



EUROPEAN CENTRAL BANK

BANKING SUPERVISION

2023 stress test of euro area banks

Final results

BANKENTOEZICHT

July 2023

BANKTILSYN BANKU UZRAUDŽĪBA

BANKŲ PRIEŽIŪRA NADZÓR BANKOWY

VIGILANZA BANCARIA

BANKFELÜGYELET

BANKING SUPERVISION

SUPERVISION BANCAIRE BANČNI NADZOR

MAOIRSEACHT AR BHAINCÉIREACHT NADZOR BANAKA

BANKING SUPERVISION

PANGANDUSJÄRELEVALVE

SUPERVISÃO BANCÁRIA

BANKOVNI DOHLED

БАНКОВ НАДЗОР

BANKTILSYN

BANKENAUF SICHT

ΤΡΑΠΕΖΙΚΗ ΕΠΟΠΤΕΙΑ PANKKIVALVONTA

SUPRAVEGHERE BANCARĂ BANKOVÝ DOHL'AD

SUPERVIŽJONI BANKARJA

SUPERVISIÓN BANCARIA

BANKING SUPERVISION

SUPERVISÃO BANCÁRIA

BANKENAUF SICHT

Contents

Executive summary	2
Introduction	5
1 Scenarios	7
2 Main results	10
2.1 Overall impact on CET1 capital	10
2.2 Credit risk	16
Box 1 Sensitivity analysis of loan losses to a further deterioration in real estate markets	19
Box 2 Leveraged finance	20
Box 3 ECB top-down credit risk benchmarks	23
2.3 Market risk	24
Box 4 Counterparty credit risk	26
2.4 Profitability	27
Box 5 Sensitivity of pass-through rate assumptions regarding banks' retail interest rates	32
2.5 Operational risk	33
2.6 Other items	34
3 Integration into SREP	37
3.1 Qualitative findings – Element 2 (internal governance and risk management)	37
3.2 Quantitative findings – determination of Pillar 2 guidance (P2G)	38
List of abbreviations	40
References	41

Executive summary

ECB Banking Supervision performed two stress test exercises for euro area significant institutions in 2023. 57 significant institutions directly supervised by the ECB took part in the EU-wide stress test coordinated by the European Banking Authority (EBA) in cooperation with the European Systemic Risk Board (ESRB), the ECB and national competent authorities (NCAs). At the same time, a further 41 significant institutions directly supervised by the ECB took part in the parallel stress test coordinated by the ECB.

The stress test results are used to assess the ability of euro area banks to cope with financial and economic shocks. The stress test uses 2022 year-end data as a starting point to analyse how each bank's capital position would evolve over the next three years under a baseline scenario and an adverse scenario. The exercises provide supervisors, banks and market participants with a common analytical framework to compare and assess the resilience of euro area banks to country-specific shocks.

An aggravation of geopolitical tensions leading to stagflation and rising interest rates are novel features of the 2023 adverse scenario. While the baseline scenario is based on the December 2022 projections from the EU national central banks,¹ the adverse scenario represents a hypothetical series of negative events triggered by the materialisation of risks to which the EU banking system is exposed.² It depicts a prolonged period of low growth and elevated inflation resulting in balance sheet stress in the corporate and household sectors, combined with sharp asset price corrections and rising interest rates. This stands in stark contrast to the 2021 adverse scenario narrative, which featured low and declining interest rates.

The stress test results show that the euro area banking sector is overall resilient to a severe economic downturn, as represented in the adverse scenario. The depletion in the system-level CET1 ratio amounts to around 4.8 percentage points, fully loaded, and 5.0 percentage points, transitional, under the adverse scenario.³ Maximum depletion is estimated at 4.9 percentage points, fully loaded, over the scenario horizon. At the end of the projection horizon, the system-level CET1 ratio stands at 10.4% in the adverse scenario and 16.4% in the baseline scenario. The impact shows a high degree of heterogeneity across banks, in line

¹ For non-EU countries, this is based on the latest forecasts of the International Monetary Fund and the Organisation for Economic Co-operation and Development.

² The adverse scenario narrative is based on the latest systemic risk assessment of the General Board of the European Systemic Risk Board and also reflects recent risk assessments by the EBA and the ECB.

³ As per the EBA methodology, all balance sheet items and P&L projections over the years 2023-25 are carried out on the basis of the accounting regime applicable as of 31 December 2022. IFRS 17 – which establishes accounting principles for the recognition and measurement of insurance contracts – only entered into force on 1 January 2023. IFRS 17 was therefore disregarded for the purpose of the EBA EU-wide stress test. To ensure sufficient transparency, however, the EBA has disclosed restated CET1 and total risk exposure amounts which reflect the impact of IFRS 17. These memorandum items have, however, not been subject to the same thorough quality assurance as performed by competent authorities for the other published stress test data.

with expectations given the diversity in the banking sector's business models and balance sheet structures. Under the adverse scenario, 53 banks are subject to restrictions on dividend payments in at least one year of the projection horizon,⁴ as they breach the risk-based MDA trigger. At the same time, only nine banks⁵ would have difficulty to meet their legally binding total SREP capital requirements (TSCR)⁶ and/or leverage ratio (LR) requirements. Given the nature of the stress test – which is not a “pass or fail” exercise – identified capital shortfalls will not, however, lead to immediate recapitalisation actions. Instead, bank-level results will inform the Supervisory Review and Evaluation Process (SREP) for each institution.

Credit and market risk losses and costs associated with funding and administrative expenses drive overall depletion. Loan loss provisions and risk exposure amounts (REA) increase substantially, as the adverse macroeconomic conditions affect borrowers' debt servicing capacity and recovery rates. At the same time, banks' net income-generation capacity contracts, as rising interest rates exert pressure on funding costs while inflationary pressures lead to an upward trend in administrative expenses. Banks also face additional losses stemming from the revaluation of their asset portfolios under the market risk framework.

Overall, the banking sector CET1 ratio depletion is slightly lower than in the previous exercise, as banks have seen their starting point improve significantly. The continuation of balance sheet cleaning programmes has led to positive trends in asset quality. Additionally, the banks' capacity to generate income has been boosted by the expansion of lending margins combined with slower adjustments of deposit rates, amid rising interest rates in the past year. These developments have allowed banks to better withstand the high severity of the adverse scenario compared to the 2021 stress test.

The ECB has also identified several qualitative findings concerning banks' stress test capabilities. While participating banks delivered stress test submissions of sufficient quality overall, risk data aggregation issues still prevail across the full sample of participating euro area banks. In addition, some institutions showed deficiencies in some of the new elements of this year's stress test. This notably concerns credit risk modelling at the level of economic sectors and leveraged finance exposures.⁷

Furthermore, the stress test results contribute to the ongoing supervisory dialogue in the context of the SREP. Qualitative outcomes will be included in the risk governance part of the SREP, thereby influencing how Pillar 2 requirements (P2R) are determined. Quantitative results will be used as a key input when setting the Pillar 2 guidance (P2G) and, for the first time, the leverage ratio P2G (P2G-LR).

⁴ 51 banks in the final year of the projection horizon.

⁵ When accounting for IFRS 17, two of these banks would no longer project TSCR and/or LR breaches under the adverse scenario.

⁶ Analysis identifying banks falling short of their individual capital requirements based on transitional capital ratios.

⁷ The leveraged exposures were subject to additional scrutiny in the exercise, under the same macroeconomic scenarios applied to the total corporate portfolios.

The exercise is designed to strengthen market discipline. The disclosure of bank-level results enables market participants to compare how common shocks affect banks' balance sheets. At the same time, supervisory stress tests are not a substitute for banks' internal stress tests, which are based on banks' own methodologies and tailor-made scenarios to assess bank-specific risk profiles and vulnerabilities.

Introduction

EU law requires the European Central Bank (ECB) to carry out stress tests on directly supervised banks at least once a year. As the competent authority, the ECB is required to carry out annual stress tests on supervised entities in the context of its Supervisory Review and Evaluation Process (SREP), as set out in Article 100 of the Capital Requirements Directive V (CRD V).⁸

ECB Banking Supervision performed two stress test exercises for significant institutions in 2023. 57 directly supervised significant institutions took part in the EU-wide stress test coordinated by the European Banking Authority (EBA) in cooperation with the European Systemic Risk Board (ESRB), the ECB and national competent authorities. These are referred to as “EBA banks” or “EBA sample” below. At the same time, a further 41 directly supervised significant institutions took part in the parallel stress test coordinated by the ECB (referred to as “SSM banks” or “SSM sample” below).

The stress test used 2022 year-end data as a starting point to analyse how banks’ capital position would evolve over the three-year scenario horizon to the end of 2025. The two exercises were conducted using the same baseline and adverse scenarios, applying a broadly similar methodology, prescribed by the EBA, with appropriate adjustments made for smaller banks to allow for proportionate treatment.

Banks’ stress test submissions were subject to a thorough quality assurance process. The ECB, in its role as competent authority, carried out in-depth quality assurance of banks’ stress test submissions. This included checking for data quality and methodological compliance as well as assessing the economic meaningfulness of banks’ stress projections. For the latter, ECB staff examined bank submissions from different perspectives, by using ECB top-down benchmarks and comparisons of banks’ projections against relevant peers (peer benchmarks), also taking bank-specific characteristics into account.

The stress test provides supervisors, banks and market participants with a common analytical framework to assess the resilience of EU banks to adverse economic shocks. In this way it also fosters market discipline and transparency. Importantly, the stress test is not a “pass or fail” exercise, namely, there are no predefined thresholds for identifying immediate recapitalisation needs. That said, the results of the stress test make it possible to assess the ability of banks to meet applicable minimum and additional own funds requirements under the given methodological assumptions and specific scenarios.

⁸ Directive (EU) 2019/878 of the European Parliament and of the Council of 20 May 2019 amending Directive 2013/36/EU as regards exempted entities, financial holding companies, mixed financial holding companies, remuneration, supervisory measures and powers and capital conservation measures (OJ L 150, 7.6.2019, p. 253-295).

The 2023 stress test provides important input for the SREP, and the findings of the stress test will be part of the ongoing supervisory dialogue. ECB Banking Supervision will use both the qualitative results (quality and timeliness of banks' submissions) and the quantitative results (capital depletion and banks' resilience to adverse market conditions) as input for the SREP. In this context, the stress test results will also be used when determining the supervisory capital requirements and guidance for banks.

This report presents the main findings and final results of the 2023 stress test. It focuses on the aggregate results for the full sample of 98 significant institutions participating in the stress test exercises this year. The EBA publishes individual results for the 57 banks taking part in the EBA-coordinated exercise and the ECB does the same for the 41 banks taking part in the ECB-coordinated exercise.

1 Scenarios

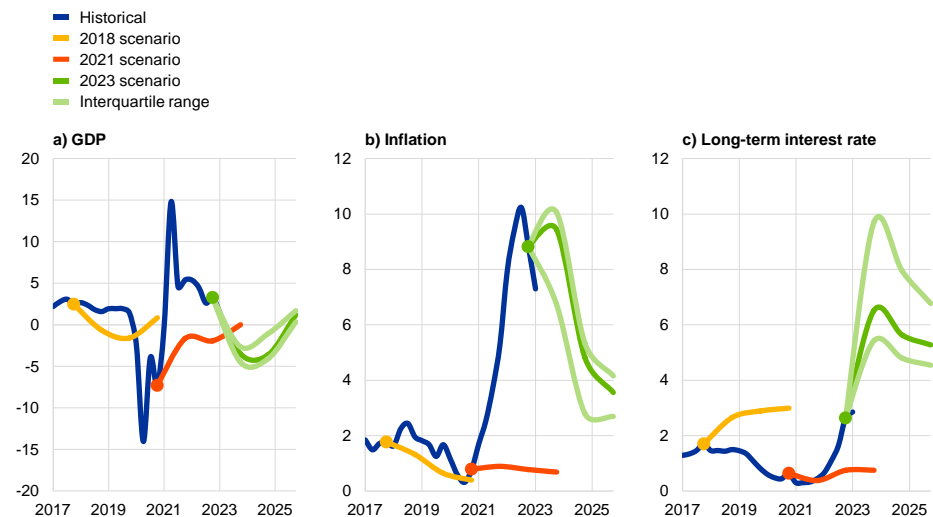
The 2023 adverse scenario is characterised by high and persistent inflation and a pronounced slowdown in economic activity, while the baseline scenario is based on the projections from the national central banks.⁹ The adverse scenario depicts a stagflation narrative encompassing a sharp fall in GDP and a departure from previously assumed low levels of inflation. Geopolitical polarisation leads to soaring prices and increasing production costs. Higher costs, together with elevated uncertainty, dampen economic sentiment, lowering consumption and investment. As persistent inflationary pressures elevate inflation expectations and wage claims, economic activity decreases further (Chart 1.1, panels a) and b).

Chart 1.1

The 2023 adverse scenario features high inflation despite slowing economic activity and high interest rates

Selected adverse scenario variables for banks in the full 2023 stress test sample

(percentage points)



Sources: ESRB and COREP.

Notes: Scenario starting points imposed on historical series. The series present historical and scenario projections weighted by the country-specific exposure of the banks included in the 2023 SSM sample. The country weights for all series are fixed as at Q4 2022. The interquartile range refers to country values on the 25th and 75th percentiles. The historical long-term interest rate is the interest rate used for convergence purposes (ten-year maturity).

High current and expected inflation leads to a substantial increase in market interest rates. High and persistent inflation in the 2023 adverse scenario triggers a prompt, strong increase in market interest rates and risk premia that is, moreover, sustained over the scenario horizon. At the same time, tighter financial conditions (Chart 1.1, panel c), together with slower economic activity, result in downward revisions of the private and public sector's creditworthiness. This scenario includes

⁹ The baseline macro-financial scenario is based on December 2022 projections from the EU national central banks, and the adverse macro-financial scenario was designed by the ESRB's Task Force on Stress Testing in close collaboration with the ECB. The scenario was approved by the ESRB's General Board and sent to the EBA on 23 January 2023. More detailed descriptions of the scenarios for the 2023 exercise can be found on the [EBA](#) and [ESRB](#) websites.

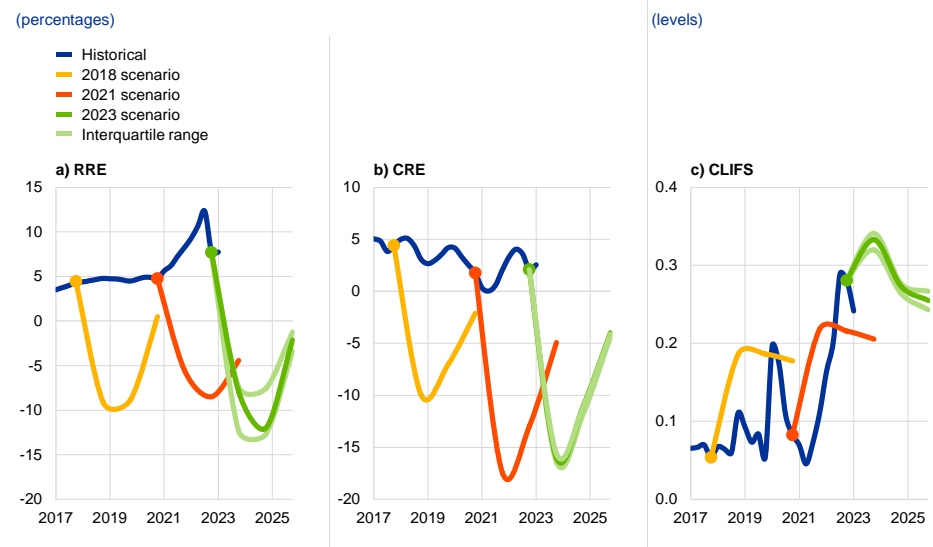
for the first time a decomposition of the GDP impact across different sectors of the economy, thereby differentiating the risks associated with exposures to energy-intensive sectors, for instance, under the adverse scenario.

