) description of the way in which each tool works;
(3) mapping of the tool against a source of systemic risk;
(4) initial/preliminary assessment of the impact of such tools, to the extent possible with the existing information.

Solvency II is a very comprehensive framework covering the calculation of capital requirements (Pillar 1), the management of risks and governance (Pillar 2) and reporting and disclosure requirements (Pillar 3). In this paper, focus is put on the following tools with *direct macroprudential impact*: the symmetric adjustment in the equity risk module, the volatility adjustment (VA), the matching adjustment (MA), the extension of the recovery period, the transitional measure on technical provisions, and prohibiting or restricting certain types of financial activities.

These tools are instruments that were specifically designed to mitigate one or more sources of systemic risk, i.e. they are tools with closer genuine macroprudential impact. They mostly encompass several of the long-term guarantees (LTG) measures that were introduced in the Solvency II directive to ensure the appropriate treatment of insurance products that include LTG. In addition, the power to prohibit or restrict certain types of financial activities is also considered.[4]

Solvency II also incorporates several other tools with *indirect macroprudential impact*. These were not primarily designed as instruments to mitigate systemic risk. In a majority of cases they are essentially microprudential elements embedded in the Solvency II framework, which should contribute to limiting the distress of individual institutions and to appropriately manage the risks that a company is incurring. Under certain circumstances, however, when they affect systemically relevant institutions or a significant number of companies, they could indeed have a macroprudential impact in addition to the microprudential one. The main tools are the prudent person principle, the own risk and solvency assessment (ORSA) and the capital add-on under specific circumstances. These tools will not be analysed in this paper, but will be taken into account in a future paper, when other potential tools are considered.

In addition, there are other specific features within Solvency II that may have some macroprudential impact, but are not within the scope of the paper. For example:

- Certain Solvency II risk modules (e.g. concentration risk module and the risk modules for different asset classes) under the standard formula and their equivalents under internal models.
- The remuneration rules, which are part of Pillar 2.
- The reporting and disclosure obligations (Pillar III) may also be relevant. As mentioned by the Euro-

3 Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of insurance and reinsurance (Solvency II).

4 The PRIIPs regulation states that in cases of significant investor protection concern or a threat to the orderly functioning of financial markets, competent authorities and, in some cases, EIOPA have the power to prohibit or restrict the marketing or distribution of certain insurance-based investment products or a type of financial activity or practice of a (re)insurer.

pean Systemic Risk Board (ESRB, 2015), an enhanced disclosure indirectly fosters a certain 'peer' comparison. As a result, it may contribute to mitigate some risks through market discipline. At the same time, however, enhanced reporting and disclosure requirements may also increase market reactions to insurers' behaviour, possibly increasing the risk of procyclicality.[5]

Lastly, the extrapolation of risk-free interest rates, which is relevant from a macroprudential point of view, will be part of the long-term guarantees measures that will be reviewed by 1 January 2021 (Box 1).

In this paper, the most important tools from a macroprudential perspective will be briefly explained, putting special attention on their role and the way in which they work, classifying them according to the following categories (Table 1).

Once defined and categorised (see Table 1), each tool will be mapped against one or more sources of systemic risk and linked to the operational objectives to be pursued by macroprudential authorities as defined in the previous paper. These are the following:

- ensure sufficient loss absorbency capacity and reserving;
- discourage excessive involvement in certain products and activities;
- discourage excessive level of direct and indirect exposure concentrations;
- limit procyclicality;
- discourage risky behaviour.

Under Solvency II, capital is held against market risk, credit risk, underwriting risk and operational risk. Furthermore, significant emphasis is also put on the identification, measurement and proactive management of risks. The ORSA ensures a prospective approach, focusing on future developments in the business that might impact the capital position of insurers. Two additional requirements are the 'Supervisory Review Process' which enables supervisors to better and earlier identify insurers that might be heading for difficulties, and enhanced information and disclosure requirements that enhances market discipline.

Box 1: The RFR curve and its macroprudential role

The risk-free interest rate (RFR) term structures are a fundamental element in insurance to discount their liabilities in a market valuation environment. The RFR curve is calculated and published on a monthly basis by the European Insurance and Occupational Pensions Authority (EIOPA) for 33 currencies and used by all undertakings, thereby contributing to more transparent and stable provisioning. The RFR curve is extrapolated towards an ultimate forward rate (UFR). The UFR is a function of long-term expectations of the inflation rate and of the long-term average of the real rate. A new methodology to derive the UFR was recently developed by EIOPA and will be applied from 1 January 2018 onwards.

The RFR and all other relevant elements have a clear macroprudential impact, as they affect the calculation of the technical provisions and, therefore, also the solvency position. Furthermore, it can also influence the investment and risk management behaviour.

In this report, EIOPA considers the potential macroprudential impact of the VA and MA only. The VA and MA are adjustments to the RFR curve. The extrapolation of RFRs is, in any case, part of the LTG measures that will be reviewed by 1 January 2021. The ESRB recently carried out an analysis on the regulatory risk-free yield curve properties and its macroprudential consequences (ESRB, 2017).

5 This could be framed in the context of the behaviour-based source of systemic risk.

Table 1: Typology of instruments/measures

Criteria	Classification	
Scope of application	• Broad-based	Instrument applied sector wide.
	• Targeted	Instrument applied to specific undertaking(s), depending on a decision of the undertaking(s) and/or supervisors.
Time dimension	• Fixed	While being active or in use, the instrument does not change over time.
	• Time-varying	Instrument can vary over time, based on the specific situation of the undertaking(s) or the macroeconomic environment (e.g. countercyclically).
Supervisory flexibility	• Rule-based	No supervisory flexibility is possible as the use of the instrument takes place in a predefined way.
	• Discretionary	A certain degree of ad hoc (expert) judgement is possible when applying the instrument.

Because of this, it can be stated that Solvency II in itself is designed to ensure sufficient loss-absorbency capacity and reserving, one of the operational objectives identified. Furthermore, significant emphasis in Solvency II is also put on the identification, measurement and proactive management of risks, providing ground also on the operational objectives linked to discouraging risky behaviour and discouraging excessive levels of direct and indirect exposure concentrations. It might, however, be the case that this microprudential framework would benefit from new tools or measures focusing on avoiding the build-up of systemwide risk, i.e. adopting a macroprudential perspective.

Lastly, an initial or preliminary assessment of the macroprudential impact of the specific Solvency II tools will be provided. The main objective is to illustrate the way in which each of the tools considered contributes to mitigating some of the sources of systemic risk identified and, therefore, to achieving one or more of the operational objectives defined. This is sometimes referred to as 'macroprudential impact' throughout the paper.

Given that Solvency II has applied since 2016, there is not an extensive amount of experience. Therefore, the issue will be approximated by different means, such as the use of available data (e.g. from EIOPA stress test or QRTs) and past experiences, country cases or stylised analysis. This analysis should only be considered as a first step. Further work might be needed at a later stage, once more information and data are available.

A last section will also provide a brief overview of other measures in case of breach of the Solvency Capital Requirement (SCR), as well as other measures available at national level in order to complete the picture.

An annex is included at the end of the paper in which an in-depth analysis of the impact of the most relevant LTG measures from a macroprudential perspective (i.e. the VA and the MA) is carried out.

2. Symmetric adjustment to the equity risk sub-module

2.1. Description

The symmetric adjustment to the equity risk sub-module is an automated measure that forms part of the calculation of the market risk module in Solvency II (Article 106).

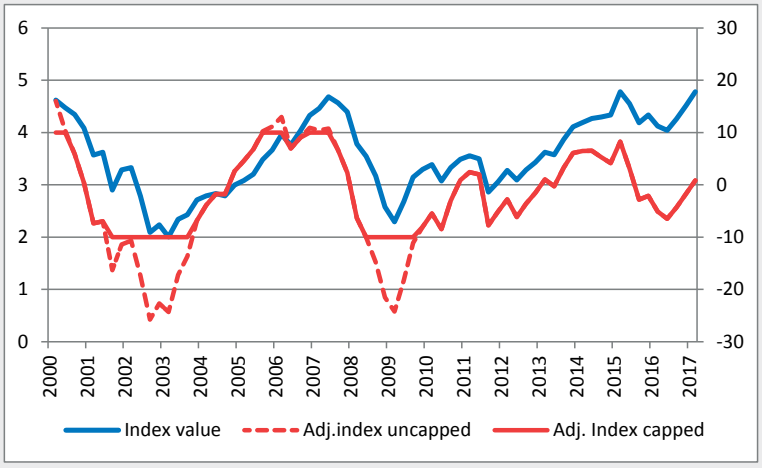
The symmetric adjustment calculates an adjustment to the equity risk charge that is based on how a particular equity index has performed over the last 3 years. The equity index is unique to this adjustment and is calculated as a weighted average of 11 other indices for the national equity markets of various Organisation for Economic Cooperation and Development countries and EU Member States.[6]

The measure works in a countercyclical manner, i.e. if the current level of the index is more than 8 % above the average of the index (calculated as the weighted average of the daily levels of the equity index over the last 3 years) the risk charge is adjusted upwards, and if it is less than 8 % above the average the risk charge is adjusted downwards.

The symmetric adjustment factor is, however, capped at 10 %, meaning it cannot increase or decrease the equity risk charges by more than 10 %. Therefore, the equity stress scenario before applying the symmetric adjustment is a decrease of equity prices by 39 % for non-strategic equity investments listed in regulated markets in the countries of the European Economic Area (EEA) or the Organisation for Economic Cooperation and Development (type 1 equity). For other non-strategic equity investments (type 2 equity) a decrease of equity prices by 49 % is assumed. After application of the symmetric adjustment the decrease of equity prices is between 29 % and 49 % for type 1 equity and between 39 % and 59 % for type 2 equity, depending on the current and past levels of the equity index.

The development of the symmetric adjustment over time is shown in Figure 1. The cap has been triggered one third of the time since January 2000. The symmetric adjustment was negative from December 2015 to February 2017, reducing the equity risk charges applied to insurers' equity holdings. The cap was triggered on 11 February 2016 after the equity price fall in early February, and was almost triggered on 27 June 2016 following the UK's referendum on leaving the EU. From February 2017 to May 2017 the symmetric adjustment was positive, averaging 1.6 %.[7]

Figure 1: Equity index and symmetric adjustment factor. January 2000-May 2017. Quarterly frequency



Source: EIOPA.

2.2. Classification and mapping

The symmetric adjustment can be classified as a broad-based tool that is applicable to all undertakings using the standard formula. Furthermore, given that it is designed in a countercyclical manner, the tool can also be considered as a *time-varying* tool. Lastly,

6 See http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R2016.

7 The paragraph refers to the official adjustment factor for Solvency II purposes published by EIOPA. Figure 1 is based on a proxy equity index, see Box 2

the symmetric adjustment to the equity risk sub-module is designed as a rule-based instrument, given that there is no room for ad hoc expert judgement in its application.

The contribution of the symmetric adjustment to the mitigation of systemic risk sources and, therefore, to the achievement of the operation objectives can be assessed as follows.

Main sources of systemic risk addressed.

- *Collective behaviour by insurers that may exacerbate market price movements.* The symmetric adjustment mechanism adjusts the capital charge with a symmetric factor that is positive when markets have risen recently and negative when markets have dropped in recent months. Reducing excessive volatility in capital requirements reduces the risk of insurers behaving in a way that exacerbates short-term market price movements such as fire sales. Also, the increase in capital requirements from the adjustment when equity prices have increased reduces the benefits that can be recognised from recent increases in equity values that may not be sustainable in the long term.

Main operational objective(s) to which the measure contributes.

- *Limit procyclicality.* The adjustment mechanism is by construction aimed at reducing procyclical incentives from capital requirements on equity holdings.[8] Depreciation (appreciation) of equities will reduce (increase) the value of assets and capital with more than the fall (increase) in the capital requirements. The difference will depend on the type of equities an insurer is holding. The adjustment mechanism is constructed to reduce these effects by lowering the difference between changes in asset values/capital on the one side and capital requirements on the other.

2.3. Initial/preliminary assessment of the impact

The symmetric adjustment mechanism applies to all 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 sub-module. It should be mentioned that, at this stage, the impact of the symmetric adjustment is limited with respect to equities purchased before the entry into force of Solvency II by the application of the equity transitional of Article 308b(13) of the Solvency II directive until 1 January 2023.

There are elements in the adjustment mechanism that may reduce the effects of the mechanism to some extent.

- The adjustment factor is capped at ± 10 %. When capped, a further change in equity values in the same direction will result in changes of capital and capital requirements as if no adjustment factor were applied.
- The calculations of the symmetric adjustment use a scaling factor of one half. This means that, for a given change in the percentage deviation of the equity index from its average, the symmetric adjustment will only change by half as much.
- Applying the equally weighted 3-year average of daily observation implies that the adjustment factor changes due to observations leaving the sample. In cases where outliers leave the sample the changes in the adjustment

8 Recital 61 of the Solvency II directive notes: 'In order to mitigate undue potential pro-cyclical effects of the financial system and 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 Solvency Capital Requirement should include a symmetric adjustment mechanism with respect to changes in the level of equity prices'.

factor may be substantial, even if there is no current movement in equity values.

- There will be a further mismatch between the actual individual portfolio of the insurance undertaking and the equity portfolio used to calculate the adjustment.

In addition to that, this tool is limited to undertakings using the standard formula for market risk and then only applies to equity risk and not to other market risks (Table 2).

mechanism may have an effect on insurers' selling of equities.

In terms of empirical evidence, one paper that has analysed the adjustment mechanism is the one by Eling and Pankoke (2013), who find that the mechanism alters the confidence level in the capital requirements of the equity risk module, but contributes to financial stability by reducing procyclicality of capital requirements. Specifically, the authors find that capital requirements are low when aggregate systemic risk (measured by CoVaR and MES) is high and vice versa. However, it should be noted that the results are based on a previous specification for the symmetric adjustment.[10] This mechanically makes the adjustment more sensitive to changes in equity prices.

Table 2: Usage of standard formula and partial internal model

Type of undertakings	Number of undertakings	Market share (technical provisions)
Standard formula	2769	60.8%
Partial internal model not covering equity risk	51	9.6%
Total	2820	70.4%

Source: EIOPA.

The effect of the mechanism is limited since only a share of equities held by insurance companies are covered by the standard formula. On the other hand, the mechanism affects the majority of insurers. Similar effects to the adjustment mechanism may also be reflected in the internal models used by insurers that do not apply the standard formula. Regulators may take this into consideration when evaluating internal models and in the ORSA processes.

Equities amount to around 10 % of EU/EEA life insurers' investment portfolios and 24 % of investments in non-life insurance companies.[9] There are considerable differences among insurance companies regarding their holding of equities and thus heterogeneity in the part of market risk stemming from the equity module. Due to the contribution to market risk and the high volatility in equities, it seems reasonable that the adjustment

EIOPA has conducted a stylised analysis of the symmetric risk adjustment to provide additional evidence. Based on this analysis it can be concluded that the adjustment factor changes in the same direction as the equity index, thus reducing the incentives for procyclical behaviour and contributing to financial stability. However, in periods with large increases or decreases in equities the effect is limited to some extent as the adjustment factor in such period tends to be capped at ± 10 %. Without capping, the adjustment factor would have reached a negative value of around 25 % at the end of

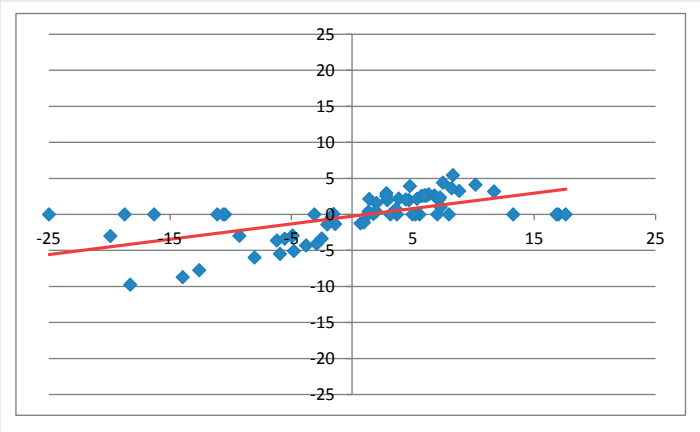
9 EIOPA (2017c).

