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FRANCE

FINANCIAL SECTOR ASSESSMENT PROGRAM

TECHNICAL NOTE ON SYSTEMIC RISK ANALYSIS

August 2025

This paper on France was prepared by a staff team of the International Monetary Fund. It is based on the information available at the time it was completed on July 31, 2025.

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TECHNICAL NOTE

SYSTEMIC RISK ANALYSIS

Prepared By
Monetary and Capital Markets Department

This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program in France. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP can be found at http://www.imf.org/external/np/fsap/fssa.aspx

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TABLES

Glossary

AC	Amortized Cost
ACPR	Autorité de contrôle prudentiel et de résolution
AE	Advanced Economy
AFS	Available for Sale
AMF	Autorité des marchés financiers
BdF	Banque de France
CBC	Counter Balancing Capacity
CET1	Common Equity Tier 1 Capital Ratio
COREP	Common Reporting Framework
CRE	Commercial Real Estate
CCyB	Countercyclical Capital Buffer
DSTI	Debt Service to Total Income
EA	Euro Area
EAD	Exposure At Default
EBA	European Banking Authority
EBIT	Earnings Before Interest and Taxes
ECB	European Central Bank
ECL	Expected Credit Loss
EMDE	Emerging Markets and Developing Economies
EU	European Union
FCI	Financial Condition Index
FINREP	Financial Reporting
FSAP	Financial System Assessment Program
FVOCI	Fair Value through Other Comprehensive Income
FVPL	Fair Value through Profit or Loss
FX	Foreign Currency
GDP	Gross Domestic Product
G-RAM	Global Risk Assessment Matrix
G-SIB	Global Systemically Important Bank
GFC	Global Financial Crisis
HFCS	Household Finance and Consumption Survey
ICR	Interest Coverage Ratio
IF	Investment Fund
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IRB	Internal Ratings-Based
IRRBB	Interest Rate Risk in the Banking Book
LCR	Liquidity Coverage Ratio
LGD	Loss Given Default

LTV	Loan-to-Value Ratio
MFI	Monetary Financial institutions
MMF	Money Market Fund
NACE	Nomenclature of Economic Activities
NBFI	Non-Bank Financial Institution
NFC	Non-Financial Corporates
NII	Net Interest Income to interest bearing total assets
NPL	Nonperforming Loan
NSFR	Net Stable Funding Ratio
OECD	Organization for Economic Co-operation and Development
O-SII	Other Systemically Important Institution
PD	Probability of Default
PiT	Point in Time
P&L	Profit and Loss
RAM	Risk Assessment Matrix
RoA	Return on Assets
RoE	Return on Equity
RRE	Residential Real Estate
RWA	Risk-Weighted Assets
SME	Small and Medium-sized Enterprise
SI	Significant Institutions
SSM	Single Supervisory Mechanism
ST	Short-Term
STA	Standardized Approach
STE	Short-Term Exercise
STeM	Stress Testing Matrix
SSyRB	Sectoral Systemic Risk Buffer
TTC	Through The Cycle
TR	Transition Rate
UB	Unemployment Benefits
WEO	World Economic Outlook

EXECUTIVE SUMMARY[1]

The French financial sector has proven resilient to the stress events of the last five years but faces some headwinds from domestic and, like in many other countries, global uncertainty. Despite high external and domestic uncertainty, sovereign debt markets have functioned well, and large debt issuance continues to be smoothly absorbed by a deep and well diversified buyer base. Banks have pre-funded part of their upcoming roll-over needs. Credit growth has moderated, and the housing market is undergoing an orderly adjustment, as household and non-financial corporates (NFC) debt remain elevated. The stability of the French financial sector is an important element of strength in the context of domestic uncertainties in a politically challenging environment, while global geoeconomic risks are on the rise.

Large and internationally active banks have high capital and liquidity buffers and have adjusted to the increase in interest rates. There are six major *bancassurance* conglomerates, which include four Global Systemically Important Banks (G-SIBs) with important cross-border exposures and market activities. The banking system has low credit risk resulting from conservative lending practices but limited profitability. For housing loans, the combination of high-quality borrowers, long-term fixed-rate loans, and loan guarantee schemes have meant low credit losses and high resilience to interest rate shocks. However, in the context of a very competitive domestic retail market, profits on home loans are low (but are often cross-subsidized by other products), and during the rising rate environment net interest margins compressed as fixed-rate housing, and to a lesser extent corporate loan books, saw slow repricing, while funding costs on largely floating-rate liabilities rose. Non-financial corporates are vulnerable due to high leverage levels. SME defaults have risen as Covid-era measures have finished rolling off, but remain at manageable levels.

Financial markets are deep and with increased complexity. France has a large corporate bond market and French firms are the largest debt issuers in Europe. It has one of the largest money-market fund markets (MMFs) in Europe, which contribute to funding banks and corporates to a lesser extent. The insurance sector is one of the top five globally and the largest in the EU, including life insurance which offers long-term saving products which are invested in EU cross-border and domestically domiciled investment funds. The bancassurance conglomerates also include one of the largest global asset managers.

Solvency stress tests show that French banks are resilient to various combinations of shocks under severe macro-financial scenarios. No banks breach their minimum capital requirements (the Basel minimum CET1 ratio plus Pillar II requirements) under either the geopolitical or recessionary adverse scenarios, although four banks, including G-SIBs, dip into their additional capital buffers (the capital conservation buffer plus G-SIB and O-SII buffers). Still, the aggregate system-wide gap to the capital requirements including buffers is small, at 1.2 and 0.8 percent of risk

[1] This Technical Note was prepared by Eriko Togo, Thierry Tressel (both MCM), and Torsten Wezel (EUR). Meiko Xie (MCM) provided very valuable support from HQ, including with data management and chart preparation.

weighted assets after three years respectively in the geopolitical and the recession scenario. Credit risk—mainly arising from vulnerable non-financial corporates—and market risk—due to market activities of banks, and fees and commission income—are the main drivers of additional capital depletion in adverse scenarios. Sensitivity analysis shows that the banking system's exposure to concentration risks is small after taking into account credit risk mitigation measures (CRM), while sectoral risks are limited. The sovereign-bank nexus channels of shock transmission appear contained among the French banks.

Macro-prudential counterfactual analysis based on solvency stress tests were conducted to help evaluate and calibrate the policy framework. Two analyses were carried out related to macroprudential issues. First, moderate economic shocks were modeled using solvency stress tests based on various macroeconomic scenarios with increasing severity. These show that the current combination of high precautionary buffers and the CCyB can in aggregate absorb the impact of a moderate macroeconomic shock. Post-shock buffers would likely be large enough to enable banks to continue lending following a range of shocks, although the impact may be heterogenous across banks. Second, a counterfactual analysis based on household micro-survey data (the 2021 ECB Household Finance and Consumption Survey) shows that macroprudential limits on DSTI are more effective than limits on LTV in containing the risk of losses from housing loans in France, a finding consistent with the approach of the French authorities.[2]

Liquidity buffers remain high in the French banking system and are resilient to various funding and market shocks. Aggregate LCRs (in all currencies) and in euros have remained stable at around 150 percent on average every month since 2020. All USD LCRs have been above 100 percent recently, although some monthly LCRs in USD were volatile in the past. Funding sources are well diversified on average and asset encumbrance is low. Under scenarios with run-off rates higher than under Basel III and/or with valuation losses on HQLA (which could occur as a result of a sell-off of fixed income securities by European investment funds), the aggregate LCR in all currencies and in euros remain above the 100 percent requirement. However, several banks have LCRs that fall below the requirement in the stress scenario. Cash flow stress tests reveal that banks can withstand significant liquidity outflows up to one month under several scenarios, although one bank would experience a small cash shortfall within 2 weeks of the shocks.

Investment funds can withstand redemption shocks. Stress testing of open-ended bond funds, mixed funds, and money market funds suggest they have sufficient liquidity to withstand plausible redemption shocks. The stress test shows that, due to high buffers of liquid assets in these funds, there is only a small additional price impact (beyond the initial interest rate or credit shock) stemming from the redemptions themselves leading to selling of less-liquid assets. In addition, a majority of funds have liquidity management tools at their disposal to mitigate the impact of redemptions and have established means to prevent disorderly outflows, further buttressing the resilience of the investment fund sector and dampening possible market impact from asset sales.

[2] For further work on these issues please consult the 2025 France FSAP Macroprudential Technical Note.

Interconnectedness analysis shows that French SIs and non-bank financial institutions (NBFIs)—maintain an extensive network, whereas contagion risks are low. The four French G-SIBs account for the bulk of bilateral credit exposures when considering exposure amounts—among themselves but also with other systemic global and euro area banks. However, system-wide liquidity and funding risks are low, with only one smaller bank experiencing severe liquidity stress in a contagion risk analysis. Among NBFIs, insurance companies are the largest institutional investors, accounting for close to half of securities holdings; importantly, they hold one-fourth of their portfolios in investment funds that, in turn, are substantially invested in bank debt.

Non-financial corporates are vulnerable to adverse macroeconomic shocks consistent with those of bank stress tests while most households remain able to service their debt under the same scenarios. Corporate debt at risk of publicly listed NFCs would increase notably, and to high levels, under the geopolitical and recession adverse scenarios, which is consistent with the credit risk assessment of banks. In addition, cash shortage of publicly listed NFCs would increase under those scenarios, as a result NFCs would increase their borrowing. A sensitivity analysis for non-listed large firms and SMEs confirms the findings of the corporate risk assessment. While French households of various income levels appear to have accumulated significant amounts of debt, stress tests suggest that the risk of default remains limited, including in adverse macroeconomic scenarios.

The French sovereign securities market forms the bedrock for financial market stability. The sovereign debt market continues to function well despite the large increase in issuance since the previous FSAP. The robustness of the French sovereign securities market is supported by a diversified investor base, a well-oiled network of intermediaries and distribution mechanism, and prudent sovereign risk management. Occasional deterioration in market liquidity has not turned into market dysfunction during market stress, while repricing of risk has taken place with investor rotation. However, emerging risks should continue to be monitored and policy tools enhanced. Secondary market liquidity support by the debt management office, including through its repo facility, reopening and tap issuances of off-the-run securities, may become more critical, but care is needed to ensure that these facilities do not distort private transactions and take away arbitrage opportunities. The presence of price sensitive investors can be a double-edged sword – they can help to support the market given attractive pricing, but they could also be the first to run when the market turns negative. Investor diversification and progress on the ongoing pension reform could expand and stabilize investor base. Above all, debt management alone cannot safeguard the safe asset status of the French government securities without market confidence in a sustainable long-term fiscal strategy.

Table 1. France: 2025 Key FSAP Recommendations		
Recommendation	**Agency**	**Timing***
Systemic risk analysis		
Work with relevant European authorities to improve data quality and timeliness on interconnectedness, and on derivative and repo market data, and undertake related risk analysis for banks and markets.	ACPR, BdF, AMF	ST
Improve liquidity monitoring through integration of liquidity stress in major currencies, and consider higher liquidity buffers to cover wholesale funding outflows within a two-week horizon	ACPR, BdF, ECB	ST
Improve monitoring of investment fund redemption risk through data sharing on fund liability structures.	ACPR, BdF, AMF	ST
* I: Immediately; ST: short term= less than 1 year; MT: medium term= 1-5 years		

MACROFINANCIAL BACKGROUND

A. Macro-Financial Landscape and Trends

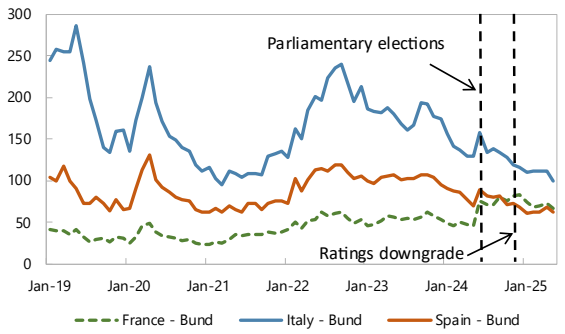
1. The French economy and financial sector have proven resilient to the stress events of the last five years but face some headwinds from domestic and, like in many other countries, external uncertainty. Growth is projected at 0.6 percent in 2025, down from 1.1 percent in 2024, as policy uncertainty amid domestic political fragmentation and rising geoeconomic tensions is affecting confidence and economic activity. Market volatility appears to have stabilized following the government's no-confidence vote in early December and the recent approval of the 2025 budget. While 10-year OAT-Bund spreads remain around 70 bps (about 25 bps higher than in early June, Figure 1), OAT yields have increased lately in step with higher German yields. The disinflationary process remains on track.

2. Sovereign debt markets continue to function well despite the steady increase in issuance since the previous FSAP (Figure 2). Over the past five years, the outstanding stock of government securities increased by 40 percent but was smoothly absorbed by the market. The sovereign debt market is deep and well diversified, with over half held by non-resident investors. Banking sector holdings of government debt are mostly low and near the Eurozone average of 6 percent of assets, and banks with larger exposures mainly hold French sovereign bonds and loans to maturity.[3]

[3] Several French SIs classify their regulated savings pooled in the Caisse des Dépôts et Consignations (CDC) as sovereign exposures in their regulatory reporting.

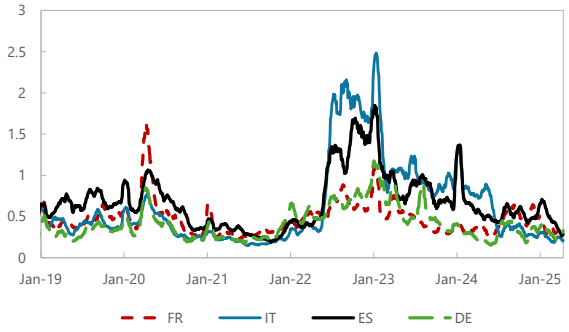
Figure 1. Government Debt Markets

10 Year Government Bonds Spread over Bund
(In Basis Points)



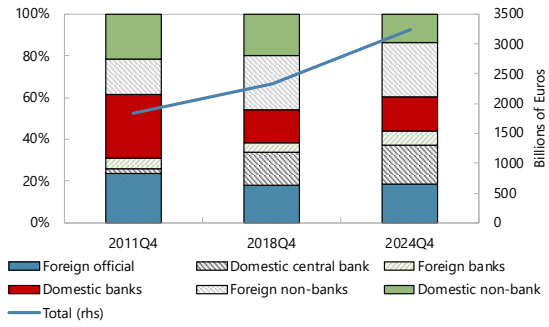
Source: Haver

Bid-Ask Spread of 10-Year Government Bonds
(In Basis Points)



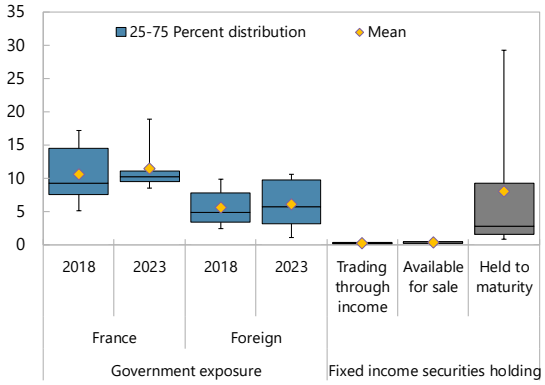
Source: Bloomberg

Holders of French Government Debt
(Percent of Total Outstanding)



Source: Arslanalp and Tsuda, IMF

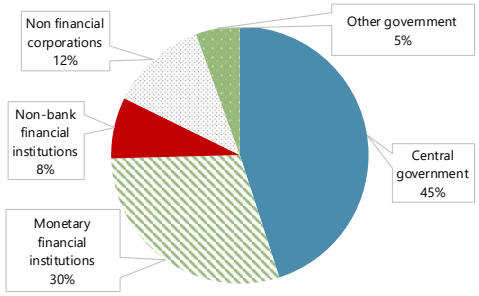
Banks' Sovereign Exposures
(Percent of Total Assets)



Source: EBA EU-wide Transparency exercise and IMF staff calculations

Figure 2. Debt Securities Markets

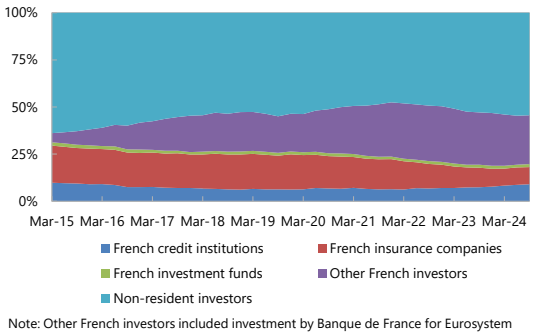
Debt Securities Outstanding in France, end-Q4 2024



Source: ECB

Holders of Government Securities, 2015-2024

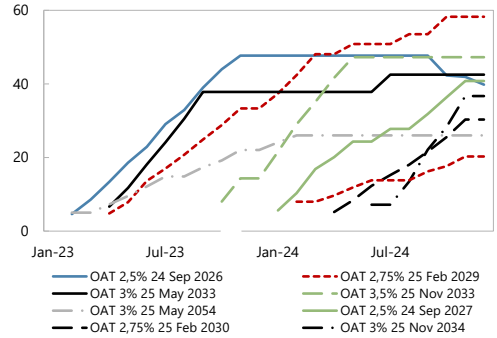
(In percent)



Note: Other French investors included investment by Banque de France for Eurosystem

Source: AFT

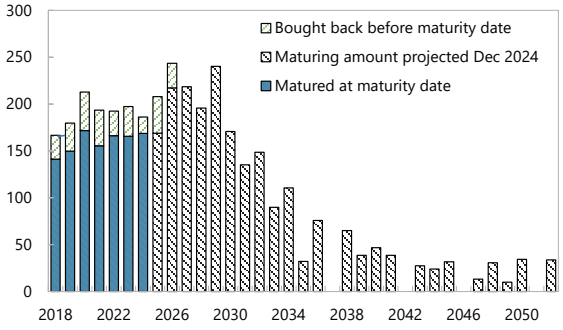
Cumulative Issuance of Benchmark Securities in 2023 and 2024 (In Billions of EUR)



Source: AFT

OAT Redemptions, Actual and Projected at end-2024

(In Billions of EUR)



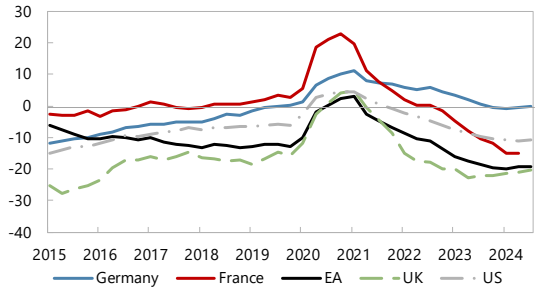
Source: AFT

3. Credit growth has moderated, and the housing market has undergone an orderly downward adjustment, as household and NFC debt remain elevated. With the delayed impact of monetary tightening, credit growth moderated, household lending stagnated, and the credit-to-GDP gap turned negative (Figure 3). Compared to other European countries, household debt levels are relatively high, while home ownership rates are below the median. However, retail credit is set to rebound on the back of stronger household loan demand and loosening credit standards. Housing loan issuance declined sharply in 2023-24, and average DSTI (debt service-to-income) increased (Figure 25). While declining by 5 percent y/y, residential property prices have stabilized following a trough in 2024:Q1. Demand for housing loans has picked up under largely unchanged credit conditions for this loan type. NFC debt is among the highest in Europe, with about one quarter of firms showing inadequate debt service capacity (Figure 4), while cash buffers appear relatively low (Figure 4). Prospects for a recovery of corporate credit are dim amid soft loan demand and still tight

credit standards. The sharp decline in European commercial real estate (CRE) prices has had a limited impact on the French banking system, as direct exposures are moderate.[4]

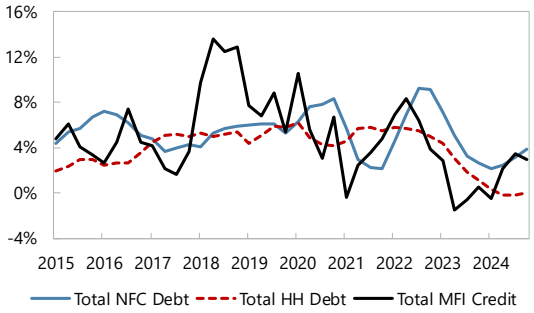
Figure 3. Credit Conditions, House Prices and Private Debt

Credit to GDP Gap
(In Percent, Quarterly Frequency)



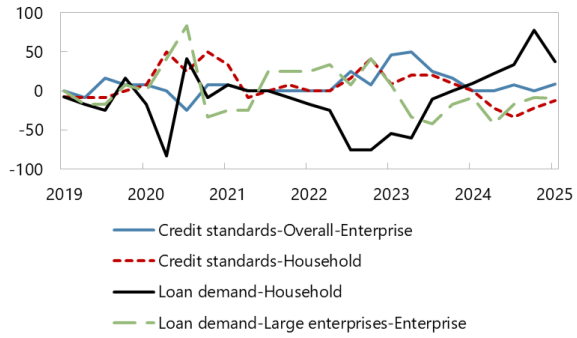
Source: Haver Analytics

Credit Growth. YoY
(In Percent, Quarterly Frequency)



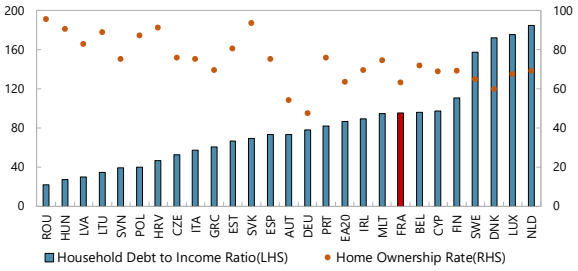
Sources: ECB; and IMF staff calculations.

Credit Conditions and Loan Demand



Source: ECB

Household Debt and Home Ownership



Note: EA20 is computed as the GDP-weighted average of the 20 euro-area countries.

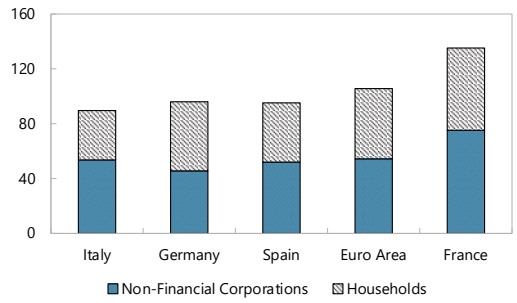
Source: Eurostat and IMF Staff Calculations.

[4] See December 2024 Financial Stability Report of the Banque de France: Financial stability report - December 2024 | Banque de France.

Figure 4. Non-Financial Corporates

Corporate debt is high compared to other EA countries….

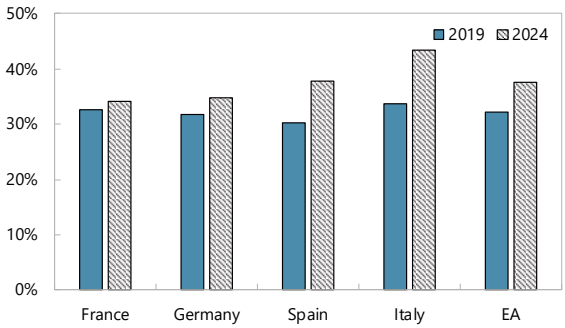
Corporate and Household Debt in 2024Q4
(Percent of GDP)



Source: BdF

But cash buffers seem relatively small….

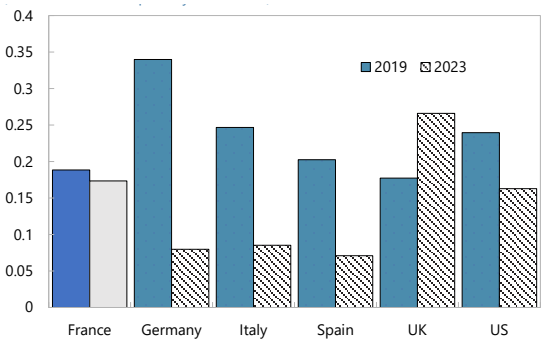
Cash Holdings
(Percent of Consolidated Debt)



Source: ECB

Large-indebted corporates account for a significant share of aggregate debt of publicly listed firms…

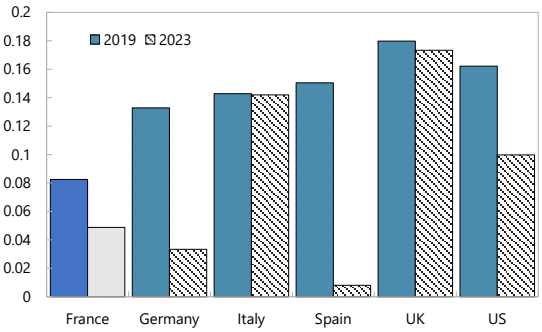
Debt of Publicly Listed Firms with Debt-to-EBITDA>6 or <0 (Share of Debt of all Publicly Listed Firms)



Sources: Datastream and IMF staff

Interest coverage ratios have improved ….

Debt of Publicly Listed Firms with ICR <1
(Share of Debt of all Publicly Listed Firms)



Sources: Datastream and IMF staff

B. Banking System Structure and Performance

4. The French banking system is dominated by large internationally active banks (Figure 5). The French banking system is large and highly concentrated, with 6 banks accounting for about 96 percent of total banking assets and 292 percent of GDP, among 4 of which are G-SIBs.[5] BNP Paribas and Société Générale have the majority of their credit exposures outside of France, while for Crédit Agricole it is 35 percent. Large Euro Area countries (In particular Italy), Luxembourg and Belgium, as well as the UK and the US, account for significant shares of their foreign activities. The large banks, in particular BNP Paribas, have significant global market activities. Exposures to sovereign fixed income securities – domestic and foreign – remain relatively low at 5.1 and 5.5

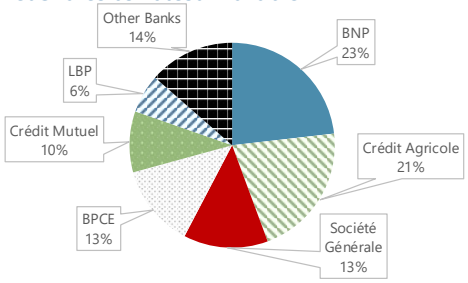
[5] Hence 4 of the 7 Euro Area G-SIBs are French banks.

percent of assets respectively on average for the 6 largest banks– except for the La Banque Postale Group.[6]

Figure 5. Structure of Banking System

The banking system is highly concentrated, with six banks accounting for 96 percent of banking assets…

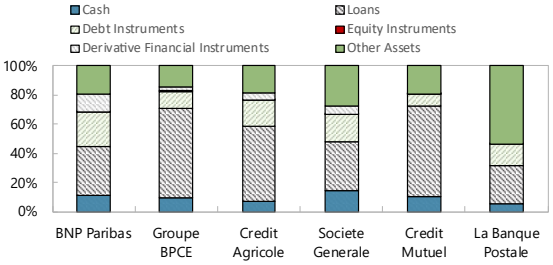
Banking Sector
Market Shares as Latest Available



Source: BMI Research

BNP Paribas and Société Générale have large market activities…

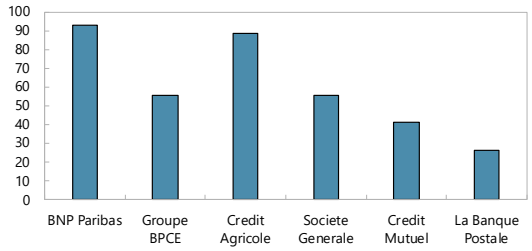
Decomposition of bank assets, 2023
(Percent of total assets)



Source: BMI Research

France is home to four GSIBs, with combined assets at 290 percent of GDP….

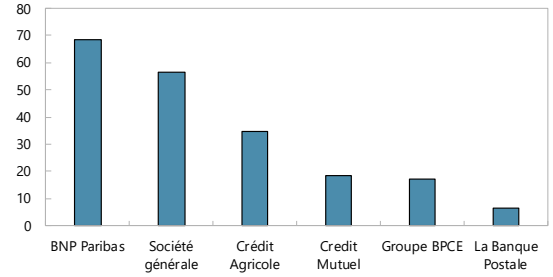
Bank assets
(% of home country GDP), 2023



Source: EBA Transparency Exercise

And very internationally active, in particular BNP Paribas and Société Générale….

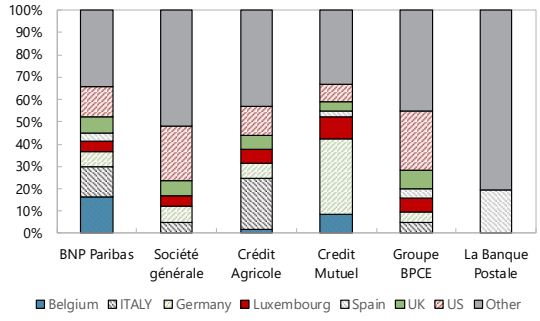
Share of credit exposures outside France



Source: EBA Transparency Exercise

International activities are located in other large European countries and in the US…

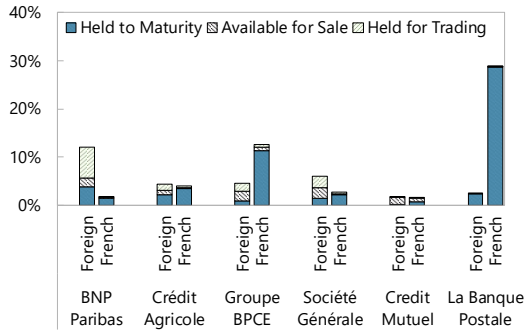
Geographical Distribution of Total Credit Exposure outside France, 2023



Source : EBA Transparency Exercise

Exposures to Sovereigns are Relatively Small in Percent of Bank Assets ….

Holdings of Sovereign Securities by Accounting Recognition (% of Total Assets, June 2024)



Source: EBA Transparency Exercise

[6] CNP Assurances is part of La Banque Postale Group and provides both Life and Non-Life Insurance.

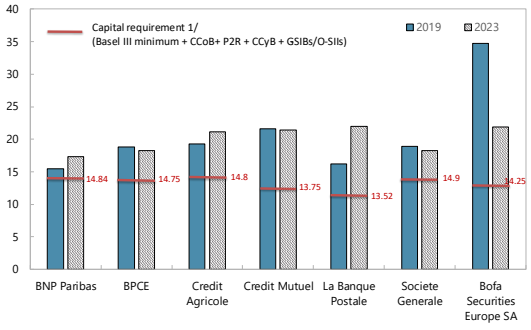
5. Performance of the French banking system has held up well in recent years in a context of rapidly rising interest rates. While several banks improved their capital ratios since before the pandemic, with varying margins over requirements, profitability has somewhat declined across banks. Before the pandemic, all 6 banks had a Return on Assets (ROA) above the EU average, despite lower-than-average Net Interest Margin (NIM). In 2023, all banks had a ROA somewhat below the EU average and below the average of the other G-SIBs (Figure 6). While French banks' Tier One ratios are on average above the G-SIB peer average (but below the average of EU peers), their leverage ratios (the ratios of capital to total assets) are below the EU peer average and the G-SIB peer average. LCR are on average above the average for the G-SIB peers but below the EU peer average (Figure 7a); however, NSFRs are below the EU and the G-SIB peer average. The below-average ROA reflects the combination of a moderate decline of French banks' profitability, and an increase of profitability among EU and G-SIB peers. The NIM of French banks has been on the low side, compared to peers, and the net fees and commission income has accounted for a share of income above EU and global peers' average. There also seems some room for improvements in cost efficiency, as the cost-to-income ratio appears to be moderately above the average for EU and for G-SIB peers for several banks (Figure 7b).[7]

Figure 6. Bank Performance Overview

Overall, bank's excess capital over requirements has improved, but some banks have small margins ….

Total Capital Adequacy Ratio

(In Percent)



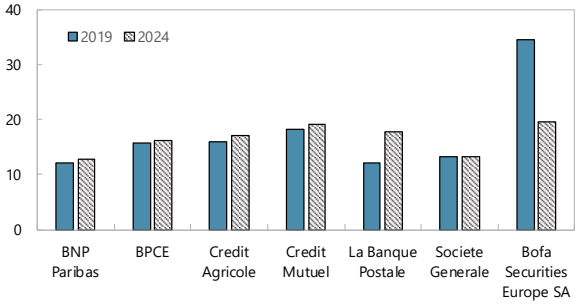
1/ The capital requirement does not include the systemic risk buffer, HCSF decision July, 31, 2023

Source: Fitch Connect, IMF staff calculations

And so has the CET1 ratio….

Core Tier 1 Capital Ratio

(In Percent)



Note: Credit Mutuel and Bofa Securities Europe SA are using the latest 2023 data.

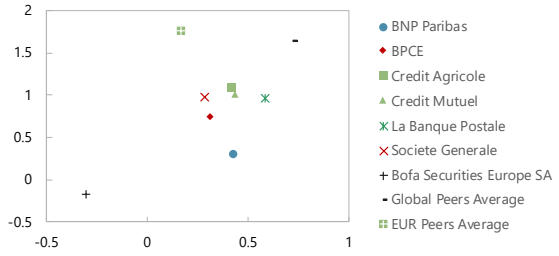
Source: Fitch Connect, IMF staff calculations

[7] LBP appears to be an outlier with a very low cost-to-income ratio, especially after taking over CNP Assurance on its balance sheet.

Figure 6. Bank Performance Overview (concluded)

In 2019, profitability was above EUR peer average despite lower-than average net interest margins…

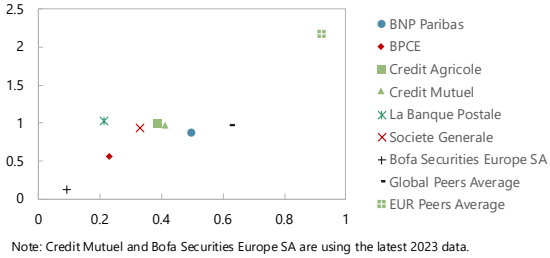
ROAA(X-axis) **& Net Interest Margin**(Y-axis)
(In 2019)



Source: Fitch Connect

In 2023, both profitability and net interest margins are below EUR peer average for all large banks….

ROAA(X-axis) **& Net Interest Margin**(Y-axis)
(In 2024)



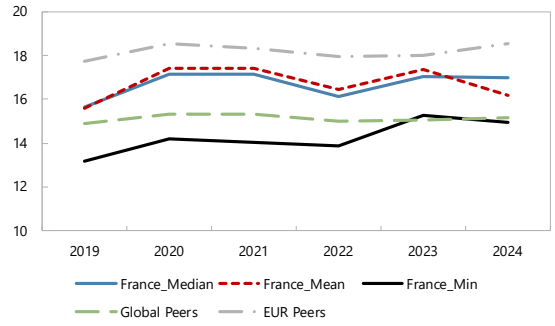
Note: Credit Mutuel and Bofa Securities Europe SA are using the latest 2023 data.

Source: Fitch Connect

Figure 7a. Comparative Analysis: Aggregate Buffers

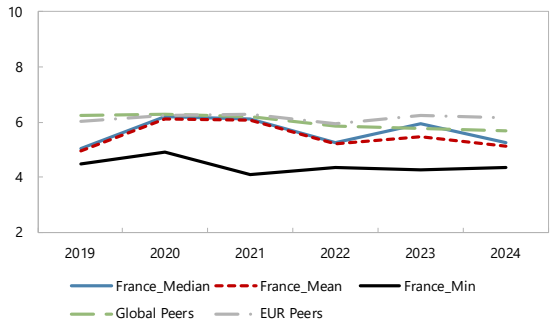
The capital ratio is below EU average, but above G-SIBs'….

Tier 1 Capital Ratio
(In Percent)



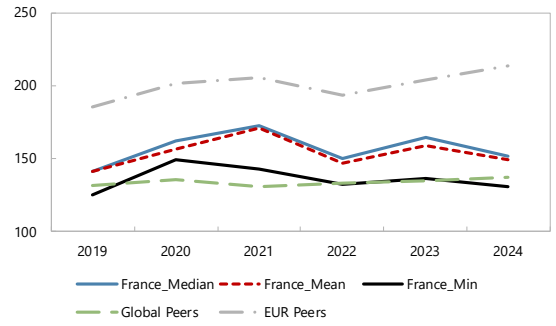
The leverage ratio is below peers' averages….

Leverage Ratio
(In Percent)



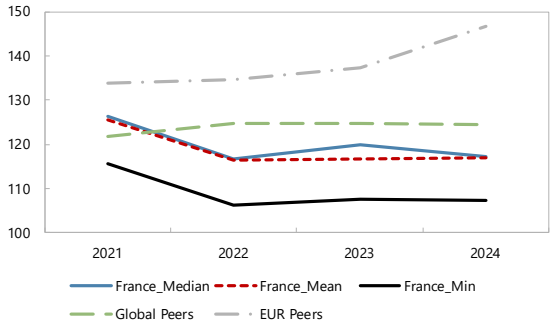
The LCR is above the Basel requirement, above G-SIBs peers but below EU peers…

Liquidity Coverage Ratio
(In Percent)



The NSFR is above requirements but below peers….

Net Stable Funding Ratio
(In Percent)



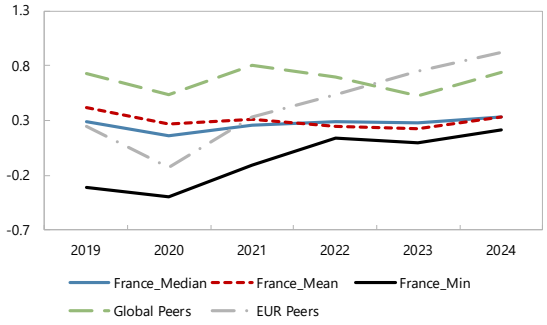
Source: Fitch Connect and IMF Staff calculations.

Note: Credit Mutuel and Bofa Securities Europe SA are using the latest 2023 data.

Figure 7b. Comparative Analysis: P&L

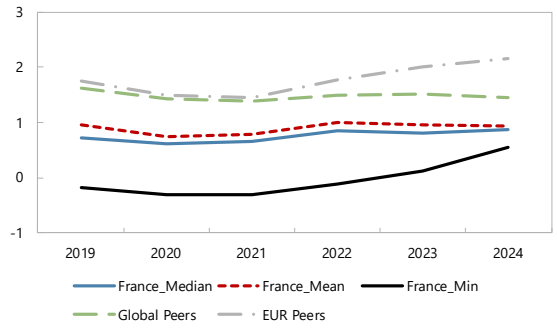
the ROA has fallen below peers average….

Return on Assets
(In Percent)



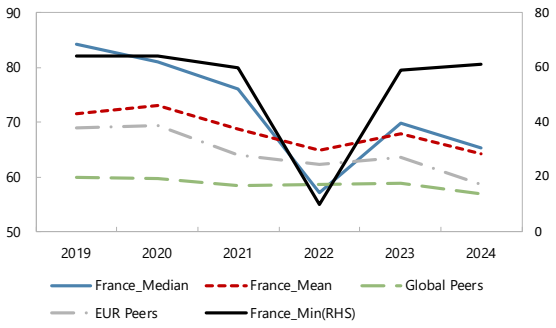
The NIM has been on the low side since before the Pandemic….

Net Interest Margin
(In Percent)



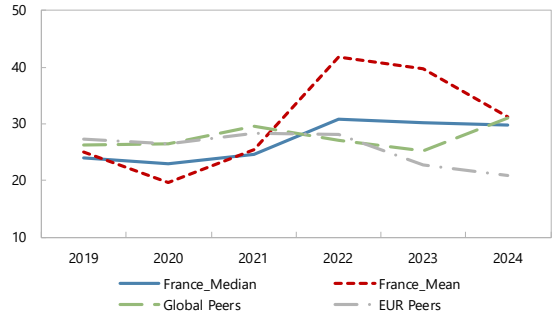
The cost-to-income ratio has declined …

Cost to Income Ratio
(In Percent)



Net fees and commission now account for a larger share of income than peers' average …

Net Fees and Commissions
(As a Percent of Total Operating Income)



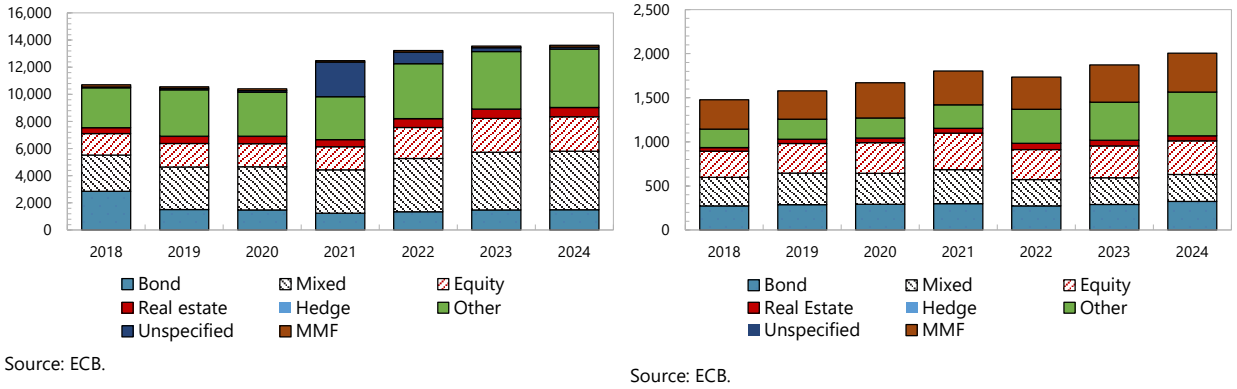
Source: Fitch Connect

Note: Credit Mutuel and Bofa Securities Europe SA are using the latest 2023 data.

C. Investment Fund Industry Structure and Recent Developments

6. The asset management industry forms an important segment of the financial system in France. The industry comprises of investment funds excluding money market funds (IFs), and money market funds (MMFs). At end-2024, there were 13,511 IFs and MMFs with a cumulated net asset value (NAV) of almost EUR 2 trillion (60 percent of GDP) (Figure 8). While the number of bond funds declined by half between 2018 and 2021, they reflect consolidation of the segment, and the NAV of these funds has grown steadily. Other investment mandates appear to have become more competitive but may reflect reclassification. A moderate number of MMFs (120 at end-2024) manage on average a larger amount of assets compared to the IFs. The French asset management industry ranked 10th largest in the world and 4th in the Euro Area in terms of fund domiciliation, after Luxemburg, Ireland, and Germany (Figure 9).

Figure 8. Number and Net Asset Value of Non-Money Market Investment Funds and Money Market Funds in France, by Investment Policy, 2018-2024

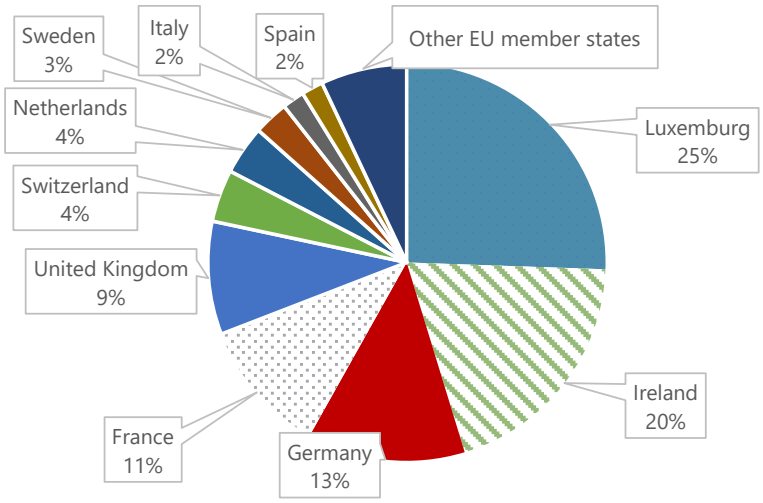


Source: ECB.

Source: ECB.

Figure 9. European Investment Funds, by Country of Domicile, 2023

(In Percent of Total Net Asset Value)

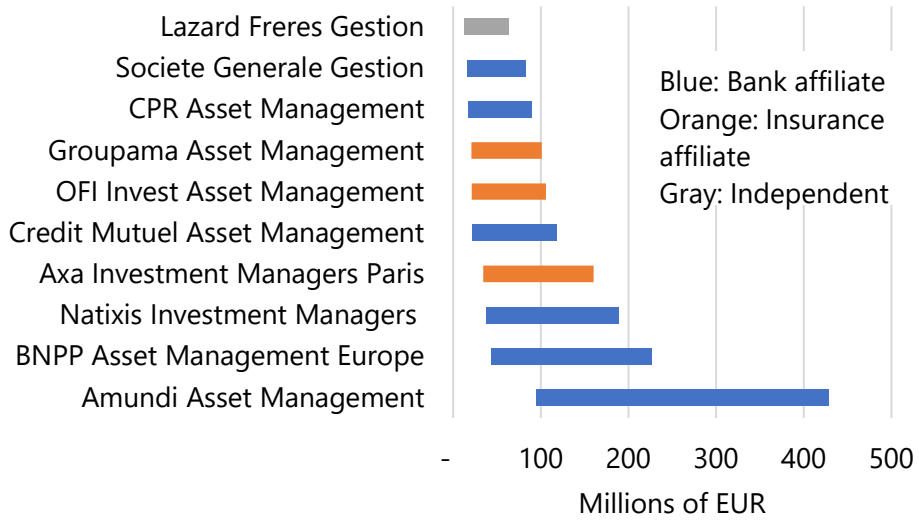


Source: EFAMA.

7. The French investment fund industry is dominated by a few firms. In 2023, the top 5 firms accounted for 45 percent of the market share in NAV in France; this compares with 58 percent for the top 5 firms in Germany, and 41 percent for the U.K. (Source: EFAMA). The top 10 firms are affiliates of French banks or insurance companies, with Amundi (affiliate of Credit Agricole) significantly dominating the industry (Figure 10). The industry continues to consolidate, with the purchase of AXA IM by BNP Paribas AM in December 2024 being the latest such transaction. Consolidation is likely to continue to prepare for potential creation of a Savings and Investments (SIU) Union within the EU to leverage the enormous wealth of private savings that is currently held

in bank deposits in Europe (EFAMA). In parallel, tax incentives are offered to enhance participation in both occupational and private pensions.

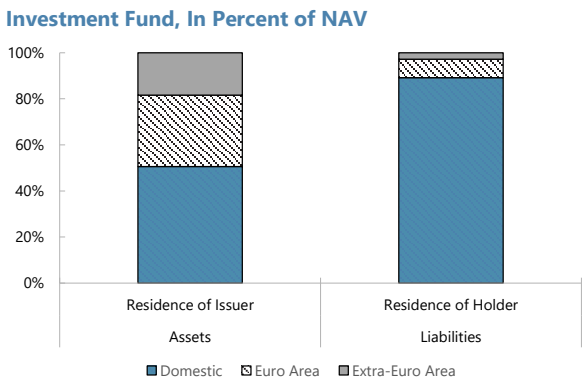
Figure 10. Top 10 Investment Management Companies Domicile in France, Net Asset Value Range of Size Class of Investment Funds in the Companies, end-2024



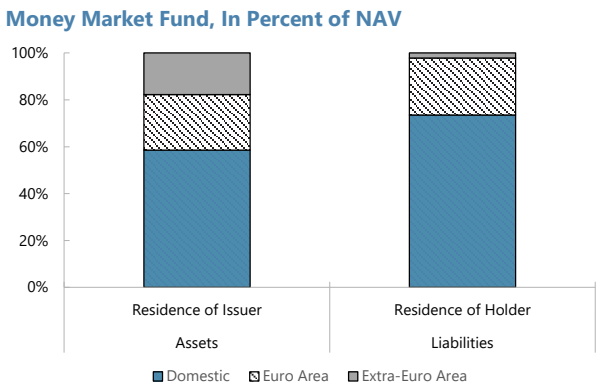
Note: Range of size class depicts the range of the size of the individual funds within each company.
Source: ECB.

8. The French asset management industry collects mostly domestic savings and invests them in domestic and foreign assets (Figure 11). Almost 90 percent of the investors in the IF shares/units are resident investors (75 percent for MMFs). About half of the assets held by IFs (60 percent for MMFs) are securities issued by French entities, 30 percent by resident issuers in the EA (20 percent for MMFs), and 20 percent by issuers in the rest of the world (20 percent for MMFs).

Figure 11. Balance Sheets of French Investment Funds and Money Market Funds, by Residency, end-2024



Source: BdF.



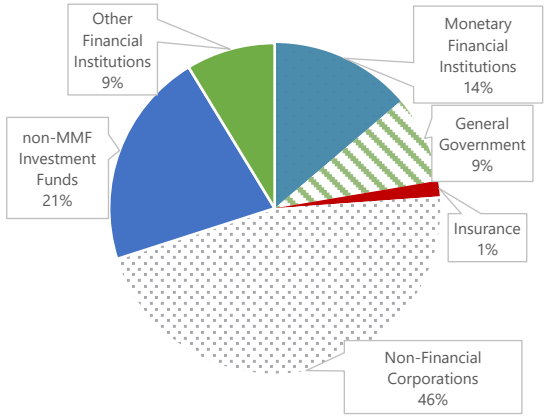
Source: BdF.

Note: "Residence of holders" denotes residence of holders of IF and MMF shares/units. "Residence of issuer" denotes the residence of the issuers of the securities held by IFs and MMFs.