The 2023 adverse scenario is rather severe, with a cumulative decline in real GDP from the starting point amounting to 6%. In addition, both residential and commercial real estate prices undergo large corrections: commercial real estate (CRE) having already been especially vulnerable following the COVID-19 pandemic, and residential real estate (RRE), due to overvaluations and increasing vulnerabilities arising from declining households' income and the rising debt servicing burden (Chart 1.2, panel a). Finally, a synthetic indicator is constructed using the Country-Level Index of Financial Stress (CLIFS) methodology to describe the severity of the financial shocks included in the scenario.¹⁰ This measure points to a significant increase in financial stress embedded in the 2023 exercise (Chart 1.2, panel c).

Chart 1.2

The adverse scenario is also characterised by pronounced shocks to real estate and financial variables

Selected adverse scenario variables for banks in the full 2023 stress test sample



Sources: ESRB and COREP.

Notes: The series present historical and scenario projections weighted by the country-specific exposure of the banks included in the 2023 SSM sample. The interquartile range refers to country values on the 25th and 75th percentiles. Scenario starting points imposed on historical series. RRE stands for residential real estate; CRE stands for commercial real estate; CLIFS stands for Country-Level Index of Financial Stress.

The combination of inflationary supply shocks, tight financial conditions, low foreign demand and a severe contraction in real GDP is expected to challenge bank capital levels by exerting a negative impact on credit risk and market risk. Credit risk would be expected to materialise as borrowers' debt servicing capacity declines, resulting in an increase in loan losses. At the same time, falling

¹⁰ Financial shocks are summarised using a CLIFS indicator (Duprey, T. and Klaus, B., "Dating systemic financial stress episodes in the EU countries", *Working Paper Series*, No 1873, ECB, December 2015). The CLIFS forecast is based on a simple country-level fixed effects panel model that accounts for the differences in credit default spread indices (iTraxx), long-term interest rates, inflation and stock prices.

real estate prices would be expected to reduce recovery rates on impaired loans, acting as a separate trigger for credit risk. Banks would also be likely to experience valuation losses on their fixed income portfolio. Finally, administrative expenses are liable to increase in a high-inflation environment.

At the same time, the way the yield curve is configured in the 2023 adverse scenario may support some elements of bank profitability. Banks with a higher share of variable-rate loans can be expected to benefit in this scenario in relative terms, as they pass through reference rates more quickly to their borrowers. However, the extent to which gains on the income side can compensate for losses incurred on the credit and market risk side will depend to a large extent on the banks' asset and liability structures and the development of their funding costs.

2 Main results

2.1 Overall impact on CET1 capital

The stress test results show that euro area significant institutions are resilient overall to a severe economic downturn, as represented in the adverse scenario. Under the adverse scenario, the system-level CET1 ratio reaches 10.4% (fully loaded)¹¹ at the end of 2025, corresponding to a depletion of 4.8 percentage points. Under the baseline scenario, the aggregate CET1 ratio increases by 1.3 percentage points to stand at 16.4% at the end of 2025 (Chart 2.1, panel a, and Chart 2.2).¹² In a historical perspective, the euro area adverse CET1 ratio drops below its lowest point of recent years. The capital build-up occurring over the last decade means that the resulting adverse CET1 ratio is well above the CET1 ratio of 8.3% projected under the adverse scenario in the 2014 Comprehensive Assessment stress test conducted at the inception of the Single Supervisory Mechanism. This illustrates how much the resilience of the euro area banking sector has improved during this period. Under the baseline scenario, the capital position of banks is projected to continue to increase, reaching an unprecedented value relative to historical levels at the end of the stress test horizon (Chart 2.1, panel a).

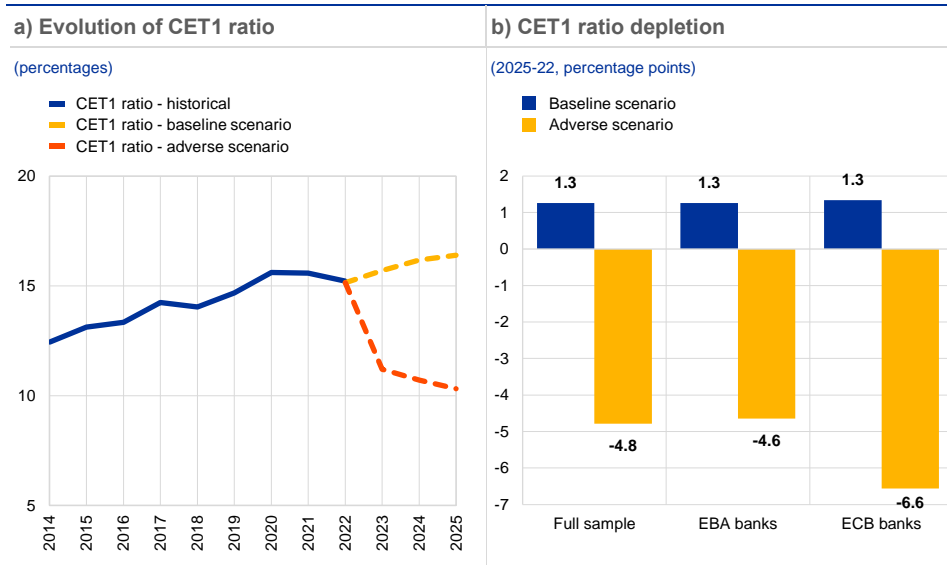
Smaller banks and certain business models included in the SSM sample exhibit higher depletion than EBA banks. Generally, results for smaller banks and specific business models which constitute the SSM sample are characterised by a lower income-generation capacity and higher loan losses over the projection horizon than the larger euro area banks belonging to the EBA sample. At the same time, SSM banks project lower administrative expenses. Additionally, as SSM banks start the exercise with a stronger capital position (20.2%) than EBA banks (14.7%), their capital ratio at the end of the exercise (13.7%) remains above that of EBA banks (10.1%), despite the higher depletion under the adverse scenario (Chart 2.1, panel b).

¹¹ All figures are expressed in fully loaded terms below, unless stated otherwise.

¹² As per the EBA methodology, all balance sheet items and P&L projections over the years 2023-25 are carried out on the basis of the accounting regime applicable as of 31 December 2022. IFRS 17 – which establishes accounting principles for the recognition and measurement of insurance contracts – only entered into force on 1 January 2023. IFRS 17 was therefore disregarded for the purpose of the EBA EU-wide stress test. To ensure sufficient transparency, however, the EBA has disclosed restated CET1 and total risk exposure amounts which reflect the impact of IFRS 17. These memorandum items have, however, not been subject to the same thorough quality assurance as performed by competent authorities for the other published stress test data.

Chart 2.1

The euro area banking sector is resilient overall under the adverse scenario, although the system-level CET1 ratio contracts significantly



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: The CET1 ratio is calculated as the ratio of Common Equity Tier 1 capital to total risk exposure amount. Panel a: the historical evolution of the transitional CET1 ratio covers an unbalanced panel, as not all of the 98 euro area institutions in the full 2023 stress test sample have been reporting supervisory data to the ECB since 2014; differences between using the full stress test sample rather than the common sample of reporting banks between the 2023 stress test and historical reporting years are assessed to be marginal.

The system-level depletion under the adverse scenario is driven by credit risk and market risk, combined with a contraction in banks' income-generation capacity (Chart 2.2). The severe macro-financial evolution leads to the materialisation of a marked increase in loan losses (contributing 4.5 percentage points to total depletion, 2.3 percentage points more than in the baseline scenario). At the same time, the system-wide income-generation capacity is weakened by rising funding costs, which offset the positive gains expected from rising rates on the assets side.¹³ Thus, banks project significantly lower net interest income in the adverse scenario than in the baseline scenario (difference of 2.4 percentage points). The contribution of net fee and commission income and dividend income also contracts by 1.2 percentage points, while market risk effects stemming from lower net trading income also contribute 2.4 percentage points to the CET1 ratio depletion in the adverse scenario compared with the baseline scenario.

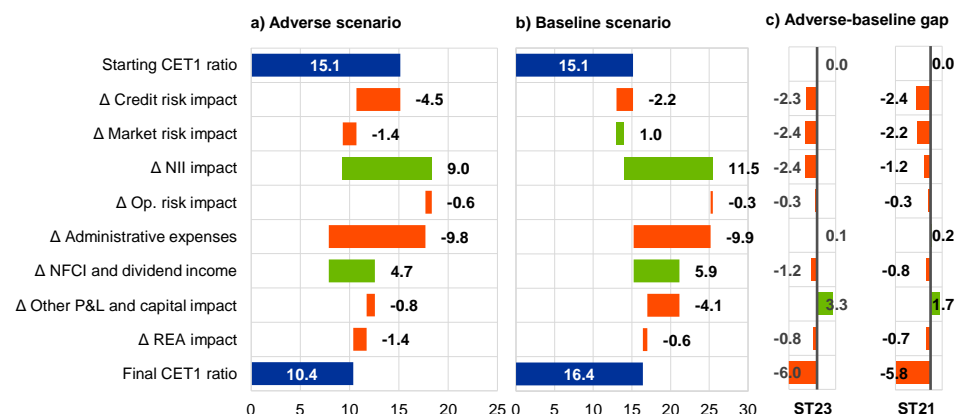
¹³ The EBA methodology provides a series of constraints aimed at ensuring an adequate level of conservativeness of projections, as a well as a level playing field across banks. One such constraint applied to NII states that, under the adverse scenario, projected NII is subject to a cap relative to the starting point. This cap also contributes to a contraction in the projected NII relative to the banks' model-based projections when assuming a static balance sheet.

Chart 2.2

System-level CET1 depletion under the adverse scenario is mostly driven by credit risk, market risk and a contraction in income-generation capacity

CET1 ratio depletion drivers

(percentages and percentage points)



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Note: NII stands for net interest income; NFCI stands for net fee and commission income; REA stands for risk exposure amount.

Under the adverse scenario, the majority of banks reach their minimum CET1 ratio at the end of the stress test horizon (Chart 2.3, panel a). A significant

number of banks (67) project the highest adverse CET1 depletion at the end of stress test horizon. However, almost a third of the full sample project the lowest CET1 ratio in the initial years. This reflects various frontloading effects of both the scenario and the EBA methodology¹⁴ that affect some banks more than others, combined with a more pronounced recovery in income generation under the scenario. The overall system-level CET1 ratio contraction, when accounting for the maximum depletion across banks, reaches 4.9 percentage points, which is 0.1 percentage points higher than the overall depletion at the end of the scenario horizon (Chart 2.3, panel b).

All banks retain sufficient capital under the baseline scenario to cover their capital requirements. Under the adverse scenario, 53 banks are subject to

restrictions on dividend payments in at least one year of the projection horizon (51 banks in the final year), as they breach the risk-based MDA trigger (Chart 2.3, panel c).¹⁵ In turn, this has a positive effect on their capital ratios, as reduced distributions boost the available capital base, leading to lower depletion over the stress test horizon overall. At the same time, this shows that under the adverse scenario, roughly half of participating banks would dip into their prudential capital buffers.¹⁶ Apart from that, only nine banks would have difficulty meeting their total SREP capital requirements and/or leverage ratio requirements under the adverse scenario. An additional €8.1 billion, in aggregate for affected banks, would be required to

¹⁴ This notably includes the “perfect foresight” assumption reflected in the losses given default and the market risk impact which is concentrated in the first year of the adverse scenario.

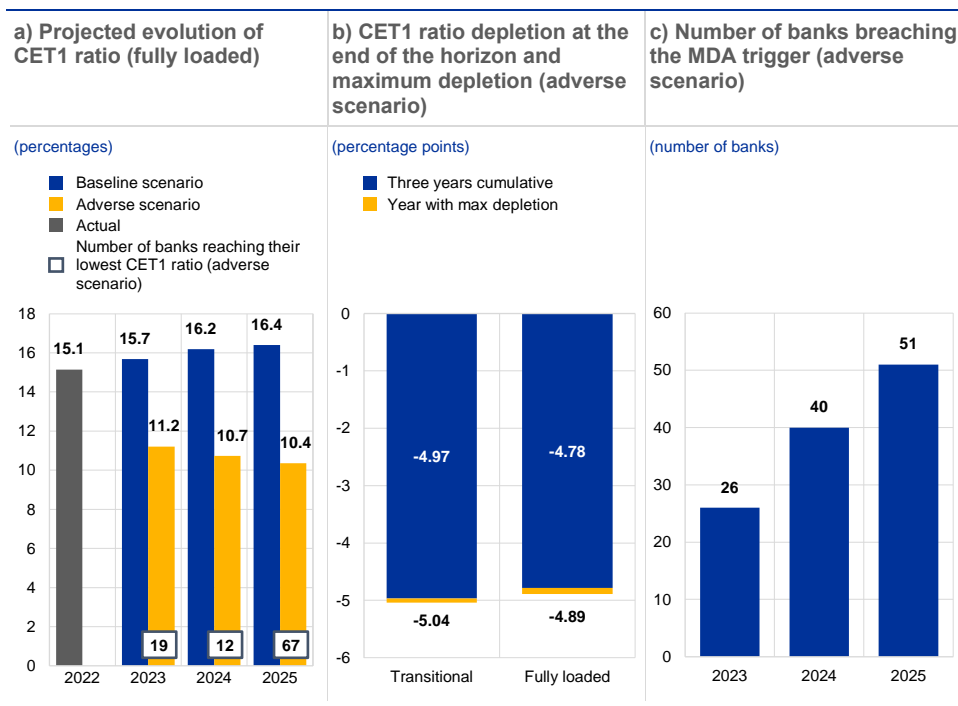
¹⁵ In line with Article 141, CRD V.

¹⁶ Combined buffer requirement as set out in Article 128, CRD V, consisting of the capital conservation buffer, countercyclical capital buffer, G-SII/O-SII buffer and systemic risk buffer.

restore capital levels in line with respective capital requirements under the specific scenario considered.¹⁷

Chart 2.3

Some banks reach the maximum depletion before the final year of the projection horizon and a number of banks breach the MDA trigger



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: Panel b: the maximum depletion at system level is calculated by aggregating the maximum depletion of individual banks, irrespective of the year this occurs. This means that the metric includes a temporal inconsistency across banks as it shows the maximum level of system-level depletion if all banks incurred the maximum depletion in the same year. Panel c: MDA stands for maximum distributable amount.

