2020 review of Solvency II

Revision of specific pieces of advice in light of Covid-19

Second batch

Any views provided in this document are tentative views at working group level and should not be understood as EIOPA positions.

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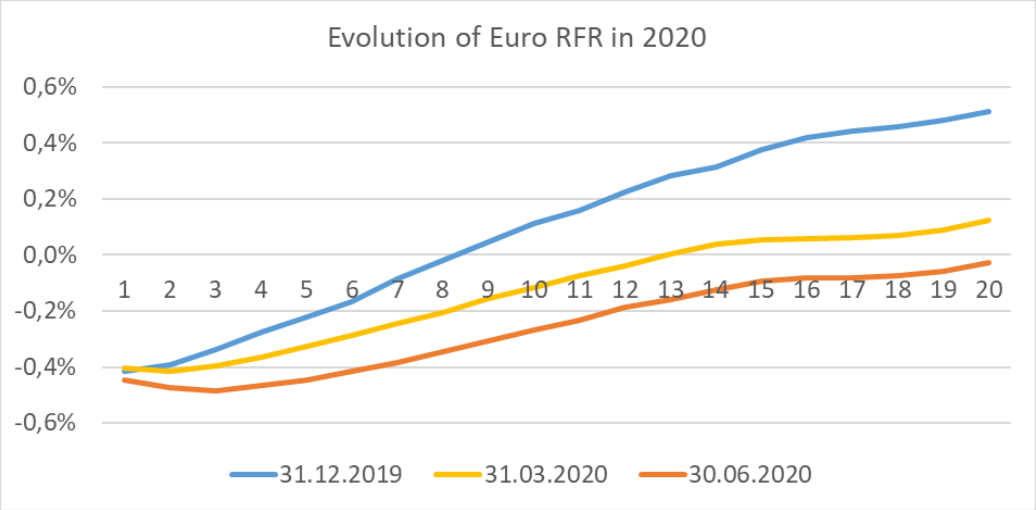
1. Extrapolation of risk-free interest rates

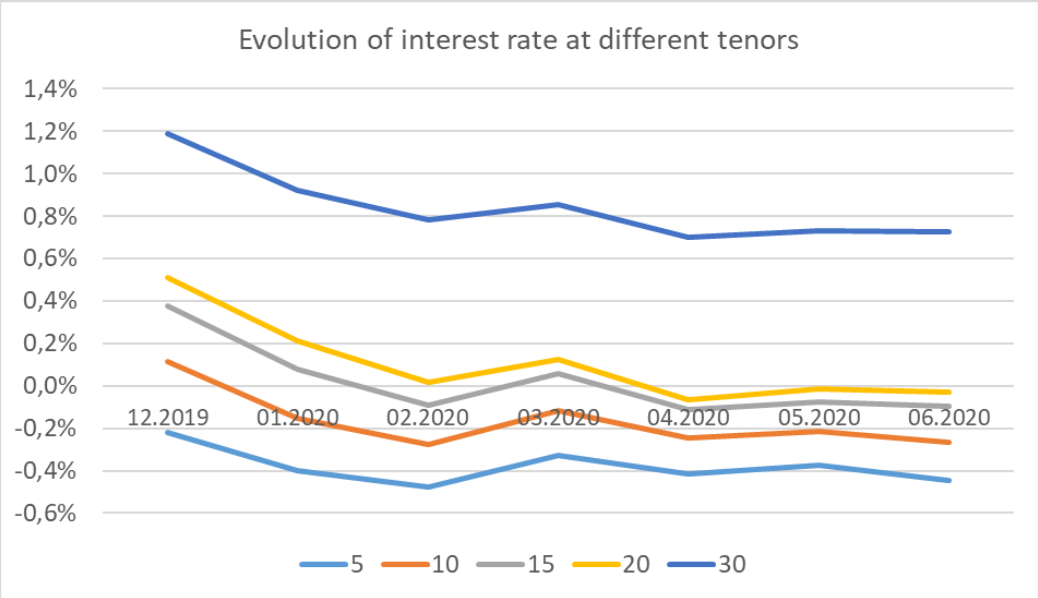
1.1. Current advice

In the consultation document, EIOPA considered several options for the LLP of the Euro, which is 20 years currently. These included an option to move the LLP to 30 or 50 years or to move to an alternative extrapolation method where market data beyond the LLP is partly taken into account. The package that was tested as part of the information request for the holistic impact assessment (HIA) included as tentative advice the option to move towards the alternative extrapolation method.

1.2. New evidence

Strong movements in interest rates could be observed during the first months of 2020, interest rates have dropped, in particular for longer maturities. The following graph outlines this evolution for the euro:

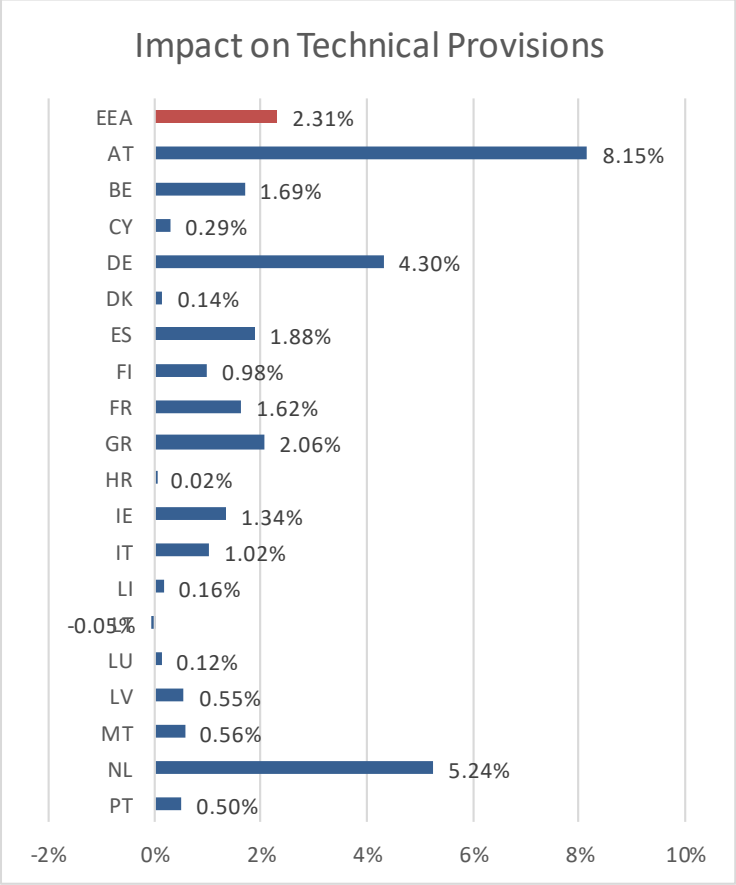




Based on this experience, a back testing of the alternative extrapolation method – how it would have behaved under these circumstances compared to the current extrapolation method – was performed for all EEA currencies, see graphs in annex 1.
Also, the analysis performed for the issues on the extrapolation, underestimation of technical provisions, risk management incentives and financial stability, were reassessed in view of current market information/evolution (see annex 1 for the issue of risk management incentives and financial stability). The assessment on the underestimation of technical provisions was updated including information from the complementary information request (CIR) where the impact of a change in LLP to 30 years for the Euro was tested to allow full re-assessment of the issue of underestimation of technical provisions.

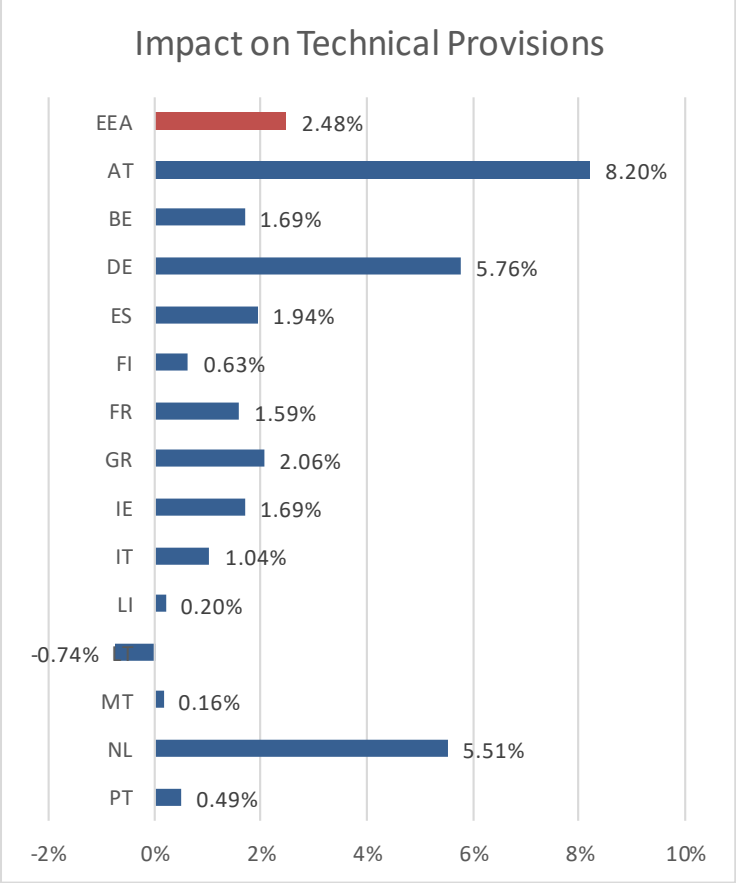
For the total CIR sample, technical provisions increase by 2,3% where the LLP for the Euro is changed to 30. Though, as expected, results vary by country and by type of undertaking.

The following graph outlines the impact for the different markets for the whole CIR sample including all types of undertakings[1]:



[1] For confidentiality reasons, this and the following graph include all countries where the sample induded 3 or more undertakings.

As the sample is different from previous information requests, the results cannot be directly compared to earlier analysis, e.g. from the LTG report 2019. Though, the numbers still indicate that the impact of an LLP 30 would – on average - be higher as at Q2 2020 than in times of a more moderate interest rate environment, e.g. as at YE 2018. The following graph outlines the impact for the different markets focussing on life and composite undertakings only. The results are a bit more accentuated compared to the total sample.



For the whole sample of the CIR, the impact of a shift of the LLP of the Euro to 30 has an impact of 124 bn Euro in terms of Technical Provisions. The results underline the concerns on an underestimation of technical provisions with the current setting of the LLP as discussed in EIOPA's consultation paper.

Thus on this issue, the main conclusions in respect of the issues identified in the draft opinion (underestimation of technical provisions, risk management incentives, financial stability) still hold and are not affected by the current crisis. For further background please consider annex 1.

In addition, the evolution of market liquidity for swap and bond markets was analysed – no clear trends could be observed here. Details on the assessments can be found in annex 1.

Furthermore, the results from the CIR were analysed. They outline the dependency of the impact of a change in the extrapolation on technical provisions (and the solvency position correspondingly) and the current interest rate

environment. While the impact of the alternative extrapolation compared to the current status quo was comparably moderate as at YE 2019, the impact is much higher as at Q2 2020.

This effect dominated the results of scenario 2 when comparing HIA and CIR, in particular for life and composite undertakings:

	Change of Surplus in Scenario 2 compared to Base (in bn. Euro)
CIR - all	-21,0
CIR – life/composite	-24,3
HIA - all	+5,0
HIA – life/composite	+1,1

1.3. Analysis of the evidence

The evidence does not change the rationale underpinning the current advice. The alternative extrapolation method has provided sensible results during the first months of 2020, where big movements in interest rates could be observed. The issues identified for the extrapolation are still relevant or have even become more relevant in 2020, the alternative extrapolation method still strikes a good balance between stability of interest rates on the one hand and moving towards more market consistency on the other hand. Also, during the first quarters, no evidence on trends in market liquidity on swap rates or the bond market was observed. Based on these considerations no need for change of the advice was identified.

However, the results from the CIR highlight the impact of the extrapolation in particular in times of low interest rates. The impact is so high, that it is considered sensible to consider whether and how this effect can be introduced.

The LTG PG identified the following three options:

Option 1: No change

Pros	Cons
Direct application of the alternative extrapolation for all currencies (consistency)	Spurious effects and high impacts for a number of undertakings, undertakings may not be able to manage the introduction of the changes to the framework.

Option 2: Include a phasing in for the extrapolation

This option foresees a phasing-in with the following features:

- To ensure simplicity and comparability it would mandatorily apply to all undertakings, during the period of phasing-in EIOPA would publish the curve to be applied by all undertakings;
- It could be applied only for the Euro (including currencies pegged), reflecting that the biggest effects are observed for that currency in the CIR; however, it would be possible to introduce a phasing-in more widely in case where such a need would be identified also for other currencies;
- The phasing in would be based on the alternative extrapolation method; for the Euro, a convergence parameter of e.g. 20% could be chosen which would be linearly decreased to 10% over 5 years.

A backtesting performed outlines that the parameterisation of the alternative extrapolation with a convergence parameter of 20% provides reasonable curves close to the current setting of the extrapolation with the Smith Wilson method and an LLP of 20 years for the euro. This backtesting is included in the annex 1.

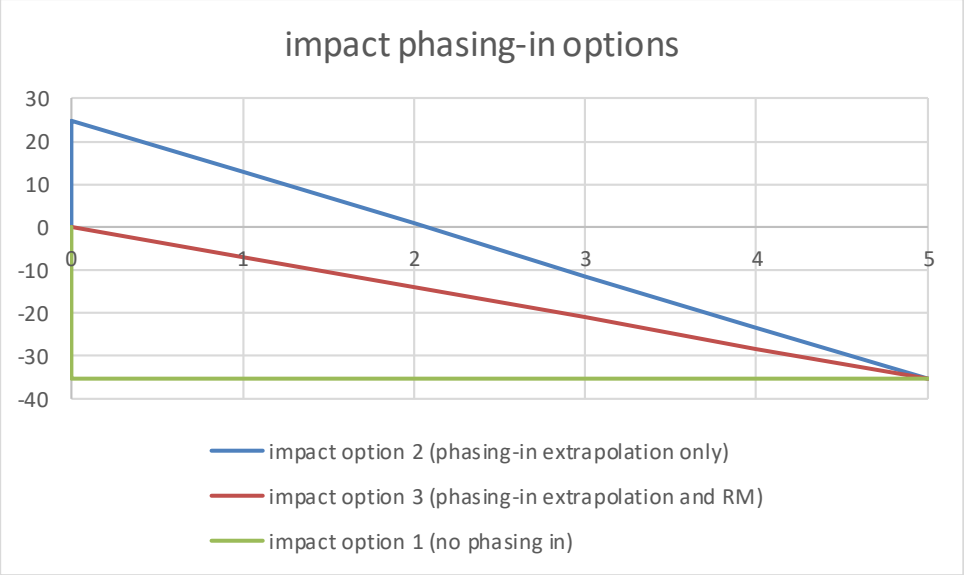
Pros	Cons
Simple to apply.	Can create unlevel-playing field for other currencies where no phasing-in is foreseen. Relevance of this argument depends on the situation where framework is introduced (for Q2 2020 highest impact for Euro observed).
Effective in managing the introduction of the changes to the SII framework.	Some undertakings may be exposed to spurious effects due to introduction of changes in framework (jump at start and then decrease due to phasing-in).
Direct implementation of the alternative extrapolation increases consistency across currencies and addresses risk management issue right from the start.	If interest rates decrease or increase between the advice and the implementation, a bigger or smaller positive initial impact of the risk margin is in the subsequent 5 years followed by a bigger or smaller negative annual impact of the extrapolation.
On a European aggregate level impact is phased in.	

Option 3: Include a phasing in for extrapolation and risk margin combined

This option would consider a phasing-in for both the extrapolation and the risk margin as these two are considered to have the biggest negative and positive impact. The phasing-in for the extrapolation would be similar to option 2. In addition, a phasing-in of the risk margin for the euro liabilities would be foreseen by applying a linear phasing in for the Lambda from a value of 1 to 0,975 over the same number of years. This phasing-in of the risk-margin would prevent the own funds to first increase due to the decrease of the risk-margin and then relatively sharply decline during the phasing-in period. Rather this option more smoothly phases in from a zero impact to the combined impact of the positive effect of the risk-margin and the negative effect of the alternative extrapolation method.

Pros	Cons
Simple to apply.	Can create unlevel-playing field for other currencies where no phasing-in is foreseen. Relevance of this argument depends on the situation where framework is introduced (for Q2 2020 highest impact for Euro observed).
Effective in managing the introduction of the changes to the SII framework.	Combined phasing-in may lead to additional volatility in cases where phasing-in of risk margin and extrapolation do not balance out. More difficult for undertakings to assess their future evolution of the solvency position.
Direct implementation of the alternative extrapolation increases consistency across currencies and addresses risk management issue right from the start.	
Expected to reduce volatility in introducing changes of the framework compared to option 2 across undertakings.	
If interest rates increase or decrease between the advice and the implementation, the changed impact of the extrapolation and opposite impact of the risk margin automatically allow for smooth transition	
Smooth transition of the impact for every undertaking, not just on an aggregate European level. Undertakings with a positive impact grow towards that level as well as undertakings with a negative impact, also if the impact of the risk margin or extrapolation deviates from the European averages	

The impact during the phasing-in period of these three options can be roughly described by the following figure:



With option 1, no phasing-in, there is a direct impact on the surplus of 35 billion Euro[2]. With option 2, only phasing-in extrapolation, there is first a positive impact of 25 billion due to a reduction in the risk margin and then a decrease over the phasing-in period to the final impact of 35 billion euros. Option 3, phasing-in both the risk margin and the alternative extrapolation, smoothens the impact from 0 to the total 35 billion euros at the end of the phasing-in period. Please note that this is a simplified representation of the impact over time as 1) phasing-in the risk margin has the biggest impact in the first years since changing it from 100% to 99.5% has a bigger impact than changing it from 98% to 97.5%[3] and 2) phasing-in extrapolation has the biggest impact in the later years since moving from the convergence parameter from 12% to 10% has a bigger impact than changing it from 20% to 18%.[4]

[2] Note that all numbers in this diagram are for illustrative purposes only

[3] The linear reduction of the lambda does not result in a linear impact in terms of surplus.

[4] Thus, effects of linear reduction of lambda and linear reduction of convergence parameter differently influence surplus – while the lambda effect is highest at the beginning of the phasing-in period, the effect of the convergence period is highest at the end of the phasing-in period.

2. Matching adjustment

2.1. Current advice

The consultation paper did not cover the calculation of fundamental spread that captures the risk of downgrading and defaults with regard to the MA.

2.2. New evidence

The current crisis is a good "real scenario" to test if the fundamental spread is correctly calculated. For the global market, there are some initial indications that hint at a deterioration of the overall credit quality and increase of downgrades in the coming months as well as an increase in the number of defaults. According to S&P, the number of corporate defaults up to 13th of May 2020 have hit the highest year-to-date levels since 2009 and already exceeded the total observed in the year of 2016, although 70% of defaults so far are concentrated in the US.
Only the Spanish market will be object of the more detailed analysis, given that the UK has left the EU. To this end, two specific info requests referred to Q1 and Q2 2020 respectively were carried out to the MA users about:

- Downgrades and defaults affecting assets included in MA portfolios
- Variation of solvency ratios comparing them at the end of 2019 and at the end of 2020 Q1 and Q2 (with and without MA).

2.3. Analysis of the evidence

During 2019 14 undertakings (15 portfolios) had authorisation to use the MA. We have obtained data on defaults and downgrades from the 14 undertakings. No default has been reported. Only one downgrade has been reported in one undertaking, with an immaterial cost.

During 2020 15 undertakings (16 portfolios) are authorised to use the MA. We have obtained data from these 15. Neither defaults nor downgrades occurred during the first quarter of 2020 have been reported. During the second quarter of 2020 there wasn't any default among the assets included in the MA portfolios, but a loss for downgrade was observed in one undertaking. The low observation of defaults and downgrades can be explained because the main investment in the MA portfolios are European government bonds and because the minor part corresponding to corporate bonds is also European. Notwithstanding the above, the full effect of crisis may not be captured, given the short observation period.

2.4. Options to change the current advice

The outcomes of the analysis does not provide evidences to change the current calculation of the fundamental spread. On the other hand, there is no reason extracted from the analysis to modify the advice as it is.

3. Volatility adjustment

3.1. Current advice

The consultation paper set out two approaches (Approach 1 and 2) for the design of the VA. The holistic impact assessments specifies the VA on basis of Approach 1, with a number of modifications.[5]

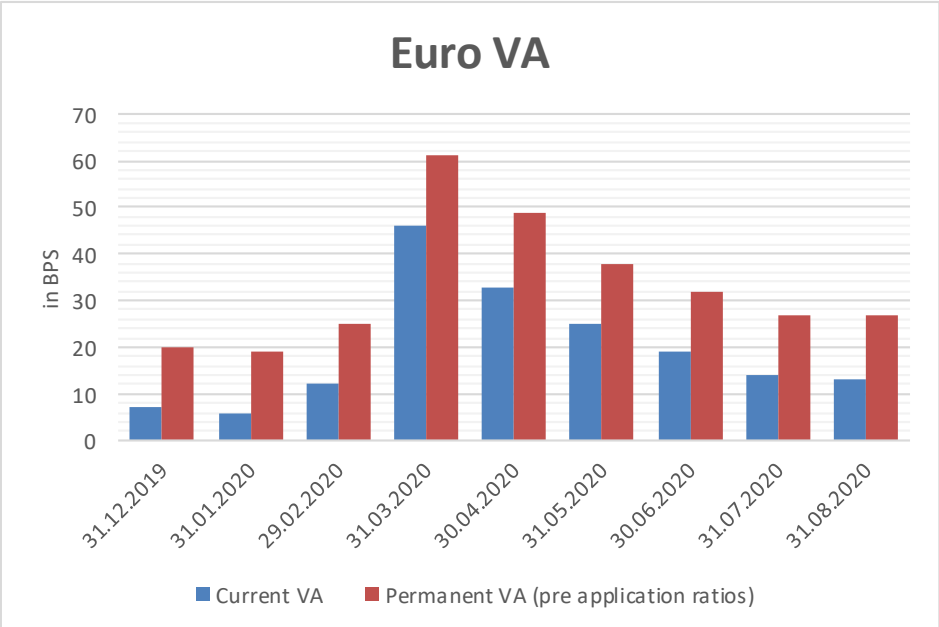
3.2. New evidence

Data in the course of the current crisis are available as part of EIOPA's monthly calculation of the VA. This period has been characterized by a high volatility of credit spreads and can offer valuable insights into the functioning of the current and proposed design of the VA.

3.3. Analysis of the evidence

Development of spreads and VA values

During March, credit spreads in fixed income investments have increased sharply. This led to a significant increase of the spread measured in the VA representative portfolios[6], and hence in the VA values. Following that, credit spreads decreased again in the second and the beginning of the third quarter of 2020. The following diagram compares the development of the current VA with the development of the proposed new design of the permanent VA since year-end 2019:



Note that the values shown here for the new design of the VA only refer to its permanent part, and do not yet include the application factors for duration mismatch and illiquidity. These factors intend to better tailor the impact of the VA

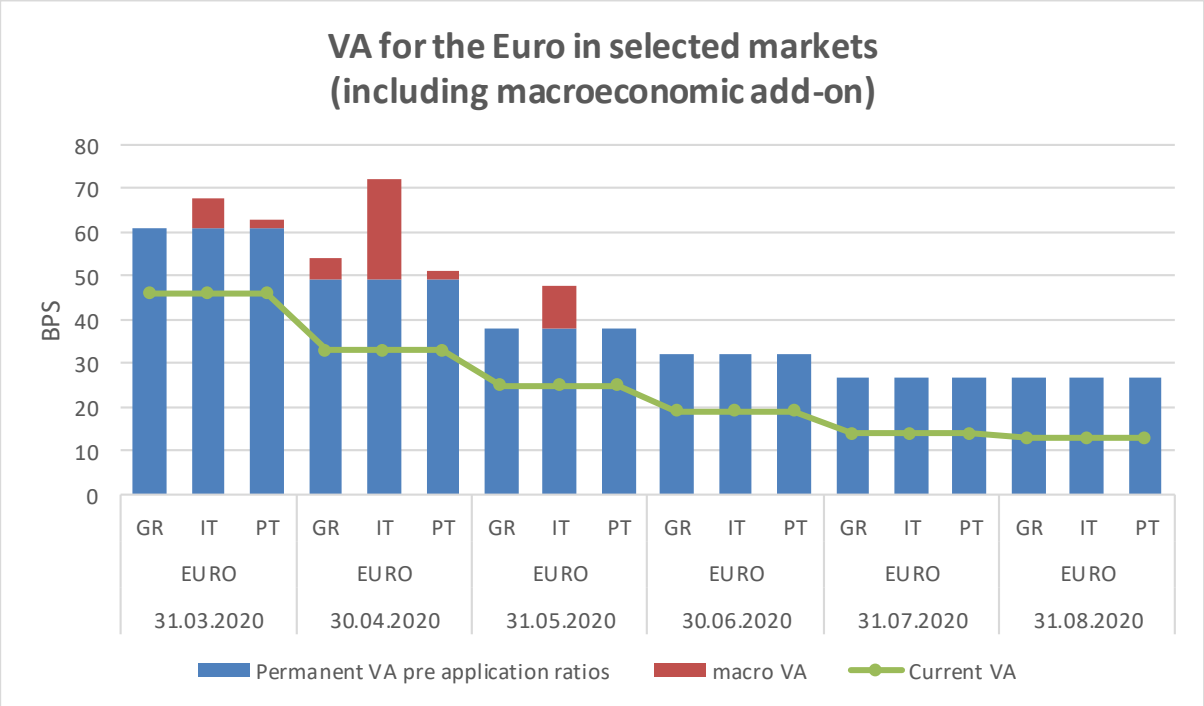
[5] See 2020 review of Solvency II - proposal for a balanced package, EIOPA-BoS-20/058, 15 January 2020

[6] See annex 5 for further information on spread development since the beginning of 2020

to the risk profile of the insurer, and lead to a lower VA where the factors are less than 100%.[7]

For the application of the VA in national markets, the proposed new design of the VA foresees an additional macroeconomic VA according to option 7 of the consultation paper (country-specific increase with smoothing mechanism).[8] This corresponds to the national VA add-on in the current design of the VA. The triggering of the macroeconomic VA depends on the difference between spreads observed in the national and the European representative portfolios.

In the first phase of the current crises, corporate spreads increased more strongly than government spreads.[9] This surge affected all countries across Europe, and led to a strong increase of the permanent (currency) component of the VA. In this context, at the end of March, the conditions for the activation of the proposed macro-economic component of the VA would have been verified in Italy and in Portugal for small amounts. During April, the picture changed, as corporate spreads decreased whereas the volatility of government spreads increased, in particular in Greece, Italy, Portugal, and, to a lesser extent, in Spain.[10] Whereas the country-specific increase of the current VA never activated in the considered period, the proposed macroeconomic VA would have triggered at the end of April in Italy, Portugal and Greece. In May government spreads started to decrease again: from June to August, in no country the conditions for the activation of the macro VA were verified, as illustrated below:[11]



[7] The data from the information requests will allow an assessment of the impact of the application ratios

[8] A technical description of this option is contained in annex 4

[9] See also figure 1 in annex 3

[10] See information on the development of spreads in national and currency portfolios in annex 3

[11] Note that the permanent VA part is shown, as above, pre applications 4 and 5

The analysis of these data indicate that the proposed measure is better responsive to the increase of volatility in credit spreads than the current VA.

Impact of VA during crises

In some countries, supervisors identified cases of an "overshooting" effect of the VA[12]. The potential for the occurrence of such effects is already identified in the consultation paper.

The information gathered from the HIA and CIR allows a more comprehensive assessment of the functioning of the VA during the first half of 2020, and on the identification of overshooting effects.

For this purpose, EIOPA analysed the financial data of 139 undertakings using the VA that participated in both the HIA and the CIR and that reported financial data for year end 2019 (as part of the HIA data) as well as for the first and second quarter of 2020 (as part of the CIR data). The total technical provisions of these undertakings – gross of reinsurance and with the use of the transitionals and the VA – amount to 4.030 billion Euro, which represents a market coverage of all undertakings in the EEA (without UK) that use the VA of 68%.

The assessment focused on the development of the own funds of the undertakings in the sample from year-end 2019 to Q2 2020 and on the observed impact of the current VA during this period. The technical details of this assessment are summarised in annex 7. Overall, the conclusions are as follows:

- Overall, the observations are commensurate with the evolution of the size of the VA as depicted at the beginning of this section, and confirm the strong role of the VA as a mitigating instrument during periods of sharp and steep spread changes.
- However, a more granular analysis at an undertaking-specific level revealed that in at least 15 cases (11% of the sample), there is a strong indication that an "overshooting" effect of the VA in the first quarter of 2020 occurred. For these undertakings, the VA effects were so strong that they overcompensated all other losses that the undertakings incurred, leading to an actual increase of the own funds in the first quarter of 2020.
- Due to data limitations, the analysis could only reveal more "extreme" cases of overshooting effects of the VA. There may be a considerable number of further undertakings – apart from the 15 identified – where the VA has overcompensated the losses from spread widening and where thus overshooting has occurred.

Under the envisaged new design of the VA, the intention is to better target the impact of the VA and to limit such overshooting effects. In particular, the application ratio for overshooting intends to limit the impact of the VA where the sensitivity of the fixed income assets of the undertaking towards changes in

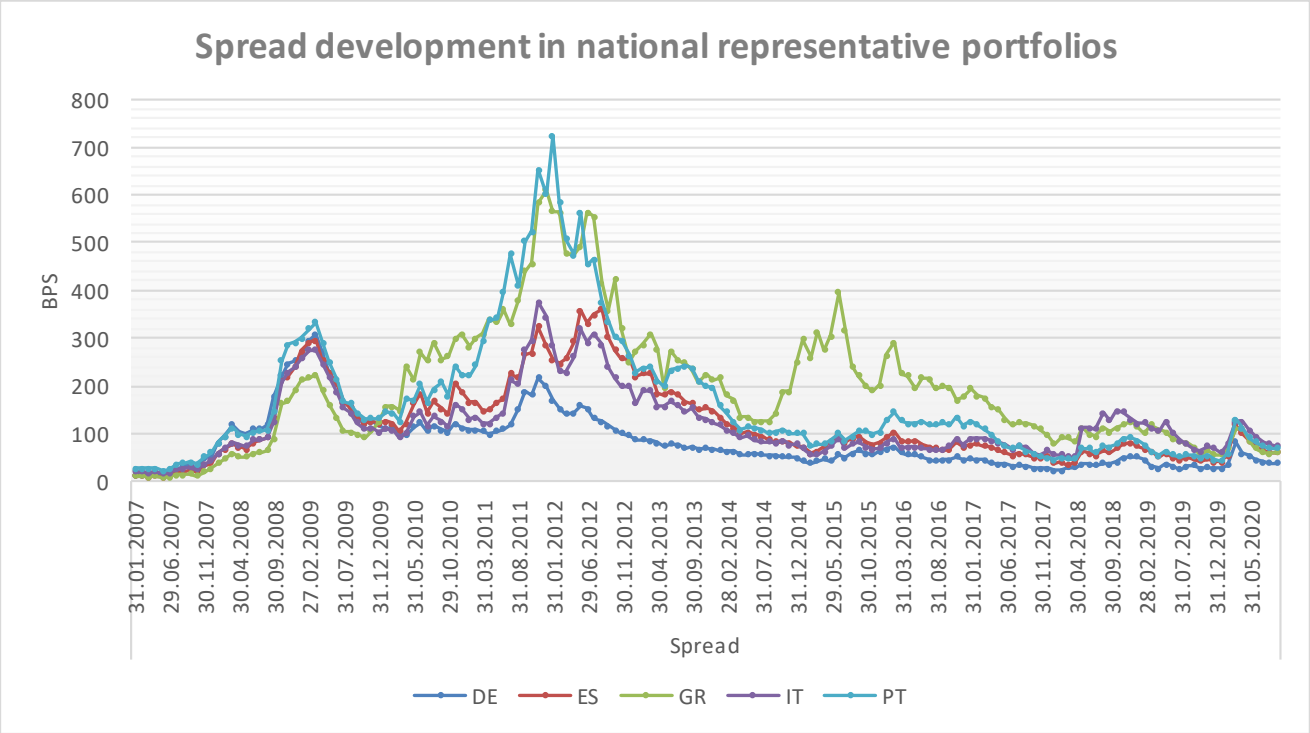
[12] See annex 8 for a case study for the Belgian market. Other countries where "overshooting" cases were observed include the Netherlands and Germany.

spreads is lower than the sensitivity of technical provisions towards changes in the VA. For the 15 undertakings for which probable cases of overshooting were identified for the current design of the VA, the average "overshooting" application ratio amounts to 71%, which is significantly lower than the average value of this ratio of 92% across the whole CIR and HIA sample. It is expected that, together with other changes in the design of the VA such as for the risk correction, this would reduce the effects described for the envisaged design of the VA.

Comparison of current and new VA design over longer time period

To assess the functioning of the VA under various economic conditions, EIOPA also undertook a comparative analysis of the envisaged and the current VA during the time period from January 2007 to September 2020. This analysis is based on the observation of spread and other interest rate related data during this time period and a simulation of the resulting historical VA values for both the current and the new design of the VA.

The following diagram shows the evolution of spread levels in the national representative portfolios of DE, ES, GR, IT and PT during this period:



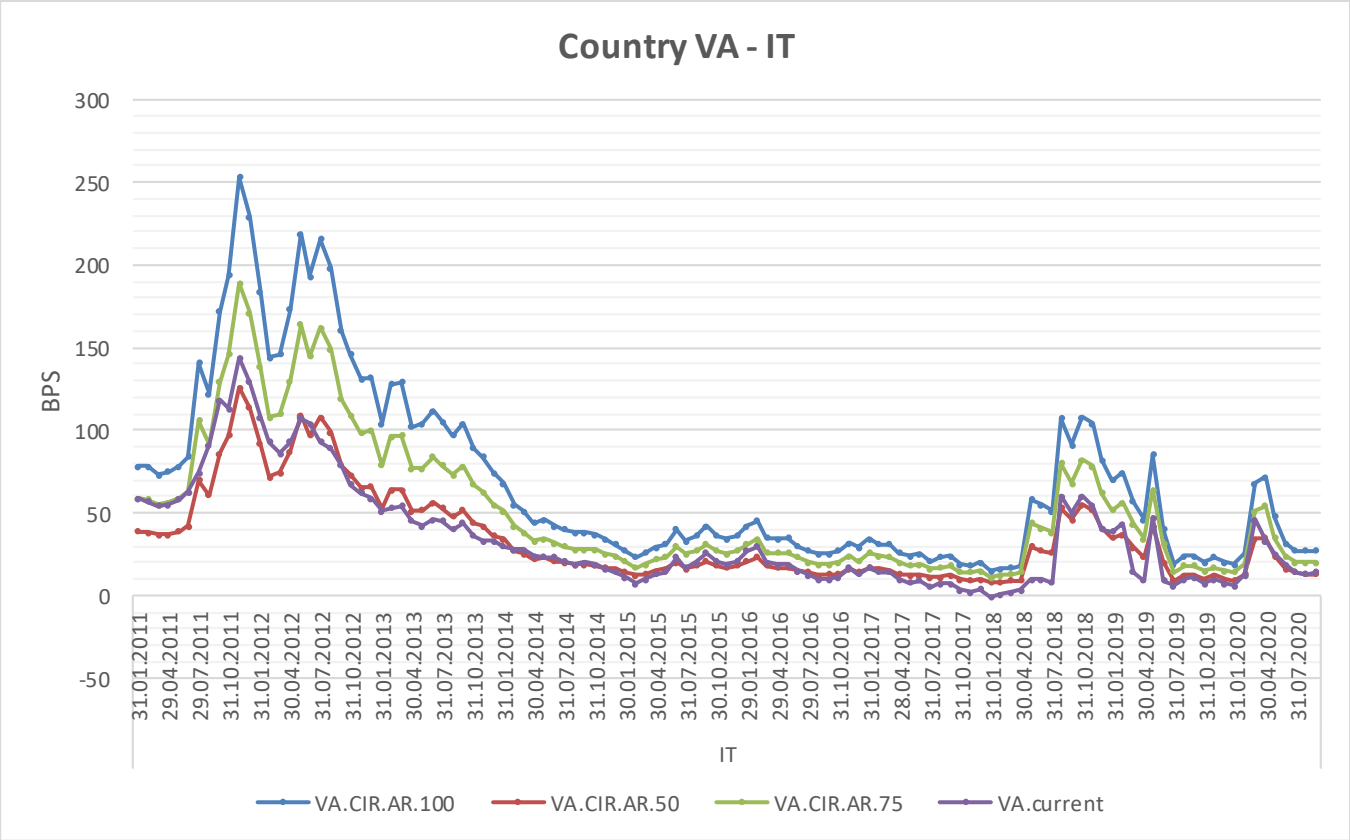
Note that this time period includes several periods of very volatility of spreads, in particular during the financial crises during 2008 and 2009, and during the sovereign debt crisis during 2011 and 2012.

EIOPA undertook a comparative assessment of the simulated historical VA values – according to both the current design and the new envisaged design of the VA - during this period. To allow for such a comparison, an assumption on the average values of the application ratios under the new design of the VA needs to be taken. For this purpose, EIOPA computed the values for the envisaged new design of the VA by considering three different levels in the combined multiplicative impact of

the VA, namely 50%, 75% and 100%. Note that, in the CIR, the average combined impact of the application ratios amounted to 70%.

Overall, this showed that the new envisaged design of the VA generally leads to higher values than under the current design, and is more effective than the current design during crisis situations. Where the new design of the VA leads to lower values than for the current VA, this is mostly the case where the combined impact of the application ratios is low. In such cases, a lower value of the VA is considered appropriate since low values of the application ratios indicate a low degree of illiquidity of the best estimate, or a risk of "overshooting" effects.

As an example, the following diagram shows the development of the VA under the current and the new envisaged design for Italy during the time period considered above.



In this diagram, the curve with the label "VA.current" refers to the values of the VA under the current design. VA values for the new envisaged design of the VA are labelled "VA.CIR.AR.50", "VA.CIR.AR.75" and "VA.CIR.AR.100" corresponding to the assumed level of the combined impact of the application ratios.

