



ICELAND

FINANCIAL SYSTEM STABILITY ASSESSMENT

June 2023

This paper on Iceland was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on May 25, 2023.

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May 25, 2023

KEY ISSUES

Context. Iceland has made solid progress since the 2008 crisis and the last FSAP update in restructuring banks and implementing important financial sector reforms. It has transposed many EU Directives and Regulations into national law, improving the regulatory, supervisory, and crisis management frameworks. Despite global headwinds, Iceland is exiting the pandemic with strong economic growth and highly capitalized banks. Rising inflation has prompted appropriate policy rate hikes, and macroprudential policies related to real estate exposures have been tightened. Payment systems are dependent on international connectivity of debit and credit card providers.

Findings. Banks are resilient to solvency stress under the adverse scenario but are sensitive to interest rate changes. Liquidity stress can generally be handled but there are vulnerabilities. The value of pension funds' assets declines substantially in the adverse scenario, reducing future pension values materially. Withdrawals from Pillar III have a noticeable impact on pension funds' cashflows.

Policy advice. Despite important progress, further reforms are needed. Regulatory agencies should be adequately resourced to be able to monitor and address emerging risks and challenges; gaps identified in the policy framework should be closed; and collaboration/allocation of tasks between the CBI and MoFEA further clarified. Key recommendations include: continue monitoring real estate risks and take further macroprudential measures if vulnerabilities persist or intensify; enhance monitoring of liquidity coverage ratio for each individual significant currency; strengthen pension fund oversight; establish a repo market and ELA; improve the legal protection of supervisors; remove MoFEA staff from CBI's FMEN and implement internal delegation of powers within CBI; develop and implement a streamlined and independent budgetary process for supervision; strengthen recovery and resolution planning; adopt EU deadline for deposit insurance disbursements; refine emergency alternative domestic retail payment solutions; strengthen the AML/CTF risk-based supervision of banks and virtual asset service providers and ensure the accuracy of basic and beneficial ownership information of legal persons; and implement an oversight strategy for climate-related financial risks.

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This report is based on the work of the Financial Sector Assessment Program (FSAP) mission that visited Iceland in November-December 2022, and in March 2023. The FSAP findings were discussed with the authorities during the Article IV consultation mission in May 2023.

- The team was led by Etienne Yehoue, Mission Chief and included: Thierry Tressel (deputy mission chief), Knarik Ayvazyan, Alexis Boher, Mahir Binici, Jorge Canales Kriljenko, Xiaodan Ding, Rim Dimashkieh, Grace Jackson, Mariano Spector, Sebastian Weber, and Lu Zhang (all IMF), as well as Timo Broszeit, Antonio Carrascosa, Geraldine Low, and Nick Strange (all IMF external experts). The team also thanks Nchimunya Kabunda for valuable support and input.
- The team met with Prime Minister Katrín Jakobsdóttir, Minister of Finance and Economic Affairs Bjarni Benediktsson, Central Bank of Iceland Governor Ásgeir Jónsson, other representatives of the public sector, as well senior representatives of banks, pension funds, and the wider services industry.
- 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 Etienne Yehoue and Thierry Tressel, with contributions from the FSAP team.

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Glossary

AML/CFT	Anti-Money Laundering/Combating the Financing of Terrorism
BCP	Basel Core Principles for Effective Banking Supervision
BIS	Bank for International Settlement
BOP	Balance of Payments
BRRD	Bank Recovery and Resolution Directive
CAR	Capital Adequacy Ratio
CB	Central Bank
CBI	Central Bank of Iceland
CRE	Residential Real Estate
CCoB	Capital conservation buffer
CCyB	Counter-Cyclical Capital Buffer
CDS	Credit Default Swap
CERT-IS	Icelandic Computer Emergency Response Team
CET1	Common Equity Tier 1
COVID	Coronavirus Disease
CMH	Crisis Management Handbook
CPI	Consumer Price Index
CRD	Capital Requirements Directive
CREs	Real Estate Firms
DAR	Detailed Assessment Report
DC	Defined Contribution
DGSD	Deposit Guarantee Scheme Directive
DORA	Digital Operational Resilience Act
DSIB	Domestic Systemically Important Bank
DSTI	Debt-Service-to-Income
EBA	European Banking Authority
EBIT	Earnings Before Interest and Taxes
ECB	European Central Bank
ECOI	Electronic Communications Office of Iceland
EEA	European Economic Area
ELA	Emergency Liquidity Assistance
ESG	Environmental Social and Governance
ESRB	European Systemic Risk Board
EU	European Union
EUR	Euro
FATF	Financial Action Task Force
FCI	Financial Cycle Indicator
FMEN	Financial Supervision Committee
FOLTF	Failing Or Likely To Fail
FRB	Federal Reserve Bank
FSA	Financial Supervisory Department

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FSB	Financial Stability Board
FSAP	Financial Sector Assessment Program
FSN	Financial Stability Committee
FSI	Financial Soundness Indicator
FSSA	Financial System Stability Assessment
FX	Foreign Exchange
GaR	Growth-at-Risk
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GG	General Government
HFF	Housing Finance Fund
HH	Household
HQLA	High Quality Liquid Assets
IADI	International Association of Deposit Insurers
ICR	Interest Coverage Ratio
ICT	Information and Communication Technology
IFRS	International Financial Reporting Standards
IRF	Impulse Response Function
IRRBB	Interest Rate Risk in the Banking Book
ISK	Icelandic Krona
LCR	Liquidity Coverage Ratio
LEG	Legal Department, IMF
LGD	Loss Given Default
LLP	Loan Loss Provision
LOLR	Lender Of Last Resort
LSI	Less Significant Institution
LTI	Loan-to-Income
LTV	Loan-to-Value
MCM	Monetary and Capital Markets Department, IMF
MoCBA	Ministry of Culture and Business Affairs
MoFEA	Ministry of Finance and Economic Affairs
MoHESI	Ministry of Higher Education Science and Innovation
MREL	Minimum Requirement for Own Funds and Eligible Liabilities
MtM	Marked to Market
MPR	Monetary Policy Rate
NBFI	Non-Bank Financial Institution
NII	Net-Interest Income
NIR	Net International Reserves
NFC	Non-Financial Corporation
NPL	Non-Performing Loan
NSFR	Net Stable Funding Ratio
ODC	Other deposit Corporation
OFC	Other Financial Corporation

O-SII	Other Systemically Important Institutions
PD	Probability of Default
PF	Pension Funds
PIT	Point in Time
RA	Resolution Authority
RES	Research Department, IMF
ROA	Return On Assets
ROSC	Report on the Observance of Standards and Codes
RoW	Rest of the World
RRE	Residential Real Estate
RTGS	Real Time Gross Settlement
RWA	Risk Weighted Assets
SRB	Systemic Risk Buffer
SREP	Supervisory Review and Evaluation Process
SSM	Single Supervisory Mechanism
SVAR	Structural Vector Auto-Regressive
SWIFT	Society for Worldwide Interbank Financial Telecommunications
TA	Technical Assistance
TN	Technical Note
T1	Tier One Capital
TIBER	Threat Intelligence-based Ethical Red Teaming
TVF	Investors' Guarantee Fund
US	United States
USD	US dollar
VARX	Vector Auto-Regressive with Exogenous Variables

EXECUTIVE SUMMARY

Iceland's robust financial system has weathered the impact of the Covid pandemic well, owing to substantially improved macro-financial frameworks since the GFC. Specific achievements include restructuring of banks; the merger of the CBI and the FSA; the strengthening of banking supervision since the 2014 ROSC; the implementation into Icelandic law of EU regulations and directives; the set-up of a macroprudential framework; and the creation of a resolution authority at the CBI. The financial sector and non-financial sectors' balance sheets were relatively strong at the onset of the pandemic. In addition, during the pandemic, a range of policies eased the burden on households and sectors of the economy such as tourism and fishing. Rising inflation has prompted appropriate policy rate hikes, and macroprudential policies related to real estate exposures have been tightened.

The key risks facing Iceland are a tightening of global financial conditions and stagflation.

These could cause disruptions to cross-border funding of banks and other funding markets while credit risk from an adjustment in the real estate market could cause losses to banks and to connected pension funds. There could be excessive debt burdens and distress of some non-financial corporates and households. Iceland also faces cyber-risks, including in payment systems.

The financial system appears resilient to severe macro-financial shocks, but some areas require attention:

- Systemically important banks (D-SIBs) are resilient to solvency stress under the adverse scenario. The real GDP decline over a two-year horizon is broadly aligned with the GFC. The capitalization of the banks remains above the hurdle rate, falling by 5.6 percentage points at the trough. The real estate sector is particularly prone to cyclical risks. Sensitivity analyses show that banks have high sensitivity to interest rate changes. Stress tests of the non-financial corporate sector confirm the presence of some vulnerabilities.
- Banks appear generally resilient to liquidity stress, but there are vulnerabilities. Banks' LCR on aggregate are resilient to adverse liquidity conditions but are exposed to liquidity outflows from pension funds and foreign funding. The cashflow based stress tests indicate vulnerabilities beyond 30 days. Both the LCR and cashflow-based stress tests reveal vulnerabilities to individual currency denominated outflows. Systemic liquidity stress tests incorporating transmission of shocks across sectors point to FX gaps, but international reserves of the central bank appear adequate to backstop liquidity needs.
- Pension fund stress tests point to substantial decline in pension funds' assets during the early years of the projection horizon, reducing future pension values materially. Concentrated exposures towards domestic banks have risen further. Exceptional withdrawals from Pillar III have a noticeable impact on pension funds' cashflows.
- The highly interconnected domestic financial system is exposed to inward cross-border contagion, and banks and pension funds can transmit shocks to each other.

The FSAP recommendations reflect steps to address existing risks and meet new challenges:

Macroprudential policies. Authorities should close data gaps, and continue closely monitoring cyclical risks in the real estate market and corporates and, while current policies are adequate, take further macroprudential measures if risks persist or intensify.

Banking Supervision. Further progress is needed to safeguard the CBI's independence, accountability, and operational effectiveness for banking supervision, including: (i) removing MoFEA staff from the Financial Supervision Committee (FMEN); (ii) implementing a formal delegation of authority for decision making within the CBI; (iii) developing and implementing a streamlined and independent budgetary process for supervision; (iv) ensuring legal protection of supervisors; (v) increasing staffing in a few key risk areas; and (vi) adopting specific national guidance in certain key risk areas.

Regulations and supervision of pension funds. (i) Strengthen the legislative framework for governance (board nominations and oversight) and internal controls (actuarial and compliance functions); (ii) enact more stringent rules on function outsourcing; (iii) expand CBI supervisory and sanctioning powers, and increase on-site inspections at larger pension funds.

Bank resolution, crisis preparedness and safety nets. Set up a coordination body between MoFEA and the resolution authority (RA), while preserving the RA's independence, increase its resources and continue to strengthen the resolution framework, including: (i) putting in place implementation rules and procedures; (ii) operationalizing resolution plans; (iii) developing operational guidance on the failing or likely to fail (FOLTF) and all the resolution tools; (iv) approving the crisis management handbook and testing it in a crisis simulation exercise; and (iv) strengthening the Deposit Guarantee Fund in line with IADI Core Principles, while reducing the maximum deadline for disbursements to seven days.

Systemic liquidity management. (i) Develop a repo market, including by setting up proper incentives to market participants; (ii) intensify the monitoring of ELA-eligible collateral; and (iii) strengthen cooperation, through swap lines, with other central banks to ensure banks' access to FX liquidity if significant stress emerges.

Cyber-resilience. Produce a financial sector-specific cybersecurity strategy, in particular for payment systems, and improve resources for oversight, while investigating alternative domestic retail payment solutions in the event of a significant disruption to the credit and debit card system.

AML/CFT policy. Further work is required to deepen the supervisory AML/CTF risk assessment, enhance the effectiveness of supervisory activities through an increased supervisory presence, and steps should be taken to ensure that banks maintain adequate, accurate and up-to-date information on the beneficial ownership and control of legal persons.

Climate-related financial risks should further be integrated into the supervisory process. This requires putting in place a concrete action plan for implementation, addressing data quality and availability gaps, while engaging more thorough banking supervision of climate-related risks.

Table 1. Iceland: 2023 FSAP: Key Recommendations

Recommendations	Authorities	Time line¹
Cross-cutting		
Increase resources at the CBI for oversight of market risks, interest rate risk in the banking book (IRRBB), financial climate risks, and operational risks (ICT risk and cybersecurity); and for the RA.	CBI	NT
Systemic Risk Analysis		
Differentiate inflation indexed and non-indexed lending and funding instruments in the analysis of inflation impact on banks' credit, interest rate, and market risks.	MoFEA/CBI	MT
Continue conducting liquidity stress tests with various runoff and haircut rates, enhance monitoring of LCR by currencies, and address outlier banks through Pillar 2 and supervisory actions.	CBI	NT
Develop approaches to monitor funding risks from NBFIs (including pension funds) and foreign investors.	CBI	NT
Closely monitor the impact of higher inflation and interest rates on banks' solvency condition and pension funds' investment behavior, counterparty default risk, and (particularly for smaller pension funds) Pillar III cash flows.	CBI (FSA)	NT
Perform data quality checks for pension funds' supervisory reporting data, require pension funds to submit corrections and expand automated validation rules.	CBI (FSA)	NT
Macroprudential Policies		
Further enhance transparency and accountability by developing a heatmap and regularly publishing reports on risk analysis.	CBI	I
Further strengthen the analytical capacity by strengthening the analysis of tail risks, spillovers, systemic risks and calibration of macroprudential tools.	CBI	NT
Continue closely monitoring cyclical risks in the real estate market and corporates and take further macroprudential measures if risks persist.	CBI	I
Close data gaps related to non-financial private sectors (households, NFCs).	CBI	I
Regulation and Supervision: Banking and Pension Funds		
Remove MoFEA staff from CBI's FMEN (independence) and implement internal delegation of powers framework (accountability).	MoFEA, CBI	NT
Develop and implement a streamlined and independent budgetary process for supervision	MoFEA, CBI	NT
Update legislation to: a) ensure protection of supervisors; b) broaden the definition of related-party transactions, and c) broaden CBI's supervisory oversight over bank's external auditors.	MoFEA, CBI	NT
Implement a comprehensive on-site inspection program for banks' risk management practices across all material risk domains incorporating an improved risk-based supervisory plan and ensure integration of climate-risks into supervisory processes.	CBI (FSA)	NT
Issue application regulations or supervisory guidance to banks for appropriate and proportionate implementation of EU rules (ensure compliance with Basel standards) and EBA guidelines.	MoFEA, CBI	MT
Define infringements and sanctions in the Pension Fund Act.	MoFEA	NT
Align rules on governance, internal controls, risk management with IORP II or Solvency II, and enact more stringent rules for outsourcing.	MoFEA, CBI (FSA)	NT
Perform regular on-site inspections for large pension funds and re-establish institutionalized supervisory dialogue.	CBI (FSA)	I
Liquidity and Crisis Management		
Develop a repo market and operationalize the ELA, including the assessment of collateral eligibility.	CBI	NT

Table 1. Iceland: 2023 FSAP: Key Recommendations (Concluded)

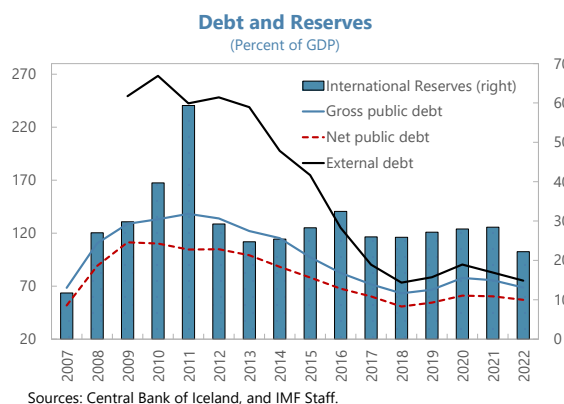
Establish a coordination body on resolution issues between the MoFEA and the CBI (RA).	MoFEA, CBI (RA)	I
Approve the crisis management handbook and test it in a simulation exercise, widening its scope to the resolution stage.	CBI (RA)	I
Operationalize the application of all the resolution tools (not just bail-in).	CBI (RA)	NT
Adopt a seven-day deadline for the Icelandic Depositors' and Investors' Guarantee Fund (TVF)'s disbursements and grant TVF access to adequate external funding sources.	CBI (RA)	NT
Cybersecurity Supervision and Oversight		
Investigate alternative domestic retail payment solutions in the event of a significant disruption to the credit and debit card system and refine playbooks to test how cash will be distributed and used in a crisis situation.	CBI	I/NT
Produce a financial sector specific cybersecurity strategy, clearly setting out the roles and responsibilities of each party.	CBI/MoFEA	I
AML/CFT		
Improve collection and analysis of data; refine the risk assessment methodology; enhance AML/CFT supervision of banks; and continue to detect unlicensed virtual asset service providers.	CBI	NT
Continue to improve bank's access to and maintenance of adequate, accurate and up-to-date information on the beneficial ownership and control of legal persons.	MoFEA and MoCBA	NT

* I-Immediate" is within one year; "NT-near-term" is 1–3 years; "MT-medium-term" is 3–5 years.

BACKGROUND

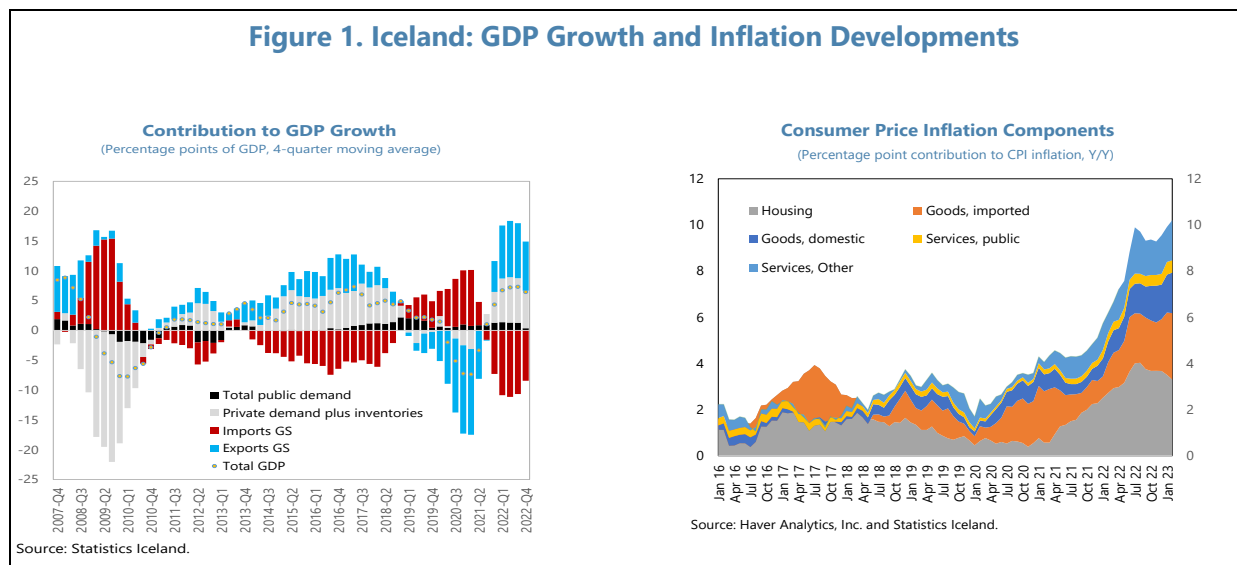
A. Macroeconomic Developments

1. Iceland entered COVID-19 with favorable economic conditions and weathered the pandemic relatively well. Public debt has declined by more than 50 percentage points of GDP since the Global Financial Crisis, private and external debt have declined by 200 percent of GDP, and international reserves have remained above 20 percent of GDP in 2022. Banks' balance sheets have been solid, with significant capital and liquidity buffers. However, the pandemic paralyzed the tourism sector—the engine of growth since 2012. A range of monetary, fiscal, and macroprudential measures eased the burden on households and the most affected sectors of the economy.

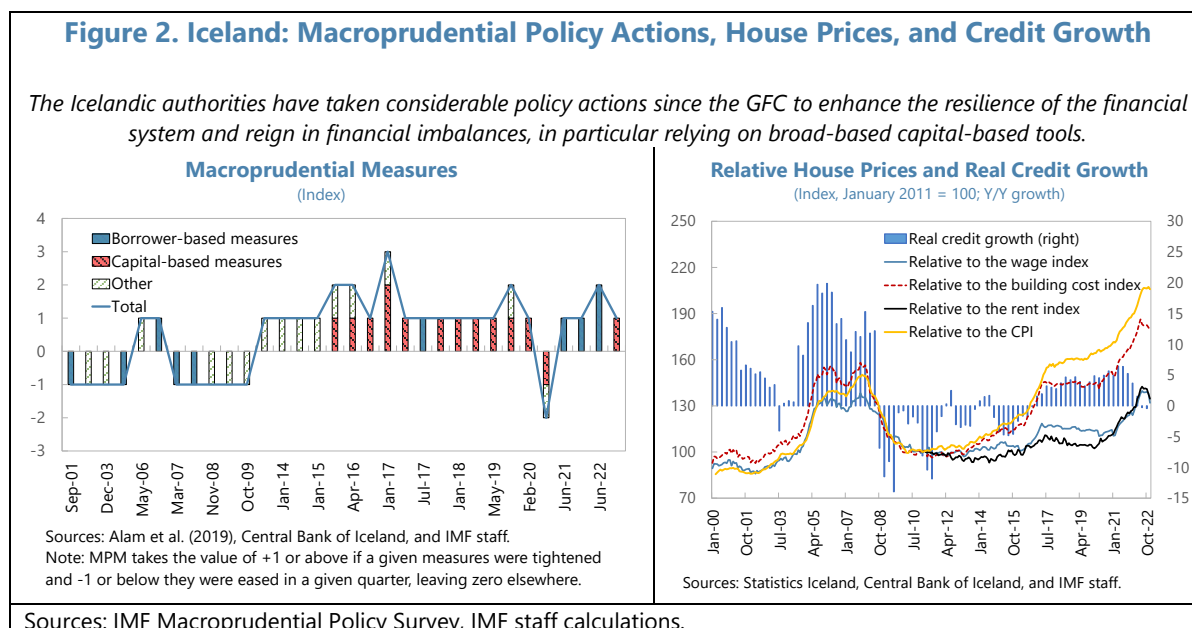


2. The economy recovered well from the pandemic. Real GDP increased by 6.4 percent in 2022, driven mainly by domestic demand and export recovery, and exceeding its pre-pandemic level, contributing to inflation and current account deficits, and reversing a decade-long trend of surpluses. Gross international reserves stood at 22 percent of GDP and external debt at 75 percent of GDP by end-2022. Labor market has tightened with unemployment rate at 3.1 percent by December 2022, below pre-pandemic levels (Table 2).

