

IMPACT OF INFLATION ON THE INSURANCE SECTOR

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EXECUTIVE SUMMARY

In the current macro-economic environment, one of the major concerns for the insurance market is the significant increase in inflation experienced since spring 2021. The high uncertainty and the slow recovery after the Covid-19 pandemic outburst in 2020, followed by the Russian invasion of Ukraine in February 2022, have reduced the outlook for growth in Europe and increased downside risks for the future course of the economy. All these events generated and/or amplified existing trends and problems like supply chain disruptions, a mismatch of supply and demand for goods and services, resource limitations raising commodity prices, deglobalisation and a decline in the working age population. The combination of these developments has caused a switch from a long period of low inflation and low interest rates to a new economic environment dominated by stubbornly high inflation and increasing interest rates.

Against this background, the aim of this report is to analyse the impact of inflation on the insurance sector as observed so far (backward looking perspective) and to assess potential risks and vulnerabilities given the uncertainty of how inflation will develop in the short-, medium- and long-term (forward looking perspective). The approach taken is to set the scene with theoretical considerations on the impact of inflation on the insurance sector, discuss the latest macroeconomic trends and highlight the evolution of insurance assets and liabilities. Then, the impact of higher inflation in conjunction with rising interest rates on the capital position, profitability, and liquidity of the European insurance sector is analysed. Finally, the impact on consumers and business models is discussed. While the focus of this report is on inflation, it does not only evaluate its impact in isolation, but also considers higher interest rates.

In theory, the key determinants of insurers' sensitivity towards inflation and interest rate changes are the exposure to interest rate sensitive assets, the duration of the liabilities and the sensitivity of claims and expenses to inflation. Since the latest widespread inflationary period occurred in the late 70's and beginning of the 80's in most European countries, inflation rates have been well contained. As insurance is a liability driven business, the duration of the commitments and the guarantees/coverage offered shape the asset allocation of insurers and their sensitivity to changes in inflation and interest rates. Claims and expense inflation is correlated with the general inflation, but tends to exceed the consumer price inflation, particularly for certain key lines of non-life business. This has been confirmed by several studies, and by the Solvency II data showing that claims and expense inflation has significantly exceeded the general inflation for several years with a sharp increase observed from 2020 to 2022.¹

¹ Claims and expense inflation are not the only drivers of the annual variation of the claims and expenses. Solvency II data does not allow to differentiate between pure cost inflation and volume effects.

Current market-based indicators and consumer surveys show inflation expectations persistently above 2%. Long-term inflation expectations remain higher than the Eurosystem target of 2%. European consumers expect an inflation rate of 3.4% for the next twelve months and 2.4% three years ahead, as reported by the ECB Consumer Expectations Survey of July 2023. The high inflation rates led to monetary policy tightening and a sharp increase in interest rates. The ultra-low nominal yield environment that persisted for several years has come to an end as in Q1 2023 nominal sovereign yields were at the highest level for years.²

The balance sheets of insurers give an indication of how they react to macroeconomic developments over time. Since the introduction of Solvency II, the portfolio composition of EEA insurers has remained stable and mainly consists of fixed-income assets. The rapid transition from a low yield to an inflationary environment with high interest rates has led to volatility in the valuation of assets. By the end of 2022, the total investments of EEA insurers excluding unit-linked assets amounted to 5.9 tr. EUR, dropping by 15.8% compared to the end of 2021. In terms of portfolio adjustments and in aggregate, insurers reduced their exposure to government bonds as well as of corporate bonds.³ As the valuation of liabilities is also market-consistent, technical provisions (TP) for life (excluding health and index-linked and unit-linked) decreased by 23% from Q4 2021 to Q4 2022 mainly due to the increase in interest rates, which more than compensated higher expense inflation. For non-life insurers, two opposite effects can be observed on the TP in an inflationary environment: higher inflation assumptions increase the expected future claims payments and thus result in higher TP (claims inflation effect); then this effect is mitigated by higher discount rates due to higher risk-free interest rates (interest rate effect). Non-life TP decreased by 2% in Q4 2022 compared to Q4 2021. This might be due to lower business volume or the discounting effect outweighing the claims inflation effect.

The capital position of insurers is impacted by the high inflation coupled with an increase in interest rates through the market consistent valuation of assets and liabilities and through the assumptions made in the calculation of the liabilities. With respect to the technical provisions, inflation negatively impacts non-life insurers through the increase in the expected cost of the claims and the costs of activities needed to service them. Higher anticipated costs lead to the increase of technical provisions such as claims reserves. As insurers must make assumptions about future claims, there is a risk of under-reserving which would eventually result in under-funding and a deterioration in the solvency position. While life insurers with mostly fixed nominal benefit payments promised to policyholders are less prone to claims inflation, they may experience lower new business and higher lapses as an effect of interest rate increases. Over a longer time-horizon, both life and non-life insurers might benefit from higher nominal reinvestment yields.

² Real yields adjusted for inflation continue to be low.

³ Fay and Ghiselli, (2023) finds European SII insurers acting procyclical in their bond investments in particular holder or issuer countries.

Since the pick-up in inflation at the end of 2021, the excess of assets over liabilities of EEA insurers has trended downward (backward-looking perspective). For life insurers, eligible own funds (EOF) and the solvency capital requirement (SCR) declined in 2022, the latter with the exception of Q3 2022. The SCR decline of more than 10% in Q4 2022 compared to Q3 2022 resulted in an increase of almost 2% in the solvency ratio (SCR%) of life insurers. Composites and reinsurers, on the other hand, had declining SCR% in the last quarters of 2022, whereas the impact on the capital position for non-life insurers was far smaller.

The different scenarios in the forward-looking perspective on the capital position show that from a financial stability perspective, changes in the term structure of interest rates as well as high inflationary pressures are significant sources of risk for the insurance sector. Within the discussed limitations of the model and of the data, the results confirm that isolated inflation shocks have a negative effect both on life and non-life undertakings according to their nature of their business. The sensitivity analysis shows that the median ratio of the excess of assets over liabilities to technical provisions (eAoL/TP) for non-life undertakings drops by almost 12 percentage points in Scenario 1 and by 20 percentage points in Scenario 2. For life undertakings this ratio drops by almost 3 percentage points in Scenario 1. Increasing interest rates in Scenario 2, on the other hand, has a beneficial effect on undertakings with long term liabilities and material negative duration gaps (typically life and composite undertakings). In their case, the increase in interest rates overcompensates the negative effect of inflation on the liabilities. In contrast, non-life undertakings with their normally short duration of liabilities do not benefit enough from higher interest rates to compensate the inflation effects. Moreover, non-life undertakings with long tail business are more exposed to inflation due to the higher risk of necessary upward revisions for future claims.⁴ The longer the inflationary environment lasts, the more impacted are both life and non-life of business. Also, given the strong uncertainty on inflation, insurers need to choose a prudent approach on reserving and to carefully investigate their vulnerabilities in the ORSA including sensitivities on longer lasting inflation.

The current and future profitability of insurers is a key element for the financial stability of the sector. For non-life insurers, the short-term impact of inflation on profitability is typically negative as reserves need to be increased and premiums can only be adjusted gradually. The situation for life business in the short term is different. Claims inflation is normally not a concern for life insurers as claims are typically defined in nominal terms. However, higher expenses due to inflation reduce profits. An environment with high inflation and high interest rates could be beneficial as it makes it easier to cover the guaranteed rates for existing business with investment income, as new investments in bonds would generate higher yields. There are though competitive challenges with other products as the rates credited to policyholders increase only gradually and other more profitable investments than life-insurance might become more attractive.

⁴ As for example, higher claims for health insurance often occur in the later stages of the contract and more distant future.

The underwriting profitability for non-life insurers has deteriorated in 2022 relative to 2021 while the return on investments of life and composite was at the lowest level since 2016. For non-life business, this was due to an increase in expenses of 4.3% and in claims of 11.3% while premiums only increased by 6.4%. Moreover, since the outburst of inflation in 2021, all categories of expenses showed an upward trend. Life and composite undertakings showed a low level of aggregated return on investments (1.1%, excluding unrealised gains and losses) that was driven by the market developments in 2022.

The medium to long-term impact on the profitability of non-life insurers that are hit by an inflation shock depends on the extent to which insurers could increase premiums. The degree to which non-life insurers could increase premiums to compensate the higher future claims and expenses depends on the ability and willingness of policyholders to pay higher premiums as well as on the competitive pressures. If inflation is accompanied by higher interest rates, the higher return on new investments should allow insurers to maintain their overall profitability in nominal terms or at least to mitigate the negative effect in case they are not able to push through premium increases that are sufficient to keep their underwriting results constant.

Future profitability of life business can benefit from reinvestment at higher yields but might be exposed to the risk of lapses. If the higher future interest rates as implied by the yield curve at the end of 2022 materialize, life insurers will be able to invest new premiums, coupons and maturing bonds at higher rates. But this will change the yield of the portfolios only gradually. Consequently, also the rates credited to policyholders will only rise gradually. This creates competitive challenges for insurers. The initial rates they can offer to new clients will be lower than for some other products. Existing customers might therefore also be tempted to surrender their policies.

Insurers might face liquidity risks due to high inflation and volatility in interest rates. The increase in interest rates lowers the value of liquid assets which results in deteriorating liquidity measures. Then, if liquid assets are sold when the risk-free rates are increasing, hence prices declining, losses are realised, and this is translated into a reduction in cashflows. Inflation, if unexpected or not priced into new premiums, erodes the cash-flows from the technical operations via an increase of the cost of claims. One way in which liquidity risk materialises is when policies are lapsed and liquid assets are not enough to cover cash-outflows. Another source of liquidity risk is the use of derivatives that might potentially trigger cash margin payments, especially in situations in which interest rates are increasing and remain highly volatile.

The overall liquidity positions of insurers deteriorated in 2022 due to the declining market value of liquid assets and material cash-outflows due to margin payments on derivative positions. The evolution of the sustainability of cash-flow positions of the aggregated EEA insurance market (i.e., the ratio between net cash flows and investment income to liquid assets) turned negative in 2022 while the lapses of life policies increased to almost 28.9% of the gross-written premiums. A 100 bps parallel upward shift in the yield curve would cause an additional cash variation margin requirement

of circa 26.8 bn. EUR for EEA insurers using interest rate swaps. However, the results show that insurers hold currently enough liquid assets to cover potential liquidity needs stemming from margin calls.

High inflation impacts consumers by eroding the value of their savings, deepens the protection gap and influences financial decisions. This has a direct impact on the way consumers deal with the insurance purchasing process. High inflation results in increased insurance premiums for consumers when insurers pass their cost increases to their clients. Some consumers will be unable or unwilling to pay more for the same coverage, and therefore might chose to reduce their level of coverage or not renew their policy consequently deepening the protection gap. In addition to the impact on benefits, lapses and withdrawals can also be relevant for policyholders in an environment with high inflation. Higher short-term interest rates to slow-down inflation could motivate policyholders to surrender insurance savings contracts for shorter-term investments with higher short-term interest rates (e.g., than the guarantees offered). That can be non-optimal from a savings perspective. Lapse rates might be further increased in case the lower real income of policyholders might urge more vulnerable ones to access their funds due to higher living costs.

1 SETTING THE SCENE

The European economy has been characterized in recent years by heightened uncertainty. Inter alia the slow recovery after the Covid-19 pandemic outburst in 2020, followed by the Russian invasion in Ukraine in February 2022, have reduced the outlook for growth in Europe and increased downside risks for the future course of the economy. All these events generated and/or amplified existing trends and problems like supply chain disruptions, a mismatch of supply and demand for goods and services, resource limitations rising commodity prices, deglobalisation and a decline in the working age population. Combined these developments have caused a switch from a long period of low inflation and ultra-low yields to a new economic environment dominated by stubbornly high inflation and increasing interest rates.

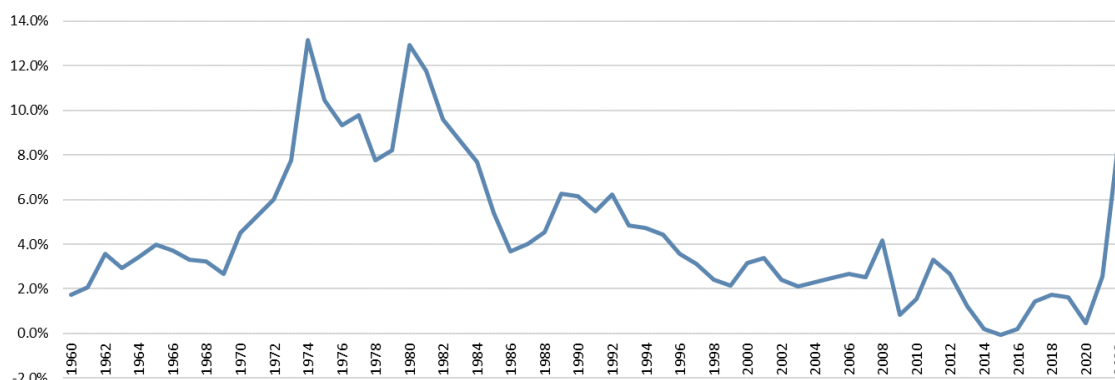
The change of the economic narrative brings new challenges and opportunities to the European insurance industry which deserve to be analysed in depth. This report, after a brief digression on the inflation episodes observed in the past, explores from a theoretical and empirical perspective how the change of the economic environment impacted the capital, liquidity and profitability of insurers and what might be the future implications.

1.1 HISTORICAL BACKGROUND ON INFLATIONARY EPISODES AND THEIR IMPACT ON THE INSURANCE SECTOR

The recent increase in inflation since spring 2021 has raised concerns in most developed economies, including European countries, reopening discussions on a topic that has been fairly absent in recent decades. The last period when high inflationary pressures were observed on a global level was the late 1970s and beginning of the 1980s, a period during which double-digit inflation rates affected countries such as the United States, Canada, as well as most European economies. According to Lowe and Warren (2010), the last time inflation spiked in the 1980s, an insurance liability crisis⁵ erupted in the United States, with claims costs increasing well above the rate of general inflation. Since then and until recently, inflation rates had been well contained.

⁵ See Lowe and Warren, (2010): "In liability lines, it was not uncommon to see 20% annual claim cost increases and adverse reserve development that put ultimate claim liabilities at double the balance sheet estimate. For the U.S. P&C industry as a whole, the accident-year combined ratio on commercial liability business topped out at roughly 200% in 1984."

Figure 1.1: Inflation, consumer prices (annual %), European Union



Source: WorldBank, Inflation, consumer prices (annual %) - European Union | [Inflation, consumer prices \(annual %\) - European Union | Data \(worldbank.org\)](https://data.worldbank.org/series/FP.CPI.EU); Note: The WorldBank data is used as it provides the longest time series publicly available for Inflation and consumer prices

The moderate and stable inflation over the past decades limits the availability of evidence to assess the impact of inflation on the insurance sector. However, several studies examine the impact of inflation on the insurance sector during the previous periods of high inflation.

For the **non-life business**, inflation has a direct negative impact on profitability via rising claims costs. Regarding the historical evidence, D'Arcy (1982) analysed the statutory underwriting profits and the investment returns for property-liability insurers between 1929 and 1981, along with the annual changes in CPI. He concluded that these two components of the insurers' operating results are negatively correlated with the inflation rate. Similarly, Swiss Re (2010) analysed the relationship between inflation and profitability in the US and Canadian P&C insurance industry between 1951 and 2008. The analysis provided some evidence of inflation driving up insurers' combined ratio and lowering their return on equity. However, this relationship was generally not statistically significant, which may be explained by other factors affecting insurers' results, such as catastrophe losses and/or capital gains on investments.

For the **life business**, an increase in inflation is expected to have a more neutral effect on profitability than in the non-life business, as the benefits paid by most life products, e.g., mortality and longevity protection, are nominally fixed and, thus, not indexed to inflation. However, inflation may pose challenges for the life insurance business as well. Future expenses of life insurers are also vulnerable to inflation and, as such, profitability is expected to be negatively impacted. Moreover, by eroding the value of life products with fixed future payments, inflation may result in lower new business and increased lapse rates, as policyholders may be more attracted to other financial products, which offer higher rates of return. Additionally, as inflation erodes households' real income, the lower purchasing power, has a negative effect on demand. Li et. al (2007) provide empirical evidence for the negative impact of inflation on the demand and sale for life insurance products. In fact, by identifying those factors that are most relevant to demand for life insurance based on a coverage

from a large number of OECD countries, they conclude that, alongside income development, inflation significantly decreases the demand for life insurance. Additionally, they conclude that high real interest rates cause households to reduce the level of insurance purchased either because of the higher expected benefits from alternative investments or because of a higher preference for immediate consumption relative to deferred consumption.

On the other hand, a shift from a period of very low interest rates, as the one experienced in recent years, to an environment with higher inflationary pressures may be positive for life insurers in the long-run due to ability to generate higher investment returns. Ahlgrim and D'Arcy (2012) argue that the life insurance industry may be more affected by sustained deflationary pressures. According to the authors, since many products provide a minimum rate of guaranteed return, any scenario that leads to deflation or sustained periods of very low inflation, may pose challenges to life insurers to earn promised guaranteed rates. Also, according to Swiss Re (2010), periods of deflation or decline in inflation and interest rates create substantial risk for savings products with minimum return guarantees. These products are anchored by nominal asset returns and therefore carry high risk exposure when investment yields fall short of the guaranteed returns. The same is true for products with equity return guarantees since equity markets usually suffer during deflationary periods.

Overall, the impact of inflation on the underwriting profitability of life business is not straightforward and will certainly depend on insurers product portfolio. Notwithstanding, Browne, Carson and Hoyt (2001) show that the financial performance measures such as return on equity (ROE) and return on assets (ROA) are significantly negatively affected by unanticipated inflation.

Regarding the impact of inflation on insurance asset values, according to Swiss Re (2010), the impact of inflation on asset prices very much depends on the time horizon in question. An asset that keeps pace with inflation over a long-time horizon might nonetheless react negatively to high inflation in the short term. It is therefore necessary to consider short and long-term effects of inflation separately. In investment management, there is some scope for inflation protection on the back of tactical asset allocation, for example by tilting the investment portfolio away from bonds towards commodities, equities, and real estate. In this regard, Swiss Re (2010) investigated the correlation between different asset classes returns and CPI in the US market between 1998 and 2009, showing that treasury bills and real estate have a positive correlation, while other classes, namely, long-term and intermediate treasury bonds show a negative correlation.

1.2 THEORETICAL IMPACT ON THE INSURANCE INDUSTRY UNDER SCENARIOS OF HIGH INFLATION

From a macroeconomic perspective, two different scenarios should be distinguished regarding an environment with high inflation. A first scenario combines high inflation with high growth whereas in the second, high inflation couples with low or no growth (similar to stagflation, where stagnant demand combines with high unemployment). This distinction matters because with high inflation and high growth financial markets, corporations and households may still flourish. Instead, with low growth businesses struggle to retain margins and the disposable income of the households is eroded.

As insurance is a liability driven business, the duration of the commitments and the guarantees/coverages offered to policyholders shape the asset allocation of the undertakings and their sensitivity to changes in inflation and subsequently to interest rates. Therefore, the key determinants of the sensitivity towards inflation and interest rate changes are mainly two: the exposure towards interest rate sensitive assets (e.g., duration of the fixed income assets) and the duration of the liabilities. This is particularly important under the Solvency II regime that is based on a full mark to market balance sheet assessment.

Insurers, and particularly those engaged in life business, are usually characterised by a negative duration gap⁶ between assets and liabilities. **An increase in the long-term interest rates with no repricing of the risk premia** (e.g., spread for counterparty risk or liquidity risk) has a beneficial effect on the own funds of the insurance undertakings that have a longer duration of liabilities than of assets. The increase of the risk-free rate causes a reduction in the value of fixed income assets that is over-compensated by the reduction of the technical provisions due to the higher discount rate curve (assets and liabilities are typically characterized by a negative duration gap). Obviously, the effect is more amplified for those undertakings characterized by liabilities with longer duration and large duration gaps.

Capital market dynamics suggests that an increase in interest rate is usually accompanied by an increase in risk spreads. **If the increase in the long-term rates is accompanied by a repricing of the risk premia**, the impact on the asset side is not limited to the fixed income assets but also reduces the market value of other asset classes.⁷ Since the valuation of the liabilities is only impacted by the risk-free interest rate (ignoring the Volatility Adjustment effect), the reduction in the value of assets due to the increased risk premia is not necessarily compensated by a reduction in the technical provisions with the result of a reduction in the excess of assets over liabilities and hence of the Own

⁶ The duration gap refers to the difference between the duration of assets and duration of liabilities.

⁷ For a quantification of the effect, see EIOPA (2022b).

Funds.⁸ Furthermore, in the situation where there is an increase in risk premia, but with the long-term interest rates remaining stable, the reduction in the value of assets will not be compensated by a reduction in the values of liabilities. In this case, the adverse movements materialize only on the assets side (repricing of risk premia), whereas the liabilities are not affected by a decrease in the risk-free rate⁹. For both non-life and life business, higher future expenses increase technical provisions. For non-life, claims reserve also increase for incurred but not settled claims, again increasing technical provisions. Life insurance benefits are often specified in nominal terms, and thus are not sensitive to inflation. The reason for the higher technical provisions is that insurers must make assumptions about inflation-induced higher future claims payments and expenses. This implies the risk of under-reserving/ funding risk and eventually a solvency risk.

The actual effect of a scenario with higher inflation and higher interest rates possibly accompanied with a repricing of risk premia on own funds depends on the duration gap, the change in interest rates and the change in risk premia. Another important factor is the difference between the previously anticipated inflation and the actual inflation (or the upwardly adjusted expectation for future inflation).

Inflation also has an impact on the Solvency capital requirement¹⁰. A decrease in the value of fixed income assets leads to a decrease of market risks in the standard formula for non-life undertakings, while the increase of exposure through increasing future premiums or higher sums insured in the natural catastrophe risk modules might lead to a potential increase of underwriting risk in the standard formula. For life insurance with profit business a higher loss absorbing capacity due to increasing interest rates might additionally lead to a decrease in the solvency capital requirements in the standard formula.

From a **liquidity** perspective, high inflation accompanied by increasing interest rates also has an impact on the insurance sector. The value of liquid assets such as government bonds is depleted due to the increase in interest rates, mechanically deteriorating liquidity measures. Inflation if unexpected or not priced into new premiums, also erodes the cash-flows from the technical operations via an increase of the cost of claims. Then policies might be lapsed, and liquid assets might not be enough to cover cash-outflows. Another source of liquidity risk is the use of derivatives. It is more pronounced in some markets, while in other markets it does not play an important role. In the latter, market bonds instead of interest rate derivatives are mainly used to manage asset liability management risks. The largest exposure of insurers is towards (receiver) interest rate swaps in which they pay floating and receive fixed rate cash flows to reduce the

⁸ This scenario was tested in the 2018 Insurance Stress Test exercise (Yield Curve Up scenario) – see EIOPA (2018), ref to section 2.3 – 2018 YCU scenario for a more extensive treatment of the results.

⁹ A full double-hit scenario, namely a drop in the risk-free rate accompanied by an increase of the risk premia was tested in the 2016 and in the 2018 Insurance stress test exercise.

¹⁰ Inflation risk is not explicitly formulated in the Solvency II standard formula, however the SCR for life expense risk and health expense risk takes into account a possible increase of 1 percentage point in the expense inflation rate that is applied in the calculation of technical provisions for insurance liabilities. Ref. to EIOPA (2014)

duration gaps between assets and liabilities.¹¹ As such, mainly life insurers are hedged against the drop in the interest rates, hence increasing interest rates exposes insurers to margin calls which require to be daily settled through cash or equivalents.

Moving to **profitability**, an increase in inflation and in interest rates could be beneficial for life and non-life insurers in the long term due to the reinvestment of assets at higher yields. In the short term, the impact is negative mainly due to losses on interest rate sensitive investments. Inflation generally results in higher claims costs for non-life and health insurers; however, life insurers are less affected because claims and benefits are mostly defined in nominal terms. Undertakings, particularly in the non-life and health sectors, may also have to revise upwards the reserves held to meet the cost of existing claims which will negatively impact profits. The potential increase in operating costs can also reduce the profitability of products. The net effect on profitability depends on the ability to adapt premiums, which depends on the competitive situation, and on adoptions of insurers' terms and conditions as for example reducing claims costs by increasing deductibles. The adaption of premiums also depends on the development of the future inflation. It might be easier to adjust premiums appropriately in a scenario where inflation quickly returns to the general ECB inflation target than in a scenario where inflation is here to stay.

1.3 GENERAL INFLATION VS. CLAIMS AND EXPENSE INFLATION

While the claims and expense inflation are correlated with the general inflation, there are also certain differences. Accordingly, it is important to consider the insurance specific characteristics of the inflation to get to the claims and expense inflation. Claims and expense inflation are mainly driven by the price of goods and services in connection with the settlement of potential insured claims. More specifically, claims inflation can be defined as a change in claims incurred due to inflation for a particular insurance portfolio over a specified period, usually one year. Claims inflation is significantly affected by increases in, for example, the prices of materials or repair work, but also by wage increases (e.g., for loss adjusters), the costs of medical care due to medical advancements, which are particularly relevant for personal injuries, and changes in judicial decisions. Depending on the definition of claims and expense inflation, it either includes or excludes the so-called social inflation. Social inflation relates to an increased propensity to court action and a resulting higher compensation for non-life claims.¹²

Masterson (1968) defines a Claims Cost Index, and by comparing it to the consumer price index (CPI), shows that insurance claims costs generally exceed the overall inflation rate. He shows that this increase was especially notable for medical and workers' compensation insurance.

¹¹ See EIOPA (2022b)

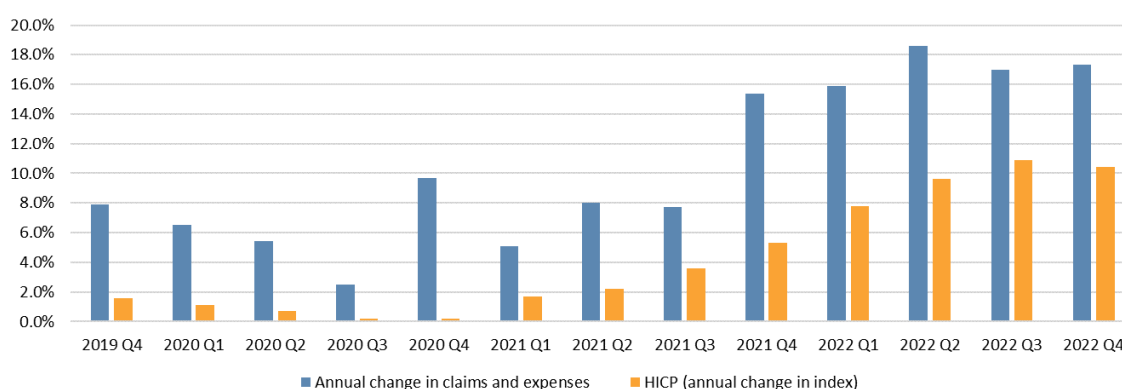
¹² In this report, claims and expense inflation will be considered jointly. The focus is on the claims and expense inflation without social inflation.

Furthermore, by comparing the historical annual growth of incurred claims to the inflation rate, Swiss Re (2010) shows that insurance claims have grown well above the inflation rate in some countries such as United States, Canada, UK, Germany, France, Italy, and Japan, during the period between 1960 and 2008.

Claims inflation tends to exceed the consumer price inflation for certain key lines of non-life business. For example, the construction price index is considered a good proxy for the average claims and expense inflation for the homeowners' insurance, an important segment in the fire and other property line of business. Another example are liability claims, which in the longer term have risen more than general inflation.¹³

Solvency II data confirms that claims and expense inflation have exceeded the general inflation for several years. Figure 1.2 shows the variation of the claims and expenses compared to the harmonised indices of consumer prices (HICP). Figure 1.2 shows that for the last 4 years the claims and expense variation has significantly exceeded the HICP. In particular, a sharp increase in claims and expenses from 2020 to 2022 can be observed. Although the claims and expense inflation are not the only driver of the annual variation of the claims and expenses as portfolio effects are not disentangled, this analysis still gives an indication about the increasing trend in claims and expense inflation in the recent years.¹⁴

Figure 1.2: Claims and expenses annual variation for non-life insurance (base = 2018 Q4, annual %)



Source: EIOPA Quarterly Reporting Solo, EUROSTAT

Claims and expense inflation is country-specific, line of business specific, and undertaking-specific. Concerning the country-specific elements of claims and expense inflation, one can broadly differentiate between EEA and the US inflation trends. Concerning the line of business differences, the drivers of claims and expense inflation differ for short and long-tail business. While for the shorter tail business such as fire and other property the increasing prices of materials and repair work drive the claims inflation, for longer tail-lines of business such as motor third party liability (MTPL), workers compensation or general liability the increase in wages and medical costs are the

¹³ See Swiss Re (2010)

¹⁴ Figure 1.2 is based on Solvency II data (S.05.01 template) which does not allow to differentiate between pure pricing and volume effects.

main drivers. EIOPA (2021) indicates that the business lines general liability, workers compensation marine, aviation, transport insurance and MTPL are long-tail business lines.¹⁵ Finally, undertaking specific portfolio effects are also important for the magnitude of claims inflation. In this regard, the composition of claims plays an important role in the claims and expense inflation, for instance effects such as the share of the personal injuries to damage claims in MTPL.

