

## Chapter 1.

# IMPACT OF RISING INTEREST RATES ON INSURANCE COMPANIES

In an era of rapidly evolving technology, intensifying climate change and rising geopolitical tensions, insurance companies face a myriad of challenges. Disruptive technologies, cybersecurity threats, diverse and changing regulations, increasing frequency and severity of natural disasters, hardened reinsurance conditions and economic instability are demanding the transformation of the insurance industry. One of the latest forces reshaping the industry's landscape is the rise in global interest rates after a prolonged period of exceptionally low rates.

In efforts to tackle record-high inflation in the post-pandemic period, major central banks have escalated interest rates faster and on the largest scale than at any time in recent history. The surge in interest rates experienced in 2022 stands out as a historic milestone. In certain aspects, the shifts in rates are even more drastic than those encountered during the global financial crisis of 2007/08. The new interest rate environment creates much uncertainty, prompting insurers to refocus on managing interest rate risk.

This chapter deals with the impact of rising interest rates on insurance companies' solvency and profitability. A rising interest rate environment is having contradicting effects on insurers. On the one hand, these companies are benefiting from greater investment yields from new investments. In addition, the increase in interest rates implies a decrease in the present value of insurers' future liabilities. At first glance, rising interest rates appear to contribute to stabilising insurers' balance sheets and strengthening their capital position. However, in the market value-based prudential regime, such as Solvency II, changes in interest rates affect both sides of insurers' balance sheets. Thus, the value of existing fixed-income securities in insurers' portfolios declines when market rates rise. Furthermore, life insurers are facing increased surrender risk as in-force contracts may be perceived as less attractive compared to new investment and savings products offering higher rates. In order to meet requests for early termination of contracts, insurers may be compelled to sell off portions of their assets, resulting in capital losses that could undermine their profitability and jeopardise solvency.

The impact of changes in interest rates on insurance companies is a subject of continuous interest among insurance theorists and practitioners. However, previous research has been predominantly devoted to the implications of low interest rates for insurers,<sup>1</sup> while the impact of rising interest rates has been less discussed. The chapter aims to overcome this gap in the literature by providing a comprehensive overview of the numerous challenges and opportunities facing insurance companies in a rising interest rate environment.

## **1. INSIGHTS INTO THE SHIFT: THE NEW INTEREST RATE ENVIRONMENT**

After the 2007/08 global financial crisis (GFC), there has been a consistent downward trend in interest rates, prompting financial institutions to refocus their strategies to adapt to the low-interest-rate environment. However, from 2022 onwards, this trend had a notable shift. The high post-pandemic inflation has compelled central banks across the globe to enact the most intense monetary policy tightening since the 1980s. A new high-interest-rate environment has been established, profoundly impacting insurers' balance sheets and risk profiles.

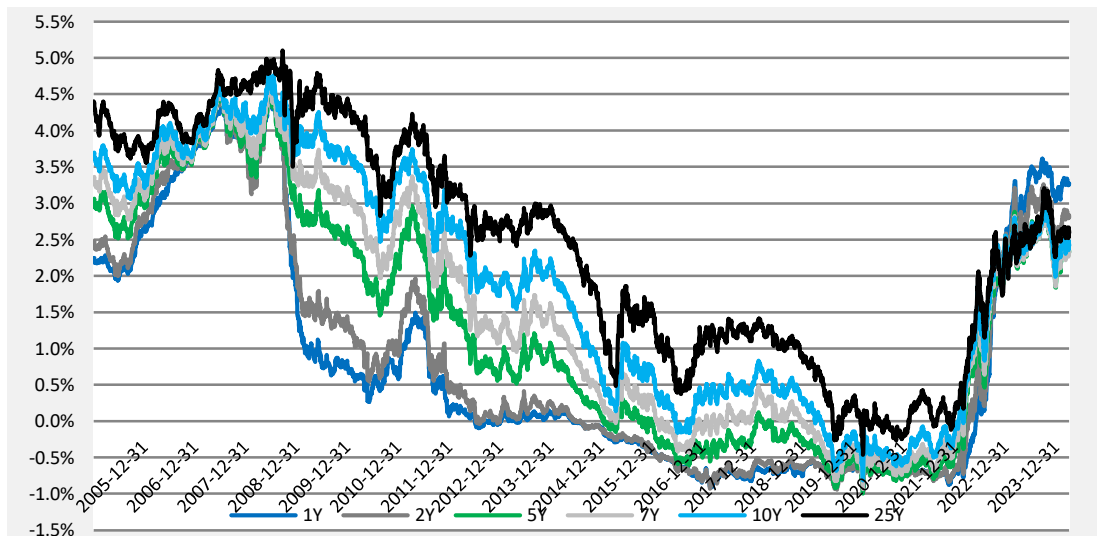
Figure 1 shows the spot rates of Euro area government bonds with different maturities. Notably, from the start of 2022, there has been a marked uptick in rates, resembling the levels observed in the years preceding the GFC. However, it is worth mentioning that the rate hikes over the past two years have occurred considerably faster. Just like during the GFC, there was a flattening of the curve. However, this time, it progressed into a notable curve inversion. The current increased volatility, akin to that seen in the aftermath of the GFC in 2009, is primarily driven by rate increases rather than decreases.<sup>2</sup>

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<sup>1</sup> See, for example, Holsboer, J. H. (2000). The Impact of Low Interest Rates on Insurers. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 25(1), pp. 38-58; Siglienti, S. (2000). Consequences of the reduction of interest rates on insurance. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 25, pp. 63-77; Antolin, P., Schich, S., & Yermo, J. (2011). The economic impact of protracted low interest rates on pension funds and insurance companies. *OECD Journal: Financial Market Trends*, 2011(1), pp. 237-256; Berdin, E., & Gründl, H. (2015). The effects of a low interest rate environment on life insurers. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 40, pp. 385-415.

