# FINANCIAL STABILITY REPORT

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MAY 2023

The data underlying the charts and tables presented in this Report can be found at the Banco de Portugal website, with some exceptions for private sources data

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# Content

# Executive summary

Risks to financial stability remained high and the cycle of interest rate hikes continued. This is due to lingering geopolitical tensions, inflationary pressures and the increased turmoil in international financial markets, linked to recent developments in US and Swiss banks. Despite reflecting idiosyncratic weaknesses in these institutions, prevailing uncertainty warrants increased monitoring. The ECB has monetary policy instruments at its disposal that can support the banking system's liquidity, if needed, and preserve the transmission of monetary policy.

The main risks and vulnerabilities to financial stability are:

- heightened turmoil in international financial markets, implying potential contagion effects across financial and business cycles. Any broader risk aversion would have an adverse impact on financing costs, the valuation of assets and economic activity;
- a less favourable path for the public debt ratio. A potentially more adverse economic and financial environment, with lower economic growth and more persistent inflation, triggering a more intense and lasting reaction of monetary authorities, increases risks associated with high indebtedness;
- potential default of the most vulnerable households due to high inflation, rising short-term interest rates and a potential worsening of the unemployment rate. The predominance of the variable interest rate in loans for house purchase means that the rise in interest rates leads to an increase in the debt burden in the short term;
- potential default of the most vulnerable firms. Despite recent evidence of the sector's resilience, a more unfavourable economic and financial environment, characterised by lower economic growth and higher interest rates, will increase the share of firms experiencing vulnerability;
- the cooling down of the residential real estate market, with an impact on prices and the value of the collateral of loans secured by real estate. Rising interest rates will contribute to a deceleration in residential real estate market prices in Portugal;
- the materialisation of market and credit risks to the banking sector.

After a long period of very low interest rates, developments in the economic and financial environment have favoured the performance of the banking sector in recent quarters, in particular income generation. In view of the identified challenges and risks, banks are expected to tailor lending conditions to their customers' ability to pay. It is also expected that they maintain prudent provisioning and capital conservation policies in order to use part of the profits to increase their ability to absorb losses, taking into account existing risks, and to continue to finance the economy.

The pursuit of these objectives over a longer time horizon requires them to act proactively and make the necessary investments to address (i) the change in the operational and competitive context due to rapid technological transformation and (ii) the financial consequences of economies adapting to climate transition. As shown in this report, a preliminary review of the banking sector's exposure to physical risks through lending to firms suggests that exposure is concentrated on firms located in areas with the potential for materialisation of water stress, heat stress and fire risks, even where intermediate risk levels are predominant.

As part of its tasks, the Banco de Portugal will continue to closely monitor the real and nominal conditions of the economy, in particular the effects of rising interest rates on the various institutional sectors, acting on the basis of its risk assessment.

# I Financial Stability outlook

# 1 Vulnerabilities, risks and macroprudential policy

## 1.1 Main risks and vulnerabilities

Risks to financial stability remain high. The international macrofinancial environment is characterised by geopolitical tensions, higher interest rates needed to counteract inflationary pressures, and additional challenges emerging from the recent developments in US and Swiss banks that caused heightened turmoil in international financial markets. Although these disturbances are associated to these banks' idiosyncratic weaknesses, the prevailing uncertainty warrants increased monitoring. The ECB has at its disposal monetary policy instruments that can support the banking system's liquidity, if needed, and preserve the transmission of monetary policy.

The main risks and vulnerabilities to financial stability are:

- Heightened turmoil in international financial markets, implying potential contagion effects across financial and business cycles. Beyond geopolitical uncertainty, tensions in international financial markets increased volatility and systemic stress. The impacts were particularly visible in the valuations of securities of financial institutions more exposed to interest rate risk, which may also trigger liquidity strains. Any broader risk aversion would have an adverse impact on financing costs, the valuation of assets and economic activity;
- A less favourable path for the public debt ratio. The projected path of reduction in the public debt ratio is a factor promoting financial resilience, not only of general government but also of all other resident economic agents. However, a potentially more adverse economic and financial environment, with lower economic growth and more persistent inflation, which prompts a more restrictive and lasting reaction from monetary authorities, increases the risk of high indebtedness. The possibility of disturbances in international financial markets that cause unjustified rises in sovereign debt risk premia is mitigated by the ECB's commitment to ensure an effective transmission of monetary policy to all jurisdictions through the Transmission Protection Instrument (TPI);
- Potential default of the most vulnerable households due to high inflation, rising short-term interest rates and a potential worsening of the unemployment rate. Given the large share of loans for house purchase with a variable rate, the increase in interest rates results in higher debt burden in the short term, increasing household credit risk. However, there are mitigating factors, such as: (i) the reduction in the indebtedness ratio of households to below the euro area average; (ii) the concentration of loans for house purchase in higher-income households; (iii) the improvement in the risk profile of new borrowers as a result of the macroprudential Recommendation; (iv) labour market shortages; (v) household savings build-up during the pandemic; and (vi) the implementation of government measures to support households, including to repay instalments on loans for house purchase;
- Potential default of the most vulnerable firms. Firms have managed to preserve their profit margins and internal capital generation capacity, reflecting an improvement in the profitability and capital ratio indicators. In addition, firms have placed and maintained large deposits, which act as major liquidity buffers. Nonetheless, in a more unfavourable economic and financial environment, characterised by smaller economic growth and higher interest rates, the share of vulnerable firms is likely to increase more sharply;

- The cooling down of the residential real estate market, with an impact on prices and on the value of the collateral of loans secured by real estate. By the end of 2022, housing prices and transactions in this market slowed down. In a context of rising interest rates, there may be some correction in residential real estate market prices. However, even if a more significant drop in prices occurs, the loan-to-value ratio distribution of loans for house purchase suggests that the banking system will not suffer high losses. In the case of the commercial real estate, the banking sector's exposure is limited and considerably lower than that of residential real estate, while capital requirements are significantly higher, limiting the potential impacts of adverse developments in this market;
- Credit and market risk materialisation in the banking sector. The baseline scenario for developments in the Portuguese economy, characterised by economic growth and rising interest rates, will tend to have a favourable effect on profitability and capital, promoting an increase in net interest income that should help to accommodate an expected rise in credit default and some market risk materialisation. Portuguese banks currently operate with structurally high capital and liquidity ratios. As such, they are expected to remain resilient, even in a more adverse economic and financial environment.

There are some additional challenges associated with: (i) the change in the operational and competitive context due to rapid technological transformation and (ii) the financial consequences of economies adapting to climate transition. In light of these risks, there has been progress in terms of regulation aiming at a more resilient financial system.

## **1.2** Macroeconomic and market environment

The current international macrofinancial environment is characterised by several challenges, related to recent developments in US and Swiss banks that originated additional turmoil in international financial markets.

In the euro area, economic growth projections for 2023 have been revised upwards and inflation projections downwards (Table I.1.1). The most recent estimates point to an inflation path compatible with the medium-term objective. The ECB has reiterated the message of focusing on the medium-term objective for inflation, pointing out that monetary policy decisions are dependent on the economic and financial data that are released. The possibility of more adverse economic impacts associated with the financial market turmoil as well as rising geopolitical tensions deserves closer attention, as it entails risks of a worsening in financing conditions and a deterioration in confidence among economic agents.

For the euro area, the ECB expects 1% GDP growth in 2023 and 1.6% growth in 2024 and 2025. In 2024, activity should accelerate as inflation decreases and supply disruptions fade. However, the rise in financing costs limits the pace of growth. For Portugal, the economy is projected to grow by 1.8% in 2023 and 2% in 2024 and 2025. The pick-up in activity benefits from a stronger growth in real household income and European fund inflows, but it will be constrained by the worsening of financing conditions.

**Table I.1.1** • GDP and inflation projections for 2022-25 | Annual rate of change, per cent

| | March 2023 | | | | December 2022 | | | |
|---|---|---|---|---|---|---|---|---|
| | 2022 (p) | 2023 (p) | 2024 (p) | 2025 (p) | 2022 (p) | 2023 (p) | 2024 (p) | 2025 (p) |
| Gross domestic product | | | | | | | | |
| Portugal | 6.7 | 1.8 | 2.0 | 2.0 | 6.8 | 1.5 | 2.0 | 1.9 |
| Euro area | 3.6 | 1.0 | 1.6 | 1.6 | 3.4 | 0.5 | 1.9 | 1.8 |
| Inflation (HICP) | | | | | | | | |
| Portugal | 8.1 | 5.5 | 3.2 | 2.1 | 8.1 | 5.8 | 3.3 | 2.1 |
| Euro area | 8.4 | 5.3 | 2.9 | 2.1 | 8.4 | 6.3 | 3.4 | 2.3 |

Sources: ECB and Banco de Portugal.

**The balance of risks suggests downside risks to Portuguese economic activity, stemming mainly from the impact of tight monetary policy, the rise in financial market frictions and geopolitical tensions.** One of the main risks relates to the effects of monetary policy normalisation on activity, which may cause a more severe worsening of financing conditions. It may also be coupled with greater turmoil in financial markets, implying contagion effects between the financial and business cycles. The rise in geopolitical tensions also poses risks: an escalation of the conflict in Ukraine could result in renewed shocks on supply and prices of commodities and a deterioration in China-US relations would have a negative impact on activity. Conversely, there are upside risks to activity, associated with the robustness of the labour market, buffers accumulated during the pandemic by households and firms (including liquidity buffers and a stronger pick-up in real wages. Moreover, the Chinese economy's reopening may imply a greater momentum of external demand for Portuguese goods and services, promoting economic growth, although it may also have an impact on commodity prices, namely on oil prices in a context of controlled supply by OPEC+.

**Despite the recent moderation in price growth, inflation is still high.** Inflation has been declining over recent months as commodity price pressures fade, especially energy-wise. **In the euro area**, total inflation fell to 6.9% in March, but it continued to rise when excluding food and energy, reaching 7.5% in March (Eurostat's flash estimate for April points to 7% and 7.3% respectively) (Chart I.1.1). **In Portugal**, the substantial inflation rate in 2022 (8.1%) mostly reflected external pressures, with the recent decline being explained almost exclusively by developments in the energy component. Excluding energy, prices have grown at a high and relatively stable pace of growth since the end of last year (close to 9%). Food price dynamics have contributed to these developments, with year-on-year rates of change of close to 20% at the beginning of 2023, higher than those observed in the euro area.

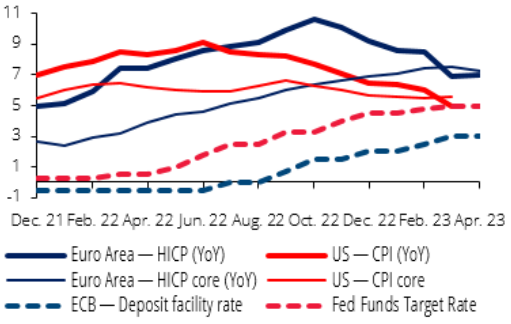
**Inflation projections point to a gradual decline** (Chart I.1.1). **In the euro area**, inflation should continue to decline. The transmission of falls in energy prices and the effects of monetary policy normalisation on the economy should be gradual. March 2023 ECB projections incorporate a reduction in total inflation to 5.3% in 2023, 2.9% in 2024 and 2.1% in 2025. Inflation excluding food and energy will go down from 4.6% in 2023 to 2.5% in 2024 and 2.2% in 2025. **For Portugal**, inflation is projected to stand at 5.5% in 2023, declining to 3.2% in 2024 and 2.1% in 2025. Over the next few quarters, developments in energy and food prices will determine this downward path. The main upside risk is associated with second-round effects on prices stemming from stronger and more persistent growth in wage and profit margins than expected or an expansionary fiscal policy.

**The sustained reduction in inflation in the euro area will continue to be the priority of the ECB, which will act in order to maintain long-term inflation expectations anchored to the price stability objective** (Chart I.1.1 and Chart I.1.2). Since the start of the monetary policy normalisation process up to the end of April, the ECB increased interest rates by 350 basis points. At the same time, it ended net asset purchases under purchase programmes (and, later, reducing reinvestments),

changed the terms and conditions of the third series of the outstanding targeted longer-term refinancing operations (TLTRO III) and, in July 2022, announced the creation of a new instrument to protect monetary policy transmission (the TPI). The ECB has reiterated that financial stability is a precondition for price stability, since it is needed to ensure an effective transmission of monetary policy, and that it has at its disposal instruments to address both aspects. On 4 May 2023, the ECB's Governing Council decided to (i) raise the three key ECB interest rates by 25 basis points (resulting in an increase in the interest rate on main refinancing operations and the interest rates on the marginal lending facility and the deposit facility to, respectively, 3.75%, 4.00% and 3.25%) and (ii) continue to reduce the asset purchase programme (APP) portfolio, expecting to discontinue reinvestments under the APP as of July 2023.

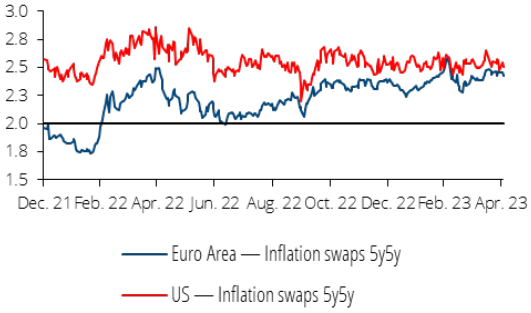
**The maintenance of persistent inflationary pressures has led to tighter monetary policy also in other geographies.** Until the end of April, the Federal Reserve System (Fed) and the Bank of England kept raising policy rates to a range between 4.75% and 5% and to 4.25% respectively. On 3 May 2023, the Fed decided to raise its policy rate to a range between 5.0% and 5.25%.

**Chart I.1.1** • Inflation and central bank interest rates | Per cent




Sources: ECB, Eurostat, Fed, Statistics Portugal and U.S. Bureau of Labor Statistics. | Note: Inflation values for the euro area for April 2023 are Eurostat flash estimates.

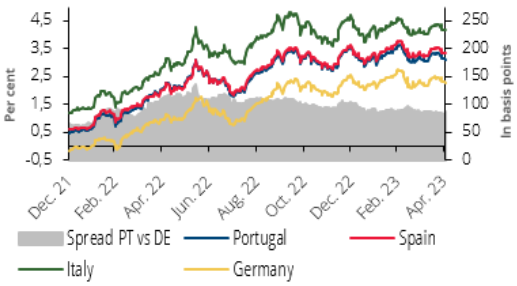
**Chart I.1.2** • Inflation expectations implied by 5y5y swaps in the euro area and United States | Per cent




Source: Refinitiv. | Notes: Closing market quotes. Latest observation: 2 May 2023.

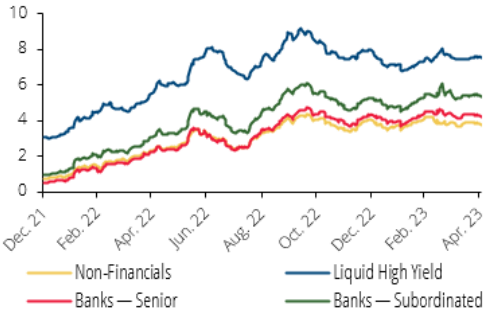
**The rise in financing costs that started in February 2022 as a result of turbulence associated with Russia's invasion of Ukraine, mainly affected government debt yields (with relative stability of differentials vis-à-vis Germany), corporate debt instrument yields and, more slowly, in the interbank interest rates of longer maturities** (Chart I.1.3, Chart I.1.4 and Chart I.1.5). From the moment the ECB announced it would start raising interest rates to the outbreak of tensions in the banking sector in the United States and Switzerland (6 March 2023), the rise in financing costs became more expressive in the private sector (about 300-325 basis points for the various maturities of the EURIBOR rates), while the increase in public debt was less marked (about 100 basis points in the 10-year maturity). In Portuguese sovereign debt yields, for the same dates, the differential against Germany narrowed, closely following euro area issuers with higher yields. The announcement by the ECB that it has the necessary instruments, namely the TPI, to ensure an effective transmission of monetary policy to the different jurisdictions of the euro area seems to have contributed to these developments.

**Chart I.1.3** • 10-year sovereign debt yields




Source: Refinitiv. | Notes: Closing market quotes. Latest observation: 2 May 2023.

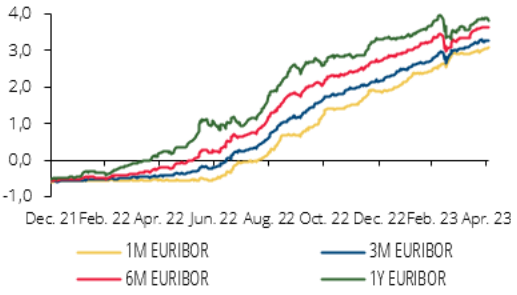
**Chart I.1.4** • NFC and bank bond yields in the euro area | Per cent




Source: Refinitiv. | Notes: Yield on iBoxx indices. Closing market quotes. Latest observation: 2 May 2023.

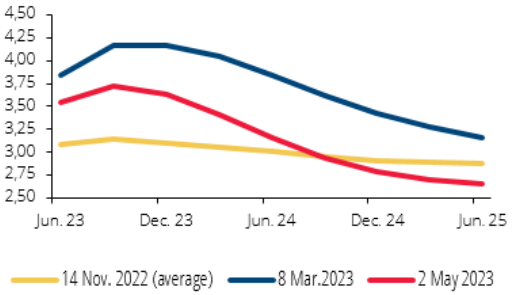
**Banking sector developments in March in the United States and Switzerland triggered an increase in volatility in the international financial markets and led to downward revisions of expectations of central bank interest rate hikes** (Chart I.1.6). There was a retraction in interbank interest rates and in expectations for their future developments. Meanwhile, as the most acute stress moments dissipate, interbank interest rates have returned to their upward trend, more evident in shorter maturities (Chart I.1.5). In the sovereign debt market, yields fell as a result of an adjustment in expectations on the monetary policy path, as well as due to flight-to-quality movements in the face of increased uncertainty, but spreads against Germany remained stable (Chart I.1.3).

**Chart I.1.5** • Euro interbank interest rates: 1-month, 3-month, 6-month and 1-year EURIBOR | Per cent




Source: Refinitiv. | Note: Latest observation: 2 May 2023.

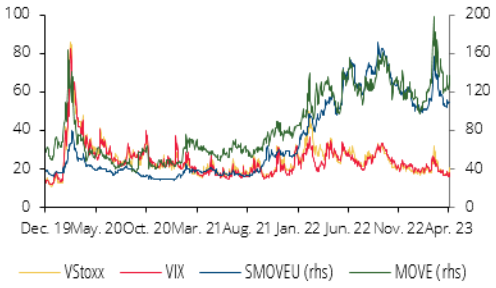
**Chart I.1.6** • Interest rate implied in three-month EURIBOR futures contracts | Per cent




Source: Refinitiv (Banco de Portugal calculations). | Notes: For 14 Nov. 2022 (cut-off date of the November 2022 *Financial Stability Report*) the average of interest rates over the last month is calculated. For the other dates, the closing quotes of the respective day were used. Latest observation: 2 May 2023.

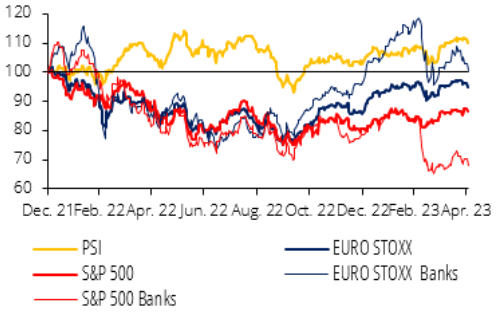
**Volatility has also been present in equity markets, but its incidence varies across geographies and sectors** (Chart I.1.7 and Chart I.1.8). The rebound in equity indices occurring since the end of September 2022 was interrupted by the March 2023 events, in particular regarding the financial sector. Between 6 March and 2 May, the Euro Stoxx Banks Index decreased by 15% and the S&P Banks Index fell by 19%, while general indices almost recovered from losses (Euro Stoxx lost 2% and S&P500 rose by 2%), since the other sectors benefited from the lower expectations of additional hikes in official interest rates.

**Chart I.1.7** • Equity and debt market volatility | Points




Source: Bloomberg. | Notes: Option-implied volatility. "VSTOXX" refers to Euro Stoxx 50, "VIX" to S&P500, "MOVE" to the US Treasury curve and "SMOVEU" to the Euro swaps curve. Latest observation: 2 May 2023.

**Chart I.1.8** • Stock indices | Points



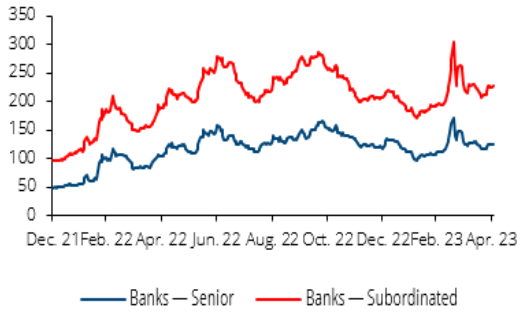

Source: Refinitiv. | Notes: Stock indices with a base value of 100 on 31 December 2021. Closing market quotes. Latest observation: 2 May 2023.

**The debt market has shown high volatility in face of recent events.** In the US and European markets, sovereign debt volatility indices reached very high levels (Chart I.1.7), which has been smoothed by authorities' intervention. However, the impact of tensions in international financial markets is still visible in private debt instruments. In particular, in the banking sector, uncertainty has had a significant impact on the increase in risk premia (Chart I.1.9).

**The increased costs of financing are particularly visible in subordinated debt instruments issued by banks** (Chart I.1.9). Following problems in Credit Suisse that led to the total write-down of contingent convertible subordinated instruments (CoCos) to absorb losses, the prices of Additional Tier 1 (AT1) instruments of other banking institutions were negatively affected. This occurred despite the instruments used in the Credit Suisse case having their own specificities. Meanwhile, the Banking Union European authorities (SRB and SSM) reaffirmed that if an intervention is needed to contain a crisis, priority given to the use of capital instruments laid down in the applicable EU law will remain. Despite the firm action of US and Swiss authorities, as well as clear communication from European authorities, this situation may affect the issuing costs of subordinated debt instruments, making future issuances with the purpose of complying with the minimum requirement for own funds and eligible liabilities (MREL) more difficult.

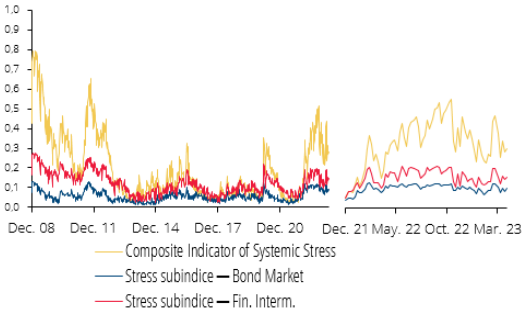
**Due to the recent tensions in international financial markets, the risk of an additional reassessment of asset prices has increased.** Besides the geopolitical tension, the uncertainty felt in financial markets, related to the US and Swiss banking sector considerably increased volatility and systemic stress (Chart I.1.10). The impacts were mainly felt in the financial sector's equity and private debt markets. These developments were particularly visible in financial institutions with business models that expose them to interest rate risk and that may also trigger difficulties from a liquidity risk perspective, while there is a risk of contagion to institutions with different business models.

**Chart I.1.9** • Asset swap spreads of bank debt securities of the euro area | In basis points




Source: Refinitiv. | Note: Asset swap spreads of iBoxx indices. Closing market quotes. Latest observation: 2 May 2023.

**Chart I.1.10** • Euro area systemic stress indicator




Source: ECB | Notes: The Composite Indicator of Systemic Stress (CISS) changes within the interval (0, 1). The CISS aims to measure the current state of instability of the financial system as a whole or, equivalently, the "systemic stress" level, interpreted as that amount of1.3 systemic risk which has materialised. The CISS compiles a set of indicators in five representative market segments: bond market, equity market, financial intermediaries, foreign exchange and money market. For more details, see Hollo, D., Kremer, M. and Lo Duca, M., "'CISS – a composite indicator of systemic stress in the financial system", *Working Paper Series*, No 1426, ECB, March 2012. Latest observation: 28 April 2023.

**The euro area banking sector is resilient, with strong capital and liquidity positions.** In addition, liquidity ratios are calculated using the market value of high-quality liquid assets (HQLA) even when these securities are held at amortised cost in the balance sheet of institutions. However, uncertainty prevails, suggesting the need for closer monitoring. The ECB also has a set of monetary policy instruments that makes it possible to provide liquidity support to the euro area banking system, if needed, and preserve monetary policy transmission.

# **1.3** Sectoral risk analysis

## **1.3.1** General government

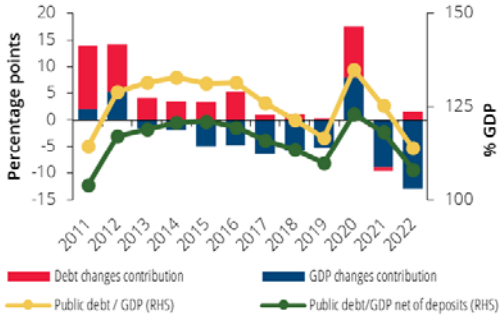
**In 2022, amid favourable developments in economic activity, whose growth was successively revised upwards throughout the year, and a high GDP deflator, the budget balance and the weight of public debt decreased significantly.** The budget deficit reached 0.4% of GDP (2.9% in 2021), while the debt ratio dropped by around 11 p.p. to 113.9% of GDP.

The improvement in the budget balance mainly reflected primary balance developments, from -0.5% of GDP in 2021 to 1.6% in 2022, but also benefited from a 0.4 p.p. reduction in interest expenditure, to 2.0% of GDP. The reduction in the public debt ratio extended to both gross debt and debt net of deposits, largely reflecting the increase in nominal GDP, which was only very partially offset by an increase in the stock of debt (gross and net of deposits) (Chart I.1.11).

**In the Stability Programme update for 2023-27, the Portuguese government continued to target further cuts in the public debt-to-GDP ratio in the coming years, against a background of economic growth expected to stabilise close to potential and gradual price growth convergence towards the threshold set by the ECB (2% over the medium term).** Achieving the proposed targets, which are expected to make way for a debt ratio of around 100% of GDP by 2025, implies maintaining budget balances close to equilibrium. Only then will conditions be set for an improvement in Portugal's relative position within the euro area, in terms of the public debt ratio (Chart I.1.12). Importantly, should this scenario materialise, it would improve the risk profile of the sovereign and other

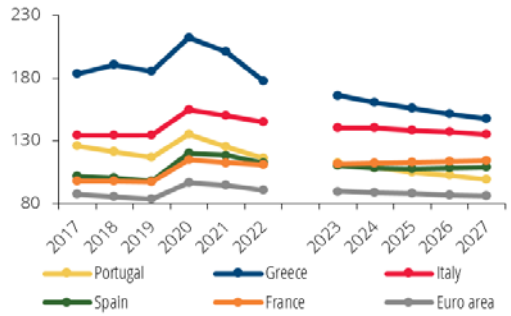
resident issuers, contributing to a reduction in their cost of market financing and, overall, fostering greater resilience to adverse economic and financial shocks.

**Chart I.1.11** • Portuguese public debt ratio




Sources: Banco de Portugal and Statistics Portugal.

**Chart I.1.12** • IMF projections for public debt developments | As a percentage of GDP

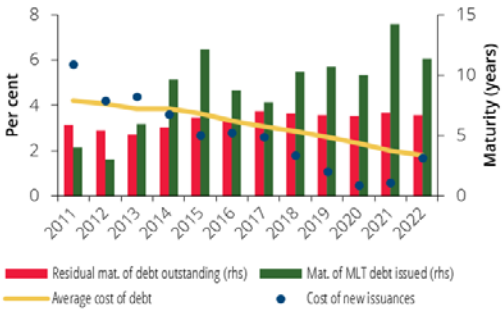



Source: IMF. | Notes: April 2023 projections. Estimates from 2023 onwards.

**The favourable effects of the improvement in the budget balance, and in particular the reduction in the public debt ratio, are increasingly important amid rising interest rates in the context of the monetary policy normalisation in the euro area.** The effects of the normalisation process extend to the entire yield curve, implying a broad-based worsening of general government financing costs. In the case of long-term debt, the increase observed in recent months in secondary market Portuguese government debt yields was in line with that observed for German debt. In the second half of 2022 and early 2023, there was a partial reversal of the widening of the spread of Portuguese sovereign debt vis-à-vis Germany seen in the first half of 2022. Throughout April, the spread stood at around 86 b.p., below the 104 b.p. average recorded in the second half of 2022.

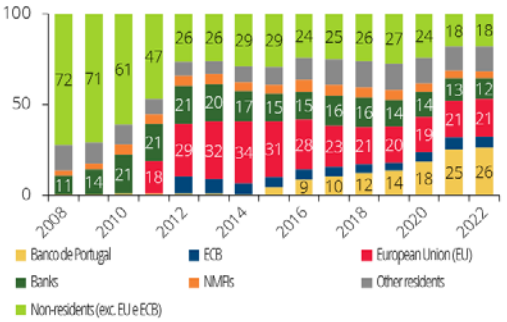
**Developments in secondary market interest rates were mirrored in the cost of new primary market public debt issues** (Chart I.1.13). Throughout 2022 the allotment rates in Treasury bonds with an approximate maturity of ten years increased by around 3 p.p. For issues at the beginning of March 2023, allotment rates at 9.4 and 12.6 years stood at 3.55% and 3.74% respectively. Likewise, and in line with the rise in Euribor rates, the allotment rates in Treasury bills increased markedly throughout the second half of 2022 and early 2023, reaching 2.98% at the 12-month issue on 15 March 2023 (in the same month of 2022, the allotment rate was -0.47%). In turn, the interest rate on new subscriptions and accruals of savings certificates, Series E, was set at 3.5% in March 2023, the ceiling for the remuneration of these savings instruments. The difference in return on savings certificates against the offer on term deposits by banks has been the grounds for the very significant amounts of subscriptions (net of redemptions) of savings certificates in recent months. The value at the end of 2022 (€19.6 billion) exceeded the latest series peak in January 2008 (€18.2 billion). The maximum amount per subscriber is €250,000.

**Chart I.1.13** • Cost and maturity of Portuguese public debt




Sources: Banco de Portugal, ECB, Portuguese Treasury and Debt Management Agency and Statistics Portugal. | Notes: The implicit average cost of the debt stock corresponds to the ratio of interest expenditure to average debt stock. The cost of debt issued in each period is weighted by amount and maturity and includes Treasury Bills, Treasury Bonds, floating rate Treasury bonds and medium-term notes issued in the corresponding year. The average maturity of medium and long-term debt comprises Treasury Bonds and medium-term notes issued in the corresponding year.

**Chart I.1.14** • Structure of Portuguese public debt holders | Per cent




Sources: Banco de Portugal and Portuguese Treasury and Debt Management Agency (Banco de Portugal calculations). | Note: End-of-period data.

**Despite the cost dynamics of new issuances, the pass-through to the average cost of the stock of debt is expected to be fairly contained in the coming years, given that, on the one hand, around 90% of debt is issued at a fixed rate and, on the other hand, most of the debt has long maturities.** At the end of 2022, 55% of debt had a residual maturity of over five years. These data reflect an active management of the maturity profile by the Portuguese Treasury and Debt Management Agency, which aims to limit short-term refinancing risk, associated with maturity concentration in each year (Table I.1.2). Contributing to containing the increase in the cost of debt, significant amounts of Treasury bonds with a high average interest rate will also mature over the next two years. Accordingly, while the average cost of the debt stock is expected to increase somewhat over the coming years, it is expected to remain historically low and not to prevent a favourable dynamic effect (the differential between the interest rate on debt and the rate of change in nominal GDP) on public debt ratio developments.

**Table I.1.2** • Annual schedule of Portuguese public debt redemptions | EUR billions and per cent

| | 2023 | 2024 | 2025 |
|---|---|---|---|
| Stock of debt maturing | 17.5 | 10.8 | 17.2 |
| Treasury bills | 6.0 | 0.6 | 0.0 |
| Official loans | 1.5 | 0.0 | 1.5 |
| Other medium- and long-term debt | 10.1 | 10.3 | 15.7 |
| Weight in total stock of debt (%) | 7.6 | 4.7 | 7.4 |
| Weight in 2022 GDP (%) | 7.3 | 4.5 | 7.2 |

Source: Portuguese Treasury and Debt Management Agency. | Notes: The maturity of loans under the European Financial Stabilisation Mechanism will be extended by seven years on average. Each loan will be effectively extended close to its maturity. Updated on 2 May.

**The projected downward path of the debt ratio is a driver of financial resilience, not only for the general government but also for resident economic agents in general.** The main risks associated with that process stem from a potentially more adverse economic and financial environment, with lower economic activity growth and more persistent inflation, triggering a more intense and lasting reaction of monetary authorities via higher interest rates. Were it to materialise, such a scenario

could put increased pressure on the balanced budget target via higher interest expenditure, the effect of automatic stabilisers, the lagged impact of inflation on primary expenditure or the adoption of additional policy measures. In this regard, and in line with the Banco de Portugal's statements, support measures aimed at mitigating the impact of temporary shocks should also be temporary and targeted at the most vulnerable economic agents and sectors, so as not to compromise the sustainability of public finances.

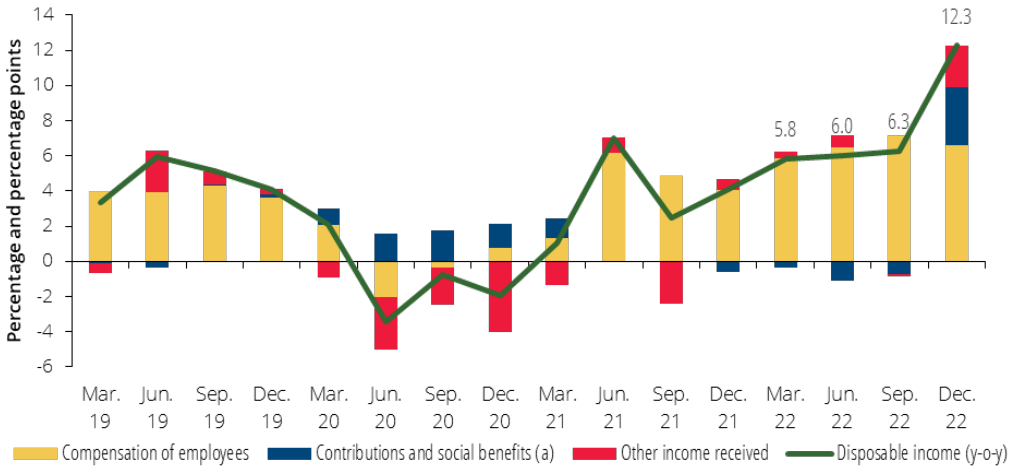
**The possibility of international financial market turmoil, leading to significant increases in the sovereign risk premium, arises in the current environment mitigated by the ECB's commitment to ensure an effective transmission of monetary policy to all jurisdictions**, through the Transmission Protection Instrument (TPI). It will be activated in the event of unwarranted, disorderly sovereign yield disruptions, not based on country-specific fundamentals. This protection is particularly important as it contains pressures on the sovereign's financing costs. It is also important as it mitigates risks for public debt holders by limiting the potential for devaluation in their portfolios.

**Over the past few years, the lower share of Portuguese banks in Portuguese sovereign debt holders as a whole has been accompanied by a geographical diversification of their exposure to sovereigns, thereby also reducing their sensitivity to adverse developments in the value of Portuguese public debt.** At the end of 2022, 52% of the stock of Portuguese public debt was held by the Eurosystem (32%) and the European Union (21%) (Chart I.1.14). Portuguese banks held only around 12% of that stock, compared to 21% in 2010, corresponding to 42% of their total exposure to public debt.

### 1.3.2 Households

Household nominal disposable income grew by 7.8% in 2022, with the largest contribution coming from labour compensation, which grew by 9.6% (Chart I.1.15). Despite the marked increase in the private consumption deflator, household real disposable income rose by 1.5% in 2022 (2.3% in 2021). This momentum was due to average wage and employment growth, in a context of economic activity expansion, particularly in more labour-intensive sectors.

**Chart I.1.15** • Household nominal disposable income | Per cent and percentage points




Sources: Banco de Portugal and Statistics Portugal. | Note: (a) Net of transfers in kind.

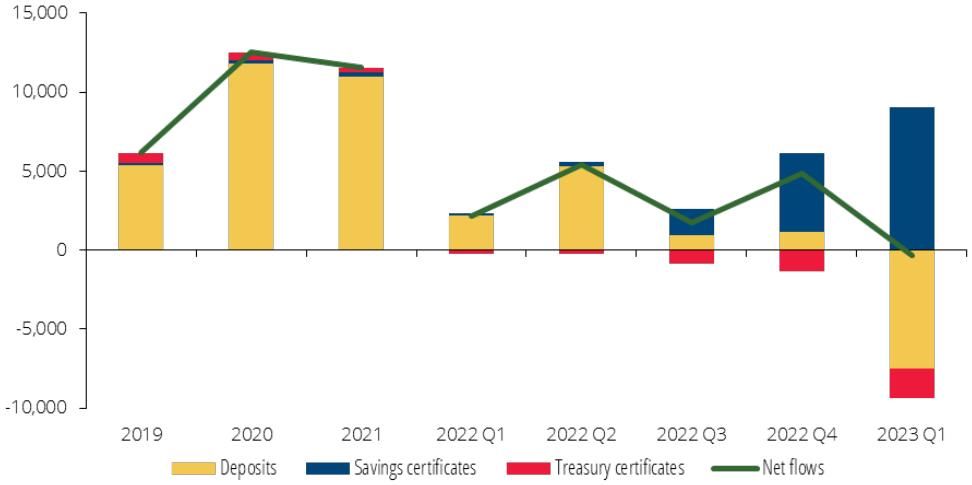
**The household saving rate fell to 6.1% of disposable income in 2022, down from 2019 (7.2%), after a strong increase during the pandemic (11.9% and 9.8% in 2020 and 2021 respectively).** In terms of investment of household savings, investment in real assets – largely in housing – continued to stand out, rising to 5.7% of disposable income (5.4% in 2021 and 5% in 2019) (Table I.1.3). The purchase of financial assets decreased to 5.3% of disposable income, with a reallocation of investment in deposits (down to 5.8% of disposable income) to savings certificates (Chart I.1.16). Throughout 2022 there was disinvestment in shares and other equity other than investment fund units (-1.9% of disposable income). There was also a relative stabilisation of investment in investment fund units and insurance and pensions.