An interesting question is also if claims and expenses inflation leads, lags or coincides with general inflation. There are lines of business like the homeowner's insurance or damage claims in the MTPL business where claims inflation has been tending to lead general inflation. There might be other lines of business where claims inflation coincides more with the general inflation. Residential liability business might be an example. For long-tail lines of business such as personal injury claims in MTPL, which are particularly driven by wage increases, claims inflation might also lag to some extent general inflation as wage increases oftentimes lag the general inflation.

Overall, when the real trend of claims growth surpasses the estimates assumed when policies were first issued, insurers may face reserve deficiencies. For long-tail lines of business, where claims may need years to settle, unanticipated surges in inflation that were not accounted for in the pricing of insurance contracts, may lead to a situation of under-reserving. The potential extent of under-reserving particularly depends on the degree to which the future inflation assumptions of the undertakings correspond to the actual realised inflation. Too optimistic inflation assumptions might lead to a higher amount of under-reserved technical provisions in a scenario where inflation is stickier than undertakings might have assumed in their best estimate calculations.

1.4 THEORETICAL IMPACT ON POLICYHOLDERS AND BUSINESS MODELS

High inflation has a direct impact on insurance consumers and business models. Focusing on **life insurance**, from a policyholder perspective, an inflationary environment may make it less attractive to enter life contracts and lapses of existing contracts might become more frequent.¹⁶ With-profit contracts normally "smooth" the rates credited to policyholders (i.e., these rates deviate from the actual return on the investments earned for the respective year and guarantees are nominal. This implies that inflation and increasing rates may reduce the policyholder's returns relative to other forms of savings.¹⁷ Other investments may be more attractive, especially short-term securities in case of an inverted shape of the interest rate curve. Lapse rates could increase when the disposable income of policyholders is eroded.¹⁸

¹⁵ See EIOPA (2021), ref. to Chapter 5: *Key Market Factors: Inflation and Government Bond Yields*

¹⁶ EIOPA (2021), ref. to Chapter 5: *Key Market Factors: Inflation and Government Bond Yields*

¹⁷ See Hombert et al. (2021)

¹⁸ EIOPA (2022a), ref to. Chapter 2: *The European Insurance Sector*

Higher inflation may lead to higher nominal policyholder returns in the long run. In case higher inflation is associated with high growth and potentially higher investment income¹⁹, insurers could distribute higher bonuses to policyholders. On the other side, this is not valid in case inflation leads to a weaker economic environment or the product is purely based on guarantees (without the participation elements).

Annuities should also be highlighted in this context. From the policyholder's perspective, these products are being subject to a double hit. First, annuity rates, i.e., the monthly income to policyholders, was low the last years due to the low yield environment. Second, having on top also higher than expected inflation, means that policyholders will get lower than expected real income.²⁰ The same considerations discussed above hold for this case, too.

The sudden strong increase of inflation and interest rates in 2022 puts the profit-participating life insurance business model under double pressure. First, the benefits of saving products if stable in their nominal value lost part of its real value, i.e., after considering the impact of inflation on consumer prices. Then, some portfolios – driven by the need to satisfy guarantees in the low yield environment – contain material portions of long maturity bonds with low yields compared to the current interest rate levels. Thus, it might take some time until benefits in with profit business will catch up with the current return expectations. This could especially become relevant in the competition with the banking sector and in the context of consumers' expectations to receive a fair share of the increasing yields.

In judging this situation and the appropriateness of profit participation, the specific character and benefits of saving in the collective business model, i.e., with profit sharing across policyholders with smoothening over time, needs to be considered. These effects were appreciated in the low yield environment, when profit participation was granted, which were partly materially higher than current market yields and especially not negative. During the low yield environment, this partly led to material single premium new business in some cases. In the current inverse situation, profit participation for single premiums contracts cannot be expected to be higher than for the in-force-book and therefore might not be competitive with the banking sector. Profit-participating life insurance provides a smoothening of a potential future downward movement in yields and of credit events, which a stand-alone direct investment would face. Furthermore, it also includes options, in particular the surrender option, which could prove to be very valuable. A fair price of options, in particular the surrender option, and guarantees have to be taken into account, when comparing returns in with profit business with banking products and direct investments. Finally, and sometimes forgotten, insurance contracts are more than saving products and any insurance protection provided needs to be taken into account as well.

¹⁹ It is to be noted that assumptions related to growth in investment returns are highly uncertain. For example, for equities the Gordon-Growth-model states that earnings growth rates must rise at a higher pace than interest rates for valuations to rise.

²⁰ Some annuity payments can be index-linked to protect against inflation.

In case of unit-linked policies, the policyholder can select the underlying assets from a range of investments, e.g., mutual funds. The allocation could involve assets that provide inflation protection or not, are more/less sensitive to weak economic environment etc. Therefore, the impact depends on the particular case. For example, a portfolio highly skewed towards equity would help beneficiaries in an inflationary environment with high growth. On the other side, when inflation is associated with low growth and declining financial markets, the loss of purchasing power due to inflation would be further exacerbated by the adverse equity performance. The contribution of fixed income assets to the performance of the portfolio would depend on the dynamics of the interest rate. Namely, if in the inflationary environment interest rates increase, the market value of fixed income would depreciate, while if interest rates would decrease fixed income would appreciate and counterbalance equity losses in the case of low growth. A crucial aspect is that these products typically²¹ require financial knowledge/literacy from the policyholder to be able to navigate through the complex dynamics of how investments affect their benefits.

Besides the impact on benefits as such, lapse and withdrawals aspects for policyholders can also be relevant in an environment with high inflation. Higher short-term interest rates (e.g., than the guarantees offered) to slow-down inflation could motivate surrendering the insurance savings contracts, that can be non-optimal from a savings perspective. These lapses can be more pronounced since the weaker real income of policyholders might urge vulnerable consumers to access their funds due to higher living costs. Also, many people close to the retirement age might postpone or consider delaying plans to leave the workforce because of rising costs of living.

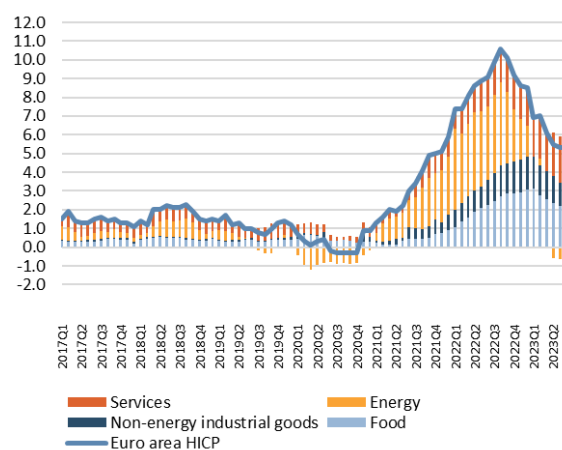
²¹ Some UL products are sold together with an investment strategy essentially managed according to certain mechanisms and not too much influence by policyholders.

2 MARKET AND ECONOMIC LANDSCAPE

2.1 MACROECONOMIC TRENDS

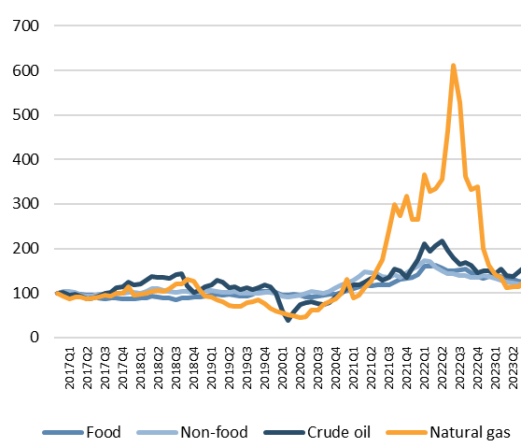
Inflation increased quickly since the middle of 2021 and inflation rates reached a peak of above 10% in October 2022. This is a level not seen for decades and well above the Eurosystem target of 2%. More recently, inflation rates are coming down reaching 5.3% in August 2023 (Figure 2.1).

Figure 2.1: HICP main components (annual % changes)



Source: ECB; Last observation: Aug 2023. Note: EA in fixed composition

Figure 2.2: Commodity prices (Jan 2017=100)



Source: ECB and World Bank. Last observation: Aug 2023. Note: Food and non-food are commodity price indices compiled by the ECB. Crude oil price displayed is Brent. Natural gas prices displayed is an index covering numerous locations provided by World Bank.

The increase in inflation is to a large extent driven by extraordinary external factors. A main factor in 2021 was price pressure driven by the re-opening after the Covid-19 pandemic with rising consumer demand. Supply chain disruptions, augmented by the global economic recovery, have pushed up producer prices due to supply and demand imbalances. Further, the re-opening of the economy has pushed up services inflation. In the second half of 2021 there was a rise in energy and commodity prices, and supply chain disruptions and shortages of labour and materials proved to be more persistent than anticipated. Russia's invasion of Ukraine marked the beginning of a new crisis with serious economic consequences, with sanctions and restrictions on imports and exports of goods and services, including raw materials from Russia, leading to inflationary pressures.

Energy prices contributed significantly to the increase and the decline in inflation. The price of natural gas in Europe spiked in August 2022 when gas imports from Russia were significantly reduced. Figure 2.2 shows how commodity prices have moved in the last years compared to 2017. Natural gas prices have come significantly down starting a trend reversal in September 2022 while

food and non-food commodities have already declined since June 2022. Non-food commodity prices as well as oil and gas prices are only moderately above end-of-2021 levels. Only food commodity prices remain elevated even though they have dropped significantly. These commodity price decreases contributed to a lower inflation rate and an improved economic sentiment at the end of 2022. However, there is significant uncertainty surrounding future energy prices.

While the inflation increase is to a large extent driven by temporary factors, there are also structural, persistent reasons for higher inflation. The IMF highlights that rising geopolitical tensions among major economies have intensified concerns about global economic and financial fragmentation, a reversal of economic and financial integration that is costly for trade and impair supply chains. In this context, the cut in gas supplies caused by the Russian invasion is a major structural change which will have ramifications for several years. As another structural factor, the green transition, including the switch to renewable energy, can have a lasting effect on prices and a structural labour shortage with the demographic change could lead to persistent wage pressures. Further structural factors concern deglobalisation and demographic changes leading to a decline in working population and thus consistently rising wages. The structural changes might particularly be potential drivers of 'inflation is here to stay' scenario.

In 2023, there are different dynamics between headline and core inflation. Lower energy prices removed the pressure from the headline number. However, excluding energy, prices continue to increase and are well above target. In particular, food price inflation increased and there is persistence in services inflation, which is expected to remain high throughout 2023. Wage growth and expanding profit margins could contribute to keeping core inflation elevated.

Market based indicators and consumer surveys show inflation expectations persistently above 2% (Figure 2.3). Long-term inflation (5Y5Y) expectations remain anchored (which is also confirmed by consumer surveys) but are above the Eurosystem target of 2%. The median European consumer expects an inflation rate of 3.4% for the next twelve months and 2.4% three years ahead, as reported by the ECB Consumer Expectations Survey - July 2023 that was published in September 2023. The ECB September inflation projection for 2023 is 5.6% with a forecasted decrease to 3.2% in 2024 and 2.1% in 2025. This projection is an upward revision for 2023 and 2024 and a downward revision for 2025. It remains at elevated levels; high inflation is stickier than previously anticipated. The IMF World Economic Outlook update of July 2023 forecasts global inflation rates of 6.8% in 2023 and 5.2% in 2024.

The high inflation rates led to monetary policy tightening and a sharp increase in interest rates. The ultra-low interest rate environment that persisted for several years has come to an end. In Q1 2023 sovereign nominal yields were at the highest level for years (Figure 2.4). Following a long period of accommodative policies, central banks have changed course. In July 2022, the ECB raised its key interest rates for the first time in a decade. So far, the Eurosystem took multiple monetary policy steps and until September 2023 the key interest rate moved up from zero to 4.5%. The Euro swap curve is widely above the level of preceding years. Over the course of 2022, the swap curve flattened and was downward sloping by the end of the year. One possible interpretation of the inversion of

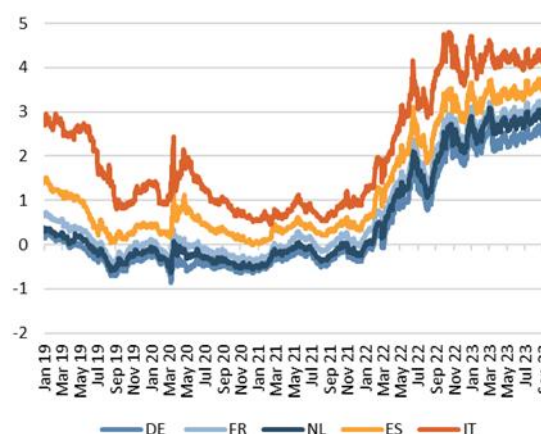
the curve is that the market expects a relaxation of the aggressive monetary policy stance over the medium-term – and possibly a recession. While the continuation of the ECB hiking cycle has led to an increase in short-term rates, market participants perceive a cap on the potential upside of interest rates in the long run.

Figure 2.3: Market based inflation expectations (%)



Source: Bloomberg, Last observation 22/09/2023.

Figure 2.4: 10y government bond yields (%)



Source: Bloomberg, Last observation 22/09/2023.

Consequently, for 2022, global growth was lower than expected, reflecting the effects of Russia's war, the damage to household incomes from high inflation, rising interest rates, and continued disruptions in China due to the COVID-19 pandemic. European growth is projected to remain at a below-trend rate in 2023-24, with inflation moderating gradually as the quick and synchronised monetary policy tightening over the past year takes full effect. In the following table, the growth trend forecasted by different relevant organisations is included. The trend shows a slowdown in 2023 followed by a slight increase in 2024 and 2025. Despite the energy shock and record high inflation, growth for 2022 is now estimated at 3.5% in both the EU and the euro area. GDP is projected to expand by 0.8% in 2023 and 1.4% in 2024 according to EC.

Table 2.1: GDP growth (%)

Organisation	Scope	2023	2024	2025
European Commission	EU	0.8	1.4	
ECB	Euro area	0.7	1.0	1.5
IMF	Euro area	0.9	1.5	
OECD	Euro area	0.9	1.5	
World Bank	Euro area	0.41	1.3	2.3

Source: EU Commission (Summer 2023 economic forecast), ECB (ECB Staff macroeconomic projections, September 2023), IMF World Economic Outlook, July 2023 update), OECD Economic Outlook (June 2023), World Bank Global Economic Prospects (June 2023)

The household demand shock is likely to be cushioned by further easing of household saving rates in many countries, as households have yet to fully use the additional savings accumulated during the pandemic. However, the impact of tighter financial conditions is otherwise likely to be felt throughout the economy over time, particularly on private investment. The disruption caused by the war in Ukraine is also likely to continue weighing on global output, both directly and indirectly,

through the impact on uncertainty, continuing risks to food and energy security, and the significant changes taking place in commodity markets as price caps and Western embargos on Russian energy outputs take full effect.

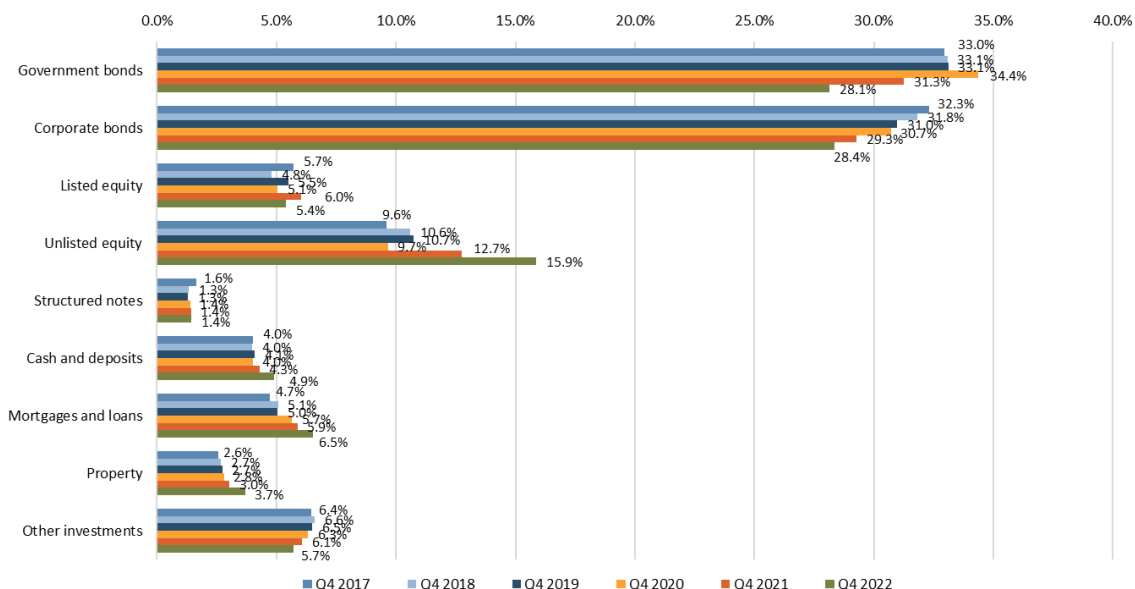
2.2 BALANCE SHEET TRENDS

This section sets up the context of the European insurance sector in aggregate figures. The Solvency II regime is based on a full balance sheet approach with a mark-to-market valuation of assets and liabilities. The market consistent valuation of assets and liabilities implies that any fluctuation in the market is reflected in the balance sheet of the undertakings. As such, any inflationary pressure affects insurers based on their business mix and investment allocation.

2.2.1 ASSET ALLOCATION

The asset allocation of insurers gives an indication how they react over time to macroeconomic developments. Since the introduction of Solvency II, the portfolio composition of EEA insurers remained stable in terms of its structure. Fixed income assets dominate the investments, followed by equity (listed and unlisted) (Figure 2.5). Mortgages and loans, cash and deposits and property have also a significant share.

Figure 2.5: Asset allocation of EEA insurers in Q4 2017 – Q4 2022



Source: EIOPA Quarterly Reporting Solo. Reference date: Q4 2022. Note: Figures are based on look-through for funds. Assets held for unit-linked business are excluded.

The rapid transition from a low interest rate to an inflationary environment with high interest rates has led to volatility of asset valuations. By the end of 2022, the total investments on the balance sheet of EEA insurers amounted to 5.9 tr. EUR (excluding unit-linked assets), dropping by 1.1 tr. EUR

or 15.8% compared to the end of 2021. The decline can be attributed to both changes in valuations (price effect) and adjustments in portfolios (quantity effect). The price effect depends on characteristics of the asset, for instance the time to maturity for bonds, but also on the valuation method. While in principle all assets are valued market consistently, certain asset classes, like property, are illiquid and require the use of Alternative Valuation Methods. These exhibit less sensitivity to interest rate changes or may respond with a time lag.²²

The lower prices of government and corporate bonds are the main explanation for the decrease in the total assets, which dropped in market value by circa 0.8 tr. EUR from Q4 2021 to Q4 2022. The share of government and corporate bonds has decreased significantly from 60.5% in Q4 2021 to 56.5% at the end of 2022. The equity's share has increased from 18.8% in Q4 2021 to 21.3% in Q4 2022, mainly due to the increase of share of unlisted equity. There is also an increase for mortgages and loans and for property, asset classes that are not valued with quoted market prices. Overall, the balance sheet changes do not offer a clear picture of a shift between asset classes.

Regarding the allocation to bonds of different credit qualities, most bonds held by European insurers are investment grade (Figure 2.6). The highest share of the value of bond portfolios represents CQS 3 ("BBB") bonds with 24.4%, having experienced a continuous growth from 2019 Q4 to 2022 Q1 (as a potential reflection of a search for yield behaviour, but also due to other factors). However, during 2022 the share has decreased. The share of low-risk bonds with CQS 0 ("AAA") and CQS 1 ("AA") has decreased from 43.1% before the pandemic to 40.2% in Q4 2022.

Figure 2.6: Credit quality of bond portfolios for the insurance in EAA.

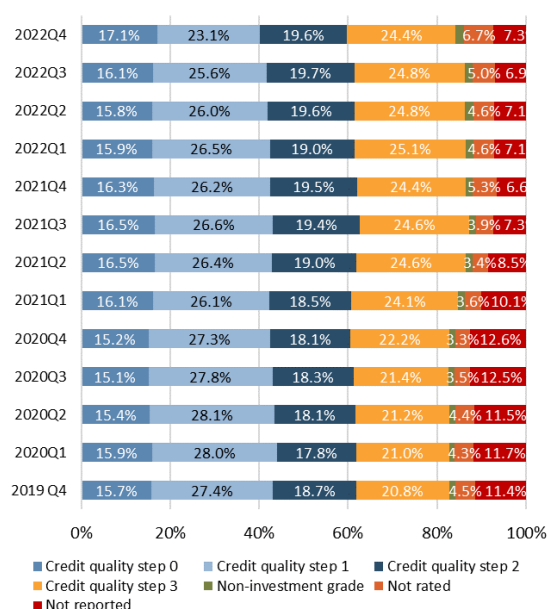
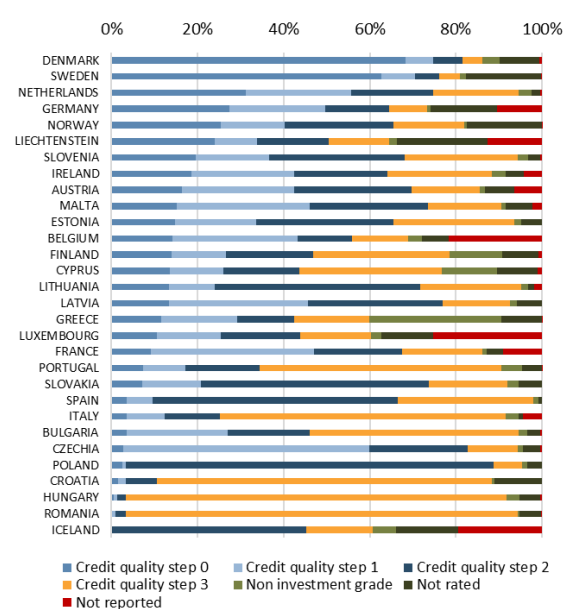


Figure 2.7: Credit quality of bond portfolios for the insurance sector across countries.



²² For instance, while property valuations of insurers correspond over longer horizons with market estimates, valuations did not reflect the asset value decreases estimated by market observers in the second half of 2022. See EIOPA (2023b) for details.

Source: EIOPA Quarterly Reporting Solo. Reference date: Q4 2022. Note: Government and corporate bond portfolios combined. Assets held for unit-linked contracts are included.

At the country level (Figure 2.7), there is great diversity in the level of concentration of the different types of bonds. Northern European countries, especially Denmark, Sweden, Germany, and the Netherlands, have a concentration of bonds mainly with CQS 0 ("AAA") and CQS 1 ("AA"). This portion is lower in southern European countries. The main reason for these cross-country differences is the rating of the home sovereign, which also influences the rating of local corporates. Insurers tend to prefer to hold domestic corporate bonds.

2.2.2 TECHNICAL PROVISIONS

Life technical provisions (TP) significantly exceed those of non-life, with 5.8 tr. EUR (3.5 tr. EUR for traditional life business) compared to 0.7 tr. EUR²³ (Figure 2.8). Besides undertaking specific elements, this asymmetry is due to the business mix, the characteristics of the products and their long-term nature, which by itself results in higher TP. It should be noticed that non-life provides coverage for specific risks, whereas life offers coverage for biometric risks, but also entails an investment component. Consequently, life insurers naturally require larger TP.

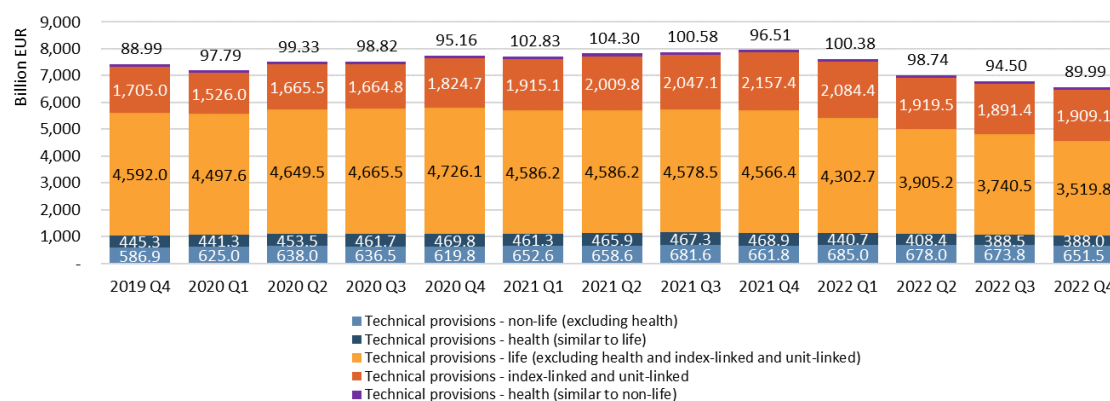
The valuation of liabilities held by the European insurers is market consistent. An increase in interest rates leads, due to discounting, to lower TP. This is the main reason why traditional life TP decreased by 23% from Q4 2021 to Q4 2022. For non-life TP there are two opposite effects in an inflationary environment. Higher inflation assumptions lead to higher non-life TP because of higher future claims payments (claims inflation effect). It is important to emphasize that the claims inflation effect strongly depends on the undertakings best estimate assumptions on future claims inflation. The increase of undiscounted TP is mitigated by higher risk-free interest rates due to discounting (interest rate effect). Both effects should be more pronounced in absolute terms for long-tail than for short tail business. Non-life TP decreased by 2%. This might be due to lower business volume or the discounting effect outweighing the claims inflation effect. The decrease is mainly due to the decrease of the claims provision. It should be also noticed that life TP has higher duration (9.5) than non-life (2.9).²⁴ In addition, the duration of the TP for the median insurer is longer than of the fixed income assets leading to a negative duration gap.²⁵ In other words, in case of an increase in interest rates, the decrease in fixed income assets is overcompensated by the decrease in TP.

²³ The comparison considers all technical provisions as reported in the Solvency II balance sheet templates. Traditional life business refers to technical provisions - life (excluding health and index-linked and unit-linked)

²⁴ See Figure 3.2.A and Figure 3.2.B for median duration of TP in Chapter 3 of this report.

²⁵ See Figure 3.1.A and Figure 3.2.A for median duration of fixed income assets in Chapter 3 of this report.

Figure 2.8 Evolution of life and non-life technical provisions



Source: EIOPA Quarterly Reporting Solo, Balance Sheet Statistics. Reference date: Q4 2022.

2.2.3 INVESTMENT DYNAMICS

As changes in portfolios can be driven by price effects, quantity effects, or a combination of both, it is important to interpret the dynamics in the asset allocation in the light of the trading activities. An analysis of trading activity²⁶ during the low yield environment has shown that insurers have adapted their portfolios to mitigate the negative overall effects of the low yields.²⁷ From 2016-19, insurers were net buyers of corporate and government bonds, however the share of government and corporate bonds relative to total investments decreased.²⁸ There have been higher net purchases of equity, predominantly unlisted equity. Further, the share of property as well as mortgages and loans increased. Another relevant period to consider was the onset of the Covid-19 pandemic, when insurers actively rebalanced their portfolios, displaying indications of procyclical behaviour.²⁹

The switch from the low yield environment with moderate inflation rates to a new regime with high inflation and increasing interest rates changed the trading pattern of insurers. On aggregate, European insurers moved away from government bonds (Figures 2.9 and 2.10) as well as of corporate bonds (Figures 2.11 and 2.12) in 2022. For both, this is the first time on a yearly basis since the introduction of Solvency II. In Q4 2022, insurers' net selling of government and corporate bonds reached a peak since the introduction of SII reporting, both in absolute terms and relative to total investments. In contrast, insurers were net buyers of equity in 2022, except for Q4 2022. This was driven by net purchases of non-listed equity. The trading activity was volatile across the quarters.