<sup>2</sup> Ruissaard, M., Broens, J., Zandbergen, F., van Beers, R., & Donckers, S. (2023). The new interest rate environment: Back to normal? – Part 1. *Briefing note*, January 27, 2023, Milliman (Retrieved April 8, 2024 from <https://www.milliman.com/en/insight/new-interest-rate-environment-back-to-normal>)

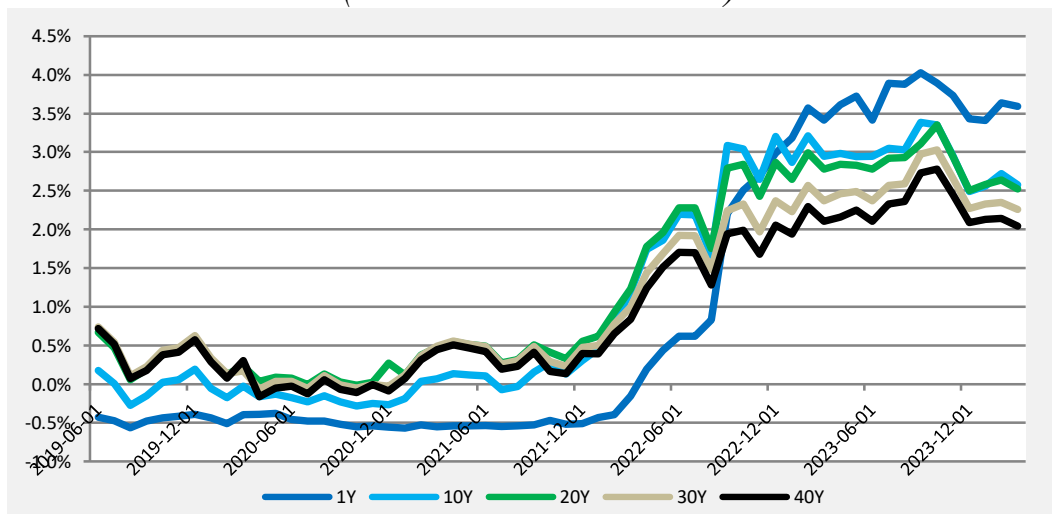
Figure 1. AAA-rated Euro area government bonds yield curves – spot rates



Source: European Central Bank (<https://data.ecb.europa.eu>)

The development of six-month (6M) European swap rates for various maturities over the last five years is shown in Figure 2. The tightening of monetary policy by the European Central Bank led the swap rates to rise since late 2021.<sup>3</sup> Thus, the 6M Euribor swap rate for a one-year maturity became positive in April 2022, reaching 3% by early 2023. It surpassed the swap rates for longer maturities, thus exemplifying the inversion moment.

Figure 2. 6M Euribor Swap Rates Across Varied Maturities (June 2019 – March 2024)

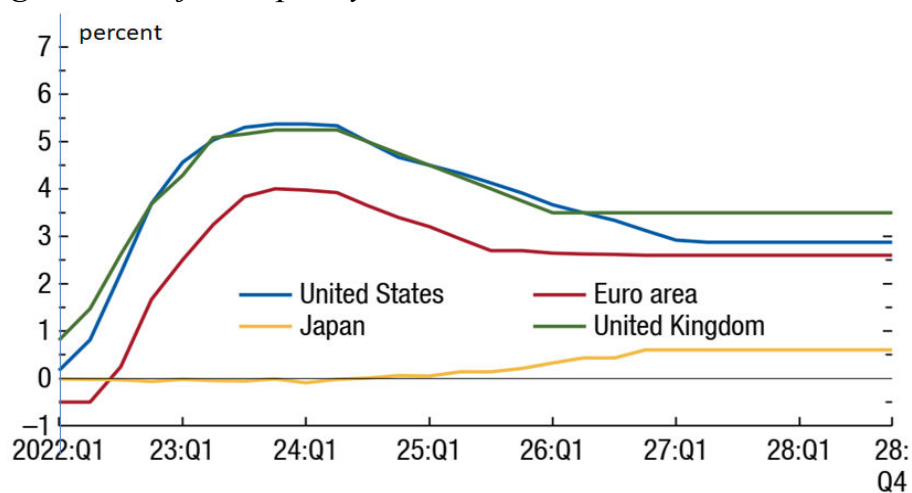


Source: Refinitiv (<https://emea1-apps.platform.refinitiv.com>)

<sup>3</sup> Babbi, F., Frieden, I., & Scheicher, M. (2023). The euro interest rate swap market: Recent trends in trading activity and liquidity. *SUERF Policy Brief*, No. 552. (Retrieved April 10, 2024 from <https://www.suerf.org/publications/suerf-policy-notes-and-briefs>)

The important question nowadays is how long the interest rates will stay high. Once the inflation is brought back under control, advanced economies' central banks are likely to ease monetary policy. That will lead to the stabilisation of real interest rates at a lower level. Predicting the exact level is challenging, as it depends on multiple factors, including future government debt levels, the energy transition, and globalisation.<sup>4</sup>

Figure 3. Projected policy rates in selected advanced economies



Source: International Monetary Fund (2024, April). *World Economic Outlook - Steady but Slow: Resilience amid Divergence*. Washington, DC: IMF, p. 8.

There are indications that rates are close to peaking.<sup>5</sup> According to the latest projections of the International Monetary Fund, central banks' policy rates in major advanced economies will start to decline in the second half of 2024 (Figure 3). However, over the longer term, average interest rates are expected to remain higher compared to the period following the 2007/08 global financial crisis.<sup>6</sup> Thus, despite prospects for interest rate normalisation, a return to low interest rates in the post-pandemic world is unlikely. As the Harvard professor Kenneth Rogoff declared, “higher interest rates are here to stay”.<sup>7</sup>

<sup>4</sup> International Monetary Fund (2023, April). *World Economic Outlook: A Rocky Recovery*. Washington, DC: IMF

<sup>5</sup> <https://www.federalreserve.gov/monetarypolicy/2024-03-mpr-summary.htm> (accessed April 24, 2024)

<sup>6</sup> World Economic Forum (2024). Are interest rate cuts coming? Here’s what the IMF and other global leaders are saying at Davos 2024 (accessed April 21, 2024 from <https://www.weforum.org/agenda/2024/01/interest-rate-cuts-imf-global-leaders-davos>)

<sup>7</sup> Rogoff, K. (2023). Higher Interest Rates Are Here to Stay. *Project Syndicate*, (accessed April 24, 2024 from <https://www.project-syndicate.org/commentary/era-of-low-interest-rates-has-come-to-an-end-by-kenneth-rogo-off-2023-12>)