Figure 1. Iceland: GDP Growth and Inflation Developments



3. Rising inflation and inflation expectations and housing costs have prompted policy rate hikes and tightening of macroprudential policies. Strong domestic demand, rising housing costs, and second-round effects of global energy and food prices fueled core inflation and inflation expectations, with the latter rising significantly in 2022 amid increasing concerns about de-anchoring. The Central Bank of Iceland (CBI) raised policy rates 13 times by a total of 800 basis points since April 2021, reaching 8.75 percent in May 2023. On the back of overvalued house prices, the CBI introduced a debt-service-to-income (DSTI) limit in 2021¹ lowered the loan-to-value ratio (LTV) limit for mortgages from 85 percent to 80 percent,² and raised the countercyclical capital buffer (CCyB), up to 2.5 percent in March 2023 (Figure 2).



4. Iceland is exposed to both physical and transition risks of climate change. Iceland is exposed to climate-induced physical risks, including sea acidification and melting of glaciers, and adaptation risks to climate change (e.g., for fishery and transportation sectors), which may have significant impacts.³ The transportation and manufacturing sectors are exposed to transition risks (Figure 3). The 2020 Climate Action Plan and the 2021 Iceland's Strategy on Adaptation to Climate Change include ambitious objectives towards carbon neutrality.

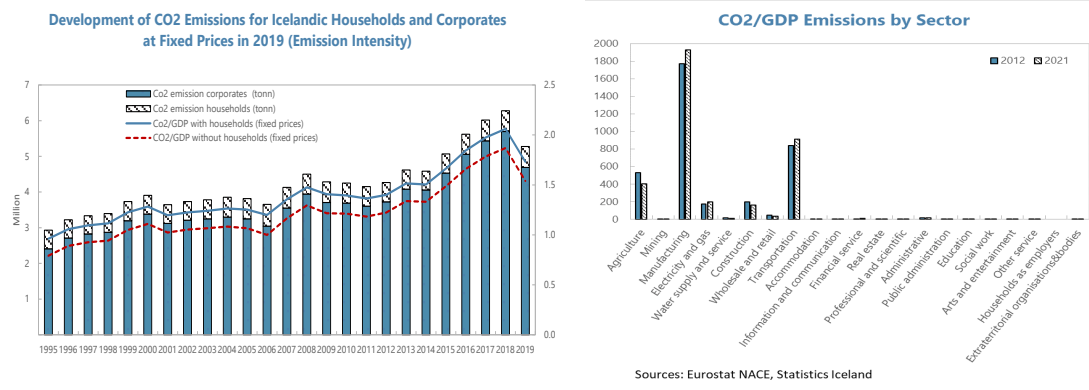
¹DSTI limit is set at 35 percent in general, but for first time buyers it stands at 40 percent.

²The LTV for first-time mortgage borrowers was lowered from 90 to 85 percent in June 2022.

³Iceland is naturally exposed to significant natural hazards, such as volcanic eruptions and extreme weather conditions.

Figure 3. Iceland: Transition Risks Arising from Climate Change

CO2 emissions are concentrated in a few sectors in Iceland, and bank loans already look largely green.



Banks' Exposures to Climate-related Transition Risks

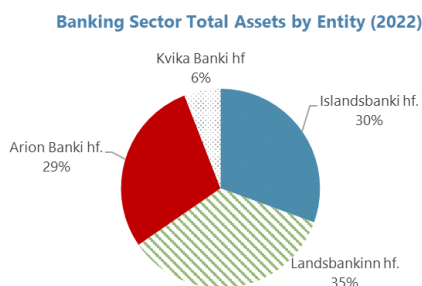
Classification of exposures (CO2/GDP split)	Book value of exposures (Icelandic krona million)	Percent of total exposures	Book value of non-performing exposures (Icelandic krona million)	Percent of total non-performing exposures	Number of non-performing counterparties	Expected losses in the next 12 months (Icelandic krona million)
Green	1,357,092.44	75.00	30,130.85	89.48	2,218	12,288.69
Neutral	288,633.55	15.95	2,740.24	8.14	287	838.47
Brown	163,687.67	9.05	802.96	2.38	141	636.72
Total	1,809,413.65	100.00	33,674.05	100.00	2,646	13,763.87

Source: CBI

Notes: Green, brown and neutral industries are based on air emission accounts. Air emission accounts by Statistics Iceland NACE1 = ISAT1 and further accounts by NACE2 = AEA groups.

B. Financial Sector Landscape

5. The banking system is large, concentrated and interconnected with Non-Bank Financial Institutions (NBFIs). Total financial sector assets reached 410 percent of GDP in September 2022. The banking system, with assets at 135 percent of GDP, comprises four commercial banks and five savings banks (Figure 24). Three commercial banks account for 95 percent of banking assets.⁴ Pension funds are systemically important due to their size and interconnectedness with the banking system. CBI's RTGS is systemically important infrastructure. Iceland is home to a nascent but growing FinTech sector.

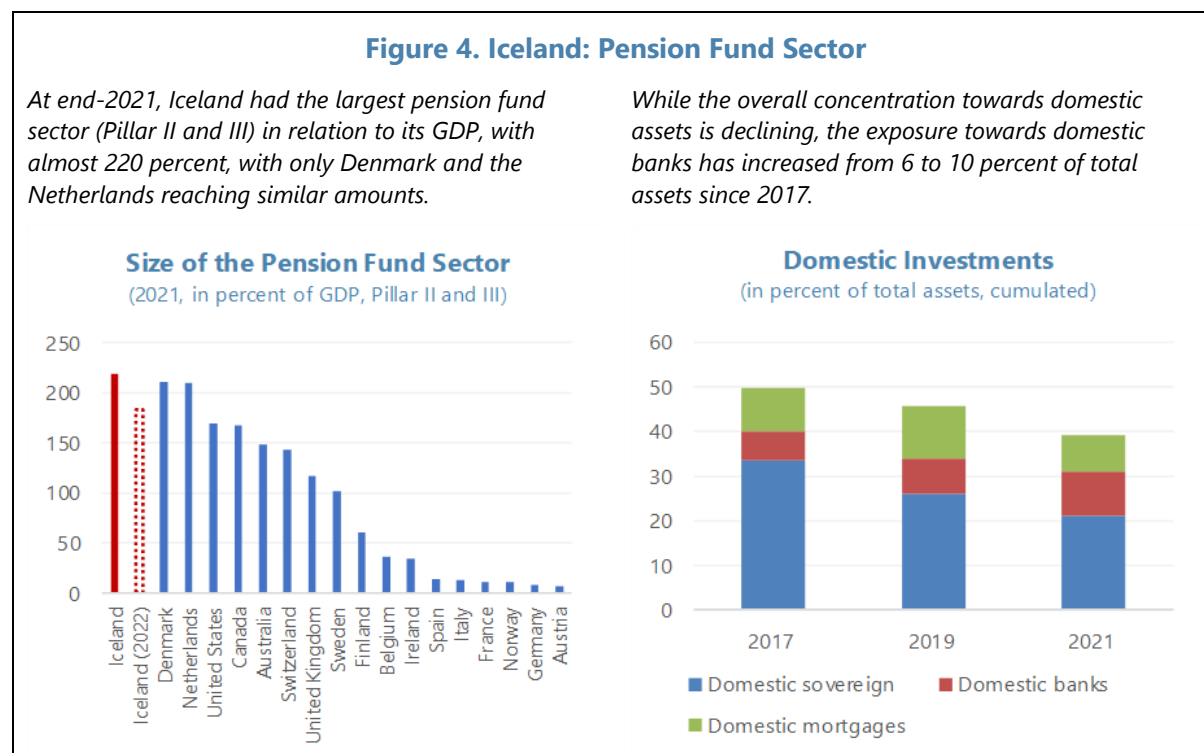


Source: FitchConnect

⁴ The high share of state-ownership among these banks is a consequence of the GFC.

6. Iceland’s mandatory occupational pension fund (PF) sector is large, and risks are mostly borne by pension fund members (Figure 4). Total assets of the fully funded PF sector—which provides mandatory Pillar II pensions and personal pension savings in Pillar III—amount to 176 percent of GDP at end-2022, more than in any other country. The mandatory pensions are provided by 21 autonomous PFs, and the large majority of schemes can be categorized as defined ambition⁵. Funding ratios of most defined-ambition schemes have dropped below 100 percent, potentially requiring some funds to adjust accrued and/or future benefits.

7. Pension funds in Iceland play a vital role in the domestic financial sector as investors and lenders. Exposures to Icelandic banks account for 10 percent of total PF assets and 14 percent of banks’ financial liabilities, and holdings of sovereign bonds account for 21 percent of assets. PFs are active in the mortgage market with an outstanding volume amounting to 23 percent of the outstanding mortgage volume. The share of foreign-denominated assets has reached 35 percent of assets as of end-2022.⁶ Unhedged currency risks are mostly borne by PFs, but historically FX investments provided a natural hedge against inflation.



⁵ A defined ambition (DA) pension fund targets but does not guarantee a certain replacement rate. On the contribution, effective January 2023, the mandatory contribution rate rises to 15.5 percent from 12 percent.

⁶ Quantitative investment limits have been traditionally used in the Pension Fund Act, and these were kept in place even when the prudent-person principle was introduced in 2017. For Pillar II pension funds, the share of foreign-denominated assets is capped at 50 percent. A bill was recently approved in Parliament which would gradually allow a higher allocation to foreign-denominated investments, up to 65 percent by 2036.

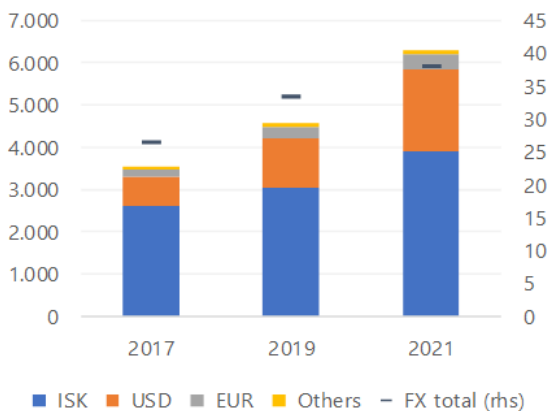
Figure 4. Iceland: Pension Fund Sector (Concluded)

Reaching 38 percent at end-2021, the relative share of FX assets has increased substantially from 26 percent at end-2017. Most is invested in US dollars.

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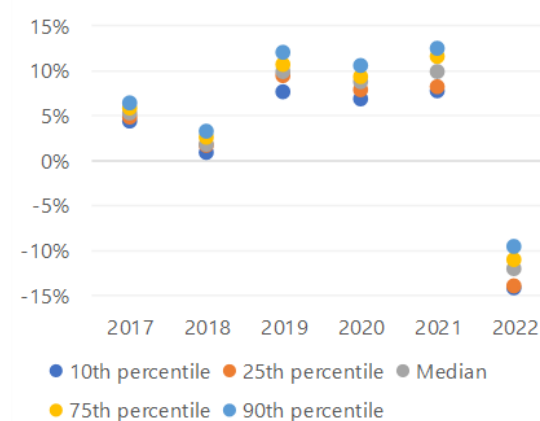
Defined Ambition: FX Assets

(in ISK billion; in percent of total assets)



Defined Ambition: Real Investment Yield

(in percent, distribution)

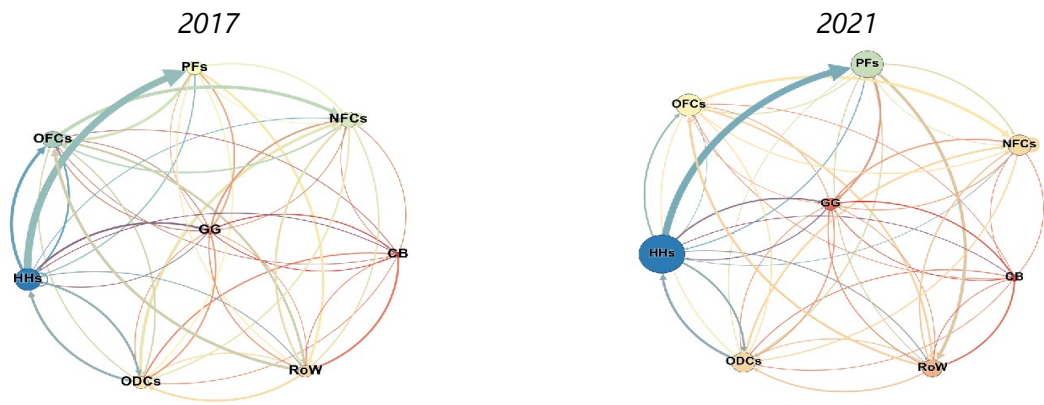


Source: IMF staff calculations based on OECD and CBI data.

8. Interconnectedness continues to increase, mainly driven by households’ (HHs) and PFs’ assets, and their exposures to banks, as well as PFs’ exposure to investment funds. By the end of 2021, Icelandic HHs’ asset position amounted to 310 percent of GDP and provided a significant amount of funding to the economy. More than 60 percent of HHs’ asset exposures are to PFs and around 13 percent are to banks. Non-Financial Corporates (NFCs) are the largest borrowers, with debt held by NBFIs, other NFCs, and banks (Figure 5).

Figure 5. Iceland: Domestic Balance Sheet Exposures: 2017 and 2021

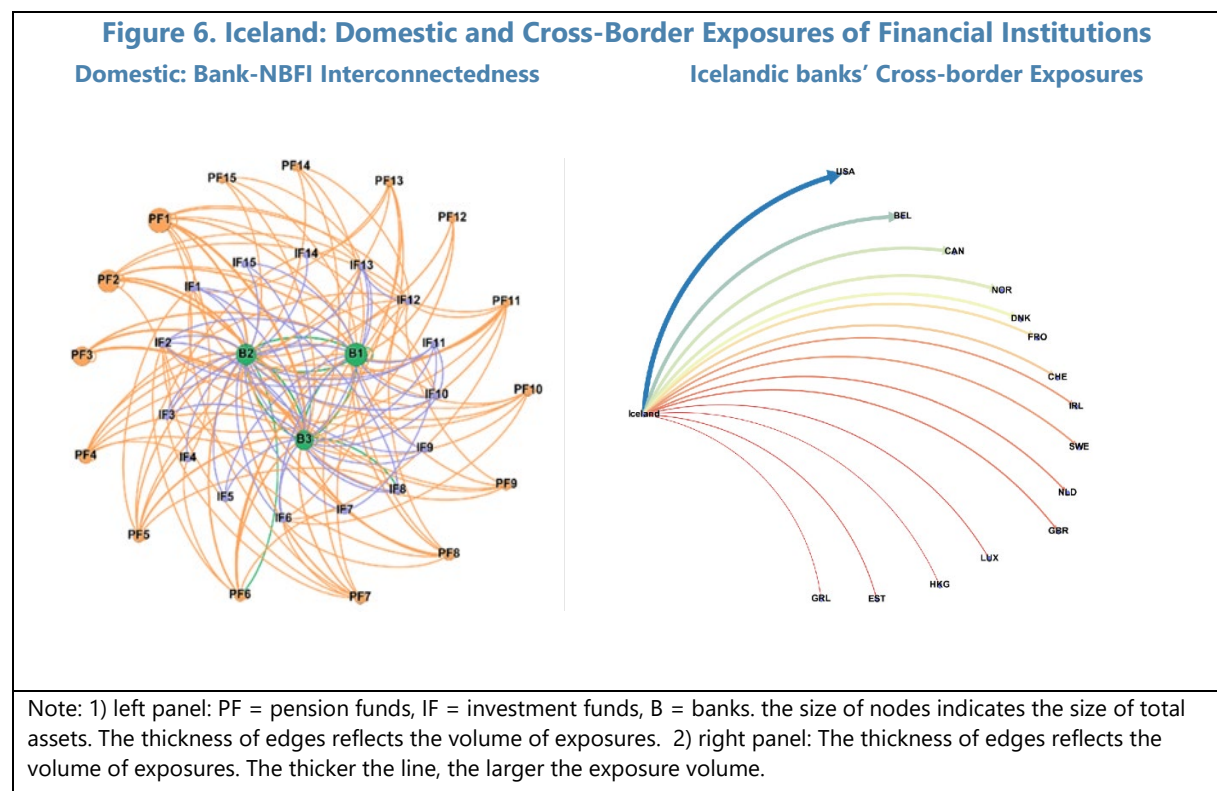
Gross exposures have increased in recent years, mainly driven by the asset increase of households and of pension funds



Source: CBI and IMF staff calculation. The size of nodes denotes asset size, and the thickness of edges denotes volume of exposures.

Other financial corporates (ODCs) contain money market funds, non-MMF investment funds, other financial intermediaries, financial auxiliaries, captive financial institutions, and insurance companies.

9. Icelandic banks are interconnected with foreign banks (Figure 6). Counterparties for Icelandic banking sector largest cross-border exposures include U.S., Belgium, and Canada. Around two-third of the exposures come from the European countries such as Belgium, Norway, and Denmark. There are also significant exposures outside Europe, particularly with the U.S. and Canada, accounting for 30 percent of total exposures.



SYSTEMIC RISK ASSESSMENT

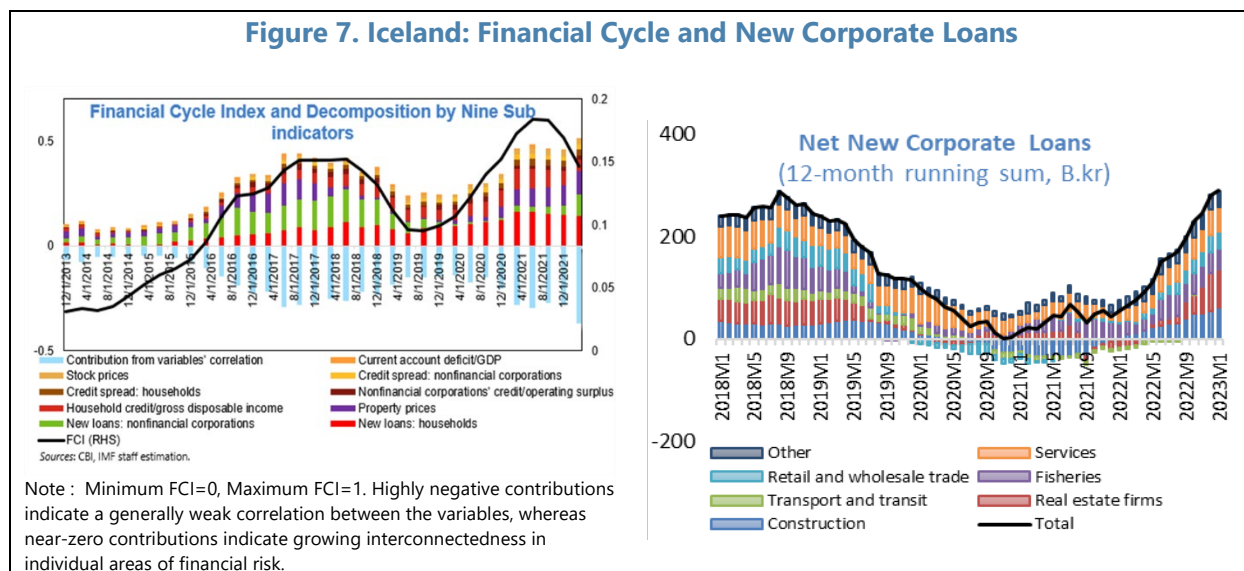
A. Macrofinancial Vulnerabilities

Cyclical Risks and Real Estate

10. Cyclical risks are declining but remain high. A Financial Cyclical Indicator (FCI) developed by the FSAP team shows that vulnerabilities have started to decline from the peak reached at the end of 2021 but remain high.⁷ Key financial vulnerabilities include household leverage amid high real estate valuations. There are signs of increased risk-taking in some sectors, notably Commercial Real Estates (CREs) through higher bank lending (Figure 7).

⁷ Please see macroprudential TN for detailed description of the FCI. An increase in the FCI means an accumulation of systemic risk.

11. House prices have become overvalued in recent years (Figure 25), with increased new loans to the construction sector (Figure 7). Higher building cost, income growth, net migration flows, and short-term rental contracts demand generated by tourism have contributed to price inflation in the real estate market. Real estate prices have exhibited some misalignment estimated to range from 6.2 to 17.6 percent as of 2022:Q2.⁸ An abrupt correction of real estate prices could result in financial losses to corporates, households, and financial institutions.



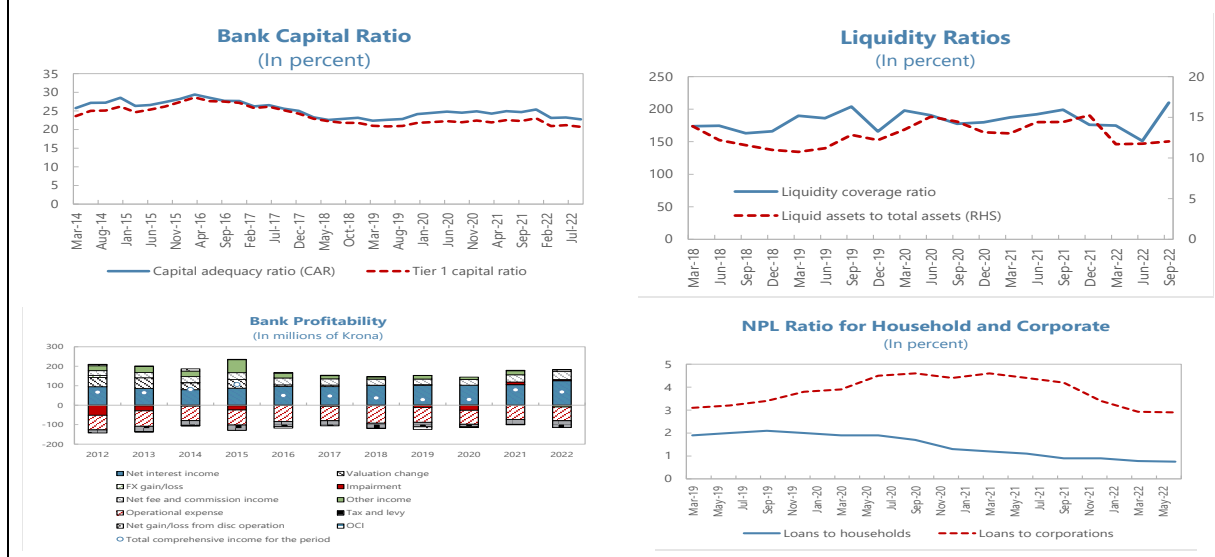
Banks

12. Banks have solid buffers (Figure 8). Banks' capital ratios are generally well above regulatory minima, with CET1 ratio at 20 percent as of 2022Q3. The LCR has increased from 151 in mid-2022 to 210 percent in 2022Q3, driven by a one-off inflow to pay off maturing bonds, but banking sector liquid assets have overall shrunk in 2022. Profitability remains robust reflecting high interest margin, low provisions, high fees and commissions, and low cost-to-asset ratio. Non-performing loans are below 2 percent due to the economic recovery, although many tourism loans were placed under forbearance at the expiration of the loan deferral program in September 2020.

