FINANCIAL SUPERVISORY AUTHORITY

REPORT ON THE STABILITY OF NON-BANK FINANCIAL MARKETS

2/2022

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Introduction

At the end of 2022, the main risks to financial markets resulted from the deteriorating geopolitical and macroeconomic context, characterised by high inflation due to rising energy prices, with a negative impact on consumers' disposable income. New vulnerabilities to the financial system arising from the energy crisis, the geopolitical context and the inflationary environment, overlapped with an economy weakened by the effects of the COVID-19 pandemic, interrupting at least temporarily the recovery of European economies. Thus, the tightening of financial conditions and increased uncertainty have had a strong impact on economic activity, in the sense of a postponement of investment projects by companies and a reduction in household consumption.

Against the backdrop of the Russia-Ukraine war, imposed sanctions and international trade disruptions, market conditions worsened and rising energy costs and supply-side bottlenecks led to significant falls in asset prices in H1 2022 and affected the recovery of financial markets that started in 2020.

The likelihood of extreme risk scenarios materialising has increased since early 2022 and has been exacerbated by recent geopolitical developments. These geopolitical developments have an impact on energy prices and supply, and higher-than-expected inflation is tightening financial conditions, which may amplify stress in the financial sector.

In this vulnerable macro-financial context, European authorities responsible for financial market regulation and supervision have taken a number of necessary measures to manage risks to consumers and market stability, including issuing warnings. Thus, the European Systemic Risk Board (ESRB) communicated in the second part of 2022 its concerns about increased uncertainty and the high likelihood of extreme risk scenarios materialising and issued a general warning in this regard. The ESRB also identified a number of severe risks to financial stability that may materialise simultaneously, amplifying each other's impact, while the risks to financial stability stemming from a sharp decline in asset prices remained some high. In addition, the likelihood of large-scale cyber incidents affecting the financial system has increased.

In Europe, rising interest rate risk has affected the performance of investment funds, leading to increased redemption requests, particularly for bond and money market funds. At the same time, massive corrections were also recorded in the crypto-asset markets, which fell by around 70% in 2022.

For the European insurance sector, the main risks and vulnerabilities identified by EIOPA remained those of a macroeconomic nature, with this category remaining at a high level. EIOPA also highlights that profitability and solvency risks are at a medium level, amid good solvency positions of insurance companies. At the same time, in order to assess the resilience of occupational pension funds in the context of the transition to a green economy, EIOPA has carried out

the first stress test of the pension sector in a climate change scenario that simulates an abrupt and disorderly transition to a green economy due to delayed implementation of policy measures. The results showed significant exposures of occupational pension funds to transition risks, with the largest declines in equity and bond investments, and confirmed that there are still difficulties in integrating ESG factors into investment decisions and allocating portfolios to different climate risk sensitive categories.

The year 2022 marked the end of a cycle of quantitative easing. Quantitative easing (QE) programmes by central banks were designed after the 2007-2009 financial crisis to stabilise financial markets. In 2022, most central banks started a monetary policy of rapidly increasing monetary policy (QT) rates. Central bank policies were also supported after 2020 by a mix of macroprudential policies that facilitated the growth of capital markets.

From the perspective of financial market interconnections, financial conditions have tightened considerably in 2022 as economic imbalances have intensified. Central banks have successively raised interest rates to combat inflation, with rising monetary policy rates in Europe leading to a high level of contagion to government bond yields across all maturities. However, the contagion index for government bonds is currently at a lower level than in 2020.

Thus, macroeconomic risk, market risk and operational risk remain at a high level. In the scenario of further economic shocks, further significant corrections in international and local financial markets are possible. Although some expected risks have not materialised, existing vulnerabilities increase sensitivity in the scenario of new unanticipated shocks. If some extreme scenarios materialise, financial stability will be affected by a sharp fall in asset prices. Operational risk has intensified with the increased frequency of cyber attacks in the context of the Russia-Ukraine military conflict.

In the local market, the analysis of systemic risk measures related to companies included in the BET index shows a tightening of risk in the periods December 2018, March - April 2020, December - March 2022 and end of September 2022. Regardless of the systemic risk measure used, moments of increasing systemic risk specific to BET index companies were observed, with simultaneous patterns manifesting for included companies, independent of sector, with consistent upside potential.

In the Romanian insurance market, underwriting volume increased significantly in the first 6 months, mainly as a result of the increase in gross written premiums for motor third party liability and carriers liability insurance. The solvency capital requirement ratio for Romanian insurance companies remained above unity, but at a lower level than the solvency position in Europe, where there was a slight improvement. For general insurance business, liquidity risk remained at a similar level to that recorded at the end of December 2021, while for life insurance business, it decreased moderately. However, companies hold a supra-unit level of the liquidity indicator, which

indicates a sufficient level of assets to meet obligations towards policyholders, as reported by insurance companies to ASF.

In the private pension fund market, persistent macro-financial vulnerabilities contributed to decreases in private pension funds' annualised rates of return at the end of September 2022 compared to the same period last year. Private pension fund investments are based on the principle of prudent management to ensure the security, diversification, quality, liquidity and profitability of private pension fund assets, and the legal framework requires maximum limits in fund portfolios by both asset class and individual holdings to allow for risk diversification and avoid portfolio concentration. The structure of the Romanian private pension system also provides for several mechanisms to protect the rights of participants, including: segregation of assets between administrators and funds, additional checks and validations by depositories, technical provisions set up by administrators, reporting requirements and increased transparency, plus the Private Pension System Rights Guarantee Fund. Although it has gone through several turbulent periods since its establishment, the Romanian private pension system has weathered both previous financial crises and various moments of volatility and downturns in the financial markets and has returned to a positive trajectory in a short time. However, past performance is no guarantee of future results, especially as current developments pose many structural challenges, given the global geopolitical dynamics and the transition to climate-sustainable economies.

Another segment of the financial market that has seen rapid growth is crypto-assets. A major event in the world of cryptoassets, occurred on November 11, 2022, when FTX, a cryptoasset trading platform ranked third in the world by market capitalization, went bankrupt. The market value of cryptoassets dropped from around USD 3 trillion in 2021 to USD 830 billion at the end of 2022, and this rapid collapse shows how fragile this market is lacking fundamentals and economic utility.

The cryptoasset market continues to be plagued by fraud and investigations in early 2023. In an ongoing criminal investigation, Bulgarian prosecutors allege that *Nexo*, a cryptoasset lender, is involved in a large-scale international criminal scheme involving money laundering activities and violations of global financial sanctions against Russia. In this context the specific risks that cryptoasset transactions generate, the high volatility and facilitation of illicit acts (money laundering, financing of criminal activities) as a result of less or no enforcement of compliance and know-your-customer checks, can generate speculative bubbles and lead to increased systemic risk.

Although these markets are not yet regulated by the competent authorities, an extensive project to regulate crypto-asset markets has been initiated at European level. The MiCA project is intended to regulate crypto-asset markets, Initial Coin Offerings, crypto-asset service providers and related services. MiCA is part of a wider package of measures on digital finance, which also includes the Digital Operational Resilience Act (DORA) and the DLT Pilot Regime Regulation (to apply from 23 March 2023).

1. Analysis of the local and international macroeconomic and financial context

The global economy continues to face challenges from the war in Ukraine, soaring inflation and the economic slowdown in China. But European economies remain the hardest hit, due to their geographical proximity to the war and their heavy (albeit declining) dependence on fossil fuel imports.

In the post-pandemic period and up to the start of the war, as containment measures were relaxed, spending increased as consumers resumed travel and restaurants, hotels and other services resumed business, so economies began to recover from losses. Although inflation has taken a toll on some of what has recovered over this period, real GDP growth in the European Union in the first two quarters of 2022 exceeded expectations (5.6% in Q1 2022 and 4.4% in Q2 2022 compared to the same period last year). In the Eurozone, GDP growth was 5.6% in Q1 2022 and 4.4% in Q2 2022.

In the third quarter of 2022, economic growth slowed considerably compared to the same period last year to 2.5% in the EU and 2.4% in the Eurozone. The slowdown in Q3 came as the strong effects of the post-pandemic economic rebound and reduced supply chain disruptions were mitigated by weakening confidence and rising imports, coupled with slowing exports and high inflation.

According to the interim winter forecast issued by the European Commission, economic growth prospects for both the Eurozone and the EU have improved since the last autumn forecast, with both areas set to avoid the technical recession that had been anticipated earlier in the year.

For 2022, economic growth has been estimated at 3.5% in both the EU and the Eurozone. For 2023, GDP is expected to grow by 0.8% in the EU and 0.9% in the Eurozone, and in 2024, GDP is expected to grow by 1.6% in the EU and 1.5% in the Eurozone.

In its autumn economic forecast, the European Commission expected the EU, the Eurozone and most Member States to enter recession in the winter of 2022/2023.

Inflation has continued to exceed expectations and has spread across its components, despite sharp falls in gas and electricity prices, falling demand, easing supply bottlenecks and government measures to limit energy price dynamics. The annual inflation rate in the Eurozone (as measured by the Harmonised Index of Consumer Prices - HICP) was 9.2% in December 2022, down from 10.1% in November 2022, according to data published by Eurostat.

Government debt and budget deficits started to decline in 2021 and 2022 for the EU and the Eurozone, but remained above pre-pandemic levels. At the end of Q3 of 2022 in the Eurozone, the ratio of government debt to GDP was 93%, compared to 94.2% at the end of

Q2 2022 and by 97.3% at the end of Q3 2021. Also in the EU, government debt to GDP declined to 85.1% from 86.4% in Q2 2022 and 89.7% in Q3 2021.

According to European Commission projections, in 2022 the budget deficit is estimated at 3.4% of GDP in the EU and 3.5% in the Eurozone[1]. In 2023, the budget deficit is projected at 3.6% in the EU and 3.7% in the Eurozone. The European Commission forecasts a budget deficit for Romania of 6.5% of GDP in 2022 and 5% of GDP in 2023.

For Romania, economic growth is estimated by the European Commission at 4.5% in 2022, 2.5% in 2023 and 3% in 2024. At the same time, the IMF forecasts economic growth of 4.8% in 2022, unchanged from the September Article IV projection[2], and for 2023, economic growth has been adjusted to 3.1% from 3.4%.

On the domestic front, the National Strategy and Forecast Commission (CNSP) forecasts economic growth for 2022 at 4.9%, 0.3 pp higher than estimated in the autumn forecast scenario (4.6%).

According to the NSI, Romania's Gross Domestic Product in Q3 2022 was, in real terms, 1.2% higher (seasonally adjusted data) compared to Q2 2022. Compared to the same quarter of 2021, GDP increased by 3.8% on the gross series and by 4.6% on the seasonally adjusted series. In terms of resources, the largest component of GDP is the services sector, with a share of 71% (Q3 2022).

In Q3 2022, the budget deficit to GDP (seasonally adjusted series) was 3.3% in the Eurozone and 3.2% in the EU. The deficit-to-GDP ratio increased due to strong increases in total expenses.

In the case of Romania, in Q3 2022, government debt to GDP was 47.8% and the budget deficit to GDP was 6.3%. The approach of the 50% government debt threshold and the need to reduce the budget deficit below 3% after the end of 2022 may pose some financing challenges for government expenditure.

In Romania, the annual inflation rate (as measured by the consumer price index - CPI) remained on an upward trend, but slowed down in the second half of the year. In December 2022, consumer prices increased by 0.4% compared to November 2022. The annual inflation rate in December 2022 compared to December 2021 was 16.4%.

[1] The latest available European Commission estimates for the budget deficit are from the autumn forecast.

[2] According to Article IV of the IMF Articles of Agreement, the IMF usually holds bilateral discussions with its members on an annual basis. A delegation visits the country, collects economic and financial information and discusses with the country's officials the country's economic developments and policies. On return to headquarters, the staff prepares a report, which forms the basis for discussion by the Executive Board.

1.1. International macroeconomic and financial developments

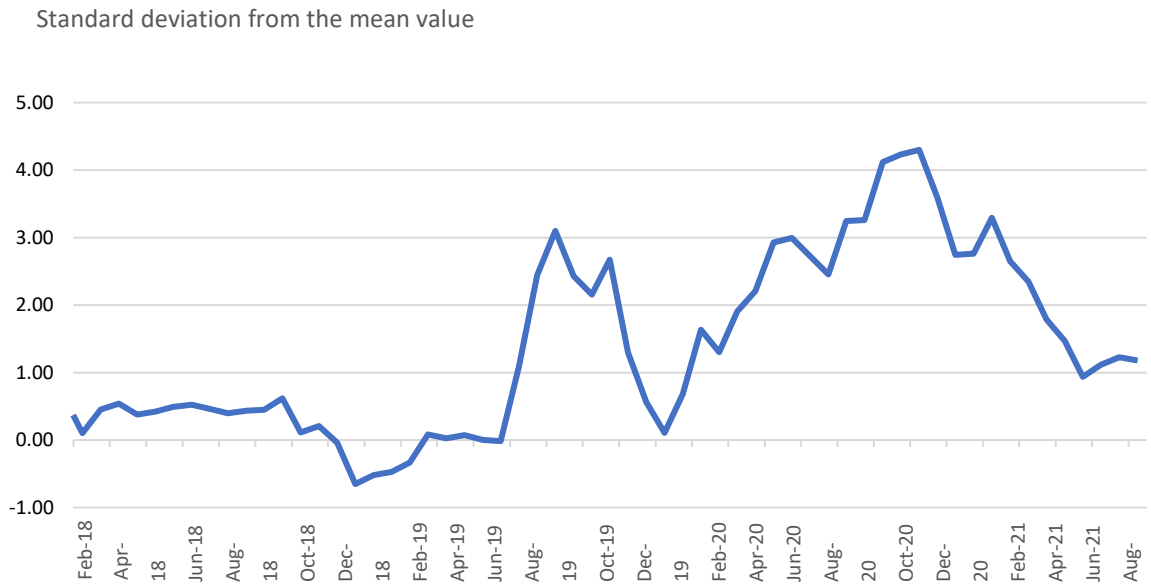
Economic growth developments

The global economic prospects have deteriorated as a result of imbalances caused by the war in Ukraine, the crisis in price growth caused by inflationary pressures and the slowdown in China. In China, the frequent zero-COVID policy bottlenecks have negatively impacted the economy, particularly in Q2 2022. In addition, the crisis in the real estate sector has deepened rapidly, accounting for between 20% and 30% of China's GDP. Given the size of China's economy and its importance to global supply chains, this is impacting global trade and activity.

The *Global Supply Chain Pressure Index* (GSCPI) measures supply chain disruptions using a range of indicators such as the Baltic Dry Index (BDI), the Harpex index, BLS air freight cost indices for freight flights between Asia, Europe and the United States, and components from Purchasing Managers' Index (PMI) surveys, focusing on manufacturing firms in seven interconnected economies: China, the Eurozone, Japan, South Korea, Taiwan, the United Kingdom and the United States.

The evolution of the index indicates a decrease in tensions in 2020 and 2021 on the supply chain structure. However, the GSPI is at a high level compared to the pre-pandemic period.

Chart 1 Evolution of the GSCPI index



Source: US Federal Reserve (FED), ASF processing

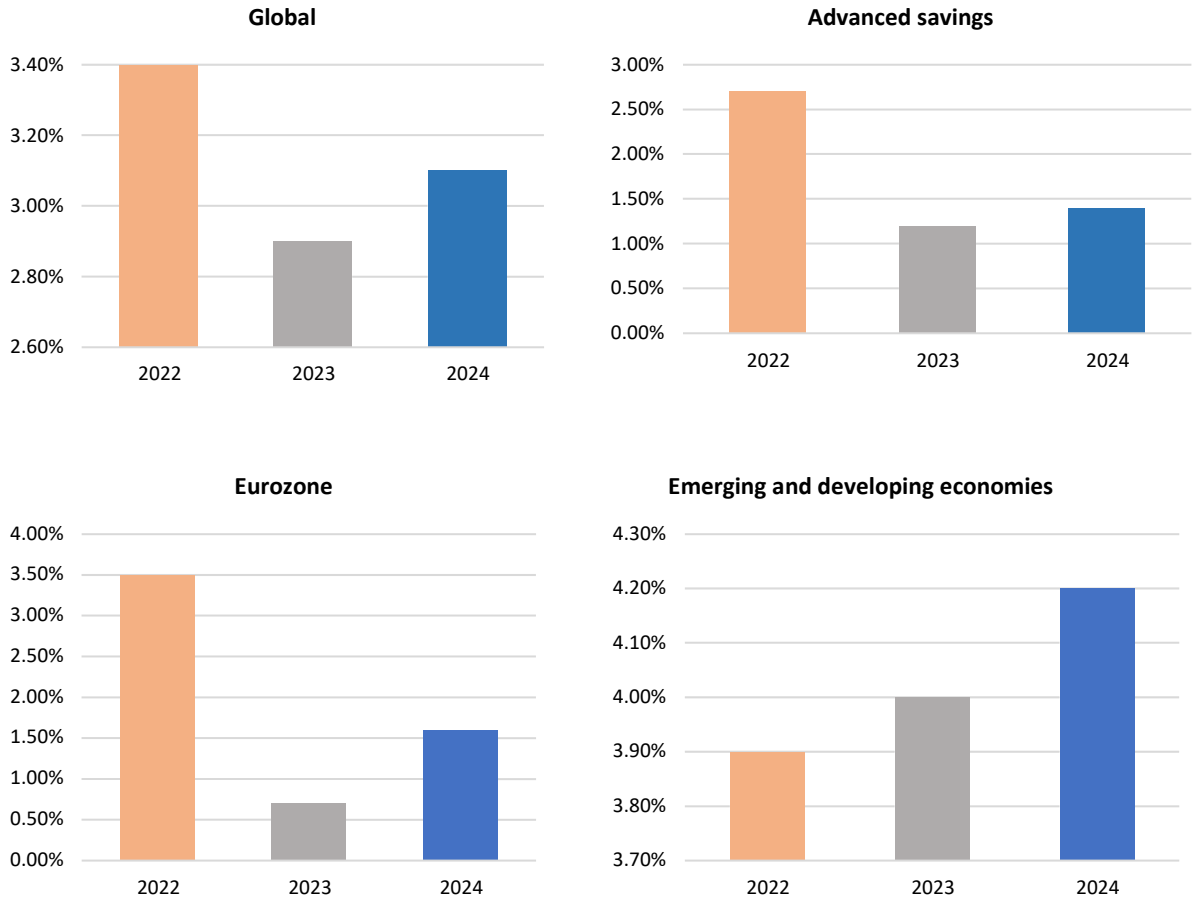
IMF (World Economic Outlook, January 2023) forecasts global growth of 3.4% in 2022, slowing to 2.9% in 2023 and rising to 3.1% in 2024.

For advanced economies, economic growth is projected to fall sharply from 2.7% in 2022 to 1.2% in 2023, before rising to 1.4% in 2024. At the same time, about 90% of advanced economies are expected to experience a decline in economic growth in 2023.

For emerging and developing economies, modest growth of 3.9% in 2022, 4.0% in 2023 and 4.2% in 2024 is projected. About half of emerging and developing economies have lower growth in 2023 than in 2022.

For the Eurozone, GDP growth has been adjusted upwards for 2023 to 0.5% (from the October estimate of 0.7%). For 2024, growth is estimated at 1.6%.

Chart 2 IMF GDP forecasts



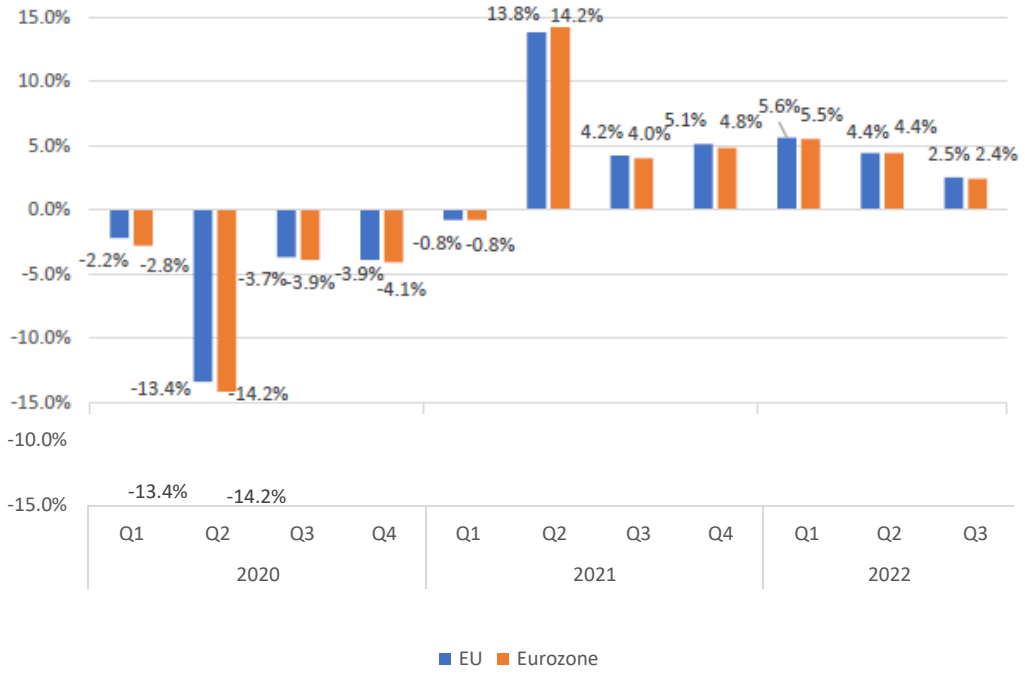
Source: IMF -World Economic Outlook, January 2023, ASF processing

According to the European Commission's interim winter forecast, economic growth prospects for both the Eurozone and the EU have improved. As a result, both areas are now set to avoid the technical recession that was anticipated for the beginning of the year. For 2022, economic growth has been estimated at 3.5% in both the EU and the Eurozone. For 2023, GDP is expected to grow by 0.8% in the EU and 0.9% in the Eurozone, and in 2024, GDP is expected to grow by 1.6% in the EU and 1.5% in the Eurozone.

The ECB forecasts a considerable slowdown in average annual real GDP growth, from 3.4% in 2022 to 0.5% in 2023, followed by a recovery to 1.9% in 2024 and 1.8% in 2025. Compared to the September 2022 projections, GDP growth prospects have been revised upwards by 0.3 pp for 2022 and downwards by 0.4 pp for 2023, remaining unchanged for 2024.

According to data published by Eurostat, compared to Q2 2022, GDP (seasonally adjusted series) grew by 0.3% in both the Eurozone and the EU in Q3 2022. Compared to the same quarter of the previous year, GDP grew by 2.4% in the Eurozone and by 2.5% in the EU in the third quarter of 2022, after an increase of 4.4% in both the Eurozone and the EU in the second quarter of 2022. In Q2 2022, GDP grew by 0.9% in the Eurozone and by 0.7% in the EU.

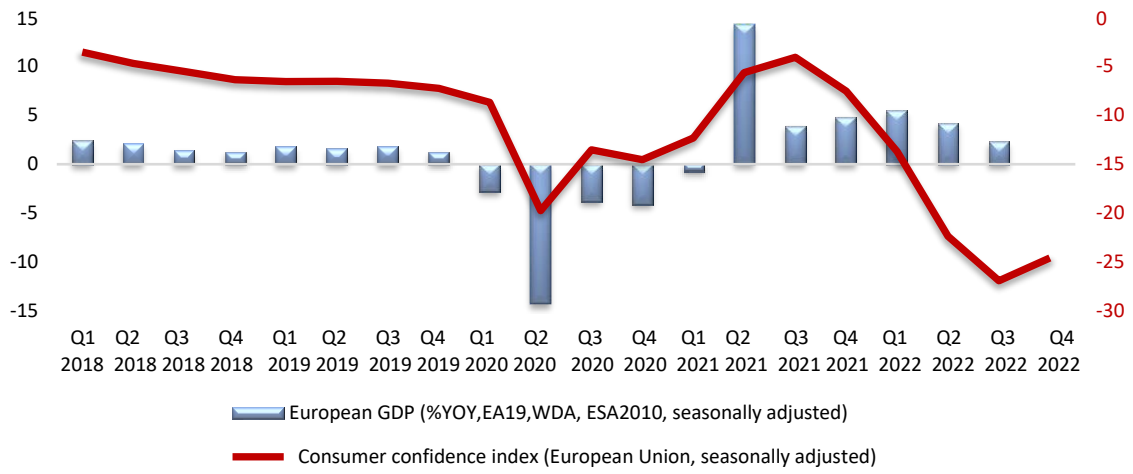
Chart 3 Quarterly GDP developments in the Eurozone and the EU, annual percentage variation, seasonally and calendar adjusted data



Source: Eurostat, ASF processing

In 2022, consumer confidence in the economic climate at the EU level deteriorated significantly, with the index falling to around -27 points in Q3. In Q4, the consumer confidence index stood at around -25 points. The fall in consumer confidence may signal a slowdown in economic growth and that the economy may be facing problems.

Chart 4 Economic growth and the public confidence index



Source: Refinitiv, ASF processing

Budget deficit and government debt at European level

Government debt and budget deficits started to decline in 2021 and 2022 for the EU and Eurozone, but remained above pre-pandemic levels.

At the end of Q3 2022, in the Eurozone, government debt-to-GDP ratio was 93%, compared with 94.2% at the end of Q2 2022 and 97.3% at the end of Q3 2021. Also in the EU, government debt to GDP declined to 85.1%, from 86.4% in Q2 2022 and 89.7% in Q3 2021. For both the Eurozone and the EU, the decline in the government debt-to-GDP ratio is due to GDP growth outpacing the growth of government debt in absolute terms. The highest government debt-to-GDP ratios at the end of Q3 2022 were recorded in Greece (178.2%), Italy (147.3%), Portugal (120.1%), Spain (115.6%), France (113.4%) and Belgium (106.3%) and the lowest in Estonia (15.8%), Bulgaria (23.1%) and Luxembourg (24.6%).

In Q3 2022, the budget deficit to GDP (seasonally adjusted series) was 3.3% in the Eurozone and 3.2% in the EU. The deficit-to-GDP ratio increased due to strong increases in total expenditure. Total revenue and expenditure continued to be influenced by policy responses to the COVID-19 pandemic, but less than in previous quarters. In Q3 2022, measures to mitigate high energy prices started to have a stronger impact on the government balance. Most Member States continued to run government deficits.

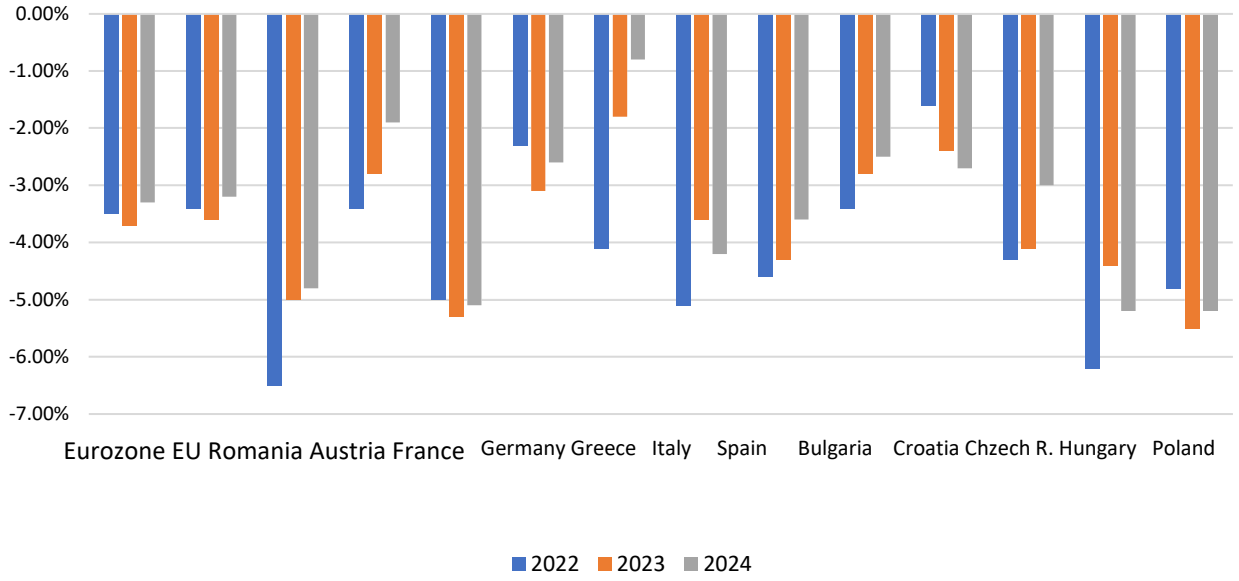
In the case of Romania, in Q3 2022, government debt to GDP was 47.8% and the budget deficit to GDP was 6.3%. The approach of the 50% government debt threshold and the need to reduce the budget deficit below 3% after the end of 2022 may pose some financing challenges for government expenditure.

Chart 5 Evolution of government debt and budget deficit (% of GDP), seasonally adjusted quarterly data - EU, Eurozone and Romania

Source: ASF processing based on Eurostat data

According to the European Commission's latest budget deficit projections, in 2022 the budget deficit is estimated at 3.4% of GDP in the EU and 3.5% in the Eurozone. In 2023, the budget deficit is projected at 3.6% in the EU and 3.7% in the Eurozone. The European Commission forecasts a budget deficit for Romania of 6.5% of GDP in 2022 and 5% of GDP in 2023.

Chart 6 Budget deficit projections



Source: European Commission, ASF processing

Inflation in Europe

The IMF projects headline inflation to reach 8.8% in 2022, but to fall to 6.6% in 2023 and 4.3% by 2024. The IMF stresses that monetary policy should maintain the path to restore price stability and fiscal policy should aim to ease cost-of-living pressures while maintaining a sufficiently tight stance aligned with monetary policy. Moreover, structural reforms can further support the fight against inflation by improving productivity and reducing supply constraints, while multilateral cooperation is needed to accelerate the transition to green energy and prevent fragmentation.

The European Commission's projections for the inflation rate have been lowered for both 2023 and 2024. Headline inflation is expected to fall from 9.2% in 2022 to 6.4% in 2023 and 2.8% in 2024 in the EU. In the Eurozone, it is expected to fall from 8.4% in 2022 to 5.6% in 2023 and 2.5% in 2024.

The annual inflation rate in the Eurozone (as measured by the Harmonised Index of Consumer Prices - HICP) was 9.2% in December 2022, down from 10.1% in November 2022, according to data published by Eurostat. In terms of contributions to the annual inflation rate, the food, alcohol and tobacco component (2.88 p.p.) has the largest share, followed by energy (2.79 p.p.), services (1.83 p.p.) and non-energy industrial goods (1.70 p.p.). According to the latest ECB projections published in December, headline HICP inflation will remain extremely high in the near term. The ECB expects the average inflation rate to fall from 8.4% in 2022 to 6.3% in 2023, with inflation falling from 10% in Q4 2022 to 3.6% in Q4 2023**.** Thereafter, inflation is expected to fall to 3.4% on average in 2024 and 2.3% in 2025. The decline in inflation over the projection horizon reflects strong base effects in the downward direction associated with energy products during 2023, the gradual impact of the normalisation of the ECB's monetary policy, which started in December 2021, the less favourable growth outlook, and the projected decline in energy and food commodity prices.

Chart 7 HICP by contribution for the Eurozone and ECB forecast

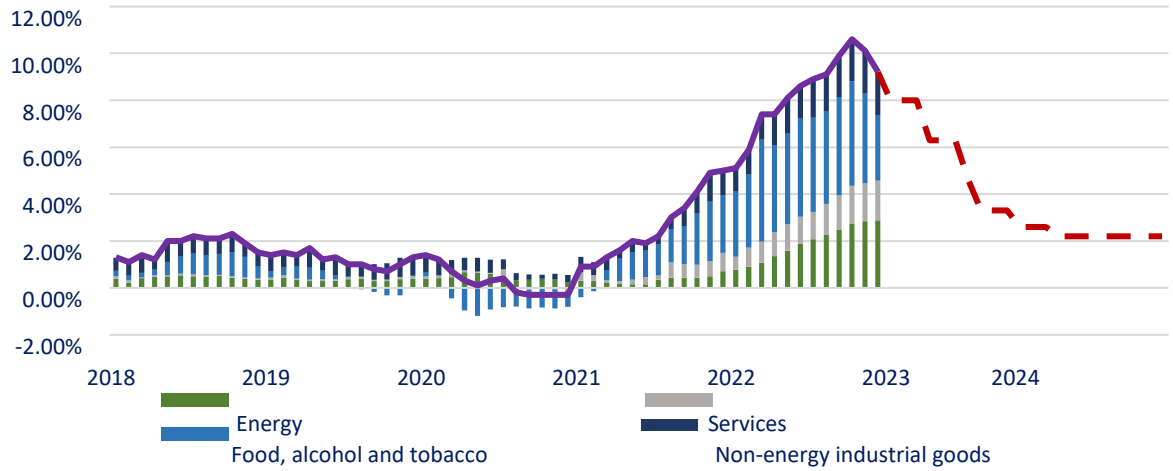


Table 1 ECB HICP projections (December 2022)

	Basic scenario			Negative scenario		
	2023	**2024**	**2025**	**2023**	**2024**	**2025**
HICP (%)	6.3	3.4	2.3	7.4	3.6	2.0
HICP (%) without energy and food	4.2	2.8	2.4	4.3	3.0	2.4

Source: ECB

Monetary policy

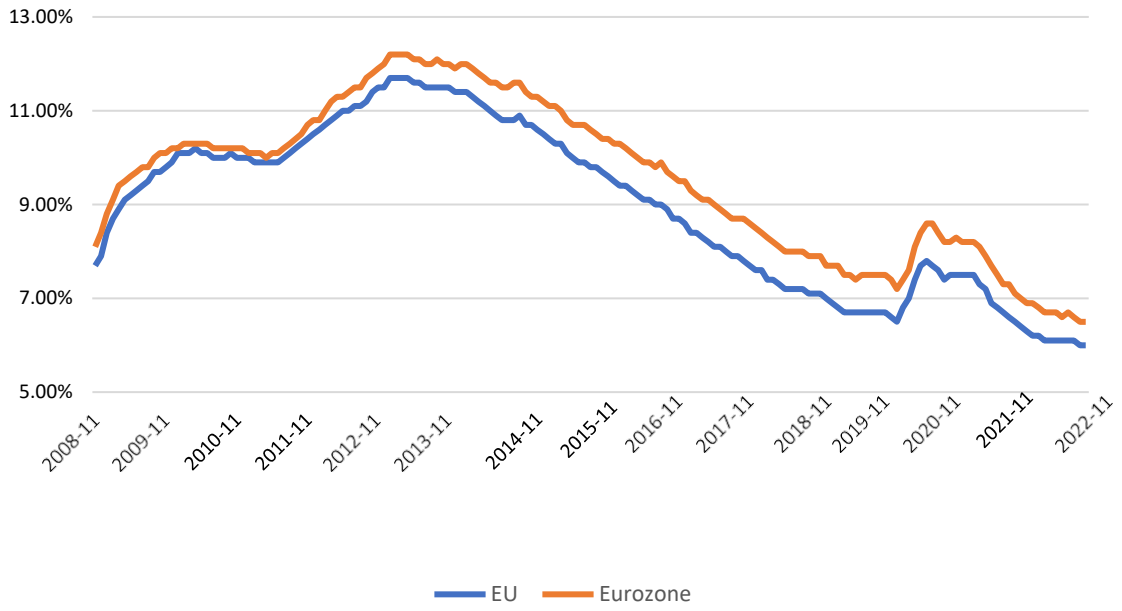
With the aim of achieving maximum employment and an inflation rate of 2%, the US Federal Reserve (Fed) announced at its December 2022 meeting that it would raise its monetary policy rate by 0.5% to 4.25%-4.5% from 3.75%-4% previously (November 2022). In addition, the Fed will continue to reduce its holdings of agency treasury and debt securities, as well as holdings of agency mortgage-backed securities, as described in the Fed's Balance Sheet Size Reduction Plan that was released in May.

In its latest monetary policy decision in mid-December 2022, the European Central Bank (ECB) took further steps to ensure that inflation returns to the 2% target over the medium term by announcing a 50 base point increase in the three key interest rates. Thus, from 21 November 2022, the monetary policy interest rate was increased to 2.5% (from 2% in November). The interest rates on the marginal lending facility and the deposit facility were also increased to 2.75% and 2% respectively. In July 2022, the ECB Governing Council raised interest rates for the first time in 11 years.

Labour market

In November 2022, the unemployment rate (seasonally adjusted series) in the Eurozone was 6.5%, unchanged from October 2022 and down from 7.1% in November 2021. The EU unemployment rate was 6.0% in November 2022, also unchanged from October 2022 and down from 6.5% in November 2021.

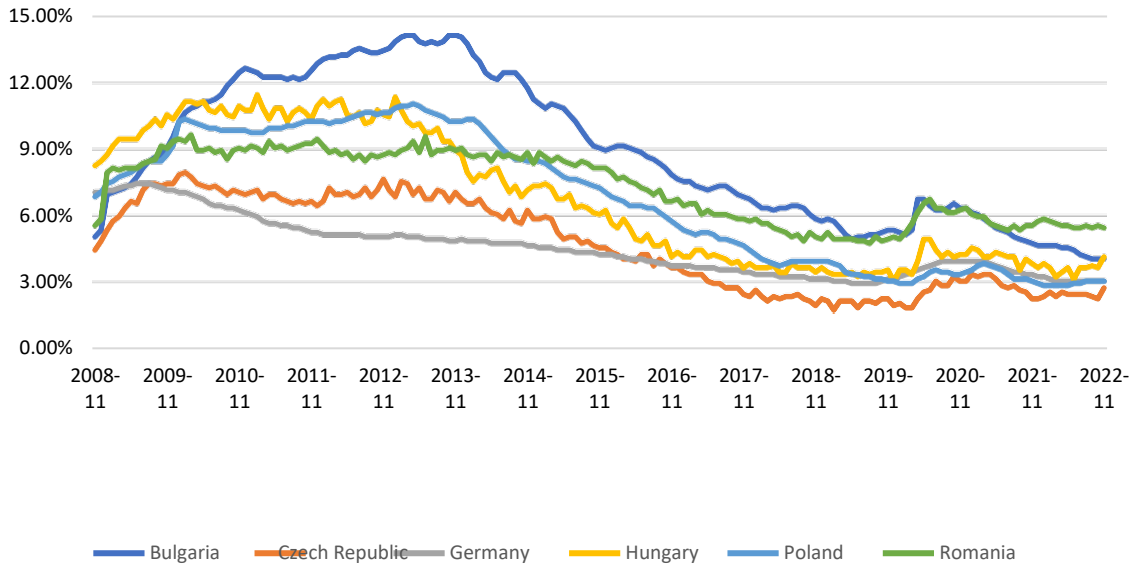
Chart 8 Unemployment rate (November 2008 - November 2022), seasonally adjusted data



Source: Eurostat, ASF processing

Among the countries with the highest unemployment rates in November 2022 are Spain - 12.4%, Greece - 11.4%, Italy - 7.8% and Cyprus - 7.5%, while the lowest unemployment rates are in the Czech Republic - 2.7%, Germany - 3%, Poland - 3% and Malta - 3.2%.

Chart 9 Unemployment rate, cross-country comparisons



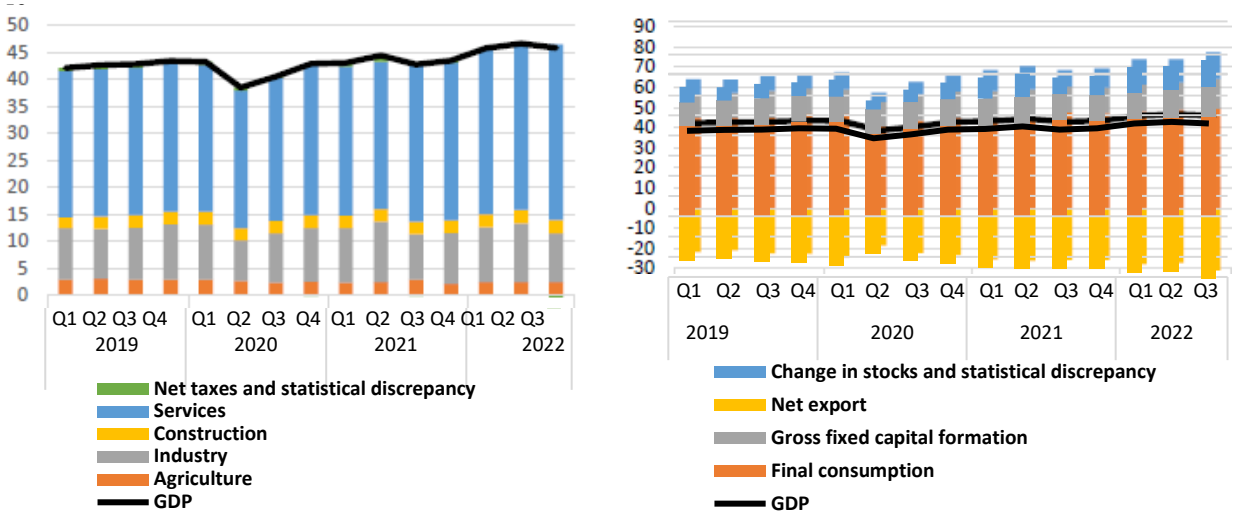
Source: Eurostat, ASF processing

1.2. Local macroeconomic and financial developments

Economic growth

According to the **NSI, Romania's Gross Domestic Product in Q3 2022** was, in real terms, 1.2% higher (seasonally adjusted data) compared to Q2 2022. Compared to the same quarter of 2021, GDP increased by 3.8% on the gross series and by 4.6% on the seasonally adjusted series. In terms of resources, the largest component of GDP is the services sector, with a share of 71% (Q3 2022). It recorded real annual growth of 10.5% in Q1 2022, 11.3% in Q2 2022 and 11.5% in Q3 2022. Compared to the corresponding quarters of 2020, the services sector grew by 12.2% in Q1 2022, 18.4% in Q2 2022 and 22.8% in Q3 2022.

Chart 10 GDP dynamics by main components (resources - left, uses - right), seasonally adjusted series, billion RON, average prices of 2000



Source: NSI, ASF processing

The construction sector accounts for 5% of GDP (Q3 2022), and compared to the corresponding quarters of 2021, it has seen increases of 3.4%, 3.6% and 11.4% in the first three quarters of 2022. Compared to the corresponding quarters of 2020, the construction sector recorded increases of 2.3% in Q1 2022, 6.8% in Q2 and Q3 2022.

Industry accounts for 20% of GDP (Q3 2022) and grew in Q3 2022 by around 7% compared to Q3 2021. Compared to Q3 2020, the manufacturing sector decreased slightly by 0.2%.

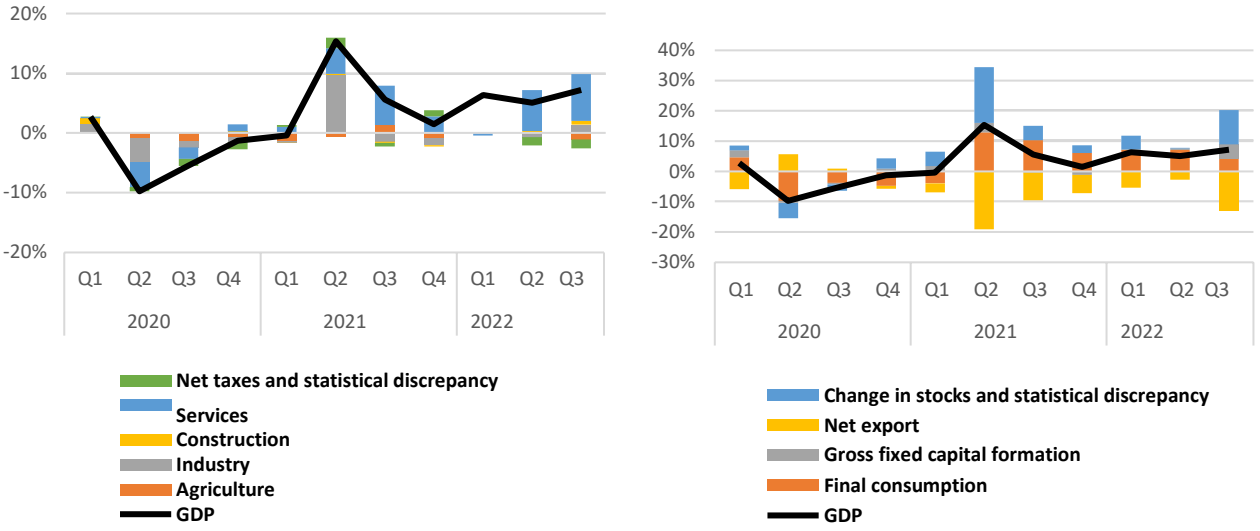
Agriculture accounts for 5% of GDP (Q3 2022). Compared to the corresponding quarters of 2021, agriculture grew by 2.8% in Q1 2022, by 1.3% in Q2 2022 and by 16.7% in Q3 2022. Compared to the corresponding quarters of 2020, agriculture contracted by 19% in Q1 2022, by 7% in Q2 2022 and by 1.3% in Q3 2022.

In terms of **uses**, final consumption represents 108% (Q3 2022). It has seen increases of 6.7%, 6.9% and 3.7% in the first three quarters of 2022.

Gross fixed capital formation (32% of GDP in Q3 2022) increased year-on-year by 0.6%, 1.8% and 16% in the first three quarters of 2022. Compared to the first three quarters of 2020, gross capital formation increased by 6.7%, 12% and 14.3% in the first three quarters of 2022. Net exports (negative contribution of -69% of GDP in Q3 2022, amounts expressed in average 2000 prices) increased by 9.2%, 4.8% and 21.7% in the first three quarters of 2022, compared to the corresponding quarters of 2021.

In terms of **contributions to the change in GDP**, in Q3 2022 the values recorded by services, industry and construction stand out (7.8%, 1.4% and 0.6% respectively). In terms of uses, the largest contribution was made by gross fixed capital formation (5%), while net exports made a negative contribution of -13%.

Chart 11 Contribution to GDP change of its main components (resources - left, uses - right), seasonally adjusted series, billion RON, average prices of 2000



Source: NSI, ASF processing

Economic growth forecasts

Economic growth for Romania is estimated by the **IMF at 4.8% in 2022** unchanged from the September Article IV projection[3], and for 2023 **economic** growth **has been adjusted to 3.1% from 3.4%.**

The European Commission has revised GDP growth in 2022 to 4.5%, down from the autumn forecast of 5.8%. However, in 2023, the economic growth estimate has been revised up from the autumn forecast, from 1.8% to 2.5%. For 2024, economic growth is forecast at 3%.

On the domestic front, the National Strategy and Forecast Commission (CNSP) forecasts economic growth for 2022 at 4.9%, 0.3 pp higher than estimated in the autumn forecast scenario (4.6%). For 2023 and in the medium term, economic growth is expected to decelerate to 2.8%, unchanged from the autumn forecast, but 0.9 pp below the level of the summer forecast (3.7%), further supported by a significant contribution from the construction sector, driven by a more efficient attraction and use of European funds.

Table 2 Economic growth forecasts

	IMF		EC		CNSP	
	2022	**2023**	**2022**	**2023**	**2022**	**2023**
Real GDP forecast (%)	4.8	3.1	4.5	2.5	4.9	2.8

Source: IMF - World Economic Outlook - October 2022, EC - Interim Winter Forecast 2023, CNSP - Winter Forecast 2022-2026

Inflation

In Romania, the annual inflation rate (as measured by the consumer price index - CPI) remained on an upward trend, but slowed down in the second half of the year. In December 2022, consumer prices increased by 0.4% compared to November 2022. The **annual inflation rate in December 2022 compared to December 2021 was 16.4%.** The average rate of change in consumer prices in the last 12 months (January 2022 - December 2022) compared to the previous 12 months (January 2021 - December 2021) was 13.8%. It is also noted that since July 2022, the CPI for the energy component has started to decline. In contrast, the CPI for food commodities continued its increase started in Q4 2021.

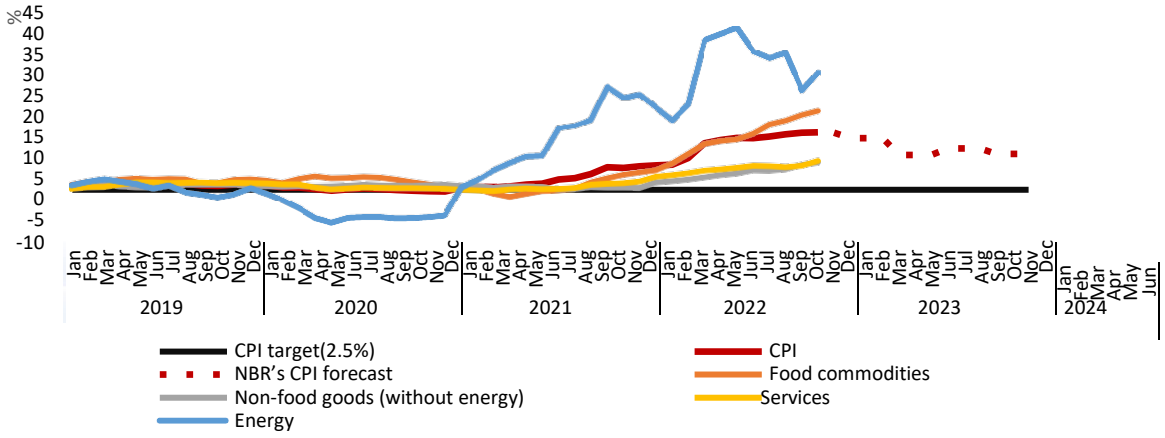
According to the "**Inflation Report"** published in November 2022, the National Bank of Romania (NBR) forecasts an inflation rate of 16.3% for the end of the current year, and for the end of

[3] In accordance with Article IV of the IMF Articles of Agreement, the IMF usually holds bilateral discussions with its members on an annual basis. A delegation visits the country, collects economic and financial information and discusses with the country's officials the country's economic developments and policies. On return to headquarters, the staff prepares a report, which forms the basis for discussion by the Executive Board.

2023, an inflation rate of 11.2% (a substantial upward revision from the June Report's forecasts of 13.9% and 7.5% respectively).

In order to temper inflationary expectations, the NBR decided to raise the monetary policy interest rate to 7.00%/year from 6.75%/year, starting 11 January 2023. At the same time, the NBR decided to increase the interest rate on the lending facility (Lombard) to 8%/year from 7.75%/year and to increase the interest rate on the deposit facility to 6.00%/year from 5.75%/year.

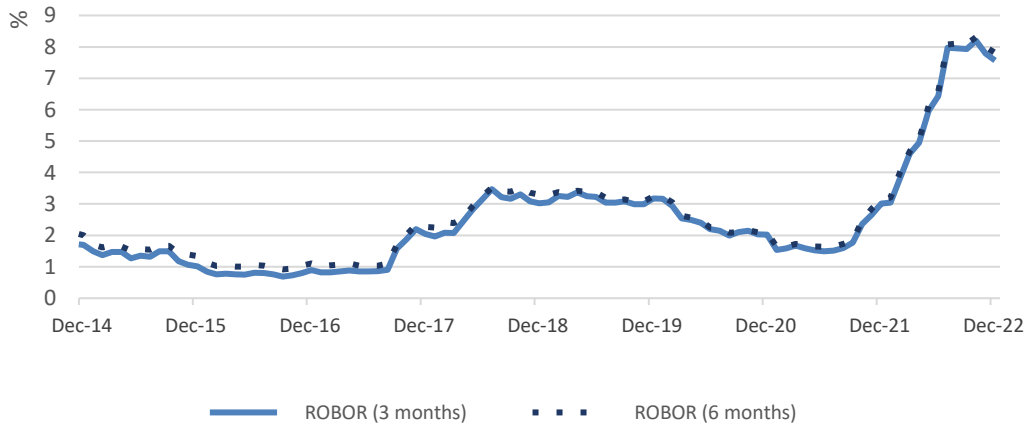
Chart 12 Inflation (CPI) and NBR CPI forecast



Source: NSI, NBR, ASF processing

The NBR's decisions to successively increase the monetary policy interest rate had an impact on interbank interest rates, which continued to rise, so that at the end of December 2022, the 3-month Robor index was 7.57% and the 6-month Robor index was quoted at 7.81%.

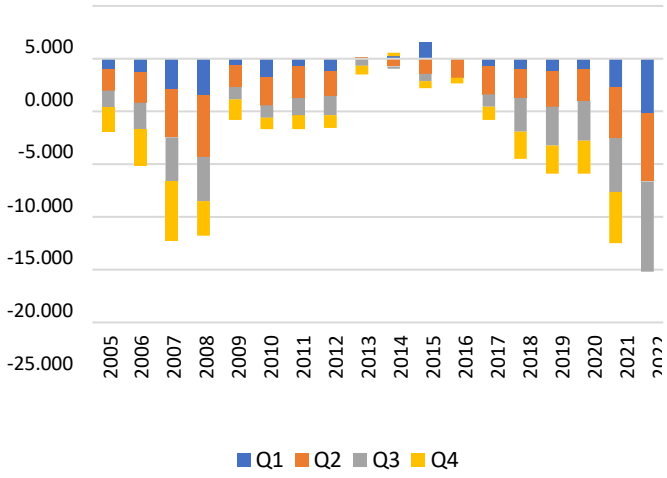
Chart 13 Interbank rate evolution (Romania)



Source: Refinitiv, ASF processing

Current account deficit and its financing

Chart 14 Current account developments, EUR billion



Source: NBR, ASF processing

Romania recorded a current account deficit of EUR 20.2 billion in the first three quarters of 2022, about 60% more than in the first three quarters of 2021 (EUR 12.65 billion). In Q3 2022, there was a substantial increase in the current account deficit to about EUR 8.5 billion, the highest quarterly value recorded in the period under review (2005-2022), exceeding the one recorded in the second quarter of RON 6.4 billion. The increase in the deficit is mainly due to an increase in the volume of transactions in goods and services, and high inflation has led to these transactions being concluded at high prices.

From a funding perspective, capital transfers related to the capital account totalled EUR 3 billion in the first three quarters of 2022, up from EUR 2.1 billion in the first three quarters of 2021. On the financial account side, portfolio investment inflows in the first three quarters of 2022 amounted to EUR 4.9 billion and direct investment to about RON 6 billion, up by about 7% and down by 1% compared to the first three quarters of 2021.

Chart 15 Balance of payments

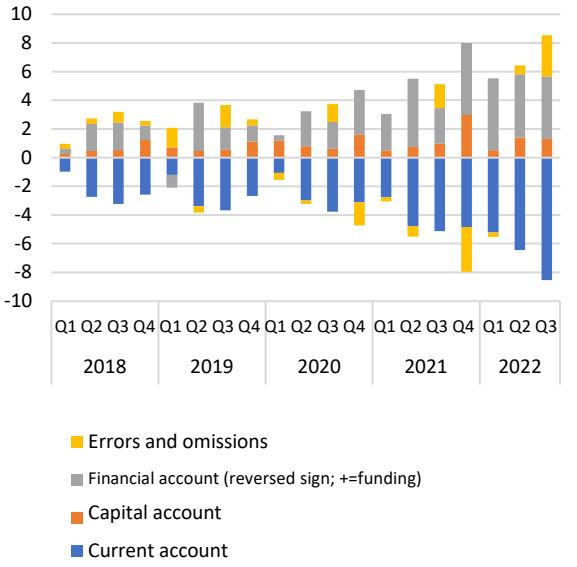
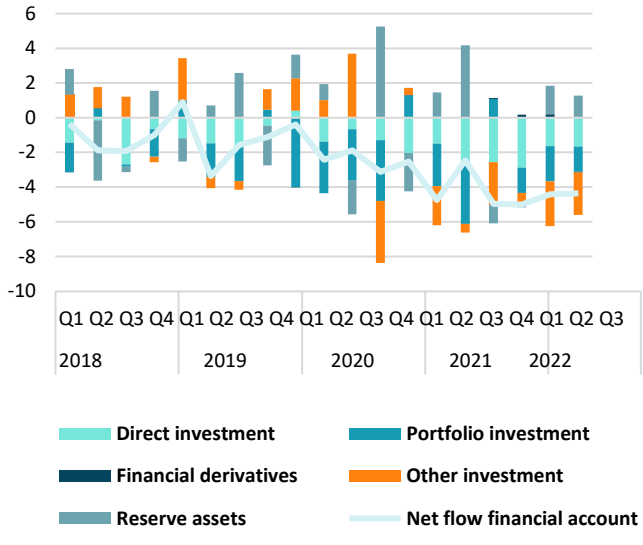


Chart 16 Structure of net flows of the financial account



Source: NBR, ASF processing

Budget deficit and its financing

In the first three quarters of 2022, compared to the first three quarters of the previous year, the data reported by the Ministry of Finance shows a **reduction in the budget deficit of about 6%, from RON 44.29 billion to RON 41.7 billion.** Total revenues to the state budget in the first three quarters of 2022 amounted to RON 331.48 billion, up by about 23% compared to the same period of 2021, while total expenditure amounted to RON 373.18, up by 18.6% compared to the first three quarters of 2021 (RON 314.65 billion).

As for the **third quarter of 2022**, according to the Ministry of Finance, **the deficit was RON 18.19 billion, and in relation to GDP it increased compared to the same period of 2021 (from 0.89% of GDP to 1.33% of GDP).** In Q3 2022, revenues amounted to RON 114.79 billion (8.4% of GDP), 22.1% above the level collected in the same period last year. This favourable development was mainly influenced by growth:

- tax revenues by 21.3%, to RON 57 billion from RON 47 billion;
- corporate income tax receipts by 44% (+ RON 2.32 billion), supported both by the increase in corporate income tax receipts from economic agents by 43.6% (+ RON 2.2 billion) and by corporate income tax paid by commercial banks by 53.5% (+ RON 0.1 billion);
- income tax receipts by 15.3%;
- value added tax receipts by 14.2% (RON 2.94 billion);
- excise revenue by 4.2% (RON 0.39 billion);
- social contributions by 9.5% (+ RON 3.04 billion).

At the same time, the amounts received in Q3 from the European Union related to projects financed both from the 2007-2013 financial framework and from the 2014-2020 financial framework, as well as the amounts related to the 2021 - 2027 European Union programming period and the amounts related to the NRRP financial assistance, amounted to RON 11.77 billion (0.86% of GDP). Of the total amount, 92.6% represented non-reimbursable external funds related to the 2014-2020 financial framework. Expenditure on these projects amounted to RON 12.3 billion.

Compared to the third quarter of the previous year, the non-reimbursable amounts received from the European Union increased by RON 5.25 billion (+80.5%), and as a share of GDP they increased by 0.31 percentage points from 0.55% of GDP in the third quarter of 2021 to 0.86% of GDP in the third quarter of 2022.

In the third quarter of 2022, **expenditure amounted to** RON 132.98 billion, representing 9.7% of GDP, and increased by 27.3% compared to the level recorded in the third quarter of 2021.

Personnel costs amounted to RON 28.97 billion, up by 7% compared to Q3 2021. Expressed as a share of GDP, personnel costs represent a level of 2.1% of GDP, 0.2 p.p. less than in the same period last year.

The personnel costs in the period under review were influenced by the salary increases granted in the budgetary sector starting from August 2022 according to the provisions of the Government Emergency Ordinance no.115/2022.

Expenditure on goods and services increased by 15.8% compared to the third quarter of 2021, mainly as a result of developments in local budgets, the budget of public institutions financed in whole or in part from own revenues, the state budget and the budget of the National Company for Road Infrastructure Management amidst increased inflationary pressures.

Interest expenditure amounted to RON 7.83 billion (0.6% of GDP), and compared to the same period of the previous year, interest payments increased by 98.6% (+ RON 3.89 billion) as a result of the increase in interest rates in the inflationary context manifested since the second part of 2021, both domestically and internationally, as well as due to the uncertainties generated by the armed conflict in Ukraine.

Expenditure on subsidies increased by 227.5% (+ RON 3.89 billion) due to the compensation of electricity and natural gas for non-household customers.

Expenditure on social assistance amounted to RON 44.14 billion and accounted for 3.2% of GDP. Expenditure on social assistance increased compared to the third quarter of 2021 by 20.6%. The development of social assistance expenditure was mainly influenced by the increase of the pension point by 10% from 1 January 2022, i.e. from RON 1,442 to RON 1,586, the level of the social allowance for pensioners (minimum pension) from RON 800 to RON 1,000, the granting of a financial aid for pensioners of the public pension system with pensions less than or equal to RON 1,600, so that all those in this category will have an income of RON 2,200 in January 2022, and the granting of the 13th allowance for people with disabilities.

