



WEST AFRICAN ECONOMIC AND MONETARY UNION

FINANCIAL SECTOR ASSESSMENT PROGRAM

FINANCIAL SYSTEM STABILITY ASSESSMENT

May 2022

This paper on the West African Economic and Monetary Union (WAEMU) was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the Union. It is based on the information available at the time it was completed in May 2022.

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West African Economic and Monetary Union (WAEMU)— Financial Sector Assessment Program and Financial Sector Stability Assessment

FOR IMMEDIATE RELEASE

WASHINGTON, DC – May 12, 2022: The Executive Board of the International Monetary Fund (IMF) concluded the Financial Sector Assessment Program (FSAP)¹ with the WAEMU on April 27, 2022, without convening formal discussions.² The Financial Sector Stability Assessment (FSSA) report was completed on April 13, 2022. The report is based on the work of joint IMF/World Bank FSAP virtual missions to the WAEMU completed between January 2021 and February 2022.

The FSSA concluded that the WAEMU's financial system functions within an improved regulatory framework. Furthermore, despite political instability in several member states, the policy response to the COVID-19 pandemic has been effective. Banks have withstood the crisis well, helped by liquidity support from Central Bank of West African States (BCEAO) and policies to support domestic demand.

The report found that the banking sector is largely resilient to macroeconomic shocks. Yet vulnerabilities remain. Banks' capital buffers do not adequately consider exposure concentrations. Particularly, a marked increase in sovereign exposures has exacerbated credit concentration and interest rate risks. The FSSA report recommended the use of capital surcharge requirements under Basel Pillar 2 to address these risks. Liquidity risks are also amplified by the underdevelopment of the regional bond market, which needs to be developed further. A timely introduction of the Basel III liquidity requirements would help banks internalize liquidity risks.

An ambitious regulatory reform has consolidated the prudential base and established the conditions for a further strengthening of banking supervision. The FSAP found that the supervisory framework has become more risk oriented, but enforcement should be strengthened, supervisory resources increased, and the supervisor's independence statutorily assured.

Further critical reforms need to be introduced. A bank resolution framework has been established but not implemented. The FSSA recommended that the framework be applied promptly to address already undercapitalized, nonviable institutions. Other recommendations addressed establishing procedures for the BCEAO emergency liquidity assistance (ELA) and measures to mitigate balance sheet risks. The supervisory program for Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT) also needs to be further reformed to fully adopt a risk-based approach and enhance onsite inspections.

¹ The Financial Sector Assessment Program (FSAP), established in 1999, is a comprehensive and in-depth assessment of a country's financial sector. FSAPs provide input for Article IV consultations and thus enhance Fund surveillance. FSAPs are mandatory for the 47 jurisdictions with systemically important financial sectors and otherwise conducted upon request from member countries. The key findings of an FSAP are summarized in a Financial System Stability Assessment (FSSA).

² The Executive Board takes decisions under its lapse-of-time procedure when the Board agrees that a proposal can be considered without convening formal discussions.



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April 13, 2022

KEY ISSUES

Context: The Financial Sector Assessment Program (FSAP) was conducted amid an economic rebound two years into the COVID-19 pandemic that had a limited impact on the financial sector. Several member states have experienced political instability, with coups in Burkina Faso and Mali leading to economic sanctions for the latter, and an attempted coup in Guinea-Bissau. Yet, short of further political deterioration, economic recovery is expected to persist. The last FSAP was conducted in 2008.

Findings: The banking sector appears resilient to shocks to economic growth and inflation, but banks' capital buffers are not commensurate with factors that amplify credit risk, including exposure concentration and interbank linkages. Banks' risk exposures, quality of risk management, and buffer availability are highly heterogeneous. Sovereign exposures have increased considerably since the 2008 FSAP and exacerbate the sovereign-bank nexus. Some banks are now also highly dependent on refinancing from the Central Bank of West African States (BCEAO). Bank regulation has been largely aligned with the Basel framework, supervision has become more risk oriented, and a resolution framework was introduced. However, certain banks' persistent non-compliance with solvency regulations is yet to be addressed decisively.

Policies: The authorities should introduce targeted Pillar 2 capital surcharges and liquidity requirements for banks most exposed to concentration and liquidity risks. A more consistent use of sanctions and, whenever needed, resolution/liquidation tools is warranted to address compliance issues on a timely basis. Supervisory independence should be enhanced via a revision of the Banking Commission (CBU) statutes and supervisory resources should continue to be reinforced. The BCEAO should introduce an emergency liquidity assistance (ELA) framework backed by appropriate risk mitigation mechanisms and conditions for ELA use.

- The FSAP team was led by Romain Veyrune (International Monetary Fund, IMF) and Pierre-Laurent Chatain (World Bank, WB), and included deputy mission chiefs Silvia Iorgova (IMF) and Jean Michel Lobet (WB); Thierry Bayle, Stéphane Couderc, André Kahn, Romain Lafarguette, Moustapha Mbohou Mama, and Alice Mugnier (all IMF); Tulu Balkir, Antoine Bavandi, Alex Berg, Caroline Cerruti, Dorothée Delort, Chiara Teresa Maria Lunetti, Fredesvinda Fatima Montes, Graciela Miralles Murciego, Antonia Menezes Preciosa, Ou (Owen) Nie, Tanjit Sandhu Kaur (all WB); external experts Gonçalo Coelho, Sophie Imani Poinot, Jay Purcell, Philippe Roussel-Galle, Maria Chiara Malaguti, Patrice Berge Vincent, and Jean-Marie Weck.
- The mission met with the BCEAO, the Secretariat General of the CBU (SGCB),¹ CBU Supervisory Board members, the Securities Agency of the WAEMU (UT), the Regional Public Investment and Financial Markets Board (CREPMF), the Deposit Guarantee and Resolution Fund (FGDR-UMOA), the Credit Reporting Bureau (BIC), and representatives of other public sector institutions, financial institutions, industry organizations, and the private sector.
- FSAPs assess the stability of the financial system as a whole and not that of individual institutions. They are intended to help countries identify key sources of systemic risk in the financial sector and implement policies to enhance its resilience to shocks and contagion. Certain categories of risk affecting financial institutions, such as operational or legal risk, or risk related to fraud, are not covered in FSAPs.
- This report was prepared by Romain Veyrune and Silvia Iorgova, with contributions from the FSAP team members.

¹ The CBU is the common banking supervisor for the WAEMU.

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This report is based on the work of the Financial Sector Assessment Program (FSAP) mission conducted remotely from January 2021 to February 2022. The FSAP findings were discussed with the authorities in January 2022.

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Glossary

AML/CFT	Anti-Money Laundering/Combating the Financing of Terrorism
BCEAO	Central Bank of West African States (In French: <i>Banque Centrale des États de l'Afrique de l'Ouest</i>)
BIC	Credit Reporting Bureau (In French: <i>Bureaux d'information sur le crédit</i>)
BOAD	West African Development Bank (In French: <i>Banque Ouest-Africaine de Développement</i>)
CBU	Banking Commission of the West African Monetary Union (In French: <i>Commission Bancaire de l'UMOA</i>)
CM	Council of Ministers of the WAEMU
CREPMF	Regional Public Investment and Financial Markets Board (In French: <i>Conseil Régional de l'épargne publique et des marchés financiers</i>)
CSF-UMOA	Financial Stability Committee of the WAEMU (In French: <i>Comité de Stabilité Financière dans l'UMOA</i>)
ECOWAS	Economic Community of West African States
ELA	Emergency Liquidity Assistance
FGDR-UMOA	Deposit Guarantee and Resolution Fund (In French: <i>Fonds de Garantie des Dépôts et de Résolution</i>)
FSAP	Financial Sector Assessment Program
HQLA	High Quality Liquid Assets
IMF	International Monetary Fund
LCR	Liquidity Coverage Ratio
ML/TF	Money Laundering and Terrorism Financing
NPL	Nonperforming Loan
PEP	Politically Exposed Person
RAM	Risk Assessment Matrix
SGCB	General Secretariat of the CBU (In French: <i>Secrétariat General de la CBU</i>)
SME	Small and Medium-sized Enterprise
SVT	Primary Dealers in Treasury Securities (In French: <i>Spécialistes en Valeurs du Trésor</i>)
UT	Securities Agency of the WAEMU (In French: <i>UMOA-Titres</i>)
WAEMU	West African Economic and Monetary Union

EXECUTIVE SUMMARY

1. The WAEMU's financial sector has undergone important structural changes since the 2008 FSAP. The size of the financial sector has increased significantly; regional banking groups have come to play a dominant role; and banks have accumulated considerable portfolios of government securities. Banks' asset quality and capitalizations have improved but should be further enhanced. The banking sector remains heterogenous in terms of solvency, risk exposures, risk management, and performance. Prudential regulation has been enhanced and aligned with Basel II/III standards, but its implementation is in progress. The banking sector has withstood the impact of COVID-19, with support from the authorities, but the fiscal space is now reduced.

2. Credit risk is amplified by asset concentration and interconnectedness. Banks are exposed to risks from a deterioration of health, security, and/or macroeconomic conditions. Stress tests, conducted based on growth-at-risk and inflation-at-risk models, indicate that a severe but plausible deterioration of economic growth or a rise in inflation, on their own, would entail moderate recapitalization needs due to the relatively small size of banks' assets as percent of regional GDP and the soundness of large banks. Many smaller banks would be affected. Yet, a concurrent economic growth slowdown and an inflation spike could further elevate these needs. Importantly, the concentration of bank exposures to private borrowers and sovereigns and banks' interconnectedness—via the interbank market and common exposures—could amplify the impact of credit shocks and raise recapitalization needs, particularly for certain member countries.

3. Liquidity risks are amplified by the inadequate development of the regional secondary bond market and interest rate risks have been on the rise. Liquidity risk is exacerbated by deposit concentration and the limited liquidity of the secondary market for government securities. Several banks are persistently dependent on BCEAO refinancing. Banks' exposure to interest rate risk has likely increased due to the rise of the share of government securities on their balance sheets, whose maturities tend to be longer than banks' funding.

4. These vulnerabilities call for a well-calibrated response. Concentration and interest rate risks, including those linked to sovereign exposures, should be covered by capital surcharges under Basel Pillar 2 to account for heterogeneity in banks' risk profiles. The timely introduction of the Basel III liquidity ratios will help banks internalize liquidity risk. The supervisor's autonomy and resources should be strengthened to support implementation of risk-based supervision. The supervisor should impose monetary sanctions more consistently, publish censure letters, and refrain from repeated use of stays of proceedings. Resolution/liquidation tools should be applied promptly to address undercapitalized, nonviable institutions. The resources of the Deposit Guarantee and Resolution Fund (FGDR-UMOA) and the autonomy of the CBU's Resolution College and the FGDR-UMOA should be reinforced. Banks dependent on BCEAO financing should be required to prepare funding plans. The BCEAO should adopt procedures for emergency liquidity assistance (ELA) and measures to mitigate balance sheet risks. The supervisory program for Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT) should be further reformed to fully adopt a risk-based approach and further enhance the capacity and methodology for onsite inspections.

5. Despite its deepening, the financial sector should be developed further to support inclusive growth. The access to finance for small and medium-sized enterprises (SMEs) should be improved via: (i) more efficient debt recovery procedures; (ii) increased competition among financial intermediaries; and (iii) further development of the credit reporting system to enhance transparency on debtor creditworthiness. Capital market development would benefit from stronger participation by social security institutions, which would be facilitated by the review of their governing frameworks. Public banks' business models should refocus to underserved populations and their governance should be enhanced to boost their financial soundness and contribution to economic growth. The region's payment infrastructures have now been set up, but the BCEAO should promote retail payment digitization to curb transaction costs relative to cash.

6. The authorities should develop a green strategy for the financial sector. The strategy should put priority on establishing a dedicated governance structure, mobilizing adequate resources, and developing capacity for evaluating the magnitude of climate risks and their impact on the financial system. In the medium term, supervisors should set prudential expectations on the inclusion of climate risk in financial institutions' risk management and disclosure frameworks; adopt a taxonomy for green assets; and encourage financial institutions to commit to region-wide climate goals. Issuance of green sovereign debt instruments would stimulate the green finance market.

Table 1. WAEMU: FSAP Key Recommendations

	Counterparty	Priority
Banking Sector Supervision and Regulation		
Modify the CBU's governing documents to institute independence of its Supervisory Board from member states and require state representatives to serve in a non-voting capacity or establish selection of commissioners based on professional qualifications.	BCEAO/ Council of Ministers (CM)	ST
Make the WAEMU Court of Justice the appellate jurisdiction for the CBU Supervisory and Resolution Boards' decisions.	BCEAO/CM	MT
Continue strengthening the number and capacity of staff at the Secretariat General of the Banking Commission the WAEMU (SGCB) assigned to supervisory functions.	BCEAO	ST
Impose capital surcharges for concentration risk and interest rate risk (Pillar 2).	CBU	ST
Make more consistent use of monetary sanctions, publish sanctions and censures, and avoid repeated stays of proceedings.	CBU	ST
Publish a guidance note for banks on the preparation of stress tests.	BCEAO/CBU	ST
Strengthen AML/CFT supervision by fully adopting a risk-based approach and enhancing the capacity and methodology for onsite supervision.	CBU	ST
Macroprudential Framework and Tools		
Designate the BCEAO as the "macroprudential authority" and introduce a mechanism for national authorities to raise legitimate concerns.	BCEAO/ CSF-UMOA	ST
Fill residual data gaps, including on the financial conditions of nonfinancial corporations, households, and the real estate sector.	BCEAO	MT
Strengthen the monitoring of WAEMU's Financial Stability Committee (CSF-UMOA) recommendations by introducing a "comply or explain" mechanism.	CSF-UMOA	MT
Systemic Liquidity		
Introduce the Basel III liquidity ratios and: (i) institute a government securities haircut; (ii) count required reserves toward liquid assets; and (iii) require banks to regularly report residual maturities on assets and liabilities, and interest rates.	BCEAO	ST
Impose a higher liquidity coverage ratio (LCR) for banks with riskier profiles (Pillar 2).	CBU	MT
Support the development of the regional bond market by: (i) introducing a development objective in medium-term borrowing strategies; (ii) unifying the central depositories; and (iii) reforming the status of the primary dealers.	BCEAO/UT/ CREPMF	MT
Introduce: (i) funding plans to manage certain banks' excessive dependence on BCEAO funding; (ii) haircuts and concentration limits for BCEAO eligible assets adapted to the underlying risks; and (iii) a framework for emergency liquidity assistance (ELA).	BCEAO	ST
Resolution and Crisis Management		
Liquidate or resolve undercapitalized, nonviable credit institutions on a timely basis.	CBU	ST
Finalize banks' resolution plans in accordance with best practices.	CBU	ST
Strengthen the independence of the: (i) Resolution Board from the Supervisory Board and member states; and (ii) FGDR, particularly from active banking industry members.	CM/CBU/FGDR	MT
Adopt a program for enhancing systemically important banks' loss-absorption capacity; speed the attainment of FGDR-UMOA's target insurance reserves coverage of eligible deposits; enable FGDR-UMOA recourse to member states in case of resource inadequacy.	BCEAO/CBU CM/FGDR	MT
Climate Risk		
Adopt a strategy for managing climate risks, including raising supervisors' and financial institutions' awareness of climate-related issues.	BCEAO/CBU	ST
Define the prudential expectations for financial institutions' integration of climate and environmental risks in risk management systems and disclosures.	BCEAO/CBU	MT

Note: ST = Short Term (1 to 2 years); MT = Medium Term (3 to 5 years).

CONTEXT

A. Macroeconomic Developments

7. WAEMU has experienced a decade of sustained economic growth. The growth—which averaged 6.4 percent during 2012–2019—was stimulated by private investment, spurred by public spending and robust credit growth (Figure 1; Table 2). External demand remains an important growth driver, but rising economic diversification has reduced regional economies’ dependence on raw materials exports and, thus, their exposures to terms-of-trade shocks.