The leverage ratio also decreases in the adverse scenario, albeit more moderately (Chart 2.4, panel a).¹⁸

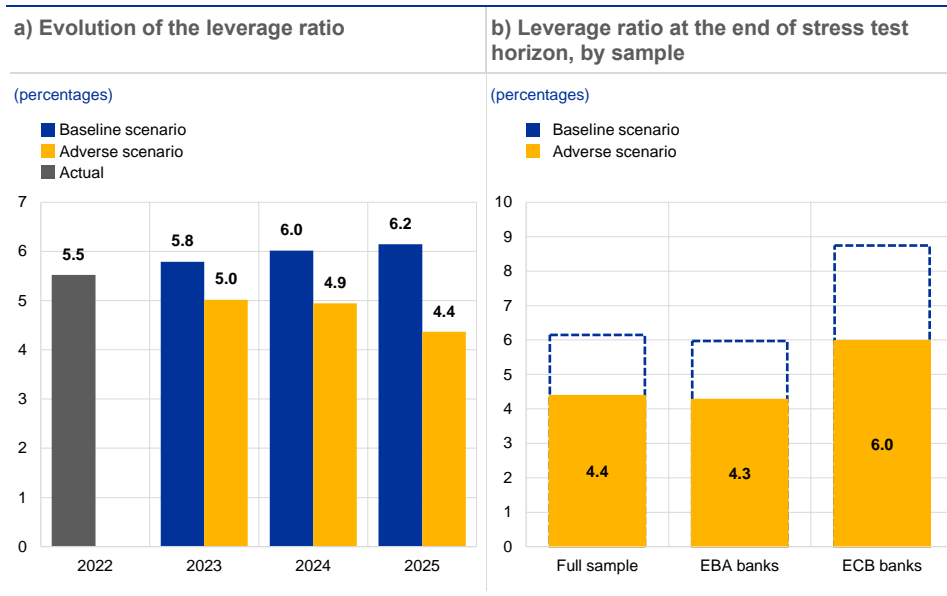
At system level, the leverage ratio decreases by 1.1 percentage points under the adverse scenario, reaching 4.4% by the end of the projection horizon. Under the baseline scenario, the leverage ratio increases by 0.7 percentage points. SSM banks project a higher leverage ratio contraction (Chart 2.4, panel b), although the higher starting point cushions the additional impact, ultimately reaching a leverage ratio level above that of EBA banks under both the baseline and adverse scenarios.

¹⁷ Following the EBA's [Guidelines on common procedures and methodologies for the supervisory review and evaluation process \(SREP\) and supervisory stress testing](#), capital shortfalls are evaluated separately for CET1, Additional Tier 1 and Tier 2 capital.

¹⁸ Under the static balance sheet assumption in the EBA methodology, total assets are assumed to remain constant over the stress test horizon, meaning that the scenario shocks only have an impact on Tier 1 capital, which is the numerator of the leverage ratio.

Chart 2.4

The leverage ratio also falls under the adverse scenario



Sources: EU-wide stress test submissions, ECB and ECB calculations.
Note: The leverage ratio is calculated as the ratio of Tier 1 capital to total assets.

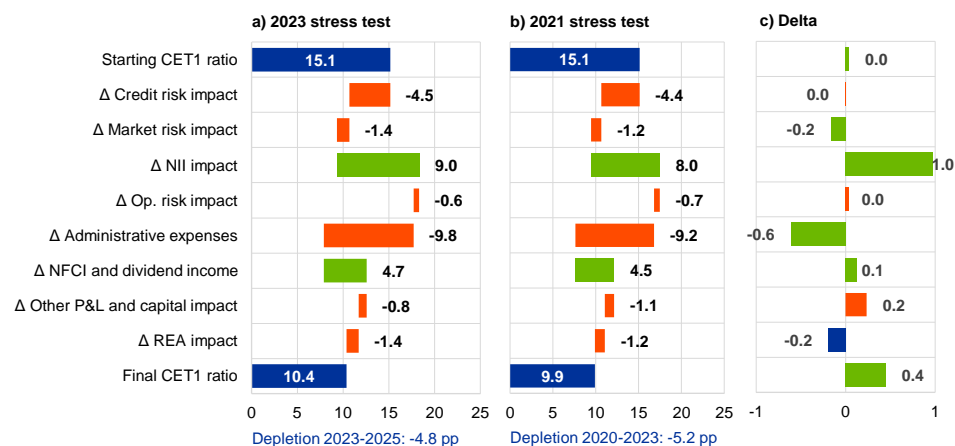
The reported CET1 ratio depletion under the adverse scenario is below the results of the previous stress test exercise of euro area banks (Chart 2.5), driven mainly by banks' higher income-generation capacity. Net interest income provides a materially higher positive contribution, related to the very different interest rate configuration of the current exercise, while the impact of loans losses remains similar to the 2021 stress test. At the same time, higher administrative expenses, resulting from the stronger inflationary pressures in the scenario, serve to narrow the gap somewhat. Additionally, banks' capacity to position and hedge their fair value portfolios more actively leads to market risk losses that are only slightly higher in the 2023 stress test.

Chart 2.5

The 2023 stress test impact is slightly below the impact of the previous exercise

Comparison of CET1 ratio impact and main drivers between 2023 and 2021 stress tests

(percentages)



Sources: EU-wide stress test submissions, ECB and ECB calculations.
 Note: The charts show the impact and drivers for the full sample of each exercise.

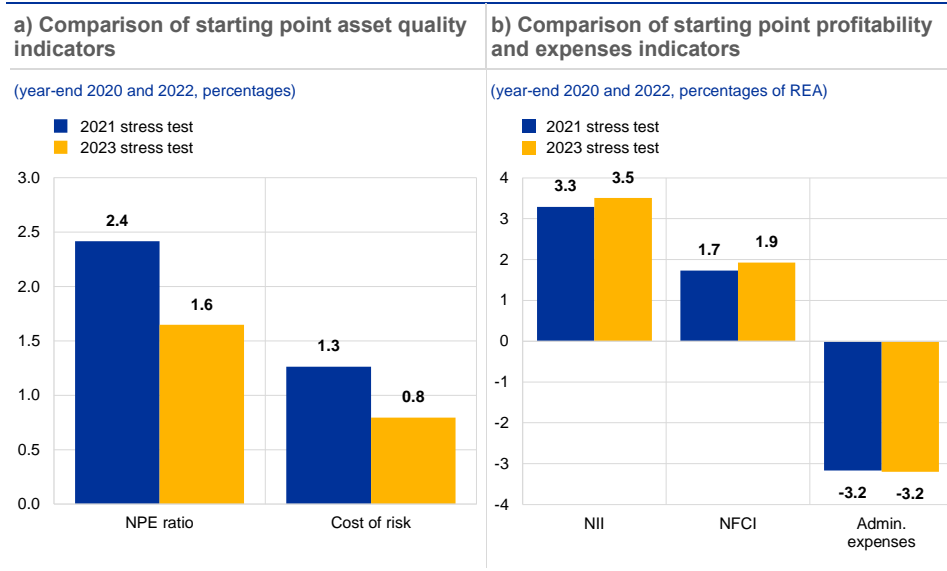
Starting point positions improved markedly compared with the previous stress test, offsetting the increased severity of the adverse scenario.

While a certain degree of heterogeneity persists across banks, the quality of the loan portfolios has improved significantly in the last few years. Banks' non-performing exposure (NPE) ratios have continued their downward trend, reaching 1.6% by end 2022 (Chart 2.6, panel a). This is almost 1 percentage point lower than the 2021 stress test starting point, driven mainly by securitisations and asset disposal strategies. Consequently, the cost of risk has also improved materially since the previous exercise.

Furthermore, the system-wide income-generation capacity has increased in the past year (Chart 2.6, panel b), boosted in particular by the recent interest rate rises driving the expansion of lending margins in parallel with slower adjustments to deposit rates.

Chart 2.6

Marked improvement in the system-level starting point compared with the previous stress test, reflecting better asset quality and higher profitability



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: The comparison between exercises covers the full sample of banks participating in each individual stress test exercise. Panel a: the NPE ratio is calculated as the share of non-performing exposures (Stage 3) in total exposures (whereby only exposures at amortised cost are included in the calculation). The cost of risk represents the NPE ratio multiplied by the coverage ratio of Stage 3 exposures, with the coverage ratio calculated as the stock of loan loss provisions for Stage 3 exposures divided by total Stage 3 exposures.

2.2 Credit risk

Credit risk losses are a key factor contributing to the depletion of banks' capital under the adverse scenario. Additional loan losses at system level account for 4.5 percentage points of the total CET1 ratio impact under the adverse scenario and 2.2 percentage points under the baseline scenario. The evolution of loan losses is driven by increasing default rates, as borrowers' debt servicing capacity is affected by the adverse macroeconomic conditions, in combination with compressed recovery rates, given the severe shocks to real estate prices. The "NPL calendar" effect¹⁹ accounts for 0.5 percentage points of the total CET1 ratio impact under the adverse scenario.

Cumulative impairments under the adverse scenario are attributable predominantly to unsecured exposures, both retail and corporate (Chart 2.7).

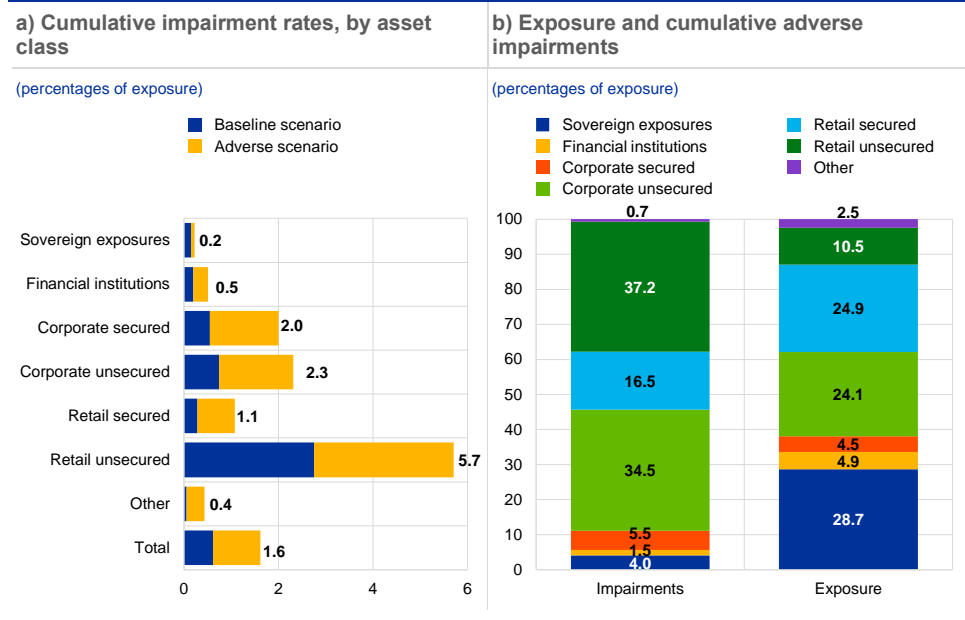
These portfolios generate around 72% of total impairments, while only representing 35% of the total exposures on the banks' balance sheets. Unsecured retail portfolios are the most vulnerable, showing a significantly higher cumulative impairment rate than other exposure classes. At the same time, secured portfolios account for around 30% of total exposures, but only contribute 22% of total impairments. Only a very small amount of the additional impairments stems from exposures to central banks and governments (sovereign exposures) and to financial institutions, even

¹⁹ This is the deduction from CET1 capital of the expected applicable amount of cover for non-performing exposures as per Article 36(1)(m) of Regulation (EU) No 575/2013.

though they have a considerable weight in the system-level portfolio composition (29%). This is attributable to their lower intrinsic riskiness under the credit risk framework.²⁰

Chart 2.7

Loan losses under the adverse scenario are driven mainly by unsecured exposures



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: Cumulative impairment rates are calculated as the sum of three-year horizon impairment flows divided by the starting point exposures. A mapping was performed to combine exposures reported under the standardised approach (STA) and the internal ratings-based (IRB) approach asset classes. This means that corporate unsecured includes all IRB corporate exposures that are secured by real estate. IRB corporate exposures not secured by real estate property and STA corporate exposures are combined in corporate unsecured. Retail secured covers IRB retail exposures secured by real estate property and STA retail exposure secured by mortgages on immovable property. Retail unsecured contains all remaining unsecured exposures. Sovereign exposures include exposures to central banks and governments.

System-level non-performing exposure (NPE) and Stage 2 ratios under IFRS 9 experience a significant upward trend, contributing to the increase in overall impairment rates.

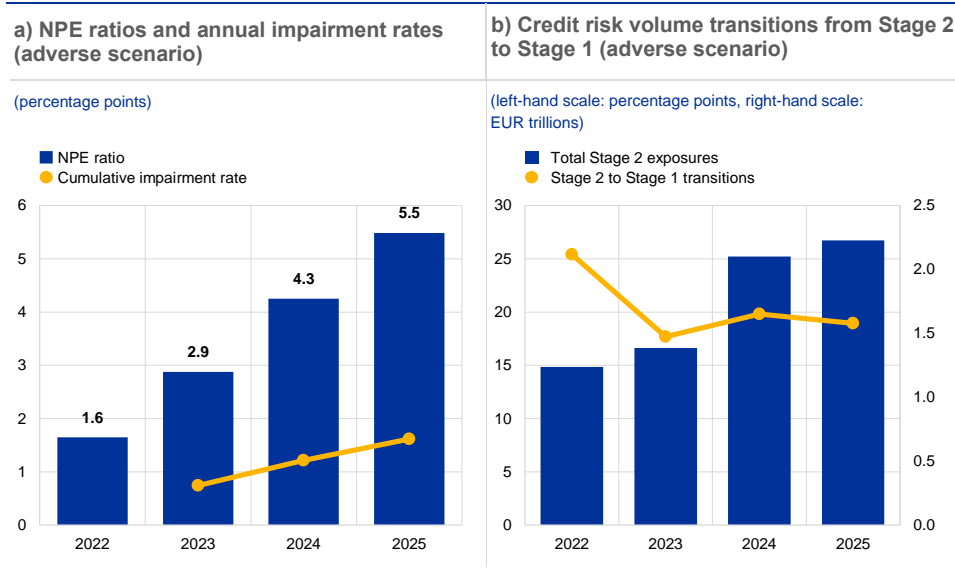
The NPE ratio increases by 3.9 percentage points²¹ under the adverse scenario, which serves to drive up impairment rates (Chart 2.8, panel a). The volumes of Stage 2 exposures also increase materially compared with the reference year (Chart 2.8, panel b). The pace of increase slows by the end of the adverse scenario, however. This is down to a pick-up in exposures that cure and transition back to Stage 1 in conjunction with the improvement in the GDP trajectory in the third year of the scenario, following the deep trough in the initial years.

²⁰ Under the EBA's EU-wide stress test methodology, only exposures measured at amortised cost are in the scope of loan loss projections under the credit risk assessment. This means that sovereign exposures are considered less risky than the rest of the portfolios from a purely credit risk perspective, as they are classified as "low default" portfolios.

²¹ The NPE ratio is constrained by the EBA's EU-wide stress test methodology that does not allow exposures to cure once they reach Stage 3. The projection can therefore be considered an upper bound.

Chart 2.8

Rising NPE ratios drive loan loss trends, but migrations from Stage 2 to Stage 1 improve marginally in the later years of the projection horizon



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: NPE ratios are calculated as the Stage 3 exposures at the end of each year as a share of total exposures at the beginning of each year. Impairment rates are calculated as the yearly impairment flows divided by the starting point total exposures.

Banks were asked to produce sector-specific loan loss projections to account for different sectoral vulnerabilities depicted in the stress test scenarios.