At the same time, it reflects the increase in the state allowance for children, thus, the state allowance for children increased from 1 January 2022 to RON 600 for children up to 2 years old or up to 3

years old in the case of a disabled child. Disabled children also benefit from this amount until they reach the age of 18. The state allowance for children aged between 2 and 18 and for young people over 18 attending secondary school or vocational school until the end of their studies, including those with disabilities attending a form of pre-university education provided for by law, but no later than the age of 26, has also been increased to RON 243. At the same time, the increase in expenditure on social assistance was also due to the payments made for electricity and gas compensation for domestic customers.

Payments for EU-funded projects, including projects financed from the NRRP non-reimbursable financial assistance, represented 0.9% of GDP and accounted for 72.3% of the programmed payments for the period under review.

Compared to Q3 2021, payments for projects financed by non-reimbursable external funds increased by 35.0% and as a percentage of GDP by 0.1 percentage points from 0.8% in the third quarter of 2021 to 0.9% in the third quarter of 2022. Out of the total payments for projects financed by EU funds including projects financed by NRRP grant assistance 91.9% were payments for projects financed under the 2014-2020 financial framework.

Capital expenditure increased by 46.7% and as a share of GDP by 0.1 percentage points from 0.5% of GDP in Q3 2021 to 0.6% of GDP in Q3 2022.

Chart 17 Dynamics of government revenue, billion RON

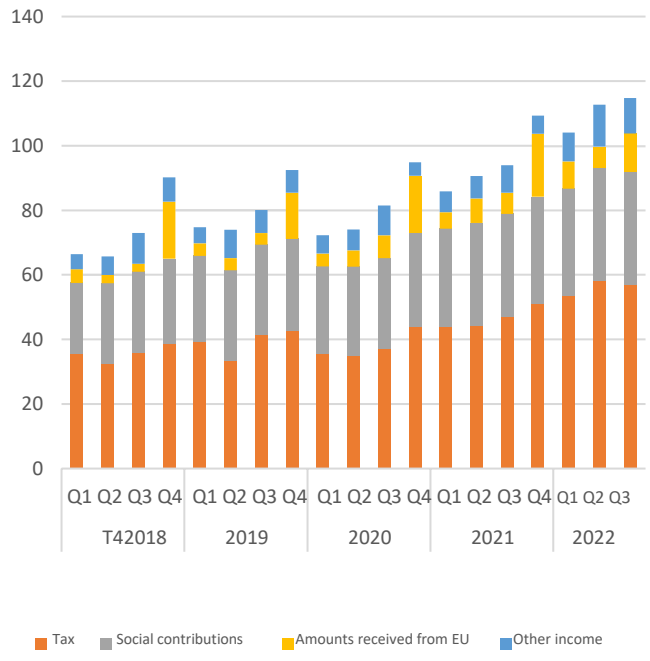
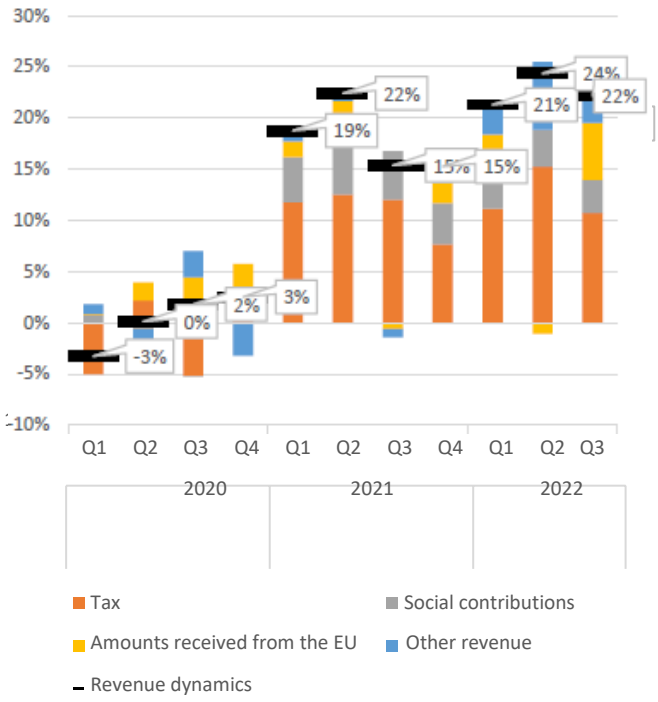


Chart 18 Contribution to revenue dynamics government



Source: Ministry of Finance, ASF processing

Chart 19 Dynamics of government expenditure, billion RON

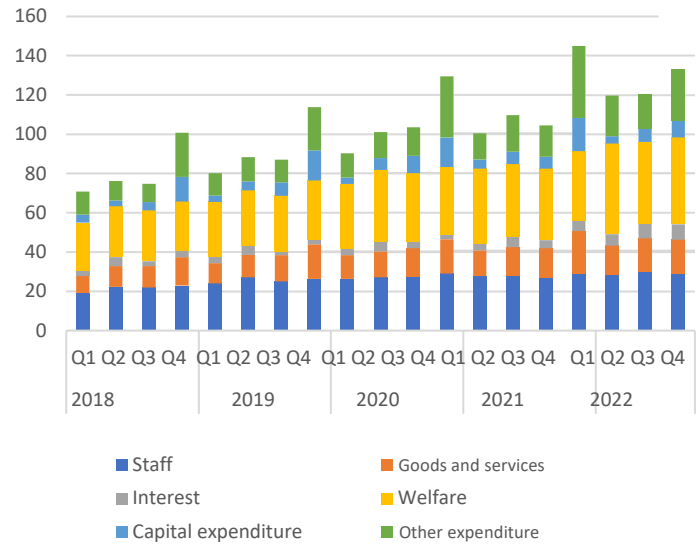
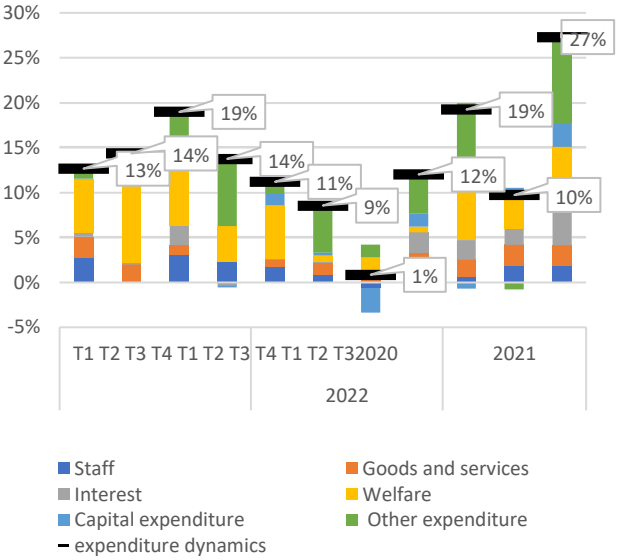


Chart 20 Contribution to government expenditure dynamics



Source: Ministry of Finance, ASF processing

2. The risk picture in non-bank financial markets

The main risks to financial markets have resulted from the **current deteriorating geopolitical and macroeconomic context, characterised by high inflation**, mainly due to rising energy prices, with a negative impact on consumers' disposable income.

Thus, in 2022, there **was a deterioration in market conditions amidst the war between Russia and Ukraine, the sanctions imposed and, implicitly, disruptions in supply chains**. Thus**,** rising energy costs and supply-side bottlenecks led to significant declines in asset prices in H1 2022, interrupting the recovery in financial markets that started in 2020. While the investment fund sector was generally characterised by stability, **rising interest rate risk led to a reduction in investment fund performance, leading to redemption requests especially for bond funds**. Money market funds also saw significant outflows in the first three months of 2022 as investors exited fixed income funds.

After the historic high in 2021, the **crypto-asset markets have** also seen **massive corrections**, with a drop of over 60% in the first 6 months of 2022.

From the perspective of the European insurance sector, the **main risks and vulnerabilities identified by EIOPA are of a macroeconomic nature, with this risk category remaining at a high level**. As regards the profitability and solvency of insurance companies, EIOPA assesses these risks at a medium level against the background of **solvency ratios remaining high**. Although life insurers reported a slight decrease in the SCR ratio, it is still above the levels reported in 2020 and 2021, while the solvency positions of groups and general insurance companies improved slightly.

To assess the resilience of occupational pension funds in the context of the transition to a green economy, EIOPA conducted the first **pension sector climate stress test** under a climate change scenario **simulating a sudden and disorderly transition to a green economy** due to delayed implementation of policy measures.

The stress test findings indicate that **IORPs have significant exposure to transition risks**. EIOPA has adopted a full balance sheet approach to examine the impact on IORPs' asset portfolios as well as their long-term liabilities.

Most of the decline in value was in equity and bond investments. The scenario, which included movements in interest rates, also affected the liabilities side. The stress test was complemented by a qualitative survey on mitigation and adaptation measures, which showed that while **IORPs are increasingly taking ESG factors into account in their investment decisions, they still face notable obstacles in allocating investments to climate risk-sensitive categories**.

In this context, **European authorities responsible for financial market regulation and supervision have taken a number of necessary measures to manage risks to consumers and market stability**, including issuing warnings.

The European Systemic Risk Board (ESRB) communicated in the second part of 2022 its concerns about increased uncertainty and the high likelihood that extreme risk scenarios will materialise, issuing a general warning[4], in line with the ESRB mandate. ESMA has issued a statement to remind firms of the relevant requirements of MiFID II in order to protect investors. ESAs (European Supervisory Authorities) have recommended national supervisors, financial institutions and market participants to prepare for the challenges ahead. They also drew attention to the high risks involved in trading crypto-assets.

2.1. Financial stability in EU financial markets

ESMA and national competent authorities have strengthened their monitoring and supervision of the energy derivatives market. Close cooperation continued to counter possible threats to market integrity and to ensure that any potential signals of market manipulation were followed up and investigated.

In the final months of 2022, inflation rates rose in the EU as well as globally, and this increase in inflation impacted households as well as investment and investment decisions. ESMA warned that from an investor protection perspective, this trend poses a risk for retail investors, as some will not understand the link between inflation and financial markets and may not fully understand how they should take inflation developments into account when making savings and investment decisions. ESMA has therefore issued a statement to remind firms of the relevant requirements of MiFID II, as it considered that investment firms can take inflation and inflation risk into account both when creating and distributing investment products and when providing investment services to retail clients. Investment firms can also contribute to increasing client awareness of inflation risk. ESMA and the competent national authorities will continue to closely monitor financial markets and market participants with a view to maintaining the stability of the EU financial system by strengthening investor protection and promoting stable and orderly financial markets.

The European Supervisory Authorities' (EBA, EIOPA and ESMA - ESAs) autumn 2022 risk report showed that the deteriorating economic outlook, high inflation and rising energy prices have increased vulnerabilities in all financial sectors. The ESAs recommended national supervisors, financial institutions and market participants to prepare for the challenges ahead. The post-pandemic economic recovery in Europe has slowed down as a result of the Russian invasion of Ukraine. Russia's war against Ukraine and disruptions in trade chains have caused a rapid deterioration in the economic outlook by increasing pre-existing inflationary pressures through sharp increases in energy and commodity prices, exacerbating demand-supply imbalances and weakening household purchasing power.

[4] https://www.esrb.europa.eu/pub/pdf/warnings/esrb.warning220929_on_vulnerabilities_union_financial_system~6ae5572939.ro.pdf

The risk of persistent inflation and stagflation has increased. These factors, together with the deteriorating economic outlook, have had a significant impact on the risk environment of the financial sector.

Financial market volatility has increased in all markets, given the high uncertainties. After a long period of low interest rates, central banks have tightened monetary policy. The combination of higher financing costs and lower economic output is putting pressure on the refinancing of public debt, the business environment and households, while having a negative impact on the credit quality of financial institutions' loan portfolios. Lower real yields through higher inflation could lead investors to take higher risks at a time when interest rate increases are setting in motion a large rebalancing of portfolios.

2.2. European capital markets

ESMA's Report on Trends, Risks and Vulnerabilities (no. 2/2022) contains the assessment of the main risks, by risk category and source, for the markets under ESMA's competence since the last assessment, as well as the outlook for the third quarter of 2022. The reference period for this report is 1 January to 30 June 2022.

The Russian military attack on Ukraine, its political and economic fallout and rising inflation have significantly affected the risk environment of EU financial markets. The recovery of EU financial markets has not been met, volatility has increased and market corrections have intensified. Therefore, the overall risk to ESMA's mission (strengthening investor protection and promoting a stable and orderly financial market) remains at the highest level. Credit risk remains high but is expected to increase in 2023. Risks remain very high in securities markets and in asset management. Infrastructure and investor risk remain at a high level, with a worsening outlook, while environmental risk remains high. In addition, the interweaving of risk sources continues to provide an extremely fragile market environment and investors should be prepared for further market corrections.

Market conditions deteriorated as the Russian invasion and sanctions caused a commodity supply shock, adding to existing pandemic-related inflationary pressures. Monetary policy tightening accelerated globally and markets increasingly anticipated the end of the period of low interest rates. Market volatility, bond yields and spreads increased, equity valuations fell and war-affected commodity values rose. Uncertainty remains high amid monetary policy normalisation, invasion and COVID-19 blockages in China.

Rising energy costs and supply-side bottlenecks led to significant declines in asset prices in H1 2022, halting the recovery that began in 2020. Inflationary pressures and anticipated monetary policy affected valuations in fixed income markets, where yields and *spreads* reached multi-year highs. The widening spreads signalled increased concerns about debt capacity.

The investment fund sector has been characterised by stability, with limited impact from the war, but deteriorating macroeconomic conditions have amplified vulnerabilities and interest rate risk has increased with rising inflation expectations. The downturn in performance led to redemption requests in bond funds in H1 2022. Money market funds also saw significant outflows in the first three months of 2022 as investors exited fixed income funds. A reallocation to inflation-protected assets is seen in US markets, which has not yet been seen in the EU.

Investor sentiment has worsened due to uncertainty and geopolitical risks. Inflation could have negative effects on many investors. At the same time, household savings have declined from the record levels reached during the pandemic. Net retail investment flows into UCITS bond funds have declined, in contrast to significant inflows in 2021.

Equity trading volume increased in H1 2022 as investors adjusted to changes in interest rates and higher volatility. Clearing volumes increased as margins collected by EU central counterparties for interest rate and commodity derivatives increased in line with volatility/price increases in the underlying instruments. Credit rating agencies reacted to the invasion by downgrading the sovereign debt of Russia and Ukraine.

Capital market funding was characterised by a high degree of caution in H1 2022 amid high secondary market volatility and uncertainty about interest rates. Primary equity markets slowed sharply after record levels in 2021, with the lowest H1 issuance in 15 years. Two-thirds of initial public offerings launched in 2021 were trading below the issue price at the end of the first half of 2022. Corporate bond issuance was also modest. However, issuance for other types of instruments remained significant, especially structured products.

The invasion of Ukraine has posed a potentially major new challenge to the EU's climate goals, as some countries have turned to coal to offset declining fossil fuel imports from Russia. It also had an asymmetric impact on ESG markets. EU ESG bond issuance slowed in H1 2022 and EU ESG equity funds saw net outflows in March 2022 for the first time in 2 years. However, ESG funds were largely protected and the price of long-term green bonds proved resilient.

Crypto-asset markets fell by more than 60% in H1 2022, from an all-time high in 2021, amid rising inflation and a deteriorating economic outlook, again highlighting the high risks of these assets (warning issued by ESAs - European Supervisory Authorities). The sudden sell-off, influenced by the collapse of the Terra stablecoin in May 2022 and the discontinuation of consumer withdrawals by lender Celsius in June 2022, the bankruptcy of the FTX digital exchange have increased investor distrust and confirmed the speculative nature of many business models in this sector.

Table 3 Overview of risks in securities markets [5]

Risk categories			Risk factors	
	Level	Prospect		Prospect
ESMA's general mission (strengthening the investor protection and promoting a stable and orderly financial market)			Geopolitical risks	
Liquidity risks			Macroeconomic environment	
Market risks			Inflation and interest rate environment	
Credit risks[6]			Sovereign and private debt	
Contagion risks			Infrastructure outages	
Operational risks			Other political risks and events	
Environmental risks				

[5] The risk assessment was based on the classification of the Joint Committee of European Supervisory Authorities. The colours indicate the current risk intensity. Coding: green = potential risk; dark blue = significant risk; turquoise = high risk; red = very high risk. Arrows pointing up = increasing risk intensity; arrows pointing down = decreasing risk intensity; horizontal arrows = no change. Change is measured relative to the previous quarter; outlook refers to the next quarter. ESMA's risk assessment is based on quantitative indicators and analysts' assessments.

[6] Credit risk is the risk that the issuer of the product or a company with which it is connected will default and be unable to meet its contractual obligations to repay the investment.

Securities markets

Level	Prospect	Factors
		- Increased uncertainty due to Russian invasion, risks of market volatility and market changes. - Risks of market revaluation due to general and commodity-driven inflation and increases in interest rates. - Low economic growth that increases the already high indebtedness due to the pandemic, weakening public and private sector balance sheets. - COVID-19 residual uncertainty and ongoing impacts (e.g. due to China blockages). - High volatility and massive losses in crypto-asset markets.

Asset management

Level	Prospect	Factors
		- The sharp deterioration in the medium-term economic outlook, supply-side pressures and inflation are driving down real portfolio returns. - Market volatility, liquidity or flows of exposed funds. - The shift in risk appetite could pull flows away from riskier bond funds (corporate, emerging markets).

Investors

Level	Prospect	Factors
		- Increased market volatility and higher inflation increase short-term risks for investors, especially losses due to negative real returns, as inflation undermines returns. - Risks of aggressive marketing, especially of high-risk structured products and crypto-assets. - Digitalisation and lack of investor competence in social media trading and copy trading[7]. - High costs; conflicts of interest related to payment flow for orders.

[7] Copy trading allows people in the financial markets to automatically copy open and managed positions of other selected people. Unlike mirror trading, a method that allows traders to copy specific strategies, copy trading links a portion of the copying trader's funds to the copied investor's account.

Infrastructure and services

Level	Prospect	Factors
		- Increased short-term operational risk of cyber attacks, especially from Russia. - High market volatility increases the short-term risks of margin breaches and trading disruption. - Significant and ongoing operational risk to infrastructure in general, including exposure due to rapidly increasing digitisation and use of *cloud* services in core production processes. - Increased operational burden on central securities depositories due to sanctions against Russia and due to the large number of corrections required to apply cash penalties under the regulation on central securities depositories.

Source: ESMA, ESMA's Report on Trends, Risks and Vulnerabilities (no. 2/2022)

2.3. EU insurance market

The *Financial Stability Report* published by EIOPA, December 2022 edition, presented the main developments and risks in the European insurance and pension sectors. In addition, the report captured four topical issues, in particular on the impact of **rising inflation and interest rates on the financial situation of insurers, insurers' use of derivatives and related liquidity needs, the increasing relevance of transfers of life insurance portfolios, and the exposure of non-life insurers to the physical risk of climate change.**

Over the past three years, European economies have faced a series of exceptional shocks related to the global pandemic and the effects of the war in Ukraine, which have aggravated inflationary pressures and dampened growth prospects. Despite the difficult environment, insurers and pension funds showed increased resilience to shocks. Entities tried to adapt to emerging risks and reduced their vulnerabilities by optimising risk management processes through portfolio transfer and product design. However, risks related to debt inflation, possible widening spreads between corporate and sovereign interest rates, deteriorating macroeconomic outlook and liquidity management in a period of rapidly rising interest rates remain and require monitoring.

The EU Insurance Market Risk Dashboard[8], prepared by EIOPA on the basis of data for the second quarter of 2022 and collected under Solvency II, shows that **insurers' exposures to macroeconomic and market risks are currently the main concern in the insurance sector**. All other risk categories, such as profitability and solvency, climate risks, as well as digitalisation and cyber risks remain at average levels.

In addition, the following **vulnerabilities for the EU insurance sector** have been observed:

- Risk levels for the European insurance sector remained broadly constant.
- **Macroeconomic risks** remained significant for the insurance sector. Global GDP growth forecasts continued to decline and inflation forecasts were at a high level for the main geographical areas. Unemployment for the main geographical areas remained low. The weighted average of 10-year swap rates increased. Central banks continued to normalise monetary policy.
- **Credit risks** remained relatively moderate. CDS spreads recorded low levels for government and financial bonds, amid a further increase for non-financial corporate bonds in the third quarter of 2022. Insurers' relative exposure to different bond classes remained broadly stable, while it declined slightly for government bonds in Q2 2022. Average credit quality for insurers' investments remained stable.

[8] Risk dashboard | Eiopa (europa.eu)

- **Market risks** were stable compared to the previous assessment. Bond and equity market volatility remained at a higher level in 2022 than the 2021 average. Real estate prices remained at the same level. Insurers' median exposure to bonds and equities remained relatively unchanged, while median exposure to real estate increased slightly in Q2 2022.
- **Profitability and solvency risks** were at a medium level. Given the decline in insurers' returns in the second quarter of 2022, all three profitability indicators (return on excess of assets over liabilities, return on assets and return on premiums) declined. Rising interest rates since early 2022 could be the main factor behind the high SCRs.
- **Interconnection** and imbalance **risks** remained at a medium level. Due to the current rise in interest rates, insurers have incurred losses in the derivatives markets, as they are positioned to hedge against falls in interest rates.
- Market perceptions were at an average level. The average price-earnings ratio of insurance groups remained around the same level. Median CDS margins of insurers continued to increase. **Insurers' external ratings** have remained broadly stable since the last assessment.
- **Climate risks** remained at a medium level. Insurers maintained their relative exposure to green bonds, while the ratio of green bond investments to total green bonds outstanding decreased slightly. The growth of green bonds in insurers' portfolios has declined, while the growth of green bonds outstanding is stable.
- **Digitisation and cyber risks** were at a medium level. The importance of these risks for insurance, as assessed by supervisors, decreased slightly, but cybersecurity issues and concerns about a hybrid geopolitical conflict remained. Negative cyber sentiment showed an increase in concern in the third quarter of 2022, while the frequency of cyber incidents decreased compared to the same quarter of 2021.

Table 4 Overview of EU insurance market risk, EIOPA, October 2022[9]

	Risks	Level	Trend (last 3 months)	Prospect [10] (next 12 months)
1.	Macroeconomic risks	**high**	→	↗
2.	Credit risks	**medium**	→	↗
3.	Market risks	**high**	→	↗
4.	Liquidity and funding risks[11]	**medium**	→	↗
5.	Profitability and solvency	**medium**	→	↗
6.	Interconnections and imbalances	**medium**	→	→
7.	Insurance risks (underwriting)	**medium**	→	↗
8.	Market perceptions	**medium**	↗	→
9.	Risks related to ESG factors[12]	**medium**	→	↗
10.	Cyber and digitisation risks[13]	**medium**	↓	↗

Source: EIOPA, EU Insurance Market Risk Dashboard (October 2022)

[9] The reference date for company data is Q2-2022 for quarterly indicators and 2021-YE for annual indicators. The cut-off date for most market indicators is the end of September 2022.
[10] The outlook shown for the next 12 months is based on the responses received from 24 national competent authorities and is categorised according to the expected change in the significance of each risk (substantial decrease, decrease, unchanged, increase and substantial increase).
[11] From October 2021, a new ESG risk category and an enhancement of the liquidity and funding risk category are included in the risk matrix published by EIOPA.
[12] Risks including environmental, social and governance (ESG) factors
[13] From January 2022, a new category of digitisation and cyber risks has been included.

2.4. Main vulnerabilities and risks at national level from a financial stability perspective

Although the European and national economies made progress in the first three quarters of 2022, the ESRB has identified a number of severe risks to financial stability. These risks may materialise simultaneously, thus interacting with each other and amplifying each other's impact.

The likelihood of extreme risk scenarios materialising has increased since early 2022 and has been exacerbated by recent geopolitical developments. These geopolitical developments have an impact on energy prices and supply, implying financial strains for businesses and households. In addition, higher than expected inflation is tightening financial conditions and amplifying stress in the financial sector. A pronounced deterioration in economic activity could lead to a further increase in credit risk at a time when some credit institutions are still in the process of managing asset quality issues in the wake of the COVID-19 pandemic, problems that have so far been limited due to extensive public support measures.

Risks to financial stability stemming from the sharp fall in asset prices remain severe. Rising mortgage interest rates and deteriorating debt servicing capacity due to falling real household income could put downward pressure on house prices, which could trigger the materialisation of accumulated cyclical risks in housing markets.

In addition, the likelihood of large-scale cyber incidents affecting the financial system has increased. Given the increased systemic risks to financial stability, the ESRB believes that private sector institutions, market participants and relevant authorities need to continue to prepare for the materialisation of extreme risk scenarios.

In this context, **several risks remain at a high level**, with further shocks potentially leading to heightened tensions and significant corrections in international and local financial markets:

- ***macroeconomic risk***, as, while progress has been made, vulnerabilities persist amid a turbulent geopolitical environment, increasing sensitivity to shocks. The risk trend was assessed as stagnating.
- ***market risk,*** amid the increased likelihood of extreme scenarios materialising, which may affect financial stability, increased contagion and the continued vulnerable outlook for macroeconomic developments, which may erode asset prices.
- ***operational risk,*** with a growing trend, amidst the intensification of large-scale cyber attacks in the context of the Russia-Ukraine military conflict.

The other risks remain in the **medium to high** category: ***credit risk***, ***liquidity risk***, ***solvency risk*** and ***profitability risk***. The trends are increasing, except for credit risk, which was assessed as stagnating.

Table 5 Overview of financial stability risks as assessed by ASF

Risk description	Determinants	Risk level	Risk trend (1 year)	Likelihood of risk materialising (1 year)
Macroeconomic risk	In the first three quarters of 2022, the European and national economies have managed to make progress so that GDP has surpassed the pre-pandemic level. However, risks remain considerable, with the likelihood of extreme scenarios materialising that could affect economies and financial stability being in growth, according to the Warning issued by the ESRB at the end of September, which also highlights the need for greater resilience in the European financial sector to be able to support economies in the event of materialisation of these risks.	5 - high	⇨ ●	5 - above average
Market risk	The Russian military aggression against Ukraine as well as its economic and political fallout have strongly affected the risk environment of EU financial markets, according to ESMA, increasing volatility and the likelihood of market corrections.	5 - Raised	⇨ ●	5 - above average
Credit risk	It depends on the macroeconomic picture. Rising inflation can lead to major difficulties in the functioning of companies and the materialisation of credit risk.	4 - Medium to high	⇨ ●	4 - below average
Liquidity risk	Possible declines in equity and bond markets may trigger chain sales and redemption requests from investment funds, which will mean amplifying market tensions and shocks.	4 - Medium to high	⇗	5 - above average
Solvency risk	Interconnections in the economy can lead to domino effect on payment obligations leading to increased solvency risk.	4 - Medium to high	⇗	5 - above average
Profitability risk	In the context of rising inflation, interest rates and continued macroeconomic vulnerabilities.	4 - Medium to high	⇗	5 - above average
Operational risk	Identification of operational risk as being in growth in financial markets amid the widespread emergence of cyber-attacks, including amid tensions regarding the Russia Ukraine conflict.	5 - High	⇗	6 - High

Source: ASF

***

In order to highlight changes from the previous report, the signs ● showing an improvement and ● showing a deterioration of the assessment contained in the columns in which they are found **have been used for the risk tables. The number of signs of the same colour represents by how many units the respective** favourable (●●...) or unfavourable (●●...) **indicator has changed**.

The scales of values of the indicators used in the evaluation were:

In classifying ***the level of risk***, the following scale was used: 6 - very high, 5 - high, 4 - medium to high, 3 - medium to low, 2 - low, 1 - not significant.
In estimating the ***trend***, one of the following values was selected: increasing, stagnating, decreasing
In classifying risks according to the ***probability of occurrence***, the following scale was used: Risk with probability 1=not significant, 2=very low, 3=low, 4=below average, 5=above average, 6=likely, 7=very high and 8=certain.

3. The interconnection of non-bank financial markets

In 2022, financial conditions tightened considerably as macroeconomic imbalances intensified. New vulnerabilities to the financial system (high inflation mainly underpinned by rising energy prices and the uncertainty of the current geopolitical context) have been superimposed on an economy weakened by the effects of the COVID-19 pandemic, at least temporarily halting the recovery of European economies. Thus, the tightening of financial conditions and increased uncertainty have had strong effects on economic activity, in the sense of a postponement of investment projects by companies, while household consumption has been reduced.

To fight inflation, central banks have been raising interest rates successively throughout 2022. Thus, the **increase in monetary policy rates in Europe has led to a high degree of contagion in sovereign bond yields for all maturities**. However, a longer-term analysis of the evolution of the contagion index for government bonds shows that **it is currently at a lower level compared to 2020**.

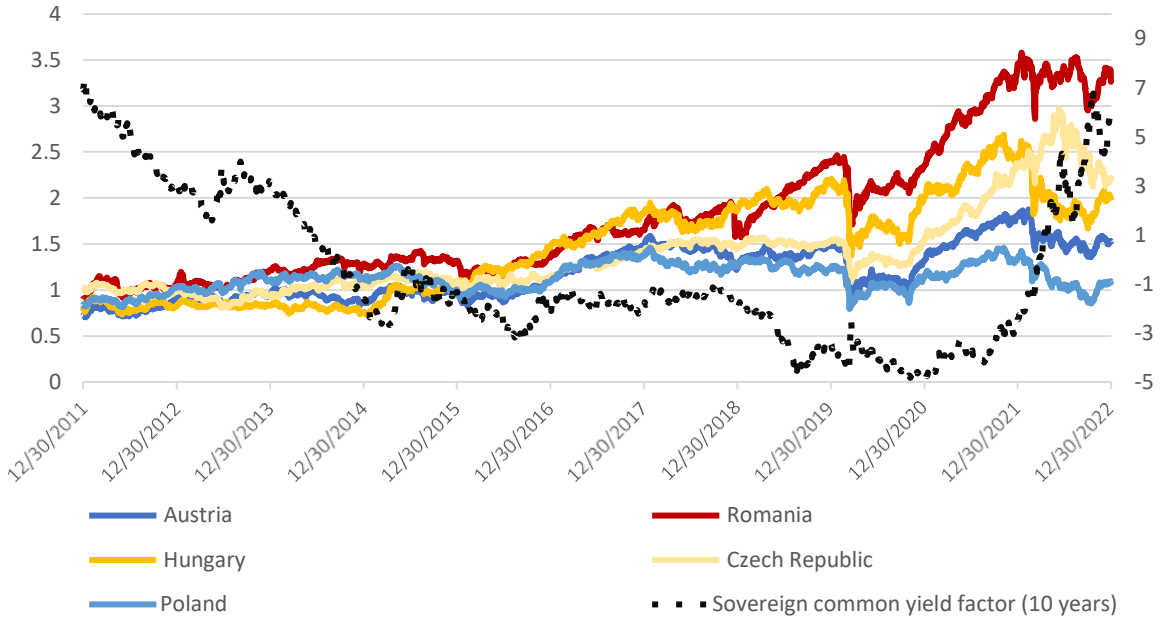
Although the local capital market experienced positive momentum during 2021 amidst increased listings and increased external attractiveness, the **quantitative tightening monetary policy in 2022 led to a contraction in the financial cycle**. **These results converge with similar estimates in the literature and point to a contraction in financial markets** in the context of rising inflation, a worsening economic outlook and a high degree of uncertainty.

The structural shock in the European economy generated by the COVID-19 pandemic, on top of which the events of 2022 were subsequently superimposed, led to an unstable, fragile investment climate that is sensitive to contagion with external capital markets. However, from a conditional value-at-risk (CoVaR) perspective, which quantifies the expected loss due to the influence of one variable on another, the **intensity of economic shocks in 2021-2022 on the local capital market is below the level recorded in March 2020 (onset of the COVID-19 pandemic)**.

The analysis of systemic risk measures related to companies included in the BET index indicates an increase in risk in the periods December 2018, March - April 2020, December - March 2022 and end of September 2022. Regardless of the systemic risk measure used, there are moments of increasing systemic risk specific to BET index companies. Moreover, it is also noted that these moments of increase tend to manifest simultaneous patterns for companies, independent of sector. Specific to 2022 is also the fact that the dynamics of systemic risk show consistent patterns of expansion.

2022 marked the end of a cycle of quantitative easing. Quantitative easing (QE) programmes by central banks were designed after the 2007-2009 financial crisis to stabilise financial markets. In 2022 most central banks started a monetary policy of rapidly increasing monetary policy rates (*Quantitative Tightening*). Central banks' policies were also supported after 2020 by a mix of prudential macro policies that accentuated the growth of capital markets.

Chart 21 Quantitative relaxation and quantitative tightening cycle. Capital market dynamics



Source: Refinitiv, ASF calculations

The evolution of stock market indices in Austria, Romania, Hungary, the Czech Republic, and Poland is normalised to 1 to facilitate comparison of stock market developments over the period 2011-2022 and is shown in Figure 21. To facilitate co-dependence between European equity markets and monetary policy, the common[14] trend in 10-year government bond yields has also been added.

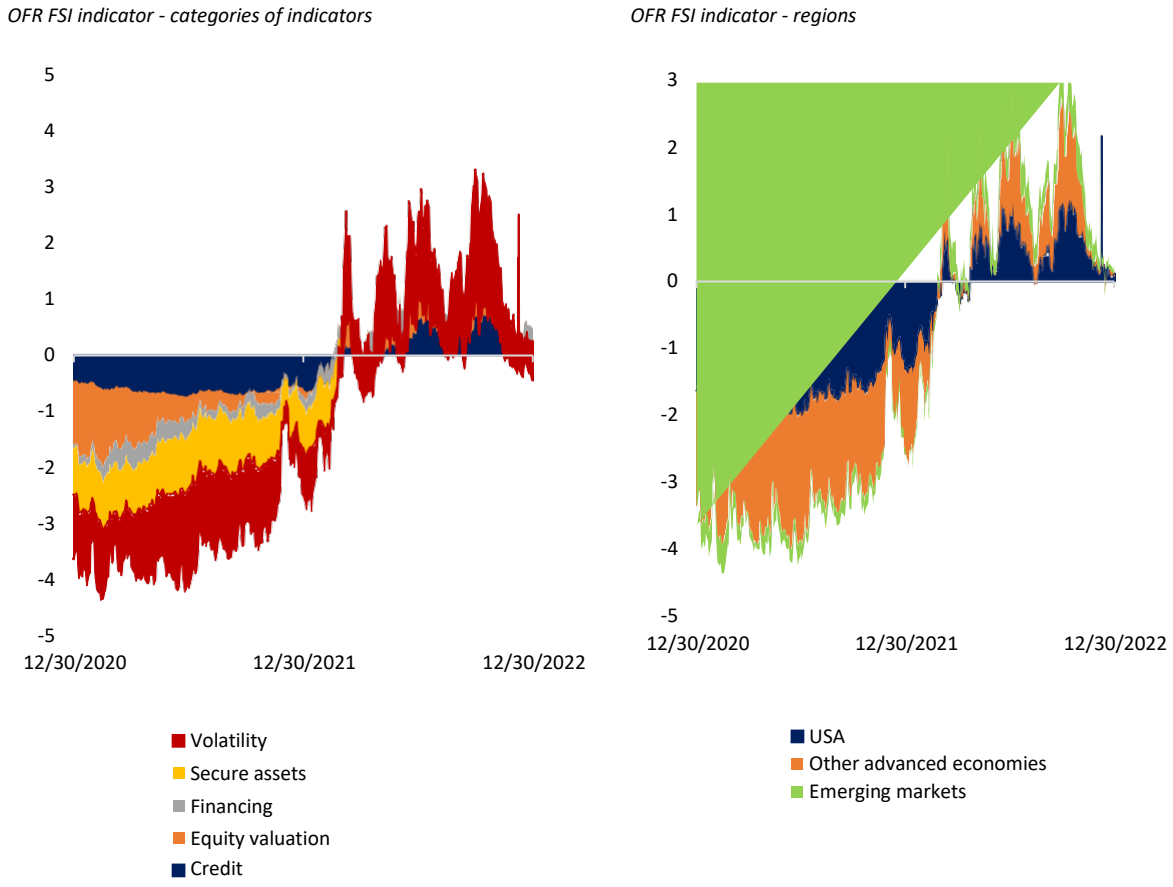
Although only a few capital markets are shown in Chart 21, all European capital markets have shown similar dynamics: the cycle of quantitative easing that started after the 2007-2009 financial crisis has facilitated a growth in capital markets. The start of the quantitative tightening cycle in 2022 has led to a readjustment without, however, any sharp corrections.

[14] The common factor is the first component of government bond yields extracted using Principal Component Analysis (PCA). The common factor explains 86% of the variation in government bond yields. The database contains daily data for approximately all European economies.

3.1. Stress levels in the financial system

The Financial Stress Index developed by the Office of Financial Research[15] (OFR) was designed to identify potential vulnerabilities in the global financial system that can generate, amplify, and transmit stress in the U.S. and/or international financial markets. Financial stress is modelled as a network of mutually reinforcing macro-financial factors.

Chart 22 Financial Stability Indicator for the US economy (OFR FSI)



Source: Office for Financial Research

The Financial Stress Index (OFR FSI) provides an overview of the level of stress in global financial markets. The index is constructed from 33 variables characteristic of financial markets and takes positive values when stress levels are above average and negative if there is no financial market stress.

[15] https://www.financialresearch.gov/

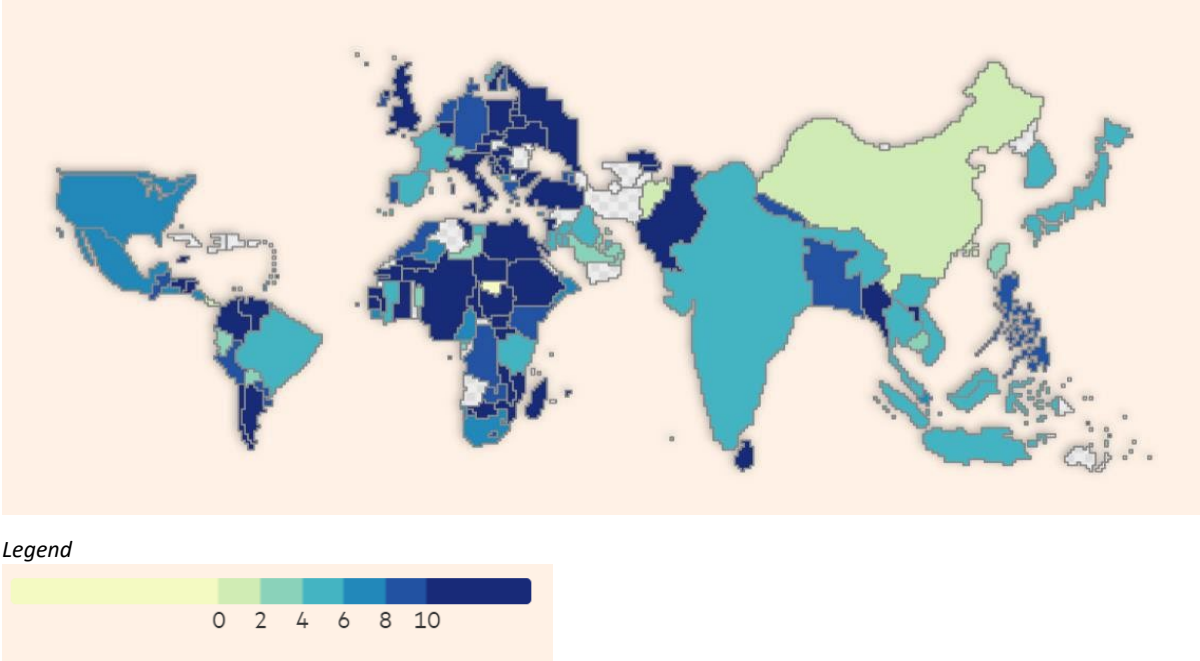
The OFR FSI is calculated daily as a weighted average level of each variable observed in the market that day, relative to its history. The index is zero when this average is zero, suggesting that stress is at normal levels.

The OFR FSI index recorded higher values in 2022 than in 2020. **Volatility, followed by credit risk[16], increased the most in 2022,** but showed a downward trend in the last quarter. The FSI indicates that emerging markets followed by advanced economies are the regions with the highest potential for economic instability among the three groups of economies. In the fourth quarter, economic instability decreased for all regions.

Financial conditions have tightened considerably as economic imbalances have intensified. This has translated into higher financing costs for firms. The tightening of financial conditions and increased uncertainty have had strong effects on economic activity as companies have postponed their investment projects and individuals have reduced their consumption out of caution or financial constraints.

In 2022 central banks acted to reduce the negative effects of inflation and rapidly increased monetary policy rates. In the following figure it can be seen that inflation affected all economies in 2022 as a global phenomenon.

Chart 23 Global inflation in 2022



Source: Financial Times

[16] The credit risk calculated by OFR contains valuation measures for credit enhancement, which represent the difference in borrowing costs for firms with different creditworthiness. In times of stress, credit spreads can increase when the default risk increases or the functioning of the credit market is disrupted. Larger spreads may indicate that investors are less willing to lend, increasing costs for lenders seeking funding.

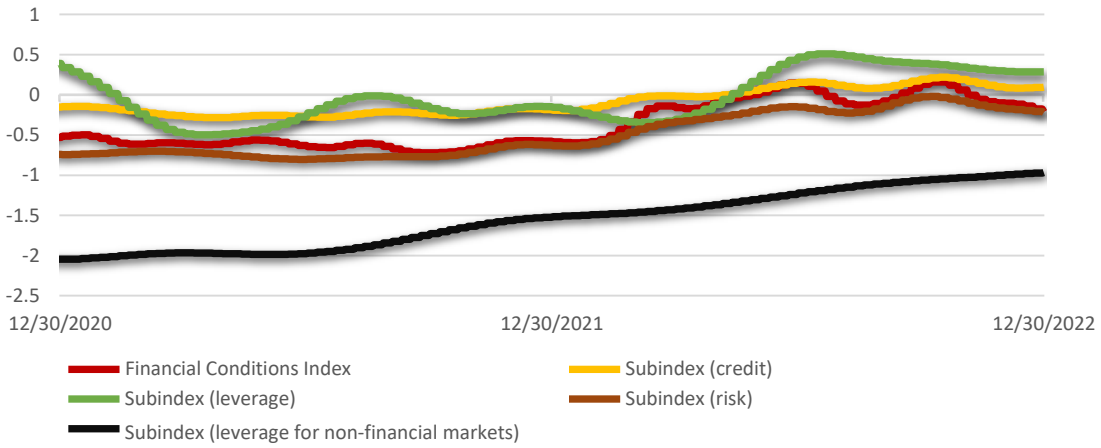
Since uncertainty shocks can affect firms in several different markets, it is necessary to use a mixed indicator to fully capture the financial side of the transmission mechanisms of financial shocks. An indicator similar to the Financial Stress Index is the *Financial Conditions Index* developed by the Chicago Fed (ANFCI). This is a composite indicator extracted by using dynamic factor analysis from a set of 105 risk, credit and leverage indicators in the US financial system. The indicator is constructed to reflect a stylized representation of financial conditions in the US and includes money markets, traditional banking markets and shadow banking. The indicator is adjusted for economic activity and inflation. The inclusion of *the Financial Conditions Index* for the US economy in the current analysis is motivated by the importance of the US economy to the global economy.

The leverage subindex for non-financial markets is a correlated indicator with the indicator measuring the share of credit in GDP, is a measure of financial market instability and is associated with an increased probability of entering a recession.

The ANFCI index is constructed to have a mean value of zero and a standard deviation of 1 on a sample from 1971 to the present. Positive ANFCI values have historically been associated with tighter financial conditions, while negative values have historically been associated with looser than average financial conditions. Positive ANFCI values are historically associated with tighter financial conditions than what would typically be suggested by prevailing macroeconomic conditions, while negative values have historically been associated with the opposite.

The risk subindex refers both to the premium included in the returns on risky assets embedded in their income and to the volatility of asset prices. The credit subindex measures the demand for credit. The leverage subindex is an estimate for the debt to asset ratio. Risk measures tend to receive positive weights, while credit and leverage measures tend to receive negative weights, so stressed financial conditions are associated with above-average risk and below-average credit and leverage.

Chart 24 Financial Conditions Index (ANFCI)

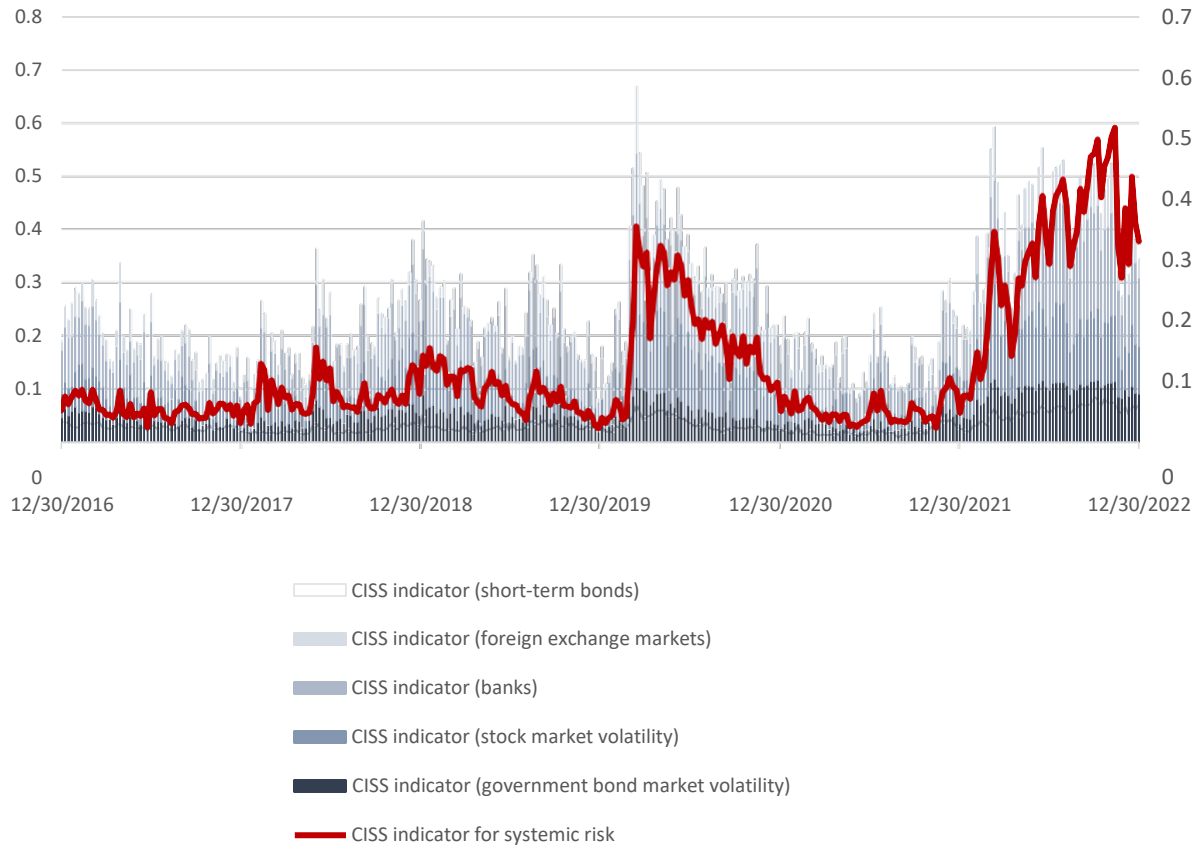


Source: Federal Reserve Bank of Chicago, ASF processing

Given the strong unconditional correlation between economic uncertainty and financial conditions, it is important to identify the general state of financial markets in order to isolate the role played by uncertainty shocks.

The measurement of systemic risk for European markets is also carried out using the CISS indicator[17] which is a composite indicator for systemic risks calculated by the European Central Bank. The CISS indicator is constructed to show the extent to which systemic financial stress contributes to financial instability in European markets. The indicator takes into account different sectors of the European financial system: equity and bond markets, foreign exchange and money markets, etc. The value of the indicator is constrained to be in the range (0, 1), so that higher values indicate periods of financial stress for European markets.

Chart 25 Composite systemic risk indicator for European financial markets



Source: European Central Bank, ASF processing

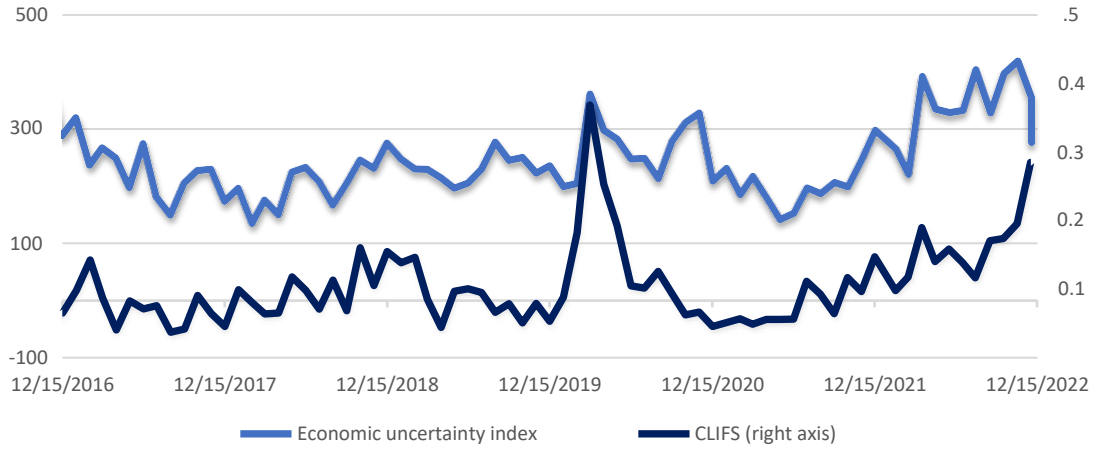
[17] CISS - Composite Indicator of Systemic Stress

The CISS subindices measuring stock, bond and foreign exchange market volatility trended upwards in 2022 exceeding in magnitude the systemic risks in 2020.

According to the CLIFS indicator, which is an index calculated by the European Central Bank to measure financial stress at the country level, **Romania was characterized by an increase in financial stress in 2022 amid rising international economic uncertainty**.

The increase in systemic risk for the Romanian economy is explained to a large extent by exogenous shocks. Chart 26 shows the high degree of co-dependence of the CLIFS indicator on the economic certainty index calculated for the European economy in 2022.

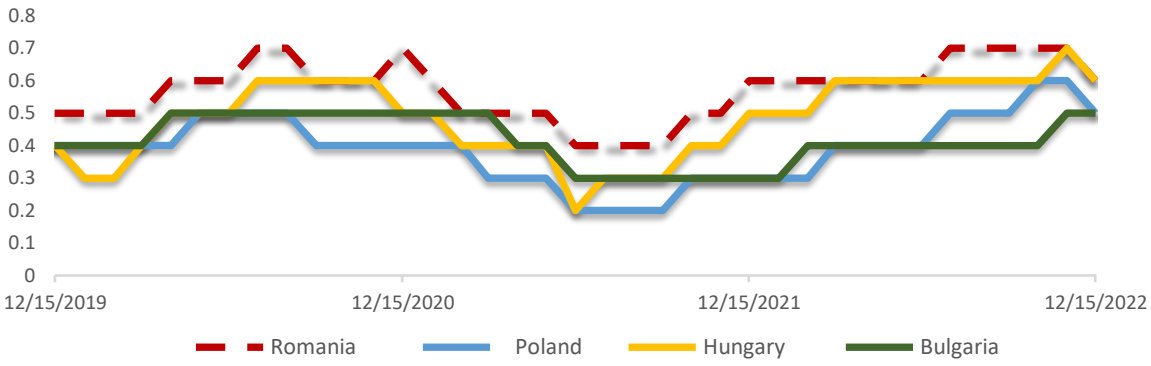
Chart 26 Financial Stress Indicator - Romania (CLIFS)



Source: European Central Bank, Economic Policy Uncertainty, ASF processing

Early warning indicators are constructed to anticipate the likelihood of an economic crisis occurring amid macroeconomic imbalances.

Chart 27 Early warning indicators



Source: Citigroup, ASF processing

Thus, although in the first three quarters of 2022, the **early warning indicator for Romania was at a high level, it showed a downward trend in the last quarter**.

3.2. Sovereign Bond Contagion Index

The government bond contagion index[18] assesses the extent to which shocks in domestic markets affect other countries and the evolution of the intensity of contagion phenomena compared to previous index values (*Diebold*, 2009).

The index calculation is based on a Vector autoregressive model with 1 lag for a moving sample of 50 weekly data for bonds denominated in euro for Italy, Estonia, Austria, France, Netherlands Portugal, Ireland Finland, Belgium, Bulgaria, Hungary, Czech Republic and Poland and in RON for Romania with a maturity of 10 years, starting from 2014. The values of bonds issued by Germany are used as the reference value for the calculation of the bond spread.

Rising monetary policy rates in Europe in 2022 led to a high degree of contagion in sovereign yields across all maturities, but lower than in 2020.

Chart 28 Contagion index for government bonds (10 years)

Source: Refinitiv, ASF calculations

Factors influencing the price of sovereign bonds are the monetary policy rate, global risk aversion, country-specific risk and contagion.

[18] Claeys, P., & Vašíček, B. (2014) Measuring bilateral spillover and testing contagion on sovereign bond markets in Europe *Journal of Banking and Finance*, *46*, 151-165.

The increase in contagion in the first three quarters was predominantly influenced by the same risk factors, i.e. inflation and rising energy prices. In the last quarter of 2022, the contagion between sovereign bond yields declined as a result of the slowdown in the pace of increase in monetary policy rates.

Net contagion is the difference between contagion received and contagion transmitted and is an indicator for their relative importance to the sovereign bond market. The model indicates that Bulgaria, Romania, the Netherlands, the Czech Republic, Austria and Portugal receive net contagion, while the rest of the countries in the sample transmit contagion.

Contagion indicates sensitivity to changes in the returns of the other indices studied and thus shows the degree of long-term integration, but also short-term sensitivity to movements in other equity markets.

Table 6 Contagion received and transmitted in government bond yields (10 years)

	RO	6.6 SP	AU	FR	NL	PT	IR	FN	BE	BL	HN	CZ	PO
RO	42.1	2.1	2.8	3.6	3.7	3	1.5	2.2	5.1	3.9	0.4	11.3	8.1	10.1
IT	1.3	30.8	14.1	4.1	8.8	3.3	10.3	9.9	4.8	10.3	0.2	1.4	0.1	0.5
SP	1.3	12.9	24.4	4.2	9.7	5.1	12.4	11	5.9	10.7	0.1	1.5	0.1	0.6
AU	2.1	4.5	4.9	30.6	9.6	9.5	3.9	4.8	10.8	13.1	0.1	3.5	0.9	1.8
FR	1.3	8	8.4	7	24.3	8.2	5.3	10.1	8.4	15.5	0.1	2.3	0.3	0.7
NL	1.6	4	6.5	10.3	10.3	28.5	4.8	7.8	9.4	13.7	0.1	2	0	0.9
PT	0.8	10.7	14.2	4.3	6.7	5.1	33.5	10.1	4.1	7.9	0.2	1.3	0.1	0.9
IR	0.8	9.8	11.3	3.1	11	6.4	8.1	29.1	6	11.8	0.1	1.9	0.1	0.7
FN	3.2	5.2	7.2	9.3	8.6	6.9	3.2	6.2	32.2	11.8	0.2	2.8	0.9	2.3
BE	1.3	8	8.4	7.5	14.1	7.5	5.9	10.7	9.7	23.4	0.1	2.2	0.4	0.8
BL	0.1	0.3	1	2.3	0.3	0.3	0.9	0.4	0.9	0.1	91.4	1.7	0.2	0.2
HN	8.7	0.8	1.2	3.3	2.6	2.1	1.1	2.4	1.8	3.1	0	48.8	8.4	15.7
CZ	8	0.2	0.2	0.9	0.6	0	0.2	0.1	1.4	0.5	1.9	12.1	54.4	19.5
PO	6.2	0.1	0.5	1.1	0.3	0.9	0.5	0.4	2.7	0.5	2	17.5	14.2	53.1

Source: Refinitiv, ASF calculations

3.3. Equilibrium level in European capital markets

The departure from the trend of equilibrium in European capital markets is a fact observed and included as a major risk to financial stability by the world's leading financial institutions.

The equilibrium level of the capital market is the normal market level, an unobservable (latent) variable that can be estimated statistically. The estimation of the equilibrium level is important for the analysis of capital market stability because it provides a reference level for capital market analysis.

Exceeding the equilibrium level may indicate a period of unsustainable growth in the financial market or a change in the equilibrium level due to changes in fundamental factors affecting the economy (e.g. technological progress). A fall in the market below the equilibrium level may indicate a temporary period of financial stress, contagion effects or a change in the equilibrium level following a period of economic recession.

The evolution of the index can be represented as the sum of the averaging process and the process of economic shocks.

The estimation of the equilibrium level of the Romanian stock market index was performed with a Local Level model (*Local Level model*[19]) estimated with the Kalman filter.

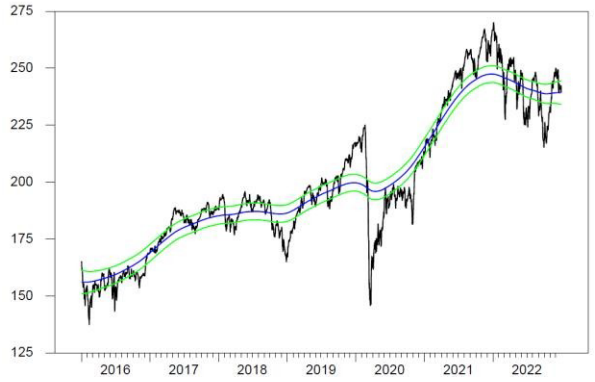
$Index_t = mean_t + shocks_t,\ shocks_t \sim NID(0, \sigma_\varepsilon^2)$

$Mean_{t+1} = \text{mean}_t + errors_t,\ errors_t \sim NID(0, \sigma_\varepsilon^2)$

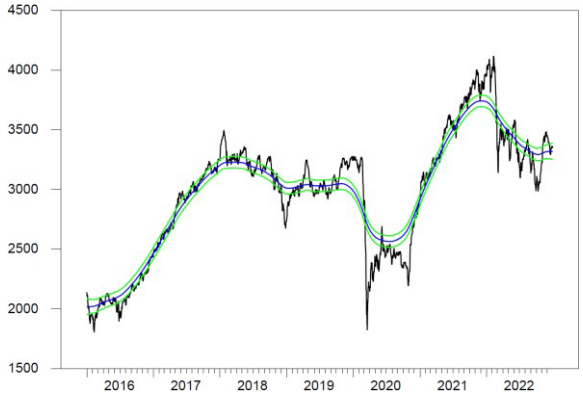
The dynamics of the mean is given by the previous day's value plus measurement errors and is modelled as a random process. Measurement errors are due to changes in the composition of the index, the weights of existing companies, etc. The equilibrium level of the stock market index is plotted by the average, whose dynamics are latent (unobservable).

Chart 29 Development of STOXX600, Austria, Romania and Poland stock market indices relative to equilibrium level

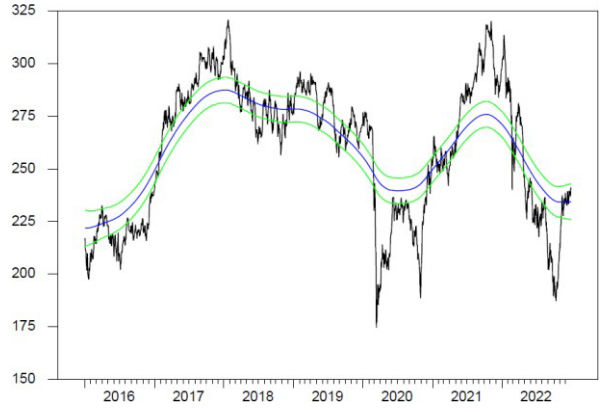
STOXX 600 Index



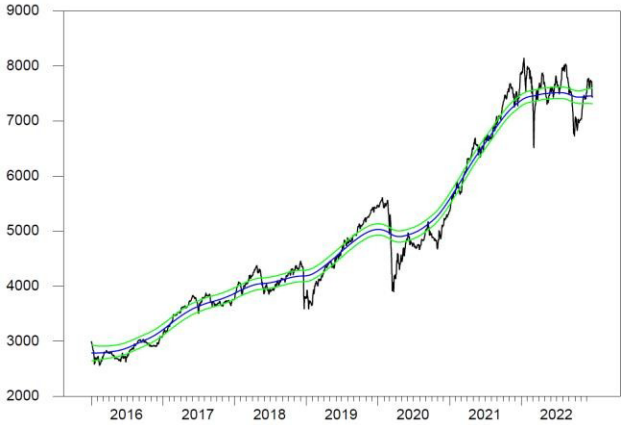
Capital market index (Austria)



Capital market index (Poland)



Capital market index (Romania)



Source: Refinitiv, ASF calculations

[19] Durbin, J. and Koopman, S.J., 2012. *Time series analysis by state space methods*. Oxford University Press.

