GEORGIA

FINANCIAL SECTOR ASSESSMENT PROGRAM

TECHNICAL NOTE— STRESS TESTING AND FINANCIAL STABILITY ANALYSIS

September 2021

This paper on Georgia 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 September 17, 2021.

INTERNATIONAL MONETARY FUND

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TECHNICAL NOTE

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Glossary

BCBS	Basel Committee on Banking Supervision
D-SIB	Domestic systemically important bank
CAR	Capital to risk-weighted assets
CET1	Common Equity Tier 1
CCB	Capital Conservation Buffer
CICR	Currency Induced Credit Risk
DEBITDA	Debt to EBITDA
EBITDA	Earnings before interest, taxes, depreciation, and amortization
EQA	Equity to assets
GDP	Gross domestic product
FSAP	Financial Sector Assessment Program
FX	Foreign exchange
ICR	Interest coverage ratio
IFI	International Financial Institution
IMF	International Monetary Fund
LCR	Liquidity-Coverage Ratio
MCM	IMF's Monetary and Capital Markets Department
NBG	National Bank of Georgia
NPL	Non-performing loans
NSFR	Net Stable Funding Ratio
ROA	Return on assets
ROE	Return on equity
RWA	Risk-weighted assets
SME	Small- and medium-size enterprises

EXECUTIVE SUMMARY[1]

This note presents the results of banks' stress tests carried out jointly by the NBG and the FSAP teams in the context of the 2021 FSAP. It describes the scope, methodology and results of a series of top-down stress tests carried out during January–April 2021. At the request of the Georgian authorities, complementary bottom-up exercises were not implemented, on account of the operational challenges facing banks because of the COVID-19 pandemic.

The banking system is relatively large and concentrated, with diversified ownership and no public participation. Banks operate traditional intermediation, focusing on lending to the resident sector. Cross-border linkages are more relevant on the liabilities' side including from non-resident deposits, which account for about one-fourth of retail deposits, and 7½ percent of banks' balance sheets. Other segments of the financial system, including microfinance institutions, insurance, pensions and investment funds, are small. Capital and money markets are shallow, limiting risk transfer and diversification.

Risks to financial stability stem from high financial dollarization and growing external imbalances. The banking system operates under substantial—albeit declining—financial dollarization, in the context of an open capital account and a flexible FX regime. Indirect credit risk stemming from FX lending to unhedged borrowers (FX-induced credit risk) is deemed material from the systemic perspective. In addition, a history of persistent current account deficits led to the buildup of foreign liabilities in the corporate sector. The fiscal sector entered the crisis from a relatively sound position, albeit a large share of public sector debt is external and therefore also exposed to risks stemming from FX depreciation.

The banking system entered the pandemic with solid profitability and strong capital buffers, on the back of strict prudent regulations. The authorities moved quickly to release the capital conservation buffer and a share of pillar 2 capital buffers for banks and provided liquidity support, along other measures. A stress test carried out by the authorities to assess the impact of the pandemic required banks to post preemptive loan loss provisions early in the crisis. Banks reacted quickly to the challenge, accommodating massive loan moratoria requests from borrowers. The government also provided strong fiscal support to sectors affected by the pandemic. Other supportive factors include moderate asset price dynamics before the pandemic, and a profile of foreign liabilities that includes debt vis-à-vis IFIs and intra-company debt.

Against this backdrop, the financial stability assessment focused on credit and liquidity risks. Emphasis was placed on assessing the extent of FX-induced credit risk and risk concentration stemming from lending to large corporations, or to borrowers exposed to similar risks (i.e., sectoral concentration). The credit risk analysis placed particular emphasis on assessing the impact of the pandemic, which is still ongoing and uneven across economic sectors and borrowers. As for liquidity risk, a detailed assessment was carried out using NBG tools. It analyzed

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banks' liquidity coverage by currency and examined the potential for sudden calls on banks' liabilities, including by non-residents.

The pandemic has had an extensive impact on bank credit portfolios, leading to substantial loan restructuring and an ongoing deterioration in credit quality. As of December 2020, about one-fifth of credit portfolios, representing about 10 percent of GDP were either non-performing or restructured. As in other countries, loan restructuring has been widespread, with deeper systemic materiality in tourism-related segments, mortgages, and real estate activities. The impact has also been more severe for FX denominated loans, highlighting risks from high financial dollarization.

The stress tests indicate that the banking system is prepared to absorb the losses stemming from the pandemic under the baseline scenario, without threatening financial stability. Credit losses, while substantial, can be absorbed with current capital cushions and internal capital generation without threatening financial stability, though, it will take a few years for banks to restore pre-crisis capital buffers. The authorities are encouraged to enforce retention of banks' earnings until pandemic-related uncertainties dissipate, credit losses are absorbed and capital cushions fully restored.

The banking system also appears resilient to distressed scenarios spanning a three-year horizon, but capital injections would be needed in some banks. The assessment encompassed two low-probability but still plausible distressed scenarios. An *Extended Pandemic* followed by a sluggish economic recovery, and a *Capital Outflows* scenario where the extended pandemic compounds with an adverse external financial environment. Under these scenarios, credit losses mount. In the most severe scenario, four small and medium-sized banks require additional capital to meet the minimum capital requirement. The aggregate capital shortfall in this case is about 1½ percent of GDP, which is not deemed substantial from a systemic perspective. Stress tests implemented by the NBG produced somewhat lower loss estimates, but the results were still broadly consistent with those obtained by the FSAP team.

Credit losses stemming from the pandemic are uneven across credit types and economic sectors. The largest losses originate from retail portfolios, and from FX loans to SMEs and corporates. Within the retail segment, FX-denominated mortgages and lari consumer loans are likely to pose substantial losses. Not surprisingly, within the corporate and SME books, the largest losses appear to originate from high-contact economic activities such as hotels, restaurants, and consumer durables. Construction and real estate services are also expected to be heavily impacted.

The assessment of credit losses was challenged by the unusual nature of the pandemic. While the NBG has a wealth of supervisory data, there may be scope to improve data on the extent of natural FX hedging of borrowers based on their FX income. The NBG's ongoing credit registry initiative, with a target completion date of end-2021, should help with data collection in this area.

The banking system appears ready for the gradual removal of liquidity support measures implemented early in the pandemic. The stress tests indicate that the system has enough high-

quality liquid assets to endure severe deposit withdrawals (both in lari and FX) during a month, while maintaining its regular operations. Stress test shocks were based on the dynamics at the peak of the 2008–09 global financial crisis, which represents the most adverse liquidity environment facing Georgian banks over the last 15 years. A complementary exercise, taking out the SME collateral pledged for central bank liquidity resulted in one small bank slightly failing the LCR test in lari, although the overall LCR remained comfortable at 120 percent.

Other risks are not deemed material from the systemic stability perspective. An adverse feedback loop between the banking and the sovereign does not pose a concern, as banks' holdings of sovereign bonds are held to maturity and sovereign debt remains sustainable. However, even if sovereign bonds were marked-to-market, a large shock of some 600 bps to sovereign spreads could be absorbed without any material impact on banks' solvency. Equity price risk is also immaterial. Moreover, interest rate and direct FX risks, corresponding to a parallel shift in the yield curve by 300 bps and an additional 20 percent depreciation in the lari respectively, can also be absorbed by the banking system without threatening the solvency of individual banks.

Corporate stress tests fully integrated in the bank solvency analysis indicate that concentration risk does not threaten financial stability. On average, the ten largest exposures of each bank represent about two-thirds of Tier 1 capital. The financial ratios of the larger corporate borrowers appeared broadly sound on the aggregate, albeit with some dispersion across individual firms. Based on firm-level consolidated financial data, about 8 percent of the companies under analysis (representing 12 percent of the assets) appeared unable to cover their interest expenses. The analysis suggested that there is scope for a moderate increase in provisions on large exposures under the adverse stressed scenarios, which most banks, except two small ones, should be able to absorb without threatening their solvency. The analysis also suggested some areas where data collection could be strengthened.

The implementation of the Basel prudential limit on large exposures would have limited impact on the financing of large corporates. Enforcement of such a concentration limit would be binding for only a handful of banks and firms, and the impact on the supply of bank credit would be small. The authorities are thus encouraged to implement, as planned, the new regulation on large exposure limits following Basel standards.

Table 1. Georgia: Summary of Key Recommendations[1]	
Recommendations	**Time[2]**
1	Enforce retention of earnings until pandemic-related uncertainties dissipate, credit losses are absorbed capital buffers are fully restored	ST
2	Implement concentration limits on large exposures to Tier 1 capital as planned	ST
3	Continue work to improve the availability and quality of data on large borrowers	ST
4	Strengthen data collection on of FX hedging of corporate borrowers	I
[1] Authority responsible for implementation is assumed to be the NBG [2] Timing: I; immediate (< 1 year); ST; short term (1–3 years); MT: medium term (3–5 years)	

BACKGROUND

1.   Georgia is a small open economy in a politically vulnerable region. The country operates under a floating FX regime with substantial financial dollarization. About half of bank loans and two-thirds of bank liabilities are denominated in FX. International reserves stand at adequate levels according to standard metrics, but a history of persistent current account deficits have led to the accumulation of substantial foreign liabilities and increasing dependence on foreign financial inflows—including from the official sector. The fiscal sector started the pandemic from a relatively comfortable position, albeit with a large share of debt denominated in FX. Property prices show no evident signs of overvaluation, and financial markets are small and shallow. Georgia was growing at a dynamic pace before the COVID pandemic, averaging about 5 percent per year since 2010. Yet, the high financial dollarization and dependence on foreign funding stand as a source of systemic risk. A less benign external financial environment or a reversal of capital flows triggered by an increase in interest rates in industrial countries of by idiosyncratic factors could lead to spikes in the country risk premium, contractionary FX depreciation, and liquidity pressures, and potentially large effects at the systemic level.

2.   The financial sector is dominated by a highly concentrated banking system. The banking system is large and concentrated. Total bank assets are about 115 percent of GDP and the three largest banks account for about 85 percent of total assets. Bank ownership is well diversified, with 14 out of the 15 banks with some foreign ownership. There are no public banks and the two largest banks are listed in the LSE. Banks focus on retail and commercial lending to the resident sector. Other financial institutions are very small in size. Microfinance organizations and insurance companies add up to 4 percent of financial system assets, and pension fund assets stand at about 2 percent. Capital and money markets are shallow, which limits risk transfer and diversification.

3.   Banks' funding structures display a relatively low reliance on retail deposits. As of end-December 2020, retail deposits represent about 36 percent of total liabilities and deposits from non-financial companies add up an additional 32 percent. In recent years, the share of FX deposits in total deposits has remained slightly above 60 percent, reflecting customer's preferences for FX and banks' funding cost optimization. The system displays a structural shortage of lari liquidity, which banks manage by partially rolling over short-term central bank funding. Wholesale funding is mainly long-term and includes financing from parent companies and international financial institutions.

4.   As in most countries, Georgia was severely affected by the pandemic in 2020. The economy contracted by 6.1 percent driven by a collapse in net exports and investment, including FDI. Tourism-related revenues collapsed, and the nominal FX depreciated by 17.7 percent vis-à-vis the USD in March, closing the year with a more moderate average nominal depreciation of about 10 percent. The drop in activity hit the corporate and household sectors, especially SMEs and businesses operating in hotels, restaurants, and other tourism-related services. Commercial real

estate and consumer durables were also affected. The labor market crumbled, and the unemployment rate increased to about 18½ percent.

5.   **An even sharper impact of the pandemic was averted by a swift and forceful policy response**. The authorities reacted quickly to the initial shock of the pandemic in early 2020. On the monetary front, the NBG cut the policy rate and activated swap facilities to provide lari liquidity to the banking system. It also widened the collateral eligible for central bank liquidity, including by launching a temporary program to accept credit to SMEs. On the regulatory front, the NBG implemented a stress test early in the pandemic and required banks to take upfront loan loss provisions. It also allowed banks more flexibility in their liquidity management with the temporal suspension of lari LCR requirements for one year. Bank capital buffers were also relaxed, alongside restrictions on dividend distributions and management bonuses. On the fiscal front, the government placed 600 million lari bonds in the banking system and deposited the matching proceeds with banks. Countercyclical policies also included support to employment-generating sectors affected by the pandemic, such as tourism, agriculture, and real estate development. As a result, the fiscal deficit ballooned to 8.9 percent of GDP and public debt jumped from about 40 percent of GDP in 2019 to 60 percent of GDP in 2020, also driven by valuation changes induced by FX depreciation.

6.   **The banking system started the pandemic from a strong position**. Banks entered the crisis with strong profitability, liquidity, and solvency indicators. Strict prudential requirements implemented in recent years contributed to the buildup of prudent capital and liquidity buffers.[2] The sources of strength of the banking system helped sustain credit growth, averting adverse feedback loops on economic activity. Banks adapted quickly to operate in the virtual environment and voluntarily accommodated massive moratoria requests from borrowers. Successive waves of loan moratoria ensued, each time involving a smaller volume of loans as some borrowers resumed servicing their loans while many others worked with banks on loan restructuring.

7.   **While the IMF's Financial Soundness Indicators for Georgia weakened somewhat during 2020, they still do not reflect the full effects of the pandemic**. Bank capital ratios dropped by almost 2 percentage points in 2020, due to preemptive loan loss provisioning (Table 2). Still, capital buffers are solid both in terms of size and quality, with Basel CAR at 17.6 percent and Tier 1 capital at 12.8 percent in December 2020. Risk-weight asset density appears high, also compared with peer countries, and bank leverage is low. The preemptive provisioning for loan losses hit the bottom line, with ROA dropping from an average of about 2½ percent to −7 percent in March 2020. For the year, however, bank profitability recovered to slightly positive levels, driven by the two largest banks. Interest margins stand above 500 basis points, providing banks with a strong loss absorption capacity. Trading income accounts for only 11 percent of total income and banks tend to hold their bond holdings to maturity. Bank positions on derivatives are also negligible. Short-term liquidity indicators dropped in March 2020 due to the

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[2] The NBG implemented Basel III capital and liquidity standards, including pillar 2 buffers, and borrower-based measures to on loan-to-value and payment-to-income to limit credit risk on FX-denominated loans.

adverse impact of the pandemic, but recovered afterwards helped by policy support. Structural liquidity appears more challenging, as loan to deposit ratios surpass 120 percent. The dollarization of bank balance sheets is substantial, generating FX-induced credit risk and liquidity risk. Yet, banks maintain closed positions in FX within prudential limits. Accordingly, direct FX risk is not material.

Table 2. Georgia: Financial Soundness Indicators
(in percent unless stated otherwise)

	2019Q1	2019Q2	2019Q3	2019Q4	2020Q1	2020Q2	2020Q3	2020Q4
Banking System								
Total Assets to GDP	94.4	101.1	95.5	94.4	98.5	98.4	110.0	114.5
Capital to Assets, percent	13.4	12.1	12.0	12.2	9.9	10.6	10.0	10.3
Regulatory Capital to Risk-Weighted Assets, percent	19.1	18.2	19.0	19.5	17.0	18.0	17.6	17.6
Risk-Weighted Assets to Total Assets, percent	87.0	86.5	86.4	85.8	85.7	84.8	82.9	83.0
Regulatory Tier 1 Capital to Risk-Weighted Assets, percent	14.1	13.6	14.4	14.6	11.8	12.8	12.5	12.8
Non-performing Loans Net of Provisions to Capital, percent 1/	7.3	8.0	6.8	5.2	7.8	7.6	7.9	7.3
Non-performing Loans to Total Gross Loans, percent 2/	3.0	2.9	2.6	1.9	2.2	2.4	2.3	2.3
Total Gross Loans to GDP	65.0	68.6	63.6	64.7	69.9	69.3	75.4	78.5
Sectoral Distribution of Total Loans, Residents, percent	97.5	97.4	97.5	97.4	97.0	97.6	97.7	97.7
Sectoral Distribution of Total Loans, Nonresidents, percent	2.5	2.6	2.5	2.6	3.0	2.4	2.3	2.3
Return on Assets, percent	2.4	2.1	2.4	2.5	-7.3	-2.4	-0.9	0.2
Return on Equity, percent	17.9	16.2	18.9	20.4	-61.3	-21.0	-8.0	1.5
Interest Margin to Gross Income, percent	61.4	60.3	58.7	58.1	56.5	58.4	58.8	58.4
Non-interest Expenses to Gross Income, percent	51.0	53.7	52.5	52.9	55.0	56.1	55.4	54.3
Liquid Assets to Total Assets (Liquid Asset Ratio), percent	22.9	23.2	22.9	19.6	20.0	21.4	21.5	21.1
Liquid Assets to Short Term Liabilities, percent	29.1	28.5	28.3	24.2	24.0	25.6	25.6	25.2
Net Open Position in Foreign Exchange to Capital, percent	-1.2	0.3	-1.8	-1.4	1.8	-2.6	1.0	3.1
Total gross loans in percent of GDP	65.0	68.6	63.6	64.7	69.9	69.3	75.4	78.5
Trading Income to Total Income, percent	9.5	9.6	11.2	11.2	12.7	11.6	10.3	10.8
Personnel Expenses to Non-interest Expenses, percent	45.8	46.0	44.6	43.5	41.2	42.0	41.8	41.5
Spread Between Reference Lending and Deposit Rates, basis points	651.9	612.5	601.6	576.7	510.6	475.2	500.2	513.9
Spread Between Highest and Lowest Interbank Rate, basis points	20.9	40.9	35.3	32.4	17.7	7.9	6.5	10.7
Customer Deposits to Total (Non-interbank) Loans, percent	80.8	80.8	81.2	78.6	77.7	77.5	81.5	81.7
Foreign-Currency-Denominated Loans to Total Loans, percent	56.3	56.2	55.0	55.1	58.5	56.5	56.9	55.3
Foreign-Currency-Denominated Liabilities to Total Liabilities, percent	63.0	62.9	63.0	61.6	63.8	62.0	62.7	61.4
Net Open Position in Equities to Capital, percent	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Non-Financial Corporations: Number of Bankruptcy Proceedings Initiated	66.0	68.0	69.0	66.0	34.0	51.0	51.0	47.0
Households								
Household Debt to GDP, percent	36.1	37.2	35.1	33.7	36.8	...	37.9	...
Household Debt Service and Principal Payments to Income, percent	14.2	14.0	12.7	12.7	12.0	11.8	...	...
Household Income, in percent of GDP	15.7	15.8	15.8	15.6	16.0	16.3	17.7	...
Residential Real Estate Loans to Total Loans, percent	32.6	33.1	32.3	31.6	32.5	32.3	33.0	32.8
Commercial Real Estate Loans to Total Loans, percent	24.9	25.7	26.2	26.3	28.8	28.7	30.1	31.8

Source: NBG and IMF staff calculations.

1/ NPLs defined as loans more than 90 days past due.

2/ NPLs defined as loans classified either as Substandard, Doubtful, or Loss.

Figure 1. Georgia: Restructured and Non-Performing Loans

Non-performing loans stand at around 8 percent of gross loans and are higher for FX-denominated loans.