At aggregate level, the exposures to potentially vulnerable sectors²² represent around 40% of total corporate exposures,²³ although the figure varies greatly across banks (Chart 2.9, panel a). Among the exposures to potentially vulnerable sectors, higher impairment rates in relative terms are projected over the stress test horizon for C – Manufacturing, M-N – Professional, scientific and technical activities, and Administrative and support service activities, H – Transportation and storage and A – Agriculture, forestry and fishing (Chart 2.9, panel b). At the same time, loan loss provisions in sectors that are considered to be less vulnerable under the adverse scenario (F – Construction, G – Wholesale and retail trade, I – Accommodation and food service activities) are projected to be higher. The low dispersion of impairment rates across sectors overall also reflects limitations in the ability of banks' models to capture sectoral vulnerabilities.

Banks' modelling abilities with regard to the quantification of sectoral vulnerabilities have room for improvements.

Most of the participating banks do not have specific models for activity sectors in place, as they usually apply simple sensitivities to their projections. Only a handful of banks employ internal models to

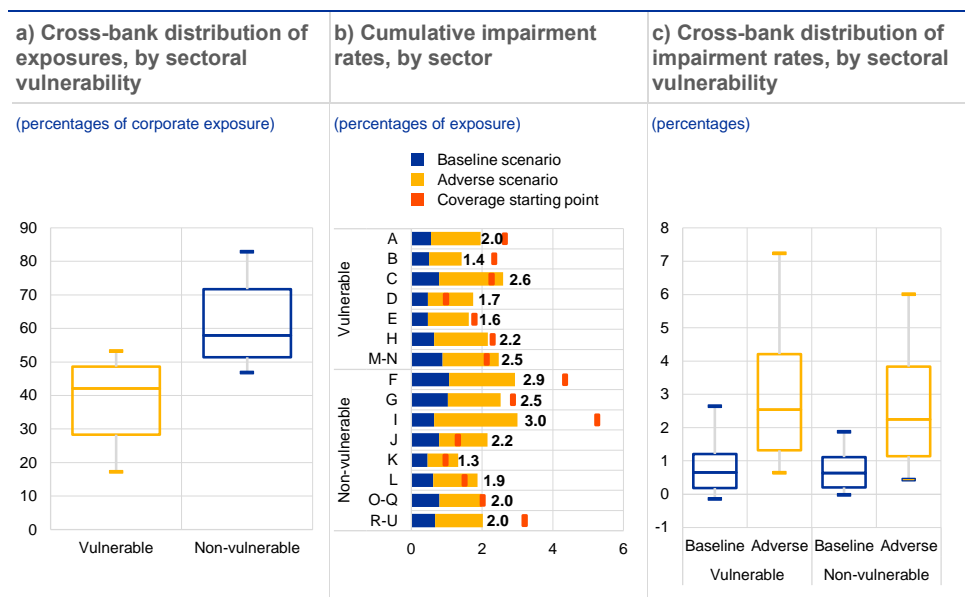
²² The sectors, based on the NACE nomenclature, with significantly greater gross value added (GVA) shocks at EU level, according to the stress test adverse scenario, than the EU overall GDP impact are classified here as vulnerable. The most affected sectors include A – Agriculture, forestry and fishing, B – Mining and quarrying, C – Manufacturing, D – Electricity, gas, steam and air conditioning supply, E – Water supply, sewerage, waste management and remediation activities, H – Transportation and storage, M-N – Professional, scientific and technical activities, and Administrative and support service activities. Sectors F – Construction and G – Wholesale and retail trade show only slightly higher cumulative GVA shocks relative to the EU GDP shocks, and so were not classified as vulnerable in this analysis.

²³ Measured as the median across banks.

derive sector-specific parameters, while most have simply adjusted their existing corporate evaluation frameworks to allow them to capture idiosyncratic risks stemming from various activity sectors. This modelling weakness is clearly reflected in the lack of scenario sensitivity in sectoral losses, which are only slightly higher in vulnerable sectors than in less vulnerable sectors (Chart 2.9, panel c). The pandemic and the energy crisis have demonstrated that vulnerable sectors are highly sensitive to a slowdown in economic activity or constrained market conditions. In this light, it is considered essential for banks to improve their ability to quantify emerging risks in these sectors promptly, not least given the key role that such capabilities play in climate stress testing.

Chart 2.9

Sectoral vulnerabilities only marginally accounted for when projecting loan losses



Sources: EU-wide stress test submissions, ECB and ECB calculations.
Notes: Cumulative impairment rates are calculated as the sum of three-year horizon impairments divided by the starting point exposures. See footnote 22 for definition of vulnerable sectors. Panels a) and c): the boxplots show the median value, the Q1-Q3 interquartile range and the whiskers show the 10th/90th percentiles.

Box 1

Sensitivity analysis of loan losses to a further deterioration in real estate markets

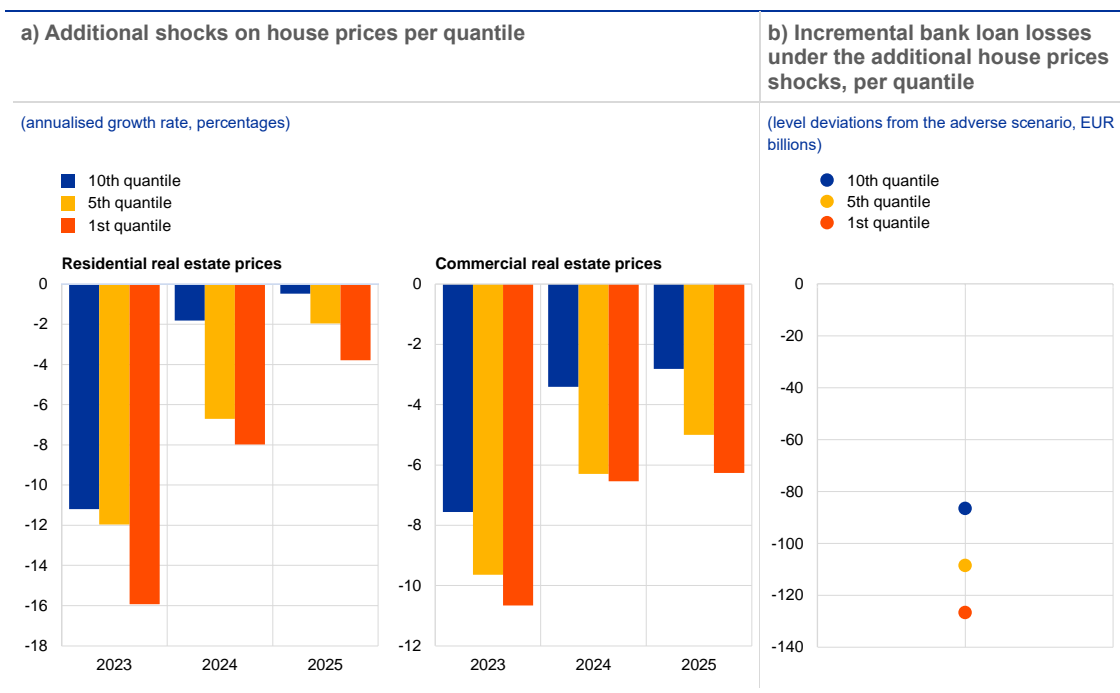
The adverse scenario for the real estate sector prescribes a considerable price adjustment against the backdrop of a severe tightening in financing conditions and a slowdown in economic activity. Downward adjustments in the commercial real estate segment are expected to be particularly pronounced, with a cumulative decline from the starting point exceeding 25% in 21 out of 27 EU countries. In parallel, residential real estate prices are expected to fall by an average of 21% between 2022 and 2025 across the EU. To explore the sensitivity of banks’ capital positions to additional shocks in the real estate segment, further scenario paths for residential and commercial real estate prices are considered in addition to those in the adverse scenario for the 2023 stress test.

Downside risks to house prices could be sensitive to a further tightening in financial conditions, remote-working policies and a slowdown in economic activity. A simulation based

on an extreme deterioration in financial conditions yields a further cumulative decline in house prices with a peak drop of 16% for residential real estate and 11% for commercial real estate, presented as deviations from the adverse scenario (Chart A, panel a). Bank losses conditional on these extreme tail scenarios for house prices materialising would lie between €70 and €110 billion (Chart A, panel b).

Chart A

Sensitivity analysis of house prices



Sources: ECB (SDW and top-down models), ECB/Eurosystem staff macroeconomic projections for the euro area and ECB calculations.
Notes: Panel a: extension of the model described in Figueres and Jarczyński (2020). The projected tails of euro area level residential and commercial real estate prices are proxied by the increase in the Composite Indicator of Systemic Stress, CISS index and current prices as for Q4 2022 estimated using quantile regression local projections. Figures show cumulative growth rates over three years (2023-25). Panel b: additional losses relative to the adverse scenario, given the additional shock on house prices as estimated in panel a (presented as deviations from the adverse scenario).

Box 2

Leveraged finance

A leveraged finance block has been included in this stress test to support supervisory efforts to assess risks related to banks' leveraged exposures²⁴. Additional data collection and quality assurance was performed for a sample of 24 banks, selected on the basis of the materiality of their leveraged finance exposures. The data cover three major risk types: credit risk, market risk and net interest income.²⁵

Leveraged finance exposures carry a high degree of credit risk and market risk, which is exacerbated by adverse conditions. Leveraged exposures in scope of credit risk account for

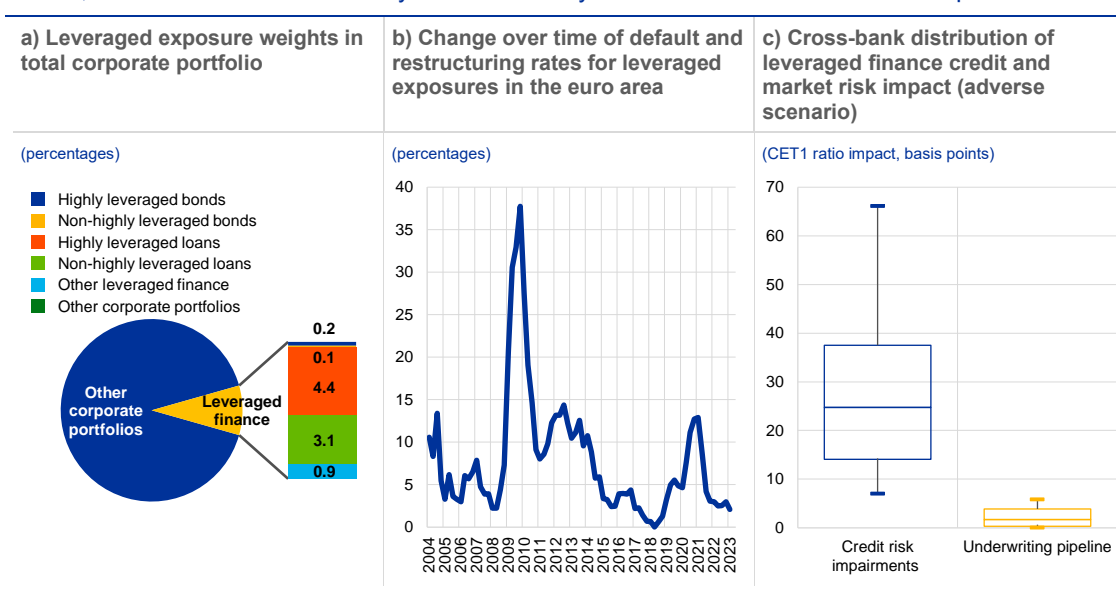
²⁴ As defined by the ECB's [Guidance on leveraged transactions](#), May 2017.

²⁵ All 24 banks were in scope for credit risk and net interest income, while 16 banks were also part of the market risk analysis. The data collection consisted of six additional templates, designed similarly to the EBA templates and subject to the same scenario, but with a focus on the leveraged exposures of the corporate portfolios.

close to 9% of total corporate exposures of the sample of banks participating in the additional data collection (Chart A, panel a). There is a high degree of heterogeneity across euro area significant institutions, with some having turned to leveraged exposures in search for higher yields, especially in the recent period of low interest rates. Leveraged exposures carry an elevated risk relative to other corporate exposures, however, as highly indebted borrowers are more sensitive to adverse economic developments. Moreover, almost half of these exposures are classified as highly leveraged.²⁶ This inherently higher risk profile of leveraged exposures is reflected in the sharp increases in default and restructuring rates for leveraged transactions observed during past downturns (Chart A, panel b). Overall, for the 24 banks with material exposures, the leveraged finance portfolio resulted in an average CET1 ratio depletion of around 25 basis points in the loan book and around 3 basis points in the underwriting pipeline (Chart A, panel c).

Chart A

Share of leveraged transactions in banks' balance sheets exposes them to additional credit risk losses, which have been historically exacerbated by adverse macroeconomic developments



Sources: EU-wide stress test submissions and ECB calculations.

Notes: Not exposure-weighted. Panel c: the x-axis indicates the additional credit risk impairments (blue box) and the underwriting pipeline losses (yellow box) as a share of the risk exposure amount (REA).

Projected credit risk indicators for banks' leveraged exposures are higher than the rest of the corporate portfolio (Chart B, panels a) and b). The increased risk inherent in the leveraged finance portfolios results in materially higher projected increases in coverage and NPE ratios compared with the total corporate exposures. Among leveraged transactions, the highest impairment rates are attributable to loans (and, in particular, highly leveraged loans), which represent almost 85% of the total exposures.

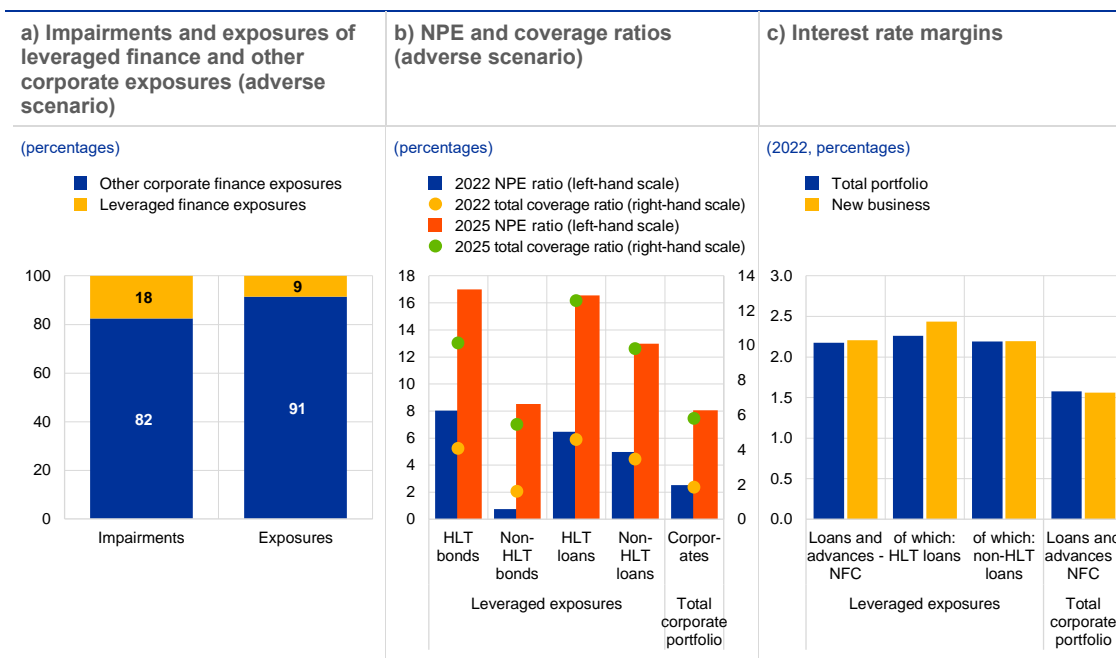
Banks are reporting elevated returns on their leveraged exposures. A key factor behind the recent strong growth in leveraged lending is the higher returns offered on leveraged finance exposures compared with other NFC exposures, with interest margins on leveraged exposures

²⁶ The highly leveraged transactions refer to the high-risk transactions where total debt is more than 6.0x EBITDA at the time of the deal's origination, as defined by the letter sent by the ECB on 28 March 2022 entitled "Leveraged transactions – supervisory expectations regarding the design and functioning of risk appetite frameworks and high levels of risk taking", as well as in the ECB Guidance on leveraged transactions (Chapter 5).

being higher by a multiple of around 1.5 (Chart B, panel c). This should, however, be set against the notably higher risks related to these exposures.