8. The authorities took measures to mitigate the negative impact of the COVID-19 pandemic on economic growth (Table 3). Authorities increased fiscal spending to support domestic demand and public deficits increased by 3.5 percent of GDP in 2020, reversing the process of fiscal consolidation. Growth in 2020 slowed to 2 percent. The BCEAO reduced the policy rate by 50 basis points to ease monetary policy. It also fully met banks’ short-term refinancing needs and expanded the eligible collateral pool to accommodate the sharply raised demand for precautionary liquidity. Banks were permitted to reschedule 3.1 percent of private sector loans until end-2020, of which only 6 percent (less than a fifth of a percentage point of total loans) were reclassified as nonperforming by end-September 2021. Most measures, except the new bank refinancing mechanism, have been phased out.

9. The economic outlook appears favorable but is subject to significant risks.² The economy is on the rebound, with GDP growth expected to have bounced back to 5.7 percent in 2021. Bank credit also rebounded, growing by nearly 11 percent year-on-year at end-October 2021. The strong economic activity and supply disruptions have spurred inflationary pressures, with the region-wide headline inflation exceeding the BCEAO’s target band since April 2021. The region is altogether vulnerable to a rise in global commodity prices. Recent global price increases could lead to higher interest rates to counteract inflation and defend the currency peg to the euro, particularly in case of a significant fall of official FX reserves, and lead to higher funding costs for regional sovereigns. Other important risks include a deterioration in the regional security situation (as already seen in Mali and Burkina Faso) and/or a resurgence of the COVID-19 pandemic. Official reserves are at a comfortable level, but narrower fiscal space could limit the policy capacity to respond to external demand shocks.³

² The economic outlook discussed here reflects the assessment of the 2021 WAEMU Article IV consultation, based on data and projections through end-2021. As of March 2022, an update reflecting the recent geopolitical situation indicated a limited impact on the Union’s growth outlook with the impact transmitted via imported inflation and an external demand decline.

³ All WAEMU states are at medium or high risk of debt distress per the IMF’s debt sustainability analyses and have sovereign ratings below investment grade.

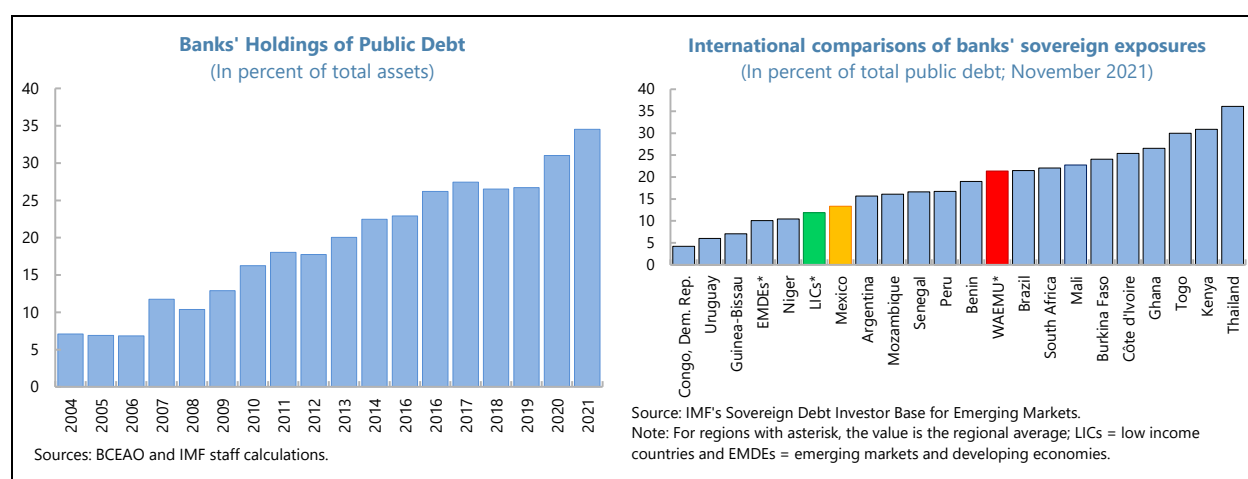
B. Financial Sector Structure

10. The WAEMU's financial system has grown considerably since the 2008 FSAP but is still dominated by the banking sector (Figure 2). It has doubled in size since 2008, with total assets at 69 percent of regional GDP at end-2020. Banks remain the principal actor in the financial system (74 percent of total assets) and follow a traditional business model of taking deposits and providing mostly short to medium-term credit to nonfinancial corporations as well as financing public spending via the regional bond market.

11. Credit growth has been steady but uneven across the region. Private sector credit has increased by an average of 12 percent a year between 2010 and 2019 but still accounts for only 25 percent of region-wide GDP and is uneven across countries. Lending to the private sector grew faster than the economy until 2018 in line with the need for financial deepening, but the credit gap has since turned negative. Agricultural (mostly seasonal) lending is limited, at 2 percent of private sector loans, despite the importance of agricultural production in some member countries, notably Burkina Faso (cotton) and Côte d'Ivoire (cacao). The availability of financial data has improved with the development of a regional credit reporting bureau (BIC) and a corporate financial analysis unit, but still does not support banks' ability to diversify their credit portfolios.

12. Important structural changes have redefined the financial sector since the 2008 FSAP. These include:

- *Conglomeration of the banking sector:* Banking groups—primarily pan-African and regional groups—now account for 86 percent of banking assets.
- *Rise in sovereign risk exposures:* The share of sovereign debt reached 35 percent of banks' total assets at end-2021 (up from 7 percent in 2004). WAEMU's member governments have overall become more dependent on the region's banks to finance public spending, with banks' share of public debt exceeding the average for emerging markets and low-income countries.



- *Banks' shift to a structural liquidity deficit:* The share of BCEAO short-term financing increased to 13 percent of total bank assets in 2021 from 2 percent in 2008, reflecting the discontinuation of monetary financing of the government deficits in 2010. From the perspective of vulnerabilities, this does not pose a concern since liquidity deficits can prompt more robust bank liquidity management and interbank market development.

C. Recommendations of the 2008 FSAP

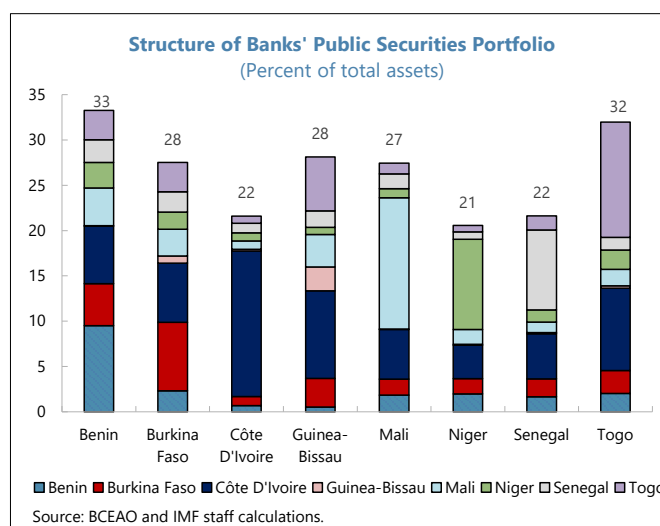
13. The authorities have implemented most recommendations of the 2008 FSAP (Table 4). Key achievements include: (i) the increase in banks' minimum capital requirement; (ii) the reform of the BCEAO and the CBU—an important step toward strengthening regulatory independence and enforcement capacity; (iii) the transition toward the Basel II/III regulatory framework; (iv) the introduction of risk-based supervision; and (v) introduction of a new AML/CFT regulatory framework via the adoption of the Uniform Law in 2015 and its implementing regulations in 2017.

FINANCIAL STABILITY ASSESSMENT

A. Financial Sector Risks and Vulnerabilities

14. Credit risk is the most important risk faced by the system. Nonperforming loans (NPLs) are high, even though they have declined to 11.2 percent of total loans in November 2021 from 20 percent at end-2006. This improvement in asset quality is less than expected after a long period of strong GDP and credit growth, all else equal. The absence of effective mechanisms for NPL recovery and the uneven enforcement of regulatory write-off rules contribute to persistent asset quality issues. There are also considerable disparities across countries and institutions, with NPLs in some member countries as high as 20 percent of loans.

15. The high concentration of banks' lending and sovereign exposures exacerbates credit risks. In their lending activities, banks are exposed to a limited set of private counterparties. Banks' single largest exposure exceeds the limit of 55 percent of regulatory capital (the current WAEMU standard) for over a third of reporting banks, and the 25 percent large exposure limit under the Basel standard for two thirds of the banks (Figure 3). The sovereign concentration risk is even more pronounced, especially in Benin and Togo. Banks' securities portfolios are partially diversified due to holdings of various member states' debt. Yet, the



diversification effects are limited, given the bias toward holding own-country and Côte d'Ivoire debt securities, and the possible correlation of member states' vulnerabilities.

16. Contagion risks in the WAEMU are high, buoyed by the presence of multiple interconnectedness channels (Figure 4). These include: (i) mostly unsecured direct interbank exposures; and (ii) considerable common exposures to private and sovereign borrowers, including cross-border investments in other member states' debt securities (e.g., Côte d'Ivoire).

17. The rise in banks' sovereign exposures and greater reliance on BCEAO short-term funding have contributed to a rise in interest rate risk. Historically, the prevalence of short-term private credit claims in banks' portfolios curbed this risk as maturity mismatches were minimal. The sharp rise in government debt holdings and expanded use of BCEAO short-term funding have raised banks' asset-liability mismatches and the risk of a contraction in their interest rate margins should interest rates rise.

18. Banks' capital buffers are limited and uneven across banks (Figure 5; Table 5).⁴ The system-wide capital adequacy ratio has risen, reaching 12.4 percent at end-June 2021, up from 10.5 percent at end-2018. This reflects an increase in the regulatory capital requirement in the context of the transition toward Basel II/III. Yet, banks' capital positions are weaker than they seem. Full provisioning of NPLs would mostly absorb existing Tier 1 capital buffers, curbing banks' capacity to cope with risk amplifiers (e.g., concentration and contagion) and emerging risks (e.g., interest rate risk).⁵ Disparities among institutions also persist, with 18 banks (10.2 percent of banks' assets) not complying with the solvency norms at end-June 2021.

19. Liquidity risks are exacerbated by the underdevelopment of the regional bond markets (Figure 6). Banks' funding, largely based on customer deposits, has been stable. Yet the heavy skew of banks' funding base toward large deposits—with the five largest depositors on average accounting for 25 percent of deposits—amplifies the impact of liquidity shocks. The illiquidity of the secondary markets for government securities hampers banks' ability to mitigate such shocks. It also stands in the way of developing the repo market, which offer a more robust form of interbank funding than the prevalent unsecured transactions. Finally, banks do not actively use debt issuances to curtail maturity mismatches and interest rate risks.

20. The quality of banks' internal risk management systems is heterogeneous.⁶ Only 35 percent of banks systematically require approval by their risk management department before making a loan. Banks also do not uniformly develop formal audit plans or risk maps. Credit risks are monitored via analysis of borrowers' financial statements and internal ratings, but credit risk analysis tools are rudimentary and suffer from the lack of borrower data. Few banks use external ratings and

⁴ The capital buffers include capital in excess of the minimum 8.25 percent capital adequacy requirement.

⁵ Provisions at end-2020 stood at 65 percent of NPLs, a level that may be insufficient to compensate for the high uncertainty of banks' debt recoveries, given inefficiencies in the legal system.

⁶ The findings in this paragraph are based on a survey conducted by the FSAP.

reporting bureaus. Only 50 of 152 banks report conducting regular solvency and liquidity stress tests, which are often limited in terms of scenarios and coverage.

21. Climate risk in the region is recognized as important but is inadequately monitored.

The WAEMU countries, particularly those in the Sahel region, are highly exposed to the effects of climate change. At the sectoral level, the agriculture sector—particularly the production of cotton—is already experiencing its adverse impact. Banks' exposures to the sector are limited and generally covered by government guarantees. Only less than a third of banks consider themselves capable of identifying assets that are directly exposed to climate risks.

B. Banking System Stress Tests

22. Solvency tests evaluated the resilience of the banking system under a severe adverse scenario (Figure 7; Appendices II and III). The adverse and baseline scenarios were estimated via a “growth-at-risk” model, which assumed a U-shaped post-COVID-19 recovery under the adverse scenario and a V-shaped recovery under the baseline scenario.^{7,8} The adverse scenario entails an accelerated fiscal adjustment; a regionwide resurgence of the COVID-19 pandemic; a deterioration in the region's security situation; an external shock due to surging commodity prices; and a climate shock that captures temperature variation, frequency of catastrophic events, and agricultural production. Regional real GDP growth cumulatively declines by 15 percentage points relative to the baseline over four years (2.3 standard deviations from historical mean in the peak year of stress).

23. The solvency test results indicate moderate system-wide recapitalization needs but vulnerabilities for many small banks. Probabilities of default were estimated by bank type (with banks clustered via a statistical model) to account for heterogeneity within the sector and by degree of risk (estimated by quantile regression). In the adverse scenario, banks' capital adequacy ratios could decline to 5.4 percent. Recapitalization needs are estimated to be limited, at up to 1.1 percent of regional GDP, reflecting the small size of banks' risk weighted assets and the soundness of larger banks.⁹ This range is largely similar across the region (in terms of national GDP), except for Guinea Bissau and Togo where higher vulnerabilities and the larger size of the banking sector (in the case of Togo) put recapitalization needs at close to 3 percent of national GDP. Region-wide, the vulnerabilities center on small banks, 35 of which see their capital positions fall below the minimum requirement in the adverse scenario, joining another 20 banks that are already undercapitalized.

24. Concentration risks pose an additional challenge for banks in the region, accounting for significant recapitalization needs in some countries. A reverse stress test estimated a

⁷ The “growth-at-risk” model is a density regression model that projects the future distribution of real GDP growth conditional on a set of macrofinancial factors. The impact of a shock on banks' capital was estimated at various risk levels (percentiles) of the distribution, with the 10th percentile of the results presented here.

⁸ The estimated growth-at-risk baseline growth was centered around the IMF World Economic Outlook projections of October 2021.

⁹ The recapitalization needs reflect the capital needed to bring banks' regulatory capital above the minimum 8.25 percent capital adequacy requirement whenever the losses in the adverse scenario exceed existing capital buffers.

continuum of scenarios entailing a deterioration in the quality of banks' largest exposures up to a "breaking point" of full depletion of the capital buffers (as defined for the solvency test). Region-wide, most banks' capital buffers are found inadequate to cover the loss of even their single largest exposure. Recapitalization needs due to losses on the largest and up to the ten largest exposures are at 1 to 3 percent of regional GDP (Figure 3). At the country level, these needs range from 1.5 percent of national GDP for Côte d'Ivoire, the largest and most diversified economy in the Union, to 7 percent for Togo.

25. Many banks are exposed to contagion risks, but recapitalization needs should be modest. Contagion tests combine a credit shock and a funding shock propagated in the regional network via interbank and common exposures.¹⁰ The failure of WAEMU's largest banking group would lead to the failure of 23 other banks. Yet, the recapitalization needs from a failure of all interbank positions would be small, at 0.3 percent of regional GDP. These needs are also small at the country level, at less than 0.2 percent of national GDP, except for Burkina Faso (close to 1 percent) and, to a lesser extent, Togo (Figure 8; Table 7). Recapitalization needs rise to about 0.8 percent of regional GDP in case of concomitant defaults of banks' 10 largest common private exposures or defaults on debt payments due in 2021 and 2022 by the largest common sovereign exposure.

26. Interest rate stress tests suggest that inflation and, indirectly, higher interest rates have an impact on banks' solvency. An "inflation-at-risk" model linked inflation to domestic and global macrofinancial conditions and evaluated the impact on banks' profitability and solvency. An adverse scenario assumed an inflation uptick to 7 percent in the first year and a gradual reduction to the BCEAO's 2-percent target (the baseline) over four years. The test results suggest that banks' return on assets would decline by 2.5 percentage points. Capital adequacy ratios would decline to 3.6 percent, with recapitalization needs reaching 1.5 percent of regional GDP (Figure 9). Higher inflation could exacerbate the impact of a growth slowdown on banks' solvency (as evaluated in the solvency test) and thus further increase recapitalization costs.

27. Liquidity test results show that banks' liquidity gaps under stress are moderate, but the capacity to withstand liquidity pressures is heterogeneous. Stress tests of liquidity coverage ratios (LCR) assessed banks' short-term resilience to sudden deposit outflows. In the event of a severe stress, most banks (58 of 91) are unable to withstand the cash outflows (Figure 10). Yet, the system-wide liquidity gap, even in the most adverse scenario, appears manageable at 2.1 percent of GDP. The inability to offset liquidity risks is most pronounced among small banks and the banks of certain member countries.