Non-Performing Loans by Currency
(in Percent of Loans in Category)
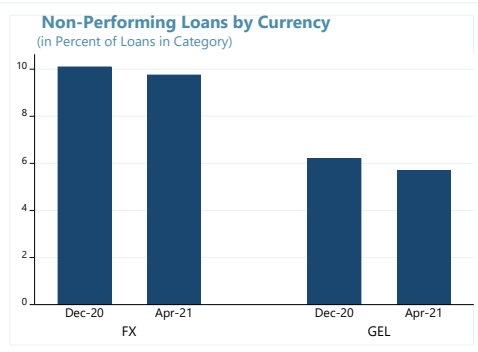
The NPL averages mask a wide dispersion across banks.

Non-Performing Loans across Banks
(in Percent of Total Loans)
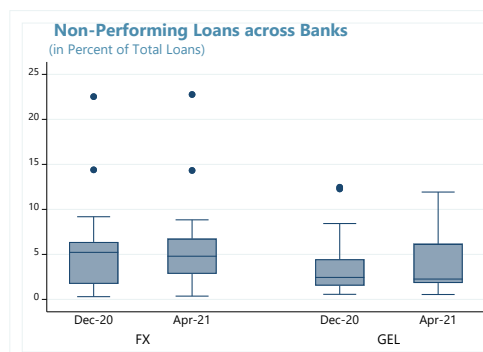
A large share of NPLs are restructured loans reclassified to higher risk categories.

Non-Performing Loans
(in Percent of Total Loans)
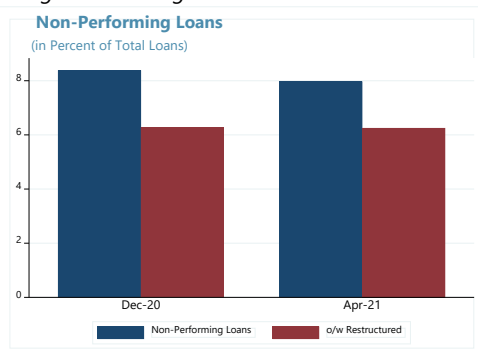
And a couple of small banks have a sizable share of NPLs in their portfolios.

Non-Performing Loans by Banks
(as of May 2021, in Percent of Total Loans)
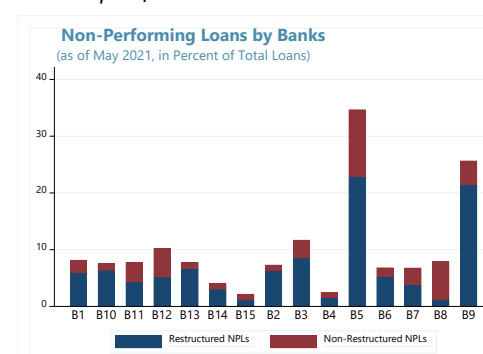
Restructured loans also vary widely across banks.

Restructured Loans across Banks
(in Percent of Total Loans)
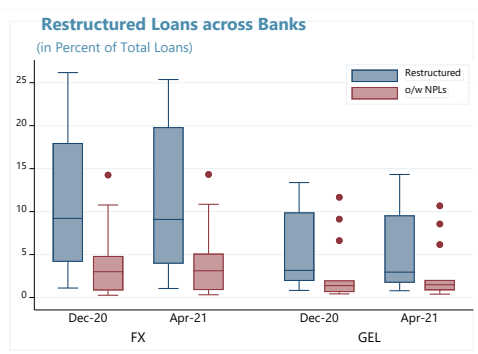
Loans under moratoria are expiring by July-2021, and some have also been restructured.

Retail Loans Under Moratoria
(as of May, 2021, in Percent of Retail Loans)
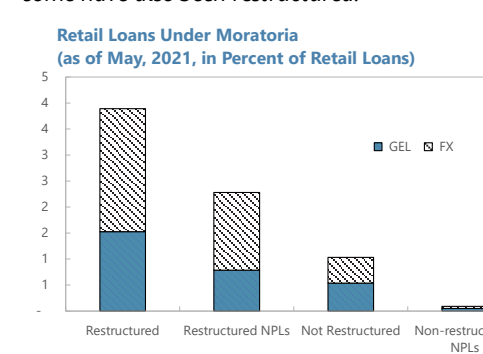
Source: NBG and Fund staff calculations.

Note: Non-performing loans according to NBG's definition.

8. **The pandemic had a severe impact on the quality of credit portfolios**. While non-performing loans according to the customary 90-day past due definition remained flat during 2020, the more conservative and forward-looking definition used by the NBG shows substantial deterioration of credit quality. This mainly comes from the downgrade of restructured loans, the majority of which are performing (Figure 1). The share of restructured loans reached 19 percent of total loans in December 2020 and has since increased further to 20½ percent in May 2021, driven by FX loan restructuring. The magnitude of restructured loans is material from the systemic perspective, as it represents about 11 percent of GDP. Going

Evolution of Non-Performing Loans
(in percent)

Source: National Bank of Georgia.

forward, the quality of these loans is likely to deteriorate further as the restructured loans mature. In addition, about 2 percent of loans were under moratoria with overlapping expirations until July 2021.

STRESS TEST SCOPE AND IMPLEMENTATION

9. **Given the size and structure of the financial system, the stress tests focused on the banking system**. Other types of financial institutions are deemed not large enough—individually or collectively—to be included. The assessment was carried out at the bank-level, covering all fifteen banks. The three largest, which jointly account for about 85 percent of system assets are systemically important. The stress tests were carried out in coordination between the NBG and the FSAP teams using a top-down approach based on supervisory data complemented with the fi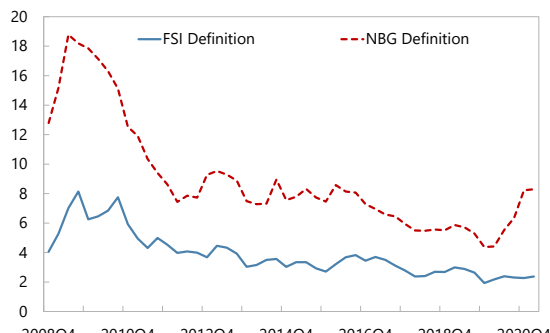ndings of an in-depth loan quality assessment carried out in 2020, and dedicated data requests to banks. At the request of the NBG, bottom-up stress tests were not carried out on account of the operational difficulties facing banks due to the pandemic.

10. **The assessment comprised a corporate stress test on the largest bank borrowers integrated with the bank solvency analysis**. The later consisted of a joint assessment of credit risk, market risks, and sovereign risk. Parallel exercises covered liquidity risk and interbank contagion.

- **Corporate Stress Tests**. To inform the credit risk assessment, the FSAP team carried out a stress test of large corporations. The sample targeted the ten largest exposures of individual banks. Each large exposure comprised the set of loans granted to related firms within conglomerate groups. The exercise was based on the latest available financial statements of each firm, provided by their lender banks. The results of the corporate stress test were matched with information from the lender banks to assess the adequacy of loan loss provisions and used as input to the credit risk models.

- **Credit risk**. Credit-to-GDP ratios stand close to 80 percent, which is relatively large against countries with similar level of development. Dollarization of credit portfolios, while decreasing, is still high at around 50 percent. The FSAP focused on the impact of the pandemic, with attention to losses stemming from FX-induced credit risk and from concentration. Since the impact of COVID has been asymmetric across economic sectors, concentration was assessed on two dimensions: via-à-vis single counterparties (i.e., large exposures), and from collective exposures vis-à-vis specific sectors. The loan book was segregated in four credit segments: corporate loans, SME loans, retail, and large exposures. In turn, corporate and SME loans were split in 32 categories reflecting the main economic activity of the borrowers, while retail loans were split in three categories encompassing mortgages, consumer loans and other retail loans. This sectoral partition facilitated a detailed assessment of credit risk.

- **Market risks**. Capital and money markets are small and shallow. Thus, equity price risk is immaterial. The assessment focused on interest rate risk (including in the banking book) and FX risk.

- **Sovereign risk**. Bank holdings of sovereign bonds stand at about 10 percent of total bank assets and are held to maturity. Since public debt is deemed sustainable, sovereign risk was assessed by measuring the impact of widening sovereign spreads on the valuation of bank holdings of sovereign bonds.

- **Liquidity risk**. Bank trading portfolios are not material. Thus, the assessment of liquidity risk focused on the liabilities' side. Given the substantial dollarization of bank liabilities and the importance of non-resident deposits, the data was partitioned by currency and by residency of bank counterparties.

- **Contagion**. The FSAP carried out contagion analysis using information on interbank exposures.

A. Stress Test Methodologies

11.   The stress tests leveraged on existing models and ongoing NBG initiatives. This included the battery of monitoring tools developed and used regularly by the NBG, the outcome of a recent Technical Assistance on FX-induced credit risk, and in-house Fund models on credit and liquidity risk, adapted to the risks and idiosyncrasies of the Georgian banking system. For the solvency analysis, hurdle rates for Basel CAR, T1 and CT1 were 8 percent, 6 percent, and 4.5 percent, respectively. For the liquidity analysis, hurdle rates were based on the LCR, with an overall requirement of 100 percent. Currency-specific LCR ratios were also computed, with hurdle rates of 100 percent for FX and 75 percent for lari, in line with current regulations. The cut-off date was December 2020. The stress test methodologies are described in the STeM matrix (Appendix I). The following remarks are worth mentioning.

- The exercises assumed semi-static bank balance sheets, with bank loans restricted to grow at the pace of economic activity in each of the stress test scenarios.

- Interest rate risk was assessed on the entire balance sheet and on relevant off-balance positions of individual banks. The exercises accounted for changes in the value of marked-to-market exposures and changes in projected cash flows stemming from repricing gaps.

- FX risk was also assessed on the entire balance sheet, without accounting for cross-currency changes.

- The credit risk assessment was based on several models, including scenario analysis, a credit VaR, and sensitivity analysis to critical risks. The models exploited an extremely rich partition of loan portfolios, comprising 32 credit types and the ten largest exposures, and two currencies. This partition was aimed at capturing FX-induced credit risk, and concentration stemming from individual large exposures and from exposures to the sectors more severely affected by the pandemic.

- The credit risk assessment was complemented with an assessment of the evolution of NPLs and restructured loans, by credit types and currencies.

- The stress tests of liquidity risk were based on cash flow analysis building on the LCR methodology.

B. Stress Test Scenarios

12.   The simulations were based on a baseline and two distressed scenarios, each one spanning three-years 2020–22. Scenario severity, measured by the deviation of the GDP path relative to the baseline, tried to capture extremely adverse, but still plausible conditions. A detailed description is presented in Appendix 2.

- **Baseline**: The Baseline scenario is based on the Spring 2021 WEO projections. It assumes that the pandemic is contained with vaccine distribution and the economy starts to recover in the second half of 2021 (Table 3 and Figure 2). Real GDP growth reached 3½ percent in 2021 and reached 2019 levels by mid-2022. In the outer years, GDP growth quickly reaches its pre-pandemic dynamics. Recent economic data suggests that the economic rebound in early 2021 is faster than envisaged. Thus, the Baseline scenario may prove conservative.

- **Scenario 1: *Extended Pandemic***. The first scenario assumes that the pandemic extends into late 2021 due to virus mutations, lags in vaccine distribution, and population resistance. Afterwards, sluggish growth reflects the combined effects of a phased withdrawal of support measures, and lower potential due to scarring and other long-lasting effects of the virus on production processes. Importantly, this scenario assumes the continuation of a benign external financial environment, were reserve currency countries maintain expansionary fiscal and unconventional monetary policies.

13.   Scenario 2: Capital Outflows. The second scenario, more severe and less plausible, assumes a similar progression of the pandemic, adding an adverse external financial environment. This tries to capture risks stemming from the large stock of external liabilities, high dollarization, and sizable gross external financing needs. The materialization of this scenario could be triggered by an idiosyncratic shock, such as political turmoil in the region or concerns on the solvency of a systemic institution, or a global shock, such an increase in risk aversion and associated turmoil in global capital markets. Under this scenario, Georgia faces a sudden stop or an episode of capital outflows leading to currency depreciation, a spike in interest spreads, and a defensive hike in the policy rate, with adverse feedback effects on economic activity.

14.   The calibration of the scenarios was difficult due to the nature of the COVID crisis. The massive impact of the pandemic on economic activity and its unique characteristics entail a structural change. Thus, historic data are of limited value to simulate economic dynamics in the projections. Furthermore, since the COVID crisis is quickly evolving in real time, the relevance of the scenarios in the near term is subject to considerable uncertainty.

15.   Considering these factors, the severity of the FSAP scenarios was calibrated by combining statistical analysis with qualitative judgement. Since the baseline forecast was already significantly below the long-term average growth path, the FSAP applied a (smaller-than-usual) 1-1.5 standard deviations below the baseline over the first two-years. Consistent with this trajectory, a set of complementary macro and financial variables was simulated using time series models. Given the dissimilar effect of the COVID crisis across economic activities, the scenarios include sectoral projections of economic activity using time series models. Figure 3 presents the sectoral contribution to GDP growth over the stress evaluation horizons. In turn, sectoral projections were mapped into the 25 commercial credit types used by the NBG and used to simulate the impact of the pandemic on the activity of the corresponding borrowers. A summary of the resulting cumulative change over 2020–21 is provided in Table 4.
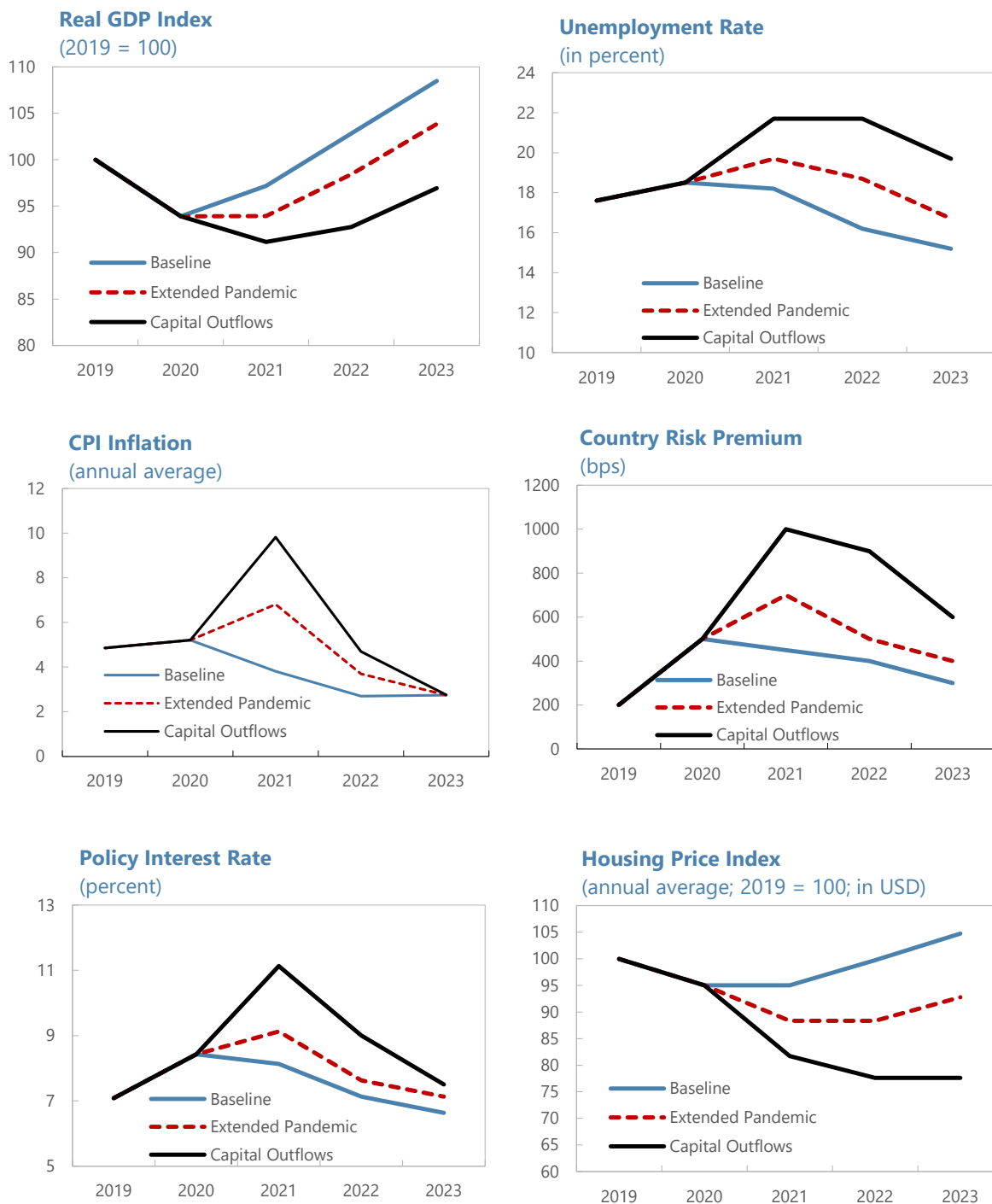
Table 3. Georgia: Evolution of Selected Variables under Stress Scenarios, 2019–23
(in percent, unless otherwise specified)

Real GDP Index (2019 = 100)	2019	2020	2021	2022	2023
Baseline	100	93.9	97.2	102.8	108.5
Scenario 1	100	93.9	93.9	98.4	103.8
Scenario 2	100	93.9	91.1	92.8	96.9

Country Risk Premium (bps)	2019	2020	2021	2022	2023
Baseline	200	500.0	450.0	400.0	300.0
Scenario 1	200	500.0	700.0	500.0	400.0
Scenario 2	200	500.0	1000.0	900.0	600.0

Potential GDP Index (2009=100)	2019	2020	2021	2022	2023
Baseline	100	97.0	101.6	105.6	109.8
Scenario 1	100	97.0	101.6	105.1	108.8
Scenario 2	100	97.0	101.6	104.6	107.2

Unemployment Rate (percent)	2019	2020	2021	2022	2023
Baseline	17.6	18.5	18.2	16.2	15.2
Scenario 1	17.6	18.5	19.7	18.7	16.7
Scenario 2	17.6	18.5	21.7	21.7	19.7

Nominal GDP Index (2019 = 100)	2019	2020	2021	2022	2023
Baseline	100	99.3	108.2	118.8	129.0
Scenario 1	100	99.3	105.6	114.8	124.7
Scenario 2	100	99.3	104.4	110.2	118.7

Policy Interest Rate (percent)	2019	2020	2021	2022	2023
Baseline	7.085	8.4	8.1	7.1	6.6
Scenario 1	7.085	8.4	9.1	7.6	7.1
Scenario 2	7.085	8.4	11.1	9.0	7.5

Average GEL/USD FX Rate Index	2019	2020	2021	2022	2023
Baseline	100	110.3	115.8	115.3	114.8
Scenario 1	100	110.3	126.8	126.3	125.8
Scenario 2	100	110.3	137.9	137.3	136.8

One year Government bond yield (flow)	2019	2020	2021	2022	2023
Baseline	7.3	8.6	8.2	7.2	6.7
Scenario 1	7.3	8.6	9.7	7.8	7.2
Scenario 2	7.3	8.6	12.5	10.2	8.0

Average Housing Price Index in USD	2019	2020	2021	2022	2023
Baseline	100	95.0	95.0	99.8	104.7
Scenario 1	100	95.0	88.4	88.4	92.8
Scenario 2	100	95.0	81.7	77.6	77.6

5 year Government bond yield (flow)	2019	2020	2021	2022	2023
Baseline	7.8	8.8	8.3	7.4	7.0
Scenario 1	7.8	8.8	10.0	8.0	7.5
Scenario 2	7.8	8.8	13.0	10.5	8.3

Source: NBG and Fund staff calculations.