²⁶ In the analysis of trading activity, no-look-through is applied and only direct holdings are considered because only for these purchased and sold quantities can be calculated using item-by-item Solvency II reporting data. The analysis is based on quarter-end asset holdings, transactions within the quarters which are not reflected at the quarter-end cannot be observed.

²⁷ See EIOPA (2020a)

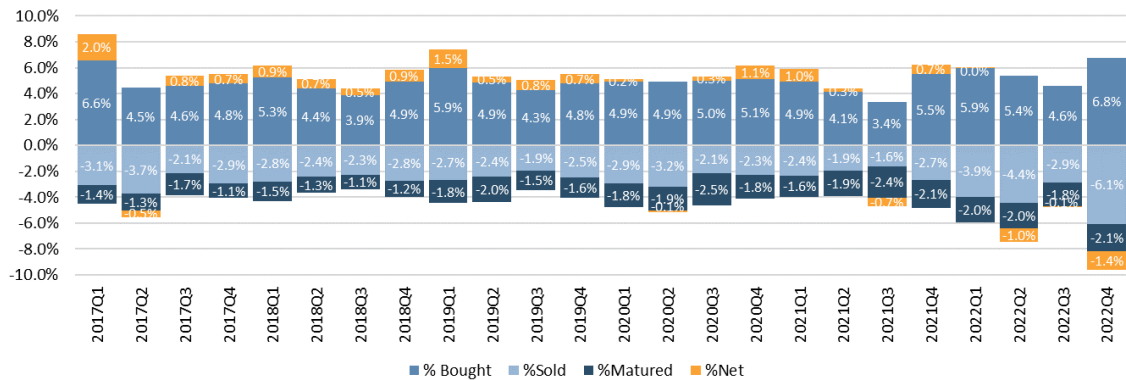
²⁸ Net buying is calculated as the difference between purchased, sold and matured bonds.

²⁹ See Fay and Ghiselli, (2023)

IMPACT OF INFLATION ON THE INSURANCE SECTOR

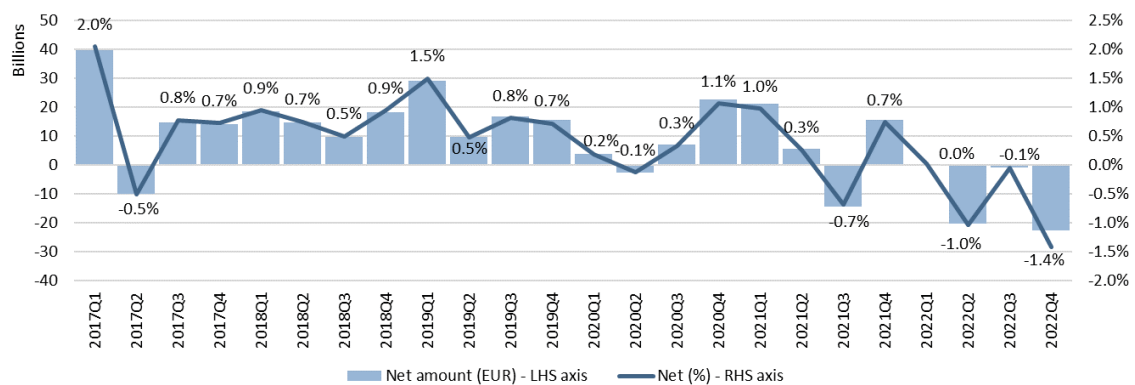
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Figure 2.9: Break down of quarterly changes in the position of insurers in government bonds (% with respect to the initial quarter Solvency II market value of the positions)



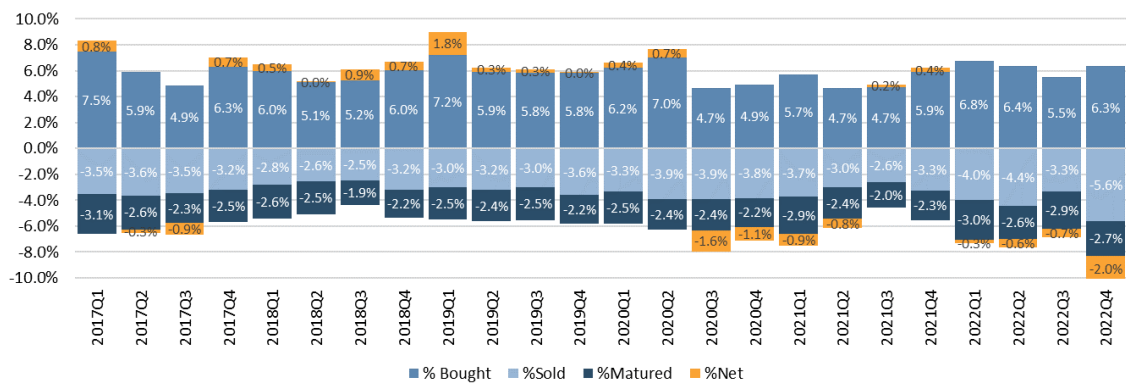
Source: EIOPA own calculations based on EIOPA Quarterly Reporting Solo

Figure 2.10: Break down of net changes in the position of insurers in government bonds (% with respect to the initial quarter Solvency II market value of the positions)



Source: EIOPA own calculations based on EIOPA Quarterly Reporting Solo

Figure 2.11: Break down of quarterly changes in the position of insurers in corporate bonds (% with respect to the initial quarter Solvency II market value of the positions)

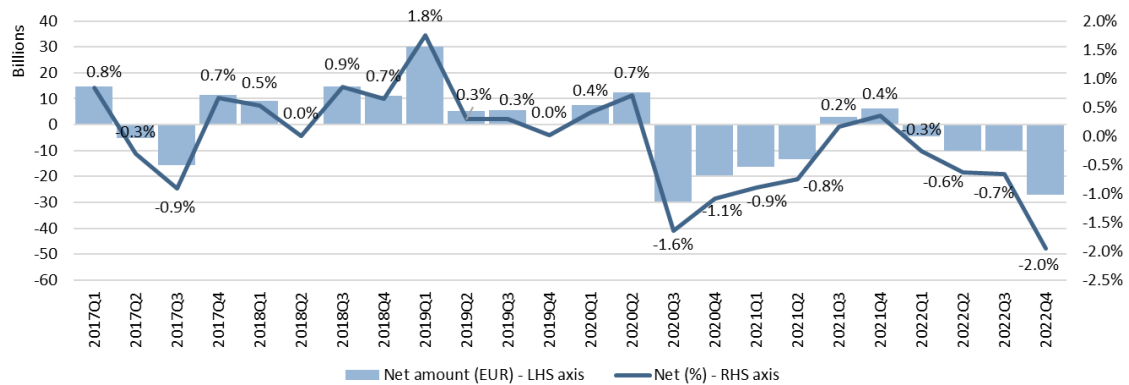


Source: EIOPA own calculations based on EIOPA Quarterly Reporting Solo

IMPACT OF INFLATION ON THE INSURANCE SECTOR

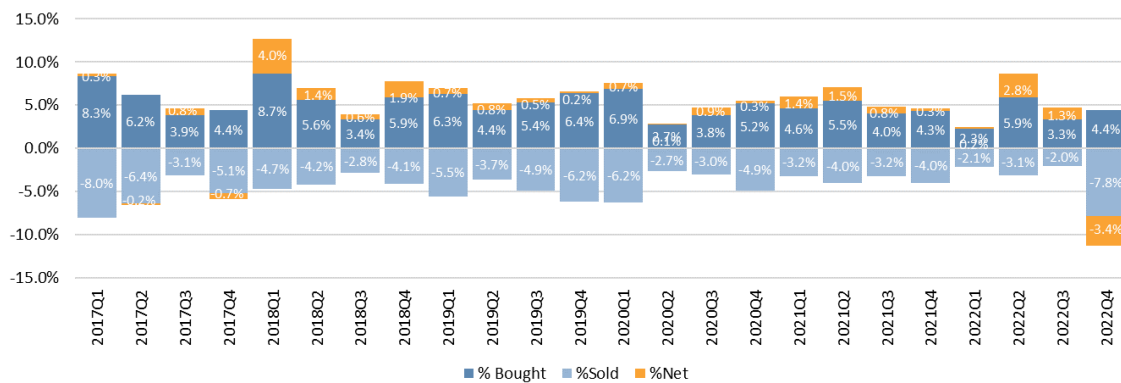
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Figure 2.12: Break down of net changes in the position of insurers in corporate bonds (% with respect to the initial quarter Solvency II market value of the positions)



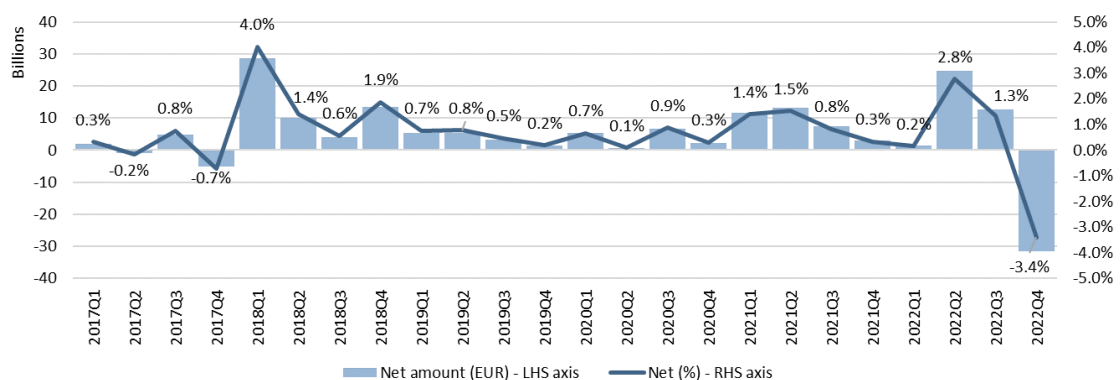
Source: EIOPA own calculations based on EIOPA Quarterly Reporting Solo

Figure 2.13: Break down of quarterly changes in the position of insurers in equity (% with respect to the initial quarter Solvency II market value of the positions)



Source: EIOPA own calculations based on EIOPA Quarterly Reporting Solo

Figure 2.14: Break down of net changes in the position of insurers in equity (% with respect to the initial quarter Solvency II market value of the positions)



Source: EIOPA own calculations based on EIOPA Quarterly Reporting Solo

High inflation and rising yields are expected to bring changes in euro area insurers' asset holdings. However, the direction is still unclear, because of various simultaneous developments that affect the asset allocation. One can differentiate between explanations based on insurers' investment demand and explanations based on asset supply. Solely relying on insurance data makes it impossible to disentangle the multiple potential explanations.

Regarding explanations based on insurer demand, higher risk-free rates may reduce the incentives to search-for-yield when attractive returns can be generated with low-risk investments. This could speak for an increased investment in bonds. Conversely, improved Solvency II ratios enable insurers to increase investment risk, to diversify or to invest counter-cyclically without being constraint by target levels. This may lead to increased investment in capital-intensive asset classes such as equity. Another factor is the shape of the yield curve. Insurers could be incentivised to reduce their asset duration by investing less in bonds with longer maturities as a response to the inversion of shape of the risk-free rate which results in higher returns and less capital charge for the shorter durations. Another factor is the sale of liquid assets to raise cash in response to liquidity needs, which may arise with an increase in lapses rates or margin calls.³⁰ Additionally, the volatility of interest rates and its effect on balance sheet valuations have to be considered. In a time when bond values are volatile, there is an incentive to move to illiquid asset classes such as private equity or infrastructure funds that shield balance sheets against short-term value fluctuations. Finally, higher interest rates affect asset-liability management, for instance because of convexity, i.e., the sensitivity of asset and liability durations to interest rate changes. This could reduce the incentive to invest in government bonds, for which there is a larger share of ultra-long maturity bonds.

With regards to explanations based on asset supply, one must acknowledge that the supply of assets fluctuates over time. In 2022, there was a low issuance of corporate bonds. In contrast, there were record issuances in 2020 during the Covid-19 pandemic. It could be the case that insurers used the record issuances in 2020 to load-up on corporate bonds and in this process, they reached or increased their target holdings.

³⁰ EIOPA (2022b) describes how those insurers that hold interest rate derivatives sold assets to respond to increased margin calls.

3 CAPITAL

3.1 BACKWARD LOOKING PERSPECTIVE

High inflation coupled with an increase in interest rates impacts the capital position of insurers through the market consistent valuation of assets and liabilities and through the assumptions made in the calculation of the liabilities (i.e., best estimate assumption on inflation used to calculate the technical provisions). The impact on the valuation of assets and liabilities amid increasing interest rates, extensively discussed in previous sections, has as a main determinant the duration gap between assets and liabilities.

Focusing on the technical provisions, inflation negatively impacts non-life insurers through the increase in the cost of the claims themselves and of the activities needed to service the claims. Higher expected costs lead to an increase in technical provisions such as claims reserves. As insurers must make assumptions about inflation-induced higher future claims, the risks of under-reserving, eventually under-funding and lower solvency arise. While life insurers with (mostly) fixed nominal benefit payments promised to policyholders are less prone to claims inflation (though still subject to increase in costs of claims management), they may experience lower new business volumes and higher lapses from the secondary effect of interest rate increases.³¹ Over a longer time-horizon, both life and non-life insurers benefit from higher nominal reinvestment yields. As investigated in the empirical models in Chapters 3.2. and 4.2., a crucial question is to what extent the positive effect from higher interest rates compensates the negative effect from higher inflation - and to what extent insurers adjust their terms and conditions.

Figures 3.1 (A to D) and 3.2 (A to D) show the durations of insurers' assets and liabilities for the EEA insurance sector by type of undertaking. Particularly life and composite insurers have typically liabilities with longer durations than assets. However, this relationship may be different for individual insurers. As of Q4 2022, the median weighted average modified duration³² for the fixed income portfolio was 4.1 years for the EEA sample whereas the median modified duration of the technical provisions was 4.2 years.

³¹ On the positive side, for some insurers lapses of unprofitable contracts may be beneficial to the capital position. See, for example, Kubitz et al. (2022).

³² Duration is computed as modified duration for assets and liabilities. Liability duration does not consider options such as future profit participation or surrenders. Duration gap refers to the difference between the duration of assets and liabilities.

Figure 3.1.A: Distribution of fixed income assets duration held by EEA life insurers

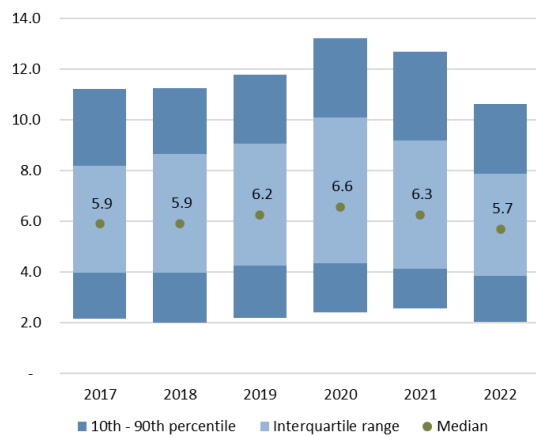


Figure 3.2.A: Distribution of duration of technical provisions held by EEA life insurers

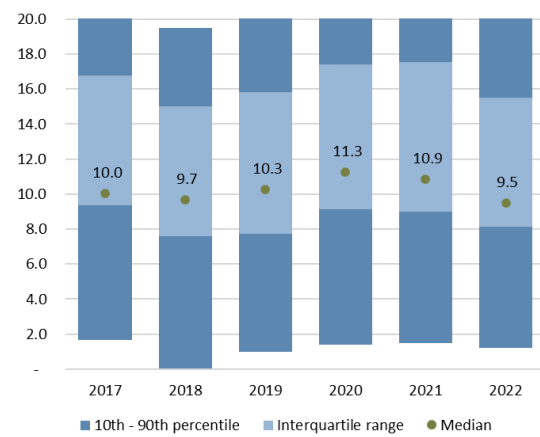


Figure 3.1.B: Distribution of fixed income assets duration held by EEA non-life insurers

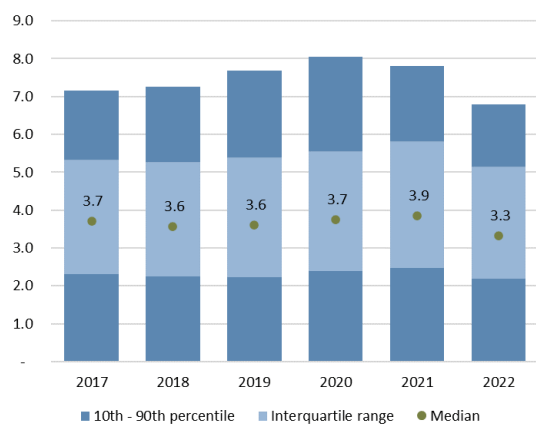


Figure 3.2.B: Distribution of duration of technical provisions held by EEA non-life insurers

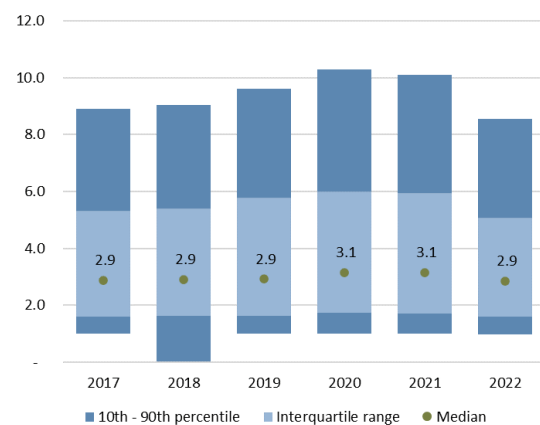


Figure 3.1.C: Distribution of fixed income assets duration held by EEA composite insurers

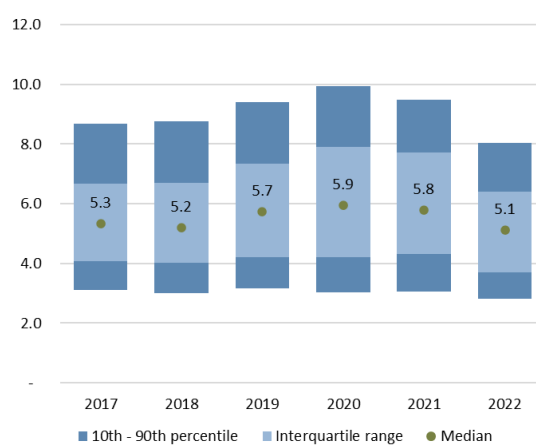


Figure 3.2.C: Distribution of duration of technical provisions held by EEA composite insurers

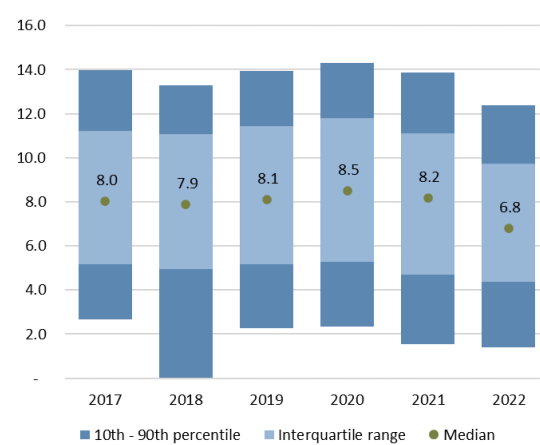


Figure 3.1.D: Distribution of fixed income assets duration held by EEA reinsurers

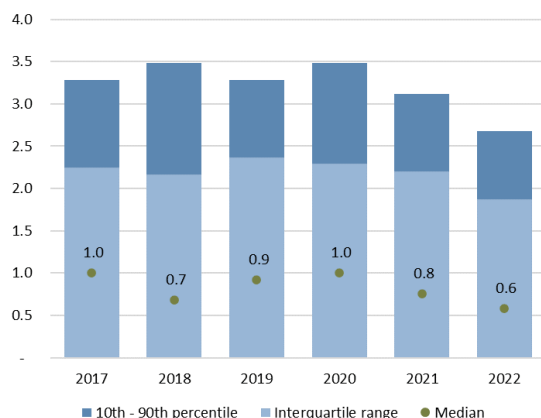


Figure 3.2.D: Distribution of duration of technical provisions held by EEA reinsurers

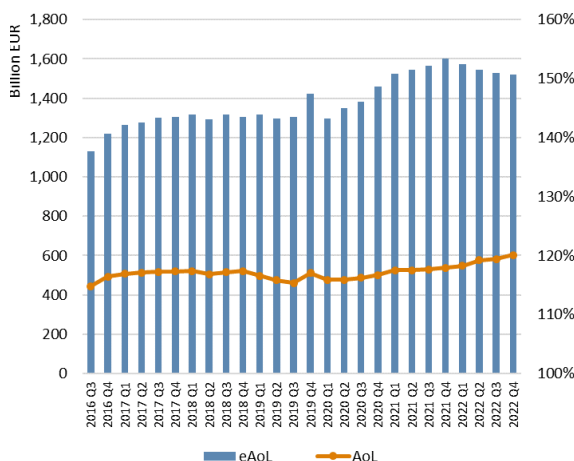


Source: SII QRTs data from EIOPA Central Repository. Quarterly prudential, Solo.S.06.02., S.13.01 and S.18.01

Note: The boxplots show the median, interquartile range and 10th and 90th percentiles of the modified duration for fixed income assets and technical provisions

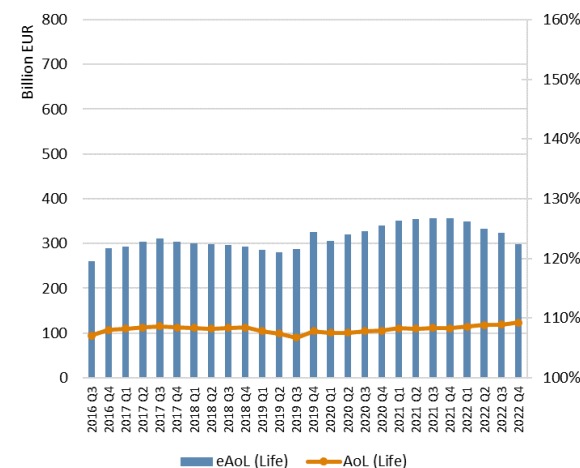
A simple measure for the impact of inflation and interest rates on insurers' capital are the changes in the excess of assets over liabilities (eAoL) and assets over liabilities (AoL). Whereas solvency ratios depend on several factors, both ratios relate to the market values of assets and liabilities and the eAoL can be a proxy for insurers' basic own funds.³³

Figure 3.3: Excess of assets over liabilities (eAoL) and assets over liabilities (AoL) for all EEA undertakings



S: SII data, QRT S.02.01.

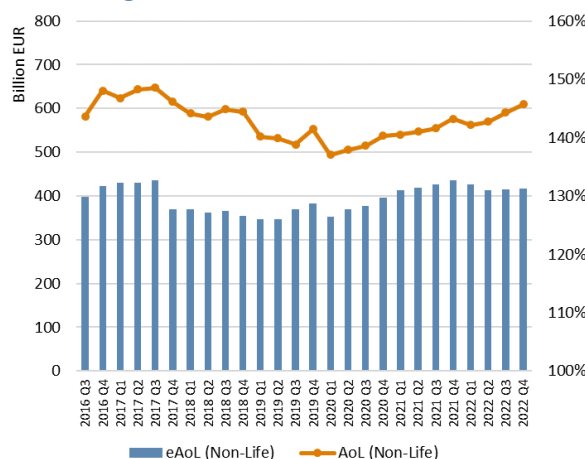
Figure 3.4: Excess of assets over liabilities (eAoL) and assets over liabilities (AoL) for EEA life undertakings



S: SII data, QRT S.02.01.

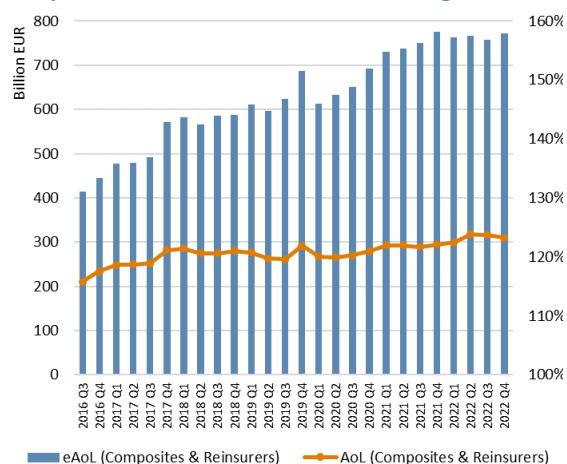
³³ Basic own funds also include subordinated liabilities. Liabilities may be reduced by the loss absorbing capacity of technical provisions (LAC TP), as insurers pass on part of asset losses by reducing future discretionary benefits for policyholders. See also Art. 206 of the Delegated Regulation (EU) 2015/35.

Figure 3.5: Excess of assets over liabilities (eAoL) and assets over liabilities (AoL) for EEA non-life undertakings



S: SII data, QRT S.02.01.

Figure 3.6: Excess of assets over liabilities (eAoL) and assets over liabilities (AoL) for EEA composites and reinsurance undertakings



S: SII data, QRT S.02.01.

As illustrated in Figure 3.3, the eAoL of EEA insurers in aggregate increased since Q3 2016 and reached a peak in Q4 2021³⁴. Since the pick-up in inflation at the end of 2021, the eAoL shows a downward trajectory due to the combined impact of economic and market dynamics. On the other hand, the AoL ratio of EEA insurers continued to slightly increase showing that in aggregate liabilities declined more than assets in relative terms. However, not all individual undertakings follow the same trajectory.

Compared to non-life insurers, European life insurers have lower capitalizations (i.e., ratios of assets over liabilities). Given their long-term, often guaranteed contracts, they are highly sensitive to changes in interest rates and their capital positions have been affected by the ultra-low yield environment since 2009.³⁵ Figure 3.4 shows that EEA life insurers' eAoL slightly declined since Q1 2022 to approx. 300 bn. EUR in Q4 2022, while AoL reached 109.2%. European non-life insurers have overall higher capitalizations and as shown in Figure 3.5 their aggregate eAoL fluctuated between 347.4 bn. EUR in Q1 2019 and 436.5 bn. EUR in Q4 2021. Since Q4 2019 the AoL ratio of non-life insurers has been increasing to 145.7% in Q4 2022. Possible explanations for the improving capitalization of non-life insurers are their often short-term, typical one-year contracts with the possibility to adjust premiums annually and to retain costs by increasing deductibles.

As shown in Figure 3.6 composite and reinsurance undertakings hold the highest eAoL. Due to their diversified business model the impact of inflation and interest rates is not straightforward. They are the only types of undertakings for which assets and liabilities increased in Q4 2022. The

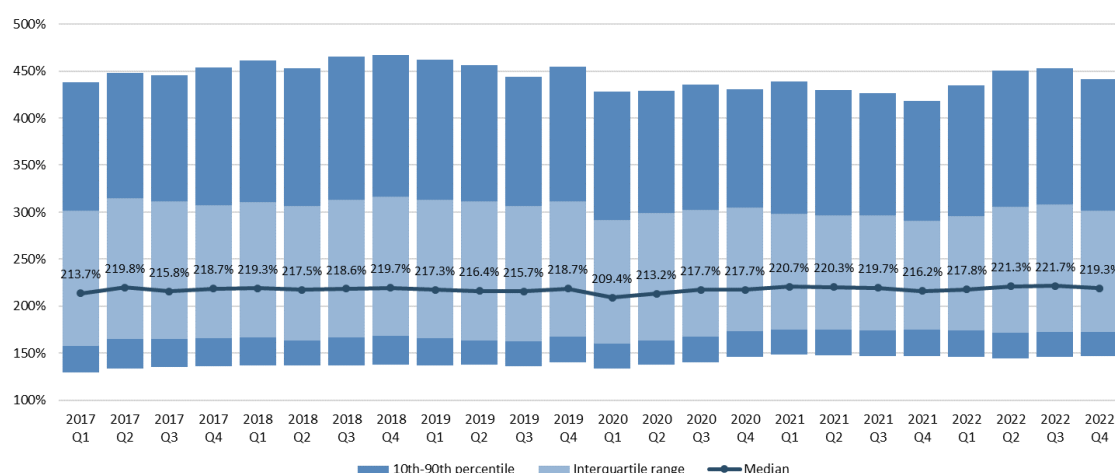
³⁴ The increase in Q4 2019 was driven by a slight increase in interest rates and by the significant increase in eligible own funds in France, due to the implementation of a decree issued in December 2019, that allows integrating part of the reserves for profit sharing in the eligible own funds, as surplus funds.