**Table I.1.3** • Sources and uses of funds by households | As a percentage of disposable income

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Current savings in Portugal | 7.2 | 11.9 | 9.8 | 6.1 |
| Assets | 8.4 | 14.6 | 12.6 | 10.7 |
| Investment in real assets [a] | 5.0 | 5.1 | 5.4 | 5.7 |
| Balance of capital transfers | -0.4 | -0.4 | -0.3 | -0.3 |
| Net acquisition of financial assets | 3.8 | 9.9 | 7.5 | 5.3 |
| o.w. Currency and deposits with resident banks | 3.6 | 8.3 | 8.1 | 5.8 |
| Liabilities | 1.2 | 2.8 | 2.8 | 4.6 |
| Financial debt [b] | 1.0 | 1.5 | 2.7 | 3.1 |
| Other financial liabilities [c] | 0.2 | 1.2 | 0.1 | 1.5 |

Sources: Banco de Portugal and Statistics Portugal. | Notes: Consolidated figures in nominal terms. (a) Corresponds to the sum of gross fixed capital formation, changes in inventories, acquisitions net of disposals of valuables and acquisitions net of disposals of non-produced non-financial assets. (b) Corresponds to the sum of loans and debt securities. (c) Other financial liabilities include liabilities associated with all financial instruments, as defined in national financial accounts, except loans and debt securities (financial debt). It also includes the statistical discrepancy between the balances of net lending/net borrowing in the capital account and in the financial account.

**Chart I.1.16** • Change in household deposits with resident banks and net subscription of savings and Treasury certificates | EUR millions




Sources: Banco de Portugal and Portuguese Treasury and Debt Management Agency

**The household indebtedness ratio as a percentage of disposable income decreased by around 3 p.p. to 93% at the end of 2022, below 2019 levels (95%) and the euro area average (97%)** (Chart I.1.17). These developments mainly reflected the significant increase in nominal disposable income, but also a marked slowdown in lending to households in the last quarter of the year. Growth in the stock of loans for house purchase declined from mid-2022 onwards and consumer credit also slowed down somewhat in the most recent period (Section 2.2). Debt net of deposits has declined in recent years and continued this trend in 2022. It should also be noted that, in the recent period, there has been a significant increase in early repayments of loans for house purchase (Section 2.2).

**In Portugal, the share of loans for house purchase in disposable income is close to the euro area average** (Chart I.1.18). At the end of 2022 the stock of loans for house purchase accounted for 61% of disposable income, ranging from 31% in Slovenia to 113% in the Netherlands. The share of consumer credit and other purposes in disposable income, which in Portugal is 18%, ranges from 6% in the Netherlands to 25% in Finland.

**Chart I.1.17** • Household indebtedness ratio in the euro area and in Portugal | As a percentage of disposable income

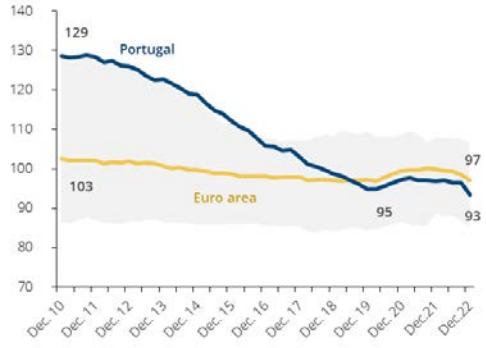
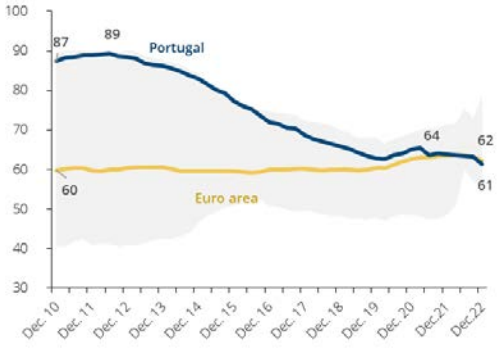



**Chart I.1.18** • Ratio of the stock of loans for house purchase to disposable income | Per cent



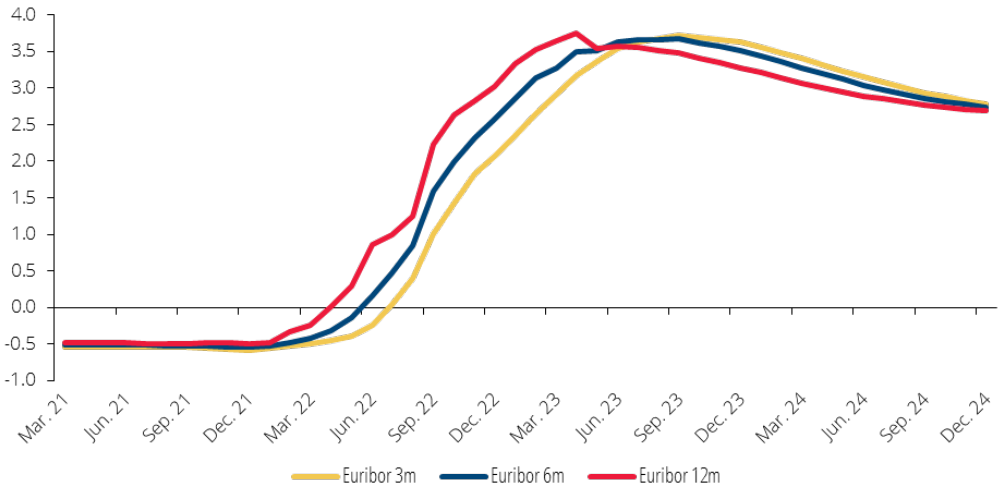

Sources: Banco de Portugal and Eurostat (Banco de Portugal calculations). | Notes: Non-consolidated figures for total debt. The grey area corresponds to the range between the third and the first quartiles of the distribution for a set of euro area countries (Belgium, Germany, Ireland, Greece, Spain, France, Italy, Netherlands, Austria, Portugal, Slovenia and Finland).

**Despite the expectation of a reduction in the inflation rate and the contained increase in the unemployment rate, the rise in short-term interest rates has heightened the risk of households defaulting.** Given that the share of the stock of loans for house purchase with a variable rate is around 90%, the increase in market interest rates has resulted in an increased debt burden leading to a potential materialisation of household credit risk.

The pass-through of rising interest rates to credit agreements is gradual, but all agreements linked to the 3-month and the 6-month Euribor and a large portion of the agreements linked to the 12-month Euribor have already posted a substantial increase in the reference rate.

According to market expectations, the rise in instalments is expected to proceed until September 2023, albeit more marked for loans linked to the 12-month Euribor and more moderate in reference rates with shorter maturities, especially in the case of the 3-month Euribor (Chart I.1.19). Given the current distribution of credit agreements for house purchase by year of loan initiation, it may be concluded that around 50% of current agreements have already recorded a reference rate higher than that expected for December 2023.

**Chart I.1.19** • Market expectations for developments in Euribor rates | Per cent




Source: Refinitiv (Banco de Portugal calculations). | Note: Information up to March 2023 refers to hard data. From April 2023 onwards, the series refer to market agents' expectations as at 2 May 2023.

The higher debt service burden of loans for house purchase is estimated to contribute to the rise in the average loan service-to-income (LSTI) ratio by around 6 p.p. between June 2022 and December 2023, to 22.3%. However, around 75% of agreements are expected to continue to have a current LSTI of 30% or less. The share of stock with an LSTI of over 40% will increase by 11 p.p. to 18.6% in December 2023 (7.7% in June 2022). This share is expected to be rather sizeable for loans linked to the 1st income quintile, of around 66% (Table I.1.4). However, in February 2023 these agreements accounted for only 9% of the stock of loans for house purchase.

**Table I.1.4** • Stock of loans for house purchase by LSTI class and income quintile | Per cent

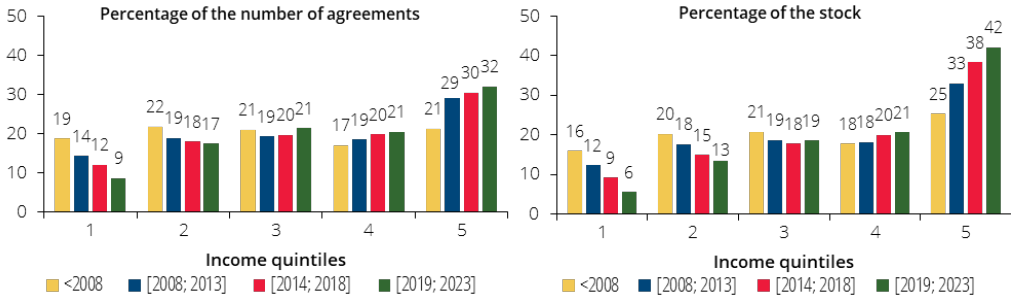
| | | Quintile 1 | | Quintile 2 | | Quintile 3 | | Quintile 4 | | Quintile 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Feb. 23 | Dec. 23 | Feb. 23 | Dec. 23 | Feb. 23 | Dec. 23 | Feb. 23 | Dec. 23 | Feb. 23 | Dec. 23 |
| LSTI class | <=20% | 6.9 | 4.2 | 20.2 | 11.5 | 40.5 | 25.4 | 59.4 | 41.6 | 82.7 | 71.9 |
| | ]20%;30%] | 18.3 | 10.8 | 35.1 | 25.7 | 35.2 | 32.2 | 28.1 | 32.6 | 12.9 | 18.5 |
| | ]30%;40%] | 23.7 | 18.9 | 23.7 | 25.6 | 16.0 | 23.5 | 8.9 | 16.1 | 3.2 | 6.5 |
| | ]40%;50%] | 17.7 | 18.9 | 11.2 | 17.6 | 5.2 | 11.3 | 2.3 | 6.2 | 0.7 | 2.0 |
| | >50% | 33.3 | 47.2 | 9.8 | 19.5 | 3.1 | 7.7 | 1.4 | 3.5 | 0.5 | 1.0 |
| Average Debt Amount | | 47,671 | 46,351 | 56,885 | 55,528 | 64,111 | 62,932 | 73,110 | 71,480 | 93,969 | 91,786 |
| Average Agreed Amount | | 72,064 | | 79,381 | | 87,869 | | 97,566 | | 124,514 | |
| memo items: | | | | | | | | | | | |
| Weight in Stock | | 9.4 | | 15.7 | | 18.9 | | 19.5 | | 36.5 | |
| Number of Agreements | | 138,893 | | 194,909 | | 207,369 | | 188,764 | | 274,960 | |

Sources: Banco de Portugal, Statistics Portugal and Ministry of Finance. | Notes: LSTI corresponds to the ratio of the instalment of the loan for house purchase to the borrowers' average monthly income (annual income divided by 12 months). It considers only 73% of the stock of loans for house purchase. It excludes agreements linked to exceptions to the DSTI ratio limit provided for in the macroprudential Recommendation. The sources of information on income are Instruction of the Banco de Portugal No 33/2018 or the Central Credit Register where not reported in the former. It should be noted, however, that developments in individual income over the borrowers' life cycle have not been taken into account, which is relevant given the long original maturities of loans for house purchase. Updated income between the latest update date and what is expected to be in force in 2023 for each agreement, based on the growth rate of 'wages and salaries' per employee (projection of the growth rate for 2023 based on the forecast for 'compensation of employees' – which to the 'wages and salaries' component adds 'employers' social security contributions' – from the State Budget).

**The challenge for households relates to the rapid pass-through of the interest rate increase (between one year and 18 months), but some factors mitigate the risk of default.** Most notable are:

- The reduction in the indebtedness ratio, below the euro area average, which was broadly based across all income classes, but particularly for lower-income households;
- The improvement in the risk profile of new borrowers as a result of the macroprudential Recommendation which, for credit agreements with a variable or mixed interest rate and with a maturity of more than ten years, considers a 3 p.p. increase in the applicable reference rate when calculating the DSTI for which a limit is set;
- Loans for house purchase are concentrated in higher-income households, which can more easily accommodate higher loan instalments. The share of lower-income households in the stock of loans for house purchase is low in Portugal, in line with other euro area countries. For loans for house purchase granted in recent years (in the period 2014-18 and particularly in 2019-22), there is a lower share of households in the lowest income quintile (9% and 6% respectively in terms of the outstanding amount of loans) compared with loans for house purchase granted in previous years (16% and 12%, for loans granted before 2008 and in the period 2008-13 respectively) (Chart I.1.20);
- Consumer credit is also relatively concentrated in higher-income households, although less so than in the case of loans for house purchase, and is predominantly composed of fixed-rate agreements;
- Labour market shortages will tend to limit the increase in the unemployment rate in the event of a sharper slowdown in economic activity;
- The build-up of savings accumulated by households during the pandemic, together with the implementation of government measures supporting households to tackle the rise in inflation and instalments on loans for house purchase.

**Chart I.1.20** • Agreements and stock of loans for house purchase by income quintile and year of loan initiation | Per cent

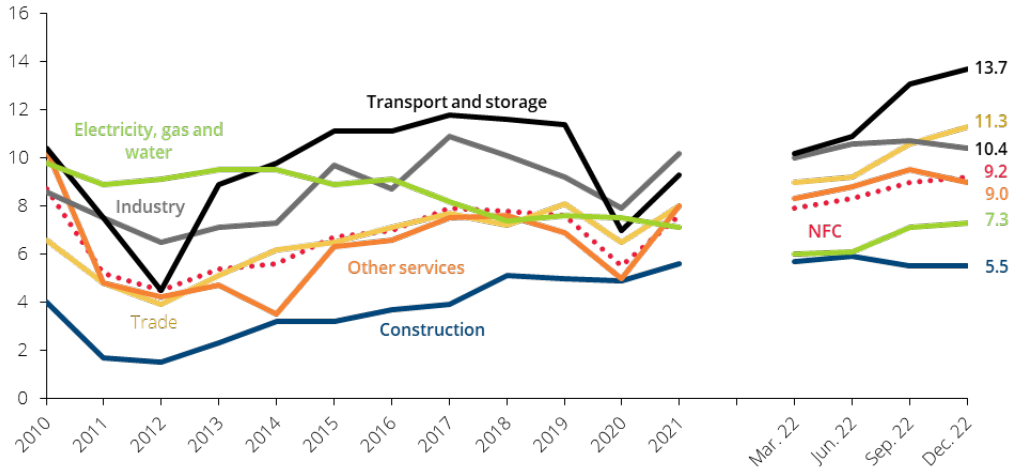



Sources: Banco de Portugal, Statistics Portugal and Ministry of Finance. | Notes: Figures based on 73% of the stock of loans for house purchase in February 2023, excluding agreements linked to exceptions to the DSTI ratio limit stipulated in the macroprudential Recommendation. The bars correspond to the share in the number of agreements/stock of loans (outstanding as at February 2023) for each class of year of loan initiation.

### 1.3.3 Non-financial corporations

**During 2022 the return on assets of non-financial corporations (NFCs) continued to increase, to stand at 9.2%, up from 2021 (7.6%)** (Chart I.1.21). Compared to 2021, only construction showed a slight decrease in profitability (-0.1 p.p.). In the last quarter of 2022, profitability growth was lower in aggregate terms, with an underlying decline in other services and industry (-0.5 p.p. and -0.3 p.p. respectively) but stabilised in the construction sector. In turn, the electricity, gas and water sector, where a significant part of revenues are linked to inflation in the previous period, saw a recovery in profitability in the second half of 2022.

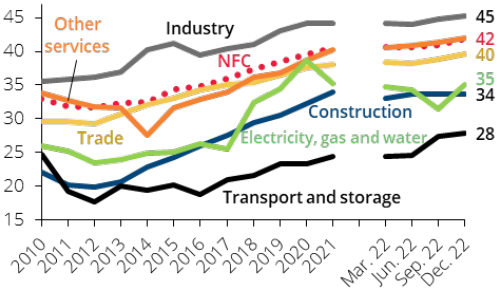
**Chart I.1.21** • NFCs' return on assets, by sector of activity | Per cent




Sources: Banco de Portugal and Statistics Portugal. | Notes: Return measured by EBITDA as a percentage of average assets for the period. Acronym for earnings before interest, taxes, depreciation and amortisation. Data for the quarters of 2022 refer to return in the year ending in the respective quarter. Other services include services except trade and transport and storage (identified in the chart); industry includes mining and quarrying

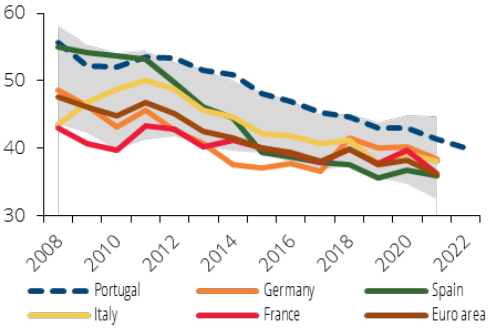
**The NFCs' capital ratio remained on the upward path that started in 2013, with the series peaking at the end of 2022**. Developments were broadly based across sectors, with only a deterioration in the electricity, gas and water sector from 2021 onwards (Chart I.1.22). Consistently, the leverage of Portuguese firms, assessed by the weight of financial debt in the financing structure (equity plus financial debt), has narrowed further, but remains above the euro area average (Chart I.1.23).

**Chart I.1.22** • NFCS' capital ratio, by sector of activity | Per cent




Source: Banco de Portugal. | Notes: The equity ratio corresponds to the ratio of equity to assets. Other services include services except trade and transport and storage (identified in the chart); industry includes mining and quarrying. In December 2022, head offices had a capital ratio of 64.4% (not shown in the chart).

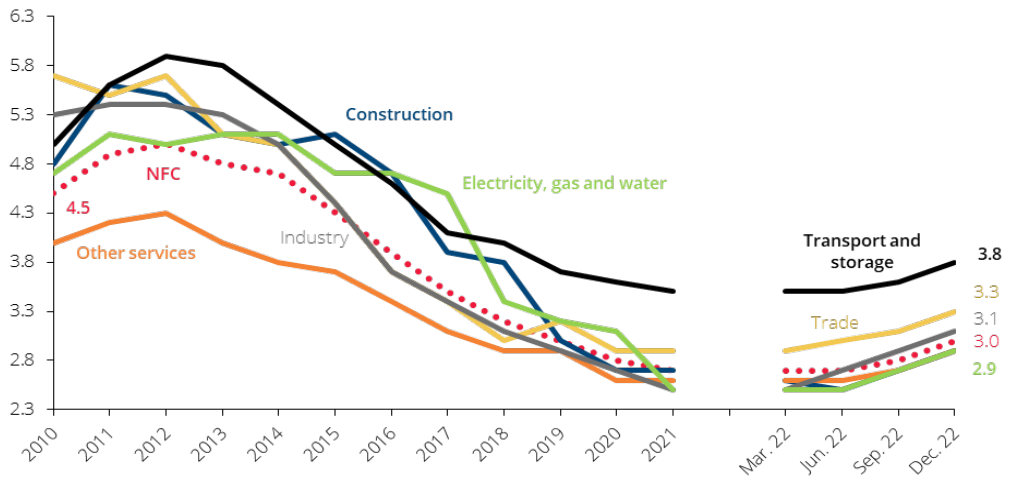
**Chart I.1.23** • Leverage ratio, distribution in the euro area | Per cent




Source: Eurostat. | Notes: (a) The interquartile range (shaded) was calculated on the basis of the distribution of leverage ratios of NFCs in euro area countries. The leverage ratio was defined as the quotient of financial debt and the sum of equity and financial debt. The value of financial debt corresponds to the stock of loans and debt securities, while the value of equity corresponds to the stock of shares and other equity (liabilities) of NFCs. Figures are calculated on the basis of the National Financial Accounts. Quoted financial instruments, according to the National Account methodology, are measured at market value.

**The cost of financial debt increased in 2022, particularly in the second half of the year, in line with the momentum observed in interest rates** (Chart I.1.24). The increase (0.2 p.p.) was broadly based across sectors. This dynamic is expected to continue in 2023 (Section 2.2), as reference rates on variable rate loans are updated or firms obtain new financing in an environment of higher interest rates.

**Chart I.1.24** • Cost of financial debt, by sector of activity | Per cent




Source: Banco de Portugal. | Notes: Other services include services except trade and transport and storage (identified in the chart); industry includes mining and quarrying. Data for the quarters of 2022 refer to financing costs in the year ending in the respective quarter.

**In 2022, reflecting favourable developments in operating profitability, the NFCs' financing expenses coverage ratio was 1 p.p. higher than in 2021.** On average, the EBITDA of an NFC covered 9.8 times its financing expenses. However, in some sectors this indicator decreased compared to 2021, namely industry (-2 p.p.), construction (-0.3 p.p.), and electricity, gas and water (-0.2 p.p.). Conversely, trade developments stood out (Chart I.1.25).

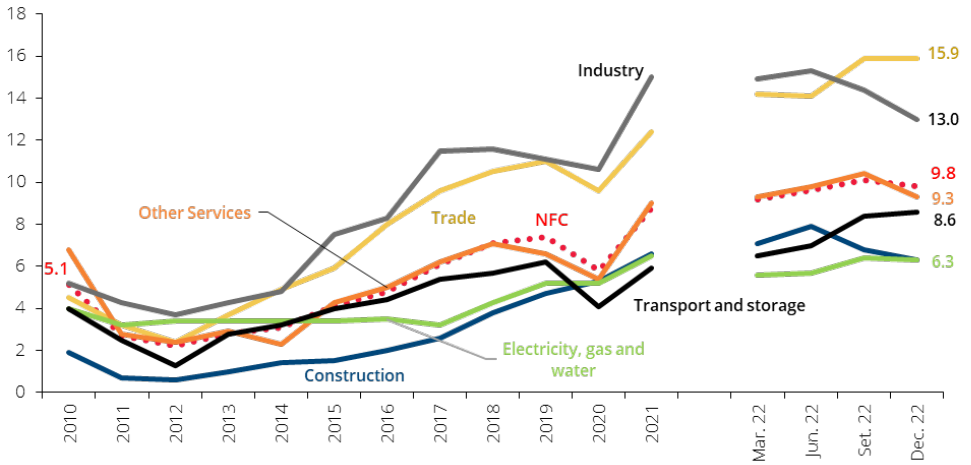
**In the last quarter of 2022, the average value of this ratio decreased (-0.3 p.p.).** This reflected the rising cost of financial debt, which in most sectors of activity exceeded improvements in the EBITDA.

**Given expectations of a rise in interest rates, the share of financially vulnerable firms, identified as having a financing expenses coverage ratio (EBITDA/financing expenses) below 2, is estimated to increase by the end of 2023** (Chart I.1.26). This result is based on the simulation exercise built on the financial situation of firms as described in the Special issue "The impact of rising interest rates on corporate debt service" of the November 2022 issue of the *Financial Stability Report*, updated for the scenario presented in the December 2022 issue of the Banco de Portugal's *Economic Bulletin*.

**The increase in the share of financially vulnerable firms is broadly based across sectors of activity.** Despite the deteriorating situation of firms, this increase is projected to be mostly driven by a rise in the share of firms with a financing expenses coverage ratio still above 1.

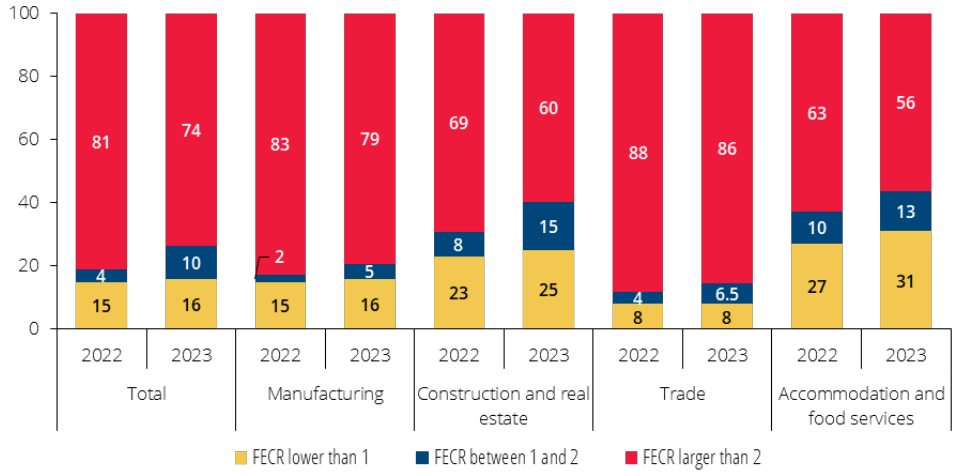
**By sector of activity, a stronger increase in the share of financially vulnerable firms is foreseen for the construction and real estate activities sector.** The accommodation and food services sector is expected to increase less than that estimated for the aggregate of firms, but continues to encompass the largest share of vulnerable firms, reflecting developments during the pandemic crisis.

**Chart I.1.25** • Financing expenses coverage ratio, by sector of activity | In number of times




Source: Banco de Portugal. | Notes: The interest coverage ratio corresponds to the number of times the EBITDA generated by firms exceeds financing expenses. A higher ratio corresponds to lower financial pressure. Other services include services except trade and transport and storage (identified in the chart); industry includes mining and quarrying. Data for the quarters of 2022 refer to the financing expenses coverage ratio in the year ending in the respective quarter.

**Chart I.1.26** • Distribution of firms according to the financing expenses coverage ratio, by sector of activity | Per cent



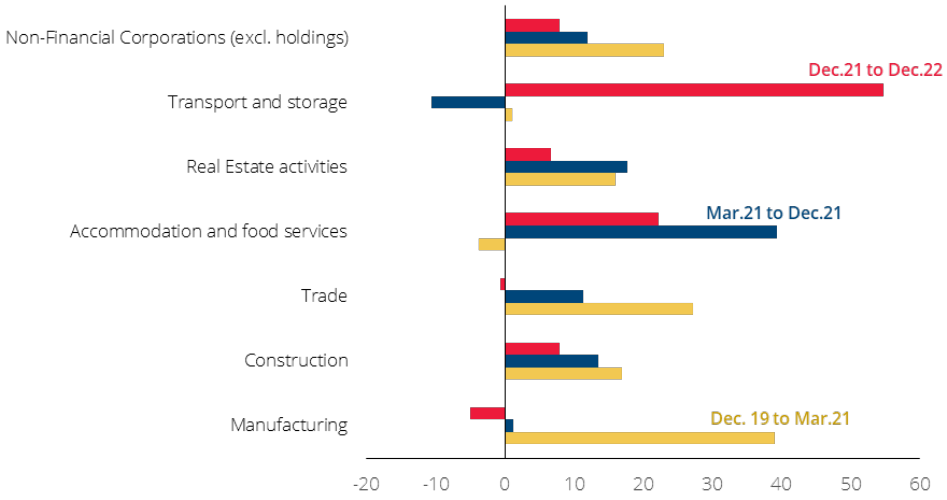

Source: Banco de Portugal. | Notes: The percentages correspond to the share of firms in each bracket of the financing expenses coverage ratio (FECR), weighted by total assets. Distinction between degrees of vulnerability based on the results of a simulation exercise built on the financial situation of firms in 2022 and 2023. Individual information on firms for 2022 is projected, given that complete data are not yet available on financial statements for this year. Only firms with positive equity and financial debt in December 2021 were considered. The simulation exercise is based on the economic scenario described in the December 2022 issue of the *Economic Bulletin*, replacing the September scenario used in the November 2022 issue of the *Financial Stability Report* (Special issue "The impact of rising interest rates on corporate debt service").

Estimates of the impact of interest rate increases point to the share of vulnerable firms remaining below the levels seen during the sovereign debt crisis. In addition, the build-up of NFC deposits in recent years may act as a mitigating factor.

**Overall, firms have placed and maintained large deposits in the period following the outbreak of the pandemic crisis, which is a major liquidity buffer in the event of adverse shocks.** In particular,

deposits have also increased for NFCs operating in the sectors more affected by the pandemic and/or rising energy and commodity costs (Chart I.1.27).

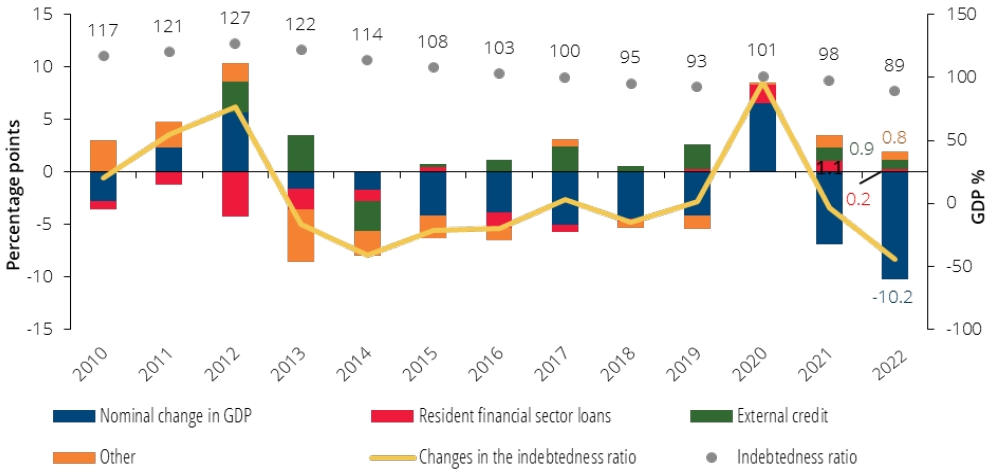
**Chart I.1.27** • Changes in NFC deposits with G8, by sector of activity | Per cent




Source: Banco de Portugal. | Notes: Deposits with the eight most significant institutions (G8) account for around 90% of OMFI deposits. Given the availability of information, the rate of change for 2020 corresponds to changes between December 2019 and March 2021, the rate of change for 2021 corresponds to changes in deposits between March 2021 and March 2022 and the rate of change for 2022 corresponds to the period between December 2021 and December 2022.

**In December 2022 the NFCs' debt-to-GDP ratio stood at 89.5%, 8.3 p.p. lower than in 2021 and 3.2 p.p. lower than in December 2019.** These developments mainly reflected nominal GDP growth, with a -10.2 p.p. contribution to the indebtedness ratio. Recourse to financing from the resident or foreign financial sector was muted, with contributions of 0.8 p.p. and 0.9 p.p. respectively (Chart I.1.28)

**Chart I.1.28** • Contributions to changes in the NFC indebtedness ratio




Sources: Banco de Portugal and Statistics Portugal. | Notes: (a) External credit includes liabilities on account of loans and debt securities held by non-residents. (b) Includes debt securities held by residents, credit written off from assets in the balance sheet of resident monetary financial institutions, loans from households, trade credits and advances and other changes in volume and value.

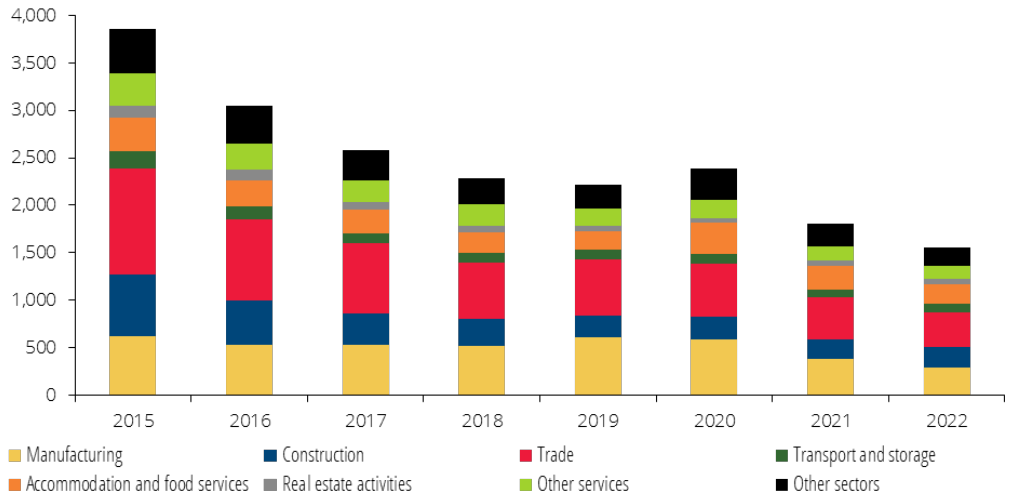
**Recourse to loans slowed down during 2022 (Section 2.2).** In turn, funding through the issuance of securities posted a positive rate of change of 1.2%, down from 7.6% in 2021. In 2022 the annual rate of change of the sector's total indebtedness stood at 1.4%, due to the increase in liabilities in the form of trade credits, reflecting the nominal increase in imports.

**According to the April 2023 bank lending survey, institutions expect a continued decline in credit demand by NFCs, in particular for investment.** In the first quarter of 2023, the contraction in demand was larger than that expected by banks in the January survey. Interest rates are the main factor behind these developments. Firms are also expected to rely on internal financing and, to a lesser extent, on debt securities issuance.

**Available data indicate that, overall, firms have been able to increase profitability and internal capital generation capacity.** This allows them to replace some external financing, reflected in their increased capital ratio. Moreover, as part of the pandemic crisis support measures, State-guaranteed credit lines with extended maturity and favourable conditions were granted to firms with lower (pre-pandemic) credit risk, helping to mitigate the refinancing risks of NFCs. Nevertheless, among the main factors limiting activity reported by firms, interest rate developments have come to the fore in recent months.

**In 2022 insolvency proceedings initiated and declared continued the downward trend observed prior to the pandemic crisis** (Chart I.1.29). This is also the case for firms in the accommodation and food services sector, after a few quarters in 2020 when they exceeded insolvencies observed in the pre-pandemic period.

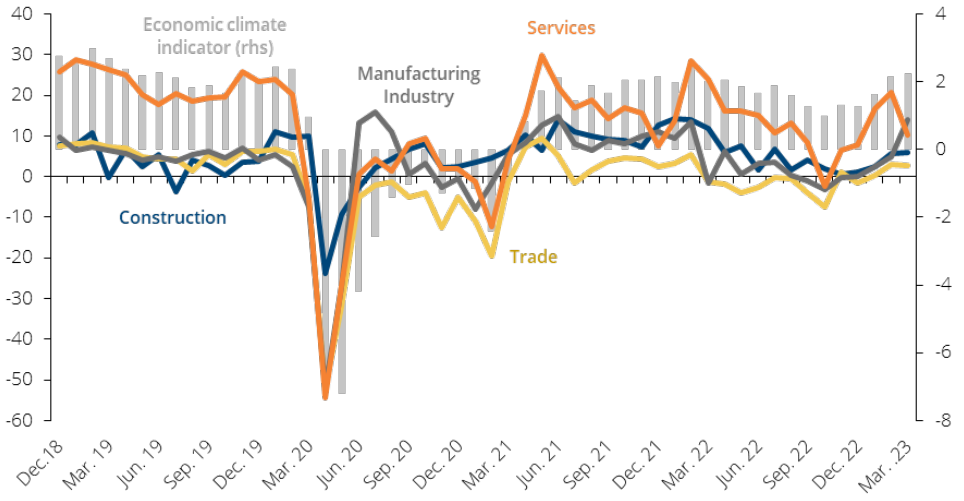
**Chart I.1.29** • Initiation of insolvency proceedings for NFCs, by sector of activity
| Number of firms




Source: Ministry of Justice

**The economic climate indicator rose in the first quarter of 2023, reversing the downward movement since March 2022** (Chart I.1.30). The outlook for short-term activity is in positive territory for all sectors.

**Chart I.1.30** • Economic climate indicator and outlook for activity over the next three months | Balance of respondents




Source: Statistics Portugal. | Notes: The economic climate indicator summarises the percentage balances of business survey questions. Seasonally adjusted figures.

**In 2023, NFC investment growth is expected to decline to 0.9%, from 2.6% in 2022**. This is explained, inter alia, by the postponement of investment decisions amid uncertainty, rising financing costs and slowing global demand. Despite the recent reduction, the costs of energy and some commodities remain high by historical standards. In specific sectors, most notably the construction sector, a significant share of firms continues to report barriers to activity and investment associated with the availability of materials and labour.

**Uncertainty about economic activity developments, coupled with higher interest rates, leads to an increase in credit portfolio default risk, in particular for the most vulnerable firms.** Also, additional disruptions in international financial institutions, with a risk of contagion to other institutions, even if they have different business models, could disrupt the normal flow of financing to and the activity of NFCs. However, the ECB has instruments at its disposal to provide liquidity to the euro area financial system, if needed, to preserve the smooth transmission of monetary policy.

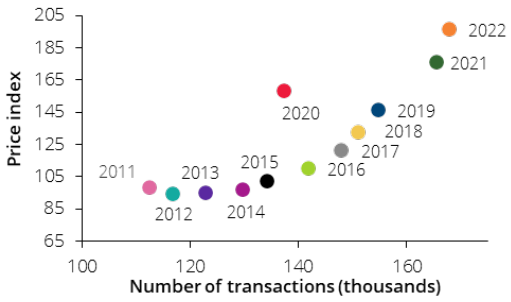
**Overall, NFCs' financial indicators have been improving, especially regarding profitability and leverage, making NFCs more resilient to adverse shocks.** The existence of deposits also helps to increase NFCs' ability to accommodate increased input and financing costs.