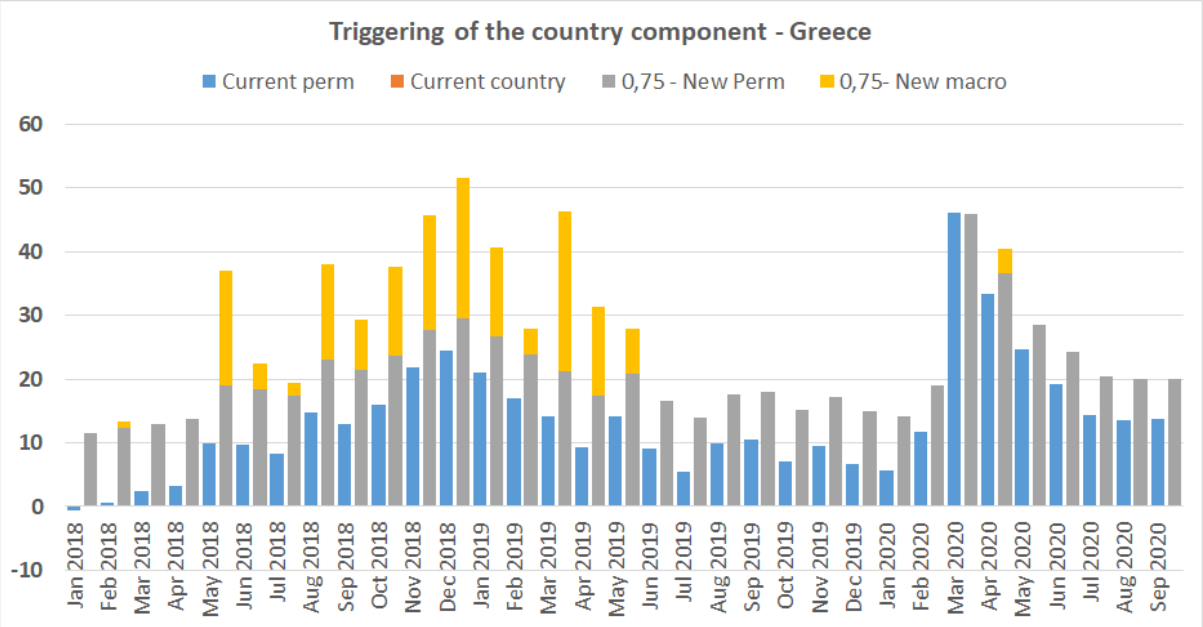
The diagram clearly shows that, in periods of medium or small spread levels, the current VA values are lower than the values for the new envisaged design of the VA. During the sovereign debt crisis 2011 – 2012, for medium or high levels of the applications ratios the new VA would have been significantly larger than under the current design. During the financial crisis, the values of the new VA corresponding to a 75% level of the application ratios would have been slightly smaller than under the current design.

In annex 7, tables and graphs for the simulated VA values for further countries are contained (GR, DE, ES and PT). There show similar characteristics.

Overall, these analysis do not indicate a need to change the envisaged design of the VA.

Effects of the new VA design on the triggering of the macro VA

Finally, the effects of the new VA design on the number of triggerings of the macro component have been investigated. In particular, the new risk correction methodology has been found to improve the triggering of macro VA in those countries that experienced severe crises in the past years. Currently, memory of these past crises is incorporated in the current risk correction, which is a long term (30 years) average of past spread data. This, in turn, reduces the risk corrected country spread for these countries, potentially preventing the triggering of the macro VA. The new risk correction methodology, which is a percentage of the current spread, does not have this drawback, improving the responsiveness of the VA to the increase of volatility in credit spreads. As an example, the following diagram shows the triggering of the macro VA in Greece in the period 2018-20. It shows that, in spite of the high level of Greek spreads in the period between May 2018 and June 2019, under the current setting the macro VA never activated.[13] On the contrary, under the proposed setting the activation would occur multiple times in this market environment.



[13] It should be noted that the country specific increase for Greece would not be triggered even if the new proposed methodology on macroeconomic VA according to option 7 of the consultation paper would be adopted in the current setting.

4. Dynamic volatility adjustment

4.1. Current advice

The October 2019 draft advice on the 'dynamic VA' by intention was not conclusive, as it naturally depends on the developments for the VA.

But the draft advice already indicated that if no or a partial solution of VA deficiencies would be introduced, measures (in regulation) are needed to maintain the DVA. Such measures would have the ambition to avoid disincentives and ensure that the DVA is risk sensitive and protect the level playing field. This might impact the use of 'direct approaches' as well as the design of 'holistic approaches'.

Following the decision to base the VA on reference portfolios, structural mismatches (sector and rating) between undertakings' portfolios and reference portfolios might still lead to 'quality mismatch' (overshooting and undershooting).

To address potential disincentives the HIA and CIR tested a proposal to require the SCR under a dynamic VA to be at least as high as the maximum of the

1. SCR under a dynamic VA replicating the EIOPA VA methodology, i.e. on the relevant currency reference portfolios[14] ('direct DVA(RefPF)').
2. SCR as under no. 1 but on the undertaking's own portfolio ('direct DVA(own PF)')

("Enhanced DVA prudency principle").

Please note, that this measure is oriented to avoid potential 'overshooting' and not addressing 'undershooting'.

4.2. New evidence

In the CIR the following information was collected:

- Q1 2020 data with and without VA (and DVA) according to current VA regime and DVA approach (Format: QRT S.22)
- Qualitative questions to undertakings on impacts from the crisis in the connection with the DVA on investment and risk management, including forced sales of assets and any disincentives from the current DVA approach as well as any observations of 'overshooting' or 'undershooting' of the VA. (See annex 9).

4.3. Analysis of the evidence

The CIR covered 40 of 62 DVA users at year-end 2019, 37 of which answered to the questions and provided SCR values for Q1 2020. The sample covers 90% of the DVA users in terms of SCR.

Answers to the qualitative questions

[14] Please note that 'macro-economic VA' according to the current proposals is not allowed for in a dynamic VA.

Overall, the existence of overshooting and undershooting of the VA in the solvency II balance sheet was confirmed, but neither forced sale of assets nor changes in risk or investment management or in risk appetite were reported.

In more detail:

Impact on 'Risk management' and 'investment management':

The participants did not report any revisions of risk or their investment management policies or practices, but some took targeted measures or used opportunities in line with their policies. No change in risk appetite was reported.

Forced sale of assets

The participants confirmed to not have experienced any forced sale of assets.

Overshooting and undershooting

Three participants actively confirmed to have observed overshooting in the balance sheet during the crisis, while ten reclaimed undershooting in general or specifically in the crisis. 24 undertakings either considered over- or undershooting as not material or did not observe any.

Supplementary calculations and considerations

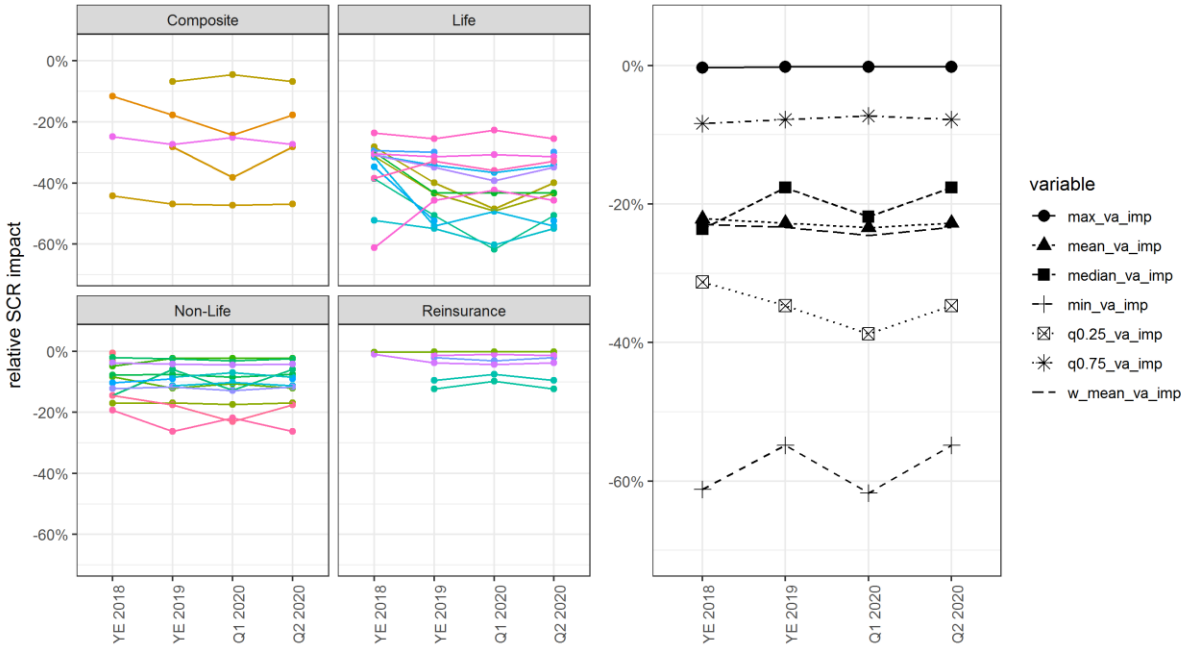
Most undertakings did not perform additional calculations but claimed to be fine with the results of their models. This includes those undertakings that observed overshooting in their balance sheet but use a holistic approach for the SCR, which in their view solves the issue. Some referred to the calculations for the impact assessments and others to similar calculations performed by own initiative.

Impact on SCR during the crisis

The following plots show the reduction of the SCR by switching on the VA for year-end 2018, year-end 2019 (HIA) as well as for Q1 2020 and Q2 2020 (CIR) in the form of 'parallel line plots' in a split by business type and basic statistics for the sample[15]:

[15] Please note that not all participants provided data for all key dates with the consequence that not all lines are across all four key dates. Please also note the reduction is shown as percentage compared to the SCR without VA and with negative sign. I.e. the strongest reductions are shown in the lower parts of the plots and the "max_va_imp" shows the lowest reduction, while "min_va_imp" shows the strongest reduction.

Relative reduction of SCR by switching on VA: YE 2018, YE 2019, Q1 2020, Q2 2020



In the right part of the plot the triangles show the mean reduction of the SCR by the VA (not only DVA but also constant VA effects), which is essentially not impacted and is roughly -20% across the key dates. The left parts, using one colour for each undertaking, shows that there is variation in the sample, but also on solo level with few exceptions the differences are mild. In some cases the reduction is stronger in times of higher spreads, but there are not only few exceptions, which confirms the analysis under spread variations and presented in EIOPA's "Report on insurers' asset and liability management in relation to the illiquidity of their liabilities" (EIOPA-BoS-19-593).

Please note that to limit the effort for participants no split in a 'constant VA' effect or the effect from including sovereign risk into the models was requested.

Summary conclusion

The data and information collected confirms the results of the analysis performed during 2019 and 2020 so far.

4.4. Options to change the current advice

The October 2019 draft advice on the 'dynamic VA' by intention was not conclusive, as it naturally depends on the developments for the VA.

The evidence collected confirmed the relevance of remaining disincentives, especially quality overshooting, and thus also confirmed that the DVA should only be maintained if measures are taken.

Options are:

Option 1: Introduce an enhancement of the 'DVA prudency principle' as tested in HIA and CIR and address especially quality overshooting in the SCR.
Option 2: Stay with the current prudency principle and cover disincentives by pillar 2 measures on risk and investment management.

5. Risk margin

5.1. Current advice

The current advice proposes changes to the methodology used to calculate the Risk Margin (RM), through the introduction of a time-dependent lambda factor in the formula, subject to a floor to prevent exaggerated impacts for very long term liabilities.

The revised methodology is defined as follows:

$$RM = CoC \times \sum_{t\geq 0} \frac{SCR(t)\times \max(\lambda^t, 0.5)}{(1+r(t+1))^{t+1}} \quad \text{, where } \lambda = 0.975$$

The proposal reduces the RM, particularly for long-term liabilities and reduces the sensitivity of the RM to interest rates.

5.2. New evidence and analysis

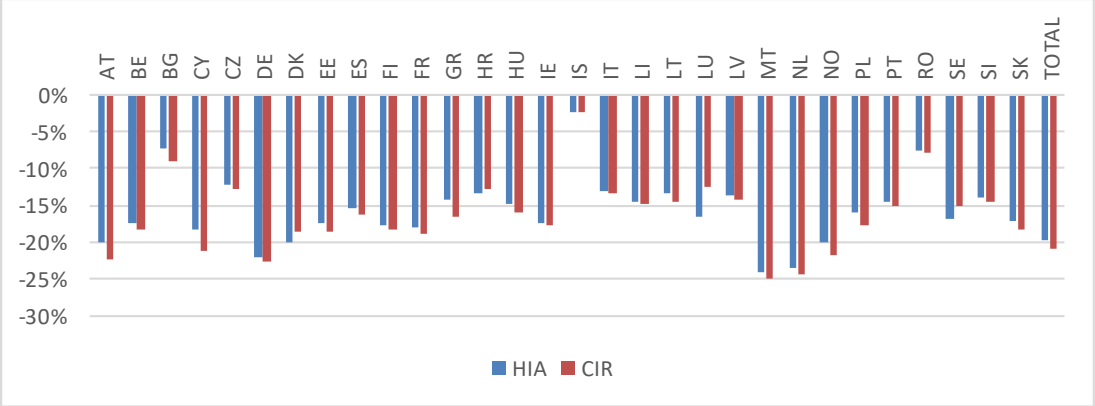
The Holistic Impact Assessment (HIA) exercise incorporated the Lambda approach for the risk margin calculation. Moreover, future SCR patterns, which are the necessary input for the risk margin calculation where a full calculation or some of the allowed simplification are used, have been collected. The data checks performed on the HIA results showed that most of the firms completed well the tables dedicated to the risk margin. Added to the latest submissions made by stakeholders for the Complementary Information request (CIR), this situation enables the figures submitted by stakeholders to be used in order to build reliable sensitivity analysis.

The following table shows the evolution of the RM, estimated through the SCR patterns indicated by stakeholders, and the impact of the lambda approach for participants to both the CIR and HIA exercises, under scenario 1.

	End 2019 (HIA)	End Q2_2020 (CIR)
RM – current approach	101 bn	111 bn
RM – lambda approach	81 bn	88 bn
Lambda eff.	-20 bn	-23 bn

Notes: Figures in EUR based on future SCR projections of the HIA exercise and HIA/CIR data. Under Scenario 1, with lambda = 0,975, with VA and transitionals, for participants to both CIR and HIA exercises

The following graph shows the country per country impact of applying Lambda to the methodology on the risk margin values:



In total, the lambda approach reduces risk margin figures of around 21% at end Q2_2020 and of around 20 % at end-2019.

Therefore, the impact of the introduction of the Lambda approach can be considered as being stable for those reference dates.

5.3. Options to change the current advice

The analysis done does not indicate that the current proposal needs to be changed.

6. Interest rate risk

6.1. Current advice

EIOPA confirmed in the consultation paper its advice to change the calibration of the interest rate risk sub-module in the standard formula in line with empirical evidence including the stress of negative interest rates. In particular, EIOPA advises to move to a relative shift approach, parameters of which vary in function of the maturity.

In the information request for the holistic impact assessment, an alternative calibration that includes a floor to interest rates of -1.25% is tested separately from the combined impact of EIOPA's advice.

6.2. New evidence

The calibration of the interest rate risk submodule was revised based on an extended time series that includes data from 2019 and 2020. The revised calibration is in line with the consultation paper calibration for the first five tenors, but then starts to significantly deviate from it. Considering the 2019 and 2020 data leads to higher shocks for the longer tenors. The higher shocks for higher maturities are largely driven by the more extreme interest rate developments in the second half of 2019 (particularly August and September 2019) and the observed flattening of the risk-free curve in 2020.

Annex 12 includes a comparison of the calibration from the consultation paper and the revised calibration.

A comparison of the potential interest rate risk floor of -1.25% with observed interest rates does not show a violation of the floor, detailed results are set out in annex 12.

6.3. Analysis of the evidence

In order to quantify the difference in the calibration the following table shows the shocked risk-free down EUR curves at 30 April 2020 with the current and the revised calibration.

The shocked interest rate down curve is about 10 basis points higher with the new calibration than the calibration in the consultation paper for longer maturities.

m	r_down_EUR new calibration	r_down_EUR CP calibration
1	-1,31%	-1,31%
2	-1,19%	-1,20%
3	-1,07%	-1,08%
4	-0,99%	-0,99%
5	-0,96%	-0,95%
6	-0,95%	-0,90%
7	-0,94%	-0,85%
8	-0,92%	-0,81%
9	-0,89%	-0,78%
10	-0,86%	-0,75%
11	-0,82%	-0,72%
12	-0,79%	-0,70%
13	-0,76%	-0,67%
14	-0,73%	-0,64%
15	-0,70%	-0,63%
16	-0,70%	-0,62%
17	-0,68%	-0,61%
18	-0,66%	-0,59%
19	-0,63%	-0,57%
20	-0,59%	-0,53%

Annex 12 includes a backtest of the current and the revised calibration for August 2019 that illustrates the deficiency of the current calibration.

6.4. Options to change the current advice

Given that the updated calibration deviates from the consultation paper calibration two options arise.

Option 1: No change. Keep the calibration from the consultation paper.
Option 2: Update the calibration in the consultation paper with the new data calibration.

Discussion of option 1

Pros	Cons
Option 1 would significant significantly correct the flaws of the current interest rate risk and it would not lead to a further increase in capital requirements.	Option 1 would not consider important interest rate movements in the calibration.
	Option 1 might potentially underestimate interest rate risk.

Discussion of option 2

Pros	Cons
Option 2 considers important interest rate developments in the last year and thus better takes the economic reality into account.	It would further increase capital requirements.
Option 2 is the more accurate calibration from the statistical point of view as it takes a longer times series with more relevant data into account.	If the interest rate development changes in 2020 such that interest rates begin to increase again, the calibration with option 1 might be a bit too sharp.
Option 2 would reduce the risk to underestimate interest rate risk.	

7. Downgrades of corporate bonds

7.1. Current advice

The current advice does not include proposals for changes with regard to spread and market concentration risk.

In the standard formula (SF) for the calculation of the Solvency Capital Requirements (SCR) both spread and market concentration risks follow methodologies which are closely linked to ratings:

- Spread risk: for bonds and loans as well as securitisations, the SCR is a function of duration and credit quality steps (CQS) (capital requirements increase for higher durations and lower credit quality). Capital requirements for credit derivatives are a function of CQS alone (steep increase from an instantaneous increase in spreads of 1.3 p.p. for CQS 0 up to 16.5 p.p. for CQS 5 of lower).
- Market concentration risk: both parameters used for the calculation of the SCR (relative excess threshold and risk factor) depend on CQS. There are some steep increases in the calibration when moving from CQS 2 to 3 (threshold is halved) and from CQS 3 to 4 (risk factor increases from 27% to 73%).

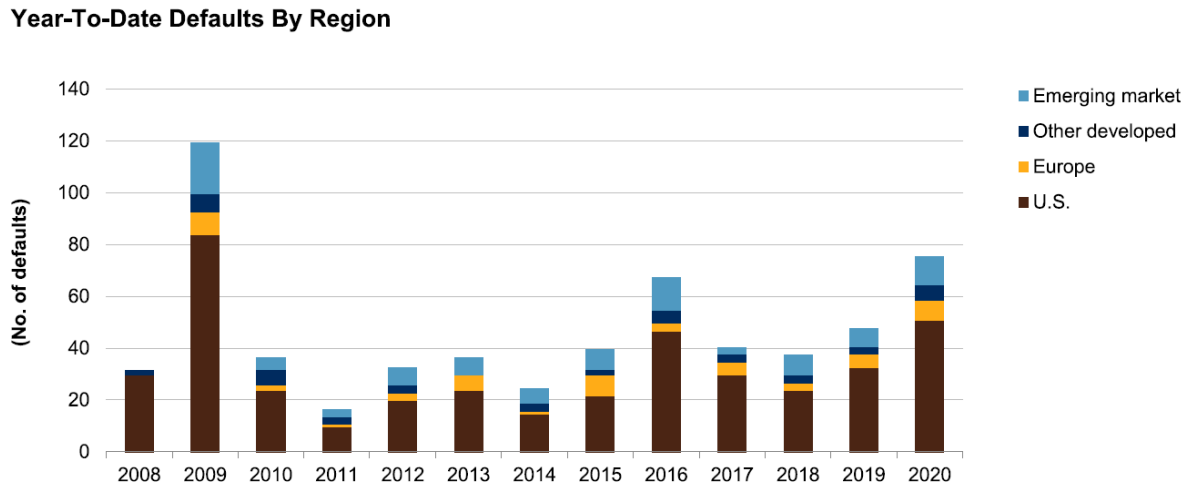
For this assessment, it should also be taken into consideration that there is usually a very close relationship between the evolution of ratings and the level of spreads, even if there may be a time differential between the materialisation of the two effects. This is relevant because, even if changes in rating may only affect capital requirements in a direct way, changes in spreads affect the value of assets and liabilities in the Solvency II balance sheet, which will then affect the SCR (e.g. change in volume measures, loss absorbency capacity of technical provisions). Spread changes will also affect some of the LTG mechanisms which are designed precisely to counter pro-cyclical effects (the VA and the MA).

7.2. New evidence

The Covid-19 pandemic and the measures adopted by governments around the World as a reaction to the spread of the virus had a significant impact in the global real economy, leading to substantial declines in the GDP.

The abrupt slowdown of the economic activity was expected to have a strong effect in the credit quality of financial instruments such as corporate bonds, potentially leading to a substantial increase of downgrades and defaults. In case of materialization of a mass downgrade/default scenario, the impact in the solvency position of (re)insurers would likely be very strong, given their large asset portfolios and relevance as investors in the wider economic activity.

Some initial data indicated a deterioration of the overall credit quality and possible increase of downgrades in the following months as well as an increase in the number of defaults. According to S&P, the number of corporate defaults up to 13th of May 2020 had hit the highest year-to-date levels since 2009 and already exceeded the total observed in the year of 2016, although 70% of defaults so far were concentrated in the US.



Source: Standard & Poors

Against this background, this work aims to investigate, on the basis of the most recently available information, whether we are in presence of a massive downgrade event and assess its consequences on the insurance sector, as well as to identify and address potential sources of cliff effects or pro-cyclical incentives in the SCR standard formula spread and market risk concentration sub-modules.

7.3. Analysis of the evidence

EIOPA assessed the issue of corporate bond downgrades and its impacts on the spread and market risk concentrations SCR sub-modules from different perspectives. This section briefly describes the analysis performed as well as the conclusions obtained. The more detailed analysis can be found in annex 13.

Conceptual analysis of downgrades concerning spread and market risk concentrations sub-modules

EIOPA analysed the conceptual design and calibration of the spread and market risk concentration sub-modules, seeking to identify potential sources of cliff effects or pro-cyclical incentives. Based on the analysis performed, the design and calibration of the spread and market risk concentrations risk modules of the SCR standard formula seem justified and in line with a risk-based approach, taking into account that the underlying target criteria of 99.5 VaR over 1-year time horizon. No evidence of excessive calibration was found. Capital charges tend to increase as the credit quality of assets deteriorate, but this is a reflection of their increased level of risk. No evidence was found pointing to the existence of cliff edge effects or pro-cyclical incentives. Furthermore, it should be highlighted that the Solvency II framework already includes a range of tools and mechanisms aimed at mitigating potential pro-cyclical effects arising from a risk- and market-based solvency regime.

Market information on downgrades and defaults

EIOPA assessed the general market movements concerning corporate bond downgrades and defaults. Based on the evidence collected so far, it seems that at this point we are not in presence of a mass downgrade/default scenario. Although a significant increase in the number of bond downgrades and, to a lesser extent, the number of defaults could be observed in the early months following the start of the pandemic crisis, those figures have receded to much more moderate numbers in recent months.

Analysis of HIA and CIR data

EIOPA analysed whether the information gathered in the information requests provides some indication of potential cliff-edge effects due to corporate bond downgrades in the spread or market risk concentration sub-modules. Based on the information provided in the HIA and CIR, no specific evidence on the existence of cliff-edge effects in spread or concentration risk due to the downgrade of specific bonds can be identified. The increase of net spread risk is a consequence of the impact of the low interest rate environment on the loss absorbing capacity of technical provisions. The gross figures do not provide indication of the market being exposed to cliff-edge effects which could potentially lead to pro-cyclical behaviour. Although for individual undertakings a high increase in spread or concentration risk could be observed in Q2 2020, EIOPA did not find evidence that this was due to downgrading of bonds but rather the result of undertaking's changes in investments.

Investment behaviour of insurance undertakings

EIOPA performed an analysis of the actual rating downgrades and trading activity on corporate bonds by EU insurers, with the aim to assess whether such trading is largely driven by bond downgrades and identify potential pro-cyclical behaviour that could threaten financial stability. The analysis of the trading behaviour of European insurers evidences a continued net buying position with regard to corporate bonds. This trend was interrupted in Q1 2020 but reinstated in Q2. Insurers tend to sell both downgraded and upgraded bonds. This trend intensified during the crisis, but it was already present in previous years. As mentioned in previous sections, the sale of downgraded bonds may be triggered by capital requirements, reflecting a de-risking behaviour by insurers, but it may also be due to other reasons, such as investment mandates linked to specific products. Sale of upgraded bonds is most likely driven by the intention to realise capital gains. The magnitude of the observed selling movement remains largely contained within the portfolio of corporate bonds held by EU insurers, without evidence that indicates substantial pro-cyclical effects triggered by the crisis. The effects seem to be manageable for the moment, especially if insurers invest in a well-diversified portfolio.

7.4. Options to change the current advice

Based on the analysis of the evidence collected, no options for changes to the current advice are deemed necessary with regard to the spread and market risk

concentrations sub-modules. No evidence could be found supporting the existence of cliff effects or pro-cyclical incentives in the design and calibration of the spread risk and market risk concentrations sub-modules of the standard formula of the Solvency II solvency capital requirements. Market data indicates that the crisis has so far not led to the materialisation of a severe downgrade scenario, and that insurers do not seem to have changed their behaviour in relation to the purchases and sales of downgraded/upgraded bonds. Impact assessment results also did not show evidence of significant changes in the weight of these capital charges since the beginning of the crisis. Finally, it is important to highlight that results of scenario based calculations estimating the macroprudential impact of mass downgrade scenarios in the insurance sector usually focus exclusively on the asset impact, therefore not taking into account the range of Solvency II mitigating tools which would compensate for the losses in asset values through adjustments to the insurance liability valuation (e.g. the Volatility Adjustment or the Matching Adjustment).

8. Correlations

8.1. Current advice

Consultation document: EIOPA advises to keep the current two-stage correlation structure in the standard formula, with correlation matrices within a submodule and a correlation matrix for the main risk modules. In particular, this implies that a direct correlation between market risk and life lapse risk should not be introduced in the standard formula. EIOPA advises to keep all correlations for the underwriting risks and the correlations between the main risks unchanged. Furthermore, EIOPA advises to keep the market risk correlations unchanged.

Balanced package (included in the Holistic Impact Assessment): The SCR standard formula correlation parameter for interest rate risk (downward shock) and spread risk should be set to 0.25 instead of 0.5. The parameter for interest rate risk (upward shock) and spread risk should stay at 0. All other correlation parameters remain unchanged.

8.2. New evidence

Correlations between market risks

The same analysis of the correlation between interest rate down and spread risk from the balanced package has been carried out, applying the same methodologies by taking also market data from 2020 into account.

The 2020 data (particularly from March and April 2020) showed stronger spread widening and decreasing interest rate rates, particularly for March and April. Calculating the correlation only from data points from these two months would give rise to a high correlation between interest rate and spread risk[16]. Taking the entire data from 2020 up to the end of August into account, leads however to a moderate correlation of 0.33 (data from January until August 2020) and 0.15 (data from March until August 2020). The new data from May until August 2020 showing a significant decrease in credit spreads, has in particular lead to significant decrease in this simple correlation calculation.
The new 173 data points have overall little impact on the overall analysis with 4452 data points. There is only a slight change of the estimated parameters in the methodologies. Hence, the derived result of a moderate correlation between spread and interest rate risk remains.

Correlation between lapse risk and the different market risks

No new evidence in view of market developments since the beginning of the year is available:

[16] Taking the simple correlation between the approximated annual spread and interest rate changes in 2020 (86 data points) leads to a correlation estimate of approximately 0.7 (Pearsson correlation). The tail correlation in the last year (30/04/2019-30/04/2020) in the joint (80,20) percentile yields a correlation estimate of 0.75. However, only 4 paired observations from the last year are in this higher percentile.

- information on lapses is only included in the Annual Solvency II reporting Solo[17] but not also in the Quarterly Reporting Templates;
- as a proxy for quarterly data, data from Quarterly Financial Stability reporting[18] available in principle both at solo and group level; however, in practice those data mostly relate to large groups.

Recent evidence on correlation between lapse risk and the different market risks

In April 2018, the Commission submitted a request to EIOPA to report on insurers' asset and liability management in relation to the illiquidity of their liabilities. EIOPA sent a dedicated questionnaire to NCAs to determine the evolution of lapse rates during the financial crisis of 2008 and 2009: the answers received highlight that policyholders' behaviour is heterogeneous (see annex 14 for further details).

Also, historical annual cancellation/surrender rates by product were provided by the undertakings participating in the information request in spring 2018. Where available, the average annual surrender/cancellations rates for the last 5 financial years was provided (see annex 14 for further details).

8.3. Analysis of the evidence

Correlations between market risks

The main reason for the resulting moderate correlation between spread and interest rate risk is that the recent data adds too few data points to the joint lower right tail (the relevant tail for the correlation between the standard formula spread and interest rate risk). It is true that one has observed strong spread widening with decreasing interest rate movements, particularly in March and April 2020. However, most of these movements do not represent a joint tail event (see annex 14 for further details).

It should be noted however that the results of the analysis include a high statistical uncertainty. The central estimate is around 20%, but the uncertainty leads to a confidence interval of roughly 80 percentage points (confidence level 95%). The performed analysis focuses specifically on a strict definition of tail events and therefore only 23 of more than 4000 data points determine the final result. If we extend the definition of tail events and base the final result on 234 data points, the correlation rises to 69% and the uncertainty drops to about 13%. However, most of these data points relate to interest rate decreases and spread widening that correspond to losses lower than the SCRs for interest rate and spread risk, but off nonetheless high severity. This estimate is broadly in line with the observed rank correlation between the interest rate and credit spread movements during the COVID-19 crisis, the Global Financial Crisis and the Sovereign crisis which are also all between 50% and 70%. The rank correlation does however not measure the dependence in the deepest tail of the distribution (above 99.5%), but the dependence of the broad tail of the distribution (above 80%), what is less

[17] Template S.05.01.01 - Premiums, claims and expenses by line of business, R2700 - Total amount of surrenders
[18] Template S.41.01.11 Lapses

adequate for the purpose of aggregating quantiles (like capital requirements), but allows for a more statistically robust estimate of the correlation.

Correlation between lapse risk and the different market risks

The data on lapse risk collected in the complementary information request do not indicate the need to revise earlier findings on lapse rates (as set out in annex 15).

8.4. Options to change the current advice

Correlations between market risks

In general, two options can be considered, also in the light that the year is not over yet and that the evolving and multifaceted nature of the pandemic implies that its ultimate impact on the solvency position of undertakings is very difficult to predict.

Option 1: Keep the proposal of a reduced correlation of 0.25 between interest rate risk down and spread risk as tested for the holistic impact assessment.

Option 2: Revert back to the current correlation of 0.5.

Discussion of option 1

Pros	Cons
Option 1 is mainly supported by the empirical analysis at hand. Over a long period, a moderate tail correlation is justified by the technical analysis at hand.	The full impact of the pandemic might not be reflected yet in the available market data. Current market volatility might give rise to extreme spread and interest rate movements that change the picture. Lowering the correlation parameter may therefore be premature.
Even the recent data with excessive spread widening in March and April 2020 barely add additional data points to the corresponding tail. The strongest interest rate decreases do not occur at the same time as the strongest spread increases.	

Discussion of option 2

Pros	Cons
Option 2 might better reflect the current market volatility which could give rise to extreme spread and interest rate movements.	It does not capture the finding that the strongest interest rate decreases have thus far not occurred at the same time as the strongest spread increases.

9. Lapse risk

9.1. Current advice

For the consultation paper for the 2020 review of Solvency II EIOPA analysed lapse risk data for SLT health insurance that were provided by stakeholders. The conclusion of the analysis was that the data are not sufficient to advice for a change of the current risk factors for lapse risk.

9.2. New evidence

Recent evidence on possible differentiation of lapse risk shocks by disincentives to lapse

In April 2018, the European Commission submitted a request to EIOPA to report on insurers' asset and liability management in relation to the illiquidity of their liabilities. EIOPA was specifically asked to provide detailed information on the liquidity of insurance undertakings' liabilities, taking into account, inter alia, (i) contractual options to (partially) redeem those liabilities before maturity;(ii) the related contractual penalties; (iii) the related tax incentives.

EIOPA also issued a questionnaire to national supervisory authorities on the areas of tax incentives and lapse rates.

According to the relevant conclusions in the "Report on insurers' asset and liability management in relation to the illiquidity of their liabilities" (EIOPA-BoS-19-593, issued 16 December 2019), there is "no strong connection between surrender rates and the existence of disincentives to surrender" (see page 32).

Questions are asked about the need to re-perform the same data collection w.r.t. the first month of 2020 (i.e. if we can reasonably assume that the situation has change since the last data collection), or if EIOPA could rather confirm the conclusion of the Report as of December 2019. Even though no strong connection between disincentives and lapse rates were observed in the past, it may change during this crisis.

Complementary information request

EIOPA collected from the insurance industry data on the lapses from 2015 to Q2 2020. The data was requested separately for line of business and separately business that is subject to disincentives to lapse.

9.3. Analysis of the evidence

Participants only reported figures relating to business with disincentives to lapse.

The sample of respondents consists of 139 undertakings: most of them (73) are life undertakings, followed by composite (54) and non-life (12) undertakings (no reinsurer). A clear majority (111) of them computes its SCR with the standard formula. About half (65) of them are located in DE (27), IT (14), ES (10), FR (8) and IE (6). They account for 43% of life insurance TPs at EEA level at the end of 2019.

As a consequence displaying the temporal evolution (from 2015 to 2020) of individual undertaking's (unweighted) lapse rates by LoB and penalty type was

found to be a more meaningful alternative to detect a potential trend in these rates. These graphs are displayed below. From these graphs no clear (upward or downward) trend in the first two quarters of 2020 can be observed.

The majority of respondents reported incomplete data as a consequence it is not possible to aggregate the lapse rate across undertakings for large samples. A visual analysis of the time series of lapse rates provided did not identify a general pattern at the beginning of the pandemic in Q2 2020. In particular lapse rates did not generally increase in response to the outbreak of the pandemic. The results do not indicate that the current lapse calibration needs to be changed. In particular the data do not provide a basis to introduce distinctions in the lapse calibration between insurance businesses that is subject to disincentives to lapse and other business.

10. Health insurance pandemic risk

10.1. Current advice

The consultation paper did not cover the calibration of the pandemic risk sub-module.

10.2. New evidence

More than 3 million persons have been tested positively on the Corona virus in the EEA.[19] The number of all tested persons is a multiple of that figure. Of those positively tested, about 22% have been hospitalised and about 9% of hospitalised persons have received intensive care.[20]

The overall capital requirement for pandemic risk of the EEA insurance undertakings applying the SCR standard formula is EUR 1.84 bn. Across countries there is a large variety as to the capital requirement (see annex 16 for more detailed figures). This finding is in line with an internal survey carried out among supervisors on coverage of pandemic risk by insurance undertakings in national markets.

In the complementary information request EIOPA collected data from insurance and reinsurance undertakings applying the standard formula on the health insurance claims caused by the pandemic until the end of Q2 2020.

10.3. Analysis of the evidence

Depending on the degree of coverage, insurance and reinsurance undertakings have to compensate health insurance claims caused by the Covid-19 pandemic, in particular for Corona virus tests, medical consultation, inability to work and hospitalisation. In particular for testing, hospitalisation and inability to work significant costs may be incurred. Costs for medical consultation may be limited given that there is currently limited medicine against Covid-19 and several countries advised at the outbreak of the pandemic that infected persons should not seek medical consultation unless there are severe symptoms.

The pandemic risk sub-module assumes for medical expense insurance that 1% of the insured are hospitalised and 20% seek medical consultation because of the pandemic. The average costs incurred for hospitalisation and consultation in a pandemic are estimated by the undertakings. The submodule further assumes that for income protection insurance 0.0075% of the total sum insured needs to be paid because of the pandemic.

Complementary information request

The sample of undertakings which reported data on pandemic risk consists of 97 undertakings (40 non-life, 31 composite, 22 life and 4 reinsurance undertakings). All EEA countries are represented except BG, LI, LU, PT, SK. About a half of them

[19] ECDC COVID-19 situation update for the EU/EEA and the UK 4 October 2020 (https://www.ecdc.europa.eu/en/cases-2019-ncov-eueea)
[20] ECDC surveillance report 1 October 2020 (https://covid19-surveillance-report.ecdc.europa.eu/)

are located in DE (11), IE (8), RO (7), ES (6), IS (6), IT (6) and MT (6). Measured in terms of SCR for pandemic risk at the end of 2019, the sample has a market share of 37%.

For the sample that participated in the complementary information request the Covid-19 related claims correspond to 9% of the SCR for pandemic risk at the end of 2019. The claims in medical expense insurance and income protection insurance correspond to 3% and 24% of the medical expense and income protection component of the pandemic risk SCR respectively. The following table sets out that percentage per national subsample for the countries where at least five undertakings provided data and where the related pandemic SCR is above EUR 1 mn.

Country	**Ratio of Covid-19 claims until mid-2020 and SCR for pandemic risk**		
	Medical expense insurance	Income protection insurance	Total
DE	7.2%	0.4%	6%
ES	2.3%	0.1%	2%
FI	3.0%	2.9%	3%
IE	0.3%	0.8%	1%
IT	7.9%	8.5%	8%

For one national market, different from the one's covered in the table, two insurance undertakings reported income protection claims that exceed the income protection insurance component of the pandemic risk SCR. Both undertakings offer disability insurance and have a pandemic SCR is above EUR 1 mn.

More detailed results on the full sample are set out in annex 16.

The results from the two disability insurance undertakings indicate that the size of the income protection component of the pandemic risk SCR might not be sufficient.

The results for the other countries do not confirm that. But it should be noted that the data basis covers only about three months since the outbreak of the pandemic. An analysis covering a longer period might come to a different result. A revision of the calibration of the pandemic risk SCR until December 2020 will however not be possible.

11. Macroprudential tools

11.1. Current advice

EIOPA's draft advice to the European Commission already included some tools with macroprudential impact that may have been useful. In particular, the draft advice considers:

- Strengthening the pre-emptive planning and preventive measures as well as the resolution framework. EIOPA's draft advice included a comprehensive proposal for a harmonised EU recovery and resolution framework, addressing all relevant aspects such as pre-emptive planning, preventive measures, resolution provisions and cooperation aspects. Such a framework should reduce the likelihood of insurance failures and/or mitigate the impact on policyholders and on the financial stability if the failures finally materialise.
- A capital surcharge for systemic risk. EIOPA proposed that, following a macroprudential analysis, supervisory authorities should have the power to set a capital surcharge to address one or more of the entity-, activity-, or behaviour-based sources of systemic risk. The capital surcharge would be in place as long as the conditions for triggering it still hold. By increasing the capital requirement, *ceteris paribus*, the SCR ratio would be lower. If companies want to keep the SCR ratio at similar levels, they will be forced to de-risk, raise capital (quite unlikely and inconvenient in a distressed market) or build it up the buffer internally.
- Liquidity tools. The advice proposes two main liquidity tools. On the crisis prevention side, EIOPA proposed that all undertakings within Solvency II should be required to draft liquidity risk management plans (LRMPs) for identifying and addressing potential liquidity stresses. However, in accordance with the proportionality principle, NSAs should be given the possibility to waive certain undertakings, based on the nature of the exposures as well as the scale and complexity of the undertaking's activities that make them more vulnerable to liquidity stresses. LRMPs allow insurers to assess the framework and arrangements that they have in place to manage, mitigate or reduce liquidity risk. On the crisis management side, EIOPA's advice proposes that NSAs should be granted with the power to temporarily freeze the redemption rights of policyholders in exceptional circumstances. The power should be applied only as a last resort measure, for a short period of time and only to undertakings affected by a significant liquidity risk.