³⁵ See EIOPA (2020a)

slight decrease in AoL in the last quarters of 2022 can therefore be explained by an increase in aggregate liabilities at a faster pace than assets.

Regarding the solvency capital requirement European insurers' capital positions have overall been very sound and stable since the start of the Solvency II regime in 2016. This also holds true for insurers with lower capitalizations which also benefit from the transitional long-term guaranteed measures:³⁶ The 10th percentile of the solvency capital requirement ratio (SCR%) for EEA insurers increased from 124% in Q3 2016 to 147% in Q4 2022. Figure 3.7 illustrates the median SCR% for all insurance undertakings reaching a peak of 222% in Q3 2022.

Figure 3.7: Distribution of SCR ratios (SCR%) for all EEA undertakings



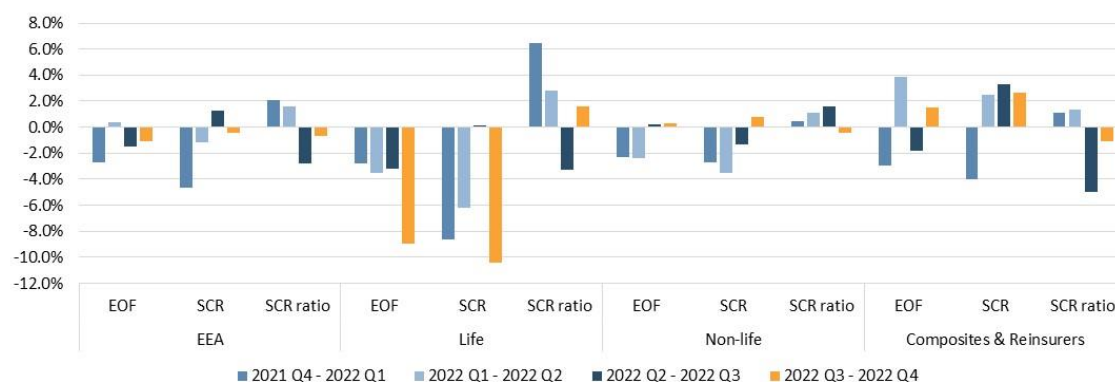
Source: EIOPA Quarterly Reporting Solo

For a better understanding of the solvency ratios since the inflation pick-up in 2022, Figure 3.8 shows their composition. The SCR% relates insurers' eligible own funds (EOF) to the solvency capital requirement (SCR). For life insurers, EOF and SCR declined in 2022. The SCR decline of more than 10% in Q4 2022 compared to Q3 2022 is reflected in an increase of almost 2% in the SCR% of life insurers.³⁷ Composite and reinsurers, on the other hand, had declining SCR% in the last quarters of 2022, whereas the impact of the new economic environment was a lot smaller for non-life insurers.

³⁶ The LTG measures supported aggregate solvency ratios up to 47 percentage points in 2019; see EIOPA (2020c).

³⁷ See also Faugère, (2023) who points out, that the increase in interest rates automatically provides, all other things being equal, an increase in average SCR ratios as the decline in the value of fixed-rate bonds is, on average, more than offset by a decline in the valuation of liabilities owing to longer duration.

Figure 3.8: Change in solvency ratios (SCR%) and its components Q4 2021 to Q4 2022



Source: EIOPA Quarterly Reporting Solo

3.2 FORWARD LOOKING PERSPECTIVE

Given these recent macroeconomic developments, this forward-looking analysis focuses from a financial stability perspective on the insurance sector's vulnerability to inflation and specifically to claims inflation.

As described in Chapter 2, high inflation and increased interest rates have already materialised for almost two years and projections show that inflation might stay for longer. One of the main challenges is to understand whether and to what extent an underestimation of the claims inflation in the best estimate assumption used to calculate the technical provisions might impact the insurance sector.

3.2.1 METHODOLOGY

To come up with an estimation for the potential impact, a simplified top-down approach is used to model the European insurance market. Starting from the baseline as the end of 2022, two different narratives are employed.

1. **Scenario 1** assumes the materialization of the average consumer price index (CPI) projections of IMF that were published in April 2023³⁸.
2. **Scenario 2**: assumes an adverse unfolding of inflation and elaborates on the trajectory of inflation included in the adverse scenario of the EBA 2023 EU-wide stress test³⁹. Given the uncertainty on the timing of the convergence to the ECB long-term inflation target of 2%, starting from the EBA HICP adverse for 2023-2025, three scenarios are tested:

³⁸ See [World Economic Outlook \(April 2023\) - Inflation rate, average consumer prices \(imf.org\)](https://www.imf.org/en/Publications/WEO/Issues/2023/04/20/wEO-23-01)

³⁹ See [EBA launches 2023 EU-wide stress test. | European Banking Authority \(europa.eu\)](https://www.eba.europa.eu/en/press/2023/04/2023-stress-test)

- **Scenario 2.1:** Convergence to ECB inflation target within 3 years
- **Scenario 2.2:** Convergence to ECB inflation target within 5 years
- **Scenario 2.3:** Convergence to ECB inflation target within 10 years

As its aim is identifying the effect of the underestimation of claims inflation, scenario 2 does not encompass additional shocks to assets classes like equities. However, to avoid a too theoretical discussion that is detached from the economic theory, it assumes an increase in interest rates reflected into positive shocks to swap rates which will be considered in the valuation of fixed income assets and in the discount curve used to calculate the technical provisions. The approach taken to simulate the impact of the scenarios assumes a fixed balance sheet approach, using as a baseline the year-end 2022 Solvency II QRTs. For assessing the sensitivity to shocks, individual balance-sheet assets and liabilities positions as well as the excess of assets over liabilities are recalculated and compared to the baseline. The shocks are assumed to be one-off, instantaneous, and simultaneous.

3.2.1.1 Scenario 1

The **Scenario 1** assumes that the inflation evolves according to the projection of the IMF, therefore its movements are already priced in by the markets (e.g., swap rates). Against this, no impact on the assets and on the discount curve for the liability is prescribed.

The scenario assumes that the best estimate assumptions on inflation are fully based on the ECB inflation target of 2% and not on the actual and expected levels. Against this, the shocks to the inflation assumptions are prescribed in terms of a new inflation vector used to recalculate the projected liability cash flows. The shocks are separately applied to life and non-life liabilities using the cash-flow approach. For the life technical provisions, the IMF CPI projections are used to re-estimate the projected expenses, while for the non-life business the same treatment of the expenses is complemented by the re-estimation of the claims provisions through the vector calculated as follows:

$$\text{Claims inflation}_i = (CPI_i * 2 - 2\%)$$

where CPI_i is the IMF projection of the inflation for year i . The value is multiplied by 2 to account for the relation between consumer prices and claims inflation (see section 1.3 and Table 3.1). 2% is the ECB inflation target that is assumed to be embedded in the best estimate. This assumption is made due to Articles 29 and 30 of Commission Delegated Regulation (EU) 2015/3512, that state that undertakings should ensure that inflation is adequately considered according to the nature, scale, and complexity of the risks, so that the level of technical provisions remains appropriate⁴⁰.

Table 3.1: Scenario 1 – claims and expense inflation shocks

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
CPI (%)	6.3	3.3	2.4	2.1	2.0	2.0	-	-	-	-
Claims/expenses inflation shock (%)	10.60	4.60	2.80	2.20	2.00	2.00	2.0	2.0	2.0	2.0

Source: CPI European Union- IMF, [World Economic Outlook \(April 2023\) - Inflation rate, average consumer prices \(imf.org\)](#), Inflation shock – EIOPA own calculations

⁴⁰ See EIOPA (2022c)

Shocks are applied to the cash flows according to their maturities. Cash flows are eventually discounted with the EIOPA December 2022 RFR curves to obtain the best estimate as follows:

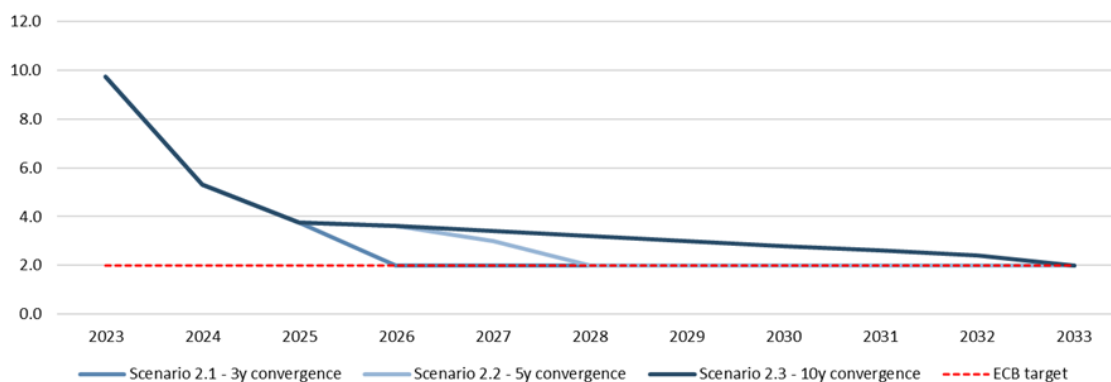
- **Assets:** no shocks
- **Liabilities:**
 - Life BE liabilities: Future expenses and other cash out-flows are inflated based on the parameters
$$CF_t^{Shock} = \text{future expenses and other cash outflows}_t \times \prod_{j=2023}^t (1 + \beta_j) + \text{other } CF_t^{baseline}$$
where 2023 is the first year of the projected shock, β_j is the inflation shock in the year j , CF_t^{Shock} is the recalculated cash-flow and $CF_t^{baseline}$ is the baseline cash-flow
 - Non-Life BE liabilities: Future expenses, future benefits and other cash out-flows are inflated based on the parameters
 - $CF_t^{Shock} = (\text{future expenses and other cash outflows}_t + \text{future benefits}_t) \times \prod_{j=2023}^t (1 + \beta_j) + \text{other } CF_t^{baseline}$
where 2023 is the first year of the projected shock, β_j is the inflation shock in year j , CF_t^{Shock} is the recalculated cash-flow and $CF_t^{baseline}$ is the baseline cash-flow

3.2.1.2 Scenario 2

Scenario 2 uses the inflation curve from the adverse scenario of the EBA 2023 stress test. While EBA scenario encompasses a larger set of market shocks, for the purpose of our simulation it relies only on HICP and swap rates. As in Scenario 1, the model assumes that claims and expense inflation are two times the CPI inflation (see section 1.3) and that the 2% ECB inflation target is embedded in the best estimate.

Swap rates are used to recalculate the risk-free rate curve according to the EIOPA methodology, and to recalculate the value of the fixed income assets exposures, to which a parallel shock up in the swap rates of 131 bps is applied. This is selected based on the change in the EUR 10Y swap curve in the adverse scenario compared to the December 2022 baseline. As the adverse HICP provided in the EBA stress test covers the period 2023-2025, the simulations are split into three cases, depending on the convergence of the inflation to the 2% ECB target (Figure 3.9). No shock to interest rate derivatives is applied.

Figure 3.9: Scenario 2 – Tested developments of HICP (%) after 2025 EBA adverse input



Source: EBA 2023 EU-wide banking sector stress test for 2023-2025 adverse HICP (%) and EIOPA assumptions

The scenario of a long-lasting inflation (“inflation is here to stay”) is based on the Scenario 2.3. It represents a more severe scenario with higher inflation shocks and particularly a slower return of the inflation towards the inflation target. Different economic drivers might lead to a high and persistent inflation. These factors include de-globalization, limited resources, climate change as well as demographic change and skills shortage. Moreover, public awareness of high inflation keeps growing and the longer inflation stays high, the more embedded it is likely to become, which might result in households becoming less perceptive for central bank policies. The scenario therefore considers that there are high uncertainties in the inflation forecasts and moreover there are economic drivers which could lead to an inflation scenario where inflation is here to stay. More importantly, a long-lasting inflation scenario is a particular risk for insurance undertakings and should thus receive supervisory attention. Accordingly, it is important to consider also such a severe scenario in the forward-looking perspective. In this case, shocks are again applied to the cash flows according to their maturities while they are eventually discounted with the recalculated RFR curves based on the swap rates:

- **Assets:** parallel shock in the swap rates of +131 bps and revaluation of fixed income assets (government and corporate bonds) based on a duration approach at country level. No inflation shock is applied to inflation sensitive assets.

$$Yield_{post\ stress}^{Bond} = Yield_{baseline}^{Bond} + (Swap_{post\ stress} - Swap_{baseline})$$

- **Liabilities:** inflation shock (applied as in Scenario 1) + recalculation of TP life and TP non-life using the change in the RFR curves based on a + 131 bps shock

Collective investment undertakings (CIUs) are considered in the analysis, but no look-through approach is applied. The applied shocks are based on an average composition of equity and fixed income assets by country and by average duration for the fixed income assets.

$$shock_{CIU} = (1 - \alpha_{equity, country}) \times shock_{fixed\ income, country, duration}$$

where $\alpha_{equity, country}$ is the average proportion of equity in the country of issuance.

Table 3.2: Scenario 2 – inflation shocks

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	after 2033
	EU HICP - Scenario growth (%)	9.7	5.3	3.8								
HICP (%)	Scenario 2.1	9.7	5.3	3.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Scenario 2.2	9.7	5.3	3.8	3.6	3.0	2.0	2.0	2.0	2.0	2.0	2.0
	Scenario 2.3	9.7	5.3	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.0
Claims/expenses inflation shock (%)	Scenario 2.1	17.5	8.6	5.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Scenario 2.2	17.5	8.6	5.5	5.2	4.0	2.0	2.0	2.0	2.0	2.0	2.0
	Scenario 2.3	17.5	8.6	5.5	5.2	4.8	4.4	4.0	3.6	3.2	2.8	2.0

Source: *EU HICP (adverse EBA 2023 EU-wide banking sector stress test), Claims and expenses inflation shock – EIOPA own calculations and assumptions

Table 3.3: Scenario 2 – Adverse swap rates

SWAP rates		
		Adverse rates (%) - 2023
EUR	1M	4.19
	3M	4.43
	1Y	5.19
	2Y	5.18
	3Y	5.16
	5Y	4.98
	7Y	4.82
	10Y	4.57
	20Y	4.49
	30Y	4.28

Source: EBA 2023 EU-wide banking sector stress test

3.2.1.3 Assumptions

All calculations are based on the following *assumptions*:

- Claims and expenses inflation for insurers is twice the amount as the general EU HICP
- Insurers currently assume a flat 2% inflation rate in their technical provisions
- Only modelling of investments and liability portfolios (i.e., no Unit- and Index-linked business)
- No consideration of the loss absorbing capacity of profit sharing
- Use of duration approach for fixed income assets
- Uniform application of claims/expenses inflation shocks across all lines of business
- Life insurers' claims provision is not sensitive to inflation
- Exclusions of reinsurance business
- Inflation linked bonds, swaps or assets are not shocked
- Interest rate swaps are not shocked in the main model, but an indication of the effect of shocking interest rate swaps is provided.

3.2.1.4 Metrics

Regarding the *metrics*, the model computes the impact of the prescribed shocks on the balance sheet items, up to the excess of assets over liabilities (eAoL) and its constituents (i.e., investments, technical provisions, etc.). As the shocks impact both assets and liabilities to different extent and the relevance of absolute changes depends on the respective size of insurers, the analysis employs the ratio between eAoL and TPs as the main indicator for the level of the surplus the insurers hold throughout the different steps.

3.2.1.5 Scope

To what concerns the *scope*, the sensitivity analysis targets solo undertakings and is performed using a combination of QRTs and market data with the reference date end 2022. The sample includes 1233 insurers (356 composite undertakings, 313 life undertakings and 564 non-life undertakings). Consistency checks between the discounted cash-flows and the best estimates

reported in the balance sheet (confidence interval applied) and completeness checks of the reporting (i.e., no gaps in cash-flow templates) were performed.

Table 3.4: Sample information

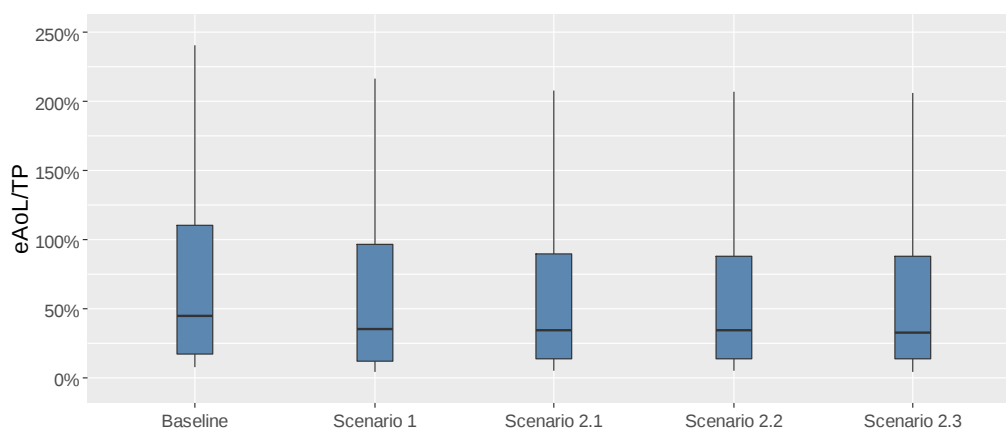
Type	No. of companies	Total assets (bn. EUR)	Total liabilities (bn. EUR)	eAoL (bn. EUR)
Life undertakings	313	3,060.1	2,777.8	282.3
Non-Life undertakings	564	841.1	535.7	305.4
Composite undertakings	356	3,124.3	2,710.9	413.4
Total	1,233	7,025.5	6,024.4	1,001.1

3.2.2 RESULTS

3.2.2.1 Aggregated results

Results of the evolution at aggregated level (life, non-life, and composite undertakings) of the main indicator starting from the baseline and moving to the two adverse scenarios are shown in Figure 3.10. Each boxplot illustrates the distribution of eAoL/TP in the baseline and after the application of the shocks in each of the scenarios considered.

Figure 3.10: Evolution of the aggregated results of eAoL/TP for baseline and each adverse scenario.



Note: Distribution of eAoL between 10th and 90th percentile.

The application of the inflation shock in **Scenario 1** to life and non-life business best estimates causes a drop in the median eAoL/TP from 44.9% to 35.5%. The median insurer experiences a 16.1% drop in the absolute eAoL, from 125.8 mil EUR to 105.6 mil. EUR (see Table 3.5). Based on the aggregated assets and liabilities of all EEA insurers in the sample the absolute excess of assets over liabilities is reduced by 146.3 bn. EUR (-14.6%) compared to the baseline.

Table 3.5: Summary results

	Indicator	Baseline	Scenario 1	Scenario 2.1	Scenario 2.2	Scenario 2.3
Individual level	Median eAoL/TP	44.9%	35.5%	34.6%	34.4%	32.8%
	Median eAoL (mil. EUR)	125.8	105.6	107.5	105	101.7
Aggregated EEA level	Aggregated eAoL/TP	16.6%	13.9%	17.9%	17.5%	17.0%
	Aggregated eAoL (bn. EUR)	1,001.1	854.8	1,013.2	996.7	972.2

In **Scenario 2.1**, the short-term convergence to the ECB inflation target within 3 years, results in the median eAoL/TP dropping to 34.6% compared to the baseline. In this narrative, the median insurer loses 18.3 mil. EUR (-14.5%) in terms of excess of assets over liabilities. Looking at the aggregate figures for the EEA insurance sector, a move in the opposite direction is observed. Overall, the EEA aggregated eAoL/TP moves up leading to an increase in absolute eAoL of 12.1 bn. EUR (+1.2%). The opposite move at aggregated level is explained by the fact that the sample in terms of size is dominated by life companies that benefit from the interest rate shock by having a long duration of their technical provisions and shorter duration of their assets and that are less impacted by the inflation shock. In other words, the higher discount rates compensate for the life undertakings the inflation shock and the loss in value of the fixed income assets. However, in the EIOPA Financial Stability Report⁴¹ a similar sensitivity analysis shows that an increase in the level of risk premia can neutralize the beneficial impact of the higher discount curves. Furthermore, if the impact from interest rate derivatives held by the insurers in the sample to a 131 bp interest rate shock up⁴² would be considered, the aggregated sample would lose approximately an additional 27.1 bn. EUR of assets and thus eAoL. That would mean that also the aggregated eAoL/TP would move in the same direction with the median indicator. As only 104 insurers in this sample out of 1233 use derivatives to hedge against interest rate movements, it is important to mention that their use is specific to certain insurers and markets in Europe.

The medium-term convergence to the ECB 2% target scenario, **Scenario 2.2**, shows that the impact of the shocks is higher than in Scenario 2.1. The median eAoL/TP decreases to 34.4%. In this narrative, the median insurer loses 20.8 mil. EUR (-16.5%) in terms of excess of assets over liabilities. Again, the opposite move observed for the aggregated figures for eAoL/TP and explained in Scenario 2.1, is still present; however, the beneficial impact of the interest rates is lower than in the previous scenario. In this circumstance, the aggregated eAoL drops below the baseline levels by 4.4 bn. EUR (-0.4%). Finally, the most severe scenario in terms of inflation shocks, **Scenario 2.3** suggests that the median eAoL/TP reaches the lowest level among the narratives considered (32.8%). In this context, the median insurer would have its eAoL decreasing by 24.1 mil. EUR (-19.2%) compared to the end of 2022. The severity of the scenario is reflected also at aggregated level as the overall eAoL would decrease by 28.9 bn. EUR (-2.9%).

⁴¹ See EIOPA (2022b)

⁴² For methodological aspects on this approximation, please refer to Chapter 5.2.2.

3.2.2.2 Results by type of undertaking

As the sensitivities to changes in inflation and interest rates vary considerably by type of undertaking, splitting the sample allows for a better understanding of the results. Table 3.6 provides a summary of the main results by type of undertaking while Figure 3.11 shows the distribution of eAoL/TP through the baseline and the two adverse scenarios for life, non-life, and composite undertakings.

Table 3.6: Summary results by type of undertaking

Type	Indicator	Baseline	Scenario 1	Scenario 2.1	Scenario 2.2	Scenario 2.3
Life undertakings	Median eAoL/TP	14.0%	11.1%	17.7%	17.2%	16.7%
	Aggregated eAoL (bn. EUR)	282.3	222.8	360.0	353.1	342.6
Non-life undertakings	Median eAoL/TP	78.2%	66.2%	58.1%	58.1%	58.1%
	Aggregated eAoL (bn. EUR)	305.4	269.3	270.2	266.6	261.5
Composite undertakings	Median eAoL/TP	36.1%	29.6%	31.4%	30.9%	30.5%
	Aggregated eAoL (bn. EUR)	413.4	362.7	383.0	376.9	368.1

Life undertakings

Decomposing the sample by type of undertaking, for life undertakings the negative impact of inflation (**Scenario 1**) unfolds over a long-time horizon with respect to non-life business due to the long duration of liabilities. The median eAoL/TP drops from 14.0% (baseline) to 11.1% (**Scenario 1**). This amounts to a relative drop in the median eAoL/TP of 20.7%. Further, the median eAoL/TP rises to 17.7% in **Scenario 2.1**, 17.2% in **Scenario 2.2** and 16.7% in **Scenario 2.3**. The results show that, under the assumption that the liabilities are mostly in nominal terms (which is most often the case), the higher interest rates more than compensate the inflation effect. However, the erosion in the real value of payments and higher interest rates might lead to higher lapse rates and a decrease in new business. As the liabilities of life undertakings have typically a longer duration than their assets, the drop in asset values is more than compensated by the lower value of liabilities resulting from the higher discount rates.

It is important to mention that although the balance sheet might improve due to rising interest rates for life undertakings, technical provisions are impacted by the increase in claims and expenses inflation as can be concluded from Scenario 1. Therefore, not taking proper inflation assumptions into account in the calculation of the technical provisions, while interest rates automatically increase, leads to an overly optimistic presentation of the balance sheet and might expose life undertakings to losses.

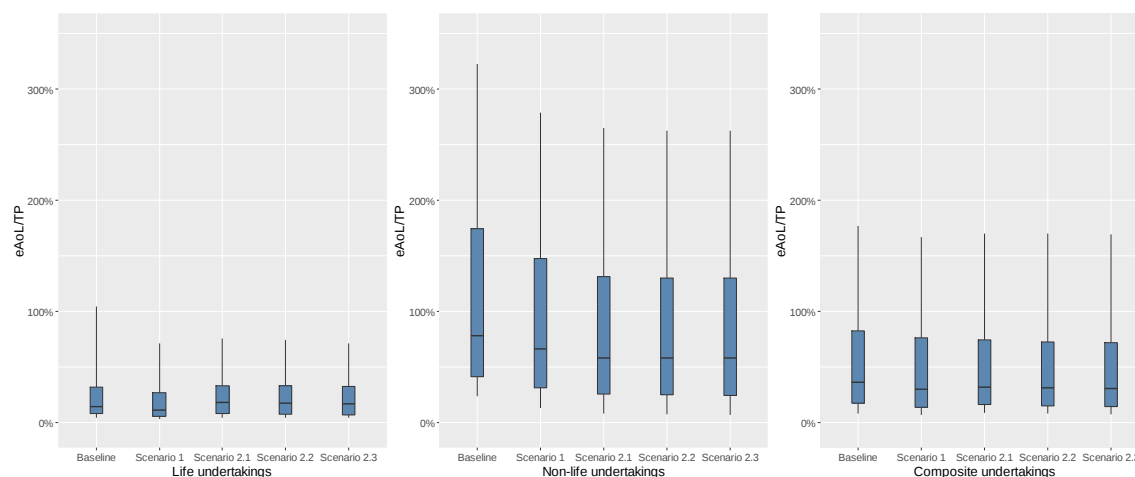
Non-life undertakings

Non-life undertakings are affected by the scenarios mostly on the short-term horizon (Figure 3.11). In **Scenario 1**, the increase in expenses and claims inflation reduces the median eAoL/TP from 78.2% in the baseline to 66.2%. This amounts to a relative drop in the median eAoL/TP of 15.3%. The impact depends on the types of risk underwritten. Long tail business such as workers compensation, medical professional liability and other liability coverage entails a higher risk of underestimating future inflation. The increase in interest rates together with the inflationary shocks in the **Scenario**

2 narratives show how vulnerable non-life undertakings are to this kind of environment. The median eAoL/TP drops even more than in the previous scenario to approximately 58.1% in all three scenarios (**Scenario 2.1**, **Scenario 2.2**, **Scenario 2.3**). While the median eAoL/TP remains almost unchanged in Scenario 2, the interquartile range changes (Figure 3.11). This is explained by the fact that the median duration of non-life TP is 2.9 (Figure 3.2.B) which means that the longer-term inflation scenarios impact more the non-life companies that have longer duration of their liabilities. Overall, for Scenario 2, this is the opposite effect to what is observed for life undertakings.

The results confirm the expectation that interest rates changes have a less significant impact on non-life companies due to the on average shorter duration of their liabilities and the lower duration mismatch between assets and liabilities. The results for median composite undertaking in the sample follow the same pattern as for the non-life undertakings. The main difference is that the losses in the median eAoL are smaller due to the impact of interest rates.

Figure 3.11: Evolution of eAoL/TP by scenarios and type of undertakings



One important qualification of the above results is that the higher sensitivity of non-life undertakings to the shocks does not automatically translate into a higher risk of default: Even though in aggregate, the life undertakings are less affected by the applied shocks than non-life and composite undertakings, their level of excess assets over liabilities in the baseline (i.e., their starting point) is lower than for the non-life undertakings. This explains why the proportion of life undertakings with less assets than liabilities after the shocks is higher than their share in the sample.

3.2.3 CONCLUDING REMARKS

From a financial stability perspective, changes in the term structure of interest rates as well as high inflationary pressures are significant sources of risk for the insurance sector. The economic narratives employed in the sensitivity allow a better understanding on how inflation and interest rate shocks affect different types of insurers.