Figure 2. Georgia: Evolution of Selected Macroeconomic Variables under Stress Scenarios

Real GDP Index
(2019 = 100)

Unemployment Rate
(in percent)

CPI Inflation
(annual average)

Country Risk Premium
(bps)

Policy Interest Rate
(percent)

Housing Price Index
(annual average; 2019 = 100; in USD)

Source: NBG and IMF Staff calculations.

Figure 3. Georgia: Sectoral Contribution to GDP Growth under Stress Scenarios
(in percent)
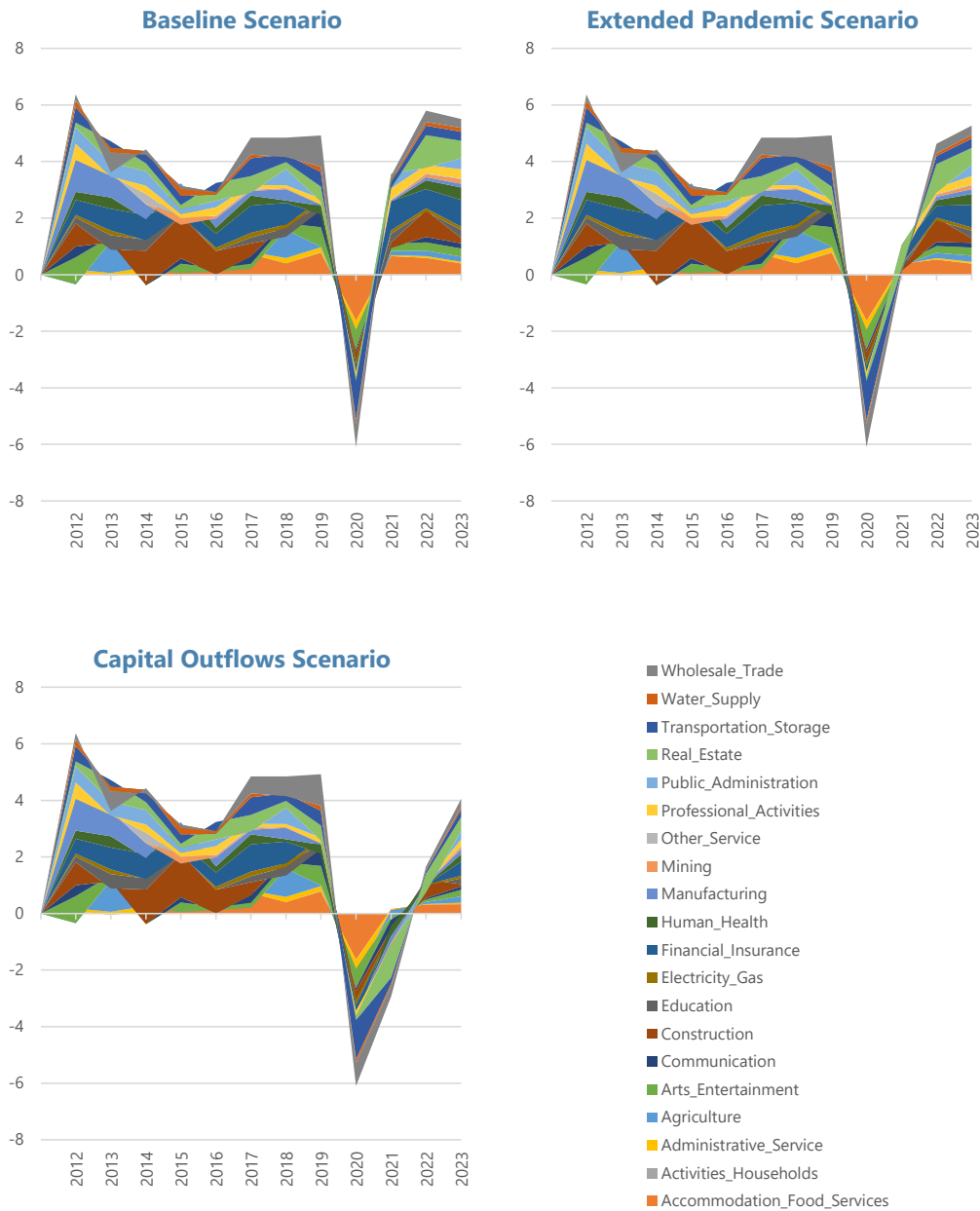
Sources: NBG and IMF Staff calculations.

Table 4. Georgia: Two-Year Cumulative Shocks to Commercial Credit Types, 2020–21
(in percent, unless otherwise specified)

Sector	Baseline	Second Wave	Sudden Stop	Diff. with Baseline (pp) Second Wave	Sudden Stop
Agro	3.4	-1.6	-5.8	-5.0	-9.2
Auto Dealers	-5.8	-6.6	-7.3	-0.8	-1.5
Construction Companies	5.5	4.2	3.0	-1.3	-2.5
Energy	-7.2	-9.8	-12.0	-2.6	-4.8
Financial Institutions	3.4	-1.6	-5.8	-5.0	-9.2
Health Care	2.2	-0.5	-2.8	-2.7	-5.0
Hotels, Tourism	-21.1	-25.7	-29.6	-4.6	-8.5
Industry	-0.6	-0.9	-1.2	-0.3	-0.6
Oil Importers and Retailers	-7.2	-9.8	-12.0	-2.6	-4.8
Other (Including Scrap-metal)	-5.8	-6.6	-7.3	-0.8	-1.5
Other Production	-0.6	-0.9	-1.2	-0.3	-0.6
Pharmacy	2.2	-0.5	-2.8	-2.7	-5.0
Production and Trade of Clothes, Shoes a	-0.6	-0.9	-1.2	-0.3	-0.6
Production and Trade of Construction Mat	5.5	4.2	3.0	-1.3	-2.5
Production and Trade of Durable Goods	-0.6	-0.9	-1.2	-0.3	-0.6
Production of Consumer Foods and Goods	-0.6	-0.9	-1.2	-0.3	-0.6
Real Estate Development	-1.3	-2.9	-4.3	-1.6	-3.0
Real Estate Management	-1.3	-2.9	-4.3	-1.6	-3.0
Restaurants	-21.1	-25.7	-29.6	-4.6	-8.5
Service	8.9	6.8	5.0	-2.1	-3.9
State	2.5	0.8	-0.8	-1.7	-3.3
Telecommunication	3.4	-1.6	-5.8	-5.0	-9.2
Trade (Other)	-5.8	-6.6	-7.3	-0.8	-1.5
Trade of Consumer Foods and Goods	-5.8	-6.6	-7.3	-0.8	-1.5

Source: NBG and Fund staff calculations.

C. Corporate Stress Tests

16.   Credit risk stemming from large corporate borrowers was assessed using company financial data provided by the lender banks. Since few firms are listed on the market, publicly available financial information on corporates is limited. To circumvent this, the FSAP focused on the largest corporate borrowers, using information provided by their lender banks. The sample targeted the ten largest borrowers of each bank, linking together all the related firms within same conglomerate groups.[3] For each of the borrower firms, their lender banks provided the more recent financial statements available. Firms with insignificant amounts of bank loans were not assessed individually.[4] In all, the sample under analysis comprised financial information for 114 firms on *a solo* basis and 49 consolidated financial statements (Table 5). In terms of size, the assets of the sampled firms added up to about 28 percent of GDP on a consolidated basis. The sample captured a few cases of large loans granted to natural persons, which were analyzed

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[3] Two small banks with predominant SME and micro lending were not included in the analysis.

[4] The financial health of firms with insignificant amounts of bank loans was assessed by proxying with the financial situation of their respective conglomerate groups.

separately. On average, total loans to the sampled borrowers represented about 16 percent of total bank loans and 72 percent of banks' capital.

	Table 5. Georgia: Sample of Corporations Included in the Stress Tests					
	Consolidated Statements			Unconsolidated Statements		
	Assets (Mil. GEL)	Assets (Pct. GDP)	Number	Assets (Mil. GEL)	Assets (Pct. GDP)	Number
B1	297	0.6	8	2,492	5.0	8
B2	5,059	10.1	8	3,286	6.6	21
B3	30	0.1	2	598	1.2	13
B4	2,551	5.1	4	1,748	3.5	7
B5	1,418	2.8	2	1,285	2.6	22
B6	1,526	3.1	5	1,839	3.7	6
B7	2,102	4.2	5	2,991	6.0	8
B8	5,424	10.9	14	4,493	9.0	23
B9	101	0.2	5	1,385	2.8	16
B10	-	-	0	12	0.0	1
B11	680	1.4	7	430	0.9	7
B12	-	-	-	-	-	-
B13	-	-	-	-	-	-
Total	19,188	38.5	60	20,561	41.2	132
Total Adjusted 1/	13,886	27.8	49	12,476	25.0	114

1/ Excluding common borrowers across banks.

Note: latest available unconsolidated financial statements (2018-19). Nominal GDP in 2020: 49,888 Mil GEL.

Source: NBG and Fund staff calculations.

17.   The financial health of firms was analyzed using a set of financial ratios under current and stressed conditions. The analysis focused on a set of customary financial ratios intended to measure firms' liquidity, profitability, leverage, and solvency. The ratios comprised: short-term debt to total debt, debt to EBITDA, return on assets, return on equity, quick ratio, current ratio, interest coverage ratio (ICR), debt to earnings before interests and taxes and adjusted by depreciation and amortization (DEBITDA), and debt to equity (DE).

18.   The results of the analysis need to be interpreted with caution due to some data limitations. The analysis was based on data provided by lender banks under a tight FSAP schedule. Ideally, the analysis of corporate borrowers should exploit consolidated financial data. Yet, consolidated financial statements at the conglomerate group level were not available in all cases. Each borrower firm had either a consolidated or an unconsolidated statement (not both) and it was not always possible to identify which companies were included in the consolidated statements of their immediate parents at the sub-group levels. Subject to these limitations, the

analysis exploited consolidated data to the largest extent possible, but in many cases the analysis of individual borrowers had to rely on unconsolidated data. It is also important to recognize that the analysis of corporate solvency based on financial data may provide a valuable first-pass assessment, but it is static and backward-looking, and therefore unable to account for company prospects and other qualitative information that could be exploited to enrich the analysis.

19. **Loan concentration and lending to related parties do not appear pervasive**. Banks' ten largest exposures add up to 11 percent of GDP and account for about two-thirds of regulatory capital, with some dispersion between banks (Table 6). Four small institutions are more exposed to concentration risk, with their large exposures in some cases surpassing 150 percent of Tier 1 capital. Large exposures vis-à-vis natural persons represent about ½ of a percent of GDP and 3½ percent of banks' Tier 1 capital. In turn, lending to related parties does not seem prevalent and it mainly comes from five banks. In all, only one small bank appears relatively more exposed to concentration risk and lending to related parties, including individuals, but the amounts are not of systemic concern.

Table 6. Georgia: Large Exposures by Lender Banks
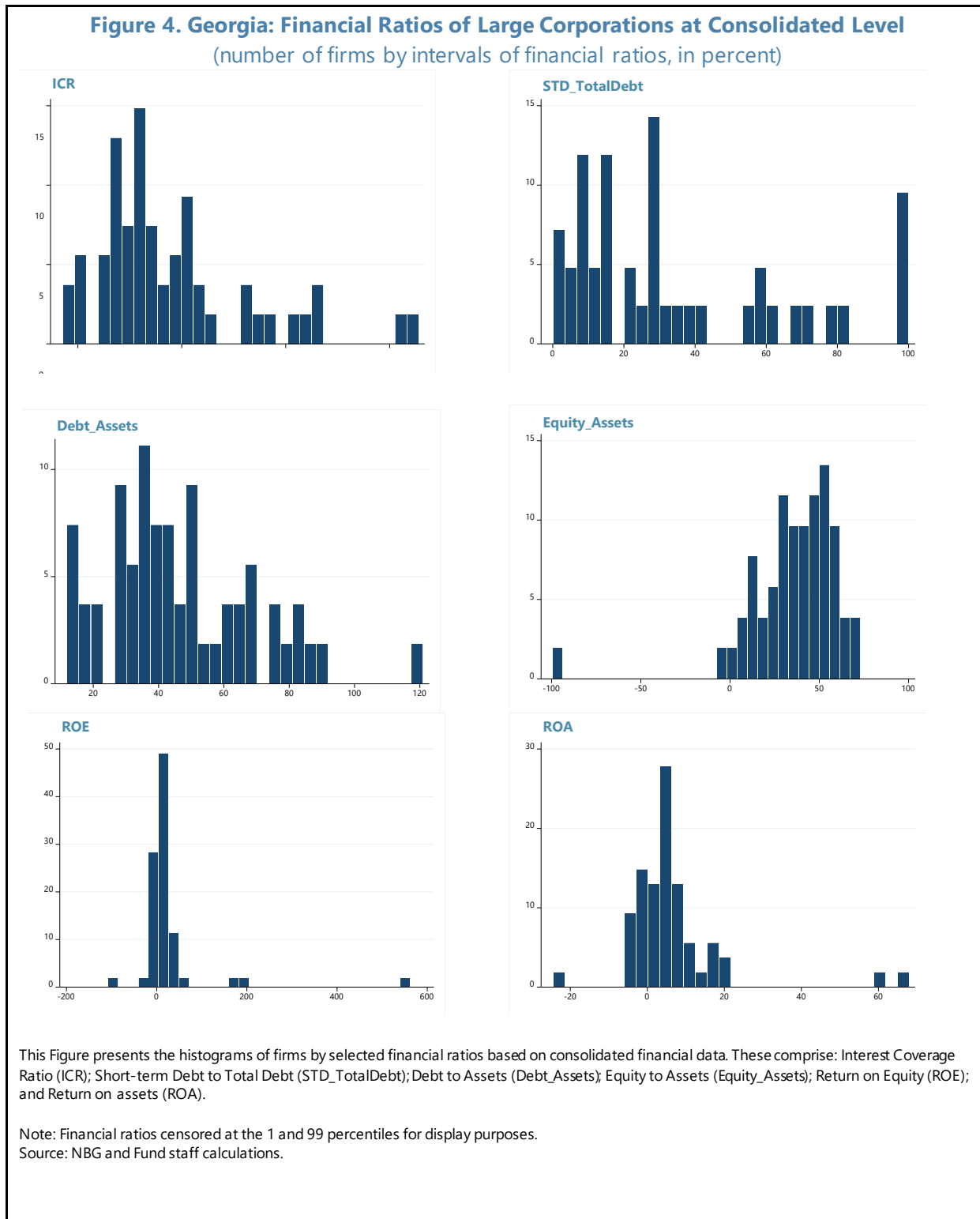(in percent of Tier 1 capital)

	Large Exposures			of which: vis-à-vis Related Parties		
	Companies	Individuals	Total	Companies	Individuals	Total
B1	85.9	4.3	90.3	-	-	-
B2	61.1	1.6	62.7	8.0	-	8.0
B3	114.0	3.7	117.7	15.8	1.7	17.5
B4	74.0	1.1	75.1	-	-	-
B5	145.5	-	145.5	-	-	-
B6	66.9	-	66.9	3.4	-	3.4
B7	98.1	0.6	98.7	-	-	-
B8	50.2	-	50.2	-	-	-
B9	11.2	0.6	11.8	10.6	0.6	11.3
B10	64.0	3.4	67.4	0.3	-	0.3
B11	80.2	4.0	84.3	-	-	-
B12	71.1	7.0	78.1	-	-	-
B13	9.7	-	9.7	-	-	-
Weighted Average	65.3	2.5	67.7	3.8	0.1	3.9

Note: Data for the top ten largest exposures of each bank.
Source NBG and IMF Staff calculations.

20. **Some firms displayed weak financial ratios at the consolidated level**. About 45 percent of the number of firms under analysis (representing 44 percent of the sampled assets), displayed at least one weak financial ratio, including negative equity, negative (or weak) profits, high leverage, and reliance on short-term debt at the consolidated level (Figure 4). Companies with ICR below 100 percent accounted for about 12 percent of the sampled assets, while companies with DEBITDA above 6 represented 24 percent of the sampled assets. Financial ratios

based on consolidated financial data were generally stronger than those stemming from financials on a *solo* basis. In fact, the distributions of the ratios had long tails, with some firms displaying weaknesses in more than one dimension.

Figure 4. Georgia: Financial Ratios of Large Corporations at Consolidated Level
(number of firms by intervals of financial ratios, in percent)

This Figure presents the histograms of firms by selected financial ratios based on consolidated financial data. These comprise: Interest Coverage Ratio (ICR); Short-term Debt to Total Debt (STD_TotalDebt); Debt to Assets (Debt_Assets); Equity to Assets (Equity_Assets); Return on Equity (ROE); and Return on assets (ROA).

Note: Financial ratios censored at the 1 and 99 percentiles for display purposes.
Source: NBG and Fund staff calculations.