13. Icelandic banks are engaged in inflation indexation. As of 2022Q3, roughly 22 percent of total loans and 17 percent of total liabilities are indexed. Interest rates of non-indexed loans spike during periods of high inflation, whereas indexed loans, which charge real interest rates but add inflationary effect onto the principle of the loans, could erode debtors' equity and lead to negative amortization during times of high inflation (Figure 25). Since both products may expose banks to credit risks, they deserve close monitoring and differentiated data collection.

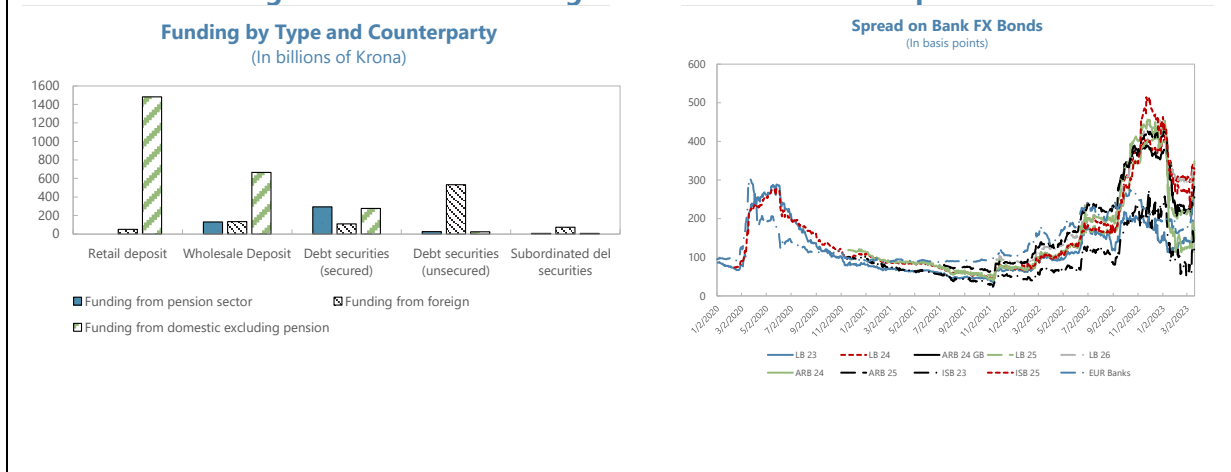
⁸ Please see macroprudential TN for details.

Figure 8. Iceland: Banking System



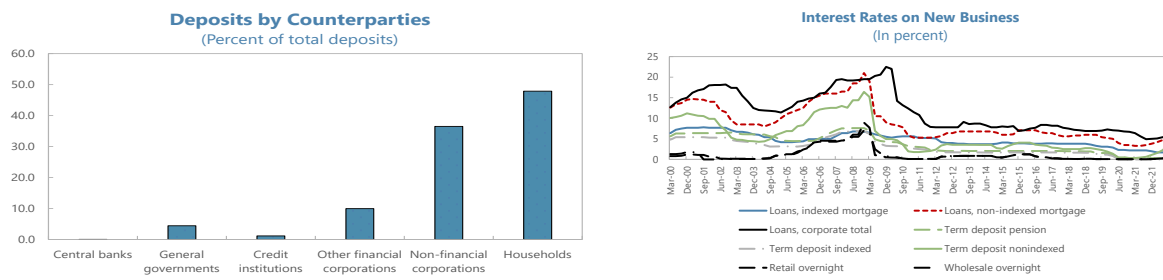
14. **Banks’ funding presents some vulnerabilities (Figure 9).** Foreign funding, mainly from unsecured debt securities and nonresident deposits, accounts for about 25 percent of total funding and are mainly used to finance FX denominated corporate loans. Given continued tightening of global financial conditions, banks may have to rollover upcoming maturing FX bonds at higher spreads.⁹ PFs are an important source of funding for banks, mostly through holdings of shares, direct deposits or covered bonds. Banks could face funding pressures if PFs re-directed their investments from domestic to foreign markets.

Figure 9. Iceland: Funding and Interest Rate Developments



⁹ It is expected that 16 percent (or 130 billion Krona) of FX bond will mature in 2023, and 23 percent (or 185 billion Krona) will mature in 2024.

Figure 9. Iceland: Funding and Interest Rate Developments (Concluded)

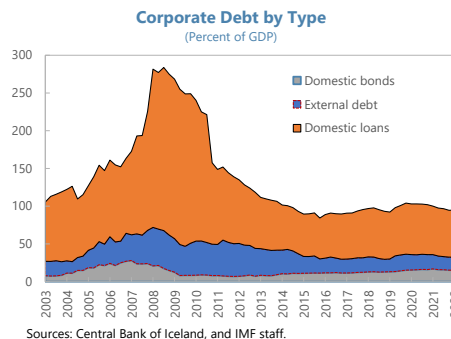


Source: CBI and IMF.

Note: Top right figure shows the time series of spreads on a number of current issuance of Icelandic bank specific FX bonds.

Corporates

15. Non-financial corporate sector debt has declined significantly but remains high at around 95 percent of GDP at the end-2022 (Text Figure). The share of external debt in total declined from about 50 percent in 2008 to 17 percent by the end-2022, due, in part, to tighter prudential regulations. Icelandic NFCs remain highly dependent on loan financing.



16. The pandemic caused a significant drop in enterprises' sales and increased corporate debt distress, but timely support measures played an important mitigation role. Profitability has declined for firms, while leverage has remained contained. A large proportion of firms had low interest coverage ratios (ICR) in 2020. Firm-at-risk and debt-at-risk—for which ICR is lower than 1.5—increased by 2.4 and 3.1 percentage points, respectively, in 2020, compared to the prior year (Figure 10). Aggregate non-performing loans on D-SIBs lending to NFCs increased marginally during the pandemic.

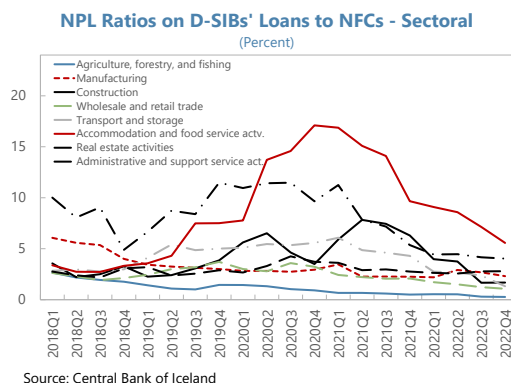
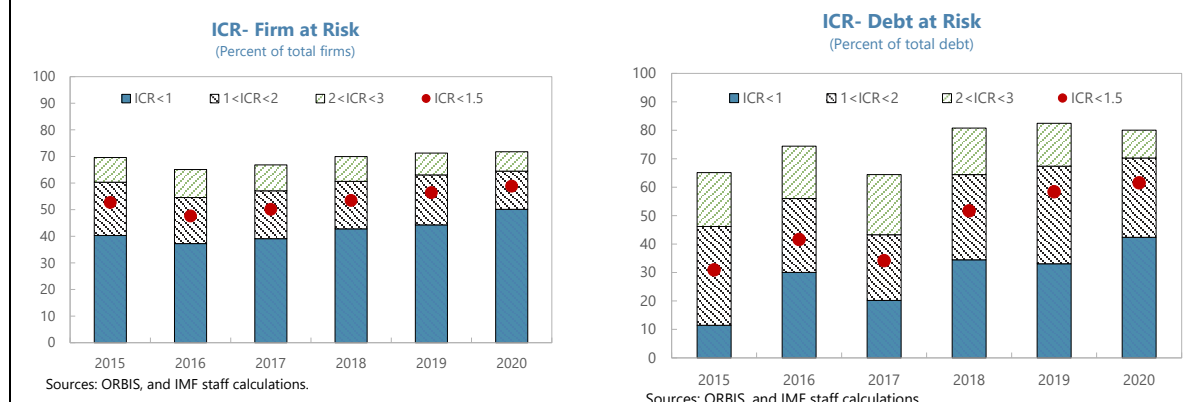


Figure 10. Iceland: Firm- and Debt-at-Risk

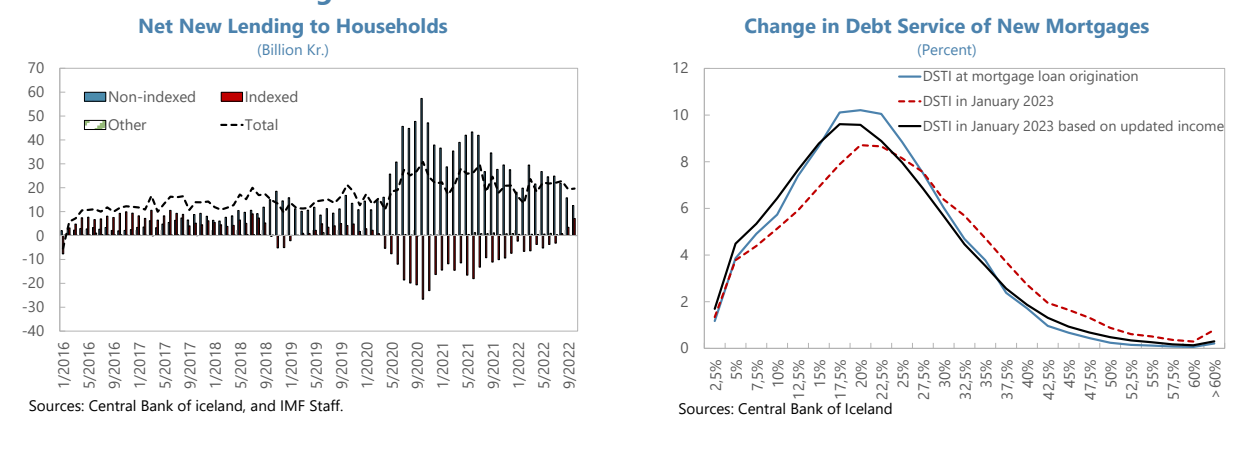


Note: Firm-at-risk and debt-at-risk presents the share of the firms and the share of the debt at different ICR threshold including when ICR is lower than 1.5.

Households

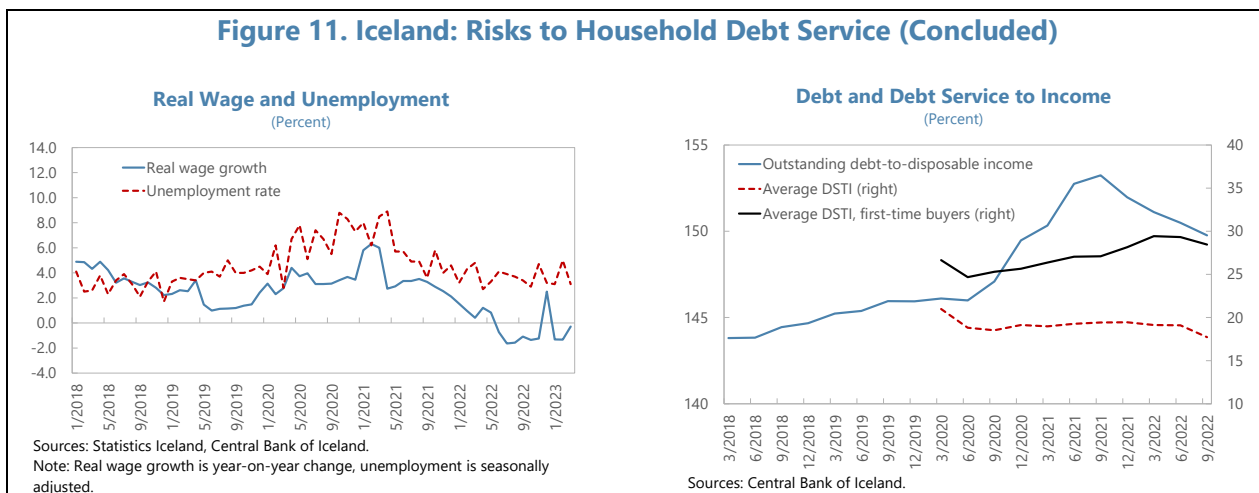
17. Household debt increased marginally during the pandemic but has been on a downward trajectory since the GFC (Figure 11). Interest rate hikes weigh on household debt service¹⁰, but higher income is a mitigant. CBI simulations suggest that, comparing the DSTI at origination versus in January 2023, the share of borrowers with DSTI above 35 percent increases from about 7 percent to 15 percent. Based on updated income as of January 2023, however, the share increases from about 7 percent to 9 only. Real wage increase, about 7 percent higher than in 2019, has boosted households' debt service capacity.

Figure 11. Iceland: Risks to Household Debt Service



¹⁰ As of end-2022, floating rate mortgages account for 45 percent of total mortgages. The fixed rate loans are not fixed for longer than 3 to 5 years.

Figure 11. Iceland: Risks to Household Debt Service (Concluded)



B. Bank Stress Tests

Solvency Stress Tests

18. The stress test covered 3 D-SIBs, accounting for about 95 percent of total banking system assets. The stress test used supervisory data as of Q3-2022 at the highest consolidation level within Iceland and adopted a scenario-based approach, complemented by sensitivity analyses of further rise in interest rates, and credit risk shocks. The adverse stagflation scenario shock to real GDP is as severe as the GFC over a two-year horizon and embodies a tightening of global financial conditions and rising funding costs, inflationary pressures and protracted supply chain disruptions due to political fragmentation, rising domestic unemployment and fall in the value of domestic assets and depreciation of the krona (see RAM). The severity of the adverse scenario is closely aligned with the 5 percent Growth-at-Risk estimate, implying a 13 percent shock to real GDP growth relative to the baseline, and a 9.3 percent decline relative to the starting point over a two-year horizon (Figures 12 and 13).

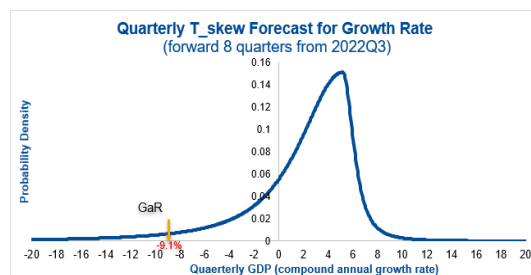
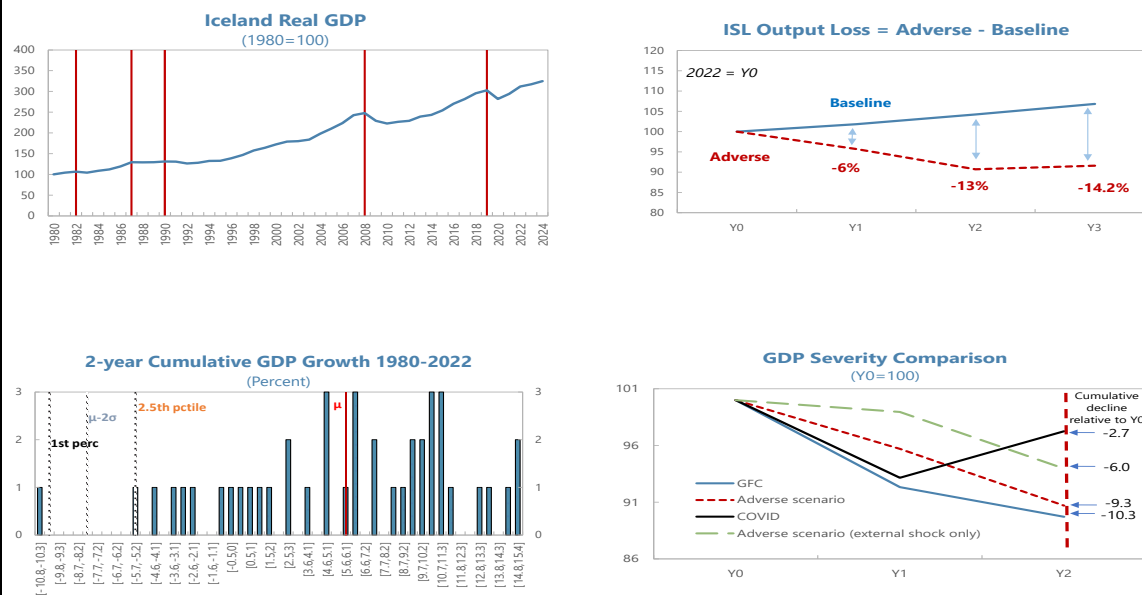


Figure 12. Iceland: Output Contractions and Scenario Design



Source: IMF staff.

Note: μ and σ denote historical mean and standard deviation of the 2-year cumulative GDP growth, respectively.

Figure 13. Iceland: Adverse Scenario (in percent)

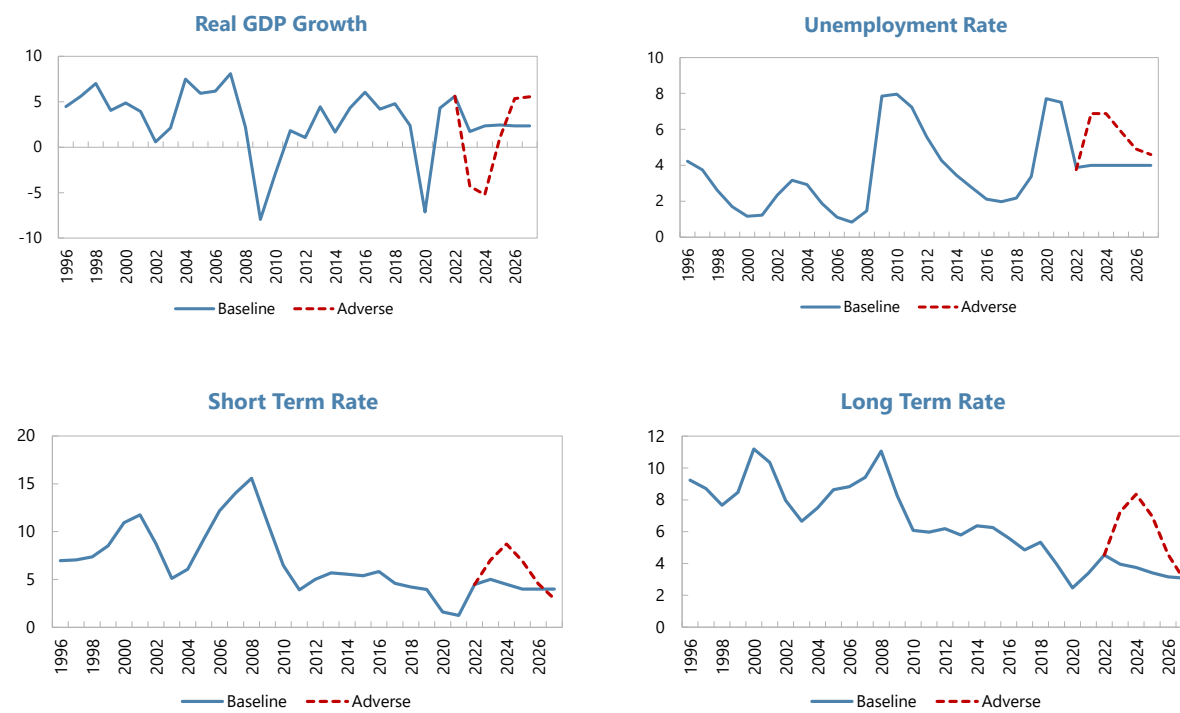
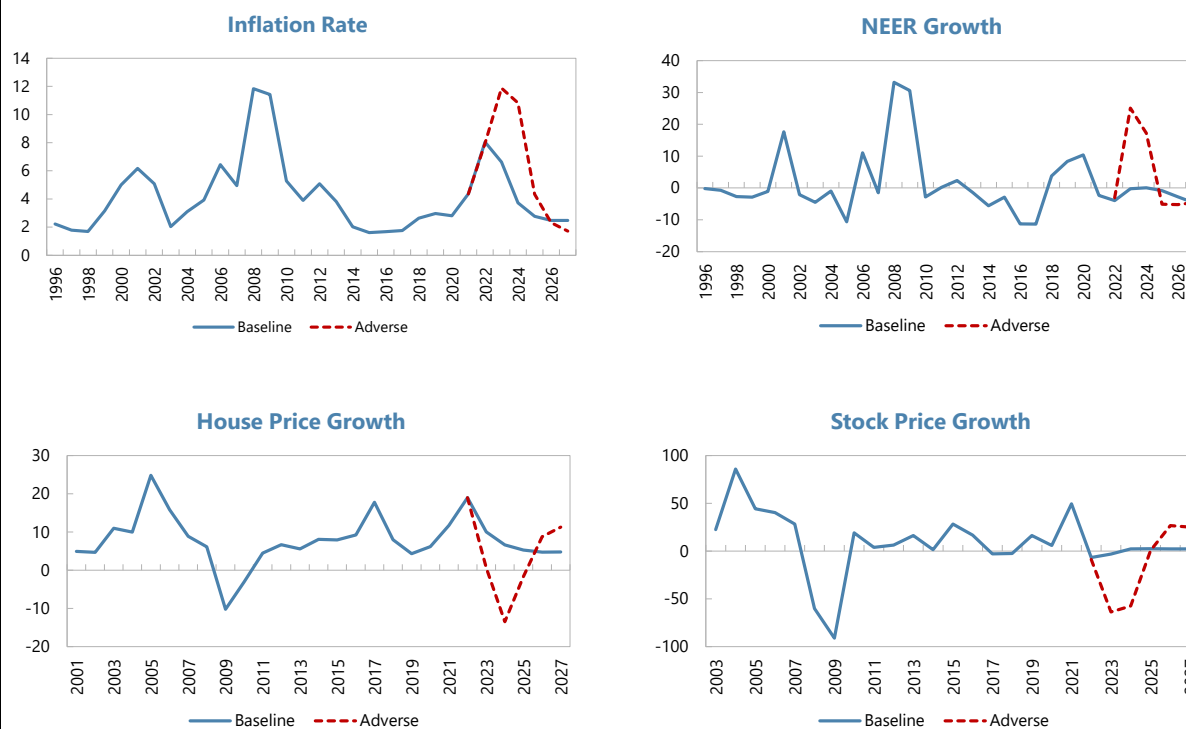


Figure 13. Iceland: Adverse Scenario (in percent)(Concluded)

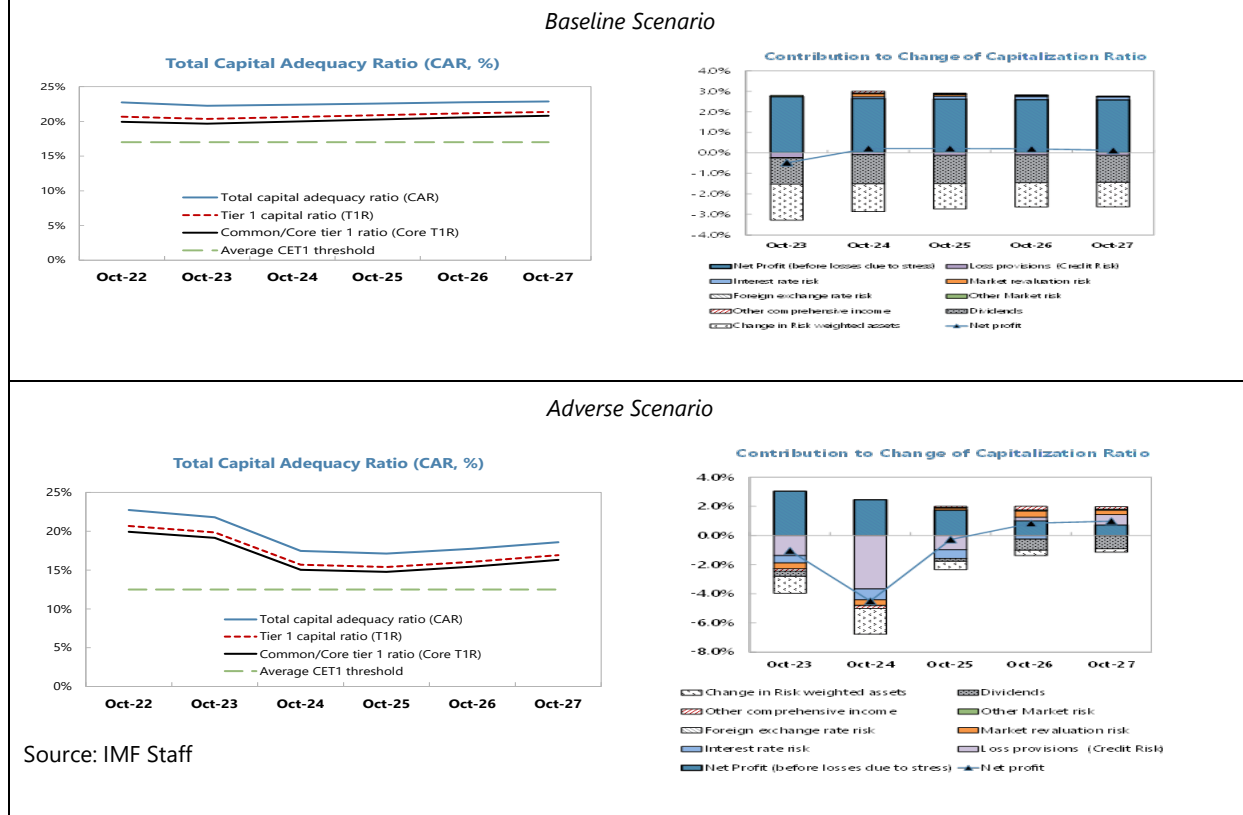
Source: CBI and IMF staff estimate.