9. IFs and MMFs channel savings from the insurance industry and invest them into non-financial corporations and monetary financial institutions (MFIs). On the liabilities side, insurance companies are the largest investors in IF shares/units, followed by households, and non-MMF investment funds. On the asset side, almost half of the investments by IFs are channeled to non-financial corporations (predominantly equity), followed by non-MMF IFs and MFIs. For MMFs, insurance companies are also the largest investors, followed by non-MMF IFs and non-financial corporations. The funds collected by MMFs are invested in bank debt securities and shares in MMFs. Net deposit account for 20 percent of MMF assets (Figure 12). An AMF study has found that insurers invest mostly in funds managed by asset management companies belonging to the same conglomerate. Conversely, asset management companies almost exclusively manage investments from insurers in the same group. The supervisory authority for investment funds, AMF, does not have a systematic database on the holders of liabilities at the fund level. AMF instead obtains information from other supervisory bodies and on an ad hoc basis. Reporting of the liabilities is not required by law or regulation. Aside from information on holders of investment fund shares/units, information on net deposits and loans received and their counterparty is unavailable. This information is critical for the supervisor in the context of monitoring redemption risk, stress testing, and analysis of interconnectedness.

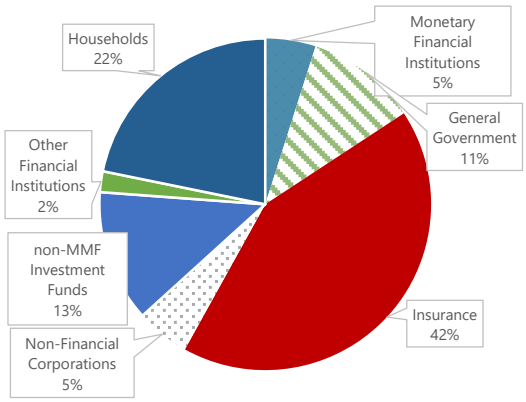
Figure 12. Balance Sheets of French Investment Funds and Money Market Funds, by Issuer, Investor, and Instruments, end-2024 (In Percent of Total Assets)

Investment Fund Assets, by Issuer



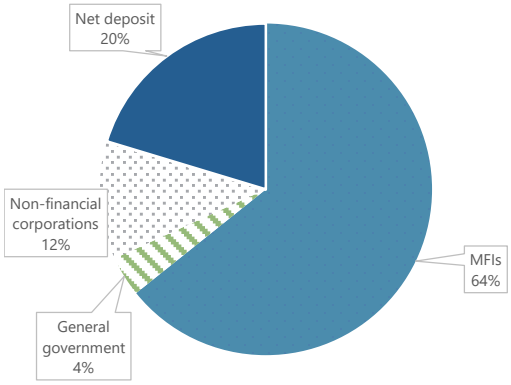
Source: BdF.

Investment Fund Liabilities, by Investor



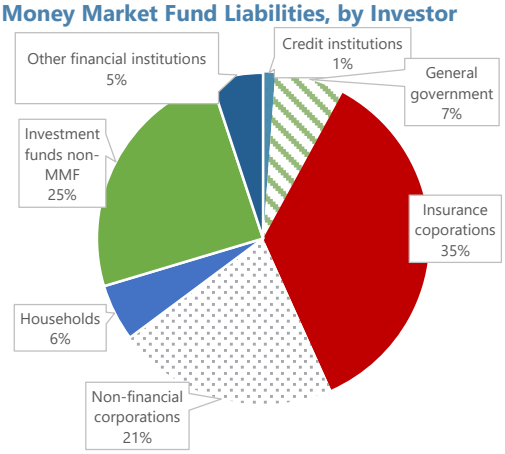
Source: BdF.

Money Market Fund Assets, by Instrument



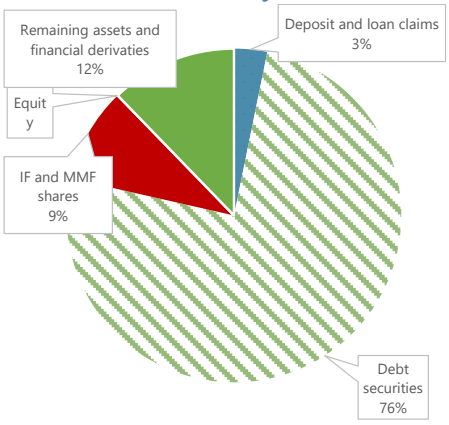
Source: BdF.

Money Market Fund Liabilities, by Investor



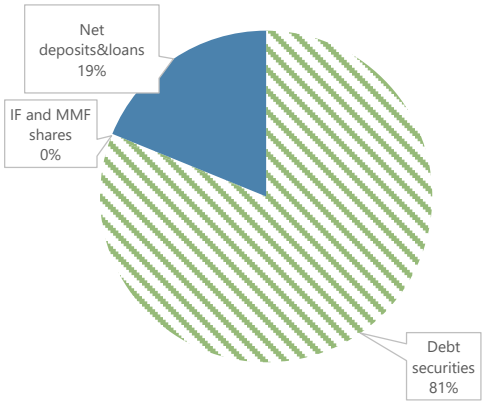
Source: BdF.

Investment Fund Assets, by Instrument



Source: BdF.

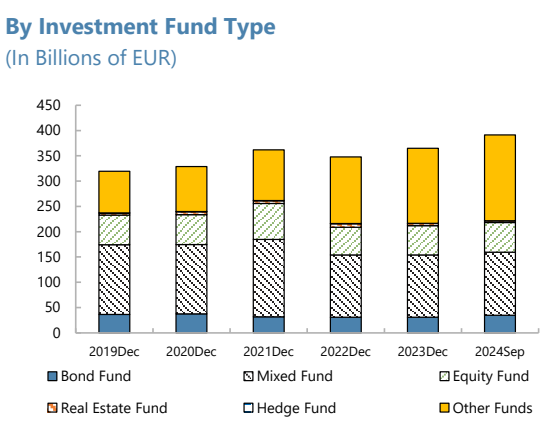
Money Market Fund Assets, by Instrument



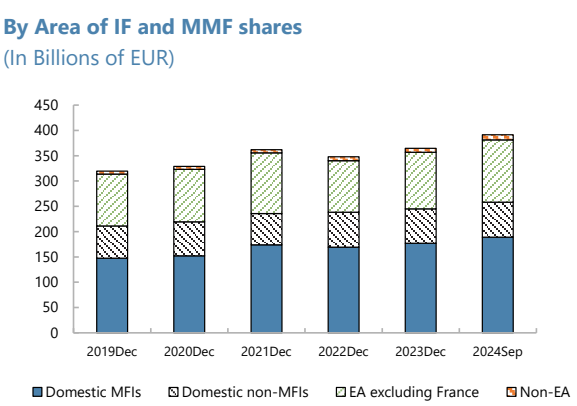
Source: BdF.

10. A fifth of the EUR 1.6 trillion in assets held by IFs are invested in shares of other IFs and MMFs. This compares with 34 percent for the EA average (2023, EFAMA). Assets managed this way has increased steadily in line with the growth in the overall investment fund industry in France, from EUR 320 billion in Q4 2019 to EUR 390 billion in Q3 2024 (Figure 13). The mixed fund and other fund categories have the highest propensity to have funds that invest in other funds. Of this, almost half (EUR189 billion) are IF and MMF shares/units issued by domestic MFIs. Investment into funds can help to diversify the portfolio by leveraging on expertise and specialists in other funds. On the other hand, the fund-of-fund model can also have a risk amplification effect as redemptions of funds can require a second round liquidation of investments in other IF and MMF shares/units. A study on the German fund sector found that exclusive focus on funds' common assets holdings could significantly underestimate fund sector vulnerabilities.[8]

Figure 13. IF and MMF Shares/Units Held by Investment Funds in France (stock)



Source ECB.



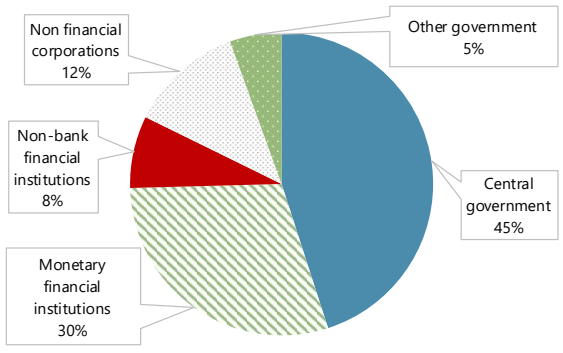
Source ECB.

11. The French IFs operate in a deep securities market. The French IFs collectively held EUR 645 billion in French debt securities and EUR 477 billion in French equities at end-2024. This compares with nominal French debt securities outstanding of EUR 5.7 trillion and total market capitalization of the French equity market of EUR 2.7 trillion. The debt securities market comprised 30 percent in debt issued by MFIs, and almost half by the French sovereign (EUR 2.8 trillion). The equity market predominantly comprises of listed shares of non-financial corporations (90 percent of the total), while MFIs accounted for only about 5 percent of the total (Figure 14).

[8] The risk of amplification will depend on business models. A similar study can be useful to investigate empirically whether the fund-of-fund model is pure diversification or a way for managers to take advantage of daily liquidity offered by funds holding illiquid assets.

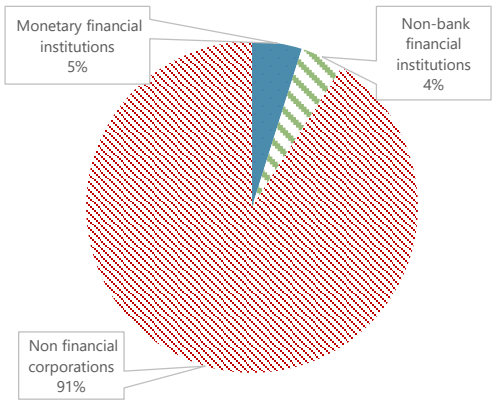
Figure 14. French Securities Outstanding, end-2024

Debt Securities Outstanding, by Issuer
(In Percent of Total Debt, EUR 5.7 trillion)



Source: ECB.

Equities Outstanding, by Issuer
(In Percent of Total Listed Equity, EUR 2.7 trillion)



Source: ECB.

D. Scope of the Systemic Risk Analysis and Scenarios

12. Key vulnerabilities in France are related to high and rising public debt and growing balance sheet weaknesses in the non-financial sector in the context of political fragmentation and potential social unrest (Table 15, RAM). A slow fiscal adjustment could lead to higher risk premia and market repricing with an adverse macro-financial feedback loop affecting NFCs, banks and NBFIs. Setbacks to fiscal consolidation agenda would negatively impact business confidence and investment, employment, raise risk premia and impact refinancing costs, and weaken public debt dynamics. Continued weak pace of reforms would weaken potential growth and further deteriorate public and private financial and non-financial balance sheets. This could result in higher credit risk and would tighten lending standards, further weakening private sector investment and potentially raising corporate default rates.

13. Global risks are on the rise and the outlook has become more uncertain. In the current challenging global macroeconomic and political environment, the financial sector remains vulnerable to adverse dynamics, which could be triggered by negative macrofinancial incidents or the materialization of geoeconomic risks and intensification or continuation of conflicts, trade policies and investment shocks, tighter financial conditions, and systemic stability risks. Leveraged firms and households have been under pressure from higher debt service costs from the tightening period 2022-2023, and higher interest rates would further adversely affect the dynamics of debt, including for the sovereign. The potential widening of sovereign spreads could raise borrowing rates and heighten credit risk. Deteriorating asset quality, lower lending, stress in core financial markets, and contagion from strains in NBFIs are risks going forward.

14. The FSAP assessed the resilience to key macro-financial risks of interconnected financial sectors and private non-financial sectors' balance sheets. Risks to the solvency of the 7

major SIs, of households and of non-financial corporates are assessed against the 2025 January WEO baseline and two severe but plausible adverse macroeconomic scenarios which are common to the Euro Area FSAP. The stress tests take into account the impact of non-financial private sectors on the solvency of banks, and interbank contagion risks are also assessed. Liquidity risks are assessed for the 7 SIs, for investment funds, against several market stress scenarios, also considering system-wide interactions from investment funds to banks, and for non-financial corporates.

- *Baseline macroeconomic scenario*. The banking sector and private non-financial sector's solvency is first simulated against the 2025 January update of the WEO, consistent with the Euro Area FSAP baseline scenario. This baseline has not been updated since and therefore does not take into account subsequent macro-economic developments.[9]

- *Geopolitical adverse scenario*. The scenario features the materialization of tail-risk hinging on deepening *geoeconomic* fragmentation, global commodity and trade shocks, which are inflationary and include the potential impact of tariff changes that would hinder global trade disrupting global production chains and investment, with large adverse trade, price and tariff shocks ("trade wars"), combined with a global loss of confidence, causing demand shocks, tighter financial conditions and asset price decline that triggers a "higher for longer" inflation environment, slowing growth amid rising short-term interest rates.

- *Recession scenario with sovereign stress*. The scenario combines global demand shocks, loss of *confidence*, tightening of financial conditions and domestic fiscal shocks that raise government borrowing costs and term premia, resulting in a recession and decline in asset markets, while structural shocks to productivity growth lower potential output growth, including in France. Shocks to France's sovereign spreads are considered to be in the intermediate range among Euro Area countries based on the extent of sovereign balance sheet vulnerabilities.

15. In addition, the resilience of banks is assessed against one-off severe market shocks that materialize in the first year of the solvency stress test adverse scenarios. Two sets of one-off market shocks – each one based on narratives consistent with each adverse macroeconomic scenario – are applied to banks at the beginning of the first year of each scenario and the capital impact is carried-over in the two following years of the scenarios. Hence, the shocks are not reverse in the course of the 3-year macroeconomic scenarios. The set of market shocks aligned with the geopolitical macro scenario feature an increase in interest rates, particularly at the short end of the EUR yield curve, commodity prices and credit spreads, and a drop in equity prices. The set of shocks consistent with the recessionary adverse scenario, feature a drop in commodity and equity prices, an increase in the credit spread of mid-risk Euro area sovereign (which includes France) and of high-risk

[9] The two adverse scenarios encompass several of the downside risks that have started to be realized since the January WEO update, including tariffs and sovereign stress, and therefore provide an assessment of solvency against the realization of such risks.

Euro Area sovereigns, while the short end of the EUR yield curve remains stable. Both sets of shocks include similar volatility shocks to equities and interest rates.

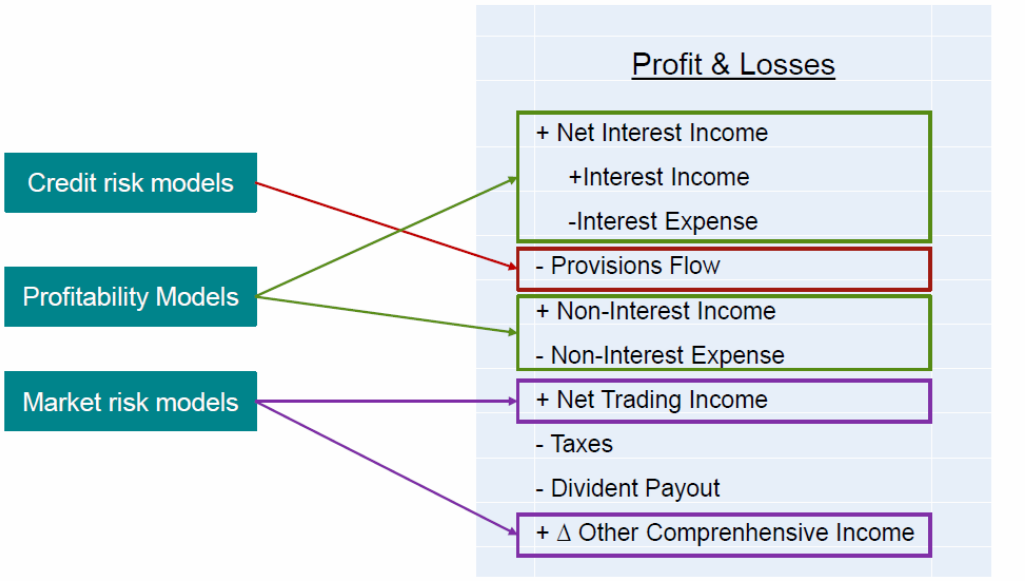
SOLVENCY STRESS TESTS OF BANKS

A. Stress Testing Approach and Macro-Financial Scenarios

16. The objective of the risk analysis component of the FSAP is to identify macro-financial vulnerabilities and is different from supervisory (EBA) approaches. The biennial EBA-SSM-ECB exercise is a constrained bottom-up stress test where banks are required to project the impact of the scenarios on their projected capital position and P&L subject to strict constraints defined in the common methodology. By contrast, the FSAP stress test is a top-down exercise with projections generated by IMF in-house models developed by the FSAP team. While the FSAP and EBA scenarios could share a consistent narrative of risks, they differ in terms of the granularity of data used, and calibration of the various shocks. The stress test considers credit risks, interest rate risks and market risks (Figure 15 and Table 19 STeM). The core bank stress-test results of the France FSAP utilize adverse scenarios and models from the contemporaneous EA FSAP.

Figure 15. Scope of the Solvency Stress Tests

The solvency stress tests developed satellite models for credit risk, interest rate risk, net fees and commission income and market risk (including through Other Comprehensive Income)



Source: IMF staff

17. The two adverse scenarios entail very large shocks to macroeconomic variables (Figure 16). The shocks correspond to a 2.4 (respectively 2.7) deviation of real GDP growth from the

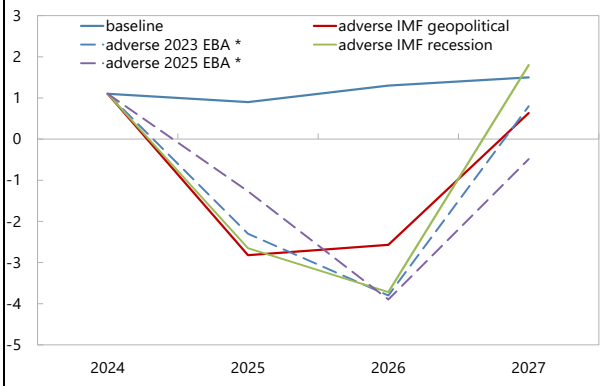
baseline in the geopolitical scenario (respectively recession scenario). They result in a decline of real GDP of about 5.3 percent (respectively 6.3 percent) after two years in the geopolitical scenario (respectively recession scenario). While in the geopolitical scenario short-term interest rates increase by 1.9 percentage point in the first year, they decline by 0.6 percentage point in the recession scenario as a consequence of the respective inflation dynamics of each scenario. Long-term interest rates spike at 5.5 percent in the geopolitical scenario and at 4.8 percent in the recession scenario in 2024, causing a widening of the term spreads of up to 2.1 percent in the recession scenario, reflecting sovereign stress. The unemployment rate increases to 10 percent (respectively 13.5 percent) after 3 years in the geopolitical scenario (respectively recession scenario).

Figure 16. Macroeconomic Scenarios for France

The two adverse scenarios entail a real GDP path broadly similar to the 2023 and 2025 EBA stress test…

Real GDP Growth

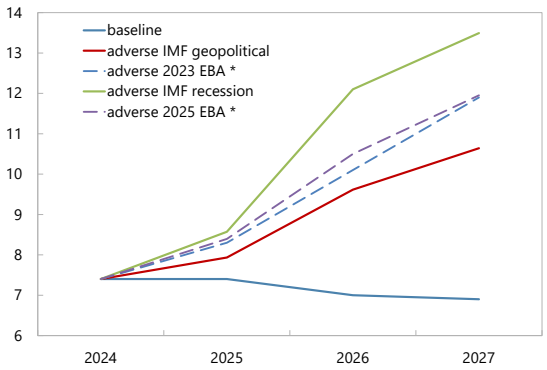
(In Percent)



The unemployment rate rises to a high level, especially in the recession scenario…

Unemployment Rate

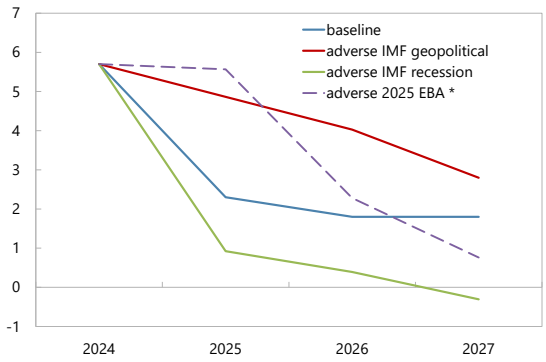
(In Percent)



Inflation remains above target in the geopolitical scenario

Inflation

(In Percent)



Triggering a tightening of monetary policy…

Short-Term Interest Rate

(In Percent)

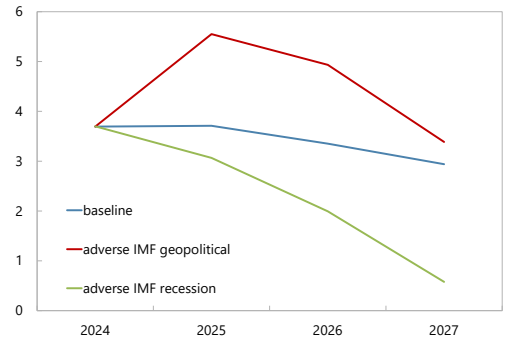
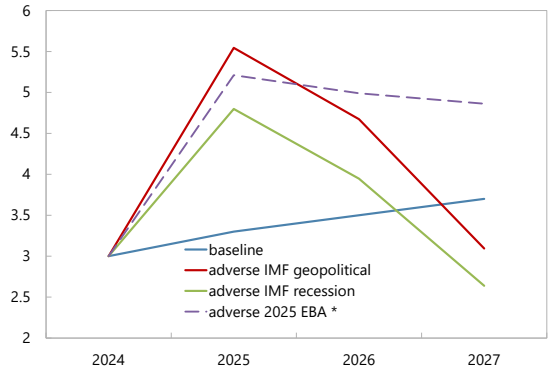


Figure 16. Macroeconomic Scenarios for France (concluded)

Long-term rates increase in both scenario…

Long-Term Interest Rate

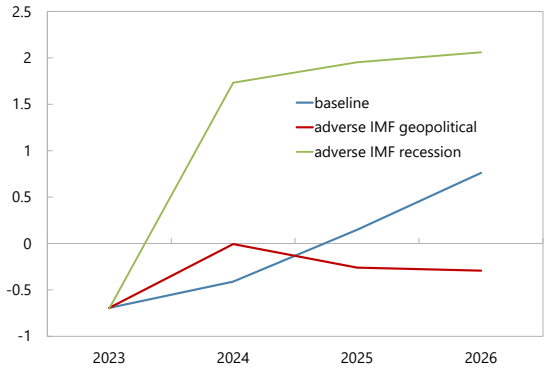
(In Percent)



But the yield curve remains flat or inverted in the geopolitical scenario…

Term Spread

(In Percent)



Source: EBA, IMF, and IMF staff calculations. Baseline projections are based on October 2024 WEO; adverse scenarios as of November 2024.

*: EBA differences from baseline applied to IMF forecasts.

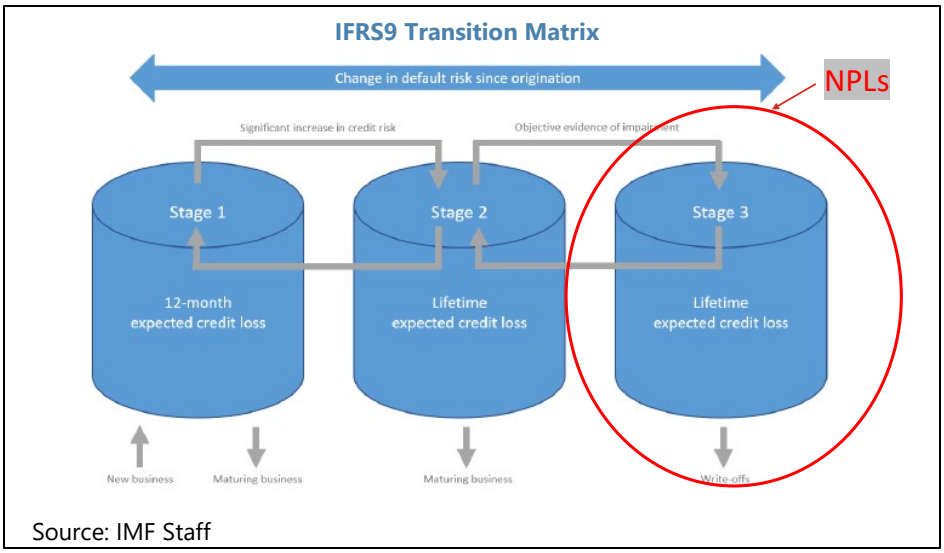
18. Market risk analysis was conducted against two short-term market stress scenarios, whose narratives are aligned with the macro scenarios. The FSAP team designed two market distress scenarios, calibrated to capture high-frequency market price and volatility movements. The scenarios are displayed in Table 2: The one on the left-hand side is aligned with the geopolitical macro scenario, featuring an increase in interest rates (particularly at the short-end of the EUR yield curve), commodity prices and credit spreads, together with a sharp contraction in equity prices; meanwhile, the scenario on the right-hand side is aligned with the recessionary macro scenario, featuring a drop in commodity and equity prices, a larger increase in the credit spread of mid- and high-risk Euro Area sovereigns, while the short-end of the EUR yield curve remains muted. The market test scenario is calibrated using an Expected Shortfall approach.

Table 2. Euro Area: Market Risk Scenarios[1]

			Geopolitical - market scenario		Recessionary - market scenario	
risk	factor	unit	delta shock	volatility shock	delta shock	volatility shock
CM	energy	relative change, percent	56.3		-58.8	
	industrial metals		24.8		-28.1	
	precious metals		17.4		-18.3	
CR	CR-low-5Y	absolute change, bps	85.5		0	
	CR-low-10Y		0		0	
	CR-mid-5Y		117.8		168.8	
	CR-mid-10Y		0		0	
	CR-high-5Y		206.8		319.3	
	CR-high-10Y		206.8		319.3	
	CR-europe		82.9		82.9	
	CR-US		98.3		98.3	
EQ	EQ-Asia	relative change, percent. PP change	-42.6	40.0	-42.6	40.0
	EQ-JP		-40.8	40.8	-40.8	40.8
	EQ-Latam		-46.8	40.0	-46.8	40.0
	EQ-US		-38.2	56.0	-38.2	56.0
	EQ-europe		-32	57.1	-32	57.1
IR	EUR-1M	absolute change, bps. PP change for vol	148.7	14.8	0	14.8
	EUR-6M		160.4	10.8	0	10.8
	EUR-1Y		178.7	13.5	0	13.5
	EUR-5Y		0	5.3	0	5.3
	EUR-10Y		0	4.8	0	4.8
	EUR-20Y		0	6.8	0	6.8
	EUR-30Y		0	6.8	0	6.8
	USD-1M		155.8	19.1	155.8	19.1
	USD-6M		158.8	21	158.8	21
	USD-1Y		171.4	23.6	171.4	23.6
	USD-5Y		164.2	7.6	164.2	7.6
	USD-10Y		151	71.8	151	71.8
	USD-20Y		127.2	8.2	127.2	8.2
	USD-30Y		112.4	8.3	112.4	8.3

CM: commodities; CR: credit spreads; EQ: equity; IR: interest rates.
Source: IMF staff
[1] The third column provides the unit of the shock for each factor, and the fourth and sixth columns the size of the shock relative to the starting point

19. The solvency stress tests cover the largest 7 SIs with accounts under IFRS9 accounting and that are included in the EBA stress tests.[10] The 7 SIs account for about 96 percent of bank assets. The stress tests were conducted using the balance sheets and profit and loss (P&L) statements of these SIs as of the end of 2024. The data on SIs were obtained from the ECB-SSM (FINREP and COREP templates, and STE files on Interest Rate Risk in the Banking Book (IRRBB), market sensitivities, and large exposures). For robustness purposes, we also constructed historical quarterly data going back to 2014 on NPL ratios and recovery rates for loans to NFCs by bank and NACE economic sector levels. Consistent with the Euro Area FSAP, the stress test considered the largest foreign exposures of France SIs, in particular to Italy, Belgium, Spain, the UK and the US, in addition to domestic exposures. As for domestic exposures, stressed foreign exposures of SIs include private sector exposures (non-financial corporates, households, financial institutions) and sovereign exposures.



Source: IMF Staff

20. The stress tests follow a balance sheet approach at a consolidated level, and were based on accounting data (IFRS9), and regulatory capital ratios. IRB and STA portfolios were consolidated at the bank level. The risk-based classification (staging) corresponds to different levels of risks. Exposures generally enter Stage 1 upon origination. Depending on change in risk, they may migrate to Stage 2 (corresponding to a significant increase in credit risk), or Stage 3 (corresponding to a non-performing exposures). Stage 1 exposures are provisioned on a 12-month horizon, while Stage 2 and Stage 3 exposures are provisioned with a life-time horizon, which makes the modeling of credit risk more complex than under the incurred loss approach. Modeling of transition matrices which depend on the macro-financial cycle requires estimations of transition rates, where TR_{xy} is the transition rate between Stage x and Stage y. In absence of historical data with long enough time series to permit modeling of transition rates, transition flows are estimated based on the beta-linking approach. [11] Starting point Point in Time (PiT) PDs and Through the Cycle (TTC) PDs are those reported by each SI in the supervisory

[10] The 7 SIs are BNP-Paribas, Groupe Crédit Agricole, BPCE, Société Générale, Confédération Nationale du Crédit Mutuel, La Banque Postale and Bank of America Securities Europe.

[11] This approach assumes constant elasticities between other transition rates and PDs (to which TR1-3 and TR2-3 are equal). [These constant elasticities are consistent with those relied upon in recent European FSAPs, in particular the France FSAP of 2019.] See Gross, M., Laliotis, D., Leika, M., and P. Lukyantsau, 2020, "Expected Credit Loss Modeling from a Top-Down Stress Testing Perspective", IMF Working Paper No. 2020/111.

templates for IRB portfolios, and for STA portfolios they are estimated based on recent historical reported transition matrices.

21. Stress tests are realized under a static balance sheet assumption. This means that there are no write-offs and new originations equal maturing loans, and the nominal balance sheet of each bank remains of constant size nominally. This implies that defaulted exposures accumulate in the balance sheet of banks and results in "conservative" (upper-bound) estimates of the decline in banks' capital ratios caused by credit risk, everything else equal.[12]

22. Two hurdle rates are considered for capital ratios. In line with the regulatory framework, the performance of banks is assessed based on the Common Equity Tier One (CET1) capital ratio. The first one, which is bank-specific, is defined as the minimum requirement equal to the Basel III common 4.5 percent minimum plus the bank-specific Pillar 2 Requirements. The second one adds the capital conservation buffer of 2.5 percent, and the systemic buffers (G-SIB buffer, O-SII buffer, and any sectoral buffer).

B. Credit Risk Modelling and RWAs

Non-Financial Corporates' Probabilities of Default and Loss-Given-Default

23. The satellite models for non-financial sector exposures are based on the MCM Corporate Stress Test methodology described in Tressel and Ding (2021) (Box 1).[13] The model combines firm-level dynamic panel regressions of firm-level variables on macroeconomic variables (real GDP growth and an FCI from the GFSR) and accounting identities to project earnings, sales, leverage and ICR at the firm level consistent with each of the macroeconomic scenarios. The scenario ICR and debt-to-equity ratios are then mapped into buckets of firm-level annual PDs based on Moody's matrix ratings (benchmarked to historical default rates in the US), which are aggregated at the country level using each firm's indebtedness as weigh in the aggregation. Aggregate PDs which are presented in this report are then rescaled to each banking system aggregate PDs on loans to NFCs (based on the EBA Risk Parameter Statistics for 2024:Q3).[14] The original model has been expanded to take into account balance sheet data and financial statements for the year 2023 (which were the only available at the start of the FSAP), and for roughly 23,000 nonfinancial firms covering 42 countries.

[12] This assumption which is borrowed from the Euro Area FSAP is likely to be especially conservative for French banks' housing loan portfolios because housing loans benefiting from a third-party guarantee are usually transferred to the guarantor's balance sheet soon after the default event.

[13] For details, see: Global Corporate Stress Tests—Impact of the COVID-19 Pandemic and Policy Responses. This model has been relied upon in previous FSAPs including Germany, the UK, the Euro Area, and Colombia among others.

[14] In the actual solvency stress tests, the rescaling is performed at the bank level based on PDs reported for IRB portfolios and default rates reported for STA portfolios.

Box 1. Corporate Credit Risk Model

The corporate PD generation is based on PD methodology described in Tressel and Ding (2021). The process starts by generating forward-looking financial statements for almost 23,000 listed non-financial corporations in 42 countries. Using 2024 balance-sheet data as a common anchor, country-specific panel regressions are estimated in which key performance ratios—sales growth, return on assets, leverage and the interest-coverage ratio—depending on their own lags and two exogenous drivers: real-GDP growth and a broad financial-conditions index that captures changes in spreads and equity valuations.

The macro inputs are taken directly from the IMF's World Economic Outlook baseline and the FSAP adverse scenarios, so each firm's projected path is automatically conditioned on the relevant national macro narrative. Accounting identities transform the projected income-statement items into stock variables—debt, equity, cash buffers—over a three-year horizon. Interest expenses evolve with both the firm's own historical funding mix and the scenario-specific shifts in short- and long-term corporate borrowing rates, ensuring that debt-service capacity reacts to the interest-rate environment as well as to changes in leverage and earnings. Interest rate shocks of the current year of a given scenario are applied to the portion of debt that matures within the year, and the interest rate shock of year +1 is applied to the portion of the debt that matures after one year. The maturity structure (remaining maturity of less than one year, above one year) is assumed to remain unchanged during the scenarios.

The simulated balance-sheet indicators are mapped into one-year forward PDs. The mapping uses a matrix, originally built by Moody's for U.S. data over 1970-2012, that assigns an empirical default frequency to each cell defined by an interest-coverage ratio band and a debt-to-equity band. Once every firm is placed in a cell for each projected year, the corresponding historical default rate becomes its PD. Aggregating across firms with debt weights yields a scenario-specific corporate default rate for each country.

Because the Moody's matrix is U.S.-centric and reflects an earlier credit cycle, the aggregated PDs are benchmarked to country-specific default measures. Two alternative anchors are employed. For a market-based view of large-listed corporates, the country aggregate for 2024 is rescaled so that it matches Moody's-KMV one-year expected default frequency (EDF); both mean and median EDFs are considered to guard against fat-tail distortions in countries such as the US and Canada. The resulting scaling factor is then applied to the entire forward path of raw PDs under each macro scenario, so differences across scenarios reflect only the impact of the macro shocks and not cross-country calibration quirks.

24. PDs for France appear to rise significantly in each of the two adverse scenarios but remain at manageable levels. Consistent with the identified vulnerabilities of NFCs in France, the model predicts that PDs increase, even in the baseline scenario, by up to 170 percent in the second year of the scenario. In the two adverse scenarios, PDs increase by about 270 percent in the second

year of each scenario, reaching 4.3-4.4 percent (text chart). Given that several French banks have significant foreign exposures, PDs for NFCs were also constructed based on this model for their exposures to NFCs in several countries (PDs for several countries of large exposures are reported in Figure 17). PDs reach the highest levels for loan exposures to NFCs of Belgium and Italy.

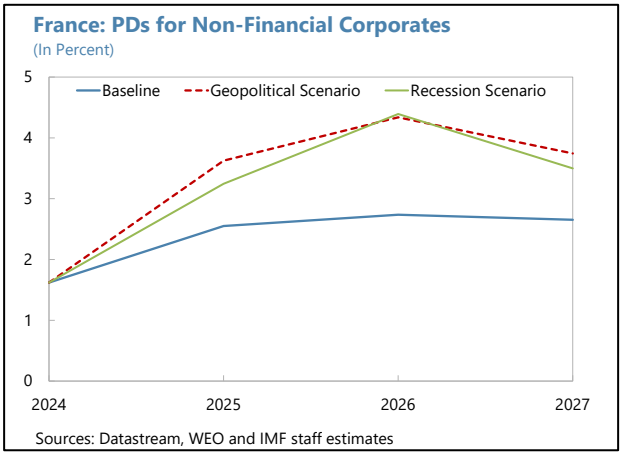
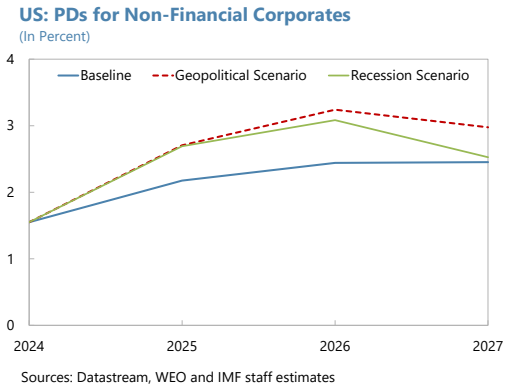
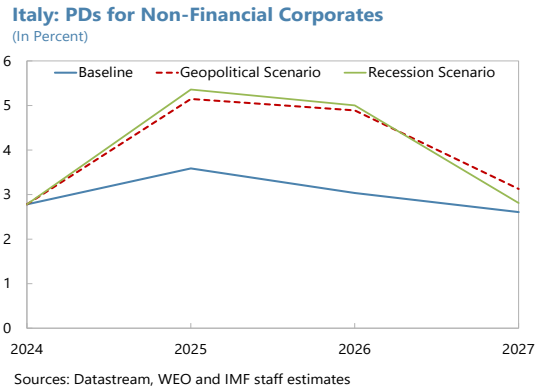
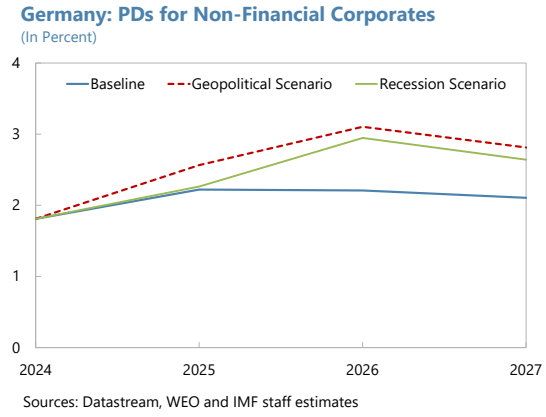


Figure 17. Cross-Border Exposures: PDs for NFCs







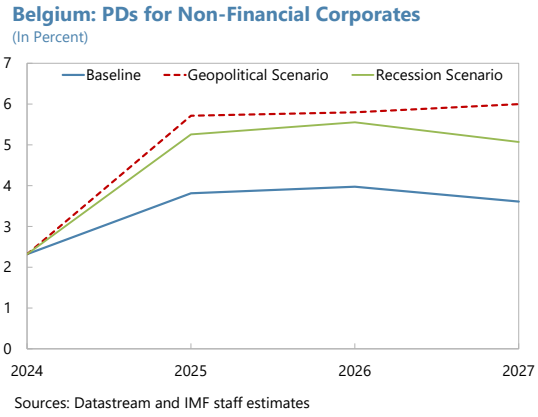
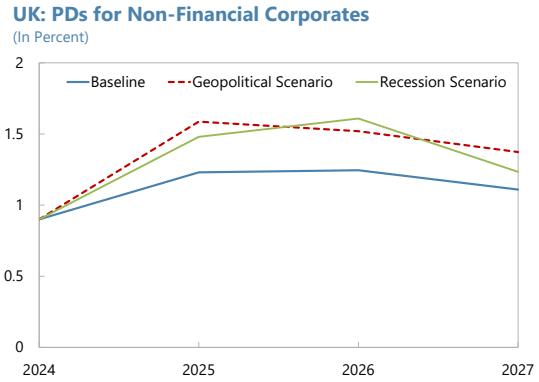
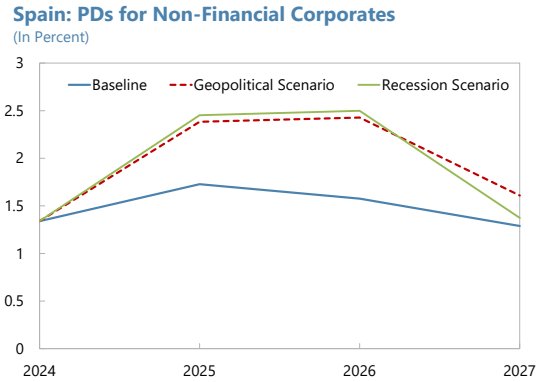


Figure 17. Cross-border exposures: PDs for NFCs (concluded)



Sources: Datastream, WEO and IMF staff estimates



Sources: Datastream, WEO and IMF staff estimates

25. LGDs are modelled based on a methodology linking LGDs to the fluctuations of PDs and an initial bank level value for each geographical segment of NFC loans (Box 2). The initial value for 2024:Q4 is obtained from individual bank's supervisory reporting. From the EBA Risk Parameter Statistics as of 2024:Q4, aggregate LGDs for French NFCs stand at 36.1 percent.

Box 2. Modeling LGDs

The method to calculate LGDs from the paths of PDs was put forth in Frye and Jacobs (2012)[1] and considers a Vašíček-type equation. It builds on two primary formulas:

$$\mathrm{LGD}_{\mathrm{t0+h}} = \frac{\Phi\left(\Phi^{-1}(\mathrm{PD}_{\mathrm{t0+h}}) - \mathrm{k}\right)}{\mathrm{PD}_{\mathrm{t0+h}}}$$

which is the LGD formula for the period t0+h as such, together with one for parameter k:

$$\mathrm{k} = \frac{\Phi^{-1}(PD^{*}_{t0}) - \Phi^{-1}(PD^{*}_{t0} \times LGD^{*}_{t0})}{\sqrt{1-\rho}}$$

The method was used in the IMF's Global Bank Stress Test (The Global Bank Stress Test (imf.org)). The PD and LGD terms with an asterisk are long-term average PDs and LGDs. The $LGD*$ term in the equation can be numerically determined for the overall model, based on a "T0" point-in-time LGD observed in the data. After that, the equations can be used for forecasting the LGD conditional on a PD path.
LGD starting point data can be obtained by using information about actual recoveries from banks.

[1] See "Credit Loss and Systematic Loss Given Default," by J. Frye and M. Jacobs (The Journal of Credit Risk, Spring 2012).

Households' PDs and LGDs

26. To achieve consistency with the Euro Area FSAP, the model of households' PDs for EU exposures is based on the Euro Area FSAP semi-structural approach (Box 3).[15] The approach relies on the 2021 ECB Household Finance and Consumption Survey and uses a matching procedure to 'age forward' the (latest) 2021 vintage to 2024 and estimate "durable" consumption. It forecasts household and personal financial conditions, the probability of falling into arrears, and the likelihood of credit impairment (arrears>90days), under the FSAP baseline and adverse scenarios. A battery of logistic regressions at country level are relied upon to identify the financial indicator and the threshold of distress which increase significantly the probability of default. Next, Montecarlo simulations of unemployment shocks at the individual level within the household (controlling for employment status and type of contract), accounting for unemployment benefits. Maturing loans are replaced by new loans with same DTI at origination and new issuances are repriced at prevailing market rates. The PDs resulting from the modelling choice results in a relatively flat dynamics of PDs (text table).[16]

PDs, In Percent

	Baseline scenario	Geopolitical scenario	Recession scenario
2023	1.32	1.32	1.32
2024	1.32	1.32	1.32
2025	1.36	1.41	1.33
2026	1.36	1.40	1.32
2027	1.36	1.38	1.30

Source: Euro Area FSAP

Box 3. Structural Model for Household Credit Risk

The impact of macrofinancial shocks on household balance sheets is quantified using microdata sourced from the 2021 (latest) Household Financial and Consumption Survey (HFCS). The survey includes 83,000 households and 200,000 personal files across 22 countries (20 EA countries, Czech Republic, and Hungary). Using a matching procedure we "age forward" households' financials (assets, liabilities, consumption, income, and payments) to project their financial position as of end 2024 (starting point of the stress test). The approach builds on Valderrama et al (2023). The credit risk model includes four steps:

[15] For more details on the methodology, see European Housing Markets at a Turning Point – Risks, Household and Bank Vulnerabilities, and Policy Options.

[16] See Euro Area FSAP for more details. The model first computes a probability of falling into arrears which depends on the overburden rate of households. The overburden rate depends on households' debt service (including mortgage, consumer loans, overdraft, other banks loans) and essential expenses (food, energy, rent). When French households are overburdened, the rate of being on arrears (late payments over 90 days) increases from 1.14% to 2.30%; likewise, the rate of being on arrears (late payments below 90 days) increases from 3.7% to 6.6%.

Box 3. Structural Model for Household Credit Risk (concluded)

First, we forecast household's balance sheets, payments, income, and consumption to project 'vulnerable' households using a simulation approach drawing on the scenarios' macrofinancial projections. We perform Montecarlo simulations of unemployment shocks at the person level within the household (controlling for employment status and type of labor contract) and account for unemployment benefits for unemployed individuals (at around 10 percent of initial income).

Second, we estimate the link between being financially vulnerable and default risk (PD). Default is proxied by being on arrears over 90 days (stage 3 loans) or less than 90 days (stage 2 loans). For this purpose, we run a battery of logistic regressions.[1] at the individual household level to identify the financial indicator of stress and the corresponding threshold which increases significantly the probability of a credit event (in line with IFRS9 accounting standards). The best performing indicator is a cost-of-living *adjusted* debt service to income (DSTI) ratio which includes debt service, essential consumption (food and energy cost) and rents.

Third, we run a horse race across adjusted DSTI thresholds using statistical methods and find that, for most countries, the relative increase in the probability of default is highest when the borrower's adjusted DSTI ratio exceeds 70 percent of disposable income ("overburdened" household). Finally, we project the share of banks' retail loan portfolio with a credit default (stage 3 loans) or credit event (stage 2 loans) by forecasting the migration of loans held by overburdened households under each scenario. In this approach, maturing loans are replaced by new loans with the debt to income (DTI) at origination, floating rate mortgages are reset over the life of the loan, and new issuances are repriced at prevailing market rates.

[1] Logistic regressions run at the country level control for the household income tercile, savings ratio, wealth ratio, and personal / household characteristics including age, gender, education, household size, number of people employed in the household, loan to value ratio of the main residence, credit constraints, source of income, and family / public financial assistance.

27. Households' LGDs are derived from the FSAP methodology combining information on LTVs and collateral values for residential properties reported in supervisory files.[17] The LGD is given by:

$LGD_t = max\left\{1 - \frac{SR_t}{LTV_t}\ ;\ 0\right\}$, where LTV is the exposure-weighted LTV ratio at default, and:

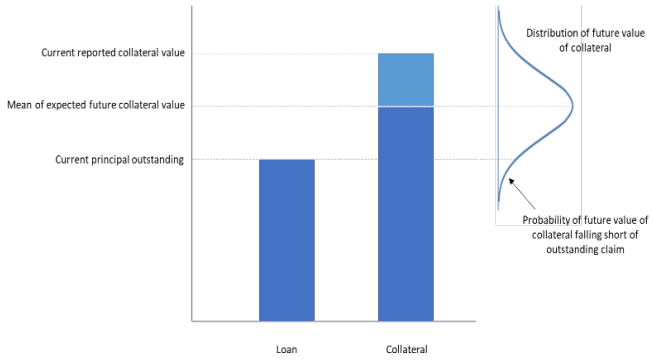
SR the sales ratio defined as: $SR_t = \frac{Expected\ Recovery\ Value}{Reported\ Collateral\ Value}$

where the reported collateral value is from individual banks' supervisory reporting.

[17] For details, see: Expected Credit Loss Modeling from a Top-Down Stress Testing Perspective

In France, aggregate LGDs for exposures to households are relatively low at 19 percent because LGDs for residential housing loans are low at 14 percent.[18] This reflects the particularity of the French residential housing loans which, for about 2/3 of them, benefit from a guarantee. In the event of default, housing loans are taken over by a guarantor (such as Credit Logement) which reimburses the value of the loan to the bank.[19]

Uncertainty about Future Sales Price of Collateral Driving



Source: IMF Staff

Credit Risk for Other Exposures

28. PDs for sovereign, financial and corporate bond exposures are estimated based on the scenarios' projections of sovereign bond yields term spreads and corporate spreads. Following the Euro Area FSAP, a Merton-based transformation is used to convert the spread between 10-year sovereign yields and the short-term rate (S_t) into a PD proxy. Based on approximated bank level residual time to maturity T-t, the implied risk neutral PD is given by:

$$PD_t = \frac{1 - e^{-S_t(T-t)}}{LGD_t}$$

The residual maturity of each bank's fixed income securities exposures to sovereign and corporates are obtained from supervisory files. We assume an LGD of 45 percent, as in many recent FSAPs. As customary in FSAPs, an economic approach is considered, and credit risk is estimated on the total exposure of each bank.

IFRS9 Transition Matrices and RWAs

29. Loss given default (LGDs) and PDs assumptions were informed by the banks' supervisory data. SIs report supervisory data on the PiT IFRS9 transition rates (from which PiT PDs can be derived), as well as on TTC PDs LGDs for IRB banks. We considered in the adverse scenario the TTC LGDs and PDs provided by each bank and the TTC LGDs in the baseline scenario, and shocked in the adverse scenario for exposures to households according to the RRE price projections based on the approach outlined in the previous paragraph.

[18] Figures are from the EBA Credit Risk Parameters Statistics, 2024:Q4.

[19] Losses incur for banks for the most part during a transition period between the time the loan goes into arrears and when it is transferred to the guarantor's balance sheet. They also incur some losses on loans due to administrative mistakes done at the time of origination which make non-performing loans non-eligible to be transferred to the guarantor when the default occurs, but these cases are few.