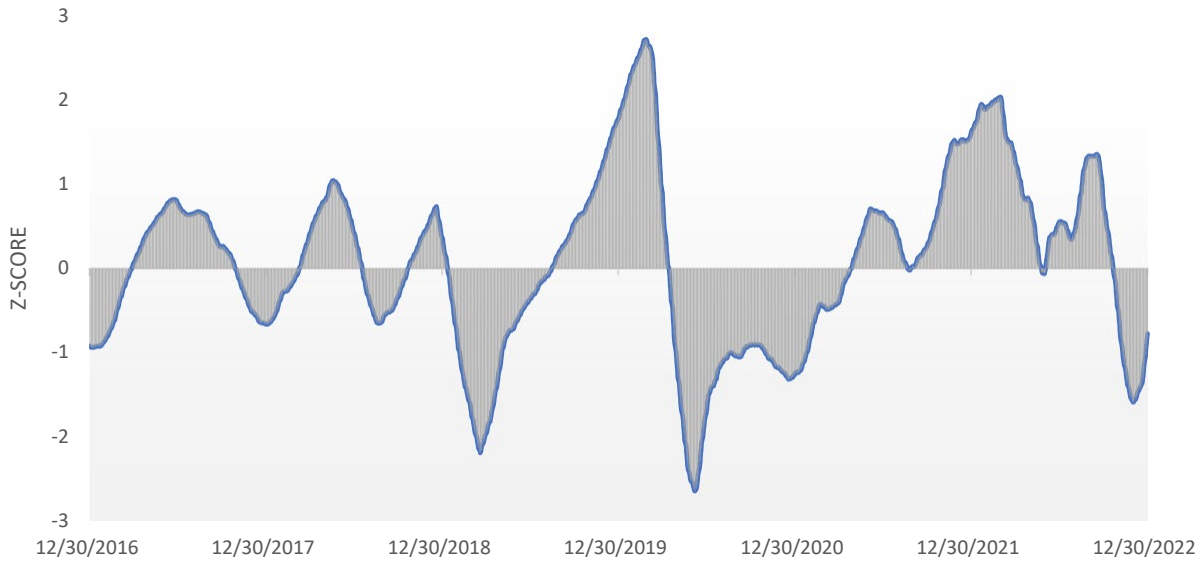
The graphical representation of the equilibrium level and confidence bands (90%) shows the equilibrium level, the confidence intervals for it and the daily closing values for the represented indices.

As of the second quarter of 2021, the STOXX600 index which is a *proxy* for the European equity market as well as indices for European financial markets have seen rapid increases above equilibrium level amid the post-Covid policy mix of strengthening economic markets. Chart 29 shows only developments in the Austrian, Romanian and Polish equity markets, together with the STOXX 600 index.

The growth of the equity markets has far exceeded the expected equilibrium level, thus indicating a different dynamic from the economic growth expectations of companies listed on these indices.

As macroeconomic growth forecasts for the European economies for 2023 are low with risks towards recession according to the ESRB warning, the evolution of the indices fell below the equilibrium level. In the last quarter of 2022, the analysed indices returned towards the equilibrium level.

Chart 30 Cyclical patterns of financial developments. Financial cycle patterns for the Romanian capital market



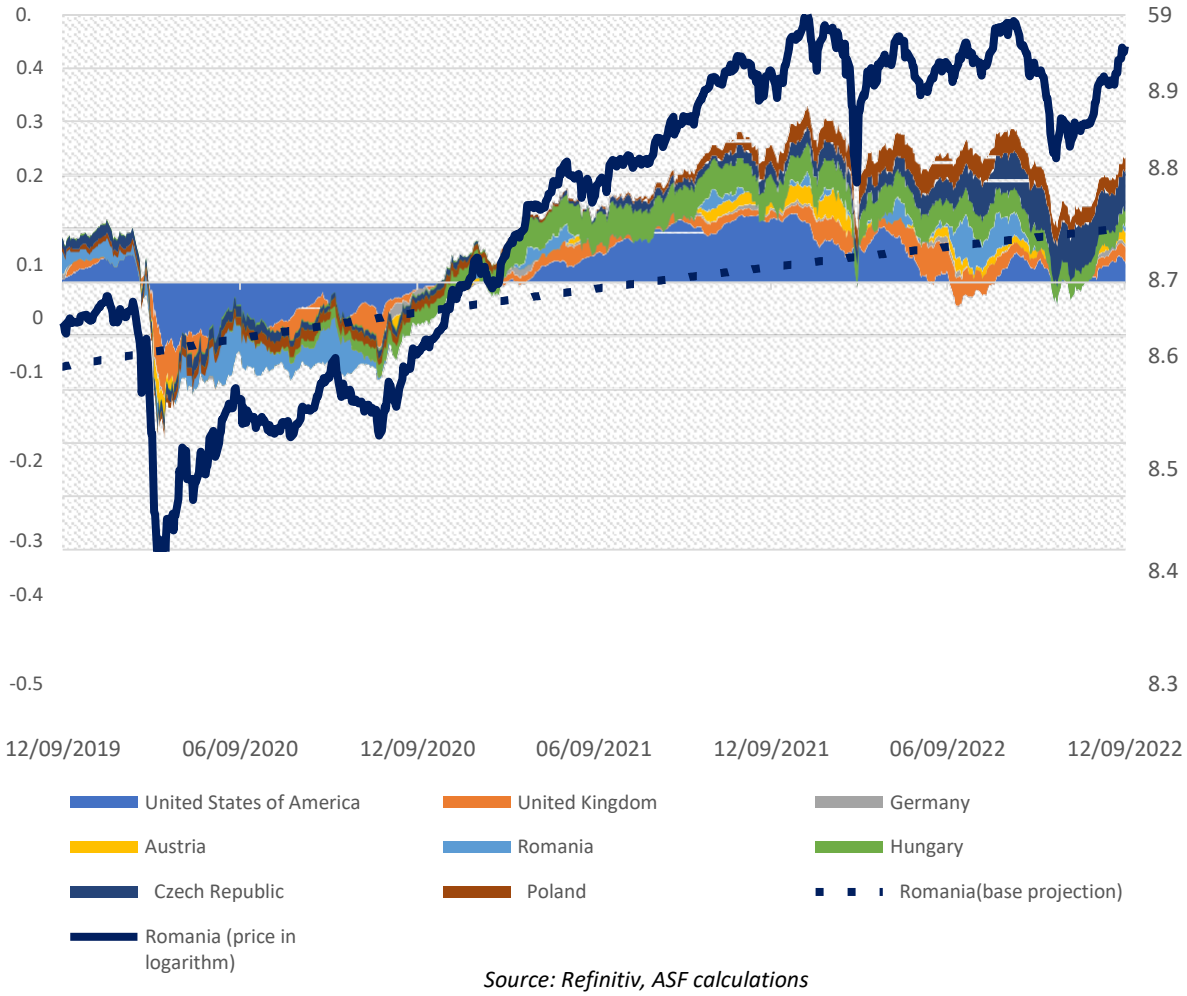
Source: Refinitiv, ASF calculations

Based on the model estimated above, *the financial cycle* for assets traded on the Romanian stock market was extracted. The results have been smoothed for a three-month duration. The extracted cyclical component was calculated as the difference between the index level for the Romanian stock market and the estimated equilibrium level.

Although the Romanian capital market in 2021 grew rapidly as a result of domestic developments materialized in listings and increased external attractiveness, the **monetary policy of quantitative tightening in 2022 led to a contraction of the financial cycle**, which is currently on a downward trend.

The results converge with similar estimates in the literature and point to a contraction in most equity markets due to rising inflation, reduced growth prospects and increased uncertainty.

Chart 31 Influence of foreign stock markets on domestic stock market returns (historical decomposition of shocks received - VAR model



Source: Refinitiv, ASF calculations

The interconnectedness of economies and financial markets allows for instantaneous reaction and uniform transmission of shocks to all economies.

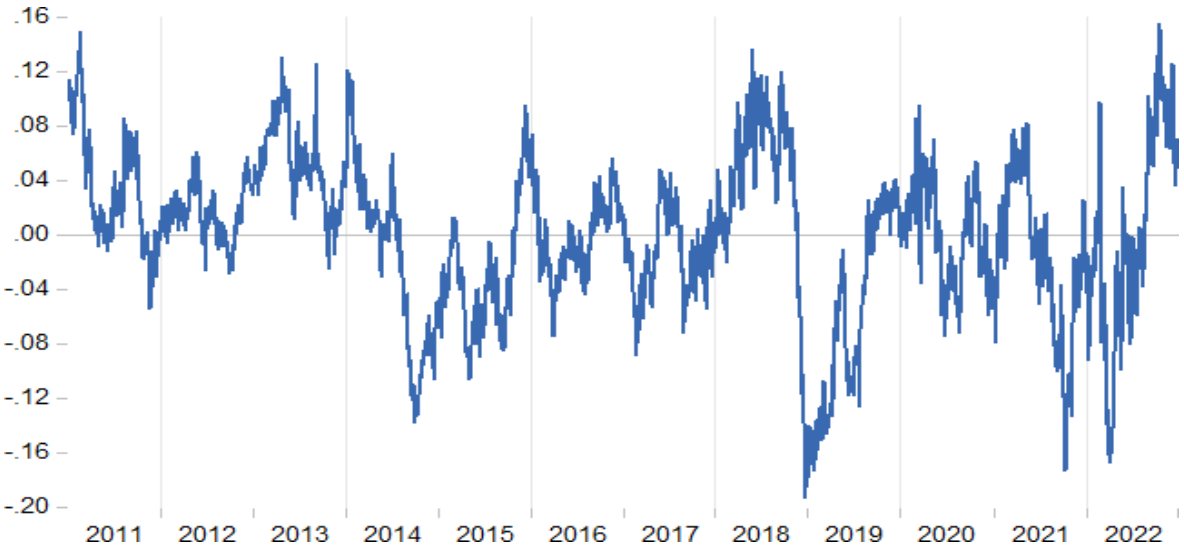
The historical breakdown of shocks shows how much an exchange has been influenced in the past performance of other exchanges. The historical breakdown of shocks received by the Romanian stock market index (index calculated by Refinitiv similar to the BET-C index) shows that in 2022 the **local stock market was exposed to a mix of external shocks.**

3.4. Short-term and long-term dynamics of the Romanian capital market

Correlation is a measure of how two variables move in tandem over time. Unlike correlation, cointegration does not measure how well two variables move together, but rather whether the difference between their means remains constant. Thus, the degree of cointegration measures the relationship between the levels of several time series, regardless of how stable a correlation is or over what period of time.

The relationship between correlation and cointegration is not well defined. Cointegrated series may have low correlation, and highly correlated series may not be cointegrated at all. While correlation describes a short-term relationship between returns, cointegration describes a long-term relationship between prices.

Chart 32 Long-term measure. Cointegration of capital markets

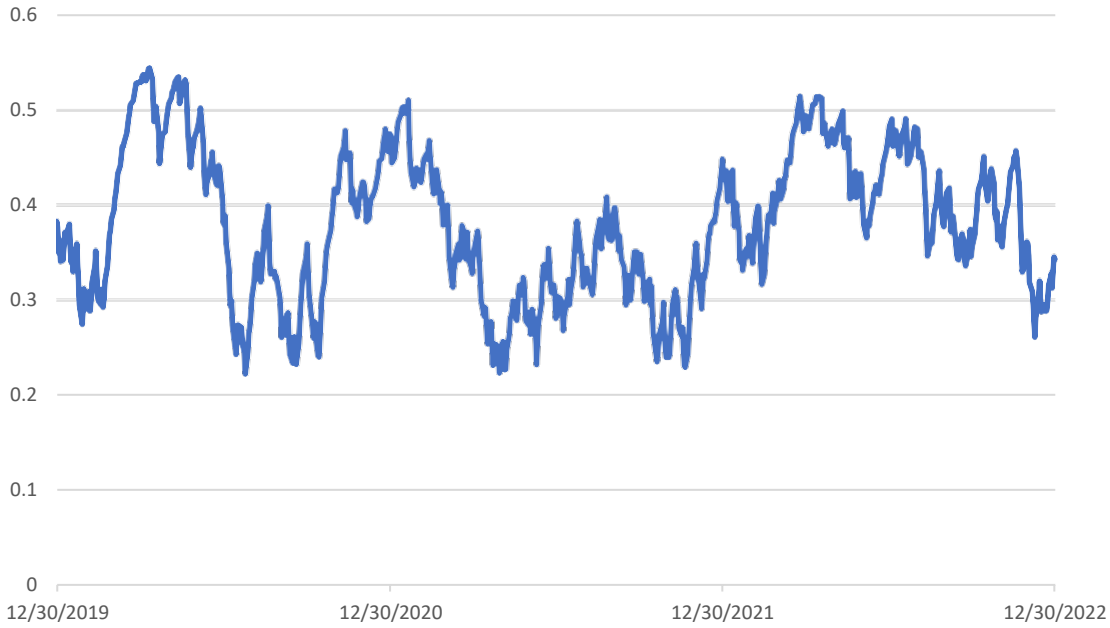


Source: Refinitiv, ASF calculations

Chart 32 shows the cointegrating relationship between the price indices of the German, Austrian, Hungarian, Polish and Romanian capital markets.

For the purpose of the current analysis, it can be seen that **in 2022 the equity markets studied showed the same common upward trend in the first three quarters of the year, only to decline rapidly in the last quarter as they were subject to the same types of shocks, mainly a monetary policy shock**.

Chart 33 Short-term measure. Dynamic correlation between the Romanian stock market and the STOXX 600 index (Dynamic Conditional Correlation-GARCH model)



Source: Refinitiv, ASF calculations

The dynamic correlation between the Romanian stock market and the STOXX 600 index was calculated with a DCC (*Dynamic Conditional Correlation*) model. The dynamic correlations between the two indices were positive and ranged from 0.2-0.55. When the correlation index is low, the correlation is not significant. However, we can only speak of a significant correlation when the correlation is higher than 0.3. In order to understand when the correlation is significant, **the correlation between the two indices will be decomposed according to the volatility of the two indices.**

Since the dependence between negative index returns cannot be explained with linear measures, correlation being a measure of linear dependence, the bivariate dependence between indices was modelled with a mixture of two bivariate distributions based on a Markov-Switching model with two volatility states: a low volatility state and a high volatility state.

In the absence of market shocks, when the correlation between indices is low, the dependence between indices is modelled with a multivariate Gaussian distribution function.

If index volatility increases, the dependence between indices increases and is modelled with a Clayton distribution. The bivariate dependence modelled with the Clayton distribution[20] is described by a single parameter that controls for the dependence between extreme negative returns that occur in the event of **simultaneous severe economic shocks** affecting stock market indices.

The relationship between the Romanian capital market and the European capital markets, synthetically represented in the STOXX 600 index, depends on the industries included in the two indices. The heterogeneity and structural differences between the two indices are represented in the figure "Probabilities for each volatility regime" in which the weak link between them is visible.

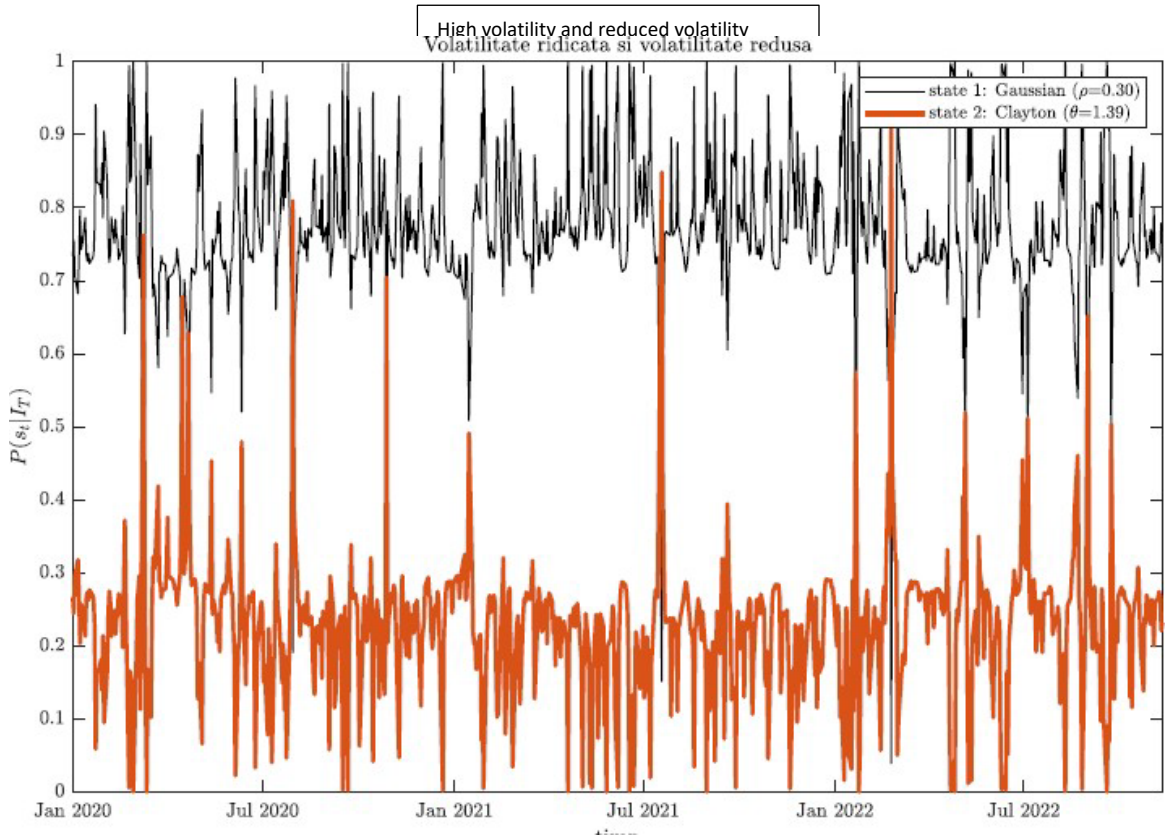
[20] For more details see https://reference.wolfram.com/language/ref/CopulaDistribution.html. The bivariate dependence modelled with Clayton is described by a single parameter controlling the dependence in the left tail of the distribution.

For the period analysed (2020-2022) the correlation between the two indices is largely insignificant, hovering around 0.3. The market regime is normal and is governed by the Gaussian distribution plotted with a black line.

Economic shocks that have generated simultaneous declines for both indices are leading to increased volatility. **In these turbulent episodes in the financial markets, the link between the two indices increases and the correlation becomes significant**. Simultaneous declines of the two indices are represented with a red line and are valid when the probability exceeds 50%.

In conclusion**, the short-term link between the Romanian capital market and the European capital market is weak. It increases only in situations of economic tensions as has happened several times over the last three years**.

Chart 34 Probabilities for each volatility regime



Source: Refinitiv; ASF calculations

The structural shock in the European economy generated by Covid-19 and subsequently by the events of 2022 has produced an unstable investment climate, fragile and sensitive to contagion with external capital markets.

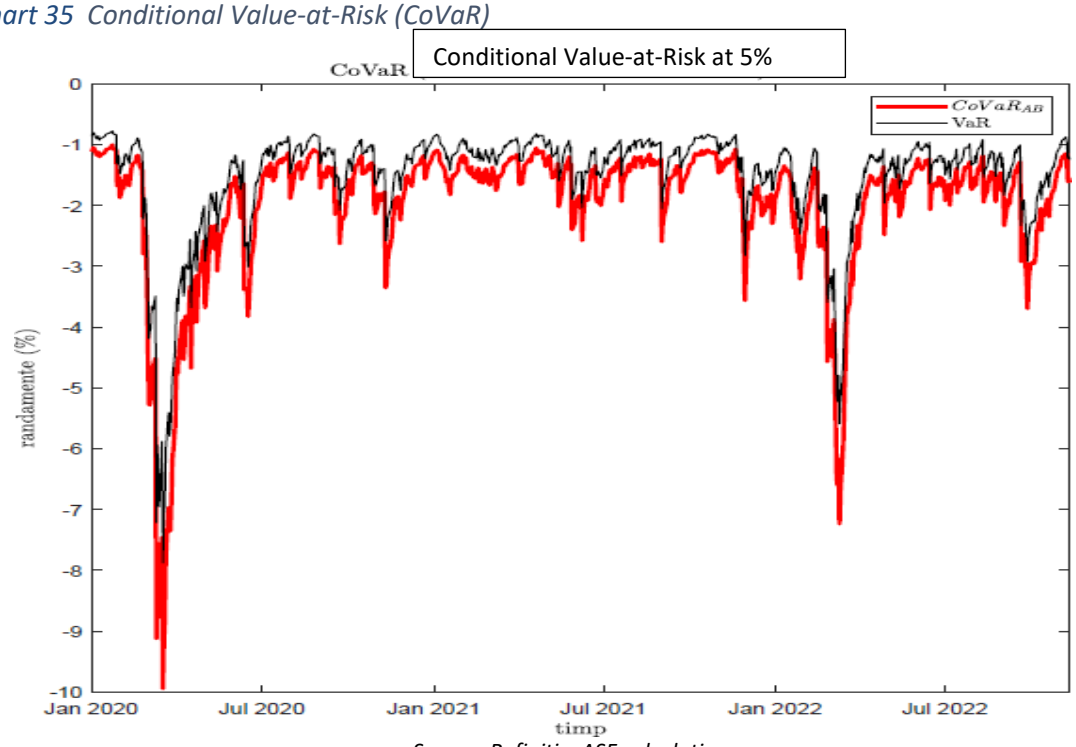
Negative shocks in one equity market can easily spread to and affect other equity markets. One way to measure the influence is with the help of Conditional Value-at-Risk (CoVaR). CoVaR is a measure of the influence of one variable on another variable if there is a dependence between them. Unlike Value-at-Risk (VaR) which measures the maximum loss of a

asset/portfolio against a confidence interval, CoVaR measures the loss as conditional on systemic risk or another factor[21].

The following graph shows the CoVaR calculated at a daily frequency for the Romanian equity market in the scenario where extreme negative shocks in the European financial market affect the Romanian equity market. The comparison between CoVaR and VaR quantifies the impact of negative shocks, i.e. declining returns, in the European equity markets on the Romanian equity market. [22]

The chart briefly presents the main economic shocks of the last three years and allows a comparison of the intensity of the shocks on the domestic capital market.

Chart 35 Conditional Value-at-Risk (CoVaR)



Source: Refinitiv; ASF calculations

[21] Adrian, T. and Brunnermeier, M.K., 2011. CoVaR (No. w17454). National Bureau of Economic Research.

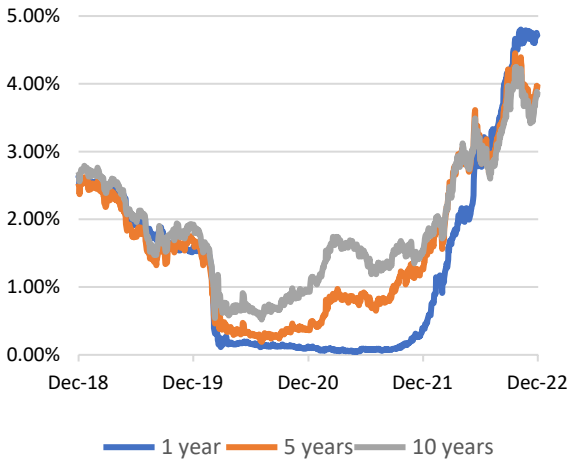
[22] Since the link between extreme negative returns cannot be explained with linear correlations, the bivariate dependence between indices was modelled with a mix of bivariate distributions.

4. Stability of financial instruments and investments market

4.1. Developments in European and international financial markets

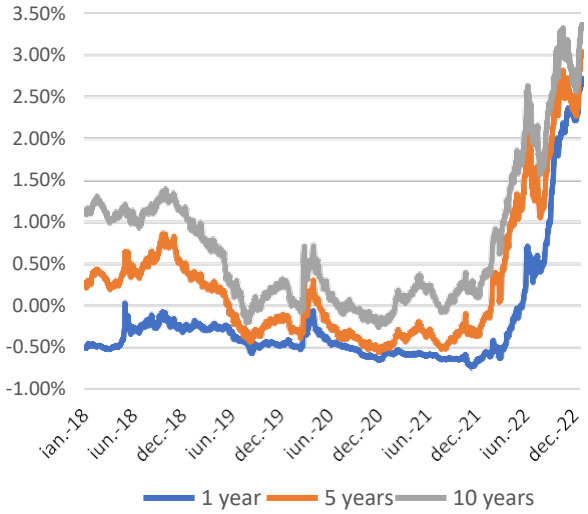
Important signals that may warn of a possible slowdown in economic activity, and in the worst-case scenario of a recession, include the evolution of specific indicators for capital markets and the dynamics of government bond yields. This shows an upward trend in US and Eurozone government bond yields from 2021 onwards.

Chart 36 Yield curve for US Treasury bonds



Source: Federal Reserve, ASF processing

Chart 37 Eurozone government bond yields



Source: Eurostat, ASF processing

The Joint Committee Report on Risks and Vulnerabilities in the EU Financial System published in September 2022 by the *Joint Committee* indicates that the financial system has been resilient despite high political and economic uncertainties.[23]

The economic advance following the resumption of activities after the pandemic was slowed by the war in Ukraine. Alongside the humanitarian consequences, the economic and financial impact of the war has been felt globally. Commodity and energy prices rose to record highs. Production and logistics costs have risen and household purchasing power has fallen. After a long period characterised by inflation and very low interest rates, monetary policy rates were raised in response to high inflation. Thus, higher financing costs and slowing economic growth have put pressure on the refinancing of public and private debt.

[23] Joint Committee Report on risks and vulnerabilities in the EU financial system

At the same time, the war is a source of risk for the quality of financial institutions' credit portfolios. In addition, financial institutions face high operational challenges associated with cyber risks and the implementation of sanctions against Russia. In view of the above-mentioned risks and uncertainties, ESA has recommended the following policy actions to be taken by competent national authorities, financial institutions and market participants:

- Financial institutions and supervisors should continue to be prepared for a deterioration in asset quality in the financial sector;
- The impact that further increases in monetary policy rates and the possibility of sudden increases in risk premia may have on financial institutions and market participants should be closely monitored;
- Financial institutions and supervisors should be aware of and closely monitor the impact of inflation risks;
- Supervisors should continue to monitor the risks that retail investors take when buying assets, especially crypto-assets and related products, without fully realising the high risks they are exposing themselves to;
- Financial institutions and supervisors should continue to carefully manage environmental and cyber risks.

4.2. The evolution of stock market indices in Romania

In December 2022 compared to December 2021, stock market indices on international markets recorded declines. A similar development was also seen in domestic equity market indices.

Table 7 Stock market yields on 30 December 2022

International indices	3 months	6 months	12 months
EA (EUROSTOXX)	12.44%	7.18%	-14.38%
FR (CAC 40)	12.35%	9.30%	-9.50%
DE (DAX)	14.93%	8.92%	-12.35%
IT (FTSE MIB)	14.81%	11.33%	-13.31%
GR (ESA)	17.26%	14.73%	4.08%
IE (ISEQ)	12.63%	13.23%	-15.82%
ES (IBEX)	11.71%	1.61%	-5.56%
UK (FTSE 100)	8.09%	3.94%	0.91%
US (DJIA)	15.39%	7.71%	-8.78%
IN (NIFTY 50)	5.91%	14.73%	4.33%
SHG (SSEA)	2.16%	-9.09%	-15.10%
JPN (N225)	0.61%	-1.13%	-9.37%

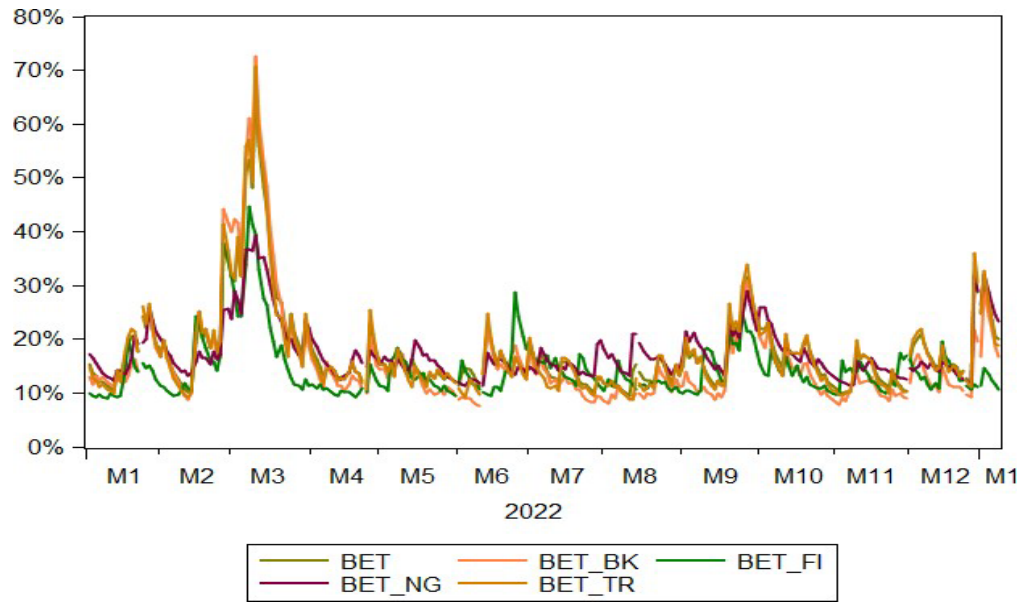
BVB indices	3 months	6 months	12 months
BET	9.63%	-5.13%	-10.70%
BET-BK	9.90%	-2.13%	-12.40%
BET-FI	6.50%	-0.24%	-3.59%
BET-NG	3.25%	-8.97%	-4.98%
BET-TR	9.67%	-2.66%	-1.85%
BET-TRN	9.67%	-2.79%	-2.34%
BET-XT	8.05%	-5.10%	-10.85%
BET-XT-TR	8.12%	-2.58%	-2.59%
BET-XT-TRN	8.12%	-2,.71%	-3.04%
BETAeRO	-1.36%	-10.78%	-22.23%
BETPlus	10.06%	-4.73%	-10.25%
ROTX	7.72%	-5.34%	-7.32%

Source: Refinitiv, ASF calculations

3M= 30 December 2022/30 September 2022; 6M=30 December 2022/30 June 2022; 12M=30 December 2022/31 December 2021
Note: Max. (green) and min. (red) are set at ±4% (3 months), ±8% (6 months) and ±15% (12 months)
3M= 31 May 2022/28 February 2022; 6M=31 May 2022/30 November 2021; 12M=31 May 2022/31 May 2021
Note: Max. (green) and min. (red) are set at ±4% (3 months), ±8% (6 months) and ±15% (12 months)

Against the backdrop of tensions between Ukraine and Russia, volatility saw a transitory jump in volatility of around 70% in March 2022. The shock was transitory, volatility subsequently recovered to a level of around 20%. Another shock of around 40% occurred in September 2022. Index volatility followed the same pattern of dynamics as a result of common shocks affecting the local equity market.

Chart 38 Volatility of BVB indices. Model GJR-GARCH(1,1)

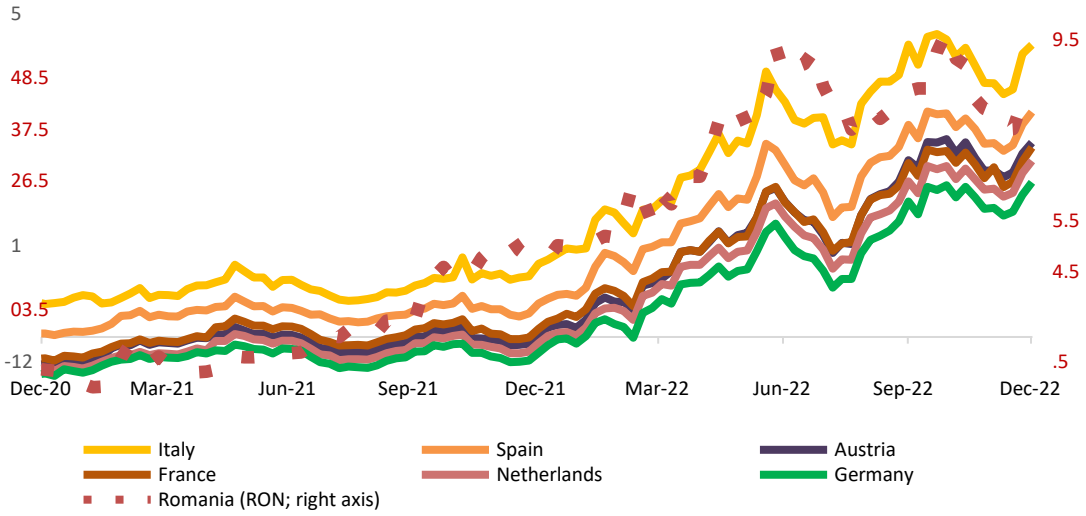


Source: Refinitiv, ASF calculations

Against the backdrop of high inflation and growth forecasts in the coming period, the sovereign bond market continued its upward trend in yields that began in 2021, surpassing levels seen at the start of the pandemic.

Thus, if at the end of 2021 the yield on 10-year government bonds for Romania was 5.27%, at the end of 2022 it was at a level of 8.37%/year. In Austria the increase was from 0.03% to 3.01%, in Germany from -0.24% to 2.39% and in France from 0.13% to 2.93%.

Chart 39 Evolution of 10-year maturity sovereign bond yields



Source: Refinitiv, ASF calculations

4.3. Systemic risk patterns in the Romanian capital market

Financial stability has become an integral part of the macroeconomic stability framework. Recent episodes of financial crises have provided empirical evidence that **financial stability is a necessary condition to support sustainable macroeconomic growth**. Financial system distress will disrupt the flow of funds to the economy in the form of lower economic liquidity, deterioration in financial intermediation, disruptions in the payments system and declining market confidence (*Warjiyo, Juhro 2019*).

The Global Financial Crisis (GFC) of 2007-2009 was caused by the materialisation of systemic risk triggered by a mortgage credit problem in the financial sector. It not only had a negative impact on financial sector performance, but also significantly derailed global economic growth. Interconnectedness and feedback loops between the financial and real sectors caused a high cost of the crisis, damaged the economy and induced an economic recovery that lasted many years. This event has increased the importance of considering macro-financial linkages in macroeconomic policy formulation.

These conditions prompted G20 leaders at their 2010 meeting in Seoul to call on the Financial Stability Board (FSB), the International Monetary Fund (IMF) and the Bank for International Settlements (BIS) to develop a macroprudential policy framework to mitigate systemic risks in the financial sector (FSB et al. 2011). As a next step, central banks and financial authorities in many countries have participated in developing a macroprudential approach to limit systemic risk and support financial system stability.

Systemic risk is at the heart of financial stability and macroprudential policy. This policy is defined as a policy that limits the risk and cost of systemic crises (*Galati, Richhild, 2011*). Meanwhile, the European Systemic Risk Board (ESRB), an institution whose tasks include the supervision of the European financial system and the avoidance and limitation of the emergence of systemic risk in the Eurozone, defines macroprudential policy as a *policy to maintain the stability of the financial system as a whole, including strengthening the resilience of the financial system and reducing the build-up of systemic risk, which leads to ensuring continued economic growth in the financial sector* (ESRB, 2013). A similar definition comes from the International Monetary Fund, which states that macroprudential policy is a policy aimed at supporting financial stability as a whole by limiting systemic risk (IMF, 2011).

Systemic risk has become an important measure of macroeconomic risk, particularly in light of growing concern about its ability to put the economy into difficulty. Thus, economic authorities need to have an understanding of systemic risk, as it can become heightened by exacerbating vulnerabilities triggered by shocks arising from different elements of the financial system, including the macroeconomic environment. As such, understanding the financial system and its elements is as important as understanding the anatomy of systemic risk.

The Financial Stability Board (FSB) defines systemic risk as the risk of failure of the flow of financial services that:

- is caused by problems in all parts of the financial system
- has the potential to have significant negative consequences for the real economy. (IMF, 2009)

In general terms, systemic risk refers to the risk that financial instability becomes so pervasive that it affects the financial system to the point where economic growth and welfare suffer an insurmountable impact (ECB, 2009).

The concept of systemic risk has recently received a significant amount of attention, both theoretical and empirical, deriving from both the academic and regulatory areas. This concern has been motivated by the characteristics of the concept and the realities observed during the most recent financial crises. A common idea present in the literature revolves around the fact that the source of systemic risk stems from the complexity of the relationships between contemporary financial institutions, acting as a propagation channel for a given shock (*Wang, 2018*).

These realities motivate the present study which aims to investigate the dynamics of systemic risk patterns existing at the level of companies included in the BET and BET-NG indices. To achieve this objective, a suite of models capable of capturing different attributes specific to systemic risk, widely used in financial institutions with financial stability concerns, is used.

In order to obtain a data matrix with relevant dimensions for the current investigation, the input data went through a preparation procedure. In this regard, due to the unavailability of closing prices for a suitable interval and given the timing of the listing of some companies we remove Sphera Franchise Group from the sample. In other words, the input data for this study incorporates 19 of the 20 companies that are part of the BET index composition. This analysis

uses a daily data set describing the dynamics of the BET index and its components over the period 02.01. 2018 - 21.11.2022. The source of the data is the Refinitiv platform.

Given the recent realities observed in the economic and geopolitical context, we also propose to study systemic risk for companies in the energy sector. Thus, we resume the modelling sequence for companies included in the BET-NG index. For a better observation of the risk dynamics, the working sample covers the period 03.01.2000 - 21.11.2022 and includes all the companies in the index composition.

Methodologically, the analysis is based on the CoVaR, Delta CoVaR, Marginal Expected Shortfall (MES) and CAViaR models. The results obtained were further tested for robustness by observing the dynamics of beta, Var and Expected Shortfall (ES) and by determining average values for each model.

The CoVaR and Delta CoVaR measures come from investigations by Adrian and Brunnermeier (2016)24 and are based on the value-at-risk for an institution X^i and a specified quantile q. The formal specifications for the two measures are:

$$Pr\left(X^j | C(X^i) \leq CoVaR_q^{j|C(X^i)}\right) = q\%$$

And

$$\Delta CoVaR_q^{j|i} = CoVaR_q^{j|X^i=Var_q^i} - CoVaR_q^{j|X^i=Var_{50}^i}$$

Adrian and Brunnermeier (2016) denote by $CoVaR_q^{j|C(X^i)}$ the Var value for an institution j (or for the financial system) conditional on a certain event $C(X^i)$ specific to institution i.

Engle and Manganelli (2004) introduce the Conditional Autoregressive Value at Risk (CaViaR) model, which is essentially a development of the VaR model incorporating a quantile regression procedure. The general formu of the CaViaR model is:

$$R_t = f_t(\beta) + \varepsilon_t$$

$$f_t(\beta) = \beta_0 + \sum_{i=1}^{q} \beta_i f_{t-i}(\beta) + \sum_{j=1}^{\gamma} \beta_j l(x_{t-j})$$

Acharya et al. (2017) argue that it is possible to isolate the systemic risk contribution of a particular institution using marginal expected shortfall (MES). The mathematical form of the model is:

$$MES_{5\%}^B = \frac{1}{number\ of\ days} \sum_{\{t:system\ is\ in\ its\ 5\%\ tail\}} R_t^b$$

The following sections report the results for each of the BET and BET NG indices. Although at first glance there is an overlap resulting from the fact that some companies are present at the

[24] For a comprehensive discussion of the construction of the measures see Adrian T.; Brunnermeier M.K. CoVaR. American Economic Review 2016, 106(7), 1705-1741.

level of both indices, the results are presented for each case taking into account the methodological construction of the risk measures which implies index reporting.

Specific literature pays a significant amount of attention to energy markets given that energy price dynamics impact the efficiency and performance of most economic sectors through different channels and at different levels (Si et al., 2021).

Given its macroeconomic importance, climate change and associated environmental issues, the energy sector attracts a solid block of research and development attention aimed at optimising its structures. This interest translates into substantial capital movements, making companies in the energy or related sectors an attractive target for portfolio formation. Accordingly, specific literature bears signs of the sector's inclusion in a wide range of financial applications in various fields, such as energy consumption and financial development (*Ozturk, Acaravci, 2013*), information contagion (*Geng et al., 2021*), volatility contagion from energy to financial markets (*Creti et al., 2013*), systemic risk (*Nevrla, 2020*), oil shocks and their effects (*Qin, 2020*), risk contagion from oil to stock index returns (*Tiwari et al., 2020*) or speculative bubbles in the energy sector (*Caraiani, Călin, 2019*), with only those areas directly related to our current research question being mentioned here. In addition, there is a well-founded literature linking energy or commodity markets with various facets of the financial spectrum; e.g. Olson et al. (2014), Ewing, Malik (2016), Zheng, Su (2017), You et al. (2017), Bouri et al. (2018), Gatzert et al. (2021).

The authors of Qin, (2020), Tiwari et al., (2020) analyse systemic risk by linking it to oil dynamics or shocks. The first study uses a structural VAR (vector autoregressive) approach for a set of 20 countries and concludes that structural oil shocks affect both individual markets and their linkages to other markets. The authors Tiwari et al. (2020) also report interesting results, among which we note that stock market returns appear to be more sensitive to oil price dynamics in volatile periods than in tranquil periods.

BET Index: systemic risk analysis on companies included in the index

Charts 40, 41, 42, and 43 contain the values obtained for the four systemic risk models used, namely CaViaR, CoVaR, Delta CoVaR and MES. These were applied at company level. Figure 36 shows the mean values obtained for each modelling specification calculated on the sample of companies.

The graphs in Chart 40 show the results of the CaViaR model in terms of systemic risk dynamics. Companies are identified by an abbreviated version of the existing name in the Refinitiv platform. As noted in the previous report, we note a particular dynamic for three companies (AQUILA PART PROD COM, ONE UNITED PROPERTIES and TTS (TRANSPORT TRADE SERVICES)). This is present across the whole result set and comes from the size of the time series available for these companies. We initially note a high degree of heterogeneity in terms of the CaViaR model results for the sample companies. The fact that the firms included in the BET

belong to a variety of economic sectors, with specific developments, explains this trend and thus the heterogeneity of results at company level.

In terms of risk contribution, the superior performance of companies in the banking sector is visible. This has been documented in the literature for a variety of markets or geographical areas. In a recent study, Usman (2022) uses two measures also present in this study (VaR and CoVaR) to observe the contribution of banks to the systemic risk present in the financial system at the US level. The author provides a substantial discussion of how banks with a higher contribution to systemic risk return lower future returns on average.

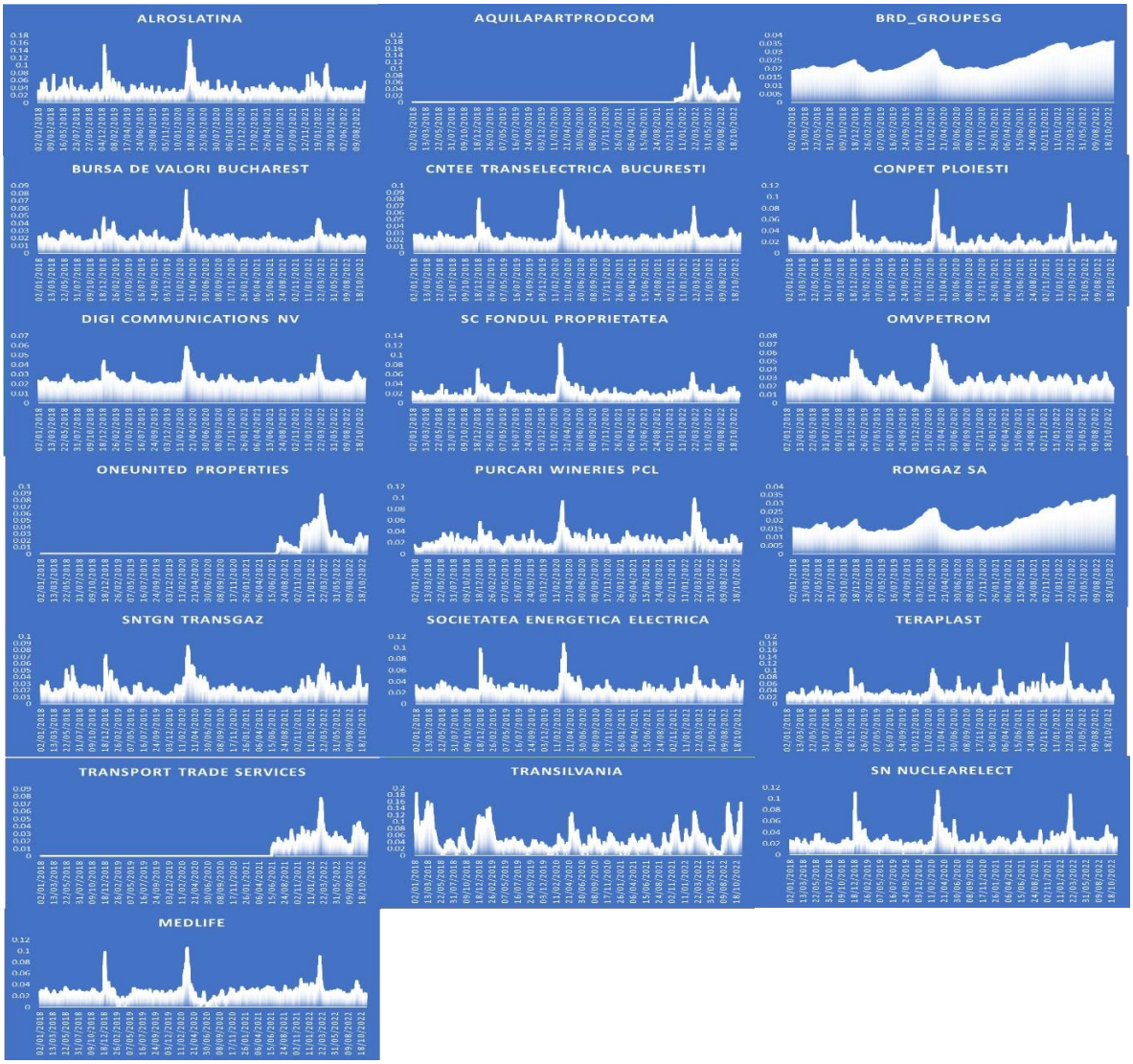
The CaViaR model results show simultaneity for the highest risk contributions returned by the sample companies in certain periods such as December 2018, February - April 2020, February 2022, September 2022, and to a lesser extent October 2022. **For the year 2022, the most relevant moments of dependent movements on high risk values are visible for the months of February and September.**

The graphs in Chart 41 show the dynamics of systemic risk captured by the CoVaR measure. Symmetrically with the previous situation, we note episodes where the CoVaR results show upward spikes for several of the assets included in the analysis. The most relevant moments of simultaneous growth are visible around the periods May 2018, December 2018 - February 2019, May 2019, February - June 2020, November 2021 and February 2022, for this moment values in the top 10% are recorded for 16 of the 17 financial assets included in the sample.

In addition, we note representative risk accumulations for the period September-October 2022. As we specified in the previous report, the contribution of the energy sector for this period is still noteworthy, especially in September 2022. These trends are maintained until the end of November 2022 for 3 companies in the energy sector present in the working sample, which motivates a future analysis focused on this economic sector in particular.

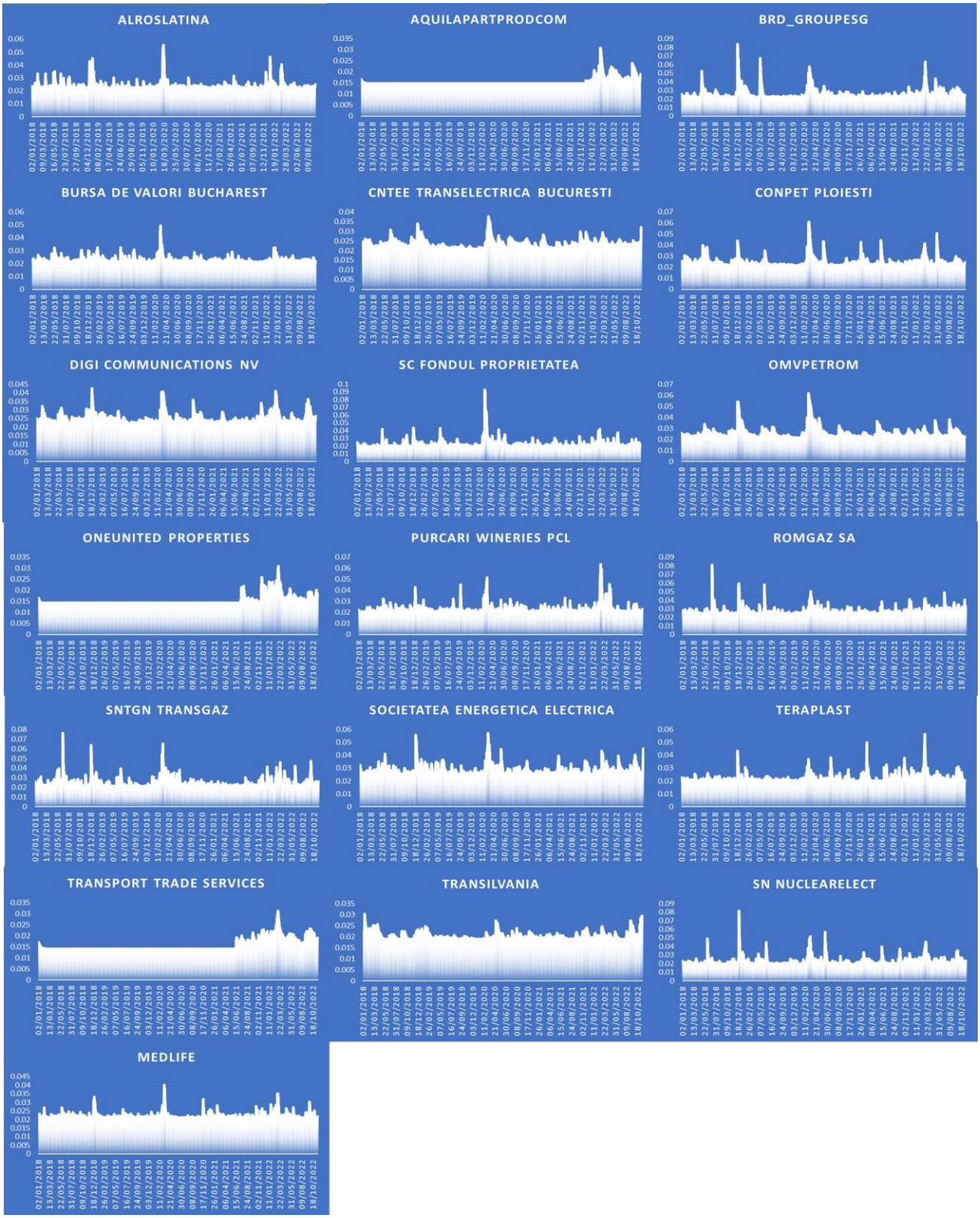
The lowest contributions in terms of risk are observed for companies listed in the real estate or transport sectors. These limited contributions are visible approximately throughout the analysis interval.

Chart 40 Results for the CaViaR (BET) specification



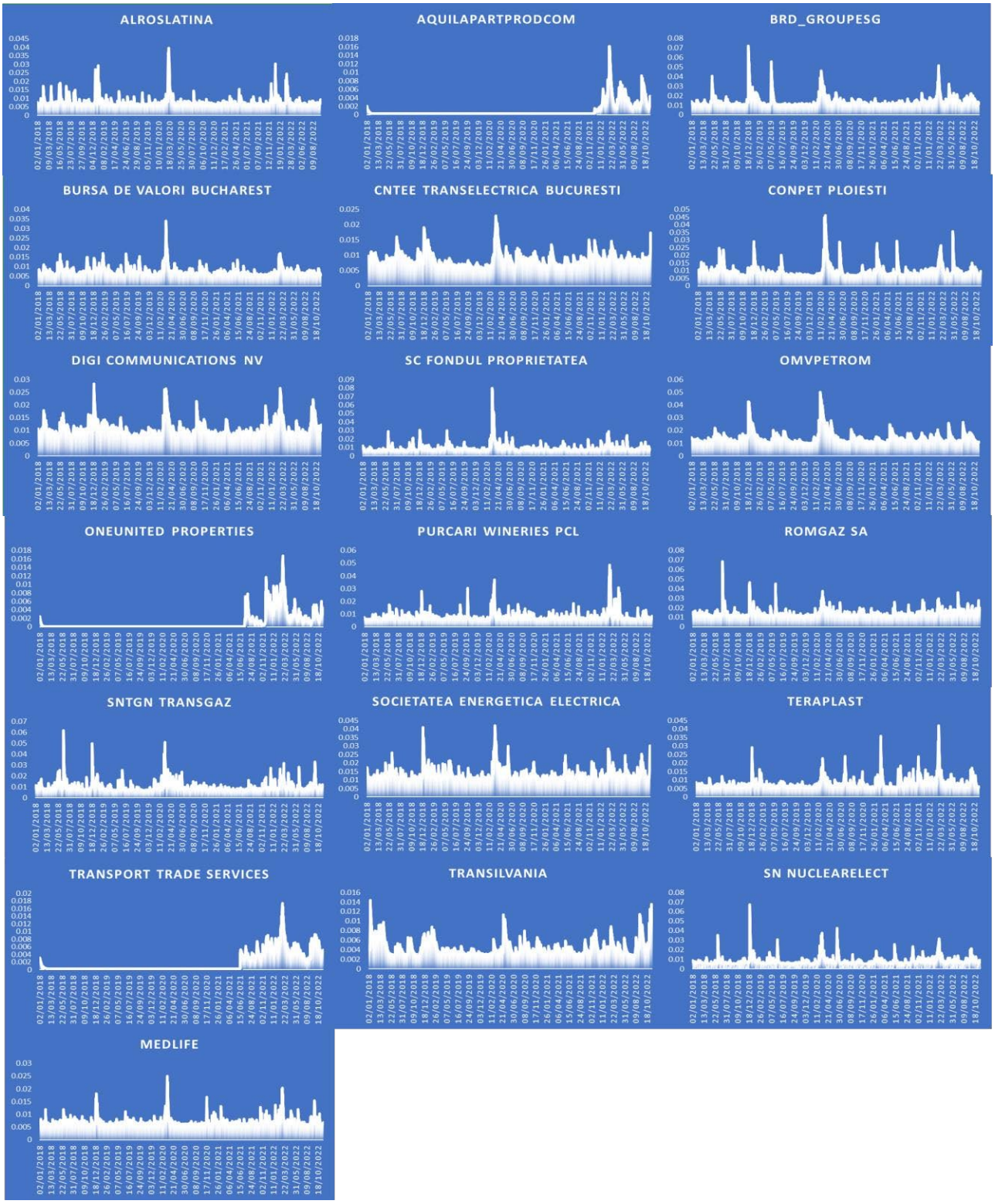
Source: ASF processing

Chart 41 Results for the CoVaR (BET) specification



Source: ASF processing

Chart 42 Results for the Delta CoVaR (BET) specification



Source: ASF processing

Charts 42 and 43 show the results obtained using the Delta CoVaR and Marginal Expected Shortfall (MES) models.

The Delta CoVaR specification leads to the results from which the graphs in Chart 42 were constructed. In general, we observe similar patterns to the specific results given by the CoVaR model, despite an apparent higher amplitude for the evolution of the companies in the sample. And this specification returns values for which we note common dynamics in particular in the following periods: May 2018, December 2018, February - May 2020 and February 2022.

The first quarter of 2022 is marked by substantial risk accumulations especially for the months of February and March. These are observable for all the assets included in the analysis, and for 95% of them rank among the highest values obtained using the Delta CoVaR specification. The trajectories observed for the period September-November 2022 are also similar to those determined by the previous specifications.

Because of the way it is constructed, the Marginal Expected Shortfall (MES) measure isolates capital losses for a company when the market falls below a certain threshold. This construction makes the measure valuable to institutions with financial regulatory concerns. Moreover, although the model has a different specification compared to previous models, we note similar dynamics, which confirms the robustness of the results obtained with the first specifications in this analysis.

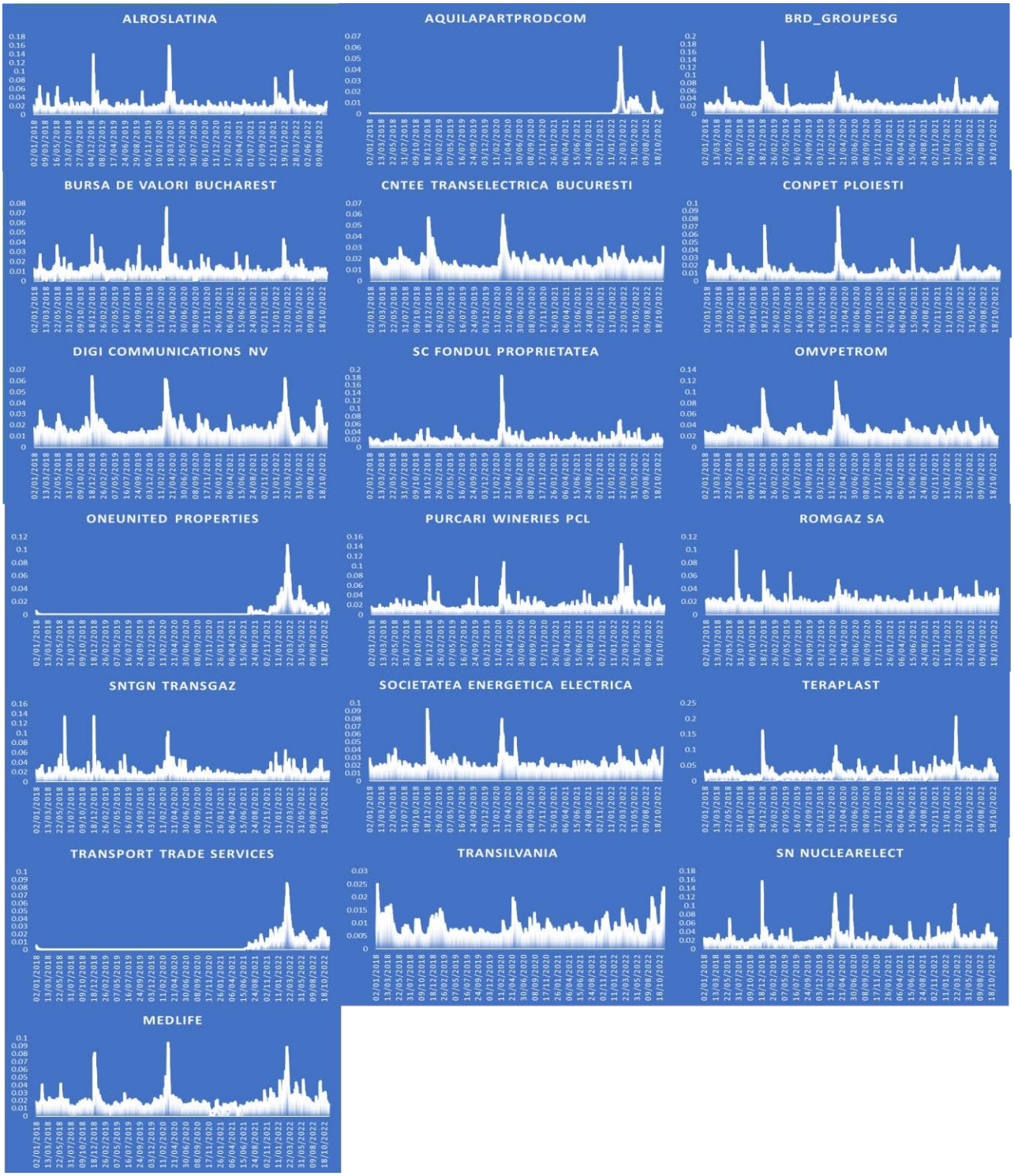
We further observe (Chart 43) that the highest values for the MES measure are observed around certain dates, and that the sampled financial assets exhibit common dynamics. The results summarized in Figure 4 show common patterns for the highest values returned by the model in the following periods: May - July 2018, December 2018 - March 2019, February - April 2020, February - March 2022, and September 2022. It is worth noting that at the aggregate level, the **first two quarters of 2022 have high values (in the top 20%) for 94% of the companies analyzed**.