19. The solvency stress test confirms the sector's resilience to severe but plausible macroeconomic shocks (Figure 14). Banks' solvency is resilient under the adverse scenario. The aggregate fully loaded CET1 ratio declines by 5.2 percentage points at the trough, and no bank sees its capital ratios fall below the hurdle rates, owing to high initial capital positions.¹¹ Credit risk provisioning is by far the largest contributor to the decline in capital ratios. The contribution from market risk is relatively small given small holdings of trading securities.¹²

¹¹ Under the adverse scenario, the hurdle rates for the CET1, Tier 1, and total capital ratio are set at minimum CET1, T1, CAR ratio (4.5, 6 or 8 percent) plus SRB, O-SII and Pillar II buffer. Banks are allowed to deplete CCyB and CCoB under the adverse scenario. The hurdle rates under the baseline scenario include CCoB. More details on methodology can be found in the technical note of the systemic risk analysis.

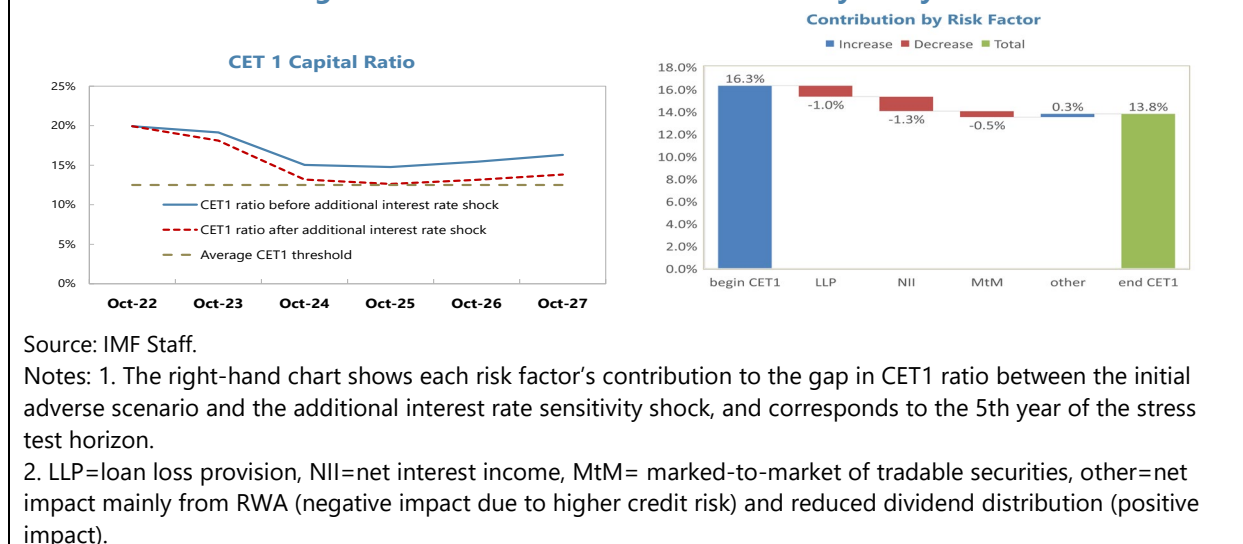
¹² There are currently no debt securities recorded under the amortized cost category, and therefore all securities are marked to market.

Figure 14. Iceland: Result for Bank Solvency Stress Test

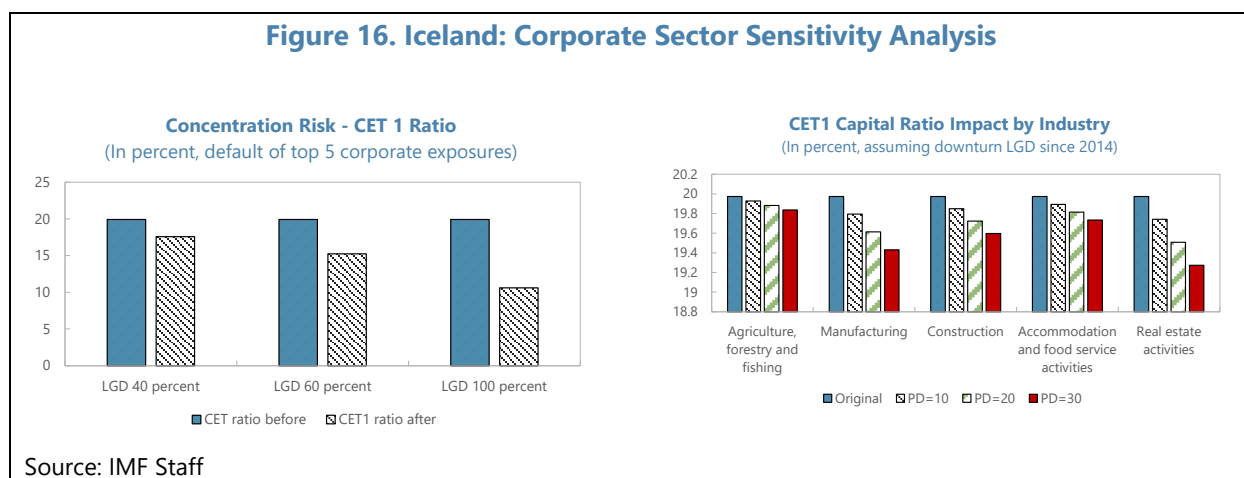


20. The sensitivity analysis reveals high sensitivity to interest rate hikes (Figure 15). An additional 2 percentage points parallel increase along the yield curve causes an additional 210 basis points decline in aggregate capital relative to the initial adverse scenario results at the trough, and 250 basis points by the end of horizon, and two banks fail to meet the hurdle rates.

Figure 15. Iceland: Interest Rate Sensitivity Analysis



21. Bank capital may be resilient to the default of top corporate exposures, depending on collateral recovery (Figure 16). Under a zero-recovery rate from the simultaneous default of the five largest NFC borrowers, the aggregate CET1 ratio declines by 9.3 percentage points, and two out of three D-SIBs may not meet the regulatory minimum CET1 capital. Under two milder scenarios assuming 40 and 60 percent LGDs, no banks breaching the hurdle rates. Increasing PD values for key sectors of credit exposure suggests the highest capital impact would come from real estate activities.



22. An analysis of macro-financial second round effects indicates that banks remain broadly resilient even after these feedback effects. The solvency stress test shows that under the first-round adverse scenario there is a sizeable impact on bank capital, even if aggregate capital ratios remain above the hurdle rate. This suggests that the initial external shocks could be amplified through a contraction of bank credit supply, resulting in a further deterioration of the macroeconomy, which in turn deepens the stress on the banking sector—the second-round effects.¹³ These second-round effects are assessed by estimating a VAR model that links the initial shock to bank capitalization with the path for bank lending and other macroeconomic variables. The analysis finds that in the second-round, one of the three banks falls slightly below at the trough but that aggregate capitalization remains above the hurdle rate (Appendix VIII).

Liquidity Stress Tests

23. Banks are generally resilient to liquidity stress,¹⁴ but there are vulnerabilities (Figure 17). Across the three main stress scenarios (Appendix III), the aggregate LCR declines from 210 percent to 122 percent in the most severe scenario, and one bank's LCR falls marginally below the minimum. When assuming additional liquidity outflow from pension and foreign funding, one more

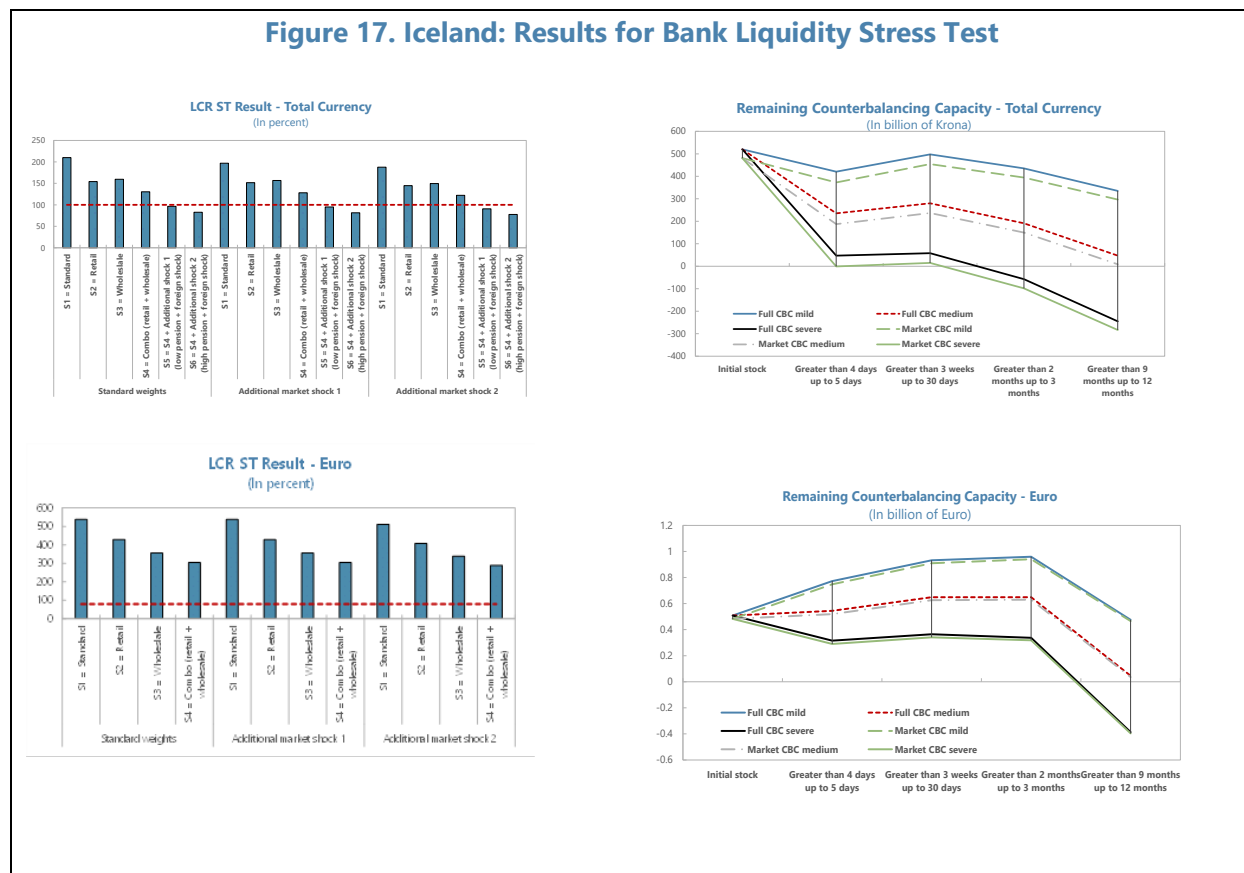
¹³ Many empirical studies find that bank lending contracts when bank capital is lower, even if capital remains above minimum requirements. See, for example, Gambacorta and Mistrulli (2004), "Does Bank Capital Affect Lending behavior" and Labonne and Lame (2014), "Credit Growth and Bank Capital Requirements: Binding or Not", which use a sample of Italian and French banks, respectively.

¹⁴ Detailed methodology on the stress test can be found in the technical note of the systemic risk analysis.

bank breaches the minimum threshold, and the aggregate LCR falls to 76 percent. The bank cashflow-based stress test indicates potential liquidity gaps beyond 30-days mainly because of a maturity mismatch between cash inflows and outflows.

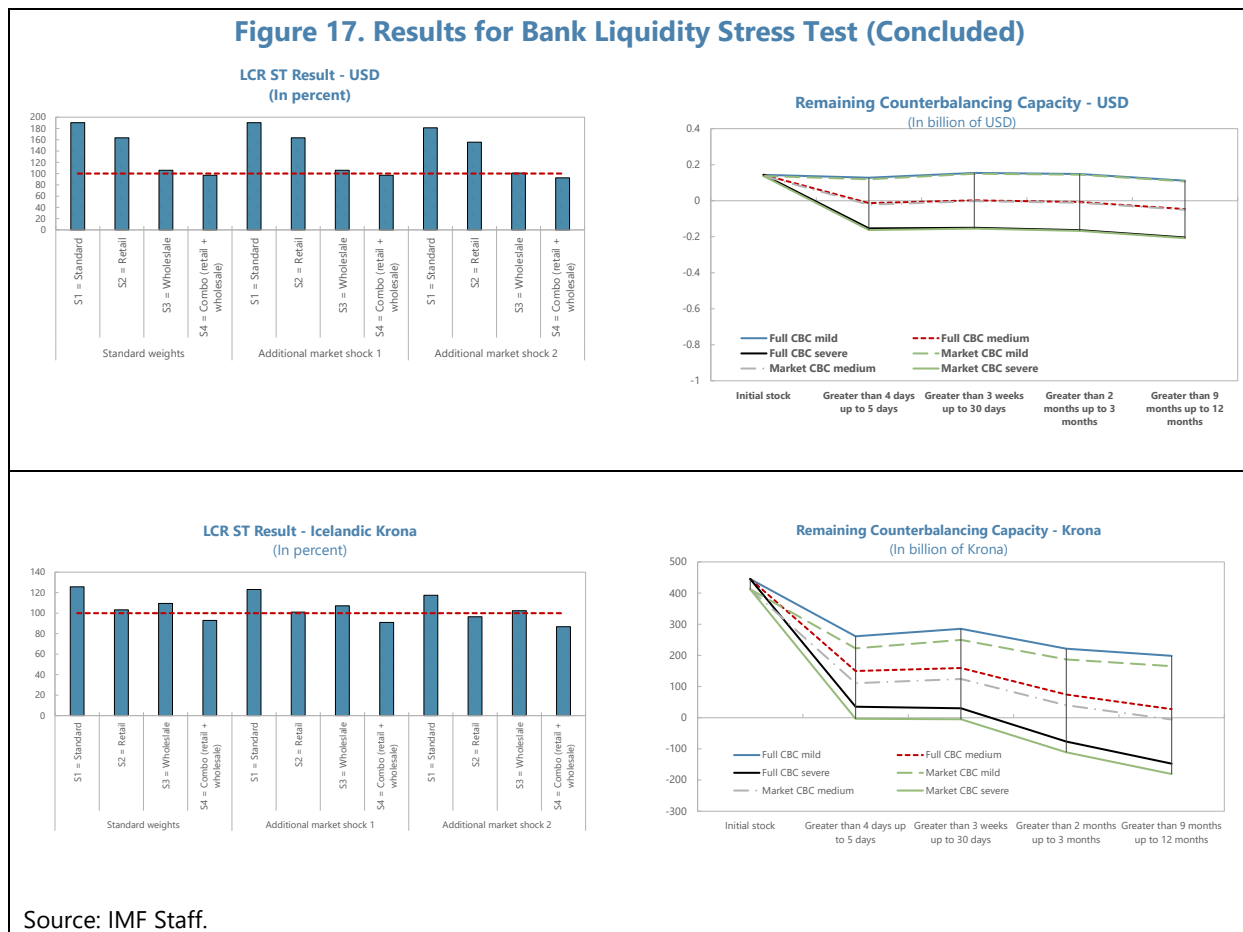
24. Banks are vulnerable to cash outflows in individual currencies. Under the most severe scenario, one bank would breach the 100 percent threshold in Euros and another one in U.S. dollars. None of the D-SIBs would meet the threshold in Icelandic Krona.¹⁵ Finally, the post-shock total currency NSFR saw no bank falling below the 100 percent threshold, but points to some currency specific vulnerabilities, particularly in US dollars.

Figure 17. Iceland: Results for Bank Liquidity Stress Test



¹⁵ For individual significant currencies, the current LCR regulatory minimum is 50 percent for Krona, 80 percent for Euro. There is no LCR limit set for the US Dollar.

Figure 17. Results for Bank Liquidity Stress Test (Concluded)



C. Systemic Liquidity Stress Tests

25. The systemic liquidity stress test simulates various liquidity outflows with increasing severity (Figure 18). A loss of confidence in the domestic market causes joint FX outflows from domestic household and corporate deposits, nonresident deposits, maturing international bonds, and additional funding shocks from PFs and other NBFIs as they move assets offshore.¹⁶ The exercise allows currency conversion into FX.¹⁷

26. Findings point to a FX liquidity gap of the banking sector (Figure 18), but the CBI’s international reserves appear sufficient to provide a backstop. Under the severe scenario banks could face sizable FX liquidity gaps, which can reach 3.4 billion US dollars (about half of gross international reserves as of end-2022¹⁸) when local currency conversion is allowed and NBFIs and the private

¹⁶ As pension funds are subject to an FX investment limit, currency depreciation could act as an offsetting factor to curb their FX liquidity outflows from the system.

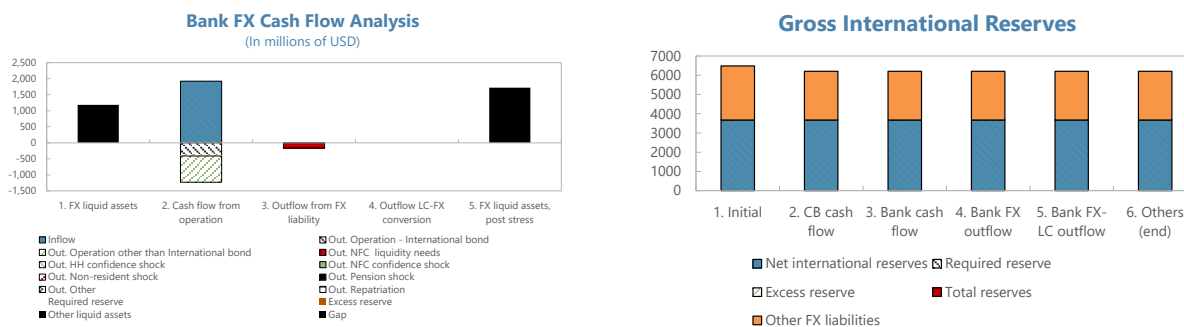
¹⁷ Although it is not mandatory for the banks to facilitate this type of transaction, the analysis assumes that a portion of local currency is converted to foreign currency to augment the initial capital flight

¹⁸ The gross international reserve is at USD 5.8 billion as of end-2022.

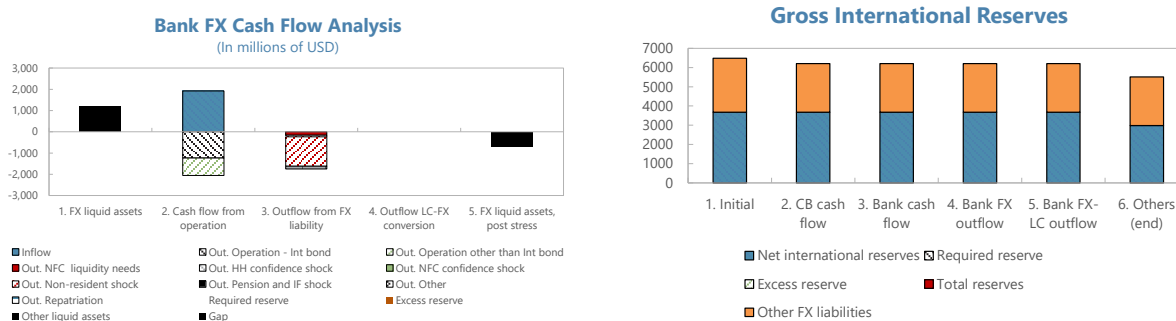
sector move some domestic assets offshore. Gross and net international reserves remain positive even under the most severe scenario.¹⁹

Figure 18. Iceland: Results for Systemic Liquidity Stress Test

Baseline scenario assuming business as usual.



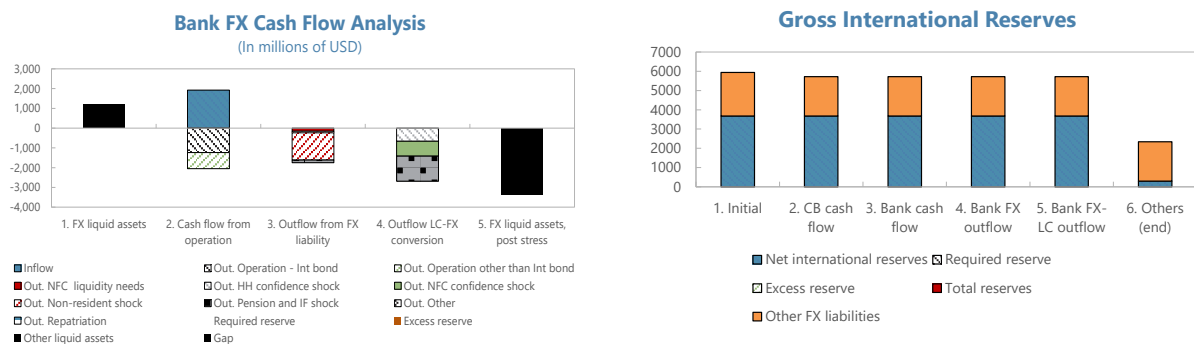
Medium scenario assuming the following run-off rates: 20 percent for household FX deposits, 40 percent for NFC FX deposits, 80 percent non-resident FX deposits, 40 percent for pension and NBFI FX funding and 30 percent for international bonds.