11.2. New developments

The outbreak of the COVID-19 crisis has revealed two areas where the advice would need to be reinforced, i.e. with regards to the insurers' financial positon as well as to the insurers' liquidity position. On the financial position, the COVID-19 crisis has shown the need to have adequate capital buffers in times of severe uncertainty. Regarding the liquidity position of undertakings, although so far no fundamental system-wide liquidity issue has been witnessed, the COVID-19 crisis stressed the need for authorities to have a proper risk monitoring and stress-testing framework in place, as well as to count with mitigating measures in case vulnerabilities are identified.

11.3. Analysis of the developments

Since the outbreak of the COVID-19 crisis, EIOPA has stressed the need to ensure the access to and continuity of insurance services, safeguarding the ability of the insurance sector to continue to perform its role as risk transfer mechanism from citizens and businesses and its capacity to mobilize savings and invest them in the real economy. This objective requires that (re)insurers take all necessary steps to continue to ensure a robust level of own funds to be able to protect policyholders and absorb potential losses.

EIOPA's statement on dividends distribution of 2 April 2020 urged undertakings to temporarily suspend all discretionary dividend distributions and share buy backs aimed at remunerating shareholders.[21] The statement also urged that this prudent approach is applied by all groups at the consolidated level and also regarding, whenever these may materially influence the solvency or liquidity position of the group or of one of the undertakings involved. The materiality of this impact should be monitored jointly by the group and solo supervisors.

The ESRB has also recommended that at least until 1 January 2021 relevant authorities request financial institutions under their supervisory remit to refrain from undertaking any of the following actions:[22] (a) make a dividend distribution or give an irrevocable commitment to make a dividend distribution; (b) buy-back ordinary shares; (c) create an obligation to pay variable remuneration to a material risk taker, which has the effect of reducing the quantity or quality of own funds at the EU group level (or at the individual level where the financial institution is not part of an EU group), and, where appropriate, at the sub-consolidated or individual level.

In addition to EIOPA's and ESRB's statements, several actions were also taken at national level. However, it became clear that a binding power was lacking in case of exceptional circumstances like the one the EU financial system is facing with the COVID-19 crisis.

In a similar vein, liquidity risk during the pandemic has been under scrutiny. In a letter to EIOPA, the President of the ESRB expressed concerns that the market liquidity conditions might further deteriorate in the future, potentially having adverse implications for the financial stability in Europe.[23] She alerted that some insurers could be prone to liquidity risk because parts of the sector could be exposed to several cash-flow shocks.[24]

She also advised that priority should be given to improved monitoring of liquidity risk in the insurance sector and that the Solvency II review presents an

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21 https://www.eiopa.europa.eu/content/eiopa-statement-dividends-distribution-and-variable-remuneration-policies-context-covid-19_en

22 https://www.esrb.europa.eu/pub/pdf/recommendations/esrb.recommendation200608_on_restriction_of_distributions_during_the_COVID-19_pandemic_2~f4cdad4ec1.en.pdf

23 https://www.esrb.europa.eu/pub/pdf/other/esrb.letter200608_to_EIOPA_on_Liquidity_risks_in_the_insurance_sector~e57389a8f1.en.pdf

24 This could include "an increase in claims (e.g. event cancellations), shortfalls in expected premia inflows (especially in countries with public health lockdowns measures), margin calls, a decrease in investment income (e.g. moratoria on mortgages, lower dividend income) and lower liquidity of insurers' investment assets".

opportunity to better enable supervisors to address liquidity risk in insurers with a vulnerable liquidity profile (e.g. through enhanced Pillar 2 provisions that enable supervisors to require these undertakings to hold a liquidity buffer).

Liquidity risk is fundamentally different from capital risk. Due to the different triggering events and the different time horizon of its materialization, an insurer can be solvent but still experience a liquidity distress. The Solvency II regime is designed to ensure a sound capital position of insurance undertakings but it does not include quantitative requirements and relative metrics with respect to the liquidity position. The absence of a commonly agreed approach to assess the liquidity sources and needs of insurers, the subsequent absence of standardized metrics such as the SCR for the capital position, and the lack of a specifically designed reporting makes an assessment of liquidity risk more difficult.

This calls for an improved framework for liquidity risk including improved monitoring and stress testing, as well as granting NSAs with mitigating measures to be used in case vulnerabilities are identified.

11.4. Options to change the current advice

Additional measures to reinforce the insurer's financial position

Two options are being considered:

1. No change, i.e. not granting NSAs with additional measures to reinforce the insurer's financial position.
2. Grant NSAs with additional measures to reinforce the insurer's financial position. Supervisors should have the power to issue, and enforce directions:[25]
    - Restricting or suspending dividends or other payments to shareholders; and
    - Restricting the purchase of the insurer's own shares.

The aim is reducing the risk that, in extreme circumstances and high-level of uncertainty, a deterioration of the financial conditions ends up putting the existence of the insurer at risk.

The measures could be applied sector-wide, in exceptional circumstances and for as long as the underlying reasons that justify the measure are present. The application of the measure should be regularly reviewed (e.g. every 3 months), and removed as soon as the underlying conditions that motivated the measure are over.

In order to ensure uniform conditions of application EIOPA should issue guidelines in accordance with Article 16 of Regulation (EU) No 1094/2010 to further specify the existence of "exceptional circumstances".

[25] Among the directions to reinforce the insurer's financial position, ICP 10 considers the following: requiring measures that reduce or mitigate risks; requiring an increase in capital; restricting or suspending dividend or other payments to shareholders; and restricting purchase of the insurer's own shares. The same logic could however apply to other distributions that result in a lower level or lower quality of capital and loss absorbing capacity, such as variable remunerations or profit sharing.

Liquidity risk framework

Two options are being considered:

1. No change, i.e. not granting NSAs with additional mitigating measures to address system-wide liquidity risk.
2. Granting NSAs with additional mitigating measures in case vulnerabilities have been identified through risk monitoring and stress-testing.

These measures could incentivise insurers to reinforce their liquidity position (e.g. via reduction in exposures more prone to liquidity risk, and or incentivise insurers' access to liquidity thus creating a liquidity buffer - e.g. via enhanced Pillar 2 provisions as proposed by the ESRB).

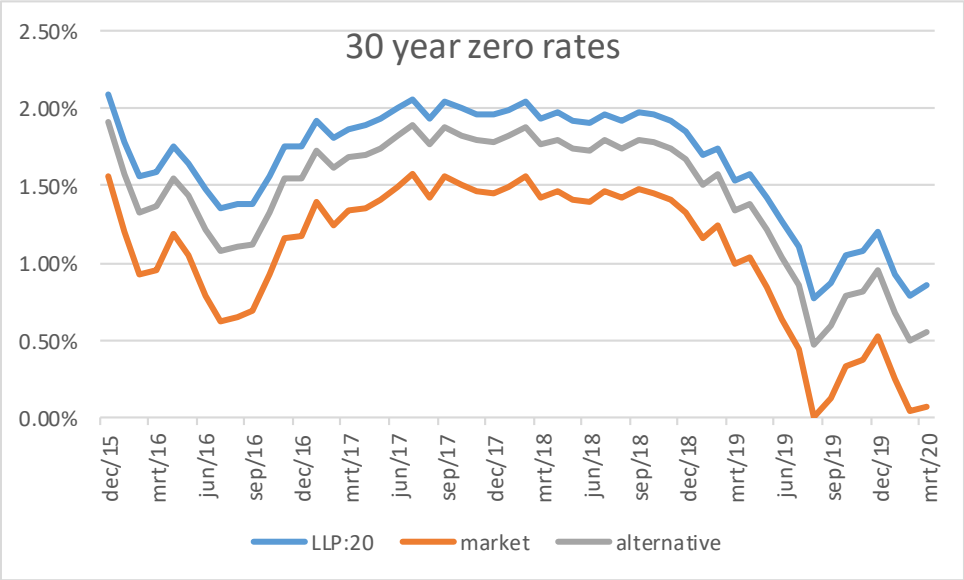
In order to ensure uniform conditions of application EIOPA should issue guidelines in accordance with Article 16 of Regulation (EU) No 1094/2010 to further specify the operational details of a potential liquidity risk framework as described.

Enhancing the reporting framework from a macroprudential point of view

In order to detect potential market-wide liquidity stresses that would help NSAs to conduct a proper risk assessment and eventually inform the need for mitigating measures, the reporting framework should be improved. Any potential changes to the reporting framework that could improve the ability of NSAs and EIOPA to perform an assessment of liquidity risk on a more complete and regular basis would be beneficial. Such changes should not disproportionately increase the reporting burden for insurance undertakings, therefore the scope of the undertakings targeted by an enhanced reporting framework could be limited for e.g. to the Financial Stability reporting sample.

Annex 1 – Extrapolation of risk-free interest rates

The LTG review PG also assessed whether new evidence on the three issues identified for the extrapolation[26] was available. In respect of the issue of underestimation of technical provisions, quantitative information on the impact on technical provisions of an LLP of 30 or 50 years is not available, so the assessment as performed for the consultation document could not be revisited. Though, the assessment and conclusion still holds, in particular as interest rates for long-term rates have decreased in the current crisis and the difference between observed market rates and extrapolated rates have generally increased. The following graph outlines the extrapolated rates for maturity 30 and the observed market rates for the time-period Q1 1999 – Q2 2020.



On the issue of risk management incentives an analysis was provided in the consultation document[27]. The lower interest rates during Q2 2020 have increased the total interest rate sensitivities and the figures would change according to the underlying cash flow profile – though, the analysis and its conclusions still hold.

On the issue of financial stability the consultation document provided an assessment on monthly volatility and quantile of interest rates.[28] It can be expected that the observation during Q2 would not change this assessment as it is based on a long-term data base. No evidence is available that allows to draw further conclusions on volatility of own funds[29] - though, it is expected that the analysis would provide similar results if undertakings have not drastically changed their interest rate hedges.

[26] underestimation of technical provisions, risk management incentives and financial stability

[27] Page 46 and 47 of the consultation document

[28] Page 48 of the consultation document

[29] The earlier assessment of the stability of own funds was based on a sensitivity calculation where undertakings were asked to assess the impact of a change in risk free interest rates by 100 basis points.

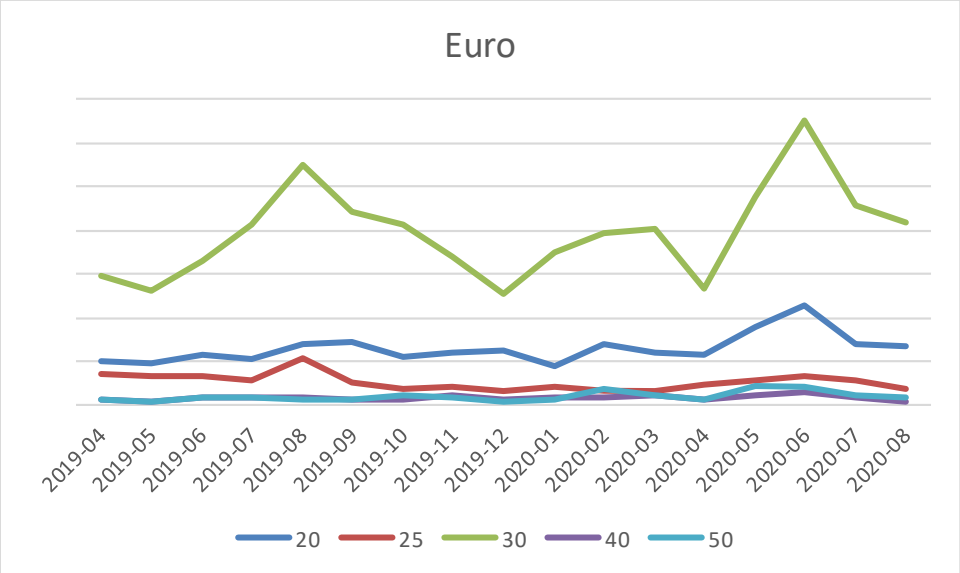
In addition, new evidence is available on the depth and liquidity of swap rates and the evolution of the liquidity of bond markets during Q1 that allows to assess the implications on the DLTness of swap rates and implications for the residual volume approach.

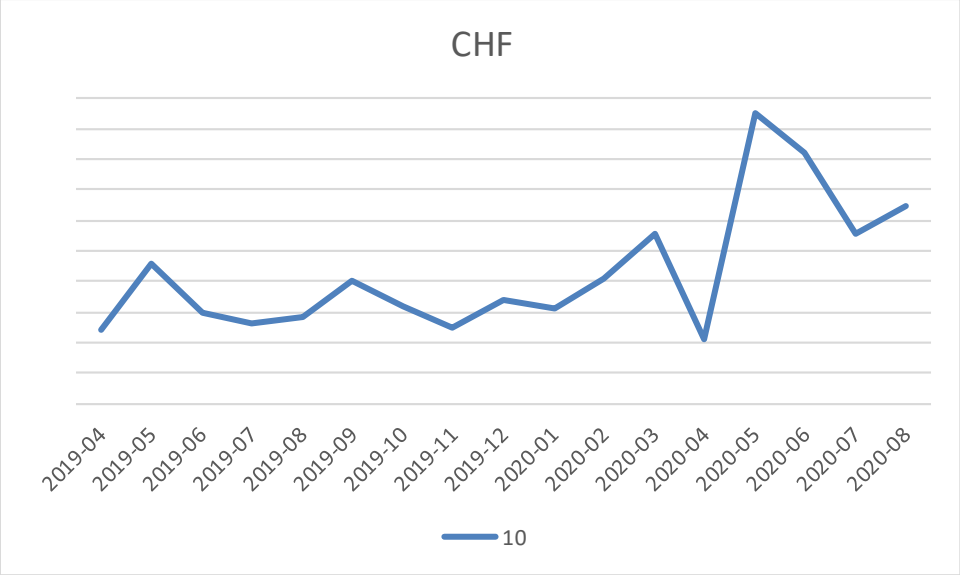
Liquidity of swap markets

Data availability does not allow to completely re-do the DLT analysis for the swap market as performed for the regular DLT assessment as data from small trade repositories is missing. Therefore, no conclusions on the DLTness of the swap rates for individual maturities can be drawn as absolute results on the number of trades and trade volumes exceeding the pre-defined thresholds cannot be derived. For some currencies, like PLN, the data basis is very limited.

Though, data available allows to assess the evolution of number of trades and trade volumes comparing the evolution during last year, including in particular the evolution during the first two quarters of this year. This allows to assess whether liquidity for individual maturities has changed during the crisis.

The following graphs outline – for currencies where data was available – the evolution of number of trades for the maturities of the LLP or FSP and thereafter:

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CZK
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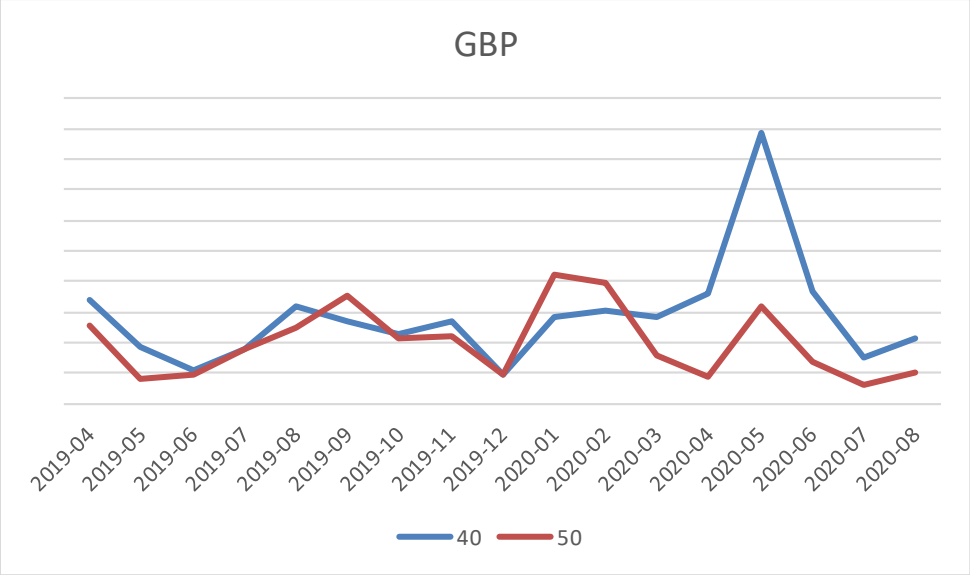
GBP
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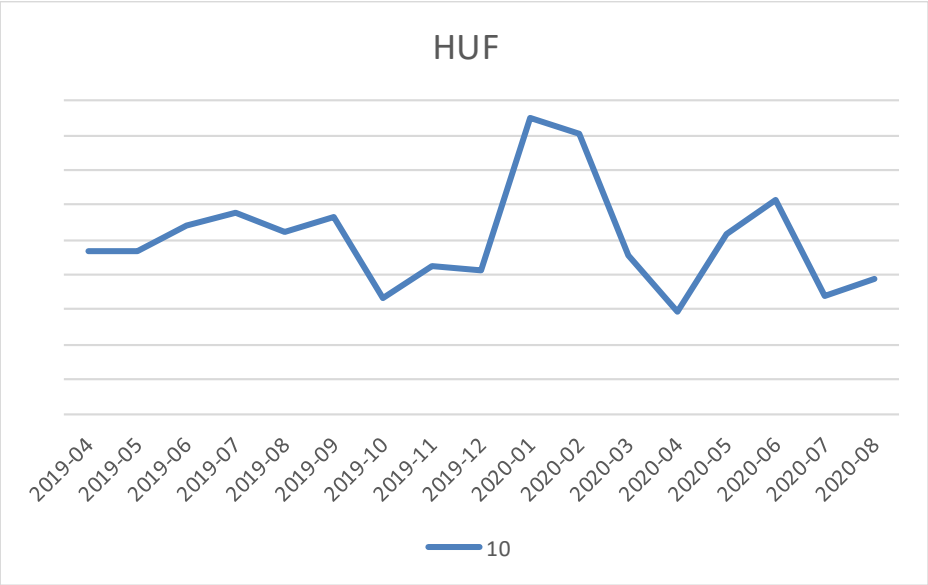
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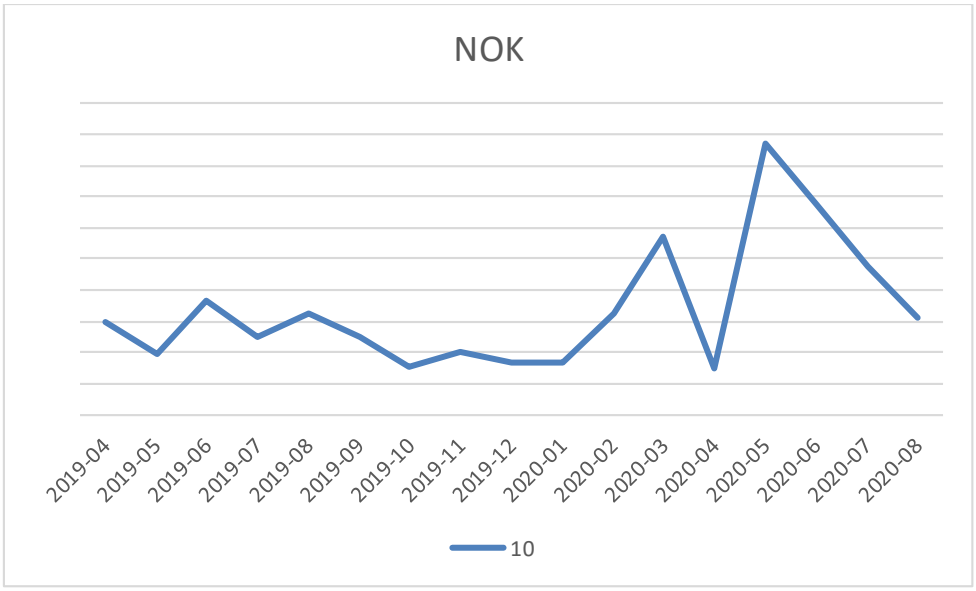
NOK
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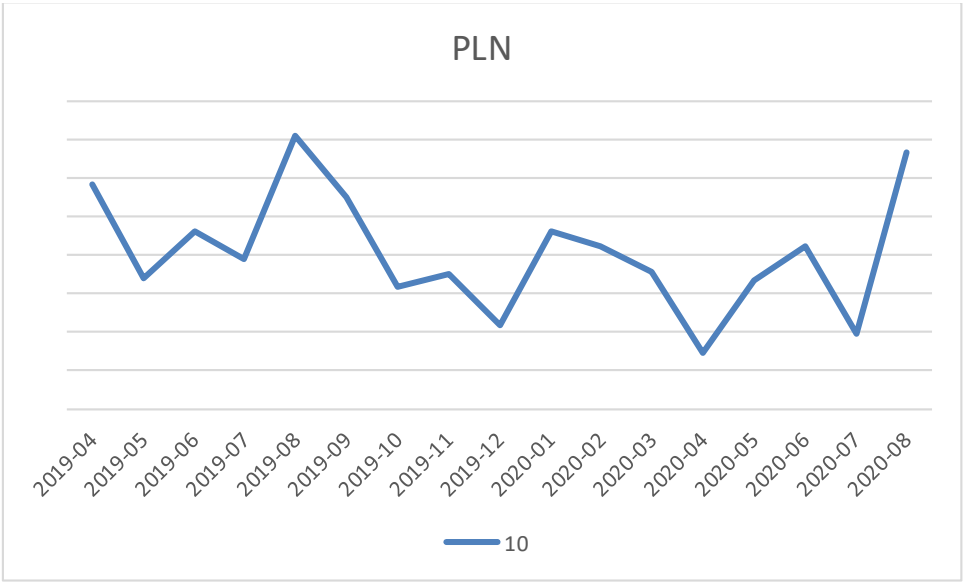
PLN
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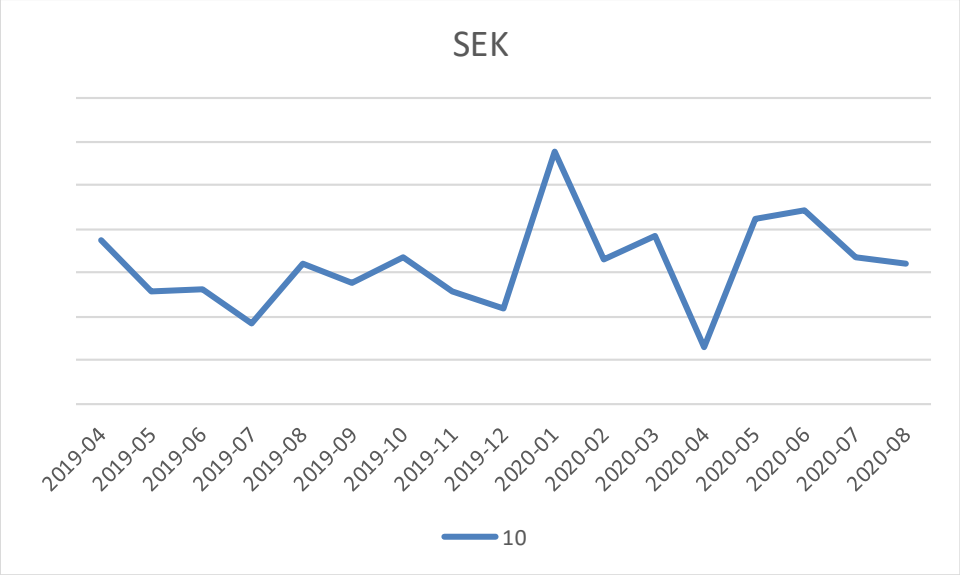
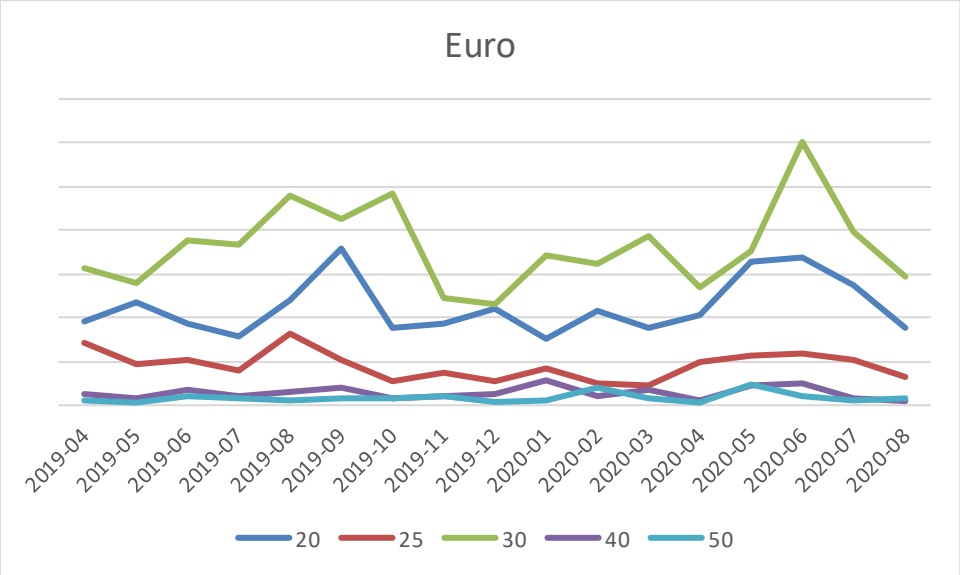
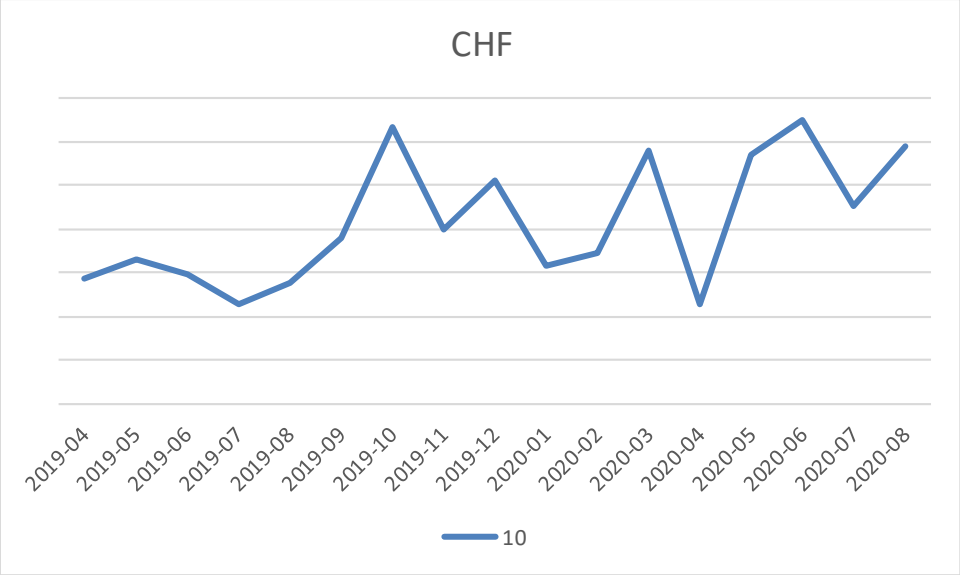


For the same currencies, the following graphs highlight the evolution of the trade volume during the same period:




CHF
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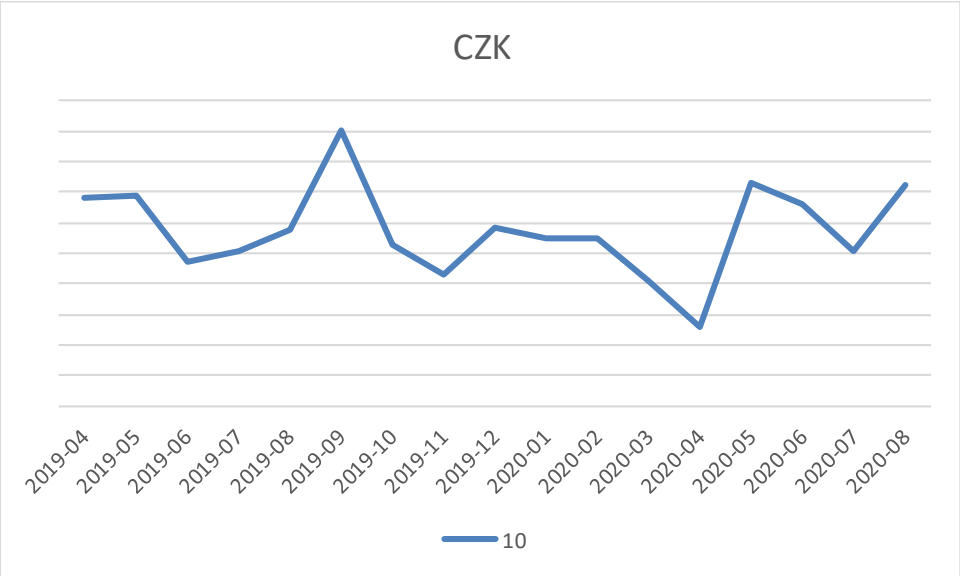
CZK
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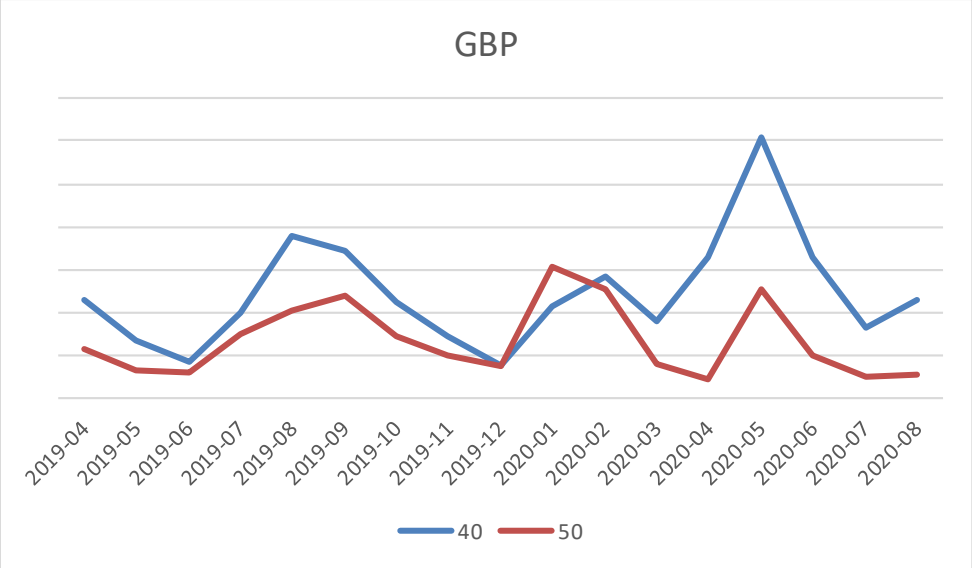
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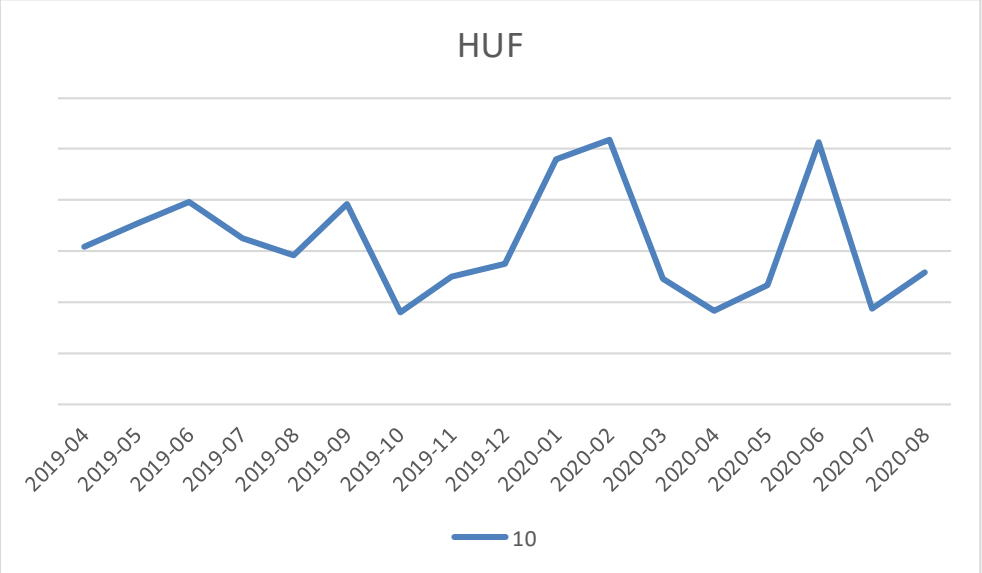
HUF
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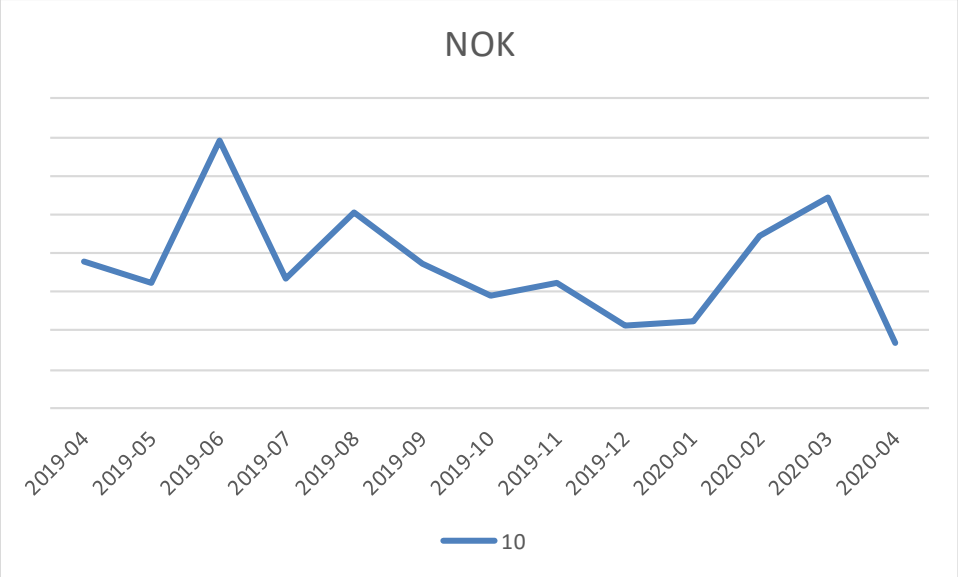
NOK
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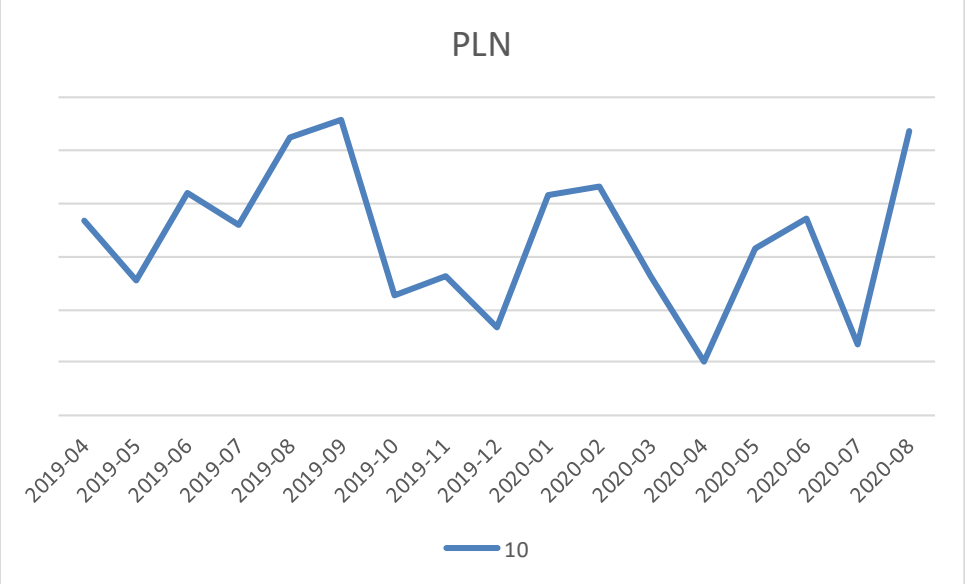
PLN
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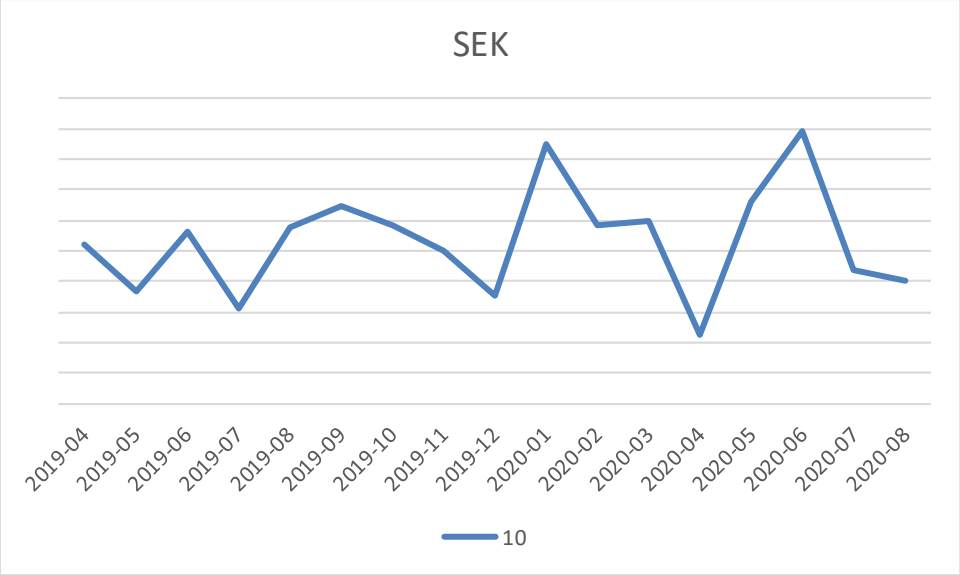
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Liquidity of bond markets

The following tables show the evolution of the results of the residual volume approach using a threshold of 6%:

Limit to the LLP resulting from the residual bond criterion

	EUR	USD	JPY	GBP	CHF	NOK	AUD	SEK	PLN	DKK
2018	22	27	27	37	20	13	10	10	10	21
2019	22	27	27	38	20	9	14	9	10	17
Q12020	22	27	27	38	20	10	14	9	10	20
Q22020	22	27	27	38	20	10	15	9	10	20

	CZK	HUF	RON	ISK	BGN	HRK
2018	17	9	10	32	9	11
2019	20	11	10	23	20	15
Q12020	16	11	10	23	20	15
Q22020	16	11	10	23	20	15

In the proposed alternative extrapolation method the residual bond criterion is used to determine the FSP. In order to ensure stability of the FSP maturities, the FSP maturity is only changed, if the residual bond criterion delivers results that vary for two consecutive years. As a consequence of this, all FSPs would remain unchanged in 2019.