The results obtained for October-November 2022 are lower than those obtained for September 2022 and follow the sectoral distribution presented above.

We do not observe simultaneity for the lowest values of the risk measures for the companies in the sample. Moreover, as observed in the analysis based on the CoVaR measure these are observed for a narrow selection of companies and seem specific to them.

In addition, it is worth noting that during periods of synchronicity of high values of the risk measure, even these companies show superior dynamics compared to their data set-level trajectory.

Chart 43 Results for the MES specification (BET)



Source: ASF processing

Thus, the results obtained with the MES model confirm the validity of previous observations in this direction as well.

Chart 40 summarises the average values obtained for each risk measure and is intended to conclude the results obtained above. It presents both the main systemic risk measures used as baseline specifications and the risk measures used as robustness tests of the results.

On average, for the CaViaR measure we obtain the highest values in the periods: December 2018, March - April 2020, December - March 2022 and the end of September 2022.

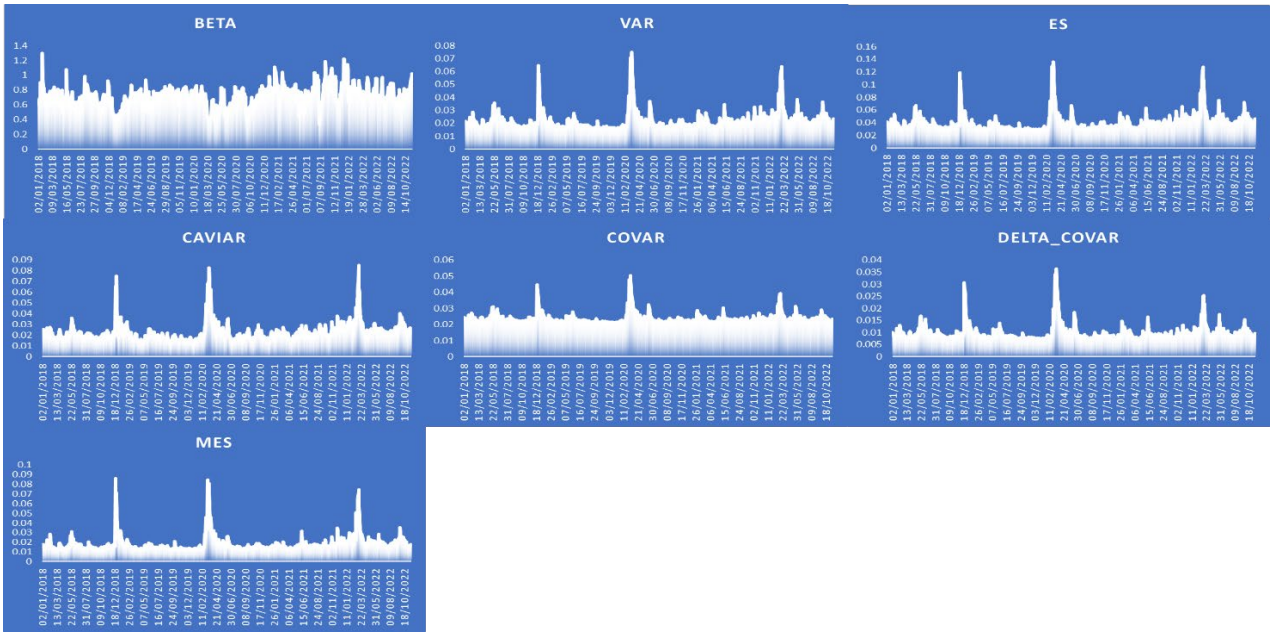
For the CoVaR measure, the reference points are May 2018, December 2018, March - April 2020, February 2022 and September 2022. For the Delta CoVaR specification, the highest results are present in May 2018, December-January 2018, March-April 2020, February-March 2022, and September 2022.

Finally, for the MES model, we observe the same dynamics. Thus, we can conclude two main aspects. First, independent of the systemic risk measure used, we observe moments of increasing systemic risk specific to the companies in the BET index.

Second, we note that these moments of increase tend to manifest simultaneous patterns for companies, independent of sector, with these patterns captured using multiple modeling specifications.

Focusing on the year 2022, it is noticeable that systemic risk dynamics show consistent patterns of expansion.

Chart 44 Average values for risk measures (BET)



Source: ASF processing

The BET-NG Index: systemic risk analysis of companies included in the index

Energy prices have a significant impact on industrial costs and thus on competitiveness. Given the liberalised nature of the market, monitoring market prices is an increasingly important task for analysts, policy makers and business entities.

As the global economy recovers from the pandemic, prices of several commodities, including oil and gas, have soared over the past year. Given that demand for energy is inelastic in the short term, massive price increases involve decreases in household purchasing power that must be absorbed through:

- Reduced consumption of goods and services from outside the energy sphere;
- Contraction of the saving process;
- Income growth.[25]

Battistini et al. (2022) discuss a number of issues related to the impact of energy price dynamics on economic developments. First, the authors note that energy prices affect private consumption through direct and indirect channels.

An increase in energy prices directly affects the purchasing power of households through higher prices for energy products (electricity, gas, petrol, fuel oil, etc.) In the Eurozone, about 30% of total energy consumption takes the form of final consumption - i.e. the use of such products by consumers (Battistini et al., 2022).

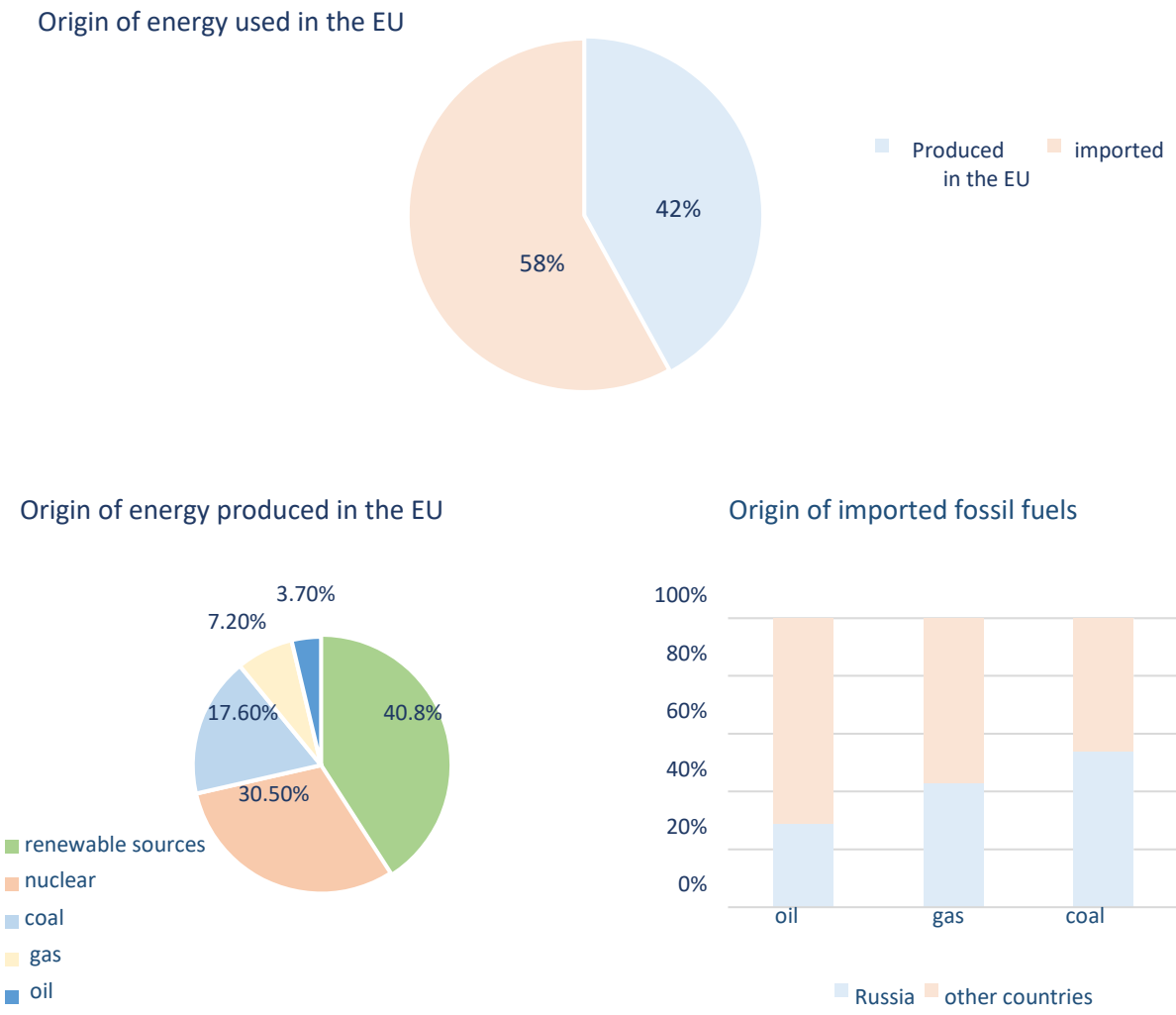
The remainder involves the use of energy in the production of non-energy goods and services (intermediate consumption). An increase in energy prices involves an increase in production costs for the non-energy sectors and - to the extent that producers of non-energy goods and services adjust their final prices - a further direct reduction in household purchasing power. If these costs cannot be passed on to the final prices of the relevant goods, there will be an indirect impact on household purchasing power, as producers in the relevant sectors will either reduce wages or have lower profits to distribute. In addition, in advanced economies that are large energy producers (e.g. Canada, Norway, the United Kingdom and the United States), the indirect effects through the wages and profits of energy producers are also important.

Russia's invasion of Ukraine has unbalanced the global economy as Russia has cut gas supplies, creating a severe energy crisis in Europe that has led to rising living costs and hampered economic activity. Russia is the EU's main supplier of fossil fuels, with[26] oil - 29%, coal - 54%, gas - 43%.

[25] Battistini, Di Nino, Dossche, Kolndrekaj (2022) Energy prices and private consumption: what are the channels? ECB Economic Bulletin, Issue 3/2022

[26] according to the data published by the European Commission available for 2020

Chart 45 Sources of energy and fossil fuels in the EU

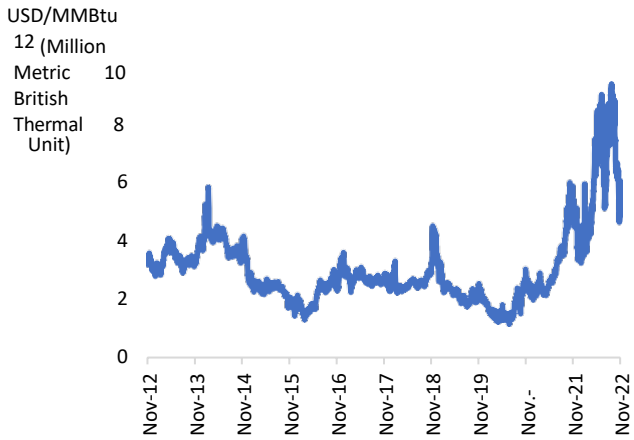


Source: European Commission, ASF processing (2020 data)

In March 2022 it was agreed at EU level to phase out the EU's dependence on Russian fossil fuels. At the same time, in October 2022, the European Commission proposed new measures to combat high gas prices in the EU and to ensure security of supply for the winter of 2022, joint gas purchases, price cap mechanisms on the TTF[27], new measures on transparent use of infrastructure, solidarity between Member States and continued efforts to reduce gas demand. Since 2021, the price of natural gas has more than tripled.

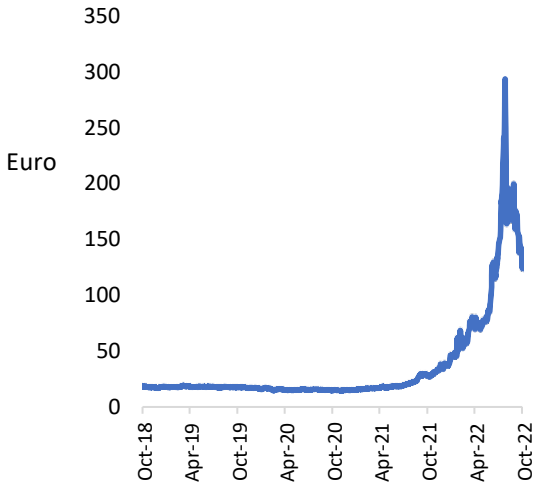
[27] Regulated Dutch gas trading platform "Title Transfer Facility" through futures and options contracts offering gas balancing markets and gas storage services as the main energy exchange in continental Europe. Liquidities on the platform have grown rapidly in recent years, helped by imports of liquefied natural gas, making it the most important price reference platform in Europe and of growing global importance.

Chart 46 Natural Gas Price (NG:NMX) NYSE



Source: Nasdaq.com, ASF processing

Chart 47 TTF gas futures price per contract/megawatt - December 2023 maturity on ENDEX European Energy Derivatives Exchange

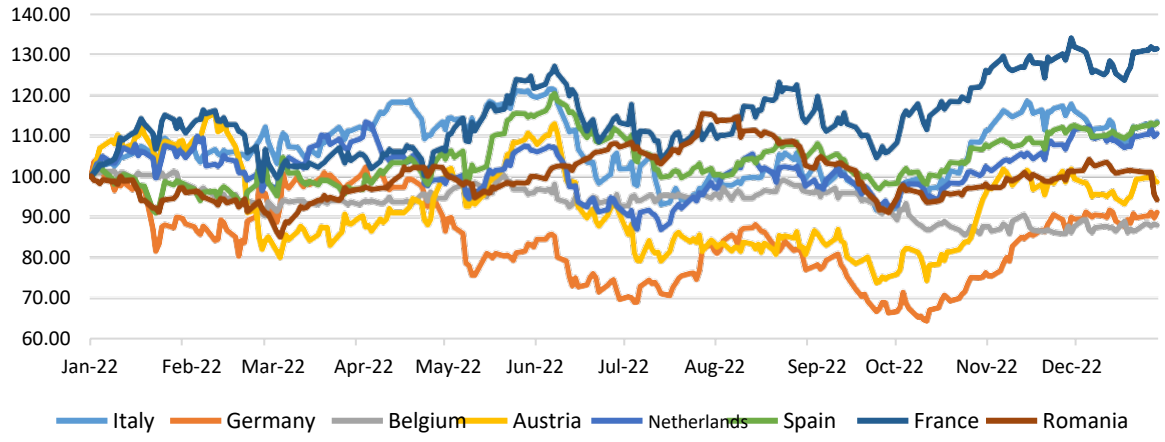


Source: Refinitiv, ASF processing

In 2020 there were massive jumps in natural gas and electricity prices. In response, the Commission has adopted a series of measures to manage the impact of rising energy prices on households and businesses, also aiming to boost resilience to shocks.

Energy sector index prices showed mixed developments in 2022. Compared to the beginning of the year, energy sector indices increased in France (29%), Spain (11%) and Italy (9%). Index decreases occurred in Belgium (-13%), Germany (-12%), Romania (-5%) and Austria (-4%).

Chart 48 Energy sector evolution by country (Jan 2022 =100)



Source: Refinitiv, ASF calculations

At the beginning of the second quarter of 2022, after reaching historic highs in March, spot gas prices declined and remained relatively stable in April and May. In June, amidst Gazprom's operations to terminate gas supply to a number of European countries and manage Nord Stream 1 flows, gas prices started to rise again. By the end of the summer season, prices reached new historical highs (EUR 315 /MWh).

Russian gas imports have fallen considerably via all transit routes; flows via the Belarus transit route are down 90% on the previous year; in May flows reached virtually zero. Flows through Nord Stream fell by 12% to zero by the end of the summer. In the period January-August 2022, EU Russian gas imports through pipelines fell by 43 billion cubic metres and total Russian gas imports, including liquefied natural gas (LNG), fell by 39 billion cubic metres. At the same time, imports of LNG from outside Russia increased by 28 bcm and imports via pipelines other than from Russia increased by 17 bcm.

EU gas consumption fell sharply by 16% (-13.9 bcm) compared to the previous year to 71 bcm. Gas demand in electricity generation also fell by 7% (-8.1 TWh). EU LNG imports increased by 49% year-on-year to 36 bcm, while total EU gas imports decreased by 3%. The EU spent around EUR 75 billion on gas imports in Q2 2022.

Gas storage was faster compared to the same period in 2021, as the average storage fill rate in the EU at 30 June 2022 was 58%, up by 32 percentage points in Q2 2022. By the end of August, the fill rate in the EU reached 80% on average. Retail gas prices for industrial customers saw a significant increase to around 126% in Q2 2022 compared to Q2 2021 for average annual consumption consumers.

The energy sector is generally of high macroeconomic relevance. This surge of interest[28] has propelled energy products and energy assets into the centre of a substantial research block, which is studying their implications for financial markets.

Charts 49, 50, 51, 52 and 53 contain the values obtained for the four systemic risk models used: CaViaR, CoVaR, Delta CoVaR and MES. These were applied at company level. Figure 53 shows the average values obtained for each modelling specification calculated on the sample of companies.

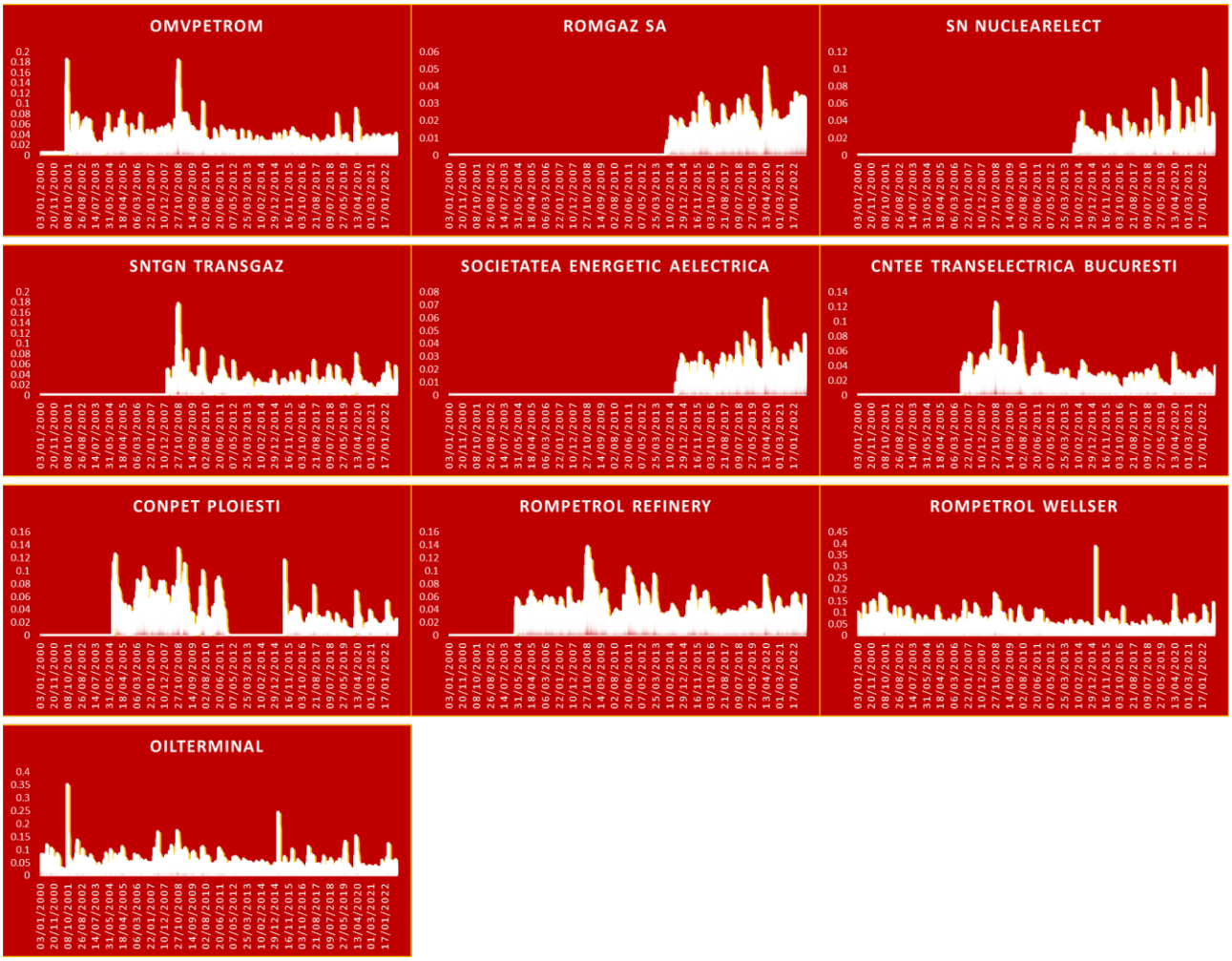
Figure 49 shows the results obtained for the CaViaR model, applied this time to the companies in the BET-NG index. We note a high degree of heterogeneity in the results obtained and

[28] Many authors address asset risk on energy for portfolio formation (Kösedağlı et al., 2021; González- Pedraz et al., 2014; Umar, 2017). For example, Ahmad, Rais (2018) examine the implications of clean energy equities on risk hedging and portfolio diversification. The risk hedging capacity of energy stocks is also studied by Hanif et al. (2020) in a multivariate factor copula modeling framework.

the fact that a number of companies tend to be the main sources of systemic risk in the sample. We also note patterns of simultaneity in terms of exacerbated risk values that differ from those recorded in the analysis for the BET index. The simultaneity patterns are explained by: the longer data sample and the smaller number of companies in the same economic sector. Thus we see risk expansion for at least 50% of the companies in the sample at the following points in time: February 2005, January 2008, September - December 2008 (70%), March - May 2009 (70%), May 2010, August 2011, March - April 2020 (100%), March 2022 and September 2022.

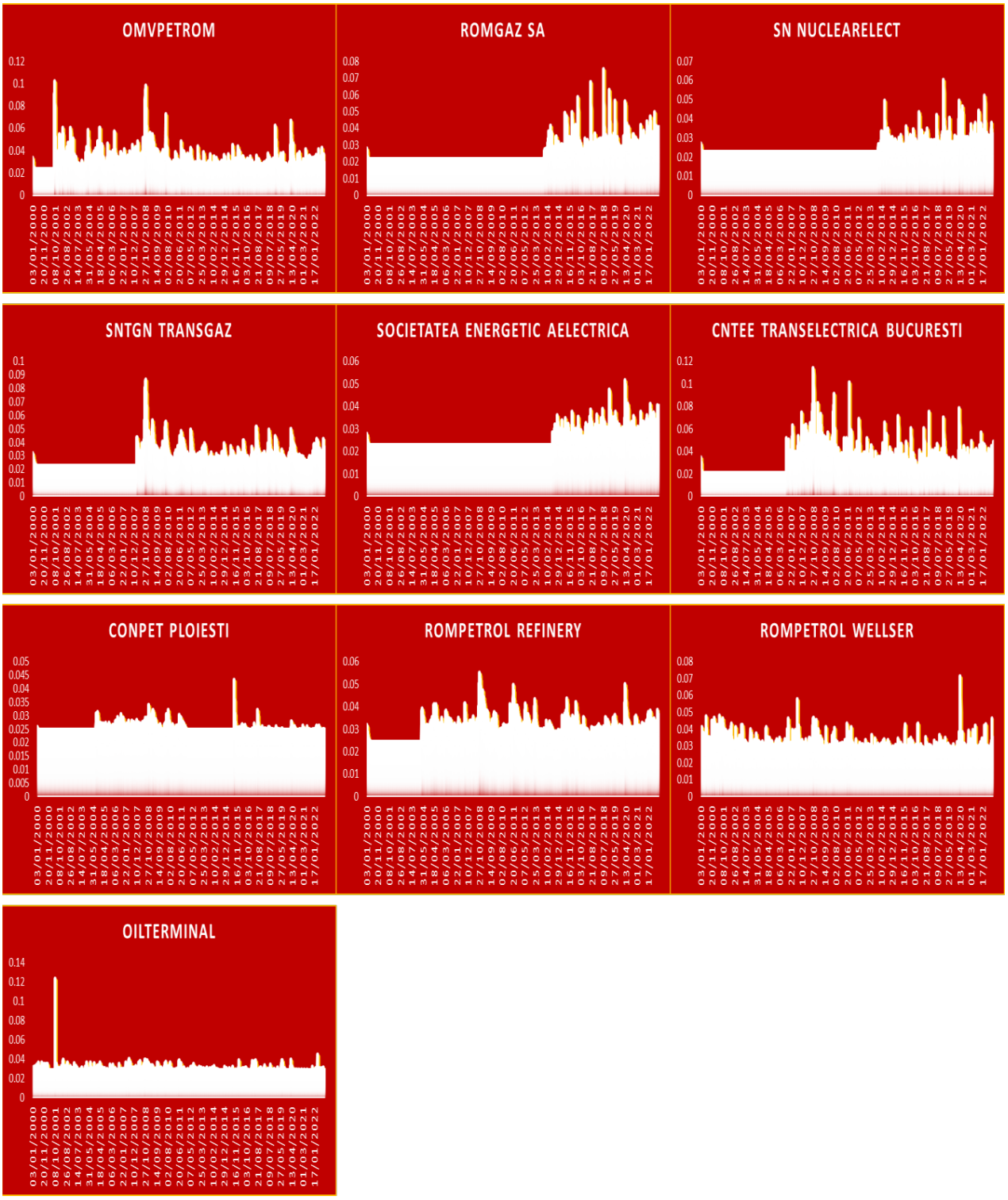
In order to return comparable results with the previous analysis, the next step of the investigation consisted in isolating a restricted working sample, targeting the same interval used for the BET index (02.01. 2018 - 21.11.2022). Under these conditions the most relevant moments become: December 2018, March - April 2020, March 2022 and September - October 2022. These are very similar to those observed in the analysis for the BET index through the CaViaR specification, which gives us an idea of market conditions and the **contribution of the energy sector to the aggregate level of systemic risk.**

Chart 49 Results for CaViaR specification (BET NG)



Source: ASF processing

Chart 50 Results for CoVaR specification (BET NG)



Source: ASF processing

An interesting result is that we observe patterns of simultaneity even for low risk values for a selection of companies at both the main and the small sample level. The most relevant times in this respect are September-December 2019 and April 2021. This result can be motivated by the specificity of the energy sector, whose peculiarities have been extensively explored in the literature[29].

Charts 50 and 51 describe the results for the CoVaR and Delta CoVaR models applied to companies in the BET NG index. In the analysis performed on the BET index, similar dynamics were detected for these two models despite differences in construction. For the CoVaR modelling specification we initially stop at the extended sample level (starting in 2000) and note moments of simultaneity in risk exacerbated values around the periods: September 2008 - January 2009, August - September 2011, January 2016, May 2018, December 2018 - January 2019, March 2020 (90%), March - April 2022 and September - October 2022 (80%).

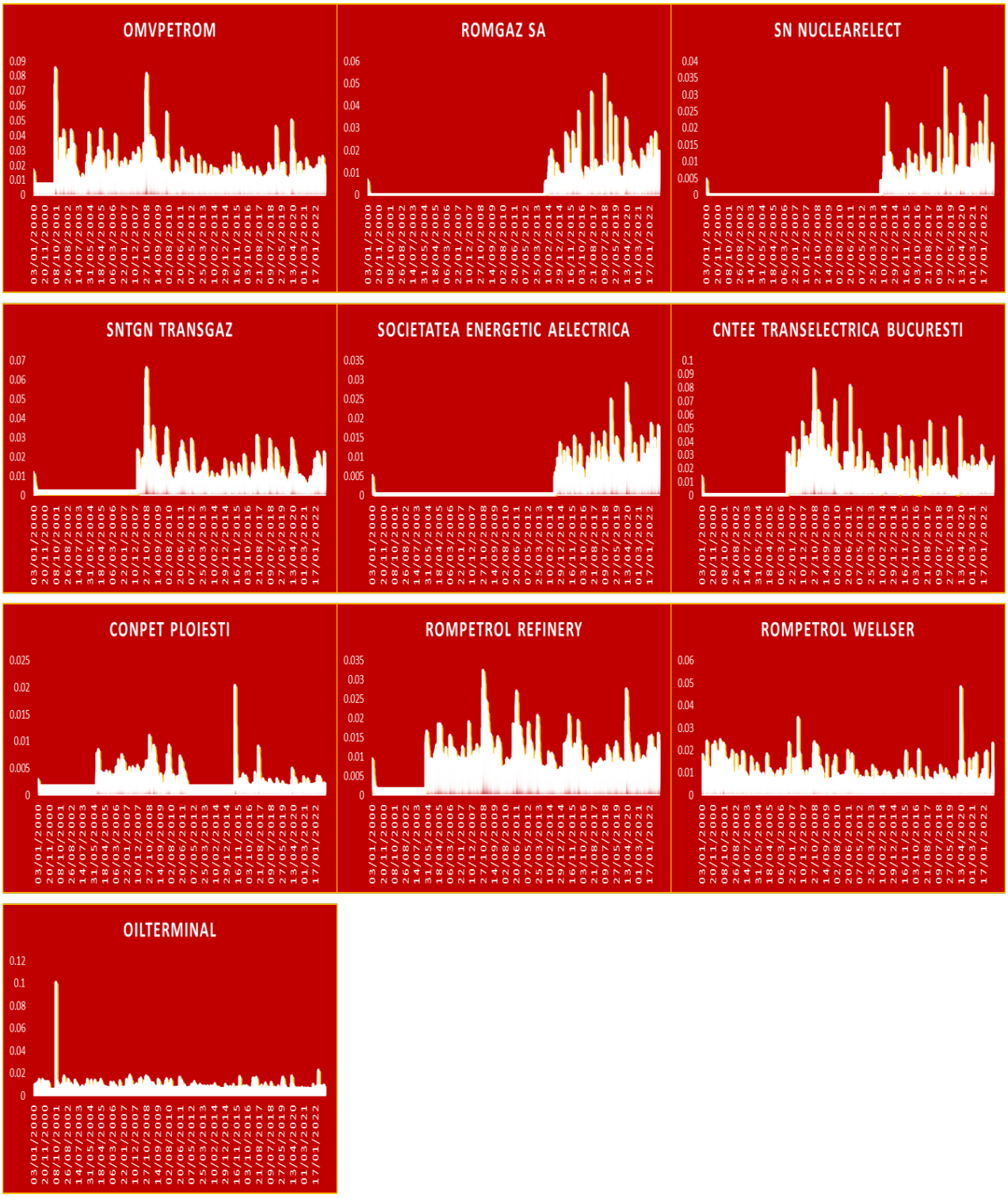
The following major episodes of contribution to systemic risk have been detected: May 2018, December 2018, March 2020, March 2022, and September 2022. Results can be interpreted in terms of contagion events.

Figure 50 shows the results obtained with the Delta CoVaR model. These show simultaneous accumulations of for systemic risk for the periods May 2018, December 2018 - January 2019, March 2020 (90%), March 2022 and September - October 2022. At the same time it is observed that in terms of magnitude the month of March 2020 is characterized by the most relevant values for systemic risk.

An interesting result in terms of market dynamics is that the lowest risk values are observed almost exclusively for two of the companies, one of which returns the lowest level of systemic risk.

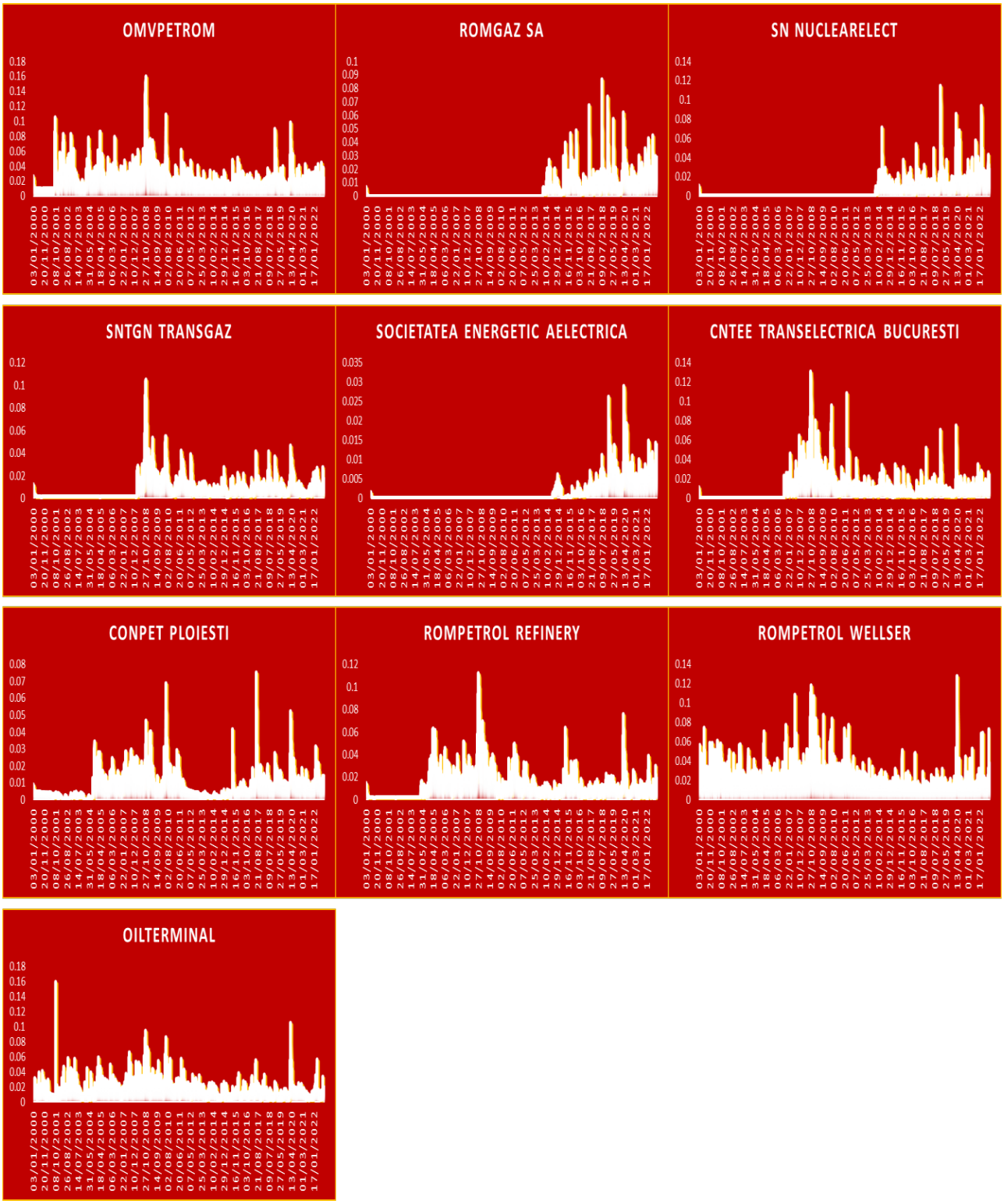
[29] See for example Caraini and Calin (2019).

Chart 51 Results for the Delta CoVaR specification (BET NG)



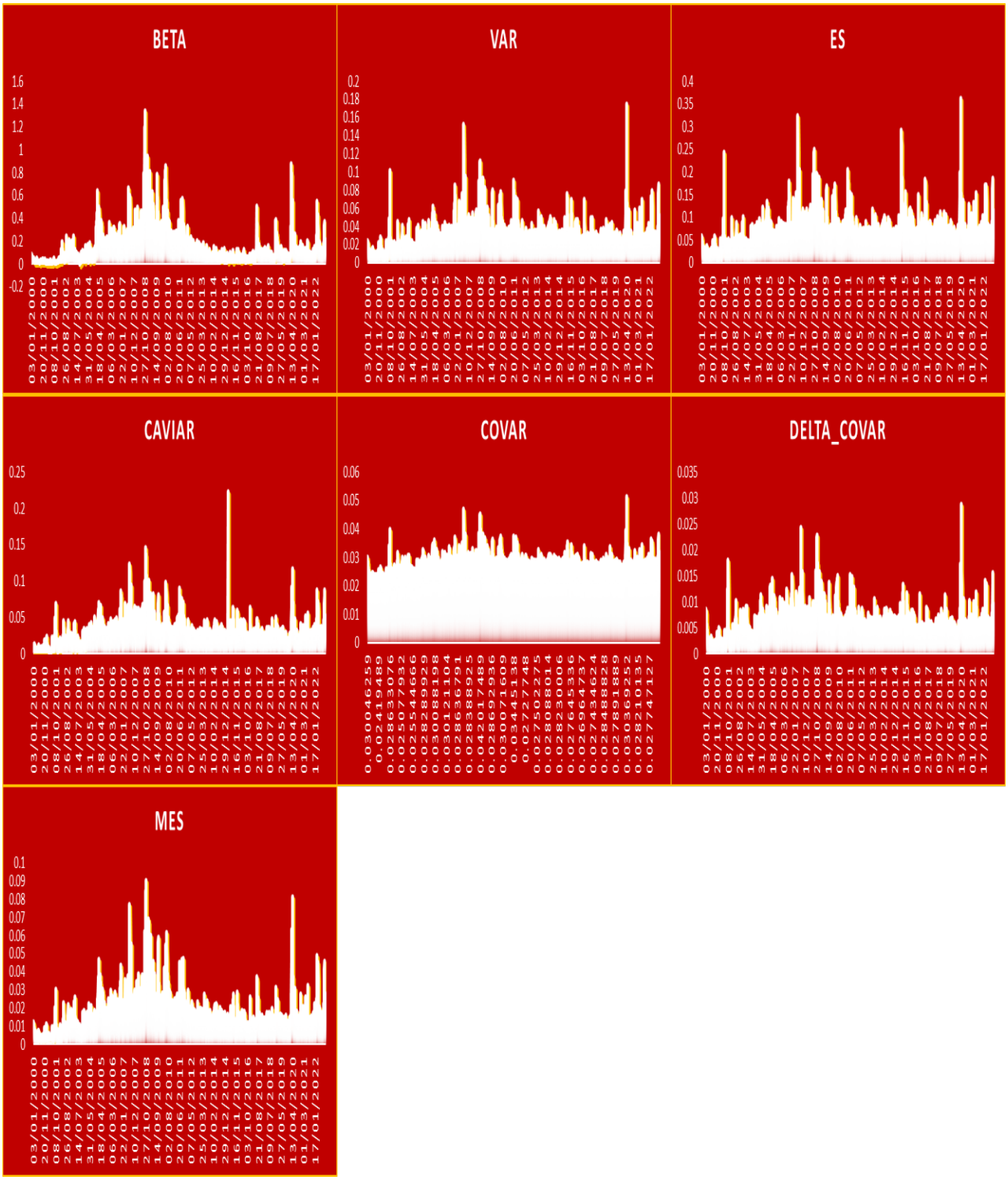
Source: ASF processing

Chart 52 Results for the MES specification (BET NG)



Source: ASF processing

Chart 53 Average values for risk measures (BET NG)



Source: ASF processing

In this respect, the most relevant moments isolated using the MES specification are December 2018, March 2020 (100%), March 2022 and September 2022. We can thus conclude that the level of systemic risk for the current interval is at a significant position, which was only exceeded by the reality present in the markets at the end of the first quarter of 2020. The fact that we obtain similar results to the previous measures despite using a model with an antinomic construction provides a presumption of validity and robustness for the analysis performed.

The results summarized in Figure 53 are intended to conclude the present investigation, but also to introduce additional robustness measures used to validate the reported results. Unlike the previous areas that provided a company-level discussion, the results in Figure 10 represent an average performed for each risk measure at the sample level (for both samples used at the BET NG index level.

For the CaViaR measure the highest values are obtained in the periods March - April 2020, June 2021, February - March 2022, and September - October 2022. For the other risk measures the highest values belong to the intervals: December 2018 - January 2019, March - April 2020, June 2021, February - March 2022 and September - October 2022.

Statistical tests to detect speculative bubbles

A financial bubble is a situation where the price of an asset, such as a stock or real estate asset, artificially rises due to excessive speculation and buying. Eventually, the bubble bursts, and the asset's price falls rapidly, often leading to significant financial losses for those who bought at high prices (Zheng (2022)). Bubbles can occur in any market, but are most commonly associated with stock and real estate markets. They can be caused by a variety of factors, including low interest rates, lax credit conditions and irrational exuberance.

There is no universally accepted definition of a "rational bubble", but some economists argue that some bubbles may be the result of a rational response to fundamental changes in an asset or the market. For example, if a new technology or innovation leads to a significant increase in the potential profitability of a particular asset, this could justify a temporary increase in the price of the asset until the new information is fully reflected in the market.

In this sense, a **rational bubble** would be a temporary deviation from the fundamental value of an asset until market participants gradually come to understand the new information and adjust their valuations accordingly. This deviation is usually short-lived and eventually the market will correct itself, realigning to fundamental values.

However, it is important to note that the term "rational bubble" is an issue under debate among economists and many argue that bubbles are always the result of irrational behavior and market inefficiencies (Lawal et al (2022).

Symmetrically, an **irrational bubble**, refers to a situation where the price of an asset artificially increases due to speculation and excessive trading despite little or no change in the underlying fundamentals of the asset. In this case, the bubble is driven by

irrational exuberance and a "herd mentality" among investors, rather than any rational response to changes in underlying asset or market fundamentals. When investors are optimistic about the future performance of an asset, they may be willing to pay higher and higher prices for it, regardless of its intrinsic value. This creates a self-sustaining cycle of trading and higher prices, which can lead to a speculative bubble. In Chapter 7 we describe how an irrational bubble forms with an example on cryptoassets.

When the bubble bursts, the asset price falls and many investors lose a significant amount of money. A bubble burst can be triggered by a variety of factors, such as a rise in interest rates, a recession or simply a loss of investor confidence.

It is important to note that irrational bubbles are often difficult to identify in real time because market participants tend to be convinced that the current price reflects the true value of the asset.

In sum, speculative bubbles represent a substantial deviation of market value from fundamental value (Gil-Alana (2019)). In this context, economic intuition led to the presumption that they could be identified by investigating the difference between a trading price and fundamental value for a given asset.

In a series of papers with great influence on academic research, Phillips, Wu, and Yu (2011) and Phillips, Wu, and Yu (2015) have developed substantial theoretical support for testing the existence of speculative bubbles. Following these contributions, the most relevant testing procedures, - SADF (sup augmented Dickey-Fuller) and the generalized version of the test (GSADF), have been used in a battery of empirical studies in which the explosive nature of the data is interpreted as the presence of a speculative bubble. The scope of this research has covered the entire spectrum of financial markets, from investigations of equity markets (Nguyen and Waters (2022)) to studies of currency dynamics (Hu and Oxley (2017)).

The GSADF[30] test for explosiveness applied to the time series $\{y_t\}_{t=0}^{T}$ is derived from the ADF statistic for a parameter θ of the form:

$$y_t = c + \theta y_{t-1} + \sum_{i=1}^{k} \lambda_i \Delta y_{t-1} + \varepsilon_t \qquad (1)$$

where: Δ represents the first difference operator and $_{\varepsilon t} \sim (0, \sigma^2)$. The objective is to test the null hypothesis $H_1 : \theta = 1$ of unit root versus the explosive alternative $H_1 : \theta > 1$.

[30] The Generalized Supremum ADF (GSADF) test is a statistical test used to detect the presence of a unit root in a time series. This property indicates the presence of a trend that cannot be explained by the current stochastic process. The GSADF test is an extension of the traditional Augmented Dickey-Fuller (ADF) test, which is used to test for a unit root in a univariate time series. If a financial time series manifests a unit root, it means that the mean and variance series will change over time and is considered non-stationary. In other words, there is a trend that cannot be explained on the basis of the stochastic process. In the context of speculative bubbles, this could indicate that the current price of an asset is determined by certain trading patterns (speculative or perception-induced) rather than elements of fundamental asset value.

Phillips, Wu, and Yu (2015) define the SADF statistic as the sup-ADF statistic that derives from the repeated empirical regression estimation in Equation 1. Considering a subsample bounded by r_1 and r_2, the test formalization is given by:

$$SADF(r_0) \equiv sup\{ADF_{r1=}^{r2}{}_0\}$$

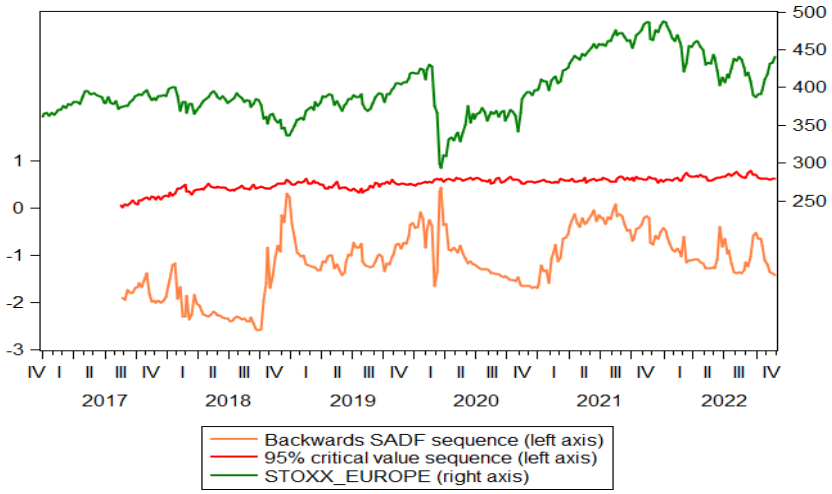
The GSADF test is based on the same logic as above, but uses more subsamples in the regression processing of Equation 1. The statistic is defined as:

$$GSADF(r_0) \equiv sup\{ADF_{r1}^{r2}\}$$

This analysis aims to identify speculative bubble patterns for the 2016 - December 2022, investigating the European Stoxx 600 index and two national indices (BET and BET NG), using daily frequency data series. Charts 50, 51 and 52 show the results obtained using the above methodology for the three indices.

At their level, the green curve represents the price of the index during the analysis period. The red curve depicts the critical values for the test. The 3rd curve in each graph represents the dynamics of the GSADF test. When it exceeds the red curve, we can conclude that the explosive nature of the price can be assimilated to a speculative bubble.

Chart 54 GSADF test dynamics for the STOXX Europe index



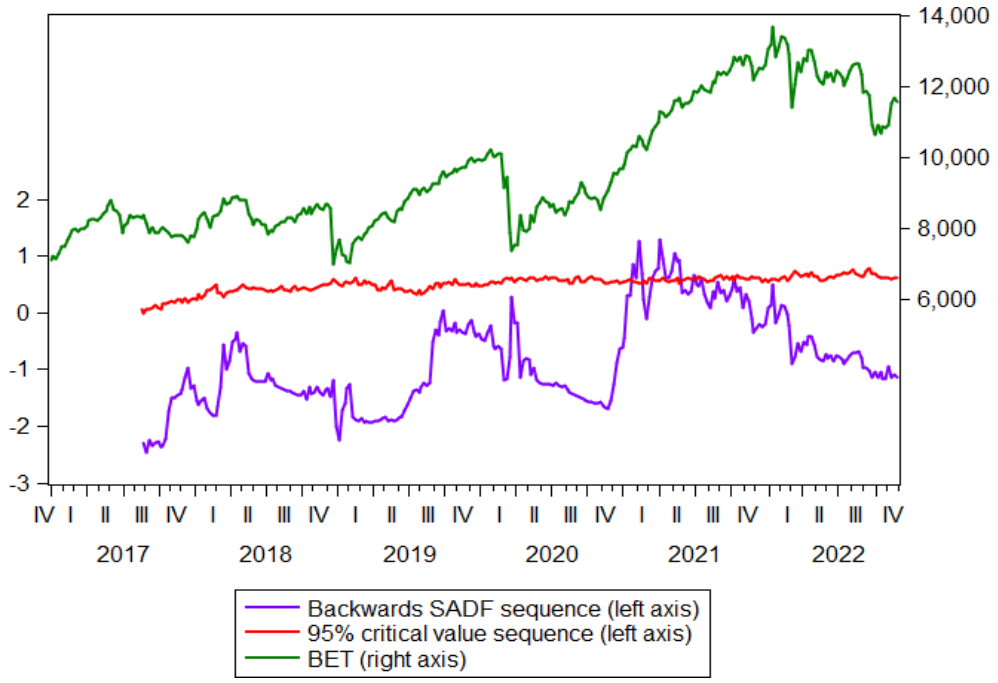
Source: ASF calculations

The Stoxx 600 Index is a benchmark for the European market and is widely used in econometric applications. This derives from representative coverage that is extended to an allocation of countries and sectors of the economy that replicates approximately 90% of the investment market. Like any other equity-based index, the Stoxx 600 index can be affected by a variety of factors and can also develop speculative bubbles.

It can be seen that for the analysed period, despite an effervescent dynamic, there were no phenomena that could be assimilated to a speculative bubble for the BET and BET-NG indices.

However, there is an exacerbated exuberance for the first two quarters of 2021 and a volatile development in the first quarter of 2022. This result is relevant given the realities observed in the market as the negative externalities specific to the pandemic period have experienced a smoothing phenomenon. The tests identified an explosive growth start that was not sustained and continued by the index dynamics.

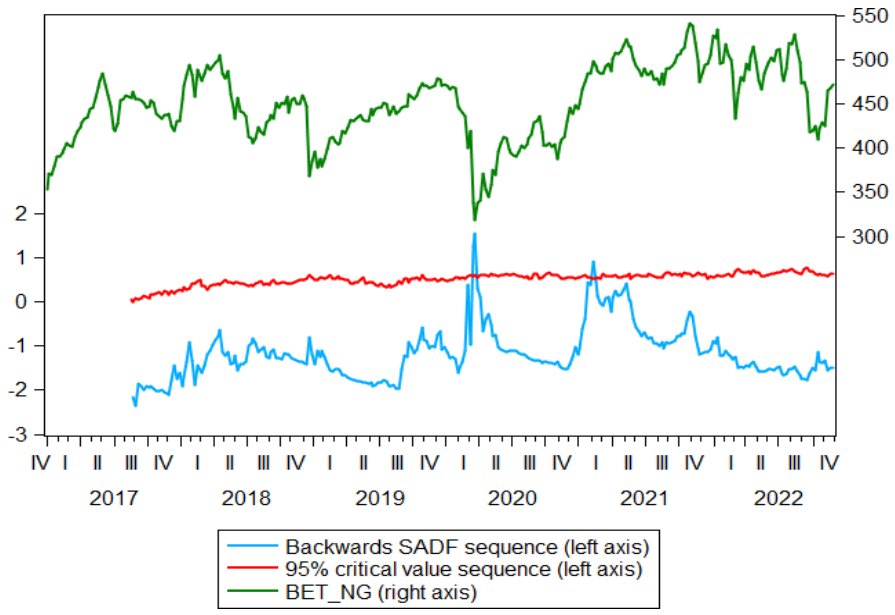
Chart 55 Dynamics of the GSADF test for the BET index



Source: ASF calculations

Energy markets and assets have been a particular focus of the financial literature on speculative bubbles (Caraiani and Calin (2019)). Figure 56 shows the dynamics of the GSADF test for the BET NG index. We note two distinct episodes that can be associated with speculative bubble phenomena in the first quarter of 2020 and the first half of 2021. Similar results have been observed in the literature. For example, Khan et al. (2022) identify price bubbles in various energy sector-specific prices for the period from January 2000 to September 2021. The authors note that elements of explosive behavior are generally specific to gas.

Chart 56 Dynamics of the GSADF test for the BET NG index



Source: ASF calculations

In 2020, Romania's energy markets were affected by a combination of factors such as the COVID-19 pandemic, changes in government policies and changes in global energy markets.

The COVID-19 pandemic has had a significant impact on energy markets in Romania, as it has caused a decrease in energy consumption due to *lockdown* measures and other measures put in place to control the spread of the virus. This led to a decrease in energy demand, which in turn led to a decrease in energy prices.

From the point of view of global energy markets, the drop in oil prices in 2020 due to the COVID-19 pandemic had a significant impact on energy markets in Romania, as the country is a net importer of oil. The drop in oil prices has led to a drop in the price of natural gas, which is used as an alternative fuel in many applications.

4.4. Risk-adjusted performance measurement methods for investment funds

Performance has two components: risk and return. While maximising returns is a valuable objective for administrators, comparing a portfolio's returns to the market alone is not sufficient. Because investors are risk averse, they will demand compensation for higher risks in the form of higher returns.

Commonly used measures of performance include **Sharpe, Sortino and Treynor Ratios.** Thus, in order to assess the overall risk-adjusted performance of the Romanian investment fund market, for each investment strategy to which the respective funds belong, the above-mentioned ratios have been calculated quarterly. The data frequency used was daily (daily NAV) and the period analysed was January 2020 - September 2022.

Based on the length of the available data series, **84 Romanian investment funds** (UCITS and AIFs) were selected, classified according to the investment strategy category[31] to which they belong, as follows:

Number of investment funds part of investment strategy		
Debt securities (Bond Fund)[32]	FO	21
Equity securities (Equity Fund)[33]	FA	16
Absolute return[34]	AR	1
Multi-active defensive[35]	MAD	3
Multi-active balancing[36]	MFA	7
Multi-active aggressive[37]	MAA	4
Multi-active flexible[38]	MAF	23
Other funds[39]	AF	9

[31] According to the EFC (European Fund Classification), a pan-European investment fund classification system developed by the EFCF (European Fund Categorization Forum) - EFAMA's working group

[32] Exposure >80% on bonds. Maximum 20% exposure in cash on hand and investments in other assets must not exceed 10%.

[33] Exposure >85% on equities

[34] Funds which are so classified according to the prospectus

[35] Exposure <35% on variable income instruments

[36] Exposure between 35% and 65% on variable income instruments

[37] Exposure >65% on variable income instruments

[38] No asset class limits

[39] Does not fall into any of the above categories

❖ The Sharpe Ratio

The Sharpe Ratio is defined as the risk premium[40] of the asset/portfolio divided by its risk. Specifically, Sharpe measures the net return on total risk taken. The higher the Sharpe value, the more attractive the risk-adjusted return.

Calculation formula:

$$\textbf{Sharpe Ratio} = \frac{(\mathbf{Rx} - \mathbf{Rf})}{\mathbf{StdDev\ Rx}}$$

where **Rx** is the portfolio return, **Rf** is the risk-free rate of return on the asset and **StdDev Rx** is the standard deviation of the portfolio return.

❖ The Sortino Ratio

The Sortino Ratio establishes a relationship between a fund's performance and its DSR (Downside Risk). The DSR is an estimate of the potential loss in value of a security if market conditions anticipate a decline in the price of that security.

For investors, a high Sortino ratio highlights funds that have performed well while remaining resilient during market downturns.

Calculation formula:

$$\textbf{Sortino Ratio} = ((Rp - Rf))/\sigma d$$

where **Rp** is the portfolio return, **Rf** is the risk-free rate and **σd** is the negative standard deviation.

Unlike the Sharpe Ratio, **the Sortino Ratio** only takes into account the negative volatility of an investment, while Sharpe takes into account the total volatility.

❖ The Treynor Ratio

The Treynor Ratio is used to measure the return of a portfolio relative to the return of a benchmark index. The benchmark used in our analysis was the **BET** index. Treynor is an extension of the Sharpe Ratio and modifies the Sharpe Ratio by replacing total risk with sensitivity to the performance of the beta benchmark.

Calculation formula:

$$\textbf{Treynor Ratio} = \frac{(\mathbf{Rp} - \mathbf{Rf})}{\boldsymbol{\beta}\mathbf{p}}$$

[40] The risk premium is compensation for systematic risk that cannot be eliminated by diversification.

where **Rp** is the portfolio return, **Rf** is the risk-free rate and βp is the portfolio beta.

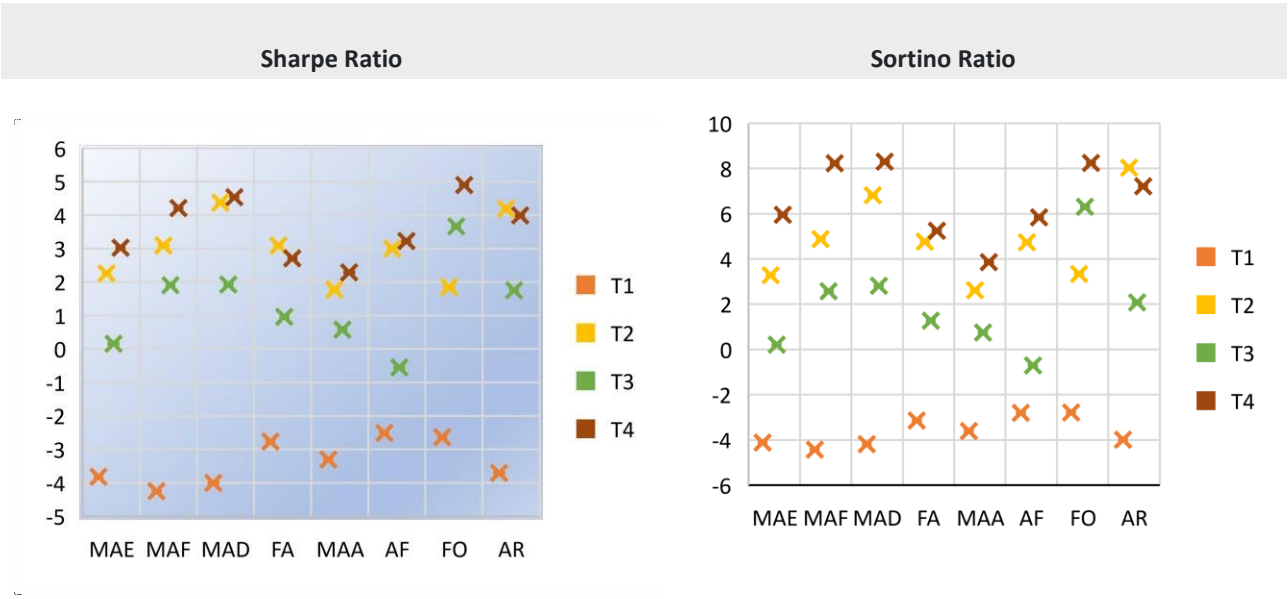
The Treynor Ratio is used to normalize the risk premium, or expected return minus the risk-free rate, which is done by dividing the premium by the portfolio beta. This means that the risk premium is independent of the portfolio risk, making it possible to compare the performance of two portfolios, even if they have different betas. This is important because some portfolios may offer a higher additional return, but at the same time may have more risk and higher beta.

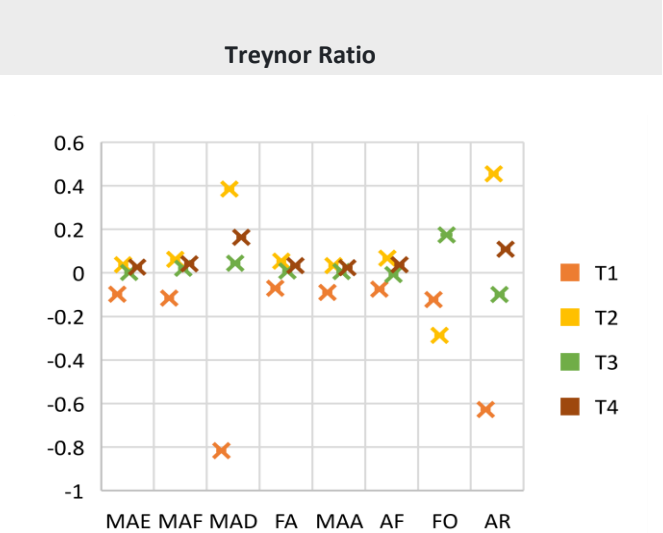
Thresholds to be tracked for measuring Sharpe and Sortino Ratios:

- Between 0 - 1 - the investment is considered poor;
- Between 1 - 1.99 - the investment is considered acceptable to good;
- Between 2 - 2.99 - the investment is considered very good;
- Greater than 3 - the investment is considered excellent.

For the **Treynor** Ratio, a higher rate indicates higher returns per unit of risk and also that the asset or portfolio of assets generated better returns than would be expected given the level of risk taken.