30. Under the economic approach of the stress tests and following the IFRS9 accounting framework, provisions of banks are computed based on the expected lifetime loss of new net flows into the Stage 2 and 3 buckets during each period. This involves projecting PDs beyond the scenario horizon, assuming the life-time horizon M is truncated at 5 years maximum:

$$ECL_t = \sum_{s=t+1}^{t+M} \frac{PD_s^* \times LGD_s \times EAD_{s-1}}{(1+r)^s}$$

Where the residual probability of default PD_s^* is the probability of default during period s conditional on not defaulting until period $s-1$ and r is a discount factor (such as short-term interest rate)

$$PD_s^* = PD_s \times \prod_{u=1}^{s-1}(1-PD_u)$$

For each exposure class, the evolution of the transition matrices over the scenario horizon is linked to the projected PDs based on the beta-linking approach as explained earlier.[20] The approach involves making use of elasticities of transition rates β with respect to PDs. For example, considering the transition from Stage 1 to Stage 2, its change over time is linked to the change in the PD during the same quarter:

$$\Delta TR_{12} = \beta_{12} \times \Delta PD$$

We constructed bank-by-bank starting point annual transition matrices from FINREP supervisory templates based on recent historical transition matrices. Once transition matrices conditional on scenarios are projected, we are able to derive the projected stocks of exposures in Stages 1–3, the required amount of provisions, and the dynamics of the capital stock.

31. Loan loss provisions reported in the balance sheet and credit impairments recognized in the P&L statement are estimated in accordance with IFRS 9. For SIs under IFRS9 accounting, flows of provisions are determined by the combination of annual expected defaulted S1 exposures, and lifetime expected losses for S2 and S3 exposures (Box 4).[21]

Box 4. Provisioning Under IFRS9 Accounting

Flows of provisions are determined by the change in the stock of provisions based on the standard IFRS9 approach, plus write-offs (assumed to be zero). The stock of provisions, in turn, is given by the expected credit losses (annual or lifetime, depending on whether the exposure is classified as S1 or S2) for each of the S1, S2 and S3 exposures:

$$Provision\_stock_t = Provision\_stock_{S1,t} + Provision\_stock_{S2,t} + Provision\_stock_{S3,t}$$

[20] See Gross, M., Laliotis, D., Leika, M., and P. Lukyantsau, 2020, "Expected Credit Loss Modeling from a Top-Down Stress Testing Perspective", IMF Working Paper No. 2020/111.

[21] Effective maturity is assumed to be 7 years for mortgages, 5 years for loans to NFCs, and 3 years for non-mortgage retail loans.

Box 4. Provisioning under IFRS9 Accounting (concluded)

For S1 exposures, the stock of provisions is equal to the expected losses during the year t:

$$Provision\_stock_{S1,t} = TR_{1\to3} \times LGD \times S1$$

For S2 exposures, the stock of provisions is equal to the lifetime expected credit losses:

$$Provision\_stock_{S2,t} = \sum_{u=t+1}^{t+M} (TR_{2\to3} \times LGD_u \times S2_{u-1})/(1+r)^{u-t}$$

Where M is the horizon at which lifetime expected credit losses are estimated, and r is a discount rate.

For S3 exposures, the stock of provisions is equal to the non-recoverable part of defaulted exposures:

$$Provision\_stock_{S3,t} = LGD_t \times S3_t$$

32. Credit risk charges in RWAs are simulated for internal ratings-based (IRB) and standardized (STA) portfolios separately. For IRB portfolios, the asymptotic single risk factor (ASRF) model for unexpected losses is implemented for different types of exposures (following Basel III). RWAs are subject to PDs and LGDs, provisions for credit losses, and the credit conversion factor of off-balance sheet items. Regulatory through-the-cycle (TTC) PDs are calibrated through the scenario as the weighted average of PiT PDs for each year of the scenarios (weighted by 0.2) and the respective TTC PDs of the previous year (weighted by 0.8, starting with the reported in COREP TTC PDs). Regulatory downturn (DT) LGD is considered as the maximum between the reported DT LGD at period 0 and the estimated PiT LGD.

33. For the banks that follow the standardized approach, credit risk charges are estimated using the density of credit RWA at the cut-off date (end of 2024). Non-performing exposures are subtracted from the time 0 RWA, assuming a risk weight of 100 percent. Next, the ratio of performing RWA to performing exposures is calculated. The credit risk chart for each year of the scenario is determined by multiplying the performing exposures by this ratio, and adding the total non-performing exposures, multiplied by the non-performing exposure RWA density (assume to be at 100 percent). This calculation is performed separately for each bank, to account for their individual RWA profiles and exposures.

C. Net Interest Income (NII) Modelling

34. Interest income and interest expense of a bank were projected using a semi-structural repricing gaps methodology which combines econometric models at the portfolio segment level and maturity "repricing" ladders for each bank. The approach is identical to the Euro Area FSAP methodology. First, econometric models were developed at the country and portfolio level for interest rates on new business for loans and deposits based on the Euro Area publicly available MFI Interest Rate Statistics to quantify the *pass-through* from market rates to deposit rates and lending

rates (Table 3).[22] Second, the IRRBB bank level data on the repricing structure of interest-bearing assets and liabilities are relied-upon to estimate the *timing* of the transmission of shocks from market rates to deposit rates and lending rates by type of instrument (and, for loans and deposits, by counterparty). Combining these two elements (pass-through and timing) at the bank-instrument level allows to simulate the interest income and interest expenses at the bank level for each of the macro-economic scenario (baseline, geopolitical scenario, and recession scenario) and in a consistent manner across Euro Area countries and bank business models.[23]

Table 3. France: Stylized IRRBB Template

Assets	Liabilities
Loans and advances: mortgages Loans and advances: non-mortgage household credit Loans and advances: NFC	Deposits: household sight deposits Deposits: household term deposits Deposits: NFC sight deposits Deposits: NFC term deposits

35. Additional assumptions are required. Following the assumptions of the Euro Area FSAP, for holdings of fixed-income securities and for market borrowings and other wholesale funding of banks, interest rates are assumed to move one-to-one with the short-term interest rates of each scenario (hence a pass-through of one) and are assumed to be uncorrelated with long-term sovereign bond yields.

36. Other data sources relied upon to model the NII include:

- The most recent bank level NII is obtained from FINREP template F 16.01.
- Exposures and *liabilities* for each segment —by portfolio type and by country of counterparty— are from FINREP templates F 20.04 and F 20.06, respectively.
- The repricing ladder for each interest-bearing portfolio segment combines several sources: STE templates for IRRBB and template J 05.00 from the supervisory IRRBB module are complemented with COREP C 66.01 data whenever data were not available.

37. The time-series econometric models for the pass-through effect on interest rates on new loans or deposits is described in Box 5. The regressions are run at the country level for each portfolio segment considered, and at a quarterly frequency for the period 2000:Q2-2024:Q4.[24] The

[22] These data do not include information on regulated saving accounts in France. The very low estimated pass-through coefficients for sight deposits reported in Table 4 however indirectly reflect the specific characteristics in term of interest rates of sight deposit accounts in France.

[23] The methodology was developed by the Euro Area FSAP team.

[24] With the exception of the model for consumer credit as data start 2023:Q2.

portfolio considered on the asset side and the liability side are in Table 4. The model estimates separately the pass-through effects from market rate shocks to interest rates on new housing loans, new consumer credit, and new loans to NFCs on the asset side; and on new sight deposits for households, new sight deposits for NFCs, new term deposits for households, and new term deposits for NFCs. Regression results are reported in Table 4. The results show a very low pass-through effect for sight deposits rate, especially for households, which is expected given that most sight deposits do not pay interest in France. At the other extreme, the pass-through effects appear to be significant economically and statistically for loans to NFC, consumer credit, and term deposits. The percentage point changes in interest rates on new businesses of banks in each scenario are reported in Table 6. The geopolitical scenario involves an increase in funding costs that tends to appear larger than the increase in lending rates in the first year, which will tend to compress the NII. On the other hand, the recession involves a decline in funding cost that appears larger than the decline in lending rates in the first year, which will tend to improve the NII. The final impact on NII in the stress tests could be sensibly different than the analysis of interest rate projections suggests and will depend on: (i) each banks' portfolio composition on the asset side and the liability side; and: (ii) each banks' time to repricing for interest-bearing assets and liabilities.[25]

Box 5. Interest Rate Pass-Through Econometric Models

Passthrough regressions were estimated independently for each segment j, using the following specification at quarterly frequency, based on the country level MFI Interest Rate Statistics of the ECB:

$$\Delta i_{t,j}^{nb} = \alpha_j + \beta_{0,j}^{ST}\Delta i_{t,c}^{ST} + \beta_{1,j}^{ST}\Delta i_{t-1,c}^{ST} + \beta_{1,j}^{LT}\Delta i_{t,c}^{LT} + \beta_1^{LT}\Delta i_{t-1,c}^{LT} + \gamma_j GDPgrowth_{t,c}$$

where Δ denotes quarterly changes, $i_{t,j}^{nb}$ is the new business rate for segment j, $i_{t,c}^{ST}$ is a short-term rate for country c (EURIBOR in the case of EA countries, and the short-term sovereign yield for non-EA countries), $i_{t,c}^{LT}$ is the long-term sovereign yield, and $GDPgrowth_t$ is the quarter-on-quarter real GDP growth.
The portfolio segment considered includes mortgages, non-mortgage household credit, and NFC loans on the asset side, and household sight deposits, household term deposits, NFC sight deposits, and NFC term deposits on the liability side. The estimated shocks to interest rates are reported in Table 6.

[25] In addition, we assume that NPLs do not pay interests to banks. This will independently lower the NII in the two adverse scenarios compared to the baseline.

Table 4. France: Specific Time Series Regressions for Models of Interest Rates

Dependent variable: change in:	Housing Loans	Loans to NFCs	Consumer Credit	Sight Deposits HHs	Sight Deposits NFCs	Term Deposits HHs	Term Deposits NFCs
Δ Euribor (t)	-0.119	0.123	-0.166	-0.00120	-0.0425	0.111	0.264**
Δ Euribor (t-1)	0.406***	0.590***	0.498***	0.0100**	0.143***	0.528***	0.617***
Δ 10Y Sovereign Yield (t)	0.0802*	0.0676	0.155*			0.0166	0.0190
10Y Sovereign Yield (t)	0.181***	-0.0400	0.177*			-0.0390	-0.0985
Real GDP growth (t)	-0.592	2.768***	3.801***	-0.0137	-0.0794	0.281	0.131
Real GDP growth (t-1)	0.300	1.602***	1.054**	0.00501	0.221***	0.701**	0.839***
Constant	-0.0187	-0.000265	-0.0223	-0.00127*	0.00577	2.57e-06	0.0147
Observations	60	60	60	60	60	60	60
R2	0.718	0.897	0.632	0.191	0.559	0.685	0.855

Note: Robust standard errors, *** p<0.01, ** p<0.05, * p<0.1

Table 5. France: Scenarios: Shocks to Interest Rates

Baseline Scenario

(In Percentage Points)	2025	2026	2027
Housing Loans	-0.4	-0.1	0.0
Loans to NFCs and Consumer Loans	-0.6	0.0	0.1
Other Interest Earning Assets	0.0	-0.4	-0.4
Sight Deposits HHs	0.0	0.0	0.0
Sight Deposits NFCs	-0.1	0.0	0.0
Term Deposits HHs	-0.7	-0.1	0.1
Term Deposits NFCs	-0.8	0.0	0.2
Other funding	0.0	-0.4	-0.4

Geopolitical Scenario

(In Percentage Points)	2025	2026	2027
Housing Loans	0.3	0.0	-0.8
Loans to NFCs and Consumer Loans	0.3	0.0	-0.8
Other Interest Earning Assets	1.9	-0.6	-1.5
Sight Deposits HHs	0.0	0.0	0.0
Sight Deposits NFCs	0.0	0.1	-0.1
Term Deposits HHs	0.1	0.1	-0.6
Term Deposits NFCs	0.4	0.2	-0.7
Other funding	1.9	-0.6	-1.5

Table 5. France: Scenarios: Shocks to Interest Rates (concluded)

Recession Scenario

(In Percentage Points)	2025	2026	2027
Housing Loans	-0.1	-0.5	-0.7
Loans to NFCs and Consumer Loans	-0.6	-1.1	-0.5
Other Interest Earning Assets	-0.6	-1.1	-1.4
Sight Deposits HHs	0.0	0.0	0.0
Sight Deposits NFCs	-0.1	-0.1	-0.1
Term Deposits HHs	-0.8	-0.8	-0.4
Term Deposits NFCs	-0.9	-1.1	-0.4
Other funding	-0.6	-1.1	-1.4

Source: MFI Interest Statistics and IMF staff estimates

38. In a second step, shocks to interest rates summarized in Box 5 are applied to repricing ladders obtained from the IRRBB templates for each bank. To quantify the NII impact of shocks to interest rates, the evolution of portfolios are simulated consistent with the assumptions of static balance sheet, in particular that the portfolio compositions for interest-rate bearing assets and liabilities remain constant over the three years of the scenarios. Next, shock to interest income (respectively expenses) for assets (respectively liabilities) in each time bucket of the repricing ladder apply to buckets that reprice during that year, while other buckets that have not repriced receive the interest income for assets (respectively bear the interest expense for liabilities) from the time of their origination. For each year of the scenarios, the interest income and expenses are then aggregated across repricing buckets.

39. Accrual versus non-accrual exposures. Under the FSAP stress testing approach, it is assumed that non-accrual exposures (e.g., non-performing or S3 exposures) do not earn interest income. Hence, net income "before stress" can decline even if other parameters are unchanged due to the accumulation of non-accrual exposures in the balance sheet of banks.

D. Market Risk Modelling

40. Market risk is assessed using a partial revaluation approach against the two market stress scenarios, as in the Euro Area FSAP. Instruments at fair value (i.e., those categorized as FVOCI and FVPL) were revalued using bank-specific sensitivities to risk factors, as reported by banks in the ECB's Short Term Exercise (STE) conducted in the context of SREP.[26] The sensitivities reported by banks in the STE template cover both the trading book and the banking book, and include: first-order sensitivity to the risk factor (delta), sensitivity to curvature risk (gamma), and sensitivity to the volatility of the risk factor (vega). Risk factors covered in the analysis were: commodity risk (CM),

[26] The STE template used for the analysis was discontinued by ECB after 2023Q3. The Euro Area FSAP team assessed that it was still reasonable to use these sensitivities to conduct the analysis for market risk with a 2024Q4 cut-off date.

credit spread risk (CR), equity risk (EQ), interest rate risk (IR), and FX risk. The shocks for each factor are displayed in Table 3) —except for the FX shock, which corresponded to the first-year FX depreciation in the adverse macro scenarios. No market shocks were applied in the baseline scenario.

41. The impact of market risk on bank capital is incorporated into the broader solvency stress test as a one-off overlay in the first year, which is not reversed in subsequent years. This approach is designed to capture the impact of short-term market distress episodes that can occur at any time during the stress testing horizon. This approach is consistent with the approach of the EBA stress tests and the US Federal Reserve stress tests.

42. Revaluation of fair value instruments is given by:

$$\Delta V = \sum_{j \in \left\{ \substack{CM,CR,EQ, \\ IR,FX} \right\}} \left(Delta_j^{BB} + Delta_j^{TB}\right) \cdot \Delta\varepsilon_j + 0.5 \cdot Gamma_j \cdot \left(\Delta\varepsilon_j\right)^2 + Vega_j \cdot \Delta\sigma_j$$

where j denotes de risk factors, $Delta_j^{BB}, Delta_j^{TB}$ are the delta sensitivities for the banking book and the trading book respectively, and $\Delta\varepsilon_j$ and $\Delta\sigma_j$ are the shocks from the market stress scenarios to the risk factor j and its volatility respectively.

43. A floor was applied to the market risk losses. Depending on the direction of banks' exposures to the various risk factors, they may have either gains or losses in the market stress scenarios. In order to take a more conservative approach, particularly for the banks that gain from the stress scenario, a floor was applied to total market risk losses. This floor was given by the maximum between:

i. the bank's own fund requirements based on the Fundamental Review of the Trading Book (as reported in the COREP C 91.00); and

ii. 8 percent of the bank's RWAs for market risk.

44. The calculation of market losses in the banking book can overestimate actual losses because it includes some instruments classified at amortized cost (AC). In the STE template used for market risk analysis, banks are instructed to report banking book deltas that correspond to all instruments for which the bank regularly calculates a fair value, *even if it is for internal risk management purposes*. This means that instruments categorized as AC may be included in the banking book deltas if the bank regularly calculates a fair value.

E. Net Fees and Commission Income

45. The NFCI was modelled based on bank-level panel regressions on the bank sample of the Euro Area FSAP. We rely on the methodology of the Euro Area FSAP team which used a panel

regression with bank-specific fixed effects similar to Kok, Mirza and Pancaro (2017).[27] The ratio of NFCI to assets is the dependent variable and the following variables are included as explanatory variables: the first lag of the NFCI ratio, real GDP growth, stock market returns, CPI inflation, residential housing price inflation, the first-difference of the 1-month EURIBOR rate, the first-difference of the yield of 10-year sovereign bonds, and two global variables were considered: the EUR/USD FX depreciation, and the growth in US stock prices. Up to one annual lag was allowed for all regressors.

46. The NFCI was projected at the highest level of aggregation. While more granular approaches were explored, a break in the time-series for the individual components in ECB's supervisory reports prevented a robust econometric analysis of the individual components.

47. The model was estimated separately for large banks and for other banks.[28] No country disaggregation was considered in order to have a larger sample size for the estimation. A LASSO methodology was applied to help select relevant regressors; almost all the regressors were identified as relevant with this methodology, and this estimator was relied upon for simulations of NFCI in scenarios.

48. Table 6 displays the estimation results for both groups of banks. Results are displayed for three specifications: (1) all regressors are included; (2) only the LASSO-selected regressors are included; and (3) only LASSO-selected regressors are included and the estimation uses the Arellano-Bond methodology for dynamic panels to obtain unbiased estimates. All variables are expressed in percentage. The interpretation of the coefficients is, for example, that an increase in stock prices by 1 percent will increase the NFCI ratio by approximately 0.2 basis points for large banks[29]; in the adverse scenarios, stock prices fall by about 50 percent, so the contribution to the change in the NFCI ratio will be of about -10 basis points.

49. Real GDP growth and the change in the EURIBOR rate appear to be significant explanatory variables across specifications, with a positive and negative coefficient respectively, while stock price growth appears significant with a positive coefficient only for large banks The signs appear reasonable: higher real GDP and stock price growth indicate a better performing real economy and growing financial markets, which would both imply an expansion of the financial services that generate fee and commission income; it is also to be expected that stock prices are more significant for larger banks, as their business model tends to rely more on market activities rather than just standard household and corporate lending; finally, the negative coefficient on the EURIBOR rate might be related to the fact that higher rates are associated with lower bank business volumes, thus reducing fee and commission income.

[27] See: Macro stress testing European banks' fees and commissions.

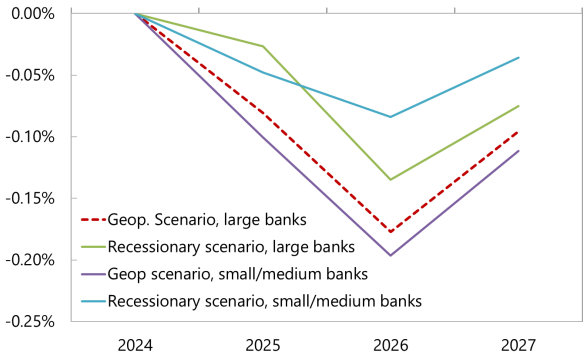
[28] Large banks are defined as those that follow the EBA Guidelines on disclosure of indicators of global systemic importance.

[29] The estimated coefficient is larger for the small/medium size banks, but it is not statistically significant.

50. The text figure displays the averaged projected change in the NFCI ratio (relative to baseline) in each adverse scenarios and by size of banks. In the baseline scenario, the NFCI ratio is assumed to remain constant at the cut-off date level. The geopolitical scenario leads to a drop in the NFCI ratio of about 0.2 percentage points at the trough. This impact is not negligible: in our sample the average NFCI ratio is about 0.5-0.6 percent, so a drop of 0.2 percentage points represents about a 33-40 percent contraction in NFCI. The adverse impact is milder in the recession scenario mainly due to the lower interest rates.

NFCIr, Difference Relative to Baseline

(In Percentage Points; Average Across All Banks)



Source: IMF staff estimates

F. Other Profit and Loss Items

51. Net trading income is linked to its historical average relative to total assets and to which a discount is applied in the adverse scenarios. In the baseline scenario, NIT is given by the 5-year average of the ratio of NTI to total assets. In the adverse scenarios, a 20 percent haircut was applied to these revenues. This approach may over or underestimate revenues from clients because NTI also includes the revaluation of fair value instruments. However, by averaging over a long period of time, the gains and losses from revaluation of instruments in different years may cancel out, thus mitigating the problem.

52. All other P&L items were projected by taking a 5-year average relative to total assets. These remaining items consist mostly of non-interest expenses, such as wages and other costs associated to operating branches. These P&L items were kept at the same level in the stress scenarios as in the baseline. Because tax information is available only at the consolidated level and cannot be allocated reliably across the individual jurisdictions in which each bank operates, we apply an historical effective-rate approach. Specifically, we compute each bank's average effective tax rate—defined as income-tax expense divided by profit before tax (PBT)—over the past five profitable fiscal years, which smooths out short-term volatility in tax payments and one-off items. This five-year average rate is then applied only to periods in which the bank reports a positive PBT. When a bank records a loss (negative PBT) each year, no tax expense is recognized for that year. If a loss in one year is followed by a profit in the subsequent year, the current-year PBT is first adjusted to offset the accumulated loss carry-forward before calculating tax.

53. Dividends were calibrated based on the bank projected net income and capital buffer. A payout rate is applied to the bank's total comprehensive income (TCI), i.e., profit after tax (PAT) and other comprehensive income (OCI), equal to the 60 percent of TCI. If the bank incurs losses, dividends are set to "0." Banks prioritize capital preservation; thus, dividends have been further adjusted based on the bank's capital in relation to the total regulatory capital requirements.

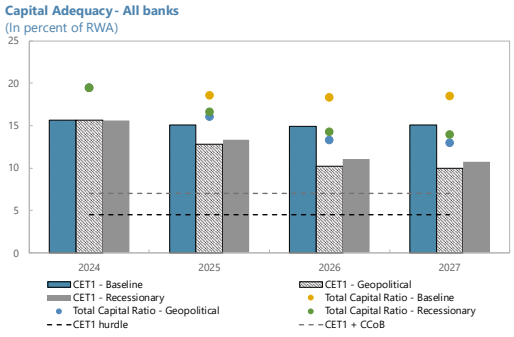
Specifically, when banks' capital positions breach the minimum regulatory requirements (both Pillar I and II), dividends have been adjusted to "0".

G. Solvency Stress Test Results

54. Under adverse conditions, the aggregate capital ratio remains above the minimum capital requirements in both scenarios (Figures 18 and 19). In the baseline scenario, the banking system remains well capitalized. The capital ratio decline is higher in the geopolitical scenario than in the recession scenario. The decline in system-level CET1 ratio amounts to 490 basis points under the recessionary scenario and to 570 basis points under the geopolitical scenario. The most quantitatively significant drivers of the decline in capital ratios in the adverse scenarios relative to baseline are, in decreasing order: (i) the credit risk for 2.0-2.3 percent of RWAs, reflecting the significant vulnerabilities of the NFCs; (ii) the market risk shocks for 1.2-1.3 percent of RWAs, reflecting the significant market activities of French banks; and: (iii) NFCI effect for 0.7-1.1 percent of RWAs, reflecting the relatively high share of cycle-sensitive fees and commission in the income of French banks. At the aggregate level, the NII appears broadly resilient, declining by "only" 0.3 percent of RWAs in the two adverse scenarios relative to the baseline. This reflects the combination of various offsetting effects at the aggregate level but with differences across banks related to business model specificities. This, on the asset-side small pass-through (and slow repricing) to fixed rate housing loans and large pass-through (and fast repricing) of NFC loans and consumer credit; and on the liability-side, very small pass-through to retail sight deposits and large pass-through (assumed equal to one) to wholesale funding.

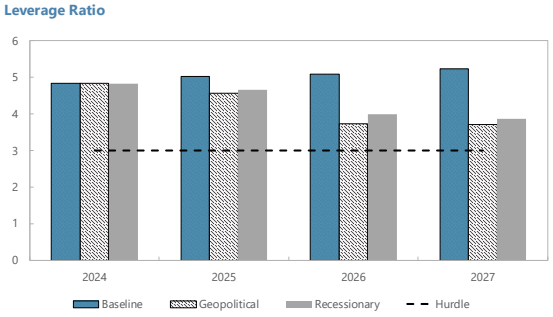
Figure 18. Scenario-Based Solvency Stress Tests

Aggregate capital ratios remain above the minimum capital requirements in adverse scenarios….



Source: IMF Staff Calculations.

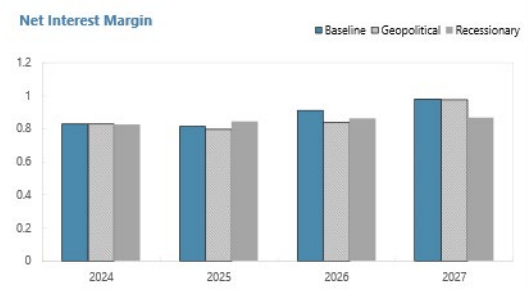
And so does the aggregate leverage ratio….



Source: IMF Staff Calculations.

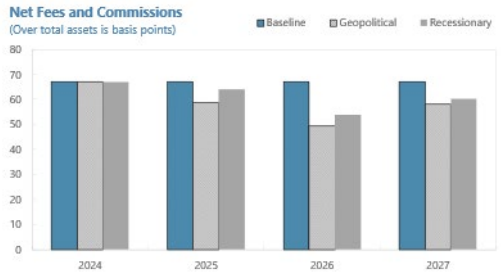
Figure 18. Scenario-Based Solvency Stress Tests (concluded)

Net Interest Income displays some stability in all scenarios….



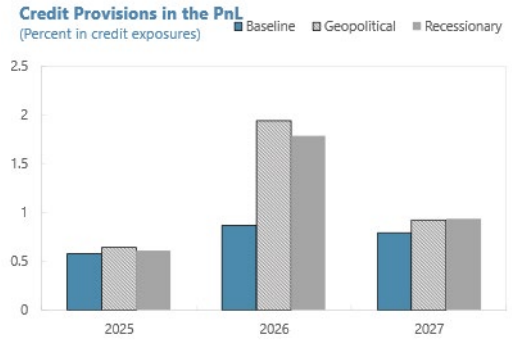
Source: IMF staff calculations

Net Fees and Commission Income decline in the two adverse scenarios ….



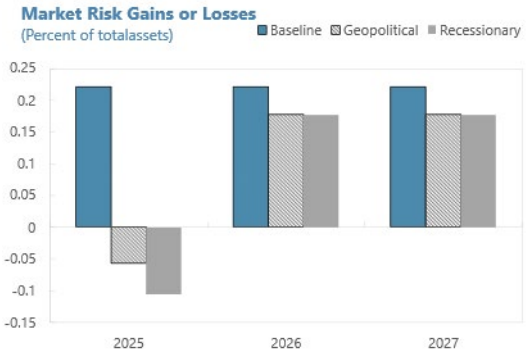
Source: IMF staff calculations

Provisions more than double in the second year of the two adverse scenarios compared to the baseline …



Source: IMF staff calculations

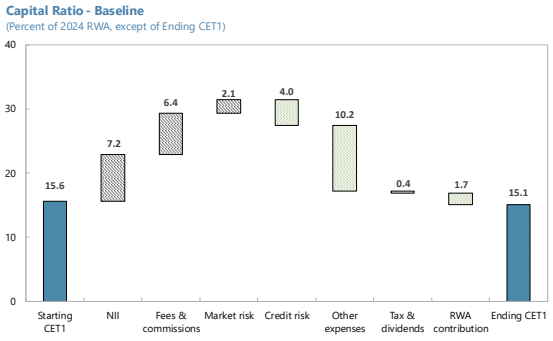
Market losses are more pronounced in the recession scenario than in the geopolitical scenario due to the sovereign stress shock….



Source: IMF staff calculations

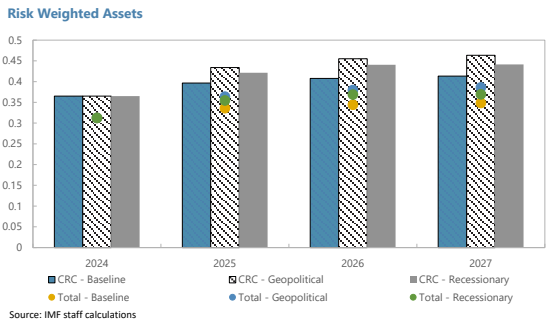
Figure 19. Solvency Stress Tests

In the baseline, the net interest income and other income broadly offset credit risk and expenses ….



Source: IMF staff calculations

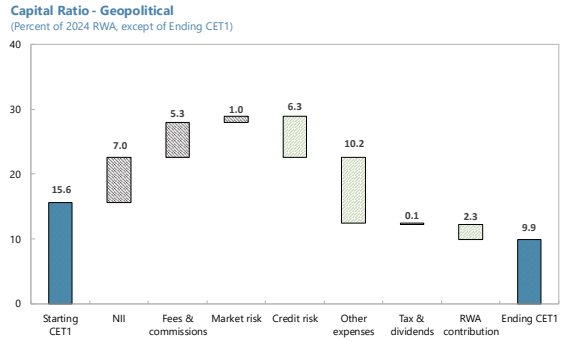
RWAs increase in the adverse scenarios as a result of credit risk….



Source: IMF staff calculations

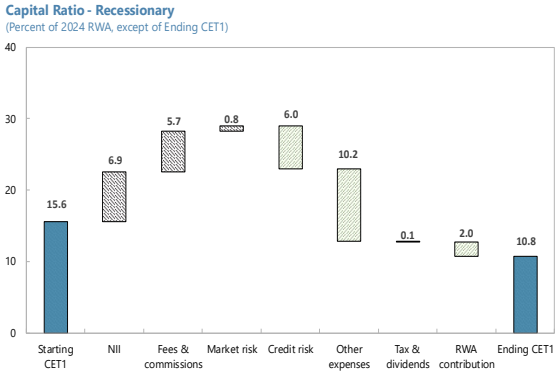
Figure 19. Solvency Stress Tests (concluded)

In the geopolitical scenario, the decline in capital ratio reflects credit risk, a decline in fees and commission income and the market shock …



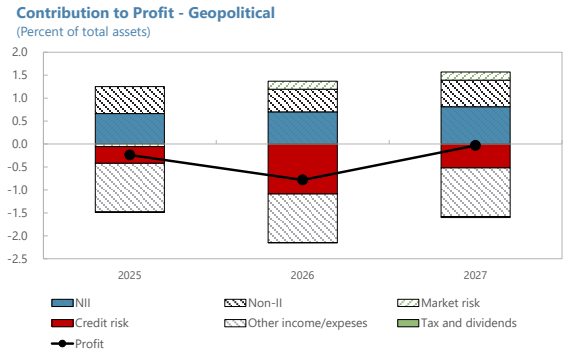
Source: IMF staff calculations

And so does in the recession scenario….



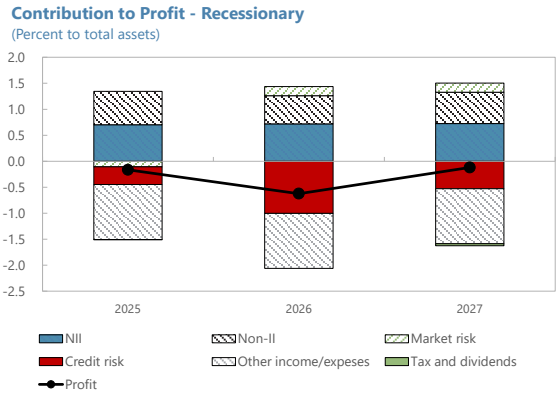
Source: IMF staff calculations

And is reflected in P&L flows…



Source: IMF staff calculations

With consistent P&L flows…

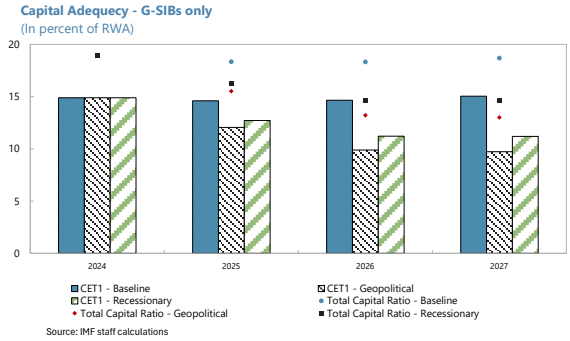


Source: IMF staff calculations

55. The decline in capital ratios for G-SIBs is moderately smaller and with somewhat different drivers than for the aggregate results (Figure 20). The declines in capital ratios reach 520 basis points and 370 basis points, respectively in the geopolitical scenario and the recession scenario. This reflects a stronger baseline than for all banks combined, lower credit risk contributions to capital ratio declines (of 1.6-1.9 percent of RWAs), and a more differentiated impact on NII across scenarios (a larger decline relative to baseline in the geopolitical scenario and a very moderate increase in the recession scenario relative to baseline), reflecting the higher share of wholesale funding with high pass-through in total funding of G-SIBs relative to other banks.

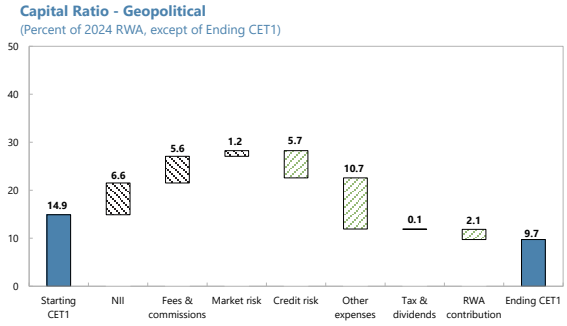
Figure 20. Scenario-Based Solvency Stress Tests for G-SIBs

For G-SIBs, the decline in capital is slightly less than for the entire sample….



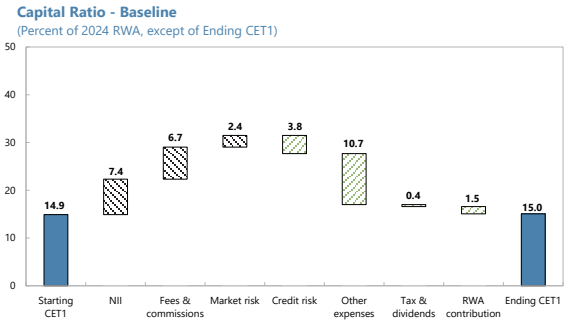
Source: IMF staff calculations

Credit risk, and net fees and commission income and market risk (relative to baseline) drive the decline in capital in the geopolitical scenario…



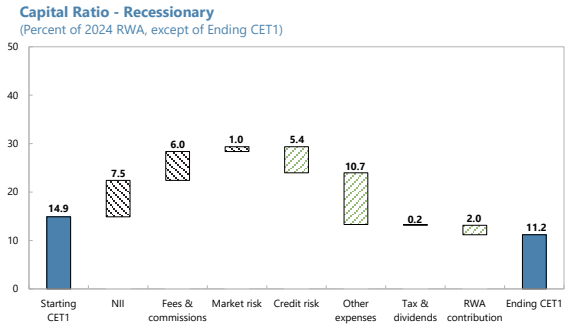
Source: IMF staff calculations

In the baseline, the capital ratio remains stable reflecting offsetting factors….



Source: IMF staff calculations

And in the recession scenario….



Source: IMF staff calculations

56. While no banks breach their minimum requirements, several banks dip in their additional buffers (CCOB and buffers for systemic institutions) in the adverse scenarios.[30] Four banks – among which are 3 G-SIBs – accounting for a large share of banking assets breach the buffer requirements but the aggregate gap to the requirement for those four banks remains small, at 1.2 and 0.8 percent of risk weighted assets on average respectively in the geopolitical and the recession scenario.

Minimum Buffer Requirements

	CET1 - Baseline	CET1 - Geopolitical	CET1 - Recessionary
All Banks			
# Banks below buffers	0	4	4
Market share of banks below buffers	0	Above 50 percent	Above 50 percent
Weighted average capital ratio gap	0	1.2	0.8
G-SIBs			
# Banks below buffers	0	3	3
Market share of banks below buffers	0	Above 50 percent	Above 50 percent
Weighted average capital ratio gap	0	1.3	0.6

Source: IMF staff calculations.

Note: market shares are grouped in 3 buckets: 0-25 percent, 25-50 percent, above 50 percent

[30] The minimum requirement is defined as the minimum CET1 ratio plus P2R, and the hurdle rate with buffers includes, in addition, the capital conservation buffer plus the systemic buffers (G-SIBs and O-SIIs). The sectoral risk buffer on exposures to highly indebted corporates and the CCyB are not included.

57. Sensitivity analysis shows that the banking system is resilient to concentration risks because of risk mitigation techniques, while sectoral risks are contained. Large exposures of banks account for multiples of capital and are therefore very significant. However, they are very small after netting out credit risk mitigation measures (CRM) (Table 6). Sectoral credit risks appear well contained (with some heterogeneity across banks) despite the large share of NFC loans going to the real estate sector which is by far the largest sectoral exposure of French banks. But even a doubling of NPLs in these two sectors exposed to real estate fluctuations would result in their NPLs reaching only about 4 percent of CET1 (Table 7).[31]

Table 6. France: Large Exposures, as Percent of Tier 1 Capital

	Exposure value before application of exemptions and CRM	Exposure value after application of exemptions and CRM
All Banks		
Top 10	10.7	0.60
Top 5	7.8	0.36
Top 3	6.3	0.23
G-SIBs		
Top 10	11.5	0.62
Top 5	8.1	0.37
Top 3	6.5	0.23

Source: COREP_LE, C 28.00 - Exposures in the non-trading and trading book

[31] The construction sector and the real estate sector account respectively for 5 percent and 23 percent of total loans to NFCs (source: FINREP).

Table 7. France: Sectoral Credit Risk Sensitivity Analysis: NPL Ratios

	50%	25%	100%
Construction			
Weighted average	0.7%	0.4%	1.4%
Standard deviation	0.4%	0.2%	0.8%
Real estate activities			
Weighted average	1.3%	0.6%	2.5%
Standard deviation	0.8%	0.4%	1.5%
Total			
Weighted average	2.0%	1.0%	3.9%
Standard deviation	1.1%	0.5%	2.1%

Source: C 01.00, F 06.01 Breakdown of non-trading loans and advances other than held for trading to non-financial corporations by NACE codes and IMF staff calculations

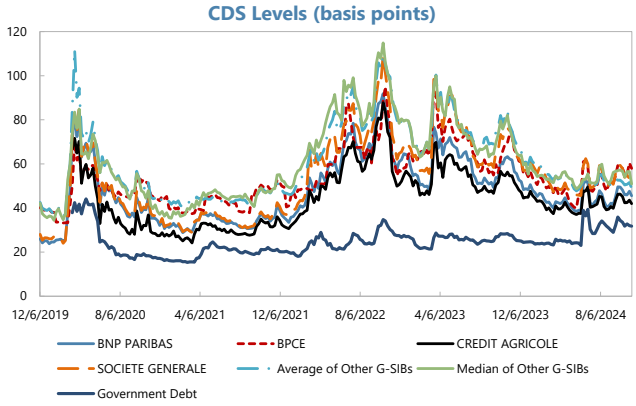
58. The sovereign-bank nexus channels of shock transmission appear contained among the French banks. The sovereign-bank nexus can be assessed through direct exposures, funding costs channels and market shocks, among various channels.[32] As shown in Section B, direct exposures of French banks to the domestic sovereign and to foreign sovereigns remain small as a share of assets – with the exception of LBP. The satellite models estimated for the NII of French banks show no statistically significant pass-through of long-term yields to deposit rates, suggesting that deposit funding costs have been decoupled from the sovereign's funding cost in the past (Table 5). Similarly, prior to June 2024, CDS spreads for French banks were only weakly correlated with sovereign CDS spreads, indicating that borrowing costs have been to some extent unrelated to sovereign bond yields (Figure 21).[33] In the market risk analysis described in section F, shocks to fixed income securities (sovereigns, and their spillovers to corporate fixed income bonds) account for a very large share of the solvency losses related to the market shock scenarios; hence these losses can be interpreted as an upper bound of the solvency impact from sovereign stress through bond markets, which is at about 1 percent of RWAs for our sample of banks.

[32] See for instance: Managing the Sovereign-Bank Nexus.

[33] However, the CDS spreads started to co-move at the time of the 2024 Parliamentary elections, suggesting that, in the future, banks' market borrowing costs could be impacted by the sovereign's balance sheet.

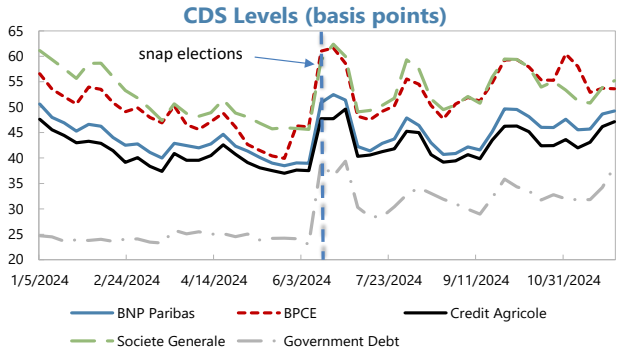
Figure 21. Bank and Sovereign CDS Spreads

In the past, CDS spreads of French banks did not correlate with the French sovereign's CDS spreads



Source: Bloomberg

However, some co-movement has become apparent since the June 2024 elections



Source: Bloomberg

H. Special Topic: Use of Solvency Stress Tests for Calibration of CCYB

59. Based on solvency stress test models of the FSAP, a range of counterfactual macroeconomic scenarios are designed to illustrate how scenario-based solvency stress tests could be relied upon, in addition to other tools, to inform the calibration of the CCyB (Figure 22). The counterfactual scenarios are designed as intermediate scenarios between the baseline macroeconomic scenario and the geopolitical scenario with increased severity of credit risk parameters simulated for each path of macroeconomic assumptions.[34] Other P&L components are based on interpolations. To focus on cyclical macroeconomic risks, the one-off unreversed market risk shocks of the adverse geopolitical scenario are excluded from the scenario (scenario 10). We considered 10 scenarios with incremental shocks which provide a range of options in terms of

[34] The model of credit risk for NFCs relied upon in this exercise is the exact same model of the main solvency stress tests described in Section G. However, household PDs were simulated based on the model of the policy counterfactual analysis described in Section T, which is specific to the France FSAP.

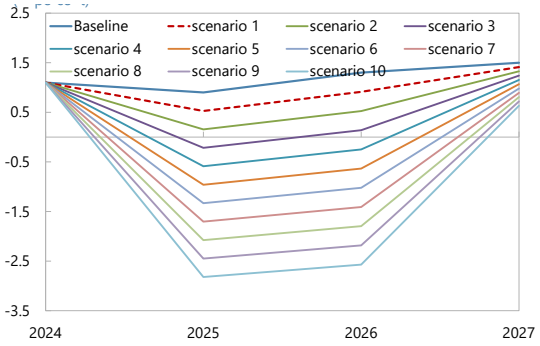
increasing severity of the macroeconomic downturn to be considered as target objectives for the CCyB setting.[35, 36]

Figure 22. Counterfactual Macroeconomic Scenarios

Various real GDP growth adverse scenarios are considered, from the baseline to the geopolitical scenario excluding market shocks ("step 10") ....

Real GDP Growth Scenarios

(In Percent)

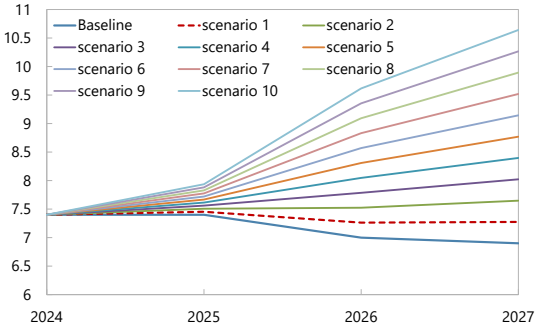


Sources: WEO and IMF staff estimates

Similarly, equally spaced unemployment scenarios are constructed to be associated with the real GDP paths ....

Unemployment Rate Scenarios

(In Percent)

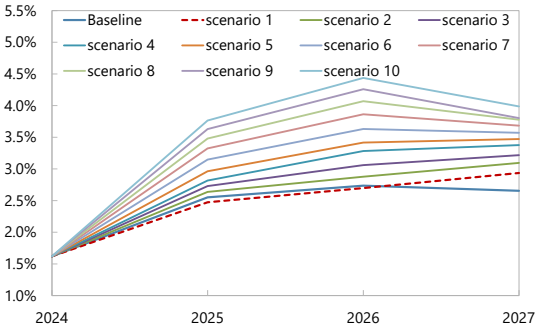


Sources: WEO and IMF staff estimates

PDs for NFCs are simulated for each of the scenarios...

PDs: Non-Financial Corporates

(In Percent)

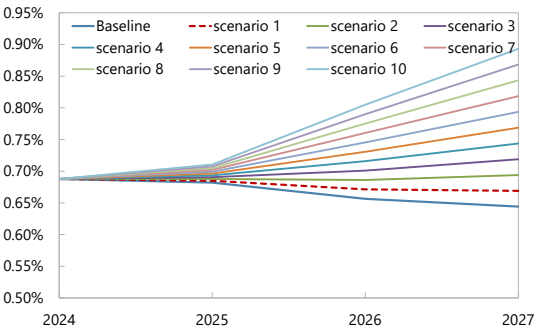


Sources: Datastream and IMF staff estimates

And household PDs for each unemployment rate path....

PDs: Households

(In Percent)

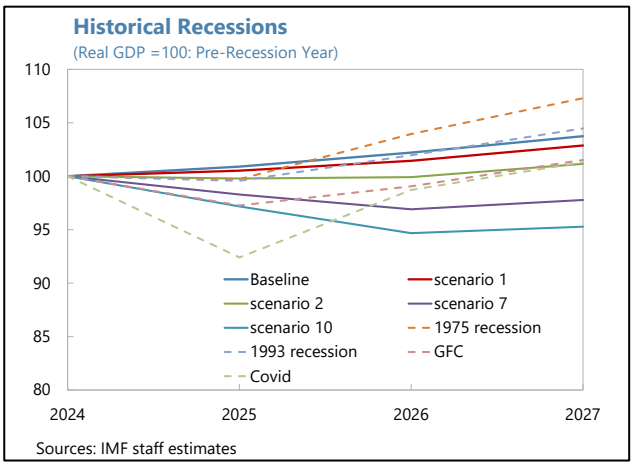


Sources: HFCS, OECD, and IMF staff estimates

[35] In the first, second and third year, the incremental shocks to real GDP growth are respectively -0.37, -0.39 and -0.09. The incremental shocks to the unemployment rate in the first year, second year and third year are respectively 0.05, 0.26 and 0.37 percentage points.

[36] To ensure comparability of results across each of these scenarios, and in absence of clear view regarding what would be an "adequate" credit growth assumption for each of these scenarios, the constant balance sheet assumption of the solvency stress test is kept. A more complete analysis would model credit demand and match it with credit growth for each scenario.

60. The scenarios can be compared with past recessions in France. Considering the shape of the scenarios, it turns out that past recessions involved a sharper decline in real GDP but also a faster recovery than these 10 scenarios designed based on the solvency stress geopolitical scenario.[37] In term of GDP loss, scenario 2 already appears more severe after 3 years than the "moderate" 1975 and 1993 recessions. The system-wide shock to aggregate capital ratios from these various solvency stress tests can inform the setting of the CCyB by comparing the aggregate outcome of capitalization for a given severity of the macroeconomic shocks with the system-wide capital requirements as well as the CCyB that could be mapped to a capital depletion for a target macroeconomic scenario.



61. When setting the CCyB, the macroprudential authority may consider; (i) the scenario under which the capital ratio decline would correspond to a CCyB target, and: (ii) the macroeconomic scenarios under which the aggregate capital ratio (including precautionary buffers) remains above capital requirements, as illustrated in Figure 23:[38]

- *At present, high precautionary buffers in combination with the CCyB would likely be sufficient to enable banks to continue lending following moderate macroeconomic shocks.* Precautionary buffers of approximately 6 percent of RWA in total, combined with the current 1 ppt CCyB, would be enough to maintain bank solvency across a wide range of outcomes. In our scenario analysis, the aggregate capital reaches the aggregate capital requirement plus the current CCyB at 11.11 percent in the scenario 10. Hence on the aggregate banks would likely maintain sufficient capital to continue lending following moderate shocks corresponding to previous recessions, or in slightly more severe scenarios, even if there is some heterogeneity across banks. However, if precautionary buffers were lower, the release of the current CCyB might not be sufficient to ensure banks continue to lend under these moderate downturn scenarios. [39]

- *At the same time, the current CCyB level at 1 percent of RWAs can absorb the solvency impact of a moderate macroeconomic shock.* The dynamics of capital ratios under the various macroeconomic scenarios show banks would exhaust the current CCyB under moderate shocks

[37] The pandemic has involved the slower recovery of real GDP compared to all 3 previous recessions, including the GFC.