Within the discussed limitations of the model and of the data, the results confirm that isolated **inflation shocks have a negative effect** both on life and non-life undertakings according to the nature of their business. The increased **interest rates have a beneficial effect** on undertakings with long term liabilities and material negative duration gap (life and composite undertakings). In their case, the increase in interest rates more than compensates the negative effect of inflation on the liabilities. In contrast, non-life undertakings with their short duration liabilities do not benefit enough from higher interest rates to offset the inflation effects. Moreover, non-life undertakings with long tail business are more exposed to inflation due to the higher risk of underestimating future claims.

The longer the inflationary environment lasts, the more impacted are both life and non-life business. Therefore, given the high uncertainty on inflation, insurers need to choose a prudent approach on reserving and carefully investigate their vulnerabilities in the ORSA including sensitivities on longer lasting inflation.

4 PROFITABILITY

4.1 INTRODUCTION

This section discusses the effect of inflation and interest rates on insurers' profitability, focusing on life and non-life business. Insurers' current and future profitability is a key element for the financial stability of the sector for several reasons: First, profitable insurers can build up own funds. Second, they are more likely to be able to raise capital in case they face short-term turbulences. Third, profitability maintains the trust of policyholders. Fourth, if their operations are profitable, they might be less prone to take additional risks. Considering all these arguments, profitability can be regarded as an indicator for the resilience of an insurer which contributes to the resilience of the market.

Given the current inflationary environment, when assessing its impact on profitability, the time horizon needs to be considered. In the short term, the impact of inflation on profitability is typically negative, in particular for non-life insurers and particularly for those insurers which have a higher share of business in very competitive lines of business such as Motor Third Party Liability insurance. On the one hand, its impact is reflected in higher claims for which insurers must increase their reserves. At the same time, to cope with the increase in claims, premiums need to be adjusted. As this cannot be done immediately and is limited by market competition, underwriting profitability is reduced. Furthermore, since inflation is usually accompanied by higher interest rates, like in the current macroeconomic situation, the lower values of fixed-income assets are a drag on the investment results. How lower market values for their investments impact the profitability of insurers depends to a large degree on the treatment of unrealized gains and losses under the accounting rules. In summary, non-life undertakings are negatively impacted by high inflation through the income channel, balance sheets valuation and (in case of positive duration gap) capital positions.

The situation for life business in the short term is different. Claims inflation is normally not a concern for life insurers as claims are typically defined in nominal terms. However, higher expenses due to inflation reduce profits. An environment with high inflation and high interest rates could be beneficial as it makes easier to cover the guaranteed rates for existing business with investment income, as new investments in bonds would generate higher yields. There are though competitive challenges with other products as the rates credited to policyholders only increase gradually and more profitable short-term investments might become more attractive. Acting rationally, policyholders might therefore lapse their products with consequences on future profits.

In unit-linked business, insurers usually charge a share of the investments backing the policies as fees. Higher yields on fixed-income investments result in valuation (capital) losses of existing holdings and thus biting fees and lowering short-term profitability.

The following analysis focusses on the effects on the profitability in the medium to long term when the business written after the inflation shock represents most of the existing business. The reason is that in Solvency II the lower profitability for existing business resulting from higher inflation and possibly increased interest rates is reflected in a reduced excess of assets over liabilities. This is already captured in the chapter on capital. Moreover, potential providers of regulatory capital will normally look at the earnings potential over the lifetime of the company. For traditional life business with guarantees the impact on profitability in the short term is however of particular relevance. Higher yields on new fixed-income investments would only gradually increase the returns on existing bond portfolios and consequently the rates credited to policyholders. This would create incentives for policyholders to lapse and to shift to products with better perceived returns.

The analysis is split into two sections. The first part looks at measures and ratios for historical profitability distinguishing between profits stemming from investment activities and profit stemming from underwriting activities (e.g., premia and claims). 2022 brought a significant surge in inflation and higher interest rates. Looking at changes in the trends for relevant indicators can therefore provide an intuition about the effects without the need to make any assumptions about future developments. Historical quantities and ratios can also provide an “anchor” for projections into the future (e.g., the effect of inflation on future combined ratios). When drawing conclusions, one needs of course to be mindful that observed changes might have multiple reasons with inflation being one of the drivers.

The second part assesses how inflation and higher interest rates could impact the profitability of new non-life business. It also analyses how higher yields on fixed-income investments would impact the investment returns on bond portfolios for traditional life products with guarantees in the next years.

4.2 BACKWARD LOOKING PERSPECTIVE

Premiums, claims and expenses are part of the technical cash-flows and contribute to the underwriting profitability of an insurer. Therefore, their changes are relevant from the profitability perspective. The latest annual aggregated EEA data for gross written premiums (GWP) (Figure 4.1) shows that in 2022 GWP for life and unit-linked business have already experienced a decrease compared to 2021 while premiums for non-life have reached the highest annual change since the introduction of Solvency II (Figure 4.2). As discussed in the previous sections of the report, non-life business is more sensitive to inflation, therefore the increase in premiums observed in 2022 seems

to be driven by a price effect amid increased cost of claims, rather than by an expansion of the business (e.g., increase in number of policies written).

Figure 4.1: EEA Gross Written Premiums changes (%YoY, split by type of business)

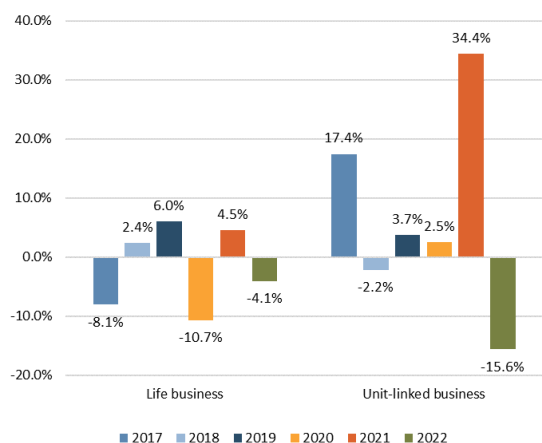
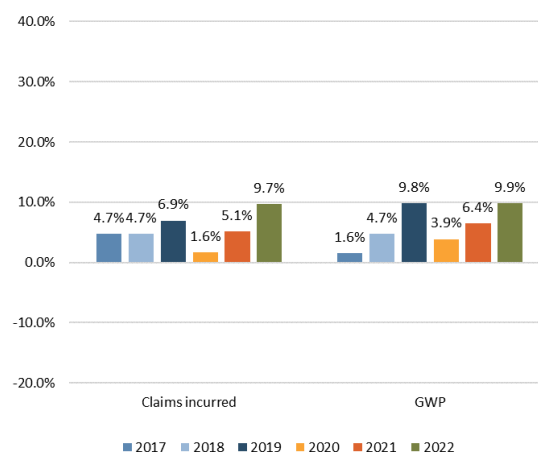


Figure 4.2: EEA Gross Written Premiums and Claims Incurred changes (%YoY, non-life business)



Source: EIOPA SII annual prudential reporting solos, 2022, S.05.01.01

In order to measure the profitability developments of the insurance sector, the split between underwriting profitability and investment returns by type of business is discussed further. As the Solvency II framework does not provide a detailed definition of profits and losses, the approach followed in this section is to use the reporting data on underwriting results which is based on statutory accounts and the data on investment results based on the SII valuation framework. While the chosen approach has its limitations, one can argue that the average profitability over the long term should not depend on the specific measurement framework⁴³. The analysis covers solo non-life and life insurance undertakings other than reinsurance undertakings. The effects of inflation and higher interest rates on composites would depend on their business mix. For non-life business underwriting profitability is discussed in more detail while for life business the focus is on return on investments. This is because non-life business is directly impacted by inflation through increases in future claims pay-outs and expenses with an effect on underwriting profitability. Furthermore, non-life undertakings have shorter term investments than life undertakings due to their lower duration of liabilities⁴⁴ and are less impacted by the long-term changes in interest rates. On the other side, typically the technical flows of traditional life business are for many years negative as monthly or annual premiums are paid by policyholders in the savings products that have a long maturity. Thus, for life business the investment returns coming from the investing of premiums is quite significant from the profitability perspective.

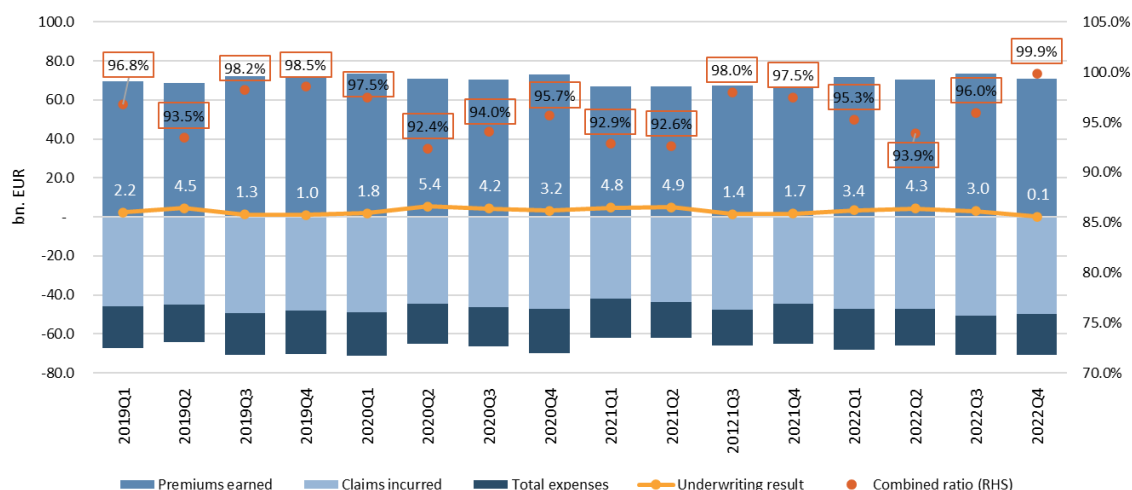
⁴³ The differences between these frameworks in how they allocate cash in- and out-flows as revenues and expenses to different periods becomes less and less relevant if longer time periods are considered.

⁴⁴ See Figure 3.1.B and Figure 3.2.B

Underwriting profitability of non-life business

As discussed, **non-life undertakings** are the most affected by inflation shocks and the first reflection of the changes appear on claims incurred and expenses. In the current inflationary environment, the underwriting result for this type of business has already deteriorated at the end of Q4 2022 (Figure 4.3). The difference between premiums and claims plus expenses amounted to approximately 0.1 bn. EUR at EEA aggregated level, the lowest level observed so far. The result is due to a 4.3% increase in expenses and 11.3% increase in claims in Q4 2022 compared to Q4 2021 while premiums have only increase by 6.4% in the same time frame. Furthermore, for the aggregated EEA sample the combined ratio that is typically used as a proxy for profitability for non-life business has reached a maximal level in Q4 2022 (99.9%) close to the point where insurers make underwriting losses.

Figure 4.3: Evolution of EEA aggregated underwriting result and combined ratio for non-life business



Source: SII QRTs data, quarterly prudential solo. Reference date: Q4 2022

As high inflation directly impacts expenses, Figure 4.4 shows therefore the development of net administrative expenses, net acquisition expenses, net overhead expenses and net investment management expenses in the period 2016 to 2022. It can be observed that trends for the different types of expenses may vary. However, since the outburst of inflation in 2021, all categories of expenses showed an upward trend. Regarding their relative importance (Figure 4.5), acquisition expenses and administrative expenses represent almost two thirds of the total expenses in non-life business.

Figure 4.4: Development of net administrative expenses, net acquisition expenses, net overhead expenses and net investment management expenses in the period 2016 to 2022

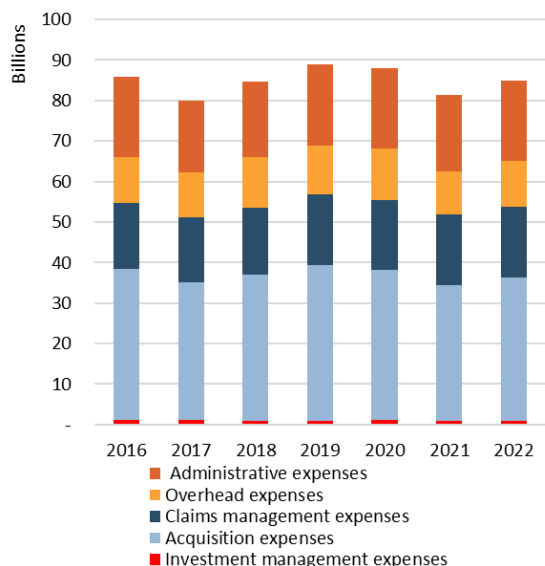
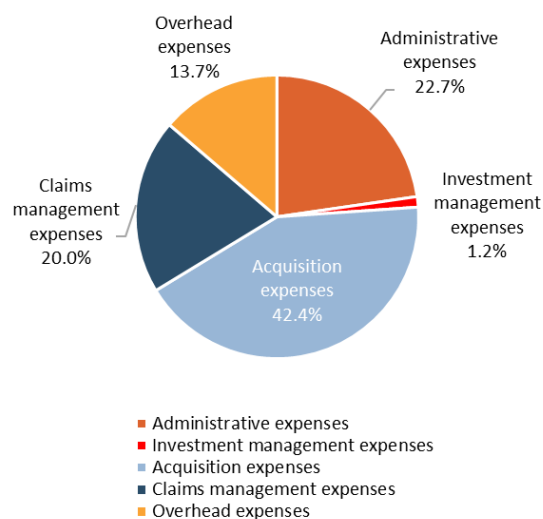


Figure 4.5: Relative importance of net administrative expenses, net acquisition expenses, net overhead expenses and net investment management expenses in the period 2016 to 2022



Source: EIOPA SII QRTs data, Q4 2022. Note: The calculation uses the data from S05.01.01

Developments at the aggregate level may hide very different trends for different Lines of Business (LoBs). To disentangle the effect of inflation from the underwriting and claims trends the analysis is based on “normalized”⁴⁵ year-on-year quarterly changes for the period from 2019 to 2022 for net premiums earned, net claims incurred and total expenses in the lines of business motor vehicle liability, general liability, medical expense insurance and fire and other damage to property which represent the largest share of business as measured by technical provisions.

Despite the volatility of the “normalized” figures over time a general increasing trend since 2021 can be observed for all the components with detrimental effects on the profitability. Conscious that the trends can be driven by other elements (e.g., for motor vehicle liabilities the effect of the lock-down amid pandemic on premia and claims is manifest – Figure 4.6), still valuable insights can be obtained from the evolution of those business lines more subject to claims inflation such as health (Figure 4.8) and general liabilities (Figure 4.7).

⁴⁵ “Normalized” means that the figure for each quarter is calculated as the year-on-year percentage change minus the average of the year-on-year percentage changes for the period 2019 to 2022. Values above (below) zero indicate an above (below) average increase.

Figure 4.6: “Normalized” year-on-year quarterly changes for net premiums earned, net claims incurred and total expenses in the line of business *motor vehicle liability insurance*

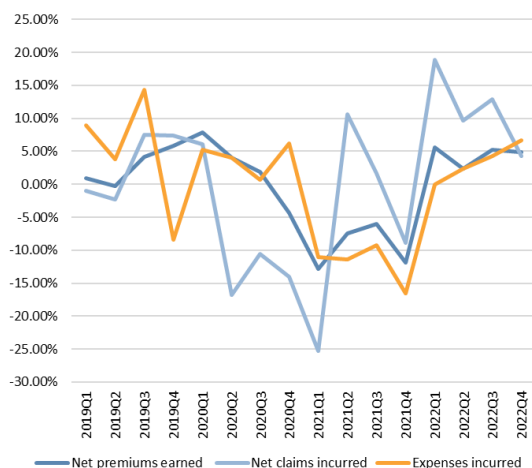


Figure 4.7: “Normalized” year-on-year quarterly changes for net premiums earned, net claims incurred and total expenses in the line of business *general liability insurance*

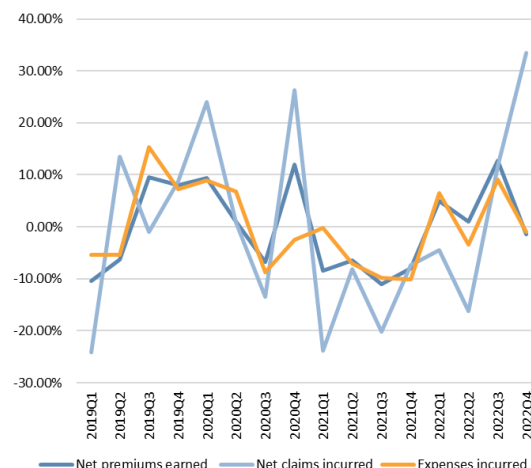


Figure 4.8: “Normalized” year-on-year quarterly changes for net premiums earned, net claims incurred and total expenses in the line of business *medical expense insurance*

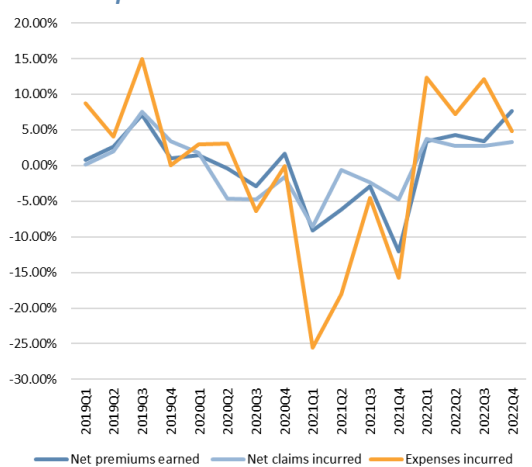
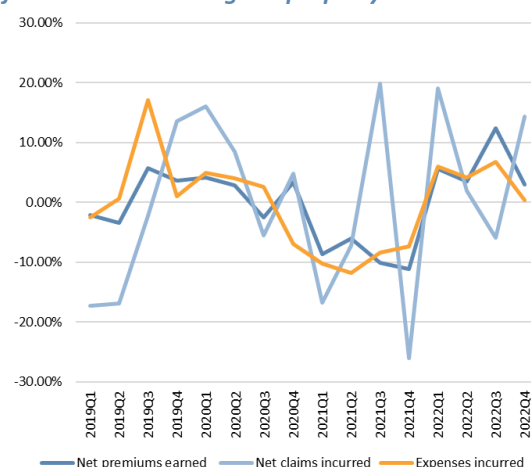


Figure 4.9: “Normalized” year-on-year quarterly changes for net premiums earned, net claims incurred and total expenses in the line of business *fire and other damage to property insurance*



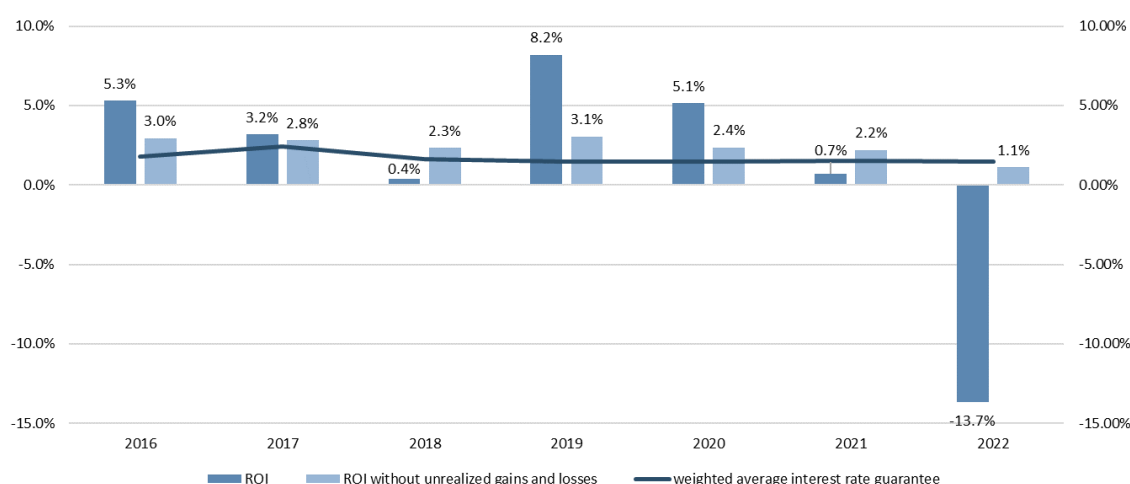
Source: EIOPA SII QRTs data, Q4 2022

Return on investments

The second important component of profitability is the investment result. Figure 4.10 shows the return on investment for the period from 2016 to 2022 for life insurers and composites undertakings and the weighted average interest rates guarantee. In the low yield environment, insurers were struggling to make investment returns in excess of guaranteed returns issued in the past. While most insurance undertakings have slowed down offering investment guarantees on new insurance policies and have increased focus on unit-linked products, the legacy products with investment guarantees still represents a significant amount of the technical provisions. If inflation is associated

with higher yields on fixed income instruments the profitability would benefit as guaranteed rates on new business are only adjusted upwards with a time delay.

Figure 4.10: Return on investment (both incl. and excl. unrealised gains/losses) vs. weighted average guaranteed interest rates for life insurers and composites undertakings



Source: EIOPA calculations using SII Annual prudential data, life and composite solo undertakings. Reference year: 2022.

Note: The weighted average guaranteed rate for life and composite insurers is calculated using the best estimate by homogeneous risk group as weights. Weighted average guaranteed rates and returns on investments (ROI) calculations are based on Solvency II reporting (QRTs S.14.01, S.09.01 and S.06.02) and may differ from national statutory accounts. ROI is calculated both including and excluding unrealized gains and losses. Unit-linked are excluded both for what concerns the calculation of the ROI and for the calculation of average guaranteed rates (SII QRT S.14.01). For clarification, in this chart the average guaranteed rate is calculated for all the Life Best Estimate TPs not only for the Life Best Estimate TPs which have positive guaranteed rates; this means that TPs with no guaranteed rates enter the calculation, and therefore affect the weighting, with a zero guaranteed rate. This approach is adopted to make the guaranteed rate comparable with the ROI which is calculated on the entire life portfolio (as, basing on SII QRTs, it is not possible, in the life portfolio, to establish a link between investments and guaranteed products on an item-by-item basis).

The increase in yields on fixed-income investments in 2022 due to increase interest rates amid inflation was certainly a main contributor to the large unrealized losses. Unrealized gains and losses can be included or excluded from the calculation of ROI depending on the purpose of the analysis. As Figure 4.10 suggests, in 2022 the return on investment without unrealized gains and losses was slightly above the guaranteed rate. However, it was at the lowest level since 2016 (1.1%) while the median weighted average contract had a 0.95% interest rate guarantee. If insurers had to sell bonds, then the unrealized losses would materialize and negatively impact their income.

Figures 4.11, 4.12 and 4.13 focus on the breakdown of the different sources of investment income. Net gains and losses (capital gains/losses on sold bonds and equities) tend to be comparatively small, with respect to total gains and losses from 2016 to 2022. For equity, unrealized gains and losses were negative in 2022, as the equity market dropped. However, income from dividends was substantial in the same year. For bonds, both corporate and government, interest income was quite stable through time, but has slightly declined in the recent years. This could be explained also by the fact that insurers have slightly decreased their allocation in fixed income assets during the low

yield environment. Another reason could be that insurers were still benefitting from higher yielding bonds purchased back in time that have matured in more recent years and that were reinvested at lower interest rates during the low yield period. Because yields have been going up starting at the end of 2021, insurers reported unrealized losses in 2021 and 2022. As unrealized gains and losses fluctuate dramatically based on how market yields on actual insurers' bonds holdings evolve, this might be reverted if interest rates will decrease again.

Figure 4.11: Income gains and losses for government bonds (in bn. EUR)

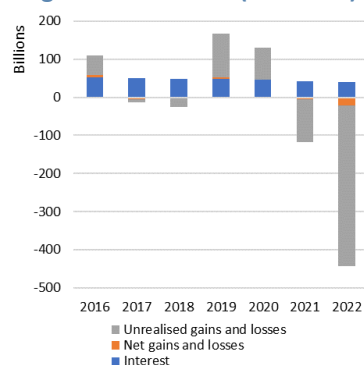


Figure 4.12: Income gains and losses for corporate bonds (in bn. EUR)

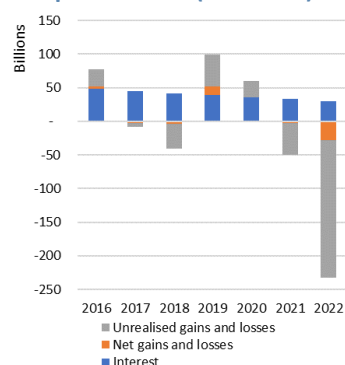
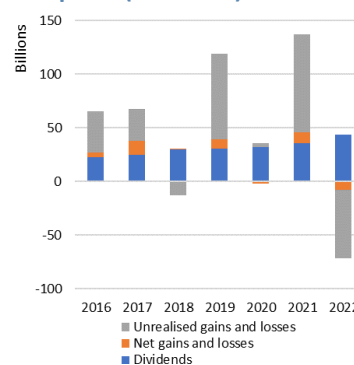


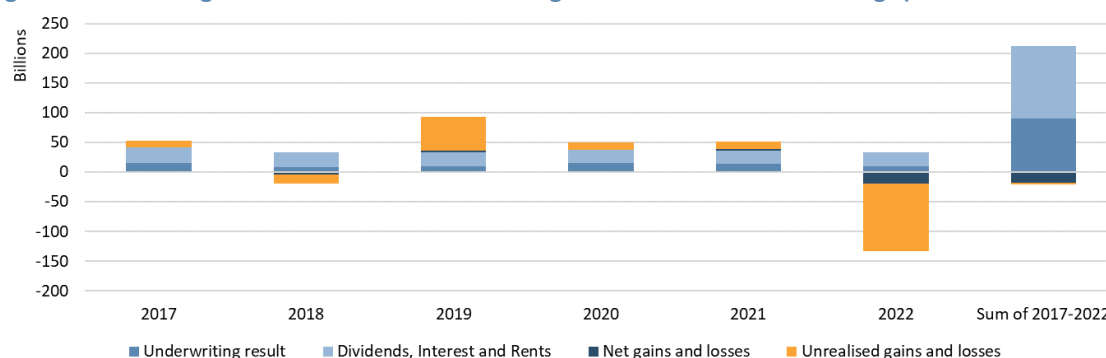
Figure 4.13: Income gains and losses for equities (in bn. EUR)



Source: EIOPA SII, annual prudential solo data. Reference year: 2022. Note: Data from S.09.01 Income gain and losses, breakdown by government, corporate bonds and equities.

Moving again to **non-life undertakings**, combining the underwriting result with the investment income might give further insights on how inflation and the increase in interest rates have impacted profitability of these undertakings (Figure 4.14). Adding up underwriting and investment results for the period from 2017 to 2022 shows the significance of the underwriting results for non-life undertakings as it represented 44.2% of the total profit. Excluding unrealized gains and losses this proportion was 35.7 %.

Figure 4.14: Income gains and losses and Underwriting result for non-life undertakings (in bn. EUR amounts)



Source: EIOPA SII, annual prudential solo data. Reference year: 2022.

4.3 FORWARD LOOKING PERSPECTIVE

The section aims at assessing the potential impact on profitability of the high-inflation and high-interest rate environment on insurers. The approach for non-life insurers focuses on the impact of inflation and higher rates on a medium to long term horizon as in this case the business written after the shocks (i.e., high inflation, high interest rates) represents most of the existing business.⁴⁶ This means insurers have the possibility to reflect the new environment in their premiums. This is complemented by a projection of life insurers' future bonds portfolio cash-flows. An aspect that is not covered by the analysis is the uncertainty that insurers may face when setting premiums. With high and volatile inflation, it would be impossible to estimate the medium to long term effects with a high degree of accuracy. The results presented here should be seen as stylised sensitivity calculations. They help to understand the different factors influencing profitability and provide an indication of possible outcomes.

Forward looking perspective for non-life insurers

The short-term underwriting profitability of non-life insurers is negatively impacted by inflation as they need to increase reserves and can adjust premia only with a time lag. However, inflation does not automatically translate into lower medium to long-term profitability if non-life insurers are able to increase policies' prices enough after an inflationary shock to maintain the pre-shock profits (measured by the combined ratio). Even if premiums cannot be raised enough to maintain underwriting profitability due to market competition, the additional premiums increase the level of investments. If high inflation is followed by high interest rates this would result in higher investment returns on the fixed income portfolios. Better investment results would allow non-life insurers to push through lower premium increases to maintain their overall profitability. In other words, assuming in a simplified approach that the pre-tax profitability of a non-life insurer is the sum of the underwriting result and the investment result⁴⁷ then higher investment results can provide at least a partial offset for the inability to increase premiums in line with inflation. Written premia that are not needed to settle current claims can be invested. This suggests that the potential partial offset from higher investment results should be more relevant for long-tail business.