Chart B

Banks' leveraged exposure credit risk-reward profiles



Sources: EU-wide stress test submissions and ECB calculations.

Notes: HLT stands for highly leveraged transaction, non-HLT stands for non-highly leveraged transaction. Panel b: the margins expressed in the chart are based on the definition set out in the EBA's EU-wide stress test methodology, which, in general, differs from banks' internal definitions of margins. Panel c: the aggregated margins were calculated after excluding the outlier values.

Exposures in leveraged underwriting (UW) pipelines are concentrated in seven portfolios, two of which suffer losses in excess of 2 basis points of the risk exposure amount (REA) in the adverse scenario. UW exposures are concentrated in the banking book, leading to higher losses under the adverse scenario (Chart C, panel a). Moreover, in terms of sensitivities to different risk factors, the UW pipeline portfolios are riskier than the corresponding general portfolios²⁷ when looking at corporate credit spreads and especially the FX risk factor.²⁸ Only one bank demonstrates a very high positive interest rate sensitivity (Chart C, panel b).

Most banks do not hedge their UW transactions. Only two banks out of fourteen hedge the macro/systemic risk of the pipeline, while none of them hedge against issuer-idiosyncratic risk or counterparty credit risk. This could be due to the low materiality of the transactions or the lack of suitable credit default swaps. Instead, banks tend to use their limit frameworks to mitigate these risks.

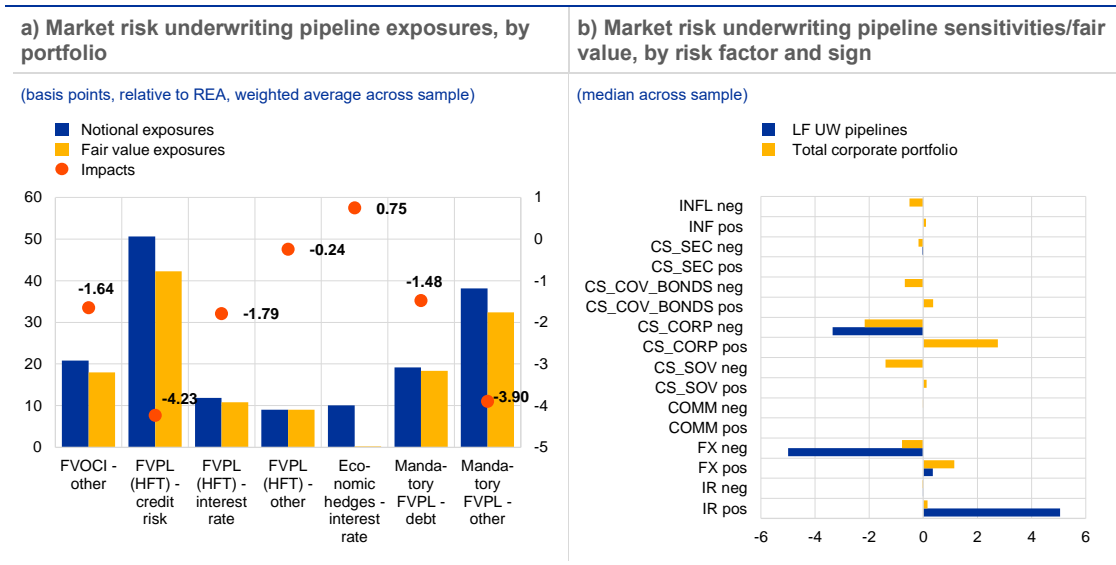
The leveraged finance deep dive detected some deficiencies in banks' approaches to stress test modelling. With respect to UW pipelines, only a few banks have in place a dedicated multiple scenario approach calibrated on relevant market crises. Similarly, on the credit risk side, only a few banks incorporate leveraged finance-specific risks in the modelling of risk parameters.

²⁷ The corresponding portfolios are reported in the CSV_MR_FULL_REVAL template.

²⁸ Notably, 47% of facilities in terms of fair value are in US dollars.

Chart C

Market risk underwriting pipeline exposures



Source: ECB calculations.

Notes: Panel a: exposures as at year-end 2022. Gains/losses after application of the 2023 adverse market risk scenario. HFT stands for held-for-trading; FVPL stands for fair value through profit or loss; FVOCI stands for fair value through other comprehensive income. Panel b: CS_SCE stands for credit spread securitisation; CS_COV_BOND stands for credit spread covered bonds; CS_CORP stands for credit spread corporate; CS_SOV stands for credit spread sovereign; COMM stands for commodities; FX stands for foreign exchange; IR stands for interest rate; "pos" stands for positive sign; "neg" stands for negative sign; LF stands for leveraged finance.

Box 3

ECB top-down credit risk benchmarks

ECB top-down models are employed to provide credit risk benchmarks to banks participating in the EU-wide stress tests and challenge their submissions. The top-down credit risk benchmarks are estimated by ECB staff and, for the purpose of providing banks with a supporting tool in the context of the EU-wide stress test, approved by the EBA's Board of Supervisors. Banks have the option to use the ECB top-down credit risk benchmarks for portfolios where they do not have an internal credit risk stress test model. The ECB top-down models ensure that there is a level playing field between participating banks and that the overall exercise is sufficiently conservative.

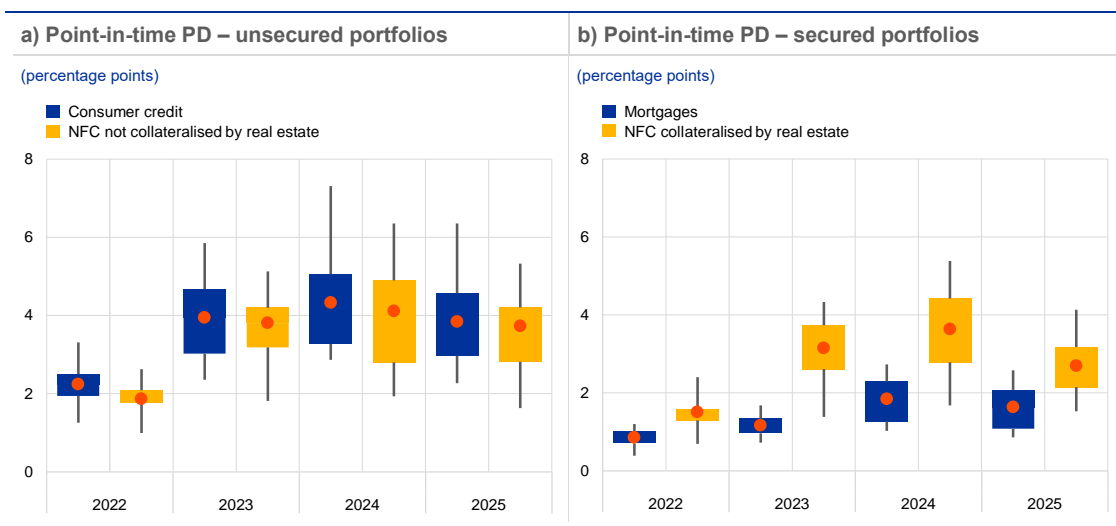
The ECB credit risk benchmarks are estimated using a suite of econometric models and conditioned on the baseline and adverse macro-financial scenarios of the stress tests.²⁹ The models employed combine both time-series and quantile panel-data econometric techniques to capture the relationship between macroeconomic variables projected in the scenarios and credit risk parameters, as well as their non-linear behaviour in the tails. National authorities report the historical data for default rates (or proxies thereof) and IFRS 9 transition probabilities used to calibrate the ECB models. This ensures that the parameter projections are based on a long time series which well captures the default dynamics of each country participating in the stress tests.

²⁹ A more detailed description of the ECB's credit risk models is available in Henry and Kok (2013), Dees et al. (2017) and a forthcoming report by the Working Group on Stress Testing under the ECB's Financial Stability Committee.

The benchmarks provide projections of IFRS 9 parameters for bank portfolios defined at the country and portfolio level. The scenario-conditional forward paths for IFRS 9 parameters are derived for all (40+) countries covered in the ESRB’s macro-financial scenario and for the following portfolio segments: real estate collateralised portfolios (mortgages, non-financial corporations), non-real estate-related exposures (consumer credit, non-financial corporations, financials) and sovereigns. Specifically, the ECB credit risk benchmarks allow banks to project default rates, transition probabilities, loss given default and lifetime loss rates. These IFRS 9 parameters evolve in line with the macro-financial scenario and are used to calculate impairments, which affect the numerator of the capital adequacy ratio. Chart A shows country aggregate distributions of point-in-time probabilities of default (PDs) projected under the adverse scenario using the ECB credit risk benchmarks for selected portfolios. Particularly for uncollateralised exposures, it indicates a predicted marked increase in credit risk in line with the assumed deterioration of economic conditions.

Chart A

Projected path of point-in-time PDs for selected portfolios, based on top-down credit risk benchmark



Sources: Free-form data collection and ECB (top-down credit risk benchmarks, approved by EU Member States).
Notes: Top-down projections based on starting points submitted by national central banks. NFC stands for non-financial corporations.

2.3 Market risk

Market risk losses increase as risk premia and uncertainty in financial markets rise.³⁰ Under the adverse scenario, the aggregate market risk impact contributes 1.4 percentage points to total CET1 ratio depletion. The impact is mainly driven by the revaluation effects stemming from positions measured at fair value. These are stressed in the first year of the adverse scenario based on a set of instantaneous shocks, as provided in the market risk scenario. The additional losses are partially

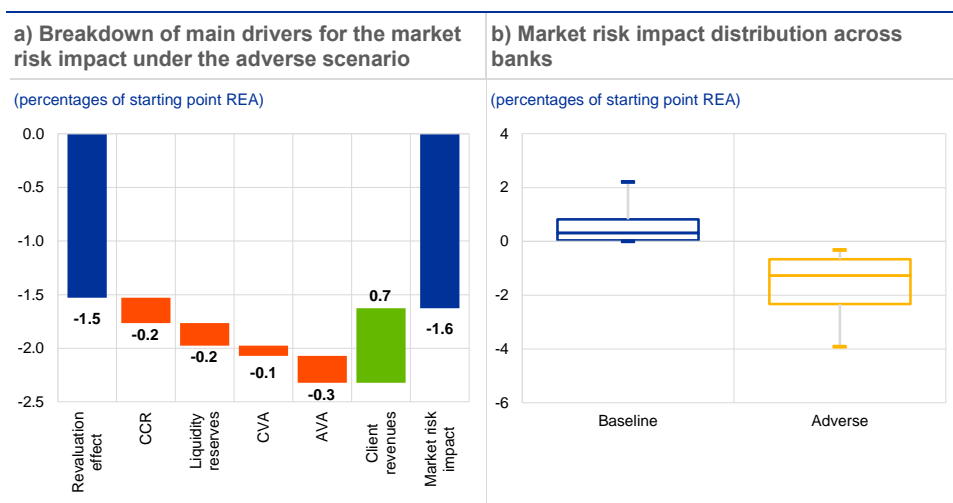
³⁰ Under the EBA’s methodological framework, NTI components, CCR exposures, hedge accounting positions, other comprehensive income, non-trading financial assets mandatorily at fair value through profit or loss and financial assets and liabilities designated at fair value fall under the scope of the market risk assessment. A set of instantaneous shocks, as provided in the market risk scenario, are applied to these items in the first year of the adverse scenario. Additional shocks from the market risk scenario are also applied to the bid-ask spread of L1, L2 and L3 instruments, leading to an increase in the reserves on fair value adjustments and additional valuation adjustments, under the liquidity issues and model risk.

offset by the projected client revenues, which make a significant positive contribution, of 0.7 percentage points (Chart 2.10, panel a).

Banks are affected by the market risk scenario to a differing extent. This can be seen from the significant dispersion of the three-year cumulative market risk losses under the adverse scenario (Chart 2.10, panel b). The dispersion is mostly attributable to the full revaluation effects, which is the main driver of market risk impact across the majority of institutions. The baseline scenario shows positive effects on capital across the sample, as only the effects of the scenario on net trading income (NTI) are taken into account.³¹

Chart 2.10

Revaluation effects drive market risk losses in the adverse scenario, but distribution of losses varies across banks



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: REA stands for risk exposure amount. Panel a: the total market risk impact also includes the AVA component. CCR stands for counterparty credit risk; CVA stands for credit valuation adjustment; AVA stands for additional valuation adjustment. Panel b: the boxplot shows the median value and the Q1-Q3 interquartile range, while the whiskers show the 10th/90th percentiles of the cross-bank distribution of the three-year cumulative market risk losses.

Reported market risk losses tend to reflect business model specialisation.

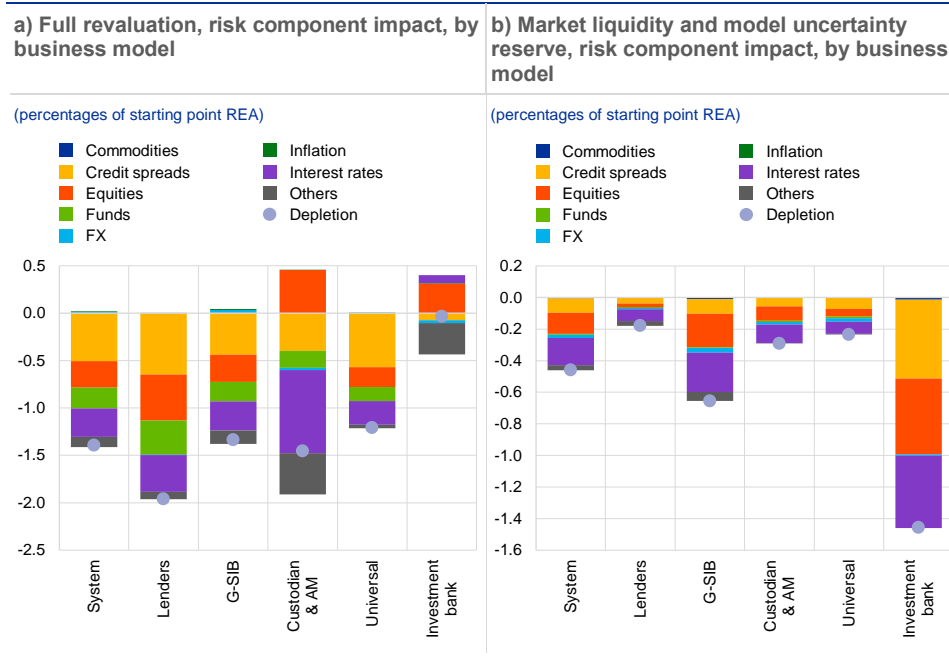
While some institutions, such as investment banks³², can benefit from equity shocks and rising interest rates, the revaluation impact of market risk shocks is generally negative (Chart 2.11, panel a). At the same time, widening bid-ask spreads of items in portfolios mainly exposed to interest rate, credit spread and equity shocks drive the system-level impact stemming from market liquidity and model uncertainty reserves, with a particularly negative effect for investment banks (Chart 2.11, panel b).