C. Policies to Reduce Vulnerabilities

28. An additional capital requirement should be calibrated to discourage banks' excessive concentration of sovereign exposures. The calibration should be nonlinear, with the requirement increasing gradually beyond a minimum concentration threshold based on the level of a bank's exposure to a specific sovereign relative to its risk-weighted assets (Figure 11). The additional capital

¹⁰ The contagion tests are based on the model of Espinosa-Vega and Sole (2010).

requirement should be based on Basel Pillar 2 or, alternatively, on Pillar 1 with an accompanying macroprudential rule. The difference in the two approaches relates to the institution in charge (the CBU for Pillar 2 and the BCEAO for Pillar 1) and the extent of public disclosure (the Pillar 1 approach entails publication of regulations).

29. The supplementary capital requirement could be extended to cover other risk types, including:

- **Large exposures to private borrowers.** The additional requirement (Pillar 2) has the advantage of accounting for more specific concentration factors, such as the correlation of risks between borrowers and sectoral exposures. It is an important complement to the Basel large exposure limit—which the authorities are strongly encouraged to implement as planned by 2023—to offset concentration risks in the banking sector.
- **Interest rate risk.** The additional requirement (Pillar 2) should be commensurate with the maturities and interest rate mismatches in banks’ balance sheets, which necessitates measuring these on a regular basis.

30. The mission supports the authorities’ efforts to encourage banks to internalize liquidity risks. An LCR requirement is expected to be introduced soon and then gradually increased to 100 percent by 2028. It is important that the requirement abides by the following:

- The haircuts on high-quality liquid assets (HQLA) should reflect the assets’ market liquidity, as revealed by liquidity indicators, to achieve risk equivalence. If the regulator opts not to apply different haircuts across sovereign issuers, a uniform haircut should be introduced at a minimum.
- Required reserves could also be counted toward HQLA without applying a discount since they are available to absorb temporary liquidity needs.¹¹
- Over time, LCR requirements should be differentiated based on banks’ relative liquidity risk profiles under the Basel Pillar 2 approach.

31. The introduction of Basel liquidity ratios will require a systematic data collection process by the supervisor. To permit the introduction of higher Pillar 2 requirements on banks more prone to larger outflows, the regulator should develop capacity to monitor the distribution of monthly changes in banks’ various funding sources. Introducing the long-term liquidity ratio should entail regular reporting requirements on the residual maturities of banks’ assets and liabilities to enable ongoing monitoring of maturity mismatches.

¹¹ See [Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools](#).

FINANCIAL SECTOR SUPERVISORY FRAMEWORK

A. System-level Oversight

Institutional Architecture

32. WAEMU’s institutional framework for financial stability and the legal mechanisms underpinning its functioning have seen substantial progress since the 2008 FSAP. Institutional reforms have clarified the mandates of the BCEAO and the CBU and strengthened the CBU’s legal autonomy and enforcement powers. In addition to the objective of preserving price stability, the BCEAO has explicitly been charged with the core task of ensuring financial stability. The law on the banking regulatory framework has established an overarching framework for the supervision of banks’ activities, which has been made more proactive and risk based with the gradual implementation of the Basel II/III framework since 2016. A macroprudential policy framework, a bank resolution regime, and a deposit guarantee fund—whose mandate was extended to bank resolution funding—have been introduced.

33. The CBU’s independence from member states should be strengthened. The principle of independence, which prohibits CBU members from receiving instructions from external entities, including member states, should be explicitly enunciated in the CBU’s governing documents (specifically the Annex to the CBU’s governing Convention). The CBU’s governing documents should also stipulate that commissioners serving on the Supervisory Board because of their status or position in a WAEMU member state’s administration (eight of the 16 members) should do so in a non-voting capacity. As an alternative, the CBU’s composition could be amended to increase representation of CM-nominated commissioners based on professional qualifications. Finally, maintaining the CM’s appellate jurisdiction over CBU decisions raises institutional independence concerns. As per good practices, such decisions should only be appealed before the WAEMU’s Court of Justice, which also has jurisdiction on these matters.

Macroprudential Policy

34. Since the 2008 FSAP, the BCEAO has implemented key elements of WAEMU’s macroprudential policy framework. The Financial Stability Committee of the WAEMU (CSF-UMOA), which was created in 2010, includes all regional financial sector regulators and is charged with conducting regular assessments of systemic risks, recommending macroprudential measures, and ensuring coordination across the various authorities responsible for financial sector oversight.

35. The macroprudential policy framework applicable to banks, introduced in 2010, includes appropriate instruments. These include capital surcharges (e.g., a countercyclical buffer, a conservation buffer, and a systemic buffer) and measures to contain credit growth applied to loans secured by real estate collateral (e.g., ceilings on loan-to-value and debt-service coverage ratios).¹²

¹² The systemic buffer is applied solely to regional systemically important institutions.

Among these instruments, only the countercyclical buffer has never been activated, reflecting limited vulnerabilities amid the cyclical slowdown in credit growth.

36. The framework for monitoring systemic risks is well defined but would benefit from closing important data gaps and monitoring sectoral vulnerabilities. The BCEAO follows a wide range of indicators and regularly conducts macroprudential stress tests to assess systemic vulnerabilities. Yet, the analyses of vulnerabilities in the nonfinancial corporate and household sectors are limited and would benefit from more extensive data collection on indebtedness and repayment capacity. The BCEAO could capitalize on the ongoing reforms of the financial reporting centers to establish a continuous data collection mechanism.

37. Several aspects of the institutional framework should be revised to enhance the effectiveness of macroprudential policymaking:

- The BCEAO should be designated as the macroprudential authority responsible *inter alia* for activating the countercyclical buffer, in line with its financial stability mandate and in view of banks' predominant role in the financial sector, while allowing national authorities to raise legitimate concerns in the context of the CSF-UMOA.
- The CSF-UMOA should be granted powers to require from macroprudential decision-making entities to "comply or explain" implementation of CSF-UMOA recommendations, with time limits for regulators to implement the proposed measures or explain failure to do so.
- The BCEAO should strengthen its capacity to analyze and monitor sectoral vulnerabilities and cover data collection gaps.
- The CSF-UMOA should communicate regularly to the public its systemic risk analyses and policy decisions to support a more transparent macroprudential policy.

B. Banking Supervision and Regulation

38. The BCEAO has undertaken an ambitious regulatory reform. The 2017 publication of four circulars on governance, risk management, internal control, and compliance has aligned the regulatory environment more closely with international best practices and have imposed stricter regulatory requirements on credit institutions. Substantial progress has been made on aligning regulatory capital requirements with Basel standards. The regulatory framework on liquidity risk management standards, published in 2017, appears complete and consistent with the Basel Core Principles. This regulatory effort has consolidated the prudential base and established the conditions for strengthened supervision.

39. The offsite supervision capacity for assessing banking sector risks should be enhanced. Specifically, off-site supervision should conduct cross-cutting analyses more frequently and its systemic risk map should be further developed. The stress testing expertise of the Secretariat General of the CBU (SGCB) should be strengthened to ensure adequate risk oversight. The methodology for rating credit institutions should be amended to: (i) account for market and interest rate risks; and (ii)

weigh risk factors by their relative importance, with a higher weight for concentration risk, given its importance in banks' risk profiles. The robustness and performance of the rating system should be assessed on a regular basis.

40. The resources of the CBU and its secretariat should be strengthened. The SGCB teams are experienced and qualified, but their capacity should be strengthened further to respond adequately to the changing banking sector landscape, including the rising complexity and stronger presence of cross-border groups, which give rise to new risk types. Continued IT investments will be needed to optimize and automate the off-site supervision's toolkit.

41. The supervisory authority's preventive efforts should be accompanied by vigorous deterrent actions. The CBU should strengthen the frequency and intensity of onsite supervision, particularly the inspection of banks' governance and risk management. The CBU has various types of sanctions at its disposal, which it can apply separately or jointly. Yet, it has not been sufficiently strict toward entities that violate prudential regulations over extended time periods, particularly in enforcing the minimum capital requirements. The CBU tends to rely on unpublished written censures and on stays of proceedings—at times used repeatedly. Censures and sanctions should be published to enhance their effectiveness, with monetary sanctions used more frequently. Repeated stays of proceedings should be avoided to the extent possible.

C. Supervision of Money Laundering and Terrorism Financing Risks

42. Despite important reforms to enhance the supervisory framework for anti-money laundering/combating the financing of terrorism (AML/CFT), significant weaknesses persist. The CBU has made important reforms to its AML/CFT supervisory program following the adoption of a new Uniform Law in 2015 and the issuance of implementing regulations in 2017. These include the introduction of a new overall supervisory risk assessment model that assigns risk ratings to each bank, the administration of an AML/CFT-specific bank questionnaire, and the issuance of updated onsite inspection checklists.¹³ Yet, significant weaknesses persist: (i) the offsite supervision program for AML-CFT is underdeveloped and not fully risk based; (ii) the AML/CFT-related inputs to the risk assessment model are unduly limited; (iii) the AML/CFT onsite inspection program requires methodological improvements in certain key areas, including to distinguish between lower- and higher-risk domestic politically exposed persons (PEPs); and (iv) the CBU does not cooperate effectively with key partners in and outside the region.

43. The authorities should undertake further steps to fully implement the AML/CFT supervisory program based on a risk-based approach and enhance supervisory capacity. These include: (i) expanding the role of offsite supervision and moving to a risk-based model; (ii) requiring banks to submit, at least annually, basic clientele statistics to serve as additional ML/TF risk indicators, including on the number of foreign customers and high-risk domestic PEPs, and residents of higher-risk regions or countries; (iii) strengthening the onsite inspection program by enhancing the methodology with respect to politically exposed persons, suspicious transaction reporting, and

¹³ The risk ratings include global ratings and ratings specific to Money Laundering and Terrorism Financing (ML/TF).

targeted financial sanctions; (iv) improving domestic and international cooperation by eliminating obstacles to information exchange between the CBU and national financial intelligence units, and making better use of existing powers and tools for information exchange with foreign counterparts; and (v) considering the establishment of an internal pool of AML/CFT expertise to further develop AML/CFT supervisory capacity.

SYSTEMIC LIQUIDITY

44. The secondary market for government securities should be deepened to reduce banks' liquidity risk. Greater asset liquidity would help banks to mitigate liquidity shocks and support the development of the more resilient secured markets. In this context, it is important to: (i) add secondary market development as an objective in member states' medium-term debt strategies; (ii) develop an institutional investor base to foster greater and more stable securities demand; (iii) address the market segmentation associated with the syndication process (in particular, unify the central depository); (iv) review the rights and obligations of primary dealers, notably their role as market makers; and (v) strengthen cooperation between the UT and the CREPMF to promote higher transparency and supervision standards in all market segments.

45. Certain banks' excessive dependence on BCEAO refinancing should be addressed via a requirement to develop funding plans. Any bank that exceeds a predefined threshold of dependence on BCEAO refinancing should be required to prepare a funding plan that is reviewed and monitored by the BCEAO and the CBU. Under the plan, the bank would be expected to reduce BCEAO financing to a predetermined threshold by controlling balance sheet growth and actively raising customer funds.

46. The BCEAO's collateral framework should set further haircuts on eligible assets based on risk type. The objective is to maintain diversity of eligible assets to preserve banks' adequate access to refinancing but also—through the application of haircuts—ensure risk equivalence across the various types of eligible assets to protect the BCEAO's balance sheet. The haircuts should reflect credit and liquidity risk, and cover government securities and private claims. Government securities' haircuts for credit risk should be based on sovereign ratings, with a larger haircut for unrated debt. The BCEAO should also introduce concentration limits to ensure diversity of accepted collateral.

47. The BCEAO should introduce an ELA framework as a financial stability measure. Under ELA, the BCEAO could provide emergency liquidity to solvent, viable banks that face temporary liquidity pressures but have exhausted collateral eligible for monetary policy operations and all other funding sources. The BCEAO would provide ELA based on an expanded collateral pool, with potential risks to the BCEAO offset by risk-control measures and conditionality that entails a repayment plan prepared by the beneficiary bank. The financing terms should discourage use of the ELA, other than as a last resort, without jeopardizing the user's solvency. Pursuant to its financial stability mandate, the BCEAO would be responsible for the ELA but would cooperate with the supervisor to assess counterparties' solvency and impose conditionality.

CRISIS MANAGEMENT AND BANK RESOLUTION

48. A bank resolution framework has been established but not implemented; yet already nonviable institutions need to be promptly addressed. The framework was introduced in 2015 but has not been put into practice, despite the presence of several banks that have been in serious violation of prudential regulations or under provisional administration for several years, with no prospect of returning to viability within a reasonable timeframe. The framework is quite comprehensive but should be extended to include liquidation in the resolution toolkit and appropriate safeguards for creditors in resolution. Importantly, undercapitalized, nonviable credit institutions that should be promptly liquidated or resolved.

49. The priority for the Resolution Board is to finalize banks' resolution plans. The publication of the regulatory texts in 2020 has permitted banks to begin preparing preventive resolution plans. The CBU's approval of the initial resolution plans for systemic institutions and financial corporations is ongoing, but the authorities need to complete the review of these plans without further delay and ensure that they are supported by reasonable funding arrangements to ensure their credibility. The urgency of preparing the resolution plans and establishing dialogue with relevant foreign resolution authorities require mobilizing adequate resources at the CBU.

50. The decision-making independence of the key stakeholders in the financial safety net should be strengthened. This relates to: (i) the independence of the CBU Resolution College relative to the Supervisory College and to national authorities; and (ii) the independence of the FGDR, with respect to active members of the banking industry. As for the Supervisory College, the review of appeals against decisions of the Resolution College should be reserved for WAEMU's Court of Justice, which has legal competency to determine their legality.¹⁴

51. The availability of funding resources for bank resolution should be strengthened. The systemic institutions' loss-absorption capacity appears inadequate, requiring further efforts to ensure availability of liabilities that can absorb losses in the event of resolution without threatening financial instability. The FGDR's reserves are insufficient to contribute to resolution funding without compromising its key mandate of guaranteeing deposits in case of liquidation. Accordingly, an ambitious strategy is needed to accelerate the FGDR's ability to attain a reasonable target for coverage of eligible deposits with available reserves. A recourse mechanism should also be established to enable the FGDR to tap member states' resources for resolution funding or reimbursement of insured depositors in case of liquidation.

¹⁴ Actions of the Court of Justice should not result in the reversal of measures taken by the resolution authority, in line with [FSB's Key Attributes of Effective Resolution Regimes for Financial Institutions, 5.4-5.5](#).

FINANCIAL SECTOR DEVELOPMENT¹⁵

52. A multipronged strategy, mindful of financial stability implications, should be developed to improve access to finance. The lack of adequate SME funding opportunities is a key impediment to inclusive growth. Financial access could be improved via: (i) more efficient debt enforcement procedures; (ii) further effort to extend the credit bureaus' information; and (iii) steps to foster competition in the financial sector. Competition-enhancing measures should establish a level playing field across private and public banks, with formal analyses assessing regulatory impact on competition conditions, conscious of possible adverse financial stability implications. Finally, social security institutions, which manage close to 5 percent of regional GDP, could play a more active role in developing the capital market as institutional investors.

53. The WAEMU has established a solid regional payment system, but further steps to foster use of novel payment methods would be beneficial. The payment system has been functioning well. Yet, further digitalization of retail payments would help reduce transaction costs relative to the mostly cash-based economy and improve welfare, including for poorer populations. Several national treasuries in the WAEMU region plan to issue electronic money to better serve populations with limited access to digital financial services and to accelerate the availability of public sector funds. The legal framework governing the payment system should be revamped to support new payment methods and operators, including fintech firms, and to protect customers and safeguard financial integrity.

54. The governance of public banks should be strengthened to increase their contribution to economic development in the Union. Public banks play a minor role in the region, accounting for a small proportion of financial sector assets. Yet, they can play an important role for funding underbanked segments, such as SMEs—a role that requires a refocusing of their traditional business model. Compliance issues with prudential regulations, including capital adequacy, persistently experienced by some public banks should be addressed decisively.