### 1.3.4 Residential and commercial real estate market

#### Residential real estate market

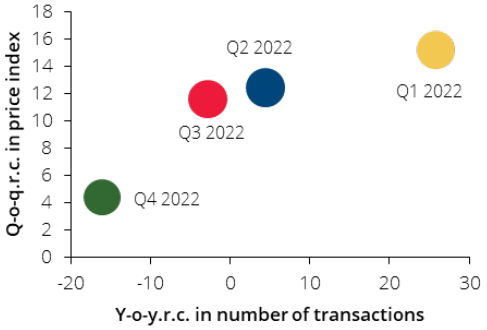
**Throughout 2022, prices remained on an upward path in the residential market**, but slowed down over the course of the year, particularly in the last quarter. The year-on-year rate of change was 11.3% at the end of the year, down by 1.8 p.p. from the third quarter (13.1%), while the quarterly rate of change decreased from 3.8% in the first quarter to 1.1% in the fourth quarter. The number of transactions increased by 1.3% in 2022 and also showed a profile of intra-annual reduction, with negative year-on-year changes in the third and fourth quarters of the year (-2.8% and -16.0%, respectively) (Chart I.1.31 and Chart I.1.32).

**Chart I.1.31** • House price index and number of transactions, 2011 to 2022




Source: Statistics Portugal.

**Chart I.1.32** • House price index and number of transactions, 2022

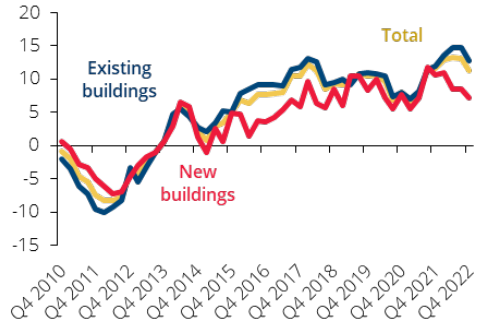



Source: Statistics Portugal. | Notes: Year-on-year rate of change in the price index and the number of transactions. The circle size is proportional to the number of transactions.

Changes in the same direction in residential market prices and volumes suggest that demand has guided developments.

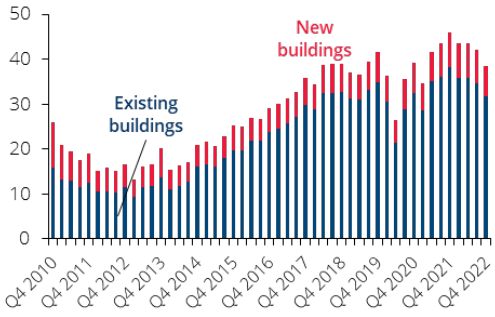
In 2022, transactions in used dwellings accounted for 77% of the amount traded and 83% of the number of transactions in dwellings in Portugal (+2 p.p. and +1 p.p. respectively than in 2021). The average change in the price index was higher for existing buildings (13.9%) than for new buildings (8.7%) (Chart I.1.33 and Chart I.1.34).

**Chart I.1.33** • Year-on-year change in the price index, new and used buildings | Per cent




Source: Statistics Portugal.

**Chart I.1.34** • Number of transactions, new and used buildings | Thousand buildings




Source: Statistics Portugal.

In 2022 the median price of housing transactions continued to increase significantly (14.4%/m$^2$) across most geographical areas. However, in the last quarter of 2022, the year-on-year rate of change in the median price per square metre (average over the last 12 months) slowed down. The Lisbon (LMA) and Porto (PMA) metropolitan areas, the Algarve and the Azores posted the largest price increases. In 2022 the number of transactions decreased in the PMA (-5.9%) and the LMA (-1.6%). This indicates a lower supply in these regions (Table I.1.5).

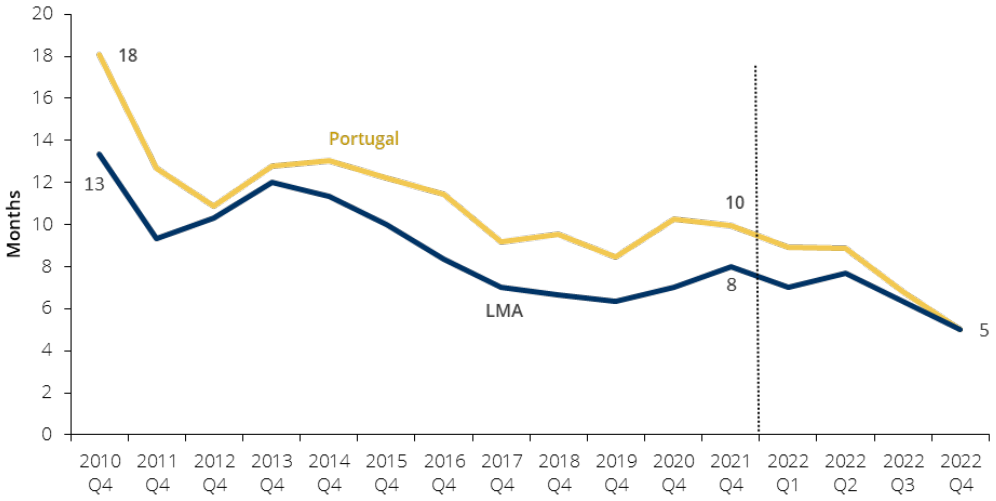
**Table I.1.5** • Median price per square meter and number of transactions, by region | Euros and per cent

| | EUR/m² | Y-o-y rate of change in median price/m² | | | | | | Y-o-y rate of change in number of transactions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2022 | 2020 | 2021 | 2022 Q1 | 2022 Q2 | 2022 Q3 | 2022 Q4 | 2020 | 2021 | 2022 Q1 | 2022 Q2 | 2022 Q3 | 2022 Q4 |
| **Portugal** | **1484** | **8.8** | **9** | **12.4** | **15.1** | **15.6** | **14.4** | **-11.2** | **20.5** | **25.8** | **4.5** | **-2.8** | **-16** |
| PMA | 1607 | 12.2 | 10.2 | 12.2 | 13.9 | 17 | 17.3 | -11.3 | 19.4 | 17.2 | -5.3 | -9 | -22.2 |
| Porto | 2568 | 13.8 | 7.9 | 6 | 9.2 | 9.8 | 12.7 | | | | | | |
| Centre | 962 | 6.6 | 4.5 | 6.7 | 10.8 | 10.5 | 9.8 | -6.4 | 21.3 | 24.7 | 4 | 1.6 | -6.3 |
| LMA | 2096 | 11.1 | 9.8 | 13 | 14.5 | 15.7 | 15.6 | -15.8 | 17.6 | 22.2 | 2.8 | -4.7 | -21.5 |
| Lisbon | 3872 | 3.9 | 3.4 | 9.3 | 10.7 | 10.1 | 9.7 | | | | | | |
| Alentejo | 848 | 8.6 | 4.1 | 3.6 | 7.3 | 9.7 | 9.0 | -1.9 | 24.4 | 26.7 | 6.6 | -5.1 | -7.9 |
| Algarve | 2339 | 7.1 | 10.1 | 14.1 | 18.4 | 17.8 | 17 | -19.4 | 29.2 | 49.8 | 20.6 | -9.3 | -26.7 |
| Azores | 1034 | 12.2 | 3.3 | 8.3 | 12.8 | 18.8 | 14.5 | -8.9 | 20.2 | 41.6 | 2.6 | 2.3 | -3 |
| Madeira | 1571 | 7.3 | 10.2 | 13.1 | 12.1 | 12 | 9.4 | -3.3 | 32 | 35.8 | 14.6 | 34.5 | -14.5 |
| Memo items: y-o-y.r.c. index | | 8.0 | 11.6 | 12.9 | 13.2 | 13.1 | 11.3 | | | | | | |

Source: Statistics Portugal. | Notes: (i) Median value of sales per m² of dwellings in the last 12 months, by geographical location. (ii) Developments in the median price per square metre may differ from developments captured by the house price index, which, among other methodological differences, controls for changes in the characteristics/quality of the property traded.

In Portugal, the average selling time for real estate declined further, even more so in the second half of the year (Chart I.1.35). These developments, against the background of decreasing transactions, reflects the reduction in the number of real estate properties put on the market for sale (Chart I.1.36).

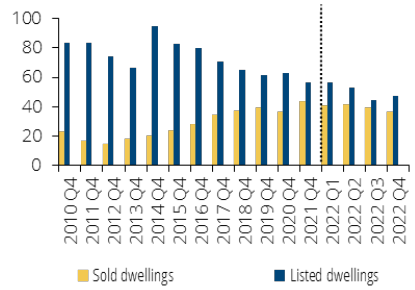
**Chart I.1.35** • Average number of months it takes for a listed property to be sold




Source: Confidencial Imobiliário.

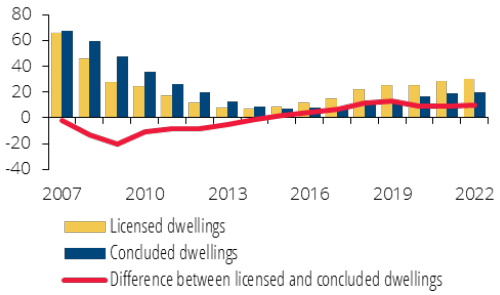
**Constraints in the supply of new housing may be contributing to the increase in residential real estate prices.** In recent years, the accumulated number of permits has been greater than the number of buildings completed. After the sharp decline during the sovereign debt crisis (2008-14), the number of buildings built per year has been slowly increasing, which, taking demographic developments per se, may be compatible with market needs (Chart I.1.37).

**Chart I.1.36** • Number of listed and sold dwellings | Thousand dwellings




Source: Confidencial Imobiliário.

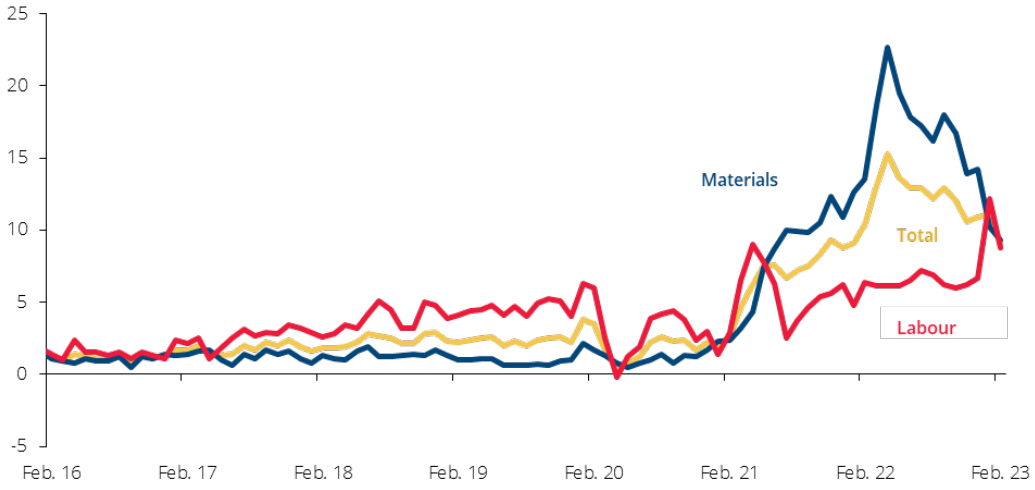
**Chart I.1.37** • Licensed and completed buildings | Thousands




Source: Statistics Portugal.

**The increase in construction costs, related to labour shortages and the price of materials, continued to be an additional factor of upward pressure on residential real estate prices.** In February 2023 the year-on-year change in construction costs stood at 9.1% (9.3% for materials and 8.8% for labour costs). However, this growth declined from September 2022 onwards on the back of a slowdown in the cost of materials, which nevertheless remains high (Chart I.1.38).

**Chart I.1.38** • Developments in construction costs | Per cent




Source: Statistics Portugal. | Note: Year-on-year change.

In addition to rising construction costs, a potential tightening in credit standards for loans to construction (May 2023 bank lending survey) combined with higher interest rates will tend to limit the construction of new buildings and the rehabilitation of used buildings.

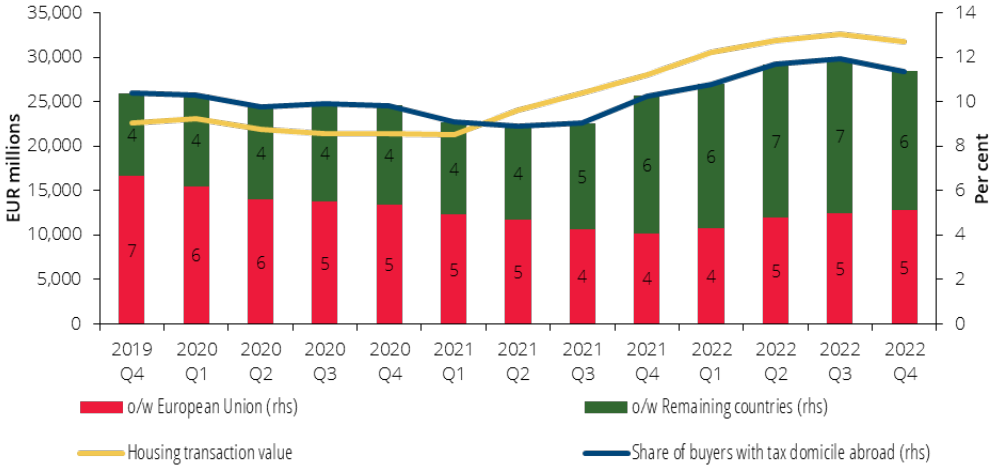
**Residential real estate may remain an attractive asset for portfolio diversification purposes, particularly in a context of international financial market turmoil, even if some alternatives for investing savings become more attractive in the meantime**. Moreover, higher expected inflation than that observed in recent years may foster demand for residential real estate for hedging reasons, to store value.

**Portugal's geographical location, and the conditions of security and stability that have made it a desirable destination, support demand from non-residents.** This has put pressure on the market, contrary to domestic demographic developments.

**During 2022, participation in the residential real estate market of buyers with tax residence outside the national territory (henceforth non-residents) remained high.** The amount traded by non-residents increased by 25% from 2021, while the number of transactions rose by 20%. These transactions represented 11% of the total amount in 2022, 1 p.p. above the 2021 percentage, an identical increase to that seen in the number of transactions, which represented 6% of the total (Chart I.1.39). Nevertheless, the value of transactions by non-residents in the fourth quarter of 2022 decreased, both compared with the previous quarter (-8%) and year on year (-24%).

**In 2022, the average value per transaction of non-resident buyers was 88% higher than that of resident buyers, a 13 p.p. decrease from 2021**.

**Chart I.1.39** • Housing transactions in Portugal and share of non-residents




Source: Statistics Portugal. | Notes: Cumulative four-quarter figures. Including transactions by natural and legal persons. The term "non-residents" refers to citizens having their tax domicile outside Portugal. In the case of natural persons, the tax domicile is the place of habitual residence. In the case of legal persons, the tax domicile is the place of the head office or effective management or, in the absence thereof, their permanent place of establishment in Portugal.

**During 2022 the Algarve (38%), the Autonomous Region of Madeira (15%) and the Lisbon Metropolitan Area (LMA/9%) were the regions with the largest share of the amount traded by non-residents.** This share increased in the Algarve, the Autonomous Regions and the Centre region, and remained constant in the LMA.

**In terms of the nationality of non-residents, available data show some recent change in the origin of buyers, particularly an increase in purchases by US citizens**. The same pattern was observed in tourism revenues. Foreign direct investment (FDI) in real estate (residential and commercial) rose by 49% in 2022 (34% in 2021), with US buyers accounting for 14% of total FDI in real estate in 2022 (8% in 2021). Among other factors, the appreciation of the US dollar in 2022 made investment and tourism more attractive to US citizens. The Golden Visa programme accounted for around 40% of FDI in real estate between 2012 and 2020, while the importance of this regime has decreased in recent years, accounting for only 17% of FDI in real estate in 2022.

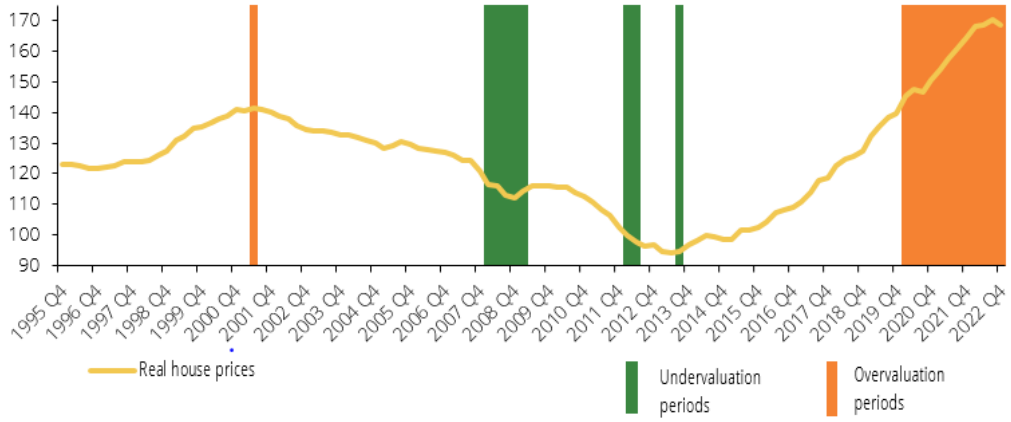
**Between 2011 and 2021, the only geographical areas where the resident population increased were the Algarve (+3.6%) and the Lisbon Metropolitan Area (+1.7%), while in the country there was a 2.1% decrease**. Over this period, the average value per transaction rose, respectively, by 96%

and 77% in those areas, exceeding the country average (61%). Together with Madeira, these areas have the highest average value per house transaction.

**This dynamic occurs in a context where real residential property prices in Portugal have been growing above historical trends.** However, these trends do not take into account the structural factors determining house prices, inter alia, the disposable income of households participating in the housing market and the interest rate. Of all the models available and which consider some of these factors, only one points to overvaluation in the residential real estate market (Chart I.1.40). However, these models do not take into account factors such as demand from non-residents and resident foreign citizens and for tourism activities, which has materially contributed to price developments in this market (Special issue "Housing price assessment methodologies applied to Portugal", *Financial Stability Report*, December 2019, and Box 4 "Impact of non-resident investment and tourist accommodation on local house prices", *Economic Bulletin*, December 2021).

The current environment, characterised by an increase in costs and lower demand for domestic loans for house purchase, may contribute to a moderation or even some correction of price growth in this market, particularly in geographical areas where demand by non-residents is less substantial and demographic pressure is lower.

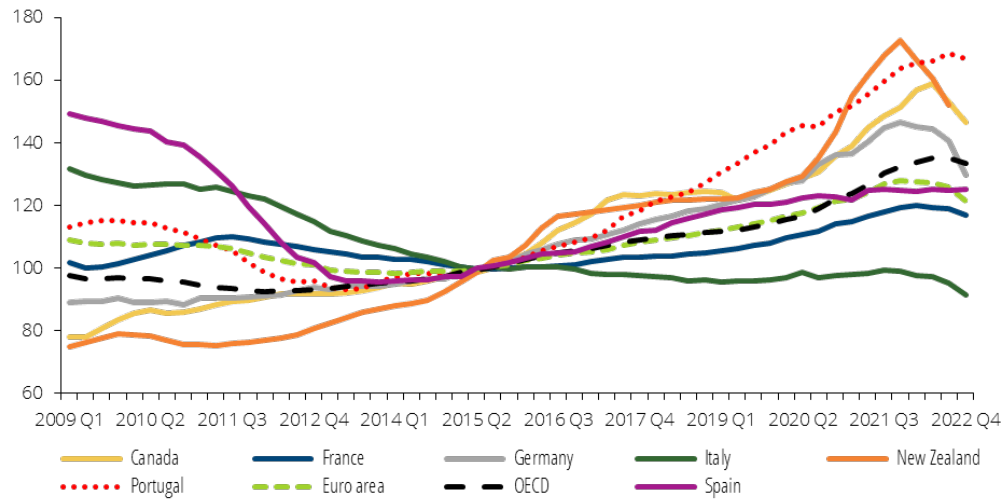
**Chart I.1.40** • House prices and evaluation measures in real terms | Index 2015=100




Sources: ECB, OECD (Banco de Portugal calculations). | Notes: Overvaluation and undervaluation periods correspond to situations in which, from the six approaches considered, at least four identify an imbalance in house prices. For more details on this methodology, see the Special issue: "Housing price assessment methodologies applied to Portugal", Banco de Portugal, *Financial Stability Report*, December 2019. Latest observation: 2022 Q4. For one of the approaches, information is only available since 2007.

**House price developments in Portugal contrasted with those in some other countries, where a more marked decline was already to be seen in the second half of 2022.** In Portugal, the year-on-year rate of change in the price index in the fourth quarter of 2022 was 11.3% (2.9% in the euro area), down from 13.1% in the previous quarter (6.6% in the euro area). Despite slowing down over the course of the year, the real price index continued to increase in Portugal in 2022, while there was some reversal in the euro area and the OECD area (Chart I.1.41). Some countries such as Germany, New Zealand and Canada have posted a reduction of between 8% and 12% in real terms since the recent peak, as well as a decrease, albeit smaller, in nominal terms.

**Chart I.1.41** • Developments in the real price index | Index 2015=100

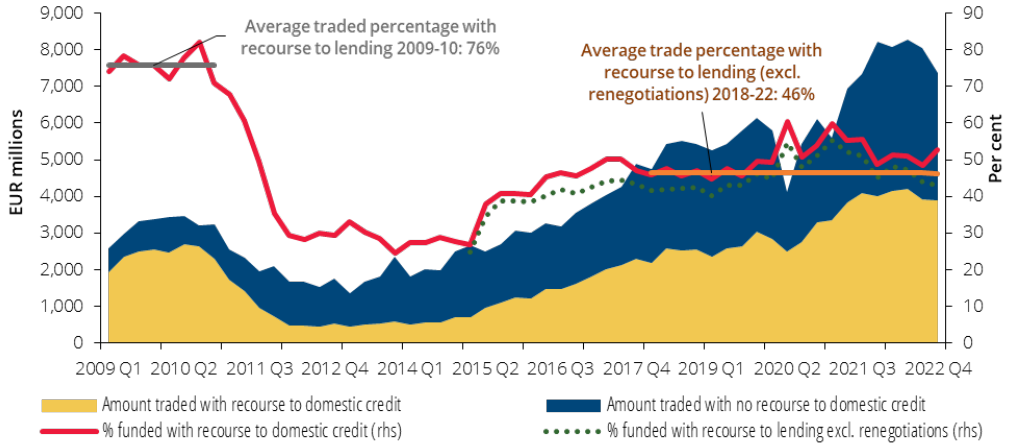



Source: OECD. | Note: Latest observation: Fourth quarter of 2022 (third quarter for New Zealand).

**There is a strong link between developments in the residential real estate market, household wealth and the financial position of banks.** According to the 2021 census, 70% of Portuguese households own their housing and 31% have a mortgage on their main residence. In turn, loans to households secured by real estate accounted for 26.0% of the Portuguese banking system's assets (25.3% in 2011). The amount of new credit for house purchase, excluding renegotiations, has been on a downward trend since March 2022, with negative year-on-year rates of change from July onwards. However, it has remained above its 2019 levels (prior to the pandemic). According to the May 2023 bank lending survey, credit demand in the housing segment decreased in the first quarter of 2023, similarly to the euro area (Chapter 2. Banking system).

**The share of transactions financed with recourse to credit (excluding renegotiations) decreased from 2021 (-4 p.p.), averaging 46%, an amount equal to the average over 2018-22**. This indicator was well below that seen in the period prior to the sovereign debt crisis (Chart I.1.42). However, there is considerable geographical heterogeneity. In 2022 the Algarve continued to have the lowest share of transactions financed by loans for house purchase (around 20%), followed by the Lisbon and Porto metropolitan areas (around 60% and 70% respectively), while in the rest of the country this share was around 80%. This pattern may reflect, inter alia, the degree of non-residents' participation in transactions in each region, as well as, in the case of the Algarve, the weight of second homes purchased with lower recourse to domestic credit. Domestic bank credit to foreign citizens still accounts for a small share of total credit, although its importance has increased recently. Loans granted since 2019 to foreign borrowers have lower current average LTV ratios and shorter average original maturities (Box 3 "Relevance of non-residents in the buoyancy of the residential real estate market", November 2022 *Financial Stability Report*).

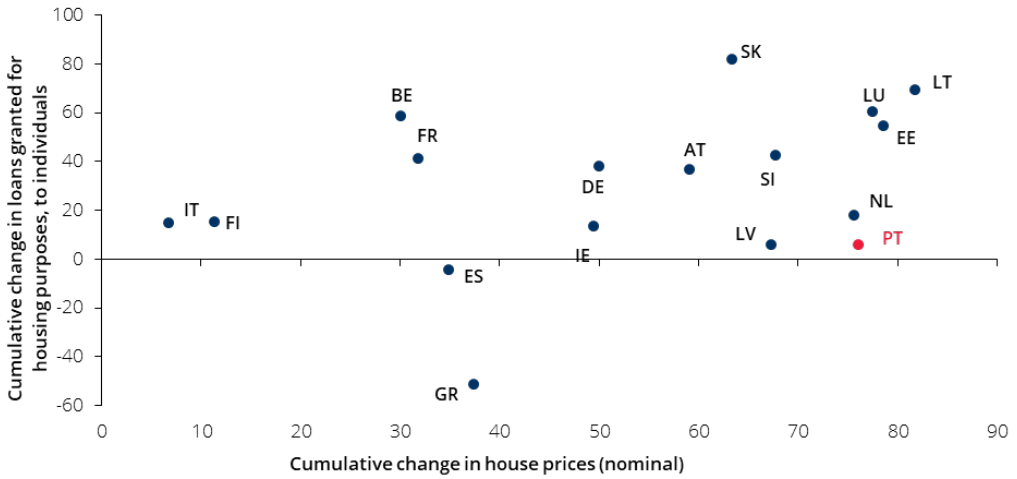
**Chart I.1.42** • Transactions in dwellings vs. new loans for house purchase




Sources: Banco de Portugal and Statistics Portugal. | Note: Information available up to December 2014 does not make it possible to isolate new loans associated with renegotiations. However, these loans are estimated to account for a residual share of the total volume of new business and therefore have no impact on the historical comparison presented. Latest observation: 2022 Q4.

From a medium-term perspective, the marked increase in residential real estate prices in recent years has been accompanied by contained growth in the stock of loans for house purchase, in contrast to other euro area countries (Chart I.1.43). Many empirical studies have documented that, in situations of very strong house price growth, the impact of any significant correction thereof on the economy and on the banking system tends to be much more limited when such growth did not occur in tandem with a substantial increase in the stock of loans for house purchase. In Portugal, the cumulative price growth rate between the fourth quarter of 2016 and the third quarter of 2022 was 76%, compared with 6% accumulated growth in the stock of loans to households for house purchase.

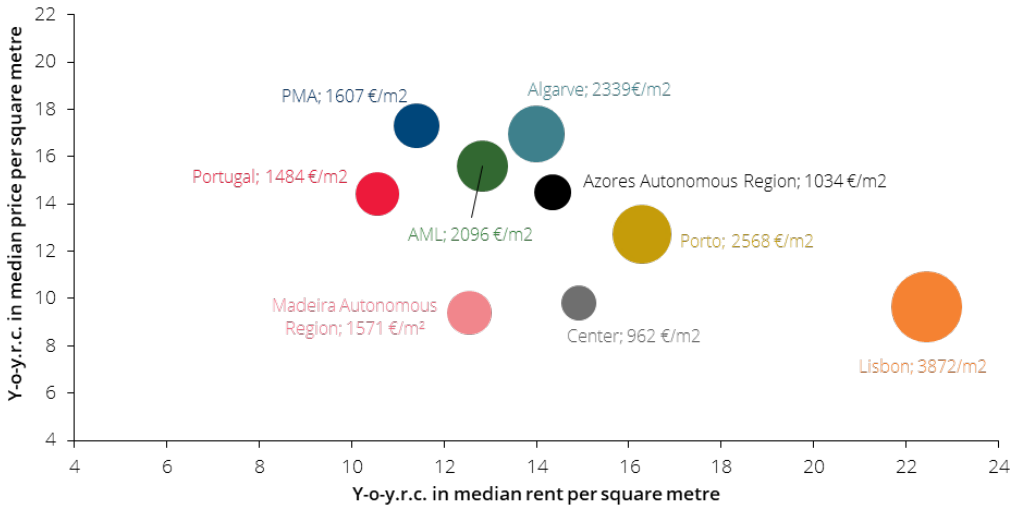
**Chart I.1.43** • Cumulative change in house prices and in loans to households for house purchase for euro area countries | Per cent




Sources: ECB and OECD. | Notes: Cumulative change between 2016 Q4 and 2022 Q3. Cyprus and Malta were excluded from the sample due to missing data. Cumulative changes in the stock of loans to households for house purchase.

**Residential real estate transaction prices are mirrored by those in the rental market. In 2022, the median value of rent per square metre continued to increase by 10.6% year on year in the fourth quarter, which was broadly based in terms of location.** The highest rents were charged in Lisbon, Porto, the LMA, the Algarve and the PMA, with year-on-year growth in these regions also standing above the Portuguese total. The increase in the median rent was greater in the locations where prices are higher, in particular Lisbon and Porto. In turn, price changes in these areas were below the country average. In the fourth quarter of 2022, the year-on-year change in the number of rentals was negative in most locations (Chart I.1.44).

**Chart I.1.44** • Change in median price and rent per $m^2$ in the fourth quarter of 2022
| Per cent and euros




Source: Statistics Portugal. | Note: The size of the circles is proportional to the median price per square metre, presented in euros.

**The limited supply of new dwellings, alongside resilient demand, means that, should demand drop, the impact on prices should be contained.** In addition, the potential to amplify shocks is lower because the economy is now less dependent on the construction sector (its contribution to GVA fell from 5.9% in the fourth quarter of 2009 to 4.4% in the fourth quarter of 2022). The banking sector's exposure to this sector is also lower; in particular, loans for construction accounted for 9% of total loans to NFCs in February 2023, down from 23% in December 2009.

**The February 2023 round of the Portuguese Housing Market Survey indicates a positive outlook for residential real estate price developments.** Regarding agreed sales and sales expectations, the net percentage balance, which has been in negative territory since August 2022, points to a continued decline in sales volume. Demand from new buyers is also in negative territory and reflects an expectation of gradually declining demand for housing. The rental market should remain resilient, and rents are expected to increase in the short run, reflecting growth in demand coupled with limited supply.

**In February 2023 the government released proposals targeting housing, with the aim of increasing the supply of real estate in the market, simplifying licensing procedures and boosting the rental market.** Support was announced on the same date for the payment of rent and instalments on loans for house purchase, provided that the beneficiaries meet income and debt service requirements. Some of these measures are already in place, while others are pending adoption/regulation.

**Commercial real estate market**

The pandemic led to mixed developments in the commercial real estate market subsectors. Commercial real estate prices were less resilient but recovered in 2021 and boosted their growth in 2022. According to the Morgan Stanley Capital International (MSCI) index, commercial real estate prices in Portugal increased by 2.5% in 2022 (1.6% in 2021).

Commercial real estate asset prices grew across all segments, with accommodation showing the most significant increase in value: 6.7% from the previous year, still in a context of recovery from losses occurred in the pandemic crisis (Table I.1.6). In the offices segment, the shortage of supply (particularly in the prime segment), consistent with demand characteristics, contributed to price and rental resilience in the course of the year. In 2022 the traded area hit an all-time high in 'Greater Lisbon', while activity remained stable in 'Greater Porto', similar to that seen in recent years, but still slightly lower than in 2019. The industrial and logistics real estate segment maintained the appreciation of recent years. In 2022 commercial real estate assets in this segment increased by 1.7%, reflecting the expansion of e-commerce and the shortage of quality supply that could match the characteristics of demand. The value of retail real estate assets increased by 2.3% in 2022 (2.5% in 2021), consolidating the recovery from the pandemic crisis. In 2022, demand for retail space according to Cushman & Wakefield was in line with the previous year. In accommodation, developments in tourism indicators over the course of 2022 showed a recovery in activity with significant increases from the previous year (the number of guests and overnight stays rose by around 80%), reaching levels similar to 2019. Investment in the sector remained buoyant, and real estate assets in this segment increased significantly in value in 2022 (6.7%).[1]

**Table I.1.6** • Developments in commercial real estate valuations by segment, in Portugal and the euro area | Per cent

| | | Portugal | Euro area |
|---|---|---|---|
| Retail | 2019 | 1.9 | -0.7 |
| | 2020 | -6.3 | -5.6 |
| | 2021 | 2.5 | -0.1 |
| | 2022 | 2.3 | -0.8 |
| Offices | 2019 | 6.0 | 6.5 |
| | 2020 | 0.3 | 1.6 |
| | 2021 | 1.8 | 4.4 |
| | 2022 | 2.5 | -1.4 |
| Industrial | 2019 | 1.5 | 9.5 |
| | 2020 | -0.3 | 7.7 |
| | 2021 | 1.2 | 17.6 |
| | 2022 | 1.7 | -5.7 |
| Accommodation | 2019 | 0.8 | 4.4 |
| | 2020 | -7.0 | -5.3 |
| | 2021 | 0.5 | 2.3 |
| | 2022 | 6.7 | 1.4 |

Source: Morgan Stanley Capital International (MSCI).

1. The information on supply, demand and investment is based on the Cushman & Wakefield MarketBeat report for Portugal, autumn 2022.

**The volume of commercial real estate transactions was very significant in 2022 and the weight of non-residents continued to account for the largest share.** Transactions totalled around €3 billion, 38% higher than in the previous two years, although lower than in 2019. Foreign capital accounted for 73% of the total. The accommodation segment was leader, concentrating 30% of the total, followed by offices, which aggregated 26% of the traded volume. Consolidating the increasing interest of investors over the past few years, the industrial and logistics segment attracted 21% of the traded value.

**The economic and financial environment, with forecast economic slowdown and interest rate increases, weighs on expectations from this market and perceptions regarding the current stage of the commercial real estate cycle. The perception of most market agents shifted to contraction in the course of 2022, in both Portugal and the euro area.** Uncertainty may lead to the postponement of investment decisions in view of possible changes in the cycle stage. Still, compared with other euro area countries, Portugal is in a less contractionary stage of the cycle.

**As such, should the overvaluation of commercial real estate in Portugal materialise, it will be much lower than that in other geographies, with price developments in this market being much less substantial than those observed in the vast majority of euro area countries and in residential real estate prices in Portugal.** In the fourth quarter of 2022, according to the Global Commercial Property Monitor survey on views from market participants on commercial real estate prices, 40% of market participants assessed commercial real estate prices as 'appropriate' in Portugal, 45% as 'expensive' and 0% as 'very expensive'. Perceptions of an overvaluation of commercial real estate assets are lower than in other euro area geographies that have a higher percentage of responses assessing commercial real estate as 'expensive' or 'very expensive' (Chart I.1.45 and Chart I.1.46).

**Chart I.1.45** • Views from market participants as to commercial real estate prices | Per cent

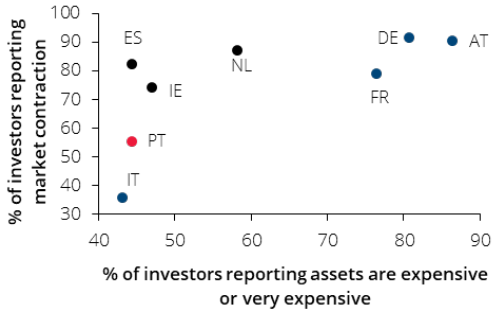
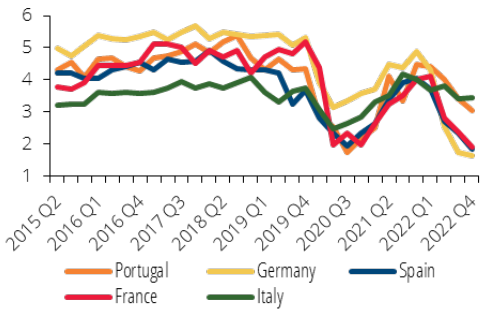


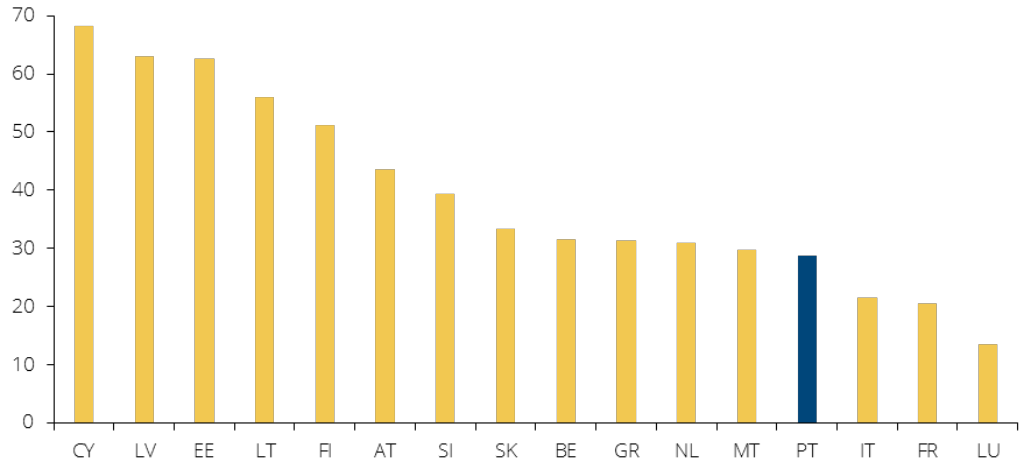

**Chart I.1.46** • Perceptions on the stage of the commercial real estate cycle | Weighted average




Source: Global Commercial Property Monitor, Royal Institution of Chartered Surveyors – RICS. | Notes: In the right-hand chart, the values on the vertical axis correspond to the average of survey responses (1-6). Low values correspond to a higher share of responses that the commercial real estate market cycle is in a downturn, while higher values correspond to the opposite situation, i.e. a higher share of responses according to which the cycle is expanding.