³¹ Under the EBA's EU-wide stress test methodology, revaluation effects, shocks to bid-ask spreads in the context of liquidity reserves and counterparty defaults are only taken into account under the adverse scenario, with no impacts incorporated in the baseline scenario.

³² The positive equity impacts seen in custodians and asset managers, as well as in investment banks, are driven by net short equity positions in the trading books of some banks with these business models. The size of the impact is also accentuated by the low REA of these business models compared with the rest of the sector.

Chart 2.11

Interest rate, credit spread and equity shocks are the main contributors to the market risk impact components across business models



Sources: EU-wide stress test submissions, ECB and ECB calculations.
 Notes: "Lenders" comprises diversified lenders, corporates/wholesale lenders, small market lenders, retail lenders and development/promotional lenders; "G-SIB" stands for global systemically important banks; "Custodian & AM" stands for custodians and asset managers; "Universal" stands for universal banks. Panel a: full revaluation losses before application of methodological floors.

Box 4

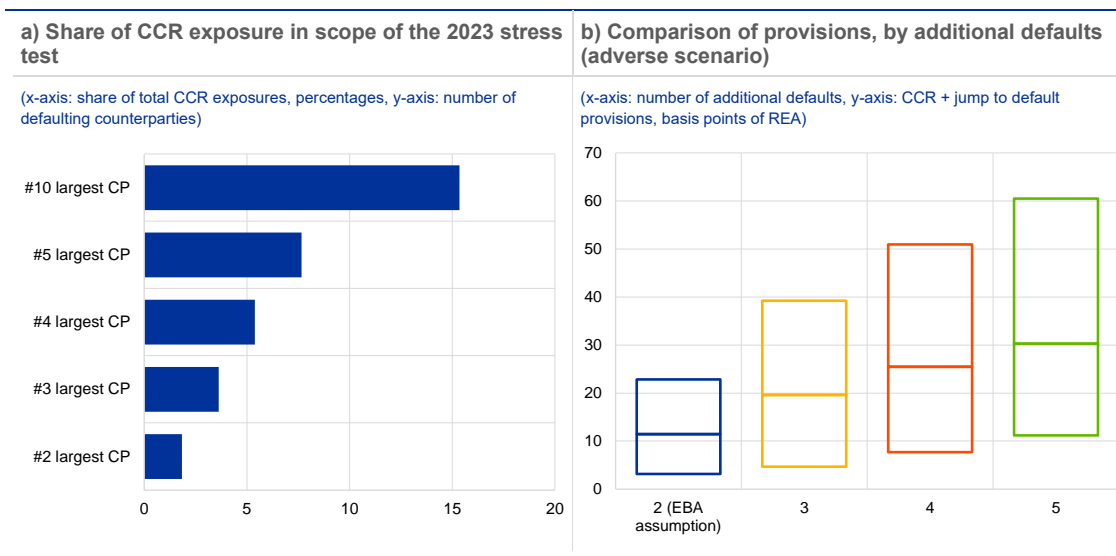
Counterparty credit risk

The EBA's EU-wide stress test methodology requires banks to simulate the P&L impact resulting from the default of the two most vulnerable counterparties in a group of the ten largest in terms of stressed counterparty credit risk (CCR) exposure. Within this group, the two most vulnerable counterparties are selected based on their probability of default. Overall, the CCR net exposures covered by the 2023 stress test represent on average 15% of the total CCR exposures not cleared through central counterparties (Chart A, panel a).

To explore banks' vulnerability to counterparty credit risk, a sensitivity analysis was conducted, varying the number of defaults by the most vulnerable counterparties (from two up to five). Chart A panel b) shows the distribution of CCR losses relative to REA across banks. As the number of defaulting counterparties increases, the median impact for two defaulting counterparties rises from around 10 basis points of additional provisions to around 25 basis points (equivalent to an increase of 165%) for five counterparties defaulting. At the same time, the dispersion of the distribution increases significantly, with some banks experiencing material increases in CCR losses as the scope of defaulting counterparties increases. Overall, this analysis illustrates that the market risk CET1 depletion stemming from counterparty credit risk is conditional on weak stress test methodological assumptions. A small change in those assumptions leads to a material additional drop in the CET1 ratio. Therefore, close monitoring of the CCR for the largest counterparties is warranted for prudent risk management purposes.

Chart A

The CCR exposures reported in the stress test template represent a small share of total CCR exposures, and median provisions increase with the number of counterparties defaulting



Sources: EU-wide stress test submissions and ECB calculations.

Note: Panel a: CP stands for counterparties. Panel b: the boxplot shows the median value and the Q1-Q3 interquartile ranges of the cross-bank distribution of the CCR losses.

2.4 Profitability

System-level profitability weakens under the adverse scenario as banks' income-generation capacity decreases.

Total net income³³ contracts by an average of 16.7% over the three years of the adverse scenario compared with the starting point, as the rising funding costs and broader macroeconomic and financial shocks impairs banks' ability to generate income. The decline in income-generation capacity leads to a contraction in the available buffer to absorb additional losses, driving a faster transmission of shocks into capital effects.

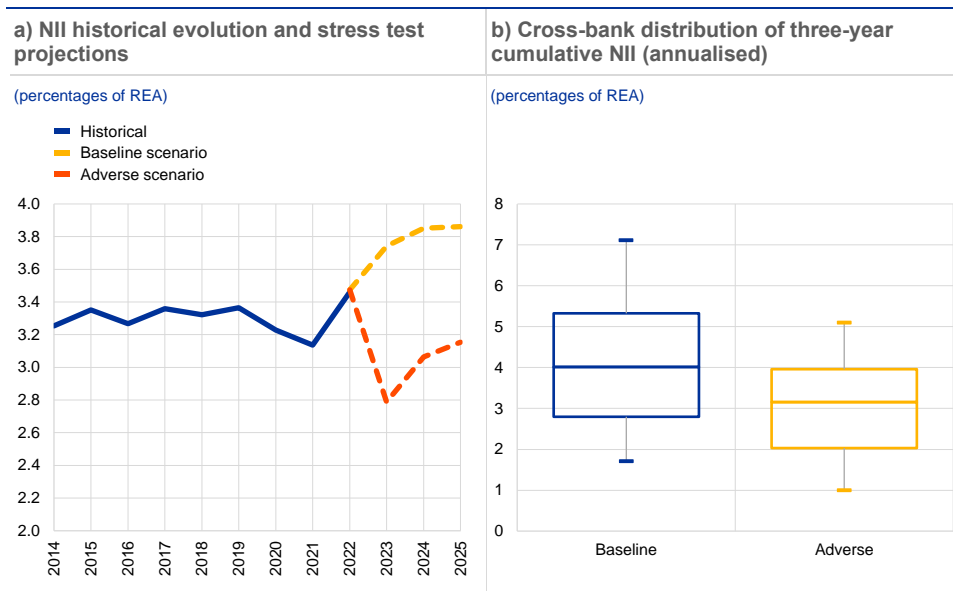
A significant contraction of net interest income (NII) can be observed under the adverse scenario, primarily due to the funding stress envisaged by the exercise (Chart 2.12, panel a). System-level NII is projected to decline in the first year of the stress test horizon and only recover gradually thereafter. Under the baseline scenario, by contrast, the system-level NII is projected to increase materially, continuing the recent trend. This system-level impact does, however, mask significant heterogeneity across banks, as the pass-through of interest rates differs, depending on the specificities of their asset and liability structures (Chart 2.12, panel b). Thus, banks with a large share of fixed-rate lending benefit less from rising interest rates than banks with more floating-rate loans. In addition, banks relying more heavily on funding sources with faster interest rate pass-through are comparatively more negatively affected under the adverse scenario. Other factors, such as hedging strategies and interest rate profiles outside the banking book also

³³ Including net interest income, net fee and commission income and dividend income.

play a relevant role. These differences lead to wide distributions of impacts in both the baseline and the adverse scenarios.

Chart 2.12

System-level NII suffers a severe hit under the adverse scenario relative to historical levels, but the impact is asymmetric across banks



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: The historical evolution of NII covers an unbalanced panel, as not all institutions in the full 2023 stress test sample have been reporting supervisory data to the ECB since 2014; differences between using the full stress test sample rather than the common sample of reporting banks between the 2023 stress test and historical reporting years are assessed to be marginal. REA stands for risk exposure amount. Panel a: historical values are expressed as a share of the respective year REA, while stress test projection values are expressed as a share of 2022 REA. Panel b: the boxplot shows the median value, the Q1-Q3 interquartile range and the whiskers show the 10th/90th percentiles.

In the adverse scenario, interest income is mainly driven by higher lending rates, and interest expenses by higher deposit rates and wholesale funding costs. On the assets side, loan portfolios (both retail and non-retail) benefit from higher reference rates and widening margins³⁴ driving up the effective interest rate and hence interest income (Chart 2.13). Additionally, the negative effect of rising lending rates on borrowers' repayment capacity is reflected to some extent by increasing provisioning for non-performing exposures (NPEs) consistent with banks' credit risk projections.³⁵ Conversely, on the liabilities side, sight deposits provide the largest contribution to interest expenses, driven by the large volumes held by banks as they represent a cheaper source of funding than term deposits. At the same time, term deposits see a much higher overall increase in costs, due to the higher pass-through rate of interest rate shocks implied by the methodology³⁶ compared with

³⁴ Under the EBA's 2023 EU-wide stress test methodology, margins are calculated as the difference between the effective interest rates reported by the banks and the scenario-implied risk-free rates. This means that the margins reflected in the analysis are not the commercial margins in the banks' loan agreements. In addition, the methodology allows for a constrained widening of margins to reflect increasing risk premia under the adverse scenario.

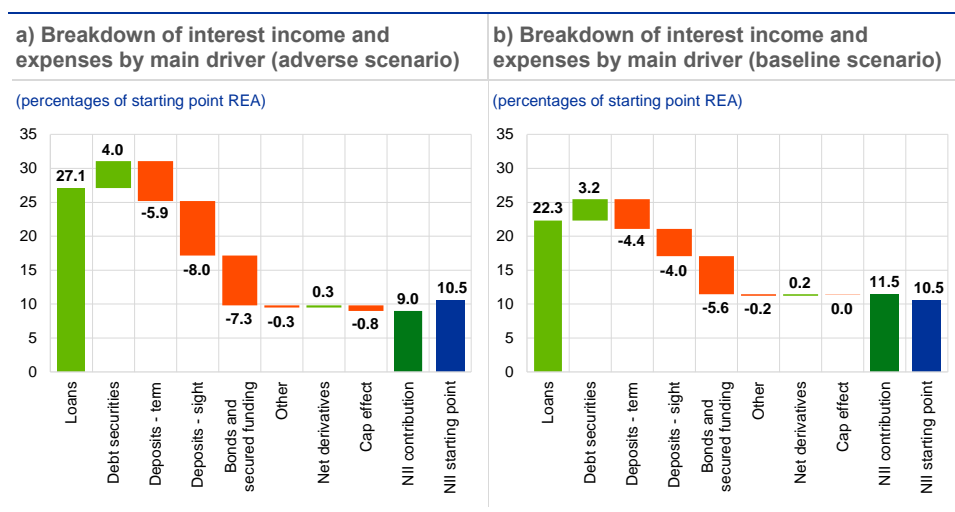
³⁵ From a methodological perspective, the NII projections capture the effect on accrued interest due to increasing provisioning for NPEs consistent with banks' credit risk projections. However, the increase in projected loan losses is treated under the credit risk framework and does not directly and equivalently reduce projected NII (as the additional losses flow through P&L).

³⁶ The methodology prescribed reference rate pass-through for sight deposits of 50% for households and 75% for non-financial corporations, and 100% otherwise. Furthermore, the methodology envisages asymmetric pass-through for the margin evolution by deposit type.

sight deposits, leading to a relatively high negative impact in NII.³⁷ Furthermore, on the funding side, the ECB's targeted longer-term refinancing operations (TLTROs) also play an important role for the projected interest expenses of some banks. While the methodology allowed banks to net the outstanding TLTRO amounts with the available excess liquidity held with the Eurosystem³⁸ upon maturity, banks were assumed to refinance the residual TLTRO amount with equivalent longer-term market-based funding, hence contributing further to interest expenses. Notably, less than a third of the banks in the sample had to partially refinance the TLTRO amount via market funding, lacking sufficient available excess liquidity. Under the baseline scenario, both interest income and expenses fluctuate less, resulting in higher NII than the starting point.

Chart 2.13

Loans generate the highest interest earnings thanks to higher interest rates overall, while deposits contribute the most to interest expenses



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: The NII starting point shown in the charts refers to three times the annual value of the 2022 NII. Stress test projection values are expressed as a share of 2022 REA.

Banks' income-generation capacity under the adverse scenario is highly correlated with their NII starting point and the pace of asset-liability repricing.

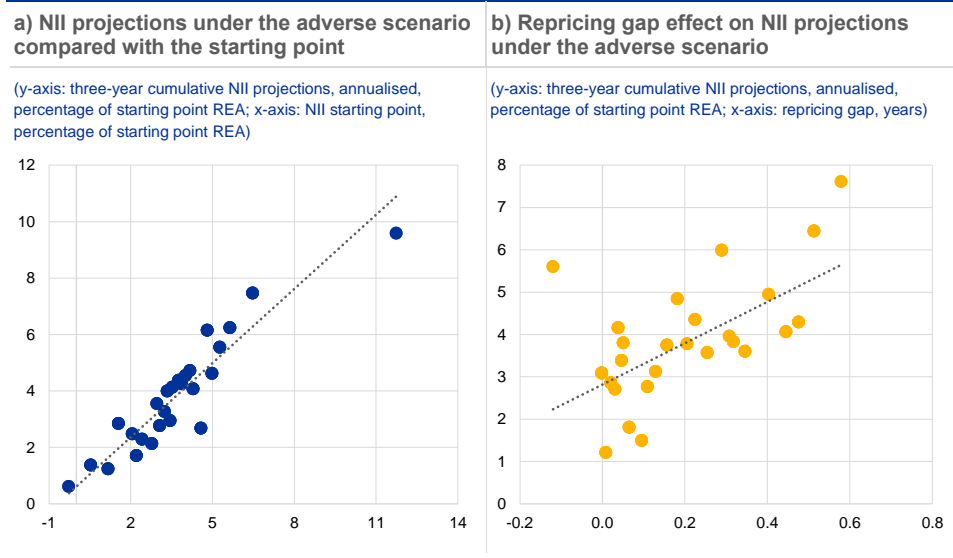
Banks that generated more NII in 2022 also have a higher income-generation capacity over the stress test horizon (Chart 2.14, panel a). This relation is driven by the repricing structure of banks' balance sheets, as banks that have a larger share of asset repricing within the stress test horizon are able to benefit more from rising interest rates by expanding their interest income on the assets side more than the interest expenses incurred on the liabilities side (Chart 2.14, panel b).

³⁷ Under the adverse scenario, projected NII cannot increase compared with the starting point NII before considering the impact from additional provisioning on NPEs, which also contributes to a contraction in the projected NII relative to the banks' model-based projections when assuming a static balance sheet.