¹⁹ When netting FX government bonds placed as government deposits at the CBI, net international reserves amount to roughly 3.7 billion US dollars.

Figure 18. Iceland: Results for Systemic Liquidity Stress Test (Concluded)

Severe scenario assuming medium scenario with additional local currency conversion from household local currency deposits (10 percent), NFC local currency deposits (20 percent), and pension and other NBFIs funding (20 percent).

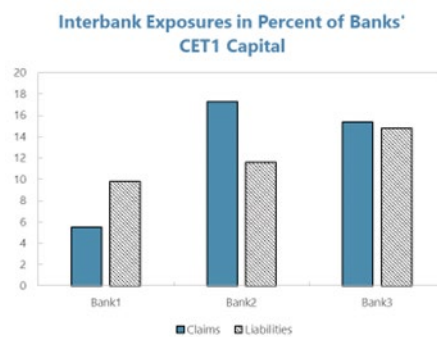


Source: IMF Staff.

Note: For the right panels, since there is currently no FX reserve requirement imposed on the Icelandic banks by the CBI, the value of required reserve, excess reserve and total reserve are set to 0.

D. Contagion Risk Analysis

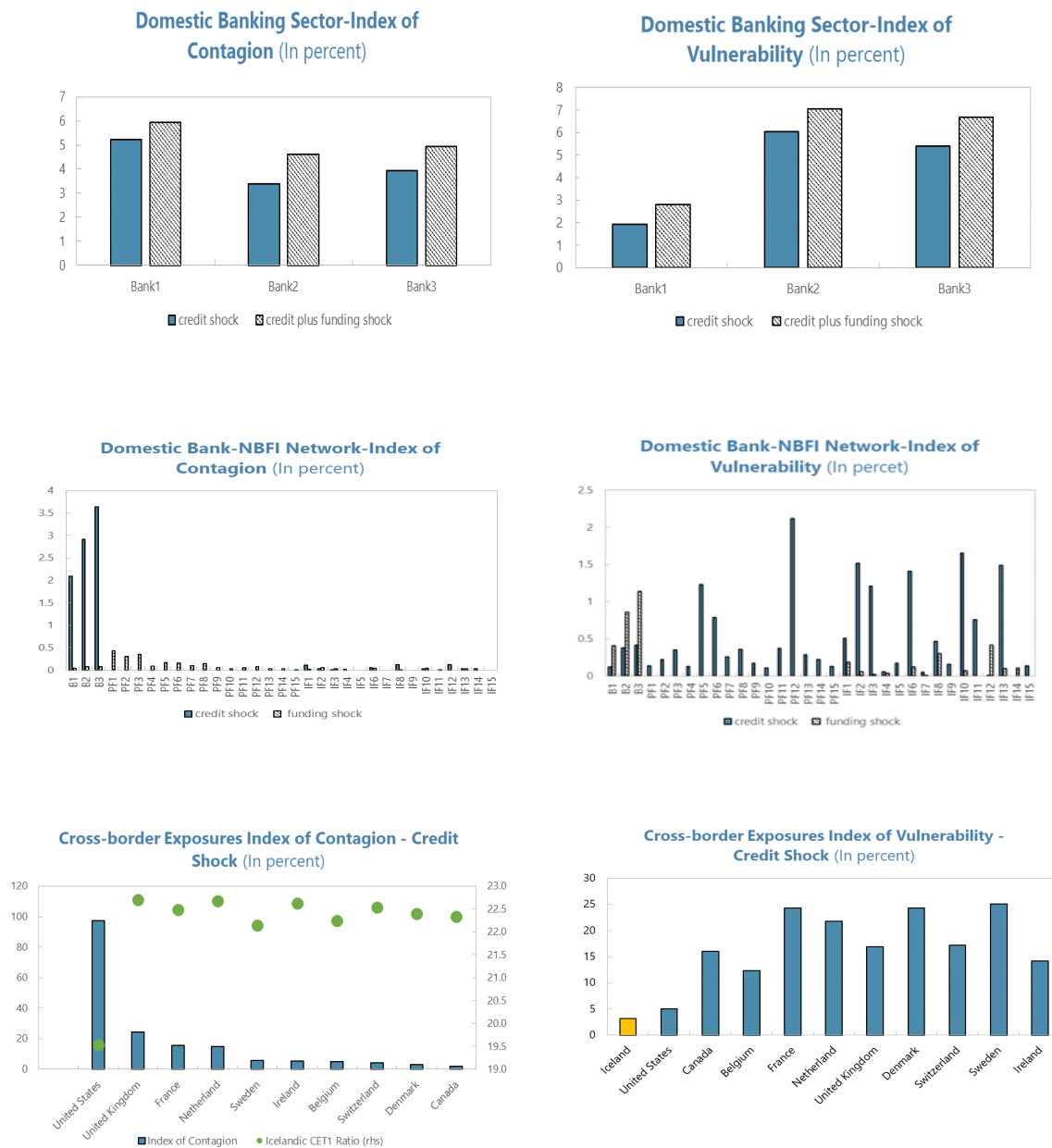
27. Contagion risks from interbank exposures through credit and funding channels are limited, but they are sizeable between banks and pension funds.²⁰ Domestic interbank exposures are small (Text Figure). No single failure of a domestic bank would trigger the failure of other banks in the system and none of the three banks are found to be undercapitalized after shock. PFs are the large creditors of banks, and would be significantly impacted by a credit shock from banks, which in turn are vulnerable to funding shocks from pension funds.



28. Banks are exposed to cross-border contagion. Icelandic banks are not a source of contagion risk to other major economies but can be negatively affected due to inward spillovers from other financial centers. Nevertheless, the Icelandic banking sector remains resilient after the shocks are considered (Figure 19).

²⁰ The model is based on Espinosa-Vega and Sole (2010). The loss-given-default (LDG) is set at 70 percent during a credit shock. In the face of a funding shock, the loss factor due to funding shortfall is set at 50 percent.

Figure 19. Iceland: Bank Contagion Analysis



Note: The index of contagion measures the average loss of other banks due to the failure of one bank. Whereas the index of vulnerability measures the average loss of a bank due to the failure of all other banks in the sample. Sources: Supervisory data, BIS consolidated banking statistics, and IMF staff calculations.

E. Risk Analysis of Pension Funds

29. The analysis projected the difference in pension values at retirement age between the baseline and the adverse scenario, for representative members with 10 to 30 years to retirement.²¹ Accrued pension benefits are shocked with the market risk stresses in each of the first three years of the projection horizon, while afterwards annual investment returns would again be in line with the baseline scenario.

30. Under the adverse scenario, PFs' assets would decline considerably in the first projection years, thereby reducing future pension values materially (Figure 20). For the median pension fund, driven by lower stock prices, pension values decline by 13 percent in 2023 and another 3 percent in 2024, before recovering in 2025. In the first year, the depreciation of the Krona increases the value of FX-denominated investments. Future pension values would decline by 9-15 percent for members at 10 years to retirement, but the impact is modest for those at 30 years to retirement.

31. Withdrawals from Pillar III funds impact liquidity conditions. The mandatory Pillar II scheme does not allow for withdrawals, except for retirement, death or disability. Within Pillar III, cash flows are impacted through transfers of pension rights between funds at the request of members, and through mortgage loan repayments which can be deducted from their contributions. More volatile outflows can occur through extraordinary withdrawals which the Icelandic government has allowed during the GFC and the pandemic which led to a noticeable impact on PFs' cashflows (Figure 21).

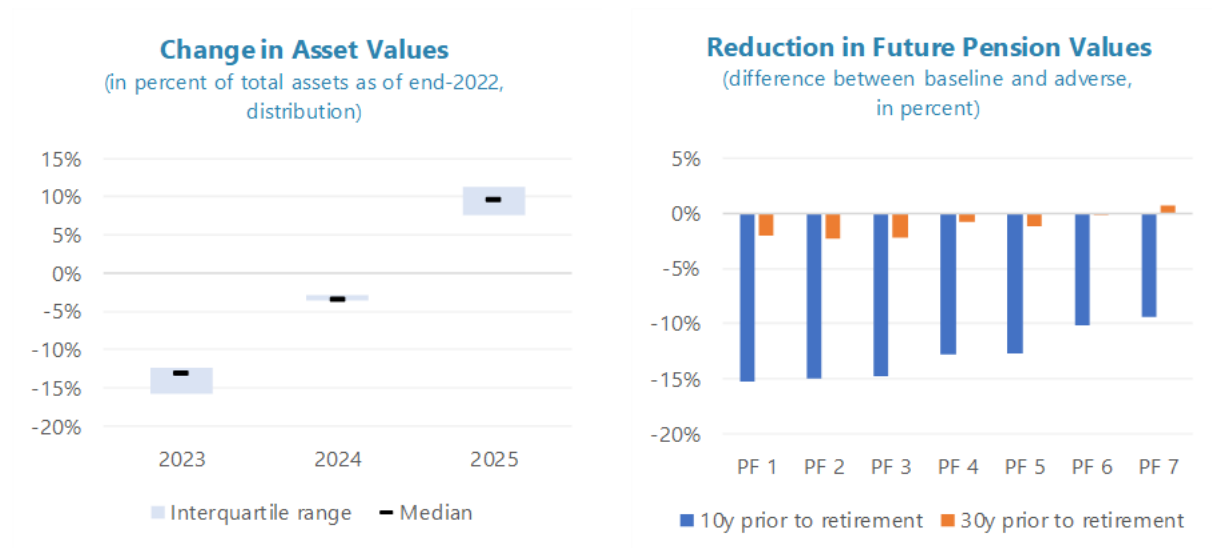
32. Asset-side vulnerabilities could arise from mortgage lending and exposures to domestic banks. While losses on mortgage loans have been very low in recent years, an increase in default probabilities could be expected as interest rates rise. All large PFs have the three large domestic banks among their largest single-name corporate exposures. While they remain below microprudential limits, the sectoral concentration and findings from the contagion risk analysis suggest the need for close monitoring.

²¹ For more details on the modeling, see the Pension Fund Stress Testing Matrix in Appendix V.

Figure 20. Iceland: Future Pension Values in the Adverse Scenario and Sensitivity Analyses

Asset values would decline substantially in 2023 (by 13 percent for the median pension fund), followed by further declines in 2024 and a partial recovery in 2025.

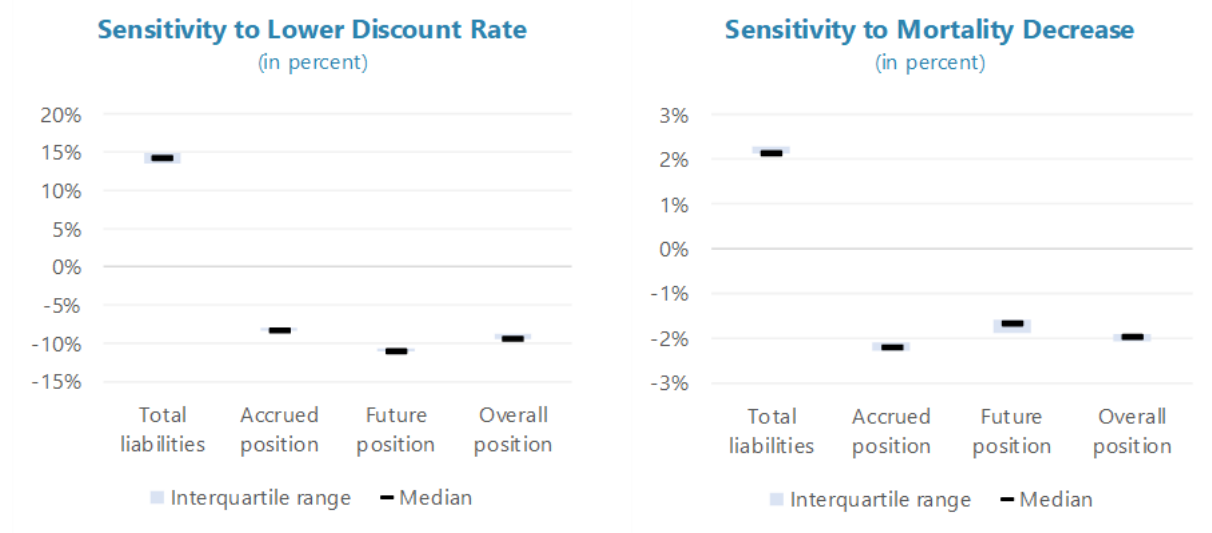
For a representative member with 10 years prior to retirement, the pension value in the median fund declines by 13 percent, but results vary between pension funds from -9 to -15 percent.



Note: Future pension values can in some cases be higher in the adverse scenario than in the baseline as higher inflation in the adverse scenario causes also an upward level shift in contributions which persists until retirement age.

Lowering the reference rate from 3.5 to 3.0 percent would increase the value of liabilities by almost 15 percent and deteriorate the actuarial position.

Assuming a decline of mortality rates by 10 percent would increase liabilities only slightly by around 2 percent.



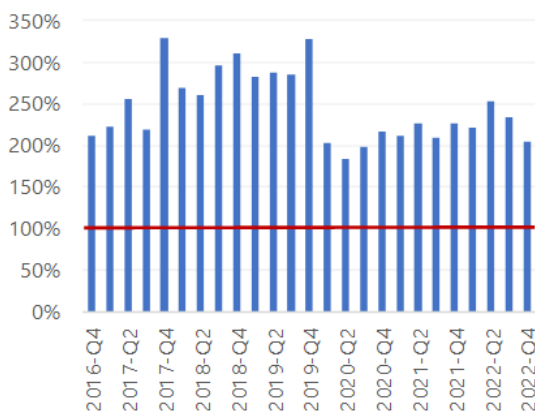
Source: IMF staff calculations based on CBI data and company submissions.

Figure 21. Iceland: Other Risks for Pension Funds

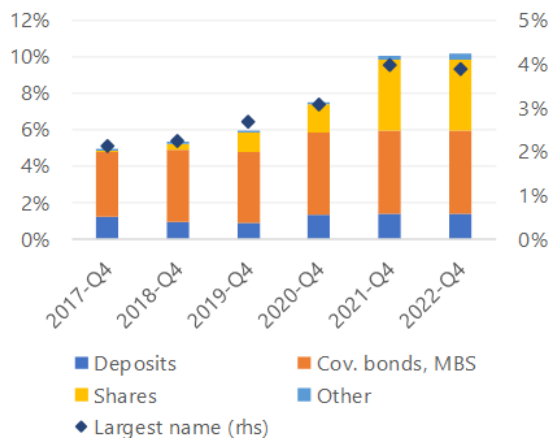
Payments into Pillar III are constantly exceeding disbursements, although extraordinary withdrawals during the Covid-19 pandemic have lowered net inflows.

Exposures towards the domestic banking sector have increased to 10 percent of assets, also driven by recent privatizations. The exposure towards the largest banking counterparty amounts to close to 4 percent.

Total Payments Received to Total Disbursements (in percent, Pillar III only)



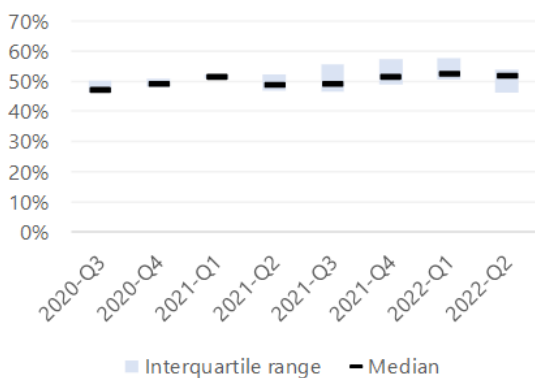
Exposures towards Domestic Banks (in percent of total assets)



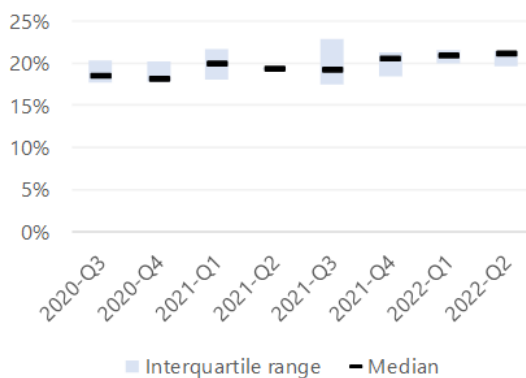
While for individual pension funds LTV ratios of newly issued mortgage loans can vary widely, the mean ratios within the sample have been fluctuating around 50 percent recently...

... and the mean DSTI ratios have increased slightly, ranging slightly above 20 percent for most pension funds as of mid-2022.

LTV Ratios for Newly Issued Mortgages (in percent, distribution of lenders' means)



DSTI Ratios for Newly Issued Mortgages (in percent, distribution of lenders' means)



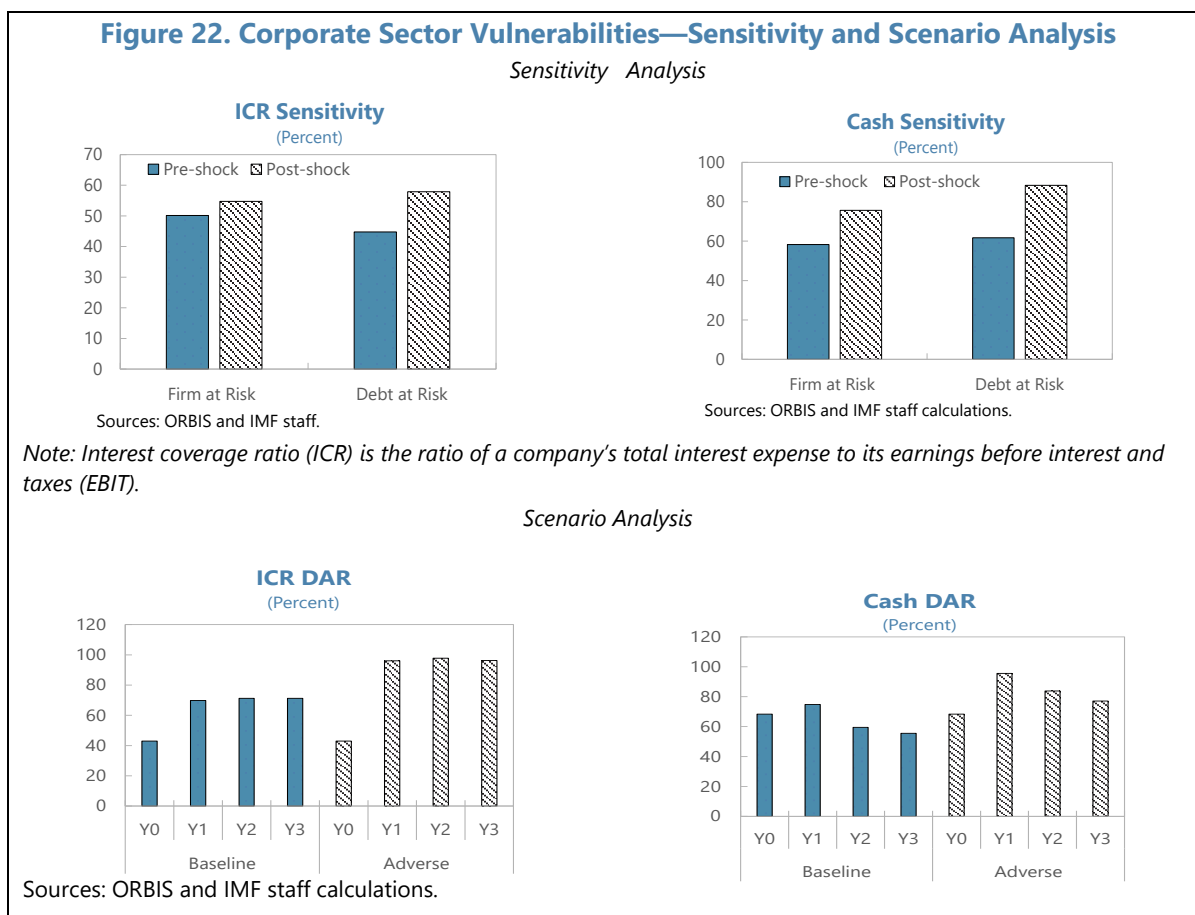
Source: IMF staff calculations based on CBI data and company submissions.

33. The CBI (FSA) should continue striving for enhanced supervisory reporting quality, and closely monitor risks. Data quality assurance should include the use of automated validation rules which would reject inconsistent PFs’ reporting. The CBI (FSA) should closely monitor the effects of high interest rates and inflation on PFs’ investment behavior, counterparty default risk, and (particularly for smaller PFs) cash flows in Pillar III. The pricing of mortgage loans and related risk management should be investigated.

F. Stress Tests of the Non-Financial Corporate Sector

34. The FSAP stress test and sensitivity analysis on NFCs use firm-level data to identify pockets of vulnerabilities and complement banking system analysis (Figure 22):

- ✓ Debt at risk increases under the adverse scenario. Notably, the share of debt for firms with an ICR<1 rises to 96 percent, 26 percentage points higher than under the baseline, in the first year. The share of debt in firms with negative cash balance also surges 25 percentage points higher than under the baseline.
- ✓ A large share of debt is at risk if interest rates rise significantly. A 30 percent change in interest expenses increases the share of debt for firms with an ICR<1 by 13 percent. A hike in interest rate expenses also yields a surge in the share of firms with cash balance below zero.



Note: Interest coverage ratio (ICR) is the ratio of a company’s total interest expense to its earnings before interest and taxes (EBIT).

FINANCIAL SECTOR OVERSIGHT

A. Microprudential Oversight of Banks

35. Following the 2020 merger of the CBI and the FSA, the FSAP conducted a full assessment of the appropriate implementation of the 2012 Basel Core Principles for Effective Banking Supervision (BCPs). The assessment updates the 2014 full-scope BCP assessment (ROSC) and subsequent reforms undertaken to address identified gaps.

36. Much progress has been achieved in strengthening Iceland’s banking regulatory and supervisory framework since the 2014 assessment. The authorities implemented: (i) Basel III requirements and an aggressive legislative reform agenda by transposing the EU legislative framework and EBA guidelines into the Icelandic banking law; and (ii) the EBA Supervisory Review and Evaluation Process (SREP) methodology, focusing mainly on the three D-SIBs. Other banks have less supervisory coverage as per CBI’s minimum engagement model.