**The banking sector's exposure to commercial real estate is limited and considerably lower than that of residential real estate.** Moreover, capital requirements for this type of credit are higher than those for residential real estate. Accordingly, any adverse developments in this segment will tend to have a limited impact on financial stability. In December 2022 loans to NFCs secured by commercial real estate (€25 billion) accounted for around 25% of total loans to NFCs on a consolidated basis, a muted level compared with the euro area (Chart I.1.47). This exposure compares with around €115 billion in the form of loans to households secured by real estate, mostly loans for house purchase (Section 2.2).

**Chart I.1.47** • Loans to NFCs secured by real estate in Portugal and the euro area – September 2022 | As a percentage of total loans to NFCs




Source: ECB (Consolidated Banking Data) and Banco de Portugal. | Notes: Consolidated data. Ratio obtained from figures net of impairments. Includes loans to NFCs secured by (commercial or other) real estate. Data not available for Germany, Spain and Ireland.

**In the case of the commercial real estate market, the role of real estate investment funds (REIFs) is particularly important.** Its potential as a sector amplifying risks in this market has been identified by some international institutions as relevant for financial stability, most notably in certain euro area countries. This risk is moderate in Portugal, given that around 65% of REIF assets are held by closed-ended funds (Subsection 1.3.5 Non-banking financial sector), where liquidity risks are low. In addition, real estate held by REIFs have a muted weight in the economy as a whole (5% of GDP), and Portugal is one of the few euro area countries where REIF assets have declined in nominal terms over the past ten years.

### 1.3.5 Non-banking financial sector

**Changes to the macrofinancial context, in particular the rise in interest rates, have significantly transformed the international environment of the non-bank financial system**. During the protracted period of very low interest rates and widely available liquidity, non-bank financial institutions adapted their balance sheets to prevailing market conditions, reflected in an increase in exposure to credit, duration and liquidity risks and in rising leverage. In particular, the interplay between lower market liquidity and the leverage strategies adopted bolsters systemic risk situations and contagion across financial system sectors at international level. Given the relevance of the non-bank financial sector in the euro area, in particular investment funds, the materialisation of these risks is likely to adversely affect international financial markets.

**In the insurance and pension funds sectors, the rise in interest rates has helped to mitigate part of the negative impacts experienced in recent years.** Profitability and capital are strengthened by rising discount rates, particularly in business segments with long-term specified liabilities. However, it also results in the devaluation of corporate and public debt securities held in portfolios. In addition, high inflation penalises the profitability of the insurance sector, as it contributes to the increase in costs associated with business lines such as the non-life segment. The deterioration in the economic conditions of savers and the slowdown in economic activity are reflected in lower business potential and the possibility of increased redemptions associated with products in these sectors.

**Higher interest rates may lead to the materialisation of accumulated vulnerabilities in non-bank financial institutions at international level, such as credit, duration and liquidity risks**. The prolonged environment of very low interest rates and favourable financing conditions contributed

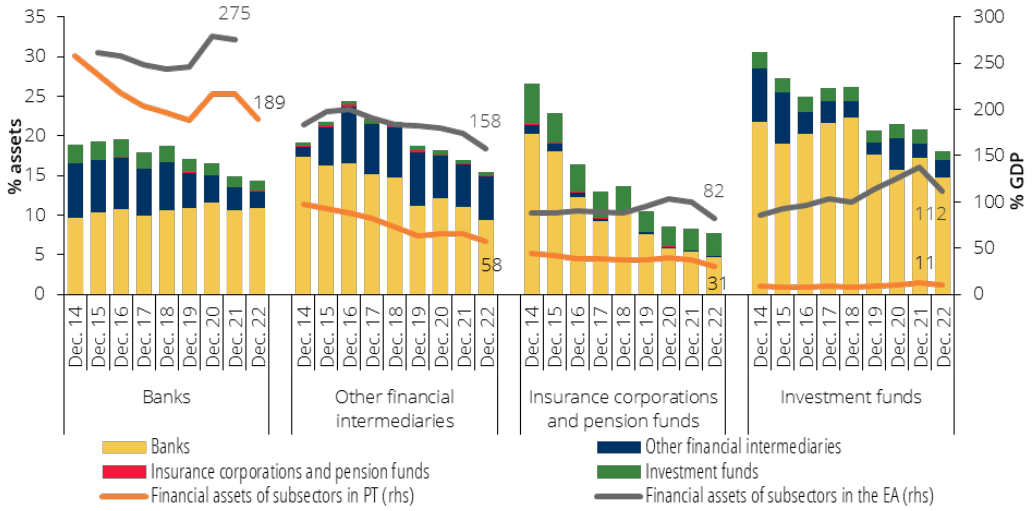
to search-for-yield behaviour, resulting in an increase in portfolios' exposure to assets with lower credit quality, reflected, for instance, in the smaller share of investment-grade debt securities and with longer maturities. Thus, rising financing costs of sovereign and corporate debt, in particular high yield, led to substantial portfolio devaluations. In addition, the maturity mismatch between liabilities and assets, in particular open-ended investment funds, where portfolios with relatively illiquid assets (e.g. real estate investment funds) coexist with the possibility of redemptions in the short term, makes these institutions sensitive to abrupt changes in financial market conditions.

The risk of additional asset price revaluation and international financial market turmoil may also exacerbate the risks associated with the use of leverage and amplify the impact of liquidity stress. The risks stemming from the concentration of strategies and leveraged exposures by financial institutions may be exacerbated by adverse events in financial markets, triggering liquidity needs to address additional financing needs or to post more collateral. These needs may not be quickly absorbed, resulting in additional losses. The increased financial market volatility may also be amplified by liquidity issues in the non-bank financial system, as shown by events in September 2022 around liability-driven investments (LDI) strategies for pension funds in the United Kingdom (*Financial Stability Report*, November 2022).

Recognising the challenges and materiality of risks associated with the transition of the macrofinancial environment, the European Systemic Risk Board (ESRB) issued a warning in September 2022, calling for the need to preserve or strengthen the resilience of the financial system. That warning explicitly included the non-banking sector and market-based financing, referring, inter alia, to the need to adequately manage market risk and structural liquidity mismatches in certain types of investment funds as well as in the insurance sector.

Contagion from the most recent cases of tensions in the US and Swiss banking sector to other segments of the financial system was limited. In the United States, deposits have been shifted into money market funds (MMFs), with an increase in subscriptions to MMFs investing in public debt. These episodes stress the importance of interlinkages and concentration of exposures across institutions in the various financial system subsectors and the potential for amplification of shocks with a systemic impact. At global level, interlinkages between non-bank financial institutions and banks have intensified in recent years, accompanied by growth in the non-bank financial sector (*Global Financial Stability Report*, IMF, April 2023). By contrast, in Portugal, interlinkages have remained on a downward trend (Chart I.1.48), which may mitigate the risk of contagion arising from the materialisation of adverse events with an impact on any systemic entity or sector in the financial system. In Portugal, the non-bank financial sector has continued to account for a small share in the economy (99% of GDP), compared to 353% of GDP in the euro area. In particular, investment funds account for a much smaller share in Portugal (11% of GDP compared to 112% in the euro area).

**Chart I.1.48** • Relative size of the financial system in Portugal and in the euro area
| As a percentage of assets and GDP

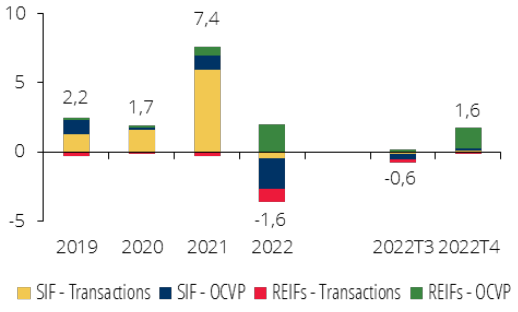



Sources: ECB and Banco de Portugal. | Notes: Total non-consolidated assets of each sector were considered. In the case of banks, the latest figure for financial assets as a percentage of GDP available for the euro area refers to December 2021. The following financial assets were considered in the calculation of exposure: deposits, debt securities, loans, shares and other investment funds units and listed shares. For simplification purposes, other financial intermediaries refer to the sum of the following subsectors: S125 – Other financial intermediaries except ICPFs, S126 – Financial auxiliaries and S127 – Captive financial auxiliary institutions and lenders. In Portugal, this sector is mostly made up of captive financial institutions and lenders. For more details on this classification, see "Institutional sectors breakdown – ESA2010".

**In Portugal, investment fund shares recovered in the last quarter of 2022, although not enough to offset the downward trend observed in the first three quarters**. In the fourth quarter of 2022, the total value of shares stood at €34.9 billion, up by 4.8% from the previous quarter, but still €1.6 billion below total shares in 2021 (Chart I.1.49). Developments in the last quarter of 2022 chiefly mirrored the effects of the statistical reclassification of a number of entities previously classified as NFCs into real estate investment funds (REIFs), as reflected in other changes in volume and price. This segment accounted for 40% of the total investment fund sector and is mostly composed of closed-ended funds (around 65%). In the year as a whole, there were net redemptions in REIFs and securities investment fund (SIFs), while decreases in value were notable in SIFs, particularly in equity and bonds, in line with developments in financial markets. The current environment will make lower-risk alternative investment options more attractive, which could trigger additional redemptions in open-ended investment funds, leading to potential liquidity risks.

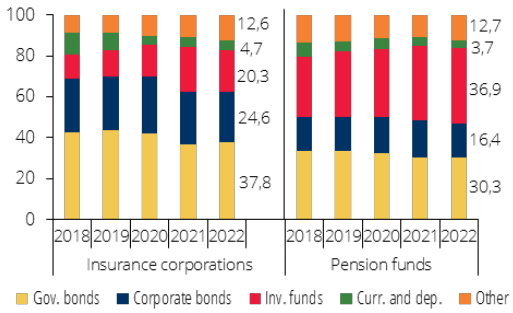
**However, most SIFs are resilient to potential liquidity stress situations**. The stress test exercise conducted by the Portuguese Securities Market Commission on SIFs domiciled in Portugal, with reference to October 2022 (published in the 2023 Risk Outlook) concluded that most of these funds have sufficient liquid assets to cope with abnormal redemption volumes similarly to, for instance, that observed during the 2008 financial crisis (in the month following the collapse of Lehman Brothers) or the outflows observed in March 2020 during the COVID-19 pandemic. The liquid assets assessed included currency and deposits (immediate liquidity), as well as high-quality sovereign debt instruments (with credit ratings above AA). The possibility of contagion to other subsectors of the Portuguese financial system, through fire sales of assets, would also be limited, given that the portfolio of these institutions is relatively smaller and mostly composed of foreign instruments.

**Chart I.1.49** • Total shares/units issued by investment funds: transactions and other changes in value and price | EUR billions




Source: Banco de Portugal. | Note: SIFs – securities investment funds, REIFs – real estate investment funds, OCVP – other changes in value and price.

**Chart I.1.50** • Composition of assets and technical provisions | As a percentage of the total insurance or pension fund portfolio




Source: Insurance and Pension Funds Supervisory Authority. | Notes: Gov. bonds - Government bonds; Private bonds. – Private debt bonds; Inv. funds – Investment funds; Curr. and dep. – Currency and deposits. 'Other' also includes real estate, derivatives, mortgages and structured products.

**Turning to the insurance and pension fund sectors in Portugal, sensitivity to adverse developments in sovereign and private debt markets due to the concentration of exposure to this type of asset is still noteworthy.** The investment portfolios of institutions in these sectors continue to include a significant share of corporate and public debt instruments (Chart I.1.50). In 2022, for insurance companies, debt securities accounted for 83.2% of the non-linked life insurance investment portfolios and 58.5% of the non-life insurance portfolios (62.4% of the total portfolio in this sector). Their importance in pension funds was lower, accounting for 46.7% of the investment portfolio. These instruments were also concentrated around ratings at the investment-grade threshold, particularly in the insurance sector, rendering them more exposed to the impact of the increased financing costs of these issuers. There has been a substitutability effect in the portfolio towards higher-rated debt instruments in both sectors, albeit not yet significantly reflected in its composition. Despite the devaluation of investment portfolios and the associated counterparty risk, the increase in yields also makes it possible to reduce the risk of reinvestment of their portfolios.

### 1.3.6 Banking system

**The rise in short-term interest rates, starting in 2022, has benefited banks' net interest income. At the same time, structural liquidity remained high and the credit quality of assets improved further among institutions (Chapter 2).** The positive effect on net interest income reflected both a faster pass-through of market interest rates to lending rates compared to the deposit interest rate and the little relevance of market funding for Portuguese banks. However, rising nominal interest rates tend to be reflected in materialised credit and market risks. In a central scenario, the increase in interest rates tends to have a positive effect on the profitability and capital of Portuguese banks (Special issue "Profitability and solvency of the Portuguese banking system in an environment of rising interest rates", in the June 2022 issue of the *Financial Stability Report*).

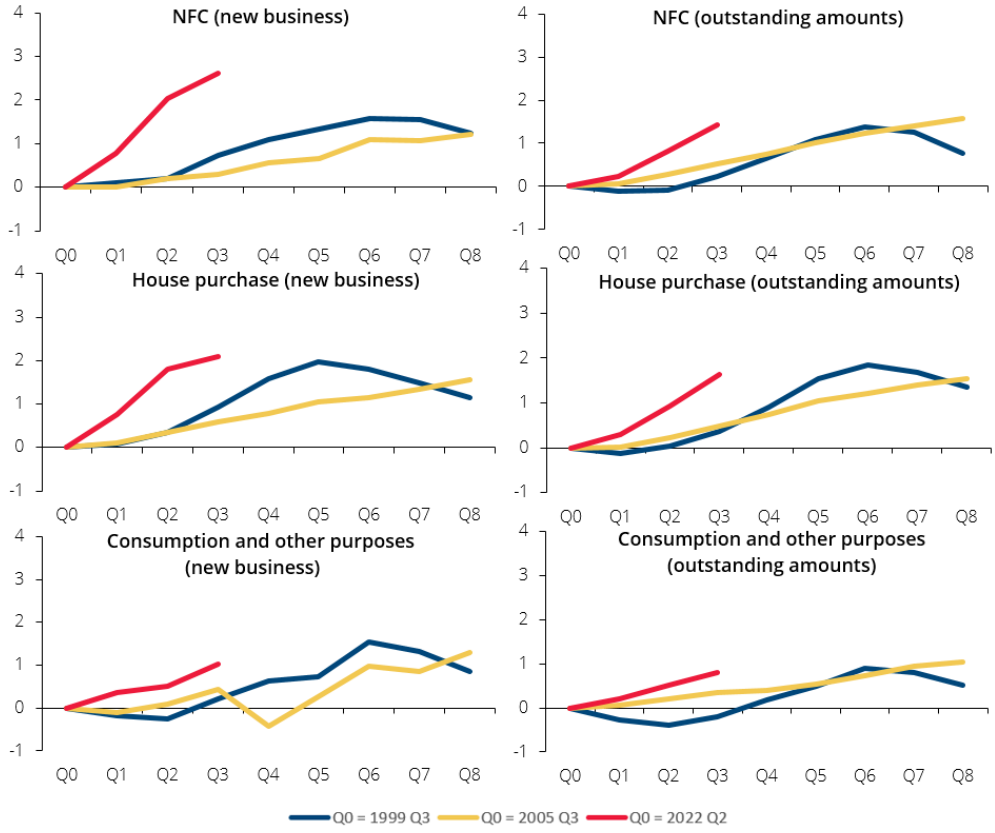
**In response to rising inflation to unprecedented levels in the euro area, key interest rates have increased particularly strongly and rapidly.** The rise in key interest rates has been faster and more marked than in previous periods of tightening financing conditions (1999 and 2005), reflected in the rise in interest rates on loans to households and NFCs (Chart I.1.51). For new business, that rise was more largely passed through to loans to NFCs up to February 2023. However, for outstanding amounts, the pass-through was somewhat faster in loans to households for house purchase than to NFCs, given that the share of loans with a variable interest rate is higher for the former (around 90%) than for the latter (around 80%). In the case of NFCs, historically there is also a substantial share of loans with relatively short maturities (up to two years), in some cases refinanced at maturity, in whole or in part, at higher rates. For loans to households for consumption and other purposes, the rise in the interest rates

on outstanding amounts was comparatively limited, also because rates in this segment were mostly fixed. Developments in interest rates on new business are mirrored across the euro area.

**Recent developments in net interest income have benefited from a very limited pass-through of key interest rate increases to bank interest rates on deposits.** Customer deposits continue to be the main source of funding for banks operating in Portugal (73.1% of total assets in December 2022). In February 2023 the annualised interest rate on new deposits with an agreed maturity from households and NFCs stood at 0.99% (+0.31 p.p. and +0.94 p.p. compared to December 2022 and December 2021 respectively). The pass-through was more marked in the euro area, with an annualised interest rate of 2.19%. This gap is related, inter alia, to the higher structural liquidity of the Portuguese banking system (total loan-to-deposit ratio of 71.7% in December 2022) compared to the euro area (total loan-to-deposit ratio of 85.9% in September 2022) (Chart I.1.52).

**However, the situation in Portugal is expected to change and the remuneration on deposits with an agreed maturity should increase more markedly.** This change will reflect, on the one hand, the significant interest rate differential vis-à-vis savings certificates, which has encouraged the reallocation of savings from household deposits to this financial instrument. On the other hand, in light of changes by the ECB to liquidity conditions and their impact on prudential liquidity ratios, institutions will tend to promote the collection of deposits more actively. The deterioration in the cost of deposits will also tend to be compounded by the expected increase in the importance of deposits with an agreed maturity, to the detriment of overnight deposits, which currently have a higher opportunity cost for banks.

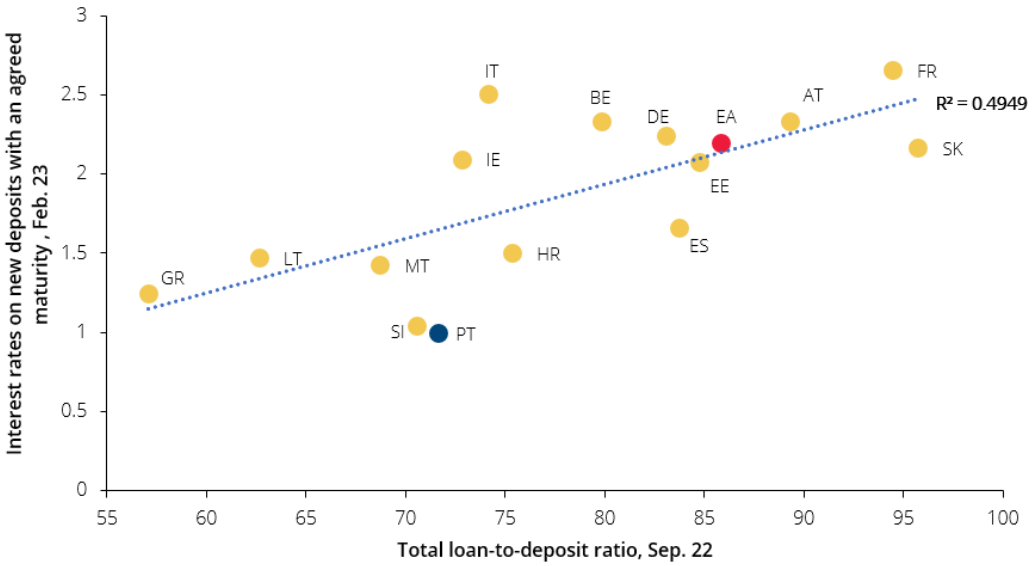
**Chart I.1.51** • Cumulative quarterly change in interest rates on new business and outstanding amounts of loans to households (house purchase and consumption and other purposes) and NFCs | Percentage points




Source: Banco de Portugal. | Notes: The three moments identified in Q0 correspond to the quarters prior to a hiking cycle (of at least three consecutive quarters) of the ECB deposit facility rate since 1999. Interest rates on new business and on outstanding amounts of loans to households (house purchase and consumption and other purposes) and NFCs are the simple quarterly average of the interest rate. The latest observation corresponds to February 2023. Activity on an individual basis.

In the current environment of high inflation and rapidly rising interest rates, given the high share of credit agreements with a variable interest rate, the default risk in the credit portfolio increases, in particular for the most vulnerable customers. The additional effort to service debt, combined on the one hand with the higher cost of goods and services for households and, on the other hand, an increase in the cost of materials for firms and a foreseeable slowdown in demand directed to them, heighten borrowers' risk of default. The lower household saving capacity, particularly in the case of the most vulnerable households, is another factor that can promote an increase in non-performing loans, even though their participation in the housing loan market, where the variable rate is predominant, has declined in recent years. An increase in credit impairment losses and stage 2 loans is therefore expected in 2023, reversing the dynamics observed in recent years, which was interrupted during the pandemic period.

**Chart I.1.52** • Interest rates on new deposits with an agreed maturity to households and NFCs and total loan-to-deposit ratio – comparison across euro area countries | Per cent




Sources: ECB (MRI and CBD) and Banco de Portugal. | Notes: The total loan-to-deposit ratio corresponds to the ratio of loans to deposits to/from customers, credit institutions and central banks. For Portugal (PT), the total loan-to-deposit ratio corresponds to that of December 2022. For the remaining countries and the euro area (EA) aggregate, the latest observation available up to the cut-off date for this Report is considered (September 2022).

Some sectors of activity are more vulnerable to the current macroeconomic and geopolitical environment. The sectors most affected by energy and/or other commodity price increases remain more vulnerable to the current context of rising protectionism and the continued conflict in Ukraine. The increased risk of loans to firms in these sectors has been reflected in a greater NPL impairment coverage by banks, reaching 91.5% in 2022 (Section 2.3). However, the coordinated response of European countries and their allies, together with the smoothing of global supply conditions, have reduced energy and most commodity costs globally.

Other risk factors arise from the possibility of write-downs in real estate assets. The potential devaluation of the residential real estate market could have an impact on the collateralised value of loans, mainly to households for house purchase. However, the high share of loans with a loan-to-value (LTV) ratio of 80% or less at the end of 2022 (94%) should make it possible to accommodate actual losses in the event of a fall in prices.

Despite being largely mitigated by the reduction in the share of securities measured at fair value on banks' balance sheets, the rise in long-term interest rates led to the materialisation of market risk. At the end of 2022, and for a representative set of institutions in the system, sovereign debt securities measured at fair value through other comprehensive income or held for trading depreciated by 17.9% from the end of 2021. Nevertheless, the largest share of total securities valued at amortised cost at the end of 2022 (77.0%) compared to the end of 2021 (59.4%) reduces the sensitivity of institutions' equity to market dynamics. However, for the purposes of calculating the liquidity coverage ratio (LCR), the value of securities is measured at market value even if they are valued at amortised cost on the institutions' balance sheets. The devaluation of securities is further mitigated by the hedging strategies adopted by banks, mainly interest rate swaps, covering around 65% of sovereign debt booked at fair value. Taking a longer-term view, management of the debt portfolio, which accounts for 20.9% of total assets, based on a holding-to-maturity logic implies that the average return on the portfolio may not follow developments in banks' funding interest rates, with a negative impact on net interest income.

The increase in yields negatively affects international financial market funding costs. The increase in private and public debt yields (Section 1.2) corresponds to a very sharp rise in institutions' wholesale debt market funding costs. This is particularly relevant for banks that need to issue debt in 2023 to comply with MREL requirements, whose transitional period ends (for most banks) on 1 January 2024. MREL requirements can also be complied with using equity.

The Portuguese banks' LCR remained at an elevated level (229%), well above the 100% minimum requirement. The liquidity buffer (LCR numerator) consists almost exclusively of reserves in central banks and public debt, readily available to obtain liquidity from central banks. This considerably mitigates market risk to meet liquidity needs. In addition, highly liquid assets accounted for approximately 27% of total deposits in 2022.

The recent default of several US banks and the actual losses to investors linked to the process of UBS's acquisition of Credit Suisse have made it even more difficult for banks to access the international debt market. The total loss experienced by Credit Suisse investors on Additional Tier 1 (AT 1) bonds significantly increased the cost of these securities and, by contagion, the rest of the debt market. These developments negatively affected confidence in financial institutions worldwide. The widespread use of electronic platforms when interacting with financial institutions, with access to and ability to conduct instant and continuous operations, amplifies the negative impact on confidence.

The lower sensitivity of Portuguese banking system's institutions to changes in the risk perception of international investors compared with the sovereign debt crisis period is a positive factor under the current circumstances. At the end of 2022, debt securities issued maintained their 2021 share in total assets, at 4.1%, significantly below the euro area (11.5% in September 2022) and the sovereign debt crisis period (18.8% in December 2010).

In recent years, the credit ratings of Portuguese banks have improved. Although there is some heterogeneity in ratings across institutions, most major banks continued to see their credit ratings upgraded by at least one rating agency in 2022 and early 2023.

Monetary policy normalisation facilitated the repayment of the third series of targeted longer-term refinancing operations (TLTRO-III), but the soundness of the funding structure remained unchanged. In the last quarter of 2022 and, following the significant increase during the pandemic period, the weight of central bank funding decreased markedly, owing to the repayment of a large part of TLTROs-III, to 3.6% of total assets (-5.1 p.p. from September 2022 and -0.8 p.p. from December 2019). However, institutions maintain a robust funding structure owing to high levels of structural liquidity (Section 2.5). Institutions will also be able to resort to additional central bank funding if needed – as the main refinancing operations (MROs) and the longer-term refinancing operations (LTROs) remain in place – and they can draw simultaneously upon sizeable collateral

on their balance sheet available for monetary policy operations (corresponding to around one-third of customer deposits in December 2022).

**Portuguese banks are better prepared to absorb possible adverse shocks than in the past.** Banks operate with stronger capital and liquidity indicators compared to periods prior to the global financial and sovereign debt crises, as a result of stricter regulation and supervision and the financial adjustment of the various institutional sectors. In the event of further adverse shocks to economic activity across institutional sectors, the banking system has a higher loss-absorption capacity, which ideally should help mitigate pro-cyclical behaviour in times of crisis. In addition, if needed, the ECB has at its disposal a set of monetary policy instruments in place to provide additional liquidity to the euro area banking sector.

**More challenges – notably those related to climate and technological factors – add to the macroeconomic and geopolitical environment, characterised by great uncertainty.** Financial risks associated with climate change also present challenges to the banking sector, which should assess its resilience against multiple climate change and energy transition scenarios and develop strategies to mitigate those impacts. In addition to the work already carried out and published in previous issues of the Report on transition risks, this issue presents a first assessment of the banking sector's exposure to physical risks through lending to firms. The results suggest that exposure is concentrated on firms located in areas with the potential for materialisation of water stress, heat stress and fire risks, most notably with intermediate risk levels. However, this exposure would be limited when considering only the highest level of physical risk, with the weight of total lending to firms ranging from 0% to 5%, with the exception of heat stress, for which exposure stands at 20% (Special issue "The banking system's exposure to physical climate risks through lending to firms – preliminary findings"). Technological advances should help improve the sector's performance by promoting more efficient processes and timely risk detection, although it entails strengthening operational resilience, namely to withstand cyber-attacks.

**The digitalisation of financial services is on a rising trend, used by banks to increase internal efficiency and diversify sources of revenue as a pillar of their strategy and business models.** Digitalisation relies not only on the transformation of distribution channels but also on financial institutions' internal processes, and benefits from the use of new, innovative technologies, such as artificial intelligence (Box 4 of the November 2022 issue of the *Financial Stability Report*). Digital transformation plans involve large investments, the gains of which tend to materialise mostly in the medium term. In 2022, IT-related expenses accounted for around 8% of banks' operating costs.

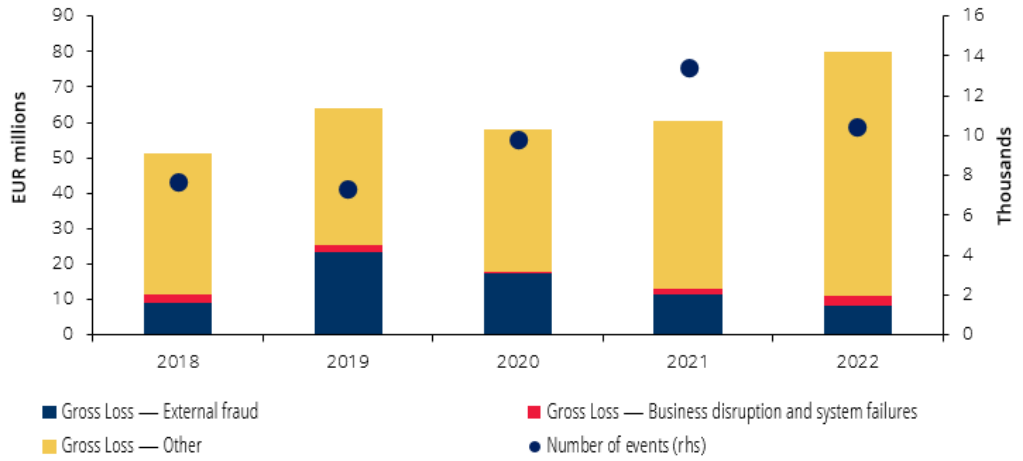
**The ongoing digital transformation, nevertheless, poses risks for the banking system. Three aspects are particularly noteworthy: outsourcing, data quality and cybersecurity, all of which are supervisory priorities.**

**The acceleration of the digitalisation process is largely based on the use of outsourcing by financial institutions of critical or key functions in the area of information and communications technology services**. This use of outsourcing accounts for a significant share of the operational cost structure (around 13% of total administrative costs in 2022) and poses an individual and systemic risk, in light of the concentration of services in a few third-party service providers. The latter's downtime may systemically jeopardise the availability and continuity, or security, of the contracting financial institutions (e.g. the use of cloud computing services).

**Against a background of increasing use of data, it is important to ensure its reliability as a key factor for decision-making by institutions and for supervisory purposes.** The Banco de Portugal is carrying out a number of supervisory actions within the framework of the Single Supervisory Mechanism (SSM) to address previously identified deficiencies, namely a programme of targeted independent audits on compliance with supervisory reporting rules, which are expected to be concluded by the end of next year.

**The widespread use of digital information/communication technologies, coupled with the current geopolitical background, increases the systemic materiality of cyber-attacks, underscoring the need to strengthen operational resilience.** Although the number of operational risk events has decreased, related losses increased in 2022 (Chart I.1.53). It should be noted, however, that the events more closely related to information technology, external fraud and business disruption have accounted for lower loss amounts over the past few years.

**Chart I.1.53** • Operational risk events and related losses for Portuguese banks




Source: Banco de Portugal.

**In view of the risks associated with digitalisation, some progress has been made in regulation, thereby fostering a more resilient digital environment.**

**Recent regulatory and policy developments should contribute to a greater cyber resilience of the financial system**. These include the implementation of DORA (Regulation (EU) 2022/2554 on digital operational resilience for the financial sector) as of January 2025, and the ESRB's ongoing work to put in place a macroprudential framework for cyber risks, with its most recent report *Advancing macroprudential tools for cyber resilience* being published in February 2023. These developments illustrate how important is the adoption of new tools and target areas for operational risk management, acting in tandem with traditional mechanisms, which are more focused on financial instruments and capital requirements. It is also crucial to acknowledge that national and European competent authorities should continue to further develop a regulatory and supervisory framework that ensures an adequate level of financial sector resilience, including from an operational point of view. With this, financial institutions can keep providing key financial services in potential crisis situations triggered by major cyber incidents.

**Recent regulatory developments aim to set up a framework promoting a balance between innovation and financial stability in matters related to crypto-assets.** Crypto-assets and decentralised financial systems (DeFi) are also among the outcomes of the digital transformation of financial activity, to which the banking sector, as a central player in the financial system, is not immune. Crypto-assets have attracted the interest of investors not only individually but also in a more traditional asset management approach. Developments in the price of those assets in 2022 highlighted the importance of regulatory measures.

**The European Regulation on markets in crypto-assets (MiCA) was approved by the European Parliament in April 2023.** The Regulation aims to protect consumers against misuse and manipulation, while fostering the traceability of transfers, which should help to identify suspicious

activities, including money laundering. The new rules informally agreed with the Council in June 2022 are yet to be formally approved by the Council and will enter into force progressively from mid-2024.

**In December 2022 the Basel Committee on Banking Supervision (BCBS) endorsed a standard on the prudential treatment of banks' exposures to crypto-assets exposures to be implemented in 2025.** This standard sets out a harmonised international approach to regulation and supervision with the purpose of building up a prudent management of banking risk and financial stability given the increasing innovation in the private sector. Overall, the new prudential framework includes, inter alia, crypto-assets' classification conditions, the calculation of capital requirements in the various relevant risk categories (e.g. credit risk, market risk), exposure limits, disclosure requirements and risk management principles associated with crypto-asset holdings. In the European Union, a possible prudential treatment for exposures to crypto-assets is being considered in the context of the ongoing legislative revision of Directive 2013/36/EU and Regulation (EU) No 575/2013.

**In the context of preventing money laundering and terrorist financing (ML/TF) several initiatives were taken.** First of all, the Notice of Banco de Portugal No 1/2023 entered into force, setting out the necessary aspects to ensure compliance with the preventive ML/TF obligations as regards entities operating with virtual assets. As regards regulatory matters, the Banco de Portugal has also continued to monitor the negotiation process of the European package of legislative proposals – the AML Package – presented by the European Commission in July 2021.

**For supervisory tasks, on- and off-site supervision has been strengthened, together with an intensive exercise of the so-called market entry functions, particularly with regard to the registration of entities that intend to engage in certain kind of activities with virtual assets in Portuguese territory**. As regards on-site supervision, the Banco de Portugal has already launched the second stage of the thematic cycle on the monitoring of the procedures implemented by supervised entities to address the ML/TF risk associated with the granting of the Residence Permits for Investment Activity. With regard to off-site supervision, mention should be made to the contributions by the Banco de Portugal in the context of the AML/CFT supervisory colleges set up within the European Banking Authority (EBA). Also worth mentioning is the ongoing follow-up on the technical advice project of the European Commission/Council of Europe, in tandem with the development of relevant IT projects in this domain.

**Still within developments in the regulatory framework, there are challenges associated with the financial risks inherent to climate change and the speed of transition to a low-carbon economy – considering the objectives set by the Paris Agreement – which have the potential to affect the soundness of credit institutions and financial stability.** Amid an accelerating energy transition and independence process in the European Union, as well as the ongoing adaptation of the regulatory framework on the prudential treatment of climate-related risks, it is all the more crucial that credit institutions assess the strategic resilience of their activities against different scenarios combining physical and transition risks and draw up management and mitigation plans accordingly. Maintaining the resilience of banks throughout the transition process is a prerequisite for the orderly unfolding of the process.

**Despite data and methodological limitations, credit institutions should also continue to make progress, via concrete action, in the assessment and timely integration of climate considerations into their risk management strategies and policies.**

**In addition, (i) regulatory developments with regard to climate-related risk disclosures, (ii) the relative uncertainty of how market prices of financial instruments will reflect these risks and (iii) the potential negative impacts on institutions' balance sheets associated with their materialisation, warrant the institutions' increased commitment to disclose transparent information on risks and vulnerabilities (as well as opportunities) to which they are exposed in terms of environmental sustainability.** In addition to being an important mechanism for market discipline, disclosures are key to mitigating the risk of greenwashing. In this context, the EBA has developed implementing

technical standards (ITS) on ESG risk disclosures, including physical and transition risks, which large institutions issuing securities admitted to trading on a regulated market in any Member State will report from 2023 onwards. Starting in 2024, these institutions will also be required to disclose the so-called green asset ratio and the banking book taxonomy alignment ratio.

Finally, and in view of the succession of events and risk factors that have emerged in recent years – for instance, the recent events involving the default of several US banks and the actual losses to investors associated with the process of UBS's acquisition of Credit Suisse – concerns have resurfaced about the current EMU institutional architecture to deal with crises in the banking system. In this regard, at the Euro Summit on 24 March 2023, European leaders called for continued efforts to complete the Banking Union, as presented by the Eurogroup in June 2022. The adoption by the European Commission on 18 April of a legislative proposal to review the bank crisis management and deposit insurance framework (CMDI framework) – with a focus on small and medium-sized banks – is the first step in that direction. While the Eurogroup has decided that other equally relevant initiatives (such as the establishment of the European Deposit Insurance Scheme – EDIS) be considered after the review of the CMDI framework, it is nevertheless crucial to bear in mind during the negotiations the existing interactions and the importance of setting up a centralised deposit protection scheme. Indeed, this is the only way to ensure that depositor confidence does not hinge on the geographical location of the bank and that the current misalignment between decision-making and funding centres is redressed, also taking advantage of lessons learned from the most recent events.

## **1.4** Macroprudential policy

In the current context of monetary policy normalisation, the impact of macroprudential policy is becoming prominent, in particular with regard to developments in business and financial cycles and what this means for credit and residential real estate prices. Macroprudential authorities have the appropriate instruments to address sources of cyclical or structural systemic risk. The choice of instruments considers the specificities of each jurisdiction, namely the legal framework, the individual financial position of institutions, the level of management capital buffers to accommodate potential losses and access to capital markets. This assessment also takes into account the uncertainty associated with the current environment and the scope available for new government policies.