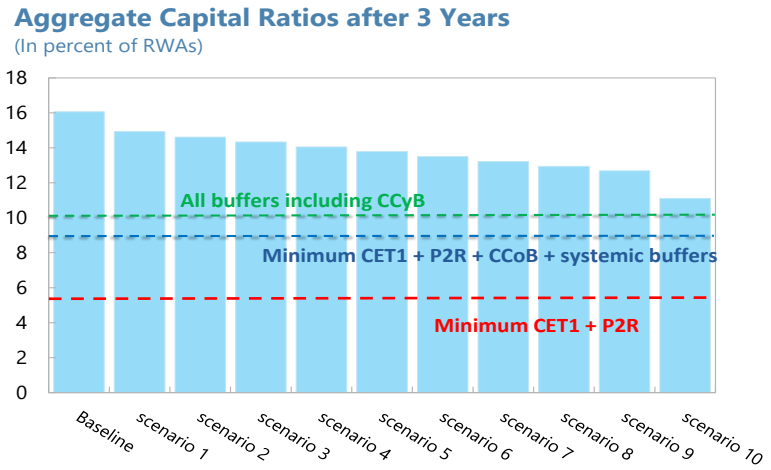
[38] See Macroprudential Policies TN for a detailed policy analysis. This analysis is illustrative of how solvency stress test can be used as one input among many additional analytical tools relied upon to calibrate a CCyB. More comprehensive analytical tools would include a model of credit supply required to match demand.

[39] For example, in the case of a moderate macroeconomic shock as in scenario 2 , the aggregate capital "space" is 4.5 percent (1 percent plus 3.5 percent). A higher CCyB, to protect against moderate shocks would need to be balanced with the current financing needs of the economy.

after 3 years, with aggregate capital ratios declining by the level of the current CCyB (1 percentage point) in the scenario 1 (which has real GDP 0.9 percent below baseline after 3 years), and a slightly higher depletion under scenario 2, which is more severe after 3 years than two past recessions. A 2-percentage point CCyB would correspond to the decline in the aggregate capital ratio in the scenario 4 (which has real GDP 3.4 percent below baseline after 3 years). Hence, if banks precautionary buffers were lower than they are currently, the release of the current CCyB following such a downturn might not be sufficient to ensure banks continue to lend under these moderate downturn scenarios.[40]

Figure 23. Aggregate Capital Ratios in Each Scenario

Any level of the CCyB can be mapped into a decline in capital ratios after a three-year cycle of a macroeconomic scenario…

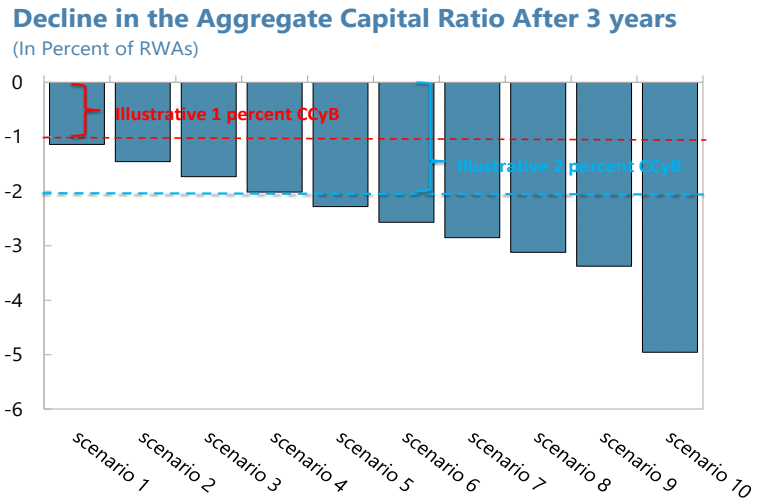


Sources: IMF staff estimates

[40] See the technical note on macroprudential issues for a more detailed discussion of this topic.

Figure 23. Aggregate Capital Ratios in Each Scenario (concluded)

It appears that, the aggregate capital ratio level reaches the capital requirements plus buffers (including the 1 percent CCyB) after 3 years in the scenario 10 (e.g., the geopolitical scenario without market shocks)…



Sources: IMF staff estimates

SPECIAL TOPICS: STRESS TESTS OF NON-FINANCIAL PRIVATE SECTORS

A. General Approach

62. Stress tests of non-financial private sectors are performed under the same baseline and adverse scenarios as the bank solvency stress tests. The methodologies are specific to each sector (NFC and households) and rely on microeconomic data. Results are then aggregated at the country level using each individual's indebtedness as weight. The resulting credit risk parameters (PDs) for NFCs are then considered as inputs in the bank solvency stress tests, while a separate model of household credit risk is considered in this section from the Euro Area FSAP household model of the bank solvency stress tests.[41] The household model developed in this section allows to undertake counter-factual policy analysis.

B. Stress Tests of Non-Financial Corporations

Risk Analysis and Stress Tests of Publicly Listed Non-Financial Corporates

[41] A separate model is chosen because the euro area FSAP model does not allow to perform such a policy counterfactual. The quantitative differences between the two models of household credit risk on bank solvency are small – mainly because the initial default rates on household mortgages – observed in bank data – are small.

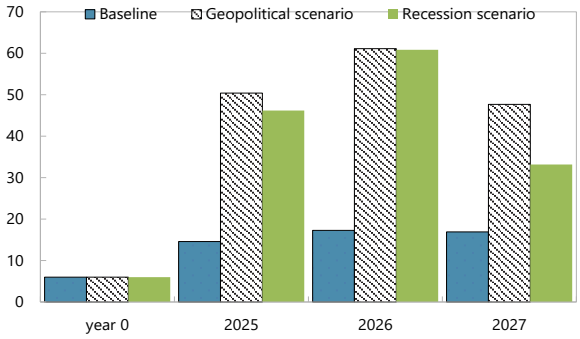
63. Analysis of publicly listed NFCs shows that corporate debt at risk would increase notably under the geopolitical and recession adverse scenarios, thus highlighting underlying vulnerabilities of the French NFC sector (Figure 24).[42] This analysis is based on the corporate stress test model relied upon to generate PDs for NFCs in the bank solvency stress tests and that is described in Box 1. Under the bank solvency stress test scenarios, based on end-2023 data for publicly-listed non-financial corporates, aggregate debt-at-risk (based on an ICR below one) would increase (but remain contained) in the baseline macro-economic scenario from 6 percent of total debt to 17 percent.[43] In the two adverse scenarios, it would increase very substantially to about 60 percent of total debt after two years and decline moderately thereafter. PDs, related to leverage and ability to cover interest expenses with income flows, would increase as a result. These PDs are relied upon in the bank solvency stress tests, which therefore incorporate this assessment of French non-financial corporates vulnerabilities.

64. Under the two adverse macroeconomic scenarios, cash shortages would increase among publicly listed NFCs (Figure 24). Already in the baseline scenario, firms accounting for up to 65 percent of total outstanding debt would have liquidity needs and would increase their indebtedness to meet cash outflows. In the two adverse scenarios, this share would increase to almost 80 percent. This reflects that under adverse macroeconomic conditions, liquidity needs of firms would increase due to a decline in earnings and an increase in interest charges, resulting in further leverage among the NFCs.

Figure 24. Scenario-Based Stress Tests of Publicly Listed NFCs

Under severe macroeconomic scenarios, vulnerabilities of publicly listed NFCs would increase significantly resulting in an increase of default risk and of borrowing needs to cover cash outflows

Share of Debt Among Publicly-Listed NFCs with ICR <1
(In Percent)



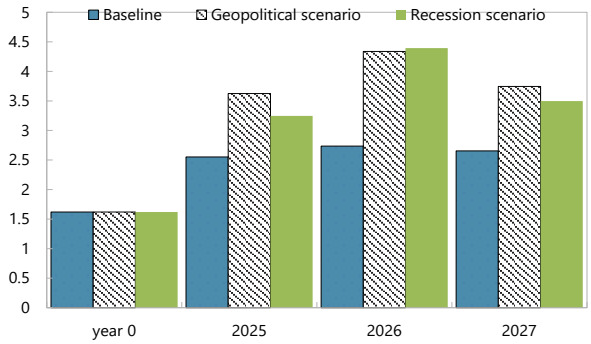
Sources: Datastream and IMF staff estimates

[42] This analysis is based on the methodology of this paper by Ding and Tressel (2021): Global Corporate Stress Tests—Impact of the COVID-19 Pandemic and Policy Responses

[43] There is heterogeneity of outcomes across firms, only aggregate statistics are reported in the Technical Note.

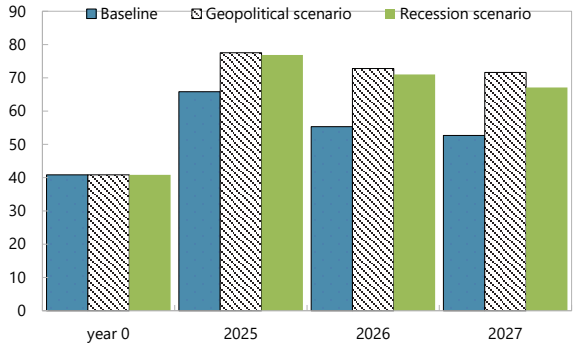
Figure 24. Scenario-Based Stress Tests of Publicly Listed NFCs (concluded)

Default Probabilities of Publicly-Listed NFCs
(In Percent)



Sources: Datastream and IMF staff estimates

Share of Debt of Publicly-Listed Firms with Borrowing Needs
(In Percent)



Sources: Datastream and IMF staff estimates

Sensitivity Analysis for Non-listed Non-Financial Corporates

65. In addition, a sensitivity analysis for non-listed NFCs was conducted to verify the findings of the corporate stress test run for listed firms. The data coverage and therefore the simulation approach differ from the stress test. The firm data obtained from ORBIS generally contain unconsolidated liabilities which may lead to worse outcomes for those non-listed firms that have intercompany debt. Moreover, they are less current than those in the stress test for publicly listed NFCs (latest available vintage as of end-2022). Applying a current stress test scenario (starting in 2025) to information more than two years dated was not deemed sensible. As a result, a less complex sensitivity analysis was carried out separately for large firms and SMEs that, however, used certain output from the corporate stress test, notably the stressed interest coverage ratios.

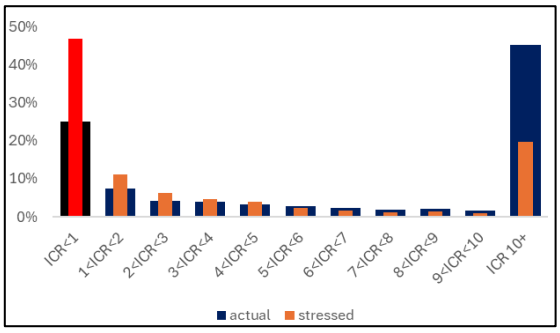
66. As in the corporate stress test, the key metric is the ICR. The starting point of the exercise was to calculate the average drop in ICRs under the most impactful (geopolitical) scenario from the corporate stress test (85 percent). Using the stressed ICRs for all unlisted firms, their stressed interest payments had to be calculated to back out the average drop in EBIT. To this end, it

was assumed that the lending rates rise in step with geopolitical stress test scenario (+2.5 percent). Given firms' funding structures, this hike translated into a median increase in interest payments of 20 percent and in combination with the stressed ICRs led to an average drop in EBIT of 80 percent. These shocks were applied to the two samples of large firms (3,638 entities) and SMEs (7,330 entities), conforming to the EU definition of SMEs (EU Commission, 2003).

67. The sensitivity analysis broadly corroborates the findings of the corporate stress test. It is noteworthy that at end-2022 close to one fourth of unlisted firms already showed an unsustainable ICR of less than 1 percent (including negative readings due to a negative EBIT). Since then, the ICRs have likely further deteriorated in line with slow growth, also mirrored by rising SME bankruptcies. The results of the sensitivity analysis suggest a similarly strong impact on debt flow sustainability (Figure 25). For large firms, the share of enterprises with debt at risk (ICR below 1) almost doubles from 25 to 47 percent as firms transition from higher to lower ICR buckets, while the impact is less pronounced for SMEs, with the share of vulnerable firms rising from 21 to 35 percent.

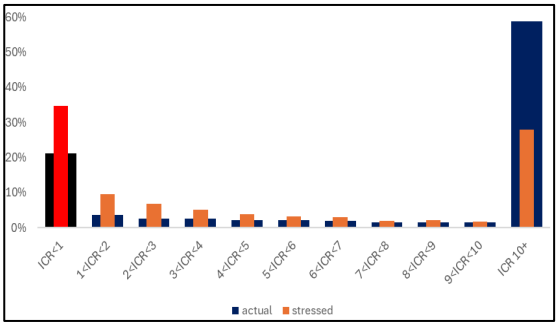
Figure 25. Interest Coverage Ratio, Actual and Stressed

Interest Coverage Ratio: Large Enterprises
(Share of Total, Actual Vs. Stressed, end-2022)



Source: Orbis, IMF staff calculations

Interest Coverage Ratio: Small and Medium Enterprises
(Share of Total, Actual Vs. Stressed, end-2022)



Source: Orbis, IMF staff calculations

68. The analysis was extended to assess the impact on the sustainability of firms' debt stocks relative to their operating income. Using the same parameters as in the ICR calculation (EBIT minus 80 percent, interest payments plus 20 percent), the debt-to-EBITDA ratio, a key debt sustainability metric, was computed with and without stress. Debt is defined as all liabilities with maturity greater than one year plus short-term loans (but excluding trade credit). For EBITDA, the depreciation and amortization expenses were added back to actual and stressed EBIT (no additional stress on D&A). It was also assumed that the higher interest payments on short-term liabilities repricing within one year were fully financed by taking out additional debt, thereby raising the debt stock in the formula.

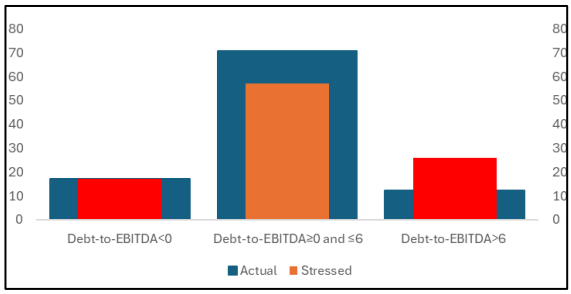
69. The results again confirm the impact of deteriorating financial conditions on corporate debt sustainability (Figure 26). Close to 30 percent of large firms had a debt to EBITDA ratio greater than the critical value of 6 or negative due to operating losses. Under stress this share

increases to 43 percent. When focusing on the debt at risk (i.e., the weighted average taking into account diverging debt stocks), the increase amounts to 20 percentage points, with the share of debt at risk rising from 44 to 64 percent. This indicates that distressed firms tend to be larger within the group of large unlisted firms. The outcome is similar for the group of SMEs, with an increase in distressed firms of 13 percentage points but starting from a slightly lower level (25 percent rather than 30 percent, this tying in with the ICR based analysis finding weaker fundamentals among larger firms). The debt at risk is particularly high for SMEs, with more than two thirds already experiencing debt sustainability issues in the baseline, and more than 80 percent under stress, although the demise of some larger SMEs biases these numbers upward.

70. In summary, debt sustainability of unlisted large firms and SMEs is cause for concern (Figure 26). Even the actual situation of such firms with respect to debt flow and stock viability is worrisome, with 20 to 30 percent of firms having unsustainable debt fundamentals, depending on the size and metric. Under the assumed shocks, this range shifts to 37 to 47 percent. When considering debt at risk, the share of distressed firms is even higher. In general, larger unlisted firms appear more vulnerable than SMEs.

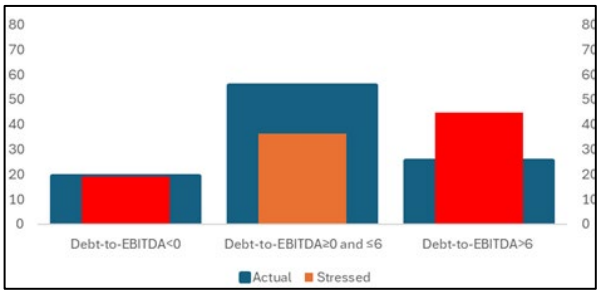
Figure 26. Debt Stock Sustainability of Large Firms and SMEs, Actual and Stressed

Share of Large Firms
(In Percent of Total)



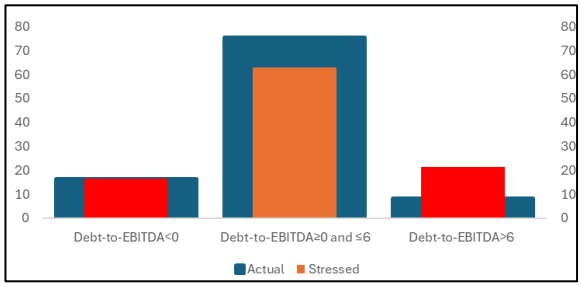
Source: Orbis, IMF staff calculations

Share of Large Firm Debt
(In Percent of Total)



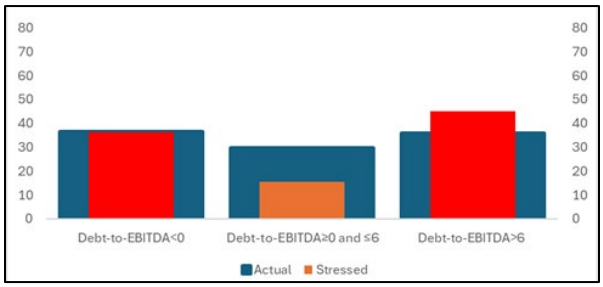
Source: Orbis, IMF staff calculations

Share of SMEs
(In Percent of Total)



Source: Orbis, IMF staff calculations

Share of SME Debt
(In Percent of Total)



Source: Orbis, IMF staff calculations

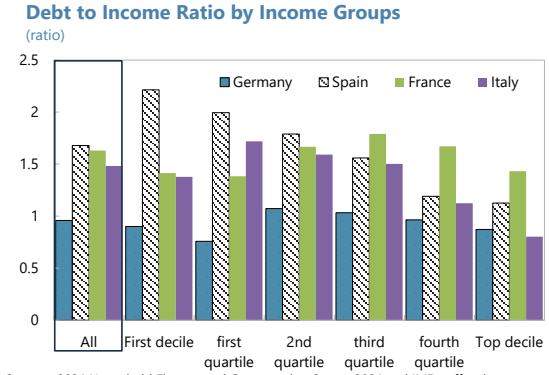
C. Solvency Stress Tests of Households' Balance Sheets

Vulnerability Analysis

71. An analysis of debt vulnerabilities based on micro-data suggests that French households have taken important leverage on their balance sheets, but ability to repay overall remains at reasonable levels (Figure 27). Data from the 2021 ECB Household Finance and Consumption Survey show that debt-to-income and debt-to-assets ratios of French households are at levels similar to those in Spain and Italy, and higher than in Germany. Debt-to-income ratios are broadly similar across income groups; in contrast debt-to-financial asset ratios are significantly higher among lower income households. Regarding characteristics of loans, the share of high LTVs at origination tends to increase with income, while the share of high DSTI tends to be lower for high income households. Overall, this suggests that pockets of vulnerabilities may be found across different income groups including primarily among lower income indebted households, with limited financial asset buffers and high debt, in contrast to higher income households which have sufficient financial assets to mitigate debt service risks.

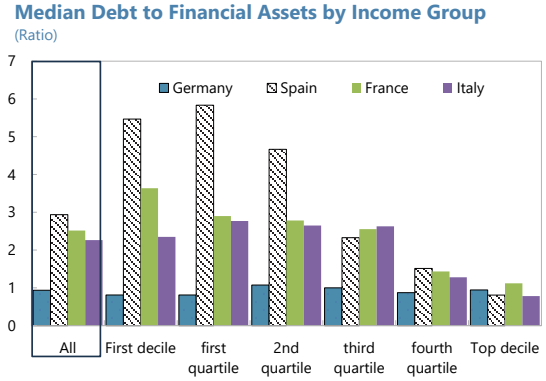
Figure 27. Comparative Analysis of Households' Indebtedness

Debt-to-Income ratios are relatively high but similar to peers….



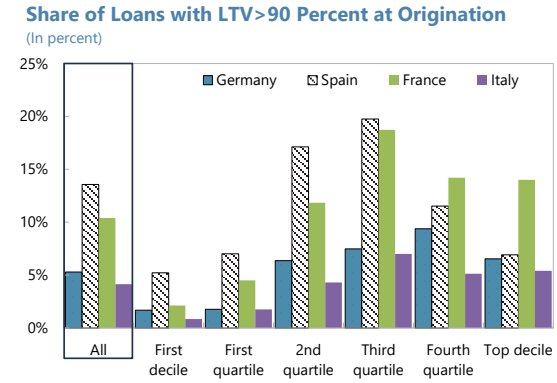
Sources: 2021 Household Finance and Consumption Survey 2021 and IMF staff estimates

As are Debt-to-Asset ratios….



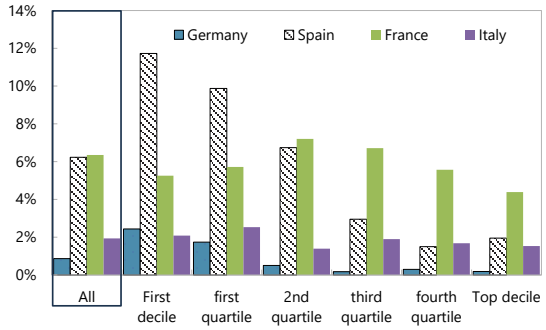
Sources: Household Finance and Consumption Survey 2021 and IMF staff estimates

The share of loans with LTV>90 percent is large…



Sources: Household Finance and Consumption Survey 2021 and IMF staff estimates

The share of households with DSTI>35 percent is reasonable but on the high side compared to peers….

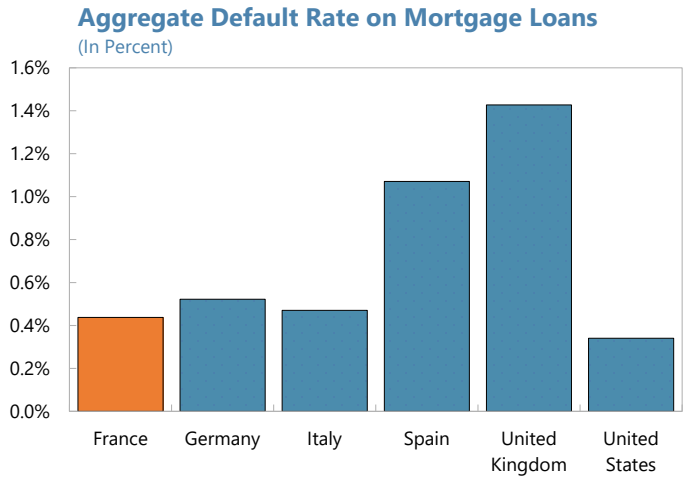


Sources: Household Finance and Consumption Survey 2021 and IMF staff estimates

72. Micro-simulations are relied upon to assess default risks among French households going forward (Box 6). At the current juncture, only a very small proportion of households default on housing loans in France, as shown in the EBA risk dashboard. While this does not exclude that some households may have high debt burdens, as discussed in the previous paragraph, this however suggests that most households are able to sustain debt repayments at the current juncture. Relying on the model described in Box 6, default rates are simulated under the baseline and adverse scenarios of the solvency stress tests, for the entire survey population of the 2021 Household Finance and Consumption Survey (HFCS). The model considers that, given that loans are full recourse, households make every effort to service their mortgage and that default occurs, after loss of a job, once households have run out of financial assets. The analysis shows that, while default rates would increase under adverse macroeconomic scenarios, they would remain contained (Figure 28).[44]

Figure 28. Stress Tests of Households' Balance Sheets

Aggregate default rates are low in absolute terms and compared to peer countries …



Sources: EBA Risk DashBoard 2024:Q4

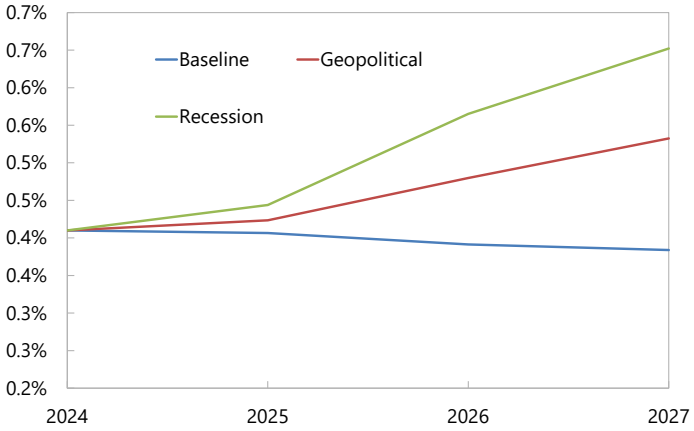
[44] For example, the highest default rates reached in the recession scenario of 0.7 percent is still below the current default rate of 1.1 percent on mortgages in Spain.

Figure 28. Stress Tests of Households' Balance Sheets (concluded)

Under adverse macroeconomic conditions, default rates would increase significantly but would remain at manageable levels …

France: Default Rates on Mortgages

(In Percent)



Sources: 2021 HFCS and IMF staff estimates

Box 6. Micro-Simulation Model of Household Default

A micro simulation model based on the 2021 Household and Finance Consumption Survey of the ECB is relied upon to estimate PDs for households.[1] The key equations of the model are the following ones.

First, the probability of default is estimated on the subset of households reporting some mortgage debt. For these households, the model considers the total debt, mortgages and other debts, of a household.

The probability of default is related to the probability of unemployment of a household as follows:

$$PD_{i,t} = Proba[Unemployment]_{i,t} \times conditional\_PD_{i,t} \quad (1)$$

Where $PD_{i,t}$ is the probability of default of household i at date t, $Proba[Unemployment]_{i,t}$ is the probability of unemployment of household i at date t, and $conditional\_PD_{i,t}$ is the probability of default of household i at date t conditional on being unemployed. This equation states that the probability of default is equal to the probability of being unemployed times the probability of default conditional on being unemployed. This assumes that households may default only if they are unemployed (which is implied by the assumption that wage income and other income are sufficient to service household debt interest and principal repayments).

$$Conditional\_PD_{i,t} = (1 - Proba[employment])_{i,t} \times \left[1 \middle| Financial\_Assets_{i,t} < 0\right] \quad (2)$$

Where $\left[1 \middle| Assets_{i,t} < 0\right]$ takes the value zero if gross financial assets are positive and the value 1 if gross financial assets are negative, and $Proba[employment]$ is the probability of returning to employment from unemployment by date t. This equation (2) states that conditionally on being unemployed at date t-1, a household will default if it remains unemployed, and his stock of financial assets is entirely depleted at date.

Box 6. Micro-Simulation Model of Household Default (concluded)

In other words, an unemployed household will default if and only if:

$$Financial\_Assets_{i,t} < 0 \quad (3)$$

If employed, the dynamics of financial assets $A_{i,t}$ of a household is given by:

$$A_{i,t} = (1+r) \times A_{i,t-1} + other_{inc_{i,t}} + Wage_{i,t} - debt\_services_{i,t} - Spending\_GS_{i,t} \quad (4)$$

If unemployed, it is given by:

$$A_{i,t} = (1+r) \times A_{i,t-1} + other_{inc_{i,t}} + UB_{i,t} - debt\_service_{i,t} - Spending\_GS_{i,} \quad (5)$$

With unemployment benefits $UB_{i,t}$ given by:

$$UB_{i,t} = Net\_replacement_{t,r} \times Wage_{i,t} \quad (6)$$

Where $Net\_replacement_{t,r}$ is the net replacement rate at date t , r quarters after becoming unemployed.

Debt service, interest and principal is $debt\_service_{i,t}$, and the amount spent on goods and services by a household during each period is given by: $Spending\_GS_i$. This spending is obtained from the survey itself, and is truncated at the 10th percentile of the distribution as a lower bound and the median of the

distribution as an upper bound. This truncation is done first to correct for potential errors (the 10th percentile is a few hundred euros monthly) and to allow for compression of spending (to the median which is a few thousand euros) for households with high spending levels.

The LGD is given by: $Max\{0, LTV - 1\}$ at the time of default, where the LTV is computed based on the remaining stock of debt at time of default divided by the value of the property at the time of default. The value of the property at time of default is given by the initial value reported in the survey times the growth rate of real estate prices assumed in the macroeconomic scenario.

Replacement rates and the likelihood of exit from unemployment r quarters after becoming unemployed are estimated from macroeconomic data on net replacement rates and outflows from unemployment published by the OECD. For adverse scenarios, outflows from unemployment are calibrated on the GFC period, and for baseline scenario on the pre-pandemic period.

[1] This toolkit is derived from the model described in: What Drives Mortgage Default Risk in Europe and the U.S.?

Counterfactual Bank Solvency Stress Tests: Limits on Borrower-Based Instruments

73. A counterfactual solvency stress test analysis is performed to assess quantitatively the impact of borrower-based instruments on credit risk in the banking system.[45] The approach relies on the micro-macro model of households' default rates described in Box 5 and aims to assess

[45] See Macropru Technical Note for more detailed policy discussion.

the impact of limits on LTVs and on DSTIs on credit risk from housing loans. Specifically, the two following macroprudential policy counterfactuals are considered: (i) a 90 percent limit on LTVs at origination; (ii) a 32 percent limit on DSTI at origination. These counterfactuals are performed by excluding from the survey population respectively households with LTV at origination above 90 percent, and households with DSTI above 32 percent.[46, 47] An assumption required for the counterfactual analysis to be conceptually valid is that the characteristics of households with LTVs - or DSTIs – below (respectively above) the limit considered are representative of the population that would originate housing loans (respectively be excluded from obtaining housing loans), would the limits on LTVs – or DSTIs - be activated.[48]

74. The counterfactual analysis is consistent with the view that, at the extensive margin, limits on DSTIs are more effective than limits on LTVs to contain the risk of default on housing loans in France (Figure 29). This finding is consistent with the French authorities' views that ability to service debt is a crucial metric to ensure creditworthiness of borrowers compared to loan-to-value ratios.[49]

- *Impact on PDs*. First, both limits on the LTV or the DSTI result in a decline in the default risk on housing loans, but the decline is much larger with the DSTI limit than with the LTV limit. This finding suggests that, at the margin, the DSTI is a better indicator of default risks than the LTV is.[50] Second, the decline in default risk associated with LTV or DSTI limits tends to be larger under adverse macroeconomic conditions than under "normal" conditions. With an LTV limit, the decline in the PD ranges from 0.07 percentage points in the baseline to 0.12 percentage points in the last year of the recession scenario. With a DSTI, the same declines in PD range from 0.22 percentage points to 0.38 percentage points.

- *Impact on capital ratios*. By helping to contain credit risk, limits on LTVs and on DSTIs tend to improve bank capital *ratios*, relative to those under no borrower-based limits. While the capitalization gains are small under "normal" economic conditions (0.1-0.6 percent of RWAs), they increase under adverse macroeconomic conditions and are the largest after 3 years of the

[46] While the survey provides LTVs at origination, only the current DSTI is available. Hence, the current DSTI is taken as a proxy for the DSTI at origination. Since the DSTI after origination will tend to decline relative to the DSTI at origination as nominal income increases, considering a 32 percent limit on current DSTI would likely correspond to a higher limit than 32 percent on the DSTI at origination.

[47] Imposing a 90 percent limit on LTVs result in dropping 44 percent of housing loans, and a 32 percent limit on the DSTI results in dropping 24 percent of housing loans. Exposures are then rescaled to maintain a constant total balance sheet of banks.

[48] In practice, we should expect that some households with sufficient savings and/or income would choose different loan characteristics at origination to have LTVs – or DSTIs – below the macroprudential limits when those are activated, relative to a situation without borrower-based limits in place.

[49] This partial analysis of housing loan credit risk focused on a policy counterfactual stress test experiment related to borrower-based instruments is not an assessment of capital requirements as many other channels are not analyzed.

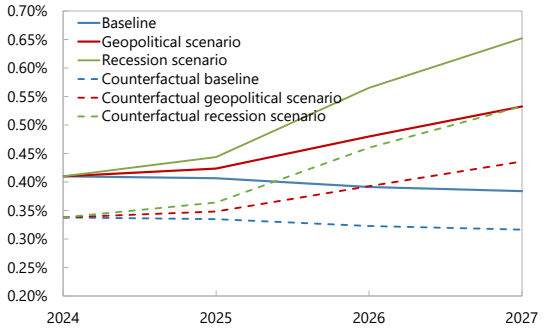
[50] This is consistent with the policy objective that DSTI limits aim at containing default risk, while LTV limits impact primarily the LGD in countries with full recourse mortgages. In these counterfactual stress tests, only the PDs were adjusted.

recessionary scenario (0.7 percent of RWAs with LTV limits, and 1.6 percent of RWAs with DSTI limits).[51]

Figure 29. Counterfactual Solvency Stress Tests

Default risk is lower among households with LTV<90 percent….

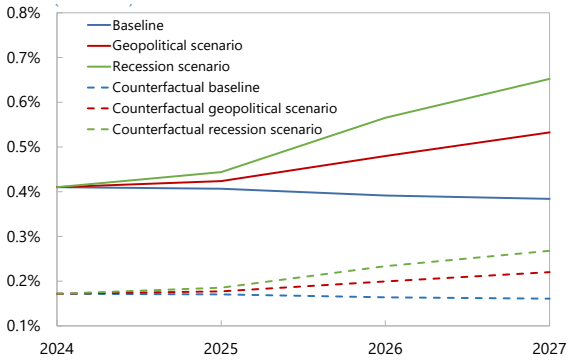
Default Probabilities: Counterfactual LTV <90 Percent (In Percent)



Sources: IMF staff estimates

But it is much lower among households with DSTI<32 percent….

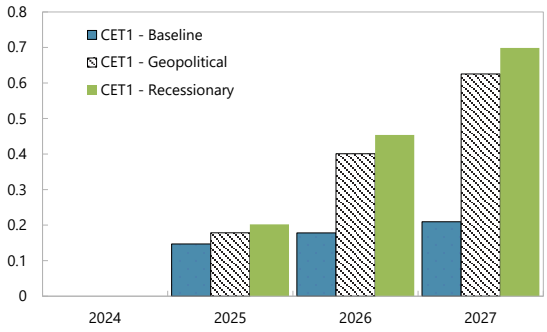
Default Probabilities: Counterfactual DSTI <32 Percent (In Percent)



Sources: IMF staff estimates

Restricting housing loans to LTVs<90 percent would modestly support capitalization, especially in a severe downturn…

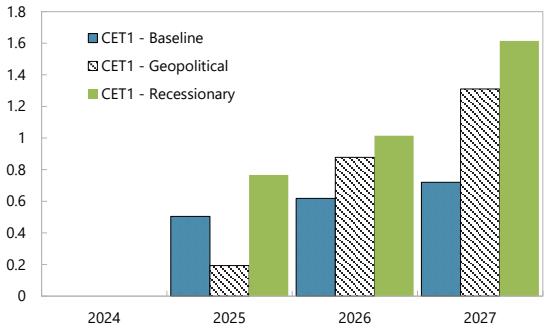
Borrower-Based Measures LTV <90 Percent Counterfactual (CET1 Impact, In Percent of RWAs)



Sources: IMF staff estimates

And even more if housing loans are restricted to DSTI<32 percent….

Borrower-Based Measures Counterfactual <32 Percent (CET1 Impact, In Percent of RWAs)



Sources: IMF staff estimates

[51] These figures likely overstate what would be the "true" capitalization impact of borrower-based limits. In particular we assume that the risk of unemployment is the same across all households. In practice, the risk of unemployment tends to be lower for households with housing loans than for households renting their home, as a result of banks' screening at the time of origination.

LIQUIDITY STRESS TESTS OF BANKS

A. General Approach and Scenarios

75. Liquidity risks in the banking system can be assessed through various approaches. The structural liquidity analysis considers the Basel III LCR and the NSFR, their evolution, volatility, structure and currency composition. While the former ratio aims at assessing banks' abilities to withstand short-term outflows by relying on liquid assets, the latter one gauges longer-term structural refinancing and funding risks given amounts of longer-term, illiquid assets. The FSAP also considered near term refinancing needs of banks, availability of collateral and diversification of funding. LCRs under a set of shocks more severe than the Basel III parameters are considered to assess the robustness of banks' LCRs to changes in outflow parameters and shocks to HQLA valuations. Cash flow stress tests are conducted under several scenarios based on supervisory returns of contractual inflows and outflows for different maturity buckets. The scenarios have increased severity of run-off rates at several horizons (up to one year) for contractual flows, combined with very short-term run-off rates ("runs") for sight and on demand deposits.[52]

76. Several stress scenarios are considered to assess French banks' resilience to liquidity risks.[53]

- *LCR risk analysis scenario (Table 10).* Sovereign stress results in valuation shocks to HQLA (Level 1A government bonds and Level 2A corporate bonds), with contagion to the secured lending market also *causing* higher drawdown of committed facilities by financial institutions.

- *Cash flow stress tests.* The cash flow analysis considers the following three scenarios (see Table 11 *Panels A, B and C* for detailed parameters of each scenario).

    - *Severe recession scenario (scenario 1).* An adverse shock to macroeconomic confidence causes a valuation loss on CBC, in particular L2 assets, a more limited access to funding markets, and a draw-down on credit lines by corporates. There are limited outflows for retail deposits, but they are more severe for non-operational deposits by corporates which draw down on liquidity facilities. Banks protect their franchise value and there is no inflow from loans to NFCs, retail, and Fis.

    - *Idiosyncratic bank run scenario (scenario 2).* An adverse idiosyncratic confidence shock for a bank, which could be due to solvency concerns, associated with credit losses, or unprofitable business model, would cause credit rating downgrades and reputational risk. Deposit outflows from retail customers, FIs and corporate non-operational deposits would be severe, and there would be some drawdown on committed credit facilities. The bank would try to

[52] For contractual flows, run-off rates on outflows should be interpreted as the percentage of contractual funding that are not rolled-over, and for inflows as the percentage of maturing assets that are not rolled-over.

[53] The scenarios are common with the 2025 Euro Area FSAP.

protect its franchise value and roll-over loans to NFCs, retail customers and FIs. Valuation effects on CBC HQLA would be limited.

- *Sovereign stress scenario (scenario 3)*.[54] HQLA is significantly affected via higher haircuts as this is a system-wide shock. Sharp increase in CBC haircuts for L1 assets. Some outflows for retail deposits, FI deposits and corporate non-operational deposits.

B. Structural Liquidity Risks

77. All banks in the FSAP sample meet the LCR 100 percent minimum requirement (Figure 30). The aggregate LCR stands at around 150 percent for the sample of banks, and the lowest LCR is at 136 percent. On average, LCRs for the French banks are above the G-SIB peer average, but below the average of European peers which is at 190 percent. Analysis of LCR outflow structure shows that the main vulnerability arises from risks related to unsecured non-retail funding, due to a large reliance on such funding (which account for about ¼ of total unweighted outflows). While aggregate LCRs in all currencies and in euros have remained stable at around 150 percent every month since 2020 and all USD LCRs are above 100 percent at the end of 2024, a significant volatility of LCRs in USD is observed at a monthly frequency, and aggregate USD LCRs were below 100 percent some months in 2021-2022. USD outflows account, in the aggregate, for a significant share of total unweighted outflows, but with important variations across points at any point in time. Even though French banks could rely on the Fed-ECB swap line in the event of USD funding stress, a continued close monitoring of USD funding conditions and buffers in USD seems warranted.

Weighted Average of Bank LCR Standard Deviations

	2020-2024	2020-2022	2022-2024
Overall LCR	0.12	0.12	0.08
LCR EUR	0.21	0.18	0.15
LCR USD	**0.48**	**0.48**	**0.31**

Source: COREP and IMF staff estimates

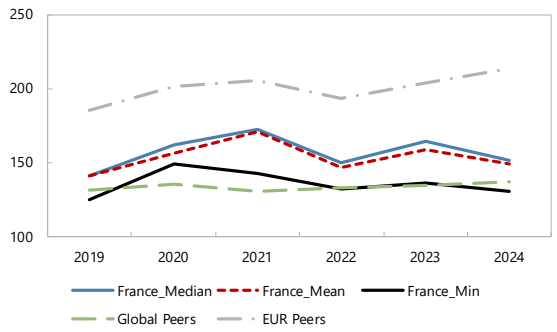
[54] This scenario does not include potential second-round effects, such as a recession and potential concerns for individual banks. Such effects would result in a significantly more severe scenario combining elements from scenario 1, scenario 2 and scenario 3.

Figure 30. Analysis of the LCR

The aggregate LCR has remained broadly stable in recent years….

Liquidity Coverage Ratio

(In Percent)

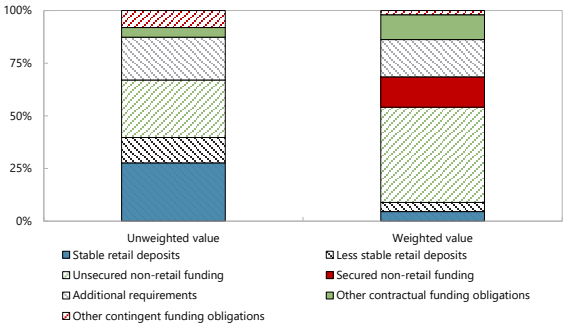


Source: Fitch and IMF staff calculations.

Unsecured non-retail funding accounts for a large share of weighted outflows….

LCR Outflow structure

(Top 7 Banks)

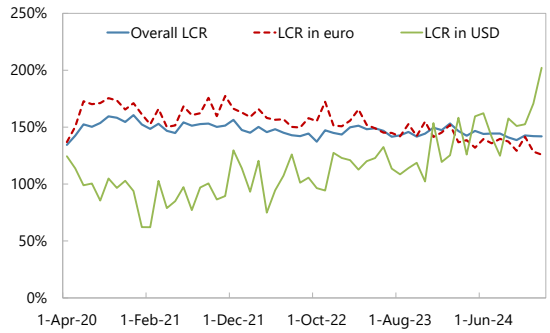


Source: 2023 and 2024 pillar III disclosures

LCRs in all currencies have remained well above the requirement in recent year, and LCRs in USD have improved….

Evolution of LCRs, Weighted Average

(In Percent)

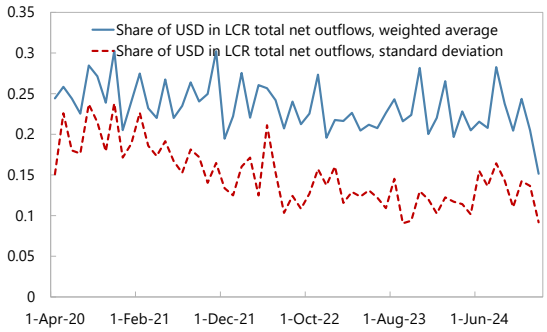


Sources: COREP and IMF staff estimates

At the aggregate level, USD outflows account for a non-negligible share of outflows….

LCR: USD (Unweighted) Net Outflows

(Share of Total Net Outflows)



Sources: COREP and IMF staff estimates

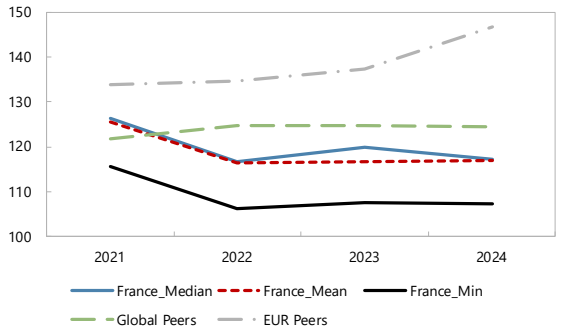
78. While French banks all meet the minimum NFSR requirement, their ratios remain below the average of European peers and of GSIBs peers (Figure 31). Wholesale funding accounts for 50 percent of unweighted available stable funding with a maturity of up to 6 months. In weighted terms, retail deposits (respectively wholesale funding) account for 46.6 percent (respectively 37,6 percent) of available stable funding. The stable funding is needed especially for loans to NFC and retail clients which account for 53 percent of the weighted required stable funding. French banks rely to a significant extent on USD funding, which account for 21 percent of total unweighted available stable funding (26 percent for G-SIBs) but on average USD funding has shorter maturity than other funding, as demonstrated by the ratio of weighted to unweighted share of USD funding, which is on average at 176 percent for all banks, and 184 percent for G-SIBs.

Figure 31. Analysis of the Net Stable Funding Ratio

The aggregate NFSR is above requirement despite having declined but is below the average of European peers….

Net Stable Funding Ratio

(In Percent)

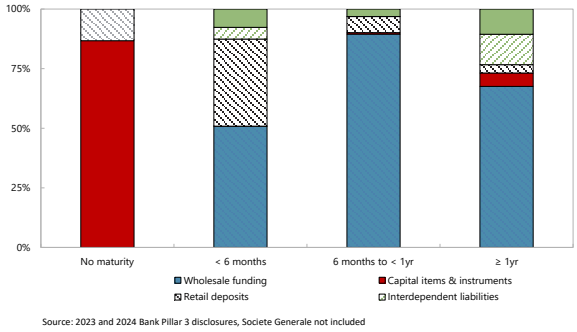


Source: Fitch Connect and IMF staff calculations.

Note: Credit Mutuel and Bofa Securities Europe SA are using 2023 data.

Non-retail funding account for most of funding at longer maturities….

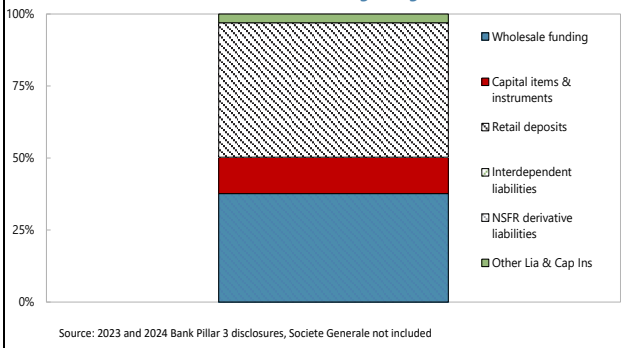
NSFR Available Stable Funding, Unweighted Values by Maturity



Source: 2023 and 2024 pillar III disclosures, Societe Generale not included

But retail deposits are the largest stable funding source in weighted terms…

NSFR Available Stable Funding, Weighted Values



USD funding appears to be on average less stable than other funding sources….

Ratio of NFSR available stable funding in USD / all currencies available stable funding

	Unweighted	Weighted	Ratio unweighted /weighted
All Banks			
Weighted average	0.21	0.13	1.76
Standard deviation	0.12	0.08	0.44
G-SIBs			
Weighted average	0.26	0.15	1.84
Standard deviation	0.06	0.06	0.58

Source: COREP_NSFR, C 81.00.x(USD), C 81.00.c

79. Other structural funding characteristics appear sound (Figure 32). Funding sources are well diversified on average and asset encumbrance is low. The G-SIBs have upcoming refinancing needs, including in the near-term, which to a large part has been pre-financed.

Figure 32. Structural Funding Characteristics and Roll-Over Needs

Funding appears well diversified…

	Weighted average share of top 10 large funding providers	Standard deviation of the share of top 10 large funding providers
All Banks	0.080	0.20
G-SIBs	0.072	0.056

Source: COREP 67.00.a(0010), COREP 67.00.a - Concentration of funding by counterparty. Total

And encumbrance of assets is low….

	Aggregate share of encumbered assets	Standard deviation of share of encumbered assets
All Banks	0.142	0.100
G-SIBs	0.138	0.040

Source: 2024-12, Finrep 32.01

C. Liquidity Stress Test Results

80. Cash flow stress tests reveal that many banks can withstand significant liquidity outflows under several scenarios (Figure 33):

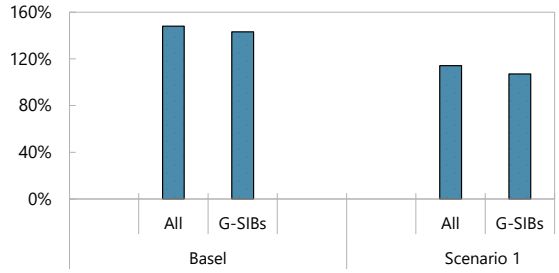
- **LCR risk analysis.** Under an LCR stress scenario with higher outflow run-off rates than Basel III and valuation losses on HQLA, the aggregate LCRs in all currencies and in euros are respectively at 114 percent and 112 percent respectively, and median at 107 percent and 101 percent respectively. 3 banks have LCRs below the 100 percent threshold, among which 2 are G-SIBs. Most of the decline in LCR is accounted for by the increased outflow rate while the valuation shocks to HQLA account for 2 percentage points of the decline in the LCRs at the aggregate level.

- **Cash flow stress tests.** Banks are the most resilient in the sovereign stress scenario, followed by the recession scenario. Survival horizons exceed one month for all banks under cash flow stress scenarios, except for one. In the most severe scenario, the net liquidity gap after use of CBC reaches 13 percent of banking assets at a 12-month horizon, but it does not exceed 4.85 percent of banking assets in the first 60 days of outflows. In scenarios with outflows of USD, up to 2 banks experience net outflows that exceed CBC in the first 30 days, but the net liquidity gap reaches a maximum of only 1.30 percent of banking sector assets at a one-year horizon.

Figure 33. Bank Liquidity Stress Tests

Aggregate LCRs in all currencies remain above the Basel minimum in a stress scenario….