55. The authorities should adopt a green strategy for the financial system to address risks and development challenges. The strategy should establish a dedicated governance structure and mobilize commensurate resources. It should focus on developing adequate capacity for evaluating the impact of climate risks on the financial system, and on establishing outreach among supervisors and financial institutions. In the medium term, supervisors should define their prudential expectations on the inclusion of climate risk in financial institutions' risk management and disclosure frameworks. They should also develop a uniform taxonomy for green assets and reach out to financial institutions to seek out their commitment to the WAEMU's and the Paris Accord's climate goals and encourage issuance of green sovereign debt to stimulate the green finance market.

¹⁵ Further details could be found in the technical notes prepared by the World Bank in the context of this FSAP.

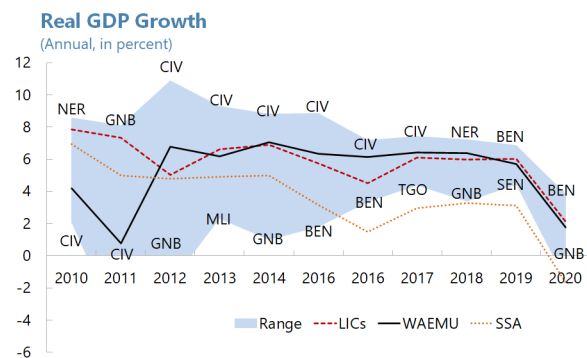
AUTHORITIES' VIEWS

56. The authorities appreciated the open and constructive discussions of the FSAP. They noted the progress identified by the FSAP, including on the regulatory framework; the banking supervision processes, methods, and capacities; and financial digitalization. The authorities broadly supported the FSAP recommendations and made the following observations:

- Further thought should be given on how best to calibrate the member states' representation at the CBU. The current system of representation is congruous with the WAEMU's institutional architecture and does not challenge the supervisor's independence.
- The reinforcement of supervisory resources is important for enhancing bank supervision. The authorities have undertaken important initiatives in this regard, including introducing a dedicated IT budget and further developing supervisory capacity with the support of the Regional Banking Training and Studies Center and the IMF.
- To enhance the impact of deterrent actions, the CBU's Supervisory Board has started publishing disciplinary and financial sanctions since December 2021.
- The CBU's Resolution Board has prepared and approved resolution plans for five systemically important banks (December 13, 2021), thereby making progress in finalizing such plans.
- The FGDR contribution rate and 10-year horizon for reaching target reserves are set based on the estimated ability of banks to service their contributions and are in line with international practices.

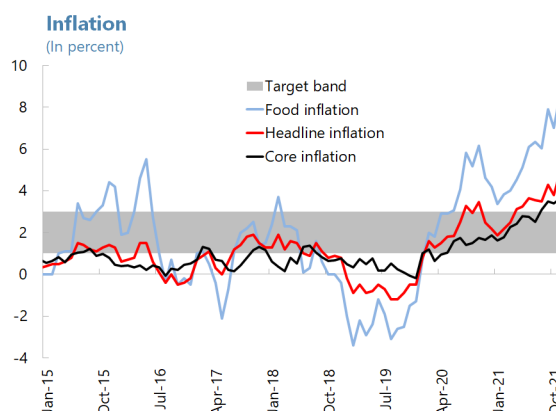
Figure 1. WAEMU: Key Macroeconomic Developments

Economic growth contracted sharply in 2020 on reduction of global demand following the COVID-19 outbreak.

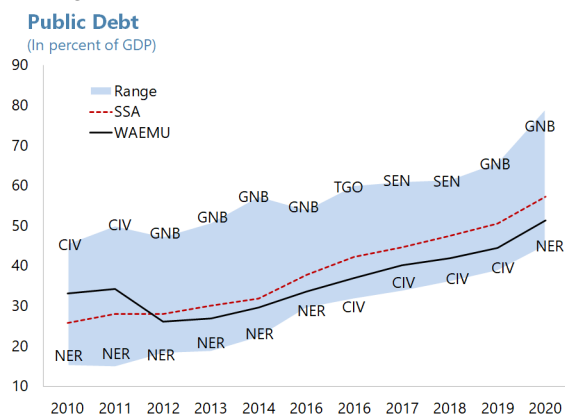


Sources: BCEAO; IMF, World Economic Outlook; and IMF staff calculations.
Note: BEN = Benin; CIV = Cote d'Ivoire; GNB = Guinea-Bissau; MLI = Mali; NER = Niger; SEN = Senegal; TGO = Togo.

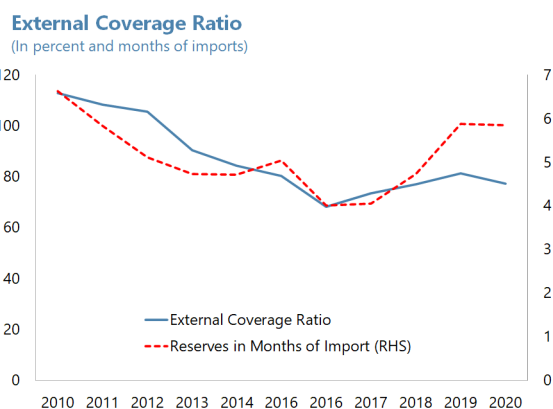
Inflation has been stable since 2010 but has edged up in 2021, now exceeding the upper limit of the target band.



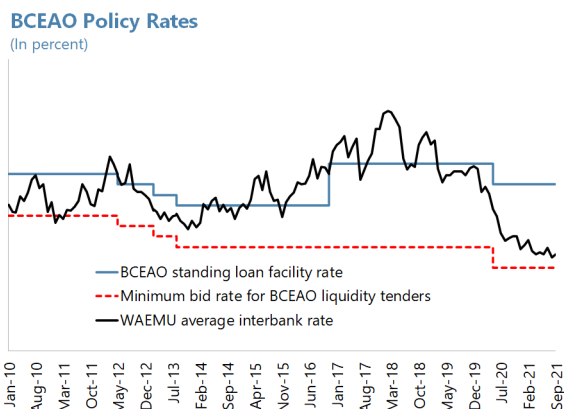
Public debt increased rapidly in 2020 to compensate weak economic growth.



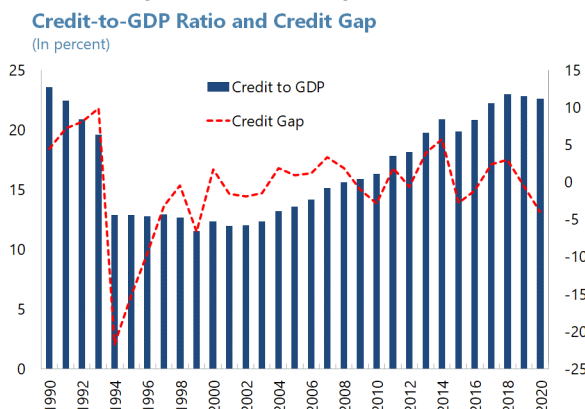
Foreign reserves stood at a comfortable level at end-2020.



Monetary policy has been accommodative since the onset of COVID-19 in 2020.



Private sector credit grew faster than the economy until 2018; the credit gap has turned negative ever since.



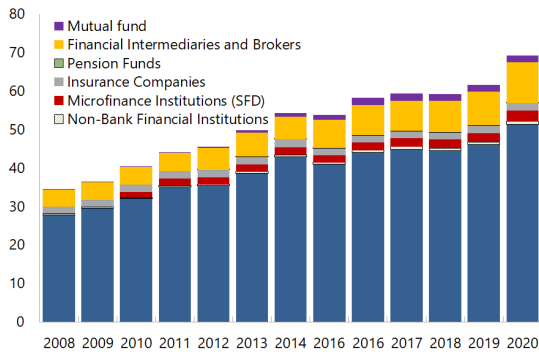
Sources: BCEAO, IMF and IMF staff calculations.

Figure 2. WAEMU: Structure of the Financial Sector

The banks continue to dominate WAEMU's financial sector...

Asset Structure of the WAEMU Financial System

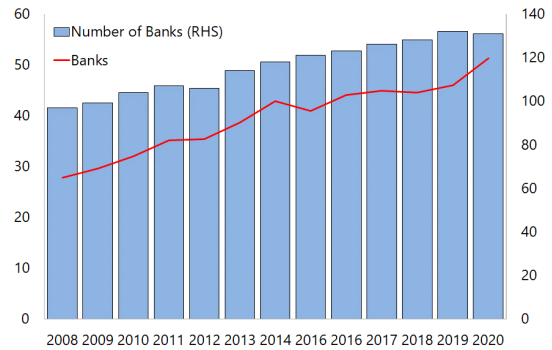
(In percent of GDP)



...experiencing stable growth since 2008, with assets now accounting for 51.3 percent of GDP.

Total Assets and Number of Banks

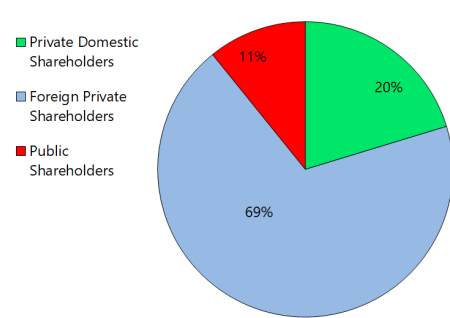
(In percent of GDP and number)



Banks' capital is sourced mostly from foreign private entities (including regional investors).

Bank Capital Shareholders, End-2020

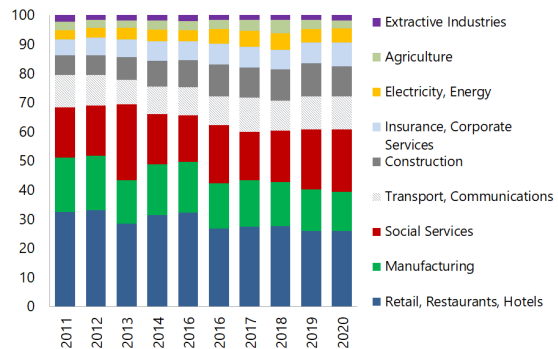
(In percent of total bank assets)



Their credit portfolios mostly consist of exposures to the hotels, manufacturing and services sectors (60 percent of total).

Sectoral Distribution of Loans

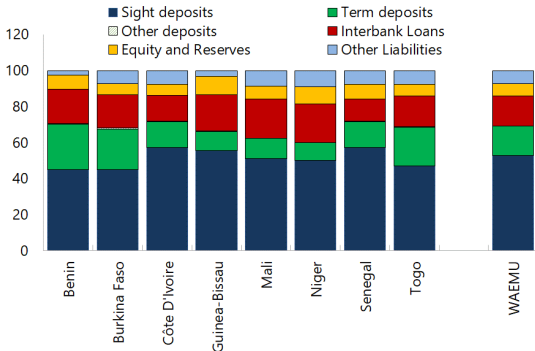
(In percent of total private loans)



Banks' financing stems mostly from customer deposits and BCEAO refinancing.

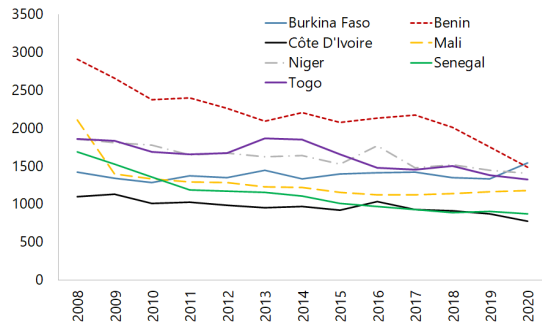
Composition of Bank Liabilities

(In percent of total liabilities)



The banking sector has become less concentrated.

Herfindahl Index for Bank Asset Concentration



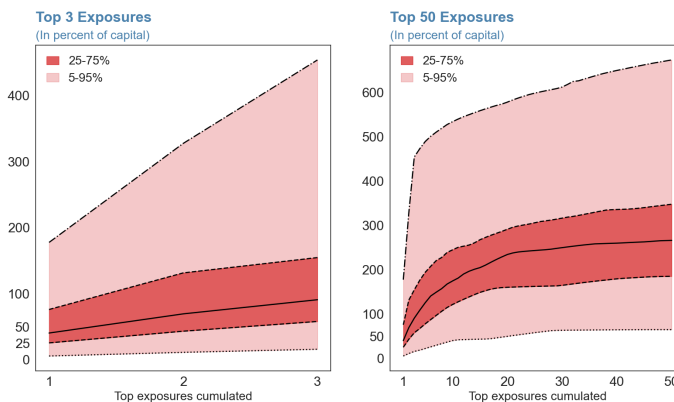
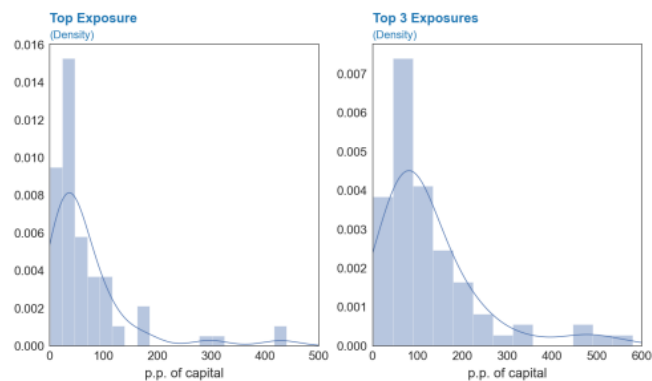
Note: Calculations based on data for 98 banks. Data for Guinea-Bissau is insufficient to calculate the index.

Sources: BCEAO; IMF; and IMF staff calculations.

Figure 3. WAEMU: Concentration Risk

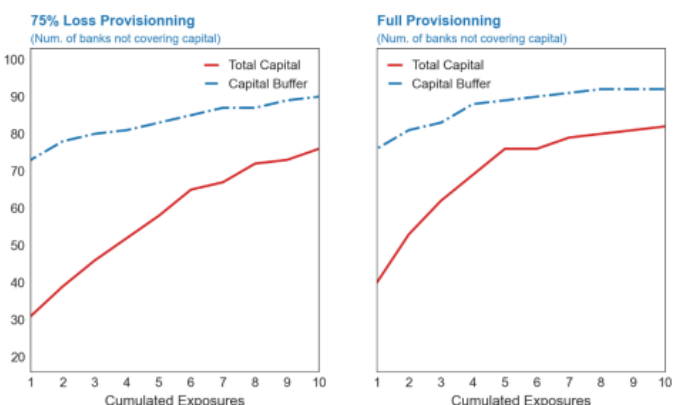
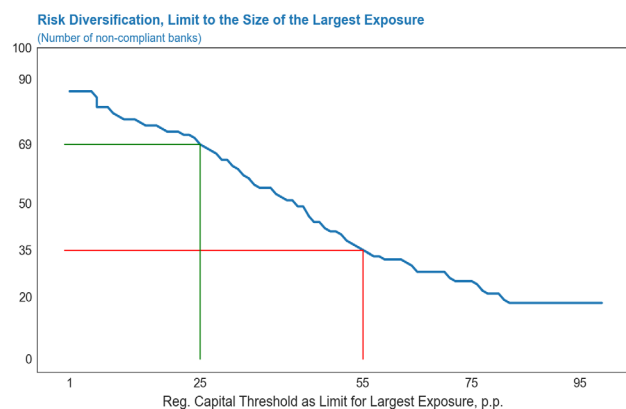
Banks' largest exposures account for a substantial share of capital...

...despite strong heterogeneity across banks, their largest exposure often exceeds their total capital.



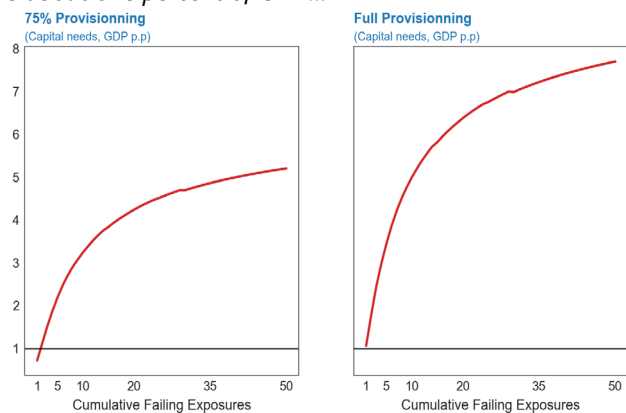
Two thirds of banks do not comply with the Basel 25 percent risk diversification limit...