Chart 57 Result of quarterly indicators calculated by investment strategy in 2020





In Q1 2020, the risk taken for any of the eight categories of investment strategies was not sufficiently compensated by their profitability, with all three ratios analysed being negative. Thus, the return on funds was lower than the risk-free rate (the average of the first quarter of 2020 was 3.31%/year for 1-year Romanian government bonds).

Q2 and Q4 saw the best returns relative to the risk taken, with positive Sharpe and Sortino Ratios for all categories of investment strategies. The Treynor Ratio also performed positively for all categories of investment strategies, with the exception of the Debt securities (bond funds - FO) category which performed negatively.

In Q2, the highest *Sharpe Ratio* value was recorded by the **MAD** category (4.37), followed by the **AR** category (4.19), and the lowest value was recorded by the **MAA** category (1.76). The highest value *of the Sortino Ratio* was recorded by the **AR** category (8.03), followed by the **MAD** category (6.81), and the **MAA** category had the lowest value (2.61).

In Q4, Sharpe Ratio values ranged from 2.29 **(MAA)** to 4.89 **(FO)** and Sortino Ratio values ranged from 3.85 **(MAA)** to 8.29 **(MAD).**

In Q3, the **AF** category was the only category for which all three ratios were negative. The category that performed best relative to the assumed risk was **FO**, with the highest ratio values (3.66-Sharpe, 6.29-Sortino, 0.17-Treynor). For the other categories, ratio values were lower compared to Q2 and Q4, ranging for Sharpe between 0.15 and 1.9, for Sortino between 0.20 and 2.57 and for Treynor between 0 and 0.17.

Source: ASF calculations

Chart 58 Result of ratios calculated quarterly by investment strategy in 2021

Of all the quarters from 2020 to Q3 2022, the best return on risk assumed was recorded in **Q1 2021**, with the ratios analysed having the highest values. In contrast, of the 2021 quarters, **Q4** was the worst in terms of return on risk assumed, with only the **MAD, FA and MAA** categories having positive ratios.

Source: ASF calculations

Chart 59 Result of ratios calculated quarterly by investment strategy in 2022

In Q1 and Q2 2022, the value of the ratios was negative for all categories of investment strategies. Specifically, the return on funds was lower than the risk-free rate (the average for the first quarter of 2022 was 4.10%/year for Romanian 1-year government bonds, and for the second quarter it was 5.96%/year). Thus, in the two quarters of 2022, the risk assumed for any of the eight investment strategies was not sufficiently offset by their returns.

In Q3 2022, the average yield on Romanian 1-year government bonds was 8.03%/year. With the exception of the other funds (**AF**) category for which the ratios were positive (1.53 - Sharpe, 2.49 - Sortino and 0.05 Treynor), the ratios calculated for the other investment categories were negative, resulting in the fact that the risk assumed was not sufficiently compensated by the return of the funds in the investment category.

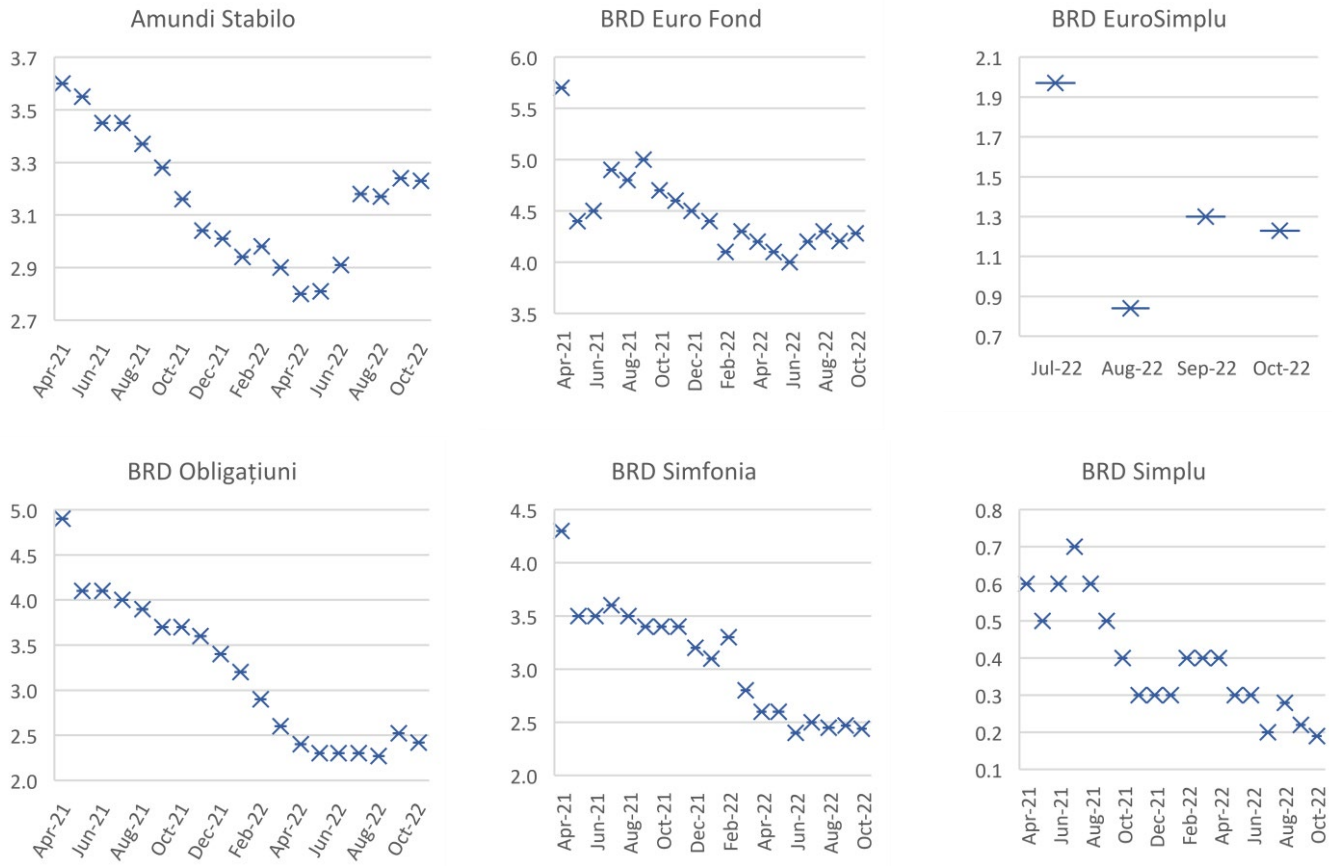
Source: ASF calculations

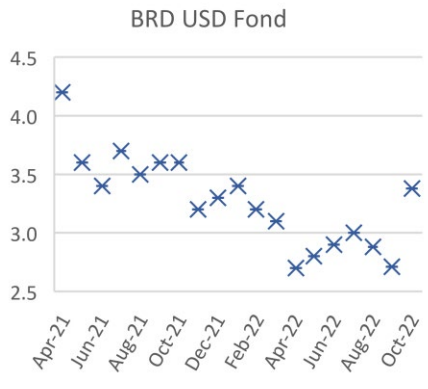
Modified duration

Modified duration provides an estimate of the percentage change in the price of a bond given a change in yield to maturity.

Modified duration is an important indicator for investors because it can help them understand how their bond holdings will react to changes in interest rates. For example, if an investor holds a bond with a modified duration value of 2, they can expect the price of the bond to fall by 2% if interest rates rise by 1%.

Chart 60 Modified duration for bond funds




BRD USD Fond
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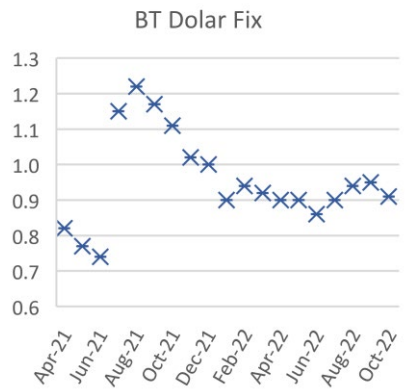
BT Dolar Fix
1.3
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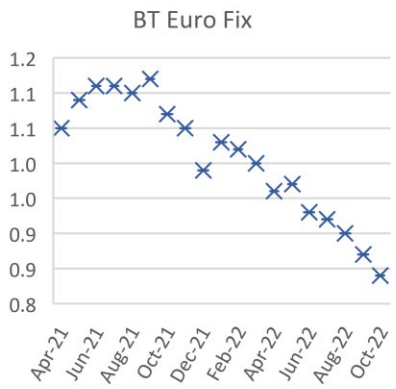
BT Euro Fix
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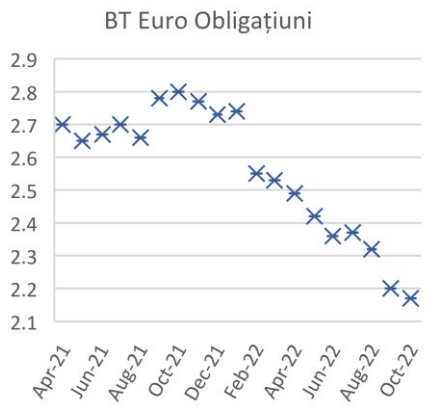
BT Euro Obligațiuni
2.9
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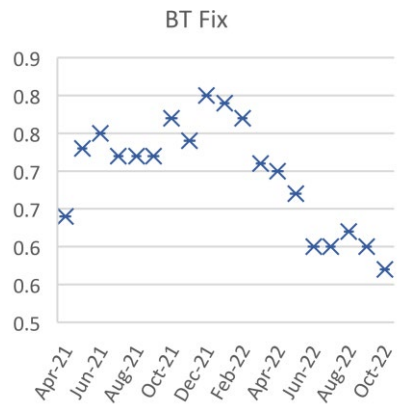
BT Fix
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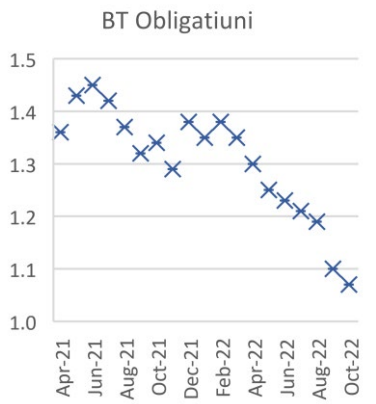
BT Obligatiuni
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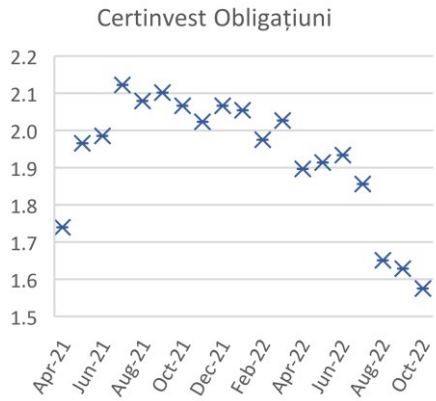
Certinvest Obligațiuni
2.2
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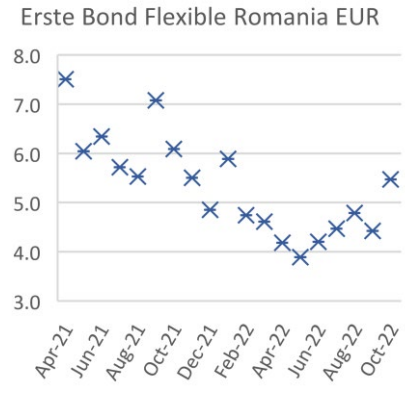
Erste Bond Flexible Romania EUR
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6.0
5.0
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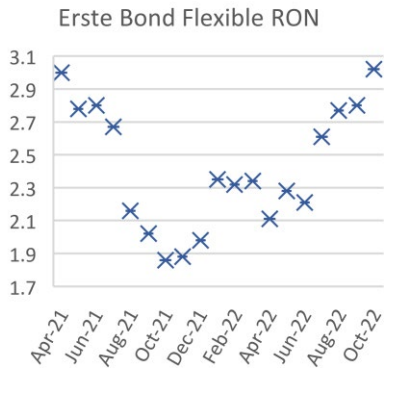
Erste Bond Flexible RON
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2.9
2.7
2.5
2.3
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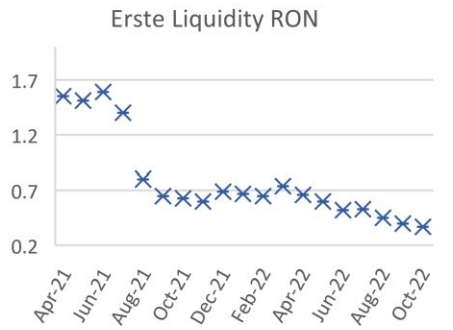
Erste Liquidity RON
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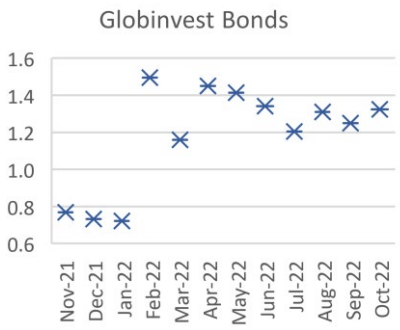
Globinvest Bonds
1.6
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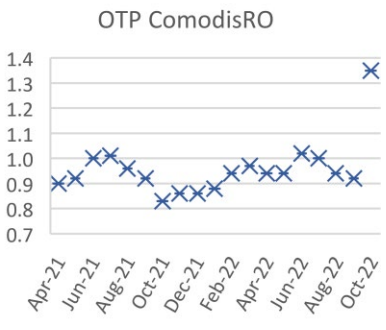
OTP ComodisRO
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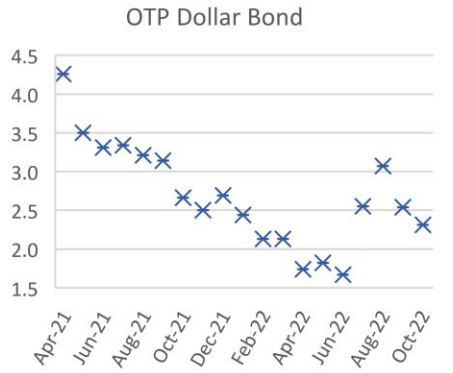
OTP Dollar Bond
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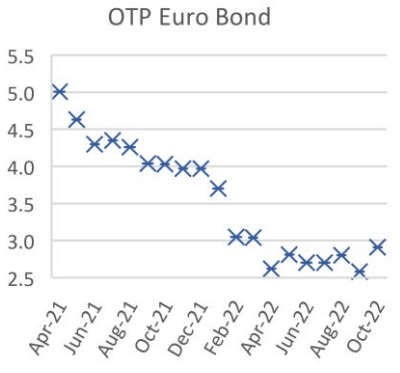
OTP Euro Bond
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5.0
4.5
4.0
3.5
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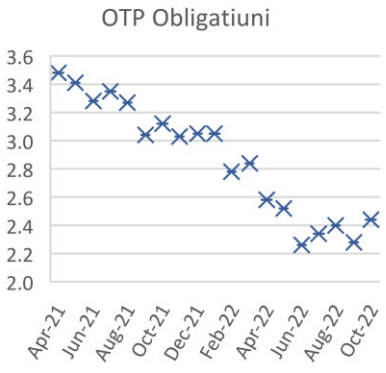
OTP Obligatiuni
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Patria Euro Obligatiuni
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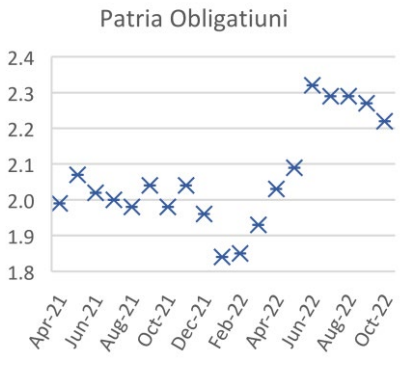
Patria Obligatiuni
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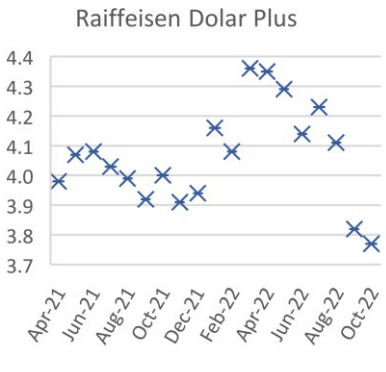
Raiffeisen Dolar Plus
4.4
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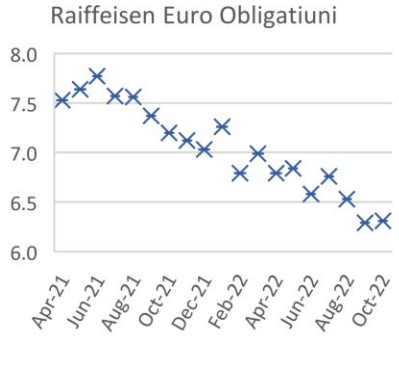
Raiffeisen Euro Obligatiuni
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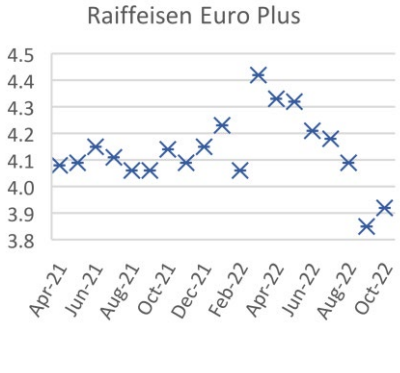
Raiffeisen Euro Plus
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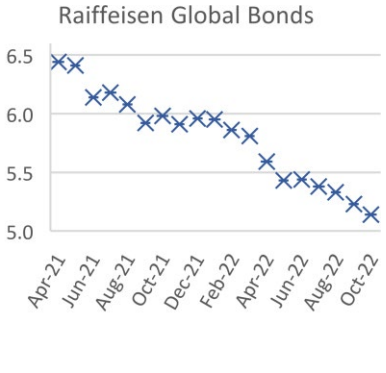
Raiffeisen Global Bonds
6.5
6.0
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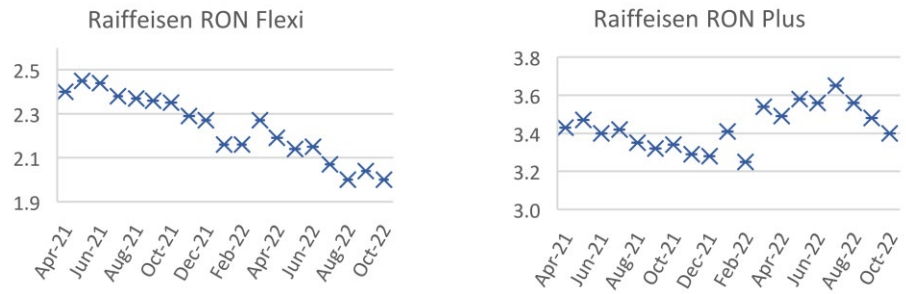
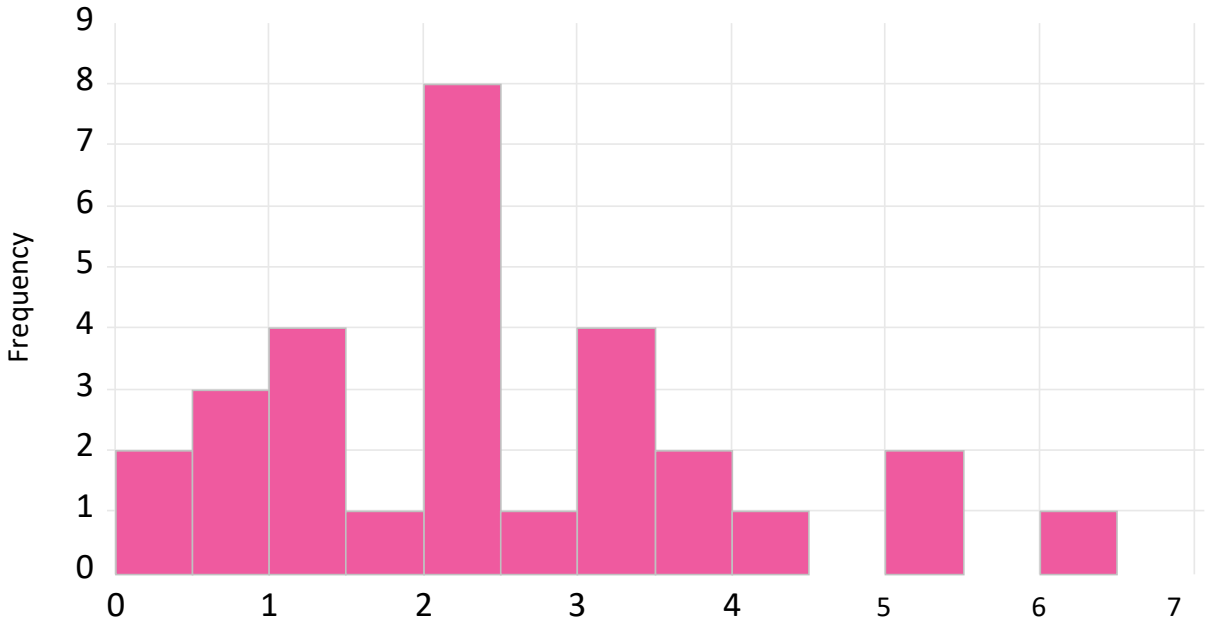


Source: ASF calculations

Chart 61 Modified duration (histogram) for bond funds (October 2022)



Source: ASF calculations

The modified duration histogram for bond funds in October 2022 shows that only 4 of the 29 bond funds have a modified duration of more than 4 years, as they are significantly exposed to interest rate risk.

5. Insurance market stability

The Romanian insurance market recorded an increase in the volume of underwritings in the first 9 months of 2022, mainly due to the increase in the value of gross premiums written for Class A10 (MTPL - compulsory motor third party liability insurance and CMR). It can thus be seen that the volume of gross premiums underwritten by companies authorised and regulated by ASF (excl. branches) for the segment of compulsory motor third party liability insurance (including CMR) increased by RON 1.8 billion (+49%), from RON 3.7 billion (January - September 2021) to RON 5.5 billion (January - September 2022). On the other hand, on the expenses side of the companies authorised and regulated by ASF (not taking into account the payments made by the Policyholders Guarantee Fund for companies in bankruptcy), gross claims paid for Class A10 amounted to RON 2.26 billion in the first 9 months of 2022. Separately from the payments made by insurance companies authorised and regulated by ASF, in the wake of the entry of City Insurance into bankruptcy, the Policyholders Guarantee Fund (FGA) made payments totalling approximately RON 583 million in 2022 to the company's insurance creditors.

As for the **Solvency Capital Requirement ratio** (SCR ratio), it is at a lower level (159%) than at the end of Q3 2021 (185%). Compared to the European average (268% in Q2 2022 for the European Economic Area), the SCR ratio for the Romanian insurance market continues to be at a lower level, showing a downward trend in the period Q3 2021 (188%) - Q3 2022 (159%). Instead, at the European level, a slight improvement in the solvency position for the whole insurance market can be observed.

Liquidity risk for the general insurance business remains at a similar level as at the end of December 2021. Of the 19 companies conducting general insurance business at the end of September 2022, 6 insurers recorded decreases in the liquidity ratio compared to the end of the previous year. However, although one company had an indicator very close to 1, the other insurers exceed this level, according to the insurers' reports to ASF.

For the life insurance business, the liquidity indicator stood at a value of 3.40 in September 2022, showing a deterioration compared to the level recorded in December 2021 (3.94). In addition, 10 of the 13 companies that conducted life insurance business recorded impairments in the liquidity indicator. However, all the companies have a supra-unit level of the liquidity indicator, which indicates a sufficient level of assets to ensure that obligations towards policyholders are met, according to insurers' reports to ASF. Only one company had a liquidity indicator very close to 1 at the end of September 2022.

5.1. The insurance market in the European context

The high inflation in 2022 has amplified stress throughout the financial system, impacting insurance companies both on the asset side, through investment portfolios whose market prices are sensitive to inflation, and on the liability side, with inflation generating higher claims costs.

Liquidity risk

EU insurers use derivatives to hedge interest rate risk arising from the long maturities of their liabilities. For this purpose, they enter into interest rate swaps (IRS). According to *the Financial Stability Report* published by EIOPA (December 2021), under these contracts, insurers predominantly pay the variable rate and receive the fixed rate. This exposes them to cash payments when risk-free rates rise. In Q1 and Q2 2022, the risk-free rate, as estimated by the EIOPA 10-year (10Y) risk-free rate, increased by almost 200 basis points, the most significant change since the introduction of Solvency II. Recent market developments in the UK, which have also forced UK pension funds to sell UK gilts in a falling market, illustrate the relevance of the topic.

According to *the Financial Stability Report* published by EIOPA (December 2022), while hedging interest rate risk makes insurers safer on an individual level, there are also a number of risks that companies may face:

- Insurers may not always be able to liquidate investments when many other investors are forced to do so; the consequence would be a loss of cover and a sudden increase in capital requirements or the need to re-establish hedging under much less favourable conditions;
- Insurers who are users of derivatives must sell when the price would fall, pushing a negative feedback mechanism. This could threaten financial stability across the market as insurers, who are usually long-term investors and could act as shock absorbers by holding their positions or even buying bonds, would in turn help fuel selling pressure.

Increase in the value of claims

The impact of inflation on the insurance sector is mainly reflected in the increase in the cost of claims (claims inflation) due to the increase in prices of services, goods and expenses incurred by insurers to meet their obligations.

Undervaluation of technical reserves

The current upward trend in the inflation rate may lead to a risk of underestimation of technical reserves. Insurers make estimates of future price developments, which they incorporate into the calculation of

the technical reserves that they have to set up to cover future claims payments. Therefore, a high level of inflation, which is higher than expected, may be a source of risk for insurers, due to the increase in the value of claims above the level planned by the company in the calculation of technical provisions.

The impact of inflation can usually be taken into account more accurately and flexibly when explicitly modelled or adjusted. According to EIOPA, *there may be a lack of historical data for high inflation scenarios and the impact of inflation may not be immediately reflected in the claims paid by insurers for certain classes of insurance*.

According to EIOPA (*Supervisory Statement on Inflation - December 2022)*, as inflation increases, more granular considerations may be needed, such as a breakdown of cost types (e.g. cost of auto parts, construction material goods, legal transactions, medical costs, etc.) or geographical considerations to ensure an adequate level of technical reserves is built up. The current level of inflation may also have an indirect impact on the best estimate through other relevant assumptions, such as future management actions and policyholder behaviour, which may be affected by cost-of-living increases. For example, increased cost of living may be a trigger for surrender and termination of life insurance policies.

Impact on investment

Inflation can also have an impact on the value of some assets, particularly those valued using alternative valuation methods[41]. The current trend in inflation may lead to a risk of overestimating the value of assets if the same methodologies are applied, in particular those that do not explicitly take inflation into account.

According to EIOPA (*Supervisory Statement on Inflation - December 2022),* insurance companies using alternative valuation methods for inflation-exposed investments should assess whether the valuation methods and/or their parameters should be adjusted for the current level of inflation to ensure that assets are valued at the value at which they could be exchanged between the parties.

In carrying out the supervisory process, when conducting the valuation of assets following a risk-based approach, competent authorities should monitor the assessment of the impact of inflation and any measures taken by insurance and reinsurance companies.

Impact on capital requirements

Inflation may also have an impact on the Solvency Capital Requirement (SCR) and some adjustments may be necessary. Thus, according to EIOPA (*Supervisory Statement on Inflation - December 2022),* companies using internal models to calculate the SCR should assess the need to adjust any inflation-related parameters of their internal model to ensure that it still provides the level of protection required by Article 101(3) of Solvency II.

[41] according to Article 10 para. (5) to (7) of Commission Delegated Regulation (EU) 2015/35

Companies that use the standard formula and have an inflation-exposed risk profile should in particular assess whether the calculated SCR does not deviate significantly from their risk profile.

Decreasing consumer interest in insurance products

The general rise in prices leads to a deterioration in consumer purchasing power, resulting in lower interest in life insurance and other long-term savings products, especially unit-linked products.

According to EIOPA's published Risk Scoreboard (Q2 2022), **profitability and solvency risks** remain relatively unchanged, with insurers' returns falling in Q2 2022. Rising interest rates from early 2022 may be the main factor behind insurers' high SCRs.

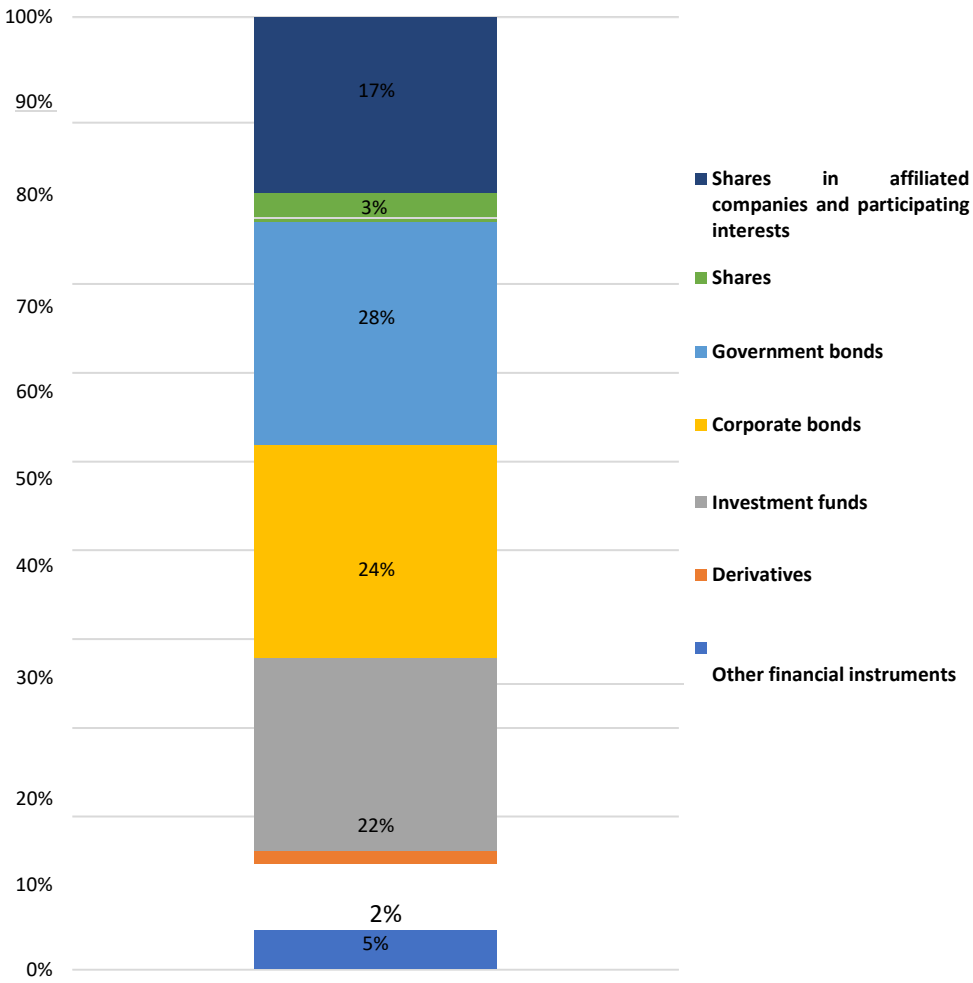
In terms of **climate risks**, insurers maintained their relative exposure to green bonds, while the ratio of insurers' investments in green bonds to the total amount of green bonds outstanding decreased slightly in Q2 2022 compared to the previous quarter.

Locally, the analysis of the reports submitted by insurance companies on climate risk showed that they have initiated different processes to implement an adequate understanding of sustainability risks, depending on the size and complexity of the business. In the insurance market, most companies and intermediaries do not treat climate risk as a separate risk, but as a factor influencing already identified and managed risks (market risk, credit risk, underwriting risk, business risk, operational risk, reputational risk, liquidity risk, strategic risk). Most insurance companies are considering reviewing internal policies and have already included sustainability aspects in business plans as well as sustainability risks in current risk policies. Six companies claim to have implemented climate governance policies and the rest are considering it in the future. Only one company reported that they are in the process of doing impact analyses on climate risks within the actuarial function.

Cyber and digitisation risks, as assessed by supervising authorities, decreased slightly. However, cybersecurity issues and concerns about a hybrid geopolitical conflict remain.

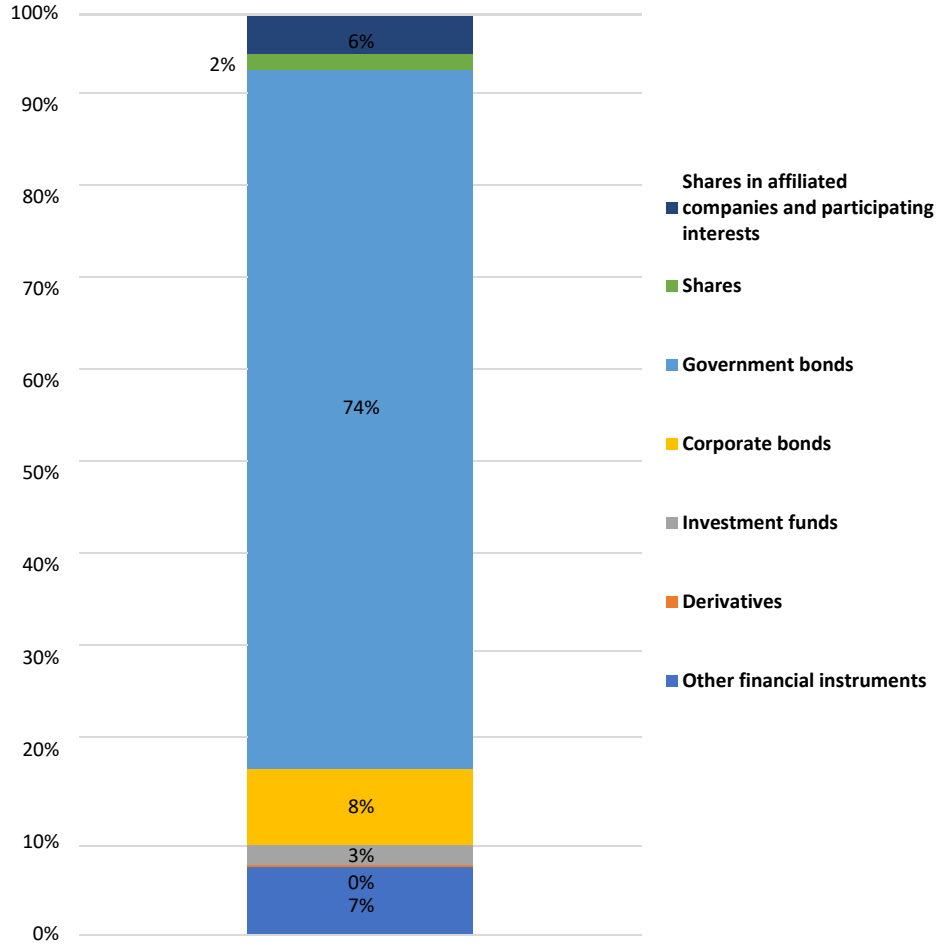
From the perspective of the aggregate investment structure of insurance companies, it can be seen that at both European and local level, the most significant share is held by bonds. Therefore, in the second quarter of 2022, insurance companies in Europe have oriented around 54% of their investments towards bond investments, while insurers in Romania have an 82% share of bond investments.

Chart 62 Aggregate investment structure of insurance companies in Europe (Q2 2022, 30 countries)



Source: EIOPA, ASF calculations

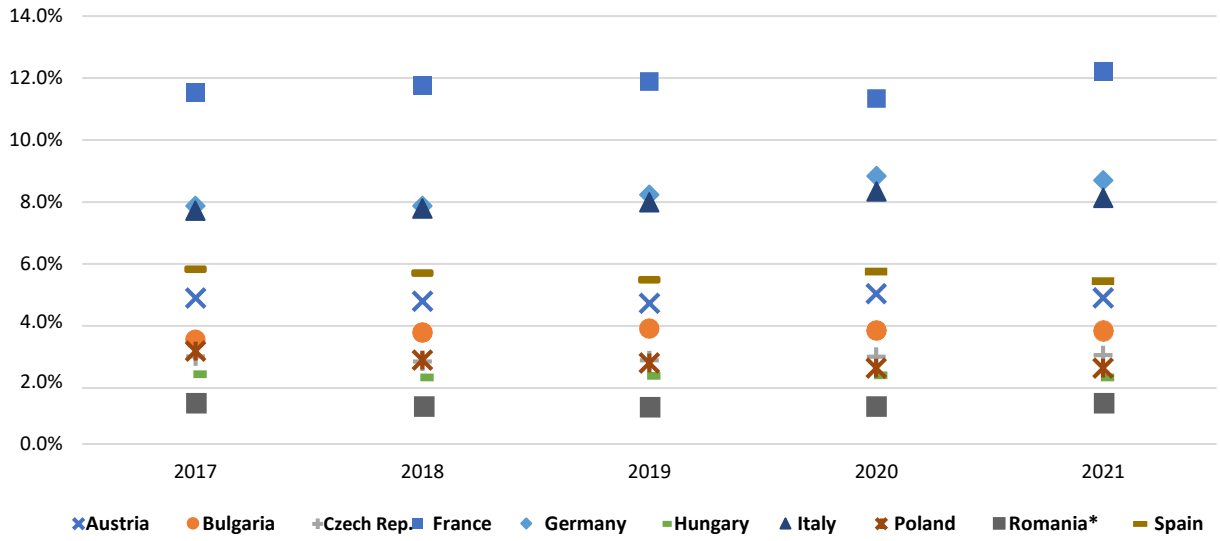
Chart 63 Aggregate investment structure of Romanian insurance companies (Q2 2022)



Source: EIOPA, ASF calculations

Insurance penetration of GDP, an indicator calculated as the ratio of the value of gross premiums written to gross domestic product (GDP), was significant for France over the period under review. In 2021, France (12.2%) recorded the highest value, followed by Germany (8.7%), Italy (8.1%) and Spain (5.4%). In the case of Romania, there is an upward trend in the penetration of insurance in GDP in 2021, with a value of around 1.29% compared to 1.15% of GDP in 2020. The penetration of insurance in GDP increased in Romania as the volume of gross premiums written increased significantly.

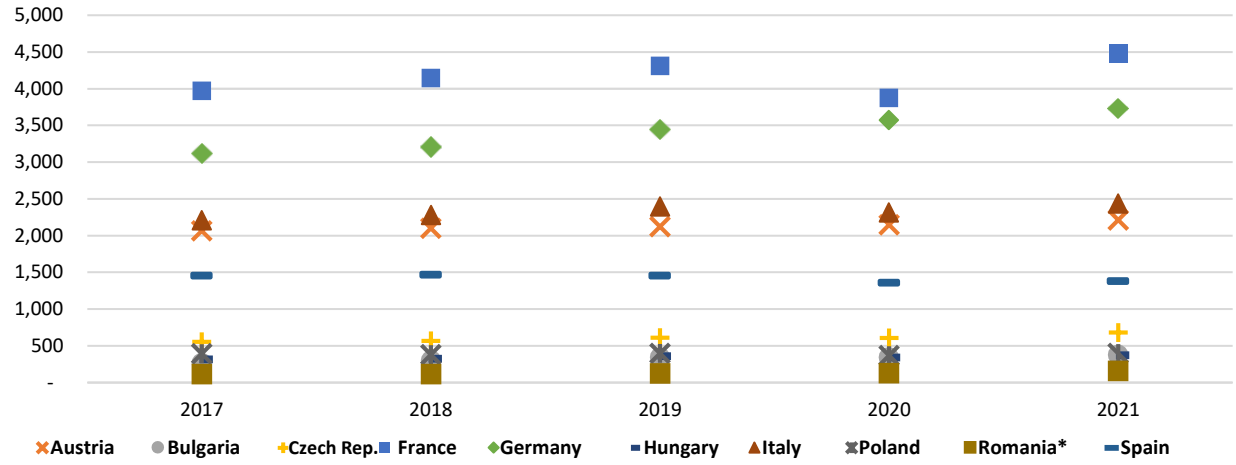
Chart 64 Insurance penetration of GDP



*Source: EIOPA, Eurostat, NSI, *ASF data, ASF calculations*

Insurance density is an indicator that shows how much the average person in a country spends on insurance products. In 2021, France also ranked first in terms of this indicator (4,478 euros/inhabitant), followed by Germany (3,733 euros/inhabitant), Italy (2,436 euros/inhabitant) and Austria (2,213 euros/inhabitant). In the case of Romania, in 2021, insurance density stood at 161 euros/inhabitant, an increase of around 24% compared to the previous year.

Chart 65 Insurance density (EUR)

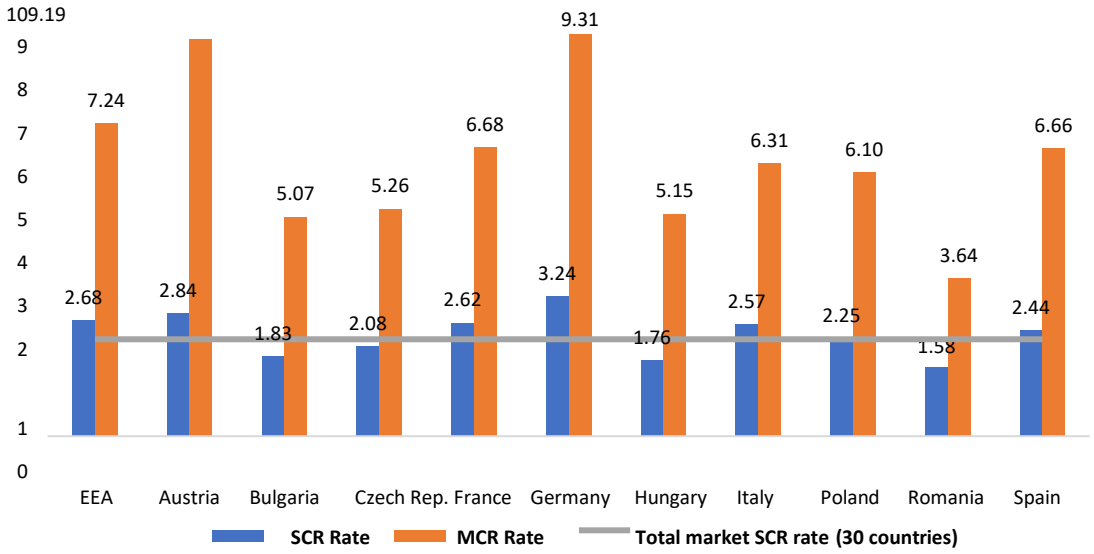


*Source: EIOPA, Eurostat, NSI, *ASF data, ASF calculations*

The share of life insurance business in the total insurance sector in Romania in terms of gross written premiums is at a low level locally compared to the other EU countries analysed. In Q2 2022, the share of the life insurance segment stood at 17% of total underwritings, while the share of the general insurance segment reached 83% of total underwritings.

As regards the solvency of the European insurance system, according to published statistics, the SCR rate in the insurance market of the 30 countries reporting to EIOPA stood at 224%. The EEA-wide SCR stood at a level of 268%, an increase compared to the previous quarters, showing a strengthening of the solvency of the EEA insurance market. In Romania, the SCR is below the EEA level (158%: Q2 2022, respectively 159% in Q3 2022).

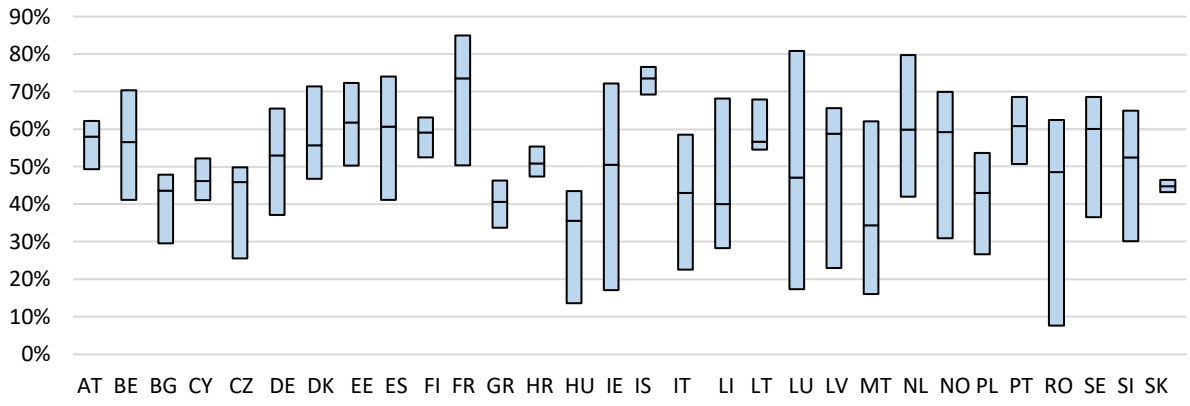
Chart 66 Solvency Capital Requirement (SCR) and Minimum Capital Requirement (MCR) ratios (Q2 2022)



Source: EIOPA

According to the *European Insurance Overview - 2022* report published by EIOPA (September 2022), **the highest average of the claim rate**, calculated as the ratio of claims paid to premiums earned, for general insurance business was recorded in **France and Iceland** (74%), while the **average of the claim rate in Malta** was the lowest (**34%**). **Romania recorded an average of the claim rate of 48.5%**.

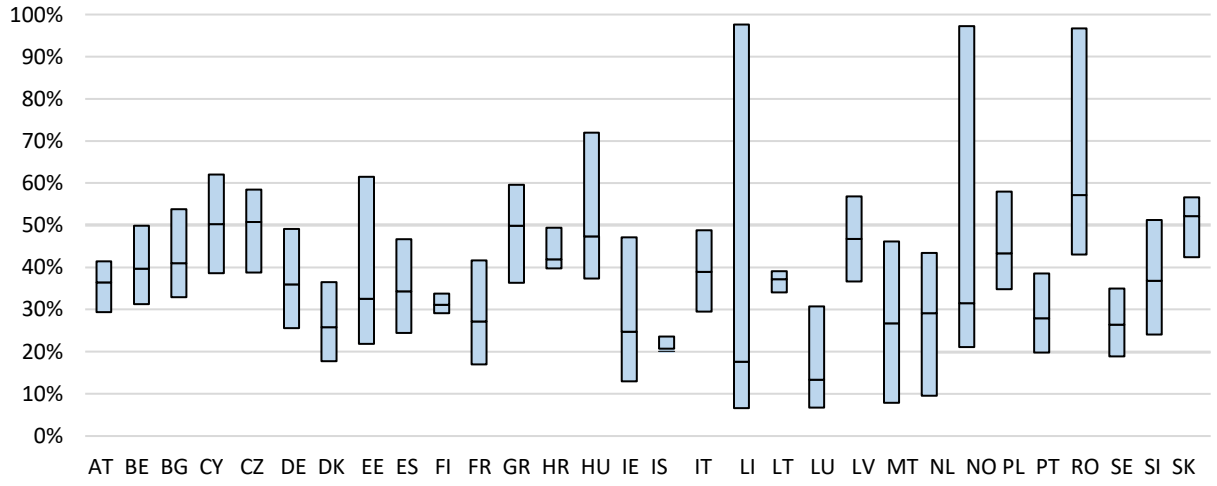
Chart 67 Claim rate by country



Source: EIOPA, the claim rate is defined as the ratio of claims paid to premiums earned, the chart shows the interquartile range and average value

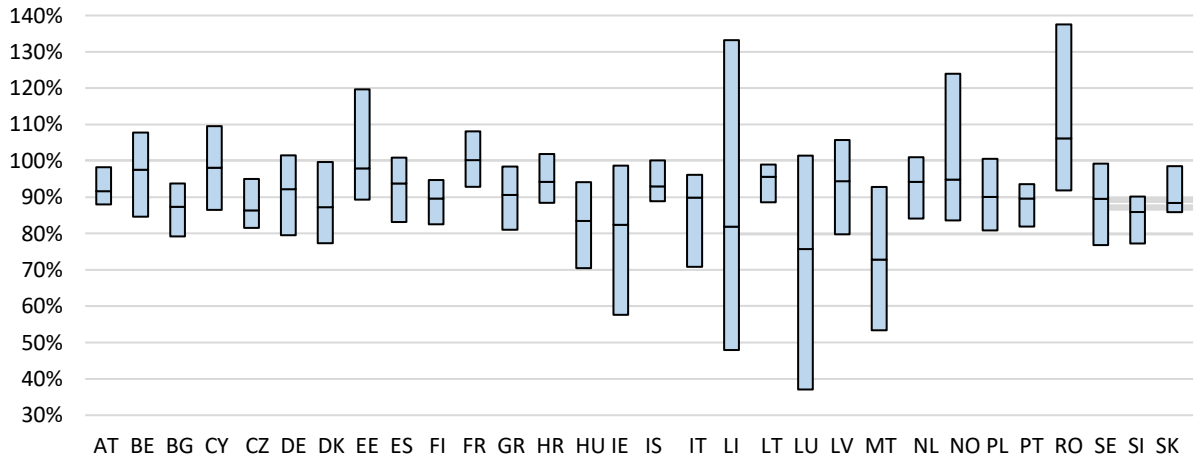
In terms of expenditure rate, **Romania had the highest average (57%)** in 2021 compared to the countries analysed, followed by Slovakia (SK: 52%) and the Czech Republic (CZ: 51%). At the other end of the scale was **Luxembourg (LU) with an average expenditure rate of only 13%.**

Chart 68 Expenditure rate by country



Source: EIOPA, expenditure rate is the ratio of expenditure to premiums earned, the graph shows the interquartile range and median value

Chart 69 Combined claim rate by country



Source: EIOPA, combined rate is defined as the sum of claims and expenses divided by earned premiums, the graph shows the interquartile range and average value

Romania (106%) and France (100%) recorded the highest average values of the combined claim ratio, and are also the only countries to record above-unit average values for this indicator, according to the *European Insurance Overview, 2021* (EIOPA, September 2022). **The lowest average values of the combined claim ratio were recorded in Malta (73%) and Luxembourg (76%).**

5.2. Systemically relevant entities

The cumulative value of insurance companies' assets[42] on 30 September 2022 for the whole insurance market was about 1.9% of GDP, down from previous periods, due to the higher dynamics of gross domestic product (calculated as the sum of the last 4 quarters) compared to the pace of growth of total assets related to insurers authorised and regulated by ASF.

Size of insurance companies

The size of the insurance business in Romania has been assessed through two indicators:

- gross written premiums;
- assets.

From the available data we see that the top 10 insurance companies account for 92.3% (H1 2022) of total gross written premiums, an increase of more than 4 percentage points compared to the same period last year (88.2%).

Table 8 Ranking of the top 10 insurance companies by market share and share of total assets in GDP

Company	GWP (million RON)	Market share	Total assets (Million RON)	% TI in GDP
GROUPAMA ASIGURARI S.A.	1,557	17.8%	3,285	0.25%
ALLIANZ - TIRIAC ASIGURARI S.A.	1,554	17.7%	3,577	0.28%
EUROINS ROMANIA ASIGURARE REASIGURARE S.A.	1,529	17.5%	2,798	0.22%
OMNIASIG VIENNA INSURANCE GROUP S.A.	1,060	12.1%	2,396	0.19%
ASIROM VIENNA INSURANCE GROUP S.A.	634	7.2%	1,888	0.15%
NN ASIGURĂRI DE VIATA S.A.	483	5.5%	3,987	0.31%
GENERALI ROMANIA ASIGURARE REASIGURARE S.A.	407	4.6%	1,357	0.11%
BCR ASIGURARI DE VIATA VIENNA INSURANCE GROUP S.A.	346	4.0%	1,645	0.13%
GRAWE ROMANIA ASIGURARE S.A.	320	3.7%	852	0.07%
UNIQA ASIGURARI S.A.	191	2.2%	734	0.06%
Total 1 - 10	**8,080**	**92.3%**	**22,519**	**1.75%**
TOTAL	**8,758**	**100.0%**	**25,310**	**1.96%**

Source: ASF

On 30 September 2022, the Romanian insurance market remains characterised by a medium to high degree of concentration. In the first 9 months of 2022, approximately 92% of the total volume of gross written premiums was carried out by 10 insurance companies out of the 26 companies authorised and regulated by ASF, which were carrying out insurance/reinsurance business as of 30 September 2022.

In terms of size (however measured - gross written premiums or total assets), **no insurance company exceeds 1% of GDP**, so there would be no argument for it to be considered systemic according to this criterion.

[42] Including German Romanian Assurance S.A.

From the perspective of the analysis of the degree of substitution in the Romanian insurance market, ASF identified 3 segments, in terms of the high degree of concentration and the significant volume of gross written premiums for these segments, but also the existence of a relatively small number of insurers authorized by ASF to carry out these activities:

- life insurance market;
- MTPL market;
- security insurance market.

Chart 70 Size of the life insurance market by class of insurance as at 30 September 2022

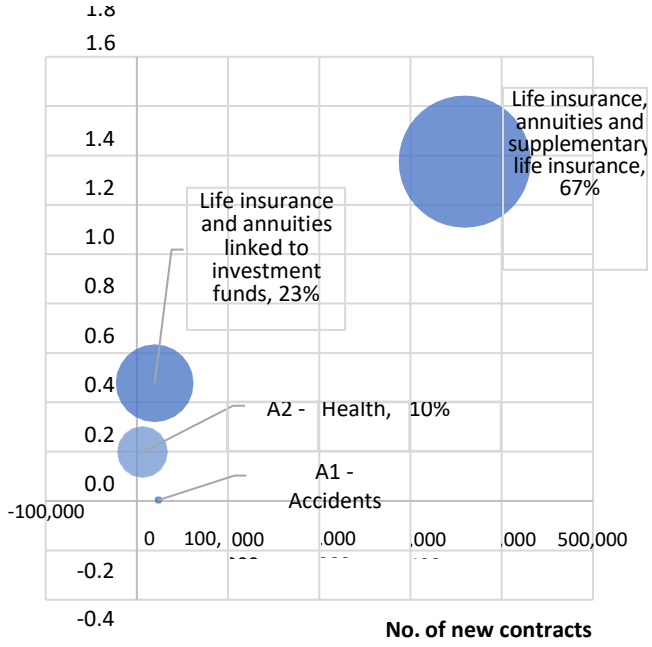
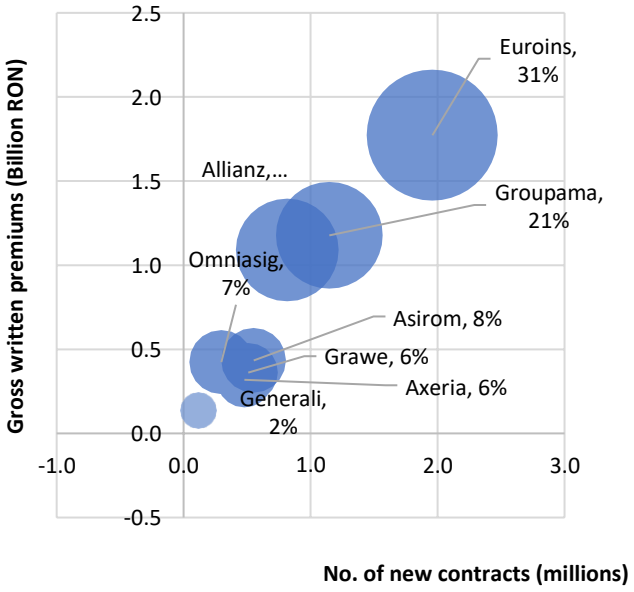


Chart 71 Size of the motor third party liability insurance (MTPL) market as at 30 September 2022

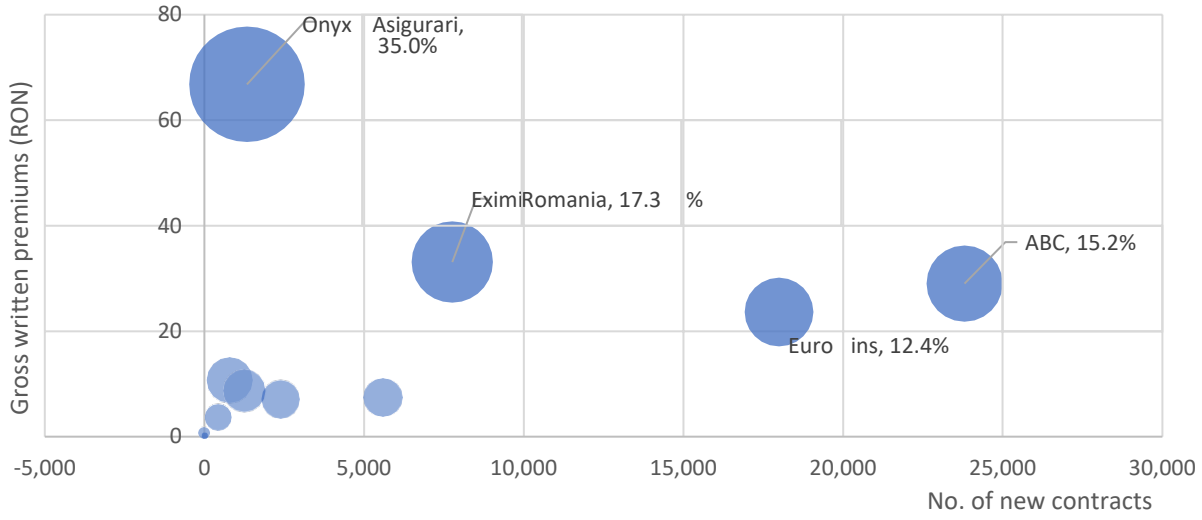


Source: ASF

In particular, the analysis of the characteristics of the **MTPL market** and of the indicators of the companies present on this market highlights the **significant position on the market and the high relevance, at least from a sectoral perspective, of Euroins Romania.**

As regards the security insurance market, Onix Asigurări has a share of about 35% of the gross premiums written by companies authorised and supervised by ASF, but writes mainly in other countries. As of 30 September 2022, 12 insurance companies were active in the security insurance market.

Chart 72 Size of the security insurance market (Class A15) as at 30 September 2022



Source: ASF

5.3. Insurance market solvency

No. of insurers authorised and supervised by ASF

As at 30 September 2022, **26 insurance companies**, authorised and regulated by ASF, were active in the insurance market, of which 13 were engaged only in general insurance ("GI"), 7 were engaged only in life insurance ("LI") and 6 in composite business.

In the first 9 months of 2022, insurance companies authorised and regulated by ASF wrote **gross premiums of about RON 12.1 billion**, up by about 23% compared to the same period last year. On the other hand, insurance companies paid **gross claims (including surrenders and maturities) totalling about RON 5.5 billion** in the first 9 months of 2022, not including payments made by the Policyholders Guarantee Fund for companies in bankruptcy, **representing about 46% of the total volume of gross premiums written during the reference period.**

According to the Policyholders Guarantee Fund (FGA), during 2022, FGA approved a total of 68,791 claims in the Special Commission for all bankrupt insurance companies. **The total amount of payments made in 2022 was RON 665.6 million.** Of the total claims considered in 2022, **60,686 claims related to insurance creditors of Societatea de Asigurare-Reasigurare City Insurance SA, with a paid-out value of RON 583.2 million**.

Gross written premiums - general insurance

Gross written premiums for general insurance business amounted to RON 10 billion in the first 9 months of 2022, which indicates a significant advance of RON 1.8 billion (+29%) compared to the amount of underwritings recorded in the same period of the previous year.

A more detailed analysis by class of insurance shows that **this dynamic was mainly influenced by the significant increase in gross written premiums for Class A10** (MTPL and CMR), taking into account the latest developments in the Romanian insurance market. Thus, the volume of gross written premiums for the compulsory motor third party liability insurance segment (including CMR) increased by RON 1.8 billion, from RON 3.7 billion to RON 5.5 billion, **reflecting the increase in prices of MTPL policies charged by insurance companies**.