³⁸ Excess liquidity is defined as the sum of banks' current accounts at Eurosystem central banks exceeding the reserve requirements, plus liquidity held in the deposit facility, net of any recourse to the marginal lending facility. The maximum amount of available excess liquidity eligible for the use of netting as prescribed by the methodology was defined as (1) the lower of the excess liquidity as per respective book values at the cut-off date and the average excess liquidity over the reserve maintenance period around the cut-off date, (2) less the amount of excess liquidity needed to comply with the regulatory LCR requirement at the cut-off date.

Chart 2.14

Banks' higher NII generation capacity at the starting point carries over to the projections, driven by balance sheet structure and repricing frequency



Sources: EU-wide stress test submissions, ECB and ECB calculations.

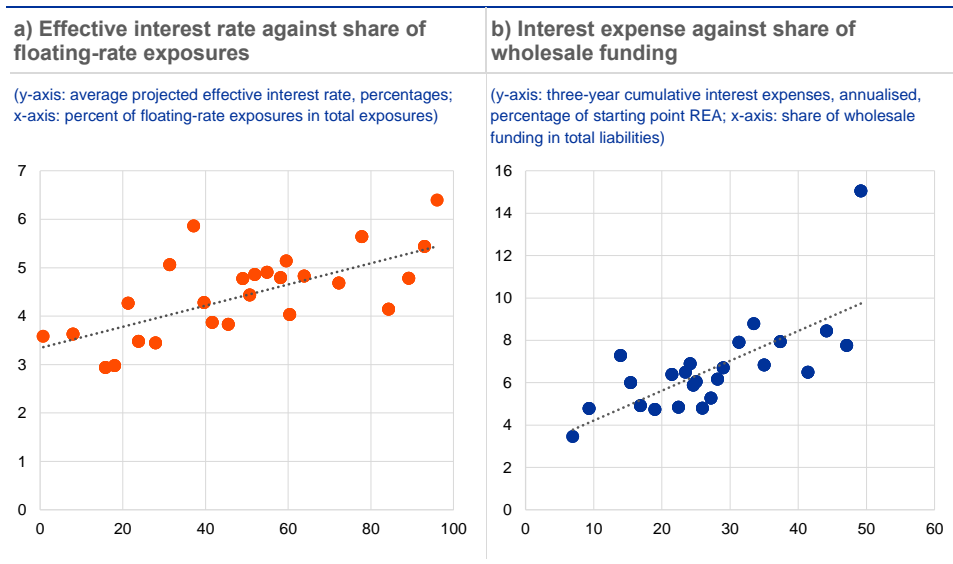
Notes: The NII projections refer to the annualised projected NII over the three-year horizon, relative to REA, before application of the methodological NII cap. Panel b: the repricing gap indicator shows the weighted average repricing timing of assets compared with liabilities (a higher positive value of the indicator indicates that the time between the repricing of assets and liabilities is lower, thereby supporting NII production). Observations in both panels refer to the average across each cluster of individual banks, whereby the clustering was performed on the basis of the statistical distribution of the NII starting point (panel a) and repricing gap (panel b), which also implies that the bank clusters shown in the two charts are not fully aligned.

The transmission of interest rate shocks to NII is determined by banks' balance sheet structures.

Banks that have a higher share of floating-rate exposures are able to pass on increases in reference rates to borrowers at a faster pace than banks with predominantly fixed-rate exposures (Chart 2.15, panel a). At the same time, banks relying more on wholesale funding sources experience a stronger increase in interest expenses under the adverse scenario than banks that rely more on funding from cheaper, stickier retail deposits (Chart 2.15, panel b).

Chart 2.15

Banks' balance sheet structures drive the transmission of interest rate shocks to NII generation capacity



Sources: EU-wide stress test submissions, ECB and ECB calculations.
 Notes: Observations in both panels refer to the average across each cluster of individual banks, whereby the clustering was performed on the basis of the statistical distribution of the share of floating-rate exposures (panel a) and the share of wholesale funding (panel b). Panel b: wholesale funding covers all funding sources in excess of the households' and non-financial corporations' deposits; derivatives are excluded.

Net fee and commission income (NFCI) declines under the adverse scenario, while remaining relatively flat under the baseline scenario. Under the adverse scenario, NFCI contracts significantly with a system-level fall of 21.4% compared with the starting point (Chart 2.16, panel a). This reduction reverses the positive trend in NFCI seen in recent years. The contraction in NFCI under the adverse scenario is consistent with past crisis experiences.³⁹ The NFCI projections in the 2023 exercise are, for the first time, based on a supervisory top-down model, meaning that the output is model-driven and harmonised.⁴⁰

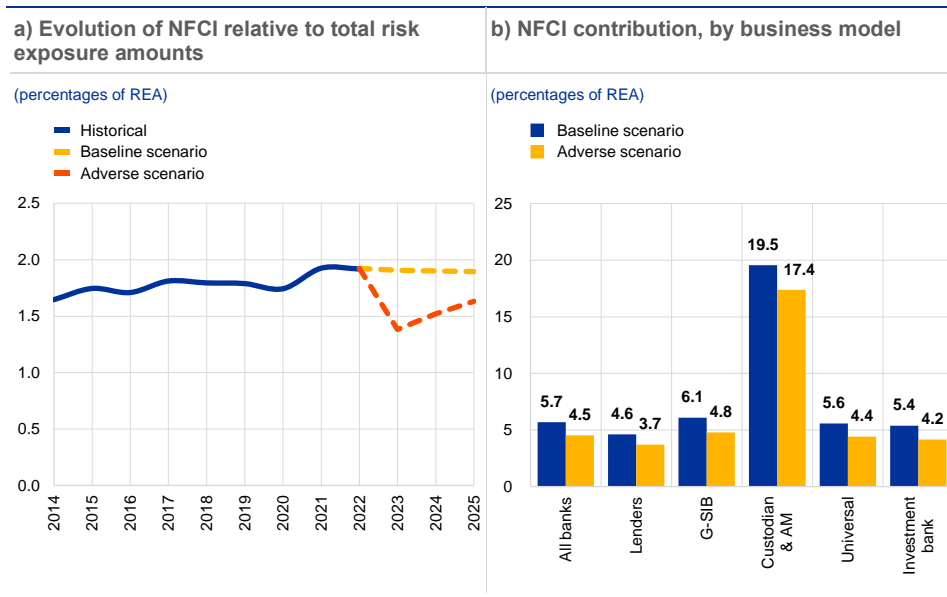
The contribution of NFCI varies across business models, with custodians and asset managers experiencing the largest gap between the adverse and baseline scenarios. Custodians and asset managers, and to some extent global systemically important banks (G-SIBs), also exhibit the highest contribution from NFCI under both scenarios (Chart 2.16, panel b). This is driven by the nature of their business models, with services remunerated by fees and commissions accounting for a large share of their activity.

³⁹ For instance, the largest decline in NFCI amounted to around 30%, observed at the onset of the financial crisis in 2006-09 (30%). More recently, a sizeable contraction of NFCI relative to total assets took place in 2017-20 (about 20%), largely in a single year (2020, the onset of the pandemic).

⁴⁰ Details of the supervisory model calibration and application are provided in Annex X of the [2023 EU-Wide Stress Test – Methodological Note](#).

Chart 2.16

NFCI also sees a significant drop under the adverse scenario, with a larger impact in the case of custodians and asset managers



Sources: EU-wide stress test submissions, ECB and ECB calculations.
Notes: Historical values are expressed as percent of the respective year REA, while stress test projections values are expressed as percent of 2022 REA. Panel a: the historical evolution of NFCI covers an unbalanced panel, as not all institutions in the full 2023 stress test sample have been reporting supervisory data to the ECB since 2014; differences between using the full stress test sample compared with the common sample of reporting banks between the 2023 stress test and historical reporting years are assessed to be marginal. See Chart 2.11 for an explanation of the business model types.

Box 5

Sensitivity of pass-through rate assumptions regarding banks’ retail interest rates

The EBA stress test methodology is highly prescriptive with regard to how changes in interest rates are passed through to the lending and deposit rates that banks offer to households and non-financial corporations. The prescriptive methodology aims at ensuring that projected net interest income under the baseline scenario, and in particular under the adverse scenario, is sufficiently conservative, reflecting an adequate level of stress. The lending and deposit pass-through rates represent banks’ competitive positions and customer behaviour in an environment of changing interest rates. The pass-through constraints in the EBA methodology have been calibrated in a conservative manner to take account of the fact that the static balance sheet may benefit banks both on the assets side (as loan volumes generating interest income would tend to decline in an economic downturn) and on the deposits side (as, in an environment of rising interest rates, bank depositors would tend to “term out”, leading to higher interest expenses).

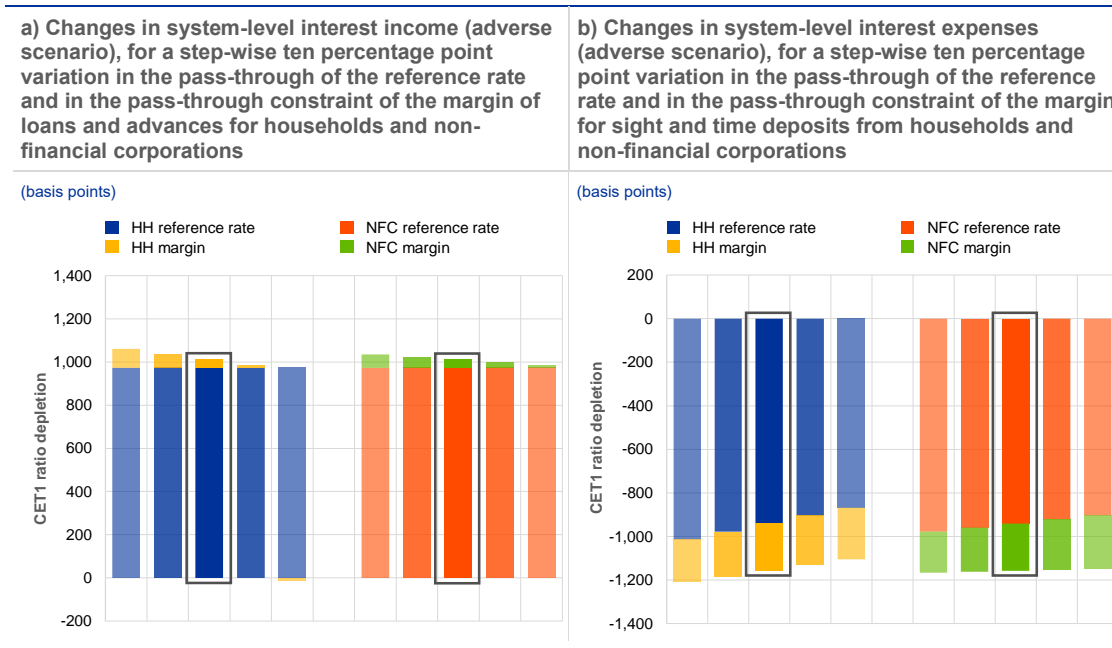
Banks’ NII generation capacity is resilient even when the pass-through assumptions are made even more conservative. There is a need to further investigate how resilient significant institutions are to changes in the assumptions for such customer behaviour and the competitive situation in these market segments. To do so, this box presents a sensitivity analysis⁴¹ to account for the potential impact of variations in the different pass-through rates and constraints on assets and liabilities as defined in the EBA stress test methodology on banks’ net interest income. Chart A,

⁴¹ The step-by-step sensitivity analysis makes it possible to determine the impact on interest income and interest expenses when the pass-through on the reference rate and the pass-through constraint on the margin are changed.

panel a) shows the sensitivities surrounding banks' retail-based interest income, while Chart A, panel b) shows those of banks' retail-based interest expenses.⁴² The results⁴³ indicate that, at the system level, banks' NII is resilient to moderate variations of the interest rate pass-through. Only in the case of very large, and often empirically implausible, variations could banks' NII come under significant pressure, further eroding the capital generation projected under the adverse scenario.

Chart A

Sensitivity analysis of interest income and expenses



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: The CET1 ratio impact is calculated as the difference between cumulative net interest income and three times the starting point (end-December 2022) divided by risk-weighted exposure. The charts include all interest-bearing assets contributing to interest income and all interest-bearing liabilities contributing to interest expenses. The sum of the reference rate and margin component, for interest income and interest expenses respectively, yields the system-wide average, which has to be added to the initial starting point (provided by the NII average in 2022), year-end effect, derivative, NPE and FX components, in order to arrive at the final net interest income. Current pass-through central scenario implied by the methodology highlighted with the blue rectangular. HH stands for households; NFC stands for non-financial corporations.

2.5 Operational risk

Conduct and operational risk losses account for 0.6 percentage points of total capital depletion under the adverse scenario, both contributing in equal measure to the impact (Chart 2.17, panel a). Material conduct risk makes a smaller contribution to total capital depletion than the other operational risk components, particularly under the baseline scenario. Additionally, material conduct risk projections indicate a contraction relative to the starting point, especially under the baseline scenario, which continues the downward trend observed in recent years (Chart 2.17, panel b). SSM banks exhibit a lower operational risk impact (0.4

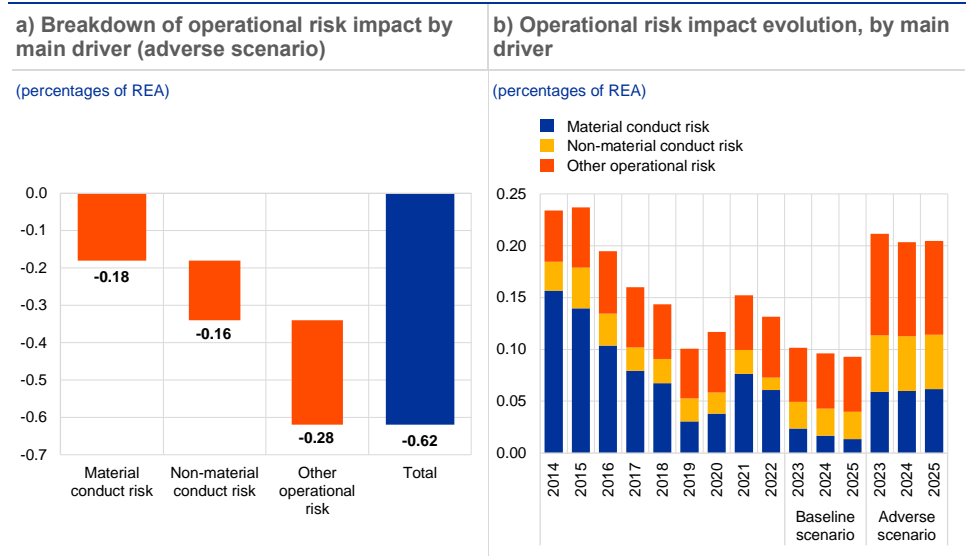
⁴² Impact from sensitivities is calculated as a linear extrapolation. This technique does not take into account potential non-linear effects which might be particularly relevant for the hedging book.

⁴³ For the sake of simplicity, NII generated from holdings of debt securities, wholesale funding and debt securities issued are excluded from the analysis. For the vast majority of significant institutions, retail loans and deposits generate the largest portion of NII.

percentage points) than EBA banks (0.6 percentage points), reflecting the less complex nature of their activities.