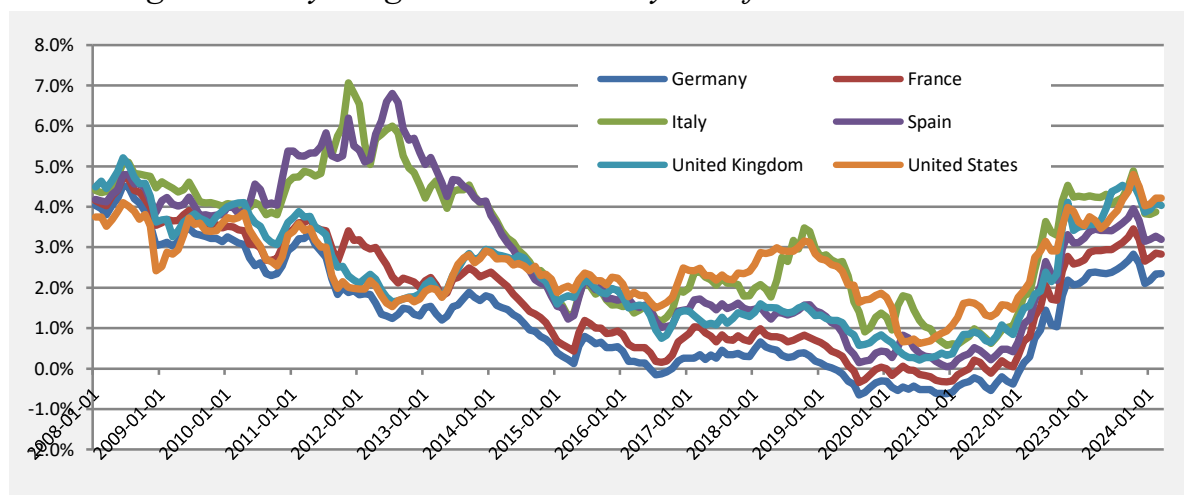
## 2. CHANNELS OF IMPACT: HOW RISING INTEREST RATES AFFECT INSURANCE COMPANIES

Rising interest rates affect insurance companies in various ways. A comprehensive analysis of the impact of increasing interest rates on insurers' solvency and profitability can facilitate the identification and better understanding of potential risks and opportunities in the new interest rate environment. The most important channels of impact include: greater investment returns, deterioration in fixed-income asset values, decrease in insurers' technical provisions, and higher surrender rates in life insurance.

### 2.1. Greater investment returns

The end of the low interest rate era opens up the possibility for significantly higher investment yields on invested underwriting cashflows and technical provisions. For example, the yield on the 10-year U.S. Treasury note rose to 4.21 per cent on March 1, 2024, from 3.66 per cent on March 1 of the previous year. By comparison, the yield on the same instrument on March 1, 2020, was only 0.87 per cent.<sup>8</sup> Yields on 10-year government bonds from other developed countries have shown a similar recovery since 2022 (Figure 4).

*Figure 4. 10-year government bond yields from selected countries*



Source: FRED (<https://fred.stlouisfed.org>)

After a prolonged period of decline, insurer investment portfolios are starting to accumulate gains from higher reinvestment yields. The return to pre-global financial crisis interest rates is generally considered beneficial for insurers as investment-related income is an important driver of their total earnings. For

<sup>8</sup> <https://fred.stlouisfed.org/series/IRLTLT01DEM156N> (accessed April 21, 2024)

instance, investment net income typically contributes about 30-70% of the earnings of European insurers.<sup>9</sup> Further increases in interest rates would mean an even greater contribution of investment results to insurers' overall results. If stronger investment yields bolster long-term profitability, insurers will be able to offer more competitive products. Consequently, they can attract greater demand and foster sustainable long-term capital growth for the industry through retained earnings. This ensures a long-term balance between the financial stability of the industry and the risks that evolve with economic development, rising natural catastrophe losses, technological disruptions, and social inflation, among other factors.<sup>10</sup>

Since life insurance contracts are typically long-term, life insurers usually plan to invest funds for a longer period, and, therefore, they are more interested in interest rate risk.<sup>11</sup> Another benefit of higher interest rates is the increasing interest rate margin in life insurance, as the spread between the net investment yield and the rate of return paid to policyholders. In the case of traditional life insurance products, accounting for 75.2% of European life insurance premiums,<sup>12</sup> investment risk is borne by the insurer. These products include guarantees, which may be fixed benefits or a guaranteed annual return (as is often the case in countries like Germany, Austria, Switzerland and Belgium). In the low interest rate environment, it was difficult for insurance companies to generate sufficiently high asset returns to meet guaranteed benefits or returns to policyholders under existing insurance contracts.<sup>13</sup> As a consequence, life insurers' interest rate margins have become negative or close to zero in most European Union (EU) member states.<sup>14</sup> Since 2014, the average guaranteed rate offered by European life insurers has been above the 10-year government bond

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<sup>9</sup> Swiss Re (2023). The old normal: interest rate rises signal relief for insurers' returns, but likely more volatility. *Economic insights*, 1/2023, Zürich: Swiss Re Institute, p. 1.

<sup>10</sup> Swiss Re (2023). Raising the bar: non-life insurance in a higher-risk, higher-return world. *Sigma*, 4/2023, Zürich: Swiss Re Institute, p. 27.

<sup>11</sup> Mitrašević, M., Kočović, J., & Stanojević, J. (2023). Resilience Of The Insurance Market In Crisis Conditions. *Challenges And Insurance Market's Responses To The Economic Crisis*, Kočović, J., Mladenović, Z., Boričić, B., Jovanović Gavrilović, B. (eds.), Belgrade: Faculty of Economics, University of Belgrade, p. 18.

<sup>12</sup> Insurance Europe (2019). *European Insurance – Key Facts*. Brussels: Insurance Europe, p. 19.

<sup>13</sup> Koprivica, M., & Balleer, M. (2020). Prospects of the insurance sector in a low interest rate environment. *Insurance Market After COVID-19*, Kočović, J., Rakonjac-Antić, T., Jovanović Gavrilović, B., Boričić, B. (eds.), Belgrade: Faculty of Economics, University of Belgrade, pp. 149.

<sup>14</sup> European Insurance and Occupational Pensions Authority (2019). *Financial Stability Report*, Frankfurt am Main: EIOPA, p. 26.

yield, meaning that investing solely in government bonds while meeting the minimum rate for policyholders would result in a loss.<sup>15</sup>

Conversely, by boosting net investment yields, the current rise in interest rates can support insurers' ability to provide guaranteed returns to their policyholders. Therefore, higher interest rates are expected to diminish reinvestment risk and make rate guarantees less expensive for life insurers.

## 2.2. Deterioration in fixed-income asset values

Higher interest rates may lead to realised and/or unrealised investment losses as a result of a decline in the market value of certain existing investments in insurer portfolios. Given that insurers primarily invest in government and corporate bonds as fixed-income instruments,<sup>16</sup> their investment portfolio loses value in times of rising interest rates. Insurers typically hold investments until maturity, which enables them to weather price fluctuations over a bond's lifespan. Thus, capital losses will predominantly be classified as unrealised and may not be realised until investments are sold, if sold at all. Nonetheless, if insurers are compelled to sell bonds, capital losses would be realised, resulting in a reduction of capital.

According to 2022 data, about 50% of total insurer investments in the European Economic Area (EEA) are related to bonds, with government and corporate bonds being roughly equally represented. Bond dominance is especially pronounced in countries like Hungary (88%), Estonia (86%), Lithuania (85%), and Slovakia (83%).<sup>17</sup> Research shows that euro-area insurers' assets materially decrease with an increase in market rates caused by monetary policy tightening.<sup>18</sup> In 2022, for example, the value of their investments dropped by EUR 1,097 bn, or 15.2%. The value of their bond portfolios declined by 21.9%, while the value of equities held by these insurers declined by 25.6%. This effect was particularly noticeable for life insurers who hold bonds with longer

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<sup>15</sup> International Association of Insurance Supervisors (2017). *Global Insurance Market Report 2016*. Basel: IAIS, p. 19.