The different macroprudential instruments – both capital measures and measures directly acting on credit standards, referred to as borrower-based measures (BBM) – may be implemented together depending on the phase of the financial cycle. Capital measures immediately and directly increase the resilience of institutions (ECB, 2023). Institutions with the highest level of resilience are those that can absorb larger unexpected losses while maintaining an adequate flow of credit to the economy. This avoids excessive deleveraging in times of risk materialisation. The intensity of the transmission mechanisms of capital measures depends on the amount of each institution's management buffers and its willingness to use these buffers as an alternative to a reduction or shift of the credit portfolio allowing capital requirements to be lowered.

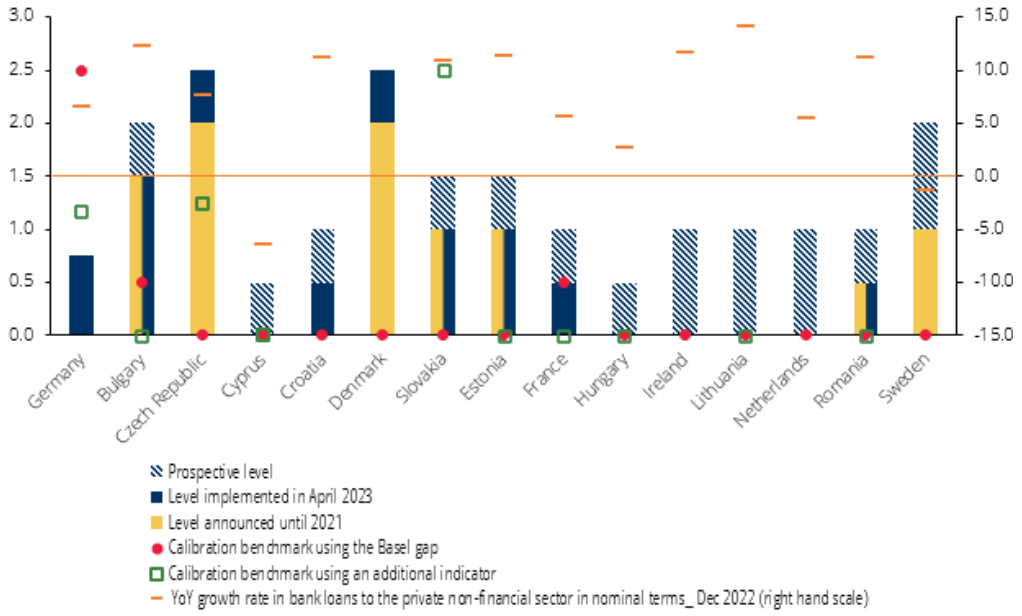
Measures directly acting on new credit flows set limits on the amount of credit that the borrower can obtain, depending generally on the collateral or income value. Despite having a limited immediate impact on the resilience of the financial system, there is evidence of an improvement in the risk profile of the credit portfolio following the introduction of such measures. This improvement reduces the magnitude of potential losses resulting from shocks in the borrowers' income and/or in the collateral value, thereby increasing resilience of both borrowers and the financial system (Gross and Población, 2017; Neugebauer et al., 2021).

The degree of complementarity between these two types of measures – capital buffers and BBM – enhances the effectiveness of macroprudential policy, despite acting through different transmission mechanisms.

**Macroprudential authorities should avoid the risk of acting procyclically if a risk materialisation phase approaches.** Macroprudential authorities analyse the costs and benefits of a trade-off between increasing resilience to absorb potential losses that result from the materialisation of risks and the risk of procyclicality. In order to mitigate the risk of procyclical action, financial institutions must have management capital buffers.

**Taking all these elements into account, several European countries decided to increase banks' capital buffers in 2022, in particular the countercyclical capital buffer (CCyB).** Currently, the legislation provides prominently for the application of quantitative rules for calibrating the CCyB rate according to the level of deviation of the credit-to-GDP ratio from its long-term trend (Basel gap), calculated in accordance with the Basel Committee on Banking Supervision's guidelines. However, the relevance of this indicator in supporting calibration decisions has declined to the extent that a broad group of countries has set CCyB rates above the benchmark level determined by the Basel gap (Chart I.1.54).[2] In this context, additional indicators of a composite nature, as well as the approach of a positive CCyB rate for an environment of neutral cyclical systemic risk, have gained greater prominence among the European authorities in taking decisions to increase this buffer. Estonia, Ireland, Cyprus, Lithuania, Netherlands and Sweden are examples of Member States that have adopted a positive level of neutral CCyB.[3]

**Chart I.1.54** • Implementation of the countercyclical capital buffer in the European Union
| Per cent




Sources: ECB, European Systemic Risk Board (Banco de Portugal calculations). | Notes: Under the CRD, institutions have a maximum period of 12 months to implement an increase in the CCyB rate, starting from the date of publication of the decision. The prospective level of the CCyB rate is related to the published decision on the rate increase in 2023 Q1, implemented after April 2023. The year-on-year rate of change of bank loans to the non-financial private sector in nominal terms is shown for the countries with the December 2022 values available up to the cut-off date of this Report.

2. In spite of the current important role assigned by the relevant legislation to the Basel gap in determining the countercyclical buffer rate, this measure of the credit cycle is frequently criticised, in particular due to the bias in end-of-sample values. For more details, see the methodological note: "The countercyclical capital buffer in Portugal", Banco de Portugal, September 2020.

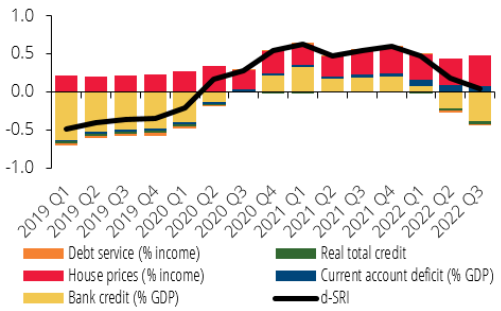
3. In the context of the European Union, the level of neutral CCyB was first used by the United Kingdom, a Member State at that time, setting a 1% neutral rate for a standard risk environment (ESRB, 2018).

**At the same time, in the European context, sectoral macroprudential policy has been largely directed towards the residential real estate market.** Regarding the sSyRB (sectoral systemic risk buffer), five EU Member States (Belgium, Germany, Lithuania, Malta and Slovenia) have so far implemented sectoral systemic risk buffer rates of between 0.5% and 9% (rates that, if converted to the total risk exposure amount, range between 0.2% and 1.3%), which are mostly applied to exposures to the residential real estate market, aiming at strengthening the resilience of each country's financial system to sudden, unexpected and significant shocks in residential market prices. In addition, countries need to take into account their macroprudential policy stance and, accordingly, all instruments activated. Most of these five countries have BBMs in place, thus making it possible to exploit the benefits of complementarity between instruments. The sSyRB aims to increase the resilience of already accumulated risks, while BBMs aim to reduce the risks associated with the flow of new lending. For those countries that have also activated the CCyB (Germany and Lithuania), the sSyRB may limit an incentive to rebalance the portfolio of institutions towards exposures with lower risk weights resulting from the implementation of a broad capital measure (ECB, 2023).

**In Portugal, the slowdown in the build-up of domestic cyclical systemic risk continued in the third quarter of 2022.** The downward trend in the domestic cyclical systemic risk indicator reflects the negative contribution of the bank credit component as a percentage of GDP, which more than offsets the increase in the positive contribution of house prices (Chart I.1.55). Against this background, the Banco de Portugal maintained the countercyclical capital buffer at 0% during the second quarter of 2023.

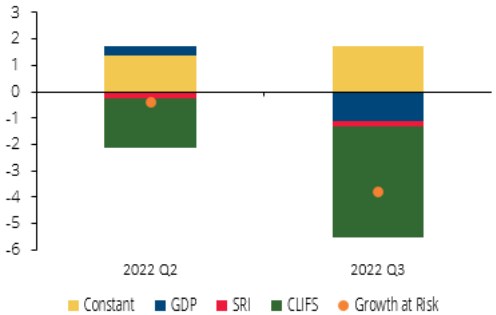
**Economic activity is projected to slow down in 2023**. Nevertheless, the 1.8% estimated year-on-year rate of change in GDP for 2023 reflects an upward revision of economic growth (March 2023 issue of the *Economic Bulletin*) compared with December 2022. Assuming a negative extreme event with a 10% probability of materialising (Growth at Risk), the year-on-year rate of change in GDP at a one-year-ahead horizon decreased significantly from -0.4% to -3.8% between projections using data up to the second and third quarters of 2022 respectively (Chart I.1.56). These estimates are negatively influenced by the GDP and especially by CLIFS, an indicator of financial stress.

**Chart I.1.55** • Domestic cyclical systemic risk indicator | Standard deviations from the median




Sources: ECB and BIS (Banco de Portugal calculations). | Notes: The d-SRI, developed by Lang et al. (2019), is an aggregate indicator aimed at identifying the accumulation of cyclical imbalances created in the domestic non-financial private sector. For further details on the d-SRI for Portugal, see the June 2019 issue of the *Financial Stability Report*.

**Chart I.1.56** • Contributions of the explanatory and control variables to projected Growth at Risk on the basis of information available up to 2022 Q2 and 2022 Q3 | Per cent and percentage points



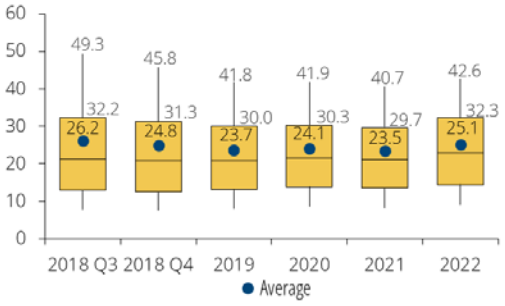

Sources: ECB, Banco de Portugal and Statistics Portugal (Banco de Portugal calculations). | Notes: Growth-at-Risk estimates for one-year projection horizons (per cent). Growth at Risk is the estimate of the 10th percentile of the distribution of the year-on-year rate of change in GDP for Portugal projected one year ahead. The estimated quantile regression model includes as explanatory variables GDP in contemporary terms, a financial stress indicator that aggregates a set of indicators from three market segments: bond market, equity market and foreign exchange market (Country-Level Index of Financial Stress – CLIFS) and the domestic systemic risk indicator (d-SRI). Contributions are in percentage points. To estimate the model, only the information available to the policymaker from the first quarter of 1991 to the projection quarter is used.

**In the 2022 exercise, the Banco de Portugal identified seven banking groups as other systemically important institutions (O-SIIs).** The other systemically important institutions buffer is one of the macroprudential instruments that the Banco de Portugal can use to mitigate the build-up of systemic risk associated with misaligned incentives and moral hazard. For the first time, the Caixa Central de Crédito Agrícola Mútuo was identified as O-SII. The Banco de Portugal has also set the corresponding capital buffer requirements for each of the identified groups. It will continue to monitor developments in the Portuguese banking system and, if appropriate, may review the O-SII buffer rate at any time.[4]

**In 2022 institutions generally continued to comply with the guidelines set out in the macroprudential Recommendation relating to new credit for house purchase and new consumer credit.** In March 2023, the Banco de Portugal published the fifth *Macroprudential recommendation on new credit agreements for consumers – progress report*.[5] In 2022, compared with the previous year, there was an increase in the average actual debt-service-to-income (DSTI) ratio, from 23.5% to 25.1%. This increase is mostly accounted for by the current environment of rising interest rates. In 2022 there was a reversal of the downward trend in the dispersion of distribution of the actual DSTI ratio between the third quarter of 2018 and 2021, although the level of the range of the distribution remains below that observed in 2018 (Chart I.1.57).

**Against a background of rising interest rates, the average actual DSTI ratio increased to 24.0% when considering only new credit for house purchase, compared with 21.9% in 2022.** The actual average DSTI ratio of credit for house purchase increased by 2.1 p.p. between 2021 and 2022. However, the 90th percentile of the distribution of the actual DSTI ratio for new credit for house purchase in 2022 (40.0%) was still below the figure for the third quarter of 2018 (42.1%) (Chart I.1.58).

**Chart I.1.57** • Distribution of the actual DSTI ratio for new loans to households
| Per cent




Source: Banco de Portugal, Central Credit Register. | Notes: Revised figures for the latest published data based on improved reporting. The lower and upper ends correspond to the 10th percentile and the 90th percentile, while the bottom and top of the boxes correspond to the 25th and 75th percentiles.

**Chart I.1.58** • Distribution of the actual DSTI ratio for new credit for house purchase
| Per cent

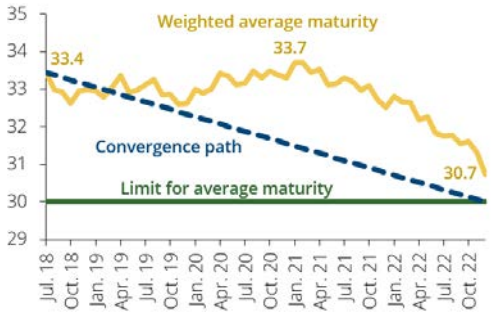

Source: Banco de Portugal, Central Credit Register. | Notes: The lower and upper ends correspond to the 10th percentile and the 90th percentile, while the bottom and top of the boxes correspond to the 25th and 75th percentiles.

**From 1 April 2022 onwards the limit on the maximum maturity of new credit agreements for house purchase was set according to the borrower's age.** In December 2022 the weighted average maturity of new credit for house purchase was 30.7 years, i.e. a three-year reduction from the peak observed in July 2021, resulting from the institutions' almost broad-based compliance with the convergence of the average maturity of new credit agreements to 30 years (Chart I.1.59). A

3. For more details, see the Banco de Portugal's website.
4. Report available on the Banco de Portugal's website.

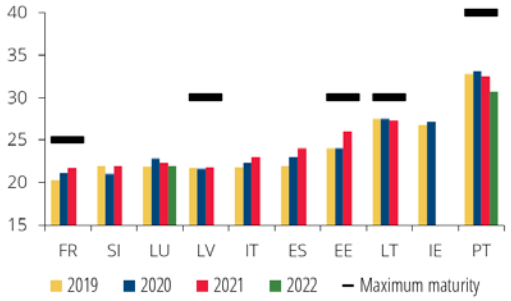
convergence plan was set out for institutions that did not yet converge. In 2022 the average maturity of new credit for house purchase in Portugal was above that recorded in EU countries for which information is available, with a maximum of 27 years in 2021 (Chart I.1.60).

**Chart I.1.59** • Weighted average maturity of new credit for house purchase | In years




Source: Banco de Portugal. | Notes: Based on information reported by a sample of nine institutions that accounted for around 97% of the housing credit market in 2022. The average maturity is weighted by the amount of credit granted.

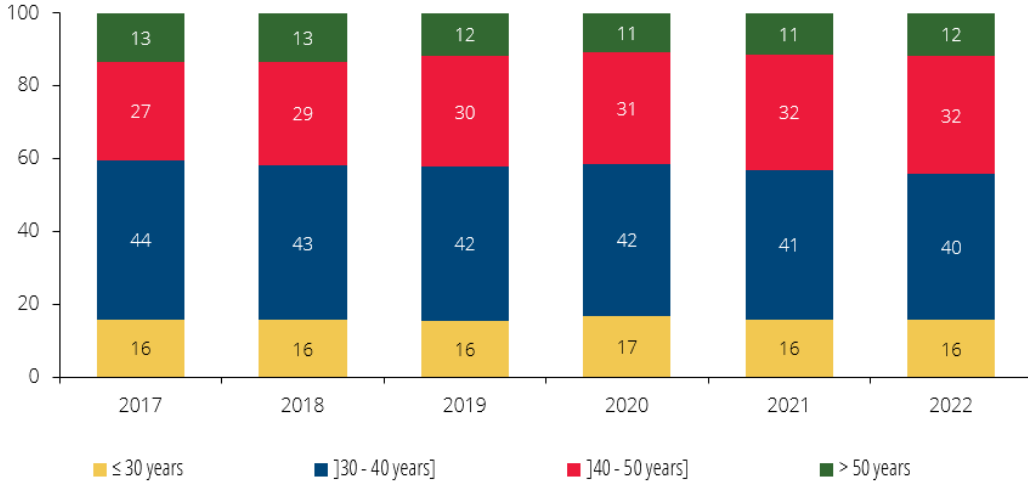
**Chart I.1.60** • Annual maximum and average maturity of new credit for house purchase by country | In years




Source: Information published by the respective national authorities. | Note: In addition to Portugal, until early 2023 Malta was the only EU country that adopted a maximum maturity of 40 years.

**Since the implementation of the Recommendation, the share of new credit for house purchase for borrowers aged 30 or below has not changed, standing at 16%** (Chart I.1.61)**.** In 2022, new credit for house purchase was mainly granted to borrowers aged 30-40, but there was a decrease in the share of this age group compared with the year before the start of the Recommendation (from 44% in 2017 to 40% in 2022).

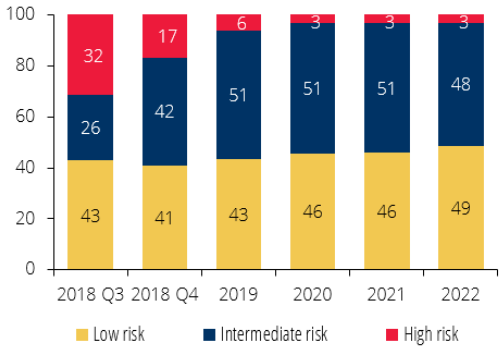
**Chart I.1.61** • Amount of new credit for house purchase by borrower age range | Per cent




Source: Banco de Portugal. | Note: Based on information reported by a sample of nine institutions that accounted for around 97% of the housing credit market in 2022.

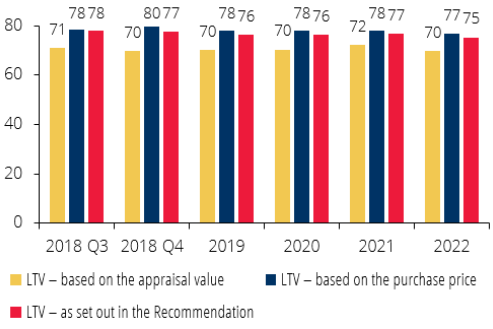
**The risk profile of borrowers of new credit for house purchase has improved since the entry into force of the Recommendation.** On the one hand, the share of credit granted to high-risk borrowers decreased from around 32% of the total amount of new credit for house purchase in the third quarter of 2018 to around 3% in 2022 (Chart I.1.62). In turn, there was an increase in the share of credit granted to borrowers with a low risk profile (from 43% in the third quarter of 2018 to around 49% in 2022), as well as an increase in the share of new loans to borrowers with an intermediate risk profile (from 26% in the third quarter of 2018 to 48% in 2022). In addition, the weighted average LTV ratio of new credit for the purchase of own and permanent residence was around 75% in 2022, translating into a reduction compared with 2021 (77%) and the third quarter of 2018 (78%) (Chart I.1.63). It is noteworthy that the Recommendation excludes new credit intended to prevent or address arrears situations, namely through refinancing or consolidation of other credit agreements, as well as through the renegotiation of the terms and conditions of prior credit agreements.

**Chart I.1.62** • Borrowers' risk profile in new credit for house purchase | Per cent




Source: Banco de Portugal. | Notes: Based on information reported by a sample of nine institutions that accounted for around 97% of the housing credit market in 2022. Low risk: DSTI≤50% and LTV≤80%; High risk: DSTI> 60% and/or LTV>90%; Intermediate risk: other cases.

**Chart I.1.63** • Evolution of the weighted average LTV ratio of new credit for the purchase of own and permanent residence | Per cent




Source: Banco de Portugal. | Notes: Information reported by a sample of nine institutions that accounted for around 97% of the housing credit market in 2022. In some periods the value of the average LTV ratio weighted by the credit amount is different to the minimum between the value of the average LTV ratio weighted by the credit amount based on the purchase price and on the appraisal value. This is because in some cases the minimum is the purchase price and in others the appraisal value.

**In December 2022, the Legal Framework of Credit Institutions and Financial Companies (*Regime Geral das Instituições de Crédito e Sociedades Financeiras* – RGISCF) was amended to transpose Directive (EU) 2019/878 (CRD V).** Law No 23-A/2022, which transposed CRD V into the Portuguese legal system, was published on 9 December 2022.This regulatory amendment provides, inter alia, for greater flexibility in the application of the SyRB, as its scope is no longer limited to long-term non-cyclical risks and can also be applied at the sectoral level.

**Regarding vulnerabilities in the European commercial real estate market, the European Systemic Risk Board (ESRB) issued a recommendation in January 2023 to the countries of the European Economic Area (ESRB/2022/9).** In some European countries, exposure to commercial real estate accounts for a significant share of GDP as well as of financial institutions' balance sheets, which is not the case for Portugal. Adverse developments in this market can have a systemic impact on both the real economy and the financial system. The ESRB recommends that financial system supervisory authorities in the European Economic Area monitor current and potentially emerging vulnerabilities related to the commercial real estate market, and act in accordance with the

principle of proportionality, using the most appropriate macroprudential tools at their disposal. At the same time, the ESRB published a report which assigns, on the one hand, a cyclical nature to these vulnerabilities given the current inflationary and tight monetary policy environment, and, on the other hand, a structural dimension such as changes in the demand criteria for offices related, for example, to the climate transition and the use of remote working (ESRB, 2023).

**For the non-bank financial sector, the European Commission's proposal to amend the European Market Infrastructure Regulation (EMIR) stands out.** On 7 December 2022, the purpose of the European Commission proposal to amend EMIR was to strengthen the central clearing capacity, thereby increasing liquidity at EU clearing houses and central counterparties (CCPs), aiming to reduce risks posed to European financial stability by excessive exposures to third-country CCPs.

**The European Banking Authority (EBA) published regulatory technical standards (RTS) on the specific liquidity measurement for investment firms under the Investment Firms Directive.** The RTS published by the EBA on 14 November 2022 will ensure that all competent authorities adopt a harmonised approach regarding the decision to implement liquidity requirements for an investment firm.

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# 2 Banking system

**Banking activity in 2022 was marked by high inflation and the beginning of the monetary policy normalisation process.** Against this background, banks' profitability increased over the year, driven by the rapid rise in interbank market interest rates, which were not matched by banks' deposit interest rates, and the reduction in provisions and credit impairments. The sector's return on assets (ROA) and equity (ROE) stood at 0.7% and 8.8% at the end of the year respectively, exceeding the respective euro area figures by 0.24 p.p. and 1.6 p.p. in the first three quarters.

**Despite the increase in interest rates, there was no deterioration in loan quality.** The gross NPL ratio continued its downward trend, reaching a trough of 3% in December 2022. This decrease was broadly based across the segments of firms and households, although in the latter case there was an increase in new NPLs (net of cures). Loans to the sectors most affected by energy and other commodity price increases continue to have a higher NPL ratio (6.9%) than the NFC average (6.5%), albeit with very high coverage (91.5%). The NPL ratio net of impairments stood at 1.3%, with a virtually nil differential from the euro area.

**The loan portfolio for house purchase continued to demonstrate it could accommodate a potential fall in residential real estate prices without incurring large losses.** At the end of 2022, around 94% of the stock of loans for house purchase granted to households had an LTV of 80% or less. The stock of housing loans, mainly composed of variable rate loans, decelerated in the final months of the year. The increase in early repayments contributed to this development, given the rise in the debt service burden, heightened by the significant differential between this burden and deposit rates. According to the Bank Lending Survey, credit standards for loans for house purchase tightened somewhat in the fourth quarter of 2022 owing to perceived risks associated with the economic situation and outlook. There was also a decline in demand for loans for house purchase, lasting into the first quarter of 2023, owing to falling consumer confidence, current interest rates and prospects for the residential real estate market.

**The stock of loans to firms continued to decelerate following the end of pandemic support measures.** Firms with lower risk or intermediate risk contributed to an increase in the stock of loans to NFCs. In contrast, there was a reduction in the stock associated with riskier firms.

**Banks maintained high liquidity and capital levels in 2022.** The share of funding from the ECB in the funding structure decreased significantly in response to changes in the interest rates applicable to TLTRO III. Customer deposits increased their importance (73.1% of assets), contributing to maintaining the downward trend of the loan-to-deposit ratio (79.2%). However, in the first few months of 2023 there has been a significant reallocation of households' savings into savings certificates, due to their higher return on savings. Despite the issuance of around €3.7 billion in instruments eligible for compliance with MREL in the course of 2022, the share of securities liabilities in total assets remains low (4.1%). The regulatory liquidity ratios, liquidity coverage and net stable funding, stood at high levels (229% and 145% respectively), well above the regulatory minimum of 100%.

**In December 2022, the total capital ratio and the CET1 ratio were of 18.1% and 15.3%.** The decrease in risk-weighted assets counterbalanced the capital reduction associated with the resumption of the dividend distribution, after the interim in the pandemic period, and the loss on securities measured at fair value as a result of the increase in interest rates. However, this component of the securities portfolio has been declining over the past few years and accounts for only 23.5% of the sovereign debt securities portfolio. The weight of Portuguese and Italian sovereign debt decreased, while exposure to Spanish and other issuers' debt continued to increase.

In the current economic and geopolitical environment, it is crucial that institutions pursue prudent policies allowing them to use part of their profits to increase resilience to adverse shocks and continue funding the economy.

## 2.1 Profitability

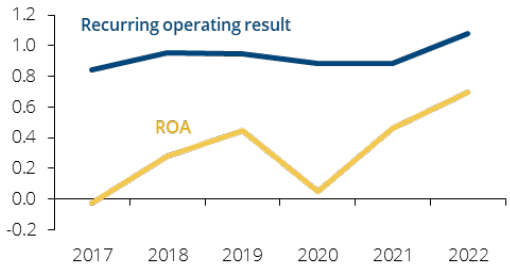
**In 2022, ROA stood at 0.70%, a 0.23 p.p. increase from 2021** (Chart I.2.1). This development largely reflected the increase in net interest income, in an environment marked by a sharp rise in interest rates. Net interest income stood at 1.65% of average assets, up 0.23 p.p. (Table I.2.1).

**International activity increased its contribution to total return, with its net interest income accounting for 0.39% of (total) average assets, up 0.10 p.p.** (Table I.2.2). Non-domestic activity is currently limited to a few countries, of which Poland stands out. This country experienced a record increase in net interest income in 2022, which was however offset by provisioning for legal risks related to Swiss franc mortgage loans and the moratoria on loans for house purchase decided by the Polish government.

**The pick-up in ROA also benefited from a decrease in provision and impairment costs, which were very close to those observed in 2019 and made a positive 0.14 p.p. contribution to the change in ROA.** The reduction in provisions and impairments takes place in most of the system's main institutions and is consistent with the trend observed in the euro area after the pandemic crisis. Despite the significant reduction in credit impairment costs, the NPL coverage ratio increased in 2022 (Section 2.3).

**The increase in the 5th and 95th percentile of the asset-weighted ROA distribution reflects the improvement in profitability for most banks.** ROE rose from 5.4% to 8.8%, peak figures for the last decade.

**Chart I.2.1** • ROA and Recurring operating result | As a percentage of average assets




Source: Banco de Portugal. | Notes: Return on assets (ROA) consists of the net result as a percentage of average assets. Recurring operating result corresponds to net interest income plus net fees and commissions less operational costs. Annualised figures.

**Table I.2.1** • Profitability | As a percentage of average assets

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Net interest income | 1.64 | 1.52 | 1.42 | 1.65 |
| Net fees and commissions | 0.76 | 0.70 | 0.71 | 0.72 |
| Income from financial operations | 0.05 | 0.03 | 0.15 | 0.10 |
| Operating costs | -1.46 | -1.33 | -1.24 | -1.29 |
| Net provisions and impairments | -0.38 | -0.84 | -0.49 | -0.33 |
| Other results | -0.17 | -0.03 | -0.09 | -0.15 |
| ROA | 0.45 | 0.05 | 0.46 | 0.70 |
| *of which:* Recurring operating result | 0.94 | 0.89 | 0.88 | 1.08 |
| ROE | 4.85 | 0.54 | 5.42 | 8.76 |

Sources: ECB and Banco de Portugal. | Notes: (a) Ratio of total capital to risk-weighted assets. (b) Percentiles obtained from the weighted distribution of risk-weighted assets of total capital ratio. (c) Ratio of Common Equity Tier 1 capital to risk-weighted assets. (d) Ratio of risk-weighted assets to total assets. (e) Percentiles obtained from asset-weighted distribution of average risk weigh. (f) September 2022.

Net interest income improved in contrast to the downward trend of the past two years, reflecting the increase in interest on loans granted to the non-financial private sector (NFPS) and on debt securities, especially those issued by general government, mitigated by the rise in interest on deposits, mainly of the NFPS (Table I.2.2). Developments in net interest income mainly reflected a price effect, based on the more significant increase in implicit lending interest rates than in deposit interest rates, 0.40 p.p. and 0.10 p.p. respectively.

**In domestic activity, the pass-through of the rise in interbank market interest rates to deposit interest rates was limited, resulting in significant increases in the spread between interest rates on loans and deposits, new business and outstanding amounts** (Chart I.2.2). In 2022 the interest rate differential on total new business increased by 0.69 p.p. compared with 2021, reflecting increases of 0.91 p.p. and 0.29 p.p. for households and firms respectively. The more subdued growth in NFCs is explained by the faster pass-through of key interest rate hikes to deposit interest rates in this segment, where competition is more intense compared to the household segment. Regarding the interest rate differential on outstanding amounts, the 0.38 p.p. growth was mostly driven by transactions with households (+ 0.42 p.p.).

**Table I.2.2** • Net interest income | As a percentage of average assets

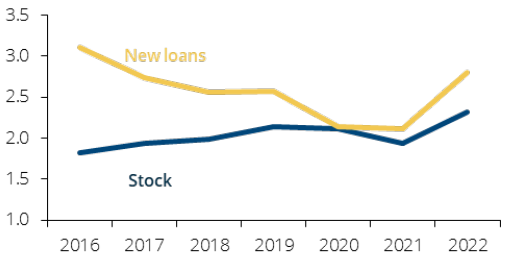
| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Overall activity | 1.64 | 1.52 | 1.42 | 1.65 |
| Derivatives | 0.04 | 0.02 | 0.00 | -0.02 |
| Debt securities | 0.36 | 0.30 | 0.27 | 0.35 |
| Loans | 1.64 | 1.44 | 1.29 | 1.59 |
| *of which:* NFCs | 0.68 | 0.60 | 0.53 | 0.60 |
| *of which:* Households | 0.82 | 0.73 | 0.67 | 0.83 |
| Other assets | 0.02 | 0.00 | 0.00 | 0.03 |
| Deposits | -0.27 | -0.12 | -0.03 | -0.17 |
| Debt securities issued | -0.09 | -0.08 | -0.07 | -0.10 |
| Other liabilities | -0.06 | -0.04 | -0.04 | -0.03 |
| *Memorandum items:* | | | | |
| Domestic activity | 1.29 | 1.23 | 1.12 | 1.26 |
| Non-domestic activity | 0.35 | 0.29 | 0.29 | 0.39 |

Source: Banco de Portugal. | Note: Annualised figures.

**The banking system's operational efficiency continued to develop favourably.** The cost-to-core-income ratio narrowed by 4.0 p.p., to 54.5% (Chart I.2.3). This improvement was mainly due to an increase in net interest income and net fees, with contributions of 7.7 p.p. and 1.3 p.p. respectively. Unlike the past two years, operating costs increased by 9.4% in 2022 (+5.1 p.p. contribution to the cost-to-core-income ratio). This development was mainly due to the increase in staff costs (12.4%) borne by a bank (caused by the financial compensation required by the termination of its pension fund) and was not a cross-cutting feature.

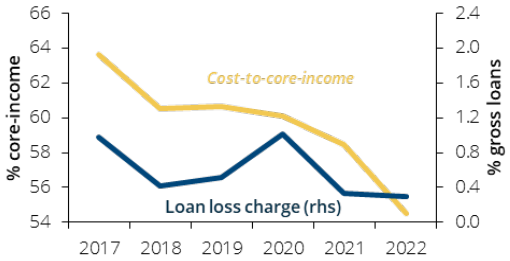
**The flow of provisions and impairments, as a percentage of average assets, continued its downward trend.** The positive effect of the flows of provisions and impairments in ROA was mainly grounded on the decrease in provisions net of reversals (by 0.12 p.p.) observed in 2022 for most institutions in the banking system. The reversal of the base effect of provisions recorded in 2021 by one bank to implement an operational and commercial transformation plan also played a significant part in this evolution of the provision and impairment flow. After reaching higher levels during the pandemic (1.01% in 2020), the loan loss charge continued to decline, reaching 0.29% in 2022, its lowest since 2007, vs. 0.41% in the same period in 2019. This reduction mainly reflected the lower flow of credit impairments, as well as the increase in the loan portfolio.

**Chart I.2.2** • Interest rate spread for the NFPS – Domestic activity | Per cent




Source: Banco de Portugal. | Notes: The non-financial private sector includes NFCs and households. Average annual rates weighted by their respective amounts. The series refers to the reporting on an individual basis of the other monetary financial institutions resident in Portugal.

**Chart I.2.3** • Cost-to-core-income and loan loss charge




Source: Banco de Portugal. | Note: Annualised figures.

In the first three quarters of 2022 the ROA of the Portuguese banking system was above the euro area average (Table I.2.3) and showed an increase of 0.20 p.p., which contrasts with a change of -0.05 p.p. over the same period for the euro area. The Portuguese banking system's profitability continued to be characterised by a greater contribution from net interest income, which rose 0.10 p.p. Contributions from operating costs and from provision and impairment costs were higher than those in the euro area, in absolute terms. Compared to 2019, however, the difference in the contribution from provisions and impairments between Portugal (PT) and the euro area (EA) decreased.

**Table I.2.3** • Profitability – International comparison | As a percentage of average assets

| 2022 Q1-Q3 | PT | EA |
|---|---|---|
| Net interest income | 1.52 | 1.08 |
| Net fees and commissions | 0.71 | 0.63 |
| Income from financial operations | 0.13 | 0.12 |
| Operating costs | -1.21 | -1.15 |
| Net provisions and impairments | -0.25 | -0.16 |
| Other results | -0.25 | -0.10 |
| ROA | 0.66 | 0.42 |
| Recurring operating result | 1.02 | 0.56 |

Sources: ECB (Consolidated Banking Data) and Banco de Portugal. | Note: Annualised figures.

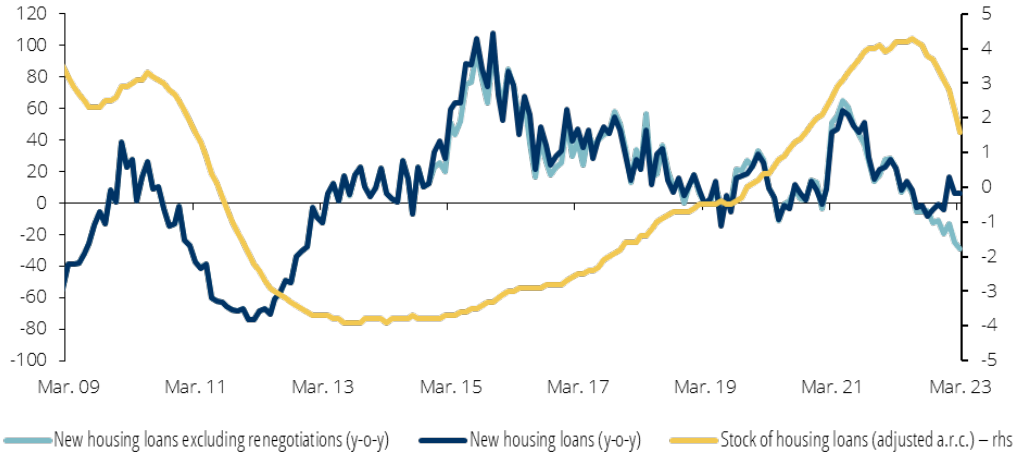
## 2.2 Credit standards

**In 2022 the portfolio of loans to customers (net of impairments) increased by 2.5%**, with loans to households and NFCs contributing 1.8 p.p. and 0.5 p.p. respectively. This change reflected an increase in performing loans (3.1%) and a reduction in non-performing loans (-23.8%). In turn, exposure to debt securities issued by NFCs increased by 2.5%.

**The annual rate of change in the stock of bank loans to households decreased to 1.7% in March 2023, reflecting the stabilisation of consumer loan growth and the slowdown in loans for house purchase** (Chart I.2.4). The stock of loans for house purchase recorded an annual rate of change adjusted for securitisation and loan transfers of 1.6% in March (4.1% in December 2021 and 3.1% in December 2022). The annualised quarterly rate of change, calculated on the basis of seasonally adjusted data and adjusted for securitisation and loan transfers, stood at -1.7% in March 2023 (4.4% in June 2022). The rate not adjusted for securitisation and loan transfers stood at 1.9% in March, below that of the euro area, 3.3%.

**The increase in early amortisations since the end of 2022 contributed to the deceleration in the stock of loans for house purchase**. In particular, the first quarter of 2023 saw an increase in early repayments of loans for house purchase of around 70% compared with the same period in 2022, accounting for 2.6% of the stock of housing loans. This is considered to be a normal development in a context of steep increases in the cost of loans, heightened by the significant spread vs. interest rates paid on deposits, which have increased more gradually.