...and most banks do not have adequate capital buffer to absorb a default of their largest exposures.



The additional capital needed to cover the largest exposure is about one percent of GDP...

...and the capital needed to cover the top five exposures is at more than two percent of GDP.



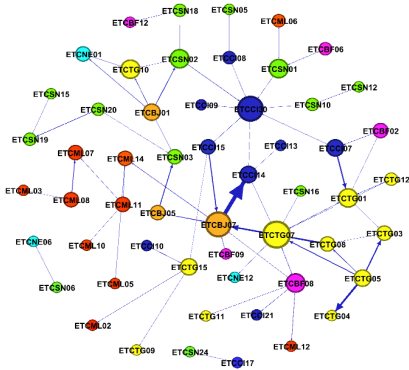
Sources: BCEAO and IMF staff computations.

Figure 4. WAEMU: Channels of Interconnectedness

Interbank transactions have intensified, and their concentration has increased.

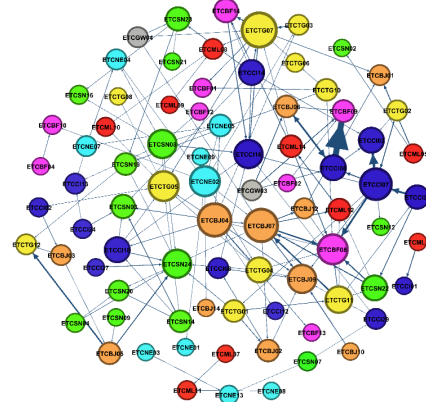
2015

Nods: 55; Edges: 71



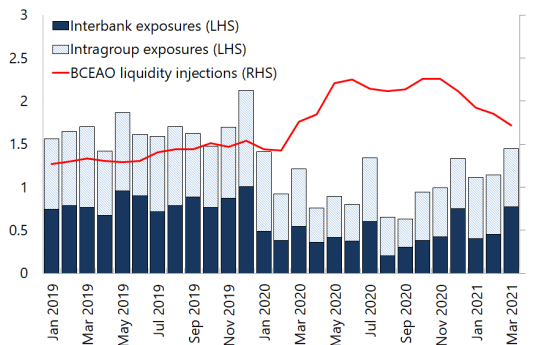
2019

Nods: 81; Edges: 150



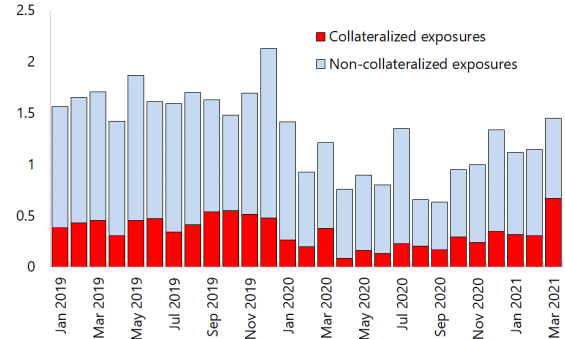
Interbank transactions are mostly cross border and intragroup in nature...

Interbank and Intragroup Exposures
(In trillions of FCFA)



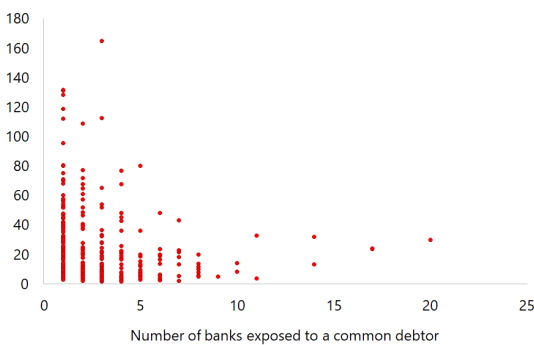
... and remain mostly uncollateralized.

Banks' Collateralized and Noncollateralized Exposures
(In trillions of FCFA)

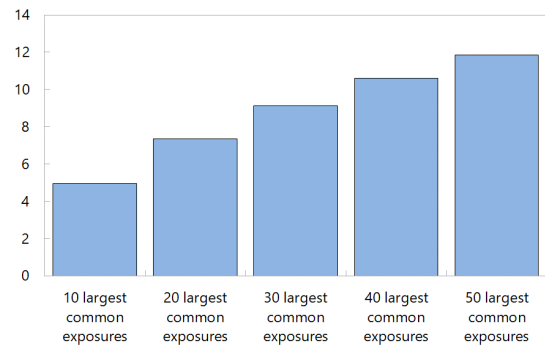


Banks are also interconnected via common exposures.

Largest Common Exposures to Private Debtors
(In percent of lender banks' total equity ; Sep 2021)



Banks' Largest Common Exposures in WAEMU
(In percent of total credit; September 2021)



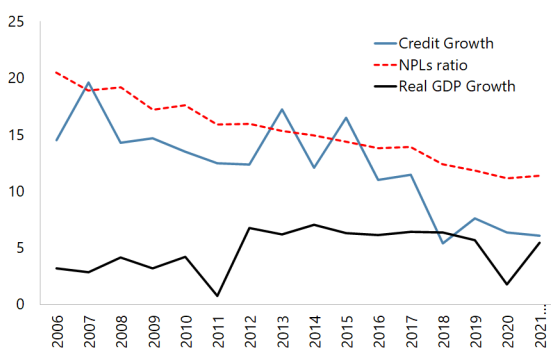
Sources: BCEAO and IMF staff calculations.

Note: The color coding of banks in the network charts is as follows: orange (Benin), purple (Burkina Faso), blue (Côte d'Ivoire), grey (Guinea-Bissau), red (Mali), turquoise (Niger), green (Senegal), and yellow (Togo).

Figure 5. WAEMU: Banking Sector Soundness

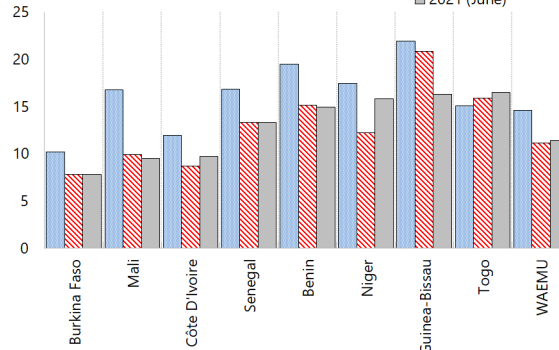
Banks' asset quality has improved over the past decade...

Credit growth and NPLs dynamic
(In percent)



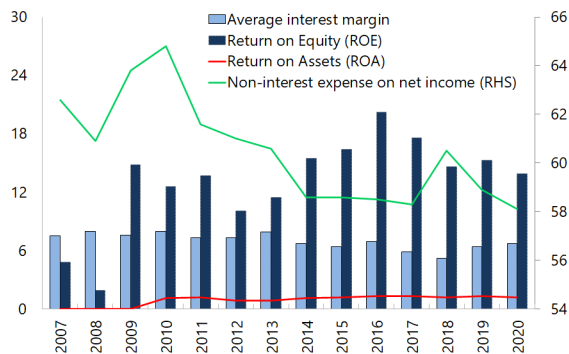
...but NPLs, particularly in some member countries, remain elevated.

Non-Performing Loans in WAEMU
(In percent of total loans)



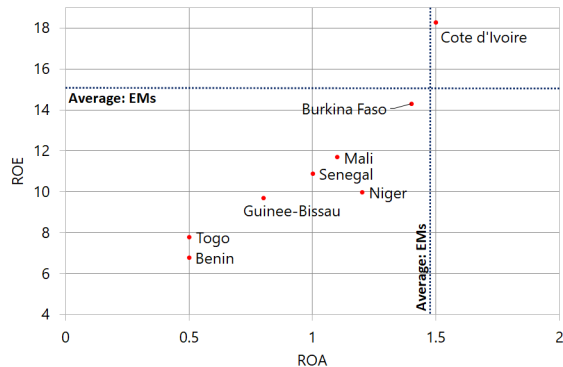
Banks' return on equity has declined since 2016 as a result of stronger competition...

ROA/ROE 2007-2020
(In percent)



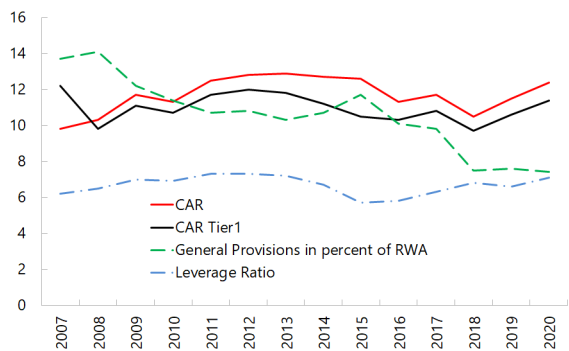
...and banks' profitability—except in Côte d'Ivoire—is lower than in other emerging market countries.

Profitability of WAEMU Banking System
(In percent)



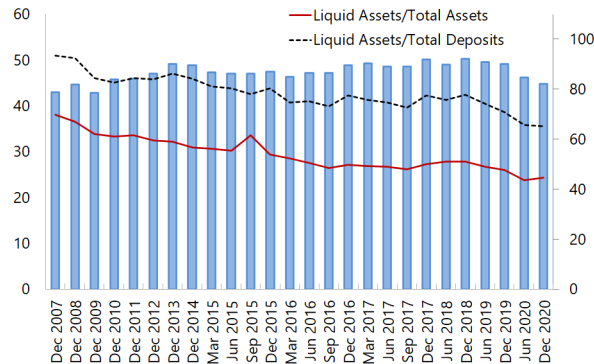
Regulatory capital has been rising; the aggregate capital adequacy ratio reached 12.4 percent in 2020.

Banking System Solvency - WAEMU
(In percent)



Banks' liquid asset positions have been declining in recent years, albeit with heterogeneity across banks.

Banks' Liquid Assets
(In percent)

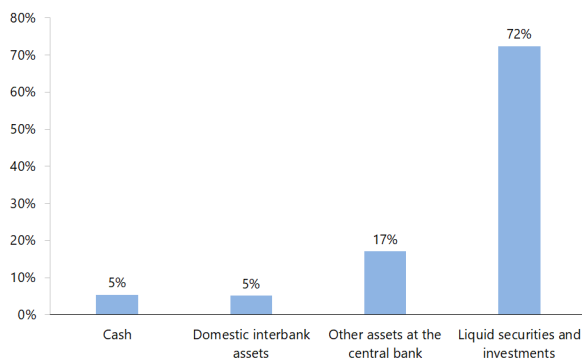


Sources: BCEAO and IMF staff calculations.

Figure 6. WAEMU: Banks' Liquidity Profiles

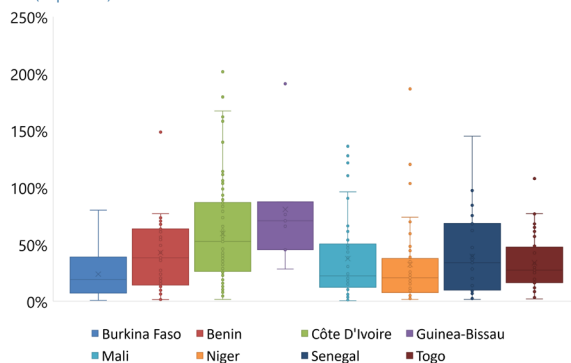
Banks' liquid assets are deemed to be concentrated in government securities...

Banks' Imputed Liquid Asset Holdings
(In percent of total)



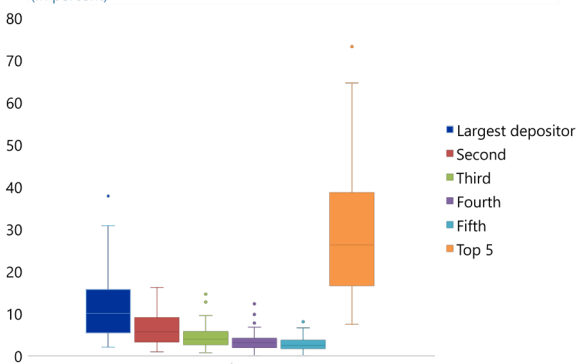
...whose secondary market liquidity is limited.

Government Securities Transactions to Emissions
(In percent)



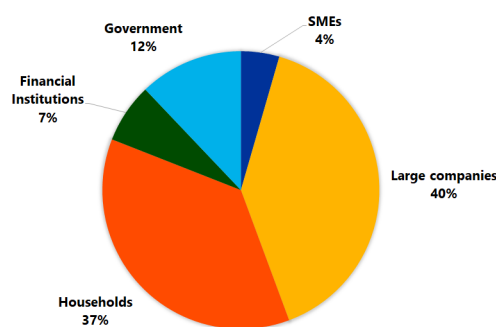
The deposit base is concentrated...

Share of Top 5 Depositors in Total Deposits
(In percent)



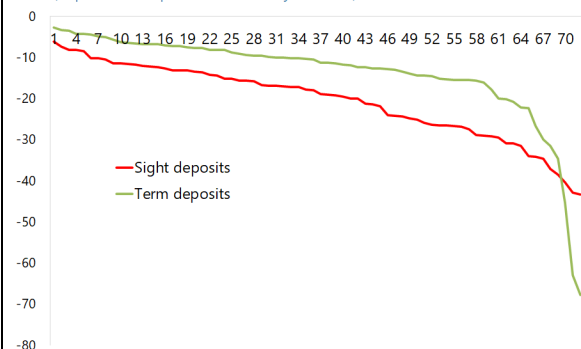
...with a high share consisting of corporate deposits.

Banks' Deposit Base, by Depositor Type
(In percent of total deposits)



Deposit run-off rates are widely different amongst banks.

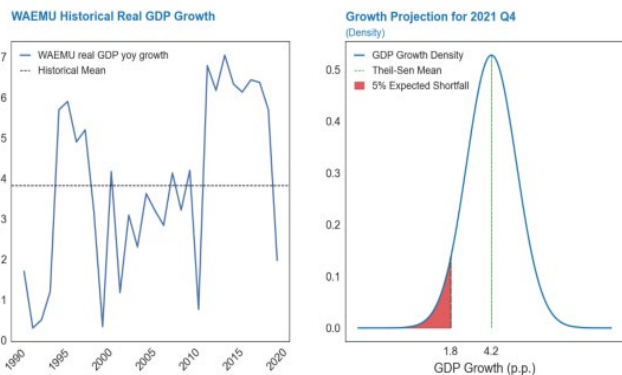
Deposit Outflows by Individual Banks
(In percent; 5th percentile, monthly outflows)



Sources: BCEAO and IMF staff calculations.

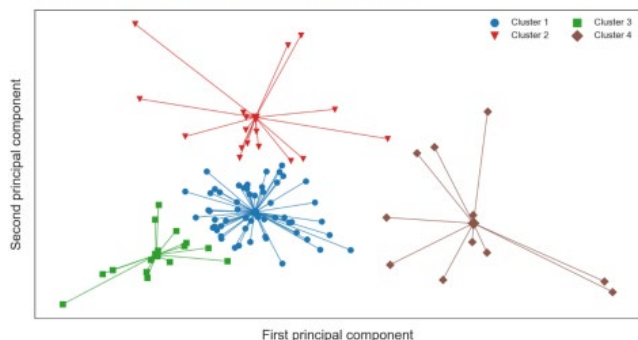
Figure 7. WAEMU: Solvency Stress Tests

A "growth-at-risk" model is designed to construct the adverse and baseline macroeconomic scenarios.

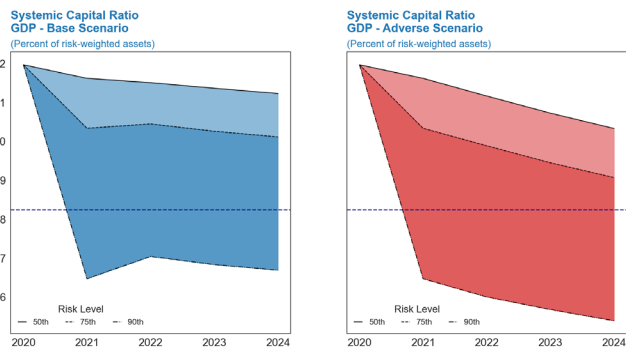


A statistical model clusters banks into four large groups.