Chart 2.17

Conduct risk makes a tangible contribution to operational risk losses, but material conduct risk remains in line with the historical trend



Sources: EU-wide stress test submissions, ECB and ECB calculations.
 Notes: The historical evolution of operational risk covers an unbalanced panel, as not all institutions in the full 2023 stress test sample have been reporting supervisory data to the ECB since 2014; differences between using the full stress test sample, compared with the common sample of reporting banks between the 2023 stress test and historical reporting years, are assessed to be marginal. Historical values are expressed as percent of the respective year REA, while stress test projections values are expressed as percent of 2022 REA.

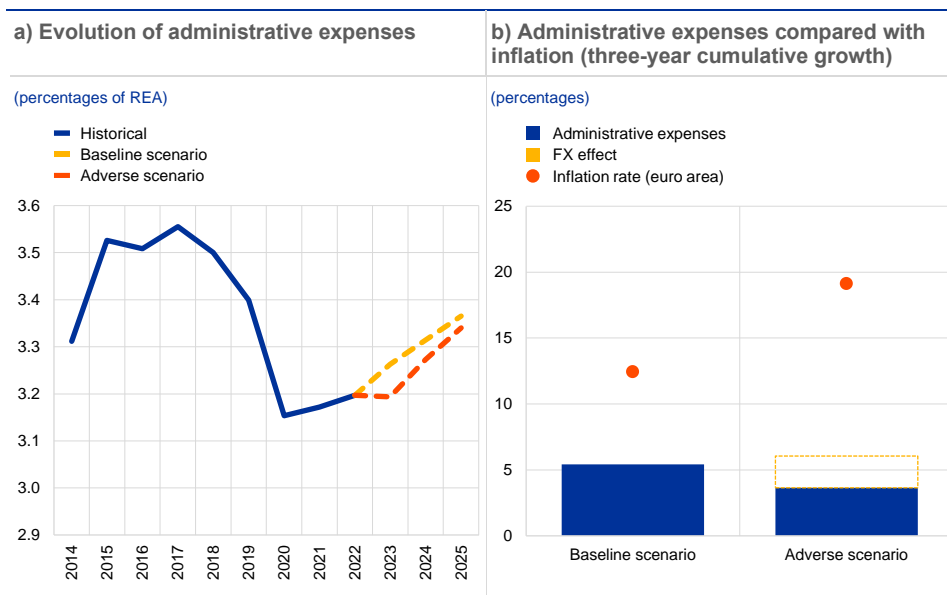
2.6 Other items

Administrative expenses follow an upward trend over the stress test horizon, in line with inflationary pressures (Chart 2.18, panel b). Administrative expenses exhibit relatively low variation, both historically and over the stress test horizon (Chart 2.18, panel a). However, banks project an increase above the starting point level, in both the adverse and the baseline scenarios, taking into account the higher inflationary pressures under the stress test. The milder trend under the adverse scenario than the baseline scenario is largely driven by the cushioning effect of the FX-denominated expenses⁴⁴, which offsets the stronger inflation impact in the adverse scenario.

⁴⁴ Exchange rate shocks applicable in the adverse scenario overall lead to a decline in administrative expenses, which are reported in euro in the exercise.

Chart 2.18

Administrative expenses increase relative to the starting point due to additional inflationary pressures



Sources: EU-wide stress test submissions, ECB and ECB calculations.

Notes: Panel a: the historical evolution of administrative expenses covers an unbalanced panel, as not all institutions in the full 2023 stress test sample have been reporting supervisory data to the ECB since 2014; differences between using the full stress test sample, compared with the common sample of reporting banks between the 2023 stress test and historical reporting years, are assessed to be marginal. Historical values are expressed as percent of the respective year REA, while stress test projection values are expressed as percent of 2022 REA. Panel b: administrative expenses are net of expenses for conduct and other operational risk; expressed as three-year cumulative growth from the starting point (which is adjusted for one-offs). The FX effects impact represents an estimation, based on the breakdown of banks' 2022 administrative expenses by currency, as reported in the stress test templates.

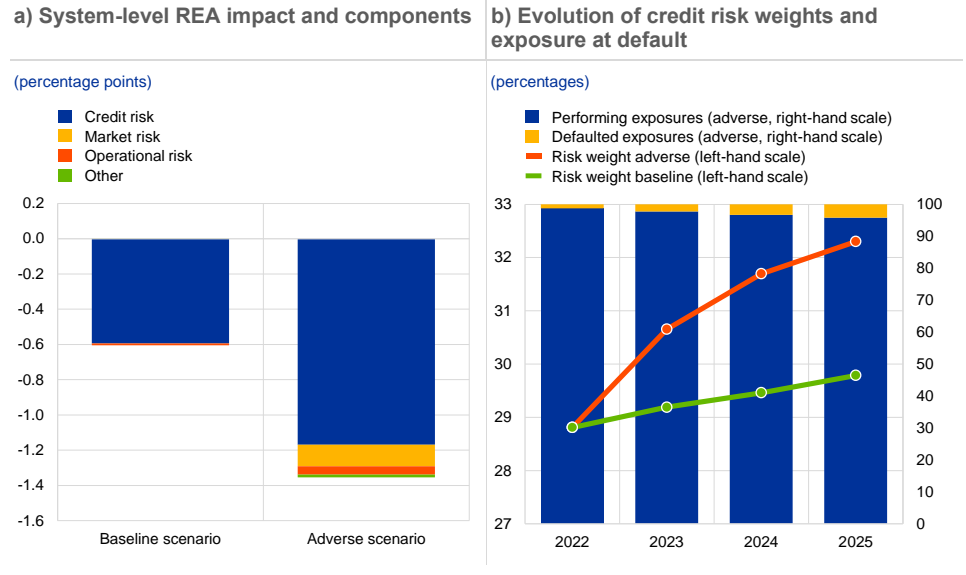
Risk exposure amounts (REA) increase under both the baseline and adverse scenarios, contributing 0.6 percentage points to total capital depletion under the baseline scenario and 1.4 percentage points under the adverse scenario.

The increase in REA is attributable predominantly to credit risk (Chart 2.19, panel a). Market risk and operational risk make only a minor contribution to the total REA impact. The increase in credit risk REA is due to the higher overall risk weights as exposures move to default, as well as to the increase in risk weights for non-defaulted exposures stemming from the deterioration in the borrowers' repayment capacity (Chart 2.19, panel b). The increase in credit risk REA under the baseline scenario is mainly explained by the assumptions under the EBA stress test methodology, which prevent loans from curing once reaching default status and thus leading to higher risk weights, as well as the methodological floor.⁴⁵

⁴⁵ Under the EBA methodology, projected risk exposure amounts are floored to the starting point values.

Chart 2.19

Total risk exposure amounts expand substantially under the adverse scenario, driven mainly by an increase in credit risk weights and exposure migration to default



Sources: EU-wide stress test submissions, ECB and ECB calculations.

3 Integration into SREP

The 2023 stress test of euro area banks contributes to the overall Supervisory Review and Evaluation Process (SREP), which aims to ensure that institutions have adequate capital and liquidity resources, as well as sound risk management and internal controls. It does so by encompassing both qualitative and quantitative findings.

3.1 Qualitative findings – Element 2 (internal governance and risk management)

Qualitative findings from the stress test exercise are included in the SREP assessment. The Joint Supervisory Teams (JSTs)⁴⁶ take several aspects of the institution's performance into account, including the timeliness and accuracy of the data, the overall level of cooperation and requests between the ECB and the institution (including information requests) and the quality of the information provided.

Measurable criteria are applied to consistently identify data quality issues which could hamper proper reporting in the context of the stress test. Thus, quantitative metrics, generated directly from IT-based data, support the assessment by providing measurable criteria to score the data quality of the banks' submissions. Both the institutions' ability to cope with the data requirements and their responsiveness throughout the stress test are measured. In addition, JST judgement is taken into account. JSTs carry out a qualitative assessment of the institution's performance during the stress test quality assurance cycles.

Institutions' performance in the stress test feeds into the broader JST assessment of risk data aggregation and reporting (RDAR), as part of Element 2. In the context of the current SSM supervisory priorities for 2023-25, in which RDAR is a key focus, institutions for which severe weaknesses have been identified – for instance in successive stress tests – and whose management bodies have otherwise failed to address identified problems in a serious and sufficiently rigorous manner, could be subject to qualitative measures with potential for further escalation, including Pillar 2 requirements (P2R).

Furthermore, qualitative findings referring to stress test modelling deficiencies also serve to inform JSTs about the banks' risk management adequacy. The quality assurance process identified a series of weaknesses in some banks' modelling approaches, as well as banks' limited modelling capacities in terms of quantifying sectoral and leveraged loan losses. More broadly, data quality issues

⁴⁶ JSTs are one of the main forms of cooperation between the ECB and the national supervisors, having responsibility for implementing day-to-day supervision. They are formed of staff from the ECB and the relevant national supervisors, including the competent authorities of the countries in which credit institutions, banking subsidiaries or significant cross-border branches of a given banking group are established.

and modelling deficiencies flagged during the stress test serve to inform JSTs of the need to reinforce and/or address banks with requests for further improvements and/or the need to plan deeper assessments (e.g., by means of dedicated on-site inspections or targeted reviews. Ultimately, qualitative findings may affect the determination of P2R.

3.2 Quantitative findings – determination of Pillar 2 guidance (P2G)

As in the 2021 stress test, the quantitative impact of the adverse scenario is used as a key input for supervisors to determine the level of P2G.⁴⁷ Following the methodology applicable since 2021, a two-step “bucketing” framework is used to determine P2G. In the first step, banks are allocated to buckets depending on the maximum fully loaded CET1 ratio depletion under the adverse scenario. The buckets are structured in line with recent supervisory experience, supervisory risk tolerance and the severity of the stress test exercise.⁴⁸ In the second step, JSTs exercise their expert judgement to adjust the P2G to reflect the profile of the individual institution. The JSTs are allowed to make adjustments within the ranges of the corresponding bucket and exceptionally beyond the range of the relevant bucket. This also makes it possible to address institution-specific situations, including for example material changes in the risk profile of the institution since the reference date of the stress test exercise and relevant mitigating actions (such as asset disposals, restructurings, etc.).

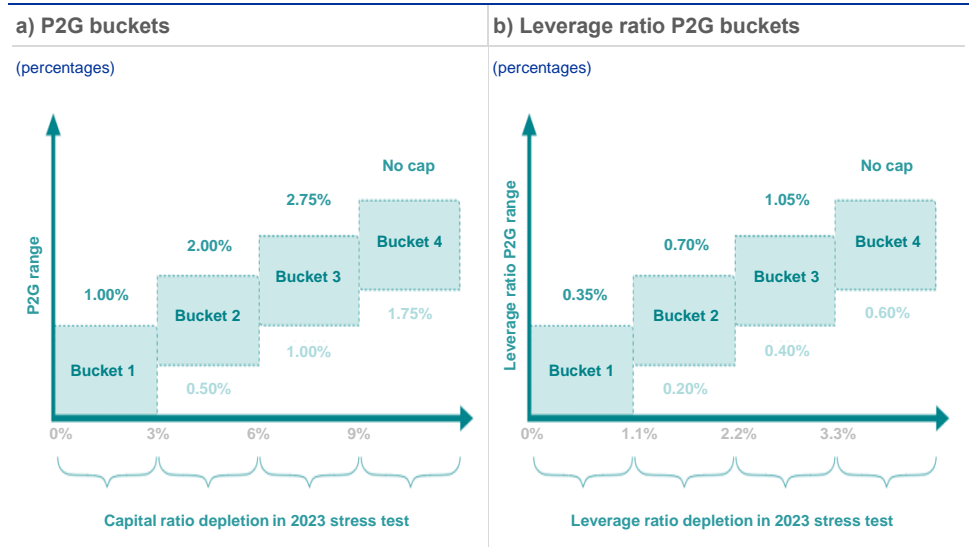
In addition, the quantitative impact of the adverse scenario is also used in 2023 to determine the leverage ratio P2G. The approach employed for the leverage ratio P2G is very similar to the two-step P2G approach described above. First, banks are allocated to buckets depending on the maximum leverage ratio depletion under the adverse scenario. Second, JSTs exercise their expert judgement to adjust the leverage ratio P2G to the profile of the individual institution. Leverage ratio P2G is only imposed for some institutions, for example where the projected leverage ratio falls below the overall leverage ratio requirement.

⁴⁷ P2G is a bank-specific recommendation that indicates the level of capital that the ECB expects banks to maintain in addition to their binding capital requirements.

⁴⁸ This bucketing approach ensures a level playing field and reinforces consistency in the P2G methodology. Overlapping P2G ranges for neighbouring buckets make it possible to avoid potential cliff effects between buckets.

Chart 3.1

P2G and leverage ratio P2G buckets, and associated ranges



Sources: EU-wide stress test submissions, ECB and ECB calculations.
 Note: Maximum P2G is not capped.

List of abbreviations

AVA	Additional valuation adjustment
CCR	Counterparty credit risk
CET1	Common Equity Tier 1
CLIFS	Country-Level Index of Financial Stress
COREP	Common reporting
CRE	Commercial real estate
CRR	Capital Requirements Regulation
CVA	Credit valuation adjustment
EBA	European Banking Authority
ECB	European Central Bank
ESRB	European Systemic Risk Board
EU	European Union
FINREP	Financial reporting
GDP	Gross domestic product
G-SIB	Global systemically important bank
GVA	Gross value added
HH	Households
IFRS	International Financial Reporting Standard
JST	Joint Supervisory Team
LGD	Loss given default
MDA	Maximum distributable amount
NACE	European Classification of Economic Activities in the European Community
NCA	National competent authority
NFC	Non-financial corporation
NPE	Non-performing exposures
NII	Net interest income
NFCI	Net fee and commission income
NTI	Net trading income
OTC	Over-the-counter
PD	Probability of default
PP	Percentage points
P2G	Pillar 2 guidance
P2G-LR	Leverage ratio Pillar 2 guidance
P2R	Pillar 2 requirements
RDAR	Risk data aggregation and reporting
REA	Risk exposure amount
RRE	Residential real estate
SREP	Supervisory Review and Evaluation Process
SSM	Single Supervisory Mechanism
ST	Stress test
UW pipeline	Underwriting pipeline

References

Dees, S., Henry, J. and Martin, R. (eds.) (2017), “STAMP€: Stress-Test Analytics for Macroprudential Purposes in the euro area”, European Central Bank.

European Banking Authority (2023a), “[2023 EU-Wide Stress Test – Methodological Note](#)”.

European Banking Authority (2023b), “[Macro-financial scenario for the 2023 EU-wide banking sector stress test](#)”.

European Central Bank (May 2017), “[Guidance on leveraged transactions](#)”.

European Central Bank (March 2022), “[Leveraged transactions](#) – supervisory expectations regarding the design and functioning of risk appetite frameworks and high levels of risk taking”.

Figueres, J.M. and Jarociński, M. (2020), “[Vulnerable growth in the euro area: Measuring the financial conditions](#)”, *Economics Letters*, Elsevier, Vol. 191(C).

Henry, J. and Kok, C. (eds.) (2013), “[A macro stress testing framework for assessing systemic risks in the banking sector](#)”, *Occasional Paper Series*, No 152, ECB.

© **European Central Bank, 2023**

Postal address 60640 Frankfurt am Main, Germany

Telephone +49 69 1344 0

Website www.bankingsupervision.europa.eu

All rights reserved. Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.

For specific terminology please refer to the [SSM glossary](#) (available in English only).

PDF ISBN 978-92-899-6184-4, doi:10.2866/47860, QB-03-23-372-EN-N