**Chart I.2.4** • Annual rate of change in the stock of loans for house purchase and year-on-year rate of change in new loans for house purchase | Per cent

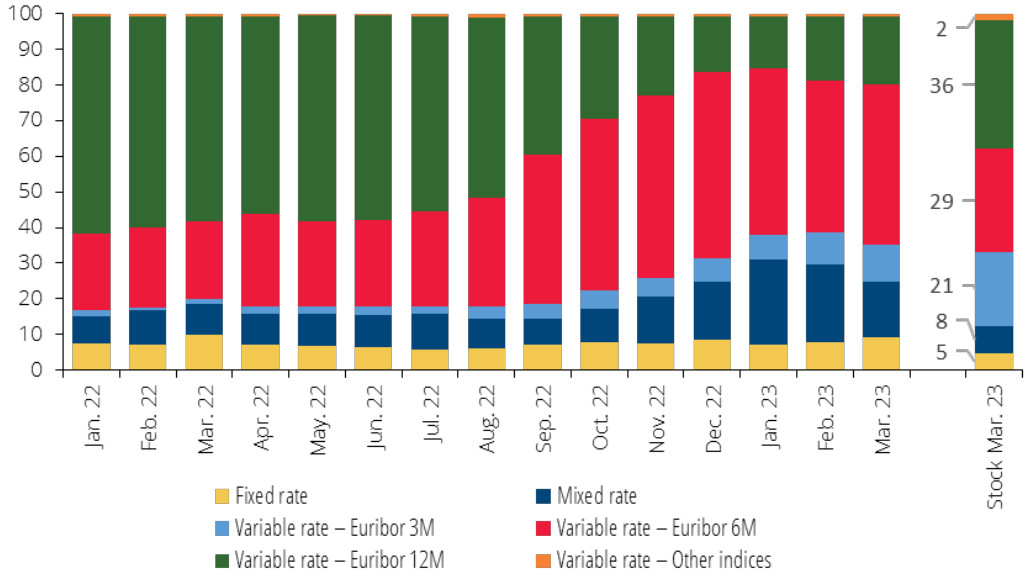



Source: Banco de Portugal. | Notes: Annual rates of change (ARC) are computed referring to end-of-month bank loans' stock changes, adjusted for changes not defined as transactions, namely, reclassifications, write-offs and exchange rate and price revaluations. Additionally, the adjusted ARC is also adjusted for securitisation and loan transfers.

**New loans for house purchase continued to increase in 2022 but fell from mid-2022 onwards compared with the same period of 2021.** New loans for house purchase (excluding renegotiations) fell by 5.3% and 14.7% year on year, in the third and fourth quarters of 2022 respectively. This fall worsened in the first quarter of 2023 (-23.1% year on year). However, the volume of new loans remained higher than in the same months of 2019. The contraction in new loans for house purchase was more pronounced in the euro area. In the third and fourth quarters of 2022, new loans for house purchase decreased by 13.3% and 25.3% year on year respectively. In March 2023, the average interest rate (AAR - annualised agreed rate) on new loans for house purchase stood at 3.6%, 0.3 p.p. above the euro area average and 2.8 p.p. higher than the rate recorded in Portugal at the end of 2021. The annual percentage rate of charge (APRC), which includes charges other than interest, has also been rising. Comparing March 2023 with 2022, the APRC on loans for house purchase increased by 3 p.p., standing at 5.4%, 1.7 p.p. above the euro area average.

**New fixed or mixed rate loans for house purchase have increased recently, accounting for 30% of the amount of new loans in the first quarter of 2023.** Lending for house purchase with a fixed or mixed interest rate differs across credit institutions. For some banks, the share of new housing loans with fixed or mixed interest rates was residual, while for other banks it accounted for more than 70% of new business, mainly in the case of the mixed rate and with an initial rate fixation period of over five years (Box 1). Yet, the stock of loans for house purchase with variable interest rates is still predominant (around 90%). More recently, the 6-month reference rate has become more important in new loans than the 12-month rate (Chart I.2.5).

**Chart I.2.5** • Monthly flow of new loans and stock of loans for house purchase by type of rate and reference rate | Per cent

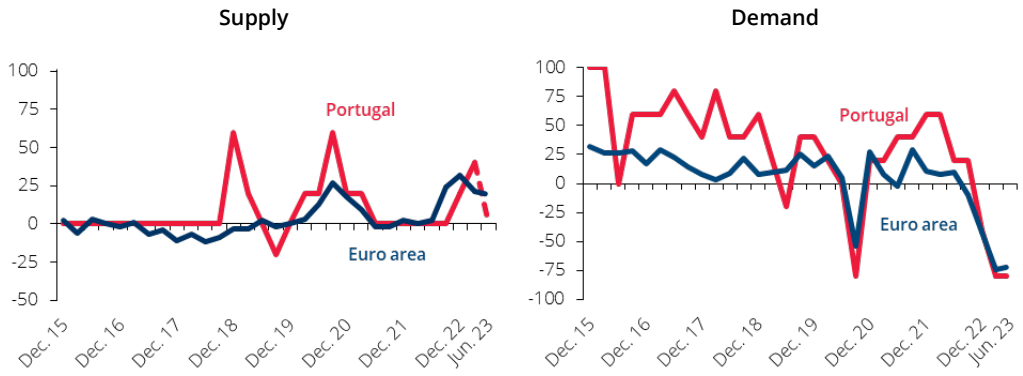



Source: Banco de Portugal. | Notes: Classification of the mixed rate is based on the date the contract is signed, when a fixed rate period is in force that differs from one contract to another. The share of mixed rate stock may include contracts that are already in the floating rate period or close to the end of the fixed rate period.

**New consumer loans increased by 19.9% in 2022 (11.1% in 2021), though consumer credit stock growth decelerated from September onwards, with the annual rate of change standing at 4.6% in March 2023.** For twelve months to March 2023, the average interest rate and the APRC on consumer loans increased by 0.7 p.p. and 0.8 p.p. to stand at 8.5% and 10.4% respectively (7.1% and 7.9% in the euro area). In contrast to loans for house purchase, most consumer credit agreements have a fixed interest rate. As at March 2023, variable rate contracts accounted for only 20% of consumer credit stock.

**Credit standards for loans to households became slightly tighter in the fourth quarter of 2022 and remained broadly unchanged in the first quarter of 2023,** according to the January and May 2023 Bank Lending Survey (Chart I.2.6). In the fourth quarter of 2022, credit standards for loans for house purchase became slightly tighter, due to perceived risks associated with the economic situation and outlook, while credit standards for consumption and other purposes remained broadly unchanged. In turn, there was a substantial decline in demand for loans for house purchase in both periods due to falling consumer confidence, current interest rates and prospects for the residential real estate market. In the second quarter of 2023, banks anticipated slightly tighter credit standards on loans to households and a decline in demand for housing loans. Housing loans demand also fell in the euro area, and banks' increased risk perception translated into a tightening of consumer loans and loans for house purchase in the fourth quarter of 2022 and in the first quarter of 2023. Banks expected this trend to continue into the second quarter of 2023.

**Chart I.2.6** • Housing loans supply and demand | Net percentage




Sources: Banco de Portugal and ECB. | Notes: An increase (decrease) in the net percentage means tighter (looser) credit standards by institutions and an increase (decrease) in demand in the credit segment. The last observation for each variable corresponds to the expectations of the institutions for the second quarter of 2023 (dashed part).

**The stock of bank loans to NFCs increased by 0.6% in 2022.** In turn, the annual rate of change in the euro area amounted to 5.5%. Developments in Portugal were heterogeneous by firm size, with micro-enterprises continuing to grow significantly (6.7%), as opposed to decreases in small and medium-sized enterprises (by around 2%) (Table I.2.4). Sectoral increases stand out in the real estate and wholesale and retail trade sectors, as does the decrease in the accommodation and food services sector. In addition, the growth of loans to the sectors potentially most affected by rising energy and/or commodities costs was relatively contained, at 0.9% (unadjusted year-on-year rate of change), down from 7.8% in 2021. In the first quarter of 2023 the stock of loans to NFCs declined by 1% (up 4.5% in the euro area).

**According to the Bank Lending Survey, interest rates contributed to a decrease in loan demand from firms in the fourth quarter of 2022 and the first quarter of 2023** (Chart I.2.7). The increase in NFCs' cost of financing had an impact on the demand profile. Banks reported a reduction in investment financing needs and, conversely, an increase in financing needs for inventories and working capital.

**In the last quarter of 2022, when interest rates grew more strongly (1.3 p.p. compared to September), there was a slight reduction in the average original maturity, which continued in the first half of 2023, consistent with the change in demand profile** (Chart I.2.8). In March 2023, the stock of loans with an original maturity of up to one year accounted for 12%, while over five years represented 67% of the total (compared to 22% and 56% respectively in 2019). The average maturity of the stock of loans was 5.6 years, with small and medium-sized enterprises recording a higher value than large firms (5.7 vs. 3.9 years).

**With interest rates rising, the average borrowed amount of outstanding loans remained stable, standing at €159 billion in March 2023.** However, the average amount for large enterprises decreased by around 5% compared to 2021 to €471 thousand.

**According to the Bank Lending Survey, credit standards for loans to firms by Portuguese banks tightened in 2022 and in the first quarter of 2023.** Long-term loans to SMEs tightened in the last two quarters of 2022 as well as in energy-intensive industries, construction and commercial real estate activities. In turn, in the first quarter of 2023 the tightening was cross-cutting by firm size. The risks associated with the economic situation and outlook, as well as with specific firms or sectors, are relevant factors for this. These factors are also those identified as most relevant in the case of the euro area, which also experienced a tightening of credit standards.

**For the second quarter of 2023, banks expect a tightening of credit standards for NFCs, in particular for SMEs, and a decline in demand**. A tightening of credit standards is also expected in

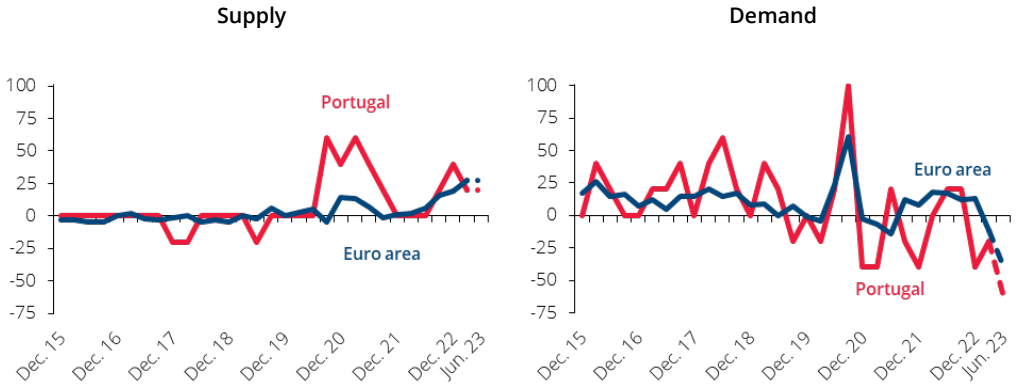
the euro area. Banks expect demand to decline further, especially for long-term loans and loans to small and medium-sized enterprises, owing to reduced financing needs for investment and interest rates.

**Table I.2.4** • Annual rate of change of loans to NFCs – domestic activity | Per cent

| | Dec. 17 | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 | Mar. 23 |
|---|---|---|---|---|---|---|---|
| Euro area | 2,0 | 2,9 | 2,6 | 6,5 | 3,8 | 5,5 | 4,5 |
| Portugal | -2,0 | 0,2 | 0,4 | 9,7 | 4,2 | 0,6 | -1,0 |
| Microenterprises | 0,5 | 4,5 | 6,2 | 13,9 | 7,7 | 6,7 | 5,9 |
| Small-sized enterprises | 0,8 | -1,9 | -1,1 | 13,3 | 4,2 | -2,4 | -3,4 |
| Medium-sized enterprises | -6,5 | -3,4 | -1,9 | 6,1 | 2,1 | -2,3 | -3,1 |
| Large enterprises | -4,0 | 0,6 | -3,1 | 3,8 | 2,1 | 0,7 | -5,4 |
| Industry | 0,8 | 3,7 | 0,1 | 9,6 | 10,3 | 1,9 | -2,2 |
| Trade | 1,6 | -2,2 | 2,2 | 9,5 | 5,1 | 5,5 | 4,5 |
| Transportation and storage | -10,6 | -3,1 | -9,3 | 0,4 | 0,1 | -2,5 | -2,6 |
| Accommodation and food services | 2,6 | 4,8 | 2,3 | 25,3 | 7,6 | -6,7 | -7,6 |
| Construction | -6,6 | -4,5 | -2,0 | 7,6 | -0,4 | 0,3 | -1,1 |
| Real estate activities | 5,9 | 0,4 | 5,3 | 3,6 | 0,2 | 7,0 | 7,5 |
| Portugal [a] | -0,1 | 1,7 | 1,1 | 10,0 | 4,5 | 0,1 | -1,0 |

Source: Banco de Portugal. | Notes: Annual rates of change are computed referring to end-of-month bank loans' stock changes, adjusted for changes not defined as transactions, namely, reclassifications, write-offs and exchange rate and price revaluations. They refer to loans granted by resident monetary financial institutions to resident NFCs. Industry, accommodation and food services and trade correspond respectively to the following sectors: "Manufacturing and Mining and quarrying", "Accommodation and food service activities" and "Wholesale and retail trade; repair of motor vehicles and motorcycles". (a) Series adjusted for loan transfers.

**Chart I.2.7** • Credit supply and demand of NFCs | Net percentage




Sources: ECB and Banco de Portugal. | Notes: An increase (decrease) in the net percentage means tighter (looser) credit standards by institutions and an increase (decrease) in demand in the credit segment. The last observation for each variable corresponds to the expectations of the institutions for the second quarter of 2023 (dashed part).

**New bank loans to NFCs increased by 5.9% in 2022, following the reduction observed in 2021 (- 37.9%).** The reduction observed in 2021 followed a situation of stronger growth of new loans at the onset of the pandemic. In March 2023, on the basis of new loans recorded in the previous 12 months, new loans to NFCs increased by 8.2% year on year.

**The proportion of new loans with an interest rate fixation period of over one year decreased by 1.3 p.p. to 18.1% (16.8% in March 2023).** By comparison, in 2022 fixed rate loans represented 16.1% of the stock, a 0.9 p.p. increase compared to 2021. New loans with longer interest rate fixation periods limit firms' exposure to the impact of interest rate hikes.

**The majority of new loans in 2022 and in the first quarter of 2023 were granted to firms in the lower-risk class and intermediate risk class** (Table I.2.5). The proportion of new business for firms in the lower-risk class increased by around 3 p.p. in 2022 and the increase was broadly based across all firm sizes, except micro-enterprises. By sector of activity there was also heterogeneity, with increases in the proportion of exposures of lower-risk firms in trade, construction and real estate activities and the relative stabilisation of the share of new business across risk classes in the manufacturing sector.

**Of the stock of loans to NFCs, around 80% was associated with the two lower risk classes.** The weight of the lower risk class increased in 2022, as opposed to reductions in the weight of the stock associated with intermediate and riskier firms.

**Table I.2.5** • Loans to NFCs by risk class | Per cent

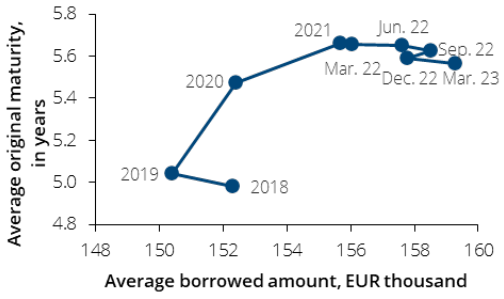
| | | Class 1 (low risk) | Class 2 | Class 3 (high risk) |
|---|---|---|---|---|
| New business | 2019 | 48 | 36 | 16 |
| | 2020 | 53 | 33 | 14 |
| | 2021 | 45 | 38 | 17 |
| | 2022 | 48 | 36 | 16 |
| | 2023 Q1 | 47 | 36 | 17 |
| Stock of loans | Dec. 19 | 38 | 38 | 24 |
| | Dec. 20 | 40 | 37 | 22 |
| | Dec. 21 | 37 | 41 | 22 |
| | Dec. 22 | 43 | 38 | 19 |
| | Mar. 23 | 43 | 38 | 19 |

Source: Banco de Portugal. | Notes: Exposure of loans to NFCs and new loans to NFCs according to the Central Credit Register. Credit risk, as measured by probability of default (PD), is based on credit ratings available from the In-house Credit Assessment System (ICAS) of Banco de Portugal. New business refers to new business of enterprises with available credit risk information. Lower risk class (risk class 1) corresponds to the enterprises with a PD in one year of 1% or less; risk class 2 corresponds to enterprises with a PD in one year of above 1% and below or equal to 5% and the higher risk class (risk class 3) corresponds to the enterprises with a PD in one year of above 5%.

**Interest rates on new loans to NFCs have followed an upward path since April 2022, reaching 4.2% in December (4.9% in March 2023)** (Chart I.2.9). The interest rate change was 2.9 p.p. for Portugal and 2.7 p.p. for the euro area between December 2021 and March 2023. The average *spread* on new business increased from the second quarter of 2022 onwards, reaching 2.0% in the fourth quarter of 2022 (Table I.2.6). In the Bank Lending Survey, banks identified tightening via a slight spread increase since the third quarter of 2022. They also refer to the application of more restrictive loan covenants. Still, reflecting the effect of new loans, renegotiations and maturing loans, the average spread on the stock of loans decreased slightly to 1.98% in March 2023 (- 0.12 p.p. compared to December 2021).

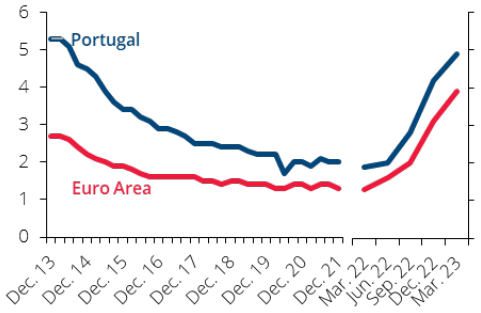
**The increase in the average spread on new loans to NFCs from the second quarter of 2022 onwards was most pronounced in the higher risk class but reversed in the first quarter of 2023** (Table I.2.5). The differentiation of the average spread between risk classes remained stable for the intermediate risk class and showed some variability in the higher risk class, reflecting a seasonal pattern. In stock, the average spread across different risk classes remained unchanged.

**Chart I.2.8** • Average original maturity and average borrowed amount of stock of loans to NFCs – domestic activity




Source: Banco de Portugal. | Note: Information from the Central Credit Register (CCR).

**Chart I.2.9** • Interest rate on new loans to NFCs | Per cent




Sources: ECB and Banco de Portugal. | Notes: Interest rate quarterly average weighted by the amounts of new loans. Interest rates on new loans granted by monetary financial institutions resident in Portugal (excluding the central bank) to residents in the euro area. Activity on an individual basis.

**Table I.2.6** • Average spread on stock and new loans to NFCs by risk class | Per cent

| | 2021 Q2 | 2021 Q3 | 2021 Q4 | 2022 Q1 | 2022 Q2 | 2022 Q3 | 2022 Q4 | 2023 Q1 |
|---|---|---|---|---|---|---|---|---|
| Stock | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 |
| Risk class 1 (low risk) | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| Class 2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 |
| Risk class 3 (high risk) | 2.9 | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 |
| New business | 1.9 | 2.1 | 2.0 | 1.8 | 1.7 | 1.8 | 2.0 | 1.9 |
| Risk class 1 (low risk) | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 | 1.5 | 1.5 | 1.5 |
| Class 2 | 2.1 | 2.3 | 2.2 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 |
| Risk class 3 (high risk) | 2.3 | 2.4 | 2.6 | 2.4 | 2.0 | 2.3 | 2.8 | 2.3 |

Source: Banco de Portugal. | Notes: Information from the Central Credit Register (CCR). Spread on variable rate loans. Amount-weighted figures.

## **2.3** Credit quality of assets

**Despite the increase in interest rates since July 2022, there was no deterioration in loan quality until the end of the year.** The share of non-performing loans in the total portfolio continued the downward trend observed in recent years. The gross NPL ratio stood at 3.0% (Table I.2.7), down by 0.7 p.p. from December 2021. This development reflected the decrease in unlikely-to-pay non-performing loans (0.4 p.p. contribution) and loans more than 90 days past due (0.3 p.p. contribution), amid a relative stabilisation of performing loans. The heterogeneity of the banking system's institutions decreased and the spread vis-à-vis the euro area median continued to decline, standing at 1.3 p.p.

**In loans to NFCs, the gross NPL ratio decreased by 1.7 p.p. to 6.5%.** This was mostly driven by a decline in non-performing loans, with a strong contribution from cures (Table I.2.8). In loans to sectors most affected by energy and other commodity price increases (44.7% of total loans to NFCs), the ratio remained slightly above the average for NFCs, at 6.9% (-1.9 p.p.).

**For loans to households, the gross NPL ratio stood at 2.3%, down by 0.5 p.p.** The decline in non-performing loans and the increase in performing loans (the denominator effect) contributed 0.4 p.p. and 0.1 p.p. respectively to these developments. Despite the decrease in NPLs mainly through write-offs and sales, there was an increase in new NPLs, net of cures. In loans to

households for house purchase and for consumption and other purposes, gross NPL ratios stood at 1.1% (-0.4 p.p.) and 6.9% (-0.6 p.p.) respectively.

**Table I.2.7** • Gross NPL ratio | Per cent

| | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Total gross NPL ratio[a] | 9.4 | 6.2 | 4.9 | 3.7 | 3.0 |
| Percentile 5[b] | 3.2 | 2.2 | 2.0 | 1.5 | 0.9 |
| Percentile 95[b] | 22.6 | 11.8 | 9.4 | 6.4 | 4.6 |
| Non-financial private sector | 10.5 | 7.0 | 5.8 | 4.9 | 3.9 |
| Non-financial corporations | 18.5 | 12.3 | 9.7 | 8.1 | 6.5 |
| More affected sectors: | | | | | |
| By energy/commodities price increases[c] | 14.3 | 11.1 | 9.6 | 8.8 | 6.9 |
| Households | 5.1 | 3.7 | 3.4 | 2.8 | 2.3 |
| House purchase | 3.8 | 2.4 | 2.0 | 1.6 | 1.1 |
| Consumption and other purposes | 10.5 | 8.2 | 8.5 | 7.5 | 6.9 |
| Euro area median | 3.1 | 2.9 | 2.5 | 2.0 | 1.7[d] |

Sources: ECB and Banco de Portugal. | Notes: (a) Corresponds to the ratio between the gross value of NPLs and the total gross value of loans. Includes loans and cash balances at central banks and credit institutions, loans to the general government, other financial corporations, non-financial corporations and individuals. (b) Percentiles were obtained from the distribution of the gross NPL ratio weighed by total loans. (c) The sectors most affected by energy and/or other commodity price increases correspond to the CAE sections in which the stock of loans granted to the CAE subclasses as defined in Box 4 in the June 2022 issue of the Financial Stability Report, accounted for, in December 2022, at least around 50% of total exposure of the respective section. (d) September 2022.

**Table I.2.8** • Gross NPL ratio – contributions to the change

| | Total | NFC | Households |
|---|---|---|---|
| Gross NPL ratio, Dec. 2021 (%) | 3.7 | 8.1 | 2.8 |
| Write-offs (p.p.) | -0.30 | -0.38 | -0.30 |
| NPL sales (p.p.) | -0.21 | -0.27 | -0.21 |
| New NPL, net of cures (p.p.) | -0.15 | -0.84 | 0.12 |
| Other denominator effects (p.p.) | -0.01 | -0.17 | -0.09 |
| Gross NPL ratio, Dec. 2022 (%) | 3.0 | 6.5 | 2.3 |

Source: Banco de Portugal. | Notes: NPL sales include securitisations. The 'New NPLs, net of cures' item reflects all the other NPL inflows and outflows, including new NPLs net of cures, amortisations and foreclosures. Other denominator effects reflect changes in the stock of loans that are not related to the NPL stock (e.g. net flow of performing loans).

In 2022 there was an increase in NPL impairment coverage. The proportion of impairments in total non-performing loans stood at 55.4% (+2.9 p.p.), 12.2 p.p. higher than the euro area median (Table I.2.9). The evolution of the ratio reflected a higher decrease in NPLs than accumulated impairments, mainly in loans to NFCs in the sectors most affected by energy and other commodity price increases (ratio of 91.5%, +10.2 p.p.) and to households for housing (ratio of 40.4%, +7.7 p.p.).

**The proportion of NPLs net of impairments in total loans was close to the median of the euro area ratio.** The NPL ratio net of impairments came at 1.3% and the differential to the median ratio in the euro area narrowed (0.9%). In the segments of loans to NFCs and households, the ratios decreased to 2.9% (-1.0 p.p.) and 1.1% (-0.3 p.p.) respectively.

**Table I.2.9** • Gross NPL impairment coverage ratio | Per cent

| | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Gross NPL impairment coverage ratio[a] | 52.0 | 51.5 | 55.0 | 52.5 | 55.4 |
| Percentile 5[b] | 41.5 | 35.7 | 35.3 | 32.6 | 40.3 |
| Percentile 95[b] | 57.2 | 71.1 | 75.7 | 65.1 | 74.9 |
| Non-financial corporations | 56.5 | 56.5 | 56.4 | 53.2 | 55.9 |
| Most affected sectors: | | | | | |
| By energy/commodities price increases[c] | 59.2 | 65.4 | 78.5 | 81.3 | 91.5 |
| Households | 40.7 | 42.3 | 50.3 | 51.0 | 55.1 |
| House purchase | 27.1 | 26.3 | 30.6 | 32.7 | 40.4 |
| Consumption and other purposes | 59.8 | 58.8 | 66.2 | 64.9 | 64.1 |
| Euro area median | 43.7 | 43.2 | 42.9 | 42.0 | 43.2[d] |
| *Memorandum items:* | | | | | |
| NPL ratio net of impairments[e] | 4.5 | 3.0 | 2.2 | 1.7 | 1.3 |
| Euro area median | 1.9 | 1.4 | 1.5 | 1.0 | 0.9[d] |

Sources: ECB and Banco de Portugal. | Notes: (a) Corresponds to the ratio between the accumulated impairments on NPLs and the gross value of NPLs. (b) Percentiles were obtained from the distribution of the NPL impairment coverage ratio weighed by total NPL. (c) The sectors most affected by energy and/or other commodity price increases correspond to the CAE sections in which the stock of loans granted to the CAE subclasses as defined in Box 4 in the June 2022 issue of the Financial Stability Report, accounted for, in December 2022, at least around 50% of total exposure of the respective section. (d) September 2022. (e) Corresponds to the ratio of NPLs net of impairments to total gross loans.

**The proportion of restructured loans in total loans continued the downward trend that started in 2017.** The forborne loans ratio decreased by 0.4 p.p. from the end of 2021, to 3.4%, mainly reflecting the decrease in the NPL component of forborne loans (Table I.2.10). In loans to NFCs and households, the indicator stood at 6.3% (-1.3 p.p.) and 2.7% (-0.3 p.p.) respectively.

**In 2022, the share of loans classified as stage 2 decreased, although it is higher than that recorded at the end of 2019.** The ratio of stage 2 loans stood at 10.3%, down by 1.4 p.p. From the end of 2021 (Table I.2.11). In loans to NFCs, the ratio stood at 16.0% (-2.8 p.p.). As to loans to households, the ratio decreased to 8.1% (-0.4 p.p.), as justified by developments in the housing segment. The impairment coverage ratio of total stage 2 loans remained on an upward trend and reached 6.9%.

**Table I.2.10** • Forborne loans ratio | Per cent

| | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Total forborne loans ratio[a] | 7.1 | 5.2 | 4.7 | 3.8 | 3.4 |
| *of which:* NPLs | 4.9 | 3.2 | 2.6 | 2.0 | 1.6 |
| Non-financial corporations | 13.7 | 10.3 | 9.4 | 7.6 | 6.3 |
| Households | 4.0 | 3.1 | 3.2 | 3.0 | 2.7 |
| House purchase | 3.5 | 2.8 | 2.7 | 2.6 | 2.3 |
| Consumption and other purposes | 6.0 | 4.3 | 4.9 | 4.5 | 4.1 |
| *Memorandum items:* | | | | | |
| Forborne loans impairment coverage ratio[b] | 37.6 | 34.5 | 34.0 | 33.1 | 31.6 |

Source: Banco de Portugal. | Notes: (a) Corresponds to the ratio of total gross loans with forbearance measures to total gross loans. (b) Corresponds to the ratio of accumulated impairments of loans with forbearance measures to total gross loans with forbearance measures.

**Table I.2.11** • Stage 2 loans ratio | Per cent

| | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Stage 2 loans ratio[a] | 10.1 | 9.4 | 11.2 | 11.6 | 10.3 |
| Non-financial corporations | 13.1 | 12.6 | 18.6 | 18.8 | 16.0 |
| Households | 8.6 | 7.7 | 7.8 | 8.5 | 8.1 |
| House purchase | n.a. | n.a. | 7.0 | 7.9 | 7.4 |
| Consumption and other purposes | n.a. | n.a. | 10.5 | 10.7 | 10.8 |
| SSM – significant institutions[b] | n.a. | n.a. | 9.3 | 9.1 | 9.8[c] |
| *Memorandum items:* | | | | | |
| Stage 2 loans coverage ratio[d] | 3.7 | 5.0 | 6.1 | 6.6 | 6.9 |

Sources: European Banking Authority and Banco de Portugal. | Notes: (a) Corresponds to the ratio of total gross stage 2 loans to total gross loans. (b) The stage 2 loan ratio for all 111 significant institutions (SIs) participating in the Single Supervisory Mechanism. (c) September 2022. (d) Corresponds to the ratio of accumulated impairments to the gross value of stage 2 loans.

Despite positive developments in credit quality indicators of the assets in 2022, some uncertainty about the potential impacts of the sharp rise in interest rates and the still high level of inflation remains. Due to the potential materialisation of credit risk for firms and households, it is important that institutions continue to manage credit risk proactively and try to identify credit agreements that require tailoring loan conditions to borrowers' debt servicing capacity, through renegotiation and restructuring.

## **2.4** Concentration of exposures

**The banking system's assets decreased by 0.5% in 2022, reversing the upward trend observed in recent years.** This reduction occurred despite the increase in loans to customers and mainly reflected the decline in cash balances at central banks (Table I.2.12). It cannot be separated from the reduction in funding obtained from central banks (section 2.5).

**Table I.2.12** • Banking system assets, year-on-year rate of change and contributions

| | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Assets (EUR billions) | 384 | 390 | 412 | 445 | 442 |
| Assets (year-on-year rate of change) | 0.9 | 1.5 | 5.5 | 8.0 | -0.5 |
| Cash balances at central banks | 0.1 | 1.4 | 3.1 | 6.7 | -2.7 |
| Loans to credit institutions | -0.2 | 0.3 | -0.3 | 0.1 | 0.3 |
| Loans to customers | -0.3 | 0.8 | 1.2 | 2.4 | 1.4 |
| Debt securities | 2.4 | 0.9 | 1.6 | 0.1 | 0.0 |
| Equity instruments | -0.6 | -0.3 | -0.1 | -0.1 | -0.2 |
| Other assets | -0.5 | -1.5 | 0.1 | -1.0 | 0.8 |

Source: Banco de Portugal. | Notes: "Other assets" include cash, loans to central banks, cash balances, cash balances at other credit institutions, derivatives, tangible assets and intangible assets and other assets.

**Exposure to real estate increased to 34.7% of assets in 2022** (Table I.2.13). Loans to households secured by real estate and, to a lesser extent, loans to NFCs in the construction and real estate activities sectors were the main contributors to the 1.4% change in this exposure. Conversely, loans to NFCs secured by real estate (excluding the construction and real estate activities sectors) and direct exposure to real estate owned decreased. Loans to households secured by real estate continued to account for the largest share in assets (26%).

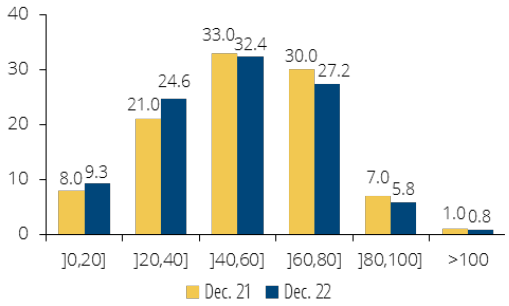
**The loan portfolio for house purchase continues to be able to accommodate a potential fall in residential real estate prices without incurring large losses.** In 2022 the share of loans with the highest loan-to-value (LTV) ratio declined slightly (Chart I.2.10). At the end of the year, about 94% of the stock of loans to households for house purchase had an LTV of 80% or less.

**Table I.2.13** • Exposure to real estate | As a percentage of assets

| | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Loans to households collateralised by RE | 27.5 | 27.1 | 26.1 | 25.1 | 26.0 |
| Loans to NFCs of construction and RE activities [(a)] | 5.1 | 4.9 | 4.6 | 4.0 | 4.2 |
| Loans to NFCs collateralised by RE[(b)] | 3.5 | 3.5 | 3.5 | 3.4 | 3.2 |
| Real estate funds[(c)] | 1.3 | 1.1 | 1.0 | 0.9 | 0.8 |
| Real estate owned[(d)] | 1.5 | 1.1 | 0.9 | 0.6 | 0.4 |
| Total | 38.9 | 37.8 | 36.0 | 34.1 | 34.7 |

Source: Banco de Portugal. | Notes: (a) Not excluding loans granted to projects not related to the real estate sector, such as public works. (b) Excluding loans to NFCs in the construction and real estate activities sectors. (c) Including loans and mutual funds shares. (d) Gross values.

**Chart I.2.10** • Current LTV of housing loan stock | As a percentage of the portfolio




Source: Banco de Portugal. | Notes: Indicator based on granular data at the loan level (Central Credit Register). Whenever the date of the last valuation of the property is prior to 2022 Q3, its current value is estimated using Statistics Portugal Housing Price Index.

**As regards exposure to the sovereign, the sovereign debt securities portfolio accounted for 14.6% of assets at the end of 2022, down by 0.2 p.p. from 2021** (Table I.2.14). This change reflected a reduction in debt securities measured at fair value (-47,5%), in a context of a rise in securities valued at amortised cost (34,3%) and a decrease in assets. The share of sovereign debt securities in assets varies between institutions, with the 10$^{th}$ and 90$^{th}$ percentiles standing at 5% and 22% respectively.

**The sovereign debt securities portfolio component value at amortised cost increased to 11.1% of the assets, now accounting for 76.5% of the portfolio.** In addition, heterogeneity across institutions declined significantly in the weight of this component. This was mainly due to the increase in the 10$^{th}$ percentile, from 6.0% to 65.5% (90$^{th}$ percentile from 88.8% to 96.6%). A larger component of the portfolio valued at amortised cost decreases exposure to market risk, as changes in yields only affect the value of this instrument in case of sale. Note, however, that these securities are recorded at market value for regulatory liquidity ratio purposes.

**Table I.2.14** • Sovereign debt securities by portfolio

| | Dec. 17 | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|---|
| % assets | | | | | | |
| Total | 13.7 | 15.3 | 15.5 | 16.2 | 14.8 | 14.6 |
| At amortised cost[(a)] | 2.2 | 4.9 | 5.4 | 7.6 | 8.3 | 11.1 |
| At fair value[(b)] | 11.5 | 10.4 | 10.1 | 8.6 | 6.5 | 3.4 |
| % portfolio | | | | | | |
| At amortised cost[(a)] | 16.2 | 32.3 | 35.0 | 46.8 | 56.0 | 76.5 |
| At fair value[(b)] | 83.8 | 67.7 | 65.0 | 53.2 | 44.0 | 23.5 |

Source: Banco de Portugal. | Notes: (a) Including debt securities recorded in assets held to maturity and other accounts receivable (IAS39), as well as amortised cost (IFRS9). (b) Including debt securities held for trading (IAS39), as well as debt securities at fair value through Other Comprehensive Income (IFRS9), debt securities recorded as held for trading and at fair value through profit or loss (IAS39/IFRS9), as well as non-trading assets at fair value through results (IFRS9).

**Alongside the change in the management model, exposure to sovereign debt securities has seen a shift in the portfolio in terms of geographical counterparty.** Based on information from domestic activity (which accounted for 90% of the total), the share of Portuguese public debt decreased by 0.8 p.p., to 5.6% of assets (42% of exposure). While the share of domestic sovereign debt securities in Portugal was on a gradually declining path, it remained higher than that observed in the euro area (2.7% of assets). At the same time, there continued to be a reduction in exposure to Italian debt, an

increase in exposure to Spanish and other issuers' debt, highlighting representativity as a percentage of assets: France, Ireland, Belgium, the United States and the European Commission (Table I.2.15).

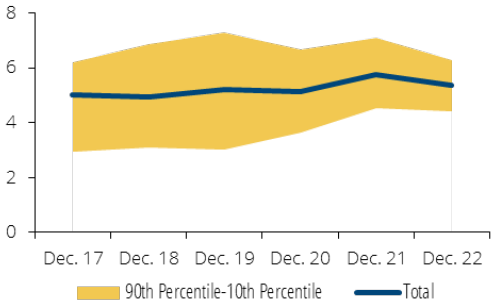
**In 2022, the average residual maturity of sovereign debt securities of the banking system's main institutions decreased from 5.8 to 5.4 years** (Chart I.2.11). This decrease reflected the decline in the share of debt securities with original maturity of more than two years. The shorter average duration of the portfolio contributes to a lower sensitivity of the value of debt securities to market fluctuations. However, despite the decline in residual maturity across the main banks, there is heterogeneity across institutions (10th and 90th percentiles of 4.4 and 6.3 years respectively).