10 The formula used for the adjustment is min {max{(CI-AI)/AI,-0.1},0.1} instead of the actual formula min {max{1/2 ((CI-AI)/AI-0.08),-0.1},0.1}.

Box 2: Stylised example of the symmetric adjustment to the equity risk sub-module

As a proxy for the 'official' equity index used by EIOPA for calculating the adjustment factor for Solvency II purposes, an index using the same 11 indices as in the EIOPA index has been constructed, but assigning equal weights for the whole period.[11] Figure B1 shows a scatterplot of quarterly changes (per cent) in index and changes in the adjustment factor (percentage points).

Figure B1. Quarterly changes in index (x-axis, per cent) and adjustment factor (y-axis, percentage points)



The following observations can be made.

- On average the adjustment factor changes in the same direction as the equity index.
- On average the adjustment factor changes by one fifth of quarterly changes in the equity index. A 10 % fall in equities tends to reduce the adjustment factor with 2 percentage points.
- When the adjustment factor is not capped at ± 10 %, the sensitivity of the adjustment factor to changes in equity index is on average one half.

In more than half of the quarters with large increases or decreases in equities (defined as more than a 10 % change in index), the adjustment factor does not change as the factor already is capped at ± 10 %.

Tables B1-B3 provide some additional information. In particular, Table B3 shows periods with strong trends in equity index. As expected the adjustment factor changes in the same direction as the equity index, thus reducing the incentives for procyclical behaviour. As the adjustment factor is capped in most cases, the effect is limited to a certain extent.

Table B1: Quarters with more than 10 % fall in equity index

Quarter	Pct fall in equity index	Change in adj. factor (percentage points)	Level of adj. factor end of quarter
2001, Q1	-12,6	-7,8	-7,4
2001, Q3	-20,0	-3,0	-10,0
2002, Q2	-16,3	0,0	-10,0
2002, Q3	-25,0	0,0	-10,0
2003, Q1	-10,5	0,0	-10,0
2008, Q1	-14,0	-8,7	-6,4
2008, Q3	-10,6	0,0	-10,0
2008, Q4	-18,7	0,0	-10,0
2009, Q1	-11,1	0,0	-10,0
2011, Q3	-18,3	-9,8	-7,8
Average	-15,7	-2,92	

11 The index corresponds to an investment strategy whereby an insurer bought a portfolio of 11 equity indexes in 1988 and has held exactly that portfolio of indices since then.

Table B2: Quarters with more than 10 % increase in equity index

Quarter	Pct fall in equity index	Change in adj. factor (percentage points)	Level of adj. factor end of quarter
2001, Q4	13,3	0,0	-10,0
2003, Q2	17,0	0,0	-10,0
2003, Q4	11,7	3,2	-6,8
2009, Q2	16,8	0,0	-10,0
2009, Q3	17,6	0,0	-10,0
2015, Q1	10,2	4,1	8,2
Average	14,43	1,22	

Table B3: Periods with strong trends in equities

Quarter	Pct fall in equity index	Percentage change in adj. factor	Adj. factor end of period
2000, Q1 - 2002, Q3	-55	-20	-10
2003, Q1 - 2007, Q3	128	17	7
2007, Q3 - 2009, Q1	-50	-17	-10
2011, Q3 - 2015, Q1	67	16	8

2002 and the beginning of 2009 (see Figure 1). In both cases, the cumulated fall in the equity index was around 50 %. It should be mentioned, however, that removing the cap may also have negative effects in terms of increasing the volatility of the equity risk charge. See Box 2 for additional technical details.

While the adjustment mechanism has some effect on reducing the procyclical incentives in the equity module, its effects are less clear regarding the objectives of limiting risky behaviour and of ensuring sufficient loss-absorbency capacity and reserving.

It seems reasonable to assume that insurers may respond to the cumulative impact of both asset value and SCR from changes in asset prices. Hence, it is assumed that changes over time are more important than levels in describing the dispositions of the undertakings. Thus, if SCR is reduced due to changes in the adjustment factor and equity prices in the same period are unchanged or have risen, this could motivate insurers to buy equities (and vice versa). This may happen due to old observations leaving the sample used in the calculation of the adjustment factor. This occurs if only a few incidents in the sample are considered (with a monthly and quarterly frequency). But this is not an unlikely scenario.

The equity index used in the equity module may deviate from the actual equity investment of insurers. This may result in changes in the adjustment factor that are not related to the actual risk exposure and hence have similar effects to those described in the paragraph above. It should also be noted that equity risk management might turn more difficult because of the difference between market and regulatory values. Also, the equity VaR will not be 99,5 % in times of stress, but lower.

There is a risk that the factors described above may result in too-risky behaviour and insufficient reserves. Such considerations should therefore be included in the ORSA. Eling and Pankoke (2014) find large deviations between individual insurers' risk situations and the risk implications of Solvency II. They also find that after 2008 the confidence level is generally less than 99.5 %, indicating too-low capital requirements. The adjustment mechanism tends to reduce the capital requirements in times of stress, which could result in insufficient capital.

The adjustment mechanism is constructed to work symmetrically. This seems to be the case as the factor on average is only slightly positive (less than 0.5 % over the last 15 years).

3. Volatility adjustment

3.1. Description

The VA to the relevant RFR term structure is one of the measures introduced in Solvency II (Article 77d) in order to prevent procyclical behaviour which may arise from the pure application of the market consistent valuation introduced by the new legislative framework.

The VA is an (optional) adjustment to the relevant RFR term structure used to calculate the technical provision (best estimate), which is set in order to counteract short-term artificial volatility due to spreads exaggeration in bond markets.[12]

It is based on 65 % of the risk-corrected spread (RC spread) between the interest rate that could be earned from bonds, loans and securitisations included in reference portfolios for currencies and countries[13] and the basic RFRs. The VA formula includes risk-corrected currency and country spreads of the reference portfolios at the respective reporting dates. Therefore, the spreads to the RFR term structure are first to be determined. For the calculation of the spread, the portfolio is divided into two classes: government bonds and non-government bonds, including loans and securitisations. The (portfolio) spread can be calculated by using the portfolio weights and the average spreads of the two components. The spreads are then reduced ('risk-corrected')[14] in order to account for expected losses, unexpected credit risk or any other relevant risks of the assets (EIOPA, 2015c).

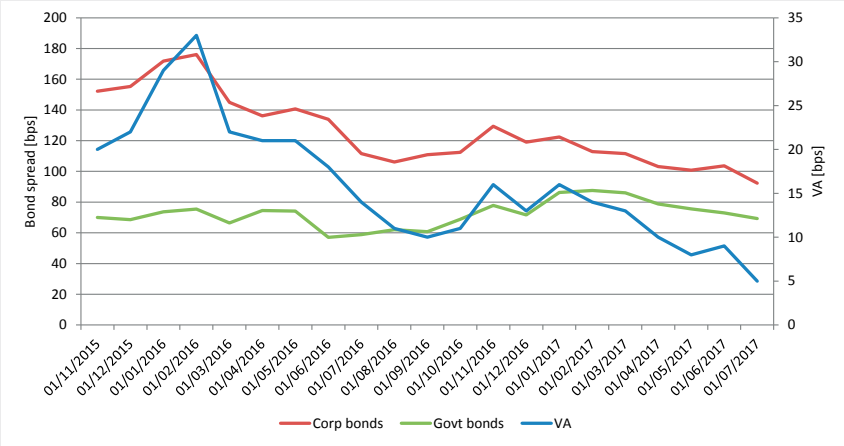
Then the VA is given by the following equation:

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

where $RCspread^{country} > 100$ bp.

Figure 2 shows a comparison between the euro currency VA and the spread over the RFR of euro government bonds and euro corporate bonds. It can be seen that, as expected, the VA follows broadly the movement of the corporate spreads, in a context in which the government spreads have not substantially moved.

Figure 2: Evolution of Euro currency VA over time (2015-2017)



Source: EIOPA.

A national component of VA is available, calculated on the basis of the spread resulting from a national reference portfolio, which is added to the VA by currency only in the event of an exceptional increase spread (in particular, provided that the RC spread at country level is higher than 100 bps and the RC spread at coun-

12 By raising in parallel the term structure of interest rates used to compute the value of balance sheet liabilities the VA, in the event of large increases in bond spreads, reduces the value of the liabilities, offsetting the devaluation of assets that occurs when the spreads on portfolio securities widen, thereby improving the solvency ratio.

13 The reference portfolios are representative portfolios of assets held by European insurance companies to cover technical reserves and are set by EIOPA on an annual basis, based on relevant indices. In order to compose the reference portfolios of indices, EIOPA first needs to build representative portfolios of assets. This is done by forming a cross-section of investments covering best-estimate liabilities of insurance undertakings in the respective currency and national insurance markets. These include bonds, loans, securitisations, equity and property, cf. EIOPA (2015c), Sections 8-9.

14 The risk correction (and the fundamental spread in the MA) reflects the probability of default of the assets (based on long-term statistics) and the expected loss resulting from downgrading the assets. Additionally, there are minimums or floors that are applied.

try level is at least twice the RC spread at currency level).

The VA is calculated and published monthly by EIOPA along with the RFR curve. It is also published every 3 months by the European Commission thereby assuming legal value.

Solvency II includes additional requirements in case of use of the VA (as well as any other LTG measure), such as the following.

- The requirement for insurers to maintain a liquidity plan, projecting the incoming and outgoing cash flows in relation to the assets and liabilities subject to the VA.[15]
- As regards asset–liability management (ALM), insurance and reinsurance undertakings shall regularly assess: (i) the sensitivity of their technical provisions and eligible own funds to the assumptions underlying the calculation of the VA and the possible effect of a forced sale of assets on their eligible own funds; (ii) the impact of a reduction of the VA to zero.[16]
- The provisions for applying capital add-ons should the risk profile of the company deviate from the assumptions underlying the VA.[17]
- More requirements related to governance, disclosure and supervisory reporting. Insurers have to separately disclose to the public and the supervisor the solvency data, gross and net of the VA and a description of their overall impact. Ongoing compliance with capital requirements must be assessed in the ORSA with and without the use of the VA.[18] The report to supervisors must include an annual assessment of the sensitivity of technical provisions and eligible own funds to the assumptions underlying the LTG measures. Where a reduction of the VA to zero would result in non-compliance with the SCR, the undertaking shall also submit an analysis of the measures it could apply in such a situation to restore compliance. Information on the use of LTG measures will be made public through the solvency and financial condition report, which will contain a statement on whether the VA is used and quantification of the impact of not applying this adjustment on the financial position of the undertaking.

According to the Solvency II directive, it is possible to apply simultaneously the VA and the transitional measure on technical provisions (TTP) or the transitional measure on RFR, but it cannot be used in conjunction with the MA on the same insurance liabilities.

3.2. Classification and mapping

The VA is a tool that is optional for companies (Article 77d). The need for an explicit approval by the national supervisor depends on the decision taken in each Member State. The tool can be classified as a *targeted* instrument whose application, however, does not depend in all cases on the authority but on each undertaking independently. In addition to that, the VA is also a *time-varying* (based on EIOPA's updates of the representative portfolios that will be used for calculation of the VA and the changes in the spreads and interest rates) and *rule-based* (as predefined in the technical specifications) instrument.

The contribution of the VA to the mitigation of systemic risk sources and, therefore, to the achievement of the operational objectives can be assessed as follows.

Main sources of systemic risk addressed.

15 Art. Article 44 of the Solvency II directive.
16 Art. Article 44 of the Solvency II directive. Where the volatility adjustment is applied, the written policy on risk management shall comprise a policy on the criteria for the application of the volatility adjustment.
17 Art. Article 37(d) of the Solvency II directive.
18 Art. Article 45 of the Solvency II directive.

- *Collective behaviour by insurers that may exacerbate market price movements.* The aim of the measure is eventually to reduce the effect of market volatility on solvency ratios of insurance undertakings, particularly in a challenging environment (e.g. in case of a prolonged low-interest-rate environment or a double-hit scenario) and under specific circumstances (e.g. exaggeration in the bond spread market). By achieving this, the VA contributes to mitigating potential collective behaviours by insurance companies (i.e. herding behaviour, 'search for yield' or fire sales) that may exacerbate market price movements.

Main operational objective(s) to which the measure contributes:

- *Limit procyclicality.* By mitigating the risk of potential collective behaviours, the VA should prevent procyclicality in times of stress and preserve the capacity of insurers to invest in long-term assets, thereby contributing to the stability of the financial system (ESRB, 2015).[19]

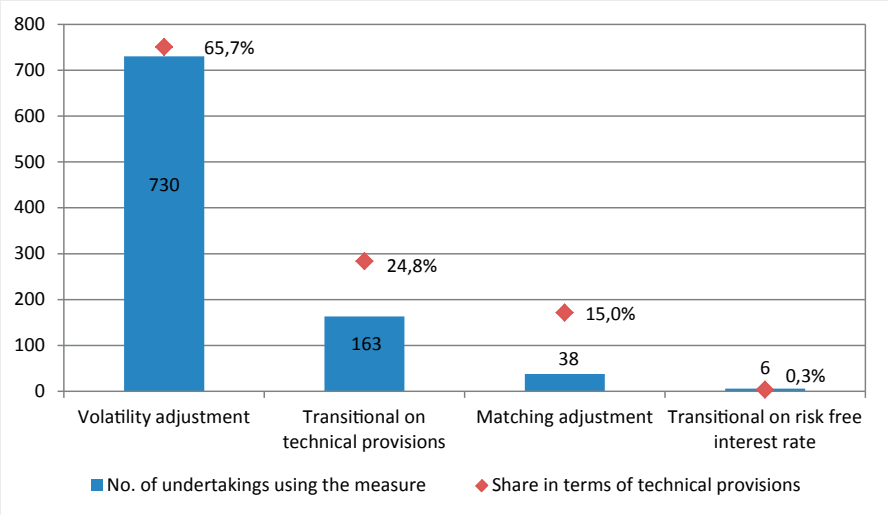
3.3. Initial/preliminary assessment of the impact

Based on the second EIOPA *Report on long-term guarantees measures and measures on equity risk 2017*, out of the 2 945 (re)insurers surveyed, 730 undertakings in 23 countries representing a European market share of 66 % in terms of technical provisions made use of the VA (see Figure 3).

Eventually, VA resulted as the most used of the LTG measures. For the (re)insurance undertakings that apply this measure, removing the VA resulted on average in a reduction of the SCR ratio by 24 bps and in an increase in technical provisions by 60 bps at EEA level. Figure 4 shows the Average impact of removing the VA on eligible own funds to cover the SCR and SCR of undertakings using the measure.