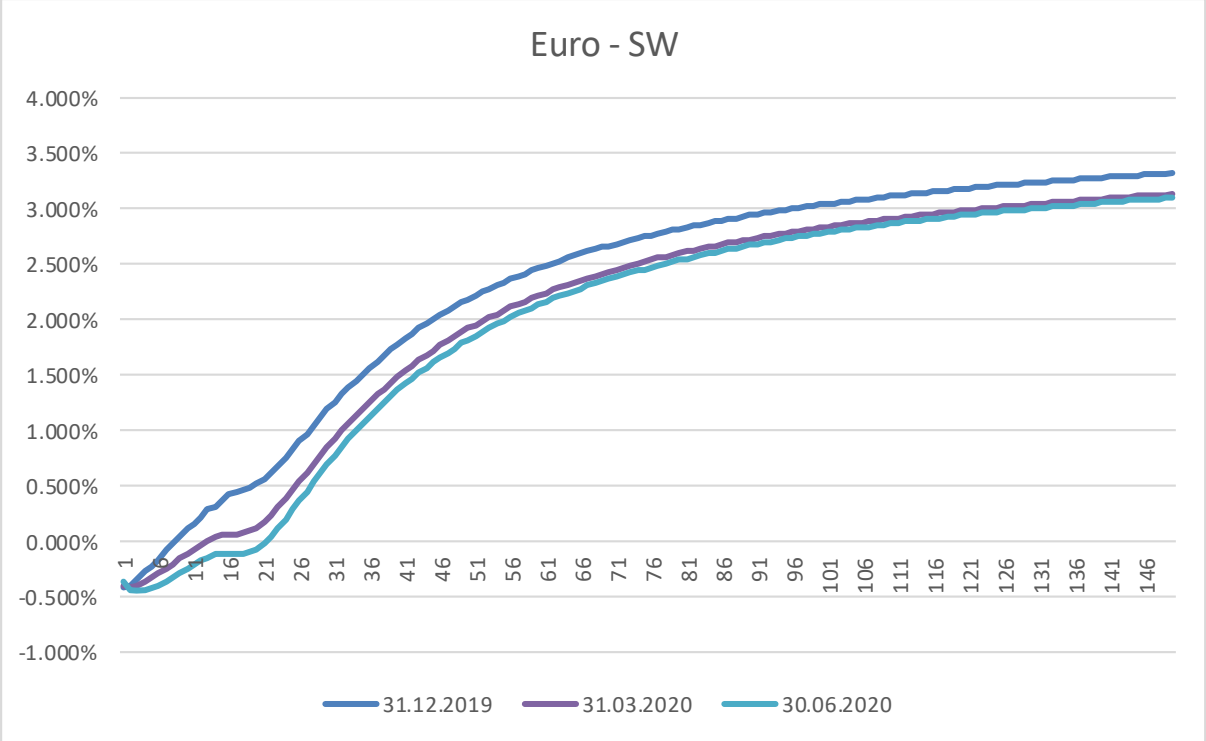
FSP resulting from the residual bond criterion

	EUR	USD	AUD	JPY	CHF	GBP	RON	HRK	ISK
2018	20	25	15	25	20	40	10	10	30
2019	20	25	15	25	20	40	10	10	25

	HUF	NOK	CZK	PLN	SEK
2018	10	10	20	10	10
2019	10	10	20	10	10

Comparison of current and alternative extrapolation method during Q2 2020

The following graphs outline the evolution of interest rates from 31.12.2019 to 30.06.2020 comparing the current Smith-Wilson extrapolation method with the alternative extrapolation method for the different EEA currencies. The term structures with the alternative extrapolation methods take into account the implications of the DLT assessment, both with regard to the choice between swaps and government bonds as the relevant instrument and with regard to the liquid maturities.


Euro - SW
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31.12.2019
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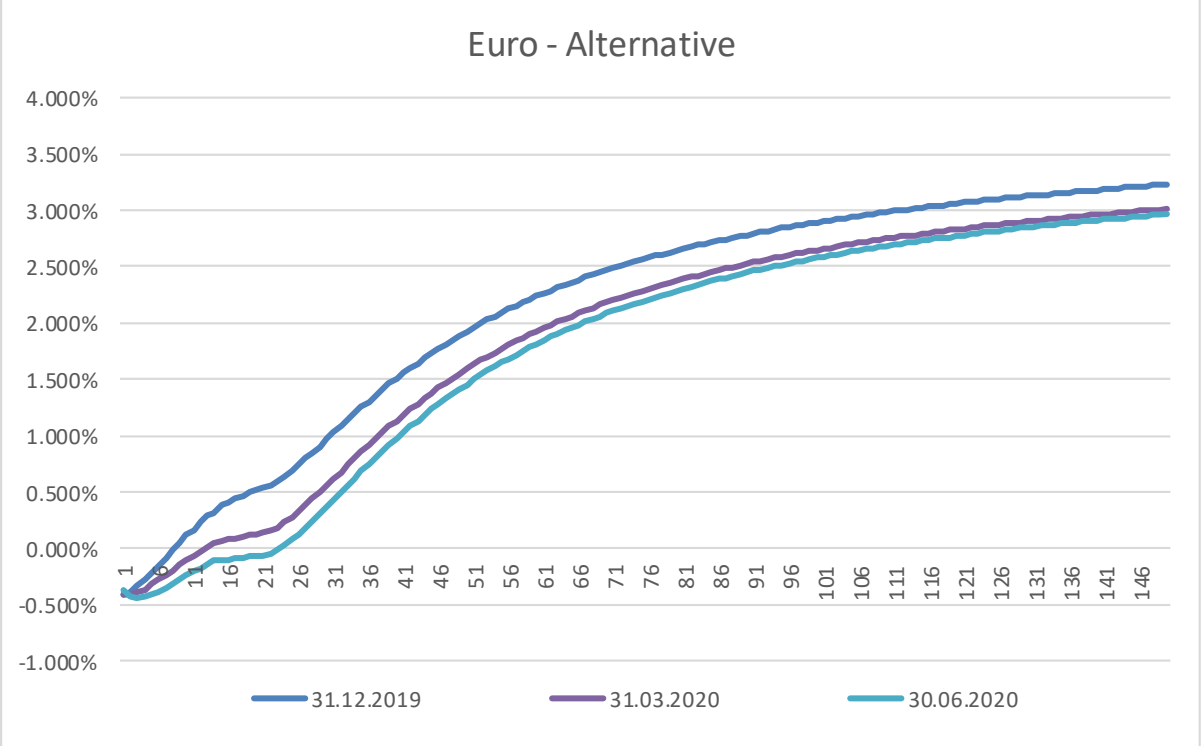
30.06.2020


Euro - Alternative
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31.12.2019
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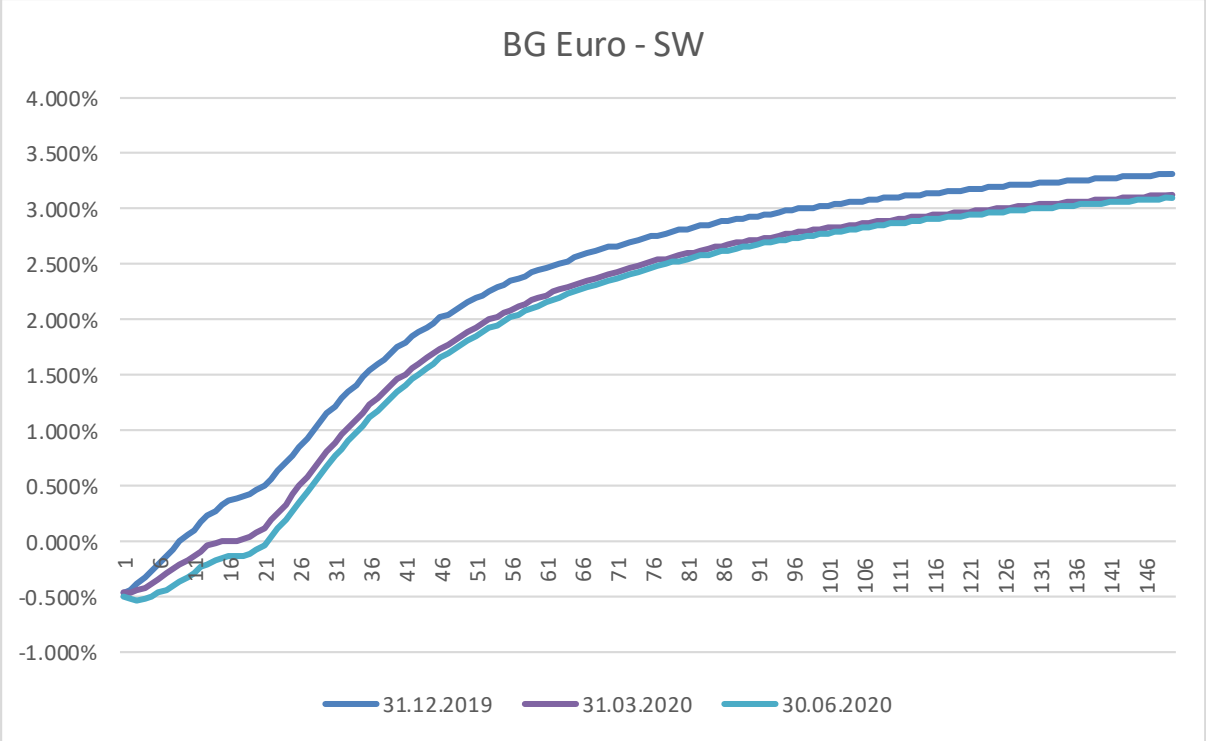
BG Euro - SW
4.000%
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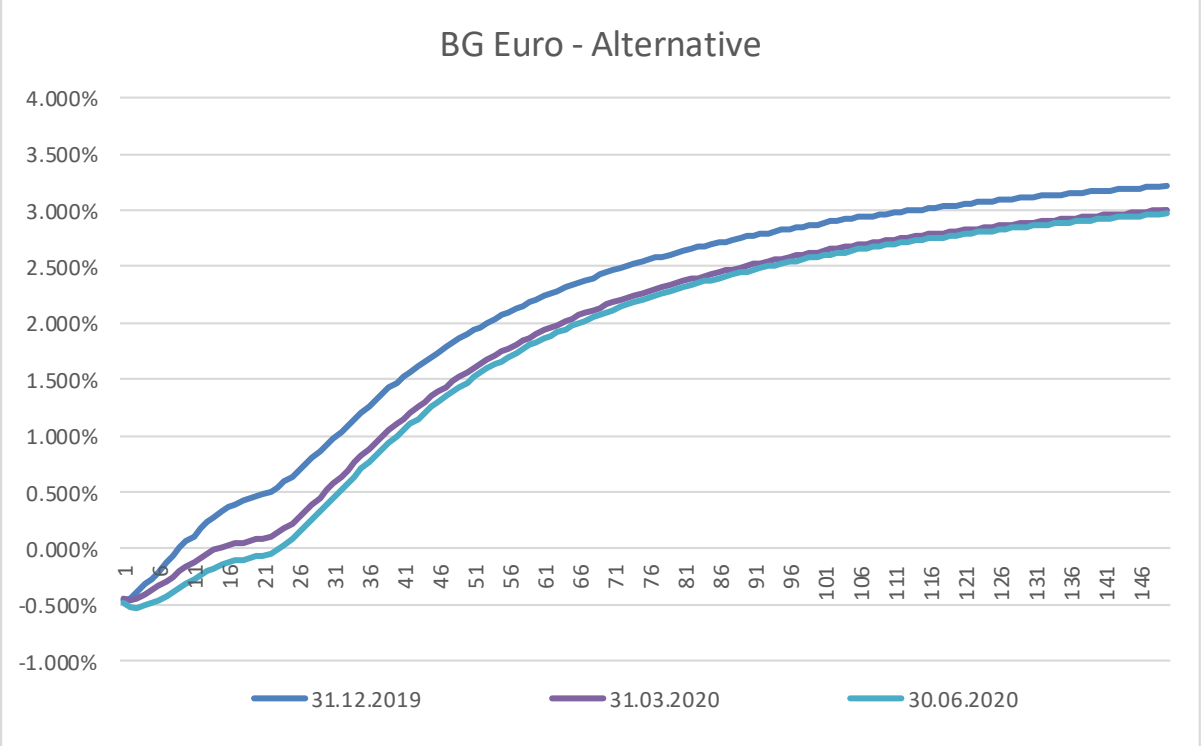
BG Euro - Alternative
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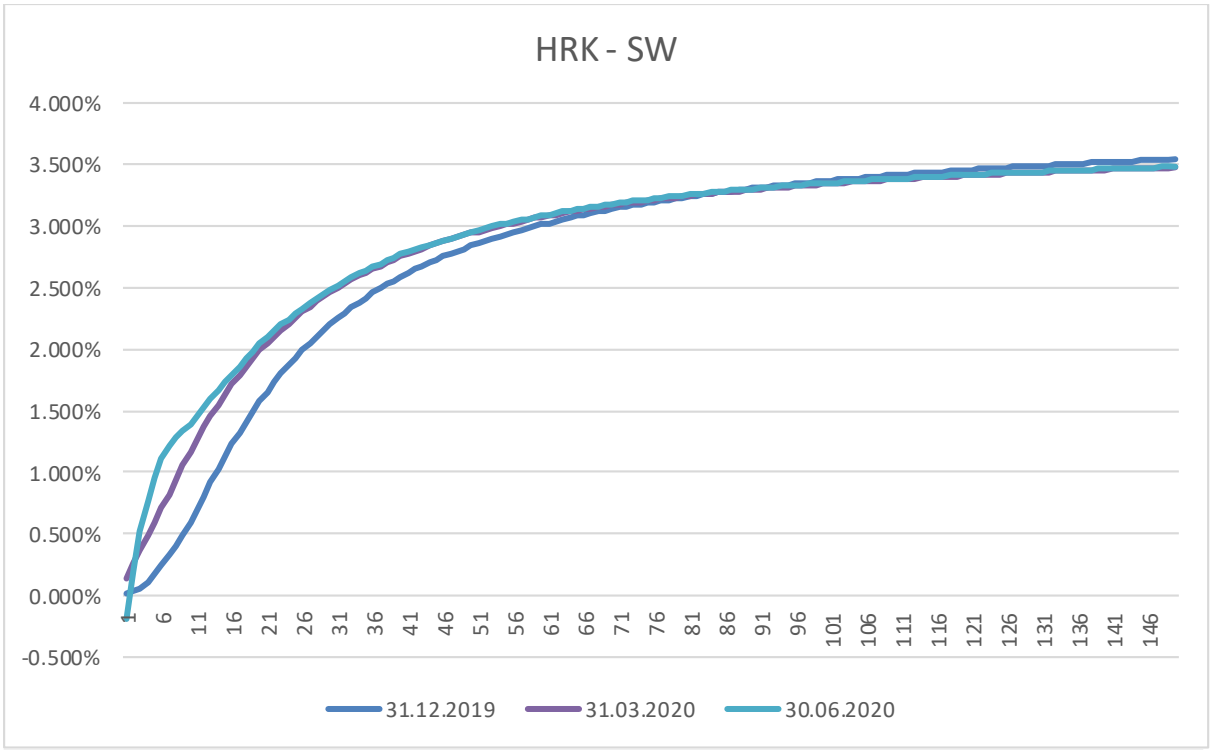
31.03.2020
30.06.2020