Bank Clusters Projected on a 2D-Space: Solvency Metrics



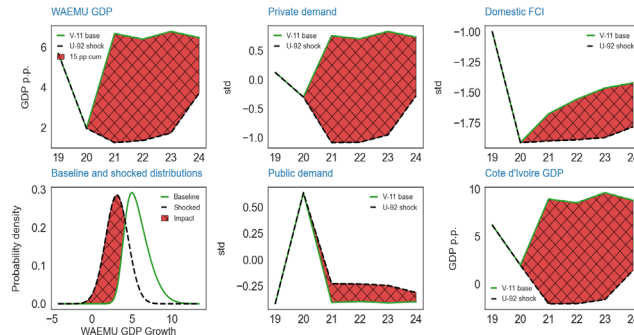
Under the severe scenario, capital ratios decline by 6 percentage points.



Sources: BCEAO and IMF staff calculations.

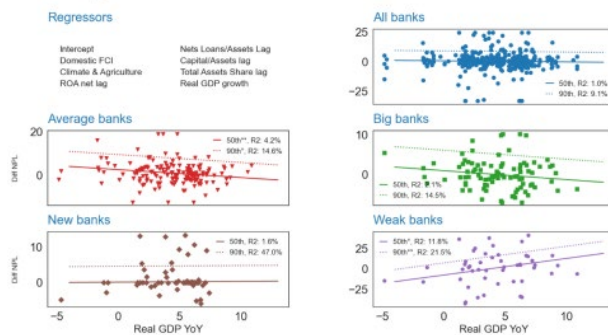
The severe scenario assumes a U-shaped recovery, with cumulative GDP growth shock of 15 p.p. relative to baseline.

Baseline versus Severe Scenarios: Macro-Financial Environment

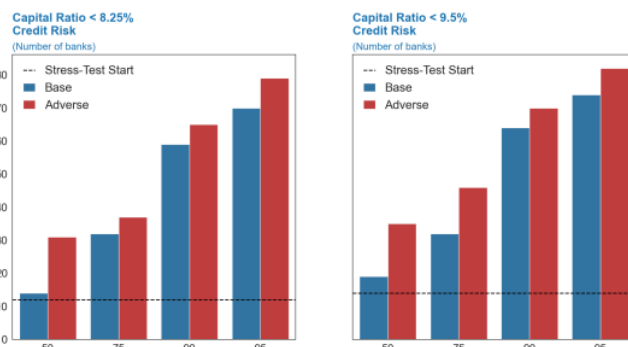


Banks' probabilities of default are estimated via quantile regressions, by cluster and by risk level.

Relationship between NPL First Difference and Real GDP Growth



35 (small) banks' capitalizations fall below the minimum requirement, joining 20 already undercapitalized banks.



Note: The four bank groups identified via cluster analysis are found to be loosely related to weak, new, big, and average banks.

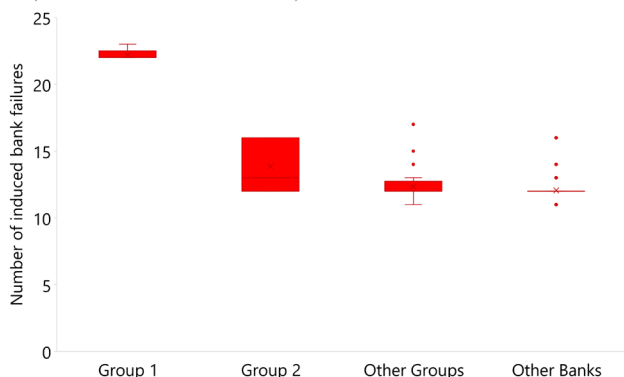
Figure 8. WAEMU: Interbank Contagion Stress Tests

The default of the largest WAEMU banking group leads to the default of 23 other banks...

...with an average loss for affected banks at up to 0.7 percent of regional GDP.

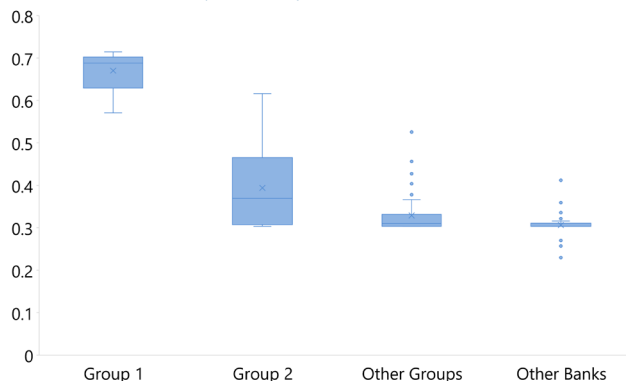
Contagion Across Banking Groups

(In number of induced bank failures)



Contagion Across Banking Groups

(Maximum induced capital loss, in percent of GDP)

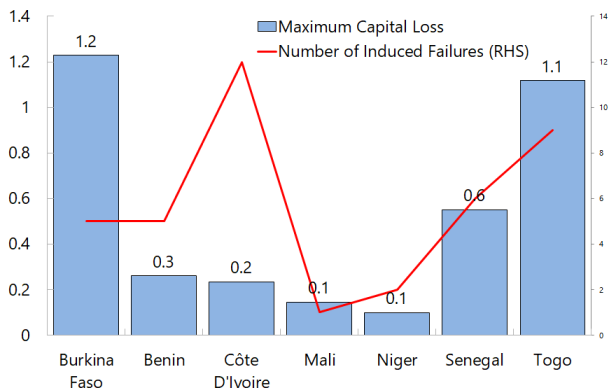


Banks in Burkina Faso and Togo are most exposed to interbank contagion.

The recapitalization needs due to failure of all interbank positions are modest, at 0.3 percent of regional GDP.

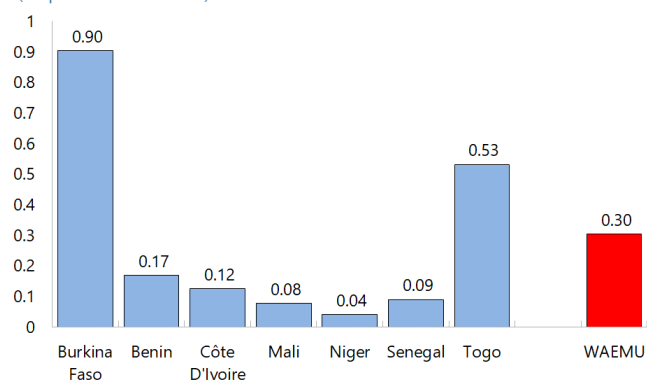
Bank Failures Due to Interbank Contagion

(Maximum capital loss in percent of GDP and number of failures)



Recapitalization Needs Due to Interbank Contagion Risk

(In percent of GDP)

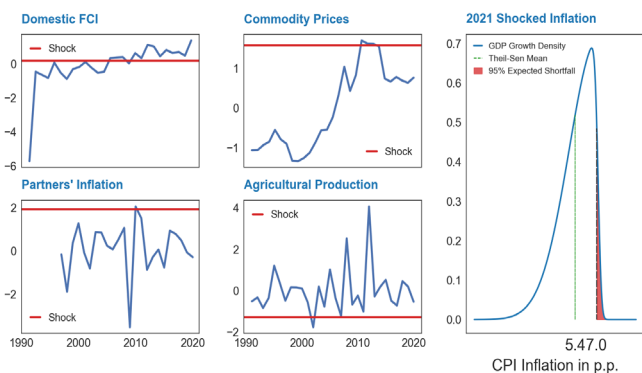


Sources: BCEAO and IMF staff calculations.

Note: Groups 1 and 2 are banking groups, the default of whose subsidiaries is most contagious and leads to most significant losses for the regional banking system.

Figure 9. WAEMU: Interest Rate Risk Stress Tests

An adverse "inflation-at-risk" scenario considers a shock that pushes inflation up to 7 percent.

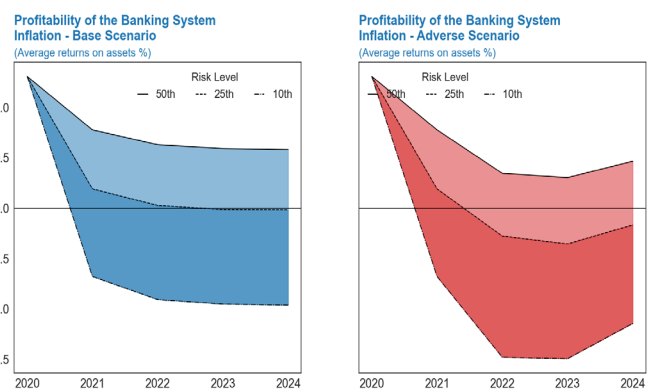


Banks are clustered based on profitability, capital ratios, nonperforming loans, and balance sheet size.

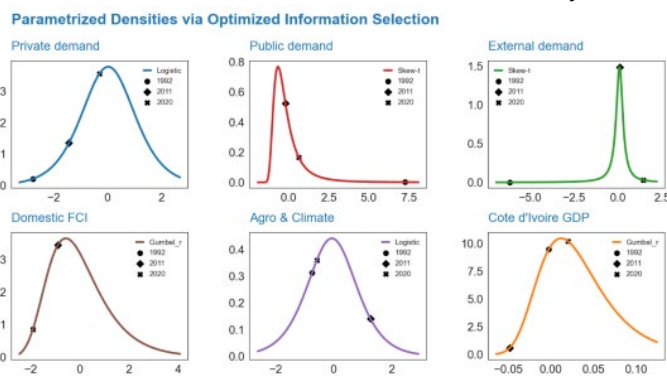
Solvency Metrics Averaged By Cluster



Under the adverse scenario, assets profitability could deteriorate by 2.5 percentage points.

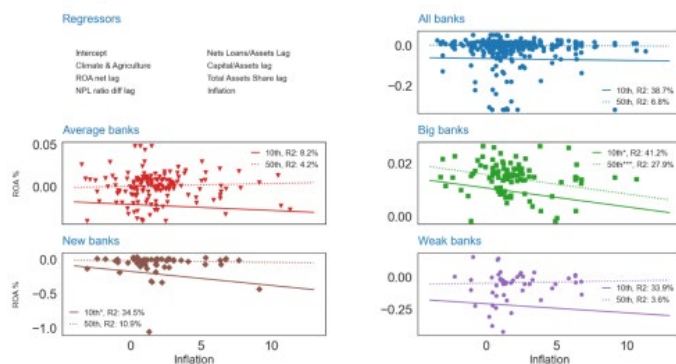


The densities of macrofinancial variables that are important inflation determinants are obtained via satellite density models.

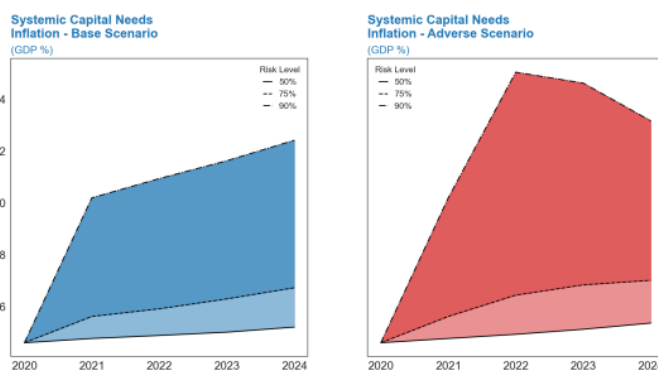


A profitability model is estimated via quantile regressions, by cluster and by risk level.

Relationship between ROA and Inflation



WAEMU-wide capital needs in the adverse scenario are limited (1.2 percentage points of GDP) even at the 90-percent risk level.



Sources : BCEAO and IMF staff computations.

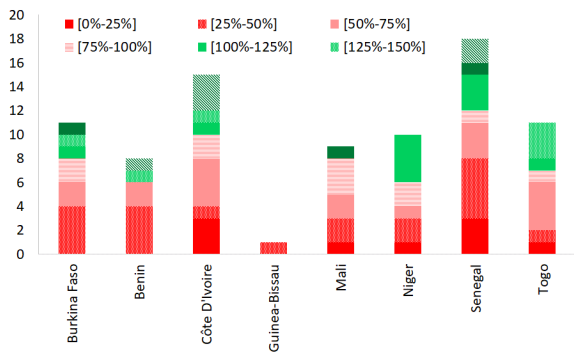
Figure 10. WAEMU: Liquidity Risk Stress Tests

A large share of banks across the region has an LCR below 100 percent, particularly in smaller jurisdictions.

Most banks' LCR falls in the 25 to 50 percent range.

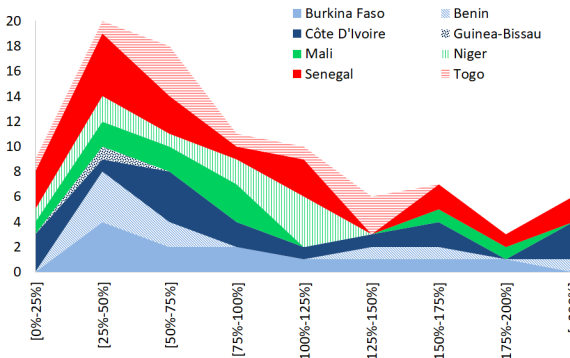
Distribution of LCR by Country

(In number of banks)



Distribution of LCR across the WAEMU

(In number of banks)

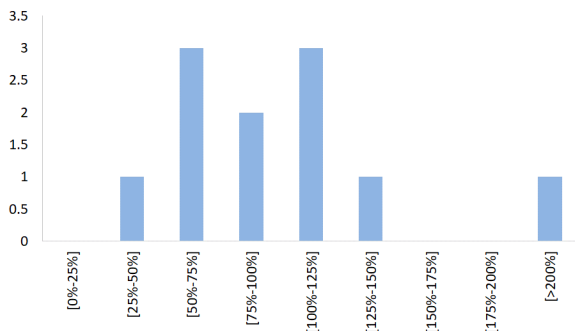


The distribution of large banks' LCR across the region tends to be clustered in the 50-125 percent range...

...and up to the 75 percent range for small banks.

Distribution of LCR, Large Banks¹

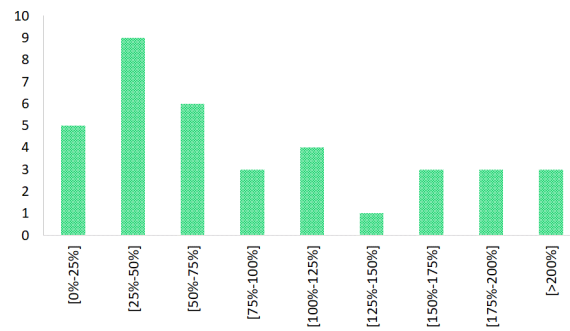
(In number of banks by LCR bucket)



¹ Banks are classified as large if they hold more than 2 percent of total system-wide assets.

Distribution of LCR, Small Banks¹

(In number of banks by LCR bucket)



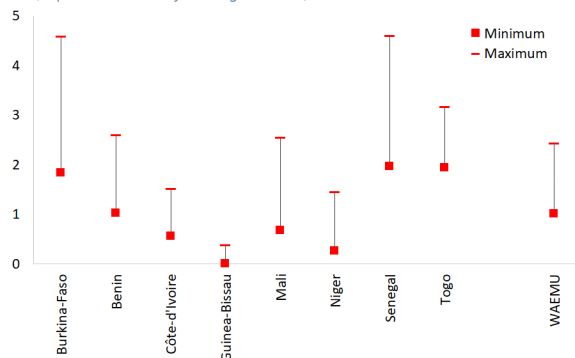
¹ Banks are classified as small if they hold less than 0.5 percent of total system-wide assets.

In the most adverse scenario, the HQLA deficit would be at 2.1 percent of GDP, but with country dispersion.

This translates into inadequate HQLA for 58 banks, mostly in the largest WAEMU jurisdictions.