Chart 73 Gross written premiums for general insurance business (Billion RON)

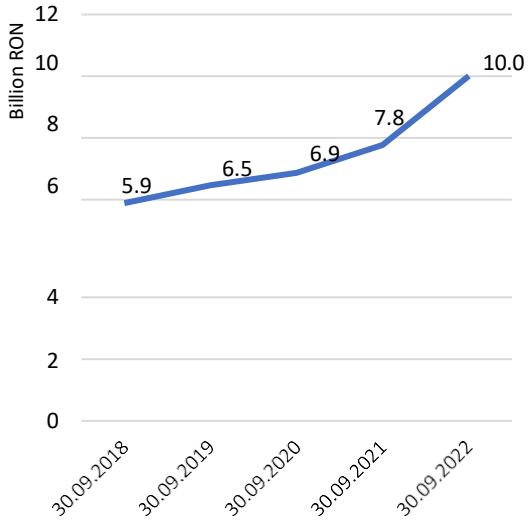
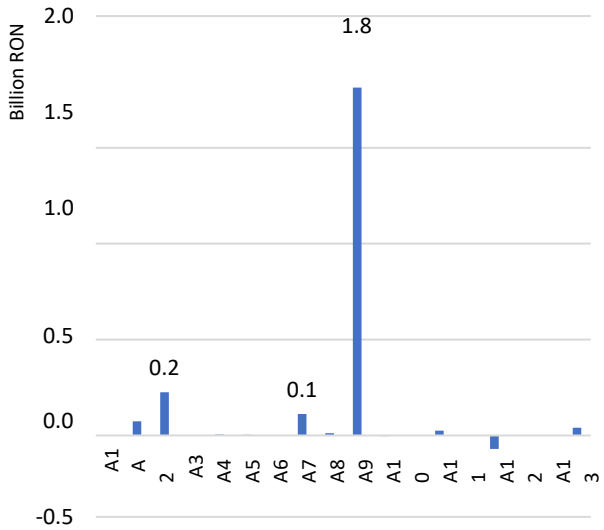


Chart 74 Changes in the volume of gross written premiums in the first 9 months of 2022 compared to the same period in 2021 by classes of general insurance (Billion RON)



Source: ASF

Gross written premiums - life insurance

The life insurance segment showed positive dynamics in the first 9 months of 2022 compared to similar analysed periods.

Gross written premiums for the entire life insurance market amounted to about RON 2.1 billion in the first 9 months of 2022, with the increase (+2% compared to the first 9 months of 2021) mainly driven by the increase in the volume of traditional life insurance underwritings (C1 class, up by RON 85 million compared to the same period in 2021). Gross written premiums for life insurance with investment component (C3 class) decreased by approximately RON 93 million compared to the first 9 months of 2021.

Chart 75 Value of gross written premiums for life insurance business (Billion RON)

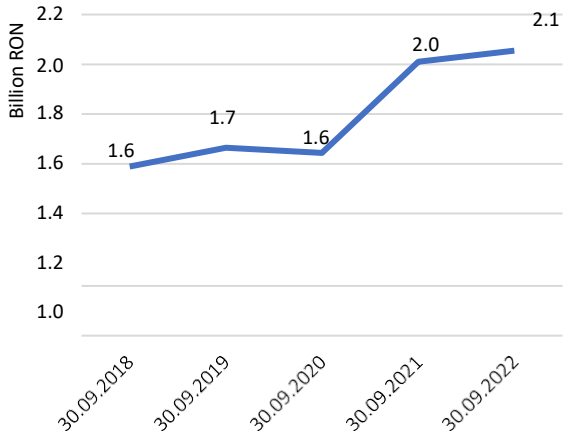
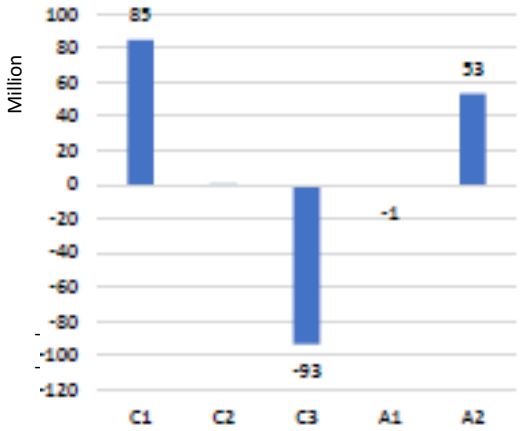


Chart 76 Changes in the volume of gross written premiums in the first 9 months of 2022 compared to the same period in 2021 by life insurance class (Million RON)



Source: ASF

Equity eligible to cover capital requirements

The excess of assets over liabilities and the **level of equity** show the amount of capital that insurance companies have available to cover their capital requirements, and a sufficient level of equity is an indicator of the financial stability of insurance companies.

At the end of Q3 2022, the surplus of assets over liabilities for the entire insurance market stood at around RON 6 billion, up 3% compared to 30 September 2021. It is also noted that Q3 2022 saw the highest level of capitalization in the period under review (Q3 2018 - Q3 2022).

Chart 77 Evolution of the Solvency Capital Requirement (SCR) and Minimum Capital Requirement (MCR) (Billion RON)

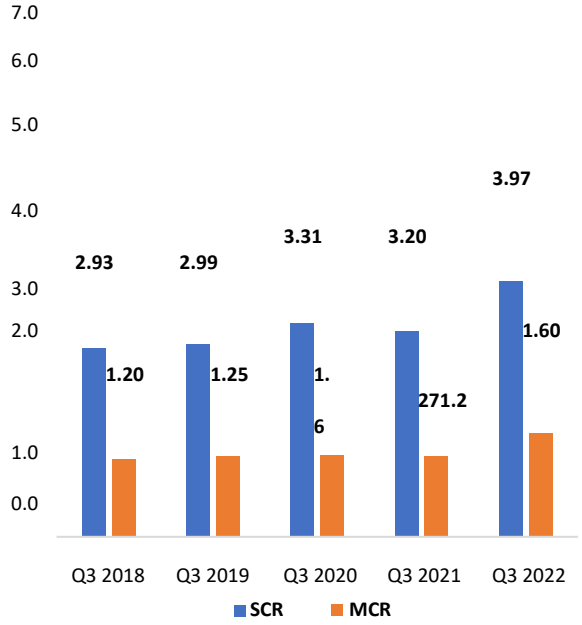
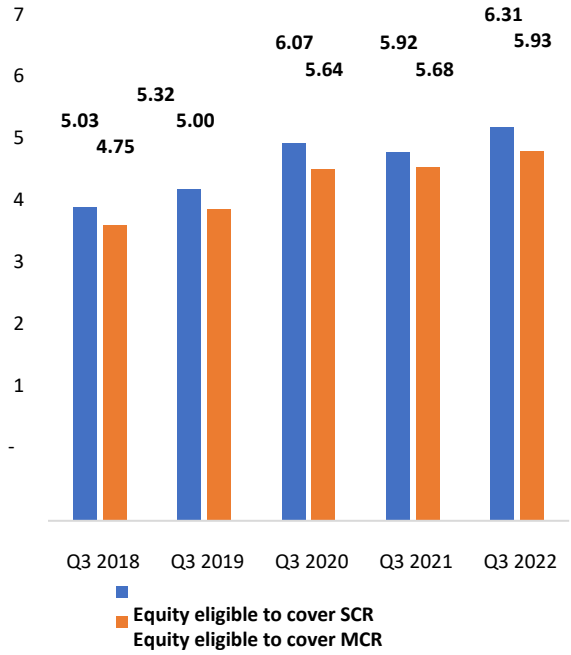


Chart 78 Amount of eligible equity covering capital requirements (Billion RON)

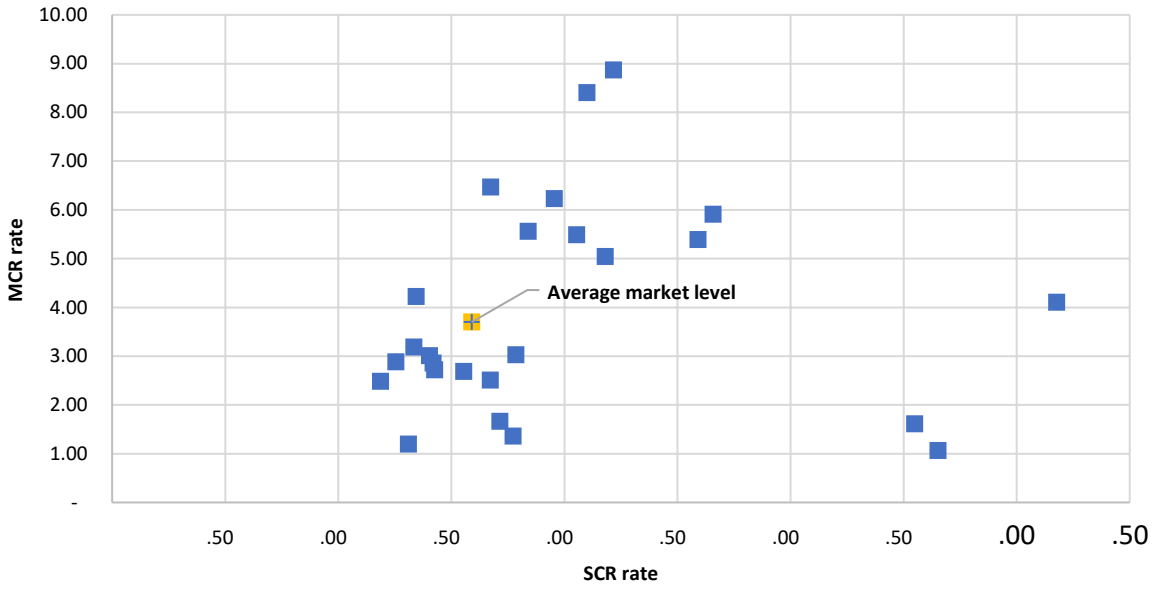


Source: ASF

A comparative analysis between the situation at the end of September 2022 and that at the end of the same period in 2021 shows an increase in the Solvency Capital Requirement (SCR) of about 24% and an increase of about 28% in the Minimum Capital Requirement (MCR).

As regards the **amount of equity eligible to cover capital requirements**, they are at higher levels compared to the other periods analysed. Thus, equity eligible to cover the Solvency Capital Requirement (SCR) increased by 7%, from RON 5.9 billion (Q3 2021) to about RON 6.3 billion (Q3 2022).

Chart 79 Capital requirement coverage ratios (SCR and MCR) by insurance company (Q3 2022)



Source: ASF

Technical reserves

The establishment of technical reserves by insurance companies is one of the most important mechanisms underlying the efficient functioning of the insurance market, with the aim of guaranteeing that their obligations towards policyholders are met in the event of insured events. Thus, the establishment of sufficient technical reserves to support the payment of all obligations to policyholders is an important pillar of risk management for insurance companies, helping to ensure the financial stability of companies.

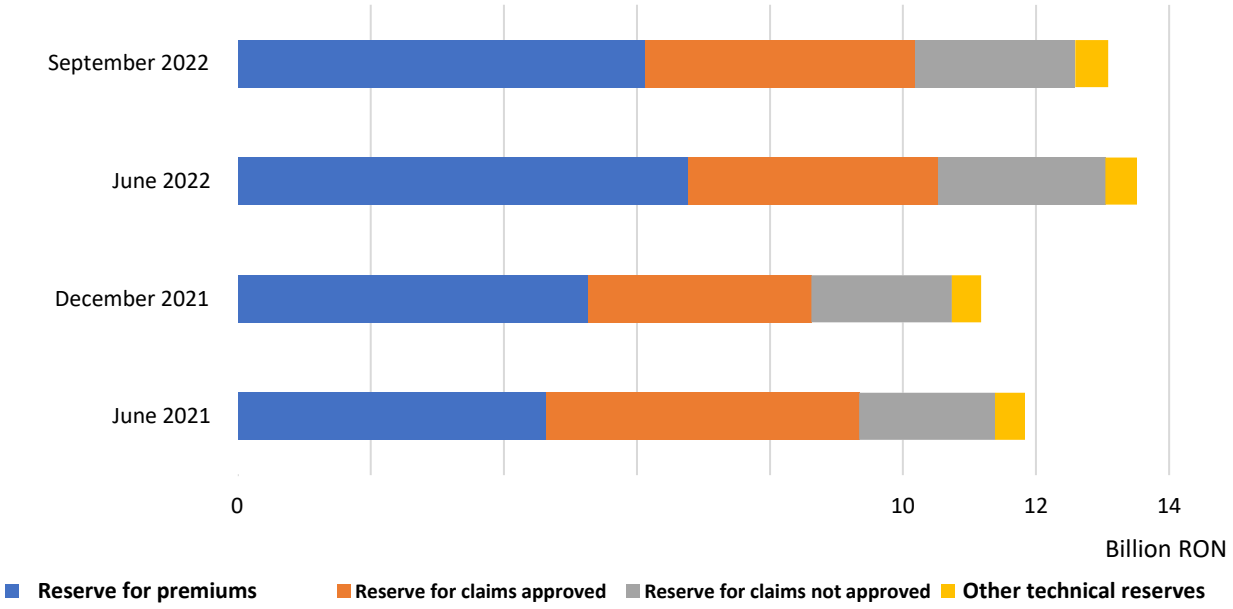
At the end of Q3 2022, insurance companies had gross technical reserves totalling about RON 22.1 billion, up by about RON 1.5 billion (+7.4%) compared to the end of 2021 (RON 20.5 billion), broken down by the two categories of insurance as follows:

- gross technical reserves established for general insurance amounted to approximately RON 13.1 billion, representing 59% of total technical reserves;
- for life insurance, companies have built up reserves of RON 9 billion, which represents 41% of total technical reserves.

Technical provisions for general insurance

For the general insurance business, as of 30 September 2022, insurance companies had gross technical reserves of RON 13.1 billion, up by RON 1.9 billion (+17%) compared to the end of 2021.

Chart 80 Evolution of technical reserves by category established for the general insurance business



Source: ASF

Table 9 Structure of gross technical provisions for general insurance as at 30.09.2022

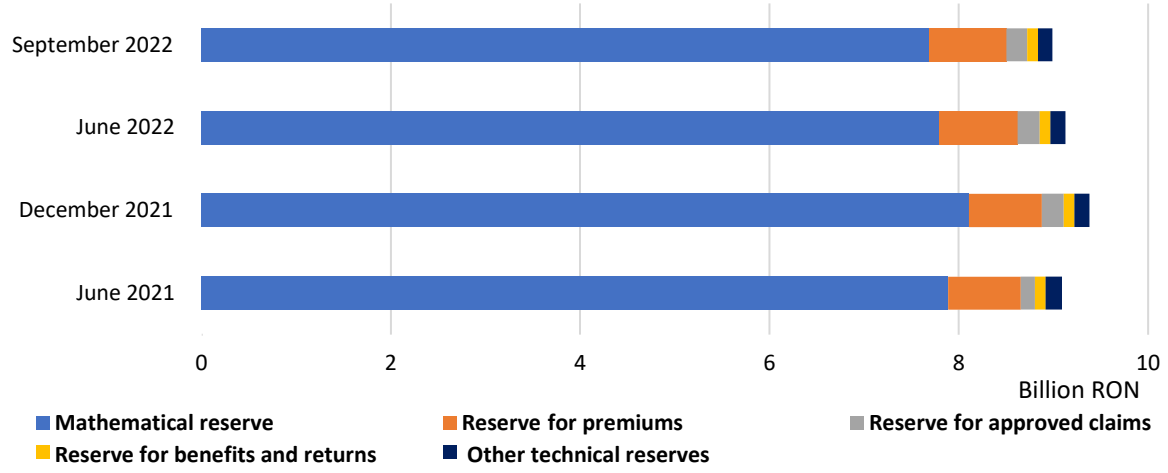
	30.09.2022	Share in total	A10	A3	A8	Share of significant classes
	Million RON	(%)	Million RON	Million RON	Million RON	(%)
Premium reserve	6,129	46.8%	3,175	1,509	722	88.2%
Approved claim reserve	4,057	31.0%	2,245	797	404	85.0%
Unapproved claim reserve	2,405	18.4%	2,071	117	67	93.8%
Other technical reserves	495	3.8%	9	110	264	77.4%
Total reserves	**13,086**	**100%**	**7,501**	**2,533**	**1,458**	**87.8%**

Source: ASF

Technical reserves for life insurance

For the life insurance business, as of 30 September 2022, insurance companies had gross technical reserves of about RON 9 billion.

Chart 81 Development of technical reserves by category of life insurance business



Source: ASF

Table 10 Structure of gross technical reserves for life insurance business as at 30.09.2022

	30.09.2022 (million RON)	Share in total (%)
Reserve for premiums	819	**9.1%**
Mathematical reserve	7,683	**85.5%**
Reserve for benefits and returns	115	**1.3%**
Other technical reserves	374	**4.2%**
Total technical reserves related to life insurance	**8,990**	**100.0%**

Source: ASF

Reinsurance

General insurance

For a significant proportion of general insurance products (e.g. catastrophe insurance, liability insurance), as part of their risk management strategy, insurers frequently use various forms of ceding reinsurance contracts, thereby limiting the maximum loss incurred in the event of insured events with significant financial impact.

At the end of June 2022, approximately 34.5% of gross written premiums were ceded to reinsurance, down from the same period in 2021.

Table 11 Development of GWP and net reinsurance premiums for the period H1 2016 - H1 2022 for GI

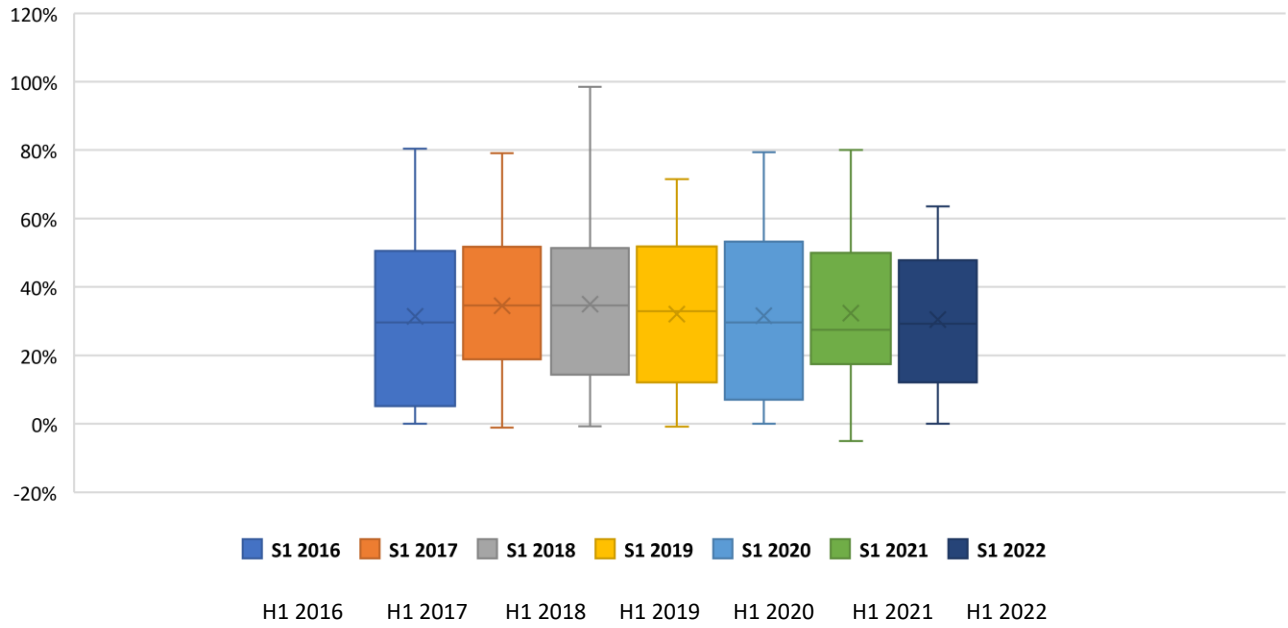
Period	GWP (RON)	Net reinsurance premiums (RON)	Retention rate (%)	Ceding ratio in reinsurance (%)
H1 2016	3,881,504,594	2,648,488,098	68.2%	31.8%
H1 2017	3,972,468,843	2,438,845,472	61.4%	38.6%
H1 2018	3,969,664,621	2,514,401,879	63.3%	36.7%
H1 2019	4,313,973,719	2,689,109,186	62.3%	37.7%
H1 2020	4,548,799,278	2,731,534,219	60.0%	40.0%

H1 2021	5,052,001,010	3,016,677,824	59.7%	40.3%
H1 2022	7,274,408,649	4,768,370,619	65.5%	34.5%

Source: ASF

At the end of September 2022, approximately 34% of gross written premiums were related to reinsurance contracts, down from 36.9% in the same period of 2021.

Chart 82 Distribution of the reinsurance cession ratio of gross premiums written by companies in the period H1 2016 - H1 2022 for the general insurance business



Source: ASF

The gross written premium ceding ratio is an indicator calculated as the **ratio of reinsurance ceded premiums** (the part of the premiums transferred to the reinsurance company in order for it to take over the insured risks) and **total gross written premiums** (total amounts collected from policyholders).

As an indicator of the size of the reinsurance programmes run by companies and therefore of risk transfer, the reinsurance cession ratio for general insurance business ranged from 0% (minimum value recorded for one company) to 64% (maximum value) in H1 2022. From the perspective of statistical indicators showing the central trend of the series, it can be seen that in the period 2016 - 2022, the average and median reinsurance cession ratio did not vary significantly, remaining at relatively similar values throughout the period. Thus, the average varied between 31% and 35%, while the median took values between 27% and 35%.

Life insurance

Traditionally, there have been important differences regarding reinsurance policy between life and general insurance business. In the case of life insurance, insurance companies generally take a much larger share of the risk underwritten.

Because insurance premiums are generally paid in advance and the compensation in the event of an insured event is fixed by contract for each event and is therefore more predictable, life insurance companies do not use reinsurance cession as often as general insurance companies.

Table 12 Development of GWP and net reinsurance premiums for the period H1 2016 - H1 2022 for LI

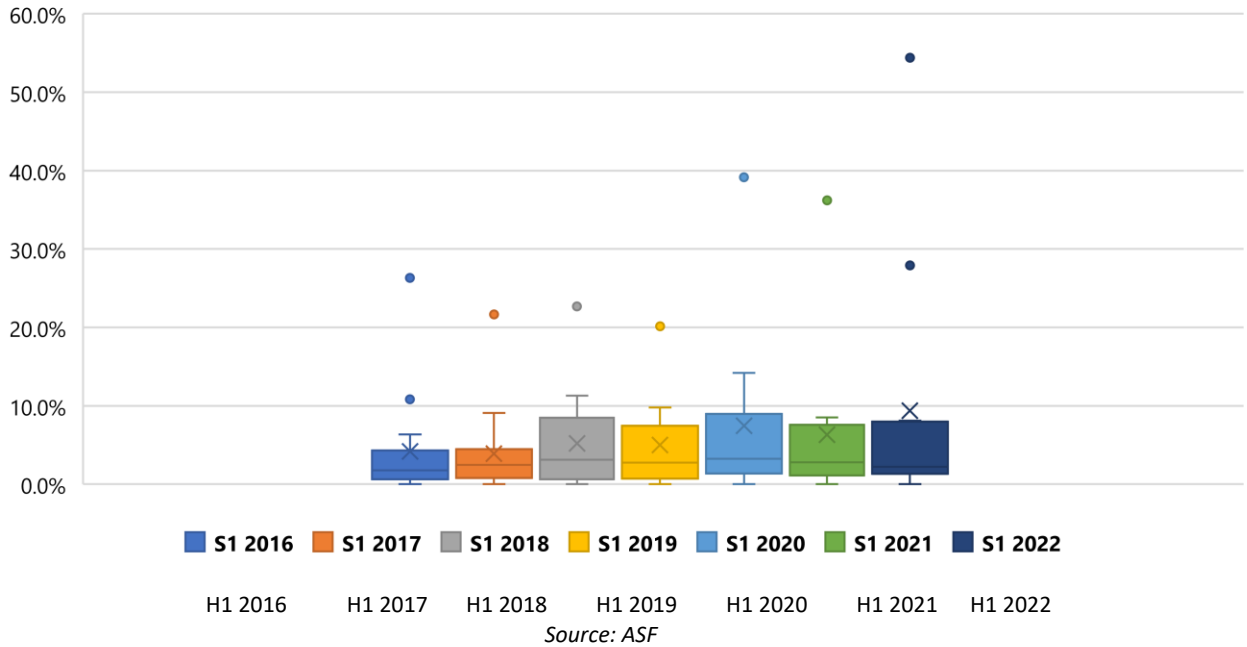
Period	Gross written premiums (RON)	Reinsurance net premium (RON)	Degree of retention	Reinsurance ceding ratio
H1 2016	784,920,172	753,582,222	96.0%	4.0%
H1 2017	1,071,185,386	1,026,519,499	95.8%	4.2%
H1 2018	1.074.855.170	1.063.225.582	98.9%	1.1%
H1 2019	1,124,790,989	1,052,918,739	93.6%	6.4%
H1 2020	1,077,379,258	990,576,101	91.9%	8.1%
H1 2021	1,339,735,088	1,246,152,882	93.0%	7.0%
H1 2022	1,483,546,749	1,302,377,569	87.8%	12.2%

Source: ASF

At the end of June 2022, approximately 12% of gross written premiums were related to reinsurance contracts, an increase compared to the same period in 2021 (7%). The situation at the end of September 2022 remains relatively similar, with a reinsurance ceding ratio of 11.7%.

The reinsurance cession ratio for life insurance business ranged from 0% (for a company that did not cede risks through reinsurance) to 54% (the maximum value recorded) in H1 2022.

Chart 83 Distribution of the reinsurance cession ratio of gross premiums written by companies in the period H1 2016 - H1 2022 for life insurance business



Source: ASF

The reinsurance cession ratio for life insurance business ranged from 0% (for a company that did not cede risks through reinsurance) and 61% (the maximum value recorded) in the first 9 months of 2022.

5.4. Insurance market liquidity

The liquidity indicator is a measure of the ability of insurance companies to meet their short-term obligations to policyholders by holding high quality assets that have a liquid and transparent market and that allow the timely and efficient mobilisation of financial resources to pay claims to policyholders.

Thus, the liquidity ratio is determined as the ratio of liquid assets to insurers' short-term obligations to policyholders, and according to legal requirements, **its value must be super-unit**.

As at 30 September 2022, the liquidity ratio for each of the insurance categories and the items contributing to it were as follows:

Table 13 Liquidity indicator by insurance category as at 30 September 2022

	Government bonds (million RON)	Municipal bonds (million RON)	Securities traded (million RON)	Deposits (million RON)	Current account and cash (million RON)	Short-term liabilities (million RON)	Liquidity ratio
GI	6,778	33	633	1,246	652	4,056	2.30
LI	3,962	49	1,385	174	163	1,687	3.40

Source: ASF

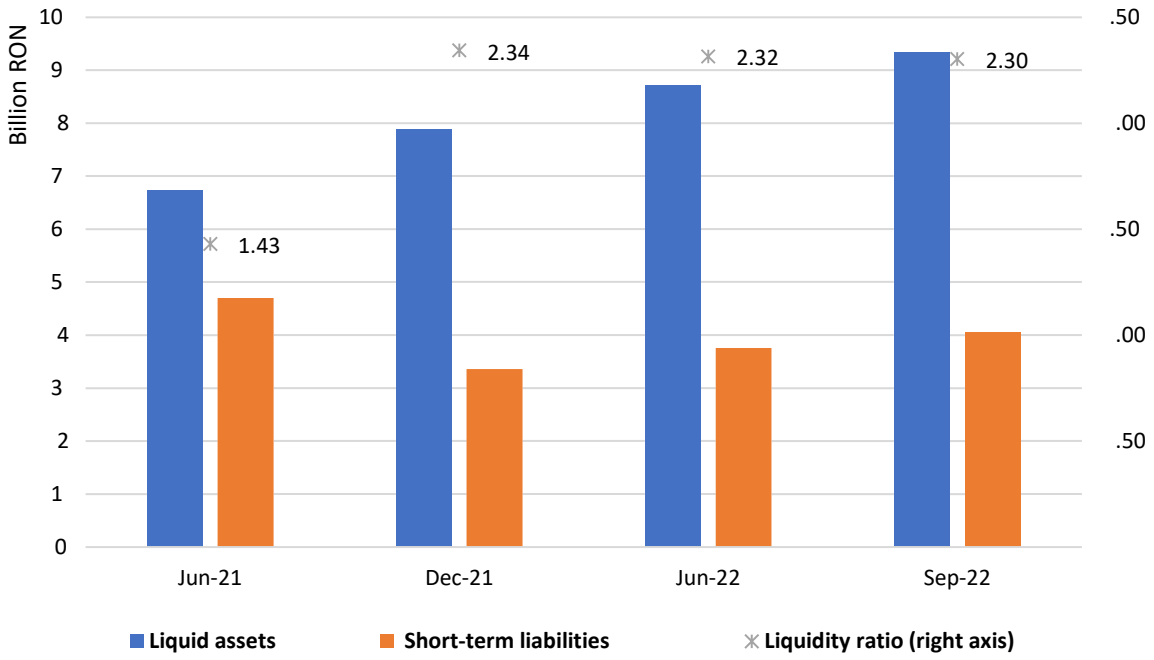
General insurance

At the insurance market level, the **liquidity ratio for general insurance business (2.3) was maintained at a similar level in September 2022 compared to June 2022 (2.32) and December 2021 (2.34)**. The liquidity indicator is at higher values compared to the situation at the end of June 2021.

The value of liquid assets stood at RON 9.3 billion, up 7% compared to June 2022 and 19% compared to the end of 2021.

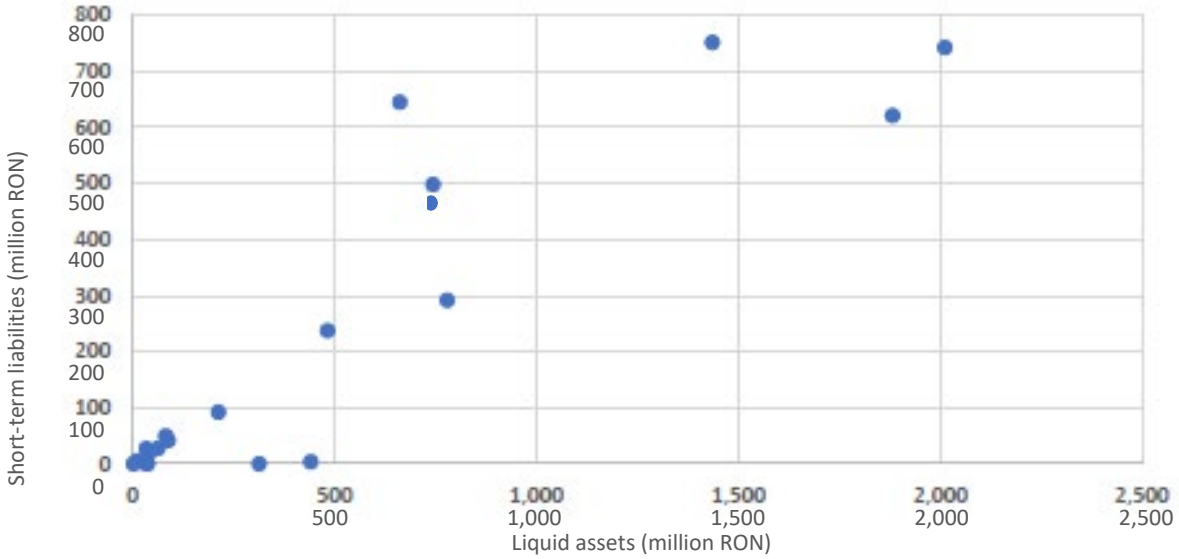
On the other hand, **insurers' short-term liabilities**, represented by the gross claims reserve, increased by 8%, from RON 3.8 billion (June 2022) to RON 4.05 billion (September 2022). Compared to December 2021, short-term liabilities increased by 21%, from RON 3.4 billion.

Chart 84 Evolution of the liquidity indicator for the general insurance business



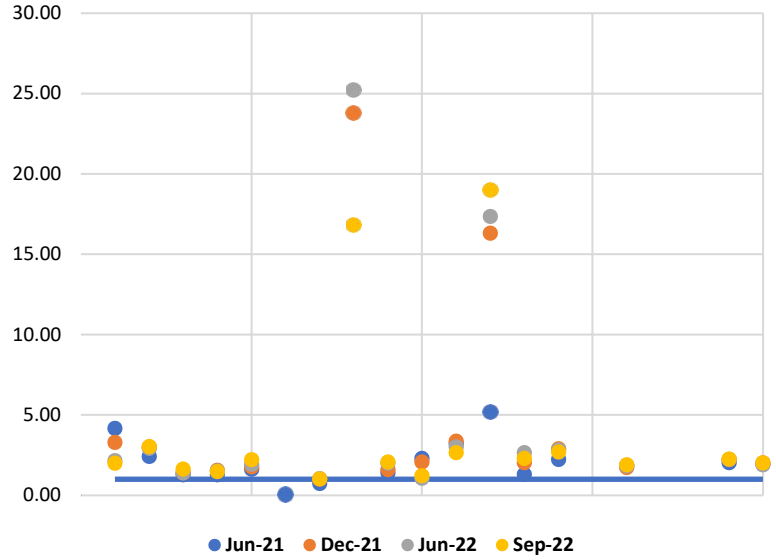
Source: ASF

Chart 85 Liquid assets vs. short-term liabilities for the general insurance business - September 2022



Source: ASF

Chart 86 Liquidity indicator for insurance companies for general insurance business



Source: ASF

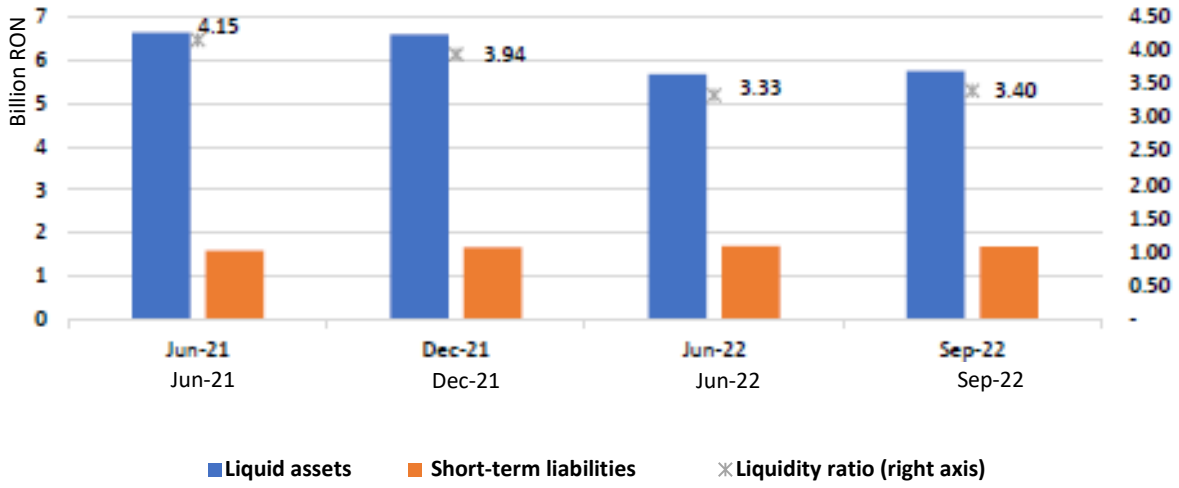
However, a more detailed analysis by insurance company shows that 6 of the 19 companies conducting general insurance business at the end of September 2022 recorded decreases in the liquidity indicator compared to the end of 2021, but a supra-unit level of the indicator is maintained, according to the insurers' reports to ASF. One insurance company recorded a liquidity indicator very close to the value of 1, while all the others exceeded this level.

Life insurance

As regards the liquidity indicator for the life insurance market, there is a decrease from a level of 3.94 (December 2021) to 3.40 (September 2022). Also, compared to June 2021 the decrease was significant, as the indicator stood at a value of 4.15.

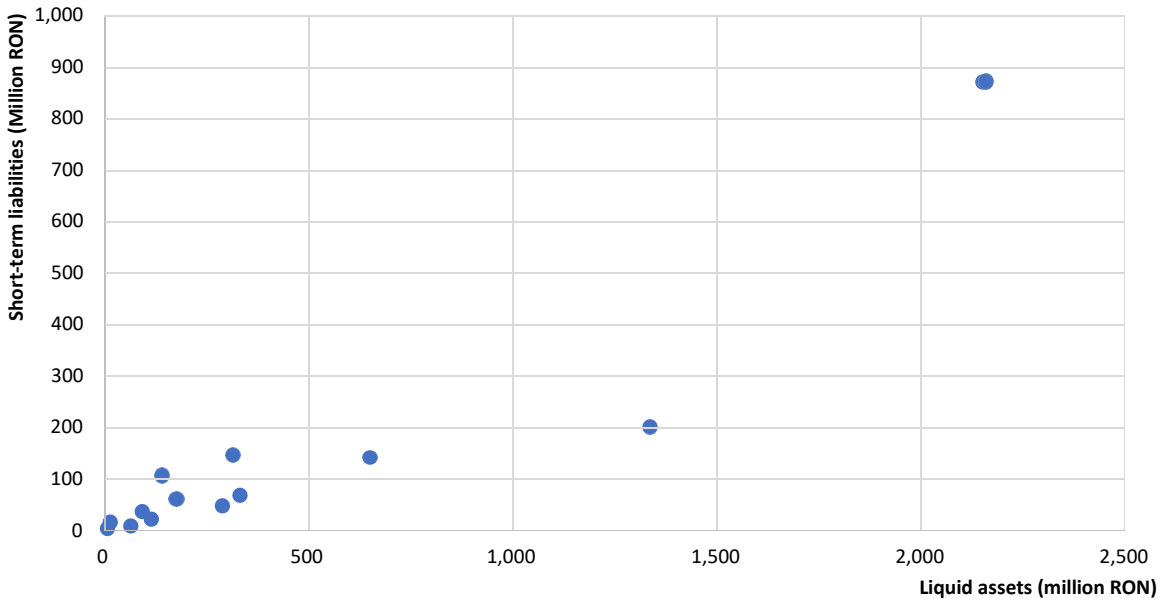
The value of liquid assets stood at a level of RON 5.7 billion, down by 13% in September 2022 compared to December 2021, while **short-term liabilities** remained at a value of about RON 1.7 billion, a relatively similar level to the end of 2021.

Chart 87 Evolution of the liquidity indicator for life insurance business



Source: ASF

Chart 88 Liquid assets vs. short-term liabilities for the life insurance business - September 2022



Source: ASF

Of the 13 companies that conducted life insurance business, 10 companies experienced impairments in the liquidity indicator in September 2022 compared to December 2021. However, all companies have a supra-unit level of the liquidity indicator, which indicates a sufficient level of assets to ensure that obligations to policyholders are met, according to insurers' reports to ASF. Only one company had a liquidity indicator very close to 1 at the end of September 2022.

Chart 89 Liquidity indicator related to insurance companies for the life insurance business

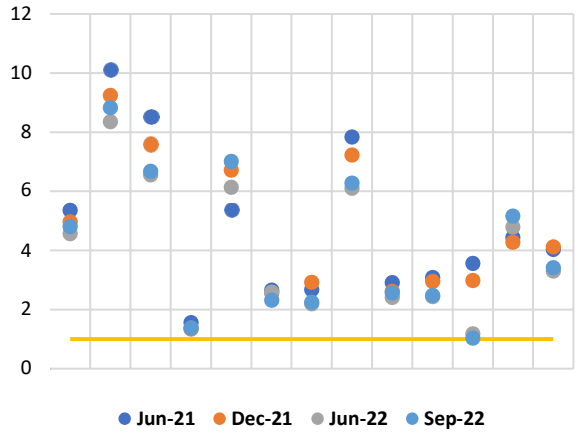
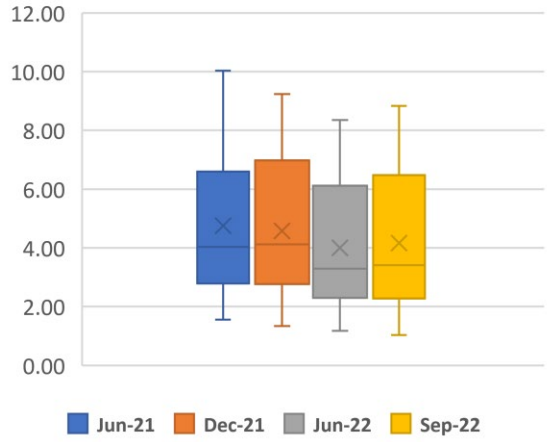


Chart 90 Distribution of liquidity indicator for the life insurance business



Source: ASF

5.5. Profitability of insurance companies

A useful indicator showing a dimension of the profitability of insurance companies is the **ratio of the expenses incurred by insurance companies on claims paid to the income of companies from the conduct of insurance business**, measured by gross premiums written.

The indicator shows how much of the gross premiums written by insurers are used to pay claims to policyholders, i.e. how much is available to insurers, after paying claims, to cover other categories of expenses and make a profit.

Thus, according to this indicator, insurance companies authorised and regulated by SF paid, **on average, in the period H1 2016 - H1 2022, claims for general insurance business representing about 54% of gross written premiums. Thus, insurers have had on average 46% of the proceeds they collect from policyholders in the form of gross written premiums available to cover other categories of expenses and make a profit**.

Moreover, in the first half of 2022, gross claims paid by insurers represented only 40% of gross written premiums, the remaining 60% (i.e. more than RON 4.3 billion) being amounts available for other categories of expenses (including administration and acquisition) and profit, depending on how insurance companies manage their financial resources.

Moreover, only income from insurance business is taken into account, but insurance companies hold investment portfolios that can generate additional income.

Table 14 Evolution of insurers' expenses on claims (gross claims paid) as a proportion of total income from policyholders (gross written premiums) for general insurance business

Period	Gross written premiums GI (GWP, RON)	Gross claims paid GI (RON)	Gross claims paid/ GWP
H1 2016	3,881,504,594	1,802,052,199	46%
H1 2017	3,972,468,843	1,958,217,305	49%
H1 2018	3,969,664,621	2,346,346,150	59%
H1 2019	4,313,973,719	2,775,706,367	64%
H1 2020	4,548,799,278	2,844,208,291	63%
H1 2021	5,052,001,010	3,121,136,469	62%
H1 2022	7,274,408,649	2,945,540,743	40%
Average H1 2016 - H1 2022			**54%**

Source: ASF

In order to determine the profitability of insurance companies for general insurance business, other categories of expenses have also been taken into account, separately from the expenses incurred on claims (gross claims paid), which are the main obligation of insurers in the event of an insured event.

Thus, **on average over the period H1 2016 to H1 2022, other categories of insurance company expenses** (other than gross claims paid) for general insurance business **have a high share, accounting for 34% of gross written premiums**.

In terms of size, the most significant expenses of insurers, after gross claims payments, are represented by **acquisition costs**, which include **commission expenses for premiums brokered by brokerage firms**.

Thus, in the first half of 2022, insurers' expenses, other than gross claims paid, totalled about RON 2.1 billion, up by 16% compared to the same period last year and representing 29% of gross written premiums.

Table 15 Change in the share of insurers' expenses other than gross claims paid, in total gross premiums written by insurers (income from general insurance business)

Period	Gross written premiums GI (GWP, RON)	Claim settlement expenses	Investment management expenses	Administrative costs	Acquisition costs	Total expenses other than gross claims paid	Total expenses other than gross claims paid /GWP
H1 2016	3,881,504,594	116,680,657	5,261,843	496,292,913	808,542,231	1,426,777,644	37%
H1 2017	3,972,468,843	92,783,386	6,349,191	440,631,939	762,993,995	1,302,758,511	33%
H1 2018	3,969,664,621	115,836,502	6,953,470	431,434,722	815,921,137	1,370,145,831	35%
H1 2019	4,313,973,719	127,126,439	5,636,060	481,316,222	953,255,088	1,567,333,809	36%
H1 2020	4,548,799,278	133,307,545	6,176,391	499,996,617	977,806,530	1,617,287,083	36%
H1 2021	5,052,001,010	151,891,706	6,569,689	540,909,887	1,125,663,893	1,825,035,176	36%
H1 2022	7,274,408,649	137,396,313	13,228,650	619,725,061	1,355,386,412	2,125,736,436	29%

Period	Gross written premiums GI (GWP, RON)	Claim settlement expenses	Investment management expenses	Administrative costs	Acquisition costs	Total expenses other than gross claims paid	Total expenses other than gross claims paid /GWP
Average H1 2016 - H1 2022							**34%**

Source: ASF

Acquisition costs related to insurance companies amounted to approximately RON 1.35 billion in the first half of 2022, an increase of 20% compared to the same period last year, accounting for 19% of gross written premiums. Of the acquisition costs, the largest amounts were allocated to commissions for premiums intermediated by brokerage firms (over RON 837 million, i.e. 12% of gross written premiums in H1 2022 for the general insurance business).

Table 16 Development of the share of acquisition costs in gross written premiums for the general insurance business

Indicators	H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022
Acquisition costs (million RON), of which:	**809**	**763**	**816**	**953**	**978**	**1,126**	**1,355**
Expenses related to commissions for premiums intermediated by brokerage firms (million RON)	520	433	490	567	620	716	837
Share of acquisition costs in GWP	**21%**	**19%**	**21%**	**22%**	**21%**	**22%**	**19%**
Share of commission expenses in GWP	13%	11%	12%	13%	14%	14%	12%

Source: ASF

5.6. Risks and vulnerabilities of the Romanian insurance system

Identification of systemically relevant entities

The Supervisory Authority conducts regular internal reviews to identify systemically and sectorally relevant entities in order to strengthen their monitoring and supervision to ensure the strategic objectives of the Authority: insurance market stability and consumer protection.

Following the most recent analysis carried out within ASF, no systemically relevant entities have been identified from a size perspective, given the low share of total assets in GDP, i.e. gross written premiums, of insurance companies authorised and supervised by the Authority.

However, the **high degree of concentration** (especially in certain segments), including in the compulsory motor third party liability (MTPL) insurance market, **indicates the systemic relevance of Euroins in terms of insurance market stability**.

Thus, given the small number of insurers authorised and regulated by ASF on the MTPL market[43], the high market share held by Euroins on the MTPL segment (32% if we take into account the underwriting of the Axeria Iard branch), the company's significant exposure to the compulsory MTPL product[44], as well as its portfolio, we consider Euroins to be a systemically relevant entity on the insurance market.

Euroins Romania

Euroins Romania remains (according to the most recent assessment) in the high supervision category, based on the criteria set out in the internal risk assessment framework which takes into account the business risks and market impact. Accordingly, the intensity of the company's supervisory actions was specific to this supervisory category.

In 2022, 3 permanent inspection actions (supervision) and 3 unannounced inspection actions were carried out. In addition, one periodic inspection action was carried out, according to the approved annual inspection plan for 2022.

As a result of the actions carried out in 2022, ASF imposed sanctions and a series of measures. The fines imposed on the company as a result of **unannounced inspections totalled RON 2,428,573** and **RON 2,821,300** as a result of **permanent inspections**. **The company's general manager was** also **fined a total of RON 310,000.**

Among the **measures imposed on the company** as a result of the above actions are:

- weekly transmission of the statement of all daily receipts and payments, including intra- and inter-bank transfers, for transactions exceeding RON 100,000 or the equivalent in foreign currency;
- reporting on the implementation of the measures taken on the governance of the investment activity and on how the company has taken into account the recommendations of the inspection team contained in the inspection report;
- the obligation to make an inventory by 31.12.2022 of the damage files pending before the courts relating to claims brought by third parties against the insurer and send to ASF the inventory situation and the measures taken.

In addition to these, there are the measures approved in 2021, which are in force at this date, covering the monitoring of technical reserves and claims settlement activity:

- submission of the quarterly *run-off* analysis for RBNS[45] and *run-off* analysis for IBNR[46] on homogeneous risk groups;

[43] As of 30 June 2022, only 7 companies authorised and regulated by ASF are active in the MTPL market, plus one branch (Axeria Iard) under the *Freedom of Establishment* (FoE).

[44] GWP of EUROINS for MTPL have a 94% share in the total volume of premiums written by the company in H1 2022

[45] Approved damage reserve

[46] Unapproved damage reserve

- monthly transmission of the statement of claims in the RBNS reserve balance, of the files of claims paid, files of claims approved in the reporting month, files of claims rejected/time-barred in the reporting month.

Further checks are currently being carried out in accordance with the provisions of Law no. 237/2015 on the authorisation and supervision of insurance and reinsurance activity and Control Regulation no. 4/2021 on the control activity carried out by the Financial Supervisory Authority.

As regards **Euroins, in the first 9 months of 2022,** a total of **3,149 unique petitions** and **non-compliance reports** were registered.

There is also a **high degree of concentration in the guarantee insurance market**, where Onix Asigurări has a share of about 35% of the gross premiums written by all companies authorised and regulated by ASF for this insurance segment. Onix Asigurări's underwriting decreased in the first half of 2022 compared to the same period of the previous year.

Table 17 Evolution of market shares of companies authorised and regulated by ASF operating in the security insurance segment (Class A15)

Class A15	Market share H1 2021	Market share H1 2022	Market share change H1 2022 vs. S1 2021
ONIX ASIGURARI S.A.	41.7%	34.6%	-7.1%
EXIM ROMANIA S.A.	4.2%	19.4%	15.2%
ABC ASIGURARI - REASIGURARI S.A.	9.7%	14.7%	4.9%
EUROINS ROMANIA ASIGURARE REASIGURARE S.A.	1.1%	13.2%	12.1%
ALLIANZ - TIRIAC ASIGURARI S.A.	1.0%	5.5%	4.5%
OMNIASIG VIG	1.9%	4.4%	2.4%
ASITO KAPITAL S.A.	1.4%	3.4%	2.0%
GROUPAMA ASIGURARI S.A.	1.3%	3.0%	1.7%
ASIROM VIENNA INSURANCE GROUP S.A.	1.0%	1.5%	0.5%
ALLIANZ-TIRIAC UNIT ASIGURARI S.A.	-0.1%	0.3%	0.4%
GENERALI ROMANIA ASIGURARE REASIGURARE S.A.	0.1%	0.1%	0.0%
GARANTA ASIGURARI S.A.	0.0%	0.0%	0.0%
CITY INSURANCE S.A.	36.7%	0.0%	
TOTAL	**100.0%**	**100.0%**	-

Source: ASF

In the current context, we believe that it is important to intensify the supervisory process in the case of insurance companies authorised and regulated by ASF, all the more so in the case of insurance companies holding significant market shares in strategic segments with a high degree of concentration.

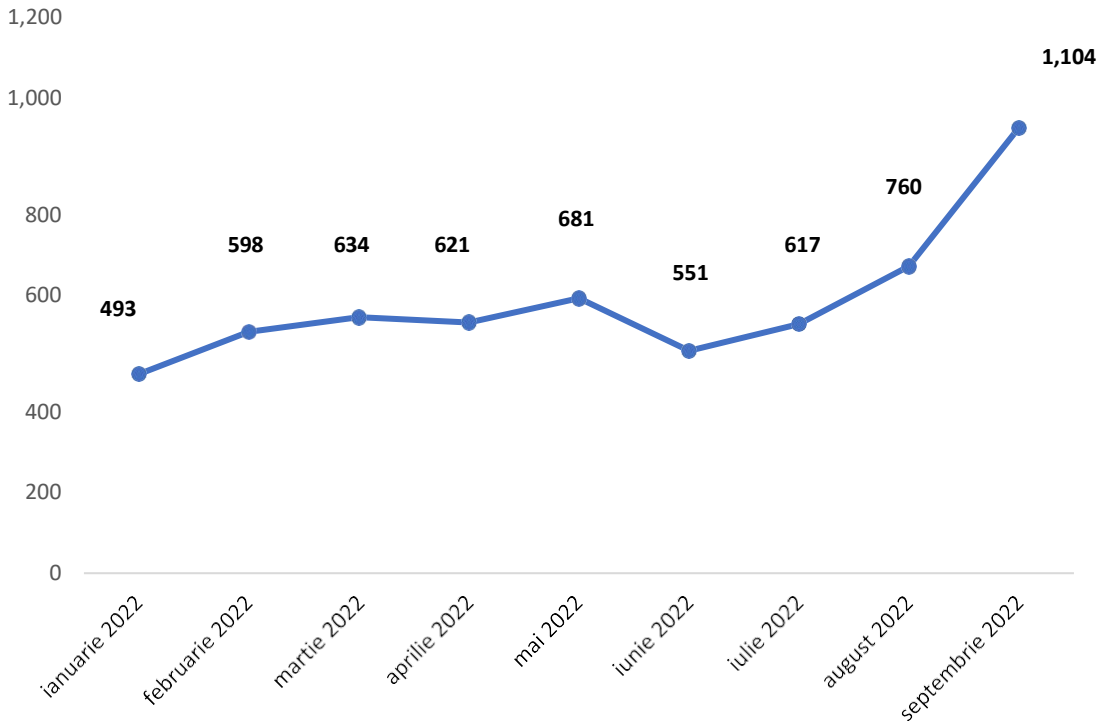
From this point of view, there is a need for intensive monitoring and supervision, including of risks from the perspective of the conduct of insurance companies, i.e. the existence of ambiguous or abusive contractual conditions that could lead to companies refusing to pay compensation in the event of insured risks.

ASF has carried out a series of supervisory actions, focused on the main stages of the underwriting process for guarantee insurance, which have identified certain risks and vulnerabilities. In this respect, ASF issued a series of recommendations on the underwriting and monitoring process of security insurance, published on the Authority's website and sent to insurance companies authorised to underwrite *Class 15 - Security insurance*, together with a request for communication of compliance and implementation modalities.

Conduct risk

In the first nine months of 2022, **6,059 petitions and non-compliance reports**[47] (preliminary data) **were** analysed **uniquely**, **which concerned the Romanian insurance market.** Compared to the same period last year, when 39,811 petitions and non-compliance reports were registered, the period analysed in 2022 **shows an 85% decrease** in the number of petitions and non-compliance reports analysed uniquely. A detailed analysis of the most frequently complained about issues shows that petitions and reports of non-conformity submitted by consumers mainly concerned **non-payment or partial payment of the amount of claims or reimbursement**, which was found in 42% of cases. On the other hand, 44% of the complaints and non-conformity reports concerned **non-compliance with the relevant legislation and ASF rules/contract conditions**.

Chart 91 Monthly evolution of the number of unique petitions and non-conformity reports analysed from January to September 2022



Source: ASF

[47] Not included in this number are the petitions registered for the Policyholders Guarantee Fund, as they relate to insurance claims registered for Societatea de Asigurare-Reasigurare City Insurance S.A.

Table 18 Monthly evolution of the number of unique petitions and non-conformity reports analysed from January to September 2022

Company	Ian 22	Feb 22	Mar 22	April 22	May 22	June 22	July 22	August 22	September 22	Total number of unique petitions and information	*Percentage of the number of petitions and non-conformity reports registered for a company in the unique total number (%)*
EUROINS S.A.	260	311	280	331	324	256	248	417	722	3,149	*51.97%*
ALLIANZ - ȚIRIAC S.A.	40	43	64	67	104	78	87	88	95	666	*10.99%*
GROUPAMA Asigurari S.A.	30	36	47	28	51	65	93	73	74	497	*8.20%*
OMNIASIG VIG S.A.	51	34	66	53	49	41	59	41	62	456	*7.53%*
ASIROM VIG S.A.	28	39	49	26	37	39	33	39	24	314	*5.18%*
GENERALI Romania S.A.	16	15	25	19	36	17	18	33	26	205	*3.38%*
GRAWE Romania S.A.	20	29	23	26	17	17	15	19	15	181	*2.99%*
AXERIA IARD S.A. LYON	0	3	2	7	4	10	16	14	26	82	*1.35%*
UNIQA Asigurari S.A.	6	13	9	7	9	5	7	7	14	77	*1.27%*
*Other entities	42	75	69	57	50	23	41	29	46	432	*7.13%*
Total	493	598	634	621	681	551	617	760	1,104	6,059	*100.00%*

Source: ASF

In terms of the classes of insurance for which petitions and information of non-conformity were registered, 85% concerned the class of motor third party liability insurance.

From the activity of processing and resolving petitions carried out in the period 01.01.2022 - 30.09.2022, **3,209** non-compliant issues were identified with **regard to the processing of MTPL claims by insurers authorized to practice this type of insurance. The main non-conformities identified concerned:**

- late payment of compensation for damage claims;
- failure to comply with the legal deadline for settling claims;
- failure to comply with deadlines for making findings and, where appropriate, additional findings;
- non-payment of penalties when the compensation is paid.

In the supervision process these issues were subject to inspection actions resulting in sanctions and/or measures.

As a result of supervisory activities in the area of conduct of insurance companies, risks and vulnerabilities were identified in relation to certain insurance products, in terms of their correlation

with the requirements, needs and objectives of customers at different stages of the product lifecycle: creation, distribution, after-sales support.

Particular attention was paid to the analysis of insurance products distributed through the *bancassurance* channel (property insurance, life insurance). The supervisory authorities of the Member States together with EIOPA launched a thematic surveillance action on these insurance products, which also included relevant insurance companies in Romania, which identified the following risks:

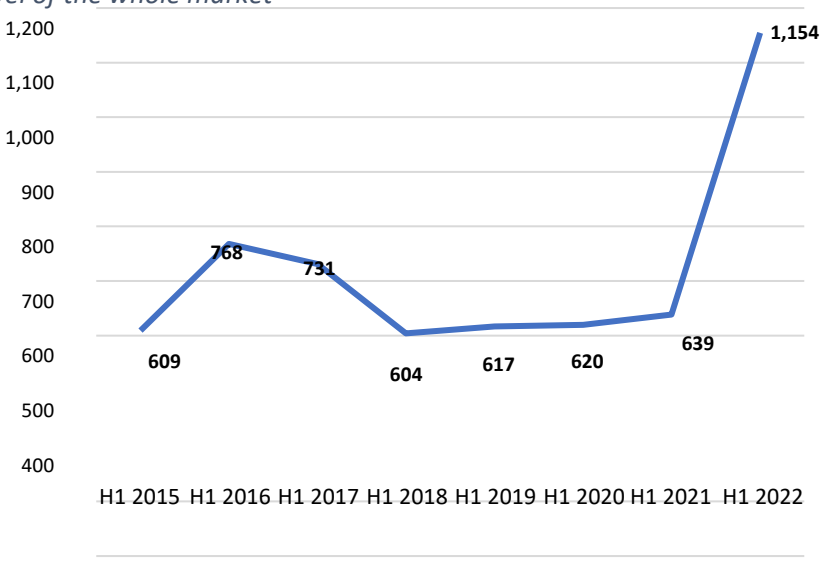
- high remunerations paid to insurance distributors for the sale of life insurance products attached to bank loans by insurers,
- potential conflicts of interest in the context of *bancassurance* business models.

Thus, a warning has been sent to insurance companies and credit institutions, as insurance distributors, regarding life insurance products attached to bank loans, to take measures to mitigate/prevent these risks. ASF also monitors life insurance products with an investment component, from the perspective of their distribution to a relevant target market in the context of ensuring a correct and complete process of information and advice to customers.

Increase in the average MTPL premium

There was a significant increase in the value of average MTPL premiums in the first half of 2022 compared to the same period of the previous year, the **average annualised MTPL premium for the entire compulsory motor third party liability insurance market (companies authorised and regulated by ASF) increased by 81%, from RON 639 (first half of 2021) to RON 1,154 (first half of 2022)**.

Chart 92 Evolution of the average annualised MTPL premium (RON) at the level of the whole market



A more detailed analysis shows that in H1 2022, the average annualised MTPL premium was ranking at the highest recorded values, with significant increases for both segments: natural persons (+82% compared to H1 2021, an increase BY over RON 400 in absolute values) and legal entities (+68%, respectively by RON 800 more than in H1 2021).