37. However, further progress is needed to safeguard CBI’s independence, accountability, and operational effectiveness for banking supervision, including:

- Removing MoFEA staff from the Financial Supervision Committee (FMEN) to safeguard CBI’s independence and avoid potential conflicts of interest, and ensuring that the CBI has discretion over all prudential banking supervision decisions;²²
- Implementing a formal delegation of authority for decision making within the CBI to ensure an adequate accountability framework is in place;²³
- Developing and implementing a streamlined and independent budgetary/funding process to ensure the funding needs of banking supervision are always met on a timely basis;
- Updating legislation to a) ensure legal protection of supervisors; b) broaden the legal definition of related-party transactions, and c) broaden CBI/FSA’s prudential oversight power over bank’s external auditors;

²² FMEN is entrusted with the former FSA decision-making powers, some of which are delegated to the CBI Deputy Governor (DG) for Financial Supervision. FMEN comprises the DG for Financial Supervision, the DG for Financial Stability, and three financial market experts appointed by the Minister of Finance and Economic Affairs (MoFEA). Currently the FMEN has a high-level MoFEA representative on the Committee.

²³ Similar issue about the delineation of duties between the FMEN, the CBI Governor, and the CBI Deputy Governor for Financial Supervision has been expressed in a report on “Appraisal of the Performance of the Central Bank of Iceland 2020-22” disclosed by the Appraisal Committee after the BCP assessment (on January 23, 2023). Source : <https://www.stjornarradid.is/library/02-Rit--skyrslur-og-skrar/Appraisal%20of%20the%20performance%20of%20the%20Central%20Bank%20of%20Iceland%202020-2022.pdf>.

- Increasing staffing in some key risk areas, covering market risk, interest rate risk in the banking book (IRRBB), and operational risk (including ICT risk and cybersecurity), addressing key person vulnerabilities and enhancing supervisory coverage.

38. Specific national guidance in certain key risk areas is warranted. The EU regulatory framework for banks (CRR/CRD, including EBA guidelines), was transposed into national laws. While the CRD/CRR is not fully aligned with the Basel standards, existing gaps may not be materially relevant for Iceland at this time.²⁴ The CBI needs to issue guidance tailored to the domestic environment in certain key risk areas to provide banks with additional clarity with respect to regulatory and supervisory expectations. Such risk-focused supervisory guidance (for instance, on operational risk) should consider the main risks highlighted in the systemic risk analysis of the FSAP, including FX funding risk and operational risk. Also, enhancing monitoring of LCR by currencies and addressing outlier banks through Pillar 2 and supervisory actions are crucial.

39. While the implementation of SREP demonstrates a comprehensive and risk-based off-site supervisory approach for major banks, the scope of on-site inspections, together with the overall supervisory planning processes, needs to be strengthened. The SREP coverage is not frequent enough for low/medium-low impact banks. Further, the scope of the on-site inspections should be deeper and broader to assess whether banks' risk management practices/framework are adequate in all risk domains. Risk-focused inspections should also consider the main risks highlighted in the systemic risk analysis. Off-site thematic reviews, including scoping for more intrusive on-site inspections, should be planned on a multi-year cycle involving all three departments—prudential supervision, conduct supervision, and financial stability—that oversee banking supervision.

B. Regulation and Supervision of Pension Funds

40. The mission conducted a targeted review of the regulatory framework and supervisory practices for occupational pension funds and recommends strengthening governance and internal controls. The Pension Fund Act pre-dates legislation in other financial sectors and is not commensurate with the systemic role of pension funds in Iceland. The mission recommends: (i) strengthening the legislative framework for governance (especially board nominations and board oversight) and internal controls (actuarial function and compliance function), and enacting more stringent rules on outsourcing; (ii) expanding the sanctioning powers of the CBI, and transferring the regulatory and supervisory tasks of the MoF to the CBI; and (iii) more on-site inspections at larger pension funds, and re-establishing the institutionalized supervisory dialogue.

C. Oversight of Climate Risks

41. Iceland has started incorporating climate-related financial risks within macroprudential surveillance and supervisory processes of banks. A commendable analysis has been made on the impact of climate-related credit risk on banks' corporate loan portfolios, and ESG

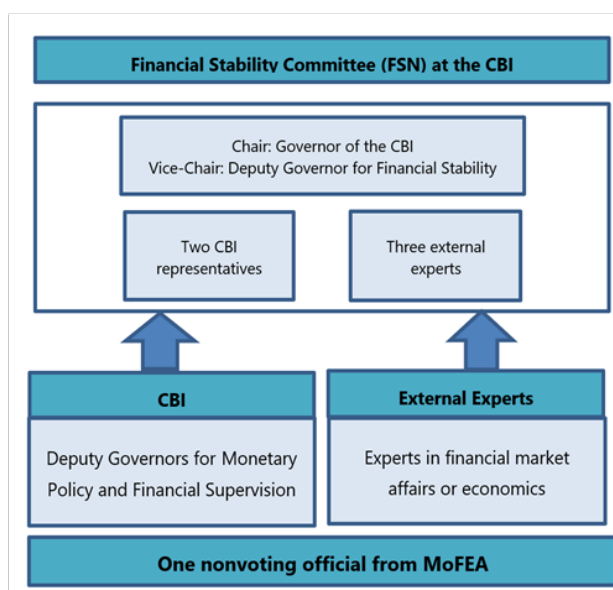
²⁴ See the Euro Area BCP assessment (2018) and the BCBS RCAPs (for the EU rules for capital, liquidity, and large exposures).

risks have been considered during the 2022 supervisory review and evaluation process (SREP) of larger banks. Some progress on measuring banks' exposure to climate-related financial risks has been made recently, notably through enhanced Pillar 3 financial disclosure on ESG in 2022. Yet the CBI is facing issues to collect relevant data from banks that would be useful to assess exposures to climate-related physical and transition risks, as no comprehensive risk assessment has been performed so far. Human resources and expertise on climate are limited.

42. Implementation issues should be gradually addressed to ensure integration of climate-related risks into supervisory processes. Authorities should: (i) tailor the implementation of EU/EBA regulations to Iceland's specifics and the supervisory needs; (ii) address data quality and availability gaps on climate-related financial risks without waiting for any EU/EBA regulation; (iii) structure a concrete action plan to implement the strategic supervisory priority on sustainable finance; (iv) develop a combination of risk-based and targeted supervisory tasks involving all relevant functions— financial stability oversight, microprudential supervision, and conduct supervision; (v) ensure that banks fully incorporate climate-related risks into their risk management, determine whether banks' capital and liquidity buffers are adequate to cover those risks, and raise buffers as needed; (vi) estimate CBI's additional human resources and budget needs for the next 3 to 5 years; (vii) enhance coordination between ministries and the CBI to support adequate consideration of climate-related financial risks within the financial sector.

D. Macroprudential Framework and Policy

43. CBI has a strong institutional framework for macroprudential policy assuring the willingness to act. The macroprudential mandate is assigned to the dedicated committee within CBI, the Financial Stability Committee (FSN) chaired by the Governor (Figure 23). The Financial Stability Department has the key role of providing financial stability analyses to support macroprudential policy. While CBI uses a range of communication tools, the authorities should consider strengthening transparency by publishing reports clarifying macroprudential policies as well as supporting studies.

Figure 23. Iceland: Macroprudential Decision Making Structure

Sources: CBI and IMF staff

44. The macroprudential framework also promotes the ability to act promptly. CBI has (hard) powers under various legislations to apply its policy-specific tools for macroprudential purposes, including those included in the EU CRDV. The FSN is empowered to issue, amend, or revoke the use of certain macroprudential policy instruments, such as the CCyB, SRB, O-SII buffer, LTV cap, net open foreign exchange positions, loans in foreign currencies, limits on DSTI and LTI ratios.

45. The institutional arrangement is conducive to effective coordination and cooperation with other institutions. The Financial Stability Council (different from the FSN) is the formal cooperation forum of public authorities for financial stability. Coordination at the domestic level is facilitated by the concentration of responsibilities at the CBI. Internationally, to cover potential cross-border risks, the CBI has adequate cooperation arrangements with Nordic-Baltic countries and has reciprocity arrangements with other countries.²⁵

46. CBI's surveillance and systemic risk assessment rely on comprehensive quantitative information and constructive dialogue with the industry as well as on various models and stress tests. In addition to a variety of indicators across sectors and market intelligence, the CBI also uses various models and performs stress tests of banks integrating top-down and bottom-up

²⁵ With the introduction of CRD IV into the EEA agreement, Iceland became a part of the ESRB framework regarding the reciprocation of capital buffers in Europe, which includes an automatic reciprocation of the CCyB on cross-border exposures. When an institution specific CCyB requirement is calculated, foreign financial institutions are required to maintain the Icelandic CCyB requirement on their exposures located in Iceland. Similarly, Icelandic banks are required to maintain an appropriate CCyB requirement for exposures located in countries where CCyB requirements are active.

approaches for both micro-prudential and macroprudential surveillance, as well as granular mortgage debt information to assess the creditworthiness of borrowers.

47. There remain gaps in terms of tools and data. The systemic risk monitoring framework is generally good but can be enhanced by: (i) developing a heatmap as a risk monitoring tool; (ii) more actively covering NBFIs and the non-financial private sector; (iii) strengthening the assessment of interactions between banks and non-banks; (iv) enhancing the analysis of tail risks, spillovers, systemic risks and calibration of macroprudential tools; (v) developing stress tests that take into account macro-financial feedback loops ; and (vi) monitoring the transmission of shocks between financial balance sheets. Data quality and availability are generally good, and further progress was recently made in expanding the data coverage of a credit registry. Nonetheless, there are important remaining data gaps, notably in the CRE sector, micro household and NFC balance sheet data, and climate risks.

48. The authorities should continue to closely monitor risks, in particular in the real estate and NBFIs sectors, and stand ready to take further macroprudential measures if needed. The authorities have increased the CCyB, introduced limits on DSTI, and tightened LTV, mainly to address vulnerabilities stemming from households' indebtedness and CRE risks. If existing measures prove insufficient to contain CRE risks, sectoral capital buffers and /or borrower-based measures targeted at CRE firms may be considered.

E. Cybersecurity Risks and Resilience

49. The oversight assessment of cyber resilience of the financial system focused on Payment Systems. With dependence on debit and credit card payments rising, international connectivity and cooperation from card providers pose a systemic macro risk. CBI should continue to investigate alternative domestic retail payment solutions, refine crisis playbooks and test how cash will be distributed and used in a crisis. The authorities should produce a financial sector-specific cybersecurity strategy clarifying the roles and responsibilities of each party. CBI faces a key person risk as operational risk expertise is limited to a few individuals. More staff are needed in this area to allow CBI to introduce on-site examinations, probe deeper into and properly challenge the self-assessments undertaken by firms, and take a more judgement-based approach to financial institutions' operational risk management. The Icelandic Computer Emergency Response Team (CERT-IS) should continue to arrange cybersecurity scenario exercises, expanding the range of financial institutions and government agencies involved.

CRISIS MANAGEMENT AND SAFETY NETS

A. Systemic Liquidity Management

50. The CBI has well-defined liquidity management framework for banks—with well-established quantitative and qualitative rules on risk management— but liquidity risk management of NBFIs could be improved. The CBI can provide liquidity support to banks, which can be carried out through longer-term lending operations. Banks have high LCR and NSFR ratios, but they are also potentially exposed to large liquidity shocks. There is a need to pay attention to

the build-up of financial sector-wide liquidity risks, as well as developing a framework for monitoring securities markets liquidity and intervention. Improving the preparedness of NBFIs' liquidity risk management framework through regulation and supervision is vital, as liquidity issues in large interconnected NBFIs could have a large impact on system-wide liquidity.

51. Setting appropriate risk/reward and regulatory incentives to develop a repo market should be a policy priority. Currently, banks exchange liquidity on an unsecured basis, with the central bank serving as a backstop. In recent years, interbank transactions have declined and are now limited. Because the underlying collateral in an effective repo market mitigates counterparty risk, a repo market would also promote interbank transactions for longer maturities and support the development of the yield curve. Central Bank's backstop to support the repo market would be needed only in the event of systemic liquidity risks, especially if the functioning of this market is deemed critical from a financial stability perspective.

52. The CBI should complete work on collateral eligibility to improve its capacity to provide liquidity in times of stress or resolution, while enhancing the monitoring of banks' eligible collateral. Monitoring information about eligible collateral, including high-quality liquid assets held by banks would allow the CBI to gauge the impact of liquidity regulation and assess real-time developments and risks to banks' liquidity buffers.

53. Whereas international reserves are adequate in size and liquid, the CBI should continue its cooperation with other central banks to be ready for coordinated actions if needed under stress. The funding in FX is significant, and elevated demand for FX liquidity could emerge in times of market stress. Broadening swap arrangements beyond the Nordic countries to central banks with reserve currencies such as the ECB and FRB could prove valuable in time of crisis.

54. The CBI recently developed a framework to provide bilateral emergency liquidity assistance (ELA) to eligible financial institutions. However, further work is required on preparedness for ELA in resolution since its operationalization—including the assessment of collateral eligibility—is yet to be effective, and the rules and procedures have yet to be tested with counterparties.²⁶

B. Crisis Preparedness, Bank Resolution and Safety Nets

55. While Iceland has transposed the BRRD into the domestic legal system, implementation rules and procedures are not in place. The lack of operationalization affects all the elements of the crisis management framework.²⁷ The authorities should fill the remaining gaps, in particular regarding: (i) escalation triggers in recovery plans; (ii) guidance on the adoption of FOLTF of a bank; (iii) valuation in resolution; (iv) operationalization of the full range of resolution powers, including bridge bank and transfer powers; (v) procedures and systems to ensure quick pay-

²⁶ NBFIs are not considered as ELA eligible financial institutions, and as such are not subject to CBI liquidity regulation.

²⁷ The crisis management framework is evaluated against international standards (e.g., the FSB Key Attributes of Effective Resolution Regimes for Financial Institutions).

outs to insured depositors by the Investors' Guarantee Fund (TVF). The forthcoming approval of a crisis management handbook by the Governor of the CBI will facilitate the completion of this task.

56. A coordination body should be established between the MoFEA and CBI (RA) to develop a structured dialogue on resolution issues with direct fiscal impact, while preserving the independence of the resolution authority. Resolution tasks are handled within the CBI but a coordination body involving the MoFEA could help to develop a more structured dialogue between the MoFEA and the CBI, especially given the need of MoFEA approval for potential use of a fiscal backstop.

57. The resolution framework set up in 2020 should be strengthened, better resourced, and fully operationalized. There is an appropriate operational separation of supervisory and resolution functions within the CBI, but the resolution authority (RA) has only 2 working-level staff. Further work is needed in resolution plans, especially to: (i) operationalize the application of all the resolution tools (not just bail-in); (ii) ensure operational continuity and liquidity in resolution; (iii) enable separability of assets and identify significant impediments to resolution (in particular from state-ownership). The RA should also develop detailed operational guidance on topics such as procedures related to FOLTF, valuation and operationalization of all the resolution tools.

58. The Deposit Guarantee Fund (TVF) should be strengthened in line with IADI Core Principles.²⁸ The maximum deadline for disbursements needs to comply with international standards and be reduced to seven days as in EU (from one year in the current framework). The introduction of "least cost test" for resolution should be envisaged. The TVF also needs a legal provision to be able to access external funding sources, including a fully operationalized public backstop (from government or central bank).

FINANCIAL INTEGRITY

59. Iceland's AML/CFT framework for banks has gone through a momentum of reforms since 2019.²⁹ In 2020, technical compliance regarding the "Regulation and Supervision of Financial Institutions" was rated "Largely Compliant", reflecting for instance enhancements to the money laundering/terrorist financing risk (ML/TF) assessment, and a new inspection schedule that better incorporates ML/TF risks.

60. The limited geographical reach of Iceland's banking network and low levels of unexplained transnational financial flows reduce the inherent ML risk exposure. Among the Nordic-Baltic region, Iceland has the most limited geographical reach (including lower levels of correspondent banking relationships), lowest number of countries with unexplained flows and the highest average value of economic linkages with a counterparty-country, indicating a strong link between the cross-border payments' value and underlying economic activity and lower ML risks.

²⁸ The Deposit Guarantee Scheme Directive (DGSD) has not been transposed into Iceland law.

²⁹ The reform momentum follows the deficiencies noted by the 2018 Mutual Evaluation Report. Progress in technical compliance is set out in Iceland's 2019, 2020 and 2021 FATF Follow-Up Reports.

61. There is scope for further refinements to the supervisory ML/TF risk assessment tools and increased data collection. These include: (i) a more comprehensive supervisory analysis and list of high-risk jurisdictions;³⁰ (ii) greater granularity in the determination of risk variables and emphasis on product risks for banks sectoral risk assessment; (iii) further enhancements to the risk assessment model to ensure a clearer delineation between inherent risk and AML/CFT systems and controls; and (iv) broaden AML/CFT supervisory data collection to also cover transaction-level data and financial flows analysis.

62. Significant efforts have been made to enhance the AML/CFT risk-based supervision of banks, however, bank's AML/CFT systems and controls are still maturing. The authorities have conducted thorough full-scope inspections of all banks, since the FATF Mutual Evaluation in 2018 and, going forward, a greater focus on thematic inspections is a welcome step. In some instances, the pace of completion of inspections has been slow. In order to drive more meaningful change in the levels of AML/CFT compliance and the effectiveness of AML/CFT controls in banks, an enhanced supervisory presence and more targeted efforts would be beneficial.

63. The authorities should continue to take steps to ensure that banks maintain adequate, accurate and up-to-date information on the beneficial ownership and control of legal persons. The Act on the Registration of Beneficial Ownership (the Act) was introduced in 2019. Further steps should be taken to improve the IT infrastructure that supports the electronic registration system to enhance the adequacy and accuracy of the beneficial ownership information.³¹

64. CBI's efforts to supervise VASPs should continue. Iceland appears to face limited ML/TF risks from its small Virtual Asset Service Provider (VASP) sector but could potentially be exposed to increasing risks with the recent expansion in scale of VASP activity. The sector is currently small comprising three VASPs serving an overwhelmingly domestic customer base.³² Efforts should continue to detect unlicensed activities and enhance AML/CFT supervision of banks through the move toward thematic inspections and more frequent supervisory interactions.

AUTHORITIES' VIEWS

65. The authorities welcomed the FSAP's positive assessment of the resilience of the financial system. They appreciated the IMF's endorsement of their solid progress since the 2008 crisis in restructuring the banking sector and implementing important financial sector reforms. They also praised the quality and extensive coverage of the FSAP's analysis, which will help reinforce their risk monitoring models, oversight, and crisis management frameworks. They welcomed the recommendations across the technical workstreams, which were tailored to Iceland's needs, and

³⁰ That could generate ill-gotten proceeds that would transit and/or be laundered in Iceland.

³¹ Administered by the Register of Enterprises.

³² The aggregate turnover in the sector is 4,3 billion Icelandic krona with a total volume of transactions of 19.928 in 2021-2022. The total number of active customers is 6.633.

considered them very helpful. They intend to consider the recommendations carefully and indicated their willingness to publish the FSSA, the DAR and Technical Notes.

66. The authorities broadly agreed with the systemic risk assessment. They noted that the resilience of the financial sector is a testimony to their determined efforts over the past decade to institute and implement financial sector reforms, as well as to build up strong capital buffers in the D-SIBs. They shared the view that systemic liquidity management is always a key area of focus for a small open economy such as Iceland with an independent monetary policy and a floating currency. They noted that in times of financial stress, the risk of contagion is high due to the interconnectedness of the system and liquidity could be volatile. They appreciated the FSAP finding that the financial system appears resilient to liquidity stress, and that the relatively large international reserves are likely sufficient for backstopping as needed, while highlighting banks' active management of FX liquidity risks, including through EU banks. They underscored the relevance of pensions funds' analysis and stress tests, which will help them strengthen their risk monitoring framework. They agreed to assess how to integrate vulnerability assessments of NFCs into systemic risk monitoring; and that risks in the real estate market should continue to be closely monitored and may warrant further macroprudential actions if they don't abate.

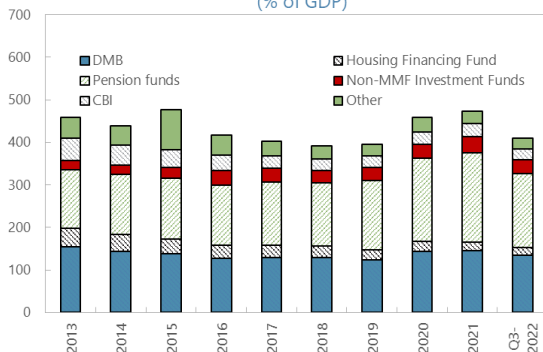
67. The authorities welcomed the positive assessment of the progress of the regulatory and supervisory framework, which is key to support future resilience. They found the recommendations to address resources, accountability, and operational effectiveness of the CBI very useful to further strengthen the supervisory framework, following the 2020 merger of the FSA with the CBI. The authorities appreciated IMF's effort in reviewing the legal funding framework for financial supervision and for providing their opinion on the membership of the Financial Supervision Committee. Both matters require further assessment, but the MoFEA emphasized that any alteration of the funding arrangements needs to meet constitutional requirements and respect the fiscal authority of the Parliament. A structured dialogue between the Ministry and the CBI, whilst fully respecting the independence and integrity of the latter, may be warranted and necessary in that context. The authorities commended the FSAP work on the pension fund oversight, as they shared the view that the governance structure of the systemically important pension system has some shortfalls and could be improved. While noting that legislative changes generally take time, they underscored that the current volatile and inflationary global environment requires close monitoring and continued readiness to act on the part of the Central Bank. The authorities confirmed that the work on continuing to strengthen the AML/CFT regime is a priority. They are committed to developing and implementing a strategy for banking supervision of climate-related financial risks. They noted that, to improve cyber-resilience, they recently devoted resources to strengthen the oversight of cyber-risks, including implementation of the European TIBER framework in Iceland.

68. The authorities considered the findings and recommendations on crisis management and safety nets very useful. They concurred with strengthening the ELA framework for resolution. They agreed with the recommendations to continue improving the bank recovery and resolution framework. They are cognizant of the need to increase the resources of the resolution authority and to continue developing the crisis preparedness and management framework.

Figure 24. Iceland: Structure of the Financial System and Recent Developments

The financial system has expanded in recent years...

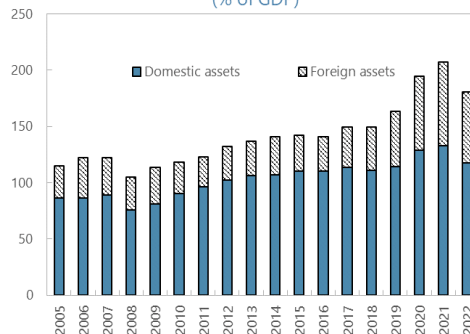
Financial System Assets
(% of GDP)



Source: CBI and Staff calculations.