**Table I.2.15** • Sovereign debt securities – domestic activity | As a percentage of assets

| | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Total | 13.1 | 13.7 | 14.6 | 13.5 | 13.4 |
| Portugal | 8.8 | 8.0 | 8.0 | 6.4 | 5.6 |
| Spain | 2.1 | 2.5 | 3.3 | 3.3 | 3.5 |
| Italy | 1.6 | 2.3 | 2.4 | 2.0 | 1.3 |
| Other | 0.6 | 0.9 | 1.0 | 1.7 | 3.1 |
| o.w. France | 0.2 | 0.2 | 0.2 | 0.5 | 1.1 |
| o.w. Ireland | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 |
| o.w. Belgium | 0.0 | 0.0 | 0.0 | 0.2 | 0.4 |
| o.w. USA | 0.2 | 0.1 | 0.1 | 0.2 | 0.3 |
| o.w. European Commission | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |

Source: Banco de Portugal. | Notes: The series refers to the reporting on an individual basis of the other monetary financial institutions resident in Portugal. Exposure by country is expressed as a percentage of other monetary financial institutions' total assets.

**Chart I.2.11** • Residual maturity of sovereign debt securities – domestic activity | In years




Source: Banco de Portugal. | Notes: The series refers to the reporting on an individual basis of the other monetary financial institutions resident in Portugal. Figures for the banking system's main institutions.

**Direct interlinkages between banks and the financial system continued to decrease in 2022.** Banks' exposure to assets (deposits, debt securities, loans, shares and other investment fund holdings and listed shares) that have as their counterpart the different financial system sub-sectors stood at 14.3% (14.9% in 2021). The decline from 2.0% to 1.4% in debt securities to other financial intermediaries (excluding investment funds) was the main driver of the aforementioned decrease. Conversely, there was a 0.2 p.p. increase in exposure between resident banks due to the increase in currency and deposits, which remains the most relevant component (10.8% of assets). The reduction in direct interlinkages in the domestic financial sector observed in recent years will tend to mitigate the transmission and the amplification potential of shocks impacting the sector.

**From a financial stability perspective, it is also important to assess the banking system's exposure to individual customers or large groups of linked customers (economic groups), in particular those with a high level of indebtedness.** The relative importance of economic groups with a high level of indebtedness decreased significantly between 2017 and 2021. In terms of banks' exposure, the average exposure ratio as a percentage of Tier 1 capital to economic groups with a high level of indebtedness shows no substantial difference to the average for all economic groups (Box 2).

## 2.5 Financing and liquidity

**Portuguese banks maintained high levels of liquidity.** At the end of 2022, the share of funding from the Eurosystem in the funding structure of the banking system decreased significantly. In response to the changes in the rates on TLTRO III loans, which have been indexed to the evolution of the key interest rates since 23 November (thus changing the reference period for determining the

rate), the banks repaid part of those loans early, standing at the lowest level in the last decade, i.e. 3.6% of average assets, 5.8 p.p. less than in 2021. The share of cash and cash balances at central banks in average assets also decreased, standing at 12.2% (-2.2 p.p.). For most of the main institutions of the Portuguese banking system, these investments exceeded the resources obtained from central banks.

**Customer deposits increased their preponderance in the funding structure of the banking system.** At the end of 2022, customer deposits increased by 6.2%, accounting for 73.1% of assets, with contributions of 2.5 p.p. and 4.0 p.p. from NFCs and households respectively. The ratio of loans to customers net of impairment to customer deposits (loan-to-deposit ratio) maintained its downward trend, standing at 78.2% (-2.9 p.p.). However, in the first months of 2023, there has been a significant reallocation of household saving into savings certificates, a shift that has proved to be more advantageous as such savings certificates have their remuneration indexed to Euribor rates. The foreseeable improvement in the remuneration of fixed-term deposits should have implications for the term structure of customer deposits. Over the past decade, in the context of falling interest rates to a very low level, sight deposits have increased their share from around 25% in 2012 to 60% in 2022, a trend which should be reversed as a result of the rising opportunity cost of holding these deposits. Despite the issuance of around €3.7 billion in instruments eligible for compliance with the MREL requirement, the debt securities issued over total assets remained virtually unchanged at 4.1% in 2022.

**The liquidity coverage ratio (LCR) declined considerably (30.8 p.p.) but remained high (229%)** (Chart I.2.12). This was due to a decline in highly liquid assets (mostly withdrawable reserves and other central bank assets) and a smaller increase in liquidity outflows, with contributions of -23 p.p. and -7.8 p.p. respectively. Although the LCR is overall well above the 100% minimum requirement in place, there is some heterogeneity across banking institutions. Two banking institutions belonging to international groups had the lowest LCRs. The liquidity buffer accounted for around 26% of total deposits in 2022, comprising 96% of Level 1 liquid assets (withdrawable reserves and other central bank assets, and regional government/local authorities assets). The share of highly liquid assets in total assets was larger than that observed for the euro area in the first three quarters of 2022, 26% and 19% respectively. At the end of 2022, this ratio stood at 25% for Portugal.

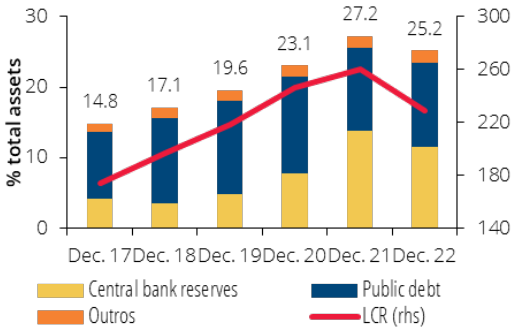
**The net stable funding ratio (NSFR) grew by 2.5 p.p. in 2022, to 145%, remaining significantly** above the 100% minimum requirement in place. Developments in the NSFR reflected the decrease in required stable funding (by around 6%), which more than offset the decrease in available stable funding (by around 5%). Retail deposits increased their share in available stable funding to around 71% of this indicator (Table I.2.16). Over the same period, the share of available stable funding from financial customers and central banks decreased to 4.7%, down by 8.2 p.p. from 2021, due to the reduction in funding obtained from the ECB, which was only partly replaced by interbank funding. The required stable funding – which depends on the liquidity characteristics and residual maturities of assets – is essentially composed of loans, a component whose share increased to around 80% in 2022.

**Over the course of 2022, the main institutions in the Portuguese banking system issued instruments eligible for compliance with the minimum requirement for own funds and eligible liabilities (MREL), totalling around €3.7 billion, predominantly preferred and non-preferred senior debt.** At the end of 2022, the most significant institutions in the Portuguese banking system complied with the intermediate MREL requirements. For most banks, the transition period ends on 1 January 2024, when MREL requirements become mandatory. In 2023, access conditions to the eligible instruments markets for compliance with MREL requirements have been characterised by higher interest rates than in recent years and have been more recently disrupted by some distrust triggered by the failure of several US banks and the procedures used for the forced merger of the Credit Suisse and UBS banks. According to the April 2023 Bank Lending Survey, three of the five surveyed institutions reported a slight or significant deterioration in the conditions of access to

funding through debt securities over the previous three months, and two of them anticipated that these difficulties would increase over the next three months.

**The asset encumbrance ratio, i.e. the share of total assets and collateral received that is used as collateral for obtaining liquidity, decreased by 5.7 p.p. from 2021, to stand at 12.5% in 2022 (-2.6 p.p. than in December 2019).** The share of unencumbered assets eligible for monetary policy operations stood at 28.2%, increasing by 5.0 p.p., largely through collateral release associated with TLTRO III loans repaid in the last months of 2022. The level observed accounted for around 27.6% of total deposits.

**Chart I.2.12** • Liquid assets and liquidity coverage ratio (LCR)




Source: Banco de Portugal. | Note: The liquidity coverage ratio corresponds to the ratio of available liquid assets and net cash outflows calculated under a 30-day stress scenario.

**Table I.2.16** • Available stable funding structure | As a percentage

| | Dec. 21 | Dec. 22 |
|---|---|---|
| Retail deposits | 64,1 | 70,9 |
| Capital instruments | 10,2 | 10,3 |
| Fin. customers and central banks | 13,0 | 4,7 |
| Other non-financial customers | 7,7 | 8,7 |
| Other liabilities | 2,9 | 3,2 |
| Operational deposits | 1,3 | 1,7 |

Source: Banco de Portugal.

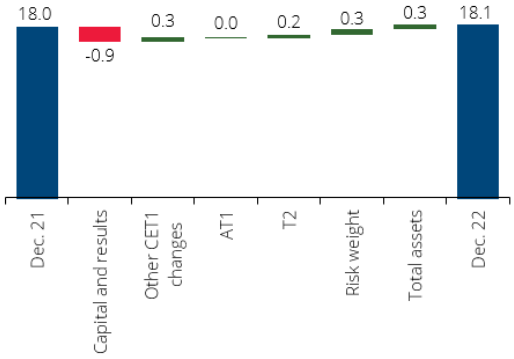
## **2.6** Capital

**In 2022, the share of capital in the total amount of risk exposure stabilised at high levels and the system's heterogeneity declined.** The total capital ratio was 18.1% (+0.1 p.p.) (Chart I.2.13). This reflected the contribution of a decrease in risk-weighted assets (+0.6 p.p.), which exceeded that of the reduction in total capital (-0.5 p.p.). The capital reduction was mainly due to a decrease in Common Equity Tier 1 (CET1) capital, partly offset by the increase in Tier 2 capital. The reduction in heterogeneity resulted from the decrease in the indicator in institutions with higher ratios.

**The CET1 ratio stood at 15.3%, down by -0.2 p.p. from 2021** (Table I.2.17). The decrease in risk-weighted assets (contribution of +0.5 p.p.) partly offset the reduction in the CET 1 amount (-0.7 p.p. contribution) for the evolution of the ratio. This CET1 reduction was associated with the resumption of dividend distribution after the interruption during the pandemic and, to a lesser extent, with the loss recorded for securities measured at fair value through other comprehensive income.

**The share of exposures in total assets continued to decrease.** The average risk weight stood at 43.2%, down by 0.8 p.p. from the end of 2021, remaining significantly above the average euro area risk weight (34.1%). The heterogeneity of this indicator in the Portuguese banking system decreased.

**Chart I.2.13** • Total capital ratio – level and contributions to changes | Per cent and percentage points




Source: Banco de Portugal.

**Table I.2.17** • Capital ratios and average risk weight

| % of risk-weighted assets | Dec. 18 | Dec. 19 | Dec. 20 | Dec. 21 | Dec. 22 |
|---|---|---|---|---|---|
| Total capital ratio[a] | 15.1 | 16.9 | 18.0 | 18.0 | 18.1 |
| Percentile 5[b] | 13.2 | 13.9 | 12.3 | 12.0 | 12.3 |
| Percentile 95[b] | 17.3 | 19.5 | 24.5 | 29.0 | 20.9 |
| CET1 ratio[c] | 13.2 | 14.3 | 15.3 | 15.5 | 15.3 |
| **% of total assets** | **Dec. 18** | **Dec. 19** | **Dec. 20** | **Dec. 21** | **Dec. 22** |
| Average risk weight[d] | 54.4 | 53.3 | 48.6 | 44.0 | 43.2 |
| Percentile 5[e] | 38.9 | 35.6 | 32.9 | 26.4 | 28.9 |
| Percentile 95[e] | 66.9 | 64.8 | 59.5 | 55.5 | 49.7 |
| Euro area | 39.4 | 39.3 | 35.9 | 35.7 | 34.1[f] |

Sources: ECB and Banco de Portugal. | Notes: (a) Ratio of total capital to risk-weighted assets. (b) Percentiles obtained from the weighted distribution of risk-weighted assets of total capital ratio. (c) Ratio of Common Equity Tier 1 capital to risk-weighted assets. (d) Ratio of risk-weighted assets to total assets. (e) Percentiles obtained from asset-weighted distribution of average risk weigh. (f) September 2022.

**The leverage ratio decreased slightly to 3.7 p.p., a figure above the minimum requirement.** The prudential leverage ratio stood at 6.7%, down by 0.3 p.p., but still significantly above the minimum requirement of 3%. This decrease was associated with the reduction in Tier 1 capital, in a context of stability in the total exposure of the banking system.

In the current economic and geopolitical context, financial institutions must implement prudent provisioning and capital conservation policies so they can use part of the profits to increase their resilience to adverse shocks and continue funding the economy.

## Box 1 • Factors underlying the predominance of variable interest rates in housing loans in Portugal

**In December 2022, 90% of the stock of loans granted for house purchase had a variable interest rate**. This characteristic of the Portuguese housing market led to a rapid pass-through of the rise in key ECB interest rates to the value of the instalments paid by households, in the same way as they had benefited during the period of rate reduction.

**This box identifies the practices and motives behind the predominance of variable interest rates in housing loans in Portugal.** To this end, a questionnaire was sent to a representative sample of ten banks, corresponding to 94% of this market segment in December 2022.

**Over the period 2011-22, Portugal had a share of new loans for house purchase with an interest rate fixation period of over ten years well below the euro area average. In 2022 this share was 9% in Portugal, compared with 59% in the euro area, having increased by 9 p.p. from the very residual figure observed in 2011.** Some countries, such as Belgium and France, maintain a very high share of loans with this characteristic, while others post a growing share during this period, like Spain and the Netherlands. Variability over time has been greater in other countries, such as Germany and Italy, with considerable declines observed over the most recent period. Finland and Portugal have very low shares (Table B1.1). The interest rate may remain fixed for the entire duration of the credit agreement (fixed interest rate) or it may be fixed for a part of the credit agreement, while the remainder will have a variable rate (mixed interest rate).

**Table B1.1** • New loans with an interest rate fixation period of over ten years | Per cent

| | 2022 | Change from 2011 |
|---|---|---|
| France | 90 | 17 |
| Belgium | 79 | 15 |
| Spain | 65 | 64 |
| **Euro area** | **59** | **24** |
| Italy | 58 | 38 |
| Netherlands | 47 | 37 |
| Austria | 46 | 46 |
| Germany | 44 | 14 |
| **Portugal** | **9** | **9** |
| Finland | 2 | 0 |

Source: ECB. | Note: For international comparison, the share of loans granted with an interest rate fixation period of over ten years (flows) is used as proxy to measure the share of new fixed rate loans. If one year were used as a limit for the fixation period, a share of the loans indexed to the 12-month Euribor would be considered as having a fixed rate.

**The share of new housing loans with some form of contractual interest rate fixation has increased in recent years in Portugal, having accounted for approximately 15% of the amount of new loans in 2022.** Taking up a housing loan with a fixed or mixed rate reduces the uncertainty associated with the borrowers' debt servicing capacity, particularly in the current environment of rising interest rates, as highlighted by the large majority of the banks responding to the questionnaire (90%). The macroprudential recommendation takes this into account, and in fixed-rate loans it is not necessary to simulate the instalment by applying a shock to the rate to be agreed in order to comply with the limits to the ratio between the total amount of monthly instalments associated with the loans held by the borrower and their net monthly income (debt service-to-income ratio, DSTI).

**In 2022, 60% and 70% of the responding banks granted fixed and mixed rate housing loans respectively**. Business practice is very diverse across responding banks, with a maximum share of 26% for new fixed rate agreements and 73% for mixed rate agreements.

The averages stand at 5% and 22% respectively. 75% of the banks that did not grant loans with a fixed and/or mixed interest rate in 2022 planned to offer this contractual alternative in 2023 (Table B1.2).

**Even though nearly all banks in the sample hold fixed and mixed rate housing loans, their importance in the banks' portfolio varies broadly**. The maximum share of the stock of housing loans with a fixed interest rate was 11% in December 2022 (2% on average), while the maximum share of housing loans with a mixed interest rate stood at 42% (8% on average). Most institutions (60%) are of the opinion that demand for fixed and mixed rate credit will increase in 2023, while 20% think it will decrease. Where available, a fixed or mixed interest rate is offered to the customer at the initial time of negotiation or simulation of the housing loan.

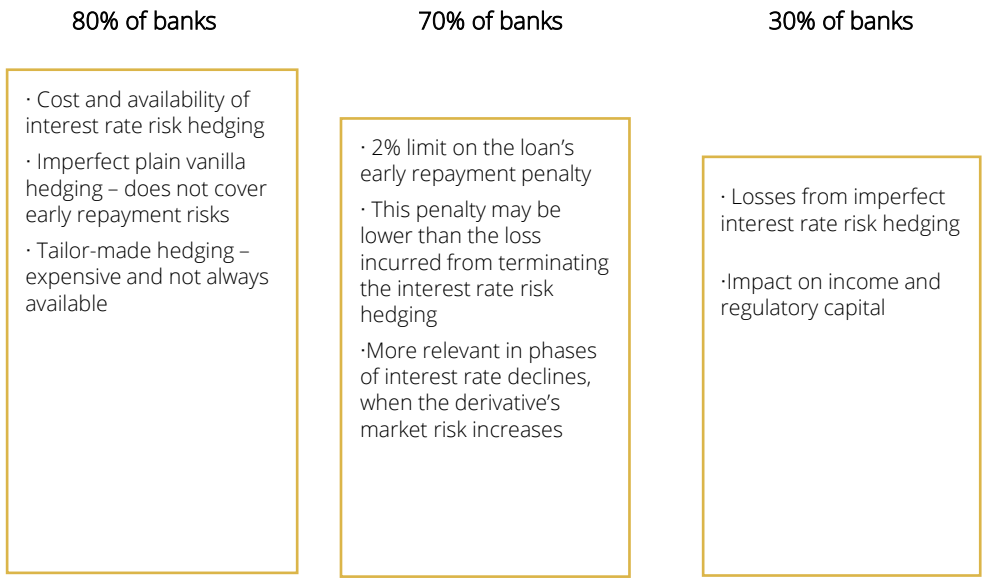
**Table B1.2** • Share of housing loans with fixed or mixed interest rate scheme | Per cent

| | Loans granted in 2022 | | | Position as at December 2022 | | |
|---|---|---|---|---|---|---|
| Interest rate scheme | Median | Average | Maximum | Median | Average | Maximum |
| Fixed | 0 | 5 | 26 | 1 | 2 | 11 |
| Mixed | 6 | 20 | 73 | 1 | 8 | 42 |
| Up to 3 years | - | 1 | 6 | | | |
| Between 3 and 5 years | 1 | 4 | 14 | | | |
| Between 5 and 10 years | 2 | 8 | 50 | | | |
| Over 10 years | 0 | 7 | 43 | | | |
| o.w. loans still in the initial fixation period | | | | 2 | 8 | 32 |
| o.w. goes to a variable rate in 2023 | | | | 0 | 1 | 2 |
| o.w. goes to a variable rate in 2024 | | | | 0 | 1 | 4 |

Source: Questionnaire addressed to ten banks operating in Portugal. (Bankinter, BCP, BPI, BST, CGD, Eurobic, Montepio Geral, Novo Banco, SICAM (Integrated Mutual Agricultural Credit Scheme) and UCI). This sample accounts for 94% of the stock of total loans granted for house purchase in 2022. Responses were received in early March 2023.

**Factors constraining the supply of fixed or mixed interest rate housing loans include the cost and availability of interest rate risk hedging, the market risk of early termination of hedging derivatives vis-à-vis the 2% upper limit of the loan's early repayment fee and related net losses that may affect the bank's income and regulatory capital** (Figure B1.1).

**Figure B.1.1** • Factors constraining the supply of fixed or mixed rate housing loans




Source: Banco de Portugal. | Note: Based on the responses to the questionnaire addressed to ten banks operating in Portugal (Bankinter, BCP, BPI, BST, CGD, Eurobic, Montepio Geral, Novo Banco, SICAM (Integrated Mutual Agricultural Credit Scheme) and UCI). This sample accounts for 94% of the stock of total credit granted for house purchase in 2022 (100% of the credit granted under a fixed or mixed rate scheme).

**Half of the banks use plain vanilla agreements (interest rate swaps) to hedge the interest rate risk arising from granting fixed/mixed rate housing loans, while the rest use tailor-made agreements, which cover interest rate risk and early repayment risk.** 60% of the banks consider that the cost of hedging increases the loan's price.

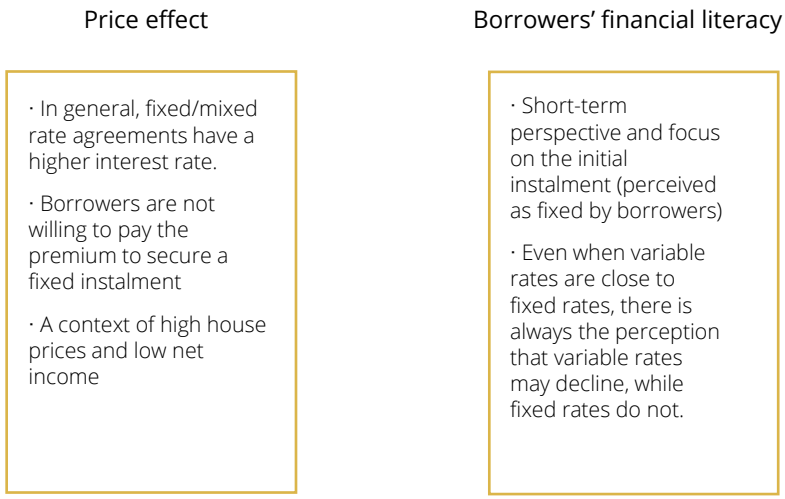
**The form of interest rate risk hedging limits changes to the type of interest rate during the loan's lifetime.** 70% of the banks consider that it is possible to switch from a variable to a fixed rate scheme. In turn, the banks highlighted the market risks of early termination of interest rate hedging either directly or by using less efficient overall hedging. In some cases, the banks do not offer the possibility of conversion (20%); in other cases, they transfer the costs to the customer.

**The type of interest rate on housing loans is also conditioned by the banks' funding structure, which differs across European countries.** Given that customer deposits, which account for a very substantial share of bank funding in Portugal, tend to be remunerated at fixed interest rates for short periods of time, the integrated management of assets and liabilities facilitates granting loans with rates indexed to the Euribor, especially for longer maturities. In other countries, by contrast, issuance of fixed-rate debt (e.g. covered bonds) plays a greater role in bank funding, favouring granting a larger share of fixed or mixed rate loans.

**Historical factors, such as the inability to hedge interest rate risk in the period prior to joining the euro area, have also contributed to limiting the increase in importance of this type of agreement**. High inflation in the 1990s and the impact of the sovereign's cost of financing on long-term fixed rate financing have made hedging interest rates very expensive. In addition, commercial practice in the Portuguese market, where competition manifests itself mainly in the variable rate loan segment – by comparing spreads applied to the index rate, rather than focusing on the agreed interest rate – favours the continued predominance of variable rate agreements. **According to the banks' responses, the main disincentive to the demand for loans with an interest rate fixation period is the immediate higher price compared with variable-rate loans**. Borrowers are not willing to pay the premium of having increased security from taking out a loan at a fixed rate. In addition,

issues were mentioned relating to the borrowers' degree of financial literacy and a focus on the short term (in the lower initial instalment). The perception that variable rates may decline while fixed rates do not, coupled with a protracted period of very low interest rates, led to a decrease in the probability attributed to higher interest rate scenarios, thus favouring the use of variable rate loans. (Figure B.1.2).

**Figure B.1.2** • Factors constraining demand for fixed-rate housing loans




Source: Banco de Portugal. | Notes: Based on the responses to the questionnaire addressed to ten banks operating in Portugal (Bankinter, BCP, BPI, BST, CGD, Eurobic, Montepio Geral, Novo Banco, SICAM (Integrated Mutual Agricultural Credit Scheme) and UCI). This sample accounts for 94% of the stock of total credit granted for house purchase in 2022 (100% of the credit granted under a fixed or mixed rate scheme).

**To sum up, the interaction between factors constraining supply and limiting demand for loans with an interest rate fixation period has led to the predominance of variable rate loans in Portugal.** Historical reasons arising from the economic situation in Portugal, banks' financing structure, the cost of interest rate hedging and the market risk of early termination of hedging derivatives, given the maximum 2% penalty for early repayment of the loan, constrain the supply. However, the materialisation of the risk of interest rate increase, with an impact on the instalments paid by borrowers, has led to a higher share of these loans in new credit. The existence of banks belonging to non-resident banking groups, operating in markets with a greater tradition of this type of interest rate scheme, has also helped to broaden the supply of these loans.

**Regulatory initiatives related to the duty to assess the creditworthiness of borrowers have been adopted in recent years, in particular considering a potential increase in interest rates in credit agreements relating to residential immovable property and other credit agreements secured by a mortgage** (Decree-Law No 74-A/2017, Notice of the Banco de Portugal No 4/2017 and Instruction of the Banco de Portugal No 3/2018, specifying the magnitude of the shocks to be considered according to the maturity of loans). In addition, banks are required to provide a set of pre-contractual information relating to the solvency assessment by means of a European Standardised Information Sheet (ESIS). The introduction of the Macroprudential Recommendation in July 2018, in particular by setting limits to the DSTI taking into account potential interest rate increases, made bank customers more aware of the always latent probability of an interest rate increase with a significant impact on monthly instalments and increased their resilience were interest rate increase scenarios to materialize.

## Box 2 • Large exposures of the banking system to highly indebted economic groups between 2017 and 2022

**Concentration in large exposures to a borrower, sector of activity, country or type of borrower through the banking system is a potential source of systemic risk.** One of the macroprudential policy objectives is to assess the materiality of direct and indirect concentrations of exposures and to adopt measures to mitigate such excessive concentrations, to promote the resilience of the financial sector.

**This Box examines the developments between 2017 and 2022 of exposures as a percentage of Tier 1 capital[1] (ratio of exposures) to large groups of connected clients. Exposures of Portuguese systemically important institutions (O-SIIs) (Banco Comercial Português, Caixa Geral de Depósitos, Santander Totta, LSF Nani Investments, Banco BPI, Caixa Económica Montepio Geral and Caixa Central de Crédito Agrícola Mútuo) will be examined. Taken together, they accounted for about 86% of Portuguese banking system's total assets in 2022.** In this context, clients are considered those that are dependent amongst themselves in terms of control or economically, as set out in the Capital Requirements Regulation (CRR) (Article 4(1)(39)).

**The European regulation lays down that exposures, net of the effect of credit risk mitigation, shall not exceed 25% of each institution's Tier 1 capital (Article 395 of the CRR).** The credit risk mitigation effect is composed of: (i) the amount of the market value or the value of the mortgaged asset, pledged as collateral, (ii) value adjustments and provisions, (iii) exposures deducted from own funds (e.g. losses in the current year and intangible assets); and (iv) exemptions from the limit on large exposures (exposures to central governments, central banks or public sector entities). The data source for large exposures is the banks' reporting for prudential purposes (COREP), with data for December.

**The leverage ratio, calculated at the highest level of consolidation, defines high indebtedness.** A consolidated reporting firm (hereinafter referred to as economic group) is classified as having high indebtedness if the leverage ratio calculated as the quotient between the financial debt net of cash and cash equivalents, and the equity is higher than 100%.[2] This information is obtained from the Banco de Portugal database for consolidated accounts of Non-Financial Corporations (NFCs), with data for 2017-21.

**The literature also considers the interest coverage ratio, calculated as the quotient between EBITDA (Earnings Before Interest, Taxes, Depreciations and Amortisations) and interest expenses, to assess NFCs' financial vulnerability and their ability to internally generate sufficient profitability to meet their contractual obligations.[3]** The interest coverage ratio is thus an indicator that may flag the likelihood of default in the future. However, this indicator is very sensitive to the cyclical position of the economy and to interest rates, which may lead to the non-identification of highly indebted economic groups in the upward phase of the economic and financial cycles and their identification in the downward phase of these cycles. Given the volatility of this indicator, the analysis is based only on economic groups' leverage ratio.

**To gauge the relevance of the economic groups' indebtedness, the asset weight of the highly indebted economic groups as a proportion of the assets of total economic groups was analysed.**

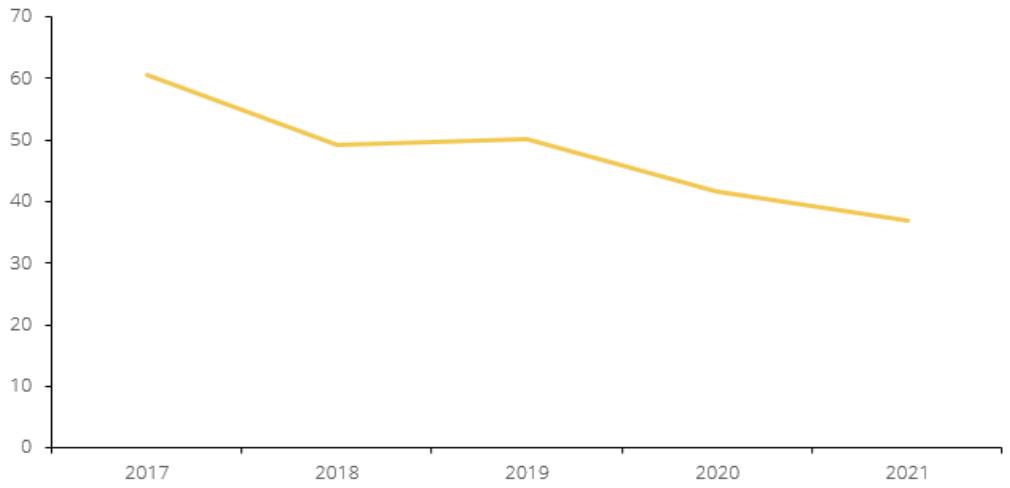
1. Tier 1 capital corresponds to the sum of common equity Tier 1 capital and additional Tier 1 capital.

2 For the purposes of the analysis in this box, the definition and limit of the leverage ratio set by the Haut Conseil de Stabilité Financière within the macro-prudential measure implemented under Article 458 of the CRR, setting a maximum exposure limit under Article 395 CRR at 5% of eligible own funds for highly indebted counterparties at the highest level of consolidation, is considered.

3. For example, according to Mateus and Augusto (2021), the threshold of 2 for the interest coverage ratio is used as a reference in a large number of studies on corporate debt vulnerability and is associated with a 20% probability of default over a 5-year time horizon (IMF, 2013).

The weight of economic groups' total assets in NFCs' total assets remained virtually unchanged between 2017 and 2021, at around 56%. The relative importance of highly indebted economic groups dropped significantly between 2017 and 2021, as their weight in the total assets of economic groups decreased from 61% to 37% (Chart B2.1).

**Chart B.2.1** • Weight of assets of highly indebted groups in the total assets of economic groups | Per cent



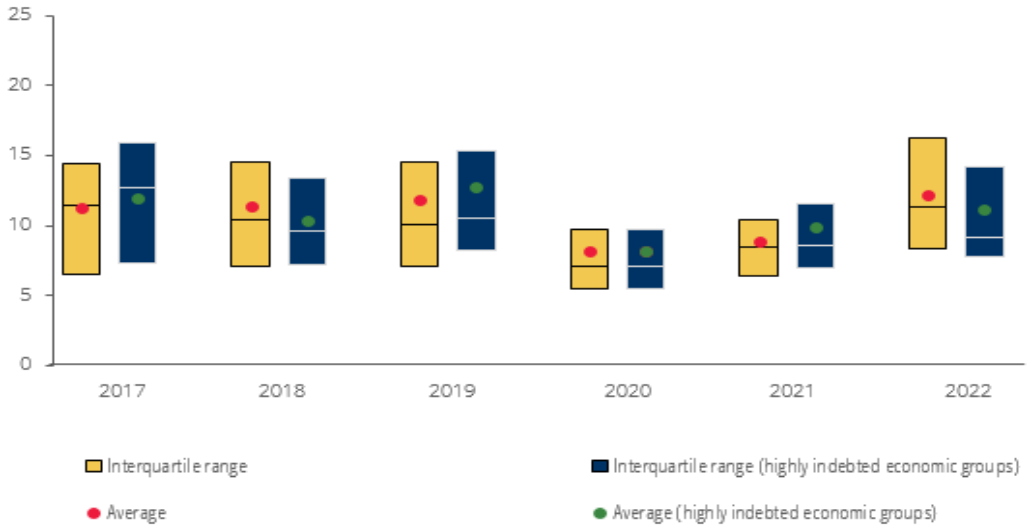

Source: Banco de Portugal. | Notes: Highly indebted economic groups are groups with a leverage ratio greater than 100%. Only economic groups with information for the whole period under analysis are considered.

**The size of the interquartile range of the net exposure ratio to large economic groups as a percentage of Tier 1 capital, as well as its components (25th percentile and 75th percentile), and the median, reduced in 2020 and 2021, meaning less dispersion in the distribution, increasing in 2022, but remaining significantly below the 25% ceiling** (Chart B2.2.). Over the 2017-22 period, the average ratio of exposures as a percentage of Tier 1 capital to highly indebted economic groups is not substantially different from the average for all economic groups over the period under review, i.e. Portuguese O-SIIs are not relatively more exposed to large economic groups with high indebtedness.

**Dispersion in the distribution, as well as the average of the ratio of net exposures to large economic groups decreased in 2020 and remained steady in 2021, years affected by the Covid-19 pandemic.** On the one hand this decrease reflects the recommendations issued by the ESRB, ECB/SSM and the Banco de Portugal in the wake of the pandemic crisis to institutions not to distribute dividends, thus producing a positive effect on capital levels for most banks and therefore on the denominator of the exposures ratio. On the other hand, there was a decrease in the existing concentration on large groups and the emergence of new exposures with relatively low ratios close to each other, thus also contributing to negative developments in the mean and dispersion in 2020.

**In 2022 the interquartile ranges and the mean increased to values close to those observed between 2017 and 2019.** The aforementioned recommendations no longer took effect as of September 2021, which partly explains the increase in the net exposure ratio in 2022. Moreover, this reversal also reflects an increase in exposures to most of the large groups in the energy production and distribution sector. However, note that this increase in dispersion, as well as in the average exposure ratio, was not driven by highly indebted groups, as these recorded slightly lower values compared with all the major economic groups under analysis.

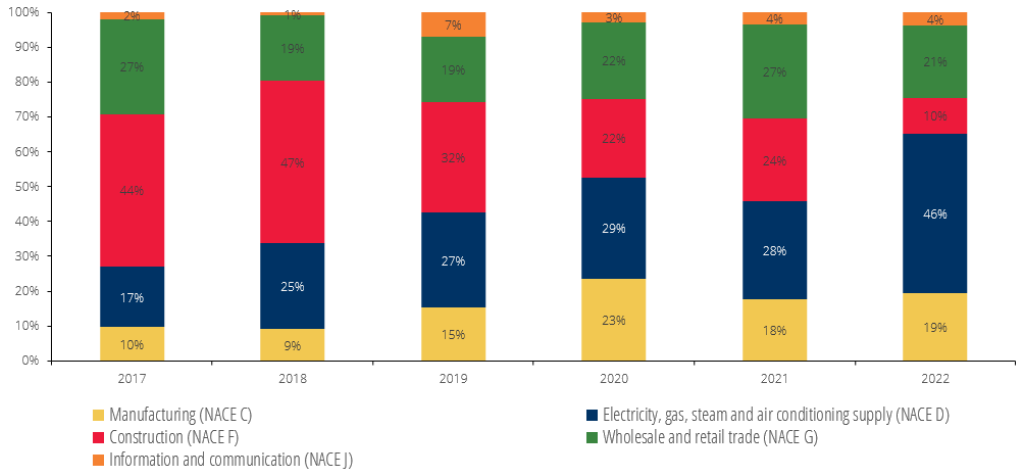
**Chart B.2.2** • Interquartile range for ratio of net exposures to large economic groups | Per cent




Source: Banco de Portugal. | Notes: The net exposure ratios of each of the other systemically important institutions (O-SIIs) of the Portuguese banking system to economic groups legally headquartered in Portugal are considered. The ratios of net exposures are calculated as a percentage of Tier 1 capital, as set forth in Article 392 of the CRR. Highly indebted groups are economic groups with a leverage ratio higher than 100%. For the analysis of large exposures in 2022, the value of the leverage ratio of the most recent available period, 2021, is considered. The lower and upper ends of the boxes correspond to the 25$^{th}$ and 75$^{th}$ percentiles of the ratio of net exposures respectively and the middle line corresponds to the median. Note that the variation in exposures to some economic groups may be related to the reporting requirements in COREP, in accordance with Article 394 of the CRR.

**The weight of net exposures to the energy production and distribution sector increased more significantly in 2022, contrary to the construction sector, which represented the largest share in 2017, whose weight significantly decreased over the period** (Chart C2.3). On the one hand, in 2022, the weight of the energy production and distribution sector increased significantly, thus representing almost half of net exposures to large economic groups (46%). The weight of the manufacturing sector also evolved positively over the period, although to a lesser extent (19% in 2022, compared with 10% in 2017). On the other hand, the weight of net exposures to the construction sector, which represented the largest share in 2017 (44%), showed a downward trend, set at 10% in 2022. Note that the economy has become less dependent on the construction sector and the banking system's exposure is also much lower than during the sovereign debt crisis.

**Chart B.2.3** • Net exposures to large economic groups by sector of economic activity | Per cent




Source: Banco de Portugal. | Notes: The value of the net exposures of each of the other systemically important institutions (O-SIIs) in the Portuguese banking system to NFCs with legal head office in Portugal and to groups of connected NFCs with a predominant type of activity of a non-financial nature. For the purposes of classifying each economic group, the predominant sector of economic activity of each group classified in accordance with the Statistical Classification of Economic Activities in the European Community (NACE) is considered. Note that the variation in exposures to some economic groups may be related to the reporting requirements in COREP, in accordance with Article 394 of the CRR.

**The Banco de Portugal will continue to monitor the evolution of net exposures to large economic groups.** Considering the distribution of the interquartile ranges of the exposure ratio observed for all economic groups and for those with high indebtedness, institutions should continue to adopt diversification procedures and strategies in terms of net exposure to large economic groups, as well as prudent behaviour regarding the indebtedness of these groups.