The model looks at the sensitivity of the underwriting profitability to an inflation shock. In response to the increase in inflation, insurers would have to increase premiums to maintain their

⁴⁶ A crucial question is which scenario for the shock to inflation and interest rates should be chosen. One possibility for an inflationary shock is an instantaneous "one-off" spike in inflation. Alternatively, there could be a prolonged period of higher inflation rates. It is quite difficult to say how interest rates and more generally the return on investment would change. To what extent investors demand a compensation for higher inflation depends on their expectations about its future magnitude and duration. The impact on the real rate of return is also uncertain as well as the resulting change in any risk premia. This uncertainty makes it attractive to calculate the outcomes for a set of possible scenarios. Another possibility to deal with it is to calculate a critical change in investment returns, which would be just sufficient to compensate for lower underwriting results due to inflation. The higher such a critical change the less likely it becomes. The chosen approach looks at the time when things have "settled down" after the inflationary shock and there is a new stable level of premiums, claims and expenses.

⁴⁷ The simplified formula can also be written as $Profit = Earned Premiums (1 - Combined Ratio) + Investment Result$

underwriting profitability. In reality, their ability to do so might be limited by competition as well as the willingness of policyholders to buy the same coverage at higher rates. Higher investment returns could help to maintain the same overall profitability even though premiums cannot be increased in line with inflation and underwriting results consequently drop. First, the underwriting results after the inflation shocks are computed assuming that insurers cannot fully compensate with increases in premiums. The second step investigates how much insurers would have to be able to increase premiums to keep their underwriting profit constant for different inflationary shocks. Finally, it is shown how much insurers would have to push up premiums to maintain their overall profitability when potentially higher investment results are considered.

The average net combined ratio (96.0%)⁴⁸ for 2016-2022 is used as the baseline of the model. This choice is made for simplicity and assuming that future profitability would be in line with the past profitability. Then, the inflation shock impacts the level of net claims incurred and total expenses. But there is not automatically a one-to-one relationship between the percentage change in these quantities and the rate of general inflation. In the past, claims and expenses inflation were a multiple of headline inflation.⁴⁹ For the sake of simplicity, the claims and expenses shock is transmitted to the same percentage increase in net claims and total expenses. In response to the higher claims and expenses, insurers would try to raise premiums to preserve their profitability with the result of an increase in net premiums earned.

The results show that starting from the 96% average net combined ratio, an increase of 5% in the baseline claims incurred and total expenses without increase in premiums would drive the combined ratio to 100.8% (Table 4.1). This means that the premiums are not enough to cover claims and expenses and the underwriting result is negative. If instead net claims and total expenses would increase by for example 15 % but insurers could subsequently raise net premiums only by 10 % then the baseline future net combined ratio would increase to 100.36 %. The entries with values below 105 % are highlighted as it seems highly unlikely that the aggregate net combined ratio for the whole non-life sector after the shock would settle at a higher level. The considerations made at an aggregated sector level hide the different impacts on the individual companies which have heterogeneous combined ratios.⁵⁰ The vulnerability to inflation shocks increases the closer the combined ratio is to 100%.

⁴⁸ The average net combined ratio is computed as the mean of the ratio between net claims incurred plus total expenses over net premiums earned for the period 2016 to 2022 for all EEA non-life solo undertakings.

⁴⁹ See Chapter 1.3.

⁵⁰ If two solo non-life undertakings with baseline net combined ratios of 90 % and 95 % were faced with the same rise of 10 % in net incurred claims and total expenses but were only able to raise premiums in response by 5 %, then the first insurer would have still a net combined ratio below 95 % while the net underwriting results of the second one would now be close to zero.

Table 4.1: Impact of claims and expense inflation on combined ratio in dependency from the subsequent increase in net premiums

		Increase in baseline net premiums earned									
		0%	5%	10%	15%	20%	25%	30%	35%	40%	45%
Increase in baseline net claims incurred and total expenses	0%	96.00%									
	5%	100.80%									
	10%	105.60%	100.57%								
	15%	110.40%	105.14%	100.36%							
	20%	115.20%	109.71%	104.73%	100.17%						
	25%	120.00%	114.29%	109.09%	104.35%	100.00%					
	30%	124.80%	118.86%	113.45%	108.52%	104.00%	99.84%				
	35%	129.60%	123.43%	117.82%	112.70%	108.00%	103.68%	99.69%			
	40%	134.40%	128.00%	122.18%	116.87%	112.00%	107.52%	103.38%	99.56%		
	45%	139.20%	132.57%	126.55%	121.04%	116.00%	111.36%	107.08%	103.11%	99.43%	
	50%	144.00%	137.14%	130.91%	125.22%	120.00%	115.20%	110.77%	106.67%	102.86%	99.31%

Net combined ratio after different shocks to claims, expenses and premiums

Note: Values below 105 % are highlighted as it seems highly unlikely that the aggregate net combined ratio for the whole non-life sector after the shock would settle at a higher level

One important aspect is to determine the necessary premium increase to keep the baseline underwriting results constant. Insurers will face resistance from policyholders to premium increases as well as competitive pressures. It is therefore interesting to see by how much insurers would have to be able to push up premiums in response to higher claims and expenses so that they can maintain their previous level of baseline net underwriting profitability. In this case, non-life insurers that face a 5% increase in claims and expenses would need to raise premiums by 4.8% to maintain the baseline net combined ratio of 96%. The necessary increases in net premiums are a little bit lower than the increase in claims and expenses.⁵¹

Table 4.2: Necessary net premium increase to maintain underwriting profitability after an inflationary shock

		Necessary increase in net earned premiums
Increase in baseline net claims incurred and total expenses	5%	4.8%
	10%	9.6%
	15%	14.4%
	20%	19.2%
	25%	24.0%
	30%	28.8%
	35%	33.6%
	40%	38.4%
	45%	43.2%
	50%	48.0%

Baseline average net combined ratio = 96%

The considerations so far were limited to the effects of higher expenses and claims due to inflation and subsequent increases in premiums on the underwriting result. In case of a combined scenario with claims and expense inflation and higher investment returns, an increased investment result might help to maintain the overall profitability even though insurers cannot enforce premiums

⁵¹ This is because the baseline combined ratio is below 100 %. If earned premiums are for example 10 and claims and expenses incurred are 90, then a 10% increase in the latter reduces the underwriting profit by 9. This means underwriting profits can be kept constant if the insurer is able to enforce premium increases of 9%. In case of 100 in earned premiums and 110 in claims and expenses incurred, a premium increase of 11 % would be necessary.

increases that keep the baseline net underwriting result constant. To limit the necessary assumptions, the combined scenario is restricted to an increase in the returns on fixed income investments. A baseline investment return on fixed income investments of 2.5% is used as a proxy in the model as it corresponds approximately to the yield of a 20-year German government bond at the end of 2022. With higher returns on their fixed income investments, insurers are able to maintain their overall profitability if they can increase premiums to the point where the decrease in the underwriting result is compensated by the higher investment result.⁵²

A crucial variable is the initial level of the baseline fixed income investments and their change in the combined scenario. The calculation uses conservative assumptions. This results in higher estimates for the net premium increases that insurers would have to push through to maintain their overall profitability.⁵³

Table 4.3: Premium increases necessary to maintain profitability with increases in the normalized return on fixed income investments

		Baseline return on fixed-income investments					
		2.5%	3.0%	3.5%	4.0%	4.5%	5.0%
Increase in baseline net claims incurred and total expenses	5%	4.8%	3.9%	3.0%	2.1%	1.1%	0.2%
	10%	9.6%	8.7%	7.8%	6.9%	5.9%	5.0%
	15%	14.4%	13.5%	12.6%	11.7%	10.7%	9.8%
	20%	19.2%	18.3%	17.4%	16.5%	15.5%	14.6%
	25%	24.0%	23.1%	22.2%	21.3%	20.3%	19.4%
	30%	28.8%	27.9%	27.0%	26.1%	25.1%	24.2%
	35%	33.6%	32.7%	31.8%	30.9%	29.9%	29.0%
	40%	38.4%	37.5%	36.6%	35.7%	34.7%	33.8%
	45%	43.2%	42.3%	41.4%	40.5%	39.5%	38.6%
	50%	48.0%	47.1%	46.2%	45.3%	44.3%	43.4%
Increase in baseline net premiums earned							

Note: Values highlighted are discussed in the report.

⁵² This can be expressed formulaically as follows: P_n , C_n and T_n denote the baseline net premiums earned, net claims incurred and total expenses, I_n the baseline level of investments, fi the share of fixed income instruments in the baseline level of investments and r_n the baseline investment return on fixed income instruments. In the considered scenario, baseline net claims incurred and baseline total expenses increase by $x\%$ and the new baseline investment return on fixed income instruments is r_n^{new} . The baseline level of investments does not change (see discussion below). Insurers would be able to maintain their overall profitability, if they can increase premiums by $y\%$ so that

$$P_n y\% - (C_n + T_n)x\% + (r_n^{new} - r_n)fiI_n = 0$$

The formula suggests that one would need information about the absolute levels of the variables. But with CR_n denoting the baseline net combined ratio dividing by P_n produces the equation $y\% - CR_n x\% + (r_n^{new} - r_n)fi \frac{I_n}{P_n} = 0$ (1).

⁵³ As the baseline net underwriting results are determined based on data from the statutory accounting the same approach is used for the investment results for the sake of consistency. Over the medium to long-term it should not matter whether SII or statutory account values are used. The calculations use the fact that based on the formula (1) in footnote 52 not the baseline level of investments but only the ratio between the baseline level of investments and the baseline net premiums earned is needed. From 2016 to 2022 the ratio between Investments (other than assets held for index-linked and unit-linked contracts) (S020101_R0070_C020) based on statutory account values and net earned premiums (S050101_R0300_C0200) for the EEA solo non-life insurers fluctuated between 3.42 and 3.28 with the lowest value in 2022. This value is used to determine the baseline investments. Ceteris paribus an increase in baseline net premiums should also result in an increase in baseline investments (and thus in higher additional investment results). The calculation below does not take this into account. In the period 2016 to 2022 the average ratio between Bonds (S020101_R0130_C0020) and Investments (other than assets held for index-linked and unit-linked contracts) (S020101_R0070_C0020) was 55.69%. This value is used in the following. It underestimates the actual proportion of fixed income investments as a part was done through Collective Investment Vehicles.

Table 4.3 shows by how much insurers would have to be able augment the baseline net earned premiums under different investment return scenarios to cope with increases in baseline net claims incurred, baseline total expenses and baseline returns on fixed-income investments in order to maintain their overall profitability at the same level.⁵⁴

The results show that in this case, if the baseline net claims incurred and total expenses would increase for example by 10% due to an inflation shock and the baseline return on fixed income investments would increase from 2.5% to 3% due to increase in yields of fixed income assets then insurers would have to push through increases in the baseline net earned premiums of 8.7% instead of 9.6% to maintain their overall profitability.

In conclusion, with an average net combined ratio of 96% between 2016 and 2022, EEA solo non-life insurers are vulnerable to a deterioration in underwriting results due to inflation. Even a moderate increase in claims incurred and total expenses which the insurers cannot fully offset with increases in premiums would result in underwriting results close to zero. In a combined scenario of higher inflation and higher returns on fixed income investments insurers would earn more on their investments. This would provide a partial offset on the overall profits and would allow them to preserve their profitability even if they are not able to raise premiums enough to keep underwriting results constant.

Forward looking perspective for life business

For traditional life business, claims are normally defined in nominal terms. Therefore, the underwriting profitability of life business is less impacted by inflation than of non-life business. However, high inflation would increase expenses and reduce the future profitability of new business. Over the medium to long-term, the profits from investments are more relevant for this type of business. If inflation is associated with higher interest rates as it is the case now, life insurers would benefit from reinvesting their fixed income portfolios at higher yields.

The following section provides information on how the current increase in interest rates due to inflation would impact the investment returns on existing bond portfolios in the coming years. This is particularly relevant for life insurers that provide savings/investment products⁵⁵ and has implications for the attractiveness of traditional policies to new as well as existing policyholders. A model projection capturing reinvestment risk with implications on profitability is employed, under the assumption that high yields are here to stay for the long term. The focus is on studying the convergence of the return on insurers' fixed income portfolios towards yields currently observed in the market. The level of guaranteed rates and the yields of insurers' portfolios are also discussed.

⁵⁴ As described in formula (1) in footnote 52, the calculation of the necessary premium increase above does not consider the absolute level of the baseline investment return on fixed income instruments. The crucial factor is the change. This means the values in the columns of the table 4.3 would be the same if one assumed any baseline investment return on fixed income instruments which increases under the scenario by 0.5%, 1.0%, 1.5 %, 2.0% and 2.5 % (e.g., from 2 % to 2.5%, 3.0% 3.5%, 4.0% and 4.5%).

⁵⁵ Even though this is particularly relevant for life business, the analysis of reinvestment risk considers all portfolio types.

Figure 4.15 shows that 9.2% of the government bonds portfolio will reach its maturity within 1 year and that in 10 years' time insurers will have replaced approximately 70% of their government bond portfolios as of end 2022. In Q4 2022, bonds held yielded, averaging across maturities, a coupon of 2.8%. The maturing bonds will have to be replaced with new ones that will yield (YTM based on market rates) higher rates. Government bonds with 10-year maturities will yield approximately 3.5% and bonds with 14-year maturities approximately 3.8%. Typically, long term investors are more likely to base their investment decision on the bond's coupon rate. In Q4 2022, the average the bond's coupon rate was lower than it was observed in a similar analysis performed on Q4 2019 during the ultra-low yield environment.⁵⁶ However, insurers need to match their assets with liabilities therefore, they need to account for the maturity of the bonds as well.

In the case of corporate bonds (Figure 4.16), 8.5% of these will reach their maturity date within 1 year. These bonds were yielding a coupon of 2.4% and will have to be replaced with bonds, which will yield (YTM current market rates) a maximum of approximately 2.3% for the longest maturity.

Figure 4.15: Government bonds: Coupon and YTM (i.e., market yields) and share of the government bonds by maturity bucket (%)

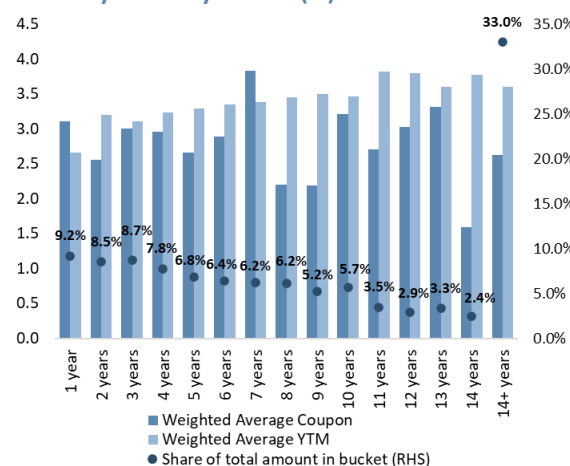
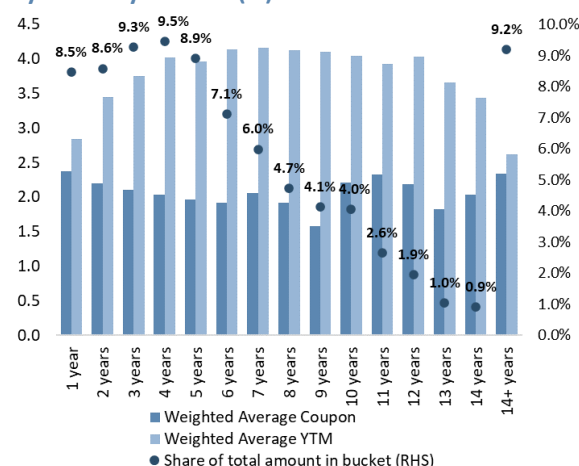


Figure 4.16: Corporate bonds: Coupon and YTM (i.e., market yields) and share of corporate bonds by maturity buckets (%)



Source: EIOPA SII QRTs data and CSDB, Q4 2022

Note: On the left-hand axis, YTM and Coupon rate of government bonds are taken from the CSDB (extract of 31 Dec 2022). Information on EU insurers' government/corporate bonds holdings by maturity are from SII QRTs data - List of assets (S.06.02) for Q4-2022. Weighted average YTM and Coupon by maturity buckets are calculated using SII amounts. On top of each bar the share of government bonds portfolio by maturity bucket is reported. Only bonds with fixed coupons are considered in the analysis therefore (also considering the merge between SII and CSDB and some data cleaning) the sample is left with approximately 80% of the total values of bonds in the SII EU sample.

Based on the information presented in Figures 4.17 and 4.18, it is possible to project insurers' future bonds portfolio cash-flows. Several simplifying assumptions are made in order to have a tractable approach. First, the model assumes that market yields will stay as in Q4-2022 for the next ten years. Additionally, other market conditions such as credit spreads are assumed unchanged. Then, every

⁵⁶ See EIOPA (2020a)

year the cash-flows generated (earned coupons and bond redemption amounts) by the portfolio are reinvested with maturities matching the current maturity structure. Capital gains on bond positions are not realized and the generated cash-flows are not distributed as profits to shareholders. The assumption is that these are reinvested in the same asset class (e.g., not in equity or others). The focus is only on the investment component of the profitability and potential gains stemming from underwriting are not taken into account. Finally, premium inflows are not considered. All these assumptions can be challenged and consequently there are several caveats to the results obtained. For example, the risk-free rate as well as credit spreads might fluctuate. The reinvested bonds' profile could be changed during the run-off projection, with undertakings choosing to prioritize their financial gains. Profits might be realized, and coupon payments might not be reinvested. Insurers might change their asset allocation and move to other asset classes. In addition, premiums and underwriting profitability might change.

Figure 4.17: 10-year projection of government bond portfolio cash-flows from Q4 2019

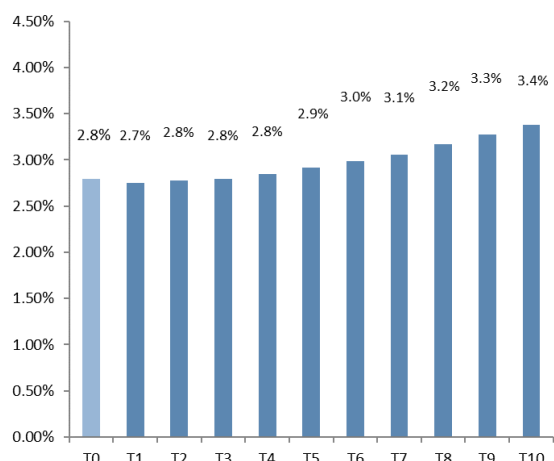
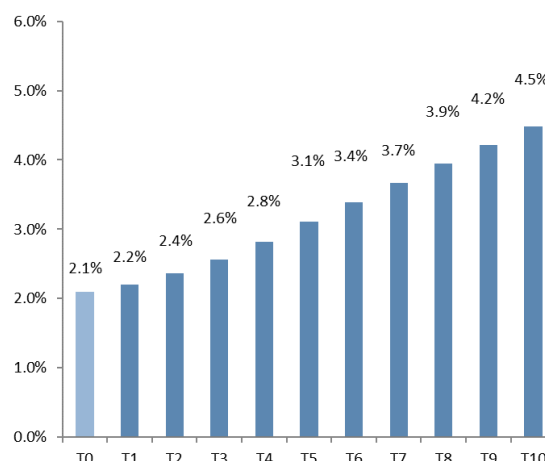


Figure 4.18: 10-year projection of corporate bond portfolio cash-flows from Q4 2019



Source: EIOPA SII QRTs data and CSDB, Q4 2022

Note: YTM and Coupon rate of government/corporate bonds are taken from the CSDB (extract of 31 December 2022). Information on EEA insurers' government bonds holdings by maturity are from SII QRTs data - List of assets (S.06.02) for Q4-2022. Weighted average YTM and Coupon by maturity buckets are calculated using SII amounts. Only bonds with fixed coupons are considered in the analysis therefore (also considering the merge between SII and CSDB and some data cleaning) the sample is left with approximately 80% of the total values of bonds in the SII EU sample.

The analysis of the future government bonds cash-flows based on the coupon projections (in % to the value of the government bond holdings) shows that these would increase from 2.8% in Q4-2022 (T0) to 3.4% in 10 years' time (T10) (Figure 4.17). Similarly, the analysis of the corporate bonds cash-flows projections shows that these would increase from 2.1% in Q4-2022 (T0) to 4.5% in 10 years' time (T10) (Figure 4.18). This can be explained by the following: in T0 the cash-flow is the weighted average of the coupon based on the amount of bonds held for each maturity. In T10 around 70% of the portfolio will have been reinvested at the market yields. Based on the assumptions above these market yields will be higher than the coupons on bonds that insurers purchased back in time when market yields were lower.

In conclusion, if the higher interest rates as of end 2022 will remain unchanged in the future, insurers will be able to invest new premiums, coupons and maturing bonds at higher rates. This will slowly change the yield of the portfolios. For their existing business as well as new business insurers will benefit only gradually in the coming years from higher returns on newly bought bonds as old bonds mature and new, higher yielding bonds can be purchased. The results illustrate this gradual shift. This means that also the rates credited to policyholders will rise only gradually. This creates competitive challenges for insurers. The initial rates they can offer to new clients will be lower than for other products like bond funds. Existing customers might also be tempted to surrender their policies and switch to alternative saving products which they might perceive as more attractive.

5 LIQUIDITY

5.1 BACKWARD LOOKING PERSPECTIVE

5.1.1 INTRODUCTION

High inflation coupled with the increase in interest rates impacts the liquidity positions of insurers for the following reasons. First, increasing interest rates depletes the value of liquid assets, which are mainly highly rated government bonds, mechanically deteriorating liquidity measures. Second, if liquid assets are sold when the risk-free rates are increasing, hence while prices are declining, losses are realised, and this translates into a reduction in their valuations. Third, if inflation is unexpected or not priced into new premiums, it erodes the cash-flows from the technical operations via an increase of the cost of claims.

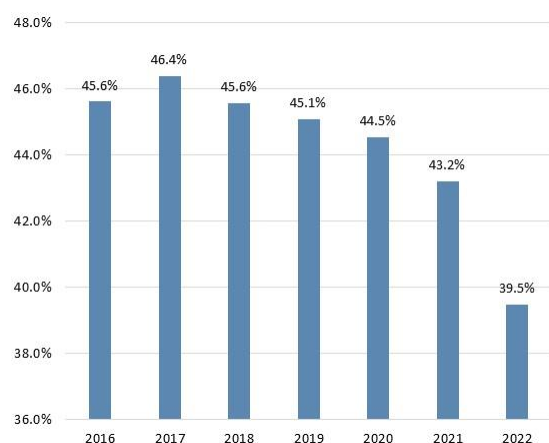
One way in which liquidity risk materialises is when policies are lapsed and liquid assets are not enough to cover cash-outflows. A fourth reason, why interest rates affect liquidity positions are liquidity risk from the use of derivatives. In fact, the use of derivatives might potentially trigger cash margin payments, especially in situations in which interest rates are increasing and remain highly volatile.

5.1.2 LIQUID ASSETS

It is noteworthy that insurers, on aggregate, hold a high level of liquid assets in their portfolios. However, Figure 5.1 shows that in 2022 the liquid asset ratio declined sharply⁵⁷; increasing interest rates depleted the value of liquid assets which are mainly highly rated government bonds. This resulted in a mechanical drop of the liquid asset ratio because other assets, that enter into the denominator of the ratio, such as corporate bonds or equity are less sensitive to interest rate-risk. In addition, the downward adjustment of valuations for other highly illiquid assets such as private equity or real estate price might only take place with a time lag.

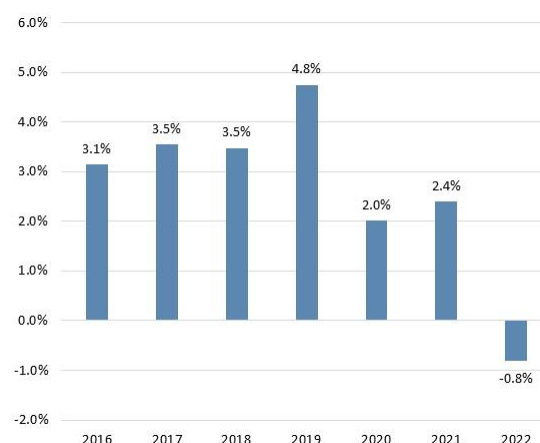
⁵⁷ The calculation methodology of these and the other liquidity indicators discussed in this section as well as the data used from the SII QRTs are described in detail in the Annex of the report.

Figure 5.1: EEA Liquid assets ratio (% Total assets)



Source: ARS, S.02.01.01, S.03.01.01, S.06.02.01

Figure 5.2: EEA Sustainability of cash-flow positions



Source: ARS, S.02.01.01, S.05.01.01, S.09.01.01

5.1.3 SUSTAINABILITY OF CASH-FLOW

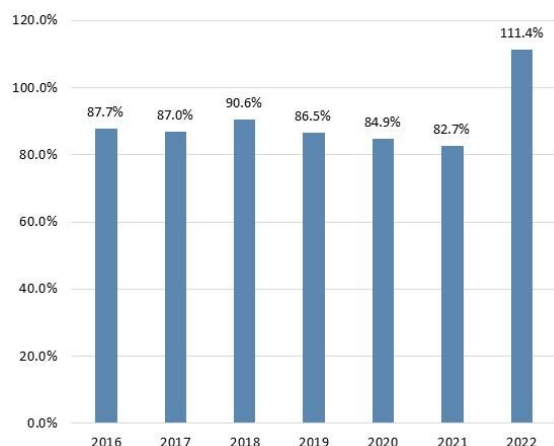
Figure 5.2 shows the evolution of the sustainability of cash-flow positions at the aggregated EEA insurance market level (for the definition of this indicator see Annex 7). Technical cash-flows plus investment returns turned negative in 2022. This is probably due to losses realized on liquidations of government bonds, corporate bonds and equities in a year of falling prices; these facts are documented in the profitability section. The size of the negative cash-flow plus returns is quite small -0.8% (also slightly amplified by the fact that “liquid assets”, i.e., the numerator, declined) compared to the realized losses on investments, meaning that positive technical cashflows are having a counterbalancing impact.

5.1.4 LIQUIDITY RISK FROM LAPSES

Another way to measure liquidity risk is to assess whether liquid assets are sufficient to cover cash out-flows in case that all non-life claims would have to be paid out or in the case that all life policies would be surrendered. Figure 5.3 shows that until 2021 insurers were well positioned. In 2022, however, the ratio is higher than 100% meaning the liquid assets are no longer sufficient to cover the cash out-flows in the most extreme scenario.

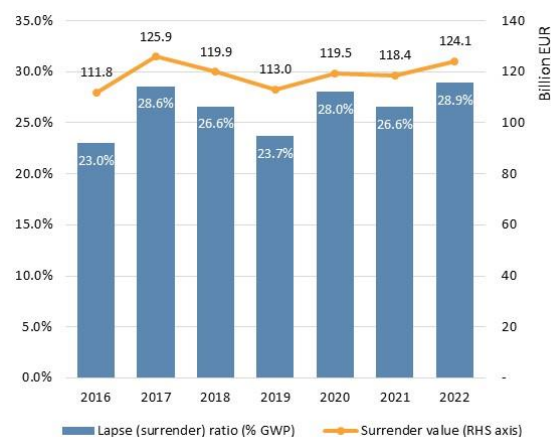
Actual lapse rates also measure liquidity developments. Figure 5.4 shows that in 2022 the value of the lapsed life policies amounts to almost 28.9% of the gross-written premiums, which is slightly higher than in previous years. In 2022 there has been also a slight decline of life gross written premia, but also the absolute value of lapses has slightly increased to 124.1 bn. EUR which is in any case still below the peak of 125.9 bn. EUR reached in 2017. Looking ahead, two developments might potentially cause an increase in lapse rates. First, a potential economic recession with further negative effects on the disposable income of policyholders and second a strong increase in yields which could create incentives to lapse on existing contracts and seek higher returns elsewhere.