HRK - SW
4.000%
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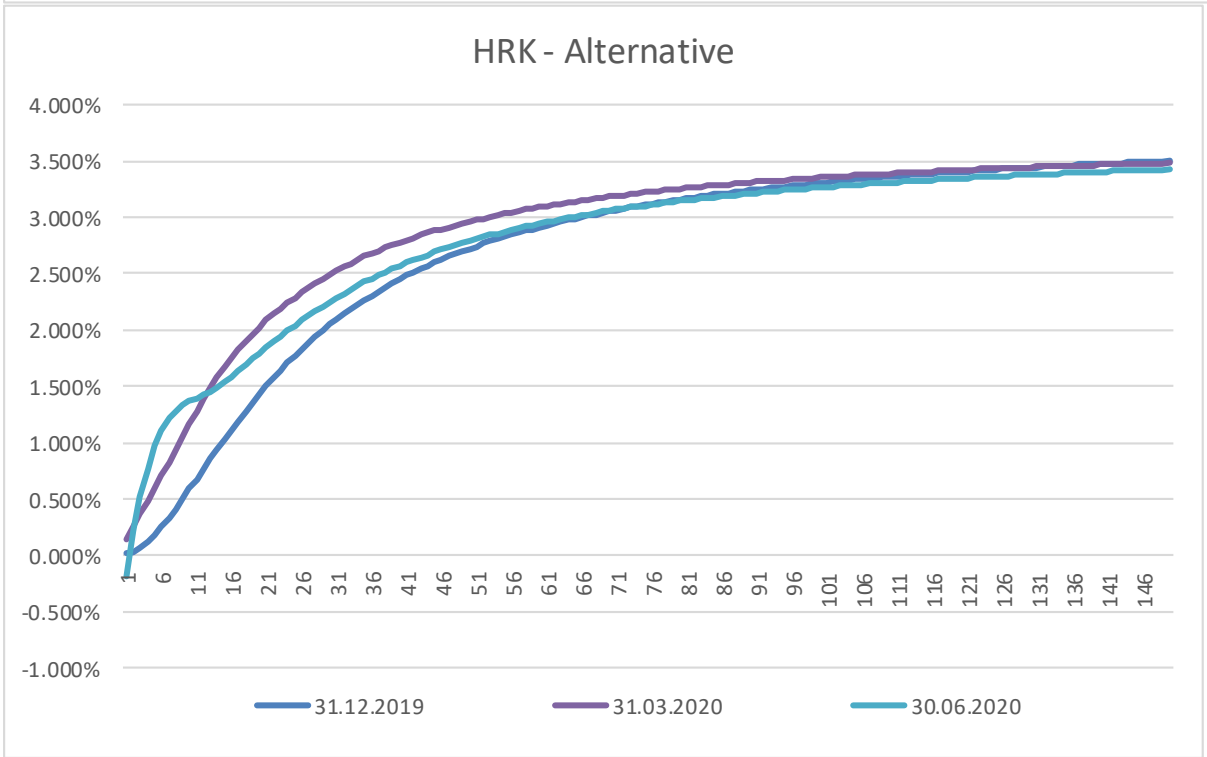
HRK - Alternative
4.000%
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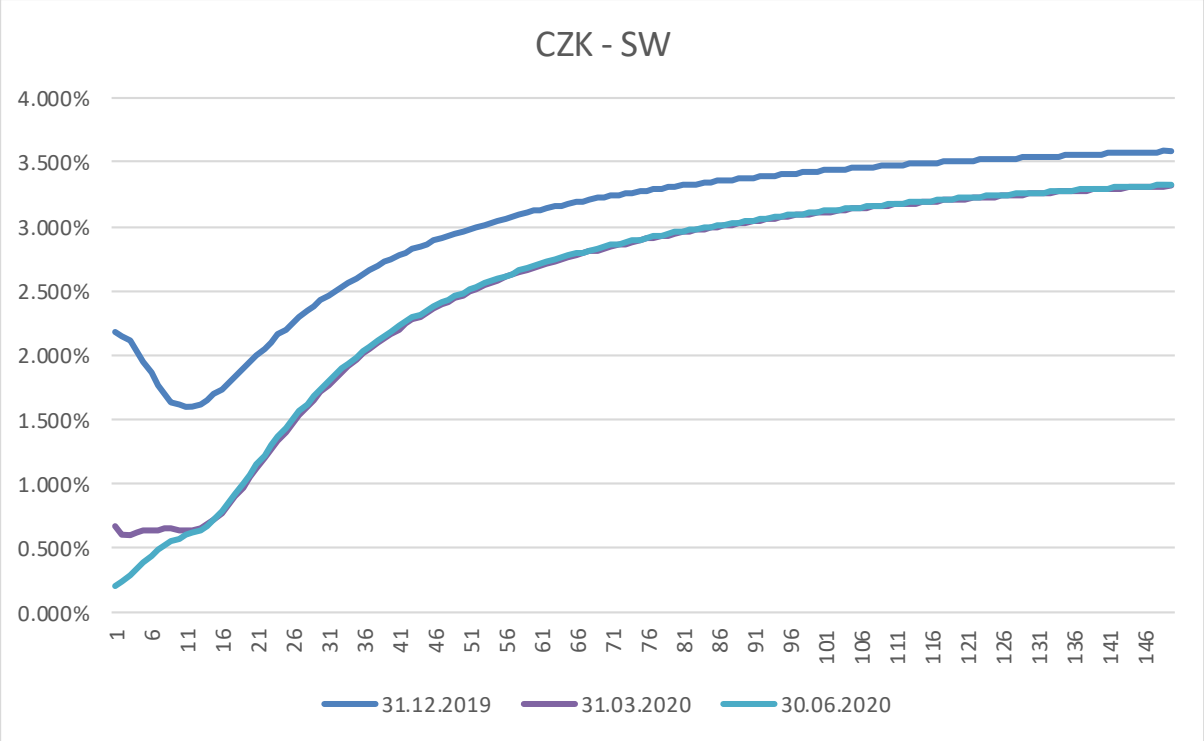
CZK - SW
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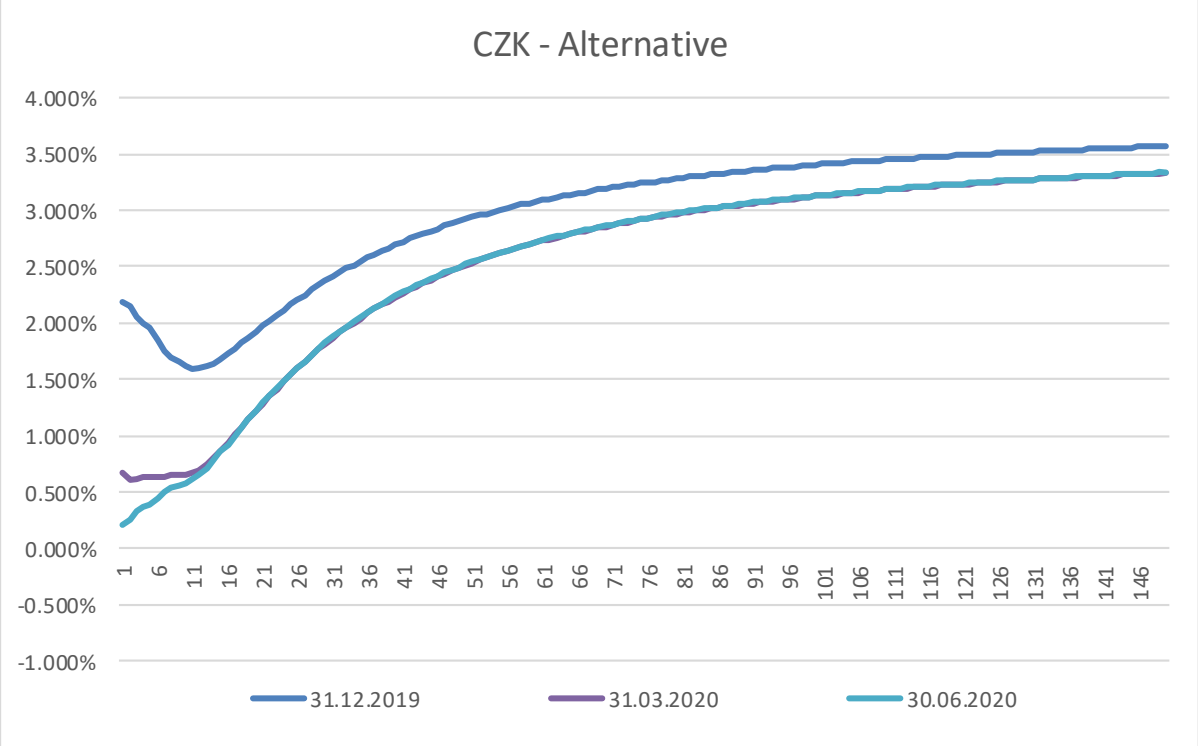
CZK - Alternative
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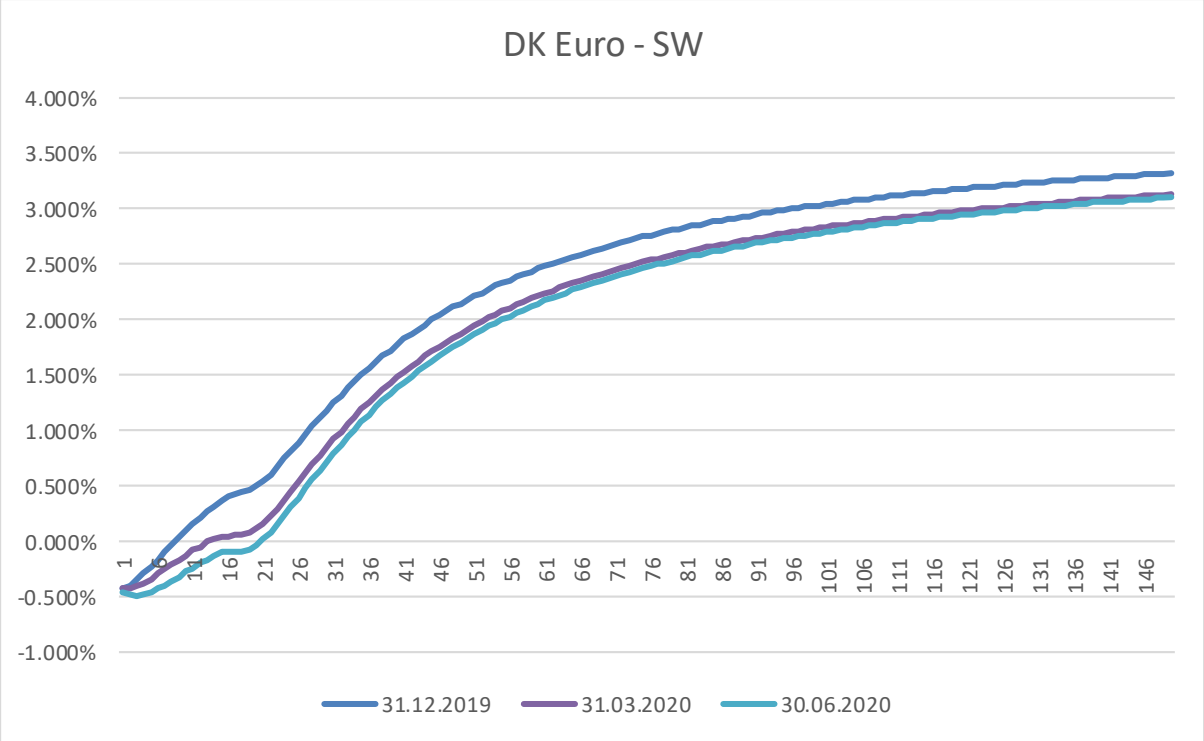
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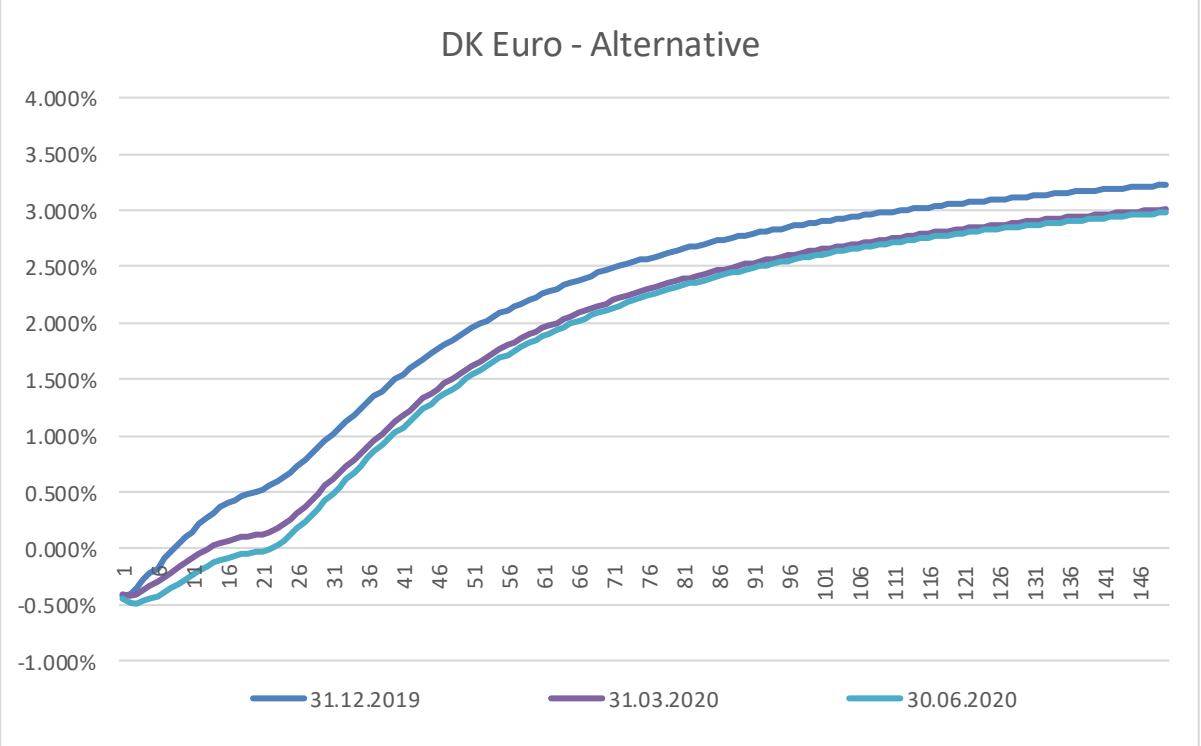
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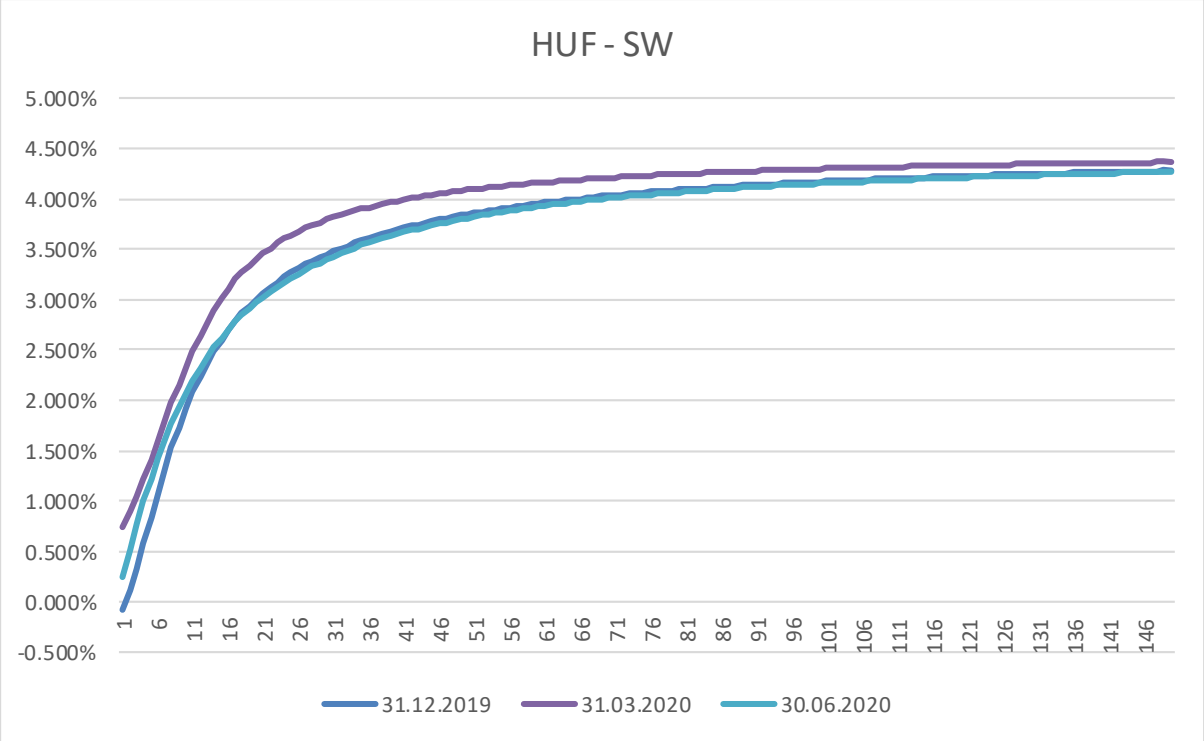
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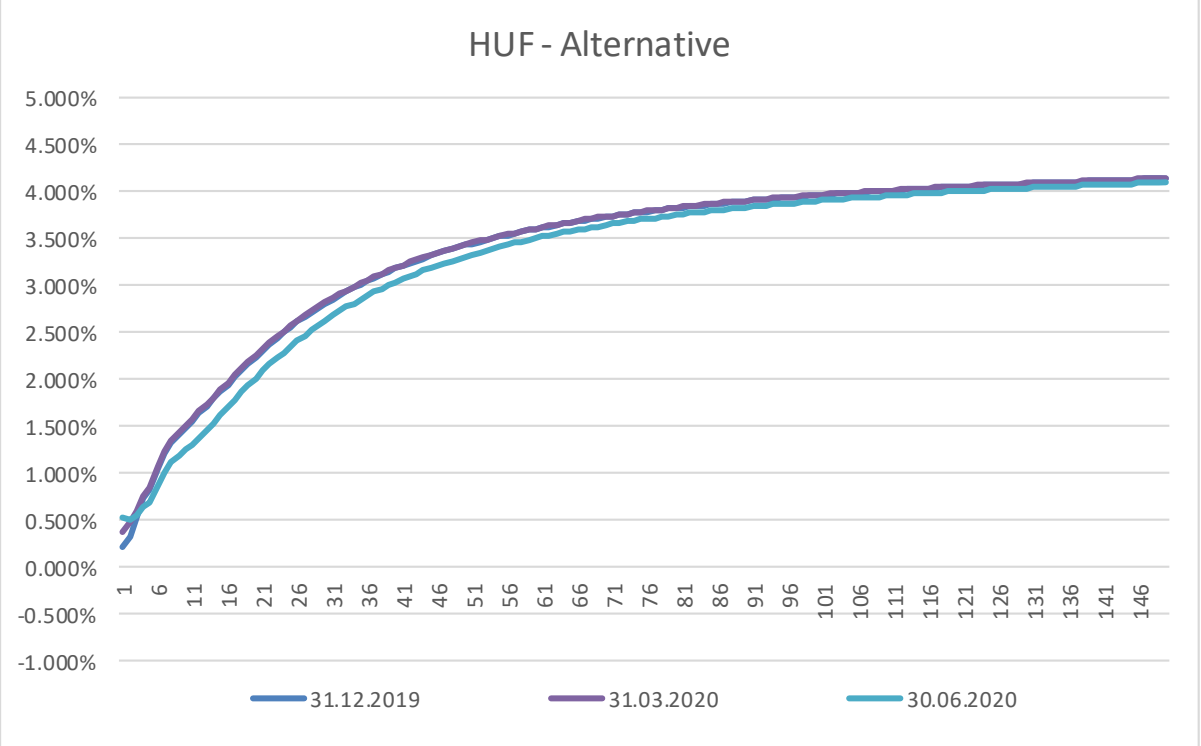
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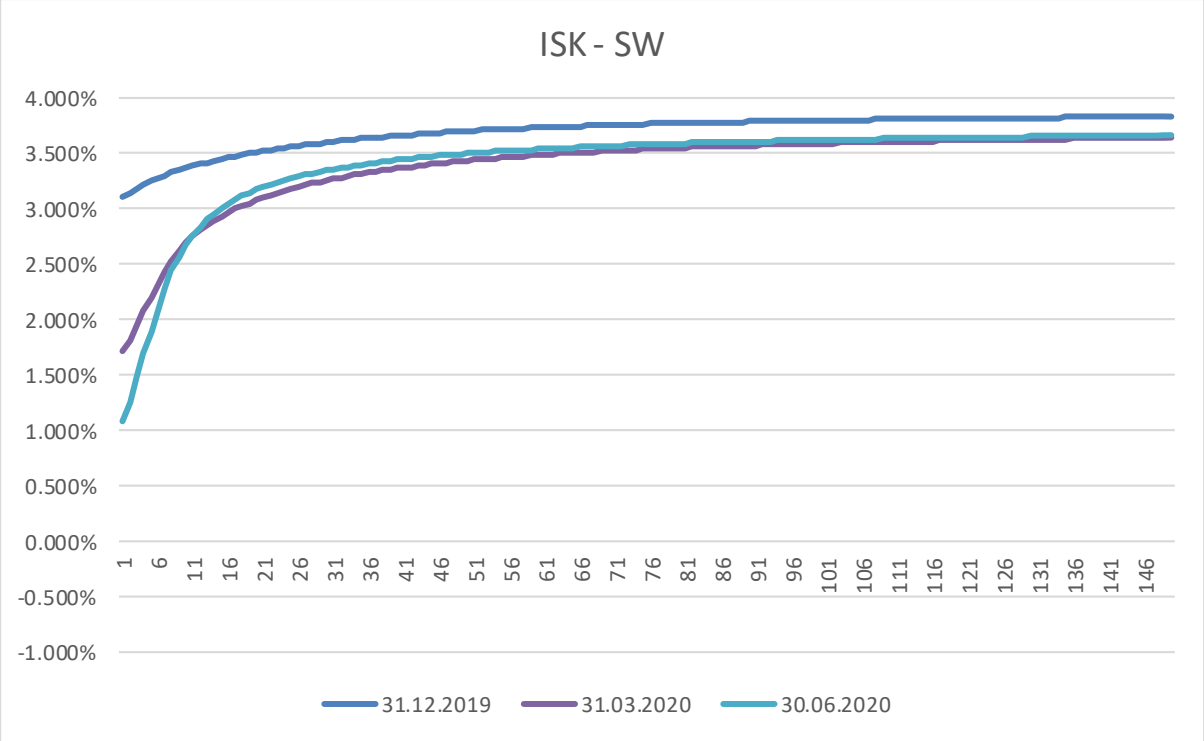
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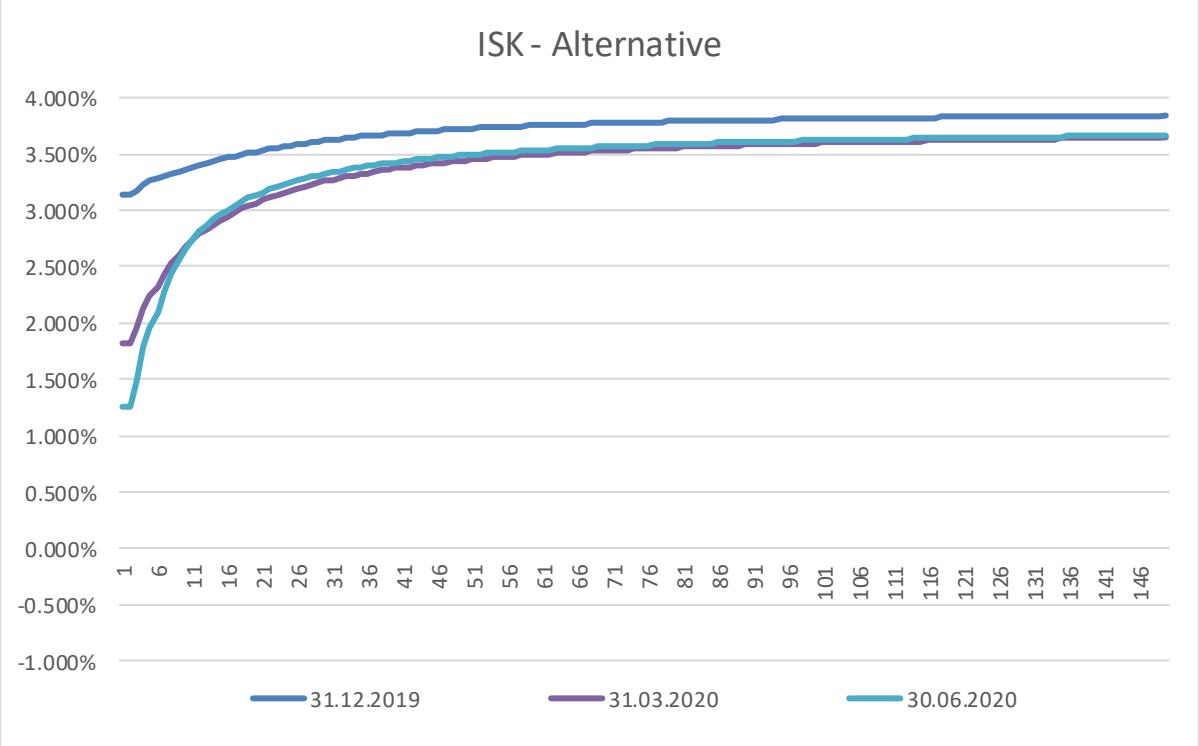
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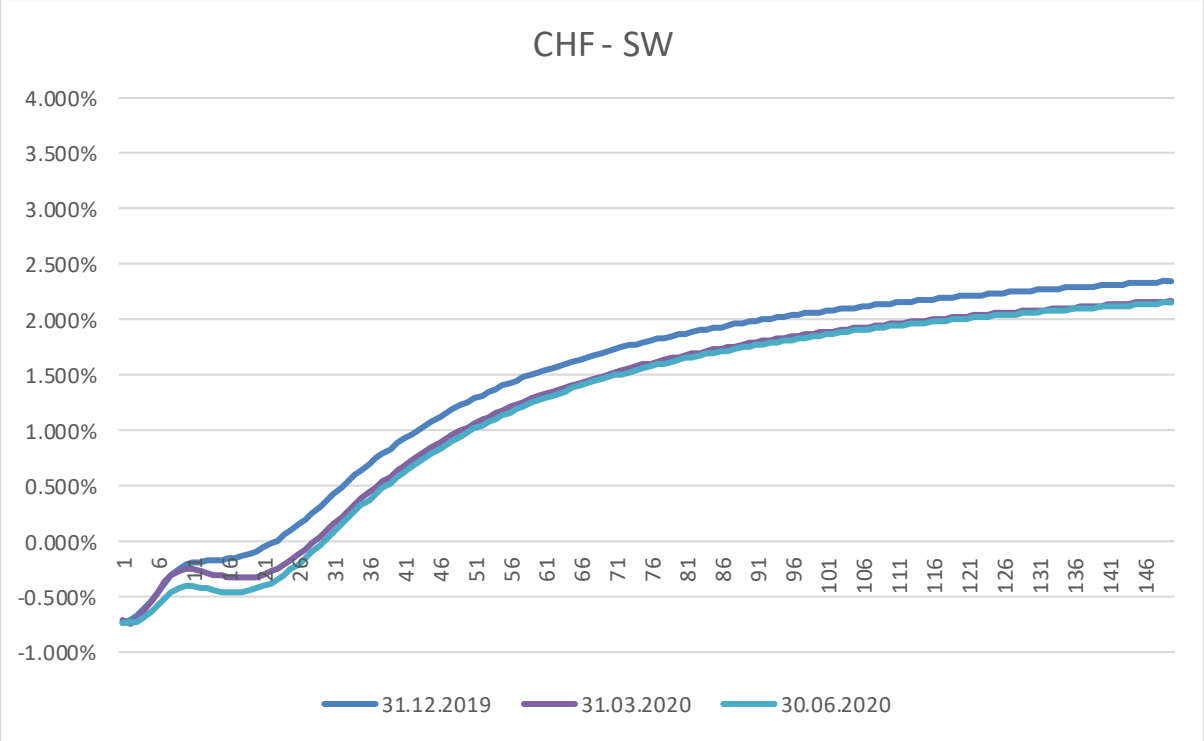
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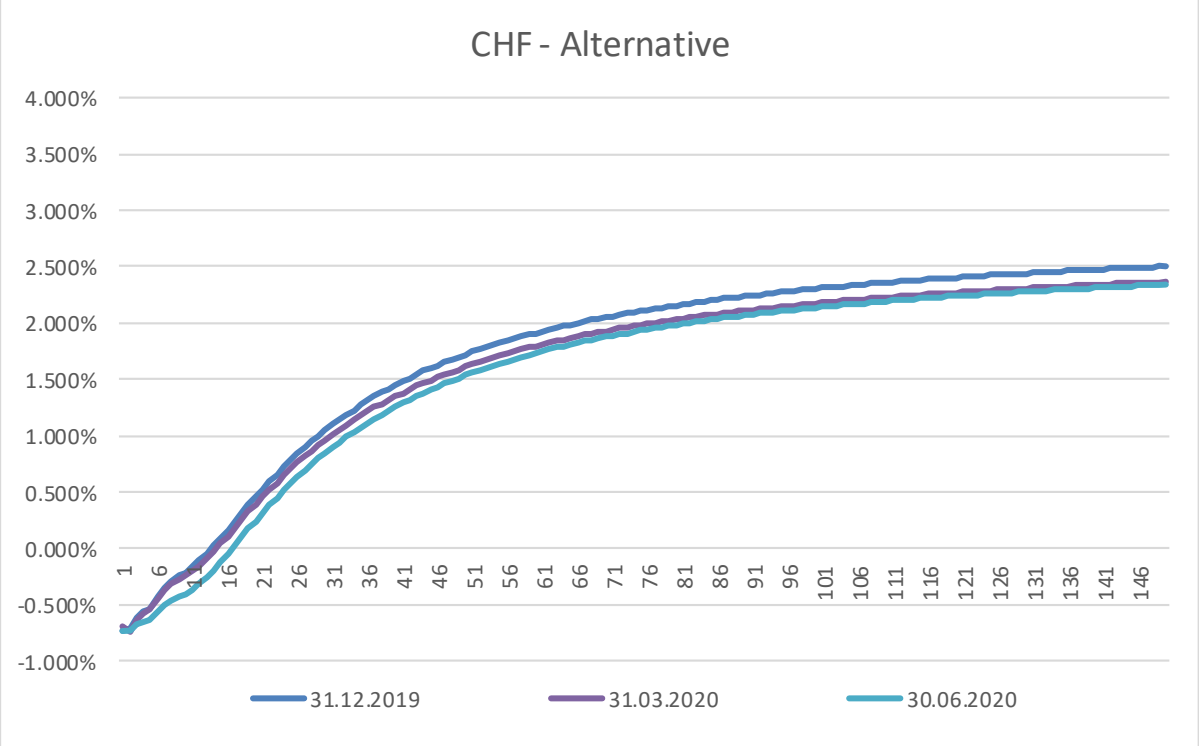
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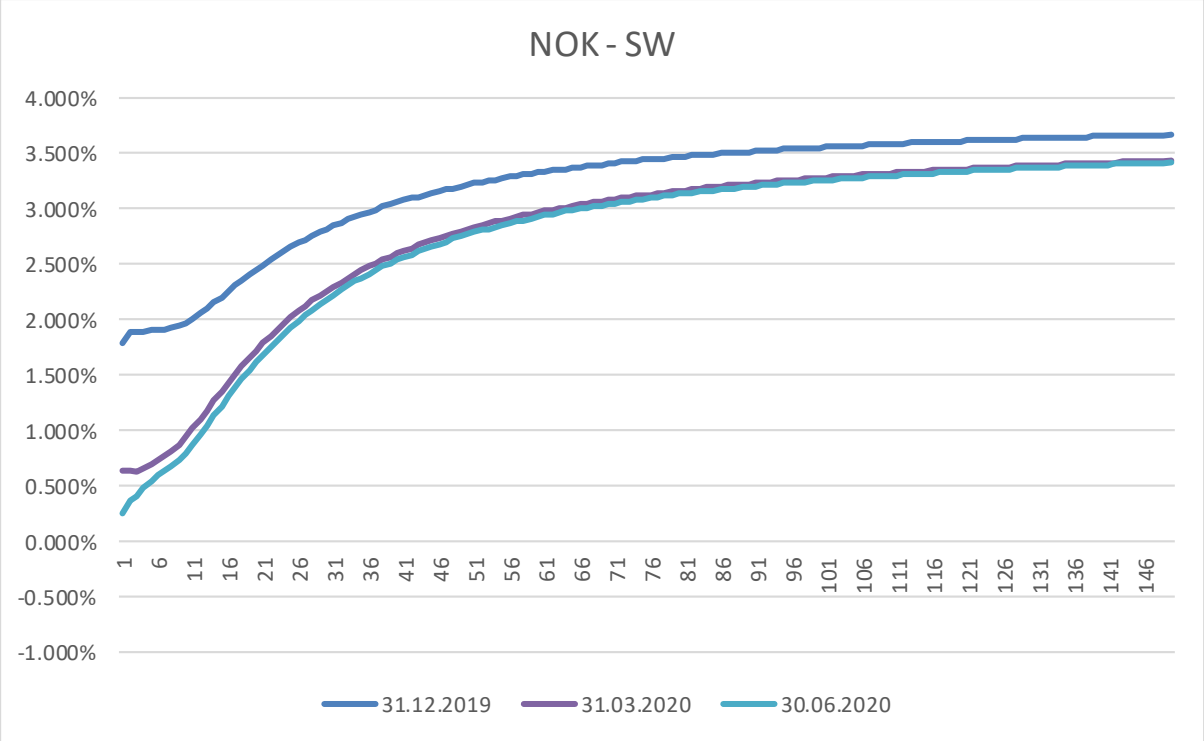
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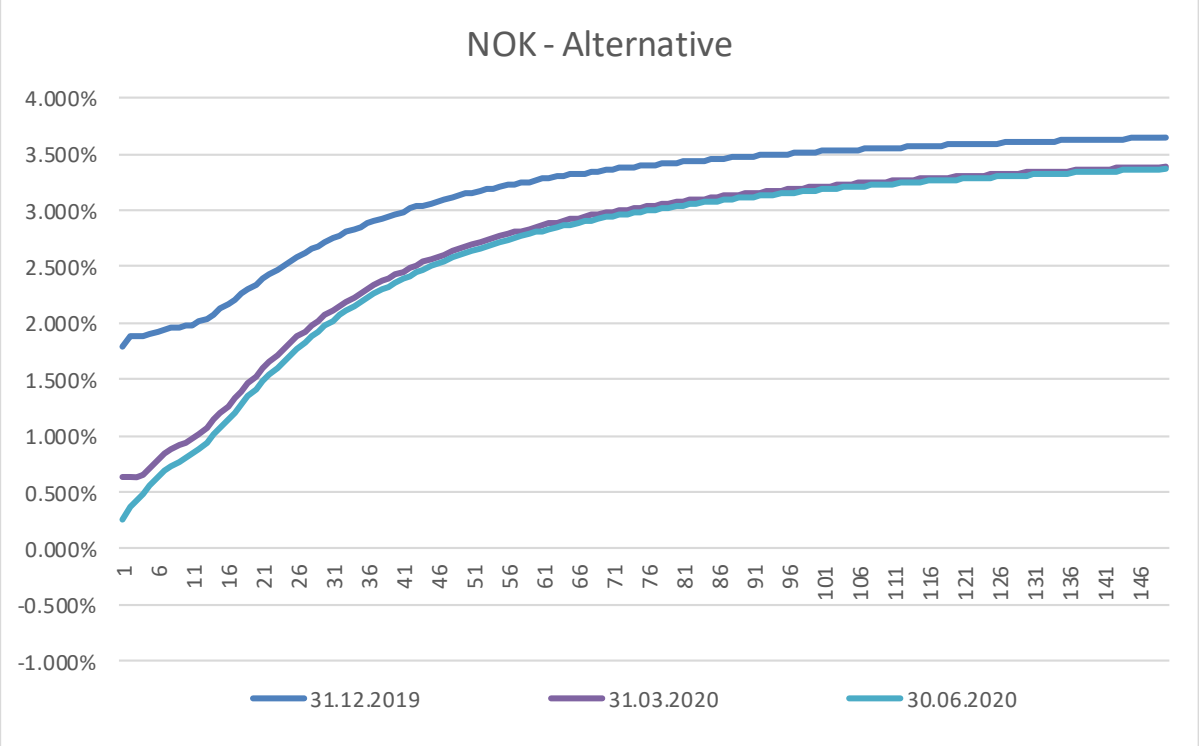
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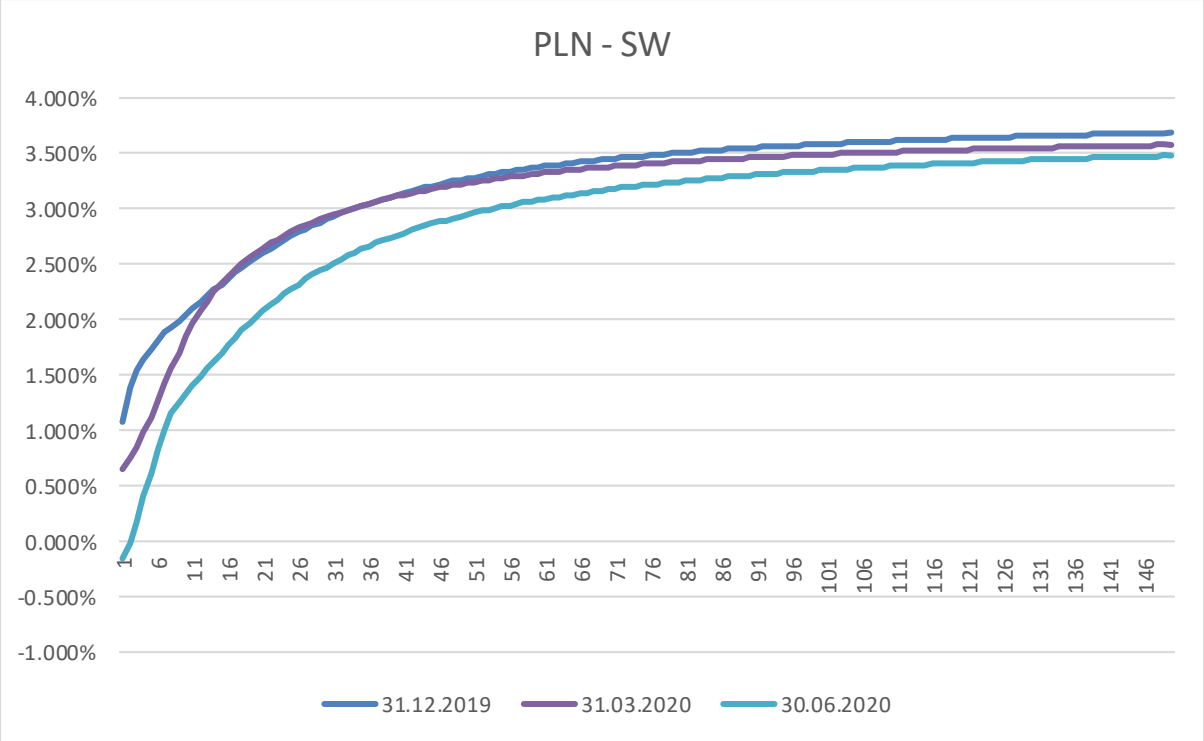
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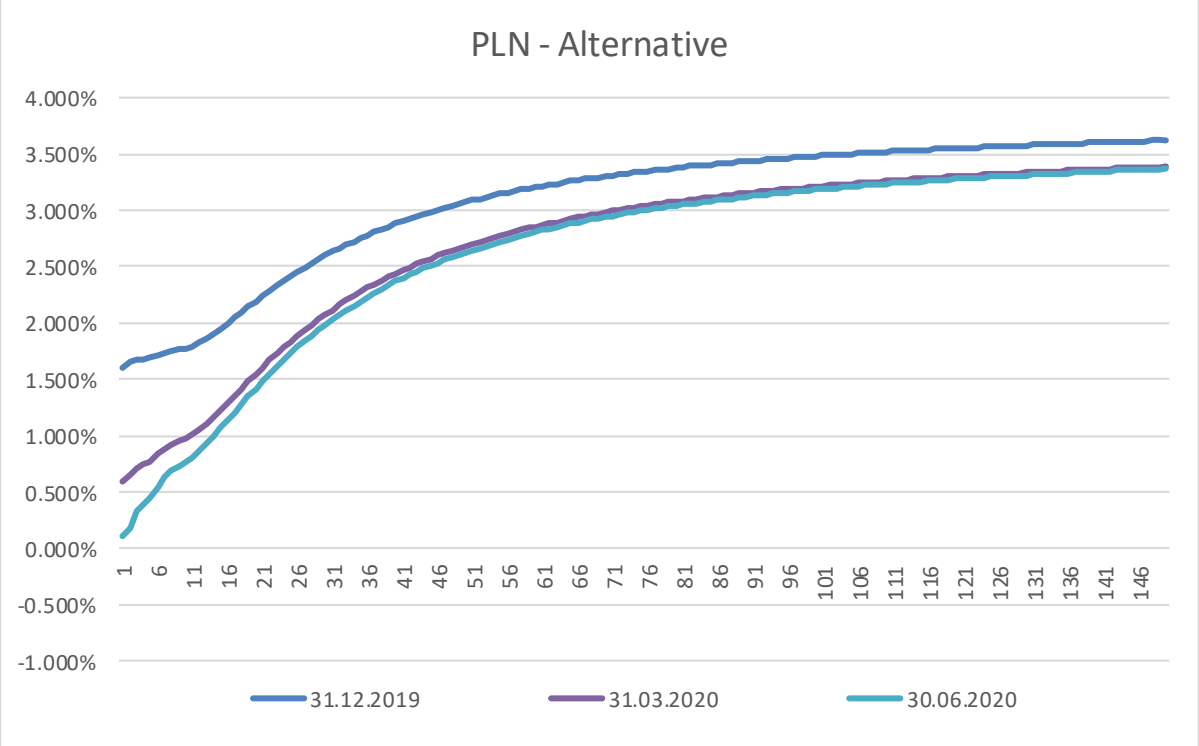
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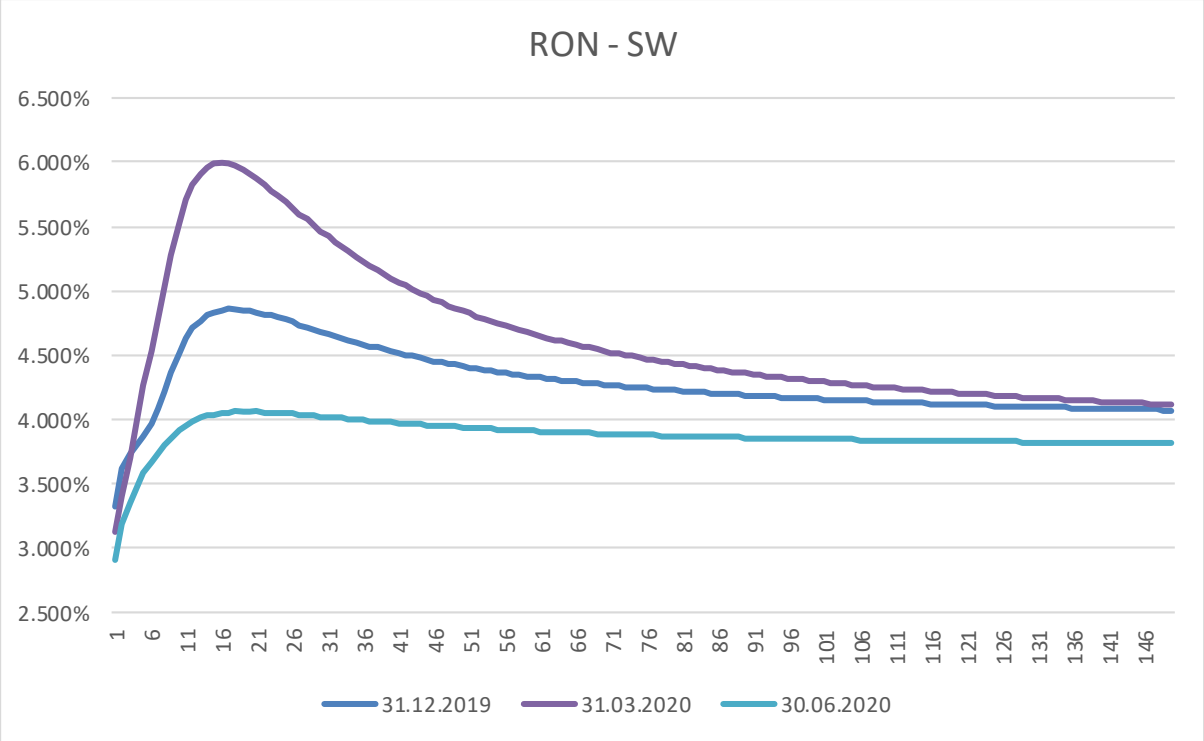
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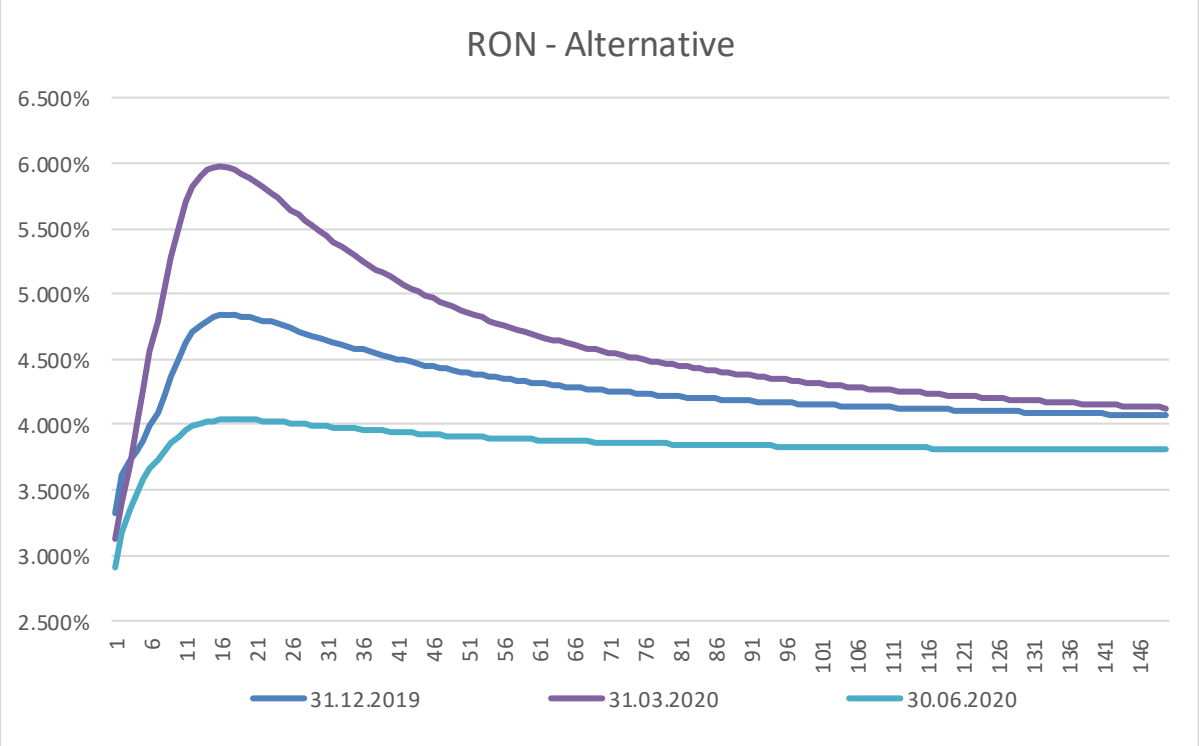
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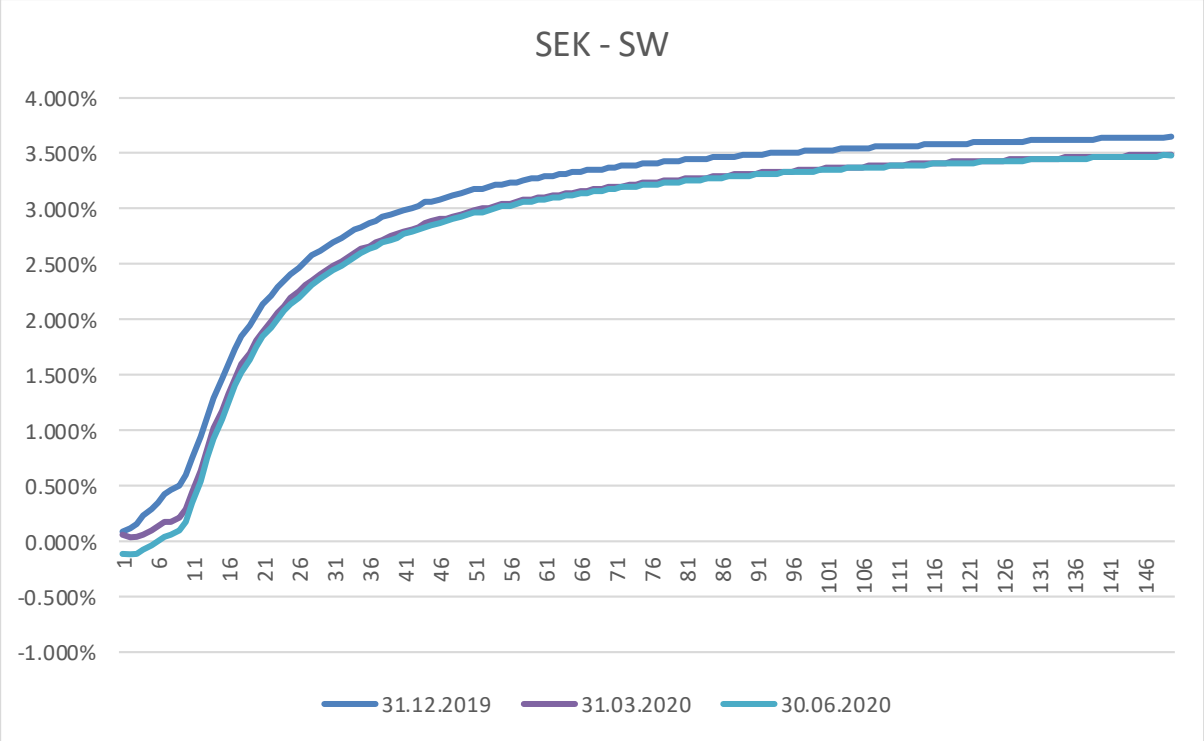
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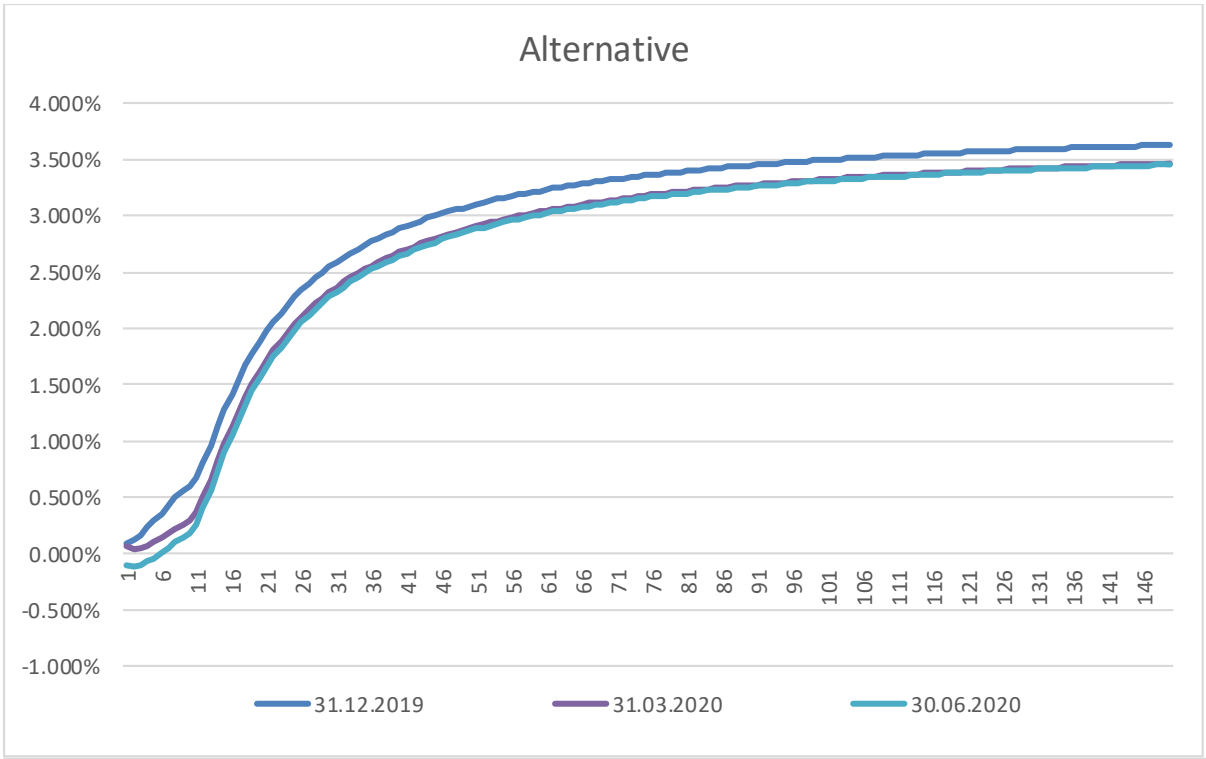
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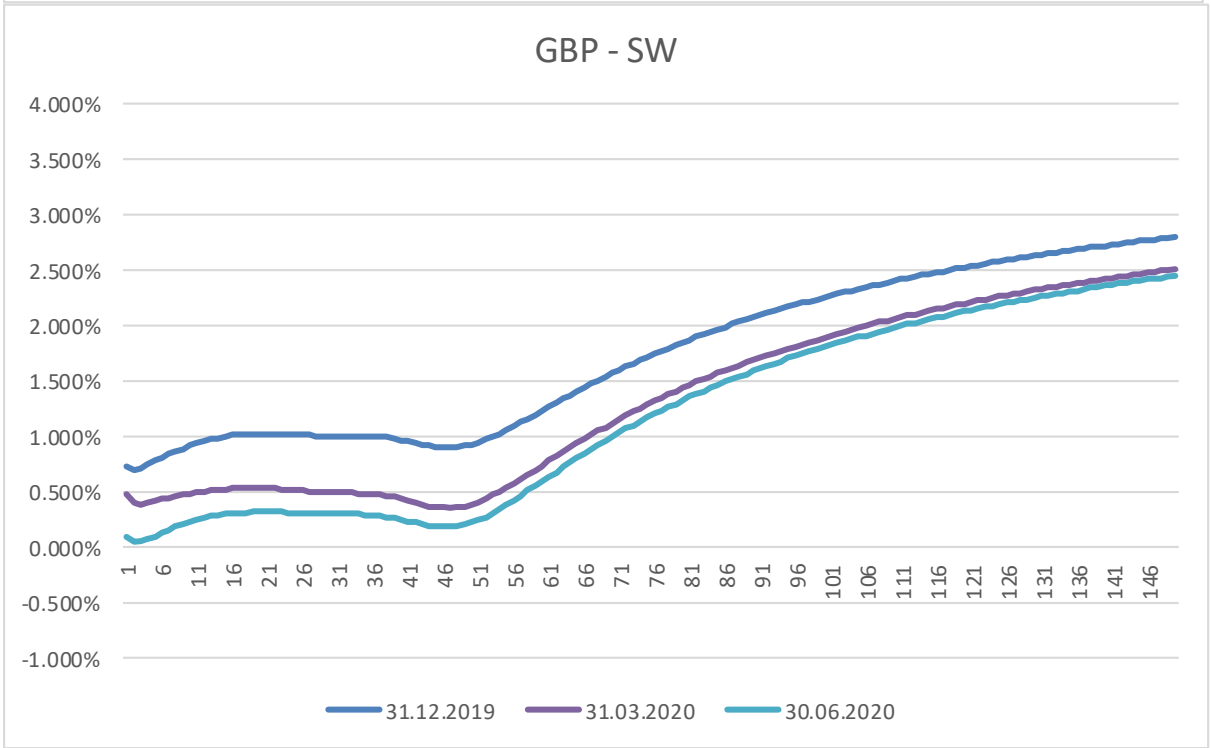
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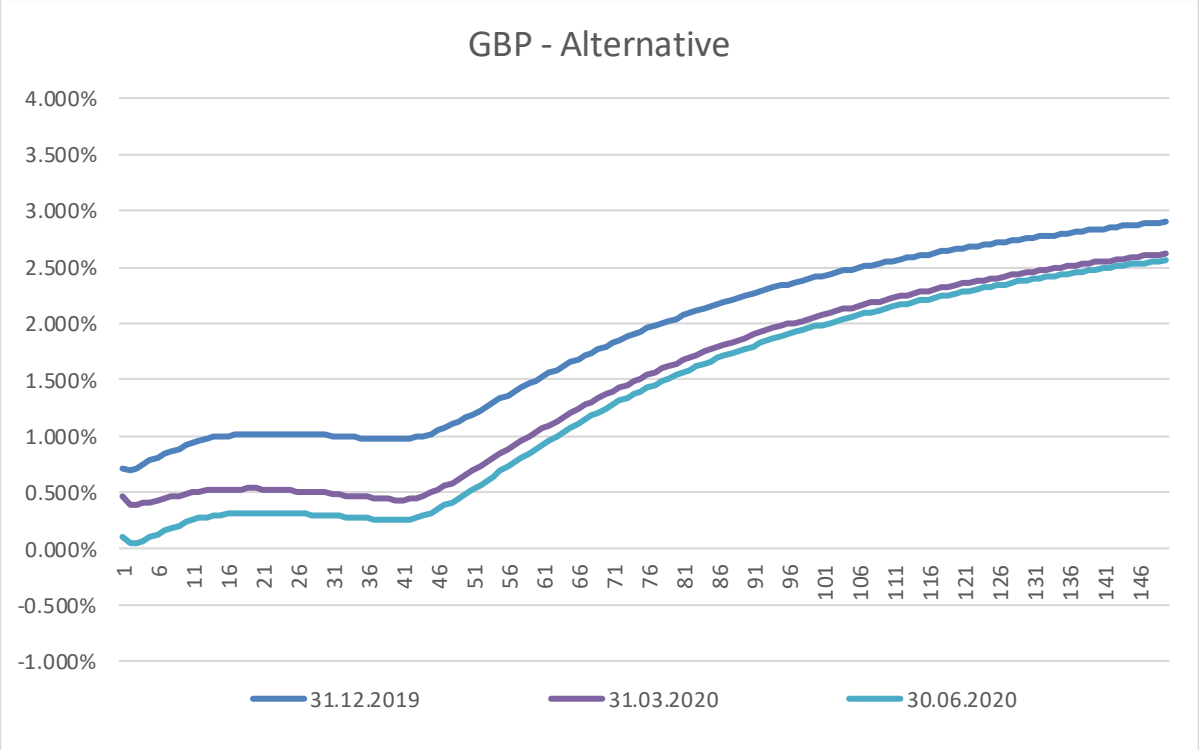


Backtesting on parametrization of the alternative extrapolation

A backtesting has been performed in order to confirm that the alternative extrapolation with a convergence parameter of 20% provides reasonable curves close to the current setting of the extrapolation with the Smith Wilson method and an LLP of 20 years for the euro. The back testing uses monthly data on interest rates since 1999.

On the whole sample the average deviation on one particular maturity point between the alternative extrapolation method and the Smith Wilson method is -3bps. The maximum deviation on one maturity point is -20 bps. The larger differences are to be observed in the curves computed for the very early periods. Since 2011, the deviations are on average very small (<1 bps).