<sup>16</sup> Kočović, J., Paunović, B., & Jovović, M. (2015). Possibilities of creating optimal investment portfolio of insurance companies in Serbia. *Ekonomika preduzeća*, 7-8, p. 388.

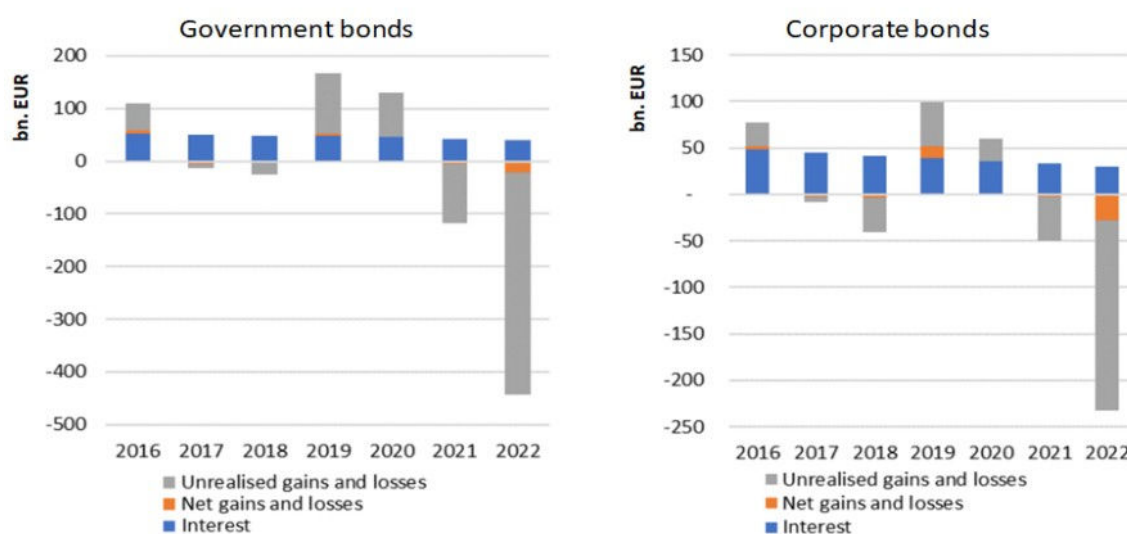
<sup>17</sup> [https://www.eiopa.europa.eu/tools-and-data/insurance-statistics\\_en](https://www.eiopa.europa.eu/tools-and-data/insurance-statistics_en) (accessed April 12, 2024)

<sup>18</sup> Kaufmann, C., Leyva, J., & Storz, M. (2022). Insurers' balance sheets amid rising interest rates: transmission and risk-taking. *Financial Stability Review*, Frankfurt am Main: European Central Bank

durations. During the first three quarters of 2022, government bonds held by life insurers depreciated by 35% (17% for non-life insurers).<sup>19</sup>

Similarly to bonds, an increase in market rates causes the required rate of return on stocks to rise, thus depressing their value based on discounted expected cash flows.<sup>20</sup> When realised and unrealised capital losses on bonds and stocks exceed the investment income from interest and dividends, the total investment return becomes negative.<sup>21</sup>

*Figure 5. Investment gains and losses for government and corporate bonds held by insurers in EEA countries*



*Source: European Insurance and Occupational Pensions Authority (2023b). Impact of inflation on the insurance sector. Frankfurt am Main: EIOPA, p. 51.*

Figure 5 shows investment gains and losses for government and corporate bonds held by insurers in EEA countries from 2016 to 2022. Because interest rates started to rise at the end of 2021, insurers reported realised and especially unrealised capital losses in 2021 and 2022 that were several times greater than interest income.

<sup>19</sup> European Insurance and Occupational Pensions Authority (2023a). *Financial Stability Report*, December 2023, Frankfurt am Main: EIOPA, p. 28.

<sup>20</sup> Schanz, K.-U., & Treccani, P. (2023). *The Return of Inflation: What it means for Insurance*. Geneva: The Geneva Association, p. 20.

<sup>21</sup> Koprivica, M. (2022). The impact of inflation risk on life and non-life insurers. *Development of modern insurance market – constraints and possibilities*, Kočović, J., Jovanović Gavrilović, B., Stojanović, Ž., Mladenović, Z., Trifunović, D., Koprivica, M. (eds.), Belgrade: Faculty of Economics, pp. 255-271.

### 2.3. Decrease in insurers' technical provisions

Under the Solvency II regime, risk-free interest rate term structures are used to calculate the technical provisions for insurance liabilities. The fair value of insurance liabilities is equal to the sum:<sup>22</sup>

$$\text{Insurance liabilities' fair value} = \text{best estimate} + \text{risk margin} \quad (1)$$

The best estimate (BE) is obtained based on the expected value of all future cash flows (without deduction of the share of reinsurers in the claims), taking into account the time value of money.<sup>23</sup> It corresponds to the probability-weighted average of the present value of future cash flows necessary to fulfil insurance obligations throughout their duration, which can be mathematically represented in the form:

$$BE = \sum_{t \geq 1} \frac{L_t}{(1+p_t)^t} \quad (2)$$

where  $L_t$  denotes the expected net cash flow on behalf of insurance liabilities in year  $t$  and  $p_t$  is the corresponding discount rate. Discounting is performed using a risk-free interest rate curve according to the maturity of each projected incremental annual net cash flow. To effectively manage currency risk, the best estimate of technical reserves shall be calculated separately for liabilities denominated in different currencies, using the respective yield curve for each of them.<sup>24</sup>

The risk margin corresponds to the amount which is necessary for increasing the technical reserves of an insurer to a level that would be deemed fair by a hypothetical (reference) (re)insurer assuming the insurer's entire portfolio of obligations. Following the cost of capital approach, the risk margin is calculated as the present value of costs of holding capital in the amount of the solvency

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<sup>22</sup> Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II). *Official Journal of the European Communities*, 2009/138/EC, article 77.

<sup>23</sup> Mitrašević M. (2015). Practical aspects of harmonisation of regulations related to calculation of technical reserves held by non-life insurers. *Strategic Management*, 20(3), p. 45.