Figure 5.3: EEA Surrender value (for the life business) and/or BEs of TPs (for the NL business) to liquid assets (%)



Source: ARS, S.06.02.01, S.12.01.01, S.17.01.01, S.18.01.01

Figure 5.4: EEA Lapse (surrender) ratio (% Gross written premiums, life business) vs. Surrender values for life business



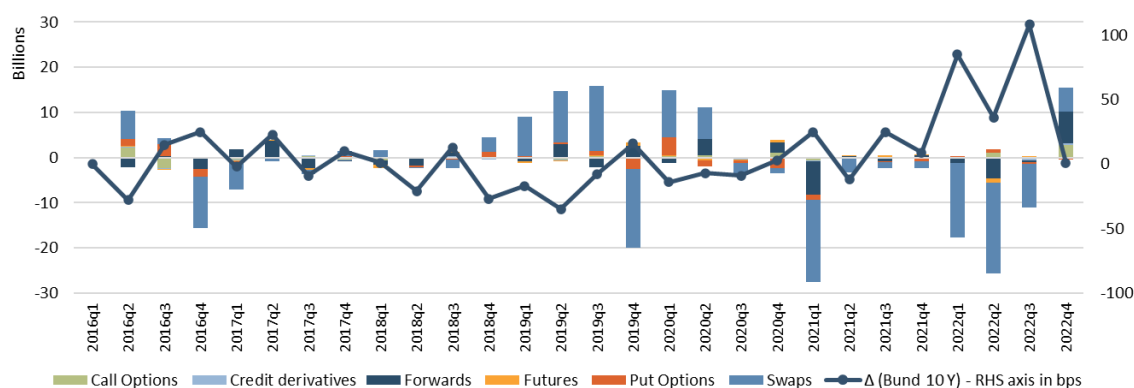
Source : ARS, S.05.01.01, excludes UL

5.1.5 LIQUIDITY RISK FROM DERIVATIVES

Another source of liquidity risk is the use of derivatives. EEA insurers use derivatives primarily to hedge interest rate risk resulting from the long maturities of their liabilities. For this purpose, they enter into Interest Rate Swap contracts (IRSs) and these need to be cleared via Central Counterparties. Under these contracts, insurers predominantly pay the floating rate and get the fixed rate. This exposes them to cash margin payments when risk-free rates increase. In Q1, Q2 and Q3 2022 the risk-free rate, as approximated by the 10-year German Government Bond rate, increased by approximately 230 bps, which represents the most dramatic shift since the introduction of SII. A topical focus in the EIOPA December 2022 Financial Stability Report discusses the amounts of cash margins insurers had to pay and shows that insurers had to liquidate investments to address their liquidity needs in Q1 and Q2 2022.

Quarter to quarter changes of derivatives Solvency II (market) values do approximate cumulative margin payments within quarter. These variations are driven by changes in the risk-free interest rate. Figure 5.5 shows that in Q1, Q2 and Q3 insurers have been subject to substantial margin payments, while in Q4 2022 they have instead been receivers of margins. The largest variation margins are paid on IRS, but material amounts are also paid/received on forwards contract used to hedge currency risk. Interest rate risk and exchange rate risk translate therefore in liquidity risk for insurers using derivatives for hedging purposes.

Figure 5.5: Quarter on quarter changes of the risk-free rate (as approximated by the 10 Year German Government Bond) and of changes of Solvency II (market) values of EEA insurers derivatives positions with a breakdown by type of derivative.



Source: List of Derivatives, Quarterly Reporting Solo.

5.1.6 CONCLUDING REMARKS

In summary, this section has shown that even if insurers are “rich” in highly liquid assets, overall liquidity positions deteriorated in 2022 due to declining prices of liquid assets and material cash-outflows due to margin payments on derivative positions. From a liquidity perspective, looking ahead, the main concern remains the potential increase in lapses on policies.

5.2 FORWARD LOOKING PERSPECTIVE: SENSITIVITY ANALYSES ON DERIVATIVE POSITIONS BASED ON INTEREST RATE SWAPS SHOCKS

5.2.1 INTRODUCTION

In a regime with high inflation and high interest rates, interest rates are also more volatile. For this reason, this paragraph assesses the potential risks and vulnerabilities of insurers liquidity positions by focusing on margin calls on interest rate derivatives used for hedging purposes.

An extensive analysis of the liquidity implications resulting from variation margins⁵⁸ on IRS positions was published in the EIOPA Financial Stability Report of December 2019 with data for 2018⁵⁹, with key elements of the analysis replicated, at a later stage, to reflect the evolution of IRS positions as of Q4 2019 and the subsequent shock due to the Covid19 virus outbreak⁶⁰.

⁵⁸ ‘Variation margins’ (VM) reflect the change in market value of Interest Rate Swap Contracts held by an insurer. The change in market value of each derivative contract is calculated by multiplying the duration of each contract with a shift of the level of the interest rate. Then, VMs are aggregated across contracts at the company level netting positive and negative VMs.

⁵⁹ See de Jong et al. (2019)

⁶⁰ See EIOPA (2020b), ref. to analysis in paragraph “Variation margins and derivatives positions”, page 72.

The analysis is now updated with Q4 2022 insurers' derivatives and liquid assets position. Results show that a 100 bps parallel upward shift in the yield curve would cause an additional cash variation margin requirement of circa 26.8 bn. EUR for EEA insurers using interest rate swaps, but it shows also that insurers hold enough liquid assets to cover potential liquidity needs.

5.2.2 METHODOLOGY

The calculation is based on reported derivatives and balance sheet positions as of Q4 2022. The sample includes 160 solo insurers which had entered into Interest Rate Swaps (IRS) with both net long and short positions. IRS are by far the most frequently used interest rate derivatives by insurers.

Based on the reported sensitivity to interest rate changes (duration) the change of the market value of IRS for different parallel up and downward shifts in the yield curve is approximated. In case of losses insurers have to post the same amount as variation margin. Insurers often have partially offsetting positions (i.e., they are at the same time "long" and "short" interest rates). The calculation assumes netting between these positions.

The estimated variation margin is compared with positions in liquid assets. In case the estimated variation margin exceeds the liquid assets, this does not imply that insurers could not meet margin calls, as: a) There could be liquidity obtained via pre-established liquidity facilities such as repos or credit lines, b) there are other sources of cash (e.g., coupon payments or regular dividends) that are not accounted for in this analysis, c) Other liquid assets like equities could be sold. Moreover, d) the size of the variation margin is only approximated.

5.2.3 RESULTS

5.2.3.1 Use of interest rate derivatives and amount of potential variation margin calls due to shift in interest rates

Figure 5.6 below shows the development over time of the total risk exposure to a 100 bps parallel upward (Panel A) and downward (Panel B) shift in the yield curve resulting from IRSs for insurers that have to pay variation margins on a net basis when the yield increases (decreases). The used measure is the loss in value (i.e., negative change in market value) of the aggregate derivative position resulting from the shift. These sensitivities are a better measure for the use of interest rate derivatives than notional amounts.

Figure 5.6.A: Interest rate risk exposure (EUR) from interest rate swaps of EEA insurers exposed to increases of the risk-free rate. Shift of risk-free rate up by 100 bps.

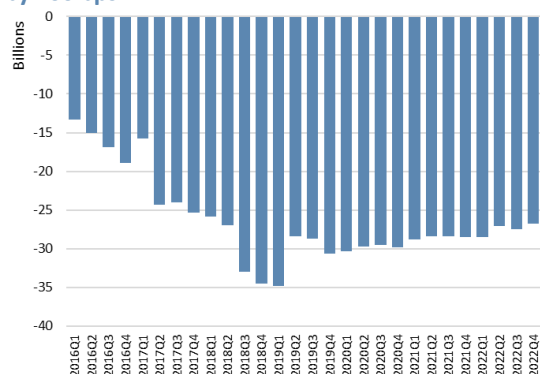
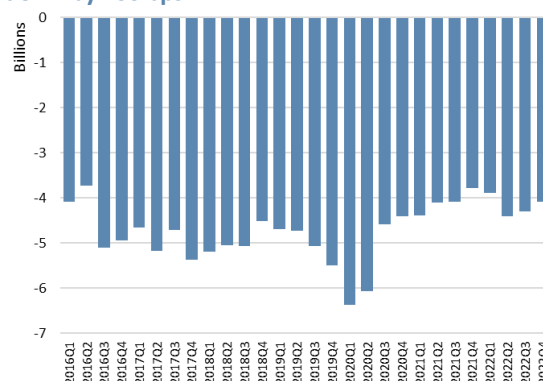


Figure 5.6.B: Interest rate risk exposure (EUR) from interest rate swaps of EEA insurers exposed to decreases of the risk-free rate. Shift of risk-free rate down by 100 bps.



Source: EIOPA own calculations, EIOPA SII QRTs data, Q4 2022.

An explanation for the observed increased use of IRS by insurers over time might be their need to extend the duration of assets in the context of the low yield environment and negative duration gaps. The result is that EEA insurers have become more exposed to upward movements in interest rates. The volume of hedging against interest rate increases is generally much lower than the one for hedging against interest rate declines: as of Q4 2022 the insurers with a derivative position on interest rate swaps paying floating and receiving fixed (short on interest rate via IRS) would have lost 26.7 bn. EUR as the result of a parallel 100 basis points upward shift with the obligation to post the same amount in variation margin (Panel A). Those with a derivative position on interest rate swaps receiving floating and paying fixed (long on interest rate via IRS) would have faced increased variation margin requirements of 4.1 bn. EUR in case of a parallel 100 bps downward shift (Panel B). Panel A shows that the hedging of potential declines in interest rates increased after the introduction of Solvency II, then reached a peak at the beginning of 2019 after which it stabilized or declined slightly.

5.2.3.2 Coverage of additional variation margin with liquid assets on the aggregate level

This section analyses to what extent the additional variation margin requirements resulting from various shifts in interest rates are covered by liquid assets. The percentage of companies with a shortfall and its amount for different interest rate up and down shocks are set out in the following tables.^{61,62}

⁶¹ Note: Cash and equivalents refers to the sum of the two categories coin and notes (CIC71) and cash equivalents and transferable deposits (CIC72). For government and corporate bonds with rating AAA (CQS0) and AA (CQS1) encumbered (i.e., out for repos, but still reported on the balance sheet) securities are excluded, because these would not be available for sale. Based on the assumption that portfolios have a weighted average duration of approximately 10 years, for the upward shocks the value of bonds is reduced by 10 times the shock (e.g., 10 % for the 100% bps upward shock). The values of money market funds shares are estimated from the list of collective investments (CIC43).

⁶² The source of this analysis relies on Solvency II solo QRTs with reference date Q2 2022; sample contains 160 undertakings.

Many insurers have sizeable derivative exposures to both falling and rising interest rates. With netting there is an “automatic” offset between these positions which reduces the variation margin to be posted. But also, without netting the insurer could meet additional margin requirements for losing positions by using variation margin collected on “winning” positions in the previous days.

Based on the analysis, the additional variation margin requirements resulting from an upward shift in interest rates range from 2.7 bn. EUR to 40.3 bn. EUR (Table 5.1). For example, in the case of a 75 bps up move, the additional variation margin would exceed the holdings of cash and equivalents for 26 of the companies in the sample (Table 5.3), i.e., 16 % of the total sample. For these undertakings the “cash shortfall” would be 11.3 bn. EUR (1.6 % of their assets).⁶³ The 26 undertakings represent 15% of total assets of the analysis sample and approximately 7% of total assets of all EEA insurers. In any case, all companies in the sample have sufficient cash and cash equivalents, AAA- and AA-rated governments bonds to cover the additional margining requirements for a 75bps upward shift.

In case of larger interest rate shifts, that could be triggered by prolonged market turmoil over several days, the cash shortfalls increase significantly. The upward shifts of 100 bps and 150 bps imply cash shortfalls of 16.7 bn. EUR and 28.4 bn. EUR (Table 5.1). A cash shortfall would occur for 19% and 25% respectively of all companies in the sample (Table 5.3). Since such sizeable shifts are more likely to occur over a number of days rather than in a single one, insurers may obtain cash through several channels other than the repo market. One possibility would be for example an outright sale of bonds, which typically has a settlement time of two days. Therefore, the cash shortfalls in this case could be interpreted as the potential demand for cash by insurance companies spread across the repo, bond, MMFs and other markets. For illustration purposes, Tables 5.2 and 5.4 show the opposite move, meaning downward shifts in interest rates of 100 bps and 150 bps.

Table 5.1: Interest rate shock up. Variation margin and shortfall between variation margin requirements (with netting of IRSs contracts) and the value of different liquid investments in bn. EUR for insurers which have to post variation margin on a net basis when interest rates increase (sample comprises 96 insurers).

Interest rate Shock	Variation margin posted	Cash and eq.	Cash & AAA Gov. Bonds	Cash & AAA/AA Gov. Bonds	Cash & AAA/AA Gov. Bonds & MMF	Cash & AAA/AA Gov. Bonds & MMF & AAA/AA Corp. Bonds
+150bp	-40.3	-28.4	-7.7	-1.9	-0.1	-0.1
+125bp	-33.5	-22.5	-3.0	-0.7	-0.1	0.0
+100bp	-26.8	-16.7	-1.2	0.0	0.0	0.0
+75bp	-20.1	-11.3	-0.3	0.0	0.0	0.0
+50bp	-13.4	-6.2	0.0	0.0	0.0	0.0
+25bp	-6.7	-2.5	0.0	0.0	0.0	0.0
+10bp	-2.7	-0.7	0.0	0.0	0.0	0.0

Table 5.2: Interest rate shock down: Variation margin and shortfall between variation margin requirements (with netting of IRS contracts) and the value of different liquid investments in bn. EUR for insurers which have to post variation margin on a net basis when interest rates decrease (sample comprises 64 insurers).

⁶³ In aggregate cash and equivalents exceed the additional variation margin requirement. But insurers can only use their own cash to post margin.

Interest rate shock	Variation margin posted	Cash and eq.	Cash & AAA Gov. Bonds	Cash & AAA/AA Gov. Bonds	Cash & AAA/AA Gov. Bonds & MMF	Cash & AAA/AA Gov. Bonds & MMF & AAA/AA Corp. Bonds
-150bp	-6.2	-2.8	-0.8	-0.5	-0.4	-0.1
-125bp	-5.2	-2.1	-0.4	-0.2	-0.2	0.0
-100bp	-4.1	-1.3	-0.2	-0.1	-0.1	0.0
-75bp	-3.1	-0.7	-0.1	0.0	0.0	0.0
-50bp	-2.1	-0.2	0.0	0.0	0.0	0.0
-25bp	-1.0	0.0	0.0	0.0	0.0	0.0
-10bp	-0.4	0.0	0.0	0.0	0.0	0.0

Table 5.3: Share of insurers in the sample (160 insurers) with a shortfall between variation margin requirements (with netting) and the value of different liquid investments in case of interest rate increases.

Interest rate Shock	Cash and eq.	Cash & AAA Gov. Bonds	Cash & AAA/AA Gov. Bonds	Cash & AAA/AA Gov. Bonds & MMF	Cash & AAA/AA Gov. Bonds & MMF & AAA/AA Corp. Bonds
+150bp	25%	10%	4%	2%	1%
+125bp	22%	7%	2%	1%	1%
+100bp	19%	4%	2%	1%	1%
+75bp	16%	3%	1%	1%	0%
+50bp	12%	2%	0%	0%	0%
+25bp	7%	0%	0%	0%	0%
+10bp	5%	0%	0%	0%	0%

Table 5.4: Share of insurers in the sample (160 insurers) with a shortfall between variation margin requirements (with netting) and the value of different liquid investments in case of interest rate decreases.

Interest rate shock	Cash and eq.	Cash & AAA Gov. Bonds	Cash & AAA/AA Gov. Bonds	Cash & AAA/AA Gov. Bonds & MMF	Cash & AAA/AA Gov. Bonds & MMF & AAA/AA Corp. Bonds
-150bp	10%	6%	5%	4%	1%
-125bp	10%	5%	4%	2%	1%
-100bp	9%	4%	2%	2%	1%
-75bp	7%	3%	2%	1%	1%
-50bp	6%	2%	1%	1%	1%
-25bp	2%	1%	1%	1%	1%
-10bp	1%	1%	1%	1%	1%

5.2.4 LIQUIDITY FACILITIES IN ADDITION TO LIQUID ASSETS

To manage the liquidity risk from derivatives, insurers may use committed liquidity facilities such as committed repo facilities or credit lines. These liquidity facilities have the primary goal to cover collateral needs in stressed situations with increasing interest rates. These are generally not used for ordinary day to day liquidity management. These facilities are primarily held by larger insurers with an interest rate or FX derivative position.

Committed repo lines are contractual agreements where the insurer can repo pre-specified assets for a pre-specified price under all market circumstances. As such, the undertaking has the guarantee that it can generate cash with additional certainty within a short period of time. This is unlike non-committed repo counterparties, where the counterparty must approve every transaction. During adverse economic circumstances (in which insurance companies face additional liquidity needs) the available market volume generally decreases, which underlines the importance of committed facilities for liquidity management purposes. Eligible assets are almost always high-quality government bonds and government related bonds. Note that repo lines do not change the overall size of the liquidity buffer but alter the composition of the liquidity buffer. This is especially of relevance to insurance companies which have to meet margin calls with cash collateral.

Committed credit lines do increase the liquidity buffer of the insurance undertaking. These are contractual agreements with banks or other financial institutions to obtain cash for a pre-specified price under all extreme circumstances. There should not be any contractual clauses that the counterparty has a one-sided option to unwind the contract for example in case of a rating downgrade or extreme losses.

Unfortunately, information on the committed liquidity facilities is not available for all insurers using derivatives in the EEA. In any case, some information is available for The Netherlands which is the country where interest rate derivatives are more heavily used. The Dutch insurance sector is, on aggregate, able to cover a 72bps increase of the interest rates with these committed liquidity facilities.

In the sensitivity analysis proposed in the previous paragraph, repos are captured because government bonds can be sold on the secondary market or sold in repos to borrow cash to pay margins. The amount of the borrowing is approximately in line with the market value of a bonds. What is instead not possible to capture are the committed credit lines.

As shown in previous EIOPA analysis⁶⁴, insurers have successfully used Interest Rate Swaps to mitigate the effect of falling interest rates on their own funds. A derivative position hedging against interest rates declines results however in additional variation margin calls when interest rates rise. Insurers hold large quantities of liquid assets which can in “normal times” be easily sold or used in repurchase agreements (repos). The presented calculations suggest that the additional requirements based on plausible interest rate changes for individual insurers can be substantial but are well covered by the available liquid assets.

If an insurer did not meet its margin requirements, the derivative contract would be terminated (probably at the worst possible time with heightened market volatility) with a sudden increase in capital requirements. The events in the UK demonstrate that the liquidation of government bonds holding by institutional investors in order to meet margin calls can result in a vicious cycle of rising rates. The analysis of reporting data for Q1 and Q2 2022 outlined in the EIOPA (2022b) shows that derivative users were net sellers in a falling bond market, in any case no material market impact has materialized.

⁶⁴ See EIOPA (2022b)

6 BUSINESS MODELS AND IMPACT ON POLICYHOLDERS

High inflation impacts not only insurance companies, but it also has a direct impact on consumers. Namely, it can erode the value of their savings, affect the insurance coverage leading to possible underinsurance and influence consumers' financial decision-making, which has a direct impact on the way consumers deal with the insurance purchasing process. This section of the report examines recent data to assess the impact of the current inflationary environment on consumers. It distinguishes the effect on policyholders of insurance-based investment products, that is unit-linked, profit-participating and hybrid life policies⁶⁵, the effect on policyholders of non-life insurance products and the impact on financial decision-making. It is important to note that this section, except for the demand-side survey, which was run in July 2023, is based on annual reporting data at end 2022; hence, some of the possible consequences of the current inflationary period may only be observed at a later stage.

6.1 IMPACT OF INFLATION ON INSURANCE-BASED INVESTMENT PRODUCTS (IBIPS)

This section⁶⁶ gives an overview of the net returns for unit-linked (UL), profit participation (PP) and hybrid (HY) insurance products – i.e., insurance-based investment products (IBIPs) – from a consumers' perspective. It draws preliminary conclusions on the actual impact on consumers' savings and consumers' purchasing powers, taking into account that real returns have been significantly eroded. It further assesses the impact of the increase in interest rates on market trends and the value of consumers' savings.⁶⁷

Traditional guaranteed products with PP mechanisms generally have the role to protect consumers from market shocks by giving them stable and, in many instances, guaranteed returns. However, during a prolonged period of high inflation consumers are typically negatively affected as the

⁶⁵ Policies combining both unit-linked and profit participation features.

⁶⁶ While comprehensive, this section of the report has been drafted at a time when re-submission activities / clarification for the Costs and Past Performance report (CPP) were ongoing. Therefore, the CPP should be the report to be looked at in terms of costs and returns.

⁶⁷ See EIOPA (2023a). EIOPA regularly monitors costs and past performance of retail investment products in its remit and provides an overview at the European Economic Area (EEA) and Member States level. EIOPA also regularly monitors premiums and contracts related trends to identify possible risks for consumers and also to determine whether external factors – such as the current cost of living crisis, increases in interest rates, and inflationary trends – influence consumers' choice.

guaranteed return is often lower than inflation, especially for products designed in periods of low to normal inflation.

For unit-linked products, where the market risk rests on policyholders, the overall effect on returns depends on the asset allocation (bonds vs. equity), the economic path and the dynamics of interest rates. In fact, if the market performs well, these products are more likely to give positive real returns. There is also a risk that the value of products such as fixed income assets are negatively affected due to increases in interest rates which normally follow inflationary periods. In fact, while returns remain mostly stable, if consumers holding unit-linked products invested in bonds decide to surrender the product before the maturity date, they are likely to receive a lower surrender value. This is because the value of the underlying bonds purchased during periods of lower interest rates is impacted as investors can now buy bonds offering higher returns.

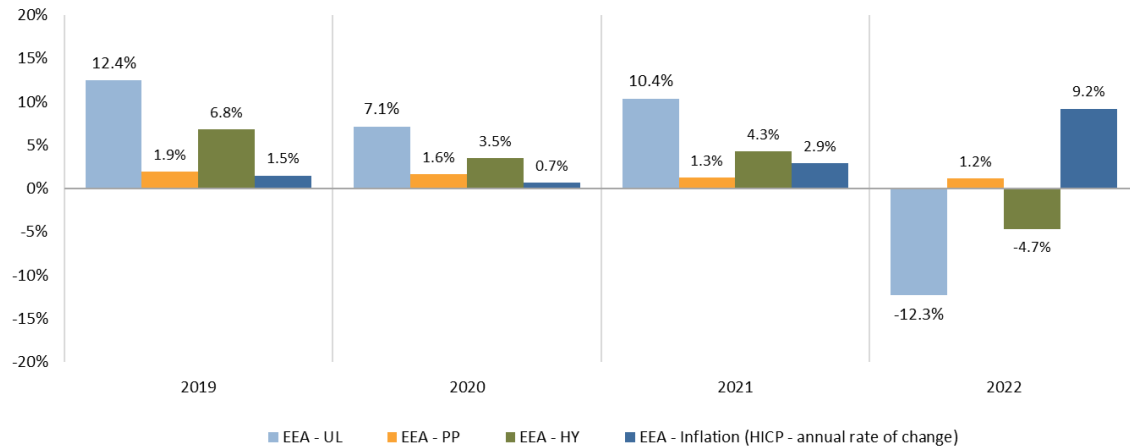
It is important to note that these are general considerations; in fact, the value of insurance often rests on the fact that some of the products shield consumers from market shocks and given their long-term nature, the impact on consumers is often limited. Moreover, an increase in interest rates also enables insurers to offer products with higher guaranteed returns which in the long term can offer significant value to consumers.

Looking at the trends observed, EIOPA's past Cost and Past Performance reports noted that from 2019 to 2021, IBIPs on average generated nominal returns mostly above the inflation rates, with UL outperformed products with guarantees during market upturns. During these periods, net returns on investments in UL and HY products outperformed inflation rates every year (Figure 6.1) due to the direct link to market performance and the low inflation rates in the European Union. In particular, average returns were impacted by markets strong performance in 2021.

In 2021, UL products delivered on average positive real returns (7.5% in 2021) while, already in 2021, PP products delivered negative real returns (-1.6% in 2021) because of the combination of low-for-long interest rates environment and the initial increase of inflation in 2021 (0.7% in 2020 vs 2.9% in 2021). HY continued to deliver positive real returns in 2021 (1.4%), however, these were significantly lower than UL products as HY products balance the benefits and costs of both unit-linked and guaranteed components.

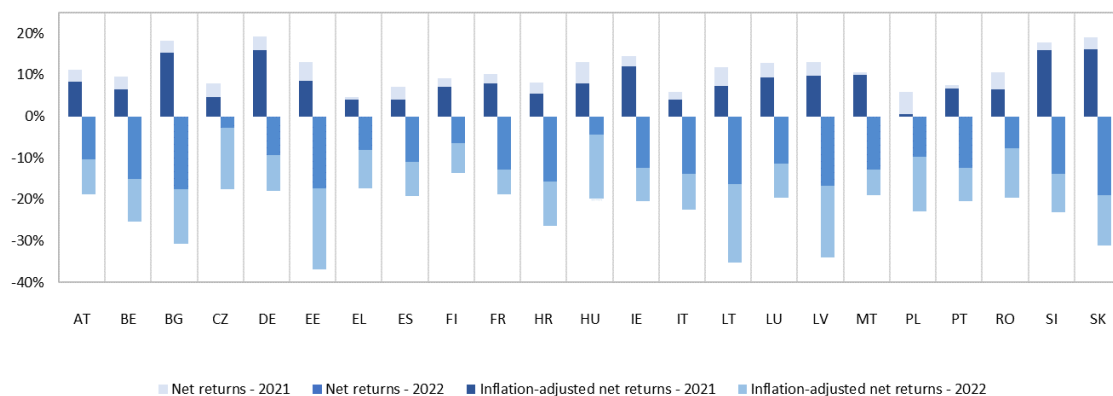
Once inflation kept rising in 2022, PP continued to have negative real returns as well as UL and HY products. In particular, while PP products delivered net positive returns – albeit significantly lower than the level of inflation – due to the market turbulence resulting from the invasion of Ukraine by Russian Forces, UL and HY not only delivered negative real returns but also incurred losses (Figures 6.2 and 6.3).

Figure 6.1: Net nominal returns for UL, PP and HY, at EEA level and inflation for the period 2019 – 2022



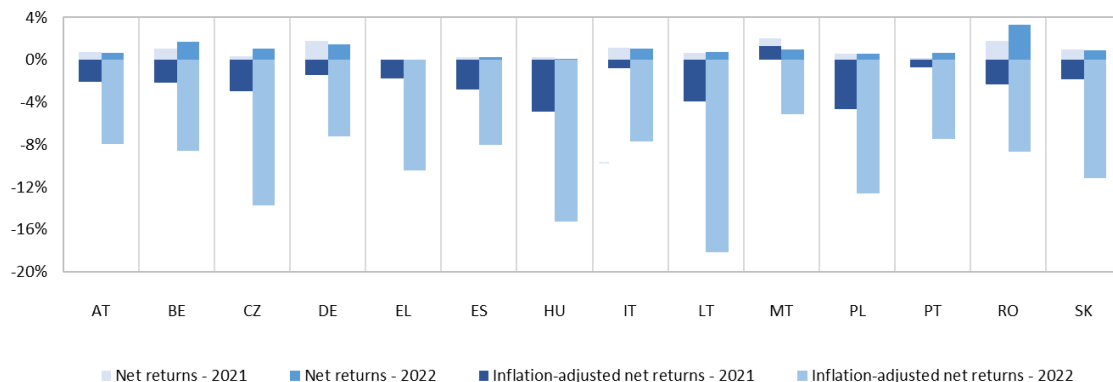
Source: Costs and Past Performance Survey 2023, EIOPA

Figure 6.2: Net nominal returns and inflation-adjusted returns for UL in 2021 and 2022 by Member State



Source: Costs and Past Performance Survey 2023, EIOPA. Note: Countries displayed according to data specificity and availability.