Figure 4. Georgia: Financial Ratios of Large Corporations at Consolidated Level (concluded)
(number of firms by intervals of financial ratios, in percent)
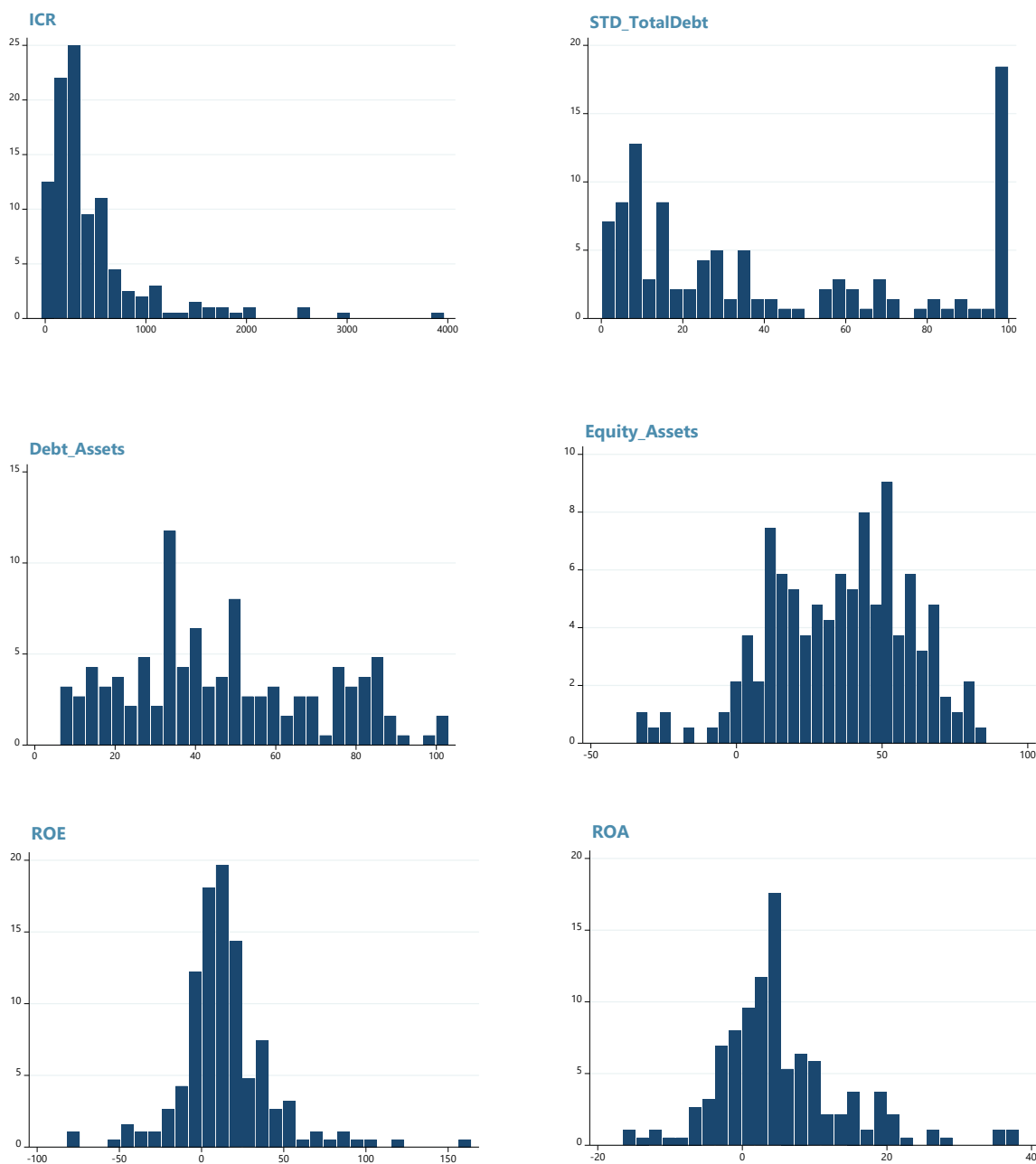
This Figure presents the histograms of firms by selected financial ratios based on unconsolidated financial data. These comprise: Interest Coverage Ratio (ICR); Short-term Debt to Total Debt (STD_TotalDebt); Debt to Assets (Debt_Assets); Equity to Assets (Equity_Assets); Return on Equity (ROE); and Return on assets (ROA).

Note: Financial ratios censored at the 5 and 95 percentiles for display purposes.
Source: NBG and Fund staff calculations.

21.   A few small banks appear exposed to large borrowers with weak financials either at the consolidated or *solo* basis. To provide a more comprehensive view of firms' financial

situation, a set of binary variables were used to identify companies with financial ratios breaching preestablished thresholds. Specifically, the binary variables identify firms with either negative equity to assets, negative ROA, short-term debt above 50 percent of long-term debt and ICR below 10 percent.[5] While arguably these thresholds are not very demanding, they are intended to isolate firms with very weak solvency, profitability, and/or ability to repay their debt. A composite indicator was assembled by adding up the binary variables. Thus, the composite ranges in the interval [0–4], with a larger number indicating a weaker financial situation. The analysis suggests that only a few small banks have more than 75 percent of their capital compromised by large exposures with weak financials (Table 7).

Table 7. Georgia: Large Exposures by Corporate Vulnerability Indicator

(in percent of lender banks' capital)

| Bank | Indicator of Corporate Vulnerability | | | | | | | Subtotal |
	0	1	2	3	4	n.a.	Total	1-4
B1	42.8	31.7	5.2	.	.	12.5	92.2	36.9
B2	35.8	10.3	3.0	3.0	.	13.1	65.2	16.3
B3	11.0	17.6	19.2	26.2	14.5	20.9	109.3	77.5
B4	38.0	29.3	6.0	.	.	1.0	74.3	35.3
B5	44.2	55.3	12.7	26.8	.	10.4	149.4	94.8
B6	14.0	33.5	7.7	.	.	14.4	69.6	41.2
B7	54.5	39.3	.	.	.	8.0	101.8	39.3
B8	36.3	8.9	.	.	.	7.8	52.9	8.9
B9	4.5	5.9	.	.	.	0.4	10.8	5.9
B10	31.8	17.0	7.1	.	.	13.7	69.6	24.1
B11	29.4	15.9	8.4	3.6	10.7	21.3	89.2	38.6
B12	29.4	18.6	6.6	10.9	.	14.9	80.3	36.1
B13	8.8	.	.	.	.	0.1	8.9	0.0

The indicator provides a broad assessment of the extent of financial weaknesses in large non-financial corporations. It ranges between 0-4, with a larger number indicating more severe corporate financial weakness. Specifically, the indicator tracks four financial ratios comprising: equity to assets, return on assets, the share of short-term debt in total debt, and the interest coverage ratio. The indicator counts the number of ratios that breach the following predetermined thresholds: negative equity to assets; negative ROA; short-term debt above 50 percent of total debt; ICR below 10 percent.

Source: NBG and Fund staff calculations.

22.   Large exposures are generally well collateralized, mostly with real estate and third-party guarantees. Real estate collateral represents almost 56 percent of total collateral value on

[5] A higher ratio of short-term debt to total debt provides a broad indication of corporate exposure to rollover risk and to interest rate risk. However, there are companies that operate with high ratios of short-term debt in their normal course of business.

the large exposures assessed, and third-part guarantees add-up an additional 40 percent. Other collateral types include bank deposits, gold, and state guarantees. The ratio of collateral to total exposures is higher for FX-denominated loans, but it varies widely across banks and individual exposures. The median of the ratio of real estate guarantees to loans stands at 119 percent for FX-denominated loans and 100 percent for lari exposures, while the median coverage of third-party guarantees stands

Distribution of Collateral to Loan Values
(in percent)

Censored at 200 percent for display purposes.
Source: NBG and Fund staff estimates.

at 14 percent for FX loans and is negligible for lari loans. The coverage ratio provided by real estate assets provides some comfort, since there are no evident signs of overpricing in the housing market, albeit the effect of the pandemic on commercial real estate prices, including in the medium term, is more uncertain.
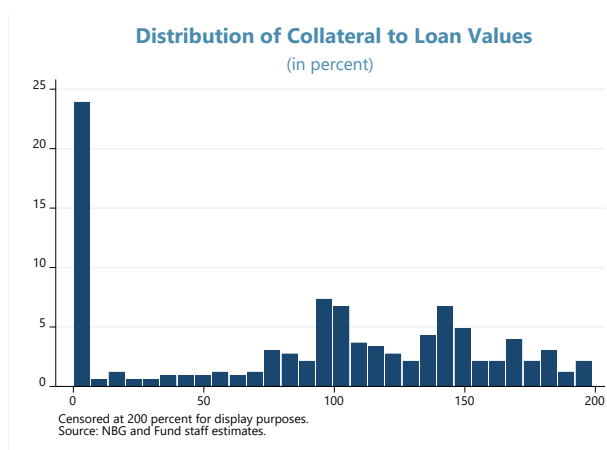
23.   Loan loss provisioning on large exposures stand at about three times expected losses, according to bank PD and LGD estimates. The NBG requires banks to provision for loan losses according to its own methodology based on borrowers' financial conditions. As a result, current loan provisioning on large exposures is higher than the provisioning implied by bank PD and LGD estimates. However, deeper analysis is needed to assess the adequacy of bank estimates, as banks provided very dissimilar estimations of PDs of common borrowers. Also, the distribution of banks' PD estimates appeared unrelated to the exposure of the firms to COVID-sensitive activities.[6] In preparation for the adoption

Bank PD Estimates, in percent
(By Company Sensitivity to COVID)

Note: PD estimates censored at 30 percent for display purposes

of IFRS, further discussion with banks in the context of the supervisory process would become more critical.

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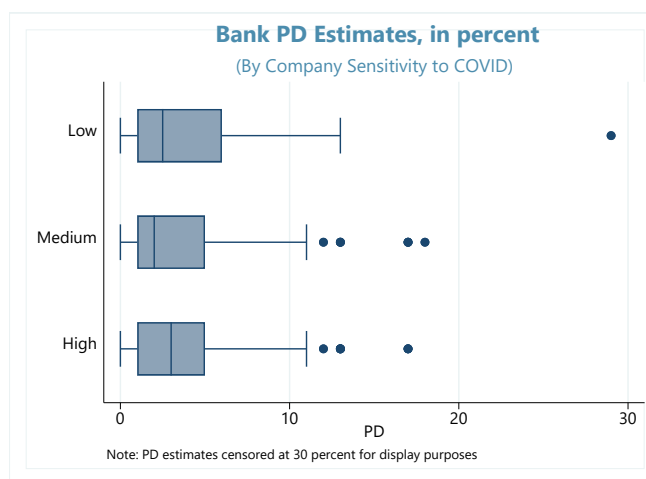
[6] Low COVID sensitivity: Telecommunication, State, Production of Consumer Foods and Goods, Pharmacy, Health Care, Agro. Medium COVID sensitivity: Trade of Consumer Foods and Goods, Trade (Other), Service, Production and Trade of Construction Mat, Production and Trade of Clothes, Shoes a, Other Production, Other (Including Scrap-metal), Loans to Oil Importers and Retailers, Industry. Financial Institutions, Energy, and Construction Companies. High COVID sensitivity: Restaurants, Real Estate Management, Production and Trade of Durable Goods, Hotels, Tourism, Construction Development, Land Development, Auto Dealers.

24. **The FSAP team carried out an estimation of loan loss provisions on large exposures using companies' financial ratios under the Baseline and stressed scenarios**.[7] For each borrower firm, net loan exposures were computed by subtracting posted collateral from the gross exposures, including loan amounts and off-balance items such as open credit lines. Collateral values were adjusted depending on their type, assuming a haircut of 30 percent to real estate collateral and 10 percent to third party guarantees, except for guarantees from the government, which were taken at full value. The haircut to real estate collateral values was imposed, as there are no apparent signs of fundamental misalignments in property prices. Cash and gold collateral were taken at full value. The resulting net exposure values were taken as the basis for computing the benchmark loan loss provisions. In the case of non-financial companies, the benchmarks were estimated by comparing their ICR, and DEBITDA with the values displayed in Table 8.[8] In addition, benchmark provisions for companies with negative equity to assets were set at 100 percent. Financial companies were assessed by their capital to asset ratios, since the ICR and DEBITDA were not deemed adequate to reflect their financial health (given their typical funding and cost structures). In general, banks' large exposures vis-à-vis corporations with weak ICR or DEBITDA appear moderate relative to Tier 1 capital, except for 3 small banks (Figure 5).

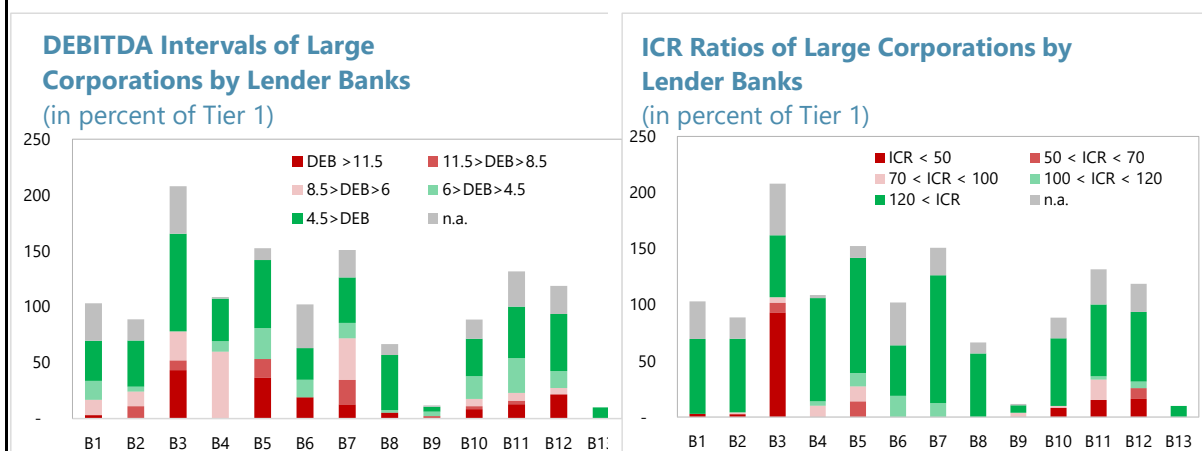| Table 8. Georgia: Required Provisions on Large Exposures, by Intervals of ICR and DEBITDA (in percent)				
Debt to EBITDA	Implied DSTI	ICR	Equity to Assets 1/	Loan Loss Provisions 2/
DEBITDA < 4.5	DSTI < 52	120 < ICR	EA > 14	2
4.5 < DEBITDA < 6.0	52 < DSTI < 69	100 < ICR < 120	8 < EA < 14	10
6.0 < DEBITDA < 8.5	69 < DSTI < 97	70 < ICR < 100	-	30
8.5 < DEBITDA < 11.5	97 < DSTI < 132	50 < ICR < 70	-	50
11.5 < DEBITDA	132 < DSTI	ICR < 50	EA < 8	100

1/ Applied to financial companies only.
2/ In addition, loan loss provisions on companies with negative equity to assets set to 100 percent.

Note: Implied DSTI based on the median effective interest rate paid by large corporations (7.7 percent) and assuming a fifteen year maturity.

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[7] The corporate stress tests implemented in the FSAP are solely based on a set of company financial ratios, and therefore fail to consider relevant factors such as shareholder support, company-specific projections and other soft information. These are crucial constituents of corporate borrower analysis which are considered by the NBG during the off-site and on-site work and used to assess the loan loss provisions and capital on these exposures.

[8] The reference ICR and DEBITDA ratios were applied evenly to all types of non-financial companies. To the extent that the pandemic is a transitory shock, companies operating in hard-hit sectors (such as tourism) could be treated in a more lenient way. In that spirit, the NBG has implemented temporary exemptions to companies operating in the hotels, energy and real estate management.

Figure 5. Georgia: Banks' ICD and DEBITDA to Tier 1 Capital
(in percent of Tier 1)

DEBITDA Intervals of Large Corporations by Lender Banks
(in percent of Tier 1)

Legend: DEB >11.5 | 11.5>DEB>8.5 | 8.5>DEB>6 | 6>DEB>4.5 | 4.5>DEB | n.a.

ICR Ratios of Large Corporations by Lender Banks
(in percent of Tier 1)

Legend: ICR < 50 | 50 < ICR < 70 | 70 < ICR < 100 | 100 < ICR < 120 | 120 < ICR | n.a.

Source: NBG and Fund staff calculations.

25.   The corporate stress tests pointed to some increases in the loan loss provisioning on large exposures in the projected scenarios. The corporate stress tests were based on the same set of bank stress test scenarios, augmented with the actual COVID shock in 2020 since the corporate financial data were pre-pandemic. Corporate borrowers were classified according to their main economic activity, and the projected evolution of the corresponding sectors during 2020–23 was used to come up with their adjusted ICR and EBITDA ratios. In turn, shocks to interest rates and to the lari/USD exchange rate in line with each of the stress test scenarios were used to reassess the impact on debt servicing costs. In all, the additional provisioning stands at about 2 percent of the Tier 1 under the Baseline stress scenario (Table 9). The additional provisions appear manageable, except for 2 small banks. In turn, the stressed scenarios produced benchmark loan loss provisions of about 6 percent of the gross large exposures in the most severe *Capital Outflows* scenario. The additional provisions relative to the gross large exposures amounted to around 2 percentage points above the current level in the two distressed scenarios. More conservative robustness checks were carried out by shortening the stress horizon to 2020–21 (i.e., censoring the economic rebound of the outer years of the stress scenarios), with similar qualitative results.[9] The lack of sensitivity to the stress scenarios suggests that most of the reference financial ratios of the weaker companies do not migrate to lower bucket intervals.

26.   The NBG has a comprehensive monitoring of the large corporate borrowers, but the financial data compiled by banks can be improved in some areas. The NBG tracks the large borrowers closely and uses both financial data and soft information to come with a comprehensive assessment of the adequacy of loan loss provisions on large exposures. Banks are also required by regulation to maintain up to date financial information on their 100 largest

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[9] This is equivalent to assuming a no-recovery, L-shaped stress test scenario, which is similar to the projection assumptions used in the NBG's supervisory stress test framework.

debtors. This is a somewhat challenging task since most firms are not listed. While the information reported by banks in the context of the FSAP had generally good coverage, some data inconsistencies suggest that the processes used by banks to collect, clean, and systematize the data could be improved. There is also room to improve the data available to determine the extent of exposure to FX-risk of the large corporate borrowers, such as their FX revenues and expenses, and FX-denominated debt issued outside the domestic banking system. This can be done through the lender banks, and by sharing non-sensitive firm data on exports and imports between government agencies. The forthcoming credit registry and related reporting forms would also contribute to further strengthening data availability.

	Table 9. Georgia: Additional and Total Provisions on Large Exposures						
	(in percent)						
	Additional Provisions, in percent of Tier 1:			Total Provisions, in percent of Exposures:			
		Extended	Capital			Extended	Capital
	Baseline	Pandemic	Outflows	Current	Baseline	Pandemic	Outflows
B1	1.2	1.3	1.3	3.5	4.8	4.9	5.0
B2	1.8	1.9	1.9	2.5	4.5	4.6	4.6
B3	2.1	2.3	2.6	3.8	5.8	6.1	6.3
B4	2.3	2.3	2.3	4.6	6.5	6.5	6.5
B5	2.4	2.8	2.8	4.4	6.8	7.2	7.2
B6	0.1	0.1	0.1	2.0	2.2	2.2	2.2
B7	5.9	6.4	6.8	10.4	13.2	13.4	13.6
B8	0.7	0.7	0.7	2.0	2.5	2.5	2.5
B9	1.0	1.2	1.4	6.5	7.4	7.5	7.7
B10	7.9	11.6	12.0	2.5	7.8	10.2	10.5
B11	17.7	19.2	19.7	2.0	13.6	14.6	15.0
B12	0.0	0.0	0.0	9.9	10.0	10.0	10.0
B13	-	-	-	8.4	8.4	8.4	8.4
Total	1.9	2.1	2.2	3.8	5.8	6.0	6.1

This table presents the estimated shortfall in provisions on large exposures under the baseline and distressed scenarios, and the impact on Tier 1 Capital Ratios.

The provision shortfall is the difference between current provisions and provisions estimated by reclassifying the loans according to stressed ICRs, Debt-to-Earnings and Equity-to-Assets under alternative scenarios. In addition, companies with negative equity were assigned 100 percent provisioning. Financial ratios of companies without financial statements were estimated by taking the weighted averages of the all the companies within the same conglomerate group.

Source: NBG and Fund staff calculations.