The VA, in theory, can take both positive and negative values (increasing/decreasing reserving requirements). More precisely: the $VA^{country}$ component is not symmetric because of the $RCspread^{country}$ floor (> 100bps); the $VA^{currency}$ component

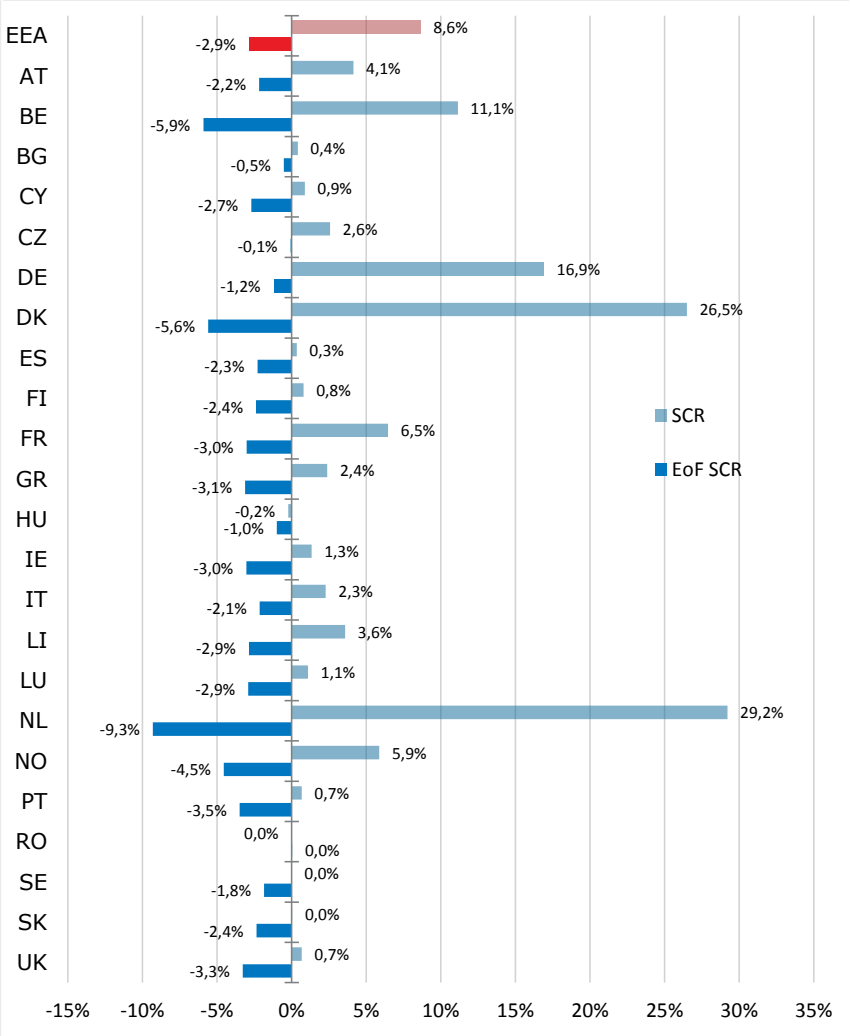
Figure 3: Overview of the use of selected LTG measures



Source: EIOPA (2017b).

19 Nevertheless, the volatility adjustment may have both pro and anti-cyclical effects. Its net balance depends on the scenario and undertakings' behaviour.

Figure 4: Average impact of removing the VA on eligible own funds to cover the SCR (EoF SCR) and SCR of undertakings using the measure



Source: EIOPA (2017b).

moves symmetrically with market data feeding into the formula. In practice, what has been observed so far is that negative values have rarely happened (this would require spreads to be exceptionally low), with generally positive values recorded.

In summary, the total VA being the sum of a $VA^{currency}$ (almost always positive) and a $VA^{country}$ (almost always nil), eventually the VA typically results in a positive adjustment. It follows that, in almost all cases, the VA allows for an upward shift of the liquid part of the Solvency II RFR with which the liabilities are discounted. This results in a partial sterilisation of high artificial volatility that characterises the financial market in times of stress and that not directly relates to changes in the undertaking's risk profile.

Furthermore, since the VA is not an entity-specific measure and since the reference portfolios are representative weighted portfolios of assets held by European insurance companies, it may also occur that, for some insurers in case of a crisis scenario, the solvency position would not reflect the real risk they face. This could eventually lead to a situation in which the solvency position may increase in time of crisis, but also to a situation in which the

level of the given VA would not reflect the effective need of the company, nor would the $VA^{country}$ be triggered because of the specific circumstances requested by the legislation.

The calculation of the VA is based on a representative portfolio of assets. There are some concerns that the use of such a portfolio entails the possibility that insurers start replicating it in their investment decisions in a sort of herding behaviour. Whether the insurers' investments become more similar to that basket of assets would yet to be demonstrated and should in any case be confronted with the additional disclosure requirements set in Solvency II.

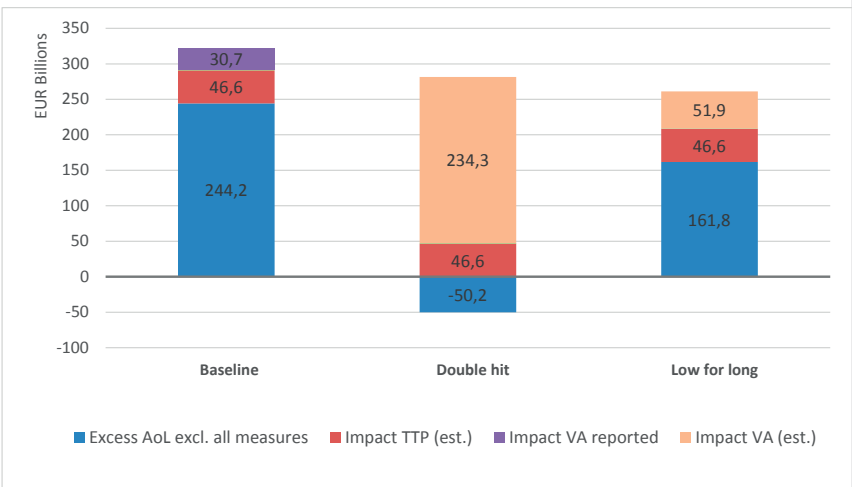
In order to assess the macroprudential impact of the VA, it is useful to compare how this measure reacted in the two scenarios considered in EIOPA's 2016 stress test,[20] analysing the impact on participants in the stress test that use VA exclusively.

While the impact of the VA in the low for long scenario is appreciable (assets over liabilities increases by around 60 %), in the double-hit scenario this impact, as expected, is far more relevant, as it increases by a factor of 7.6 compared to the baseline scenario (see Figure 5).[21] This significant impact is explained by the mechanics of the VA, which makes this tool particularly sensitive to exacerbated asset spreads as in a double-hit scenario (see Annex).

It is important to remark that, given the VA based on a representative weighted portfolio of assets, the increase in the VA (and as a consequence the decrease in discounted liabilities) happens regardless of the actual portfolio of assets held by individual undertakings using the VA.

A detailed analysis of the macroprudential impact of VA and MA in a stress scenario is provided in the Annex to this paper. As is shown, the VA has indeed limited the volatility in the extreme scenarios considered. From that point of view, it helps to avoid fire sales in period of short-term volatility. Furthermore, it can be concluded that the VA works countercyclically in times of dramatic stress. That is, however, not to say that it might not have unintended consequences as well, as it could be the bigger losses suffered due to delayed sales of risky assets if the adverse situation proves to be of a more permanent or fundamental nature. These are yet to be assessed in detail, however, and could be further investigated.

Figure 5: Impact of VA and TTP on VA users exclusively (Sample of 142 insurers)



Source: EIOPA.

Insurance and reinsurance undertakings may anticipate that the VA will immunise their prudential balance sheet against the widening of credit spreads. That may provide an incentive to undertakings to take more spread risk in times of narrow spreads. This may in particular be an is-

20 To assess insurers' vulnerabilities and resilience, two severe market developments were included in EIOPA's 2016 stress test: a prolonged low-yield environment ('low-for-long') — entrenched secular stagnation driving down yields at all maturities for a long period of time; and a 'double-hit' scenario — a sudden increase in risk premia combined with the low yield environment.

21 It should be noted that the figure does not measure the impact of the VA on the capital requirements.

sue where undertakings use an internal model that is based on a dynamic VA. These potential consequences should in any case be confronted with the additional requirements set out in Solvency II and costs also in terms of reputational risk related to the transparency required when using the VA.

The VA usually lowers the technical provisions of undertakings. From an economic point of view this reduction is only justified where the undertaking is able to earn a yield on its investments that is at least the RFR plus the VA. This may not be the case where undertakings hold investments different from the representative portfolio, where there is a significant mismatch between assets and liabilities duration, where they need to sell them while spreads are wide or where the defaults on their investments exceed the losses reflected in the risk correction of the VA. In these situations, the application of the VA may undermine the solvency position of the undertaking. Similar concerns exist with regard to the reduction of the SCR, especially through the application of a dynamic VA within an internal model.[22] The possibility for the insurers to herd into the basket should be further investigated in order to see if insurers have been changing their investment profile to mirror the representative portfolios of assets as used by EIOPA to calculate the VA. On the other hand, it has to be considered that the VA primarily has not an economic justification rather a stabilisation one, as it is a measure conceived not for the individual insurer but for the market in order to avoid procyclicality in specific circumstances (such as when spreads are widening in the market).

The VA may also be high and decrease technical provisions and SCR where there is no apparent macroeconomic need for such a reduction. Examples are the currently high VAs for some currencies.

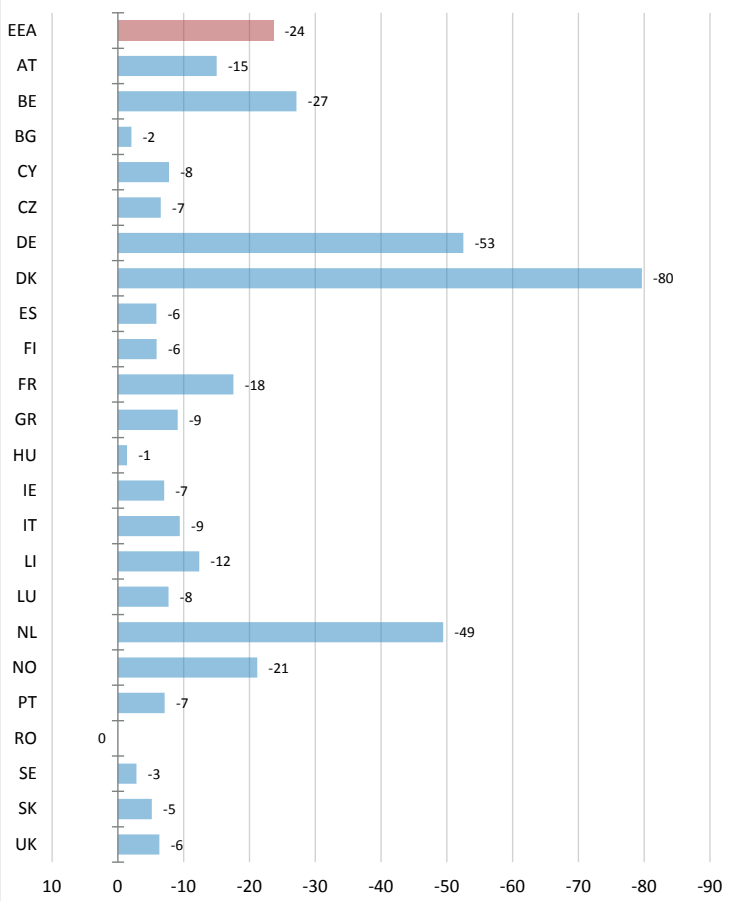
22 This paper does however not cover the macroprudential impact of the dynamic VA.

Box 3: The impact of the volatility adjustment for some European insurance companies[23]

Based on a survey conducted by EIOPA at the beginning of 2017, the VA is the LTG measure most widely adopted in Europe. For example, the technical provisions of undertakings applying the VA in France represent 21.6%, and in Germany 10.5% of the overall technical provisions in the EEA.

The standard methodology used for calculating the VA has two components: the first, which raised the yield curve by 13 basis points at the end of 2016, is the same for all the euro-area countries; the second is specific to each country. The common component for the euro-area countries is calculated on the credit spreads of a reference portfolio currently consisting of 27 % European government securities, 44 % private-sector bonds diversified according to sector and rating and the remainder other categories of assets.

Chart B1: Average impact of the VA on the SCR ratio of undertakings using the measure in %pts



For the EEA countries, the VA, calculated on a common reference portfolio for all of the countries, raised the average solvency ratio of insurance companies from 199 to 223 %. Without using the VA, the technical provisions of EEA countries would increase in value by 0.6 % on average (French, Spanish and German undertakings, 0.4 %; and Italian undertakings, 0.5 %).

The adjustment had a positive impact on the solvency ratio of companies, ranging from 1 percentages points for Hungarian companies to 80 percentages points in the case of Danish companies.

23 EIOPA (2017b).

4. Matching adjustment

4.1. Description

The MA to the relevant RFR term structure is an adjustment to the calculation of the RFR used in the technical provisions, set out in Articles 77b and 77c of the Solvency II directive.

The use of the MA is subject to prior supervisory approval and both the assets and the liabilities must meet certain criteria to ensure use of the MA is appropriate, as well as being separately identifiable from other activities for the insurer. As described in EIOPA's report on LTG measures, 38 insurers adjust the RFR upwards in recognition of the assets held to maturity and not subject to the risk of changing spreads on those assets.

According to Article 77b of the Solvency II directive, the only underwriting risks connected to the portfolio of obligations are longevity, mortality, expense and revision risk. This implies that, besides the adjusted RFR, the only assumptions used to calculate the technical provisions are the mortality tables, the cost charges and parameters that explicitly reflect the revision risk.

A matching technique fully immunises the portfolio against interest-rate risk and spread risk only if an exact matching is achieved. If this cannot be achieved, some interest rate and spread risk remains. According to Article 77(1)(c) of the Solvency II directive an exact match is not required, but undertakings have to ensure that any mismatch does not give rise to risks that are material in relation to the risks inherent in the insurance or reinsurance business to which the MA is applied. Furthermore, according to Article 77b(2), if an undertaking that applies the MA is no longer able to comply with the conditions set out it shall immediately inform the supervisory authority and take the necessary measures to restore compliance with these conditions. Where such an undertaking is not able to restore compliance with these conditions within 2 months it shall cease applying the MA to any of its insurance or reinsurance obligations, and shall only be able to apply the MA again after a period of 24 months.

4.2. Classification and mapping

The MA is a targeted instrument. It can only be applied by undertakings requesting it and upon approval by the supervisor, subject to specific criteria on the assets and liabilities that may be eligible. It is predominantly also a *time-varying* instrument. It applies to an assigned portfolio of assets, consisting of bonds and other assets with similar cash-flow characteristics, to cover the best estimate of the portfolio of an undertaking's obligations, which is maintained over the lifetime of the obligations (except for the purpose of maintaining the replication of expected cash flows between assets and liabilities where the cash flows have materially changed). However, the MA also varies over time, depending on the market rates. Lastly, it is a rule-based instrument, i.e. the conditions are predefined in Article 77b and need to be met in order to obtain approval from supervisors. Once approval is given the impact of the MA on the insurer's solvency position is automated, notwithstanding the supervisory review process.

The contribution of the MA to the mitigation of systemic risk sources and, therefore, to the achievement of the operation objectives can be assessed as follows.

Main sources of systemic risk addressed.

- *Collective behaviour by insurers that may exacerbate market price movements*. Cash-flow matching, together with the rest of the necessary requirements to be able to use the MA, aims at ensuring that assets can be held to maturity, thus removing the insurers' exposure to market risks (other than credit risks) on the supporting assets. The MA directly influences the asset

allocation of insurers to best match the cash flows of their liabilities, and reduce both market risk and liquidity mismatch. Its design also reduces the volatility of own funds, which may itself drive insurers to undertake procyclical investment behaviour.

Main operational objective(s) to which the measure contributes.

- *Limit procyclicality.* By recognising the fact that insurers have effectively matched the cash flows of their liabilities with cash flows on their assets, the MA contributes to the mitigation of possible procyclical investment behaviour. A case study is included in Box 4.

As also stressed in the context of the VA, conceptually the MA is designed to act as symmetric adjustment, given that under certain circumstances it could lead to a negative adjustment resulting in higher liabilities, which, however, is unlikely in practice.

Undertakings do not have the flexibility to 'opt out' of using MA when it becomes negative, due to a provision of the Solvency II directive that states that 'Insurance or reinsurance undertakings that apply the MA to a portfolio of insurance or reinsurance obligations shall not revert back to an approach that does not include a matching adjustment'.[24]

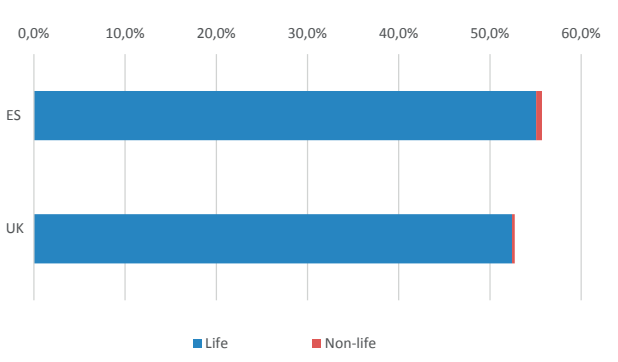
4.3. Initial/preliminary assessment of the impact

In terms of the number of entities, the use is more restricted compared with the VA. According to the LTG report 2017, out of the 2 945 (re)insurers surveyed, only 38 undertakings use the MA, representing 15 % in terms of the technical provisions. Although from an EU aggregate level the impact of MA is more limited, its use is concentrated in just two Member States: Spain (15 undertakings) and the United Kingdom (23 undertakings). In these Member States the MA plays a very important role in ensuring financial stability. The increase in technical provisions without the MA for those undertakings applying the measure would be around 5.4 % in Spain and 4 % in the UK.