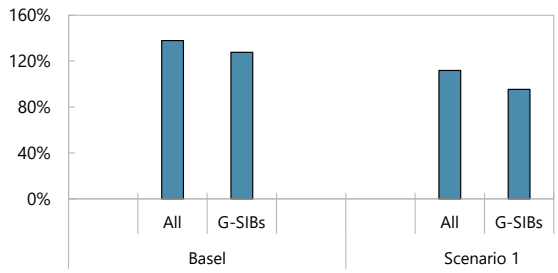
LCR All Currencies, Weighted Average



Sources: COREP and IMF staff calculations

This is also the case for euro LCRs….

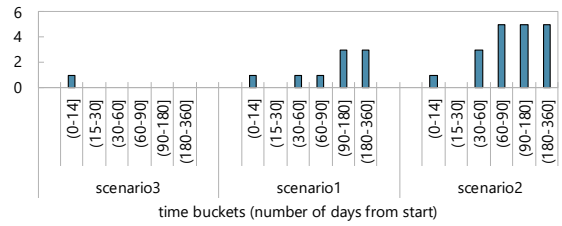
LCR in Euros, Weighted Average



Sources: COREP and IMF staff calculations

Most banks can sustain liquidity outflows beyond one month even in a severe scenario….

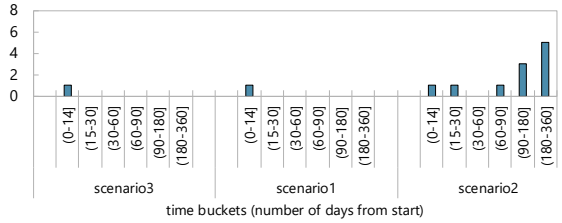
Number of Banks with Negative Funding Gap, in all currencies



Sources: COREP and IMF staff calculations

This is also the case for USD outflows….

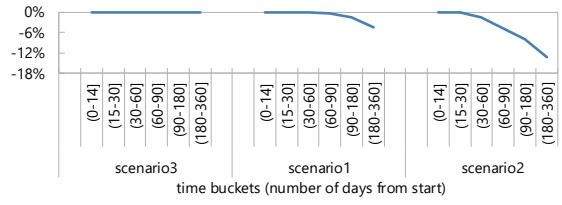
Number of Banks with Negative Funding Gap, in USD



Sources: COREP and IMF staff calculations

Aggregate funding gaps remain small as a share of assets at least for 2 months even in the most severe scenario…

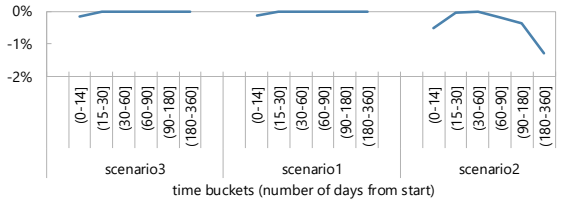
Aggregate Net Funding Gap of Banks with Liquidity Shortfall, in all currencies
(As a Pecent of Total Assets)



Sources: COREP and IMF staff calculations

Funding gaps in USD are small as a share of assets even in the most severe scenario….

Aggregate Net Funding Gap of Banks with Liquidity Shortfal, in USD
(As a Pecent of Total Assets)



Sources: COREP and IMF staff calculations

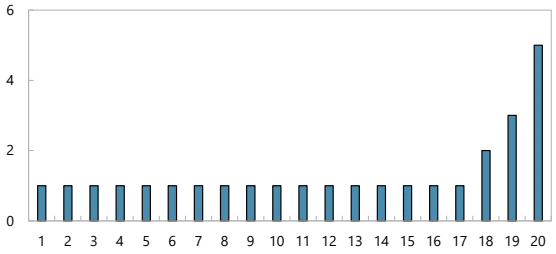
81. Reverse cash flow stress tests illustrate at which level of shock severity total net outflows after CBC become negative (Figure 34). The reverse stress tests are undertaken at a horizon of 30 days, and the most severe version of the scenario considered assumes that the terminal value of severity is double the original severity of the starting point scenario. The steps of increasing severity (capped at 20) are based on a convex increase in outflows/decrease in inflows (if

relevant), with a cap for parameters at 0 percent inflows and 100 percent outflows. The reverse stress tests are performed for (i) the least severe scenario (scenario 3); and: (ii) the most severe scenario (scenario 2). Reverse stress tests for scenario 3 show that cash flows remain resilient at 30 days for most banks until the very last 3 iterations of increasing severity, while in scenario 3, it takes 8 iterations for 4 banks to face funding gaps at a 30-day horizon and aggregate cash flows turn negative after 9 iterations.

Figure 34. Reverse Cash-Flow Stress Tests

Under scenario 3, it takes a very significant convex increase in shocks to observe more than one bank with a gap within 30 days….

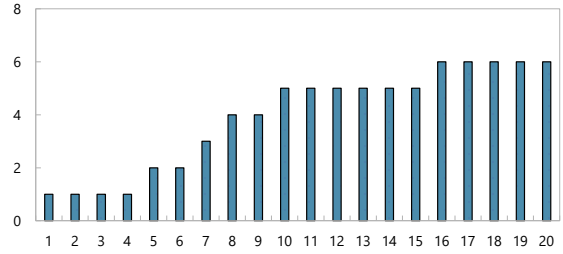
Scenario 3: Number of Banks with Negative CBC Within 30 Days



Source: COREP C.66 and IMF staff estimates

Under scenario 2, a smaller increase in the shocks is needed to observe more than one bank with a negative funding gap….

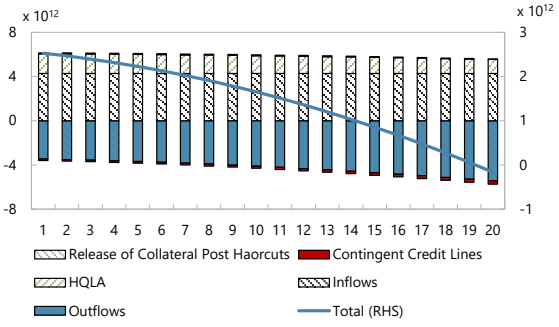
Scenario 2: Number of Banks with Negative CBC Within 30 Days



Source: COREP C.66 and IMF staff estimates

Under scenario 3, aggregate cash flows remain non-negative for 18 simulations…

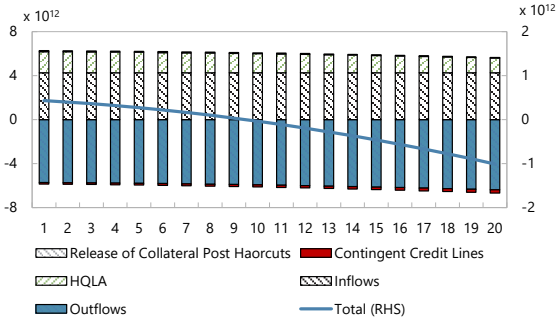
Reverse Stress Test Based on Scenario 3



Source: COREP C.66 and IMF staff estimates

Under scenario 2, total cash flows turn negative after 9 simulations ….

Reverse Stress Test Based on Scenario 2



Source: COREP C.66 and IMF staff estimates

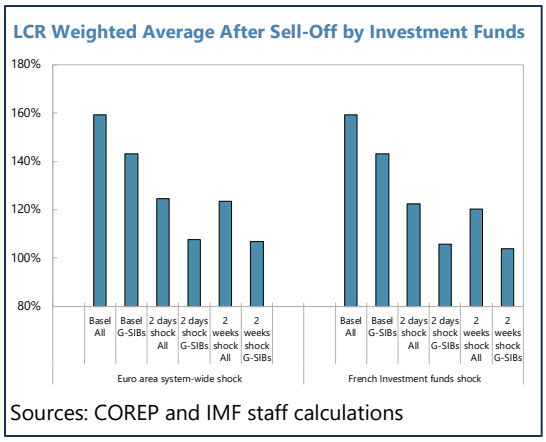
D. Special Topic: "System-Wide" Liquidity Stress Tests

82. In addition to the standard liquidity stress tests of banks, the FSAP considered an analysis of spillover effects on banks triggered by a sell-off by investment funds via the market liquidity channel. A sell-off by investment funds can affect banks via: (i) the market liquidity channel (as investment funds sell securities, the valuation of these securities fall, which impacts negatively the value of HQLA that banks hold for liquidity purposes); and: (ii) the funding liquidity

channel (as investment withdraw funding from banks). Two exercises focused on the first channel were considered.[55] First, the FSAP considered the market impact of a sell-off by France domiciled investment funds (UCITS) and French MMFs. Second, the market impact of a sell-off by Euro Area domiciled investment funds (which includes domestically domiciled as well as cross-border investment funds such as those domiciled in Luxembourg) is considered.[56]

83. The liquidity stress test scenarios were broadly similar for the Euro –Area-wide investment funds analysis and for the analysis of the France domiciled non-MMF investment funds and MMFs, but with more severe shocks in the latter.[57] The system-wide valuation shock results from redemptions caused by spread and interest rate shocks which causes a sell-off. The valuation impacts however are larger in the scenario of a sell-off by French domiciled investment funds than in the Euro Area-wide exercise. In the former, the valuation shock on 1-5 years France sovereign bonds result in a price fall of 13 percent over the first two days and 19 percent over a total 2-week period. In the latter, the valuation shocks for AA sovereign bonds of residual maturity of 3-5 years are 3 percent over the first two days and 6 percent over the total 2 weeks. These valuation shocks were mapped to the sovereign bond Level 1 category of HQLA.

84. Despite the differences of valuation shocks between the France specific stress test and the Euro Area-wide stress test, the impact on banks' liquidity appears to be of comparable magnitudes. In both scenarios impacting the valuation of HQLA, French banks' aggregate LCRs remain above the Basel III requirement. In the Euro Area system-wide shock, the aggregate LCR declines to 125 percent and 123 percent respectively after 2 days and 2 weeks. In the France specific investment funds' shock, the aggregate LCR declines to 122 percent after two days and 120 percent after 2 weeks. In both stress scenarios, 3 banks experience a decline of their LCR after 2 days.



Sources: COREP and IMF staff calculations

[55] The funding liquidity channel could not be assessed in absence of granular data on the bilateral exposures of investment funds to French banks.

[56] See Euro Area FSAP Technical Note on NBFI stress tests.

[57] The scenarios however are not directly comparable, including because of different granularity of fixed-income securities markets.

INTERCONNECTEDNESS AND CONTAGION ANALYSIS

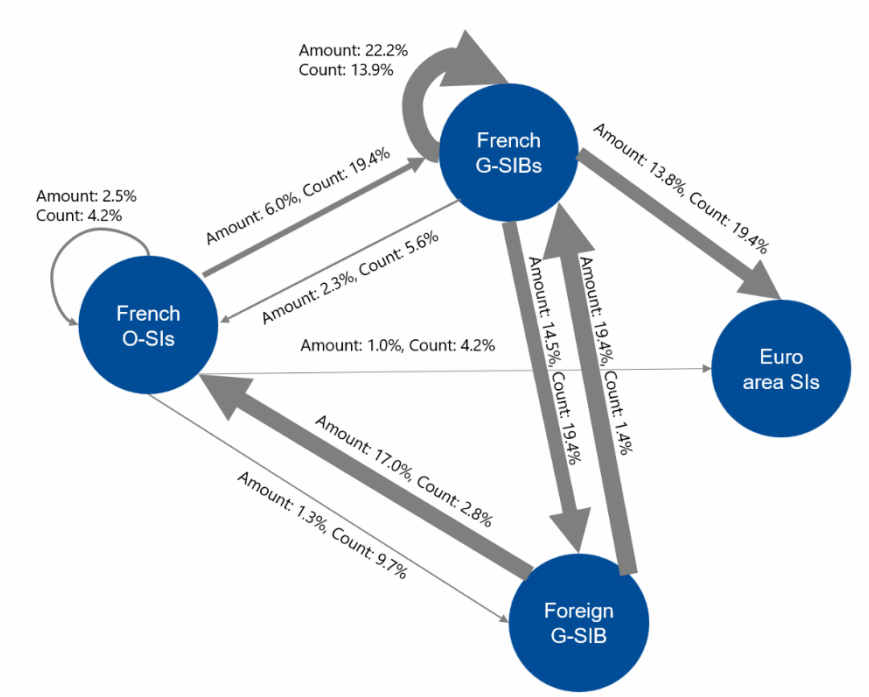
A. Interconnectedness

Banks

85. Network analysis is conducted to map the interconnectedness between banks. A network of interbank connections was constructed using large exposure data for French SIs that is regularly compiled by the SSM (data as of end-2024). There was no readily available information for exposures of SI to NBFIs (that information was compiled separately by BdF) which would have been necessary to obtain a holistic view of linkages across subsectors. The network of bilateral bank credit claims was constructed from the large exposure sheets in COREP, including claims on non-resident (foreign) banks. A few French banks also had large funding exposures to international banks, captured in a dedicated sheet showing the ten largest funding sources of each bank (each more than 1 percent of liabilities). In total, the network used for this exercise consists of 10 French SI (including the 4 G-SIBs) and another credit institution (Crédit Logement), 6 SIs from other EU countries (of which 3 G-SIBs), and 10 G-SIBs outside the EU.

86. The analysis shows that French SIs maintain an extensive interbank network (Figure 35). The 4 French G-SIBs account for the bulk of bilateral credit exposures when considering amounts; this is among themselves but also with global and Euro Area SIs. The G-SIBs are net providers of liquidity cross-border but net borrowers from the other French SIs, some of which themselves obtain funding from global G-SIBs. These SIs are less connected in terms of credit amounts but maintain a high count of individual claims, including with G-SIBs.

Figure 35. Network of Bilateral Interbank Exposures



Source: ECB and IMF staff calculations

Non-Bank Financial Institutions

87. The mission also conducted a mapping of securities holdings by type of financial institution. Data compiled by the BdF shows that as of September 2024 banks, insurance companies and investment funds held a total of EUR 4.9 trillion in debt securities, listed shares and investment fund shares or units of these industries as well as securities issued by other private and public institutions, both domestic and foreign. The BdF database does not include other instruments such as bank deposits.

88. Insurance companies are the largest institutional investors, particularly in investment funds (Table 8). Of the outstanding securities, insurance companies hold 43 percent. Within these, securities issued by non-residents combine to close to half of total holdings. Investment funds[58] hold about one third of securities, again with about half invested in foreign paper. Domestic banks account for one fourth of holdings, mostly in foreign instruments and split almost evenly between private and public securities. It is noteworthy that insurance companies hold about one fourth of their securities in investment funds that in turn invest in bank securities and deposits (not included here).

[58] The investment fund industry represented in this statistic includes bond funds, equity funds, hedge funds, mixed funds, real estate funds and other funds as well as money market funds.

Table 8. France: Bank and NBFI Securities Holdings by Type of Issuer[1]
(Percent of Total Outstanding Securities, September 2024)

Issuer / Holder/	Insurance Comp.	Investment Funds	Domestic Banks	Other, Domestic Private	Other, Domestic Public	Other, Foreign Private	Other, Foreign Public
Insurance Comp.	0.4	10.4	2.2	3.8	6.0	14.5	5.7
Investment Funds	0.2	5.2	3.4	5.3	0.8	16.0	1.8
Domestic Banks	0.0	0.3	0.7	1.4	2.7	10.3	9.0

Source: BdF.

Note: Holdings are to be read as the left-hand side sector having an exposure to securities issued by institutions in the top line; for example, Insurance companies holding 10.4 percent of all outstanding securities in securities issued by investment funds. All cells add up to 100 percent.

[1] The investment fund industry represented in this statistic includes bond funds, equity funds, hedge funds, mixed funds, real estate funds and other funds as well as money market funds.

B. Bank Contagion Analysis

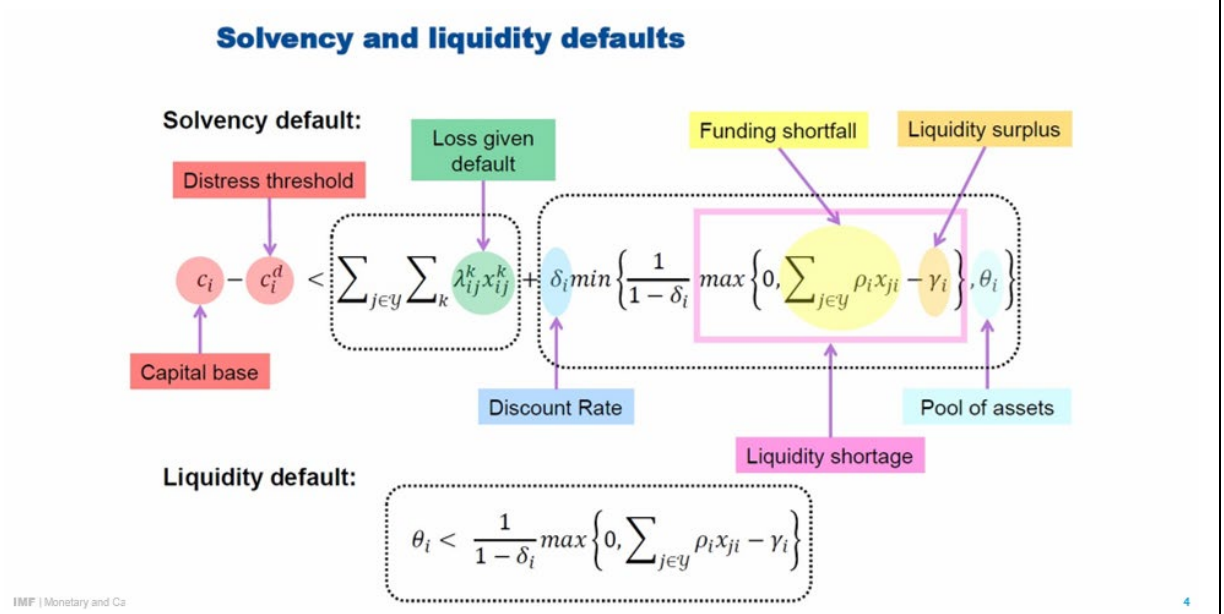
89. The contagion stress test evaluates a bank's capacity to react to credit and funding shocks without violating liquidity and solvency requirements. A bank is considered to pass the liquidity requirement when it can replace withdrawn funding by tapping into its buffer of HQLA after accounting for net liquidity outflows, or, having exhausted this buffer, use its counterbalancing capacity consisting of unencumbered marketable securities, subject to an assumed fire-sale haircut. When a bank exhausts that additional buffer as well, it is considered to fail because of a funding shortfall. A bank can also fail because the credit losses from the simulated defaults of counterparty banks and fire sale losses of marketable securities exhaust all its voluntary and additional capital buffers. In the stress test, the applicable hurdle rate conforms to the minimum requirement used in the corresponding Euro Area FSAP stress test, which is CET1 capital of 4.5 percent of risk-weighted assets plus the Pillar 2 requirement that varies across banks.

90. The assessment uses the now-standard IMF contagion stress test methodology by Covi et al. (2021).[59] The methodology expands the traditional model of Espinosa-Vega and Solé (2010) beyond interbank loans to capture all interbank claims. It also incorporates both credit shocks from debtor banks defaulting on their obligations and funding shocks from other banks' withdrawal of funding, forcing the banks to use liquid assets, including central bank emergency liquidity assistance, or, when exhausted, deleverage by selling less liquid assets a discount (fire sale) in order to meet the funding run-off.

[59] Covi, G., Gorpe, Z., and Kok, C. (2019), "CoMap: mapping contagion in the euro area banking sector", ECB Working Paper No. 2224.

91. A bank can suffer capital losses due to writing down claims on other banks and valuation losses from fire sales of less liquid assets. In the simulation it fails if such losses make the capital base (CET1) drop below the distress threshold, as illustrated in Figure 36. In the simulation, the loss given default (LGD) is bank-specific and depends on credit risk mitigants (e.g., provisions) in each bank-to-bank exposure (in the exercise ranging between 90 and 100 percent, as interbank claims are weakly collateralized). The fire sale valuation losses are associated with a discount factor (δ_i) assumed to be 30 percent, with an upper limit to selling illiquid assets denoted by θ_i, which in the exercise are each bank's marketable unencumbered securities (net of those pledged to the ECB). A bank is assumed to becomes illiquid if its remaining assets are insufficient to match the liquidity shortage expressed as the funding shortfall $\rho_i x_{ij}$ (with ρ_i set to 1) from withdrawals less the existing liquidity surplus γ_i (in the exercise equated to a bank's HQLA minus the net liquidity outflow, or the difference between the LCR numerator and denominator, given an LCR exceeding 100 percent). A bank may default contemporaneously via solvency and liquidity gaps when both inequalities shown in Figure 36 are jointly satisfied.

Figure 36. Bank Contagion Model



Source: Covi et al. (2021), adapted

92. Bank-specific exposures and other information was obtained from the COREP and FINREP supervisory data at the ECB. As mentioned, the interbank network of bilateral credit claims was constructed from the large exposure sheets, with the LGD of each claim calculated as the ratio of net exposure (after deducting mitigants) to gross exposure as well as some bilateral funding exposures obtained from a different set of large exposure sheets. Other information gleaned from these supervisory sheets encompasses total assets, risk-weighted assets, capital (CET1) and Pillar 2 requirement of each bank, unencumbered marketable securities for the "pool of assets", and the LCR components needed to calculate the liquidity surplus.

93. In the simulation, a sequential default of debtor banks within the bilateral interbank network is assumed. After each hypothetical default, irrespective of the likelihood of such default, the capital and liquidity impact on each bank in the system is computed and the resulting post-shock amounts compared to the applicable hurdle rate. If a bank fails in this first round, there may be a secondary impact in a subsequent round, transmitted through the network as illustrated in Espinosa-Vega and Solé (2010). Once no bank fails in a given round, the exercise is terminated, and the stress test results obtained.

94. Two scenarios are considered for this contagion stress test. In the first scenario, only the bilateral network of resident banks (all 10 systemic institutions (SIs) supervised by the SMM, combining for close to 90 percent of system assets) is considered, whereas the second scenario additionally includes cross-border exposures to non-resident banks, both credit and a few funding exposures. In that second scenario, the network was restricted to the main international G-SIBs as well as to several European O-SIs to which French SIs are particularly connected. In total, the first scenario includes 25 bilateral connections and the second one 71 connections (of which, four funding exposures).

95. The stress test results indicate that credit and funding risks in the French interbank market are low. In the first scenario, no bank fails the contagion stress test, whereas in the second scenario one smaller French SI fails in the first round due to a relatively large funding exposure assumed to be withdrawn in the simulation.

96. Even so, the shocks do have an impact on capital and liquidity, as indicated by contagion and vulnerability indices. A contagion index (CI) summarizes the system-wide losses induced by a particular bank in percent of total capital in the system (excluding the bank itself), whereas a vulnerability index (VI) indicates the average loss experienced by a particular bank across all simulations in percent of its own capital (Covi et al., 2021). Table 9 below shows the sum of the individual CIs and VIs. Regarding the transmission of shocks, the summary statistics illustrate that in the both scenarios the contagion from the French G-SIB through default in credit exposures dominates (with the index in the second scenario lower due to the larger capital base when including the non-resident institutions). The VIs show that both the French G-SIBs and the other SIs are similarly vulnerable to credit shocks in the first scenario. The second scenario indicates that the increment in vulnerability of non-resident banks is very limited due to their large size compared to the claims in question and that there is a funding vulnerability that, as mentioned, triggers the failure of one SI that is also somewhat vulnerable to credit shocks.

Table 9. France: Bank Contagion Stress Test – Contagion and Vulnerability Indices[1]

	Scenario 1	Scenario 2
Contagion Index Overall	**7.687**	**3.579**
o/w for Credit	7.687	3.579
o/w for Funding	0	0
Contagion Index GSIBs	**7.610**	**3.166**
o/w for Credit	7.610	3.166
o/w for Funding	0	0
Contagion Index SIs	**0.077**	**0.413**
o/w for Credit	0.077	0.413
o/w for Funding	0	0
-- o/w Contagion Index of Failing SI	**0**	**0.701**
-- o/w for Credit	0	0.701
-- o/w for Funding	0	0
Vulnerability Index French and Int'l Banks	**n/a**	**7.208**
o/w for Credit	n/a	6.335
o/w for Funding	n/a	0.873
Vulnerability Index French Banks	**8.104**	**6.399**
o/w for Credit	8.104	5.526
o/w for Funding	0	0.873
Vulnerability Index GSIBs	**3.158**	**2.889**
o/w for Credit	3.158	2.889
o/w for Funding	0	0
Vulnerability Index Sis	**4.946**	**3.510**
o/w for Credit	4.946	2.637
o/w for Funding	0	0.873
-- o/w Vulnerability Index of Failing SI	**n/a**	**1.716**
-- o/w for Credit	n/a	0.843
-- o/w for Funding	n/a	0.873

Source: IMF staff calculations

[1] An application of the methodology to a previous country case can be found in International Monetary Fund (2020)

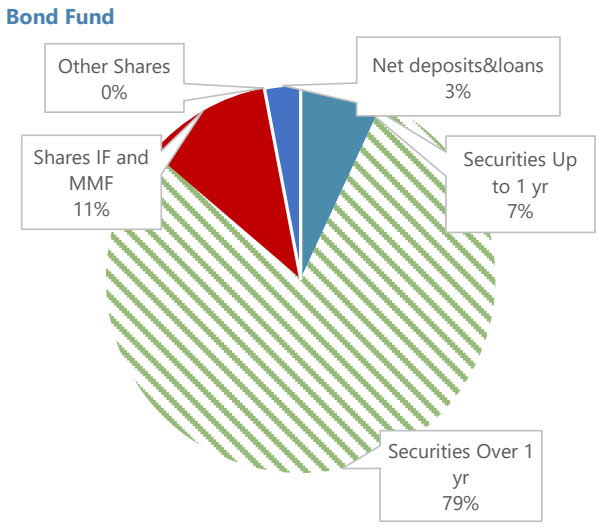
INVESTMENT FUNDS' LIQUIDITY STRESS TESTS

A. Introduction

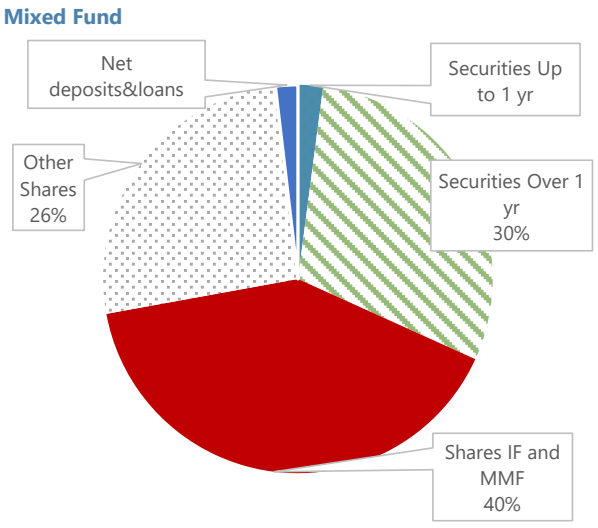
97. Liquidity stress arising from open-ended IFs offering daily redemptions could in certain conditions trigger systemic liquidity stress. Over 80 percent of the NAV of investment funds domiciled in France is managed by open-ended collective investment vehicles susceptible to

runs under stressed market conditions. Investment funds offering daily redemption and investing in longer-term assets can face maturity mismatch when dealing with large net redemptions. Open-ended bond funds and to a lesser extent mixed funds engage in maturity transformation creating maturity mismatches requiring sound liquidity risk management (Figure 37). In particular, as long as funds hold sufficient quantities of liquid assets, redemptions can be met through their sales. When there are large unexpected net redemptions, IFs may be forced into fire sales of less-liquid assets and incur significant losses for the remaining shareholders. The consequent simultaneous rise in funding costs for banks, firms and governments, and loss in market valuation of fixed income assets is susceptible to systemically dislocate funding and market liquidity.

Figure 37. Assets Held by Bond Funds and Mixed Funds, end-2024



Source: BdF.

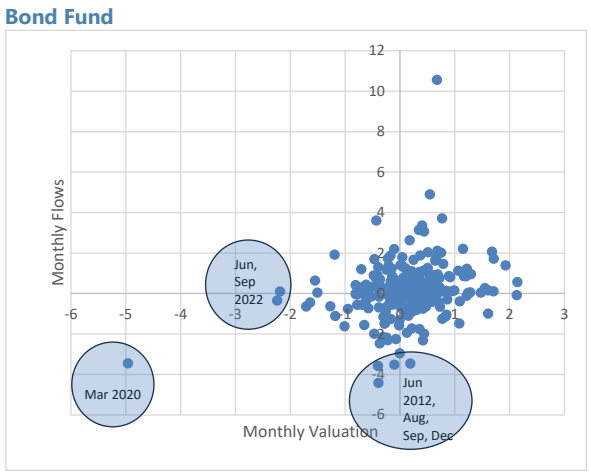


Source: BdF.

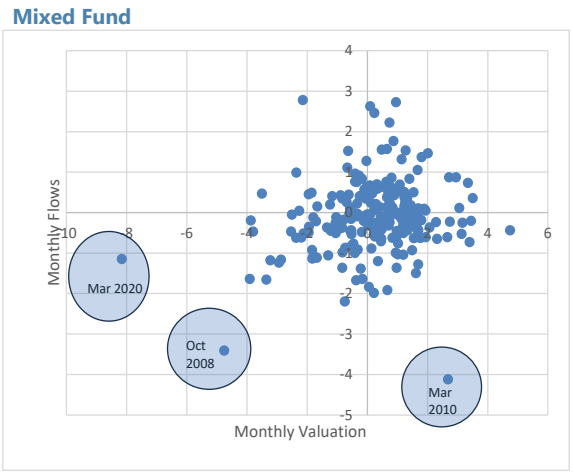
98. Redemption risk can arise from various shocks. Flareups in geopolitical tensions, unanticipated dislocation from sovereign stress, and other events could be a source of redemption. Historical extreme events that have led to large redemptions include the global financial crisis (GFC), the European debt crisis, and the COVID-19 pandemic. During the month of June 2012, amidst the European debt crisis, bond fund redemptions recorded EUR 9.3 billion, equivalent to 4.4 percent of outstanding shares/units at end-May. The redemption shock during the COVID-19 pandemic in March 2020 resulted in a net withdrawal of EUR 10.3 billion, equivalent to 3.4 percent of IF outstanding shares/units at end-February. The change in valuation during these events varied widely, at EUR 0.8 billion and EUR 14.8 billion, respectively, despite comparable redemption shocks. The simultaneous flow and valuation effects together led to a decline in NAV of EUR 10.1 billion and EUR 25.1 billion in the respective periods (Figure 38 and Table 13). The very different observed outcomes of fund performance and redemptions support previous studies that there is no discernible relationship between fund performance and redemptions for MMFs in France and that other factors such as the structure of liabilities, the freeze of the underlying market may have played a preponderant role in the redemption episode. For French bond funds, another study found that

there was indeed a relationship between fund performance and redemption but that there was no increased sensitivity to negative performance, or amplified reactions in times of crisis leading to a destabilizing effect.

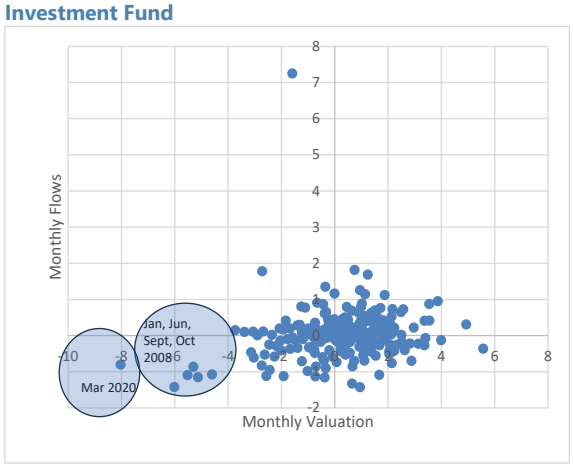
Figure 38. Performance and Redemptions of Investment Funds and MMFs, 2007-24
(In Percent of Previous Period NAV)



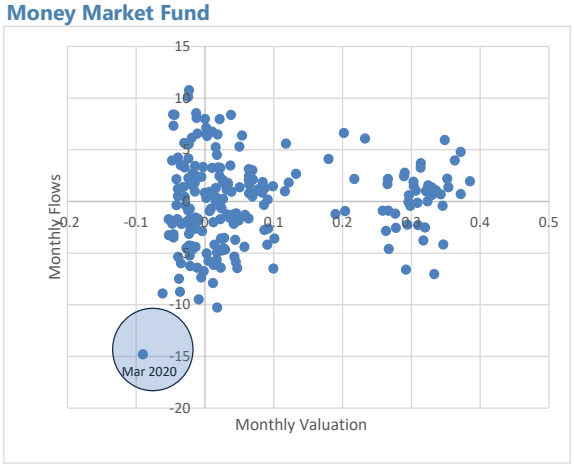
Source: BdF.



Source: BdF.



Source: BdF.

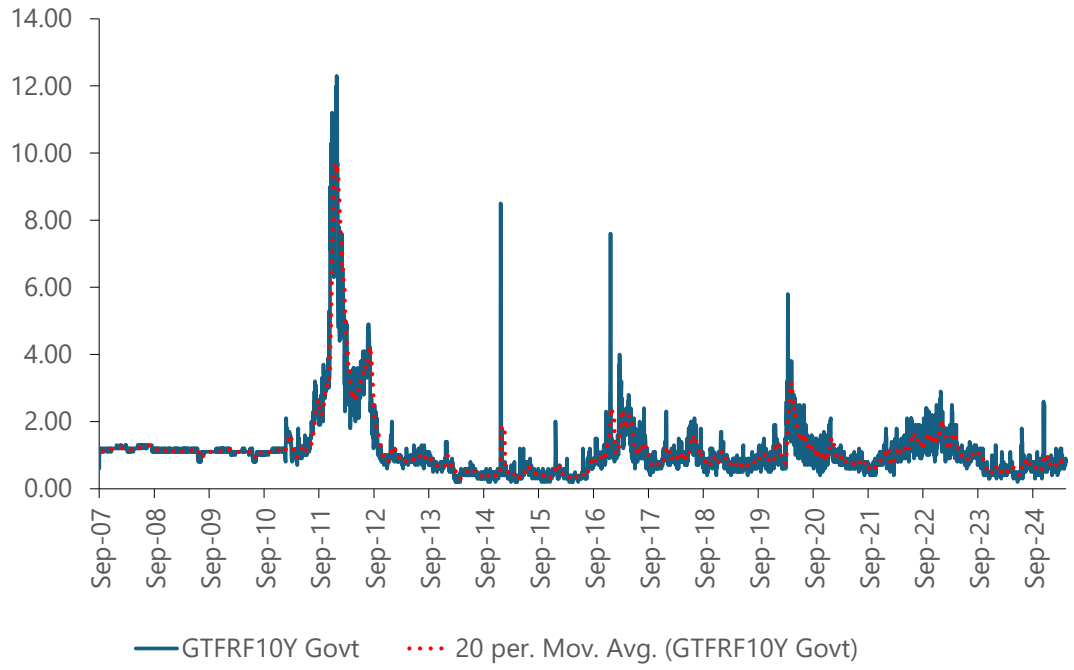


Source: BdF.

99. During the same periods, liquidity deteriorated sharply exacerbating the price impact. Using various measures of bond market liquidity, AMF studies show that bond market illiquidity spiked during the GFC, the European debt crisis and the Covid-19 pandemic (Figure 39).[60]

[60] Study of liquidity in French bond markets.pdf and 2021-markets-and-risk-outlook.pdf p.37.

Figure 39. Indicator of Liquidity, French 10-year Government Security Price Bid-Ask Spread
(In 100 Basis Points)



Source: Bloomberg and staff calculations.

B. Methodology and Analysis

Scope and coverage

100. This study covers bond and mixed funds, as well as MMFs. Liquidity transformation is carried out by these funds holding medium- to long-maturity fixed income assets. MMFs are also covered, as they may face simultaneous redemption pressures and could contribute to an amplification effect to the short-term funding market when common assets are sold simultaneously with other fixed income asset holders. The analysis is conducted based on end Q3 2024 data.

Data

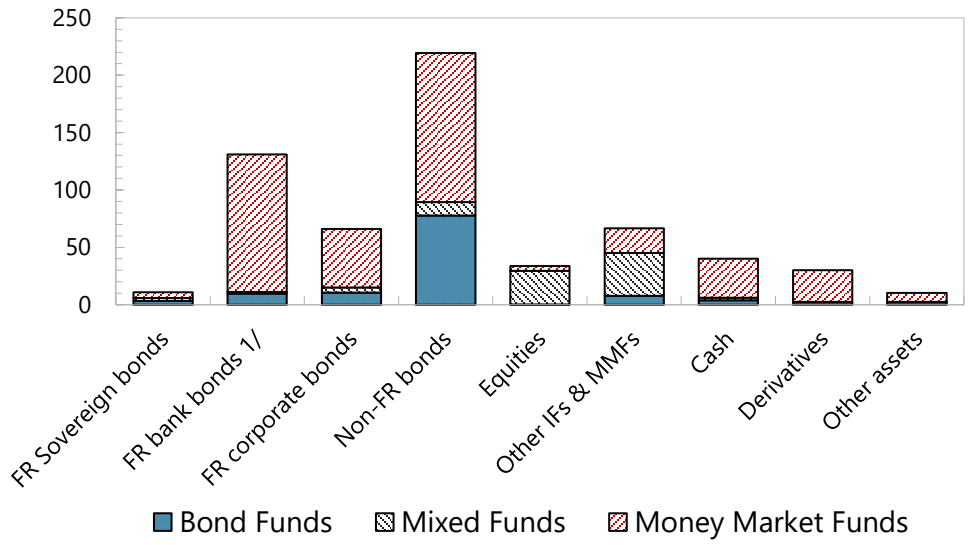
101. Investment fund data and assets held is extracted from Lipper.[61] The data covers 293 bond funds, 456 mixed funds, and 62 MMFs, holding EUR 118 billion, EUR 88 billion, and EUR 402 billion, respectively, totaling EUR 608 billion.[62] This compares with NAV of EUR 1070 billion held among the three fund types as at-September 2024. Sample coverage relative to the actual total

[61] The coverage of commercial data such as that used here could be subject to reporting bias (van Dijk, 2024). The study finds that omitting missing portfolios and non-reporting funds can lead to significantly different conclusions from those obtained when all data is considered.

[62] Fund classification was corrected based on supervisory data. Also only open-ended funds offering daily redemptions were selected, based on reporting to the AMF.

industry is the best for the MMFs at 91 percent, followed by the bond fund (37 percent) and mixed fund (29 percent). Lipper reports data on individual securities (ISIN-by-ISIN) held by each fund and this information is also extracted. The 293 bond funds held predominantly a fixed income portfolio, the mixed funds held a balanced mix of equities and bonds, with a large share in other investment funds (Figure 40). Three quarters of MMF assets were in debt securities (CP, CD, MTN, bonds with a short residual maturity), of which 40 percent in securities issued by French banks. The three fund types together held EUR 13.2 billion in French sovereign securities. This compares with total outstanding sovereign securities of EUR 2.8 trillion.

Figure 40. Securities Held by Bond, Mixed, and Money Market Funds in the Sample Funds
(In Billions of EUR)



Source: Lipper.

1/ Includes other financial institutions.

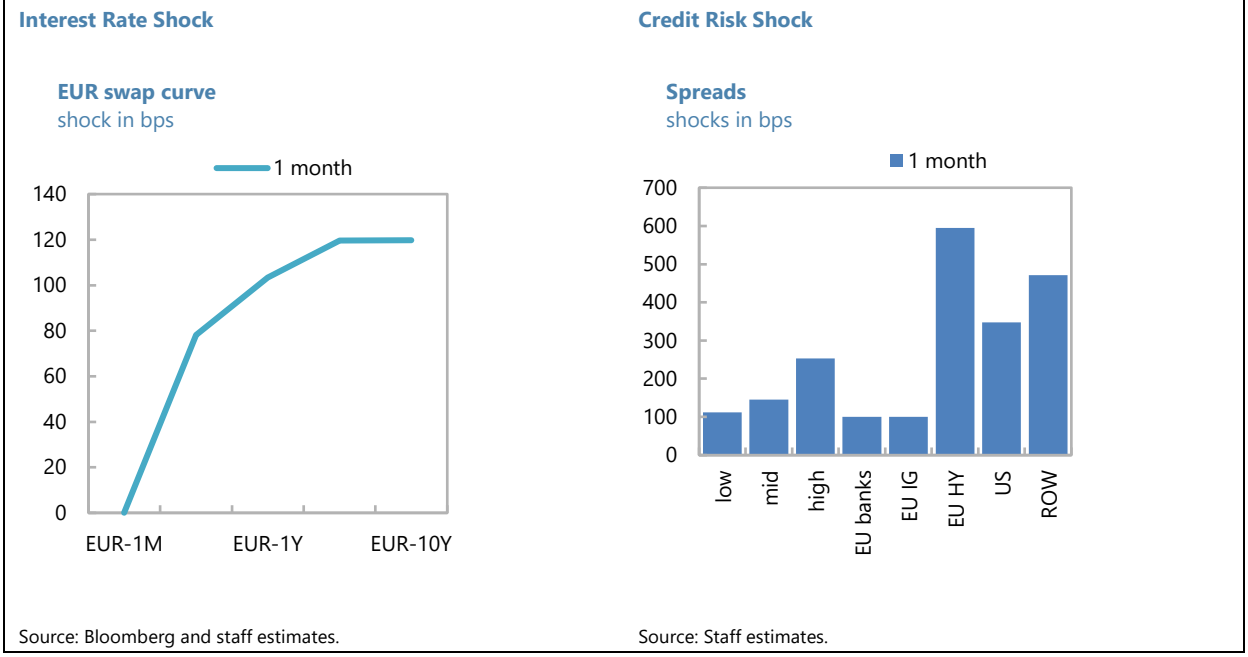
102. Information on the characteristics of the assets held by the IFs is extracted from Bloomberg. Based on the ISIN-by-ISIN information of securities, the following attributes were collected: asset class (bonds, equities, investment funds, securitized debt, cash, and derivatives); issuer type (bank, corporate, sovereign, multilateral institution, investment fund); credit rating; domicile region of the asset (France, Euro Area, other Advanced Economies, and EMDE); and for bond assets, detailed characteristics of the instruments (amount outstanding, coupon rate, maturity, fixed or variable rate, and if variable rate reference rate and spread). Price and yield of the assets are collected for end Q3-2024. Time series data for average daily trading volume and price volatility are also collected.

Scenarios and Assumptions

103. Initial market shock. The analysis draws from the Euro Area FSAP recession scenario where a "synchronized global slowdown amplified by sovereign debt distress in the Euro Area, the

widening of credit spreads, term premium decompression, and confidence losses softening aggregate demand" (Figure 41). This would encompass a scenario of a downgrade of the French sovereign with knock on effect on the banking and corporate sectors. These risks are consistent with the risks identified in the 2024 AMF Risk Outlook.[63]

Figure 41. Interest Rate and Credit Risk Shock Scenarios



Source: Bloomberg and staff estimates.

Source: Staff estimates.

104. Redemption shock. We first examine standardized uniform withdrawal assumptions of 2 percent and 5 percent of total NAV observed during the historical extreme events discussed above (Figure 38 and Table 9). For sensitivity analysis, we draw on the distribution of firms experiencing different levels of outflows as observed during the COVID-19 pandemic period (Table 10). The sensitivity analysis will be discussed further below.

[63] https://www.amf-france.org/sites/institutionnel/files/private/2024-07/2024-markets-and-risk-outlook.pdf

Table 10. France: Distribution of Redemption Flows During March 2020
(Number of Firms in the Sample and as Percent of end-February 2020 NAV)

	Number of funds in sample			Redemption flows over the month of March 2020 (as a % of end-Feb NAV)		
	Bond	Mix	MMF	Bond	Mix	MMF
1%	3	4	1	-48.909	-32.336	-42.146
5%	15	21	3	-14.979	-10.068	-29.269
10%	29	41	6	-9.525	-4.845	-19.372
25%	73	103	16	-3.415	-1.924	-7.682
50%	147	206	31	-0.547	-0.251	0.171
75%	220	308	47	0	0	4.117
90%	264	370	56	2.618	1.366	10.732
95%	278	390	59	6.541	4.618	24.630
99%	290	407	61	55.379	27.330	57.120
Sample	293	411	62			
2020	883	2,024	174			
2024	1503	4305	120			

Source: AMF, Lipper, and Staff calculations.

105. Classification of liquid assets. The adequacy of liquidity coverage is measured by the liquidity coverage ratio. The outcome depends crucially on assumptions made on what constitutes a liquid asset. Liquidity is characterized by the immediacy of trade, the depth of the market, transaction cost, etc. We apply the banking sector definition of HQLA (Bouveret, 2017). The approach is useful to relate to the standard liquidity stress testing for banks. However, we make some modifications at the margin to account for illiquid assets such as securities issued by EMDE governments (Table 11).

Table 11. France: Asset Classified as Liquid
(In Billions of EUR)

		French assets			Other AE assets						
	Cash	BANK	CORP	GOVT	BANK	CORP	GOVT	Equity	IF&MMF	OTHER	DERIV
AAA to AA	40.1	0.2	0.3	10.9	1.7	0.4	8.4	22.5	77.7	9.6	30.2
A	-	11.6	6.2	-	30.3	17.3	12.8	-	-	-	-
BBB to BB	-	0.1	2.8	-	2.0	6.2	-	-	-	-	-
B and below 1/	-	119.1	56.9	-	103.0	34.7	1.1	-	-	-	-
Total	40.1	131.1	66.1	10.9	137.0	58.7	22.2	22.5	77.7	9.6	30.2

1/ Including non-rated securities and securities for which rating information was not available.

Source: Lipper and staff calculations.

106. Market impact. Redemptions of investment fund shares can cause investment funds to liquidate assets. When a fund sector sells common assets simultaneously, it could have material impact on prices. The magnitude of the price impact of asset sales in our analysis is modeled as a function of the average daily volume (the higher the average daily volume, the lower the negative price impact), the amount of assets being sold (the higher the amount being sold, the greater the negative price impact) and volatility of prices (the higher the volatility, the greater the negative price impact).[64]

$$\Phi(q) = c \cdot \sigma \sqrt{\frac{q}{ADV}}$$

107. Liquidation strategy. IFs have investment mandates and fiduciary duty to all investors. They thus seek to avoid the remaining holdings to be too distorted by the sales of assets away from the benchmark portfolio. This implies the vertical slicing of all assets and selling them in proportion (pro-rata). In our analysis, we liquidate only the liquid assets as defined above with the objective of assessing the point at which more illiquid assets will have to be sold with greater price impact and possibly as distress sales. We examine the impact of pro-rata sale of these highly liquid assets, as well as a waterfall sale, where assets are sold according to a pre-determined ranking of liquid assets, with cash followed by MMF shares/units as the most liquid asset. For sensitivity analysis, we also assess the impact of cash hoarding behavior, as seen during the COVID-19 pandemic (but not during GFC or the European debt crisis).

Output of the Analysis

a) Assessing adequacy of liquidity of individual IFs and quantifying possible liquidity shortfalls

108. The investment funds in the sample have sufficient liquidity under the uniform redemption shocks similar to levels observed during the GFC, the European debt crisis, and COVID-19 pandemic. Of the 811 funds in the sample, 19 bond funds and 1 mixed fund (2.5 percent of total number of funds) will face liquidity shortfalls, but with a very small aggregate shortfall of EUR 88 million (0.01 percent of total NAV). At a uniform 5 percent redemption shock, 31 bond funds and 1 mixed fund (3.9 percent of total number of funds) will face a liquidity shortfall of EUR 421 million (0.07 percent of total NAV). Proportionately scaling the sample results to the actual total number of funds and NAV as at end-2024, the equivalent at 2 percent redemption shock is EUR 240 million and EUR 1.1 billion at 5 percent redemption shock.

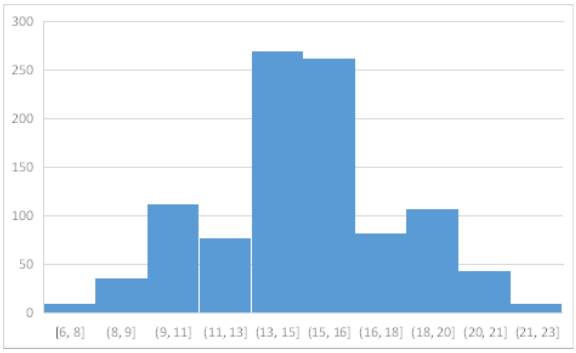
109. Sensitivity analysis was conducted using the experience during the COVID-19 where the worst outflows have been experienced in recent years. Using the distribution from the experience (Table 10), a Montecarlo simulation was applied where 1000 random draws assuming that 1, 5, 10, 25, and 50 percent of the funds would face levels of outflows experienced during the COVID-19 pandemic (i.e., matching the actual distribution). For example, in the case where a random

[64] See Bouchaud, 2010.

5 percent of the bond funds were to experience a redemption shock similar to that faced during the COVID-19 pandemic (-14.979 percent of NAV), a third of the draws point to an aggregate liquidity shortfall between 8 and 12 percent of NAV (Figure 42). For MMFs, 90 percent of the funds would imply small aggregate liquidity shortfalls of about 3 percent of NAV. However, there is a tail risk should the largest funds be hit by a 29 percent redemption shock (corresponding to the redemption shock experienced by 5 percent of the funds in March 2020): the aggregate liquidity shortfall could in this case reach 33 percent of NAV. Note that the results are based on the liquid asset definition in Table 11, where single A-rated banks are not treated as liquid assets. Data issues, including the non-availability of ratings of specific securities may also bias towards conservative results.