27.   Separately, the planned implementation of single-party concentration limits should have no material impact on the supply of bank credit. The authorities are concerned on the potential impact of enforcing the new large exposure regulation, which sets single party concentration limits of 25 percent of Tier 1 capital, in line with Basel standards. The dependence of Georgian firms on bank lending is deemed high, given the shallow capital and money markets and the cost of issuing debt in foreign jurisdictions. While only a few firms and banks would be immediately affected if the limit is enforced, there are still questions on its potential longer-term

impact on the ability of banks to provide financing to large projects. Loan syndication offers a limited alternative given the high concentration of the Georgian banking system. To assess the impact, the mission carried out a forward-looking hypothetical increase in the size of large exposures from 20 to 60 percent from current levels (Table 10). The results suggest that the limit would bind for about 30 percent of the firms under analysis, but the resulting shortage of credit induced by the regulation appears immaterial from the macro perspective, with a maximum of around 2 percent of GDP. Thus, enforcing the single party limit should not induce a sizable constraint on the capacity of banks to provide credit to the economy.

Table 10. Georgia: Estimated Impact of Large Exposure Limits on Bank Loan Supply
(in percent)

	Number of Companies if Loan Demand Increases by:				Loan Shortage, in percent of GDP if Loan Demand Increases by:			
	Actual	20	40	60	Actual	20	40	60
B1	0	0	1	2	0.0	0.0	0.2	0.4
B2	1	1	1	1	0.1	0.3	0.5	0.7
B3	0	0	2	2	0.0	0.0	0.0	0.0
B4	0	1	2	4	0.0	0.0	0.0	0.1
B5	0	0	0	0	0.0	0.0	0.0	0.0
B6	0	0	0	0	0.0	0.0	0.0	0.0
B7	4	5	5	8	0.1	0.2	0.3	0.5
B8	1	1	2	4	0.0	0.0	0.0	0.1
B9	0	1	1	1	0.0	0.0	0.0	0.0
B10	2	3	6	8	0.0	0.0	0.1	0.1
B11	0	1	1	3	0.0	0.0	0.0	0.0
B12	0	0	0	0	0.0	0.0	0.0	0.0
B13	0	0	0	0	0.0	0.0	0.0	0.0
Total		8	13	21	33	0.2	0.6	1.2	1.9

This table presents an estimation of the number of firms that would hit single exposure concentration limits with their lender banks, if their loan demand increases by 20-60 percent above their current loan volumes. It also presents the estimated loan shortage, measure by the difference between the requested loan amount and the regulatory limit, expressed in percent of GDP.

Source: NBG and Fund staff calculations.

D. Bank Solvency Analysis

28.   The assessment of bank solvency was based on multiple approaches on account of the uncertain effects of the pandemic on credit losses and the countervailing policy responses. The atypical nature of the pandemic and its asymmetric effects on economic activity, posed some challenges to the bank solvency analysis. First, the nature of the COVID shock weakened the usefulness of historic data to assess its impact on credit losses. Second, government support measures reduced vulnerabilities in the corporate and household sectors,

concealing the impact of the pandemic on their underlying financial situation. Bank behavioral responses to their environment, notably including the loan moratoria and subsequent restructuring, also masked the underlying effects of the COVID crisis on the performance of credit portfolios. On account of these effects, the FSAP leaned towards conservative estimations of bank losses and profits in the projected scenarios. Risk parameters were estimated using pre-COVID data and, whenever possible, uncertainty around the point estimates was included in the calculations. In addition, sensitivity analyses were used to inform the bank solvency assessment. This section describes the main models applied and discusses their results.

Credit Value at Risk

29.   A Credit Value at Risk model (C-VaR) was used to provide an initial evaluation of credit risk and to assess the adequacy of existing loan loss provisions and capital. The C-VaR calculations were carried out for each bank, using a granular partition of credit portfolios by main credit types, economic activity of the borrowers, and currency. Individual credit operations were grouped in four segments: corporate, SME, Retail, and Large Exposures. In turn, the corporate and SME loans were split in 25 categories, following NBG practice to track the economic activity of the borrower. Retail loans were split 7 categories, notably including housing mortgages and consumer loans. As for large exposures, the inputs were taken from the corporate stress test, including posted collateral, the main economic activity of the corporation and bank estimates of PDs and LGDs. In all, the model encompassed 39 credit types in two currencies, resulting in 78 categories.

30.   Credit risk parameters for the granular exposures were estimated from historic data and projected using satellite econometric models. The estimation of PDs for the granular exposures exploited historic data on nonperforming loan flows and stocks at the bank-level during 2012–20. Longer time series to cover at least one entire economic cycle, were not available. The estimated PDs ranged between 3–7½ percent (Box 1). In line with expectations, the lower PDs were obtained for mortgages. However, there were no significant differences between mortgages in FX and lari, a result probably due to tighter lending standards applied to FX-denominated mortgages. Higher PDs were obtained for FX-denominated corporate loans and lari loans to SMEs, with relatively large standard deviations. PDs were projected over each scenario using satellite econometric models (Box 2). Credit exposures were split by currency and in five segments deemed material for the Georgian banking system. These comprised Corporate loans, SME loans, and Retail—the later further divided in Consumer loans and Mortgages. As for LGDs, calibration was based on the market value of collateral posted, applying a 30 percent haircut. Overcollateralized exposures were subject to an LGD floor of 10 percent to err on the conservative side. Uncollateralized transactions were assigned a flat 45 percent LGD, which was deemed conservative as the Georgian legal framework allows full recourse against defaulting borrowers.

Box 1. Estimation of PDs by Credit Types

The FSAP team exploited bank-level information on nonperforming loan flows and stocks at the yearly frequency during 2012–20, to estimate Probabilities of Default (PDs) over one year by main credit types. The estimation was carried out for the granular credit portfolios. As for the large exposures, PDs and LGDs were taken from bank estimations.

The partition of the granular portfolios tried to capture the most important risk exposures. Given the relevance of FX-induced credit risk, loans were split by currency, grouping Fx loans in a single category as cross-currency risk was deemed of secondary importance. Each of these classes was in turn divided into commercial credit, credit to SMEs, and retail, with the later further divided into mortgages, consumer loans and other retail loans.

Loan default was proxied by the (gross) flow of loans downgraded to NPLs in each period. The definition of NPLs followed the NBG's risk classification, comprising loans in categories Substandard, Doubtful, or Loss. PDs for loans type i in period t were computed as follows:

$$PD_{i,t} = \frac{New\ NPL_{i,t}}{Performing\ Loans_{i,t-1}} = \frac{NPL_{i,t} - NPL_{i,t-1} + Net\ Write\ Offs_{i,t}}{Loans_{i,t-1} - NPL_{i,t-1}}$$

The mean estimated PDs ranged between 3–7½ percent. Across credit types, the lower PDs were obtained for mortgages, without significant differences between mortgages in FX and lari, a result probably attributable to the tighter lending standards applied to FX-denominated mortgages. In turn, higher PDs were obtained for FX-denominated corporate loans and lari loans to SMEs, with substantial standard deviations. The evolution of the PDs over time shows a rapid increase in 2016–17 mirroring the economic slowdown. More recently, low PD levels in 2019 were followed by a sharp increase in 2020 likely reflecting the pandemic.

PDs by Loan Types and Currency, 2012-20
(in percent)

Loan Type	Mean	St. Dv.
GEL Loans		
Consumer	0.046	0.049
Corporate	0.050	0.085
Mortgages	0.029	0.071
Retail	0.043	0.047
SME	0.069	0.120
FX Loans		
Consumer	0.041	0.058
Corporate	0.074	0.164
Mortgages	0.030	0.040
Retail	0.044	0.116
SME	0.046	0.067

Source: NBG and Fund staff calculations.

Distribution of PDs 2012-20
GEL Loans

Distribution of PDs 2012-20
FX Loans
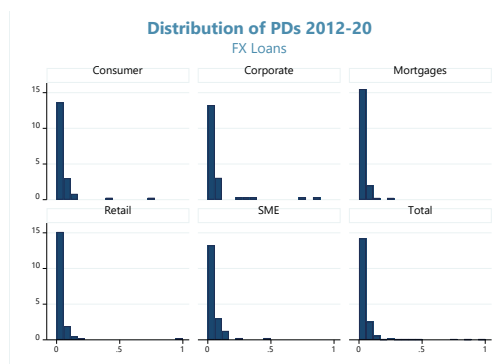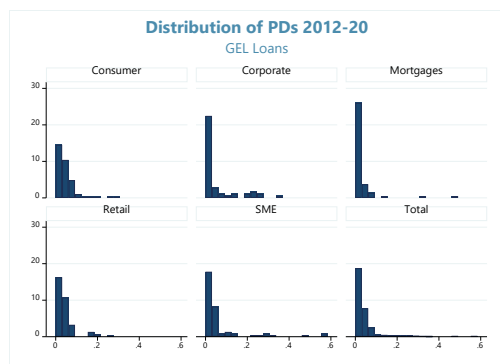
Box 2. Mapping Macroeconomic Conditions to PDs

The projection of expected credit losses over the *Baseline* and stressed scenarios is carried out with a satellite model mapping the impact of selected macroeconomic variables on the (logit transformation of) PDs. The model exploited panel data econometrics, were the panels are given by the combination of credit types and banks. Separate regressions were carried out for lari and FX loans. The sample spanned 2012–20 at the yearly frequency. Unfortunately, longer time series were not available, which limits somehow the analysis as the data does not cover a previous economic downturn.

Panel Regressions of PDs on Macro Factors, 2012-20
Dependent Variable: Logit of PDs

	FX Loans	GEL Loans
Lagged Logit of PD	0.1218	0.1251
	[0.080]	[0.074]
Unemployment Rate	0.3524	0.2945
	[0.082]	[0.057]
Lagged GDP Growth	-0.1654	-0.1042
	[0.176]	[0.078]
Lagged FX Rate Depreciation	0.0266	
	[0.013]	
Dummy Mortgage	-0.2754	-0.6379
	[0.215]	[0.273]
Constant	-7.6648	-6.4784
	[1.307]	[0.808]
Observations	167	235
Number of Panels	49	59
R-Squared	0.17	0.19

Robust standard errors in square brackets.
This table presents the results of panel regressions of (the logit of) PDs on their lagged values and a set of macroeconomic factors. The panel dimension is represented by 7 credit types and 15 banks. The sample covers 2012-20 at the yearly frequency.

The selected specification included the lagged value of the PDs, the unemployment rate, and lagged GDP growth. The regressions of PDs on FX loans also included the lagged value of the average FX depreciation. Exploratory specifications included a full set of dummy variables for each one of the five credit types (i.e., corporate loans, SME loans, mortgages, consumer loans, and overall retail loans) but the associated coefficients were not statistically different from each other, except for mortgages.

In all, the lari regression encompasses 167 observations and the FX regression 235, with 49 and 59 panels, respectively. The coefficients of the lagged dependent variable are around 0.12 in both regressions, suggesting that the evolution of the PDs has relatively low inertia. In the projections of the stressed scenarios, this result allows PDs to respond quickly to the stressed macro factors. All the estimated coefficients have the expected signs and are statistically significant, except for GDP growth, were the point estimates have relatively large standard errors. This result maybe driven by the inclusion of the unemployment rate, which was robust in alternative specifications. Not surprisingly, the dummy for mortgages has a negative coefficient, reflecting the lower PDs on mortgage loans, particularly those denominated in lari. The overall goodness of fit of the regressions is not large, as typical of panel estimations.

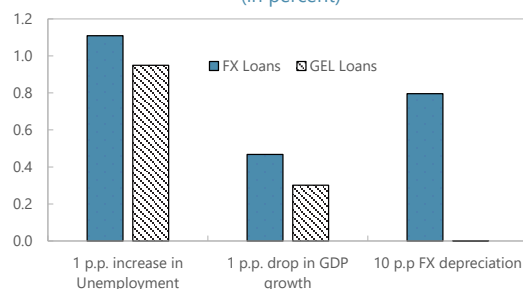The estimated coefficients indicate that PDs are particularly sensitive to unemployment and, in the case of FX-denominated loans, also to FX depreciation. Evaluating the regressions at the average values of the explanatory variables for reference, a 1 percentage point increase in the unemployment rate would lead to about 1 percentage point increase in average PDs over one year. In turn, 10 percentage point increase in FX depreciation would lead to about 0.8 percentage point increase in average PDs over one year. Thus, this model generates sharp increases in PDs over the distressed scenarios.

Estimated Impact of Macro Factors on Average PDs over One Year
(in percent)

31. **The results of the C-VaR indicate that the credit losses stemming from the pandemic could be very large**. Under the *Baseline*, the expected credit losses in 2021 stand at about 2¾ percent of the gross exposures, which is roughly comparable with pre-emptive loan loss

32. provisions created in March 2020 (Table 11). In turn, the expected credit losses under the distressed scenarios range from about 4 percent of the gross exposures in the *Extended Pandemic* to 6¾ percent under the *Capital Outflows* scenario. Going to the tails of the distribution, the credit losses at the 99 percentile level range from about 7 percent of the performing loans (i.e., gross exposures) in the *Baseline* to as high as 17 percent of the performing loans under the *Extended Pandemic*. Accordingly, in the most adverse event, credit losses would remain below 17 percent with 99 percent confidence. To appreciate the massive size of the estimated losses it is useful to compare them with the average loan write-offs observed during 2012–2020. The historic cost of credit

Average Yearly Write-Offs, 2012-20
(in percent of loans in category)

Segments	Currency	
	FX	GEL
Consumer	0.926771	2.525366
Corporate	0.786019	0.833491
Mortgages	0.759927	0.098468
Retail	1.137602	2.702682
SME	2.065128	1.059528
Unweighted Average	1.136996	1.520218
Weighted Average	1.169071	1.92568

Source: NBG and Fund staff calculations.

in Georgia adjusted for the size of the credit portfolios as of end-2020 would lead to expected yearly losses of about 688 mil. lari in normal times. Thus, the expected losses under the baseline would be 40 percent larger than usual in the *Baseline*, two times larger than usual in the Extended Pandemic, and up to 3½ higher than usual in the Capital Outflows scenario. A cursory comparison of the estimated losses with system-wide loan-loss provisions and capital, further assuming 30 percent loss on existing NPLs and ignoring bank profits, suggest that aggregate CAR would fall from 17.7 percent to 16.6 percent under the Baseline, and to 10.8 percent in the most extreme scenario. In turn, Tier 1 would fall from 12.7 to 5.3 percent. Thus, the system appears able to endure the stress scenarios even under very conservative assumptions.

33. **Current loan loss provisions and capital are commensurate with the C-VaR results**. A more detailed bank-level analysis confirms that current loan loss provisions and capital buffers are broadly in line with the CVaR estimates (Table 12). More specifically, the ratio of loan loss provisions to expected CVaR losses remains above 100 percent across the three scenarios, except for 5 banks. But the shortage of provisions is severe only in the case of two small banks. Similarly, capital cushions are also broadly in line with the estimated losses at the 99 percentile except for the same 2 banks. In all, the results of the CVaR indicate that the system is well prepared to absorb the credit losses stemming from the stress scenarios without imperiling financial stability.

34. **Current risk-weights on loans appear broadly consistent with the results of the C-VaR under the *Baseline* and *Extended Pandemic* scenarios**. Estimated risk-weights on credit portfolios based on the CVaR under the *Baseline* scenario averaged 0.9 for the entire system, compared with a current risk-weight density or around 1.0. In turn, the calculated risk-weights under the Extended Pandemic averaged 1.2, with 8 banks falling somewhat sort of the reference.

A stricter comparison using the credit risk parameters of the *Capital Outflows* scenario produced average risk weights of 2.0. In all, current risk weights are deemed broadly adequate under the most plausible scenarios.

Table 11. Georgia: Summary Results of One-Year 99 percent C-VaR
(in percent, unless indicated)

	2020	Credit VaR Results, 2021		
		Baseline	Ext. Pandemic	Cap. Outflows
Summary Results, in percent				
Expected Loss to Gross Exposure	2.3	2.7	4.1	6.7
VaR to Gross Exposure	6.8	7.0	10.4	17.0
Tier 1 Ratio	12.7	11.5	9.1	5.3
CAR	17.5	16.6	14.4	10.8
Selected Parameters				
Performing Exposures (Mil. GEL)	35,016	35,012	35,012	35,012
Number of Loans (Million)	3.2	3.2	3.2	3.2
Number of Banks	15	15	15	15
Number of Credit Types	78	78	78	78
Number of Currencies	2	2	2	2
Probability of Default (percent)				
Median	4.7	11.1	11.1	11.1
Mean	5.5	17.3	17.3	17.3
Recovery Rates (percent)				
Median	51.9	55.0	55.0	55.0
Mean	60.3	65.1	65.1	65.1
Memo Items, in Mil. GEL				
VaR (Mil. GEL)		2,464.3	3,626.6	5,935.5
Expected Loss (Mil. GEL)		959.0	1,424.5	2,346.8
Total Gross Loans	38,234.0	38,234.0	38,234.0	38,234.0
Loan loss reserves	2,434.0	2,434.0	2,434.0	2,434.0
Total Assets	57,051.0	57,051.0	57,051.0	57,051.0
Tier I	6,059.0	6,059.0	6,059.0	6,059.0
Eligible Total Capital	8,320.0	8,320.0	8,320.0	8,320.0
Risk-Weighted Assets	47,539.7	47,539.7	47,539.7	47,539.7
o/w on Credit Portfolios	39,745.9	39,745.9	39,745.9	39,745.9

This table presents summary results of a one-year credit VaR at the 99 percent level.
Source: NBG and IMF Staff calculations.

Table 12. Georgia: Ratios of Existing Loan Loss Provisions and Capital to C-VaR Results
(in percent)

	Actual	Baseline	Extended Pandemic	Capital Outflows	Actual	Baseline	Extended Pandemic	Capital Outflows
B1	100.0	391.5	256.2	149.3	100.0	621.0	305.9	248.4
B2	100.0	243.3	158.3	93.1	100.0	350.5	228.2	134.4
B3	100.0	336.0	309.2	265.6	100.0	265.6	248.9	219.8
B4	100.0	64.8	43.9	28.3	100.0	128.2	86.9	56.1
B5	100.0	107.7	73.8	48.7	100.0	181.4	124.3	82.2
B6	100.0	482.3	343.1	209.7	100.0	484.4	357.0	223.9
B7	100.0	596.6	461.8	285.1	100.0	779.8	704.3	541.1
B8	100.0	291.9	208.2	135.3	100.0	295.2	212.9	139.3
B9	100.0	347.4	239.4	145.3	100.0	601.0	453.1	294.1
B10	100.0	368.9	223.3	116.4	100.0	508.9	309.9	162.3
B11	100.0	384.6	283.9	201.1	100.0	5985.6	4843.8	3658.6
B12	100.0	252.4	166.9	100.0	100.0	340.2	225.2	134.9
B13	100.0	261.5	170.2	99.3	100.0	301.7	197.1	115.3
B14	100.0	327.1	243.4	160.0	100.0	296.4	232.4	159.1
B15	100.0	591.7	476.8	354.2	100.0	2601.4	2242.8	1785.3
Total	100.0	253.8	170.9	103.7	100.0	337.6	228.0	140.2

This table presents the ratios of existing loan loss provisions and capital buffers to the expected and tail losses of a one-year C-VaR at the 99 percent level.