<sup>24</sup> See more in: Jović, D., Kočović, J., & Koprivica, M. (2018). Valuation of insurance liabilities under Solvency II and IFRS 17. *Quantitative Models in Economics*, Kočović, J., Selimović, J., Boričić, B., Kaščelan, V., Rajić, V. (eds.), Belgrade: Faculty of Economics, University of Belgrade, pp. 241-264.

capital requirement (*SCR*) for the reference (re)insurer throughout the entire period until the portfolio's expiration.<sup>25</sup> The projected *SCR* amounts are multiplied by a fixed cost-of-capital rate *CoC* of 6% per annum and discounted using risk-free discount rates. The sum of discounted values across all covered years  $t = 1, 2, \dots$  is the insurer's risk margin (*RM*):<sup>26</sup>

$$RM = \sum_{t \geq 0} CoC \cdot \frac{SCR_t}{(1+p_{t+1})^{t+1}} \quad (3)$$

where *CoC* is the cost-of-capital rate,  $SCR_t$  is the projected amount of *SCR* at the end of year  $t$  and  $p_{t+1}$  is a risk-free interest rate for a maturity of  $t + 1$  years.<sup>27</sup>

A risk-free interest rate curve under the Solvency II regime is derived based on swap rates or the rates of government bonds issued in a given currency where swap rates are not available.<sup>28</sup> The data on these rates are obtained from the financial market, and they determine the liquid part of the yield curve. After adjusting for credit risk, available rates are extrapolated to an ultimate forward rate (UFR) using the Smith-Wilson method.<sup>29</sup>

The European Insurance and Occupational Pensions Authority (EIOPA) periodically publishes the applicable risk-free interest rate term structures for a larger number of currencies for integer maturities from one year to 150 years. When evaluating insurance liabilities denominated in other currencies, the relevant risk-free interest rate curve must be constructed following the same methodology and principles.<sup>30</sup>

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<sup>25</sup> Kočović, J., Koprivica, M., & Paunović, B. (2017). Initial effects of Solvency II implementation in the European Union. *Ekonomika preduzeća*, 2017(7-8), p. 445.

<sup>26</sup> European Insurance and Occupational Pensions Authority (2014). Technical Specifications for the Preparatory Phase (Part I). *EIOPA-14/209*. Frankfurt am Main: EIOPA, p. 87.

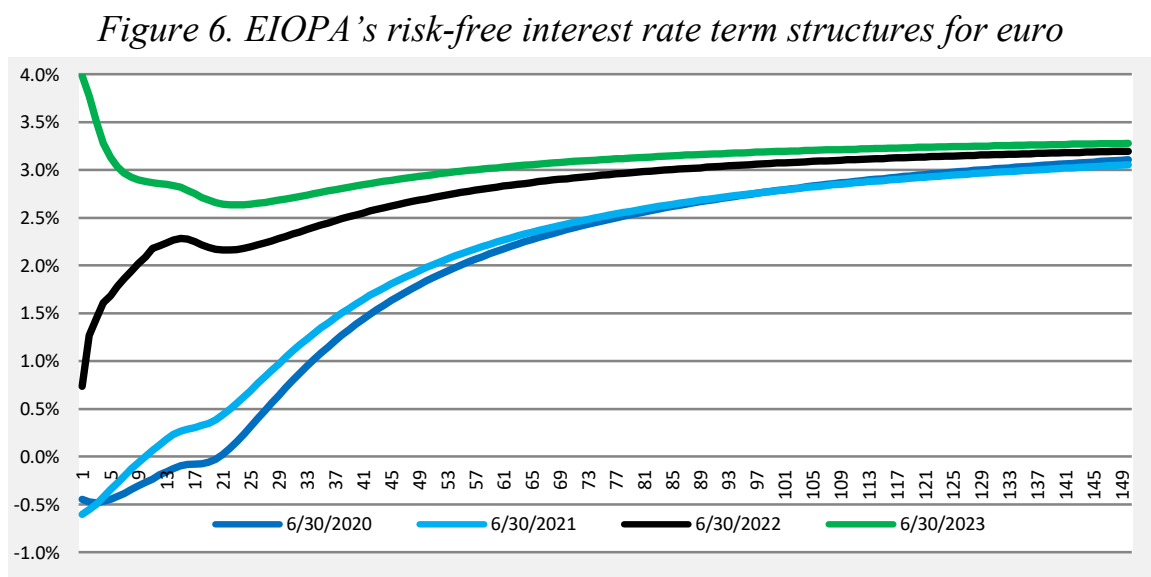
<sup>27</sup> See more in: Kočović, J., & Koprivica, M. (2021). Problemi obračuna riziko-margine u regulatornom okviru Solventnost II. *Tokovi osiguranja*, 37(1), pp. 7-23.

<sup>28</sup> Commission Delegated Regulation (EU) 2015/35 of 10 October 2014 supplementing Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II). *Official Journal of the European Union*, 2015/35, article 44.

<sup>29</sup> Smith, A., & Wilson, T. (2001). Fitting yield curves with long term constraints. *Bacon & Woodrow Research Notes*, London.

<sup>30</sup> See more in: Kočović, J., & Koprivica, M. (2019). Izvođenje krive prinosa za vrednovanje obaveza iz osiguranja u regulatornom okviru Solventnost II. *Ekonomске ideje i praksa*, 32, pp. 7-24.

Figure 6 shows EIOPA's basic risk-free interest rate curves for the euro on selected dates. As market rates rise, the curve shifts upwards. Consequently, the present value of expected future cash flows related to insurance obligations, i.e., the best estimate, decreases. Additionally, the risk margin decreases for two reasons. Firstly, the decline in the best estimate contributes to the reduction of the SCR, which is factored into the risk margin calculation. Secondly, the present value of projected capital costs decreases as they are discounted at higher rates. Therefore, the increase in market rates leads to a substantial reduction in insurers' technical reserves. This reduction has been partially restrained by the inversion of the interest rate curve beyond 20-year maturities in 2022.<sup>31</sup>



Note: No volatility adjustment.