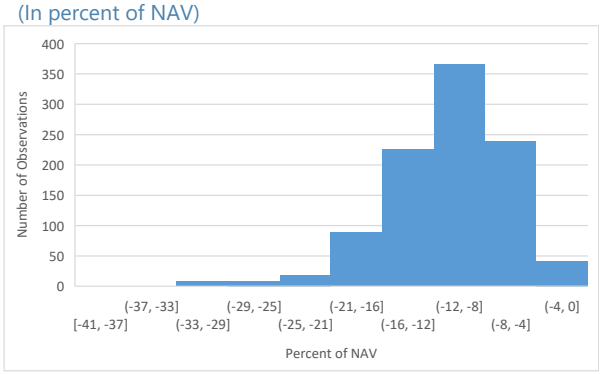
Figure 42. Distribution of Fund Liquidity Shortfalls under Scenario where 5 percent of the Funds Face Redemptions Shocks Similar to Levels Experienced during March 2020

Bond Fund, Distribution of Funds with Shortfalls
(Number of funds with shortfalls)



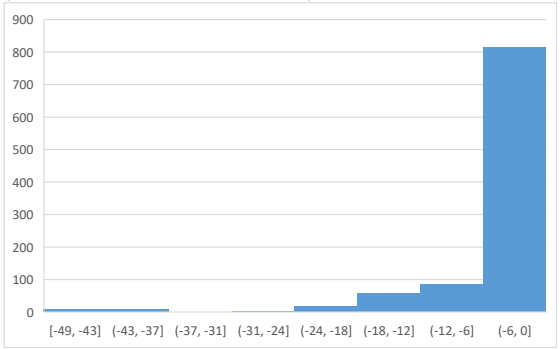
Source: AMF, Lipper, and staff estimates.

Bond Fund, Distribution of Shortfall
(In percent of NAV)

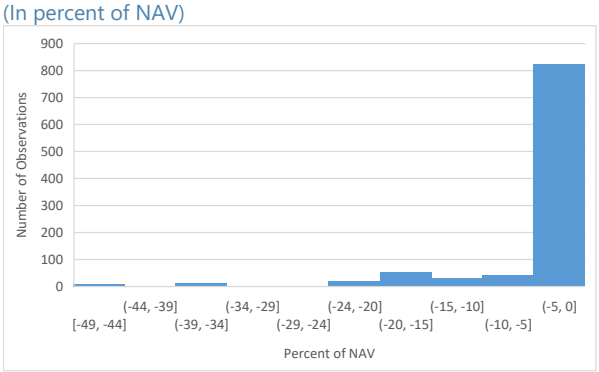


Source: AMF, Lipper, and staff estimates.

Mixed Fund, Distribution of Funds with Shortfalls
(Number of funds with shortfalls)



Mixed Fund, Distribution of Shortfalls
(In percent of NAV)

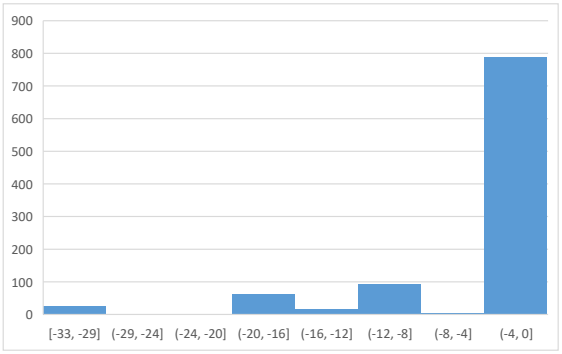


Source: AMF, Lipper, and staff estimates.

Source: AMF, Lipper, and staff estimates.

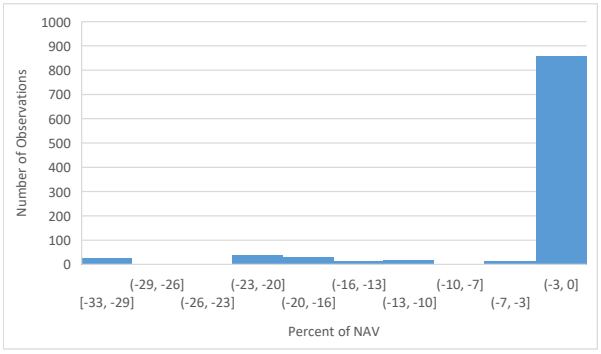
Figure 42. Distribution of Fund Liquidity Shortfalls under Scenario where 5 percent of the Funds Face Redemptions Shocks Similar to Levels Experienced during March 2020 (concluded)

Money Market Fund, Distribution of Shortfalls
(Number of observations)



Source: AMF, Lipper, and staff estimates.

Money Market Fund, Distribution of Shortfalls
(In percent of NAV)



Source: AMF, Lipper, and staff estimates.

b) Assessing the valuation impact

110. The valuation impact can be decomposed into two parts: The combined impact of (1) the initial asset price drop arising from interest rate and credit shocks; (2) the asset price decline from disposal of assets resulting from redemptions, will result in the total change in NAV from the previous period.

$$\Delta \text{Valuation}_t^i = \Delta \text{due to initial impact}_t^i + \Delta \text{due to market impact}_t^i$$

111. Initial market price impact: The initial price impact is a function of modified duration. It will depend on the cash flow weights, where the larger the cash flow in outer periods, the higher the price sensitivity to changes in interest rates. Because bond funds hold longer maturity fixed income securities compared to MMFs or mixed funds, they will have the portfolios with the highest price impact. This initial price impact does not make any assumption on the liquidity of the securities. Based on the securities holdings of the sample funds, bond funds will face a decline in asset prices of about 2.5 percent under the interest rate shock, and 3.2 percent under the credit shock. Asset prices of mixed funds will decline by 0.8 -1 percent under the two shock scenarios, and MMFs will face 0.2-0.3 percent in price declines.

112. Price impact from asset sales: As discussed, the price impact from asset sales is set to be a function of quantity of asset sold, the average daily traded volume and volatility. However, for short-maturity securities, this assumption is suppressed because these instruments are not traded, but by virtue of their short maturities, they are "liquid". Figure 38 above and Table 12 also shows empirically that even during extreme stress episodes, valuation effects for MMFs (who hold predominantly

short-maturity securities) have been minimal. For the rest of the securities, in practice, market liquidity may deteriorate rapidly, volume may either disappear or increase significantly and volatility increase during crisis periods. The market impact derived from our analysis likely underestimates the potential price impact during stress.

Table 12. France: Historical Extreme Events: Monthly Changes in NAV and its Components (Changes in Flows, Valuation, and Quantity) in Bond Fund, Mixed Fund, Investment Fund and MMF, 2007-2024 (In Billions of EUR)

Bond Fund		In Historical Value					Rescaled to end-2024 NAV			
		NAV	NAV change	Flow	Valuation change	Quantity change	NAV change	Flow	Valuation change	Quantity change
1	2012-06	200.3	-10.1	-9.3	-0.8	0.0	-17.4	-15.2	-1.4	0.0
2	2007-12	175.8	-3.4	-6.4	-0.7	3.7	-6.7	-12.3	-1.4	7.1
3	2007-09	186.0	-4.9	-6.7	-0.2	2.0	-9.1	-12.1	-0.4	3.6
4	2007-08	190.9	-4.9	-6.8	0.4	1.5	-8.8	-11.9	0.6	2.6
5	2020-03	273.6	-25.1	-10.3	-14.8	-0.0	-31.5	-11.8	-17.0	0.0

Mixed Fund		In Historical Value					Rescaled to end-2024 NAV			
		NAV	NAV change	Flow	Valuation change	Quantity change	NAV change	Flow	Valuation change	Quantity change
1	2010-03	277.3	-4.1	-11.6	7.5	-0.0	-4.5	-12.6	8.2	0.0
2	2008-10	264.6	-10.6	-9.4	-13.1	11.9	-12.3	-10.4	-14.6	13.2
3	2007-08	353.9	-5.5	-7.9	-2.7	5.1	-4.7	-6.7	-2.3	4.3
4	2020-01	349.1	-6.3	-7.0	0.8	-0.0	-5.5	-6.1	0.7	0.0
5	2007-09	348.5	-5.5	-6.8	2.3	-1.1	-4.8	-5.9	2.0	-0.9
11	2020-03	308.8	-31.4	-3.9	-27.8	0.2	-31.2	-3.5	-25.0	0.2

Investment Fund		In Historical Value					Rescaled to end-2024 NAV			
		NAV	NAV change	Flow	Valuation change	Quantity change	NAV change	Flow	Valuation change	Quantity Change
1	2012-06	843.6	-4.1	-12.1	8.0	-0.0	-8.1	-24.0	15.9	0.0
2	2008-10	808.8	-29.7	-11.9	-50.4	32.6	-61.7	-23.9	-101.0	65.4
3	2007-09	1,068.0	-16.6	-14.4	7.1	-9.3	-26.1	-22.3	10.9	-14.3
4	2007-12	1,029.9	-12.7	-12.1	-3.9	3.3	-20.7	-19.4	-6.3	5.3
5	2008-06	884.4	-13.9	-10.3	-46.1	42.5	-26.4	-19.3	-86.2	79.4
11	2020-03	1,166.9	-113.1	-10.3	-102.8	-	-162.8	-13.5	-134.9	0.0

Money Market Fund		In Historical Value					Rescaled to end-2024 NAV			
		NAV	NAV change	Flow	Valuation change	Quantity change	NAV change	Flow	Valuation change	Quantity Change
1	2020-03	301.8	-52.7	-52.4	-0.3	-	-75.8	-64.1	-0.4	0.0
2	2014-12	288.9	-32.9	-33.0	0.1	0.0	-49.4	-44.5	0.1	0.1

Table 12. France: Historical Extreme Events: Monthly Changes in NAV and its Components (Changes in Flows, Valuation, and Quantity) in Bond Fund, Mixed Fund, Investment Fund and MMF, 2007-2024 (In Billions of EUR) **(concluded)**

Money Market Fund		In Historical Value					Rescaled to end-2024 NAV			
		NAV	NAV change	Flow	Valuation change	Quantity change	NAV change	Flow	Valuation change	Quantity Change
3	2015-12	311.7	-32.7	-32.6	-0.0	0.0	-45.4	-41.1	0.0	0.0
4	2022-02	338.0	-33.8	-33.1	-0.2	-0.5	-43.4	-38.6	-0.3	-0.6
5	2019-12	314.7	-30.3	-30.2	-0.1	-0.0	-41.8	-37.9	-0.2	0.0
6	2013-06	335.8	-28.7	-28.8	0.0	0.0	-37.1	-34.2	0.0	0.0
11	2007-12	428.5	-32.2	-30.4	1.3	-3.1	-32.6	-28.6	1.3	-3.0

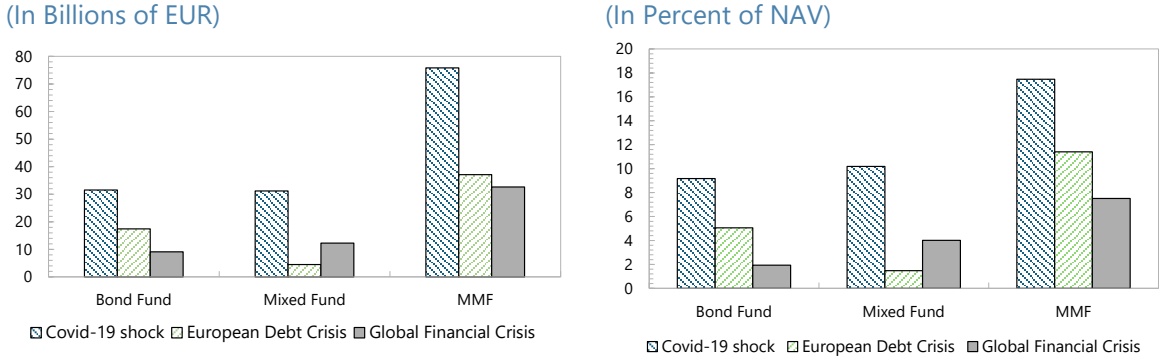
Source: BdF and IMF staff estimates.

113. The change in NAV can be summarized as the sum of valuation changes and net redemption flows.

$$\Delta \text{NAV}_t^i = \Delta \text{due to valuation}_t^i + \Delta \text{due to liquidation (net redemption flows)}_t^i$$

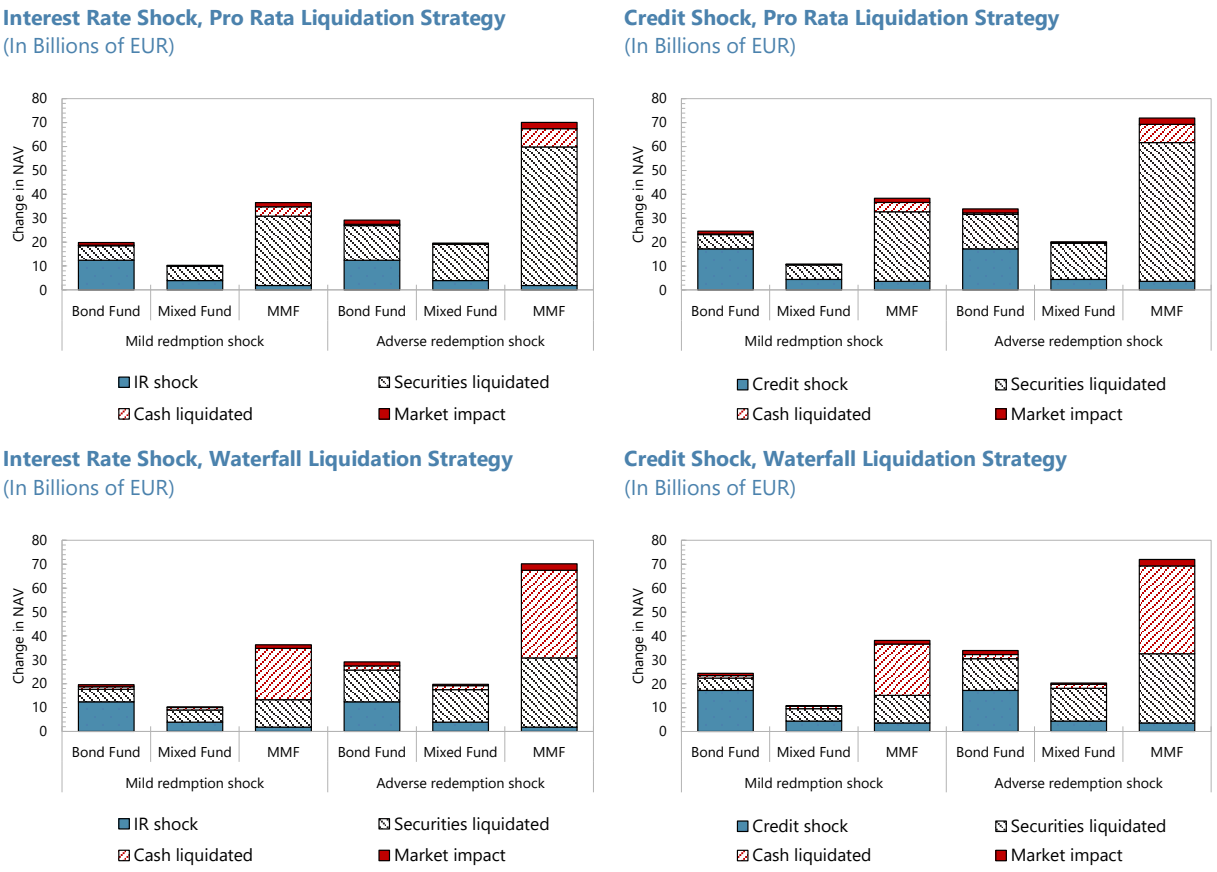
114. The adverse stress test closely resembles the change in NAV observed during March 2020 COVID-19 pandemic (Figure 43). Under the pro-rata liquidation strategy, the change in NAV under the adverse redemption scenario is explained approximately equally by valuation change from interest rate or credit shock, and flows (liquidation) while market impact accounted for a smaller portion. For MMFs, the valuation impact is minimal, while most of the change is explained by asset liquidation and some cash liquidation. Under the waterfall liquidation strategy MMFs use greater amount of cash to meet redemptions (Figure 44).

Figure 43. Change in Net Asset Value Under Historical Shock Events



Note: Change in NAV from previous month during the respective shock event, rescaled to NAV in respective fund sector at end 2024.
Source: BdF and staff calculations.

Figure 44. Decomposition of the Change in Net Asset Value, by Interest Rate Shock, Credit Shock, Redemption Shock, and Market Impact, by Liquidation Strategy



Note: Mild redemption shock: standardized redemption of 2 percent of NAV for bond and mixed funds, and 7.5 percent of NAV for MMFs. Adverse redemption shock: standardized redemption of 5 percent of NAV for bond and mixed funds, and 15 percent of NAV for MMFs.
Source: Lipper and Staff Calculations.

c) Assessing the securities liquidated and possible spillovers

115. We examine implications of alternative liquidation strategy for the types and quantity of liquid securities being sold into the market (Figure 45).

- Under the pro-rata strategy where the liquid assets are sold in proportion of NAV for each fund, EUR 61 billion in liquid assets and EUR 8 billion in cash under the adverse redemption shock (where 5% of assets are sold) are disposed to pay the investors. Under the pro-rata strategy, the stress test suggests that MMFs could sell French bank and corporate debt securities as well as non-French debt securities, while bond funds would mainly liquidate non-French debt securities. Mixed funds could sell French IF and MMF shares/units, ETF and equities, as well as non-French securities.

- Under the waterfall strategy under the adverse scenario, bond funds, mixed funds, and MMFs would use EUR 40 billion in cash to pay off the investors, and sell EUR 29 billion in liquid securities, with French and non-French government securities being liquidated after cash.

- Since recent events highlighted the dash-for-cash behavior whereby IFs and MMFs sold assets in order to hold a cash cushion, we examine a strategy in which the waterfall strategy does not utilize cash, but only sells securities to meet the redemptions. Under this strategy, all funds would sell French government securities more aggressively, in complement the MMFs would also sell more French bank, and additionally corporate debt securities and non-French debt securities, while bond funds will sell predominantly non-French securities and mixed funds will additionally liquidate MMF and IF shares/units and equity. While this waterfall strategy is an extreme form of cash hoarding, it usefully demonstrates the liquidity cushion that funds have as next-in-line in case cash is not deployed, in the form of government securities and other securities.

116. The small market impact may be explained by the type of securities and amounts being sold into the market. With the French government securities average daily trading volume being EUR 15 billion, the market impact of the sale of EUR 1-5 billion due to redemption shocks of 2-5 percent for bond and mixed funds, and 15 percent of MMF will be unlikely to dislocate markets. However, the sale of EUR 11-23 billion in French bank securities can put significant price pressure and impact the banks' funding market. Should IFs and MMFs hoard cash by selling assets and not using their cash holdings to meet redemptions, the French government securities market will still be able to absorb them albeit with greater price impact, but banking sector securities is further vulnerable to the risk of market dislocation.

C. Conclusions and Recommendations

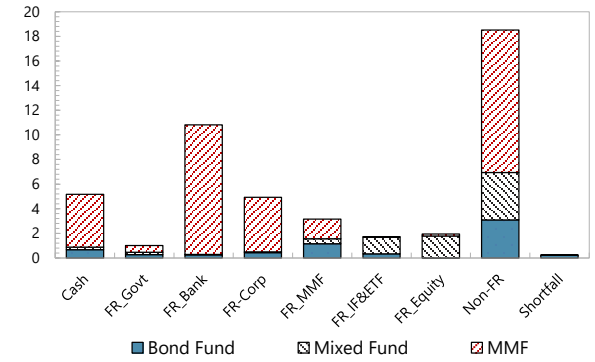
117. The French IFs and MMFs have important liquidity buffers to weather plausible redemptions shocks. The study covered open-ended bond funds, mixed funds, and money market funds offering daily redemptions. Based on the sample studied, IFs have sufficient liquidity to meet plausible redemption shocks. They are supported by a regulatory framework that minimizes risks, and by the operating environment of a deep and liquid securities market which reduces market impact. Tail risk could be large should a large fund face large redemptions. A majority of investment funds has liquidity management tools (LMT) incorporated in their prospectus and is able to operationalize them either (i) to ensure fair treatment between investors that generate cost of liquidity as they redeem (or subscribe) in the fund and investors that remain passively invested in the fund or (ii) to prevent the risk of disorderly redemptions that could affect their investors' best interests.[65] To better understand the risks of redemptions and to monitor closely movements in redemptions, a more regular and periodic data sharing arrangement on funds' liabilities should be

[65] The operationalization is evidenced by the activation of liquidity management tools by the funds in 2022 which helped to mitigate some of the redemptions (AMF Annual Report, 2024).

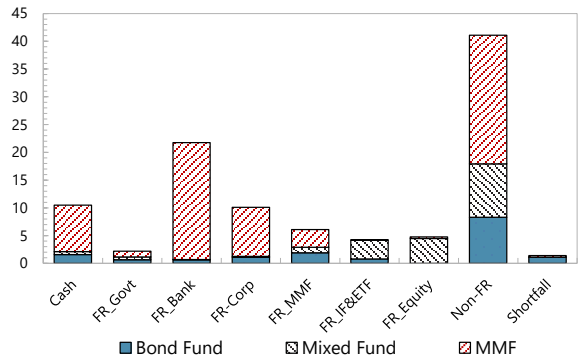
established between AMF and other relevant regulators.[66] A study on the behavior of IFs investing in other IF shares/units and whether redemptions of such shares/units have amplification effects is recommended. Empirical analysis of past stress episodes examining whether in the presence of dash-for-cash, market impact is greater than episodes where dash-for-cash has been absent can help explain the divergent flow-performance relationships in crisis episodes.

Figure 45. Cash and Securities Liquidated Under Alternative Liquidation Strategies

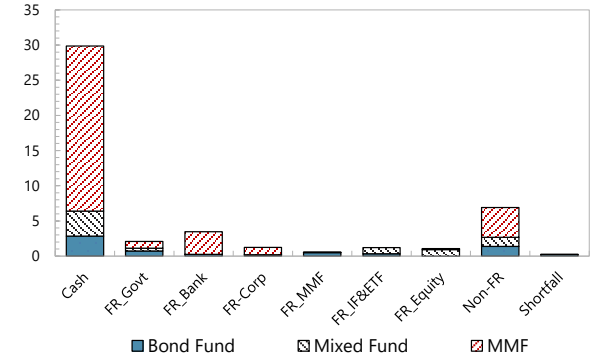
Asset Sales under Mild Redemption Shock, Pro-Rata Liquidation Strategy
(In billions of EUR)



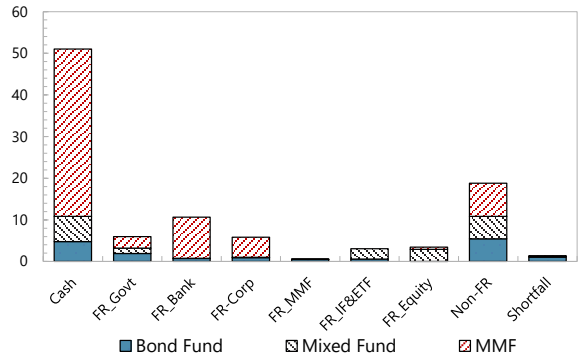
Asset Sales under Severe Redemption Shock, Pro-Rata Liquidation Strategy
(In billions of EUR)



Asset Sales under Mild Redemption Shock, Waterfall Liquidation Strategy
(In billions of EUR)



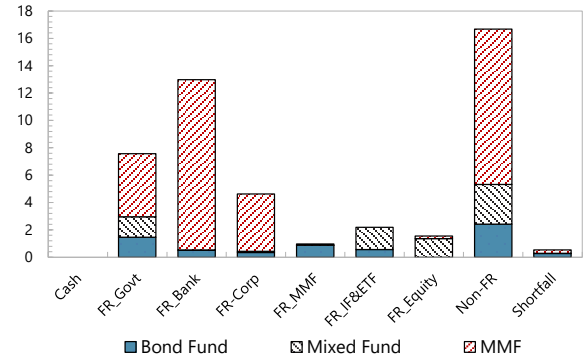
Asset Sales under Severe Redemption Shock, Waterfall Liquidation Strategy
(In billions of EUR)



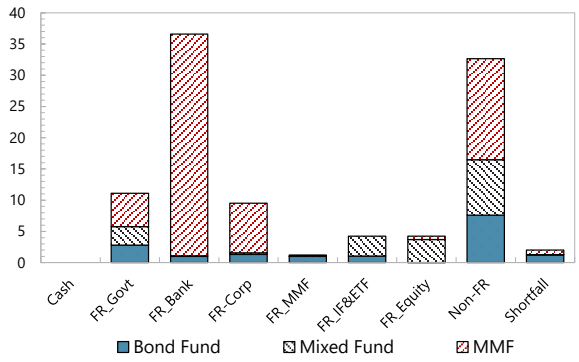
[66] The ongoing system-wide stress test exercise covers this risk.

Figure 45. Cash and Securities Liquidated Under Alternative Liquidation Strategies (concluded)

Asset Sales under Mild Redemption Shock, Waterfall Liquidation Strategy with Cash Hoarding
(In billions of EUR)



Asset Sales under Mild Redemption Shock, Waterfall Liquidation Strategy with Cash Hoarding
(In billions of EUR)



Note: Mild redemption shock: standardized redemption of 2 percent of NAV for bond and mixed funds, and 7.5 percent of NAV for MMFs. Adverse redemption shock: standardized redemption of 5 percent of NAV for bond and mixed funds, and 15 percent of NAV for MMFs.

Source: Lipper and Staff Calculations.

SPECIAL TOPIC: FINANCIAL STABILITY AND THE FRENCH SOVEREIGN DEBT SECURITIES MARKET

A. Introduction

118. The French sovereign debt securities market forms the bedrock for financial market stability.[67] Sovereign debt securities serve as a benchmark for pricing financial assets, are eligible as collateral for borrowing and lending activities, and act as safe-haven assets in times of crisis. These features underpin their zero risk weighting in capital adequacy calculations and their classification as high-quality liquid assets (HQLA) for liquidity coverage ratios in the banking sector. The functions played by the sovereign securities market ultimately help to maintain financial stability as they facilitate price discovery and the repricing of risk for all financial assets—both domestically and cross-border. Indeed, French securities perform a safe-haven asset role for not only for French institutions but also for those in the Euro area as a whole and provides support to broader Euro Area financial stability. For sovereign securities to serve these functions, the market has to be liquid and well-functioning. Rising sovereign debt vulnerabilities in France, the domestic political discourse, and global geopolitical fragmentation have raised concerns of possible financial stability risks arising from the sovereign securities market.

[67] In this section, securities refer to sovereign debt securities, and sovereign securities market is used interchangeably with sovereign debt market. The sovereign refers to central government.

119. Dysfunction and stress in the sovereign debt market manifest themselves when bond market liquidity deteriorates significantly and the market fails to adequately price risks. Market stress and dysfunction are influenced by various factors, including supply-demand imbalances, shifts in investor sentiment, deleveraging, reduced intermediary balance sheet capacity, and funding market stress. These dynamics arise from the interactions among key market participants: the government (through the French debt management office, AFT, as issuer), investors (as buyers), and intermediaries, each driven by distinct objectives, incentives, and constraints. The AFT plays a central role in preserving market functioning and preventing dislocation to safeguard financial stability, while navigating the risk that the sovereign itself may become the source of instability at a time of rising sovereign debt and global uncertainty. The central bank (BdF) and the Eurosystem also contribute to maintaining market functioning and safeguarding financial stability. Beyond the cash market, derivatives and repo markets support the funding market and position-taking, enabling dealers to provide liquidity. These markets, along with market infrastructure and regulation, facilitate risk mitigation and arbitrage and ensures the efficient allocation of resources.

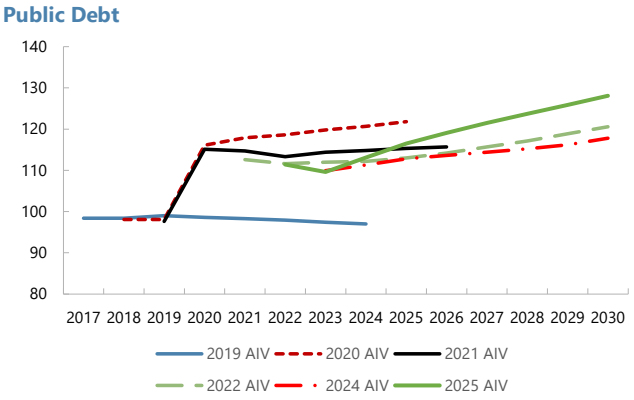
120. This section discusses the French sovereign debt securities market, the possible channels in which financial stability risk could be transmitted, and how they are mitigated. It presents recent developments, the structure of the French sovereign securities market focusing on the supply, the demand, the distribution mechanism, and the intermediaries. It then discusses their interaction through the lens of secondary market liquidity, where vulnerabilities could emerge, and the mitigating factors that help to contain these risks, including sovereign risk management. Finally, it concludes. The section does not discuss issues surrounding regulatory, market infrastructure, or derivatives market, which highly are relevant to the discussion of financial stability.

B. Recent Developments

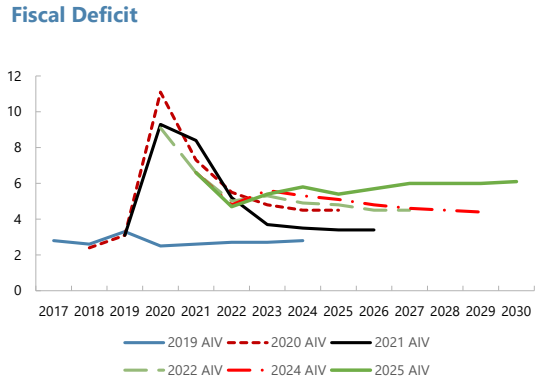
121. The significant increase in sovereign debt and its upward trajectory marks a significant change in the sovereign debt landscape since the last FSAP. The increase in primary deficit during the COVID-19 pandemic contributed to the initial sharp increase in general government debt, from 97.6 percent of GDP in 2019 to 114.6 percent of GDP in 2020. While the level has since declined, debt is projected to continue rising to a high of 128 percent of GDP in 2030 (IMF 2025 Article IV). This compares with a gently downward sloping trajectory at the time of the last FSAP (Figure 46).

122. The rising deficit is placing a significant burden on public finances (Figure 46). France has not run a primary surplus since 2007. In the aftermath of the European debt crisis, unconventional monetary policy helped to keep interest costs low, thereby preventing debt dynamics from deteriorating sharply despite the primary deficits. However, the supportive monetary policy environment has reversed, contributing to rising interest cost, while growth remains subdued. This has turned the "r-g" dynamics, driving faster debt accumulation and a rising debt trajectory.

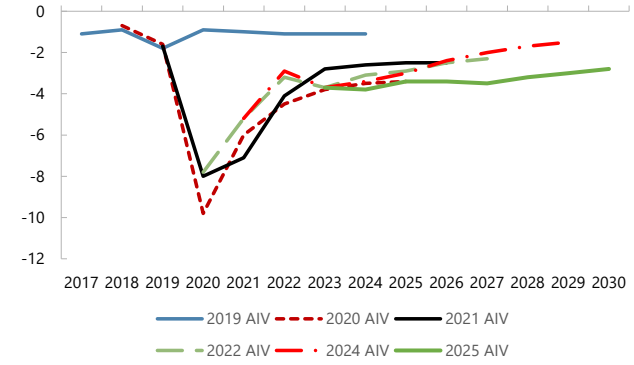
Figure 46. Public Debt, Fiscal Deficit, Primary Balance and Interest Payment
(In percent of GDP)

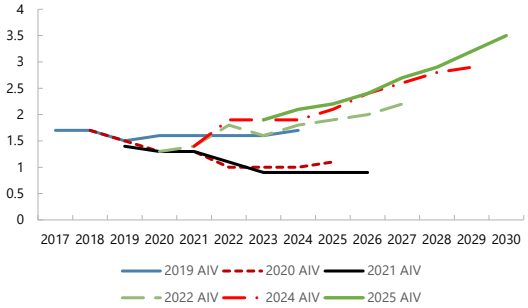


Source: IMF Article IV Reports.



Source: IMF Article IV Reports.





Source: IMF Article IV Reports.

Source: IMF Article IV Reports.

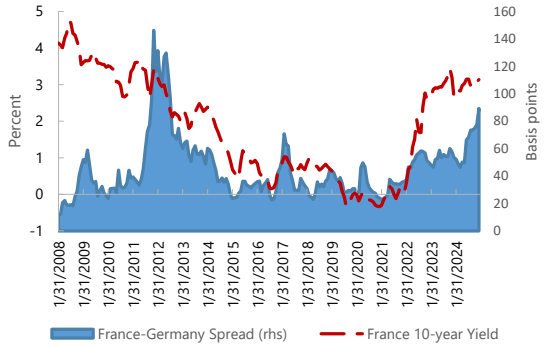
123. Notwithstanding monetary easing in the Euro Area in 2024, yields on the French medium- to long-term government securities (OATs) remained high and rising. As a result, the yield curve steepened and maturity premia increased. This contrasts with the yields on German Bunds which began declining in 2024. The spread between the 10-year OAT and Bund widened to historic highs, reaching 85 basis points by early January 2025. In turn, OAT spread vis-à-vis the periphery European sovereigns tightened, resulting in single-A rated Spain's yield briefly falling slightly below that of AA-rated France, with Greece following closely behind Spain. While the spread against the Bund subsequently tightened (and spread against Spain and Greece widened), rising yields in Germany, Japan, U.K., and the U.S. suggest a broad-based increase in global interest rates (Figure 47).

124. From a long-term perspective, yields remain close to historical averages, particularly in real terms. Current French real yields (around 2 percent) remain below levels observed during the GFC, when they reached 4.5 percent (including in Germany). The term premia, while rising, is also

still far below levels seen during the European debt crisis. However, given challenging debt dynamics, France faces heighten sensitivity to potential spillovers.

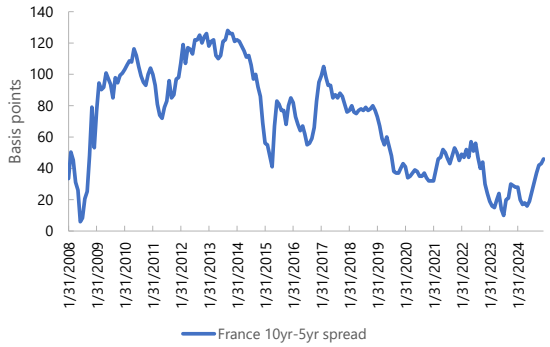
Figure 47. Yield and Spread of French Sovereign Securities

10-Year Bond Yield and Spread against German 10-Year Bond



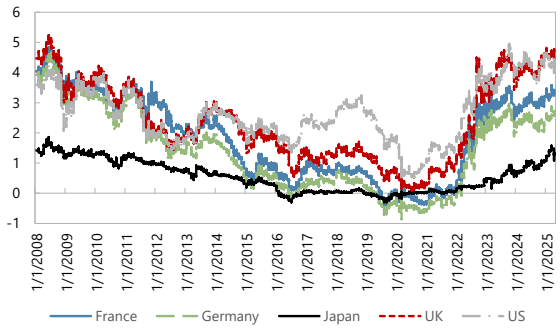
Source: BdF.

10-year – 5-year Spread
(In Basis Points)



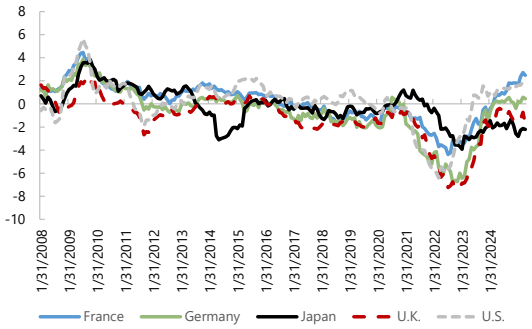
Source: BdF.

10-Year Sovereign Bond Yields in Core Markets
(In Percent)



Source: Bloomberg.

Ex-Post Real Interest Rate of 10-Year Sovereign Bonds in Core Markets (In Percent)



Source: BdF and IMF.

125. Since the last FSAP, France's sovereign credit rating was downgraded to AA-/Aa3. France's rating was first downgraded from AAA to AA+ in 2012-13, and to AA in 2013-15 following the European debt crisis. In April 2023, Fitch downgraded France to AA-, followed by S&P in May 2024, and Moody's in December 2024, on concerns over the political discourse and the resultant slow pace of fiscal adjustment, and rising vulnerabilities in the sovereign debt metrics. According to Fitch, France's debt to GDP ratio stands more than twice the AA median of 50.1 percent at end-2023, second only to the U.S. Despite the sovereign downgrade, banks were not downgraded by Fitch in April 2023 and by S&P in June 2024, but they were downgraded by Moody's in December 2024.

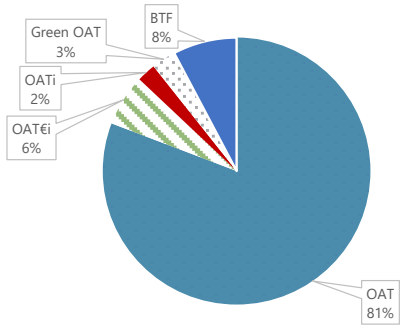
126. Despite the weakening financial position of the sovereign, the OAT market remains resilient and continues to maintain its safe-haven status. Among the factors that enables the market to function well and maintain its safe-haven status include the diversified investor base, stable and predictable primary issuance practices supported by the primary dealers' (PDs) system, a liquid money market and secondary market, secure infrastructure, with AFT policies to ensure the smooth functioning of the market while balancing costs and risks of the sovereign debt portfolio are key to this success.

C. Structure of the French Government Securities Market

Supply

127. Total general government debt outstanding at end-2024 stood at EUR 3.3 trillion. Of this, EUR 2.6 trillion was central government marketable debt securities, and the rest comprised debt of entities such as CADES, an autonomous central government entity that assumed the social security debt (Figure 48). Sovereign debt securities comprise of fixed rate medium- to long-term securities (OAT), inflation linked securities (OATi and OAT€i), green bonds (part of OAT and OAT€i), and short-term securities (BTF).

Figure 48. French Government Debt Securities Outstanding at end-2024, by Instrument
(In percent, total outstanding EUR 2.6 trillion)



Source: AFT

128. With rising fiscal deficit, net issuances have been increasing. Fiscal deficit increased from EUR 58 billion (2.4 percent of GDP) in 2019 to EUR 207 billion (8.9 percent of GDP) in 2020; in 2024, fiscal deficit remained well above pre-pandemic levels, at EUR 173 billion (5.9 percent of GDP). As a result, cumulative net debt issuance totaled EUR 825 billion over the 5 years between 2020-24. Cumulative net debt issuance over the next 5 years between 2025-29 is projected at EUR 938 billion (source: 2024 Article IV).

129. Compounding the increase in net supply, the rolling-off of the Eurosystem holdings of French government securities will add to government financing pressures over the medium-term. As at December 2024, the cumulative net purchases of French public sector debt securities under the Public Sector Purchase Program by the Eurosystem stood at EUR 458 billion and under the Pandemic Emergency Purchase Program (PEPP) at EUR 292 billion. Together they amount to

about 30 percent of French medium- to long-term government securities outstanding.[68] With the weighted average maturity of the Eurosystem holdings at 6.3 years, a simplifying assumption suggests about EUR 60 billion in securities could be rolled off annually over the next 12 years. This represents 20 percent of the 2025 government gross financing needs totaling EUR 300 billion, which the private sector has to absorb (or non-Eurosystem central banks/public sector). In 2020, the Eurosystem's net purchase of French securities amounted to 64 percent of gross securities issuances (Table 13). Since 2023, the Eurosystem's net purchase has turned negative, and starting in August 2024, have entered fully into a phase of passive redemptions. In 2023 and 2024, the Eurosystem redemption of French government securities accounted for 19 percent and 31 percent of total redemptions, respectively, that were absorbed by the private sector or foreign official sector.

Table 13. France: Gross Issuance and Redemption of OATs and Net Purchases of OATs by the Eurosystem, 2015-24

Year	Gross OAT issuance 1/	OAT Redemption	Net purchase under PSPP	Net purchase under PEPP	Net purchase as share of:	
					Gross issuance	Redemption
	In EUR millions				In percent	
2015	176,345	125,812	91,767	-	52.0	
2016	214,279	152,645	149,100	-	69.6	
2017	213,141	141,200	134,836	-	63.3	
2018	225,384	141,207	44,554	-	19.8	
2019	245,616	149,773	4,904	-	2.0	
2020	289,509	171,578	63,375	122,840	64.3	
2021	285,063	155,388	27,496	158,313	65.2	
2022	286,230	166,176	17,942	19,423	13.1	
2023	303,094	165,599	(29,797)	(1,436)	-10.3	18.9

[68] This amount overstates the true amount as part of the PSPP and PEPP portfolios include French agencies.

Table 13. France: Gross Issuance and Redemption of OATs and Net Purchases of OATs by the Eurosystem, 2015-24 (concluded)

Year	Gross OAT issuance 1/	OAT Redemption	Net purchase under PSPP	Net purchase under PEPP	Net purchase as share of: Gross issuance
	In EUR millions			In percent	
2024	339,804	168,612	(46,225)	(6,971)	-15.7	31.5

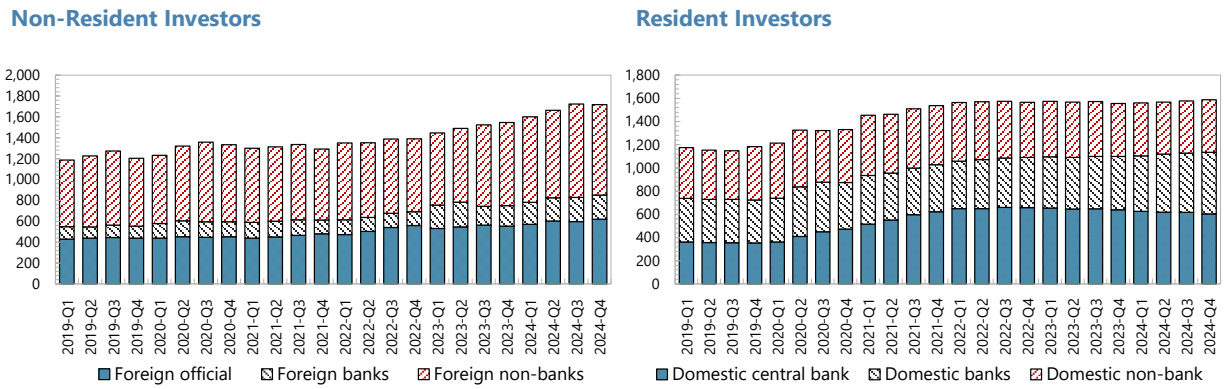
1/ Including issuance to buy back securities.

Source: AFT and ECB.

D. Demand

130. The investor base is evolving. Since the last FSAP, the split between the holdings of general government debt between non-residents and residents remains approximately evenly divided. The change in investor landscape during the period was dominated by the purchases by the Eurosystem, while resident private investors remained relatively stable. Meanwhile, non-resident official, banks, and non-bank investors have all increased their holdings of French government debt (Figure 49). As the Eurosystem unwinds the asset purchases program, alternative investors will have to step in. The existence of a diverse investor base with different time preference and price elasticity of demand ensures that there is demand for government securities at different maturities and price points, ensuring increased issuance will be absorbed with the repricing of risks and thereby safeguard financial stability.

Figure 49. Holders of General Government Debt



Source: Arslanalp and Tsuda

Source: Arslanalp and Tsuda

131. Focusing on the holdings of central government securities, the proportion of resident and non-resident investors appears to have ebbed and flowed since the last FSAP.[69] The non-resident investor share declined following the COVID-19 pandemic, but is now back around the same level as in 2019 (Figure 49). However, this change has been driven mainly by the large Eurosystem purchases, and on net, non-residents have continued to increase their holdings of French government securities. Non-residents hold about 52 percent of OATs (EUR 1,122 billion), 32 percent of Euro inflation-linked OATs (EUR 54 billion), 17 percent of French inflation-linked OATs (EUR 10 billion), and 87 percent of BTFs (EUR 174 billion) (Source: Banque de France). Historically, non-resident share has reached as high as 60 percent, in the aftermath of the European debt crisis.

132. Non-resident official and private sector have different objectives and behaviors. The Banque de France data does not distinguish between non-resident official and private sector holders of French sovereign securities. The Arslanalp and Tsuda database suggests official sector investors including foreign central banks and sovereign wealth funds accounted for 37 of non-resident holdings. While their primary motivation for holding French securities is likely to be for liquidity, they are likely to be a more stable investor base compared to the non-resident private sector investors. The non-resident private sector investors are the most price sensitive of all investor classes and have played a role in stepping in as prices became more attractive (Banque de France). Earlier studies by Banque de France suggest that the European core government securities rolled off by the Eurosystem had been bought by non-residents private sector investors and foreign central banks/official institutions. More recently, ECB analysis suggests the Eurosystem holdings are increasingly being replaced by hedge funds that are contributing significantly to absorbing the net supply of government bonds across the Euro Area.[70] BdF analysis suggests the preferred habitat of hedge funds are in the ultra-long maturities.

133. Non-resident transaction data suggest sustained net inflows since 2021 (Figure 50)**.** While Q4s tend to see net outflows, there has been net inflows since 2021 sustained by Euro Area and other non-resident investor ex-Japan and the US. During the period, Euro Area investors have accumulated EUR 183 billion in French government securities (source: ECB). However, after large position taking in early 2019, Japanese private sector investors have become notable net sellers, with their selling accelerating in the second half of 2024 (source: BoJ). Private Japanese investors sold EUR 46 billion cumulatively between 2021-24. During the same period, US investors have also been net sellers, cumulative liquidating EUR 28 billion (source: US Treasury). Euro Area investors excluding French investors, on the other hand have been net buyers, accumulating EUR 183 billion (source:

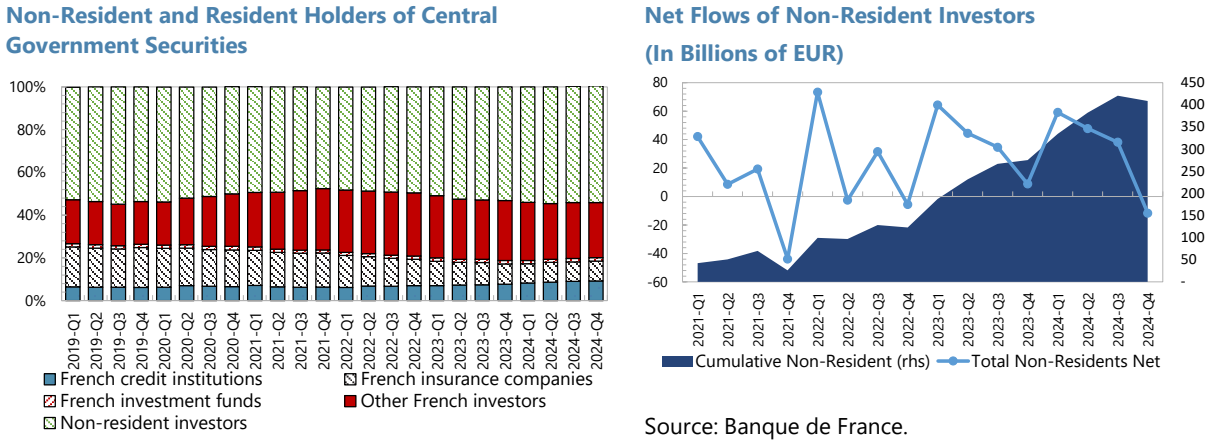
[69] The data compiled by Arslanalp and Tsuda include general government debt totaling EUR 3.3 trillion at Q4-2024. Central government debt securities outstanding account for EUR 2.6 trillion and EUR 0.7 trillion correspond to loans and securities contracted by other government bodies including the debt of local administrations, of social administrations and of central administrations other than the State. Since central government securities are the core concern for financial stability, we focus our analysis on these securities and rely on ECB and AFT data. Data from ECB's Securities Holdings Statistic provides useful disaggregation of Euro Area holders, but they include securities issued by the other government bodies (EUR 2.8 trillion at Q4-2024), or EUR 0.2 trillion in securities issued by these bodies. Finally, AFT publishes data on holdings of central government securities.

[70] ECB 2024. Hedge funds: good or bad for market functioning?

ECB). While different data source makes direct comparison difficult, it appears that the net sales by Japanese and US investors have been more than offset by net purchases by Euro Area and other non-resident investors.

134. Excluding central bank and general government holdings, French and Euro Area private sector investors held EUR 1.3 trillion in French government securities (Figure 50). French private investors were concentrated in the insurance and banking sectors, while Euro Area investors are more diverse including insurance companies, banks, MMF and non-MMF investment funds. As at Q4 2024, French insurance companies and pension funds together held EUR 360 billion. Their holdings have been declining from EUR 400 billion in Q1 2021, but this trend has modestly reversed starting Q1 2024. French investment funds including MMFs held EUR 129 billion in government securities, just 6 percent of total NAV. The above ECB study[71] notes that insurance companies, investment funds, and pension funds tend to increase their purchase when yield rises. However, their absorption capacity tends to decrease in times of elevated financial market uncertainty. The large holdings of French government securities by other Euro Area investors suggest the safe-asset role they play not only for French investor but for a broader set of Euro Area investors.