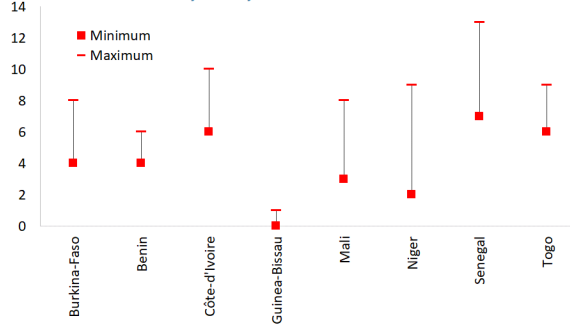
HQLA Gaps, Range by Adverse Scenario

(In percent of country and regional GDP)



Banks with Negative HQLA Gaps

(In number of banks by country)



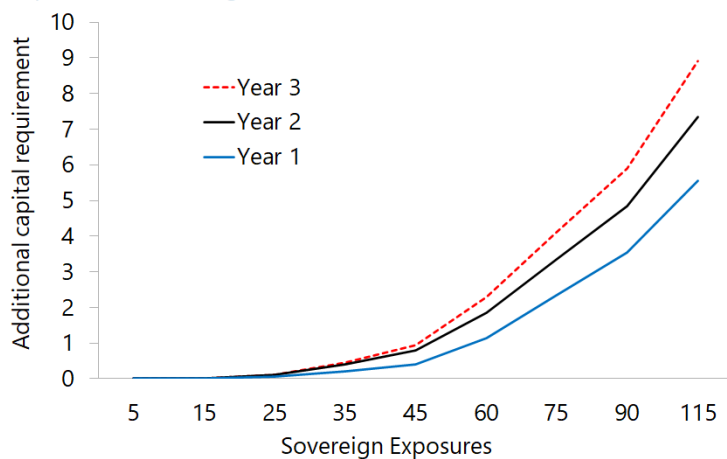
Note: In the most extreme scenario, 58 banks in the region face a negative HQLA gap.

Sources : BCEAO and IMF staff computations.

Figure 11. WAEMU: Calibration of Capital Surcharges for Sovereign Concentration Risk

Example of calibration of additional capital requirements for risks from sovereign exposure concentration

(In percent of risk-weighted assets)



Calibration of additional capital to cover risks related to the high concentration of portfolios on sovereign exposures

Sovereign Exposures in % of RWA

Marginal capital add-on	<20	20-30	30-45	45-60	>60
Year 1	0	1%	2%	5%	8%
Year 2	0	2%	4%	7%	10%
Year 3	0	2%	5%	9%	12%

Sources: BCEAO and IMF staff calculations.

Table 2. WAEMU: Selected Economic and Social Indicators

Social Indicators											
GDP			Poverty (2015 or latest available)								
Nominal GDP (2020, millions of US Dollars)	159,277		Headcount ratio at \$1.90 a day (2011 PPP)								
GDP per capita (2020, US Dollars)	1,218		Undernourishment (percent of population)								
Population characteristics			Inequality (2015 or latest available)								
Total (2020, millions)	127.1		Income share held by highest 10 percent of population								
Urban Population (2020, percent of total)	40.4		Income share held by lowest 20 percent of population								
Life expectancy at birth (2019, years)	61.4		Gini index								
Economic Indicators											
	2018	2019	2020		2021		2022	2023	2024	2025	2026
			SM/21/5 ²	Est.	SM/21/5 ²	Proj.	Projected				
(Annual percentage changes)											
National income and prices											
GDP at constant prices ³	6.5	5.8	0.3	2.0	5.4	5.7	6.1	7.0	7.2	6.1	5.8
GDP per capita at constant prices	3.4	2.8	-2.5	-1.0	2.5	2.8	3.1	3.9	4.1	3.1	2.8
Consumer prices (average)	1.0	-0.1	1.7	2.3	1.6	3.3	2.5	1.9	1.9	1.9	1.9
Terms of trade	-1.9	-3.2	18.4	19.4	2.3	-3.1	-1.7	-2.6	-2.2	-0.5	-0.6
Nominal effective exchange rate	4.1	-0.5	...	3.7	...	...	...	...	...	...	...
Real effective exchange rate	2.2	-3.7	...	3.7	...	...	...	...	...	...	...
(Percent of GDP)											
National accounts											
Gross national savings	18.6	19.4	18.6	20.1	19.4	19.5	20.1	20.7	21.0	21.4	21.5
Gross domestic investment	24.4	24.2	24.0	24.6	25.1	25.4	25.9	26.0	25.5	25.8	26.0
Of which: public investment	6.4	6.1	7.1	7.1	7.1	7.5	7.8	7.4	6.9	7.0	7.1
(Annual changes in percent of beginning-of-period broad money)											
Money and credit											
Net foreign assets	4.6	6.6	0.3	0.7	-0.5	2.5	-0.1	0.7	1.8	1.3	1.0
Net domestic assets	7.9	3.7	10.1	15.9	7.4	5.5	8.0	8.0	7.2	6.7	6.7
Broad money	12.5	10.3	10.4	16.5	6.9	8.0	8.0	8.7	9.0	8.0	7.7
Credit to the economy	5.9	4.2	5.6	4.1	3.3	2.6	2.5	3.8	4.6	3.9	3.8
(Percent of GDP, unless otherwise indicated)											
Government financial operations											
Government total revenue, excl. grants	14.6	15.6	14.7	15.2	15.5	15.3	15.9	16.3	16.5	16.9	17.2
Government expenditure	19.7	19.8	23.1	22.9	22.3	22.9	22.4	21.6	21.0	21.2	21.4
Overall fiscal balance, excl. grants	-5.0	-4.1	-8.4	-7.6	-6.9	-7.6	-6.5	-5.4	-4.4	-4.3	-4.2
Overall fiscal balance, incl. grants	-3.3	-2.3	-5.9	-5.7	-4.9	-5.9	-4.7	-3.8	-3.0	-3.0	-3.0
External sector											
Exports of goods and services ⁴	19.2	19.6	17.0	18.7	18.1	18.9	19.9	19.7	20.3	20.2	19.8
Imports of goods and services ⁴	25.5	25.4	23.4	24.2	24.3	25.8	26.6	25.7	25.4	25.0	24.8
Current account, excl. grants	-6.7	-6.1	-6.9	-5.9	-6.8	-6.8	-6.8	-6.3	-5.4	-5.3	-5.3
Current account, incl. grants	-5.6	-4.9	-5.4	-4.5	-5.7	-5.9	-5.9	-5.3	-4.5	-4.5	-4.6
External public debt	28.0	30.2	32.9	33.6	33.3	36.4	35.1	33.5	31.8	30.3	29.4
Total public debt	43.4	45.5	48.5	52.1	49.6	55.6	55.5	54.5	52.7	51.5	50.8
Broad money	33.0	34.3	37.1	38.6	37.1	38.6	...	...	...	...	...
Memorandum items:											
Nominal GDP (billions of CFA francs)	83,301	88,519	90,231	91,545	96,476	98,891	106,762	116,024	126,456	136,513	147,001
Nominal GDP per capita (US dollars)	1,217	1,190	1,198	1,218	1,322	1,332	1,394	1,494	1,600	1,692	1,784
CFA franc per US dollars, average	555	585.9	...	574.8	...	...	...	...	...	...	...
: Gross international reserves ⁵											
In months of next year's imports (of goods and services)	4.6	5.6	5.5	5.5	5.0	5.8	5.5	5.3	5.3	5.2	5.0
In percent of current GDP	10.3	11.7	...	12.8	...	13.9	12.9	12.2	11.9	11.5	11.0
In percent of the BCEAO's sight liabilities	79.6	81.4	...	77.3	...	86.4	89.4	84.2	81.9	79.2	76.1
In millions of US dollars	14,853	17,547	19,275	21,764	19,497	24,228	24,898	25,827	27,626	29,035	30,043

Sources: IMF, African Development database; World Economic Outlook; World Bank World Development Indicators; IMF staff estimates and projections.

¹ All projections presented in this staff report were prepared in the first half of December 2021 and do not incorporate any further developments.

² Shows data from the IMF Country Report No. 21/49, published on January 21, 2021 (Board document number SM/21/5).

³ The acceleration in GDP growth in 2023 is due to the start of production of large hydrocarbon projects in Niger and Senegal.

⁴ Excluding intraregional trade.

⁵ Projections for 2021 include the 2021 SDR allocation which is equivalent to US\$2,327 million, or 0.6 months of imports and 9.6 percent of the BCEAO's sight liabilities.

Table 3. WAEMU: Measures for Managing COVID-19 Impact

March 31, 2020	The banks' refinancing demand was fully met at the policy rate to respond to the increase in precautionary liquidity demand.
April 28 to May 15, 2020	Member countries issued Treasury bills with a maturity of three months at a rate capped at 3.5 percent. The BCEAO set up a special three-month refinancing window at 2.5 percent for three months for these bills.
June 24, 2020	The policy rate was reduced from 2.5 percent to 2 percent.
June 26, 2020	A one-year extension was agreed for the transposition of Basel II and III rules. The decision was taken by the CM of the Union at the proposal of the BCEAO on June 26, 2020.
Expired in December 2020	The BCEAO authorized the banks to place any of their performing loans that had been rescheduled in a specific account within the category of performing loans, and not under past due loans.
Over the course of 2020	Various WAEMU countries, in cooperation with the banking sector, introduced partial guarantees on credits to companies impacted by the crisis.
Over the course of 2020	The BCEAO agreed with the West African Development Bank (BOAD) to establish a facility permitting the banks to obtain medium-term financing against loans granted to companies affected by the crisis.
Over the course of 2020	The BCEAO provided CFAF 25 billion and the WAEMU Commission provided CFAF 15 billion to the BOAD's interest subsidy mechanism to enable it to grant CFAF 120 billion in concessional loans to the member countries (that is CFAF 15 billion for each country) at a subsidized interest rate.
Sources: BCEAO and IMF staff calculations.	

Table 4. WAEMU: Implementation of the 2008 FSAP Recommendations

Objectives	Recommendations	Completion	Comments
Enhancing the soundness of the banking system	Validation and monitoring of plans to increase banks' and financial institutions' minimum capital (first phase) and a proposed timetable for future actions (second phase)	Completed	The first phase of raising the minimum capital requirement was completed in 2010. The second phase on ensuring minimum social capital of CFAF 10 billion for banks and CFAF 3 billion for financial institutions of banking nature was achieved in July 2015. Administrative measures and disciplinary sanctions had been announced for institutions failing to comply with minimum share capital and its representation by core capital.
	Definition of minimum solvency rules applicable to microfinance institutions (MFIs)	Completed	The prudential documents governing MFIs came into effect on August 30, 2010. The minimum solvency rules applicable to the MFIs in the WAEMU are set forth in Directive 010/08/2010 on the prudential rules applicable to the MFIs of the WAEMU Member Countries and Directive 016-12-2010 on the financing of fixed assets and holdings by the Microfinance Institutions.
	Implement an increase in the minimum capital of banks and financial institutions	Partially completed	The credit institutions have complied with the regulatory measure to raise minimum capital with few exceptions.
	Revise the prudential rules as part of the transition to Basel II	Completed	The regulatory decision on the Basel II/III implementation by credit institutions and financial companies in the WAEMU was introduced on January 1, 2018 (N°013/24/06/2016/CM/UMOA). It was complemented by a regulatory decision on the consolidated supervision of parent company credit institutions and financial companies in the WAEMU (N°014/24/06/2016/CM/UMOA) and by Banking Commission Circulars on governance, risk management, compliance, and others.
Improve the supervision framework for banks and microfinance institutions	Adopt the Institutional Reform of the WAEMU and the BCEAO, with specific attention to enhancing the independence of financial supervision authorities	Completed	All member countries have adopted the basic texts of the Institutional Reform, effective April 1, 2010. In addition, the annex to the Convention governing the CBU was revised in 2018 to include a banking crisis resolution framework.
	Modernize the systems to collect and process financial and prudential information	Completed	The BCEAO has set up a BIC that collects credit risk information. The BIC—Creditinfo West Africa—has been operating across the Union since February 2016. Currently, 231 entities provide data to the BIC, including 143 credit institutions, 67 microfinance institutions, and 21 major invoicing companies.
	Improve prevention of difficulties arising for banks and microfinance institutions	Completed	The 2010 institutional reform strengthened the CBU's enforcement capacity and the banking resolution framework. The supervisor improved its bank monitoring capacity via the development of a rating system. The BCEAO now publishes an annual report on banks' financial condition. The regulatory framework for microfinance institutions was strengthened, and an early warning system was introduced.
	Adjust the methods of banking supervision to the nature and profile of banking risks from compliance to risk-based supervision	In progress	The regulatory framework is aligned with the Basel principles for efficient supervision. In accordance with the risk-based framework, the regulator introduced a rating system and risk mapping. A stress testing exercise is in place but needs to be enhanced. Finally, banking supervision benefited from IT development and the automation of tasks.

Table 4. WAEMU: Implementation of the 2008 FSAP Recommendations (concluded)

Objectives	Recommendations	Completion	Comments
Improve the supervision framework for credit institutions	Prepare a new prudential framework for microfinance institutions based on the new regulatory framework	Completed	A specific accounting framework was introduced for microfinance institutions (Directive 25-02-2009). Directives 10-08-2010 and 16-12-2010 specify the prudential rules and standards applicable to microfinance institutions
	Continue implementing anti-money laundering and combating the financing of terrorism procedure in the WAEMU Member Countries	Completed	The CM adopted the regulatory framework establishing anti-money laundering and combating the financing of terrorism in July 2015 and the BCEAO issued four circulars in 2017 establishing the practical implementation of the regulatory framework.
	Establish a consolidated regulatory framework to provide an overview of the solvency of banking groups	Completed	Consolidated supervision is in operation. The regulatory framework applies to parent companies and their subsidiaries. The supervisor: (i) publishes each year a list of the banks that are supervised on a consolidated basis; and (ii) organizes yearly meetings with the relevant foreign supervisors.
Improve governance	Implement fully banking and microfinance regulation	Completed	The new institutional reform texts specifically strengthen banking and microfinance institution regulation and the powers of the Banking Commission in relation to the regulatory and legal requirements applicable to credit institutions and MFIs. An update is provided every three months to the authorities of the Union by the BCEAO and the WAEMU Banking Commission for their periodic meetings.
	Formalize the consultation framework between regulators and supervisors	Completed	A Financial Stability Committee was created in 2010, which represents the consultation framework for the regulators and supervisors of the Union, including national governments, the BCEAO, the banking commission, and the market regulator.
Foster the development of financial markets	Set up a system of primary dealers in treasury securities (SVTs)	Completed	The SVT system was introduced in 2013 and primary dealers now operate in each member country. A project is underway to make the system more efficient.
	Issue government securities via competitive tender	Completed	An automated system for the issuance and management of government securities (SAGETIL-UMOA) was introduced in 2014.
	Simplify the management of government securities by keeping them in a single depository.	Partially completed	Custody and securities management procedures have improved notably but the market remains segmented between tenders and syndications, as the securities issued via the different allotment methods are not fungible due to the presence of two depositories.
	Produce reliable annual issuance calendars to ensure good visibility of government security issuances on the market	Completed	In coordination with the National Treasuries, the UT now publishes and updates the government issuance calendars quarterly.
	Increase market liquidity by formalizing the conceptual framework for repurchase facilities	Completed	The legal framework for repurchase facilities was formalized in 2013.
	Reduce illiquidity risk via the introduction of intraday advances	Completed	The BCEAO introduced intraday advances in 2016. The facility is well known by market participants and is used occasionally.

Sources: BCEAO and IMF staff calculations.