Source: EIOPA (<https://www.eiopa.europa.eu>)

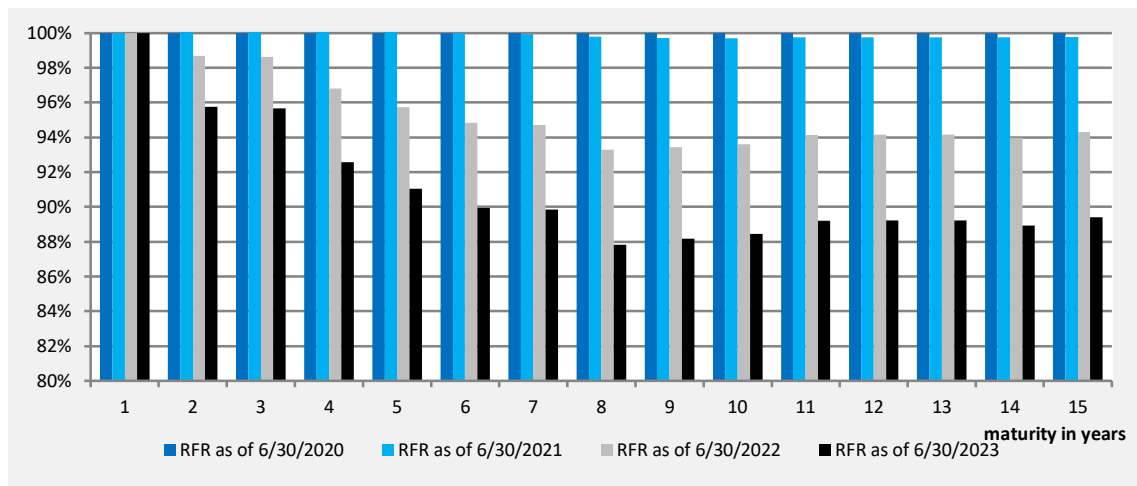
The impact of increasing interest rates on the value of loss reserves can be demonstrated through a hypothetical example. Based on a loss triangle illustrating the development of paid losses denominated in euros for one insurer in a specific type of insurance, future incremental claim payments were projected using the chain-ladder method.<sup>32</sup> These projected payments were then discounted using various EIOPA's risk-free interest rate term structures as depicted in Figure 6.

<sup>31</sup> Ruissaard et al. (2023), op. cit.

<sup>32</sup> See more in: Kočović, J., Rajić, V., & Jovović, M. (2012). Prednosti i nedostaci Chain Ladder metoda za procenu rezervi za štete, *SYM-OP-IS 2012*, Ćirović, G. (ed.), Belgrade: Higher School of Civil Engineering and Geodesy, 4 pages

As can be seen from Figure 7, the higher the discount rate, the lower the present value of the projected future cash flow. In addition, the discounting effect becomes more significant for longer durations. In the observed case, the total discounted reserves in the given type of insurance would be over 10% lower if the risk-free-rate term structure as of June 30, 2023 were applied to the same claims triangle, in comparison to the term structure as of June 30, 2020.

*Figure 7. Discounted cash flows related to loss reserves for different risk-free rate term structures*



Note: RFR = risk-free-rate term structure.

Source: Authors' calculations.

The impact of interest rate changes on the balance sheet depends on the extent to which these types of assets are used to cover liabilities, as well as the quality of the cash flow and compliance maturities of assets and liabilities. A substantial decrease in loss reserves resulting from the increase of the market rates in a high inflation environment can lead to the underestimation of these reserves, which is one of the leading causes of insurer insolvency.<sup>33</sup> Therefore, if discounting of expected future cash flows for insurance liabilities is already undertaken and interest rates are rising, the effects of inflation should be explicitly incorporated into the calculation of loss reserves to prevent their inadequacy.<sup>34</sup>

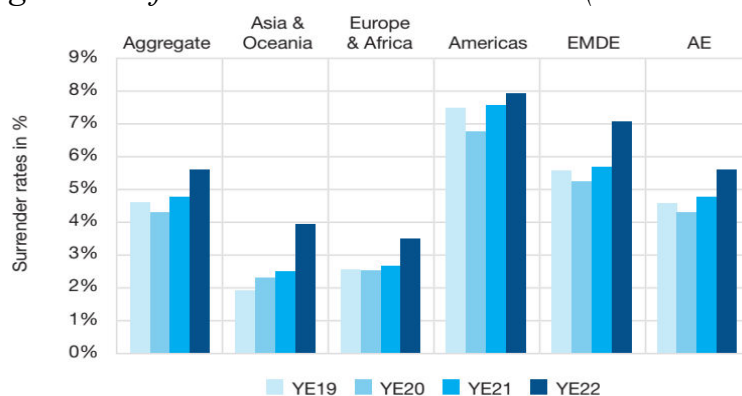
<sup>33</sup> European Insurance and Occupational Pensions Authority (2018). *Failures and near misses in insurance: Overview of the causes and early identification*. Frankfurt am Main: EIOPA

<sup>34</sup> See more in: Kočović, J., Koprivica, M., & Jović, Ž. (2022). Efekat uključivanja inflacije pri obračunu rezervacija za štete. *SYM-OP-IS 2022*, Mladenović, Z., Stamenković, M. (eds.), Belgrade: Faculty of Economics, University of Belgrade, pp. 119-124.

## 2.4. Higher surrender rates in life insurance

The new interest rate environment poses an additional challenge for life insurers. Insurance policies issued when interest rates were low may become less appealing to policyholders once interest rates rise, prompting them to seek out alternative savings options with potentially higher returns. The right to surrender a life insurance contract constitutes an implicit option that can be exercised when prevailing market rates are higher than the guaranteed rate of return.<sup>35</sup> Moreover, with the increase in the interest rates, equilibrium premiums decrease. It becomes more likely that a new policy will offer the same coverage at a lower premium. Thus, policyholders' efforts to exploit higher yields and/or lower premiums when market rates rise might lead to increased surrender rates, in accordance with the interest rate hypothesis<sup>36</sup>. A positive relation between market interest rates and life insurance surrender rates has been confirmed in many empirical studies.<sup>37</sup>

Figure 8. Life insurance surrender rates (2019-2022)



Note: AE = advanced economy, EMDE = emerging market and developing economy, YE = year-end

Source: International Association of Insurance Supervisors (2023). *Global Insurance Market Report 2023*. Basel: IAIS, p. 18.

<sup>35</sup> Albizzati, M.-O., & Geman, H. (1994). Interest Rate Risk Management and Valuation of the Surrender Option in Life Insurance Policies. *Journal of Risk and Insurance*, 61(4), pp. 616-637.

<sup>36</sup> Kuo, W., Tsai, C., & Chen, W. K. (2003). An empirical study on the lapse rate: The cointegration approach. *Journal of Risk and Insurance*, 70(3), pp. 489-508.

<sup>37</sup> See, for example: Phillips Jr, J. M., Schweig, B. B., & Scott, J. P. (1985). Explaining whole life insurance lapse rates. *The Journal of Insurance Issues and Practices*, 8(2), pp. 32-40; Cox, S. H., Laporte, P. D., Linney, S. R., & Lombardi, L. (1992). Single-premium deferred-annuity persistency study. *Transactions of Society of Actuaries Reports*, pp. 281-332; Russell, D. T., Fier, S. G., Carson, J. M., & Dumm, R. E. (2013). An empirical analysis of life insurance policy surrender activity. *Journal of Insurance Issues*, pp. 35-57.