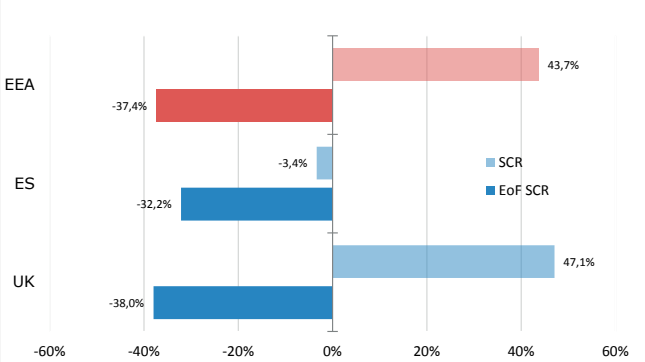
The approval of an MA is restricted to asset and liability portfolios for which it can be demonstrated by the undertakings that several strict conditions are met, as laid down in Article 77b(1) of

Figure 6: Impact of the use of MA in relevant countries

National market share in technical provisions of undertakings using MA



Average impact of removing the MA on eligible own funds to cover the SCR (EoF SCR) and SCR of undertakings using the measure



Source: EIOPA (2017b).

24 Article 77b(2) of the Solvency II directive.

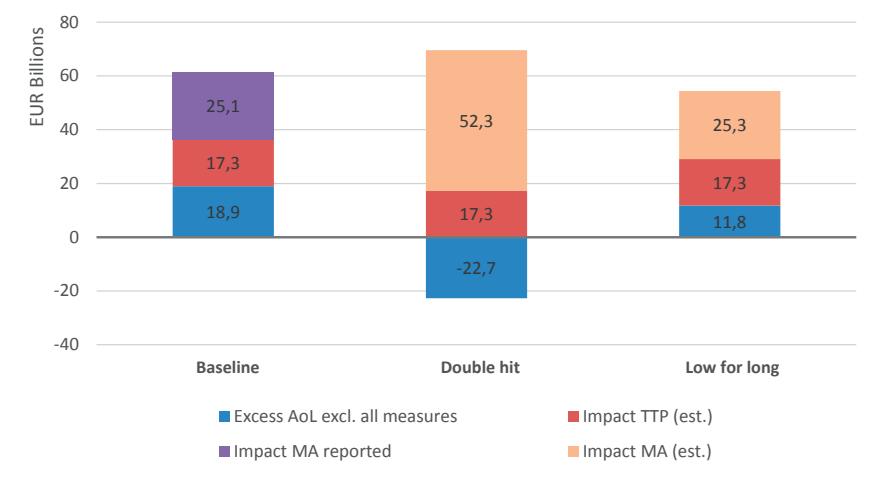
the Solvency II directive. Also, according to Article 77b of the directive, the only underwriting risks connected to the portfolio of obligations are longevity, mortality, expense and revision risk. These eligibility criteria aim at ensuring the efficiency of the measure restricting its use for the sake of soundness.

The 2016 EIOPA stress-test data also provide a useful insight into the financial stability impact of the MA in the baseline scenario and in the double-hit and low-for-long scenarios. In this case the sample is small, comprising only six undertakings.

As shown in Figure 7[25] the MA has an effect in both the low-for-long and baseline scenarios. In the low–for-long scenario, the effect of the MA hardly changes compared to the baseline (roughly 40-50 % of excess of assets over liabilities, EAOL), showing that the MA portfolios are effectively immunised to the interest-rate movements as asset and liability movements offset each other. This is in line with the expectations, as the application of the MA requires strict asset and liability cash-flow matching. The impact of the MA in the double-hit scenario is definitely more pronounced, increasing by a factor of 2.1 as this scenario implied an increase in the spreads, and this is a tool sensitive to exacerbated asset spreads. Please note that the figure does not reflect the impact of the MA on capital requirements, and the sample in this case is quite small.

As mentioned before, a detailed analysis of the macroprudential impact of VA and MA in a stress scenario is provided in the Annex to this paper. Based on this analysis, it can be concluded that the MA has also contributed to limiting short-term volatility. Furthermore, due to its design, the MA limits any risk of potential fire sales of assets actually held to match liability cash flows. It is important to remark that the increase in the MA and its impact is directly driven by an increase in the spreads in the actual undertaking's portfolio. Provided that all the strict MA requirements are met, and to the extent that the assets are not sold and their credit quality of

Figure 7: Impact of MA and TTP on MA users exclusively (Sample of 6 insurers)



Source: EIOPA.

25 Note that the sample of insurers that use only the MA is very small and not necessarily representative for the full market, or for the impact of MA among insurers that use MA and VA.

the actual asset portfolio is not deteriorated, despite the increase in the spreads the valuation of the matched liabilities still reflects that as the insured payments are due, they will be sufficiently covered by the assets cash flows. Lastly, similar to the VA, it can also be concluded that the MA works countercyclically in times of dramatic stress.

The MA may be higher when the investments of the undertaking have a lower credit quality and a higher spread. This may provide an incentive to undertakings to take more spread risk. To counteract this incentive, the Solvency II directive states that 'the fundamental spread must be increased where necessary to ensure that the MA for assets with sub-investment grade credit quality does not exceed the MAs for assets of investment grade credit quality and the same duration and asset class'.[26] Additionally, the prudent person principle also applies to insurers that use the MA and, according to Article 77b(1)(a) of the Solvency II directive, they can replace assets in case the expected cash flows between assets and liabilities have materially and adversely changed. This could be the case, in the absence of any buffer, when the default probability of assets deteriorates or the expected assumptions (mortality or cost charges) materially deviate from the actual experience.

Furthermore, undertakings may anticipate that the MA will immunise their prudential balance sheet against the widening of credit spreads. That may also provide an incentive to undertakings to take more spread risk. Nevertheless, this potential incentive is mitigated by the aforementioned restriction.

The MA usually lowers the technical provisions of undertakings. From an economic point of view this reduction is only justified where the undertaking is able to earn a yield on its investments that is at least the RFR plus the MA. The requirements for the application of the MA and the calculation of the MA aim at ensuring that. Where the assumption that these requirements and calculations are based on turns out not to hold true, for example the assumption that the undertaking can uphold the asset–liability matching or the assumption that the fundamental spread covers the relevant risks of the assets, the insurers may incur losses in their balance sheet that cause their solvency position to deteriorate.

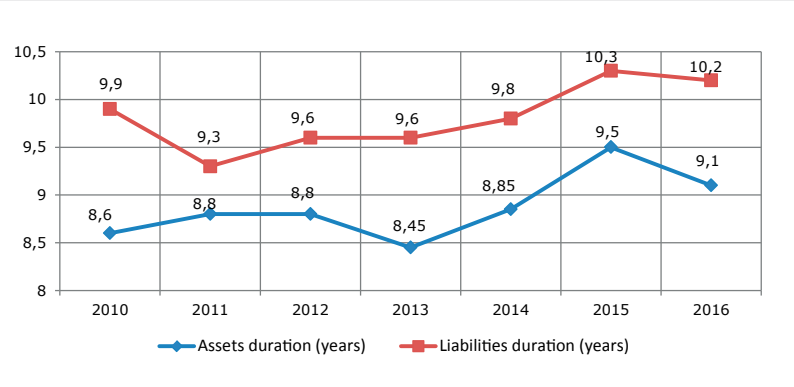
The impact of the MA on insurers' investment behaviour is also considered in the Bank of England's November 2016 *Financial Stability Report*, concluding that the MA is beneficial from a macroprudential perspective by reducing potential instability across the financial system. The underlying modelling of this analysis is set out in more detail in staff working paper No 664 (Douglas *et al.*, 2017). It models how some life insurers' allocations between risky and safe assets vary in response to different types of changes in financial market prices, allowing them to estimate the propensity for some insurers to act procyclically as a result of the regulatory regime. The conclusion is that insurers are expected to invest only modestly procyclically under Solvency II regulations following a fall in risky asset prices caused by an increase in liquidity premia or by a deterioration in credit fundamentals. The limited investment response under Solvency II is partly driven by the MA, which cushions insurers' capital resources in the face of changes in risky asset prices.

26 Article 77c(1)(c) of the Solvency II directive.

Box 4: The Spanish experience with a type of matching adjustment immunisation technique

Spain incorporated the financial immunisation and ALM methodology for covering interest rate and spread risks in 1999. This immunisation technique is comparable to the MA under Solvency II. One of the key elements of the immunisation technique is that the duration of the portfolio of assets assigned to the liabilities is in a similar range.

Figure B1: Duration of assets and liabilities using the immunisation technique

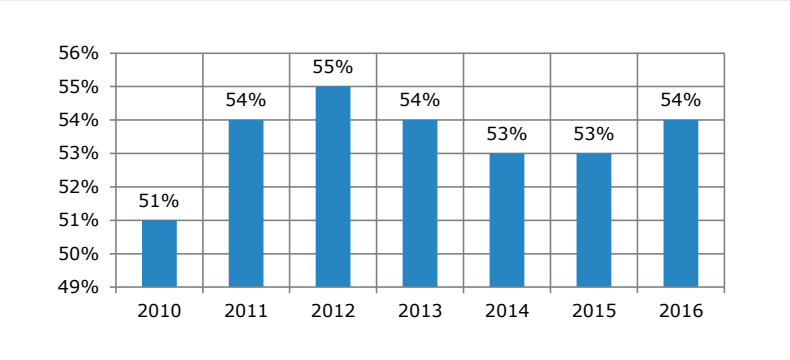


Source: DGSFP.

Although the methodology adopted in Spain has differences compared to the Solvency II MA,[27] the experience gained in Spain provides valuable insights to assess the macroprudential impact of the Solvency II measure. Furthermore, during the 18 years in which the measure has been in place in Spain, the Spanish economy has gone through different macroeconomic environments (high and low interest rates, different phases in the business cycle, etc.), which make the analysis more valuable also in light of Solvency II.

The use of the immunisation techniques by Spanish insurers has remained rather stable over time, and with the entry into force of Solvency II in 2016 insurers have adopted the MA.[28]

Figure B2: Percentage of transitional provisions using immunisation techniques



Source: DGSFP.

27 The key differences refer to the adjustment to the discount rate (in Solvency II, the adjustment is based on the market value of assets), the ALM technique (only cash-flow matching is allowed under Solvency II) and fundamental spread (in the new prudential framework, one part of the spread is deducted from the de-risk CF (PD) and the rest from the IRR).

28 Although there are different possibilities, the Spanish life insurance products to which the matching mechanism applies are traditional life insurance products providing long-term fixed-interest-rate guarantees at maturity.

The Spanish supervisory authority, the Dirección General de Seguros y Fondos de Pensiones (DGSFP), views the impact of such a measure positively in terms of managing the interest-rate and spread risks of life-insurance undertakings, thereby contributing to the financial stability of the insurance sector.

Although insurers have faced several challenges (e.g. high guaranteed products in a low-interest-rate environment), these challenges have not resulted in solvency problems for the undertakings using this technique. Additionally, the measure contributed to avoiding situations of fire sales of assets and proving the countercyclical behaviour of the undertakings. For example, during the peak of the financial crisis in Spain (2011-2012), almost 97 % of the assets of insurance companies using immunisation techniques remained in their portfolio.

Furthermore, the 2016 EIOPA stress test showed that the excess of assets over liabilities of Spanish undertakings increased by 1.6 % under the low yield scenario, showing the immunity of insurance companies using the tool against interest rate movements.

In summary, according to the analysis carried out by the DGSFP, the financial immunisation and ALM tool in Spain has contributed to the stability of the financial system and the real economy as follows.

- Insurers have been able to keep their countercyclical behaviour during one of the toughest crises in modern history. Undertakings have played a very important role acting as a stabiliser of the real economy and financial markets during volatile markets (as long-term holders of corporate and sovereign bonds).
- Insurers have been able to support and help stimulate the real economy in Spain through investments in long-term bonds.

5. Extension of the recovery period in case of non-compliance with the SCR

5.1. Description

The extension recovery period (ERP) in case of non-compliance with the SCR introduces — under exceptional circumstances — the permission to extend the recovery period designated in the usual application of Article 138(3), in case of non-compliance with the SCR. According to this article, the National Supervisory Authority (NSA) shall require that the undertaking concerned take the necessary measures to restore their financial soundness within 6 months (extendable to a maximum of 9 months) from the observation of non-compliance with the SCR. Accordingly, companies should re-establish the level of eligible own funds covering the SCR and/or reduce their risk profile to ensure compliance with the SCR.

The 6-9-month period could, however, be extended in exceptional circumstances. Article 138(4) states that if EIOPA declares the existence of an 'exceptional adverse situation', the concerned NSAs may extend the recovery period by a maximum of 7 years.

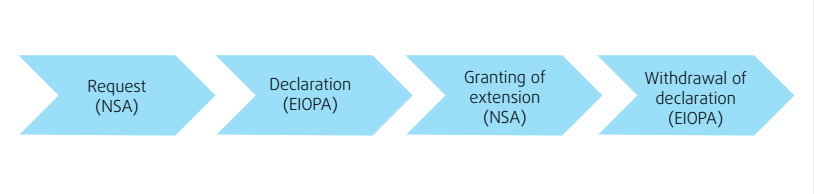
According to the said article, an exceptional adverse situation exists where the financial situation of insurance or reinsurance undertakings representing a significant share of the market or of the affected lines of business are seriously or adversely affected by one or more of the following conditions:

(a) a fall in financial markets which is unforeseen, sharp and steep;
(b) a persistent low interest rate environment;
(c) a high-impact catastrophic event.

Article 289 of the delegated regulation[29] provides an overview of the factors and criteria that NSAs shall take into account when considering whether and to what length an extension of the recovery period should be granted, thereby also suggesting potential benefits of this tool.

This tool, which can only be used by NSAs after EIOPA has declared the existence of an exceptional adverse situation, is activated/deactivated as described in Figure 8. The relevant NSA(s) need to submit a formal request to EIOPA on the existence of an exceptional adverse situation. EIOPA will then assess the situation and take an informed decision on whether an exceptional adverse situation exists, where appropriate after consulting the ESRB.

Figure 8: Process for the extension of the recovery period



Once EIOPA has officially declared the existence of an exceptional adverse situation, and throughout the time frame in which the declaration is valid, NSAs may extend, for affected undertakings, the recovery period by a maximum period of 7 years, taking into account all relevant factors as described in the delegated regulation. During this period, insurers should submit progress reports to the NSA setting out the measures taken and the progress made to ensure compliance with the SCR. NSAs must withdraw the extension where a progress report shows that there has been no significant progress.

The validity of the declaration will be reassessed on a regular basis by EIOPA, until a decision to withdraw the declaration (i.e. deactivation of the instrument) is taken. As stated in the EIOPA guidelines, 'where EIOPA has declared that the exceptional adverse situation no longer exists, the supervisory authority should review any

29 Commission Delegated Regulation (EU) 2015/35 of 10 October 2014 supplementing Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of insurance and reinsurance (Solvency II).

extension granted as soon as possible' (EIOPA, 2015a), i.e. the relevant NSA will take the final decision to maintain or not the extension of the recovery period.

5.2. Classification and mapping

The ERP is a *targeted* instrument. Once the exceptional adverse situation has been officially declared by EIOPA, NSAs can grant an extension of the recovery period to specific undertakings.

Furthermore, the instrument has a certain *time-varying* element. Although the decision to grant an extension is fixed, NSAs could – within the 7-year period – decide on a new extension, in accordance with the financial situation of the affected undertakings and on the basis of the risks for the financial system that not granting a new extension could imply.