Figure 50. Holdings of French Government Securities



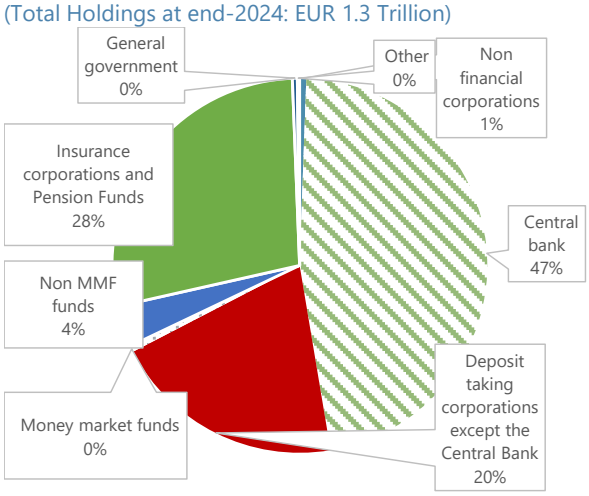
Source: Banque de France

Source: Banque de France.

[71] Sovereign bond markets and financial stability: examining the risk to absorption capacity

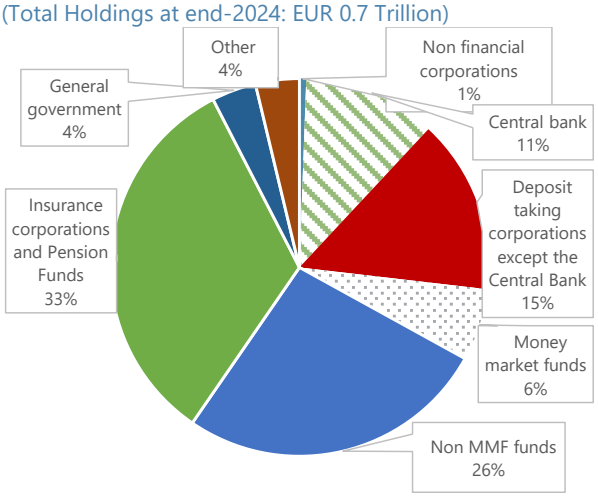
Figure 50. Holdings of French Government Securities (concluded)

Holdings by French Investors
(Total Holdings at end-2024: EUR 1.3 Trillion)



Source: ECB

Holdings by Euro Area Investors
(Total Holdings at end-2024: EUR 0.7 Trillion)

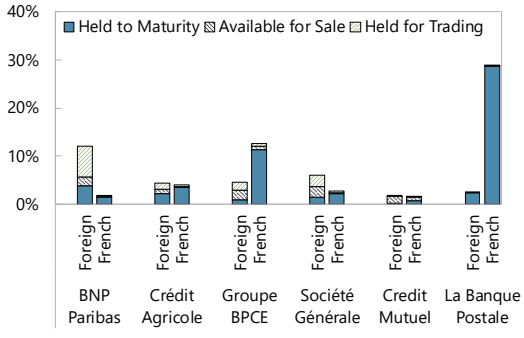


Source: ECB

135. Domestic banks holding of government securities have been stable and limited (Figure 51). French commercial banks held EUR 463 billion in general government debt, of which EUR 251 billion in securities (mostly issued by the central government) and EUR 212 billion in loans (to local governments) as at Q2 2024, accounting for less than 5 percent of total banking sector assets (IMF). ECB suggests Euro Area bank holdings of sovereign bonds relative to total Tier 1 capital is at a 10-year low. In addition, banks predominantly hold government securities in held-to-maturity portfolios (EBA).

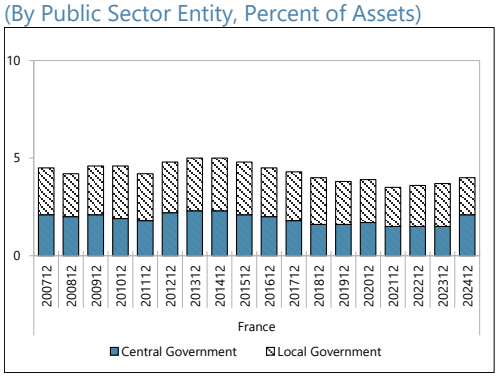
Figure 51. Domestic Banks Holdings of General Government Debt

Major Banks' Sovereign Exposures
(Percent of Total Assets, June 2024)



Source: EBA

Banks' Exposure to the Public Sector
(By Public Sector Entity, Percent of Assets)



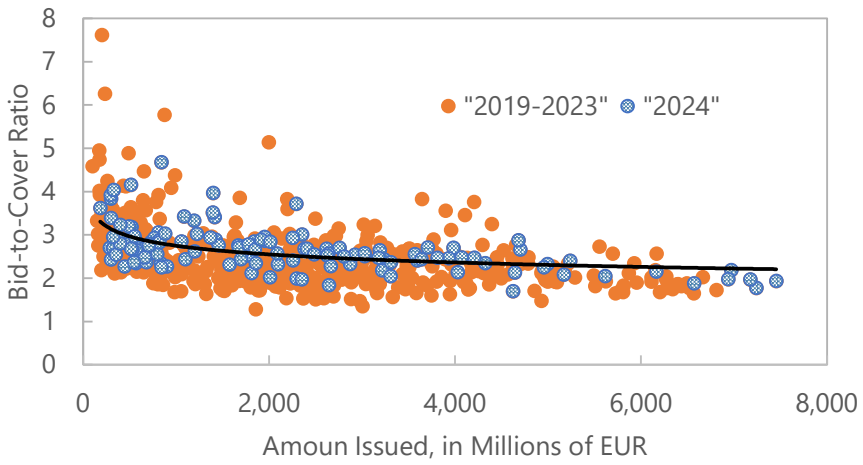
Source: IMF

E. Supply and Distribution

136. The supply of new securities is distributed primarily through regular auctions carried out throughout the year. The annual financing plan is published together with the budget announced toward the end of the previous calendar year. The annual financing plan presents the total gross amount of securities planned to be issued, with a breakdown of medium- to long-term OATs and short-term BTFs, together with net cash balance. The annual auction calendar is also published, with scheduled dates for the auctions. The auction dates are fixed and predictable, with auctions of OATs taking place on the first and third Thursdays every month and BTFs every week. The auction calendar also specifies the date in which non-competitive bids will take place. After consultation with the primary dealers the week before the auction, the instruments and the target amount to be issued are determined. There is a pre-auction announcement on the amounts and instruments to be issued, and there is significant post-auction transparency. Non-competitive bids are accepted one day after the BTF and OAT auctions. Some off-the-run securities are offered on tap to minimize the effects of their becoming "special" in repo markets. Overall, auctions are carried out prioritizing transparency and predictability but some flexibility is maintained to respond to evolving demand. The increasing size of securities offered in each auction has not been accompanied by an increase in issuance frequency.

137. Auctions continue to face excess demand relative to the amount issued. Over a wide range of instruments, maturities and issue size, the auction bid-to-cover ratio centered around three times in 2024 (Figure 52), which is above the average over 2019-2024 and European average that have fluctuated between 2-2.5 (source: AFME). While excess demand can be based on much higher yields compared to the cut-off rate, the fact that the cover ratio is consistently and significantly above one, and dealers are evaluated on the basis of submitting competitive bids, suggests that there is robust excess demand. Strong demand in the primary market would generally suggest a robust post-auction secondary market because it would indicate there is still unmet demand. Having this margin of excess demand reduces the risk that Primary Dealers cannot offload the large quantity of securities purchased at auction; on the contrary, it increases the likelihood that they can be sold at profit in the secondary market and encourage aggressive bidding in the primary market.

Figure 52. Bid-to-Cover Ratio in OAT Auctions



Source: AFT

138. Syndication complements the regular auctions. While auction is the main distribution channel, syndications are used when issuing new products and new benchmark bonds, as well as bonds that are difficult to price or require extra marketing, including green bonds or ultra long bonds. Syndications have reached a diverse set of investors, despite targeted instruments. The proportion of issuance through syndication relative to auctions has been increasing over recent years; however, compared with other Euro Area sovereign issuers, the use of syndication in France is still in the lower range (AFME). Syndications have also faced excess demand and have generally been successful.

139. Intermediaries play a critical role to ensure supply and demand meet at a fair price. In France, as in most Euro Area member countries, PDs play a central role in intermediating sovereign securities and ensuring the market remains liquid. The PD system builds on a three-year agreement between the government and the PDs which governs the privileges and obligations to be a PD. The privilege comprises of direct access to the AFT, access to syndication, tap issue, and prestige. The obligations include the requirement to participate regularly and competitively in primary auctions, participate and provide firm quotes in the secondary market and trading, and marketing government securities. PDs thus commit their balance sheets to absorb the periodic new supply of securities and distributes them to end investors, helping the government to meet its fundamental debt management objective to ensure its financing needs are met at minimum cost subject to risk.

140. Concerns have been raised regarding the disproportionate increase in the supply of government securities relative to the PDs' balance sheet capacity. The number of PDs in France (15) remains constant over the past 5 years despite significant increase in government securities. Amidst tightening regulatory frameworks following the GFC, whilst the risk weight of sovereign securities remained zero, the introduction of the supplementary leverage ratio has reduced PDs'

capacity to absorb risk. However, the introduction of a tighter regulatory framework coincided with the period of unprecedented monetary policy. To the extent that the increased securities issuances was absorbed by the Eurosystem bond buying programs and the foreign official sector, the constraint on PD balance sheet remained mute. Entering an era of increasing free float, combined with increasing competing issuers including Germany and Euro Area institutions, the issue could become more acute.

141. PDs' businesses may have become more order driven rather than position taking, as evidenced by the decline in positions in the trading books (Table 14). However, An ECB survey of dealers conducted in early 2024 suggested that dealer intermediation capacity in both European government bond and repo markets remained strong, with most dealers reporting *increased* capacity.[72] While the leverage ratio remained the main constraint for some, others cited risk-based limits, and profitability remains a key driver of balance sheet allocation. PDs are selected on the basis of their strong balance sheet and distribution capacity to reach a wide range of investor base. Large banks are able to cross subsidize businesses, but the same may not be true for smaller banks. Providing liquidity costs capital, and the tighter the bid-ask spread, the more the business becomes unprofitable, hence greater financial incentives are needed to incentivize PDs to stay in the business (prestige alone may not be a sufficient incentive to remain a PD). Syndication, non-competitive bids, and ability to tap securities on demand are some of the incentives offered to the PDs by the authorities.

Table 14. France: Selected Primary Dealers' Holdings of General Government Debt
(In Millions of EUR)

	Held in Trading Portfolio			CET1			Trading Portfolio/CET1		
	2021	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**
BNP Paribas	12,425	4,383	3,874	91,976	91,828	91,992	13.5	4.8	4.2
BofA Securities Europe SA	n.a.	n.a.	477	n.a.	6,501	7,898	n.a.	n.a.	6.0
Groupe Crédit Agricole	3,136	3,793	6,565	102,693	100,861	106,881	3.1	3.8	6.1
Société générale S.A.	6,846	1,060	2,053	49,835	48,639	51,127	13.7	2.2	4.0
DEUTSCHE BANK	5,373	4,968	6,021	46,506	48,097	48,066	11.6	10.3	12.5
COMMERZBANK	34	144	75	23,765	23,854	25,720	0.1	0.6	0.3
Goldman Sachs Bank Europe SE	n.a.	528	1,052	n.a.	8,911	12,872	n.a.	5.9	8.2
JP MORGAN SE	2,089	1,616	2,789	15,425	22,516	24,164	13.5	7.2	11.5
Banco Santander, S.A.	193	193	2,177	72,402	74,202	76,741	0.3	0.3	2.8
Total sample	**30,096**	**16,685**	**25,083**	**402,602**	**425,409**	**445,461**			

Source: EBA

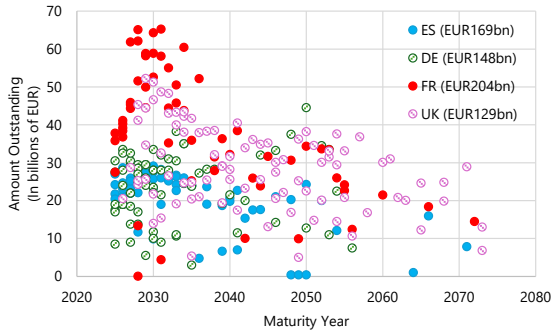
[72] ECB (2024). Survey of dealer banks on intermediation capacity in EGB repo and trading markets.

F. Secondary Market Liquidity

142. Individual French bonds outstanding are among the largest in Europe. The large benchmark bonds are important to ensure there are sufficient fungible securities that will improve secondary market liquidity. Even after the establishment of new benchmark bonds and when a security becomes off-the-run, the securities continue to be re-opened and continue to build up its outstanding size. Particularly around the 5-year segment, OATs are the largest individual securities outstanding, with 16 bonds exceeding EUR 50 billion in size. Only France and UK have bonds with outstanding size above EUR 40 billion (Figure 53). The weighted average amount outstanding for French OATs is also the highest, at EUR 204 billion, compared with EUR 169 billion, EUR 148 billion, and EUR 129 billion for Spain, Germany, and the UK, respectively. In France, 4 or 5 new conventional bonds are introduced as new benchmark bonds every year. They comprise 2 or 3 medium- and 2 long-term bonds.

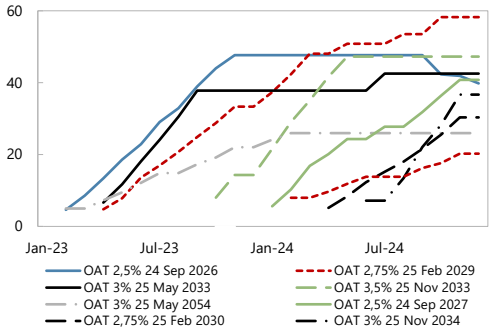
Figure 53. Issue Size of Government Securities

Issue Size by Maturity of Instrument



Source: Deutsche Finanzagentur, AFT, Tesoro Público Spain, UKDMO.

Cumulative Issuance of Benchmark Securities in 2023 and 2024 (in Billions of EUR)

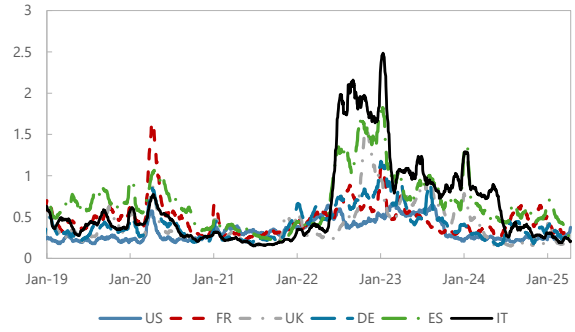


Source: AFT

143. Despite the largest benchmark securities in Europe, different liquidity measures point to mixed signals (Figure 54). After peaking in March 2020 and again in January 2023, and with some increase in mid-June and Decembre 2024 during the political crisis, the French 5-year government bond bid-ask spread has been one of the tightest in Europe. However, dispersion measure of off-the-run securities, measured as deviations from the fitted curve, suggests liquidity of off-the-run securities have been deteriorating. In turn, although the data are not strictly comparable, average daily trading volume of French government bonds appear comparable to that of Germany and Spain, and half of the UK's.

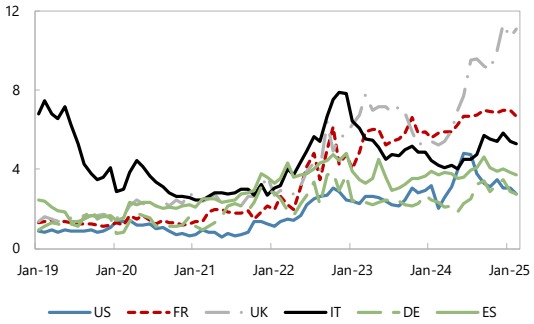
Figure 54. Measures of Liquidity in Government Securities Market

5-Year Government Bond Price Bid-Ask Spread



Source: Bloomberg

Relative Liquidity of Non-Benchmark Securities

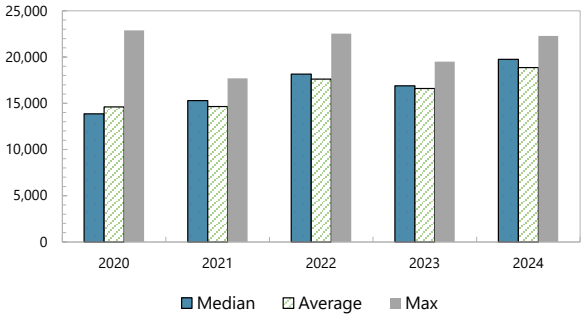


Note: This measure of liquidity is based on a Bloomberg yield curve spline measure which aims to capture off-the run liquidity and dislocations across yield curve maturities. The higher the index, the worse the liquidity situation.

Source: Bloomberg

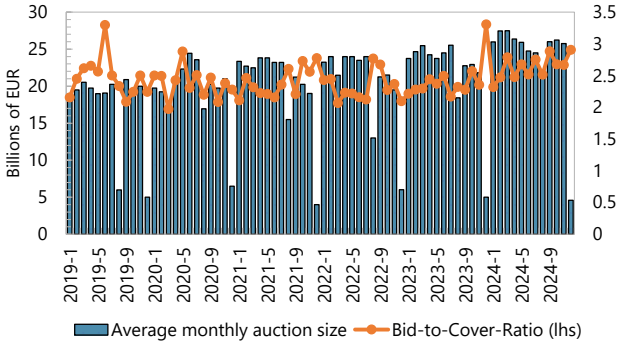
Primary Dealers Average Daily Volume of OATs

(In Millions of EUR)



Source: Reporting by primary dealers excluding Eurosystems asset purchase program flows, AFT calculations.

Monthly Average Auction Size and Cover Ratio



Source: AFT.

144. Liquidity can suffer due to several reasons. In particular, when the off-the-run securities have coupon rates that are significantly different from current coupon rates, their liquidity suffers as demand switches to the benchmark securities. In an environment of rising market interest rates rise, the difference in coupon rates between on-the-run and off-the-run securities increases making off-the-runs more illiquid. Compared to Spain and Italy, French benchmark bonds tend to have tighter bid-ask spreads. However, in the past year, French spreads were widening vis-a-vis the German Bund while Spanish and Italian spreads were tightening because of improving fundamentals. This movement in the Spanish and Italian spread meant that their off-the-run and on-the-run yields were converging making them easier to price. In contrast, widening French spreads against the Bund meant off-the-run yields were moving farther away from benchmark securities, increasing the price dispersion of off-the-run relative to benchmark securities. Eurosystem holding of OATs and reduced free float that created collateral scarcity has also contributed to liquidity squeeze, but that also applied to other core European government securities. The larger holdings of buy-and-hold investors in French securities including insurance companies and sovereign wealth funds may also explain the lower turnover ratio relative to other Euro Area sovereigns (AFME). ESMA notes that

based on traded volumes, market liquidity tends to be concentrated on bonds with original maturity less than 12 years for Euro Area sovereigns.

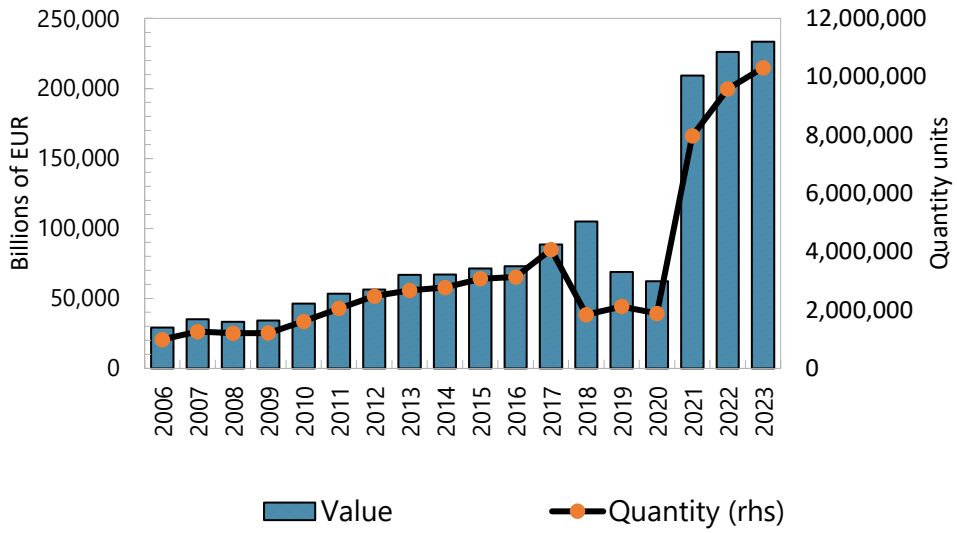
145. Market liquidity and funding liquidity can reinforce each other, potentially creating liquidity spirals (ECB).[73] Primary dealers borrow in the repo market using the bonds purchased as collateral to provide liquidity in the secondary (cash) market. A funding liquidity shock, such as an increase in margin calls and haircuts, could limit dealers' capacity to take positions, hampering their ability to provide market liquidity. Deteriorating market liquidity conditions can, in turn, negatively affect funding liquidity. As poor market liquidity conditions exacerbate price volatility, they can also lead to an increase in margins and haircuts, which again worsens overall funding liquidity conditions. Ultimately, such liquidity spirals can become self-fulfilling.

146. Sovereign securities serve as collateral for the repo market. The retreat of the Eurosystem, through their reductions in APP and PEPP holdings, has restored significant volumes of collateral to the hands of the private sector. This has improved repo market functioning and alignment with policy benchmarks, but liquidity redistribution now relies more heavily on the private sector. This shift has introduced new vulnerabilities. The Euro Area (and French) repo market remains largely overnight in nature, with limited term activity (ESMA). This structure heightens sensitivity to calendar effects and regulatory reporting cycles, which can amplify volatility. Hedge funds (many offshore) are said to have become more active in French government bond repo (and futures) markets. Many rely on leveraged strategies, such as basis trades, that depend on stable repo funding and low collateral volatility. While exposures remain moderate, they could become a source of instability if volatility rises, or funding conditions tighten. Equally, contagion from other markets (US treasuries, JGBs) could be a source of vulnerability.

147. A downgrade of French government bonds could raise financial stability concerns due to increased volatility and higher margin requirements. Potential changes in collateral treatment by central counterparty clearing houses where 90 percent of repo transactions take place (ESMA) can also cause market dislocation. Repo transactions through LCH Clearnet have increased multiple fold in 2021 and continue to grow (Figure 55). Should there be sovereign downgrades, clearing houses may respond by raising margin demands and reassessing the eligibility of French bonds or increase haircuts, which could strain market liquidity. Difficulties in the secondary market will ripple through to the primary market and the ability for the government and other public sector issuers to fund themselves, further affecting investor confidence.

[73] ECB (2023). Gauging the interplay between market liquidity and funding liquidity. Financial Stability Review, May.

Figure 55. Repo Transactions through LCH Clearnet S.A. (France)



Source: ECB.

148. AFT, BdF, and the Eurosystem play important roles in backstopping market and funding liquidity. AFT has a standing repo facility with the PDs to provide security in short supply, or to enable them to take short-term positions to manage their inventory. The AFT has also offered securities on tap to minimize specialness of a security. In turn, BdF's securities lending facilities avails the securities under the PPP and PEPP as a lender of last resort.[74] Studies show that the facilities have helped to alleviate scarcity in the repo market and enhanced cash market liquidity.[75] Further, the Eurosystem also has tools to safeguard market functioning and prevent dislocations. These include instruments such as the Outright Monetary Transactions (OMT) and the Transmission Protection Instrument (TPI) which provide credible backstops against unwarranted market stress. In addition, the ECB retains the flexibility to restart reinvestments under the PSPP or PEPP if needed, offering another potent lever to stabilize markets and reinforce investor confidence.

G. Sovereign Risk Management

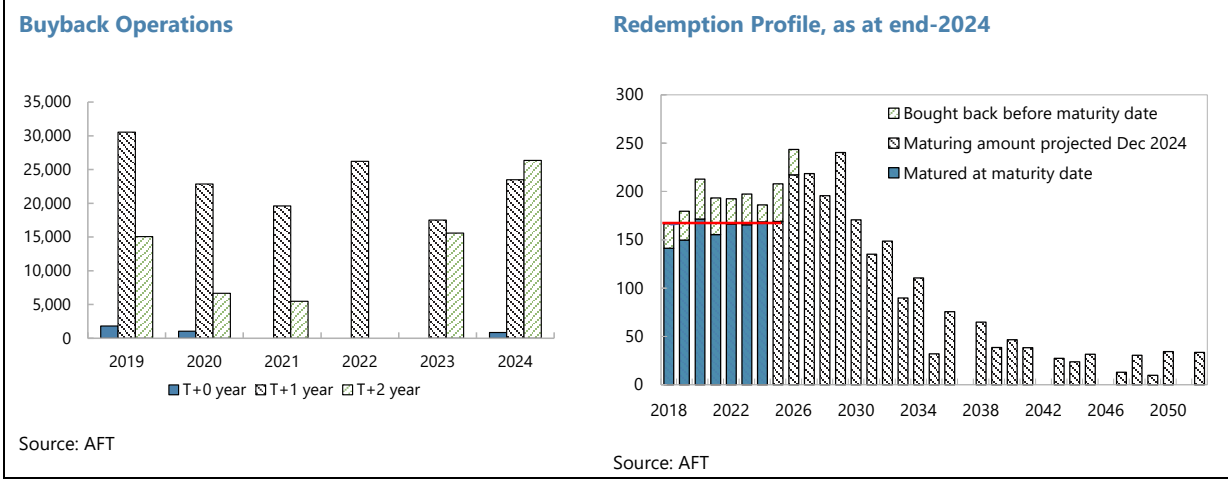
149. Notwithstanding the rising deficit and debt, and large benchmark bond size, gross borrowing needs has remained stable. While the sovereign debt management strategy does not explicitly target a specific average maturity, France's regular issuance across the curve, especially in medium- and long-term segments, helps to maintain a long average maturity, currently over 9 years (8.5 years including BTFs). This has helped to reduce near-term redemptions. However, considering the largest single gross issuance to date of EUR 42 billion (March 2024), the larger benchmarks (after

[74] ECB. Securities lending of holdings under the asset purchase programme (APP) and pandemic emergency purchase programme (PEPP).

[75] Greppmair and Jank (2022).

re-openings) of EUR 60 billion can present significant single-day refinancing risk.[76] To manage such refinancing risk, the authorities have aggressively pursued buyback operations. Buybacks are allowed for securities up to two years ahead. In 2024, EUR 50 billion in securities maturing between 2025-27 were bought back (Figure 56). These operations have helped to smooth the near-term (single-day and) annual redemptions, resulting in broadly unchanged maturities between 2022-25. For 2024 and 2025, the original maturities were EUR 168 and EUR 198 billion, respectively; after the buybacks, they were reduced to EUR 155 and EUR 135 billion, respectively. In 2025, EUR 48 billion will need to be bought back to bring 2026 maturities to 2025 levels, and another similar amount is needed to be bought back to bring the 2027 maturities to 2025 level. Buyback operations also help to improve liquidity in the secondary market by taking out illiquid off-the-run short-residual maturity securities.

Figure 56. Managing Refinancing Risk and Promoting Liquidity



Source: AFT

Source: AFT

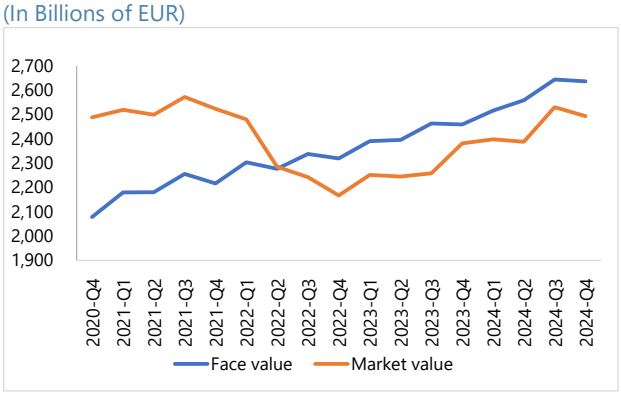
150. The long average maturity helps contain refinancing risk and interest-rate refixing risk for the government, but increases duration risk for mark-to-market investors. With average time to maturity at 9 years, refinancing risk for the government are contained. The long average maturity also helps to contain interest-rate refixing risk: effective interest rate of the government debt portfolio at end-2024 stood at 1.5 percent, while the marginal funding cost in 2024 was 3 percent. However, with the gross financing needs at over 10 percent of GDP, and the further increase in the marginal financing costs following developments in the French and global core bond markets, are starting to weigh on the debt dynamics. The rising term premia and increasing global bond supply may mean that the current issuance strategy may need to adjust to shorter- and medium-maturities, and away from the very long end.

[76] While the average maturity of the central government debt securities is long, the average maturity of social security debt is significantly shorter, with higher refinancing risk. AFT extended financing through an emergency liquidity facility to address this.

151. From the investors' perspective, the effects have been harsh for mark-to-market portfolios. Since the last FSAP, the yield curve has shifted up 200-300 basis points which imply a significant valuation loss on a 9-year average maturity portfolio. From the end-December 2024 price level, a 1 percent increase in interest rate will incur another valuation loss of EUR 12.5 billion, and a 2 percent increase will imply EUR 23.4 billion in valuation loss (Figure 57). Most investors, however, including banks and insurers, typically hold government bonds to maturity or on an amortized cost basis, which limits the transmission of these valuation losses to broader financial stability concerns.

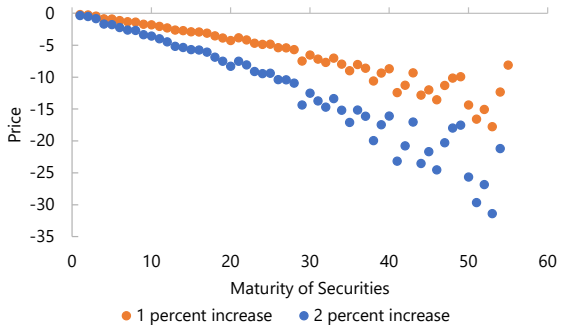
Figure 57. Market Valuation of Government Securities

Face Value and Market Value of Fixed Rate Government Securities
(In Billions of EUR)



Source: ECB CSEC database

Price Impact of Interest Rate Increases on Fixed-Rate Government Securities



Source: AFT and staff calculations

H. Conclusions

152. The French sovereign securities market forms the bedrock for financial market stability. Sovereign securities serve as a benchmark for pricing financial assets, are eligible for collateral in the funding market, and act as safe-haven assets in times of crisis. These features are the basis for which sovereign securities are assigned zero risk weight for the purpose of capital adequacy measure and classified as high-quality liquid asset underpinning liquidity coverage ratios for the banking sector. The functions sovereign securities perform ultimately help to maintain financial stability as they facilitate price discovery and the repricing of risk for all financial assets in the country and facilitate cross-border comparison.

153. The robustness of the French sovereign securities market is supported by a diversified investor base, a well-oiled network of intermediaries and distribution mechanism, and prudent sovereign risk management. Despite rising public debt and free float, the demand for sovereign securities remains robust as the investor base continues to be broad and dynamic, enabling the government to meet its financing needs. Auctions and syndications are competitive and new supply continues to be absorbed well by the market as evidenced by persistently strong bid-to-cover ratio, while a repricing of risk has taken place as the sovereign faced rating downgrades. Despite regulatory disincentives, PDs continue to see value in performing well even if

the business is not profitable, as they see value in the prestige associated with this role and in order to meet overall client needs. Some measures of secondary market liquidity suggest deterioration, but benchmark bonds appear to continue to be one of the most liquid in the Euro Area. Sovereign risks are contained assisted by prudent debt management over the years resulting in long average maturities shielding the debt portfolio from rising interest rates. Together with the active buyback operations, gross financing needs remain flat and refinancing risk and interest rate refixing risk remain manageable. There is a strong commitment by the AFT for transparency and predictability in core debt management operations, while responding to evolving demand. Although not exhaustive, these are some of the key features that investors see the French government securities as safe asset. The backstop by the Eurosystem as lender of last resort and their willingness to intervene in the event of severe market dislocation also reinforce investor confidence.

154. Emerging risks should continue to be monitored and policy tools enhanced. Should PDs' balance sheet capacity to absorb the growing auctions become a binding constraint, the mix between auctions and syndications may need to be recalibrated or the pool of PDs expanded. Short-term funding markets that enable PDs to purchase the securities could freeze up, exacerbating the drying up of secondary market liquidity. Policy tools to support secondary market liquidity, including the repo facility at the AFT, reopening and tap issuances of off-the-run securities, may become even more critical, but care is needed to ensure that these facilities do not distort private transactions and take away arbitrage opportunities. The presence of price sensitive investors can be a double-edged sword – they can help to support the market given attractive pricing, but they could also be the first to run when there is a negative shock. Investor diversification and progress on the ongoing pension reform could expand and stabilize investor base. Above all, debt management alone cannot safeguard the safe asset status of the French government securities without market confidence in a sustainable long-term fiscal strategy. While ultimately, liquidity backstop by the ECB may be called in to stabilize the market and safeguard financial stability, market discipline should be allowed to operate to reprice risk and preserve the integrity of the market.

Table 15. France: Risk Assessment Matrix			
Source of Risks	**Relative Likelihood[1]**	**Impact if Realized**	**Policy Response**
Global Risks			
Trade policy and investment shocks. Higher trade barriers or sanctions reduce external trade, disrupt FDI and supply chains, and trigger further U.S. dollar appreciation, tighter financial conditions, and higher inflation.	**High**	**Medium:** Increasing geoeconomic fragmentation could reduce exports and trade market share, directly and due to negative spillovers from key trading partners, and lower potential growth.	Further diversify supply chains and undertake structural reforms to boost competitiveness. Deepen the European single market and foster capital market integration to encourage investment and innovation. Maintain a level playing field between firms and sectors, and limit state intervention to address market failures.
Sovereign debt distress. Higher interest rates, stronger U.S. dollar, and shrinking development aid amplified by sovereign-bank feedback result in capital outflows, rising risk premia, loss of market access, abrupt expenditure cuts, and lower growth in highly indebted countries.	**High**	**Medium:** Higher sovereign bond yields in France raise refinancing costs over the medium-term, weakening debt dynamics, and reducing fiscal space for growth-enhancing spending. This is mitigated by France's liquid debt market, diversified investor base and the stabilizing role of the ECB.	Advance fiscal consolidation efforts under the authorities' medium-term fiscal structural plan, underpinned by a comprehensive and credible package of fiscal measures over the medium term. Support fiscal adjustment efforts with structural reforms to support jobs and growth.
Tighter financial conditions and systemic instability. Higher-for-longer interest rates and term premia amid looser financial regulation, rising investments in cryptocurrencies, and higher trade barriers trigger asset repricing, market dislocations, weak bank and NBFI distress, and further U.S. dollar appreciation, which widens global imbalances and worsens debt affordability.	**Medium**	**Medium:** Tighter financial conditions could trigger further deleveraging of the private sector, increase vulnerabilities, and lower growth.	Macroprudential policies, including cyclical and systemic buffers, should be deployed as warranted to mitigate systemic financial instability. Maintain close monitoring of liquidity risks in NBFIs. Fiscal policy should allow automatic stabilizers to operate.
Regional conflicts. Intensification of conflicts (e.g., in the Middle East, Ukraine, Sahel, and East Africa) or terrorism disrupt trade in energy and food, tourism, supply chains, remittances, FDI and financial flows, payment systems, and increase refugee flows.	**Medium**	**Medium**: Heightened uncertainty weakens consumer and business confidence with a negative impact on consumption and investment, affecting both manufacturing and services.	Accelerate the green transition and further diversify energy mix and sources. Provide targeted fiscal support to vulnerable households and firms. Advance structural reform agenda to boost productivity and improve competitiveness.
Commodity price volatility. Supply and demand volatility (due to conflicts, trade restrictions, OPEC+ decisions, AE energy policies, or green transition) increases commodity price volatility, external and fiscal pressures, social discontent, and economic instability.	**Medium**	**Medium:** France is a net energy importer, with imported products accounting for about half of total energy supply. The adverse terms-of-trade shock from a renewed spike in international energy prices would have a material impact on inflation and real income.	Accelerate the green transition and further diversify energy mix and sources. Provide targeted fiscal support to vulnerable households and firms. Advance structural reform agenda to boost productivity and improve competitiveness.

Table 15. France: Risk Assessment Matrix (concluded)

Source of Risks	Relative Likelihood[1]	Impact if Realized	Policy Response
Global Risks			
Deepening geoeconomic fragmentation. Persistent conflicts, inward-oriented policies, protectionism, weaker international cooperation, labor mobility curbs, and fracturing technological and payments systems lead to higher input costs, hinder green transition, and lower trade and potential growth.	**High**	**Medium:** Increasing geoeconomic fragmentation could reduce exports and trade market share, directly and due to negative spillovers from key trading partners, and lower potential growth.	Further diversify supply chains and undertake structural reforms to boost competitiveness. Deepen the European single market and foster capital market integration to encourage investment and innovation. Maintain a level playing field between firms and sectors, and limit state intervention to address market failures.
Cyberthreats. Cyberattacks on physical or digital infrastructure (including digital currency and crypto assets), technical failures, or misuse of AI technologies trigger financial and economic instability.	**High**	**Medium/High:** Cyberattacks to key infrastructure can disrupt economic activity and threaten financial stability.	Advance crisis preparedness to cyberattacks and further strengthen coordination at the European/international level. Strengthen the operational resilience of the financial system.
Climate change. Extreme climate events driven by rising temperatures cause loss of life, damage to infrastructure, food insecurity, supply disruptions, lower growth, and financial instability.	**Medium**	**Medium:** Extreme climate events disrupt economic activity and negatively impact growth.	Provide targeted fiscal support and undertake public investment for climate change preparedness and adaptation.
Domestic Risks			
Political fragmentation. Lack of political consensus leads to delays in needed fiscal adjustment and the reform agenda.	**High**	**Medium/High.** Setbacks to the fiscal and structural agenda would negatively impact business confidence and investment, employment, raise refinancing costs, and weaken public debt dynamics.	Promote broad-based political and social support to advance France's fiscal plans, as per EU fiscal rules, and make progress on structural priorities, providing targeted support to the most vulnerable.
Social discontent. Real income loss, spillovers from conflicts, dissatisfaction with migration, and worsening inequality ignite social unrest, populism, polarization, and resistance to reforms or suboptimal policies. This weakens growth and leads to policy uncertainty and market repricing.	**Medium**	**Medium:** Social discontent could impact consumer and business confidence and slow growth. This could delay fiscal adjustment and reform efforts, increase financing costs, and weaken public debt dynamics.	Provide targeted fiscal support to vulnerable households and firms. Advance structural reform agenda to boost jobs and productivity.

[1] The Risk Assessment Matrix shows events that could materially alter the baseline path. The relative likelihood is the staff's subjective assessment of the risks surrounding the baseline ("low" is meant to indicate a probability below 10 percent, "medium" a probability between 10 and 30 percent, and "high" a probability of 30 percent or more).

Box 7. Euro Area: Structural Model for Repricing of Net Interest Income

All formulas in the following apply at the bank-segment level; the notation omits these subindices for brevity.

The model requires two key inputs:

- A repricing ladder at T0, given by the value of exposures in each repricing bucket $[k, k+1]$ (i.e., exposures with time-to-repricing between k and $k+1$ years), denoted as $E_0^{[k,k+1]}$. The corresponding fraction of total exposures in that bucket is denoted as $\theta_0^{[k,k+1]}$. This is summarized in the following table:

Repricing Buckets	Value of Exposures	Share of Exposures
[0;1] yrs	$E_0^{[0,1]}$	$\theta_0^{[0,1]} = E_0^{[0,1]}/E_0$
[1;2] yrs	$E_0^{[1,2]}$	$\theta_0^{[1,2]} = E_0^{[1,2]}/E_0$
[2;3] yrs	$E_0^{[2,3]}$	$\theta_0^{[2,3]} = E_0^{[2,3]}/E_0$
[3;4] yrs	$E_0^{[3,4]}$	$\theta_0^{[3,4]} = E_0^{[3,4]}/E_0$

  - Any exposure with time-to-repricing larger than three years can be allocated to the [3;4] year bucket. This is without loss of generality because those exposures will not reprice within the three-year stress-testing window.
- Scenario-specific projections for the interest rate on new business, denoted as r_t^{nb}.
  - The model calculations are conducted in three steps.

Step 1: Simulate the exposures originated/repriced in each bucket and period.

The model simulates the "law of motion" of exposures across buckets. Consider, for example, the value of exposures in bucket $[k-1, k]$ at the end of year-1. The exposures in that bucket will correspond either to exposures that at end of year-0 were in bucket $[k, k+1]$ (so one year later they have moved to the bucket with 1-year lower time-to-repricing), or to exposures that have been newly issued/repriced during year-1. The corresponding equation for this is:

(1) $E_t^{[k-1,k]} = E_{t-1}^{[k,k+1]} + I_t^{[k-1,k]}$

- where $I_t^{[k-1,k]}$ are the newly issued/repriced loans in bucket $[k-1, k]$ during year-t. In order to pin down the value of $I_t^{[k-1,k]}$, the key assumption is that the shares of exposures across buckets are constant over time. That is,

(2) $\theta_t^{[k,k+1]} = \theta_0^{[k,k+1]}$ for all t, k

- This assumption is consistent with the static balance sheet used throughout the stress test.

Step 2: Simulate the average interest rate for each bucket and period.

- Denote as $r_{t-1}^{[k,k+1]}$ the average interest rate of the exposures that at end of year-$(t-1)$ were in bucket $[k, k+1]$. This interest rate can be calculated recursively. From equation (1), $E_t^{[k-1,k]}$ is the sum of the exposures that were in bucket $[k, k+1]$ at end of year-$(t-1)$ and the newly issued/repriced exposures $I_t^{[k-1,k]}$. Then, it must be that the average interest rate of

Box 7. Euro Area: Structural Model for Repricing of Net Interest Income (concluded)

$E_t^{[k-1,k]}$ is an exposure-weighted average of the respective interest rates of these two terms. That is:

(3) $i_t^{[k-1,k]} = \rho_t r_{t-1}^{[k,k+1]} + (1-\rho_t) r_t^{nb}$ where $\rho_t = \frac{E_{t-1}^{[k,k+1]}}{E_t^{[k-1,k]}}$

- The recursive definition in equation (3) requires an initial condition, $r_0^{[k-1,k]}$. The assumption will be that the initial interest rate in all buckets is equal to the average interest income rate of the portfolio at T0, denoted as IIR_0.

Step 3: Calculate the interest income.

- Consider first the case without NPEs; the interest income is:

(4) $II_t = \sum_{k=0}^{3} r_{t-1}^{[k,k+1]} E_0^{[k,k+1]} + (1-\omega)\left(r_t^{nb} - r_{t-1}^{[0,1]}\right) E_0^{[0,1]}$ where $\omega = \frac{avg\ days\ to\ repricing}{365}$

- The first term is the base rate, which is determined in year $(t-1)$ and is therefore unaffected by the year t interest rate shock; the second term captures the effect of the year t interest rate shock on the interest income from interest-sensitive assets (i.e., exposures that reprice during year- t). The interest-sensitive assets will, on average, continue to earn the old interest rate $r_{t-1}^{[0,1]}$ during the fraction ω of the year, and during the remaining fraction $(1-\omega)$ their rate will change by a magnitude $r_t^{nb} - r_{t-1}^{[0,1]}$. The exposures have a T0 subindex because of the static balance sheet assumption.
- In order to incorporate NPLs into the model, the simplifying assumption is that the NPE ratio is the same across buckets. The interest income is therefore:

(5) $\widetilde{II}_t = (1 - \overline{NPER}_t) \cdot II_t$

That is, the interest income $\widetilde{II}_t$ from equation (4) is multiplied by the exposure-weighted average share of performing exposures.

Rewriting the model in terms of interest rate "deltas"

It is useful to rewrite equation (4) in terms of changes, or "deltas", relative to the initial interest income rate IIR_0. In the hypothetical situation in which there are no interest rate shocks —i.e., $r_t^{nb} = IIR_0$ for all t—, the interest income from equation (4) would simply be $\overline{II}_t = IIR_0 \cdot E_0$, where $\overline{II}_t$ is used to denote this particular case of constant rates. Equation (4) can then be rewritten as a difference from $\overline{II}_t$ as

$$II_t - \overline{II}_t = \sum_{k=0}^{3} dr_{t-1}^{[k,k+1]} E_0^{[k,k+1]} + (1-\omega)\left(dr_t^{nb} - dr_{t-1}^{[0,1]}\right) E_0^{[0,1]} \qquad (4b)$$

where dr denotes the interest rate "delta" relative to IIR_0 (e.g., $dr_t^{nb} = r_t^{nb} - IIR_0$).

Table 16. France: NFCI Panel Regressions

	Large banks			Small/Medium-sized banks		
	All regressors	Lasso-selected regresors	Arellano-Bond estimator	All regressors	Lasso-selected regresors	Arellano-Bond estimator
	(1)	(2)	(3)	(1)	(2)	(3)
NFCIR (t-1)	0.707***	0.707***	0.623***	0.717***	0.714***	0.463***
RGDP growth	0.00891***	0.00862***	0.00880***	0.00700***	0.00612**	0.00584***
RGDP growth (t-1)	0.00186	0.00174	0.00277*	0.000274	0.000286	0.00188
Stocks growth	0.00189**	0.00190**	0.00222***	0.000349	0.000204	0.000523
Stocks growth (t-1)	0.0000981	0.0000929	0.000262	0.000439	0.000703	0.000685
D.EURIBOR	-0.0270***	-0.0270***	-0.0295***	-0.0162**	-0.0177***	-0.0184**
D.EURIBOR (t-1)	-0.00566	-0.00464	-0.00991	-0.0398**	-0.0360**	-0.0373***
10y sov yield	0.0140	0.0137	0.0112	0.00125		
10y sov yield (t-1)	-0.0158	-0.0158	-0.00758	0.00638	0.00672	0.00525
CPI inflation	-0.000760			-0.00434	-0.00259	-0.00337
CPI inflation (t-1)	0.00739*	0.00764*	0.00501	0.00626*	0.00652**	0.00577**
HPI inflation	-0.000626			-0.00173*		
HPI inflation (t-1)	0.00237	0.00184*	0.00225**	0.00287***	0.00170	0.00217
US stocks growth	-0.00162	-0.00161	-0.00226*	0.000506	0.000854	0.000379
US stocks growth (t-1)	0.000516	0.000480	0.000327	0.000687		
EUR/USD FX change	-0.000281	-0.000248	-0.000919	0.000684		
EUR/USD FX change (t-1)	0.00156	0.00158	0.00163	0.000540	0.000520	0.000889
r2	0.609	0.609		0.608	0.605	
N	595	595	568	942	942	867

="* p<0.10 ** p<0.05 *** p<0.01"

All variables are expressed in percentages.