Table 5. WAEMU: Financial Stability Indicators

	2016	2017	2018 ¹	2019	2020
	(Percent, unless otherwise indicated)				
Solvency ratios					
Regulatory capital to risk weighted assets	11.3	11.7	10.5	11.5	12.4
Tier I capital to risk-weighted assets	10.3	10.8	9.7	10.6	11.4
Provisions to risk-weighted assets	10.1	9.8	7.5	7.6	7.4
Capital to total assets	5.8	6.3	6.8	6.6	7.1
Composition and quality of assets					
Total loans to total assets	52.2	54.1	55.7	56.2	52.3
Concentration: loans to 5 largest borrowers to capital ²	101.9	89.8	82.6	86.1	72.0
Sectoral distribution of loans					
Agriculture	3.2	3.9	4.6	3.0	3.0
Extractive industries	1.6	1.5	1.7	1.7	1.8
Manufacturing	15.5	16.2	15.1	14.3	13.0
Electricity, water and gas	4.9	5.6	5.6	4.6	4.7
Construction	10.8	9.8	10.6	11.2	10.2
Retail and wholesale trade, restaurants and hotels	26.7	26.8	27.7	25.9	26.5
Transportation and communication	9.9	11.6	10.5	11.3	10.8
Insurance, real estate and services	7.2	7.2	6.8	7.2	8.4
Other services	20.1	17.4	17.5	20.8	21.7
Gross NPLs to total loans	13.8	13.9	12.4	11.4	11.0
Provisioning rate	65.5	63.6	65.3	63.3	67.2
Net NPLs to total loans	5.2	5.5	4.7	4.5	3.9
Net NPLs to capital	47.2	48.0	38.2	38.3	29.0
Earnings and profitability					
Average cost of borrowed funds	2.9	2.5	2.4	0.7	0.9
Average interest rate on loans	9.8	8.4	7.6	7.1	7.6
Average interest margin ³	6.9	5.9	5.2	6.4	6.7
After-tax return on average assets (ROA)	1.3	1.3	1.2	1.3	1.2
After-tax return on average equity (ROE)	20.2	17.6	14.6	15.3	13.9
Noninterest expenses/net banking income	58.5	58.3	60.5	58.9	58.1
Salaries and wages/net banking income	25.6	25.0	25.9	24.8	25.1
Liquidity					
Liquid assets to total assets	27.1	27.3	27.8	26.0	24.4
Liquid assets to total deposits	42.3	42.3	42.4	38.7	35.5
Total loans to total deposits	89.5	92.0	92.2	90.2	82.2
Total deposits to total liabilities	64.1	64.5	65.7	67.1	68.7
Sight deposits to total liabilities ⁴	34.4	34.7	35.1	35.8	37.1
Term deposits to total liabilities	29.7	29.8	30.6	31.4	31.5

Source: BCEAO.

¹ First year reported in accordance with Basel II/III prudential standards and the new banking chart of account.

² Indicators do not account for the additional provisions required by the WAEMU Banking Commission.

³ Excluding tax on bank operations.

⁴ Including saving accounts.

Table 6. WAEMU: Stress Testing Framework

Credit		Inflation/Interest rate		Liquidity	Contagion
Macroeconomic scenarios: recovery at risk		Macroeconomic scenarios: inflation at risk		Liquidity coverage ratio based on cash flows	Network analysis of the banking sector
Recovery path: V-shaped recovery with path shape as in 2011-12 (baseline) U-shaped recovery, with path shape as in 1982-85 and 1992-95 (adverse scenario)	Shocks: Accelerated fiscal adjustment (RAM 3) Resurgence of the COVID-19 pandemic (RAM 1) Deterioration of the security situation (RAM 2) External shock due to in commodities prices (RAM 4) Adverse impact of climate change (RAM 5)	Inflation path: Inflation at the 2% target (baseline) Inflation spike to 7% followed by gradual reduction to BCEAO's target over four year (adverse scenario)	Shocks: Imported inflation (RAM 3) Increase in oil price (RAM 4) Decrease in agricultural productions	Shocks: Withdrawals differentiated by deposit size Withdrawals differentiated by depositor type	Shocks: Combined credit and liquidity shocks on interbank exposures Shock on common large private and sovereign exposures
Modeling of the probability of default and return on assets based on GDP path					Model of cross network exposures based on Espinosa M. and Sole J. (2010)
Sensitivity test for concentration risk					
Supervisory and banks' data					
Sources: IMF staff.					

Table 7. WAEMU: Assumptions and Results of Contagion Stress Tests

Assumptions/Shock parameters		
Credit shock:		
Loss given default		100%
Funding shock:		
Share of lost interbank funding lines that cannot be replaced		42%
Discounts applied to securities in case of urgent sale on the interbank market		50%
Provisioning rate		100%
Results of shocks and simulations		
1/ Contagion due to direct interbank exposures		
<i>National banking systems</i>	Capital losses ^{1/}	Recapitalization needs ^{1/}
Benin	1.2	0.9
Burkina Faso	0.3	0.17
Côte d'Ivoire	0.2	0.12
Mali	0.1	0.08
Niger	0.1	0.04
Senegal	0.6	0.09
Togo	1.1	0.5
WAEMU	0.7	0.3
2/ Contagion due to large common private exposures		
<i>Cumulative large exposures</i>	Capital losses ^{1/}	Recapitalization needs ^{1/}
10 largest common exposures	1.62	0.85
20 largest common exposures	2.21	1.22
30 largest common exposures	2.66	1.57
40 largest common exposures	2.99	1.88
50 largest common exposures	3.25	2.07
3/ Contagion due to sovereign exposures		
<i>Issuing country defaults on payments due in 2021 and 2022</i>	Capital losses ^{1/}	Recapitalization needs ^{1/}
Benin	0.2	0.06
Burkina Faso	0.4	0.1
Côte d'Ivoire	1.7	0.8
Guinea-Bissau	0.1	0.04
Mali	0.4	0.15
Niger	0.4	0.13
Senegal	0.2	0.05
Togo	0.2	0.06

Sources: BCEAO and IMF staff calculations.

Table 8. WAEMU: Run-off Rates in Liquidity Stress Test Scenarios

	Run-off rate	
	Moderate scenario	Severe scenario
Deposits ≤ 1 000 000 FCFA	5%	10%
Deposits >1 000 000 FCFA et ≤10 000 000 FCFA	5%	10%
Deposits >10 000 000 FCFA et ≤100 000 000 FCFA	10%	20%
Deposits >100 000 000 FCFA et ≤1 000 000 000 FCFA	10%	20%
Deposits >1 000 000 000 FCFA et ≤10 000 000 000 FCFA	20%	40%
Deposits >10 000 000 000 FCFA	20%	40%
Interbank borrowing		
Unsecured borrowing	50%	100%
Secured borrowing	0%	0%

	Run-off rate	
	Moderate scenario	Severe scenario
Deposits: Households	5%	10%
Deposits: SMEs	10%	20%
Deposits: Large companies	20%	40%
Deposits: Financial institutions	20%	40%
Deposits: Central and local public administrations	20%	40%
Deposits: Non-residents	20%	40%
Interbank borrowing		
Unsecured borrowing	50%	100%
Secured borrowing	0%	0%

Sources: BCEAO and IMF staff calculations.

Table 9. WAEMU: Assumed Asset Haircuts in Liquidity Stress Tests

	HQLA depreciation	
	Moderate scenario	Severe scenario
Cash	0%	0%
Reserves at BCEAO	0%	0%
Sovereign debt securities		
Benin	10%	30%
Burkina Faso	10%	30%
Côte-d'Ivoire	10%	30%
Guinea-Bissau	10%	30%
Mali	10%	30%
Niger	10%	30%
Senegal	10%	30%
Togo	10%	30%

Sources: BCEAO and IMF staff calculations.

Domain		Assumptions
BANKING SECTOR: SOLVENCY RISKS		
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> 99 banks or almost all banks, with some exceptions due to missing data for very small banks with insignificant activity.
	Market share	<ul style="list-style-type: none"> More than 95 percent of banking sector assets in the region.
	Data and baseline date	<ul style="list-style-type: none"> 2000–2020 (macro data), 2010–2020 (banking data). Reference date: Q4 2020. The bank-by-bank data provided by the authorities include historical series over about ten years for: <ul style="list-style-type: none"> Balance sheets, P&L statements, equity, credit breakdowns, securities holdings Credit risk (e.g., doubtful debts), concentration risk (for deposits and loans), interest rate risk, foreign exchange risk and liquidity risk. Macroeconomic data (e.g., interest rates, inflation, and climate index) from the usual sources, including the IMF, Haver, and Bloomberg, are used to model the macroeconomic linkages.
2. Risk propagation channels	Methodology	<ul style="list-style-type: none"> A macroeconomic growth-at-risk model projects the future distribution of real GDP growth as a function of current macrofinancial conditions. The propagation of risks to WAEMU growth is captured by nonlinear density estimators, with shocks transmitted nonlinearly across the GDP distribution. The FSAP team developed a density projection model specifically adapted to low-income countries, with estimation methods that are robust to measurement errors and accurate for small samples. The 99 banks are divided into four groups via statistical learning methods and form clusters that are homogeneous in terms of asset quality, size, capitalization, and asset returns. The conditional distribution of doubtful debts explained by the macroeconomic variables is estimated separately for each group in order to predict the rise in the probabilities of default (PDs) under each macroeconomic scenario and risk level. The loss recovery assumptions are <i>ad hoc</i>, due to the lack of adequate historical data. The stress test of banks' credit portfolios is conducted via a balance sheet method—including estimation of the PDs, calculation of default losses, equity absorption—assuming

Domain		Assumptions
		<p>a static balance sheet size and composition during the stressed period. The WAEMU FSAP team innovated by using statistical learning methods for processing noisy data and addressing the issue of small sample size.</p> <ul style="list-style-type: none"> The same methodology has been used to estimate an inflation-at-risk model and its impact on banks' capital.
	Satellite models	<ul style="list-style-type: none"> Based on the estimated growth-at-risk (or inflation-at-risk) and the stress paths over a three-year horizon, the team uses a series of satellite models to infer the dynamic of macroeconomic variables of interest, such as interest rate, inflation, etc.
	Stress testing horizon	<ul style="list-style-type: none"> Four years, 2021–24.
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> The FSAP constructed two scenarios: a baseline scenario and an adverse scenario. Due to the current COVID-19 crisis, the scenarios entail a recovery-at-risk, modeling the risks of a slow U-shaped recovery and a rapid V-shaped recovery. The baseline scenario is aligned with the IMF's latest <i>World Economic Outlook</i> and consistent with the WAEMU's Article IV. The adverse scenarios are structured dynamically as a function of: (i) the macroeconomic shocks of the Article IV report's Risk Assessment Matrix (RAM); (ii) historical crisis paths in the WAEMU; and (iii) the level of assumed risk (e.g., value at risk of 5 percent).
	Sensitivity analysis	<ul style="list-style-type: none"> The stress test of concentration risk is conducted by a sensitivity analysis with <i>ad hoc</i> tests of defaults of largest borrowers and withdrawals of largest depositors.
4. Risks and buffers	Risks/factors assessed (How each element is assessed, assumptions)	<ul style="list-style-type: none"> The FSAP models: <ul style="list-style-type: none"> A set of macrofinancial shocks derived from the Article IV report (external demand shock, worsening of the COVID-19 pandemic, climate change, deterioration of international financial conditions, etc.). Propagation of shocks emanating from each country of the monetary zone to the region. The modeling of shocks is nonlinear and dynamic, with the shocks corresponding to points in the distributions of GDP, inflation, and associated macroeconomic variables.

Domain		Assumptions
		<ul style="list-style-type: none"> ○ The shocks are calibrated based on the unconditional distribution of the explanatory variables.
	Behavioral adjustments	<ul style="list-style-type: none"> • Banks' balance sheet compositions and sizes are assumed to be static over the entire stress period. • Dividend distributions are only permitted for banks that meet the regulatory capital requirements and have positive profits.
5. Regulatory and market-based standards and parameters	Calibration of risk parameters	<ul style="list-style-type: none"> • The risk parameters are estimated via density models using structural relationships and estimated distributions conditional on the macrofinancial conditions at the reference date. This approach permits time series modeling of relationships, while also accounting for the already exceptionally strong shock of COVID-19. • The risk paths are calibrated—in distribution percentiles—on the WAEMU's crises of 1982, 1994, and 2011, which enables different (U-shaped and V-shaped) recoveries to be captured.
	Regulatory, accounting, and market-based standards	<ul style="list-style-type: none"> • Use of regulatory ratios and minimum capital requirements imposed by the BCEAO as IMF stress test standard.
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> • A decline in banking sector capital during the stress period, under different scenarios. • Number of banks and share of banking sector assets of banks whose capital falls below the regulatory minimum. • Recapitalization needs in percent of GDP.

Domain		Assumptions
BANKING SECTOR: LIQUIDITY RISKS		
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> • 99 banks or almost all banks with some exceptions due to missing data for very small banks with insignificant activity
	Market share	<ul style="list-style-type: none"> • More than 95 percent of banking sector assets in the region
	Data and baseline date	<ul style="list-style-type: none"> • Reference date: Q4 2020. • The bank-by-bank data provided by the authorities include historical series over about ten years for: <ul style="list-style-type: none"> ○ The balance sheet ○ The five largest deposits, the distribution of deposits by amounts, and a breakdown of deposits by type of depositor (non-financial enterprises and households).
2. Risk propagation channels	Methodology	<ul style="list-style-type: none"> • Sensitivity test entailing withdrawals by the largest depositors, taking into account the nature of the largest depositors (households and corporates) and the estimated stability of deposits. • Sensitivity test based on the classification of liquid assets, particularly government securities.
3. Risks and buffers	Risks	<ul style="list-style-type: none"> • High deposit concentration. • Illiquidity of secondary markets. • Dependence on central bank financing.
	Buffers	<ul style="list-style-type: none"> • Excess reserves.
4. Tail shocks	Size of the shock	<ul style="list-style-type: none"> • Withdrawals differentiated by deposit sizes. • Withdrawals differentiated by type of depositors.
5. Regulatory and market-based standards and parameters	Regulatory standards	<ul style="list-style-type: none"> • Not applicable.
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> • Number of banks breaching the LCR. • Liquidity gap as a percentage of GDP.

Appendix II. Risk Assessment Matrix

Risk Origin	Relative Probability/Horizon	Expected Impact if Realized
RAM 1: A lethal and highly contagious local outbreak of COVID-19 leads to subpar/volatile growth.	High	High
	Short to medium term The region's low vaccination rates raise the probability of reimposing containment measures, leading to weaker economic growth, worsened fiscal situation, and elevated debt sustainability concerns.	New costly containment measures at the national level, including large-scale lockdowns, lead to a contraction in private sector demand that cannot be redressed by the public sector due to limited fiscal space. The slowdown in economic growth leads to a deterioration in banks' asset quality. The impact is exacerbated by weaknesses in the WAEMU's health system.
RAM 2: A systematic deterioration of the security situation in the region.	Medium	High
	Short to medium term An intensification of security incidents in the region and spillovers across member countries can slow economic activity and impair public finances and policy implementation more broadly.	The deterioration in the security situation impairs domestic demand (public and private sector) of one or two countries of the Union, with spillovers to other member countries. The slowdown in economic growth leads to a deterioration in banks' asset quality.
RAM 3: De-anchoring of inflation expectations in the U.S. and/or advanced European countries leading to a rise in interest rates and risk premia.	Medium	High
	Short to medium term A sustained rise of inflation and an unanchoring of U.S. inflation expectations could prompt an early U.S. monetary policy tightening. The repositioning of global market players would lead to tighter global financial conditions and higher risk premia for frontier markets, with negative consequences for capital inflows and official foreign reserves in the WAEMU.	Member countries lose global market access due to a deterioration in global conditions or rising doubts about debt sustainability. An inability of the regional government debt market to absorb fiscal demand leads to a decline in foreign reserves and an interest rate spike. An accelerated fiscal correction dampens public sector demand. Higher interest rates and crowding out of private sector demand lead to credit contraction, which exacerbates the decline in private sector demand. The slowdown in economic growth leads to a deterioration in banks' asset quality. The interest rate increase squeezes banks' margins.
RAM 4: Rising and volatile food and energy prices.	High	Medium
	Short to medium term Raw material prices rise more than expected due to pent-up post-pandemic demand and supply disruptions. Uncertainty leads to a bout of volatility, particularly in oil prices, with resultant fiscal implications, given the WAEMU's status as a net oil importer.	An accelerated fiscal correction could dampen public sector demand and spill over to private sector demand. The contribution of external demand to GDP growth declines or turns negative. The rise in inflation and the drop in foreign reserves due to the increase in raw material prices lead to higher interest rates and lower private sector demand. The slowdown in economic growth leads to a deterioration in banks' asset quality. The interest rate increase squeezes banks' profitability.
RAM 5: A rise in the frequency and intensity of natural disasters related to climate change.	Medium	High
	Short to medium term Climate change could negatively affect agricultural production and exports, increase the need for subsidies, and reduce the population's standard of living.	Reduced yields on food crops dampen growth due to lower net exports. The asset quality of banks with agricultural exposures is impaired directly as yields drop. Government exposure guarantees pass the losses to the public sector. Use of subsidies to offset climate impact diverts resources from more productive uses and reduces the growth impact of public expenditure. The small size of exposures dampens the impact.