...as pension funds' assets reached 200 percent of GDP

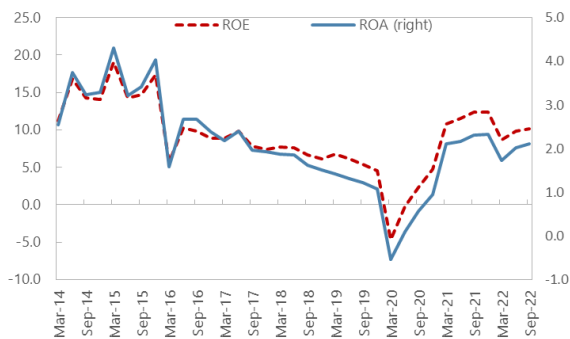
Pension Funds' Assets
(% of GDP)



Sources: Statistics Iceland, CBI, Staff calculations.

Banks' profitability has improved...

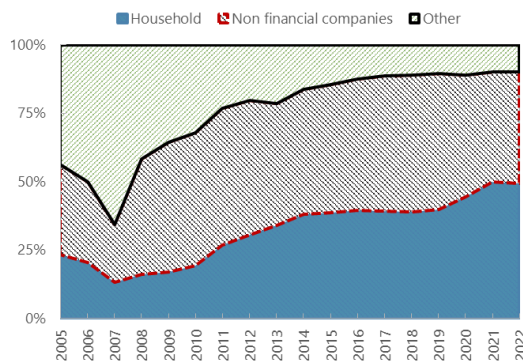
Bank Profitability- ROA and ROE
(%)



Source: IMF FSI and Staff calculations.

and household mortgages are a larger share of their portfolio....

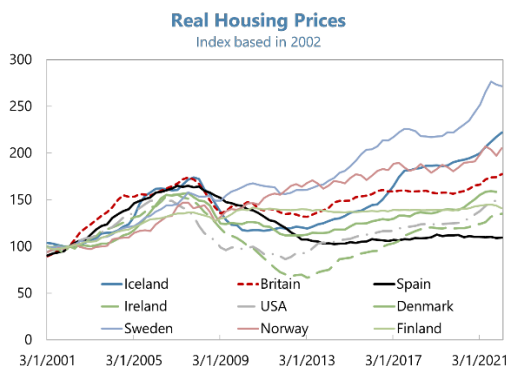
Household and Corporate Loans
(Percent of total)



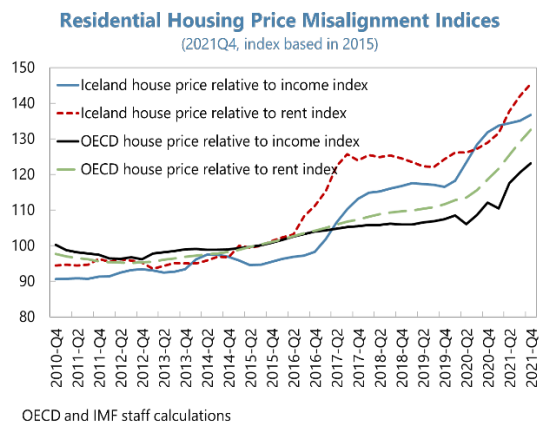
Sources: CBI and IMF Staff Calculations

Figure 25. Iceland: Real Estate Market and Non-Financial Private Sector Debt

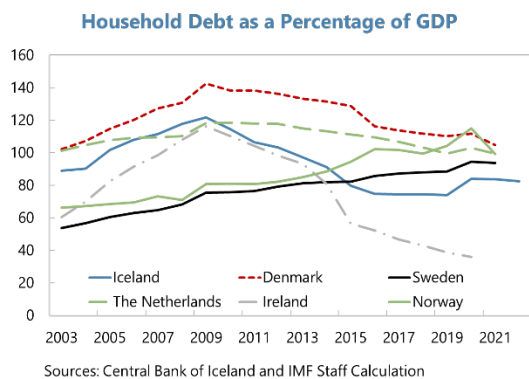
Real estate prices have risen significantly in the past 20 years....



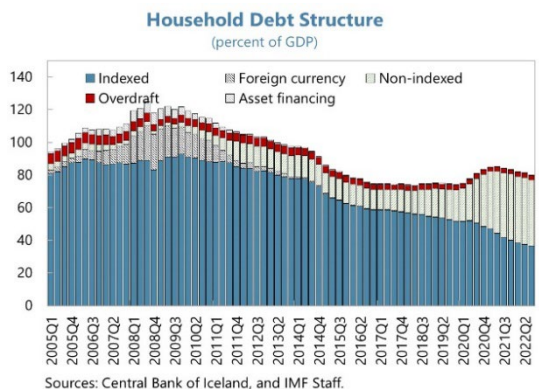
.... and there are signs of overvaluation



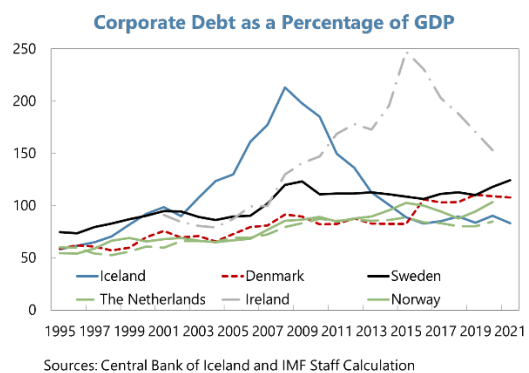
Household debt has declined since the GFC but is below that of most peer countries....



Meanwhile the share of unsecured loans has risen.



Corporate debt has significantly declined since the GFC and remains broadly in line with peer countries ...



and is accounted mostly by domestic indexed and non-index loans and by FX loans

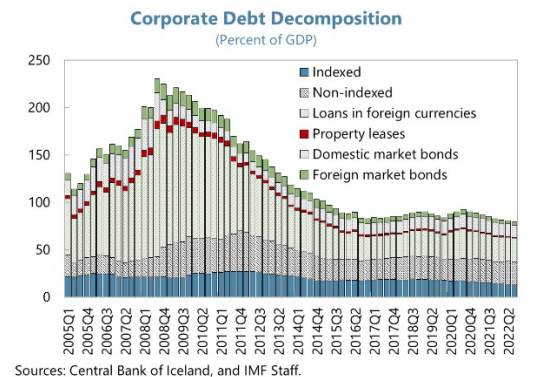
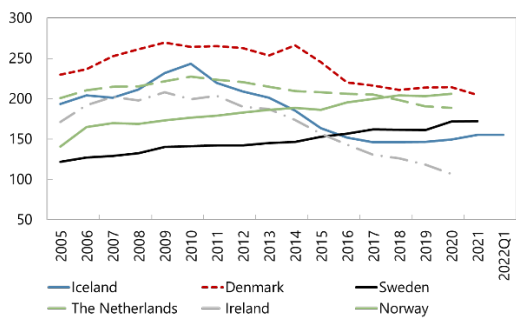


Figure 25. Iceland: Real Estate Market and Non-Financial Private Sector Debt (Concluded)

Household debt remains high as a percentage of disposable income ...

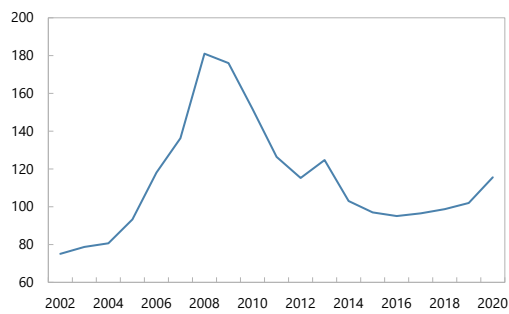
... and corporate debt is on the rise relative to income

Household Debt as a Percentage of Disposable Income



Sources: Central Bank of Iceland and IMF Staff Calculation

Corporate Liabilities as a Percentage of Operating Income



Sources: Central Bank of Iceland and IMF Staff Calculation

Table 2. Iceland: Selected Economic Indicators, 2017-2028

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
						Prel.	Proj.	Proj.	Proj.	Proj.	Proj.	Proj.
(Percentage change unless otherwise indicated)												
National Accounts (constant prices)												
Gross domestic product	4.2	4.9	1.8	-7.2	4.3	6.4	3.2	1.9	2.1	2.1	2.1	2.2
Total domestic demand	7.6	4.5	0.5	-1.1	6.3	6.4	1.2	0.9	1.1	1.2	1.4	1.6
Private consumption	8.0	4.8	1.7	-3.4	7.0	8.6	1.8	0.9	1.1	1.2	1.5	1.7
Public consumption	2.9	4.7	3.9	5.1	2.4	1.6	0.8	1.0	1.0	1.0	1.0	1.0
Gross fixed investment	10.6	2.3	-4.1	-7.4	9.8	6.9	2.6	1.6	1.6	1.6	1.7	1.8
Net exports (contribution to growth)	-2.9	0.7	1.5	-6.1	-2.1	-0.2	1.6	1.0	1.0	0.9	0.7	0.7
Exports of goods and services	5.1	0.4	-5.5	-31.1	14.7	20.6	5.8	3.0	3.6	3.4	3.2	3.2
Imports of goods and services	11.8	-0.9	-9.1	-20.6	19.9	19.7	2.0	0.7	1.4	1.5	1.7	1.9
Output gap (percent of potential output)	1.5	3.6	3.5	-5.2	-2.5	0.9	1.5	0.9	0.6	0.3	0.1	0.0
Selected Indicators												
Gross domestic product (ISK bn.)	2,642	2,844	3,024	2,919	3,245	3,766	4,117	4,353	4,603	4,843	5,103	5,384
Gross domestic product (\$ bn.)	24.7	26.3	24.7	21.6	25.6	27.8	29.1	31.4	33.9	36.4	39.1	42.0
GDP per capita (\$ thousands)	73.1	75.4	69.1	59.2	69.3	74.0	75.2	81.6	87.1	92.4	98.3	104.5
Private consumption (percent of GDP)	50.1	50.3	50.2	52.0	52.0	52.2	52.8	52.7	52.3	51.6	50.9	50.3
Public consumption (percent of GDP)	23.7	24.1	24.6	28.1	27.6	25.9	24.6	24.3	24.4	24.8	25.1	25.4
Gross fixed investment (percent of GDP)	21.8	21.8	20.9	21.3	22.2	22.4	22.9	23.0	23.0	22.9	22.6	22.5
Gross national saving (percent of GDP)	26.0	26.4	27.2	22.3	20.0	21.1	21.5	21.7	22.3	22.8	23.3	23.7
Unemployment rate (percent of labor force)	3.3	3.1	3.9	6.4	6.0	3.8	3.3	3.6	3.7	3.8	3.9	4.0
Employment	1.0	1.8	0.9	-3.0	3.6	6.9	2.6	1.3	1.5	1.5	1.5	1.6
Labor productivity	3.8	2.6	1.6	-1.9	1.6	0.3	0.6	0.6	0.6	0.6	0.6	0.6
Real wages	7.2	3.7	1.8	3.4	3.7	0.0	0.6	0.6	0.6	0.6	0.6	0.6
Nominal wages	9.1	6.5	4.9	6.3	8.3	8.3	9.3	5.2	4.2	3.2	3.1	3.1
Consumer price index (average)	1.8	2.7	3.0	2.8	4.5	8.3	8.7	4.6	3.6	2.6	2.5	2.5
Consumer price index (end period)	1.9	3.7	2.0	3.6	5.1	9.6	7.4	4.0	3.0	2.5	2.5	2.5
Core CPI (average)	2.0	2.4	2.9	3.0	4.3	7.6	8.5	4.6	3.6	2.6	2.5	2.5
ISK/€ (average)	121	128	141	157	148	159	...	...	...	...	...	...
ISK/\$ (average)	107	108	123	135	127	135	...	...	...	...	...	...
Terms of trade (average)	1.5	-3.8	-0.8	-1.3	3.8	3.0	-2.9	-1.6	-1.1	-0.9	-0.1	-0.1
Money and Credit (end period)												
Base money (M0)	37.9	-1.7	-9.2	11.8	9.0	1.5	9.3	9.9	8.8	7.4	6.9	6.6
Broad money (M3)	5.0	7.0	6.6	7.4	10.9	8.9	10.8	8.3	7.6	6.5	6.3	6.2
Credit to nonfinancial private sector	9.2	11.9	2.9	10.5	10.5	11.2	9.3	5.7	5.2	5.2	5.4	5.5
Central bank 7 day term deposit rate 1/	4.25	4.50	3.00	0.75	2.00	6.00	8.75	...	...	...	...	...
(Percent of GDP unless otherwise indicated)												
General Government Finances 2/												
Revenue	45.4	44.8	42.1	42.2	41.4	41.8	42.8	42.8	42.4	42.0	41.4	41.3
Expenditure	44.4	43.8	43.6	51.2	49.8	46.1	45.5	45.7	45.0	43.6	43.3	43.3
Overall balance	1.0	0.9	-1.5	-9.0	-8.4	-4.3	-2.7	-2.9	-2.5	-1.7	-1.9	-1.9
Structural primary balance 3/	1.9	0.5	-2.0	-0.8	-1.5	-3.1	-1.4	-1.8	-1.2	0.0	0.0	0.2
Cyclically-adjusted primary balance	3.2	1.3	-1.3	-3.9	-5.1	-2.5	-0.8	-1.5	-0.9	0.1	0.1	0.2
Gross debt	71.7	63.2	66.6	77.8	75.6	68.7	65.1	61.2	60.0	58.2	56.5	55.2
Net debt	60.3	50.7	54.4	61.1	60.4	57.1	54.4	51.1	50.5	49.1	47.9	47.0
Balance of Payments												
Current account balance	4.2	4.3	6.5	1.0	-2.4	-1.5	-1.6	-1.3	-0.7	-0.1	0.6	1.2
of which: services balance	10.6	9.0	8.0	1.4	2.3	5.0	7.0	7.3	7.4	7.5	7.5	7.5
Capital and financial account (+ = outflow)	1.1	6.0	6.1	6.1	0.8	-2.4	-1.7	-1.5	-0.8	-0.2	0.5	1.1
of which: direct investment, net (+ = outflow)	-0.7	1.7	2.9	2.3	-0.7	-2.9	-0.8	-1.1	-1.0	-0.9	-0.9	-0.8
Gross external debt	90.3	73.3	78.4	90.4	82.8	75.2	75.2	69.3	64.1	59.6	55.4	51.5
Central bank reserves (\$ bn)	6.6	6.1	6.7	6.4	7.1	5.9	6.0	6.3	6.4	6.6	7.0	7.6

Sources: Central Bank of Iceland; Ministry of Finance; Statistics Iceland; and IMF staff projections.

1/ For 2023, rate as of end-May.

2/ In 2020, the definition of the general government was expanded to include 24 new entities, of which the largest are the IL Fund and the Student Loan Fund.

3/ Cyclically-adjusted balance excluding one offs.

Table 3. Iceland: Financial Soundness Indicators 1/
(Percent)

	2019Q1	2019Q2	2019Q3	2019Q4	2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4	2022Q1	2022Q2	2022Q3	2022Q4
Capital																
Regulatory capital to risk-weighted assets 2/	22.4	22.6	22.9	24.2	24.5	24.8	24.5	24.9	24.3	24.9	24.7	25.4	23.1	23.3	22.8	23.7
Regulatory tier 1 capital to risk-weighted assets 2/	21.0	20.9	21.0	21.8	22.0	22.3	22.0	22.4	21.9	22.5	22.3	23.1	21.0	21.2	20.7	21.1
Profitability																
Net interest margin 2/	2.8	2.8	2.7	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.6	2.7	2.8	2.8
Return on assets 2/	1.4	1.4	1.3	1.2	-0.5	0.1	0.6	0.9	2.1	2.2	2.3	2.3	1.7	2.0	2.1	2.1
Return on equity 2/	8.7	8.7	8.3	7.2	-3.4	0.6	3.7	5.9	10.8	11.5	12.4	12.4	8.6	9.8	10.1	10.1
Net interest income to total income 2/ 3/	60.2	62.4	64.9	66.8	90.8	75.1	73.3	69.5	60.4	60.9	59.8	60.0	71.4	67.5	70.9	70.9
Noninterest expense to total income 2/ 3/	61.4	62.4	64.2	65.9	76.1	62.2	58.4	56.3	52.3	51.6	48.4	49.3	53.9	49.5	48.8	49.6
Funding and liquidity																
Liquid assets to total assets 2/ 4/	10.8	11.2	12.8	12.2	13.5	15.1	14.5	13.2	13.0	14.4	14.4	15.3	11.7	11.7	12.0	12.9
High-quality liquid assets to total assets	10.7	11.0	12.6	12.0	13.3	14.7	14.2	12.8	12.4	13.6	13.6	14.5	11.5	11.4	11.8	12.6
Net open foreign exchange position to capital 2/	0.0	0.7	1.0	2.1	-0.4	0.0	0.2	0.3	1.3	0.3	-0.4	-0.7	-0.7	0.6	0.2	0.5
Asset quality																
Total nonperforming loans (NPLs), facility level 5/	2.2	2.2	2.7	2.6	3.6	3.3	3.3	2.9	2.8	2.6	2.4	2.1	1.8	1.8	1.5	1.5
Household NPLs, cross default basis 6/ 7/	2.0	2.2	2.3	2.1	2.2	2.7	2.4	2.9	2.8	2.5	2.2	1.8	1.6	1.3	1.3	1.4
Corporate NPLs, cross default basis 6/	5.9	4.6	4.7	4.8	6.2	8.5	9.1	18.0	17.8	17.6	16.7	14.2	13.2	10.1	9.4	7.9
Household and corporate NPLs, cross default basis 6/	4.2	3.5	3.6	3.6	4.6	6.0	6.1	10.9	10.5	10.0	9.3	7.8	7.2	5.5	5.2	4.6
Loan loss provisions to household loans in default	20.7	19.0	17.9	17.5	19.0	18.1	17.6	17.7	16.6	15.4	16.4	16.3	16.5	16.6	17.1	16.2
Loan loss provisions to corporate loans in default	32.5	35.7	33.3	31.5	34.1	33.6	34.2	34.1	33.1	28.1	28.4	27.9	28.7	26.6	27.3	24.8
Loan loss provisions to total loans in default	29.1	30.6	28.6	27.6	30.3	29.1	29.2	29.7	29.8	25.6	26.2	25.4	25.9	24.3	24.8	22.6

Sources: CBI IMF FSI database, and IMF staff calculations.

1/ Three largest deposit money banks unless otherwise indicated.

2/ Data for 2017Q1 through 2020Q4 are IMF staff estimates.

3/ Total income is total gross income.

4/ Liquid assets comprise cash and balances with the central bank, claims on credit institutions, and bonds and debt instruments.

5/ Over 90 days in default. From 2017Q4 EBA definition for non-performing loans is used, i.e. facility level, over 90 days in default or unlikely to pay.

6/ Over 90 days in default or deemed unlikely to be paid.

7/ Includes loans from the Housing Financing Fund.

Table 4. Iceland: Risk Assessment Matrix

Risks	Relative Likelihood	Impact if Realized
<p>Intensification of regional conflict(s). Escalation of Russia's war in Ukraine or other regional conflicts and resulting economic sanctions disrupt trade (e.g., energy, food, tourism, and/or critical supply chain components), remittances, refugee flows, FDI and financial flows, and payment systems.</p>	<p>High</p> <ul style="list-style-type: none"> ▪ Escalation would trigger commodity price shocks, and a global slowdown. ▪ Worldwide tourism flows are further subdued, coupled with spillovers from lower than envisaged trading partner activity. 	<p>Medium</p> <ul style="list-style-type: none"> ▪ Further de-anchoring of inflation expectations sustains a rise in real estate markets. ▪ Tighter financial conditions, and higher credit risk. ▪ Iceland's low dependence on fossil fuels is mitigating factors.
<p>Abrupt global slowdown or recession. Global and idiosyncratic risk factors combine to cause a synchronized sharp growth slowdown, with outright recessions in some countries.</p>	<p>Medium (U.S.) / High (Europe)</p> <ul style="list-style-type: none"> ▪ In the U.S amid persistently high inflation driven by tight labor markets, supply disruptions and continued commodity price shocks, the Fed tightens policies faster and by more than anticipated, resulting in a "hard landing", housing market correction, and a stronger U.S. dollar. Negative demand shock triggered by rapid interest rate increases depresses U.S. households' net worth and consumer spending. ▪ In Europe the fallout from the war in Ukraine is exacerbated by a gas shutoff by Russia, resulting in acute gas shortages and further supply disruptions, which trigger a recession and sharp fall in real incomes and reduced import demand. 	<p>High</p> <ul style="list-style-type: none"> ▪ Spillovers through trade and financial channels and downward pressures on some commodity prices, possibly depressing export revenues. ▪ Knock-on effects from higher risk spreads, external financing costs and lower tourism earnings. ▪ Rising unemployment causing defaults and a housing market correction.
<p>Monetary policy miscalibration. Amid high economic uncertainty and volatility, major central banks slow monetary policy tightening or pivot to loosen monetary policy stance prematurely, de-anchoring inflation expectations and triggering a wage-price spiral in tight labor markets.</p>	<p>Medium</p> <ul style="list-style-type: none"> ▪ The Fed reacts by tightening abruptly and higher than expected. The resulting repositioning by market participants leads to a sharp tightening of financial conditions and higher risk premia, including for credit, equities, and emerging and frontier market currencies. ▪ The de-anchoring of inflation expectations increases risk premia, sending long-term bond yields and corporate spreads to historic heights, with plunging house prices and 	<p>Medium</p> <ul style="list-style-type: none"> ▪ Currency depreciation puts pressure on inflation; high premium complicates government financing. ▪ Rise in interest rates exacerbates vulnerabilities in household balance sheets through floating rate mortgages, the real estate market falls, causing feed-back effects to the banking system. ▪ Pension fund's assets depreciate, causing income loss to households.

Table 4. Iceland: Risk Assessment Matrix (Concluded)

Table 4. Iceland: Risk Assessment Matrix (Concluded)		
	consumer confidence that deepen the recessions	
A sudden correction in the domestic real estate market	<p style="text-align: center;">Medium</p> <ul style="list-style-type: none"> ▪ Real estate prices have increased rapidly in Iceland over the last years and are assessed to be overvalued. ▪ While there are no signs of looser lending standards, the share of indexed loans is high compared to Iceland's peers. ▪ There are risks to repayments due to capacity linked to downside scenarios and indexation as well as litigation over the flexible interest rate loans. 	<p style="text-align: center;">Medium</p> <ul style="list-style-type: none"> ▪ A drop in real estate prices, would result in higher impairment charges for banks, causing defaults or delayed loan repayments by highly leveraged households. ▪ Lower house prices could depress domestic demand through reduced consumption, hitting banks' profits further.
Systemic financial instability. Sharp swings in real interest rates, risk premia, and assets repricing amid economic slowdowns and policy shifts trigger insolvencies in countries with weak banks or non-bank financial institutions, causing markets dislocations and adverse cross-border spillovers.	<p style="text-align: center;">Medium</p> <ul style="list-style-type: none"> ▪ Risk-off sentiment has intensified amid market turmoil triggered by the liquidity and solvency problems of a few weak banks. This has enlarged reputational risks of wider market participants and dent market confidence, leading to sharp swings in the value of marketable assets. 	<p style="text-align: center;">Medium</p> <ul style="list-style-type: none"> ▪ Sharp correction in asset price may lead to valuation losses of banks which hold marketable asset instruments. ▪ Large interest rate swings may intensify credit risks of borrowers that are sensitive to interest rate movement. ▪ Net interest margin of the banks may become volatile, potentially leading to further losses in profit.