Lastly, the ERP is a *discretionary* decision by the relevant NSA(s). Indeed, NSAs already have discretion at the beginning of the process, given that it is up to them to make a request to EIOPA on the potential existence of an exceptional adverse situation. Furthermore, the fact that EIOPA has declared the existence of an exceptional adverse situation does not imply an automatic extension of the recovery period. NSAs can, at their discretion, decide whether and to which companies the extension should apply, along with the length of such an extension. Furthermore, according to the EIOPA guidelines, 'the supervisory authority should make all decisions to extend the recovery period subject to the provision whereby the supervisory authority may revoke or reduce the extended recovery period, as appropriate, where the underlying circumstances of the extension have changed'.

The contribution of the ERP to the mitigation of systemic risk sources and, therefore, to the achievement of the operation objectives can be assessed as follows.

Main sources of systemic risk addressed.

- *Collective behaviour by insurers that may exacerbate market price movements.* As set out in recital 35 of Omnibus II, the tool to extend the recovery period is provided to allow for flexibility with regard to supervisory measures where a significant part of the insurance market faces major problems that may negatively impact the market as a whole. These could materialise if a significant part of the market is forced to take similar measures within the same limited time frame.

Main operational objective(s) to which the measure contributes.

- *Limit procyclicality.* The ERP contributes to avoiding the procyclicality stemming from collective behaviours that may negatively impact the financial system and create systemic risk.

5.3. Initial/preliminary assessment of the impact

Taking into account all LTG and equity measures applied, 44 undertakings were in breach of the SCR on 31 December 2016 (Table 3).

Although several companies are in breach of the SCR in the EU, to date EIOPA has not received a request to declare an exceptional adverse situation. Conceptually, however, the correct use of this tool may have a positive impact on markets and undertakings.

- Given that the extension of the recovery is granted in a challenging environment in which a significant part of the market would be affected, the tool avoids the potential negative impact of certain collective behaviours, for example a large number of companies looking for funding in the market at the same time. This, however, comes at a certain cost, i.e. insurers would be capitalised at a level that is lower than needed from an economic

perspective for a longer period (since insurers are longer non-compliant with the SCR in this case).

- From the perspective of undertakings, the extension of the recovery period provides insurers with additional time to mitigate the negative impacts of volatility reflected in the Solvency II balance sheet and to avoid procyclical behaviour such as fire sales.

In light of potential future developments, the impact of these tools could be assessed in the following way.

(a) Once an exceptional adverse situation has been declared by EIOPA, but before it has been withdrawn, it could be interesting to look at the following issues:

- number of actual extensions granted to undertakings;
- number of cases of withdrawal/revocation of the extension granted during the exceptional adverse situation;
- evolution of the SCR ratio for undertakings/markets/lines of business affected;
- changes in the composition of the investment portfolio.

(b) Once an exceptional adverse situation, as declared by EIOPA, has been withdrawn, it could be interesting to analyse the number of undertakings that were able to restore compliance during the extended recovery period in contrast with the number of undertakings that did not recover in spite of the extended recovery period.

It is difficult to predict how the market will react to insurers disclosing SCR breaches and the uncertainty of whether an exceptional adverse situation will be declared, or how the market will react to the declaration once it occurs, given the lack of experience with this tool. Further work could be carried out to identify how to avoid negative side effects of the application of this tool and to allow for the full materialisation of the benefits, including how to continuously assess the long-term viability of insurers and how to prevent disproportionate negative effects for the financial market in general, or the insurance market in particular when granting an extension of the recovery period and deciding on the duration of that extension.

Table 3: Number of undertakings breaching the SCR

Member State	Undertakings breaching the SCR
Bulgaria	3
Cyprus	1
Czech Republic	1
France	4
Greece	1
Ireland	3
Italy	4
Luxembourg	6
Malta	2
Netherlands	3
Norway	1
Poland	1
Romania	1
Spain	2
UK	12
Total	44

Source: EIOPA (2017b).

6. Transitional measure on technical provisions

6.1. Description

The purpose of the TTP, which is laid down in Article 308d of the Solvency II directive, is to smooth the transition to the new Solvency II regime and to avoid market disruption and limiting interferences with existing products, as well as ensuring the availability of insurance products. The transitional measures should encourage undertakings to move towards compliance with the particular requirements of the new regime as soon as possible. The relevance of the transitionals is expected to decrease over time, as undertakings are required to increasingly converge towards the full application of Solvency II.

The difference between the two technical provisions for the insurer's book of pre-January 2016 insurance business is calculated and that amount is then deducted from the insurer's technical provisions required under Solvency II, decreasing every year by one sixteenth until 1 January 2032 where no deduction is made and the insurer is expected to meet the Solvency II calculated technical provisions in full.

The technical provisions used to calculate the transitional deduction may also be recalculated every 24 months, or more frequently when the risk profile of the undertaking has materially changed. This adjustment means that the deduction will adapt to the changing position of the insurer's technical provisions under both the Solvency I and Solvency II regimes, as economic conditions change. For example, if Solvency II technical provisions fell relative to Solvency I technical provisions, in case of a recalculation the deduction would also fall, and if the Solvency II technical provisions were to increase relative to the Solvency I technical provisions, the deduction would also increase (relatively speaking, as overall the deduction decreases by 6.25 % each year).[30]

30 This example assumes that the TTP has not been limited in accordance with Article 308d(4) of the Solvency II directive.

6.2. Classification and mapping

The TTP is not a tool or instrument of Solvency II but an opportunity for insurers to implement the new prudential regime avoiding strong disruptions. The decision to apply the TTP is made by undertakings but is subject to prior approval by their supervisory authority.

Box 5: Some comments on the transitional measure on the risk-free interest rates

The transitional measure on risk-free interest rates (TRFR) is an option that, subject to supervisory approval, undertakings can use for a period of 16 years after the start of Solvency II. The TRFR is an adjustment to the RFR for the valuation of insurance and reinsurance obligations, which is based on the difference between the discount rates of Solvency I and the Solvency II relevant RFRs. At the beginning of Solvency II the transitional adjustment is 100 % of that difference. Over the transitional period of 16 years the transitional adjustment is linearly reduced to zero. The transitional measure applies only to insurance and reinsurance obligations arising from contracts concluded before the start of Solvency II.

According to EIOPA (2017b), six undertakings in four Member States were using the TRFR at the time of that report was prepared (Germany, Ireland, Greece and France). The market share in technical provisions of undertakings using the TRFR is negligible both at EEA level and at national level, except in Greece, where the aggregated market share of the two undertakings using the TRFR is approximately 10 % of the national market. Furthermore, according to the Solvency II directive it is possible to apply TRFR and VA simultaneously to the same liabilities. Of the six European undertakings applying the TRFR, four also apply the VA.

Like the TTP, the purpose of the TRFR is to help insurers adjust to any higher technical provisions required under Solvency II compared to their previous national regimes and smooths the adjustment to higher technical provisions under Solvency II compared to their previous national regimes. However, unlike the TTP the TRFR is not recalculated in response to changes in the risk profile of the insurers and so does not have the same countercyclical element. This, together with the limited use, makes the TRFR less attractive from a macroprudential point of view.

From that point of view, it can be considered a targeted measure that affects specific companies.[31] The TTP has also a certain *time-varying* element. As mentioned before, subject to prior approval by or on the initiative of the supervisory authority, the amounts of technical provisions (including, where applicable, the amount of the VA used to calculate the transitional deduction) may be recalculated every 24 months, or more frequently when the risk profile of the undertaking has materially changed. Lastly, given that the supervisor has to approve the use of the TTP and can choose whether to apply a limit to the TTP amount, it allows for a certain amount of *discretion* in its use.

The contribution of the TTP to the mitigation of systemic risk sources and, therefore, to the achievement of the operation objectives can be assessed as follows.

Main sources of systemic risk addressed.

- *Collective behaviour by insurers that may exacerbate market price movements*. The objective of the TTP is to smooth the adjustment to higher technical provisions under Solvency II compared to their previous national regimes and reduce negative effects that may occur from significant changes in the capital positions of insurers through the introduction of Solvency II. Generally, insurers who do not have sufficient retained profits will react to increased regulatory solvency requirements by raising capital or by reallocating their asset portfolios to improve their solvency position. However, this can lead to inefficiencies, for example insurers may find capital raising more costly than needed or may not receive the best prices for their assets. If many insurers undertake these activities at the same time (such as in response to a new solvency regime), it can also become a destabilising element to the rest of the market.

Main operational objective(s) to which the measure contributes.

- *Limit procyclicality.* In the absence of the TTP, the transition from Solvency I to Solvency II may affect insurers' propensity to invest procyclically by encouraging insurance companies to reinforce falls (rises) in RFRs by switching into (out of) low-risk assets.[32]

6.3. Initial/preliminary assessment of the impact

EIOPA's LTG report noted that the TTP is the second most commonly used measure after VA and is applied by 163 undertakings from 11 countries, representing 24.9 % of the overall amount of TPs at EEA level.

From a macroprudential point of view, two main impacts can be identified: (a) the avoidance of market disruptions if a significant number of insurers take similar actions to comply with the new capital requirements in a short period of time, i.e. potential procyclicality effects of regulatory changes; and (b) the ability to recalculate the deduction can act as a tool against certain types of procyclicality in the Solvency II capital rules.

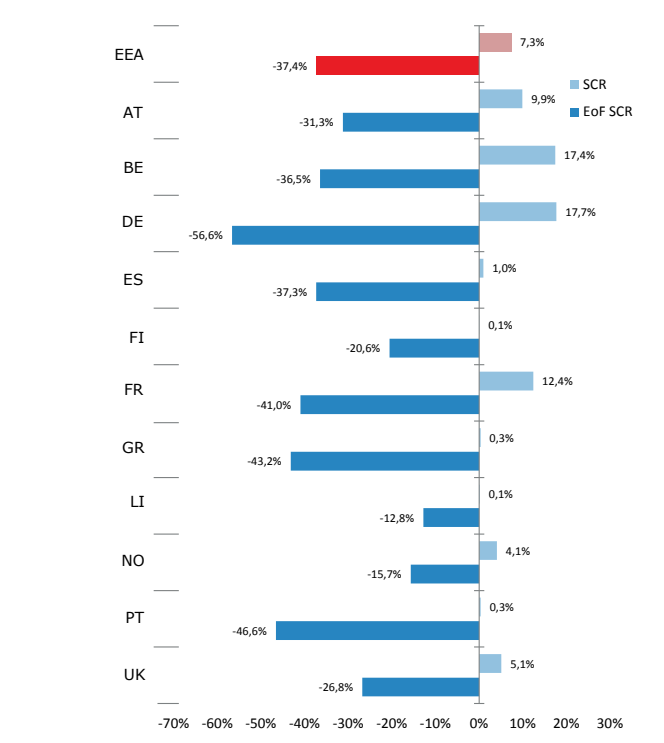
On the latter, where an exogenous shock leads to increased Solvency II technical provisions relative to the Solvency I provisions, recalculation of the deduction and the consequential increased deduction will absorb some of the increased technical provisions and reduce volatility in the capital requirements.[33] While some volatility in capital requirements

31 The main reason for this targeted nature is that, as a matter of fact, the TTP is designed to address not systemic risk but shortages in undertakings' capital.

32 Bank of England (2016).

33 This may not hold true in all markets because the Solvency I technical provisions may also change over time.

Figure 9: Average impact of removing the TTP on eligible own funds to cover the SCR (EoF SCR) and SCR of undertakings using the measure



Source: EIOPA (2017b)

is appropriate and even fundamental to the market-consistent approach adopted under Solvency II, excessive volatility in the level of the SCR can have a macro-prudential impact, and some method of softening and absorbing volatility will need to be considered in order to avoid incentivising unintended consequences. For example, insurers may become unwilling to take on investments or liabilities that receive excessively volatile capital treatment, despite these investments or liability types being beneficial for the real economy.

It should be stressed, however, that the main reason for applying the measure is not to address procyclicality but to deal with a shortage of capital for a limited period. Another consideration is that the scenarios where the recalculation of the deduction would have a countercyclical effect seem to be limited (only changes of interest rates). Furthermore, the measure may not be effective where Solvency I technical provisions have increased since the last calculation of the deduction.

The downside to any transitional measure that offsets higher technical provisions is that insurers are capitalised at a level that is lower than needed from an economic perspective for a longer period of time, increasing the risk that they will not have sufficient capital to pay their claims or to fund a transfer of their liabilities to another insurer if they get into further distress. Nevertheless, it should be considered that the fact that the TTP is time-limited and their impact will fade is, to a certain extent, a safeguard against prolonged undercapitalisation.

In order to mitigate the risk that insurers do not strive to improve their capital position in the long-term, Solvency II introduced requirements that must be met before the transitional benefit is approved

Box 6: The United Kingdom's experience of the TTP

In the United Kingdom, 29 undertakings representing 13.7 % in terms of technical provision use the TTP. Because the TTP can be recalculated, it is able to act as a countercyclical tool in some situations. For example, for many insurers in the United Kingdom, a decrease in long-term interest rates would mean that insurers' solvency positions would immediately deteriorate due to increases in the amount of the risk margin, unless insurers also recalculated the TTP so that the shock to the risk margin would be recognised in the transitional benefit. The Prudential Regulation Authority made it clear in May 2016 that changes in operating conditions, such as sustained changes in RFRs that led to a material increase or decrease in a firms' solvency coverage ratio, could give rise to the need to recalculate the TTP.[34]

In July 2016, the Bank of England noted in their Financial Stability Report that the Financial Policy Committee:

'... supported the position of the Prudential Regulation Authority (PRA) to allow insurance companies to use the flexibility in Solvency II regulations to recalculate transitional measures. These measures smooth the impact of those regulations. Without them, the regulations, which came into force in January, would tighten regulatory constraints on insurance companies following sharp falls in market interest rates. At the margin, the recalculation of transitional measures is likely to reduce immediate pressure on insurance companies to sell corporate securities and other risky assets.'

Insurance products that are long term in nature and exposed to longevity risk (such as annuities) are most affected by volatility in the risk margin. These products make up a significant share of the UK life insurance market.

The underlying work on the impact of the TTP on the capital position shock due to the risk margin is set out in more detail in the November 2016 Financial Stability Report and staff working paper No 664 (see Douglas et al. (2017).

However, the TTP's macroprudential effectiveness as a countercyclical tool is time limited, as the deduction is reduced from 100 % of the increase in technical provisions in 2016 to 0 % in 2032. For example, if the shock to interest rates were to occur in 2030, only 12.5 % of the shock to insurers' solvency positions would be absorbed.

34 Prudential Regulation Authority supervisory statement SS6/16, Recalculation of the 'transitional measure on technical provisions' under Solvency II, May 2016 (http://www.bankofengland.co.uk/pra/Documents/publications/ss/2016/ss616.pdf).

and that seek to ensure insurers are not undercapitalised for a longer period than necessary. These requirements include the requirement for insurers to publicly disclose their use of the transitional benefit and its impact on their financial position. Supervisors may limit the deduction to ensure it does not lead to a reduction in required capital compared to the previous solvency regime. If the insurer relies on the transitional benefit to meet its SCR, an annual report setting out measures taken and progress towards improving their financial position to ensure compliance with the SCR at the end of the 16-year transitional period is required, and supervisors must revoke the approval of the deduction if the report shows that compliance with the SCR at the end of the transitional period is unrealistic.[35] This revocation of the transitional period will mean the insurer must recover under a much shorter time frame.

35 These requirements are set out in Article 108d(4) and (5).

7. Prohibit or restrict certain types of financial activities

7.1. Description

This power, which is not part of Solvency II, is however considered within the scope of this paper. The power is compatible and in line with the spirit of Solvency II (in terms of the protection of policyholders and the stability of the financial system) and should also be implemented EU wide.

The power to prohibit or restrict certain types of financial activities is given to EIOPA and EU competent authorities by, respectively, Articles 16 and 17 of Regulation (EU) No 1286/2014 on key information documents for packaged retail and insurance-based investment products (PRIIPs).[36] Article 16 states that EIOPA may temporarily prohibit or restrict in the EU 'a type of financial activity or practice of an insurance or reinsurance undertaking'.[37] Article 17 gives competent authorities the same power, subject to a slightly different set of conditions and restricted to the competent authority's own Member State.