Annex 3 – Volatility adjustment

Development of spreads in Euro representative portfolio

The following diagram shows the development of weighted spreads in the European representative portfolio for the Euro:[30]

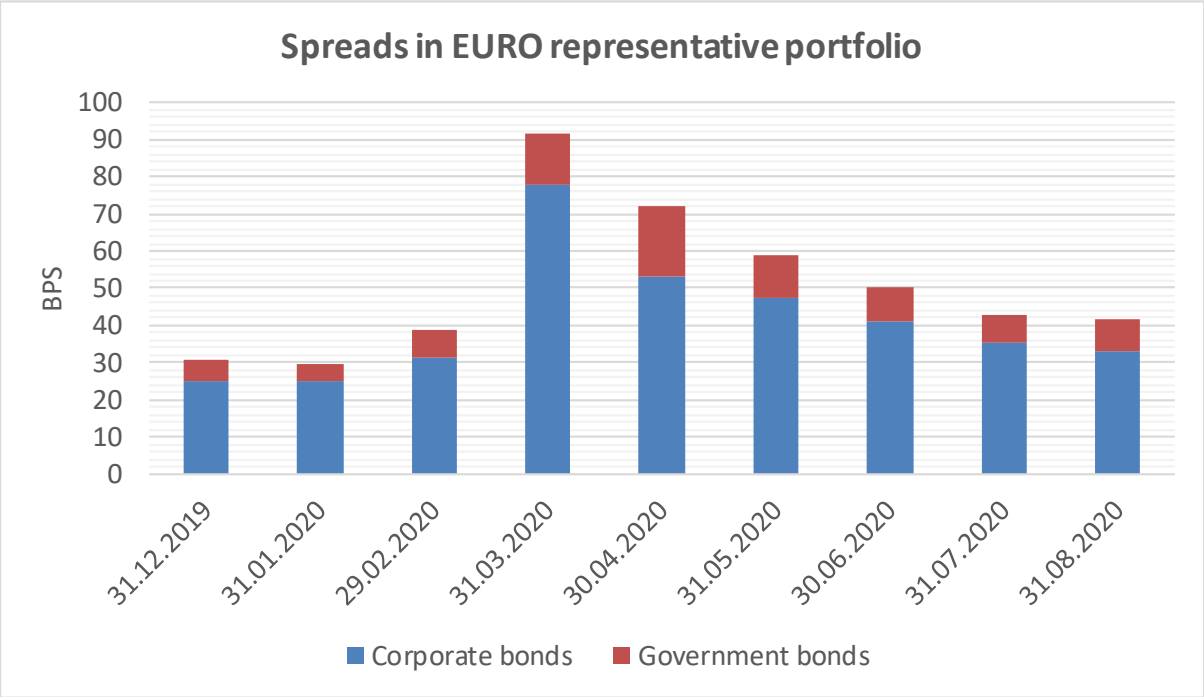
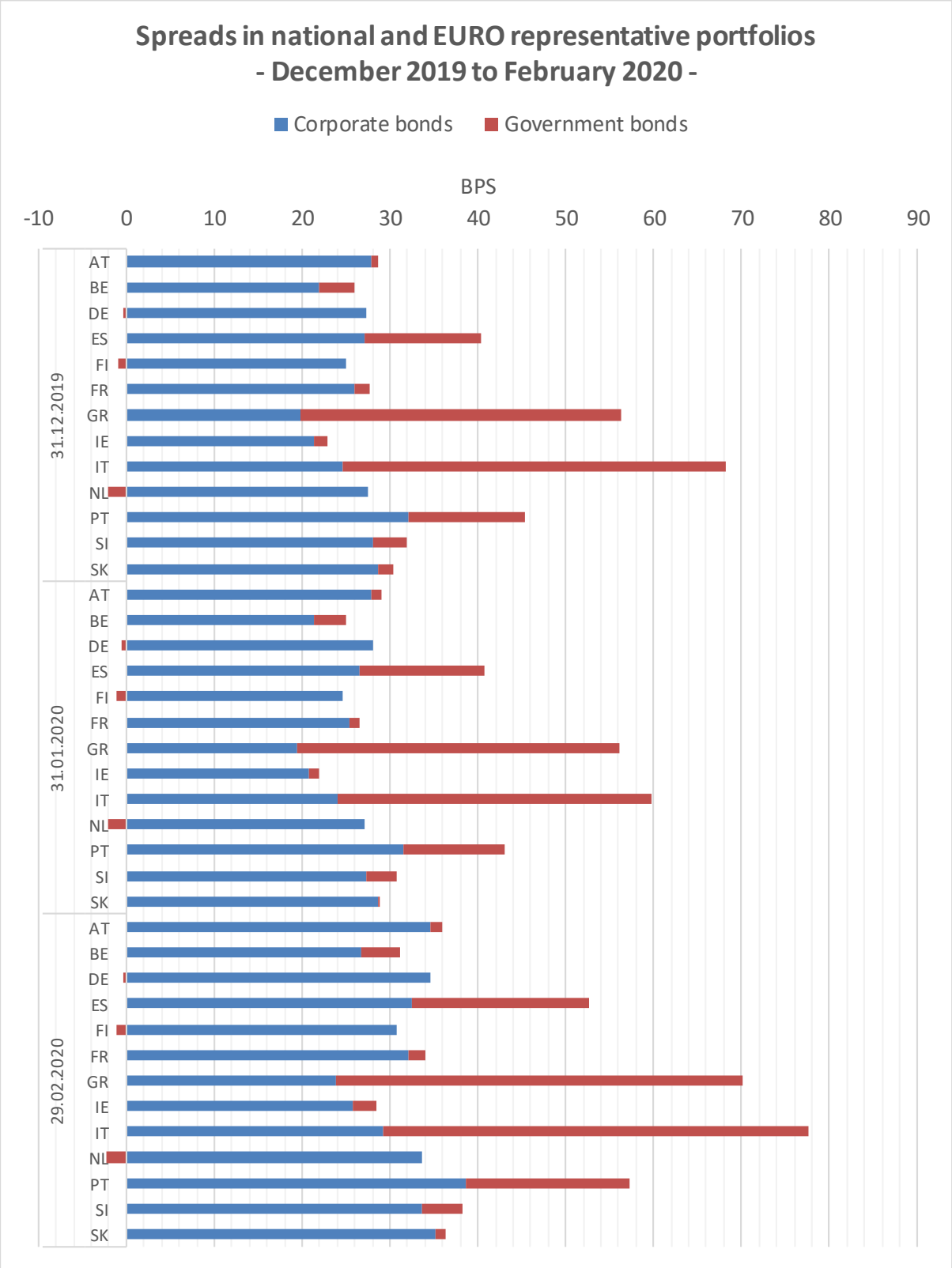


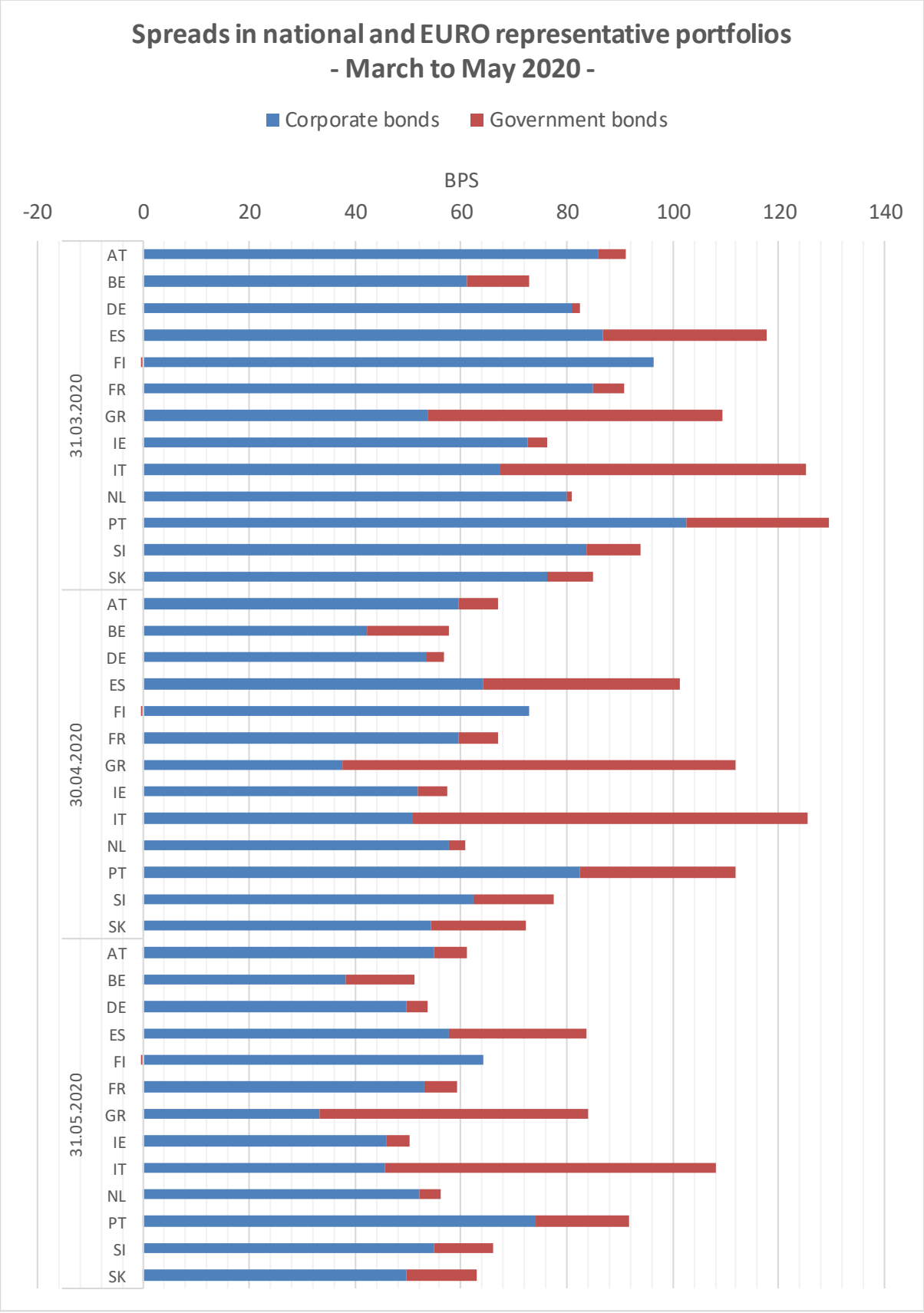
Figure 1

[30] Note this shows the (unscaled) spreads in the currency representative portfolio for the Euro, differentiating between the government portfolio and the corporate portfolio

Development of spreads in national and currency portfolios

The following diagrams show the development of weighted spreads in the national representative portfolios associated with the Euro.




Spreads in national and EURO representative portfolios
- March to May 2020 -
Corporate bonds
Government bonds
BPS
-20
0
20
40
60
80
100
120
140
31.03.2020
30.04.2020
31.05.2020
AT
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NL
PT
SI
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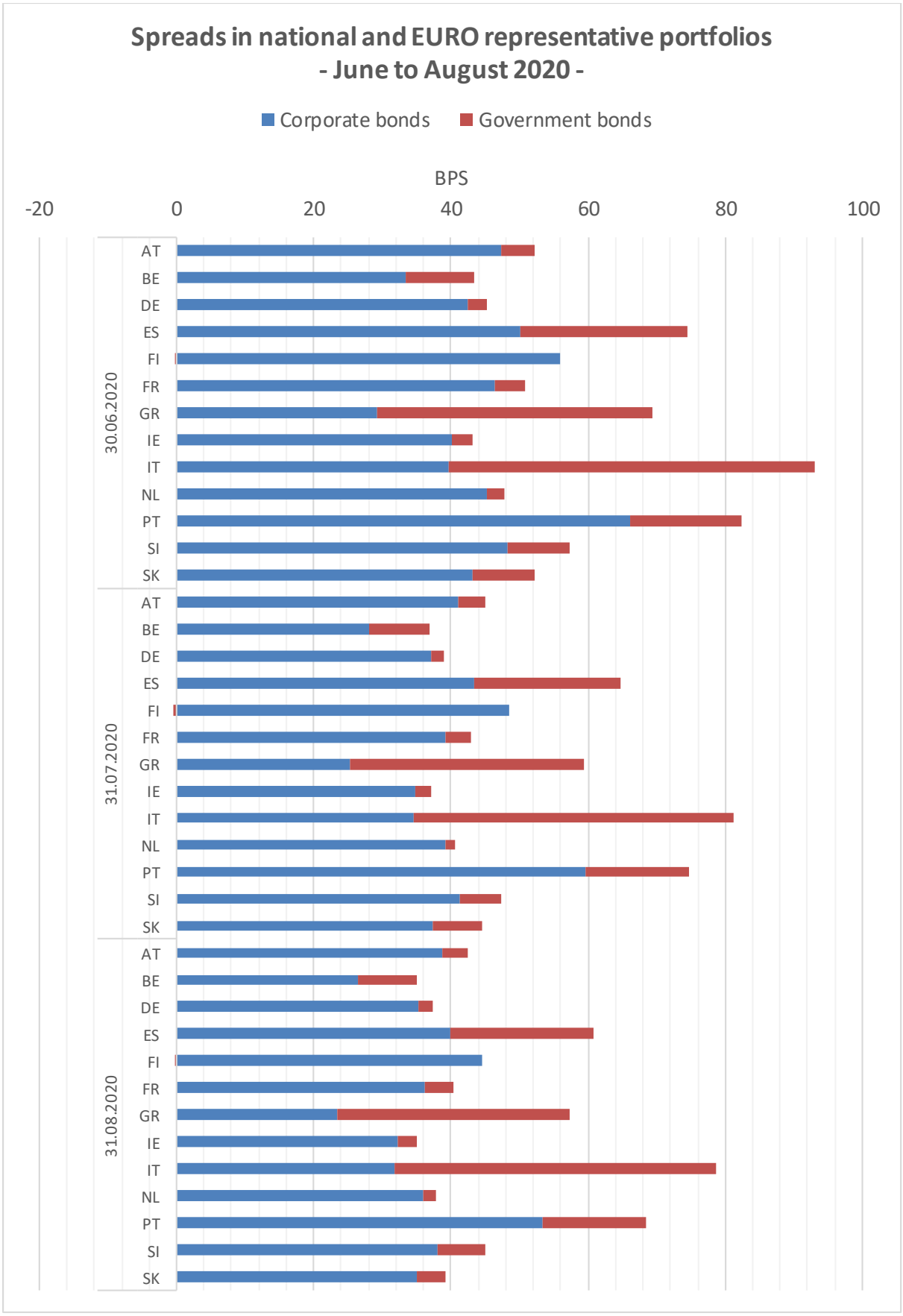
Spreads in national and EURO representative portfolios
- June to August 2020 -
Corporate bonds
Government bonds
BPS
-20
0
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40
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30.06.2020
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Annex 4 – Macro-economic VA

Macro-economic VA: formula

The macro-economic VA is an additive component to the permanent VA, which depends on the level of the risk corrected (RC) spread in each country, relatively to the currency RC spread. Its formula is the following:

$$VA_{macro} = GAR * AR_4 * AR_5 * \omega_{country} * max\left(RC\_S_{country} * Scale_{country} - 1.3 * RC\_S_{currency} * Scale_{currency}; 0\right)$$

with

$$\omega_{country} = \begin{cases} 0 & if\ RC\_S_{country} \leq RC\_S^L_{country} \\ \dfrac{RC\_S_{country} - RC\_S^L_{country}}{RC\_S^H_{country} - RC\_S^L_{country}} & if\ RC\_S^L_{country} < RC\_S_{country} \leq RC\_S^H_{country} \\ 1 & if\ RC\_S_{country} > RC\_S^H_{country} \end{cases}$$

The total VA applicable for an undertaking i located in a particular country is:

$$VA^i{}_{permanent} + VA^i{}_{macro,country}$$

where

- GAR is the general application ratio
- $AR_{i,c}^{Option\ 4}$ denotes the application ratio 4 for undertaking *i* currency *c*
- $AR_{i,c}^{Option\ 5}$ denotes the application ratio 5 for undertaking *i* currency *c*
- $RC\_S_{currency}$ denotes the risk-corrected spread of the representative portfolio for currency *c*
- $RC\_S_{country}$ denotes the risk-corrected spread of the *country* representative portfolio
- $Scale_{currency}$ denotes the scaling-factor for currency *c*
- $Scale_{country}$ denotes the scaling-factor for *country*

The scaling-factor $Scale_{...}$ is determined as:

$$Scale_{...} = \frac{1}{w_{gov,...} + w_{corp,..}}$$

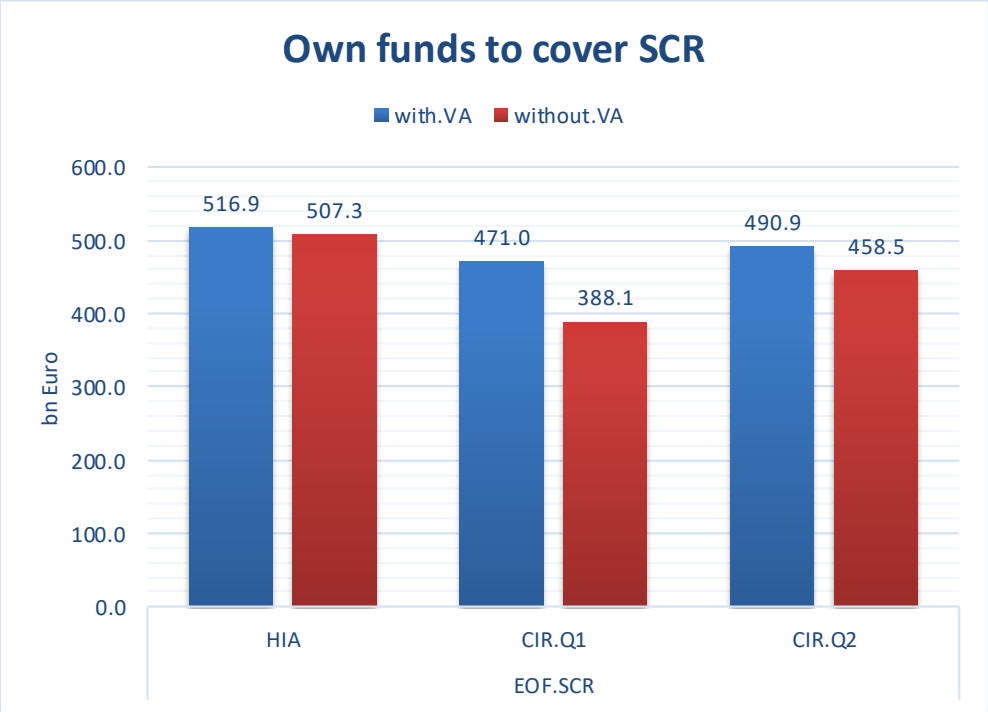
where

- $w_{gov,...}$ denotes the weight of the government bond portfolio in the representative portfolio for currency *c* (or *country*); and
- $w_{corp,...}$denotes the weight of the corporate bond portfolio in the representative portfolio for currency *c* (or *country*)

Annex 5 – Assessment of VA development during 2020

To assess the functioning of the VA during the first half of 2020, EIOPA analysed the financial data of 139 undertakings using the VA that participated in both the HIA and the CIR and that reported financial data for year end 2019 (as part of the HIA data) as well as for the first and second quarter of 2020 (as part of the CIR data). The total technical provisions of these undertakings – gross of reinsurance and with the use of the transitionals and the VA – amount to 4.030 billion Euro, which represents a market coverage of all undertakings in the EEA (without UK) that use the VA of 68%.

The following diagram shows the evolution of the own funds eligible to cover the SCR for this sample over the three different reference dates:[31]



This shows that, in the aggregate, the amount of own funds decreased between year end 2019 and Q1 2020, and increased between Q1 and Q2 2020. This corresponds to the evolution of the financial markets during this period, which is characterised by a sharp downturn in the first quarter of 2020, followed by a partial relief in the second quarter.

The diagram above also illustrates that the VA had a very strong impact on the solvency position of the undertakings. Between year-end 2019 and Q1 2020, the VA mitigated to a large extent the loss in own funds that the undertakings would have suffered without the VA. In fact, the impact of the VA on the own funds of the undertakings in the sample increased from 9,6 billion Euro to 82,9 billion Euro during this period, an increase of more than 73 billion Euro.

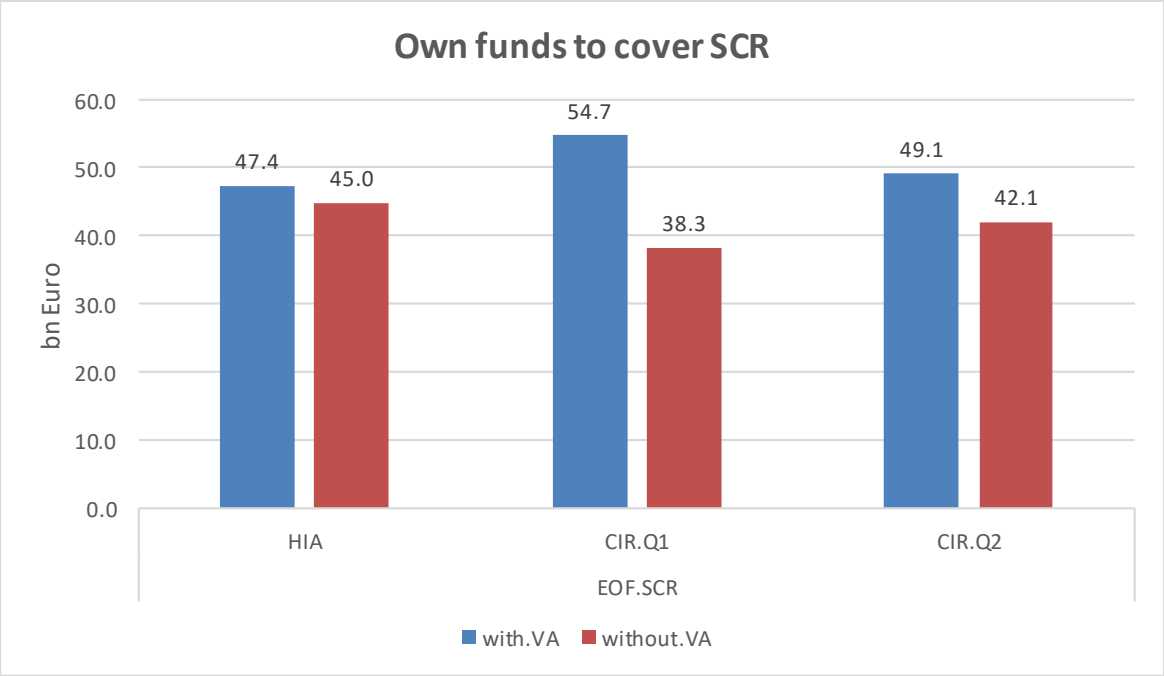
[31] Note that all amounts refer to the value of own funds without the transitionals.

Likewise, in the second quarter of 2020, the VA mitigated the strong increase of the own funds calculated without the VA when market turbulences partly receded during this period. Between Q1 and Q2 2020, the impact of the VA decreased by 50.6 billion Euro, which led to an impact of 32.3 billion at Q2 2020 which is still more than three times as high as the year end 2019 impact.

Overall, these observations are commensurate with the evolution of the size of the VA as depicted at the beginning of this section, and confirm the strong role of the VA as a mitigating instrument during periods of sharp and steep spread changes.

However, whereas the impact of the VA in the aggregate appears satisfactory, this may mask the occurrence of "overshooting" effects at an undertaking specific level. To explore this aspect, EIOPA assessed the evolution of the own funds of each of the 139 undertakings on the sample. During the period from year-end 2019 to Q1 2020, 128 undertakings in the sample suffered a loss in own funds when calculated without the VA. When calculated with the VA, only 114 undertakings suffered a loss, whereas for 25 undertakings in the sample the value of own funds with the VA actually increased. For 15 of the 25 undertakings, in the period between year-end 2019 and Q1 2020 the value of own funds with the VA increased, whereas the value of own funds calculated without the VA decreased.

In the aggregate, these 15 undertakings have the following development of own funds:



Note that the pattern of the development shown here being characteristic for all of these undertakings: Whereas the value of own funds decreased from year-end 2019 to the first quarter and then partially recovered, as in the full sample, the

undertakings experienced an actual increase in their own funds with the LTG measures in the first quarter and a loss in the second quarter.

This is a strong indication of an "overshooting" effect of the VA for these undertakings in the first quarter of 2020, since the loss of own funds without the VA is likely to exceed the loss in the market value of the fixed income investments of the undertakings, given that the downturn in the financial markets during the first quarter led to an overall loss in market values also in other asset categories, whereas the technical provisions generally increased due to a decline in risk-free rates during this quarter[32].

The change in own funds under the new VA is more in line with market developments: a decrease in the first half year of 2020[33], but still a smaller decrease than without the application of the VA.

Note that this approach only allows for an identification of the "obvious" cases of overshooting. As the situation at Q1 compared to year-end 19 has also been considerably influenced by a further reduction in risk free interest rates, in cases where the own funds of an undertaking have increased in Q1 compared to year-end 19 when applying the VA, the VA has not only compensated for the losses incurred due to a widening of credit spreads but also the losses incurred due to the reduction in interest rate levels. Thus, there may be a considerable number of further undertakings – apart from the 15 identified – where the VA has overcompensated the losses from spread widening and where thus overshooting has occurred.

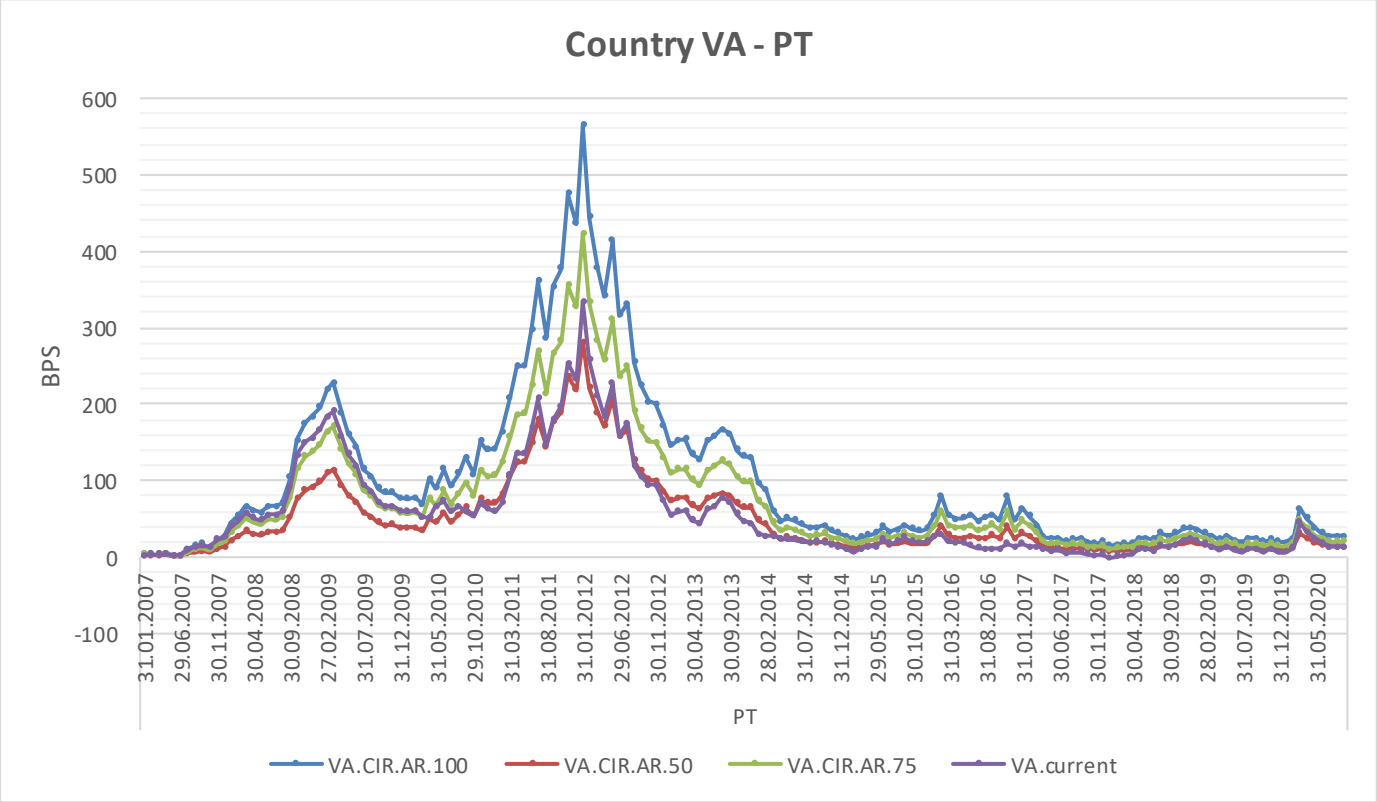
[32] One could question if the decline in interest rates could not have offset the losses in fixed income assets from spreads and maybe overcompensated also the increase of technical provisions due to a positive duration gap. But the analysis of the effective durations which form the basis for application ratio 4 for the 15 identified cases confirms the indication of a stronger sensitivity of liabilities than assets. This is supported by the inspection of the modified durations collected in the HIA.

[33] Data on the new VA were not gathered for Q1 2020 to reduce the burden for the undertakings.

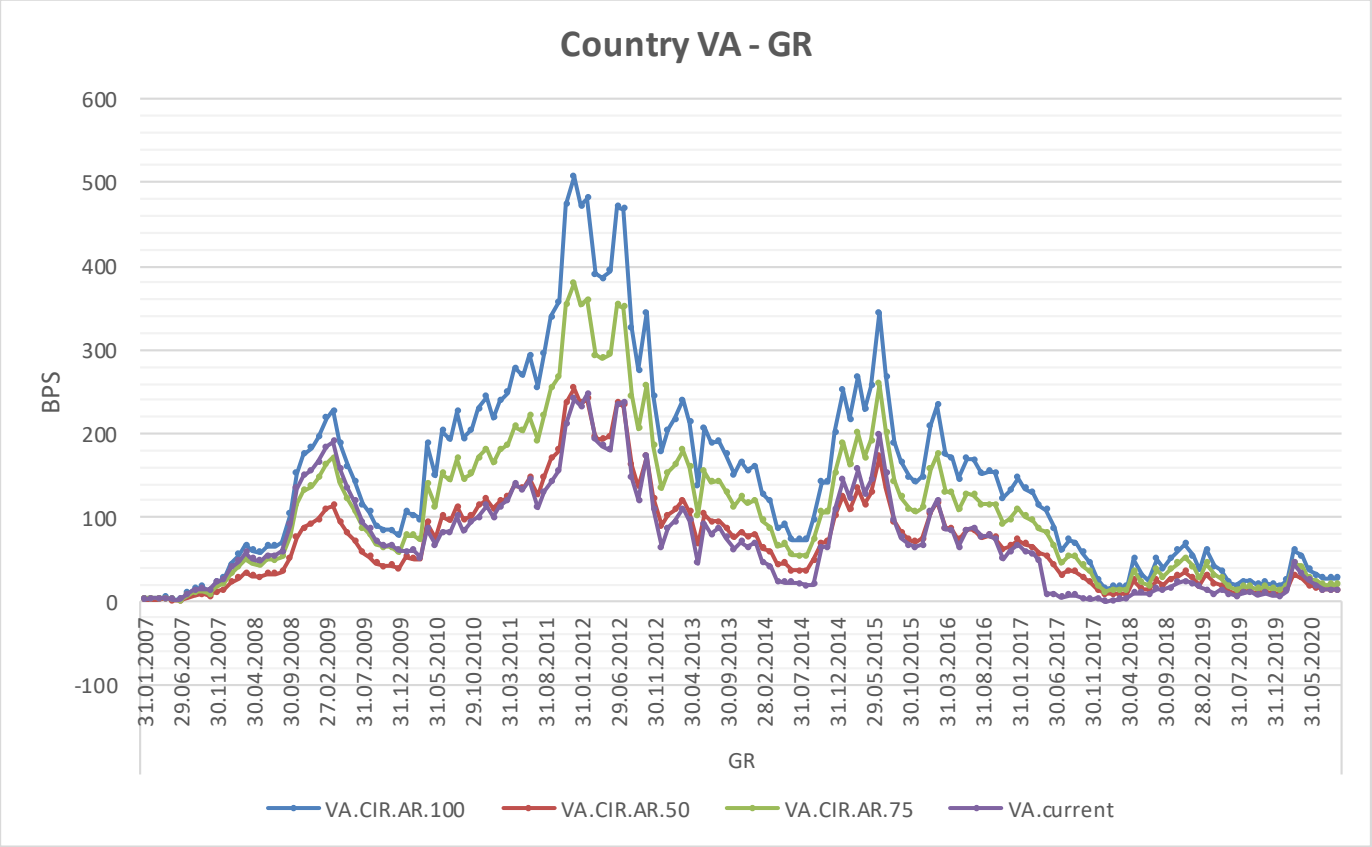
Annex 7 – New and current VA for selected countries

The following diagrams show the development of the new envisaged design of the VA and the current design over the time period January 2007 to September 2020 for the countries ES, GR, PT and DE. The values of the VA have been simulated using data from the development of yields and spreads in the representative portfolios of the respective countries over this time period. For the new VA, three different levels of the combined multiplicative level of the application ratios were assumed (50%, 75% and 100%).

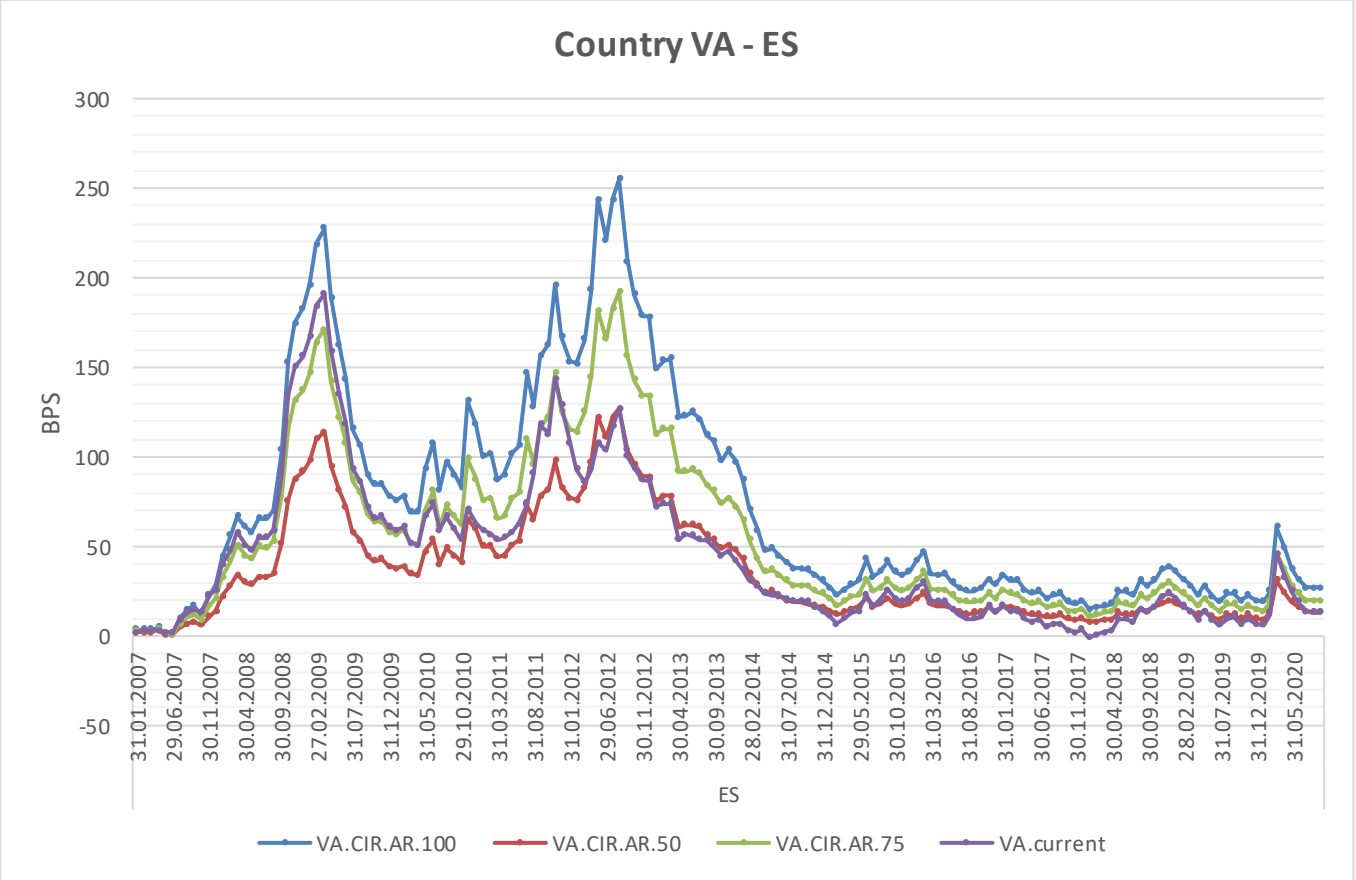
Spain:



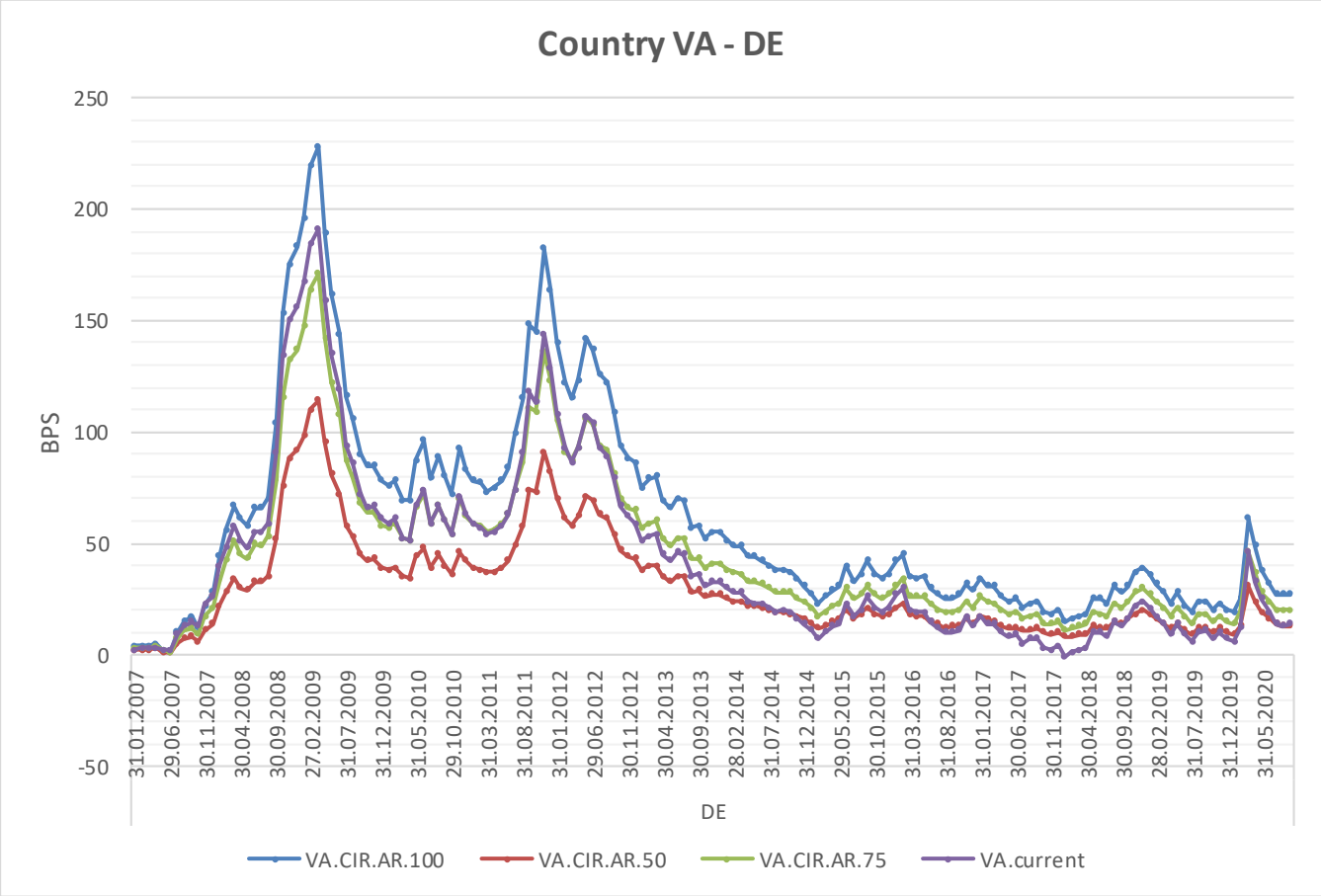
Greece:


Country VA - GR
600
500
400
300
200
100
0
-100
BPS
31.01.2007
29.06.2007
30.11.2007
30.04.2008
30.09.2008
27.02.2009
31.07.2009
31.12.2009
31.05.2010
29.10.2010
31.03.2011
31.08.2011
31.01.2012
29.06.2012
30.11.2012
30.04.2013
30.09.2013
28.02.2014
31.07.2014
31.12.2014
29.05.2015
30.10.2015
31.03.2016
31.08.2016
31.01.2017
30.06.2017
30.11.2017
30.04.2018
30.09.2018
28.02.2019
31.07.2019
31.12.2019
31.05.2020
GR
VA.CIR.AR.100
VA.CIR.AR.50
VA.CIR.AR.75
VA.current

Spain:


Country VA - ES
300
250
200
150
100
50
0
-50
BPS
31.01.2007
29.06.2007
30.11.2007
30.04.2008
30.09.2008
27.02.2009
31.07.2009
31.12.2009
31.05.2010
29.10.2010
31.03.2011
31.08.2011
31.01.2012
29.06.2012
30.11.2012
30.04.2013
30.09.2013
28.02.2014
31.07.2014
31.12.2014
29.05.2015
30.10.2015
31.03.2016
31.08.2016
31.01.2017
30.06.2017
30.11.2017
30.04.2018
30.09.2018
28.02.2019
31.07.2019
31.12.2019
31.05.2020
ES
VA.CIR.AR.100
VA.CIR.AR.50
VA.CIR.AR.75
VA.current

Germany:


Country VA - DE
250
200
150
100
50
0
-50
BPS
31.01.2007
29.06.2007
30.11.2007
30.04.2008
30.09.2008
27.02.2009
31.07.2009
31.12.2009
31.05.2010
29.10.2010
31.03.2011
31.08.2011
31.01.2012
29.06.2012
30.11.2012
30.04.2013
30.09.2013
28.02.2014
31.07.2014
31.12.2014
29.05.2015
30.10.2015
31.03.2016
31.08.2016
31.01.2017
30.06.2017
30.11.2017
30.04.2018
30.09.2018
28.02.2019
31.07.2019
31.12.2019
31.05.2020
DE
VA.CIR.AR.100
VA.CIR.AR.50
VA.CIR.AR.75
VA.current

Annex 8 – Belgian case study

Belgian case study on impact of current VA during crisis

All other things remaining equal, when the average spread of an undertaking's portfolio of bonds increases, the value of these bonds decreases, and subsequently the value of the own funds decreases. The volatility of the own funds caused by the volatility of spreads could have unintended consequences such as triggering procyclical behaviour.[34] As part of its overall objectives, the VA is intended to mitigate the impact of exaggerations of bond spreads on own funds and to prevent procyclical investment behaviour. Where the impact of the VA is higher than is warranted to achieve this aim, an "overshooting" effect may occur. One can state that the volatility adjustment overshoots when the decrease in the best estimate caused by the volatility adjustment is higher than the decrease in the value of an undertaking's bonds portfolio caused by its average risk-corrected spread.