Source: NBG and Fund staff estimates.

Scenario Analysis

35.   The solvency stress tests are based on a model that integrates credit and market risks. The model was developed by a Fund Technical Assistance carried out during 2019–20 and is currently used by the NBG as part of their regular toolkit. The model is based on a quasi-static balance sheet. In the FSAP scenarios, credit growth is assumed to follow GDP growth, adjusted by flows of loan loss provisions and valuation changes on the stock of FX-denominated loans due to changes in the Exchange rate. Credit stocks and flows follow accounting relationships, assuming fixed write-off and cure rates for NPLs. The loan book is partitioned in two borrower types: corporations and households, and each class is in turn broken down by domestic and FX to facilitate the analysis of FX-induced credit risk. Exchange rate effects are also incorporated in the projection of other bank assets and liabilities, including deposits. The model simulates the evolution of net interest income by projecting interest-sensitive assets and liabilities and their respective interest rates under each stress scenario. In addition, interest revenues from loans do

not include accrued interests on non-performing loans. Sovereign risk is incorporated by measuring the impact of sovereign spreads on the net-present value of the positions, and direct FX risk comes from the revaluation of FX assets and liabilities in response to changes in the Exchange rate. The solvency analysis, however, is not integrated with the liquidity stress tests, which is a caveat of the exercises.

36.   The model was run in parallel by the NBG and FSAP teams, with alternative credit loss modelling approaches to accommodate uncertainty on the effects of the pandemic. Specifically, the NBG modeled expected credit losses using the projected evolution of NPLs under each scenario. In turn, the FSAP team used the estimated PDs and LGDs for the granular portfolios and the results of the corporate stress test for the large exposures.

37.   Overall, the results obtained by the NBG and FSAP teams indicate that the system is well positioned to absorb the losses under the stress scenarios. The estimated losses are larger under the approach implemented by the FSAP team. Yet, the results are broadly comparable in qualitative terms. The system appears able to absorb the losses stemming from the stress scenarios without threatening financial stability at the systemic level. This result originates from the strong pre-COVID capital buffers, both in terms of size and quality, and from robust profitability. As expected, the largest losses stem from credit portfolios, particularly FX-denominated loans for corporations, SMEs, and mortgages, and lari-denominated consumer loans. A few small banks fall under minimum CAR and Tier 1 ratios and require fresh capital injections, but the estimated capital shortfalls are not large from the macrofinancial perspective.

Results of Scenario Analysis by FSAP Team

38.   The system appears well prepared to absorb the losses stemming from the pandemic under the *Baseline* scenario, without threatening financial stability. This resilience comes from robust profitability, solid pre-crisis capital buffers, and authorities' measures to support the system. Credit losses are substantial from historic comparison, but can be absorbed with current loan loss provisions, operational profits, and capital cushions, without threatening financial stability. In this scenario, aggregate CAR drops by 1 p.p. to around 16½ percent in 2021 and starts to recover from 2022 on. Given the widespread impact of the pandemic, the replenishment of bank capital buffers is likely to take some 2-3 years. This is broadly in line with the NBG capital restoration plan, which envisages the gradual replenishment of pilar 2 and systemic buffers starting by end-2021 and until 2023, subject to economic conditions.

39.   Under the stressed scenarios a few small banks would require fresh capital, but the system still appears resilient. An *Extended Pandemic* followed by a sluggish economic recovery will deepen the deterioration of credit quality and dent on bank profits, with three banks requiring fresh capital (Figure 6). In turn, the credit losses under the *Capital Outflows* scenario are substantially larger, with four banks failing the test. Yet, the aggregated capitalization shortfalls under the two scenarios are relatively small, with Tier 1 recapitalization reaching 1.5 percent of GDP in the most adverse case.

40.   The projected losses stem mainly from credit and are uneven across credit types and economic sectors. The heavier losses originate from FX loans to SMEs and corporates, particularly on credit to companies operating in high-contact economic activities such as hotels and restaurants, and activities hit by the pandemic such as consumer durables. Construction, commercial real estate and FX-denominated housing mortgages are also heavily impacted. Interest rate risk is the next contributor to losses, but the amounts involved are of secondary importance. The importance of other market risks to the stress test results is negligible.

Figure 6. Georgia: Results of the Stress Tests based on Scenario Analysis
(in percent, unless otherwise indicated)
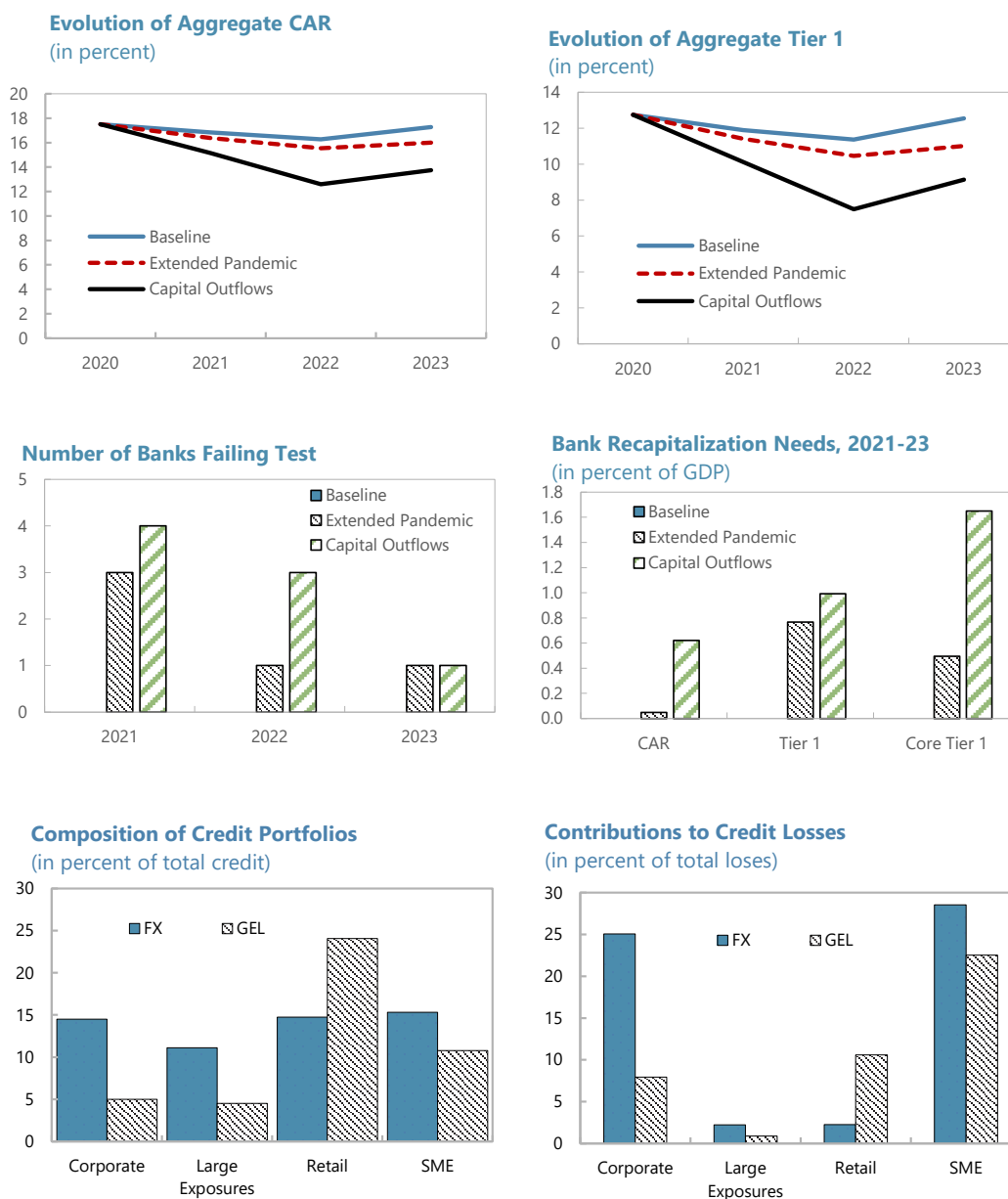
Source: NBG and Fund staff calculations.

Figure 6. Georgia: Results of the Stress Tests based on Scenario Analysis (Concluded)
(Contribution to Capital Ratios, in percent of RWA)

Baseline Scenario
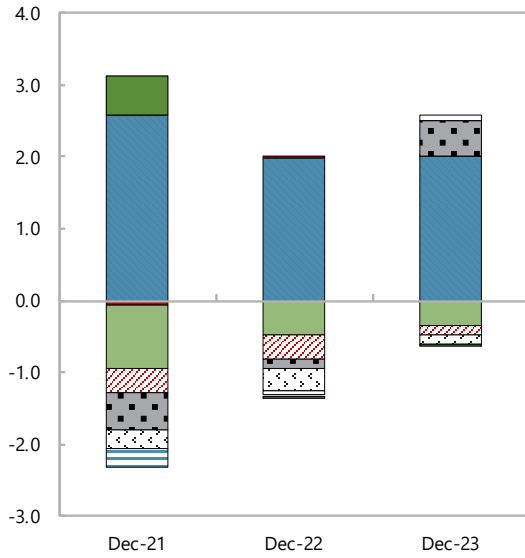
Extended Pandemic
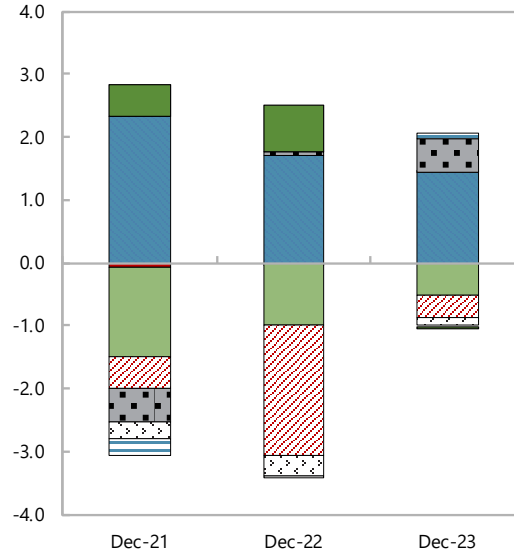
Capital Outflows
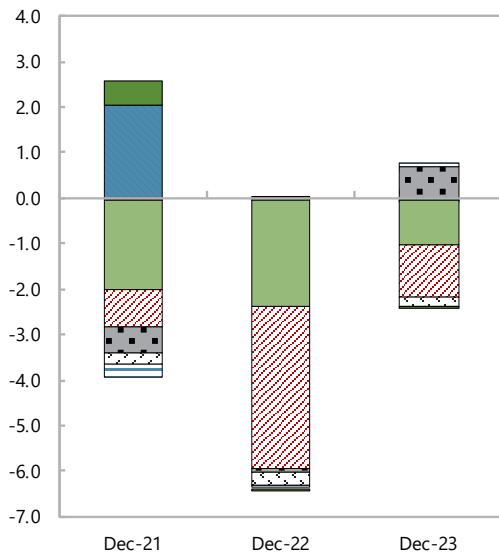
Legend:
- Total adjustments to Tier 2 due to FX effect
- NFC in FC
- NFC in DC
- Interest rate risk in FC
- Interest rate risk in DC
- Loss provisions in FC
- Loss provisions in DC
- Commodity risk
- Foreign exchange rate risk
- Repricing risk in the trading book
- Credit spread risk
- Net Profit (before losses due to stress)

Source: NBG and Fund staff estimates.

Results of Scenario Analysis Implemented by the NBG[10]

41.   Credit risk is the most important factor affecting banks' capital adequacy ratio in Georgia. The banking sector is mainly focused on lending, while maintaining net foreign currency positions close to zero and holding securities until maturity. The COVID-19 pandemic had an uneven impact on economic sectors, with activities related to tourism being more significantly affected. Accordingly, the estimation of credit risk was based on the projection of NPLs, in domestic and foreign currency, by fifteen economic sectors. Loan loss provisions were obtained by assuming that banks maintain the actual sectoral provision coverage rate plus up to 10 percent, depending on the sector and currency denomination of the loan.[11] To assess the impact of interest rate risk on the capital adequacy ratio, the NBG used maturity-adjusted gap analysis. Throughout the stress horizon, the net interest income (NII) is affected by interest rate shocks applied to interest rate sensitive assets and liabilities, as the positions reach their repricing time. In addition, interest rate margins are further compressed under the stress scenarios based on their historical distribution. Net fees and commission income and net non-interest income are assumed to follow the nominal GDP growth path. This stress testing framework, enhanced with the support of technical assistance provided by the International Monetary Fund in 2019–20, and is deemed to properly capture the characteristics and risks of the Georgian banking sector, including channels of dollarization risk. It should be noted that the stress testing is based on the assumption of a static balance sheets, without factoring in active responses from banks or banking supervisors, or change in banks' business models.

42.   The Georgian financial system faced the COVID-19 pandemic well prepared, owing to financial policies implemented in the years prior to the pandemic. Capital surcharges imposed by the NBG and profits retained by banks in recent years have enabled banks to build up capital buffers deemed sufficient to handle pandemic-related stress. In addition, the NBG implemented a series of macroprudential measures to curb household indebtedness and loan dollarization. These measures have helped reduce vulnerabilities in the non-financial sector and built up financial system's resilience. At the start of the pandemic, commercial banks made precautionary loan loss provisions of around 3 percent of RWAs, but operational profitability has offset these losses and banks were able to end 2020 with a small but positive profit.

43.   Overall, the results of the stress tests implemented by the NBG indicate that capital adequacy ratios under the baseline scenario could be fully restored by 2023. In the *Baseline* scenario, aggregate capital adequacy is projected to recover to the pre-crisis level by the end of 2022. Some banks will need a longer period until the end of 2023 to fully restore capital buffers, while several banks, with significant share of the market, will be able to restore released capital buffers even in 2021.
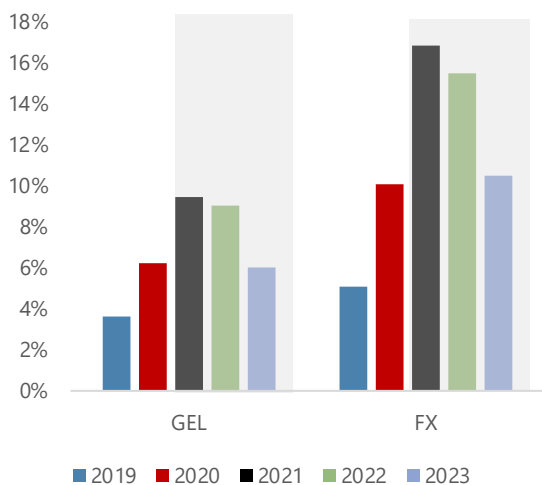
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[10] This section was prepared by the NBG.

[11] If the current provisioning rate is less than 40 percent, an additional 10 percent of loan provisions is added, and if the current provisioning rate is between 40–50 percent, an additional 5 percent is added.
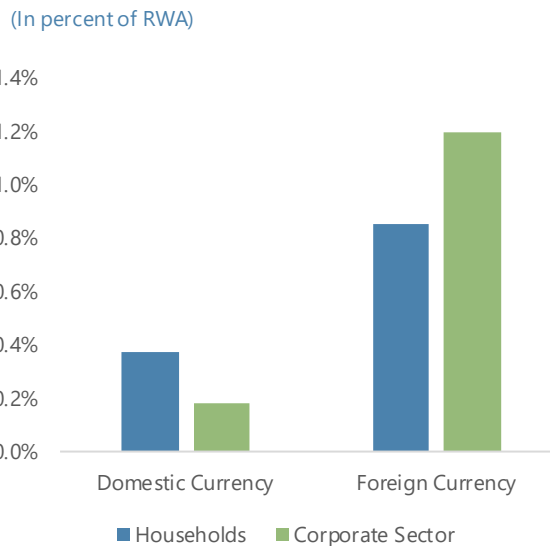
Figure 7. Georgia: Results of the Stress Tests Carried out by the NBG
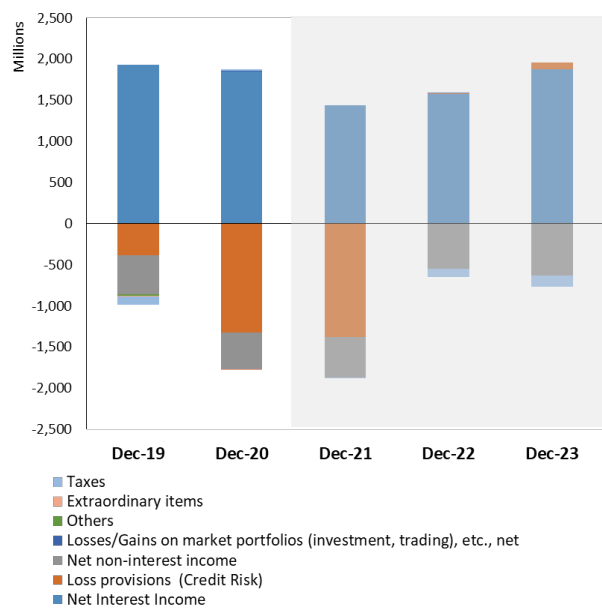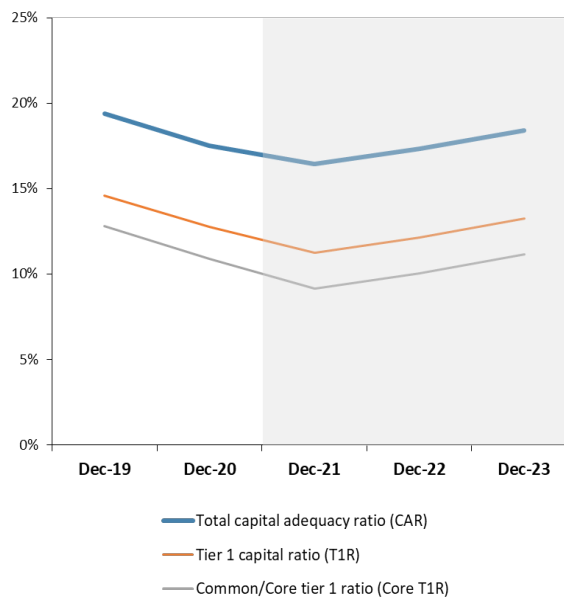(in percent, unless otherwise indicated)

NPL projection

Legend: ■ 2019 ■ 2020 ■ 2021 ■ 2022 ■ 2023

Losses by Credit Type during 2021

(In percent of RWA)

Legend: ■ Households ■ Corporate Sector

Decomposition of Net Profit

- ■ Taxes
- ■ Extraordinary items
- ■ Others
- ■ Losses/Gains on market portfolios (investment, trading), etc., net
- ■ Net non-interest income
- ■ Loss provisions (Credit Risk)
- ■ Net Interest Income

Evolution of Total Capital Adequacy Ratio

- —— Total capital adequacy ratio (CAR)
- —— Tier 1 capital ratio (T1R)
- —— Common/Core tier 1 ratio (Core T1R)

Source: NBG.