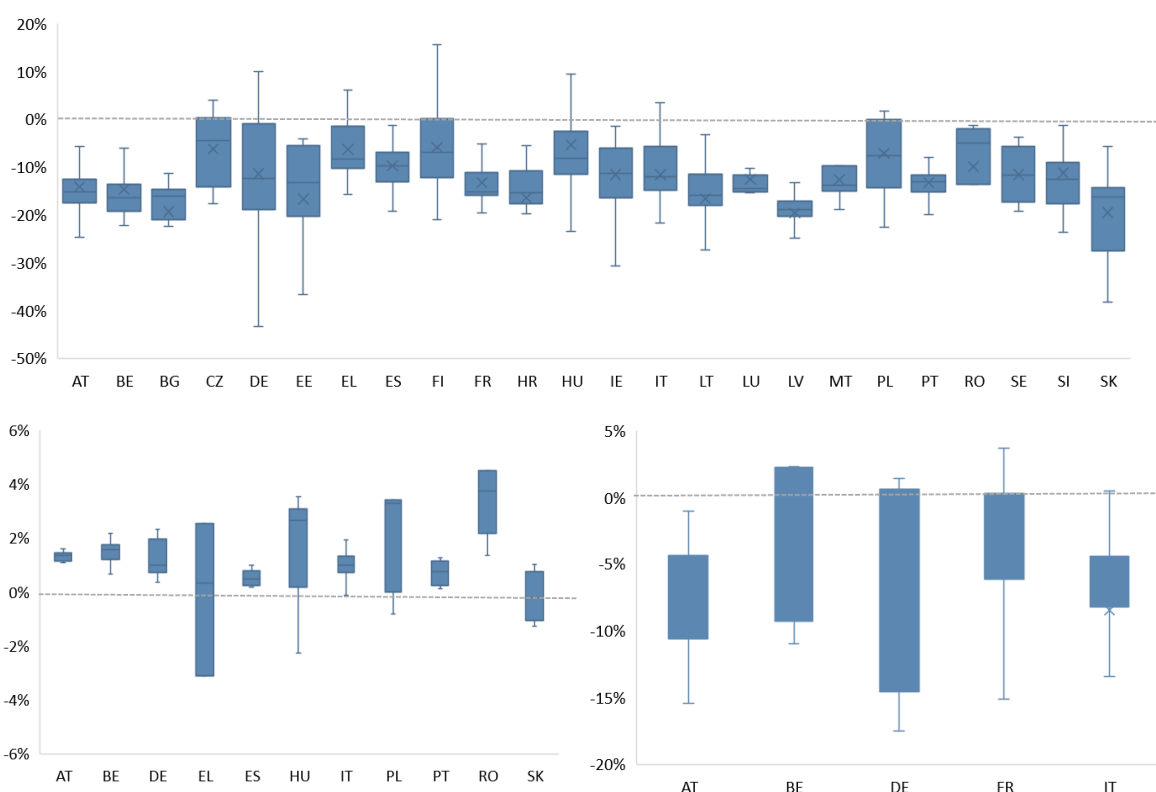
Figure 6.3: Net nominal returns and inflation-adjusted returns for PP in 2021 and 2022 by Member State



Source: Costs and Past Performance Survey 2023, EIOPA. Note: Countries displayed according to data specificity and availability.

As UL products depend on market performance, the stock market decline in 2022 lead UL products to report significant negative returns, exposing consumers to high market fluctuations. Beyond the negative performance of most products, the dispersion of net returns for UL and HY policies at Member State level continued being significant showing that, regardless of market trends, the impact on the value of consumers' policies substantially varies based on the products purchased. Like in the past years, given their ability to protect consumers from shocks, the dispersion of PP product was less significant and limited consumers' exposure to market fluctuations.

Figure 6.4: Dispersion of net nominal returns 2022 per Member State for UL (above) and PP (below on the left) and HY products (below on the right)

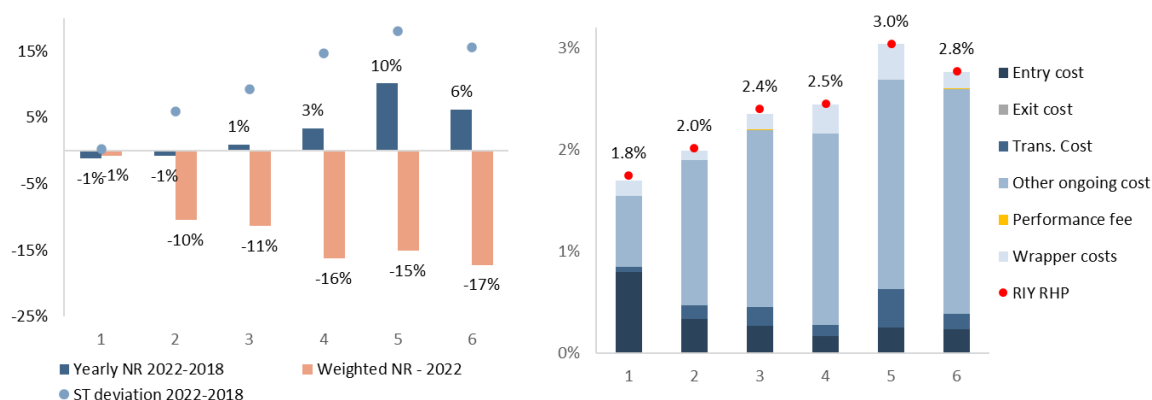


Source: Costs and Past Performance Survey 2023, EIOPA. Note: Countries displayed according to data specificity and availability.

In addition, it is worth mentioning that the net performance of IBIPs is also influenced by the risk class, recommended holding period (RHP) and, to a lesser extent, by the premium frequency. The risk class is the most significant driver for UL products, with higher risk classes showing higher volatility over the years and delivering the highest annual or lowest average net returns depending on market trends. For PP products, RHP weights more, with longer holding periods driving higher net returns. Exogenously, the net performance can be further impacted by the increasing level of interest rates and the effect on the economy, including shares and bond valuations as shown in 2022.

Lower risk class products, which generally rely on fixed income investments and provide more stable returns, may provide increasing returns in the future if the underlying assets are reinvested in higher yielding fixed income – e.g., bonds offering higher yield. However, this switch might generate risks for consumers as the underlying value of lower yield bonds, at present would result in a lower surrender value for consumers. In practice, this means that while consumers can switch to higher yield products, the underlying value of their investments may be impacted and lead to detrimental outcome in case of early surrender.

Figure 6.5: Average net nominal returns (2018-2022) and costs at RHP by risk class from 1 to 6⁶⁸



Source: Costs and Past Performance Survey 2023, EIOPA

6.2 IMPACT OF INFLATION ON NON-LIFE INSURANCE

While the impact of inflation on real returns for IBIPs is clear, high inflation can also significantly impact consumers' access to non-life insurance. As insurers face higher costs for claims pay-outs and higher expenses – Solvency II data shows that total expenses increased across 10 non-life insurance lines of business – they may adjust their premiums accordingly. Based on a survey carried out by EIOPA for its annual Consumer Trends Report, 78% of reporting NCAs reported evidence of inflation impacting premiums. In some Member States, certain products, such as household insurance have contractual automatic indexations of premiums, which leads to an automatic increase of the premium in line with increases in costs due to inflation.

NCAs reported household insurance (17 NCAs), motor insurance (15 NCAs) and accident/health insurance (11 NCAs) as the lines of business most impacted by inflation. This was also confirmed by EIOPA's 2023 Eurobarometer survey which shows that around a third of EU consumers saw their insurance premiums increase on those lines of business (Table 6.1).

⁶⁸ Risk class 7, which allows to seek higher returns when market outperforms but also expose consumers to the highest losses in market downturns, is not included as EIOPA considered the sample not to be representative for EEA level analysis (4 out of 562 products).

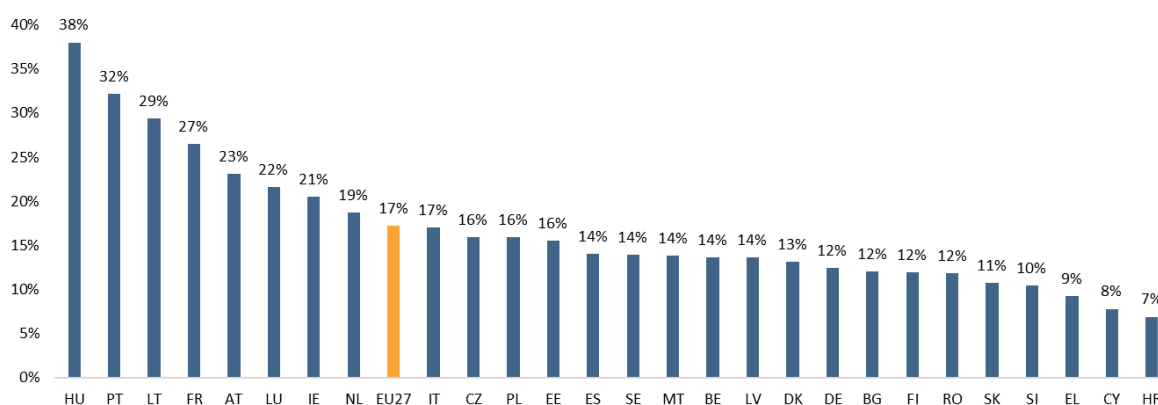
Table 6.1 – Percentage of EU consumers that saw their insurance product price increase despite their risk situation not changing.

Household insurance	Motor insurance	Accident and health insurance
29%	32%	27%

Source: EIOPA's Eurobarometer Survey, July 2023

Some consumers might be unable or unwilling to pay more for the same coverage, and therefore might chose to decrease their level of coverage or to not renew their policy, leaving them less protected. Particularly for lower income consumers it can be a significant financial burden to pay more for the same coverage, leaving them more vulnerable to shocks. Indeed, EIOPA's Eurobarometer shows that 11% of EU consumers feel underinsured as they cannot afford the type of coverage they need.

To offset the increased cost of claims and expenses, insurers can also increase levels of contract deductibles. As shown in Figure 6.6, 17% of EU Consumers saw their deductibles increase in the last two years, with over a fourth of consumers experiencing this in Hungary, Portugal, Lithuania and France. This can further increase the financial burden on consumers in the event of a claim. For example, some consumers might refrain from filing a claim straight away, as they are unable to cover the costs of deductibles which can then in turn impact their ability to be repaid if they are not familiar with time limits envisaged in terms and conditions.

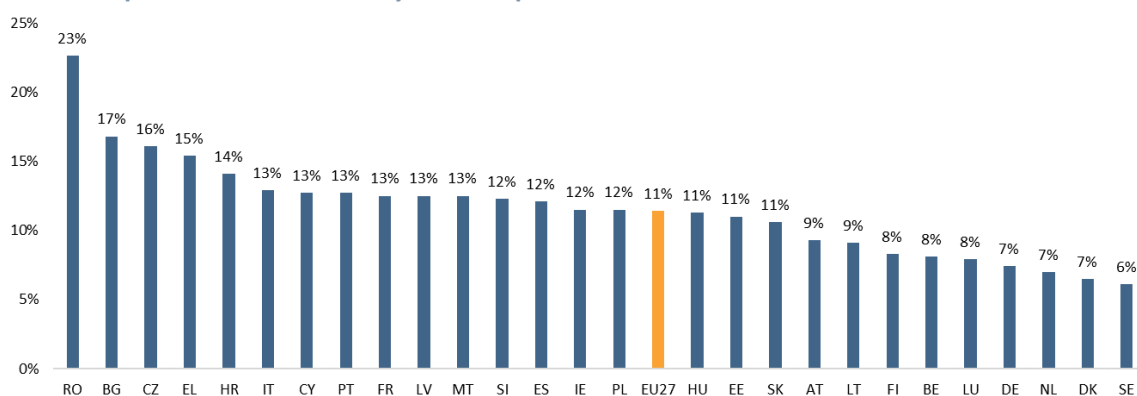
Figure 6.6: Percentage of EU consumers that saw the deductibles of their insurance products increase.

Source: EIOPA's Eurobarometer Survey, July 2023

Beyond the increase in premiums and higher deductibles, if consumers' insurance coverage does not adjust for inflation or if the payout has a predetermined maximum amount, they may find themselves underinsured. For example, a consumer that has insured their house against fire and other damages or against natural catastrophes up to a certain amount, their insurance coverage may not be sufficient to cover the cost of repairs or replacement as inflation caused the costs of rebuilding the house (i.e., construction materials, labor) to rise significantly.

Solvency II reporting for the fire and other damage to property line of business shows a 4% decrease in claims ratio from 2021 to 2022, indicating a potential decrease in claims payout to consumers relative to the premium paid. In fact, while premiums may have already increased, coverage amounts may have not been adjusted. Considering that the claims rejected ratio decreased from 2021 to 2022 (6% in 2022 vs 11% in 2021), it means that the lower claims ratios cannot be attributed to higher rejection rates. In line with this trends, EIOPA's 2023 Eurobarometer shows that 11% of EU consumers felt underinsured as the potential pay-out of their insurance policies would not fully cover expenses due to inflation.

Figure 6.7: Percentage of EU consumers that feel underinsured as the potential pay-out of their insurance policies would not fully cover expenses due to inflation.



Source: EIOPA's Eurobarometer Survey, July 2023

High inflation also leads to lower real disposable income, as price increases generally outpace wage increases. This can lead consumers to stop renewing crucial non-life insurance coverage or prevent them from buying the needed insurance coverage, as they would have to spend more money on other expenses (e.g., food, electricity) – leaving them less protected in case of shocks. Table 6.2 shows that the the cost-of-living increase appears to be the main reason for consumers not buying or renewing non-life coverage. This information is also confirmed by data reported by NCAs for EIOPA's Consumer Trends Report 2023. This situation could worsen, especially as government policies that were meant to protect consumers from rising living costs (e.g., price caps on goods and services or discounts on energy bills) come to an end. Based on EIOPA's 2023 Eurobarometer Survey, 21% of European consumers did not buy or renew their accident and health insurance products, 16% did not buy or renew their household insurance products, and 18% did not buy or renew at least one other insurance product.

Table 6.2: Percentage of EU consumers, amongst those who did not buy or renew selected insurance products, by reason leading to the decision.

	Household insurance	Accident and health insurance	Any other insurance policies
Because of cost-of-living increase	58%	56%	61%

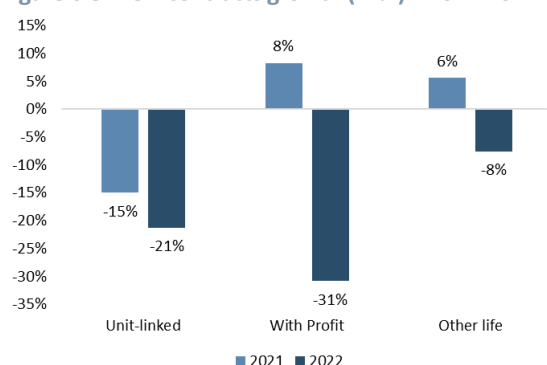
Because of other reasons	42%	44%	39%
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Source: EIOPA's Eurobarometer Survey, July 2023

6.3 IMPACT OF INFLATION ON CONSUMERS' DECISION MAKING

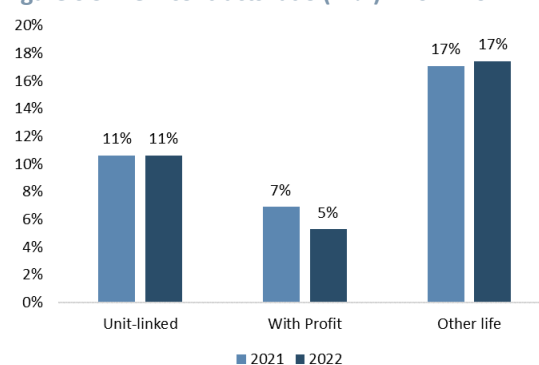
Beyond impacting returns and the protection, the current market and inflationary trends are also having an impact on consumers demand for different products. The shift from traditional PP products, that was gradually being observed over the last several years, was exacerbated by the market turbulence brought by the pandemic coupled with the prolonged low interest rate environment. It also continued in 2022 as consumers searched for products giving them the possibility to get higher yields. The number of new contracts dropped in 2022 (Figure 6.8) – possibly because consumers have lower disposable income. The proportion of new contracts over total contracts is significantly lower for PP than for UL products (Figure 6.9).

Figure 6.8: New contracts growth (in %) – 2021-2022



Source: EIOPA SII annual data, 2022

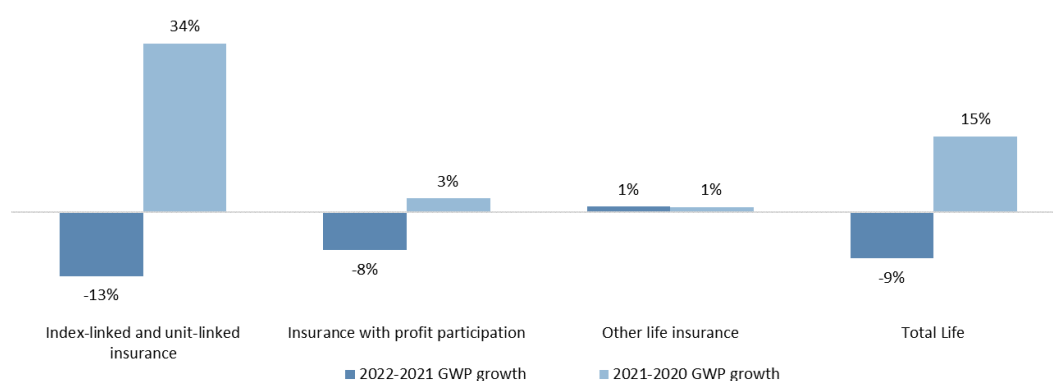
Figure 6.9: New contracts ratio (in %) – 2021-2022



Source: EIOPA SII annual data, 2022

Higher inflation weakens policyholders' purchasing power and lowers the appeal of entering multiyear life insurance contracts. As a result, life insurance GWP dropped across all life insurance lines of business in 2022 after having significantly increased in 2021 (Figure 6.10).

Figure 6.10: Life insurance GWP in €Bn – 2020-2022



Source: EIOPA SII annual data, 2022

Lapses and surrenders can be triggered by the lower purchasing power and the need for policyholders to access more funding. The EIOPA's 2023 Eurobarometer Survey shows that in 2023 the percentage of consumers who:

- Did not buy or renew an IBIPs because of inflation stood at 13% (vs. 9% for other reasons) ranging from 24% in Bulgaria to 5% in Sweden.
- Stopped making regular contributions to the IBIPs they hold because of inflation stood at 5% (vs. 4% for other reasons) ranging from 9% in Ireland to 2% in Denmark.
- Cancelled or surrendered their products because of inflation stood at 4% (vs. 3% for other reasons) ranging from 6% in Lithuania and Poland to 1% in Luxembourg.

Finally, it is worth noting that the EIOPA's 2023 and 2022 Eurobarometer surveys show that the percentage of European consumers that are confident in their ability to live comfortably throughout their retirement years has decreased by 3 percentage points at EU level from June 2022 to July 2023.

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8 ANNEX

- **Liquid assets ratio**

The index is based on a weighting and bucketing of asset classes according to their liquidity (see Basel III The Liquidity Coverage Ratio and EIOPA Liquidity monitoring exercise, Methodological principles in insurance stress testing – Liquidity component and EIOPA 2021 Insurance Stress test templates for liquidity. Ratio:

Numerator:

Liquid assets for each asset category i are consolidated as follows:

$$\text{Liquid assets} = \text{Sum of asset (category)}_i * \text{weight}_i$$

Details on the bucketing of the liquid assets and weights are described in Table A.1.

Denominator: Total assets as in Table A.1

- **Surrender value and/or non-life Best Estimate to liquid assets (%)**

Ratio (1 year time horizon):

Numerator:

Life:

[Sum of Surrender value - Total (Life other than health insurance, incl. Unit-Linked) (S120101_R0300_C0150) and Surrender value - Total (Health similar to life insurance) (S120101_R0300_C0210)] minus Surrender value - Index-linked and unit-linked insurance (S120101_R0300_C0030)]

plus

Non-life:

Ratio between Total Best estimate - net - Total Non-Life obligation (S170101_R0270_C0180) and duration of non-life technical provisions calculated following specifications in EIOPA Supervisory Handbook - Prudent Person Principle Chapter (EIOPA-BoS-15-211/EIOPA-BoS-16-053)

Denominator:

Liquid assets calculated as described in above and following specifications in Table A.1

- **Sustainability of cash-flow position**

Ratio:

Numerator: Sum of net cash flows and investment income calculated as described in Table A.2

Denominator: Liquid assets as above

- **Lapse (surrender) ratio (% Gross written premiums, life business)**

Ratio (life business, excluding index-linked and unit-linked insurance):

Numerator:

Total amount of surrenders - Total (S050101_R2700_C0300) minus Total amount of surrenders - Index-linked and unit-linked insurance (S050101_R2700_C0230)

Denominator:

Premiums written - Gross - Total (S050101_R1410_C0300) minus Premiums written - Gross - Index-linked and unit-linked insurance (S050101_R1410_C0230)

IMPACT OF INFLATION ON THE INSURANCE SECTOR

EIOPA-BoS-23-360

Table A.1

Type	SII Reference	QRT Template	Column/Row	Definition	Filters	Description	Weight
Cash & Bank Deposits & Bank Commercial Paper/Certificates of Deposits)	Cash and equivalent	S.06.02	[C0170]	Solvency II amount	[C0090]=2; [C0230]=K64.1.9 or K64.9.2 and K64.1.9 or K64.9.2; [C0290]=7+23+24 excluding [C0290]=75;	Cash & deposits CIC category = 7 excluding 75; Bank commercial paper CIC 23 Bank certificates of deposits CIC 24 and NACE (filter for banks) like K64.1.9 or K64.9.2 and NACE like K64.1.9 or K64.9.2	1.00
Assets (excluding assets held for UL/IL, MA portfolios and Ring Fenced Funds)							
Government-Related Securities (Central governments & affiliates)							
issued/guaranteed by EU member states (all CQSs) and issued by highly rated non-EU countries (CQS0/1)	Government bonds issued by EU countries	S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0270]= EU country + non EU with CQS=0/1; [C0290]=11+13+14+15; [C0340]=0/1 (for non EU); [C0100]=9	Asset not held in unit linked and index linked contracts; Issuer country in EU or top rated; CIC equal to Government bonds, Central government bonds+Regional government bonds+municipal government bonds+treasury bonds; CQS=0 or 1; asset not pledged as collateral	1.00
Issued or guaranteed by highly rated non-EU countries (CQS2/3)	Government bonds issued by non EU countries	S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0270]= non EU with CQS=2/3; [C0290]=11+13+14+15; [C0340]=2/3 (for non EU); [C0100]=9	Asset not held in unit linked and index linked contracts; Issuer country outside EU; CIC equal to Government bonds, Central government bonds+Regional government bonds+municipal government bonds+treasury bonds; CQS=2 or 3; asset not pledged as collateral	0.85
Exposures to ECB, Central banks, multilateral development banks & international organisations							
issued or guaranteed by ECB, EU central banks, supranational institutions (BIS, IMF, EC,...) or Multilateral Development Banks		S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0270]= EU+XA; [C0290]=12+17; [C0100]=9	Asset not held in unit linked and index linked contracts; Issuer EU or supranational; CIC equal to supranational bonds; asset not pledged as collateral	1.00
issued or guaranteed by central banks of non-EU countries (CQS0/1)		S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0270]= non-EU country; [C0290]=12; [C0340]=0/1; [C0100]=9	Asset not held in unit linked and index linked contracts; Issuer non EU or supranational; CIC equal to supranational bonds; CQS=0 or 1; asset not pledged as collateral	0.85
High Quality Covered bonds							
Extremely high quality covered bonds - CQS0/1	Covered bonds	S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0290]=16+26+27; [C0340]=0/1; [C0100]=9	Asset not held in unit linked and index linked contracts; CIC equal to Corporate bonds, Covered bonds; CQS=0 or 1; asset not pledged as collateral	0.93
High quality covered bonds - CQS2	Covered bonds	S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0290]=16+26+27; [C0340]=2; [C0100]=9	Asset not held in unit linked and index linked contracts; CIC equal to Corporate bonds, Covered bonds; CQS=2; asset not pledged as collateral	0.85
Corporate bonds (not issued by a financial institution or its affiliate)							
Corporate debt securities (CQS0/1)	Corporate bonds CQS0/1	S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0290]=21+22+25+28+29; [C0340]=0/1; [C0230] < K; [C0100]=9	Asset not held in unit linked and index linked contracts; CIC equal to Corporate bonds, Common bonds; CQS=0 or 1; NACE code not equal to k to exclude issuance from financials and affiliates; asset not pledged as collateral	0.85
Corporate debt securities (CQS2/3)	Corporate bonds CQS2/3	S.06.02	[C0170]	Total Solvency II amount	[C0090]=2; [C0290]=21+22+25+28+29; [C0340]=2/3; [C0230] < K; [C0100]=9	Asset not held in unit linked and index linked contracts; CIC equal to Corporate bonds, Common bonds; CQS=2 or 3; NACE code not equal to k to exclude issuance from financials and affiliates; asset not pledged as collateral	0.50
Listed Equity (not issued by a financial institution or its affiliate)	Listed equities	S.06.02	[C0170]	Equities - listed Solvency II amount	[C0090]=2; [C0290]=3; CIC not XT, XL; [C0310]=1; [C0230] < K	Listed equities excluding participations; NACE code not equal to k to exclude issuance from financials and affiliates	0.50
Collateralised securities (CQS0/1)		S.06.02	[C0170]		[C0090]=2; [C0290]=6; [C0340]=0/1	Asset not held in unit linked and index linked contracts; CIC equal to Collateralised securities; CQS=0 or 1	0.65
Collective Investment Undertakings	CIU	S.06.02	[C0170]	Collective Investments Undertakings Solvency II amount	[C0090]=2; [C0290]=4	Asset not held in unit linked and index linked contracts; CIC equal to Collective investment undertaking	0.60
Total Assets (excluding assets held for UL/IL)		S.02.01	[R0500_C0010] [R0220_C0010]	Solvency II value		Total Asset not held for index-linked and unit-linked contracts	

IMPACT OF INFLATION ON THE INSURANCE SECTOR

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Table A.2

Net Cash Flows Life (excluding UL/IL)

		SII references	QRT Template	Column/Row	Calculation	Description
C.1.1	Premium (written)*	Premiums written (Gross)	S0501	[C0300/R1410] [C0230/R1410]	[C0300/R1410] [C0230/R1410] –	Total Gross written premium deducted by the UL/IL insurance gross written premium
C.1.2	Claims and other technical outflows (excluding surrender)*	Claims an expenses incurred	S0501	[C0300/R1610] [C0230/R1610] [C0300/R1900] [C0230/R1900]	[C0300/R1610] [C0300/R1900] [C0230/R1610] [C0230/R1900] + – –	Total Gross claims incurred + expense incurred deducted by the UL/IL insurance gross claims incurred and the UL/IL related expense incurred
C.1.3	Surrender	Total amount of surrenders	S0501	[C0300/R2700] [C0230/R2700]	[C0300]/[R2700]- [C0230]/[R2700]	Total amount of surrenders deducted by the UL/IL insurance amount of surrenders
C.1.4	Reinsurance inflows	Reinsurance shares of claims	S0501	[C0300/R1620] [C0230/R1620]	[C0300/R1620] [C0230/R1620] –	Total reinsurance share of claims incurred deducted by UL/IL business
C.1.5	Reinsurance outflows	Reinsurance shares of premium	S0501	[C0300/R1420] [C0230/R1420]	[C0300/R1420] [C0230/R1420] –	Total reinsurance share of premiums written deducted by UL/IL insurance
C.1	Net Cash Flows				=C.1.1-C.1.2-C.1.3 + (C.1.4-C.1.5)	
Net Cash Flows Non-Life business						
		SII references	QRT Template	Column/Row	Calculation	Description
C.2.1	Premium (written)*	Premiums written (Gross)	S0501	[C0200/R0110] [C0200/R0120] [C0200/R0130]	[C0200/R0110] [C0200/R0120] [C0200/R0130] + +	Sum of premium Written – Gross direct business, gross proportional reinsurance accepted, gross non-proportional reinsurance
C.2.2	Claims and other technical outflows	Claims an expenses incurred	S0501	[C0200/R0310] [C0200/R0320] [C0200/R0330] [C0200/R1300]	[C0200/R0310] [C0200/R0320] [C0200/R0330] [C0200/R1300] + + +	Sum of claims incurred – Gross direct business, gross proportional reinsurance accepted, gross non-proportional reinsurance + Total expenses
C.2.3	Reinsurance inflows	Reinsurance shares of claims	S0501	[C0200/R0340]	[C0200/R0340]	Reinsurance share of claims incurred
C.2.4	Reinsurance outflows	Reinsurance shares of premiums	S0501	[C0200/R0140]	[C0200/R0140]	Reinsurance share of premium written
C.2	Net Cash Flows				=C.2.1 – C.2.2+ (C.2.3 – C.2.4)	

Investment income (sum of the following components of template S.09.01.01.01, excluding UL)

Dividends	Interest	Rent	Net gains and losses
C0070	C0080	C0090	C0100

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