Table 17. France: Parameters for LCR Scenario Analysis (Based on EBA COREP Templates)

Panel A. HQLA Parameters (COREP 72.00)

TOTAL UNADJUSTED LIQUID ASSETS				0010	1	Basel III	Stress scenario
	Total unadjusted level 1 ASSETS			0020	2		
		Total unadjusted level 1 assets excluding extremely high quality covered bonds		0030	3		
			Coins and banknotes	0040	4	100.00%	100.00%
			Withdrawable central bank reserves	0050	5	100.00%	100.00%
			Central bank assets	0060	6	100.00%	100.00%
			Central government assets	0070	7	100.00%	95.00%
			Regional government / local authorities assets	0080	8	100.00%	95.00%
			Public Sector Entity assets	0090	9	100.00%	95.00%
			Recognisable domestic and foreign currency central government and central bank assets	0100	10	100.00%	95.00%
			Credit institution (protected by Member State government, promotional lender) assets	0110	11	100.00%	95.00%
			Multilateral development bank and international organisations assets	0120	12	100.00%	100.00%
			Qualifying CIU shares/units: underlying is coins/banknotes and/or central bank exposure	0130	13	100.00%	100.00%
			Qualifying CIU shares/units: underlying is Level 1 assets excluding extremely high quality	0140	14	95.00%	95.00%
			Alternative Liquidity Approaches: Central bank credit facility	0150	15	100.00%	100.00%
			Central institutions: Level 1 assets excl. EHQ CB which are considered liquid assets for	0160	16	95.00%	95.00%
			Alternative Liquidity Approaches: Inclusion of Level 2A assets recognised as Level 1	0170	17	80.00%	80.00%
		Total unadjusted level 1 extremely high quality		0180	18		
			Extremely high quality covered bonds	0190	19	93.00%	93.00%
			Qualifying CIU shares/units: underlying is extremely high quality covered bonds	0200	20	88.00%	88.00%
			Central institutions: Level 1 EHQ covered bonds which are considered liquid assets for the	0210	21	100.00%	100.00%
	Total unadjusted level 2 ASSETS			0220	22		
		Total unadjusted level 2A assets		0230	23		
			Regional government / local authorities or Public Sector Entity assets (Member State,	0240	24	85.00%	85.00%
			Central bank or central / regional government or local authorities or Public Sector Entity	0250	25	85.00%	85.00%
			High quality covered bonds (CQS2)	0260	26	85.00%	85.00%
			High quality covered bonds (Third Country, CQS1)	0270	27	85.00%	85.00%
			Corporate debt securities (CQS1)	0280	28	85.00%	75.00%
			Qualifying CIU shares/units: underlying is Level 2A assets	0290	29	80.00%	75.00%
			Central institutions: Level 2A assets which are considered liquid assets for the depositing	0300	30	80.00%	75.00%
		Total unadjusted level 2B assets		0310	31		
			Asset-backed securities (residential, CQS1)	0320	32	75.00%	75.00%
			Asset-backed securities (auto, CQS1)	0330	33	75.00%	75.00%
			High quality covered bonds (RW35%)	0340	34	70.00%	70.00%
			Asset-backed securities (commercial or individuals, Member State, CQS1)	0350	35	65.00%	65.00%
			Corporate debt securities (CQS2/3)	0360	36	50.00%	50.00%
			Corporate debt securities - non-interest bearing assets (held by credit institutions for	0370	37	50.00%	50.00%
			Shares (major stock index)	0380	38	50.00%	50.00%
			Non-interest bearing assets (held by credit institutions for religious reasons) (CQS3-5)	0390	39	50.00%	50.00%
			Restricted-use central bank committed liquidity facilities	0400	40	100.00%	100.00%
			Qualifying CIU shares/units: underlying is asset-backed securities (residential or auto,	0410	41	70.00%	70.00%
			Qualifying CIU shares/units: underlying is high quality covered bonds (RW35%)	0420	42	65.00%	65.00%
			Qualifying CIU shares/units: underlying is asset-backed securities (commercial or	0430	43	60.00%	65.00%
			Qualifying CIU shares/units: underlying is corporate debt securities (CQS2/3), shares	0440	44	45.00%	45.00%
			Deposits by network member with central institution (no obligated investment)	0450	45	75.00%	75.00%
			Liquidity funding available to network member from central institution (non-specified	0460	46	75.00%	75.00%
			Central institutions: Level 2B assets which are considered liquid assets for the depositing	0470	47	75.00%	75.00%

Table 17. France: Parameters for LCR Scenario Analysis (based on EBA COREP Templates) (concluded)

Panel B. Outflow Parameters (COREP 73.00)

									ID	Basel III	Stress scenario
										040	040
OUTFLOWS								0010	1		
	OUTFLOWS FROM UNSECURED TRANSACTIONS/DEPOSITS							0020	2		
		Retail deposits						0030	3		
			deposits exempted from the calculation of outflows					0035	4	0.00%	0.00%
			deposits where the payout has been agreed within the following 30 days					0040	5	100.00%	100.00%
			deposits subject to higher outflows	category 1				0060	7	10%	10.00%
				category 2				0070	8	15%	15.00%
			stable deposits					0080	9	5.00%	5.00%
			derogated stable deposits					0090	10	3.00%	5.00%
			other retail deposits					0110	12	10.00%	10.00%
		Operational deposits	maintained for clearing, custody, cash management or other comparable	covered by DGS				0140	15	5.00%	5.00%
				not covered by DGS				0150	16	25.00%	25.00%
			maintained in the context of IPS or a cooperative network	not treated as liquid assets for the depositing institution				0170	18	25.00%	25.00%
				treated as liquid assets for the depositing credit institution				0180	19	100.00%	100.00%
			maintained in the context of an established operational relationship (other) with non-financial customers					0190	20	25.00%	25.00%
			maintained to obtain cash clearing and central credit institution services within a network					0200	21	25.00%	25.00%
		Excess operational deposits	deposits by financial customers					0204	23	100.00%	100.00%
			deposits by other customers	covered by DGS				0206	25	20.00%	20.00%
				not covered by DGS				0207	26	40.00%	40.00%
		Non-operational deposits	correspondent banking and provisions of prime brokerage deposits					0220	28	100.00%	100.00%
			deposits by financial customers					0230	29	100.00%	100.00%
			deposits by other customers	covered by DGS				0250	31	20.00%	25.00%
				not covered by DGS				0260	32	40.00%	40.00%
		Additional outflows	collateral other than Level 1 assets collateral posted for derivatives					0280	34	20.00%	20.00%
			Level 1 EHQ Covered Bonds assets collateral posted for derivatives					0290	35	10.00%	10.00%
			material outflows due to deterioration of own credit quality					0300	36	100.00%	100.00%
			impact of an adverse market scenario on derivatives transactions					0310	37	100.00%	100.00%
			outflows from derivatives					0340	38	100.00%	100.00%
			short positions	other				0370	41	100.00%	100.00%
			callable excess collateral					0380	42	100.00%	100.00%
			due collateral					0390	43	100.00%	100.00%
			liquid asset collateral exchangable for non-liquid asset collateral					0400	44	100.00%	100.00%
			loss of funding on structured financing activites	structured financing instruments				0420	46	100.00%	100.00%
				financing facilites				0430	47	100.00%	100.00%
			internal netting of client's positions					0450	48	50.00%	50.00%
		Committed facilities	credit facilities	to retail customers				0480	51	5.00%	5.00%
				to non-financial customers other than retail customers				0490	52	10.00%	10.00%
				to credit institutions	for funding promotional loans of retail			0510	54	5.00%	10.00%
					for funding promotional loans of non-			0520	55	10.00%	15.00%
					other			0530	56	40.00%	40.00%
				to regulated institutions other than credit institutions				0540	57	40.00%	40.00%
				within IPS or cooperative network if treated as liquid asset by				0560	59	75.00%	75.00%
				to other financial customers				0570	60	100.00%	100.00%
			liquidity facilities	to retail customers				0590	62	5.00%	5.00%
				to non-financial customers other than retail customers				0600	63	30.00%	30.00%
				to personal investment companies				0610	64	40.00%	40.00%
				to SSPEs	to purchase assets other than			0630	66	10.00%	10.00%
					other			0640	67	100.00%	100.00%
				to credit institutions	for funding promotional loans of retail			0660	69	5.00%	5.00%
					for funding promotional loans of non-			0670	70	30.00%	30.00%
					other			0680	71	40.00%	40.00%
				within IPS or cooperative network if treated as liquid asset by				0700	73	75.00%	75.00%
				to other financial customers				0710	74	100.00%	100.00%
		Other products and services	Uncommitted funding facilities					0731	76	100.00%	100.00%
			undrawn loans and advances to wholesale counterparties					0740	77	100.00%	100.00%
			mortgages that have been agreed but not yet drawn down					0750	78	100.00%	100.00%
			credit cards					0760	79	100.00%	100.00%
			overdrafts					0770	80	100.00%	100.00%
			planned derivatives payables					0850	82	100.00%	100.00%
			trade finance off-balance sheet related products					0860	83	5.00%	5.00%
			others					0870	84	100.00%	100.00%
		Other liabilities and due commitments	liabilities resulting from operating expenses					0890	86	0.00%	0.00%
			in the form of debt securities if not treated as retail deposits					0900	87	100.00%	100.00%
			the excess of funding to non-financial customers	the excess of funding to retail customers				0913	89	100.00%	100.00%
				the excess of funding to non financial corporates				0914	90	100.00%	100.00%
				the excess of funding to sovereigns, MLDBs and PSEs				0915	91	100.00%	100.00%
				the excess of funding to other legal entities				0916	92	100.00%	100.00%
			assets borrowed on an unsecured basis					0917	93	100.00%	100.00%
			others					0918	94	100.00%	100.00%
	OUTFLOWS FROM SECURED LENDING AND CAPITAL MARKET-DRIVEN TRANSACTIONS	Counterparty is central bank	level 1 excl. EHQ Covered Bonds					0940	97	0.00%	5.00%
			level 1 EHQ Covered Bonds collateral					0950	99	0.00%	5.00%
			level 2A collateral					0960	101	0.00%	5.00%
			level 2B asset-backed securities					0970	103	0.00%	5.00%
			level 2B covered bonds					0980	105	0.00%	5.00%
			level 2B asset-backed securities					0990	107	0.00%	5.00%
			other Level 2B assets collateral					1000	109	0.00%	5.00%
			non-liquid assets collateral					1010	111	0.00%	40.00%
		Counterparty is non-central bank	level 1 excl. EHQ Covered Bonds					1030	113	0.00%	5.00%
			level 1 EHQ Covered Bonds collateral					1040	115	7.00%	15.00%
			level 2A collateral					1050	117	15.00%	20.00%
			level 2B asset-backed securities					1060	119	25.00%	25.00%
			level 2B covered bonds					1070	121	30.00%	40.00%
			level 2B asset-backed securities					1080	123	35.00%	40.00%
			other Level 2B assets collateral					1090	125	50.00%	60.00%
			non-liquid assets collateral					1100	127	100.00%	100.00%
MEMORANDUM ITEMS	INTRA GROUP OR IPS OUTFLOWS	of which: to financial customers						1290	137	100.00%	100.00%
		of which: liabilities in the form of debt securities if not treated as retail deposits						1360	145	100.00%	100.00%

Table 18a. France: Cash Flow Analysis Scenarios: Scenario 1

Panel A. Outflow Parameters (COREP 66.01)

		CBC Initial Stock	Columns						
			Overnight		Greater than overnight up to 2	....	Greater than 5 months up to 6	...	Greater than 9 months up to 12
				Of which: Open Maturity items					
			0020	0025	0030	0160	0170	0180	0190
0005 OUTFLOWS									
Liabilities resulting from securities issued (if not treated as retail deposits)	0010								
of which: Intragroup or IPS	0011								
Unsecured bonds due	0020		50%		50%	...	50%	...	50%
Regulated covered bonds	0030		50%		50%	...	50%	...	50%
Securitisations due	0040		50%		50%	...	50%	...	50%
Other	0050		50%		50%	...	50%	...	50%
Liabilities resulting from secured lending and capital market driven transactions collateralised by (Counterparty is non - Central Bank)	0065								
Of which: Intragroup or IPS	0066								
Level 1 tradable assets	0075								
Level 1 excluding covered bonds	0085								
Level 1 central bank	0095		100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0105		100%		100%	...	100%	...	100%
Level 1 (CQS2, CQS3)	0115		100%		100%	...	100%	...	100%
Level 1 (CQS4+)	0125		100%		100%	...	100%	...	100%
Level 1 covered bonds (CQS1)	0135		100%		100%	...	100%	...	100%
Level 2A tradable assets	0145								
Level 2A corporate bonds (CQS1)	0155		100%		100%	...	100%	...	100%
Level 2A covered bonds (CQS1, CQS2)	0165		100%		100%	...	100%	...	100%
Level 2A public sector (CQS1, CQS2)	0175		100%		100%	...	100%	...	100%
Level 2B tradable assets	0185								
Level 2B ABS (CQS1)	0195		100%		100%	...	100%	...	100%
Level 2B covered bonds (CQS1-6)	0205		100%		100%	...	100%	...	100%
Level 2B: corporate bonds (CQ1-3)	0215		100%		100%	...	100%	...	100%
Level 2B shares	0225		100%		100%	...	100%	...	100%
Level 2B public sector (CQS 3-5)	0235		100%		100%	...	100%	...	100%
Other tradable assets	0245		100%		100%	...	100%	...	100%
Other assets	0251		100%		100%	...	100%	...	100%
Liabilities resulting from secured lending and capital market driven transactions collateralised by (Counterparty is Central Bank):	0252								
Level 1 tradable assets	0253		100%		100%	...	100%	...	100%
Level 2A tradable assets	0254		100%		100%	...	100%	...	100%
Level 2B tradable assets	0255		100%		100%	...	100%	...	100%
Other tradable assets	0256		100%		100%	...	100%	...	100%
Other assets	0257		100%		100%	...	100%	...	100%
Liabilities not reported in 1.2, resulting from deposits received (excluding deposits received as collateral)	0260								
Of which: Intragroup or IPS	0261								
Stable retail deposits	0270		19%	0.16149%	19%	...	19%	...	19%
Other retail deposits	0280		44%	0.44087%	44%	...	44%	...	44%
Operational deposits	0290		10%	0.51446%	10%	...	10%	...	10%
Non-operational deposits from credit institutions	0300		50%	0.524%	50%	...	50%	...	50%
Non-operational deposits from other financial customers	0310		50%	0.524%	50%	...	50%	...	50%
Non-operational deposits from central banks	0320		25%	0.218%	25%	...	25%	...	25%
Non-operational deposits from non-financial corporates	0330		25%	0.218%	25%	...	25%	...	25%
Non-operational deposits from other counterparties	0340		25%	0.218%	25%	...	25%	...	25%
FX-swaps maturing	0350		50%		50%	...	50%	...	50%
Derivatives amount payables other than those reported in 1.4	0360		50%		50%	...	50%	...	50%
Other outflows	0370		50%		50%	...	50%	...	50%
Total outflows	0380								

Table 18a. France: Cash Flow Analysis Scenarios: Scenario 1 (continued)

Panel B. Inflow Parameters (COREP 66.01)

			Columns						
		CBC Initial Stock	Overnight		Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
				Of which: Open Maturity items					
		0020	0025	0030	0160	0170	0180	0190
0389 INFLOWS									
Monies due from secured lending and capital market driven transactions collateralised by:	0390								
Of which: Intragroup or IPS	0391								
Level 1 tradable assets	0400								
Level 1 excluding covered bonds	0410								
Level 1 central bank	0420		100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0430		100%		100%	...	100%	...	100%
Level 1 (CQS2, CQS3)	0440		100%		100%	...	100%	...	100%
Level 1 (CQS4+)	0450		100%		100%	...	100%	...	100%
Level 1 covered bonds (CQS1)	0460		100%		100%	...	100%	...	100%
Level 2A tradable assets	0470								
Level 2A corporate bonds (CQS1)	0480		100%		100%	...	100%	...	100%
Level 2A covered bonds (CQS1, CQS2)	0490		100%		100%	...	100%	...	100%
Level 2A public sector (CQS1, CQS2)	0500		100%		100%	...	100%	...	100%
Level 2B tradable assets	0510								
Level 2B ABS (CQS1)	0520		100%		100%	...	100%	...	100%
Level 2B covered bonds (CQS1-6)	0530		100%		100%	...	100%	...	100%
Level 2B: corporate bonds (CQ1-3)	0540		100%		100%	...	100%	...	100%
Level 2B shares	0550		100%		100%	...	100%	...	100%
Level 2B public sector (CQS 3-5)	0560		100%		100%	...	100%	...	100%
Other tradable assets	0570		100%		100%	...	100%	...	100%
Other assets	0580		100%		100%	...	100%	...	100%
Monies due not reported in 2.1 resulting from loans and advances granted to:	0590								
Retail customers	0600		2%	0.0154%	2%	...	2%	...	2%
Non-financial corporates	0610		2%	0.0154%	2%	...	2%	...	2%
Credit institutions	0620		100%	100%	100%	...	100%	...	100%
Of which: Intragroup or IPS	0621								
Other financial customers	0630		100%	100%	100%	...	100%	...	100%
Central banks	0640		100%	100%	100%	...	100%	...	100%
Other counterparties	0650		3%	0.0154%	3%	...	3%	...	3%
FX-swaps maturing	0660		100%		100%	...	100%	...	100%
Derivatives amount receivables other than those reported in 2.3	0670		100%		100%	...	100%	...	100%
Paper in own portfolio maturing	0680		100%		100%	...	100%	...	100%
Other inflows	0690		100%		100%	...	100%	...	100%

Table 18a. France: Cash Flow Analysis Scenarios: Scenario 1 (concluded)

Panel C. Haircuts to Counter-Balancing Capacity

			Columns						
		CBC Initial Stock	Overnight	Of which: Open Maturity items	Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
			0020	0025	0030	0160	0170	0180	0190
0729 COUNTERBALANCING CAPACITY									
Level 1 tradable assets	0750								
Level 1 excluding covered bonds	0760								
Level 1 central bank	0770	100%	100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0780	98%	98%		98%	...	98%	...	98%
Level 1 (CQS2, CQS3)	0790	95%	95%		95%	...	95%	...	95%
Level 1 (CQS4+)	0800	75%	75%		75%	...	75%	...	75%
Level 1 covered bonds (CQS1)	0810	97%	97%		97%	...	97%	...	97%
Level 2A tradable assets	0820								
Level 2A corporate bonds (CQS1)	0830	85%	85%		85%	...	85%	...	85%
Level 2A covered bonds (CQS 1, CQS2)	0840	85%	85%		85%	...	85%	...	85%
Level 2A public sector (CQS1, CQS2)	0850	85%	85%		85%	...	85%	...	85%
Level 2B tradable assets	0860								
Level 2B ABS (CQS1)	0870	75%	75%		75%	...	75%	...	75%
Level 2B covered bonds (CQS1-6)	0880	75%	75%		75%	...	75%	...	75%
Level 2B corporate bonds (CQ1-3)	0890	75%	75%		75%	...	75%	...	75%
Level 2B shares	0900	75%	75%		75%	...	75%	...	75%
Level 2B public sector (CQS 3-5)	0910	75%	75%		75%	...	75%	...	75%
Other tradable assets	0920	75%	75%		75%	...	75%	...	75%
Central government (CQS1)	0930								
Central government (CQS 2 & 3)	0940								
Shares	0950								
Covered bonds	0960								
ABS	0970								
Other tradable assets	0980								
Non tradable assets eligible for central banks	0990	62%	62%		62%	...	62%	...	62%
Own issuances eligible for central banks	0991	62%	62%		62%	...	62%	...	62%
Undrawn committed facilities received	1000								
Level 1 facilities	1010	25%	25%		25%	...	25%	...	25%
Level 2B restricted use facilities	1020	25%	25%		25%	...	25%	...	25%
Level 2B IPS facilities	1030	25%	25%		25%	...	25%	...	25%
Other facilities	1040								
From intragroup counterparties	1050	25%	25%		25%	...	25%	...	25%
From other counterparties	1060	25%	25%		25%	...	25%	...	25%
Net change of Counterbalancing Capacity	1070								
Cumulated Counterbalancing Capacity	1080								
1089 CONTINGENCIES									
Outflows from committed facilities	1090								
Of which: Intragroup or IPS	1091								
Committed credit facilities	1100								
Considered as Level 2B by the receiver	1110		40%		40%	...	40%	...	40%
Other	1120		40%		40%	...	40%	...	40%
Liquidity facilities	1130		40%		40%	...	40%	...	40%
Outflows from uncommitted funding facilities	1131		0%		0%	...	0%	...	0%
Outflows due to downgrade triggers	1140		25%		25%	...	25%	...	25%
1149 MEMORANDUM ITEMS									
HQLA central bank eligible - Tradable assets	1230								
Assets reported in 3.6 that are non-HQLA central bank eligible	1241								

Table 18b. France: Cash Flow Analysis Scenarios: Scenario 2

Panel A. Outflow Parameters (COREP 66.01)

		CBC Initial Stock	Columns						
			Overnight		Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
				Of which: Open Maturity items					
		0020	0020	0025	0030	0160	0170	0180	0190
0005 OUTFLOWS									
Liabilities resulting from securities issued (if not treated as retail deposits)	0010								
of which: Intragroup or IPS	0011								
Unsecured bonds due	0020		100%		100%	...	100%	...	100%
Regulated covered bonds	0030		100%		100%	...	100%	...	100%
Securitisations due	0040		100%		100%	...	100%	...	100%
Other	0050		100%		100%	...	100%	...	100%
Liabilities resulting from secured lending and capital market driven transactions collateralised by (Counterparty is non - Central Bank)	0065								
Of which: Intragroup or IPS	0066								
Level 1 tradable assets	0075								
Level 1 excluding covered bonds	0085								
Level 1 central bank	0095		100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0105		100%		100%	...	100%	...	100%
Level 1 (CQS2, CQS3)	0115		100%		100%	...	100%	...	100%
Level 1 (CQS4+)	0125		100%		100%	...	100%	...	100%
Level 1 covered bonds (CQS1)	0135		100%		100%	...	100%	...	100%
Level 2A tradable assets	0145								
Level 2A corporate bonds (CQS1)	0155		100%		100%	...	100%	...	100%
Level 2A covered bonds (CQS1, CQS2)	0165		100%		100%	...	100%	...	100%
Level 2A public sector (CQS1, CQS2)	0175		100%		100%	...	100%	...	100%
Level 2B tradable assets	0185								
Level 2B ABS (CQS1)	0195		100%		100%	...	100%	...	100%
Level 2B covered bonds (CQS1-6)	0205		100%		100%	...	100%	...	100%
Level 2B: corporate bonds (CQ1-3)	0215		100%		100%	...	100%	...	100%
Level 2B shares	0225		100%		100%	...	100%	...	100%
Level 2B public sector (CQS 3-5)	0235		100%		100%	...	100%	...	100%
Other tradable assets	0245		100%		100%	...	100%	...	100%
Other assets	0251		100%		100%	...	100%	...	100%
Liabilities resulting from secured lending and capital market driven transactions collateralised by (Counterparty is Central Bank):	0252								
Level 1 tradable assets	0253		100%		100%	...	100%	...	100%
Level 2A tradable assets	0254		100%		100%	...	100%	...	100%
Level 2B tradable assets	0255		100%		100%	...	100%	...	100%
Other tradable assets	0256		100%		100%	...	100%	...	100%
Other assets	0257		100%		100%	...	100%	...	100%
Liabilities not reported in 1.2, resulting from deposits received (excluding deposits received as collateral)	0260								
Of which: Intragroup or IPS	0261								
Stable retail deposits	0270		5%	0.03885%	5%	...	5%	...	5%
Other retail deposits	0280		10%	0.07979%	10%	...	10%	...	10%
Operational deposits	0290		49%	0.51475%	49%	...	49%	...	49%
Non-operational deposits from credit institutions	0300		100%	100.00000%	100%	...	100%	...	100%
Non-operational deposits from other financial customers	0310		100%	100.00000%	100%	...	100%	...	100%
Non-operational deposits from central banks	0320		25%	0.21770%	25%	...	25%	...	25%
Non-operational deposits from non-financial corporates	0330		76%	1.06602%	76%	...	76%	...	76%
Non-operational deposits from other counterparties	0340		76%	1.06602%	76%	...	76%	...	76%
FX-swaps maturing	0350		100%		100%	...	100%	...	100%
Derivatives amount payables other than those reported in 1.4	0360		100%		100%	...	100%	...	100%
Other outflows	0370		100%		100%	...	100%	...	100%

Table 18b. France: Cash Flow Analysis Scenarios: Scenario 2 (continued)

Panel B. Inflow Parameters (COREP 66.01)

			Columns						
		CBC Initial Stock	Overnight		Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
				Of which: Open Maturity items					
		0020	0025	0030	0160	0170	0180	0190
0389 INFLOWS									
Monies due from secured lending and capital market driven transactions collateralised by:	0390								
Of which: Intragroup or IPS	0391								
Level 1 tradable assets	0400								
Level 1 excluding covered bonds	0410								
Level 1 central bank	0420		100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0430		100%		100%	...	100%	...	100%
Level 1 (CQS2, CQS3)	0440		100%		100%	...	100%	...	100%
Level 1 (CQS4+)	0450		100%		100%	...	100%	...	100%
Level 1 covered bonds (CQS1)	0460		100%		100%	...	100%	...	100%
Level 2A tradable assets	0470								
Level 2A corporate bonds (CQS1)	0480		100%		100%	...	100%	...	100%
Level 2A covered bonds (CQS1, CQS2)	0490		100%		100%	...	100%	...	100%
Level 2A public sector (CQS1, CQS2)	0500		100%		100%	...	100%	...	100%
Level 2B tradable assets	0510								
Level 2B ABS (CQS1)	0520		100%		100%	...	100%	...	100%
Level 2B covered bonds (CQS1-6)	0530		100%		100%	...	100%	...	100%
Level 2B: corporate bonds (CQ1-3)	0540		100%		100%	...	100%	...	100%
Level 2B shares	0550		100%		100%	...	100%	...	100%
Level 2B public sector (CQS 3-5)	0560		100%		100%	...	100%	...	100%
Other tradable assets	0570		100%		100%	...	100%	...	100%
Other assets	0580		100%		100%	...	100%	...	100%
Monies due not reported in 2.1 resulting from loans and advances granted to:	0590								
Retail customers	0600		2%	0.0154%	2%	...	2%	...	2%
Non-financial corporates	0610		2%	0.0154%	2%	...	2%	...	2%
Credit institutions	0620		100%	100%	100%	...	100%	...	100%
Of which: Intragroup or IPS	0621								
Other financial customers	0630		100%	100%	100%	...	100%	...	100%
Central banks	0640		100%	100%	100%	...	100%	...	100%
Other counterparties	0650		3%	0.0154%	3%	...	3%	...	3%
FX-swaps maturing	0660		100%		100%	...	100%	...	100%
Derivatives amount receivables other than those reported in 2.3	0670		100%		100%	...	100%	...	100%
Paper in own portfolio maturing	0680		100%		100%	...	100%	...	100%
Other inflows	0690		100%		100%	...	100%	...	100%

Table 18b. France: Cash Flow Analysis Scenarios: Scenario 2 (concluded)

Panel C. Haircuts to Counter-Balancing Capacity

			Columns						
		CBC Initial Stock	Overnight	Of which: Open Maturity items	Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
			0020	0025	0030	0160	0170	0180	0190
0729 COUNTERBALANCING CAPACITY									
Level 1 tradable assets	0750								
Level 1 excluding covered bonds	0760								
Level 1 central bank	0770	100%	100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0780	98%	98%		98%	...	98%	...	98%
Level 1 (CQS2, CQS3)	0790	95%	95%		95%	...	95%	...	95%
Level 1 (CQS4+)	0800	75%	75%		75%	...	75%	...	75%
Level 1 covered bonds (CQS1)	0810	97%	97%		97%	...	97%	...	97%
Level 2A tradable assets	0820								
Level 2A corporate bonds (CQS1)	0830	85%	85%		85%	...	85%	...	85%
Level 2A covered bonds (CQS 1, CQS2)	0840	85%	85%		85%	...	85%	...	85%
Level 2A public sector (CQS1, CQS2)	0850	85%	85%		85%	...	85%	...	85%
Level 2B tradable assets	0860								
Level 2B ABS (CQS1)	0870	75%	75%		75%	...	75%	...	75%
Level 2B covered bonds (CQS1-6)	0880	75%	75%		75%	...	75%	...	75%
Level 2B corporate bonds (CQ1-3)	0890	75%	75%		75%	...	75%	...	75%
Level 2B shares	0900	75%	75%		75%	...	75%	...	75%
Level 2B public sector (CQS 3-5)	0910	75%	75%		75%	...	75%	...	75%
Other tradable assets	0920	75%	75%		75%	...	75%	...	75%
Central government (CQS1)	0930								
Central government (CQS 2 & 3)	0940								
Shares	0950								
Covered bonds	0960								
ABS	0970								
Other tradable assets	0980								
Non tradable assets eligible for central banks	0990	62%	62%		62%	...	62%	...	62%
Own issuances eligible for central banks	0991	62%	62%		62%	...	62%	...	62%
Undrawn committed facilities received	1000								
Level 1 facilities	1010	25%	25%		25%	...	25%	...	25%
Level 2B restricted use facilities	1020	25%	25%		25%	...	25%	...	25%
Level 2B IPS facilities	1030	25%	25%		25%	...	25%	...	25%
Other facilities	1040								
From intragroup counterparties	1050	25%	25%		25%	...	25%	...	25%
From other counterparties	1060	25%	25%		25%	...	25%	...	25%

Table 18c. France: Cash Flow Analysis Scenarios: Scenario 3

Panel A. Outflow Parameters (COREP 66.01)

		CBC Initial Stock	Columns						
			Overnight		Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
				Of which: Open Maturity items					
		0020	0025	0030	0160	0170	0180	0190	
0005 OUTFLOWS									
Liabilities resulting from securities issued (if not treated as retail deposits)	0010								
of which: Intragroup or IPS	0011								
Unsecured bonds due	0020		50%		50%	...	50%	...	50%
Regulated covered bonds	0030		50%		50%	...	50%	...	50%
Securitisations due	0040		50%		50%	...	50%	...	50%
Other	0050		50%		50%	...	50%	...	50%
Liabilities resulting from secured lending and capital market driven transactions collateralised by (Counterparty is non - Central Bank)	0065								
Of which: Intragroup or IPS	0066								
Level 1 tradable assets	0075								
Level 1 excluding covered bonds	0085								
Level 1 central bank	0095		100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0105		100%		100%	...	100%	...	100%
Level 1 (CQS2, CQS3)	0115		100%		100%	...	100%	...	100%
Level 1 (CQS4+)	0125		100%		100%	...	100%	...	100%
Level 1 covered bonds (CQS1)	0135		100%		100%	...	100%	...	100%
Level 2A tradable assets	0145								
Level 2A corporate bonds (CQS1)	0155		100%		100%	...	100%	...	100%
Level 2A covered bonds (CQS1, CQS2)	0165		100%		100%	...	100%	...	100%
Level 2A public sector (CQS1, CQS2)	0175		100%		100%	...	100%	...	100%
Level 2B tradable assets	0185								
Level 2B ABS (CQS1)	0195		100%		100%	...	100%	...	100%
Level 2B covered bonds (CQS1-6)	0205		100%		100%	...	100%	...	100%
Level 2B: corporate bonds (CQ1-3)	0215		100%		100%	...	100%	...	100%
Level 2B shares	0225		100%		100%	...	100%	...	100%
Level 2B public sector (CQS 3-5)	0235		100%		100%	...	100%	...	100%
Other tradable assets	0245		100%		100%	...	100%	...	100%
Other assets	0251		100%		100%	...	100%	...	100%
Liabilities resulting from secured lending and capital market driven transactions collateralised by (Counterparty is Central Bank):	0252								
Level 1 tradable assets	0253		100%		100%	...	100%	...	100%
Level 2A tradable assets	0254		100%		100%	...	100%	...	100%
Level 2B tradable assets	0255		100%		100%	...	100%	...	100%
Other tradable assets	0256		100%		100%	...	100%	...	100%
Other assets	0257		100%		100%	...	100%	...	100%
Liabilities not reported in 1.2, resulting from deposits received (excluding deposits received as collateral)	0260								
Of which: Intragroup or IPS	0261								
Stable retail deposits	0270		5%	0.03885%	5%	...	5%	...	5%
Other retail deposits	0280		10%	0.07979%	10%	...	10%	...	10%
Operational deposits	0290		15%	0.12304%	15%	...	15%	...	15%
Non-operational deposits from credit institutions	0300		50%	0.52374%	50%	...	50%	...	50%
Non-operational deposits from other financial customers	0310		50%	0.52374%	50%	...	50%	...	50%
Non-operational deposits from central banks	0320		25%	0.21770%	25%	...	25%	...	25%
Non-operational deposits from non-financial corporates	0330		25%	0.21770%	25%	...	25%	...	25%
Non-operational deposits from other counterparties	0340		25%	0.21770%	25%	...	25%	...	25%
FX-swaps maturing	0350		50%		50%	...	50%	...	50%
Derivatives amount payables other than those reported in 1.4	0360		50%		50%	...	50%	...	50%
Other outflows	0370		50%		50%	...	50%	...	50%

Table 18c. France: Cash Flow Analysis Scenarios: Scenario 3 (continued)

Panel B. Inflow Parameters (COREP 66.01)

			Columns						
		CBC Initial Stock	Overnight		Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
				Of which: Open Maturity items					
		0020	0025	0030	0160	0170	0180	0190
0389 INFLOWS									
Monies due from secured lending and capital market driven transactions collateralised by:	0390								
Of which: Intragroup or IPS	0391								
Level 1 tradable assets	0400								
Level 1 excluding covered bonds	0410								
Level 1 central bank	0420		100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0430		100%		100%	...	100%	...	100%
Level 1 (CQS2, CQS3)	0440		100%		100%	...	100%	...	100%
Level 1 (CQS4+)	0450		100%		100%	...	100%	...	100%
Level 1 covered bonds (CQS1)	0460		100%		100%	...	100%	...	100%
Level 2A tradable assets	0470								
Level 2A corporate bonds (CQS1)	0480		100%		100%	...	100%	...	100%
Level 2A covered bonds (CQS1, CQS2)	0490		100%		100%	...	100%	...	100%
Level 2A public sector (CQS1, CQS2)	0500		100%		100%	...	100%	...	100%
Level 2B tradable assets	0510								
Level 2B ABS (CQS1)	0520		100%		100%	...	100%	...	100%
Level 2B covered bonds (CQS1-6)	0530		100%		100%	...	100%	...	100%
Level 2B: corporate bonds (CQ1-3)	0540		100%		100%	...	100%	...	100%
Level 2B shares	0550		100%		100%	...	100%	...	100%
Level 2B public sector (CQS 3-5)	0560		100%		100%	...	100%	...	100%
Other tradable assets	0570		100%		100%	...	100%	...	100%
Other assets	0580		100%		100%	...	100%	...	100%
Monies due not reported in 2.1 resulting from loans and advances granted to:	0590								
Retail customers	0600		2%	0.0154%	2%	...	2%	...	2%
Non-financial corporates	0610		2%	0.0154%	2%	...	2%	...	2%
Credit institutions	0620		100%	100%	100%	...	100%	...	100%
Of which: Intragroup or IPS	0621								
Other financial customers	0630		100%	100%	100%	...	100%	...	100%
Central banks	0640		100%	100%	100%	...	100%	...	100%
Other counterparties	0650		3%	0.0154%	3%	...	3%	...	3%
FX-swaps maturing	0660		100%		100%	...	100%	...	100%
Derivatives amount receivables other than those reported in 2.3	0670		100%		100%	...	100%	...	100%
Paper in own portfolio maturing	0680		100%		100%	...	100%	...	100%
Other inflows	0690		100%		100%	...	100%	...	100%

Table 18c. France: Cash Flow Analysis Scenarios: Scenario 3 (concluded)

Panel C. Haircuts to Counter-Balancing Capacity

		CBC Initial Stock	Columns						
			Overnight		Greater than overnight up to 2 days	....	Greater than 5 months up to 6 months	...	Greater than 9 months up to 12 months
				Of which: Open Maturity items					
		0020	0025	0030	0160	0170	0180	0190
0729 COUNTERBALANCING CAPACITY									
Level 1 tradable assets	0750								
Level 1 excluding covered bonds	0760								
Level 1 central bank	0770	100%	100%		100%	...	100%	...	100%
Level 1 (CQS 1)	0780	90%	90%		90%	...	90%	...	90%
Level 1 (CQS2, CQS3)	0790	85%	85%		85%	...	85%	...	85%
Level 1 (CQS4+)	0800	60%	60%		60%	...	60%	...	60%
Level 1 covered bonds (CQS1)	0810	90%	90%		90%	...	90%	...	90%
Level 2A tradable assets	0820								
Level 2A corporate bonds (CQS1)	0830	80%	80%		80%	...	80%	...	80%
Level 2A covered bonds (CQS 1, CQS2)	0840	80%	80%		80%	...	80%	...	80%
Level 2A public sector (CQS1, CQS2)	0850	80%	80%		80%	...	80%	...	80%
Level 2B tradable assets	0860								
Level 2B ABS (CQS1)	0870	50%	50%		50%	...	50%	...	50%
Level 2B covered bonds (CQS1-6)	0880	50%	50%		50%	...	50%	...	50%
Level 2B corporate bonds (CQ1-3)	0890	50%	50%		50%	...	50%	...	50%
Level 2B shares	0900	50%	50%		50%	...	50%	...	50%
Level 2B public sector (CQS 3-5)	0910	50%	50%		50%	...	50%	...	50%
Other tradable assets	0920	75%	75%		75%	...	75%	...	75%
Central government (CQS1)	0930								
Central government (CQS 2 & 3)	0940								
Shares	0950								
Covered bonds	0960								
ABS	0970								
Other tradable assets	0980								
Non tradable assets eligible for central banks	0990	50%	50%		50%	...	50%	...	50%
Own issuances eligible for central banks	0991	50%	50%		50%	...	50%	...	50%
Undrawn committed facilities received	1000								
Level 1 facilities	1010	25%	25%		25%	...	25%	...	25%
Level 2B restricted use facilities	1020	25%	25%		25%	...	25%	...	25%
Level 2B IPS facilities	1030	25%	25%		25%	...	25%	...	25%
Other facilities	1040								
From intragroup counterparties	1050	25%	25%		25%	...	25%	...	25%
From other counterparties	1060	25%	25%		25%	...	25%	...	25%
Net change of Counterbalancing Capacity	1070								
Cumulated Counterbalancing Capacity	1080								
1089 CONTINGENCIES									
Outflows from committed facilities	1090								
Of which: Intragroup or IPS	1091								
Committed credit facilities	1100								
Considered as Level 2B by the receiver	1110		20%		20%	...	20%	...	20%
Other	1120		20%		20%	...	20%	...	20%
Liquidity facilities	1130		20%		20%	...	20%	...	20%
Outflows from uncommitted funding facilities	1131		0%		0%	...	0%	...	0%
Outflows due to downgrade triggers	1140		75%		75%	...	75%	...	75%

Table 19. France: Stress Test Matrix (STeM)		
A. Banking Sector: Solvency Stress Test		
Top-down by IMF		
1. Institutional Perimeter	Institutions included	• 7 SI banks, 4 of which are G-SIBs
	Market share	• Around 96 percent of the banking sector assets
	Data and baseline date	• Data vintage: 2024 Q4 (starting point for PL, balance sheet and capital). • Supervisory data: Bank balance sheet and supervisory statistics (including FINREP and COREP), information on interest rate risk in the banking book (IRRBB), short-term exercise (STE), provided by the ECB. PDs for non-financial corporates are estimated based on the Corporate Stress Test (see: Global Corporate Stress Tests—Impact of the COVID-19 Pandemic and Policy Responses) and complemented for some foreign exposures with Expected Default Frequency sourced from Moody's. Further supervisory and market information might be provided, including the probability of defaults by credit portfolios and information on debt securities (duration, yield, etc.). Household analysis relies on the 2021 Household Finance and Consumption Survey. • Market and publicly available data, such as information from ECB statistical data warehouse on funding and lending rates for new business (front-book) by type of asset and funding portfolios. Capital IQ and Orbis for corporate sector analysis. • Scope of consolidation: banking activities of the consolidated banking group for banks having their headquarters in France. • Coverage of sovereign and non-sovereign securities exposures: debt securities measured through fair value (FVPL and FVOCI) and amortized cost (AC) account.

Table 19. France: Stress Test Matrix (STeM) (continued)		
A. Banking Sector: Solvency Stress Test		
Top-down by IMF		
2. Channels of Risk Propagation	Methodology	• FSAP team satellite models and methodologies. • For internally modelled exposures (IRB), projection of PiT and TTC PDs, PiT and DT LGDs, EAD, and RWA. For SA exposures, projection of new flows of defaulted exposures and RWA based on risk weights for performing and non-performing loans separately. • Balance-sheet regulatory approach. • Provisioning for IRB and SA are modeled using IFRS9 transition matrix approach. • Market risk impact from the revaluation of trading assets (FVPL) and securities classified as fair value thorough other comprehensive income (FVOCI) securities assessed using a modified duration approach or sensitivities to market risk factors (Greeks) with hedging strategy considered. Equity and derivative exposures assessed using sensitivities to market risk factors (Greeks). • Time-to-repricing approach for Interest income and expense
	Satellite models for macro-financial linkages	• Models for credit losses, funding costs, lending rates • Within EA, for household and corporate, analysis of PD using micro-data at individual household (based on household survey HFCS) and non-financial corporate (based on commercial corporate database). Outside of EA, EDF or the Corporate Stress Test model will be used as proxies for PDs. LGD shocks for collateralized exposures will be linked to paths for real estate prices in the scenario using a smoothing factor to account for the TTC regulatory approach. • Interest income to be projected at portfolio level using a structural approach applying interest rate shocks on new originations and loans' repricing ladder to outstanding volumes. • Funding costs to be projected at portfolio level using funding structure by product (retail and wholesale deposits, secured and unsecured debt securities, repo, etc.) and maturity bucket (overnight vs. term).

Table 19. France: Stress Test Matrix (STeM) (continued)		
A. Banking Sector: Solvency Stress Test		
Top-down by IMF		
3. Tail Shocks	Stress test horizon	• 2024 Q2– 2027 Q2 (three years)

	Scenario	• Three scenarios:
		  • A baseline scenario drawn from the October 2024 WEO macroeconomic projections.
		  • Adverse scenario 1: A geopolitical scenario (or higher-for-longer) featuring an escalation of geopolitical conflicts.
		  • Adverse scenario 2: A recessionary scenario showing a synchronized global slowdown amplified by sovereign debt distress in EA.
		  • The two adverse scenarios rely on GFM, a structural macro-econometric model of the world economy, disaggregated into forty national economies, documented in Vitek (2018).
		  • Real GDP paths in the geopolitical scenario (respectively recession scenario) entail a shock over two years of 2.4 times (respectively 2.7 times) the standard deviation of 2-year real GDP growth over 1970-2024.
		  • The market risk shocks are modeled as an add-on materializing at the beginning of the first year of each adverse scenario

	Second-round effects and Sensitivity analysis	• Counterfactual policy analysis of household borrower-based instruments and mortgage default • Sovereign spreads shocks incorporated in the market risk scenarios • Exposures to large counterparties are documented • Variations on scenario analysis to inform calibration of the positive neutral CCyB

Table 19. France: Stress Test Matrix (STeM) (continued)		
A. Banking Sector: Solvency Stress Test		
Top-down by IMF		
4. Risks and Buffers	Risk covered	• Risks covered include credit (on loans and debt securities), market (valuation impact of debt instruments through repricing and credit spread risk as well as the P&L impact of net open positions in market risk factors such as foreign exchange risks) and interest rate risk on the banking book (IRRBB).
	Behavioral Adjustment	• For the growth of the banks' balance sheet over the stress-test horizon, a quasi-static approach is used. Asset allocation and the composition of funding remain the same, whereas the balance sheet grows in line with the nominal GDP paths of major geographical exposures. However, to prevent the banks from deleveraging, the rate of change of balance sheets is set at a floor of zero percent. This constraint is binding in the adverse scenario. FX shock from revaluation effects on foreign currency loans specified in the stress test scenario. • In projecting RWAs, standardized and IRB portfolios are differentiated. For the standardized portfolios, RWAs changed due to the balance sheet growth, new inflows of non-performing loans, exchange rate movements, and the conversion of a portion of off-balance sheet items (undisbursed credit lines and guarantees) to on-balance sheet items. For the IRB portfolios, through-the-cycle-PDs, downturn LGDs and EAD for each asset class/industry are used to project risk weights.
	Calibration of risk parameters	• Interest income from nonperforming loan is not accrued. • Dividends are paid out by banks that remain profitable and adequately capitalized throughout the stress. The dividend rate will be the average ratio between observed dividends and profits after tax over the last five years. The tax rate will be set at 30 percent in line with 2023 EBA methodology.
5. Regulatory and Market-Based Standards and Parameters		• National regulatory framework Basel III regulatory minima on CET1 (4.5 percent) and include any requirements due to systemic buffers (SyRB, G-SII buffer, O-SII buffer), with and without capital conservation buffer (CCoB), and Pillar II requirement. Leverage ratio during the stress test horizon against the 3 percent Basel III minimum requirement.

Table 19. France: Stress Test Matrix (STeM) (continued)

A. Banking Sector: Solvency Stress Test		
Top-down by IMF		
6. Reporting Form for Results	Output presentation	• Capital path under various scenarios by groups of banks, categorized by business model. • System-wide capital shortfall. • Number of banks and percentage of banking assets in the system that fall below regulatory minima or breach capital buffers. • Outputs also include information on impact of different result drivers, including profit components.

B. Banking Sector: Liquidity Test		
Domain		**Framework**
		Top-Down by IMF
1. Institutional perimeter	Institutions included	7 SI banks, of which four are G-SIBs.
	Market share	Around 96 percent of the banking sector assets.
	Data and horizon	Data vintage: 2024 Q4 Data: Supervisory data from ITS files (FINREP, COREP) Scope of consolidation: Consolidated group basis. Perimeter of the banking group (CRD V). Insurance activities are excluded; banking associates are included.
2. Methodology	Methodology	LCR -based tests, using regulatory parameters and more severe scenarios. Breakdown by significant currency, where available. Cashflow-based liquidity stress test. Breakdown by significant currency, where available. Share of large depositors to describe concentration risks.
	Stress test horizon	30 days for LCR-based tests, and up to 1 year for cashflow analysis.
3. Type of analyses	Scenario analysis	Various stress scenarios are considered, with varying intensity of adverse liquidity conditions. Main risks analyzed are market upheaval and tightening of market liquidity conditions (linked to solvency adverse scenario, where possible), deposit run-offs, outflows from top funding sources. Reverse stress tests

Table 19. France: Stress Test Matrix (STeM) (continued)

B. Banking Sector: Liquidity Test		
Domain		**Framework**
		Top-Down by IMF
4. Buffers	Behavioral adjustments	Liquidity from the central bank is not considered.
	Buffers	Capacity of banks to generate liquidity from inflows and from assets under stress (i.e., counter-balancing capacity).
5. Regulatory standards	Regulatory/accounting and market-based standards	For LCR -based tests, the hurdle rate is set at 100 percent at the aggregate currency level (per Basel III and domestic regulation). For cashflow analysis, the outcomes of interest are the Net Liquidity Position and the survival period.
6. Reporting format for results	Output presentation	Outputs include (1) Average LCR, Net Liquidity Position and survival period, (2) Number of institutions with LCR below regulatory limits.
C. Mutual Funds Sector: Liquidity Risk		
Top-down Stress Test by FSAP Team —Assumptions		
1. Institutional perimeter	Institutions included	• All open-end debt-oriented schemes
		• Supervisory data includes: 1) Fund level characteristics and AUM, 2) Cash flow data, 3) Fund investment portfolio, and 4) bond market trading data
		• Other commercial data sources: Bloomberg
		• From December 2017 to September 2024
2. Channels of risk propagation	Methodology	• The liquidity resilience of funds is measured by the Redemption Coverage Ratio which is based on value of high-quality liquid assets and calibration of redemption shock
		• The calibration of redemption shock uses both the historical simulation and flow-performance approach
		• Under the historical simulation approach, instantaneous shocks simulated based on historical net flows under fund homogeneity, fund heterogeneity and fund family assumptions

Table 19. France: Stress Test Matrix (STeM) (continued)		
C. Mutual Funds Sector: Liquidity Risk		
Top-down Stress Test by FSAP Team —Assumptions		
		• With the flow-performance approach, exogenous market shocks trigger the change of NAV which lead to additional redemption outflows
		• The redemption shock triggered from the change of NAV from macroeconomic scenarios which will lead to the change in interest rates and credit spreads
		• The market impact is estimated based on assumptions on different fund liquidation strategies and segmental-market characteristics
		• A second-round redemption shock will be triggered if the market sale causes significant price impacts that lead to the asset devaluation of funds
3. Tail shocks	Scenario analysis	• This analysis includes two scenarios:
		• A baseline scenario uses the historical simulation approach that calibrates the redemption shock based on time series cash flow data under four years horizon.
		• The adverse scenario with exogenous market shock that triggers the asset depreciation through interest rate risk and creates additional redemption shocks.
		• The funds will react to the redemption shock with two liquidation approach: prorate approach and waterfall approach
		• The market impact from asset liquidation is estimated under three market scenarios based on the volume of market trading activity at its peak, normal and low.
	Sensitivity analysis	• Reverse stress test which shows the total number of funds failure with levels of redemption shock apply to funds homogeneously

Table 19. France: Stress Test Matrix (STeM) (concluded)		
C. Mutual Funds Sector: Liquidity Risk		
Top-down Stress Test by FSAP Team —Assumptions		
4. Risk and buffers	Risk factors assessed	• Interest rate risk
		• Market risk
		• Liquidity risk
5. Reporting format for results	Output Presentation	• Redemption Coverage Ratio and liquidity shortfalls on fund level
		• Number of funds that cannot survive the shocks (with the RCR ratio below one and liquidity shortfall larger than zero)
		• Total value of assets sold under different scenarios
		• The percent of price decline under different market conditions and the mitigation effect of central bank lending facilities

References

AMF (2015). Study of liquidity in French Bond Markets.
AMF (2021). 2021 Markets and Risk Outlook.
AMF (2024). 2024 Markets and Risk Outlook.
AFME (2025). AFME Government Bond Data Report Q4 2024 & 2024FY.
BdF (2023). French sovereign debt liquidity: main factors, recent developments and resilience during the Covid crisis. May-June.
Bouchaud, Jean-Philippe (2010). Price Impact.
Capota, Laura and Darpeix, Pierre-Emmanuel (2023). Flow-Performance Relationship of French Bond Funds. November AMF.
Copin, Pol and Jean Dalbard (2022). France's Sovereign Debt Issuance Strategy, Tresor Economics No. 297, January.
Darpeix, Pierre-Emmanuel (2021). Econometric Analysis of the Determinants of Redemption Flows on French Money Market Funds during the 2020 Crisis. July AMF.
Darpeix, Pierre-Emmanuel, Rosspopoff, Bastien and Sacauflaire, Jacques (2024). Monitoring of the Adoption of Liquidity Management Tools by French Funds.
ECB (2023). Sovereign bond markets and financial stability: examining the risk to absorption capacity. November.
ECB (2024). Hedge funds: good or bad for market functioning? September.
ECB (2024). Survey of Dealer Banks on Intermediation Capacity in EGB Repo and Trading Markets. March. ECB Bond Market Contact Group.
ESMA (2024). EU Securities Markets 2023. May.
Greppmair, Stefan and Stephan Jank (2022). Securities Lender of Last Resort: On the Causal Effects of Central Banks' Securities Lending Facilities, ECB.
Van Dijk, Floris (2024). The Missing Data Bias in Modern Fund Portfolio Data, Standard and Poors Global Market Intelligence.