Domain		Top-down Stress Test by FSAP Team—Assumptions
Banking Sector: Solvency Risk		
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> • Top three commercial banks (under IFRS9).
	Market share	<ul style="list-style-type: none"> • The top three commercial banks account for about 95 percent of the deposit taking corporations (excl. central bank) assets.
	Data source and baseline date	<ul style="list-style-type: none"> • Supervisory data provided by the Central bank of Iceland. Other data sources include public sources (EBA Transparency Exercises, Banks' Annual Reports, Statistics Iceland), commercial databases (Fitch, Haver Analytics), IMF Global Assumptions (GAS) and IMF WEO. • Data as of October 2022. • Consolidated at national bank level.
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> • Balance sheet-based tool developed by MCM • Satellite models developed by the FSAP team
	Satellite models for macro-financial linkages	<ul style="list-style-type: none"> • Credit risk: Parameter (PD, LGD, EAD) projections generated by product. Modeling relies on IFRS9 modeling and transition matrices. Analysis uses as starting points the PDs and LGDs reported by banks. • Net Interest Income: Based on two complementary approaches (structural and empirical). The empirical approach relies on estimates from regression models using individual bank or system level data and pass-through estimates. The structural model combines this with repricing ladders on the portfolio of assets and liabilities. • Net Fees and Commission income and other income/expenses: bank-panel model or by assumption. • Market risk: Duration approach for interest rate instruments and consideration of equity, FX and inflation risks.
	Stress test horizon	<ul style="list-style-type: none"> • 5 years (2023-2027).

Domain		Top-down Stress Test by FSAP Team—Assumptions
Banking Sector: Solvency Risk		
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> • Baseline from the March 2023 WEO, complemented with VAR model to project scenario consistent additional variables. • An adverse scenario with severity calibrated to a 2.2 standard deviation shock to real GDP growth relative to baseline over 2023-2024. Macro-financial simulations are realized based on an Iceland-specific VAR model and benchmarked against the “other advanced economies” group dynamics in a similar scenario implemented in the Global Financial Models (see Vitek (2018)). • Macro-financial scenarios for foreign countries and relevant interest rates rely on the GFM simulations • The adverse scenario is characterized by a U-shaped path for real GDP growth, tightening of global financial conditions, global supply chain disruptions, and rise of commodity prices, a de-anchoring of inflation expectations and a trade-off for monetary policy between unemployment and inflation, as described in the RAM. • The VARX model is specified as follows: The vector of endogenous variables (Y_t) includes real GDP, unemployment rate, CPI index, policy rate, nominal effective exchange rate (NEER), and a measure of real loans, given by the CPI deflated sum of NFC and household loans. The vector of exogenous variables (X_t) includes the US real GDP (as a measure of global demand), and the oil price (as a measure of global prices) and a dummy for the GFC (2008Q4). The selection of variables is conditioned by trading off degrees of freedom against the necessity (i) to reflect the relevant source of the shocks, (ii) to capture variables of relevance to the stress test (and captured in the IMF’s global models used for adverse scenario generation) and (iii) to limit possible missing variable bias. L_1 and L_2 are the lag length for endogenous and exogenous variables, respectively, and are chosen to be $L_1=L_2=4$. All variables, other than unemployment and policy rates, are in logs. The path of external variables in the VARX for the baseline and adverse scenario is taken from the global model maintained by MCM, which ensures the shocks of the global adverse are consistent with other FSAPs.

Domain		Top-down Stress Test by FSAP Team—Assumptions
Banking Sector: Solvency Risk		
	Sensitivity analysis	<ul style="list-style-type: none"> • Concentration analysis on top lending and funding exposures of the banks. • Sensitivity analysis on further rising in interest rates. • Sensitivity analysis on further credit deterioration in covid-sensitive sectors.
4. Risks and buffers	Risks/factors assessed	<ul style="list-style-type: none"> • Credit risk (corporates, households, sovereign). • Interest rate risk in the banking book. • Market risk from fixed income securities (interest rate, spreads), FX inflation and equity risks.
	Behavioral adjustments	<ul style="list-style-type: none"> • Balance sheet assumptions such that credit growth ensures that credit to GDP ratio remains constant. Counter-factual analysis enabling macro-feedback loop. • Cures no/with write-offs and new credit production endogenously consistent with credit growth assumption. • Portfolio composition unchanged over time.
5. Regulatory and market-based standards and parameters	Calibration of risk parameters	<ul style="list-style-type: none"> • PDs and LGDs obtained from supervisory files, or where not available estimated at the asset class level. • Dynamics based on model estimated PDs in line with the scenario considered (WEO baseline, adverse scenarios).
	Regulatory/ accounting and market-based standards	<ul style="list-style-type: none"> • Regulatory capital ratios and IFSR9 accounting standards.
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> • Aggregate results and contributions to evolution of capital ratios.

Appendix II. Liquidity Banking Sector Stress Testing Matrix (STeM)

Domain		Assumptions
		Top-down by FSAP team
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> • Top three commercial banks.
	Market share	<ul style="list-style-type: none"> • The top three commercial banks account for about 95 percent of the deposit taking corporations (excluding central bank) assets.
	Data and baseline date	<ul style="list-style-type: none"> • Liquidity Coverage Ratio, Net Stable Funding Ratio, and Cash flow table from supervisory data. • Data as of October 2022. • Consolidated at national bank level.
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> • The cash-flow stress test analyzes the net cash balance, accounting for available unencumbered assets, • Contractual cash inflows and outflows, and behavioral flows. • The test is to be repeated for all significant currencies for the reporting banks. • The analysis is complemented with LCR and NSFR stress tests.
	Stress test horizon	<ul style="list-style-type: none"> • For the cash-flow analysis, the horizon of stress events varies by scenario and can extend up to a period 12 months. • The horizon for LCR stress test is one month.
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> • Baseline and various scenarios are considered, with varying intensity of adverse liquidity conditions and reflecting different liquidity risks.
	Sensitivity analysis	<ul style="list-style-type: none"> • Further withdrawal of funding from pension and foreign funding.

Domain		Assumptions
		Top-down by FSAP team
4. Risks and buffers	Risks/factors assessed (how each element is derived, assumptions)	<ul style="list-style-type: none"> Funding liquidity risk is reflected in funding and asset roll-off rates, the latter providing cash inflows are related to non-renewal of maturing assets. Market liquidity risk is reflected in asset haircuts, which could be influenced by market movements, potential fire sales and collateral supply considerations.
	Behavioral adjustments	<ul style="list-style-type: none"> Liquidity from the central bank's emergency lending assistance (ELA) is not considered. The cash-flow analysis may consider some behavioral assumptions about a counterparty's ability or willingness to transact based on banks' solvency and liquidity conditions.
5. Regulatory and market-based standards and parameters	Calibration of risk parameters	<ul style="list-style-type: none"> Stress funding run-off rates, asset roll-over rates, and asset haircuts are calibrated based on empirical evidence and relevant international experiences. The HQLA haircuts are informed by market value declines from the solvency stress test where applicable, while the rest are informed by the ECB valuation haircut when banks need to repo the liquid assets to the central bank. Icelandic banks do not hold securities under the amortized (or equivalently HTM) category.
	Regulatory/accounting and market-based standards	<ul style="list-style-type: none"> The LCR hurdle rate is set at 100 percent at the aggregate currency level (per Basel III and domestic regulation) and at 100 percent for significant foreign currencies (per domestic regulation). NSFR per Basel III; limit of 100 percent.
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> Outputs include (1) Changes in the system-wide liquidity position, (2) number of institutions with LCR/NSFR below regulatory limits, and (3) amount of liquidity shortfall.
7. Infrastructure		<ul style="list-style-type: none"> Infrastructure developed by IMF staff based on FINREP/COREP data input.

Position	Scenario					
	Scenario S1 Regulatory LCR	Scenario S2 Retail	Scenario S3 Wholesale	Scenario S4 Combo = retail + wholesale + price shock	Scenario S5 S4 + Additional shock 1 (low pension + foreign funding shock)	Scenario S6 S4 + Additional shock 2 (high pension + foreign funding shock)
stable retail deposits	5%	10%	5%	10%	10%	10%
other retail deposits	10%	20%	10%	20%	20%	20%
operational deposits	5-25%	5-25%	15-35%	15-35%	15-35%	15-35%
non-operational deposits other than financial institutions	20-40%	20-40%	30-50%	30-50%	30-50%	30-50%
non-operational deposits financial institutions	100%	100%	100%	100%	100%	100%
committed facilities to retail customers	5%	10-15%	5-10%	10-15%	10-15%	10-15%
committed facilities to corporate customers	10-30%	10-40%	20-50%	20-50%	20-50%	20-50%
pension funding (other than non-operational deposit)	0%	0%	0%	0%	10%	15%
foreign funding (other than non-operational deposit)	0%	0%	0%	0%	15%	25%
level 1 assets	no	no	no	-5/0%	-5/0%	-5/0%
level 1 covered bonds	no	no	no	-20/-3%	-20/-3%	-20/-3%
level 2A assets	no	no	no	-15/-5%	-15/-5%	-15/-5%
level 2B assets	no	no	no	-25/-5%	-25/-5%	-25/-5%

Source: IMF staff.

Note: The HQLA haircuts are informed by market value declines from the solvency stress test where applicable, while the rest are informed by the ECB valuation haircut when banks need to repo the liquid assets to the central bank. Icelandic banks do not hold securities under the amortized (or equivalently HTM) category.

Domain		Assumptions
Banks, Pension Funds, and Investment Funds: Interconnectedness Analysis		
1. Institutional Perimeter	Institutions included	<ul style="list-style-type: none"> • Interbank network: 3 commercial banks (out of 4) accounting for 95 percent of total banking sector assets, ranked by unconsolidated assets; • Inter-pension fund network: largest 15 pension funds ranked by total assets; • Inter-Investment fund network: largest 15 investment funds ranked by total assets; • Inter-financial sector network: banks, pension funds, and investment funds for the network and exposure analysis; and • Aggregate cross-sectoral exposure data: financial sector and domestic real sector interconnectedness.
	Data and starting position	<ul style="list-style-type: none"> • Domestic interconnectedness. • Data source: supervisory data. • Starting position: three snapshots: 2011, 2017, and 2022 to reflect evolution; Data granularity: institutional level bilateral exposure data among all entities, including within the banking sector, pension fund sector, and investment fund sector; and across-sectors including between central bank, banks, pension funds, other financial corporates, non-financial corporates, general government, households, and the rest of the world. • Cross-border interconnectedness. • Cross-border data for banking sector and pension funds at institutional level, based on the supervisory data and BIS cross-border exposures statistics. • Financial market data for sovereign CDS spreads and equity returns data from 2001 to 2022.
2. Methodology	Overall framework	<ul style="list-style-type: none"> • Interbank and cross-border balance sheet exposure based on Espinosa-Vega and Juan Sole (2010). • Failure thresholds are institution-specific, considering regulatory requirements and applicable buffers. • Cross-border: Market price-based spillover model by Diebold and Yilmaz (2014). • Assess overall price-based banking sector and pension funds international interconnectedness and main spillover directions.
3. Risks and buffers	Risks	<ul style="list-style-type: none"> • Credit shock and funding shock bringing capital impairment due to interbank exposures and intra-financial exposures.
	Buffers	<ul style="list-style-type: none"> • Domestic interconnectedness: institution's own capital and liquidity buffers. • Banks: minimum CET1 ratio is considered. • Pension funds: minimum solvency capital ratio.

Domain		Assumptions
4. Reporting format for results	Output presentation	<ul style="list-style-type: none"> • Domestic and cross-border interconnectedness and contagion analysis. • Inter-financial sector network: a network chart based on exposures. • Aggregate inter-sectoral network: a network chart based on the exposures between CB, ODCs(banks), PFs, OFCs, NFCs, GG, HHs, and ROW. • Index of vulnerability and contagion for inter/intra-sectoral exposures at institutional level. • Distribution of the spillover indices based on institution size, institutional sector, and other characteristics. • Market data contagion analysis. • Cross-country interconnectedness charts on sovereign CDS and equity return. • Spillover indices at country level on sovereign CDS and equity return.

PENSION FUNDS: FUTURE PENSION VALUES, LIABILITIES, AND LIQUIDITY RISK			
		Top-down	Bottom-up
1. Institutional perimeter	Number of institutions	7 occupational pension funds (defined ambition) Almenni, Birta, Frjalsi, Gildi, LSR, LV, Stapi	
	Market share	77 percent of Pillar II assets, 76 percent of Pillar II contributions; excl. closed defined-benefit schemes	
	Data	Statutory returns, company submissions	Company submissions
	Reference date	December 2022	
2. Channels of risk propagation	Methodology	Investment assets: market value changes of assets after price shocks, affecting future pension values Liabilities: valuation change after changing assumptions on future wage inflation, asset returns	Liabilities: valuation change after changing the regulatory discount rates and biometric assumptions
	Time horizon	<ul style="list-style-type: none"> Adverse scenario: 2023-2025. Medium- to long-term projections for replacement rates (up to 30 years). 	Instantaneous shock

PENSION FUNDS: FUTURE PENSION VALUES, LIABILITIES, LIQUIDITY RISK			
		Top-down	Bottom-up
3. Scenario analysis	Tail shocks	Adverse scenario: <ul style="list-style-type: none"> Interest rates: short-term rates +171 bps, long-term rates +212 bps in 2013. Equity price: -79.8 percent for listed domestic shares, and -32.0 percent for foreign shares in 2013. ISK depreciation: -30.6 percent in 2023 Inflation: 8.6 percent in 2023. 	Not applicable
	Sensitivity analysis	<ul style="list-style-type: none"> Default of largest bank / non-financial counterparty. 	<ul style="list-style-type: none"> Reduction in the discount rate from 3.5 to 3.0 percent. Decrease in mortality by 10 percent across all age cohorts.

4. Risk factors assessed		<ul style="list-style-type: none"> • Market risks: interest rates, share prices, property prices, FX rates, credit spreads. • Credit risks: Default of largest bank (and non-financial) counterparty. 	<ul style="list-style-type: none"> • Regulatory risk / interest rate risk. • Biometric risks: Mortality.
5. Regulatory/accounting standards		National GAAP	National GAAP

PENSION FUNDS: FUTURE PENSION VALUES, LIABILITIES, LIQUIDITY RISK			
		Top-down	Bottom-up
6. Reporting Formats for results	Output presentation	<ul style="list-style-type: none"> • Impact on value of assets. • Impact on future pension values. • Dispersion across companies. • Contribution of individual shocks. 	<ul style="list-style-type: none"> • Impact on value of assets and liabilities. • Dispersion across companies. • Contribution of individual shocks.

Domain		Assumptions Top-down Analysis by FSAP Team
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> About 8,500 non-financial companies.
	Market share	<ul style="list-style-type: none"> About 25 percent of active firms in 2020.
	Data source and reference date	<ul style="list-style-type: none"> Orbis (Bureau van Dijk) database for company level data. Statistics Iceland for aggregate sectoral key indicators. Data as of December 2020.
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> Dynamic Scenario-Based Stress Tests and Sensitivity Analysis (Tressel, T. and Ding, X., 2021, "Global Corporate Stress Tests—Impact of the COVID-19 Pandemic and Policy Responses", IMF WP 21/212). Probability of default (PD).
	Time horizon	<ul style="list-style-type: none"> Instantaneous shock and 3 years (2021-2023)
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> Baseline scenarios in line with the bank solvency stress test and October 2022 WEO. An adverse scenario with a lower GDP growth consistent with the severity of bank solvency stress test, and a tightening of financial conditions, global supply chain disruptions, and rise of commodity prices.
	Sensitivity analysis	<ul style="list-style-type: none"> Interest rate shock.
4. Risks and buffers	Risks/factors assessed	<ul style="list-style-type: none"> Bankruptcy, default on any loans or bonds, ICR falling below specific thresholds.
	Behavioral adjustments	<ul style="list-style-type: none"> None.
5. Regulatory and market-based standards and parameters	Regulatory/ accounting standards	<ul style="list-style-type: none"> National accounting standards in line with EU Directives and Regulations.
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> Aggregate results with the impact on debt distress, contribution of individual shocks.

Appendix VII. Implementation Status of 2008 FSAP Recommendations

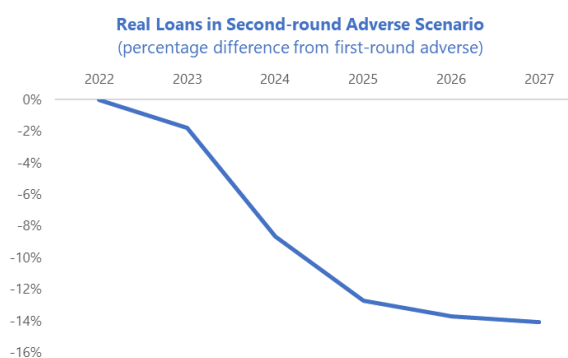
	Recommendations	Status March 2023
1.	Given the challenges of operating in an adverse financial environment, increase capital adequacy ratios to historical levels and evaluate the need for additional increases in the context of the ICAAP review process.	Implemented
2.	Strengthen the quality and sources of bank capital, by identifying and reducing possibilities of excessive exposure to shareholders, and, where necessary, attracting new shareholders.	Implemented
3.	Evaluate banks' liquidity plans using scenario analyses of future cash flows and banks' ability to sell securities in an illiquid market.	Implemented
4.	Monitor credit quality, taking remedial actions as warranted, such as establishing reserves for future credit losses.	Implemented
5.	Develop contingency plans for resolving funding limitations by bank and by currency.	Implemented
6.	Given market concerns, require greater disclosure in financial statements identifying and reducing cross holdings, related-party lending, and concentration in lending.	Implemented
7.	Address market concerns about the size of the large banks by (i) ensuring banks have strong capital not reliant on borrowing as a source; (ii) making ownership structure more transparent; and (iii) increasing liquidity buffers	Implemented
8.	The FME should carefully examine the extent to which the size of banks' balance sheets is appropriate given risk management, operational controls, and systemic vulnerabilities.	Implemented
10.	Strengthen existing crisis management arrangements, including provisions for information exchange and contingency plans for banking distress.	Implemented
11.	Establish a bank bankruptcy regime that strengthens the remedial action and enhances the tools for bank resolution.	Implemented

Appendix VIII. Analysis of Macro-Financial Second-Round Effects

1. The solvency bank stress test was complemented by an analysis of macro-financial second-round effects. The initial external shocks that generate the adverse scenario considered in the solvency stress test could be amplified through the banking sector's response, especially a contraction in its credit supply to the real economy. This credit supply shock could lead to a further deterioration of the macroeconomic scenario, which would in turn deepen the stress on the banking sector.

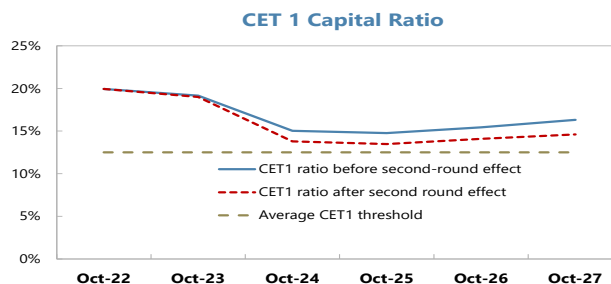
2. A structural VAR (SVAR) model was used to identify the macroeconomic effects of a shock to bank capitalization. The SVAR uses the same domestic and external variables as the ones included in the model used to generate the basic adverse scenario. The domestic variables are: Iceland's real GDP, CPI, nominal exchange rate (all in logs), unemployment rate, and policy interest rate, while the external variables are: US real GDP, oil price (both in logs) and US policy rate. The external variables enter the VAR as exogenous regressors. To capture macro-financial linkages, a banking block was added to the model, with three variables: bank capital, bank outstanding loans to domestic households and non-financial corporates (both in logs and divided by CPI to express them in real terms), and the spread between the lending rate and the policy rate.

3. The second-round scenario displays more adverse paths for macroeconomic variables together with bank deleveraging; these two developments have opposing effects on bank capitalization ratios. The second-round scenario obtained by adding the macro-financial feedback effect displays a lower real GDP, higher unemployment and lower housing prices (3.8 percent lower, 1.6 percentage points higher and 9 percent lower, respectively, at the trough, which occurs in 2024). This more adverse scenario negatively affects banks' profitability. However, the second-round stress-test assumes a deleveraging of the lending portfolio that is equal to the aggregate real loan growth obtained from the SVAR, which decreases RWAs and thus tends to increase capital ratios. Therefore, since there are two effects at play which move capital ratios in opposite directions, the total effect could generally go in either direction.



4. The quantitative results indicate that the lower profitability is the stronger effect in this case, thus leading to lower capital ratios in the second- than in the first-round. The bank solvency stress-test based on the second-round scenario results on a path for aggregate CAR that is lower than in the first round by 1.2 percentage points in 2024 (on average for the three banks) and by 1.7 percentage points in 2027. The most important factor driving down profitability in the second-round scenario is credit risk, mainly due to higher PDs driven by higher unemployment. The deleveraging of the lending portfolio also lowers net interest income, although this effect is outweighed by the lower RWAs that tend to increase capital ratios. The gap in capital ratio slightly increases throughout the stress-testing horizon as the lower profitability accumulates over time.

5. While in the first-round all banks remain above the hurdle rate throughout the stress-testing period, in the second-round one of the three banks falls slightly below at the trough; aggregate capitalization remains above the hurdle rate throughout. Thus, the macro-financial linkages exercise confirms the aggregate resilience of the banking sector in terms of solvency even in a severely adverse scenario, while pointing to some vulnerabilities which could be addressed with macroprudential tools like the CCyB.



6. The macro-financial linkages model can be used to inform the CCyB calibration through a reverse-stress-testing exercise. The CCyB is implemented as an extension of the capital conservation buffer, ensuring that capital requirements take into account the macro-financial environment in which banks operate. Since there is no universally agreed-upon approach to calibrate the CCyB, the FSAP's solvency stress-test and second-round effects model can provide guidance for its calibration. In particular, the FSAP team conducted a reverse-stress-testing exercise to find the minimum CCyB rate such that, at the trough, all three banks remain above the CAR hurdle-rate throughout the stress-testing period.

7. The reverse-stress-testing exercise indicates that an additional 80bps of CCyB (relative to the 2 percent at the starting point) would be required for all banks to remain above the hurdle rate. The reverse-stress-testing exercise indicates that a CCyB of 2.8 percent would keep all banks above the hurdle rate throughout the stress-testing horizon with the third-round scenario. This value would be similar if the reverse-stress-testing exercise were based on the second-round scenario instead; this is because the improvement in the macro-outlook due to the higher bank capitalization induced by the CCyB is roughly offset by the higher RWAs that result from higher bank leverage.