44.   In the *Extended Pandemic* scenario, the banking system maintains resilience and the capital ratio of all banks remains above the minimum regulatory threshold. In the *Extended Pandemic* scenario, as a result of sluggish economic growth and exchange rate fluctuation,

households' and firms' abilities to service their debts deteriorate and thereby credit risk rises. However, despite compressed interest margins, operational profitability offset these losses and the overall Tier 1 capital ratio decreases only marginally. In this scenario, all banks satisfy required minimum capital adequacy.

45.   **The *Capital Outflows* scenario would impose significant losses on the banking sector, but the sector's overall capital ratio would remain above the regulatory threshold**. In this scenario, sizable losses will originate in the foreign currency portfolio and in sectors linked to tourism. Three banks would reveal vulnerabilities and would need additional capital to maintain the minimum capital adequacy ratio. However, capitalization needs are insignificant and according to NBG's evaluation, banks' ownership structures would enable them to attract additional capital. Therefore, capital needs under this scenario are not significant enough to constitute a risk to the sector's stability or resilience. Moreover, after the second year of the stress horizon, the capital adequacy of banks starts to gradually recover as a result of improved asset quality and stable operating profits.

E.   Sensitivity Analysis

46.   **Robustness checks of the stress test results were carried out using sensitivity analysis**. To account for uncertainty on the estimated credit risk parameters, two basic exercises were carried out to assess the gross magnitude of credit losses by focusing on the restructured and non-performing loans. In turn, sensitivity analyses of sovereign risk and interest rate risk were also carried by applying shocks to the corresponding risk factors.

Credit Risk

47.   **The first exercise imposed sizable defaults on the restructured loan portfolios**. Credit losses were computed by assuming defaults on restructured loans ranging from 30–70 percent and imposing a flat 55 LGD rate regardless of posted collateral, so as to account for uncertainty on the market value of real estate collateral, particularly commercial property. In addition, pre-impairment profits observed in 2020 were reduced by the estimated lost interest revenues on defaulting loans. No adjustments were made to RWAs. The results corroborate that the system can withstand a very conservative repayment performance of restructured loans, with only two banks failing to meet an 8 percent minimum CAR requirement (Table 13).

48.   **The second exercise imposed more conservative PDs on the borrowers that operate in COVID-sensitive sectors**. Specifically, the pre-pandemic PDs on COVID-sensitive activities were augmented by two-times their standard deviations. As before, LGDs were assumed flat at 55 percent and pre-impairment profits were reduced by the amount of lost interest revenues. In this case, two small and medium-sized banks fail to meet CAR requirements, but the aggregate capital shortfall is inconsequential from the systemic stability perspective.

Table 13. Georgia: Sensitivity Analysis of Credit Risk
(in percent)

	CAR Before	Exercise 1: CAR After Losses on Restructured Loans (percent)			Exercise 2: CAR After COVID-Specific Stressed PDs 1/ Mean + 2 SdDev.
		30	50	70	
B1	16.0	15.2	13.2	11.2	10.3
B2	16.4	15.9	14.3	12.7	9.5
B3	12.7	13.5	12.9	12.3	9.8
B4	14.3	16.5	16.1	15.6	9.3
B5	16.2	16.9	16.5	16.1	11.9
B6	15.3	14.9	14.0	13.0	13.2
B7	26.7	34.2	32.4	30.6	17.9
B8	14.2	12.0	11.0	10.1	-3.5
B9	14.0	12.9	11.1	9.3	8.4
B10	18.6	20.5	18.9	17.4	14.3
B11	20.2	18.0	17.0	15.9	16.7
B12	18.0	17.6	16.6	15.5	1.6
B13	21.5	22.6	22.5	22.5	23.1
B14	46.7	47.2	46.0	44.7	43.6
B15	83.5	84.8	84.5	84.2	81.3

1/ PDs on loans to counterparties operating in COVID-sensitive sectors augmented by two times their standard deviations.

Market Risks

49.   **Single factor sensitivity analysis corroborates that market risks are not significant**. As noted above equity price risk is absent. Interest rate risk stemming from repricing gaps is small. A parallel increase in the yield curve by 300 bps would lead to an average increase in ROA by 0.05 percentage points, with the change in ROA of individual banks ranging from −0.3 to 0.4 percentage points (Figure 8). In turn, while duration mismatches are large in some banks, interest rate risk in the banking book is deemed moderate. A 300 basis point parallel increase in the yield curve would lead to a 3.9 percentage point drop in average CAR. In practice this risk is deemed inconsequential, since bank assets and liabilities are not market-to-market. Net open positions in FX stand at 0.2 percent of regulatory capital on average, ranging from −3.3 percent to 15.3 percent of capital across individual banks. Thus, a 20 percent lari depreciation would lead to a drop in the CAR ratio of the bank with the largest net short FX position of about 0.6 percentage points.

Figure 8. Georgia: Sensitivity to Market Risks
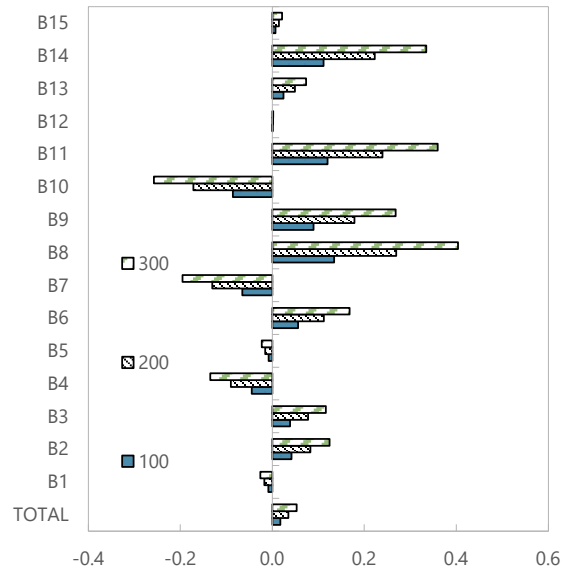### (in percent, unless otherwise indicated)

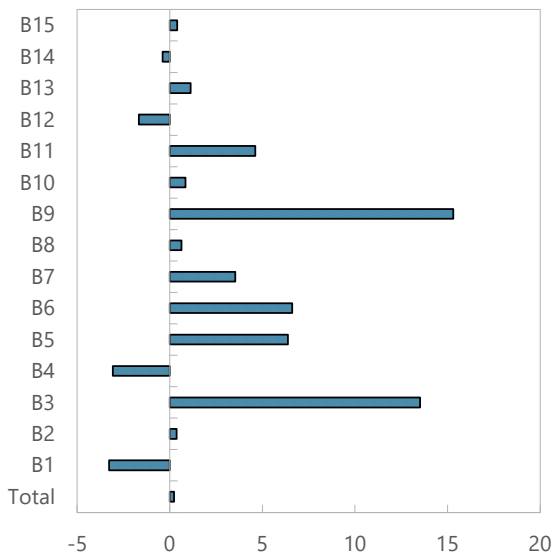**Sovereign Risk, CAR After Shocks to Sovereign Spreads (bps)**
(in percent)
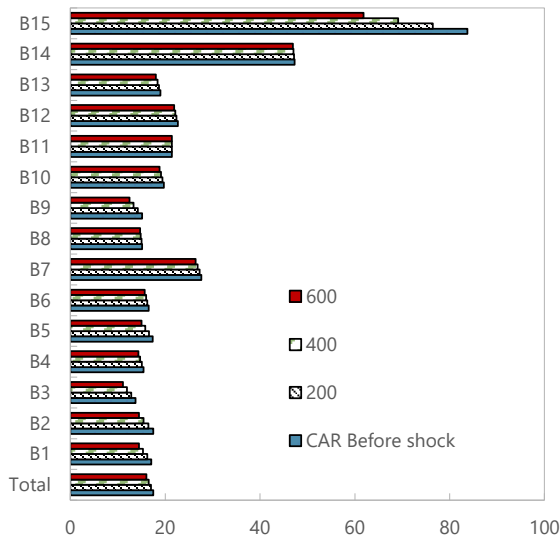
Repricing: Change in ROA After Shocks to the Yield Curve (bsp)
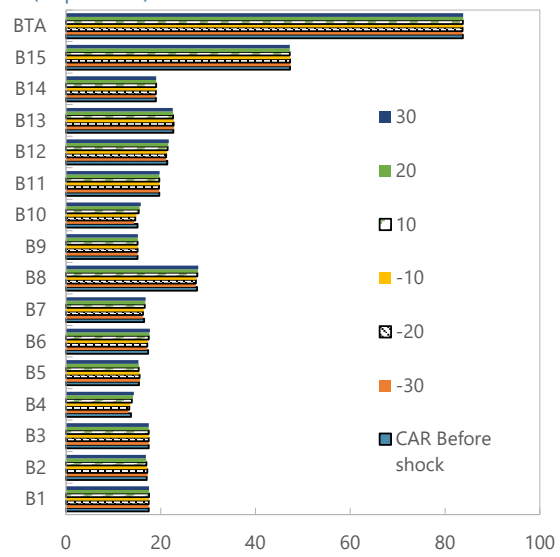(in percentage points)

Net FX Positions to Regulatory Capital
(in percent)

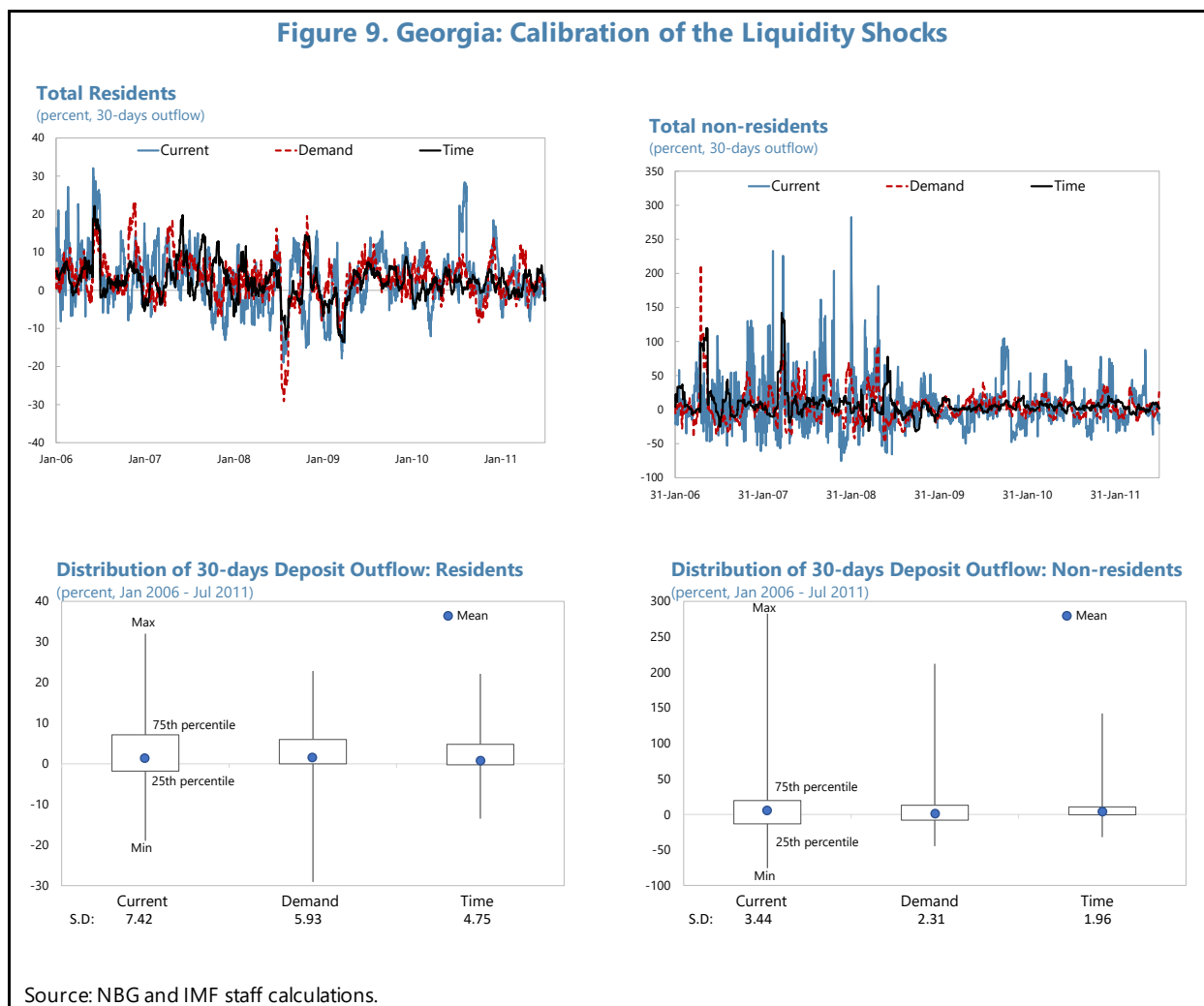**Direct FX Risk, CAR After Shocks to FX Rate (p.p.)**
(in percent)

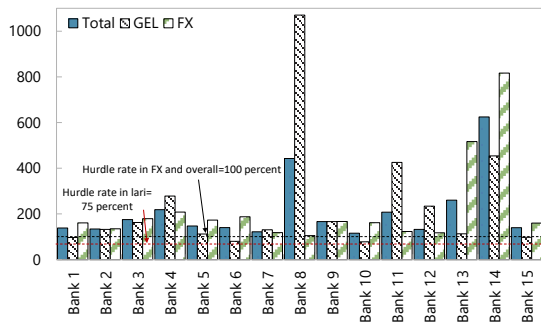Source: NBG and Fund staff calculations.

F. Liquidity Stress Test

50.   Banks have sufficient high-quality liquid assets to survive severe shocks to their deposit base. In alternative exercises, all banks were able to endure extreme shocks to their liabilities during a month with overall LCR ratios above 100 percent while sustaining their regular operations, even after restricting the gross inflows from loans and securities to zero. The shocks were based on the dynamics at the peak of the 2008–09 global financial crisis, which represents the most adverse liquidity environment facing Georgian banks over the last 15 years (Figure 9). Across currencies, liquidity in lari proved tighter, with the lari LCR of one small bank dropping below 75 percent (Figure 10). A complementary exercise, taking out the SME collateral pledged for central bank liquidity resulted in one small bank slightly failing the LCR test in lari, although the overall LCR remained comfortable at 120 percent. Thus, the banking system appears ready for the gradual removal of the liquidity support measures implemented early in the pandemic. In May 2021 the LCR requirement in lari was restored and the authorities are planning to gradually unwind the eligibility of SME loans as collateral for central bank liquidity over two years starting at the end of 2021.

Figure 9. Georgia: Calibration of the Liquidity Shocks

Total Residents
(percent, 30-days outflow)

Total non-residents
(percent, 30-days outflow)

Distribution of 30-days Deposit Outflow: Residents
(percent, Jan 2006 - Jul 2011)

S.D: Current 7.42   Demand 5.93   Time 4.75

Distribution of 30-days Deposit Outflow: Non-residents
(percent, Jan 2006 - Jul 2011)

S.D: Current 3.44   Demand 2.31   Time 1.96

Source: NBG and IMF staff calculations.

Figure 10. Georgia: Summary Results of the Liquidity Stress Tests

Pre-Stress LCR
(percent)

Hurdle rate in FX and overall=100 percent

Hurdle rate in lari= 75 percent
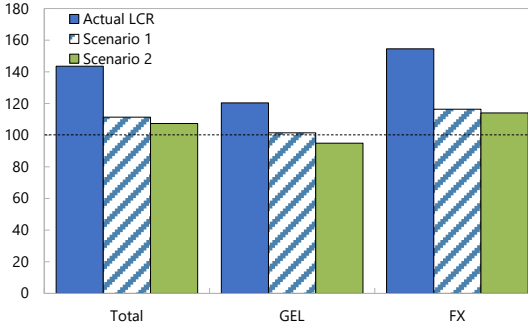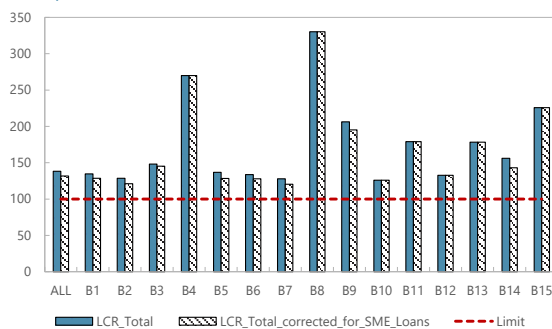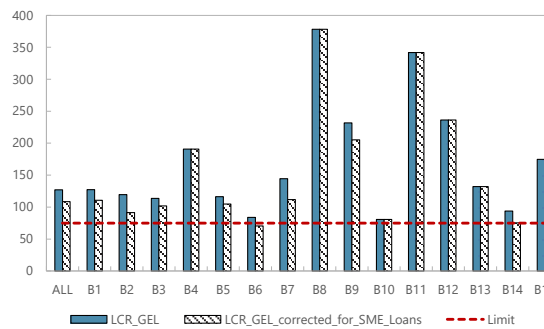
LCR After Stress
(percent)

Total Liquidity Coverage Ratio
(in percent)

Liquidity Coverage Ratio in GEL
(in percent)

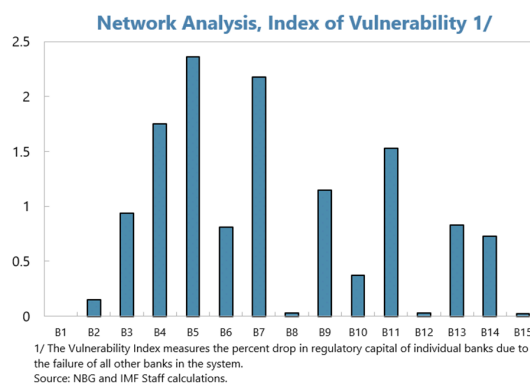Sources: NBG and IMF staff calculations

G. Interbank Contagion

51.   The interbank market is shallow and interbank contagion immaterial from the systemic perspective. The matrix of interbank exposures is sparse. Most banks split their interbank deposits between the two largest D-SIBs, but the amounts involved are relatively small. Gross interbank loans represent only 0.5 percent of total bank assets. Thus, interbank contagion is not material in terms of the credit risk exposure of the lender banks, or the liquidity risk for the borrower banks. A cursory assessment of the effects of individual bank failures on the CAR of lender banks produces a 2.2 p.p. average drop in CAR ratios, and a post-shock minimum CAR of 12.6 percent. There are no bank failures induced directly (or indirectly) by

**Interbank Contagion
Pre- and Post-Stress CAR, in percent**
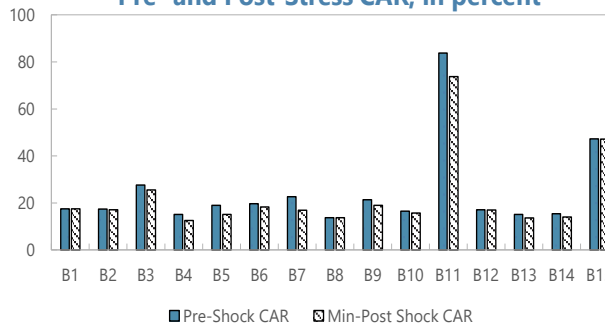
the failure of individual banks. Contagion, however, could still occur due to confidence effects stemming from the failure of a D-SIB.