According to Article 2(1), the regulation applies to 'PRIIP manufacturers and persons advising on, or selling, PRIIPs'. A PRIIP is defined in the regulation as any product 'manufactured by the financial services industry to provide investment opportunities to retail investors, where the amount repayable to the retail investor is subject to fluctuation because of exposure to reference values, or subject to the performance of one or more assets which are not directly purchased by the retail investor'. It includes, among other products, investment funds, unit-linked policies and life insurance policies with an investment element.

In order for EIOPA to exercise this power, all of the following conditions must be met:

- the proposed action addresses a significant investor protection concern or a threat to the orderly functioning and integrity of financial markets or to the stability of the whole or part of the EU's financial system;
- regulatory requirements under EU law that are applicable to the relevant activity do not address the threat;
- competent authorities have either not taken action to address the threat or the actions taken have been inadequate; and
- the proposed action does not have a disproportionate negative impact on investors or the efficiency of financial markets and does not create a risk of regulatory arbitrage.

Prohibitions or restrictions implemented under this power are active for 3 months. EIOPA must review any such actions at least every 3 months. If, after review, it is decided not to renew the action question, it shall expire.

For competent authorities, the set of considerations is slightly different. Namely, a competent authority must be satisfied on reasonable grounds that:

- an activity or practice gives rise to significant investor protection concerns or poses a threat to the orderly functioning and integrity of financial markets or the stability of whole or part of the financial system within at least one Member State;
- existing regulatory requirements under EU law applicable to the activity or practice do not sufficiently address the targeted risks and the issue would not be better addressed by improved

36 Regulation (EU) No 1286/2014 of the European Parliament and of the Council of 26 November 2014 on key information documents for packaged retail and insurance-based investment products (PRIIPs) (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R1286).

37 Subject to a certain conditions and in accordance with Article 9(5) of Regulation (EU) No 1094/2010 and the further conditions specified in Delegated Regulation (EU) 2016/1904 with regard to product intervention (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R1904).

supervision or enforcement of existing requirements;

- the action is proportionate taking into account the nature of the risks identified, the level of sophistication of investors or market participants concerned and the likely effect of the action on investors and market participants;
- the competent authority has properly consulted competent authorities in other Member States that may be significantly affected by the action; and
- the action does not have a discriminatory effect on services or activities provided from another Member State.

The Commission has adopted delegated acts specifying the criteria to be considered when determining where there is a significant investor protection concern or a threat to the functioning of financial markets and the financial system.[38] A number of criteria may be particularly relevant from a macroprudential perspective. These include:

- the complexity of the insurance-based investment product or type of financial activity or practice;
- leverage due to financing;
- features of securities financing transactions;
- whether the financial activity or financial practice poses a particularly high risk to the resilience or smooth operation of markets; or
- whether the financial activity poses a high risk of disruption to financial institutions deemed to be important to the EU financial system.

When exercising this power, a competent authority must give notice to EIOPA and all other competent authorities involved at least 1 month ahead of any action taking effect. However, in a situation where a 1-month notification period would prevent the targeted risks from being addressed, a competent authority may take action on a provisional basis with only 24 hours' notice. This provisional action may not last for more than 3 months.

7.2. Classification and mapping

Prohibiting or restricting certain types of financial activities is a *broad-based* measure. Once the decision is made, it affects all institutions involved in the manufacture or sale of such PRIIPs. Furthermore, the measure is activated and deactivated without adapting during the period in which it is active, so can be considered fixed measure. Lastly, as authorities have a certain amount of flexibility to activate the instrument based on the ad hoc analysis and judgement, prohibiting and restricting certain financial activities can be considered a *discretionary* measure.

The contribution of this measure to the mitigation of systemic risk sources, and therefore to the achievement of the operation objectives, can be assessed as follows.

Main sources of systemic risk addressed.

- *Involvement in certain activities or products with greater potential to pose systemic risk*. The activities that could be subject to limitation or restrictions are those with features that may lead to systemic risk.
- *Potential dangerous interconnections*. These activities, which are not directly connected to traditional insurance, also generally lead to dangerous interconnections across the insurance sector and with other financial sectors.

38 Commission Delegated Regulation (EU) 2016/1904 of 14 July 2016 supplementing Regulation (EU) No 1286/2014 of the European Parliament and of the Council with regard to product intervention.

Main operational objective(s) to which the measure contributes.

- *Discourage excessive involvement in certain products and activities.* Prohibiting or restricting certain activities before they have reached a certain level is a measure that could limit the negative systemic implications and the material risk to financial stability. It could be particularly useful in situations in which risks are difficult to assess and quantify. In such cases, other tools such as capital and leverage tools may be inappropriate and prohibitively difficult to calibrate.
- *Discourage risky behaviour.* At the same time, the restrictions or prohibitions would set a clear limit to the risk behaviour of undertakings.

7.3. Initial/preliminary assessment of the impact

There is not much experience with this tool, and therefore the assessment of its potential macroprudential impact is difficult to envisage at this stage. It will, however, very much depend on the way that EIOPA and national competent authorities exercise their product intervention powers. Its impact is counterbalanced by the existence of a potentially very high threshold for intervention. This could limit its use as a forward-looking tool. The high threshold for intervention may prevent authorities from acting when risks are first identified. It may instead be necessary to wait until risks have started to crystallise in order to provide evidence of significant concern for financial markets or the financial system.

Also, the announcement of the use of this power could lead to market disruption.[39] This is in contrast with other tools that can be implemented on a precautionary basis. The disruptive effect would be increased if the threshold for activation were only met once certain risks had already begun to materialise.

In the delegated acts, a distinction is drawn between a 'threat', which is required to intervene on the grounds of the orderly functioning and integrity of financial or commodity markets or stability of the financial system, and a 'significant concern', which is relevant for investor or policyholder protection. A 'threat' is deemed to be a higher threshold. Thus, although the measure may be imposed on a precautionary basis (and is likely to be more effective if used at an early stage), the scope for using this power as a pre-emptive tool may be subject to certain risks, which could lead to inaction bias by the authority.

Furthermore, two additional aspects need to be considered in order to increase the likelihood of an effective outcome. First, the power must be used in a coherent and coordinated way in all relevant jurisdictions, as laid down in the PRIIPs regulation. The effectiveness of the measure is significantly reduced in case of divergent approaches in EU Member States. Second, consistency should also be achieved on a cross-sectoral basis to prevent risks from being transferred across sectors. Special attention needs to be paid to non-insurance subsidiaries.

Given that there are no experiences in the insurance sector with regard to prohibiting or restricting financial products or activities that could threaten the stability of the whole or part of the financial system in the EU, a case study seems to be the only way to assess the potential macroprudential impact of such a measure in terms of mitigating systemic risk.

A commonly used example is the American International Group (AIG) case. Some of the main facts and figures from the problems arising with the credit default swaps (CDSs) and securities lending programme are sketched out in Box 7.

39 ESMA has recently announced some measures along these lines (https://www.esma.europa.eu/document/product-intervention-general-statement).

Box 7: Case study: Some facts and figures of the AIG case

The US Congressional Oversight Panel (2010) provided a comprehensive report regarding of the AIG case. Below are some facts and figures extracted from this report.

- The London-based AIG Financial Products (AIGFP) unit of AIG started trading CDSs on collateralised debt obligations backed by subprime mortgages, which produced unrealised valuation losses and collateral calls that brought AIG near to failure in 2008.
- As a result of this business, the AIGFP's operating income grew from USD 131 million in 1994 to USD 949 million in 2006 in line with the derivative and CDS markets. At its peak in 2007, the CDS business represented an aggregate portfolio of USD 527 billion, constituting just 20 % of the unit's overall derivatives exposure of USD 2.66 trillion.
- When market conditions became stressful (as a result of liquidity drains, downgrades on the reference securities and valuation losses by market participants), the demand for collateral calls increased dramatically and unveiled the non-viability of the AIGFP model.
- By the end of September 2008, AIG had recorded cumulative unrealised market valuation losses over the prior 2 years of USD 33 billion on this portfolio. This coincided with posted collateral of USD 32 billion, which represented 44 % of the notional value of the multisector CDS portfolio at the time.
- In addition, AIG had put in place a significant securities lending programme, which resulted in additional demands by its counterparties for the return of their cash collateral.
- AIG lent out securities owned by participating insurance subsidiaries in exchange for cash collateral, and some of this collateral was used to buy residential mortgage-backed securities (RMBS), with the intention of maximising its returns. At its peak in 2007, the US pool held USD 76 billion in invested liabilities, 60 % of which were RMBS.
- With the mortgage crisis, the ratings of the securities deteriorated, along with liquidity in the underlying market. The investment structure represented a sort of maturity transformation (AIG's counterparties could request the return of their cash collateral at short notice, while AIG had invested the money in securities that were increasingly illiquid after housing prices began to fall in 2006) that put the company in a very delicate situation.
- The increased demand for collateral lead to a liquidity crisis that nearly brought down AIG in full.
- The total government assistance at that time reached USD 182 billion. After repayments and investment returns the bail-out of AIG officially ended up costing taxpayers the net amount of USD 15 billion.[40]

40 The Washington Times, 23 June 2017 (https://www.washingtontimes.com/news/2017/jun/23/tarps-final-price-tag-33-billion-cbo).

The AIG case showed that prohibiting or restricting certain activities could have prevented the failure of a strong financial institution and the associated impact on the stability of the financial system as a whole.[41] The activities in question posed significant systemic risk for three main reasons:

- first, these activities can make even large insurance groups extremely vulnerable to market disturbances and closely linked to the business cycle;
- second, this activity significantly increases the linkages between the insurance sector and other financial sectors and financial institutions, and exposes the insurance group to substantial liquidity risk;
- third, as a result, a potential failure of the group would spill over to other financial institutions that act as counterparties or are related to the company engaged in these transactions.

41 The applicability of the PRIIPs regulation to mitigate the impact of an AIG-type case would require further analysis, taking into consideration issues such as the issuer and buyer of the products, the type of products or the existence of a threat to financial stability.

Box 8: Short-selling prohibition in Germany

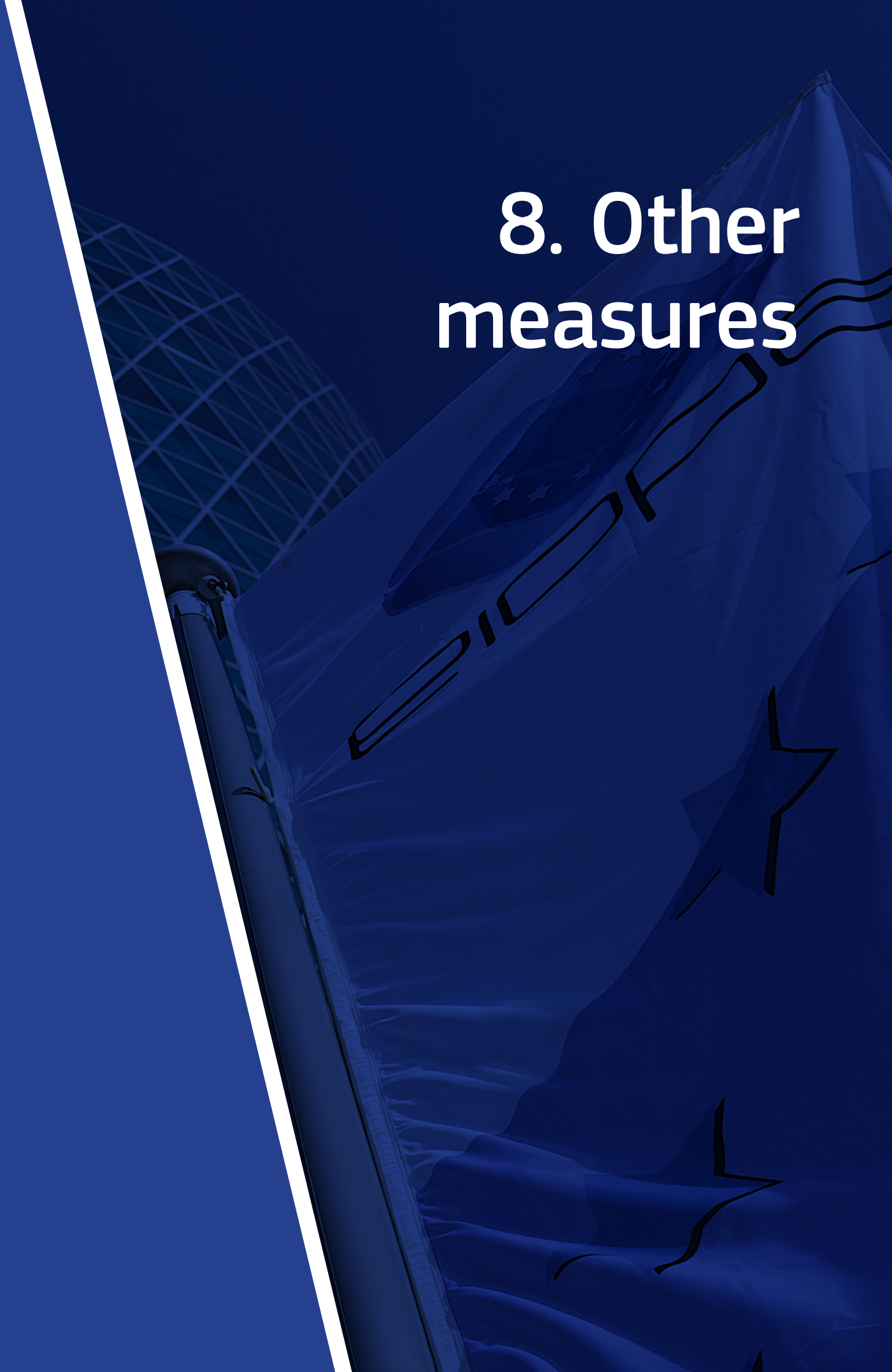
Even before the introduction of Solvency II, the use of derivative instruments by insurers had been regulated subject to applicable principles and good practice. As such, insurers shall assess the risks of the derivatives they hold at all times and document their assessment continuously. In order to fulfil the requirements of Pillar II, insurers also have to monitor the performance of derivatives continuously. All rules for derivatives also apply for derivatives embedded into a structured product.

In order to follow the prudent person principle, insurers can only purchase derivatives to hedge against risks stemming from price and interest rate risks of assets held or where derivatives are bought to prepare the purchase of an asset. The crucial condition is that in any case these derivatives must not lead to underfunding.

Furthermore, the risks have to be reduced or the portfolio management has to be more efficient with the derivatives held. Thus, insurers may acquire derivatives in order to manage a portfolio efficiently. This means that the quality, security, liquidity or profitability of the portfolio is increased without adversely changing the risk profile significantly.

In line with supervisory practice that had been established in the run-up to Solvency II, recent legal clarifications were included along with the general reform of German supervisory law. Consequently, the supervisory law now explicitly prohibits arbitrage trading and short selling.

8. Other measures



This last section provides an overview of other measures that exist in Solvency II in case of breach of the SCR. In order to provide a complete picture of measures that may have macroprudential impact, this section also addresses other measures that may be available at the national level.

8.1. Other measures in case of breach of the SCR

The Solvency II directive includes additional measure that could indirectly have a macroprudential impact, to the extent that they contribute to avoiding the deterioration of the solvency position of insures and, therefore, to the operational objective of ensuring sufficient loss absorbency capacity and reserving.

These measures are only available to the authorities in case of a breach of the SCR. As a result, they are less interesting from a crisis prevention point of view.