The primary measure to deter higher surrender rates is the imposition of a contractual penalty that policyholders are required to pay should they decide to lapse. Surprisingly, more than 50% of insurance contracts sold by large EU life insurers do not involve penalty clauses, whereas more than 90% of contracts can be lapsed with a penalty lower than 15% of the policy value.<sup>38</sup> Therefore, a sharp rise in interest rates could motivate a significant portion of policyholders to lapse and surrender their life insurance contracts, posing a liquidity risk for the insurer.<sup>39</sup> Specifically, policies with low guaranteed returns to policyholders issued during the prolonged period of low interest rates may be vulnerable to lapses and surrenders. As interest rates increase, policies with relatively small guarantees are typically the first to surrender, leaving mainly policies with larger guarantees in the insurer's portfolio. This subsequent increase in the average guarantee in-force leads to higher capital requirements and lower profits.<sup>40</sup>

Globally, surrender rates are on the increase (Figure 8). In 2022, the share of surrenders in outstanding life insurance policies reached 5.5% in advanced economies and 8% in emerging market and developing economies. The liquidity ratio of life insurers sharply declined in the same year.<sup>41</sup> The extent of surrender risk exposure is primarily determined by the existence of penalty clauses, contractual guarantees and portfolio structure. Half of surrender values in 2022 worldwide relates to contracts without any penalties.<sup>42</sup> In most of continental Europe countries, buyers of life insurance are usually provided with guarantees that their policy can be surrendered at its book value, amplifying surrender risk for insurers in those markets.<sup>43</sup> Finally, products with a savings element typically encounter greater surrender risk compared to pure protection products.<sup>44</sup>

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<sup>38</sup> European Systemic Risk Board (2015). *Report on systemic risks in the EU insurance sector*. Frankfurt am Main: ESRB, p. 9.

<sup>39</sup> Haefeli, D., & Ruprecht, W. (eds.) (2012). *Surrenders in the Life Insurance Industry and their Impact on Liquidity*. Geneva: The Geneva Association

<sup>40</sup> Berdin, E., Gründl, H., & Kubitza, C. (2017). Rising interest rates, lapse risk, and the stability of life insurers, *ICIR Working Paper Series*, No. 29/17, Goethe University Frankfurt, International Center for Insurance Regulation (ICIR)

<sup>41</sup> Farkas, B., Lewrick, U., Stastny, T., & Tarashev, N. (2023). Life insurance companies - the missing relief from rising interest rates. *BIS Quarterly Review*, December 2023, Basel: Bank for International Settlements

<sup>42</sup> International Association of Insurance Supervisors (2023), op. cit., p. 18.

<sup>43</sup> Pinette, F., Chen, R., & Busson, E. (2023). Mass Lapse Risk in European Life Insurance: A gray rhino awakening, *Gray Rhino Series*, Gallagher Re, p. 6.

<sup>44</sup> Kim, C. (2005). Modeling surrender and lapse rates with economic variables. *North American Actuarial Journal*, 9(4), p. 57.

## 2.5. The resulting impact on insurers' solvency and profitability

The preceding analysis indicates that the value of both insurers' liabilities and assets declines with rising interest rates and vice versa. When the durations of assets and liabilities are perfectly matched, their value rises or falls by exactly the same magnitude when interest rates change so that the capital remains unchanged. However, this ideal scenario is seldom realised in practice because of the lack of long-term fixed-income instruments. Thus, most insurers' balance sheets exhibit a negative duration gap,<sup>45</sup> meaning that liabilities have a longer maturity than the assets held to meet those liabilities. This implies that insurers' liabilities are more interest-sensitive than their assets.<sup>46</sup> In other words, the present value of insurers' liabilities decreases by a greater extent than the market value of their assets when interest rates rise linearly. As a consequence, the excess of assets over liabilities increases. That way, rising interest rates may improve the solvency position of insurers.

Nevertheless, if interest rates do not rise linearly (such is the case of inverted yield curves), insurers' solvency positions may be negatively affected.<sup>47</sup> Figures 1 and 2 indicate that the level and shape of the yield curve have been moving in opposing directions. At first glance, considering predominantly negative duration gaps, a parallel upward shift in the yield curve, as seen at the onset of the monetary tightening cycle in early 2022, could have increased the value of equity. Conversely, the increase in yields at the shorter end of the curve surpassing those at the longer end – indicating the curve's inversion by late-2022 – could potentially lead to a worsening of insurers' solvency position by implementing a higher discount rate for their fixed income assets than for their liabilities. Therefore, the decline in the value of assets may exceed the decline in the value of insurance liabilities. Which of the two opposing effects will prevail depends on the distinctive structure of individual insurers' balance sheets.<sup>48</sup>

Moreover, in an inflationary environment, insurance liabilities may not necessarily decrease even though interest rates are high. In fact, the reduction in

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<sup>45</sup> Paunović, B., Mitrašević, M., & Janković, D. (2017). Profitability management of life insurance companies under conditions of low interest rates. *Challenges and Tendencies in Contemporary Insurance Market*, Kočović, J., Boričić, B., Jovanović Gavrilović, B., Balleer, M. (eds.), Belgrade: Faculty of Economics, University of Belgrade, p. 303.

<sup>46</sup> Koprivica & Baller (2020), op. cit., p. 146.

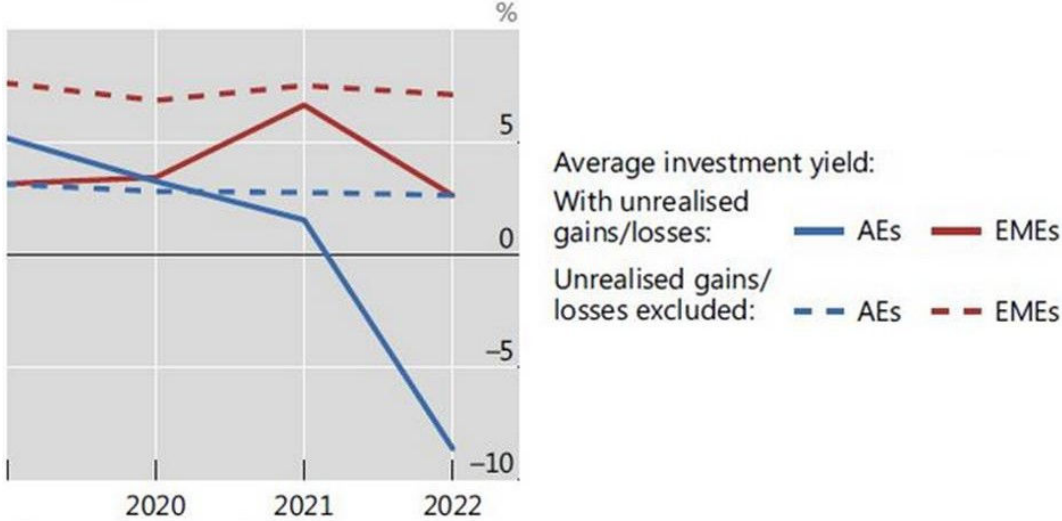
<sup>47</sup> International Association of Insurance Supervisors (2023), op. cit., p. 16.