Source: ASF

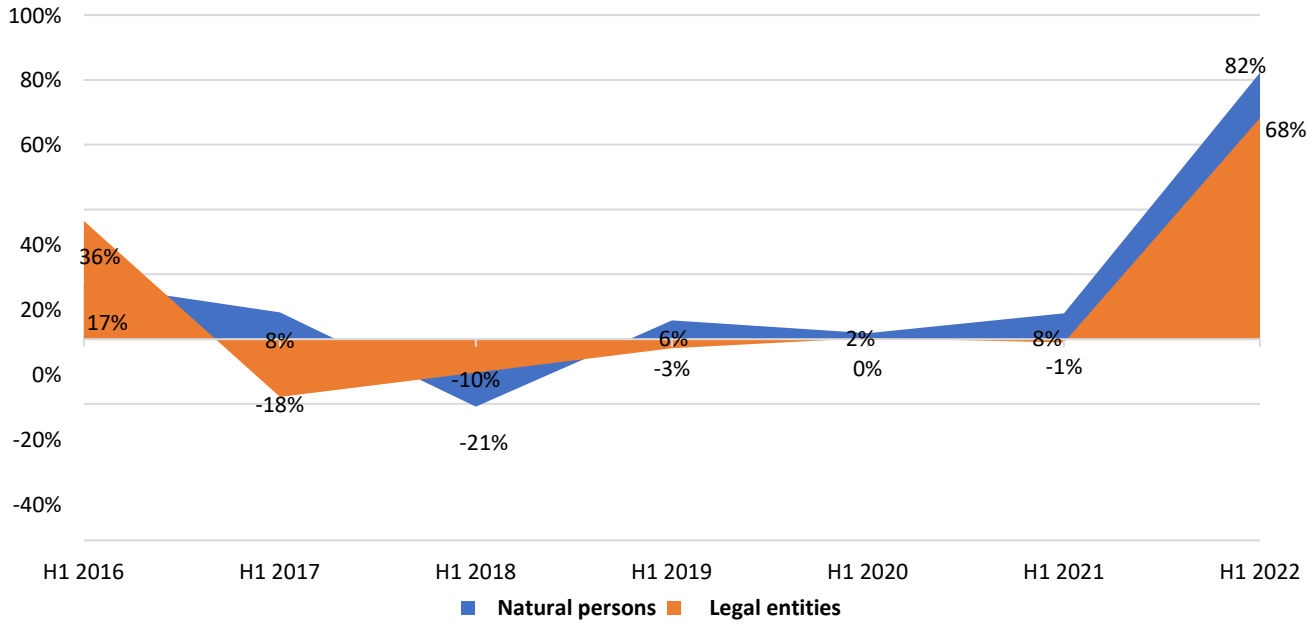
On 30 September 2022, the average annualised MTPL premium stood at RON 1,152, similar to the level recorded in the first 6 months of the year. The average annualised MTPL premium for natural persons was RON 910 and for legal entities it was RON 1,906.

Table 19 Evolution of the average annualised MTPL premium (RON) by category of persons

Average annualised MTPL premium (RON)	H1 2015	H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022
Natural persons	424	497	538	426	451	459	496	904
Legal entities	1,209	1,650	1,356	1,217	1,184	1,188	1,176	1,978

Source: ASF

Chart 93 Evolution of annual rates of change in average annualised MTPL premium (%) by category of persons



Source: ASF

Also, **for all insurance companies there are consistent price increases for all categories of average MTPL premiums**.

Of the 7 insurance companies supervised and authorised by ASF to also provide compulsory motor third party liability insurance, which carried out business during the first half of 2022, 3 companies recorded annual growth rates in the average annualised MTPL premium of between 60 and 90%, and 2 companies recorded growth of between 90 and 120%. One company has seen a 33% increase in the average annualised MTPL premium, while at the other end of the scale, one company has seen a 121% increase.

The distribution of average annualised MTPL premiums shows a significant increase. While in H1 2021 the highest average annualised MTPL premium was RON 892, in H1 2022 the lowest average annualised MTPL premium recorded by a company was RON 952.

Chart 94 Distribution of average annualised MTPL premiums for companies in the total MTPL market

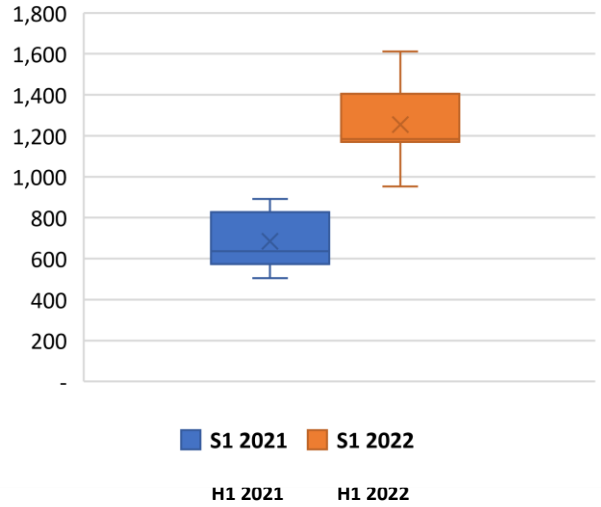
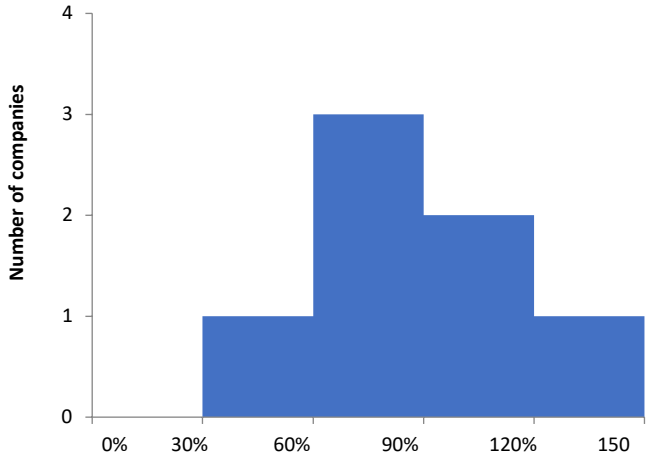
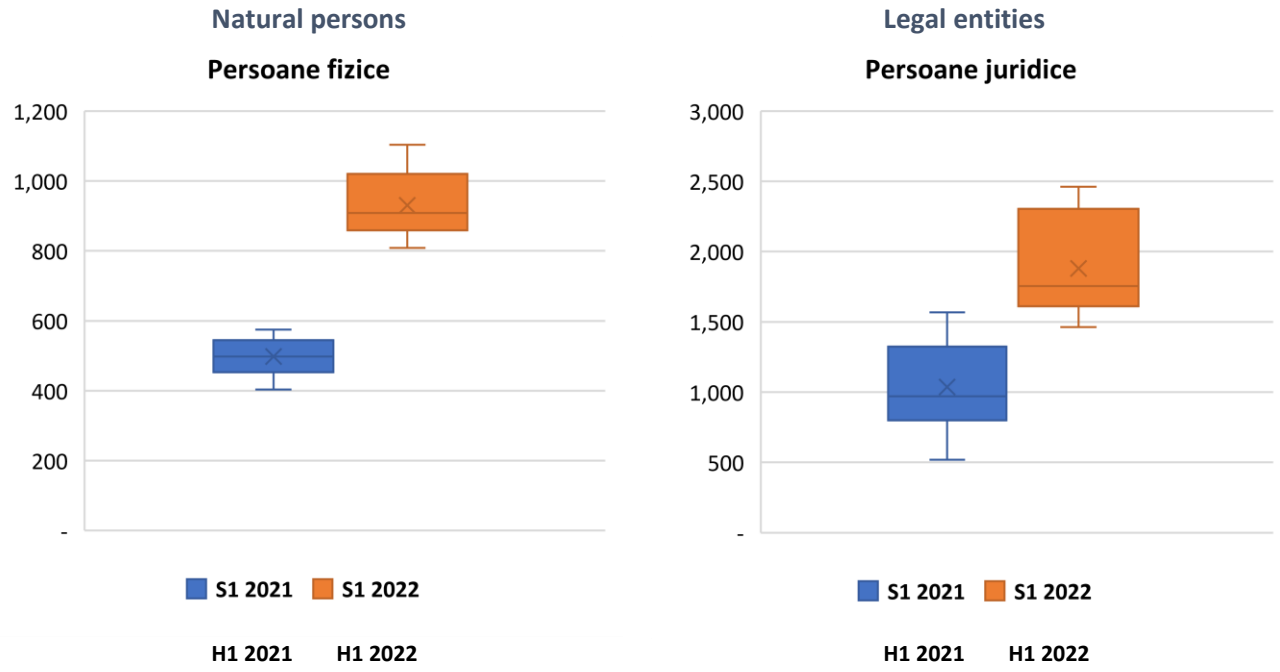


Chart 95 Distribution of average annualised MTPL premium growth rates for companies in H1 2022 compared to H1 2021



Source: ASF

Chart 96 Distribution of average annualised MTPL premiums for natural persons and legal entities respectively



Source: ASF

In view of the most recent developments in the MTPL market in Romania, ASF conducted an analysis to identify the economic fundamentals behind the sharp increases in MTPL rates charged by insurers in this segment. In general, the increase in claims or the expectation of an increase in the amount of gross claims to be paid to policyholders are the most important economic justifications on which companies base their decisions to increase rates.

In this case, during the first half of 2022, the **value of gross written premiums increased by 89%** in the first half of 2022 compared to the same period last year, **as insurers have**

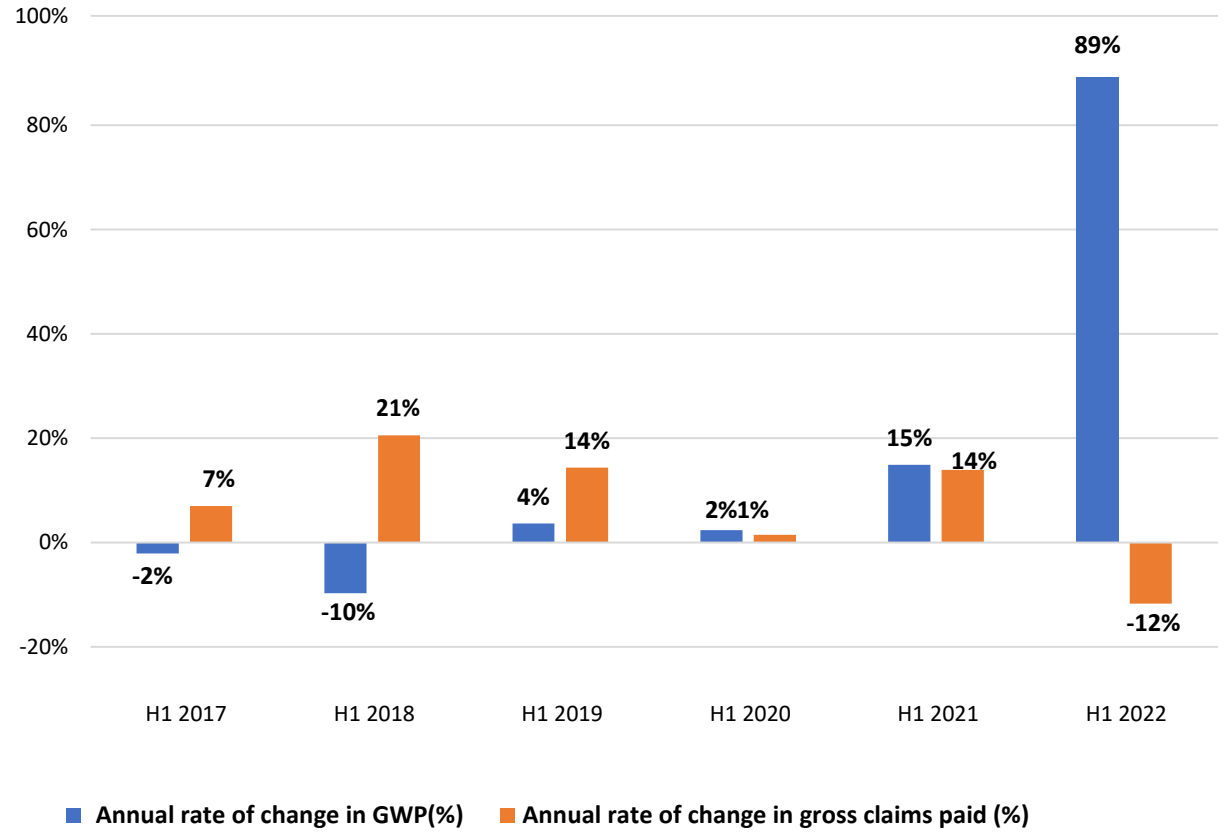
paid gross claims 12% lower than in H1 2021. Thus, insurers authorised and supervised by ASF recorded RON 2 billion higher gross written premium income, while they paid out RON 200 million lower gross claims to policyholders in H1 2022 compared to H1 2021.

Table 20 Evolution of the volume of gross written premiums for the compulsory motor third party liability insurance segment (only MTPL - companies authorised and regulated by ASF)

Indicator	H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022
GWP (billion RON)	2,08	2,04	1,84	1,91	1,95	2,25	4,25
Gross claims paid (billion RON)	1,03	1,11	1,33	1,52	1,55	1,76	1,56

Source: ASF

Chart 97 Annual rate of change in gross written premiums and gross claims paid (year/year)



Source: ASF

Analysis of insurers' income and expenses - Class A10 (MTPL and CMR)

Taking into account the most recent developments in the MTPL market in Romania, ASF has conducted **an analysis of the income of insurance companies for Class A10 (MTPL and CMR), measured by gross written premiums, and the main categories of expenses**, for the period H1 2016 - H1 2022.

The main expense of insurance companies is the cost of claims in order to meet their obligations to policyholders in the event of an insured event. **A decrease in the value of gross claims paid (-14%) is observed, from RON 1.81 billion** (in H1 2021) **to approximately RON 1.56 billion** (H1 2022). On the **income side,** however, **gross written premiums for Class A10** (MTPL and CMR) **recorded a considerable advance of 83% (an increase of RON 2 billion),** from a volume of RON 2.3 billion in H1 2021 to RON 4.3 billion in H1 2022.

Thus, in the first half of 2022, the **value of gross claims paid by companies to policyholders for Class A10 represented only 36% of the value of gross premiums written by companies**. The insurance companies had total liquid assets amounting to RON 2.75 billion (the remaining 64% of gross written premiums), after covering their obligations to policyholders by paying gross claims, managing other categories of expenses and making profits.

Moreover, the **average share of gross claims paid in the value of gross written premiums was 59% in the period H1 2016 - H1 2022**, with insurance companies recording an average half-yearly value of gross written premiums of RON 2.4 billion in H1 2016 - H1 2022 and paying policyholders, on average, around RON 1.4 billion in gross claims related to Class A10 in the first 6 months of 2016 - 2022. Thus, on average, **about 41% of the value of gross written premiums represented company income available for managing other categories of expenses and making profit**.

Acquisition costs (which include expenses on commissions paid to brokerage firms for intermediated premiums) and **administration expenses** (including salaries and fees paid by insurers) amounted **to RON 980 million in the first half of 2022, representing 23% of the value of gross premiums written by insurance companies**.

On average, in the period H1 2016 - H1 2022, **acquisition and administration expenses represented about 28% of the value** of **gross written premiums**, with the average half-yearly amount (RON 670 million) representing about half (47%) of the value of gross claims paid (of companies' obligations to policyholders).

Table 21 Expenses of insurance companies on gross premiums written for Class A10

Indicators	H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022	Average H1 2016 - H1 2022
Gross claims paid/GWP	48%	54%	71%	77%	77%	77%	36%	59%
Claim settlement expenses/ GWP	3%	2%	3%	3%	3%	3%	2%	2.6%
Investment management expenses/GWP	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.2%	0.1%

Administrative costs/GWP	**11%**	**10%**	**10%**	**10%**	**10%**	**10%**	**7%**	**9%**
Acquisition costs/GWP	**19%**	**17%**	**18%**	**20%**	**20%**	**21%**	**16%**	**18%**
Administrative and acquisition costs/GWP	**30%**	**27%**	**28%**	**31%**	**30%**	**30%**	**23%**	**28%**
Total expenses/GWP	**82%**	**83%**	**102%**	**111%**	**110%**	**110%**	**61%**	**90%**

Source: ASF

Claim settlement expenses[48] ranged from RON 42 to RON 71 million between 2016 and 2022. As a share of insurers' revenues, claim settlement expenses did not vary significantly in the first 6 months of 2016 - 2022, representing on average about 3% of gross written premiums.

Table 22 Evolution of acquisition and administration costs and gross claims paid by insurance companies for Class A10 (MTPL and CMR) in the period H1 2016 - H1 2022

Period	Acquisition and administration costs (RON)	Gross claims paid (RON)	Acquisition and administration costs/ gross claims paid
H1 2016	655,811,277	1,044,523,852	63%
H1 2017	564,589,832	1,128,277,109	50%
H1 2018	537,505,813	1,359,070,806	40%
H1 2019	616,535,104	1,559,040,694	40%
H1 2020	620,191,027	1,587,147,249	39%
H1 2021	714,550,551	1,809,102,460	39%
H1 2022	980,004,733	1,560,104,661	63%
Average H1 2016 - H1 2022	**669,884,048**	**1,435,323,833**	**47%**

Source: ASF

Thus, in H1 2022, acquisition and administration costs related to Class A10 amounted to about RON 980 million, up by 37% compared to H1 2021. These represented **around 23% of gross written premiums for this class, i.e. 63% of gross claims paid.**

Table 23 Evolution of gross written premiums (insurers' income from insurance business) and expenses incurred by insurers for Class A10 (MTPL and CMR)

		H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022
Income (Million RON)	**GWP Class A10 (premium income)**	2,157	2,105	1,919	2,013	2,066	2,357	4,310
Expenses (Million RON)	Gross claims paid Class A10 (liabilities to policyholders as a result of the occurrence of events insured)	1,045	1,128	1,359	1,559	1,587	1,809	1,560
	Claim settlement expenses	64	42	61	63	67	71	68

[48] Expenses related to processing and settling claims, including legal costs and expert valuers' fees and bank charges for compensation payments

Investment management expenses	3	3	3	2	2	2	9
Administrative costs	239	215	183	207	211	228	295
Acquisition costs	417	350	355	409	409	487	685
Total	**1,768**	**1,738**	**1,960**	**2,241**	**2,276**	**2,596**	**2,617**

Source: ASF

Although there were years when the total amount of expenses reported by insurance companies exceeded the amount of gross premiums written, it can be seen that **throughout the period under review companies had between 23% and 64% of gross written premium income available to manage expenses and make a profit after paying out claims to policyholders.** Thus, in the first 6 months of the period 2016 - 2022, the **value of revenues measured as gross written premiums for Class A10 (MTPL and CMR) exceeded the value of companies' obligations to policyholders** (the value of gross claims paid).

Moreover, it should be noted that **insurance companies hold investment portfolios, which generate income in addition to that received from premiums paid by policyholders**. This analysis covers only the income of companies exclusively from the insurance business carried out for Class A10 (MTPL and CMR).

Table 24 Expenses of insurance companies (other than gross claims paid to policyholders) in gross claims paid for Class A10

Indicator	H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022
Acquisition and administration costs (RON), of which:	**655,811,277**	**564,589,832**	**537,505,813**	**616,535,104**	**620,191,027**	**714,550,551**	**980,004,733**
Acquisition costs (RON)	417,069,132	349,768,553	354,892,407	409,437,650	409,086,631	487,011,503	684,713,880
Administration costs (RON)	238,742,145	214,821,279	182,613,406	207,097,454	211,104,396	227,539,048	295,290,853
Gross claims paid (RON)	**1,044,523,852**	**1,128,277,109**	**1,359,070,806**	**1,559,040,694**	**1,587,147,249**	**1,809,102,460**	**1,560,104,661**
Acquisition and administration costs/ gross claims paid	**63%**	**50%**	**40%**	**40%**	**39%**	**39%**	**63%**
Acquisition costs/ Gross claims paid	40%	31%	26%	26%	26%	27%	44%
Administration costs/ Gross claims paid	23%	19%	13%	13%	13%	13%	19%

Source: ASF

Insurance market concentration

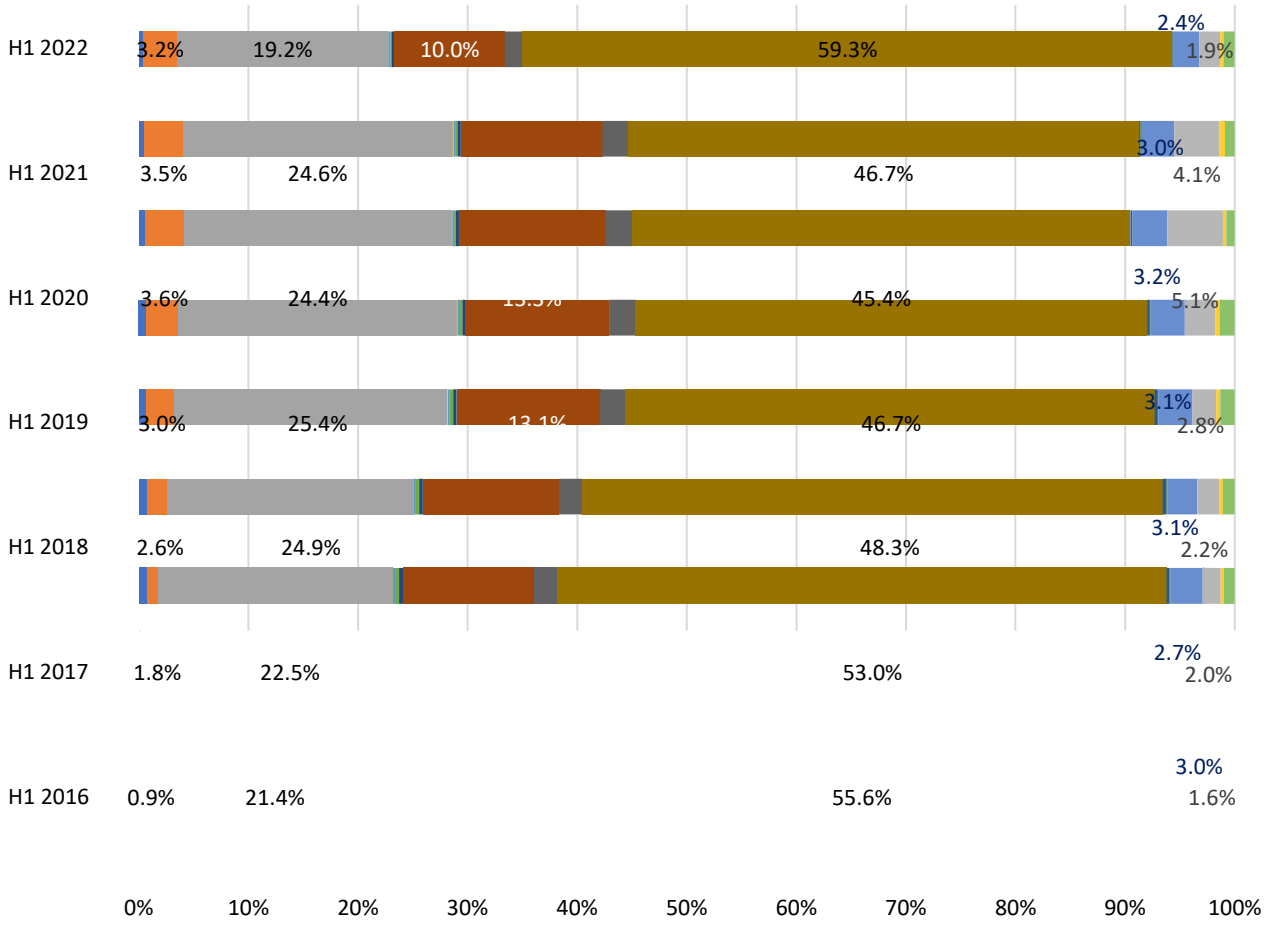
The high degree of concentration in the insurance market continues to be a vulnerability both in terms of exposure by class of insurance and in terms of significant market shares held by a relatively small number of insurance companies.

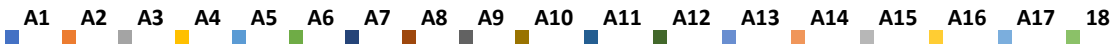
In terms of class exposure, the Romanian insurance market is characterised by a high degree of concentration both in the general insurance segment (motor insurance dominates the local market: Classes A3 and A10) and in life insurance business.

General Insurance

The highest underwriting values are recorded by **motor insurance - Classes A10 (MTPL and CMR) and A3 (CASCO) represent 78.5% of the general insurance market, up by more than 7 pp compared to H1 2021 (71.3%)** due to the significant increase in gross written premium volume for class A10. The top 3 insurance classes in terms of gross written premium volume have a combined share of 88.5% in gross written premiums for the entire general insurance business conducted by companies authorised and regulated by ASF.

Chart 98 Share of gross written premiums by class of insurance in total gross written premiums for the general insurance business





Source: ASF

As regards concentration by gross written premiums of companies, the CR3 indicator used by the Competition Council, which represents the value of the aggregate market shares of the top 3

insurance companies in terms of volume of gross written premiums, **recorded a value of 61.3% in the general insurance segment at the end of H1 2022, up from the level recorded in H1 2021 (55%)**.

The largest increases in market share were recorded by Groupama Asigurări (from 10.5% in H1 2021 to 21% in H1 2022), Euroins Romania (from 14.4% to 21%) and Allianz- Țiriac (from 12.6% to 19.3%).

Table 25 Ranking of the top 15 insurance companies by market share in the general insurance segment

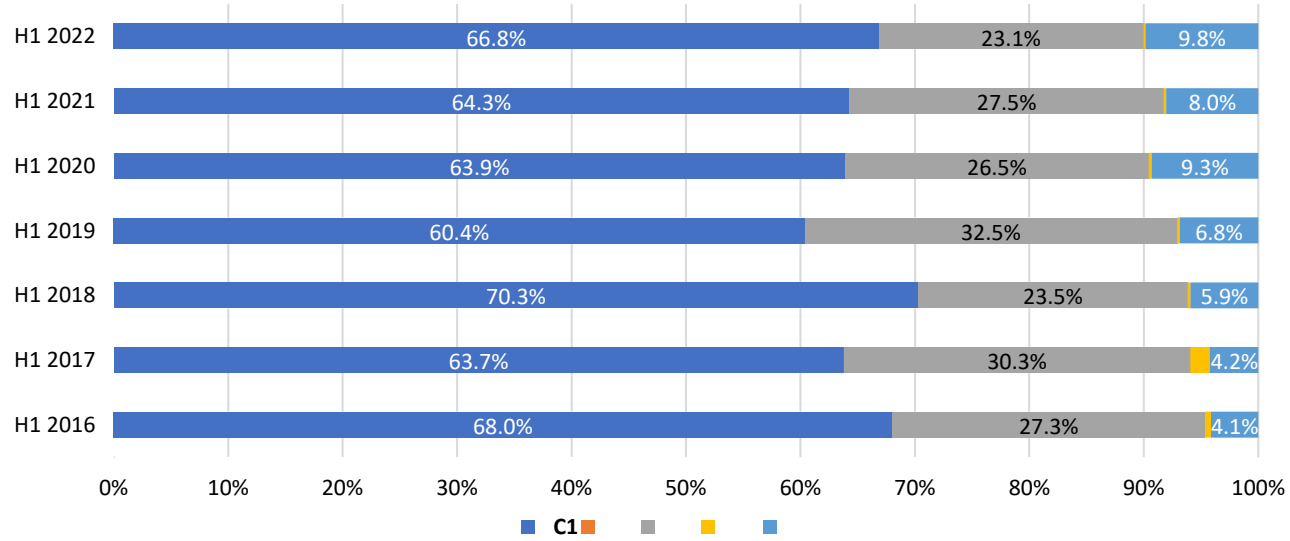
	H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022
EUROINS ROMANIA ASIGURARE REASIGURARE S.A.	10.3%	15.6%	12.1%	14.5%	14.8%	14.4%	21.0%
GROUPAMA ASIGURARI S.A.	10.9%	11.2%	12.2%	12.2%	11.0%	10.5%	21.0%
ALLIANZ - TIRIAC ASIGURARI S.A.	13.8%	14.3%	15.3%	14.2%	13.0%	12.6%	19.3%
OMNIASIG VIG	11.7%	12.9%	14.1%	14.8%	14.3%	14.4%	14.6%
ASIROM VIENNA INSURANCE GROUP S.A.	15.6%	10.2%	11.8%	4.9%	5.9%	5.9%	8.0%
GENERALI ROMANIA ASIGURARE REASIGURARE S.A.	6.1%	7.4%	6.6%	6.6%	5.2%	4.7%	4.8%
GRAWE ROMANIA ASIGURARE S.A.	0.0%	0.1%	0.3%	1.1%	1.3%	1.2%	4.0%
UNIQA ASIGURARI S.A.	5.4%	5.1%	4.1%	4.3%	4.0%	3.8%	2.6%
P.A.I.D.	1.8%	1.7%	1.8%	1.7%	1.7%	1.7%	1.2%
ONIX ASIGURARI S.A.	0.5%	0.5%	0.4%	0.4%	2.0%	1.7%	0.7%
ALLIANZ-TIRIAC UNIT ASIGURARI S.A.	1.2%	1.4%	1.9%	1.1%	0.8%	0.8%	0.7%
SIGNAL IDUNA ASIGURARI S.A.	0.6%	0.9%	0.8%	0.6%	0.5%	0.5%	0.5%
EXIM ROMANIA S.A.	0.2%	0.1%	0.1%	0.2%	0.2%	0.2%	0.4%
ABC ASIGURARI - REASIGURARI S.A.	0.3%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%
GARANTA ASIGURARI S.A.	0.4%	0.4%	0.4%	0.5%	0.4%	0.4%	0.3%
Total 1 - 15	**78.8%**	**82.2%**	**82.2%**	**77.5%**	**75.7%**	**73.5%**	**99.6%**

Source: ASF

Life Insurance

The degree of concentration by class of life insurance remains high, with the top two classes of general insurance, **Class C1** (Life insurance, annuities and supplementary life insurance) and **Class C3** (Life insurance and annuities, linked to investment funds) **accounting for around 90% of the life insurance market**.

Chart 99 Share of gross written premiums by class of insurance in total gross written premiums for the life insurance business



Source: ASF

The top 3 companies have a combined market share of around 66% in H1 2022, which is relatively similar to the situation at the end of H1 2021 (65%).

Table 26 Ranking of insurance companies by market share in the life insurance segment

	H1 2016	H1 2017	H1 2018	H1 2019	H1 2020	H1 2021	H1 2022
NN ASIGURARI DE VIATA S.A.	40.7%	33.5%	35.0%	35.6%	39.1%	34.2%	32.5%
BCR ASIGURARI DE VIATA VIG S.A.	11.4%	18.2%	16.0%	18.3%	12.6%	16.8%	23.3%
ALLIANZ - TIRIAC ASIGURARI S.A.	7.5%	6.9%	7.2%	7.3%	8.7%	9.3%	9.9%
BRD ASIGURARI DE VIATA S.A.	6.5%	6.5%	8.5%	11.3%	12.8%	14.4%	9.3%
SIGNAL IDUNA ASIGURARE REASIGURARE S.A.	2.7%	2.9%	4.7%	5.3%	7.2%	5.9%	7.8%
UNIQA ASIGURARI DE VIATA S.A.	3.4%	2.6%	4.1%	3.7%	3.4%	4.3%	4.8%
GENERALI ROMANIA ASIGURARE REASIGURARE S.A.	4.8%	3.2%	3.2%	6.2%	5.5%	5.8%	4.1%
ASIROM VIENNA INSURANCE GROUP S.A.	7.3%	6.1%	6.9%	5.9%	4.8%	3.9%	3.3%
GROUPAMA ASIGURARI S.A.	2.3%	1.6%	2.0%	1.5%	2.1%	2.1%	2.0%
GRAWE ROMANIA ASIGURARE S.A.	2.8%	2.1%	2.1%	2.0%	2.1%	1.8%	1.7%
EUROLIFE FFH ASIGURARI DE VIATA S.A.	3.6%	8.5%	1.3%	0.9%	0.8%	0.6%	0.5%
SIGNAL IDUNA ASIGURARI DE VIATA S.A.	5.4%	7.0%	8.9%	1.8%	0.6%	0.6%	0.5%
GARANTA ASIGURARI S.A.	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.2%
AXA LIFE INSURANCE S.A.	1.1%	0.5%					

Source: ASF

Although the local insurance market continues to be significantly dependent on motor insurance (Classes A3, CASCO, and A10, MTPL and CMR), the life and health insurance segment is gradually strengthening.

6. Private pension market stability

The private pension market in the European context

Private pensions are an important financial component globally, a trend that is also observed locally. Assets of private pension funds in Romania increased from 3% of GDP in 2014 to around 7% of GDP in the first half of 2022.

There is a certain degree of heterogeneity in private pension schemes in European countries. In general, central eastern states rely on defined contribution (DC) schemes and western states focus on defined benefit (DB) schemes, while only four states also opt for hybrid schemes (Belgium, Liechtenstein, Luxembourg and Spain), according to a report published by EIOPA in 2018.

In some countries there are other investment vehicles, except pension funds, in which retirement savings can be accumulated. For example, one way of saving for retirement is *provisions* in employers' books, which is common in countries such as Austria, Germany and Sweden. Other forms of saving for retirement are: individual pension insurance contracts in Belgium, Denmark, France and the USA or individual retirement savings accounts managed by banks or investment firms in Belgium, Denmark and the USA. More assets are accumulated in these types of retirement savings than in pension funds in Belgium, Denmark, France, Latvia or Sweden.

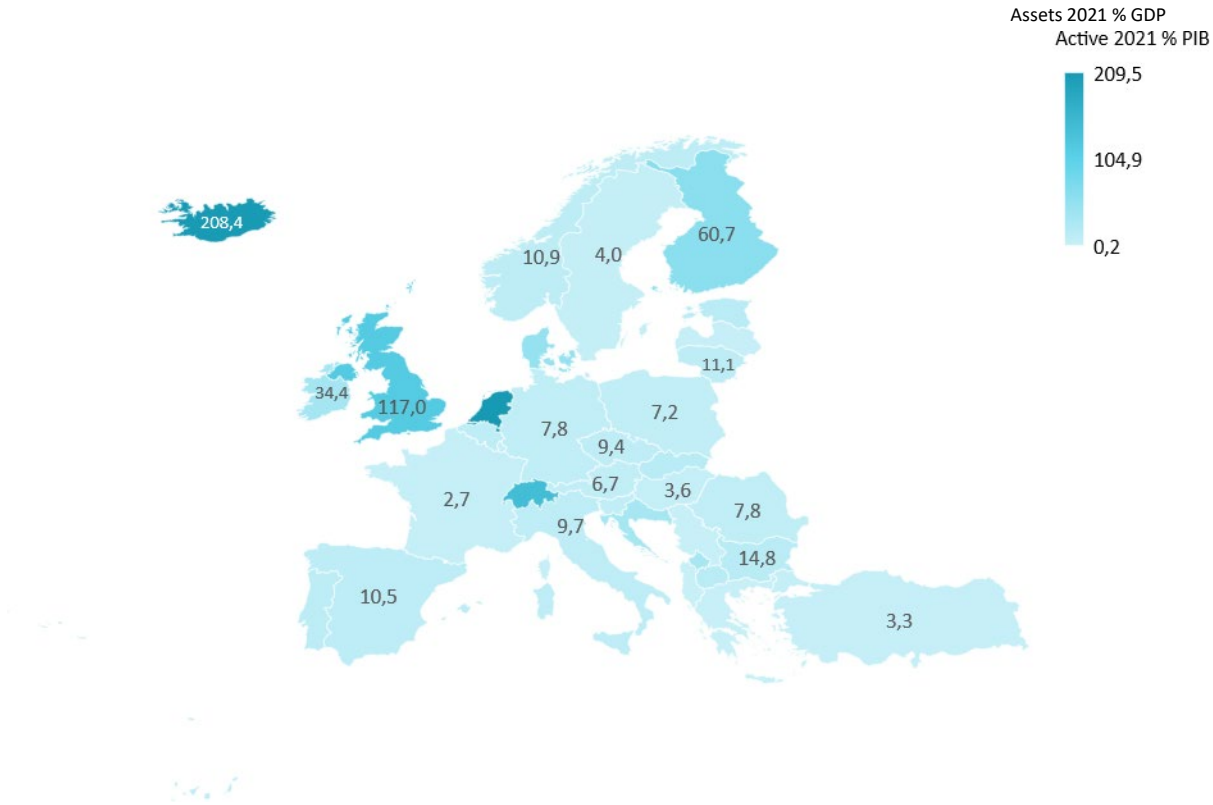
Currently, the private pension system in Romania is composed of Pillar II (privately managed pensions) and Pillar III (voluntary pensions), both of which are defined contribution (DC). In 2020, a fourth pension pillar was established in Romania, namely the occupational pension (DC) system, for which occupational pension funds have not yet been set up.

Taking into account the size of each country's economy, total private pension fund assets as a percentage of GDP give a clearer picture of the importance of private pensions.

Globally, total private pension fund assets reached USD 38.5 trillion in 2021[49], up by 8% compared to the previous year. In absolute terms, the highest asset values for private pension funds were recorded in the Americas, Australia, the Netherlands, Canada, Japan and Switzerland. Private pension penetration, calculated as the ratio of total assets of retirement savings vehicles to GDP, differs from country to country, with the highest level for 2021 recorded by Iceland (219%), followed by Denmark (211%), according to the OECD. In the case of Romania, private pension penetration reached 7.8% in 2021. In Estonia, the indicator reached 16.8%, in Croatia the level was 33.1%, in Slovakia 15.9% and in Poland the penetration reached 7.2%.

[49] Pension Markets in Focus Preliminary 2021

Chart 100 Private pension penetration in 2021 (total assets of private pension funds % GDP)



Source: OECD - Pension Markets in Focus, preliminary data

As it can be seen in the graph below, the most developed European countries in terms of retirement savings are in North-West Europe.

Table 27 Evolution of private pension penetration (total retirement savings assets % GDP)

	Assets % GDP 2011	Assets % GDP 2021
Iceland	129.2	219.1
Denmark	180.9	210.8
USA	116.0	170.0
Sweden	59.5	101.8
Belgium	25.1	36.6
Croatia	12.9	33.1
Kosovo	14.2	30.9
Latvia	6.9	20.5
Estonia	8.4	16.8
Slovakia	8.1	15.9
North Macedonia	3.5	15.0
Bulgaria	5.7	14.8
Spain	12.5	14.2

Italy	5.6	12.6
Lithuania	3.9	11.1
France	8.4	11.1
Czech Republic	6.1	9.4
Slovenia	6.0	7.8
Romania	**1.2**	**7.8**
Hungary	3.7	5.2
Serbia	0.3	0,8
Albania	0.0	0,2

Source: OECD - Pension Markets in Focus, preliminary data

The investment structure of portfolios influences the returns earned by investment vehicles. Thus, a higher portfolio allocation to risky assets implies higher potential returns but also higher volatility of returns.

Given the mandatory nature of the privately managed pension scheme in Romania, the legislator has established several mechanisms to protect participants, including the minimum rate of return for each risk category of private pension funds. If a fund regularly achieves rates of return below the minimum rate, special supervisory measures are triggered to redress the situation. In the context of a limited number of privately managed pension funds and the existing protection mechanisms, a similar approach has been observed on the part of administrators in terms of the strategic allocation of the investment portfolio, characterised by a moderate exposure to risk and at the same time a preference for bonds issued by the Romanian State. At European level, the private pension fund markets are structurally different from the Romanian market. Most products are voluntary and occupational pension funds predominate in many countries. In this context, the much larger aggregate portfolios of European pension funds are invested in a mix of financial assets, mainly bonds and equities.

Government bonds are the main financial instrument in which retirement assets have been invested, given the need for a predictable stream of fixed income. For example, in the Czech Republic, pension funds offering positive annual nominal bonds to members invest in treasury certificates and bonds in order to have fixed income streams. Investment regulations in some countries may also require pension providers to invest a certain proportion of their assets in certain financial instruments.

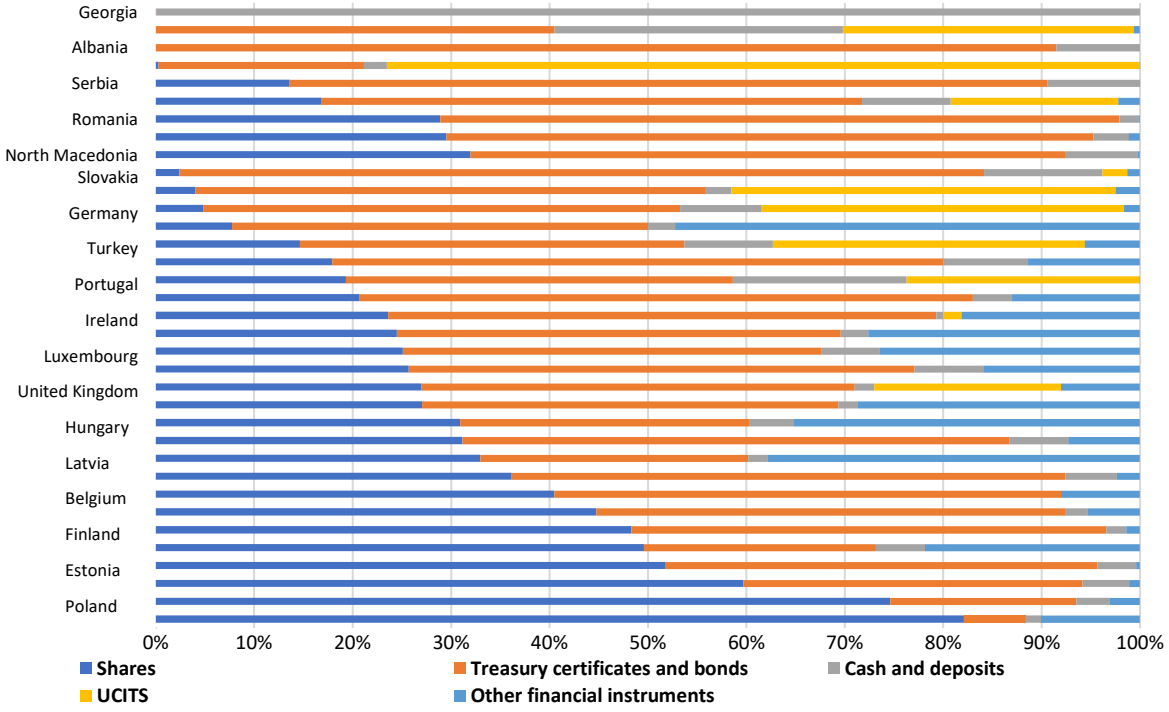
While bonds typically account for a large share of pension fund investments, pension funds in 18 of the 67 reporting jurisdictions, including some of the largest pension markets, preferred equity investments. Pension funds invested even more than 50% of their assets in equities in six reporting jurisdictions: Poland (82.1%), where open pension funds (OFEs) are not allowed to invest in sovereign bonds, Lithuania (74.6%), Estonia (59.7%) and Iceland (51.7%), among OECD countries. Around two-thirds of reporting jurisdictions have seen an increase in the proportion of equities in pension fund portfolios in 2021, either as a result of an increase in the value of equities in portfolios or a shift towards equities to benefit from the recovery in stock markets.

Cash and deposits are also a traditional instrument in pension fund portfolios, representing on average 9% of pension fund holdings at the end of 2021. Cash and deposits are more liquid instruments and offer a stable return with a low risk of loss, but also lower growth potential than other asset classes. For example, and despite rising interest rates, pension funds in the Czech Republic reduced the proportion of assets in bank deposits by 2 percentage points in 2021 in favour of bonds and equities.

Pension funds have also invested in other instruments (or "alternative" instruments) except for bonds, shares, cash or bank deposits. Such instruments accounted for over 25% of portfolios in 13 reporting jurisdictions, including Australia (26.4%), Canada (27.7%), Switzerland (35.2%) and the U.K. (28.7%). These alternative investments can be in various products, including real estate, structured products and loans in the case of the U.K., for example.

In terms of the investment structure of pension fund portfolios, investment risk or market risk refers to the risk of loss due to adverse movements in interest rates and other market prices - leading to underfunding in DB plans and low balances in DC accounts. In 2022, the global economy was affected by increased market risk driven by rising interest rates and falling equity prices, with quantification of loss expected in future publications by international authorities.

Chart 101 Investment structure of retirement savings in European countries in 2021 (%)



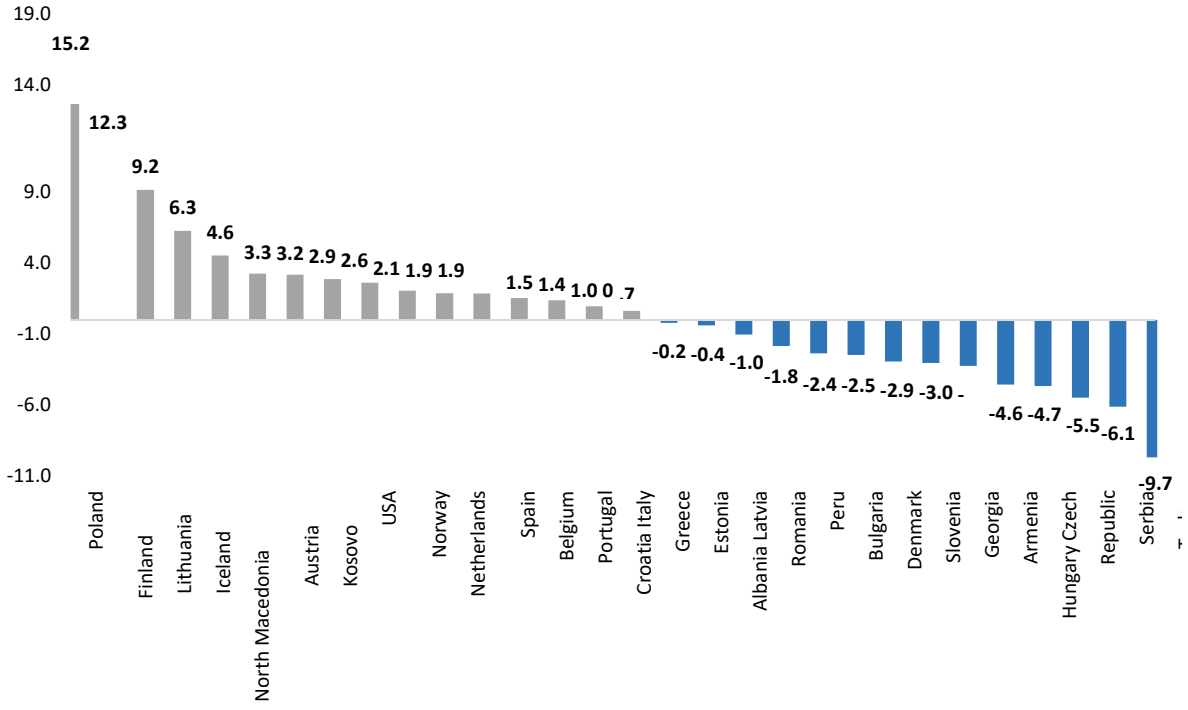
Source: OECD - Pension Markets in Focus, preliminary data

Pension funds capitalised on the growth of stock markets in 2021 and continued their recovery from the sharp drop in early 2020 caused by the COVID-19 pandemic. Financial markets benefited from the supportive measures that some governments continued to implement for the economy, as well as the recovery of the global economy after the bottlenecks of 2020.

According to preliminary OECD data, pension fund investment gains were sufficient to offset rising inflation in more than half of the reporting jurisdictions (29 out of 53). Inflation hit a 30-year high in December 2021, reaching 6.6% in the OECD area. However, pension funds still recorded positive real investment return rates in 18 out of 27 OECD reporting countries. Pension funds even managed to record double-digit returns in real terms in four OECD countries in 2021: Poland (15.2%), Finland (12.3%), Australia (11.1%) and Costa Rica (10.0%).

The strong performance in these four countries may be due to lower inflation (between 3.3% and 3.8% for Australia, Costa Rica and Finland) or a higher proportion of assets invested in equities than in other countries. In the OECD area, pension funds recorded the lowest real rate of return oninvestments in Turkey (-9.7%), where inflation reached 36.1%. In the case of Romania, the real investment rate of return had a negative dynamic of -1.8%, as a result of rising inflation which reached 8.2% in December 2021. Rising inflation in 2022 continued to put additional pressure on the national private pension system.

Chart 102 Annual real rate of return on investment in 2021 (%)



Source: OECD - Pension Markets in Focus, preliminary data

In 2022, global macroeconomic developments have led to increased uncertainty about asset dynamics in international financial markets. Private pension fund assets have

been affected by the current level of systemic risk in the European economy, which is at a higher level than during the COVID-19 pandemic in 2020.

Sustainability and environmental risk management have become key factors for long-term investors and, in particular, for European Institutions for Occupational Retirement Provision (IORPs).

In early 2022, EIOPA launched a climate stress test for the occupational pensions sector to obtain information on the effects of environmental risks on this sector. The stress test targeted defined benefit (DB) and defined contribution (DC) occupational retirement schemes (IORPs) in the European Economic Area whose occupational pension sector assets exceed EUR 500 million. The IORP stress test tested the resilience of European IORPs to a climate change scenario, which was developed together with the European Systemic Risk Board and the European Central Bank.

The test scenario assumed an abrupt and disorderly transition to climate neutrality due to delayed politics action, resulting in a sharp increase in carbon prices. This sudden increase in carbon prices triggers transition risk effects for the whole economy. The results have taken into account a corresponding depreciation of investments in industries exposed to climate risks.

Although the stress test is not a pass/fail exercise, the results indicate that IORPs have significant exposure to transition risks. With a sample of 187 IORPs from 18 countries, the stress test covered all European Economic Area (EEA) countries with significant IORP sectors. In total, more than 65% of defined benefit (DB) and defined contribution (DC) pension scheme assets were analysed. EIOPA adopted a full balance sheet approach to examine the impact on IORPs' asset portfolios as well as their long-term liabilities. The exercise followed a dual methodology: in addition to a national balance sheet (NBS) approach, based on the national valuation regulation, a common balance sheet (CBS) approach was used, with mark-to-market valuations, to make meaningful comparisons possible.

Given the nature of the disorderly transition scenario, the exercise focused on IORP's asset portfolio. The results show that IORPs are significantly exposed to transition risks. On the asset side, the stress scenario caused a considerable overall loss of 12.9%, corresponding to asset valuation losses of approximately EUR 255 billion. Most of the fall in value was recorded in equity and bond investments.

On average, IORPs had around 6% of equity investments and 10% of corporate bond investments in carbon-intensive industries such as mining, electricity and natural gas, and land transport, for which the scenario predicted steep depreciations of between 20% and 38%. The scenario, which included movements in interest rates, also affected the liabilities side. The stress test was complemented by a qualitative survey on mitigation and adaptation measures, which showed that while IORPs are increasingly taking ESG factors into account in their investment decisions, they still face notable obstacles in allocating investments to climate risk-sensitive categories.

6.2. Systemically relevant entities

Total accumulated assets for Pillar II and III exceeded RON 92 billion at the end of September 2022; as a percentage of GDP, the **total accumulated assets of the Romanian private pension system represented about 6.78% of annual GDP** (calculated as the sum of the last 4 quarters).

Over the period of its operation, the private pension system has been on an upward trend, with the share of private pension fund assets in GDP reaching 6.78% of GDP at the end of September 2022. The decrease in the share compared to the end of 2021 is due on the one hand to faster GDP growth, and on the other hand to the temporary decline in the market value of private pension fund assets amid rapidly rising inflation and market interest rates.

Table 28 Size of the Romanian private pension sector (total assets to GDP)

	2015	2016	2017	2018	2019	2020	2021	Sep 2022*
Private pension funds	3.64%	4.32%	4.84%	5.21%	6.09%	7.37%	7.83%	6.78

GDP calculated as the sum of the last 4 quarters (Q3 2021 - Q2 2022)

Source: NSI, ASF calculations

The main indicator for assessing the size of private pension funds is the **value of total assets**.

Table 29 Private pension fund assets and their share in GDP

Fund type	Private pension fund	Total assets (million RON) 30 Sep 2022	Total assets (million RON) 30 June 2022	%GDP as at 30 June 2022
P2	NN	30,439	30,083	2.33%
P2	AZT VIITORUL TAU	18,767	18,554	1.44%
P2	METROPOLITAN LIFE	12,709	12,514	0.97%
P2	VITAL	9,066	8,878	0.69%
P2	ARIPI	7,899	7,812	0.61%
P2	BCR	6,165	5,980	0.46%
P2	BRD	3,662	3,549	0.28%
P3	NN OPTIM	1,447	1,425	0.11%
P3	BCR PLUS	557	552	0.04%
P3	NN ACTIV	399	398	0.03%
P3	AZT MODERATO	337	336	0.03%
P3	BRD MEDIO	174	172	0.01%
P3	PENSIA MEA	136	129	0.01%
P3	RAIFFEISEN ACUMULARE	126	124	0.01%
P3	AZT VIVACE	119	122	0.01%
P3	GENERALI STABIL	33	32	0.00%
P3	AEGON ESENTIAL	11	11	0.00%
Total		**92,044**	**90,671**	**7.04%**

Source: ASF

Two Pillar II private pension funds have total assets above 1% of GDP, **of which only one pension fund is above the 2% threshold, i.e. NN privately managed pension fund**. It can be considered systemically relevant in terms of the size criterion.

Due to the long-term institutional investor nature of pension funds and the accumulation phase they are currently in, it is unlikely for the time being that they will generate liquidity and price shocks to financial markets through forced asset sales.

However, it is important to reiterate that, as far as the Romanian private pension system is concerned, the risks to the stability and proper functioning of pension funds remain at low levels, given the mechanism of implementation and operation of the Romanian private pension system of the defined contribution type with absolute and relative guarantees in which one of the important mechanisms for protecting the rights of participants is the **separation of the assets of administrators from the assets of private pension funds**.

6.3. Recent developments in the Romanian private pension market

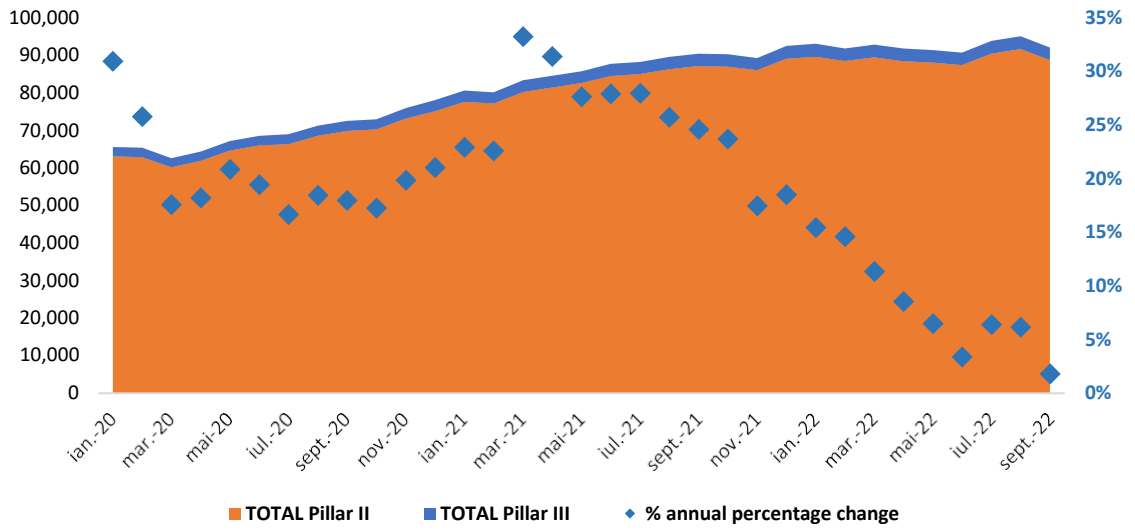
Romania's private pension system contributes to long-term economic development and facilitates saving for additional retirement income.

In 2020, the fourth pension pillar, the occupational pension scheme, was established. At the beginning of 2020, the Parliament adopted *Law no. 1/2020 on occupational pensions*, which transposes the provisions of *EU Directive 2341/2016 on the activities and supervision of institutions for occupational retirement provision* (IORP II). The objective of this new system is to provide a supplementary pension component, financed mainly by employers and subsidiarily by employees. The ASF Council meeting of 09.02.2022 approved the application of BCR PENSII, Societate de Administrare a Fondurilor de Pensii Private SA, for authorisation as administrator of occupational pension funds.

The total assets under management of the entire private pension system reached RON 92.04 billion (EUR 18.60 billion) at the end of September 2022, with 8,512,355 participants.

Over the past year, the monthly value of pension funds has seen increasingly smaller annual increases, as shown in the chart below. The biggest impact in the decrease in the growth of private pension funds' assets has been the depreciation in the value of government bonds held in pension funds' portfolios. The general increase in interest rates has led to decreases in the prices of government bonds held in private pension fund portfolios, which have contributed to the decrease in unit values of net assets.

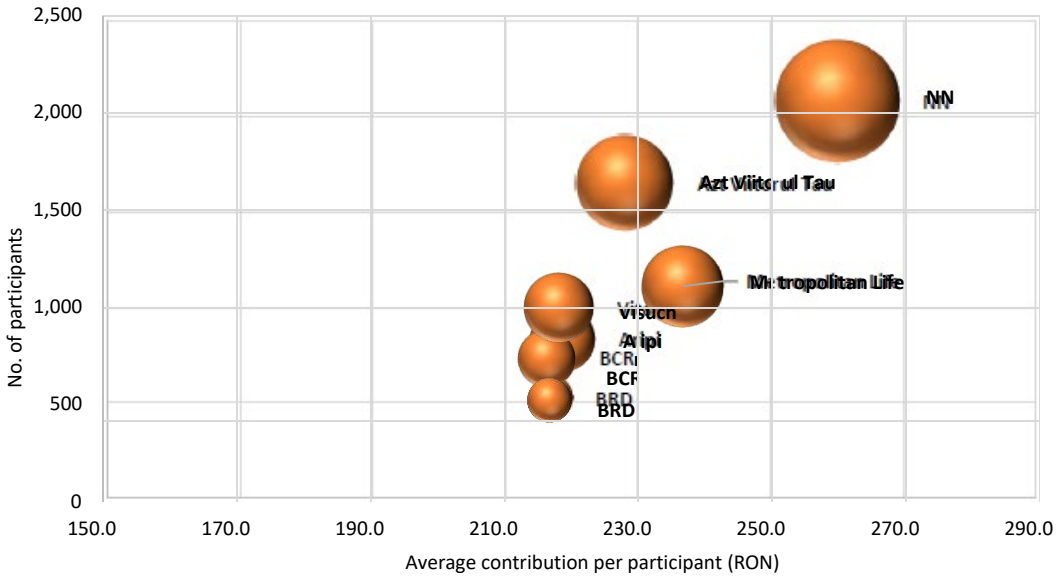
Chart 103 Assets of the private pension system (billion RON)



Source: ASF

The private pension market remained the largest segment of the non-banking financial market supervised by ASF in terms of asset value, in H1 2022, accounting for approximately 7% of GDP (GDP calculated as the sum of the last 4 quarters).

Chart 104 Distribution of privately managed pension funds by average contribution per participant, total number of participants and market share as at 30 September 2022

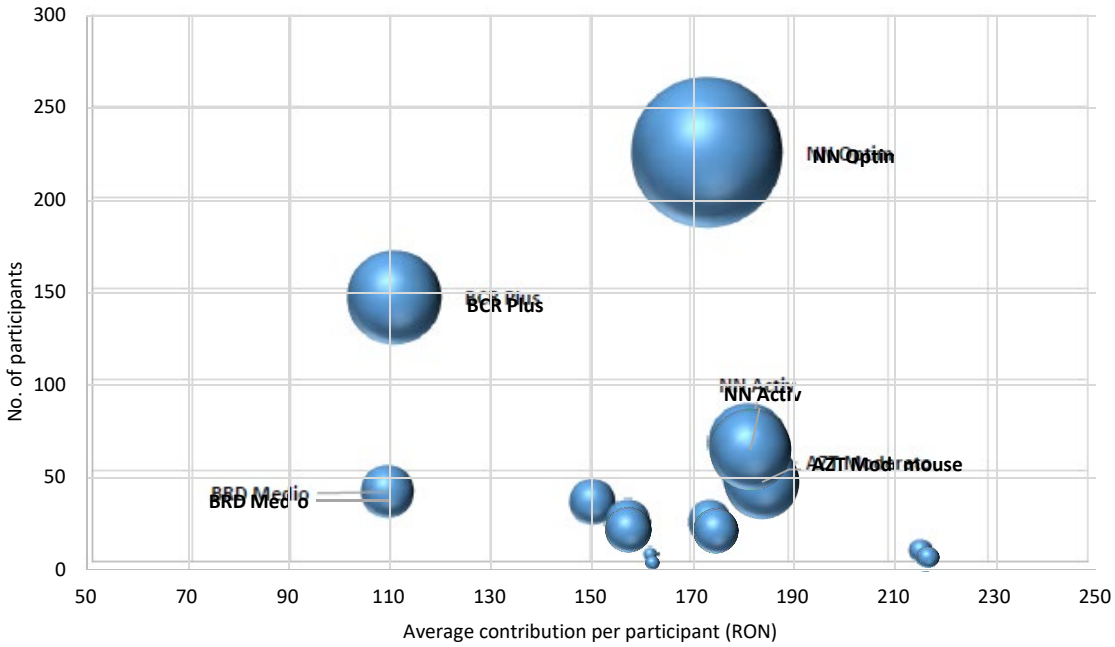


Source: ASF

At the level of privately managed pension funds, the average contribution of participants in September 2022 was about RON 235, an increase of 15% compared to the same date last year. The privately managed pension fund with the highest average contribution per participant, but also with

the largest number of registered participants was FPAP NN, with a market share of around 34% (calculated by net assets).