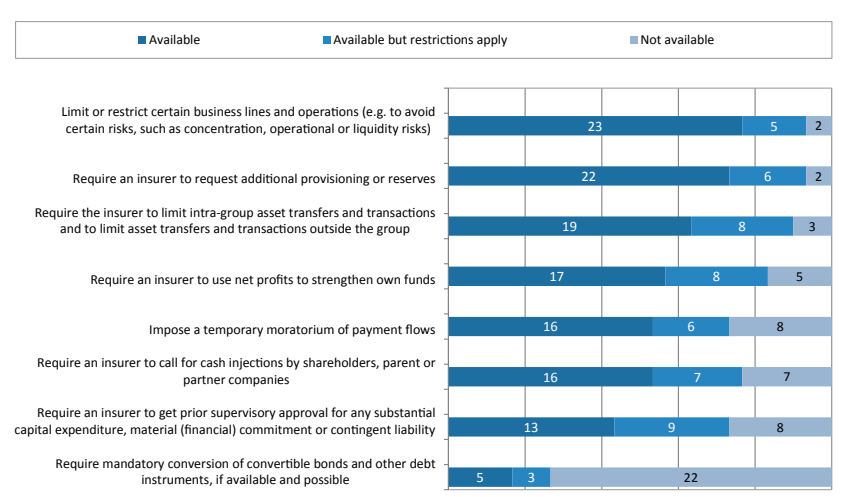
- *Cancellation or deferral of dividends/ distributions.* Solvency II defines mechanisms for the automatic cancellation or deferral of dividends/distributions when the SCR is breached or when the payment of dividends/ distributions would lead to non-compliance with the SCR.[42] From a Pillar II perspective, supervisors could also challenge an undertaking's medium-term capital management plan, including the impact of their dividend policy (EIOPA, 2016b).
- *Requesting recovery plans and short-term finance schemes.* Solvency II provides for mandatory recovery plans and finance schemes to be submitted to supervisors in case of financial distress (Articles 138 and 139). Whereas the recovery plan should be submitted within 2 months from the observation of non-compliance with the SCR, the finance scheme should be submitted within 1 month from the observation of non-compliance with the Minimum Capital Requirements (MCR).
- *Prohibit free disposal of assets.* Article 140 provides Member States with the power to take the measures necessary to prohibit the free disposal of assets located within their territory.

8.2. Other national measures

In addition to that, NSAs have other powers at their disposal to intervene in a troubled insurer. Those powers aim at restoring capital adequacy, management and governance, business and organisation, and include measures affecting the shareholders.

A survey carried out by EIOPA (2017a) considered such powers, which may also have a certain macroprudential impact. Figure 10 provides an overview of some of these powers.

Figure 10: Some additional powers available to NSAs



Source: Extracted from EIOPA (2017a).
NB: This figure represents the number of NSAs that replied that a certain power was available, available but subject to certain restrictions or not available. The survey presents the situation in the Member States as of February 2016. In total, 30 NSAs responded to the survey.

42 Solvency II delegated regulation, Articles 71(1)(l), 73(1)(g) and 77(1)(f). Whether it is a cancellation or deferral depends on the nature and tiering of the own-fund item.

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Annex: Long-term guarantees measures under stress — macroprudential impact

Background

This note expands on the macroprudential impact of two of the main tools embedded in Solvency II, namely the VA and MA. Both tools are permanent elements of the Solvency II regime.

Additionally, it also briefly discusses some transitional measures that would potentially have financial stability implications and be relevant for macroprudential purposes, like the TTP and the TRFR. Those measures are temporary elements of the regime aimed at ensuring a smooth transition between Solvency I and Solvency II.

Using data from the 2016 EIOPA insurance stress test, this annex aims to quantitatively assess how some LTG measures may affect the regulatory balance sheet of insurance undertakings and consequently their behaviour in stressed situations. The purpose is to assess, where possible, potential implications for financial stability and the macroprudential effects of these measures.

Data description and restrictions

The data used in this annex comes from the 2016 EIOPA insurance stress test. A complete description of the sample, the data collected and the methodology can be found on EIOPA's website. This note does not discuss other elements of the regime that might be relevant for the same purposes but for which there is no evidence in the stress test data.

The 2016 EIOPA insurance stress test comprised two scenarios: the 'low-for-long' scenario includes a period of permanently low productivity growth and scarcity of risk free assets that drives down yields at all maturities; the 'double-hit' scenario also prescribes a prolonged period of low interest rates (though less pronounced than in the low-for-long scenario), but with an abrupt increase in risk premia affecting asset prices negatively (asset price shock).

The stress test sample consists of solo undertakings, predominantly life insurers. A total of 236 companies from 30 EU/EEA countries participated, covering 77 % of total life technical provisions in the EU/EEA, excluding health and unit linked.

The initial balance sheet corresponds to the Solvency II balance sheet. However, the stress balance sheets differ from the Solvency II balance sheet in the following two important aspects.

(a) A different assumption for the UFR was used in the low-for-long scenario (with a lower UFR).

(b) Stress test participants were required to keep the effects of the two relevant transitional measures in computing the technical provisions constant (i.e. the adjustments derived from the TTP and the TRFR were fully allowed in the baseline situation,[43] but participants were requested to freeze those effects and were not allowed to recalculate them post-stress).

The specifications included the basic RFRs and those including the VA for each scenario and relevant currency. Below, the euro curves are depicted as an example, in which differences in the shape and level of the curves can be compared visually, along with differences in the VA.

The balance sheets post-stress were not designed to assess compliance with the legally enforceable capital requirements under Solvency II, and the

43 Calculated in accordance with Articles 308c and 308d of the Solvency II directive respectively.

recalculation of the MCR and SCR was not requested after the scenarios.

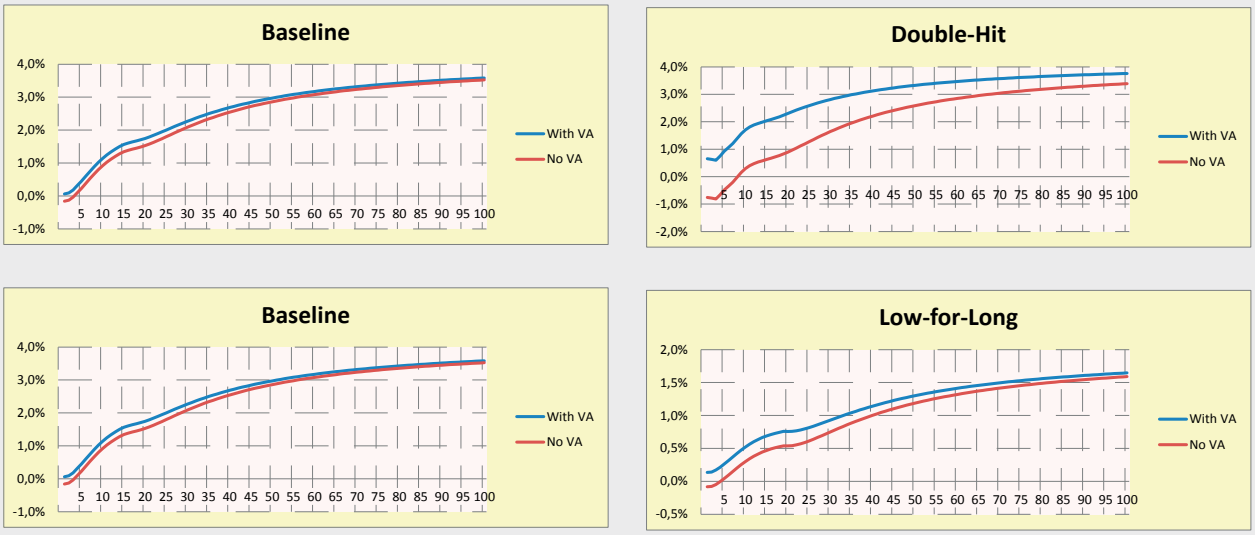
The VA and the MA were included in the stress test technical specifications in line with the general Solvency II rules, and were expected to move in line with the prescribed stress scenarios. Therefore, EIOPA provided recalculated VA figures for the double-hit scenario based on the widening of the relevant asset spreads. For the low-for-long scenario, credit spreads were assumed to be constant after stress, implying no change in the VA and MA. Mathematically speaking, however, adjusting the lower swap rates prescribed by the low-for-long scenario with the same number of basis points as in the baseline implies a relatively higher adjustment.

that they used the VA. Only 1 % used the TRFR and 18 % used the TTP.

Balance sheet impact of the long-term guarantees and transitional measures

For a complete analysis of the impact of the LTG and transitional measures in the baseline of the EIOPA 2016 insurance stress test (i.e. YE-2015 situation before any stress) refer to EIOPA's Report on long-term guarantees measures and measures on equity risk.[44] That report showed that the overall impact of the MA is higher than the VA in the baseline, except on the MCR and SCR figures, despite the MA being used by a smaller number of undertakings and its scope, in terms of the portfolio to which it can be applied,

Figure A1: Euro curves — baseline, double-hit and low-for-long scenarios



Source: EIOPA.

Stress test participants were required to report the separate impact of the individual LTG and transitional measures in the baseline only. Post-stress, the impacts of the LTG and transitional measures were grouped together.

Overall, 7 % of the stress test participants reported that they used the MA, while 64 % of the participants reported

being more limited than that of the VA.

In order to assess the financial stability — and macroprudential — implications of the LTG measures, it is useful to compare how they reacted in the two scenarios considered in EIOPA's stress test. In particular, given the difference in the formu-

44 https://eiopa.europa.eu/Publications/Responses/EIOPA-BoS-16-279_LTG_REPORT_2016.pdf

lation of the two scenarios (asset-price shock only in the double-hit scenario), a comparison of the impact of the LTG effects in the two scenarios can be very informative in this context. Figure A2 shows the overall impact of the LTG and transitional measures pre- and post-stress, as reported by stress test participants on the excess of assets over liabilities. The LTG and transitional measures were grouped together post-stress.

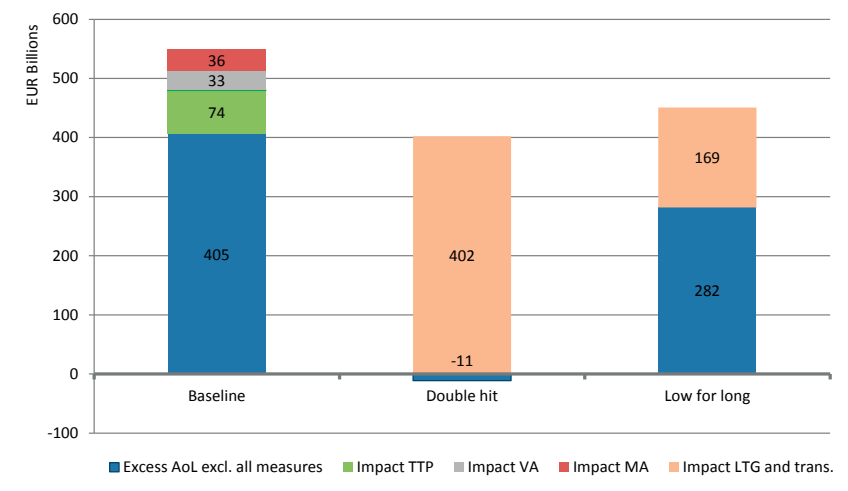
A striking insight from Figure A2 is the completely different impacts of the LTG and transitional measures combined in the two stressed scenarios. In the low-for-long scenario, the impact of the measures increases by 17 %, raising the excess of assets over liabilities by about 60 % to EUR 450 billion. However, even without the measures, the excess of assets over liabilities is positive, with more than EUR 280 billion in excess. This stands in contrast to the double-hit scenario, in which the effects of the LTG and transitional measures combined increase by 280 % and account for all the excess of assets over liabilities post-stress, i.e. more than EUR 400 billion.

Since the impacts stemming from the transitionals were kept constant post-stress, it is possible to estimate the impact of the LTG measures (VA and MA combined) post-stress by isolating the effect of the transitionals. Figure A3 shows the results and illustrates that, in the baseline and low-for-long scenarios, the effects of the LTG measures are comparable to those of the transitionals. However, in the double-hit scenario, the estimated impact of the VA and MA measures increases by close to EUR 260 billion, implying an increase of 4.8 times.

In order to further dissect the estimated impacts of the VA and MA respectively,[45] Figure A4 shows the impact of the measures split into two groups: group A consists of participants who use MA exclusively; group B consists of participants that use VA exclusively. Zooming to smaller but 'purest' samples of undertakings helps to isolate the effects of the measures separately. It nonetheless requires an understanding of the differences in the number of undertakings using each of the measures. For instance, it is possible that the more portfolio-specific and restrictive the requirements for supervisory approval are, the less likely the measure is to be used. These features might explain the significant differences

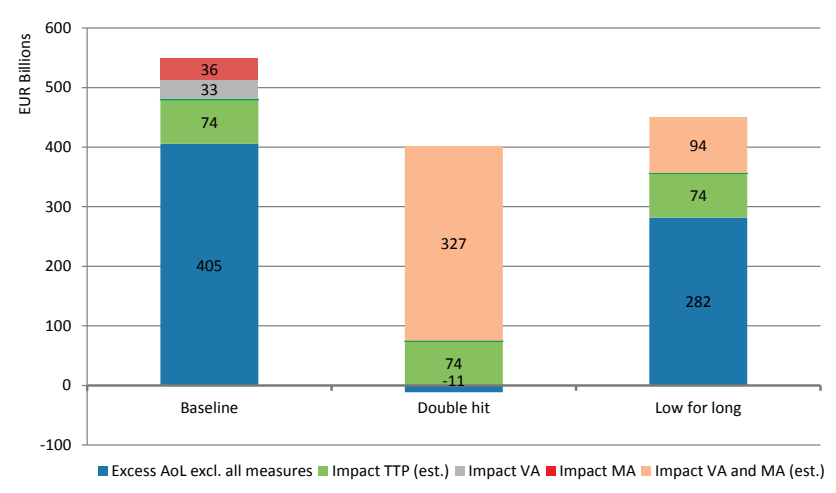
45 Note that the sample of insurers that use only the MA is very small and not necessarily representative for the full market, or for the impact of MA among insurers that use MA and VA.

Figure A2: Impact of LTG and transitional measures as reported by participants



Source: EIOPA.

Figure A3: Impact of LTG and transitional measures assuming constant transitionals



Source: EIOPA.

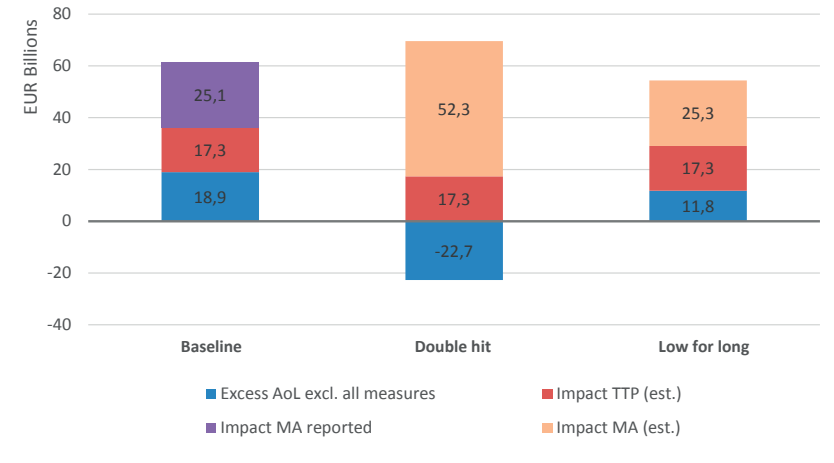
between the numbers of MA and VA users. It is important to highlight that relative effects are valid as the sample sizes are kept constant in every scenario for each sub-sample in Figure A4. The materiality of the effects is better captured in Figure A3 above, with bigger samples and therefore broader representativeness, although the effects are combined as already explained.

Figure A4 reveals several interesting differences between the MA and the VA. In the low-for-long scenario, the effect of the MA hardly changes compared to the baseline (roughly 40-50 % of EAOL), since the portfolios are nearly immunised to the interest-rate movements as asset and liability movements offset each other. This is in line with expectations, as the application of the MA requires strict asset and liability cash-flow matching. Regarding the effect of the VA, for which asset and liability matching is not required (Figure A4, right side), it does increase by close to 70 % in this scenario (from 10 % to 20 % of EAOL). The sizes of the sub-samples are influenced by the specificities and restrictiveness in applying the measures, however leaving those sizes aside there are clear differences in how the effect of the two measures change under the same scenario analysed. Differences in the products sold and in the business models may determine the different exposure of the undertakings and their portfolios to a scenario such as low-for-long, but also the undertaking's ability to apply one measure or the other, i.e. VA or MA, which as illustrated in this note does not bring neutral effects.