52.   The two largest banks pose the largest contagion risk in the system. The *Contagion Index*, which measures the impact of individual bank failures on the average capital loss of all other banks in the system, shows a clear dominance of the two largest D-SIBs. In turn, the *Vulnerability Index*, which measures the capital loss of individual banks after the default of all other banks indicates that the most vulnerable institutions tend to be the smallest in terms of assets.

Network Analysis, Index of Vulnerability 1/

1/ The Vulnerability Index measures the percent drop in regulatory capital of individual banks due to the failure of all other banks in the system.
Source: NBG and IMF Staff calculations.

H. Climate Stress Test

53.   There was limited data available for an assessment of climate risk for the financial sector. Discussions with the authorities and World Bank on climate risk suggested limited availability of relevant data to carry out an assessment of banking sector impact from physical climate risks. However, there may be scope in future to carry out a climate transition risk analysis using emissions data for different corporate industries along with estimates of possible carbon taxes on greenhouse gases, since Georgia is a signatory to the Paris Climate Accord of 2016, to estimate the compliance cost for corporates and relatedly on their ability to service bank debt.

RECOMMENDATIONS

54.   Enforce retention of earnings until the pandemic dissipates, credit losses are absorbed, and capital cushions fully restored. To a large extent, the resilience of the banking system rests on solid pre-pandemic capital buffers. As the economy recovers, it will be crucial to ensure that banks fully deploy their profit margins to absorb credit losses and rebuild capital. At this stage, the proposed timetable to replenish capital appears reasonable. Still, the uncertain speed of the recovery calls for prudence and flexibility to accommodate unforeseen events.

55.   Implement large exposure limits as planned, following Basel standards. Concerns on the impact of prudential concentration limits on the supply of bank loans are legitimate given the extent of corporate dependence on bank financing and the need of large investments for economic development. Yet, from the prudential perspective, preventing unwarranted risk concentration in single exposures is also critical. The analysis carried out by the FSAP suggests that, on impact, enforcing single exposure limits as per Basel standards, would be binding for very few firms and banks. Moreover, the hypothetical increase of individual large exposures by up to 60 percent does not appear to imply severe restrictions on the capacity of banks to provide financing, when measured by the number of companies affected and against GDP. There may also be some room to resort to loan syndication, as most firms obtain financing from a single bank,

albeit the large concentration in the banking system poses limits to the practical use of syndication.

56.   Continue to ensure accurate and transparent classification of the restructured loan portfolios throughout the pandemic. The disclosure and risk classification of restructured loans follows sound practices. In the event of further economic distress, pressures could mount for regulatory forbearance, especially if bank capital cushions become thin. Maintaining high supervisory standards on loan classification and disclosure help support market discipline and provide adequate incentives to banks' management.

57.   Continue to improve the credit information environment. The ongoing Credit Registry project, which is planned to be launched by end-2021 should prove extremely useful in this regard. Specific areas that could be further improved include:

- Information to determine the extent of FX-hedging of large corporate borrowers. The corporate financial data compiled by banks and transmitted to the NBG should aim at including revenues and expenses in FX and a partition of non-bank debt in domestic and foreign currency. Establishing the protocols for data sharing on firm exports and imports between relevant government agencies and the NBG could be useful.

- Organization of the financial data for analytical purposes. The classification of the financial statements within corporate groups should seek to replicate the conglomerate ownership structures, allowing to trace individual companies to the consolidated statements of their parents at the sub-group or group levels

- Data quality. Since there is limited public information on company financials, there is room to improve the accuracy and completeness of the data compiled and processed by banks.

Appendix I. Stress Testing Matrix (STeM)

Domain		Assumptions
		Top-down by FSAP Team
Banking Sector: Solvency Stress Test		
1. Institutional Perimeter	Institutions included	• All banks (fifteen institutions with total assets equivalent to about 100 percent of GDP) including the three DSIBs.
	Market share	• About 95 percent of total financial system assets.
	Data source and starting date	• Data Sources: Supervisory returns, special requests to banks and publicly available data. • Baseline date: Balance sheets as of October 2020, with a later update to target December 2020 as the final cutoff date. Credit and funding risk based on historical data up to 2010. • Scope of Consolidation: Consolidated bank balance sheets.
2. Methodology	Overall framework	• Credit risk assessed with two methodologies, trying to compensate for model and parameter uncertainty, which are amplified by the idiosyncratic nature of the COVID pandemic. The two methods comprise: IMF Balance sheet-based model and a static credit VaR using monte carlo simulation to compute expected and tail losses. These two models will be complemented with sensitivity analysis and reverse stress testing (see below). • Given the high dollarization of bank credit and the asymmetric impact of the pandemic across economic activities, the credit portfolio will be split by credit types (retail, mortgages, SMEs and commercial), currency, and main activity of the corporate borrowers. In addition, concentration risk will be assessed with a case-by-case analysis of the financial statements of the largest ten borrowers for each bank, using the results of a corporate stress test.
	Satellite models for macro-financial linkages	• Satellite models based on previous IMF TA linking PDs, NPL ratios, and provisioning levels to a set of macroeconomic variables comprising GDP growth, Exchange rate depreciation, interest spreads, and other macro variables. • Net interest income based on dynamic panel econometrics.
	Stress test horizon	• 3-years (2021-23).
	Assumptions	• Passive balance sheet assumption: (i) total assets and credit growth evolve in line with nominal GDP growth; (ii) the composition of the asset side of the balance sheet remains constant throughout the stress test horizon; (iii) banks build capital through retained earnings; and (iv) short-term liabilities adjust as needed to close the accounting identity • Dividend distribution allowed if net income after taxes are positive and if banks are adequately capitalized. In practice, only the two largest banks pay dividends, and payout ratios are typically between 25–40 percent. Yet, the dividend payout ratio is assumed to be 50 percent.

Domain		Assumptions
		Top-down by FSAP Team

3. Type of analyses	Scenario analysis	• Scenario-based stress tests focus on the impact of the macroeconomic environment on FX-induced credit risk, COVID-related credit losses, and concentration risk.
		
		• Given the domestic orientation of banks, the scenarios focus on domestic macro-financial variables (e.g., GDP, inflation, interest rates, unemployment rate, exchange rate, and property prices).
		
		• To account for the differential impact of COVID across businesses, the scenarios will simulate the evolution of value added by economic sectors. These sectors are grouped in three categories to differentiate their sensitivity to the pandemic.
		
		• Three scenarios are simulated at the yearly frequency, using NBG and RES models:
		
		   • Baseline scenario using the April 2021 WEO projections. The economy continues recovering from the April 2020 slump, supported by benign external and domestic financial conditions. Still, growth momentum remains weak in the near term, as social distancing measures and the pandemic drags on tourism and other contact-intensive services.
		
		   • Adverse Scenario 1: *Extended pandemic*. Assumes that COVID infections extend into late 2021 under supportive conditions in global financial markets. GDP growth remains sluggish in 2022, fueling unemployment and hitting household income. Firms operating in tourism-related services, particularly SMEs are severely hit, and many become insolvent. The effects of the pandemic on economic activity are long-lasting, denting on potential growth.
		
		   • Adverse scenario 2: A Sudden Stop. This scenario, more severe and less likely, combines the *Extended Pandemic* with an adverse financial environment. Georgia faces a sudden stop that leads to substantial currency depreciation, and a spike in interest spreads, with adverse feedback effects on economic activity. The materialization of this scenario is triggered by an idiosyncratic shock (i.e., political turmoil in the region or concerns on the solvency of a systemic institution), or by a global shock (i.e., increase in risk aversion and associated turmoil in global capital markets).

	Sensitivity analysis	• Sensitivity analyses and reverse stress testing to complement the scenario-based analysis. The risks comprise:
		
		   • Credit risk from reclassification of loans between risk categories
		
		   • FX-induced credit risk
		
		   • Credit risk from large exposures
		
		   • Interest rate risk in the banking book
		
		   • Sovereign debt holdings

4.Risks and Buffers	Risks assessed	• Credit loss from banks' loan portfolios and sovereign exposures, including off-balance sheet credit exposures. • Interest rate risk in the banking book, compression of interest margins.
	Buffers	• Existing loan loss provisions and capital buffers. • Internal capital generation from net income after taxes.

Domain		Assumptions
		Top-down by FSAP Team
		• No new capital injections.
5. Regulatory Standards	Regulatory Standards	• National regulatory framework. • Basel III approach. Capital adequacy is benchmarked against Basel standards. Hurdle rates of 8 percent for Basel CAR, 6 percent for Tier 1, and 4.5 percent for core Tier1.
6. Reporting Format for Results	Output presentation	• System-wide capital shortfalls from macroprudential perspective. • Number of banks and percentage of banking system assets by CAR intervals. • Impact of shocks on NPLs. • Impact of shocks on key P&L components.
Banking Sector: Liquidity Stress Test		
1. Institutional Perimeter	Institutions included	• All fifteen banks.
	Market share	• About 95 percent of total financial system assets.
	Data and Starting position	• Baseline date: December 31, 2020 (possibly updated at a later date). • Data Source: Daily supervisory returns on bank liquid assets and liabilities, and projected cash flows at various horizons. Liabilities classified by liquidity, currency, size, and residency of the counterparts.
2. Methodology	Overall framework	• Cash-flow cum counterbalancing capacity-based liquidity stress test • Basel III-LCR ratio. • Separate results by local and foreign currency.
3. Type of analyses	Scenario analysis	• Four scenarios combining two shocks to liabilities and two assumptions on asset haircuts. Shock calibration based on historic data.
4. Risks and Buffers	Risks	• Cash-flow based LST. Adverse shock to deposits and other liquid liabilities combined with reduction of asset liquidity
	Buffers	• Cash-flow based LST: Capacity of banks to generate liquidity from assets under stress (counterbalancing capacity) and central bank facilities • LCR regulatory buffers
5. Regulatory Standards	Regulatory Standards	• National regulatory framework: The LCR and NFSR. Hurdle rates of 75 percent for LCR in local currency and 100 percent for LCR in FX.
6. Reporting Format for Results	Output presentation	• Distribution of banks and total assets by intervals of LCR after shock.
Corporate Stress Test		
1. Institutional Perimeter	Entities included	• About 100 large corporations on a solo basis, representing about 49 corporations at the consolidated level. The sampled firms have total assets equivalent to about 25 percent of GDP on a solo basis, and 28 percent of GDP on a consolidated basis.

Domain		Assumptions
		Top-down by FSAP Team
		• The sample targets the ten largest borrowers of each bank.
	Data	• Publicly available financial data on corporations is limited due to the shallow capital market. The corporate stress test uses data from bank files, comprising the latest available balance sheet and income statement accounts of the sampled corporations on a solo and a consolidated basis.
	Time Horizon	• Data are unbalanced, during 2018–20.
2. Methodology	Overall framework	• Stress test based on the Interest Coverage Ratio (ICR) and EBITD conditional on the distressed scenarios applied to the bank stress tests. • Individual firms are classified by their economic activities and subject to the adverse scenarios used in the bank stress tests. The shocks include an increase in interests on short-term debt and maturing long-term debt, and a drop in EBITD proportional to the evolution of value added in the sector where the firm operates. • Individual firms are mapped to their corporate groups and to their lender banks, and the results used to inform the bank stress tests of credit risk.
	Scenarios	• The analysis applies the same baseline and distressed scenarios used in the bank stress tests. The corporate stress test applies the projections of sectoral value added and the shocks to sovereign spreads to come up with a set of firm-specific shocks consistent with the bank stress tests.
3. Risks and Buffers	Risks	• Insolvency risk.
	Buffers:	• EBITD and share of long-term debt in total debt.
4. Reporting Format for Results	Output presentation	• Total assets and number of firms with ICR below 100 percent by economic sectors, and lender banks, under baseline and distressed scenarios. • Total bank debt owed by firms with ICR below 100 percent, by lender banks, under baseline and distressed scenarios. • Total bank debt owed by firms with negative EBITD or negative equity, by lender banks, under baseline and distressed scenarios.
Financial System: Interconnectedness Analysis		
1. Institutional Perimeter	Institutions Included	• Interbank network: Largest all fifteen 15 banks.
	Data	• Data source: Supervisory data on interbank exposures. • Interbank positions as of October 2020, with a later update to target December 2020 as the final cutoff date.
2. Methodology	Overall framework	• Interbank: Balance sheet-based interbank model by Espinosa-Vega and Solé (2010). • Common exposure: balance sheet approach.
3. Risks and Buffers	Risks	• Credit and funding losses related to interbank exposures. • Default of large common borrowers in the banking system.

Domain		Assumptions
		Top-down by FSAP Team
	Buffers	• Interbank network: banks' own capital and liquidity buffers.
4. Reporting Format for Results	Output presentation	• Interbank network: a network chart, index of vulnerabilities. • Common exposure: system-wide capital shortfalls. • Evolution and direction of spillovers.

Appendix II. Stress Test Scenarios

The main set of stress tests is based on three scenarios, a baseline and two distressed scenarios, each one spanning 2021–23.

Baseline Scenario

1.   The baseline scenario rules out a second COVID wave. It assumes that the economy continues recovering from the April 2020 slump, supported by benign external financial conditions. Still, growth momentum remains weak in the near term, as social distancing measures and the pandemic drags on tourism and other contact-intensive services. The unemployment rate picks up throughout 2020, hitting household income. The economy starts to recover on firmer footing in the first half of 2021, driven by a quicker rebound in manufacturing and agriculture. Real GDP reaches pre-crisis levels by early 2022 and negative effects on long-term potential prove negligible.

2.   Monetary conditions in this scenario are supportive. The NBG maintains a low policy rate on account of subdued inflation. Throughout, housing prices are resilient, except for some segments of commercial real estate, which undergo a mild drop in real terms. In the FX market, substantial lari depreciation in 2020 is followed by a moderate but stable appreciating trend from 2021 onwards. The current account deficit widens in 2020, driven by a halt in tourism receipts, and is financed by steady remittances and official inflows. Mirroring this trend, net FDI and portfolio inflows decline in 2020 and start to recover in the second half of 2021 helping to close the large external financing needs.

3.   Fiscal performance is adversely affected by the pandemic due to cyclical factors and the expansion of expenditures in support of households and businesses. Public debt to GDP jumps in 2020 on account of the wider fiscal deficit, real FX depreciation and some buildup of liquidity buffers. Yet, sovereign spreads stay compressed, reflecting sound fiscal fundamentals and ample liquidity provision overseas. Public debt remains sustainable and starts to decline with gradual fiscal consolidation from 2022 onwards.

4.   In the banking system, non-performing loans increase during 2021–22, but without threatening systemic stability. Banks maintain good profitability and solvency ratios and credit growth remains resilient. Yet, the provision of credit to SMEs and commercial real estate is sluggish.

Scenario 1: Extended Pandemic

5.   This scenario assumes that COVID infections extend into late 2021 due to lags in vaccine production and distribution, population resistance, or virus mutations. Weak demand and lockdown measures weigh heavily on production processes. As a result, GDP growth remains sluggish in 2022, fueling unemployment and hitting household income. The corporate sector is also embattled. Firms operating in tourism-related services, particularly SMEs are

severely hit, and many become insolvent. The effects of the pandemic on economic activity are long-lasting due to the phased withdrawal of support measures, and lower potential due to scarring and other long-lasting effects of the virus on production processes.

6. **This scenario assumes the continuation of benign external financial conditions, as reserve currency countries maintain expansionary fiscal and unconventional monetary policies.** Thus, monetary conditions remain broadly supportive. Inflation declines on account of weak demand and muted FX pass-through, allowing the NBG to keep the policy rate at historic lows. Property prices undergo a substantial drop, more severely felt on commercial real estate. In the FX market, lari depreciation continues into 2021, and bouts in FX volatility are curbed by NBG intervention. The current account deficit moderates but external financing needs remain large, with official inflows and steady worker remittances helping to close the gap.

7. **In this environment, fiscal performance is severely affected by the drop in tax revenues and the expansion of support measures to households and businesses.** Public debt balloons, resuming a downward path only after 2023. Sovereign spreads widen moderately, reflecting the effects of the crisis on public finances.

8. **The banking system experiences substantial stress.** Non-performing loans increase sharply and the need for greater loan-loss provisioning, together with higher funding costs and lost interest income dent on profitability. Additional vulnerabilities include the substantial dependence on external financing and high concentration in the banking sector. As a result, credit conditions tighten and credit growth becomes negative, leading to second round effects on real activity. The tightening of credit conditions and weakening of the real economy expose vulnerabilities, with some banks requiring fresh capital.

Scenario 2: Capital Outflows

9. **This scenario, more severe and less plausible, assumes a progression of the pandemic parallel that of the *Extended Pandemic* scenario, but incorporates an adverse external financial environment.** Georgia faces a sudden stop or an episode of capital outflows that leads to substantial currency depreciation, and a spike in interest spreads, with adverse feedback effects on economic activity. This configuration tries to capture risks stemming from the large stock of external liabilities, the still high dollarization, and the sizable gross external financing needs. The materialization of this scenario is triggered by an idiosyncratic shock (i.e., political turmoil in the region or concerns on the solvency of a systemic institution), or by a global shock (i.e., increases in policy rates in industrial countries leading, or increase in risk aversion and associated turmoil in global capital markets).

10. **In this environment, real activity is heavily affected by weak demand, the impact of the pandemic on production, and adverse feedback loops stemming from credit markets.** GDP growth remains in negative territory during 2022 causing a sharp and long-lasting increase in unemployment and significant financial distress on low-income and severely indebted households. Significant lay-offs are reported in the construction and retail sectors, hurting

household income. Across sectors, the most affected by the slump are construction, manufacturing, consumer goods, and hotels and restaurants. There is widespread insolvency among SMEs and firms operating in tourism-related activities. The effects of the crisis on potential output are long lasting, and real GDP fails to reach pre-crisis levels during the projection.

11.   Monetary conditions tighten. The sudden stop induces the NBG to intervene forcefully in the FX market and to hike the policy rate. Yet, inflation remains subdued in response to global commodity price developments and a sharp contraction in domestic demand. The current account deficit closes and the trade balance is fully financed by worker remittances. Net FDI and portfolio inflows decline until the first half of 2023. The drop of external financing leads to the evaporation of liquidity, forcing banks to increase rates on domestic and FX deposits and leading to margin compression. Credit growth turns negative, and banks react to deteriorating asset quality and profitability by tightening lending standards. Property prices undergo a substantial decline, and some segments of commercial real estate such as offices and retail spaces are severely hit.

12.   The effects of this scenario on the fiscal sector are severe, as the extension of countercyclical fiscal policy combines with weak tax revenues. Public debt to GDP increases substantially due to the combined effects of FX depreciation and the fiscal gap. Sovereign spreads widen, adding to the stress.

13.   In the banking system, liquidity and solvency ratios deteriorate. The level of nonperforming loans increases sharply and the need for greater loan-loss provisioning, higher funding costs and lost interest income dent on profitability. Additional vulnerabilities are the dependence on external financing and high banking sector concentration.