Assessing the over- or the undershooting of the VA is not straightforward in practice, as this requires information on the impact of the undertaking's specific risk-corrected spread, for instance provided by a specific sensitivity analysis on the spreads or the calculation of the so-called 'undertaking specific'-VA. An analysis of the evolution of the solvency position of an undertaking can in some specific circumstances provide an indication of the overshooting of the VA, this indication needs to be confirmed by an in-depth analysis before concluding the VA effectively overshoots.

Evidence of overshooting between 31/12/2019 and 24/04/2020

If we take for example the situation between year-end 2019 and 24 March 2020, the average basic RFR calculated as one single discount rate for the Belgian market (hereafter Basic RFR) decreased from 63 BPS to 40 BPS while the VA increased by 44 bps. Although a decrease in the basic RFR is an adverse scenario expected to negatively impact the solvency position of undertakings, it has been observed that the solvency position of some undertakings significantly improved in this period. As the VA increased strongly during this period, the overshooting of the VA could be one explanation for these improvements in the solvency positions. From an in-depth analysis performed by four undertakings for which the solvency ratio improved, it appeared that the significant increase of the VA is the main explanation for the improvement of their solvency position, providing evidence that the VA is overshooting in their case.

Developing an overall indicator for overshooting

Considering the development of the difference between the value of technical provisions subject to the VA and the value of an undertaking's portfolio of fixed income investments (sovereign and corporate bonds) could provide an indication of the overshooting of the VA. This indication is only credible where it is possible to identify that the observed development is mainly attributable to the change of risk-corrected spreads in both the technical provisions and in the undertaking's bond portfolio.

[34] See section 2.4.5.1.1. in the consultation paper on the Solvency II Review

Ideally, the following three requirements should be met:

- All the best estimate assumptions except the discount rates remain unchanged
- The undertaking's portfolio of bonds remains unchanged
- Basic RFR and the VA evolve in different directions and the evolution of the VA is more important than the evolution of the Basic RFR

Although the first and the second conditions can only be confirmed by the undertaking, it appears reasonable to assume that these conditions are met if the observation period is very short, for example only one or two weeks. If the three conditions are met and an increase in the VA causes a decrease in the technical provisions which overcompensates the observed decrease in the undertaking's bond portfolio[35], then this provides a strong indication that the VA is overshooting.

An analysis of the evolution of the basic risk-free rate and the VA shows that only two periods meet the third requirement, i.e. the period between 31/12/ 2019 and 24/03/2020 (T1) and the period between 06/04/2020 and 14/04/2020 (T2).

	31/12/2019	24/03/2020	31/03/2020	06/04/2020	14/04/2020	30/04/2020
VA	7	51	46	46	36	33
Basic RFR	0,630%	0,403%	0,366%	0,351%	0,354%	0,224%

The indicator that will be used in the following analysis relates to the expected increase / decrease in eligible own funds that is attributable to the difference between the evolution of the total value of the bonds and the total value of the technical provisions subject to the VA. In T1 the VA increased more than the decrease in the Basic RFR, an increase in eligible own funds that is attributable to the difference between the evolution of the total value of the bonds and the total value of the technical provisions subject to the VA therefore indicates the VA is overshooting at the end of T1. Vice versa for T2, a decrease the in eligible own funds will indicate the VA was overshooting at the beginning of T2.

For the four undertakings for which the overshooting had been confirmed with factual evidence, the results of the indicator confirms the overshooting for three of the four undertakings in T1 and for the four undertakings in T2. This is in line with the expectation explained above that the indicator would perform better for very small periods.

Calculating the indicator in T2 for a broader sample of 25 Belgian undertakings using the VA indicates that the VA might be overshooting for 21 of 25 undertakings in the sample.

[35] so that the impact of the VA on the value of the technical provisions is higher than the impact of the undertaking's risk corrected spread on its bond portfolio

Annex 9 – Questions to DVA users on risk and investment management in the CIR

11.5. Annex: Questions to DVA users on risk and investment management in the CIR

The CIR raised the following questions to DVA users:

Q1: 'Risk management' (cf. article 44 of the Solvency II Directive) and 'investment management':

Did the crisis impact your risk appetite to credit spread risk, especially with respect to disincentives? This especially relates to investment in riskier assets for the sole purpose of lowering the SCR.

Q2: 'Forced sale of assets' (cf. article 44(2a) (c) (i) of the Solvency II Directive):

Did you experience any forced sale of you assets during the crisis? Did you need to change your risk management provisions with respect to forced sale of assets due to experiences from the crisis?"

Q2: "'Overshooting' and 'undershooting':

Did you observe any 'overshooting' or 'undershooting' of the volatility adjustment (VA)? If yes, would you see the reason in a structural mismatch of your asset portfolio to the VA reference portfolio?

In your answer please consider inter alia the following: Did your own funds position improve compared to year-end 2019 when using the VA but declined due to losses from increasing spreads without using the VA? Or conversely: Did you experience a pronounced loss but only very limited compensation by the VA?"

Q3: Supplementary calculations and considerations:

In view of experienced or potential overshooting or undershooting: Did you perform supplementary calculations, for example using a dynamic VA model that is different from the one used for regular reporting (e.g. based on your own asset portfolio)? If yes, please share insights from such calculations. Furthermore, do you think that your answers to the questions in the bullet points above would be different if you were using a different VA model, based on your own portfolio as VA option 1 described in the 2019 consultation paper? Similarly, would the proposed application ratios or the new risk correction have influenced your answer?

Annex 12 – Interest rate risk

Comparison of the calibration from the consultation paper and the revised calibration

The interest rate risk calibration is reassessed in the interest rate down scenario with the most recent data. The same shifted approach as in the consultation paper is applied. In technical terms, this means that the shift vector remained unchanged while the shock parameters s_m^{down} and b_m^{down} have been updated with the new data from 2019 and 2020.

The results of the new calibration are displayed in the table below:

m	s_m_down	b_m_down
1	-58%	-1,16%
2	-50%	-0,98%
3	-43%	-0,81%
4	-40%	-0,73%
5	-40%	-0,71%
6	-42%	-0,72%
7	-44%	-0,74%
8	-46%	-0,74%
9	-47%	-0,74%
10	-48%	-0,73%
11	-49%	-0,72%
12	-49%	-0,70%
13	-50%	-0,69%
14	-51%	-0,67%
15	-52%	-0,65%
16	-53%	-0,64%
17	-54%	-0,63%
18	-55%	-0,61%
19	-56%	-0,59%
20	-56%	-0,56%

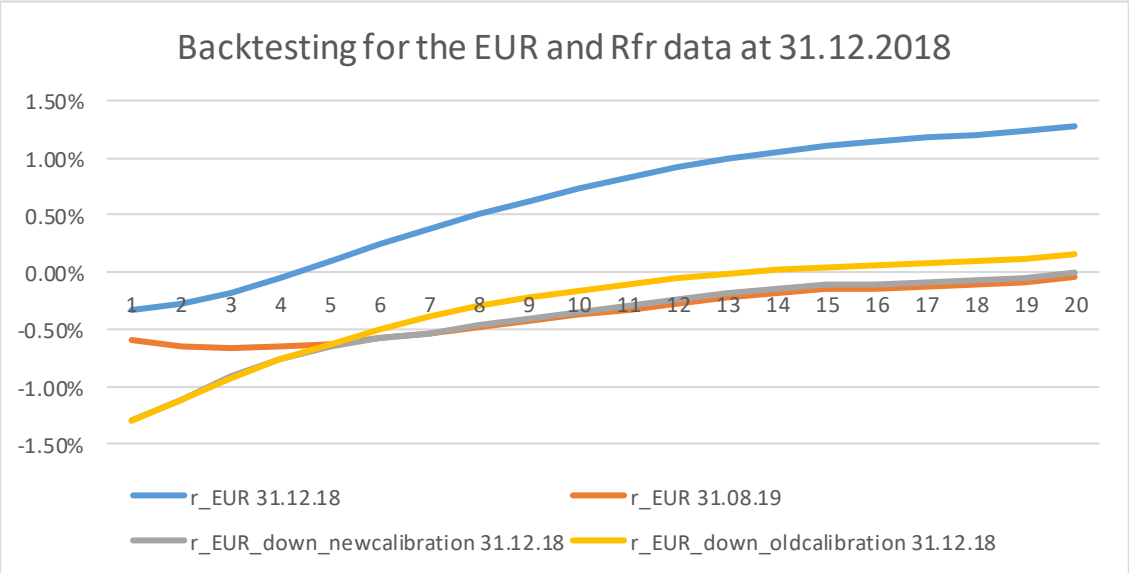
In comparison, the calibration from the consultation paper is displayed in the following table:

m	s_m_down	b_m_down
1	-58%	-1,16%
2	-51%	-0,99%
3	-44%	-0,83%
4	-40%	-0,74%
5	-40%	-0,71%
6	-38%	-0,67%

7	-37%	-0,63%
8	-38%	-0,62%
9	-39%	-0,61%
10	-40%	-0,61%
11	-41%	-0,60%
12	-42%	-0,60%
13	-43%	-0,59%
14	-44%	-0,58%
15	-45%	-0,57%
16	-47%	-0,56%
17	-48%	-0,55%
18	-49%	-0,54%
19	-49%	-0,52%
20	-50%	-0,50%

Backtesting of the calibration from the consultation paper and the revised calibration

It is interesting to see how the two calibrations had performed in the extreme interest rate event at 31 August 2019. The figure below illustrates this backtesting exercise. The blue line is the term structure at 31 December 2019, the orange line the term structure at 31 August 2019, the grey line the shocked interest rate down curve with the shocks from table 1 (new calibration), while the yellow line is the shocked interest rate down curve with the CP shocks (table 2). One can observe that either calibration underestimates the realised interest rate curve at 31 August 2019 from the 5 year maturity onwards. However, while the shocked curve with the new shocks (grey line) is very close to the realised curve at 2019, the shocked curve with the CP shocks underestimated the realised curve by more than 20 basis points for certain maturities.



Observed minimum interest rates

The following table sets out the lowest observed interest rates for EUR, JPY and CHF swap rates and for German government bonds until end of August 2020. During the crisis new minima were observed for German government bond rates of maturities 2 to 10 years.

EUR									
1Y	**2Y**	**3Y**	**4Y**	**5Y**	**6Y**	**7Y**	**8Y**	**9Y**	**10Y**
18/12/2017	04/09/2019	02/09/2019	02/09/2019	02/09/2019	28/08/2019	28/08/2019	16/08/2019	16/08/2019	16/08/2019
-0.579	-0.554	-0.530	-0.490	-0.437	-0.395	-0.355	-0.314	-0.269	-0.217
JPY									
1Y	**2Y**	**3Y**	**4Y**	**5Y**	**6Y**	**7Y**	**8Y**	**9Y**	**10Y**
27/07/2016	27/07/2016	25/09/2019	25/09/2019	25/09/2019	25/09/2019	25/09/2019	03/09/2019	04/09/2019	29/08/2019
-0.365	-0.356	-0.371	-0.390	-0.395	-0.401	-0.401	-0.384	-0.337	-0.284
CHF									
1Y	**2Y**	**3Y**	**4Y**	**5Y**	**6Y**	**7Y**	**8Y**	**9Y**	**10Y**
03/09/2019	01/12/2015	15/08/2019	15/08/2019	15/08/2019	15/08/2019	15/08/2019	15/08/2019	15/08/2019	15/08/2019
-1.158	-1.217	-1.187	-1.189	-1.189	-1.171	-1.165	-1.177	-1.193	-1.131
DE									
1Y	**2Y**	**3Y**	**4Y**	**5Y**	**6Y**	**7Y**	**8Y**	**9Y**	**10Y**
09/03/2017	09/03/2020	09/03/2020	09/03/2020	09/03/2020	09/03/2020	09/03/2020	09/03/2020	09/03/2020	09/03/2020
-0.969	-1.015	-1.035	-1.027	-1.010	-0.987	-0.958	-0.927	-0.894	-0.864

Annex 13 - Downgrades of corporate bonds

Conceptual analysis of downgrades concerning spread and market risk concentrations sub-modules

The aim of this analysis is to investigate whether Solvency II can potentially result in pro-cyclical investment behaviour due to widening credit spreads as well as downgrades of credit ratings. Higher credit spreads (and yields), which are equivalent to a fall in bond prices, may result in a decline in the excess of assets over liabilities of undertakings. If the excess of assets over liabilities is no longer sufficient to cover the SCR then undertakings have the choice to either de-risk their investment portfolio or to attract additional capital. Undertakings face the same choice if they no longer comply with the SCR due to an increase in capital requirements. Downgrades will raise capital requirements in SCR sub-modules that rely on credit ratings to establish risk-based capital charges, like the spread risk and market risk concentrations sub-modules. Undertakings are expected to continuously manage the risks arising from fluctuations of corporate bond spreads as part of risk management requirements, which implies that downgrades should not be the sole key driver of reactions to the deterioration in the credit quality of assets held.

Spread risk sub-module

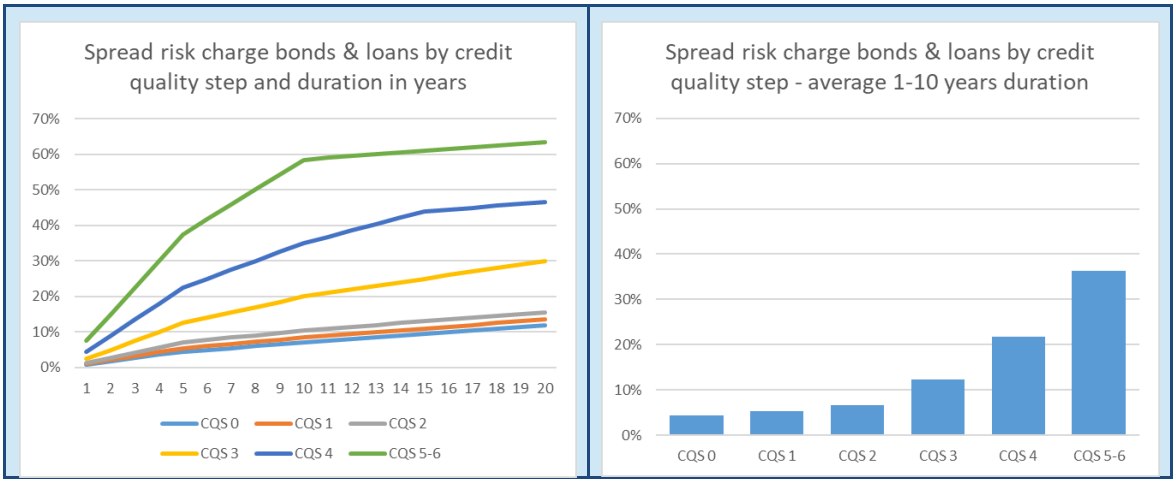
The spread risk sub-module, like other SCR (sub-)modules, is calibrated to ensure that the market value of assets exceeds the value of liabilities with 99.5% certainty within one year. As long as the market value of assets exceeds the value of liabilities, undertakings have enough means to meet obligations towards policyholders. Conversely, once the market value of assets falls below the amount of technical provisions, obligation towards policyholders can no longer be fulfilled with sufficient certainty.[36]

The spread risk charges on bonds and loans were estimated using historical data on daily spreads over the risk-free rate, distinguishing the credit quality step (CQS) and maturity of corporate bonds.[37,38] The spread risk charges correspond to the 0.5% quantile of the (rolling) year-on-year widening of corporate spreads. The calibration allows spread risk charges to increase non-linearly with the duration of bonds and loans, the so-called "kinked" approach. The charts below show that the resulting spread risk charges increase with the CQSs, i.e. bonds with a higher credit quality are subject to lower capital charges than bonds with lower credit quality. In interpreting the spread risk charges, it should be noted that the chart does not take into account information on the incidence of bonds and loans with a certain CQS and duration. Typically, bonds with low ratings have a lower duration than bonds and loans with high ratings, as investors will be reluctant to lend to speculative grade issuers for prolonged, fixed periods.

[36] See section 5.2.5.2 on page 357 in EIOPA, Consultation Paper on the 2020 review of Solvency II, EIOPA-BoS-19/465, 15 October 2019: https://www.eiopa.europa.eu/sites/default/files/publications/consultations/eiopa-bos-19-465_cp_opinion_2020_review.pdf

[37] See section 2.5 in EIOPA, The underlying assumptions in the standard formula for the Solvency Capital Requirement calculation, EIOPA-14-322, 25 July 2014.

[38] Monthly corporate bond indices were constructed broken down by credit quality steps and one-year maturity buckets for the first ten years and an overall bucket for maturities exceeding ten years. Subsequently, daily yield spread data were generated given the index composition at the beginning of each month.



The fact that capital charges increase with a decrease in credit quality means that a downgrade of a bond or loan from one step, e.g. CQS 3, to another step, e.g. CQS 4, results in higher capital requirements. This reflects the higher risk (of losses in market value corresponding to a 0.5% one-year VaR) on bonds and loans with lower credit quality.

The increase in the capital charges occurs in discrete steps because of the level of granularity assumed in the spread risk sub-module. The Solvency II Delegated Regulation distinguishes an objective scale of 7 credit quality steps, i.e. CQS 0 to 6, and not the intermediate steps within credit quality steps that rating agencies tend to assign to corporates. Moreover, for the purpose of calibrating the capital charges on bonds and loans, credit quality steps 5 and 6 were combined, presumably to address the lack of observations in the individual steps 5 and 6.

The discrete nature of the calibration may have a binary effects on capital charges for individual bonds in the context of downgrades. On the one hand, a downgrade of one intermediate step within a credit quality set will have no impact on capital requirements. On the other hand, the same one intermediate-step downgrade may have a large impact if the credit rating crosses from one credit quality step to another, e.g. from CQS 3 to CQS 4. However, these binary effects take place in a very dynamic way and they would be expected to average out when considering all bonds and loans of an undertaking – or all undertakings, which would be the most relevant from a financial stability perspective.

Market risk concentrations sub-module

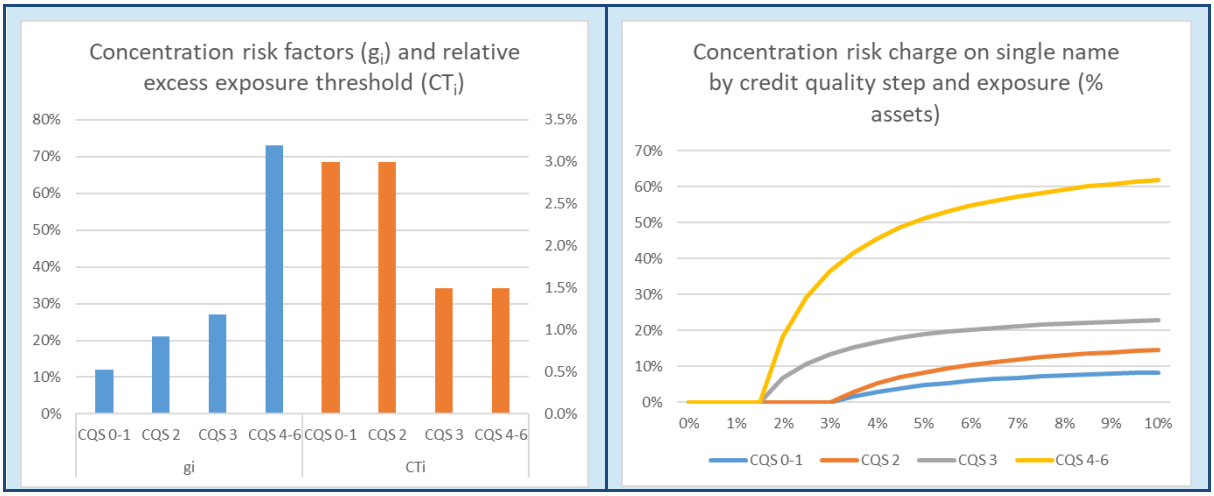
The market risk concentrations sub-module accounts for the idiosyncratic risk associated with non-diversified exposures to single issuers or, in Solvency II terminology, names. The capital charge for concentration risk is applied on top of the regular risk charges on assets distinguished in the market risk module, like bonds and equities.

The capital charge for concentration risk depends on the credit quality step of the single name. The credit quality step determines both the relative excess exposure threshold and the concentration risk factors that are applied to exposures in excess of this threshold. The risk factors were calibrated by gradually increasing

exposures to a single name to a well-diversified portfolio of bonds and equities.[39,40] Subsequently, the increase in the 0.5% one-year VaR relative to the diversified portfolio can be calculated for each credit quality step and degree of concentrated excess exposure.

The left-hand chart below shows that the empirical risk factors (g_i) increase with the credit quality of the issuer. The relative excess exposure threshold (CT_i) equals 3% for CQS 0-2 and 1.5% for CQS 3-6. The right-hand chart presents the resulting capital charge after applying the risk factors to the exposures exceeding the thresholds. The capital charge for each credit quality step increases in a continuous fashion with exposures increasing beyond the threshold.

The calibration for the concentration risk sub-module was conducted using a lower level of granularity compared to the spread risk sub-module, combining CQS 0 and 1 as well as CQS 4 to 6. The reason is that the single names considered in the calibration[41], presumably, did not allow for precise estimates for these credit quality steps individually. The lower resolution may result in a disproportionate increase in capital requirements, especially in a scenario with substantial downgrades from CQS 3 to CQS 4. Even if this would be the case, the question is whether this would have material negative effects on financial stability. Undertakings will likely aim to minimise concentrated exposures to single issuers. Not only because this will lead to higher capital requirements, but also because this will result in inefficient portfolios. Financial markets do not reward idiosyncratic risk since it can be diversified away for free.



Global consistency with counterparty default risk module

One would expect global consistency between capital charges in the spread and concentration risk sub-modules and the counterparty default risk module, as

[39] See section 3.1.6 in CEIOPS, Solvency II Calibration paper, CEIOPS-SEC-40-10, 15 April 2010: https://www.eiopa.europa.eu/sites/default/files/publications/submissions/ceiops-calibration-paper-solvency-ii.pdf

[40] The diversified portfolio was assumed to be comprised of 25% risk-free bonds, 55% corporate bonds and 20% equities.

[41] The calibration considered companies in the EURO STOXX 50 index together with additional names "to complete all the buckets of the cross-table resulting from, on one dimension rating categories considered, and on the other dimension economic sectors included in this exercise."

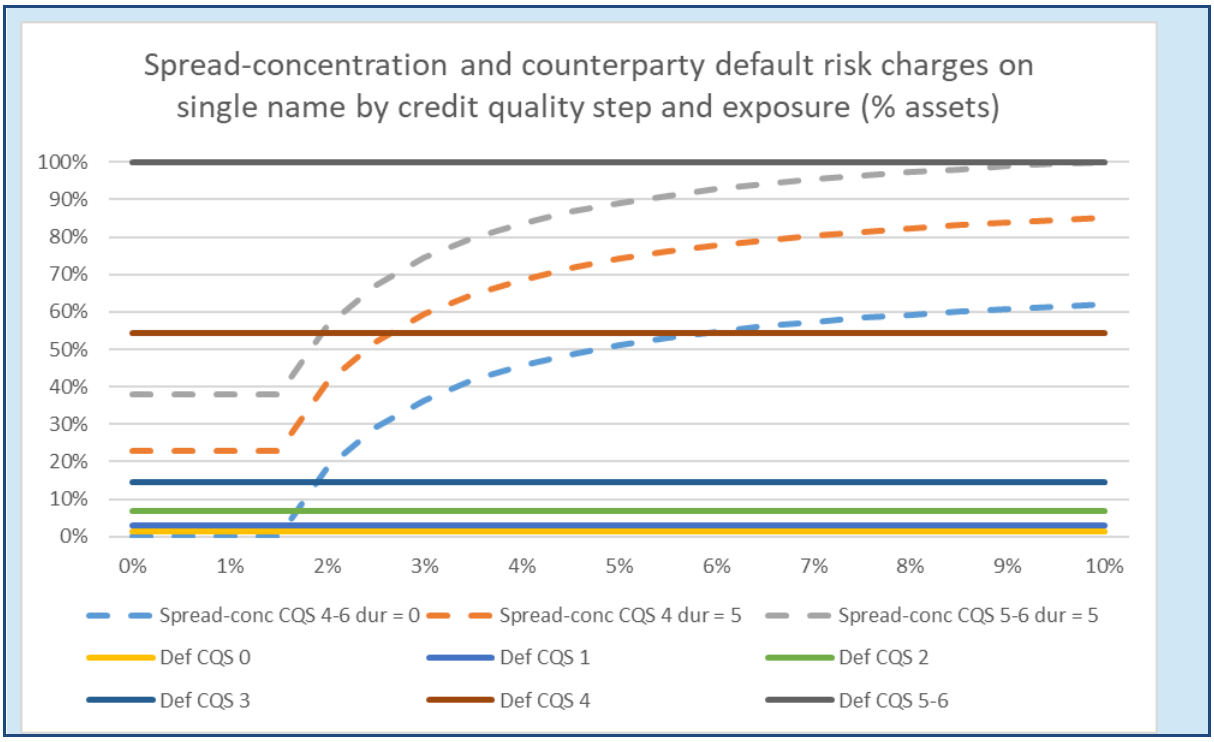
instruments with similar characteristics are covered under these separate modules. Most notably, this is true for bank deposits, which are covered by the spread and concentration risk modules, and cash at bank, which falls under the counterparty default risk module.

The chart below compares counterparty default risk charges on a single counterparty, which can be thought of as cash at bank, with spread-concentration risk charges, broken down by credit quality step and exposure. The counterparty default risk charge is independent of the exposure to the counterparty. It is assumed that there is only one counterparty, meaning that risk diversification between counterparties does not play a role.

Spread-concentration risk charges for instruments, which can be thought of as bank deposits, with three different characteristics are shown:

- A credit quality step of the issuer of 4-6 and a duration of the instrument of 0 years, which means that the capital charge reduces to the concentration risk charges;
- A credit quality step of the issuer of 4 and a duration of the instrument of 5 years, which means that the combined capital charge equals the concentration risk charge (CQS 4-6) plus a spread risk charge of 23%;
- A credit quality step of the issuer of 5-6 and a duration of the instrument of 5 years, which means that the combined capital charge equals the concentration risk charge (CQS 4-6) plus a spread risk charge of 38%;

The chart provides a stylised comparison, e.g. by assuming that the undertaking only disposes of one counterparty. Still, especially when comparing the counterparty default risk charges for CQS 4 and 5-6 (i.e. cash at bank) with the concentration risk charge for CQS 4-6 (i.e. near-term bank deposits), a conclusion may be that the calibration of the latter is not excessive.



Note: The standard deviation (σ) of the loss distribution of type 1 exposures in the counterparty default module in case of one counterparty reduces to: $\sqrt{PD(1-PD)}LGD$ where PD is the probability of default and LGD the loss-given-default. The capital charge equals 3 x σ where σ is less or equal to 7% and 5 x σ where σ is higher than 7% and less or equal to 20%.

Factors mitigating the pro-cyclical impact of downgrades

Downgrades of bonds/names may raise capital charges for spread risk and concentration risk, reflecting the higher risk of (downgraded) corporate bond holdings and concentrated exposures. The extent to which the higher capital charges result in a higher SCR and lead to pro-cyclical investment behaviour depends on several factors:

- Loss-absorbency of technical provisions and unit/index-linked products The capital charges for spread risk and concentration risk discussed above are gross capital charges, which do not take into account the loss-absorbency of technical provisions. Some of the higher risk may be borne by policyholders, e.g. in case of profit-sharing policies and unit/index-linked products;
- Excess solvency capital The increase in capital requirements will only force undertakings to de-risk their investment portfolio when the excess of assets over liabilities is insufficient to cover the higher SCR. Other undertakings may dispose of sufficient excess solvency capital to absorb the rise in capital requirements without having to resort to forced sales of assets.

  Moreover, Solvency II already contains a range of tools to limit pro-cyclicality[42], including:

- The volatility adjustment allows undertakings to reflect part of the credit spreads on government and corporate bonds in the risk-free interest rate curve. As such, the volatility adjustment will mitigate the adverse consequence of an increase in spreads (and accompanying downgrades) will be mitigated by a higher discount curve and a lower value of technical provisions.
- An extension of recovery periods In the event of exceptional adverse situations, as declared by EIOPA, and where appropriate after consulting the ESRB, supervisory authorities may extend the recovery period of 6 months to restore compliance with the SCR by a maximum period of seven years.

Finally, it is important to note that undertakings may encourage pro-cyclicality in the wake of downgrades, regardless of Solvency II capital requirements. For example, undertakings may consider it prudent and in the interest of policyholders to restrict corporate bond allocations through asset management mandates and investment funds to investment grade bonds. This means that asset managers would have to sell corporate bonds following a downgrade from investment to speculative grade.

Conclusion

Based on the analysis performed, the design and calibration of the spread and market risk concentrations risk modules of the SCR standard formula seem justified and in line with a risk-based approach, taking into account that the underlying target criteria of 99.5 VaR over 1-year time horizon. No evidence of

[42] See Table 11.2 in Section 11.3.3 in EIOPA, Consultation Paper on the 2020 review of Solvency II, EIOPA-BoS-19/465, 15 October 2019.

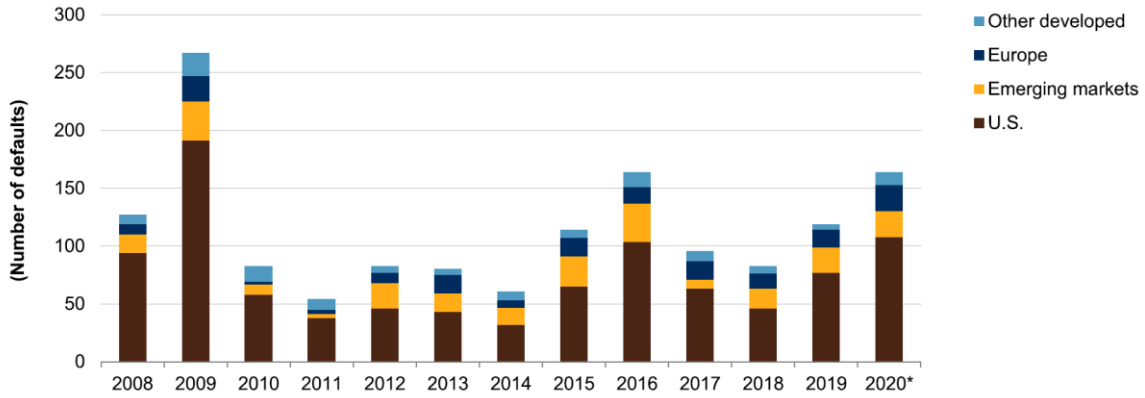
excessive calibration was found. Capital charges tend to increase as the credit quality of assets deteriorate, but this is a reflection of their increased level of risk. No evidence was found pointing to the existence of cliff edge effects or pro-cyclical incentives. Furthermore, it should be highlighted that the Solvency II framework already includes a range of tools and mechanisms aimed at mitigating potential pro-cyclical effects arising from a risk- and market-based solvency regime.

Market information on downgrades and defaults

As a results of the large impact of the COVID-19 crisis in the economic activity of the main economies around the World, evidence collected at the initial stages of the crisis indicated a material impact of the deterioration of the economic conditions in bond downgrades and defaults. Given the risk-based nature of Solvency II, this triggered concerns that a mass downgrade scenario could lead to sector-wide negative impacts on the solvency positions of undertakings.

Based on S&P data, the number of defaults has increased significantly in 2020 compared to previous years, to a level which already matches the total defaults observed in 2016. Full-year figures are likely to be close to 2009 levels. It should however the noted that defaults continue to be concentrated in the US. Analysts expect that global defaults will continue to increase, especially concerning speculative grade corporate bonds.

2020 Global Defaults Are Level With The Year-End 2016 Tally



*Data as of Sept. 2, 2020. Other developed region is Australia, Canada, Japan, and New Zealand. Sources: S&P Global Ratings Research and S&P Global Market Intelligence's CreditPro®.

Concerning downgrades at global level, information from rating agencies indicates that an increase in the number of downgrades took place in the first months after the start of the crisis, however the number of downgrades seems to have largely reduced in more recent months.

When analysing information on transition matrices, a similar pattern is observed. The likelihood of a given bond to be downgraded was lower in July when compared with the assessment performed in March.

CONCLUSION

Based on the evidence collected so far, it seems that at this point we are not in presence of a mass downgrade/default scenario. Although a significant increase

in the number of bond downgrades and, to a lesser extent, the number of defaults could be observed in the early months following the start of the pandemic crisis, those figures have receded to much more moderate numbers in recent months.

Analysis of HIA and CIR data

EIOPA has assessed whether the information gathered in the information requests provide some indication of potential cliff-edge effects due to corporate bond downgrades in the spread or concentration risk sub-module of the standard formula. Information in the QRT was not considered sufficiently granular to allow for such an assessment. In the HIA and in the CIR participants provided information on the size of the spread risk for bonds and loans as well as for concentration risk.

EIOPA compared the size of the spread risk for bonds and loans as well as for concentration risk for YE 2019 and Q2 2020 for those undertakings providing information in both requests.

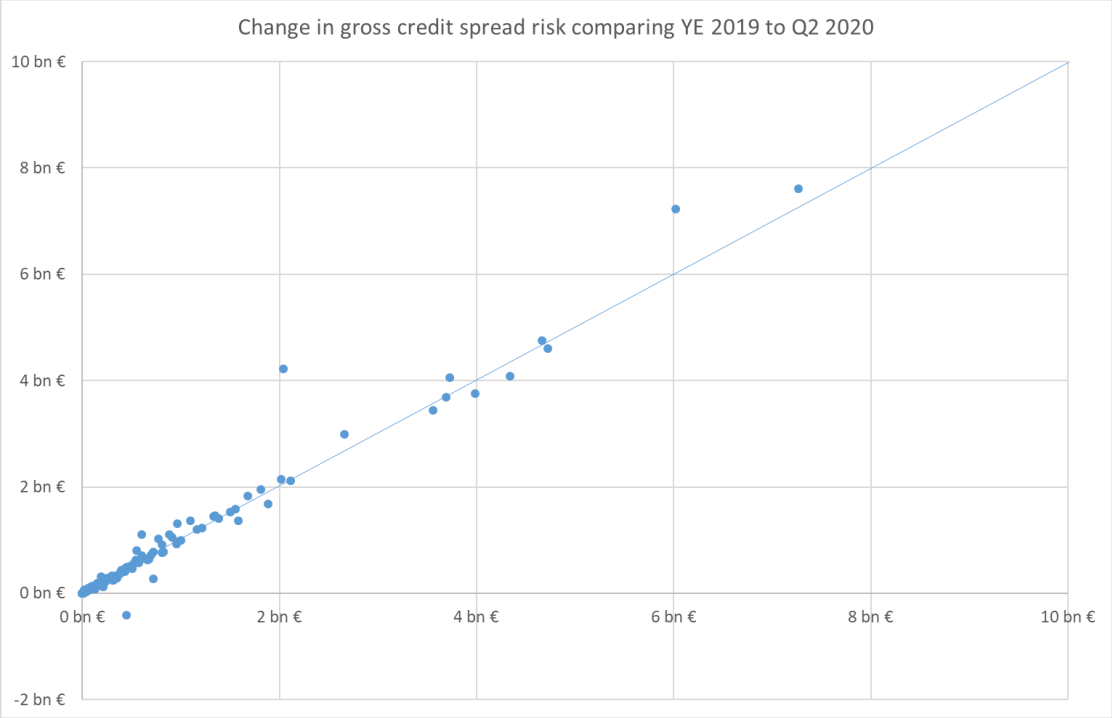
It should be noted, however, that the differences observed cannot be directly assigned to movements in credit quality of the assets or even corporate bond downgrades but may be a result of different sources, such as:

- reduction of interest rate level in the first half of 2020 has led to an increase in market value of the bonds leading to an increase in spread risk;
- reduction of interest rate level led to a reduction in FDB leading to an increase in net risks (due to lower Loss-absorbing capacity of TPs);
- increase in spread levels reducing the market value of bonds leading to a decrease in spread risk;
- changes in asset allocation can also have an impact in positive or negative terms on the size of market risks.

Thus, no direct conclusions can be drawn from the simple comparison of results.

The numbers show that the net spread risk and net concentration risk increased from YE 2019 to Q2 2020 by 28% and 7% for the undertakings participating in both information requests. This increase seems mainly driven by the reduced impact of the loss absorbing capacity of technical provisions as this evolution of the gross figures is rather different.

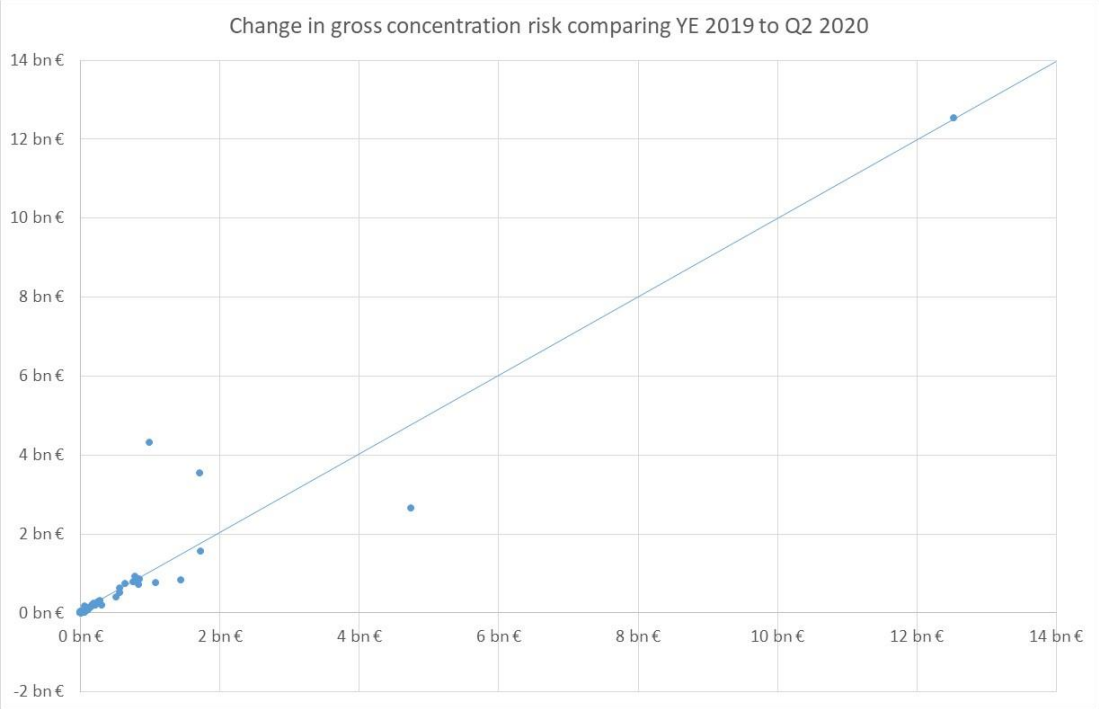
The following graph compares the size of the gross credit spread risk for bonds and loans for YE 2019 and Q2 2020:



For the vast majority of undertakings the risk has hardly changed in Q2 2020 compared to YE 2019. On average, an increase in gross spread risk of only 1% can be observed. Despite this, a number of undertakings have reported a comparably high increase.