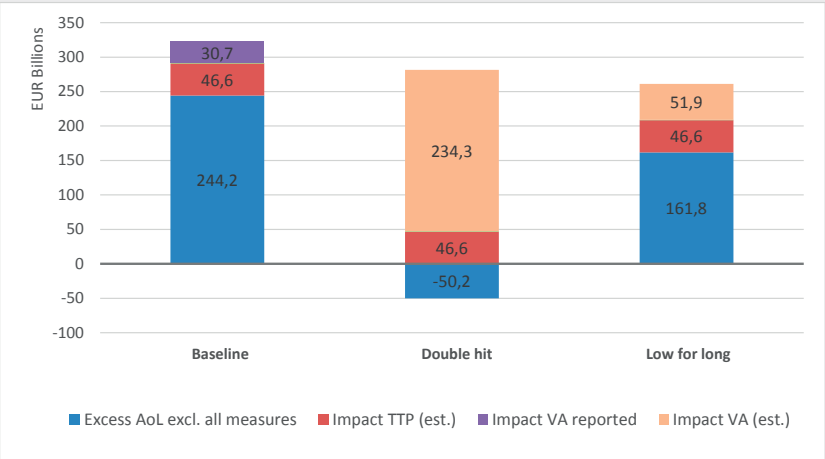
In the double-hit scenario, however, both VA and MA users benefit substantially more than in the baseline from these measures. Furthermore, combined with the transitionals, these measures are necessary to keep the excess of assets over liabilities positive. The increase in the effect for VA is, however, much larger than for MA. In line with the rationale behind the VA, the effect of the VA increases by a factor of 7.6, while the effect of the MA increases by a factor of 2.1. Indeed, the mechanics of the VA and the MA imply that when the spreads of the assets included in the representative portfolio (in the case of VA) or in the undertaking's MA portfolio (in case of MA) are widened, as occurs in the double-hit scenario, the adjustment to be added to the basic RFRs also widen, hence reducing the discounted value of the liabilities and explaining the exponential increase in the effect of this measure compared to the baseline. It is important to remark that the latter increase in the VA (i.e. the

Figure A4: Impact of LTG and transitional measures assuming constant transitionals, by MA and VA users

Group A — MA exclusively



Group B — VA exclusively



Source: EIOPA (2017b).

decrease in discounted liabilities) happens regardless of the actual individual portfolio of assets held by undertakings using the VA, while the increase in the MA is directly driven by an increase in the spreads in the actual undertaking's portfolio. The non-portfolio-specific nature of the VA measure can be illustrated with an extreme example, where a VA user could potentially not be affected by any increase in the spreads or drop in asset market prices imposed by the scenario (e.g. one undertaking that would be 100 % invested in US equity), while it would benefit from the increased VA when discounting the liabilities. Conversely, if an undertaking is affected by the increase in the spreads of assets that are not reflected in the representative portfolio for the VA, the undertaking will not be able to benefit from the VA increase.

Financial stability and macroprudential implications

The LTG measures were introduced in Solvency II as a remedy for the potential financial stability issues that could be caused by excessive volatility in the insurers' own funds stemming from the application of market consistent valuation to long-term business. Such volatility in own funds would not appropriately reflect the characteristics of the life insurance sector, and its consequences would be particularity dramatic in periods with extremely low interest rates and/or with exacerbated asset-price volatility, as the ones in the stress test.

The TTP and the TRFR were also introduced as preventive measures to avoid financial instability stemming from a disordered transition. In some cases these measures represent necessary conditions for some carriers of back books with long-term business to survive the change of the regulatory regime. This is the case particularly because Solvency II entered into force amid historically low interest rates.

The relevance of the MA, the VA and the transitionals is generally expected to decrease as market interest rates increase. Moreover, irrespective of future interest-rate changes, the relevance of the transitionals is expected to decrease substantially over time as undertakings are increasingly required to converge towards the full application of Solvency II.

Contrary to what happens with the transitionals, the VA and the MA are, at least in principle, designed to act as symmetric adjustments. While the use of transitionals will always lower the value of the liabilities on the balance sheet, the VA or MA might under certain scenarios work as a negative adjustment to the curve used to discount the liabilities, leading to higher liabilities compared to the option of not using the VA or MA.[46]

The quantitative assessment carried out provides several insights with implications for financial stability based on the stress test data.[47]

- First, it is clear that the effects of the measures are substantial, both in economic terms and in terms of the consequences for the subsec-

46 Solvency II technical documentation on risk-free-rate term structures published by EIOPA on 27 February 2017. Includes a negative volatility adjustment for liabilities expressed in Romanian currency (i.e. – 2 bbpp).

47 The 2016 stress test also included a 'second-round effect' questionnaire in which participants were asked about their potential reactions to the stress scenarios and how these scenarios may affect their behaviour in terms of reallocation of asset portfolios, changes in assets mix, asset sales, etc. Although the questionnaire was not designed to assess the degree to which this behaviour was dependent on the existence or effectiveness of the LTG and transitional measures, an attempt was made to compare the replies provided by the users of those LTG or transitional measures and the replies from participants that did not use any of them. The replies of the different groups are rather similar, which does not allow for any relevant conclusions based on them.

tor[48] tested in the stressed scenarios and, for some countries, also in the baseline scenario. Many life insurance companies participating in the stress test would be dependent on the LTG measures (VA and MA) to keep a positive excess of assets over liabilities in the stressed scenarios. It should, however, be noted that the stresses tested here are rather extreme (albeit plausible). In aggregate, the sample tested would depend on the VA and the MA to remain buoyant in a situation characterised by the double-hit scenario.

- Second, the percentage changes in the effects of the VA in the stressed scenarios are much more pronounced than those of the MA, meaning that under the circumstances of moving from the baseline to the scenarios tested, the VA provides more of a cushion than the MA. This is expected, however, as the MA usually only applies to parts of a portfolio with clearly defined boundaries, while the VA would have an impact on the whole balance sheet. Moreover, once (and where) it is approved by the supervisor, the VA is granted irrespective of the actual asset or liability portfolio. Given its non-portfolio-specific nature, it cannot be ruled out that it could delay required risk management actions in 'bad times' or encourage risk seeking in 'good times', and could therefore contribute to procyclicality. However, this kind of behaviour is yet to be proved, and it should be noted that Solvency II prescribes enhanced risk management requirements when the VA and MA measures are used and that the effects on the financial position would have to be disclosed, possibly limiting such risk seeking.[49]
- Third, the large differences in the effects of the measures, especially the VA, in the double-hit and low-for-long scenarios provides evidence that the measures do indeed work to limit the volatility of own funds. In that way the measures may help to avoid fire sales in periods of short-term volatility or any other actions by the insurance companies that may exacerbate the instability in the markets (i.e. massive raising of capital as a reaction to simultaneous capital shortfalls in the absence of some LTG measures). In contrast to the VA, which by construction provides general relief on the liability side regardless of what happens to the actual individual portfolio of assets (based on a weighted portfolio), the strict rules of the MA limit, by construction, any risk of potential fire sales. This risk limitation, however, is confined to the earmarked assets actually held to match the liabilities, allowing the undertaking to hold them despite market turbulence and provided that the risk of default is handled according to the MA requirements. While the low-for-long scenario represents a 'slow-burning' issue, with expectations of very low growth for a very long time (as represented by the lower UFR), the double-hit scenario represents more of a sudden impact in asset prices, which may be short lived. If insurers were forced to react immediately to these losses they would need to sell assets or reinvest in bonds with a smaller capital charge, very likely acting largely procyclically by selling risk assets. However, given the long-term nature of insurance, the MA in particular would allow insurers to keep the assets until maturity, assuming that these assets do not default (the risk of the bonds being default should in any case be covered in the SCR). While the immediate effect of the VA illustrated above may seem striking, it is important to note that the effect of the VA would decrease over time if the situation were to persist, because the VA

48 Predominantly life (long-term) insurance business, excluding health and unit linked.

49 Articles 44(2)(a) and 51(1)(a) of the Solvency II directive.

calculation would include more of the period under stress.

In this regard, a main finding is that the VA and the MA indeed work in a countercyclical manner in times of dramatic stress. That is not to say, however, that in the case of the VA it might not have unintended consequences as well, as there could be larger losses suffered due to delayed sales of risky assets if the adverse situation proved to be of a more permanent or fundamental nature. Moreover, this note has not aimed to fully assess whether the calibration of these measures is appropriate in (a) providing a reasonable cushion in light of the stresses and (b) does not provide adverse incentives for excessive risk-taking in 'good times'. The section below, however, further investigates potential overcompensation from the VA.

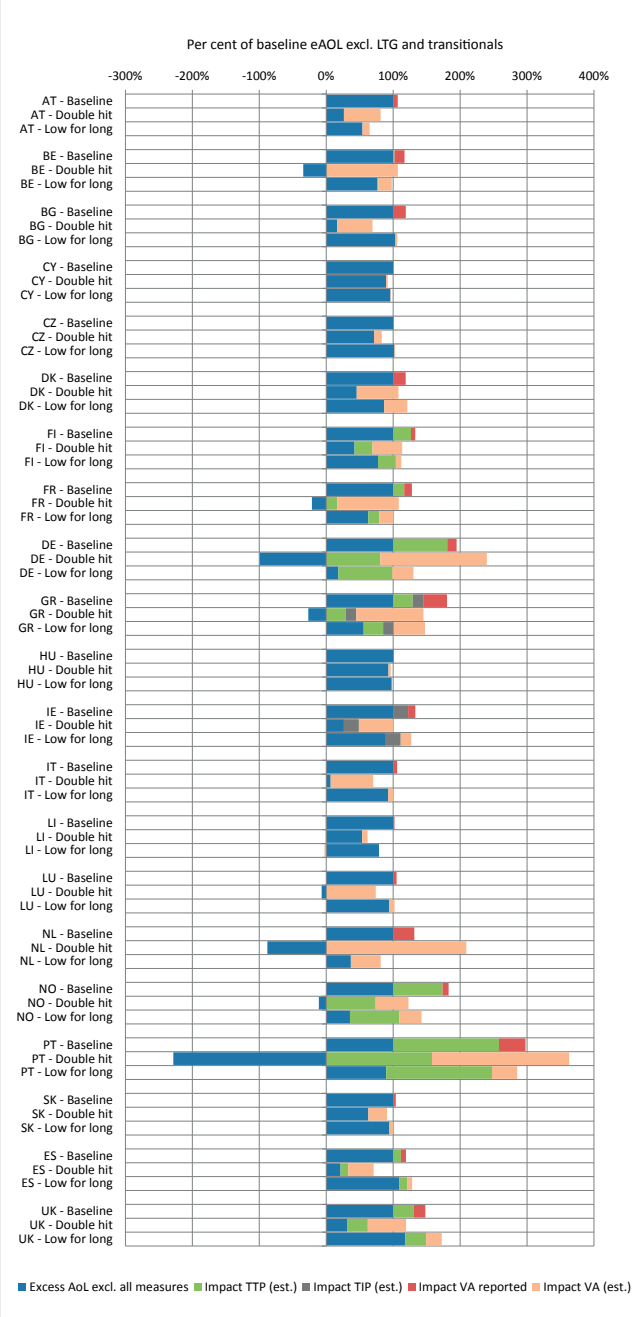
One remaining issue: the potential for overcompensation by the VA

Figure A4 showed that the impact of LTG and transitional measures (assuming constant transitionals) was substantial and could raise the question of whether there was any indication of overshooting by the LTG measures, i.e. situations in which the dampening effect on the liability side of, for example, the VA was larger than the negative effect of the increased volatility on the asset side.

Figure A5 breaks down this impact per country to shed additional light on this question. Overall, there are some Member States (United Kingdom, Spain) where the EAOL is higher post-stress than pre-stress in the low-for-long scenario. This, however, seems to be more a result of the balance sheet EAOL excluding LTG and transitionals than any additional 'benefit' stemming from those measures. This effect is explained by the additional ALM requirements for MA users.

On an individual level, Figure A6 shows a cross plot of how the EAOL would look in baseline versus post-stress if only VA was used. The red line is the 45-degree line indicating that the pre- and post-stress EAOL is identical. Companies above the 45-degree line have a higher EAOL position post-stress than pre-stress. The figures identify a few such occurrences, which may be signs of overshooting of the VA.

Figure A5: Impact of LTG and transitionals assuming constant transitionals by country — VA



Source: EIOPA.

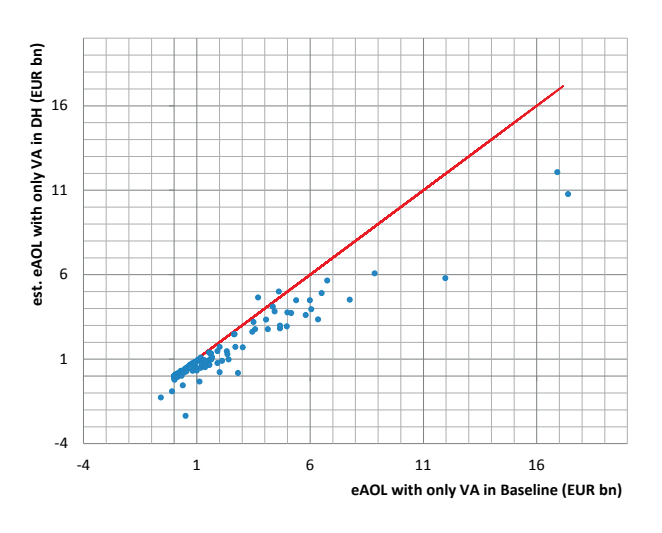
Indeed, looking at the underlying data, in two cases in the double-hit scenario the VA more than accounts for the fall in EAOL. In both of these cases, the EAOL excluding LTG and transitionals would be negative. These two are examples of overshooting of the VA.

In the low-for-long scenario there are 26 companies with a (slightly) higher EAOL post-stress than pre-stress. In 11 of these cases this increase is due to the VA more than accounting for the decline in the EAOL, i.e. overshooting. The implied overshooting, however, is marginal in most cases.

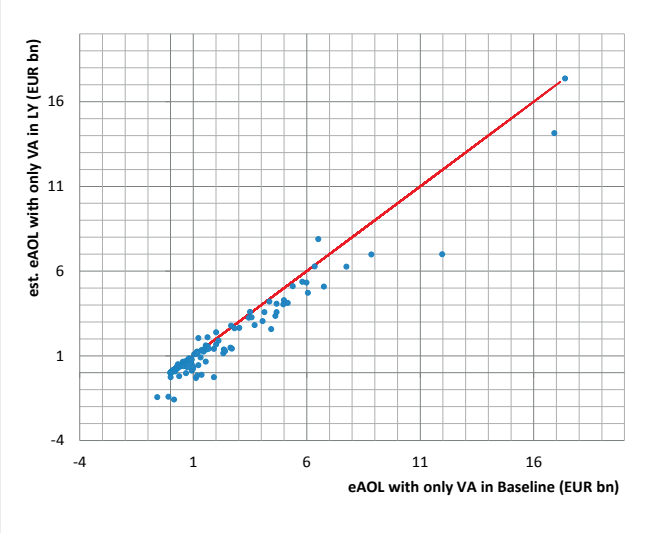
Overall, the data cannot completely rule out potential overcompensation by the VA. In the assessed scenarios, however, this seems more like isolated cases than a general system-wide issue. In most cases where the overcompensation exists the effect is marginal, and could be due to the assumptions made in this analysis or in the stress test parameters. Only in a few instances does the overcompensation appear to be more material. In interpreting these results it needs to be considered that the double-hit scenario includes a combination of stresses on interest rates, equity, property and spreads, while the VA only compensates for spread widening. In scenarios where the spreads mainly widen while other market parameters are less affected, the VA is likely to overshoot for a larger number of undertakings.

Figure A6: EAOL in baseline versus post-stress only allowing VA

Double hit



Low for long



Source: EIOPA.

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