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# II Special issue

## Portuguese banking system's exposure to physical climate risks through credit granted to firms – preliminary results

# Portuguese banking system's exposure to physical climate risks through credit granted to firms – preliminary results[9]

## 1 Introduction

### 1.1 Motivation

**This Special issue provides a preliminary analysis of the banking system's exposure to physical risks through credit granted to firms.** Given the increasing relevance of climate change, it is essential to identify the main risks and vulnerabilities to financial stability. The development of this analytical framework includes an assessment of the exposure associated with physical risks, measured through credit granted to firms, including loans and debt securities. This work addresses impacts associated with heat stress, water stress, wildfires, floods, sea level rise and hurricanes and typhoons (tropical cyclones),[10] based on climate data from private sources (2. Data and methodology).

**The complexity in estimating physical risk stems not only from challenges associated with data availability relating to climate hazards and their effects, but also from the necessary granularity of economic activities' locations.** Against this background, the validity of findings depends on data available and considered in this exercise. Further developments at this level will tend to ensure greater robustness of the quantification presented. Thus, these results should be seen as preliminary. Notwithstanding, this Special issue is a contribution to the discussion of the relevance of climate change to the banking system and financial stability in Portugal.

### 1.2 Climate change and physical risks

**The topic of climate change and its impact on the economy and the financial system has gained relevance in recent years.** Events such as wildfires, heatwaves, droughts and water shortages have become more frequent and more intense. Some studies, such as Kalkuhl et al. (2020), point to a significant impact of climate change on the economy.[11]

**From a financial stability perspective, it is important to assess the impact of climate change-related losses and how they directly or indirectly affect financial institutions and may become systemic in nature (NGFS, 2019).** Risks stemming from climate change are classified into two main categories: transition and physical. Transition risks are associated with possible impacts of structural changes

9. Prepared by Simone Caldeira.

10. Hurricanes and typhoons are part of the set of storms known as tropical cyclones. If these take place in the North Atlantic, central North Pacific and eastern North Pacific they are hurricanes. In the northwest Pacific they are known as typhoons.

11. The authors estimate that an overall rise of 3.5º C in global surface temperatures by 2100 could lead to a reduction in world output of between 7% and 14%.

related to the transition to a low-carbon economy. Physical risks refer to the economic and financial impact arising from the expected increase in the frequency and intensity of natural disasters associated with climate change. These risks are interrelated, to the extent that failure to make a timely and effective transition to a low-carbon economy, with a corresponding reduction in greenhouse gas (GHG) emissions, could increase the likelihood and magnitude of physical risks materialising.

Physical risks may be subcategorised into acute risks, which refer to the impact of extreme weather events, e.g. wildfires, heatwaves, floods or storms such as hurricanes, or chronic risks, associated with gradual climate changes, such as changes in temperature, rainfall, droughts, sea level rises and coastal erosion.

The impact of physical risks on the economy and the financial system is difficult to estimate and their results are highly uncertain. In particular, it is worth noting the non-linearity of the relationship between the increase in average global temperature and physical risk (e.g. occurrence of tipping points), or the possibility of the same location being exposed to several physical risk hazards, as well as the interaction between these and economic activity (e.g. impact on labour productivity). The use of very long-horizon projections (e.g. several decades) also contributes to the complexity in estimating the effects arising from the materialisation of physical risks.

The need for high spatial resolution data to assess the impact of physical risks also means increased challenges in obtaining information. According to the methodology defined by the Intergovernmental Panel on Climate Change (IPCC),[12] assessing the physical risk impact should consider three major issues: (i) the likelihood of a hazard occurring that may cause loss of life and/or any other damage, (ii) exposure, i.e. the geospatial distribution of the population and the natural and economic resources that could be adversely affected, and (iii) vulnerability, depending on the characteristics of the population and resources in a given territorial unit, as well as its resilience, adaptability and ability to recover from the impact of the physical risk event through, for example, the implementation of mitigation strategies. These issues require the use of very granular data (e.g. climate, financial), which is not always available.

### **1.3** Mechanisms transmitting physical risks to the banking system

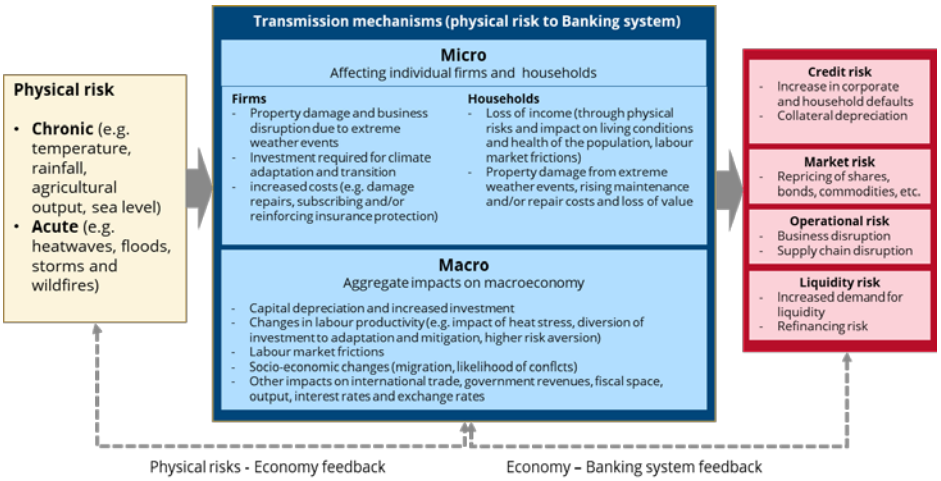
Physical risks materialising may entail significant economic and financial costs. The impact from extreme events (acute risks) may lead to the destruction of firms' physical assets, such as buildings and infrastructure, and the disruption of supply chains and markets, causing partial or total disruption to their business. Progressive impacts from chronic risks are also reflected in deteriorating living standards and health of the population and tend to lead to loss of labour productivity. The need to cope with these effects, for example with the reconstruction or replacement of destroyed assets, may also result in an increase in firms' liabilities.

In parallel, climate change adaptation strategies translate into increased investment needs and costs for economic actors. The investment required to adjust to and to mitigate the impacts of climate change as well as subscribing to or reinforcing insurance protection to reduce losses have an impact on business costs and may result in an increase in financing needs.

These effects are transmitted to the banking sector, as they affect households' and firms' financial positions and their ability to meet debt service, as well as the value of assets pledged as collateral in loans (Figure 1).

12. Definitions adapted from the IPCC report (2012).

**Figure II.1.1** • Physical risk transmission channels to the banking system




Source: *etwork for Greening the Financial System* (adapted) and the Banco de Portugal.

**In addition to the impact on credit risk, the materialisation of physical risks may also be reflected in the other categories of prudential risks such as market, liquidity and operational risks of the banking system (BCBS (2021)).** In the case of market risk, losses resulting from physical risk events may lead to abrupt corrections in asset pricing or the valuation of the most exposed firms, causing credit institutions' portfolios to devalue. In terms of liquidity risk, firms and households may make significant withdrawals from bank deposits and credit lines to cover losses. Operational risk may arise from banks' exposure to physical risks, either through their branches or the location of their decision centres and data centres, including those of their suppliers. In the latter case, the risk may be systemic in nature, to the extent that there is a concentration of locations, common to several credit institutions, that would compromise their business continuity. Furthermore, it may also affect reputational and litigation risks.

## 2 Data and methodology

**The use of data with sufficient granularity to grasp territorial differences in exposure to physical risks is critical for a correct impact assessment of such risks.** Identifying the geospatial distribution of both the areas affected by the materialisation of physical risk events and the assets located in those areas is a prerequisite for this analysis. Regarding this last point, the geographical distribution of firms' production units or assets allows for a more accurate assessment of the potential impact of physical risks. Nevertheless, obtaining these various locations is particularly challenging, therefore most analyses have considered only the location of the firm's headquarters, limiting the validity of the findings (see, for example, ECB/ESRB (2021) and Alogoskoufis et al. (2021)).

**This Special issue considers the banking system's exposure to physical risks through credit to firms.** It uses the locations of the 50,000 firms, via their headquarters' addresses, with the largest outstanding amount of loans granted, in the Central Credit Register (CCR) of the Banco de Portugal in December 2021 (hereinafter referred to as "firms").[13] The amount of debt securities issued by

13. The information on the headquarters address was obtained from Moody's Orbis Bureau Van Dijk database. For a very residual group of firms (0.6% of the total) it was not possible to obtain a valid address information, therefore the postal code was considered for location purposes.

firms and held by the banking system, obtained from the Securities Holding Statistics (SHS) of the Banco de Portugal for the same period, was added to the loans. For firms that are part of economic groups, credit was calculated on a consolidated group basis, and distributed to each individual firm through the weight of their turnover in total.[14]

The loans to firms considered for the assessment of the banking system's exposure to physical risk amount to €63 billion in the case of the outstanding amount of loans in the CCR (approximately 81% of total loans to NFCs) and €11 billion in the case of debt securities held by banks (approximately 74% of total debt securities of NFCs reported in the SHS). Note that around 90% of these firms (corresponding to 73% of total credit analysed) have only one establishment (corresponding to their head office), therefore the assumption made for the location should not, in this case, limit the conclusions.

**As regards distribution of physical risks, the potential materialisation of six climate hazards or events is taken into account.** Of these, three are chronic risks – heat stress, water stress and sea level rise, and three extreme weather events, or acute risks - floods, wildfires and hurricanes and typhoons. These climate hazards are in line with the identification of major impacts and vulnerabilities associated with climate change under the Action Programme for Adaptation to Climate Change (P-3AC),[15] especially events such as the increase in maximum temperature and susceptibility to desertification, rising sea levels, as well as the increased frequency and intensity of extreme events such as rural wildfires, heatwaves, droughts and water shortages, extreme rainfall and coastal overtopping and erosion.

**The information on physical risks was obtained from the geolocation of the address of firms' headquarters (latitude and longitude variables).** This is based on Moody's Climate on Demand (Moody's COD, formerly Four Twenty Seven) indicators or scores,[16] a database that assesses the potential exposure of firms' locations to physical risks such as heat stress, water stress, wildfires, floods, rising sea levels, and hurricanes and typhoons (tropical cyclones) (Table 1). These indicators combine various types of information – from climate models, climate databases (used in some cases in a supplementary way) and simulations using historical data. In the case of data from climate models, Moody's COD considers the Representative Concentration Pathway (RCP) 8.5 scenario, which is the most adverse in terms of emissions and where it is assumed that no efforts are made to limit GHG emissions.[17] The information is summarised as scores, on a scale from 0 to 100, incorporating the level of exposure to physical risk in relation to its distribution on a global territory.

14. As the CCR is reported on an individual basis, this hypothesis assumes that in these cases funding is managed at the economic group level, incorporating the credit granted to firms specialised in obtaining funding for the group. SHS information also includes issues by non-resident firms that are part of the economic group, and the amounts of debt securities are allocated following the same logic used for loans in the CCR.

15. Approved by the Resolution of the Council of Ministers No 130/2019 of 2 August 2019. This programme aims to implement adaptation measures in Portugal and establishes the direct lines of action on the territory and infrastructure and the cross-cutting lines of action. More details are available at: https://apambiente.pt/clima/programa-de-acao-para-adaptacao-alteracoes-climaticas-p-3ac and https://apambiente.pt/clima/projetos-em-adaptacao.

16. Moody's COD (former Four Twenty Seven) is a database that provides physical risk indicators for a range of physical risk events, more details available at: https://www.moodysanalytics.com/microsites/climate%20on%20demand?utm_medium=cpc&utm_campaign=climateondemand&utm_source=google&utm_term=europe. For a further description of this information, see also ECB/ESRB Report Climate-related risk and financial stability – Data Supplement: https://www.esrb.europa.eu/pub/pdf/recommendations/2021/esrb.climateriskfinancialstability202107_annex~35e1822ff7.en.pdf?fe8cacf5c2844527a9c43678bde76442.

17. RCPs describe different trajectories for GHG emissions and concentration, air pollutant emissions and land cover up to 2100. Further details can be found in the IPCC report (2014).

**Table 1** • Summary of physical risks and potential impacts on business activity

| Hazard | Description | Potential impact on business activity |
|---|---|---|
| Water stress (WS) | Changes in water demand and supply | – Reduced water supply<br>– Increased water costs<br>– Erosion of the "social licence to operate" and/or reputation [(a)] |
| Heat stress (HS) | Increase in temperature | – Increased energy costs<br>– Heightened risk of brownouts/power outages<br>– Stress on human health/labour force |
| Wildfires (WF) | Change in fire potential | – Permanent loss of property value<br>– Stress on human health (air quality)<br>– Stress on ecosystem services<br>– Business interruptions<br>– High insurance costs or loss of insurance protection |
| Floods (FL) | Change in rainfall conditions and size and frequency of possible floods | – Property and building damage<br>– Compromised infrastructure<br>– Business interruptions |
| Sea-level rise (SLR) | Heightened storm surge, augmented by sea level rise | – Property damage<br>– Permanent loss of property value<br>– Relocation costs |
| Hurricanes and typhoons – tropical cyclones (HT) | Exposure to past cyclones | – Severe property damage<br>– Permanent loss of property value<br>– Relocation costs |

Source: *Moody's Climate on Demand* (*Moody's COD*). | Note: (a) The "social licence to operate" refers to the idea that firms need the support of the society and the community where they operate to maintain their activity, also reducing their reputational risk. This concept is relevant in some activities such as the mining industry or the intensive agriculture.

**This analysis considers the risk indicators that incorporate information, including climate model projections, until 2050.** Note that the use of past events distribution in assessing exposure to physical risks is not necessarily the best representation of their current or future materialisation, and therefore the use of forward-looking information, even if subject to high uncertainty, is of paramount importance in this type of analysis. Only the assessment of tropical cyclone risks (hurricanes and typhoons) is exclusively based on historical data, given the lack of projections available. Other indicators combine historical data with projections, such as flood risk. Choosing a long-term horizon makes it possible to analyse the effects of physical risks, especially in the case of accumulated chronic risks.

**Physical risk scores are classified by Moody's COD into five risk levels, according to the potential impact of physical risk at a particular location.** Areas not exposed to a particular risk or whose exposure to physical risks is not significant are categorised as no risk or low risk, respectively. The medium level reflects, in general for the set of events analysed, a possibility that the area in question may be affected by the materialisation of physical risk. In the case of the high-risk level,

some exposure to physical risk is already observable, with a tendency to increase in the future. Severe risk (red flag) translates, on the one hand, to a significant exposure to physical risk, and on the other hand, a considerable intensification, with a high potential for the materialisation of a negative impact for firms in that location. The latter two levels (high and severe) thus represent greater vulnerability to risk materialisation.

From the combination of data on physical risks associated with the location of firms and credit granted (loans and debt securities) the quantification of the banking system's exposure to physical risk is obtained. The banking system's exposure to physical risk through credit granted to firms is calculated based on the following formula:

$$Exposure\ to\ credit\ to\ firms_{f,s} = \frac{\sum_{50.000}^{i=1} Credit\ to\ firm_{i,f,s}}{\sum_{50.000}^{i=1} Credit\ to\ firm_{i}} (1)$$

Where $i - firm$, $f - physical\ risk$ and $s - physical\ risk\ level$.

This analysis aims to obtain an estimate of the banking system's exposure to physical risks, through loans and debt securities to firms, for a wide range of climate hazards, as well as the identification of potential concentration of exposure to risks, taking into account their relevance for firms.

# 3 Banking sector exposure

The banking system's exposure to firms most affected by physical risks depends largely on the territorial distribution of physical risks and the location of the firms and their assets. Most firms under this analysis are located in the northern and central coastal areas of mainland Portugal, and large (headquarters of) firms are located mainly in the metropolitan areas of Lisbon and Porto.

Taking into account the six climate hazards under analysis, the geographical distribution of physical risks associated with firms' locations is quite diverse. Considering firms located in areas exposed to the materialisation of physical risk, identified by medium, high and severe levels according to Moody's COD data (Figures 2 to 4 in the annex), we may conclude that:

- Water stress risk is more intense for firms located in central and southern mainland Portugal, with some relevance also in Madeira Island;
  Exposure to heat stress extends throughout the territory of mainland Portugal and the archipelagos of Azores and Madeira with varying degrees of intensity. The medium level is concentrated essentially in the region of Lisbon and the Tagus Valley, the south coast of mainland Portugal and the islands. High and severe levels are mainly observed in the northern and central zones and inland Alentejo;
- In terms of wildfires, the medium level of risk has greater incidence in the Lisbon and Tagus Valley region, the districts of Porto and Braga and the archipelagos of the Azores and Madeira. The high level is spread throughout the country, being residual in the regions identified previously. There are no firms with exposure classified as severe;
  Concerning floods, medium and high levels of risk are greater in the northern coastal area of mainland Portugal and in the archipelago of Madeira (medium level). In the case of the severe level there is only a very residual exposure in the Minho region;
- The risk of sea level rise points to high vulnerability (severe risk) for firms located along the country's coastline;
  As for hurricanes and typhoons, a residual exposure is identified for firms located in areas with a medium risk level in the district of Viana do Castelo and the Azores archipelago.

**Chart 1** • Exposure of the banking system to firms affected by physical risks
| As a percentage of total loans to firms

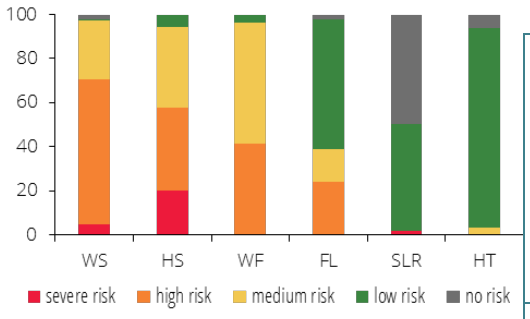



**Table 2** • Exposure of the banking system to firms affected by physical risks
| As a percentage of total loans to firms

| | WS | HS | WF | FL | SLR | HT |
|---|---|---|---|---|---|---|
| No risk | 2 | 0 | 0 | 2 | 50 | 6 |
| Low risk | 0 | 6 | 4 | 59 | 48 | 91 |
| Medium risk | 27 | 37 | 55 | 15 | 0 | 3 |
| High risk | 66 | 37 | 41 | 23 | 0 | 0 |
| Severe risk | 5 | 20 | 0 | 0 | 2 | 0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |

Sources: Banco de Portugal and Moody's COD. | Notes: Total credit includes the outstanding amount of loans reported in the CCR, as well as debt securities held by banks obtained through the Portuguese SHS for the set of 50,000 firms under analysis. Hazards considered are water stress (WS), heat stress (HS), wildfires (WF), floods (FL), sea level rise (SLR) and hurricanes and typhoons (HT). Percentages may not add up to 100 due to rounding.

**As regards the banking system's exposure, evaluated through credit to firms, it is possible to identify some concentration in firms located in areas with a potential for the materialisation of physical risk, with a predominance of medium and high levels** (Chart 1 and Table 2). Exposure to physical risks is determined on the basis of the importance of loans and debt securities to firms associated with medium, high and severe risk categories. This is particularly significant for water stress, heat stress and wildfire hazards, with credit to firms accounting for more than 90% of the total. Despite their different compositions across different risk levels, concentration in medium and high risks stands out, and therefore there is a greater weight of credit associated to firms located in areas vulnerable to physical risk materialising. There is also a risk exposure for firms located in flood-prone areas, with 38% of total loans to firms. Exposure to physical risks related to rising sea levels or hurricanes and typhoons is reduced, reflecting a more specific nature associated with these types of hazards.

**Considering only the highest risk category (severe level), the banking system's exposure to hazards included in the analysis is limited, except for heat stress**. In this case, around 20% of total credit belongs to firms located in areas where the variation in maximum temperatures is expected to be among the highest on a global level (Table 2). The severe level associated with water stress and sea level rise has a very small weight, with approximately 5% and 2% of total credit to firms respectively, and it is immaterial in all other situations.

**The impact of physical hazards in different sectors of activity reflects their dependence on resources, such as energy or water, and on working conditions (with impact on productivity).** For example, sectors such as construction, as they often include outdoor activities, are particularly subject to weather conditions and available water supply. Other activities such as manufacturing, wholesale and retail trade and accommodation and food services depend on their ability to keep their spaces properly air-conditioned, leading to increased energy consumption if the temperature rises (or falls).

**Table 3** • Bank credit to firms with exposure to physical risk (medium, high and severe levels (A)) and firms more vulnerable to the materialisation of physical risk (high and severe levels (B)) by sector of activity | As a percentage of loans to firms

| | Total | WS | | HS | | WF | | FL | | SLR | | HT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (A) | (B) | (A) | (B) | (A) | (B) | (A) | (B) | (A) | (B) | (A) | (B) |
| Manufacturing | 25 | 26 | 19 | 27 | 43 | 26 | 25 | 28 | 24 | 13 | 14 | 18 | 0 |
| Wholesale and retail trade | 20 | 20 | 17 | 20 | 18 | 19 | 18 | 21 | 22 | 18 | 16 | 22 | 0 |
| Const. and Real estate activities | 12 | 12 | 16 | 12 | 8 | 12 | 14 | 10 | 11 | 12 | 13 | 10 | 75 |
| Accommodation and food services activities | 8 | 8 | 5 | 7 | 3 | 8 | 10 | 7 | 8 | 28 | 26 | 6 | 25 |
| Other | 35 | 35 | 42 | 35 | 28 | 35 | 33 | 34 | 35 | 29 | 31 | 43 | 0 |
| Total | 100 | 96 | 70 | 94 | 58 | 97 | 41 | 39 | 24 | 2 | 2 | 3 | 0 |

Source: Banco de Portugal and Moody's COD. | Notes: Hazards considered are water stress (WS), heat stress (HS), wildfires (WF), floods (FL), sea level rise (SLR) and hurricanes and typhoons (HT). (A) corresponds to the sum of the exposure associated with medium, high and severe levels and (B) to the sum of the exposure of high and severe levels. The latter definition is associated with firms that are most vulnerable to physical risk materialisation. Figures are shaded in grey where the weight of credit to firms in a given hazard and sector of activity is higher than the total weight of the sector in the total credit to firms portfolio. Mapping of the sectors of activity: Manufacturing, Wholesale and retail trade, Construction and real estate activities, Accommodation and food service activities and the remaining category of Other.

**The distribution of loans to firms exposed to physical risk (medium to severe levels) by sector of activity is similar to the structure of total loans to firms** (Table 3). Hence, taking into account total exposure at medium to severe levels, the weight of credit granted to sectors such as 'manufacturing', 'wholesale and retail trade' and 'construction and real estate activities', whose activities may be particularly affected should physical risks materialise, is higher. In the case of sea level rise, the incidence of credit to the 'accommodation and food service sector' is higher, despite the small exposure associated with this hazard. However, if only credit granted to firms located in the areas most vulnerable to physical risk materialisation (high and severe levels) is considered, the concentration of exposure to the 'manufacturing' sector in heat stress and the 'construction and other real estate' and 'accommodation and food services' sectors in hurricanes and typhoons also stands out, although in the latter case, the exposure of the banking sector is residual.

# 4 Conclusions

**The results of the analysis suggest concentration of credit (loans and debt securities) granted to firms located in areas with potential materialisation of water stress, heat stress and wildfire risks, with a weight above 90% of total credit in all cases and a higher incidence of medium and high-risk levels.** The predominance of intermediate levels highlights the importance of the risks already observed in some climate hazards, some of which with the potential to intensify (high risk). The absence of appropriate measures will tend to increase physical risk severity for firms and, consequently, for the banking system.

**However, exposure to the highest level of physical risk (severe risk) would still be limited, in all the climate-related hazards analysed, with a weight of total credit granted to firms of between 0% and 5%, except for heat stress, where it reaches 20%.** Furthermore, given the concentration of credit granted to the manufacturing sector in the case of exposure to this risk, the impact of it materialising may be particularly relevant in the cost structure of these firms, due to greater energy consumption needs for capital and human factor climatisation.

**These results must be interpreted as initial estimates of the banking system's exposure to physical risks through credit granted to firms.** The use of Moody's COD data has made it possible to assess the banking system's exposure to a wide range of physical risks. However, estimating the effects of physical risks on the economy and the financial system is complex. The incorporation of other sources of information, including climate data and the strengthening of the methodologies adopted may have an impact on the findings identified herein.

**The use of the static balance sheet of banks and firms in this projection horizon of physical risks (2050) may result in an overestimation of the exposure to risk**, since it is expected that banks adapt their credit policy to firms, reflecting inter alia climate change materialising, in particular the transition risks and physical risks, and the adaptation or mitigation processes implemented by firms.

**The Banco de Portugal will continue to keep track of this issue by using other sources of information, in particular considering the NGFS scenarios.** In the analysis presented, the assessment focused only on direct exposure to physical risks, whereas the impact of second order effects, such as the destruction of vital infrastructure (e.g. transport networks) or the supply chain may also have a material impact on firms' businesses and their ability to service their debt. Moreover, the interaction between physical risks should also be considered, as the occurrence of several hazards at the same time may amplify the impact of climate change.

**Other relevant information should also be incorporated in the analysis of the impact of physical risks materialising.** In particular, the location of the firms' various establishments, the existence of insurance cover for assets pledged as collateral for loans, or other risk adaptation and mitigation strategies. In the case of real estate assets, the correlation of their location with the location of the firm's establishments and their exposure to physical risk must also be assessed. Therefore, sufficient available granular information is essential.

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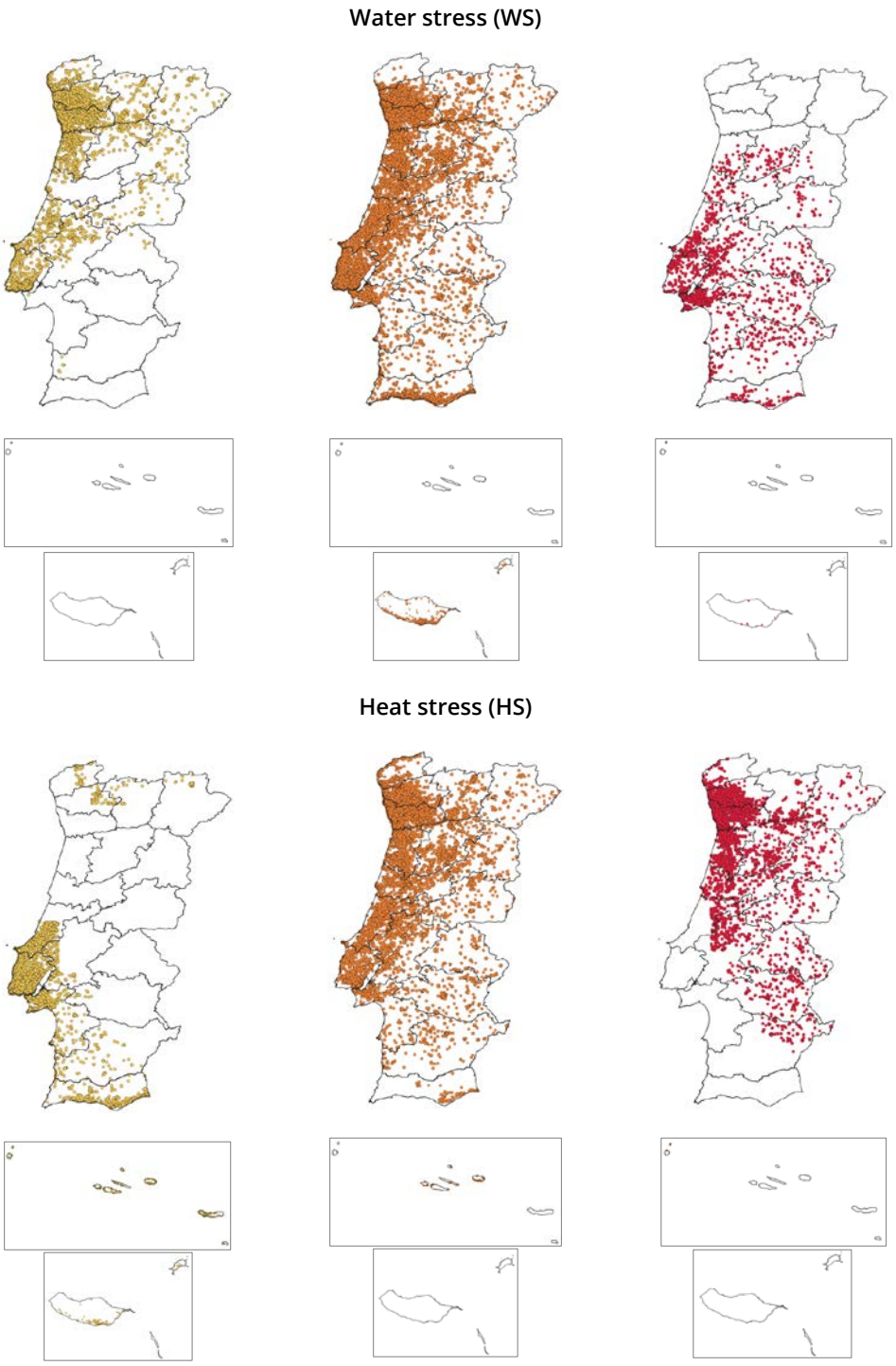
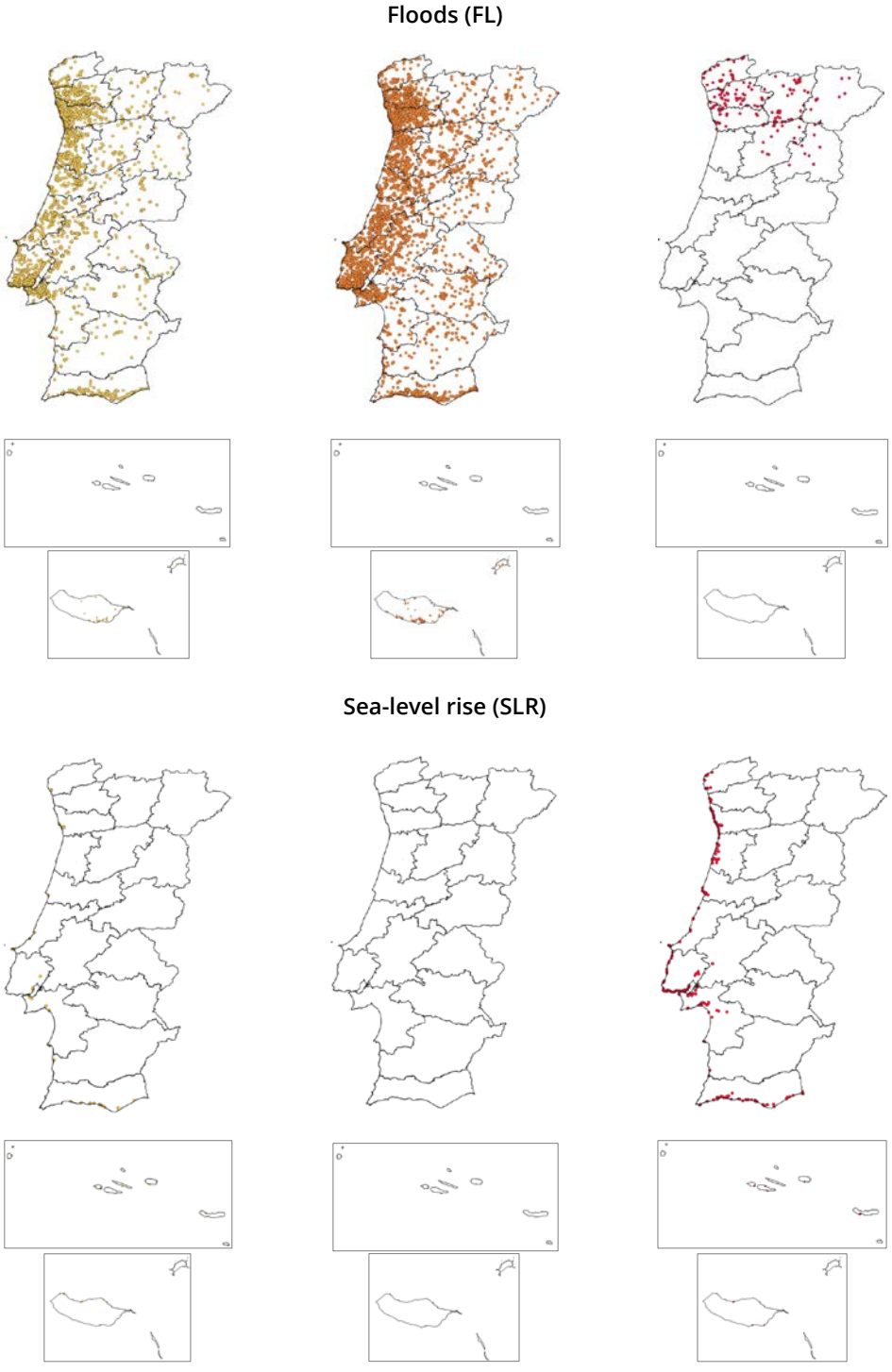
# Annexes

**Figure 1** • Firms located in areas more vulnerable to the materialisation of physical risk (medium, high and severe levels)



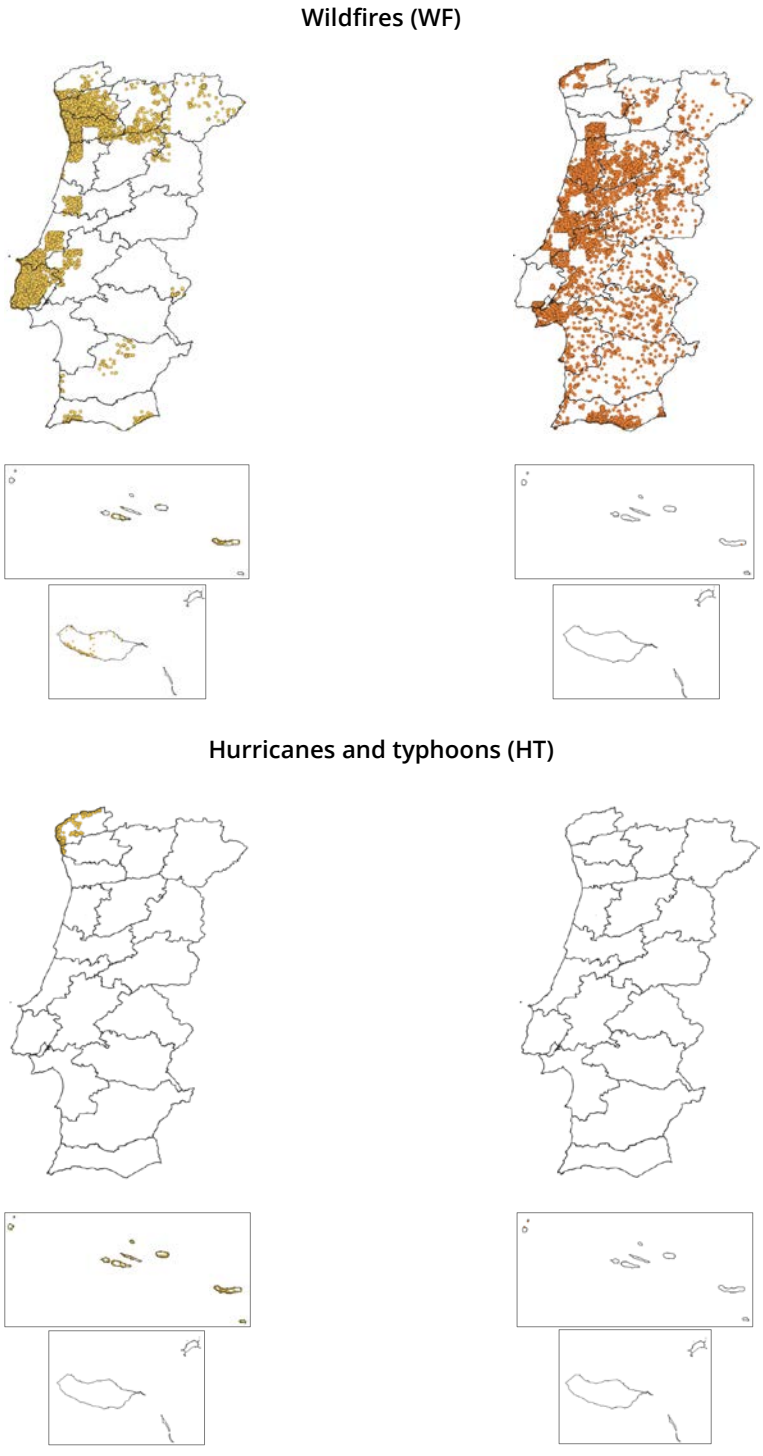

Sources: Banco de Portugal and Moody's COD. | Notes: Each dot corresponds to the location of a firm's headquarters. Yellow dots correspond to medium risk, orange to high risk and red to severe risk respectively. In the case of the mainland, the lines correspond to districts. To help visualising and interpreting the results from the Azores and Madeira archipelagos, smaller scales were used compared to the territory of mainland Portugal.

**Figure 2** • Firms located in areas more vulnerable to the materialisation of physical risk (medium, high and severe levels)




Sources: Banco de Portugal and Moody's COD. | Notes: Each dot corresponds to the location of a firm's headquarters. Yellow dots correspond to medium risk, orange to high risk and red to severe risk respectively. In the case of the mainland, the lines correspond to districts. To help visualising and interpreting the results from the Azores and Madeira archipelagos, smaller scales were used compared to the territory of mainland Portugal.

**Figure 3** • Firms located in areas more vulnerable to the materialisation of physical risk (medium and high levels)




Sources: Banco de Portugal and *Moody's COD*. | Notes: Each dot corresponds to the location of a firm's headquarters. Yellow dots correspond to medium risk and orange to high risk. As regards wildfires and hurricanes and typhoons hazards, no firm's locations are associated with severe risk. In the case of the mainland, the lines correspond to districts. To help visualising and interpreting the results from the Azores and Madeira archipelagos, smaller scales were used compared to the territory of mainland Portugal.