Chart 105 Distribution of voluntary pension funds by average contribution per participant, total number of participants and market share as at 30 September 2022



Source: ASF

As for voluntary pension funds, the average contribution per participant in September 2022 was about RON 165, up by 6% compared to September 2021. The voluntary pension fund with the highest number of participants is FPF NN Optim, also recording the highest market share by net assets (43%).

In the first nine months of 2022, gross contributions of RON 8.19 billion were paid into the privately managed pension system, 13% more than in the same period last year. Gross contributions of RON 367 million were paid into Pillar III in the first three quarters of 2022, up by 25% compared to 2021.

The contributions of participants in private pension funds are transferred directly to the account of the pension fund registered with the depository bank, which is authorised, regulated, supervised and controlled by the National Bank of Romania. Depositaries are therefore responsible, together with the pension fund administrators, for the participants' assets. The most recent data on the pension fund market show that asset safekeeping services are offered by three credit institutions authorised by the National Bank of Romania (NBR): BRD, which has the highest share of assets at around 82.0%, Raiffeisen, 13.8%, and BCR, 4.2%.

The market for depositary services for private pension funds is highly concentrated, and the complexity and importance of depositary arrangements for the proper functioning of

these markets make the risk of substitution high for the entity with the largest market share in this segment, i.e. BRD - Groupe Societe Generale. However, it is not subject to prudential supervision by ASF, but by the National Bank of Romania and is already included in the category of other systemically important institutions in Romania (an additional capital buffer being imposed on it as a result of its inclusion in this category based on the score calculated according to the methodology harmonised with the European Banking Authority guidelines).

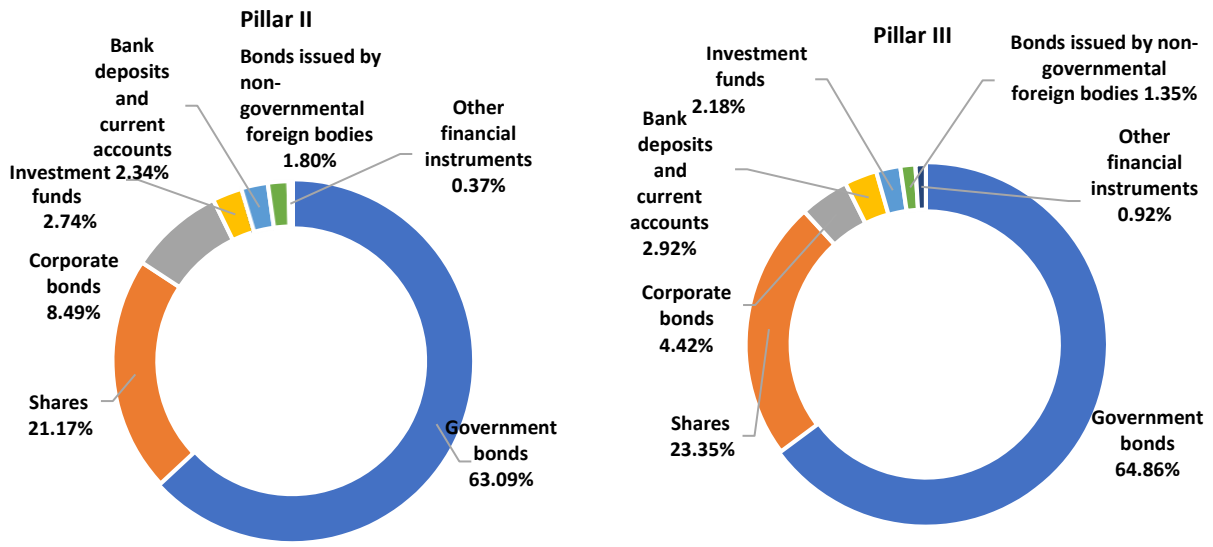
Private pension funds have a low risk profile and the less risky assets in which they predominantly invest are generally, regardless of market developments, government bonds. Thus, private pension funds invest predominantly in sovereign bonds, but also in companies listed on the capital market, which are transparent and comply with corporate governance, thus stimulating the development of the primary and secondary market.

The investment policy aims to diversify the portfolios of private pension funds, thereby reducing the market risk of an asset class at a time when prices of other financial assets are falling. Pension funds invest in a mix of financial assets such as equities, corporate bonds, municipal bonds, supranational bonds, government bonds, UCITS units, bank deposits. The private pension system has also historically complied with prudential and portfolio security requirements for the benefit of participants to ensure the quality, liquidity and profitability of assets.

The largest share of private pension funds' portfolios has always been held by fixed-income financial instruments (mainly government bonds, followed by corporate, supranational and municipal bonds). Even though the investment structure has slightly diversified in recent years, the share of fixed-income instruments exceeds 70% of the total. Private pension funds are only allowed to invest in *Investment Grade* fixed income instruments. On 30 September 2022, 63% of the scheme's total assets were invested in government bonds issued by Romania.

Since the establishment of private pension funds, their investments have been mainly in Romanian issuers, with 88% of pension fund investments being made locally at the end of September 2022. The majority of Romanian instruments are government bonds, shares listed on the Bucharest Stock Exchange, bank deposits and corporate bonds.

Chart 106 Asset structure of private pension funds as at 30 September 2022



Source: ASF

Table 30 Investments in shares of private pension funds (Pillar II + Pillar III) as at 30 September 2022

Issuer name	Value in RON	% value traded with shares
Fondul Proprietatea S.A.	3,442,006,990	17.60%
OMV Petrom S.A.	3,333,059,102	17.04%
Banca Transilvania S.A.	2,972,897,945	15.20%
Romgaz S.A.	2,453,842,600	12.55%
BRD - Groupe Societe Generale S.A.	1,318,655,869	6.74%
Nuclearelectrica S.A.	1,189,237,253	6.08%
Med Life S.A.	893,365,296	4.57%
Transgaz S.A.	587,599,948	3.00%
Electrica S.A.	487,331,904	2.49%
Digi Communications NV	339,768,104	1.74%
Other companies	2,540,318,651	12.99%
TOTAL	**19,558,083,660**	**100.00%**

Source: ASF

Private pension funds are significant institutional investors in the capital market, investing in issuers that respect corporate governance and are transparent. As of 30 September 2022, 21% of the Romanian private pension system was invested in equities, and 87% of this percentage is represented by 10 companies, which are among the most traded companies on the main segment of BVB.

Table 31 Investments in corporate bonds of private pension funds (Pillar II + Pillar III) as at 30 September 2022

Issuer name	Value in RON	% value traded with corporate bonds
Citigroup Global Markets Holdings Inc	1,379,340,203	11.88%
Banca Comerciala Romana	1,301,318,852	11.21%
Banco Santander S.A.	1,063,217,770	9.16%
The Goldman Sachs Group INC	1,046,956,067	9.02%
ING Bank NV	795,556,583	6.85%
Raiffeisen Bank S.A.	637,065,002	5.49%
Citigroup Inc	432,457,029	3.73%
BNP Paribas	355,610,626	3.06%
JPMorgan Chase & Co	105,592,193	0.91%
UniCredit SpA	102,903,014	0.89%
Other companies	461,506,586	37.79%
TOTAL	**7,681,523,925**	**100.00%**

Source: ASF

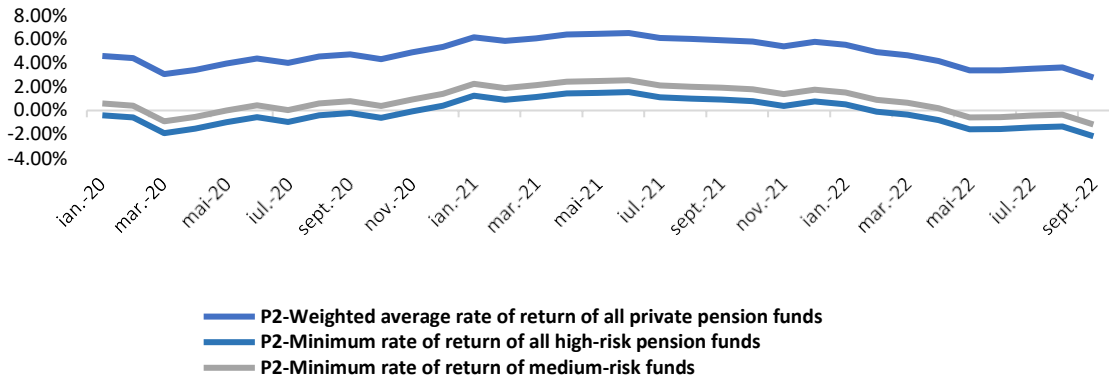
Pension fund investments in corporate bonds accounted for 8.35% of total private pension scheme assets. Thus, private pension funds invested in corporate bonds issued both in Romania and abroad, mostly by financial or banking groups. Many of the corporate bonds were issued in the US (39%), Romania (26%) and Spain (14%).

Fund unit yields

As at 30 September 2022, the weighted average rate of return of all privately managed pension funds (Pillar II) was 2.8%, while for voluntary pension funds (Pillar III), the weighted average rate of return of all high-risk voluntary pension funds was 0.9107%, while the weighted average rate of return of all medium-risk voluntary pension funds was -1.15%.

Both minimum rates of return of privately managed pension funds followed the same trend as the weighted average rate of return of all pension funds and were calculated accordingly.

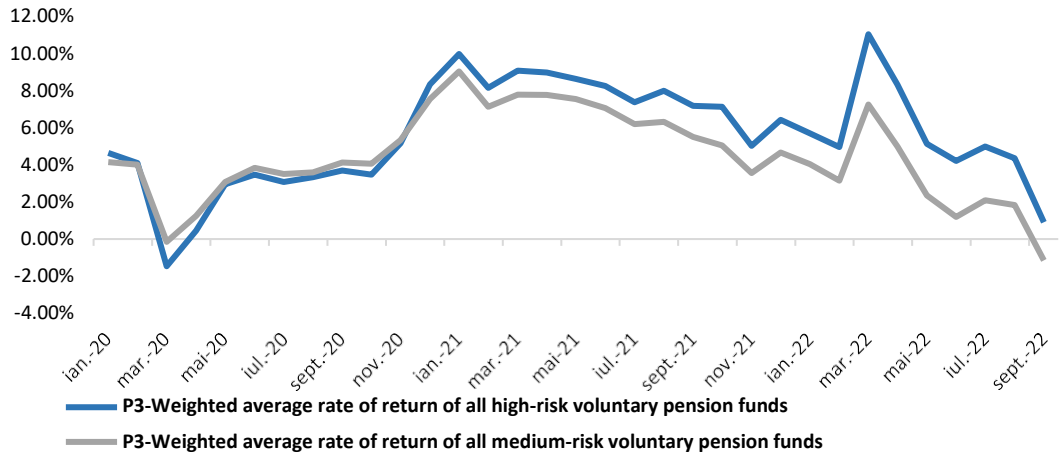
Chart 107 Evolution of privately managed pension fund rates of return



Source: ASF

In the case of voluntary pension funds, the weighted average rates for both risk categories (medium and high) have seen declines since the second quarter of 2022.

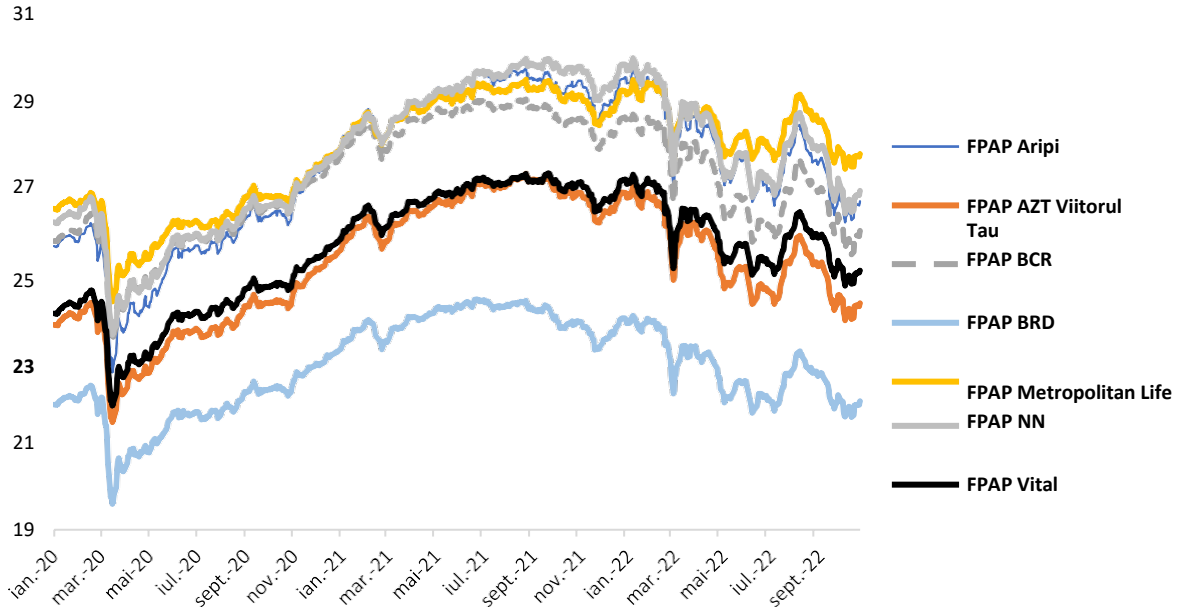
Chart 108 Evolution of the rates of return of voluntary pension funds



Source: ASF

The net asset value (NAV) is the ratio of the net asset value of the pension fund on a given date to the total number of units in the fund on the same date. The general increase in interest rates has led to falls in the prices of government bonds held in private pension fund portfolios, which has generated a short-term shock of falling net asset values. The shock was transitory and has eased as the outlook for further acceleration in inflation has moderated.

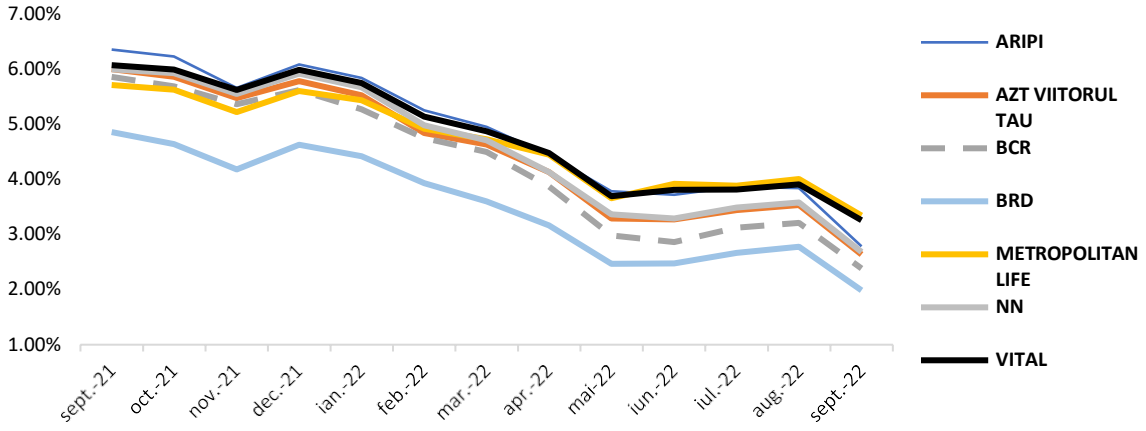
Chart 109 Evolution of Pillar II pension funds' net asset values (RON)



Source: ASF

The rate of return of a privately managed pension fund over a period is the difference between the value of the fund unit on the last business day of the period and the value of the fund unit on the last business day preceding that period, all in relation to the value of the fund unit on the last business day preceding that period. The annualised rate of return of a privately managed pension fund shall be measured for the period of the last 60 months preceding the calculation.

Chart 110 Evolution of annualised rates of return of privately managed pension funds



Source: ASF

At the end of September 2022, all privately managed pension funds recorded decreases in annualised rates of return compared to the same period last year, amid increased market risk and persistently high interest rates.

In the long term, over the entire period of operation of private pension funds, their annualised return[50] has remained high.

Table 32 Annualised return of NAV in Pillar II from establishment to 1 November 2022

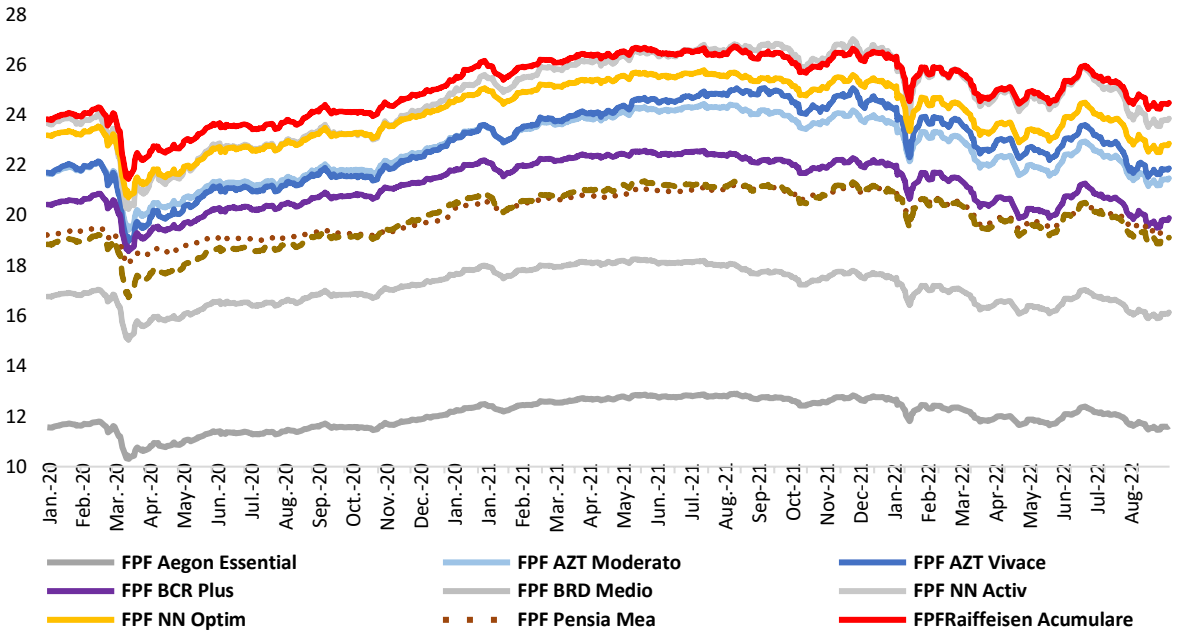
FPAP Aripi	FPAP AZT Viitorul Tau	FPAP BCR	BRD FPAP	FPAP Metropolitan Life	FPAP NN	FPAP Vital
6.95%	6.29%	6.76%	5.61%	7.23%	7.01%	6.51%

Source: ASF

Due to the similar structure of investments, the evolution of the returns of the fund units of Pillar III voluntary pension funds followed the same trend as for Pillar II funds, except that some funds were launched more recently and therefore their long-term performance history is different. In the short term, however, the trend in returns is very similar across the whole private pension fund market.

[50] Annualised return is the average annual return calculated over the long term from the establishment of the private pension scheme to the present day

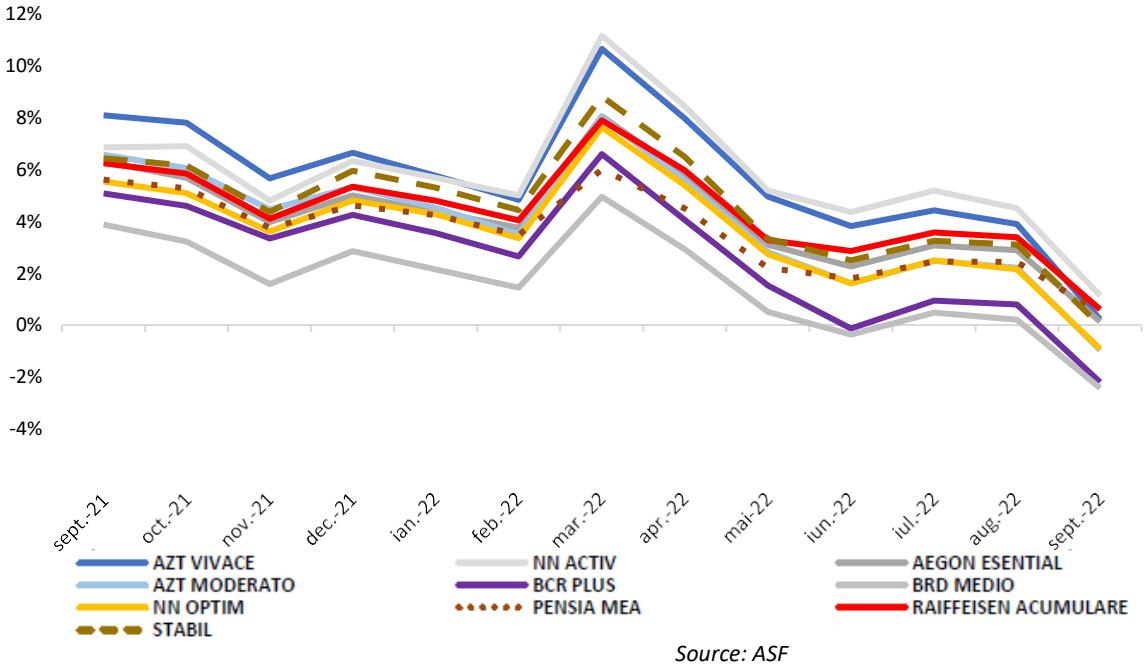
Chart 111 Evolution of Pillar III pension funds' net asset values



Source: ASF

The rate of return of voluntary pension funds is the annualised rate of the product of daily returns, measured over a 24-month period.

Chart 112 Evolution of annualised rates of return of voluntary pension funds



Source: ASF

All voluntary pension funds recorded decreases in annualised rates of return at the end of September 2022 compared to the same period last year. The sharpest decrease was recorded by FPF BRD Medio, while FPF NN Activ had the smallest decrease. Five of the ten voluntary pension funds recorded negative rates of return in September 2022.

In the case of Pillar III too, the annualised return on the NAV has decreased.

Table 33 Annualised return of NAV in Pillar III from establishment to 1 November 2022

FPF Aegon Essential	FPF AZT Moderato	FPF AZT Vivace	FPF BCR Plus	FPF BRD Medio	FPF NN Activ	FPF NN Optim	FPF Pensia Mea	FPF Raiffeisen Acumulare	FPF Stabil
2.22%	5.03%	5.19%	4.51%	3.62%	5.72%	5.52%	4.36%	6.39%	4.84%

Source: ASF

6.4. Risks and vulnerabilities in the private pension market

Private pension fund investments are based on the principle of prudent management to ensure the security, diversification, quality, liquidity and profitability of private pension fund assets, and the legal framework requires maximum limits on fund portfolios by both asset class and individual holdings to allow for risk diversification and avoid portfolio concentration. Currently, private pension funds' investment portfolios comprise a mix of financial assets such as equities, corporate bonds, municipal bonds, bonds issued by foreign non-governmental entities, government bonds, investments in mutual funds, bank deposits, commodity and precious metals funds, derivatives, etc. Administrators are also required to comply with the investment policy authorised by ASF.

The privately managed pension market is highly concentrated, with the top three pension funds accounting for 70% of assets at the end of the third quarter of 2022. The degree of concentration is similar for voluntary pension funds, with the top three funds accounting for 72% of assets. Voluntary pension funds managed by NN have 55% of the market. The level of concentration in the private pension system depends both on structural causes related to the functioning of the system and its characteristics, and on its evolution over time.

Private pension funds have to opt for a risk category, expressed in terms of investment policy, when they are set up, in the prospectus, in which they have to keep their classification: low risk, medium risk and high risk. In general, a low risk category involves a risk-averse investment policy with lower exposures to equities and other more volatile instruments. In this case, expected returns are also lower, being correlated with the level of risk taken. At the other end of the spectrum, a high risk category implies a greater appetite for equities or other investments that can offer higher returns.

Under Pillar II, all pension funds are in the medium risk category, with the exception of FPAP Aripi (managed by Generali Societate de Administrare a Fondurilor de Pensii Private S.A.), which is in the

high risk category. Under Pillar III there are 8 voluntary pension funds in the medium risk category and two in the high risk category (NN Activ managed by NN Asigurări de Viață S.A. and AZT Vivace managed by ALLIANZ-ȚIRIAC PENSII PRIVATE Societate de administrare a fondurilor de pensii private S.A.).

Market risk is the risk of loss resulting from adverse movements in interest rates, exchange rates or other market prices in general. We assess that market risk remains at a high level due to rising interest rates driven by increasing inflationary pressures and escalating tensions between Russia and Ukraine. Taking into account the significant share of bonds in pension funds' portfolios, a decline in their assets is expected in 2022. Given the current context of persistent macroeconomic and financial vulnerabilities and uncertainties, all private pension funds experienced decreases in annualised rates of return at the end of September 2022 compared to the same period last year, amid increased market risk and persistently high interest rates.

As regards credit risk, it remains low due to the high quality of issuers of fixed income instruments held by the funds, the vast majority of which are government bonds and bonds issued by international financial institutions. The share of deposits with credit institutions and corporate bonds (investment grade) is around 11%. Private pension funds are only allowed to invest in fixed-income instruments with an investment grade rating. At the end of September 2022, more than 63% of the scheme's total assets were invested in government bonds issued by Romania.

Private pension funds invested most of their assets in local currency-denominated financial instruments. Pillar II and Pillar III hold 8.65% and 8.74% of their portfolios in EUR-denominated financial instruments respectively. Taking into account the limited exposure on foreign currency denominated financial instruments (of which the largest part is related to EUR-denominated instruments, around 9% as at 30 September 2022), the currency risk is still at a very low level at the end of the first nine months of 2022, being limited by managing the share of foreign currency denominated assets in total assets and by the use of derivatives.

Liquidity risk is at an insignificant level, with 2.36% of private pension fund assets held in current accounts and short-term deposits. From a liquidity point of view, the private pension scheme is currently resilient to any claims on its assets due to the fact that it is in the accumulation period and outflows from the scheme (due to death, disability, retirement, transfer) are still low.

Solvency risk is also kept at a low level in the context of the existence of several mechanisms to protect participants (separation of administrator’s and fund’s assets, establishment of technical provisions, Private Pension System Rights Guarantee Fund).

Operational risk is at a low level, with pension fund administrators continuously monitoring/evaluating operational processes to mitigate this risk. In this respect,

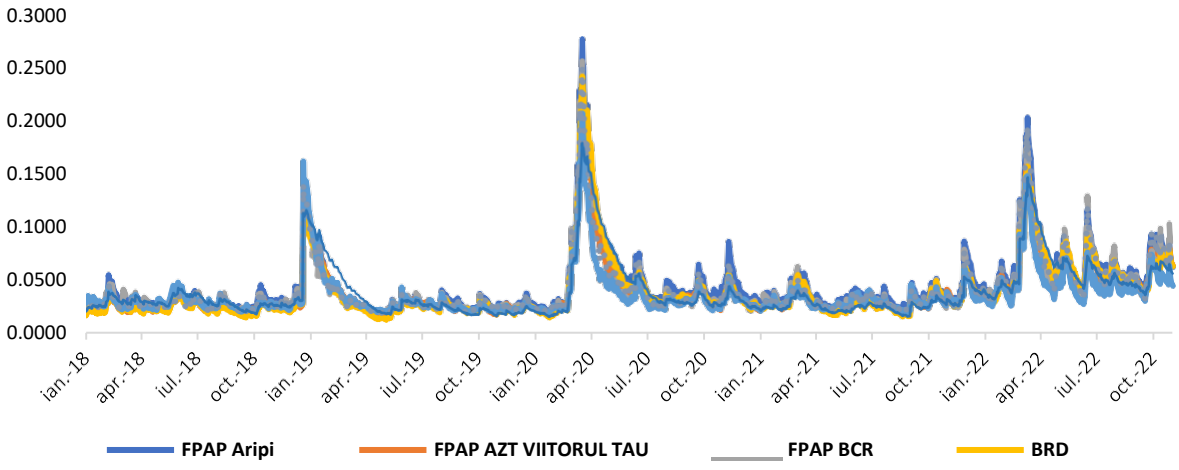
ASF Rule no. 6/2015 on the management of operational risks generated by IT systems used by entities regulated, authorised/approved and/or supervised by ASF is applied. To date, no cyber attacks on the pension fund industry have been reported.

At the same time, the Financial Supervisory Authority supported the adoption by the Romanian Government of the *Emergency Ordinance no. 174/2022 for amending and supplementing certain regulatory acts in the field of private pensions*, which amends *Law no. 411/2004 on privately managed pension funds, republished, with subsequent amendments and additions*, *Law no. 204/2006 on voluntary pensions, with subsequent amendments and additions*, as well as *Law no. 187/2011 on the establishment, organisation and functioning of the Private Pension System Rights Guarantee Fund*, which aimed to **improve corporate governance, the investment framework and the sanctioning regime**.

The structure of the Romanian private pension system provides for several mechanisms to protect the rights of participants, including: segregation of assets between administrators and funds, additional checks and validations by depositories, technical provisions set up by administrators, reporting requirements and increased transparency, plus the Private Pension System Rights Guarantee Fund (FGDSPP). This market construction, together with the stage of its evolution, which is still in a period of accumulation, means that the stability of the FGDSPP remains at low risk.

In the third quarter of 2022, the annualised volatility of Pillar II fund units has increased and is at a higher level compared to previous years, as the pension system is influenced by shocks from European financial markets. Several episodes of high volatility can be highlighted from 2018 to date: December 2018, March 2020 and March 2022, the latter triggered by a combination of macroeconomic factors, including investor fears about the war in Ukraine, rising energy prices, high inflation, international trade disruption, etc.

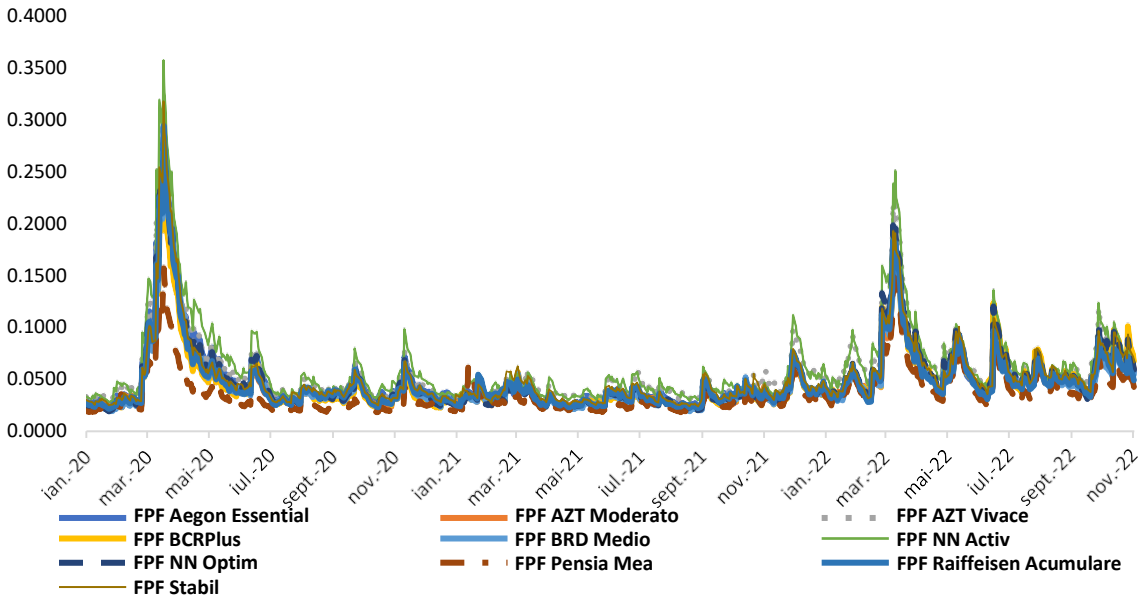
Chart 113 Evolution of daily annualised volatility of Pillar II pension funds



Source: ASF calculations (Garch model)

The annualised volatility of Pillar III fund units followed the same trend as for Pillar II.

Chart 114 Evolution of daily annualised volatility of Pillar III pension funds



Source: ASF calculations (Garch model)

Conduct risk

BRD SAFPP notified ASF of the **impairment of the company's financial situation**, following suspicions of misappropriation of its funds, while assuring ASF that urgent measures will be taken to remedy the situation. According to the communications, **the estimated damage increased to RON 20.5 million.**

All the fraudulent transactions were carried out on the assets of the BRD SAFPP administrator, the **assets of the private pension funds under the management of BRD SAFPP were not affected, so that the interests of the participants were not harmed.**

In this context**, ASF ordered BRD SAFPP to take the following measures**:

- checking the company's activity (including by making inspections);
- reassessment of the members of the management structure and withdrawal, where appropriate, of the approvals of the members of the Board of Directors as well as the Chief Executive Officer of BRD SAFPP;
- the imposition of fines on the company, the Board members, the General Manager, the person who managed the internal audit structure and the person who managed the internal control structure;
- referral to criminal investigation bodies and other competent institutions;

- imposing an obligation to report weekly on the measures taken to achieve financial recovery.

At the same time, ASF held **regular meetings** with representatives of the management structure of BRD SAFPP, during which issues related to the organization and functioning of the company were discussed, as well as the commitment of the shareholders to continue to support the company financially and to take all necessary measures to restore its situation, in order to comply with the requirements imposed by the legal framework in force.

BRD SAFPP reported the implementation of measures for:

- ensuring the continuity of the accounting activity;
- compliance with the legal provisions regarding share capital;
- ensuring the necessary staffing of the company's operations, both in terms of management structure and key functions.

Please note that ASF is **continuously monitoring** the activity of BRD SAFPP.

7. Crypto-assets and their risks to financial stability

7.1. FTX bankruptcy

Crypto-asset markets are not regulated by regulators, which can lead to speculative bubbles and increased systemic risk. A major event in the cryptoasset markets occurred on 11 November 2022, when FTX, a cryptoasset trading platform ranked third in the world by market capitalisation, went bankrupt. A percentage of FTX's damaged parties, will get some of their money back, but no investor will be fully compensated. FTX investors in the US, whose money is locked up in the FTX platform, will have to join a list of creditors, as there is no guarantee fund for crypto-asset industry customers, hence the downside of the lack of rigorous industry regulation.

The market value of all cryptoassets declined from around USD 3 trillion in 2021 to USD 830 billion at the end of 2022. The rapid collapse in the value of the cryptoassets market shows how fragile this market is, which has no economic fundamentals.

FTX was a crypto-asset trading platform where investors could buy and sell hundreds of digital assets. Such platforms have grown in popularity in recent years as more and more people were interested in investing in cryptoassets without being concerned about their inherent risks.

FTX started in 2019 and has quickly risen to international prominence through a series of high-profile acquisitions, aggressive marketing strategies and reduces trading commissions.

Even those unfamiliar with the technology were attracted to FTX, with the promise of much better returns compared to investing in traditional assets. Large portfolio management companies and pension funds have invested in the platform, with over USD 2 billion invested, which has increased investor confidence and helped attract even more investment.

Sam Bankman-Fried, the 30-year-old founder of FTX, has become the face of the company and the face of the crypto-asset markets in general. His marketing and major sponsorships of American sports have made FTX a renowned platform.

In the terms and conditions that FTX was supposed to comply with, it was stipulated that FTX would not lend client assets to its trading division. However, investigations to date (January 2023) show that USD 8 billion of the USD 14 billion, was loaned to Alameda Research, a crypto-asset trading company also owned by FTX founder Sam Bankman-Fried. The investors' money was used by Alameda to make risky investments.

Coindesk, a major news site for the cryptoasset community, reported on Alameda's balance sheet as being full of irregularities. It shows that Alameda, had USD 8 billion in loans and that its assets consisted largely of tokens suddenly created by FTX. Combining the two balance sheets of Sam Bankman-Fried's companies, it shows that before things started to deteriorate, Bankman-Fried's companies took in about USD 14 billion in deposits, borrowed USD 8 billion, and raised nearly USD 2 billion in equity from investors. His companies have returned USD 5 billion to those who withdrew their investments when the time was right, and are estimated to have holdings of about USD 5.7 billion in equity and venture investments, plus USD 1 billion in cash. That's an estimated loss of between USD 4 billion and USD 12 billion, depending on how much of Alameda's debt is to FTX.

The issue came to a head because Alameda held USD 8 billion in customer funds belonging to FTX. Bankman-Fried claimed that Alameda held these FTX customer funds because it had received cash from them before the exchange had its own bank account. Several FTX customers testified that they transferred money to Alameda that was later to be used on the exchange. Alameda's assets included large venture capital investments and crypto tokens that could not be quickly converted into cash.

FTX's CEO confessed to former employees that excessive lending to Alameda, his own trading company, led to FTX's demise, and he also insisted that he had no knowledge of leveraged positions taken by investors. This practice led to a widening liquidity crisis that could not be covered as the USD 2 billion loan, turned into USD 8 billion and the assets backing the loan collapsed.

This asset crash was triggered when investors found out that the trading platform was clearly in trouble and started withdrawing their money massively. So FTX investors wanted to withdraw USD 5 billion, and the platform had saleable assets of just USD 900 million.

This made the collapse of the FTX platform possible. Sam Bankman-Fried was arrested in December 2022 for fraud along with other Alameda executives.

After the FTX bankruptcy, Changpeng Zhao head of rival trading platform Binance announced that Binance would liquidate its FTT holdings, which precipitated the FTX platform's situation. Binance then offered to come to the rescue, but quickly backed out after reviewing FTX's financials.

The pace of events accelerated after the news, and CEO Bankman-Fried called on investors who had bought FTX to save the platform. Sequoia, an investment fund, wrote down the value of its investment in the platform to zero.

Unlike traditional exchanges, which simply match buyers with sellers, cryptoasset exchanges typically hold client assets for long periods of time to facilitate transactions. However, the practice used leaves users vulnerable if the exchange itself runs into trouble.

Crypto-asset exchanges such as FTX should be more strictly regulated before they become a *risk to the financial system*, a senior Bank of England official has warned. In a speech by the Bank of England's Deputy Deputy Governor Sir Jon Cunliffe, he said ***digital asset exchanges created risks for the UK market by conducting transactions that encompass trading, lending, clearing and custody of client assets***. It should be emphasised that for transactions conducted on regulated financial markets a careful separation is maintained between these different roles to protect against risk.

FTX and trading company Alameda's heavy reliance on the platform's own FTT token was a key factor in their collapse. Any company that accepts its own uncollateralized crypto asset as collateral for loans and margin payments, as there are indications it was in the case of FTX, creates a large risk.

Crypto markets do not yet have close links to traditional financial markets that threaten global financial stability, but regulators need to protect consumers. Regulations are needed as soon as possible before the crypto market becomes even larger and more interconnected to develop the regulatory frameworks needed to prevent a crypto shock that could have a much larger destabilizing impact. The FTX failure has prompted calls from those involved in the crypto industry to move away from centralized exchanges and towards decentralized financial protocols, where transactions and loans are handled automatically by software.

Recent developments in the crypto markets raise doubts as to whether these protocols are truly decentralised in practice.

The sudden failure of the FTX, until recently considered one of the most responsible places to trade cryptoassets, has put pressure on other digital exchanges. There are many blurred lines between the different roles played by crypto trading venues that will be brought into the regulatory spotlight, along with the need for transparency in terms of corporate structures, governance and auditing.

After the FTX bankruptcy, the question now is whether crypto-assets can ever be useful. The promise of FTX was to create a technology that could make financial intermediation faster, cheaper and more efficient because blockchain technology is built on a network of computers, making transactions in theory transparent and trustworthy. Every new failure in this industry dramatically decreases investor confidence.

Although blockchain was explicitly designed to escape regulation, these principles justify regulating the institutions that keep the industry running smoothly. One obvious measure is to require digital exchanges to back customer deposits with liquid assets. A second step is disclosure rules, revealing whether, for example, a loan with dubious collateral or no collateral was made to the exchange's own trading department.

Stablecoins are based on blockchain technology and are set at the US dollar exchange rate. In general, they serve as vehicle currencies for trading crypto-assets due to reduced intermediation costs by operating on the blockchain. The composition of stablecoins is based on assets such as cash, treasuries and corporate bonds, but the full transparency of its structure is unclear as the asset allocation within the cryptoasset is not known. As shown in a previous analysis in the *Financial Stability Report (1/2022)*[51], stablecoins are inherently just as risky. The lack of regulation in the crypto-asset market has also led to multiple bankruptcies in 2022:

- Celsius crypto-lending platform, which collapsed,
- The bankruptcy of the stablecoin Earth
- Three Arrows Capital crypto fund bankruptcy
- FTX bankruptcy

The steps to be taken in the regulation of cryptoassets should ensure that 1) theft and fraud are minimised, as with any financial activity, 2) the traditional financial system must be protected from industry failures.

Fourteen years after the invention of the Bitcoin blockchain, none of the initial promises of decentralised finance have been kept. Huge amounts of money, time, talent and energy have been used to build digital trading exchanges that have more in common with virtual games and casinos than financial markets.

7.2 Trends, risks and vulnerabilities of cryptoassets

According to the report published by the *European Securities and Markets Authority* (ESMA), crypto-assets and traditional financial markets are still considered two separate systems. However, it has been noted that it is possible for shocks to be transmitted between the two due to the existence of a connection, which is expected to increase in the coming period.

[51] Chapter 9 - *Crypto asset markets and financial stability*

To summarise the sources of risk and potential channels of transmission to the mainstream financial system, a framework was used that assesses risk along five dimensions:

- liquidity
- market
- credit
- contagion
- operational.

Contagion risk has been divided into internal contagion risk and external contagion risk, which refers to the transmission of shocks from the crypto-asset market to the traditional financial system.

The risk assessment was carried out on four major components of the cryptoasset market:

- Cryptoactive without coverage;
- Cryptoactive guaranteed;
- Cryptoasset service providers;
- Decentralised finance.

Table 34 Risk assessment of the cryptoassets market

	Level	Prospect
Liquidity risks		
Market risks		
Credit risks		
Risks of internal contagion		
Risks of external contagion		
Operational risks		

Source: ESMA, Report on Trends, Risks and Vulnerabilities of crypto-assets (October 2022)

Liquidity risk is the absence of minimum standards for the provision of liquidity on centralised exchanges or DEXs. As there is currently no reason to believe that current liquidity will deteriorate or improve, a stable outlook is maintained.

In terms of market risk, the amount and concentration of liquidity in certain crypto-assets is taken into account. Although a reduction in leverage has been observed in the crypto-asset market, analysts continue to assign a high degree of leverage to this risk, with a stable short-term outlook.

Credit risk has arisen with the implicit pseudonym condition in blockchain technology, thus preventing proper assessment of counterparty risk. For this reason, credit risk is considered to have a medium to low rating with a negative outlook.

The risk of domestic contagion has arisen as a result of the bankruptcy of several large DeFi platforms. These events also coincided with an overall market decline of around 50%. In addition, crypto-assets and intermediaries with higher market importance and interconnections within the crypto-asset system, result in a high level of risk.

As regards the **risk of external contagion**, no signs of risk have been identified in the markets, so it is still considered a low risk. However, experts say the situation remains uncertain, as there are several channels of transmission of shocks and markets continue to evolve rapidly, forcing the relevant authorities to find mechanisms to limit newly emerging risks. The risk of contagion is therefore expected to increase rapidly.

Operational risk is high due to the inherent vulnerabilities associated with blockchain and DeFi technology.

Crypto-assets involve numerous risks that may become significant for financial stability in the future. So far, instability in this market has not spilled over into traditional financial markets or the real economy. However, the way current risks are controlled and the speed at which the links between the two markets will develop may lead to spill-over effects. Even if these threats have not materialised so far, their causes can be used in developing an appropriate regulatory framework.

The FTX collapse has imposed greater urgency in regulating the crypto sector, and targeting such "conglomerate" platforms will take centre stage in 2023, new IOSCO chairman Jean-Paul Servais said in an interview. He said regulation of crypto platforms could be based on principles from other sectors that manage conflicts of interest, such as credit rating agencies, without having to start from scratch.

7.3. Crypto-assets: stylised facts

Bitcoin was created to go beyond the existing monetary and financial system as an alternative payment system. In practice **Bitcoin is rarely used for legal transactions. Real Bitcoin transactions are cumbersome, slow and expensive. 85% of companies that have applied to the FCA register have failed the anti-money laundering test**.

Bitcoin was originally marketed as a decentralised global digital currency. In reality, **Bitcoin is not suitable as an investment. Crypto-assets don't generate cash flows like real estate or dividends like stocks, can't be used productively like commodities, and don't provide social benefits like gold**.

Bitcoin was originally promoted as a long-term investment and was considered the best insurance against political and macroeconomic risks. In reality, **the extreme volatility, lack of corporate governance standards, market abuse, lack of any collateral, indicates that crypto-assets are not**

appropriate investment instruments. In addition, crypto-assets are dependent on the economic cycle. The onset of quantitative tightening policy started in 2022 led to their growth being halted and thus to the crypto market failures of 2022. This shows that **crypto-assets respond to monetary policy shocks and rely solely on the influx of money and new users. Since Ponzi speculative schemes rely on inflows of new cash, it can be argued that although crypto-assets are not inherently Ponzi schemes, they can turn into them.**

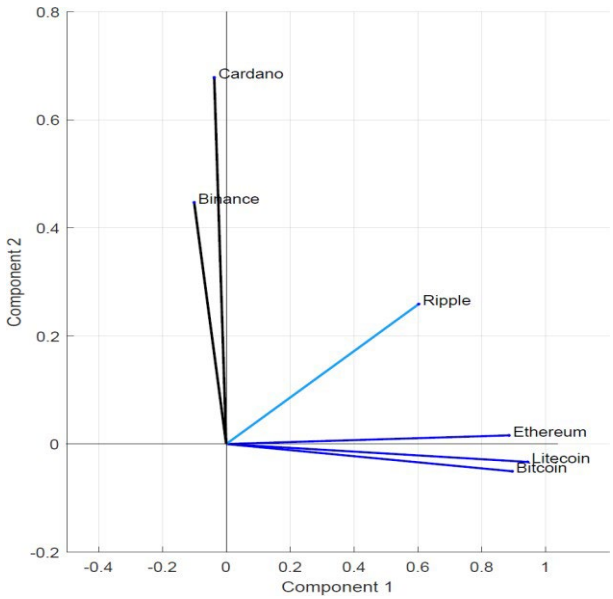
In terms of environmental impact, estimates indicate that crypto-asset mining consumes very large amounts of electricity annually. Secondly, very large amounts of hardware waste are produced. The whole **system of cryptoasset transactions generates a lot of electronic waste.**

7.4. Crypto-assets and the generation of speculative bubbles

While Bitcoin is the most well-known crypto-asset, there are over a thousand crypto-assets in circulation. Crypto-assets were selected by capitalization size for the period January 2018-December 2022. Given the high correlation between the selected crypto-assets, a factor model analysis was used for which a *promax* factor rotation was calculated. The factor analysis model allows the extraction of statistical factors that can explain the dynamics of the crypto-assets.

The results indicate that Ethereum, Litecoin and Bitcoin have very similar dynamics, while Cardono and Binance are better explained by the second statistical factor. The first factor explains 64% of the variation of the selected crypto-assets, while the second factor explains only 12%. Other variables such as gold, USD index, oil price or VIX index are not explanatory variables for the evolution of crypto-assets.

Chart 115 Factor model for the main crypto-assets



Source: Refinitiv, ASF calculations

The high correlation of the first principal component with the evolution of Bitcoin suggests that Bitcoin dynamics is a key factor for the evolution of the other cryptoassets. The increase in the first principal component indicates the increasing degree of interdependence between cryptoassets. Some cryptoassets are more influenced by market developments: Bitcoin 24%, Ethereum 19.9%, Litecoin 14.2%, Ripple 40%, Binance 82.8%, Cardano 59%.

Because **Bitcoin's dynamics best explain the dynamics of other cryptoassets**, Bitcoin's dynamics between January 2012 and December 2022 will be further analysed. In the first graph the dynamics of Bitcoin over the period 2012-2018 are shown and in the second graph for 2018-2022.

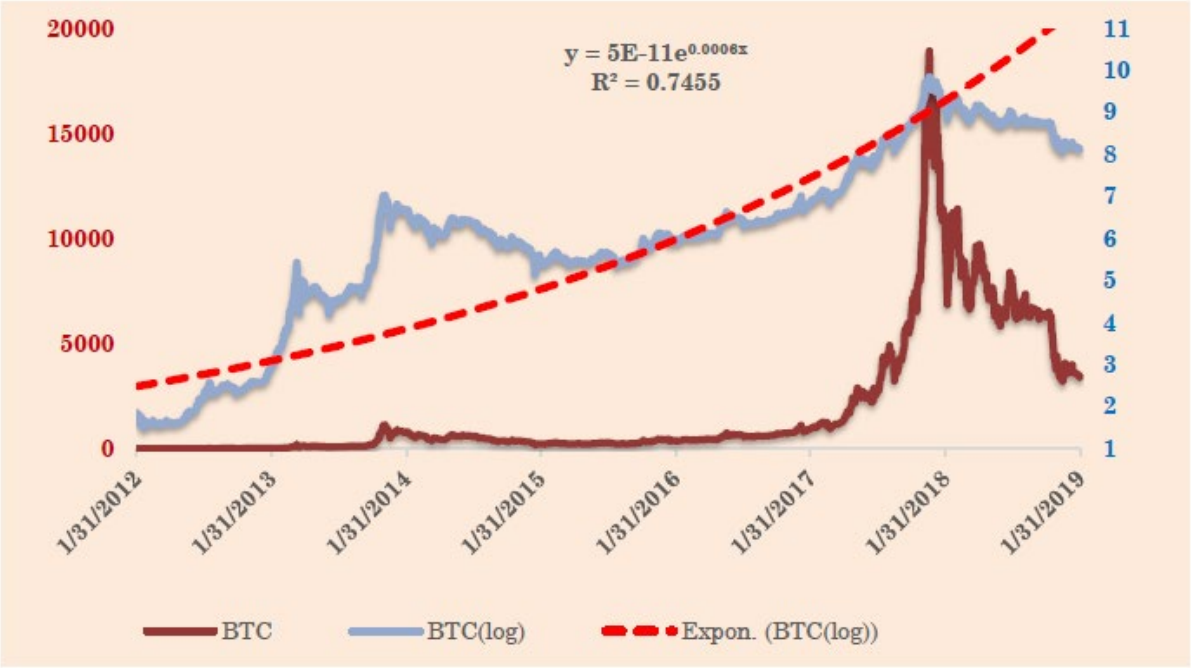
The Bitcoin price is represented with a red line and the logarithm of the price is blue and is represented on the right axis. It can be seen that the logarithm of the bitcoin price has shown an exponential increasing trend in both periods. The results are included in the graph and indicate how speculative bubbles form in the Bitcoin price.

Since an **exponential increase[52] in the price of an asset leads implicitly from a point to a limit of growth**, it follows that the price dynamics of crypto-assets implicitly lead to the generation of speculative bubbles. In Chapter 3 of the Financial Stability Report (2/2022) speculative bubbles were divided into two categories: a) rational bubbles b) irrational bubbles.

The dynamics of crypto-assets and the speculative bubbles they generate fall into the category of irrational bubbles as the intrinsic value of crypto-assets is zero and price dynamics are based only on stochastic shocks.

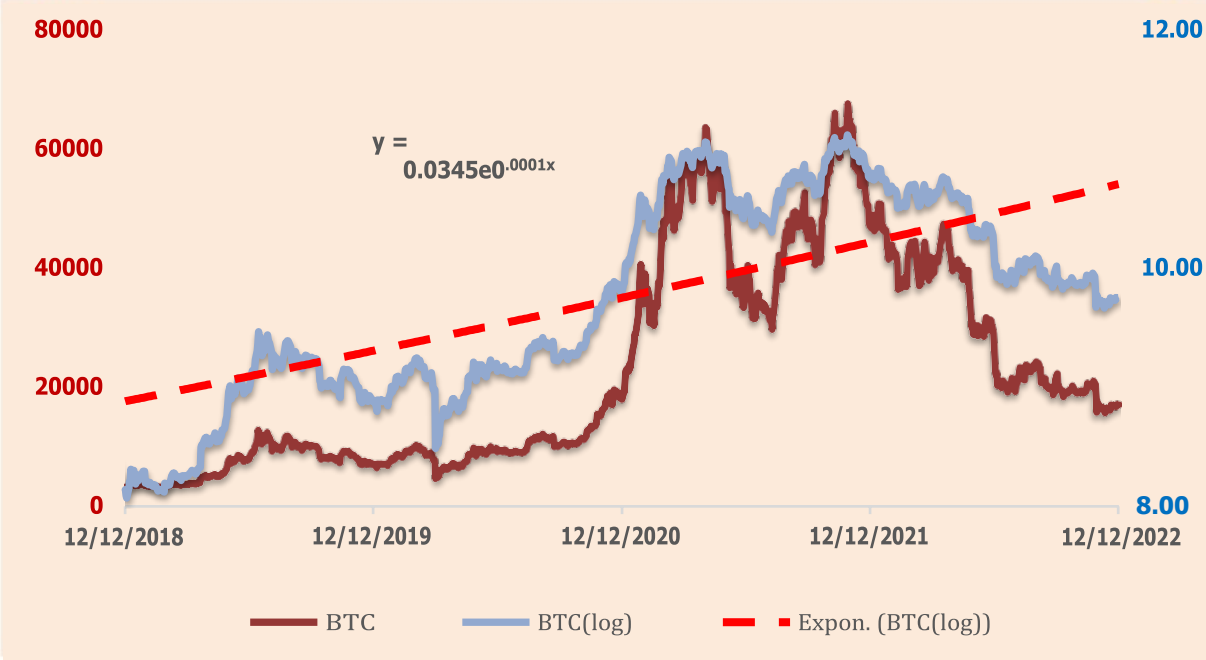
[52] Exponential growth - Wikipedia

Chart 116 Bitcoin price dynamics (2012-2018)



Source: Refinitiv, ASF calculations

Chart 117 Bitcoin price dynamics (2018-2022)



Source: Refinitiv, ASF calculations

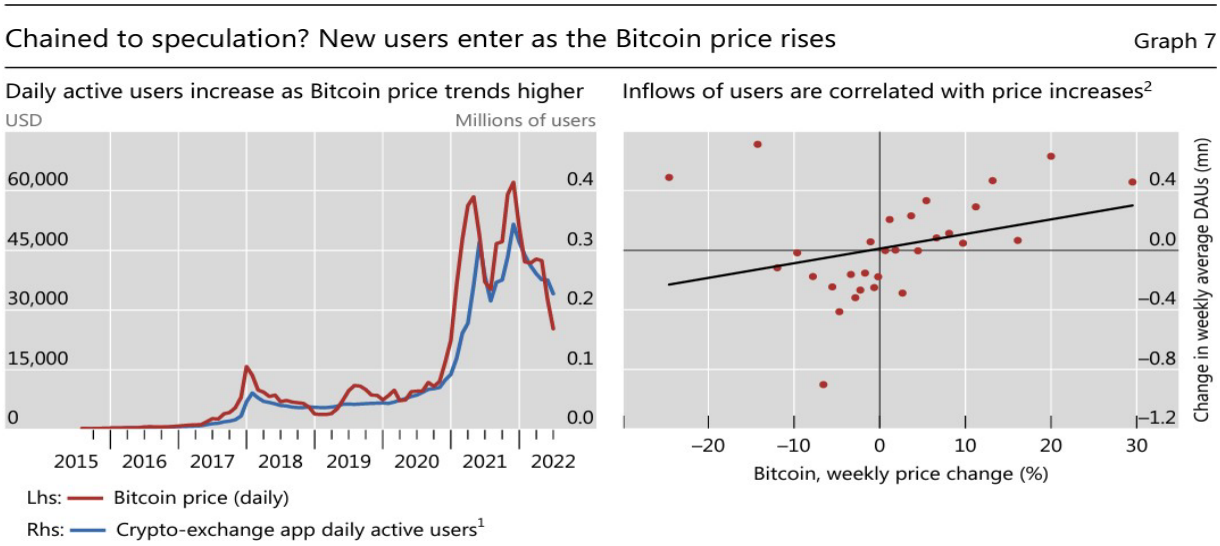
Recent results from the academic literature[53] show that the determinants of the Bitcoin price are:

- **Bitcoin's price is associated with a significant increase in the number of new users,** i.e. the entry of new investors. This positive correlation remains robust even when controlling for other potential factors, such as general financial market conditions, uncertainty or country characteristics. From this point of view the price formation of cryptoassets is similar to a Ponzi scheme. **Although crypto-assets are not inherently Ponzi schemes, they can turn into pyramid schemes especially when crypto-asset markets are not regulated and are subject to market abuse**.
- 40% of users are men under 35.
- Users are attracted by **rising bitcoin prices** rather than aversion to the traditional financial system or a search for a better-yielding asset.
- Analysis of the blockchain data shows that while prices were rising and retail users were buying bitcoin, the largest holders were selling, profiting at the expense of retail users. The results show that retail investors are not fully informed about the risk of crypto assets.
- As recent events have made clear, rising interest rates and other shocks have led to a persistent fall in prices as the momentum that drove the market goes into reverse.

The number of app users responds strongly to a shock in the price of bitcoin. **In the case of a 15% increase in Bitcoin prices** (corresponding to a 1 standard deviation shock), the number of crypto-asset exchange app users increases by 3% on impact and continues to increase significantly for seven months after the shock.

[53] Auer, Raphael, et al. *Crypto trading and Bitcoin prices: evidence from a new database of retail adoption*. No. 1049. Bank for International Settlements, 2022.

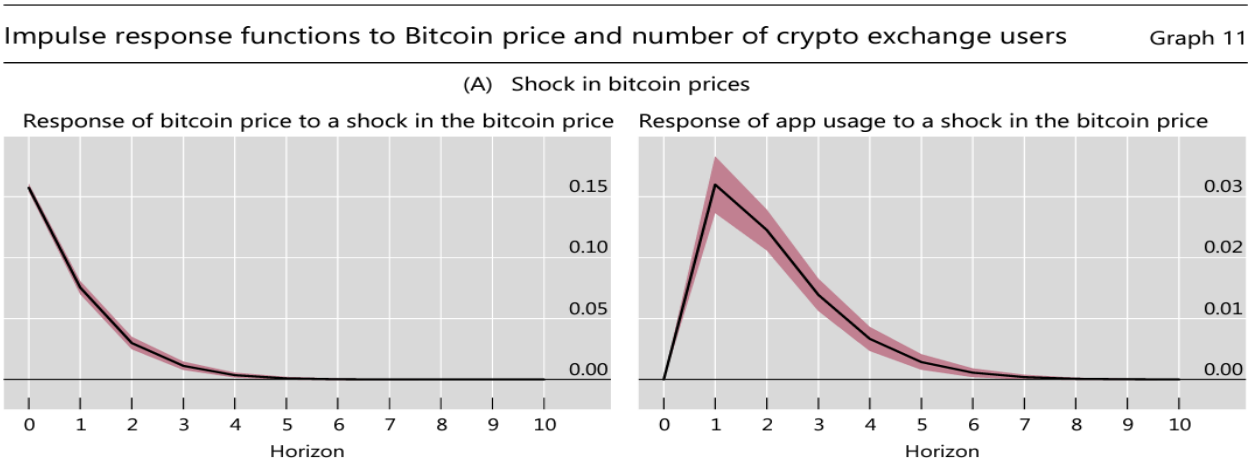
Chart 118 Impulse response function when Bitcoin price rises



Source: Auer, Raphael, et al (2022)

A **12% increase in the number of** crypto-active **app users** (corresponding to a 1 standard deviation shock) immediately increases the price of Bitcoin by 6%. The effect continues to be significant for one month, with an additional 1.5% increase in the price of Bitcoin. It disappears after two months.

Chart 119 Impulse response function when increasing the number of users



Source: Auer, Raphael, et al (2022)

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