For those, EIOPA has investigated further and liaised with NSAs. NSAs provided further information on some of these cases and identified reinvestments (e.g. from government bonds to corporate bonds) as a major trigger for the observed increase.

The following graph focusses on the market concentration risk and compares results for YE 2019 and Q2 2020:



As can be seen, similar to the credit spread risk, the gross concentration risk is comparable or decreases in the majority of cases. On average though, an increase by 6% can be observed which is driven by a small number of undertakings.

Similar to spread risk, EIOPA has investigated further and liaised with NSAs. NSAs provided further information on some of these cases and identified increase in specific exposures as a major trigger for the observed increase.

Conclusion

Based on the information provided in the HIA and CIR, no specific evidence on the existence of cliff-edge effects in spread or concentration risk due to the downgrade of specific bonds can be identified.

The increase of net spread risk is a consequence of the impact of the low interest rate environment on the loss absorbing capacity of technical provisions.

The gross figures do not provide indication of the market being exposed to cliff-edge effects which could potentially lead to pro-cyclical behaviour.

Although for individual undertakings a high increase in spread or concentration risk could be observed in Q2 2020, EIOPA did not find evidence that this was due to downgrading of bonds but rather the result of undertaking's changes in investments.

Investment behaviour of insurance undertakings

EIOPA performed an analysis of the actual rating downgrades and trading activity on corporate bonds by EU insurers, with the aim to assess whether such trading

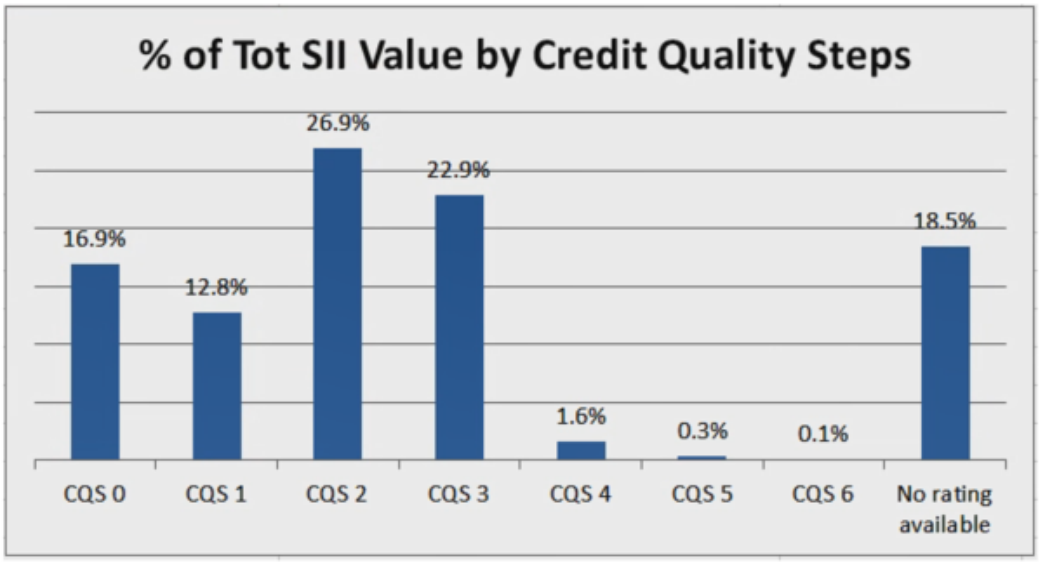
is largely driven by bond downgrades and identify potential pro-cyclical behaviour that could threaten financial stability.

The analysis was based on QRT information for a long historical period including Q1 and Q2 2020. To enable a comparison across quarters, the sample had to be reduced to include only those undertakings which are continuously present throughout the analysis period.

The EU insurance industry invests in EUR 11,357 bn of assets. The largest investment categories are government and corporate bonds with respectively EUR 2,545 bn and EUR 2.325 bn corresponding to shares of 22% and 20% of total investments; these figures refer only to direct investments, i.e. holdings though funds are not considered.

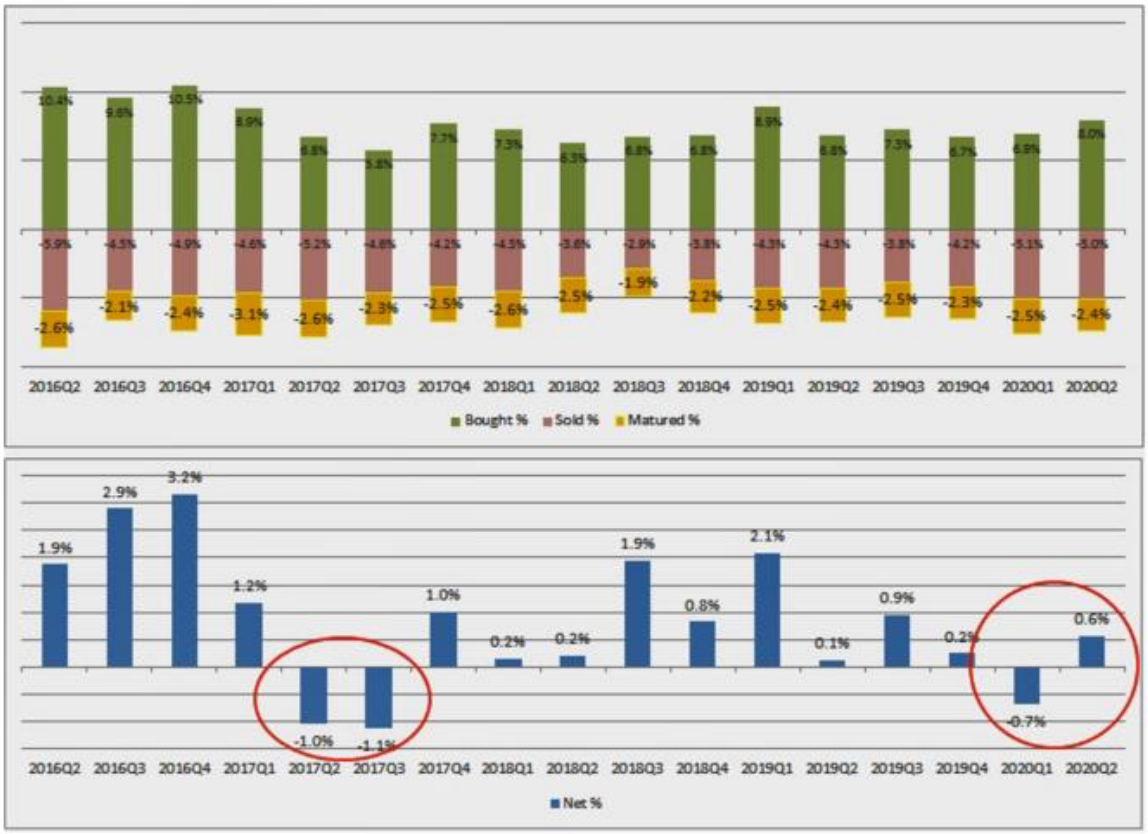
When looking at the sectoral distribution of EU insurers' corporate bond holdings (considering the percentage of SII value to total by sector (NACE code)) at Q4 2019, there is a significant focus in Financial and insurance activities, which concentrate 56.5% of the total, followed by the Manufacturing sector with only 11.8%. Geographically, most exposures are concentrated in the EU (excl. UK) with 64.7%, followed by the UD (13.9%) and the US (13.2%).

The breakdown by credit quality step (CQS) can be observed in the following chart.



Source: EIOPA Central Repository, Prudential solo reporting Q4-2019.

When assessing the behaviour of EU insurers over the time horizon Q2 2016 to Q2 2020, the following pattern can be observed.



Source: EIOPA, Prudential solo reporting. The sample covered goes from Q1-2016 to Q2-2020.

From this analysis, it can be concluded that insurers are usually net buyers of corporate bonds. Only in 3 quarters such situation was not observed, including in Q1 2020. However, that situation was inverted and in Q2 2020 insurers were again net buyers of corporate bonds, despite the persistence of an above-average selling pressure. In Q1 2020, the largest amount of bonds sold had a AAA rating, whereas in Q2 2020 the largest amount corresponded to BBB bonds. Insurers seem to buy mostly newly issued bonds (still without CQS information assigned).

When looking at downgrades of unique assets in the EIOPA database, it can be observed that the number and amount of downgrades increased in Q1 and Q2 2020, representing 2.9% and 2.6% of total unique bonds held, respectively. These figures compare to about 1% of bond downgrades in 2019. The number of upgrades, on the other hand, has been significantly reduced.

	Q1-2019 to Q4-2019		Q1-2020		Q2-2020	
Notch var.	Count of unique assets	% of Count	Count of Unique Assets	% of Count	Count of Unique Assets	% of Count
5	1	0.00%	-	0.00%	-	0.0%
4	1	0.00%	2	0.00%	-	0.0%
3	37	0.06%	3	0.01%	2	0.0%
2	113	0.18%	67	0.13%	10	0.0%
1	851	1.40%	653	1.22%	382	0.7%
0	59,360	97.32%	51,068	95.70%	53,067	96.6%
-1	597	0.98%	1,343	2.52%	1,366	2.5%
-2	26	0.04%	153	0.29%	68	0.1%
-3	8	0.01%	73	0.14%	14	0.0%
-4	2	0.00%	1	0.00%	-	0.0%
-5	0	0.00%	2	0.00%	-	0.0%
Tot upgrades (+)	1002	1.6%	725	1.4%	394	0.7%
Tot downgrades (-)	633	1.0%	1572	2.9%	1448	2.6%

	Q1-2019 to Q4-2019		Q1-2020		Q2-2020	
Notch var.	Sum of SII amount (EUR)	% of SII Amount	Sum of SII amount (EUR)	% of SII Amount	Sum of SII amount (EUR)	% of SII Amount
5	11,385,897	0.00%	-	0.00%	-	0.00%
4	3,671,247	0.00%	26,169,054	0.00%	-	0.00%
3	203,154,936	0.01%	25,774,496	0.00%	35,092,169	0.00%
2	831,492,326	0.04%	1,398,298,151	0.07%	601,272,919	0.03%
1	17,694,188,482	0.95%	23,490,505,941	1.26%	15,412,924,611	0.80%
0	1,828,498,993,256	98.43%	1,816,660,398,367	97.25%	1,877,583,286,755	97.51%
-1	10,082,052,790	0.54%	25,659,643,205	1.37%	30,876,129,960	1.60%
-2	150,346,345	0.01%	646,020,596	0.03%	805,116,388	0.04%
-3	72,549,434	0.00%	71,300,739	0.00%	195,471,835	0.01%
-4	10,688,391	0.00%	58,278	0.00%	-	0.00%
-5	11,695,167	0.00%	2,602,748	0.00%	-	0.00%
Tot upgrades (+)	18,743,892,887	1.0%	24,940,747,642	1.3%	16,049,289,699	0.8%
Tot downgrades (-)	10,327,332,128	0.6%	26,379,625,567	1.4%	31,876,718,184	1.7%

Source: EIOPA Central Repository, Prudential solo reporting. The sample covered goes from Q1-2016 to Q4-2019, Q1-2020 and Q2-2020. Where more insurers report the same bond the mode of the reporting CQS is taken in each period. For Fitch Ratings, Moody's Investor Service and S&P Global Ratings the mapping is the following: CQS 0 (AAA), CQS 1 (AA), CQS 2 (A), CQS 3 (BBB), CQS 4 (BB), CQS 5 (B) and CQS 6 (CCC).

When focusing at the trading activity of downgraded bonds, it can be observed that insurers tend to sell both upgraded and downgraded bonds, although the underlying motivations for the two behaviours are likely to be very distinct. However, when measuring the percentage of SII value compared to the position at the beginning of the quarter which was net bought/sold, it can be observed that, despite the increase in the number and value of downgraded bonds, the proportion of those which were actually sold decreased in Q1 and Q2 2020.

	Q1 to Q4-2019		
	Bought %	Sold %	Net %
Bonds upgraded by 1 notch	3.4%	-4.3%	-1.0%
Bonds with stable CQS	3.3%	-3.2%	0.1%
Bonds downgraded by 1 notch	4.7%	-9.1%	-4.4%
All upgrades	3.4%	-4.6%	-1.3%
All downgrades	4.9%	-9.0%	-4.1%

	Q1-2020		
	Bought %	Sold %	Net %
Bonds upgraded by 1 notch	2.6%	-4.3%	-1.7%
Bonds with stable CQS	3.6%	-4.2%	-0.7%
Bonds downgraded by 1 notch	4.6%	-8.4%	-3.9%
All upgrades	2.5%	-4.1%	-1.6%
All downgrades	5.1%	-8.4%	-3.2%

	Q2-2020		
	Bought %	Sold %	Net %
Bonds upgraded by 1 notch	7.7%	-2.9%	4.8%
Bonds with stable CQS	3.4%	-4.4%	-1.0%
Bonds downgraded by 1 notch	3.9%	-5.9%	-2.0%
All upgrades	9.8%	-2.9%	6.9%
All downgrades	4.0%	-5.8%	-1.8%

Source: EIOPA Central Repository, Prudential solo reporting. The sample covered goes from Q1-2016 to Q4-2019, Q1-2020 and Q2-2020[10]. Maturing bonds is 2.5% and very stable across quarters; therefore this figure can be ignored for the purpose of comparing trading activity, however to have a view on the total net activity it has to be factored in the calculation.

Looking into the data at a more granular level, the trading behaviour of insurers by CQS was also assessed.

It was observed that, among the downgraded bonds, insurers tend to sell a higher proportion of those that were rated BBB at the start of the period, with a net sale of about 6%.

However, the total amounts are still relatively small when looking at the total portfolio of bonds held. In Q2 2020, about 384 mln EUR of bonds were sold, from the total value 6,244 mln EUR BBB bonds which were downgraded. In total, net sales represented less than 0.6 EUR bn among all downgraded bonds from all CQS in Q2 2020 (about 30 EUR bn), this within a total universe of over 2,300 EUR bn corporate bonds held.

Conclusion

The analysis of the trading behaviour of European insurers evidences a continued net buying position with regard to corporate bonds. This trend was interrupted in Q1 2020 but reinstated in Q2.

Insurers tend to sell both downgraded and upgraded bonds. This trend intensified during the crisis, but it was already present in previous years. As mentioned in previous sections, the sale of downgraded bonds may be triggered by capital requirements, reflecting a de-risking behaviour by insurers, but it may also be due

to other reasons, such as investment mandates linked to specific products. Sale of upgraded bonds is most likely driven by the intention to realise capital gains.

The magnitude of the observed selling movement remains largely contained within the portfolio of corporate bonds held by EU insurers, without evidence that indicates substantial pro-cyclical effects triggered by the crisis. The effects seem to be manageable for the moment, especially if insurers invest in a well-diversified portfolio.

Insights from other work

Summary ESRB downgrade analysis

Against the background of the COVID-19 crisis, the ESRB conducted a scenario analysis, quantifying the pro-cyclical impact that a mass downgrade of corporate bonds may have on the financial system. The analysis discerns three stages:

(i) direct impact of higher credit spreads and downgrades on losses of financial institutions;

(ii) the amount of forced sales resulting from corporate bonds becoming 'fallen angels', i.e. being downgraded from investment grade to speculative grade;

(iii) the price impact of these forced sales and the resulting additional losses incurred by the financial system.

The analysis shows that system-wide initial losses ranged from EUR 145.9bn to EUR 212.7bn, depending on the scenario. Subsequent losses, due to forced sales, could range from EUR 1.7bn to EUR 84.6bn, depending on behavioural and price-impact assumptions.

The corresponding initial losses of the European insurance sector, which holds around one-third of the EUR 3,000bn EU corporate bond market, would range from EUR 69.0bn to EUR 96.5bn. The additional losses, resulting from forced sales throughout the financial sector, would lie between EUR 0.5bn and EUR 9.9bn. The projected losses for the insurance sector in the different scenarios and under the various assumptions, consider direct holdings to corporate bonds by undertakings, but ignore indirect exposures through investment funds.

The ESRB analysis assumes that initial spread increases and downgrades occur simultaneously. In practice, downgrades by rating agencies will lag the reappraisal of (corporate) credit risk by financial markets. As such, downgrades can be seen as manifestations of an increase in credit risk exposure of corporate bonds. At the same time, credit ratings play a substantial role in prudential regulation in measuring the degree of risk of corporate bond portfolios. Moreover, credit ratings are used to limit risk in asset management mandates and investment funds, e.g. investment grade corporate bond funds.

Annex 14 – Correlations

Estimation of the correlation between spread risk and interest rate risk

The recent 2020 data particularly from March and April 2020 might give rise to a high correlation between interest rate and spread risk. Taking the simple correlation between the approximated annual spread and interest rate changes[43] in March and April (86 data points) leads to a correlation estimate of approximately 0.7 (Pearsson correlation). The tail correlation in the last year (30/04/2019-30/04/2020) in the joint (80,20) percentile [44] yields a correlation estimate of 0.75. However, only 4 paired observations from the last year are in this higher percentile.

Taking the entire data from 2020 into account the correlation between the approximated annual spread and interest rate changes leads however to a moderate correlation of 0.33 (data from January until August 2020) and 0.15 (data from March until August 2020). The new data from May until August 2020 showing a significant decrease in credit spreads, has in particular lead to significant decrease in the correlation.

The 173 data points in 2020 have little impact on the overall tail correlation analysis with 4539 data points (see the balanced package paper, the time series starts at 2002). There is only a slight change of the estimated parameters in the methodologies. Hence, the derived result of a moderate correlation between spread and interest rate risk remains.

The main reason for this result is that the recent data adds too few data points to the joint lower right tail (the relevant tail for the correlation between the standard formula spread and interest rate risk). It is true that one has observed strong spread widening with decreasing interest rate movements in March and April 2020. However, most of these movements do not represent a joint tail event. As can be seen in figure 1, only 1 additional data point in the joint (80,20) percentile comes from the 2020 data and there is no additional data point in the joint (85,15) percentile. Specifically most of the paired observations are far from the joint (80,20) percentile. While extremely high annual spread changes have been observed in 2020 (see figure 2), very high annual interest rate decreases of the 10 year risk-free rate (that served as a proxy for the interest rate risk) have not been observed in 2020 (see figure 3), but rather in 2019. One can further observe from figure 2 and figure 3, that the annual interest rate changes have reduced when the very excessive spread widening took place. All these observations confirm the finding in the preceding analysis that the strongest interest rate decreases do not occur at the same point in time as the strongest spread increases.

[43] The approximated annual spread risk change and the corresponding annual interest rate change are calculated as the absolute annual change times the modified duration of 10 years.

[44] That is the 80% empirical quantile of the approximated annual spread changes and the 20% empirical quantile of the approximated annual interest rate changes.

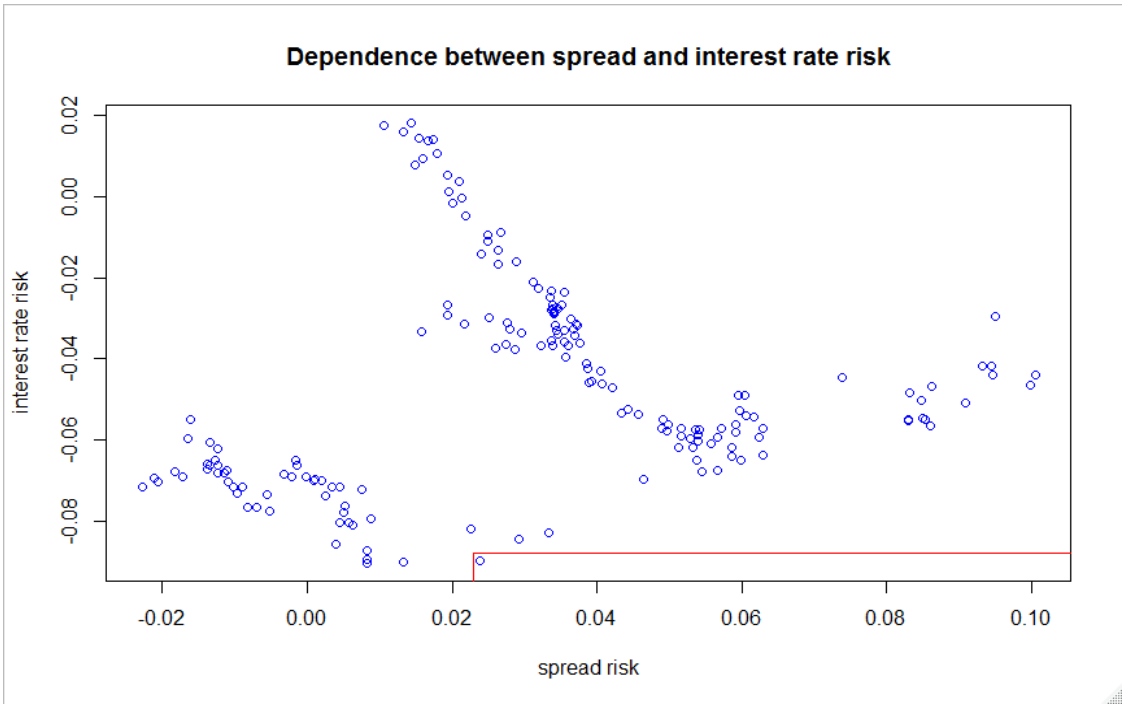


Figure 1: Paired observations of the approximated annual spread and interest rate changes in 2020. The lower right rectangle represents the join (80,20) percentile. Note that the joint (80,20) percentile is derived from the entire time series.

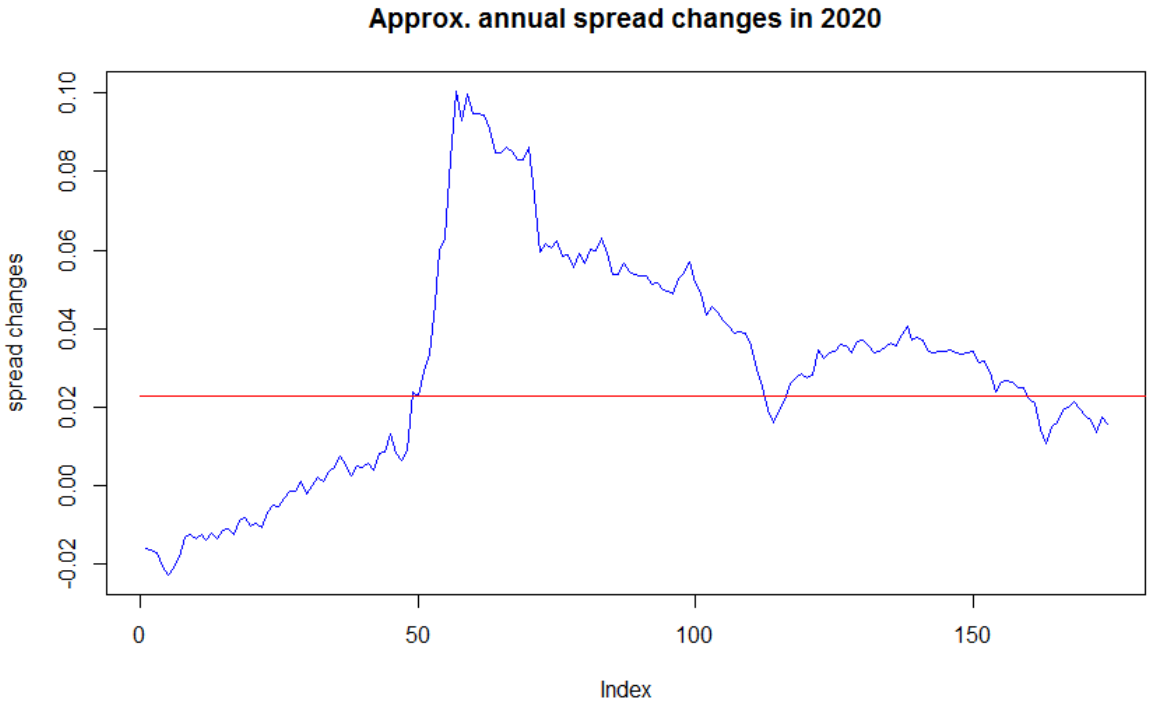


Figure 2: Approximated annual spread changes in 2020. The red line shows the empirical 80th percentile.

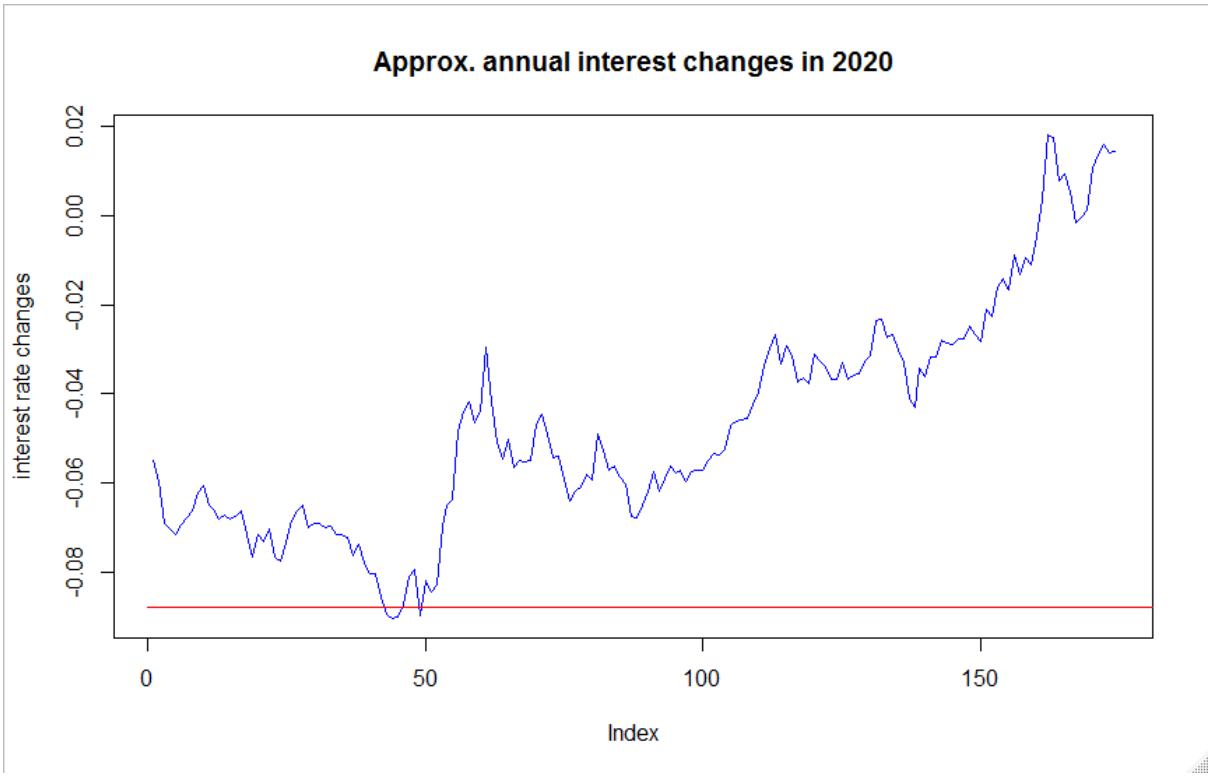


Figure 3: Approximated annual interest rate changes in 2020. The red line shows the empirical 20th percentile.

Data source for the figures: Refinitiv

Annex 15 – Lapse rates

Analysis of lapse rates during financial crisis

(p. 32-34 of the Report on insurers' asset and liability management in relation to the illiquidity of their liabilities)

Of the 12 Member States that provided responses to this questionnaire, France, Portugal, the UK, Germany, Iceland, Slovenia, Italy, the Netherlands and Liechtenstein provided data on this particular question. The other three Member States that responded clearly had no impact at this level. One of the Member States that did provide data provided historical information on surrender rates for the life insurance industry (therefore reflecting all types of life insurance business, such as savings, annuity and protection): for this country, the data outline the stability of surrender rates for the last two decades: a slightly decreasing trend is visible.

In the other countries that responded to the questionnaire, the impact was more or less material. Among the six countries in which lapse rates changed during this timeframe, in some cases we cannot conclude with 100% certainty that the results are related to the financial crisis, owing to the lack of explanations or justifications provided by the relevant NSAs; however, that relationship is likely. A brief analysis per Member State seems useful for understanding these behaviours better.

In one country, there was a significant increase in lapse rates in life businesses during the financial crisis. The cause of this might be the effect of the crisis on the banking sector (e.g. the channelling of household savings from insurance and other products to bank deposits).

In another country there was just a small decrease of the number of life contracts in 2009 and it noted that almost all of the terminations observed in the period under analysis were the result of the failure of policyholders to pay premiums on the renewal of contracts.

In another country, there was a significant increase in lapse rates in 2008 and 2009 and lapse rates remained at relatively high levels from 2010 to 2012 compared with the period before 2008. However, this is discernible in relation only to technical provisions and not to the number of policies (the policies lapsed are the policies with higher technical provisions).

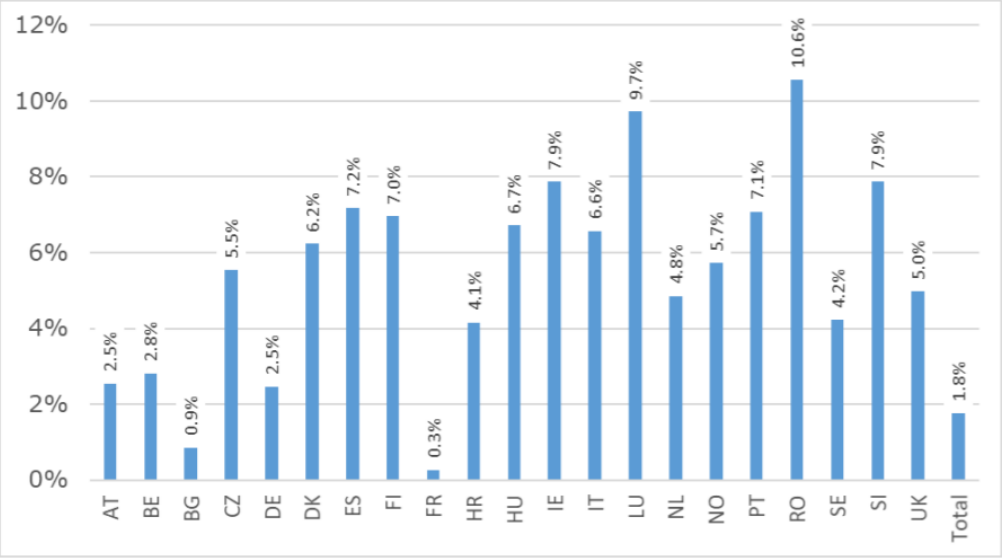
One country also concluded that the financial crisis in 2008 led to an increase in surrender rates. This was true for life businesses, whether they were linked to investment funds or not. In the former case, the lapse rate (calculated based on number of policies) went from around 5% in 2008 to more than 10% in 2009 and, in the latter case, it went from around 5% in 2007, increasing to roughly 7.5% in 2008, to more than 10% in 2009.

Finally, one country reported that lapse rates in 2007 were 9%, whereas in 2008 they were 13%, in 2009 they were 12% and in 2011 they were 8%.

Analysis of lapse rates for the last 5 years per country

(p. 31 of the Report on insurers' asset and liability management in relation to the illiquidity of their liabilities)

Figure 3: Average annual surrender/cancellations rates for the last 5 years per country



At the European level, the historical lapse rate from the studied sample is 1.8%. The level lapse rate varies significantly from one country to the other: while it is close to zero (0.3%) in France, it is 10.6% in Romania. This discrepancy in the experienced lapse rates could be explained by several factors: the differences in the European insurance markets, contractual obligations or disincentives to cancellation (such as tax disincentives).

Quality of lapse data from the complementary information request

No data were reported for the two lines of business (LoBs) 'Annuities stemming from non-life insurance contracts and relating to health insurance obligations' and 'Annuities stemming from non-life insurance contracts and relating to insurance obligations other than health insurance obligations'.

The table below shows by LoB of interest the number of undertakings that reported lapse rates[45] (including when these are equal to 0%), volume measure (default – surrender strain – or fallback option – sum insured) and the combination of both lapse rates and volume measure:

	LoBs of interest				
	Health	Insurance with profit participation	Index-linked and unit-linked insurance	Other life insurance	Total
(1) Lapse rate	50	123	111	67	89

[45] And not necessarily over the total requested time span.

(2) Surrender strain	9	27	22	15	20
(3) Sum insured	21	47	41	27	37
(4) Lapse rate & surrender strain	9	27	21	14	19
(5) Lapse rate & sum insured	20	46	40	26	36
Lapse rate & one volume measure (either default or fallback option)	29	73	61	40	55

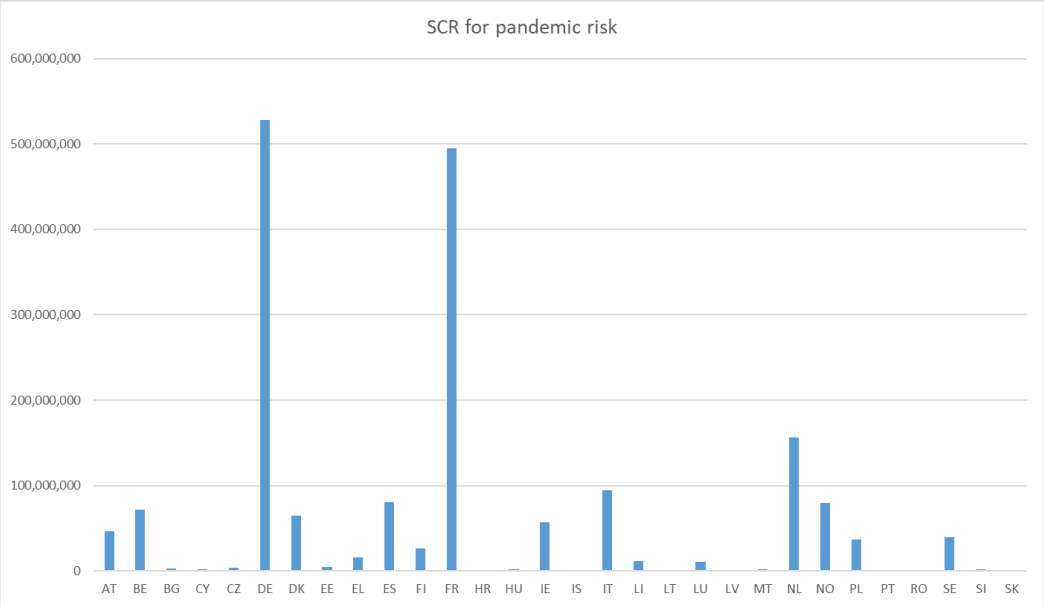
Aggregating lapse rates from various undertakings requires weighting each of individual undertaking's lapse rate with a volume measure. However, for the sake of comparability between undertakings, only one type of volume measure should be chosen for this aggregation, i.e. surrender strain or sum insured (that's why the last row of the previous table was greyed out). It is therefore obvious that the low number of undertakings within each LoB (in rows # 4 and #5) makes it impossible to derive reliable and representative aggregated figures at EEA level. Moreover, the type of penalty (tax, surrender penalty and other) subsequently divides each LoB into 3 different parts.

Annex 16 – Health insurance pandemic risk

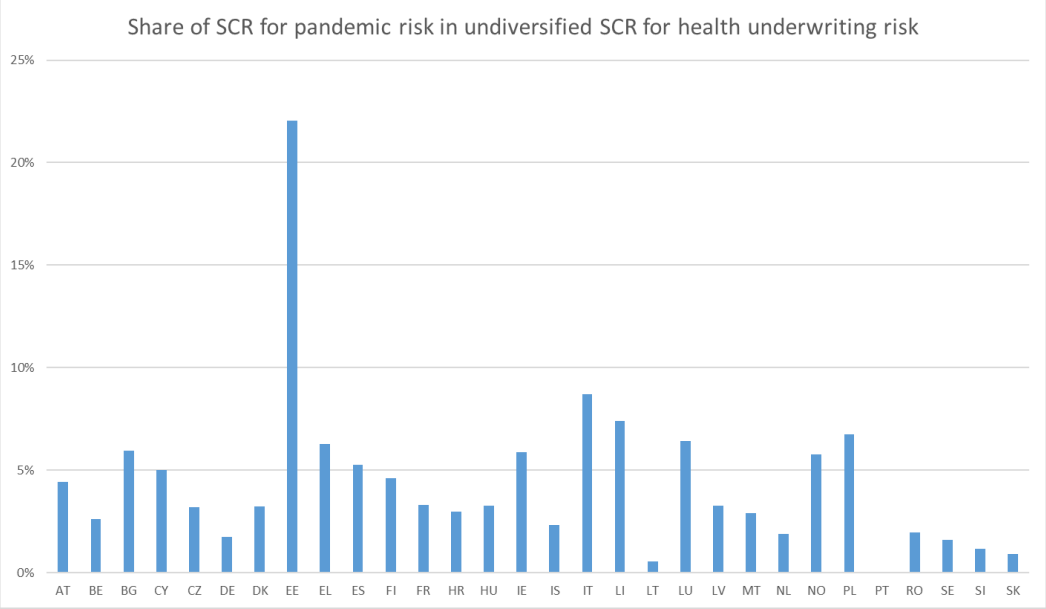
Capital requirement on pandemic risks

The following figures relate to the SCR for end-2018 of insurance undertaking that apply the standard formula.

Across the EEA the SCR for pandemic risk amounts to EUR 1.84 bn. The following diagram provides a decomposition of the amount by country of the undertaking.



On average the SCR for pandemic risk contributes only to 2% of the health underwriting risk before diversification. The following diagram provides the corresponding share for each country.



Results of the complementary information request

	Medical expense insurance (LoB #1)			Income protection insurance (LoB #2)	Total both LoBs
	Hospitalisation	Consultation with a medical practitioner (including tests on Corona virus infections of ambulant patients)	Other expenses		
1. Number of insured for which claims caused by the Covid-19 pandemic were incurred (both reported and not reported)	6 596	8 471	3 344	3 234	21 645
2. Claims paid and claims reserve (of claims incurred both reported and not reported) caused by the Covid-19 pandemic in EUR	12 686 465	1 523 322	107 928	44 941 335	59 259 051
3. Pandemic risk sub-module SCR (gross of reinsurance and LAC TPs and DTs) in EUR	326 656 261	153 813 597	15 172 041	185 630 124	681 272 024
4. Ratio of 2 and 3	4%	1%	1%	24%	9%