<sup>48</sup> Farkas et al. (2023), op. cit.

technical reserves due to higher discount rates may be counteracted by the increase in technical reserves caused by higher inflation assumptions, which raise the expected future claims payments.<sup>49</sup> If the claims inflation effect outweighs the discounting effect, insurers' liabilities will increase rather than decrease, further weakening their solvency position. Therefore, the effect of rising interest rates on insurers' solvency is unclear.

Regarding insurers' profitability, long-term improvement is expected due to higher interest earnings on new bonds that will replace existing ones upon maturity. However, in the short term, this effect of rising interest rates is offset by losses on existing fixed-income instruments in insurers' portfolios. For example, average investment yields of life insurers, defined as investment income excluding unrealised capital gains/losses divided by the sum of cash and invested assets remained stable in 2002 compared to the previous year. However, taking into account unrealised capital losses reveals that the average investment yield of these insurers significantly decreased in 2022, even became negative in advanced economies (Figure 9). In the EEA countries, for example, the average investment yield of life insurers without unrealised investment losses in 2022 was at the lowest level since 2016 (1.1%) and slightly above the average guaranteed rate (0.95%). However, the average investment yield including unrealised investment losses in the same year was -13.7%.<sup>50</sup>

Figure 9. Investment yields of life insurance companies



Note: AEs = advanced economies, EMEs = emerging market economies

Source: Farkas et al. (2023), op. cit.

<sup>49</sup> European Insurance and Occupational Pensions Authority (2023b), op. cit., p. 5.

<sup>50</sup> Ibid, p. 50.

A significant amount of time may pass before asset returns adjust to rising interest rates. The time lag in adjusting returns to market rates is notably pronounced in life insurance. To match the duration of their assets with the duration of their liabilities, life insurers primarily invest in long-term bonds, which they usually hold to maturity. Thus, bonds acquired during a period of low interest rates would likely remain in insurers' portfolios for an extended period before reaching maturity and being exchanged for higher-interest-earning bonds.<sup>51</sup> Therefore, it is unrealistic to expect an increase in the profitability of insurers' investments in the short term. On the contrary, it may be reduced if liquidity needs force insurers to sell existing fixed-income assets and thus to recognise yet unrecognised losses. A substantial rise in interest rates exposes life insurers to the risk of a mass policy lapse. The accompanying cash outflows could compel insurers to liquidate their assets. The resulting 'fire' sales could exacerbate the initial interest rate shock by further depressing the prices of fixed-income assets.<sup>52</sup>

In the current macroeconomic environment, insurers' underwriting profitability is also under pressure. Due to higher surrender rates and lower demand for new insurance contracts in an inflationary environment, life insurers are experiencing a decline in premium income. At the same time, the underwriting profitability of non-life insurers is burdened by significant claims cost inflation. Therefore, the initial resulting impact of rising interest rates on insurers' profitability is negative. This is also evidenced by the deterioration of overall profitability for insurers in EEA countries in 2022 relative to 2021.<sup>53</sup>

#### **4. HOW INSURERS (CAN) RESPOND TO HIGHER INTEREST RATES**

The previous analysis indicates that a rising interest rate environment is presenting a new set of challenges and opportunities for insurers. Successfully navigating this new regime demands a reconsideration of portfolio structure, investment strategy, and product design.

To cope with the low interest rate environment of the last decade, many insurance companies have adjusted the types of insurance policies they offer

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<sup>51</sup> National Association of Insurance Commissioners (2023). Interest rates & insurance, NAIC (Retrieved April 21, 2024 from <https://content.naic.org/cipr-topics/low-interest-rates>)

<sup>52</sup> Förstemann, T. (2021). Lethal lapses - how a positive interest rate shock might stress life insurers. *Available at SSRN 2766999*

<sup>53</sup> European Insurance and Occupational Pensions Authority (2023b), op. cit., p. 7.

and the types of assets they invest in. The new macroeconomic reality allows and demands these trends to be reversed.

Over the last years life insurers in many countries have shifted away from interest rate sensitive traditional life insurance products offering guarantees towards unit-linked products allowing interest rate risk to be largely transferred to policyholders.<sup>54</sup> Now that a low interest rate environment is no longer the norm, higher interest rates, coupled with turbulent financial markets, are expected to diminish the attractiveness of unit-linked products for policyholders. As rates rise, life insurers are in a better position to offer products with more substantive interest rate guarantees. Therefore, it can be expected that the share of traditional products in the structure of the life insurance portfolio will rise in the foreseeable future.

In an attempt to boost investment yields during a period of low interest rates, insurers increased their allocation to alternative asset classes, such as real estate holdings, direct lending, alternative, infrastructure and private equity funds.<sup>55</sup> Such a search for yield implies greater exposure to liquidity and credit risks. This trend may reverse now that more traditional investments, such as government and corporate bonds, offer significantly higher yields. Thus, insurers could rebalance their investment portfolios towards a higher share of conventional debt securities and rely less on capital-intensive-high alternative asset classes.<sup>56</sup>

In order to protect themselves from surrender risk, life insurers must ensure that new contracts include adequate surrender penalties. Other measures involve modelling the impact of potential mass lapses in Own Risk and Solvency Assessment (ORSA) as well as taking out reinsurance against mass-lapse risk.<sup>57</sup> Mass lapse reinsurance protects the insurer against the adverse financial impact of a mass lapse in its portfolio. The popularity of this innovative reinsurance solution has been growing rapidly since 2022. It has been used in Italy and Scandinavian countries for several years, but interest in this type of reinsurance coverage is rapidly expanding in other European countries, such as France and Belgium.<sup>58</sup> Also, insurers are expected to monitor and manage liquidity risks

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<sup>54</sup> European Insurance and Occupational Pensions Authority (2022). *Financial Stability Report*, December 2022, Frankfurt am Main: EIOPA, p. 3.

<sup>55</sup> European Central Bank (2019). *Financial Stability Review*, Frankfurt am Main: ECB, p. 116.

<sup>56</sup> European Insurance and Occupational Pensions Authority (2023a), op. cit., p. 28.

<sup>57</sup> International Association of Insurance Supervisors (2023), op. cit., p. 19.

<sup>58</sup> Pinette et al. (2023), op. cit., p. 8.

actively, with performing liquidity stress tests as an essential part of liquidity management. Finally, policymakers and regulators ought to revise solvency regimes designed for a period of lower interest rates to align with the current macroeconomic landscape.

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